

## **Appendix A: Operator Messages**



## Appendix A1: Interactive Messages

The following messages are displayed on the second line of the screen, normally during execution of menu-screen functions.

MESSAGE	MEANING
Attempt to transfer source to itself	Source selections in the <b>From</b> and <b>To</b> fields on the Data Transfer screen are the same. Change one selection. To use one drive to perform data transfer involving two disks, change <b>To</b> selection to <b>NEW</b> .
Attempted to mount uninitialized disk	Check disk. It may require formatting.
Attempting to initialize link	Physical link being established prior to transfer.
BNDX message request failed	Message should not normally appear. If it recurs, contact Customer Service.
Backup complete, no errors	Duplication process is successful.
Bad object file format	Data is not recognized in format of object file. Try again to save the source file as an object file.
Can't load object file - Incompatible FEB installed	Current hardware is different from hardware of unit on which object file was saved. Save the source file as an object file on the unit on which it will be loaded and run.
Can't load object file - Incompatible MPM addressing	Current hardware is different from hardware of unit on which object file was saved. Save the source file as an object file on the unit on which it will be loaded and run.

Can't load object file - Incompatible mux installed

Current hardware is different from hardware of unit on which object file was saved. Save the source file as an object file on the unit on which it will be loaded and run.

Can't load object file - Insufficient MPMs

Current hardware is different from hardware of unit on which object file was saved. Save the source file as an object file on the unit on which it will be loaded and run.

Can't load object file - No mux installed

Current hardware is different from hardware of unit on which object file was saved. Save the source file as an object file on the unit on which it will be loaded and run.

Can't read disk

Make sure disk is correctly inserted. If message recurs, disk may be bad.

Cannot append to a wrapped DAT

Record Setup menu shows Stop at: **ENDLESS LOOP**. End of data acquisition tracks was reached, so wrapping occurred. Then, Data Transfer command attempted to append data from source to the end of DAT on destination disk. Select Start At: **BEGIN** on Data Transfer screen.

Cannot copy a file to itself

Be certain that name of destination file on File Maintenance screen differs from name of source file.

Cannot copy directory tree into itself

Attempt to copy a directory into one of its subdirectories. For example, a command to copy */usr* into */usr/programs* will fail.

Cannot delete a non-empty directory

File named for deletion is directory containing files. Before deleting directory, delete or move files.

Cannot open file

In attempt to load or save a file, the file could not be opened. Check the write-protect window. It should be closed to write to the disk.

Cannot open redirect file

Printer Setup menu shows that output will be redirected to a file. Check to make sure that the disk is properly inserted in the correct drive and is not write-protected.

Cannot move file across disk boundaries	Attempt to rename a file from one disk to another. Make sure only one drive is specified on File Maintenance screen.
Cannot remove an open file	Attempt was made to copy a directory into itself. Files being copied also need to be deleted, but cannot be since they are open. Copy the directory to another source. In general, close files before attempting to delete them.
Cannot unmount disk, files open	Attempt was made to remove disk before operation was completed.
Cannot write to redirect file	Printer Setup menu shows that output will be redirected to a file. Error in trying to write to the file. Check disk.
Change floppy disk 1	During multi-disk recording operation, disk in drive 1 has been filled. Remove old disk and insert new one.
Change floppy disk 2	During multi-disk recording operation, disk in drive 2 has been filled. Remove old disk and insert new one.
Character buffer not yet allocated	From field on the Data Transfer screen shows <b>CHARBUFFER</b> , but unless Run has been executed, there is no character buffer. Press <b>RUN</b> , and then try the transfer operation again.
Compilation aborted	User has pressed ABORT softkey or <b>PROGRAM</b> to arrest the Compile operation (from the File Maintenance menu). Destination file may have been partially overwritten if compile was to an existing file.
Compilation completed	The Compile command (from the File Maintenance menu) has been executed.
Compilation failed - Errors detected	The Compile command (from the File Maintenance menu) has been aborted because of errors. Go to the Protocol Spreadsheet and press <b>ENT</b> , <b>F8</b> to display the first error message.
Compilation is in progress	The Compile command (from the File Maintenance menu) is being executed to compile and save a file of standard C code as object code.

Copy completed	Selected file(s) has (have) been copied successfully.
Copy is in progress	Selected file(s) is (are) being copied.
Could not load a layer personality package	Attempt to load a protocol package from the Layer Setup screen has failed. Make sure that correct disk is installed in drive indicated on menu. If attempt still fails, package may have been corrupted.
Current test invalidated	Changes have been made to the menu screens or Protocol Spreadsheet which invalidate a loaded object file.
Data transfer source and destination are the same	Source selections in the From and To fields on the Data Transfer screen are the same. Change one selection. To use one drive to perform data transfer involving two disks, change To selection to <b>NEW</b> .
Destination disk does not contain user file system	Check file contents on File Maintenance screen. If disk is intended for user files, you may need to allocate disk space to the filing system. Use Disk Utilities screen to check disk allocation.
Destination file is a directory	Copy or save operation not complete because file named to receive copy is a directory. Change destination filename and re-execute.
Destination file is write protected	Change destination filename or write-enable file. Then repeat save or copy operation.
Directory file expected	Check directory named in Change Directory command. Use only names labeled DIR in file listings.
Directory is empty	Attempted to copy the contents of an empty directory.
Directory is not empty	Directory cannot be deleted until all of the files it contains have been deleted.
Disk corrupted	Disk is worn out or damaged and should not be used for future operations.
Disk duplication aborted	Operator has aborted disk duplication. Data on destination disk may have been partially overwritten.

Disk duplication in progress	Disk is being duplicated. Do not remove disks from active drives.
Disk formatted	Formatting operation is complete.
Disk full	No space left on disk to perform operation. Use a new disk, or remove unneeded data from disk.
Disk not mounted	Re-insert disk and attempt operation again. Also try to power-up again. If message recurs, the disk may be bad.
Disk record error (controller error) -- Aborted	Disk may be write protected or recording too fast. Also may be an internal error or bad disk. Try again with a new disk. Contact Customer Service if it recurs.
Disk record error (timeout) -- Aborted	May be an internal error or bad disk. Try again with a new disk. Disk may be write protected or recording too fast. Try turning off time ticks, leads, and/or suppress idle in the FEB Setup.
Display screen command failed	Message should not normally appear. Contact Customer Service if it recurs.
Entering testprep	First status message entering Run mode. Test preparation mode precedes compilation of program.
Error during load of code file	Check code files. Message indicates code file is not found, or code file has been modified.
Error trying to print file	Try printing again. If attempt fails, disk file is probably corrupted.
Error trying to print screen	Try printing again. If problem recurs, contact Customer Service.
Errors occurred during load	Try loading again. If attempt fails, disk file is probably corrupted.
Errors occurred during save	Try saving again. If attempt fails, disk is probably corrupted.
Errors occurred during testprep	Attempt to perform Save command as a object file before the program had ever been compiled. An error was detected as compilation was attempted. Go to the Protocol Spreadsheet and search for errors. The Line Setup menu, for example, may show Mode: MONITOR and Source: DISK, but no disk is present in the selected drive.

Fatal Hardware Error	Invalid hardware setup. Contact Customer Service.
Fatal Software Error	Message should not normally appear. If it recurs, contact Customer Service.
FE buffer overflowed – Incoming data halted	Data is coming in faster than it can be received.
File access error	File named cannot be accessed. Check disk.
File copy aborted	User has pressed ABORT softkey to arrest copy operation. Destination file may have been partially overwritten if copy was to an existing file.
File is a directory	Operation, View for example, could not be performed on a directory. Select or enter the name of a file. See listings on File Maintenance screen for entry NOT labeled DIR.
File is write-protected	File named cannot be deleted or saved. Check name. To perform operation on named file, write-enable it from the File Maintenance screen.
File loaded	File has been loaded successfully as a Program, Setup, or Object file.
File name not found	Filename (or directory) as entered does not appear in listings. Check spelling of entry. Make sure you are operating in correct directory.
File name already exists	Attempt to use the Make Directory command, naming a directory that already exists.
File saved	File has been saved successfully as a Program, Setup, or Object file.
File size can't be increased, index block full	File is larger than the file system can handle.
Formatting disk – max floppy disk DAT allowed = 1422K bytes	Too much space specified for data acquisition tracks. Maximum space has been allocated.
Formatting disk – max hard disk DAT allowed = 20774K bytes	Too much space specified for data acquisition tracks. Maximum space has been allocated.



Formatting disk	Formatting in progress. Do not remove disk from active drive.
Formatting will destroy data - Depress F1 key to continue.	Message appears when a formatted disk has been inserted for reformatting. Press ABORT to avoid overwriting data. Press F1 to format the disk.
Function failed -- Check media	Attempt operation again. If operation still fails, disk may be bad. Try new disk.
Function(s) not yet implemented	Operation attempted is not available with the software version installed.
Il buffer services error	Error in using OSI variables or routines. May occur, for example, if operation is attempted on buffer which no longer exists. Set maintain bits at each layer that needs to reserve the buffer for subsequent operations.
Illegal device name	Message should not normally appear. If it recurs, contact Customer Service.
Illegal expansion unit, not 1-255	Message should not normally appear. If it recurs, contact Customer Service.
Illegal file number passed to open	Message should not normally appear. If it recurs, contact Customer Service.
Illegal major device number given	Message should not normally appear. If it recurs, contact Customer Service.
Illegal parameter to volume init. function	Message should not normally appear. If it recurs, contact Customer Service.
Illegal pathname	Pathname provided is incomplete or invalid. Check entry.
Illegal position parameter, not 0-2	Message should not normally appear. If it recurs, contact Customer Service.
Illegal synchronization mode, not 0-2	Message should not normally appear. If it recurs, contact Customer Service.
Indirect stat update msg received	Message should not normally appear. If it recurs, contact Customer Service.

Insert next disk -- Depress F1 key to continue	More than one disk required to perform duplication.
Insert destination disk, depress F1 key to continue	Operation involving more than one disk being performed using one drive.
Insert source disk, depress F1 key to continue	Operation involving more than one disk being performed using one drive.
Internal disk sub-system error	Message should not normally appear. If it recurs, contact Customer Service.
Inter-processor communication overrun	Communication from MPM to CPM occurring too fast for CPM. Available buffer space exceeded.
Invalid contents in field	Entry made in menu field is illegal.
Invalid DAT block version number	Each block in DAT has a version number. If it is wrong, the disk may be corrupted.
Invalid DAT version number	Header in DAT has a version number. If it is wrong, the disk may be corrupted.
Invalid data type	During attempted playback, INTERVIEW did not recognize type of data. Be certain recorded data rather than program data is being accessed.
Invalid destination	Destination file in a Copy command is a relative pathname on a drive which is not the current drive.
Invalid disk sub-system function number	Message should not normally appear. If it recurs, contact Customer Service.
Invalid file identifier, no such open file	Message should not normally appear. If it recurs, contact Customer Service.
Invalid file identifier, out of range	Message should not normally appear. If it recurs, contact Customer Service.
Invalid filetype	Command cannot be used on file type indicated. A Load command, for example, is not valid for SYS files.

Invalid filetype for viewing	View command cannot be used for data in file indicated. Files with type SYS, for example, cannot be viewed.
Invalid layer number	User has entered layer number out of valid range.
Invalid object code version	Object file was saved under a different version than current software. Save the source file as an object file using the same software with which it will be loaded and run.
Invalid section name	Message should not normally appear. If it recurs, contact Customer Service.
Invalid stat update msg received	Message should not normally appear. If it recurs, contact Customer Service.
Load aborted	Operator has aborted Load operation. Program already residing in INTERVIEW may have been altered.
Load is in progress	Selected Program, Setup, or Object file is being loaded.
Loaded package and configuration screen don't match	Message should not normally appear. If it recurs, contact Customer Service.
Marked entry not copied	Too many items have been marked for single operation. Not all files marked have been copied. Check listings on the File Maintenance screen. Files still marked are not yet copied. Repeat copy operation on remaining files.
Marked entry not deleted	Too many items have been marked for single operation. Not all files marked have been deleted. Check listings on the File Maintenance screen. Files still marked are not yet deleted. Repeat delete operation on remaining files.
Marked entry not printed	Too many items have been marked for single operation. Not all files marked have been printed. Check listings on the File Maintenance screen. Files still marked are not yet printed. Repeat print operation on remaining files.

Maximum number of entries exceeded	Error on Tabular Statistics screen. Maximum number of entries is 100.
Maximum disks already mounted	Message should not normally appear. If it recurs, contact Customer Service.
Memory has not been unlocked yet	Message should not normally appear. If it recurs, contact Customer Service.
Message exchange full	Message should not normally appear. If it recurs, contact Customer Service.
Message ID too big	Message should not normally appear. If it recurs, contact Customer Service.
Move would destroy directory tree structure	Attempt to rename a directory the same as one of its subdirectories.
MPM -- Bus error	May indicate a hardware problem, but check program for logic errors relating to storage allocation. May have attempted to access something that doesn't exist.
MPM -- Divide fault	Program may include an attempt to divide by zero. Check for other logic errors in program.
MPM -- Processor fault	May indicate a hardware problem, but check program for logic errors relating to storage allocation. May have attempted to access something that doesn't exist.
MPM -- Memory fault	Logic error in program, typically relating to storage allocation. May have attempted to access something that doesn't exist, accessing an array outside of its range, for example. May also indicate type mismatches.
MPM -- Stack fault	Logic error in program, typically relating to storage allocation. May have attempted to access something that doesn't exist, accessing an array outside of its range, for example. May also indicate type mismatches.
NEWDISK illegal with source of hard disk	When To field for a Copy command is <b>NEW</b> , it means that the same drive will be used to perform a copy involving two disks. Change From field to <b>FD1</b> or <b>FD2</b> .

NEWDISK illegal with source of RAM or hard disk	When To field for a Data Transfer command is NEW, it means that the same drive will be used to perform a transfer involving two disks. Change From field to FD1 or FD2.
No DAT RAM currently allocated	Attempt to transfer data from RAM without it having been recorded previously to RAM.
No default directory set	Message should not normally appear. If it recurs, contact Customer Service.
No file name specified	Enter or indicate file on which operation attempted is to be performed.
No package loaded for this layer	Selection has been made on the Layer Setup screen, but no protocol package has been loaded. Return to Layer Setup, check selection, and press <input type="button" value="XEO"/> .
No packages loaded	Selections have been made on the Layer Setup screen, but no protocol packages have been loaded. Return to Layer Setup, check selections, and press <input type="button" value="XEO"/> .
No RAM recording memory available	Program is too large to be recorded into available RAM.
No start of section indicator	Operation on file cannot be performed because (1) file is not a program or setup, (2) format of the file is invalid, or (3) file has been corrupted.
No message entered in message buffer	Check BERT screen. Configured menu indicated a message would be sent, but none was entered.
Obsolete object program – Source must be recompiled	Object file is incompatible with current software.
Out of memory	Insufficient memory to perform operation. (Program is too large to run.)
Operation not allowed on specified file	Selected command cannot be used on file indicated.
Parent directory of file is write-protected	Parent directory must be write-enabled before you can modify or delete this file.
Parent directory of target file does not exist	Check spelling of directory.

Pathnames limited to 122 characters	File pathnames, including the drive specifier—HRD, FD1, or FD2—have a maximum length of 122 characters.
Play underrun	Data could not be output at speed requested.
Premature end of section	Operation on file cannot be performed because (1) file is not a program or setup, (2) format of the file is invalid, or (3) file has been corrupted.
Previous lock user has died	Message should not normally appear. If it recurs, contact Customer Service.
Print queue is full	Maximum number of print jobs has been requested. Wait for some requests to be completed. Then repeat print operation.
Printing is done	Print jobs requested are completed.
Record overrun	Data being received too rapidly for capture to RAM.
Remove screen command failed	Message should not normally appear. If it recurs, contact Customer Service.
Replace screen command failed	Message should not normally appear. If it recurs, contact Customer Service.
Resetting compiled test	Program being run again without recompiling. Menus can be viewed and selected changes can be made to menus without forcing a recompile.
Routine calling save_prog_setup is unknown	Message should not normally appear. If it recurs, contact Customer Service.
Save aborted	Operator has aborted save operation. If save was to an existing file, the file may have been partially overwritten.
Save is in progress	Selected Program, Setup, or Object file is being saved.
Seek attempted before beginning of DAT	Data Transfer screen shows transfer from disk with <b>Start At Block</b> entry that precedes the block number at which data actually begins. DAT may begin at block 20, for example. If you enter <b>Start At Block: 2</b> , this error message will be displayed. To guarantee that data transfer starts from the beginning of DAT, enter zero in the <b>Start At Block</b> field. Zero is a special entry. It references the beginning of DAT, regardless of what the actual block number may be. Any other entry is interpreted as a literal block number.

Seek attempted past end of DAT	Data Transfer screen shows transfer from disk with <b>Start At Block</b> entry that exceeds the block number at which data actually ends. DAT may end at block 100, for example. If you enter <b>Start At Block: 101</b> , this error message will be displayed. To guarantee that data transfer starts from the beginning of DAT, enter zero in the <b>Start At Block</b> field. Zero is a special entry. It references the beginning of DAT, regardless of what the actual block number may be. Any other entry is interpreted as a literal block number.
Seek attempted past end of file	Message should not normally appear. If it recurs, contact Customer Service.
Source & destination can't be the same disk	Error in entries made for disk duplication. Check disks selected.
Source disk does not contain user file system	Check disk contents on the Disk Utility screen. If disk is intended for user files, you may need to allocate space to the filing system.
Source file not found	In Interview 10/15/20 file transfer, the source file which was specified does not exist.
Stopped at end of DAT	During playback, stopped at end of recorded data. During recording, stopped at end of data acquisition tracks.
Subdirectory nesting limited to 16 levels	The maximum number of directories and subdirectories a file can reside in is 16.
TEST PREPARATION Phase 1	Program is being compiled.
TEST PREPARATION Phase 2	Program is being compiled.
TEST PREPARATION Phase 3	Program is being compiled.
TEST PREPARATION Phase 4	Program is being compiled.
TEST PREPARATION Phase 5	Program is being compiled.
TEST PREPARATION Phase 6	Program is being compiled.
TEST PREPARATION Phase 7	Program is being compiled.
There are no free locks left	Message should not normally appear. If it recurs, contact Customer Service.

Token in load file is invalid	Operation on file cannot be performed because (1) file is not a program, setup, or object, (2) format of the file is invalid, or (3) file has been corrupted.
Token is incomplete	Operation on file cannot be performed because (1) file is not a program, setup, or object, (2) format of the file is invalid, or (3) file has been corrupted.
Too many files in directory	Maximum number of files that can be displayed is 200. If the current directory contains more than 200 files, this message is displayed.
Too many files on disk, FLIST full	Directory area on disk is full, although there may be more space available for recording. Delete unnecessary filenames to gain access to free space remaining on disk.
Too many open files for process	Each process is limited to a maximum of ten files open at one time.
Too many open files for system	There is a system-wide limit of 20 files open at one time.
Too many processes using disk sub-system	There can be no more than twelve processes using file I/O simultaneously.
Too many source files selected	Operator has used <u>mark</u> to select multiple source files for executing the Compile command (from the File Maintenance menu). Select only one source file to compile and save as a linkable-object (LOBJ) file.
Transfer aborted	Data transfer operation has been aborted. Partial transfer of data may have occurred, overwriting storage medium at destination.
Transfer complete	Data transfer has been completed successfully.
Transfer in progress	Data transfer being executed.
Transmit overrun	Attempt to transmit data faster than unit can transmit.
Unable to access disk	No file named in a Data Transfer to a file, disk not in drive, disk is write-protected, or disk is unformatted.



Unable to access disk in selected drive.	During multi-disk recording, the next drive in sequence does not contain a disk, contains a write-protected disk, or contains an unformatted disk. During file maintenance operations or disk duplication, source disk is not present in selected drive, is write-protected, or is unformatted.
Unable to access m_list	Disk error. Check disk and try operation again. If message recurs, disk may need reformatting.
Unable to execute XEQ key	Attempt to execute a File Maintenance command before the current directory is displayed.
Unable to open DAT	There are no data acquisition tracks on the disk being accessed.
Unable to open file	Disk error. Check disk and try operation again. If message recurs, disk may need reformatting.
Unable to open next disk	Recording using more than one disk. Next disk may not be installed.
Unable to read DAT info block	DAT block not where indicated. Disk may be corrupted.
Unable to read file	Check disk.
Unable to read from DAT	Check disk.
Unable to write to DAT	1) May have attempted to transfer more data to destination disk than the space allocated for data during disk formatting. A Summary of the disk may show no free space remaining for data acquisition. 2) Disk may be write-protected.
Unhandled CPM interrupt	Message should not normally appear. If it recurs, contact Customer Service.
Unhandled MPM interrupt	Press <b>PROGRAM</b> to recover from this error. Message should not normally appear, however. If it recurs, contact Customer Service.
Unknown DAT type	Data acquisition tracks may have been recorded on a unit with more recent software than is installed in the unit being used to playback the data.

Unknown filetype

Check entry in file listing. Check disk. Try operation again. If message recurs, delete and recreate file (if possible). Some file types may not be known for certain operations. A Print command on a SYS file, for example, generates this error message.

Unprintable screen

Screen requested cannot be printed. Refer to section on printing for printable screens.

Unrecoverable error during format

Format operation failed. Make sure disk is inserted properly in selected drive. Check disk type. One Mbyte disks are not supported. If disk type is correct, re-attempt formatting. If second attempt fails, disk may be bad.

Warning -- running in a degraded condition

This message appears only in *TURBO* units when your program's size causes it to be divided between the processor's local memory and other memory. This can have a impact on the speed performance of your program.

WARNING: Unit may need CPM hardware upgrade. Call AR for info.

During power-up, *TURBO* units check the revision levels of all boards for compatibility. Even if the revision levels are not as expected, the general operation of the unit is unaffected. Contact Customer Service for further information.

## Appendix A2: Easy View Messages

The following messages may appear when you are using the Easy View system (in *TURBO* units only).

MESSAGE	MEANING
Error occurred while opening the compiled menu file <pathname>	A file system error occurred when the menu system tried to open the compiled menu file. The most likely cause is that the disk holding the file has been corrupted.
Error occurred while preparing to run program	An error occurred during the testprep process for an application program which was loaded by the menu system. Exit from the menu system, enter the spreadsheet, and use the GOERR softkey to view the error messages generated for the program.
Error occurred while reading text file <pathname>	A file system error occurred when the menu system tried to read a help or information file. The most likely cause is that the disk holding the file has been corrupted.
Error occurred while trying to load program file <pathname>	An error occurred when the menu system tried to load an application program file. The most likely cause is that the disk holding the file has been corrupted.
Error occurred while trying to open text file <pathname>	A file system error occurred when the menu system tried to open a help or information file. The most likely cause is that the disk holding the file has been corrupted.
Error reading the compiled menu file <pathname>	A file system error occurred when the menu system tried to read the compiled menu file. The most likely cause is that the disk holding the file has been corrupted.
Error: couldn't find program file <pathname>	The menu system was unable to locate the specified application program on the designated disk(s). Either copy the proper file to the hard disk or place the proper floppy disk in one of the drives.

Error: couldn't find text file <pathname>	The menu system was unable to locate the specified text file on the designated disk(s). Either copy the proper file to the hard disk or place the proper floppy disk in one of the drives.
Error: couldn't find the compiled menu file <pathname>	The menu system was unable to locate the compiled menu file on the hard disk. Create a copy of the compiled menu file on the hard disk.
Error: not enough memory to hold menu information	Message should not normally appear. Contact Customer Service.
No help is available for this item	The user has pressed the ? key while the selection bar was over a menu item for which no help file has been specified in the compiled menu file.
Not enough memory available to load text file	Message should not normally appear. Contact Customer Service.
Press the PROGRAM key to abort running this program. The menu will reappear when loading is completed.	Status message displayed while the menu system is loading an application program from disk.
The compiled menu file has been corrupted (checksum) <pathname>	The checksum computed for the compiled menu file does not match the checksum stored in that file. The compiled menu file should be regenerated by the menu compiler application program.
The compiled menu file has been corrupted (too short) <pathname>	The compiled menu file does not contain the number of bytes indicated in the header portion of the file. The compiled menu file should be regenerated by the menu compiler application program.

## Appendix A3: Error Messages Issued by C Translator

If a spreadsheet program contains any of the following errors, the compilation will be interrupted and you will be returned to the Protocol Spreadsheet. A diagnostic message about the first error will be displayed at the top (second line) of the screen. To search for additional error messages, press **F8**.

MESSAGE	MEANING
AR "C" conditions text too long	A C region in a CONDITIONS block is more than 300 characters.
Bad format in object file	Unsuccessful attempt to access linkable-object file via the OBJECT block identifier. Use the Compile command on the File Maintenance screen to recreate the LOBJ file, and try again.
BIB value out of range	An SS#7 condition at Layer 2 specifies a BIB= value that is not zero or one.
Bit mask exceeds maximum length	A FLAG condition or FLAG name SET action includes a bit mask that exceeds 16 bits. In other uses, bit mask is typically eight bits.
Cannot find object file	Attempt to access a linkable-object file via the OBJECT block identifier. Either the file does not exist, or it resides in a directory not included in the search path.
Constant reference stack overflow	1) Attempt to nest constants more than eight deep, or 2) constants are defined circularly.
Constant value too long	Context in which constant is used determines what value is too long. A constant in a Layer 1 receive string condition, for example, when expanded, cannot exceed 32 characters.
Duplicate state name	Attempt to use state name twice in the same test.

