TPC Benchmark™ C

Full Disclosure Report for

PRIMERGY H400

Using Microsoft SQL Server 2000 Enterprise Edition

and Microsoft Windows 2000 Advanced Server

March 22, 2001

First Edition

First Edition March 22, 2001

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Benchmark results are highly dependent upon workload, specific application requirements, system design and implementation. Relative system performance will vary as a result of these and other factors. Therefore, TPC Benchmark™ C should not be used as a substitute for a specific customer application benchmark when critical capacity planning and/or product evaluation decisions are contemlated.

All performance data contained in this report were obtained in a rigorously controlled environment. Results obtained in other operating environments may vary significantly. We do not warrant or represent that a user can or will achieve similar performance expressed in transactions per minute (tpmC) or normalized price/performance (€/tpmC). No warranty of system performance or price/performance is expressed or implied in this report.

Preface

The Transaction Processing Performance Council (TPC), of which Fujitsu Siemens Computers GmbH is a member, is an organization of computer companies, dedicated to the development of objective, industry-wide performance metrics in the area of transaction processing. Fujitsu Siemens Computers GmbH is involved in this effort, participating on the council and utilizing TPC benchmarks in performance evaluation.

The TPC Benchmark™ C Standard Specification was developed by the Transaction Processing Performance Council. This benchmark exercises the system components necessary to perform tasks associated with that class of on-line transaction processing (OLTP) environments emphasizing a mixture of read-only and update intensive transactions. This is a complex OLTP application environment exercising a breadth of system components associated by such environments characterized by:

- The simultaneous execution of multiple transaction types that span a breadth of complexity
- On-line and deferred transaction execution modes
- Multiple on-line terminal sessions
- Moderate system and application execution time
- Significant disk input/output
- Transaction integrity (ACID properties)
- Non-uniform distribution of data access through primary and secondary keys
- Databases consisting of many tables with a wide variety of sizes, attributes, and relationships
- Contention on data access and update

This benchmark defines four on-line transactions and one deferred transaction, intended to emulate functions that are common to many OLTP applications. However, this benchmark does not reflect the entire range of OLTP requirements. The extent to which a customer can achieve the results reported by a vendor is highly dependent on how closely TPC-C approximates the customer application. The relative performance of systems derived from this benchmark does not necessarily hold for other workloads or environments. Extrapolations to any other environment are not recommended.

Benchmark results are highly dependent upon workload, specific application requirements, system design and implementation. Relative system performance will vary as a result of these and other factors. Therefore, TPC-C should not be used as a substitute for a specific customer application benchmarking when critical capacity planning and/or product evaluation decisions are contemplated.

The performance metric reported by TPC-C is a "business throughput" measuring the number of orders processed per minute. Multiple transactions are used to simulate the business activity of processing an order , and each transaction is subjected to a response time constraint. The performance metric for this benchmark is expressed in transactions-per-minute-C (tpmC). To be compliant with the TPC-C standard, all references to tpmC results must include the tpmC rate, the associated price-per-tpmC, and the availability date of the priced configuration.

Summary

This report documents the TPC Benchmark™ C results achieved by the Fujitsu Siemens Computers GmbH using Microsoft SQL Server 2000 Enterprise Edition.

The TPC Benchmark™ C tests were run on a PRIMERGY H400 system using the Windows 2000 Advanced Server operating system.

The results, summarized below, show the number of TPC Benchmark™ C transactions per minute (tpmC) and the price per tpmC (€/tpmC).

Software	Hardware	tpmC	€/tpmC
Microsoft SQL Server 2000 Enterprise Edition, Windows 2000 Advanced Server	Fujitsu Siemens Computers GmbH PRIMERGY H400	37,383.57	12.80€

FUJITSU COMPUTERS SIEMENS

PRIMERGY H400

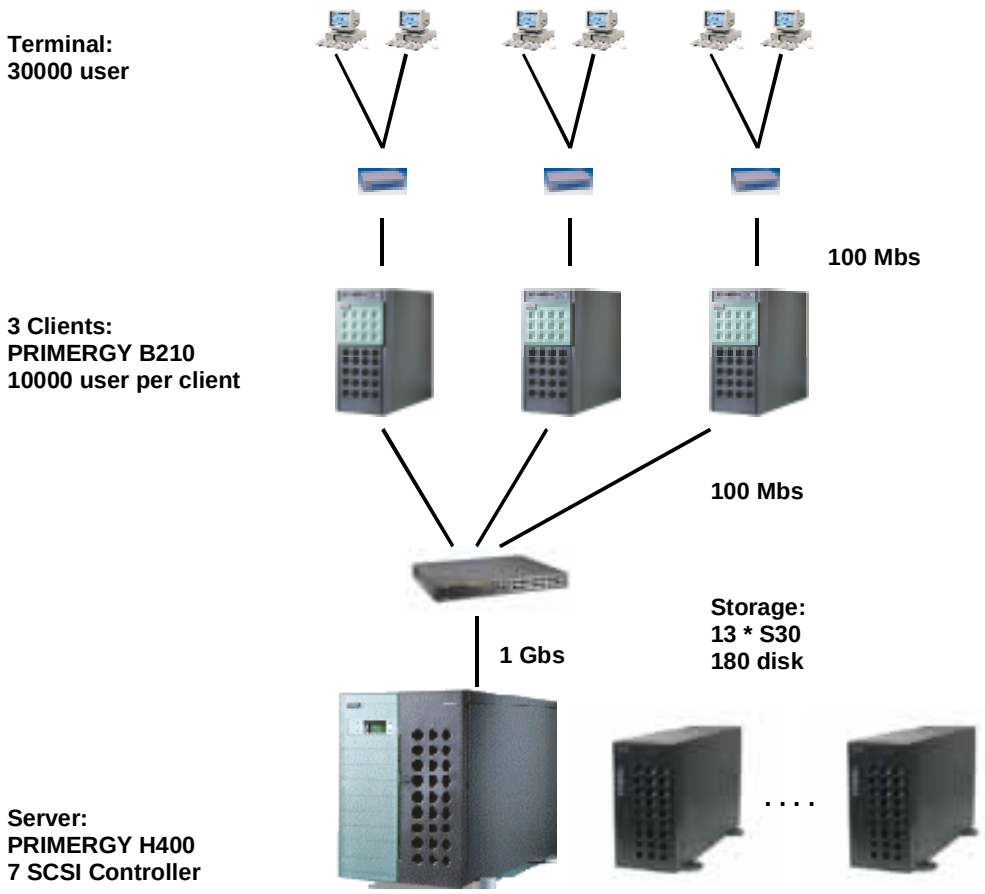
C/S with 3 PRIMERGY B210

TPC-C REV 5.0
EXECUTIVE SUMMARY

Report Date: March 22, 2001

Total System Cost	TPC-C Throughput	Price/Performance	Availability Date
€ 478,649	37,383.57 tpmC	€12.80/tpmC	April 1, 2001

Processors	Database Manager	Operating-System	Other Software	Number of Users
4 Intel Pentium® III Xeon 900 MHz with 2 MB SLC	Microsoft SQL Server 2000 Enterprise Edition	Microsoft Windows 2000 Advanced Server	Windows 2000 Server, IIS 5.0 and COM+	30,000



System Components	Qty/Srv.	1 PRIMERGY H400	Qty/Client	3 PRIMERGY B210
Processors	4	Intel Pentium® III Xeon 900 MHz with 2 MB SLC	2	Intel Pentium® III 933 MHz with256 KB SLC
Memory	8	GB	512	MB
Disk Controller	7	Mylex eXtremeRAID 2000	1	SCSI Controller
Disk Drives	1	9 GB	1	9 GB
	180	18 GB		
Total GB of Storage	1	2,867 GB	1	9 GB

FUJITSU COMPUTERS SIEMENS

PRIMERGY H400

TPC-C REV 5.0
EXECUTIVE SUMMARY

C/S with 3 PRIMERGY B210

Report Date: March 22, 2001

Description	Part Number	Third Party Brand	Pricing	Unit Price	Qty.	Extended Price	3yr Maint. Price
PRIMERGY H400 Base (1x900MHz/2MB)	SNP:SY-K595V209-A		1	13,765 Euro	1	13,765 Euro	
Pentium III Xeon Processor 900MHz/2MB	S26361-F2276-E902		1	9,400 Euro	3	28,200 Euro	
Memory 2 GB SDRAM 100MHz (4 Mod.)	SNP:SY-F2174E545-A		1	5,760 Euro	4	23,040 Euro	
Gigabit Ethernet PCI 32/64	D:RM6T5-CL18		1	3,107 Euro	1	3,107 Euro	
Tape Drv SLR50 , 25GB	SNP:SY-F1835E2-A		1	1,480 Euro	1	1,480 Euro	
Disk 9GB, 10k, U160, Hot Plug	SNP:SY-F2294E109-A		1	420 Euro	1	420 Euro	
RAID-Ctrl, PCI, 4-Ch, BBU	SNP:SY-F2190-E128		1	2,520 Euro	7	17,640 Euro	
APC USV 3000VA	S26113-E399-L1		1	1,316 Euro	1	1,316 Euro	
CD-ROM 40x, Ultra SCSI	SNP:SY-F2086L1-A		1	120 Euro	1	120 Euro	
Power Supply Module 400W (add)	SNP:PS-F234E4-A		1	320 Euro	1	320 Euro	
Keyboard KBPC B Light Basic (D)	S26381-K271-V320		1	22 Euro	1	22 Euro	
Country Pack	SNP:SY-F2195B201-A		1	40 Euro	1	40 Euro	
Monitor 154V	S26361-K605-V150		1	186 Euro	1	186 Euro	
	Server Hardware Subtotal					89,656 Euro	
18GB, 15k, U160, Hot plug, 1"	S26361-F2336-E518		1	940 Euro	180	169,200 Euro	
18GB, 15k, U160, Hot plug, 1", 10%sprare	S26361-F2336-E518		1	940 Euro	18	16,920 Euro	
PRIMERGY S30 FH 2-Kanal U160 SCSI	SNP:SY-K638V110-P		1	2,801 Euro	13	36,413 Euro	
PRIMERGY S30 Country Pack	SNP:SY-F1699B953-P		1	40 Euro	13	520 Euro	
PRIMERGY S30 10 % spare	SNP:SY-K638V110-P		1	2,801 Euro	2	5,602 Euro	
Country Pack S30 incl. spare	SNP:SY-F1699B953-P		1	40 Euro	2	80 Euro	
	Storage Subtotal					228,735 Euro	
Maintenance	G3S0400SES		1	1,585 Euro			1,585 Euro
	Server Subtotal						1,585 Euro
PRIMERGY B210 GE FS 933	S26361-K649-V131		1	1,662 Euro	3	4,986 Euro	
Pentium III Prozessor 933 MHz FCPGA	SNP:SY-F2369E293-A		1	700 Euro	3	2,100 Euro	
Memory 128MB SDRAM PC133 ECC	SNP:SY-F2306E512-A		1	228 Euro	12	2,736 Euro	
Disk 9GB, 10k, U160, Hot Plug, 1"	SNP:SY-F2266E109-A		1	420 Euro	3	1,260 Euro	
Fast Ether-Express-Pro/100+ Server (PCI)	SNP:SY-F2071E1-A		1	100 Euro	3	300 Euro	
Monitor 154V	S26361-K605-V150		1	186 Euro	3	558 Euro	
Keyboard KBPC B Light Basic (D)	S26381-K271-V320		1	22 Euro	3	66 Euro	
Country Pack	SNP:SY-F1699B401-A		1	40 Euro	3	120 Euro	
Maintenance	G3S0400SEL		1	765 Euro	3		2,295 Euro
	Client Hardware Subtotal		1			12,126 Euro	2,295 Euro
Microsoft Windows 2000 Adv. Server, incl 5 CALs	SNP:SY-F1940E706-P		1	3,939 Euro	1	3,939 Euro	
MS SQL-Server 2000 Ent.Edit. Per Proc Lic.	MSO810-00963		1	30,116 Euro	4	120,464 Euro	
	Server Software Subtotal					124,403 Euro	
Microsoft Windows 2000 Server, incl.5 CALs	SNP:SY-F1940E701-P		1	1,037 Euro	3	3,111 Euro	
Microsoft Visual C++ Professional 6.01	MSO048-00328		1	859 Euro	1	859 Euro	
	Client Software Subtotal					3,970 Euro	
Microsoft Software Support (all above)	SNP:10901600012		1				10,353 Euro
24x10/0100Mbit Switch (+10% spare)	DES-3225G	Bus.	2	1,272 Euro	3	3,816 Euro	
Gigabit Uplink (+10% spare)	DES-3251G	Bus.	2	570 Euro	3	1,710 Euro	
	User Connectivity Subtotal					5,526 Euro	
	Total					464,416 Euro	14,233 Euro

Three-Year Cost of Ownership	478,649 Euro
tpmC Rating	37,383
Euro / tpmC	12.80 Euro

1=Fujitsu-Siemens, 2=Businessline

Prices used in TPC bechmarks reflect the actual prices a customer would pay for a one-time purchase of the stated components. Individually negotiated discounts are not permitted. Special prices based on assumptions about past or future purchases are not permitted. All discounts reflect standard pricing policies for the listed components. For complete details, see the pricing section of the TPC benchmark pricing specifications. If you find that the stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank you.

Five-Year Cost of Ownership:	€478,649
tpmC Rating:	37,383.57
€ / tpmC:	12.80

Note: The benchmark results and test methodology were audited by Francios Raab and Bradley Askins of InfoSizing

Numerical Quantities Summary

MQTh, computed Maximum Qualified Throughput 37,383.57 tpmC

Response Times (in seconds)	90th percentile	Average	Maximum
- New-Order	0.820	0.492	9.467
- Payment	0.750	0.422	9.895
- Order-Status	0.770	0.446	7.128
- Delivery (interactive portion)	0.110	0.104	1.786
- Delivery (deferred portion)	0.330	0.198	3.063
- Stock-Level	1.790	1.250	11.199
- Menu	0.110	0.105	1.807

Transaction Mix, in percent of total transactions	
- New-Order	44.890 %
- Payment	43.035 %
- Order-Status	4.020 %
- Delivery	4.027 %
- Stock-Level	4.028 %

Emulation Delay (in seconds)	Response Time	Menu
- New-Order	0.1	0.1
- Payment	0.1	0.1
- Order-Status	0.1	0.1
- Delivery (interactive)	0.1	0.1
- Stock-Level	0.1	0.1

Keying/Think Times (in seconds)	Minimum	Average	Maximum
- New-Order	18.003/0.000	18.015/12.053	18.046/120.507
- Payment	3.003/0.000	3.016/12.047	3.046/120.512
- Order-Status	2.003/0.000	2.016/10.034	2.040/100.499
- Delivery (interactive)	2.003/0.000	2.016/ 5.060	2.040/ 50.504
- Stock-Level	2.003/0.000	2.016/ 5.047	2.042/ 50.500

Test Duration and Checkpointing	
- Ramp-up time	29 minutes
- Measurement interval	120 minutes
- Number of checkpoints	4
- Checkpoint interval	30 minutes
- Transactions during measurement interval (all types)	10,395,808

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Introduction

This is the Full Disclosure Report for the TPC Benchmark™ C running on the Fujitsu Siemens Computers system PRIMERGY H400. It meets the requirements of the TPC Benchmark™ C Standard Revision 5.0.

System Overview	*This report documents the compliance of the Fujitsu Siemens Computers GmbH TPC Benchmark™ C tests using Microsoft SQL Server 2000 Enterprise Edition Relational Database Management System.*

The TPC Benchmark™ C tests were carried out on a PRIMERGY H400. The PRIMERGY H400 is a powerful Server with a motherboard based on the ServerWorks chipset that holds up to 4 Intel Pentium® III Xeon 900 MHz processors with 2 MB L2 cache. The system was equipped with 8 GB of ECC SDRAM memory. 7 of the 8 PCI-Slots were used for SCSI RAID controllers, 1 was used for an Alteon Gigabit Ethernet adapter.
The client machines were 3 PRIMERGY B210 with 2 Intel Pentium® III 933 MHz. They all included 512 MB ECC SDRAM memory and 1 Intel Pro/100+ ethernet adapter.

The server operating system was Windows 2000 Advanced Server. The client operating system was Windows 2000 Server.

Full Disclosure	*From Clause 8.1 of the TPC Benchmark™ C Standard Specification:* The intent of this disclosure is for a customer to be able to replicate the results of this benchmark given the appropriate documentation and products.

Fujitsu Siemens Computers believes that this full disclosure report meets the stated intention. Fujitsu Siemens Computers has strived to maintain the integrity of the Specification by adhering not only to the letter of the Specification, but also to its spirit.

Report Format	*The format of this document follows Clause 8 of the TPC Benchmark™ C specification (*TPC Benchmark™ C Standard Specification, *Revision 5.0, Transaction Processing Performance Council) which describes the full disclosure report requirements for the test.*

Each section of this report begins with the specification requirement printed in *italic type*. It is followed by plain type text that explains how the test complies with the requirement. Sections which require extensive listings reference appropriate appendices.

Report organization**:**

- General Items
- Clause 1 Related Items - Logical Database Design
- Clause 2 Related Items - Transaction and Terminal Profiles
- Clause 3 Related Items - Transaction and System Properties
- Clause 4 Related Items - Scaling and Database Population
- Clause 5 Related Items - Performance Metrics and Response Time
- Clause 6 Related Items - SUT, Driver, and Communication Definition
- Clause 7 Related Items - Pricing
- Clause 8 Related Items - Audit
- Appendix A - Application Source Code
- Appendix B - Database Details
- Appendix C - Tunable Parameters and Options
- Appendix D – Space Calculation
- Appendix E - Price Quotations
- Appendix F - Attestation Letter

Additional Copies	*Additional copies of this report are available upon request from Fujitsu Siemens Computers GmbH:* *Fujitsu Siemens Computers* *ES PS DS 5* *PRIMERGY Server Performance Lab* *Mr. Bathe* *Heinz-Nixdorf-Ring 1* *33106 Paderborn* *Germany*

1. General Items

1.1 **Application Code**	*The application program (as defined in Clause 2.1.7) must be disclosed. This includes, but is not limited to, the code implementing the five transactions and the terminal input and output functions. [Clause 8.1.1.4]*

The source code of the application program is provided in Appendix A - Application Source Code.

1.2 **Benchmark Sponsor**	*A statement identifying the benchmark sponsor(s) and other participating companies must be provided. [Clause 8.1.1.5]*

This benchmark was sponsored and executed by Fujitsu Siemens Computers GmbH.
The benchmark was developed and engineered by Fujitsu Siemens Computers GmbH and Microsoft Corporation. Testing took place at Fujitsu Siemens Computers PRIMERGY benchmark laboratories in Paderborn, Germany.

1.3 **Parameter Settings**	*Settings must be provided for all customer-tunable parameters and options which have been changed from the defaults found in actual products, including but not limited to:* • *Database tuning options.* • *Recovery/commit options.* • *Consistency/locking options.* • *Operating system and application configuration parameters.* *[Clause 8.1.1.6]*

The significant parameters and system configuration files are provided in Appendix C - Tunable Parameters and Options.

1.4 Configuration Diagrams	*Diagrams of both measured and priced configurations must be provided, accompanied by a description of the differences. This includes, but is not limited to:* • *Number and type of processors.* • *Size of allocated memory, and any specific mapping/partitioning of memory unique to the test.* • *Number and type of disk units (and controllers, if applicable).* • *Number of channels or bus connections to disk units, including their protocol type.* • *Number of LAN (e.g., Ethernet) connections, including routers, workstations, terminals, etc., that were physically used in the test or are incorporated into the pricing structure (see Clause 8.1.8).* • *Type and the run-time execution location of software components (e.g., DBMS, client processes, transaction monitors, software drivers, etc.).* *[Clause 8.1.1.7]*

SUT Configuration	The PRIMERGY H400 server system included:

4	Intel Pentium® III Xeon 900 MHz with 2 MB Second Level Cache
8	GB memory
7	Mylex eXtremRAID 2000 SCSI controllers
1	disks 9 GB measured
180	disks 18 GB measured
0	disks 36 GB measured
1	disks 9 GB priced
180	disks 18 GB priced
0	disks 36 GB priced
1	LAN

Client Configuration	The PRIMERGY B210 client systems included:

2	Intel Pentium® III 933 MHz with 256 KB Second Level Cache
512	MB memory
1	SCSI controller
1	disk 9 GB
1	Intel Pro/100+

The benchmarked and priced system configurations are shown in Figure 1 and Figure 2 in accordance with Clause 8.1.1.7.

FIGURE 1: BENCHMARK SYSTEM CONFIGURATION PRIMERGY H400

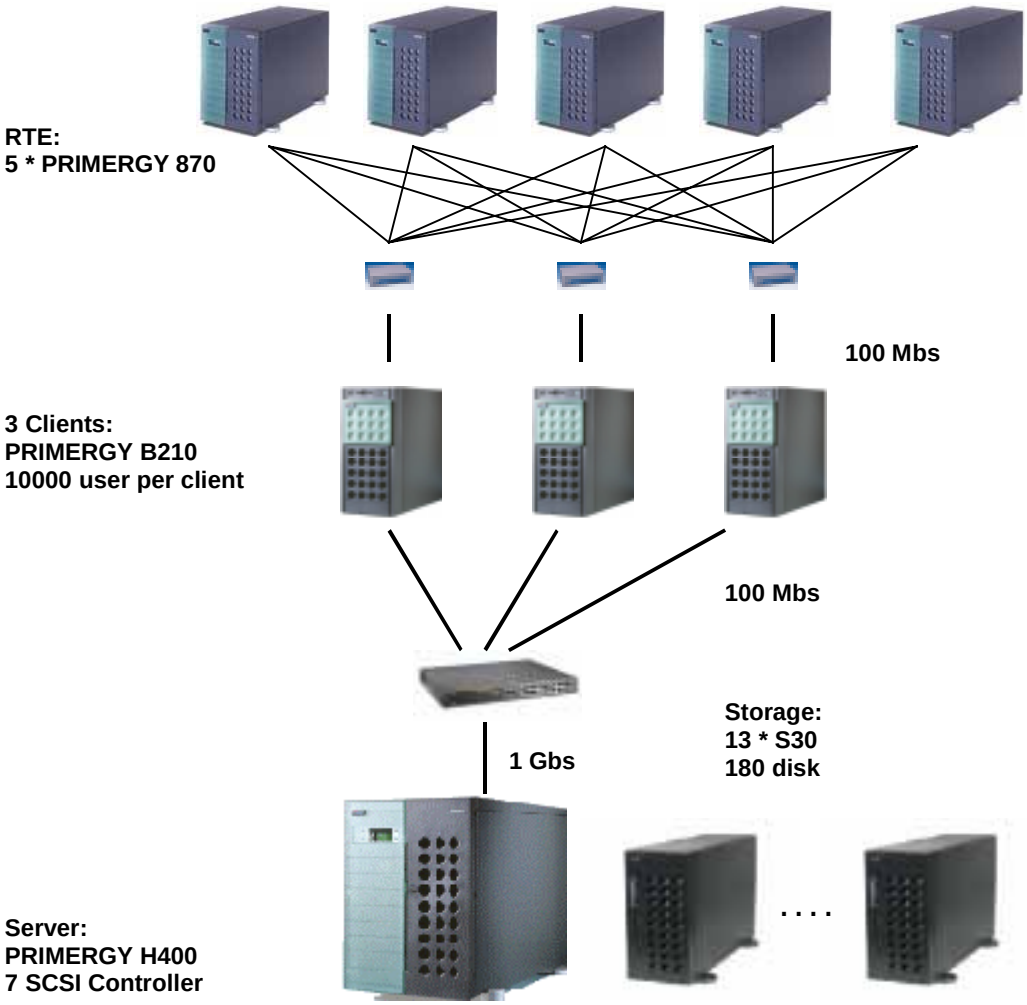
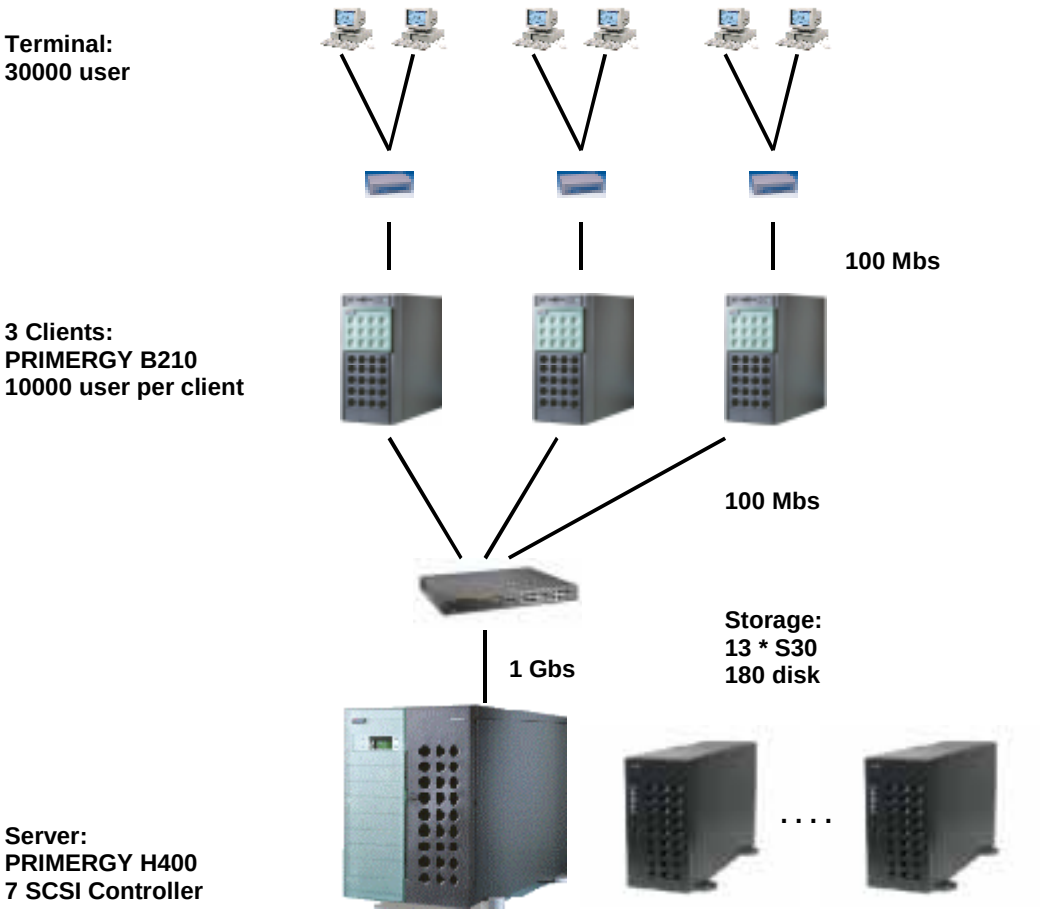


FIGURE 2: PRICED SYSTEM CONFIGURATION PRIMERGY H400



2. Clause 1 Related Items - Logical Database Design

2.1 Table Definitions	*Listings must be provided for all table definition statements and all other statements used to set-up the database. [Clause 8.1.2.1]*

The programs that defined, created, and populated the Microsoft SQL Server 2000 Enterprise Edition database for this TPC benchmark™ C are listed in Appendix B - Database Details.

2.2 Physical Organization of Database	*The physical organization of tables and indices, within the database, must be disclosed. [Clause 8.1.2.2]*

FIGURE 3: PHYSICAL ORGANIZATION OF THE DATABASE

Controller	Channel 0	Channel 1	Channel 2	Channel 3	RAID	Drive
eXtremeRAID 2000 #0	0-0 0-1 0-2 0-3 0-4 0-5 0-10	1-0 1-1 1-2 1-3 1-4 1-5 1-10	2-0 2-1 2-2 2-3 2-4 2-5 2-10	3-0 3-1 3-2 3-3 3-4 3-5 3-10	SPAN 0 to 3 RAID0	E: N:
eXtremeRAID 2000 #1	0-0 0-1 0-2 0-3 0-4 0-5 0-10	1-0 1-1 1-2 1-3 1-4 1-5 1-10	2-0 2-1 2-2 2-3 2-4 2-5 2-10	3-0 3-1 3-2 3-3 3-4 3-5 3-10	SPAN 0 to 3 RAID0	F: O: X:
eXtremeRAID 2000 #2	0-0 0-1 0-2 0-3 0-4 0-5 0-10	1-0 1-1 1-2 1-3 1-4 1-5 1-10	2-0 2-1 2-2 2-3 2-4 2-5 2-10	3-0 3-1 3-2 3-3 3-4 3-5 3-10	SPAN 0 to 3 RAID0	G: P: Y:
eXtremeRAID 2000 #3	0-0 0-1 0-2 0-3 0-4 0-5 0-10	1-0 1-1 1-2 1-3 1-4 1-5 1-10	2-0 2-1 2-2 2-3 2-4 2-5 2-10	3-0 3-1 3-2 3-3 3-4 3-5 3-10	SPAN 0 to 3 RAID0	H: Q: Z:
eXtremeRAID 2000 #4	0-0 0-1 0-2 0-3	1-0 1-1 1-2 1-3	2-0 2-1 2-2 2-3	3-0 3-1 3-2 3-3	SPAN 0 to 3 RAID0	I: R:

	0-4 0-5 0-10	1-4 1-5 1-10	2-4 2-5 2-10	3-4 3-5 3-10		
eXtremeRAID 2000 #5	0-0 0-1 0-2 0-3 0-4 0-5 0-10	1-0 1-1 1-2 1-3 1-4 1-5 1-10	2-0 2-1 2-2 2-3 2-4 2-5 2-10	3-0 3-1 3-2 3-3 3-4 3-5 3-10	SPAN 0 to 3 RAID0	J: S:
eXtremeRAID 2000 #6	0-0 1-0 2-0	0-1 1-1 2-1			SPAN 0 to 1 RAID1	L:

All controllers were configured with write cache disabled. Write cache was enabled on the log drives and disabled on the data drives. Disk types are Seagate ST318451LC 18 GB with 15000 rpm.
Space was allocated to Microsoft SQL Server 2000 Enterprise Edition on SUT disks according to the data in section 5.2. The size of the datafile on each disk drive was calculated to provide even distribution on load across the disk drives. The Windows Disk Manager was used to create raw devices for data/log and NTFS partitions for dump devices. For further information see Appendix B (Disk Usage) and Figure 4 in 5.2 (Distribution of Tables and Log). No attempt was made to alter the default physical organization of the database tables and indices chosen by Microsoft SQL Server 2000 Enterprise Edition.

2.3 Insert and Delete Operations	*It must be ascertained that insert and/or delete operations to any of the tables can occur concurrently with the TPC-C transaction mix. Furthermore, any restriction in the SUT database implementation that precludes inserts beyond the limits defined in Clause 1.4.11 must be disclosed. This includes the maximum number of rows that can be inserted and the maximum key value for these new rows. [Clause 8.1.2.3]*

There were no restrictions on insert and delete operations to any tables.

2.4 Database Partitioning	*While there are a few restrictions placed upon horizontal or vertical partitioning of tables and rows in the TPC benchmark™ C (see Clause 1.6), any such partitioning must be disclosed. [Clause 8.1.2.4]*

There was no partitioning used in this implementation.

2.5 Replication of Tables	*Replication of tables, if used, must be disclosed (see Clause 1.4.6). [Clause 8.1.2.5]*

Replication of tables was not used in this implementation.

2.6 **Additional and/or Duplicated Attributes**	*Additional and/or duplicated attributes in any table must be disclosed along with a statement on the impact on performance (see Clause 1.4.7). [Clause 8.1.2.6]*

No additional and/or duplicated attributes were used.

3. Clause 2 Related Items - Transaction and Terminal Profiles

3.1 Random Number Generator	*The method of verification for the random number generation must be described. [Clause 8.1.3.1]*

The random number generation was done in Microsoft BenchCraft, which was audited independently.

3.2 Input/Output Screen Layout	*The actual layouts of the terminal input/output screens must be disclosed. [Clause 8.1.3.2]*

The screen layout corresponded exactly to those of the TPC-C Standard Specification (specified in Clause 2.4.3, 2.5.3, 2.6.3, 2.7.3, and 2.8.3).

3.3 Configured Terminal Features	*The method used to verify that the emulated terminals provide all the features described in Clause 2.2.2.4 must be explained. Although not specifically priced, the type and model of the terminals used for the demonstration in 8.1.3.3 must be disclosed and commercially available (including supporting software and maintenance). [Clause 8.1.3.3]*

All of the requirements in clause 2.2.2.4. are supported. This was verified by manually exercising each specification on a PRIMERGY 870.

3.4 Presentation Managers or Intelligent Terminals	*Any usage of presentation managers or intelligent terminals must be explained. [Clause 8.1.3.4]*

Application code running on the client machines implemented the TPC-C user interface. No presentation manager software or intelligent terminal features were used. The source code for the forms application is listed in Appendix A - Application Source Code.

3.5 **Transaction Statistics**	*The numerical quantities which are required are listed in the following table. [Clause 8.1.3.5 to 8.1.3.11]*

	Statistics	**Percentage**
New-Order	Home order-lines	99.00%
	Remote order-lines	1.00%
	Rolled back transactions	1.00%
	Average items per order	10.00
Payment	Home transactions	85.00%
	Remote transactions	15.00%
	Non-primary key access	60.01%
Order-Status	Non-primary key access	60.08
Delivery	Skipped transactions	0
Transaction Mix	New-Order	44.890 %
	Payment	43.035 %
	Order-Status	4.020 %
	Delivery	4.027 %
	Stock-Level	4.028 %

3.6 **Queueing Mechanism**	*The queuing mechanism used to defer the execution of the Delivery transaction must be disclosed. [Clause 8.1.12]*

Deferred deliveries are queued by making an entry in an array within the client application process (tpcc.dll). The queued delivery transactions are processed and logged asynchronously by background threads within the application.
The source code is listed in Appendix A - Application Source Code.

4. Clause 3 Related Items - Transaction and System Properties

ACID Tests	*The results of the ACID tests must disclosed along with a description of how the ACID requirements were met. This includes disclosing which case was followed for the execution of Isolation Test 7. [Clause 8.1.4.1]*

All ACID tests were performed successfully. The following sections describe the requirements of each of the tests as described in Clause 3 and the approach used to satisfy them.

All ACID tests were performed on the PRIMERGY H400 system using the fully scaled database, except for the test of durable media failure.
The durability test was performed on a database scaled to 15 warehouses. This test would also pass on a fully scaled database.

4.1 Atomicity	*The system under test must guarantee that database transactions are atomic; the system will either perform all individual operations on the data, or will assure that no partially-completed operations leave any effects on the data. [Clause 3.2.1]*

Commit Transaction	Perform the Payment transaction for a randomly selected warehouse, district, and customer (by customer number as specified in Clause 2.5.1.2) and verify that the records in the CUSTOMER, DISTRICT, and WAREHOUSE tables have been changed appropriately. [Clause 3.2.2.1]

The following steps demonstrated atomicity for completed (COMMIT) transactions:

- A row was randomly selected from the warehouse, district and customer table.
- the current balance was noted.
- A payment transaction was executed with the above identifiers and a known amount.
- The transaction was committed.
- It was verified, that the rows contain the correct updated balances.

Rollback Transaction	Perform the Payment transaction for a randomly selected warehouse, district, and customer (by customer number as specified in Clause 2.5.1.2) and substitute a ROLLBACK of the transaction for the COMMIT of the transaction. Verify that the records in the CUSTOMER, DISTRICT, and WAREHOUSE tables have NOT been changed. [Clause 3.2.2.2]

The following steps demonstrated atomicity for aborted (ROLLBACK) transactions:

- A row was randomly selected from the warehouse, district and customer table.
- the current balance was noted.
- A payment transaction was executed with the above identifiers and a known amount.
- The transaction was rolled back.
- It was verified, that the rows contain the original balances.

4.2 Consistency	*Consistency is the property of the application that requires any execution of a database transaction to take the database from one consistent state to another, assuming that the database is initially in a consistent state. [Clause 3.3.1]*

Consistency conditions 1 - 4 were tested by issuing queries to the database. The results of the queries verified that the database was consistent for all these tests. The tests were performed before and after the performance run on the same database that was used for the benchmark.

4.3 Isolation	*Operations of concurrent transactions must yield results which are indistinguishable from the results which would be obtained by forcing each transaction to be serially executed to completion in some order.*

We ran all of the seven isolation tests as described in clause 3.4.2.1 to 3.4.2.7 and additionally the two phantom protection tests. The tests were executed using shell scripts to issue queries to the database. The results of the queries verified that the required isolation had been met.

4.4 Durability	*The tested system must guarantee durability: the ability to preserve the effects of committed transactions and insure database consistency after recovery from any one of the failures listed in Clause 3.5.3. [Clause 3.5]* *List of single failures* *1 Permanent irrecoverable failure of any single durable medium containing TPC-C database tables or recovery log data* *2 Instantaneous interruption (system crash / system hang) in processing which requires system reboot to recover* *3 Failure of all or part of memory (loss of contents).*
	[Clause 3.5.3] *The intent of these tests is to demonstrate that all transactions whose output messages have been received at the terminal or RTE have in fact been committed in spite of any single failure from the list in Clause 3.5.3 and that all consistency conditions are still met after the database is recovered.* *It is required that the system crash test(s) and the loss of memory test(s) described in Clause 3.5.3.2 and 3.5.3.3 be performed under full terminal load and a fully scaled database. The durable media failure test(s) described in Clause 3.5.3.1 may be performed on a subset of the SUT configuration and database. For the SUT subset, all multiple hardware components, such as processors and disk / controllers in the full SUT configuration, must be represented by the greater of 10% of the configuration or two of each of the multiple hardware components. The database must be scaled to at least 10% of the fully scaled database, with a minimum of two warehouses. ... Furthermore, the standard driving mechanism must be used in this test. The test sponsor must state that to the best of their knowledge, a fully scaled test would also pass all durability tests. [Clause 3.5.4]*

The failure of all or part of memory test and the system crash test were combined with the loss of log disk and performed under full load and by using a fully scaled database.

The full hardware configuration of the SUT (in accordance with Clause 3.5.4) and the same test procedure was used during all durability tests, except the test for loss of data.

- The current count of the total number of orders was determined by summing up the D_NEXT_O_ID fields of all rows in the DISTRICT table before the test.
- After 6 min in steady state we pulled off one of the log disks. As we use hardware-mirrored diskpairs with the SCSI-controller, execution continued.
- After additional 6 min we powered of the server to emulate the loss of memory. After server system reboot, SQL-Server starts with recovering the database tpcc. After completion, we computed the sum of D_NEXT_O_ID from district. Client and RTE systems were interrupted and evaluation started on the RTE. The difference of all D_NEXT_O_ID between RTE an server was in the permitted scope.

The durable media failure test for loss of data disk was performed with 28 of the 168 data disks and a database scaled to 15 warehouses under the load of 150

users. We used one RTE and one client system. To the best of the test sponsor's knowledge, a fully loaded and fully scaled database would also pass this durability test.

- The database was backed up.
- The current count of the total number of orders was determined by summing up the D_NEXT_O_ID fields of all rows in the DISTRICT table before the test.
- After 5 min in steady state we pulled of one of the data disks.
- SQL-Server recognized the loss of a device. We dumped the transaction log and removed the database with dropdevice. Then we shut down SQL-Server and the system.
- We replaced the disk and made it online.
- We restarted SQL-Server, no tpcc database and none of its devices were present. We recreated the database, loaded dump and load transaction log
- After completion, we computed the sum of D_NEXT_O_ID from district.
- Client and RTE systems were interrupted and evaluation started on the RTE. The difference of all D_NEXT_O_ID between RTE an server was in the permitted scope.

5. Clause 4 Related Items - Scaling and Database Population

5.1 Initial Cardinality of Tables	*The cardinality (e.g., the number of rows) of each table, as it existed at the start of the benchmark run (see Clause 4.2), must be disclosed. If the database was over-scaled and inactive rows of the WAREHOUSE table were deleted (see Clause 4.2.2), the cardinality of the WAREHOUSE table as initially configured and the number of rows deleted must be disclosed. [Clause 8.1.5.1]*

The database for the PRIMERGY H400 system was scaled for 3000 warehouses. The performance run used 3000 warehouses. In accordance with Clause 4.2, the following number of records were loaded in the specified tables:

Table	Number of Records
Warehouse	3000
District	30,000
Customer	90,000,000
History	90,000,000
Order	90,000,000
New-Order	27,000,000
Order-Line	899,996,621
Stock	300,000,000
Item	100,000
Deleted Warehouses	0

The following constant values were used during the database build and benchmark test for the NURand function:

Constant C	Value
C_LAST (build)	123
C_LAST (run)	233

5.2 Distribution of Tables and Log	*The distribution of tables and logs across all media must be explicitly depicted for the tested and priced systems. [Clause 8.1.5.2]*

FIGURE 4: LOGICAL ORGANIZATION OF THE DATABASE

Disk	Controller	Disktype	RAID Configuration	Drive Letter	Size MB	Filegroup or Filesystem
0	onboard	9 GB	-	system C:	9000	NTFS
1	eXtremeRAID 2000 #0	28 x 18 GB	RAID 0	E: N:	30000 16500	cs1 misc1
2	eXtremeRAID 2000 #1	28 x 18 GB	RAID 0	F: O: X	30000 16500 300000	cs2 misc2 backup1
3	eXtremeRAID 2000 #2	28 x 18 GB	RAID 0	G: P: Y:	30000 16500 300000	cs3 misc3 backup2
4	eXtremeRAID 2000 #3	28 x 18 GB	RAID 0	H: Q: Z:	30000 16500 300000	cs4 misc4 backup3
5	eXtremeRAID 2000 #4	28 x 18 GB	RAID 0	I: R:	30000 16500	cs5 misc5
6	eXtremeRAID 2000 #5	28 x 18 GB	RAID 0	J: S:	30000 16500	cs6 misc6
7	eXtremeRAID 2000 #6	12 x 18GB	RAID 1	L:	95000	log

5.3 Database Model, Interface, and Access Language	*A statement must be provided that describes:* *1. The data model implemented by the DBMS used (e.g., relational, network, hierarchical)* *2. The database interface (e.g., embedded, call level) and access language (e.g., SQL, DL/1, COBOL read/write) used to implement the TPC-C transactions. If more than one interface/access language is used to implement TPC-C, each interface / access language must be described and a list of which interface/access language is used with which transaction type must be disclosed.* *[Clause 8.1.5.3]*

Microsoft SQL Server 2000 Enterprise Edition is a Relational DataBase Management System. The interface used was Microsoft SQL Server 2000 Enterprise Edition stored procedures accessed with Remote Procedure Calls embedded in C code.

5.4 Database Partitions/Replications Mapping	*The mapping of database partitions/replications must be explicitly described. [Clause 8.1.5.4]*

There was no partitioning and/or replication used in this implementation.

5.5 60 day space Calculation	*Details of the 60-day space computations along with proof that the database is configured to subtain 8 hours of growth for the dynamic tables (Order, Order-Line, and History) must be disclosed (see Clause 4.2.3). [Clause 8.1.5.5]*

Calculations of space requirements in the priced configurations for the 60-day period are provided in Appendix D – Space Calculation.

6. Clause 5 Related Items - Performance Metrics and Response Time

6.1 Measured tpmC	*Measured tpmC must be reported. [Clause 8.1.6.1]*

During the 120 minutes measurement period on the PRIMERGY H400 the throughput measured was 37,383.57 tpmC.

6.2 Response Times	*Ninetieth percentile, maximum and average response times must be reported for all transaction types as well as for the Menu response time. [Clause 8.1.6.2]*

Type	Average	Maximum	90 Percentile
New-Order	0.492	9.467	0.820
Payment	0.422	9.895	0.750
Order-Status	0.446	7.128	0.770
Interactive Delivery	0.104	1.786	0.110
Deferred Delivery	0.198	3.063	0.330
Stock-Level	1.250	11.199	1.790
Menu	0.105	1.807	0.110

6.3 Keying and Think Times	*The minimum, the average, and the maximum keying and think times must be reported for each transaction type. [Clause 8.1.6.3]*

Keying Times			
Type	**Average**	**Maximum**	**Minimum**
New-Order	18.015	18.046	18.003
Payment	3.016	3.046	3.003
Order-Status	2.016	2.040	2.003
Delivery	2.016	2.040	2.003
Stock-Level	2.016	2.042	2.003

Think Times			
Type	**Average**	**Maximum**	**Minimum**
New-Order	12.053	120.507	0.000
Payment	12.047	120.512	0.000
Order-Status	10.034	100.499	0.000
Delivery	5.060	50.504	0.000
Stock-Level	5.047	50.500	0.000

6.4 Graphs	Response Time frequency distribution curves (see Clause 5.6.1) must be reported for each transaction type. [Clause 8.1.6.4] The performance curve for response times versus throughput (see Clause 5.6.2) must be reported for the New-Order transaction. [Clause 8.1.6.5] Think Time frequency distribution curves (see Clause 5.6.3) must be reported for each transaction type. [Clause 8.1.6.6] A graph of throughput versus elapsed time (see Clause 5.6.5) must be reported for the New-Order transaction. [Clause 8.1.6.8]

FIGURE 5: NEW-ORDER RESPONSE TIME DISTRIBUTION

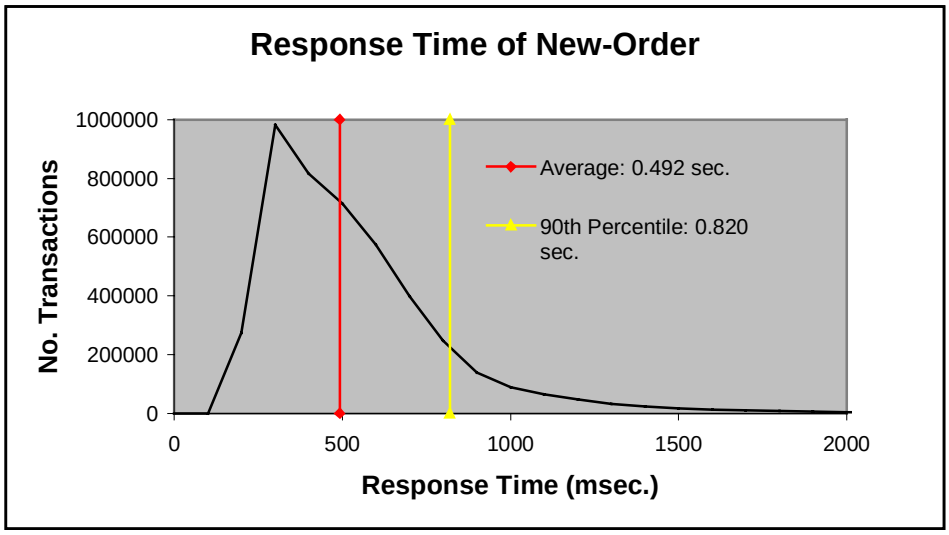


FIGURE 6: PAYMENT RESPONSE TIME DISTRIBUTION

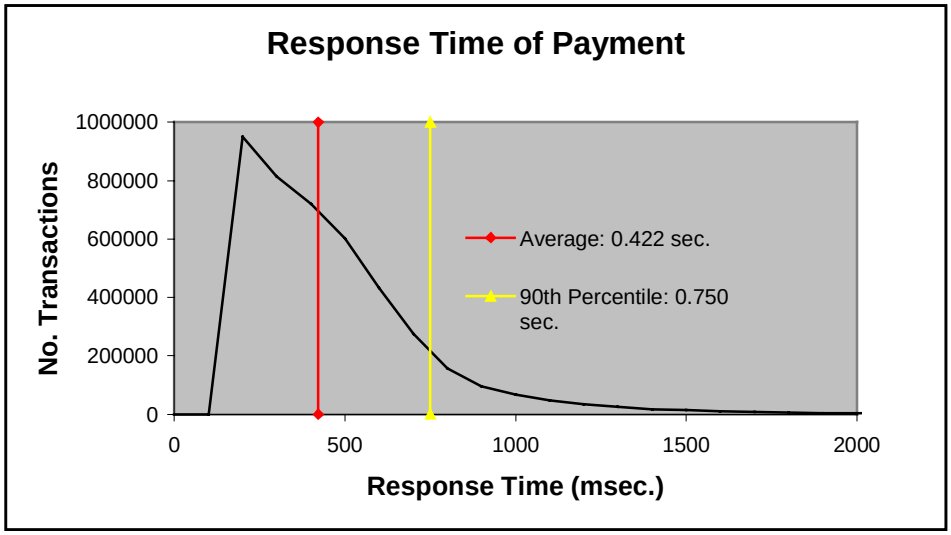


FIGURE 7: ORDER-STATUS RESPONSE TIME DISTRIBUTION

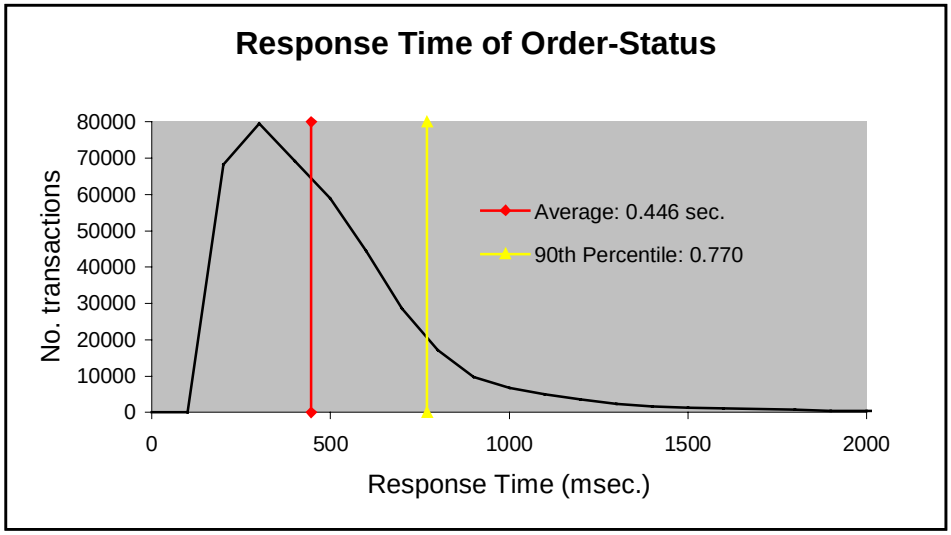


FIGURE 8: DELIVERY RESPONSE TIME DISTRIBUTION

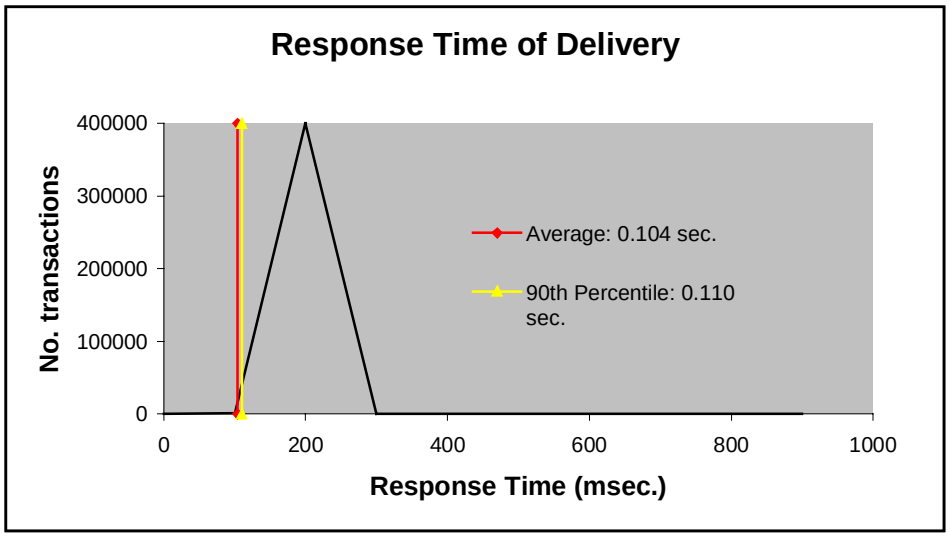


FIGURE 9: STOCK-LEVEL RESPONSE TIME DISTRIBUTION

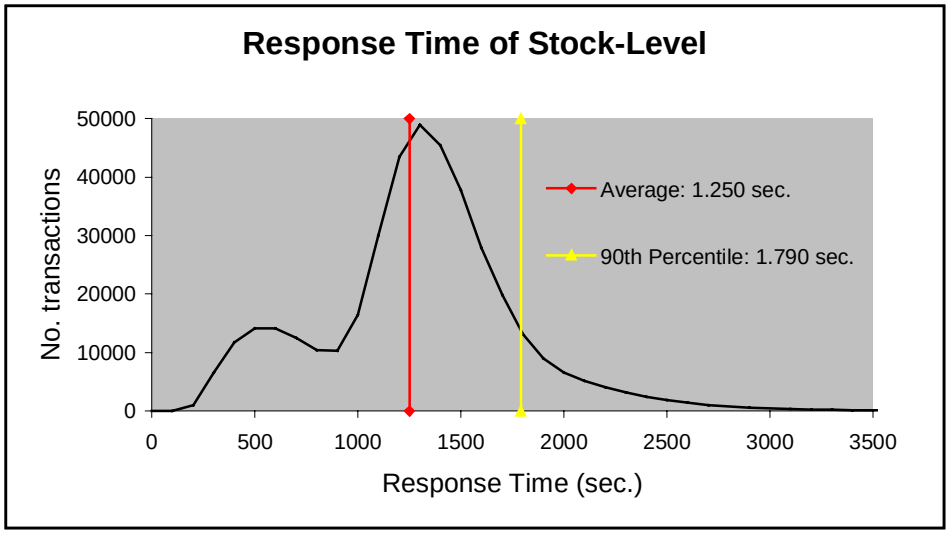


FIGURE 10: RESPONSE TIME VERSUS THROUGHPUT

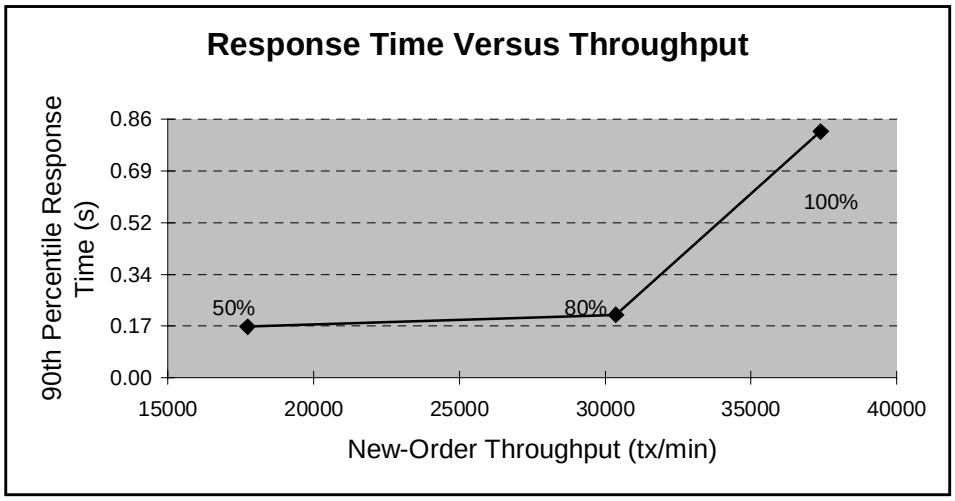


FIGURE 11: NEW-ORDER THINK TIME DISTRIBUTION

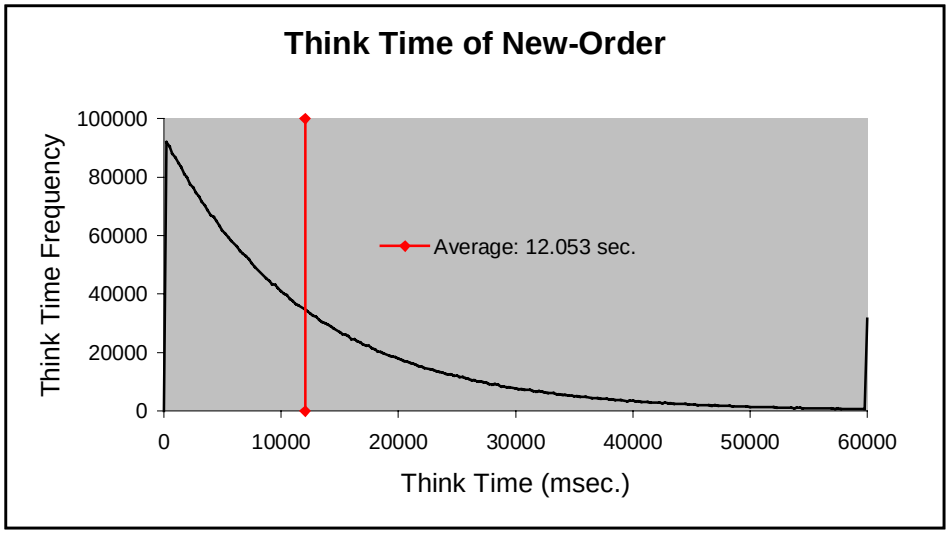
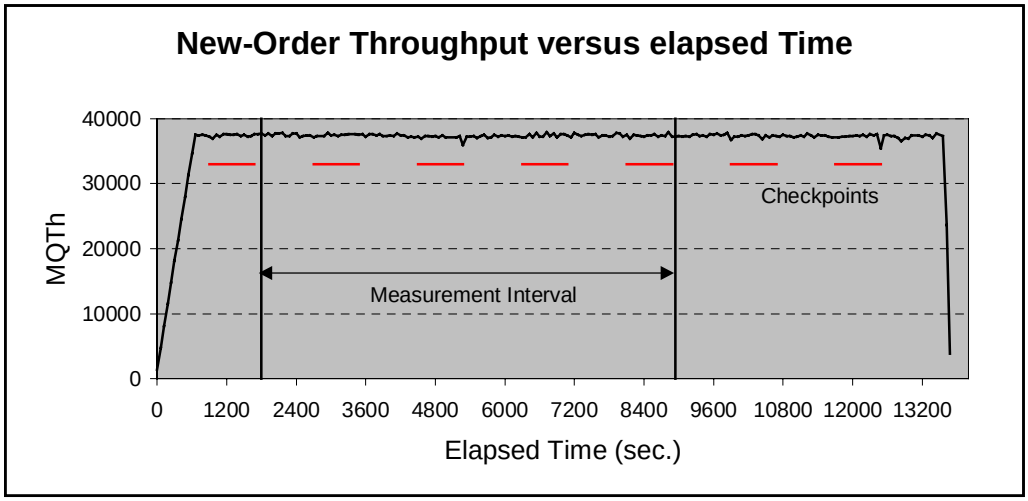


FIGURE 12: THROUGHPUT VERSUS ELAPSED TIME



6.5 Steady State Determination	*The method used to determine that the SUT had reached a steady state prior to commencing the measurement interval (see Clause 5.5) must be described. [Clause 8.1.6.9]*

In all test runs, steady state was achieved before the measurement period began. Steady state was determined to occur based on a visual inspection of tpmC versus time (see graph in section 6.4).

The graph in section 6.4 illustrates that the measurement period was within the steady state period for the run. One checkpoint occurred before and four during the measurement period.

6.6 Work Performed	*A description of how the work normally performed during a sustained test (for example checkpointing, writing redo/undo log records, etc.), actually occurred during the measurement interval must be reported. [Clause 8.1.6.10]*

The RTE generated the required input data to choose a transaction from the menu. This data was timestamped and captured in RTE log files before being transmitted. There was one log file for each user. The input screen for the requested transaction was returned and it was also captured and timestamped in the RTE log files. The difference between these two timestamps was the menu response time.

The RTE generated the required input data for the chosen transaction. It waited to complete the minimum required key time before transmitting the input screen. The transmission was timestamped and captured in RTE log files. The return of the screen with the required response data was timestamped and captured in the RTE log files. The difference between these two timestamps was the response time for that transaction.

The RTE then waited the required think time interval before repeating the process starting at selecting a transaction from the menu.

The RTE transmissions were sent to Internet Information Server running on the client machines through Ethernet LANs. Internet Information Server handled all screen I/O as well as all requests to the database on the server. Internet Information Server communicated with the database server over COM+ which was used as transaction monitor.

All database operations like update, select, delete and insert are performed by one of the TPC-C back end programs. The TPC-C backend program commits the transaction after all the corresponding operations are done.

Modified database buffers are migrated to disk a least-recently-used basis independent of transaction commits. In addition, every block modification is protected by log records. Asynchronously the log buffers are flushed to a log file on disk either when the transaction is committed or when the log buffer's fill state reaches it's limit. The log buffer's always flushed by a commit before it become full.

To perform checkpoints at specific intervals, we wrote a script to schedule multiple checkpoints at specific intervals. By setting the trace flag #3502, SQL Server logged the checkpoint beginning and ending time in the ERRORLOG file. The script included a wait time between each checkpoint equal to the measurement interval which was 120 minutes. The checkpoint script was started manually after the RTE had all users logged in and sending transactions.

At each checkpoint, Microsoft SQL Server wrote to disk all memory pages that had been updated but not yet physically written to disk. Upon completion of the checkpoint, Microsoft SQL Server wrote a special record to the recovery log to indicate that all disk operations had been satisfied to this point.

6.7 **Duration of Checkpoints**	*The start time and duration in seconds of at least the four (4) longest checkpoints during the MeasurementInterval must be disclosed (see Clause 5.5.2.2 (2)). [Clause 8.1.6.11]*

There was one checkpoint before measurement and four checkpoints during measurement. These four checkpoints started 953, 2752, 4551 and 6350 seconds after the begin of measurement. The duration was 840 seconds for each checkpoint.

Measurement		duration	
Start =	End =	minutes	seconds
09:49:00	11:49:00	120	7200
4 Checkpoints		duration	
Start =	End =	minutes	seconds
10:04:53	10:18:53	14:00	840
10:34:52	10:48:52	14:00	840
11:04:51	11:18:51	14:00	840
11:34:50	11:48:50	14:00	840

6.8 **Duration of Measurement**	*A statement of the duration of the measurement interval for the reported Maximum Qualified Throughput (tpmC) must be included. [Clause 8.1.6.12]*

The measurement interval of the PRIMERGY H400 system test was 120 minutes.

6.9 **Regulation of Transaction Mix**	*The method of regulation of the transaction mix (e.g., card decks or weighted random distribution) must be described. If weighted distribution is used and the RTE adjusts the weights associated with each transaction type, the maximum adjustments to the weight from the initial value must be disclosed. [Clause 8.1.6.13]*

The transaction mix was regulated by weighted distribution. The chosen weights meet the required minimum percentages of the mix which are described in Clause 5.2.3 of the Standard Specifications. No adjustments were made by the RTE.

6.10 **Transaction Mix**	*The percentage of the total mix for each transaction type must be disclosed. [Clause 8.1.6.14]*

	Percentage
New-Order	44.890 %
Payment	43.035 %
Order-Status	4.020 %
Delivery	4.027 %
Stock-Level	4.028 %

6.11 Transaction Statistics	*The percentage of New-Order transactions rolled back as a result of invalid item number must be disclosed. [Clause 8.1.6.15]* *The average number of order-lines entered per New-Order transaction must be disclosed. [Clause 8.1.6.16]* *The percentage of remote order-lines entered per New-Order transaction must be disclosed. [Clause 8.1.6.17]* *The percentage of remote Payment transactions must be disclosed. [Clause 8.1.6.18]* *The percentage of customer selections by customer last name in the Payment and Order-Status transactions must be disclosed. [Clause 8.1.6.19]* *The percentage of Delivery transactions skipped due to there being fewer than necessary orders in the New-Order table must be disclosed. [Clause 8.1.6.20]*

The numerical quantities which are required in Clause 8.1.6.15 to 8.1.6.20 are already listed in a table above (see section 3.5).

6.12 Checkpoint Statistics	*The number of checkpoints in the Measurement Interval, the time in seconds from the start of the Measurement Interval to the first checkpoint and the Checkpoint Interval must be disclosed. [Clause 8.1.6.21]*

The numerical quantities which are required in Clause 8.1.6.21 are already listed above (see section 6.7).

7. Clause 6 Related Items - SUT, Driver, and Communication Definition

7.1 RTE Inputs	*If the RTE is commercially available, then its inputs must be specified. Otherwise, a description must be supplied of what inputs (e.g., scripts) to the RTE had been used. [Clause 8.1.7.1]*

Microsoft Benchcraft was used as the RTE to emulate the terminals. Its input parameters are shown in Appendix C - Tunable Parameters and Options.

We used COM+ to simulate terminal users, generate random data, record response times and statistical data. Its input parameters are shown in Appendix C - Tunable Parameters and Options.

7.2 Lost Connections	*The number of terminal connections lost during the Measurement Interval must be disclosed (seeClause 6.6.2). [Clause 8.1.7.3]*

There were no lost connections during measurement interval.

7.3 Functionality and Performance of Emulated Components	*It must be demonstrated that the functionality and performance of the components being emulated in the Driver System are equivalent to that of the priced system. The results of the test described in Clause 6.6.3.4 must be disclosed. [Clause 8.1.7.3]*

The Driver System consisted of a PRIMERGY 870. This driver was attached to the client machine through a 100 Mbps ethernet LAN and switch. Since this is exactly the same connectivity as configured in the priced system, no component was emulated. Therefore, the test described in Clause 6.6.3.4 was not required.

7.4 Functional Diagrams of the Benchmarked and Proposed Configuration	*A complete functional diagram of both the benchmark configuration and the configuration of the proposed (target) system must be disclosed. A detailed list of all software and hardware functionality being performed on the Driver System, and its interface to the SUT must be disclosed (see Clause 6.6.3.6). [Clause 8.1.7.4]*

Figure 1 and Figure 2 in section 1.4 show the functional diagrams of the benchmark configuration and the priced configuration.

7.5 Network Configurations of the Tested and Proposed Services	*The network configurations of both the tested services and the proposed (target) services which are being represented and a thorough explanation of exactly which parts of the proposed configuration are being replaced with the Driver System must be disclosed (see Clause 6.6.4). [Clause 8.1.7.5]*

Figure 1 and Figure 2 in section 1.4 show the network setup of both configurations. The driver replaces the workstations.

In both configurations one 1Gbs/100Mbs ethernet LAN segment was used to connect the server with the 3 clients and 100Mbs LAN with switch to connect the RTE systems or 30,000 workstations to the clients.

7.6 Network Bandwidth	*The bandwidth of the network(s) used in the tested / priced configuration must be disclosed. [Clause 8.1.7.6]*

The ethernet used in the local area network (LAN) between the emulated user system and the front-end system complies with the IEEE 802.3 standard. Its bandwith is 100 Mbps. Between front-end and SUT the bandwidth is 1 Gbps/100 Mbps.

7.7 Operator Intervention	*If the configuration requires operator intervention (see Clause 6.6.6), the mechanism and the frequency of this intervention must be disclosed. [Clause 8.1.7.7]*

The PRIMERGY H400 requires no operator intervention to sustain the reported throughput.

8. Clause 7 Related Items - Pricing

8.1 **System Pricing**	*A detailed list of hardware and software used in the priced system must be reported. Each separately orderable item must have vendor part number, description, and release/revision level, and either general availability status or committed delivery date. If package-pricing is used, vendor part number of the package and a description uniquely identifying each of the components of the package must be disclosed. Pricing source(s) and effective date(s) of price(s) must also be reported. [Clause 8.1.8.1]* *The total 3-year price of the entire configuration must be reported, including: hardware, software, and maintenance charges. Separate component pricing is recommended. The basis of all discounts used must be disclosed. [Clause 8..1.8.2]*

The details of the hardware and software are reported in the summary in front of this report. The spreadsheet used to determine the 3-year price and the speadsheet used to describe the priced configuration can be found in Appendix E - Price Quotations.

8.2 **Availability Dates**	*The committed delivery date for general availability (availability date) of products used in the price calculations must be reported. When the priced system includes products with different availability dates, the reported availability date for the priced system must be the date at which all components are committed to be available. This single date must be reported on the first page of the Executive Summary. All availability dates,whether for individual components or for the SUT as a whole, must be disclosed to a precision of one day. [Clause 8.1.8.3]*

All hardware and software components used in the price calculations of the PRIMERGY H400 system will be generally available from Fujitsu Siemens Computers GmbH as of April 1, 2001.

8.3 **Throughput and Price/Performance**	*A statement of the measured tpmC, as well as the respective calculations for 3-year pricing, price/performance (price/tpmC), and the availability date must be included. [Clause 8.1.8.4]*

PRIMERGY H400 system was measured at 37,383.57 tpmC with Microsoft SQL Server 2000 Enterprise Edition with a 3-year system price of €478,649. The respective price/performance for the PRIMERGY H400 is €12.80/tpmC. The priced PRIMERGY H400 will be available as of April 1, 2001.

8.4 **Country Specific Pricing**	*Additional Clause 7 related items may be included in the Full Disclosure Report for each country specific priced configuration. Country specifiv pricing is subject to Clause 7.1.7 [Clause 8.1.8.5]*

The system is being priced for Germany.

8.5 **Usage Pricing**	*For any usage pricing, the sponsor must diclose:* • *Usage level at which the component was priced.* • *A statement of the company policy allowing such pricing.* *[Clause 8.1.8.6]*

The component pricing based on usage is shown below:

- One Microsoft SQL Server 2000 Enterprise Edition
- One Windows 2000 Advanced Server
- 3 Microsoft Windows 2000 Server license (includes 5 client access licenses)
- One Microsoft Visual C++ Professional 6.0

9. Clause 8 Related Items - Audit

9.1 Auditor	*The auditor's name, address, phone number, and a copy of the auditor's attestation letter indicating compliance must be included in the Full Disclosure Report.* *A review of the pricing model is required to ensure that all components required are priced (see Clause 9.2.8). The auditor is not required to review the final Full Disclosure Report or the final pricing prior to issuing the attestation letter. [Clause 8.1.9]*

The benchmark test of the PRIMERGY H400 system with Microsoft SQL Server 2000 Enterprise Edition was independently audited by:

Francios Raab and Bradley Askins, TPC certified auditors of Infosizing.
The attestation letter is included in Appendix F.

Requests for this TPC-C Full Disclosure Report should be sent to:

Transaction Processing Performance Council
c/o Shanley Public Relations
777 North First Street, Suite 6000
San Jose, CA 95112-6311

or

FUJITSU SIEMENS COMPUTERS
EP PS DS5
PRIMERGY Server Performance Lab
Mr. Bathe
Heinz-Nixdorf-Ring 1
33106 Paderborn
Germany

