

GTS

Release Notes, Version 2.2.0

036R903-V220 Issue 03, January 1999

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GTS V2.2.0 Release Notes

1.0 GENERAL

These notes accompany GTS Controller software release V2.2.0. The purpose of these notes is to provide relevant information concerning the GTS Controller V2.2.0 software. Contact your GDC field representative if you have any questions concerning the following information. It is recommended that the Release Notes be read completely, prior to installing and using Release V2.2.0.

1.1 Software Version

These release notes cover the software product: GTS Controller V2.2.0 software. This software requires a Controller configured to GDC specifications as documented in the Operation Manual for TMS-3000 Controller, GDC 036R603-V220. The diskettes for GTS Controller V2.2.0 clearly identify the software package as GTS Controller V2.2.0. GDC part numbers are as follows:

- V2.2.0 for ISA/EISA; 3.5" Diskettes - GDC Part 036U612-301A
- V2.2.0 for PS/2; 3.5" Diskettes - GDC Part 036U613-301A
- V2.2.0 for Value Point; 3.5" Diskettes - GDC Part 036U614-301A
- Upgrade from V3.0.1-V2.1.0 ISA/EISA; 3.5" Diskettes - GDC Part 036Y612-301A
- Upgrade from V3.0.1-V2.1.0 PS/2; 3.5" Diskettes - GDC Part 036Y613-301A
- Upgrade from V3.0.1-V2.1.0 Value Point; 3.5" Diskettes - GDC Part 036Y614-301A

If you do not know which software version is running in your network controller, either invoke the Software Integrity routine or check the first screen that appears after loading the software (you may step back to this screen by repeatedly pressing the F3 key and then logging out).

1.2 Organization of Release Notes

The release notes are in five sections:

1. General - The section you are now reading. Provides general information concerning the GTS Controller software release and release notes.
2. Loading and Downloading Software - Describes the procedures for loading the GTS Controller and downloading the GTS V2.2.0 software release.
3. Software Release Features - Describes the new features that are available in this GTS Controller software release.
4. Software Improvements - Describes the enhancements made to the GTS Controller software.
5. Operating Guidelines - Describes procedures to use the system most efficiently and avoid potential problems.

1.3 Additional Documentation

This information supplements the Operation Manual for TMS-3000 Controller, GDC 036R603-V220. If you require additional information, refer to this manual.

TPP card software releases are made independent of GTS releases. Therefore it is recommended that TPP users refer to the release notes for the specific version of TPP software being used, to supplement these GTS release notes.

2.0 LOADING AND DOWNLOADING SOFTWARE

This section of the release notes describes the procedures for loading the GTS Controller and downloading the GTS V2.2.0 software release.

The non-disruptive upgrade method used for a GTS version is much different than the MSO method. Therefore, it is very important that proper procedures be followed. Specifically, the operator must refer to the “Software Updates” portion of the “System Start-up, Updates, and Maintenance” chapter in the *GTS Users Guide*. If you have not yet loaded XENIX and GTS software, refer to Chapter 5, GDC 036R303-000, Issue 9.

2.1 Minimum Nodal Hardware Requirements

The following lists the minimum hardware revisions of the TMS common card modules required to support this release:

- Enterprise System Control Card (ESCC) (GDC Part No. 036M337-001)
- Aggregate Control Card (ACC) (GDC Part No. 036M313-003)
- Channel Interface Card (CIC) (GDC Part No. 036P304-002)
- Digital Bridge Card (DBC) (GDC Part No. 036P342-001)
- Combined Digital Aggregate (CDA-T1) (GDC Part No. 036M309-002/3)
- Combined Digital Aggregate (CDA-E1) (GDC Part No. 036M328-001/2)
- ADPCM Compression Module (ACM) (GDC Part No. 036M330-001/2)
- ADPCM Compression Module II (ACM-II) (GDC Part No. 036M335-001/2)
- ISDN Aggregate Card (IAC-T1) (GDC Part No. 036M327-001/2)
- TMS Packet Processor (TPP) (GDC Part No. 036M360-XXX)

The following lists the minimum revisions of OCM cards required to support this release:

- Common Control Module (CCM) (GDC Part No. 036M400-004)
- DSX1 T1 LIM (GDC Part No. 036M410-001)
- CEPT E1 LIM (GDC Part No. 036M410-002)
- CSU T1 LIM (GDC Part No. 036M410-003)
- V.11 LIM (GDC Part No. 036P436-001)
- V.35 LIM (GDC Part No. 036P436-002)
- BQ LIM/BQ Channel (GDC Part No. 036P438-001)
- Dual Data Module (DDM 232) (GDC Part No. 036P413-001)
- High Speed Data Module EIA232 (HSDM) (GDC Part No. 036P410-001)

- High Speed Data Module V.35 (HSDM) (GDC Part No. 036P410-002)
- High Speed Data Module RS422 (HSDM) (GDC Part No. 036P410-003)
- High Speed Data Module RS423 (HSDM) (GDC Part No. 036P410-004)
- High Speed Data Module G.703 (HSDM) (GDC Part No. 036P416-001)
- Turbo Data Channel - 256K (GDC Part No. GS936P417-001)
- Turbo Data Channel - 512K (GDC Part No. GS936P417-002)
- ADPCM Voice Module (FXS, FXO, or E&M) with/without Echo Cancellor
- VLBRV Voice Module (FXS, FXO, or E&M) with/without FAX
- CELP Voice Module (FXS, FXO, or E&M) with/without FAX
- DPV Voice Module (FXS, FXO, or E&M) with/without FAX X.50
- Quad Data Module (GDC Part No. 036P414-001)
- OCM Packet Processor - Ethernet (OPP) (GDC Part No. 036M450-001B/003/004)
- OCM Packet Processor - Token Ring (OPP) (GDC Part No. 036M451-001B/003/004)

In order to support connection to the OCM, a CDA-T1 with GDC part number 036M309-003, a CDA-E1 with GDC part number 036M328-002, or an IAC-T1 with GDC part number 036M327-002 must be used.

For X.50 subaggregates, it is recommended that you use a CDA-T1 with GDC part number 036M309-003, or a CDA-E1 with GDC part number 036M328-002 so that channel data is not inverted. See the operating guidelines for additional details.

