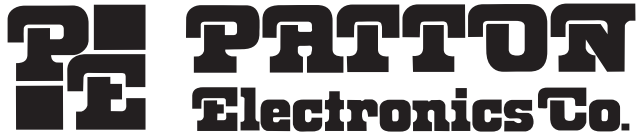


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Part #: 07M3028-A



STATISTICAL MULTIPLEXER 3028 Turbo

(CTS 2031 *TURBO*)

INSTALLATION AND OPERATIONS MANUAL

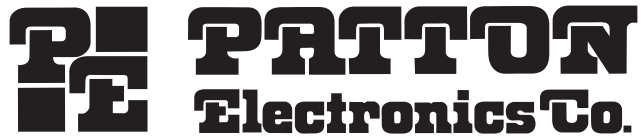
May 31, 2000



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Certified Company

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Doc #: 154001UA
Part #: 07M3028-A



STATISTICAL MULTIPLEXER 3028 Turbo

(CTS 2031 *TURBO*)

INSTALLATION AND OPERATIONS MANUAL



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Preface

AUDIENCE AND OBJECTIVES

This manual contains information about the installation and operation of the 3028*Turbo* (CTS 2031 Turbo) Statistical Multiplexer. The manual is intended for use by the technician installing the equipment and the operator using the equipment. This manual assumes that its user is familiar with basic telecommunications and computer terminology.

RELATED DOCUMENTS

2980-A2-GN30 *DCX 840 Installation, Operation and Maintenance Manual*

2985-A2-GN30 *DCX 840 Installation, Operation and Maintenance Manual*

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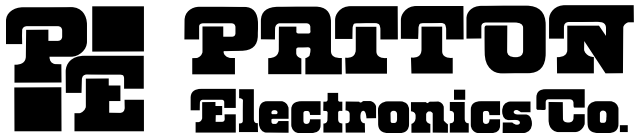
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OVERVIEW

The 3028 Turbo (CTS 3028 Turbo (CTS 2031 Turbo)) Statistical Multiplexer has two primary applications: Point-to-Point and DCX™ networking (Figure 1-1). Point-to-Point operations in a single link environment supports up to eight terminals. All of the DCX networking applications, including direct connections to a DCX 840 or DCX 850 are supported. The 3028 Turbo (CTS 3028 Turbo (CTS 2031 Turbo)) also supports the onward linking facilities through a DCX 825/871.

The SDLC/HDLC protocol is a standard feature that supports the bit-oriented synchronous protocols.

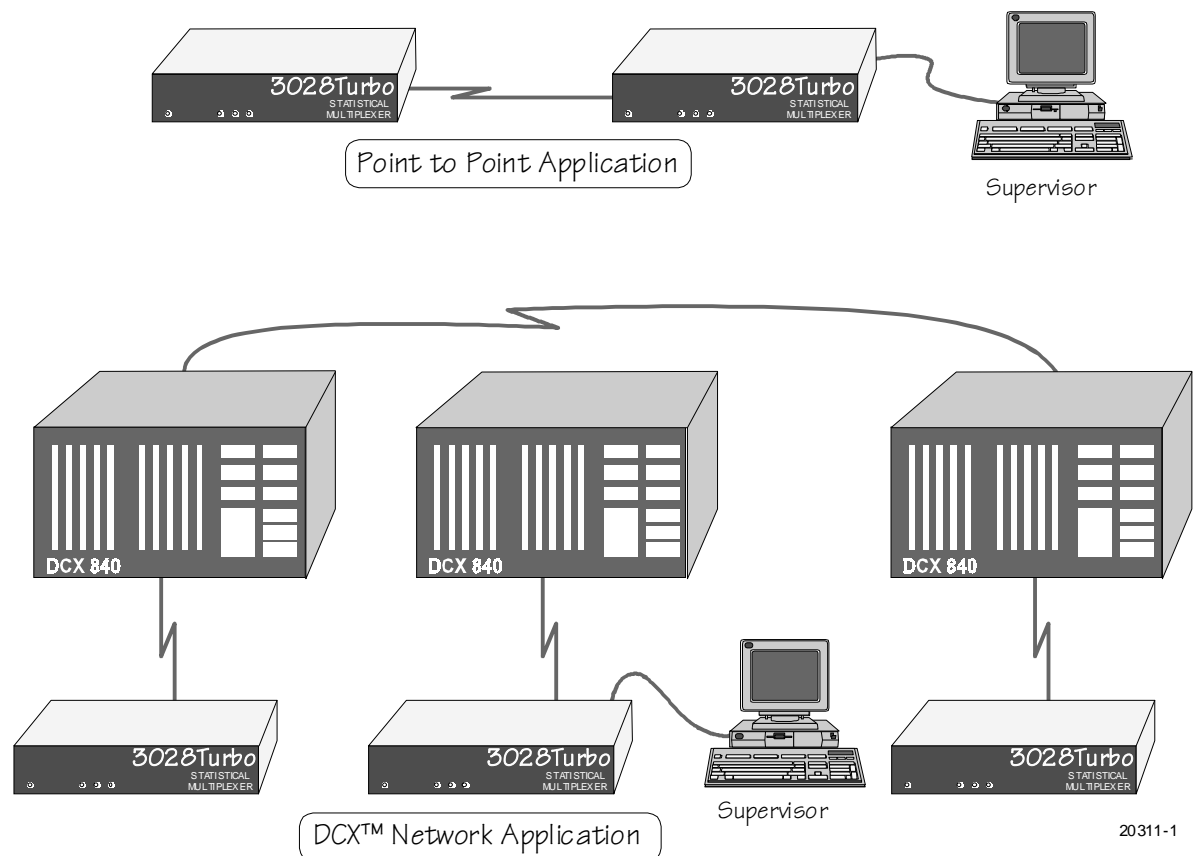


Figure 1-1. Multiplexer Product Application Examples

The multiplexer combines data traffic from up to eight sources into a high-speed composite link. Channel speeds supported are from 75bps to 19,200bps with an automatic channel speed detection (AUTOBAUD) option up to 9,600bps. The buffer management allows storage of 16K bytes to be shared on demand by the channels. Each channel is assigned a minimum of 372 bytes of buffer space to prevent lockout. Because of the buffering action of the 2031, the data rates on the channel side of the multiplexer may total several times the actual link rate without data loss. The multiplexer will handle an aggregate of 76,800 bps in constant full-duplex traffic (with flow control) and a 64,000K bps link without loss of data.

The multiplexer can transmit control messages end-to-end to handle such things as break propagation, EIA signal propagation, and autobaud speeds. The control messages are transparent to the user. In addition, any of the EIA interface outputs can be forced high or low through the user interface.

Multiplexer configuration and operation monitoring is accomplished in a variety of ways. An ASCII asynchronous terminal can be attached to the supervisory port on the back panel or to a data channel that has the supervisory access enabled, or the front panel push-buttons and LCD display can be used. Another method of access is from a remote multiplexer in a point-to-point or a DCX network application. Access to the supervisory function can be password protected for security. All parameters are contained in nonvolatile storage.

The 3028 Turbo (CTS 3028 Turbo (CTS 2031 Turbo)) multiplexer is designed to be a cost-effective point-to-point multiplexer. At the same time, it is fully compatible with the CTS 2031 and the AT&T Paradyne DCX family of multiplexers and can serve as an 8-channel node in a DCX network.

PRODUCT TERMINOLOGY

The following terms are used when referring to the multiplexer:

CHANNEL	One of the eight possible low-speed port interfaces.
LINK	The high-speed composite multiplexed interface.
CHANNEL PORT	The physical interface for a channel.
LINK PORT	The physical interface for a link.
SUPERVISORY PORT	The connector reserved for supervisor functions, such as configuring channel parameters or monitoring status and statistics.
DCE	Data Communication Equipment -- This can be any Modem attached to the multiplexer on the Composite port.
DTE	Data Terminal Equipment -- This can be any terminal or host attached to the multiplexer on a channel port.
LCD	Liquid Crystal Display -- This is located on the front panel of the 3028 Turbo (CTS 3028 Turbo (CTS 2031 Turbo)). It displays two lines of 16 characters each.
NETWORK APPLICATION	This term refers to the use of the 3028 Turbo (CTS 3028 Turbo (CTS 2031 Turbo)) multiplexer in a network of one or more DCX devices.
POINT-TO-POINT APPLICATION	This term refers to the use of the 3028 Turbo (CTS 2031 Turbo) multiplexer in direct communications with another 3028 Turbo (CTS 2031 Turbo) multiplexer. This application involves only two devices.

EQUIPMENT SUPPLIED

A shielded, Male to Female, straight through cable is supplied to connect the multiplexer Composite Port to an external modem.

EQUIPMENT REQUIRED BUT NOT SUPPLIED

Customer-supplied RS-232-C I/O cables from each DTE to standard EIA 25-pin female connectors are required. A special cable is needed when using the Tandem T-Pause® Flow Control application (refer to Appendix F).

Modem tail circuit applications require crossover cables (Figure 1-3).

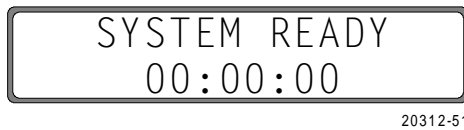
Note

Shielded RS-232-C I/O cables are required.

UNPACKING AND SETUP

The following lists the procedure for unpacking and setting up the 3028 Turbo (CTS 2031 Turbo).

1. Remove the 3028 Turbo (CTS 2031 Turbo) from the box and place it on a flat surface.
2. **MODEM CONNECTION.** Connect the supplied composite link cable to the port labeled *COMPOSITE* on the rear panel (Figures 1-2) and then to the modem. *The Composite port is configured as a DTE* to allow use of a shielded, Male to Female, straight through cable to connect the Modem.
3. Connect the customer-supplied shielded, Male to Male, RS-232-C cables to the selected ports and the DTEs, respectively.
4. The voltage selector is set to the proper line voltage for the area of the world where the unit will be used at the factory. For the United States the switch is set to 115V. Plug the female end of the power cable into the receptacle on the rear panel and connect the other end to the power source. The unit is operational when the **POWER** LED lights.
5. After the 3028 Turbo (CTS 2031 Turbo) has been attached to the proper power source, it performs a series of tests to insure the integrity of the system components. If the tests are passed, the multiplexer LCD displays:

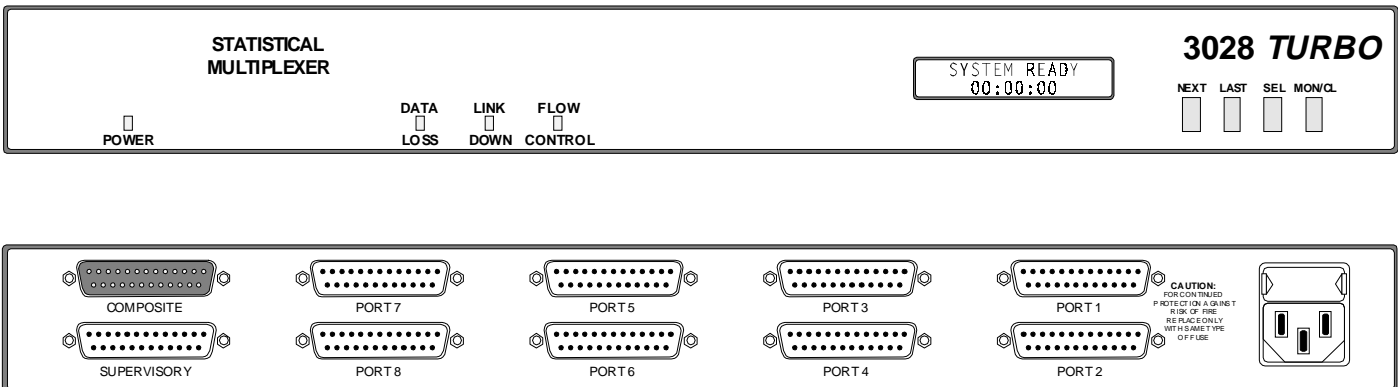


and the system configuration can be performed. If any of the tests fail, the LCD displays a message (refer to System Error Messages section). When this message is displayed, cycle the power. If the error occurs again contact your CTS service representative.

Note

Shielded RS-232-C I/O cables are required.

6. Connect a standard ASCII terminal, if used, to the 3028 Turbo (CTS 2031 Turbo) using a customer-supplied, straight-through, RS-232-C I/O cable at the port labeled SUPERVISORY.



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Figure 1-2. Front & Rear Panel, Model 3028Turbo

Connect the terminal to the power source and turn on the terminal.

PRESS: <supervisor logon character>
(default = CTRL + V)

The System Menu is Displayed

Check the following items if the System Menu does not appear.

- Terminal cabling
- Terminal power switch ON
- Terminal speed 9600 (refer to terminal manual)
- Multiplexer <supervisory logon character> is decimal 022 (default = CTRL + V) (refer to Appendix D)
- Multiplexer stop bits (refer to Chapter 2)
- Multiplexer parity (refer to Appendix D)

For additional information on these items refer to the indicated chapters.

MULTIPLEXER FACTORY DEFAULTS

The multiplexer is configured at the factory with a set of default parameters. Refer to Tables 1-1 and 1-2 for the default settings.

If you want to change any of the multiplexer parameters, refer to the appropriate paragraph in Chapter 2.

Table 1-1. Supervisory Port Defaults

COMMAND	PARAMETER	DEFAULT SETTING
SUPERVISORY PARAMETERS	SPEED	9600
	DATA BITS	8
	STOP BITS	1
	PARITY	NONE/SPACE
	RV FL CTL (Reverse Flow Control)	NONE

Table 1-2. Channel Port Default Configuration Settings

COMMAND	PARAMETER	DEFAULT SETTING
CHANNEL PARAMETERS	SPEED	9600
	TYPE	ASYNC
	DATA BITS	8
	STOP BITS	1
	PARITY	NONE/SPACE
	FL CTL (Flow Control)	DC3/DC1
	FL CTL TR (Flow Control Translation)	NO
	RV FL CTL (Reverse Flow Control)	NONE
	EIA PROP (EIA Propagation)	NO
	BRK PROP (Break Propagation)	NO
	ECHOPLEX	NO
	FLYBACK (Flyback Buffering)	NO
	CTS-RTS (Clear-to-Send Ready-to-Send)	NO
	MSG ENAB (Messages Enabled)	NO
	SPVR ENAB (Supervisor Enabled)	NO
	INAC DISC (Inactivity Disconnect)	NO
	DISC CHAR (Disconnect Character)	CTL-T
LINK PARAMETERS	LINK CLK SOURCE (Link Clock Source)	EXTERN
	LINK CLK RATE (Link Clock Rate)	9600

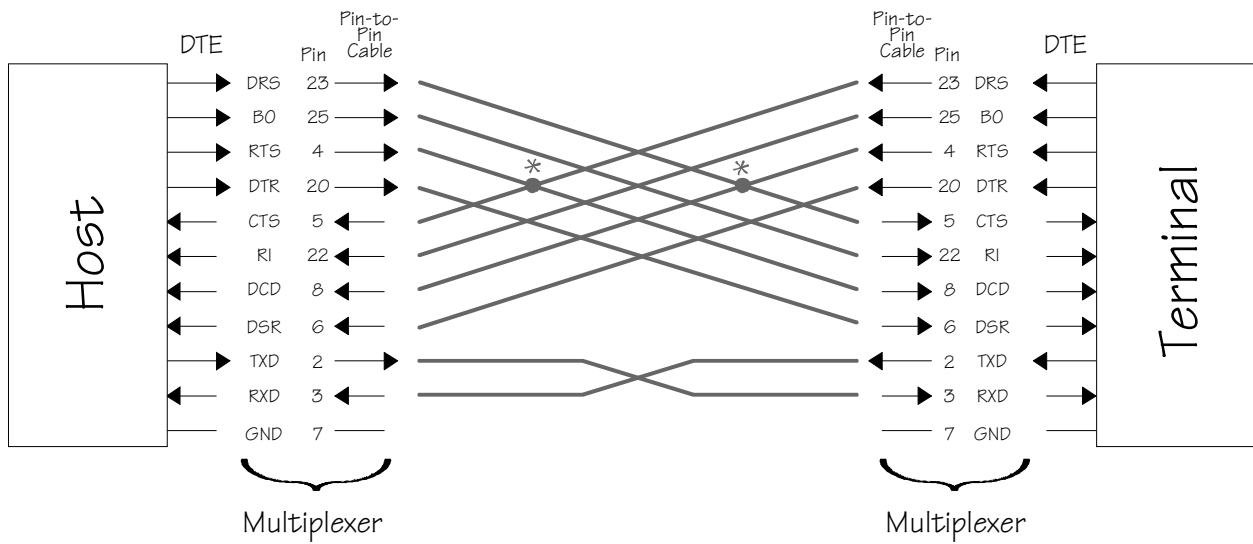
RS-232-C is defined in terms of a DTE at one end and a DCE at the other. Normally this would be a terminal or host (DTE) and a modem (DCE). The 3028 *Turbo (CTS 2031 Turbo)* multiplexer is designed to play the role of a DCE normally. When attached to a modem on the channel port however, the 3028 *Turbo (CTS 2031 Turbo)* plays the role of a DTE with EIA signals exchanged through a special cable.

EIA SIGNALS

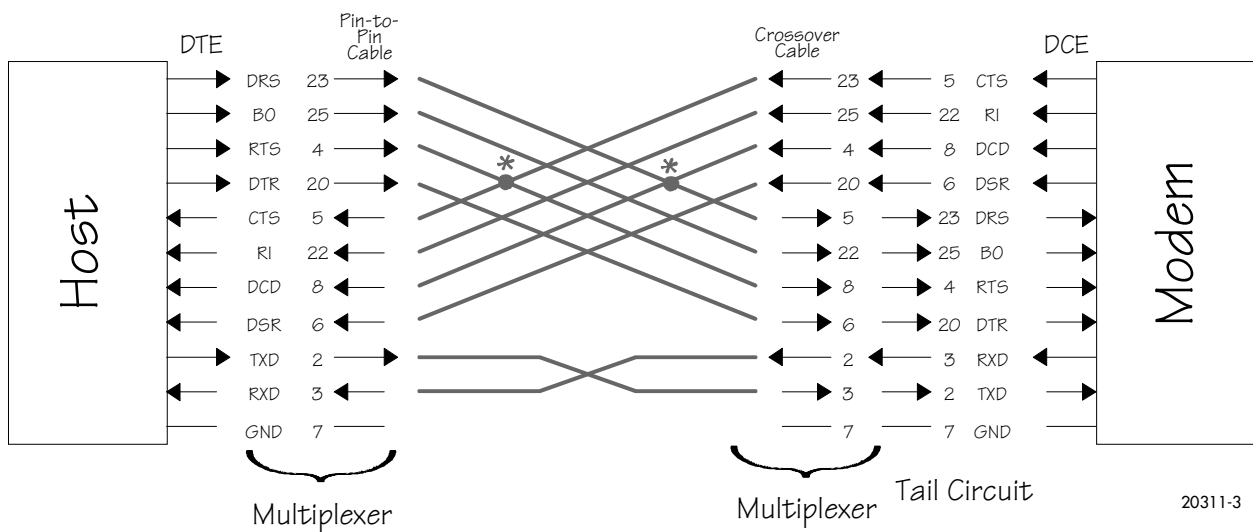
Figure 1-3 identifies the EIA signal propagation. EIA signal propagation must be enabled for the channel, for signal propagation to take place.

The Composite port is configured as a DTE to allow it to be connected to a modem (DCE) type device. The following signals are active on the Composite port: TXD (2), RXD (3), TXC (15), RXC (17), RTS (4), CTS (5), DCD (8), DTR (20) and XTXC (24). The composite link is synchronous, full duplex and point to point. Front panel configuration allows the 3028 *Turbo (CTS 2031 Turbo)* to provide clocking on the XTXC signal lead as well as take clocking from the RXC and TXC signal leads. If DCD becomes inactive the 3028 *Turbo (CTS 2031 Turbo)* assumes the link is down. RTS will be provided by the 3028 *Turbo (CTS 2031 Turbo)*. CTS must be returned by the modem for the 3028 *Turbo (CTS 2031 Turbo)* to send data and establish a link. DTR is forced active by the 3028 *Turbo (CTS 2031 Turbo)* software.

Standard Terminal / Host Connection



Tail Circuit Application



* Optional Under Software Control

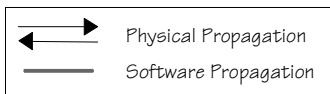


Figure 1-3. EIA Signals

20311-3

The 3028 Turbo (CTS 2031 Turbo) provides “Link Down” and “Data Loss” alarm signals as TTL (0 to +5V) indications on the Supervisor port.

The “Link Down” alarm signal is indicated on pin 9 as a 0V level as long as the datalink between the 3028 Turbo (CTS 2031 Turbo)s *is not* operational. +5V is provided as long as the datalink between the 3028 Turbo (CTS 2031 Turbo)s *is* operational. Pin 9 is an Open Collector output.

The “Data Loss” alarm signal is indicated on pin 10 as a 0V level as long as the data loss LED is illuminated and +5V is provided as long as the data loss LED is extinguished. Pin 10 is an Open Collector output.

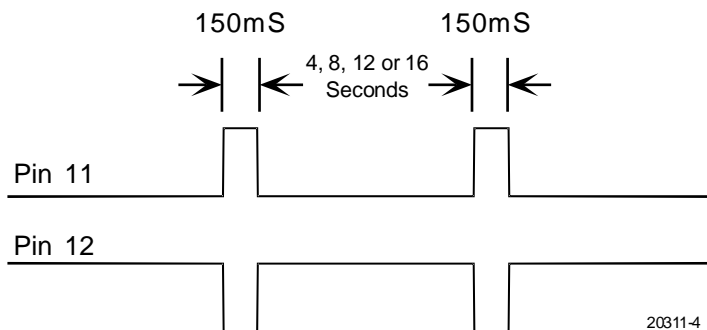
SUPERVISORY ALARM SIGNALS

The 3028 Turbo (CTS 2031 Turbo) provides a Crypto Reset signal as an RS-232-C signal indication on the Composite port.