Appendix A - Application Source Code

```
LIBRARY TPCC.DLL

EXPORTS

     GetExtensionVersion  @1
     HttpExtensionProc    @2
     TerminateExtension   @3


/*   FILE:      TPCC.H
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   Version 4.10.000 audited by Richard Gimarc, Performance
Metrics, 3/17/99
 *
 *   PURPOSE:   Header file for ISAPI TPCC.DLL, defines structures and
functions used in the isapi tpcc.dll.
 *
 */

//VERSION RESOURCE DEFINES
#define _APS_NEXT_RESOURCE_VALUE                    101
#define _APS_NEXT_COMMAND_VALUE                     40001
#define _APS_NEXT_CONTROL_VALUE                     1000
#define _APS_NEXT_SYMED_VALUE                       101

#define TP_MAX_RETRIES                                   50


//note that the welcome form must be processed first as terminal ids
assigned here, once the
//terminal id is assigned then the forms can be processed in any order.
#define WELCOME_FORM                              1          //beginning form
no term id assigned, form id
#define MAIN_MENU_FORM                                   2          //term id
assigned main menu form id
#define NEW_ORDER_FORM                                   3          //new order
form id
#define PAYMENT_FORM                              4          //payment form id
#define DELIVERY_FORM                             5          //delivery form id
#define ORDER_STATUS_FORM                         6          //order status id
#define STOCK_LEVEL_FORM                          7          //stock level form
id
```

```
//This macro is used to prevent the compiler error unused formal parameter
#define UNUSEDPARAM(x) (x = x)


//This structure defines the data necessary to keep distinct for each
terminal or client connection.
typedef struct _CLIENTDATA
{
     int             iNextFree;                //index of next free element
or -1 if this entry in use.
     int             w_id;                     //warehouse id assigned at
welcome form
     int             d_id;                     //district id assigned at
welcome form

     int             iSyncId;                  //syncronization id
     int             iTickCount;                    //time of last access;

     CTPCC_BASE *pTxn;

} CLIENTDATA, *PCLIENTDATA;


//This structure is used to define the operational interface for terminal id
support
typedef struct _TERM
{
     int             iNumEntries;                        //total allocated
terminal array entries
     int             iFreeList;                          //next available
terminal array element or -1 if none
     int             iMasterSyncId;                      //syncronization
id
     CLIENTDATA *pClientData;                       //pointer to allocated
client data
} TERM;

typedef TERM *PTERM;                                     //pointer to terminal
structure type


     enum WEBERROR
     {
          NO_ERR,
          ERR_COMMAND_UNDEFINED,
          ERR_D_ID_INVALID,
```

```
ERR_DELIVERY_CARRIER_ID_RANGE,
ERR_DELIVERY_CARRIER_INVALID,
ERR_DELIVERY_MISSING_OCD_KEY,
ERR_DELIVERY_THREAD_FAILED,
ERR_GETPROCADDR_FAILED,
ERR_HTML_ILL_FORMED,
ERR_INVALID_SYNC_CONNECTION,
ERR_INVALID_TERMID,
ERR_LOADDLL_FAILED,
ERR_MAX_CONNECTIONS_EXCEEDED,
ERR_MEM_ALLOC_FAILED,
ERR_MISSING_REGISTRY_ENTRIES,
ERR_NEWORDER_CUSTOMER_INVALID,
ERR_NEWORDER_CUSTOMER_KEY,
ERR_NEWORDER_DISTRICT_INVALID,
ERR_NEWORDER_FORM_MISSING_DID,
ERR_NEWORDER_ITEMID_INVALID,
ERR_NEWORDER_ITEMID_RANGE,
ERR_NEWORDER_ITEMID_WITHOUT_SUPPW,
ERR_NEWORDER_MISSING_IID_KEY,
ERR_NEWORDER_MISSING_QTY_KEY,
ERR_NEWORDER_MISSING_SUPPW_KEY,
ERR_NEWORDER_NOITEMS_ENTERED,
ERR_NEWORDER_QTY_INVALID,
ERR_NEWORDER_QTY_RANGE,
ERR_NEWORDER_QTY_WITHOUT_SUPPW,
ERR_NEWORDER_SUPPW_INVALID,
ERR_NO_SERVER_SPECIFIED,
ERR_ORDERSTATUS_CID_AND_CLT,
ERR_ORDERSTATUS_CID_INVALID,
ERR_ORDERSTATUS_CLT_RANGE,
ERR_ORDERSTATUS_DID_INVALID,
ERR_ORDERSTATUS_MISSING_CID_CLT,
ERR_ORDERSTATUS_MISSING_CID_KEY,
ERR_ORDERSTATUS_MISSING_CLT_KEY,
ERR_ORDERSTATUS_MISSING_DID_KEY,
ERR_PAYMENT_CDI_INVALID,
ERR_PAYMENT_CID_AND_CLT,
ERR_PAYMENT_CUSTOMER_INVALID,
ERR_PAYMENT_CWI_INVALID,
ERR_PAYMENT_DISTRICT_INVALID,
ERR_PAYMENT_HAM_INVALID,
ERR_PAYMENT_HAM_RANGE,
ERR_PAYMENT_LAST_NAME_TO_LONG,
ERR_PAYMENT_MISSING_CDI_KEY,
ERR_PAYMENT_MISSING_CID_CLT,
ERR_PAYMENT_MISSING_CID_KEY,
ERR_PAYMENT_MISSING_CLT,
ERR_PAYMENT_MISSING_CLT_KEY,
ERR_PAYMENT_MISSING_CWI_KEY,
ERR_PAYMENT_MISSING_DID_KEY,
ERR_PAYMENT_MISSING_HAM_KEY,
ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY,
          ERR_STOCKLEVEL_THRESHOLD_INVALID,
          ERR_STOCKLEVEL_THRESHOLD_RANGE,
          ERR_VERSION_MISMATCH,
          ERR_W_ID_INVALID
     };

class CWEBCLNT_ERR : public CBaseErr
{
     public:

          CWEBCLNT_ERR(WEBERROR Err)
          {
               m_Error = Err;
               m_szTextDetail = NULL;
               m_SystemErr = 0;
               m_szErrorText = NULL;
          };

          CWEBCLNT_ERR(WEBERROR Err, char *szTextDetail, DWORD dwSystemErr)
          {
               m_Error = Err;
               m_szTextDetail = new char[strlen(szTextDetail)+1];
               strcpy( m_szTextDetail, szTextDetail );
               m_SystemErr = dwSystemErr;
               m_szErrorText = NULL;
          };

          ~CWEBCLNT_ERR()
          {
               if (m_szTextDetail != NULL)
                    delete [] m_szTextDetail;
               if (m_szErrorText != NULL)
                    delete [] m_szErrorText;
          };

          WEBERROR   m_Error;
          char       *m_szTextDetail;     //
          char       *m_szErrorText;
          DWORD      m_SystemErr;

          int ErrorType() {return ERR_TYPE_WEBDLL;};
          int ErrorNum() {return m_Error;};
          char *ErrorText();

};

//These constants have already been defined in engstut.h, but since we do
//not want to include it in the delisrv executable
#define    TXN_EVENT_START      2
#define    TXN_EVENT_STOP       4
#define TXN_EVENT_WARNING  6         //used to record a warning into the log

//function prototypes
```

```
BOOL APIENTRY DllMain(HANDLE hModule, DWORD ul_reason_for_call, LPVOID
lpReserved);
void WriteMessageToEventLog(LPTSTR lpszMsg);
void ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB, int *pCmd, int
*pFormId, int *pTermId, int *pSyncId);
void WelcomeForm(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer);
void SubmitCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer);
void BeginCmd(EXTENSION_CONTROL_BLOCK *pECB, int iFormId, int iTermId);
void ProcessCmd(EXTENSION_CONTROL_BLOCK *pECB, int iFormId, int iTermId);
void StatsCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer);
void ErrorMessage(EXTENSION_CONTROL_BLOCK *pECB, int iError, int iErrorType,
char *szMsg, int iTermId);
void GetKeyValue(char **pQueryString, char *pKey, char *pValue, int iMax,
WEBERROR err);
int  GetIntKeyValue(char **pQueryString, char *pKey, WEBERROR NoKeyErr,
WEBERROR NotIntErr);
void TermInit(void);
void TermDeleteAll(void);
int  TermAdd(void);
void TermDelete(int id);
void ErrorForm(EXTENSION_CONTROL_BLOCK *pECB, int iType, int iErrorNum, int
iTermId, int iSyncId, char *szErrorText, char *szBuffer );
void MakeMainMenuForm(int iTermId, int iSyncId, char *szForm);
void MakeStockLevelForm(int iTermId, STOCK_LEVEL_DATA *pStockLevelData, BOOL
bInput, char *szForm);
void MakeNewOrderForm(int iTermId, NEW_ORDER_DATA *pNewOrderData, BOOL
bInput, char *szForm);
void MakePaymentForm(int iTermId, PAYMENT_DATA *pPaymentData, BOOL bInput,
char *szForm);
void MakeOrderStatusForm(int iTermId, ORDER_STATUS_DATA *pOrderStatusData,
BOOL bInput, char *szForm);
void MakeDeliveryForm(int iTermId, DELIVERY_DATA *pDeliveryData, BOOL
bInput, char *szForm);
void ProcessNewOrderForm(EXTENSION_CONTROL_BLOCK     *pECB, int iTermId,
char *szBuffer);
void ProcessPaymentForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char
*szBuffer);
void ProcessOrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char
*szBuffer);
void ProcessDeliveryForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char
*szBuffer);
void ProcessStockLevelForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char
*szBuffer);
void GetNewOrderData(LPSTR lpszQueryString, NEW_ORDER_DATA *pNewOrderData);
void GetPaymentData(LPSTR lpszQueryString, PAYMENT_DATA *pPaymentData);
void GetOrderStatusData(LPSTR lpszQueryString, ORDER_STATUS_DATA
*pOrderStatusData);
BOOL PostDeliveryInfo(short w_id, short o_carrier_id);
BOOL IsNumeric(char *ptr);
BOOL IsDecimal(char *ptr);
void DeliveryWorkerThread(void *ptr);
```

```
//Microsoft Developer Studio generated resource script.
//
#include "resource.h"

#define APSTUDIO_READONLY_SYMBOLS
////////////////////////////////////////////////////////////////////////////
/
//
// Generated from the TEXTINCLUDE 2 resource.
//
#include "afxres.h"

////////////////////////////////////////////////////////////////////////////
/
#undef APSTUDIO_READONLY_SYMBOLS

////////////////////////////////////////////////////////////////////////////
/
// English (U.S.) resources

#if !defined(AFX_RESOURCE_DLL) || defined(AFX_TARG_ENU)
#ifdef _WIN32
LANGUAGE LANG_ENGLISH, SUBLANG_ENGLISH_US
#pragma code_page(1252)
#endif //_WIN32

#ifndef _MAC
////////////////////////////////////////////////////////////////////////////
/
//
// Version
//

VS_VERSION_INFO VERSIONINFO
 FILEVERSION 0,4,0,0
 PRODUCTVERSION 0,4,0,0
 FILEFLAGSMASK 0x3fL
#ifdef _DEBUG
 FILEFLAGS 0x1L
#else
 FILEFLAGS 0x0L
#endif
 FILEOS 0x40004L
 FILETYPE 0x2L
 FILESUBTYPE 0x0L
BEGIN
    BLOCK "StringFileInfo"
    BEGIN
        BLOCK "040904b0"
        BEGIN
            VALUE "Comments", "TPC-C HTML DLL Server (DBLIB)\0"
            VALUE "CompanyName", "Microsoft\0"
            VALUE "FileDescription", "TPC-C HTML DLL Server (DBLIB)\0"
```

```
            VALUE "FileVersion", "0, 4, 0, 0\0"
            VALUE "InternalName", "tpcc\0"
            VALUE "LegalCopyright", "Copyright © 1997\0"
            VALUE "OriginalFilename", "tpcc.dll\0"
            VALUE "ProductName", "Microsoft tpcc\0"
            VALUE "ProductVersion", "0, 4, 0, 0\0"
        END
    END
    BLOCK "VarFileInfo"
    BEGIN
        VALUE "Translation", 0x409, 1200
    END
END

#endif    // !_MAC


#ifdef APSTUDIO_INVOKED
////////////////////////////////////////////////////////////////////////////
/
//
// TEXTINCLUDE
//

1 TEXTINCLUDE DISCARDABLE
BEGIN
    "resource.h\0"
END

2 TEXTINCLUDE DISCARDABLE
BEGIN
    "#include ""afxres.h""\r\n"
    "\0"
END

3 TEXTINCLUDE DISCARDABLE
BEGIN
    "\r\n"
    "\0"
END

#endif    // APSTUDIO_INVOKED


////////////////////////////////////////////////////////////////////////////
/
//
// Dialog
//

IDD_DIALOG1 DIALOG DISCARDABLE  0, 0, 186, 95
STYLE DS_MODALFRAME | WS_POPUP | WS_CAPTION | WS_SYSMENU
CAPTION "Dialog"
FONT 8, "MS Sans Serif"
BEGIN
    DEFPUSHBUTTON   "OK",IDOK,129,7,50,14
    PUSHBUTTON      "Cancel",IDCANCEL,129,24,50,14
END


////////////////////////////////////////////////////////////////////////////
/
//
// DESIGNINFO
//

#ifdef APSTUDIO_INVOKED
GUIDELINES DESIGNINFO DISCARDABLE
BEGIN
    IDD_DIALOG1, DIALOG
    BEGIN
        LEFTMARGIN, 7
        RIGHTMARGIN, 179
        TOPMARGIN, 7
        BOTTOMMARGIN, 88
    END
END
#endif    // APSTUDIO_INVOKED

#endif    // English (U.S.) resources
////////////////////////////////////////////////////////////////////////////
/



#ifndef APSTUDIO_INVOKED
////////////////////////////////////////////////////////////////////////////
/
//
// Generated from the TEXTINCLUDE 3 resource.
//


////////////////////////////////////////////////////////////////////////////
/
#endif    // not APSTUDIO_INVOKED


/*    FILE:      TPCC.C
 *                    Microsoft TPC-C Kit Ver. 4.20.000
 *                    Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                    Version 4.10.000 audited by Richard Gimarc, Performance
Metrics, 3/17/99
 *
```

```
 *   PURPOSE:   Main module for TPCC.DLL which is an ISAPI service dll.
 *   Contact:   Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *        4.20.000 - reworked error handling; added options for COM and
Encina txn monitors
 */

#include <windows.h>
#include <process.h>
#include <tchar.h>
#include <stdio.h>
#include <stdarg.h>
#include <malloc.h>
#include <stdlib.h>
#include <string.h>
#include <time.h>
#include <sys\timeb.h>
#include <io.h>
#include <assert.h>

#include <sqltypes.h>

#ifdef ICECAP
#include <icapexp.h>
#endif

#include "..\..\common\src\trans.h"       //tpckit transaction header
contains definations of structures specific to TPC-C
#include "..\..\common\src\error.h"
#include "..\..\common\src\txn_base.h"
#include "..\..\common\src\ReadRegistry.h"

#include "..\..\common\txnlog\include\rtetime.h"
#include "..\..\common\txnlog\include\spinlock.h"
#include "..\..\common\txnlog\include\txnlog.h"

// Database layer includes
#include "..\..\db_dblib_dll\src\tpcc_dblib.h"       // DBLIB implementation
of TPC-C txns
#include "..\..\db_odbc_dll\src\tpcc_odbc.h"         // ODBC implementation
of TPC-C txns

// Txn monitor layer includes
#include "..\..\tm_com_dll\src\tpcc_com.h"           // COM Services
implementation on TPC-C txns
#include "..\..\tm_tuxedo_dll\src\tpcc_tux.h"        // interface to Tuxedo
libraries
#include "..\..\tm_encina_dll\src\tpcc_enc.h"        // interface to Encina
libraries

#include "httpext.h"                //ISAPI DLL information header
#include "tpcc.h"                          //this dlls specific structure,
value e.t. header.


#define    LEN_ERR_STRING  256

// defines for Make<Txn>Form calls to distinguish input and output flavors
#define    OUTPUT_FORM     0
#define INPUT_FORM   1

char       szMyComputerName[MAX_COMPUTERNAME_LENGTH+1];

//Terminal client id structure
TERM  Term = { 0, 0, 0, NULL };

// The WEBCLIENT_VERSION string specifies the version level of this web
client interface.
// The RTE must be synchronized with the interface level on login, otherwise
the login
// will fail.  This is a sanity check to catch problems resulting from
mismatched versions
// of the RTE and web client.
#define WEBCLIENT_VERSION "410"

static     CRITICAL_SECTION          TermCriticalSection;

static  HINSTANCE hLibInstanceTm = NULL;
static  HINSTANCE hLibInstanceDb = NULL;

TYPE_CTPCC_DBLIB     *pCTPCC_DBLIB_new;
TYPE_CTPCC_ODBC      *pCTPCC_ODBC_new;
TYPE_CTPCC_TUXEDO    *pCTPCC_TUXEDO_new;
TYPE_CTPCC_ENCINA   *pCTPCC_ENCINA_new;
TYPE_CTPCC_ENCINA   *pCTPCC_ENCINA_post_init;
TYPE_CTPCC_COM       *pCTPCC_COM_new;

// For deferred Delivery txns:

CTxnLog                         *txnDelilog = NULL;            //used to log
delivery transaction information

HANDLE                          hWorkerSemaphore     = INVALID_HANDLE_VALUE;
HANDLE                          hDoneEvent           = INVALID_HANDLE_VALUE;
HANDLE                          *pDeliHandles        = NULL;

// configuration settings from registry
TPCCREGISTRYDATA          Reg;


DWORD                     dwNumDeliveryThreads = 4;
CRITICAL_SECTION          DelBuffCriticalSection;        //critical section
for delivery transactions cache
DELIVERY_TRANSACTION *pDelBuff            = NULL;
```

```
DWORD                     dwDelBuffSize        = 100;          // size of
circular buffer for delivery txns
DWORD                     dwDelBuffFreeCount;                  // number of
buffers free
DWORD                     dwDelBuffBusyIndex   = 0;       // index position
of entry waiting to be delivered
DWORD                     dwDelBuffFreeIndex   = 0;       // index position
of unused entry

#include "..\..\common\src\ReadRegistry.cpp"

/* FUNCTION: DllMain
 *
 * PURPOSE:     This function is the entry point for the DLL.  This
implementation is based on the
 *              fact that DLL_PROCESS_ATTACH is only called from the inet
service once.
 *
 * ARGUMENTS:   HANDLE     hModule                   module handle
 *                   DWORD ul_reason_for_call   reason for call
 *                   LPVOID     lpReserved           reserved for future use
 *
 * RETURNS:          BOOL  FALSE                 errors occured in
initialization
 *                         TRUE                  DLL successfully
initialized
 */

BOOL APIENTRY DllMain(HANDLE hModule, DWORD ul_reason_for_call, LPVOID
lpReserved)
{
     DWORD  i;
     char szEvent[LEN_ERR_STRING] = "\0";
     char szLogFile[128];
     char szDllName[128];

// debugging....
// DebugBreak();

     try
     {
          switch( ul_reason_for_call )
          {
               case DLL_PROCESS_ATTACH:
                    {
                         DWORD dwSize = MAX_COMPUTERNAME_LENGTH+1;
                         GetComputerName(szMyComputerName, &dwSize);
                         szMyComputerName[dwSize] = 0;
                    }

                    DisableThreadLibraryCalls((HMODULE)hModule);
                    InitializeCriticalSection(&TermCriticalSection);

                    if ( ReadTPCCRegistrySettings( &Reg ) )
                         throw new CWEBCLNT_ERR(
ERR_MISSING_REGISTRY_ENTRIES );

                    dwDelBuffSize = min( Reg.dwMaxPendingDeliveries, 10000
);  // min with 10000 as a sanity constraint
                    dwNumDeliveryThreads = min(
Reg.dwNumberOfDeliveryThreads, 100 );  // min with 100 as a sanity
constraint

                    TermInit();

                    // load DLL for txn monitor
                    if (Reg.eTxnMon == TUXEDO)
                    {
                         strcpy( szDllName, Reg.szPath );
                         strcat( szDllName, "tpcc_tuxedo.dll");
                         hLibInstanceTm = LoadLibrary( szDllName );
                         if (hLibInstanceTm == NULL)
                              throw new CWEBCLNT_ERR( ERR_LOADDLL_FAILED,
szDllName, GetLastError() );

                         // get function pointer to wrapper for class
constructor
                         pCTPCC_TUXEDO_new = (TYPE_CTPCC_TUXEDO*)
GetProcAddress(hLibInstanceTm,"CTPCC_TUXEDO_new");
                         if (pCTPCC_TUXEDO_new == NULL)
                              throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                    }
                    else if (Reg.eTxnMon == ENCINA)
                    {
                         strcpy( szDllName, Reg.szPath );
                         strcat( szDllName, "tpcc_encina.dll");
                         hLibInstanceTm = LoadLibrary( szDllName );
                         if (hLibInstanceTm == NULL)
                              throw new CWEBCLNT_ERR( ERR_LOADDLL_FAILED,
szDllName, GetLastError() );
                         // get function pointer to wrapper for class
constructor
                         pCTPCC_ENCINA_new = (TYPE_CTPCC_ENCINA*)
GetProcAddress(hLibInstanceTm,"CTPCC_ENCINA_new");
                         pCTPCC_ENCINA_post_init = (TYPE_CTPCC_ENCINA*)
GetProcAddress(hLibInstanceTm,"CTPCC_ENCINA_post_init");
                         if (pCTPCC_ENCINA_new == NULL)
                              throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                    }
                    else if (Reg.eTxnMon == COM)
                    {
                         strcpy( szDllName, Reg.szPath );
                         strcat( szDllName, "tpcc_com.dll");
                         hLibInstanceTm = LoadLibrary( szDllName );
```

```
                        if (hLibInstanceTm == NULL)
                             throw new CWEBCLNT_ERR( ERR_LOADDLL_FAILED,
szDllName, GetLastError() );

                        // get function pointer to wrapper for class
constructor
                        pCTPCC_COM_new = (TYPE_CTPCC_COM*)
GetProcAddress(hLibInstanceTm,"CTPCC_COM_new");
                        if (pCTPCC_COM_new == NULL)
                             throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                   }

                   // load DLL for database connection
                   if ((Reg.eTxnMon == None) || (dwNumDeliveryThreads >
0))
                   {
                        if (Reg.eDB_Protocol == DBLIB)
                        {
                             strcpy( szDllName, Reg.szPath );
                             strcat( szDllName, "tpcc_dblib.dll");
                             hLibInstanceDb = LoadLibrary( szDllName );
                             if (hLibInstanceDb == NULL)
                                  throw new CWEBCLNT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );

                             // get function pointer to wrapper for class
constructor
                             pCTPCC_DBLIB_new = (TYPE_CTPCC_DBLIB*)
GetProcAddress(hLibInstanceDb,"CTPCC_DBLIB_new");
                             if (pCTPCC_DBLIB_new == NULL)
                                  throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                        }
                        else if (Reg.eDB_Protocol == ODBC)
                        {
                             strcpy( szDllName, Reg.szPath );
                             strcat( szDllName, "tpcc_odbc.dll");
                             hLibInstanceDb = LoadLibrary( szDllName );
                             if (hLibInstanceDb == NULL)
                                  throw new CWEBCLNT_ERR(
ERR_LOADDLL_FAILED, szDllName, GetLastError() );

                             // get function pointer to wrapper for class
constructor
                             pCTPCC_ODBC_new = (TYPE_CTPCC_ODBC*)
GetProcAddress(hLibInstanceDb,"CTPCC_ODBC_new");
                             if (pCTPCC_ODBC_new == NULL)
                                  throw new CWEBCLNT_ERR(
ERR_GETPROCADDR_FAILED, szDllName, GetLastError() );
                        }
                   }
```

```
                   if (dwNumDeliveryThreads)
                   {
                        // for deferred delivery txns:
                        hDoneEvent = CreateEvent( NULL, TRUE /* manual
reset */, FALSE /* initially not signalled */, NULL );

     InitializeCriticalSection(&DelBuffCriticalSection);
                        hWorkerSemaphore = CreateSemaphore( NULL, 0,
dwDelBuffSize, NULL );
                        dwDelBuffFreeCount = dwDelBuffSize;

                        InitJulianTime(NULL);

                        // create unique log file name based on delilog-
yymmdd-hhmm.log
                        SYSTEMTIME Time;
                        GetLocalTime( &Time );
                        wsprintf( szLogFile, "%sdelivery-%2.2d%2.2d%2.2d-
%2.2d%2.2d.log",
                                  Reg.szPath, Time.wYear % 100,
Time.wMonth, Time.wDay, Time.wHour, Time.wMinute );
                        txnDelilog = new CTxnLog(szLogFile,
TXN_LOG_WRITE);

                        //write event into txn log for START
                        txnDelilog->WriteCtrlRecToLog(TXN_EVENT_START,
szMyComputerName, sizeof(szMyComputerName));

                        // allocate structures for delivery buffers and
thread mgmt
                        pDeliHandles = new HANDLE[dwNumDeliveryThreads];
                        pDelBuff = new
DELIVERY_TRANSACTION[dwDelBuffSize];
                        // launch DeliveryWorkerThread to perform actual
delivery txns
                        for(i=0; i<dwNumDeliveryThreads; i++)
                        {
                             pDeliHandles[i] = (HANDLE) _beginthread(
DeliveryWorkerThread, 0, NULL );
                             if (pDeliHandles[i] == INVALID_HANDLE_VALUE)
                                  throw new CWEBCLNT_ERR(
ERR_DELIVERY_THREAD_FAILED );
                        }
                   }

                   break;

              case DLL_PROCESS_DETACH:
                   if (dwNumDeliveryThreads)
                   {
                        if (txnDelilog != NULL)
                        {
                             //write event into txn log for STOP
```

```
                              txnDelilog-
>WriteCtrlRecToLog(TXN_EVENT_STOP, szMyComputerName,
sizeof(szMyComputerName));

                              // This will do a clean shutdown of the
delivery log file
                              CTxnLog    *txnDelilogLocal = txnDelilog;
                              txnDelilog= NULL;
                              delete txnDelilogLocal;
                         }

                         delete [] pDeliHandles;
                         delete [] pDelBuff;

                         CloseHandle( hWorkerSemaphore );
                         CloseHandle( hDoneEvent );
                         DeleteCriticalSection(&DelBuffCriticalSection);
                    }

                    DeleteCriticalSection(&TermCriticalSection);

                    if (hLibInstanceTm != NULL)
                         FreeLibrary( hLibInstanceTm );
                    hLibInstanceTm = NULL;

                    if (hLibInstanceDb != NULL)
                         FreeLibrary( hLibInstanceDb );
                    hLibInstanceDb = NULL;

                    Sleep(500);
                    break;

               default:
                    /* nothing */;
          }
     }
     catch (CBaseErr *e)
     {
          WriteMessageToEventLog( e->ErrorText() );
          delete e;
          TerminateExtension(0);
          return FALSE;
     }
     catch (...)
     {
          WriteMessageToEventLog(TEXT("Unhandled exception.  DLL could not
load."));
          TerminateExtension(0);
          return FALSE;
     }

     return TRUE;
}
```

```
/* FUNCTION: GetExtensionVersion
 *
 * PURPOSE:     This function is called by the inet service when the DLL is
first loaded.
 *
 * ARGUMENTS:   HSE_VERSION_INFO     *pVer passed in structure in which to
place expected version number.
 *
 * RETURNS:          TRUE inet service expected return value.
 */

BOOL WINAPI GetExtensionVersion(HSE_VERSION_INFO *pVer)
{
     pVer->dwExtensionVersion = MAKELONG(HSE_VERSION_MINOR,
HSE_VERSION_MAJOR);
     lstrcpyn(pVer->lpszExtensionDesc, "TPC-C Server.",
HSE_MAX_EXT_DLL_NAME_LEN);

     // TODO: why do we need this here instead of in the DLL attach?
     if (Reg.eTxnMon == ENCINA)
          pCTPCC_ENCINA_post_init();

     return TRUE;
}

/* FUNCTION: TerminateExtension
 *
 * PURPOSE:     This function is called by the inet service when the DLL is
about to be unloaded.
 *              Release all resources in anticipation of being unloaded.
 *
 * RETURNS:          TRUE inet service expected return value.
 */

BOOL WINAPI TerminateExtension( DWORD dwFlags )
{
     if (pDeliHandles)
     {
          SetEvent( hDoneEvent );
          for(DWORD i=0; i<dwNumDeliveryThreads; i++)
               WaitForSingleObject( pDeliHandles[i], INFINITE );
     }

     TermDeleteAll();
     return TRUE;
}


/* FUNCTION: HttpExtensionProc
 *
```

```
 * PURPOSE:     This function is the main entry point for the TPCC DLL. The
internet service
 *              calls this function passing in the http string.
 *
 * ARGUMENTS:   EXTENSION_CONTROL_BLOCK    *pECB structure pointer to passed
in internet
 *                                                                  service
information.
 *
 * RETURNS:          DWORD HSE_STATUS_SUCCESS
     connection can be dropped if error
 *                            HSE_STATUS_SUCCESS_AND_KEEP_CONN     keep
connect valid comment sent
 *
 * COMMENTS:    None
 *
 */

DWORD WINAPI HttpExtensionProc(EXTENSION_CONTROL_BLOCK *pECB)
{
     int             iCmd, FormId, TermId, iSyncId;
     char       szBuffer[4096];

     int             lpbSize;
     static char     szHeader[] = "200 Ok";
     DWORD      dwSize = 6;          // initial value is strlen(szHeader)
     char       szHeader1[4096];


#ifdef ICECAP
     StartCAP();
#endif

     try
     {
          //process http query
          ProcessQueryString(pECB, &iCmd, &FormId, &TermId, &iSyncId);

          if (TermId != 0)
          {
               if ( TermId < 0 || TermId >= Term.iNumEntries ||
Term.pClientData[TermId].iNextFree != -1 )
               {
                    // debugging...
                    char szTmp[128];
                    wsprintf( szTmp, "Invalid term ID; TermId = %d", TermId
);
                    WriteMessageToEventLog( szTmp );

                    throw new CWEBCLNT_ERR( ERR_INVALID_TERMID );
               }

               //must have a valid syncid here since termid is valid
               if (iSyncId != Term.pClientData[TermId].iSyncId)
                    throw new CWEBCLNT_ERR( ERR_INVALID_SYNC_CONNECTION );

               //set use time
               Term.pClientData[TermId].iTickCount = GetTickCount();
          }


          switch(iCmd)
          {
          case 0:
               WelcomeForm(pECB, szBuffer);
               break;
          case 1:
               switch( FormId )
               {
                    case WELCOME_FORM:
                    case MAIN_MENU_FORM:
                         break;
                    case NEW_ORDER_FORM:
                         ProcessNewOrderForm(pECB, TermId, szBuffer);
                         break;
                    case PAYMENT_FORM:
                         ProcessPaymentForm(pECB, TermId, szBuffer);
                         break;
                    case DELIVERY_FORM:
                         ProcessDeliveryForm(pECB, TermId, szBuffer);
                         break;
                    case ORDER_STATUS_FORM:
                         ProcessOrderStatusForm(pECB, TermId, szBuffer);
                         break;
                    case STOCK_LEVEL_FORM:
                         ProcessStockLevelForm(pECB, TermId, szBuffer);
                         break;
               }
               break;
          case 2:
               // new-order selected from menu; display new-order input
form
               MakeNewOrderForm(TermId, NULL, INPUT_FORM, szBuffer);
               break;
          case 3:
               // payment selected from menu; display payment input form
               MakePaymentForm(TermId, NULL, INPUT_FORM, szBuffer);
               break;
          case 4:
               // delivery selected from menu; display delivery input form
               MakeDeliveryForm(TermId, NULL, INPUT_FORM, szBuffer);
               break;
          case 5:
               // order-status selected from menu; display order-status
input form
               MakeOrderStatusForm(TermId, NULL, INPUT_FORM, szBuffer);
```

```
                break;
           case 6:
                // stock-level selected from menu; display stock-level input
form
                MakeStockLevelForm(TermId, NULL, INPUT_FORM, szBuffer);
                break;
           case 7:
                // ExitCmd
                TermDelete(TermId);
                WelcomeForm(pECB, szBuffer);
                break;
           case 8:
                SubmitCmd(pECB, szBuffer);
                break;
           case 9:
                // menu
                MakeMainMenuForm(TermId, Term.pClientData[TermId].iSyncId,
szBuffer);
                break;
           case 10:
                // CMD=Clear
                // resets all connections; should only be used when no other
connections are active
                TermDeleteAll();
                TermInit();
                WelcomeForm(pECB, szBuffer);
                break;
           case 11:   // CMD=Stats
                StatsCmd(pECB, szBuffer);
                break;
           }
      }
      catch (CBaseErr *e)
      {
           ErrorForm( pECB, e->ErrorType(), e->ErrorNum(), TermId, iSyncId,
e->ErrorText(), szBuffer );
           delete e;
      }
      catch (...)
      {
           ErrorForm( pECB, ERR_TYPE_WEBDLL, 0, TermId, iSyncId, "Error:
Unhandled exception in Web Client.", szBuffer );
      }

#ifdef ICECAP
      StopCAP();
#endif


      lpbSize = strlen(szBuffer);
      wsprintf(szHeader1,
                "Content-Type: text/html\r\n"
                "Content-Length: %d\r\n"
                "Connection: Keep-Alive\r\n\r\n" , lpbSize);
      strcat( szHeader1, szBuffer );

      (*pECB->ServerSupportFunction)(pECB->ConnID,
HSE_REQ_SEND_RESPONSE_HEADER, szHeader, (LPDWORD) &dwSize,
(LPDWORD)szHeader1);

      //finish up and keep connection
      pECB->dwHttpStatusCode = 200;
      return HSE_STATUS_SUCCESS_AND_KEEP_CONN;
}


void WriteMessageToEventLog(LPTSTR lpszMsg)
{
    TCHAR   szMsg[256];
    HANDLE  hEventSource;
    LPTSTR  lpszStrings[2];

    // Use event logging to log the error.
    //
    hEventSource = RegisterEventSource(NULL, TEXT("TPCC.DLL"));

    _stprintf(szMsg, TEXT("Error in TPCC.DLL: "));
    lpszStrings[0] = szMsg;
    lpszStrings[1] = lpszMsg;

    if (hEventSource != NULL)
     {
        ReportEvent(hEventSource, // handle of event source
            EVENTLOG_ERROR_TYPE,  // event type
            0,                    // event category
            0,                    // event ID
            NULL,                 // current user's SID
            2,                    // strings in lpszStrings
            0,                    // no bytes of raw data
            (LPCTSTR *)lpszStrings,    // array of error strings
            NULL);                // no raw data

        (VOID) DeregisterEventSource(hEventSource);
    }
}


/* FUNCTION: DeliveryWorkerThread
 *
 * PURPOSE:     This function processes deferred delivery txns.  There are
typically several
 *              threads running this routine.  The number of threads is
determined by an entry
 *              read from the registry.  The thread waits for work by
waiting on semaphore.
```

```
 *              When a delivery txn is posted, the semaphore is released.
After processing
 *              the delivery txn, information is logged to record the txn
status and execution
 *              time.
 */

/*static*/ void DeliveryWorkerThread(void *ptr)
{
     CTPCC_BASE      *pTxn = NULL;

     DELIVERY_TRANSACTION      delivery;
     PDELIVERY_DATA                 pDeliveryData;
     TXN_RECORD_TPCC_DELIV_DEF  txnDeliRec;

     DWORD                     index;
     HANDLE                         handles[2];

     SYSTEMTIME      trans_end;      //delivery transaction finished time
     SYSTEMTIME      trans_start;    //delivery transaction start time

     assert(txnDelilog != NULL);

     try
     {
          if (Reg.eDB_Protocol == ODBC)
               pTxn = pCTPCC_ODBC_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName );
          else if (Reg.eDB_Protocol == DBLIB)
               pTxn = pCTPCC_DBLIB_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName );
          pDeliveryData = pTxn->BuffAddr_Delivery();
     }
     catch (CBaseErr *e)
     {
          char szTmp[1024];
          wsprintf( szTmp, "Error in Delivery Txn thread.  Could not connect
to database.  "
                    "%s.  Server=%s, User=%s, Password=%s, Database=%s",
                    e->ErrorText(), Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, Reg.szDbName );
          WriteMessageToEventLog( szTmp );
          delete e;
          goto ErrorExit;
     }
     catch (...)
     {
          WriteMessageToEventLog(TEXT("Unhandled exception caught in
DeliveryWorkerThread."));
          goto ErrorExit;
     }

     while (TRUE)
     {
          try
          {
               //while delivery thread running, i.e. user has not requested
termination
               while (TRUE)
               {
                    // need to wait for multiple objects: program exit or
worker semaphore;
                    handles[0] = hDoneEvent;
                    handles[1] = hWorkerSemaphore;
                    index = WaitForMultipleObjects( 2, &handles[0], FALSE,
INFINITE );
                    if (index == WAIT_OBJECT_0)
                         goto ErrorExit;

                    ZeroMemory(&txnDeliRec, sizeof(txnDeliRec));
                    txnDeliRec.TxnType = TXN_REC_TYPE_TPCC_DELIV_DEF;

                    // make a local copy of current entry from delivery
buffer and increment buffer index
                    EnterCriticalSection(&DelBuffCriticalSection);
                    delivery = *(pDelBuff+dwDelBuffBusyIndex);
                    dwDelBuffFreeCount++;
                    dwDelBuffBusyIndex++;
                    if (dwDelBuffBusyIndex == dwDelBuffSize)  // wrap-
around if at end of buffer
                         dwDelBuffBusyIndex = 0;

                    LeaveCriticalSection(&DelBuffCriticalSection);

                    pDeliveryData->w_id = delivery.w_id;
                    pDeliveryData->o_carrier_id = delivery.o_carrier_id;

                    txnDeliRec.w_id = pDeliveryData->w_id;
                    txnDeliRec.o_carrier_id = pDeliveryData->o_carrier_id;
                    txnDeliRec.TxnStartT0 = Get64BitTime(&delivery.queue);

                    GetLocalTime( &trans_start );
                    pTxn->Delivery();
                    GetLocalTime( &trans_end );

                    //log txn
                    txnDeliRec.TxnStatus = ERR_SUCCESS;
                    for (int i=0; i<10; i++)
                         txnDeliRec.o_id[i] = pDeliveryData->o_id[i];
                    txnDeliRec.DeltaT4 = (int)(Get64BitTime(&trans_end) -
txnDeliRec.TxnStartT0);
                    txnDeliRec.DeltaTxnExec =
(int)(Get64BitTime(&trans_end) - Get64BitTime(&trans_start));

                    if (txnDelilog != NULL)
                         txnDelilog->WriteToLog(&txnDeliRec);
```

```
            }
        }
        catch (CBaseErr *e)
        {
            char szTmp[1024];
            wsprintf( szTmp, "Error in Delivery Txn thread.  %s", e-
>ErrorText() );
            WriteMessageToEventLog( szTmp );

            // log the error txn
            txnDeliRec.TxnStatus = e->ErrorType();
            if (txnDelilog != NULL)
                txnDelilog->WriteToLog(&txnDeliRec);

            delete e;
        }
        catch (...)
        {
            // unhandled exception; shouldn't happen; not much we can
do...
            WriteMessageToEventLog(TEXT("Unhandled exception caught in
DeliveryWorkerThread."));
        }
    }

ErrorExit:
    delete pTxn;
    _endthread();
}

/* FUNCTION: PostDeliveryInfo
 *
 * PURPOSE:     This function enters the delivery txn into the deferred
delivery buffer.
 *
 * RETURNS:          BOOL  FALSE delivery information posted successfully
 *                         TRUE  error cannot post delivery info
 */

BOOL PostDeliveryInfo(short w_id, short o_carrier_id)
{
    BOOL bError;

    EnterCriticalSection(&DelBuffCriticalSection);
    if (dwDelBuffFreeCount > 0)
    {
        bError = FALSE;
        (pDelBuff+dwDelBuffFreeIndex)->w_id             = w_id;
        (pDelBuff+dwDelBuffFreeIndex)->o_carrier_id     = o_carrier_id;
        GetLocalTime(&(pDelBuff+dwDelBuffFreeIndex)->queue);

        dwDelBuffFreeCount--;
        dwDelBuffFreeIndex++;
        if (dwDelBuffFreeIndex == dwDelBuffSize)
            dwDelBuffFreeIndex = 0;         // wrap-around if at end of
buffer
    }
    else
        // No free buffers.  Return an error, which indicates that the
delivery buffer is full.
        // Most likely, the number of delivery worker threads needs to be
increased to keep up
        // with the txn rate.
        bError = TRUE;
    LeaveCriticalSection(&DelBuffCriticalSection);

    if (!bError)
        // increment worker semaphore to wake up a worker thread
        ReleaseSemaphore( hWorkerSemaphore, 1, NULL );

    return bError;
}

/* FUNCTION: ProcessQueryString
 *
 * PURPOSE:     This function extracts the relevent information out of the
http command passed in from
 *              the browser.
 *
 * COMMENTS:    If this is the initial connection i.e. client is at welcome
screen then
 *                  there will not be a terminal id or current form id.  If
this is the case
 *                  then the pTermid and pFormid return values are
undefined.
 */

void ProcessQueryString(EXTENSION_CONTROL_BLOCK *pECB, int *pCmd, int
*pFormId, int *pTermId, int *pSyncId)
{
    char *ptr = pECB->lpszQueryString;
    char szBuffer[25];
    int i;

    //allowable client command strings i.e. CMD=command
    static char *szCmds[] =
    {
        "Process", "..NewOrder..", "..Payment..", "..Delivery..",
"..Order-Status..", "..Stock-Level..",
        "..Exit..", "Submit", "Menu", "Clear", "Stats", ""
    };

    *pCmd = 0;      // default is the login screen
    *pTermId = 0;

    // if no params (i.e., empty query string), then return login screen
```

```
     if (strlen(pECB->lpszQueryString) == 0)
          return;

     // parse FORMID, TERMID, and SYNCID
     *pFormId = GetIntKeyValue(&ptr, "FORMID", NO_ERR, NO_ERR);
     *pTermId = GetIntKeyValue(&ptr, "TERMID", NO_ERR, NO_ERR);
     *pSyncId = GetIntKeyValue(&ptr, "SYNCID", NO_ERR, NO_ERR);

     // parse CMD
     GetKeyValue(&ptr, "CMD", szBuffer, sizeof(szBuffer),
ERR_COMMAND_UNDEFINED);

     // see which command it matches
     for(i=0; ; i++)
     {
          if (szCmds[i][0] == 0)
               // no more; no match; return error
               throw new CWEBCLNT_ERR( ERR_COMMAND_UNDEFINED );
          if ( !strcmp(szCmds[i], szBuffer) )
          {
               *pCmd = i+1;
               break;
          }
     }
}

/* FUNCTION: void WelcomeForm
 *
 */

void WelcomeForm(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer)
{
     char szTmp[1024];

     //welcome to tpc-c html form buffer, this is first form client sees.
     strcpy( szBuffer,    "<HTML><HEAD><TITLE>TPC-C Web
Client</TITLE></HEAD><BODY>"
                          "<B><BIG>Microsoft TPC-C Web Client (ver
4.20)</BIG></B> <BR> <BR>"
                          "<font face=\"Courier New\"><PRE>"
                          "Compiled: "__DATE__", "__TIME__" <BR>"
                          "Source:   "__FILE__" ("__TIMESTAMP__")
<BR>"
                          "</PRE></font>"
                          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
                          "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\"
VALUE=\"0\">"
                          "<INPUT TYPE=\"hidden\" NAME=\"ERROR\"
VALUE=\"0\">"
                          "<INPUT TYPE=\"hidden\" NAME=\"FORMID\"
VALUE=\"1\">"
                          "<INPUT TYPE=\"hidden\" NAME=\"TERMID\"
VALUE=\"0\">"
                          "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\"
VALUE=\"0\">"
                          "<INPUT TYPE=\"hidden\" NAME=\"VERSION\"
VALUE=\"" WEBCLIENT_VERSION "\">"
               );

     sprintf( szTmp, "Configuration Settings: <BR><font face=\"Courier New\"
color=\"blue\"><PRE>"
                         "Txn Monitor            = <B>%s</B><BR>"
                         "Database protocol      = <B>%s</B><BR>"
                         "Max Connections        = <B>%d</B><BR>"
                         "# of Delivery Threads  = <B>%d</B><BR>"
                         "Max Pending Deliveries = <B>%d</B><BR>"
               , szTxnMonNames[Reg.eTxnMon], szDBNames[Reg.eDB_Protocol],
               Reg.dwMaxConnections, dwNumDeliveryThreads, dwDelBuffSize );
     strcat( szBuffer, szTmp);

     if (Reg.eTxnMon == COM)
     {
          sprintf( szTmp, "COM Single Pool        = <B>%s</B><BR>",
               Reg.bCOM_SinglePool ? "YES" : "NO" );
          strcat( szBuffer, szTmp);
     }
     strcat( szBuffer, "</PRE></font>");

     if (Reg.eTxnMon == None)
          // connection options may be specified when not using a txn
monitor
          sprintf( szTmp, "Please enter your database options for this
connection:<BR>"
                          "<font face=\"Courier New\"
color=\"blue\"><PRE>"
                          "DB Server    = <INPUT NAME=\"db_server\"
SIZE=20 VALUE=\"%s\"><BR>"
                          "DB User ID   = <INPUT NAME=\"db_user\"
SIZE=20 VALUE=\"%s\"><BR>"
                          "DB Password  = <INPUT NAME=\"db_passwd\"
SIZE=20 VALUE=\"%s\"><BR>"
                          "DB Name      = <INPUT NAME=\"db_name\"
SIZE=20 VALUE=\"%s\"><BR>"
                          "</PRE></font>"
                    , Reg.szDbServer, Reg.szDbUser, Reg.szDbPassword,
Reg.szDbName );
     else
          // if using a txn monitor, connection options are determined from
registry; can't
          // set per user.  show options fyi
          sprintf( szTmp, "Database options which will be used by the
transaction monitor:<BR>"
                          "<font face=\"Courier New\"
color=\"blue\"><PRE>"
                          "DB Server              = <B>%s</B><BR>"
                          "DB User ID             = <B>%s</B><BR>"
```

```
                              "DB Password            = <B>%s</B><BR>"
                              "DB Name                = <B>%s</B><BR>"
                              "</PRE></font>"
                        , Reg.szDbServer, Reg.szDbUser, Reg.szDbPassword,
Reg.szDbName );
     strcat( szBuffer, szTmp);

     sprintf( szTmp, "Please enter your Warehouse and District for this
session:<BR>"
                         "<font face=\"Courier New\" color=\"blue\"><PRE>"
);
     strcat( szBuffer, szTmp);
     strcat( szBuffer,    "Warehouse ID = <INPUT NAME=\"w_id\" SIZE=4><BR>"
                              "District ID  = <INPUT NAME=\"d_id\"
SIZE=2><BR>"
                              "</PRE></font><HR>"
                              "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Submit\">"
                              "</FORM></BODY></HTML>");
}

/* FUNCTION: SubmitCmd
 *
 * PURPOSE:     This function allocated a new terminal id in the Term
structure array.
 *
 */

void SubmitCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer)
{
     int        iNewTerm;
     char  *ptr = pECB->lpszQueryString;

     char  szVersion[32]   = { 0 };
     char  szServer[32]    = { 0 };
     char  szUser[32]      = "sa";
     char  szPassword[32]  = { 0 };
     char  szDatabase[32]  = "tpcc";

     // validate version field; the version field ensures that the RTE is
synchronized with the web client
     GetKeyValue(&ptr, "VERSION", szVersion, sizeof(szVersion),
ERR_VERSION_MISMATCH);
     if ( strcmp( szVersion, WEBCLIENT_VERSION ) )
          throw new CWEBCLNT_ERR( ERR_VERSION_MISMATCH );

     if (Reg.eTxnMon == None)
     {
          // parse Server name
          GetKeyValue(&ptr, "db_server", szServer, sizeof(szServer),
ERR_NO_SERVER_SPECIFIED);
          // parse User name
          GetKeyValue(&ptr, "db_user", szUser, sizeof(szUser), NO_ERR);
          // parse Password
          GetKeyValue(&ptr, "db_passwd", szPassword, sizeof(szPassword),
NO_ERR);
          // parse Database name
          GetKeyValue(&ptr, "db_name", szDatabase, sizeof(szDatabase),
NO_ERR);
     }

     // parse warehouse ID
     int w_id = GetIntKeyValue(&ptr, "w_id", ERR_HTML_ILL_FORMED,
ERR_W_ID_INVALID);
     if ( w_id < 1 )
          throw new CWEBCLNT_ERR( ERR_W_ID_INVALID );

     // parse district ID
     int d_id = GetIntKeyValue(&ptr, "d_id", ERR_HTML_ILL_FORMED,
ERR_D_ID_INVALID);
     if ( d_id < 1 || d_id > 10 )
          throw new CWEBCLNT_ERR( ERR_D_ID_INVALID );


     iNewTerm = TermAdd();

     Term.pClientData[iNewTerm].w_id = w_id;
     Term.pClientData[iNewTerm].d_id = d_id;

     try
     {
          if (Reg.eTxnMon == TUXEDO)
               Term.pClientData[iNewTerm].pTxn = pCTPCC_TUXEDO_new();
          else if (Reg.eTxnMon == ENCINA)
               Term.pClientData[iNewTerm].pTxn = pCTPCC_ENCINA_new();
          else if (Reg.eTxnMon == COM)
               Term.pClientData[iNewTerm].pTxn = pCTPCC_COM_new(
Reg.bCOM_SinglePool );
          else if (Reg.eDB_Protocol == ODBC)
               Term.pClientData[iNewTerm].pTxn = pCTPCC_ODBC_new( szServer,
szUser, szPassword, szMyComputerName, szDatabase );
          else if (Reg.eDB_Protocol == DBLIB)
               Term.pClientData[iNewTerm].pTxn = pCTPCC_DBLIB_new(
szServer, szUser, szPassword, szMyComputerName, szDatabase );
     }
     catch (...)
     {
          TermDelete(iNewTerm);
          throw;          // pass exception upward
     }

     MakeMainMenuForm(iNewTerm, Term.pClientData[iNewTerm].iSyncId,
szBuffer);
}

/* FUNCTION: StatsCmd
```

```
 *
 * PURPOSE:     This function returns to the browser the total number of
active terminal ids.
 *              This routine is for development/debugging purposes.
 *
 */

void StatsCmd(EXTENSION_CONTROL_BLOCK *pECB, char *szBuffer)
{
     int i;
     int  iTotal;

     EnterCriticalSection(&TermCriticalSection);

     iTotal = 0;
     for(i=0; i<Term.iNumEntries; i++)
     {
          if (Term.pClientData[i].iNextFree == -1)
               iTotal++;
     }

     LeaveCriticalSection(&TermCriticalSection);

     wsprintf( szBuffer,
               "<HTML><HEAD><TITLE>TPC-C Web Client Stats</TITLE></HEAD>"
               "<BODY><B><BIG> Total Active Connections: %d
</BIG></B><BR></BODY></HTML>"
               , iTotal );
}

char *CWEBCLNT_ERR::ErrorText()
{
     static SERRORMSG errorMsgs[] =
     {
          {    ERR_COMMAND_UNDEFINED,                         "Command
undefined."                                                          },
          {    ERR_D_ID_INVALID,                              "Invalid
District ID Must be 1 to 10."                                        },
          {    ERR_DELIVERY_CARRIER_ID_RANGE,            "Delivery Carrier
ID out of range must be 1 - 10."                                     },
          {    ERR_DELIVERY_CARRIER_INVALID,             "Delivery Carrier
ID invalid must be numeric 1 - 10."                  },
          {    ERR_DELIVERY_MISSING_OCD_KEY,             "Delivery missing
Carrier ID key \"OCD*\"."                                            },
          {    ERR_DELIVERY_THREAD_FAILED,                    "Could not
start delivery worker thread."                                       },
          {    ERR_GETPROCADDR_FAILED,                        "Could not
map proc in DLL.  GetProcAddr error.  DLL="                          },
          {    ERR_HTML_ILL_FORMED,                      "Required key
field is missing from HTML string."                                  },
          {    ERR_INVALID_SYNC_CONNECTION,              "Invalid Terminal
Sync ID."                                                            },
          {    ERR_INVALID_TERMID,                            "Invalid
Terminal ID."                                                                },
          {    ERR_LOADDLL_FAILED,                            "Load of DLL
failed.  DLL="                                                       },
          {    ERR_MAX_CONNECTIONS_EXCEEDED,             "No connections
available.  Max Connections is probably too low."   },
          {    ERR_MISSING_REGISTRY_ENTRIES,             "Required registry
entries are missing.  Rerun INSTALL to correct."     },
          {    ERR_NEWORDER_CUSTOMER_INVALID,            "New Order
customer id invalid data type, range = 1 to 3000."         },
          {    ERR_NEWORDER_CUSTOMER_KEY,                "New Order missing
Customer key \"CID*\"."                                    },
          {    ERR_NEWORDER_DISTRICT_INVALID,            "New Order
District ID Invalid range 1 - 10."                              },
          {    ERR_NEWORDER_FORM_MISSING_DID,            "New Order missing
District key \"DID*\"."                                    },
          {    ERR_NEWORDER_ITEMID_INVALID,              "New Order Item Id
is wrong data type, must be numeric."           },
          {    ERR_NEWORDER_ITEMID_RANGE,                "New Order Item Id
is out of range. Range = 1 to 999999."                },
          {    ERR_NEWORDER_ITEMID_WITHOUT_SUPPW,        "New Order Item_Id
field entered without a corresponding Supp_W."  },
          {    ERR_NEWORDER_MISSING_IID_KEY,             "New Order missing
Item Id key \"IID*\"."                                     },
          {    ERR_NEWORDER_MISSING_QTY_KEY,             "New Order Missing
Qty key \"Qty##*\"."                                       },
          {    ERR_NEWORDER_MISSING_SUPPW_KEY,           "New Order missing
Supp_W key \"SP##*\"."                                     },
          {    ERR_NEWORDER_NOITEMS_ENTERED,             "New Order No
order lines entered."                                           },
          {    ERR_NEWORDER_QTY_INVALID,                 "New Order Qty
invalid must be numeric range 1 - 99."                     },
          {    ERR_NEWORDER_QTY_RANGE,                        "New Order
Qty is out of range. Range = 1 to 99."                          },
          {    ERR_NEWORDER_QTY_WITHOUT_SUPPW,           "New Order Qty
field entered without a corresponding Supp_W."       },
          {    ERR_NEWORDER_SUPPW_INVALID,                    "New Order
Supp_W invalid data type must be numeric."                 },
          {    ERR_NO_SERVER_SPECIFIED,                  "No Server name
specified."                                                          },
          {    ERR_ORDERSTATUS_CID_AND_CLT,              "Order Status Only
Customer ID or Last Name may be entered, not both."  },
          {    ERR_ORDERSTATUS_CID_INVALID,              "Order Status
Customer ID invalid, range must be numeric 1 - 3000."},
          {    ERR_ORDERSTATUS_CLT_RANGE,                "Order Status
Customer last name longer than 16 characters."       },
          {    ERR_ORDERSTATUS_DID_INVALID,              "Order Status
District invalid, value must be numeric 1 - 10."           },
          {    ERR_ORDERSTATUS_MISSING_CID_CLT,          "Order Status
Either Customer ID or Last Name must be entered."          },
          {    ERR_ORDERSTATUS_MISSING_CID_KEY,          "Order Status
missing Customer key \"CID*\"."                            },
```

```
          {    ERR_ORDERSTATUS_MISSING_CLT_KEY,          "Order Status
missing Customer Last Name key \"CLT*\"."                 },
          {    ERR_ORDERSTATUS_MISSING_DID_KEY,          "Order Status
missing District key \"DID*\"."                           },
          {    ERR_PAYMENT_CDI_INVALID,                  "Payment Customer
district invalid must be numeric."                  },
          {    ERR_PAYMENT_CID_AND_CLT,                  "Payment Only
Customer ID or Last Name may be entered, not both."  },
          {    ERR_PAYMENT_CUSTOMER_INVALID,             "Payment Customer
data type invalid, must be numeric."                },
          {    ERR_PAYMENT_CWI_INVALID,                  "Payment Customer
Warehouse invalid, must be numeric."                },
          {    ERR_PAYMENT_DISTRICT_INVALID,             "Payment District
ID is invalid, must be 1 - 10."                     },
          {    ERR_PAYMENT_HAM_INVALID,                  "Payment Amount
invalid data type must be numeric."                       },
          {    ERR_PAYMENT_HAM_RANGE,                         "Payment
Amount out of range, 0 - 9999.99."                              },
          {    ERR_PAYMENT_LAST_NAME_TO_LONG,            "Payment Customer
last name longer than 16 characters."               },
          {    ERR_PAYMENT_MISSING_CDI_KEY,              "Payment missing
Customer district key \"CDI*\"."                          },
          {    ERR_PAYMENT_MISSING_CID_CLT,              "Payment Either
Customer ID or Last Name must be entered."          },
          {    ERR_PAYMENT_MISSING_CID_KEY,              "Payment missing
Customer Key \"CID*\"."                                   },
          {    ERR_PAYMENT_MISSING_CLT_KEY,              "Payment missing
Customer Last Name key \"CLT*\"."                         },
          {    ERR_PAYMENT_MISSING_CWI_KEY,              "Payment missing
Customer Warehouse key \"CWI*\"."                         },
          {    ERR_PAYMENT_MISSING_DID_KEY,              "Payment missing
District Key \"DID*\"."                                   },
          {    ERR_PAYMENT_MISSING_HAM_KEY,              "Payment missing
Amount key \"HAM*\"."                                     },
          {    ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY,"Stock Level; missing
Threshold key \"TT*\"."                             },
          {    ERR_STOCKLEVEL_THRESHOLD_INVALID,         "Stock Level;
Threshold value must be in the range = 1 - 99."     },
          {    ERR_STOCKLEVEL_THRESHOLD_RANGE,           "Stock Level
Threshold out of range, range must be 1 - 99."            },
          {    ERR_VERSION_MISMATCH,                     "Invalid version
field.  RTE and Web Client are probably out of sync." },
          {    ERR_W_ID_INVALID,                              "Invalid
Warehouse ID."                                                      },
          {    0,                                                 ""

          }
     };

     char szTmp[256];
     int i = 0;
     while (TRUE)
     {
          if (errorMsgs[i].szMsg[0] == 0)
          {
               strcpy( szTmp, "Unknown error number." );
               break;
          }
          if (m_Error == errorMsgs[i].iError)
          {
               strcpy( szTmp, errorMsgs[i].szMsg );
               break;
          }
          i++;
     }

     if (m_szTextDetail)
          strcat( szTmp, m_szTextDetail );
     if (m_SystemErr)
          wsprintf( szTmp+strlen(szTmp), "  Error=%d", m_SystemErr );

     m_szErrorText = new char[strlen(szTmp)+1];
     strcpy( m_szErrorText, szTmp );
     return m_szErrorText;

}

/* FUNCTION: GetKeyValue
 *
 * PURPOSE:     This function parses a http formatted string for specific
key values.
 *
 * ARGUMENTS:   char            *pQueryString   http string from client
browser
 *                   char            *pKey           key value to look for
 *                   char            *pValue              character array
into which to place key's value
 *                   int                  iMax            maximum length of
key value array.
 *                   WEBERROR        err                  error value to
throw
 *
 * RETURNS:          nothing.
 *
 * ERROR:       if (the pKey value is not found) then
 *                         if (err == 0)
 *                              return (empty string)
 *                         else
 *                              throw CWEBCLNT_ERR(err)
 *
 * COMMENTS:    http keys are formatted either KEY=value& or KEY=value\0.
This DLL formats
 *                   TPC-C input fields in such a manner that the keys can
be extracted in the
 *                   above manner.
 */
```

```
void GetKeyValue(char **pQueryString, char *pKey, char *pValue, int iMax,
WEBERROR err)
{
     char *ptr;

     if ( !(ptr=strstr(*pQueryString, pKey)) )
          goto ErrorExit;
     ptr += strlen(pKey);
     if ( *ptr != '=' )
          goto ErrorExit;
     ptr++;

     iMax--;  // one position is for terminating null
     while( *ptr && *ptr != '&' && iMax)
     {
          *pValue++ = *ptr++;
          iMax--;
     }
     *pValue = 0;  // terminating null

     *pQueryString = ptr;
     return;

ErrorExit:
     if (err != NO_ERR)
          throw new CWEBCLNT_ERR( err );
     *pValue = 0;  // return empty result string
}

/* FUNCTION: GetIntKeyValue
 *
 * PURPOSE:     This function parses a http formatted string for a specific
key value.
 *
 * ARGUMENTS:   char            *pQueryString   http string from client
browser
 *                   char            *pKey           key value to look for
 *                   WEBERROR        NoKeyErr        error value to throw if
key not found
 *                   WEBERROR        NotIntErr       error value to throw if
value not numeric
 *
 * RETURNS:          integer
 *
 * ERROR:       if (the pKey value is not found) then
 *                        if (NoKeyErr != NO_ERR)
 *                             throw CWEBCLNT_ERR(err)
 *                        else
 *                             return 0
 *                   else if (non-numeric char found) then
 *                        if (NotIntErr != NO_ERR) then
 *                             throw CWEBCLNT_ERR(err)
 *                        else
 *                             return 0
 *
 * COMMENTS:    http keys are formatted either KEY=value& or KEY=value\0.
This DLL formats
 *                   TPC-C input fields in such a manner that the keys can
be extracted in the
 *                   above manner.
 */

int GetIntKeyValue(char **pQueryString, char *pKey, WEBERROR NoKeyErr,
WEBERROR NotIntErr)
{
     char *ptr0;
     char *ptr;

     if ( !(ptr=strstr(*pQueryString, pKey)) )
          goto ErrorNoKey;
     ptr += strlen(pKey);
     if ( *ptr != '=' )
          goto ErrorNoKey;
     ptr++;

     ptr0 = ptr;          // remember starting point
     // scan string until a terminator (null or &) or a non-digit
     while( *ptr && *ptr != '&' && isdigit(*ptr) )
          ptr++;

     // make sure we stopped scanning for the right reason
     if ((ptr0 == ptr) || (*ptr && *ptr != '&'))
     {
          if (NotIntErr != NO_ERR)
               throw new CWEBCLNT_ERR( NoKeyErr );
          return 0;
     }

     *pQueryString = ptr;
     return atoi(ptr0);

ErrorNoKey:
     if (NoKeyErr != NO_ERR)
          throw new CWEBCLNT_ERR( NoKeyErr );
     return 0;
}

/* FUNCTION: TermInit
 *
 * PURPOSE:     This function initializes the client terminal structure; it
is called when the TPCC.DLL
 *              is first loaded by the inet service.
 *
 */
```

```
void TermInit(void)
{
     EnterCriticalSection(&TermCriticalSection);

     Term.iMasterSyncId   = 1;
     Term.iNumEntries     = Reg.dwMaxConnections+1;

     Term.pClientData     = NULL;
     Term.pClientData     = (PCLIENTDATA)malloc(Term.iNumEntries *
sizeof(CLIENTDATA));
     if (Term.pClientData == NULL)
     {
          LeaveCriticalSection(&TermCriticalSection);
          throw new CWEBCLNT_ERR( ERR_MEM_ALLOC_FAILED );
     }

     ZeroMemory( Term.pClientData, Term.iNumEntries * sizeof(CLIENTDATA) );

     Term.iFreeList       = Term.iNumEntries-1;
     // build free list
     // note: Term.pClientData[0].iNextFree gets set to -1, which marks it
as "in use".
     //       This is intentional, as the zero entry is used as an anchor
and never
     //         allocated as an actual terminal.
     for(int i=0; i<Term.iNumEntries; i++)
          Term.pClientData[i].iNextFree = i-1;

     LeaveCriticalSection(&TermCriticalSection);
}

/* FUNCTION: TermDeleteAll
 *
 * PURPOSE:     This function frees allocated resources associated with the
terminal structure.
 *
 * ARGUMENTS:   none
 *
 * RETURNS:          None
 *
 * COMMENTS:    This function is called only when the inet service unloads
the TPCC.DLL
 *
 */

void TermDeleteAll(void)
{
     EnterCriticalSection(&TermCriticalSection);

     for(int i=1; i<Term.iNumEntries; i++)
     {
          if (Term.pClientData[i].iNextFree == -1)
               delete Term.pClientData[i].pTxn;
     }

     Term.iFreeList       = 0;
     Term.iNumEntries     = 0;
     if ( Term.pClientData )
          free(Term.pClientData);
     Term.pClientData     = NULL;

     LeaveCriticalSection(&TermCriticalSection);
}

/* FUNCTION: TermAdd
 *
 * PURPOSE:     This function assigns a terminal id which is used to
identify a client browser.
 *
 * RETURNS:          int        assigned terminal id
 *
 */

int TermAdd(void)
{
     DWORD i;
     int        iNewTerm, iTickCount;

     if (Term.iNumEntries == 0)
          return -1;

     EnterCriticalSection(&TermCriticalSection);
     if (Term.iFreeList != 0)
     {    // position is available
          iNewTerm = Term.iFreeList;
          Term.iFreeList = Term.pClientData[iNewTerm].iNextFree;
          Term.pClientData[iNewTerm].iNextFree = -1;  // indicates this
position is in use
     }
     else
     {    // no open slots, so find the slot that hasn't been used in the
longest time and reuse it
          for(iNewTerm=1, i=1, iTickCount=0x7FFFFFFF;
i<Reg.dwMaxConnections; i++)
          {
               if (iTickCount > Term.pClientData[i].iTickCount)
               {
                    iTickCount = Term.pClientData[i].iTickCount;
                    iNewTerm = i;
               }
          }
          // if oldest term is less than one minute old, it probably means
that more connections
          // are being attempted than were specified as "Max Connections" at
install.  In this case,
```

```
          // do not bump existing connection; instead, return error to
requestor.
          if ((GetTickCount() - iTickCount) < 60000)
          {
               LeaveCriticalSection(&TermCriticalSection);
               throw new CWEBCLNT_ERR( ERR_MAX_CONNECTIONS_EXCEEDED );
          }
     }

     Term.pClientData[iNewTerm].iTickCount = GetTickCount();
     Term.pClientData[iNewTerm].iSyncId = Term.iMasterSyncId++;
     Term.pClientData[iNewTerm].pTxn = NULL;

     LeaveCriticalSection(&TermCriticalSection);
     return iNewTerm;
}

/* FUNCTION: TermDelete
 *
 * PURPOSE:     This function makes a terminal entry in the Term array
available for reuse.
 *
 * ARGUMENTS:   int                              id         Terminal id of
client exiting
 *
 */

void TermDelete(int id)
{
     if ( id > 0 && id < Term.iNumEntries )
     {
          delete Term.pClientData[id].pTxn;

          // put onto free list
          EnterCriticalSection(&TermCriticalSection);

          Term.pClientData[id].iNextFree = Term.iFreeList;
          Term.iFreeList = id;

          LeaveCriticalSection(&TermCriticalSection);
     }
}


/* FUNCTION: MakeErrorForm
 */

void ErrorForm(EXTENSION_CONTROL_BLOCK *pECB, int iType, int iErrorNum, int
iTermId, int iSyncId, char *szErrorText, char *szBuffer )
{
     wsprintf(szBuffer,
          "<HTML><HEAD><TITLE>TPC-C Error</TITLE></HEAD><BODY>"
          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
          "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
          "<BOLD>An Error Occurred</BOLD><BR><BR>"
          "%s"
          "<BR><BR><HR>"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..NewOrder..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Payment..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Delivery..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-Status..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Stock-Level..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Exit..\">"
          "</FORM></BODY></HTML>"
          , iType, iErrorNum, MAIN_MENU_FORM, iTermId, iSyncId, szErrorText
);
}

/* FUNCTION: MakeMainMenuForm
 */

void MakeMainMenuForm(int iTermId, int iSyncId, char *szForm)
{
     wsprintf(szForm,
          "<HTML><HEAD><TITLE>TPC-C Main Menu</TITLE></HEAD><BODY>"
          "Select Desired Transaction.<BR><HR>"
          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
          "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..NewOrder..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Payment..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Delivery..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-Status..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Stock-Level..\">"
          "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Exit..\">"
          "</FORM></BODY></HTML>"
          , MAIN_MENU_FORM, iTermId, iSyncId);
}

/* FUNCTION: MakeStockLevelForm
 *
 * PURPOSE:     This function constructs the Stock Level HTML page.
 *
 * COMMENTS:    The internal client buffer is created when the terminal id
is assigned and should not
 *                    be freed except when the client terminal id is no
longer needed.
 */
```

```
void MakeStockLevelForm(int iTermId, STOCK_LEVEL_DATA *pStockLevelData, BOOL
bInput, char *szForm)
{
     int   c;

     c = wsprintf(szForm,
          "<HTML><HEAD><TITLE>TPC-C Stock Level</TITLE></HEAD><FORM
ACTION=\"tpcc.dll\" METHOD=\"GET\">"
          "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
          "<PRE><font face=\"Courier\">
Stock-Level<BR>"
          "Warehouse: %4.4d   District: %2.2d<BR> <BR>",
          STOCK_LEVEL_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
          Term.pClientData[iTermId].w_id, Term.pClientData[iTermId].d_id);

     if ( bInput )
     {
          strcpy(szForm+c,
               "Stock Level Threshold: <INPUT NAME=\"TT*\" SIZE=2><BR>
<BR>"
               "low stock:    </font><BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR> <BR> <BR>"
               " <BR> <BR> <BR> <BR> <BR> <BR> <BR></PRE><HR>"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Process\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
               "</FORM></HTML>" );
     }
     else
     {
          wsprintf(szForm+c,
               "Stock Level Threshold: %2.2d<BR> <BR>"
               "low stock: %3.3d</font> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR> <BR>"
               " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR></PRE><HR>"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..NewOrder..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Payment..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-
Status..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Stock-
Level..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Exit..\">"
               "</FORM></HTML>"
               , pStockLevelData->threshold, pStockLevelData->low_stock);
     }
}
```

```
/* FUNCTION: MakeNewOrderForm
 *
 * COMMENTS:    The internal client buffer is created when the terminal id
is assigned and should not
 *                   be freed except when the client terminal id is no
longer needed.
 */

void MakeNewOrderForm(int iTermId, NEW_ORDER_DATA *pNewOrderData, BOOL
bInput, char *szForm)
{
     int       i, c;
     BOOL  bValid;
     static    char szBR[] = " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR> <BR> <BR> <BR> <BR> <BR>";

     if (!bInput)
          assert( pNewOrderData->exec_status_code == eOK || pNewOrderData-
>exec_status_code == eInvalidItem );

     bValid = (bInput || (pNewOrderData->exec_status_code == eOK));

     c = wsprintf(szForm,
          "<HTML><HEAD><TITLE>TPC-C New Order</TITLE></HEAD><BODY>"
          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
          "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
          "<PRE><font face=\"Courier\">
New Order<BR>"
          , bValid ? 0 : ERR_BAD_ITEM_ID, NEW_ORDER_FORM, iTermId,
Term.pClientData[iTermId].iSyncId);

     if ( bInput )
     {
          c += wsprintf(szForm+c, "Warehouse: %4.4d   ",
Term.pClientData[iTermId].w_id );

          strcpy( szForm+c,
               "District: <INPUT NAME=\"DID*\" SIZE=1>
Date:<BR>"
               "Customer:  <INPUT NAME=\"CID*\" SIZE=4>   Name:
Credit:      %Disc:<BR>"
               "Order Number:           Number of Lines:           W_tax:
D_tax:<BR> <BR>"
               " Supp_W  Item_Id  Item Name                Qty  Stock  B/G
Price    Amount<BR>"
               "  <INPUT NAME=\"SP00*\" SIZE=4>  <INPUT NAME=\"IID00*\"
SIZE=6>                          <INPUT NAME=\"Qty00*\" SIZE=1><BR>"
               "  <INPUT NAME=\"SP01*\" SIZE=4>  <INPUT NAME=\"IID01*\"
SIZE=6>                          <INPUT NAME=\"Qty01*\" SIZE=1><BR>"
```

```
                "  <INPUT NAME=\"SP02*\" SIZE=4>  <INPUT NAME=\"IID02*\"
SIZE=6>                          <INPUT NAME=\"Qty02*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP03*\" SIZE=4>  <INPUT NAME=\"IID03*\"
SIZE=6>                          <INPUT NAME=\"Qty03*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP04*\" SIZE=4>  <INPUT NAME=\"IID04*\"
SIZE=6>                          <INPUT NAME=\"Qty04*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP05*\" SIZE=4>  <INPUT NAME=\"IID05*\"
SIZE=6>                          <INPUT NAME=\"Qty05*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP06*\" SIZE=4>  <INPUT NAME=\"IID06*\"
SIZE=6>                          <INPUT NAME=\"Qty06*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP07*\" SIZE=4>  <INPUT NAME=\"IID07*\"
SIZE=6>                          <INPUT NAME=\"Qty07*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP08*\" SIZE=4>  <INPUT NAME=\"IID08*\"
SIZE=6>                          <INPUT NAME=\"Qty08*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP09*\" SIZE=4>  <INPUT NAME=\"IID09*\"
SIZE=6>                          <INPUT NAME=\"Qty09*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP10*\" SIZE=4>  <INPUT NAME=\"IID10*\"
SIZE=6>                          <INPUT NAME=\"Qty10*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP11*\" SIZE=4>  <INPUT NAME=\"IID11*\"
SIZE=6>                          <INPUT NAME=\"Qty11*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP12*\" SIZE=4>  <INPUT NAME=\"IID12*\"
SIZE=6>                          <INPUT NAME=\"Qty12*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP13*\" SIZE=4>  <INPUT NAME=\"IID13*\"
SIZE=6>                          <INPUT NAME=\"Qty13*\" SIZE=1><BR>"
                "  <INPUT NAME=\"SP14*\" SIZE=4>  <INPUT NAME=\"IID14*\"
SIZE=6>                          <INPUT NAME=\"Qty14*\" SIZE=1><BR>"
                "Execution Status:
Total:<BR>"
                "</font></PRE><HR>"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Process\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
                "</FORM></HTML>"
                );
     }
     else
     {
          c += wsprintf(szForm+c, "Warehouse: %4.4d   District: %2.2d
Date: ",
                pNewOrderData->w_id,
                pNewOrderData->d_id);

          if ( bValid )
          {
                c += wsprintf(szForm+c, "%2.2d-%2.2d-%4.4d
%2.2d:%2.2d:%2.2d",
                     pNewOrderData->o_entry_d.day,
                     pNewOrderData->o_entry_d.month,
                     pNewOrderData->o_entry_d.year,
                     pNewOrderData->o_entry_d.hour,
                     pNewOrderData->o_entry_d.minute,
                     pNewOrderData->o_entry_d.second);
          }
          c += wsprintf(szForm+c, "<BR>Customer:  %4.4d   Name: %-16s
Credit: %-2s   ",
                pNewOrderData->c_id, pNewOrderData->c_last, pNewOrderData-
>c_credit);

          if ( bValid )
          {
                c += sprintf(szForm+c,
                                  "%%Disc: %5.2f           <BR>"
                                  "Order Number: %8.8d  Number of Lines: %2.2d
W_tax: %5.2f   D_tax: %5.2f  <BR> <BR>"
                                  " Supp_W  Item_Id  Item Name
Qty  Stock  B/G  Price    Amount<BR>",
                     100.0*pNewOrderData->c_discount,
                     pNewOrderData->o_id,
                     pNewOrderData->o_ol_cnt,
                     100.0 * pNewOrderData->w_tax,
                     100.0 * pNewOrderData->d_tax);

                for(i=0; i<pNewOrderData->o_ol_cnt; i++)
                {
                     c += sprintf(szForm+c, "  %4.4d   %6.6d   %-24s  %2.2d
%3.3d    %1.1s   $%6.2f  $%7.2f  <BR>",
                          pNewOrderData->OL[i].ol_supply_w_id,
                          pNewOrderData->OL[i].ol_i_id,
                          pNewOrderData->OL[i].ol_i_name,
                          pNewOrderData->OL[i].ol_quantity,
                          pNewOrderData->OL[i].ol_stock,
                          pNewOrderData->OL[i].ol_brand_generic,
                          pNewOrderData->OL[i].ol_i_price,
                          pNewOrderData->OL[i].ol_amount );
                }
          }
          else
          {
                c += wsprintf(szForm+c,
                     "%Disc:<BR>"
                     "Order Number: %8.8d  Number of Lines:
W_tax:         D_tax:<BR> <BR>"
                     " Supp_W  Item_Id  Item Name                 Qty  Stock
B/G  Price    Amount<BR>"
                     , pNewOrderData->o_id);

                i = 0;
          }

          strncpy( szForm+c, szBR, (15-i)*5 );
          c += (15-i)*5;

          if ( bValid )
                c += sprintf(szForm+c, "Execution Status: Transaction
commited.                     Total:  $%8.2f  ",
                     pNewOrderData->total_amount);
```

```
          else
               c += wsprintf(szForm+c, "Execution Status: Item number is
not valid.                  Total:");

          strcpy(szForm+c,
               " <BR></font></PRE><HR>"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..NewOrder..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Payment..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-
Status..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Stock-
Level..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Exit..\">"
               "</FORM></HTML>"
               );
     }
}

/* FUNCTION: MakePaymentForm
 *
 * COMMENTS:    The internal client buffer is created when the terminal id
is assigned and should not
 *                   be freed except when the client terminal id is no
longer needed.
 */

void MakePaymentForm(int iTermId, PAYMENT_DATA *pPaymentData, BOOL bInput,
char *szForm)
{
     int c;

     c = wsprintf(szForm,
          "<HTML><HEAD><TITLE>TPC-C Payment</TITLE></HEAD><BODY>"
          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
          "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
          "<PRE><font face=\"Courier\">
Payment<BR>"
          "Date: "
          , PAYMENT_FORM, iTermId, Term.pClientData[iTermId].iSyncId);

     if ( !bInput )
     {
          c += wsprintf(szForm+c, "%2.2d-%2.2d-%4.4d %2.2d:%2.2d:%2.2d",
               pPaymentData->h_date.day,
               pPaymentData->h_date.month,
               pPaymentData->h_date.year,
               pPaymentData->h_date.hour,
               pPaymentData->h_date.minute,
               pPaymentData->h_date.second);
     }

     if ( bInput )
     {
          c += wsprintf(szForm+c,
               "<BR> <BR>Warehouse: %4.4d"
               "                          District: <INPUT NAME=\"DID*\"
SIZE=1><BR> <BR> <BR> <BR> <BR>"
               "Customer: <INPUT NAME=\"CID*\" SIZE=4>"
               "Cust-Warehouse: <INPUT NAME=\"CWI*\" SIZE=4>  "
               "Cust-District: <INPUT NAME=\"CDI*\" SIZE=1><BR>"
               "Name:                      <INPUT NAME=\"CLT*\" SIZE=16>
Since:<BR>"
               "
Credit:<BR>"
               "                                                    Disc:<BR>"
               "                                                    Phone:<BR>
<BR>"
               "Amount Paid:          $<INPUT NAME=\"HAM*\" SIZE=7>
New Cust-Balance:<BR>"
               "Credit Limit:<BR> <BR>Cust-Data: <BR> <BR> <BR> <BR>
<BR></font></PRE><HR>"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\"><INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
               "</BODY></FORM></HTML>"
               , Term.pClientData[iTermId].w_id);
     }
     else
     {
          c += wsprintf(szForm+c,
               "<BR> <BR>Warehouse: %4.4d
District: %2.2d<BR>"
               "%-20s                    %-20s<BR>"
               "%-20s                    %-20s<BR>"
               "%-20s %-2s %5.5s-%4.4s       %-20s %-2s %5.5s-%4.4s<BR>
<BR>"
               "Customer: %4.4d  Cust-Warehouse: %4.4d  Cust-District:
%2.2d<BR>"
               "Name:   %-16s %-2s %-16s     Since:  %2.2d-%2.2d-%4.4d<BR>"
               "        %-20s                    Credit: %-2s<BR>"

               , Term.pClientData[iTermId].w_id, pPaymentData->d_id
               , pPaymentData->w_street_1, pPaymentData->d_street_1
               , pPaymentData->w_street_2, pPaymentData->d_street_2
               , pPaymentData->w_city, pPaymentData->w_state, pPaymentData-
>w_zip, pPaymentData->w_zip+5
               , pPaymentData->d_city, pPaymentData->d_state, pPaymentData-
>d_zip, pPaymentData->d_zip+5
               , pPaymentData->c_id, pPaymentData->c_w_id,     pPaymentData-
>c_d_id
```

```
                , pPaymentData->c_first, pPaymentData->c_middle,
pPaymentData->c_last
                , pPaymentData->c_since.day, pPaymentData->c_since.month,
     pPaymentData->c_since.year
                , pPaymentData->c_street_1, pPaymentData->c_credit
                );

        c += sprintf(szForm+c,
                "        %-20s                    %%Disc:  %5.2f<BR>",
                pPaymentData->c_street_2, 100.0*pPaymentData->c_discount);

          c += wsprintf(szForm+c,
                "        %-20s %-2s %5.5s-%4.4s       Phone:  %6.6s-%3.3s-
%3.3s-%4.4s<BR> <BR>",
                pPaymentData->c_city, pPaymentData->c_state, pPaymentData-
>c_zip, pPaymentData->c_zip+5,
                pPaymentData->c_phone, pPaymentData->c_phone+6,
pPaymentData->c_phone+9, pPaymentData->c_phone+12 );

          c += sprintf(szForm+c,
                "Amount Paid:          $%7.2f      New Cust-Balance:
$%14.2f<BR>"
                "Credit Limit:   $%13.2f<BR> <BR>"
                , pPaymentData->h_amount, pPaymentData->c_balance
                , pPaymentData->c_credit_lim
                );

          if ( pPaymentData->c_credit[0] == 'B' && pPaymentData->c_credit[1]
== 'C' )
                c += wsprintf(szForm+c,
                           "Cust-Data: %-50.50s<BR>           %-50.50s<BR>
%-50.50s<BR>           %-50.50s<BR>",
                           pPaymentData->c_data, pPaymentData->c_data+50,
pPaymentData->c_data+100, pPaymentData->c_data+150 );
          else
                strcpy(szForm+c, "Cust-Data: <BR> <BR> <BR> <BR>");

          strcat(szForm,  " <BR></font></PRE><HR>"
                               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..NewOrder..\">"
                               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Payment..\">"
                               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"
                               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Order-Status..\">"
                               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Stock-Level..\">"
                               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Exit..\">"
                               "</BODY></FORM></HTML>");
     }
}

/* FUNCTION: MakeOrderStatusForm
 *
 * COMMENTS:    The internal client buffer is created when the terminal id
is assigned and should not
 *                   be freed except when the client terminal id is no
longer needed.
 */

void MakeOrderStatusForm(int iTermId, ORDER_STATUS_DATA *pOrderStatusData,
BOOL bInput, char *szForm)
{
     int       i, c;
     static char szBR[] = " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR> <BR> <BR> <BR> <BR>";

     c = wsprintf(szForm,
          "<HTML><HEAD><TITLE>TPC-C Order-Status</TITLE></HEAD><BODY>"
          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
          "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
          "<PRE><font face=\"Courier\">
Order-Status<BR>"
          "Warehouse: %4.4d   ",
          ORDER_STATUS_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
Term.pClientData[iTermId].w_id);

     if ( bInput )
     {
          strcpy(szForm+c,
               "District: <INPUT NAME=\"DID*\" SIZE=1><BR>"
               "Customer: <INPUT NAME=\"CID*\" SIZE=4>   Name:
<INPUT NAME=\"CLT*\" SIZE=23><BR>"
               "Cust-Balance:<BR> <BR>"
               "Order-Number:            Entry-Date:
Carrier-Number:<BR>"
               "Supply-W     Item-Id    Qty     Amount      Delivery-
Date<BR> <BR> <BR> <BR> <BR>"
               " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR></font></PRE>"
               "<HR><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"Process\"><INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
               "</BODY></FORM></HTML>" );
     }
     else
     {
          c += wsprintf(szForm+c,
               "District: %2.2d<BR>"
               "Customer: %4.4d   Name: %-16s %-2s %-16s<BR>",
```

```
                pOrderStatusData->d_id, pOrderStatusData->c_id,
                pOrderStatusData->c_first, pOrderStatusData->c_middle,
pOrderStatusData->c_last);

          c += sprintf(szForm+c, "Cust-Balance: $%9.2f<BR> <BR>",
                pOrderStatusData->c_balance);

          c += wsprintf(szForm+c,
                "Order-Number: %8.8d   Entry-Date: %2.2d-%2.2d-%4.4d
%2.2d:%2.2d:%2.2d   Carrier-Number: %2.2d<BR>"
                "Supply-W     Item-Id    Qty     Amount      Delivery-
Date<BR>",
                pOrderStatusData->o_id,
                pOrderStatusData->o_entry_d.day,
                pOrderStatusData->o_entry_d.month,
                pOrderStatusData->o_entry_d.year,
                pOrderStatusData->o_entry_d.hour,
                pOrderStatusData->o_entry_d.minute,
                pOrderStatusData->o_entry_d.second,
                pOrderStatusData->o_carrier_id);

          for(i=0; i< pOrderStatusData->o_ol_cnt; i++)
          {
                c += sprintf(szForm+c, "  %4.4d       %6.6d     %2.2d
$%8.2f      %2.2d-%2.2d-%4.4d<BR>",
                      pOrderStatusData->OL[i].ol_supply_w_id,
                      pOrderStatusData->OL[i].ol_i_id,
                      pOrderStatusData->OL[i].ol_quantity,
                      pOrderStatusData->OL[i].ol_amount,
                      pOrderStatusData->OL[i].ol_delivery_d.day,
                      pOrderStatusData->OL[i].ol_delivery_d.month,
                      pOrderStatusData->OL[i].ol_delivery_d.year);
          }

          strncpy( szForm+c, szBR, (15-i)*5 );
          c += (15-i)*5;

          strcpy(szForm+c,
                "</font></PRE><HR><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..NewOrder..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Payment..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-
Status..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Stock-
Level..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Exit..\">"
                "</BODY></FORM></HTML>" );
     }
}

/* FUNCTION: MakeDeliveryForm
 *
 * COMMENTS:    The internal client buffer is created when the terminal id
is assigned and should not
 *                    be freed except when the client terminal id is no
longer needed.
 */

void MakeDeliveryForm(int iTermId, DELIVERY_DATA *pDeliveryData, BOOL
bInput, char *szForm)
{
     int  c;

     c = wsprintf(szForm,
          "<HTML><HEAD><TITLE>TPC-C Delivery</TITLE></HEAD><BODY>"
          "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
          "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"ERROR\" VALUE=\"0\">"
          "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
          "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
          "<PRE><font face=\"Courier\">
Delivery<BR>"
          "Warehouse: %4.4d<BR> <BR>",
          (!bInput && (pDeliveryData->exec_status_code != eOK)) ?
ERR_TYPE_DELIVERY_POST : 0,
          DELIVERY_FORM, iTermId, Term.pClientData[iTermId].iSyncId,
Term.pClientData[iTermId].w_id);

     if ( bInput )
     {
          strcpy( szForm+c,
               "Carrier Number: <INPUT NAME=\"OCD*\" SIZE=1><BR> <BR>"
               "Execution Status: <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR>"
               " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> </font></PRE><HR>"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Process\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Menu\">"
               "</BODY></FORM></HTML>" );
     }
     else
     {
          wsprintf( szForm+c,
               "Carrier Number: %2.2d<BR> <BR>"
               "Execution Status: %s <BR> <BR> <BR> <BR> <BR> <BR> <BR>
<BR>"
               " <BR> <BR> <BR> <BR> <BR> <BR> <BR> <BR> </font></PRE>"
               "<HR><INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..NewOrder..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Payment..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\"
VALUE=\"..Delivery..\">"
               "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Order-
Status..\">"
```

```
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Stock-
Level..\">"
                "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..Exit..\">"
                "</BODY></FORM></HTML>"

                , pDeliveryData->o_carrier_id,
                (pDeliveryData->exec_status_code == eOK) ? "Delivery has
been queued." : "Delivery Post Failed     "
                );
     }
}

/* FUNCTION: ProcessNewOrderForm
 *
 * PURPOSE:     This function gets and validates the input data from the new
order form
 *              filling in the required input variables. it then calls the
SQLNewOrder
 *              transaction, constructs the output form and writes it back
to client
 *              browser.
 */

void ProcessNewOrderForm(EXTENSION_CONTROL_BLOCK     *pECB, int iTermId,
char *szBuffer)
{
     PNEW_ORDER_DATA      pNewOrder;

     pNewOrder = Term.pClientData[iTermId].pTxn->BuffAddr_NewOrder();

     ZeroMemory(pNewOrder, sizeof(NEW_ORDER_DATA));
     pNewOrder->w_id = Term.pClientData[iTermId].w_id;
     GetNewOrderData(pECB->lpszQueryString, pNewOrder);

     Term.pClientData[iTermId].pTxn->NewOrder();

     pNewOrder = Term.pClientData[iTermId].pTxn->BuffAddr_NewOrder();
     MakeNewOrderForm(iTermId, pNewOrder, OUTPUT_FORM, szBuffer );
}

/* FUNCTION: void ProcessPaymentForm
 *
 * PURPOSE:     This function gets and validates the input data from the
payment form
 *              filling in the required input variables. It then calls the
SQLPayment
 *              transaction, constructs the output form and writes it back
to client
 *              browser.
 *
 * ARGUMENTS:   EXTENSION_CONTROL_BLOCK    *pECB passed in structure pointer
from inetsrv.
 *                  int                             iTermId    client
browser terminal id
 *
 */

void ProcessPaymentForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char
*szBuffer)
{
     PPAYMENT_DATA   pPayment;

     pPayment = Term.pClientData[iTermId].pTxn->BuffAddr_Payment();
     ZeroMemory(pPayment, sizeof(PAYMENT_DATA));
     pPayment->w_id = Term.pClientData[iTermId].w_id;
     GetPaymentData(pECB->lpszQueryString, pPayment);

     Term.pClientData[iTermId].pTxn->Payment();

     pPayment = Term.pClientData[iTermId].pTxn->BuffAddr_Payment();
     MakePaymentForm(iTermId, pPayment, OUTPUT_FORM, szBuffer);
}

/* FUNCTION: ProcessOrderStatusForm
 *
 * PURPOSE:     This function gets and validates the input data from the
Order Status
 *              form filling in the required input variables. It then calls
the
 *              SQLOrderStatus transaction, constructs the output form and
writes it
 *              back to client browser.
 *
 * ARGUMENTS:   EXTENSION_CONTROL_BLOCK    *pECB passed in structure pointer
from inetsrv.
 *                  int                             iTermId    client
browser terminal id
 *
 */

void ProcessOrderStatusForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char
*szBuffer)
{
     PORDER_STATUS_DATA   pOrderStatus;

     pOrderStatus = Term.pClientData[iTermId].pTxn->BuffAddr_OrderStatus();
     ZeroMemory(pOrderStatus, sizeof(ORDER_STATUS_DATA));
     pOrderStatus->w_id = Term.pClientData[iTermId].w_id;
     GetOrderStatusData(pECB->lpszQueryString, pOrderStatus);

     Term.pClientData[iTermId].pTxn->OrderStatus();

     pOrderStatus = Term.pClientData[iTermId].pTxn->BuffAddr_OrderStatus();
     MakeOrderStatusForm(iTermId, pOrderStatus, OUTPUT_FORM, szBuffer);
}
```

```
/* FUNCTION: ProcessDeliveryForm
 *
 * PURPOSE:     This function gets and validates the input data from the
delivery form
 *              filling in the required input variables. It then calls the
PostDeliveryInfo
 *              Api, The client is then informed that the transaction has
been posted.
 *
 * ARGUMENTS:   EXTENSION_CONTROL_BLOCK    *pECB passed in structure pointer
from inetsrv.
 *                  int                             iTermId    client
browser terminal id
 *
 */

void ProcessDeliveryForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char
*szBuffer)
{
     char  *ptr = pECB->lpszQueryString;

     PDELIVERY_DATA  pDelivery;

     pDelivery = Term.pClientData[iTermId].pTxn->BuffAddr_Delivery();
     ZeroMemory(pDelivery, sizeof(DELIVERY_DATA));
     pDelivery->w_id = Term.pClientData[iTermId].w_id;

     pDelivery->o_carrier_id    = GetIntKeyValue(&ptr, "OCD*",
ERR_DELIVERY_MISSING_OCD_KEY, ERR_DELIVERY_CARRIER_INVALID);
     if ( pDelivery->o_carrier_id > 10 || pDelivery->o_carrier_id < 1 )
          throw new CWEBCLNT_ERR( ERR_DELIVERY_CARRIER_ID_RANGE );

     if (dwNumDeliveryThreads)
     {
          //post delivery info
          if ( PostDeliveryInfo(pDelivery->w_id, pDelivery->o_carrier_id) )
               pDelivery->exec_status_code = eDeliveryFailed;
          else
               pDelivery->exec_status_code = eOK;
     }
     else // delivery is done synchronously if no delivery threads
configured
          Term.pClientData[iTermId].pTxn->Delivery();

     pDelivery = Term.pClientData[iTermId].pTxn->BuffAddr_Delivery();
     MakeDeliveryForm(iTermId, pDelivery, OUTPUT_FORM, szBuffer);
}

/* FUNCTION: ProcessStockLevelForm
 *
 * PURPOSE:     This function gets and validates the input data from the
Stock Level
 *              form filling in the required input variables. It then calls
the
 *              SQLStockLevel transaction, constructs the output form and
writes it
 *              back to client browser.
 *
 * ARGUMENTS:   EXTENSION_CONTROL_BLOCK    *pECB passed in structure pointer
from inetsrv.
 *                  int                             iTermId    client
browser terminal id
 *
 */

void ProcessStockLevelForm(EXTENSION_CONTROL_BLOCK *pECB, int iTermId, char
*szBuffer)
{
     char       *ptr = pECB->lpszQueryString;

     PSTOCK_LEVEL_DATA    pStockLevel;

     pStockLevel = Term.pClientData[iTermId].pTxn->BuffAddr_StockLevel();
     ZeroMemory( pStockLevel, sizeof(STOCK_LEVEL_DATA) );

     pStockLevel->w_id = Term.pClientData[iTermId].w_id;
     pStockLevel->d_id = Term.pClientData[iTermId].d_id;

     pStockLevel->threshold = GetIntKeyValue(&ptr, "TT*",
ERR_STOCKLEVEL_MISSING_THRESHOLD_KEY, ERR_STOCKLEVEL_THRESHOLD_INVALID);
     if ( pStockLevel->threshold >= 100 || pStockLevel->threshold < 0 )
          throw new CWEBCLNT_ERR( ERR_STOCKLEVEL_THRESHOLD_RANGE );

     Term.pClientData[iTermId].pTxn->StockLevel();

     pStockLevel = Term.pClientData[iTermId].pTxn->BuffAddr_StockLevel();
     MakeStockLevelForm(iTermId, pStockLevel, OUTPUT_FORM, szBuffer);
}

/* FUNCTION: GetNewOrderData
 *
 * PURPOSE:     This function extracts and validates the new order form data
from an http command string.
 *
 * ARGUMENTS:   LPSTR           lpszQueryString      client browser http
command string
 *                  NEW_ORDER_DATA  *pNewOrderData       pointer to new
order data structure
 *
 */

void GetNewOrderData(LPSTR lpszQueryString, NEW_ORDER_DATA *pNewOrderData)
{
     char  szTmp[26];
     int        i;
```

```
     short items;
     int       ol_i_id, ol_quantity;
     char  *ptr = lpszQueryString;

     static char szSP[MAX_OL_NEW_ORDER_ITEMS][6] =
          { "SP00*", "SP01*", "SP02*", "SP03*", "SP04*",
            "SP05*", "SP06*", "SP07*", "SP08*", "SP09*",
            "SP10*", "SP11*", "SP12*", "SP13*", "SP14*" };
     static char szIID[MAX_OL_NEW_ORDER_ITEMS][7] =
          { "IID00*", "IID01*", "IID02*", "IID03*", "IID04*",
            "IID05*", "IID06*", "IID07*", "IID08*", "IID09*",
            "IID10*", "IID11*", "IID12*", "IID13*", "IID14*" };
     static char szQty[MAX_OL_NEW_ORDER_ITEMS][7] =
          { "Qty00*", "Qty01*", "Qty02*", "Qty03*", "Qty04*",
            "Qty05*", "Qty06*", "Qty07*", "Qty08*", "Qty09*",
            "Qty10*", "Qty11*", "Qty12*", "Qty13*", "Qty14*" };

     pNewOrderData->d_id = GetIntKeyValue(&ptr, "DID*",
ERR_NEWORDER_FORM_MISSING_DID, ERR_NEWORDER_DISTRICT_INVALID);
     pNewOrderData->c_id = GetIntKeyValue(&ptr, "CID*",
ERR_NEWORDER_CUSTOMER_KEY, ERR_NEWORDER_CUSTOMER_INVALID);

     for(i=0, items=0; i<MAX_OL_NEW_ORDER_ITEMS; i++)
     {
          GetKeyValue(&ptr, szSP[i], szTmp, sizeof(szTmp),
ERR_NEWORDER_MISSING_SUPPW_KEY);
          if ( szTmp[0] )
          {
               if ( !IsNumeric(szTmp) )
                    throw new CWEBCLNT_ERR( ERR_NEWORDER_SUPPW_INVALID );
               pNewOrderData->OL[items].ol_supply_w_id =
(short)atoi(szTmp);

               ol_i_id = pNewOrderData->OL[items].ol_i_id =
                    GetIntKeyValue(&ptr, szIID[i],
ERR_NEWORDER_MISSING_IID_KEY, ERR_NEWORDER_ITEMID_INVALID);
               if ( ol_i_id > 999999 || ol_i_id < 1 )
                    throw new CWEBCLNT_ERR( ERR_NEWORDER_ITEMID_RANGE );

               ol_quantity = pNewOrderData->OL[items].ol_quantity =
                    GetIntKeyValue(&ptr, szQty[i],
ERR_NEWORDER_MISSING_QTY_KEY, ERR_NEWORDER_QTY_INVALID);
               if ( ol_quantity > 99 || ol_quantity < 1 )
                    throw new CWEBCLNT_ERR( ERR_NEWORDER_QTY_RANGE );

               items++;
          }
          else
          {    // nothing entered for supply warehouse, so item id and qty
must also be blank
               GetKeyValue(&ptr, szIID[i], szTmp, sizeof(szTmp),
ERR_NEWORDER_MISSING_IID_KEY);
               if ( szTmp[0] )
                    throw new CWEBCLNT_ERR(
ERR_NEWORDER_ITEMID_WITHOUT_SUPPW );

               GetKeyValue(&ptr, szQty[i], szTmp, sizeof(szTmp),
ERR_NEWORDER_MISSING_QTY_KEY);
               if ( szTmp[0] )
                    throw new CWEBCLNT_ERR( ERR_NEWORDER_QTY_WITHOUT_SUPPW
);
          }
     }
     if ( items == 0 )
          throw new CWEBCLNT_ERR( ERR_NEWORDER_NOITEMS_ENTERED );

     pNewOrderData->o_ol_cnt = items;
}

/* FUNCTION: GetPaymentData
 *
 * PURPOSE:     This function extracts and validates the payment form data
from an http command string.
 *
 * ARGUMENTS:   LPSTR           lpszQueryString      client browser http
command string
 *                   PAYMENT_DATA    *pPaymentData        pointer to payment
data structure
 */

void GetPaymentData(LPSTR lpszQueryString, PAYMENT_DATA *pPaymentData)
{
     char  szTmp[26];
     char  *ptr = lpszQueryString;
     BOOL  bCustIdBlank;

     pPaymentData->d_id = GetIntKeyValue(&ptr, "DID*",
ERR_PAYMENT_MISSING_DID_KEY, ERR_PAYMENT_DISTRICT_INVALID);

     GetKeyValue(&ptr, "CID*", szTmp, sizeof(szTmp),
ERR_PAYMENT_MISSING_CID_KEY);
     if ( szTmp[0] == 0 )
     {
          bCustIdBlank = TRUE;
          pPaymentData->c_id = 0;
     }
     else
     {    // parse customer id and verify that last name was NOT entered
          bCustIdBlank = FALSE;
          if ( !IsNumeric(szTmp) )
               throw new CWEBCLNT_ERR( ERR_PAYMENT_CUSTOMER_INVALID );
          pPaymentData->c_id = atoi(szTmp);
     }

     pPaymentData->c_w_id = GetIntKeyValue(&ptr, "CWI*",
ERR_PAYMENT_MISSING_CWI_KEY, ERR_PAYMENT_CWI_INVALID);
```

```
     pPaymentData->c_d_id = GetIntKeyValue(&ptr, "CDI*",
ERR_PAYMENT_MISSING_CDI_KEY, ERR_PAYMENT_CDI_INVALID);

     if ( bCustIdBlank )
     {    // customer id is blank, so last name must be entered
          GetKeyValue(&ptr, "CLT*", szTmp, sizeof(szTmp),
ERR_PAYMENT_MISSING_CLT_KEY);
          if ( szTmp[0] == 0 )
               throw new CWEBCLNT_ERR( ERR_PAYMENT_MISSING_CID_CLT );

          _strupr( szTmp );
          if ( strlen(pPaymentData->c_last) > LAST_NAME_LEN )
               throw new CWEBCLNT_ERR( ERR_PAYMENT_LAST_NAME_TO_LONG );
          strcpy(pPaymentData->c_last, szTmp);
     }
     else
     {    // parse customer id and verify that last name was NOT entered
          GetKeyValue(&ptr, "CLT*", szTmp, sizeof(szTmp),
ERR_PAYMENT_MISSING_CLT_KEY);
          if ( szTmp[0] != 0 )
               throw new CWEBCLNT_ERR( ERR_PAYMENT_CID_AND_CLT );
     }

     GetKeyValue(&ptr, "HAM*", szTmp, sizeof(szTmp),
ERR_PAYMENT_MISSING_HAM_KEY);
     if (!IsDecimal(szTmp))
          throw new CWEBCLNT_ERR( ERR_PAYMENT_HAM_INVALID );
     pPaymentData->h_amount = atof(szTmp);
     if ( pPaymentData->h_amount >= 10000.00 || pPaymentData->h_amount < 0 )
          throw new CWEBCLNT_ERR( ERR_PAYMENT_HAM_RANGE );
}

/* FUNCTION: GetOrderStatusData
 *
 * PURPOSE:     This function extracts and validates the payment form data
from an http command string.
 *
 */
void GetOrderStatusData(LPSTR lpszQueryString, ORDER_STATUS_DATA
*pOrderStatusData)
{
     char  szTmp[26];
     char  *ptr = lpszQueryString;

     pOrderStatusData->d_id = GetIntKeyValue(&ptr, "DID*",
ERR_ORDERSTATUS_MISSING_DID_KEY, ERR_ORDERSTATUS_DID_INVALID);

     GetKeyValue(&ptr, "CID*", szTmp, sizeof(szTmp),
ERR_ORDERSTATUS_MISSING_CID_KEY);
     if ( szTmp[0] == 0 )
     {    // customer id is blank, so last name must be entered
          pOrderStatusData->c_id = 0;
          GetKeyValue(&ptr, "CLT*", szTmp, sizeof(szTmp),
ERR_ORDERSTATUS_MISSING_CLT_KEY);
          if ( szTmp[0] == 0 )
               throw new CWEBCLNT_ERR( ERR_ORDERSTATUS_MISSING_CID_CLT );

          _strupr( szTmp );
          if ( strlen(pOrderStatusData->c_last) > LAST_NAME_LEN )
               throw new CWEBCLNT_ERR( ERR_ORDERSTATUS_CLT_RANGE );
          strcpy(pOrderStatusData->c_last, szTmp);
     }
     else
     {    // parse customer id and verify that last name was NOT entered
          if ( !IsNumeric(szTmp) )
               throw new CWEBCLNT_ERR( ERR_ORDERSTATUS_CID_INVALID );
          pOrderStatusData->c_id = atoi(szTmp);
          GetKeyValue(&ptr, "CLT*", szTmp, sizeof(szTmp),
ERR_ORDERSTATUS_MISSING_CLT_KEY);
          if ( szTmp[0] != 0 )
               throw new CWEBCLNT_ERR( ERR_ORDERSTATUS_CID_AND_CLT );
     }

}

/* FUNCTION: BOOL IsNumeric(char *ptr)
 *
 * PURPOSE:     This function determines if a string is numeric. It fails if
any characters other
 *              than numeric and null terminator are present.
 *
 * ARGUMENTS:   char            *ptr pointer to string to check.
 *
 * RETURNS:          BOOL  FALSE if string is not all numeric
 *                         TRUE  if string contains only numeric
characters i.e. '0' - '9'
 */

BOOL IsNumeric(char *ptr)
{
     if ( *ptr == 0 )
          return FALSE;

     while( *ptr && isdigit(*ptr) )
          ptr++;
     return ( !*ptr );
}

/* FUNCTION: BOOL IsDecimal(char *ptr)
 *
 * PURPOSE:     This function determines if a string is a non-negative
decimal value.
 *          It fails if any characters other than a series of numbers
followed by
```

```
 *              a decimal point, another series of numbers, and a null
terminator are present.
 *
 * ARGUMENTS:   char            *ptr pointer to string to check.
 *
 * RETURNS:          BOOL  FALSE if string is not a valid non-negative
decimal value
 *                              TRUE  if string is OK
 */

BOOL IsDecimal(char *ptr)
{
     char *dotptr;
     BOOL  bValid;

     if ( *ptr == 0 )
          return FALSE;

     // find decimal point
     dotptr = strchr( ptr, '.' );
     if (dotptr == NULL)
          // no decimal point, so just check for numeric
          return IsNumeric(ptr);
     *dotptr = 0;  // temporarily replace decimal with a terminator

     if ( *ptr != 0 )
          bValid = IsNumeric(ptr);
     // string starts with decimal point
     else if (*(dotptr+1) == 0)
          return FALSE;  // nothing but a decimal point is bad
     else
          bValid = TRUE;

     if (*(dotptr+1) != 0)
          // check text after decimal point
          bValid &= IsNumeric(dotptr+1);

     *dotptr = '.';  // replace decimal point
     return bValid;
}

//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by tpcc.rc
//
#define IDD_DIALOG1                     101

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifndef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE        102
#define _APS_NEXT_COMMAND_VALUE         40001
#define _APS_NEXT_CONTROL_VALUE         1000
#define _APS_NEXT_SYMED_VALUE           101
#endif
#endif

/*   FILE:      READREGISTRY.CPP
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   not yet audited
 *
 *   PURPOSE:   Implementation for TPC-C Tuxedo class.
 *   Contact:   Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *         4.20.000 - first version
 */


/* FUNCTION: ReadTPCCRegistrySettings
 *
 * PURPOSE:     This function reads the NT registry for startup parameters.
There parameters are
 *              under the TPCC key.
 *
 * RETURNS FALSE = no errors
 *              TRUE  = error reading registry
 */
BOOL ReadTPCCRegistrySettings( TPCCREGISTRYDATA *pReg )
{
     HKEY  hKey;
     DWORD size;
     DWORD type;
     DWORD dwTmp;
     char  szTmp[256];

     if ( RegOpenKeyEx(HKEY_LOCAL_MACHINE, "SOFTWARE\\Microsoft\\TPCC", 0,
KEY_READ, &hKey) != ERROR_SUCCESS )
          return TRUE;

     // determine database protocol to use; may be either ODBC or DBLIB
     pReg->eDB_Protocol = Unspecified;
     size = sizeof(szTmp);
     if ( RegQueryValueEx(hKey, "DB_Protocol", 0, &type, (BYTE *)&szTmp,
&size) == ERROR_SUCCESS )
     {
          if ( !stricmp(szTmp, szDBNames[ODBC]) )
               pReg->eDB_Protocol = ODBC;
          else if ( !stricmp(szTmp, szDBNames[DBLIB]) )
               pReg->eDB_Protocol = DBLIB;