GTS Controller V2.x software requires that installed hardware modules meet the above requirements. For existing installations, you may upgrade to the above hardware levels while running MSO 3.0.1. or TMS Controller V2.x. There is full compatibility between the GTS nodal hardware modules listed above and these earlier revisions of MEGAMUX and TMS software. In order to install ESCC cards you must have previously upgraded your system to MSO V3.0.1 with Patch 27. The ESCC cards must be installed before upgrading to GTS. Be sure you install the correct cards in the nodes prior to installation of GTS Controller V2.2.0 to assure proper system operation.

2.1.1 CDA Firmware Compatibility

The CDA-T1 card requires Firmware version 036Z316-601D or 036Z316-601E to operate V2.2.0, which correspond to versions CD_D or CD_E respectively in the CDA Diagnostics screen. The CDA-E1 card requires Firmware version 036Z316-617C or 036Z316-617D to operate GTS V2.2.0, which correspond to versions E1_A and E1_B respectively.

2.1.2 IAC Firmware Compatibility

The IAC-T1 card requires Firmware version 036Z318-626-- to operate V2.2.0, which corresponds to version IT_A.

2.1.3 CCM Firmware Compatibility

The OCM CCM card must be part number 036M400-004 to operate V2.2.0. An upgrade is available to customers wishing to convert a -002 CCM to a -004 CCM. The -004 contains a CCM firmware revision which appears on the PC screen as version D-. If using the BQ LIM module, a minimum of version E- boot is required.

2.2 Minimum PC Controller Hardware Requirements

The minimum requirement for a GTS 2.2 TMS Controller is a 486 PC with 5MB RAM (8 recommended) and an 80 MB (200 MB recommended) hard disk. For optimum performance, however, a GDC supplied 200MHz Pentium, with 32MB RAM, 1.44MB floppy, 2.5GB hard drive is highly recommended.

To support the TCP/IP feature, you must also have a 3Com Etherlink II card (Etherlink III cards are not supported).

Use of large hard drives (greater than 1023 cylinders or 16 heads), use of other than GDC-recommended PCs, and PC setup are all discussed in the *Installation and Operation Manual* for TMS-3000 (GDC 036R303-000, Issue 9, Chapter 5).

Note. Recent generation PCs with the following attributes may not operate reliably (or at all) with the Xenix Operating System and are therefore incompatible with GTS 2.2:

- processor rates of 200 MHz or greater
- plug and play BIOS *with* hard drives greater than 1023 cylinders or 16 heads

Note. If a DigiBoard will be used, the motherboard must be strapped to run at no more than 150MHz.

2.3 Minimum PC Controller System Software

GTS Controller V2.2.0 requires that your controller be operating with SCO Xenix 386 Operating System Version 2.3.4 and Informix RDB Version 2.10.03K. SCO XENIX Version 2.3.4 was first shipped with MSO V3.0.0. To support the TCP/IP feature, you must also have SCO Streams and SCO TCP/IP, both with multi-user license, for SCO Xenix 2.3.4.

2.4 Network Controller Software Installation

If you have received a new GTS Controller from GDC, it contains GTS Controller V2.2.0 software and the proper hardware configuration.

In the event that your GTS Controller does not contain GTS Controller software, see Chapter 5 of the Installation and Operation manual for TMS-3000, GDC 036R303-000, Issue 9 for instructions on how to load this software. Fourteen 3-1/2 inch floppy diskettes (one setup disk, one kernel diskette, two ESCC diskettes, and a set of disks numbered 1 through 10) contain the GTS Controller software.

2.5 Using the GTS TCP/IP Option

This option (GDC Part# 036U333-301A) allows you to connect any TMS controller to your Local Area Network. From your network, you may access any files that reside on the TMS controller or bring up a remote GTS session from a remote location.

If you believe you may be using the GTS-TCP option at any time in the future, it is required that the Xenix LINK package, the streams package, and the TCP/IP software be installed. It is recommended that the Xenix LINK option be installed before loading GTS 2.2.0.

If you do not load the LINK package prior to loading GTS 2.2.0, and you want to use the TCP option in the future, you will have to load the LINK package and then reload GTS 2.2.0.

To load the link package follow the following steps:

1. Log in as root on the alt-f2 screen.
2. Type custom and press <Enter>.

3. Select 1.) Operating system and press <Enter>.
4. Select 1.) Install one or more packages and press <Enter>.
5. Type in LINK and press <Enter>.
6. Insert the SCO Xenix release disks as prompted.
7. Press q until you reach the # prompt.
8. Press <alt-f1> and resume normal GTS loading procedures.

For full instructions on loading the entire TCP-IP software option reference Appendix A in the Installation and Operation manual for TMS-3000 (GDC 036R303-000, Issue 9) for further information.

2.6 Configuration Issues

The following notes presume that you have loaded SCO V2.3.4, Informix RDB V2.10.03K and GTS V2.2.0 onto your controller as discussed in the TMS-3000 Installation and Operation manual.

The GTS Controller that the software will be loaded onto must be disconnected from the Network.

Back-up your configuration onto diskette prior to loading GTS V2.2.0.

Regardless of the earlier version, after using the “mninstall” procedure to complete the installation, you must re-enter all GTS Controller I/O port configurations and alarm settings. After completing an “mninstall” procedure, if the “ACC Performance” feature is required, its key disk must also be reinstalled.

Refer to Chapter 1 of the Operation Manual for TMS-3000 Controller (GDC Publication No. 036R603-V220) for basic guidelines concerning your network configuration restoral.

Note that when restoring configurations created with MSO V3.0.1 or GTS V2.0.0 onto this release of GTS all X.50 Termination circuits will be deleted. This is because an improved mechanism for defining these circuits has been added.

Prior to loading a configuration onto a GTS V2.2.0 Controller, any configuration of features which are not supported should be removed. These unsupported features will be deleted or converted during the upgrade process if you have not previously done so. The following list describes features which are not supported in GTS V2.X and suggests how to deal with these features:

- Bell I/O Card - Should be replaced with a Digiboard I/O card if support for those applications supported by an optional I/O card is required. Contact VITAL Network Services Technical Support for details.
- Netview PC Support - This feature is no longer supported.
- 1258 Multiplexer - These multiplexers are no longer supported. These must be removed from the network configuration. It is recommended that the customer consider replacing the 1258 multiplexers with Universal Megamux Plus V4 or preferably OCMs.
- All Megamux Plus multiplexers earlier than Universal Megamux Plus V4 - These multiplexers are no longer supported. It is recommended that the customer consider upgrading these multiplexers to the Universal Megamux Plus V4 or replacing them with OCMs.