CRYPTO RESET SIGNAL

The positive signal for Crypto Reset is provided on pin 11. The negative signal is provided on pin 12. The Crypto reset pulse is 150ms in duration and occurs every 4, 8, 12 or 16 seconds as selected by jumpers J15 and J16 and the table below.

JP16	JP15	Time Delay
ON	ON	4 Seconds
OFF	ON	8 Seconds
ON	OFF	12 Seconds
OFF	OFF	16 Seconds



The first pulse is sent after the “Link Down” indication has occurred for the length of time specified by the selection jumpers and continues to occur at the selected interval until the link is operational once more.

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This chapter explains the different methods you can use to configure, monitor and control the multiplexer operations. It provides step-by-step instructions for each method and summary areas for quick reference.

OVERVIEW

When the multiplexer is attached to a DCX multiplexer, there are three ways to operate the supervisory functions:

1. The front panel keys and LCD display.
2. A terminal connected to the supervisory port.
3. A terminal connected to any asynchronous channel port enabled for the supervisory function.
4. A terminal connected via the DCX network to an enabled supervisor channel.

SUPERVISORY FUNCTION OVERVIEW

When the multiplexer is being used in Point-to-Point applications, there are three additional operating methods:

1. The remote front panel interface.
2. A terminal connected to a remote supervisory port.
3. A terminal connected to a remote asynchronous channel port enabled for the supervisory function.

Note

In general only one terminal, local or remote, may be signed on as supervisor at the multiplexer at any given time. Supervisory functions at the front panel, however, may be carried on concurrently with a terminal supervisor.

Any of the terminals in Figure 2-1 may be used to access supervisory functions in either 3028 Turbo (CTS 2031 Turbo). In addition, when the multiplexer is used in a DCX™ network (Figure 2-1) any attached terminal can access the DCX supervisory functions remotely. Refer to the *DCX 850 Installation and Operation Manual*, 2985-A2-GN30, for procedures.

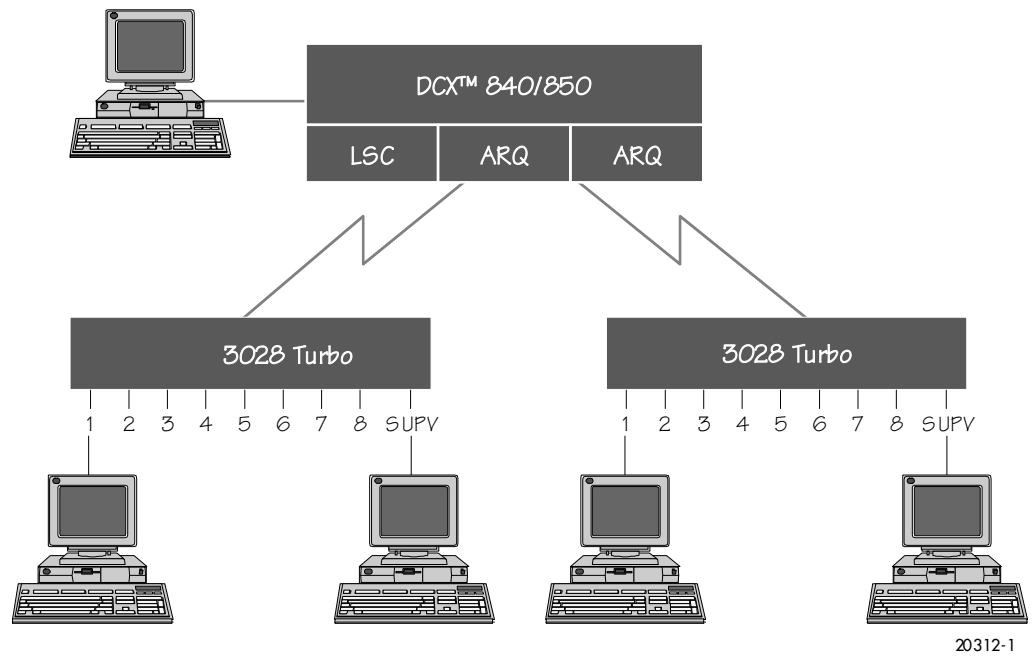


Figure 2-1. Remote Supervisory Access in a DCX Network Configuration

FRONT PANEL OPERATION

There are four push buttons on the front panel that can be used to configure the multiplexer (Figure 2-2). These push buttons are:

- *NEXT*
- *LAST*
- *SELECT*
- *MON/CLR* (Monitor/Clear)



Figure 2-2. Multiplexer Front Panel

The functions of these push buttons are summarized in Table 21.

Note

Use of these push buttons in *COMMAND* mode may be disabled if the front panel has been disabled via the *CRT Disable/Enable Front Panel* command.

Table 2-1. Front Panel Push Button Descriptions

PUSH BUTTON	DESCRIPTION
NEXT	<p>This push button allows entry into COMMAND mode (refer to COMMAND MODE section) when the start-up message is displayed or the device is in MONITOR mode (refer to MONITOR MODE section).</p> <p>In COMMAND mode (COMMAND MODE displayed on the first line of the LCD) this push button moves to the next command. If the LCD displays a parameter (parameter displayed on the first line of the LCD) this push button causes the next parameter to appear. This push button does not update the parameter.</p>
LAST	<p>In COMMAND mode this push button is used to move to the previous command, parameter or option depending on the level of operation at any given time. This push button does not update the parameter.</p>
SELECT	<p>This push button is used in COMMAND mode to enter the displayed parameter or update use of the selected option.</p>
MON/CLR	<p>This push button is used in COMMAND mode to exit a parameter without making changes and return to the COMMAND MODE / CHNL PARAMETERS display.</p> <p>If you are already at the command prompt, this push button logs off as supervisor and enters MONITOR mode. If this push button is pressed while in MONITOR mode, the LCD will display:</p> <div data-bbox="574 972 940 1050" style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px auto; width: fit-content;"> <p>SYSTEM READY 00:00:00</p> </div> <p>This display will remain until the NEXT push button is pressed to enter COMMAND mode or the MON/CLR push</p>

The multiplexer has four LED displays on the front panel. Their functions are described in Table 2-2.

Table 2-2. Panel LED Descriptions

LED	DESCRIPTION
POWER	<p>This LED indicates that the power supply is operating. If this LED does not light and the system is plugged in, a</p>
LINK DOWN	<p>This LED, when lit, indicates that the communication link has failed, when flashing, indicates a loopback state.</p>
FLOW CONTROL	<p>This LED is turned on when buffer usage reaches 65% and is turned off when the total buffer usage drops below 45%. These limits indicate the thresholds for potentially invoking or releasing channel flow control signals.</p>
DATA LOSS	<p>This LED is lit for ten seconds when data is lost or when the aggregate input limit of 76.8Kbps has been exceeded.</p>

TERMINAL OPERATION

Configuration of the multiplexer can be done through the use of an attached terminal. The attached terminal can be any standard asynchronous terminal. A series of screens enable you to configure the multiplexer. The keys available for use are:

- **RETURN** or **ENTER**
The **RETURN** or **ENTER** key is used to update the selected option, to exit a menu without making changes, or to access the Main Menu from **MONITOR** mode.
- **BACKSPACE** or **DELETE**
The **BACKSPACE** or **DELETE** key is used to correct mistakes during entry before pressing the **RETURN** key.
- **Number Keys**
The number keys are used to select options from the menu screens.

MODES OF OPERATION

Front Panel

There are three modes of operation:

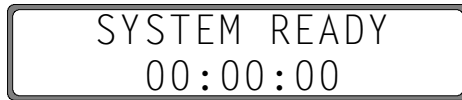
STANDBY MODE	This mode displays the message SYSTEM READY and the system clock.
MONITOR MODE	This mode allows for the display of system events.
COMMAND MODE	This mode provides access to the supervisory functions.

Terminal

There are three modes of operation:

LOGOFF	This mode causes the terminal to display the message SUPERVISOR LOGOFF @ hh:mm:ss where hh:mm:ss is the current system time.
MONITOR MODE	This mode allows for the display of system events.
COMMAND MODE	This mode provides access to the supervisory functions.

When the multiplexer is in *STANDBY* mode, the system event displays are stored and displayed when monitor mode is entered. The display that is shown during the *STANDBY* mode is:



SYSTEM READY
00:00:00

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When the multiplexer terminal is in *LOGOFF* mode the terminal displays *SUPERVISOR LOGOFF @ hh:mm:ss* where the time displayed is the current system time. The terminal will remain logged off until the supervisor logon character is pressed to enter *COMMAND* mode. From *COMMAND* mode, changes to the parameters may be made or *MONITOR* mode can be entered.

STANDBY MODE/ LOGOFF

When the multiplexer is in *MONITOR* mode the system displays the system events as they occur. Entry into *MONITOR* mode also constitutes a supervisory signoff allowing other channels access to the supervisory functions.

The first display after entering *MONITOR* mode is the current PROM level installed (REV nnn.nn). After this, the events that have occurred are displayed. The message queue holds 16 messages and after they are displayed they cannot be recalled. The messages can be displayed on either the terminal or LCD, whichever enters *MONITOR* mode first. If more than 16 messages occur, only the latest 16 are kept to be displayed.

MONITOR MODE

Note

When you are signed on to a remote 3028 Turbo (CTS 2031 Turbo), the messages displayed as remote events are actually local events to your 3028 Turbo (CTS 2031 Turbo).

Front Panel Access

MONITOR mode is entered by pressing the MON/CLR push button once from the *STANDBY* or *COMMAND* modes and by pressing the MON/CLR push button twice from a command, parameter or option in *COMMAND* mode. The LCD will display the following until an event occurs for display.

When you enter *MONITOR* mode and there are events in the queue, they will be displayed, earliest first, for a minimum of two seconds each.

In a point-to-point application, events are displayed at both the local and the remote ends when each LCD is in the *MONITOR* mode (Figures 2-3 and 2-4). The first line displays the time the event occurred and the second line displays the event that occurred (Table 2-3). Events are displayed in the following format:



MONITOR MODE
REV 938 14.0

20312-52

```
EVENT @ 10:00:00
CHNL 1 RESET
```

Figure 2-3. Local Event Display

20312-53

```
R EVT @ 10:00:00
CHNL 1 RESET
```

Figure 2-4. Remote Event Display

20312-54

Note

The multiplexer uses a 24-hour clock for time displays and does not have the date maintained as part of the time stamp. Queued messages are deleted when the system clock goes from 23:59:59 to 00:00:00.

To enter *STANDBY* mode:

PRESS: MON/CLR

To enter *COMMAND* mode:

PRESS: NEXT

Terminal Access

To enter *MONITOR* mode from the terminal main menu:

TYPE: 22

PRESS: RETURN

The terminal indicates that *MONITOR* mode is entered with a screen display:

```
MONITOR MODE
REV 938 14.0
```

20312-3

When an event occurs (Figure 2-5) it is displayed on the terminal:

```
MONITOR MODE
EVENT @ 10:00:00 event
REMOTE EVENT @ 10:00:00 event
```

Figure 2-5. Event Messages

20312-4

To enter *COMMAND* mode ,

PRESS: <supervisor logon character>
(default = CTRL + V)

If the password protection is in use, you are prompted to enter the correct password. Enter the password and press *RETURN*; the Main Menu will then be displayed.

The SYSTEM ERROR message displayed in diagnostic failure at start-up provides information as to the type of failure detected. The format of the information is as follows:

SYSTEM ERROR n

20312-55

System Error Messages

Where **n** is one of the following:

- M - EPROM checksum failed., U41 & U42
- A - memory A000-AFFF failed, RAM U40
- B - memory B000-BFFF failed, RAM U40
- C - memory C000-CFFF failed, RAM U39
- D - memory D000-DFFF failed, RAM U39
- E - memory E000-EFFF failed, RAM U38
- F - memory F000-FFFF failed, RAM U38
- 1 - Port 1 or Supervisory Port failed - SCC U29 or U33
- 2 - Port 2 failed - SCC U29
- 3 - Port 3 failed - SCC U30
- 4 - Port 4 failed - SCC U30
- 5 - Port 5 failed - SCC U31
- 6 - Port 6 failed - SCC U31
- 7 - Port 7 failed - SCC U32
- 8 - Port 8 failed - SCC U32

The order of testing is as listed above. Any one failure will terminate testing.

Monitor Mode Events

Table 2-3 lists the *MONITOR* mode events.

Table 2-3. MONITOR Mode Events

EVENT	DESCRIPTION
CHNL n RESET*	This event indicates that the indicated channel has been reset, locally or remotely, via the terminal or front panel interface. The reset function clears the data buffers and resets any flow control or reverse flow control states at each end.
CHNL n FL CTL*	This event reports that flow control was invoked for the indicated channel in response to either the channel exceeding its flow control level (the percent is based on the channel speed) or the total system buffer utilization reaching 65% of the multiplexer capacity (reported locally only).
CHNL n RV FL CTL*	This event indicates that a preprogrammed reverse flow control signal has been received from the indicated channel, causing the multiplexer to suspend transmission temporarily (reported locally only).
CHNL n ACTIVE*	This event indicates that the flow control or reverse flow control condition has cleared at the indicated channel through normal means (not a Channel RESET command) (reported locally only).
CHNL n LOOPED*	This event indicates that the channel has been put in a loopback condition, where the data sent to the channel both inward and outward is looped back.
LINK FAILED	This event indicates that a link interface is no longer receiving acknowledgements to its transmissions. This is generated only when a link that has been operational fails. A failure is declared after approximately 10 seconds of noncommunication and retries (reported locally only).
LINK # CHL INV	This event reports that the remote multiplexer has more
CHNL n DATA LOSS*	This event reports that user channel data has been lost.
LINK ESTABLISHED	This event reports that a link has been established and communication can begin. A failed link continually tries to reestablish itself; if it is successful, this event occurs (reported locally only).
SUPVR SIGNON	This event reports that a local or remote supervisor has logged on.
SUPVR SIGNOFF	This event reports that a local or remote supervisor has logged off.
*n = the channel on which the event occurs.	

MEMORY CAPABILITY

The 3028 Turbo (CTS 2031 Turbo) has sufficient nonvolatile memory so that certain operating parameters will be retained through a power loss. The following will be maintained through a power-off, power-on sequence:

- Channel parameters
- Supervisory port parameters
- Link parameters
- System password
- System banner (part of Main Menu)
- Any front panel inhibited status
- Any forced EIA output signals

The following are not maintained through a power-off, power-on sequence, but are "cleared" upon system restart:

- Peak channel and link usage statistics
- System time
- Any flow control or reverse flow control XOFF states
- Any channel loopbacks
- Link loopbacks
- Detected autobaud speeds
- Propagated EIA signals
- Monitor messages

Command mode allows the operator to configure the multiplexer for operation using either the multiplexer front panel or an attached terminal.

COMMAND MODE

Front Panel Access

The *NEXT* push button accesses Command mode from Monitor mode or Standby mode. The LCD will Display



COMMAND MODE
CHNL PARAMETERS

20312-56

SUPERVISOR BUSY displays when an attempt is made to sign on to a remote 3028 Turbo (CTS 2031 Turbo) that has a front panel already in use.



SUPERVISOR BUSY

20312-57

Terminal Access

At initial logon or from *MONITOR MODE*

PRESS: <supervisor logon character>
(default = CTRL + V)

If a password entry is needed, you are prompted to enter the password. After doing this the Main Menu (figure 2-6) displays:

```

                                S Y S T E M   M E N U

1. SET CHANNEL PARAMETERS          13. RESET STATISTICS
2. SET LINK PARAMETERS             14. CHANNEL VALIDATE
3. SET SUPERVISORY PARAMETERS     15. CHANNEL STATUS
4. COPY PARAMETERS                16. REMOTE SIGNON
5. CHANNEL STATISTICS             17. REMOTE SIGNOFF
6. LINK STATISTICS               18. SET SYSTEM PASSWORD
7. SET/CLEAR LOCAL CHANNEL LOOPBACK 19. SET SYSTEM BANNER
8. SET/CLEAR REMOTE CHANNEL LOOPBACK 20. SET SYSTEM TIME
9. LOCAL LINK LOOPBACK           21. DISABLE/ENABLE FRONT PANEL
10. RESET A SINGLE CHANNEL        22. ENTER MONITOR MODE
11. RESET ALL CHANNELS           23. LOGOFF
12. RESET LINK

ENTER 1-23 <CR> TO SELECT DESIRED FUNCTION:

```

Figure 2-6. Command Mode Main Menu

20312-5

If the Main Menu does not appear, check to make sure the *SUPERVISOR ENABLED* parameter is set to *YES* (refer to Channel Supervisor Enabled paragraph).

If the supervisor is currently in use, the message *SUPERVISOR BUSY* is returned.

Command Mode Definitions

LCD

The LCD display is made up of 2 lines with 16 character positions on each line.

An asterisk (*) before the channel number selection (Figure 2-7) indicates the current selection. Use the *NEXT* or *LAST* push button to move the asterisk to the next or previous option, respectively.

```

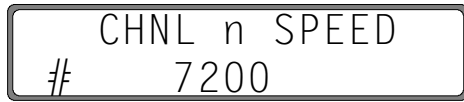
SELECT CHANNEL:
*1 2 3 4 5 6 7 8

```

20312-58

Figure 2-7. Asterisk Position Example

A number sign (#) in the first position of the second line (Figure 2-8) indicates the current value for the parameter.



20312-59

Figure 2-8. Number Sign Position Example

An *n* in a display will be replaced by the channel number selected.

Use the *NEXT* and *LAST* push buttons to move forward or backward through the commands, parameters or options.

When pressed, the *SELECT* push button either moves from a command to a parameter, a parameter to an option or updates the selected option.

The displays and screens shown are samples and do not necessarily reflect your configuration.

In this chapter, the symbol  indicates that the values following will appear on the second line of the display.

The starting point for accessing commands and parameters described in this chapter is the COMMAND MODE display (Figure 2-9).



20312-60

Figure 2-9. Command Mode Display

Note

When a parameter is selected to change a particular channel, you receive the following display prior to access of the options.



20312-58

The commands that require channel selection are indicated in Table 2-4 by a double asterisk (**) following the command name. Factory set defaults are listed first in the options/notes column.

Terminal Access

The terminal screen does not clear after selection of a command or parameter. It scrolls the selected option information onto the bottom of the screen. For display purposes, the screen in the following paragraphs shows only the information for the selection and not the information that will appear above that on your screen.

The **BACKSPACE** or **DELETE** keys can be used to erase an incorrect entry before pressing **RETURN**.

The following paragraphs describe access of the commands and parameters (Table 2-4) from both the front panel and an attached terminal.

Note

When a parameter is selected to change a particular channel, you receive the following display prior to access of the options.



```
SELECT CHANNEL NUMBER (1-8) <CR>:
```

2031N-1

The commands that require channel selection are indicated in Table 2-4 by a double asterisk (**) following the command name. Factory set defaults are listed first in the options/notes column.

Table 2-4. Commands, Parameters and Options (1 of 2)

COMMAND	PARAMETER	OPTIONS/NOTES
CHNL PARAMETERS**	SPEED	9600, 19,200, DOWNL, AUTOB, 50, 75, 110, 134, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200
	TYPE	ASYNC, HPENQ, SDLC/HDLC
	DATA BITS	8, 7, 6, 5
	STOP BITS	1, 1.5, 2
	PARITY	NONE/SPACE, NONE/ODD, NONE/EVEN, ODD, EVEN, NONE/MARK
	FL CTL	DC3/DC1, DC2/DC1, DC4/DC2, USER, WANG@, TANDEM@, CTS-/CTS+, DSR-/DSR+, NONE
	FL CTL TR	NO, YES
	RV FL CTL	NONE, DC3/DC1, DC2/DC1, DC4/DC2, USER, WANG@, RTS-/RTS+, DTR-/DTR+
	EIA PROP	NO, YES
	BRK PROP	NO, YES
	ECHOPLEX	NO, YES
	FLYBACK	NO, YES
	CTS-RTS	NO, YES
	MSGs ENAB	NO, YES
	SPVR ENAB	NO, YES
INAC DISC	NO, YES	
DISC CHAR	CTL-T, NONE, USER	

Table 2-4. Commands, Parameters and Options (2 of 2)

COMMAND	PARAMETER	OPTIONS/NOTES
LINK PARAMETERS	LINK CLK SOURCE LINK CLK RATE	EXTERN, INTERN 9600, 7200, 4800, 3600, 2400, 1200, 19,200.
COPY PARAMETERS**	COPY FROM COPY TO	select channel (1-8). select channel (1-8 or ALL).
CHANNEL STATISTICS	BF UTIL nn% CURR BF UTIL nn% PEAK EXC nnnn FC nnnn RV FC nnnn	nn is the percentage of utilization, nnnn is the number of occurrences.
LINK STATISTICS	FR RECD nnn CURR FR RECD nnn PEAK FR NAKD nnn CURR FR NAKD nnn PEAK FR RSNT nnn CURR FR RSNT nnn PEAK TX UTIL nn% CURR TX UTIL nn% PEAK RX UTIL nn% CURR RX UTIL nn% PEAK	nn is the percentage of utilization, nnn is the number of occurrences.
CHANNEL STATUS**	DRS xxx BO xxx DTR xxx RTS xxx CTS xxx RI xxx DCD xxx DSR xxx LLB xxx RLB xxx FC xxx RFC xxx ACTIVITY zzz	xxx is ON or OFF, zzz is YES or NO.
LOCAL CHANNEL LOOPBACK**		select channel (1-8).
REMOTE CHANNEL LOOPBACK**		select channel (1-8), not available in remote supervisor mode.
LINK LOOPBACK		
CHANNEL RESET**		select channel (1-8 or ALL).
LINK RESET		
CHANNEL VALIDATE**		select channel (1-8 or supervisor).
STATISTICS RESET		
REMOTE SIGNON		not available in remote supervisor mode.
REMOTE SIGNOFF		
SET TIME	00:00:00	set time according to a 24-hour clock.