Duplicate test name	Attempt to use test name twice in the same task (layer).
Edit buffer full	Spreadsheet program is too large. Use include files.
Empty conditions section	There is no entry for a CONDITIONS block.
FIB value out of range	An SS#7 condition at Layer 2 specifies an FIB= value that is not zero or one.
Identifier exceeds maximum length	Message should not normally appear. It means, however, that an identifier is too long for the context in which it is being used.
Idle string must contain exactly one character	Layer 1 IDLE action includes a string with more than one character.
Illegal bit value	Bit has been assigned a value other than zero or one. In X.25 protocol, for example, the user supplies a value for the Q, D, or M bit at Layer 3.
Illegal cause value	An X.25 condition at Layer 3 specifies a numeric value for the CAUSE= selection which is outside the valid range. Select a value between hexadecimal 0 and FF.
Illegal CIC type for ISDN	An SS#7 condition at Layer 3 specifies a CIC= value for an ISDN header which is outside the valid range. Select a value between hexadecimal 0 and FFFF.
Illegal CIC type for TUP	An SS#7 condition at Layer 3 specifies a CIC= value for a TUP header which is outside the valid range. Select a value between hexadecimal 0 and FFF.
Illegal control byte	An X.25, LAPD, SDLC, or SNA condition at Layer 2 (as in the example which follows) specifies a value for the frame type which is outside the valid range: CONDITIONS: DTE OTHER 1FF. Select a value between hexadecimal 0 and FF.
Illegal diag value	An X.25 condition at Layer 3 specifies a value for the DIAG= selection which is outside the valid range. Select a value between hexadecimal 0 and FF.

Illegal DPC type	An SS#7 condition at Layer 3 specifies a value for the DPC= selection which is outside the valid range. For CCITT format, select a value between hexadecimal 0 and 3FFF. For ANSI format, select a value between hexadecimal 0 and FFFFFFFF.
Illegal frame address	An X.25, SDLC, or SNA condition at Layer 2 (as in the example which follows) specifies a value for the frame address which is outside the valid range: CONDITIONS: DTE INFO ADDR= 1FF. Select a value between hexadecimal 0 and FF.
Illegal LCN value	An X.25 condition at Layer 3 specifies a value for the LCN= selection which is outside the valid range. Select a value between hexadecimal 0 and FFF.
Illegal OPC type	An SS#7 condition at Layer 3 specifies a value for the OPC= selection which is outside the valid range. For CCITT format, select a value between hexadecimal 0 and 3FFF. For ANSI format, select a value between hexadecimal 0 and FFFFFFFF.
Illegal path number	An X.25 condition or action at Layer 3 specifies a value for the PATH= selection which is outside the valid range. Select a value between zero and eight.
Illegal P/F bit	An X.25, SDLC, or SNA condition or SEND action at Layer 2 specifies a value for the P/F= selection that is not zero or one.
Illegal PR value	An X.25 SEND action at Layer 3 specifies a value for the PR= selection which is outside the valid range. Select a value between zero and 127.
Illegal PS value	An X.25 SEND action at Layer 3 specifies a value for the PS= selection which is outside the valid range. Select a value between zero and 127.
Illegal receive count	In an X.25, SDLC, LAPD, or SNA Layer 2 SEND action, the value specified for N(R) is out of range. Select a value between zero and 127.
Illegal SAPI value	A LAPD condition or SEND action at Layer 2 specifies a value for the SAPI= selection which is outside the valid range. Select a value between hexadecimal 0 and 3F.

Illegal send count	In an X.25, SDLC, LAPD, or SNA Layer 2 SEND action, the value specified for N(S) is out of range. Select a value between zero and 127.
Illegal SI type	In an SS#7 Layer 3 OTHER condition, the value specified for Service Information is out of range. Select a value between hexadecimal 0 and FF.
Illegal SLS type	An SS#7 condition at Layer 3 specifies a value for the SLS= selection which is outside the valid range. For CCITT format, select a value between hexadecimal 0 and F. For ANSI format, select a value between hexadecimal 0 and 1F.
Illegal TEI value	A LAPD condition or SEND action at Layer 2 specifies a value for the TEI= selection which is outside the valid range. Select a value between hexadecimal 0 and 7F.
Incomplete EIA action	Required number of softkey selections have not been made for a Layer 1 EIA action.
Invalid constant reference	Valid characters for a constant name include 0-9, upper- and lower-case letters, and underscores. Name cannot begin with a number. The message also may indicate that a special "constant" of the form <code>&lt;&lt;name[45]&gt;&gt;</code> has been used, but the string using it is missing the enclosing quotation marks.
Invalid counter arguments	In a SEND action, the string to be sent contains a reference of the form <code>&lt;&lt;counter[n]&gt;&gt;</code> . The value of <i>n</i> is out of range. Select a value between zero and three.
Invalid counter value	COUNTER condition or a COUNTER name SET action specifies a value for the counter which is outside the valid range. Select a value between zero and 4,294,967,295.
Invalid day of month	TIME condition specifies a day of the month which is outside the valid range. Select a value between one and thirty-one.
Invalid flag arguments	In a SEND action, the string to be sent contains a reference of the form <code>&lt;&lt;flag[n]&gt;&gt;</code> . The value of <i>n</i> is out of range. Select either zero or one.



Invalid time value	TIME condition specifies a time which is outside the valid range for the 24-hour format.
Invalid time of day	TIME condition specifies a time which is outside the valid range for the 24-hour format.
Invalid timeout value	TIMEOUT name RESTART action specifies a value which is outside the valid range. Select a value between 0.001 and 65.535. Do not begin entry with decimal point.
Invalid trigger (lacks transitional)	Condition does not contain an event. At Layer 3 in X.25 for example, the status-only condition MORE_TO_RESEND is not combined with an event. Add an event such as PACKET_SENT to the condition.
Invalid trigger (multiple transitional-only)	Condition contains more than one event. Since no two events can come true at the same time, move one of the events to a separate CONDITIONS block.
Invalid character in constant name	Valid characters include 0-9, upper- and lower-case letters, and underscores. Name cannot begin with a number.
No closing »	Double parentheses delimit constants.
No closing ]	In a SEND action, the string contains a reference to a flag or counter which includes additional information inside brackets. The closing bracket is missing.
No more errors	There are no more errors to be displayed via GO_ERR. The next time you press <b>F8</b> , the last error message will be displayed.
Not an object file	Attempt to access a file via the OBJECT block identifier that has a type other than LOBJ (linkable-object). Use the Compile command on the File Maintenance screen to create a linkable-object file from a source file containing standard C code.
Obsolete object file version	Attempt to access a linkable-object file via the OBJECT block identifier. Use the Compile command on the File Maintenance screen to recompile the source file, and try again.

Obsolete package loaded	A layer personality package is loaded which came from an older version of the software. The package is attempting to use facilities which are not provided in the current version of the software.
Out of buffer space	The translator has run out of memory.
Out of memory	The translator has run out of memory.
Premature end of file	1) Required softkey selections for a condition have not been made. To send a string at Layer 1, for example, you must make a BCC selection, or 2) string does not contain closing quotation mark.
Receive string cannot be longer than 32 characters	RECEIVE STRING condition at Layer 1 contains more than 32 characters. Note that constants are expanded before they are counted.
Reference to undefined constant	Attempt to use a constant that has not been defined.
Reference to undefined state	State name referenced in NEXT_STATE does not exist.
Syntax error	Program may contain punctuation errors or incomplete softkey selections. This message often accompanies other errors messages.
There is no next state	Included NEXT_STATE: NEXT, but no state follows.
Unclosed AR"C" region	1) Unequal number of opening and closing curly braces, 2) unclosed quotation marks, or 3) unclosed parentheses.
Unclosed quoted string	Insert closing quotation marks at end of string.
Undefined name	The string in a SEND action contains a constant reference which does not refer to any defined flag, counter, constant, or special inter-layer data constant.
Unexpected character in constant name	Valid characters include 0-9, upper- and lower-case letters, and underscores. Name cannot begin with a number.
Unknown object file version	Should not normally appear. May be attempting to use version of a linkable-object file which is incompatible with older versions of software.
WAIT_EOF with ENTER_STATE	A trigger condition has both ENTER_STATE and a line condition including the WAIT_EOF option. This error is a special case of the "Invalid trigger (multiple transition-only)" error.

## Appendix A4: Error Messages Issued by C Compiler

Most of the following messages report errors that interrupt the compilation of a spreadsheet program and return you to the Protocol Spreadsheet. A diagnostic message about the first error will be displayed at the top (second line) of the screen. To search for additional errors, press **F8**.

Some messages are warnings. Warnings do not cause compilation to be aborted, but they are displayed on the Protocol Spreadsheet with error messages. Suppress warning messages using the following *#pragma*:

```
#pragma nowarn
```

**Table A4-1**  
**Numbered Error Messages Returned for C Coding†**

---

001	Only integral values may be added to pointers.
002	Within constant expressions, the operand of the unary '&' operator must be an object of static storage class.
003	Only integers and pointers may be converted to pointers.
004	Attempt to create more than one instance of a task which waits for fast_event variable—task instance '(identifier)'.
005	Only numeric values may be converted to float.
006	Illegal operation on relocatable value in constant expression.
007	Illegal conversion from a structure or union type.
008	Operands of binary operator have incompatible types.
009	Illegal indirection through a non-pointer value.
010	An integral constant expression is required.
011	A scalar expression is required.
012	Bitfield values are not allowed in constant expressions.
013	Operands of '**', '/', and '%' must be numeric.

---

† Errors 001 - 699 are returned by the compiler. Errors 700 and higher are returned by the pre-processor.

Table A4-1 (Continued)

---

- 014 Operands of logical operators must be integers.
- 015 Pointer values being compared or subtracted in constant expressions must point to the same aggregate.
- 016 Assignment operators are invalid in constant expressions.
- 017 Operands of % operator may not be floating point.
- 018 The ++ and -- operators are invalid in constant expressions.
- 019 A non-relocatable constant expression is expected.
- 020 Relocatable quantities cannot be converted to float in constant expressions.
- 021 Void expressions are not permitted in constant expressions.
- 022 A structure or union is required for membership operators.
- 023 Attempt to apply a subscript to something other than an array or pointer.
- 024 Only integral values and pointers may be subtracted from pointers.
- 025 Pointers may only be subtracted from pointers of the same type.
- 026 Undeclared variable '(identifier)'.
- 027 Constant expressions may not have type 'void'.
- 028 Illegal implicit pointer-to-floating conversion.
- 029 Illegal implicit pointer-to-integer conversion.
- 030 Illegal implicit pointer-to-pointer conversion.
- 031 Illegal implicit integer-to-pointer conversion.
- 032 Illegal implicit floating-to-pointer conversion.
- 033 Illegal conversion.
- 034 Attempt to use an event variable in an arithmetic expression.

**Table A4-1 (Continued)**

---

035	Parameter declarations are invalid with function prototypes.
036	Functions may not be initialized.
037	Task instances may not be initialized.
038	Typedefs may not be initialized.
039	Invalid initializer on function or task.
040	Array or structure initializers must be a list of constant expressions.
041	Attempt to initialize a bitfield with a relocatable value.
042	String is too long to fit into array.
043	Too many levels of braces in initializer.
044	Too many initializers.
045	Union (identifier) undefined.
046	Struct (identifier) undefined.
047	Task has more than one entrypoint.
048	File has more than one entrypoint.
049	A function exceeds 64K bytes in size.
050	Integral type expected.
051	Incompatible types.
052	Pointers must be of the same type.
053	Integral expression expected.
054	Illegal operands of minus.
055	Arithmetic types required.

Table A4-1 (Continued)

---

056	Division by zero.
057	Division by zero prohibited.
058	Illegal types.
059	Arithmetic types expected.
060	Integral types expected.
061	The operands of the (symbol) operator have incompatible types.
062	Operands of incompatible type to '(symbol)' operator.
063	Branch condition must have scalar type.
064	Value of void function used.
065	Value of task invocation used.
066	Attempt to invoke an object which is not a function or task.
067	Argument must not be void.
068	Not enough arguments supplied in function call.
069	Too many arguments supplied in function call.
070	Unknown size.
071	Attempt to call bad function.
072	Extensive use of fast_event variables has caused a code segment to overflow it's 64K byte limit.
073	(Identifier) undeclared.
074	The left operand of the DOT operator must be of structure or union type.
075	The left operand of the -> operator must be either a pointer to a structure, or a pointer to a union.

**Table A4-1 (Continued)**

---

076	(Identifier) is an unknown member.
077	Illegal indirection or illegal subscript.
078	Illegal L-value.
079	Operand of prefix (symbol ++ or --) operator must be scalar.
080	Operand of postfix (symbol ++ or --) operator must be scalar.
081	Unary PLUS operator requires scalar operand.
082	Unary minus operator requires arithmetic operand.
083	Bitwise NOT operator requires integral operand.
084	DEFAULT not inside SWITCH.
085	Multiple DEFAULT's in switch.
086	Label '(identifier)' multiply defined.
087	BREAK outside of loop or switch.
088	CONTINUE outside of loop.
089	RETURN is invalid inside WAITFOR.
090	Void functions must not return a value.
095	Conflicting tag: (struct, union, enum, or task) (identifier) and (struct, union, enum, or task) (identifier).
091	Expression must have type 'label'.
092	Controlling expression must be integral.
093	CASE expression must be integral.
094	Duplicate CASE, value = (number).

**Table A4-1 (Continued)**

---

096	WAITFOR is invalid within another WAITFOR.
097	Attempt to wait for non-event variable.
098	Invalid L-value.
099	Attempt to modify CONST L-value.
100	Attempt to use an event value in an expression.
101	Attempt to use a label value in an expression.
102	Attempt to use a void value.
103	Arrays of functions or tasks are invalid.
104	Illegal storage class for function.
105	Illegal storage class for task instance.
106	Invalid storage class.
107	Extern variables may not be initialized within a function.
108	Function (identifier) redeclared.
109	Function (identifier) redefined.
110	(Identifier) redeclared.
111	(Identifier) redefined.
112	Typedef redefined.
113	Label '(identifier)' is undefined.
114	(1) Unknown size for (identifier).
115	(2) Unknown size for (identifier).
116	Enum (tag identifier) redeclared.



Table A4-1 (Continued)

---

117	Newline in character constant.
118	Newline in string constant.
119	Unknown character.
120	Unexpected character.
121	Token type missing.
122	Wrong type of declarator for function definition.
123	Parameter # (number) has no identifier.
124	(Named item) is declared in the parameter declarations, but is not listed in the parameter list of the function.
125	Extra ; in function definition.
126	Syntax error in attribute.
127	Syntax error in declarator or initializer.
128	Syntax error in initializer.
129	Syntax error in parameter definition.
130	Attempt to initialize a formal parameter.
131	Syntax error in parameter.
132	Syntax error in struct/union declaration.
133	Syntax error in type specifier.
134	Syntax error in structure member.
135	Syntax error in enumerator list.
136	Syntax error in enumerator.

**Table A4-1 (Continued)**

---

137	Syntax error in task specifier.
138	Syntax error in array subscript.
139	Syntax error in parameter list.
140	Unresolved reference (identifier).
141	Syntax error in statement.
142	Syntax error in conditional expression.
143	Syntax error in DO statement.
144	Syntax error in condition.
145	Syntax error in BREAK statement.
146	Syntax error in CONTINUE statement.
147	Syntax error in RETURN statement.
148	Syntax error in GOTO expression.
149	Syntax error in TASK list.
150	Syntax error in FOR statement.
151	Syntax error in FOR initialization.
152	Syntax error in FOR condition.
153	Syntax error in FOR increment.
154	Syntax error in SWITCH condition.
155	Syntax error in CASE expression.
156	Syntax error in compound statement.

Table A4-1 (Continued)

---

157	Syntax error in sizeof type name.
158	Syntax error in subscript.
159	Syntax error in function call.
160	Syntax error in expression.
161	Type clash.
162	More than one storage class.
163	Array of unknown size.
164	Cannot take size of function.
165	Structure or union of unknown size.
166	Circular definition of enumerated type.
167	Cannot take size of task.
168	Struct (identifier) redeclared.
169	Functions and tasks may not be structure members.
170	Zero-width bitfields may not be named.
171	Structure member (identifier) multiply defined.
172	Invalid negative bit-field width.
173	(Struct, union, enum, or task ) (identifier) multiply defined.
174	Task (identifier) redeclared.
175	Union (identifier) redeclared.
176	Functions and tasks may not be union members.

**Table A4-1 (Continued)**

---

177	Invalid zero-bit member.
178	Union member (identifier) multiply defined.
179	No main routine supplied.
180	Arrow operator given structure, not a pointer.
181	DOT operator given a pointer to a structure, not a structure.
182	Address of array.
183	Address of function.
184	Address of register variable.
185	Address of bit-field.
186	Address of non-L-value.
187	Attempt to use a LABEL value in an expression.
188	Attempt to use an EVENT value in an expression.
189	Invalid zero or negative array dimension.
190	Only const or volatile allowed.
191	Maximum bit-field width is 16.
192	Illegal storage class for formal parameter.
193	Function parameters may not be functions.
194	Function parameters may not be tasks.
195	Bad parameter storage class.
196	Event expression required in waitfor clause.
197	Scalars must be initialized with a single expression, optionally in braces.

**Table A4-1 (Continued)**

---

198	Label undeclared.
199	Syntax error in declarator or initializer.
200	Pointers to different objects shouldn't be subtracted.
201	Duplicate formal parameters of a function.
202	External variables may not be initialized inside of a function.
203	Formal parameters of functions may not be initialized.
204	Attempt to use labels outside a function.
205	Variable (identifier) undeclared.
206	Attempt to take the value of a typedef.
207	Function's stack frame is too large.
208	Floating point has not yet been implemented.
209	Invalid conversion of relocatable quantity in constant expression.
210	Attempt to redefine the reserved name '(identifier)'.
211	CASE outside of switch statement.
212	Returned values of this size are not implemented.
213	Unrecoverable syntax error.
214	Parsing stack overflow.
215	Too many errors have been encountered during compilation.
216	Compiler aborted.
217	Register variable '(identifier)' declared with non-scalar type.
218	Implicit declaration of function '(identifier)'.

**Table A4-1 (Continued)**

---

219	Out of memory during compilation—program too big.
220	Internal software error in compiler (error number). Compilation aborted.
221	No T1 Mux Installed.
222	A waitfor statement has one or more condition clauses, none of which names an event variable. This is often caused by either misspelling an event variable, or by failing to declare an event variable.
223	The variable '(identifier)' has been declared inside of a task with the "extern" attribute, but has never been defined within that task. In this context, the keyword "extern" may only be used to forward-declare an identifier which is fully defined later in the task body.
226	Invalid or Incompatible Data Acquisition Tracks on selected playback device.
227	No ISDN Mux Installed.
230	Object file (name) is in obsolete format. Fix by recompiling it.
231	Symbol (identifier) multiply defined by object file.
232	The symbol (identifier) has been used as an event variable in one module and as a function or variable in another.
233	The symbol (identifier) has type event in one module, but has type fast_event in another.
234	Different modules have used the symbol (identifier) inconsistently as code, data, or read-only data.
235	Bad format in object file (name).
236	Cannot find object file (name).
237	No room: '(segment name)', size (segment size) on CPU (CPU number).
238	Running in degraded condition due to overflow in CPU memory bank(s) (CPU number and bank name). Attempting to spill segments into less appropriate memory banks.
239	Attempting to spill segment '(name)'.

Table A4-1 (Continued)

---

700	#else inside of #else clause.
701	#elif inside of #else clause.
702	Too many nested #if's.
703	Extra tokens at end of line.
704	Unexpected end of file.
705	Identifier missing from #ifdef directive.
706	Identifier missing from #ifndef directive.
707	#elif without matching #if.
708	#else without matching #if.
709	#endif without matching #if.
710	Syntax error.
711	Syntax error in constant expression.
712	String constant in constant expression.
713	Invalid character in constant expression.
714	Error in hex number.
715	End of file in char constant.
716	Newline in char constant.
717	End of file in string.
718	Newline inside string.
719	Attempt to divide by zero.
720	Unknown preprocessor command.

**Table A4-1 (Continued)**

---

721	Syntax error in formal parameters of macro.
722	Duplication of formal parameter (identifier) in macro definition.
723	No macro name given.
724	Macro redefined.
725	Syntax error in #line directive.
726	Unterminated string literal.
727	Cannot open include file (identifier).
728	Cannot find include file (identifier).
729	Identifier does not exist.
730	Syntax error in #include directive.
731	Include identifier is not defined.
732	Unterminated character constant.
733	End of file inside char constant.
734	End of file inside string.
735	End of file inside comment.
736	Argument list required.
737	Attempt to close bracket [ or { with ).
738	Attempt to close arg list with }.
739	Attempt to close bracket [ or ( with ).
740	Attempt to close arg list with ].



Table A4-1 (Continued)

---

741	Attempt to close bracket ( or { with ]).
742	Incomplete argument list.
743	No parameter after a # char.
744	(User-generated error message.)
745	File ends with \\..
746	Number of arguments does not match number of parameters.
749	Identifier missing from #undef.

---



## Appendix B: Glossary of Acronyms, Abbreviations and Mnemonics

ACK	Acknowledgment
ACTLU	Activate Logical Unit (SNA)
ADR	Address
AK	ACK: Acknowledgment
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange, standard code for digital communications
ASYNC	Asynchronous format (indicates START and STOP bits)
AUX	Auxiliary
BAUDOT	Five bit code for data transmission using one start and one stop element; used in some teletypewriter machines
BBI	Begin Bracket Indicator (SNA)
BCC	Block Check Calculation
BCN	Beacon (SDLC)
BDLC	Burroughs Data Link Control
BEL	Bell
BERT	Bit Error Rate Testing
BIB	Backward Indicator Bit (SS#7 Layer 2)
BISYNC	Binary Synchronous Communications Protocol (IBM); also BSC
BITIM	Bit image
BL	BEL: Bell
BLI	Blink (CRT enhancement)
BM	Bit Mask
BNC	A highly reliable twist-lock connector used to carry wide-band video/digital signals; used with coaxial cable (G.703)
BOP	Bit-Oriented Protocol, e.g., SDLC
bps	Bits per second
BS	Backspace
BSC	BISYNC

C	Control (X.21 signal)
CAN	Cancel
CAS	Channel Associated Signaling (G.703)
CCITT	Consultative Committee, International Telephone and Telegraph
CCS	Clear Channel Signaling (G.703)
CCSS#7	Common Channel Signaling System #7
CD	Carrier Detect (RS-232/V.24 and V.35 signal); same as RLSD
CDI	Change Direction Indicator (SNA)
CEDI	Conditional End Bracket Indicator (SNA)
CF	Command Format (SNA)
CHAR	Character
CHDAT	Character data
CIC	Circuit Identifier Code (SS#7 Layer 3)
CLR	Clear
CN	CAN: Cancel
CONF	Confirm
const	Constant, modifier to a declaration in C language
CPM	Central Processing Module
CR	Carriage Return
CRC	Cyclic Redundancy Check
CSI	Code Selection Indicator (SNA)
CSN	Command Sequence Number (SNA)
CTS	Clear To Send (RS-232/V.24 and V.35 signal)
D	D bit (Bit 7 in first octet of packet-level X.25)
DAF	Destination Address Field (SNA)
DAT	Data Acquisition Tracks
DB-25	25-Pin D connector (standard for RS-232/V.24)
DC1	Device Control 1
DC3	Device Control 3
DCE	Data Circuit-terminating Equipment (or Data Communications Equipment), typically a modem
DCF	Data Count Field (SNA)
DDCMP	Digital Data Communications Message Protocol
DEC	Decrement
DEF	Destination Element Field (SNA)
#define	Preprocessor directive, C language
DEL	Delete
DFC	Data Flow Control (SNA)
DIAG	Diagnostic (X.25 Layer 3)
DIR	Directory
DISC	Disconnect (SDLC, LAPD, X.25 Layer 2)
DL	DLE: Data Link Escape; also Data Link layer (OSI primitive)
DLC	Data Link Control
DLE	Data Link Escape (used principally in transparent BISYNC)

DM	Disconnected Mode (SDLC, LAPD, X.25 Layer 2)
DMA	Direct Memory Access
DPC	Destination Point Code (SS#7 Layer 2)
DRAM	Dynamic Random Access Memory; one Mbyte of memory space of each MPM, dedicated to storage or receive data
DRI	Direct Response Indicator (SNA)
DSAF	Destination Subarea Address Field (SNA)
DSK	Disk
DSR	Data Set Ready (RS-232/V.24 and V.35 control lead)
DTE	Data Terminal Equipment
DTR	Data Terminal Ready (RS-232/V.24 and V.35 control lead)
DUP	Duplicate
EB	ETB, EOB: End of Transmission Block
EBCD	Extended Binary Coded Decimal
EBCDIC	Extended Binary Coded Decimal Interchange Code
EBI	End Bracket Indicator (SNA)
EC	ESC: Escape
EIA	Electronic Industries Association
#elif	Else if, preprocessor directive, C language
EM	EOM: End of Message
#endif	Preprocessor directive, C language
ENQ	Enquiry
enum	Enumeration, set of integer constants, C language
EOB	End of Transmission Block
EOF	End of Frame
EOM	End of Message
EOT	End of Transmission
EPROM	PROM containing power-up software and initialization routines
EQ	Equal
EQ	ENQ: Enquiry
ERI	Exception Response Indicator
ERN	Explicit Route Number
ESC	Escape
ET	EOT: End of Transmission
ETB	End of Transmission Block
ETX	End of Text
evar	Event variable, pre-declared identifier, AR extension to C language
EX	ETX: End of Text
extern	External, storage class specifier, C language
FAC	Facilities (X.25 Layer 3)
FAS	Frame Alignment Signal (G.703)
FCS	Frame Check Sequence (used in BOP)
FD1	Floppy-disk Drive 1