- Bell 303 Aggregate Interface - This aggregate interface is no longer supported and should be reconfigured to an appropriate interface option. Contact VITAL Network Services Technical Support for suggestions.
- Bell T1/D4E Aggregate Interface - This aggregate interface is no longer supported and should be reconfigured to an appropriate interface option. Contact VITAL Network Services Technical Support for suggestions.
- PCM Circuit Type - This circuit type was associated with older PCM channel cards and is no longer supported. These circuits must be deleted from the configuration or reconfigured appropriately. These applications are supported more efficiently by newer UVC type channel cards.
- ACM-PCM Circuit Type - This circuit type was associated with older PCM channel cards and is no longer supported. These circuits must be deleted from the configuration or reconfigured appropriately. These applications are supported more efficiently by newer UVC type channel cards.
- ADPCM Circuit Type - This circuit type was associated with older ADPCM channel cards and is no longer supported. These circuits must be deleted from the configuration or reconfigured appropriately. These applications are supported more efficiently by newer UVC type channel cards.
- PCM-T Circuit Type - This circuit type is no longer supported. These circuits should be modified to use U-ADPCM circuits with a data rate of 64KPCM. The network operation will be unchanged.
- SYNC-A Circuit Type - This circuit type was only available to 1258 Multiplexer and will be automatically deleted by the system when updating to newer multiplexer products.

When updating from V2.1.0 to V2.2.0 all TPP circuits with channel numbers greater than 64 will be deleted.

GTS Controller V2.2.0 will convert any configuration operating or backed-up under MSO V3.0.1 or GTS Vx.x.x. When restoring older version back-ups, new features are typically set to default values. Customers must review configurations to assure that their requirements are met. For assistance contact VITAL Network Services Technical Support.

2.7 Program Downloads

Note that TMS program download can be non-disruptive in the GTS software releases. In order for non-disruptive download to proceed as expected, it is essential that the operator understand the correct procedure. Please refer to “Software Updates” in Section 1 of the Operation Manual for TMS-3000 Controller for a full discussion of this procedure.

Please note that if loading V2.2.0 software over MSO V3.0.1 software, it is very important that the network be operating under MSO V3.0.1 with Patch 27 and ESCCs installed. If loading V2.2.0 software over GTS 2.1.0 software, it is very important that the network be operating under GTS 2.1.0 with Patch 23.

Note that the GTS V2.2.0 multiplexer software should be downloaded in background mode before connecting the GTS V2.2.0 Controller to the TMS 3000 network.

Also note that in the V2.2.0 release, OCM downloads remain disruptive but are much more efficient, since each TMS 3000 node will download OCM nodes to which it is connected as opposed to having all OCM downloads proceed from the Controller. After loading this release all future OCM downloads will be non-disruptive as documented in Section 3.2 below. Note that non-disruptive OCM download requires redundant CCM cards.

After the download is complete, certain of the OCM nodes may not respond to, or communicate with the controller. It may, therefore, be necessary to cycle power at each of these nodes in order for the OCM to activate the new software download.

3.0 SOFTWARE RELEASE FEATURES

This section of the release notes briefly describes GTS system enhancements since GTS V2.1.0. For detailed information concerning these features see the Operation Manual for TMS-3000 Controller.

3.1 Dual Private Voice

The DPV is a new dual-channel analog voice compression module for OCM-2000 (and OCM-1000). It offers voice compression quality similar to the current CELP product, operates at 2.4, 4.8, 6.4, 8.0, and 9.6Kbps, supports GIII Fax bypass, and integral echo cancellation. The DPV doubles the voice capacity of the OCM, and is priced below competitive products.

3.2 Network Channel on OCM

The OCM-2000 will provide a “network channel” capability similar to the TMS’s “clear channel”. Individual Nx56/64 Kbps data channels may be DACS groomed for termination at other network devices. The capability allows the OCM to act as a local “channel bank”, allowing the TMS to deliver twice as many narrowband circuits to remote OCMs than is currently possible. This capability also increases the channel capacity of the TMS from 512 channels to 2032 channels per node. Configuration of this option is accomplished by creating a Network class circuit of type Full Transparent/Rate Adapt with appropriate end points and data rate.

3.3 BQ LIM/ BQ Channel

The BQ module is an integral 2B1Q line driver within the OCM. The module allows remote OCMs or remote NTUs (600 series) to be supported over 6 km of standard copper wire.

3.4 CCM Non-Disruptive Download

Under GTS V2.2.0, software can be downloaded to the OCM-2000 without disruption to the production network by downloading to the OCM’s redundant common logic module.

3.5 Enhanced Granularity of Selects

The ACC module may now be configured to use increments of 66Kbps, rather than only 1 or 2 Mbps. This feature preserves backplane bandwidth, and increases the capacity of nodes using this module.

3.6 Miscellaneous

1. In this release it is not necessary to configure a TMS circuit to an OPP in order for the OPP to operate successfully. The OPP will successfully transmit data from its LAN port to/from its backplane port and to other OPP cards in the OCM node without a TMS circuit being defined.
2. The TMS controller communication system between the PC and the local node has been upgraded to perform up to 30% faster depending on configuration. This effect will be most significant in larger networks. In coordination with this new feature, several new rates for communications to the local node are provided: 19.2K Asynchronous, 38.4K Synchronous, and 64K synchronous. To maximize the performance improvement, synchronous commu-