     }
```

```
     pReg->eTxnMon = None;
     // determine txn monitor to use; may be either TUXEDO, or blank
     size = sizeof(szTmp);
     if ( RegQueryValueEx(hKey, "TxnMonitor", 0, &type, (BYTE *)&szTmp,
&size) == ERROR_SUCCESS )
     {
          if ( !stricmp(szTmp, szTxnMonNames[TUXEDO]) )
               pReg->eTxnMon = TUXEDO;
          else if ( !stricmp(szTmp, szTxnMonNames[ENCINA]) )
               pReg->eTxnMon = ENCINA;
          else if ( !stricmp(szTmp, szTxnMonNames[COM]) )
               pReg->eTxnMon = COM;
     }

     pReg->bCOM_SinglePool = FALSE;
     size = sizeof(szTmp);
     if ( RegQueryValueEx(hKey, "COM_SinglePool", 0, &type, (BYTE *)&szTmp,
&size) == ERROR_SUCCESS )
     {
          if ( !stricmp(szTmp, "YES") )
               pReg->bCOM_SinglePool = TRUE;
     }

     pReg->dwMaxConnections = 0;
     size = sizeof(dwTmp);
     if ( ( RegQueryValueEx(hKey, "MaxConnections", 0, &type,
(LPBYTE)&dwTmp, &size) == ERROR_SUCCESS )
          && (type == REG_DWORD) )
          pReg->dwMaxConnections = dwTmp;

     pReg->dwMaxPendingDeliveries = 0;
     size = sizeof(dwTmp);
     if ( ( RegQueryValueEx(hKey, "MaxPendingDeliveries", 0, &type,
(LPBYTE)&dwTmp, &size) == ERROR_SUCCESS )
          && (type == REG_DWORD) )
          pReg->dwMaxPendingDeliveries = dwTmp;

     pReg->dwNumberOfDeliveryThreads = 0;
     size = sizeof(dwTmp);
     if ( ( RegQueryValueEx(hKey, "NumberOfDeliveryThreads", 0, &type,
(LPBYTE)&dwTmp, &size) == ERROR_SUCCESS )
          && (type == REG_DWORD) )
          pReg->dwNumberOfDeliveryThreads = dwTmp;

     size = sizeof( pReg->szPath );
     if ( RegQueryValueEx(hKey, "Path", 0, &type, (BYTE *)&pReg->szPath,
&size) != ERROR_SUCCESS )
          pReg->szPath[0] = 0;

     size = sizeof( pReg->szDbServer );
     if ( RegQueryValueEx(hKey, "DbServer", 0, &type, (BYTE *)&pReg-
>szDbServer, &size) != ERROR_SUCCESS )
          pReg->szDbServer[0] = 0;

     size = sizeof( pReg->szDbName );
     if ( RegQueryValueEx(hKey, "DbName", 0, &type, (BYTE *)&pReg->szDbName,
&size) != ERROR_SUCCESS )
          pReg->szDbName[0] = 0;

     size = sizeof( pReg->szDbUser );
     if ( RegQueryValueEx(hKey, "DbUser", 0, &type, (BYTE *)&pReg->szDbUser,
&size) != ERROR_SUCCESS )
          pReg->szDbUser[0] = 0;

     size = sizeof( pReg->szDbPassword );
     if ( RegQueryValueEx(hKey, "DbPassword", 0, &type, (BYTE *)&pReg-
>szDbPassword, &size) != ERROR_SUCCESS )
          pReg->szDbPassword[0] = 0;

     RegCloseKey(hKey);

     return FALSE;
}

/*   FILE:      ReadRegistry.h
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   not audited
 *
 *   PURPOSE:   Header for registry related code.
 *
 *  Change history:
 *         4.20.000 - first version
 */

enum DBPROTOCOL { Unspecified, ODBC, DBLIB };
const char *szDBNames[] = { "Unspecified", "ODBC", "DBLIB" };

enum TXNMON { None, TUXEDO, ENCINA, COM };
const char *szTxnMonNames[] = { "NONE", "TUXEDO", "ENCINA", "COM" };

//This structure defines the data necessary to keep distinct for each
terminal or client connection.
typedef struct _TPCCREGISTRYDATA
{
     enum DBPROTOCOL eDB_Protocol;
     enum TXNMON eTxnMon;
     BOOL bCOM_SinglePool;
     DWORD dwMaxConnections;
     DWORD dwMaxPendingDeliveries;
     DWORD dwNumberOfDeliveryThreads;
     char szPath[128];
     char szDbServer[32];
     char szDbName[32];
```

```
     char szDbUser[32];
     char szDbPassword[32];
} TPCCREGISTRYDATA, *PTPCCREGISTRYDATA;

BOOL ReadTPCCRegistrySettings( TPCCREGISTRYDATA *pReg );

/*   FILE:      ERROR.H
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   Version 4.10.000 audited by Richard Gimarc, Performance
Metrics, 3/17/99
 *
 *   PURPOSE:   Header file for error exception classes.
 *
 *  Change history:
 *         4.20.000 - updated rev number to match kit
 *         4.21.000 - fixed bug: ~CBaseErr needed to be declared virtual
 */

#pragma once

#ifndef _INC_STRING
     #include <string.h>
#endif

const int m_szMsg_size = 512;
const int m_szApp_size = 64;
const int m_szLoc_size = 64;

//error message structure used in ErrorText routines
typedef struct _SERRORMSG
{
     int       iError;                  //error id of message
     char  szMsg[256];               //message to sent to browser
} SERRORMSG;

#define ERR_FATAL_LEVEL             1
#define ERR_WARNING_LEVEL       2
#define ERR_INFORMATION_LEVEL   3


#define ERR_TYPE_LOGIC                                   -1        //logic
error in program; internal error
#define ERR_SUCCESS                                      0
     //success (a non-error error)
#define ERR_BAD_ITEM_ID                                  1
     //expected abort record in txnRecord
#define ERR_TYPE_DELIVERY_POST                    2         //expected
delivery post failed
#define    ERR_TYPE_WEBDLL                               3         //tpcc
web generated error
#define    ERR_TYPE_SQL                                  4         //sql
server generated error
#define    ERR_TYPE_DBLIB                                5         //dblib
generated error
#define    ERR_TYPE_ODBC                                 6         //odbc
generated error
#define ERR_TYPE_SOCKET                                  7         //error
on communication socket client rte only
#define ERR_TYPE_DEADLOCK                           8         //dblib and
odbc only deadlock condition
#define ERR_TYPE_COM                                9         //error from
COM call
#define ERR_TYPE_TUXEDO                                  10
     //tuxedo error
#define ERR_TYPE_OS                                      11
     //operating system error
#define ERR_TYPE_MEMORY                                  12
     //memory allocation error
#define ERR_TYPE_TPCC_ODBC                          13        //error from
tpcc odbc txn module
#define ERR_TYPE_TPCC_DBLIB                              14        //error
from tpcc dblib txn module
#define ERR_TYPE_DELISRV                            15        //delivery
server error
#define ERR_TYPE_TXNLOG                                  16        //txn
log error
#define ERR_TYPE_BCCONN                                  17
     //Benchcraft connection class
#define ERR_TYPE_TPCC_CONN                          18        //Benchcraft
connection class
#define ERR_TYPE_ENCINA                                  19
     //Encina error
#define ERR_TYPE_COMPONENT                          20        //error from
COM component
#define ERR_TYPE_RTE                                21        //Benchcraft
rte
#define ERR_TYPE_AUTOMATION                              22
     //Benchcraft automation errors


class CBaseErr
{
public:
     char  *m_szApp;
     char  *m_szMsg;
     char  *m_szLoc;  // code location where the error occurred
     int       m_idMsg;

     CBaseErr(void)
     {
          m_idMsg        = 0;
          m_szMsg        = new char[m_szMsg_size];
          m_szApp        = new char[m_szApp_size];
```

```
      m_szLoc         = NULL;

      m_szMsg[0] = 0;
      m_szApp[0] = 0;

      GetModuleFileName(GetModuleHandle(NULL), m_szApp, m_szApp_size);
}

virtual ~CBaseErr(void)
{
      if (m_szMsg)
            delete [] m_szMsg;
      if (m_szApp)
            delete [] m_szApp;
      if (m_szLoc)
            delete [] m_szLoc;
};

CBaseErr(int idMsg)
{
      m_idMsg         = idMsg;
      m_szApp         = new char[m_szApp_size];
      m_szMsg         = new char[m_szMsg_size];
      m_szLoc         = NULL;

      GetModuleFileName(GetModuleHandle(NULL), m_szApp, m_szApp_size);
      LoadString(GetModuleHandle(NULL), idMsg, m_szMsg, m_szMsg_size);
}

CBaseErr(LPCTSTR szMsg)
{
      m_idMsg         = 0;
      m_szApp         = new char[m_szApp_size];
      m_szMsg         = new char[m_szMsg_size];
      m_szLoc         = NULL;

      GetModuleFileName(GetModuleHandle(NULL), m_szApp, m_szApp_size);
      strcpy(m_szMsg, szMsg);
}

void SetError(char *szMsg, LPCTSTR szLocation)
{
      if (szMsg != NULL)
            strcpy(m_szMsg, szMsg);
      else
            m_szMsg[0] = 0;

      if (szLocation != NULL)
      {
            delete [] m_szLoc;
            m_szLoc = new char[strlen(szLocation)+1];
            strcpy(m_szLoc, szLocation);
      }
      else
      {
            delete [] m_szLoc;
            m_szLoc = NULL;
      }
}

      virtual void Draw(HWND hwnd, LPCTSTR szStr = NULL)
      {
            int       j;
            char  szTmp[512];

            if (szStr)
                  j = wsprintf(szTmp, "%s\n",szStr);
            if (m_szLoc)
                  j += wsprintf(szTmp+j, "Location=%s\n",m_szLoc);
            if (m_szMsg)
                  j += wsprintf(szTmp+j, "%s\n", m_szMsg);

            ::MessageBox(hwnd, szTmp, m_szApp, MB_OK);
      }

      char *GetApp(void) { return m_szApp; }
      char *GetMsg(void) { return m_szMsg; }
      char *GetLocation(void) { return m_szLoc; }

      virtual int ErrorType() = 0;    // a value which distinguishes the kind
of error that occurred
      virtual int ErrorNum() = 0;          // an error value specific to the
error type
      virtual char *ErrorText() = 0;  // a string (i.e., human readable)
representation of the error

};

class CSocketErr : public CBaseErr
{
public:
      enum Action
      {
            eNone,
            eSend,
            eSocket,
            eConnect
      };

      CSocketErr(Action eAction, LPCTSTR szLocation);
      CSocketErr(int iError) { m_errId = iError; };
      int       m_errId;
      Action    m_eAction;

      int ErrorType() { return ERR_TYPE_SOCKET;};
      int ErrorNum() { return m_errId;};
```

```
      char *ErrorText(void);
};

class CSystemErr : public CBaseErr
{
public:
      enum Action
      {
            eNone,
            eTransactNamedPipe,
            eWaitNamedPipe,
            eSetNamedPipeHandleState,
            eCreateFile,
            eCreateProcess,
            eCallNamedPipe,
            eCreateEvent,
            eCreateThread,
            eVirtualAlloc,
            eReadFile,
            eWriteFile,
            eMapViewOfFile,
            eCreateFileMapping,
            eInitializeSecurityDescriptor,
            eSetSecurityDescriptorDacl,
            eCreateNamedPipe,
            eConnectNamedPipe,
            eWaitForSingleObject,
            eRegOpenKeyEx,
            eRegQueryValueEx,
      };

      CSystemErr(Action eAction, LPCTSTR szLocation);

      void Draw(HWND hwnd, LPCTSTR szStr = NULL);

      int       m_errId;
      Action    m_eAction;

      int ErrorType() { return ERR_TYPE_OS;}
      int ErrorNum() { return m_errId;}
      char *ErrorText() { return m_szMsg; }
};

class CMemoryErr : public CBaseErr
{
public:
      CMemoryErr(void);

      int ErrorType() { return ERR_TYPE_MEMORY;}
      int ErrorNum() { return 0;}
      char *ErrorText() { return "Insufficient Memory to continue.";}
};
```

```
/*    FILE:      TRANS.H
 *                     Microsoft TPC-C Kit Ver. 4.20.000
 *                     Copyright Microsoft, 1999
 *               All Rights Reserved
 *
 *                     Version 4.10.000 audited by Richard Gimarc, Performance
Metrics, 3/17/99
 *
 *    PURPOSE:   Header file for TPC-C structure templates.
 *
 *  Change history:
 *         4.20.000 - updated rev number to match kit
 */
#pragma once

// String length constants
#define SERVER_NAME_LEN            20
#define DATABASE_NAME_LEN          20
#define USER_NAME_LEN              20
#define PASSWORD_LEN               20
#define TABLE_NAME_LEN             20
#define I_DATA_LEN                 50
#define I_NAME_LEN                 24
#define BRAND_LEN                   1
#define LAST_NAME_LEN              16
#define W_NAME_LEN                 10
#define ADDRESS_LEN                20
#define STATE_LEN                   2
#define ZIP_LEN                     9
#define S_DIST_LEN                 24
#define S_DATA_LEN                 50
#define D_NAME_LEN                 10
#define FIRST_NAME_LEN             16
#define MIDDLE_NAME_LEN             2
#define PHONE_LEN                  16
#define DATETIME_LEN               30
#define CREDIT_LEN                  2
#define C_DATA_LEN                250
#define H_DATA_LEN                 24
#define DIST_INFO_LEN              24
#define MAX_OL_NEW_ORDER_ITEMS     15
#define MAX_OL_ORDER_STATUS_ITEMS  15
#define STATUS_LEN                 25
#define OL_DIST_INFO_LEN           24

// TIMESTAMP_STRUCT is provided by the ODBC header file sqltypes.h, but is
not available
// when compiling with dblib, so redefined here.  Note: we are using the
symbol "__SQLTYPES"
// (declared in sqltypes.h) as a way to determine if TIMESTAMP_STRUCT has
been declared.
#ifndef __SQLTYPES
      typedef struct
```

```
     {
               short          /* SQLSMALLINT */    year;
               unsigned short  /* SQLUSMALLINT */   month;
               unsigned short  /* SQLUSMALLINT */   day;
               unsigned short  /* SQLUSMALLINT */   hour;
               unsigned short  /* SQLUSMALLINT */   minute;
               unsigned short  /* SQLUSMALLINT */   second;
               unsigned long   /* SQLUINTEGER */    fraction;
     } TIMESTAMP_STRUCT;
#endif

// possible values for exec_status_code after transaction completes
enum EXEC_STATUS
{
     eOK,            // 0 "Transaction commited."
     eInvalidItem,   // 1 "Item number is not valid."
     eDeliveryFailed // 2 "Delivery Post Failed."
};

// transaction structures
typedef struct
{
     // input params
     short                     ol_supply_w_id;
     long                      ol_i_id;
     short                     ol_quantity;

     // output params
     char                      ol_i_name[I_NAME_LEN+1];
     char                      ol_brand_generic[BRAND_LEN+1];
     double                    ol_i_price;
     double                    ol_amount;
     short                     ol_stock;
} OL_NEW_ORDER_DATA;

typedef struct
{
     // input params
     short               w_id;
     short               d_id;
     long                c_id;
     short               o_ol_cnt;

     // output params
     EXEC_STATUS              exec_status_code;
     char                c_last[LAST_NAME_LEN+1];
     char                c_credit[CREDIT_LEN+1];
     double              c_discount;
     double              w_tax;
     double              d_tax;
     long                o_id;
     short               o_commit_flag;
     TIMESTAMP_STRUCT    o_entry_d;
     short               o_all_local;
     double              total_amount;
     OL_NEW_ORDER_DATA   OL[MAX_OL_NEW_ORDER_ITEMS];
} NEW_ORDER_DATA, *PNEW_ORDER_DATA;

typedef struct
{    // input params
     short                     w_id;
     short                     d_id;
     long                 c_id;
     short                     c_d_id;
     short                     c_w_id;
     double                    h_amount;
     char                 c_last[LAST_NAME_LEN+1];

     // output params
     EXEC_STATUS               exec_status_code;
     TIMESTAMP_STRUCT     h_date;
     char                      w_street_1[ADDRESS_LEN+1];
     char                      w_street_2[ADDRESS_LEN+1];
     char                      w_city[ADDRESS_LEN+1];
     char                      w_state[STATE_LEN+1];
     char                      w_zip[ZIP_LEN+1];
     char                      d_street_1[ADDRESS_LEN+1];
     char                      d_street_2[ADDRESS_LEN+1];
     char                      d_city[ADDRESS_LEN+1];
     char                      d_state[STATE_LEN+1];
     char                     d_zip[ZIP_LEN+1];
     char                      c_first[FIRST_NAME_LEN+1];
     char                      c_middle[MIDDLE_NAME_LEN + 1];
     char                      c_street_1[ADDRESS_LEN+1];
     char                      c_street_2[ADDRESS_LEN+1];
     char                      c_city[ADDRESS_LEN+1];
     char                      c_state[STATE_LEN+1];
     char                      c_zip[ZIP_LEN+1];
     char                      c_phone[PHONE_LEN+1];
     TIMESTAMP_STRUCT     c_since;
     char                      c_credit[CREDIT_LEN+1];
     double                    c_credit_lim;
     double                    c_discount;
     double                    c_balance;
     char                      c_data[200+1];
} PAYMENT_DATA, *PPAYMENT_DATA;

typedef struct
{
     long                ol_i_id;
     short               ol_supply_w_id;
     short               ol_quantity;
     double              ol_amount;
     TIMESTAMP_STRUCT    ol_delivery_d;
} OL_ORDER_STATUS_DATA;
```

```
typedef struct
{    // input params
     short               w_id;
     short               d_id;
     long                c_id;
     char                c_last[LAST_NAME_LEN+1];

     // output params
     EXEC_STATUS              exec_status_code;
     char                c_first[FIRST_NAME_LEN+1];
     char                c_middle[MIDDLE_NAME_LEN+1];
     double              c_balance;
     long                o_id;
     TIMESTAMP_STRUCT     o_entry_d;
     short               o_carrier_id;
     OL_ORDER_STATUS_DATA OL[MAX_OL_ORDER_STATUS_ITEMS];
     short               o_ol_cnt;
} ORDER_STATUS_DATA, *PORDER_STATUS_DATA;


typedef struct
{    // input params
     short               w_id;
     short               o_carrier_id;

     // output params
     EXEC_STATUS              exec_status_code;
     SYSTEMTIME          queue_time;
     long                o_id[10];       // id's of delivered orders for
districts 1 to 10
} DELIVERY_DATA, *PDELIVERY_DATA;

//This structure is used for posting delivery transactions and for writing
them to the delivery server.
typedef struct _DELIVERY_TRANSACTION
{
     SYSTEMTIME queue;              //time delivery transaction queued
     short      w_id;          //delivery warehouse
     short      o_carrier_id;  //carrier id
} DELIVERY_TRANSACTION;

typedef struct
{    // input params
     short                    w_id;
     short                    d_id;
     short                    threshold;

     // output params
     EXEC_STATUS              exec_status_code;
     long                     low_stock;
} STOCK_LEVEL_DATA, *PSTOCK_LEVEL_DATA;

/*   FILE:      TXN_BASE.H
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   Version 4.10.000 audited by Richard Gimarc, Performance
Metrics, 3/17/99
 *
 *   PURPOSE:   Header file for TPC-C txn class implementation.
 *
 *  Change history:
 *         4.20.000 - updated rev number to match kit
 */

#pragma once

// need to declare functions for import, unless define has already been
created
// by the DLL's .cpp module for export.
#ifndef DllDecl
#define DllDecl  __declspec( dllimport )
#endif

class DllDecl CTPCC_BASE
{
     public:
          CTPCC_BASE(void) {};
          virtual ~CTPCC_BASE(void) {};

          virtual PNEW_ORDER_DATA         BuffAddr_NewOrder()       = 0;
          virtual PPAYMENT_DATA      BuffAddr_Payment()        = 0;
          virtual PDELIVERY_DATA          BuffAddr_Delivery()       = 0;
          virtual PSTOCK_LEVEL_DATA  BuffAddr_StockLevel()= 0;
          virtual PORDER_STATUS_DATA BuffAddr_OrderStatus()    = 0;

          virtual void NewOrder     () = 0;
          virtual void Payment      () = 0;
          virtual void Delivery     () = 0;
          virtual void StockLevel         () = 0;
          virtual void OrderStatus  () = 0;
};

/*   FILE:      TPCC_DBLIB.CPP
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   Version 4.10.000 audited by Richard Gimarc, Performance
Metrics, 3/17/99
 *
 *   PURPOSE:   Implements dblib calls for TPC-C txns.
 *   Contact:   Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
```

```
 *        4.20.000 - updated rev number to match kit
 *        4.10.001 - not deleting error class in catch handler on deadlock
retry;
 *                   not a functional bug, but a memory leak
 *                 - had to tweak some declarations to compile with
latest SDK; no functional change
 */

#include <windows.h>
#include <stdio.h>
#include <assert.h>

#define DBNTWIN32
#include <sqlfront.h>
#include <sqldb.h>

#ifdef ICECAP
#include <icapexp.h>
#endif

// need to declare functions for export
#define DllDecl  __declspec( dllexport )

#include "..\..\common\src\error.h"
#include "..\..\common\src\trans.h"
#include "..\..\common\src\txn_base.h"
#include "tpcc_dblib.h"

#define    DEFCLPACKSIZE             4096

// version string; must match return value from tpcc_version stored proc
const char sVersion[] = "4.10.000";

const          iMaxRetries = 10;         // how many retries on deadlock
static     long iConnectionCount = 0;  // number of current dblib
connections

const int iErrOleDbProvider = 7312;
const char sErrTimeoutExpired[] = "Timeout expired";

BOOL APIENTRY DllMain(HMODULE hModule, DWORD ul_reason_for_call, LPVOID
lpReserved)
{
     switch( ul_reason_for_call )
     {
          case DLL_PROCESS_ATTACH:
               DisableThreadLibraryCalls(hModule);
               dbinit();       // initialize dblib
               break;

          case DLL_PROCESS_DETACH:
               dbexit();       // close all dblib structures/connections
               break;
          default:
               /* nothing */;
     }
     return TRUE;
}


int err_handler(DBPROCESS *dbproc, int severity, int dberr, int oserr,
LPCSTR dberrstr, LPCSTR oserrstr)
{
     CTPCC_DBLIB               *pConn;

     assert(dbproc != NULL);
     pConn = (CTPCC_DBLIB*)dbgetuserdata(dbproc);

     if (pConn != NULL)
     {
          pConn->SetDbLibError( severity, dberr, oserr, dberrstr, oserrstr
);
     }
     return INT_CANCEL;
}

/* FUNCTION: int msg_handler(DBPROCESS *dbproc, DBINT msgno, int msgstate,
int severity, char *msgtext)
 *
 * PURPOSE:     This function handles DB-Library SQL Server error messages
 *
 * ARGUMENTS:   DBPROCESS       *dbproc              DBPROCESS id pointer
 *                   DBINT           msgno           message number
 *                   int                  msgstate        message state
 *                   int                  severity        message severity
 *                   char            *msgtext        printable message
description
 *
 * RETURNS:          int                  INT_CONTINUE    continue if error
is SQLETIME else INT_CANCEL action
 *                                        INT_CANCEL      cancel operation
 *
 * COMMENTS:    This function also sets the dead lock dbproc variable if
necessary.
 *
 */

// typedef INT (SQLAPI *DBMSGHANDLE_PROC)(PDBPROCESS, DBINT, INT, INT,
LPCSTR, LPCSTR, LPCSTR, DBUSMALLINT);

int msg_handler(DBPROCESS *dbproc, DBINT msgno, int msgstate, int severity,
                   LPCSTR msgtext, LPCSTR srvname, LPCSTR procname,
DBUSMALLINT line)
{
     CTPCC_DBLIB               *pConn;
```

```
     assert(dbproc != NULL);
     pConn = (CTPCC_DBLIB*)dbgetuserdata(dbproc);

     if (pConn != NULL)
     {
          pConn->SetSqlError( msgno, msgstate, severity, msgtext );
     }

     return 0;
}

/* FUNCTION: void UtilStrCpy(char * pDest, char * pSrc, int n)
 *
 * PURPOSE:     This function copies n characters from string pSrc to pDst
and places a
 *              null character at the end of the destination string.
 *
 * ARGUMENTS:   char            *pDest     destination string pointer
 *                   char            *pSrc source string pointer
 *                   int                  n          number of characters to
copy
 *
 * RETURNS:          None
 *
 * COMMENTS:    Unlike strncpy this function ensures that the result string
is
 *                   always null terminated.
 *
 */

inline static void UtilStrCpy(char * pDest, const BYTE * pSrc, int n)
{
    strncpy(pDest, (char *)pSrc, n);
    pDest[n] = '\0';

     return;
}

/* FUNCTION: CTPCC_DBLIB_ERR::ErrorText
 *
 */

char* CTPCC_DBLIB_ERR::ErrorText(void)
{
     int i;

     static SERRORMSG errorMsgs[] =
     {
          { ERR_WRONG_SP_VERSION,         "Wrong version of stored procs on
database server"     },
          { ERR_INVALID_CUST,             "Invalid Customer id,name."
                              },
          { ERR_NO_SUCH_ORDER,       "No orders found for customer."
                    },
          { ERR_RETRIED_TRANS,       "Retries before transaction succeeded."
                    },
          { 0,                                 ""
                                    }
     };

     static char szNotFound[] = "Unknown error number.";

     for(i=0; errorMsgs[i].szMsg[0]; i++)
     {
          if ( m_errno == errorMsgs[i].iError )
               break;
     }
     if ( !errorMsgs[i].szMsg[0] )
          return szNotFound;
     else
          return errorMsgs[i].szMsg;
}

// wrapper routine for class constructor
__declspec(dllexport) CTPCC_DBLIB* CTPCC_DBLIB_new(
     LPCSTR szServer,           // name of SQL server
     LPCSTR szUser,             // user name for login
     LPCSTR szPassword,         // password for login
     LPCSTR szHost,             // workstation name; shows up in sp_who; max
30 chars, only first 10 kept by SQL Server
     LPCSTR szDatabase )        // name of database to use
{
     return new CTPCC_DBLIB( szServer, szUser, szPassword, szHost,
szDatabase );
}


CTPCC_DBLIB::CTPCC_DBLIB (
     LPCSTR szServer,           // name of SQL server
     LPCSTR szUser,             // user name for login
     LPCSTR szPassword,         // password for login
     LPCSTR szHost,             // workstation name; shows up in sp_who; max
30 chars, only first 10 kept by SQL Server
     LPCSTR szDatabase )        // name of database to use
{
     LOGINREC   *login;
     const BYTE *pData;

     // initialization
     m_dbproc = NULL;
     m_DbLibErr = (CDBLIBERR*)NULL;
     m_SqlErr = (CSQLERR*)NULL;

     m_MaxRetries = 10;         // how many retries on deadlock
```

```
    // increase max number of connections if getting close
    if ( dbgetmaxprocs() < (iConnectionCount+5) )
    {
         if ( dbsetmaxprocs(iConnectionCount+10) == FAIL )
              ThrowError(CDBLIBERR::eDbSetMaxProcs);
    }

    // allocate a login structure
    login = dblogin();
    if (login == NULL)
         ThrowError(CDBLIBERR::eLogin);
    InterlockedIncrement( &iConnectionCount );

    // register error and message handler functions
    if (dbprocerrhandle(login, err_handler) == NULL)
         ThrowError(CDBLIBERR::eDbProcHandler);

    if (dbprocmsghandle(login, msg_handler) == NULL)
         ThrowError(CDBLIBERR::eDbProcHandler);


    DBSETLUSER(login, szUser);
    DBSETLPWD(login, szPassword);
    DBSETLHOST(login, szHost);
    DBSETLPACKET(login, (unsigned short)DEFCLPACKSIZE);
    DBSETLVERSION(login, DBVER60);       // use dblib ver 6.0 client
behavior

    // set time to wait for login
    if (dbsetlogintime(60) == FAIL)
         ThrowError(CDBLIBERR::eDbSet);

    // set time to wait for statement execution
    if (dbsettime(180) == FAIL)
         ThrowError(CDBLIBERR::eDbSet);

    m_dbproc = dbopen(login, szServer);

    // deallocate login structure before checking for success
    dbfreelogin( login );

    if (m_dbproc == NULL)
         ThrowError(CDBLIBERR::eDbOpen);

    // save address of class instance so that the message and error handler
    // can get to data.
    dbsetuserdata(m_dbproc, (LPVOID)this);

    // Use the the right database
    if (dbuse(m_dbproc, szDatabase) == FAIL)
         ThrowError(CDBLIBERR::eDbUse);
```

```
    dbcmd(m_dbproc, "set nocount on ");            // do not return row
counts
    dbcmd(m_dbproc, "set XACT_ABORT ON");     // rollback transaction on
abort

    if (dbsqlexec(m_dbproc) == FAIL)
         ThrowError(CDBLIBERR::eDbSqlExec);

    DiscardNextResults(2);

    // verify that version of stored procs on server is correct
    dbrpcinit(m_dbproc, "tpcc_version", 0);

    if (dbrpcexec(m_dbproc) == FAIL)
         ThrowError(CDBLIBERR::eDbRpcExec);

    if (dbresults(m_dbproc) != SUCCEED)
         ThrowError(CDBLIBERR::eDbResults);

    if (dbnextrow(m_dbproc) != REG_ROW)
         ThrowError(CDBLIBERR::eDbNextRow);

    char szSrvVersion[16];
    pData=dbdata(m_dbproc, 1);
    if (pData)
         UtilStrCpy(szSrvVersion, pData, dbdatlen(m_dbproc, 1));
    else
         szSrvVersion[0]=0;
    if (strcmp(szSrvVersion,sVersion))
         throw new CTPCC_DBLIB_ERR( CTPCC_DBLIB_ERR::ERR_WRONG_SP_VERSION
);


    DiscardNextRows(0);
    DiscardNextResults(0);
}


CTPCC_DBLIB::~CTPCC_DBLIB( void )
{
    // close db connection and deallocate resources
    dbclose(m_dbproc);
    InterlockedDecrement( &iConnectionCount );
    if (m_DbLibErr != NULL)
         delete m_DbLibErr;
    if (m_SqlErr != NULL)
         delete m_SqlErr;
}

void CTPCC_DBLIB::SetDbLibError(int severity, int dberr, int oserr, LPCSTR
dberrstr, LPCSTR oserrstr)
{
    delete m_DbLibErr;
```

```
     m_DbLibErr = new CDBLIBERR(CDBLIBERR::eUnknown, severity, dberr,
oserr);

     if (dberrstr != NULL)
     {
          m_DbLibErr->m_dberrstr = new char[ strlen(dberrstr)+1 ];
          strcpy( m_DbLibErr->m_dberrstr, dberrstr );
     }

     if (oserrstr != NULL)
     {
          m_DbLibErr->m_oserrstr = new char[ strlen(oserrstr)+1 ];
          strcpy( m_DbLibErr->m_oserrstr, oserrstr );
     }

}

void CTPCC_DBLIB::SetSqlError( int /*DBINT*/ msgno, int msgstate, int
severity, LPCSTR msgtext )
{
     if (m_SqlErr == NULL)
          m_SqlErr = new CSQLERR();

     m_SqlErr->m_msgno = msgno;
     m_SqlErr->m_msgstate = msgstate;
     m_SqlErr->m_severity = severity;

     delete [] m_SqlErr->m_msgtext;
     if (msgtext != NULL)
     {
          m_SqlErr->m_msgtext = new char[ strlen(msgtext)+1 ];
          strcpy( m_SqlErr->m_msgtext, msgtext );
     }
}

void CTPCC_DBLIB::ThrowError( CDBLIBERR::ACTION eAction )
{
     // discard anything still in return buffer
     DiscardNextRows(-1);
     DiscardNextResults(-1);

     // check for SQL Server error first;  if yes, throw it and ignore any
DBLib error.
     if (m_SqlErr != NULL)
     {
          CSQLERR         *pSqlErr;
          pSqlErr = m_SqlErr;
          m_SqlErr = NULL;     // clear our pointer to instance; catch
handler will delete
          throw pSqlErr;
     }

     CDBLIBERR  *pDbLibErr;

     if (m_DbLibErr == NULL)
          // this case isn't expected to happen, since it means that an
error was returned
          // but the error handlers were not called.
          pDbLibErr = new CDBLIBERR(eAction);
     else
     {
          pDbLibErr = m_DbLibErr;
          pDbLibErr->m_eAction = eAction;
          m_DbLibErr = NULL;         // clear our pointer to instance; catch
handler will delete
     }

     throw pDbLibErr;
}

// Read and discard rows until no more.  Throw an exception if number of
rows read doesn't
// match number of rows expected.  The row count will be ignored if the
expected count value
// passed in is negative.  A typical use of this routine is to verify that
there are no more
// rows to be read.
void CTPCC_DBLIB::DiscardNextRows(int iExpectedCount)
{
     int        iRowsRead = 0;
     RETCODE    rc;

     while (TRUE)
     {
          rc = dbnextrow(m_dbproc);
          if (rc == NO_MORE_ROWS)
               break;
          if (rc == FAIL)
          {
               if (iExpectedCount >= 0)
                    ThrowError(CDBLIBERR::eDbNextRow);
               else
                    break;
          }
          iRowsRead++;
     }

     if ((iExpectedCount >= 0) &&
          (iExpectedCount != iRowsRead))
          ThrowError(CDBLIBERR::eWrongRowCount);
}

// Read and discard results until no more.  Throw an exception if number of
result sets read doesn't
// match number expected.  The result set count will be ignored if the
expected count value
```

```
// passed in is negative.  A typical use of this routine is to verify that
there are no more
// result sets to be read.
void CTPCC_DBLIB::DiscardNextResults(int iExpectedCount)
{
     int       iResultsRead = 0;
     RETCODE   rc;

     while (TRUE)
     {
          rc = dbresults(m_dbproc);
          if (rc == NO_MORE_RESULTS)
               break;
          if (rc == FAIL)
          {
               if (iExpectedCount >= 0)
                    ThrowError(CDBLIBERR::eDbResults);
               else
                    break;
          }

          DiscardNextRows(-1);
          iResultsRead++;
     }

     if ((iExpectedCount >= 0) &&
          (iExpectedCount != iResultsRead))
          ThrowError(CDBLIBERR::eWrongRowCount);
}

void CTPCC_DBLIB::StockLevel()
{
     int            iTryCount = 0;
     const BYTE *pData;

     ResetError();

     while (TRUE)
     {
          try
          {
               dbrpcinit(m_dbproc, "tpcc_stocklevel", 0);

               dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.StockLevel.w_id);       // @w_id smallint
               dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.StockLevel.d_id);       // @d_id tinyint
               dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.StockLevel.threshold);  // @threshhold smallint

               if (dbrpcexec(m_dbproc) == FAIL)
                    ThrowError(CDBLIBERR::eDbRpcExec);

               if (dbresults(m_dbproc) != SUCCEED)
                    ThrowError(CDBLIBERR::eDbResults);

               if (dbnextrow(m_dbproc) != REG_ROW)
                    ThrowError(CDBLIBERR::eDbNextRow);

               if (pData=dbdata(m_dbproc, 1))
                    m_txn.StockLevel.low_stock = *((long *) pData);

               DiscardNextRows(0);
               DiscardNextResults(0);

               m_txn.StockLevel.exec_status_code = eOK;
               return;
          }
          catch (CSQLERR *e)
          {
               if ((e->m_msgno == 1205 ||
                    (e->m_msgno == iErrOleDbProvider &&
                    strstr(e->m_msgtext, sErrTimeoutExpired) != NULL)) &&
                    (++iTryCount <= iMaxRetries))
               {
                    // hit deadlock; backoff for increasingly longer period
                    delete e;
                    Sleep(10 * iTryCount);
               }
               else
                    throw;
          }
     }    // while (TRUE)

     //if (iTryCount)
     //   throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}


void CTPCC_DBLIB::NewOrder()
{
     int            i;
     DBINT     commit_flag;
     DBDATETIME datetime;
     DBDATEREC  daterec;

     int            iTryCount = 0;
     const BYTE *pData;

     ResetError();

     while (TRUE)
     {
          try
          {
```

```
                dbrpcinit(m_dbproc, "tpcc_neworder", 0);

                dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.NewOrder.w_id);
                dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.NewOrder.d_id);
                dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.NewOrder.c_id);
                dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.NewOrder.o_ol_cnt);

                // check whether any order lines are for a remote warehouse
                m_txn.NewOrder.o_all_local = 1;
                for (i = 0; i < m_txn.NewOrder.o_ol_cnt; i++)
                {
                     if (m_txn.NewOrder.OL[i].ol_supply_w_id !=
m_txn.NewOrder.w_id)
                     {
                          m_txn.NewOrder.o_all_local = 0;  // at least one
remote warehouse
                          break;
                     }
                }
                dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.NewOrder.o_all_local);

                for (i = 0; i < m_txn.NewOrder.o_ol_cnt; i++)
                {
                     dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.NewOrder.OL[i].ol_i_id);
                     dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.NewOrder.OL[i].ol_supply_w_id);
                     dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.NewOrder.OL[i].ol_quantity);
                }

                if (dbrpcexec(m_dbproc) == FAIL)
                     ThrowError(CDBLIBERR::eDbRpcExec);


                // Get order line results
                m_txn.NewOrder.total_amount = 0;
                for (i = 0; i<m_txn.NewOrder.o_ol_cnt; i++)
                {
                     if (dbresults(m_dbproc) != SUCCEED)
                          ThrowError(CDBLIBERR::eDbResults);

                     if (dbnumcols(m_dbproc) != 5)
                          ThrowError(CDBLIBERR::eWrongNumCols);

                     if (dbnextrow(m_dbproc) != REG_ROW)
                          ThrowError(CDBLIBERR::eDbNextRow);

                     if(pData=dbdata(m_dbproc, 1))
                          UtilStrCpy(m_txn.NewOrder.OL[i].ol_i_name, pData,
dbdatlen(m_dbproc, 1));
                     if(pData=dbdata(m_dbproc, 2))
                          m_txn.NewOrder.OL[i].ol_stock = (*(DBSMALLINT *)
pData);
                     if(pData=dbdata(m_dbproc, 3))
                          UtilStrCpy(m_txn.NewOrder.OL[i].ol_brand_generic,
pData, dbdatlen(m_dbproc, 3));
                     if(pData=dbdata(m_dbproc, 4))
                          dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,4),
                          SQLFLT8, (BYTE *)&m_txn.NewOrder.OL[i].ol_i_price,
8);
                     if(pData=dbdata(m_dbproc, 5))

                          dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,5),
                          SQLFLT8, (BYTE *)&m_txn.NewOrder.OL[i].ol_amount,
8);

                     m_txn.NewOrder.total_amount =
m_txn.NewOrder.total_amount + m_txn.NewOrder.OL[i].ol_amount;

                          DiscardNextRows(0);
                }


                // get remaining values for w_tax, d_tax, o_id, c_last,
c_discount, c_credit, o_entry_d, commit_flag
                if (dbresults(m_dbproc) != SUCCEED)
                     ThrowError(CDBLIBERR::eDbResults);

                if (dbnextrow(m_dbproc) != REG_ROW)
                     ThrowError(CDBLIBERR::eDbNextRow);

                if (dbnumcols(m_dbproc) != 8)
                     ThrowError(CDBLIBERR::eWrongNumCols);

                if (pData=dbdata(m_dbproc, 1))

                     dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,1), SQLFLT8, (BYTE *)&m_txn.NewOrder.w_tax, 8);
                if (pData=dbdata(m_dbproc, 2))

                     dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,2), SQLFLT8, (BYTE *)&m_txn.NewOrder.d_tax, 8);
                if (pData=dbdata(m_dbproc, 3))
                     m_txn.NewOrder.o_id = (*(DBINT *) pData);
                if (pData=dbdata(m_dbproc, 4))
                     UtilStrCpy(m_txn.NewOrder.c_last, pData,
dbdatlen(m_dbproc, 4));
                if (pData=dbdata(m_dbproc, 5))
```

```
                    dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,5), SQLFLT8, (BYTE *)&m_txn.NewOrder.c_discount, 8);
               if (pData=dbdata(m_dbproc, 6))
                    UtilStrCpy(m_txn.NewOrder.c_credit, pData,
dbdatlen(m_dbproc, 6));
               if (pData=dbdata(m_dbproc, 7))
               {
                    datetime = *((DBDATETIME *) pData);
                    dbdatecrack(m_dbproc, &daterec, &datetime);
                    m_txn.NewOrder.o_entry_d.year   = daterec.year;
                    m_txn.NewOrder.o_entry_d.month  = daterec.month;
                    m_txn.NewOrder.o_entry_d.day    = daterec.day;
                    m_txn.NewOrder.o_entry_d.hour   = daterec.hour;
                    m_txn.NewOrder.o_entry_d.minute = daterec.minute;
                    m_txn.NewOrder.o_entry_d.second = daterec.second;
               }
               if (pData=dbdata(m_dbproc, 8))
                    commit_flag = (*(DBTINYINT *) pData);

               DiscardNextRows(0);
               DiscardNextResults(0);


               if (commit_flag == 1)
               {
                    m_txn.NewOrder.total_amount *= ((1 +
m_txn.NewOrder.w_tax + m_txn.NewOrder.d_tax) * (1 -
m_txn.NewOrder.c_discount));
                    m_txn.NewOrder.exec_status_code = eOK;
               }
               else
                    m_txn.NewOrder.exec_status_code = eInvalidItem;

               return;
          }
          catch (CSQLERR *e)
          {
               if ((e->m_msgno == 1205 ||
                    (e->m_msgno == iErrOleDbProvider &&
                    strstr(e->m_msgtext, sErrTimeoutExpired) != NULL)) &&
                    (++iTryCount <= iMaxRetries))
               {
                    // hit deadlock; backoff for increasingly longer period
                    delete e;
                    Sleep(10 * iTryCount);
               }
               else
                    throw;
          }
     }    // while (TRUE)

//   if (iTryCount)
//        throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}


void CTPCC_DBLIB::Payment()
{
     DBDATETIME datetime;
     DBDATEREC  daterec;

     int             iTryCount = 0;
     const BYTE *pData;

     ResetError();

     while (TRUE)
     {
          try
          {
               dbrpcinit(m_dbproc, "tpcc_payment", 0);

               dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.Payment.w_id);
               dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.Payment.c_w_id);
               dbrpcparam(m_dbproc, NULL, 0, SQLFLT8, -1, -1, (BYTE *)
&m_txn.Payment.h_amount);
               dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.Payment.d_id);
               dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.Payment.c_d_id);
               dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.Payment.c_id);

               // if customer id is zero, then payment is by name
               if (m_txn.Payment.c_id == 0)
                    dbrpcparam(m_dbproc, NULL, 0, SQLCHAR, -1,
strlen(m_txn.Payment.c_last), (unsigned char *)m_txn.Payment.c_last);

               if (dbrpcexec(m_dbproc) == FAIL)
                    ThrowError(CDBLIBERR::eDbRpcExec);

               if (dbresults(m_dbproc) != SUCCEED)
                    ThrowError(CDBLIBERR::eDbResults);

               if (dbnextrow(m_dbproc) != REG_ROW)
                    ThrowError(CDBLIBERR::eDbNextRow);

               if (dbnumcols(m_dbproc) != 27)
                    ThrowError(CDBLIBERR::eWrongNumCols);

               if (pData=dbdata(m_dbproc, 1))
                    m_txn.Payment.c_id = *((DBINT *) pData);
```

```
                if (pData=dbdata(m_dbproc, 2))
                     UtilStrCpy(m_txn.Payment.c_last, pData,
dbdatlen(m_dbproc, 2));
                if (pData=dbdata(m_dbproc, 3))
                {
                     datetime = *((DBDATETIME *) pData);
                     dbdatecrack(m_dbproc, &daterec, &datetime);
                     m_txn.Payment.h_date.year   = daterec.year;
                     m_txn.Payment.h_date.month  = daterec.month;
                     m_txn.Payment.h_date.day    = daterec.day;
                     m_txn.Payment.h_date.hour   = daterec.hour;
                     m_txn.Payment.h_date.minute = daterec.minute;
                     m_txn.Payment.h_date.second = daterec.second;
                }
                if (pData=dbdata(m_dbproc, 4))
                     UtilStrCpy(m_txn.Payment.w_street_1, pData,
dbdatlen(m_dbproc, 4));
                if (pData=dbdata(m_dbproc, 5))
                     UtilStrCpy(m_txn.Payment.w_street_2, pData,
dbdatlen(m_dbproc, 5));
                if (pData=dbdata(m_dbproc, 6))
                     UtilStrCpy(m_txn.Payment.w_city, pData,
dbdatlen(m_dbproc, 6));
                if (pData=dbdata(m_dbproc, 7))
                     UtilStrCpy(m_txn.Payment.w_state, pData,
dbdatlen(m_dbproc, 7));
                if (pData=dbdata(m_dbproc, 8))
                     UtilStrCpy(m_txn.Payment.w_zip, pData,
dbdatlen(m_dbproc, 8));
                if (pData=dbdata(m_dbproc, 9))
                     UtilStrCpy(m_txn.Payment.d_street_1, pData,
dbdatlen(m_dbproc, 9));
                if (pData=dbdata(m_dbproc, 10))
                     UtilStrCpy(m_txn.Payment.d_street_2, pData,
dbdatlen(m_dbproc, 10));
                if (pData=dbdata(m_dbproc, 11))
                     UtilStrCpy(m_txn.Payment.d_city, pData,
dbdatlen(m_dbproc, 11));
                if (pData=dbdata(m_dbproc, 12))
                     UtilStrCpy(m_txn.Payment.d_state, pData,
dbdatlen(m_dbproc, 12));
                if (pData=dbdata(m_dbproc, 13))
                     UtilStrCpy(m_txn.Payment.d_zip, pData,
dbdatlen(m_dbproc, 13));
                if (pData=dbdata(m_dbproc, 14))
                     UtilStrCpy(m_txn.Payment.c_first, pData,
dbdatlen(m_dbproc, 14));
                if (pData=dbdata(m_dbproc, 15))
                     UtilStrCpy(m_txn.Payment.c_middle, pData,
dbdatlen(m_dbproc, 15));
                if (pData=dbdata(m_dbproc, 16))
                     UtilStrCpy(m_txn.Payment.c_street_1, pData,
dbdatlen(m_dbproc, 16));
                if (pData=dbdata(m_dbproc, 17))
                     UtilStrCpy(m_txn.Payment.c_street_2, pData,
dbdatlen(m_dbproc, 17));
                if (pData=dbdata(m_dbproc, 18))
                     UtilStrCpy(m_txn.Payment.c_city, pData,
dbdatlen(m_dbproc, 18));
                if (pData=dbdata(m_dbproc, 19))
                     UtilStrCpy(m_txn.Payment.c_state, pData,
dbdatlen(m_dbproc, 19));
                if (pData=dbdata(m_dbproc, 20))
                     UtilStrCpy(m_txn.Payment.c_zip, pData,
dbdatlen(m_dbproc, 20));
                if (pData=dbdata(m_dbproc, 21))
                     UtilStrCpy(m_txn.Payment.c_phone, pData,
dbdatlen(m_dbproc, 21));
                if (pData=dbdata(m_dbproc, 22))
                {
                     datetime = *((DBDATETIME *) pData);
                     dbdatecrack(m_dbproc, &daterec, &datetime);
                     m_txn.Payment.c_since.year   = daterec.year;
                     m_txn.Payment.c_since.month  = daterec.month;
                     m_txn.Payment.c_since.day    = daterec.day;
                     m_txn.Payment.c_since.hour   = daterec.hour;
                     m_txn.Payment.c_since.minute = daterec.minute;
                     m_txn.Payment.c_since.second = daterec.second;
                }
                if(pData=dbdata(m_dbproc, 23))
                     UtilStrCpy(m_txn.Payment.c_credit, pData,
dbdatlen(m_dbproc, 23));
                if(pData=dbdata(m_dbproc, 24))
                     dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,24), SQLFLT8, (BYTE *)&m_txn.Payment.c_credit_lim, 8);
                if(pData=dbdata(m_dbproc, 25))
                     dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,25), SQLFLT8, (BYTE *)&m_txn.Payment.c_discount, 8);
                if(pData=dbdata(m_dbproc, 26))
                     dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,26), SQLFLT8, (BYTE *)&m_txn.Payment.c_balance, 8);
                if(pData=dbdata(m_dbproc, 27))
                     UtilStrCpy(m_txn.Payment.c_data, pData,
dbdatlen(m_dbproc, 27));

                DiscardNextRows(0);
                DiscardNextResults(0);


                if (m_txn.Payment.c_id == 0)
                     throw new CTPCC_DBLIB_ERR(
CTPCC_DBLIB_ERR::ERR_INVALID_CUST );
                else
                     m_txn.Payment.exec_status_code = eOK;

                return;
```

```
          }
          catch (CSQLERR *e)
          {
               if ((e->m_msgno == 1205 ||
                    (e->m_msgno == iErrOleDbProvider &&
                    strstr(e->m_msgtext, sErrTimeoutExpired) != NULL)) &&
                    (++iTryCount <= iMaxRetries))
               {
                    // hit deadlock; backoff for increasingly longer period
                    delete e;
                    Sleep(10 * iTryCount);
               }
               else
                    throw;
          }
     }    // while (TRUE)

//   if (iTryCount)
//        throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}



void CTPCC_DBLIB::OrderStatus()
{
     int             i;
     DBDATETIME datetime;
     DBDATEREC  daterec;

     int             iTryCount = 0;
     RETCODE         rc;
     const BYTE *pData;

     ResetError();

     while (TRUE)
     {
          try
          {
               dbrpcinit(m_dbproc, "tpcc_orderstatus", 0);

               dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.OrderStatus.w_id);
               dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.OrderStatus.d_id);
               dbrpcparam(m_dbproc, NULL, 0, SQLINT4, -1, -1, (BYTE *)
&m_txn.OrderStatus.c_id);

               // if customer id is zero, then order status is by name
               if (m_txn.OrderStatus.c_id == 0)
                    dbrpcparam(m_dbproc, NULL, 0, SQLCHAR, -1,
strlen(m_txn.OrderStatus.c_last), (unsigned char
*)m_txn.OrderStatus.c_last);


               if (dbrpcexec(m_dbproc) == FAIL)
                    ThrowError(CDBLIBERR::eDbRpcExec);

               // Get order lines
               if (dbresults(m_dbproc) != SUCCEED)
               {
                    if ((m_DbLibErr == NULL) && (m_SqlErr == NULL))
                         throw new CTPCC_DBLIB_ERR(
CTPCC_DBLIB_ERR::ERR_NO_SUCH_ORDER );
                    else
                         ThrowError(CDBLIBERR::eDbResults);
               }

               if (dbnumcols(m_dbproc) != 5)
                    ThrowError(CDBLIBERR::eWrongNumCols);

               i = 0;
               while (TRUE)
               {
                    rc = dbnextrow(m_dbproc);
                    if (rc == NO_MORE_ROWS)
                         break;
                    if (rc != REG_ROW)
                         ThrowError(CDBLIBERR::eDbNextRow);

                    if(pData=dbdata(m_dbproc, 1))
                         m_txn.OrderStatus.OL[i].ol_supply_w_id =
(*(DBSMALLINT *) pData);
                    if(pData=dbdata(m_dbproc, 2))
                         m_txn.OrderStatus.OL[i].ol_i_id = (*(DBINT *)
pData);
                    if(pData=dbdata(m_dbproc, 3))
                         m_txn.OrderStatus.OL[i].ol_quantity =
(*(DBSMALLINT *) pData);
                    if(pData=dbdata(m_dbproc, 4))
                         dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,4),
                                        SQLFLT8, (BYTE
*)&m_txn.OrderStatus.OL[i].ol_amount, 8);
                    if(pData=dbdata(m_dbproc, 5))
                    {
                         datetime = *((DBDATETIME *) pData);
                         dbdatecrack(m_dbproc, &daterec, &datetime);
                         m_txn.OrderStatus.OL[i].ol_delivery_d.year   =
daterec.year;
                         m_txn.OrderStatus.OL[i].ol_delivery_d.month  =
daterec.month;
```

```
                        m_txn.OrderStatus.OL[i].ol_delivery_d.day    =
daterec.day;
                        m_txn.OrderStatus.OL[i].ol_delivery_d.hour   =
daterec.hour;
                        m_txn.OrderStatus.OL[i].ol_delivery_d.minute =
daterec.minute;
                        m_txn.OrderStatus.OL[i].ol_delivery_d.second =
daterec.second;
                   }
                   i++;
              }
              m_txn.OrderStatus.o_ol_cnt = i;


              if (dbresults(m_dbproc) != SUCCEED)
                   ThrowError(CDBLIBERR::eDbResults);

              if (dbnextrow(m_dbproc) != REG_ROW)
                   ThrowError(CDBLIBERR::eDbNextRow);

              if (dbnumcols(m_dbproc) != 8)
                   ThrowError(CDBLIBERR::eWrongNumCols);

              if(pData=dbdata(m_dbproc, 1))
                   m_txn.OrderStatus.c_id = (*(DBINT *) pData);
              if(pData=dbdata(m_dbproc, 2))
                   UtilStrCpy(m_txn.OrderStatus.c_last, pData,
dbdatlen(m_dbproc,2));
              if(pData=dbdata(m_dbproc, 3))
                   UtilStrCpy(m_txn.OrderStatus.c_first, pData,
dbdatlen(m_dbproc,3));
              if(pData=dbdata(m_dbproc, 4))
                   UtilStrCpy(m_txn.OrderStatus.c_middle, pData,
dbdatlen(m_dbproc, 4));
              if(pData=dbdata(m_dbproc, 5))
              {
                   datetime = *((DBDATETIME *) pData);
                   dbdatecrack(m_dbproc, &daterec, &datetime);
                   m_txn.OrderStatus.o_entry_d.year   = daterec.year;
                   m_txn.OrderStatus.o_entry_d.month  = daterec.month;
                   m_txn.OrderStatus.o_entry_d.day    = daterec.day;
                   m_txn.OrderStatus.o_entry_d.hour   = daterec.hour;
                   m_txn.OrderStatus.o_entry_d.minute = daterec.minute;
                   m_txn.OrderStatus.o_entry_d.second = daterec.second;
              }
              if(pData=dbdata(m_dbproc, 6))
                   m_txn.OrderStatus.o_carrier_id = (*(DBSMALLINT *)
pData);
              if(pData=dbdata(m_dbproc, 7))
                   dbconvert(m_dbproc, SQLNUMERIC, (LPCBYTE)pData,
dbdatlen(m_dbproc,7),
                             SQLFLT8, (BYTE
*)&m_txn.OrderStatus.c_balance, 8);
              if(pData=dbdata(m_dbproc, 8))
                   m_txn.OrderStatus.o_id = (*(DBINT *) pData);

              DiscardNextRows(0);
              DiscardNextResults(0);


              if (m_txn.OrderStatus.o_ol_cnt == 0)
                   throw new CTPCC_DBLIB_ERR(
CTPCC_DBLIB_ERR::ERR_NO_SUCH_ORDER );
              else if (m_txn.OrderStatus.c_id == 0 &&
m_txn.OrderStatus.c_last[0] == 0)
                   throw new CTPCC_DBLIB_ERR(
CTPCC_DBLIB_ERR::ERR_INVALID_CUST );
              else
                   m_txn.OrderStatus.exec_status_code = eOK;

              return;
         }
         catch (CSQLERR *e)
         {
              if ((e->m_msgno == 1205 ||
                   (e->m_msgno == iErrOleDbProvider &&
                   strstr(e->m_msgtext, sErrTimeoutExpired) != NULL)) &&
                   (++iTryCount <= iMaxRetries))
              {
                   // hit deadlock; backoff for increasingly longer period
                   delete e;
                   Sleep(10 * iTryCount);
              }
              else
                   throw;
         }
    }    // while (TRUE)

//   if (iTryCount)
//        throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}


void CTPCC_DBLIB::Delivery()
{
    int             i;
    int             iTryCount = 0;
    const BYTE *pData;

    ResetError();

    while (TRUE)
    {
         try
         {
```

```
               dbrpcinit(m_dbproc, "tpcc_delivery", 0);

               dbrpcparam(m_dbproc, NULL, 0, SQLINT2, -1, -1, (BYTE *)
&m_txn.Delivery.w_id);
               dbrpcparam(m_dbproc, NULL, 0, SQLINT1, -1, -1, (BYTE *)
&m_txn.Delivery.o_carrier_id);

               if (dbrpcexec(m_dbproc) == FAIL)
                    ThrowError(CDBLIBERR::eDbRpcExec);

               if (dbresults(m_dbproc) != SUCCEED)
                    ThrowError(CDBLIBERR::eDbResults);

               if (dbnextrow(m_dbproc) != REG_ROW)
                    ThrowError(CDBLIBERR::eDbNextRow);

               if (dbnumcols(m_dbproc) != 10)
                    ThrowError(CDBLIBERR::eWrongNumCols);

               for (i=0; i<10; i++)
               {
                    if (pData = dbdata(m_dbproc, i+1))
                         m_txn.Delivery.o_id[i] = *((DBINT *)pData);
               }

               DiscardNextRows(0);
               DiscardNextResults(0);

               m_txn.Delivery.exec_status_code = eOK;
               return;
          }
          catch (CSQLERR *e)
          {
               if ((e->m_msgno == 1205 ||
                    (e->m_msgno == iErrOleDbProvider &&
                    strstr(e->m_msgtext, sErrTimeoutExpired) != NULL)) &&
                    (++iTryCount <= iMaxRetries))
               {
                    // hit deadlock; backoff for increasingly longer period
                    delete e;
                    Sleep(10 * iTryCount);
               }
               else
                    throw;
          }
     }    // while (TRUE)

//   if (iTryCount)
//        throw new CTPCC_DBLIB_ERR(CTPCC_DBLIB_ERR::ERR_RETRIED_TRANS,
iTryCount);
}

void CTPCC_DBLIB::ResetError()
{
     if (m_DbLibErr != NULL)
     {
          delete m_DbLibErr;
          m_DbLibErr = (CDBLIBERR*)NULL;
     }

     if (m_SqlErr != NULL)
     {
          delete m_SqlErr;
          m_SqlErr = (CSQLERR*)NULL;
     }
     return;
}

/*   FILE:      TPCC_DBLIB.H
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   Version 4.10.000 audited by Richard Gimarc, Performance
Metrics, 3/17/99
 *
 *   PURPOSE:   Header file for TPC-C txn class implementation.
 *
 *  Change history:
 *         4.20.000 - updated rev number to match kit
 */
#pragma once

#ifndef PDBPROCESS
#define DBPROCESS void   // dbprocess structure type
typedef DBPROCESS * PDBPROCESS;
#endif

// need to declare functions for import, unless define has already been
created
// by the DLL's .cpp module for export.
#ifndef DllDecl
#define DllDecl  __declspec( dllimport )
#endif

class CSQLERR : public CBaseErr
{
     public:

          CSQLERR(void)
          {
               m_msgno = 0;
               m_msgstate = 0;
               m_severity = 0;
               m_msgtext = NULL;
          };
```

```
          ~CSQLERR()
          {
               delete [] m_msgtext;
          };

          int       m_msgno;
          int       m_msgstate;
          int       m_severity;
          char   *m_msgtext;

          int ErrorType() {return ERR_TYPE_SQL;};
          int ErrorNum() {return m_msgno;};
          char *ErrorText() {return m_msgtext;};

};

class CDBLIBERR : public CBaseErr
{
     public:
          enum ACTION
          {
               eNone,
               eUnknown,
               eLogin,                  // error from dblogin
               eDbOpen,            // error from dbopen
               eDbUse,                  // error from dbuse
               eDbSqlExec,              // error from dbsqlexec
               eDbSet,                  // error from one of the dbset*
routines
               eDbNextRow,              // error from dbnextrow
               eWrongRowCount,     // more or less rows returned than
expected
               eWrongNumCols,      // more or less columns returned than
expected
               eDbResults,              // error from dbresults
               eDbRpcExec,              // error from dbrpcexec
               eDbSetMaxProcs,     // error from dbsetmaxprocs
               eDbProcHandler      // error from either dbprocerrhandle or
dbprocmsghandle
          };

          CDBLIBERR(ACTION eAction, int severity = 0, int dberror = 0, int
oserr = 0)
          {
               m_eAction = eAction;
               m_severity = severity;
               m_dberror = dberror;
               m_oserr = oserr;

               m_dberrstr = NULL;
               m_oserrstr = NULL;
          };

          ~CDBLIBERR()
          {
               delete [] m_dberrstr;
               delete [] m_oserrstr;
          };

          ACTION    m_eAction;
          int       m_severity;
          int       m_dberror;
          int       m_oserr;
          char   *m_dberrstr;
          char   *m_oserrstr;

          int ErrorType() {return ERR_TYPE_DBLIB;};
          int ErrorNum() {return m_dberror;};
          char *ErrorText() {return m_dberrstr;};

};

class CTPCC_DBLIB_ERR : public CBaseErr
{
     public:
          enum CTPCC_DBLIB_ERRS
          {
               ERR_WRONG_SP_VERSION = 1,  // "Wrong version of stored procs
on database server"
               ERR_INVALID_CUST,               // "Invalid Customer
id,name."
               ERR_NO_SUCH_ORDER,              // "No orders found for
customer."
               ERR_RETRIED_TRANS,              // "Retries before
transaction succeeded."
          };

          CTPCC_DBLIB_ERR( int iErr ) { m_errno = iErr; m_iTryCount = 0; };

          CTPCC_DBLIB_ERR( int iErr, int iTryCount ) { m_errno = iErr;
m_iTryCount = iTryCount; };

          int       m_errno;
          int       m_iTryCount;

          int ErrorType() {return ERR_TYPE_TPCC_DBLIB;};
          int ErrorNum() {return m_errno;};

          char *ErrorText();
};

class DllDecl CTPCC_DBLIB : public CTPCC_BASE
{
     private:
          // declare variables and private functions here...
```

```
          PDBPROCESS m_dbproc;
          CDBLIBERR  *m_DbLibErr;         // not allocated until needed
(maybe never)
          CSQLERR         *m_SqlErr;           // not allocated until
needed (maybe never)
          int             m_MaxRetries;        // retry count on deadlock

          void DiscardNextRows(int iExpectedCount);
          void DiscardNextResults(int iExpectedCount);
          void ThrowError( CDBLIBERR::ACTION eAction );
          void ResetError();

          union
          {
               NEW_ORDER_DATA       NewOrder;
               PAYMENT_DATA         Payment;
               DELIVERY_DATA        Delivery;
               STOCK_LEVEL_DATA     StockLevel;
               ORDER_STATUS_DATA    OrderStatus;
          }               m_txn;

     public:
          CTPCC_DBLIB(LPCSTR szServer, LPCSTR szUser, LPCSTR szPassword,
LPCSTR szHost, LPCSTR szDatabase );
          ~CTPCC_DBLIB(void);

          inline PNEW_ORDER_DATA          BuffAddr_NewOrder()       {
return &m_txn.NewOrder;    };
          inline PPAYMENT_DATA       BuffAddr_Payment()        { return
&m_txn.Payment;     };
          inline PDELIVERY_DATA      BuffAddr_Delivery()       { return
&m_txn.Delivery;    };
          inline PSTOCK_LEVEL_DATA   BuffAddr_StockLevel(){ return
&m_txn.StockLevel;  };
          inline PORDER_STATUS_DATA  BuffAddr_OrderStatus()    { return
&m_txn.OrderStatus; };

          void NewOrder        ();
          void Payment         ();
          void Delivery        ();
          void StockLevel      ();
          void OrderStatus     ();


          // these are public because they must be called from the dblib
err_handler and msg_hangler
          // outside of the class
          void SetDbLibError(int severity, int dberr, int oserr, LPCSTR
dberrstr, LPCSTR oserrstr);
          void SetSqlError( int msgno, int msgstate, int severity, LPCSTR
msgtext );

};
```

```
extern "C" DllDecl CTPCC_DBLIB* CTPCC_DBLIB_new
     ( LPCSTR szServer, LPCSTR szUser, LPCSTR szPassword, LPCSTR szHost,
LPCSTR szDatabase );

typedef CTPCC_DBLIB* (TYPE_CTPCC_DBLIB)(LPCSTR, LPCSTR, LPCSTR, LPCSTR,
LPCSTR);

/*   FILE:      TPCC_COM.CPP
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   not yet audited
 *
 *   PURPOSE:   Source file for TPC-C COM+ class implementation.
 *   Contact:   Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *         4.20.000 - first version
 */

// needed for CoinitializeEx
#define _WIN32_WINNT 0x0400

#include <windows.h>

// need to declare functions for export
#define DllDecl  __declspec( dllexport )

#include "..\..\common\src\trans.h"       //tpckit transaction header
contains definations of structures specific to TPC-C
#include "..\..\common\src\error.h"
#include "..\..\common\src\txn_base.h"
#include "tpcc_com.h"

#include "..\..\tpcc_com_ps\src\tpcc_com_ps_i.c"
#include "..\..\tpcc_com_all\src\tpcc_com_all_i.c"

// wrapper routine for class constructor
__declspec(dllexport) CTPCC_COM* CTPCC_COM_new(BOOL bSinglePool)
{
     return new CTPCC_COM(bSinglePool);
}

CTPCC_COM::CTPCC_COM(BOOL bSinglePool)
{
     HRESULT hr = NULL;
     long lRet = 0;
     ULONG ulTmpSize = 0;

     m_pTxn               = NULL;
     m_pNewOrder          = NULL;
```

```
     m_pPayment      = NULL;
     m_pStockLevel   = NULL;
     m_pOrderStatus  = NULL;

     m_bSinglePool   = bSinglePool;

     ulTmpSize = (ULONG) sizeof(COM_DATA);
     VariantInit(&m_vTxn);
     m_vTxn.vt = VT_SAFEARRAY;

     m_vTxn.parray = SafeArrayCreateVector(VT_UI1, ulTmpSize, ulTmpSize);
     if (!m_vTxn.parray)
          throw new CCOMERR( E_FAIL );

     memset((void*)m_vTxn.parray->pvData,0,ulTmpSize);
     m_pTxn = (COM_DATA*)m_vTxn.parray->pvData;

     hr = CoInitializeEx(NULL, COINIT_MULTITHREADED);
     if (FAILED(hr))
     {
          throw new CCOMERR( hr );
     }

     // create components
     if (m_bSinglePool)
     {
          hr = CoCreateInstance(CLSID_TPCC, NULL, CLSCTX_SERVER, IID_ITPCC,
(void **)&m_pNewOrder);
          if (FAILED(hr))
               throw new CCOMERR(hr);

          // all txns will use same component
          m_pPayment = m_pNewOrder;
          m_pStockLevel = m_pNewOrder;
          m_pOrderStatus = m_pNewOrder;
     }
     else
     {
          // use different components for each txn

          hr = CoCreateInstance(CLSID_NewOrder, NULL, CLSCTX_SERVER,
IID_ITPCC, (void **)&m_pNewOrder);
          if (FAILED(hr))
               throw new CCOMERR(hr);

          hr = CoCreateInstance(CLSID_Payment, NULL, CLSCTX_SERVER,
IID_ITPCC, (void **)&m_pPayment);
          if (FAILED(hr))
               throw new CCOMERR(hr);

          hr = CoCreateInstance(CLSID_StockLevel, NULL, CLSCTX_SERVER,
IID_ITPCC, (void **)&m_pStockLevel);
          if (FAILED(hr))
               throw new CCOMERR(hr);

          hr = CoCreateInstance(CLSID_OrderStatus, NULL, CLSCTX_SERVER,
IID_ITPCC, (void **)&m_pOrderStatus);
          if (FAILED(hr))
               throw new CCOMERR(hr);
     }

     // call setcomplete to release each component back into pool
     hr = m_pNewOrder->CallSetComplete();
     if (FAILED(hr))
          throw new CCOMERR(hr);

     if (!m_bSinglePool)
     {
          hr = m_pPayment->CallSetComplete();
          if (FAILED(hr))
               throw new CCOMERR(hr);

          hr = m_pStockLevel->CallSetComplete();
          if (FAILED(hr))
               throw new CCOMERR(hr);

          hr = m_pOrderStatus->CallSetComplete();
          if (FAILED(hr))
               throw new CCOMERR(hr);
     }
}

CTPCC_COM::~CTPCC_COM()
{
     if (m_pTxn)
          SafeArrayDestroy(m_vTxn.parray);

     ReleaseInterface(m_pNewOrder);
     if (!m_bSinglePool)
     {
          ReleaseInterface(m_pPayment);
          ReleaseInterface(m_pStockLevel);
          ReleaseInterface(m_pOrderStatus);
     }
     CoUninitialize();
}

void CTPCC_COM::NewOrder()
{
     VARIANT   vTxn_out;

     HRESULT hr = m_pNewOrder->NewOrder(m_vTxn, &vTxn_out);
     if (FAILED(hr))
          throw new CCOMERR( hr );
     memcpy(m_pTxn, (void *)vTxn_out.parray->pvData,vTxn_out.parray-
>rgsabound[0].cElements);
```

```
     SafeArrayDestroy(vTxn_out.parray);

     if ( m_pTxn->ErrorType != ERR_SUCCESS )
          throw new CCOMERR( m_pTxn->ErrorType, m_pTxn->error );
}

void CTPCC_COM::Payment()
{
     VARIANT   vTxn_out;

     HRESULT hr = m_pPayment->Payment(m_vTxn, &vTxn_out);
     if (FAILED(hr))
          throw new CCOMERR( hr );
     memcpy(m_pTxn, (void *)vTxn_out.parray->pvData,vTxn_out.parray-
>rgsabound[0].cElements);
     SafeArrayDestroy(vTxn_out.parray);

     if ( m_pTxn->ErrorType != ERR_SUCCESS )
          throw new CCOMERR( m_pTxn->ErrorType, m_pTxn->error );
}

void CTPCC_COM::StockLevel()
{
     VARIANT   vTxn_out;

     HRESULT hr = m_pStockLevel->StockLevel(m_vTxn, &vTxn_out);
     if (FAILED(hr))
          throw new CCOMERR( hr );
     memcpy(m_pTxn, (void *)vTxn_out.parray->pvData,vTxn_out.parray-
>rgsabound[0].cElements);
     SafeArrayDestroy(vTxn_out.parray);

     if ( m_pTxn->ErrorType != ERR_SUCCESS )
          throw new CCOMERR( m_pTxn->ErrorType, m_pTxn->error );
}

void CTPCC_COM::OrderStatus()
{
     VARIANT   vTxn_out;

     HRESULT hr = m_pOrderStatus->OrderStatus(m_vTxn, &vTxn_out);
     if (FAILED(hr))
          throw new CCOMERR( hr );
     memcpy(m_pTxn, (void *)vTxn_out.parray->pvData,vTxn_out.parray-
>rgsabound[0].cElements);
     SafeArrayDestroy(vTxn_out.parray);

     if ( m_pTxn->ErrorType != ERR_SUCCESS )
          throw new CCOMERR( m_pTxn->ErrorType, m_pTxn->error );
}

/*   FILE:     TPCC_COM.H
 *                  Microsoft TPC-C Kit Ver. 4.20.000
 *                  Copyright Microsoft, 1999
 *             All Rights Reserved
 *
 *                  not yet audited
 *
 *   PURPOSE:   Header file for TPC-C COM+ class implementation.
 *
 *  Change history:
 *         4.20.000 - first version
 */

#pragma once

#include <stdio.h>
#include "..\..\tpcc_com_ps\src\tpcc_com_ps.h"

// need to declare functions for import, unless define has already been
created
// by the DLL's .cpp module for export.
#ifndef DllDecl
#define DllDecl  __declspec( dllimport )
#endif

class CCOMERR : public CBaseErr
{
     private:
          char m_szErrorText[64];

     public:
          // use this interface for genuine COM errors
          CCOMERR( HRESULT hr )
          {
               m_hr = hr;
               m_iErrorType = 0;
               m_iError = 0;
          }

          // use this interface to impersonate a non-COM error type
          CCOMERR( int iErrorType, int iError )
          {
               m_iErrorType = iErrorType;
               m_iError = iError;
               m_hr = S_OK;
          }

          int       m_hr;
          int       m_iErrorType;
          int       m_iError;

          // A CCOMERR class can impersonate another class, which happens if
the error
          // was not actually a COM Services error, but was simply
transmitted back via COM.
```

```
          int ErrorType()
          {
               if (m_iErrorType == 0)
                    return ERR_TYPE_COM;
               else
                    return m_iErrorType;
          }

          int ErrorNum() {return m_hr;}

          char *ErrorText()
          {
               if (m_hr == S_OK)
                    sprintf( m_szErrorText, "Error: Class %d, error # %d",
m_iErrorType, m_iError );
               else
                    sprintf( m_szErrorText, "Error: COM HRESULT %x", m_hr
);
               return m_szErrorText;
          }
};

class DllDecl CTPCC_COM : public CTPCC_BASE
{
     private:
          BOOL m_bSinglePool;

          // COM Interface pointers
          ITPCC*               m_pNewOrder;
          ITPCC*               m_pPayment;
          ITPCC*               m_pStockLevel;
          ITPCC*               m_pOrderStatus;

          struct COM_DATA
          {
               int ErrorType;
               int error;
               union
               {
                    NEW_ORDER_DATA       NewOrder;
                    PAYMENT_DATA         Payment;
                    DELIVERY_DATA        Delivery;
                    STOCK_LEVEL_DATA     StockLevel;
                    ORDER_STATUS_DATA    OrderStatus;
               } u;
          } *m_pTxn;

          VARIANT m_vTxn;
     public:
          CTPCC_COM(BOOL bSinglePool);
          ~CTPCC_COM(void);
          inline PNEW_ORDER_DATA          BuffAddr_NewOrder()       {
return &m_pTxn->u.NewOrder;    };
          inline PPAYMENT_DATA       BuffAddr_Payment()        { return
&m_pTxn->u.Payment;     };
          inline PDELIVERY_DATA      BuffAddr_Delivery()       { return
&m_pTxn->u.Delivery;    };
          inline PSTOCK_LEVEL_DATA   BuffAddr_StockLevel(){ return &m_pTxn-
>u.StockLevel;  };
          inline PORDER_STATUS_DATA  BuffAddr_OrderStatus()    { return
&m_pTxn->u.OrderStatus; };

          void NewOrder        ();
          void Payment         ();
          void StockLevel      ();
          void OrderStatus     ();
          void Delivery        () { throw new CCOMERR(E_NOTIMPL); }  // not
supported
};


inline void ReleaseInterface(IUnknown *pUnk)
{
     if (pUnk)
     {
          pUnk->Release();
          pUnk = NULL;
     }
}


// wrapper routine for class constructor
extern "C" __declspec(dllexport) CTPCC_COM* CTPCC_COM_new(BOOL);

typedef CTPCC_COM* (TYPE_CTPCC_COM)(BOOL);

/*    FILE:      METHODS.H
 *                    Microsoft TPC-C Kit Ver. 4.20.000
 *                    Copyright Microsoft, 1999
 *               All Rights Reserved
 *
 *                    not yet audited
 *
 *    PURPOSE:   Header file for COM components.
 *
 *  Change history:
 *          4.20.000 - first version
 */


enum COMPONENT_ERROR
{
     ERR_MISSING_REGISTRY_ENTRIES = 1,
     ERR_LOADDLL_FAILED,
```

```
     ERR_GETPROCADDR_FAILED,
     ERR_UNKNOWN_DB_PROTOCOL
};

class CCOMPONENT_ERR : public CBaseErr
{
     public:
          CCOMPONENT_ERR(COMPONENT_ERROR Err)
          {
               m_Error = Err;
               m_szTextDetail = NULL;
               m_SystemErr = 0;
               m_szErrorText = NULL;
          };

          CCOMPONENT_ERR(COMPONENT_ERROR Err, char *szTextDetail, DWORD
dwSystemErr)
          {
               m_Error = Err;
               m_szTextDetail = new char[strlen(szTextDetail)+1];
               strcpy( m_szTextDetail, szTextDetail );
               m_SystemErr = dwSystemErr;
               m_szErrorText = NULL;
          };

          ~CCOMPONENT_ERR()
          {
               if (m_szTextDetail != NULL)
                    delete [] m_szTextDetail;
               if (m_szErrorText != NULL)
                    delete [] m_szErrorText;
          };

          COMPONENT_ERROR m_Error;
          char            *m_szTextDetail;
          char            *m_szErrorText;
          DWORD           m_SystemErr;

          int ErrorType() {return ERR_TYPE_COMPONENT;};
          int ErrorNum() {return m_Error;};
          char *ErrorText();
};


static void WriteMessageToEventLog(LPTSTR lpszMsg);


////////////////////////////////////////////////////////////////////////
/
// CTPCC_Common
class CTPCC_Common :
     public ITPCC,
     public IObjectControl,
     public IObjectConstruct,
     public CComObjectRootEx<CComSingleThreadModel>
{
public:
BEGIN_COM_MAP(CTPCC_Common)
     COM_INTERFACE_ENTRY(ITPCC)
     COM_INTERFACE_ENTRY(IObjectControl)
     COM_INTERFACE_ENTRY(IObjectConstruct)
END_COM_MAP()

     CTPCC_Common();
     ~CTPCC_Common();

// ITPCC
public:
     HRESULT __stdcall NewOrder(          int* iSize, UCHAR** txn);
     HRESULT __stdcall Payment(      int* iSize, UCHAR** txn);
     HRESULT __stdcall Delivery(          int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn);
     HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn);

     HRESULT __stdcall CallSetComplete();

// IObjectControl
     STDMETHODIMP_(BOOL) CanBePooled() { return m_bCanBePooled; }
     STDMETHODIMP Activate() { return S_OK; }  // we don't support COM
Services transactions (no enlistment)
     STDMETHODIMP_(void) Deactivate() { /* nothing to do */ }

// IObjectConstruct
     STDMETHODIMP Construct(IDispatch * pUnk);

     // helper methods
private:
     BOOL       m_bCanBePooled;
     CTPCC_BASE *m_pTxn;

     struct COM_DATA
     {
          int retval;
          int error;
          union
          {
               NEW_ORDER_DATA       NewOrder;
               PAYMENT_DATA         Payment;
               DELIVERY_DATA        Delivery;
               STOCK_LEVEL_DATA     StockLevel;
               ORDER_STATUS_DATA    OrderStatus;
          } u;
     };

};
```

```
////////////////////////////////////////////////////////////////////////////
/
// CTPCC
class CTPCC :
     public CTPCC_Common,
     public CComCoClass<CTPCC, &CLSID_TPCC>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_TPCC)

BEGIN_COM_MAP(CTPCC)
     COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
     COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

};


////////////////////////////////////////////////////////////////////////////
/
// CNewOrder
class CNewOrder :
     public CTPCC_Common,
     public CComCoClass<CNewOrder, &CLSID_NewOrder>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_NEWORDER)

BEGIN_COM_MAP(CNewOrder)
     COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
     COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

// ITPCC
public:
//   HRESULT __stdcall NewOrder(          int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall Payment(      int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
};


     ////////////////////////////////////////////////////////////////////
//////
// COrderStatus
class COrderStatus :
     public CTPCC_Common,
     public CComCoClass<COrderStatus, &CLSID_OrderStatus>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_ORDERSTATUS)

BEGIN_COM_MAP(COrderStatus)
     COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
     COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

// ITPCC
public:
     HRESULT __stdcall NewOrder(          int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall Payment(      int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
//   HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
};


////////////////////////////////////////////////////////////////////////////
/
// CPayment
class CPayment :
     public CTPCC_Common,
     public CComCoClass<CPayment, &CLSID_Payment>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_PAYMENT)

BEGIN_COM_MAP(CPayment)
     COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
     COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

// ITPCC
public:
     HRESULT __stdcall NewOrder(          int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
//   HRESULT __stdcall Payment(      int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
};


////////////////////////////////////////////////////////////////////////////
/
// CStockLevel
```

```
class CStockLevel :
     public CTPCC_Common,
     public CComCoClass<CStockLevel, &CLSID_StockLevel>
{
public:
DECLARE_REGISTRY_RESOURCEID(IDR_STOCKLEVEL)

BEGIN_COM_MAP(CStockLevel)
     COM_INTERFACE_ENTRY2(IUnknown, CComObjectRootEx)
     COM_INTERFACE_ENTRY_CHAIN(CTPCC_Common)
END_COM_MAP()

// ITPCC
public:
     HRESULT __stdcall NewOrder(          int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall Payment(      int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
//   HRESULT __stdcall StockLevel(   int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
     HRESULT __stdcall OrderStatus(  int* iSize, UCHAR** txn) {return
E_NOTIMPL;}
};


//{{NO_DEPENDENCIES}}
// Microsoft Developer Studio generated include file.
// Used by tpcc_com_all.rc
//
#define IDS_PROJNAME                    100
#define IDR_TPCC                        101
#define IDR_NEWORDER                    102
#define IDR_ORDERSTATUS                 103
#define IDR_PAYMENT                     104
#define IDR_STOCKLEVEL                  105

// Next default values for new objects
//
#ifdef APSTUDIO_INVOKED
#ifndef APSTUDIO_READONLY_SYMBOLS
#define _APS_NEXT_RESOURCE_VALUE        202
#define _APS_NEXT_COMMAND_VALUE         32768
#define _APS_NEXT_CONTROL_VALUE         201
#define _APS_NEXT_SYMED_VALUE           106
#endif
#endif

/*   FILE:      TPCC_COM_ALL.CPP
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   Version 4.10.000 audited by Richard Gimarc, Performance
Metrics, 3/17/99
 *
 *    PURPOSE:   Implementation for TPC-C Tuxedo class.
 *    Contact:   Charles Levine (clevine@microsoft.com)
 *
 *  Change history:
 *         4.20.000 - updated rev number to match kit
 */

#define STRICT
#define _WIN32_WINNT 0x0400
#define _ATL_APARTMENT_THREADED

#include <stdio.h>
#include <atlbase.h>
//You may derive a class from CComModule and use it if you want to override
//something, but do not change the name of _Module
extern CComModule _Module;

#include <atlcom.h>
#include <initguid.h>
#include <transact.h>
#include <atlimpl.cpp>
#include <comsvcs.h>

#include <sqltypes.h>
#include <sql.h>
#include <sqlext.h>

#include "tpcc_com_ps.h"
#include "..\..\common\src\trans.h"                          //tpckit
transaction header contains defination of structures specific to TPC-C
#include "..\..\common\src\txn_base.h"
#include "..\..\common\src\error.h"
#include "..\..\common\src\ReadRegistry.h"
#include "..\..\db_dblib_dll\src\tpcc_dblib.h"       // DBLIB implementation
of TPC-C txns
#include "..\..\db_odbc_dll\src\tpcc_odbc.h"         // ODBC implementation
of TPC-C txns


#include "resource.h"
#include "tpcc_com_all.h"
#include "tpcc_com_all_i.c"
#include "Methods.h"
#include "..\..\tpcc_com_ps\src\tpcc_com_ps_i.c"
#include "..\..\common\src\ReadRegistry.cpp"


CComModule _Module;

BEGIN_OBJECT_MAP(ObjectMap)
```

```
     OBJECT_ENTRY(CLSID_TPCC, CTPCC)
     OBJECT_ENTRY(CLSID_NewOrder, CNewOrder)
     OBJECT_ENTRY(CLSID_OrderStatus, COrderStatus)
     OBJECT_ENTRY(CLSID_Payment, CPayment)
     OBJECT_ENTRY(CLSID_StockLevel, CStockLevel)
END_OBJECT_MAP()


// configuration settings from registry
TPCCREGISTRYDATA     Reg;
char                 szMyComputerName[MAX_COMPUTERNAME_LENGTH+1];

static  HINSTANCE hLibInstanceDb = NULL;

TYPE_CTPCC_DBLIB     *pCTPCC_DBLIB_new;
TYPE_CTPCC_ODBC      *pCTPCC_ODBC_new;


////////////////////////////////////////////////////////////////////////
/
// DLL Entry Point

extern "C"
BOOL WINAPI DllMain(HINSTANCE hInstance, DWORD dwReason, LPVOID
/*lpReserved*/)
{
     char szDllName[128];

     try
     {
          if (dwReason == DLL_PROCESS_ATTACH)
          {
               _Module.Init(ObjectMap, hInstance);
               DisableThreadLibraryCalls(hInstance);

               DWORD dwSize = MAX_COMPUTERNAME_LENGTH+1;
               GetComputerName(szMyComputerName, &dwSize);
               szMyComputerName[dwSize] = 0;

               if ( ReadTPCCRegistrySettings( &Reg ) )
                    throw new CCOMPONENT_ERR( ERR_MISSING_REGISTRY_ENTRIES
);

               if (Reg.eDB_Protocol == DBLIB)
               {
                    strcpy( szDllName, Reg.szPath );
                    strcat( szDllName, "tpcc_dblib.dll");
                    hLibInstanceDb = LoadLibrary( szDllName );
                    if (hLibInstanceDb == NULL)
                         throw new CCOMPONENT_ERR( ERR_LOADDLL_FAILED,
szDllName, GetLastError() );

                    // get function pointer to wrapper for class
constructor
                    pCTPCC_DBLIB_new = (TYPE_CTPCC_DBLIB*)
GetProcAddress(hLibInstanceDb,"CTPCC_DBLIB_new");
                    if (pCTPCC_DBLIB_new == NULL)
                         throw new CCOMPONENT_ERR( ERR_GETPROCADDR_FAILED,
szDllName, GetLastError() );
               }
               else if (Reg.eDB_Protocol == ODBC)
               {
                    strcpy( szDllName, Reg.szPath );
                    strcat( szDllName, "tpcc_odbc.dll");
                    hLibInstanceDb = LoadLibrary( szDllName );
                    if (hLibInstanceDb == NULL)
                         throw new CCOMPONENT_ERR( ERR_LOADDLL_FAILED,
szDllName, GetLastError() );

                    // get function pointer to wrapper for class
constructor
                    pCTPCC_ODBC_new = (TYPE_CTPCC_ODBC*)
GetProcAddress(hLibInstanceDb,"CTPCC_ODBC_new");
                    if (pCTPCC_ODBC_new == NULL)
                         throw new CCOMPONENT_ERR( ERR_GETPROCADDR_FAILED,
szDllName, GetLastError() );
               }
               else
                    throw new CCOMPONENT_ERR( ERR_UNKNOWN_DB_PROTOCOL );
          }
          else if (dwReason == DLL_PROCESS_DETACH)
               _Module.Term();

     }
     catch (CBaseErr *e)
     {
          WriteMessageToEventLog(e->ErrorText());
          delete e;
          return FALSE;
     }
     catch (...)
     {
          WriteMessageToEventLog(TEXT("Unhandled exception in object
DllMain"));
          return FALSE;
     }

     return TRUE;    // OK
}

////////////////////////////////////////////////////////////////////////
/
// Used to determine whether the DLL can be unloaded by OLE

STDAPI DllCanUnloadNow(void)
```

```
{
     return (_Module.GetLockCount()==0) ? S_OK : S_FALSE;
}

///////////////////////////////////////////////////////////////////////////
/
// Returns a class factory to create an object of the requested type

STDAPI DllGetClassObject(REFCLSID rclsid, REFIID riid, LPVOID* ppv)
{
     return _Module.GetClassObject(rclsid, riid, ppv);
}

///////////////////////////////////////////////////////////////////////////
/
// DllRegisterServer - Adds entries to the system registry

STDAPI DllRegisterServer(void)
{
     // registers object, typelib and all interfaces in typelib
     return _Module.RegisterServer(TRUE);
}

///////////////////////////////////////////////////////////////////////////
/
// DllUnregisterServer - Removes entries from the system registry

STDAPI DllUnregisterServer(void)
{
     _Module.UnregisterServer();
     return S_OK;
}


static void WriteMessageToEventLog(LPTSTR lpszMsg)
{
    TCHAR   szMsg[256];
    HANDLE  hEventSource;
    LPTSTR  lpszStrings[2];

    // Use event logging to log the error.
    //
    hEventSource = RegisterEventSource(NULL, TEXT("tpcc_com_all.dll"));

    _stprintf(szMsg, TEXT("Error in COM+ TPC-C Component: "));
    lpszStrings[0] = szMsg;
    lpszStrings[1] = lpszMsg;

    if (hEventSource != NULL)
     {
        ReportEvent(hEventSource, // handle of event source
            EVENTLOG_ERROR_TYPE,  // event type
            0,                    // event category
            0,                    // event ID
            NULL,                 // current user's SID
            2,                    // strings in lpszStrings
            0,                    // no bytes of raw data
            (LPCTSTR *)lpszStrings,    // array of error strings
            NULL);                // no raw data

        (VOID) DeregisterEventSource(hEventSource);
    }
}

inline void ReleaseInterface(IUnknown *pUnk)
{
     if (pUnk)
     {
          pUnk->Release();
          pUnk = NULL;
     }
}

/* FUNCTION: CCOMPONENT_ERR::ErrorText
 *
 */

char* CCOMPONENT_ERR::ErrorText(void)
{
     static SERRORMSG errorMsgs[] =
     {
          { ERR_MISSING_REGISTRY_ENTRIES, "Required entries missing from
registry."              },
          { ERR_LOADDLL_FAILED,           "Load of DLL failed.  DLL="
                                       },
          { ERR_GETPROCADDR_FAILED,       "Could not map proc in DLL.
GetProcAddr error.  DLL=" },
          { ERR_UNKNOWN_DB_PROTOCOL,      "Unknown database protocol
specified in registry."         },
          { 0,                                 ""
                                               }
     };

     char szTmp[256];
     int i = 0;
     while (TRUE)
     {
          if (errorMsgs[i].szMsg[0] == 0)
          {
               strcpy( szTmp, "Unknown error number." );
               break;
          }
          if (m_Error == errorMsgs[i].iError)
          {
               strcpy( szTmp, errorMsgs[i].szMsg );
               break;
```

```
          }
          i++;
     }

     if (m_szTextDetail)
          strcat( szTmp, m_szTextDetail );
     if (m_SystemErr)
          wsprintf( szTmp+strlen(szTmp), "  Error=%d", m_SystemErr );

     m_szErrorText = new char[strlen(szTmp)+1];
     strcpy( m_szErrorText, szTmp );
     return m_szErrorText;
}


CTPCC_Common::CTPCC_Common()
{
     m_pTxn = NULL;
     m_bCanBePooled = TRUE;
}

CTPCC_Common::~CTPCC_Common()
{
     if (m_pTxn)
          delete m_pTxn;
}

HRESULT CTPCC_Common::CallSetComplete()
{
     IObjectContext* pObjectContext = NULL;

     // get our object context
     HRESULT hr = CoGetObjectContext( IID_IObjectContext, (void
**)&pObjectContext );
     pObjectContext->SetComplete();
     ReleaseInterface(pObjectContext);
     return hr;
}

//
//   called by the ctor activator
//
STDMETHODIMP CTPCC_Common::Construct(IDispatch * pUnk)
{
     // Code to access construction string, if needed later...
     //   if (!pUnk)
     //        return E_UNEXPECTED;
     //   IObjectConstructString * pString = NULL;
     //   HRESULT hr = pUnk->QueryInterface(IID_IObjectConstructString,
(void **)&pString);
     //   pString->Release();

     try
     {
          if (Reg.eDB_Protocol == ODBC)
               m_pTxn = pCTPCC_ODBC_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName );
          else if (Reg.eDB_Protocol == DBLIB)
               m_pTxn = pCTPCC_DBLIB_new( Reg.szDbServer, Reg.szDbUser,
Reg.szDbPassword, szMyComputerName, Reg.szDbName );
     }
     catch (CBaseErr *e)
     {
          WriteMessageToEventLog(e->ErrorText());
          delete e;
          return E_FAIL;
     }
     catch (...)
     {
          WriteMessageToEventLog(TEXT("Unhandled exception in object
::Construct"));
          return E_FAIL;
     }

     return S_OK;
}

HRESULT CTPCC_Common::NewOrder(int* iSize, UCHAR **txn)
{
     PNEW_ORDER_DATA pNewOrder;
     COM_DATA        *pData;

     try
     {
          pData = (COM_DATA*)*txn;
          pNewOrder = m_pTxn->BuffAddr_NewOrder();

          memcpy(pNewOrder, &pData->u.NewOrder, sizeof(NEW_ORDER_DATA));
          m_pTxn->NewOrder();
          memcpy( &pData->u.NewOrder, pNewOrder, sizeof(NEW_ORDER_DATA));

          pData->retval = ERR_SUCCESS;
          pData->error = 0;
          return S_OK;
     }
     catch (CBaseErr *e)
     {
          // check for lost database connection; if yes, component is toast
          if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() ==
10005)) ||
               ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
10054)) )
               m_bCanBePooled = FALSE;

          pData->retval = e->ErrorType();
          pData->error = e->ErrorNum();
```

```
          delete e;
          return E_FAIL;
     }
     catch (...)
     {
          WriteMessageToEventLog(TEXT("Unhandled exception."));
          pData->retval = ERR_TYPE_LOGIC;
          pData->error = 0;
          m_bCanBePooled = FALSE;
          return E_FAIL;
     }
}

HRESULT CTPCC_Common::Payment(int* iSize, UCHAR** txn)
{
     PPAYMENT_DATA   pPayment;
     COM_DATA        *pData;

     try
     {
          pData = (COM_DATA*)*txn;
          pPayment = m_pTxn->BuffAddr_Payment();

          memcpy(pPayment, &pData->u.Payment, sizeof(PAYMENT_DATA) );
          m_pTxn->Payment();
          memcpy( &pData->u.Payment, pPayment, sizeof(PAYMENT_DATA) );

          pData->retval = ERR_SUCCESS;
          pData->error = 0;
          return S_OK;
     }
     catch (CBaseErr *e)
     {
          // check for lost database connection; if yes, component is toast
          if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() ==
10005)) ||
                ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
10054)) )
               m_bCanBePooled = FALSE;

          pData->retval = e->ErrorType();
          pData->error = e->ErrorNum();
          delete e;
          return E_FAIL;
     }
     catch (...)
     {
          WriteMessageToEventLog(TEXT("Unhandled exception."));
          pData->retval = ERR_TYPE_LOGIC;
          pData->error = 0;
          m_bCanBePooled = FALSE;
          return E_FAIL;
     }
}

HRESULT CTPCC_Common::StockLevel(int* iSize, UCHAR** txn)
{
     PSTOCK_LEVEL_DATA    pStockLevel;
     COM_DATA             *pData;

     try
     {
          pData = (COM_DATA*)*txn;
          pStockLevel = m_pTxn->BuffAddr_StockLevel();

          memcpy(pStockLevel, &pData->u.StockLevel, sizeof(STOCK_LEVEL_DATA)
);
          m_pTxn->StockLevel();
          memcpy( &pData->u.StockLevel, pStockLevel,
sizeof(STOCK_LEVEL_DATA) );

          pData->retval = ERR_SUCCESS;
          pData->error = 0;
          return S_OK;
     }
     catch (CBaseErr *e)
     {
          // check for lost database connection; if yes, component is toast
          if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() ==
10005)) ||
                ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
10054)) )
               m_bCanBePooled = FALSE;

          pData->retval = e->ErrorType();
          pData->error = e->ErrorNum();
          delete e;
          return E_FAIL;
     }
     catch (...)
     {
          WriteMessageToEventLog(TEXT("Unhandled exception."));
          pData->retval = ERR_TYPE_LOGIC;
          pData->error = 0;
          m_bCanBePooled = FALSE;
          return E_FAIL;
     }
}

HRESULT CTPCC_Common::OrderStatus(int* iSize, UCHAR** txn)
{
     PORDER_STATUS_DATA   pOrderStatus;
     COM_DATA             *pData;

     try
     {
```

```
          pData = (COM_DATA*)*txn;
          pOrderStatus = m_pTxn->BuffAddr_OrderStatus();

          memcpy(pOrderStatus, &pData->u.OrderStatus,
sizeof(ORDER_STATUS_DATA) );
          m_pTxn->OrderStatus();
          memcpy( &pData->u.OrderStatus, pOrderStatus,
sizeof(ORDER_STATUS_DATA) );

          pData->retval = ERR_SUCCESS;
          pData->error = 0;
          return S_OK;
     }
     catch (CBaseErr *e)
     {
          // check for lost database connection; if yes, component is toast
          if ( ((e->ErrorType() == ERR_TYPE_DBLIB) && (e->ErrorNum() ==
10005)) ||
               ((e->ErrorType() == ERR_TYPE_ODBC) && (e->ErrorNum() ==
10054)) )
               m_bCanBePooled = FALSE;

          pData->retval = e->ErrorType();
          pData->error = e->ErrorNum();
          delete e;
          return E_FAIL;
     }
     catch (...)
     {
          WriteMessageToEventLog(TEXT("Unhandled exception."));
          pData->retval = ERR_TYPE_LOGIC;
          pData->error = 0;
          m_bCanBePooled = FALSE;
          return E_FAIL;
     }
}

; tpcc_com_all.def : Declares the module parameters.

LIBRARY      "tpcc_com_all.dll"

EXPORTS
     DllCanUnloadNow     @1 PRIVATE
     DllGetClassObject   @2 PRIVATE
     DllRegisterServer   @3 PRIVATE
     DllUnregisterServer  @4 PRIVATE


#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the definitions for the interfaces */
```

```
 /* File created by MIDL compiler version 5.03.0280 */
/* at Mon Jan 24 20:00:20 2000
 */
/* Compiler settings for .\src\tpcc_com_all.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )


/* verify that the <rpcndr.h> version is high enough to compile this file*/
#ifndef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

#include "rpc.h"
#include "rpcndr.h"

#ifndef __tpcc_com_all_h__
#define __tpcc_com_all_h__

/* Forward Declarations */

#ifndef __TPCC_FWD_DEFINED__
#define __TPCC_FWD_DEFINED__

#ifdef __cplusplus
typedef class TPCC TPCC;
#else
typedef struct TPCC TPCC;
#endif /* __cplusplus */

#endif     /* __TPCC_FWD_DEFINED__ */


#ifndef __NewOrder_FWD_DEFINED__
#define __NewOrder_FWD_DEFINED__

#ifdef __cplusplus
typedef class NewOrder NewOrder;
#else
typedef struct NewOrder NewOrder;
#endif /* __cplusplus */

#endif     /* __NewOrder_FWD_DEFINED__ */


#ifndef __OrderStatus_FWD_DEFINED__
#define __OrderStatus_FWD_DEFINED__
```

```
#ifdef __cplusplus
typedef class OrderStatus OrderStatus;
#else
typedef struct OrderStatus OrderStatus;
#endif /* __cplusplus */

#endif     /* __OrderStatus_FWD_DEFINED__ */


#ifndef __Payment_FWD_DEFINED__
#define __Payment_FWD_DEFINED__

#ifdef __cplusplus
typedef class Payment Payment;
#else
typedef struct Payment Payment;
#endif /* __cplusplus */

#endif     /* __Payment_FWD_DEFINED__ */


#ifndef __StockLevel_FWD_DEFINED__
#define __StockLevel_FWD_DEFINED__

#ifdef __cplusplus
typedef class StockLevel StockLevel;
#else
typedef struct StockLevel StockLevel;
#endif /* __cplusplus */

#endif     /* __StockLevel_FWD_DEFINED__ */


/* header files for imported files */
#include "oaidl.h"
#include "ocidl.h"
#include "tpcc_com_ps.h"

#ifdef __cplusplus
extern "C"{
#endif

void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t);
void __RPC_USER MIDL_user_free( void __RPC_FAR * );

/* interface __MIDL_itf_tpcc_com_all_0000 */
/* [local] */


extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_all_0000_v0_0_c_ifspec;
extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_all_0000_v0_0_s_ifspec;


#ifndef __TPCCLib_LIBRARY_DEFINED__
#define __TPCCLib_LIBRARY_DEFINED__

/* library TPCCLib */
/* [helpstring][version][uuid] */


EXTERN_C const IID LIBID_TPCCLib;

EXTERN_C const CLSID CLSID_TPCC;

#ifdef __cplusplus

class DECLSPEC_UUID("122A3128-2520-11D3-BA71-00C04FBFE08B")
TPCC;
#endif

EXTERN_C const CLSID CLSID_NewOrder;

#ifdef __cplusplus

class DECLSPEC_UUID("975BAABF-84A7-11D2-BA47-00C04FBFE08B")
NewOrder;
#endif

EXTERN_C const CLSID CLSID_OrderStatus;

#ifdef __cplusplus

class DECLSPEC_UUID("266836AD-A50D-11D2-BA4E-00C04FBFE08B")
OrderStatus;
#endif

EXTERN_C const CLSID CLSID_Payment;

#ifdef __cplusplus

class DECLSPEC_UUID("CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B")
Payment;
#endif

EXTERN_C const CLSID CLSID_StockLevel;

#ifdef __cplusplus

class DECLSPEC_UUID("2668369E-A50D-11D2-BA4E-00C04FBFE08B")
StockLevel;
```

```
#endif
#endif /* __TPCCLib_LIBRARY_DEFINED__ */

/* Additional Prototypes for ALL interfaces */

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif



/*   FILE:      TPCC.IDL
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   not yet audited
 *
 *   PURPOSE:   IDL source for TPCC.dll.  This file is processed by the MIDL
tool to
 *                   produce the type library (TPCC.tlb) and marshalling
code.
 *
 *  Change history:
 *         4.20.000 - first version
 */

interface TPCC;
interface NewOrder;
interface OrderStatus;
interface Payment;
interface StockLevel;


import "oaidl.idl";
import "ocidl.idl";
import "..\tpcc_com_ps\src\tpcc_com_ps.idl";

[
     uuid(122A3117-2520-11D3-BA71-00C04FBFE08B),
     version(1.0),
     helpstring("TPC-C 1.0 Type Library")
]
library TPCCLib
{
     importlib("stdole32.tlb");
     importlib("stdole2.tlb");

     [
          uuid(122A3128-2520-11D3-BA71-00C04FBFE08B),
          helpstring("All Txns Class")
     ]
     coclass TPCC
     {
          [default] interface ITPCC;
     };


     [
          uuid(975BAABF-84A7-11D2-BA47-00C04FBFE08B),
          helpstring("NewOrder Class")
     ]
     coclass NewOrder
     {
          [default] interface ITPCC;
     };


     [
          uuid(266836AD-A50D-11D2-BA4E-00C04FBFE08B),
          helpstring("OrderStatus Class")
     ]
     coclass OrderStatus
     {
          [default] interface ITPCC;
     };


     [
          uuid(CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B),
          helpstring("Payment Class")
     ]
     coclass Payment
     {
          [default] interface ITPCC;
     };


     [
          uuid(2668369E-A50D-11D2-BA4E-00C04FBFE08B),
          helpstring("StockLevel Class")
     ]
     coclass StockLevel
     {
          [default] interface ITPCC;
     };

};

//Microsoft Developer Studio generated resource script.
//
#include "resource.h"
```

```
#define APSTUDIO_READONLY_SYMBOLS
////////////////////////////////////////////////////////////////////////////
/
//
// Generated from the TEXTINCLUDE 2 resource.
//
#include "winres.h"

////////////////////////////////////////////////////////////////////////////
/
#undef APSTUDIO_READONLY_SYMBOLS

////////////////////////////////////////////////////////////////////////////
/
// English (U.S.) resources

#if !defined(AFX_RESOURCE_DLL) || defined(AFX_TARG_ENU)
#ifdef _WIN32
LANGUAGE LANG_ENGLISH, SUBLANG_ENGLISH_US
#pragma code_page(1252)
#endif //_WIN32

#ifdef APSTUDIO_INVOKED
////////////////////////////////////////////////////////////////////////////
/
//
// TEXTINCLUDE
//

1 TEXTINCLUDE DISCARDABLE
BEGIN
    "resource.h\0"
END

2 TEXTINCLUDE DISCARDABLE
BEGIN
    "#include ""winres.h""\r\n"
    "\0"
END

3 TEXTINCLUDE DISCARDABLE
BEGIN
    "1 TYPELIB ""tpcc_com_all.tlb""\r\n"
    "\0"
END

#endif    // APSTUDIO_INVOKED


#ifndef _MAC
////////////////////////////////////////////////////////////////////////////
/
//
// Version
//

VS_VERSION_INFO VERSIONINFO
 FILEVERSION 1,0,0,1
 PRODUCTVERSION 1,0,0,1
 FILEFLAGSMASK 0x3fL
#ifdef _DEBUG
 FILEFLAGS 0x1L
#else
 FILEFLAGS 0x0L
#endif
 FILEOS 0x4L
 FILETYPE 0x2L
 FILESUBTYPE 0x0L
BEGIN
    BLOCK "StringFileInfo"
    BEGIN
        BLOCK "040904B0"
        BEGIN
            VALUE "CompanyName", "\0"
            VALUE "FileDescription", "tpcc_com_all Module\0"
            VALUE "FileVersion", "1, 0, 0, 1\0"
            VALUE "InternalName", "TPCCNEWORDER\0"
            VALUE "LegalCopyright", "Copyright 1997\0"
            VALUE "OriginalFilename", "tpcc_com_all.DLL\0"
            VALUE "ProductName", "tpcc_com_all Module\0"
            VALUE "ProductVersion", "1, 0, 0, 1\0"
            VALUE "OLESelfRegister", "\0"
        END
    END
    BLOCK "VarFileInfo"
    BEGIN
        VALUE "Translation", 0x409, 1200
    END
END

#endif    // !_MAC


////////////////////////////////////////////////////////////////////////////
/
//
// REGISTRY
//

IDR_TPCC                REGISTRY DISCARDABLE    "tpcc_com_all.rgs"
IDR_NEWORDER            REGISTRY DISCARDABLE    "tpcc_com_no.rgs"
IDR_ORDERSTATUS         REGISTRY DISCARDABLE    "tpcc_com_os.rgs"
IDR_PAYMENT             REGISTRY DISCARDABLE    "tpcc_com_pay.rgs"
IDR_STOCKLEVEL          REGISTRY DISCARDABLE    "tpcc_com_sl.rgs"
```

```
//////////////////////////////////////////////////////////////////////////////
/
//
// String Table
//

STRINGTABLE DISCARDABLE
BEGIN
    IDS_PROJNAME            "tpcc_com_all"
END

#endif    // English (U.S.) resources
//////////////////////////////////////////////////////////////////////////////
/



#ifndef APSTUDIO_INVOKED
//////////////////////////////////////////////////////////////////////////////
/
//
// Generated from the TEXTINCLUDE 3 resource.
//
1 TYPELIB "tpcc_com_all.tlb"

//////////////////////////////////////////////////////////////////////////////
/
#endif    // not APSTUDIO_INVOKED


HKCR
{
     TPCC.AllTxns.1 = s 'All Txns Class'
     {
          CLSID = s '{122A3128-2520-11D3-BA71-00C04FBFE08B}'
     }
     TPCC.AllTxns = s 'TPCC Class'
     {
          CurVer = s 'TPCC.AllTxns.1'
     }
     NoRemove CLSID
     {
          ForceRemove {122A3128-2520-11D3-BA71-00C04FBFE08B} = s 'TPCC
Class'
          {
               ProgID = s 'TPCC.AllTxns.1'
               VersionIndependentProgID = s 'TPCC.AllTxns'
               InprocServer32 = s '%MODULE%'
               {
                    val ThreadingModel = s 'Both'
               }
          }
     }
}


#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Mon Jan 24 20:00:20 2000
 */
/* Compiler settings for .\src\tpcc_com_all.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if !defined(_M_IA64) && !defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif


#include <rpc.h>
#include <rpcndr.h>

#ifdef _MIDL_USE_GUIDDEF_

#ifndef INITGUID
#define INITGUID
#include <guiddef.h>
#undef INITGUID
#else
#include <guiddef.h>
#endif

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8)

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
{
    unsigned long x;
```

```
    unsigned short s1;
    unsigned short s2;
    unsigned char  c[8];
} IID;

#endif // __IID_DEFINED__

#ifndef CLSID_DEFINED
#define CLSID_DEFINED
typedef IID CLSID;
#endif // CLSID_DEFINED

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}

#endif !_MIDL_USE_GUIDDEF_

MIDL_DEFINE_GUID(IID,
LIBID_TPCCLib,0x122A3117,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x
8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_TPCC,0x122A3128,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B)
;


MIDL_DEFINE_GUID(CLSID,
CLSID_NewOrder,0x975BAABF,0x84A7,0x11D2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0
x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_OrderStatus,0x266836AD,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE
0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_Payment,0xCD02F7EF,0xA4FA,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x
8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_StockLevel,0x2668369E,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0
,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif


#endif /* !defined(_M_IA64) && !defined(_M_AXP64)*/


#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Mon Jan 24 20:00:20 2000
 */
/* Compiler settings for .\src\tpcc_com_all.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win64 (32b run,appending), ms_ext, c_ext,
robust
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if defined(_M_IA64) || defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif


#include <rpc.h>
#include <rpcndr.h>

#ifdef _MIDL_USE_GUIDDEF_

#ifndef INITGUID
#define INITGUID
#include <guiddef.h>
#undef INITGUID
#else
#include <guiddef.h>
#endif

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8)

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
```

```
{
    unsigned long x;
    unsigned short s1;
    unsigned short s2;
    unsigned char  c[8];
} IID;

#endif // __IID_DEFINED__

#ifndef CLSID_DEFINED
#define CLSID_DEFINED
typedef IID CLSID;
#endif // CLSID_DEFINED

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}

#endif !_MIDL_USE_GUIDDEF_

MIDL_DEFINE_GUID(IID,
LIBID_TPCCLib,0x122A3117,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x
8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_TPCC,0x122A3128,0x2520,0x11D3,0xBA,0x71,0x00,0xC0,0x4F,0xBF,0xE0,0x8B)
;


MIDL_DEFINE_GUID(CLSID,
CLSID_NewOrder,0x975BAABF,0x84A7,0x11D2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0
x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_OrderStatus,0x266836AD,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE
0,0x8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_Payment,0xCD02F7EF,0xA4FA,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0,0x
8B);


MIDL_DEFINE_GUID(CLSID,