FD2	Floppy-disk Drive 2
FDX	Full duplex (permits simultaneous data in both directions)
FEB	Front End Buffer
fevar	Fast event variable, pre-declared identifier, AR extension to C language
FF	Form Feed
FI	Format Indicator (SNA)
FIB	Forward Indicator Bit (SS#7 Layer 2)
FID	Format Identifier (SNA)
fifo	First in, first out; memory queue on boards
FMD	Function Management Data (SNA)
FRMR	Frame Reject (SDLC, LAPD, X.25 Layer 2)
FS	Field Separator
FSN	Forward Sequence Number (SS#7 Layer 2)
GBM	Global Bus Module
GE	Greater than or equal to
GFI	Group Format Indicator (X.25 Layer 3)
goto	Jump statement, C language
GS	Group Separator
GT	Greater than
HDL	High Level Data Link Control procedure
HDX	Half duplex (data cannot be transmitted in both directions simultaneously)
HEX	Hexadecimal number; also the hex key
HRD	Hard disk
Hz	Hertz
I	Indication (X.21 signal)
I	Information (SDLC, LAPD, X.25 Layer 2)
iAPX 286	Part number for Intel 80286 processor
IERN	Initial Explicit Route Number (SNA)
#if	Preprocessor directive, C language
#ifdef	If defined..., preprocessor directive, C language
#ifndef	If not defined..., preprocessor directive, C language
IL	Interlayer (message buffer)
INC	Increment
#include	Preprocessor directive, C language
IND	Indication
INFO	Information (SDLC, LAPD, X.25 Layer 2)
init	Initialize
int	Integer data type, C language
INT	Interrupt (X.25 Layer 3)
I/O	Input/Output
IPARS	International Passenger Airlines Reservation System

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ISDN	Integrated Services Digital Network
ISO	International Standards Organization
ISOC	Isochronous
JIS	Japanese Industrial Standard
kana	Japanese syllabic alphabet
Kbits	Kilobits
Kbps	Kilobits per second
Kbyte	Kilobyte
LAF	Local Address Field (SNA)
LAPD	Link Access Procedure on the D-channel
LCG	Logical Channel Group (X.25 Layer 3)
LCN	Logical Channel Number (X.25 Layer 3)
LE	Less than or equal to
LED	Light Emitting Diode
LF	Line Feed
LI	Length Indicator (SS#7 Layer 2)
LOBJ	Linkable-object
LRC	Longitudinal Redundancy Check
LSU	Link Status Unit (SS#7 Layer 2)
LT	Less than
LTA	Link Test Acknowledge
LTM	Link Test Message
LU	Logical Unit (SNA)
M	M bit (X.25 Layer 3, Bit 4 of first octet)
macro	Macro replacement of text initiated by define preprocessor directive, C language
Mbyte	Megabyte
MOD	Modulus; maximum window size for frames or packets, 8 or 128
MPM	Main Processing Module
msec	Millisecond
MSU	Message Signal Unit (SS#7 Layer 2)
mux	Multiplexer
N	Network layer (OSI primitive)
NAK	Negative Acknowledgment
NC	Network Control (SNA)
NE	Not equal to
NETM	Network Management (SS#7 Layer 3)
NI	Network Indicator
NK	NAK: Negative Acknowledgment
NP	Network Priority (SNA)

Nr	Number (next) receive frame (SDLC, LAPD, X.25 Layer 2); also NR and N(R)
NRZI	Non-Return to Zero Inverted (used with SDLC and ASYNC modems—sometimes with clocked modems)
Ns	Number (frame) sent (SDLC, LAPD, X.25 Layer 2); also NS and N(S)
NT	Network Termination (ISDN)
NTR	Network Test Regular (SS#7 Layer 3)
NTS	Network Test Special (SS#7 Layer 3)
NU	NUL: Null
NUL	Null
OBJ	Object code
OEF	Origin Element Field (SNA)
OPC	Originating Point Code (SS#7 Layer 3)
OSAF	Origin Subarea Address Field (SNA)
OSI	Open Systems Interconnection
OUTSYNC	Out of synchronization
pad	DEL or idle line character
pal	Programmable array logic
parens	Parentheses
PCM	Peripheral Control Module
PDU	Primitive Data Unit
P/F	Poll/Final bit used in control byte at frame level (SDLC, X.25)
PH	Physical layer (OSI primitive)
PI	Pacing Indicator (SNA)
PIU	Path Information Unit (SNA)
PLU	Primary Logical Unit (SNA)
pos	Position
Pr	Packet (next) receive sequence number (X.25 Layer 3); also PR and P(R)
#pragma	Preprocessor directive, C language
PRGM	Program
PROG TR	Program Trace Run-mode screen
PROM	Programmable Read-Only Memory
Ps	Packet send sequence number (X.25 Layer 3); also PS and P(S)
PU	Physical Unit (SNA)
Q	Q bit (Bit 8 of first octet in packet-level X.25)
QRI	Queued Response Indicator (SNA)
R	Receive (X.21 signal)
RAM	Random Access Memory
RD	Received Data (RS-232/V.24 and V.35 signal)
REG	Registration (X.25 Layer 3)
REJ	Reject (SDLC, LAPD, X.25 Layer 2)



REQ	Request
RESP	Response
Rev	Reverse
RGB	Red Green Blue (connector for color monitor)
RH	Request/Response Header (SNA)
RJ-11C	Standard for common telephone jack
RLSD	Received Line Signal Detect (RS-232/V.24 signal); same as CD: Carrier Detect
RNR	Receive Not-Ready (SDLC, LAPD, X.25 Layer 2, X.25 Layer 3)
ROM	Read-Only Memory (firmware/software storage)
RR	Receive Ready (SDLC, LAPD, X.25 Layer 2, X.25 Layer 3)
RS	Record Separator
RS-232/V.24	List of definitions for interchange circuit between data terminal equipment and data circuit termination equipment established by EIA
RS-449	EIA standard for 37-pin and 9-pin DTE-DCE interface
RTI	Response Type Indicator (SNA)
RTS	Request To Send (RS-232/V.24 and V.35 signal)
RU	Request/Response Unit (SNA)
SABM	Set Asynchronous Balanced Mode (LAPD, X.25 Layer 2)
SABME	Set Asynchronous Balanced Mode Extended (LAPD, X.25 Layer 2)
SAPI	Service Access Point Identifier (LAPD)
SB	SUB: Substitute
SC	Session Control (SNA)
SCCP	Signalling Connection Control Part (SS#7 Layer 3)
SCR	Signal Clock Receive (RS-232/V.24 and V.35 signal), used when DCE clock drives DTE
SCT	Signal Clock Transmit (RS-232/V.24 and V.35 signal), used when DCE clock drives DTE
SCTE	Signal Clock Transmit External (RS-232/V.24 and V.35 signal), used when DTE clock drives DCE
SDI	Sense Data Indicator (SNA)
SDLC	Synchronous Data Link Control (IBM)
SDU	Service Data Unit
SELECTRIC	IBM typewriter/printer code
SFO	Status Field Octet (SS#7 Layer 2)
SH	SOH: Start of Header
SI	Shift In
SIO	Sequenced Information Frame 0 (LAPD)
SI1	Sequenced Information Frame 1 (LAPD)
SIG	Signal
SIO	Service Information Octet (SS#7 Layer 3)
SLS	Signalling Link Selection (SS#7 Layer 3)
SLU	Secondary Logical Unit (SNA)
SMP	Sample

SNA	System Network Architecture (IBM)
SNAI	SNA Indicator (SNA)
SNF	Sequence Number Field (SNA)
SNRM	Set Normal Response Mode (SDLC)
SO	Shift Out
SOH	Start of Header
SRC	Source
SREJ	Selective Reject (SDLC)
SSCP	System Services Control Point (SNA)
SS#7	CCSS#7: Common Channel Signaling System #7
struct	Structure, data type which consists of a group of variables referenced under the same name, C language
STR	String
STX	Start of Text
SUB	Substitute
SX	STX: Start of Text
SY	SYN: Synchronization character
SYN	Synchronization character
SYS	System file
sys	System directory
T	Transmit (X.21 signal)
T	Transport layer (OSI primitive)
TD	Transmitted Data (RS-232/V.24 and V.35 signal)
TE	Terminal Equipment (ISDN)
TEI	Terminal Endpoint Identifier (LAPD)
TGNFI	Transmission Group Non-Fifo Indicator (SNA)
TGSI	Transmission Group Sweep Indicator (SNA)
TGSNF	Transmission Group Sequence Number Field (SNA)
TH	Transmission Header
TIM	Test Interface Module
TPF	Transmission Priority Field (SNA)
TS	Transmission Services (SNA)
TTL	Transistor-to-Transistor Logic
TUP	Telephone User Part (SS#7 Layer 3)
typedef	Type definition, data type which creates new name for existing data type, C language
UA	Unnumbered Acknowledgment (SDLC, LAPD, X.25 Layer 2)
UI	Unnumbered Information (SDLC)
UL	Underwriters' Laboratory
#undef	Undefine, preprocessor directive, C language
US	Unit Separator
usec	Microsecond
USER TR	Run-mode User Trace screen

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usr	User directory
VRCWI	Virtual Route Change Window Indicator (SNA)
VRCWRI	Virtual Route Change Window Reply Indicator (SNA)
VRID	Virtual Route Identifier (SNA)
VRN	Virtual Route Number (SNA)
VRPCI	Virtual Route Pacing Count Indicator (SNA)
VRPRQ	Virtual Route Pacing Request (SNA)
VRPRS	Virtual Route Pacing Response (SNA)
VRRWI	Virtual Route Reset Window Indicator (SNA)
VRSI	Virtual Route Support Indicator (SNA)
VRSSN	Virtual Route Send Sequence Number (SNA)
VRSTI	Virtual Route Sequence and Type Indicator (SNA)
VT	Vertical Tab
X.21	CCITT recommendation governing synchronous DTE-DCE operation on public data networks
X.25	CCITT recommendation governing the packet mode link connecting the user site with a public data network
XDRAM	Extended Dynamic Random Access Memory
XEQ	Execute
XFER	Transfer
XID	Exchange Identification (SDLC)
XMIT	Transmit, transmission



## Appendix C: Selectable Data Speeds

There are four clock crystals installed in the INTERVIEW. These clocks provide the bits-per-second rates listed on the following pages. (An optional crystal is also available that may be factory-configured for speeds not listed here.)

These baud rates apply to all clock and data format selections, with one exception. If you are operating in Emulate DCE mode using internal clock and the data format is anything other than Async, you may enter clock speeds 16 times higher than those listed. The following formula allows you to determine whether a higher data speed is selectable in this special case.

The frequency of each standard clock crystal is first divided by 2 to derive four values of X:

$$X1 = 3686400/2$$

$$X2 = 4096000/2$$

$$X3 = 4608000/2$$

$$X4 = 5376000/2$$

Divide the desired bps rate into each of the values of X to produce result Y.

$$Y1 = X1/\text{bps}$$

$$Y2 = X2/\text{bps}$$

$$Y3 = X3/\text{bps}$$

$$Y4 = X4/\text{bps}$$

Round each of the Y values to the nearest whole number.

Next, divide each Y value into the corresponding X value, to produce four possible speeds:

$$X1/Y1 = \text{SPEED1}$$

$$X2/Y2 = \text{SPEED2}$$

$$X3/Y3 = \text{SPEED3}$$

$$X4/Y4 = \text{SPEED4}$$

The values resulting from this calculation are the data speeds which may be selected for the desired bits-per-second rate. Select the closest speed and use this as your entry on the Line Setup Screen as the Internal Clock speed.

Table C-1  
Line Setup Clock Speeds

168000.0	12923.08	6582.9	4421.05	3339.1	2679.07	2215.38
144000.0	12800.0	6545.45	4413.79	3294.12	2666.67	2210.53
128000.0	12126.3	6461.54	4363.64	3291.43	2648.3	2206.810
115200.0	12000.0	6400.0	4347.2	3282.05	2625.0	2194.3
84000.0	11636.36	6260.87	4307.69	3272.73	2618.18	2181.82
76800.0	11520.0	6227.0	4266.67	3245.1	2612.24	2173.58
72000.0	11200.0	6222.22	4235.29	3230.77	2588.8	2169.49
64000.0	11076.92	6095.24	4200.0	3200.0	2584.62	2153.85
57600.0	10971.4	6063.16	4189.1	3169.81	2571.43	2149.25
56000.0	10666.67	6000.0	4129.03	3156.2	2560.0	2133.33
48000.0	10500.0	5907.7	4114.29	3130.43	2545.45	2126.58
46080.0	10472.73	5818.18	4097.56	3121.95	2526.32	2117.65
42666.67	10285.71	5793.10	4042.1	3113.51	2509.80	2113.8
42000.0	10017.4	5760.0	4000.0	3111.11	2507.46	2100.0
38400.0	9882.35	5619.5	3972.41	3072.0	2504.35	2098.36
36000.0	9846.15	5600.0	3906.98	3063.83	2482.76	2094.55
33600.0	9600.0	5565.22	3905.1	3054.55	2477.4	2086.96
32914.3	9333.33	5538.46	3891.89	3047.62	2470.59	2075.7
32000.0	9216.0	5485.71	3878.79	3031.58	2461.54	2074.07
28800.0	9142.86	5419.35	3840.0	3000.0	2451.06	2064.52
28000.0	9000.0	5358.1	3818.18	2992.2	2440.68	2057.14
25600.0	8861.54	5333.33	3789.47	2976.74	2434.78	2048.78
24000.0	8842.11	5250.0	3777.0	2953.85	2425.3	2038.9
23040.0	8533.33	5236.36	3764.71	2947.37	2415.09	2031.75
21333.33	8470.59	5142.86	3733.33	2938.78	2400.0	2028.17
21000.0	8400.0	5120.0	3716.13	2916.5	2375.3	2024.010
20945.5	8228.57	5090.91	3692.31	2909.09	2370.37	2021.05
20571.43	8000.0	5008.610	3657.14	2896.55	2366.110	2003.5
19200.0	7944.8	4965.52	3652.17	2880.0	2360.66	2000.0
18666.67	7680.0	4941.18	3600.0	2847.46	2351.02	1986.21
18285.71	7636.36	4923.08	3574.47	2844.44	2333.33	1976.47
18000.0	7578.95	4902.1	3555.56	2823.53	2327.27	1972.60
17723.1	7529.41	4800.0	3544.6	2809.76	2322.58	1969.23
16800.0	7432.3	4740.74	3512.110	2800.0	2304.0	1953.49
16457.14	7304.35	4702.0	3500.0	2782.61	2301.37	1952.54
16000.0	7200.0	4666.67	3490.91	2775.9	2285.71	1945.95
15360.0	7111.11	4645.16	3459.46	2769.23	2281.2	1939.39
15272.73	7000.0	4608.0	3438.8	2754.010	2270.27	1931.03
14400.0	6981.8	4571.43	3428.57	2742.86	2258.82	1920.0
14222.22	6857.14	4540.54	3388.24	2723.40	2250.0	1910.45
14000.0	6776.47	4517.6	3368.42	2716.98	2245.61	1909.09
13552.9	6736.84	4500.0	3360.0	2710.6	2240.0	1904.1
13090.91	6720.0	4430.77	3348.84	2709.68	2236.9	1894.74

Table C-1 (continued)

1888.52	1655.17	1473.68	1331.8	1210.08	1112.58	1028.57
1887.64	1647.06	1471.26	1324.14	1208.63	1107.69	1024.39
1882.35	1645.71	1469.39	1322.83	1207.55	1105.26	1024.0
1873.2	1641.03	1467.5	1321.10	1206.3	1103.45	1021.28
1870.13	1636.36	1460.87	1319.59	1200.0	1102.4	1019.47
1866.67	1634.0	1458.23	1316.6	1196.26	1099.24	1018.18
1858.06	1631.07	1454.55	1312.50	1193.8	1098.04	1015.87
1855.07	1622.54	1449.1	1309.09	1191.49	1097.14	1015.0
1846.15	1620.25	1448.28	1306.12	1190.08	1094.02	1014.08
1843.2	1617.98	1440.0	1302.33	1187.63	1091.9	1012.05
1828.57	1615.38	1438.20	1301.7	1185.19	1090.91	1010.53
1826.09	1611.2	1435.810	1297.210	1183.010	1086.79	1007.87
1822.78	1600.0	1431.1	1294.38	1181.5	1084.75	1006.99
1814.2	1589.0	1425.74	1292.93	1180.33	1083.87	1006.1
1806.45	1584.91	1423.73	1292.31	1175.51	1082.71	1005.99
1802.82	1582.42	1422.22	1287.2	1174.83	1081.7	1001.74
1800.0	1580.25	1413.5	1285.71	1174.31	1076.92	1000.0
1787.23	1578.08	1411.76	1282.44	1170.73	1076.64	997.4
1786.0	1570.09	1406.59	1280.0	1169.5	1075.63	994.08
1777.78	1567.3	1404.88	1274.34	1166.67	1074.63	993.10
1772.31	1565.22	1400.0	1272.9	1163.64	1071.6	992.25
1768.42	1560.98	1398.06	1272.73	1161.29	1070.06	988.8
1758.8	1556.76	1396.0	1267.33	1158.62	1066.67	988.24
1756.010	1555.56	1391.30	1265.93	1157.8	1063.29	986.30
1753.42	1548.39	1388.43	1263.16	1153.15	1061.8	984.62
1750.0	1546.3	1388.0	1259.0	1152.0	1058.82	982.46
1745.45	1542.17	1387.95	1254.90	1150.68	1057.85	980.4
1734.94	1541.28	1384.62	1253.73	1146.3	1056.88	979.59
1732.3	1536.0	1379.6	1252.17	1142.86	1056.60	977.010
1731.96	1531.91	1377.05	1245.4	1140.59	1052.1	976.74
1729.73	1527.27	1376.34	1244.44	1135.14	1051.09	976.27
1719.40	1525.8	1371.43	1242.72	1135.0	1050.0	972.97
1714.29	1523.81	1365.85	1241.38	1133.86	1049.18	972.2
1706.67	1515.79	1363.3	1238.71	1132.74	1047.27	971.010
1696.97	1513.51	1361.70	1235.29	1129.41	1043.48	969.610
1694.12	1505.88	1358.49	1232.1	1127.52	1042.5	968.07
1684.21	1500.0	1355.29	1230.77	1125.0	1040.65	966.44
1681.8	1496.10	1354.84	1226.28	1123.9	1037.84	965.52
1680.0	1488.37	1347.37	1225.53	1122.81	1037.04	964.0
1674.42	1486.73	1345.79	1220.34	1120.0	1035.97	962.41
1669.57	1486.5	1344.0	1219.05	1118.45	1033.2	960.0
1663.37	1484.54	1339.53	1217.39	1116.28	1032.26	956.0
1662.34	1476.92	1333.33	1212.63	1113.04	1030.67	955.22

Table C-1 (continued)

954.55	893.02	835.82	786.89	743.23	702.93	669.32
953.64	889.6	834.78	786.3	742.27	702.44	667.8
952.07	888.89	832.37	785.28	740.8	700.3	666.67
949.15	886.15	831.8	785.05	740.09	700.0	665.9
948.15	884.21	831.68	783.67	739.88	699.45	665.810
947.37	883.44	831.17	782.61	738.46	699.03	664.03
944.26	882.76	828.78	781.310	736.84	698.18	663.59
943.82	879.58	827.59	781.0	736.1	697.010	663.21
941.18	879.39	825.81	780.49	735.63	696.1	662.07
940.4	878.05	823.53	778.38	734.69	695.65	661.42
938.55	876.71	822.86	777.78	733.76	694.21	660.55
936.59	876.0	820.51	775.76	733.62	694.0	660.2
935.06	875.0	819.9	774.19	731.43	693.98	659.79
934.31	872.73	819.51	773.15	730.96	692.31	658.82
933.33	870.75	818.18	771.08	730.43	691.89	658.29
932.8	870.47	817.02	770.64	729.11	691.36	657.53
929.03	869.4	815.53	770.05	727.27	689.82	656.41
928.18	867.47	815.29	768.0	726.8	688.910	656.25
927.54	866.17	814.1	767.12	724.53	688.52	654.55
925.3	865.98	813.56	766.47	724.14	688.17	653.610
923.08	864.86	811.59	765.96	723.62	687.8	653.06
921.60	862.9	811.27	765.4	723.16	685.71	652.7
920.86	862.28	810.13	763.64	722.3	684.49	651.58
918.03	861.54	808.99	762.91	721.03	683.7	651.16
917.9	859.70	808.4	761.90	720.0	682.93	650.85
917.110	859.06	807.69	760.4	719.10	682.46	649.75
914.29	857.14	805.59	760.18	717.95	681.66	649.0
913.04	856.5	805.03	757.89	717.8	680.85	648.65
911.39	853.33	804.47	757.310	716.42	680.16	647.19
910.7	852.79	803.83	756.76	715.53	679.6	646.46
908.11	852.07	802.8	755.4	715.08	679.25	646.15
907.80	850.2	800.0	753.93	714.89	677.65	645.74
907.09	848.48	797.2	753.36	713.3	677.42	645.4
905.66	847.68	796.21	752.94	712.87	677.25	643.68
903.5	847.06	795.58	750.5	711.86	676.06	643.58
903.23	844.22	795.03	750.0	711.11	675.7	643.22
901.41	844.0	794.48	748.54	709.36	674.610	642.86
900.0	842.11	792.45	748.05	708.86	673.68	641.8
898.310	840.88	791.8	746.67	707.18	672.810	641.22
896.5	840.0	791.21	746.11	706.75	672.0	640.0
895.10	837.8	790.12	745.6	705.88	671.7	638.78
894.41	837.21	789.04	744.19	704.6	670.16	638.2
893.62	836.60	788.73	743.36	703.210	669.77	637.17



Table C-1 (continued)

636.82	608.610	581.82	559.22	538.32	517.8	498.52
636.46	607.9	581.31	558.95	537.82	516.92	498.27
636.36	607.59	580.65	558.14	537.31	516.59	498.05
634.7	606.64	580.4	557.9	537.1	516.13	497.6
634.36	606.410	579.31	556.52	536.74	515.4	497.04
633.96	606.32	579.19	556.29	535.81	515.34	496.55
633.66	605.04	578.89	555.98	535.56	514.29	496.6
633.0	604.7	578.31	555.2	535.32	514.06	496.12
632.97	604.32	577.4	554.46	535.03	513.76	495.58
631.58	603.77	577.32	554.11	534.6	513.1	495.5
631.2	603.14	576.58	553.85	533.33	512.46	494.85
630.54	602.51	576.0	552.63	532.1	512.110	494.42
629.51	602.15	575.34	552.5	531.65	512.0	494.21
629.21	601.6	574.6	551.72	531.37	510.9	494.12
628.82	600.94	573.99	551.2	531.12	510.64	493.4
627.8	600.0	573.71	551.110	530.88	509.96	493.15
627.45	598.4	573.38	550.82	529.97	509.73	492.67
626.87	598.13	573.13	549.9	529.7	509.09	492.31
626.09	597.86	571.7	549.62	529.41	508.83	491.47
624.54	597.51	571.43	549.36	528.93	508.6	491.3
624.39	596.89	570.3	549.02	528.44	507.94	491.23
623.38	595.74	570.210	548.57	528.30	507.55	490.42
622.70	595.35	569.49	547.53	527.47	507.49	490.21
622.22	595.04	569.17	547.3	527.2	507.04	489.710
621.36	593.81	568.89	547.23	526.75	506.4	489.2
621.0	593.64	567.57	547.01	526.65	506.02	488.55
620.69	592.59	567.49	546.0	526.03	505.93	488.37
619.93	592.3	566.93	545.97	525.55	505.26	488.14
619.35	591.55	566.37	545.45	525.0	504.50	486.96
617.7	590.77	566.1	544.68	524.8	504.2	486.69
618.36	590.16	565.66	543.69	524.59	503.94	486.49
618.03	589.86	564.71	543.4	523.64	503.410	486.08
617.65	589.47	563.88	543.310	523.36	503.1	485.55
616.04	589.3	563.76	542.37	522.45	503.06	484.85
615.38	587.76	563.3	542.1	521.74	502.99	484.15
614.4	587.41	562.50	541.94	521.27	502.0	484.03
613.14	587.16	562.0	541.35	520.33	501.96	483.22
612.77	586.3	561.95	540.85	520.12	501.74	483.02
612.44	585.37	561.87	540.19	519.86	501.49	482.76
611.1	584.77	561.40	540.08	518.92	500.87	482.01
610.91	584.47	560.31	539.6	518.52	500.0	481.61
610.17	583.33	560.6	539.33	518.22	499.8	481.38
609.52	582.910	560.0	538.46	517.99	498.70	481.20

Table C-1 (continued)