Channel Parameters

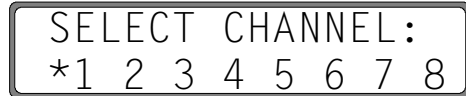
The *CHANNEL PARAMETERS* command is used to change or examine any of 17 programmable parameters on any of the available channel ports or the supervisory port.

Front Panel Access

From the *COMMAND MODE / CHANNEL PARAMETER* display:

PRESS: SELECT

The LCD Displays:



```

SELECT CHANNEL:
*1 2 3 4 5 6 7 8
  
```

20312-58

PRESS: NEXT or LAST

to select a channel

PRESS: SELECT

The asterisk (*) before the channel number indicates the channel which is accessed.

The LCD will now display:



```

CHNL PARAMETERS
  
```

20312-61

Where is

CHNL n SPEED	CHNL n BRK PROP
CHNL n TYPE	CHNL n ECHOPLEX
CHNL n DATA BITS	CHNL n FLYBACK
CHNL n STOP BITS	CHNL n CTS-RTS
CHNL n PARITY	CHNL n MSGS ENAB
CHNL n FL CTL	CHNL n SPVR ENAB
CHNL n RV FL CTL	CHNL n INAC DISC
CHNL n FL CTL TR	CHNL n DISC CHAR
CHNL n EIA PROP	

Terminal Access

To select the **CHANNEL PARAMETERS** screen:

TYPE: 1
PRESS: RETURN

A channel must be selected following the display:

```
SELECT CHANNEL NUMBER (1-8) <CR>
```

20312-6

After a channel is selected the terminal displays:

```
1. SPEED: 9600      6. FLOW CTL      8. FL CTL TR: NO  13. CTS-RTS: NO
2. TYPE: ASYNC      (XOFF/XON):      9. EIA PROP: NO  14. MSGS ENAB: NO
3. DATA BITS: 8    DC3/DC1         10. BREAK: NO   15. SUPERV ENAB: NO
4. STOP BITS: 1    7. REV FL CTL:  11. ECHO: NO    16. INACT DISC: NO
5. PARITY: NONE/SPACE  NONE          12. FLYBK: NO   17. DISC CHAR: CTL-T

(ENTER 1-17 <CR> TO SELECT A PARAMETER, OR <CR> TO QUIT.):
```

20312-7

The **SPEED** parameter sets the data rate for the Channel port. There are 16 speeds to choose from, or the channel may be set to detect the speed of the incoming characters and adjust itself appropriately using **AUTOBAUD** options. The **AUTOBAUD** option will not trigger on the following speeds: 19.2K, 134.5, 110, 75 and 50. The remote end channel, when set to **DOWNL**, receives the setting and is also adjusted to the detected speed. The **AUTOBAUD** option is used when data transmission rates vary or are unknown such as with asynchronous modem tail circuits. To use the **AUTOBAUD** option, turn the attached terminal on, then enter a **CARRIAGE RETURN**. Cycling the power is necessary since an off-to-on transition on DTR is required to trigger the multiplexer to look for the **AUTOBAUD** character. (Note that this will be DSR OFF-to-ON if a standard crossover cable is used on a modem tail circuit.)

Channel Speed

If the speed is detected, the following display appears on an attached terminal (if available):

```
AUTOBAUD SPEED DETECTED: nnnn
```

20312-8

If the message is received but is garbled, either the speed was incorrectly determined or the parity is in error. To use the built in auto-parity function to set the parity, enter the following immediately after the *AUTOBAUD SPEED DETECTED* message.

TYPE: P (capital)

PRESS: RETURN

The multiplexer will set the parity based on the *P* and *RETURN* characters received.

Note

All channels can be set to the 19,200 speed option as long as the maximum aggregate input does not exceed 76,800bps. Exceeding the 76,800bps input may cause data loss. Enabling certain channel parameters can affect the aggregate input limit. Enabling the following channel parameters will reduce the maximum aggregate input rate supported on the multiplexer: In-Band Reverse Flow Control, Echoplex, Supervisor Enabled, and Flyback Buffering. This is caused by the requirement to examine every character of data generated by the terminal to the multiplexer.

Front Panel Access

From the *COMMAND* mode display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n SPEED* displays on the second line

PRESS: SELECT

the LCD displays:

CHNL n SPEED

20312-62

Where is

9600	110	1800
19200	134	2000
DOWNL	150	2400
AUTOB	300	3600
50	600	4800
75	1200	7200

PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel speed and returns the *CHNL PARAMETERS/CHNL TYPE* display.

Update the channel type,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

From the Main Menu:

TYPE: 1
PRESS: RETURN
TYPE: n (n= channel number)
PRESS: RETURN
TYPE: 1

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n SPEED:          CURRENTLY: 9600
 1: 19200   4: 4800   7: 2000   10: 600   13: 150   16: 50
 2:  9600   5: 3600   8: 1800   11: 300   14: 110   17: DOWNL
 3:  7200   6: 2400   9: 1200   12: 134.5 15:  75   18: AUTOB
(ENTER 1-18 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-9

TYPE: n (n = the speed option number)

PRESS: RETURN

The multiplexer updates the channel speed and returns the *CHANNEL PARAMETERS* menu. If the *RETURN* key is pressed without entering a speed option, the Main Menu is returned.

Channel Type

The *TYPE* parameter allows you to select a standard asynchronous data stream or a channel with special protocol handling. The *HPENQ* option selects a set of functions to improve throughput for terminals and CPUs observing the Hewlett-Packard *ENQ/ACK*[®] block mode protocol. Appendix E provides information on the Hewlett-Packard *ENQ/ACK*[®] protocol. The SDLC/HDLC option is described in Appendix I.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

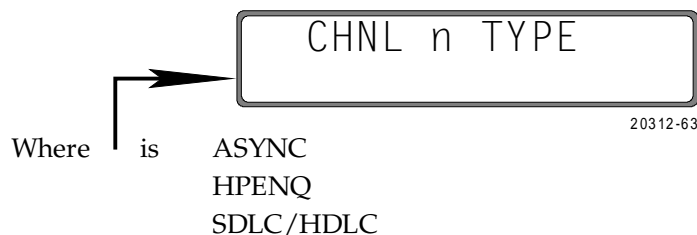
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n TYPE* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel type and returns the *CHNL PARAMETERS/CHNL DATA BITS* display.

Update the channel data bits,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *TYPE* parameter from the Main Menu:

TYPE: 1
PRESS: RETURN
TYPE: n (n = channel number)
PRESS: RETURN
TYPE: 2

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n TYPE:          CURRENTLY: ASYNC
 1: ASYNC   2: HPENQ   3: SDLC/HDLC
(ENTER 1-3 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-10

TYPE: n (n = the channel type option number)
PRESS: RETURN

The multiplexer updates the channel type and returns the *CHANNEL PARAMETERS* menu. If the *RETURN* key is pressed without entering a type option, the Main Menu is returned.

The *DATA BITS* parameter establishes the number of data bits (excluding any parity) between the start and stop bits of the character.

Channel Data Bits*Front Panel Access*

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

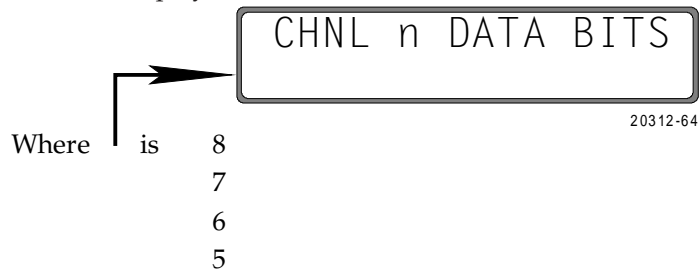
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n DATA BITS* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel data bits and returns the *CHNL PARAMETERS/CHNL STOP BITS* display.

Update the channel stop bits,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *DATA BITS* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 3

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n DATA BITS:      CURRENTLY:  8
  1:  8      2:  7      3:  6      4:  5
(ENTER 1-4 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-11

TYPE: n (n = the data bit option number)

PRESS: RETURN

The multiplexer updates the channel data bits and returns the *CHANNEL PARAMETERS* menu. If the *RETURN* key is pressed without entering a data bits option, the Main Menu is returned.

Channel Stop Bits

The *STOP BITS* parameter establishes the number of stop bits generated for an outgoing asynchronous character. For incoming characters to the 3028 Turbo (CTS 2031 Turbo) this parameter is not critical since only one stop bit is looked for. Some terminals, however, will not operate correctly unless two stop bits are appended to each character sent toward them. Stop bits are not transmitted across the composite link.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

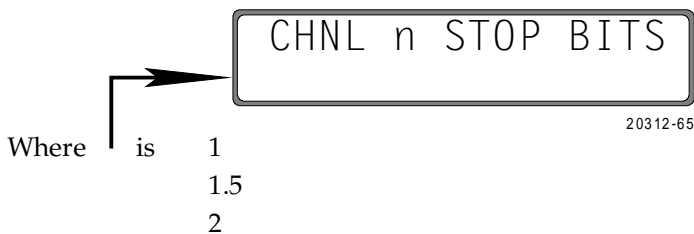
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n STOP BITS* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel stop bits and returns the *CHNL PARAMETERS/CHNL PARITY BITS* display.

Update the channel parity bits,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *STOP BITS* parameter from the Main Menu:

TYPE: 1
PRESS: RETURN
TYPE: n (n = channel number)
PRESS: RETURN
TYPE: 4

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n STOP BITS:      CURRENTLY:  1
  1:  1      2:  1.5      3:  2
(ENTER 1-3 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-12

TYPE: n (n = the stop bit option number)
PRESS: RETURN

The multiplexer updates the channel stop bits and returns the *CHANNEL PARAMETERS* menu. If the *RETURN* key is pressed without entering a stop bit option, the Main Menu is returned.

Channel Parity

The *PARITY* parameter controls whether or not a parity bit, in addition to the data bits, is checked on incoming characters and appended on outgoing characters.

If you do not want the multiplexer to be sensitive to parity, the *NONE/ODD*, *NONE/EVEN*, *NONE/MARK* or *NONE/SPACE* option should be chosen. The *NONE* portion of the selection disables parity checking/insertion. The *ODD*, *EVEN*, *MARK* or *SPACE* portion of the selections refers to the parity setting of the 3028 Turbo (CTS 2031 Turbo) generated messages such as Menus, *LINK DOWN* or *DATA LOSS*. The *MESSAGES ENABLED* parameter must be set to *YES* before messages are sent to the attached device.

When the *ODD* or *EVEN* option is selected and a parity error is detected, parity is stripped and the character is sent as received to the remote end. A parity error count is maintained in the channel statistics under *CHANNEL EXCEPTIONS*.

Appendix D provides more information on parity.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

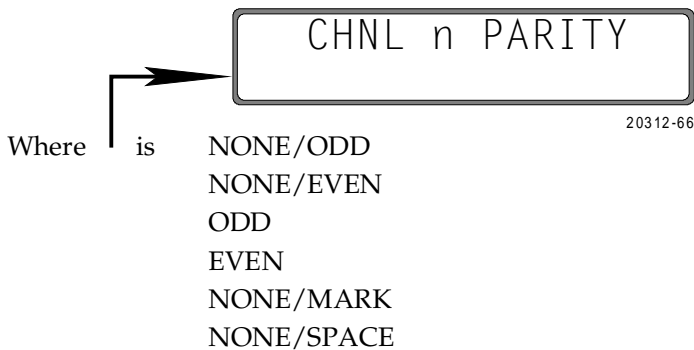
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n PARITY* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel parity and returns the *CHNL PARAMETERS/CHNL FL CTL* display.

Update the channel flow control,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *PARITY* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 5

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

TYPE: n (n = the parity option number)

```

CHANNEL n PARITY:          CURRENTLY: NONE/ODD

1: NONE/ODD      3: NONE/EVEN  5: NONE/MARK
2: NONE/SPACE   4: ODD         6: EVEN
(ENTER 1-6 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20312-13

PRESS: RETURN

The multiplexer updates the channel parity and returns the *CHANNEL PARAMETERS* menu. If the *RETURN* key is pressed without entering a parity option, the Main Menu is returned.

Channel Flow Control

The *FLOW CONTROL* parameter, also known as buffer overflow protection, is a means of preventing data loss in high-traffic periods. Some terminals respond to ASCII control characters (most commonly Device Control 1 and Device Control 3 [DC1/DC3]) as signals to suspend and resume transmission. Others respond to changes in the RS-232-C leads (most commonly CTS). Options supported provide these and other possibilities, including any user-specified character as either the XOFF (turning the data transmission off) or the XON (turning the data transmission on) signal.

The *USER* option allows entry of arbitrary XON and XOFF characters. After selection of the *USER* option, the current setting is displayed. Enter the revised setting in decimal (0-255), allowing any of the 128 ASCII characters with either parity setting. Entry of 255 and 0 are interpreted the same by the multiplexer.

Appendix F provides information on the TANDEM T-Pause[®] and Wang[®] flow control methods.

Appendix J provides information on the EIA Signal Exceptions.

Note

Forcing an EIA signal high or low using the *CHANNEL STATUS* command prevents using that signal as a flow control option.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

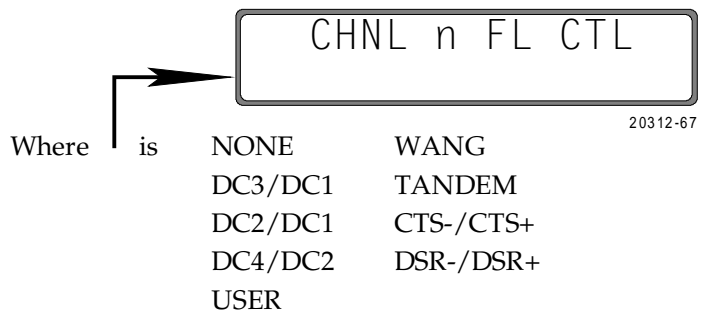
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n FL CTL* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel flow control and returns the *CHNL PARAMETERS/CHNL RV FL CTL* display.

Update the channel Reverse Flow Control,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *FLOW CONTROL* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 6

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n FLOW CTL:          CURRENTLY: DC3/DC1      (XOFF/XON)

1: NONE          4: DC4/DC2      7: TANDEM
2: DC3/DC1       5: USER          8: CTS-/CTS+
3: DC2/DC1       6: WANG          9: DSR-/DSR+
(ENTER 1-9 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20312-14

TYPE: n (n = the flow control option number)

PRESS: RETURN

The multiplexer updates the channel flow control and returns the *CHANNEL PARAMETERS* menu. If the *RETURN* key is pressed without entering a flow control option, the Main Menu is returned.

Channel Reverse Flow Control

The *REVERSE FLOW CONTROL* parameter, also known as terminal flow control, establishes signals to suspend and resume output to attached peripherals. Reverse flow control is similar to flow control, except that it goes in the other direction, i.e. from the terminal or host to the multiplexer.

When a terminal raises a reverse flow control signal, the remote end is notified via an internal control message so that flow control can be invoked there to prevent excessive buildup of data within the multiplexer. The *USER* option can be used to set arbitrary reverse flow control XON/XOFF characters.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

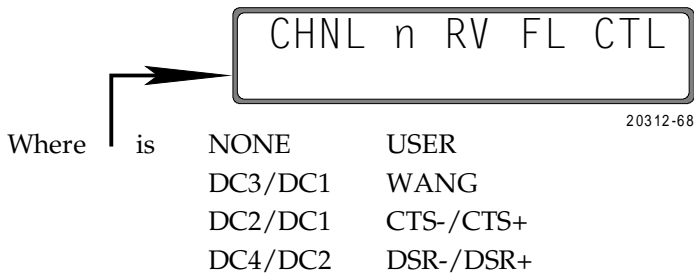
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n RV FL CTL* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel Reverse Flow Control and returns the **CHNL PARAMETERS/CHNL FL CTL TR** display.

Update the channel Flow Control Translation,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the **REVERSE FLOW CONTROL** parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 7

from the **CHANNEL PARAMETERS** menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n REV FL CTL:      CURRENTLY: NONE (XOFF/XON)

1: NONE          4: DC4/DC2    7: RTS-/RTS+
2: DC3/DC1      5: USER          8: DTR-/DTR+
3: DC2/DC1      6: WANG

(ENTER 1-8 <CR> TO CHANGE. <CR> TO RETAIN OLD SETTING.):

```

20312-15

TYPE: n (n = the reverse flow control option number)

PRESS: RETURN

The multiplexer updates the channel reverse flow control and returns the **CHANNEL PARAMETERS** menu. If the **RETURN** key is pressed without entering a reverse flow control option, the Main Menu is returned.

Channel Flow Control Translation

The **FLOW CONTROL TRANSLATION** parameter allows terminals with out-of-band reverse flow control logic (e.g. DTR-/DTR+) to connect to hosts that operate with in-band flow control, and vice versa.

Appendix G provides a table of what occurs when flow control translation is enabled.

Front Panel Access

From the **COMMAND MODE** display

PRESS: NEXT or LAST

until **CHNL PARAMETERS** displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

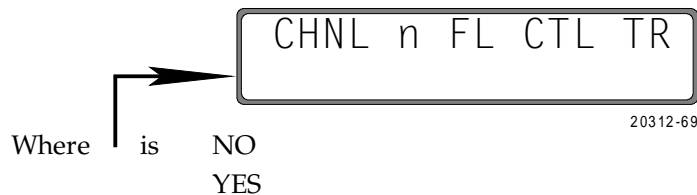
PRESS: SELECT

PRESS: NEXT or LAST

until **CHNL n FL CTL TR** displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel flow control translation and returns the **CHNL PARAMETERS/CHNL EIA PROP** display.

Update the channel EIA Propagation,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the **FLOW CONTROL TRANSLATION** parameter from the Main Menu:

TYPE: 1
PRESS: RETURN
TYPE: n (n = channel number)
PRESS: RETURN
TYPE: 8

from the **CHANNEL PARAMETERS** menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n FLOW CONTROL TRANSLATION:      CURRENTLY: NO
1: YES          2: NO
(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-16

TYPE: n (n = the flow control translation option number)
PRESS: RETURN

The multiplexer updates the channel flow control translation and returns the **CHANNEL PARAMETERS** menu. If the **RETURN** key is pressed without entering a flow translation control option, the Main Menu is returned.

The **EIA PROPAGATION** parameter controls whether or not the RS-232-C control lead inputs are propagated end-to-end. If disabled, transitions on the RS-232-C control signals are not propagated to the remote end.

Channel EIA Propagation

Appendix J provides information on the EIA Signal Exceptions.

Front Panel Access

From the **COMMAND MODE** display

PRESS: NEXT or LAST

until **CHNL PARAMETERS** displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

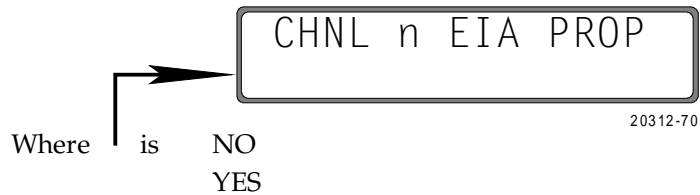
PRESS: SELECT

PRESS: NEXT or LAST

until **CHNL n EIA PROP** displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel EIA Propagation and returns the **CHNL PARAMETERS/CHNL BRK PROP** display.

Update the channel Break Propagation,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the **EIA PROPAGATION** parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 9

from the **CHANNEL PARAMETERS** menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n EIA PROP:      CURRENTLY: NO
1: YES      2: NO
(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-17

TYPE: n (n = the EIA propagation option number)

PRESS: RETURN

The multiplexer updates the EIA propagation and returns the **CHANNEL PARAMETERS** menu. If the **RETURN** key is pressed without entering an EIA propagation option, the Main Menu is returned.

Channel Break Propagation

The *BREAK PROPAGATION* parameter controls whether or not break signals are detected and regenerated. A break signal is defined as the space condition of a line for more than one character time. Once the break condition is detected, a break-on control message is sent to the remote end causing the break signal to be regenerated until a break-off control message is received or 2.016 seconds elapse. Both ends, local and remote, must be programmed the same for proper operation of this parameter.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

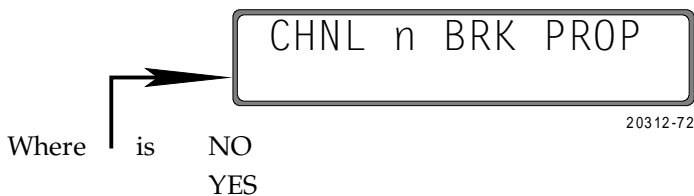
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n BRK PROP* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel Break Propagation and returns the *CHNL PARAMETERS/CHNL ECHOPLEX* display.