- nications at 64K between the Controller and the ESCC should be used. A lesser improvement will be seen using 19.2K asynchronous communications with the local node. Some minimal improvement will be seen even if the communications to the local node remains at 9600 Baud.
3. When using synchronous communications between the PC and the local node, the user is allowed several timing options not offered before. This permits additional flexibility in communications paths between the Controller and its local TMS node.
 4. The TMS feature formerly designated as “Internet” has been renamed to “XNET” to eliminate confusion. The function of this feature is unchanged.
 5. Most software options that previously required a key disk to enable the feature are now enabled by default. These options include: OCM, TPP, OPP, XNET, IAC, X50, DRR, and Megaview. The “Aggregate Performance” option still requires a key disk.
 6. On IAC CLR or DTEC bundles with caller type “DST-***”, it is now possible to set “Remote Phone Checking” to OFF. If this is set, it is not required to enter the Remote ISDN number, and the card will not check the remote number upon receipt of a call. This allows the IAC to accept a call from any calling number.
 7. It is now possible to designate TMS or TMS/Network OCM or CDA bundles as “backup” bundles. Such bundles will not carry circuits unless one or more bundles they are backing up are inoperative, and will not show alarm conditions in status or diagnostics while in an idle state. Certain new IAR status messages reflect the activation and status of these backup links. This feature is not active unless IAR is enabled. For more information, consult the User's Manual.
 8. Under ESCC Diagnostics, a new menu option, “ESCC Switch Settings”, will bring up a display giving various switch and jumper settings for all ESCCs at the node. This feature is fully described in the User's Manual.
 9. An improvement has been made to IAR providing more efficient routing without use of manual required or manual preferred circuit selections. Within a given circuit priority, IAR will do a preliminary calculation of the number of hops in the circuits route assuming it is the first circuit in the group to be routed. It then routes the circuits in order of number of calculated hops starting with the minimum hops.
 10. It is now possible to configure a CLR bundle on a CDA port with line encoding ASDS/Alternate DS0.
 11. The new alarm “OOServ Link Dn” has been added to indicate that the in-service ESCC at a node is unable to communicate with the out-of-service ESCC.
 12. The user is now prompted before resetting network clocking in diagnostics. This avoids inadvertently resetting network clocking after entering the clocking diagnostics screen.
 13. Byte mode communications are now available between TPP cards and between OPP cards and external network DS0s. This allows more efficient use of bandwidth for these configurations.
 14. TMS/Network class circuit configuration now offers the option of accomplishing a data inversion via a software option. Note that this option is operable only if the circuit terminates on a CDA-T1 with GDC part number 036M309-003, or a CDA-E1 with GDC part number 036M328-002. If earlier CDA cards are used, the CDA card will always invert the data and the TMS channel card must also be set to invert the data. This is done by placing the S1-1 switch on the channel card to the MIL_STD_188C position. For data compression channel cards, there is no invert switch available on the channel card, so in order to avoid inversion, a 309-003 or 328-002 CDA card must be used with the software option (“Data”) set to Nor-

mal. All TMS/Network circuits created using pre V2.2.0 GTS software versions will automatically have the Data option set to Invert to assure continued operation. New TMS/Network circuits will be created with the option defaulted to Normal. It will no longer be necessary to set the S1-1 switch on the channel card provided the 309-003 or 328-002 CDA card is used.

15. E1 ACM to ADPCM FXS voice circuits are now supported per ITU-T recommendation Q.422.

4.0 SOFTWARE IMPROVEMENTS

This section of the release notes describes GTS system improvements since GTS V2.1.0. These sections are listed alphabetically.

4.1 ACM

1. Previously, the user could not configure FXS/LS and FXS/GS 4 state signalling between and E1 ACM and a UVC card. This option is now available.
2. In GTS V2.1.0, for ACM-UVC circuits, conditioning for the A-Bit from the ACM to an external PBX was configured on the UVC side. This was not consistent with earlier releases. With GTS V2.2.0 software, the conditioning for the A-Bit to an external PBX is configured on the ACM side, consistent with pre-V2.1.0 releases.
3. A problem in which ACM-UVC circuit bandwidth was not counted correctly on the CIC side has been repaired. In V2.1.0 an extra 800Hz of bandwidth required for an ACM-UVC circuit synchronization was not taken into consideration which would potentially allow for configuring more circuits than the CIC can handle.
4. When an ACM-E1 receives a Remote Alarm indication, it no longer sends Control 6 (remote channel alarm) on each channel to the remote ACM. This prevents the remote ACM from conditioning its timeslots, and the ACM is now compliant with the G.732 spec.

4.2 Aggregate Control Card

1. Control bandwidth on an ACC is now distributed more evenly which eliminates the possibility with certain configurations that channel controls will be corrupted. Because of this improvement the maximum number of channels that can be routed over an ACC has been changed from 126 to 125.
2. On the Aggregate Configuration screen for the interface types BELL T1-D4, NTT, CCITT G704, T1D4/DS0 and T1D4/FT1 when selecting REMOTE NODE by toggling Node Clocking Availability field, the Interface Clocking for the opposite side of the link was adjusted incorrectly. This would make the corresponding link go out of sync after configuration download. This problem has been repaired.
3. Editing of ACC links with different interface types on the two sides of the link has been improved.
4. Users can now select the "Interface Clocking" field on ACC links from a TMS node to a MM+ tail node.
5. In a configuration where many aggregates were set to Facility clocking, it was possible to get system errors when attempting to modify the configuration. This problem has been repaired.

6. The possibility has been eliminated that an ACC link will not switch to and remain in the data frame if both ACCs (local and remote) are powered up simultaneously.
7. The ACC failure simulation test is now indicated on the node and card diagnostics screens.
8. If an ACC is inserted in the backup slot of a TMS Compact and the primary slots are configured as non-redundant, the status reported will now be correct.
9. Aggregate links between an EIA-422 aggregate card and a T1/FT1 or T1/DS0 aggregate card will now correctly pass data.

4.3 Aggregate Performance Option

1. When the “Aggregate Performance” option is installed and in the serial port configuration screen, when “Agg. Perf.” is selected as the port type on the Digiboard, the system now behaves correctly.
2. ACC Link Performance messages are now properly reported.

4.4 CELP

1. A noise burst will no longer occur when the FXS end of an FXS/FXO circuit goes off hook.
2. Pulse dialing will now function properly with VCM CELP cards.
3. When an FXS to FXO VCM CELP circuit loses or regains sync, an erroneous short ring will no longer occur at the FXS circuit end.
4. Some applications of E&M to FXS VCM CELP circuits require the ring signal (“A” bit) to be regenerated identically to the ring signal received at the remote circuit end. GTS V2.2.0 will support this as follows. If switch position 6 of switch bank 3 of a CELP VCM is in the ON position, and this CELP VCM is configured as the FXS end of an E&M to FXS CELP circuit, then the ring signal will be reproduced at the FXS circuit end just as it was received at the E&M circuit end.
5. CELP modules will no longer erroneously fail self test and report board failure.

4.5 CDA

1. Problems with supervisory communications and CDAs rebooting in networks with two or more PC controllers and more than four subaggregates have been repaired.
2. CDAs needing software will now properly get crossloaded from another CDA that has its software.
3. Supervisory communications will now be properly established on a CDA with 3 or more OCM subaggregates and 2 non-consecutive CDA subaggregates.
4. Since the CDA did not properly support the ESF data link feature (AT&T 54016 specification), it has been removed. ESF register data is available from the CSU. The CDA still reports its ESF port statistics data to the PC.