481.0	464.09	449.12	435.23	422.29	407.93	393.85
480.0	463.77	449.110	435.05	422.11	407.77	393.44
479.40	463.6	448.510	434.72	422.0	407.64	393.17
479.0	463.02	448.25	434.11	421.98	407.07	392.64
478.63	462.81	448.2	433.9	421.2	406.78	392.52
478.41	462.7	448.0	433.810	421.05	406.35	392.37
478.01	462.65	447.55	433.73	420.44	405.710	391.84
477.61	462.09	447.4	433.08	420.0	405.63	391.61
477.27	461.7	447.20	432.99	419.83	405.06	391.44
477.0	461.54	446.81	432.43	419.67	404.82	391.30
476.82	460.80	446.51	432.3	418.95	404.49	390.610
476.03	460.43	445.99	431.88	418.91	404.21	390.51
475.92	460.27	445.82	431.46	418.9	403.85	390.24
475.84	460.06	445.62	431.14	418.60	403.79	389.79
475.25	459.9	444.79	430.98	418.30	403.36	389.19
475.1	459.02	444.44	430.77	418.1	402.88	389.06
474.58	458.96	443.9	430.7	417.91	402.710	388.89
474.07	458.78	443.27	429.9	417.39	402.52	388.14
473.68	458.510	443.08	429.85	416.94	402.23	387.99
473.24	458.1	442.91	429.67	416.87	401.91	387.88
473.1	457.77	442.2	429.53	416.18	401.39	387.010
472.32	457.14	442.11	429.1	415.88	401.25	386.71
472.13	456.52	441.72	428.57	415.84	401.11	386.58
471.91	456.2	441.38	428.3	415.58	400.95	386.21
471.2	455.610	440.94	428.25	414.99	400.0	386.06
470.59	455.52	440.5	428.09	414.81	399.05	385.54
470.20	455.34	440.37	427.48	414.39	398.89	385.32
469.27	455.28	439.86	427.210	414.24	398.75	385.28
469.2	454.4	439.79	426.67	413.79	398.62	385.03
469.06	454.26	439.69	426.310	412.90	398.10	384.44
468.86	454.05	439.02	426.04	412.78	397.79	384.38
468.29	453.90	438.9	425.9	412.61	397.52	384.0
467.97	453.54	438.64	425.32	411.76	397.24	383.56
467.53	452.83	438.36	425.25	411.58	397.16	383.23
467.15	452.7	438.02	425.09	411.43	396.69	382.98
466.67	452.210	438.0	424.78	410.76	396.28	382.72
466.4	451.76	437.69	424.3	410.26	396.23	382.69
466.310	451.61	437.50	424.24	409.96	395.88	382.09
466.02	451.41	437.2	423.84	409.76	395.60	381.96
465.5	450.9	436.86	423.53	409.09	395.29	381.82
465.45	450.70	436.36	423.17	408.95	395.06	381.46
465.37	450.40	435.5	422.8	408.76	394.52	380.95
464.52	450.0	435.37	422.44	408.51	394.37	380.110

Table C-1 (continued)

380.09	367.61	355.93	344.91	334.20	324.32	315.110
379.95	367.35	355.56	344.410	334.11	324.05	315.010
379.82	366.88	355.18	344.26	333.91	323.610	314.75
379.23	366.81	354.68	344.09	333.33	323.510	314.61
378.95	366.76	354.57	343.88	332.95	323.23	314.410
378.610	366.41	354.46	343.68	332.67	323.08	314.02
378.38	366.01	354.43	343.56	332.56	322.87	313.810
377.95	365.71	353.81	343.16	332.47	322.69	313.73
377.70	365.48	353.68	342.86	332.02	322.46	313.43
377.58	365.22	353.59	342.25	331.99	322.42	313.04
377.53	364.67	353.37	342.16	331.710	322.15	312.96
376.96	364.56	352.94	342.04	331.61	321.84	312.85
376.68	364.43	352.62	341.84	331.36	321.79	312.36
376.47	363.64	352.29	341.46	331.03	321.61	312.27
375.98	363.41	352.20	341.33	330.75	321.43	312.110
375.84	362.85	352.08	341.23	330.71	321.22	311.69
375.37	362.72	351.65	340.83	330.28	320.89	311.44
375.24	362.61	351.46	340.77	330.09	320.80	311.35
375.0	362.26	351.22	340.43	330.06	320.71	311.11
374.27	362.07	350.73	340.08	329.810	320.61	311.02
374.16	361.81	350.68	339.82	329.52	320.0	310.68
374.03	361.58	350.36	339.62	329.41	319.39	310.54
373.33	361.29	350.15	339.52	329.14	319.29	310.51
373.18	361.13	350.0	339.39	329.05	319.20	310.34
373.06	360.90	349.73	338.82	328.77	319.11	309.96
372.82	360.56	349.51	338.71	328.21	318.79	309.93
372.51	360.52	349.27	338.62	328.13	318.58	309.68
372.09	360.0	349.09	338.03	328.02	318.41	309.39
371.68	359.74	348.77	337.83	327.49	318.23	309.18
371.61	359.55	348.67	337.73	327.37	318.18	309.01
371.13	359.10	348.55	337.35	327.27	317.88	308.85
371.01	358.97	348.04	337.24	326.85	317.62	308.82
370.86	358.88	347.83	336.84	326.53	317.58	308.43
370.42	358.54	347.11	336.67	326.35	317.36	308.35
370.18	358.21	346.99	336.45	326.21	317.18	308.26
370.04	357.76	346.88	336.0	325.79	316.98	308.02
369.94	357.54	346.39	335.96	325.610	316.83	307.69
369.23	357.45	346.15	335.86	325.58	316.48	307.20
368.88	357.32	345.95	335.66	325.42	316.38	307.13
368.42	356.69	345.68	335.33	325.06	316.05	307.04
368.29	356.66	345.32	335.08	324.95	315.79	306.95
368.05	356.55	345.01	334.88	324.87	315.62	306.57
367.82	356.44	344.97	334.66	324.51	315.27	306.38

**Table C-1 (continued)**

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306.22	303.710	301.18	150.0	100.0	45.0	16.0
306.01	303.32	301.08	144.0	96.0	42.0	15.0
305.73	303.25	300.0	140.0	90.0	40.0	14.0
305.57	303.16	288.0	134.5	84.0	36.0	12.0
305.49	302.70	280.0	128.0	80.0	35.0	10.0
305.45	302.60	256.0	125.0	75.0	32.0	9.0
305.08	302.52	210.0	120.0	72.0	30.0	8.0
304.90	302.36	200.0	250.0	70.0	28.0	7.0
304.76	302.16	192.0	240.0	64.0	25.0	6.0
304.44	301.89	180.0	225.0	60.0	24.0	5.0
304.35	301.62	175.0	224.0	56.0	21.0	4.0
304.04	301.57	168.0	112.0	50.0	20.0	3.0
303.96	301.26	160.0	105.0	48.0	18.0	2.0

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## Appendix D: Code Charts



## **Appendix D1: Keyboard-to-Hex Translation**

Table D1-1  
Keyboard-to-EBCDIC

KEY	UNSHIFTED		SHIFTED		CONTROL	
	CHAR <sup>1</sup>	HEX <sup>2</sup>	CHAR <sup>1</sup>	HEX <sup>2</sup>	CHAR <sup>1</sup>	HEX <sup>2</sup>
A	a	81	A	C1	SOH	01
B	b	82	B	C2	STX	02
C	c	83	C	C3	ETX	03
D	d	84	D	C4	EOT	37
E	e	85	E	C5	ENQ	2D
F	f	86	F	C6	ACK	2E
G	g	87	G	C7	BEL	2F
H	h	88	H	C8	BS	16
I	i	89	I	C9	HT	05
J	j	91	J	D1	LF	25
K	k	92	K	D2	VT	0B
L	l	93	L	D3	FF	0C
M	m	94	M	D4	CR	0D
N	n	95	N	D5	SO	0E
O	o	96	O	D6	SI	0F
P	p	97	P	D7	DLE	10
Q	q	98	Q	D8	DC1	11
R	r	99	R	D9	DC2	12
S	s	A2	S	E2	DC3	13
T	t	A3	T	E3	DC4	3C
U	u	A4	U	E4	NAK	3D
V	v	A5	V	E5	SYN	32
W	w	A6	W	E6	ETB	26
X	x	A7	X	E7	CAN	18
Y	y	A8	Y	E8	EM	19
Z	z	A9	Z	E9	SUB	3F
0	0	F0		5D		
1	1	F1		5A		
2	2	F2	@	7C	Same	
3	3	F3	#	7B		
4	4	F4	\$	5B	as	
5	5	F5	%	6C		
6	6	F6	-	-		
7	7	F7	&	50		
8	8	F8	.	5C	Unshifted	
9	9	F9	(	4D		
dāsh	dāsh	60	underline	6D		
=	=	7E	+	4E		A1
\ <sup>3</sup>	\	E0	+	6A		79
[	-	-	{	C0	DEL	07
]	-	-	}	D0	ESC	27
:	:	5E	:	7A	NUL	00
:	:	7D	:	7F	GS	1D
.	.	6B	<	4C	RS	35
.	.	4B	>	6E	US	1F
/	/	61	?	6F	FS	22
Space	Space	40	Space	40	Space	40

Untranslatable characters ("-" in the above table) that are entered in transmit strings will be replaced by NULL (hex 00) during transmission.  
<sup>1</sup>CHAR displayed in Run mode  
<sup>2</sup>HEX byte trapped/transmitted  
<sup>3</sup>Enter the hex value for the \ character.



Table D1-2  
Keyboard-to-ASCII

KEY	UNSHIFTED		SHIFTED		CONTROL	
	CHAR <sup>1</sup>	HEX <sup>2</sup>	CHAR <sup>1</sup>	HEX <sup>2</sup>	CHAR <sup>1</sup>	HEX <sup>2</sup>
A	a	61	A	41	SOH	01
B	b	62	B	42	STX	02
C	c	63	C	43	ETX	03
D	d	64	D	44	EOT	04
E	e	65	E	45	ENQ	05
F	f	66	F	46	ACK	06
G	g	67	G	47	BEL	07
H	h	68	H	48	BS	08
I	i	69	I	49	HT	09
J	j	6A	J	4A	LF	0A
K	k	6B	K	4B	VT	0B
L	l	6C	L	4C	FF	0C
M	m	6D	M	4D	CR	0D
N	n	6E	N	4E	SO	0E
O	o	6F	O	4F	SI	0F
P	p	70	P	50	DLE	10
Q	q	71	Q	51	DC1	11
R	r	72	R	52	DC2	12
S	s	73	S	53	DC3	13
T	t	74	T	54	DC4	14
U	u	75	U	55	NAK	15
V	v	76	V	56	SYN	16
W	w	77	W	57	ETB	17
X	x	78	X	58	CAN	18
Y	y	79	Y	59	EM	19
Z	z	7A	Z	5A	SUB	1A
0	0	30		29		
1	1	31		21		
2	2	32	@	40	Same	
3	3	33	#	23		
4	4	34	\$	24	as	
5	5	35	%	25		
6	6	36	^	5E		
7	7	37	&	26		
8	8	38	*	2A	Unshifted	
9	9	39	(	28		
dāsh	dāsh	2D	( underline	5F		
=	=	3D	+	2B	-	7E
\ <sup>3</sup>	\	5C	!	7C	.	60
[	[	5B	{	7B	DEL	7F
]	]	5D	}	7D	ESC	1B
:	:	3B	:	3A	NUL	00
.	.	27	;	22	GS	1D
,	,	2C	<	3C	RS	1E
/	/	2E	>	3E	US	1F
/	/	2F	?	3F	FS	1C
Space	Space	20	Space	20	Space	20

<sup>1</sup>CHAR displayed in Run mode

<sup>2</sup>HEX byte trapped/transmitted (space parity)

<sup>3</sup>Enter the hex value for the \ character.

Table D1-3  
Keyboard-to-EBCD

KEY	UNSHIFTED			SHIFTED			CONTROL	
	LOWER(\) <sup>1</sup>	UPPER(') <sup>2</sup>	HEX <sup>3</sup>	LOWER(\) <sup>1</sup>	UPPER(') <sup>2</sup>	HEX <sup>3</sup>	CHAR <sup>4</sup>	HEX <sup>3</sup>
A	a	A	23	a	A	23	SOH	3E
B	b	B	13	b	B	13	-	-
C	c	C	73	c	C	73	-	-
D	d	D	0B	d	D	0B	EOT	7C
E	e	E	6B	e	E	6B	-	-
F	f	F	5B	f	F	5B	-	-
G	g	G	3B	g	G	3B	-	-
H	h	H	07	h	H	07	BS	5D
I	i	I	67	i	I	67	HT	2F
J	j	J	61	j	J	61	LF	6E
K	k	K	51	k	K	51	-	-
L	l	L	31	l	L	31	-	-
M	m	M	49	m	M	49	CR	6D
N	n	N	29	n	N	29	-	-
O	o	O	19	o	O	19	-	-
P	p	P	79	p	P	79	-	-
Q	q	Q	45	q	Q	45	-	-
R	r	R	25	r	R	25	DC2	4C
S	s	S	52	s	S	52	-	-
T	t	T	32	t	T	32	DC4	4F
U	u	U	4A	u	U	4A	-	-
V	v	V	2A	v	V	2A	SYN	3D
W	w	W	1A	w	W	1A	ETB	5E
X	x	X	7A	x	X	7A	-	-
Y	y	Y	46	y	Y	46	-	-
Z	z	Z	26	z	Z	26	-	-
0	0	)	54	0	>	54	-	-
1	1	=	20	1		75	-	-
2	2	<	10	@	02	02	Same	-
3	3	:	70	#	:	34	-	-
4	4	;	08	\$	!	75	as	-
5	5	%	68	5	%	68	-	-
6	6	'	58	,	'	1C	-	-
7	7	>	38	&	+	43	Unshifted	-
8	8	*	04	8	*	04	-	-
9	9	(	64	9	(	64	-	-
dāsh	dāsh	dāsh	01	-	-	-	-	-
=	1	=	20	&	+	43	-	-
\ <sup>5</sup>	\	\	1F	-	-	-	DEL	7F
[	-	-	-	-	-	-	-	-
]	-	-	-	-	-	-	-	-
:	3	:	70	4	:	08	-	-
.	6	:	58	#	:	34	-	-
,	,	'	76	2	<	10	RS	2C
.	.	'	37	7	>	38	-	-
/	/	?	62	/	?	62	-	-
Space	Space	Space	40	Space	Space	40	-	-

Untranslatable characters ("-" in the above table) that are entered n transmit strings will be replaced by SPACE (hex 40) during transmission.

<sup>1</sup>CHAR displayed in Run mode if latest case-control character was lower

<sup>2</sup>CHAR displayed in Run mode if latest case-control character was upper

<sup>3</sup>HEX byte trapped/transmitted (odd parity)

<sup>4</sup>CHAR displayed in Run mode

<sup>5</sup>Enter the hex value for the \ character.

Table D1-4  
Keyboard-to-XS-3 (SYN=35; EOM=55)

KEY	UNSHIFTED		SHIFTED		CONTROL	
	CHAR <sup>1</sup>	HEX <sup>2</sup>	CHAR <sup>1</sup>	HEX <sup>2</sup>	CHAR <sup>1</sup>	HEX <sup>2</sup>
A	A	54	A	54	-	-
B	B	15	B	15	-	-
C	C	16	C	16	-	-
D	D	57	D	57	-	-
E	E	58	E	58	-	-
F	F	19	F	19	-	-
G	G	1A	G	1A	-	-
H	H	5B	H	5B	-	-
I	I	1C	I	1C	-	-
J	J	64	J	64	-	-
K	K	25	K	25	-	-
L	L	26	L	26	-	-
M	M	67	M	67	-	-
N	N	68	N	68	-	-
O	O	29	O	29	-	-
P	P	2A	P	2A	-	-
Q	Q	6B	Q	6B	-	-
R	R	2C	R	2C	-	-
S	S	75	S	75	-	-
T	T	76	T	76	-	-
U	U	37	U	37	-	-
V	V	38	V	38	-	-
W	W	79	W	79	-	-
X	X	7A	X	7A	-	-
Y	Y	3B	Y	3B	-	-
Z	Z	7C	Z	7C	-	-
0	0	43	)	3D	-	-
1	1	04		23	-	-
2	2	45	@	20	Same	-
3	3	46	#	1F	as	-
4	4	07	,\$%	6D	Unshifted	-
5	5	08	&	2F	-	-
6	6	49	'	61	-	-
7	7	4A	~	31	-	-
8	8	0B	(	70	-	-
9	9	4C	underline	10	-	-
dāsh	dāsh	02	+	-	-	-
=	=	5D	-	-	-	-
\ <sup>3</sup>	\	0D	-	-	-	-
[	[	4F	-	-	-	-
]	]	01	-	-	-	-
:	:	0E	-	-	-	-
;	;	6E	-	-	-	-
,	,	32	-	-	-	-
.	.	52	-	-	-	-
/	/	34	-	-	-	-
Space	Space	40	Space	40	Space	40

Untranslatable characters ("-" in the above tables) that are entered in transmit strings will be replaced by NULL (hex 00) during transmission.

<sup>1</sup>CHAR displayed in Run mode

<sup>2</sup>HEX byte trapped/transmitted (odd parity)

<sup>3</sup>Enter the hex value for the \ character.

Table D1-5  
Keyboard-to-IPARS

KEY	UNSHIFTED		SHIFTED		CONTROL	
	CHAR <sup>1</sup>	HEX <sup>2</sup>	CHAR <sup>1</sup>	HEX <sup>2</sup>	CHAR <sup>1</sup>	HEX <sup>2</sup>
A	A	31	A	31	-	-
B	B	32	B	32	-	-
C	C	33	C	33	-	-
D	D	34	D	34	-	-
E	E	35	E	35	-	-
F	F	36	F	36	-	-
G	G	37	G	37	-	-
H	H	38	H	38	-	-
I	I	39	I	39	-	-
J	J	21	J	21	-	-
K	K	22	K	22	-	-
L	L	23	L	23	-	-
M	M	24	M	24	CR	0C
N	N	25	N	25	-	-
O	O	26	O	26	-	-
P	P	27	P	27	-	-
Q	Q	28	Q	28	-	-
R	R	29	R	29	-	-
S	S	12	S	12	-	-
T	T	13	T	13	-	-
U	U	14	U	14	-	-
V	V	15	V	15	-	-
W	W	16	W	16	-	-
X	X	17	X	17	-	-
Y	Y	18	Y	18	-	-
Z	Z	19	Z	19	-	-
0	0	0A	)	2E	-	-
1	1	01	-	-	-	-
2	2	02	@	20	Same	-
3	3	03	#	1B	-	-
4	4	04	\$	30	as	-
5	5	05	%	3C	-	-
6	6	06	-	-	Unshifted	-
7	7	07	-	-	-	-
8	8	08	'	0B	-	-
9	9	09	(	2F	-	-
dāsh	dāsh	1A	-	-	-	-
=	=	0E	+	2C	-	-
\	-	-	-	-	-	-
[	[	1E	-	-	-	-
]	-	-	-	-	-	-
:	-	-	:	2A	-	-
;	-	-	;	3E	-	-
,	,	1F	<	2B	-	-
.	.	3B	-	-	-	-
/	-	-	?	3A	-	-
Space	Space	1C	Space	1C	Space	1C

<sup>1</sup>CHAR displayed in Run mode  
<sup>2</sup>HEX byte trapped/transmitted

Table D1-6  
Keyboard-to-REVERSE EBCD

KEY	UNSHIFTED			SHIFTED			CONTROL		
	LOWER(\) <sup>1</sup>	UPPER(^) <sup>2</sup>	HEX <sup>3</sup>	LOWER(\) <sup>1</sup>	UPPER(^) <sup>2</sup>	HEX <sup>3</sup>	LOWER(\) <sup>1</sup>	UPPER(^) <sup>2</sup>	HEX <sup>3</sup>
A	a	A	31	a	A	31	-	-	-
B	b	B	32	b	B	32	-	-	-
C	c	C	73	c	C	73	-	-	-
D	d	D	34	d	D	34	EOT	EOT	4F
E	e	E	75	e	E	75	-	-	-
F	f	F	76	f	F	76	-	-	-
G	g	G	37	g	G	37	-	-	-
H	h	H	38	h	H	38	BS	BS	6E
I	i	I	79	i	I	79	HT	HT	3D
J	j	J	61	j	J	61	LF	LF	5D
K	k	K	62	k	K	62	-	-	-
L	l	L	23	l	L	23	FF	FF	0D
M	m	M	64	m	M	64	CR	CR	60
N	n	N	25	n	N	25	-	-	-
O	o	O	26	o	O	26	-	-	-
P	p	P	67	p	P	67	-	-	-
Q	q	Q	68	q	Q	68	-	-	-
R	r	R	29	r	R	29	-	-	-
S	s	S	52	s	S	52	-	-	-
T	t	T	13	t	T	13	-	-	-
U	u	U	54	u	U	54	-	-	-
V	v	V	15	v	V	15	-	-	-
W	w	W	16	w	W	16	ETB	ETB	5E
X	x	X	57	x	X	57	-	-	-
Y	y	Y	58	y	Y	58	-	-	-
Z	z	Z	19	z	Z	19	-	-	-
0	0	)	4A	0		4A	-	-	-
1	1	=	01	\$		6B	-	-	-
2	2	<	02	@		10	-	-	-
3	3	...	43	#	!	0B	Same	-	-
4	4	...	04	\$	!	6B	as	-	-
5	5	%	45	5	%	45	-	-	-
6	6	...	46	^	^	0E	-	-	-
7	7	>	07	&	+	70	Unshifted	-	-
8	8	*	08	8	+	08	-	-	-
9	9	(	49	9	(	49	-	-	-
dāsh	dāsh	dāsh	20	-	-	-	-	-	-
=	=	=	01	&	+	70	-	:	7C
\ <sup>4</sup>	\	\	3E	-	-	-	DEL	DEL	7C
{	{	}	4C	}	}	1C	-	-	7F
			4C	}	}	1C	-	-	-
...	3	...	43	4	...	04	-	-	-
.	.	.	46	#	...	08	-	-	-
,	,	.	5B	2	<	02	-	-	-
/	/	.	3B	7	>	07	-	-	-
Space	Space	? <sup>?</sup>	51	/	? <sup>?</sup>	51	-	-	-
Space	Space	Space	40	Space	Space	40	Space	Space	40

Untranslatable characters ("-" in the above table) that are entered in transmit strings will be replaced by SPACE (hex 40) during transmission.  
<sup>1</sup>CHAR displayed in Run mode if latest case-control character was lower  
<sup>2</sup>CHAR displayed in Run mode if latest case-control character was upper  
<sup>3</sup>HEX byte trapped/transmitted (odd parity)  
<sup>4</sup>Enter the hex value for the \ character.

Table D1-7  
Keyboard-to-SELECTRIC

KEY	UNSHIFTED			SHIFTED			CONTROL	
	LOWER(\) <sup>1</sup>	UPPER(^) <sup>2</sup>	HEX <sup>3</sup>	LOWER(\) <sup>1</sup>	UPPER(!) <sup>2</sup>	HEX <sup>3</sup>	CHAR <sup>4</sup>	HEX <sup>3</sup>
A	a	A	79	a	A	79	-	-
B	b	B	76	b	B	76	-	-
C	c	C	7A	c	C	7A	-	-
D	d	D	2A	d	D	2A	EOT	7C
E	e	E	4A	e	E	4A	-	-
F	f	F	73	f	F	73	-	-
G	g	G	23	g	G	23	-	-
H	h	H	26	h	H	26	BS	5D
I	i	I	19	i	I	19	HT	2F
J	j	J	43	j	J	43	LF	6E
K	k	K	1A	k	K	1A	-	-
L	l	L	46	l	L	46	-	-
M	m	M	61	m	M	61	CR	6D
N	n	N	52	n	N	52	-	-
O	o	O	45	o	O	45	-	-
P	p	P	0B	p	P	0B	-	-
Q	q	Q	5B	q	Q	5B	-	-
R	r	R	29	r	R	29	-	-
S	s	S	25	s	S	25	-	-
T	t	T	02	t	T	02	-	-
U	u	U	32	u	U	32	-	-
V	v	V	31	v	V	31	-	-
W	w	W	75	w	W	75	ETB	5E
X	x	X	62	x	X	62	-	-
Y	y	Y	67	y	Y	67	-	-
Z	z	Z	54	z	Z	54	-	-
0	0	)	64	0	)	64	-	-
1	1		20	!	01	01	-	-
2	2	@	10	2	@	10	-	-
3	3	#	70	3	#	70	Same	-
4	4	\$	04	4	\$	04	as	-
5	5	%	08	5	%	08	-	-
6	6	^	58	^	^	1C	-	-
7	7	&	68	7	&	68	Unshifted	-
8	8	*	38	8	*	38	-	-
9	9	{	34	9	{	34	-	-
dāsh	dāsh	underline	37	dāsh	underline	37	-	-
=	=	+	13	=	+	13	-	-
\ <sup>6</sup>	\	/	1F	-	-	-	DEL	7F
[	[	[	20	-	-	-	-	-
:]	:]	:]	6B	-	-	-	-	-
:	:	:	49	:	:	6B	-	-
.	.	.	3B	-	-	-	RS	2C
.	.	.	51	-	-	-	-	-
/	/	?	07	/	?	07	-	-
Space	Space	Space	40	Space	Space	40	Space	40

Untranslatable characters ("-" in the above table) that are entered in transmit strings will be replaced by SPACE (hex 40) during transmission.

<sup>1</sup>CHAR displayed in Run mode if latest case-control character was lower

<sup>2</sup>CHAR displayed in Run mode if latest case-control character was upper

<sup>3</sup>HEX byte trapped/transmitted (odd parity)

<sup>4</sup>CHAR displayed in Run mode

<sup>6</sup>Enter the hex value for the \ character.