Update the channel echoplex,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the **BREAK PROPAGATION** parameter from the Main Menu:

TYPE: 1
PRESS: RETURN
TYPE: n (n = channel number)
PRESS: RETURN
TYPE: 10

from the **CHANNEL PARAMETERS** menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n BREAK:          CURRENTLY: NO
1: YES                   2: NO
(ENTER 1-2 <CR> TO CHANGE. <CR> TO RETAIN OLD SETTING.):
```

20312-18

TYPE: n (n = the break propagation option number)
PRESS: RETURN

The multiplexer updates the break propagation and returns the **CHANNEL PARAMETERS** menu. If the **RETURN** key is pressed without entering a break propagation option, the Main Menu is returned.

Channel Echoplex

The **ECHOPLEX** parameter selects whether or not the multiplexer should echo back to the attached peripherals all printable characters received. If selected, all input except control characters are echoed back to the terminal. The purpose of this parameter is to shorten the response time for half-duplex terminals. All characters are Echoplexed except a flow control XOFF.

Note

If echoing is enabled at the multiplexer, it must be disabled within the host or double characters will appear.

Front Panel Access

From the **COMMAND MODE** display

PRESS: NEXT or LAST

until **CHNL PARAMETERS** displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

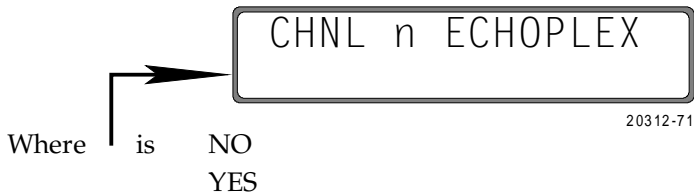
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n ECHOPLEX* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel Echoplex and returns the *CHNL PARAMETERS/CHNL FLYBACK* display.

Update the channel Flyback,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *ECHOPLEX* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 11

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n ECHOPLEX:          CURRENTLY: NO
1: YES                      2: NO
(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20312-19

TYPE: n (n = the echoplex option number)

PRESS: RETURN

The multiplexer updates the channel echoplex and returns the *CHANNEL PARAMETERS* menu. If the *RETURN* key is pressed without entering an echoplex option, the Main Menu is returned.

Channel Flyback Buffering

The *FLYBACK BUFFERING* parameter causes detection and regeneration at the remote end of any delay encountered after reception of characters which cause print-heads to "flyback" to the beginning of a line. If selected, the delay is regenerated after the ASCII characters: Carriage Return, Line Feed, Form Feed, Horizontal Tab, and Vertical Tab.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n FLYBACK* displays on the second line

PRESS: SELECT

the LCD displays:

Where  is NO
YES

20312-73

PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel Flyback and returns the *CHNL PARAMETERS/CHNL CTS-RTS* display.

Update the channel CTS-RTS,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *FLYBACK BUFFERING* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 12

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n FLYBACK BUFFERING:      CURRENTLY: NO
1: YES          2: NO
(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-20

TYPE: n (n = the flyback buffering option number)

PRESS: RETURN

The multiplexer updates the channel flyback buffering and returns the *CHANNEL PARAMETERS* menu. If the *RETURN* key is pressed without entering a flyback buffering option, the Main Menu is returned.

The *CTS-RTS CONTROL* parameter allows selection of whether or not the CTS output is programmed to track the state of the local RTS input. This is important when used in extremely delay-sensitive applications. This tying of local CTS output to the local RTS input disables the end-to-end propagation of DRSS (Data Rate Secondary Select) as CTS. The state of the CTS lead may be overridden by the manual setting of control leads.

Channel CTS-RTS Control

Appendix J provides information in the EIA Signals Exceptions.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n CTS-RTS* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel CTS-RTS and returns the *CHNL PARAMETERS/CHNL MSGS ENAB* display.

Update the channel Message Enabled,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *CTS-RTS CONTROL* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 13

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n CTS-RTS CONTROL:      CURRENTLY: NO
1: YES          2: NO
(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-21

TYPE: n (n = the CTS-RTS option number)

PRESS: RETURN

The multiplexer updates the channel CTS-RTS and returns the **CHANNEL PARAMETERS** menu. If the **RETURN** key is pressed without entering an CTS-RTS option, the Main Menu is returned.

The **MESSAGES ENABLED** parameter allows or disallows message output to connected equipment from the multiplexer, such as **DATA LOST**, **LINK DOWN**, or **AUTOBAUD SPEED DETECTED**. Such messages are usually disabled on the channel port at the host or at a non-ASCII terminal.

**Channel Messages
Enabled**

Front Panel Access

From the **COMMAND MODE** display

PRESS: NEXT or LAST

until **CHNL PARAMETERS** displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

PRESS: NEXT or LAST

until **CHNL n MSGS ENAB** displays on the second line

PRESS: SELECT

the LCD displays:



```
CHNL n MSGS ENAB
```

20312-75

Where is NO
YES

PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel messages enabled and returns the **CHNL PARAMETERS/CHNL SPVR ENAB** display.

Update the channel Supervisor Enabled,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the **MESSAGES ENABLED** parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 14

from the **CHANNEL PARAMETERS** menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n MSGS ENABLED:          CURRENTLY: NO
1: YES          2: NO
(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20312-22

TYPE: n (n = the messages enabled option number)

PRESS: RETURN

The multiplexer updates the channel messages enabled and returns the **CHANNEL PARAMETERS** menu. If the **RETURN** key is pressed without entering a messages enabled option, the Main Menu is returned.

**Channel Supervisor
Enabled**

The *SUPERVISOR ENABLED* parameter determines whether or not the connected equipment is allowed access to supervisory functions via entry of the <supervisor logon character> from an attached terminal keyboard.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

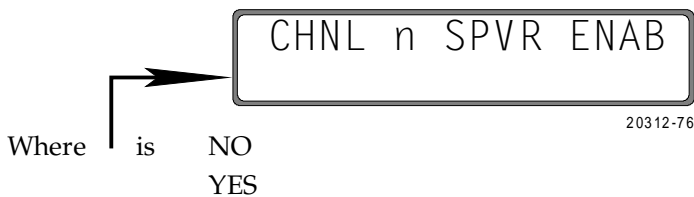
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n SPVR ENAB* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

If the *YES* option is selected, the current supervisor logon character is displayed. A new character may be entered, using the number keys, in decimal from Appendix C.

Note

Each channel can have a different supervisor logon character

The multiplexer updates the channel supervisory enabled selection and returns the *CHNL PARAMETERS/CHNL INAC DISC* display.

Update the channel Inactivity Disconnect,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *SUPERVISOR ENABLED* parameter from the Main Menu:

TYPE: 1
PRESS: RETURN
TYPE: n (n = channel number)
PRESS: RETURN
TYPE: 15

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n SUPERVISORY MODE ENABLED:          CURRENTLY: NO
1: YES          2: NO
(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20312-23

TYPE: n (n = the supervisor enabled option number)
PRESS: RETURN

If the **YES** option is selected, the current supervisor logon character is displayed. A new character may be entered, using the number keys, in decimal from Appendix C. Press the **RETURN** key to update the multiplexer.

Note

Each channel can have a different supervisor logon character

The multiplexer updates the channel supervisor enabled and returns the *CHANNEL PARAMETERS* menu. If the **RETURN** key is pressed without entering a supervisor enabled option, the Main Menu is returned.

Channel Inactivity Disconnect

The *INACTIVITY DISCONNECT* parameter is only relevant in DCX™ network applications. When enabled, the multiplexer sends an internal control code to the DCX 850 User Switching Option (USO) when the channel has been idle for more than 20 minutes, freeing the port for other traffic.

Note

This parameter should be set to NO if not in a DCX 850 network.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

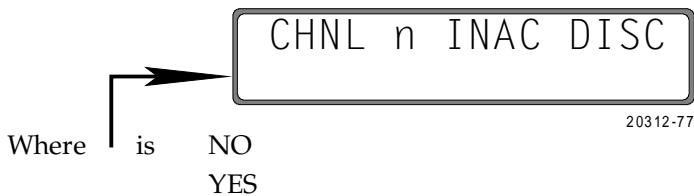
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n INAC DISC* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the channel inactivity disconnect and returns the *CHNL PARAMETERS/CHNL DISC CHAR* display.

Update the channel Disconnect Character,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the *INACTIVITY DISCONNECT* parameter from the Main Menu:

TYPE: 1
PRESS: RETURN
TYPE: n (n = channel number)
PRESS: RETURN
TYPE: 16

from the *CHANNEL PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n INACTIVITY DISCONNECT:          CURRENTLY: NO

1: YES          2: NO

(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20312-24

TYPE: n (n = the inactivity disconnect option number)
PRESS: RETURN

The multiplexer updates the channel inactivity disconnect and returns the *CHANNEL PARAMETERS* menu. If the *RETURN* key is pressed without entering an inactivity disconnect option, the Main Menu is returned.

Channel Disconnect Character

The *DISCONNECT CHARACTER* parameter is only relevant in DCX™ networking applications. Upon receipt of the disconnect character, a message is generated to the DCX™ to either make or tear down a DCX 850 User Switching Option (USO) connection. This character is normally CTRL + T, but you may specify any other character by selecting the *USER* option.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

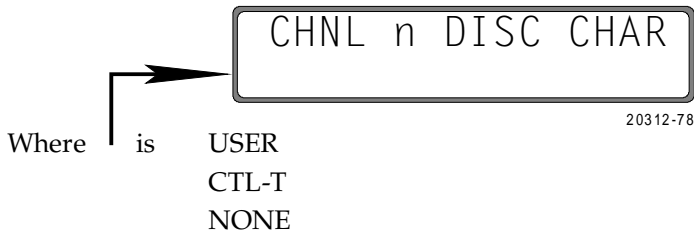
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n DISC CHAR* displays on the second line

PRESS: SELECT

the LCD displays:



PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

If the **USER** option is selected, the current user value is displayed. A new character can be entered, using the number keys, in decimal from Appendix C. Press the **RETURN** key to update the multiplexer.

Note

Each channel can have a different disconnect character

The multiplexer updates the channel disconnect character and returns the **CHNL PARAMETERS/CHNL SPEED** display.

Update the channel Speed,

PRESS: MON/CLR

to exit, or

PRESS: NEXT or LAST

to go to another parameter

Terminal Access

To access the **DISCONNECT CHARACTER** parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 17

from the **CHANNEL PARAMETERS** menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n DISCONNECT CHARACTER:      CURRENTLY: CTL-T
1:  USER          2:  CTL-T          3:  NONE
(ENTER 1-3 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-25

TYPE: n (n = the disconnect character option number)

PRESS: RETURN

If the ***USER*** option is selected, the current user value is displayed. A new character can be entered, using the number keys, in decimal from Appendix C. Press the ***RETURN*** key to update the multiplexer.

Note

Each channel can have a different disconnect character

The multiplexer updates the channel disconnect character and returns the ***CHANNEL PARAMETERS*** menu. If the ***RETURN*** key is pressed without entering a disconnect character option, the Main Menu is returned.

Link Parameters

The **LINK PARAMETERS** command allows you to change the parameters of the link port. Enter **COMMAND** mode by pressing the NEXT push button from either the **MONITOR** or **STANDBY** mode.

The **CLOCK SOURCE** parameter selects whether the multiplexer link serial interface will accept the clock source from pins 15 and 17 (external clocks) or to furnish clock on Pin 24 (internal clock). With synchronous modems, the external clock is normally used. When external is chosen, the clock rate parameter has no affect on link transmission. However, the clock rate should still be set, so that the link statistics are computed correctly.

Link Clock Source

Front Panel Access

From the **COMMAND MODE** display:

PRESS: NEXT or LAST

until **LINK PARAMETERS** displays on the second line

PRESS: SELECT

The LCD displays:



LINK PARAMETERS
LINK CLK SOURCE

20312-79

PRESS: SELECT

The LCD displays:



LINK CLK SOURCE

20312-80

Where is
INTERN
EXTERN

PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT key

The multiplexer updates the link clock source and returns the **LINK PARAMETERS/LINK CLK RATE** display

Update the link Clock Rate, or

PRESS: MON/CLR

to exit

Terminal Access

To access the **LINK CLOCK SOURCE** parameter from the Main Menu:

TYPE: 2
PRESS: RETURN

The terminal displays:

```
LINK PARAMETERS:
1. CLOCK SOURCE:  INTERNAL      2. CLOCK RATE:  9600
(ENTER 1-2 <CR> TO SELECT PARAMETER, OR <CR> TO QUIT.):
```

20312-26

TYPE: 1
from the **LINK PARAMETERS** menu

PRESS: RETURN

```
LINK CLOCK SOURCE:      CURRENTLY: INTERN
1. EXTERNAL      2. INTERNAL
(ENTER 1-3 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-28

The terminal displays:

TYPE: n (n = clock source option number)
PRESS: RETURN

The multiplexer updates the link clock source and returns the **LINK PARAMETERS** menu. If the RETURN key is pressed without entering a clock source option, the Main Menu is returned.

Link Clock Rate

The **CLOCK RATE** parameter selects the data rate of the link port. It is used when the internal clock is selected and for link statistics. The **CLOCK RATE** parameter should always be set so that link statistics are computed correctly.

Front Panel Access

From the **COMMAND MODE** display:

PRESS: NEXT or LAST
until **LINK PARAMETERS** displays on the second line

PRESS: SELECT

The LCD displays:

```
LINK PARAMETERS
LINK CLK RATE
```

20312-81

PRESS: SELECT

The LCD displays:

```
LINK CLK RATE
```

20312-82

Where is

19200	3600
9600	2400
7200	1200
4800	

PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT key

The multiplexer updates the link clock rate and returns the *LINK PARAMETERS/LINK CLK SOURCE* display

Update the link Clock Source, or

PRESS: MON/CLR

to exit

Terminal Access

To access the *CLOCK RATE* parameter from the Main Menu:

TYPE: 2

PRESS: RETURN

The terminal displays:

```
LINK PARAMETERS:
1. CLOCK SOURCE:  INTERNAL      2. CLOCK RATE:  9600
(ENTER 1-2 <CR> TO SELECT PARAMETER, OR <CR> TO QUIT.):
```

20312-26

TYPE: 2

from the *LINK PARAMETERS* menu

PRESS: RETURN

The terminal displays:

```
LINK CLOCK RATE:          CURRENTLY: 9600
1: 19200      3: 7200      5: 3600      7: 1200
2: 9600       4: 4800      6: 2400
(ENTER 1-3 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20312-27

TYPE: n (n = clock rate option number)

PRESS: RETURN

The multiplexer updates the link clock rate and returns the **LINK PARAMETERS** menu. If the **RETURN** key is pressed without entering a clock rate option, the Main Menu is returned.

Supervisory Parameters

The **SUPERVISORY PARAMETERS** command is used to examine and change the parameters of the supervisory port. This port does not take part in connections, therefore, not all of the channel parameters are relevant. The supervisory parameters are not copied when the **COPY PARAMETERS** command is used. Refer to Table 2-5 for the supervisory parameters.

Table 2-5. Supervisory Commands and Options

COMMAND	DEFAULT	OPTIONS
SPEED	9600	50, 75, 110, 134, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600 or AUTOB
DATA BITS	8	8 or 7
STOP BITS	2	1, 1.5, 2
PARITY	NONE/ODD	NONE/ODD, NONE/EVEN, ODD, EVEN, NONE/MARK, NONE/SPACE
RV FL CTL (Reverse Flow Control)	NONE	DC3/DC1, DC2/DC1, DC4/DC2 or NONE
NOTE: These are the only supported supervisory parameters and options.		

Front Panel Access

Supervisory parameters are set using the **CHANNEL PARAMETERS** and selecting the supervisor channel for configuration.

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: LAST

to select the supervisor channel

PRESS: SELECT

the LCD displays:

```

  CHNL PARAMETERS
  CHNL A SPEED
  
```

20312-83

PRESS: NEXT or LAST

until the parameter to change displays

PRESS: SELECT

PRESS: NEXT or LAST

until the desired option displays

PRESS: SELECT

The multiplexer updates the Supervisory Port and returns the next Supervisory Port parameter display.

Terminal Access

To access the *SUPERVISORY PORT* parameter from the Main Menu:

TYPE: 3

PRESS: RETURN

The terminal displays:

```

SUPERVISORY PORT PARAMETERS:

 1. SPEED: 9600      4. PARITY: NONE/ODD
 2. DATA BITS: 8   5. REV FL CTL:
 3. STOP BITS: 1      NONE
(ENTER 1-5 <CR> TO SELECT PARAMETER, OR <CR> TO QUIT.):
  
```

20312-29

TYPE: n (n = supervisory parameter number)

PRESS: RETURN

TYPE: n (n = supervisory option number)

PRESS: RETURN

The multiplexer updates the Supervisory Port and returns the *SUPERVISORY PORT PARAMETERS* menu. If the *RETURN* key is pressed without entering a supervisory port option, the Main Menu is returned.

Copy Parameters

The *COPY PARAMETERS* command is used to copy parameters from one channel to another or all channels. When this command is chosen all parameters are copied from the "from" channel to the "to" channel. When the *ALL* option is chosen, the Supervisory Port options are not copied.

CAUTION

Do not Copy Parameters to a Channel That is Currently in use. Data Communications may be Disrupted due to Channel Parameter Incompatibility.

Front Panel Access

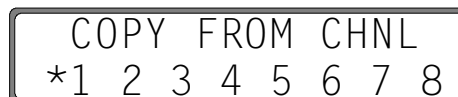
From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *COPY PARAMETERS* displays on the second line

PRESS: SELECT

The LCD displays:



COPY FROM CHNL
*1 2 3 4 5 6 7 8

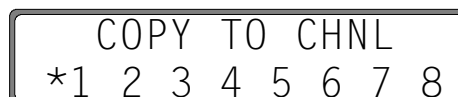
20312-84

PRESS: NEXT or LAST

to choose the channel to copy FROM

PRESS: SELECT

The LCD displays:



COPY TO CHNL
*1 2 3 4 5 6 7 8

20312-85

PRESS: NEXT or LAST

to choose the channel to copy TO

Note

From the display press LAST to display the ALL option.

PRESS: SELECT

The LCD displays:



COPY PARAMETERS
ACTION COMPLETE

20312-86

PRESS: SELECT

to exit copy parameters

Terminal Access

To access the **COPY PARAMETERS** command from the Main Menu:

TYPE: 4

PRESS: RETURN

The terminal displays:

```
COPY PARAMETERS FROM:
SELECT CHANNEL NUMBER (1-8) <CR>:
```

20312-30

TYPE: n (n = the channel to copy FROM)

PRESS: RETURN

The terminal displays:

```
TO:
SELECT CHANNEL NUMBER (1-8 OR ALL) <CR>:
```

20312-31

TYPE: n or ALL (n = the channel to copy TO)

PRESS: RETURN

The multiplexer copies the parameters to the specified channel(s) and returns you to the Main Menu.

The **CHANNEL STATISTICS** command provides a display of the current and peak buffer utilization statistics, the counts of errors, and flow control or reverse flow control conditions invoked for each of the ports. Each channel is assigned a minimum buffer space to prevent lockout.

Channel Statistics

The statistics recorded include:

CURRENT BUFFER UTILIZATION. This percentage indicates the amount of buffer usage currently for this channel.

PEAK BUFFER UTILIZATION. This percentage indicates the channel buffer usage when all channels together were at the highest total utilization since the last statistics reset.

CHANNEL EXCEPTIONS. This lists the number of exceptions since the last statistic reset. Exceptions are parity errors and framing errors. High exception counts generally indicate a wrong speed or parity setting.

FLOW CONTROL. The number of times flow control has been invoked since the last statistics reset.

REVERSE FLOW CONTROL. The number of times reversed flow control has been invoked since the last statistics reset.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL STATUS* displays on the second line

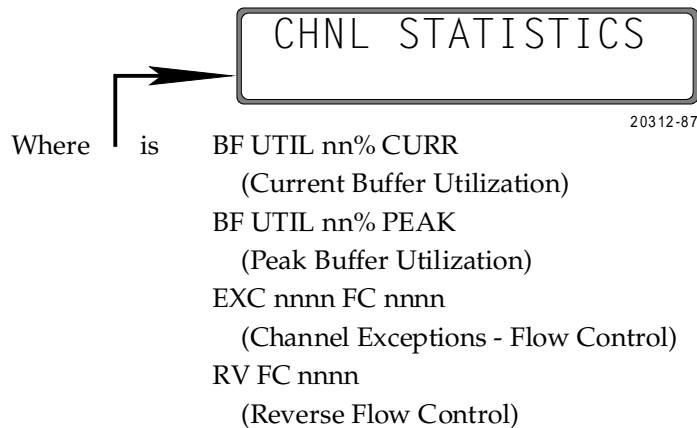
PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

The LCD displays:



PRESS: NEXT or LAST

to scroll through statistics

PRESS: MON/CLR

to exit

Note

nn is the utilization percentage. nnn is the number or occurrences.

To update the channel statistics display:

PRESS: SELECT

To display the channel status in real-time (continuous update):

PRESS & HOLD: SELECT

PRESS: MON/CLR

Release the keys. The display is continuously updated each second, providing the ability to dynamically track the displayed channel statistics parameter.

PRESS: MON/CLR

to exit

Terminal Access

To access *CHANNEL STATISTICS* from the Main Menu:

TYPE: 5
PRESS: RETURN

The terminal displays:

```
CHANNEL STATISTICS:
      CH1  CH2  CH3  CH4  CH5  CH6  CH7  CH8  TOTAL
CURRENT BUFFER UTIL:  02%  02%  02%  02%  02%  02%  02%  02%  16%
PEAK BUFFER UTIL:    02%  02%  02%  02%  02%  02%  02%  02%  16%
CHANNEL EXCEPTIONS:  0000  0000  0000  0000  0000  0000  0000  0000  00000
FLOW CONTROLS:      0000  0000  0000  0000  0000  0000  0000  0000  00000
REV FLOW CONTROLS:  0000  0000  0000  0000  0000  0000  0000  0000  00000