CLSID_StockLevel,0x2668369E,0xA50D,0x11D2,0xBA,0x4E,0x00,0xC0,0x4F,0xBF,0xE0
,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif
```

```
#endif /* defined(_M_IA64) || defined(_M_AXP64)*/


HKCR
{
      TPCC.NewOrder.1 = s 'NewOrder Class'
      {
            CLSID = s '{975BAABF-84A7-11D2-BA47-00C04FBFE08B}'
      }
      TPCC.NewOrder = s 'NewOrder Class'
      {
            CurVer = s 'TPCC.NewOrder.1'
      }
      NoRemove CLSID
      {
            ForceRemove {975BAABF-84A7-11D2-BA47-00C04FBFE08B} = s 'NewOrder
Class'
            {
                  ProgID = s 'TPCC.NewOrder.1'
                  VersionIndependentProgID = s 'TPCC.NewOrder'
                  InprocServer32 = s '%MODULE%'
                  {
                        val ThreadingModel = s 'Both'
                  }
            }
      }
}

HKCR
{
      TPCC.OrderStatus.1 = s 'OrderStatus Class'
      {
            CLSID = s '{266836AD-A50D-11D2-BA4E-00C04FBFE08B}'
      }
      TPCC.OrderStatus = s 'OrderStatus Class'
      {
            CurVer = s 'TPCC.OrderStatus.1'
      }
      NoRemove CLSID
      {
            ForceRemove {266836AD-A50D-11D2-BA4E-00C04FBFE08B} = s
'OrderStatus Class'
            {
                  ProgID = s 'TPCC.OrderStatus.1'
                  VersionIndependentProgID = s 'TPCC.OrderStatus'
                  InprocServer32 = s '%MODULE%'
                  {
                        val ThreadingModel = s 'Both'
                  }
            }
```

```
     }
}

HKCR
{
     TPCC.Payment.1 = s 'Payment Class'
     {
          CLSID = s '{CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B}'
     }
     TPCC.Payment = s 'Payment Class'
     {
          CurVer = s 'TPCC.Payment.1'
     }
     NoRemove CLSID
     {
          ForceRemove {CD02F7EF-A4FA-11D2-BA4E-00C04FBFE08B} = s 'Payment
Class'
          {
               ProgID = s 'TPCC.Payment.1'
               VersionIndependentProgID = s 'TPCC.Payment'
               InprocServer32 = s '%MODULE%'
               {
                    val ThreadingModel = s 'Both'
               }
          }
     }
}


#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the definitions for the interfaces */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Mon Jan 24 20:00:07 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )


/* verify that the <rpcndr.h> version is high enough to compile this file*/
#ifndef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

#include "rpc.h"
#include "rpcndr.h"

#ifndef __RPCNDR_H_VERSION__
#error this stub requires an updated version of <rpcndr.h>
#endif // __RPCNDR_H_VERSION__

#ifndef COM_NO_WINDOWS_H
#include "windows.h"
#include "ole2.h"
#endif /*COM_NO_WINDOWS_H*/

#ifndef __tpcc_com_ps_h__
#define __tpcc_com_ps_h__

/* Forward Declarations */

#ifndef __ITPCC_FWD_DEFINED__
#define __ITPCC_FWD_DEFINED__
typedef interface ITPCC ITPCC;
#endif     /* __ITPCC_FWD_DEFINED__ */


/* header files for imported files */
#include "oaidl.h"
#include "ocidl.h"

#ifdef __cplusplus
extern "C"{
#endif

void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t);
void __RPC_USER MIDL_user_free( void __RPC_FAR * );

#ifndef __ITPCC_INTERFACE_DEFINED__
#define __ITPCC_INTERFACE_DEFINED__

/* interface ITPCC */
/* [unique][helpstring][uuid][object] */


EXTERN_C const IID IID_ITPCC;

#if defined(__cplusplus) && !defined(CINTERFACE)

    MIDL_INTERFACE("FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B")
    ITPCC : public IUnknown
    {
    public:
        virtual HRESULT __stdcall NewOrder(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;
```

```
        virtual HRESULT __stdcall Payment(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;

        virtual HRESULT __stdcall Delivery(
            /* [in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn) = 0;

        virtual HRESULT __stdcall StockLevel(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;

        virtual HRESULT __stdcall OrderStatus(
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn) = 0;

        virtual HRESULT __stdcall CallSetComplete( void) = 0;

    };

#else      /* C style interface */

    typedef struct ITPCCVtbl
    {
        BEGIN_INTERFACE

        HRESULT ( STDMETHODCALLTYPE __RPC_FAR *QueryInterface )(
            ITPCC __RPC_FAR * This,
            /* [in] */ REFIID riid,
            /* [iid_is][out] */ void __RPC_FAR *__RPC_FAR *ppvObject);

        ULONG ( STDMETHODCALLTYPE __RPC_FAR *AddRef )(
            ITPCC __RPC_FAR * This);

        ULONG ( STDMETHODCALLTYPE __RPC_FAR *Release )(
            ITPCC __RPC_FAR * This);

        HRESULT ( __stdcall __RPC_FAR *NewOrder )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        HRESULT ( __stdcall __RPC_FAR *Payment )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        HRESULT ( __stdcall __RPC_FAR *Delivery )(
            ITPCC __RPC_FAR * This,
            /* [in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn);

        HRESULT ( __stdcall __RPC_FAR *StockLevel )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        HRESULT ( __stdcall __RPC_FAR *OrderStatus )(
            ITPCC __RPC_FAR * This,
            /* [out][in] */ int __RPC_FAR *iSize,
            /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR
*__RPC_FAR *txn);

        HRESULT ( __stdcall __RPC_FAR *CallSetComplete )(
            ITPCC __RPC_FAR * This);

        END_INTERFACE
    } ITPCCVtbl;

    interface ITPCC
    {
        CONST_VTBL struct ITPCCVtbl __RPC_FAR *lpVtbl;
    };



#ifdef COBJMACROS


#define ITPCC_QueryInterface(This,riid,ppvObject)    \
    (This)->lpVtbl -> QueryInterface(This,riid,ppvObject)

#define ITPCC_AddRef(This) \
    (This)->lpVtbl -> AddRef(This)

#define ITPCC_Release(This)     \
    (This)->lpVtbl -> Release(This)


#define ITPCC_NewOrder(This,iSize,txn)     \
    (This)->lpVtbl -> NewOrder(This,iSize,txn)

#define ITPCC_Payment(This,iSize,txn)\
    (This)->lpVtbl -> Payment(This,iSize,txn)

#define ITPCC_Delivery(This,iSize,txn)     \
    (This)->lpVtbl -> Delivery(This,iSize,txn)
```

```
#define ITPCC_StockLevel(This,iSize,txn)  \
    (This)->lpVtbl -> StockLevel(This,iSize,txn)

#define ITPCC_OrderStatus(This,iSize,txn) \
    (This)->lpVtbl -> OrderStatus(This,iSize,txn)

#define ITPCC_CallSetComplete(This)  \
    (This)->lpVtbl -> CallSetComplete(This)

#endif /* COBJMACROS */


#endif     /* C style interface */



HRESULT __stdcall ITPCC_NewOrder_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn);


void __RPC_STUB ITPCC_NewOrder_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_Payment_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn);


void __RPC_STUB ITPCC_Payment_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_Delivery_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][in] */ unsigned char __RPC_FAR *__RPC_FAR *txn);


void __RPC_STUB ITPCC_Delivery_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_StockLevel_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn);


void __RPC_STUB ITPCC_StockLevel_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_OrderStatus_Proxy(
    ITPCC __RPC_FAR * This,
    /* [out][in] */ int __RPC_FAR *iSize,
    /* [size_is][size_is][out][in] */ unsigned char __RPC_FAR *__RPC_FAR
*txn);


void __RPC_STUB ITPCC_OrderStatus_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_CallSetComplete_Proxy(
    ITPCC __RPC_FAR * This);


void __RPC_STUB ITPCC_CallSetComplete_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);



#endif     /* __ITPCC_INTERFACE_DEFINED__ */


/* Additional Prototypes for ALL interfaces */

/* end of Additional Prototypes */

#ifdef __cplusplus
}
```

```
#endif

#endif



HKCR
{
     TPCC.StockLevel.1 = s 'StockLevel Class'
     {
          CLSID = s '{2668369E-A50D-11D2-BA4E-00C04FBFE08B}'
     }
     TPCC.StockLevel = s 'StockLevel Class'
     {
          CurVer = s 'TPCC.StockLevel.1'
     }
     NoRemove CLSID
     {
          ForceRemove {2668369E-A50D-11D2-BA4E-00C04FBFE08B} = s 'StockLevel
Class'
          {
               ProgID = s 'TPCC.StockLevel.1'
               VersionIndependentProgID = s 'TPCC.StockLevel'
               InprocServer32 = s '%MODULE%'
               {
                    val ThreadingModel = s 'Both'
               }
          }
     }
}

/****************************************************
   DllData file -- generated by MIDL compiler

        DO NOT ALTER THIS FILE

   This file is regenerated by MIDL on every IDL file compile.

   To completely reconstruct this file, delete it and rerun MIDL
   on all the IDL files in this DLL, specifying this file for the
   /dlldata command line option

****************************************************/


#include <rpcproxy.h>

#ifdef __cplusplus
extern "C"   {
#endif

EXTERN_PROXY_FILE( tpcc_com_ps )


PROXYFILE_LIST_START
/* Start of list */
  REFERENCE_PROXY_FILE( tpcc_com_ps ),
/* End of list */
PROXYFILE_LIST_END


DLLDATA_ROUTINES( aProxyFileList, GET_DLL_CLSID )

#ifdef __cplusplus
}  /*extern "C" */
#endif

/* end of generated dlldata file */


LIBRARY      "tpcc_com_ps"

DESCRIPTION  'Proxy/Stub DLL'

EXPORTS
     DllGetClassObject       @1 PRIVATE
     DllCanUnloadNow         @2 PRIVATE
     GetProxyDllInfo         @3 PRIVATE
     DllRegisterServer          @4   PRIVATE
     DllUnregisterServer        @5   PRIVATE


#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the definitions for the interfaces */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )


/* verify that the <rpcndr.h> version is high enough to compile this file*/
#ifndef __REQUIRED_RPCNDR_H_VERSION__
#define __REQUIRED_RPCNDR_H_VERSION__ 440
#endif

#include "rpc.h"
```

```
#include "rpcndr.h"

#ifndef __RPCNDR_H_VERSION__
#error this stub requires an updated version of <rpcndr.h>
#endif // __RPCNDR_H_VERSION__

#ifndef COM_NO_WINDOWS_H
#include "windows.h"
#include "ole2.h"
#endif /*COM_NO_WINDOWS_H*/

#ifndef __tpcc_com_ps_h__
#define __tpcc_com_ps_h__

/* Forward Declarations */

#ifndef __ITPCC_FWD_DEFINED__
#define __ITPCC_FWD_DEFINED__
typedef interface ITPCC ITPCC;
#endif     /* __ITPCC_FWD_DEFINED__ */


/* header files for imported files */
#include "oaidl.h"
#include "ocidl.h"

#ifdef __cplusplus
extern "C"{
#endif

void __RPC_FAR * __RPC_USER MIDL_user_allocate(size_t);
void __RPC_USER MIDL_user_free( void __RPC_FAR * );

/* interface __MIDL_itf_tpcc_com_ps_0000 */
/* [local] */




extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_c_ifspec;
extern RPC_IF_HANDLE __MIDL_itf_tpcc_com_ps_0000_v0_0_s_ifspec;

#ifndef __ITPCC_INTERFACE_DEFINED__
#define __ITPCC_INTERFACE_DEFINED__

/* interface ITPCC */
/* [unique][helpstring][uuid][oleautomation][object] */


EXTERN_C const IID IID_ITPCC;

#if defined(__cplusplus) && !defined(CINTERFACE)

    MIDL_INTERFACE("FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B")
    ITPCC : public IUnknown
    {
    public:
        virtual HRESULT __stdcall NewOrder(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall Payment(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall Delivery(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall StockLevel(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall OrderStatus(
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out) = 0;

        virtual HRESULT __stdcall CallSetComplete( void) = 0;

    };

#else     /* C style interface */

    typedef struct ITPCCVtbl
    {
        BEGIN_INTERFACE

        HRESULT ( STDMETHODCALLTYPE __RPC_FAR *QueryInterface )(
            ITPCC __RPC_FAR * This,
            /* [in] */ REFIID riid,
            /* [iid_is][out] */ void __RPC_FAR *__RPC_FAR *ppvObject);

        ULONG ( STDMETHODCALLTYPE __RPC_FAR *AddRef )(
            ITPCC __RPC_FAR * This);

        ULONG ( STDMETHODCALLTYPE __RPC_FAR *Release )(
            ITPCC __RPC_FAR * This);

        HRESULT ( __stdcall __RPC_FAR *NewOrder )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *Payment )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
```

```
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *Delivery )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *StockLevel )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *OrderStatus )(
            ITPCC __RPC_FAR * This,
            /* [in] */ VARIANT txn_in,
            /* [out] */ VARIANT __RPC_FAR *txn_out);

        HRESULT ( __stdcall __RPC_FAR *CallSetComplete )(
            ITPCC __RPC_FAR * This);

        END_INTERFACE
    } ITPCCVtbl;

    interface ITPCC
    {
        CONST_VTBL struct ITPCCVtbl __RPC_FAR *lpVtbl;
    };



#ifdef COBJMACROS


#define ITPCC_QueryInterface(This,riid,ppvObject)    \
    (This)->lpVtbl -> QueryInterface(This,riid,ppvObject)

#define ITPCC_AddRef(This) \
    (This)->lpVtbl -> AddRef(This)

#define ITPCC_Release(This)     \
    (This)->lpVtbl -> Release(This)


#define ITPCC_NewOrder(This,txn_in,txn_out)     \
    (This)->lpVtbl -> NewOrder(This,txn_in,txn_out)

#define ITPCC_Payment(This,txn_in,txn_out) \
    (This)->lpVtbl -> Payment(This,txn_in,txn_out)

#define ITPCC_Delivery(This,txn_in,txn_out)     \
    (This)->lpVtbl -> Delivery(This,txn_in,txn_out)

#define ITPCC_StockLevel(This,txn_in,txn_out)   \
    (This)->lpVtbl -> StockLevel(This,txn_in,txn_out)

#define ITPCC_OrderStatus(This,txn_in,txn_out)  \
    (This)->lpVtbl -> OrderStatus(This,txn_in,txn_out)

#define ITPCC_CallSetComplete(This)  \
    (This)->lpVtbl -> CallSetComplete(This)

#endif /* COBJMACROS */


#endif     /* C style interface */



HRESULT __stdcall ITPCC_NewOrder_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_NewOrder_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_Payment_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_Payment_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_Delivery_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_Delivery_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);
```

```
HRESULT __stdcall ITPCC_StockLevel_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_StockLevel_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_OrderStatus_Proxy(
    ITPCC __RPC_FAR * This,
    /* [in] */ VARIANT txn_in,
    /* [out] */ VARIANT __RPC_FAR *txn_out);


void __RPC_STUB ITPCC_OrderStatus_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);


HRESULT __stdcall ITPCC_CallSetComplete_Proxy(
    ITPCC __RPC_FAR * This);


void __RPC_STUB ITPCC_CallSetComplete_Stub(
    IRpcStubBuffer *This,
    IRpcChannelBuffer *_pRpcChannelBuffer,
    PRPC_MESSAGE _pRpcMessage,
    DWORD *_pdwStubPhase);



#endif     /* __ITPCC_INTERFACE_DEFINED__ */


/* Additional Prototypes for ALL interfaces */

unsigned long             __RPC_USER  VARIANT_UserSize(     unsigned long
__RPC_FAR *, unsigned long            , VARIANT __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER  VARIANT_UserMarshal(  unsigned long
__RPC_FAR *, unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
unsigned char __RPC_FAR * __RPC_USER  VARIANT_UserUnmarshal(unsigned long
__RPC_FAR *, unsigned char __RPC_FAR *, VARIANT __RPC_FAR * );
void                      __RPC_USER  VARIANT_UserFree(     unsigned long
__RPC_FAR *, VARIANT __RPC_FAR * );

/* end of Additional Prototypes */

#ifdef __cplusplus
}
#endif

#endif



/*   FILE:      ITPCC.IDL
 *                   Microsoft TPC-C Kit Ver. 4.20.000
 *                   Copyright Microsoft, 1999
 *              All Rights Reserved
 *
 *                   not yet audited
 *
 *   PURPOSE:   Defines the interface used by TPCC. This interface can be
implemented by C++ components.
 *
 *  Change history:
 *         4.20.000 - first version
 */

// Forward declare all types defined
interface ITPCC;
import "oaidl.idl";
import "ocidl.idl";

     [
          object,
          oleautomation,
          uuid(FEEE6AA2-84B1-11d2-BA47-00C04FBFE08B),
          helpstring("ITPCC Interface"),
          pointer_default(unique)
     ]
     interface ITPCC : IUnknown
     {

        HRESULT _stdcall NewOrder
                                  (
                                  [in] VARIANT  txn_in,
                                  [out] VARIANT *txn_out
                                  );

        HRESULT _stdcall Payment
                                  (
                                  [in] VARIANT txn_in,
                                  [out] VARIANT *txn_out
                                  );

        HRESULT _stdcall Delivery
                                  (
```

```
                            [in] VARIANT txn_in,
                            [out] VARIANT *txn_out
                            );

        HRESULT _stdcall StockLevel
                            (
                            [in] VARIANT txn_in,
                            [out] VARIANT *txn_out
                            );

        HRESULT _stdcall OrderStatus
                            (
                            [in] VARIANT txn_in,
                            [out] VARIANT *txn_out
                            );

        HRESULT _stdcall CallSetComplete
                            (
                            );

    };     // interface ITPCC



#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if !defined(_M_IA64) && !defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif


#include <rpc.h>
#include <rpcndr.h>


#ifdef _MIDL_USE_GUIDDEF_

#ifndef INITGUID
#define INITGUID
#include <guiddef.h>
#undef INITGUID
#else
#include <guiddef.h>
#endif

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8)

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
{
    unsigned long x;
    unsigned short s1;
    unsigned short s2;
    unsigned char  c[8];
} IID;

#endif // __IID_DEFINED__

#ifndef CLSID_DEFINED
#define CLSID_DEFINED
typedef IID CLSID;
#endif // CLSID_DEFINED

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}

#endif !_MIDL_USE_GUIDDEF_

MIDL_DEFINE_GUID(IID,
IID_ITPCC,0xFEEE6AA2,0x84B1,0x11d2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif



#endif /* !defined(_M_IA64) && !defined(_M_AXP64)*/
```

```
#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the IIDs and CLSIDs */

/* link this file in with the server and any clients */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win64 (32b run,appending), ms_ext, c_ext,
robust
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if defined(_M_IA64) || defined(_M_AXP64)

#ifdef __cplusplus
extern "C"{
#endif


#include <rpc.h>
#include <rpcndr.h>

#ifdef _MIDL_USE_GUIDDEF_

#ifndef INITGUID
#define INITGUID
#include <guiddef.h>
#undef INITGUID
#else
#include <guiddef.h>
#endif

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        DEFINE_GUID(name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8)

#else // !_MIDL_USE_GUIDDEF_

#ifndef __IID_DEFINED__
#define __IID_DEFINED__

typedef struct _IID
{
    unsigned long x;
    unsigned short s1;
    unsigned short s2;
    unsigned char  c[8];
} IID;

#endif // __IID_DEFINED__

#ifndef CLSID_DEFINED
#define CLSID_DEFINED
typedef IID CLSID;
#endif // CLSID_DEFINED

#define MIDL_DEFINE_GUID(type,name,l,w1,w2,b1,b2,b3,b4,b5,b6,b7,b8) \
        const type name = {l,w1,w2,{b1,b2,b3,b4,b5,b6,b7,b8}}

#endif !_MIDL_USE_GUIDDEF_

MIDL_DEFINE_GUID(IID,
IID_ITPCC,0xFEEE6AA2,0x84B1,0x11d2,0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B);

#undef MIDL_DEFINE_GUID

#ifdef __cplusplus
}
#endif



#endif /* defined(_M_IA64) || defined(_M_AXP64)*/



#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the proxy stub code */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win32 (32b run), ms_ext, c_ext
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
//@@MIDL_FILE_HEADING(  )

#if !defined(_M_IA64) && !defined(_M_AXP64)
#define USE_STUBLESS_PROXY


/* verify that the <rpcproxy.h> version is high enough to compile this
file*/
```

```
#ifndef __REDQ_RPCPROXY_H_VERSION__
#define __REQUIRED_RPCPROXY_H_VERSION__ 440
#endif


#include "rpcproxy.h"
#ifndef __RPCPROXY_H_VERSION__
#error this stub requires an updated version of <rpcproxy.h>
#endif // __RPCPROXY_H_VERSION__


#include "tpcc_com_ps.h"

#define TYPE_FORMAT_STRING_SIZE   997
#define PROC_FORMAT_STRING_SIZE   193
#define TRANSMIT_AS_TABLE_SIZE    0
#define WIRE_MARSHAL_TABLE_SIZE   1

typedef struct _MIDL_TYPE_FORMAT_STRING
    {
    short          Pad;
    unsigned char  Format[ TYPE_FORMAT_STRING_SIZE ];
    } MIDL_TYPE_FORMAT_STRING;

typedef struct _MIDL_PROC_FORMAT_STRING
    {
    short          Pad;
    unsigned char  Format[ PROC_FORMAT_STRING_SIZE ];
    } MIDL_PROC_FORMAT_STRING;


extern const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString;
extern const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString;


/* Standard interface: __MIDL_itf_tpcc_com_ps_0000, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00}}
*/


/* Object interface: IUnknown, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0xC0,0x00,0x00,0x00,0x00,0x00,0x00,0x46}}
*/


/* Object interface: ITPCC, ver. 0.0,
   GUID={0xFEEE6AA2,0x84B1,0x11d2,{0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B}}
*/


extern const MIDL_STUB_DESC Object_StubDesc;

extern const MIDL_SERVER_INFO ITPCC_ServerInfo;

#pragma code_seg(".orpc")
static const unsigned short ITPCC_FormatStringOffsetTable[] =
    {
    0,
    34,
    68,
    102,
    136,
    170
    };

static const MIDL_SERVER_INFO ITPCC_ServerInfo =
    {
    &Object_StubDesc,
    0,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0,
    0
    };

static const MIDL_STUBLESS_PROXY_INFO ITPCC_ProxyInfo =
    {
    &Object_StubDesc,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0
    };

CINTERFACE_PROXY_VTABLE(9) _ITPCCProxyVtbl =
{
    &ITPCC_ProxyInfo,
    &IID_ITPCC,
    IUnknown_QueryInterface_Proxy,
    IUnknown_AddRef_Proxy,
    IUnknown_Release_Proxy ,
    (void *)-1 /* ITPCC::NewOrder */ ,
    (void *)-1 /* ITPCC::Payment */ ,
    (void *)-1 /* ITPCC::Delivery */ ,
    (void *)-1 /* ITPCC::StockLevel */ ,
    (void *)-1 /* ITPCC::OrderStatus */ ,
    (void *)-1 /* ITPCC::CallSetComplete */
};

const CInterfaceStubVtbl _ITPCCStubVtbl =
{
    &IID_ITPCC,
```

```
    &ITPCC_ServerInfo,
    9,
    0, /* pure interpreted */
    CStdStubBuffer_METHODS
};

extern const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[
WIRE_MARSHAL_TABLE_SIZE ];

static const MIDL_STUB_DESC Object_StubDesc =
    {
    0,
    NdrOleAllocate,
    NdrOleFree,
    0,
    0,
    0,
    0,
    0,
    __MIDL_TypeFormatString.Format,
    1, /* -error bounds_check flag */
    0x20000, /* Ndr library version */
    0,
    0x5030118, /* MIDL Version 5.3.280 */
    0,
    UserMarshalRoutines,
    0,  /* notify & notify_flag routine table */
    0x1, /* MIDL flag */
    0,  /* Reserved3 */
    0,  /* Reserved4 */
    0   /* Reserved5 */
    };

#pragma data_seg(".rdata")

static const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[
WIRE_MARSHAL_TABLE_SIZE ] =
        {

            {
            VARIANT_UserSize
            ,VARIANT_UserMarshal
            ,VARIANT_UserUnmarshal
            ,VARIANT_UserFree
            }

        };


#if !defined(__RPC_WIN32__)
#error  Invalid build platform for this stub.
#endif

#if !(TARGET_IS_NT40_OR_LATER)
#error You need a Windows NT 4.0 or later to run this stub because it uses
these features:
#error   -Oif or -Oicf, [wire_marshal] or [user_marshal] attribute.
#error However, your C/C++ compilation flags indicate you intend to run this
app on earlier systems.
#error This app will die there with the RPC_X_WRONG_STUB_VERSION error.
#endif


static const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString =
    {
        0,
        {

     /* Procedure NewOrder */

                0x33,      /* FC_AUTO_HANDLE */
                0x6c,      /* Old Flags:  object, Oi2 */
/*  2 */   NdrFcLong( 0x0 ),     /* 0 */
/*  6 */   NdrFcShort( 0x3 ),    /* 3 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/*  8 */   NdrFcShort( 0x1c ),  /* x86 Stack size/offset = 28 */
#else
                NdrFcShort( 0x20 ),  /*  MIPS Stack size/offset = 32 */
#endif
#else
                NdrFcShort( 0x20 ),  /* PPC Stack size/offset = 32 */
#endif
#else
                NdrFcShort( 0x28 ),  /* Alpha Stack size/offset = 40 */
#endif
/* 10 */   NdrFcShort( 0x0 ),    /* 0 */
/* 12 */   NdrFcShort( 0x8 ),    /* 8 */
/* 14 */   0x7,       /* Oi2 Flags:  srv must size, clt must size, has
return, */
                0x3,       /* 3 */

     /* Parameter txn_in */

/* 16 */   NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 18 */   NdrFcShort( 0x4 ),    /* x86 Stack size/offset = 4 */
#else
                NdrFcShort( 0x8 ),    /*  MIPS Stack size/offset = 8 */
#endif
#else
                NdrFcShort( 0x8 ),    /* PPC Stack size/offset = 8 */
```

```
#endif
#else
                NdrFcShort( 0x8 ),   /* Alpha Stack size/offset = 8 */
#endif
/* 20 */   NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Parameter txn_out */

/* 22 */   NdrFcShort( 0x4113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 24 */   NdrFcShort( 0x14 ),  /* x86 Stack size/offset = 20 */
#else
                NdrFcShort( 0x18 ),  /*  MIPS Stack size/offset = 24 */
#endif
#else
                NdrFcShort( 0x18 ),  /* PPC Stack size/offset = 24 */
#endif
#else
                NdrFcShort( 0x18 ),  /* Alpha Stack size/offset = 24 */
#endif
/* 26 */   NdrFcShort( 0x3da ), /* Type Offset=986 */

     /* Return value */

/* 28 */   NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 30 */   NdrFcShort( 0x18 ),  /* x86 Stack size/offset = 24 */
#else
                NdrFcShort( 0x1c ),  /*  MIPS Stack size/offset = 28 */
#endif
#else
                NdrFcShort( 0x1c ),  /* PPC Stack size/offset = 28 */
#endif
#else
                NdrFcShort( 0x20 ),  /* Alpha Stack size/offset = 32 */
#endif
/* 32 */   0x8,       /* FC_LONG */
                0x0,       /* 0 */

     /* Procedure Payment */

/* 34 */   0x33,      /* FC_AUTO_HANDLE */
                0x6c,      /* Old Flags:  object, Oi2 */
/* 36 */   NdrFcLong( 0x0 ),    /* 0 */
/* 40 */   NdrFcShort( 0x4 ),   /* 4 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 42 */   NdrFcShort( 0x1c ),  /* x86 Stack size/offset = 28 */
#else
                NdrFcShort( 0x20 ),  /*  MIPS Stack size/offset = 32 */
#endif
#else
                NdrFcShort( 0x20 ),  /* PPC Stack size/offset = 32 */
#endif
#else
                NdrFcShort( 0x28 ),  /* Alpha Stack size/offset = 40 */
#endif
/* 44 */   NdrFcShort( 0x0 ),   /* 0 */
/* 46 */   NdrFcShort( 0x8 ),   /* 8 */
/* 48 */   0x7,       /* Oi2 Flags:  srv must size, clt must size, has
return, */
                0x3,       /* 3 */

     /* Parameter txn_in */

/* 50 */   NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 52 */   NdrFcShort( 0x4 ),   /* x86 Stack size/offset = 4 */
#else
                NdrFcShort( 0x8 ),   /*  MIPS Stack size/offset = 8 */
#endif
#else
                NdrFcShort( 0x8 ),   /* PPC Stack size/offset = 8 */
#endif
#else
                NdrFcShort( 0x8 ),   /* Alpha Stack size/offset = 8 */
#endif
/* 54 */   NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Parameter txn_out */

/* 56 */   NdrFcShort( 0x4113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 58 */   NdrFcShort( 0x14 ),  /* x86 Stack size/offset = 20 */
#else
                NdrFcShort( 0x18 ),  /*  MIPS Stack size/offset = 24 */
#endif
#else
                NdrFcShort( 0x18 ),  /* PPC Stack size/offset = 24 */
#endif
#else
                NdrFcShort( 0x18 ),  /* Alpha Stack size/offset = 24 */
#endif
/* 60 */   NdrFcShort( 0x3da ), /* Type Offset=986 */
```

```
     /* Return value */

/* 62 */   NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 64 */   NdrFcShort( 0x18 ),  /* x86 Stack size/offset = 24 */
#else
               NdrFcShort( 0x1c ),  /*  MIPS Stack size/offset = 28 */
#endif
#else
               NdrFcShort( 0x1c ),  /* PPC Stack size/offset = 28 */
#endif
#else
               NdrFcShort( 0x20 ),  /* Alpha Stack size/offset = 32 */
#endif
/* 66 */   0x8,       /* FC_LONG */
               0x0,       /* 0 */

     /* Procedure Delivery */

/* 68 */   0x33,      /* FC_AUTO_HANDLE */
               0x6c,      /* Old Flags:  object, Oi2 */
/* 70 */   NdrFcLong( 0x0 ),    /* 0 */
/* 74 */   NdrFcShort( 0x5 ),   /* 5 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 76 */   NdrFcShort( 0x1c ),  /* x86 Stack size/offset = 28 */
#else
               NdrFcShort( 0x20 ),  /*  MIPS Stack size/offset = 32 */
#endif
#else
               NdrFcShort( 0x20 ),  /* PPC Stack size/offset = 32 */
#endif
#else
               NdrFcShort( 0x28 ),  /* Alpha Stack size/offset = 40 */
#endif
/* 78 */   NdrFcShort( 0x0 ),   /* 0 */
/* 80 */   NdrFcShort( 0x8 ),   /* 8 */
/* 82 */   0x7,       /* Oi2 Flags:  srv must size, clt must size, has
return, */
               0x3,       /* 3 */

     /* Parameter txn_in */

/* 84 */   NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 86 */   NdrFcShort( 0x4 ),   /* x86 Stack size/offset = 4 */
#else
               NdrFcShort( 0x8 ),   /*  MIPS Stack size/offset = 8 */
#endif
#else
               NdrFcShort( 0x8 ),   /* PPC Stack size/offset = 8 */
#endif
#else
               NdrFcShort( 0x8 ),   /* Alpha Stack size/offset = 8 */
#endif
/* 88 */   NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Parameter txn_out */

/* 90 */   NdrFcShort( 0x4113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 92 */   NdrFcShort( 0x14 ),  /* x86 Stack size/offset = 20 */
#else
               NdrFcShort( 0x18 ),  /*  MIPS Stack size/offset = 24 */
#endif
#else
               NdrFcShort( 0x18 ),  /* PPC Stack size/offset = 24 */
#endif
#else
               NdrFcShort( 0x18 ),  /* Alpha Stack size/offset = 24 */
#endif
/* 94 */   NdrFcShort( 0x3da ), /* Type Offset=986 */

     /* Return value */

/* 96 */   NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 98 */   NdrFcShort( 0x18 ),  /* x86 Stack size/offset = 24 */
#else
               NdrFcShort( 0x1c ),  /*  MIPS Stack size/offset = 28 */
#endif
#else
               NdrFcShort( 0x1c ),  /* PPC Stack size/offset = 28 */
#endif
#else
               NdrFcShort( 0x20 ),  /* Alpha Stack size/offset = 32 */
#endif
/* 100 */  0x8,       /* FC_LONG */
               0x0,       /* 0 */

     /* Procedure StockLevel */

/* 102 */  0x33,      /* FC_AUTO_HANDLE */
               0x6c,      /* Old Flags:  object, Oi2 */
```

```
/* 104 */  NdrFcLong( 0x0 ),    /* 0 */
/* 108 */  NdrFcShort( 0x6 ),   /* 6 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 110 */  NdrFcShort( 0x1c ),  /* x86 Stack size/offset = 28 */
#else
               NdrFcShort( 0x20 ),  /*  MIPS Stack size/offset = 32 */
#endif
#else
               NdrFcShort( 0x20 ),  /* PPC Stack size/offset = 32 */
#endif
#else
               NdrFcShort( 0x28 ),  /* Alpha Stack size/offset = 40 */
#endif
/* 112 */  NdrFcShort( 0x0 ),   /* 0 */
/* 114 */  NdrFcShort( 0x8 ),   /* 8 */
/* 116 */  0x7,       /* Oi2 Flags:  srv must size, clt must size, has
return, */
               0x3,       /* 3 */

     /* Parameter txn_in */

/* 118 */  NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 120 */  NdrFcShort( 0x4 ),   /* x86 Stack size/offset = 4 */
#else
               NdrFcShort( 0x8 ),   /*  MIPS Stack size/offset = 8 */
#endif
#else
               NdrFcShort( 0x8 ),   /* PPC Stack size/offset = 8 */
#endif
#else
               NdrFcShort( 0x8 ),   /* Alpha Stack size/offset = 8 */
#endif
/* 122 */  NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Parameter txn_out */

/* 124 */  NdrFcShort( 0x4113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 126 */  NdrFcShort( 0x14 ),  /* x86 Stack size/offset = 20 */
#else
               NdrFcShort( 0x18 ),  /*  MIPS Stack size/offset = 24 */
#endif
#else
               NdrFcShort( 0x18 ),  /* PPC Stack size/offset = 24 */
#endif
#else
               NdrFcShort( 0x18 ),  /* Alpha Stack size/offset = 24 */
#endif
/* 128 */  NdrFcShort( 0x3da ), /* Type Offset=986 */

     /* Return value */

/* 130 */  NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 132 */  NdrFcShort( 0x18 ),  /* x86 Stack size/offset = 24 */
#else
               NdrFcShort( 0x1c ),  /*  MIPS Stack size/offset = 28 */
#endif
#else
               NdrFcShort( 0x1c ),  /* PPC Stack size/offset = 28 */
#endif
#else
               NdrFcShort( 0x20 ),  /* Alpha Stack size/offset = 32 */
#endif
/* 134 */  0x8,       /* FC_LONG */
               0x0,       /* 0 */

     /* Procedure OrderStatus */

/* 136 */  0x33,      /* FC_AUTO_HANDLE */
               0x6c,      /* Old Flags:  object, Oi2 */
/* 138 */  NdrFcLong( 0x0 ),    /* 0 */
/* 142 */  NdrFcShort( 0x7 ),   /* 7 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 144 */  NdrFcShort( 0x1c ),  /* x86 Stack size/offset = 28 */
#else
               NdrFcShort( 0x20 ),  /*  MIPS Stack size/offset = 32 */
#endif
#else
               NdrFcShort( 0x20 ),  /* PPC Stack size/offset = 32 */
#endif
#else
               NdrFcShort( 0x28 ),  /* Alpha Stack size/offset = 40 */
#endif
/* 146 */  NdrFcShort( 0x0 ),   /* 0 */
/* 148 */  NdrFcShort( 0x8 ),   /* 8 */
/* 150 */  0x7,       /* Oi2 Flags:  srv must size, clt must size, has
return, */
               0x3,       /* 3 */

     /* Parameter txn_in */
```

```
/* 152 */  NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 154 */  NdrFcShort( 0x4 ),   /* x86 Stack size/offset = 4 */
#else
               NdrFcShort( 0x8 ),   /*  MIPS Stack size/offset = 8 */
#endif
#else
               NdrFcShort( 0x8 ),   /* PPC Stack size/offset = 8 */
#endif
#else
               NdrFcShort( 0x8 ),   /* Alpha Stack size/offset = 8 */
#endif
/* 156 */  NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Parameter txn_out */

/* 158 */  NdrFcShort( 0x4113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=16 */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 160 */  NdrFcShort( 0x14 ),  /* x86 Stack size/offset = 20 */
#else
               NdrFcShort( 0x18 ),  /*  MIPS Stack size/offset = 24 */
#endif
#else
               NdrFcShort( 0x18 ),  /* PPC Stack size/offset = 24 */
#endif
#else
               NdrFcShort( 0x18 ),  /* Alpha Stack size/offset = 24 */
#endif
/* 162 */  NdrFcShort( 0x3da ), /* Type Offset=986 */

     /* Return value */

/* 164 */  NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
#ifndef _PPC_
#if !defined(_MIPS_)
/* 166 */  NdrFcShort( 0x18 ),  /* x86 Stack size/offset = 24 */
#else
               NdrFcShort( 0x1c ),  /*  MIPS Stack size/offset = 28 */
#endif
#else
               NdrFcShort( 0x1c ),  /* PPC Stack size/offset = 28 */
#endif
#else
               NdrFcShort( 0x20 ),  /* Alpha Stack size/offset = 32 */
#endif
/* 168 */  0x8,       /* FC_LONG */
               0x0,       /* 0 */

     /* Procedure CallSetComplete */

/* 170 */  0x33,      /* FC_AUTO_HANDLE */
               0x6c,      /* Old Flags:  object, Oi2 */
/* 172 */  NdrFcLong( 0x0 ),    /* 0 */
/* 176 */  NdrFcShort( 0x8 ),   /* 8 */
#ifndef _ALPHA_
/* 178 */  NdrFcShort( 0x8 ),   /* x86, MIPS, PPC Stack size/offset = 8 */
#else
               NdrFcShort( 0x10 ),  /* Alpha Stack size/offset = 16 */
#endif
/* 180 */  NdrFcShort( 0x0 ),   /* 0 */
/* 182 */  NdrFcShort( 0x8 ),   /* 8 */
/* 184 */  0x4,       /* Oi2 Flags:  has return, */
               0x1,       /* 1 */

     /* Return value */

/* 186 */  NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 188 */  NdrFcShort( 0x4 ),   /* x86, MIPS, PPC Stack size/offset = 4 */
#else
               NdrFcShort( 0x8 ),   /* Alpha Stack size/offset = 8 */
#endif
/* 190 */  0x8,       /* FC_LONG */
               0x0,       /* 0 */

               0x0
          }
     };

static const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString =
    {
        0,
        {
               NdrFcShort( 0x0 ),   /* 0 */
/*  2 */
               0x12, 0x0, /* FC_UP */
/*  4 */   NdrFcShort( 0x3b0 ), /* Offset= 944 (948) */
/*  6 */
               0x2b,      /* FC_NON_ENCAPSULATED_UNION */
               0x9,       /* FC_ULONG */
/*  8 */   0x7,       /* Corr desc: FC_USHORT */
               0x0,       /*  */
/* 10 */   NdrFcShort( 0xfff8 ),/* -8 */
/* 12 */   NdrFcShort( 0x2 ),   /* Offset= 2 (14) */
/* 14 */   NdrFcShort( 0x10 ),  /* 16 */
/* 16 */   NdrFcShort( 0x2b ),  /* 43 */
/* 18 */   NdrFcLong( 0x3 ),    /* 3 */
/* 22 */   NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 24 */   NdrFcLong( 0x11 ),   /* 17 */
```

```
/* 28 */   NdrFcShort( 0x8001 ),/* Simple arm type: FC_BYTE */
/* 30 */   NdrFcLong( 0x2 ),    /* 2 */
/* 34 */   NdrFcShort( 0x8006 ),/* Simple arm type: FC_SHORT */
/* 36 */   NdrFcLong( 0x4 ),    /* 4 */
/* 40 */   NdrFcShort( 0x800a ),/* Simple arm type: FC_FLOAT */
/* 42 */   NdrFcLong( 0x5 ),    /* 5 */
/* 46 */   NdrFcShort( 0x800c ),/* Simple arm type: FC_DOUBLE */
/* 48 */   NdrFcLong( 0xb ),    /* 11 */
/* 52 */   NdrFcShort( 0x8006 ),/* Simple arm type: FC_SHORT */
/* 54 */   NdrFcLong( 0xa ),    /* 10 */
/* 58 */   NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 60 */   NdrFcLong( 0x6 ),    /* 6 */
/* 64 */   NdrFcShort( 0xd6 ),  /* Offset= 214 (278) */
/* 66 */   NdrFcLong( 0x7 ),    /* 7 */
/* 70 */   NdrFcShort( 0x800c ),/* Simple arm type: FC_DOUBLE */
/* 72 */   NdrFcLong( 0x8 ),    /* 8 */
/* 76 */   NdrFcShort( 0xd0 ),  /* Offset= 208 (284) */
/* 78 */   NdrFcLong( 0xd ),    /* 13 */
/* 82 */   NdrFcShort( 0xe2 ),  /* Offset= 226 (308) */
/* 84 */   NdrFcLong( 0x9 ),    /* 9 */
/* 88 */   NdrFcShort( 0xee ),  /* Offset= 238 (326) */
/* 90 */   NdrFcLong( 0x2000 ), /* 8192 */
/* 94 */   NdrFcShort( 0xfa ),  /* Offset= 250 (344) */
/* 96 */   NdrFcLong( 0x24 ),   /* 36 */
/* 100 */  NdrFcShort( 0x308 ), /* Offset= 776 (876) */
/* 102 */  NdrFcLong( 0x4024 ), /* 16420 */
/* 106 */  NdrFcShort( 0x302 ), /* Offset= 770 (876) */
/* 108 */  NdrFcLong( 0x4011 ), /* 16401 */
/* 112 */  NdrFcShort( 0x300 ), /* Offset= 768 (880) */
/* 114 */  NdrFcLong( 0x4002 ), /* 16386 */
/* 118 */  NdrFcShort( 0x2fe ), /* Offset= 766 (884) */
/* 120 */  NdrFcLong( 0x4003 ), /* 16387 */
/* 124 */  NdrFcShort( 0x2fc ), /* Offset= 764 (888) */
/* 126 */  NdrFcLong( 0x4004 ), /* 16388 */
/* 130 */  NdrFcShort( 0x2fa ), /* Offset= 762 (892) */
/* 132 */  NdrFcLong( 0x4005 ), /* 16389 */
/* 136 */  NdrFcShort( 0x2f8 ), /* Offset= 760 (896) */
/* 138 */  NdrFcLong( 0x400b ), /* 16395 */
/* 142 */  NdrFcShort( 0x2e6 ), /* Offset= 742 (884) */
/* 144 */  NdrFcLong( 0x400a ), /* 16394 */
/* 148 */  NdrFcShort( 0x2e4 ), /* Offset= 740 (888) */
/* 150 */  NdrFcLong( 0x4006 ), /* 16390 */
/* 154 */  NdrFcShort( 0x2ea ), /* Offset= 746 (900) */
/* 156 */  NdrFcLong( 0x4007 ), /* 16391 */
/* 160 */  NdrFcShort( 0x2e0 ), /* Offset= 736 (896) */
/* 162 */  NdrFcLong( 0x4008 ), /* 16392 */
/* 166 */  NdrFcShort( 0x2e2 ), /* Offset= 738 (904) */
/* 168 */  NdrFcLong( 0x400d ), /* 16397 */
/* 172 */  NdrFcShort( 0x2e0 ), /* Offset= 736 (908) */
/* 174 */  NdrFcLong( 0x4009 ), /* 16393 */
/* 178 */  NdrFcShort( 0x2de ), /* Offset= 734 (912) */
/* 180 */  NdrFcLong( 0x6000 ), /* 24576 */
/* 184 */  NdrFcShort( 0x2dc ), /* Offset= 732 (916) */
/* 186 */  NdrFcLong( 0x400c ), /* 16396 */
/* 190 */  NdrFcShort( 0x2da ), /* Offset= 730 (920) */
/* 192 */  NdrFcLong( 0x10 ),   /* 16 */
/* 196 */  NdrFcShort( 0x8002 ),/* Simple arm type: FC_CHAR */
/* 198 */  NdrFcLong( 0x12 ),   /* 18 */
/* 202 */  NdrFcShort( 0x8006 ),/* Simple arm type: FC_SHORT */
/* 204 */  NdrFcLong( 0x13 ),   /* 19 */
/* 208 */  NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 210 */  NdrFcLong( 0x16 ),   /* 22 */
/* 214 */  NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 216 */  NdrFcLong( 0x17 ),   /* 23 */
/* 220 */  NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 222 */  NdrFcLong( 0xe ),    /* 14 */
/* 226 */  NdrFcShort( 0x2be ), /* Offset= 702 (928) */
/* 228 */  NdrFcLong( 0x400e ), /* 16398 */
/* 232 */  NdrFcShort( 0x2c4 ), /* Offset= 708 (940) */
/* 234 */  NdrFcLong( 0x4010 ), /* 16400 */
/* 238 */  NdrFcShort( 0x2c2 ), /* Offset= 706 (944) */
/* 240 */  NdrFcLong( 0x4012 ), /* 16402 */
/* 244 */  NdrFcShort( 0x280 ), /* Offset= 640 (884) */
/* 246 */  NdrFcLong( 0x4013 ), /* 16403 */
/* 250 */  NdrFcShort( 0x27e ), /* Offset= 638 (888) */
/* 252 */  NdrFcLong( 0x4016 ), /* 16406 */
/* 256 */  NdrFcShort( 0x278 ), /* Offset= 632 (888) */
/* 258 */  NdrFcLong( 0x4017 ), /* 16407 */
/* 262 */  NdrFcShort( 0x272 ), /* Offset= 626 (888) */
/* 264 */  NdrFcLong( 0x0 ),    /* 0 */
/* 268 */  NdrFcShort( 0x0 ),   /* Offset= 0 (268) */
/* 270 */  NdrFcLong( 0x1 ),    /* 1 */
/* 274 */  NdrFcShort( 0x0 ),   /* Offset= 0 (274) */
/* 276 */  NdrFcShort( 0xffffffff ),  /* Offset= -1 (275) */
/* 278 */
                0x15,      /* FC_STRUCT */
                0x7,       /* 7 */
/* 280 */  NdrFcShort( 0x8 ),   /* 8 */
/* 282 */  0xb,       /* FC_HYPER */
                0x5b,      /* FC_END */
/* 284 */
                0x12, 0x0, /* FC_UP */
/* 286 */  NdrFcShort( 0xc ),   /* Offset= 12 (298) */
/* 288 */
                0x1b,      /* FC_CARRAY */
                0x1,       /* 1 */
/* 290 */  NdrFcShort( 0x2 ),   /* 2 */
/* 292 */  0x9,       /* Corr desc: FC_ULONG */
                0x0,       /*  */
/* 294 */  NdrFcShort( 0xfffc ),/* -4 */
/* 296 */  0x6,       /* FC_SHORT */
                0x5b,      /* FC_END */
/* 298 */
                0x17,      /* FC_CSTRUCT */
                0x3,       /* 3 */
/* 300 */  NdrFcShort( 0x8 ),   /* 8 */
```

```
/* 302 */  NdrFcShort( 0xfffffff2 ),  /* Offset= -14 (288) */
/* 304 */  0x8,       /* FC_LONG */
               0x8,       /* FC_LONG */
/* 306 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 308 */
               0x2f,      /* FC_IP */
               0x5a,      /* FC_CONSTANT_IID */
/* 310 */  NdrFcLong( 0x0 ),     /* 0 */
/* 314 */  NdrFcShort( 0x0 ),    /* 0 */
/* 316 */  NdrFcShort( 0x0 ),    /* 0 */
/* 318 */  0xc0,      /* 192 */
               0x0,       /* 0 */
/* 320 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 322 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 324 */  0x0,       /* 0 */
               0x46,      /* 70 */
/* 326 */
               0x2f,      /* FC_IP */
               0x5a,      /* FC_CONSTANT_IID */
/* 328 */  NdrFcLong( 0x20400 ),/* 132096 */
/* 332 */  NdrFcShort( 0x0 ),    /* 0 */
/* 334 */  NdrFcShort( 0x0 ),    /* 0 */
/* 336 */  0xc0,      /* 192 */
               0x0,       /* 0 */
/* 338 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 340 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 342 */  0x0,       /* 0 */
               0x46,      /* 70 */
/* 344 */
               0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 346 */  NdrFcShort( 0x2 ),    /* Offset= 2 (348) */
/* 348 */
               0x12, 0x0, /* FC_UP */
/* 350 */  NdrFcShort( 0x1fc ), /* Offset= 508 (858) */
/* 352 */
               0x2a,      /* FC_ENCAPSULATED_UNION */
               0x49,      /* 73 */
/* 354 */  NdrFcShort( 0x18 ),   /* 24 */
/* 356 */  NdrFcShort( 0xa ),    /* 10 */
/* 358 */  NdrFcLong( 0x8 ),     /* 8 */
/* 362 */  NdrFcShort( 0x58 ),   /* Offset= 88 (450) */
/* 364 */  NdrFcLong( 0xd ),     /* 13 */
/* 368 */  NdrFcShort( 0x78 ),   /* Offset= 120 (488) */
/* 370 */  NdrFcLong( 0x9 ),     /* 9 */
/* 374 */  NdrFcShort( 0x94 ),   /* Offset= 148 (522) */
/* 376 */  NdrFcLong( 0xc ),     /* 12 */
/* 380 */  NdrFcShort( 0xbc ),   /* Offset= 188 (568) */
/* 382 */  NdrFcLong( 0x24 ),    /* 36 */
/* 386 */  NdrFcShort( 0x114 ),  /* Offset= 276 (662) */
/* 388 */  NdrFcLong( 0x800d ),  /* 32781 */
/* 392 */  NdrFcShort( 0x130 ),  /* Offset= 304 (696) */
/* 394 */  NdrFcLong( 0x10 ),    /* 16 */
/* 398 */  NdrFcShort( 0x148 ),  /* Offset= 328 (726) */
/* 400 */  NdrFcLong( 0x2 ),     /* 2 */
/* 404 */  NdrFcShort( 0x160 ),  /* Offset= 352 (756) */
/* 406 */  NdrFcLong( 0x3 ),     /* 3 */
/* 410 */  NdrFcShort( 0x178 ),  /* Offset= 376 (786) */
/* 412 */  NdrFcLong( 0x14 ),    /* 20 */
/* 416 */  NdrFcShort( 0x190 ),  /* Offset= 400 (816) */
/* 418 */  NdrFcShort( 0xffffffff ),  /* Offset= -1 (417) */
/* 420 */
               0x1b,      /* FC_CARRAY */
               0x3,       /* 3 */
/* 422 */  NdrFcShort( 0x4 ),    /* 4 */
/* 424 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
               0x0,       /*  */
/* 426 */  NdrFcShort( 0x0 ),    /* 0 */
/* 428 */
               0x4b,      /* FC_PP */
               0x5c,      /* FC_PAD */
/* 430 */
               0x48,      /* FC_VARIABLE_REPEAT */
               0x49,      /* FC_FIXED_OFFSET */
/* 432 */  NdrFcShort( 0x4 ),    /* 4 */
/* 434 */  NdrFcShort( 0x0 ),    /* 0 */
/* 436 */  NdrFcShort( 0x1 ),    /* 1 */
/* 438 */  NdrFcShort( 0x0 ),    /* 0 */
/* 440 */  NdrFcShort( 0x0 ),    /* 0 */
/* 442 */  0x12, 0x0, /* FC_UP */
/* 444 */  NdrFcShort( 0xffffff6e ),  /* Offset= -146 (298) */
/* 446 */
               0x5b,      /* FC_END */

               0x8,       /* FC_LONG */
/* 448 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 450 */
               0x16,      /* FC_PSTRUCT */
               0x3,       /* 3 */
/* 452 */  NdrFcShort( 0x8 ),    /* 8 */
/* 454 */
               0x4b,      /* FC_PP */
               0x5c,      /* FC_PAD */
/* 456 */
               0x46,      /* FC_NO_REPEAT */
               0x5c,      /* FC_PAD */
/* 458 */  NdrFcShort( 0x4 ),    /* 4 */
/* 460 */  NdrFcShort( 0x4 ),    /* 4 */
/* 462 */  0x11, 0x0, /* FC_RP */
/* 464 */  NdrFcShort( 0xffffffd4 ),  /* Offset= -44 (420) */
/* 466 */
```

```
                0x5b,       /* FC_END */

                0x8,        /* FC_LONG */
/* 468 */  0x8,        /* FC_LONG */
                0x5b,       /* FC_END */
/* 470 */
                0x21,       /* FC_BOGUS_ARRAY */
                0x3,        /* 3 */
/* 472 */  NdrFcShort( 0x0 ),    /* 0 */
/* 474 */  0x19,       /* Corr desc:  field pointer, FC_ULONG */
                0x0,        /*  */
/* 476 */  NdrFcShort( 0x0 ),    /* 0 */
/* 478 */  NdrFcLong( 0xffffffff ),   /* -1 */
/* 482 */  0x4c,       /* FC_EMBEDDED_COMPLEX */
                0x0,        /* 0 */
/* 484 */  NdrFcShort( 0xffffff50 ),  /* Offset= -176 (308) */
/* 486 */  0x5c,       /* FC_PAD */
                0x5b,       /* FC_END */
/* 488 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x3,        /* 3 */
/* 490 */  NdrFcShort( 0x8 ),    /* 8 */
/* 492 */  NdrFcShort( 0x0 ),    /* 0 */
/* 494 */  NdrFcShort( 0x6 ),    /* Offset= 6 (500) */
/* 496 */  0x8,        /* FC_LONG */
                0x36,       /* FC_POINTER */
/* 498 */  0x5c,       /* FC_PAD */
                0x5b,       /* FC_END */
/* 500 */
                0x11, 0x0, /* FC_RP */
/* 502 */  NdrFcShort( 0xfffffff0 ),  /* Offset= -32 (470) */
/* 504 */
                0x21,       /* FC_BOGUS_ARRAY */
                0x3,        /* 3 */
/* 506 */  NdrFcShort( 0x0 ),    /* 0 */
/* 508 */  0x19,       /* Corr desc:  field pointer, FC_ULONG */
                0x0,        /*  */
/* 510 */  NdrFcShort( 0x0 ),    /* 0 */
/* 512 */  NdrFcLong( 0xffffffff ),   /* -1 */
/* 516 */  0x4c,       /* FC_EMBEDDED_COMPLEX */
                0x0,        /* 0 */
/* 518 */  NdrFcShort( 0xffffff40 ),  /* Offset= -192 (326) */
/* 520 */  0x5c,       /* FC_PAD */
                0x5b,       /* FC_END */
/* 522 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x3,        /* 3 */
/* 524 */  NdrFcShort( 0x8 ),    /* 8 */
/* 526 */  NdrFcShort( 0x0 ),    /* 0 */
/* 528 */  NdrFcShort( 0x6 ),    /* Offset= 6 (534) */
/* 530 */  0x8,        /* FC_LONG */
                0x36,       /* FC_POINTER */
/* 532 */  0x5c,       /* FC_PAD */
                0x5b,       /* FC_END */
/* 534 */
                0x11, 0x0, /* FC_RP */
/* 536 */  NdrFcShort( 0xfffffff0 ),  /* Offset= -32 (504) */
/* 538 */
                0x1b,       /* FC_CARRAY */
                0x3,        /* 3 */
/* 540 */  NdrFcShort( 0x4 ),    /* 4 */
/* 542 */  0x19,       /* Corr desc:  field pointer, FC_ULONG */
                0x0,        /*  */
/* 544 */  NdrFcShort( 0x0 ),    /* 0 */
/* 546 */
                0x4b,       /* FC_PP */
                0x5c,       /* FC_PAD */
/* 548 */
                0x48,       /* FC_VARIABLE_REPEAT */
                0x49,       /* FC_FIXED_OFFSET */
/* 550 */  NdrFcShort( 0x4 ),    /* 4 */
/* 552 */  NdrFcShort( 0x0 ),    /* 0 */
/* 554 */  NdrFcShort( 0x1 ),    /* 1 */
/* 556 */  NdrFcShort( 0x0 ),    /* 0 */
/* 558 */  NdrFcShort( 0x0 ),    /* 0 */
/* 560 */  0x12, 0x0, /* FC_UP */
/* 562 */  NdrFcShort( 0x182 ), /* Offset= 386 (948) */
/* 564 */
                0x5b,       /* FC_END */

                0x8,        /* FC_LONG */
/* 566 */  0x5c,       /* FC_PAD */
                0x5b,       /* FC_END */
/* 568 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x3,        /* 3 */
/* 570 */  NdrFcShort( 0x8 ),    /* 8 */
/* 572 */  NdrFcShort( 0x0 ),    /* 0 */
/* 574 */  NdrFcShort( 0x6 ),    /* Offset= 6 (580) */
/* 576 */  0x8,        /* FC_LONG */
                0x36,       /* FC_POINTER */
/* 578 */  0x5c,       /* FC_PAD */
                0x5b,       /* FC_END */
/* 580 */
                0x11, 0x0, /* FC_RP */
/* 582 */  NdrFcShort( 0xffffffd4 ),  /* Offset= -44 (538) */
/* 584 */
                0x2f,       /* FC_IP */
                0x5a,       /* FC_CONSTANT_IID */
/* 586 */  NdrFcLong( 0x2f ),    /* 47 */
/* 590 */  NdrFcShort( 0x0 ),    /* 0 */
/* 592 */  NdrFcShort( 0x0 ),    /* 0 */
/* 594 */  0xc0,       /* 192 */
                0x0,        /* 0 */
/* 596 */  0x0,        /* 0 */
                0x0,        /* 0 */
```

```
/* 598 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 600 */  0x0,       /* 0 */
               0x46,      /* 70 */
/* 602 */
               0x1b,      /* FC_CARRAY */
               0x0,       /* 0 */
/* 604 */  NdrFcShort( 0x1 ),    /* 1 */
/* 606 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
               0x0,       /*  */
/* 608 */  NdrFcShort( 0x4 ),    /* 4 */
/* 610 */  0x1,       /* FC_BYTE */
               0x5b,      /* FC_END */
/* 612 */
               0x1a,      /* FC_BOGUS_STRUCT */
               0x3,       /* 3 */
/* 614 */  NdrFcShort( 0x10 ),   /* 16 */
/* 616 */  NdrFcShort( 0x0 ),    /* 0 */
/* 618 */  NdrFcShort( 0xa ),    /* Offset= 10 (628) */
/* 620 */  0x8,       /* FC_LONG */
               0x8,       /* FC_LONG */
/* 622 */  0x4c,      /* FC_EMBEDDED_COMPLEX */
               0x0,       /* 0 */
/* 624 */  NdrFcShort( 0xffffffd8 ),  /* Offset= -40 (584) */
/* 626 */  0x36,      /* FC_POINTER */
               0x5b,      /* FC_END */
/* 628 */
               0x12, 0x0, /* FC_UP */
/* 630 */  NdrFcShort( 0xfffffffe4 ),  /* Offset= -28 (602) */
/* 632 */
               0x1b,      /* FC_CARRAY */
               0x3,       /* 3 */
/* 634 */  NdrFcShort( 0x4 ),    /* 4 */
/* 636 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
               0x0,       /*  */
/* 638 */  NdrFcShort( 0x0 ),    /* 0 */
/* 640 */
               0x4b,      /* FC_PP */
               0x5c,      /* FC_PAD */
/* 642 */
               0x48,      /* FC_VARIABLE_REPEAT */
               0x49,      /* FC_FIXED_OFFSET */
/* 644 */  NdrFcShort( 0x4 ),    /* 4 */
/* 646 */  NdrFcShort( 0x0 ),    /* 0 */
/* 648 */  NdrFcShort( 0x1 ),    /* 1 */
/* 650 */  NdrFcShort( 0x0 ),    /* 0 */
/* 652 */  NdrFcShort( 0x0 ),    /* 0 */
/* 654 */  0x12, 0x0, /* FC_UP */
/* 656 */  NdrFcShort( 0xffffffd4 ),  /* Offset= -44 (612) */
/* 658 */
               0x5b,      /* FC_END */

               0x8,       /* FC_LONG */
```

```
/* 660 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 662 */
               0x1a,      /* FC_BOGUS_STRUCT */
               0x3,       /* 3 */
/* 664 */  NdrFcShort( 0x8 ),    /* 8 */
/* 666 */  NdrFcShort( 0x0 ),    /* 0 */
/* 668 */  NdrFcShort( 0x6 ),    /* Offset= 6 (674) */
/* 670 */  0x8,       /* FC_LONG */
               0x36,      /* FC_POINTER */
/* 672 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 674 */
               0x11, 0x0, /* FC_RP */
/* 676 */  NdrFcShort( 0xffffffd4 ),  /* Offset= -44 (632) */
/* 678 */
               0x1d,      /* FC_SMFARRAY */
               0x0,       /* 0 */
/* 680 */  NdrFcShort( 0x8 ),    /* 8 */
/* 682 */  0x2,       /* FC_CHAR */
               0x5b,      /* FC_END */
/* 684 */
               0x15,      /* FC_STRUCT */
               0x3,       /* 3 */
/* 686 */  NdrFcShort( 0x10 ),   /* 16 */
/* 688 */  0x8,       /* FC_LONG */
               0x6,       /* FC_SHORT */
/* 690 */  0x6,       /* FC_SHORT */
               0x4c,      /* FC_EMBEDDED_COMPLEX */
/* 692 */  0x0,       /* 0 */
               NdrFcShort( 0xfffffff1 ),  /* Offset= -15 (678) */
               0x5b,      /* FC_END */
/* 696 */
               0x1a,      /* FC_BOGUS_STRUCT */
               0x3,       /* 3 */
/* 698 */  NdrFcShort( 0x18 ),   /* 24 */
/* 700 */  NdrFcShort( 0x0 ),    /* 0 */
/* 702 */  NdrFcShort( 0xa ),    /* Offset= 10 (712) */
/* 704 */  0x8,       /* FC_LONG */
               0x36,      /* FC_POINTER */
/* 706 */  0x4c,      /* FC_EMBEDDED_COMPLEX */
               0x0,       /* 0 */
/* 708 */  NdrFcShort( 0xffffffe8 ),  /* Offset= -24 (684) */
/* 710 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 712 */
               0x11, 0x0, /* FC_RP */
/* 714 */  NdrFcShort( 0xffffff0c ),  /* Offset= -244 (470) */
/* 716 */
               0x1b,      /* FC_CARRAY */
               0x0,       /* 0 */
/* 718 */  NdrFcShort( 0x1 ),    /* 1 */
/* 720 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
```

```
                0x0,       /*  */
/* 722 */  NdrFcShort( 0x0 ),    /* 0 */
/* 724 */  0x1,       /* FC_BYTE */
                0x5b,      /* FC_END */
/* 726 */
                0x16,      /* FC_PSTRUCT */
                0x3,       /* 3 */
/* 728 */  NdrFcShort( 0x8 ),    /* 8 */
/* 730 */
                0x4b,      /* FC_PP */
                0x5c,      /* FC_PAD */
/* 732 */
                0x46,      /* FC_NO_REPEAT */
                0x5c,      /* FC_PAD */
/* 734 */  NdrFcShort( 0x4 ),    /* 4 */
/* 736 */  NdrFcShort( 0x4 ),    /* 4 */
/* 738 */  0x12, 0x0, /* FC_UP */
/* 740 */  NdrFcShort( 0xfffffff8 ),  /* Offset= -24 (716) */
/* 742 */
                0x5b,      /* FC_END */

                0x8,       /* FC_LONG */
/* 744 */  0x8,       /* FC_LONG */
                0x5b,      /* FC_END */
/* 746 */
                0x1b,      /* FC_CARRAY */
                0x1,       /* 1 */
/* 748 */  NdrFcShort( 0x2 ),    /* 2 */
/* 750 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
                0x0,       /*  */
/* 752 */  NdrFcShort( 0x0 ),    /* 0 */
/* 754 */  0x6,       /* FC_SHORT */
                0x5b,      /* FC_END */
/* 756 */
                0x16,      /* FC_PSTRUCT */
                0x3,       /* 3 */
/* 758 */  NdrFcShort( 0x8 ),    /* 8 */
/* 760 */
                0x4b,      /* FC_PP */
                0x5c,      /* FC_PAD */
/* 762 */
                0x46,      /* FC_NO_REPEAT */
                0x5c,      /* FC_PAD */
/* 764 */  NdrFcShort( 0x4 ),    /* 4 */
/* 766 */  NdrFcShort( 0x4 ),    /* 4 */
/* 768 */  0x12, 0x0, /* FC_UP */
/* 770 */  NdrFcShort( 0xfffffff8 ),  /* Offset= -24 (746) */
/* 772 */
                0x5b,      /* FC_END */

                0x8,       /* FC_LONG */
/* 774 */  0x8,       /* FC_LONG */
                0x5b,      /* FC_END */
/* 776 */
                0x1b,      /* FC_CARRAY */
                0x3,       /* 3 */
/* 778 */  NdrFcShort( 0x4 ),    /* 4 */
/* 780 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
                0x0,       /*  */
/* 782 */  NdrFcShort( 0x0 ),    /* 0 */
/* 784 */  0x8,       /* FC_LONG */
                0x5b,      /* FC_END */
/* 786 */
                0x16,      /* FC_PSTRUCT */
                0x3,       /* 3 */
/* 788 */  NdrFcShort( 0x8 ),    /* 8 */
/* 790 */
                0x4b,      /* FC_PP */
                0x5c,      /* FC_PAD */
/* 792 */
                0x46,      /* FC_NO_REPEAT */
                0x5c,      /* FC_PAD */
/* 794 */  NdrFcShort( 0x4 ),    /* 4 */
/* 796 */  NdrFcShort( 0x4 ),    /* 4 */
/* 798 */  0x12, 0x0, /* FC_UP */
/* 800 */  NdrFcShort( 0xfffffff8 ),  /* Offset= -24 (776) */
/* 802 */
                0x5b,      /* FC_END */

                0x8,       /* FC_LONG */
/* 804 */  0x8,       /* FC_LONG */
                0x5b,      /* FC_END */
/* 806 */
                0x1b,      /* FC_CARRAY */
                0x7,       /* 7 */
/* 808 */  NdrFcShort( 0x8 ),    /* 8 */
/* 810 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
                0x0,       /*  */
/* 812 */  NdrFcShort( 0x0 ),    /* 0 */
/* 814 */  0xb,       /* FC_HYPER */
                0x5b,      /* FC_END */
/* 816 */
                0x16,      /* FC_PSTRUCT */
                0x3,       /* 3 */
/* 818 */  NdrFcShort( 0x8 ),    /* 8 */
/* 820 */
                0x4b,      /* FC_PP */
                0x5c,      /* FC_PAD */
/* 822 */
                0x46,      /* FC_NO_REPEAT */
                0x5c,      /* FC_PAD */
/* 824 */  NdrFcShort( 0x4 ),    /* 4 */
/* 826 */  NdrFcShort( 0x4 ),    /* 4 */
/* 828 */  0x12, 0x0, /* FC_UP */
/* 830 */  NdrFcShort( 0xfffffff8 ),  /* Offset= -24 (806) */
/* 832 */
```

```
                0x5b,       /* FC_END */

                0x8,        /* FC_LONG */
/* 834 */  0x8,        /* FC_LONG */
                0x5b,       /* FC_END */
/* 836 */
                0x15,       /* FC_STRUCT */
                0x3,        /* 3 */
/* 838 */  NdrFcShort( 0x8 ),    /* 8 */
/* 840 */  0x8,        /* FC_LONG */
                0x8,        /* FC_LONG */
/* 842 */  0x5c,       /* FC_PAD */
                0x5b,       /* FC_END */
/* 844 */
                0x1b,       /* FC_CARRAY */
                0x3,        /* 3 */
/* 846 */  NdrFcShort( 0x8 ),    /* 8 */
/* 848 */  0x7,        /* Corr desc: FC_USHORT */
                0x0,        /*  */
/* 850 */  NdrFcShort( 0xffd8 ),/* -40 */
/* 852 */  0x4c,       /* FC_EMBEDDED_COMPLEX */
                0x0,        /* 0 */
/* 854 */  NdrFcShort( 0xffffffee ),  /* Offset= -18 (836) */
/* 856 */  0x5c,       /* FC_PAD */
                0x5b,       /* FC_END */
/* 858 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x3,        /* 3 */
/* 860 */  NdrFcShort( 0x28 ),   /* 40 */
/* 862 */  NdrFcShort( 0xffffffee ),  /* Offset= -18 (844) */
/* 864 */  NdrFcShort( 0x0 ),    /* Offset= 0 (864) */
/* 866 */  0x6,        /* FC_SHORT */
                0x6,        /* FC_SHORT */
/* 868 */  0x38,       /* FC_ALIGNM4 */
                0x8,        /* FC_LONG */
/* 870 */  0x8,        /* FC_LONG */
                0x4c,       /* FC_EMBEDDED_COMPLEX */
/* 872 */  0x0,        /* 0 */
                NdrFcShort( 0xfffffdf7 ),  /* Offset= -521 (352) */
                0x5b,       /* FC_END */
/* 876 */
                0x12, 0x0, /* FC_UP */
/* 878 */  NdrFcShort( 0xfffffef6 ),  /* Offset= -266 (612) */
/* 880 */
                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 882 */  0x1,        /* FC_BYTE */
                0x5c,       /* FC_PAD */
/* 884 */
                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 886 */  0x6,        /* FC_SHORT */
                0x5c,       /* FC_PAD */
/* 888 */
                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 890 */  0x8,        /* FC_LONG */
                0x5c,       /* FC_PAD */
/* 892 */
                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 894 */  0xa,        /* FC_FLOAT */
                0x5c,       /* FC_PAD */
/* 896 */
                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 898 */  0xc,        /* FC_DOUBLE */
                0x5c,       /* FC_PAD */
/* 900 */
                0x12, 0x0, /* FC_UP */
/* 902 */  NdrFcShort( 0xfffffd90 ),  /* Offset= -624 (278) */
/* 904 */
                0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 906 */  NdrFcShort( 0xfffffd92 ),  /* Offset= -622 (284) */
/* 908 */
                0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 910 */  NdrFcShort( 0xfffffda6 ),  /* Offset= -602 (308) */
/* 912 */
                0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 914 */  NdrFcShort( 0xfffffdb4 ),  /* Offset= -588 (326) */
/* 916 */
                0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 918 */  NdrFcShort( 0xfffffdc2 ),  /* Offset= -574 (344) */
/* 920 */
                0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 922 */  NdrFcShort( 0x2 ),    /* Offset= 2 (924) */
/* 924 */
                0x12, 0x0, /* FC_UP */
/* 926 */  NdrFcShort( 0x16 ),   /* Offset= 22 (948) */
/* 928 */
                0x15,       /* FC_STRUCT */
                0x7,        /* 7 */
/* 930 */  NdrFcShort( 0x10 ),   /* 16 */
/* 932 */  0x6,        /* FC_SHORT */
                0x1,        /* FC_BYTE */
/* 934 */  0x1,        /* FC_BYTE */
                0x38,       /* FC_ALIGNM4 */
/* 936 */  0x8,        /* FC_LONG */
                0x39,       /* FC_ALIGNM8 */
/* 938 */  0xb,        /* FC_HYPER */
                0x5b,       /* FC_END */
/* 940 */
                0x12, 0x0, /* FC_UP */
/* 942 */  NdrFcShort( 0xfffffff2 ),  /* Offset= -14 (928) */
/* 944 */
                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 946 */  0x2,        /* FC_CHAR */
                0x5c,       /* FC_PAD */
/* 948 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x7,        /* 7 */
```

```
/* 950 */  NdrFcShort( 0x20 ),  /* 32 */
/* 952 */  NdrFcShort( 0x0 ),   /* 0 */
/* 954 */  NdrFcShort( 0x0 ),   /* Offset= 0 (954) */
/* 956 */  0x8,       /* FC_LONG */
               0x8,       /* FC_LONG */
/* 958 */  0x6,       /* FC_SHORT */
               0x6,       /* FC_SHORT */
/* 960 */  0x6,       /* FC_SHORT */
               0x6,       /* FC_SHORT */
/* 962 */  0x4c,      /* FC_EMBEDDED_COMPLEX */
               0x0,       /* 0 */
/* 964 */  NdrFcShort( 0xfffffc42 ),  /* Offset= -958 (6) */
/* 966 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 968 */  0xb4,      /* FC_USER_MARSHAL */
               0x83,      /* 131 */
/* 970 */  NdrFcShort( 0x0 ),   /* 0 */
/* 972 */  NdrFcShort( 0x10 ),  /* 16 */
/* 974 */  NdrFcShort( 0x0 ),   /* 0 */
/* 976 */  NdrFcShort( 0xfffffc32 ),  /* Offset= -974 (2) */
/* 978 */
               0x11, 0x4, /* FC_RP [alloced_on_stack] */
/* 980 */  NdrFcShort( 0x6 ),   /* Offset= 6 (986) */
/* 982 */
               0x13, 0x0, /* FC_OP */
/* 984 */  NdrFcShort( 0xffffffdc ),  /* Offset= -36 (948) */
/* 986 */  0xb4,      /* FC_USER_MARSHAL */
               0x83,      /* 131 */
/* 988 */  NdrFcShort( 0x0 ),   /* 0 */
/* 990 */  NdrFcShort( 0x10 ),  /* 16 */
/* 992 */  NdrFcShort( 0x0 ),   /* 0 */
/* 994 */  NdrFcShort( 0xfffffff4 ),  /* Offset= -12 (982) */

               0x0
        }
    };

const CInterfaceProxyVtbl * _tpcc_com_ps_ProxyVtblList[] =
{
    ( CInterfaceProxyVtbl *) &_ITPCCProxyVtbl,
    0
};

const CInterfaceStubVtbl * _tpcc_com_ps_StubVtblList[] =
{
    ( CInterfaceStubVtbl *) &_ITPCCStubVtbl,
    0
};

PCInterfaceName const _tpcc_com_ps_InterfaceNamesList[] =
{
    "ITPCC",
    0
};


#define _tpcc_com_ps_CHECK_IID(n)    IID_GENERIC_CHECK_IID( _tpcc_com_ps,
pIID, n)

int __stdcall _tpcc_com_ps_IID_Lookup( const IID * pIID, int * pIndex )
{

    if(!_tpcc_com_ps_CHECK_IID(0))
        {
        *pIndex = 0;
        return 1;
        }

    return 0;
}

const ExtendedProxyFileInfo tpcc_com_ps_ProxyFileInfo =
{
    (PCInterfaceProxyVtblList *) & _tpcc_com_ps_ProxyVtblList,
    (PCInterfaceStubVtblList *) & _tpcc_com_ps_StubVtblList,
    (const PCInterfaceName * ) & _tpcc_com_ps_InterfaceNamesList,
    0, // no delegation
    & _tpcc_com_ps_IID_Lookup,
    1,
    2,
    0, /* table of [async_uuid] interfaces */
    0, /* Filler1 */
    0, /* Filler2 */
    0  /* Filler3 */
};


#endif /* !defined(_M_IA64) && !defined(_M_AXP64)*/


#pragma warning( disable: 4049 )  /* more than 64k source lines */

/* this ALWAYS GENERATED file contains the proxy stub code */


 /* File created by MIDL compiler version 5.03.0280 */
/* at Sat Apr 08 16:40:10 2000
 */
/* Compiler settings for .\src\tpcc_com_ps.idl:
    Oicf (OptLev=i2), W1, Zp8, env=Win64 (32b run,appending), ms_ext, c_ext,
robust
    error checks: allocation ref bounds_check enum stub_data
    VC __declspec() decoration level:
         __declspec(uuid()), __declspec(selectany), __declspec(novtable)
         DECLSPEC_UUID(), MIDL_INTERFACE()
*/
```

```
//@@MIDL_FILE_HEADING(  )

#if defined(_M_IA64) || defined(_M_AXP64)
#define USE_STUBLESS_PROXY


/* verify that the <rpcproxy.h> version is high enough to compile this
file*/
#ifndef __REDQ_RPCPROXY_H_VERSION__
#define __REQUIRED_RPCPROXY_H_VERSION__ 475
#endif


#include "rpcproxy.h"
#ifndef __RPCPROXY_H_VERSION__
#error this stub requires an updated version of <rpcproxy.h>
#endif // __RPCPROXY_H_VERSION__


#include "tpcc_com_ps.h"

#define TYPE_FORMAT_STRING_SIZE   979
#define PROC_FORMAT_STRING_SIZE   253
#define TRANSMIT_AS_TABLE_SIZE    0
#define WIRE_MARSHAL_TABLE_SIZE   1

typedef struct _MIDL_TYPE_FORMAT_STRING
    {
    short          Pad;
    unsigned char  Format[ TYPE_FORMAT_STRING_SIZE ];
    } MIDL_TYPE_FORMAT_STRING;

typedef struct _MIDL_PROC_FORMAT_STRING
    {
    short          Pad;
    unsigned char  Format[ PROC_FORMAT_STRING_SIZE ];
    } MIDL_PROC_FORMAT_STRING;


extern const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString;
extern const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString;


/* Standard interface: __MIDL_itf_tpcc_com_ps_0000, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0x00,0x00,0x00,0x00,0x00,0x00,0x00,0x00}}
*/


/* Object interface: IUnknown, ver. 0.0,
   GUID={0x00000000,0x0000,0x0000,{0xC0,0x00,0x00,0x00,0x00,0x00,0x00,0x46}}
*/
```

```
/* Object interface: ITPCC, ver. 0.0,
   GUID={0xFEEE6AA2,0x84B1,0x11d2,{0xBA,0x47,0x00,0xC0,0x4F,0xBF,0xE0,0x8B}}
*/


extern const MIDL_STUB_DESC Object_StubDesc;


extern const MIDL_SERVER_INFO ITPCC_ServerInfo;

#pragma code_seg(".orpc")
static const unsigned short ITPCC_FormatStringOffsetTable[] =
    {
    0,
    44,
    88,
    132,
    176,
    220
    };

static const MIDL_SERVER_INFO ITPCC_ServerInfo =
    {
    &Object_StubDesc,
    0,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0,
    0
    };

static const MIDL_STUBLESS_PROXY_INFO ITPCC_ProxyInfo =
    {
    &Object_StubDesc,
    __MIDL_ProcFormatString.Format,
    &ITPCC_FormatStringOffsetTable[-3],
    0,
    0,
    0
    };

CINTERFACE_PROXY_VTABLE(9) _ITPCCProxyVtbl =
{
    &ITPCC_ProxyInfo,
    &IID_ITPCC,
    IUnknown_QueryInterface_Proxy,
    IUnknown_AddRef_Proxy,
    IUnknown_Release_Proxy ,
    (void *)-1 /* ITPCC::NewOrder */ ,
    (void *)-1 /* ITPCC::Payment */ ,
    (void *)-1 /* ITPCC::Delivery */ ,
```

```
    (void *)-1 /* ITPCC::StockLevel */ ,
    (void *)-1 /* ITPCC::OrderStatus */ ,
    (void *)-1 /* ITPCC::CallSetComplete */
};

const CInterfaceStubVtbl _ITPCCStubVtbl =
{
    &IID_ITPCC,
    &ITPCC_ServerInfo,
    9,
    0, /* pure interpreted */
    CStdStubBuffer_METHODS
};

extern const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[
WIRE_MARSHAL_TABLE_SIZE ];

static const MIDL_STUB_DESC Object_StubDesc =
    {
    0,
    NdrOleAllocate,
    NdrOleFree,
    0,
    0,
    0,
    0,
    0,
    __MIDL_TypeFormatString.Format,
    1, /* -error bounds_check flag */
    0x50002, /* Ndr library version */
    0,
    0x5030118, /* MIDL Version 5.3.280 */
    0,
    UserMarshalRoutines,
    0,  /* notify & notify_flag routine table */
    0x1, /* MIDL flag */
    0,  /* Reserved3 */
    0,  /* Reserved4 */
    0   /* Reserved5 */
    };

#pragma data_seg(".rdata")

static const USER_MARSHAL_ROUTINE_QUADRUPLE UserMarshalRoutines[
WIRE_MARSHAL_TABLE_SIZE ] =
        {

            {
            VARIANT_UserSize
            ,VARIANT_UserMarshal
            ,VARIANT_UserUnmarshal
            ,VARIANT_UserFree
            }

        };


#if !defined(__RPC_WIN64__)
#error  Invalid build platform for this stub.
#endif

static const MIDL_PROC_FORMAT_STRING __MIDL_ProcFormatString =
    {
        0,
        {

     /* Procedure NewOrder */

                0x33,       /* FC_AUTO_HANDLE */
                0x6c,       /* Old Flags:  object, Oi2 */
/*  2 */   NdrFcLong( 0x0 ),    /* 0 */
/*  6 */   NdrFcShort( 0x3 ),   /* 3 */
#ifndef _ALPHA_
/*  8 */   NdrFcShort( 0x38 ),  /* ia64 Stack size/offset = 56 */
#else
                NdrFcShort( 0x30 ),  /* axp64 Stack size/offset = 48 */
#endif
/* 10 */   NdrFcShort( 0x0 ),   /* 0 */
/* 12 */   NdrFcShort( 0x8 ),   /* 8 */
/* 14 */   0x47,       /* Oi2 Flags:  srv must size, clt must size, has
return, has ext, */
                0x3,        /* 3 */
/* 16 */   0xa,        /* 10 */
                0x7,        /* Ext Flags:  new corr desc, clt corr check, srv
corr check, */
/* 18 */   NdrFcShort( 0x20 ),  /* 32 */
/* 20 */   NdrFcShort( 0x20 ),  /* 32 */
/* 22 */   NdrFcShort( 0x0 ),   /* 0 */
/* 24 */   NdrFcShort( 0x0 ),   /* 0 */

     /* Parameter txn_in */

/* 26 */   NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
/* 28 */   NdrFcShort( 0x10 ),  /* ia64 Stack size/offset = 16 */
#else
                NdrFcShort( 0x8 ),   /* axp64 Stack size/offset = 8 */
#endif
/* 30 */   NdrFcShort( 0x3b6 ), /* Type Offset=950 */

     /* Parameter txn_out */

/* 32 */   NdrFcShort( 0x6113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=24 */
#ifndef _ALPHA_
```

```
/* 34 */   NdrFcShort( 0x28 ),  /* ia64 Stack size/offset = 40 */
#else
                NdrFcShort( 0x20 ),  /* axp64 Stack size/offset = 32 */
#endif
/* 36 */   NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Return value */

/* 38 */   NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 40 */   NdrFcShort( 0x30 ),  /* ia64 Stack size/offset = 48 */
#else
                NdrFcShort( 0x28 ),  /* axp64 Stack size/offset = 40 */
#endif
/* 42 */   0x8,       /* FC_LONG */
                0x0,       /* 0 */

     /* Procedure Payment */

/* 44 */   0x33,      /* FC_AUTO_HANDLE */
                0x6c,      /* Old Flags:  object, Oi2 */
/* 46 */   NdrFcLong( 0x0 ),    /* 0 */
/* 50 */   NdrFcShort( 0x4 ),   /* 4 */
#ifndef _ALPHA_
/* 52 */   NdrFcShort( 0x38 ),  /* ia64 Stack size/offset = 56 */
#else
                NdrFcShort( 0x30 ),  /* axp64 Stack size/offset = 48 */
#endif
/* 54 */   NdrFcShort( 0x0 ),   /* 0 */
/* 56 */   NdrFcShort( 0x8 ),   /* 8 */
/* 58 */   0x47,      /* Oi2 Flags:  srv must size, clt must size, has
return, has ext, */
                0x3,       /* 3 */
/* 60 */   0xa,       /* 10 */
                0x7,       /* Ext Flags:  new corr desc, clt corr check, srv
corr check, */
/* 62 */   NdrFcShort( 0x20 ),  /* 32 */
/* 64 */   NdrFcShort( 0x20 ),  /* 32 */
/* 66 */   NdrFcShort( 0x0 ),   /* 0 */
/* 68 */   NdrFcShort( 0x0 ),   /* 0 */

     /* Parameter txn_in */

/* 70 */   NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
/* 72 */   NdrFcShort( 0x10 ),  /* ia64 Stack size/offset = 16 */
#else
                NdrFcShort( 0x8 ),   /* axp64 Stack size/offset = 8 */
#endif
/* 74 */   NdrFcShort( 0x3b6 ), /* Type Offset=950 */

     /* Parameter txn_out */

/* 76 */   NdrFcShort( 0x6113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=24 */
#ifndef _ALPHA_
/* 78 */   NdrFcShort( 0x28 ),  /* ia64 Stack size/offset = 40 */
#else
                NdrFcShort( 0x20 ),  /* axp64 Stack size/offset = 32 */
#endif
/* 80 */   NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Return value */

/* 82 */   NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 84 */   NdrFcShort( 0x30 ),  /* ia64 Stack size/offset = 48 */
#else
                NdrFcShort( 0x28 ),  /* axp64 Stack size/offset = 40 */
#endif
/* 86 */   0x8,       /* FC_LONG */
                0x0,       /* 0 */

     /* Procedure Delivery */

/* 88 */   0x33,      /* FC_AUTO_HANDLE */
                0x6c,      /* Old Flags:  object, Oi2 */
/* 90 */   NdrFcLong( 0x0 ),    /* 0 */
/* 94 */   NdrFcShort( 0x5 ),   /* 5 */
#ifndef _ALPHA_
/* 96 */   NdrFcShort( 0x38 ),  /* ia64 Stack size/offset = 56 */
#else
                NdrFcShort( 0x30 ),  /* axp64 Stack size/offset = 48 */
#endif
/* 98 */   NdrFcShort( 0x0 ),   /* 0 */
/* 100 */  NdrFcShort( 0x8 ),   /* 8 */
/* 102 */  0x47,      /* Oi2 Flags:  srv must size, clt must size, has
return, has ext, */
                0x3,       /* 3 */
/* 104 */  0xa,       /* 10 */
                0x7,       /* Ext Flags:  new corr desc, clt corr check, srv
corr check, */
/* 106 */  NdrFcShort( 0x20 ),  /* 32 */
/* 108 */  NdrFcShort( 0x20 ),  /* 32 */
/* 110 */  NdrFcShort( 0x0 ),   /* 0 */
/* 112 */  NdrFcShort( 0x0 ),   /* 0 */

     /* Parameter txn_in */

/* 114 */  NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
/* 116 */  NdrFcShort( 0x10 ),  /* ia64 Stack size/offset = 16 */
#else
                NdrFcShort( 0x8 ),   /* axp64 Stack size/offset = 8 */
```

```
#endif
/* 118 */  NdrFcShort( 0x3b6 ), /* Type Offset=950 */

     /* Parameter txn_out */

/* 120 */  NdrFcShort( 0x6113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=24 */
#ifndef _ALPHA_
/* 122 */  NdrFcShort( 0x28 ),  /* ia64 Stack size/offset = 40 */
#else
                NdrFcShort( 0x20 ),  /* axp64 Stack size/offset = 32 */
#endif
/* 124 */  NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Return value */

/* 126 */  NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 128 */  NdrFcShort( 0x30 ),  /* ia64 Stack size/offset = 48 */
#else
                NdrFcShort( 0x28 ),  /* axp64 Stack size/offset = 40 */
#endif
/* 130 */  0x8,       /* FC_LONG */
                0x0,       /* 0 */

     /* Procedure StockLevel */

/* 132 */  0x33,      /* FC_AUTO_HANDLE */
                0x6c,      /* Old Flags:  object, Oi2 */
/* 134 */  NdrFcLong( 0x0 ),    /* 0 */
/* 138 */  NdrFcShort( 0x6 ),   /* 6 */
#ifndef _ALPHA_
/* 140 */  NdrFcShort( 0x38 ),  /* ia64 Stack size/offset = 56 */
#else
                NdrFcShort( 0x30 ),  /* axp64 Stack size/offset = 48 */
#endif
/* 142 */  NdrFcShort( 0x0 ),   /* 0 */
/* 144 */  NdrFcShort( 0x8 ),   /* 8 */
/* 146 */  0x47,      /* Oi2 Flags:  srv must size, clt must size, has
return, has ext, */
                0x3,       /* 3 */
/* 148 */  0xa,       /* 10 */
                0x7,       /* Ext Flags:  new corr desc, clt corr check, srv
corr check, */
/* 150 */  NdrFcShort( 0x20 ),  /* 32 */
/* 152 */  NdrFcShort( 0x20 ),  /* 32 */
/* 154 */  NdrFcShort( 0x0 ),   /* 0 */
/* 156 */  NdrFcShort( 0x0 ),   /* 0 */

     /* Parameter txn_in */

/* 158 */  NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
/* 160 */  NdrFcShort( 0x10 ),  /* ia64 Stack size/offset = 16 */
#else
                NdrFcShort( 0x8 ),   /* axp64 Stack size/offset = 8 */
#endif
/* 162 */  NdrFcShort( 0x3b6 ), /* Type Offset=950 */

     /* Parameter txn_out */

/* 164 */  NdrFcShort( 0x6113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=24 */
#ifndef _ALPHA_
/* 166 */  NdrFcShort( 0x28 ),  /* ia64 Stack size/offset = 40 */
#else
                NdrFcShort( 0x20 ),  /* axp64 Stack size/offset = 32 */
#endif
/* 168 */  NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Return value */

/* 170 */  NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 172 */  NdrFcShort( 0x30 ),  /* ia64 Stack size/offset = 48 */
#else
                NdrFcShort( 0x28 ),  /* axp64 Stack size/offset = 40 */
#endif
/* 174 */  0x8,       /* FC_LONG */
                0x0,       /* 0 */

     /* Procedure OrderStatus */

/* 176 */  0x33,      /* FC_AUTO_HANDLE */
                0x6c,      /* Old Flags:  object, Oi2 */
/* 178 */  NdrFcLong( 0x0 ),    /* 0 */
/* 182 */  NdrFcShort( 0x7 ),   /* 7 */
#ifndef _ALPHA_
/* 184 */  NdrFcShort( 0x38 ),  /* ia64 Stack size/offset = 56 */
#else
                NdrFcShort( 0x30 ),  /* axp64 Stack size/offset = 48 */
#endif
/* 186 */  NdrFcShort( 0x0 ),   /* 0 */
/* 188 */  NdrFcShort( 0x8 ),   /* 8 */
/* 190 */  0x47,      /* Oi2 Flags:  srv must size, clt must size, has
return, has ext, */
                0x3,       /* 3 */
/* 192 */  0xa,       /* 10 */
                0x7,       /* Ext Flags:  new corr desc, clt corr check, srv
corr check, */
/* 194 */  NdrFcShort( 0x20 ),  /* 32 */
/* 196 */  NdrFcShort( 0x20 ),  /* 32 */
/* 198 */  NdrFcShort( 0x0 ),   /* 0 */
/* 200 */  NdrFcShort( 0x0 ),   /* 0 */
```

```
     /* Parameter txn_in */

/* 202 */  NdrFcShort( 0x8b ),  /* Flags:  must size, must free, in, by val,
*/
#ifndef _ALPHA_
/* 204 */  NdrFcShort( 0x10 ),  /* ia64 Stack size/offset = 16 */
#else
               NdrFcShort( 0x8 ),   /* axp64 Stack size/offset = 8 */
#endif
/* 206 */  NdrFcShort( 0x3b6 ), /* Type Offset=950 */

     /* Parameter txn_out */

/* 208 */  NdrFcShort( 0x6113 ),/* Flags:  must size, must free, out, simple
ref, srv alloc size=24 */
#ifndef _ALPHA_
/* 210 */  NdrFcShort( 0x28 ),  /* ia64 Stack size/offset = 40 */
#else
               NdrFcShort( 0x20 ),  /* axp64 Stack size/offset = 32 */
#endif
/* 212 */  NdrFcShort( 0x3c8 ), /* Type Offset=968 */

     /* Return value */

/* 214 */  NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
#ifndef _ALPHA_
/* 216 */  NdrFcShort( 0x30 ),  /* ia64 Stack size/offset = 48 */
#else
               NdrFcShort( 0x28 ),  /* axp64 Stack size/offset = 40 */
#endif
/* 218 */  0x8,       /* FC_LONG */
               0x0,       /* 0 */

     /* Procedure CallSetComplete */

/* 220 */  0x33,      /* FC_AUTO_HANDLE */
               0x6c,      /* Old Flags:  object, Oi2 */
/* 222 */  NdrFcLong( 0x0 ),    /* 0 */
/* 226 */  NdrFcShort( 0x8 ),   /* 8 */
/* 228 */  NdrFcShort( 0x10 ),  /* ia64, axp64 Stack size/offset = 16 */
/* 230 */  NdrFcShort( 0x0 ),   /* 0 */
/* 232 */  NdrFcShort( 0x8 ),   /* 8 */
/* 234 */  0x44,      /* Oi2 Flags:  has return, has ext, */
               0x1,       /* 1 */
/* 236 */  0xa,       /* 10 */
               0x1,       /* Ext Flags:  new corr desc, */
/* 238 */  NdrFcShort( 0x0 ),   /* 0 */
/* 240 */  NdrFcShort( 0x0 ),   /* 0 */
/* 242 */  NdrFcShort( 0x0 ),   /* 0 */
/* 244 */  NdrFcShort( 0x0 ),   /* 0 */

     /* Return value */

/* 246 */  NdrFcShort( 0x70 ),  /* Flags:  out, return, base type, */
/* 248 */  NdrFcShort( 0x8 ),   /* ia64, axp64 Stack size/offset = 8 */
/* 250 */  0x8,       /* FC_LONG */
               0x0,       /* 0 */

               0x0
          }
     };

static const MIDL_TYPE_FORMAT_STRING __MIDL_TypeFormatString =
     {
         0,
         {
               NdrFcShort( 0x0 ),   /* 0 */
/*  2 */
               0x12, 0x0, /* FC_UP */
/*  4 */   NdrFcShort( 0x39e ), /* Offset= 926 (930) */
/*  6 */
               0x2b,      /* FC_NON_ENCAPSULATED_UNION */
               0x9,       /* FC_ULONG */
/*  8 */   0x7,       /* Corr desc: FC_USHORT */
               0x0,       /*  */
/* 10 */   NdrFcShort( 0xfff8 ),/* -8 */
/* 12 */   NdrFcShort( 0x1 ),   /* Corr flags:  early, */
/* 14 */   NdrFcShort( 0x2 ),   /* Offset= 2 (16) */
/* 16 */   NdrFcShort( 0x10 ),  /* 16 */
/* 18 */   NdrFcShort( 0x2b ),  /* 43 */
/* 20 */   NdrFcLong( 0x3 ),    /* 3 */
/* 24 */   NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 26 */   NdrFcLong( 0x11 ),   /* 17 */
/* 30 */   NdrFcShort( 0x8001 ),/* Simple arm type: FC_BYTE */
/* 32 */   NdrFcLong( 0x2 ),    /* 2 */
/* 36 */   NdrFcShort( 0x8006 ),/* Simple arm type: FC_SHORT */
/* 38 */   NdrFcLong( 0x4 ),    /* 4 */
/* 42 */   NdrFcShort( 0x800a ),/* Simple arm type: FC_FLOAT */
/* 44 */   NdrFcLong( 0x5 ),    /* 5 */
/* 48 */   NdrFcShort( 0x800c ),/* Simple arm type: FC_DOUBLE */
/* 50 */   NdrFcLong( 0xb ),    /* 11 */
/* 54 */   NdrFcShort( 0x8006 ),/* Simple arm type: FC_SHORT */
/* 56 */   NdrFcLong( 0xa ),    /* 10 */
/* 60 */   NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 62 */   NdrFcLong( 0x6 ),    /* 6 */
/* 66 */   NdrFcShort( 0xd6 ),  /* Offset= 214 (280) */
/* 68 */   NdrFcLong( 0x7 ),    /* 7 */
/* 72 */   NdrFcShort( 0x800c ),/* Simple arm type: FC_DOUBLE */
/* 74 */   NdrFcLong( 0x8 ),    /* 8 */
/* 78 */   NdrFcShort( 0xd0 ),  /* Offset= 208 (286) */
/* 80 */   NdrFcLong( 0xd ),    /* 13 */
/* 84 */   NdrFcShort( 0xe4 ),  /* Offset= 228 (312) */
/* 86 */   NdrFcLong( 0x9 ),    /* 9 */
/* 90 */   NdrFcShort( 0xf0 ),  /* Offset= 240 (330) */
/* 92 */   NdrFcLong( 0x2000 ), /* 8192 */
/* 96 */   NdrFcShort( 0xfc ),  /* Offset= 252 (348) */
```

```
/* 98 */   NdrFcLong( 0x24 ),   /* 36 */
/* 102 */  NdrFcShort( 0x2f4 ), /* Offset= 756 (858) */
/* 104 */  NdrFcLong( 0x4024 ), /* 16420 */
/* 108 */  NdrFcShort( 0x2ee ), /* Offset= 750 (858) */
/* 110 */  NdrFcLong( 0x4011 ), /* 16401 */
/* 114 */  NdrFcShort( 0x2ec ), /* Offset= 748 (862) */
/* 116 */  NdrFcLong( 0x4002 ), /* 16386 */
/* 120 */  NdrFcShort( 0x2ea ), /* Offset= 746 (866) */
/* 122 */  NdrFcLong( 0x4003 ), /* 16387 */
/* 126 */  NdrFcShort( 0x2e8 ), /* Offset= 744 (870) */
/* 128 */  NdrFcLong( 0x4004 ), /* 16388 */
/* 132 */  NdrFcShort( 0x2e6 ), /* Offset= 742 (874) */
/* 134 */  NdrFcLong( 0x4005 ), /* 16389 */
/* 138 */  NdrFcShort( 0x2e4 ), /* Offset= 740 (878) */
/* 140 */  NdrFcLong( 0x400b ), /* 16395 */
/* 144 */  NdrFcShort( 0x2d2 ), /* Offset= 722 (866) */
/* 146 */  NdrFcLong( 0x400a ), /* 16394 */
/* 150 */  NdrFcShort( 0x2d0 ), /* Offset= 720 (870) */
/* 152 */  NdrFcLong( 0x4006 ), /* 16390 */
/* 156 */  NdrFcShort( 0x2d6 ), /* Offset= 726 (882) */
/* 158 */  NdrFcLong( 0x4007 ), /* 16391 */
/* 162 */  NdrFcShort( 0x2cc ), /* Offset= 716 (878) */
/* 164 */  NdrFcLong( 0x4008 ), /* 16392 */
/* 168 */  NdrFcShort( 0x2ce ), /* Offset= 718 (886) */
/* 170 */  NdrFcLong( 0x400d ), /* 16397 */
/* 174 */  NdrFcShort( 0x2cc ), /* Offset= 716 (890) */
/* 176 */  NdrFcLong( 0x4009 ), /* 16393 */
/* 180 */  NdrFcShort( 0x2ca ), /* Offset= 714 (894) */
/* 182 */  NdrFcLong( 0x6000 ), /* 24576 */
/* 186 */  NdrFcShort( 0x2c8 ), /* Offset= 712 (898) */
/* 188 */  NdrFcLong( 0x400c ), /* 16396 */
/* 192 */  NdrFcShort( 0x2c6 ), /* Offset= 710 (902) */
/* 194 */  NdrFcLong( 0x10 ),   /* 16 */
/* 198 */  NdrFcShort( 0x8002 ),/* Simple arm type: FC_CHAR */
/* 200 */  NdrFcLong( 0x12 ),   /* 18 */
/* 204 */  NdrFcShort( 0x8006 ),/* Simple arm type: FC_SHORT */
/* 206 */  NdrFcLong( 0x13 ),   /* 19 */
/* 210 */  NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 212 */  NdrFcLong( 0x16 ),   /* 22 */
/* 216 */  NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 218 */  NdrFcLong( 0x17 ),   /* 23 */
/* 222 */  NdrFcShort( 0x8008 ),/* Simple arm type: FC_LONG */
/* 224 */  NdrFcLong( 0xe ),    /* 14 */
/* 228 */  NdrFcShort( 0x2aa ), /* Offset= 682 (910) */
/* 230 */  NdrFcLong( 0x400e ), /* 16398 */
/* 234 */  NdrFcShort( 0x2b0 ), /* Offset= 688 (922) */
/* 236 */  NdrFcLong( 0x4010 ), /* 16400 */
/* 240 */  NdrFcShort( 0x2ae ), /* Offset= 686 (926) */
/* 242 */  NdrFcLong( 0x4012 ), /* 16402 */
/* 246 */  NdrFcShort( 0x26c ), /* Offset= 620 (866) */
/* 248 */  NdrFcLong( 0x4013 ), /* 16403 */
/* 252 */  NdrFcShort( 0x26a ), /* Offset= 618 (870) */
/* 254 */  NdrFcLong( 0x4016 ), /* 16406 */
/* 258 */  NdrFcShort( 0x264 ), /* Offset= 612 (870) */
/* 260 */  NdrFcLong( 0x4017 ), /* 16407 */
/* 264 */  NdrFcShort( 0x25e ), /* Offset= 606 (870) */
/* 266 */  NdrFcLong( 0x0 ),    /* 0 */
/* 270 */  NdrFcShort( 0x0 ),   /* Offset= 0 (270) */
/* 272 */  NdrFcLong( 0x1 ),    /* 1 */
/* 276 */  NdrFcShort( 0x0 ),   /* Offset= 0 (276) */
/* 278 */  NdrFcShort( 0xffffffff ),  /* Offset= -1 (277) */
/* 280 */
               0x15,      /* FC_STRUCT */
               0x7,       /* 7 */
/* 282 */  NdrFcShort( 0x8 ),   /* 8 */
/* 284 */  0xb,       /* FC_HYPER */
               0x5b,      /* FC_END */
/* 286 */
               0x12, 0x0, /* FC_UP */
/* 288 */  NdrFcShort( 0xe ),   /* Offset= 14 (302) */
/* 290 */
               0x1b,      /* FC_CARRAY */
               0x1,       /* 1 */
/* 292 */  NdrFcShort( 0x2 ),   /* 2 */
/* 294 */  0x9,       /* Corr desc: FC_ULONG */
               0x0,       /*  */
/* 296 */  NdrFcShort( 0xfffc ),/* -4 */
/* 298 */  NdrFcShort( 0x1 ),   /* Corr flags:  early, */
/* 300 */  0x6,       /* FC_SHORT */
               0x5b,      /* FC_END */
/* 302 */
               0x17,      /* FC_CSTRUCT */
               0x3,       /* 3 */
/* 304 */  NdrFcShort( 0x8 ),   /* 8 */
/* 306 */  NdrFcShort( 0xfffffff0 ),  /* Offset= -16 (290) */
/* 308 */  0x8,       /* FC_LONG */
               0x8,       /* FC_LONG */
/* 310 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 312 */
               0x2f,      /* FC_IP */
               0x5a,      /* FC_CONSTANT_IID */
/* 314 */  NdrFcLong( 0x0 ),    /* 0 */
/* 318 */  NdrFcShort( 0x0 ),   /* 0 */
/* 320 */  NdrFcShort( 0x0 ),   /* 0 */
/* 322 */  0xc0,      /* 192 */
               0x0,       /* 0 */
/* 324 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 326 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 328 */  0x0,       /* 0 */
               0x46,      /* 70 */
/* 330 */
               0x2f,      /* FC_IP */
               0x5a,      /* FC_CONSTANT_IID */
```

```
/* 332 */  NdrFcLong( 0x20400 ),/* 132096 */
/* 336 */  NdrFcShort( 0x0 ),   /* 0 */
/* 338 */  NdrFcShort( 0x0 ),   /* 0 */
/* 340 */  0xc0,      /* 192 */
               0x0,       /* 0 */
/* 342 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 344 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 346 */  0x0,       /* 0 */
               0x46,      /* 70 */
/* 348 */
               0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 350 */  NdrFcShort( 0x2 ),   /* Offset= 2 (352) */
/* 352 */
               0x12, 0x0, /* FC_UP */
/* 354 */  NdrFcShort( 0x1e6 ), /* Offset= 486 (840) */
/* 356 */
               0x2a,      /* FC_ENCAPSULATED_UNION */
               0x89,      /* 137 */
/* 358 */  NdrFcShort( 0x20 ),  /* 32 */
/* 360 */  NdrFcShort( 0xa ),   /* 10 */
/* 362 */  NdrFcLong( 0x8 ),    /* 8 */
/* 366 */  NdrFcShort( 0x50 ),  /* Offset= 80 (446) */
/* 368 */  NdrFcLong( 0xd ),    /* 13 */
/* 372 */  NdrFcShort( 0x70 ),  /* Offset= 112 (484) */
/* 374 */  NdrFcLong( 0x9 ),    /* 9 */
/* 378 */  NdrFcShort( 0x90 ),  /* Offset= 144 (522) */
/* 380 */  NdrFcLong( 0xc ),    /* 12 */
/* 384 */  NdrFcShort( 0xb0 ),  /* Offset= 176 (560) */
/* 386 */  NdrFcLong( 0x24 ),   /* 36 */
/* 390 */  NdrFcShort( 0x104 ), /* Offset= 260 (650) */
/* 392 */  NdrFcLong( 0x800d ), /* 32781 */
/* 396 */  NdrFcShort( 0x120 ), /* Offset= 288 (684) */
/* 398 */  NdrFcLong( 0x10 ),   /* 16 */
/* 402 */  NdrFcShort( 0x13a ), /* Offset= 314 (716) */
/* 404 */  NdrFcLong( 0x2 ),    /* 2 */
/* 408 */  NdrFcShort( 0x150 ), /* Offset= 336 (744) */
/* 410 */  NdrFcLong( 0x3 ),    /* 3 */
/* 414 */  NdrFcShort( 0x166 ), /* Offset= 358 (772) */
/* 416 */  NdrFcLong( 0x14 ),   /* 20 */
/* 420 */  NdrFcShort( 0x17c ), /* Offset= 380 (800) */
/* 422 */  NdrFcShort( 0xffffffff ),  /* Offset= -1 (421) */
/* 424 */
               0x21,      /* FC_BOGUS_ARRAY */
               0x3,       /* 3 */
/* 426 */  NdrFcShort( 0x0 ),   /* 0 */
/* 428 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
               0x0,       /*  */
/* 430 */  NdrFcShort( 0x0 ),   /* 0 */
/* 432 */  NdrFcShort( 0x1 ),   /* Corr flags:  early, */
/* 434 */  NdrFcLong( 0xffffffff ),   /* -1 */
/* 438 */  NdrFcShort( 0x0 ),   /* Corr flags:  */
/* 440 */
               0x12, 0x0, /* FC_UP */
/* 442 */  NdrFcShort( 0xffffff74 ),  /* Offset= -140 (302) */
/* 444 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 446 */
               0x1a,      /* FC_BOGUS_STRUCT */
               0x3,       /* 3 */
/* 448 */  NdrFcShort( 0x10 ),  /* 16 */
/* 450 */  NdrFcShort( 0x0 ),   /* 0 */
/* 452 */  NdrFcShort( 0x6 ),   /* Offset= 6 (458) */
/* 454 */  0x8,       /* FC_LONG */
               0x39,      /* FC_ALIGNM8 */
/* 456 */  0x36,      /* FC_POINTER */
               0x5b,      /* FC_END */
/* 458 */
               0x11, 0x0, /* FC_RP */
/* 460 */  NdrFcShort( 0xffffffdc ),  /* Offset= -36 (424) */
/* 462 */
               0x21,      /* FC_BOGUS_ARRAY */
               0x3,       /* 3 */
/* 464 */  NdrFcShort( 0x0 ),   /* 0 */
/* 466 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
               0x0,       /*  */
/* 468 */  NdrFcShort( 0x0 ),   /* 0 */
/* 470 */  NdrFcShort( 0x1 ),   /* Corr flags:  early, */
/* 472 */  NdrFcLong( 0xffffffff ),   /* -1 */
/* 476 */  NdrFcShort( 0x0 ),   /* Corr flags:  */
/* 478 */  0x4c,      /* FC_EMBEDDED_COMPLEX */
               0x0,       /* 0 */
/* 480 */  NdrFcShort( 0xffffff58 ),  /* Offset= -168 (312) */
/* 482 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 484 */
               0x1a,      /* FC_BOGUS_STRUCT */
               0x3,       /* 3 */
/* 486 */  NdrFcShort( 0x10 ),  /* 16 */
/* 488 */  NdrFcShort( 0x0 ),   /* 0 */
/* 490 */  NdrFcShort( 0x6 ),   /* Offset= 6 (496) */
/* 492 */  0x8,       /* FC_LONG */
               0x39,      /* FC_ALIGNM8 */
/* 494 */  0x36,      /* FC_POINTER */
               0x5b,      /* FC_END */
/* 496 */
               0x11, 0x0, /* FC_RP */
/* 498 */  NdrFcShort( 0xffffffdc ),  /* Offset= -36 (462) */
/* 500 */
               0x21,      /* FC_BOGUS_ARRAY */
               0x3,       /* 3 */
/* 502 */  NdrFcShort( 0x0 ),   /* 0 */
/* 504 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
               0x0,       /*  */
/* 506 */  NdrFcShort( 0x0 ),   /* 0 */
```

```
/* 508 */  NdrFcShort( 0x1 ),    /* Corr flags:  early, */
/* 510 */  NdrFcLong( 0xffffffff ),   /* -1 */
/* 514 */  NdrFcShort( 0x0 ),    /* Corr flags:  */
/* 516 */  0x4c,      /* FC_EMBEDDED_COMPLEX */
               0x0,       /* 0 */
/* 518 */  NdrFcShort( 0xffffff44 ),  /* Offset= -188 (330) */
/* 520 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 522 */
               0x1a,      /* FC_BOGUS_STRUCT */
               0x3,       /* 3 */
/* 524 */  NdrFcShort( 0x10 ),   /* 16 */
/* 526 */  NdrFcShort( 0x0 ),    /* 0 */
/* 528 */  NdrFcShort( 0x6 ),    /* Offset= 6 (534) */
/* 530 */  0x8,       /* FC_LONG */
               0x39,      /* FC_ALIGNM8 */
/* 532 */  0x36,      /* FC_POINTER */
               0x5b,      /* FC_END */
/* 534 */
               0x11, 0x0, /* FC_RP */
/* 536 */  NdrFcShort( 0xffffffdc ),  /* Offset= -36 (500) */
/* 538 */
               0x21,      /* FC_BOGUS_ARRAY */
               0x3,       /* 3 */
/* 540 */  NdrFcShort( 0x0 ),    /* 0 */
/* 542 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
               0x0,       /*  */
/* 544 */  NdrFcShort( 0x0 ),    /* 0 */
/* 546 */  NdrFcShort( 0x1 ),    /* Corr flags:  early, */
/* 548 */  NdrFcLong( 0xffffffff ),   /* -1 */
/* 552 */  NdrFcShort( 0x0 ),    /* Corr flags:  */
/* 554 */
               0x12, 0x0, /* FC_UP */
/* 556 */  NdrFcShort( 0x176 ),  /* Offset= 374 (930) */
/* 558 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 560 */
               0x1a,      /* FC_BOGUS_STRUCT */
               0x3,       /* 3 */
/* 562 */  NdrFcShort( 0x10 ),   /* 16 */
/* 564 */  NdrFcShort( 0x0 ),    /* 0 */
/* 566 */  NdrFcShort( 0x6 ),    /* Offset= 6 (572) */
/* 568 */  0x8,       /* FC_LONG */
               0x39,      /* FC_ALIGNM8 */
/* 570 */  0x36,      /* FC_POINTER */
               0x5b,      /* FC_END */
/* 572 */
               0x11, 0x0, /* FC_RP */
/* 574 */  NdrFcShort( 0xffffffdc ),  /* Offset= -36 (538) */
/* 576 */
               0x2f,      /* FC_IP */
               0x5a,      /* FC_CONSTANT_IID */
/* 578 */  NdrFcLong( 0x2f ),    /* 47 */
/* 582 */  NdrFcShort( 0x0 ),    /* 0 */
/* 584 */  NdrFcShort( 0x0 ),    /* 0 */
/* 586 */  0xc0,      /* 192 */
               0x0,       /* 0 */
/* 588 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 590 */  0x0,       /* 0 */
               0x0,       /* 0 */
/* 592 */  0x0,       /* 0 */
               0x46,      /* 70 */
/* 594 */
               0x1b,      /* FC_CARRAY */
               0x0,       /* 0 */
/* 596 */  NdrFcShort( 0x1 ),    /* 1 */
/* 598 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
               0x0,       /*  */
/* 600 */  NdrFcShort( 0x4 ),    /* 4 */
/* 602 */  NdrFcShort( 0x1 ),    /* Corr flags:  early, */
/* 604 */  0x1,       /* FC_BYTE */
               0x5b,      /* FC_END */
/* 606 */
               0x1a,      /* FC_BOGUS_STRUCT */
               0x3,       /* 3 */
/* 608 */  NdrFcShort( 0x18 ),   /* 24 */
/* 610 */  NdrFcShort( 0x0 ),    /* 0 */
/* 612 */  NdrFcShort( 0xc ),    /* Offset= 12 (624) */
/* 614 */  0x8,       /* FC_LONG */
               0x8,       /* FC_LONG */
/* 616 */  0x4c,      /* FC_EMBEDDED_COMPLEX */
               0x0,       /* 0 */
/* 618 */  NdrFcShort( 0xffffffd6 ),  /* Offset= -42 (576) */
/* 620 */  0x39,      /* FC_ALIGNM8 */
               0x36,      /* FC_POINTER */
/* 622 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
/* 624 */
               0x12, 0x0, /* FC_UP */
/* 626 */  NdrFcShort( 0xfffffe0 ),  /* Offset= -32 (594) */
/* 628 */
               0x21,      /* FC_BOGUS_ARRAY */
               0x3,       /* 3 */
/* 630 */  NdrFcShort( 0x0 ),    /* 0 */
/* 632 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
               0x0,       /*  */
/* 634 */  NdrFcShort( 0x0 ),    /* 0 */
/* 636 */  NdrFcShort( 0x1 ),    /* Corr flags:  early, */
/* 638 */  NdrFcLong( 0xffffffff ),   /* -1 */
/* 642 */  NdrFcShort( 0x0 ),    /* Corr flags:  */
/* 644 */
               0x12, 0x0, /* FC_UP */
/* 646 */  NdrFcShort( 0xffffffd8 ),  /* Offset= -40 (606) */
/* 648 */  0x5c,      /* FC_PAD */
               0x5b,      /* FC_END */
```

```
/* 650 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x3,        /* 3 */
/* 652 */  NdrFcShort( 0x10 ),  /* 16 */
/* 654 */  NdrFcShort( 0x0 ),   /* 0 */
/* 656 */  NdrFcShort( 0x6 ),   /* Offset= 6 (662) */
/* 658 */  0x8,        /* FC_LONG */
                0x39,       /* FC_ALIGNM8 */
/* 660 */  0x36,       /* FC_POINTER */
                0x5b,       /* FC_END */
/* 662 */
                0x11, 0x0, /* FC_RP */
/* 664 */  NdrFcShort( 0xffffffdc ),  /* Offset= -36 (628) */
/* 666 */
                0x1d,       /* FC_SMFARRAY */
                0x0,        /* 0 */
/* 668 */  NdrFcShort( 0x8 ),   /* 8 */
/* 670 */  0x2,        /* FC_CHAR */
                0x5b,       /* FC_END */
/* 672 */
                0x15,       /* FC_STRUCT */
                0x3,        /* 3 */
/* 674 */  NdrFcShort( 0x10 ),  /* 16 */
/* 676 */  0x8,        /* FC_LONG */
                0x6,        /* FC_SHORT */
/* 678 */  0x6,        /* FC_SHORT */
                0x4c,       /* FC_EMBEDDED_COMPLEX */
/* 680 */  0x0,        /* 0 */
                NdrFcShort( 0xfffffff1 ),  /* Offset= -15 (666) */
                0x5b,       /* FC_END */
/* 684 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x3,        /* 3 */
/* 686 */  NdrFcShort( 0x20 ),  /* 32 */
/* 688 */  NdrFcShort( 0x0 ),   /* 0 */
/* 690 */  NdrFcShort( 0xa ),   /* Offset= 10 (700) */
/* 692 */  0x8,        /* FC_LONG */
                0x39,       /* FC_ALIGNM8 */
/* 694 */  0x36,       /* FC_POINTER */
                0x4c,       /* FC_EMBEDDED_COMPLEX */
/* 696 */  0x0,        /* 0 */
                NdrFcShort( 0xfffffffe7 ),  /* Offset= -25 (672) */
                0x5b,       /* FC_END */
/* 700 */
                0x11, 0x0, /* FC_RP */
/* 702 */  NdrFcShort( 0xffffff10 ),  /* Offset= -240 (462) */
/* 704 */
                0x1b,       /* FC_CARRAY */
                0x0,        /* 0 */
/* 706 */  NdrFcShort( 0x1 ),   /* 1 */
/* 708 */  0x19,       /* Corr desc:  field pointer, FC_ULONG */
                0x0,        /*  */
/* 710 */  NdrFcShort( 0x0 ),   /* 0 */
/* 712 */  NdrFcShort( 0x1 ),   /* Corr flags:  early, */
/* 714 */  0x1,        /* FC_BYTE */
                0x5b,       /* FC_END */
/* 716 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x3,        /* 3 */
/* 718 */  NdrFcShort( 0x10 ),  /* 16 */
/* 720 */  NdrFcShort( 0x0 ),   /* 0 */
/* 722 */  NdrFcShort( 0x6 ),   /* Offset= 6 (728) */
/* 724 */  0x8,        /* FC_LONG */
                0x39,       /* FC_ALIGNM8 */
/* 726 */  0x36,       /* FC_POINTER */
                0x5b,       /* FC_END */
/* 728 */
                0x12, 0x0, /* FC_UP */
/* 730 */  NdrFcShort( 0xfffffffe6 ),  /* Offset= -26 (704) */
/* 732 */
                0x1b,       /* FC_CARRAY */
                0x1,        /* 1 */
/* 734 */  NdrFcShort( 0x2 ),   /* 2 */
/* 736 */  0x19,       /* Corr desc:  field pointer, FC_ULONG */
                0x0,        /*  */
/* 738 */  NdrFcShort( 0x0 ),   /* 0 */
/* 740 */  NdrFcShort( 0x1 ),   /* Corr flags:  early, */
/* 742 */  0x6,        /* FC_SHORT */
                0x5b,       /* FC_END */
/* 744 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x3,        /* 3 */
/* 746 */  NdrFcShort( 0x10 ),  /* 16 */
/* 748 */  NdrFcShort( 0x0 ),   /* 0 */
/* 750 */  NdrFcShort( 0x6 ),   /* Offset= 6 (756) */
/* 752 */  0x8,        /* FC_LONG */
                0x39,       /* FC_ALIGNM8 */
/* 754 */  0x36,       /* FC_POINTER */
                0x5b,       /* FC_END */
/* 756 */
                0x12, 0x0, /* FC_UP */
/* 758 */  NdrFcShort( 0xfffffffe6 ),  /* Offset= -26 (732) */
/* 760 */
                0x1b,       /* FC_CARRAY */
                0x3,        /* 3 */
/* 762 */  NdrFcShort( 0x4 ),   /* 4 */
/* 764 */  0x19,       /* Corr desc:  field pointer, FC_ULONG */
                0x0,        /*  */
/* 766 */  NdrFcShort( 0x0 ),   /* 0 */
/* 768 */  NdrFcShort( 0x1 ),   /* Corr flags:  early, */
/* 770 */  0x8,        /* FC_LONG */
                0x5b,       /* FC_END */
/* 772 */
                0x1a,       /* FC_BOGUS_STRUCT */
                0x3,        /* 3 */
/* 774 */  NdrFcShort( 0x10 ),  /* 16 */
```

```
/* 776 */  NdrFcShort( 0x0 ),   /* 0 */
/* 778 */  NdrFcShort( 0x6 ),   /* Offset= 6 (784) */
/* 780 */  0x8,       /* FC_LONG */
           0x39,      /* FC_ALIGNM8 */
/* 782 */  0x36,      /* FC_POINTER */
           0x5b,      /* FC_END */
/* 784 */
           0x12, 0x0, /* FC_UP */
/* 786 */  NdrFcShort( 0xffffffe6 ),  /* Offset= -26 (760) */
/* 788 */
           0x1b,      /* FC_CARRAY */
           0x7,       /* 7 */
/* 790 */  NdrFcShort( 0x8 ),   /* 8 */
/* 792 */  0x19,      /* Corr desc:  field pointer, FC_ULONG */
           0x0,       /*  */
/* 794 */  NdrFcShort( 0x0 ),   /* 0 */
/* 796 */  NdrFcShort( 0x1 ),   /* Corr flags:  early, */
/* 798 */  0xb,       /* FC_HYPER */
           0x5b,      /* FC_END */
/* 800 */
           0x1a,      /* FC_BOGUS_STRUCT */
           0x3,       /* 3 */
/* 802 */  NdrFcShort( 0x10 ),  /* 16 */
/* 804 */  NdrFcShort( 0x0 ),   /* 0 */
/* 806 */  NdrFcShort( 0x6 ),   /* Offset= 6 (812) */
/* 808 */  0x8,       /* FC_LONG */
           0x39,      /* FC_ALIGNM8 */
/* 810 */  0x36,      /* FC_POINTER */
           0x5b,      /* FC_END */
/* 812 */
           0x12, 0x0, /* FC_UP */
/* 814 */  NdrFcShort( 0xffffffe6 ),  /* Offset= -26 (788) */
/* 816 */
           0x15,      /* FC_STRUCT */
           0x3,       /* 3 */
/* 818 */  NdrFcShort( 0x8 ),   /* 8 */
/* 820 */  0x8,       /* FC_LONG */
           0x8,       /* FC_LONG */
/* 822 */  0x5c,      /* FC_PAD */
           0x5b,      /* FC_END */
/* 824 */
           0x1b,      /* FC_CARRAY */
           0x3,       /* 3 */
/* 826 */  NdrFcShort( 0x8 ),   /* 8 */
/* 828 */  0x7,       /* Corr desc: FC_USHORT */
           0x0,       /*  */
/* 830 */  NdrFcShort( 0xffc8 ),/* -56 */
/* 832 */  NdrFcShort( 0x1 ),   /* Corr flags:  early, */
/* 834 */  0x4c,      /* FC_EMBEDDED_COMPLEX */
           0x0,       /* 0 */
/* 836 */  NdrFcShort( 0xffffffec ),  /* Offset= -20 (816) */
/* 838 */  0x5c,      /* FC_PAD */
           0x5b,      /* FC_END */
/* 840 */
           0x1a,      /* FC_BOGUS_STRUCT */
           0x3,       /* 3 */
/* 842 */  NdrFcShort( 0x38 ),  /* 56 */
/* 844 */  NdrFcShort( 0xffffffec ),  /* Offset= -20 (824) */
/* 846 */  NdrFcShort( 0x0 ),   /* Offset= 0 (846) */
/* 848 */  0x6,       /* FC_SHORT */
           0x6,       /* FC_SHORT */
/* 850 */  0x38,      /* FC_ALIGNM4 */
           0x8,       /* FC_LONG */
/* 852 */  0x8,       /* FC_LONG */
           0x4c,      /* FC_EMBEDDED_COMPLEX */
/* 854 */  0x4,       /* 4 */
           NdrFcShort( 0xfffffe0d ),  /* Offset= -499 (356) */
           0x5b,      /* FC_END */
/* 858 */
           0x12, 0x0, /* FC_UP */
/* 860 */  NdrFcShort( 0xffffff02 ),  /* Offset= -254 (606) */
/* 862 */
           0x12, 0x8, /* FC_UP [simple_pointer] */
/* 864 */  0x1,       /* FC_BYTE */
           0x5c,      /* FC_PAD */
/* 866 */
           0x12, 0x8, /* FC_UP [simple_pointer] */
/* 868 */  0x6,       /* FC_SHORT */
           0x5c,      /* FC_PAD */
/* 870 */
           0x12, 0x8, /* FC_UP [simple_pointer] */
/* 872 */  0x8,       /* FC_LONG */
           0x5c,      /* FC_PAD */
/* 874 */
           0x12, 0x8, /* FC_UP [simple_pointer] */
/* 876 */  0xa,       /* FC_FLOAT */
           0x5c,      /* FC_PAD */
/* 878 */
           0x12, 0x8, /* FC_UP [simple_pointer] */
/* 880 */  0xc,       /* FC_DOUBLE */
           0x5c,      /* FC_PAD */
/* 882 */
           0x12, 0x0, /* FC_UP */
/* 884 */  NdrFcShort( 0xfffffda4 ),  /* Offset= -604 (280) */
/* 886 */
           0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 888 */  NdrFcShort( 0xfffffda6 ),  /* Offset= -602 (286) */
/* 890 */
           0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 892 */  NdrFcShort( 0xfffffdbc ),  /* Offset= -580 (312) */
/* 894 */
           0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 896 */  NdrFcShort( 0xfffffdca ),  /* Offset= -566 (330) */
/* 898 */
           0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 900 */  NdrFcShort( 0xfffffdd8 ),  /* Offset= -552 (348) */
```

```
/* 902 */
                0x12, 0x10,     /* FC_UP [pointer_deref] */
/* 904 */  NdrFcShort( 0x2 ),   /* Offset= 2 (906) */
/* 906 */
                0x12, 0x0, /* FC_UP */
/* 908 */  NdrFcShort( 0x16 ),  /* Offset= 22 (930) */
/* 910 */
                0x15,      /* FC_STRUCT */
                0x7,       /* 7 */
/* 912 */  NdrFcShort( 0x10 ),  /* 16 */
/* 914 */  0x6,       /* FC_SHORT */
                0x1,       /* FC_BYTE */
/* 916 */  0x1,       /* FC_BYTE */
                0x38,      /* FC_ALIGNM4 */
/* 918 */  0x8,       /* FC_LONG */
                0x39,      /* FC_ALIGNM8 */
/* 920 */  0xb,       /* FC_HYPER */
                0x5b,      /* FC_END */
/* 922 */
                0x12, 0x0, /* FC_UP */
/* 924 */  NdrFcShort( 0xfffffff2 ),  /* Offset= -14 (910) */
/* 926 */
                0x12, 0x8, /* FC_UP [simple_pointer] */
/* 928 */  0x2,       /* FC_CHAR */
                0x5c,      /* FC_PAD */
/* 930 */
                0x1a,      /* FC_BOGUS_STRUCT */
                0x7,       /* 7 */
/* 932 */  NdrFcShort( 0x20 ),  /* 32 */
/* 934 */  NdrFcShort( 0x0 ),   /* 0 */
/* 936 */  NdrFcShort( 0x0 ),   /* Offset= 0 (936) */
/* 938 */  0x8,       /* FC_LONG */
                0x8,       /* FC_LONG */
/* 940 */  0x6,       /* FC_SHORT */
                0x6,       /* FC_SHORT */
/* 942 */  0x6,       /* FC_SHORT */
                0x6,       /* FC_SHORT */
/* 944 */  0x4c,      /* FC_EMBEDDED_COMPLEX */
                0x0,       /* 0 */
/* 946 */  NdrFcShort( 0xfffffc54 ),  /* Offset= -940 (6) */
/* 948 */  0x5c,      /* FC_PAD */
                0x5b,      /* FC_END */
/* 950 */  0xb4,      /* FC_USER_MARSHAL */
                0x83,      /* 131 */
/* 952 */  NdrFcShort( 0x0 ),   /* 0 */
/* 954 */  NdrFcShort( 0x18 ),  /* 24 */
/* 956 */  NdrFcShort( 0x0 ),   /* 0 */
/* 958 */  NdrFcShort( 0xfffffc44 ),  /* Offset= -956 (2) */
/* 960 */
                0x11, 0x4, /* FC_RP [alloced_on_stack] */
/* 962 */  NdrFcShort( 0x6 ),   /* Offset= 6 (968) */
/* 964 */
                0x13, 0x0, /* FC_OP */
/* 966 */  NdrFcShort( 0xfffffdc ),  /* Offset= -36 (930) */
/* 968 */  0xb4,      /* FC_USER_MARSHAL */
                0x83,      /* 131 */
/* 970 */  NdrFcShort( 0x0 ),   /* 0 */
/* 972 */  NdrFcShort( 0x18 ),  /* 24 */
/* 974 */  NdrFcShort( 0x0 ),   /* 0 */
/* 976 */  NdrFcShort( 0xfffffff4 ),  /* Offset= -12 (964) */

                0x0
        }
    };

const CInterfaceProxyVtbl * _tpcc_com_ps_ProxyVtblList[] =
{
    ( CInterfaceProxyVtbl *) &_ITPCCProxyVtbl,
    0
};

const CInterfaceStubVtbl * _tpcc_com_ps_StubVtblList[] =
{
    ( CInterfaceStubVtbl *) &_ITPCCStubVtbl,
    0
};

PCInterfaceName const _tpcc_com_ps_InterfaceNamesList[] =
{
    "ITPCC",
    0
};


#define _tpcc_com_ps_CHECK_IID(n)    IID_GENERIC_CHECK_IID( _tpcc_com_ps,
pIID, n)

int __stdcall _tpcc_com_ps_IID_Lookup( const IID * pIID, int * pIndex )
{

    if(!_tpcc_com_ps_CHECK_IID(0))
        {
        *pIndex = 0;
        return 1;
        }

    return 0;
}

const ExtendedProxyFileInfo tpcc_com_ps_ProxyFileInfo =
{
    (PCInterfaceProxyVtblList *) & _tpcc_com_ps_ProxyVtblList,
    (PCInterfaceStubVtblList *) & _tpcc_com_ps_StubVtblList,
    (const PCInterfaceName * ) & _tpcc_com_ps_InterfaceNamesList,
    0, // no delegation
    & _tpcc_com_ps_IID_Lookup,
```

```
    1,
    2,
    0, /* table of [async_uuid] interfaces */
    0, /* Filler1 */
    0, /* Filler2 */
    0  /* Filler3 */
};


#endif /* defined(_M_IA64) || defined(_M_AXP64)*/
```