Table D1-8  
Keyboard-to-BAUDOT

KEY	UNSHIFTED			SHIFTED			CONTROL		
	LOWER(\) <sup>1</sup>	UPPER(^) <sup>2</sup>	HEX <sup>3</sup>	LOWER(\) <sup>1</sup>	UPPER(^) <sup>2</sup>	HEX <sup>3</sup>	LOWER(\) <sup>1</sup>	UPPER(^) <sup>2</sup>	HEX <sup>3</sup>
A	A	dash	03	A	dash	03	-	-	-
B	B	?	19	B	?	19	-	-	-
C	C	:	0E	C	:	0E	-	-	-
D	D	\$	09	D	\$	09	-	-	-
E	E	3	01	E	3	01	-	-	-
F	F	!	0D	F	!	0D	-	-	-
G	G	&	1A	G	&	1A	S	BEL	05
H	H	#	14	H	#	14	-	-	-
I	I	8	06	I	8	06	-	-	-
J	J	.	0B	J	.	0B	LF	LF	02
K	K	(	0F	K	(	0F	-	-	-
L	L	)	12	L	)	12	-	-	-
M	M	.	1C	M	.	1C	CR	CR	08
N	N	.	0C	N	.	0C	-	-	-
O	O	9	18	O	9	18	-	-	-
P	P	0	16	P	0	16	-	-	-
Q	Q	1	17	Q	1	17	-	-	-
R	R	4	0A	R	4	0A	-	-	-
S	S	BEL	05	S	BEL	05	-	-	-
T	T	5	10	T	5	10	-	-	-
U	U	7	07	U	7	07	-	-	-
V	V	:	1E	V	:	1E	-	-	-
W	W	2	13	W	2	13	-	-	-
X	X	/	1D	X	/	1D	-	-	-
Y	Y	6	15	Y	6	15	-	-	-
Z	Z	"	11	Z	"	11	-	-	-
0	0	0	16	0	0	16	-	-	-
1	1	1	17	1	1	17	-	-	-
2	2	2	13	2	2	13	-	-	-
3	3	3	01	3	3	01	-	-	-
4	4	4	0A	4	4	0A	-	-	-
5	5	5	10	5	5	10	-	-	-
6	6	6	15	6	6	15	-	-	-
7	7	7	07	7	7	07	-	-	-
8	8	8	06	8	8	06	-	-	-
9	9	9	18	9	9	18	-	-	-
dash	A	dash	03	-	-	-	-	-	-
=	-	-	-	-	-	-	-	-	-
\ <sup>4</sup>	\	\	1F	-	-	-	-	-	-
[	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-
;	V	:	1E	C	:	0E	NUL	NUL	00
:	J	.	0B	Z	.	11	-	-	-
,	N	,	0C	-	-	-	-	-	-
.	M	.	1C	-	-	-	-	-	-
/	X	/	1D	B	?	19	-	-	-
Space	Space	Space	04	Space	Space	04	-	-	-

Untranslatable characters ("-" in the above table) that are entered in transmit strings will be replaced by NULL (hex 00) during transmission.

<sup>1</sup>CHAR displayed in Run mode if latest case-control character was letter

<sup>2</sup>CHAR displayed in Run mode if latest case-control character was figure

<sup>3</sup>HEX byte searched for/transmitted

<sup>4</sup>Enter the hex value for the \ character.

Table D1-9  
Keyboard-to-JIS7

KEY	UNSHIFTED			SHIFTED			CONTROL		
	LOWER( $\text{S}_1$ ) <sup>1</sup>	UPPER( $\text{S}_2$ ) <sup>2</sup>	HEX <sup>3</sup>	LOWER( $\text{S}_1$ ) <sup>1</sup>	UPPER( $\text{S}_2$ ) <sup>2</sup>	HEX <sup>3</sup>	LOWER( $\text{S}_1$ ) <sup>1</sup>	UPPER( $\text{S}_2$ ) <sup>2</sup>	HEX <sup>3</sup>
A	a	61	61	A	ア	41	SOH	SOH	01
B	b	62	62	B	イ	42	STX	STX	02
C	c	63	63	C	ウ	43	ETX	ETX	03
D	d	64	64	D	エ	44	EOT	EOT	04
E	e	65	65	E	オ	45	ENQ	ENQ	05
F	f	66	66	F	カ	46	ACK	ACK	06
G	g	67	67	G	キ	47	BEL	BEL	07
H	h	68	68	H	ク	48	BS	BS	08
I	i	69	69	I	ケ	49	HT	HT	09
J	j	6A	6A	J	コ	4A	LF	LF	0A
K	k	6B	6B	K	セ	4B	VT	VT	0B
L	l	6C	6C	L	ソ	4C	FF	FF	0C
M	m	6D	6D	M	タ	4D	CR	CR	0D
N	n	6E	6E	N	チ	4E	SO	SO	0E
O	o	6F	6F	O	テ	4F	SI	SI	0F
P	p	70	70	P	ト	50	DLE	DLE	10
Q	q	71	71	Q	ナ	51	DC1	DC1	11
R	r	72	72	R	ネ	52	DC2	DC2	12
S	s	73	73	S	ノ	53	DC3	DC3	13
T	t	74	74	T	ハ	54	DC4	DC4	14
U	u	75	75	U	ヒ	55	NAK	NAK	15
V	v	76	76	V	フ	56	SYN	SYN	16
W	w	77	77	W	ヘ	57	ETB	ETB	17
X	x	78	78	X	ネ	58	CAN	CAN	18
Y	y	79	79	Y	ル	59	EM	EM	19

<sup>1</sup>CHAR displayed in Run mode if latest case-control character was Shift In ( $\text{S}_1$ ).

<sup>2</sup>CHAR displayed in Run mode if latest case-control character was Shift Out ( $\text{S}_2$ ).

<sup>3</sup>HEX byte trapped/transmitted (space parity)



Table D1-9 (continued)

KEY	UNSHIFTED			SHIFTED			CONTROL		
	LOWER(シ) <sup>1</sup>	UPPER(シ) <sup>2</sup>	HEX <sup>3</sup>	LOWER(シ) <sup>1</sup>	UPPER(シ) <sup>2</sup>	HEX <sup>3</sup>	LOWER(シ) <sup>1</sup>	UPPER(シ) <sup>2</sup>	HEX <sup>3</sup>
Z	z	7A	7A	Z	レ	5A	SUB	SUB	1A
0	0	-	30	)	ろ	29	-----		
1	1	ア	31	!	。	21			
2	2	イ	32	@	ヲ	40	Same		
3	3	ウ	33	#	」	23			
4	4	エ	34	\$	、	24			
5	5	オ	35	%	・	25	as		
6	6	カ	36	~	”	5E			
7	7	キ	37	&	ヲ	26			
8	8	ク	38	*	エ	2A	Unshifted		
9	9	ケ	39	(	イ	28			
dāsh	dāsh	ユ	2D	underline	*	5F	-----		
=	=	ス	3D	+	オ	2B	-	7E	7E
¥ <sup>4</sup>	¥	ク	5C	!	7C	7C	'	60	60
[	[	□	5B	{	7B	7B	DEL	DEL	7F
]	]	コ	5D	}	7D	7D	ESC	ESC	1B
;	;	サ	3B	:	コ	3A	NUL	NUL	00
'	'	ア	27	"	「	22	GS	GS	1D
,	,	ハ	2C	<	シ	3C	RS	RS	1E
.	.	ヨ	2E	>	セ	3E	US	US	1F
/	/	ツ	2F	?	ソ	3F	FS	FS	1C
Space	Space	Space	20	Space	Space	20	Space	Space	20

<sup>1</sup>CHAR displayed in Run mode if latest case-control character was Shift In (シ).  
<sup>2</sup>CHAR displayed in Run mode if latest case-control character was Shift Out (シ).  
<sup>3</sup>HEX byte trapped/transmitted (space parity)  
<sup>4</sup>Enter the hex value for the ¥ and □ characters.

**Table D1-10**  
**Keyboard-to-JIS8 (space parity)<sup>1</sup>**

KEY	UNSHIFTED		SHIFTED		CONTROL	
	CHAR <sup>2</sup>	HEX <sup>3</sup>	CHAR <sup>2</sup>	HEX <sup>3</sup>	CHAR <sup>2</sup>	HEX <sup>3</sup>
A	a	61	A	41	SOH	01
B	b	62	B	42	STX	02
C	c	63	C	43	ETX	03
D	d	64	D	44	EOT	04
E	e	65	E	45	ENQ	05
F	f	66	F	46	ACK	06
G	g	67	G	47	BEL	07
H	h	68	H	48	BS	08
I	i	69	I	49	HT	09
J	j	6A	J	4A	LF	0A
K	k	6B	K	4B	VT	0B
L	l	6C	L	4C	FF	0C
M	m	6D	M	4D	CR	0D
N	n	6E	N	4E	SO	0E
O	o	6F	O	4F	SI	0F
P	p	70	P	50	DLE	10
Q	q	71	Q	51	DC1	11
R	r	72	R	52	DC2	12
S	s	73	S	53	DC3	13
T	t	74	T	54	DC4	14
U	u	75	U	55	NAK	15
V	v	76	V	56	SYN	16
W	w	77	W	57	ETB	17
X	x	78	X	58	CAN	18
Y	y	79	Y	59	EM	19
Z	z	7A	Z	5A	SUB	1A
0	0	30	)	29		
1	1	31		21		
2	2	32	@	40	Same	
3	3	33	#	23		
4	4	34	\$	24		
5	5	35	%	25	as	
6	6	36	^	5E		
7	7	37	&	26		
8	8	38	*	2A	Unshifted	
9	9	39	(	28		
dāsh	dāsh	2D	underline	5F		
=	=	3D	+	2B	-	7E
\*	¥	5C		7C	,	60
[	[	5B	{	7B	DEL	7F
]	]	5D	}	7D	ESC	1B
:	:	3B	:	3A	NUL	00
:	:	27	*	22	GS	1D
.	.	2C	<	3C	RS	1E
.	.	2E	>	3E	US	1F
/	/	2F	?	3F	FS	1C
Space	Space	20	Space	20	Space	20

<sup>1</sup>Hex data-entry will override parity  
<sup>2</sup>CHAR displayed in Run mode  
<sup>3</sup>HEX byte trapped/transmitted  
<sup>4</sup>Enter the hex value for the ¥ character.

Table D1-11  
Keyboard-to-JIS8 (mark parity)<sup>1</sup>

KEY	UNSHIFTED		SHIFTED		CONTROL	
	CHAR <sup>2</sup>	HEX <sup>3</sup>	CHAR <sup>2</sup>	HEX <sup>3</sup>	CHAR <sup>2</sup>	HEX <sup>3</sup>
A	E1	E1	チ	C1	81	81
B	E2	E2	ツ	C2	82	82
C	E3	E3	テ	C3	83	83
D	E4	E4	ト	C4	84	84
E	E5	E5	ナ	C5	85	85
F	E6	E6	ニ	C6	86	86
G	E7	E7	ヌ	C7	87	87
H	E8	E8	ネ	C8	88	88
I	E9	E9	ノ	C9	89	89
J	EA	EA	ハ	CA	8A	8A
K	EB	EB	ヒ	CB	8B	8B
L	EC	EC	フ	CC	8C	8C
M	ED	ED	ヘ	CD	8D	8D
N	EE	EE	ホ	CE	8E	8E
O	EF	EF	マ	CF	8F	8F
P	F0	F0	ミ	D0	90	90
Q	F1	F1	ム	D1	91	91
R	F2	F2	メ	D2	92	92
S	F3	F3	モ	D3	93	93
T	F4	F4	ヤ	D4	94	94
U	F5	F5	ユ	D5	95	95
V	F6	F6	ヨ	D6	96	96
W	F7	F7	ラ	D7	97	97
X	F8	F8	リ	D8	98	98
Y	F9	F9	ル	D9	99	99
Z	FA	FA	レ	DA	9A	9A
0	ー	B0	っ	A9		
1	ア	B1	。・	A1		
2	イ	B2	夕	C0	Same	
3	ウ	B3	」	A3		
4	エ	B4	、	A4		
5	オ	B5	・	A5	as	
6	カ	B6	”	DE		
7	キ	B7	ヲ	A6		
8	ク	B8	エ	AA	Unshifted	
9	ケ	B9	イ	A8		
dash	ユ	AD	・	DF		

<sup>1</sup>Hex data-entry will override parity

<sup>2</sup>CHAR displayed in Run mode

<sup>3</sup>HEX byte trapped/transmitted

Table D1-11 (continued)

KEY	UNSHIFTED		SHIFTED		CONTROL	
	CHAR	HEX	CHAR	HEX	CHAR	HEX
=	ス	BD	オ	AB	FE	FE
\ <sup>4</sup>	ワ	DC	FC	FC	E0	E0
{	□	DB	FB	FB	FF	FF
}	コ	DD	FD	FD	9B	9B
;	サ	BB	コ	BA	80	80
,	ア	A7	フ	A2	9D	9D
.	ヤ	AC	シ	BC	9E	9E
.	ヨ	AE	セ	BE	9F	9F
/	ツ	AF	ソ	BF	9C	9C
Space	A0	A0	A0	A0	A0	A0

\*Enter the hex value for the □ character.

## Appendix D2: Hex-to-Display Translation

The left-hand column in the following table (labeled "INPUT HEX") is the hex value presented on the Run-mode data screen when HEX display is turned on.

The remaining columns show the character that is presented for each hex value in each of the available code sets when hex display is turned off. Where no character in the code set corresponds to the hex value received, hex display is always used.

The bit in the "input hex" value that was received first by the INTERVIEW's receivers will vary with the code. In the column heading for each code we have placed a small arrow next to the rightmost or leftmost bit to indicate which was the first bit received. In IPARS, for example, the leftmost bit is the first bit received.

We have tried also to indicate the significance of each bit. In EBCD, the third bit from the left in the hex value is the least significant (=1) bit, while the rightmost bit is the most significant (=32). This means that the first ten hex values in this code set are not really 00 through 09. Rather they are 00, 20, 10, 30, 08, 28, 18, 38, 04 and 24—corresponding to the characters SPACE, 1, 2, 3, 4, 5, 6, 7, 8, and 9, and corresponding also to the following binary series, which increments from left to right:

```
00000000
00100000
00010000
00110000
00001000
00101000
00011000
00111000
00000100
00100100
etc.
```



Table D2-1  
Hex-to-Display Translation

INPUT HEX	ASCII <sup>1</sup>	EBCDIC <sup>1</sup>	EBCD <sup>1</sup>		XS-3 <sup>1</sup>	IPARS <sup>2</sup>	REV EBCD <sup>3</sup>		BAUDOT <sup>1</sup>		SELECTRIC <sup>1</sup>		JIS7 <sup>1</sup>		JIS8 <sup>1</sup>
	(P)A2(8421)	(P)A2(8421)	(P)1248(8421)	LOWER UPPER	(P)A2(8421)	(P)A2(8421)	LOWER UPPER	LETTERS FIGURES	LOWER UPPER	LOWER UPPER	LOWER UPPER	LOWER UPPER	LOWER UPPER		
00	NU	NU	space	space	space	hex	space	space	hex	hex	SP	SP	NU	NU	NU
01	SH	SH	dāsh	dāsh	]	1	1	=	E	3	l	hex	SH	SH	SH
02	SX	SX	@	hex	dāsh	2	2	<	LF	LF	t	T	SX	SX	SX
03	EX	EX	&	+	0	3	3	:	A	-	j	J	EX	EX	EX
04	ET	hex	8	*	1	4	4	:	space	hex	4	\$	ET	ET	ET
05	EQ	HT	q	Q	2	5	5	%	S	hex	o	O	EQ	EQ	EQ
06	AK	hex	y	Y	3	6	6	'	I	8	l	L	AK	AK	AK
07	BL	pad	h	H	4	7	7	>	U	7	/	?	BL	BL	BL
08	BS	hex	4	:	5	8	8	*	CR	CR	5	%	BS	BS	BS
09	HT	hex	m	M	6	9	9	(	D	\$	'	'	HT	HT	HT
0A	LF	hex	u	U	7	0	0	)	R	4	e	E	LF	LF	LF
0B	VT	VT	d	D	8	*	#	'	J	.	p	P	VT	VT	VT
0C	FF	FF	D2	D2	9	CR	[	]	N	.	hex	hex	FF	FF	FF
0D	CR	CR	hex	hex	\	hex	FF	FF	F	!	hex	hex	CR	CR	CR
0E	SO	SO	hex	hex	:	=	^	^	C	:	hex	hex	SO	SO	SO
0F	SI	SI	D4	D4	[	hex	ET	ET	K	(	hex	hex	SI	SI	SI
10	DL	DL	2,	<	+	hex	@	hex	T	5	2	@	DL	DL	DL
11	D1	D1	k	K	:	hex	/	?	Z	hex	.	.	D1	D1	D1
12	D2	D2	s	S	.	S	s	S	L	)	n	N	D2	D2	D2
13	D3	D3	b	B	?	T	t	T	W	2	=	+	D3	D3	D3
14	D4	hex	0	)	A	U	u	U	H	#	z	Z	D4	D4	D4
15	NK	hex	hex	hex	B	V	v	V	Y	6	hex	hex	NK	NK	NK
16	SY	BS	.	hex	C	W	w	W	P	0	hex	hex	SY	SY	SY
17	EB	hex	hex	hex	D	X	x	X	Q	1	hex	hex	EB	EB	EB
18	CN	CN	6	.	E	Y	y	Y	O	9	6	hex	CN	CN	CN
19	EM	EM	o	O	F	Z	z	Z	B	?	l	l	EM	EM	EM
1A	SB	hex	w	W	G	dāsh	hex	hex	G	&	k	K	SB	SB	SB
1B	EC	hex	f	F	H	#	.	hex	^	^	q	Q	EC	EC	EC
1C	FS	hex	^	^	I	space	}	{	M	.	^	^	FS	FS	FS
1D	GS	GS	BS	BS	=	hex	LF	LF	X	/	BS	BS	GS	GS	GS
1E	RS	hex	EB	EB	<	[	EB	EB	V	:	EB	EB	RS	RS	RS
1F	US	US	\	\	#	,	hex	hex	\	\	\	\	US	US	US

<sup>1</sup>Select Bit Order/Polarity: NORMAL

<sup>2</sup>Select Bit Order/Polarity: REV-INVERT

<sup>3</sup>Select Bit Order/Polarity: REVERSE-NORM

Table D2-1 (continued)

INPUT HEX	ASCII	EBCDIC	EBCD		XS-3	IPARS	REV EBCD		BAUDOT		SELECTRIC		JIS7		JIS8
			LOWER	UPPER			LOWER	UPPER	LETTERS	FIGURES	LOWER	UPPER	LOWER	UPPER	
20	space	hex	1	=	@	@	dāsh	dāsh	hex	hex	1	[	space	space	space
21		hex	J	J	*	J	J	J	hex	hex	m	M		■	
22	"	FS	/	?	\$	K	k	K	hex	hex	x	X	"	「	"
23	#	hex	a	A	!	L	l	L	hex	hex	g	G	#	」	#
24	\$	hex	9	G	J	M	m	M	hex	hex	0	)	\$	、	\$
25	%	LF	r	R	K	N	n	N	hex	hex	s	S	%	・	%
26	&	EB	z	Z	L	O	o	O	hex	hex	h	H	&	ヲ	&
27	'	EC	l	l	M	P	p	P	hex	hex	y	Y	'	ア	'
28	(	hex	5	%	N	Q	q	Q	hex	hex	7	&	(	イ	(
29	)	hex	n	N	O	R	r	R	hex	hex	r	R	)	ウ	)
2A	*	hex	v	V	P	:	hex	hex	hex	hex	d	D	*	エ	*
2B	+	hex	e	E	Q	<	\$	!	hex	hex	:	:	+	オ	+
2C	,	hex	RS	RS	R	+	hex	hex	hex	hex	RS	RS	,	ヤ	,
2D	-	EQ	CR	CR	%	hex	CR	CR	hex	hex	CR	CR	dāsh	ユ	dāsh
2E	.	AK	LF	LF	'	)	BS	BS	hex	hex	LF	LF	.	ヨ	.
2F	/	BL	HT	HT	^	(	hex	hex	hex	hex	HT	HT	/	ツ	/
30	0	hex	3	;	underline	\$	&	+	hex	hex	3	#	0	ー	0
31	1	hex	l	L	(	A	a	A	hex	hex	v	V	1	ア	1
32	2	SY	t	T	,	B	b	B	hex	hex	u	U	2	イ	2
33	3	hex	c	C	&	C	c	C	hex	hex	f	F	3	ウ	3
34	4	hex	#	"	/	D	d	D	hex	hex	9	(	4	エ	4
35	5	RS	\$	!	S*	E	e	E	hex	hex	w	W	5	オ	5
36	6	hex	,	hex	T	F	f	F	hex	hex	b	B	6	カ	6
37	7	ET	.	hex	U	G	g	G	hex	hex	-	-	7	キ	7
38	8	hex	7	>	V	H	h	H	hex	hex	8	"	8	ク	8
39	9	hex	p	P	W	l	l	l	hex	hex	a	A	9	ケ	9
3A	:	hex	x	X	X	?	hex	hex	hex	hex	c	C	:	コ	:
3B	:	hex	g	G	Y	.	.	hex	hex	hex	,	,	:	サ	:
3C	<	D4	ET	ET	Z	%	-	'	hex	hex	ET	ET	<	シ	<
3D	=	NK	SY	SY	)	hex	HT	HT	hex	hex	hex	hex	=	ス	=
3E	>	hex	SH	SH	>	"	\	\	hex	hex	hex	hex	>	セ	>
3F	?	SB	pad	pad	"	hex	pad	pad	hex	hex	pad	pad	?	ソ	?

\*SYNC = even parity S (35<sub>16</sub>).



Table D2-1 (continued)

INPUT HEX	ASCII	EBCDIC	EBCD LOWER UPPER		XS-3	IPARS	REV EBCD LOWER UPPER		BAUDOT LETTERS FIGURES		SELECTRIC LOWER UPPER		JIS7 LOWER UPPER		JIS8
40	@	space	space	space	space	hex	space	space	hex	hex	SP	SP	@	ㇿ	@
41	A	hex	-	-	]	hex	1	=	hex	hex	l	hex	A	ㇾ	A
42	B	hex	@	hex	dāsh	hex	2	<	hex	hex	t	T	B	ㇼ	B
43	C	hex	&	+	0	hex	3	:	hex	hex	j	J	C	ㇽ	C
44	D	hex	8	*	1	hex	4	:	hex	hex	4	\$	D	ㇾ	D
45	E	hex	q	Q	2	hex	5	%	hex	hex	o	O	E	ㇿ	E
46	F	hex	y	Y	3	hex	6	'	hex	hex	l	L	F	ㇼ	F
47	G	hex	h	H	4	hex	7	>	hex	hex	/	?	G	ㇽ	G
48	H	hex	4	:	5	hex	8	*	hex	hex	5	%	H	ㇾ	H
49	I	hex	m	M	6	hex	9	(	hex	hex	.	'	I	ㇿ	I
4A	J	hex	u	U	7	hex	0	)	hex	hex	e	E	J	ㇼ	J
4B	K	.	d	D	8	hex	#	'	hex	hex	p	P	K	ㇽ	K
4C	L	<	D4	D2	9	hex	[	]	hex	hex	hex	hex	L	ㇾ	L
4D	M	(	hex	hex	\	hex	FF	FF	hex	hex	hex	hex	M	ㇿ	M
4E	N	+	hex	hex	:	hex	^	^	hex	hex	hex	hex	N	ㇼ	N
4F	O	hex	D4	D4	[	hex	ET	ET	hex	hex	hex	hex	O	ㇽ	O
50	P	&	2	<	+	hex	@	hex	hex	hex	2	@	P	ㇾ	P
51	Q	hex	k	K	:	hex	/	?	hex	hex	.	.	Q	ㇿ	Q
52	R	hex	s	S	.	hex	s	S	hex	hex	n	N	R	ㇼ	R
53	S	hex	b	B	?	hex	t	T	hex	hex	=	+	S	ㇽ	S
54	T	hex	0	)	A	hex	u	U	hex	hex	z	Z	T	ㇾ	T
55	U	hex	hex	hex	B*	hex	v	V	hex	hex	hex	hex	U	ㇿ	U
56	V	hex	hex	hex	C	hex	w	W	hex	hex	hex	hex	V	ㇼ	V
57	W	hex	hex	hex	D	hex	x	X	hex	hex	hex	hex	W	ㇽ	W
58	X	hex	6	'	E	hex	y	Y	hex	hex	6	hex	X	ㇾ	X
59	Y	hex	o	O	F	hex	z	Z	hex	hex	l	l	Y	ㇿ	Y
5A	Z	l	w	W	G	hex	hex	hex	hex	hex	k	K	Z	ㇼ	Z
5B	[	\$	f	F	H	hex	.	hex	hex	hex	q	Q	[	ㇽ	[
5C	\	*	^	^	I	hex	}	{	hex	hex	^	^	\	ㇾ	\
5D	]	)	BS	BS	=	hex	LF	LF	hex	hex	BS	BS	]	ㇿ	]
5E	^	:	EB	EB	<	hex	EB	EB	hex	hex	EB	EB	^	ㇼ	^
5F	_	hex	\	\	#	hex	hex	hex	hex	hex	\	\	underline	ㇽ	underline

\*EOM = even parity B (55<sub>16</sub>).