(ENTER <CR> TO EXIT.)
```

20312-32

PRESS: RETURN

to exit

Link Statistics

The *LINK STATISTICS* command provides current and peak link utilization statistics, together with current and peak activity for both directions of the link. These statistics are updated once a second.

The statistics recorded include:

CURRENT TRANSMIT LINK UTILIZATION. This is the current percentage of total link bandwidth used in the transmit direction in the most recent second.

PEAK TRANSMIT LINK UTILIZATION. This is the highest percentage of total link bandwidth used in the transmit direction for any one-second interval since the last reset.

CURRENT RECEIVE LINK UTILIZATION. This is the current percentage of total link bandwidth used in the receive direction in the most recent second.

PEAK RECEIVE LINK UTILIZATION. This is the highest percentage of total link bandwidth used in the receive direction for any one-second interval since the last reset.

CURRENT FRAMES RECEIVED. This is the number of frames received in the last second.

PEAK FRAMES RECEIVED. This is the highest number of frames received in a second since the last reset.

CURRENT ERROR FRAMES RECEIVED. This is the number of errored frames received in the last second.

PEAK ERROR FRAMES RECEIVED. This is the highest number of errored frames received in a second since the last reset.

CURRENT RESENT FRAMES. This is the number of retransmitted frames in the last second.

PEAK RESENT FRAMES. This is the highest number of retransmitted frames in a second since the last reset.

Front Panel Access

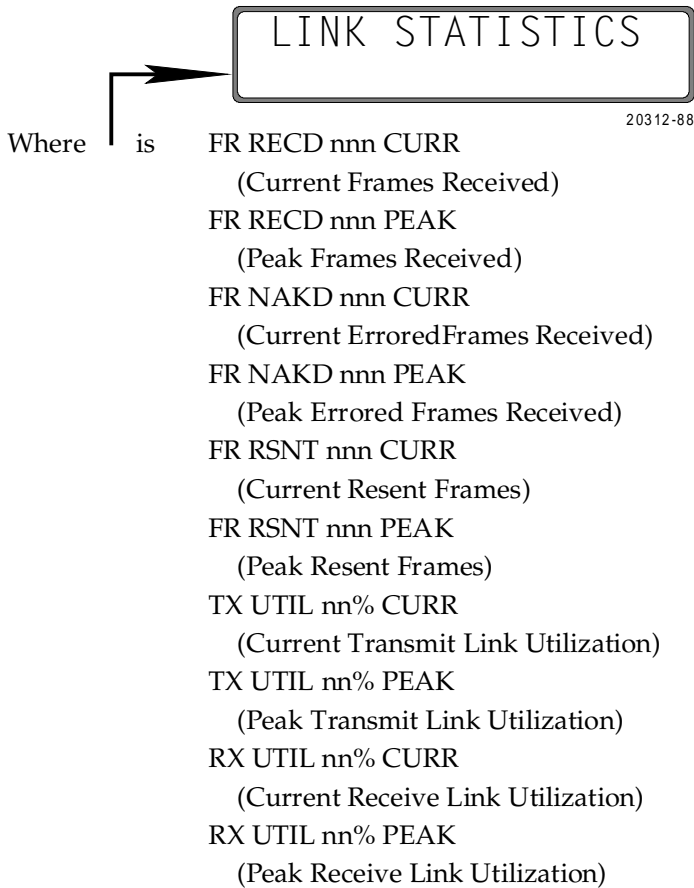
From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *LINK STATISTICS* displays on the second line

PRESS: SELECT

The LCD displays:



PRESS: NEXT or LAST

to scroll through the statistics

PRESS: MON/CLR

to exit

Note

nnn is the number of frames. nn is the utilization percentage.

To update the link statistics display:

PRESS: SELECT

To display the channel status in real-time (continuous update):

PRESS: SELECT & MON/CLR simultaneously

Release the push buttons. The display is continuously updated each second, providing the ability to dynamically track the displayed link statistic parameter.

PRESS: MON/CLR

to exit

Terminal Access

To access *LINK STATISTICS* from the Main Menu:

TYPE: 6

PRESS: RETURN

The terminal displays:

```
LINK STATISTICS:
CURRENT TRANSMIT LINK UTILIZATION:    00%
PEAK TRANSMIT LINK UTILIZATION:       00%
CURRENT RECEIVE LINK UTILIZATION:     00%
PEAK RECEIVE LINK UTILIZATION:        00%
CURRENT FRAMES RECEIVED PER SECOND:   000
PEAK FRAMES RECEIVED PER SECOND:      000
CURRENT ERRORED FRAMES RECD. PER SEC.: 000
PEAK ERRORED FRAMES RECD. PER SECOND: 000
CURRENT RESENT FRAMES PER SECOND:     000
PEAK RESENT FRAMES PER SECOND:        000
```

(ENTER <CR> TO EXIT.)

20312-33

PRESS: RETURN

to exit

Local Channel Loopback

Note

In Supervisory Mode, do not Issue a Channel Loopback to the Data Channel you are Attached to; Communications is Lost to That Channel.

The **LOCAL CHANNEL LOOPBACK** command sets or clears, on a selected local channel, the inward and outward looping of the receive and transmit data streams at the channel interface. The signals incoming on Pin 2 (TxD) are looped back on Pin 3 (RxD) and data incoming from the link to the looped channel is sent back to the link as received (Figure 2-10). This parameter is an effective troubleshooting mechanism, but disrupts the normal channel traffic for the duration of the loopback state. This command acts as a toggle switch. The second time it is selected the channel loopback is cleared.

A **CHANNEL RESET**, System Reset, or power failure will clear a channel loopback state. To determine the loopback status use the **CHANNEL STATUS** command.

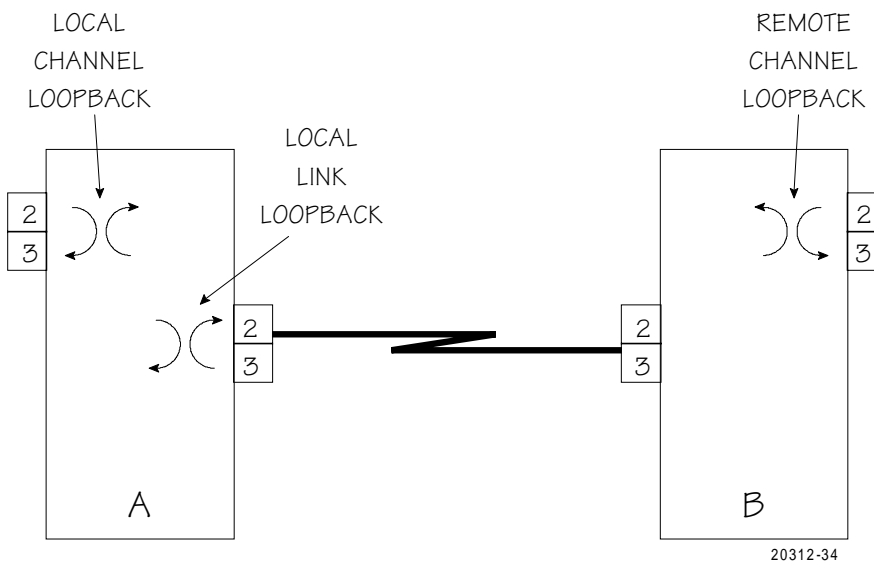


Figure 2-10. Loopback Points from 3028 Turbo (CTS 2031 Turbo) Multiplexer A

Front Panel Access

From the **COMMAND MODE** display:

PRESS: NEXT or LAST

until **LOC CHNL LOOPK BK** displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

The multiplexer sets or clears the local channel loopback on the designated channel and returns to the *COMMAND MODE* display. A message, with the time the loopback occurred, is stored in the *MONITOR MODE* queue to be displayed when the mode is entered.

Terminal Access

To access *LOCAL CHANNEL LOOPBACK* from the Main Menu:

TYPE: 7

PRESS: RETURN

TYPE: n (n = the channel to be looped/cleared)

PRESS: RETURN

When a channel loopback is activated the terminal displays:

When a channel loopback is cleared the terminal displays:

```
LOCAL CHANNEL LOOPBACK ACTIVE.  <CR> TO EXIT.
```

20312-36

The multiplexer performs the local channel loopback. A message, with the time the

```
LOCAL CHANNEL LOOPBACK CLEARED.  <CR> TO EXIT.
```

20312-37

loopback occurred, is stored in the *MONITOR MODE* queue to be displayed when the mode is entered.

PRESS: RETURN

to exit

Remote Channel Loopback

The *REMOTE CHANNEL LOOPBACK* command sets or clears, on a selected remote channel, the inward and outward looping of the receive and transmit data streams at the serial interface (Figure 2-10). This command acts as a toggle switch. The second time it is selected the remote channel loopback is cleared.

A *CHANNEL RESET*, System Reset, or power failure on the remote multiplexer will also clear a remote channel loopback. To determine the loopback status use the *CHANNEL STATUS* command.

Front Panel Access

From the *COMMAND MODE* display

PRESS: NEXT or LAST

until *REM CHNL LOOPBK* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

The multiplexer sets or clears the remote channel loopback on the designated channel and returns to the *COMMAND MODE* display. A message, with the time the loopback occurred, is stored in the *MONITOR MODE* queue to be displayed when the mode is entered.

Terminal Access

To access *REMOTE CHANNEL LOOPBACK* from the Main Menu:

TYPE: 8

PRESS: RETURN

TYPE: n (n = the channel to be looped/cleared)

PRESS: RETURN

When a remote channel loopback is activated the terminal displays:

```
REMOTE CHANNEL LOOPBACK ACTIVE.  <CR> TO EXIT.
```

20312-38

When a remote channel loopback is cleared the terminal displays:

```
REMOTE CHANNEL LOOPBACK CLEARED.  <CR> TO EXIT.
```

20312-39

The multiplexer performs the remote channel loopback. A message, with the time the loopback occurred, is stored in the *MONITOR MODE* queue to be displayed when the mode is entered.

PRESS: RETURN

to exit

Local Link Loopback

The *LOCAL LINK LOOPBACK* command sets and clears a bidirectional loopback function on the link port. When activated the link port will loop all data sent from the channels to the link back to the respective channel ports (Figure 2-10). At the same time, it will loop outward on Pin 2 (TxD) all data received on Pin 3 (RxD). This command is not usable in remote supervisory mode since it will disrupt remote communications. This command acts as a toggle switch. The first time it is selected the local link loopback is activated. The second time it is selected the local link loopback is cleared.

During a link loopback state, the link down LED on the front panel will flash to indicate the existence of the loopback state.

A *LINK RESET*, System Reset or power failure will also clear a local link loopback state.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *LINK LOOPBACK* displays on the second line

PRESS: SELECT

The multiplexer performs the link loopback and returns to the *COMMAND MODE* display. A message, with the time loopback occurred, is stored in the *MONITOR MODE* queue to be displayed when the mode is entered.

Terminal Access

To access *LOCAL LINK LOOPBACK* from the Main Menu:

TYPE: 9

PRESS: RETURN

The multiplexer performs the link loopback and returns to the Main Menu. A message, with the time loopback occurred, is stored in the *MONITOR MODE* queue to be displayed when the mode is entered.

Channel Reset

The **CHANNEL RESET** command causes the local and remote ends to be reset. It clears the channel data buffers, any flow control XOFF state (if present and if the channel has the option), and any reverse flow control XOFF state. In addition, it removes any forced EIA output signals on the local end (refer to the Channel Status section). The channel reset function will cause an event display in **MONITOR MODE**. The event lists the occurrence of the reset, the channel number, and the time.

Note

A channel reset normally acts upon both ends of a connection. The exception is when the reset is invoked upon a channel which is in Supervisory mode; in this case a channel reset is only done on the local end. It should be noted that the **CHANNEL RESET** command will cause data in the buffers to be cleared, so it should be used with caution. It will not clear forced EIA outputs on the remote end.

Front Panel Access

When using the front panel, you can reset all of the channels simultaneously by using the option: **ALL CHANNELS**

From the **COMMAND MODE** display:

PRESS: NEXT or LAST

until **CHNL RESET** displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number or **ALL CHANNELS**

PRESS: SELECT

The multiplexer resets the designated channel(s) and returns to the **COMMAND MODE** display. A message, with the time the channel reset occurred, is stored in the **MONITOR MODE** queue to be displayed when the mode is entered.

Terminal Access

To reset a **SINGLE CHANNEL**, from the Main Menu:

TYPE: 10

PRESS: RETURN

TYPE: n (n = the channel to be reset)

PRESS: RETURN

To reset **ALL CHANNELS**, from the Main Menu:

TYPE: 11

PRESS: RETURN

The multiplexer resets the designated channel(s), and returns the Main Menu. A message, with the time the channel reset occurred, is stored in the *MONITOR MODE* queue to be displayed when the mode is entered.

Link Reset

The *LINK RESET* command clears and reestablishes communications with the other multiplexer over the link. The multiplexer continually tries to establish a link connection when it is down, therefore, this command is used for test purposes on an established link.

Note

This command will interfere with normal data traffic on the link.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *LINK RESET* displays on the second line

PRESS: SELECT

The multiplexer resets the link and returns to the *COMMAND MODE* display. A message, with the time Link Reset occurred, is stored in the *MONITOR MODE* queue to be displayed when the mode is entered.

Terminal Access

To access *LINK RESET* from the Main Menu:

TYPE: 12

PRESS: RETURN

The multiplexer resets the link and returns to the Main Menu. A message, with the time Link Reset occurred, is stored in the *MONITOR MODE* queue to be displayed when the mode is entered.

The **STATISTICS RESET** command resets all link and channel current and peak histories.

Statistics Reset

Front Panel Access

From the **COMMAND MODE** display:

PRESS: NEXT or LAST

until **STATISTICS RESET** displays on the second line

PRESS: SELECT

The multiplexer resets the statistics and returns the **COMMAND MODE** display.

Terminal Access

To access **STATISTICS RESET** from the Main Menu:

TYPE: 13

PRESS: RETURN

The multiplexer resets the statistics and returns to the Main Menu.

The **CHANNEL VALIDATE** command initiates a test of the data path end-to-end for the selected channel. A test word is sent to the remote end of a connection and looped back. If the initiating channel receives the looped back test word, the test is passed. If the test word is not received back at the initiating channel within five seconds, the test is failed.

Channel Validate

Note

This channel validate test is non-interfering and can be initiated while data traffic is active.

Front Panel Access

From the **COMMAND MODE** display:

PRESS: NEXT or LAST

until **CHNL VALIDATE** displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

The LCD displays:

CHNL n VALIDATE:
 TEST ACTIVE

20312-89

If the test passed, the LCD displays:

CHNL n VALIDATE:
 TEST PASSED

20312-90

If the test failed, the LCD displays:

CHNL n VALIDATE:
 TEST FAILED

20312-91

PRESS: MON/CLR

to exit

Terminal Access

To access *CHANNEL VALIDATE*, from the Main Menu:

TYPE: 14

PRESS: RETURN

TYPE: n (n = the channel number to be tested)

PRESS: RETURN

If the test passed, the terminal displays:

VALIDATE TEST PASSED. <CR> TO EXIT.

20312-40

If the test failed, the terminal displays:

VALIDATE TEST FAILED. <CR> TO EXIT.

20312-41

PRESS: RETURN

to exit

Channel Status

The **CHANNEL STATUS** command provides information on flow control, reverse flow control, data activity (in the last two minutes), remote and local loopback status, and the polarity of the RS-232-C control leads.

Appendix J provides information on the EIA Signal Exceptions.

Front Panel Access

From the **COMMAND MODE** display:

PRESS: NEXT or LAST

until **CHNL STATUS** displays on the second line


PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

The LCD displays:

Where  is

20312-92

DRS xxx BO xxx
(Data Rate (Secondary) Select - Busy Out)

DTR xxx RTS xxx
(Data Terminal Ready - Ready To Send)

CTS xxx RI xxx
(Clear To Send - Ring Indicator)

DCD xxx DSR xxx
(Data Carrier Detect - Data Set Ready)

LLB xxx RLB xxx
(Local Loopback - Remote Loopback)

FC xxx RFC xxx
(Flow Control - Reverse Flow Control)

ACTIVITY zzz

PRESS: NEXT or LAST

to scroll through status

Note

xxx is ON or OFF depending on the selection. zzz is YES or NO depending on the selection.

To update the channel status display:

PRESS: SELECT

To display the channel status in real-time (continuous update):

PRESS & HOLD: SELECT

PRESS: MON/CLR

Release the push buttons. The display is continuously updated each second, providing the ability to dynamically track the displayed channel status parameter.

PRESS: MON/CLR

to exit

The *CHNL STATUS* function can be used to force certain EIA leads *ON* or *OFF*.

When CTS xxx RI xxx or DCD xxx DSR xxx is displayed, an asterisk (*) is displayed before the option that can be changed. Only the EIA outputs CTS, RI, DCD and DSR can be changed. The change is from *ON* to *OFF* similar to a toggle switch. To change a display:

PRESS: SELECT

The display will have an @ symbol before the xxx indicating the change was forced by the operator. The *CHANNEL PARAMETER CTS_RTS ENABLED* is overridden when the CTS signal is forced using this command.

Note

A CHANNEL RESET or System Reset will remove a forced condition. A power failure will not reset the forced condition.

To update the next parameter:

PRESS: NEXT

or

PRESS: MON/CLR

to exit

Terminal Access

To access *CHANNEL STATUS*, from the Main Menu:

TYPE: 15

PRESS: RETURN

TYPE: n (n = the channel number)

PRESS: RETURN

The terminal displays:

```

CHANNEL n STATUS:

EIA OUTPUTS:          EIA INPUTS:          STATUS:
1. CTS:  OFF          DSRS:  OFF          LOCAL LOOPBACK:  OFF
2.  RI:  OFF          BO:    OFF          REMOTE LOOPBACK: OFF
3. DCD:  OFF          RTS:  OFF          DATA ACTIVITY:  NO
4. DSR:  OFF          DTR:  OFF          FLOW CONTROL:    OFF
                                REV FL CONTROL:  OFF

(ENTER 1-4 <CR> TO SET OR RELEASE OUTPUT SIGNAL, OR <CR> TO EXIT.):

```

20312-42

To change the EIA output options:

TYPE: n (n = the number of the output to change)

PRESS: RETURN

The display will have an @ symbol after the *ON* or *OFF* indicating the change was forced by the operator.

Note

A CHANNEL RESET or System Reset will remove a forced condition. A power failure will not reset the forced condition.

The Main Menu is displayed after an EIA output is changed. To verify that the EIA output was updated, the parameter must be selected again.

The **REMOTE SIGNON** command is used in a point-to-point application with a 3028 Turbo (CTS 2031 Turbo) multiplexer at each end. It allows access to the supervisory functions at the remote end. Any command that is available on the local supervisory facility can be accessed except Remote Signon, Link Reset, and Link Loopback. When in remote supervisor mode, the **LOGOFF** command and the **REMOTE SIGNOFF** command will both cause the remote supervisor to be signed

Remote Signon

Note

Ensure that supervisory mode is enabled at the local and remote ends before attempting to sign on through a standard channel port.

off.

Front Panel Access

From the **COMMAND MODE** display:

PRESS: NEXT or LAST

until *REMOTE SIGNON* displays on the second line

PRESS: SELECT

The multiplexer indicates access of supervisor mode at the remote end with the *COMMAND MODE* display. The display is in lowercase indicating remote access.

```
command mode
chnl parameters
```

20312-96

If the remote front panel is already in supervisor mode, the following message is displayed and access is denied.

```
COMMAND MODE
supervisor busy
```

20312-93

Terminal Access

The remote signon is available to a terminal attached through a dedicated local supervisory port, a local floating supervisory port (a designated data channel that is enabled for supervisory access), or any terminal in the network that is connected to the supervisor facility. Only one terminal can be logged on as supervisor at a time.

To access *REMOTE SIGNON* from the Main Menu:

TYPE: 16

Note

When a user is logged on to a remote channel as supervisor, the attached device at the remote end is effectively disabled until signoff.

PRESS: RETURN

The terminal displays the system menu from the remote 3028 *Turbo* (CTS 2031 *Turbo*) multiplexer or a prompt for the password to be entered, if one is programmed. Enter the password.

PRESS: RETURN

The menu appears and you are logged on and may continue to change or inquire about the parameters.

When signed on to a remote multiplexer as supervisor, all menus and displays are generated by the remote multiplexer. To clarify which node one is talking to, especially if jumping between remote and local supervisor modes, it is a good idea to modify the system banner to indicate the identity of the node producing the menu. This can be done via the *SET SYSTEM BANNER* command.

If the supervisory function is currently in use, access is denied and the terminal displays:

```
SUPERVISOR MODE ALREADY ACTIVE.  
<CR> TO EXIT.):
```

20312-43

The **REMOTE SIGNOFF** command logs off the supervisory facility at the remote site multiplexer. If the remote supervisor is not logged on, this command has no effect.

Remote Signoff

Front Panel Access

From the **COMMAND MODE** display:

PRESS: NEXT or LAST

until **REMOTE SIGNOFF** displays on the second line

```
command mode  
remote signoff
```

20312-97

PRESS: SELECT

The multiplexer logs off the remote multiplexer and returns to local operation.