Appendix B - Database Details

BACKUP.SQL

```
--  File:     BACKUP.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates backup of tpcc database


declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

dump database tpcc to tpccback1, tpccback2, tpccback3 with init, stats = 1

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

BACKUPDEV.SQL

```
--  File:     BACKUPDEVB.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates tpcc database Backup Devices


use master
go

--  create backup devices

exec sp_addumpdevice 'disk','tpccback1','X:\tpccback1.dmp'
exec sp_addumpdevice 'disk','tpccback2','Y:\tpccback2.dmp'
exec sp_addumpdevice 'disk','tpccback3','Z:\tpccback3.dmp'
go
```

CREATEDB.SQL

```
--  File:     CREATEDB.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates tpcc database and backup files


use master
go

--    Create temporary table for timing

if exists ( select name from sysobjects where name = 'tpcc_timer' )
     drop table tpcc_timer
go

create table tpcc_timer
(
     start_date                char(30),
     end_date                  char(30)
)

insert     into tpcc_timer values (0,0)
go

--    Store starting time

update     tpcc_timer
set  start_date = (select convert(char(30), getdate(),9))
go

--  create main database files

CREATE DATABASE tpcc
ON PRIMARY
(    NAME       = MSSQL70_tpcc_root,
     FILENAME   = "C:\tpcc_root.mdf",
     SIZE       = 50MB,
     FILEGROWTH =0),
FILEGROUP  MSSQL70_cs_fg
(    NAME       = MSSQL70_cs1,
     FILENAME   = "E:",
     SIZE       = 29600MB,
     FILEGROWTH = 0),
(    NAME       = MSSQL70_cs2,
     FILENAME   = "F:",
     SIZE       = 29600MB,
     FILEGROWTH = 0),
(    NAME       = MSSQL70_cs3,
     FILENAME   = "G:",
     SIZE       = 29600MB,
```

```
     FILEGROWTH = 0),
(    NAME       = MSSQL70_cs4,
     FILENAME   = "H:",
     SIZE       = 29600MB,
     FILEGROWTH = 0),
(    NAME       = MSSQL70_cs5,
     FILENAME   = "I:",
     SIZE       = 29600MB,
     FILEGROWTH = 0),
(    NAME       = MSSQL70_cs6,
     FILENAME   = "J:",
     SIZE       = 29600MB,
     FILEGROWTH = 0),
FILEGROUP  MSSQL70_misc_fg
(    NAME       = MSSQL70_misc1,
     FILENAME   = "N:",
     SIZE       = 16000MB,
     FILEGROWTH = 0),
(    NAME       = MSSQL70_misc2,
     FILENAME   = "O:",
     SIZE       = 16000MB,
     FILEGROWTH = 0),
(    NAME       = MSSQL70_misc3,
     FILENAME   = "P:",
     SIZE       = 16000MB,
     FILEGROWTH = 0),
(    NAME       = MSSQL70_misc4,
     FILENAME   = "Q:",
     SIZE       = 16000MB,
     FILEGROWTH = 0),
(    NAME       = MSSQL70_misc5,
     FILENAME   = "R:",
     SIZE       = 16000MB,
     FILEGROWTH = 0),
(    NAME       = MSSQL70_misc6,
     FILENAME   = "S:",
     SIZE       = 16000MB,
     FILEGROWTH = 0)
LOG ON
(    NAME       =MSSQL70_tpcc_log,
     FILENAME   ="L:",
     SIZE       =80000MB,
     FILEGROWTH =0)
go

-- Store ending time
update    tpcc_timer
set  end_date   = (select convert(char(30), getdate(),9))
go

select "Elapsed time (in seconds): ", datediff(second,(select start_date
from tpcc_timer),(select end_date from tpcc_timer))

--   remove temporary table

if exists ( select name from sysobjects where name = 'tpcc_timer' )
     drop table tpcc_timer
go
```

DBOPT1.SQL

```
--  File:     DBOPT1.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Sets database options for data load


use master
go

exec sp_dboption tpcc,'select into/bulkcopy',true
exec sp_dboption tpcc,'trunc. log on chkpt.',true
go

use tpcc
go

checkpoint
go
```

DBOPT2.SQL

```
--  File:     DBOPT2.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Resets database options after data load

sp_dboption tpcc,'select into/bulkcopy',FALSE
GO

sp_dboption tpcc,'trunc. log on chkpt.',FALSE
GO

USE tpcc
GO

CHECKPOINT
GO
```

```
sp_configure 'allow updates',1
GO

RECONFIGURE WITH OVERRIDE
GO

DECLARE    @msg      varchar(50)

IF (SELECT (SUBSTRING((SELECT @@version),1,26))) = 'Microsoft SQL Server
2000'
     BEGIN
          --                                          --
          --        OPTIONS FOR SQL SERVER 8.0        --
          -- Set option values for user-defined indexes --
          --                                          --

          SET  @msg = ' '
          PRINT@msg                                --
          SET  @msg = 'Setting SQL Server 8.0 indexoptions'
          PRINT@msg
          SET  @msg = ' '
          PRINT@msg                                --

          EXEC sp_indexoption  'customer',     'DisAllowPageLocks', TRUE
          EXEC sp_indexoption  'district',     'DisAllowPageLocks', TRUE
          EXEC sp_indexoption  'warehouse',    'DisAllowPageLocks', TRUE
          EXEC sp_indexoption  'stock',   'DisAllowPageLocks', TRUE
          EXEC sp_indexoption  'order_line',   'DisAllowRowLocks',  TRUE
          EXEC sp_indexoption  'orders',  'DisAllowRowLocks',  TRUE
          EXEC sp_indexoption  'new_order',    'DisAllowRowLocks',  TRUE
          EXEC sp_indexoption  'item',         'DisAllowRowLocks',  TRUE
          EXEC sp_indexoption  'item',         'DisAllowPageLocks', TRUE
     END
ELSE
     BEGIN
          --                                          --
          --        OPTIONS FOR SQL SERVER 7.0        --
          -- Set option values for user-defined indexes --
          --

          SET  @msg = ' '
          PRINT@msg                                --
          SET  @msg = 'Setting SQL Server 7.0 indexoptions'
          PRINT@msg
          SET  @msg = ' '
          PRINT@msg                                --

          EXEC sp_indexoption  'customer',     'AllowPageLocks',    FALSE
          EXEC sp_indexoption  'district',     'AllowPageLocks',    FALSE
          EXEC sp_indexoption  'warehouse',    'AllowPageLocks',    FALSE
          EXEC sp_indexoption  'stock',   'AllowPageLocks',    FALSE
          EXEC sp_indexoption  'order_line',   'AllowRowLocks',     FALSE
          EXEC sp_indexoption  'orders',  'AllowRowLocks',     FALSE
          EXEC sp_indexoption  'new_order',    'AllowRowLocks',     FALSE
          EXEC sp_indexoption  'item',         'AllowRowLocks',     FALSE
          EXEC sp_indexoption  'item',         'AllowPageLocks',    FALSE

     END
GO

Print ' '
Print '******************'
Print 'Pre-specified Locking Hierarchy:'
Print '      Lockflag = 0 ==> No pre-specified hierarchy'
Print '   Lockflag = 1 ==> Lock at Page-level then Table-level'
Print '   Lockflag = 2 ==> Lock at Row-level then Table-level'
Print '   Lockflag = 3 ==> Lock at Table-level'
Print ' '