Table D2-1 (continued)

INPUT HEX	ASCII	EBCDIC	EBCD		XS-3	IPARS	REV EBCD		BAUDOT		SELECTRIC		JIS7		JIS8
			LOWER	UPPER			LOWER	UPPER	LETTERS	FIGURES	LOWER	UPPER	LOWER	UPPER	
60	'	dāsh	1	=	@	hex	dāsh	dāsh	hex	hex	1	[	'	hex	'
61	a	/	j	J	·	hex	j	J	hex	hex	m	M	a	hex	a
62	b	hex	/	?	\$	hex	k	K	hex	hex	x	X	b	hex	b
63	c	hex	a	A	l	hex	l	L	hex	hex	g	G	c	hex	c
64	d	hex	9	{	J	hex	m	M	hex	hex	0	}	d	hex	d
65	e	hex	r	R	K	hex	n	N	hex	hex	s	S	e	hex	e
66	f	hex	z	Z	L	hex	o	O	hex	hex	h	H	f	hex	f
67	g	hex	l	l	M	hex	p	P	hex	hex	y	Y	g	hex	g
68	h	hex	5	%	N	hex	q	Q	hex	hex	7	&	h	hex	h
69	i	hex	n	N	O	hex	r	R	hex	hex	r	RI	i	hex	i
6A	j	;	v	V	P	hex	hex	hex	hex	hex	d	D	j	hex	j
6B	k	,	e	E	Q	hex	\$	l	hex	hex	:	:	k	hex	k
6C	l	%	RS	RS	R	hex	hex	hex	hex	hex	RS	RS	l	hex	l
6D	m	CR	CR	CR	%	hex	CR	CR	hex	hex	CR	CR	m	hex	m
6E	n	v	LF	LF	'	hex	BS	BS	hex	hex	LF	LF	n	hex	n
6F	o	?	HT	HT	·	hex	hex	hex	hex	hex	HT	HT	o	hex	o
70	p	hex	3	;	_	hex	&	+	hex	hex	3	#	p	hex	p
71	q	hex	l	L	(	hex	a	A	hex	hex	v	V	q	hex	q
72	r	hex	t	T	,	hex	b	B	hex	hex	u	U	r	hex	r
73	s	hex	c	C	&	hex	c	C	hex	hex	f	F	s	hex	s
74	t	hex	#	"	/	hex	d	D	hex	hex	q	{	t	hex	t
75	u	hex	\$		S	hex	e	E	hex	hex	w	W	u	hex	u
76	v	hex	.	hex	T	hex	f	F	hex	hex	b	B	v	hex	v
77	w	hex	.	hex	U	hex	g	G	hex	hex	dāsh	underline	w	hex	w
78	x	hex	7	>	V	hex	h	H	hex	hex	8	'	x	hex	x
79	y	'	p	P	W	hex	l	l	hex	hex	a	A	y	hex	y
7A	z	:	x	X	X	hex	hex	hex	hex	hex	c	C	z	hex	z
7B	{	#	g	G	Y	hex	.	hex	hex	hex	.	.	{	hex	{
7C	;	@	ET	ET	Z	hex	-	'	hex	hex	ET	ET	;	hex	;
7D	}	'	SY	SY	)	hex	HT	HT	hex	hex	hex	hex	}	hex	}
7E	-	=	SH	SH	>	hex	\	\	hex	hex	hex	hex	-	hex	-
7F	pad	·	pad	pad	·	hex	pad	pad	hex	hex	pad	pad	pad	hex	pad

Table D2-1 (continued)

INPUT HEX	ASCII	EBCDIC	EBCD		XS-3	IPARS	REV EBCD		BAUDOT LETTERS FIGURES	SELECTRIC		JIS7		JIS8
			LOWER	UPPER			LOWER	UPPER		LOWER	UPPER	LOWER	UPPER	
80	NU	hex			hex	hex						NU	NU	hex
81	SH	a			hex	hex						SH	SH	hex
82	SX	b			hex	hex						SX	SX	hex
83	EX	c			hex	hex						EX	EX	hex
84	ET	d			hex	hex						ET	ET	hex
85	EQ	e			hex	hex						EQ	EQ	hex
86	AK	f			hex	hex						AK	AK	hex
87	BL	g			hex	hex						BL	BL	hex
88	BS	h			hex	hex						BS	BS	hex
89	HT	i			hex	hex						HT	HT	hex
8A	LF	hex			hex	hex						LF	LF	hex
8B	VT	hex			hex	hex						VT	VT	hex
8C	FF	hex			hex	hex						FF	FF	hex
8D	CR	hex			hex	hex						CR	CR	hex
8E	SO	hex			hex	hex						SO	SO	hex
8F	SI	hex			hex	hex						SI	SI	hex
90	DL	hex			hex	hex						DL	DL	hex
91	D1	j			hex	hex						D1	D1	hex
92	D2	k			hex	hex						D2	D2	hex
93	D3	l			hex	hex						D3	D3	hex
94	D4	m			hex	hex						D4	D4	hex
95	NK	n			hex	hex						NK	NK	hex
96	SY	o			hex	hex						SY	SY	hex
97	EB	p			hex	hex						EB	EB	hex
98	CN	q			hex	hex						CN	CN	hex
99	EM	r			hex	hex						EM	EM	hex
9A	SB	hex			hex	hex						SB	SB	hex
9B	EC	hex			hex	hex						EC	EC	hex
9C	FS	hex			hex	hex						FS	FS	hex
9D	GS	hex			hex	hex						GS	GS	hex
9E	RS	hex			hex	hex						RS	RS	hex
9F	US	hex			hex	hex						US	US	hex

Table D2-1 (continued)

INPUT HEX	ASCII	EBCDIC	EBCD LOWER UPPER	XS-3	IPARS	REV EBCD LOWER UPPER	BAUDOT LETTERS FIGURES	SELECTRIC LOWER UPPER	JIS7 LOWER UPPER	JIS8	
A0	space	hex		hex	hex				space	space	hex
A1	!	-		hex	hex				!	!	!
A2	"	s		hex	hex				"	"	"
A3	#	t		hex	hex				#	#	#
A4	\$	u		hex	hex				\$	\$	\$
A5	%	v		hex	hex				%	%	%
A6	&	w		hex	hex				&	ヲ	ヲ
A7	'	x		hex	hex				'	ア	ア
A8	(	y		hex	hex				(	イ	イ
A9	)	z		hex	hex				)	ウ	ウ
AA	*	hex		hex	hex				*	エ	エ
AB	+	hex		hex	hex				+	オ	オ
AC	.	hex		hex	hex				.	ヤ	ヤ
AD	dash	hex		hex	hex				dash	ユ	ユ
AE	.	hex		hex	hex				.	ヨ	ヨ
AF	/	hex		hex	hex				/	ツ	ツ
B0	0	hex		hex	hex				0	ー	ー
B1	1	hex		hex	hex				1	ア	ア
B2	2	hex		hex	hex				2	イ	イ
B3	3	hex		hex	hex				3	ウ	ウ
B4	4	hex		hex	hex				4	エ	エ
B5	5	hex		hex	hex				5	オ	オ
B6	6	hex		hex	hex				6	カ	カ
B7	7	hex		hex	hex				7	キ	キ
B8	8	hex		hex	hex				8	ク	ク
B9	9	hex		hex	hex				9	ケ	ケ
BA	:	hex		hex	hex				:	コ	コ
BB	;	hex		hex	hex				;	サ	サ
BC	<	hex		hex	hex				<	シ	シ
BD	=	hex		hex	hex				=	ス	ス
BE	>	hex		hex	hex				>	セ	セ
BF	?	hex		hex	hex				?	ソ	ソ

Table D2-1 (continued)

INPUT HEX	ASCII	EBCDIC	EBCD		XS-3	IPARS	REV EBCD		BAUDOT LETTERS FIGURES	SELECTRIC		JIS7		JIS8
			LOWER	UPPER			LOWER	UPPER		LOWER	UPPER	LOWER	UPPER	
C0	@	{			hex	hex					@	タ	タ	
C1	A	A			hex	hex					A	チ	チ	
C2	B	B			hex	hex					B	ツ	ツ	
C3	C	C			hex	hex					C	テ	テ	
C4	D	D			hex	hex					D	ト	ト	
C5	E	E			hex	hex					E	ナ	ナ	
C6	F	F			hex	hex					F	ニ	ニ	
C7	G	G			hex	hex					G	ヌ	ヌ	
C8	H	H			hex	hex					H	ネ	ネ	
C9	I	I			hex	hex					I	ノ	ノ	
CA	J	hex			hex	hex					J	ハ	ハ	
CB	K	hex			hex	hex					K	ヒ	ヒ	
CC	L	hex			hex	hex					L	フ	フ	
CD	M	hex			hex	hex					M	ヘ	ヘ	
CE	N	hex			hex	hex					N	ホ	ホ	
CF	O	hex			hex	hex					O	マ	マ	
D0	P	}			hex	hex					P	ヨ	ヨ	
D1	Q	J			hex	hex					Q	ム	ム	
D2	R	K			hex	hex					R	メ	メ	
D3	S	L			hex	hex					S	モ	モ	
D4	T	M			hex	hex					T	ヤ	ヤ	
D5	U	N			hex	hex					U	ユ	ユ	
D6	V	O			hex	hex					V	ヨ	ヨ	
D7	W	P			hex	hex					W	ラ	ラ	
D8	X	Q			hex	hex					X	リ	リ	
D9	Y	R			hex	hex					Y	ル	ル	
DA	Z	hex			hex	hex					Z	レ	レ	
DB	[	hex			hex	hex					[	ロ	ロ	
DC	\	hex			hex	hex					\	コ	コ	
DD	]	hex			hex	hex					]	ク	ク	
DE	^	hex			hex	hex					^	カ	カ	
DF	_	hex			hex	hex					_	キ	キ	

underline

Table D2-1 (continued)

INPUT HEX	ASCII	EBCDIC	EBCD		XS-3	IPARS	REV EBCD		BAUDOT		SELECTRIC		JIS7		JIS8
			LOWER	UPPER			LOWER	UPPER	LETTERS	FIGURES	LOWER	UPPER	LOWER	UPPER	
E0	.	{			hex	hex					.	hex	hex		
E1	a	hex			hex	hex					a	hex	hex		
E2	b	S			hex	hex					b	hex	hex		
E3	c	T			hex	hex					c	hex	hex		
E4	d	U			hex	hex					d	hex	hex		
E5	e	V			hex	hex					e	hex	hex		
E6	f	W			hex	hex					f	hex	hex		
E7	g	X			hex	hex					g	hex	hex		
E8	h	Y			hex	hex					h	hex	hex		
E9	i	Z			hex	hex					i	hex	hex		
EA	j	hex			hex	hex					j	hex	hex		
EB	k	hex			hex	hex					k	hex	hex		
EC	l	hex			hex	hex					l	hex	hex		
ED	m	hex			hex	hex					m	hex	hex		
EE	n	hex			hex	hex					n	hex	hex		
EF	o	hex			hex	hex					o	hex	hex		
F0	p	0			hex	hex					p	hex	hex		
F1	q	1			hex	hex					q	hex	hex		
F2	r	2			hex	hex					r	hex	hex		
F3	s	3			hex	hex					s	hex	hex		
F4	t	4			hex	hex					t	hex	hex		
F5	u	5			hex	hex					u	hex	hex		
F6	v	6			hex	hex					v	hex	hex		
F7	w	7			hex	hex					w	hex	hex		
F8	x	8			hex	hex					x	hex	hex		
F9	y	9			hex	hex					y	hex	hex		
FA	z	hex			hex	hex					z	hex	hex		
FB	{	hex			hex	hex					{	hex	hex		
FC	:	hex			hex	hex					:	hex	hex		
FD	}	hex			hex	hex					}	hex	hex		
FE	-	hex			hex	hex					-	hex	hex		
FF	pad	hex			hex	hex					pad	hex	hex		

## Appendix D3: User-Defined Codes

The character set shown in Table D3-1 can be used to adapt existing code sets or to create customized codes. Follow the steps in the example below to create a new code set.

As an example, we'll change the standard ASCII code set to one which includes the ¥ (yen) symbol.

1. *Determine hex values.* First, we will determine which hexadecimal value or values we want to have generate the ¥ symbol, one for space parity and one for mark parity. In our example, the values will be hexadecimal 5C and DC.
2. *Read existing code file to spreadsheet.* Whether adapting an existing code set or creating a new one, use an existing code file as a template. (Some files include shifted and unshifted coding.) Go to the Protocol Spreadsheet and press **EDIT**, **BLOCK (F1)**, **IN/OUT (F7)**, **READ/U (F3)**. Enter the name of the file when prompted. The absolute pathname of the standard ASCII code file is *HRD/sys/codes/ASCII*. Press **GO**. Do not use the Load command on the File Maintenance screen to access the file.

The ASCII code set will be displayed on the Protocol Spreadsheet, as in Figure D3-1. Initially, the file is highlighted on the Protocol Spreadsheet in reverse video. You may clear the highlighting by pressing **DOWN**, **F3**. Since you will be writing your revised code set back to a file, however, you may want to retain the highlighting. Then you will not have to identify the block again before writing.

3. *Locate position.* Positions in the code proceed sequentially, beginning with hexadecimal 00 and ending with FF. Each row in the code table contains eight elements. The first two rows, for example, correspond to hex 00 through 0F. The next two rows contain elements in positions 10 through 1F, and so on. Move the cursor to position 5C.

```

** Protocol Spreadsheet **
Name of file: HRD/sys/codes/ASCII
//
// Code for ASCII
//
Version: 3;
Name: "ASCII";
To Graphic:
nu sh  sx  ex  et  eq  ak  bl
bs ht  lf  vt  ff  cr  so  si
dl dl  d2 d3 d4 nk sy eb
cn em  sb  ec  fs  gs  rs  us
',' '!' ',' '#' '$' '%' '&' ''
'(' ')' '*' '+' ', ' '-' ' ' '/'

```

F 1	F 2	F 3	F 4	F 5	F 6	F 7	F 8
BEGIN	END	CLEAR	DELETE	MOVE	COPY	IN/OUT	

Figure D3-1 When the standard ASCII code file is written to the Protocol Spreadsheet, a code table appears with 32 rows of eight elements per row, corresponding to 256 possible hex values.

4. *Enter new code.* Replace the entry with a new value. Refer to Table D3-1. All values under "Code-Table Entry" are three-digit hexadecimal. A leading zero identifies an entry as a numerical value and guarantees accurate translation. Notice in Figure D3-1 that there is special notation for ASCII control characters. A *dl* entry, for example, translates as the ASCII control character  $\rho$ . Entered as *0dl* (or *0D1*), the meaning is  $\rho$ . Values which begin with a digit in the range 0-9, 80 for example, do not strictly require the leading zero. Also notice in Figure D3-1 and Figure D3-2 that alphanumerics may be entered as character constants. A set of single quotation marks surrounds a character constant, an alternative way of entering ASCII keyboard characters.

In our example, replace '\ ' with *080*. Figure D3-2 shows the set after the first replacement. Next, locate and edit position DC.



```

** Protocol Spreadsheet **
Name of file: HRD/sys/codes/ASCII
Name: "ASCII";

To Graphic:

nu  sh  sx  ex  et  eq  ak  bl
bs  ht  lf  vt  ff  cr  so  si
dl  dl  d2 d3  d4  nk  sy  eb
cn  em  sb  ec  fs  gs  rs  us
',' '!' '",' '#,' '$,' '%,' '&,' ''
'(' ')' '*,' '+,' ',,' '-' '._' '/'
'0' '1' '2' '3' '4' '5' '6' '7'
'8' '9' ':' ';' '<' '=' '>' '?'
'@' 'A' 'B' 'C' 'D' 'E' 'F' 'G'
'H' 'I' 'J' 'K' 'L' 'M' 'N' 'O'
'P' 'Q' 'R' 'S' 'T' 'U' 'V' 'W'
'X' 'Y' 'Z' '[' 080 ']' '^' '_'

F 1   F 2   F 3   F 4   F 5   F 6   F 7   F 8
BEGIN  END   CLEAR DELETE MOVE  COPY  IN/OUT

```

Figure D3-2 On the bottom line of the spreadsheet, the entry 080 has replaced the previous entry. On Table D3-1, 080 corresponds to the yen symbol.

5. *Write file to disk.* If you cleared the highlighting, mark the file via the BLOCK, BEGIN, and END softkey selections. Use the BLOCK, IN/OUT, and WRITE/U commands to write your code to the disk. Give the file a different name to prevent an existing file from being overwritten.
6. *Reboot.* Turn the INTERVIEW off. When you turn the unit back on, it will reboot and automatically load in the new (or edited) code set. The first seven characters in the name of the code file will be displayed as a softkey selection for the Code field on the Line Setup screen.

**NOTE:** If your code contains an error—a hexadecimal value does not begin with a digit, for example—it will not be loaded into the INTERVIEW's memory, even if it appears as a Code selection on the Line Setup menu. Usually, the standard ASCII code will be used instead.

**Table D3-1  
Code-Set Characters**

Character	Code-Table Entry	Character	Code-Table Entry
ℵ	000	ℵ	01b
ℵ <sub>4</sub>	001	ℵ <sub>5</sub>	01c
ℵ <sub>x</sub>	002	ℵ	01d
ℵ <sub>x</sub>	003	ℵ <sub>5</sub>	01e
ℵ <sub>4</sub>	004	ℵ	01f
ℵ <sub>0</sub>	005	(space)	020
ℵ <sub>k</sub>	006	!	021
ℵ <sub>l</sub>	007	"	022
ℵ <sub>5</sub>	008	#	023
ℵ <sub>4</sub>	009	\$	024
ℵ <sub>4</sub>	00a	%	025
ℵ <sub>4</sub>	00b	&	026
ℵ <sub>F</sub>	00c	'	027
ℵ <sub>R</sub>	00d	(	028
ℵ <sub>0</sub>	00e	)	029
ℵ <sub>1</sub>	00f	*	02a
ℵ <sub>l</sub>	010	+	02b
ℵ <sub>1</sub>	011	,	02c
ℵ <sub>2</sub>	012	-	02d
ℵ <sub>3</sub>	013	.	02e
ℵ <sub>4</sub>	014	/	02f
ℵ <sub>k</sub>	015	0	030
ℵ <sub>4</sub>	016	1	031
ℵ <sub>4</sub>	017	2	032
ℵ <sub>4</sub>	018	3	033
ℵ <sub>4</sub>	019		
ℵ <sub>0</sub>	01a		

Table D3-1 (continued)

Character	Code-Table Entry	Character	Code-Table Entry
4	034	P	050
5	035	Q	051
6	036	R	052
7	037	S	053
8	038	T	054
9	039	U	055
:	03a	V	056
;	03b	W	057
<	03c	X	058
=	03d	Y	059
>	03e	Z	05a
?	03f	[	05b
@	040	\	05c
A	041	]	05d
B	042	^	05e
C	043	_	05f
D	044	`	060
E	045	a	061
F	046	b	062
G	047	c	063
H	048	d	064
I	049	e	065
J	04a	f	066
K	04b	g	067
L	04c	h	068
M	04d	i	069
N	04e		
O	04f		

Table D3-1(continued)

Character	Code-Table Entry	Character	Code-Table Entry
J	06a	ヲ	086
k	06b	ア	087
l	06c	イ	088
m	06d	ウ	089
n	06e	エ	08a
o	06f	オ	08b
p	070	カ	08c
q	071	ク	08d
r	072	コ	08e
s	073	ケ	08f
t	074	ー	090
u	075	ア	091
v	076	イ	092
w	077	ウ	093
x	078	エ	094
y	079	オ	095
z	07a	カ	096
{	07b	キ	097
	07c	ク	098
}	07d	ケ	099
~	07e	コ	09a
///	07f	サ	09b
¥	080	シ	09c
▪	081	ス	09d
┌	082	セ	09e
└	083	ソ	09f
、	084		
•	085		

Table D3-1(continued)

Character	Code-Table Entry	Character	Code-Table Entry
夕	0a0	□	0bb
チ	0a1	◻	0bc
ツ	0a2	◻	0bd
テ	0a3	”	0be
ト	0a4	•	0bf
ナ	0a5	Ç	0c0
ニ	0a6	Ú	0c1
ヌ	0a7	é	0c2
ネ	0a8	â	0c3
ノ	0a9	ä	0c4
ハ	0aa	à	0c5
ヒ	0ab	â	0c6
フ	0ac	Ç	0c7
ヘ	0ad	ê	0c8
ホ	0ae	ë	0c9
マ	0af	è	0ca
ミ	0b0	ï	0cb
ム	0b1	î	0cc
メ	0b2	ì	0cd
モ	0b3	Ë	0ce
ヤ	0b4	Ä	0cf
ユ	0b5	É	0d0
ヨ	0b6	æ	0d1
ラ	0b7	ƒ	0d2
リ	0b8	ó	0d3
ル	0b9		
レ	0ba		

**Table D3-1(continued)**

Character	Code-Table Entry	Character	Code-Table Entry
ö	0d4	ú	0e3
ò	0d5	ñ	0e4
ù	0d6	ñ	0e5
ù	0d7	ä	0e6
ÿ	0d8	ø	0e7
Ö	0d9	č	0e8
Ü	0da	ı	0e9
ϕ	0db	ı	0ea
£	0dc	½	0eb
ß	0dd	¼	0ec
Ŕ	0de	ı	0ed
Œ	0df	ı	0ee
ä	0e0	§	0ef
ı	0e1	°	0f0 †
ó	0e2		

† Values 0f1-0ff are undefined.

## Appendix E: Communications with the AR Division Factory

All communications with the factory of the AR Division of Telenex Corporation begin with a call to Customer Service:

Customers outside the Washington D.C. Greater Metropolitan Area and Virginia	1-800-368-3261
In Virginia	1-703-644-9190
Local customers	644-9190

If necessary, Customer Service will direct your call to the appropriate department.

### E.1 Returning an INTERVIEW or Subassemblies for Repair

#### (A) Authorization

1. The first step is always to call AR Division Customer Service in Springfield, Virginia.
2. Customer Service will issue a RETURN AUTHORIZATION (RA) number. This number should be posted on the outside of the package of all equipment returned for repair. The RA number, as well as a description of the problem, should be cited in all documentation, written correspondence, or telephone conversations concerning the specific repair.

*WARNING: Special RA numbers are issued for customers who have purchased a Maintenance Agreement plan (or plans) from AR Division. Since these numbers identify equipment under maintenance, you must post this RA number on the outside of the package in order for AR Division to honor the terms of the Maintenance Agreement.*

3. Turnaround time for repairs is usually two weeks in addition to transportation time. Customer Service can arrange to furnish a rental unit if it is not practical for you to be without the equipment for that length of time. We can either include the rental fee on the repair bill or bill the rental fee separately.

**NOTE:** AR Division offers expedited service Maintenance Agreement plans. Under these plans, the customer chooses between expedited repair (72-hour factory turnaround) or a loaner unit for the duration of the repair. Contact Customer Service for complete details.

### **(B) Shipping**

1. Always include with the shipment a detailed description of the problem to be corrected. Put the assigned RA number on this document.
2. If the item is out of warranty, you should either
  - a. provide a purchase order for the repair, or
  - b. request an estimate of the amount of the repair.
3. Select suitable packing materials for electronic equipment containing a cathode ray tube, and pack the INTERVIEW with care. If possible, the carton and foam packing material in which you received the equipment should be used for returning it for repairs.
4. Write the return authorization number on the outside of the shipment: "ATTN RA *number*."
5. International customers should address the shipment to

Telenex Corporation, AR Division  
ATTN RA *number*  
c/o Emery Customs Brokers  
101A Executive Drive  
Sterling, Virginia 22170  
U.S.A.

**NOTE:** For customs purposes, international customers *MUST* identify the country of origin (usually the U.S.A.) for returned equipment on the *pro forma* invoice. When returning an individual part, use the country of origin listed on the part.



6. Domestic customers should address the shipment to

Customer Service  
Telenex Corporation  
AR Division  
ATTN RA *number*  
7401 Boston Boulevard  
Springfield, Virginia 22153  
U.S.A.

7. Ship **PREPAID** *even if you have a Maintenance Agreement with AR Division.* No collect shipments will be accepted unless previously authorized by Customer Service.
8. Most repairs will be completed within two weeks, not including transportation time.

## **E.2 Ordering Replacement Parts or Assemblies**

To obtain price quotations or to order spare or replacement parts, contact Customer Service. Customer Service will need to know the model designation of the unit, its serial number and software version, and what options are installed.

## **E.3 PC Board or Subassembly Exchanges**

The AR Division's repair replacement policy applies to the exchange of PC Boards or Subassemblies that need repair. Please contact Customer Service.

## **E.4 For Analysis of Problems**

For applications, troubleshooting, or repair problems requiring technical assistance, call Customer Service.

## **E.5 Warranties**

There is a standard warranty on all AR Division equipment. This warranty is for 12 months.

Extended and/or Expedited Service Agreements are available for INTERVIEW 7000 Series equipment. Operating system software maintenance is also offered. Please contact Customer Service.

## **E.6 Loaner Units**

Loaner units are available under some hardware Maintenance Agreement plans. Contact Customer Service for additional information.



## Appendix F: Packing and Shipping Instructions

The INTERVIEW is usually shipped either as baggage or as freight. The basic difference, of course, is in quantity and quality of handling to which the unit is subjected. It follows that different packing methods are called for.

When a unit is shipped as baggage, it will probably be subjected to much less severe treatment than when it is shipped by freight. The AR Division of Telenex Corporation offers its INTERVIEW Soft Pack Travel Bag, Option No. OPT-951-99-1, for this purpose. This bag has two inches of high-density foam protecting all surfaces of the INTERVIEW. It is yellow for easy identification among other luggage. An identification card case, FRAGILE markings, and leather appointments are standard features. On the outside is a large pocket for carrying notes, manuals, and so forth.

Before packing the INTERVIEW in the carrying bag, remove any diskettes from the microdiskette drives. To protect the heads during transit, insert the two yellow plastic shipping diskettes that were delivered with the unit, one in each drive. The manual should go in the front (center) pocket of the travel bag. There is an inside pocket for the power cord and other cables.

Put the INTERVIEW in the bag with its handle up (as in Figure F-1). Then close and secure the bag cover with its velcro closing.

*CAUTION: The bag is considered to be reasonable protection for the INTERVIEW when it is shipped as baggage. However, it should never be used for freight shipment. The AR Division of Telenex Corporation can assume no liability for damage to units shipped this way, owing to circumstances beyond our control.*

For freight shipment, the INTERVIEW should be packed in molded polyurethane foam and a heavy-duty outer cardboard carton, as delivered by AR Division. All manuals and accessories should be packed in a separate box within the carton. This packing system has been designed to give maximum reasonable protection to the INTERVIEW and ensure its safe arrival. However, damages due to mishandling must be the responsibility of the carrier.