4.6 Channel Interface Card

The UDC will no longer report a configuration error when it is configured as ISOC or T-ENC.

4.7 Clocking

1. In certain networks with a large number of nodes, depending on the clocking configuration, there were system errors reported to the TMS controller. This usually happened after users went into the “Modify Configuration” routine, made some changes and tried to save them. These system errors will no longer occur.
2. The ESCC will now properly phase lock to 12KHz and 8.448MHz external clocks.
3. OCMs will now always report the proper slot and rate to which it is phase locked.
4. When force clocking is enabled and a clock failure occurs and subsequently clears, the status for this failure will now properly clear.

4.8 Diagnostics

There are no longer system errors when entering diagnostics in networks with more than 128 Universal MM+4 nodes.

4.9 Digital Bridge Card

1. A number of problems when utilizing DBCs as an end point for clear channels, are corrected.
2. The major alarm LED of a stand-by DBC will now properly turn off following a self test.

4.10 Document Network

A number of improvements and enhancements to document network have been added in this release. Support for all of the new features discussed above have been added. Improvements have been made to documentation in the following areas: circuit conditioning; IAR; Digiboard; DBC; special rates; and backup links.

4.11 ESCC

1. When using a dial backup modem, a DSR alarm will be properly reported if configured for tone dialing.
2. Dial backup will now work properly at rates up to 19.2Kbps.
3. “Revision list download failed” messages will no longer be erroneously reported by the ESCC to the TMS Controller.
4. When the stand-by ESCC is in the Boot, the active ESCC will no longer report incorrect status about the stand-by ESCC.
5. A momentary alarm is now generated when ESCCs are toggled. This alarm will provide visibility to the operator to the occurrence of redundant switches on an ESCC pair due to failure conditions.
6. If the ESCC’s watchdog switch is set for disable, it will now generate a major alarm status.
7. When ESCCs are toggled, the ESCC’s Major Alarm LED will no longer come on.
8. Erroneous revision list time-outs will no longer occur.

4.12 IAR

1. In the past, an extremely fully-equipped network, or a network configuration with a large number of OCMs, may have given system errors in IAR due to an incorrect structure size limit. This has been corrected.
2. If a configuration contained a node where all 8 slot-pairs were occupied but not all 16 back-plane selects were allocated to those slots, it was possible to see “Invalid Bandwidth” displayed when entering the “Examine Bandwidth” display under the routing menu due to a discrepancy between IAR’s routing calculations and the actual node configuration. The display has now been corrected.
3. In this release, the controller sends revision list updates only to those nodes which have requested them, rather than to all nodes. This reduces the amount of time the controller spends updating node revision lists in networks with many ESCCs, allowing greater responsiveness to network events.

4.13 Megaview Support

1. The Intel 486-66 MHz. PC was found to have had a memory conflict when used with the Digiboard 8i+ card and the Megaview option. If this platform scenario is absolutely necessary, an alternative BIOS setup is available from VITAL Network Services Technical Support. The disadvantage to using this setup is degraded PC performance.
2. Some early versions of the Intel Pentium-90 had trouble recognizing the Digiboard cards when installed. This has been fixed.
3. A problem in which the communications to Megaview periodically timed out has been repaired.
4. A problem which caused the PC to lockup when communicating with Megaview has been repaired.
5. Colors are now correct when using a remote GTS login initiated from a Megaview controller using a Digiboard port.
6. Problems with incorrect identification of a few alarms to Megaview have been corrected.

4.14 OCM

1. A problem with FXS and FXO signaling setting the wrong controls on OCM VCM cards has been resolved.
2. The user was allowed to change the OCM node type when in “Examine configuration”. This is now disallowed.
3. The time needed for the CDA/E1 to declare “SAGG DOWN” on OCM subaggregates has been reduced. This improves IAR circuit rerouting.
4. VF idle tests, 1 KHz tone tests, and digital tests that originate on VCMs and loopback remotely at UVCs will now function properly.
5. Receive and transmit db levels can now be set properly on OCM VCMs.
6. Performance of status responses from OCM nodes is faster.
7. A T1/CSU LIM configured for AMI Bit 7 will now function properly.

8. If there is only one TMS subaggregate terminating at an OCM, then supervisory communications can now be established without any TMS circuits being configured and routed to that OCM.
9. When supervisory communications was lost to an OCM node it would sometimes require the initiation of a CDA loopback for it to recover. This is no longer true.
10. When running internal Bert tests that are set for CTA-1 controls, it is no longer necessary to force RTS "ON" at the OCM channel at the circuit end that is looping back to the originating end.
11. After an OCM data channel diagnostic test is terminated, controls are now restored to their original state.
12. Channel diagnostic tests now function properly for asynchronous circuits that originate on an OCM card and loopback remotely at a UDC.
13. An internally generated BERT test running on an OCM data channel that has clocking configured as EXT/INT or EXT/EXT now functions properly.
14. Internal Bert tests (511/2047 patterns) will now operate on OCM G.703 channel modules.
15. V.11 LIMs will now operate properly.
16. Redundant E1 LIMs will now dependably switch on receipt of a redundancy toggle command from the GTS Controller.
17. Various improvements were made in the accuracy of LIM status reporting. This includes displaying HW OPTIONS in yellow when there is no way to determine if the settings are correct. This situation occurs when the card had not received a configuration from the CCM or the card in slot does not match the configuration.

4.15 OPP

1. The OPP card HW/FW detail screen now displays blanks for the non-existent C and D piggybacks.
2. ACO now functions for OPPs.
3. Self-test can now be performed on OPPs.

4.16 Software Integrity

1. The software integrity summary screen will now correctly reflect the state of all software versions on the nodes. It is no longer necessary to check the detailed software integrity for each node to be sure the correct software is loaded in the stored area.
2. The OCM Node Integrity screen has been enhanced. Revision lists and active/stored software revisions are now displayed for the CCM and the new Dual Private Voice cards.
3. There are no longer system errors when entering software integrity in networks with more than 140 tail nodes.
4. There is new status in Software Integrity that will indicate if a file is being received by the In-service or Out-of-Service ESCC.
5. There is new status in Software Integrity that will indicate if the stand-by ESCC is disabled from receiving updates.

4.17 Software Upgrade

1. Activation of recently upgraded (i.e.; downloaded, but not yet activated) OCMs has been increased up by a factor of twelve through an improvement on the ESCC.
2. A CDA with both ports configured as ESF-NDL can now download software to as many as 4 OCMs simultaneously instead of only 2.