SELECT     name,lockflags
FROM sysindexes
WHEREobject_id('warehouse')     = id OR
     object_id('district')= id OR
     object_id('customer')= id OR
     object_id('stock')   = id OR
     object_id('orders')  = id OR
     object_id('order_line')    = id OR
     object_id('history') = id OR
     object_id('new_order')     = id OR
     object_id('item')    = id
ORDERBY lockflags asc
GO

sp_configure 'allow updates',0
GO

RECONFIGURE WITH OVERRIDE
GO

EXEC sp_dboption tpcc,     'auto update statistics',  FALSE
EXEC sp_dboption tpcc,     'auto create statistics',  FALSE
EXEC sp_dboption tpcc,     'torn page detection',          FALSE
GO

EXEC sp_tableoption  'district',     'pintable',true
EXEC sp_tableoption  'warehouse',    'pintable',true
EXEC sp_tableoption  'new_order',    'pintable',true
EXEC sp_tableoption  'item',         'pintable',true
GO
```

REMOVEDB.SQL

```
--  File:     REMOVEDB.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Removes tpcc database and backup files


use master
go

--  remove any existing database and backup files

exec sp_dbremove tpcc, dropdev
go

exec sp_dropdevice 'tpccback1'
exec sp_dropdevice 'tpccback2'
go
```

RESTORE.SQL

```
--  File:     RESTORE.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Loads database backup from backup files


declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

load database tpcc from tpccback1, tpccback2, tpccback3, with stats = 1

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

VERIFYTPCCLOAD.SQL

```
--  File:     VERIFYTPCCLOAD.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Performs series of TPCC database checks to verify
--         that database load completed correctly

print" "
select     convert(char(30), getdate(),9)
print" "

use tpcc
go

--    *********************************
--
--    Check rows per table from SYSINDEXES
--
--    *********************************

print'WAREHOUSE TABLE'

select     rows
from sysindexes
where id    = object_id("warehouse")
go

print'DISTRICT TABLE = (10 * No of warehouses)'

select     rows
from sysindexes
where id    =object_id("district")
go

print'ITEM TABLE = 100,000'

select     rows
from sysindexes
where id    =object_id("item")
go

print'CUSTOMER TABLE = (30,000 * No of warehouses)'

select     rows
from sysindexes
where id    =object_id("customer")
go

print 'ORDERS TABLE = (30,000 * No of warehouses)'

select     rows
from sysindexes
where id    =object_id("orders")
go

print'HISTORY TABLE = (30,000 * No of warehouses)'

select     rows
from sysindexes
where id    =object_id("history")
go
```

```
print 'STOCK TABLE = (100,000 * No of warehouses)'

select     rows
from sysindexes
where id   =object_id("stock")
go

print 'ORDER_LINE TABLE = (300,000 * No of warehouses + some change)'

select     rows
from sysindexes
where id   =object_id("order_line")
go

print 'NEW_ORDER TABLE = (9000 * No of warehouses)'

select     rows
from sysindexes
where id   =object_id("new_order")
go

--    *************
--
--    Check indices
--
--    *************

print '**************Index Check****************'

use tpcc
go

sp_helpindex    customer
go

sp_helpindex    stock
go

sp_helpindex    district
go

sp_helpindex    item
go

sp_helpindex    new_order
go

sp_helpindex    orders
go

sp_helpindex    order_line
go

sp_helpindex    warehouse
go
```

IDXCUSCL.SQL

```
--  File:     IDXCUSCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates clustered index on customer table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where name = 'customer_c1' )
     drop index customer.customer_c1

create unique clustered index customer_c1 on customer(c_w_id, c_d_id, c_id)
     on MSSQL70_cs_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

IDXCUSNC.SQL

```
--  File:     IDXCUSNC.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates non-clustered index on customer table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'customer_nc1' )
```

```
     drop index customer.customer_nc1

create unique nonclustered index customer_nc1 on customer(c_w_id, c_d_id,
c_last, c_first, c_id)
     on MSSQL70_cs_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

IDXDISCL.SQL

```
--  File:     IDXDISCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates clustered index on district table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where name = 'district_c1' )
     drop index district.district_c1

create unique clustered index  district_c1 on district(d_w_id, d_id)
     with fillfactor=100 on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

IDXITMCL.SQL

```
--  File:     IDXITMCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates clustered index on item table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'item_c1' )
     drop index item.item_c1

create unique clustered index item_c1 on item(i_id)
     on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

IDXNODCL.SQL

```
--  File:     IDXNODCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates clustered index on new_order table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'new_order_c1' )
     drop index new_order.new_order_c1

create unique clustered index new_order_c1 on new_order(no_w_id, no_d_id,
no_o_id)
     on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

IDXODLCL.SQL

```
--  File:     IDXODLCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates clustered index on order_line table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'order_line_c1' )
     drop index order_line.order_line_c1

create unique clustered index order_line_c1 on order_line(ol_w_id, ol_d_id,
ol_o_id, ol_number)
     on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

IDXORDCL.SQL

```
--  File:     IDXORDCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates clustered index on orders table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'orders_c1' )
     drop index orders.orders_c1

create unique clustered index orders_c1 on orders(o_w_id, o_d_id, o_id)
     on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

IDXORDNC.SQL

```
--  File:     IDXORDNC.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates non-clustered index on orders table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'orders_nc1' )
     drop index orders.orders_nc1

create index orders_nc1 on orders(o_w_id, o_d_id, o_c_id, o_id)
     on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

IDXSTKCL.SQL

```
--  File:     IDXSTKCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates clustered index on stock table


use tpcc
go

declare @startdate datetime
```

```
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'stock_c1' )
     drop index stock.stock_c1

create unique clustered index stock_c1 on stock(s_i_id, s_w_id)
     on MSSQL70_cs_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

IDXWARCL.SQL

```
--  File:     IDXWARCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates clustered index on warehouse table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where name = 'warehouse_c1' )
     drop index warehouse.warehouse_c1

create unique clustered index warehouse_c1 on warehouse(w_id)
     with fillfactor=100 on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate, @enddate)

go
```

TABLES.SQL

```
--  File:     TABLES.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.20
--            Copyright Microsoft, 1999
--  Purpose:  Creates TPC-C tables


use tpcc
go

--
--  Remove all existing TPC-C tables
--

if exists ( select name from sysobjects where name = 'warehouse' )
     drop table warehouse
go
if exists ( select name from sysobjects where name = 'district' )
     drop table district
go
if exists ( select name from sysobjects where name = 'customer' )
     drop table customer
go
if exists ( select name from sysobjects where name = 'history' )
     drop table history
go
if exists ( select name from sysobjects where name = 'new_order' )
     drop table new_order
go
if exists ( select name from sysobjects where name = 'orders' )
     drop table orders
go
if exists ( select name from sysobjects where name = 'order_line' )
     drop table order_line
go
if exists ( select name from sysobjects where name = 'item' )
     drop table item
go
if exists ( select name from sysobjects where name = 'stock' )
     drop table stock
go

--
--  Create new tables
--

create table warehouse
(
     w_id                smallint,
     w_name                   char(10),
     w_street_1          char(20),
     w_street_2          char(20),
     w_city                   char(20),
     w_state                  char(2),
     w_zip               char(9),
```

```
     w_tax               numeric(4,4),
     w_ytd               numeric(12,2)
) on MSSQL70_misc_fg
go

create table district
(
     d_id                tinyint,
     d_w_id                   smallint,
     d_name                   char(10),
     d_street_1          char(20),
     d_street_2          char(20),
     d_city                   char(20),
     d_state                  char(2),
     d_zip               char(9),
     d_tax               numeric(4,4),
     d_ytd               numeric(12,2),
     d_next_o_id              int
) on MSSQL70_misc_fg
go

create table customer
(
     c_id                int,
     c_d_id                   tinyint,
     c_w_id                   smallint,
     c_first                  char(16),
     c_middle            char(2),
     c_last                   char(16),
     c_street_1          char(20),
     c_street_2          char(20),
     c_city                   char(20),
     c_state                  char(2),
     c_zip               char(9),
     c_phone                  char(16),
     c_since                  datetime,
     c_credit            char(2),
     c_credit_lim        numeric(12,2),
     c_discount          numeric(4,4),
     c_balance           numeric(12,2),
     c_ytd_payment       numeric(12,2),
     c_payment_cnt       smallint,
     c_delivery_cnt      smallint,
     c_data                   char(500)
) on MSSQL70_cs_fg
go

create table history
(
     h_c_id                   int,
     h_c_d_id            tinyint,
     h_c_w_id            smallint,
     h_d_id                   tinyint,
     h_w_id                   smallint,
     h_date                   datetime,
     h_amount            numeric(6,2),
     h_data                   char(24)
) on MSSQL70_misc_fg
go

create table new_order
(
     no_o_id                  int,
     no_d_id                  tinyint,
     no_w_id                  smallint
) on MSSQL70_misc_fg
go

create table orders
(
     o_id                int,
     o_d_id                   tinyint,
     o_w_id                   smallint,
     o_c_id                   int,
     o_entry_d           datetime,
     o_carrier_id        tinyint,
     o_ol_cnt            tinyint,
     o_all_local              tinyint
) on MSSQL70_misc_fg
go

create table order_line
(
     ol_o_id                  int,
     ol_d_id                  tinyint,
     ol_w_id                  smallint,
     ol_number           tinyint,
     ol_i_id                  int,
     ol_supply_w_id      smallint,
     ol_delivery_d       datetime,
     ol_quantity              smallint,
     ol_amount           numeric(6,2),
     ol_dist_info        char(24)
) on MSSQL70_misc_fg
go

create table item
(
     i_id                int,
     i_im_id                  int,
     i_name                   char(24),
     i_price                  numeric(5,2),
     i_data                   char(50)
) on MSSQL70_misc_fg
```

```
go

create table stock
(
     s_i_id                    int,
     s_w_id                    smallint,
     s_quantity           smallint,
     s_dist_01            char(24),
     s_dist_02            char(24),
     s_dist_03            char(24),
     s_dist_04            char(24),
     s_dist_05            char(24),
     s_dist_06            char(24),
     s_dist_07            char(24),
     s_dist_08            char(24),
     s_dist_09            char(24),
     s_dist_10            char(24),
     s_ytd                int,
     s_order_cnt               smallint,
     s_remote_cnt         smallint,
     s_data                    char(50)
) on MSSQL70_cs_fg
go
```

DELIVERY.SQL

```
--  File:     DELIVERY.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Creates delivery transaction stored procedure
--
--   Interface Level: 4.10.000

use tpcc
go

if exists (select name from sysobjects where name = "tpcc_delivery" )
     drop procedure tpcc_delivery
go

create proc tpcc_delivery  @w_id           smallint,

                     @o_carrier_id   smallint
as

declare @d_id   tinyint,
        @o_id   int,
        @c_id   int,
        @total  numeric(12,2),
        @oid1   int,
        @oid2   int,
        @oid3   int,
        @oid4   int,
        @oid5   int,
        @oid6   int,
        @oid7   int,
        @oid8   int,
        @oid9   int,
        @oid10  int

select @d_id = 0

begin tran d

     while (@d_id < 10)
     begin

             select  @d_id  = @d_id + 1,
               @total = 0,
               @o_id  = 0

          select     top 1
               @o_id= no_o_id
          from new_order (serializable updlock)
          where no_w_id    = @w_id and
               no_d_id    = @d_id
          order by no_o_id asc

            if (@@rowcount <> 0)
          begin

--  claim the order for this district

               delete     new_order
               where no_w_id    = @w_id and
                     no_d_id    = @d_id and
                     no_o_id    = @o_id

--  set carrier_id on this order (and get customer id)

               update     orders
               set  o_carrier_id    = @o_carrier_id,
                     @c_id      = o_c_id
               where o_w_id          = @w_id and
                     o_d_id          = @d_id and
                     o_id       = @o_id

--  set date in all lineitems for this order (and sum amounts)

               update     order_line
               set  ol_delivery_d   = getdate(),
                     @total          = @total + ol_amount
               where ol_w_id         = @w_id and
```

```
                    ol_d_id         = @d_id and
                    ol_o_id         = @o_id

--  accummulate lineitem amounts for this order into customer

               update    customer
               set   c_balance  = c_balance + @total,
                     c_delivery_cnt  = c_delivery_cnt + 1
               where c_w_id          = @w_id and
                     c_d_id          = @d_id and
                     c_id       = @c_id


          end

     select @oid1 = case @d_id when  1  then @o_id else @oid1 end,
               @oid2 = case @d_id when  2  then @o_id else @oid2 end,
               @oid3 = case @d_id when  3  then @o_id else @oid3 end,
               @oid4 = case @d_id when  4  then @o_id else @oid4 end,
               @oid5 = case @d_id when  5  then @o_id else @oid5 end,
               @oid6 = case @d_id when  6  then @o_id else @oid6 end,
               @oid7 = case @d_id when  7  then @o_id else @oid7 end,
               @oid8 = case @d_id when  8  then @o_id else @oid8 end,
               @oid9 = case @d_id when  9  then @o_id else @oid9 end,
               @oid10 = case @d_id when 10 then @o_id else @oid10 end

    end

commit tran d

-- return delivery data to client

select @oid1,
       @oid2,
       @oid3,
       @oid4,
       @oid5,
       @oid6,
       @oid7,
       @oid8,
       @oid9,
       @oid10

go
```

NEWORD.SQL

```
--  File:     NEWORD.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Creates new order transaction stored procedure
--
--   Interface Level: 4.10.000

use tpcc
go

if exists ( select name from sysobjects where name = "tpcc_neworder" )
     drop procedure tpcc_neworder
go

create proc tpcc_neworder
                           @w_id           smallint,
                           @d_id           tinyint,
                           @c_id           int,
                           @o_ol_cnt       tinyint,
                           @o_all_local    tinyint,
                           @i_id1  int = 0, @s_w_id1  smallint = 0, @ol_qty1
smallint = 0,
                           @i_id2  int = 0, @s_w_id2  smallint = 0, @ol_qty2
smallint = 0,
                           @i_id3  int = 0, @s_w_id3  smallint = 0, @ol_qty3
smallint = 0,
                           @i_id4  int = 0, @s_w_id4  smallint = 0, @ol_qty4
smallint = 0,
                           @i_id5  int = 0, @s_w_id5  smallint = 0, @ol_qty5
smallint = 0,
                           @i_id6  int = 0, @s_w_id6  smallint = 0, @ol_qty6
smallint = 0,
                           @i_id7  int = 0, @s_w_id7  smallint = 0, @ol_qty7
smallint = 0,
                           @i_id8  int = 0, @s_w_id8  smallint = 0, @ol_qty8
smallint = 0,
                           @i_id9  int = 0, @s_w_id9  smallint = 0, @ol_qty9
smallint = 0,
                           @i_id10 int = 0, @s_w_id10 smallint = 0, @ol_qty10
smallint = 0,
                           @i_id11 int = 0, @s_w_id11 smallint = 0, @ol_qty11
smallint = 0,
                           @i_id12 int = 0, @s_w_id12 smallint = 0, @ol_qty12
smallint = 0,
                           @i_id13 int = 0, @s_w_id13 smallint = 0, @ol_qty13
smallint = 0,
                           @i_id14 int = 0, @s_w_id14 smallint = 0, @ol_qty14
smallint = 0,
                           @i_id15 int = 0, @s_w_id15 smallint = 0, @ol_qty15
smallint = 0

as
declare    @w_tax          numeric(4,4),
           @d_tax          numeric(4,4),
           @c_last         char(16),
           @c_credit       char(2),
           @c_discount     numeric(4,4),
```

```
        @i_price        numeric(5,2),
        @i_name         char(24),
        @i_data         char(50),
        @o_entry_d      datetime,
        @remote_flag    int,
        @s_quantity     smallint,
        @s_data         char(50),
        @s_dist         char(24),
      @li_no          int,
      @o_id     int,
      @commit_flag    tinyint,
        @li_id          int,
        @li_s_w_id      smallint,
        @li_qty         smallint,
      @ol_number int,
      @c_id_local     int

begin

begin transaction n

--  get district tax and next availible order id and update
--  plus initialize local variables

      update    district
      set   @d_tax       = d_tax,
            @o_id        = d_next_o_id,
            d_next_o_id  = d_next_o_id + 1,
            @o_entry_d   = getdate(),
            @li_no       = 0,
            @commit_flag = 1
      where d_w_id       = @w_id and
            d_id         = @d_id

--  process orderlines

      while (@li_no < @o_ol_cnt)
      begin

            select @li_no = @li_no + 1

--  set i_id, s_w_id, and qty for this lineitem

            select     @li_id = case @li_no
                        when 1 then @i_id1
                        when 2 then @i_id2
                        when 3 then @i_id3
                        when 4 then @i_id4
                        when 5 then @i_id5
                        when 6 then @i_id6
                        when 7 then @i_id7
                        when 8 then @i_id8
                        when 9 then @i_id9
                        when 10 then @i_id10
                        when 11 then @i_id11
                        when 12 then @i_id12
                        when 13 then @i_id13
                        when 14 then @i_id14
                        when 15 then @i_id15
                        end,

                   @li_s_w_id = case @li_no
                              when 1 then @s_w_id1
                              when 2 then @s_w_id2
                              when 3 then @s_w_id3
                              when 4 then @s_w_id4
                              when 5 then @s_w_id5
                              when 6 then @s_w_id6
                              when 7 then @s_w_id7
                              when 8 then @s_w_id8
                              when 9 then @s_w_id9
                              when 10 then @s_w_id10
                              when 11 then @s_w_id11
                              when 12 then @s_w_id12
                              when 13 then @s_w_id13
                              when 14 then @s_w_id14
                              when 15 then @s_w_id15
                              end,

                   @li_qty = case  @li_no
                             when 1 then @ol_qty1
                             when 2 then @ol_qty2
                             when 3 then @ol_qty3
                             when 4 then @ol_qty4
                             when 5 then @ol_qty5
                             when 6 then @ol_qty6
                             when 7 then @ol_qty7
                             when 8 then @ol_qty8
                             when 9 then @ol_qty9
                             when 10 then @ol_qty10
                             when 11 then @ol_qty11
                             when 12 then @ol_qty12
                             when 13 then @ol_qty13
                             when 14 then @ol_qty14
                             when 15 then @ol_qty15
                             end

--  get item data (no one updates item)

            select     @i_price = i_price,
                  @i_name  = i_name,
                  @i_data  = i_data
            from  item (tablock repeatableread)
            where i_id = @li_id
```

```
--  update stock values

          update    stock
          set  s_ytd     = s_ytd + @li_qty,
               @s_quantity     = s_quantity   = s_quantity - @li_qty +
                                    case when (s_quantity - @li_qty < 10)
then 91 else 0 end,
               s_order_cnt     = s_order_cnt + 1,
               s_remote_cnt    = s_remote_cnt + case when (@li_s_w_id =
@w_id) then 0 else 1 end,
               @s_data         = s_data,
               @s_dist         = case @d_id
                            when 1  then s_dist_01
                            when 2  then s_dist_02
                            when 3  then s_dist_03
                            when 4  then s_dist_04
                            when 5  then s_dist_05
                            when 6  then s_dist_06
                            when 7  then s_dist_07
                            when 8  then s_dist_08
                            when 9  then s_dist_09
                            when 10 then s_dist_10
                            end
          where s_i_id          = @li_id and
               s_w_id          = @li_s_w_id

--  if there actually is a stock (and item) with these ids, go to work

          if (@@rowcount > 0)
          begin

--  insert order_line data (using data from item and stock)

               insert into order_line values(@o_id,
                                    @d_id,
                                    @w_id,
                                    @li_no,
                                    @li_id,
                                    @li_s_w_id,
                                    "dec 31, 1899",
                                    @li_qty,
                                    @i_price * @li_qty,
                                    @s_dist)

--  send line-item data to client

               select    @i_name,
                    @s_quantity,
                    b_g = case when ( (patindex("%ORIGINAL%",@i_data) > 0)
and
                                   (patindex("%ORIGINAL%",@s_data) > 0) )
                                        then "B" else "G" end,
                    @i_price,
                    @i_price * @li_qty

          end
          else
          begin

--  no item (or stock) found - triggers rollback condition

               select "",0,"",0,0
               select @commit_flag = 0

          end
     end

--  get customer last name, discount, and credit rating

     select    @c_last     = c_last,
          @c_discount = c_discount,
          @c_credit   = c_credit,
          @c_id_local = c_id
     from customer (repeatableread)
     where c_id       = @c_id and
          c_w_id          = @w_id and
          c_d_id          = @d_id

--  insert fresh row into orders table

     insert into orders values (     @o_id,
                           @d_id,
                           @w_id,
                           @c_id_local,
                           @o_entry_d,
                           0,
                           @o_ol_cnt,
                           @o_all_local)

--  insert corresponding row into new-order table

     insert into new_order values (  @o_id,
                           @d_id,
                           @w_id)

--  select warehouse tax

     select    @w_tax     = w_tax
     from warehouse (repeatableread)
     where w_id = @w_id

     if (@commit_flag = 1)
          commit transaction n
```

```
     else

--  all that work for nuthin!!!

           rollback transaction n

--  return order data to client

     select    @w_tax,
          @d_tax,
          @o_id,
          @c_last,
          @c_discount,
          @c_credit,
          @o_entry_d,
          @commit_flag

end

go
```

ORDSTAT.SQL

```
--  File:     ORDSTAT.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Creates order status transaction stored procedure
--
--    Interface Level: 4.10.000

use tpcc
go

if exists ( select name from sysobjects where name = "tpcc_orderstatus" )
     drop procedure   tpcc_orderstatus
go

create proc tpcc_orderstatus    @w_id smallint,
                     @d_id tinyint,
                     @c_id int,
                     @c_last    char(16) = ""

as

declare @c_balance         numeric(12,2),
        @c_first           char(16),
        @c_middle          char(2),
        @o_id              int,
        @o_entry_d         datetime,
        @o_carrier_id      smallint,
        @cnt               smallint

begin tran o

if (@c_id = 0)
     begin

--  get customer id and info using last name

           select    @cnt = (count(*)+1)/2
           from customer (repeatableread)
           where c_last     = @c_last and
                c_w_id     = @w_id and
                c_d_id     = @d_id

           set  rowcount @cnt

           select    @c_id      = c_id,
                @c_balance = c_balance,
                   @c_first     = c_first,
                   @c_last = c_last,
                   @c_middle    = c_middle
           from customer (repeatableread)
           where c_last          = @c_last and
                c_w_id          = @w_id and
                c_d_id          = @d_id
           order by c_w_id, c_d_id, c_last, c_first

           set  rowcount 0
     end

     else

     begin

--  get customer info if by id

           select    @c_balance = c_balance,
                @c_first   = c_first,
                @c_middle  = c_middle,
                @c_last         = c_last
           from customer (repeatableread)
           where c_id       = @c_id and
                c_d_id          = @d_id and
                c_w_id          = @w_id

           select    @cnt = @@rowcount

     end

--  if no such customer

     if (@cnt = 0)
```

```
     begin
          raiserror("Customer not found",18,1)
          goto custnotfound
     end

--  get order info

     select    @o_id      = o_id,
          @o_entry_d = o_entry_d,
          @o_carrier_id   = o_carrier_id
     from  orders (serializable)
     where o_c_id          = @c_id and
          o_d_id          = @d_id and
          o_w_id          = @w_id
     order by o_id asc

--  select order lines for the current order

     select    ol_supply_w_id,
          ol_i_id,
          ol_quantity,
          ol_amount,
          ol_delivery_d
     from  order_line (repeatableread)
     where ol_o_id = @o_id and
          ol_d_id = @d_id and
          ol_w_id = @w_id

custnotfound:

commit tran o

--  return data to client

select    @c_id,
     @c_last,
     @c_first,
     @c_middle,
     @o_entry_d,
     @o_carrier_id,
     @c_balance,
     @o_id

go
```

PAYMENT.SQL

```
--  File:     PAYMENT.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Creates payment transaction stored procedure
--
--    Interface Level: 4.10.000

use tpcc
go

if exists (select name from sysobjects where name = "tpcc_payment" )
     drop procedure tpcc_payment
go

create proc tpcc_payment   @w_id           smallint,
                           @c_w_id         smallint,
                           @h_amount       numeric(6,2),
                           @d_id           tinyint,
                           @c_d_id         tinyint,
                           @c_id           int,
                           @c_last         char(16) = ""


as
declare  @w_street_1     char(20),
         @w_street_2     char(20),
         @w_city         char(20),
         @w_state        char(2),
         @w_zip          char(9),
         @w_name         char(10),
         @d_street_1     char(20),
         @d_street_2     char(20),
         @d_city         char(20),
         @d_state        char(2),
         @d_zip          char(9),
         @d_name         char(10),
         @c_first        char(16),
         @c_middle       char(2),
         @c_street_1     char(20),
         @c_street_2     char(20),
         @c_city         char(20),
         @c_state        char(2),
         @c_zip          char(9),
         @c_phone        char(16),
         @c_since        datetime,
         @c_credit       char(2),
         @c_credit_lim   numeric(12,2),
         @c_balance      numeric(12,2),
         @c_discount     numeric(4,4),
         @data           char(500),
         @c_data         char(500),
         @datetime       datetime,
         @w_ytd          numeric(12,2),
         @d_ytd          numeric(12,2),
         @cnt            smallint,
         @val            smallint,
```

```
        @screen_data char(200),
      @d_id_local     tinyint,
      @w_id_local     smallint,
      @c_id_local     int

select @screen_data = ""

begin tran p

--  get payment date

     select     @datetime = getdate()

     if (@c_id = 0)
     begin

--  get customer id and info using last name

          select     @cnt = count(*)
          from customer (repeatableread)
          where c_last     = @c_last and
                c_w_id     = @c_w_id and
                c_d_id     = @c_d_id

          select     @val = (@cnt + 1) / 2
          set  rowcount @val

          select     @c_id= c_id
          from customer (repeatableread)
          where c_last     = @c_last and
                c_w_id     = @c_w_id and
                c_d_id     = @c_d_id
          order by c_last, c_first

          set  rowcount 0
     end

--  get customer info and update balances

     update     customer
     set  @c_balance = c_balance     = c_balance - @h_amount,
          c_payment_cnt   = c_payment_cnt + 1,
          c_ytd_payment   = c_ytd_payment + @h_amount,
          @c_first   = c_first,
          @c_middle  = c_middle,
          @c_last         = c_last,
          @c_street_1     = c_street_1,
          @c_street_2     = c_street_2,
          @c_city         = c_city,
          @c_state   = c_state,
          @c_zip          = c_zip,
          @c_phone   = c_phone,
          @c_credit  = c_credit,
          @c_credit_lim   = c_credit_lim,
          @c_discount     = c_discount,
          @c_since   = c_since,
          @data      = c_data,
          @c_id_local     = c_id
     where c_id       = @c_id and
          c_w_id          = @c_w_id and
          c_d_id          = @c_d_id

--  if customer has bad credit get some more info

     if (@c_credit = "BC")
     begin

--   compute new info

          select @c_data  = convert(char(5),@c_id) +
                       convert(char(4),@c_d_id) +
                       convert(char(5),@c_w_id) +
                       convert(char(4),@d_id) +
                       convert(char(5),@w_id) +
                       convert(char(19),@h_amount) +
                       substring(@data, 1, 458)

--  update customer info

          update     customer
          set  c_data     = @c_data
          where c_id = @c_id and
               c_w_id     = @c_w_id and
               c_d_id     = @c_d_id

          select     @screen_data = substring (@c_data,1,200)
     end

--  get district data and update year-to-date

     update     district
     set  d_ytd      = d_ytd + @h_amount,
          @d_street_1     = d_street_1,
          @d_street_2     = d_street_2,
          @d_city         = d_city,
          @d_state   = d_state,
          @d_zip          = d_zip,
          @d_name         = d_name,
          @d_id_local     = d_id
     where d_w_id          = @w_id and
          d_id       = @d_id

--  get warehouse data and update year-to-date
```

```
     update    warehouse
     set  w_ytd      = w_ytd + @h_amount,
          @w_street_1     = w_street_1,
          @w_street_2     = w_street_2,
          @w_city         = w_city,
          @w_state   = w_state,
          @w_zip          = w_zip,
          @w_name         = w_name,
          @w_id_local     = w_id
     where w_id      = @w_id

--  create history record

     insert into history values (    @c_id_local,
                          @c_d_id,
                          @c_w_id,
                          @d_id_local,
                          @w_id_local,
                          @datetime,
                          @h_amount,
                          @w_name + "    " + @d_name)
commit tran p

--  return data to client

select    @c_id,
     @c_last,
     @datetime,
     @w_street_1,
     @w_street_2,
     @w_city,
     @w_state,
     @w_zip,
     @d_street_1,
     @d_street_2,
     @d_city,
     @d_state,
     @d_zip,
     @c_first,
     @c_middle,
     @c_street_1,
     @c_street_2,
     @c_city,
     @c_state,
     @c_zip,
     @c_phone,
     @c_since,
     @c_credit,
     @c_credit_lim,
     @c_discount,
     @c_balance,
     @screen_data
go
```

STOCKLEV.SQL

```
--  File:     STOCKLEV.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21.000
--            Copyright Microsoft, 1999, 2000
--  Purpose:  Creates stock level transaction stored procedure
--
--   Interface Level: 4.10.000

use tpcc
go

if exists (select name from sysobjects where name = "tpcc_stocklevel" )
     drop procedure tpcc_stocklevel
go

create proc tpcc_stocklevel     @w_id           smallint,
                     @d_id           tinyint,
                     @threshhold     smallint
as

declare   @o_id_low int,
     @o_id_high int

select    @o_id_low  = (d_next_o_id - 20),
     @o_id_high = (d_next_o_id - 1)
from district
where d_w_id          = @w_id and
     d_id       = @d_id

select    count(distinct(s_i_id))
from stock, order_line
where ol_w_id         =  @w_id and
     ol_d_id          =  @d_id and
     ol_o_id             between @o_id_low and
                    @o_id_high and
     s_w_id           =  ol_w_id and
     s_i_id           =  ol_i_id and
     s_quantity <  @threshhold

go
```

VERSION.SQL

```
--  File:     VERSION.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.21.000
--            Copyright Microsoft, 1999, 2000
```

```
--  Purpose:  Returns version level of TPC-C stored procs
--  Note:     Always update the return value of this proc for
--            any interface changes or "must have" bug fixes.
--
--  The value returned by this SP defines the "interface level",
--  which must match between the stored procs and the client code.
--  The interface level may be down rev from the current kit.  This
--  indicates that the interface hasn't changed since that version.

use tpcc
go

if exists ( select name from sysobjects where name = "tpcc_version" )
     drop procedure tpcc_version
go

create proc tpcc_version
as
declare    @version   char(8)

begin
     select @version = "4.10.000"
     select @version as "Version"
end

go
```

GETARGS.C

```
//   File:      GETARGS.C
//                   Microsoft TPC-C Kit Ver. 4.20
//                   Copyright Microsoft, 1996, 1997, 1998, 1999
//   Purpose:   Source file for command line processing


// Includes
#include "tpcc.h"

//============================================================================
//
// Function name: GetArgsLoader
//
//============================================================================

void GetArgsLoader(int argc, char **argv, TPCCLDR_ARGS *pargs)
{
    int         i;
    char   *ptr;

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsLoader()\n", (int)
GetCurrentThreadId());
#endif

    /* init args struct with some useful values */
    pargs->server                    =  SERVER;
    pargs->user                      =  USER;
    pargs->password                  =  PASSWORD;
    pargs->database                  =  DATABASE;
    pargs->batch                     =  BATCH;
    pargs->num_warehouses            =  UNDEF;
     pargs->tables_all               =  TRUE;
     pargs->table_item               =  FALSE;
     pargs->table_warehouse          =  FALSE;
     pargs->table_customer      =  FALSE;
     pargs->table_orders             =  FALSE;
     pargs->loader_res_file          =  LOADER_RES_FILE;
     pargs->pack_size                =  DEFLDPACKSIZE;
     pargs->starting_warehouse  =  DEF_STARTING_WAREHOUSE;
     pargs->build_index              =  BUILD_INDEX;
     pargs->index_order              =  INDEX_ORDER;
     pargs->index_script_path   =  INDEX_SCRIPT_PATH;
     pargs->scale_down               =  SCALE_DOWN;

    /* check for zero command line args */
    if ( argc == 1 )
          GetArgsLoaderUsage();

    for (i = 1; i < argc; ++i)
    {
          if (argv[i][0] != '-' && argv[i][0] != '/')
          {
          printf("\nUnrecognized command");
          GetArgsLoaderUsage();
          exit(1);
          }

          ptr = argv[i];

          switch (ptr[1])
          {
          case 'h':     /* Fall throught */
          case 'H':
                    GetArgsLoaderUsage();
                    break;

          case 'D':
                    pargs->database = ptr+2;
                    break;

          case 'P':
                    pargs->password = ptr+2;
```

```
            break;

case 'S':
            pargs->server = ptr+2;
            break;

case 'U':
            pargs->user = ptr+2;
            break;

case 'b':
            pargs->batch = atol(ptr+2);
            break;

case 'W':
            pargs->num_warehouses = atol(ptr+2);
            break;

case 's':
            pargs->starting_warehouse = atol(ptr+2);
            break;

case 't':
            {
                  pargs->tables_all = FALSE;
                  if (strcmp(ptr+2,"item") == 0)
                        pargs->table_item = TRUE;
                  else if (strcmp(ptr+2,"warehouse") == 0)
                        pargs->table_warehouse = TRUE;
                  else if (strcmp(ptr+2,"customer") == 0)
                        pargs->table_customer = TRUE;
                  else if (strcmp(ptr+2,"orders") == 0)
                        pargs->table_orders = TRUE;
                  else
                  {
                  printf("\nUnrecognized command");
                  GetArgsLoaderUsage();
                  exit(1);
                  }

                  break;
            }

      case 'f':
            pargs->loader_res_file = ptr+2;
            break;

      case 'p':
            pargs->pack_size = atol(ptr+2);
            break;

      case 'i':
                  pargs->build_index = atol(ptr+2);
                  break;

            case 'o':
                  pargs->index_order = atol(ptr+2);
                  break;

            case 'c':
                  pargs->scale_down = atol(ptr+2);
                  break;

          case 'd':
                  pargs->index_script_path = ptr+2;
                  break;

          default:
                  GetArgsLoaderUsage();
                  exit(-1);
                  break;
          }
    }

    /* check for required args */
    if (pargs->num_warehouses == UNDEF )
    {
          printf("Number of Warehouses is required\n");
          exit(-2);
    }

    return;
}


//==============================================================================
//
// Function name: GetArgsLoaderUsage
//
//==============================================================================

void GetArgsLoaderUsage()
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsLoaderUsage()\n", (int)
GetCurrentThreadId());
#endif


    printf("TPCCLDR:\n\n");
     printf("Parameter
Default\n");
```

```
     printf("-------------------------------------------------------------
\n");
    printf("-W Number of Warehouses to Load                          Required
\n");
    printf("-S Server                                                %s\n",
SERVER);
    printf("-U Username                                              %s\n",
USER);
    printf("-P Password                                              %s\n",
PASSWORD);
    printf("-D Database                                              %s\n",
DATABASE);
     printf("-b Batch Size                                            %ld\n",
(long) BATCH);
     printf("-p TDS packet size                                       %ld\n",
(long) DEFLDPACKSIZE);
     printf("-f Loader Results Output Filename                        %s\n",
LOADER_RES_FILE);
     printf("-s Starting Warehouse                                    %ld\n",
(long) DEF_STARTING_WAREHOUSE);
     printf("-i Build Option (data = 0, data and index = 1)           %ld\n",
(long) BUILD_INDEX);
     printf("-o Cluster Index Build Order (before = 1, after = 0)     %ld\n",
(long) INDEX_ORDER);
     printf("-c Build Scaled Database (normal = 0, tiny = 1)          %ld\n",
(long) SCALE_DOWN);
     printf("-d Index Script Path                                     %s\n",
INDEX_SCRIPT_PATH);
     printf("-t Table to Load                                         all
tables \n");
    printf("   [item|warehouse|customer|orders]\n");
    printf("   Notes: \n");
    printf("     - the '-t' parameter may be included multiple times to
\n");
    printf("       specify multiple tables to be loaded \n");
    printf("     - 'item' loads ITEM table \n");
    printf("     - 'warehouse' loads WAREHOUSE, DISTRICT, and STOCK tables
\n");
    printf("     - 'customer' loads CUSTOMER and HISTORY tables \n");
    printf("     - 'orders' load NEW-ORDER, ORDERS, ORDER-LINE tables \n");

     printf("\nNote:  Command line switches are case sensitive.\n");

    exit(0);
}
```

RANDOM.C

```
//   File:      RANDOM.C
//                    Microsoft TPC-C Kit Ver. 4.20
//                    Copyright Microsoft, 1996, 1997, 1998, 1999
//   Purpose:   Random number generation routines for database loader


// Includes
#include "tpcc.h"
#include "math.h"

// Defines
#define A            16807
#define M       2147483647
#define Q           127773      /* M div A */
#define R             2836      /* M mod A */
#define Thread  __declspec(thread)

// Globals
long  Thread Seed = 0;       /* thread local seed */

/*****************************************************************************
***
*
*
* random -
*
*       Implements a GOOD pseudo random number generator.  This generator
*
*       will/should? run the complete period before repeating.
*
*
*
* Copied from:
*
*       Random Numbers Generators: Good Ones Are Hard to Find.
*
*       Communications of the ACM - October 1988 Volume 31 Number 10
*
*
*
* Machine Dependencies:
*
*       long must be 2 ^ 31 - 1 or greater.
*
*
*
*****************************************************************************
**/

/*****************************************************************************
***
* seed - load the Seed value used in irand and drand.  Should be used before
*
```

```
*       first call to irand or drand.
*
*************************************************************************
**/

void seed(long val)
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering seed()...\n", (int) GetCurrentThreadId());
     printf("Old Seed %ld New Seed %ld\n",Seed, val);
#endif

    if ( val < 0 )
         val = abs(val);

    Seed = val;

}


/*************************************************************************
**
*
* irand - returns a 32 bit integer pseudo random number with a period of
*
*       1 to 2 ^ 32 - 1.
*
*
*
* parameters:
*
*       none.
*
*
*
* returns:
*
*       32 bit integer - defined as long ( see above ).
*
*
*
* side effects:
*
*       seed get recomputed.
*
*************************************************************************
*/

long irand()
{
    register long    s;      /* copy of seed */
    register long    test;   /* test flag */
    register long    hi;     /* tmp value for speed */
    register long    lo;     /* tmp value for speed */

#ifdef DEBUG
    printf("[%ld]DBG: Entering irand()...\n", (int) GetCurrentThreadId());
#endif

    s = Seed;
    hi = s / Q;
    lo = s % Q;

    test = A * lo - R * hi;
    if ( test > 0 )
           Seed = test;
    else
           Seed = test + M;

    return( Seed );
}


/*************************************************************************
**
*
* drand - returns a double pseudo random number between 0.0 and 1.0.
*
*       See irand.
*
*************************************************************************
*/
double drand()
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering drand()...\n", (int) GetCurrentThreadId());
#endif

    return( (double)irand() / 2147483647.0);
}


//=========================================================================
// Function   : RandomNumber
//
// Description:
//=========================================================================
long RandomNumber(long lower, long upper)
{
    long rand_num;
```

```
#ifdef DEBUG
    printf("[%ld]DBG: Entering RandomNumber()...\n", (int)
GetCurrentThreadId());
#endif

     if ( upper == lower )/* pgd 08-13-96 perf enhancement */
          return lower;

     upper++;

    if ( upper <= lower )
          rand_num = upper;
    else
          rand_num = lower + irand() % (upper - lower); /* pgd 08-13-96 perf
enhancement */


#ifdef DEBUG
    printf("[%ld]DBG: RandomNumber between %ld & %ld ==> %ld\n",
                     (int) GetCurrentThreadId(), lower, upper, rand_num);
#endif


    return rand_num;
}


#if 0

//Orginal code pgd 08/13/96

long RandomNumber(long lower,
                       long upper)
{
    long rand_num;

#ifdef DEBUG
    printf("[%ld]DBG: Entering RandomNumber()...\n", (int)
GetCurrentThreadId());
#endif

     upper++;

    if ((upper <= lower))
          rand_num = upper;
    else
          rand_num = lower + irand() % ((upper > lower) ? upper - lower :
upper);


#ifdef DEBUG
    printf("[%ld]DBG: RandomNumber between %ld & %ld ==> %ld\n",
                     (int) GetCurrentThreadId(), lower, upper, rand_num);
#endif


    return rand_num;
}
#endif

//=============================================================================
// Function   : NURand
//
// Description:
//=============================================================================
long NURand(int iConst,
         long x,
         long y,
         long C)
{
    long rand_num;

#ifdef DEBUG
    printf("[%ld]DBG: Entering NURand()...\n", (int) GetCurrentThreadId());
#endif

    rand_num = (((RandomNumber(0,iConst) | RandomNumber(x,y)) + C) % (y-
x+1))+x;

#ifdef DEBUG
    printf("[%ld]DBG: NURand: num = %d\n", (int) GetCurrentThreadId(),
rand_num);
#endif

    return rand_num;
}
```

STRINGS.C

```
//   File:      STRINGS.C
//                   Microsoft TPC-C Kit Ver. 4.20
//                   Copyright Microsoft, 1996, 1997, 1998, 1999
//   Purpose:   Source file for database loader string functions


// Includes
#include "tpcc.h"
#include <string.h>
#include <ctype.h>
```

```
//==========================================================================
//
// Function name: MakeAddress
//
//==========================================================================

void MakeAddress(char *street_1,
                      char *street_2,
                      char *city,
                      char *state,
                      char *zip)
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeAddress()\n", (int)
GetCurrentThreadId());
#endif

    MakeAlphaString (10, 20, ADDRESS_LEN, street_1);
    MakeAlphaString (10, 20, ADDRESS_LEN, street_2);
    MakeAlphaString (10, 20, ADDRESS_LEN, city);
    MakeAlphaString ( 2,  2, STATE_LEN, state);
    MakeZipNumberString( 9,  9, ZIP_LEN, zip);

#ifdef DEBUG
    printf("[%ld]DBG: MakeAddress: street_1: %s, street_2: %s, city: %s,
state: %s, zip: %s\n",
                (int) GetCurrentThreadId(), street_1, street_2, city, state,
zip);
#endif

    return;

}


//==========================================================================
//
// Function name: LastName
//
//==========================================================================

void LastName(int  num,
                 char *name)
{
    static char *n[] =
    {
          "BAR" , "OUGHT", "ABLE" , "PRI"  , "PRES",
          "ESE" , "ANTI" , "CALLY", "ATION", "EING"
    };

#ifdef DEBUG
    printf("[%ld]DBG: Entering LastName()\n", (int) GetCurrentThreadId());
#endif

    if ((num >= 0) && (num < 1000))
    {
          strcpy(name, n[(num/100)%10]);
          strcat(name, n[(num/10)%10]);
          strcat(name, n[(num/1)%10]);

          if (strlen(name) < LAST_NAME_LEN)
          {
               PaddString(LAST_NAME_LEN, name);
          }

    }
    else
    {
          printf("\nError in LastName()... num <%ld> out of range
(0,999)\n", num);
          exit(-1);
    }


#ifdef DEBUG
    printf("[%ld]DBG: LastName: num = [%d] ==> [%d][%d][%d]\n",
                (int) GetCurrentThreadId(), num, num/100, (num/10)%10,
num%10);
     printf("[%ld]DBG: LastName: String = %s\n", (int) GetCurrentThreadId(),
name);
#endif

    return;

}


//==========================================================================
//
// Function name: MakeAlphaString
//
//==========================================================================

//philipdu 08/13/96 Changed MakeAlphaString to use A-Z, a-z, and 0-9 in
//accordance with spec see below:
//The spec says:
//4.3.2.2  The notation random a-string [x .. y]
//(respectively, n-string [x .. y]) represents a string of random
alphanumeric
//(respectively, numeric) characters of a random length of minimum x,
maximum y,
//and mean (y+x)/2. Alphanumerics are A..Z, a..z, and 0..9.  The only other
```

```
//requirement is that the character set used "must be able to represent a
minimum
//of 128 different characters".  We are using 8-bit chars, so this is a non
issue.
//It is completely unreasonable to stuff non-printing chars into the text
fields.
//-CLevine 08/13/96

int MakeAlphaString( int  x, int  y, int  z, char *str)
{
     int        len;
     int        i;
    char    cc = 'a';
     static     char chArray[] =
"0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz";
     static     int  chArrayMax = 61;

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeAlphaString()\n", (int)
GetCurrentThreadId());
#endif

     len= RandomNumber(x, y);

     for (i=0; i<len; i++)
     {
          cc = chArray[RandomNumber(0, chArrayMax)];
        str[i] = cc;
    }
     if ( len < z )
          memset(str+len, ' ', z - len);
     str[len] = 0;

    return len;
}


//============================================================================
//
// Function name: MakeOriginalAlphaString
//
//============================================================================

int MakeOriginalAlphaString(int  x,
                                    int  y,
                                     int  z,
                                    char *str,
                                int  percent)
{
    int         len;
    int         val;
    int         start;


#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeOriginalAlphaString()\n", (int)
GetCurrentThreadId());
#endif

    // verify prercentage is valid
    if ((percent < 0) || (percent > 100))
    {
           printf("MakeOrigianlAlphaString: Invalid percentage: %d\n",
percent);
           exit(-1);
    }

    // verify string is at least 8 chars in length
    if ((x + y) <= 8)
    {
           printf("MakeOriginalAlphaString: string length must be >= 8\n");
           exit(-1);
    }

    // Make Alpha String
    len = MakeAlphaString(x,y, z, str);

    val = RandomNumber(1,100);
    if (val <= percent)
    {
           start = RandomNumber(0, len - 8);
           strncpy(str + start, "ORIGINAL", 8);
    }


#ifdef DEBUG
    printf("[%ld]DBG: MakeOriginalAlphaString: : %s\n",
                (int) GetCurrentThreadId(), str);
#endif

    return strlen(str);
}


//============================================================================
//
// Function name: MakeNumberString
//
//============================================================================
int MakeNumberString(int  x, int  y, int  z, char *str)
{
     char tmp[16];

     //MakeNumberString is always called MakeZipNumberString(16, 16, 16,
string)
```

```
     memset(str, '0', 16);
     itoa(RandomNumber(0, 99999999), tmp, 10);
     memcpy(str, tmp, strlen(tmp));

     itoa(RandomNumber(0, 99999999), tmp, 10);
     memcpy(str+8, tmp, strlen(tmp));

     str[16] = 0;

    return 16;
}


//============================================================================
//
// Function name: MakeZipNumberString
//
//============================================================================
int MakeZipNumberString(int  x, int  y, int  z, char *str)
{
     char tmp[16];

     //MakeZipNumberString is always called MakeZipNumberString(9, 9, 9,
string)

     strcpy(str, "000011111");

     itoa(RandomNumber(0, 9999), tmp, 10);
     memcpy(str, tmp, strlen(tmp));

    return 9;
}


//============================================================================
//
// Function name: InitString
//
//============================================================================
void InitString(char *str, int len)
{
#ifdef DEBUG
    printf("[%ld]DBG: Entering InitString()\n", (int) GetCurrentThreadId());
#endif

     memset(str, ' ', len);
    str[len] = 0;
}


//============================================================================
```

```
// Function name: InitAddress
//
// Description:
//
//============================================================================

void InitAddress(char *street_1, char *street_2, char *city, char *state,
char *zip)
{
     memset(street_1, ' ', ADDRESS_LEN+1);
     memset(street_2, ' ', ADDRESS_LEN+1);
     memset(city, ' ', ADDRESS_LEN+1);

    street_1[ADDRESS_LEN+1] = 0;
    street_2[ADDRESS_LEN+1] = 0;
    city[ADDRESS_LEN+1]     = 0;

     memset(state, ' ', STATE_LEN+1);
    state[STATE_LEN+1] = 0;

     memset(zip, ' ', ZIP_LEN+1);
    zip[ZIP_LEN+1] = 0;
}


//============================================================================
//
// Function name: PaddString
//
//============================================================================

void PaddString(int max, char *name)
{
     int        len;

     len = strlen(name);
     if ( len < max )
          memset(name+len, ' ', max - len);
     name[max] = 0;

     return;
}
```

TIME.C

```
//   File:      TIME.C
//                   Microsoft TPC-C Kit Ver. 4.20
//                   Copyright Microsoft, 1996, 1997, 1998, 1999
//   Purpose:   Source file for time functions
```

```
// Includes
#include "tpcc.h"

// Globals
static long start_sec;


//====================================================================
//
// Function name: TimeNow
//
//====================================================================

long TimeNow()
{
   long         time_now;
   struct  _timeb el_time;

#ifdef DEBUG
    printf("[%ld]DBG: Entering TimeNow()\n", (int) GetCurrentThreadId());
#endif

   _ftime(&el_time);

   time_now = ((el_time.time - start_sec) * 1000) + el_time.millitm;

   return time_now;
}
```

TPCC.H

```
//   File:      TPCC.H
//                   Microsoft TPC-C Kit Ver. 4.20
//                   Copyright Microsoft, 1996, 1997, 1998, 1999
//   Purpose:   Header file for TPC-C database loader


// Build number of TPC Benchmark Kit
#define TPCKIT_VER   "4.20"

// General headers
#include <windows.h>
#include <winbase.h>
#include <stdlib.h>
#include <stdio.h>
#include <process.h>
#include <stddef.h>
#include <stdarg.h>
#include <string.h>
#include <time.h>
#include <sys\timeb.h>
#include <sys\types.h>

// ODBC headers
#include <sql.h>
#include <sqlext.h>
#include <odbcss.h>

// General constants
#define MILLI                    1000
#define FALSE                       0
#define TRUE                        1
#define UNDEF                         -1
#define MINPRINTASCII              32
#define MAXPRINTASCII             126

// Default environment constants
#define SERVER                      ""
#define DATABASE                    "tpcc"
#define USER                        "sa"
#define PASSWORD                   ""

// Default loader arguments
#define BATCH                   10000
#define DEFLDPACKSIZE           32768
#define LOADER_RES_FILE           "logs\\load.out"
#define LOADER_NURAND_C                123
#define DEF_STARTING_WAREHOUSE       1
#define BUILD_INDEX                         1    // build both data and
indexes
#define INDEX_ORDER                         1    // build indexes before load
#define SCALE_DOWN                          0   // build a normal scale
database
#define INDEX_SCRIPT_PATH  "scripts"

typedef struct
{
    char                  *server;
    char                  *database;
    char                  *user;
    char                  *password;
     BOOL                 tables_all;               // set if loading all
tables
     BOOL                 table_item;               // set if loading ITEM
table specifically
     BOOL                 table_warehouse;     // set if loading WAREHOUSE,
DISTRICT, and STOCK
     BOOL                 table_customer;      // set if loading CUSTOMER
and HISTORY
     BOOL                 table_orders;        // set if loading NEW-ORDER,
ORDERS, ORDER-LINE
```

```
    long                        num_warehouses;
    long                        batch;
    long                        verbose;
     long                       pack_size;
     char                   *loader_res_file;
     char                   *synch_servername;
     long                   case_sensitivity;
     long                   starting_warehouse;
     long                   build_index;
     long                   index_order;
     long                   scale_down;
     char                   *index_script_path;
} TPCCLDR_ARGS;

// String length constants
     #define SERVER_NAME_LEN            20
     #define DATABASE_NAME_LEN          20
     #define USER_NAME_LEN              20
     #define PASSWORD_LEN               20
     #define TABLE_NAME_LEN             20
     #define I_DATA_LEN                 50
     #define I_NAME_LEN                 24
     #define BRAND_LEN                   1
     #define LAST_NAME_LEN              16
     #define W_NAME_LEN                 10
     #define ADDRESS_LEN                20
     #define STATE_LEN                   2
     #define ZIP_LEN                     9
     #define S_DIST_LEN                 24
     #define S_DATA_LEN                 50
     #define D_NAME_LEN                 10
     #define FIRST_NAME_LEN             16
     #define MIDDLE_NAME_LEN             2
     #define PHONE_LEN                  16
     #define CREDIT_LEN                  2
     #define C_DATA_LEN                500
     #define H_DATA_LEN                 24
     #define DIST_INFO_LEN              24
     #define MAX_OL_NEW_ORDER_ITEMS     15
     #define MAX_OL_ORDER_STATUS_ITEMS  15
     #define STATUS_LEN                 25
     #define OL_DIST_INFO_LEN           24
     #define C_SINCE_LEN                     23
     #define H_DATE_LEN                      23
     #define OL_DELIVERY_D_LEN          23
     #define O_ENTRY_D_LEN              23


// Functions in random.c
void       seed();
long       irand();
double     drand();
void WUCreate();
short WURand();
long RandomNumber(long lower, long upper);

// Functions in getargs.c;
void GetArgsLoader();
void GetArgsLoaderUsage();

// Functions in time.c
long TimeNow();

// Functions in strings.c
void MakeAddress();
void LastName();
int  MakeAlphaString();
int  MakeOriginalAlphaString();
int  MakeNumberString();
int  MakeZipNumberString();
void InitString();
void InitAddress();
void PaddString();
```

TPCCLDR.C

```
//   File:      TPCCLDR.C
//                   Microsoft TPC-C Kit Ver. 4.20
//                   Copyright Microsoft, 1996, 1997, 1998, 1999
//   Purpose:   Source file for TPC-C database loader


// Includes
#include "tpcc.h"
#include "search.h"

// Defines
#define MAXITEMS                100000
#define MAXITEMS_SCALE_DOWN          100
#define CUSTOMERS_PER_DISTRICT  3000
#define CUSTOMERS_SCALE_DOWN    30
#define DISTRICT_PER_WAREHOUSE  10
#define ORDERS_PER_DISTRICT     3000
#define ORDERS_SCALE_DOWN       30
#define MAX_CUSTOMER_THREADS    2
#define MAX_ORDER_THREADS       3
#define MAX_MAIN_THREADS        4

// Functions declarations

void HandleErrorDBC (SQLHDBC  hdbc1);

void CheckSQL();
```

```
void CheckDataBase();

long NURand();
void LoadItem();
void LoadWarehouse();

void Stock();
void District();

void LoadCustomer();
void CustomerBufInit();
void CustomerBufLoad();
void LoadCustomerTable();
void LoadHistoryTable();

void LoadOrders();
void OrdersBufInit();
void OrdersBufLoad();
void LoadOrdersTable();
void LoadNewOrderTable();
void LoadOrderLineTable();
void GetPermutation();
void CheckForCommit();
void OpenConnections();
void BuildIndex();
void FormatDate ();

// Shared memory structures

typedef struct
{
    long                ol;
    long                ol_i_id;
    short               ol_supply_w_id;
    short               ol_quantity;
    double              ol_amount;
    char                ol_dist_info[DIST_INFO_LEN+1];
     char                  ol_delivery_d[OL_DELIVERY_D_LEN+1];
} ORDER_LINE_STRUCT;

typedef struct
{
    long                o_id;
    short               o_d_id;
    short               o_w_id;
    long                o_c_id;
    short               o_carrier_id;
    short               o_ol_cnt;
    short               o_all_local;
     ORDER_LINE_STRUCT   o_ol[15];
} ORDERS_STRUCT;

typedef struct
{
    long                c_id;
    short               c_d_id;
    short               c_w_id;
     char               c_first[FIRST_NAME_LEN+1];
    char                c_middle[MIDDLE_NAME_LEN+1];
    char                c_last[LAST_NAME_LEN+1];
    char                c_street_1[ADDRESS_LEN+1];
    char                c_street_2[ADDRESS_LEN+1];
    char                c_city[ADDRESS_LEN+1];
    char                c_state[STATE_LEN+1];
    char                c_zip[ZIP_LEN+1];
    char                c_phone[PHONE_LEN+1];
    char                c_credit[CREDIT_LEN+1];
    double              c_credit_lim;
    double              c_discount;
//  fix to avoid ODBC float to numeric conversion problem.
//  double              c_balance;
     char               c_balance[6];

    double              c_ytd_payment;
     short              c_payment_cnt;
     short              c_delivery_cnt;
     char               c_data[C_DATA_LEN+1];
     double                  h_amount;
    char                h_data[H_DATA_LEN+1];
} CUSTOMER_STRUCT;

typedef struct
{
     char               c_last[LAST_NAME_LEN+1];
     char               c_first[FIRST_NAME_LEN+1];
    long                c_id;
} CUSTOMER_SORT_STRUCT;

typedef struct
{
    long            time_start;
} LOADER_TIME_STRUCT;


// Global variables

char  szLastError[300];

HENV henv;

HDBC v_hdbc;                            // for SQL Server version
verification
HDBC i_hdbc1;                       // for ITEM table
HDBC w_hdbc1;                       // for WAREHOUSE, DISTRICT, STOCK
```

```
HDBC c_hdbc1;                        // for CUSTOMER
HDBC c_hdbc2;                        // for HISTORY
HDBC o_hdbc1;                        // for ORDERS
HDBC o_hdbc2;                        // for NEW-ORDER
HDBC o_hdbc3;                        // for ORDER-LINE

HSTMT v_hstmt;                       // for SQL Server version verification
HSTMT i_hstmt1;
HSTMT w_hstmt1;
HSTMT c_hstmt1, c_hstmt2;
HSTMT o_hstmt1, o_hstmt2, o_hstmt3;

ORDERS_STRUCT   orders_buf[ORDERS_PER_DISTRICT];
CUSTOMER_STRUCT customer_buf[CUSTOMERS_PER_DISTRICT];
long            orders_rows_loaded;
long            new_order_rows_loaded;
long            order_line_rows_loaded;
long            history_rows_loaded;
long            customer_rows_loaded;
long            stock_rows_loaded;
long            district_rows_loaded;
long            item_rows_loaded;
long            warehouse_rows_loaded;
long            main_time_start;
long            main_time_end;
long            max_items;
long            customers_per_district;
long            orders_per_district;
long            first_new_order;
long            last_new_order;


TPCCLDR_ARGS    *aptr, args;


//============================================================================
//
// Function name: main
//
//============================================================================

int main(int  argc, char **argv)
{

     DWORD          dwThreadID[MAX_MAIN_THREADS];
     HANDLE         hThread[MAX_MAIN_THREADS];
     FILE           *fLoader;
     char           buffer[255];
     int                 i;

     for (i=0; i<MAX_MAIN_THREADS; i++)
          hThread[i] = NULL;


    printf("\n*************************************************");
     printf("\n*                                               *");
     printf("\n*  Microsoft SQL Server                         *");
     printf("\n*                                               *");
     printf("\n*  TPC-C BENCHMARK KIT:  Database loader        *");
     printf("\n*  Version %s                                 *",
TPCKIT_VER);
     printf("\n*                                               *");
     printf("\n*************************************************\n\n");

    // process command line arguments

    aptr = &args;
    GetArgsLoader(argc, argv, aptr);

     // verify correct SQL Server version in use
     // you must be using SQL Server 7.00.623 or better to load

     CheckSQL();

     // verify database and tables exist before attempting to load

     CheckDataBase();

     printf("Build interface is ODBC.\n");

     if (aptr->build_index == 0)
          printf("Data load only - no index creation.\n");
     else
          printf("Data load and index creation.\n");

     if (aptr->index_order == 0)
          printf("Clustered indexes will be created after bulk load.\n");
     else
          printf("Clustered indexes will be created before bulk load.\n");

     // set database scale values
     if (aptr->scale_down == 1)
     {
          printf("*** Scaled Down Database ***\n");
          max_items = MAXITEMS_SCALE_DOWN;
          customers_per_district = CUSTOMERS_SCALE_DOWN;
          orders_per_district = ORDERS_SCALE_DOWN;
          first_new_order = 0;
          last_new_order  = 30;
     }
     else
     {
          max_items = MAXITEMS;
          customers_per_district = CUSTOMERS_PER_DISTRICT;
          orders_per_district = ORDERS_PER_DISTRICT;
```

```
          first_new_order = 2100;
          last_new_order  = 3000;
     }


     // open connections to SQL Server

     OpenConnections();

     // open file for loader results
    fLoader = fopen(aptr->loader_res_file, "w");

    if (fLoader == NULL)
     {
          printf("Error, loader result file open failed.");
          exit(-1);
     }

    // start loading data

    sprintf(buffer,"TPC-C load started for %ld warehouses.\n",aptr-
>num_warehouses);

     printf("%s",buffer);
     fprintf(fLoader,"%s",buffer);

     main_time_start = (TimeNow() / MILLI);

     // start parallel load threads


     if (aptr->tables_all || aptr->table_item)
     {
          fprintf(fLoader, "\nStarting loader threads for: item\n");

          hThread[0] = CreateThread(NULL,
                                    0,
                                    (LPTHREAD_START_ROUTINE)
LoadItem,
                                    NULL,
                                    0,
                                    &dwThreadID[0]);

          if (hThread[0] == NULL)
          {
               printf("Error, failed in creating creating thread = 0.\n");
               exit(-1);
          }
     }

     if (aptr->tables_all || aptr->table_warehouse)
     {
          fprintf(fLoader, "Starting loader threads for: warehouse\n");

          hThread[1] = CreateThread(NULL,
                                    0,
                                    (LPTHREAD_START_ROUTINE)
LoadWarehouse,
                                    NULL,
                                    0,
                                    &dwThreadID[1]);

          if (hThread[1] == NULL)
          {
               printf("Error, failed in creating creating thread = 1.\n");
               exit(-1);
          }
     }

     if (aptr->tables_all || aptr->table_customer)
     {
          fprintf(fLoader, "Starting loader threads for: customer\n");

          hThread[2] = CreateThread(NULL,
                                    0,
                                    (LPTHREAD_START_ROUTINE)
LoadCustomer,
                                    NULL,
                                    0,
                                    &dwThreadID[2]);

          if (hThread[2] == NULL)
          {
               printf("Error, failed in creating creating main thread =
2.\n");
               exit(-1);
          }
     }

     if (aptr->tables_all || aptr->table_orders)
     {
          fprintf(fLoader, "Starting loader threads for: orders\n");

          hThread[3] = CreateThread(NULL,
                                    0,
                                    (LPTHREAD_START_ROUTINE)
LoadOrders,
                                    NULL,
                                    0,
                                    &dwThreadID[3]);

          if (hThread[3] == NULL)
          {
```

```
                printf("Error, failed in creating creating main thread =
3.\n");
                exit(-1);
           }
     }

     // Wait for threads to finish...
     for (i=0; i<MAX_MAIN_THREADS; i++)
     {
          if (hThread[i] != NULL)
          {
               WaitForSingleObject( hThread[i], INFINITE );
               CloseHandle(hThread[i]);
               hThread[i] = NULL;
          }
     }

     main_time_end = (TimeNow() / MILLI);

    sprintf(buffer,"\nTPC-C load completed successfully in %ld minutes.\n",
               (main_time_end - main_time_start)/60);

     printf("%s",buffer);
     fprintf(fLoader, "%s", buffer);

     fclose(fLoader);

     SQLFreeEnv(henv);

    exit(0);

     return 0;
}


//==============================================================================
//
// Function name: LoadItem
//
//==============================================================================

void LoadItem()
{
    long        i_id;
     long       i_im_id;
    char        i_name[I_NAME_LEN+1];
    double      i_price;
    char        i_data[I_DATA_LEN+1];
     char       name[20];
     long       time_start;
     RETCODE         rc;
     DBINT      rcint;
     char       bcphint[128];

     // Seed with unique number
     seed(1);

     printf("Loading item table...\n");

     // if build index before load
     if ((aptr->build_index == 1) && (aptr->index_order == 1))
          BuildIndex("idxitmcl");

     InitString(i_name, I_NAME_LEN+1);
     InitString(i_data, I_DATA_LEN+1);

     sprintf(name, "%s..%s", aptr->database, "item");

     rc = bcp_init(i_hdbc1, name, NULL, "logs\\item.err", DB_IN);
     if (rc != SUCCEED)
          HandleErrorDBC(i_hdbc1);

     if ((aptr->build_index == 1) && (aptr->index_order == 1))
     {
          sprintf(bcphint, "tablock, order (i_id), ROWS_PER_BATCH =
100000");
          rc = bcp_control(i_hdbc1, BCPHINTS, (void*) bcphint);
          if (rc != SUCCEED)
               HandleErrorDBC(i_hdbc1);
     }

     rc = bcp_bind(i_hdbc1, (BYTE *) &i_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
     if (rc != SUCCEED)
          HandleErrorDBC(i_hdbc1);

     rc = bcp_bind(i_hdbc1, (BYTE *) &i_im_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 2);
     if (rc != SUCCEED)
          HandleErrorDBC(i_hdbc1);

     rc = bcp_bind(i_hdbc1, (BYTE *) i_name, 0, I_NAME_LEN, NULL, 0, 0, 3);
     if (rc != SUCCEED)
          HandleErrorDBC(i_hdbc1);

     rc = bcp_bind(i_hdbc1, (BYTE *) &i_price, 0, SQL_VARLEN_DATA, NULL, 0,
SQLFLT8, 4);
     if (rc != SUCCEED)
          HandleErrorDBC(i_hdbc1);

     rc = bcp_bind(i_hdbc1, (BYTE *) i_data, 0, I_DATA_LEN, NULL, 0, 0, 5);
     if (rc != SUCCEED)
          HandleErrorDBC(i_hdbc1);
```

```
     time_start = (TimeNow() / MILLI);

     item_rows_loaded = 0;

     for (i_id = 1; i_id <= max_items; i_id++)
     {
          i_im_id = RandomNumber(1L, 10000L);

          MakeAlphaString(14, 24, I_NAME_LEN, i_name);

          i_price = ((float) RandomNumber(100L, 10000L))/100.0;

          MakeOriginalAlphaString(26, 50, I_DATA_LEN, i_data, 10);

          rc = bcp_sendrow(i_hdbc1);
          if (rc != SUCCEED)
               HandleErrorDBC(i_hdbc1);

          item_rows_loaded++;
          CheckForCommit(i_hdbc1, i_hstmt1, item_rows_loaded, "item",
&time_start);
     }

     rcint = bcp_done(i_hdbc1);
     if (rcint < 0)
          HandleErrorDBC(i_hdbc1);

     printf("Finished loading item table.\n");

     SQLFreeStmt(i_hstmt1, SQL_DROP);
     SQLDisconnect(i_hdbc1);
     SQLFreeConnect(i_hdbc1);

     // if build index after load
     if ((aptr->build_index == 1) && (aptr->index_order == 0))
          BuildIndex("idxitmcl");

}


//============================================================================
===
//
// Function   : LoadWarehouse
//
// Loads WAREHOUSE table and loads Stock and District as Warehouses are
created
//
//============================================================================
===

void LoadWarehouse()
{
    short  w_id;
    char   w_name[W_NAME_LEN+1];
    char   w_street_1[ADDRESS_LEN+1];
    char   w_street_2[ADDRESS_LEN+1];
    char   w_city[ADDRESS_LEN+1];
    char   w_state[STATE_LEN+1];
    char   w_zip[ZIP_LEN+1];
    double w_tax;
    double w_ytd;
     char  name[20];
     long  time_start;
     RETCODE    rc;
     DBINT rcint;
     char  bcphint[128];


     // Seed with unique number
     seed(2);

     printf("Loading warehouse table...\n");

     // if build index before load...
     if ((aptr->build_index == 1) && (aptr->index_order == 1))
          BuildIndex("idxwarcl");

     InitString(w_name, W_NAME_LEN+1);
     InitAddress(w_street_1, w_street_2, w_city, w_state, w_zip);

     sprintf(name, "%s..%s", aptr->database, "warehouse");

     rc = bcp_init(w_hdbc1, name, NULL, "logs\\whouse.err", DB_IN);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     if ((aptr->build_index == 1) && (aptr->index_order == 1))
     {
          sprintf(bcphint, "tablock, order (w_id), ROWS_PER_BATCH = %d",
aptr->num_warehouses);
          rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
          if (rc != SUCCEED)
               HandleErrorDBC(w_hdbc1);
     }

     rc = bcp_bind(w_hdbc1, (BYTE *) &w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 1);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) w_name, 0, W_NAME_LEN, NULL, 0, 0, 2);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);
```

```
     rc = bcp_bind(w_hdbc1, (BYTE *) w_street_1, 0, ADDRESS_LEN, NULL, 0, 0,
3);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) w_street_2, 0, ADDRESS_LEN, NULL, 0, 0,
4);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) w_city, 0, ADDRESS_LEN, NULL, 0, 0, 5);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) w_state, 0, STATE_LEN, NULL, 0, 0, 6);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) w_zip, 0, ZIP_LEN, NULL, 0, 0, 7);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &w_tax, 0, SQL_VARLEN_DATA, NULL, 0,
SQLFLT8, 8);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &w_ytd, 0, SQL_VARLEN_DATA, NULL, 0,
SQLFLT8, 9);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     time_start = (TimeNow() / MILLI);

     warehouse_rows_loaded = 0;

     for (w_id = (short)aptr->starting_warehouse; w_id <= aptr-
>num_warehouses; w_id++)
     {
          MakeAlphaString(6,10, W_NAME_LEN, w_name);

          MakeAddress(w_street_1, w_street_2, w_city, w_state, w_zip);

          w_tax = ((float) RandomNumber(0L,2000L))/10000.00;

          w_ytd = 300000.00;

          rc = bcp_sendrow(w_hdbc1);
          if (rc != SUCCEED)
               HandleErrorDBC(w_hdbc1);

          warehouse_rows_loaded++;
          CheckForCommit(w_hdbc1, i_hstmt1, warehouse_rows_loaded,
"warehouse", &time_start);
     }

     rcint = bcp_done(w_hdbc1);
     if (rcint < 0)
          HandleErrorDBC(w_hdbc1);

     printf("Finished loading warehouse table.\n");

     // if build index after load...
     if ((aptr->build_index == 1) && (aptr->index_order == 0))
          BuildIndex("idxwarcl");

     stock_rows_loaded = 0;
     district_rows_loaded = 0;

     District();
     Stock();

}


//==============================================================================
//
// Function   : District
//
//==============================================================================

void District()
{
    short  d_id;
    short  d_w_id;
    char   d_name[D_NAME_LEN+1];
    char   d_street_1[ADDRESS_LEN+1];
    char   d_street_2[ADDRESS_LEN+1];
    char   d_city[ADDRESS_LEN+1];
    char   d_state[STATE_LEN+1];
    char   d_zip[ZIP_LEN+1];
    double d_tax;
    double d_ytd;
     char  name[20];
    long   d_next_o_id;
     long  time_start;
     int        w_id;
     RETCODE    rc;
     DBINT rcint;
     char  bcphint[128];

     // Seed with unique number
     seed(4);
```

```
     printf("Loading district table...\n");

     // build index before load
     if ((aptr->build_index == 1) && (aptr->index_order == 1))
          BuildIndex("idxdiscl");

     InitString(d_name, D_NAME_LEN+1);
     InitAddress(d_street_1, d_street_2, d_city, d_state, d_zip);
     sprintf(name, "%s..%s", aptr->database, "district");

     rc = bcp_init(w_hdbc1, name, NULL, "logs\\district.err", DB_IN);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     if ((aptr->build_index == 1) && (aptr->index_order == 1))
     {
          sprintf(bcphint, "tablock, order (d_w_id, d_id), ROWS_PER_BATCH =
%u", (aptr->num_warehouses * 10));
          rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
          if (rc != SUCCEED)
               HandleErrorDBC(w_hdbc1);
     }

     rc = bcp_bind(w_hdbc1, (BYTE *) &d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 1);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &d_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) d_name, 0, D_NAME_LEN, NULL, 0, 0, 3);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) d_street_1, 0, ADDRESS_LEN, NULL, 0, 0,
4);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) d_street_2, 0, ADDRESS_LEN, NULL, 0, 0,
5);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) d_city, 0, ADDRESS_LEN, NULL, 0, 0, 6);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) d_state, 0, STATE_LEN, NULL, 0, 0, 7);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) d_zip, 0, ZIP_LEN, NULL, 0, 0, 8);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &d_tax, 0, SQL_VARLEN_DATA, NULL, 0,
SQLFLT8, 9);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &d_ytd, 0, SQL_VARLEN_DATA, NULL, 0,
SQLFLT8, 10);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &d_next_o_id, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT4, 11);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     d_ytd  = 30000.0;

     d_next_o_id = orders_per_district+1;

     time_start = (TimeNow() / MILLI);

     for (w_id = aptr->starting_warehouse; w_id <= aptr->num_warehouses;
w_id++)
     {
          d_w_id = w_id;

          for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
          {
               MakeAlphaString(6,10,D_NAME_LEN, d_name);

               MakeAddress(d_street_1, d_street_2, d_city, d_state, d_zip);

               d_tax = ((float) RandomNumber(0L,2000L))/10000.00;

               rc = bcp_sendrow(w_hdbc1);
               if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

               district_rows_loaded++;
               CheckForCommit(w_hdbc1, w_hstmt1, district_rows_loaded,
"district", &time_start);
          }
    }
```

```
     rcint = bcp_done(w_hdbc1);
     if (rcint < 0)
          HandleErrorDBC(w_hdbc1);

     printf("Finished loading district table.\n");

     // if build index after load...
     if ((aptr->build_index == 1) && (aptr->index_order == 0))
          BuildIndex("idxdiscl");

    return;
}


//================================================================================
//
// Function   : Stock
//
//================================================================================

void Stock()
{
    long   s_i_id;
    short  s_w_id;
    short  s_quantity;
    char   s_dist_01[S_DIST_LEN+1];
    char   s_dist_02[S_DIST_LEN+1];
    char   s_dist_03[S_DIST_LEN+1];
    char   s_dist_04[S_DIST_LEN+1];
    char   s_dist_05[S_DIST_LEN+1];
    char   s_dist_06[S_DIST_LEN+1];
    char   s_dist_07[S_DIST_LEN+1];
    char   s_dist_08[S_DIST_LEN+1];
    char   s_dist_09[S_DIST_LEN+1];
    char   s_dist_10[S_DIST_LEN+1];
    long   s_ytd;
    short  s_order_cnt;
    short  s_remote_cnt;
    char   s_data[S_DATA_LEN+1];
    short  len;
     char  name[20];
     long  time_start;
     RETCODE    rc;
     DBINT rcint;
     char  bcphint[128];

     // Seed with unique number
     seed(3);

     // if build index before load...
     if ((aptr->build_index == 1) && (aptr->index_order == 1))
          BuildIndex("idxstkcl");


     sprintf(name, "%s..%s", aptr->database, "stock");

     rc = bcp_init(w_hdbc1, name, NULL, "logs\\stock.err", DB_IN);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     if ((aptr->build_index == 1) && (aptr->index_order == 1))
     {
          sprintf(bcphint, "tablock, order (s_i_id, s_w_id), ROWS_PER_BATCH
= %u", (aptr->num_warehouses * 100000));
          rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
          if (rc != SUCCEED)
               HandleErrorDBC(w_hdbc1);
     }

     rc = bcp_bind(w_hdbc1, (BYTE *) &s_i_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     bcp_bind(w_hdbc1, (BYTE *) &s_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &s_quantity, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 3);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_01, 0, S_DIST_LEN, NULL, 0, 0,
4);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_02, 0, S_DIST_LEN, NULL, 0, 0,
5);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_03, 0, S_DIST_LEN, NULL, 0, 0,
6);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_04, 0, S_DIST_LEN, NULL, 0, 0,
7);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);
```

```
     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_05, 0, S_DIST_LEN, NULL, 0, 0,
8);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_06, 0, S_DIST_LEN, NULL, 0, 0,
9);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_07, 0, S_DIST_LEN, NULL, 0, 0,
10);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_08, 0, S_DIST_LEN, NULL, 0, 0,
11);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_09, 0, S_DIST_LEN, NULL, 0, 0,
12);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_10, 0, S_DIST_LEN, NULL, 0, 0,
13);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &s_ytd, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 14);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &s_order_cnt, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 15);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) &s_remote_cnt, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 16);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = bcp_bind(w_hdbc1, (BYTE *) s_data, 0, S_DATA_LEN, NULL, 0, 0, 17);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     s_ytd = s_order_cnt = s_remote_cnt = 0;

     time_start = (TimeNow() / MILLI);


     printf("...Loading stock table\n");

     for (s_i_id=1; s_i_id <= max_items; s_i_id++)
     {

          for (s_w_id = (short)aptr->starting_warehouse; s_w_id <= aptr-
>num_warehouses; s_w_id++)
          {

               s_quantity = (short)RandomNumber(10L,100L);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_01);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_02);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_03);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_04);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_05);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_06);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_07);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_08);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_09);
               len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_10);

               len = MakeOriginalAlphaString(26,50, S_DATA_LEN, s_data,10);

               rc = bcp_sendrow(w_hdbc1);
               if (rc != SUCCEED)
                    HandleErrorDBC(w_hdbc1);

               stock_rows_loaded++;
               CheckForCommit(w_hdbc1, w_hstmt1, stock_rows_loaded,
"stock", &time_start);

          }
     }

     rcint = bcp_done(w_hdbc1);
     if (rcint < 0)
          HandleErrorDBC(w_hdbc1);

     printf("Finished loading stock table.\n");

     SQLFreeStmt(w_hstmt1, SQL_DROP);
     SQLDisconnect(w_hdbc1);
     SQLFreeConnect(w_hdbc1);

     // if build index after load...
     if ((aptr->build_index == 1) && (aptr->index_order == 0))
          BuildIndex("idxstkcl");

     return;
}
```

```
//==========================================================================
//
// Function   : LoadCustomer
//
//==========================================================================

void LoadCustomer()
{
     LOADER_TIME_STRUCT      customer_time_start;
     LOADER_TIME_STRUCT      history_time_start;
     short                     w_id;
    short                  d_id;
     DWORD                     dwThreadID[MAX_CUSTOMER_THREADS];
     HANDLE                    hThread[MAX_CUSTOMER_THREADS];
     char                      name[20];
     RETCODE                        rc;
     DBINT                     rcint;
     char                      bcphint[128];
     char                      cmd[256];
     // SQLRETURN                   rc_1;
     // SQLSMALLINT                 recnum, MsgLen;
     // SQLCHAR                     SqlState[6],
Msg[SQL_MAX_MESSAGE_LENGTH];
     // SQLINTEGER                  NativeError;

     // Seed with unique number
     seed(5);

     printf("Loading customer and history tables...\n");

     // if build index before load...
     if ((aptr->build_index == 1) && (aptr->index_order == 1))
          BuildIndex("idxcuscl");

     // Initialize bulk copy
     sprintf(name, "%s..%s", aptr->database, "customer");

     rc = bcp_init(c_hdbc1, name, NULL, "logs\\customer.err", DB_IN);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

     if ((aptr->build_index == 1) && (aptr->index_order == 1))
     {
          sprintf(bcphint, "tablock, order (c_w_id, c_d_id, c_id),
ROWS_PER_BATCH = %u", (aptr->num_warehouses * 30000));
          rc = bcp_control(c_hdbc1, BCPHINTS, (void*) bcphint);
          if (rc != SUCCEED)
               HandleErrorDBC(c_hdbc1);
     }

     sprintf(name, "%s..%s", aptr->database, "history");

     rc = bcp_init(c_hdbc2, name, NULL, "logs\\history.err", DB_IN);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

     sprintf(bcphint, "tablock");
     rc = bcp_control(c_hdbc2, BCPHINTS, (void*) bcphint);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

     customer_rows_loaded    = 0;
     history_rows_loaded     = 0;

     CustomerBufInit();

     customer_time_start.time_start = (TimeNow() / MILLI);
     history_time_start.time_start = (TimeNow() / MILLI);

     for (w_id = (short)aptr->starting_warehouse; w_id <= aptr-
>num_warehouses; w_id++)
     {
          for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
          {

               CustomerBufLoad(d_id, w_id);

               // Start parallel loading threads here...

               // Start customer table thread

               printf("...Loading customer table for: d_id = %d, w_id =
%d\n", d_id, w_id);

               hThread[0] = CreateThread(NULL,
                                                      0,
                                                      (LPTHREAD_START_ROUTINE)
LoadCustomerTable,
                                                      &customer_time_start,
                                                      0,
                                                      &dwThreadID[0]);

               if (hThread[0] == NULL)
               {
                    printf("Error, failed in creating creating thread =
0.\n");
                    exit(-1);
               }

               // Start History table thread

               printf("...Loading history table for: d_id = %d, w_id =
%d\n", d_id, w_id);
```

```
                hThread[1] = CreateThread(NULL,
                                          0,
                                          (LPTHREAD_START_ROUTINE)
LoadHistoryTable,
                                          &history_time_start,
                                          0,
                                          &dwThreadID[1]);

                if (hThread[1] == NULL)
                {
                     printf("Error, failed in creating creating thread =
1.\n");
                     exit(-1);
                }

                WaitForSingleObject( hThread[0], INFINITE );
                WaitForSingleObject( hThread[1], INFINITE );

                if (CloseHandle(hThread[0]) == FALSE)
                {
                     printf("Error, failed in closing customer thread handle
with errno: %d\n", GetLastError());
                }

                if (CloseHandle(hThread[1]) == FALSE)
                {
                     printf("Error, failed in closing history thread handle
with errno: %d\n", GetLastError());
                }


          }

     }

     // flush the bulk connection
     rcint = bcp_done(c_hdbc1);
     if (rcint < 0)
          HandleErrorDBC(c_hdbc1);

     rcint = bcp_done(c_hdbc2);
     if (rcint < 0)
          HandleErrorDBC(c_hdbc2);

     printf("Finished loading customer table.\n");

     // if build index after load...
     if ((aptr->build_index == 1) && (aptr->index_order == 0))
          BuildIndex("idxcuscl");

     // build non-clustered index
     if (aptr->build_index == 1)
          BuildIndex("idxcusnc");

     // Output the NURAND used for the loader into C_FIRST for C_ID = 1,
     // C_W_ID = 1, and C_D_ID = 1
     sprintf(cmd, "isql -S%s -U%s -P%s -d%s -e -Q\"update customer set
c_first = 'C_LOAD = %d' where c_id = 1 and c_w_id = 1 and c_d_id = 1\" >
logs\\nurand_load.log",
                         aptr->server,
                         aptr->user,
                         aptr->password,
                         aptr->database,
                         LOADER_NURAND_C);

     system(cmd);

     SQLFreeStmt(c_hstmt1, SQL_DROP);
     SQLDisconnect(c_hdbc1);
     SQLFreeConnect(c_hdbc1);

     SQLFreeStmt(c_hstmt2, SQL_DROP);
     SQLDisconnect(c_hdbc2);
     SQLFreeConnect(c_hdbc2);


    return;

}


//============================================================================
//
// Function   : CustomerBufInit
//
//============================================================================

void CustomerBufInit()
{
     int     i;

     for (i=0;i<customers_per_district;i++)
     {
          customer_buf[i].c_id = 0;
          customer_buf[i].c_d_id = 0;
          customer_buf[i].c_w_id = 0;

          strcpy(customer_buf[i].c_first,"");
          strcpy(customer_buf[i].c_middle,"");
          strcpy(customer_buf[i].c_last,"");
          strcpy(customer_buf[i].c_street_1,"");
          strcpy(customer_buf[i].c_street_2,"");
          strcpy(customer_buf[i].c_city,"");
```

```
          strcpy(customer_buf[i].c_state,"");
          strcpy(customer_buf[i].c_zip,"");
          strcpy(customer_buf[i].c_phone,"");
          strcpy(customer_buf[i].c_credit,"");

          customer_buf[i].c_credit_lim = 0;
          customer_buf[i].c_discount = (float) 0;

          //  fix to avoid ODBC float to numeric conversion problem.
          //   customer_buf[i].c_balance = 0;
          strcpy(customer_buf[i].c_balance,"");

          customer_buf[i].c_ytd_payment = 0;
          customer_buf[i].c_payment_cnt = 0;
          customer_buf[i].c_delivery_cnt = 0;

          strcpy(customer_buf[i].c_data,"");

          customer_buf[i].h_amount = 0;

          strcpy(customer_buf[i].h_data,"");

     }

}


//=============================================================================
//
// Function   : CustomerBufLoad
//
// Fills shared buffer for HISTORY and CUSTOMER
//=============================================================================

void CustomerBufLoad(int d_id, int w_id)
{
     long                       i;
    CUSTOMER_SORT_STRUCT    c[CUSTOMERS_PER_DISTRICT];


     for (i=0;i<customers_per_district;i++)
     {
          if (i < 1000)
               LastName(i, c[i].c_last);
          else
               LastName(NURand(255,0,999,LOADER_NURAND_C), c[i].c_last);

          MakeAlphaString(8,16,FIRST_NAME_LEN, c[i].c_first);

          c[i].c_id = i+1;

     }


     printf("...Loading customer buffer for: d_id = %d, w_id = %d\n",
               d_id, w_id);

     for (i=0;i<customers_per_district;i++)
     {

          customer_buf[i].c_d_id = d_id;
          customer_buf[i].c_w_id = w_id;
          customer_buf[i].h_amount = 10.0;

          customer_buf[i].c_ytd_payment  = 10.0;

          customer_buf[i].c_payment_cnt  = 1;
          customer_buf[i].c_delivery_cnt = 0;

          // Generate CUSTOMER and HISTORY data

          customer_buf[i].c_id = c[i].c_id;

          strcpy(customer_buf[i].c_first, c[i].c_first);
          strcpy(customer_buf[i].c_last, c[i].c_last);

          customer_buf[i].c_middle[0] = 'O';
          customer_buf[i].c_middle[1] = 'E';

          MakeAddress(customer_buf[i].c_street_1,
                        customer_buf[i].c_street_2,
                        customer_buf[i].c_city,
                        customer_buf[i].c_state,
                        customer_buf[i].c_zip);

          MakeNumberString(16, 16, PHONE_LEN, customer_buf[i].c_phone);

          if (RandomNumber(1L, 100L) > 10)
               customer_buf[i].c_credit[0] = 'G';
          else
               customer_buf[i].c_credit[0] = 'B';
          customer_buf[i].c_credit[1] = 'C';

          customer_buf[i].c_credit_lim = 50000.0;
          customer_buf[i].c_discount = ((float) RandomNumber(0L, 5000L)) /
10000.0;

          //  fix to avoid ODBC float to numeric conversion problem.
          //  customer_buf[i].c_balance = -10.0;
          strcpy(customer_buf[i].c_balance,"-10.0");

          MakeAlphaString(300, 500, C_DATA_LEN, customer_buf[i].c_data);


          // Generate HISTORY data
```

```
          MakeAlphaString(12, 24, H_DATA_LEN, customer_buf[i].h_data);

     }
}

//==============================================================================
//
// Function   : LoadCustomerTable
//
//==============================================================================

void LoadCustomerTable(LOADER_TIME_STRUCT *customer_time_start)
{
     int         i;
    long        c_id;
    short       c_d_id;
    short       c_w_id;
    char        c_first[FIRST_NAME_LEN+1];
    char        c_middle[MIDDLE_NAME_LEN+1];
    char        c_last[LAST_NAME_LEN+1];
    char        c_street_1[ADDRESS_LEN+1];
    char        c_street_2[ADDRESS_LEN+1];
    char        c_city[ADDRESS_LEN+1];
    char        c_state[STATE_LEN+1];
    char        c_zip[ZIP_LEN+1];
    char        c_phone[PHONE_LEN+1];
    char        c_credit[CREDIT_LEN+1];
    double      c_credit_lim;
    double      c_discount;

     //  fix to avoid ODBC float to numeric conversion problem.
     //  double      c_balance;
     char       c_balance[6];

    double      c_ytd_payment;
    short       c_payment_cnt;
    short       c_delivery_cnt;
    char        c_data[C_DATA_LEN+1];
     char       c_since[C_SINCE_LEN+1];
     RETCODE         rc;

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_first, 0, FIRST_NAME_LEN, NULL, 0, 0,
4);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_middle, 0, MIDDLE_NAME_LEN,NULL, 0, 0,
5);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_last, 0, LAST_NAME_LEN, NULL, 0, 0,
6);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_street_1, 0, ADDRESS_LEN, NULL, 0, 0,
7);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_street_2, 0, ADDRESS_LEN, NULL,0,0,
8);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_city, 0, ADDRESS_LEN, NULL, 0, 0, 9);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_state, 0, STATE_LEN, NULL, 0, 0, 10);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_zip, 0, ZIP_LEN, NULL, 0, 0, 11);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_phone, 0, PHONE_LEN, NULL, 0, 0, 12);

     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

     rc = bcp_bind(c_hdbc1, (BYTE *) &c_since, 0, C_SINCE_LEN, NULL, 0,
SQLCHARACTER, 13);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);
```

```
    rc = bcp_bind(c_hdbc1, (BYTE *) c_credit, 0, CREDIT_LEN, NULL, 0, 0,
14);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_credit_lim, 0, SQL_VARLEN_DATA, NULL,
0, SQLFLT8, 15);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_discount, 0, SQL_VARLEN_DATA, NULL,
0, SQLFLT8, 16);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);


     //  fix to avoid ODBC float to numeric conversion problem.
    //  rc = bcp_bind(c_hdbc1, (BYTE *) &c_balance, 0, SQL_VARLEN_DATA,
NULL, 0, SQLFLT8, 17);
     //  if (rc != SUCCEED)
     //   HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_balance, 0, 5, NULL, 0, SQLCHARACTER,
17);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);


    rc = bcp_bind(c_hdbc1, (BYTE *) &c_ytd_payment, 0, SQL_VARLEN_DATA,
NULL, 0, SQLFLT8, 18);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_payment_cnt, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 19);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_delivery_cnt,0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 20);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_data, 0, 500, NULL, 0, 0, 21);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

    for (i = 0; i < customers_per_district; i++)
    {
          c_id = customer_buf[i].c_id;
          c_d_id = customer_buf[i].c_d_id;
          c_w_id = customer_buf[i].c_w_id;
          strcpy(c_first, customer_buf[i].c_first);
          strcpy(c_middle, customer_buf[i].c_middle);
          strcpy(c_last, customer_buf[i].c_last);
          strcpy(c_street_1, customer_buf[i].c_street_1);
          strcpy(c_street_2, customer_buf[i].c_street_2);
          strcpy(c_city, customer_buf[i].c_city);
          strcpy(c_state, customer_buf[i].c_state);
          strcpy(c_zip, customer_buf[i].c_zip);
          strcpy(c_phone, customer_buf[i].c_phone);
          strcpy(c_credit, customer_buf[i].c_credit);

          FormatDate(&c_since);

          c_credit_lim = customer_buf[i].c_credit_lim;
          c_discount = customer_buf[i].c_discount;

          //  fix to avoid ODBC float to numeric conversion problem.