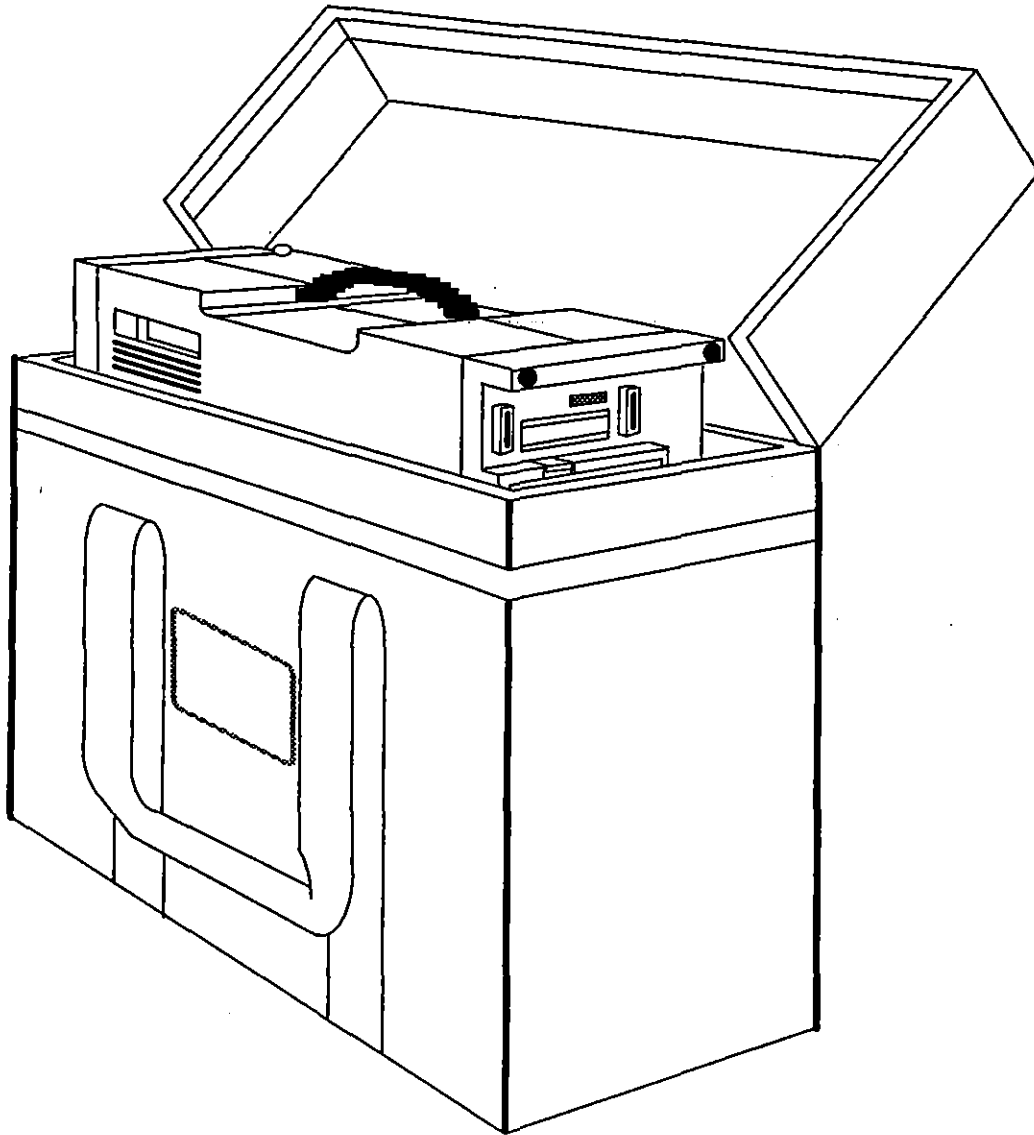


Figure F-1 Soft Pack Travel Bag, Option 99.



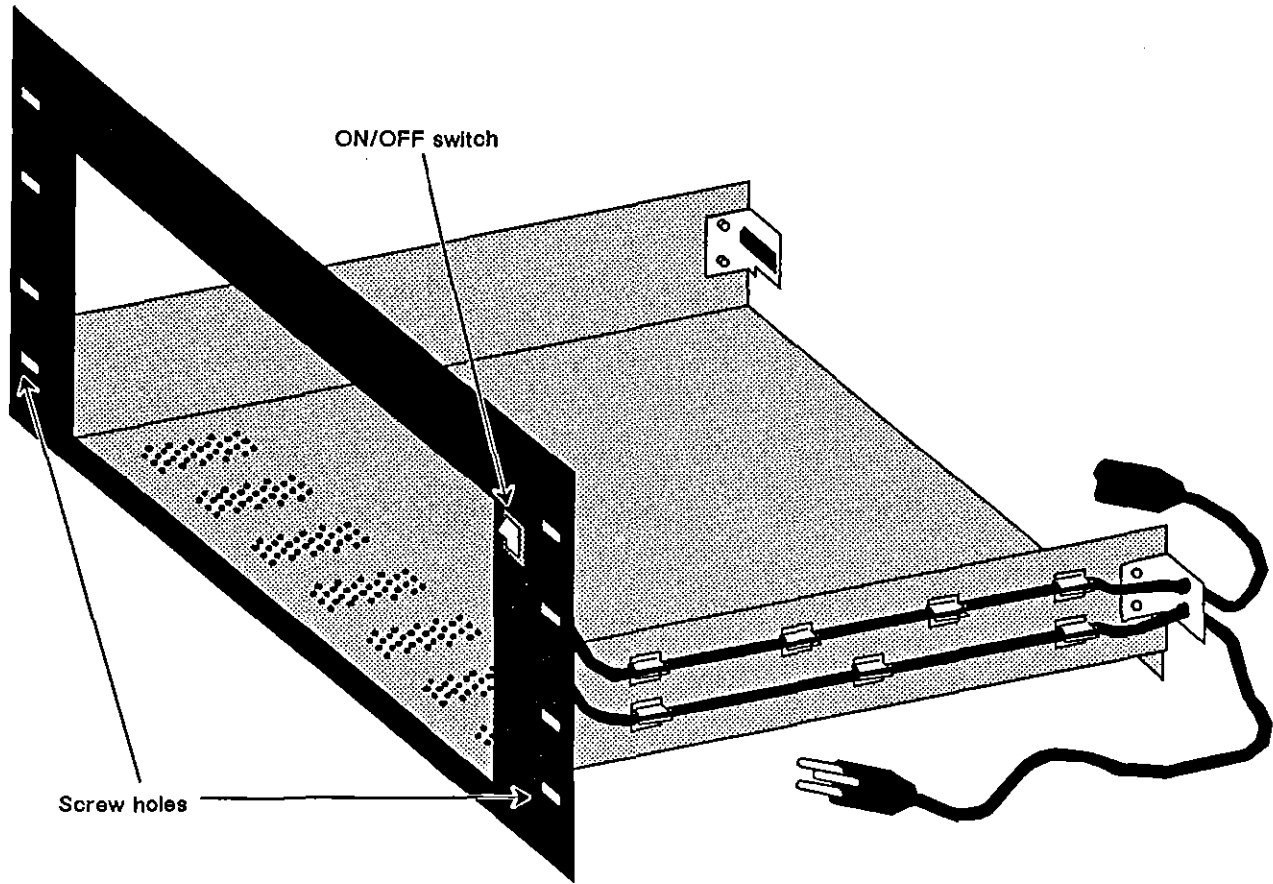
Figure F-2 Hard Shell Travel Case, Option 95.

For freight shipment, we also recommend the hard-shell travel case (OPT-951-95-1). See Figure F-2. This is a wheeled suitcase made of high-impact plastic, steel and rubber. It is designed for use with all AR test equipment. Because it has built-in wheels and an extension handle, the hard-shell travel case is especially useful for frequent hand-toting of the instrument.

**NOTE:** Please do not return any unit to the AR Division without prior authorization (see Appendix E).



**Appendix G: Rack Mount (OPT-951-98-1)**



**Figure G-1** Rack mount for INTERVIEW.



## Appendix G: Rack Mount (OPT-951-98-1)

A Rack Mount Kit (OPT-951-98-1) allows the INTERVIEW to be installed in a standard 19-inch wide equipment rack.

### G.1 General Description

The Kit will fit either standard vertical high-boy or sloped front-panel, low-boy racks. Please note that, for proper installation, the rack must be equipped with a horizontal writing shelf.

The Rack Mount Kit offers the user slide-in/out mounting with a sloped keyboard position.

Physical specifications are as follows:

Height: 10.5 inches  
Width: 19 inches  
Depth: 18 inches  
Weight: approximately 5.5 pounds

### G.2 Installation

1. Install the rack mount into the front of the cabinet directly above the writing shelf. Secure the rack mount with the eight sets of included black panel screws (AR #33689) and nut clips (AR #33686).
2. Slide the INTERVIEW about three-quarters of the way into the opening. *DO NOT SLIDE THE UNIT IN FURTHER AT THIS TIME.*
3. Open the front panel and rest the keyboard on the writing shelf by sliding back the top two blue latches. At this point the hooks of the latches are exposed out the front of the unit. Press down slightly on the recessed circle of these latches and continue to slide the latches inside the unit until they stop. The indented circle should be almost centered in the sliding area and the hooks of the latches are no longer visible from the front of the unit. *These latches must be properly placed or they will lock the keyboard shut if it is accidentally closed.*
4. Carefully slide the unit into the rack mount, with the keyboard lying open, until the front blue rubber bumpers on the right side of the unit are behind the face of the rack mount. You will have approximately one inch of the unit exposed out the front of the cabinet. The INTERVIEW is now in proper position for operation.

5. Notice the rack mount has two electrical wires connecting to a switch mounted on the right front of the rack. Plug the female connector of the top wire into the power connector, located at the bottom left of the rear panel of the unit. It is a standard three-wire grounded male connector.
6. The bottom wire of the rack mount is now the power connector for your unit. Plug this male connector into a standard outlet. Check the voltage selection; see Section 1.5(B). Turn on the power switch, located on the left side of the rear panel of the unit. This permits the ON/OFF switch on the rack mount to become the power switch for your unit.
7. To complete the connections on your unit, refer to Section 1, Hardware.

## Appendix H: Optional Codes JIS7/JIS8

JIS7 and JIS8 Katakana character sets are contained in files named *JIS7* and *JIS8* in the */sys/codes* directory of DSK-951-025-1, the floppy diskette that comprises software option OPT-951-22-1. The files should be copied into the */sys/codes* directory on the boot-up disk. When the unit is rebooted, the new codes will be available as Code selections on the Line Setup menu.

### H.1 Accessing the Directory Containing JIS7 and JIS8 Files

Insert the disk containing the optional codes into Floppy Drive 1 (FD1). With the unit powered on and booted, press **F10**, FMAINT to access the File Maintenance screen. Press CHNGDIR and FLOPPY1, then enter the following pathname in the Name field: */sys/codes*. The first two lines of your File Maintenance should look like the screen in Figure H-1.

Press **F2** to access the directory containing the *JIS7* and *JIS8* files.

** File Maintenance **				
Command:	<b>CHANGE DIR</b>	Push <b>XEQ</b> To Perform Command		
Drive:	<b>FD1</b>	Name:	<b>/sys/codes</b>	
Current Directory: HRD/usr				
Include	DIR	32	08/30/88	16:09
layer_pkgs	DIR	112	12/17/88	09:21
Enter Directory Pathname: /sys/codes				
<b>F 1</b>	<b>F 2</b>	<b>F 3</b>	<b>F 4</b>	<b>F 5</b>
<b>F 6</b>	<b>F 7</b>	<b>F 8</b>		

Figure H-1 To see the *JIS7* and *JIS8* files in the File Maintenance listings, you must change to the *FD1/sys/codes* directory.

## H.2 Copying JIS7 and JIS8 Files into /sys/codes Directory

Press COPY. Leave the source pathname on the From line blank: we will make the From selections via the **MARK** key in the body of the current directory listings themselves. Press the **↓** key to move the cursor to the To field.

On the To line, select the boot disk-drive. This may be the hard (HRD) drive; or you may install the boot-up diskette in Floppy Drive 2 (FD2). If your unit has only a single disk drive, you will use Floppy Drive 1 (FD1) to house first the source disk and then the destination (boot-up) diskette. In that case, select To: **NEW**.

In the Name data-entry field, type */sys/codes*. Be sure to type a slash (/) both before and after the *sys* entry.

Now move the cursor into the directory listings. With the blinking cursor positioned over the filename *JIS7*, press **MARK**. Move the cursor down over *JIS8* and mark this file as well.

Your screen should resemble the screen drawn in Figure H-2. Press **XEQ** to copy the *JIS7* and *JIS8* files to the */sys/codes* directory on the boot disk.

If you are using a single-drive unit, prompts will "walk" you through the exchange of disks in the single drive.

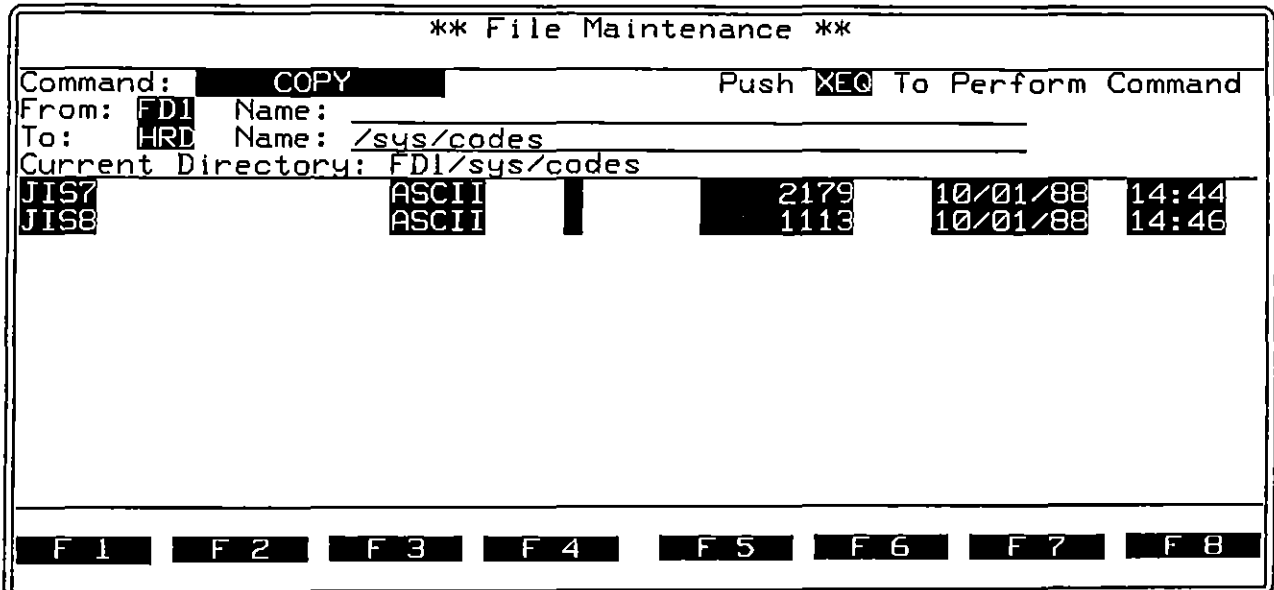


Figure H-2 You may use the **MARK** key to select both JIS files for copying into the */sys/codes* directory on the boot disk.

### H.3 Selecting JIS7 or JIS8 Code

Once the JIS files are copied into the */sys/codes* directory, reboot the unit as follows: turn the unit off, wait ten seconds, then turn the power switch on again.

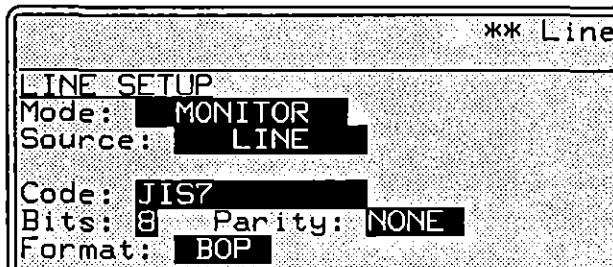


Figure H-3 Files loaded into the */sys/codes* directory are selectable in the *Code* field on the Line Setup menu.

After bootup, press **PROGRAM**, **SETUP**, **LINE**, to access the Line Setup menu. Move the cursor down to the **Code** field. Press **ROLL FWD** or **ROLL BACK** to rotate the selections in this field until you have verified that **JIS7** and **JIS8** are available as new code selections. Figure H-3 shows a line setup with **JIS7** selected in the **Code** field.

### H.4 Testing with JIS7/JIS8

In your line setup, be sure to change **Mode**: **AUTOMON** to **MONITOR** or to one of the emulate modes. The Automonitor sequence will not configure the unit to run with JIS7/JIS8 code, and it will usually change the code selection to **ASCII**.

Figure H-4 shows a screen display for JIS7, a shifted code. Note that the messages with Katakana text begin with Shift Out (**␣**, hex **0e**).

When you type monitor/receive strings or transmit strings into your program, the characters displayed on the trigger menus or on the Protocol Spreadsheet will always be ASCII. Use the JIS7 and JIS8 charts in Appendix D to correlate your ASCII data-entries with the actual JIS7/JIS8 characters that will be searched for or transmitted.

```

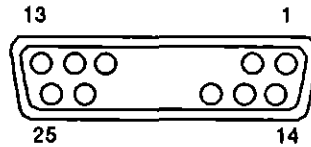
*MON/DISK/FD1*          BLK=00095 P 12/08/88
JIS7/8/NONE/BOP
x. 二@. . . . . = 9 5 ツ % / 1 0 - .   コレハ、ワシントンワカトウキョウヘノ、エコー・テストテ
. . . . . 9 5 @ . . . . .
. . . . . 9 5 D % / 1 0 - .   コレハ、ワシントンワカトウキョウヘノ、エコー・テストテ" ス。 9 5 @ . . .
o, this is an echo test from Washington DC t
. . . . .
! , @ . . . . .
. . . . . 9 5 / 9 5 % ; 'hello, this is an echo test from Was
. . . . . A * @ # L 9 5 # * @ . . . . . N 9 5 % / 1 0 - .   コレハ、ワシントンワカトウキョウヘノ、
G @ . . . . . 9 5 @ . . . . . 9 5 @ . . . . .
. . . . . 9 5 ; ' ; @ . . . . .
. . . . . 9 5 ( @ . . . . . 9 5 9 5 % / 1 0 - .   コレハ、ワシントンワカトウキョウヘノ、エコー・テストテ
. . . . .
. . . . .
CENTER 4 9          ** ST
F 1    F 2    F 3    F 4    F 5    F
DATA          STATS

```

Figure H-4 JIS7 is a shifted code, with an upshift character (SO) preceding Katakana conversion and a downshift character (SI) preceding ASCII conversion.

## **Appendix I: Interface Specifications**

**Table I-1  
Remote Connector**

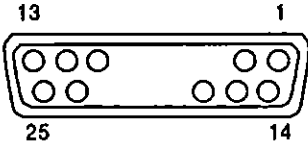


(DB-25, female)

Pin No.	Pin Name	Signal Description
1	Frame Ground	Ground
2	TD	RS-232/V.24 Output
3	RD	RS-232/V.24 Input
4	RTS	RS-232/V.24 Output
5	CTS	RS-232/V.24 Input
6		
7	Signal Ground	Ground
8	CD	RS-232/V.24 Input
9		
10		
11		
12		
13		
14		
15	SCT	RS-232/V.24 Input
16		
17	SCR	RS-232/V.24 Input
18		
19		
20	DTR	RS-232/V.24 Output
21		
22		
23		
24		
25		



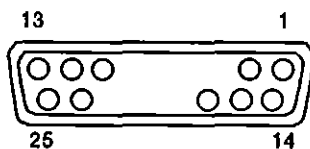
**Table I-2  
Printer Connector**



(DB-25, male)

Pin No.	Pin Name	Signal Description
1	Frame Ground	Ground
2	TD	RS-232/V.24 Input
3	RD	RS-232/V.24 Output
4	RTS	RS-232/V.24 Input
5	CTS	RS-232/V.24 Output
6	DSR	RS-232/V.24 Output
7	Signal Ground	Ground
8	CD	RS-232/V.24 Output
9		
10		
11		
12		
13		
14		
15	SCT	RS-232/V.24 Input
16		
17	SCR	RS-232/V.24 Input
18		
19		
20	DTR	RS-232/V.24 Input
21		
22		
23		
24		
25		

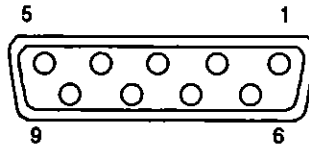
**Table I-3**  
**Auxiliary Connector**



(16-pin Bi-directional TTL Input/Output, DB-25, female)

Pin No.	Pin Name
1	PA0
2	PB0
3	PA1
4	PB1
5	PA2
6	PB2
7	PA3
8	PB3
9	PA4
10	PB4
11	PA5
12	PB5
13	PA6
14	PB6
15	PA7
16	PB7
17	Signal Ground
18	Reserved
19	Signal Ground
20	Reserved
21	Signal Ground
22	Reserved
23	Signal Ground
24	Reserved
25	Signal Ground

Table I-4  
RGB Monitor



(DB-9, female)

Pin No.	Pin Name
1	Signal Ground
2	Signal Ground
3	Red
4	Green
5	Blue
6	Brightness
7	Reserved
8	Horizontal Sync
9	Vertical Sync

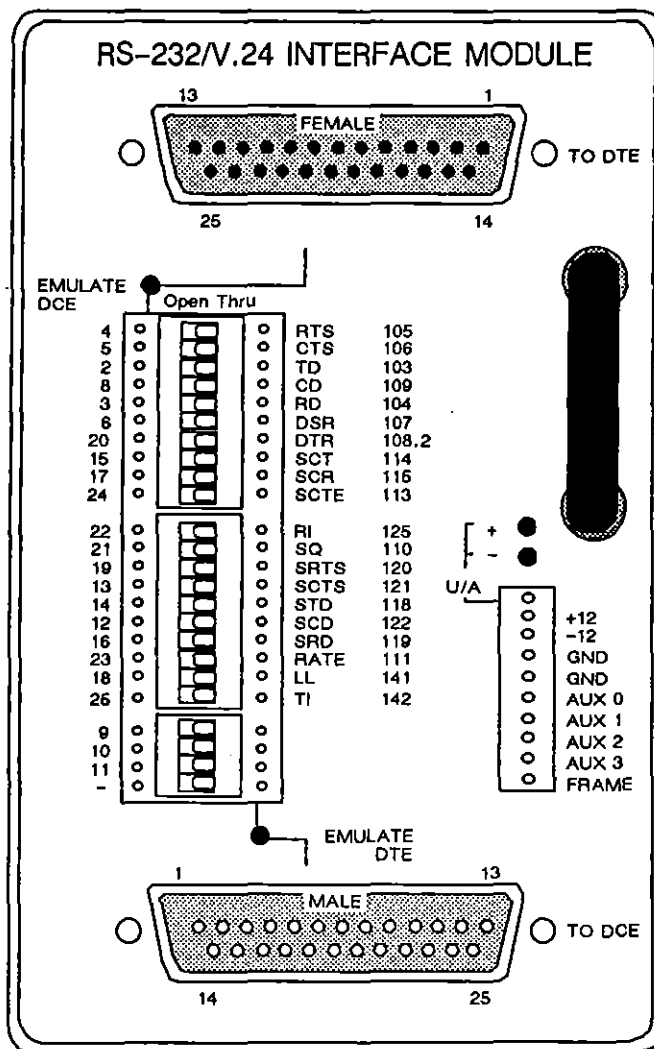


Figure I-1 RS-232/V.24 Interface Module.

**Table I-5  
RS-232 Test Interface Module**

Pin No.	Pin Name	Monitor Mode	Signal Description	
			To DCE (Em DTE) (DB-25, male)	To DTE (Em DCE) (DB-25, female)
1	Frame Ground	Frame Ground	Frame Ground	Frame Ground
2	TD	High Impedance Input	RS-232/V.24 Output	RS-232/V.24 Input
3	RD	High Impedance Input	RS-232/V.24 Input	RS-232/V.24 Output
4	RTS	High Impedance Input	RS-232/V.24 Output	RS-232/V.24 Input
5	CTS	High Impedance Input	RS-232/V.24 Input	RS-232/V.24 Output
6	DSR	High Impedance Input	RS-232/V.24 Input	RS-232/V.24 Output
7	Signal Ground	Signal Ground	Signal Ground	Signal Ground
8	CD	High Impedance Input	RS-232/V.24 Input	RS-232/V.24 Output
9	—	Test Point	Test Point	Test Point
10	—	Test Point	Test Point	Test Point
11	—	Test Point	Test Point	Test Point
12	SCD	Test Point	Test Point	Test Point
13	SCTS	Test Point	Test Point	Test Point
14	STD	Test Point	Test Point	Test Point
15	SCT	High Impedance Input	RS-232/V.24 Input	RS-232/V.24 Output
16	SRD	Test Point	Test Point	Test Point
17	SCR	High Impedance input	RS-232/V.24 Input	RS-232/V.24 Output
18	LL	Test Point	Test Point	Test Point
19	SRTS	Test Point	Test Point	Test Point
20	DTR	High Impedance Input	RS-232/V.24 Output	RS-232/V.24 Input
21	SQ	Test Point	Test Point	Test Point
22	RI	Test Point	Test Point	Test Point
23	DSRS	Test Point	Test Point	Test Point
24	SCTE	High Impedance Input	RS-232/V.24 Output	RS-232/V.24 Input
25	TI	Test Point	Test Point	Test Point

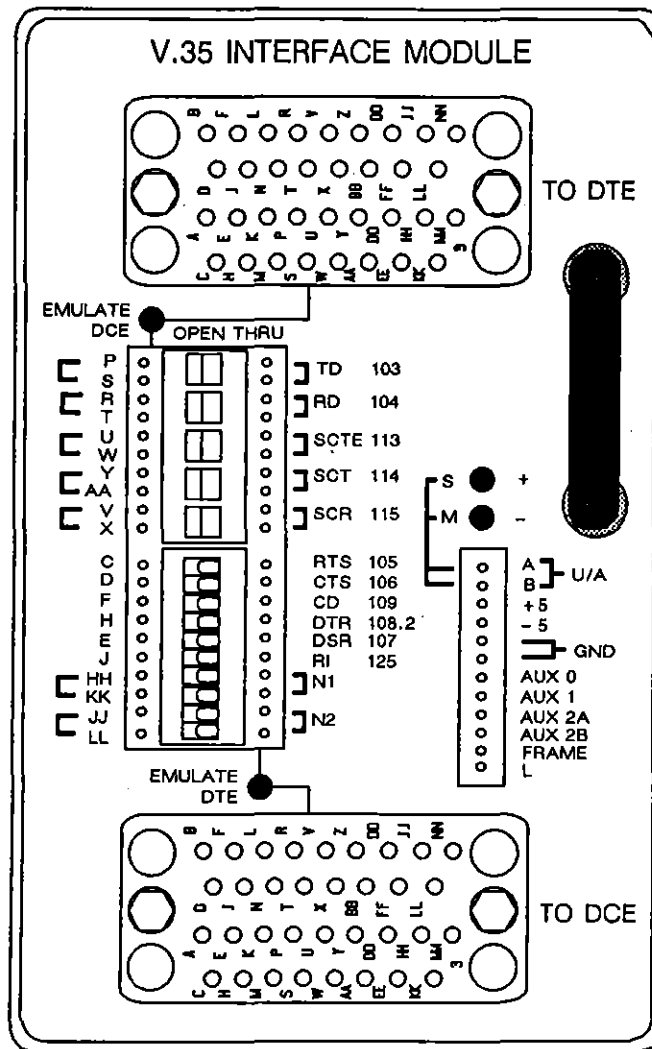


Figure I-2 V.35 Interface Module.