4.18 Supervisory Communications

1. In GTS V2.1.0, there were occasional incidents where the TMS Controller lost communications with certain nodes. To remedy this, users had to toggle redundant ESCCs. This problem will no longer occur.
2. A problem with the PC to Node supervisor autobaud has been fixed.
3. On the Download screen, if the user selects "Force Supervisory Route Restoral", then a prompt is given for verification of this action.
4. The possibility has been eliminated that erroneous message time-outs and user reset alarms may occur while performing supervisory route tracing diagnostics.
5. In an OCM with 2 subaggregates, supervisory communications will switch faster from one subaggregate to the other when supervisory communications has failed on one of the subaggregates.

4.19 TCP-IP Option

3com Etherlink II cards that use 3com's new extended MAC addresses are now supported.

4.20 TPP

1. In examine routing bandwidth, the bandwidth used by TPP network circuits is now correctly displayed.
2. TPP to TPP, or TPP to OPP circuits, cannot have rates chosen that are less than 19.2K. This also applies to the ports associated with the TPP or OPP cards.

4.21 XNET

In earlier releases it was not possible to configure controls on the XNET end of an XNET circuit. This is now permitted. Certain limitations apply when using this option. Contact VITAL Network Services Technical Support for details.

4.22 X.50

1. If selecting an X.50 switching circuit, with a rate of 19.2K, the user now cannot configure consecutive selects for the X.50 algorithm. This option was previously configurable but did not operate well. 19.2K rate with nonconsecutive selects is fully standards compliant and operational.
2. OCM X.50 termination channels can now be configured over redundant LIMs without causing the CCM to go to INIT.
3. It is now possible to configure more than 28 X.50 DS0s on a single OCM shelf without causing the CCM to go to INIT.
4. When modifying the destination or starting subaggregate ID of an OCM originated X.50 circuit, it is no longer necessary to delete the circuit first and then add it back into the con-

figuration. Furthermore, in a dual LIM configuration it is no longer necessary to manually require X.50 Network circuits on one of the links since IAR will now properly re-route the circuit.

5. The TMS Controller will no longer allow diagnostics tests on an X.50 termination circuit if its associated X.50 network circuit is not configured.

5.0 OPERATING GUIDELINES

This section of the release notes describes the operating guidelines for the GTS Controller V2.2.0. Follow these guidelines to maximize system effectiveness and avoid potential problems.

Most of the items described here are application specific; you will not likely encounter most of the situations described below. However, when you do encounter a system limitation, use these guidelines to work around the limitation. Contact your GDC field representative if you have any further questions.

5.1 ACM

A problem arises if a 320K bundle circuit is configured between two ACM IIs, and there is insufficient bandwidth in the TMS network to support this circuit. A configuration error will be reported at the GTS Controller for the ACM IIs, and the ACM IIs will go out of service (standby).

5.2 Alarms

1. Inserting a CDA into a slot which has the ACO set may generate alarm clear messages for the port and subaggregates. However, ACO becomes effective shortly thereafter.
2. If an undefined common card slot becomes defined and the card is not in slot, no "Not in Slot" alarm is generated. A subsequent alarm regeneration will generate the "Not in Slot" alarm.
3. Because of Alarm filtering that occurs on the CIC/DBC, channel transmit and receive clock alarms of short durations may not be reported to the TMS Controller. 4.

5.3 CDA

1. If an X.50 subaggregate is configured on a CDA/T1 001 or 002 card or a CDA/E1 001 card, the X.50 channel data is inverted. This inversion can be corrected as follows:
 - If the X.50 channel enters the network on an older CDA card and leaves the network on an older CDA card, there is no inversion. The data will get inverted twice, resulting in no net inversion.
 - If the X.50 channel enters the network on an older CDA card and terminates on a TMS data card, the inversion can be corrected by inverting the data on the channel. This is done by placing the S1-1 switch on the channel card to the MIL_STD_188C position.
 - If the X.50 channel enters on an older card and leaves on a new card (T1-003 or E1-002), the channel will be inverted. It cannot be corrected in the network. It may be possible to correct it outside the network (i.e., if one end terminates on another GDC network, the channel card can be set to invert.)
 - If the X.50 channel enters on an older card and terminates on an OCM channel card, the data will be inverted. The OCM channel card cannot be set to invert.
2. If a CDA subaggregate is more than 1 DS0 and is carried over a link that has missing or bad DS0s, the CDA may not generate an alarm.

3. Communications to a remote node could be lost if the DS0 location of a subaggregate is changed and the subaggregate is the only supervisory path to that node. Utilize the following steps to rectify this situation:
 - Access the remote node via DBU to perform a configuration download
 - or
 - Access the remote node via the ESCC maintenance console and clear the CDA configuration. This may be accomplished by configuring the CDA's slot as a redundant ACC with a rate index of 0.
4. Network and Clear channels configured on a CDA actually appear to the CDA as subaggregates. Since IAR and TOR can add or delete these channels, other subaggregates on the CDA may take momentary "hits." Configure clear channels or network channels on the CDA to use DS0 numbers that are higher than any TMS or TMS/network subaggregates. This will avoid hits on the TMS subaggregates when TOR or IAR modifies the clear channels.
5. The Tran/B7 Jumper should be set to Tran (Transparent) in all cases. Failure to do so causes data errors and subaggregate failures.
6. There is a problem on the CDA with Overhead Communications, which affects subaggregates connected to OCM V.35 or V.11 LIMs. The symptoms are: loss of Overhead Communications (Subagg Down), or the inability of OCM to get a configuration. To avoid this problem, the following configuration combinations must be adhered to.

<u>Total Number of DS0s Used on CDA (in DS0s)</u>	<u>Maximum Allowable Size of V.35/V.11 Subaggregate (in DS0s)</u>
31, 32	6
30	9
25-29	10
20-24	11
Below 20	No Restriction

Example: If a CDA has a 10 DS0 subagg to a V.35 OCM and also has 15 single DS0 subaggregates for a total of 25 DS0s used, the 10 DS0 V.35 subaggregate may experience problems.

5.4 Diversity and Redundancy

1. If the backup card in a TMS Compact node is switched into service for an ACC which it is NOT already set to back up (i.e.; for which the Backup card is not already primed), a short link down may be generated (2-5 seconds).
2. Only insert a CDA card configured as non-redundant 256 into the primary slot. If a CDA is configured non-redundant 256 and inserted into the secondary slot and any common card is inserted into the corresponding primary slot, the card in the primary slot will come in-service and the CDA in the secondary slot will go out-of service.