          //  c_balance = customer_buf[i].c_balance;
          strcpy(c_balance, customer_buf[i].c_balance);

          c_ytd_payment = customer_buf[i].c_ytd_payment;
          c_payment_cnt = customer_buf[i].c_payment_cnt;
          c_delivery_cnt = customer_buf[i].c_delivery_cnt;

          strcpy(c_data, customer_buf[i].c_data);

          // Send data to server
          rc = bcp_sendrow(c_hdbc1);
          if (rc != SUCCEED)
               HandleErrorDBC(c_hdbc1);

          customer_rows_loaded++;
          CheckForCommit(c_hdbc1, c_hstmt1, customer_rows_loaded,
"customer", &customer_time_start->time_start);
    }

}


//========================================================================
//
// Function   : LoadHistoryTable
//
//========================================================================

void LoadHistoryTable(LOADER_TIME_STRUCT *history_time_start)
{
     int         i;
    long        c_id;
    short       c_d_id;
    short       c_w_id;
```

```
     double     h_amount;
    char        h_data[H_DATA_LEN+1];
     char       h_date[H_DATE_LEN+1];
     RETCODE         rc;

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 4);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 5);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

     rc = bcp_bind(c_hdbc2, (BYTE *) &h_date, 0, H_DATE_LEN, NULL, 0,
SQLCHARACTER, 6);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &h_amount, 0, SQL_VARLEN_DATA, NULL, 0,
SQLFLT8, 7);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) h_data, 0, H_DATA_LEN, NULL, 0, 0, 8);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

    for (i = 0; i < customers_per_district; i++)
    {
          c_id = customer_buf[i].c_id;
          c_d_id = customer_buf[i].c_d_id;
          c_w_id = customer_buf[i].c_w_id;
          h_amount = customer_buf[i].h_amount;
          strcpy(h_data, customer_buf[i].h_data);
          FormatDate(&h_date);

          // send to server
          rc = bcp_sendrow(c_hdbc2);
          if (rc != SUCCEED)
               HandleErrorDBC(c_hdbc2);

          history_rows_loaded++;
          CheckForCommit(c_hdbc2, c_hstmt2, history_rows_loaded, "history",
&history_time_start->time_start);
    }

}


//============================================================-
===============
//
// Function   : LoadOrders
//
//============================================================================
==

void LoadOrders()
{
     LOADER_TIME_STRUCT      orders_time_start;
     LOADER_TIME_STRUCT      new_order_time_start;
     LOADER_TIME_STRUCT      order_line_time_start;
     short                     w_id;
    short                  d_id;
     DWORD                     dwThreadID[MAX_ORDER_THREADS];
     HANDLE                    hThread[MAX_ORDER_THREADS];
     char                      name[20];
     RETCODE                        rc;
     char                      bcphint[128];

     // seed with unique number
     seed(6);

     printf("Loading orders...\n");

     // if build index before load...
     if ((aptr->build_index == 1) && (aptr->index_order == 1))
     {
               BuildIndex("idxordcl");
               BuildIndex("idxnodcl");
               BuildIndex("idxodlcl");
     }

     // initialize bulk copy
     sprintf(name, "%s..%s", aptr->database, "orders");
```

```
     rc = bcp_init(o_hdbc1, name, NULL, "logs\\orders.err", DB_IN);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

     if ((aptr->build_index == 1) && (aptr->index_order == 1))
     {
          sprintf(bcphint, "tablock, order (o_w_id, o_d_id, o_id),
ROWS_PER_BATCH = %u", (aptr->num_warehouses * 30000));
          rc = bcp_control(o_hdbc1, BCPHINTS, (void*) bcphint);
          if (rc != SUCCEED)
               HandleErrorDBC(o_hdbc1);
     }

     sprintf(name, "%s..%s", aptr->database, "new_order");

     rc = bcp_init(o_hdbc2, name, NULL, "logs\\neword.err", DB_IN);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc2);

     if ((aptr->build_index == 1) && (aptr->index_order == 1))
     {
          sprintf(bcphint, "tablock, order (no_w_id, no_d_id, no_o_id),
ROWS_PER_BATCH = %u", (aptr->num_warehouses * 9000));
          rc = bcp_control(o_hdbc2, BCPHINTS, (void*) bcphint);
          if (rc != SUCCEED)
               HandleErrorDBC(o_hdbc2);
     }

     sprintf(name, "%s..%s", aptr->database, "order_line");

     rc = bcp_init(o_hdbc3, name, NULL, "logs\\ordline.err", DB_IN);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

    if ((aptr->build_index == 1) && (aptr->index_order == 1))
     {
          sprintf(bcphint, "tablock, order (ol_w_id, ol_d_id, ol_o_id,
ol_number), ROWS_PER_BATCH = %u", (aptr->num_warehouses * 300000));
          rc = bcp_control(o_hdbc3, BCPHINTS, (void*) bcphint);
          if (rc != SUCCEED)
               HandleErrorDBC(o_hdbc3);
     }

     orders_rows_loaded      = 0;
     new_order_rows_loaded   = 0;
     order_line_rows_loaded  = 0;

     OrdersBufInit();

     orders_time_start.time_start = (TimeNow() / MILLI);
     new_order_time_start.time_start = (TimeNow() / MILLI);
     order_line_time_start.time_start = (TimeNow() / MILLI);

     for (w_id = (short)aptr->starting_warehouse; w_id <= aptr-
>num_warehouses; w_id++)
     {
          for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
          {

               OrdersBufLoad(d_id, w_id);

               // start parallel loading threads here...

               // start Orders table thread

               printf("...Loading Order Table for: d_id = %d, w_id = %d\n",
d_id, w_id);

               hThread[0] = CreateThread(NULL,
                                                 0,
                                                 (LPTHREAD_START_ROUTINE)
LoadOrdersTable,
                                                 &orders_time_start,
                                                 0,
                                                 &dwThreadID[0]);

               if (hThread[0] == NULL)
               {
                    printf("Error, failed in creating creating thread =
0.\n");
                    exit(-1);
               }

               // start NewOrder table thread

               printf("...Loading New-Order Table for: d_id = %d, w_id =
%d\n", d_id, w_id);

               hThread[1] = CreateThread(NULL,
                                                 0,
                                                 (LPTHREAD_START_ROUTINE)
LoadNewOrderTable,
                                                 &new_order_time_start,
                                                 0,
                                                 &dwThreadID[1]);

               if (hThread[1] == NULL)
               {
                    printf("Error, failed in creating creating thread =
1.\n");
                    exit(-1);
               }

               // start Order-Line table thread
```

```
                printf("...Loading Order-Line Table for: d_id = %d, w_id =
%d\n", d_id, w_id);

                hThread[2] = CreateThread(NULL,
                                          0,
                                          (LPTHREAD_START_ROUTINE)
LoadOrderLineTable,
                                          &order_line_time_start,
                                          0,
                                          &dwThreadID[2]);

                if (hThread[2] == NULL)
                {
                     printf("Error, failed in creating creating thread =
2.\n");
                     exit(-1);
                }

                WaitForSingleObject( hThread[0], INFINITE );
                WaitForSingleObject( hThread[1], INFINITE );
                WaitForSingleObject( hThread[2], INFINITE );

                if (CloseHandle(hThread[0]) == FALSE)
                {
                     printf("Error, failed in closing Orders thread handle
with errno: %d\n", GetLastError());
                }

                if (CloseHandle(hThread[1]) == FALSE)
                {
                     printf("Error, failed in closing NewOrder thread handle
with errno: %d\n", GetLastError());
                }

                if (CloseHandle(hThread[2]) == FALSE)
                {
                     printf("Error, failed in closing OrderLine thread
handle with errno: %d\n", GetLastError());
                }

           }
     }

     printf("Finished loading orders.\n");


    return;
}


//===============================================================================
//
// Function   : OrdersBufInit
//
// Clears shared buffer for ORDERS, NEWORDER, and ORDERLINE
//
//===============================================================================

void OrdersBufInit()
{
     int     i;
     int       j;

     for (i=0;i<orders_per_district;i++)
     {
          orders_buf[i].o_id = 0;
          orders_buf[i].o_d_id = 0;
          orders_buf[i].o_w_id = 0;
          orders_buf[i].o_c_id = 0;
          orders_buf[i].o_carrier_id = 0;
          orders_buf[i].o_ol_cnt = 0;
          orders_buf[i].o_all_local = 0;

          for (j=0;j<=14;j++)
          {
               orders_buf[i].o_ol[j].ol = 0;
               orders_buf[i].o_ol[j].ol_i_id = 0;
               orders_buf[i].o_ol[j].ol_supply_w_id = 0;
               orders_buf[i].o_ol[j].ol_quantity = 0;
               orders_buf[i].o_ol[j].ol_amount = 0;
               strcpy(orders_buf[i].o_ol[j].ol_dist_info,"");
          }
     }

}


//===============================================================================
//
// Function   : OrdersBufLoad
//
// Fills shared buffer for ORDERS, NEWORDER, and ORDERLINE
//
//===============================================================================

void OrdersBufLoad(int d_id, int w_id)
{

     int     cust[ORDERS_PER_DISTRICT+1];
     long    o_id;
     short   ol;

     printf("...Loading Order Buffer for: d_id = %d, w_id = %d\n",
```

```
            d_id, w_id);

     GetPermutation(cust, orders_per_district);

     for (o_id=0;o_id<orders_per_district;o_id++)
     {

          // Generate ORDER and NEW-ORDER data

          orders_buf[o_id].o_d_id = d_id;
          orders_buf[o_id].o_w_id = w_id;
          orders_buf[o_id].o_id = o_id+1;
          orders_buf[o_id].o_c_id = cust[o_id+1];
          orders_buf[o_id].o_ol_cnt = (short)RandomNumber(5L, 15L);

          if (o_id < first_new_order)
          {
               orders_buf[o_id].o_carrier_id = (short)RandomNumber(1L,
10L);
               orders_buf[o_id].o_all_local  = 1;
          }
          else
          {
               orders_buf[o_id].o_carrier_id = 0;
               orders_buf[o_id].o_all_local  = 1;
          }

          for (ol=0; ol<orders_buf[o_id].o_ol_cnt; ol++)
          {

               orders_buf[o_id].o_ol[ol].ol = ol+1;
               orders_buf[o_id].o_ol[ol].ol_i_id = RandomNumber(1L,
max_items);
               orders_buf[o_id].o_ol[ol].ol_supply_w_id = w_id;
               orders_buf[o_id].o_ol[ol].ol_quantity = 5;
               MakeAlphaString(24, 24, OL_DIST_INFO_LEN,
&orders_buf[o_id].o_ol[ol].ol_dist_info);

               // Generate ORDER-LINE data
               if (o_id < first_new_order)
               {
                    orders_buf[o_id].o_ol[ol].ol_amount = 0;
                    // Added to insure ol_delivery_d set properly during
load


                    FormatDate(&orders_buf[o_id].o_ol[ol].ol_delivery_d);

               }
               else
               {
                    orders_buf[o_id].o_ol[ol].ol_amount =
RandomNumber(1,999999)/100.0;

                    // Added to insure ol_delivery_d set properly during
load

                    // odbc datetime format
                    strcpy(orders_buf[o_id].o_ol[ol].ol_delivery_d,"1899-
12-31 00:00:00.000");

               }
          }
     }
}


//===========================================================================
//
// Function   : LoadOrdersTable
//
//===========================================================================

void LoadOrdersTable(LOADER_TIME_STRUCT *orders_time_start)
{
     int         i;
    long        o_id;
     short      o_d_id;
     short      o_w_id;
    long        o_c_id;
    short       o_carrier_id;
    short       o_ol_cnt;
    short       o_all_local;
     char       o_entry_d[O_ENTRY_D_LEN+1];
     RETCODE         rc;
     DBINT      rcint;

     // bind ORDER data
    rc = bcp_bind(o_hdbc1, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_c_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 4);
     if (rc != SUCCEED)
```

```
          HandleErrorDBC(o_hdbc1);

     rc = bcp_bind(o_hdbc1, (BYTE *) &o_entry_d, 0, O_ENTRY_D_LEN, NULL, 0,
SQLCHARACTER, 5);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_carrier_id, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 6);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_ol_cnt, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 7);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_all_local, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 8);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

    for (i = 0; i < orders_per_district; i++)
    {
          o_id         = orders_buf[i].o_id;
          o_d_id       = orders_buf[i].o_d_id;
          o_w_id       = orders_buf[i].o_w_id;
          o_c_id       = orders_buf[i].o_c_id;
          o_carrier_id = orders_buf[i].o_carrier_id;
          o_ol_cnt     = orders_buf[i].o_ol_cnt;
          o_all_local  = orders_buf[i].o_all_local;

          FormatDate(&o_entry_d);

          // send data to server
          rc = bcp_sendrow(o_hdbc1);
          if (rc != SUCCEED)
               HandleErrorDBC(o_hdbc1);

          orders_rows_loaded++;
          CheckForCommit(o_hdbc1, o_hstmt1, orders_rows_loaded, "orders",
&orders_time_start->time_start);
    }

     // rcint = bcp_batch(o_hdbc1);
     // if (rcint < 0)
     //    HandleErrorDBC(o_hdbc1);

     if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
     {
          rcint = bcp_done(o_hdbc1);
          if (rcint < 0)
               HandleErrorDBC(o_hdbc1);

          SQLFreeStmt(o_hstmt1, SQL_DROP);
          SQLDisconnect(o_hdbc1);
          SQLFreeConnect(o_hdbc1);

          // if build index after load...
          if ((aptr->build_index == 1) && (aptr->index_order == 0))
               BuildIndex("idxordcl");

          // build non-clustered index
          if (aptr->build_index == 1)
               BuildIndex("idxordnc");
     }

}


//=============================================================================
//
// Function   : LoadNewOrderTable
//
//=============================================================================

void LoadNewOrderTable(LOADER_TIME_STRUCT *new_order_time_start)
{
    int         i;
    long        o_id;
    short       o_d_id;
    short       o_w_id;
     RETCODE         rc;
     DBINT      rcint;

     // Bind NEW-ORDER data

    rc = bcp_bind(o_hdbc2, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc2);

    rc = bcp_bind(o_hdbc2, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc2);

    rc = bcp_bind(o_hdbc2, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc2);

     for (i = first_new_order; i < last_new_order; i++)
     {
```

```
          o_id    = orders_buf[i].o_id;
          o_d_id  = orders_buf[i].o_d_id;
          o_w_id  = orders_buf[i].o_w_id;

          rc = bcp_sendrow(o_hdbc2);
          if (rc != SUCCEED)
               HandleErrorDBC(o_hdbc2);

          new_order_rows_loaded++;
          CheckForCommit(o_hdbc2, o_hstmt2, new_order_rows_loaded,
"new_order", &new_order_time_start->time_start);
     }

     // rcint = bcp_batch(o_hdbc2);
     // if (rcint < 0)
     //    HandleErrorDBC(o_hdbc2);

     if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
     {
          rcint = bcp_done(o_hdbc2);
          if (rcint < 0)
               HandleErrorDBC(o_hdbc2);

          SQLFreeStmt(o_hstmt2, SQL_DROP);
          SQLDisconnect(o_hdbc2);
          SQLFreeConnect(o_hdbc2);

          // if build index after load...
          if ((aptr->build_index == 1) && (aptr->index_order == 0))
               BuildIndex("idxnodcl");

     }

}


//================================================================================
//
// Function   : LoadOrderLineTable
//
//================================================================================

void LoadOrderLineTable(LOADER_TIME_STRUCT *order_line_time_start)
{
     int         i,j;
    long        o_id;
     short      o_d_id;
     short      o_w_id;
    long        ol;
     long       ol_i_id;
    short       ol_supply_w_id;
    short       ol_quantity;
    double      ol_amount;
    char        ol_dist_info[DIST_INFO_LEN+1];
     char       ol_delivery_d[OL_DELIVERY_D_LEN+1];
     RETCODE         rc;
     DBINT      rcint;

     // bind ORDER-LINE data
    rc = bcp_bind(o_hdbc3, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 4);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_i_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 5);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_supply_w_id, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 6);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

     rc = bcp_bind(o_hdbc3, (BYTE *) &ol_delivery_d, 0, OL_DELIVERY_D_LEN,
NULL, 0, SQLCHARACTER, 7);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_quantity, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 8);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_amount, 0, SQL_VARLEN_DATA, NULL, 0,
SQLFLT8, 9);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);
```

```
    rc = bcp_bind(o_hdbc3, (BYTE *) ol_dist_info, 0, DIST_INFO_LEN, NULL, 0,
0, 10);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

     for (i = 0; i < orders_per_district; i++)
    {
          o_id    = orders_buf[i].o_id;
          o_d_id  = orders_buf[i].o_d_id;
          o_w_id  = orders_buf[i].o_w_id;

          for (j=0; j < orders_buf[i].o_ol_cnt; j++)
          {
               ol             = orders_buf[i].o_ol[j].ol;
               ol_i_id        = orders_buf[i].o_ol[j].ol_i_id;
               ol_supply_w_id = orders_buf[i].o_ol[j].ol_supply_w_id;
               ol_quantity    = orders_buf[i].o_ol[j].ol_quantity;
               ol_amount      = orders_buf[i].o_ol[j].ol_amount;

               strcpy(ol_delivery_d,orders_buf[i].o_ol[j].ol_delivery_d);

               strcpy(ol_dist_info,orders_buf[i].o_ol[j].ol_dist_info);

               rc = bcp_sendrow(o_hdbc3);
               if (rc != SUCCEED)
                    HandleErrorDBC(o_hdbc3);

               order_line_rows_loaded++;
               CheckForCommit(o_hdbc3, o_hstmt3, order_line_rows_loaded,
"order_line", &order_line_time_start->time_start);
          }

     }

     // rcint = bcp_batch(o_hdbc3);
     // if (rcint < 0)
     //   HandleErrorDBC(o_hdbc3);

     if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
     {
          rcint = bcp_done(o_hdbc3);
          if (rcint < 0)
               HandleErrorDBC(o_hdbc3);

          SQLFreeStmt(o_hstmt3, SQL_DROP);
          SQLDisconnect(o_hdbc3);
          SQLFreeConnect(o_hdbc3);

          // if build index after load...
          if ((aptr->build_index == 1) && (aptr->index_order == 0))
               BuildIndex("idxodlcl");
     }

}


//==============================================================================
//
// Function   : GetPermutation
//
//==============================================================================

void GetPermutation(int perm[], int n)
{
     int i, r, t;

     for (i=1;i<=n;i++)
          perm[i] = i;

     for (i=1;i<=n;i++)
     {
          r = RandomNumber(i,n);
          t = perm[i];
          perm[i] = perm[r];
          perm[r] = t;
     }

}


//==============================================================================
//
// Function   : CheckForCommit
//
//==============================================================================

void CheckForCommit(HDBC hdbc,
                         HSTMT hstmt,
                    int rows_loaded,
                         char *table_name,
                    long *time_start)
{

    long   time_end, time_diff;
     // DBINT   rcint;

    if ( !(rows_loaded % aptr->batch) )
    {

          // rcint = bcp_batch(hdbc);
          // if (rcint < 0)
          //   HandleErrorDBC(hdbc);
```

```
          time_end = (TimeNow() / MILLI);
          time_diff = time_end - *time_start;

          printf("-> Loaded %ld rows into %s in %ld sec - Total = %d (%.2f
rps)\n",
               aptr->batch,
               table_name,
                    time_diff,
               rows_loaded,
                    (float) aptr->batch / (time_diff ? time_diff : 1L));

          *time_start = time_end;
    }

    return;
}


//========================================================================
//
// Function   : OpenConnections
//
//========================================================================

void OpenConnections()
{

     RETCODE         rc;

     char            szDriverString[300];
     char            szDriverStringOut[1024];
     SQLSMALLINT          cbDriverStringOut;


     SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv );

     SQLSetEnvAttr(henv, SQL_ATTR_ODBC_VERSION, (void*)SQL_OV_ODBC3, 0 );

     SQLAllocHandle(SQL_HANDLE_DBC, henv , &i_hdbc1);
     SQLAllocHandle(SQL_HANDLE_DBC, henv , &w_hdbc1);
     SQLAllocHandle(SQL_HANDLE_DBC, henv , &c_hdbc1);
     SQLAllocHandle(SQL_HANDLE_DBC, henv , &c_hdbc2);
     SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc1);
     SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc2);
     SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc3);

     SQLSetConnectAttr(i_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
     SQLSetConnectAttr(w_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
     SQLSetConnectAttr(c_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
     SQLSetConnectAttr(c_hdbc2, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
     SQLSetConnectAttr(o_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
     SQLSetConnectAttr(o_hdbc2, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
     SQLSetConnectAttr(o_hdbc3, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );

     // Open connections to SQL Server

     // Connection 1

     sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                   aptr->server,
                                   aptr->user,
                                   aptr->password,
                                   aptr->database );

     rc = SQLSetConnectOption (i_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
     if (rc != SUCCEED)
          HandleErrorDBC(i_hdbc1);

     rc = SQLDriverConnect ( i_hdbc1,
                                  NULL,
                                   (SQLCHAR*)&szDriverString[0] ,
                                   SQL_NTS,
                                   (SQLCHAR*)&szDriverStringOut[0],
                                   sizeof(szDriverStringOut),
                                   &cbDriverStringOut,
                                   SQL_DRIVER_NOPROMPT );
     if (rc != SUCCEED)
          HandleErrorDBC(i_hdbc1);

     // Connection 2

     sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                   aptr->server,
                                   aptr->user,
                                   aptr->password,
                                   aptr->database );

     rc = SQLSetConnectOption (w_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     rc = SQLDriverConnect ( w_hdbc1,
                                        NULL,
                                        (SQLCHAR*)&szDriverString[0] ,
                                        SQL_NTS,
```

```
                                    (SQLCHAR*)&szDriverStringOut[0],
                                    sizeof(szDriverStringOut),
                                    &cbDriverStringOut,
                                    SQL_DRIVER_NOPROMPT );
     if (rc != SUCCEED)
          HandleErrorDBC(w_hdbc1);

     // Connection 3

     sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                  aptr->server,
                                  aptr->user,
                                  aptr->password,
                                  aptr->database );

     rc = SQLSetConnectOption (c_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

     rc = SQLDriverConnect ( c_hdbc1,
                                    NULL,
                                    (SQLCHAR*)&szDriverString[0] ,
                                    SQL_NTS,
                                    (SQLCHAR*)&szDriverStringOut[0],
                                    sizeof(szDriverStringOut),
                                    &cbDriverStringOut,
                                    SQL_DRIVER_NOPROMPT );
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc1);

     // Connection 4

     sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                  aptr->server,
                                  aptr->user,
                                  aptr->password,
                                  aptr->database );

     rc = SQLSetConnectOption (c_hdbc2, SQL_PACKET_SIZE, aptr->pack_size);
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

     rc = SQLDriverConnect ( c_hdbc2,
                                    NULL,
                                    (SQLCHAR*)&szDriverString[0] ,
                                    SQL_NTS,
                                    (SQLCHAR*)&szDriverStringOut[0],
                                    sizeof(szDriverStringOut),
                                    &cbDriverStringOut,
                                    SQL_DRIVER_NOPROMPT );
     if (rc != SUCCEED)
          HandleErrorDBC(c_hdbc2);

     // Connection 5

     sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                  aptr->server,
                                  aptr->user,
                                  aptr->password,
                                  aptr->database );

     rc = SQLSetConnectOption (o_hdbc1, SQL_PACKET_SIZE, aptr->pack_size);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

     rc = SQLDriverConnect ( o_hdbc1,
                                    NULL,
                                    (SQLCHAR*)&szDriverString[0] ,
                                    SQL_NTS,
                                    (SQLCHAR*)&szDriverStringOut[0],
                                    sizeof(szDriverStringOut),
                                    &cbDriverStringOut,
                                    SQL_DRIVER_NOPROMPT );
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc1);

     // Connection 6

     sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                  aptr->server,
                                  aptr->user,
                                  aptr->password,
                                  aptr->database );

     rc = SQLSetConnectOption (o_hdbc2, SQL_PACKET_SIZE, aptr->pack_size);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc2);

     rc = SQLDriverConnect ( o_hdbc2,
                                    NULL,
                                    (SQLCHAR*)&szDriverString[0] ,
                                    SQL_NTS,
                                    (SQLCHAR*)&szDriverStringOut[0],
                                    sizeof(szDriverStringOut),
                                    &cbDriverStringOut,
                                    SQL_DRIVER_NOPROMPT );
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc2);

     // Connection 7
```

```
     sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                   aptr->server,
                                   aptr->user,
                                   aptr->password,
                                   aptr->database );

     rc = SQLSetConnectOption (o_hdbc3, SQL_PACKET_SIZE, aptr->pack_size);
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

     rc = SQLDriverConnect ( o_hdbc3,
                                     NULL,
                                     (SQLCHAR*)&szDriverString[0] ,
                                     SQL_NTS,
                                     (SQLCHAR*)&szDriverStringOut[0],
                                     sizeof(szDriverStringOut),
                                     &cbDriverStringOut,
                                     SQL_DRIVER_NOPROMPT );
     if (rc != SUCCEED)
          HandleErrorDBC(o_hdbc3);

}

//========================================================================
//
// Function name: BuildIndex
//
//========================================================================

void BuildIndex(char *index_script)
{
     char  cmd[256];

     printf("Starting index creation:  %s\n",index_script);

     sprintf(cmd, "isql -S%s -U%s -P%s -e -i%s\\%s.sql > logs\\%s.log",
                     aptr->server,
                     aptr->user,
                     aptr->password,
                     aptr->index_script_path,
                     index_script,
                     index_script);

     system(cmd);

     printf("Finished index creation:  %s\n",index_script);
}


void HandleErrorDBC (SQLHDBC  hdbc1)
{

     SQLCHAR         SqlState[6], Msg[SQL_MAX_MESSAGE_LENGTH];
     SQLINTEGER  NativeError;
     SQLSMALLINT i, MsgLen;
     SQLRETURN   rc2;
     char       timebuf[128];
     char       datebuf[128];
     FILE       *fp1;

     i = 1;
     while (( rc2 = SQLGetDiagRec(SQL_HANDLE_DBC , hdbc1, i, SqlState ,
&NativeError,
                         Msg, sizeof(Msg) , &MsgLen )) != SQL_NO_DATA )
     {

          sprintf( szLastError , "%s" ,  Msg );

          _strtime(timebuf);
          _strdate(datebuf);

          printf( "[%s : %s] %s\n" , datebuf, timebuf, szLastError);

          fp1 = fopen("logs\\tpccldr.err","w");
          if (fp1 == NULL)
               printf("ERROR:  Unable to open errorlog file.\n");
          else
          {
               fprintf(fp1, "[%s : %s] %s\n" , datebuf, timebuf,
szLastError);
               fclose(fp1);
          }

          i++;

     }
}

void HandleErrorSTMT (HSTMT  hstmt1)
{

     SQLCHAR         SqlState[6], Msg[SQL_MAX_MESSAGE_LENGTH];
     SQLINTEGER  NativeError;
     SQLSMALLINT i, MsgLen;
     SQLRETURN   rc2;
     char       timebuf[128];
     char       datebuf[128];
     FILE       *fp1;

     i = 1;
     while (( rc2 = SQLGetDiagRec(SQL_HANDLE_STMT , hstmt1, i, SqlState ,
&NativeError,
```

```
                        Msg, sizeof(Msg) , &MsgLen )) != SQL_NO_DATA )
     {

          sprintf( szLastError , "%s" ,  Msg );

          _strtime(timebuf);
          _strdate(datebuf);

          printf( "[%s : %s] %s\n" , datebuf, timebuf, szLastError);

          fp1 = fopen("logs\\tpccldr.err","w");
          if (fp1 == NULL)
               printf("ERROR:  Unable to open errorlog file.\n");
          else
          {
               fprintf(fp1, "[%s : %s] %s\n" , datebuf, timebuf,
szLastError);
               fclose(fp1);
          }

          i++;

     }
}


void FormatDate ( char* szTimeCOutput )
{

     struct tm when;
     time_t now;

     time( &now );
     when  = *localtime( &now );

     mktime( &when );

     // odbc datetime format
     strftime( szTimeCOutput , 30 , "%Y-%m-%d %H:%M:%S.000", &when );

     return;

}


//=========================================================================
//
// Function   : CheckSQL
//
//=========================================================================

void CheckSQL()
{

     RETCODE         rc;

     char            szDriverString[300];
     char            szDriverStringOut[1024];
     int                  SQLBuildFlag;

     SQLSMALLINT          cbDriverStringOut;
     SQLCHAR              SQLVersion[19];
     SQLINTEGER      SQLVersionInd;



     SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv );

     SQLSetEnvAttr(henv, SQL_ATTR_ODBC_VERSION, (void*)SQL_OV_ODBC3, 0 );

     SQLAllocHandle(SQL_HANDLE_DBC, henv , &v_hdbc);

     SQLSetConnectAttr(v_hdbc, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );

     // Open connection to SQL Server

     sprintf( szDriverString , "DRIVER={SQL Server};SERVER=%s;UID=%s;PWD=%s"
,
                                   aptr->server,
                                   aptr->user,
                                   aptr->password );

     if ( SQLSetConnectAttr( v_hdbc, SQL_ATTR_PACKET_SIZE, (SQLPOINTER)aptr-
>pack_size, SQL_IS_UINTEGER ) != SQL_SUCCESS )
          HandleErrorDBC(v_hdbc);

     rc = SQLDriverConnect ( v_hdbc,
                              NULL,
                               (SQLCHAR*)&szDriverString[0] ,
                               SQL_NTS,
                               (SQLCHAR*)&szDriverStringOut[0],
                               sizeof(szDriverStringOut),
                               &cbDriverStringOut,
                               SQL_DRIVER_NOPROMPT );

     if ((rc != SQL_SUCCESS) && (rc != SQL_SUCCESS_WITH_INFO))
          HandleErrorDBC(v_hdbc);

     if ( SQLAllocHandle(SQL_HANDLE_STMT, v_hdbc , &v_hstmt) != SQL_SUCCESS
)
          HandleErrorSTMT(v_hstmt);
```

```
     rc = SQLBindCol(v_hstmt, 4, SQL_C_CHAR, &SQLVersion,
sizeof(SQLVersion), &SQLVersionInd);

     // issue SQL Server extended stored procedure (xp_msver) to determine
installed version
     rc = SQLExecDirect(v_hstmt, "EXECUTE xp_msver ProductVersion",
SQL_NTS);

     if ((rc != SQL_SUCCESS) && (rc != SQL_SUCCESS_WITH_INFO))
          HandleErrorSTMT(v_hstmt);

     rc = SQLFetch(v_hstmt);

     if (rc != SQL_SUCCESS)
          HandleErrorDBC(v_hdbc);

     // Check build number to ensure 7.00.623 or higher

     SQLBuildFlag = 1;

     if ( SQLVersion[0] == 55 )
     {
          if ( SQLVersion[2] == 48 )
          {
               if ( SQLVersion[5] == 56 )
               {
                    if ( (SQLVersion[6] >= 48) &  (SQLVersion[7] >= 53) )
                    {
                         SQLBuildFlag = 0;
                         printf("You are using SQL Server version =
%9s\n\n", SQLVersion);
                    }
                    else
                    {
                         SQLBuildFlag = 1;
                    }
               }
               else
               {
                    if ( SQLVersion[5] >= 54 )
                    {
                         if ( (SQLVersion[6] >= 50) & (SQLVersion[7] >= 51)
)
                         {
                              SQLBuildFlag = 0;
                              printf("You are using SQL Server version =
%9s\n\n", SQLVersion);
                         }
                         else
                         {
                              SQLBuildFlag = 1;
                         }
                    }
                    else
                    {
                         if ( SQLVersion[5] >= 55 )
                         {
                              if ( (SQLVersion[6] >= 48) & (SQLVersion[7]
>= 48) )
                              {
                                   SQLBuildFlag = 0;
                                   printf("You are using SQL Server
version = %9s\n\n", SQLVersion);
                              }
                              else
                              {
                                   SQLBuildFlag = 1;
                              }
                         }
                    }

               }
          }
          else
          {
               if ( SQLVersion[5] >= 49 )
               {
                    if ( (SQLVersion[6] >= 52) & (SQLVersion[7] >= 48) )
                    {
                         SQLBuildFlag = 0;
                         printf("You are using SQL Server version =
%9s\n\n", SQLVersion);
                    }
                    else
                    {
                         SQLBuildFlag = 1;
                    }
               }
               else
               {
                    SQLBuildFlag = 1;
               }
          }
     }
     else
     {
          SQLBuildFlag = 1;
     }


     if ( SQLBuildFlag == 1 )
     {
          printf("ERROR.  The SQL Server version you are using is not
supported\n");
```

```
          printf("for TPC-C benchmarking.  You currently have SQL Server
version %9s\n",SQLVersion);
          printf("installed.  Please upgrade to Microsoft SQL Server
7.00.623 or better.\n");
          printf("and re-run the SETUP program.\n\n");
          exit(1);
     }

     SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);
     SQLDisconnect(v_hdbc);
     SQLFreeHandle(SQL_HANDLE_DBC, v_hdbc);

     return;

}

//=============================================================================
//
// Function   : CheckDataBase
//
//=============================================================================

void CheckDataBase()
{

     RETCODE         rc;

     char            szDriverString[300];
     char            szDriverStringOut[1024];
     char            TablesBitMap[9] = {"000000000"};
     int                  i, ExitFlag;

     SQLSMALLINT          cbDriverStringOut;
     SQLCHAR              TabName[10];
     SQLINTEGER      TabNameInd, TabCount, TabCountInd;


     ExitFlag = 0;

     SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv );

     SQLSetEnvAttr(henv, SQL_ATTR_ODBC_VERSION, (void*)SQL_OV_ODBC3, 0 );

     SQLAllocHandle(SQL_HANDLE_DBC, henv , &v_hdbc);

     SQLSetConnectAttr(v_hdbc, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );

     // Open connection to SQL Server

     sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                   aptr->server,
                                   aptr->user,
                                   aptr->password,
                                   aptr->database );

     rc = SQLSetConnectAttr( v_hdbc, SQL_ATTR_PACKET_SIZE, (SQLPOINTER)aptr-
>pack_size, SQL_IS_UINTEGER );
     if (rc != SQL_SUCCESS)
          HandleErrorDBC(v_hdbc);

     rc = SQLDriverConnect ( v_hdbc,
                             NULL,
                              (SQLCHAR*)&szDriverString[0] ,
                              SQL_NTS,
                              (SQLCHAR*)&szDriverStringOut[0],
                              sizeof(szDriverStringOut),
                              &cbDriverStringOut,
                              SQL_DRIVER_NOPROMPT );

     // if the rc is SQL_ERROR, the the TPCC database probably does not
exist
     if (rc == SQL_ERROR)
     {
          printf("The database TPCC does not appear to exist!\n");
          printf("\nCheck LOGS\\ directory for database creation
errors.\n");

          // cleanup database connections and handles
          SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);
          SQLDisconnect(v_hdbc);
          SQLFreeHandle(SQL_HANDLE_DBC, v_hdbc);

          // since there is not a database, exit back to SETUP.CMD
          exit(1);
     }

     if ( SQLAllocHandle(SQL_HANDLE_STMT, v_hdbc , &v_hstmt) != SQL_SUCCESS
)
          HandleErrorDBC(v_hdbc);

     if ( SQLBindCol(v_hstmt, 1, SQL_C_ULONG, &TabCount, 0, &TabCountInd) !=
SQL_SUCCESS )
          HandleErrorSTMT(v_hstmt);

     // count the number of user tables from sysobjects
     rc = SQLExecDirect(v_hstmt, "select count(*) from sysobjects where
xtype = \'U\'", SQL_NTS);
     if ((rc != SQL_SUCCESS) && (rc != SQL_SUCCESS_WITH_INFO))
          HandleErrorSTMT(v_hstmt);

     if ( SQLFetch(v_hstmt) != SQL_SUCCESS )
          HandleErrorSTMT(v_hstmt);
```

```
     // if the number of tables is less than 9, select all the user tables
in TPCC
     if (TabCount != 9)
     {
          SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);

          SQLAllocHandle(SQL_HANDLE_STMT, v_hdbc , &v_hstmt);

          if ( SQLBindCol(v_hstmt, 1, SQL_C_CHAR, &TabName, sizeof(TabName),
&TabNameInd) != SQL_SUCCESS )
               HandleErrorSTMT(v_hstmt);

          // select the list of user tables into a result set
          rc = SQLExecDirect(v_hstmt, "select * from sysobjects where xtype
= \'U\'", SQL_NTS);
          if ((rc != SQL_SUCCESS) && (rc != SQL_SUCCESS_WITH_INFO))
               HandleErrorSTMT(v_hstmt);

          // go through the result set and set the bitmap for each found
table
          // set the bitmap to '1' if the table name is found

          while ((rc = SQLFetch(v_hstmt)) != SQL_NO_DATA)
          {
               switch( TabName[0] )
               {
               case 'w':
                    TablesBitMap[0] = '1';
                    break;
               case 'd':
                    TablesBitMap[1] = '1';
                    break;
               case 'c':
                    TablesBitMap[2] = '1';
                    break;
               case 'h':
                    TablesBitMap[3] = '1';
                    break;
               case 'n':
                    TablesBitMap[4] = '1';
                    break;
               case 'o':
                    if (TabName[5] = 's')
                         TablesBitMap[5] = '1';
                    if (TabName[5] = '_')
                         TablesBitMap[6] = '1';
                    break;
               case 'i':
                    TablesBitMap[7] = '1';
                    break;
               case 's':
                    TablesBitMap[8] = '1';
                    break;
               }
          }

          // a '0' ExitFlag means do NOT exit the loader early, a '1' means
exit the loader early
          ExitFlag = 0;

          // interate through the bitmap to display which table(s) is
actually missing
          for (i = 0; i <= 8; i++)
          {
               switch(i)
               {
               case 0:
                    if (TablesBitMap[i] == '0')
                    {
                         printf("The Warehouse table is missing or
damaged.\n");
                         ExitFlag = 1;
                    }
                    break;
               case 1:
                    if (TablesBitMap[i] == '0')
                    {
                         printf("The District table is missing or
damaged.\n");
                         ExitFlag = 1;
                    }
                    break;
               case 2:
                    if (TablesBitMap[i] == '0')
                    {
                         printf("The Customer table is missing or
damaged.\n");
                         ExitFlag = 1;
                    }
                    break;
               case 3:
                    if (TablesBitMap[i] == '0')
                    {
                         printf("The History table is missing or
damaged.\n");
                         ExitFlag = 1;
                    }
                    break;
               case 4:
                    if (TablesBitMap[i] == '0')
                    {
                         printf("The New_Order table is missing or
damaged.\n");
```

```
                        ExitFlag = 1;
                    }
                    break;
               case 5:
                    if (TablesBitMap[i] == '0')
                    {
                        printf("The Orders table is missing or
damaged.\n");
                        ExitFlag = 1;
                    }
                    break;
               case 6:
                    if (TablesBitMap[i] == '0')
                    {
                        printf("The Order_Line table is missing or
damaged.\n");
                        ExitFlag = 1;
                    }
                    break;
               case 7:
                    if (TablesBitMap[i] == '0')
                    {
                        printf("The Item table is missing or damaged.\n");
                        ExitFlag = 1;
                    }
                    break;
               case 8:
                    if (TablesBitMap[i] == '0')
                    {
                        printf("The Stock table is missing or
damaged.\n");
                        ExitFlag = 1;
                    }
                    break;
               }
          }

          // if one or more tables are missing, display message and exit the
loader
          if (ExitFlag = 1)
          {
               printf("\nExiting TPC-C Loader!\n");
               printf("\nCheck LOGS\\ directory for database\n");
               printf("or table creation errors.\n");

               // cleanup database connections and handles
               SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);
               SQLDisconnect(v_hdbc);
               SQLFreeHandle(SQL_HANDLE_DBC, v_hdbc);

               exit(1);
          }
     }

     // cleanup database connections and handles
     SQLFreeHandle(SQL_HANDLE_STMT, v_hstmt);
     SQLDisconnect(v_hdbc);
     SQLFreeHandle(SQL_HANDLE_DBC, v_hdbc);

     return;
}
```

Appendix C - Tunable Parameters and Options

This section discloses hardware information and the Windows 2000 Advanced Server registry parameters used on the PRIMERGY H400 server system.

```
[System Summary]

Item Value
OS Name    Microsoft Windows 2000 Advanced Server
Version    5.0.2195 Service Pack 1 Build 2195
OS Manufacturer Microsoft Corporation
System Name     H400
System Manufacturer  FSC
System Model    H400
System Type     X86-based PC
Processor  x86 Family 6 Model 10 Stepping 4 GenuineIntel ~900 Mhz
Processor  x86 Family 6 Model 10 Stepping 4 GenuineIntel ~900 Mhz
Processor  x86 Family 6 Model 10 Stepping 4 GenuineIntel ~900 Mhz
Processor  x86 Family 6 Model 10 Stepping 4 GenuineIntel ~900 Mhz
BIOS Version    PhoenixBIOS Version 4.06  Rev. 1.08C.1173
Windows Directory    C:\WINNT
System Directory     C:\WINNT\System32
Boot Device     \Device\Harddisk0\Partition1
Locale     United States
User Name  H400\Administrator
Time Zone  W. Europe Standard Time
Total Physical Memory 8,191,268 KB
Available Physical Memory  7,961,728 KB
Total Virtual Memory 18,275,356 KB
Available Virtual Memory   17,991,820 KB
Page File Space 10,084,088 KB
Page File  C:\pagefile.sys


System Information report written at: 03/15/2001 13:35:56
[Hardware Resources]

[ Following are sub-categories of this main category ]

[Conflicts/Sharing]

Resource   Device
IRQ 9 Microsoft ACPI-Compliant System
IRQ 9 PCI Device
[DMA]

Channel    Device     Status
4     Direct memory access controller OK
2     Standard floppy disk controller OK

[Forced Hardware]

Device     PNP Device ID
No Forced Hardware

[I/O]

Address Range   Device     Status
0x0000-0x03AF   PCI bus    OK
0x0000-0x03AF   Direct memory access controller OK
0x03B0-0x03DF   PCI bus    OK
0x03B0-0x03DF   ATI Technologies Inc. RAGE XL PCI     OK
0x03E0-0x0CF7   PCI bus    OK
0x0D00-0x0FFF   PCI bus    OK
0x1000-0x3FFF   PCI bus    OK
0x1000-0x3FFF   ATI Technologies Inc. RAGE XL PCI     OK
0x03C0-0x03DF   ATI Technologies Inc. RAGE XL PCI     OK
0x1450-0x1457   PCI Device OK
0x2000-0x2FFF   DEC 21154 PCI to PCI bridge     OK
0x2000-0x2FFF   Mylex EXR2000 Disk Array Controller  OK
0x3000-0x3FFF   DEC 21154 PCI to PCI bridge     OK
0x3000-0x3FFF   Mylex EXR2000 Disk Array Controller  OK
0x0A79-0x0A79   ISAPNP Read Data Port OK
0x0279-0x0279   ISAPNP Read Data Port OK
0x02F4-0x02F7   ISAPNP Read Data Port OK
0x0060-0x0060   Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
     OK
0x0064-0x0064   Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
     OK
0x0081-0x008F   Direct memory access controller OK
0x00C0-0x00DF   Direct memory access controller OK
0x0070-0x0071   System CMOS/real time clock     OK
0x0020-0x0021   Programmable interrupt controller     OK
0x00A0-0x00A1   Programmable interrupt controller     OK
0x00F0-0x00FF   Numeric data processor     OK
0x0040-0x0043   System timer    OK
0x0061-0x0061   System speaker  OK
0x0026-0x0027   Motherboard resources OK
0x0080-0x0080   Motherboard resources OK
0x0500-0x054F   Motherboard resources OK
```

```
0x0580-0x058F   Motherboard resources OK
0x040B-0x040B   Motherboard resources OK
0x04D0-0x04D1   Motherboard resources OK
0x04D6-0x04D6   Motherboard resources OK
0x0C00-0x0C01   Motherboard resources OK
0x0C14-0x0C14   Motherboard resources OK
0x0C49-0x0C4A   Motherboard resources OK
0x0C52-0x0C52   Motherboard resources OK
0x0C6C-0x0C6C   Motherboard resources OK
0x0C6F-0x0C6F   Motherboard resources OK
0x0C90-0x0C97   Motherboard resources OK
0x0CA0-0x0CBF   Motherboard resources OK
0x0CD6-0x0CD7   Motherboard resources OK
0x0F50-0x0F57   Motherboard resources OK
0x03F0-0x03F5   Standard floppy disk controller OK
0x03F7-0x03F7   Standard floppy disk controller OK
0x4000-0x6FFF   PCI bus    OK
0x4000-0x6FFF   Adaptec AIC-7899 Ultra160/m PCI SCSI Card  OK
0x4400-0x44FF   Adaptec AIC-7899 Ultra160/m PCI SCSI Card  OK
0x5000-0x5FFF   DEC 21154 PCI to PCI bridge     OK
0x5000-0x5FFF   Mylex EXR2000 Disk Array Controller  OK
0x6000-0x6FFF   DEC 21154 PCI to PCI bridge     OK
0x6000-0x6FFF   Mylex EXR2000 Disk Array Controller  OK
0x7000-0x9FFF   PCI bus    OK
0x7000-0x9FFF   DEC 21154 PCI to PCI bridge     OK
0x7000-0x9FFF   Mylex EXR2000 Disk Array Controller  OK
0x8000-0x8FFF   DEC 21154 PCI to PCI bridge     OK
0x8000-0x8FFF   Mylex EXR2000 Disk Array Controller  OK
0x9000-0x9FFF   DEC 21154 PCI to PCI bridge     OK
0x9000-0x9FFF   Mylex EXR2000 Disk Array Controller  OK

[IRQs]

IRQ Number Device
9    Microsoft ACPI-Compliant System
9    PCI Device
17   ATI Technologies Inc. RAGE XL PCI
26   Mylex EXR2000 Disk Array Controller
24   Mylex EXR2000 Disk Array Controller
1    Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
8    System CMOS/real time clock
13   Numeric data processor
12   PS/2 Compatible Mouse
6    Standard floppy disk controller
18   Adaptec AIC-7899 Ultra160/m PCI SCSI Card
19   Adaptec AIC-7899 Ultra160/m PCI SCSI Card
20   Mylex EXR2000 Disk Array Controller
22   Mylex EXR2000 Disk Array Controller
28   Mylex EXR2000 Disk Array Controller
29   Mylex EXR2000 Disk Array Controller
30   Mylex EXR2000 Disk Array Controller
31   Alteon WebSystems PCI Gigabit Ethernet Adapter #2

[Memory]

Range Device     Status
0xA0000-0xBFFFF PCI bus    OK
0xA0000-0xBFFFF ATI Technologies Inc. RAGE XL PCI    OK
0xD0000-0xE7FFF PCI bus    OK
0xF4000000-0xF6FFFFFF PCI bus    OK
0xF4000000-0xF6FFFFFF PCI Device OK
0xF7000000-0xF7FFFFFF PCI bus    OK
0xF7000000-0xF7FFFFFF DEC 21154 PCI to PCI bridge     OK
0xF7000000-0xF7FFFFFF Mylex EXR2000 Disk Array Controller  OK
0xF5000000-0xF5FFFFFF ATI Technologies Inc. RAGE XL PCI    OK
0xF4121000-0xF4121FFF ATI Technologies Inc. RAGE XL PCI    OK
0xF4122000-0xF4122FFF PCI Device OK
0xF6000000-0xF67FFFFF DEC 21154 PCI to PCI bridge     OK
0xF6000000-0xF67FFFFF Mylex EXR2000 Disk Array Controller  OK
0xF6800000-0xF6FFFFFF DEC 21154 PCI to PCI bridge     OK
0xF6800000-0xF6FFFFFF Mylex EXR2000 Disk Array Controller  OK
0xF7800000-0xF7FFFFFF DEC 21154 PCI to PCI bridge     OK
0xF7800000-0xF7FFFFFF Mylex EXR2000 Disk Array Controller  OK
0xFEC00000-0xFEC0FFFF Motherboard resources OK
0xFEE00000-0xFEE00FFF Motherboard resources OK
0xF8000000-0xF97FFFFF PCI bus    OK
0xF8000000-0xF97FFFFF Adaptec AIC-7899 Ultra160/m PCI SCSI Card  OK
0xF9800000-0xFA7FFFFF PCI bus    OK
0xF9800000-0xFA7FFFFF DEC 21154 PCI to PCI bridge     OK
0xF9800000-0xFA7FFFFF Mylex EXR2000 Disk Array Controller  OK
0xF8001000-0xF8001FFF Adaptec AIC-7899 Ultra160/m PCI SCSI Card  OK
0xF8800000-0xF8FFFFFF DEC 21154 PCI to PCI bridge     OK
0xF8800000-0xF8FFFFFF Mylex EXR2000 Disk Array Controller  OK
0xF9000000-0xF97FFFFF DEC 21154 PCI to PCI bridge     OK
0xF9000000-0xF97FFFFF Mylex EXR2000 Disk Array Controller  OK
0xFA000000-0xFA7FFFFF DEC 21154 PCI to PCI bridge     OK
0xFA000000-0xFA7FFFFF Mylex EXR2000 Disk Array Controller  OK
0xFA800000-0xFC7FFFFF PCI bus    OK
0xFA800000-0xFC7FFFFF Alteon WebSystems PCI Gigabit Ethernet Adapter #2
     OK
0xFC800000-0xFDFFFFFF PCI bus    OK
0xFC800000-0xFDFFFFFF DEC 21154 PCI to PCI bridge     OK
0xFC800000-0xFDFFFFFF Mylex EXR2000 Disk Array Controller  OK
0xFB000000-0xFB7FFFFF DEC 21154 PCI to PCI bridge     OK
0xFB000000-0xFB7FFFFF Mylex EXR2000 Disk Array Controller  OK
0xFB800000-0xFBFFFFFF DEC 21154 PCI to PCI bridge     OK
0xFB800000-0xFBFFFFFF Mylex EXR2000 Disk Array Controller  OK
0xFD000000-0xFD7FFFFF DEC 21154 PCI to PCI bridge     OK
0xFD000000-0xFD7FFFFF Mylex EXR2000 Disk Array Controller  OK
0xFC000000-0xFC7FFFFF DEC 21154 PCI to PCI bridge     OK
0xFC000000-0xFC7FFFFF Mylex EXR2000 Disk Array Controller  OK
0xFD800000-0xFDFFFFFF DEC 21154 PCI to PCI bridge     OK
0xFD800000-0xFDFFFFFF Mylex EXR2000 Disk Array Controller  OK

[CD-ROM]
```

```
Item Value
Drive D:
Description     CD-ROM Drive
Media Loaded    False
Media Type CD-ROM
Name NEC CD-ROM DRIVE:466 SCSI CdRom Device
Manufacturer    (Standard CD-ROM drives)
Status     OK
Transfer Rate   Not Available
SCSI Target ID  5
PNP Device ID   SCSI\CDROM&VEN_NEC&PROD_CD-
ROM_DRIVE:466&REV_1.17\4&6A93E40&0&050

[Display]

Item Value
Name ATI Technologies Inc. RAGE XL PCI
PNP Device ID
     PCI\VEN_1002&DEV_4752&SUBSYS_6618110A&REV_65\3&291BF6FF&1&28
Adapter Type    ATI RAGE XL PCI (B22), ATI Technologies Inc. compatible
Adapter Description  ATI Technologies Inc. RAGE XL PCI
Adapter RAM     4.00 MB (4,194,304 bytes)
Installed Drivers    atidrab.dll
Driver Version  5.00.2179.1
INF File   display.inf (atirage3 section)
Color Planes    1
Color Table Entries  16777216
Resolution 800 x 600 x 72 hertz
Bits/Pixel 24

[Keyboard]

Item Value
Description     Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
Name Enhanced (101- or 102-key)
Layout     00000407
PNP Device ID   ACPI\PNP0303\4&F7E21BA&0
NumberOfFunctionKeys 12

[Pointing Device]

Item Value
Hardware Type   PS/2 Compatible Mouse
Number of Buttons    2
Status     OK
PNP Device ID   ACPI\PNP0F13\4&F7E21BA&0
Power Management Supported False
Double Click Threshold     6
Handedness Right Handed Operation

[Adapter]

Item Value
Name [00000000] RAS Async Adapter
Adapter Type    Not Available
Product Name    RAS Async Adapter
Installed  True
PNP Device ID   Not Available
Last Reset 3/15/2001 09:49:53
Index 0
Service Name    AsyncMac
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway   Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires   Not Available
DHCP Lease Obtained  Not Available
MAC Address     Not Available
Service Name    Not Available

Name [00000001] WAN Miniport (L2TP)
Adapter Type    Not Available
Product Name    WAN Miniport (L2TP)
Installed  True
PNP Device ID   ROOT\MS_L2TPMINIPORT\0000
Last Reset 3/15/2001 09:49:53
Index 1
Service Name    Rasl2tp
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway   Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires   Not Available
DHCP Lease Obtained  Not Available
MAC Address     Not Available
Service Name    Rasl2tp
Driver     c:\winnt\system32\drivers\rasl2tp.sys (50800, 5.00.2179.1)

Name [00000002] WAN Miniport (PPTP)
Adapter Type    Not Available
Product Name    WAN Miniport (PPTP)
Installed  True
PNP Device ID   ROOT\MS_PPTPMINIPORT\0000
Last Reset 3/15/2001 09:49:53
Index 2
Service Name    PptpMiniport
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway   Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires   Not Available
DHCP Lease Obtained  Not Available
MAC Address     Not Available
```

```
Service Name    PptpMiniport
Driver     c:\winnt\system32\drivers\raspptp.sys (47856, 5.00.2160.1)

Name [00000003] Direct Parallel
Adapter Type    Not Available
Product Name    Direct Parallel
Installed  True
PNP Device ID   ROOT\MS_PTIMINIPORT\0000
Last Reset 3/15/2001 09:49:53
Index 3
Service Name    Raspti
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     Not Available
Service Name    Raspti
Driver     c:\winnt\system32\drivers\raspti.sys (16880, 5.00.2146.1)

Name [00000004] WAN Miniport (IP)
Adapter Type    Not Available
Product Name    WAN Miniport (IP)
Installed  True
PNP Device ID   ROOT\MS_NDISWANIP\0000
Last Reset 3/15/2001 09:49:53
Index 4
Service Name    NdisWan
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     Not Available
Service Name    NdisWan
Driver     c:\winnt\system32\drivers\ndiswan.sys (90768, 5.00.2184.1)

Name [00000005] Intel 8255x-based PCI Ethernet Adapter (10/100)
Adapter Type    Not Available
Product Name    Intel 8255x-based PCI Ethernet Adapter (10/100)
Installed  True
PNP Device ID
     PCI\VEN_8086&DEV_1229&SUBSYS_6618110A&REV_09\3&291BF6FF&1&20
Last Reset 3/15/2001 09:49:53
Index 5
Service Name    E100B
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway    Not Available
DHCP Enabled    True
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     Not Available
Service Name    E100B
Driver     c:\winnt\system32\drivers\e100bnt5.sys (88848, 4.03.18.0000)

Name [00000006] Alteon WebSystems PCI Gigabit Ethernet Adapter
Adapter Type    Not Available
Product Name    Alteon WebSystems PCI Gigabit Ethernet Adapter
Installed  True
PNP Device ID   Not Available
Last Reset 3/15/2001 09:49:53
Index 6
Service Name    altnd5
IP Address 129.103.181.144
IP Subnet  255.255.255.0
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     00:60:CF:20:07:0D
Service Name    Not Available

Name [00000007] Alteon WebSystems PCI Gigabit Ethernet Adapter
Adapter Type    Ethernet 802.3
Product Name    Alteon WebSystems PCI Gigabit Ethernet Adapter
Installed  True
PNP Device ID
     PCI\VEN_12AE&DEV_0001&SUBSYS_00000000&REV_01\3&12F48E42&2&58
Last Reset 3/15/2001 09:49:53
Index 7
Service Name    altnd5
IP Address 129.103.181.144
IP Subnet  255.255.255.0
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     00:60:CF:20:07:0D
Service Name    altnd5
IRQ Number 31
Driver     c:\winnt\system32\drivers\altnd5.sys (597776, 1.17.13)


[Storage]

[ Following are sub-categories of this main category ]

[Drives]
```

```
Item Value
Drive A:
Description     3 1/2 Inch Floppy Drive

Drive C:
Description     Local Fixed Disk
Compressed False
File System     NTFS
Size 8.50 GB (9,121,800,192 bytes)
Free Space 2.20 GB (2,362,232,832 bytes)
Volume Name
Volume Serial Number 40AF51BF
Partition  Disk #0, Partition #0
Partition Size  8.50 GB (9,121,803,264 bytes)
Starting Offset 32256 bytes
Drive Description    Disk drive
Drive Manufacturer   (Standard disk drives)
Drive Model     FUJITSU MAG3091LC SCSI Disk Device
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     1
Drive SCSIBus   0
Drive SCSILogicalUnit 0
Drive SCSIPort  1
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 9121835520 bytes
Drive TotalCylinders 1109
Drive TotalSectors   17816085
Drive TotalTracks    282795
Drive TracksPerCylinder    255

Drive E:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number Not Available
Partition  Disk #1, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE1
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     2
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  2
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive F:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number Not Available
Partition  Disk #2, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE2
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     3
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  3
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive G:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number Not Available
Partition  Disk #3, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE3
Drive Manufacturer   Not Available
Drive Model     Not Available
```

```
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     3
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  4
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive H:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #4, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE4
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     3
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  5
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive I:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #5, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE5
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     2
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  6
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive J:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #6, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE6
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     2
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  7
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive L:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
```

```
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #7, Partition #0
Partition Size  102.41 GB (109,963,768,320 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE7
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     1
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  8
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 109971993600 bytes
Drive TotalCylinders  13370
Drive TotalSectors    214789050
Drive TotalTracks     3409350
Drive TracksPerCylinder    255

Drive N:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #1, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE1
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     2
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  2
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders  62394
Drive TotalSectors    1002359610
Drive TotalTracks     15910470
Drive TracksPerCylinder    255

Drive O:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #2, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE2
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     3
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  3
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders  62394
Drive TotalSectors    1002359610
Drive TotalTracks     15910470
Drive TracksPerCylinder    255

Drive P:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #3, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE3
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     3
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  4
Drive SCSITargetId   0
Drive SectorsPerTrack 63
```

```
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive Q:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #4, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE4
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     3
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  5
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive R:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #5, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE5
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     2
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  6
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive S:
Description     Local Fixed Disk
Compressed Not Available
File System     Not Available
Size  Not Available
Free Space Not Available
Volume Name     Not Available
Volume Serial Number  Not Available
Partition  Disk #6, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE6
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     2
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  7
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive X:
Description     Local Fixed Disk
Compressed False
File System     NTFS
Size  292.97 GB (314,575,798,272 bytes)
Free Space 219.26 GB (235,429,675,008 bytes)
Volume Name     backup1
Volume Serial Number  44FA6C1F
Partition  Disk #2, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE2
Drive Manufacturer   Not Available
```

```
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     3
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  3
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive Y:
Description     Local Fixed Disk
Compressed False
File System     NTFS
Size 292.97 GB (314,575,798,272 bytes)
Free Space 219.26 GB (235,429,675,008 bytes)
Volume Name     backup2
Volume Serial Number 8418C88F
Partition  Disk #3, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE3
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     3
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  4
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255

Drive Z:
Description     Local Fixed Disk
Compressed False
File System     NTFS
Size 292.97 GB (314,575,798,272 bytes)
Free Space 204.56 GB (219,642,900,480 bytes)
Volume Name     backup3
Volume Serial Number 3432AF27
Partition  Disk #4, Partition #0
Partition Size  477.95 GB (513,199,895,040 bytes)
Starting Offset 8225280 bytes
Drive Description    \\.\PHYSICALDRIVE4
Drive Manufacturer   Not Available
Drive Model     Not Available
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     3
Drive SCSIBus   4
Drive SCSILogicalUnit 0
Drive SCSIPort  5
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 513208120320 bytes
Drive TotalCylinders 62394
Drive TotalSectors   1002359610
Drive TotalTracks    15910470
Drive TracksPerCylinder    255


[SCSI]

Item Value
Name Mylex EXR2000 Disk Array Controller
Caption    Mylex EXR2000 Disk Array Controller
Driver     dac2w2k
Status     OK
PNP Device ID
     PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&13288E12&0&4050
Device ID  PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&13288E12&0&4050
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 26
I/O Port   0x2000-0x2FFF
Driver     c:\winnt\system32\drivers\dac2w2k.sys (185488, 6.00-03)

Name Mylex EXR2000 Disk Array Controller
Caption    Mylex EXR2000 Disk Array Controller
Driver     dac2w2k
Status     OK
PNP Device ID
     PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&399DFF2&0&4060
Device ID  PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&399DFF2&0&4060
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 24
I/O Port   0x3000-0x3FFF
Driver     c:\winnt\system32\drivers\dac2w2k.sys (185488, 6.00-03)
```

```
Name  Adaptec AIC-7899 Ultra160/m PCI SCSI Card
Caption    Adaptec AIC-7899 Ultra160/m PCI SCSI Card
Driver     adpu160m
Status     OK
PNP Device ID
     PCI\VEN_9005&DEV_00CF&SUBSYS_6618110A&REV_01\3&3ADD9D&1&30
Device ID  PCI\VEN_9005&DEV_00CF&SUBSYS_6618110A&REV_01\3&3ADD9D&1&30
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 18
I/O Port   0x4000-0x6FFF
Driver     c:\winnt\system32\drivers\adpu160m.sys (64432, v3.10a)

Name  Adaptec AIC-7899 Ultra160/m PCI SCSI Card
Caption    Adaptec AIC-7899 Ultra160/m PCI SCSI Card
Driver     adpu160m
Status     OK
PNP Device ID
     PCI\VEN_9005&DEV_00CF&SUBSYS_6618110A&REV_01\3&3ADD9D&1&31
Device ID  PCI\VEN_9005&DEV_00CF&SUBSYS_6618110A&REV_01\3&3ADD9D&1&31
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 19
I/O Port   0x4400-0x44FF
Driver     c:\winnt\system32\drivers\adpu160m.sys (64432, v3.10a)

Name  Mylex EXR2000 Disk Array Controller
Caption    Mylex EXR2000 Disk Array Controller
Driver     dac2w2k
Status     OK
PNP Device ID
     PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&F1D5628&0&4040
Device ID  PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&F1D5628&0&4040
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 20
I/O Port   0x5000-0x5FFF
Driver     c:\winnt\system32\drivers\dac2w2k.sys (185488, 6.00-03)

Name  Mylex EXR2000 Disk Array Controller
Caption    Mylex EXR2000 Disk Array Controller
Driver     dac2w2k
Status     OK
PNP Device ID
     PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&7157F8&0&4050
Device ID  PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&7157F8&0&4050
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 22
I/O Port   0x6000-0x6FFF
Driver     c:\winnt\system32\drivers\dac2w2k.sys (185488, 6.00-03)

Name  Mylex EXR2000 Disk Array Controller
Caption    Mylex EXR2000 Disk Array Controller
Driver     dac2w2k
Status     OK
PNP Device ID
     PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&1126C2F3&0&4040
Device ID  PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&1126C2F3&0&4040
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 28
I/O Port   0x7000-0x9FFF
Driver     c:\winnt\system32\drivers\dac2w2k.sys (185488, 6.00-03)

Name  Mylex EXR2000 Disk Array Controller
Caption    Mylex EXR2000 Disk Array Controller
Driver     dac2w2k
Status     OK
PNP Device ID
     PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&1D70EDDE&0&4048
Device ID  PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&1D70EDDE&0&4048
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 29
I/O Port   0x8000-0x8FFF
Driver     c:\winnt\system32\drivers\dac2w2k.sys (185488, 6.00-03)

Name  Mylex EXR2000 Disk Array Controller
Caption    Mylex EXR2000 Disk Array Controller
Driver     dac2w2k
Status     OK
PNP Device ID
     PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&3A02B534&0&4050
Device ID  PCI\VEN_1069&DEV_BA56&SUBSYS_00401069&REV_00\4&3A02B534&0&4050
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 30
I/O Port   0x9000-0x9FFF
Driver     c:\winnt\system32\drivers\dac2w2k.sys (185488, 6.00-03)

[Problem Devices]

Device     PNP Device ID   Error Code
Intel 8255x-based PCI Ethernet Adapter (10/100) #2
     PCI\VEN_8086&DEV_1229&SUBSYS_6618110A&REV_09\3&291BF6FF&1&20    22
PCI Device PCI\VEN_110A&DEV_001D&SUBSYS_0063110A&REV_01\3&291BF6FF&1&48
     28
Communications Port (COM1) ACPI\PNP0501\1  22
```

```
Communications Port (COM2) ACPI\PNP0501\2  22
ECP Printer Port (LPT1)    ACPI\PNP0401\4&F7E21BA&0   22
Standard Dual Channel PCI IDE Controller
     PCI\VEN_1166&DEV_0211&SUBSYS_00000000&REV_00\3&291BF6FF&1&79    22
Standard OpenHCD USB Host Controller
     PCI\VEN_1166&DEV_0220&SUBSYS_02201166&REV_04\3&291BF6FF&1&7A    22
FSC STM/LC-S SCSI Processor Device    SCSI\PROCESSOR&VEN_FSC&PROD_STM/LC-
S&REV_0\4&2F8A57A2&0&080   28
QLogic GEM359 SCSI Processor Device
     SCSI\PROCESSOR&VEN_QLOGIC&PROD_GEM359&REV_1.06\5&27D6DE41&0&080 28
QLogic GEM359 SCSI Processor Device
     SCSI\PROCESSOR&VEN_QLOGIC&PROD_GEM359&REV_1.06\5&27D6DE41&0&180 28
Standard IDE/ESDI Hard Disk Controller     ROOT\LEGACY_ATAPI\0000     22
gamdrv     ROOT\LEGACY_GAMDRV\0000    22
WAN Miniport (L2TP)  ROOT\MS_L2TPMINIPORT\0000  22
WAN Miniport (IP)    ROOT\MS_NDISWANIP\0000     22
WAN Miniport (PPTP)  ROOT\MS_PPTPMINIPORT\0000  22
Direct Parallel ROOT\MS_PTIMINIPORT\0000   22

[USB]

Device     PNP Device ID
Standard OpenHCD USB Host Controller
     PCI\VEN_1166&DEV_0220&SUBSYS_02201166&REV_04\3&291BF6FF&1&7A


========== disk configuration controller 0 .. 5 ==============

Begin
BeginGroup
 PhysicalDevice0 = Channel=0, Target=0, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice1 = Channel=0, Target=1, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice2 = Channel=0, Target=2, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice3 = Channel=0, Target=3, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice4 = Channel=0, Target=4, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice5 = Channel=0, Target=5, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice6 = Channel=0, Target=10, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice7 = Channel=1, Target=0, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice8 = Channel=1, Target=1, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice9 = Channel=1, Target=2, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice10 = Channel=1, Target=3, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice11 = Channel=1, Target=4, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice12 = Channel=1, Target=5, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice13 = Channel=1, Target=10, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice14 = Channel=2, Target=0, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice15 = Channel=2, Target=1, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice16 = Channel=2, Target=2, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice17 = Channel=2, Target=3, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice18 = Channel=2, Target=4, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice19 = Channel=2, Target=5, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice20 = Channel=2, Target=10, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice21 = Channel=3, Target=0, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice22 = Channel=3, Target=1, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice23 = Channel=3, Target=2, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice24 = Channel=3, Target=3, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice25 = Channel=3, Target=4, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice26 = Channel=3, Target=5, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice27 = Channel=3, Target=10, Size=17480mb, State=Online,
     TransferSpeed=40MHz, TransferWidth=16Bit, MaxTag=16;
 IntermediateDevice0 = StripeSize=128kb, Raid=0, WriteThrough=1,
Size=122360mb,
     (PhysicalDevice0, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice1, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice2, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice3, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice4, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice5, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice6, StartAddress=0mb, Size=17480mb);
 IntermediateDevice1 = StripeSize=128kb, Raid=0, WriteThrough=1,
Size=122360mb,
     (PhysicalDevice7, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice8, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice9, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice10, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice11, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice12, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice13, StartAddress=0mb, Size=17480mb);
 IntermediateDevice2 = StripeSize=128kb, Raid=0, WriteThrough=1,
Size=122360mb,
```

```
     (PhysicalDevice14, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice15, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice16, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice17, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice18, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice19, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice20, StartAddress=0mb, Size=17480mb);
 IntermediateDevice3 = StripeSize=128kb, Raid=0, WriteThrough=1,
Size=122360mb,
     (PhysicalDevice21, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice22, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice23, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice24, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice25, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice26, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice27, StartAddress=0mb, Size=17480mb);
 LogicalDevice0 = StripeSize=128kb, Raid=12, WriteThrough=1,
Size=489440mb, BIOSGeometry=8GB,
     (IntermediateDevice0, StartAddress=0mb, Size=122360mb),
     (IntermediateDevice1, StartAddress=0mb, Size=122360mb),
     (IntermediateDevice2, StartAddress=0mb, Size=122360mb),
     (IntermediateDevice3, StartAddress=0mb, Size=122360mb);
EndGroup
BeginControllerParameter
     ControllerName = eXtremeRAID 2000;
     ControllerType = 28;
     FirmwareVersion = 5.60;
     CacheLineSize = 8KB;
     BackgroundTaskRate = 50;
     InitiatorID = 7;
     DiskStartupMode = AutoSpin;
     DevicesPerSpin = 2;
     InitialDelay = 6S;
     SequentialDelay = 0S;
     EnableDriveSizing = 0;
     EnableClustering = 0;
     EnableBGInit = 1;
     EnableReadAhead = 0;
     EnableBiosLoadDelay = 0;
     EnableForcedUnitAccess = 1;
     DisableBios = 1;
     EnableCDROMBoot = 0;
     EnableStorageWorks = 0;
     EnableSAFTE = 0;
     EnableSES = 0;
     EnableARM = 0;
     EnableOFM = 1;
     OEMCode = 0;
     StartupOption = 0;
EndControllerParameter
End

========== disk configuration controller 6 ==============

Begin
BeginGroup
 PhysicalDevice0 = Channel=0, Target=0, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice1 = Channel=1, Target=0, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice2 = Channel=0, Target=1, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice3 = Channel=1, Target=1, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice4 = Channel=0, Target=2, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice5 = Channel=1, Target=2, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice6 = Channel=0, Target=3, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice7 = Channel=1, Target=3, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice8 = Channel=0, Target=4, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice9 = Channel=1, Target=4, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice10 = Channel=0, Target=10, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 PhysicalDevice11 = Channel=1, Target=10, Size=17480mb, State=Online,
     TransferSpeed=80MHz, TransferWidth=16Bit, MaxTag=16;
 IntermediateDevice0 = StripeSize=32kb, Raid=1, WriteThrough=1,
Size=17480mb,
     (PhysicalDevice0, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice1, StartAddress=0mb, Size=17480mb);
 IntermediateDevice1 = StripeSize=32kb, Raid=1, WriteThrough=1,
Size=17480mb,
     (PhysicalDevice2, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice3, StartAddress=0mb, Size=17480mb);
 IntermediateDevice2 = StripeSize=32kb, Raid=1, WriteThrough=1,
Size=17480mb,
     (PhysicalDevice4, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice5, StartAddress=0mb, Size=17480mb);
 IntermediateDevice3 = StripeSize=32kb, Raid=1, WriteThrough=1,
Size=17480mb,
     (PhysicalDevice6, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice7, StartAddress=0mb, Size=17480mb);
 IntermediateDevice4 = StripeSize=32kb, Raid=1, WriteThrough=1,
Size=17480mb,
     (PhysicalDevice8, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice9, StartAddress=0mb, Size=17480mb);
 IntermediateDevice5 = StripeSize=32kb, Raid=1, WriteThrough=1,
Size=17480mb,
     (PhysicalDevice10, StartAddress=0mb, Size=17480mb),
     (PhysicalDevice11, StartAddress=0mb, Size=17480mb);
 LogicalDevice0 = StripeSize=32kb, Raid=12, WriteThrough=1,
Size=104880mb, BIOSGeometry=2GB,
```

```
     (IntermediateDevice0, StartAddress=0mb, Size=34960mb),
     (IntermediateDevice1, StartAddress=0mb, Size=34960mb),
     (IntermediateDevice2, StartAddress=0mb, Size=34960mb),
     (IntermediateDevice3, StartAddress=0mb, Size=34960mb),
     (IntermediateDevice4, StartAddress=0mb, Size=34960mb),
     (IntermediateDevice5, StartAddress=0mb, Size=34960mb);
EndGroup
BeginControllerParameter
     ControllerName = eXtremeRAID 2000;
     ControllerType = 28;
     FirmwareVersion = 5.60;
     CacheLineSize = 8KB;
     BackgroundTaskRate = 50;
     InitiatorID = 7;
     DiskStartupMode = AutoSpin;
     DevicesPerSpin = 3;
     InitialDelay = 4S;
     SequentialDelay = 0S;
     EnableDriveSizing = 0;
     EnableClustering = 0;
     EnableBGInit = 1;
     EnableReadAhead = 0;
     EnableBiosLoadDelay = 0;
     EnableForcedUnitAccess = 1;
     DisableBios = 1;
     EnableCDROMBoot = 0;
     EnableStorageWorks = 0;
     EnableSAFTE = 0;
     EnableSES = 0;
     EnableARM = 1;
     EnableOFM = 1;
     OEMCode = 0;
     StartupOption = 0;
EndControllerParameter
End


[Environment Variables]

Variable   Value User Name
ComSpec    %SystemRoot%\system32\cmd.exe   <SYSTEM>
NUMBER_OF_PROCESSORS 4     <SYSTEM>
OS    Windows_NT <SYSTEM>
Os2LibPath %SystemRoot%\system32\os2\dll;  <SYSTEM>
Path
     c:\isen\mks\mksnt;C:\WINNT\system32;C:\WINNT;C:\WINNT\system32\WBEM;
C:\PROGRA~1\MICROS~2\MSSQL\BINN;C:\PROGRA~1\MICROS~2\80\Tools\BINN;
     <SYSTEM>
PATHEXT    .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH     <SYSTEM>
PROCESSOR_ARCHITECTURE     x86   <SYSTEM>
PROCESSOR_IDENTIFIER x86 Family 6 Model 10 Stepping 4, GenuineIntel
     <SYSTEM>
PROCESSOR_LEVEL 6     <SYSTEM>
PROCESSOR_REVISION    0a04 <SYSTEM>
TEMP %SystemRoot%\TEMP     <SYSTEM>
TMP  %SystemRoot%\TEMP     <SYSTEM>
windir     %SystemRoot%    <SYSTEM>
TEMP %USERPROFILE%\Local Settings\Temp     H400\Administrator
TMP  %USERPROFILE%\Local Settings\Temp     H400\Administrator

[Network Connections]

Local Name Remote Name     Type Status     User Name
No network connections information

[Running Tasks]

Name Path Process ID Priority   Min Working Set Max Working Set Start
Time Version    Size File Date
system idle process  Not Available   0     0     Not Available   Not
Available  Not Available   Unknown    Unknown    Unknown
system     Not Available   8     8     0     1413120    Not Available
     Unknown    Unknown    Unknown
smss.exe   c:\winnt\system32\smss.exe 148  11    204800     1413120
     3/15/2001 08:50:36   5.00.2195.31    44.27 KB (45,328 bytes)
     12/7/1999 13:00:00
csrss.exe  Not Available   176  13    Not Available   Not Available
     3/15/2001 08:50:42   Unknown    Unknown    Unknown
winlogon.exe    c:\winnt\system32\winlogon.exe  196  13    204800
     1413120    3/15/2001 08:50:43   5.00.2195.1600  172.77 KB (176,912
bytes)     12/7/1999 13:00:00
services.exe    c:\winnt\system32\services.exe  224  9     204800
     1413120    3/15/2001 08:50:45   5.00.2134.1     86.77 KB (88,848
bytes)     12/7/1999 13:00:00
lsass.exe  c:\winnt\system32\lsass.exe     236  13    204800     1413120
     3/15/2001 08:50:45   5.00.2195.1620  32.77 KB (33,552 bytes)
     12/7/1999 13:00:00
svchost.exe     c:\winnt\system32\svchost.exe   388  8     204800
     1413120    3/15/2001 08:50:49   5.00.2134.1     7.77 KB (7,952
bytes)     12/7/1999 13:00:00
winmgmt.exe     c:\winnt\system32\wbem\winmgmt.exe   428  8     204800
     1413120    3/15/2001 08:50:50   1.50.1085.0009  192.08 KB (196,685
bytes)     8/9/2000 12:41:48
explorer.exe    c:\winnt\explorer.exe 576  8     204800     1413120
     3/15/2001 08:51:22   5.00.3103.1000  237.27 KB (242,960 bytes)
     8/9/2000 12:41:43
svchost.exe     c:\winnt\system32\svchost.exe   532  8     204800
     1413120    3/15/2001 08:51:23   5.00.2134.1     7.77 KB (7,952
bytes)     12/7/1999 13:00:00
mmc.exe    c:\winnt\system32\mmc.exe  652  8     204800     1413120
     3/15/2001 13:34:02   5.00.2153.1     589.27 KB (603,408 bytes)
     12/7/1999 13:00:00
rsvp.exe   c:\winnt\system32\rsvp.exe 732  8     204800     1413120
     3/15/2001 13:36:12   5.00.2167.1     172.77 KB (176,912 bytes)
     12/7/1999 13:00:00
```

```
[Services]