**Table I-6**  
**V.35 Test Interface Module**

Pin No.	Circuit	Signal	Monitor Mode	To DTE (Em DCE) (34-pin, female)	To DCE (Em DTE) (34-pin, female)
A	101	Frame Ground	Frame Ground	Frame Ground	Frame Ground
B	102	Signal Ground	Signal Ground	Signal Ground	Signal Ground
C	105	RTS	High Impedance Input	V.35 Input	V.35 Output
D	106	CTS	High Impedance Input	V.35 Output	V.35 Input
E	107	DSR	High Impedance Input	V.35 Output	V.35 Input
F	109	CD	High Impedance Input	V.35 Output	V.35 Input
H	108	DTR	High Impedance Input	V.35 Input	V.35 Output
J	125	RI	Test Point	Test Point	Test Point
R	104A	RD	High Impedance Input	V.35 Output	V.35 Input
T	104B				
V	115A	SCR	High Impedance Input	V.35 Output	V.35 Input
X	115B				
Y	114A	SCT	High Impedance Input	V.35 Output	V.35 Input
AA	114B				
P	103A	TD	High Impedance Input	V.35 Input	V.35 Output
S	103B				
U	113A	SCTE	High Impedance Input	V.35 Input	V.35 Output
W	113B				
K	F1	—	—	—	—
M	F1	—	—	—	—
L	F2	Test Point	Test Point	Test Point	Test Point
N	F2	—	—	—	—
Z	F3	—	—	—	—
BB	F3	—	—	—	—
CC	F4	—	—	—	—
EE	F4	—	—	—	—
DD	F5	—	—	—	—
FF	F5	—	—	—	—
HH	N1	{ Test Point	Test Point	Test Point	Test Point
KK	N1				
JJ	N2	{ Test Point	Test Point	Test Point	Test Point
LL	N2				
MM	F	—	—	—	—
NN	F	—	—	—	—

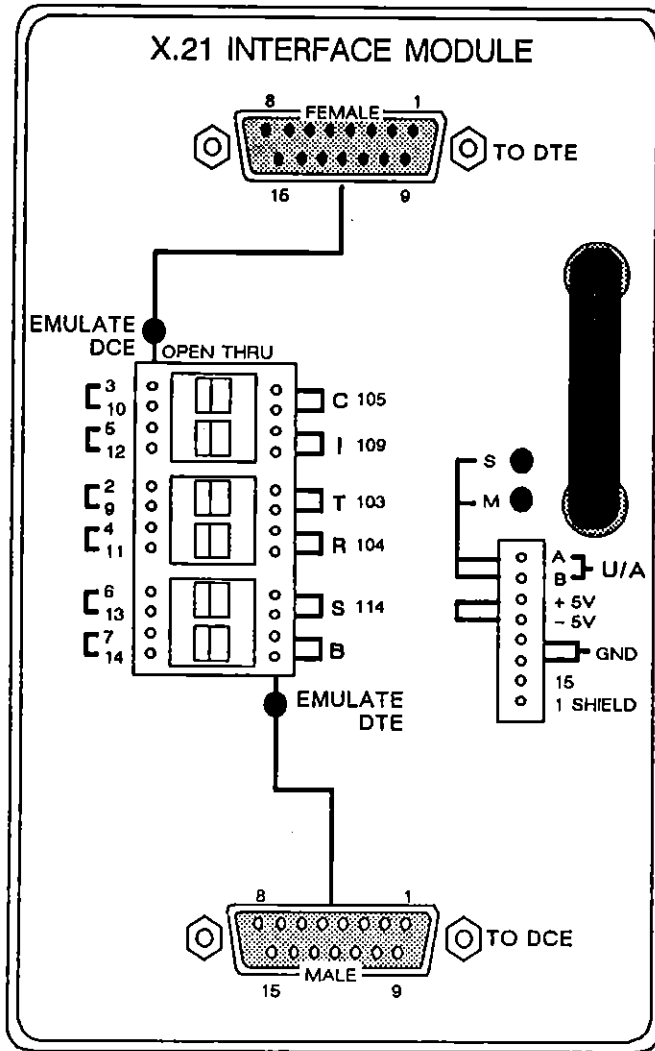


Figure I-3 X.21 Interface Module.

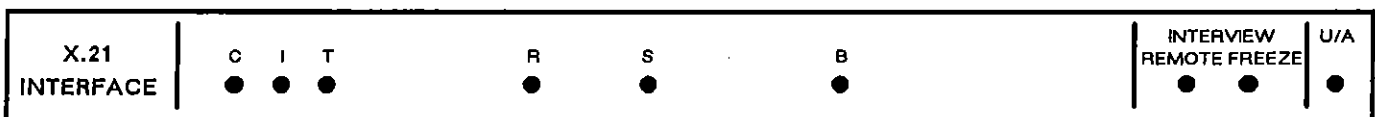


Figure I-4 X.21 LED Overlay.



**Table I-7**  
**X.21 Test Interface Module**

Pin No.	Circuit	Pin ID	Pin Name	Monitor Mode	Signal Description	
					To DCE (Em DTE) (15 Pin, male)	To DTE (Em DCE) (15 Pin, female)
1	—	Shield	Shield	Frame Ground	Frame Ground	Frame Ground
2,9	103	T	Transmit Data	High Impedance Input	X.21 Output	X.21 Input
3,10	105	C	Control	High Impedance Input	X.21 Output	X.21 Input
4,11	104	R	Receive Data	High Impedance Input	X.21 Input	X.21 Output
5,12	109	I	Indicator	High Impedance Input	X.21 Input	X.21 Output
6,13	114	S	Signal Timing	High Impedance Input	X.21 Input	X.21 Output
7,14	—	B	Byte Strobe	High Impedance Input	X.21 Input	X.21 Output
15	—	—	—	Test Point	Test Point	Test Point
Patch Panel:		U/A A,B*		High Impedance	High Impedance	High Impedance
				Differential Input	Differential Input	Differential Input
		+5V		Output	Output	Output
		-5V		Output	Output	Output
		GND	Ground	Ground	Ground	Ground

\* UA A and B can be used for balanced or unbalanced signals. (Do not connect B when you are looking at unbalanced signals.)

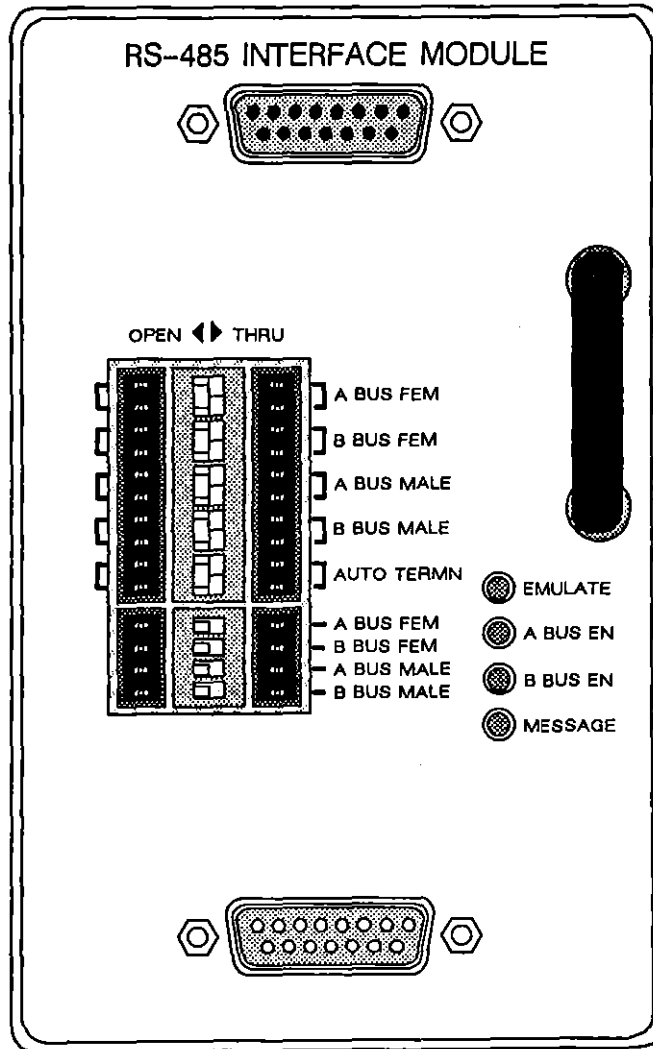


Figure I-5 RS-485 Interface Module.

**Table I-8**  
**RS-485 Test Interface Module**

Pin No.	Circuit	Pin ID	Monitor Mode	Signal Description	
				16 Pin, Male	16 Pin, Female
1	—	Shield	Frame Ground	Frame Ground	Frame Ground
2	103	A Bus +	High Impedance Input	RS-485 Output	RS-485 Input
9	103	A Bus -	High Impedance Input	RS-485 Output	RS-485 Input
3,10	—	—	—	—	—
4	104	B Bus +	High Impedance Input	RS-485 Input	RS-485 Output
11	104	B Bus -	High Impedance Input	RS-485 Input	RS-485 Output
5,12	—	—	—	—	—
6,13	—	—	—	—	—
7,14	—	—	—	—	—
15	—	—	—	—	—

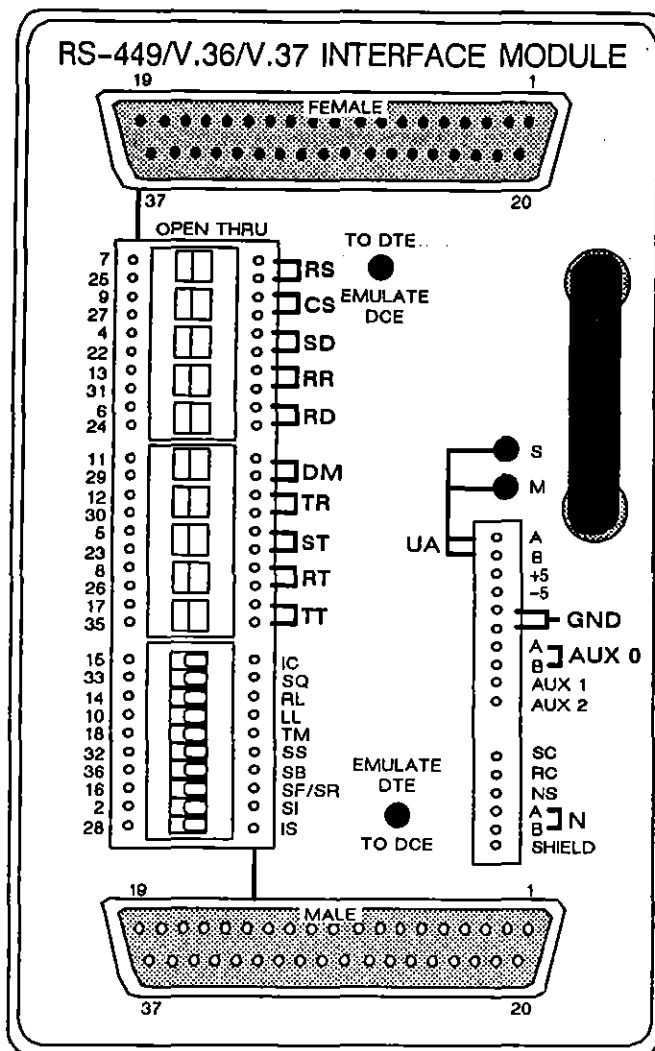


Figure I-6 RS-449/V.36/V.37 Interface Module.

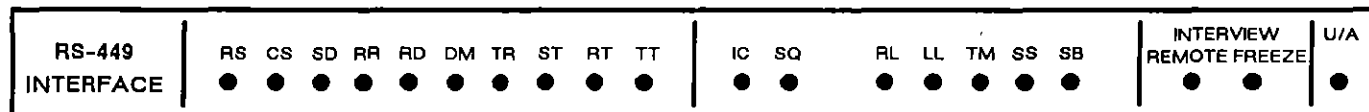


Figure I-7 RS-449/V.36/V.37 LED Overlay.

**Table I-9**  
**RS-449/V.36/V.37 Test Interface Module**

Pin No.	Pin ID	Pin Name	Monitor Mode	Signal Description	
				To DCE (Em DTE) (36 Pin, male)	To DTE (Em DCE) (36 Pin, female)
2	SI	Signalling Rate Indicator	Test Point	Test Point	Test Point
4,22	SD	Send Data	High Impedance Input	RS-449 Output	RS-449 Input
5,23	ST	Send Timing	High Impedance Input	RS-449 Input	RS-449 Output
6,24	RD	Receive Data	High Impedance Input	RS-449 Input	RS-449 Output
7,25	RS	Request to Send	High Impedance Input	RS-449 Output	RS-449 Input
8,26	RT	Receive Timing	High Impedance Input	RS-449 Input	RS-449 Output
9,27	CS	Clear to Send	High Impedance Input	RS-449 Input	RS-449 Output
10	LL	Local Loopback	High Impedance Input	Test Point	Test Point
11,29	DM	Data Mode	High Impedance Input	RS-449 Input	RS-449 Output
12,30	TR	Terminal Ready	High Impedance Input	RS-449 Output	RS-449 Input
13,31	RR	Receiver Ready	High Impedance Input	RS-449 Input	RS-449 Output
14	RL	Remote Loopback	High Impedance Input	High Impedance Input	High Impedance Input
15	IC	Incoming Call	High Impedance Input	High Impedance Input	High Impedance Input
16	SF/SR	Select Frequency/ Signalling Rate Selector	Test Point	Test Point	Test Point
17,35	TT	Terminal Timing	High Impedance Input	RS-449 Output	RS-449 Input
18	TM	Test Mode	High Impedance Input	High Impedance Input	High Impedance Input
19	SG	Signal Ground	Signal Ground	Signal Ground	Signal Ground
28	IS	In Service	Test Point	Test Point	Test Point
32	SS	Select Standby	High Impedance Input	High Impedance Input	High Impedance Input
33	SQ	Signal Quality	High Impedance Input	High Impedance Input	High Impedance Input
36	SB	Standby Indicator	High Impedance Input	High Impedance Input	High Impedance Input
<b>Auxiliary Patch Panel:</b>					
	UA A,B	Unassigned Input	High Impedance Input	High Impedance Input	High Impedance Input
	+5	+5 Volts	Output	Output	Output
	-5	-5 Volts	Output	Output	Output
19	GND	Ground	Signal Ground	Signal Ground	Signal Ground
	AUX0 A,B	Auxiliary	Output	Output	Output
	AUX1	Auxiliary	Output	Output	Output
	AUX2	Auxiliary	Output	Output	Output
37	SC	Send Common	Send Common	Send Common	Send Common
20	RC	Receive Common	Receive Common	Receive Common	Receive Common
34	NS	New Signal	Test Point	Test Point	Test Point
3,21	N A,B	National A, B	Reserved	Reserved	Reserved
1	SHIELD	Shield	Frame Ground	Frame Ground	Frame Ground

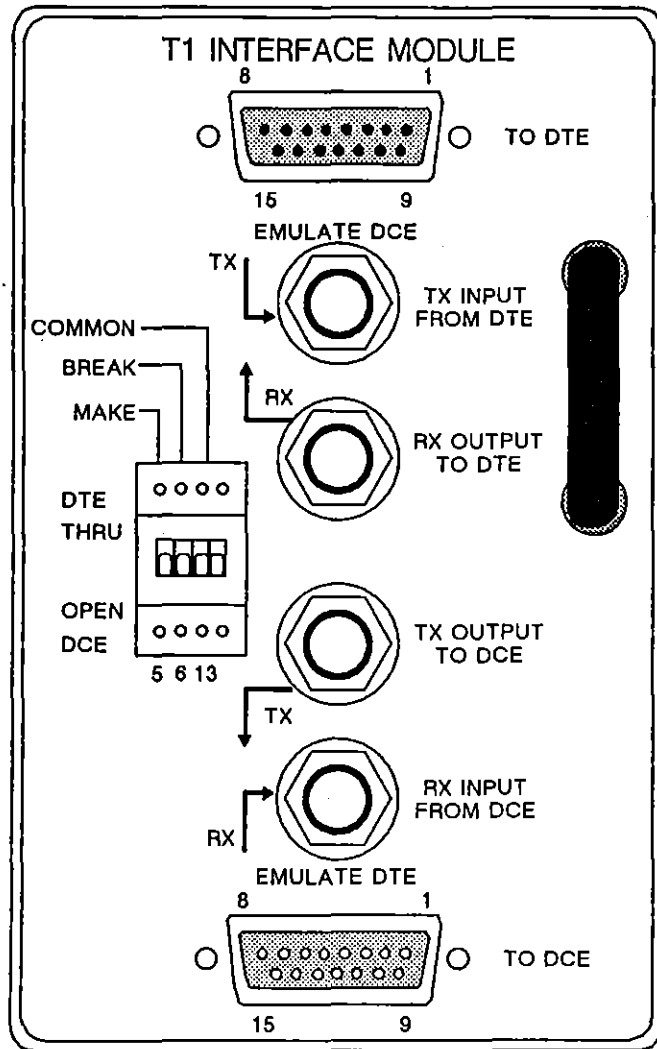


Figure I-8 T1 Interface Module.

Table I-10  
T-1 Test Interface Specifications <sup>1</sup>

Pin No.	Pin Name	Signal Description		
		Monitor	To DCE (Em DTE)	To DTE (Em DCE)
1	Send Data Tip	High Impedance Input	Output	Input
2	Frame Ground	Ground	Ground	Ground
3	Receive Data Tip	High Impedance Input	Input	Output
5	Remote Test Make	High Impedance Input	Test Point	Test Point
6	Remote Test Break	High Impedance Input	Test Point	Test Point
9	Send Data Ring	High Impedance Input	Output	Input
11	Receive Data Ring	High Impedance Input	Input	Output
13	Remote Test Common	High Impedance Input	Test Point	Test Point

(1) Unlisted connectors are wired 1-for-1 through the two connectors. Test points are connected to switches and test points only.

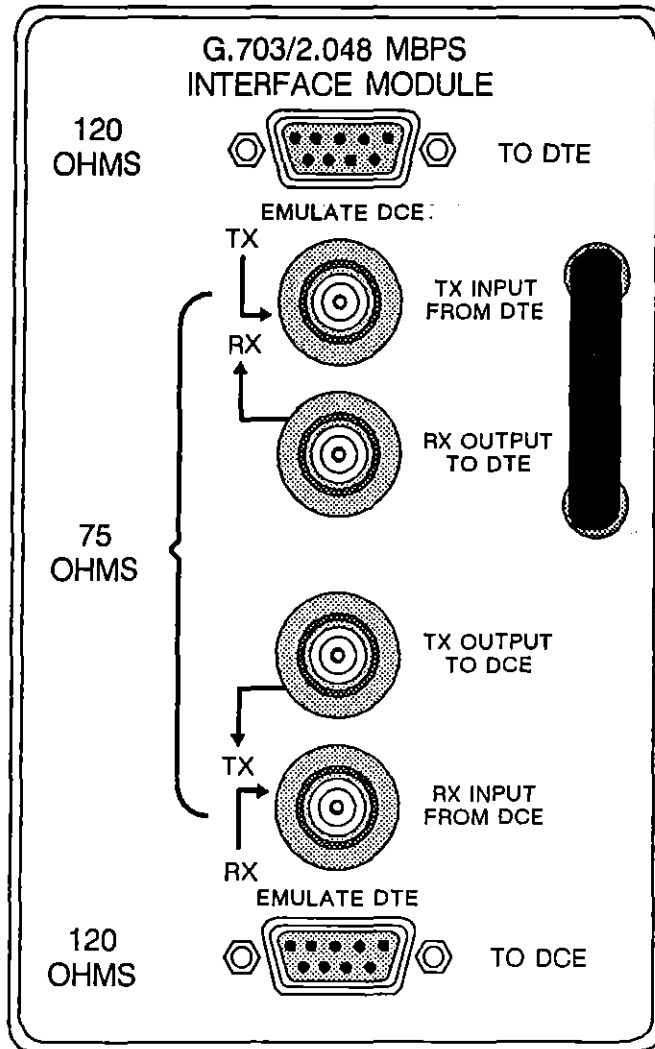


Figure I-9 G.703 Interface Module.



**Table I-11  
G.703 Test Interface Specifications**

Pin No.	Pin Name	Monitor	Signal Description	
			To DCE (Em DTE)	To DTE (Em DCE)
1	Receive Data Tip	High Impedance Input	Input	Output
2	Frame Ground	Ground	Ground	Ground
5	Send Data Tip	High Impedance Input	Output	Input
6	Receive Data Ring	High Impedance Input	Input	Output
9	Send Data Ring	High Impedance Input	Output	Input

(1) Unlisted connectors are wired 1-for-1 through the two connectors.

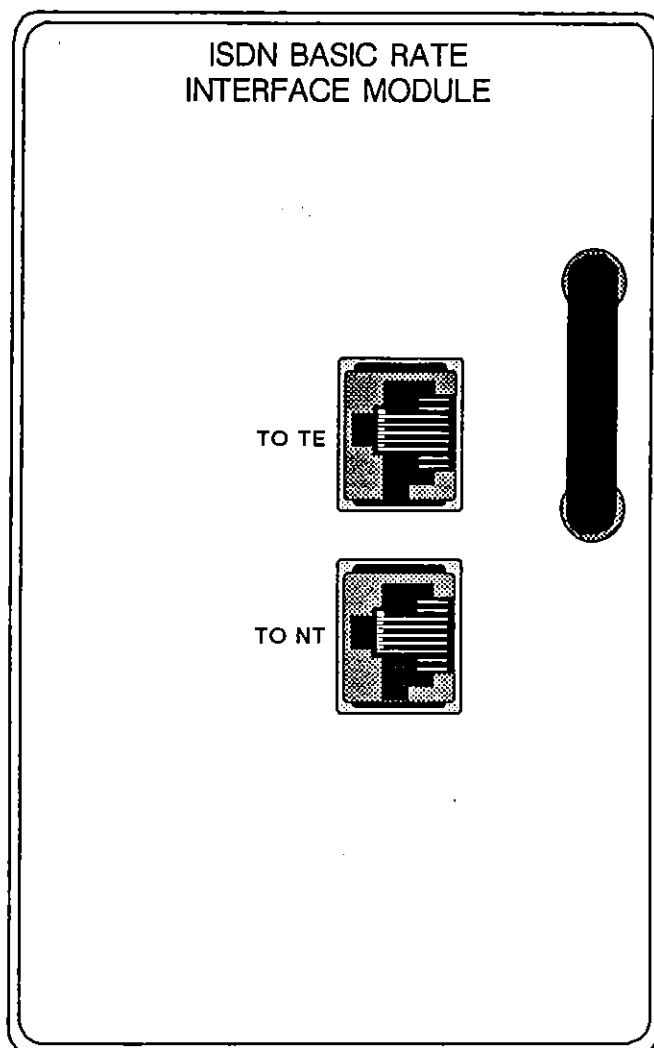


Figure I-10 ISDN Interface Module.



Figure I-11 ISDN LED overlay.

**Table I-12**  
**ISDN Test Interface Specifications**

Pin No.	Pin Name	Signal Description		
		Monitor	To DCE (Em DTE)	To DTE (Em DCE)
3	Send Data Tip	High Impedance Input	Output	Input
4	Receive Data Tip	High Impedance Input	Input	Output
5	Receive Data Ring	High Impedance Input	Input	Output
6	Send Data Ring	High Impedance Input	Output	Input
7 <sup>2</sup>	- voltage	Output	Output	Output
8 <sup>2</sup>	+ voltage	Output	Output	Output

(1) Unlisted connectors are wired 1-for-1 through the two connectors.

(2) Pins 7 and 8 have a voltage differential of 48 volts; see ISO 8877 (1987-08-15) and CCITT 1.430. This power source is supplied by the network.