5.5 IAC

1. An IAC-E1 card can not be configured in this release.
2. The IAC card does not support 2-for-1 redundancy in the TMS 3000 Compact node.

3. An IAC port may not be configured with “Remote IAC” as the Port Destination type.
4. Nodes containing IACs will support 92 telephone numbers per node.
5. The IAC-T1 is certified to be compliant with AT&T Technical Reference 41449 and 41459; and can also be installed to Northern Telecom C.O. plant - e.g. MCI or Spring IXCs. Connection to any other service which does not support these specifications is not supported.
6. The IAC card does not support the “Buffer Slip Threshold” alarm on the port level. Regardless of the value configured in the IAC Port Configuration screen for “allowable slips per day/hour” the alarm will never be generated. However, the Port Statistics information will give a good indication if error events are occurring on a periodic basis.
7. The IAC-T1 card will disconnect, then reconnect calls associated with H0 or Nx64K bandwidth bundles when the following occurs:
 1. A Network or TMS/Network circuit is added to the bundle
 2. A Network or TMS/Network circuit is deleted from the bundle
 3. A Network or TMS/Network circuit in the bundle changes size

This will momentarily disrupt user data on all circuits associated with the bundle.

5.6 IAR

It is recommended that the number of events listed in the IAR event screen be checked periodically. If the number of events exceeds 50, IAR performance will be seriously degraded. Doing a circuit route optimization will reset the event list.

5.7 Manual Routes

When configuring a circuit with routing type either “Manual Preferred” or “Manual Required”, if the user enters the “Circuit Route Selection” screen and hits the F4 key, the “Route Information” screen comes up. On this screen and the “Route Definition” manual route screen, the destination end (located on the right side of the screen) of a link which terminates on a CDA-E1 card will display the DS0 bundle number as one greater than it actually is in the configuration. This is a display issue only.

5.8 OCM

1. Disregard “SYS ERR” which may appear on software integrity screen just after the activation of a new version of the OCM software.
2. Performing selftest on a channel card which terminates the only circuit on a subagg may cause the other subagg (if one exists) to lose sync momentarily.
3. Non-disruptive downloads once started must finish. Trying to abort the download by changing the revision list may not be effective. Only changing the revision list after download is finished will recover the CCM version.
4. During non-disruptive downloads to the redundant CCM, the CCM’s status screens will be in alarm due to the detailed status alarm “RED. CNFG. MISMATCH.” This alarm is invalid and should be ignored. The status error will clear when the download finishes.
5. LIMs with network circuits which lose their TMS circuit configuration will not report “No Configuration” until an optimization is done.

6. After a link outage on a redundant V.35 LIM, it is possible that a red alarm will remain active on the out-of-service LIM even though the link has recovered. This alarm can be cleared by toggling the out-of-service LIM into service or re-seating the out-of-service LIM
7. If experiencing inexplicable losses of sync on a V.35/V.11 LIM, it may be due to control 1 (RTS/DCD) into the LIM being in the off state. Check your wiring and/or application, as appropriate.
8. The OCM architecture uses a framing processor on the Channel Module to set up communication with the CDA. The OCM searches for a maximum of two subaggregates (aggregates). The framing processor on the common control module is shared between the two subaggregates until a configuration is received that has at least one channel configured and a channel module is present. Until the OCM receives such a configuration, the software integrity screen will not show any configuration for this subaggregate's group. In subaggregate status these subaggregates will show up as "not part of the running configuration".
9. When doing local loopbacks on a CDA subaggregate connected to an OCM V.35 LIM card, the diagnostic screen will first indicate "Local Loopback" status and will then indicate "External Loopback" status. Since the Controller cannot terminate an external loopback, the user must wait for the loopback to time-out before the subaggregate returns to normal.
10. Maintenance terminal features modem support; and diagnostics are not supported in this release.
11. The option to supply an alarm associated with dropping of Control 1 is not supported in the OCM in this release.
12. Do not configure a LIM-T1 module in slot 2 of an OCM enclosure if this slot does not have an RJ45 connector on the backplane.
13. The VF dBm Monitor on the VCM is a peak latch. For best results, the user should manually reset the results and collect a few samples.
14. T1/E1 LIM switch options will be displayed under HW options on the network controller only if the LIM has a firmware revision of C- or later. Older LIM firmware revisions do not support this feature and the switch status displayed will be incorrect.
15. Running a Self Test on the Primary LIM of a redundant pair will cause a redundancy toggle even if the Primary has been "Forced".
16. Remote OCM subaggregate loopbacks cannot be prematurely terminated, they must run for the time duration specified when the test was started.
17. When forcing control state changes in channel diagnostics, OCM voice channels will display "controller state change" and turn on their test LED whereas OCM data channels will not.
18. When a loopback is initiated on an OCM subaggregate and this subaggregate provides the current communications path to the OCM, then the communications path may be lost before the TMS controller receives a diagnostics acknowledgment from the OCM. The Controller will appear to lock up for a short period of time until communications is restored or the Controller recognizes that communications is not available. However, the loopback test does function properly.
19. BQM LIM redundancy is not supported
20. BQM LIM is not supported in a Dual LIM configuration.
21. OCM non-disruptive download does not support "fallback" capability.