Display Name    Name State Start Mode Service Type    Path Error Control
     Start Name Tag ID
Alerter    Alerter    Running    Auto  Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Application Management     AppMgmt    Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Computer Browser     Browser    Stopped    Disabled   Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Indexing Service     cisvc Stopped    Manual     Share Process
     c:\winnt\system32\cisvc.exe     Normal     LocalSystem     0
ClipBook   ClipSrv    Stopped    Manual     Own Process
     c:\winnt\system32\clipsrv.exe   Normal     LocalSystem     0
Distributed File System    Dfs  Stopped    Manual     Own Process
     c:\winnt\system32\dfssvc.exe    Normal     LocalSystem     0
DHCP Client     Dhcp Stopped    Disabled   Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Logical Disk Manager Administrative Service     dmadmin    Stopped
     Manual     Share Process   c:\winnt\system32\dmadmin.exe /com
     Normal     LocalSystem     0
Logical Disk Manager dmserver   Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
DNS Client Dnscache   Stopped    Disabled   Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Event Log  Eventlog   Running    Auto  Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
COM+ Event System     EventSystem     Stopped    Disabled   Share Process
     c:\winnt\system32\svchost.exe -k netsvcs   Normal     LocalSystem
     0
Fax Service     Fax  Stopped    Disabled   Own Process
     c:\winnt\system32\faxsvc.exe    Normal     LocalSystem     0
Intersite Messaging  IsmServ    Stopped    Manual     Own Process
     c:\winnt\system32\ismserv.exe   Normal     LocalSystem     0
Kerberos Key Distribution Center     kdc  Stopped    Disabled   Share
Process    c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
Server     lanmanserver    Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Workstation     lanmanworkstation    Running    Auto  Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
License Logging Service    LicenseService  Stopped    Manual     Own
Process    c:\winnt\system32\llssrv.exe    Normal     LocalSystem     0
TCP/IP NetBIOS Helper Service   LmHosts    Running    Auto  Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Messenger  Messenger  Running    Auto  Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
NetMeeting Remote Desktop Sharing    mnmsrvc    Stopped    Manual     Own
Process    c:\winnt\system32\mnmsrvc.exe   Normal     LocalSystem     0
Distributed Transaction Coordinator   MSDTC Stopped    Manual     Own
Process    c:\winnt\system32\msdtc.exe     Normal     LocalSystem     1
Windows Installer     MSIServer  Stopped    Manual     Share Process
     c:\winnt\system32\msiexec.exe /v     Normal     LocalSystem     0
Microsoft Search     MSSEARCH   Stopped    Manual     Share Process
     "c:\program files\common files\system\mssearch\bin\mssearch.exe"
     Normal     LocalSystem     0
MSSQLSERVER     MSSQLSERVER     Stopped    Manual     Own Process
     c:\progra~1\micros~2\mssql\binn\sqlservr.exe    Normal
     LocalSystem     0
MSSQLServerADHelper  MSSQLServerADHelper  Stopped    Manual     Own
Process    c:\program files\microsoft sql
server\80\tools\binn\sqladhlp.exe     Normal     LocalSystem     0
Network DDE     NetDDE     Stopped    Manual     Share Process
     c:\winnt\system32\netdde.exe    Normal     LocalSystem     0
Network DDE DSDM     NetDDEdsdm Stopped    Manual     Share Process
     c:\winnt\system32\netdde.exe    Normal     LocalSystem     0
Net Logon  Netlogon   Stopped    Manual     Share Process
     c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
Network Connections  Netman     Running    Manual     Share Process
     c:\winnt\system32\svchost.exe -k netsvcs   Normal     LocalSystem
     0
File Replication     NtFrs Stopped    Manual     Own Process
     c:\winnt\system32\ntfrs.exe     Ignore     LocalSystem     0
NT LM Security Support Provider NtLmSsp    Stopped    Manual     Share
Process    c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
Removable Storage     NtmsSvc    Stopped    Disabled   Share Process
     c:\winnt\system32\svchost.exe -k netsvcs   Normal     LocalSystem
     0
Plug and Play   PlugPlay   Running    Auto  Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
IPSEC Policy Agent    PolicyAgent     Stopped    Manual     Share Process
     c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
Protected Storage     ProtectedStorage      Stopped    Manual     Share
Process    c:\winnt\system32\services.exe  Normal     LocalSystem     0
Remote Access Auto Connection Manager RasAuto    Stopped    Manual
     Share Process   c:\winnt\system32\svchost.exe -k netsvcs   Normal
     LocalSystem     0
Remote Access Connection Manager     RasMan     Stopped    Manual
     Share Process   c:\winnt\system32\svchost.exe -k netsvcs   Normal
     LocalSystem     0
Routing and Remote Access  RemoteAccess    Stopped    Manual     Share
Process    c:\winnt\system32\svchost.exe -k netsvcs   Normal
     LocalSystem     0
Remote Registry Service    RemoteRegistry  Stopped    Manual     Own
Process    c:\winnt\system32\regsvc.exe    Normal     LocalSystem     0
Remote Command Service     RMSYS Stopped    Disabled   Own Process
     d:\benchcrf\rsys.exe Normal     LocalSystem     0
Remote Procedure Call (RPC) Locator  RpcLocator Stopped    Manual     Own
Process    c:\winnt\system32\locator.exe   Normal     LocalSystem     0
Remote Procedure Call (RPC)     RpcSs Running    Manual     Share Process
     c:\winnt\system32\svchost -k rpcss   Normal     LocalSystem     0
QoS RSVP   RSVP Running    Manual     Own Process
     c:\winnt\system32\rsvp.exe -s   Normal     LocalSystem     0
Security Accounts Manager  SamSs Stopped    Manual     Share Process
     c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
```

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Smart Card Helper    SCardDrv   Stopped    Manual     Share Process
     c:\winnt\system32\scardsvr.exe  Ignore     LocalSystem     0
Smart Card SCardSvr   Stopped    Manual     Share Process
     c:\winnt\system32\scardsvr.exe  Ignore     LocalSystem     0
Task Scheduler  Schedule   Stopped    Manual     Share Process
     c:\winnt\system32\mstask.exe    Normal     LocalSystem     0
RunAs Service   seclogon   Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Ignore     LocalSystem     0
System Event Notification  SENS Stopped    Auto  Share Process
     c:\winnt\system32\svchost.exe -k netsvcs   Normal     LocalSystem
     0
Internet Connection Sharing     SharedAccess    Stopped    Manual
     Share Process   c:\winnt\system32\svchost.exe -k netsvcs   Normal
     LocalSystem     0
Print Spooler   Spooler    Stopped    Manual     Own Process
     c:\winnt\system32\spoolsv.exe   Normal     LocalSystem     0
SQLSERVERAGENT  SQLSERVERAGENT  Stopped    Manual     Own Process
     c:\progra~1\micros~2\mssql\binn\sqlagent.exe    Normal
     LocalSystem     0
Performance Logs and Alerts     SysmonLog  Stopped    Manual     Own
Process    c:\winnt\system32\smlogsvc.exe  Normal     LocalSystem     0
Telephony  TapiSrv    Stopped    Disabled   Share Process
     c:\winnt\system32\svchost.exe -k tapisrv   Normal     LocalSystem
     0
Terminal Services    TermService     Stopped    Disabled   Own Process
     c:\winnt\system32\termsrv.exe   Normal     LocalSystem     0
Telnet     TlntSvr    Stopped    Manual     Own Process
     c:\winnt\system32\tlntsvr.exe   Normal     LocalSystem     0
Distributed Link Tracking Server     TrkSvr     Stopped    Manual
     Share Process   c:\winnt\system32\services.exe  Normal
     LocalSystem     0
Distributed Link Tracking Client     TrkWks     Stopped    Disabled
     Share Process   c:\winnt\system32\services.exe  Normal
     LocalSystem     0
Uninterruptible Power Supply    UPS  Stopped    Manual     Own Process
     c:\winnt\system32\ups.exe  Normal     LocalSystem     0
Utility Manager UtilMan    Stopped    Manual     Own Process
     c:\winnt\system32\utilman.exe   Normal     LocalSystem     0
Windows Time    W32Time    Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Windows Management Instrumentation   WinMgmt    Running    Auto  Own
Process    c:\winnt\system32\wbem\winmgmt.exe   Ignore     LocalSystem
     0
Windows Management Instrumentation Driver Extensions Wmi  Running
     Manual     Share Process   c:\winnt\system32\services.exe  Normal
     LocalSystem     0


Key Name:          SYSTEM\CurrentControlSet\Services\NDIS\Parameters
Class Name:        <NO CLASS>
Last Write Time:   9/13/2000 - 11:47
Value 0
  Name:            ProcessorAffinityMask
  Type:            REG_DWORD
  Data:            0


Key Name:          SYSTEM\CurrentControlSet\Control\Session
Manager\Memory Management
Class Name:        <NO CLASS>
Last Write Time:   9/4/2000 - 13:57
Value 0
  Name:            ClearPageFileAtShutdown
  Type:            REG_DWORD
  Data:            0

Value 1
  Name:            DisablePagingExecutive
  Type:            REG_DWORD
  Data:            0

Value 2
  Name:            DontVerifyRandomDrivers
  Type:            REG_DWORD
  Data:            0x1

Value 3
  Name:            IoPageLockLimit
  Type:            REG_DWORD
  Data:            0

Value 4
  Name:            LargeSystemCache
  Type:            REG_DWORD
  Data:            0

Value 5
  Name:            NonPagedPoolQuota
  Type:            REG_DWORD
  Data:            0

Value 6
  Name:            NonPagedPoolSize
  Type:            REG_DWORD
  Data:            0

Value 7
  Name:            PagedPoolQuota
  Type:            REG_DWORD
  Data:            0

Value 8
  Name:            PagedPoolSize
  Type:            REG_DWORD
  Data:            0
```

```
Value 9
  Name:            PagingFiles
  Type:            REG_MULTI_SZ
  Data:            C:\pagefile.sys 2046 4092


Value 10
  Name:            PhysicalAddressExtension
  Type:            REG_DWORD
  Data:            0x1

Value 11
  Name:            SecondLevelDataCache
  Type:            REG_DWORD
  Data:            0

Value 12
  Name:            SystemPages
  Type:            REG_DWORD
  Data:            0


Key Name:          SYSTEM\CurrentControlSet\Control\Session Manager\I/O
System
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 12:16
Value 0
  Name:            CountOperations
  Type:            REG_DWORD
  Data:            0

Value 1
  Name:            LargeIrpStackLocations
  Type:            REG_DWORD
  Data:            0x7


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007
Class Name:        <NO CLASS>
Last Write Time:   3/13/2001 - 10:44
Value 0
  Name:            BusType
  Type:            REG_SZ
  Data:            5

Value 1
  Name:            Characteristics
  Type:            REG_DWORD
  Data:            0x84

Value 2
  Name:            CksumOffload
  Type:            REG_SZ
  Data:            1

Value 3
  Name:            ComponentId
  Type:            REG_SZ
  Data:            pci\ven_12ae&dev_0001&subsys_00000000

Value 4
  Name:            DebugPci
  Type:            REG_SZ
  Data:            0

Value 5
  Name:            DriverDate
  Type:            REG_SZ
  Data:            10-19-1999

Value 6
  Name:            DriverDateData
  Type:            REG_BINARY
  Data:
00000000   00 c0 db e2 c4 19 bf 01 -                           .ÀÛâÄ.¿.

Value 7
  Name:            DriverDesc
  Type:            REG_SZ
  Data:            Alteon WebSystems PCI Gigabit Ethernet Adapter

Value 8
  Name:            DriverVersion
  Type:            REG_SZ
  Data:            1.16.2.0

Value 9
  Name:            FdrFilter
  Type:            REG_SZ
  Data:            0

Value 10
  Name:            Fix450GX
  Type:            REG_SZ
  Data:            0

Value 11
  Name:            HostTracing
  Type:            REG_SZ
  Data:            1

Value 12
  Name:            InfPath
  Type:            REG_SZ
  Data:            netalt.inf
```

```
Value 13
  Name:           InfSection
  Type:           REG_SZ
  Data:           acenic.ndi

Value 14
  Name:           InfSectionExt
  Type:           REG_SZ
  Data:           .NT

Value 15
  Name:           IntCount
  Type:           REG_SZ
  Data:           1500

Value 16
  Name:           JumboFrames
  Type:           REG_SZ
  Data:           0

Value 17
  Name:           JumboMtu
  Type:           REG_SZ
  Data:           1500

Value 18
  Name:           LinkNegotiation
  Type:           REG_SZ
  Data:           1

Value 19
  Name:           MatchingDeviceId
  Type:           REG_SZ
  Data:           pci\ven_12ae&dev_0001&subsys_00000000

Value 20
  Name:           NetCfgInstanceId
  Type:           REG_SZ
  Data:           {2996E500-5018-41B8-9061-5BBFC58971BA}

Value 21
  Name:           NicTracing
  Type:           REG_SZ
  Data:           0

Value 22
  Name:           PciLatencyTimer
  Type:           REG_SZ
  Data:           40

Value 23
  Name:           PciMemInvalidate
  Type:           REG_SZ
  Data:           1

Value 24
  Name:           PciReadMax
  Type:           REG_SZ
  Data:           ffffffff

Value 25
  Name:           PciWriteMax
  Type:           REG_SZ
  Data:           ffffffff

Value 26
  Name:           ProviderName
  Type:           REG_SZ
  Data:           Microsoft

Value 27
  Name:           RecvCoalMax
  Type:           REG_SZ
  Data:           100

Value 28
  Name:           RecvCoalTicks
  Type:           REG_SZ
  Data:           8000

Value 29
  Name:           RxFlowControl
  Type:           REG_SZ
  Data:           0

Value 30
  Name:           SendCoalMax
  Type:           REG_SZ
  Data:           100

Value 31
  Name:           SendCoalTicks
  Type:           REG_SZ
  Data:           8000

Value 32
  Name:           StatTicks
  Type:           REG_SZ
  Data:           100000

Value 33
  Name:           TxFlowControl
  Type:           REG_SZ
  Data:           0
```

```
Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Linkage
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            Export
  Type:            REG_MULTI_SZ
  Data:            \Device\{2996E500-5018-41B8-9061-5BBFC58971BA}


Value 1
  Name:            RootDevice
  Type:            REG_MULTI_SZ
  Data:            {2996E500-5018-41B8-9061-5BBFC58971BA}


Value 2
  Name:            UpperBind
  Type:            REG_MULTI_SZ
  Data:            Tcpip



Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            Service
  Type:            REG_SZ
  Data:            altnd5


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\Interfaces
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            LowerRange
  Type:            REG_SZ
  Data:            ethernet

Value 1
  Name:            UpperRange
  Type:            REG_SZ
  Data:            ndis5


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
```

```
Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\JumboFrames
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            JumboFrames

Value 2
  Name:            type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\JumboFrames\enum
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Off

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            On


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\JumboMtu
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            default
  Type:            REG_SZ
  Data:            1500

Value 2
  Name:            max
  Type:            REG_SZ
```

```
  Data:            9000

Value 3
  Name:            min
  Type:            REG_SZ
  Data:            1500

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            JumboMtu

Value 5
  Name:            step
  Type:            REG_SZ
  Data:            100

Value 6
  Name:            type
  Type:            REG_SZ
  Data:            dword


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\LinkNegotiation
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            default
  Type:            REG_SZ
  Data:            1

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            LinkNegotiation

Value 2
  Name:            type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\LinkNegotiation\enum
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Off

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            On


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\NetworkAddress
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            default
  Type:            REG_SZ
  Data:            0060CF000000

Value 1
  Name:            optional
  Type:            REG_SZ
  Data:            1

Value 2
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            NetworkAddress

Value 3
  Name:            type
  Type:            REG_SZ
  Data:            edit


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\RxFlowControl
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            default
  Type:            REG_SZ
  Data:            1

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            RxFlowControl

Value 2
  Name:            type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\RxFlowControl\enum
Class Name:        <NO CLASS>
```

```
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Off

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            On


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\TxFlowControl
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            TxFlowControl

Value 2
  Name:            type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0007\Ndi\params\TxFlowControl\enum
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 08:10
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Off

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            On


Key Name:          SYSTEM\CurrentControlSet\Services\dac2w2k
Class Name:        <NO CLASS>
Last Write Time:   3/15/2000 - 14:50
Value 0
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            Group
  Type:            REG_SZ
  Data:            SCSI Miniport

Value 2
  Name:            ImagePath
  Type:            REG_EXPAND_SZ
  Data:            System32\DRIVERS\dac2w2k.sys

Value 3
  Name:            Start
  Type:            REG_DWORD
  Data:            0

Value 4
  Name:            Tag
  Type:            REG_DWORD
  Data:            0x21

Value 5
  Name:            Type
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\dac2w2k\Parameters
Class Name:        <NO CLASS>
Last Write Time:   3/15/2000 - 14:50

Key Name:
SYSTEM\CurrentControlSet\Services\dac2w2k\Parameters\Device
Class Name:        <NO CLASS>
Last Write Time:   3/13/2001 - 10:45
Value 0
  Name:            DriverParameter
  Type:            REG_SZ
  Data:            ConfigureSIR=12
```

This section discloses hardware information and the Windows 2000 registry parameters used on the PRIMERGY B210 client systems.

```
[System Summary]

Item Value
OS Name    Microsoft Windows 2000 Server
```

```
Version    5.0.2195 Service Pack 1 Build 2195
OS Manufacturer Microsoft Corporation
System Name     B210CL3
System Manufacturer  FUJITSU SIEMENS COMPUTERS
System Model    System Name
System Type     X86-based PC
Processor  x86 Family 6 Model 8 Stepping 6 GenuineIntel ~933 Mhz
Processor  x86 Family 6 Model 8 Stepping 6 GenuineIntel ~933 Mhz
BIOS Version    Award Medallion BIOS v6.0
Windows Directory    C:\WINNT
System Directory     C:\WINNT\System32
Boot Device     \Device\Harddisk0\Partition1
Locale     United States
User Name  B210CL3\Administrator
Time Zone  W. Europe Standard Time
Total Physical Memory 523,800 KB
Available Physical Memory  442,128 KB
Total Virtual Memory 1,802,648 KB
Available Virtual Memory   1,665,828 KB
Page File Space 1,278,848 KB
Page File  C:\pagefile.sys


[Conflicts/Sharing]

Resource   Device
No conflicted/shared resources

[DMA]

Channel    Device     Status
4     Direct memory access controller OK
2     Standard floppy disk controller OK

[Forced Hardware]

Device     PNP Device ID
No Forced Hardware

[I/O]

Address Range   Device     Status
0x0000-0x0CF7   PCI bus    OK
0x0000-0x0CF7   Direct memory access controller OK
0x0D00-0xAFFF   PCI bus    OK
0xC000-0xFFFF   PCI bus    OK
0xD800-0xD83F   Intel(R) PRO/100+ Server Adapter (PILA8470B)    OK
0xF000-0xF0FF   ATI Technologies Inc. RAGE XL PCI     OK
0x03B0-0x03BB   ATI Technologies Inc. RAGE XL PCI     OK
0x03C0-0x03DF   ATI Technologies Inc. RAGE XL PCI     OK
0x0A79-0x0A79   ISAPNP Read Data Port OK
0x0279-0x0279   ISAPNP Read Data Port OK
0x02F4-0x02F7   ISAPNP Read Data Port OK
0x0081-0x008F   Direct memory access controller OK
0x00C0-0x00DF   Direct memory access controller OK
0x0020-0x0021   Programmable interrupt controller     OK
0x00A0-0x00A1   Programmable interrupt controller     OK
0x00F0-0x00FE   Numeric data processor     OK
0x0040-0x0043   System timer    OK
0x0061-0x0061   System speaker  OK
0x0C00-0x0CEF   Motherboard resources OK
0x0F50-0x0F58   Motherboard resources OK
0xE400-0xE47F   Motherboard resources OK
0xEB00-0xEB3F   Motherboard resources OK
0x0060-0x0060   Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
     OK
0x0064-0x0064   Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
     OK
0x0070-0x0071   System CMOS/real time clock     OK
0x03F0-0x03F5   Standard floppy disk controller OK
0x03F7-0x03F7   Standard floppy disk controller OK
0xD000-0xD00F   Standard Dual Channel PCI IDE Controller   OK
0x01F0-0x01F7   Primary IDE Channel  OK
0x03F6-0x03F6   Primary IDE Channel  OK
0x0170-0x0177   Secondary IDE Channel OK
0x0376-0x0376   Secondary IDE Channel OK
0xB000-0xBFFF   PCI bus    OK
0xB000-0xBFFF   LSI Logic Ultra3 PCI SCSI Adapter     OK
0xB800-0xB83F   Intel(R) PRO/100+ Management Adapter OK
0xB400-0xB4FF   LSI Logic Ultra3 PCI SCSI Adapter     OK

[IRQs]

IRQ Number Device
9     Microsoft ACPI-Compliant System
20    Intel(R) PRO/100+ Server Adapter (PILA8470B)
13    Numeric data processor
1     Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
12    PS/2 Compatible Mouse
8     System CMOS/real time clock
6     Standard floppy disk controller
14    Primary IDE Channel
22    Intel(R) PRO/100+ Management Adapter
24    LSI Logic Ultra3 PCI SCSI Adapter
25    LSI Logic Ultra3 PCI SCSI Adapter

[Memory]

Range Device     Status
0x0000-0x9FFFF  System board     OK
0xF0000-0xFFFFF System board     OK
0x100000-0x1FFFFFFF  System board     OK
0xFFF80000-0xFFFFFFFF System board     OK
0xA0000-0xBFFFF PCI bus    OK
0xA0000-0xBFFFF ATI Technologies Inc. RAGE XL PCI     OK
0xFB000000-0xFE9FFFFF PCI bus    OK
```

```
0xFEBE0000-0xFEBFFFFF PCI bus    OK
0xFE000000-0xFE000FFF Intel(R) PRO/100+ Server Adapter (PILA8470B)    OK
0xFD800000-0xFD8FFFFF Intel(R) PRO/100+ Server Adapter (PILA8470B)    OK
0xFC000000-0xFCFFFFFF ATI Technologies Inc. RAGE XL PCI    OK
0xFB800000-0xFB800FFF ATI Technologies Inc. RAGE XL PCI    OK
0xF8000000-0xFAFFFFFF PCI bus    OK
0xF8000000-0xFAFFFFFF LSI Logic Ultra3 PCI SCSI Adapter    OK
0xFEA00000-0xFEBDFFFF PCI bus    OK
0xFEE10000-0xFFF7FFFF PCI bus    OK
0xFA800000-0xFA800FFF Intel(R) PRO/100+ Management Adapter OK
0xFA000000-0xFA0FFFFF Intel(R) PRO/100+ Management Adapter OK
0xF9800000-0xF98003FF LSI Logic Ultra3 PCI SCSI Adapter    OK
0xF9000000-0xF9001FFF LSI Logic Ultra3 PCI SCSI Adapter    OK
0xF8800000-0xF88003FF LSI Logic Ultra3 PCI SCSI Adapter    OK


[Drives]

Item Value
Drive A:
Description     3 1/2 Inch Floppy Drive

Drive C:
Description     Local Fixed Disk
Compressed False
File System     NTFS
Size 8.50 GB (9,121,800,192 bytes)
Free Space 6.64 GB (7,125,860,352 bytes)
Volume Name
Volume Serial Number 080A3D50
Partition  Disk #0, Partition #0
Partition Size  8.50 GB (9,121,803,264 bytes)
Starting Offset 32256 bytes
Drive Description    Disk drive
Drive Manufacturer   (Standard disk drives)
Drive Model     FUJITSU MAG3091LC SCSI Disk Device
Drive BytesPerSector 512
Drive MediaLoaded    True
Drive MediaType Fixed hard disk media
Drive Partitions     1
Drive SCSIBus   0
Drive SCSILogicalUnit 0
Drive SCSIPort  2
Drive SCSITargetId   0
Drive SectorsPerTrack 63
Drive Size 9121835520 bytes
Drive TotalCylinders 1109
Drive TotalSectors   17816085
Drive TotalTracks    282795
Drive TracksPerCylinder    255


[SCSI]

Item Value
Name LSI Logic Ultra3 PCI SCSI Adapter
Caption    LSI Logic Ultra3 PCI SCSI Adapter
Driver     Lsi_u3
Status     OK
PNP Device ID
     PCI\VEN_1000&DEV_0020&SUBSYS_00000000&REV_01\3&1070020&0&28
Device ID  PCI\VEN_1000&DEV_0020&SUBSYS_00000000&REV_01\3&1070020&0&28
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 24
I/O Port   0xB400-0xB4FF
Driver     c:\winnt\system32\drivers\lsi_u3.sys (30192, LSI_U3NT-5.01.00)

Name LSI Logic Ultra3 PCI SCSI Adapter
Caption    LSI Logic Ultra3 PCI SCSI Adapter
Driver     Lsi_u3
Status     OK
PNP Device ID
     PCI\VEN_1000&DEV_0020&SUBSYS_00000000&REV_01\3&1070020&0&29
Device ID  PCI\VEN_1000&DEV_0020&SUBSYS_00000000&REV_01\3&1070020&0&29
Device Map Not Available
Index Not Available
Max Number Controlled Not Available
IRQ Number 25
I/O Port   0xB000-0xBFFF
Driver     c:\winnt\system32\drivers\lsi_u3.sys (30192, LSI_U3NT-5.01.00)


[Adapter]

Item Value
Name [00000000] Intel(R) PRO/100+ Server Adapter (PILA8470B)
Adapter Type    Ethernet 802.3
Product Name    Intel(R) PRO/100+ Server Adapter (PILA8470B)
Installed  True
PNP Device ID
     PCI\VEN_8086&DEV_1229&SUBSYS_100C8086&REV_08\3&13C0B0C5&0&10
Last Reset 3/19/2001 9:53:11 AM
Index 0
Service Name    E100B
IP Address 129.103.181.213
IP Subnet  255.255.255.0
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     00:E0:18:04:82:7B
Service Name    E100B
IRQ Number 20
```

```
I/O Port   0xD800-0xD83F
Driver     c:\winnt\system32\drivers\e100bnt5.sys (104720, 5.00.67.0000)

Name [00000001] RAS Async Adapter
Adapter Type    Not Available
Product Name    RAS Async Adapter
Installed  True
PNP Device ID   Not Available
Last Reset 3/19/2001 9:53:11 AM
Index 1
Service Name    AsyncMac
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     Not Available
Service Name    Not Available

Name [00000002] WAN Miniport (L2TP)
Adapter Type    Not Available
Product Name    WAN Miniport (L2TP)
Installed  True
PNP Device ID   ROOT\MS_L2TPMINIPORT\0000
Last Reset 3/19/2001 9:53:11 AM
Index 2
Service Name    Rasl2tp
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     Not Available
Service Name    Rasl2tp
Driver     c:\winnt\system32\drivers\rasl2tp.sys (50800, 5.00.2179.1)

Name [00000003] WAN Miniport (PPTP)
Adapter Type    Wide Area Network (WAN)
Product Name    WAN Miniport (PPTP)
Installed  True
PNP Device ID   ROOT\MS_PPTPMINIPORT\0000
Last Reset 3/19/2001 9:53:11 AM
Index 3
Service Name    PptpMiniport
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     50:50:54:50:30:30
Service Name    PptpMiniport
Driver     c:\winnt\system32\drivers\raspptp.sys (47856, 5.00.2160.1)

Name [00000004] Direct Parallel
Adapter Type    Not Available
Product Name    Direct Parallel
Installed  True
PNP Device ID   ROOT\MS_PTIMINIPORT\0000
Last Reset 3/19/2001 9:53:11 AM
Index 4
Service Name    Raspti
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     Not Available
Service Name    Raspti
Driver     c:\winnt\system32\drivers\raspti.sys (16880, 5.00.2146.1)

Name [00000005] WAN Miniport (IP)
Adapter Type    Not Available
Product Name    WAN Miniport (IP)
Installed  True
PNP Device ID   ROOT\MS_NDISWANIP\0000
Last Reset 3/19/2001 9:53:11 AM
Index 5
Service Name    NdisWan
IP Address Not Available
IP Subnet  Not Available
Default IP Gateway    Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires    Not Available
DHCP Lease Obtained   Not Available
MAC Address     Not Available
Service Name    NdisWan
Driver     c:\winnt\system32\drivers\ndiswan.sys (90768, 5.00.2184.1)

Name [00000006] Intel(R) PRO/100+ Management Adapter
Adapter Type    Ethernet 802.3
Product Name    Intel(R) PRO/100+ Management Adapter
Installed  True
PNP Device ID
     PCI\VEN_8086&DEV_1229&SUBSYS_000C8086&REV_08\3&1070020&0&18
Last Reset 3/19/2001 9:53:11 AM
Index 6
Service Name    E100B
```

```
IP Address 129.103.213.1
IP Subnet  255.255.255.0
Default IP Gateway   Not Available
DHCP Enabled    False
DHCP Server     Not Available
DHCP Lease Expires   Not Available
DHCP Lease Obtained  Not Available
MAC Address     00:03:47:24:50:36
Service Name    E100B
IRQ Number 22
I/O Port   0xB800-0xB83F
Driver     c:\winnt\system32\drivers\e100bnt5.sys (104720, 5.00.67.0000)

[Environment Variables]

Variable   Value User Name
ComSpec    %SystemRoot%\system32\cmd.exe   <SYSTEM>
Os2LibPath %SystemRoot%\system32\os2\dll;  <SYSTEM>
Path
     %SystemRoot%\system32;%SystemRoot%;%SystemRoot%\System32\Wbem;C:\Pro
gram Files\Microsoft SQL Server\80\Tools\BINN   <SYSTEM>
windir     %SystemRoot%    <SYSTEM>
OS    Windows_NT <SYSTEM>
PROCESSOR_ARCHITECTURE     x86   <SYSTEM>
PROCESSOR_LEVEL 6     <SYSTEM>
PROCESSOR_IDENTIFIER x86 Family 6 Model 8 Stepping 6, GenuineIntel
     <SYSTEM>
PROCESSOR_REVISION    0806 <SYSTEM>
NUMBER_OF_PROCESSORS 2     <SYSTEM>
PATHEXT    .COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH     <SYSTEM>
TEMP  %SystemRoot%\TEMP     <SYSTEM>
TMP   %SystemRoot%\TEMP     <SYSTEM>
TEMP  %USERPROFILE%\Local Settings\Temp     B210CL3\Administrator
TMP   %USERPROFILE%\Local Settings\Temp     B210CL3\Administrator


System Information report written at: 03/20/2001 09:26:18 AM
[Services]

Display Name     Name  State Start Mode Service Type     Path  Error Control
     Start Name Tag ID
Alerter    Alerter    Running    Auto  Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Application Management     AppMgmt    Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Computer Browser      Browser    Stopped    Disabled   Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Indexing Service      cisvc Stopped    Manual     Share Process
     c:\winnt\system32\cisvc.exe     Normal     LocalSystem     0
ClipBook   ClipSrv    Stopped    Manual     Own Process
     c:\winnt\system32\clipsrv.exe   Normal     LocalSystem     0
Distributed File System    Dfs   Stopped    Manual     Own Process
     c:\winnt\system32\dfssvc.exe    Normal     LocalSystem     0
DHCP Client     Dhcp Stopped    Disabled   Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Logical Disk Manager Administrative Service     dmadmin    Stopped
     Manual     Share Process   c:\winnt\system32\dmadmin.exe /com
     Normal     LocalSystem     0
Logical Disk Manager dmserver   Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
DNS Client Dnscache   Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Event Log  Eventlog   Running    Auto Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
COM+ Event System     EventSystem     Running    Auto Share Process
     c:\winnt\system32\svchost.exe -k netsvcs   Normal     LocalSystem
     0
Fax Service     Fax   Stopped    Disabled   Own Process
     c:\winnt\system32\faxsvc.exe    Normal     LocalSystem     0
IIS Admin Service     IISADMIN   Running    Manual     Share Process
     c:\winnt\system32\inetsrv\inetinfo.exe     Normal     LocalSystem
     0
Intersite Messaging  IsmServ    Stopped    Disabled   Own Process
     c:\winnt\system32\ismserv.exe   Normal     LocalSystem     0
Kerberos Key Distribution Center     kdc   Stopped    Disabled   Share
Process    c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
Server     lanmanserver    Running    Auto Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Workstation     lanmanworkstation     Running    Auto Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
License Logging Service    LicenseService  Stopped    Manual     Own
Process    c:\winnt\system32\llssrv.exe    Normal     LocalSystem     0
TCP/IP NetBIOS Helper Service   LmHosts    Running    Auto Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Messenger  Messenger  Running    Auto Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
NetMeeting Remote Desktop Sharing     mnmsrvc    Stopped    Disabled   Own
Process    c:\winnt\system32\mnmsrvc.exe   Normal     LocalSystem     0
Distributed Transaction Coordinator   MSDTC Stopped    Manual     Own
Process    c:\winnt\system32\msdtc.exe     Normal     LocalSystem     0
Windows Installer     MSIServer  Stopped    Manual     Share Process
     c:\winnt\system32\msiexec.exe /v      Normal     LocalSystem     0
Network DDE     NetDDE     Stopped    Manual     Share Process
     c:\winnt\system32\netdde.exe    Normal     LocalSystem     0
Network DDE DSDM      NetDDEdsdm Stopped    Manual     Share Process
     c:\winnt\system32\netdde.exe    Normal     LocalSystem     0
Net Logon  Netlogon   Stopped    Manual     Share Process
     c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
Network Connections   Netman     Running    Manual     Share Process
     c:\winnt\system32\svchost.exe -k netsvcs   Normal     LocalSystem
     0
NMS Service     NMSSvc     Stopped    Manual     Own Process
     c:\winnt\system32\nmssvc.exe    Normal     LocalSystem     0
File Replication      NtFrs Stopped    Manual     Own Process
     c:\winnt\system32\ntfrs.exe     Ignore     LocalSystem     0
```

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NT LM Security Support Provider NtLmSsp    Stopped    Manual     Share
Process    c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
Removable Storage     NtmsSvc    Stopped    Disabled   Share Process
     c:\winnt\system32\svchost.exe -k netsvcs   Normal     LocalSystem
     0
Plug and Play   PlugPlay   Running    Auto  Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
IPSEC Policy Agent    PolicyAgent     Stopped    Manual     Share Process
     c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
Protected Storage     ProtectedStorage     Running    Auto  Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
Remote Access Auto Connection Manager RasAuto    Stopped    Manual
     Share Process   c:\winnt\system32\svchost.exe -k netsvcs   Normal
     LocalSystem     0
Remote Access Connection Manager      RasMan     Stopped    Manual
     Share Process   c:\winnt\system32\svchost.exe -k netsvcs   Normal
     LocalSystem     0
Routing and Remote Access  RemoteAccess    Stopped    Disabled   Share
Process    c:\winnt\system32\svchost.exe -k netsvcs   Normal
     LocalSystem     0
Remote Registry Service    RemoteRegistry  Stopped    Manual     Own
Process    c:\winnt\system32\regsvc.exe    Normal     LocalSystem     0
Remote Command Service     RMSYS Stopped    Disabled   Own Process
     c:\benchcrf_422\rsys.exe   Normal     LocalSystem     0
Remote Procedure Call (RPC) Locator   RpcLocator Stopped    Manual     Own
Process    c:\winnt\system32\locator.exe   Normal     LocalSystem     0
Remote Procedure Call (RPC)     RpcSs Running    Auto  Share Process
     c:\winnt\system32\svchost -k rpcss    Normal     LocalSystem     0
QoS RSVP   RSVP  Running    Manual     Own Process
     c:\winnt\system32\rsvp.exe -s   Normal     LocalSystem     0
Security Accounts Manager  SamSs Stopped    Manual     Share Process
     c:\winnt\system32\lsass.exe     Normal     LocalSystem     0
Smart Card Helper     SCardDrv   Stopped    Manual     Share Process
     c:\winnt\system32\scardsvr.exe  Ignore     LocalSystem     0
Smart Card SCardSvr   Stopped    Manual     Share Process
     c:\winnt\system32\scardsvr.exe  Ignore     LocalSystem     0
Task Scheduler  Schedule   Stopped    Manual     Share Process
     c:\winnt\system32\mstask.exe    Normal     LocalSystem     0
RunAs Service   seclogon   Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Ignore     LocalSystem     0
System Event Notification  SENS Running    Auto  Share Process
     c:\winnt\system32\svchost.exe -k netsvcs   Normal     LocalSystem
     0
Internet Connection Sharing     SharedAccess    Stopped    Manual
     Share Process   c:\winnt\system32\svchost.exe -k netsvcs   Normal
     LocalSystem     0
Simple Mail Transport Protocol (SMTP) SMTPSVC    Stopped    Manual
     Share Process   c:\winnt\system32\inetsrv\inetinfo.exe     Normal
     LocalSystem     0
Print Spooler   Spooler    Stopped    Disabled   Own Process
     c:\winnt\system32\spoolsv.exe   Normal     LocalSystem     0
Performance Logs and Alerts     SysmonLog  Stopped    Manual     Own
Process    c:\winnt\system32\smlogsvc.exe  Normal     LocalSystem     0
Telephony  TapiSrv    Stopped    Disabled   Share Process
     c:\winnt\system32\svchost.exe -k tapisrv   Normal     LocalSystem
     0
Terminal Services     TermService     Stopped    Disabled   Own Process
     c:\winnt\system32\termsrv.exe   Normal     LocalSystem     0
Telnet     TlntSvr    Stopped    Disabled   Own Process
     c:\winnt\system32\tlntsvr.exe   Normal     LocalSystem     0
Distributed Link Tracking Server      TrkSvr     Stopped    Manual
     Share Process   c:\winnt\system32\services.exe  Normal
     LocalSystem     0
Distributed Link Tracking Client      TrkWks     Stopped    Manual
     Share Process   c:\winnt\system32\services.exe  Normal
     LocalSystem     0
Uninterruptible Power Supply    UPS  Stopped    Manual     Own Process
     c:\winnt\system32\ups.exe  Normal     LocalSystem     0
Utility Manager UtilMan    Stopped    Manual     Own Process
     c:\winnt\system32\utilman.exe   Normal     LocalSystem     0
Windows Time    W32Time    Stopped    Manual     Share Process
     c:\winnt\system32\services.exe  Normal     LocalSystem     0
World Wide Web Publishing Service     W3SVC Running    Auto  Share Process
     c:\winnt\system32\inetsrv\inetinfo.exe     Normal     LocalSystem
     0
Windows Management Instrumentation    WinMgmt    Running    Auto  Own
Process    c:\winnt\system32\wbem\winmgmt.exe   Ignore     LocalSystem
     0
Windows Management Instrumentation Driver Extensions Wmi  Running
     Manual     Share Process   c:\winnt\system32\services.exe  Normal
     LocalSystem     0


Key Name:          SYSTEM\CurrentControlSet\Services\E100B
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            DisplayName
  Type:            REG_SZ
  Data:            Intel(R) PRO Adapter Driver

Value 1
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            Group
  Type:            REG_SZ
  Data:            NDIS

Value 3
  Name:            ImagePath
  Type:            REG_EXPAND_SZ
  Data:            System32\DRIVERS\e100bnt5.sys
```

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Value 4
  Name:            Start
  Type:            REG_DWORD
  Data:            0x3

Value 5
  Name:            Tag
  Type:            REG_DWORD
  Data:            0xa

Value 6
  Name:            TextModeFlags
  Type:            REG_DWORD
  Data:            0x1

Value 7
  Name:            Type
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\E100B\Enum
Class Name:        <NO CLASS>
Last Write Time:   3/19/2001 - 8:53 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:
PCI\VEN_8086&DEV_1229&SUBSYS_100C8086&REV_08\3&13c0b0c5&0&10

Value 1
  Name:            1
  Type:            REG_SZ
  Data:
PCI\VEN_8086&DEV_1229&SUBSYS_000C8086&REV_08\3&1070020&0&18

Value 2
  Name:            Count
  Type:            REG_DWORD
  Data:            0x2

Value 3
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x2


Key Name:          SYSTEM\CurrentControlSet\Services\E100B\Security
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM
Value 0
  Name:            Security
  Type:            REG_BINARY
  Data:
00000000   01 00 14 80 a0 00 00 00 - ac 00 00 00 14 00 00 00
.... ...¬.......
00000010   30 00 00 00 02 00 1c 00 - 01 00 00 00 02 80 14 00
0...............
00000020   ff 01 0f 00 01 01 00 00 - 00 00 00 01 00 00 00 00
ÿ...............
00000030   02 00 70 00 04 00 00 00 - 00 00 18 00 fd 01 02 00
..p.........ý...
00000040   01 01 00 00 00 00 00 05 - 12 00 00 00 20 02 00 00
............ ...
00000050   00 00 1c 00 ff 01 0f 00 - 01 02 00 00 00 00 00 05
....ÿ...........
00000060   20 00 00 00 20 02 00 00 - 74 00 00 00 00 00 18 00   ...
...t.......
00000070   8d 01 02 00 01 01 00 00 - 00 00 00 05 0b 00 00 00
................
00000080   20 02 00 00 00 00 1c 00 - fd 01 02 00 01 02 00 00
.......ý.......
00000090   00 00 00 05 20 00 00 00 - 23 02 00 00 74 00 00 00  ....
...#...t...
000000a0   01 01 00 00 00 00 00 05 - 12 00 00 00 01 01 00 00
................
000000b0   00 00 00 05 12 00 00 00 -                          ........


Key Name:          SYSTEM\CurrentControlSet\Services\InetInfo
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 3:45 PM

Key Name:          SYSTEM\CurrentControlSet\Services\InetInfo\Parameters
Class Name:        <NO CLASS>
Last Write Time:   3/15/2001 - 7:44 AM
Value 0
  Name:            DispatchEntries
  Type:            REG_MULTI_SZ
  Data:            LDAPSVC
                   SMTPSVC

Value 1
  Name:            ListenBackLog
  Type:            REG_DWORD
  Data:            0x2710

Value 2
  Name:            PoolThreadLimit
  Type:            REG_DWORD
  Data:            0x2b0

Value 3
  Name:            ThreadTimeout
```

```
  Type:            REG_DWORD
  Data:            0x15180


Key Name:          SYSTEM\CurrentControlSet\Services\InetInfo\Performance
Class Name:        <NO CLASS>
Last Write Time:   3/19/2001 - 8:53 AM
Value 0
  Name:            Close
  Type:            REG_SZ
  Data:            CloseINFOPerformanceData

Value 1
  Name:            Collect
  Type:            REG_SZ
  Data:            CollectINFOPerformanceData

Value 2
  Name:            First Counter
  Type:            REG_DWORD
  Data:            0x802

Value 3
  Name:            First Help
  Type:            REG_DWORD
  Data:            0x803

Value 4
  Name:            Last Counter
  Type:            REG_DWORD
  Data:            0x842

Value 5
  Name:            Last Help
  Type:            REG_DWORD
  Data:            0x843

Value 6
  Name:            Library
  Type:            REG_SZ
  Data:            infoctrs.dll

Value 7
  Name:            Library Validation Code
  Type:            REG_BINARY
  Data:
00000000   7e 16 f0 b4 0a 95 c0 01 - 10 25 00 00 00 00 00 00
~.ð´..À..%......

Value 8
  Name:            Open
  Type:            REG_SZ
  Data:            OpenINFOPerformanceData


Value 9
  Name:            WbemAdapFileSize
  Type:            REG_DWORD
  Data:            0x2510

Value 10
  Name:            WbemAdapFileTime
  Type:            REG_BINARY
  Data:
00000000   00 fe e3 e4 0b f3 bf 01 -                          .þãä.ó¿.

Value 11
  Name:            WbemAdapStatus
  Type:            REG_DWORD
  Data:            0


Key Name:          SYSTEM\CurrentControlSet\Services\Tcpip
Class Name:        Class
Last Write Time:   2/12/2001 - 4:40 PM
Value 0
  Name:            Description
  Type:            REG_SZ
  Data:            TCP/IP Protocol Driver

Value 1
  Name:            DisplayName
  Type:            REG_SZ
  Data:            TCP/IP Protocol Driver

Value 2
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 3
  Name:            Group
  Type:            REG_SZ
  Data:            PNP_TDI

Value 4
  Name:            ImagePath
  Type:            REG_EXPAND_SZ
  Data:            System32\DRIVERS\tcpip.sys

Value 5
  Name:            Start
  Type:            REG_DWORD
  Data:            0x1

Value 6
  Name:            Tag
```

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  Type:            REG_DWORD
  Data:            0x4

Value 7
  Name:            Type
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\Tcpip\Enum
Class Name:        <NO CLASS>
Last Write Time:   3/19/2001 - 8:53 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Root\LEGACY_TCPIP\0000

Value 1
  Name:            Count
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\Tcpip\Linkage
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Bind
  Type:            REG_MULTI_SZ
  Data:            \Device\{896609FD-5213-4FCF-82EC-7D9F10C4F225}
                   \Device\{9B070E23-A33F-47B8-852E-BE365B1D8C9C}
                   \Device\NdisWanIp


Value 1
  Name:            Export
  Type:            REG_MULTI_SZ
  Data:            \Device\Tcpip_{896609FD-5213-4FCF-82EC-7D9F10C4F225}
                   \Device\Tcpip_{9B070E23-A33F-47B8-852E-BE365B1D8C9C}
                   \Device\Tcpip_{CA92CE14-2FC2-4FF3-B680-1F7DF9594EAF}
                   \Device\Tcpip_{FD73BFE5-0643-4705-9572-5E3D92E4F8AD}


Value 2
  Name:            Route
  Type:            REG_MULTI_SZ
  Data:            "{896609FD-5213-4FCF-82EC-7D9F10C4F225}"
                   "{9B070E23-A33F-47B8-852E-BE365B1D8C9C}"
                   "NdisWanIp"


Key Name:          SYSTEM\CurrentControlSet\Services\Tcpip\Parameters
Class Name:        Class
Last Write Time:   2/27/2001 - 7:47 AM
Value 0
  Name:            AllowUnqualifiedQuery
  Type:            REG_DWORD
  Data:            0

Value 1
  Name:            DataBasePath
  Type:            REG_EXPAND_SZ
  Data:            %SystemRoot%\System32\drivers\etc

Value 2
  Name:            DeadGWDetectDefault
  Type:            REG_DWORD
  Data:            0x1

Value 3
  Name:            Domain
  Type:            REG_SZ
  Data:

Value 4
  Name:            DontAddDefaultGatewayDefault
  Type:            REG_DWORD
  Data:            0

Value 5
  Name:            EnableICMPRedirect
  Type:            REG_DWORD
  Data:            0x1

Value 6
  Name:            EnableSecurityFilters
  Type:            REG_DWORD
  Data:            0

Value 7
  Name:            ForwardBroadcasts
  Type:            REG_DWORD
  Data:            0

Value 8
  Name:            Hostname
  Type:            REG_SZ
  Data:            b210cl3

Value 9
```

```
  Name:            IPEnableRouter
  Type:            REG_DWORD
  Data:            0

Value 10
  Name:            MaxUserPort
  Type:            REG_DWORD
  Data:            0xfffe

Value 11
  Name:            NameServer
  Type:            REG_SZ
  Data:

Value 12
  Name:            NV Hostname
  Type:            REG_SZ
  Data:            b210cl3

Value 13
  Name:            PrioritizeRecordData
  Type:            REG_DWORD
  Data:            0x1

Value 14
  Name:            SearchList
  Type:            REG_SZ
  Data:

Value 15
  Name:            UseDomainNameDevolution
  Type:            REG_DWORD
  Data:            0



Key Name:          SYSTEM\CurrentControlSet\Services\W3SVC
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 1:12 PM
Value 0
  Name:            DependOnGroup
  Type:            REG_MULTI_SZ
  Data:

Value 1
  Name:            DependOnService
  Type:            REG_MULTI_SZ
  Data:            IISADMIN


Value 2
  Name:            Description
  Type:            REG_SZ
  Data:            Provides Web connectivity and administration through
the Internet Information Services snap-in.

Value 3
  Name:            DisplayName
  Type:            REG_SZ
  Data:            World Wide Web Publishing Service

Value 4
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 5
  Name:            ImagePath
  Type:            REG_EXPAND_SZ
  Data:            C:\WINNT\System32\inetsrv\inetinfo.exe

Value 6
  Name:            ObjectName
  Type:            REG_SZ
  Data:            LocalSystem

Value 7
  Name:            Start
  Type:            REG_DWORD
  Data:            0x2

Value 8
  Name:            Type
  Type:            REG_DWORD
  Data:            0x20


Key Name:          SYSTEM\CurrentControlSet\Services\W3SVC\ASP
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 3:46 PM
Value 0
  Name:            NOTE
  Type:            REG_SZ
  Data:            This is for backward compatibility only.


Key Name:          SYSTEM\CurrentControlSet\Services\W3SVC\ASP\Parameters
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 3:46 PM

Key Name:          SYSTEM\CurrentControlSet\Services\W3SVC\Enum
Class Name:        <NO CLASS>
Last Write Time:   3/19/2001 - 8:53 AM
Value 0
  Name:            0
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```
  Type:            REG_SZ
  Data:            Root\LEGACY_W3SVC\0000

Value 1
  Name:            Count
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\W3SVC\Parameters
Class Name:        <NO CLASS>
Last Write Time:   3/2/2001 - 1:38 PM
Value 0
  Name:            AcceptExOutstanding
  Type:            REG_DWORD
  Data:            0x28

Value 1
  Name:            AccessDeniedMessage
  Type:            REG_SZ
  Data:            Error: Access is Denied.

Value 2
  Name:            CertMapList
  Type:            REG_SZ
  Data:            C:\WINNT\System32\inetsrv\iiscrmap.dll

Value 3
  Name:            Filter DLLs
  Type:            REG_SZ
  Data:

Value 4
  Name:            InstallPath
  Type:            REG_SZ
  Data:            C:\WINNT\System32\inetsrv

Value 5
  Name:            LogFileDirectory
  Type:            REG_SZ
  Data:            C:\WINNT\System32\LogFiles

Value 6
  Name:            MajorVersion
  Type:            REG_DWORD
  Data:            0x5

Value 7
  Name:            MinorVersion
  Type:            REG_DWORD
  Data:            0


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Linkage
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:40 PM
Value 0
  Name:            Export
  Type:            REG_MULTI_SZ
  Data:            \Device\{9B070E23-A33F-47B8-852E-BE365B1D8C9C}


Value 1
  Name:            RootDevice
  Type:            REG_MULTI_SZ
  Data:            {9B070E23-A33F-47B8-852E-BE365B1D8C9C}


Value 2
  Name:            UpperBind
  Type:            REG_MULTI_SZ
  Data:            Tcpip



Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM
Value 0
  Name:            Service
  Type:            REG_SZ
  Data:            E100B


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\Interfaces
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM
Value 0
  Name:            LowerRange
  Type:            REG_SZ
  Data:            ethernet

Value 1
  Name:            UpperRange
  Type:            REG_SZ
  Data:            ndis5
```

```
Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM

Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\Adaptive_IFS
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            1

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            255

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            0

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Inter-Frame Spacing

Value 5
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 6
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\Coalesce
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            PCI Bus Efficiency

Value 2
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\Coalesce\Enum
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Disabled

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            Enabled


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\EnablePME
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            2

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Enable PME

Value 2
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\EnablePME\Enum
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            0
```

```
  Type:            REG_SZ
  Data:            Disabled

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            Enabled

Value 2
  Name:            2
  Type:            REG_SZ
  Data:            No Action

Value 3
  Name:            255
  Type:            REG_SZ
  Data:            Hardware Default


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\NetworkAddress
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:

Value 1
  Name:            LimitText
  Type:            REG_SZ
  Data:            12

Value 2
  Name:            optional
  Type:            REG_SZ
  Data:            1

Value 3
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Locally Administered Address

Value 4
  Name:            type
  Type:            REG_SZ
  Data:            edit

Value 5
  Name:            UpperCase
  Type:            REG_SZ
  Data:            1


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\NumCoalesce
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            default
  Type:            REG_SZ
  Data:            8

Value 2
  Name:            max
  Type:            REG_SZ
  Data:            32

Value 3
  Name:            min
  Type:            REG_SZ
  Data:            1

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Coalesce Buffers

Value 5
  Name:            step
  Type:            REG_SZ
  Data:            1

Value 6
  Name:            type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\NumRfd
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            default
  Type:            REG_SZ
```

```
  Data:            48

Value 2
  Name:            max
  Type:            REG_SZ
  Data:            1024

Value 3
  Name:            min
  Type:            REG_SZ
  Data:            1

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Receive Buffers

Value 5
  Name:            step
  Type:            REG_SZ
  Data:            1

Value 6
  Name:            type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\NumTcb
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            default
  Type:            REG_SZ
  Data:            32

Value 2
  Name:            max
  Type:            REG_SZ
  Data:            64

Value 3
  Name:            min
  Type:            REG_SZ
  Data:            1

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Transmit Control Blocks

Value 5
  Name:            step
  Type:            REG_SZ
  Data:            1

Value 6
  Name:            type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\SpeedDuplex
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM
Value 0
  Name:            default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Link Speed & Duplex

Value 2
  Name:            type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\SpeedDuplex\enum
Class Name:        <NO CLASS>
Last Write Time:   2/12/2001 - 4:30 PM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Auto Detect

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            10Mbps/Half Duplex

Value 2
  Name:            2
  Type:            REG_SZ
  Data:            10Mbps/Full Duplex
```

```
Value 3
  Name:            3
  Type:            REG_SZ
  Data:            100Mbps/Half Duplex

Value 4
  Name:            4
  Type:            REG_SZ
  Data:            100Mbps/Full Duplex


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\TaggingMode
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            802.1p/802.1Q Tagging

Value 2
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\TaggingMode\Enum
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Disabled

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            Enabled


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\Threshold
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            12

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            200

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            0

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Transmit Threshold

Value 5
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 6
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\UcodeSW
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            1

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Technology

Value 2
  Name:            Type
  Type:            REG_SZ
  Data:            enum
```

```
Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\Ndi\params\UcodeSW\Enum
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Off

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            On


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\PROSetNdi
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM

Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\PROSetNdi\Params
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM

Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\PROSetNdi\Params\CPUSaver
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 9:13 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            1536

Value 1
  Name:            ExposeLevel
  Type:            REG_SZ
  Data:            2

Value 2
  Name:            LeftLabel
  Type:            REG_SZ
  Data:            Adapter Bandwidth

Value 3
  Name:            MiniHelp
  Type:            REG_SZ
  Data:            Sets optimal point of CPU/Adapter performance for this
system.  See help.

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Performance Tuning

Value 5
  Name:            RightLabel
  Type:            REG_SZ
  Data:            CPU Utilization

Value 6
  Name:            Type
  Type:            REG_SZ
  Data:            slider


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\PROSetNdi\Params\CPUSaver\Values
Class Name:        <NO CLASS>
Last Write Time:   2/13/2001 - 8:26 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            1

Value 2
  Name:            10
  Type:            REG_SZ
  Data:            2560

Value 3
  Name:            11
  Type:            REG_SZ
  Data:            2816

Value 4
  Name:            12
  Type:            REG_SZ
  Data:            3072

Value 5
  Name:            13
  Type:            REG_SZ
  Data:            3328

Value 6
  Name:            14
  Type:            REG_SZ
  Data:            3584
```

```
Value 7
  Name:           15
  Type:           REG_SZ
  Data:           3840

Value 8
  Name:           16
  Type:           REG_SZ
  Data:           4096

Value 9
  Name:           2
  Type:           REG_SZ
  Data:           512

Value 10
  Name:           3
  Type:           REG_SZ
  Data:           768

Value 11
  Name:           4
  Type:           REG_SZ
  Data:           1024

Value 12
  Name:           5
  Type:           REG_SZ
  Data:           1280

Value 13
  Name:           6
  Type:           REG_SZ
  Data:           1536

Value 14
  Name:           7
  Type:           REG_SZ
  Data:           1792

Value 15
  Name:           8
  Type:           REG_SZ
  Data:           2048

Value 16
  Name:           9
  Type:           REG_SZ
  Data:           2304


Key Name:         SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0000\PROSetNdi\Params\NetworkAddress
Class Name:       <NO CLASS>
Last Write Time:  2/13/2001 - 9:13 AM
Value 0
  Name:           Base
  Type:           REG_SZ
  Data:           16

Value 1
  Name:           Default
  Type:           REG_SZ
  Data:

Value 2
  Name:           ExposeLevel
  Type:           REG_SZ
  Data:           2

Value 3
  Name:           ParamDesc
  Type:           REG_SZ
  Data:           Locally Administered Address

Value 4
  Name:           Type
  Type:           REG_SZ
  Data:           edit


Key Name:         SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006
Class Name:       <NO CLASS>
Last Write Time:  3/12/2001 - 2:43 PM
Value 0
  Name:           Adaptive_IFS
  Type:           REG_SZ
  Data:           1

Value 1
  Name:           BusType
  Type:           REG_SZ
  Data:           5

Value 2
  Name:           Characteristics
  Type:           REG_DWORD
  Data:           0x84

Value 3
  Name:           Coalesce
  Type:           REG_SZ
  Data:           1

Value 4
```

```
  Name:            CoInstallFlag
  Type:            REG_DWORD
  Data:            0x80000004

Value 5
  Name:            ComponentId
  Type:            REG_SZ
  Data:            pci\ven_8086&dev_1229&subsys_000c8086

Value 6
  Name:            CPUSaver
  Type:            REG_SZ
  Data:            2560

Value 7
  Name:            DeviceVxDsPrefix
  Type:            REG_SZ
  Data:            e100b

Value 8
  Name:            DriverDate
  Type:            REG_SZ
  Data:            8-5-2000

Value 9
  Name:            DriverDateData
  Type:            REG_BINARY
  Data:
00000000   00 00 11 19 70 fe bf 01 -                          ....pþ¿.

Value 10
  Name:            DriverDesc
  Type:            REG_SZ
  Data:            Intel(R) PRO/100+ Management Adapter

Value 11
  Name:            DriverVersion
  Type:            REG_SZ
  Data:            5.0.67.0

Value 12
  Name:            EnablePME
  Type:            REG_SZ
  Data:            2

Value 13
  Name:            HardwareAddress
  Type:            REG_SZ
  Data:            000347245036

Value 14
  Name:            InfPath
  Type:            REG_SZ
  Data:            oem0.inf

Value 15
  Name:            InfSection
  Type:            REG_SZ
  Data:            D101M.ndi

Value 16
  Name:            InfSectionExt
  Type:            REG_SZ
  Data:            .NT

Value 17
  Name:            LogErrorMessages
  Type:            REG_SZ
  Data:            1

Value 18
  Name:            MatchingDeviceId
  Type:            REG_SZ
  Data:            pci\ven_8086&dev_1229&subsys_000c8086

Value 19
  Name:            MWIEnable
  Type:            REG_SZ
  Data:            0

Value 20
  Name:            NetCfgInstanceId
  Type:            REG_SZ
  Data:            {896609FD-5213-4FCF-82EC-7D9F10C4F225}

Value 21
  Name:            NumCoalesce
  Type:            REG_SZ
  Data:            32

Value 22
  Name:            NumRfd
  Type:            REG_SZ
  Data:            1024

Value 23
  Name:            NumTcb
  Type:            REG_SZ
  Data:            64

Value 24
  Name:            PcNic
  Type:            REG_SZ
  Data:            1

Value 25
```

```
  Name:            PnPCapabilities
  Type:            REG_DWORD
  Data:            0x38

Value 26
  Name:            ProviderName
  Type:            REG_SZ
  Data:            Intel

Value 27
  Name:            SpeedDuplex
  Type:            REG_SZ
  Data:            4

Value 28
  Name:            TaggingMode
  Type:            REG_SZ
  Data:            0

Value 29
  Name:            Threshold
  Type:            REG_SZ
  Data:            128

Value 30
  Name:            UcodeSW
  Type:            REG_SZ
  Data:            1


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Linkage
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Export
  Type:            REG_MULTI_SZ
  Data:            \Device\{896609FD-5213-4FCF-82EC-7D9F10C4F225}


Value 1
  Name:            RootDevice
  Type:            REG_MULTI_SZ
  Data:            {896609FD-5213-4FCF-82EC-7D9F10C4F225}


Value 2
  Name:            UpperBind
  Type:            REG_MULTI_SZ
  Data:            Tcpip
```

```
Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Service
  Type:            REG_SZ
  Data:            E100B


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\Interfaces
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            LowerRange
  Type:            REG_SZ
  Data:            ethernet

Value 1
  Name:            UpperRange
  Type:            REG_SZ
  Data:            ndis5


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM

Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\Adaptive_IFS
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            1

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            255

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            0
```

```
Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Inter-Frame Spacing

Value 5
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 6
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\Coalesce
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            PCI Bus Efficiency

Value 2
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\Coalesce\Enum
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Disabled

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            Enabled
```

```
Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\EnablePME
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            2

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Enable PME

Value 2
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\EnablePME\Enum
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Disabled

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            Enabled

Value 2
  Name:            2
  Type:            REG_SZ
  Data:            No Action

Value 3
  Name:            255
  Type:            REG_SZ
  Data:            Hardware Default


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\NumCoalesce
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10
```

```
Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            8

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            32

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            1

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Coalesce Buffers

Value 5
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 6
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\NumRfd
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            48

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            1024

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            1

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Receive Buffers

Value 5
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 6
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\NumTcb
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            32

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            64

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            1

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Transmit Control Blocks

Value 5
  Name:            Step
  Type:            REG_SZ
  Data:            1
```

```
Value 6
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\SpeedDuplex
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Link Speed & Duplex

Value 2
  Name:            type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\SpeedDuplex\enum
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Auto Detect

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            10Mbps/Half Duplex

Value 2
  Name:            2
  Type:            REG_SZ
  Data:            10Mbps/Full Duplex

Value 3
  Name:            3
  Type:            REG_SZ
  Data:            100Mbps/Half Duplex

Value 4
  Name:            4
  Type:            REG_SZ
  Data:            100Mbps/Full Duplex


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\TaggingMode
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            802.1p/802.1Q Tagging

Value 2
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\TaggingMode\Enum
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Disabled

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            Enabled


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\Threshold
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            12

Value 2
```

```
  Name:            Max
  Type:            REG_SZ
  Data:            200

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            0

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Transmit Threshold

Value 5
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 6
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\UcodeSW
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            1

Value 1
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Technology

Value 2
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\Ndi\params\UcodeSW\Enum
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Off

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            On


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\PROSetNdi
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM

Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\PROSetNdi\Params
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM

Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\PROSetNdi\Params\CPUSaver
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            1536

Value 1
  Name:            ExposeLevel
  Type:            REG_SZ
  Data:            2

Value 2
  Name:            LeftLabel
  Type:            REG_SZ
  Data:            Adapter Bandwidth

Value 3
  Name:            MiniHelp
  Type:            REG_SZ
  Data:            Sets optimal point of CPU/Adapter performance for this
system.  See help.

Value 4
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Performance Tuning

Value 5
  Name:            RightLabel
  Type:            REG_SZ
  Data:            CPU Utilization

Value 6
```

```
  Name:            Type
  Type:            REG_SZ
  Data:            slider


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\PROSetNdi\Params\CPUSaver\Values
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            1

Value 2
  Name:            10
  Type:            REG_SZ
  Data:            2560

Value 3
  Name:            11
  Type:            REG_SZ
  Data:            2816

Value 4
  Name:            12
  Type:            REG_SZ
  Data:            3072

Value 5
  Name:            13
  Type:            REG_SZ
  Data:            3328

Value 6
  Name:            14
  Type:            REG_SZ
  Data:            3584

Value 7
  Name:            15
  Type:            REG_SZ
  Data:            3840

Value 8
  Name:            16
  Type:            REG_SZ
  Data:            4096

Value 9
  Name:            2
  Type:            REG_SZ
  Data:            512

Value 10
  Name:            3
  Type:            REG_SZ
  Data:            768

Value 11
  Name:            4
  Type:            REG_SZ
  Data:            1024

Value 12
  Name:            5
  Type:            REG_SZ
  Data:            1280

Value 13
  Name:            6
  Type:            REG_SZ
  Data:            1536

Value 14
  Name:            7
  Type:            REG_SZ
  Data:            1792

Value 15
  Name:            8
  Type:            REG_SZ
  Data:            2048

Value 16
  Name:            9
  Type:            REG_SZ
  Data:            2304


Key Name:          SYSTEM\CurrentControlSet\Control\Class\{4D36E972-E325-
11CE-BFC1-08002BE10318}\0006\PROSetNdi\Params\NetworkAddress
Class Name:        <NO CLASS>
Last Write Time:   3/12/2001 - 2:33 PM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            16

Value 1
  Name:            Default
```

```
  Type:            REG_SZ
  Data:

Value 2
  Name:            ExposeLevel
  Type:            REG_SZ
  Data:            2

Value 3
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Locally Administered Address

Value 4
  Name:            Type
  Type:            REG_SZ
  Data:            edit


Key Name:          SOFTWARE\Microsoft\TPCC
Class Name:        <NO CLASS>
Last Write Time:   3/13/2001 - 10:54 AM
Value 0
  Name:            COM_SinglePool
  Type:            REG_SZ
  Data:            YES

Value 1
  Name:            DB_Protocol
  Type:            REG_SZ
  Data:            ODBC

Value 2
  Name:            DbName
  Type:            REG_SZ
  Data:            tpcc

Value 3
  Name:            DbPassword
  Type:            REG_SZ
  Data:

Value 4
  Name:            DbServer
  Type:            REG_SZ
  Data:            h400

Value 5
  Name:            DbUser
  Type:            REG_SZ
  Data:            sa

Value 6
  Name:            MaxConnections
  Type:            REG_DWORD
  Data:            0x2710

Value 7
  Name:            MaxPendingDeliveries
  Type:            REG_DWORD
  Data:            0x3e8

Value 8
  Name:            NumberOfDeliveryThreads
  Type:            REG_DWORD
  Data:            0x5

Value 9
  Name:            Path
  Type:            REG_SZ
  Data:            c:\inetpub\wwwroot\

Value 10
  Name:            TxnMonitor
  Type:            REG_SZ
  Data:            COM
```

Component Services Configuration:
COM+ Component TPCC.AllTXns Settings:

Transactions not supported
Enable object pooling
Minimum pool size 49
Maximum pool size 49
Creation timeout 60,000
Enable object construction
Enable just in time activation
Concurrency required

This section discloses the RTE parameters used on the PRIMERGY 870 system.

```
Profile:   HTML_30000
File Path: G:\Audit_H400_2\HTML_30000.pro
Version:   1.0.1

     Number of Engines: 15
```

```
Name: DRIVER01
Description: tuerkis1
Directory: c:\log_b210_t1.log
Machine: tuerkis
Parameter Set: All_Times
Index: 0
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER15224187
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 0

Name: DRIVER02
Description: tuerkis2
Directory: c:\log_b210_t2.log
Machine: tuerkis
Parameter Set: All_Times
Index: 100000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER25270250
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 1

Name: DRIVER03
Description: tuerkis3
Directory: c:\log_b210_t3.log
Machine: tuerkis
Parameter Set: All_Times
Index: 200000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER35312546
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 2

Name: DRIVER04
Description: rosa1
Directory: c:\log_b210_r1.log
Machine: rosa
Parameter Set: All_Times
Index: 300000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER45344812
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 0

Name: DRIVER05
Description: rosa2
Directory: c:\log_b210_r2.log
Machine: rosa
Parameter Set: All_Times
Index: 400000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER55370562
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 1

Name: DRIVER06
Description: rosa3
Directory: c:\log_b210_r3.log
Machine: rosa
Parameter Set: All_Times
Index: 500000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER65399328
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 2

Name: DRIVER07
Description: schwarz1
Directory: c:\log_b210_s1.log
Machine: schwarz
Parameter Set: All_Times
Index: 600000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER75423031
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 0

Name: DRIVER08
Description: schwarz2
Directory: c:\log_b210_s2.log
Machine: schwarz
Parameter Set: All_Times
Index: 700000000
Seed: 11063
```

```
Configured Users: 2000
Pipe Name: DRIVER85450390
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 1

Name: DRIVER09
Description: schwarz3
Directory: c:\log_b210_s3.log
Machine: schwarz
Parameter Set: All_Times
Index: 800000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER95473703
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 2

Name: DRIVER10
Description: blau1
Directory: d:\log_b210_b1.log
Machine: blau
Parameter Set: All_Times
Index: 900000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER105500000
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 0

Name: DRIVER11
Description: blau2
Directory: d:\log_b210_b2.log
Machine: blau
Parameter Set: All_Times
Index: 1000000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER115543375
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 1

Name: DRIVER12
Description: blau3
Directory: d:\log_b210_b3.log
Machine: blau
Parameter Set: All_Times
Index: 1100000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER125565906
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 2

Name: DRIVER13
Description: oliv1
Directory: d:\log_b210_o1.log
Machine: oliv
Parameter Set: All_Times
Index: 1200000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER135593468
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 0

Name: DRIVER14
Description: oliv2
Directory: d:\log_b210_o2.log
Machine: oliv
Parameter Set: All_Times
Index: 1300000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER145611984
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 1

Name: DRIVER15
Description: oliv3
Directory: d:\log_b210_o3.log
Machine: oliv
Parameter Set: All_Times
Index: 1400000000
Seed: 11063
Configured Users: 2000
Pipe Name: DRIVER155643187
Connect Rate: 200
Start Rate: 200
CLIENT_NURAND: 233
CPU: 2

Number of User groups: 15
```

```
Driver Engine: DRIVER01
IIS Server: b210cl1
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 1 - 200
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER04
IIS Server: b210cl1
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 601 - 800
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER05
IIS Server: b210cl2
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 801 - 1000
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER06
IIS Server: b210cl3
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 1001 - 1200
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER07
IIS Server: b210cl1
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 1201 - 1400
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER08
IIS Server: b210cl2
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 1401 - 1600
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER09
IIS Server: b210cl3
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 1601 - 1800
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER10
IIS Server: b210cl1
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 1801 - 2000
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER11
IIS Server: b210cl2
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 2001 - 2200
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
```

```
District id: 1
Scale Down: No

Driver Engine: DRIVER12
IIS Server: b210cl3
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 2201 - 2400
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER13
IIS Server: b210cl1
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 2401 - 2600
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER14
IIS Server: b210cl2
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 2601 - 2800
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER15
IIS Server: b210cl3
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 2801 - 3000
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER02
IIS Server: b210cl2
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 201 - 400
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Driver Engine: DRIVER03
IIS Server: b210cl3
SQL Server: h400
User: sa
Protocol: Html
w_id Range: 401 - 600
w_id Max Warehouse: 3000
Scale: Normal
User Count: 2000
District id: 1
Scale Down: No

Number of Parameter Sets: 3


~Default
Default Parameter Set
                        Txn     Think   Key     RT      RT      Menu
                        Weight  Time    Time    Delay   Fence   Delay
New Order                 10.00     12.05     18.01      0.10
5.00    0.10
Payment                   10.00     12.05      3.01      0.10
5.00    0.10
Delivery                   1.00      5.05      2.01      0.10
5.00    0.10
Stock Level                1.00      5.05      2.01      0.10
20.00   0.10
Order Status               1.00     10.05      2.01      0.10
5.00    0.10

All_Times
HTML Param. Set
                        Txn     Think   Key     RT      RT      Menu
                        Weight  Time    Time    Delay   Fence   Delay
New Order                 44.85     12.05     18.01      0.10
5.00    0.10
Payment                   43.05     12.05      3.01      0.10
5.00    0.10
Delivery                   4.04      5.06      2.01      0.10
5.00    0.10
Stock Level                4.03      5.06      2.01      0.10
20.00   0.10
```

```
          Order Status       4.03      10.05       2.01       0.10
5.00     0.10

          All_Times2
          Times2
                          Txn      Think    Key      RT       RT       Menu
                          Weight   Time     Time     Delay    Fence    Delay
          New Order         44.78      12.05      18.01       0.10
5.00     0.10
          Payment           43.07      12.05       3.01       0.10
5.00     0.10
          Delivery           4.05       5.05       2.01       0.10
5.00     0.10
          Stock Level        4.05       5.05       2.01       0.10
20.00    0.10
          Order Status       4.05      10.08       2.01       0.10
5.00     0.10
```

This section discloses the Microsoft SQL Server 2000 Enterprise Edition parameters used on the PRIMERGY H400 server system.

```
Microsoft SQL Server Startup Parameters:

sqlservr -c -x -T3502 -g80

where:
-c Start SQL Server independently of the Windows NT Service Control Manager
-x Disables the keeping of CPU time and cache-hit ratio statistics
-T3502 Prints a message to the SQL Server log at start and end of each checkpoint
-g80 memory in MB reserved for memory requests outside the buffer pool

Microsoft SQL Server Stack Size:

The default stack size for Microsoft SQL Server 2000 was changed using the EDITBIN utility:
editbin /STACK:131072

Microsoft SQL Server Configuration Parameters:


1> 2> 3> 4> 5> 6> 7> 8> 9> 10> 11>
--  File:     VERSION.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.22
--            Copyright Microsoft, 2001
--  Purpose:  Returns SQL Server version string



print " "
select convert(char(30), getdate(),9)
print " "

 ------------------------------
 Mar 15 2001  9:15:18:990AM

(1 row affected)

1> 2> 3>
select @@version




 -------------------------------------------------------------------------------
     ---------------------------------------------------------------------
     ---------------------------------------------------------------------
     ----------------------------------
 Microsoft SQL Server  2000 - 8.00.194 (Intel X86)
     Aug  6 2000 00:57:48
     Cop
     yright (c) 1988-2000 Microsoft Corporation
     Enterprise Edition on Windo
     ws NT 5.0 (Build 2195: Service Pack 1)



(1 row affected)
1> 2>
1> 2> 3> 4> 5> 6> 7> 8> 9> 10>
--  File:     CONFIG.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.22
--            Copyright Microsoft, 2001
--  Purpose:  Collects SQL Server configuration parameters


print " "
```

```
select convert(char(30), getdate(),9)
print " "

 ------------------------------
 Mar 15 2001  9:15:19:820AM

(1 row affected)

1> 2> 3> DBCC execution completed. If DBCC printed error messages, contact your system administrator.
Configuration option 'show advanced options' changed from 1 to 1. Run the RECONFIGURE statement to
install.

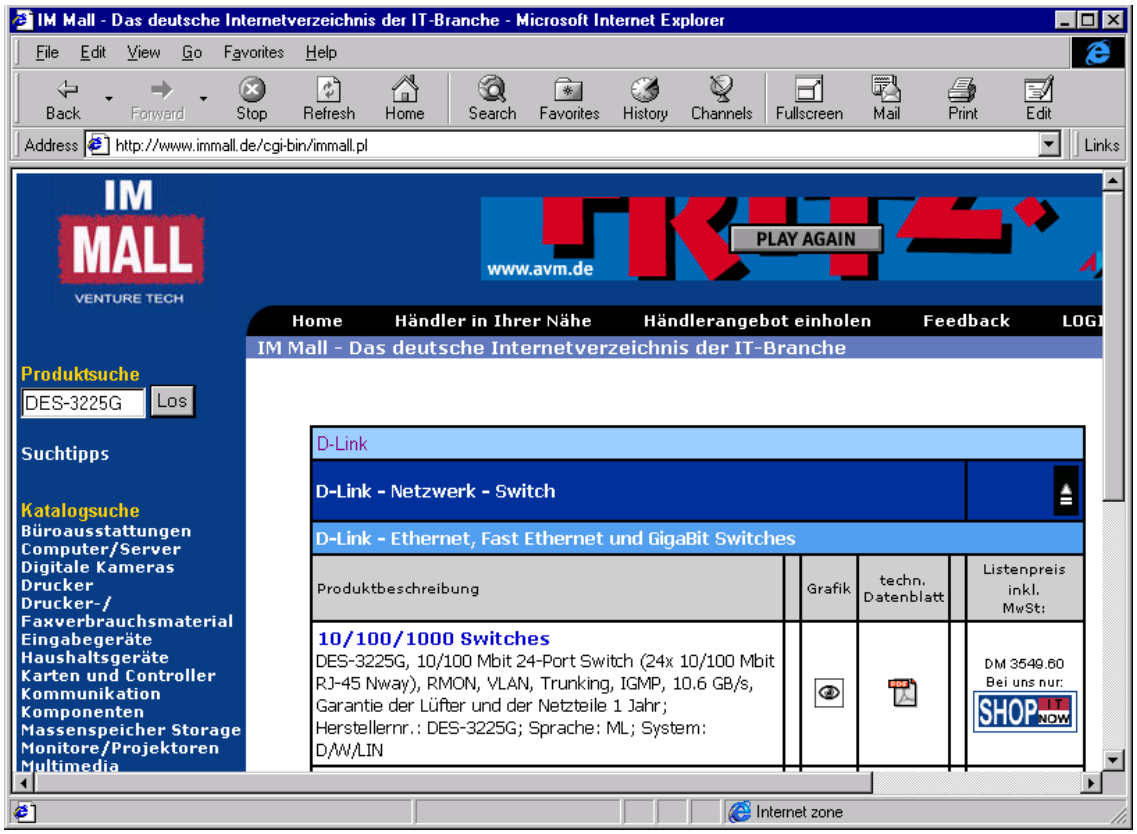
sp_configure "show advanced",1
1> 2> reconfigure with override
1> 2> sp_configure
 name                                minimum     maximum     config_value run_value
 ---------------------------------- ----------- ----------- ------------ -----------
 affinity mask                                0  2147483647           15          15
 allow updates                                0           1            0           0
 awe enabled                                  0           1            1           1
 c2 audit mode                                0           1            0           0
 cost threshold for parallelism               0       32767            5           5
 cursor threshold                            -1  2147483647           -1          -1
 default full-text language                   0  2147483647         1033        1033
 default language                             0        9999            0           0
 fill factor (%)                              0         100            0           0
 index create memory (KB)                   704  2147483647            0           0
 lightweight pooling                          0           1            1           1
 locks                                     5000  2147483647        10000       10000
 max degree of parallelism                    0          32            1           1
 max server memory (MB)                       4  2147483647   2147483647  2147483647
 max text repl size (B)                       0  2147483647        65536       65536
 max worker threads                          32       32767          180         180
 media retention                              0         365            0           0
 min memory per query (KB)                  512  2147483647          512         512
 min server memory (MB)                       0  2147483647            0           0
 nested triggers                              0           1            1           1
 network packet size (B)                    512       65536         4096        4096
 open objects                                 0  2147483647            0           0
 priority boost                               0           1            1           1
 query governor cost limit                    0  2147483647            0           0
 query wait (s)                              -1  2147483647           -1          -1
 recovery interval (min)                      0       32767           56          56
 remote access                                0           1            1           1
 remote login timeout (s)                     0  2147483647           20          20
 remote proc trans                            0           1            0           0
 remote query timeout (s)                     0  2147483647          600         600
 scan for startup procs                       0           1            0           0
 set working set size                         0           1            0           0
 show advanced options                        0           1            1           1
 two digit year cutoff                     1753        9999         2049        2049
 user connections                             0       32767            0           0
 user options                                 0       32767            0           0

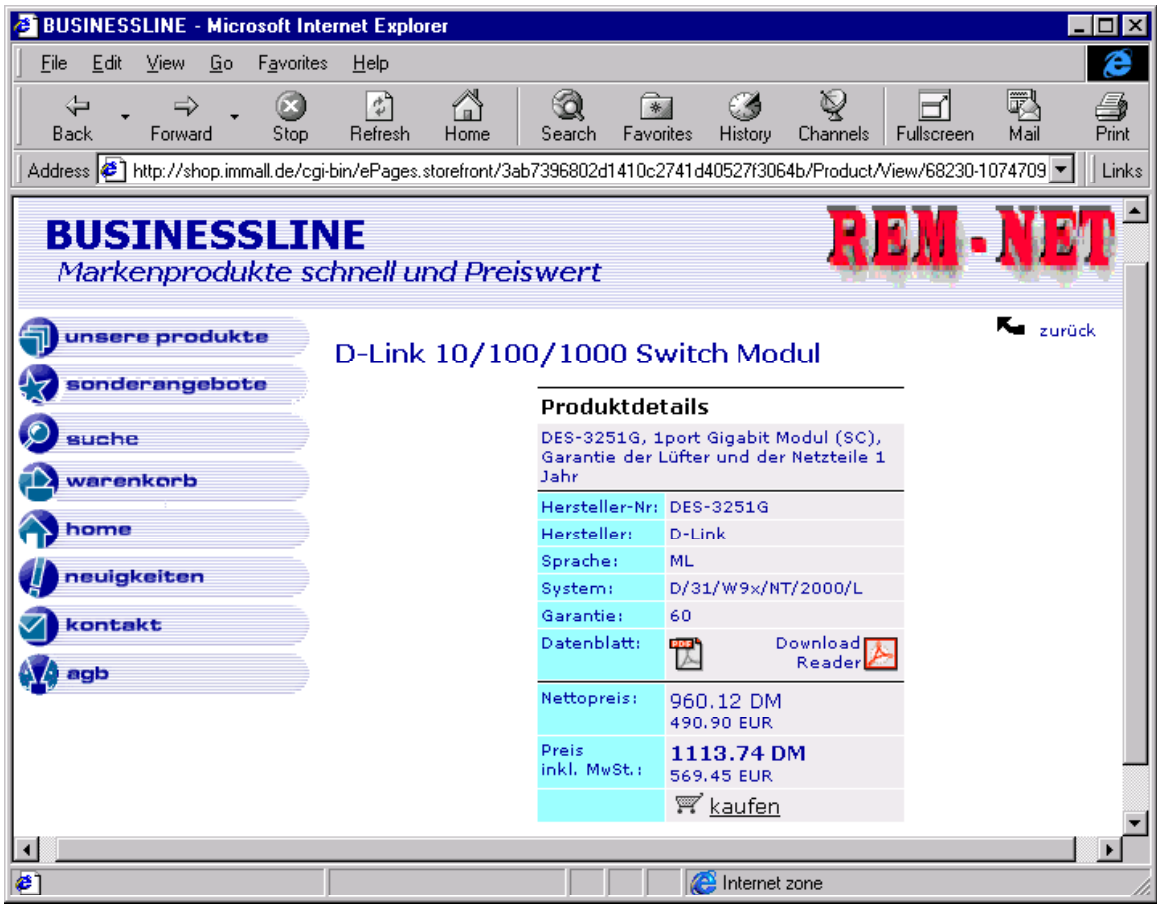
1>
```

Appendix D – Space Calculation

					Microsoft SQL Server		
Note : Numbers are in KBytes unless otherwise specified					Updated for Version 7 (FR)		
Warehouses	**3000**	**tpmC**	37383	**tpmC/W**	12.46		
Table	**Rows**	**Data**	**Index**	**5% Space**	**8H Space**	**Total Space**	
Warehouse	3,000	320	48	18		386	
District	30,000	3,336	56	170		3,562	
Item	100,000	9,528	72	480		10,080	
New-order	27,000,000	426,880	1,000		240,000	667,880	
History	90,000,000	5,000,008	96		996,901	5,997,005	
Orders	90,000,000	2,758,624	1,254,480		800,117	4,813,221	
Customer	90,000,000	65,454,552	3,903,088	3,467,882		72,825,522	
Order-line	899,996,621	56,249,792	119,080		11,238,600	67,607,472	
Stock	300,000,000	96,000,000	179,456	4,808,973		100,988,429	
Totals		225,903,040	5,457,376	8,277,523	13,275,618	252,913,556	
Segment	**LogDev Cnt.**	**Seg. Size**	**Needed**	**Overhead**		**Not Needed**	
misc	6	98,304,000	79,890,602	798,906		17,614,492	
customer/stock	6	181,862,400	175,552,090	1,755,521		4,554,789	
Totals		280,166,400	255,442,692	2,554,427		22,169,281	
Dynamic space	64,008,424	Sum of Data for Order, Order-Line and History					
Static space	178,183,942	Data + Index + 5% Space + Overhead - Dynamic space					
Free space	15,804,753	Total Seg. Size - Dynamic Space - Static Space - Not Needed					
Daily growth	12,761,744	(Dynamic space/W * 62.5)* tpmC					
Daily spread	-3,337,862	Free space - 1.5 * Daily growth (zero if negative)					
60 day (KB)	943,888,554	Static space + 60 (daily growth + daily spread)					
60 day (GB)	900.16	60-day space in GB (excludes OS, Paging and RDBMS Logs)					
Log size (MB)	80,000	Total size of log file					
% Log used	51.2285	% of log file used during entire run					
Total N-O Txn	8219494	Total count of N-O transactions during entire run					
Log per N-O txn	5.1057	KB of log per New-Order transaction					
8 Hour Log (GB)	87.37	8 hours of log in GB (excluding space for redundancy)					
Disk Capacity	**MB**	**GB**	**disks needed**	**disks priced**	**GB priced**		
18 GB 15000 rpm	17480	17.07		168	2,867.81		
60 day (GB)		900.16	52.73	168	2,867.81		
Disk Capacity	**MB**	**GB**	**disks needed**	**disks priced**			
18 GB 15000 rpm	17480	17.07					
8 Hour Log (RAID 1)		87.37	5.12	6+6			

Appendix E - Price Quotations





Appendix F - Attestation Letter

BENCHMARK SPONSOR:

Franz-Josef Bathe
Fujitsu Siemens Computers
Heinz-Nixdorf-Ring 1
D-33106 Paderborn, Germany

March 23, 2001

I remotely verified the TPC Benchmark™ C performance of the following Client/Server configuration:

Platform:	**Siemens Primergy H400**
Operating system:	**Microsoft Windows 2000 Advanced Server**
Database Manager:	**Microsoft SQL Server 2000 Enterprise Edition**
Transaction Manager:	**Microsoft COM+ (Included in Windows 2000)**

The results were:

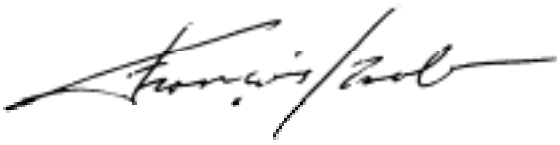
CPU's Speed	Memory	Disks	NewOrder 90% Response Time	**tpmC**
4 x Pentium III Xeon (900 MHz)	8 GB Main (2MB L2 Cache per processor)	180 x 18 GB 1 x 9 GB	0.82 Seconds	**37,383.57**
Three (3) Clients: Primergy B210 (Specification for each)				
2 x Pentium III (933 MHz)	512 MB Main Cache: 256 KB	1 x 9 GB	n/a	n/a

In my opinion, these performance results were produced in compliance with the TPC's requirements for the benchmark. The following verification items were given special attention:

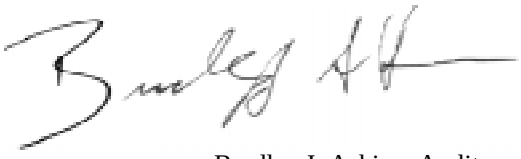
- The database records were the proper size
- The database was properly scaled and populated
- The required ACID properties were met

- The transactions were correctly implemented
- Input data was generated according to the specified percentages
- The transaction cycle times included the required keying and think times
- The reported response times were correctly measured.
- All 90% response times were under the specified maximums
- At least 90% of all delivery transactions met the 80 Second completion time limit
- The reported measurement interval was 120 minutes (7200 seconds)
- The reported measurement interval was representative of steady state conditions
- Four checkpoints were taken during the reported measurement interval
- The 60 day storage requirement was correctly computed
- The system pricing was verified for major components and maintenance

Respectfully Yours,



François Raab, President



Bradley J. Askins, Auditor