22. The OCM G.703 channel module's alarm LED is not turned on when an "external signal loss" alarm is active.
23. Status of any OCM card that was just inserted may temporarily be invalid.
24. An OCM channel module self test will not run if another diagnostic test is already running on that channel.
25. Stand-by CCMs do not store OCM configuration. When a stand-by CCM comes into service it must get its configuration records from the connected CDA(s) and the TMS Controller. Therefore it will take approximately 60 seconds for the OCM to restore to full operation after the CCM swap.
26. If two subaggregates are defined on an OCM at least one circuit must be routed to the OCM.
27. Local loopbacks on a CDA subaggregate connected to an OCM should be done as bilateral loopbacks.
28. Selftest cannot not be commanded on the in-service CCM. The selftest results reported for CCMs are the results from the last selftest performed. Selftests are performed on CCMs at power up and when commanded on an out-of-service (redundant) CCM.
29. The USA900 (900 ohm analog port impedance) country code configuration option for the DPV FXS and FXO cards is not currently implemented by GTS 2.2.
30. If a DPV circuit is configured and saved with a rate selected other than the default, and then the rate-selection screen is reentered, typing of alpha-numeric keys at that point may cause the cursor to jump to the upper left hand corner of the PC screen and echo the typed text. The F3 key will return the cursor to the previous screen. It is possible that the rate will have been changed to an undesired value at this point, and will need to be re-selected. In order to avoid the problem, use only the arrow keys when in the rate selection screen.
31. An alarm indication is erroneously reported and summed-up to the LIM, Node and Network Status screens when a LIM is forced into service via the Redundancy Control diagnostic feature. In addition, on those same screens, a diagnostic test is also reported as being in progress, accurately reflecting that a "User State Change" condition exists while the LIM is forced. However, on the LIM Status Detail screen, the "Diag" field continues to display "None" (even though the Status Detail subscreen accurately displays "User State Change").
32. If an OCM is configured with redundant CCMs in slots 1 & 2 while slots 5 through the last slot are already configured, then slot "2A" is erroneously offered as the default next available slot when attempting to configure a Network circuit to that Node. Simply change the slot number to 3, 4, or 5.
33. The LIM/CSU does not report the ESF ANSI mode status correctly. If the LIM/CSU is both configured and strapped for ANSI ESF mode, the card erroneously reports an Office Compatibility Mismatch, and displays the ANSI strap setting in red. There is no similar problem with the status when the mode is set for ATT.
34. Running a node selftest may cause a non-recoverable loss of communications with the OCM being tested. To re-establish communications, power must be cycled on the OCM.
35. LIMs with Network Circuits which lose their configuration will not report "No Configuration" in the Alarm field on the LIM Status screen (and "Configuration Not Loaded" in the Status Detail subscreen) until an Optimization is done.
36. When configuring an FXS to FXO circuit connection, it is necessary to select the "A0" selection in order to configure the FXS channel-end for "Not Ring" conditioning.

5.9 OPP

1. A configuration mismatch will not be reported when a non-OPP card is in a slot configured for an OPP card.
2. The Encoding field on an OPP Network Circuit screen is erroneously fixed at NRZI, even though the OPP card defaults to NRZ and is not currently configurable. The PC ought to display NRZ, and not allow access to the field.
3. To use an OPP card in a Network Circuit configuration, the minimum OPP version required is OPP V2.2.0.

5.10 RCC

There is a new version of the RCC (-003) which does not have an internal modem. Status at the TMS Controller cannot currently distinguish it from other RCC versions.

5.11 Redundant Controllers

If the operator logs in to a different on-line network on the Master Controller and the Subordinate Controller has two networks defined, neither of which has the same name as the new network on the Master, the network will not be crossloaded. In order to force crossload of the new network, the operator on the Subordinate Controller must create a new minimal network with the name of the new network as documented in the TMS 3000 Installation and Operation Manual, Chapter 6.

5.12 Software Upgrade

A CDA may have trouble accepting a software download. This can occur if:

1. It is not a background download, that is, the CDA is in boot.
2. The boot is revision CD_D (CDA-T1) or E1_A (CDA-E1).
3. The CDA is receiving Network or Clear Channel data on port A. The workaround if this occurs is to stop the channel's data flow until the download is complete.

5.13 Status/Diagnostics

1. The diagnostic indicator on the Channel Summary screen does not always reflect the true state of Circuit Diagnostics, rather, it gives the view of the circuit from the selected side only. The test will always be properly displayed in the Circuit Diagnostic or Status screen.
2. Some Megamux Plus diagnostic tests are not displayed correctly on a supervisory terminal. However, the tests run correctly.
3. VF-idle test sometimes fails. This can be caused by the propagation delay over CDA links of the controls needed for the test. To work around this problem, restart the test without terminating it. This resets the failure without interrupting the test.
4. Some local voice channel diagnostics can cause "Out-of-Sync" error messages at the remote channel end.
5. Internal Bert tests on TMS channels deceptively report zero errors if the channel cards have no receive clock.
6. In the Equipment Diagnostic screen for a redundant card, if neither card is in-service at the time of examination, the "Card In-service" field should show "Neither", however, it may blank out.

7. On an OCM-to-OCM voice circuit it is necessary to terminate the operating test before initiating a VF Monitor Test.
8. It is possible that Supervisory Route Tracing will show successful routing to an OCM node even though a User Reset alarm exists to that node.
9. The Subaggregate Status Summary screen may indicate “----” in the Alarm field. That does not indicate a problem with the subaggregate. The Subaggregate Diagnostics screen is available for more detail.

5.14 Supervisory Communications

If the user desires to move a Controller between two nodes each of which has been defined as being connected to a Network Controller, the following steps must be followed:

1. Unhook the controller.
2. Go into the Download screen and wait until “No recognized network” is displayed on the top left corner of the screen and “No cnfg” is displayed on the green bar at the bottom of the screen, and the “Controller Lnk Lvl-Prt [0 or 1] Inoperative” alarm is received.
3. Log out of the on-line network.
4. Log into the on-line network.
5. Reconnect the Controller.

5.15 XNET

XNET compatibility is not guaranteed between GTS software and V2.X versions of MSO software unless the following guidelines are followed. Unfortunately an enhancement to the Aggregate framing was made in MSO V3.0.0 that makes the algorithm incompatible with earlier TMS release versions. If you wish to XNET with networks containing earlier revisions of TMS Controller software the following versions compatible with GTS 2.X do exist.

- MSO V2.0.5 with patch 15 (Controller only patch)
- MSO V2.0.6 with patch 03 (Controller only patch)
- MSO V2.0.6 with patch 12 (Requires disruptive node based software load)
- MSO V3.0.x (No patches required)
- GTS V2.0.0 (No patches required)

Contact VITAL Network Services Technical Support if one of these patches is required.

1. When using special rates over an XNET link, for either link rate or circuits, the rates must have the same rate index in both networks. For example, if a rate is defined as special rate number 3 in one network, it also must be defined as special rate number 3 on the other network.
2. Not all combinations of signalling are supported on a voice circuit across an XNET link; at least one end must be configured for E&M.

5.16 X.50

1. An OCM X.50 termination circuit (configured to an X.50 DS0) must have a corresponding X.50-bundle/network-circuit configured in order to be fully functional. If an X.50 termination circuit's network circuit is not configured, then the X.50 channel card will remain out of service. The TMS Controller's status screen will report no error conditions for this channel.
2. 14.4Kbps X.50 channel rates is not supported.



General DataComm