```
command mode  
remote signedoff
```

20312-98

A message is stored in **MONITOR** mode indicating the signoff and the time.

Terminal Access

To access **REMOTE SIGNOFF** from the Main Menu:

TYPE: 17

PRESS: RETURN

The multiplexer logs off the remote multiplexer and returns to local operation. A message is stored in **MONITOR MODE** indicating the signoff and the time.

Set System Password

The *SET SYSTEM PASSWORD* command is used to set or change the password required to access the supervisory functions. A fixed password entry protects against entry by unauthorized users. Before the prompt is displayed to enter a new password the correct fixed password must be entered. This function is only available from an attached terminal. The password can be any combination of alphanumeric characters and symbols, except RETURN, up to 19 characters.

To access *SET SYSTEM PASSWORD* from the Main Menu:

TYPE: 18
PRESS: RETURN

The terminal displays:

```
ENTER FIXED PASSWORD <CR>:
```

20312-44

Enter the fixed password)&(

If the incorrect entry is made, the prompt is repeated two more times for the correct entry. If the correct entry is made, the screen displays:

```
ENTER NEW PASSWORD <CR>:
```

20312-45

TYPE: password (password = the selected password)
PRESS: RETURN

To delete a password completely, enter a *CARRIAGE RETURN* for the new password entry.

The terminal displays:

```
ENTER AGAIN TO VERIFY <CR>:
```

20312-46

TYPE: password (password = the same entry as above)
PRESS: RETURN
PRESS: RETURN

to exit without gaining access

Set System Banner

The *SET SYSTEM BANNER* command allows you to program the top line on the Main Menu. The system accepts up to 60 characters and prints them each time the Main Menu is displayed.

To access *SET SYSTEM BANNER* from the Main Menu:

TYPE: 19
PRESS: RETURN

The terminal displays:

```
BANNER CURRENTLY:          S Y S T E M   M E N U          :
ENTER NEW BANNER <CR>:
```

20312-47

Type in the new banner up to 60 characters.

PRESS: RETURN

The system changes the banner and displays the Main Menu.

Note

The banner will survive a power failure. A System Reset will return the factory default banner.

The *SET SYSTEM TIME* command allows the operator to set the clock for Monitor event messages and the logon message. If the time is not set, the system time is reported based on the power-on value of 00:00:00.

Set System Time

Note

The multiplexer uses a 24-hour clock. Entries using this command should reflect this. The system time is reset to 00:00:00 after a power failure.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *SET TIME* displays as the second line

PRESS: SELECT

The LCD displays:



SET TIME
00:00:00

20312-94

PRESS: SELECT

to move from hours to minutes to seconds

PRESS: NEXT or LAST

to set each setting

PRESS: MON/CLR

to exit


Terminal Access

To access *SET SYSTEM TIME* from the Main Menu:

TYPE: 20

PRESS: RETURN

The terminal displays:



CURRENT SYSTEM TIME: 05:47:05
ENTER NEW TIME <CR>:

20312-48

Enter the time in the format hh:mm:ss with colons separating the three fields.

PRESS: RETURN

If the time set is accepted, the Main Menu displays. If the time set is not accepted, the prompt is returned.

Disable/Enable Front Panel

The *DISABLE/ENABLE FRONT PANEL* command disables or enables the push buttons on the front panel of the multiplexer. This function is only available from an attached terminal. This command acts as a toggle switch, the first time it is selected the front panel is disabled, the second time, the front panel is enabled. When using this command ensure that the correct front panel is being disabled/enabled.

To access *DISABLE /ENABLE FRONT PANEL* from the Main Menu:

TYPE: 21

PRESS: RETURN

The terminal displays:

```
FRONT PANEL CURRENTLY ENABLED.
(ENTER 1 <CR> TO CHANGE SETTING, OR <CR> TO EXIT.):
```

20312-95

TYPE: 1

to change the setting

PRESS: RETURN

to update, change or exit with no change

The **MONITOR MODE** command causes the supervisor to be logged off, and the events to be displayed. The monitor mode queue will store the 16 most recent local and remote events to display.

Monitor Mode

Front Panel Access

From the **COMMAND MODE** display:

PRESS: MON/CLR

The LCD displays:

```
MONITOR MODE
REV 938 14.0
```

20312-52

This display appears until an event occurs. **REV nnn.nn** indicates the PROM level on the multiplexer board. When you first enter **MONITOR MODE** (after the PROM level display), events that have been stored in the queue display in the order they occurred.

Terminal Access

To access **MONITOR MODE** from the Main Menu:

TYPE: 22

PRESS: RETURN

The terminal displays:

```
MONITOR MODE
REV 938 14.0
```

20312-3

This display appears until an event occurs. REV nnn.nn indicates the PROM level on the multiplexer board. When you first enter MONITOR MODE (after the PROM level display), events that have been stored in the queue display in the order they occurred.

Logoff

The *LOGOFF* parameter ends the *COMMAND MODE* function and allows supervisory access to other users.

To access *LOGOFF* from the Main Menu:

TYPE: 23

PRESS: RETURN

The terminal displays:

```
SUPERVISORY SIGNOFF AT 10:10:00
```

20312-49

RESETTING THE MULTIPLEXER

Coldstart

To reset the multiplexer:

1. Ensure that the front panel is in MONITOR mode.
2. Press & Hold the SELECT push button while pressing the NEXT push button.

Note

When the Multiplexer is RESET all Buffers, Channel and Link Loopbacks, and the Supervisor Password are Cleared. The Supervisor is also Logged off.

The Channel and Link Parameters are Reset to the Factory Specified Defaults.

The system is reset and the front panel displays:

```
SYSTEM READY
00:00:00
```

20312-51

Warmstart

To reset the multiplexer without returning to the factory-set defaults, remove power to the unit. Restore power to the unit. The multiplexer is reset, but the set values remain the same.

A. Multiplexer Command Mode Summary

Command Mode Use	A-1
Front Panel Access	A-1
Terminal Access	A-1

COMMAND MODE USE

This appendix summarizes the usage of the *COMMAND* mode commands, listing each parameter available for change and its options, in a flowchart format, in the order they are displayed.

Front Panel Access

The *COMMAND* mode is entered by pressing the NEXT push button from the *MONITOR* or *STANDBY* modes. After entering the *COMMAND* mode the commands are listed on the second line of the display. The NEXT or LAST push buttons will advance through the commands, forward or backwards respectively, changing the second line display accordingly. To access the command parameters, press the SELECT push button. The command is displayed on the first line and the parameter is displayed on the second line. Use the NEXT or LAST push button to scroll through the parameters. Use the SELECT push button to access the parameter options. The parameter is displayed on the first line and the options are displayed on the second line. The NEXT and LAST push buttons will scroll through the options. The SELECT push button will update the multiplexer. The MON/CLR push button can be used at any time to exit to the *COMMAND* mode display without updating parameter values.

Terminal Access

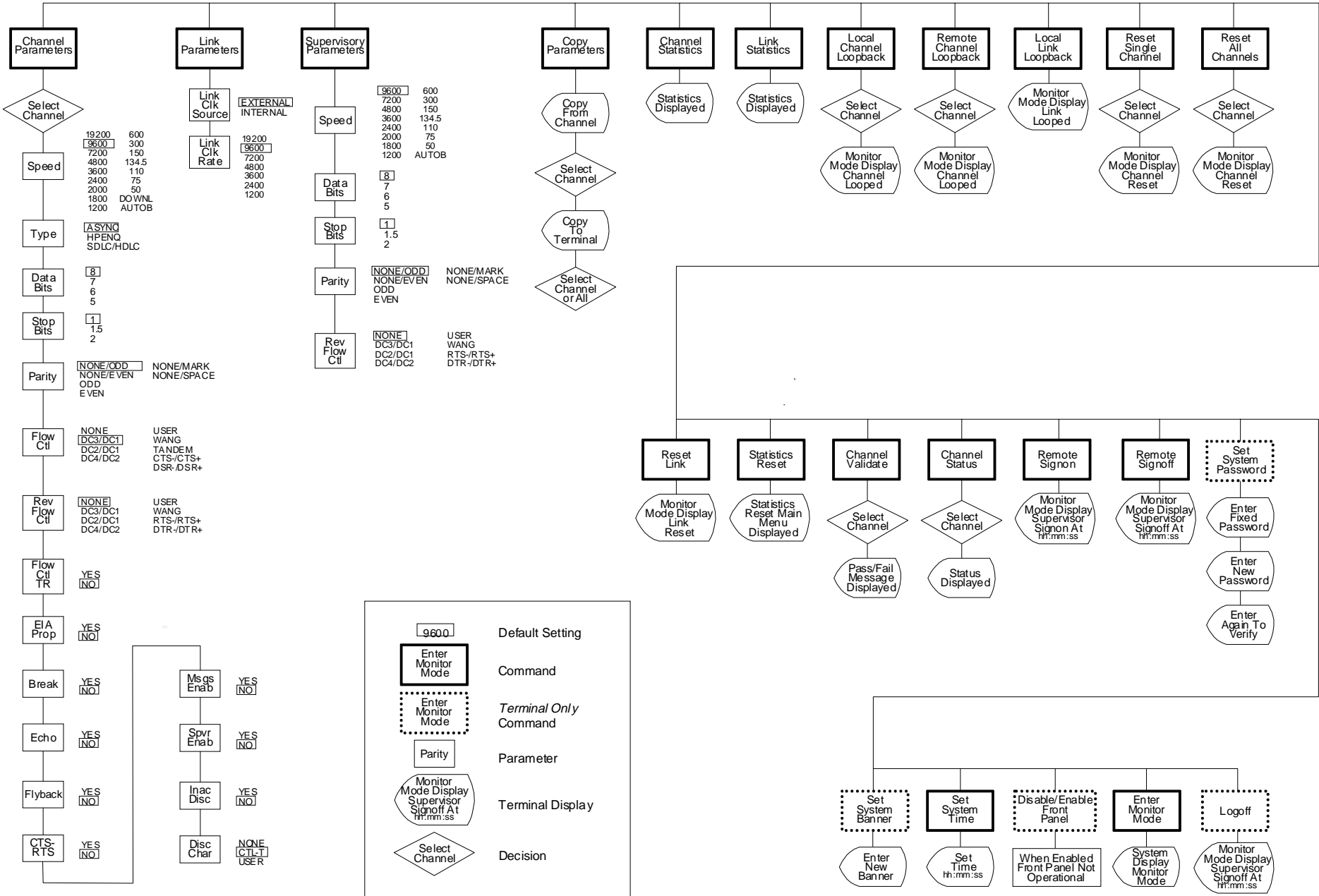
SUPERVISOR mode is entered by pressing the <supervisor logon character> from a port that has the supervisor enabled. If the password has been previously programmed, a prompt is displayed. If a password is not in use, the Main Menu is displayed.

After the Main Menu is displayed, menu items can be selected by typing the number before the item and pressing RETURN. This will display a second-level menu, a list of options, or instructions for command usage. The RETURN key can be used at any time to exit the Main Menu.

Note

The following flowchart is designed to be used by anyone with operating experience on the 3028 Turbo (CTS 2031 Turbo) multiplexer. It should be used as a reference tool for configuration.

3028 Turbo Multiplexer Command Mode Summary



B. Technical Specifications

Multiplexer Technical Specifications	B-1
Approvals	B-1

MULTIPLEXER TECHNICAL SPECIFICATIONS

POWER SUPPLY

115/230Vac, 50/60 Hz, 0.16/0.08 A, Switch Selectable

HEAT DISSIPATION

7 Btu/hr

ENVIRONMENT

Operating Temp: 32°F (0°C) to 113°F (45°C)

Storage: -4°F (-20°C) to 158°F (7°C)

Rel Humidity: 5% to 90% non-condensing

DIMENSIONS

Height: 1.75 in. (4.44cm)

Width: 17.00 in. (43.18cm)

Depth: 12.00 in. (18.93cm)

WEIGHT

4.5 lb (2.1 kg)

INTERFACE STANDARDS

RS-232-C

V.24

LINK PROTOCOL STANDARDS

Modified HDLC

X.25 Level 2

ERROR CONTROL

16 bit cyclical redundancy check

BUFFER CAPACITY

16,384 bytes

LINK TIMING

Internal from 1.2 Kbps to 19.2 Kbps, External to 64Kbps

APPROVALS

Model 3028 Turbo (2031T)

- MET, c-MET and CE

C. ASCII Character Codes

Decimal Value	Binary	Hex	Octal	Mnemonic Character	Description	Decimal Value	Binary	Hex	Octal	Mnemonic Character	Description
0	000 0000	00	000	NUL	Null	64	100 0000	40	100	@	
1	000 0001	01	001	SOH	Start of Header	65	100 0001	41	101	A	
2	000 0010	02	002	STX	Start of Text	66	100 0010	42	102	B	
3	000 0011	03	003	ETX	End of Text	67	100 0011	43	103	C	
4	000 0100	04	004	EOT	End of Transmission	68	100 0100	44	104	D	
5	000 0101	05	005	ENQ	Enquiry	69	100 0101	45	105	E	
6	000 0110	06	006	ACK	Positive Acknowledge	70	100 0110	46	106	F	
7	000 0111	07	007	BEL	Bell	71	100 0111	47	107	G	
8	000 1000	08	010	BS	Back Space	72	100 1000	48	110	H	
9	000 1001	09	011	HT	Horizontal Tab	73	100 1001	49	111	I	
10	000 1010	0A	012	LF	Line Feed	74	100 1010	4A	112	J	
11	000 1011	0B	013	VT	Vertical Tab	75	100 1011	4B	113	K	
12	000 1100	0C	014	FF	Form Feed	76	100 1100	4C	114	L	
13	000 1101	0D	015	CR	Carriage Return	77	100 1101	4D	115	M	
14	000 1110	0E	016	SO	Shift Out	78	100 1110	4E	116	N	
15	000 1111	0F	017	SI	Shift In	79	100 1111	4F	117	O	
16	001 0000	10	020	DLE	Data Link Escape	80	101 0000	50	120	P	
17	001 0001	11	021	DC1	Device Control 1	81	101 0001	51	121	Q	
18	001 0010	12	022	DC2	Device Control 2	82	101 0010	52	122	R	
19	001 0011	13	023	DC3	Device Control 3	83	101 0011	53	123	S	
20	001 0100	14	024	DC4	Device Control 4	84	101 0100	54	124	T	
21	001 0101	15	025	NAK	Negative Acknowledge	85	101 0101	55	125	U	
22	001 0110	16	026	SYN	Synchronous Idle	86	101 0110	56	126	V	
23	001 0111	17	027	ETB	End of Transmission Block	87	101 0111	57	127	W	
24	001 1000	18	030	CAN	Cancel	88	101 1000	58	130	X	
25	001 1001	19	031	EM	End of Medium	89	101 1001	59	131	Y	
26	001 1010	1A	032	SUB	Substitute	90	101 1010	5A	132	Z	
27	001 1011	1B	033	ESC	Escape	91	101 1011	5B	133	[
28	001 1100	1C	034	FS	File Separator	92	101 1100	5C	134	\	
29	001 1101	1D	035	GS	Group Separator	93	101 1101	5D	135]	
30	001 1110	1E	036	RS	Record Separator	94	101 1110	5E	136	^	
31	001 1111	1F	037	US	Unit Separator	95	101 1111	5F	137	_	
32	010 0000	20	040	(space)		96	110 0000	60	140	`	
33	010 0001	21	041	!		97	110 0001	61	141	a	
34	010 0010	22	042	"		98	110 0010	62	142	b	
35	010 0011	23	043	#		99	110 0011	63	143	c	
36	010 0100	24	044	\$		100	110 0100	64	144	d	
37	010 0101	25	045	%		101	110 0101	65	145	e	
38	010 0110	26	046	&		102	110 0110	66	146	f	
39	010 0111	27	047	'		103	110 0111	67	147	g	
40	010 1000	28	050	(		104	110 1000	68	150	h	
41	010 1001	29	051	)		105	110 1001	69	151	i	
42	010 1010	2A	052	*		106	110 1010	6A	152	j	
43	010 1011	2B	053	+		107	110 1011	6B	153	k	
44	010 1100	2C	054	,		108	110 1100	6C	154	l	
45	010 1101	2D	055	-		109	110 1101	6D	155	m	
46	010 1110	2E	056	.		110	110 1110	6E	156	n	
47	010 1111	2F	057	/		111	110 1111	6F	157	o	
48	011 0000	30	060	0		112	111 0000	70	160	p	
49	011 0001	31	061	1		113	111 0001	71	161	q	
50	011 0010	32	062	2		114	111 0010	72	162	r	
51	011 0011	33	063	3		115	111 0011	73	163	s	
52	011 0100	34	064	4		116	111 0100	74	164	t	
53	011 0101	35	065	5		117	111 0101	75	165	u	
54	011 0110	36	066	6		118	111 0110	76	166	v	
55	011 0111	37	067	7		119	111 0111	77	167	w	
56	011 1000	38	070	8		120	111 1000	78	170	x	
57	011 1001	39	071	9		121	111 1001	79	171	y	
58	011 1010	3A	072	:		122	111 1010	7A	172	z	
59	011 1011	3B	073	;		123	111 1011	7B	173	{	
60	011 1100	3C	074	<		124	111 1100	7C	174	|	
61	011 1101	3D	075	=		125	111 1101	7D	175	}	
62	011 1110	3E	076	>		126	111 1110	7E	176	~	
63	011 1111	3F	077	?		127	111 1111	7F	177	(delete)	

D. Multiplexer Parity Options

The parity options supported by the multiplexer are: *NONE/ODD*, *NONE/EVEN*, *NONE/MARK*, *NONE/SPACE*, *ODD*, *EVEN*. All of the options starting "NONE/" make the multiplexer insensitive to parity. The parity is not checked on incoming characters or appended to outgoing characters. Instead, the stop bit immediately follows the last data bit. This does not mean that the DTE equipment does not furnish or require parity, only that the multiplexer transfers the parity bit transparently, treating it as another data bit. Even if the multiplexer is transparent to parity, the correct parity setting must be known so that the multiplexer-generated messages will be transmitted correctly. That is the reason for the different options following "NONE/". The difference is what is put in bit eight when messages are sent to the user (since only ASCII messages are supported the parity bit is assumed to be bit eight). The parity is inserted by the software, but is subject to the data bits parameter in that if the data bits are not set to eight, the eighth bit is not sent by the hardware.

ODD and *EVEN* parity settings make the multiplexer sensitive to parity. Parity is checked on incoming characters, stripped for transmission, and then recalculated on outgoing characters. This parity is handled by the hardware, and is always the next bit after the programmed number of data bits. System generated messages will always have a zero in the eight bit for either of these parity options.

Table D-1 summarizes the proper setting for the parity and data bits parameters, based on whether parity transparency or sensitivity is required.

Table D-1. Multiplexer Parity and Data Bit Settings

TERMINAL SETTING		2031 Multiplexer Setting			
		PARITY TRANSPARENCY		PARITY SENSITIVITY	
DATA BITS	PARITY	DATA BITS	PARITY	DATA BITS	PARITY
7	ODD	8	NONE/ODD	7	ODD
7	EVEN	8	NONE/EVEN	7	EVEN
7	MARK	8	NONE/MARK		
7	SPACE	8	NONE/SPACE		
7	NONE	7	any NONE/		
8	ODD			8	ODD
8	EVEN			8	EVEN
8	MARK				
8	SPACE				
8	NONE	8	any NONE/		

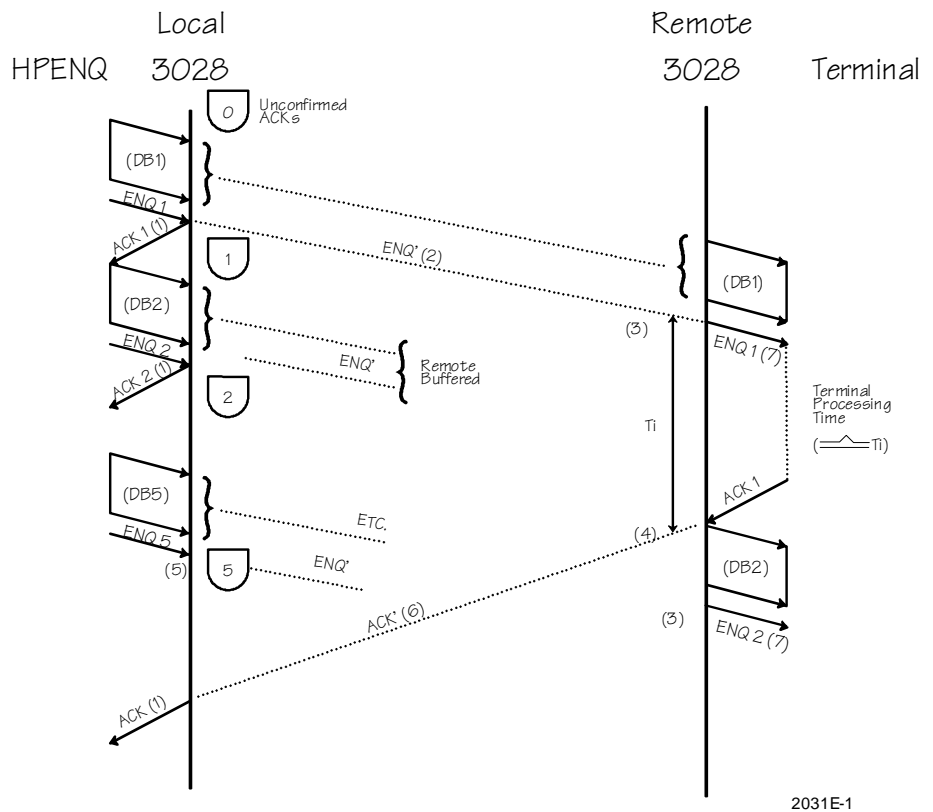
Grayed out blocks are not supported or not applicable

E. Hewlett-Packard Protocol

ENQ/ACK PROTOCOL

In the ENQ/ACK protocol, the host sends block of asynchronous data followed by an ASCII ENQ character. Transmission of the next block is withheld until the receiving end sends back the ASCII ACK signal. This signifies that the receiving end has processed the data block and is ready to receive another. The multiplexer is programmed during this option to issue ACKs itself, eliminating the delay required for each ACK to separately propagate through the remote connection. Up to five blocks can be acknowledged by the multiplexer at any time. Simultaneously at the remote end, the multiplexer is watching for ACKs and converting them to internal control codes to send to the local end. The result is a 5 block window, allowing ENQ-blocks and ACKs to be overlapped, making transmission more efficient. Both ends of the connection must be configured HPENQ for this to work.

Figure E-1 gives a sequence chart of the protocol assistance.



- NOTE:**
- 1) Parity of ACK according to local system option.
 - 2) ENQ' DCX control code representing ASCII ENQ.
 - 3) HP X-OFF state entered.
 - 4) HP X-ON state entered.
 - 5) 5 Unconfirmed ACK's, therefore no response to CPU's ACK.
 - 6) ACK' DCX control code representing ASCII ACK.
 - 7) Parity of ENQ according to remote system option.

Figure E-1. HPENQ Protocol Assistance

F. Tandem T-Pause and Wang Flow Control Methods

Tandem T-Pause Flow Control F-1
 Wang Flow Control F-2

TANDEM T-PAUSE FLOW CONTROL

T-Pause is a flow control method used in some Tandem minicomputer environments, basically a form of out-of-band flow control. A typical application is depicted in Figure F-1. On the terminal end, the device signals to the multiplexer that it is unable to receive more data by dropping DTR. The 3028 Turbo (CTS 2031 Turbo) multiplexer at the terminal end is thus set to a Reverse Flow Control (RFC) option of DTR-/DTR+; no special crossover or tandem option is required.

At the host end, the Tandem computer looks for a rising Pin 12 to signal T-Pause (XOFF), and a falling Pin 12 to mean Ready (XON). At this end there is a need for both a special Tandem crossover cable and a Tandem option for the Flow Control (FC) parameter to do the following:

- Invert the DTR signal propagated from the far end, since the remote's falling DTR must be converted to the host's Rising Pin 12, and
- Output the far end's DTR input signal (inverted) on BOTH output pins 5 and 6. This is done to accommodate existing T-Pause cabling for various manufacturers. Customers without crossovers may select either option in customer-supplied crossover.

Note that EIA propagation should be enabled at both ends for the Tandem option to work properly.

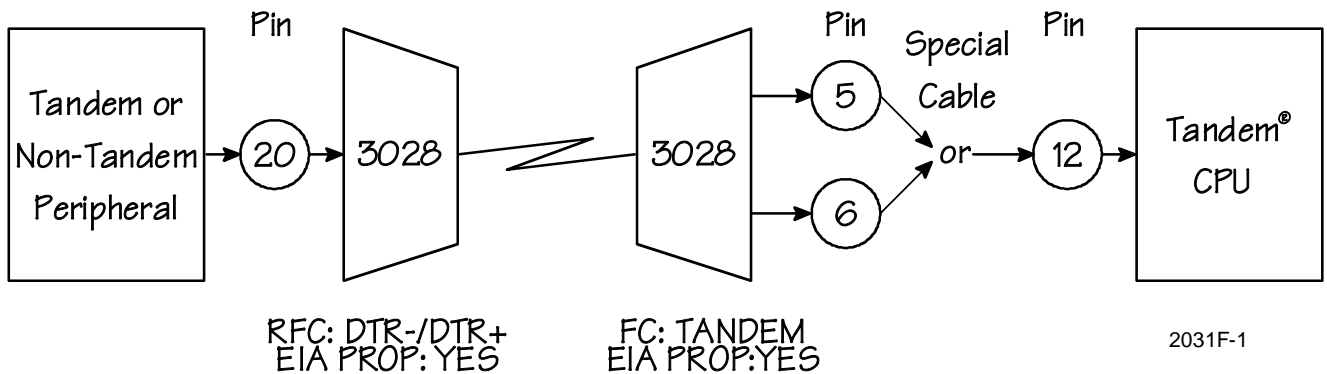


Figure F-1. Tandem T-Pause Flow Control Example

Note

When TANDEM is selected a special customer-supplied cable is required. Refer to the following table for pin-out sequences.

Female Pin	Male Pin
2	2
3	3
4	4
5 } or } 6 }	12
7	7
8	8
20	20
22	22
25	25
Multiplexer	Tandem

2031F-2

The Wang 2200 Flow Control and Reverse Flow Control options support a special two-level in-band flow control mechanism characteristic of the Wang 2200 computer system. The Wang 2200 terminal may have a printer attached; when it does, separate XON and XOFF reverse flow control characters are generated by the CRT and the attached printer. These in turn are propagated separately by the 2031 *Turbo* multiplexer as flow control characters to the host end. The CRT issues an XOFF of FA hexadecimal and an XON of F8, while the printer uses an XOFF of FB and an XON of F9.

To support this mechanism, the **WANG** option must be selected for the Reverse Flow Control option at the terminal end; at the host end, select the **WANG** option for Flow Control, **NONE** for Reverse Flow Control, and **YES** for the Flow Control Translation parameter.

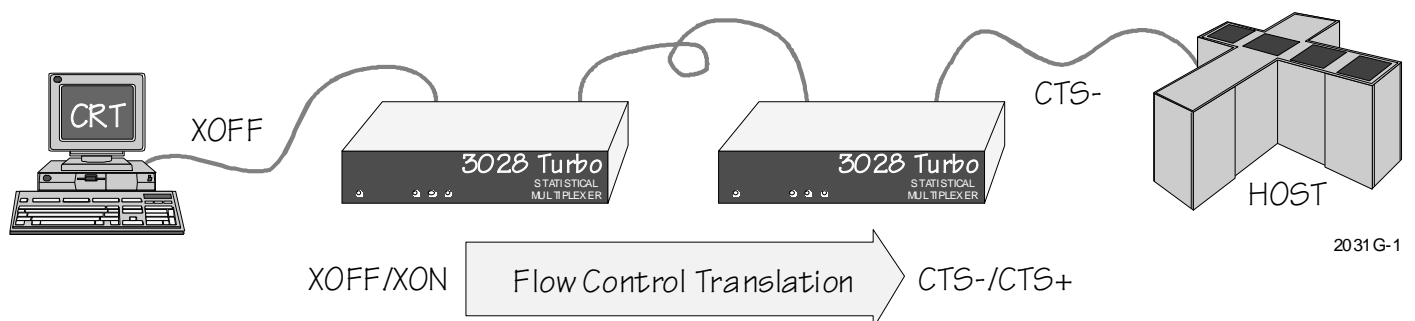
**WANG FLOW
CONTROL**

G. Flow Control Translation

Normally, when a reverse flow control signal is received at one end of the connection (typically the terminal end), an internal multiplexer control message is sent to the other end to exert flow control upon the host. If both flow control and flow control translation are set at the host end, then a channel converts a reverse flow control internal message to the programmed flow control option.

For example, the terminal end multiplexer is configured for in-band flow control and reverse flow control. The host end multiplexer is configured for out-of-band flow control and reverse flow control and has flow control translation enabled. The terminal end multiplexer will stop transmission from the terminal to the multiplexer using the in-band flow control (XOFF) character that has been selected by the user. Transmission will be restarted using the specified in-band (XON) character. Similarly, in this example, the terminal will stop and start transmission from the multiplexer to the terminal using the specified in-band reverse flow control (XOFF/XON) characters.

Upon receiving a reverse flow control (XOFF) character from the terminal, the multiplexer will immediately suspend transmission to the terminal and send the in-band reverse flow control character to the host end. The host end multiplexer will convert the in-band flow control XOFF character (initiated by the terminal) to the specified out-of-band flow control signal for presentation to the host. In this example, an ASCII XOFF character generated by the terminal will cause the host end multiplexer to perform the appropriate out-of-band EIA signaling to the host. It is important to remember that, in this example, the translation takes place in the host end multiplexer (Figure G-1).



2031 G-1

Figure G-1. Flow Control Translation

Table G-1 shows the action that takes place when flow control translation is enabled.

Table G-1. Action When Flow Control Translation is Enabled

		FLOW CONTROL (END B)		
		NONE	TANDEM, CTS-/CTS+, DSR-/DSR+	DC3/DC1, DC2/DC1, DC4/DC2, USER,WANG
REVERSE FLOW CONTROL (END A)	NONE	1. Transparent data transmission including DC1, DC2, DC3, and DC4.	1. Transparent data transmission including DC1, DC2, DC3, and DC4.	1. Transparent data DC2, DC3, and DC4.
	RTS-/RTS+, DTR-/DTR+	1. Transparent data transmission including DC1, DC2, DC3, and DC4.	1. Transparent data transmission including DC1, DC2, DC3, and DC4. 2. End B CTS and DSR follow End A DTR (if local CTS then End A RTS must be on).	1. Transparent data DC2, DC3, and DC4. 2. End A DTR signal is detected. DTR in the normal manner.
	DC3/DC1, DC2/DC1, DC4/DC2, USER,WANG	1. Reverse Flow Control characters are reconstructed at End B with parity as defined at End B.	1. End B CTS follows End A Reverse Flow Control State. XON state. B.	1. End A XON and XOFF into End B XON and XOFF

- DC1 = ASCII code DC1
- DC2 = ASCII code DC2
- DC3 = ASCII code DC3
- DC4 = ASCII code DC4
- CTS = RS-232-C control Clear to Send
- RTS = RS-232-C control Request to Send
- DTR = RS-232-C control Data Terminal Ready
- DSR = RS-232-C control Data Set Ready

H. Factory Hardware Option Settings

Overview H-1
 Option Selection and Configuration Symbology H-1
 Multiplexer Configuration H-2

OVERVIEW

The internal configuration of the multiplexer and modem are done at the factory. This appendix provides information to be used by service personnel for internal configuration of the multiplexer.

Note

The settings described should only be changed by service personnel.

OPTION SELECTION AND CONFIGURATION SYMBOLOLOGY

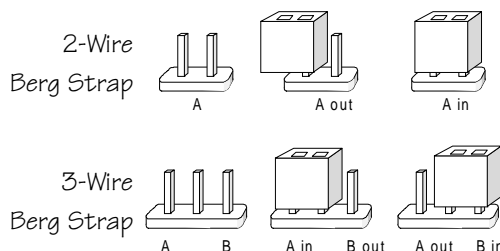
Patton printed circuit boards (PCBs or cards) that include optional circuit configurations have built in strapping features.

In this manual, strap options for the card are described under separate headings with numbered paragraphs for each strap function. Additionally, a strapping instruction figure is provided for the card. Each figure contains the following strapping aids:

- A nonscale drawing showing the relative location of each wire strap and each miniature switch.
- A nonscale drawing of each miniature switch showing the standard and mandatory setting for each switch segment.
- Tables summarizing the strapping, the standard setting and the paragraph reference for each strap function.

The features set at the factory are implemented through miniature switches. The miniature switch occupies a dual inline package (DIP) component location on the card. The switch location can be referenced by the switch number silkscreened on the PCB. Switch 1 (SW1) is currently not used on this version of the 2031 *Turbo* and the switch segment positions make no difference.

Hardware (Berg) strapping is accomplished through the use of pins that protrude from the PCB and can be connected by an insulated shorting bar. The arrangements of the Berg straps are



H-1. Berg Strapping Examples

MULTIPLEXER CONFIGURATION

The multiplexer card for the 3028 Turbo (CTS 2031 Turbo) is illustrated in Figure H-2. The strapping options for this PCB are discussed in the following paragraphs.

Put switch 1, position 1 through 4, in the **OFF** position. It is unused.

JP11 is the Watch Dog Timer and is **ENABLED**.

JP10 is the Signal Ground to Chassis Ground connect. To connect chassis and signal ground install the jumper. Factory default is not connected.

JP12, JP13 and JP14 are used for factory test only and must be installed for operation of the 2031 Turbo.

JP1 - JP8 are to enable or disable External Receive Clocks (pin 18). To use the External Receive Clock Option install the jumper on the A side of the appropriate port. Jumpers on A is factory default

JP2 (1A & 1B) go to Port 1
 JP1 (2A & 2B) go to Port 2
 JP4 (3A & 3B) go to Port 3
 JP3 (4A & 4B) go to Port 4
 JP6 (5A & 5B) go to Port 5
 JP5 (6A & 6B) go to Port 6
 JP8 (7A & 7B) go to Port 7
 JP7 (8A & 8B) go to Port 8

JP9 selects the TX Clock Source for the Composite Port. Select 9A for clock source from Pin 15 (TxC), select 9B for clock source from Pin 24 (ETxC). Factory default is 9A.

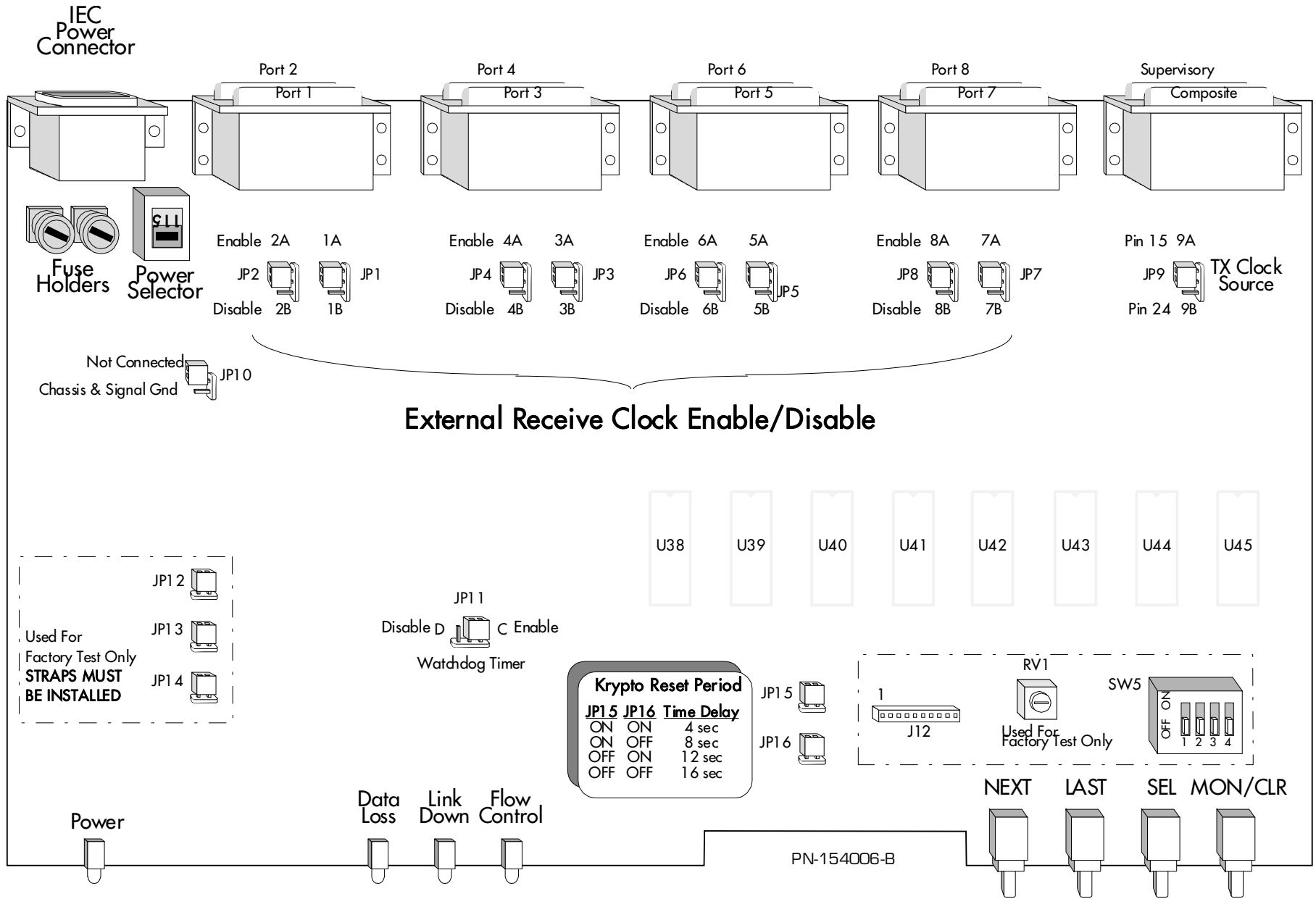
F1 and F2 provide over current protection for the 2031 Turbo. When the Power Selector switch is set for 115V, replace blown fuses with 0.16ASB 250V. When the Power Selector switch is set for 230V, replace blown fuses with 0.08ASB 250V. To replace the fuse, remove the power cord from the rear of the unit, then turn the fuse cap a quarter turn to the right. Remove the cap with the fuse attached and replace the fuse. Reverse the process to reinstall the new fuse. Reattach the power cord to the rear of the unit.

The 3028 Turbo (CTS 2031 Turbo) is factory set to the proper line voltage for the area it is shipped to from the factory. In the event it is necessary to install the unit in an area with a line voltage other than the voltage initially set at the factory, remove the line cord and move the Power Selector switch to the appropriate setting. *Never remove the cover without removing the line cord first.*

The Krypto reset pulse is 150ms in duration and occurs every 4, 8, 12 or 16 seconds as selected by jumpers J15 and J16 and the table below. (See page 1-8)

JP16	JP15	Time Delay
ON	ON	4 Seconds
OFF	ON	8 Seconds
ON	OFF	12 Seconds
OFF	OFF	16 Seconds

Figure H-2. CCA Strap Locations



I. SDLC/HDLC Protocol

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INTRODUCTION

This appendix defines the requirements for enhancing the capability of the 3028 Turbo (CTS 2031 Turbo) Multiplexer to provide support for bit-oriented synchronous protocols (SDLC/HDLC) on some or all of the channels

PRODUCT APPLICATION

The SDLC/HDLC protocol permits multiplexing of bit-oriented synchronous data from selected channels on a demand basis across a high-speed composite link between two multiplexers onto corresponding remote channels. The multiplexers operate transparently (with the exceptions noted in the Error Conditions in the Multiplexer section) to connect SDLC/HDLC stations. The multiplexers are not sensitive to any of the SDLC/HDLC procedural or high-level protocol features (such as SNA), but certain anomalies may arise due to data loss.

Figure I-2 identifies the EIA signals for the SDLC/HDLC Channel.

Note

In order for SDLC/HDLC to function, both the remote and local multiplexers must be 3028 Turbo, CTS 2031, CTS 2031 Turbo, CTS 2530 or Paradyne 2030 multiplexers with SDLC/HDLC features. (This enhancement is NOT compatible with DCX SLINK.) It can be used in a DCX network as long as the two ends are 3028 Turbo's, CTS 2031's or Paradyne 2030's; however, multimode connections will add delays that may cause time-outs.

SDLC/HDLC refers to the bit-oriented synchronous data link control protocols that are based on HDLC. The basic format for SDLC/HDLC is a frame (Figure I-1)

The beginning and ending flags each consist of an 8-bit binary pattern of 01111110 (7E hex). These fields serve as reference points for the position of the address and control fields and initiate transmission error checking. The ending flag may serve as the beginning flag for the next frame. Multiple flags may be repeated between frames to keep the line in an active state. The idle state of the line may be flags or all 1's (MARK). While the channel is idling MARK, any data input from the channel which is not a flag character is discarded.

SDLC/HDLC is code transparent and the only unique bit stream is the flag field. The logic will not allow the 01111110 pattern to be transmitted in other parts of the frame. The transmitter watches the transmit data stream and automatically inserts a 0 after any successive five 1's. The receiver searches the receive data stream for five consecutive 1's and deletes the next bit if it is a 0.

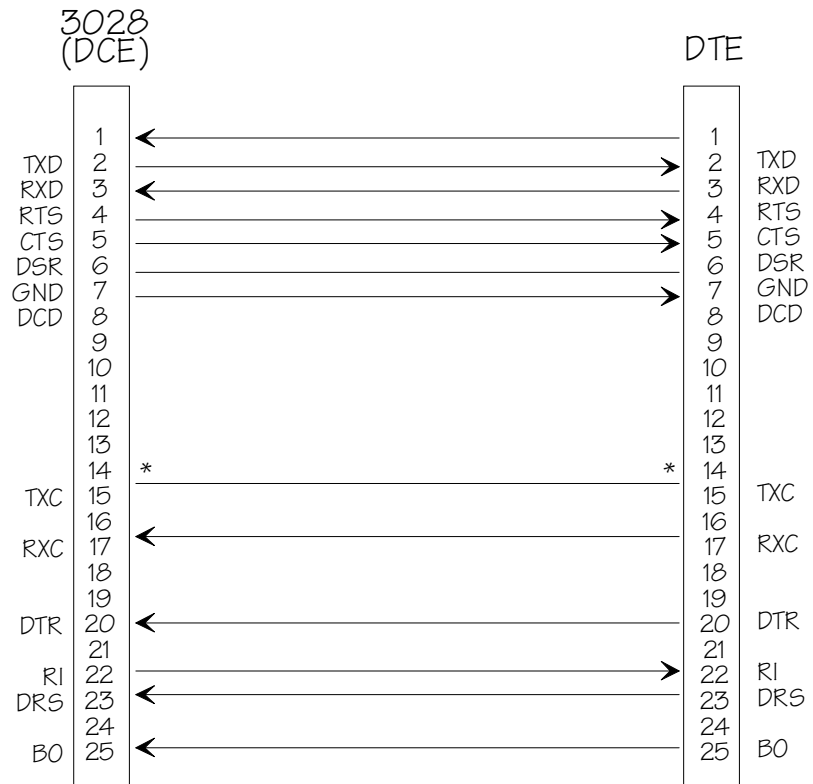


Figure I-1. SDLC/HDLC Frame Format

2031I-1

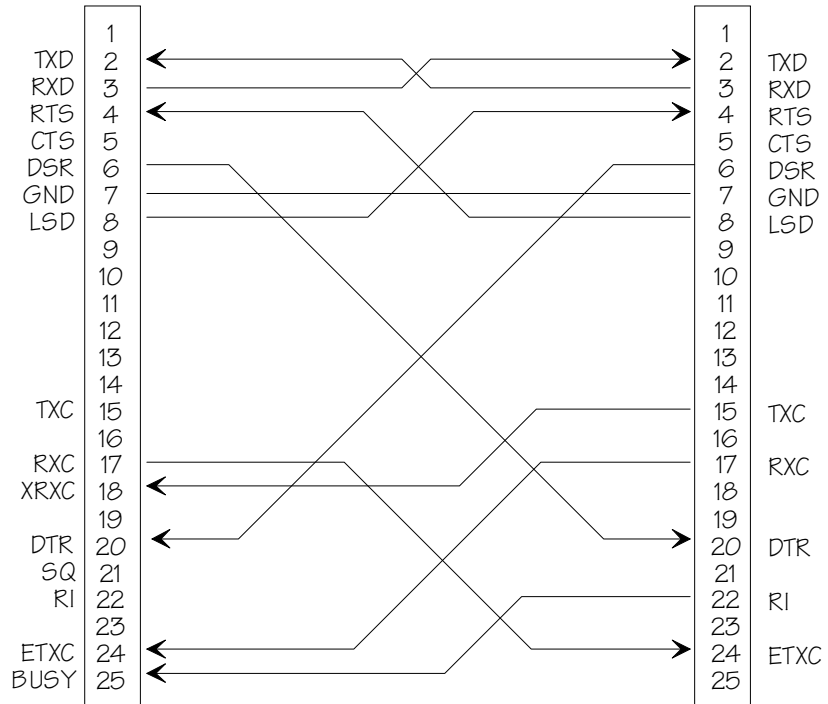
SDLC/HDLC OVERVIEW

Standard SDLC DTE Connection



* Depends on clock source

SDLC Tail Circuit Application



2031 I-2

Figure I-2. SDLC/HDLC Channel EIA Signals

PERFORMANCE GUIDELINES

While the multiplexer will support all eight channels of SDLC/HDLC data or any combination of ASYNC and SDLC/HDLC channels, you must keep in mind that SDLC/HDLC is inherently traffic dependent.

Therefore, you should consider the following guidelines:

1. No SDLC/HDLC channel speed should be greater than the link speed.
2. The aggregate SDLC/HDLC input rate should not be greater than double the link speed.

Example: 4 channels at 9.6K bps may be run with a 19.2K bps link.

The functions of the LCD display and terminal interface as described in the COMMAND MODE section in Chapter 2 remain valid for SDLC/HDLC except for the following:

EXCEPTIONS

CHANNEL PARAMETERS

CHANNEL STATISTICS

CHANNEL STATUS

Note

SDLC/HDLC channels may not be used to access supervisory functions.

The 3028 supervisory functions are available from the front panel or a standard asynchronous terminal only.

SDLC/HDLC channels may be configured via an asynchronous terminal interface.

One important feature added with SDLC/HDLC is that any SDLC/HDLC channel is given preference over any asynchronous channels when contending for link bandwidth. SDLC/HDLC channels are further prioritized, from low to high, by channel number (Channel 1 has a higher priority than Channel 2, etc.).

The Command mode allows you to configure the multiplexer for operation using either the multiplexer front panel or an attached asynchronous terminal.

The following sequence of option configuration is used to set up the SDLC/HDLC channels:

- CHANNEL n TYPE

Set the channel to SDLC/HDLC, which makes the following eight options available for configuration.

- CHANNEL n CLOCK SOURCE

Set the channel clock source, *INTERNAL*, *EXTERNAL* or *INT/EXT*.

MULTIPLEXER CONFIGURATION

- CHANNEL n ENCODING
Set the channel encoding, NRZ or NRZI.
- CHANNEL SPEED
Set the channel speed to one of the six available speeds.
- CHANNEL n IDLE CHARACTER
Set the IDLE CHARACTER to FLAG or MARK.
- CHANNEL n EIA PROPAGATION
Set EIA PROPAGATION to YES or NO.
- CHANNEL n CTS-RTS
Set CHANNEL CTS-RTS to YES or NO.
- CHANNEL n MAX BLOCK
Set the channel maximum block size to one of six available sizes.
- CHANNEL n FLOW CONTROL
Set the channel flow control to NONE or CTS-/CTS+.

(n = the channel, 1 through 8, to be accessed)

Channel Parameters

This option is used to change or examine any of the nine SDLC/HDLC programmable channel parameters at any of eight channel ports

Note

Changing any of the following parameters while data is flowing can cause data to be lost: TYPE, CLOCK SOURCE, ENCODING, SPEED, IDLE CHAR.

Front Panel Access

From the *COMMAND MODE/CHANNEL PARAMETER* display:

PRESS: SELECT

The LCD displays:

```

SELECT CHANNEL:
*1 2 3 4 5 6 7 8

```

20312-58

PRESS: NEXT or LAST

to select a channel number

PRESS: SELECT

The asterisk (*) before the channel number indicates the channel which is accessed.

After selection of the *CHNL PARAMETERS* and the channel number, the display shows the *SDLC/HDLC* configuration options if the channel has already been configured for *SDLC/HDLC*.

The first display following channel selection is *SPEED* for asynchronous channels. If the *CHANNEL n TYPE* has already been established, you may proceed with the remaining parameters. If you are setting the channel up for *SDLC/HDLC* for the first time, skip *SPEED*, as a change of *CHANNEL n TYPE* resets the *SPEED* and all of the other parameters to their default settings as shown in Table I-1.

Table I-1. SDLC/HDLC Channel Parameters

COMMAND	PARAMETER	DEFAULT SETTING
CHNL PARAMETERS	TYPE	SDLC/HDLC, ASYNC or HPENQ
	CLK SRC	INT, EXT or INT/EXT
	ENCODING	NRZ or NRZI
	SPEED	
	IDLE CHAR	MARK or FLAG
	EIA PROP (EIA Propigation)	NO or YES
	CTS-RTS	YES or NO
	MAX BLOCK	256, 512, 1K, 2K, 4K or 128
	FLOW CTL	NONE or CTS-/CTS+

After selection of the *CHNL PARAMETERS* and the channel number, the display shows the following:

```

CHNL PARAMETERS
CHNL n SPEED
  
```

20311-15

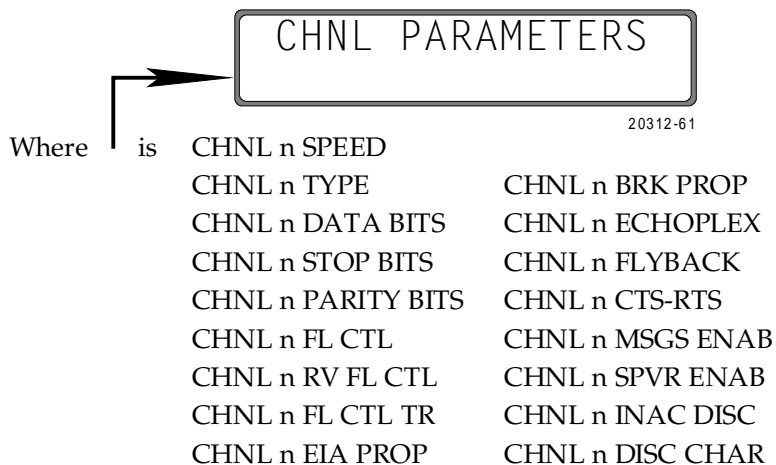
where n is the channel number.

Note

Any channel speed selected at this step will be lost when the TYPE is changed as shown in the CHANNEL PARAMETERS section.

The options available for an *ASYNC* channel are listed below.

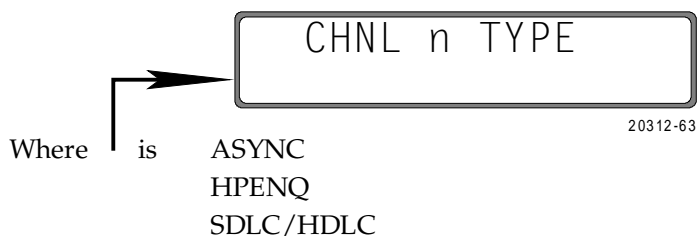
The *CHNL n TYPE* option must be completed first in order to configure the remaining options under *SDLC/HDLC*.



To make an *ASYN*C channel *SDLC/HDLC*:

PRESS: NEXT

The LCD will display:



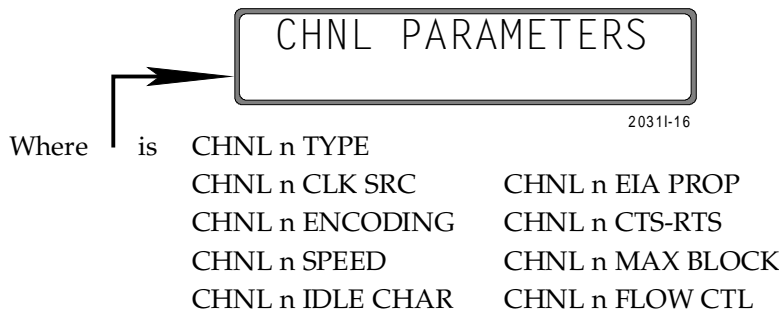
PRESS: NEXT or LAST

until the *SDLC/HDLC* option displays

PRESS: SELECT

The next time the *SDLC/HDLC* channel is accessed through the front panel or terminal *COMMAND MODE* and *CHNL PARAMETERS*, the system automatically skips to the *SDLC/HDLC* options.

The LCD will display:



Terminal Access

SYSTEM MENU

- | | |
|--------------------------------------|--------------------------------|
| 1. SET CHANNEL PARAMETERS | 13. RESET STATISTICS |
| 2. SET LINK PARAMETERS | 14. CHANNEL VALIDATE |
| 3. SET SUPERVISORY PARAMETERS | 15. CHANNEL STATUS |
| 4. COPY PARAMETERS | 16. REMOTE SIGNON |
| 5. CHANNEL STATISTICS | 17. REMOTE SIGNOFF |
| 6. LINK STATISTICS | 18. SET SYSTEM PASSWORD |
| 7. SET/CLEAR LOCAL CHANNEL LOOPBACK | 19. SET SYSTEM BANNER |
| 8. SET/CLEAR REMOTE CHANNEL LOOPBACK | 20. SET SYSTEM TIME |
| 9. LOCAL LINK LOOPBACK | 21. DISABLE/ENABLE FRONT PANEL |
| 10. RESET A SINGLE CHANNEL | 22. ENTER MONITOR MODE |
| 11. RESET ALL CHANNELS | 23. LOGOFF |
| 12. RESET LINK | |

ENTER 1-23 <CR> TO SELECT DESIRED FUNCTION:

20312-5

To select *SDLC/HDLC* modes from the Main Menu:

To select the *CHANNEL PARAMETERS* screen:

TYPE: 1
PRESS: RETURN

A channel must be selected following the display:

SELECT CHANNEL NUMBER (1-8) <CR>:

20312-6

TYPE: n (n = the channel number)
PRESS: RETURN

Note

If the channel has already been configured for SDLC/HDLC the system skips to the SDLC/HDLC CHANNEL n PARAMETERS screen. The standard 17-item ASYNC screen illustrated below will not be shown

If a non-*SDLC/HDLC* channel is selected the terminal displays:

CHANNEL n PARAMETERS:

1. SPEED: 9600	6. FLOW CTL	8. FL CTL TR: NO	13. CTS-RTS: NO
2. TYPE: ASYNC	(XOFF/XON):	9. EIA PROP: NO	14. MSGS ENAB: NO
3. DATA BITS: 8	DC3/DC1	10. BREAK: NO	15. SUPERV ENAB: NO
4. STOP BITS: 1	7. REV FL CTL:	11. ECHO: NO	16. INACT DISC: NO
5. PARITY: NONE/SPACE	NONE	12. FLYBK: NO	17. DISC CHAR: CTL-T

(ENTER 1-17 <CR> TO SELECT A PARAMETER, OR <CR> TO QUIT.):

20312-7

To configure the channel for *SDLC/HDLC*

TYPE: 2

PRESS: RETURN

The terminal displays:

CHANNEL n TYPE: CURRENTLY: ASYNC

1: ASYNC 2: HPENQ 3: SDLC/HDLC

(ENTER 1-3 <CR> TO CHANGE. <CR> TO RETAIN OLD SETTING.):

20312-10

TYPE: 3

PRESS: RETURN

The terminal now displays:

CHANNEL n PARAMETERS:

1. TYPE: SDLC/HDLC	6. EIA PROP: NO
2. CLOCK SOURCE: INTERN	7. CTS - RTS: NO
3. ENCODING: NRZ	8. MAX BLOCK: 256
4. SPEED: 9600	9. FLOW CTL: NONE
5. IDLE CHAR: MARK	

(ENTER 1-9 <CR> TO CHANGE. <CR> TO RETAIN OLD SETTING.):

20311-4

Channel Type

This parameter selects between standard asynchronous start-stop data (ASYNC), a synchronous data stream with special protocol handling (HPENQ), and synchronous bit-oriented data (SDLC/HDLC). The HPENQ parameter selects a set of functions to improve throughput for terminals and CPUs observing the Hewlett-Packard ENQ/ACK block mode protocol.

Note

When a channel's type is changed from ASYNC to SDLC/HDLC or vice versa, the default parameter settings for that type are loaded. Thus, even parameters that are common between the two types (speed, EIA propagation, CTS-RTS, or Flow Control) could change.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

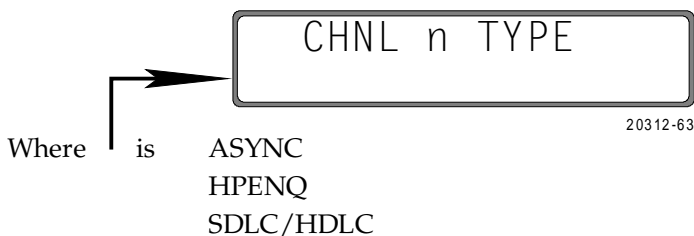
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n TYPE* displays on the second line

PRESS: SELECT

The LCD displays:



PRESS: NEXT or LAST

until *SDLC/HDLC* appears on the second line

PRESS: SELECT

At this time, if desired, it is possible to configure the channel to an *ASYNC* or *HPENQ* channel. ALL parameter settings will be reset to the default settings for the selected channel type.

If the *TYPE* is not changed (configured for *SDLC/HDLC*) the parameter values chosen will not change.

Terminal Access

The following procedure assumes the channel has already been assigned as *SDLC/HDLC*.

To select *CHANNEL TYPE* from the Main Menu:

TYPE: 1
PRESS: RETURN
TYPE: n (n = channel number)
PRESS: RETURN

The *SDLC/HDLC* Parameters Menu Displays.

TYPE: 1

from the *CHANNEL PARAMETERS* Menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n TYPE:          CURRENTLY:  SDLC/HDLC
1: ASYNC   2: HPENQ   3: SDLC/HDLC
(ENTER 1-3 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):
```

20311-14

Clock Source

This parameter determines how the data will be clocked in and out of the 3028 Turbo (CTS 2031 Turbo) multiplexer. If you select the internal (*INTERN*) clock the 3028 Turbo (CTS 2031 Turbo) multiplexer furnishes both transmit and receive clocks on Pins 15 and 17. If you select external (*EXTERN*) clock, the 3028 Turbo (CTS 2031 Turbo) multiplexer will accept external transmit clock on Pin 24 and receive clock on Pin 18. If internal/external (*INT/EXT*) clock is selected, the 3028 Turbo (CTS 2031 Turbo) multiplexer will furnish receive clock on Pin 17 and will accept external transmit clock on Pin 24.

When external clock is selected, the channel speed is not used (unless the channel is programmed for *NRZI* data encoding. This will be explained in the Data Encoding section). A specific speed **MUST** be selected with the other two clock source options.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

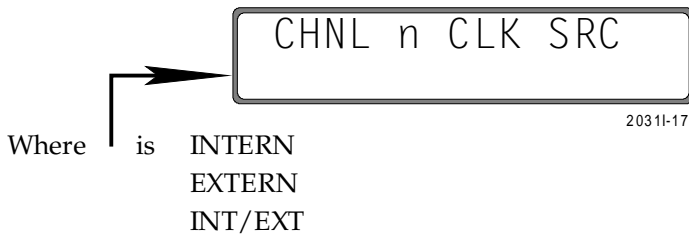
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n CLK SRC* displays on the second line

PRESS: SELECT

The LCD displays:



PRESS: NEXT or LAST

until *SDLC/HDLC* appears on the second line

PRESS: SELECT

Terminal Access

To access the *CLOCK SOURCE* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

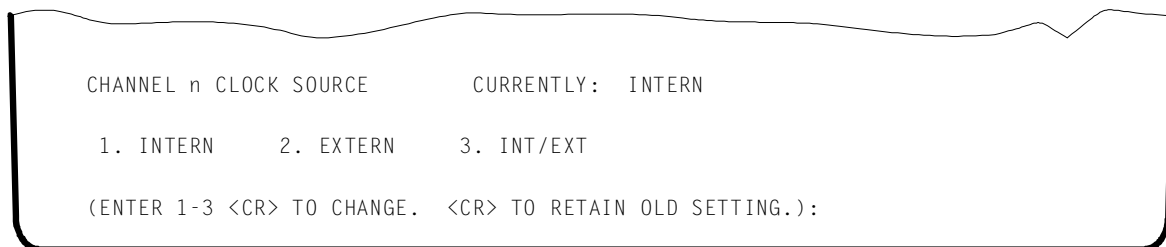
PRESS: RETURN

TYPE: 2

from the *CHANNEL PARAMETERS* Menu

PRESS: RETURN

The terminal displays:



20311-5

Data Encoding

In *NRZ* encoding, a 1 is represented by a High level and a 0 is represented by a Low level. In *NRZI* encoding, a 1 is represented by no change in level and a 0 is represented by a change in level. The receive and transmit clocks will always be derived from the data stream with *NRZI* encoding, so the clock source chosen is ignored. However, a speed parameter *MUST* be selected, as it is used internally to derive the clock.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n ENCODING* displays on the second line

PRESS: SELECT

The LCD displays:



PRESS: NEXT or LAST

until desired option appears on the second line

PRESS: SELECT

Terminal Access

To access the *DATA ENCODING* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 3

from the *CHANNEL PARAMETERS* Menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n ENCODING          CURRENTLY: NRZ

1: NRZ    2: NRZI

(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20311-6

The speed parameter set the nominal data rate for the *SDLC/HDLC* data (if the clock source is *INTERN* or *INT/EXT*). Any of six speeds may be selected; however, the aggregate data rate of the *SDLC/HDLC* channels should not exceed the limits given in the Performance Guidelines section.

Channel Speed

If you select external clock, the speed is ignored. The speed option selected must be the same at both ends of a channel connection (this will not be checked by the multiplexer, but is necessary for proper operation).

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n SPEED* displays on the second line

PRESS: SELECT

The LCD displays:



20311-19

Where is

9600	3600
7200	2400
4800	1200

PRESS: NEXT or LAST

until desired option appears on the second line

PRESS: SELECT

Terminal Access

To access the *CHANNEL SPEED* parameter from the Main Menu:

TYPE: 1
PRESS: RETURN
TYPE: n (n = channel number)
PRESS: RETURN
TYPE: 4

from the *CHANNEL PARAMETERS* Menu

PRESS: RETURN

The terminal displays:

```
CHANNEL n SPEED:          CURRENTLY: 9600
```

```
1. 9600      3. 4800      5. 2400  
2. 7200      4. 3600      6. 1200
```

```
(ENTER 1-6 <CR> TO CHANGE. <CR> TO RETAIN OLD SETTING.):
```

20311-7

Idle Character

This parameter selects whether the channel will idle continuous flags (7E HEX) or continuous 1's (MARK). If MARK is selected, the channel *may* transmit more than one opening flag for a data packet.

Note

If the channel is configured for NRZI data encoding, MARK IDLE should not be chosen.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

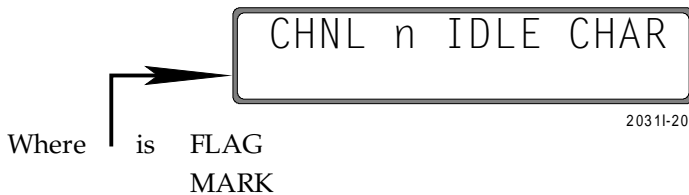
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n IDLE CHAR* displays on the second line

PRESS: SELECT

The LCD displays:



PRESS: NEXT or LAST

until desired option appears on the second line

PRESS: SELECT

Terminal Access

To access the *IDLE CHAR* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 5

from the *CHANNEL PARAMETERS* Menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n IDLE CHAR      CURRENTLY: MARK

1: MARK   2: FLAG

(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20311-8

EIA Signal Propagation

It is possible to specify, for any *SDLC/HDLC* channel, that EIA signals present on the channel be propagated, or not propagated, across the link as described in the EIA Signals section. It is not possible to individually select EIA signals.

The EIA leads can also be forced high or low (on or off). This could be used, for example, to hold DSR high. An explanation of this may be found in the *CHANNEL STATUS* section.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number


PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n EIA PROP* displays on the second line

PRESS: SELECT

The LCD displays:

Where  is YES
NO

20311-21

PRESS: NEXT or LAST

until desired option appears on the second line

PRESS: SELECT

Terminal Access

To access the *EIA PROP* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 6

from the *CHANNEL PARAMETERS* Menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n EIA PROP:      CURRENTLY: NO

1: YES    2: NO

(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20311-9

This parameter selects whether the CTS output is programmed to track the state of the local RTS input or to follow the state of the far-end's DSR input, assuming EIA propagation is enabled. If CTS-RTS is enabled, EIA propagation is in effect disabled for the CTS output only. The default parameter is CTS-RTS enabled.

CTS-RTS

It is highly recommended that the user configure both 3028 Turbo (CTS 2031 Turbo) multiplexers for CTS-RTS. This configuration allows the multiplexer to simulate a modem and will allow the 3028 Turbo (CTS 2031 Turbo) multiplexer to drop the CTS if the composite link goes down and to follow the state of RTS when the link comes back up. The CTS-RTS configuration will also allow flow control to function properly (if enabled). If the device attached, a front-end processor, for example, holds RTS high, the 3028 Turbo (CTS 2031 Turbo) multiplexer will hold CTS high. This is preferable to forcing CTS high on the 3028 Turbo (CTS 2031 Turbo) multiplexer. CTS forced high has the highest priority (see Table I-2) and will override both the link going down and flow control.

1. Forced
2. Flow Control, Link Up/Down
3. CTS-RTS
4. EIA Propagation

Table I-2. CTS Signal Priority

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

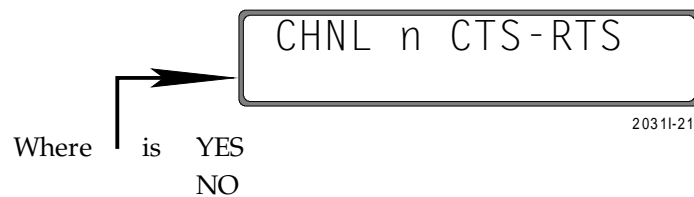
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n CTS-RTS* displays on the second line

PRESS: SELECT

The LCD displays:



PRESS: NEXT or LAST

until desired option appears on the second line

PRESS: SELECT

Terminal Access

To access the *CTS-RTS* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

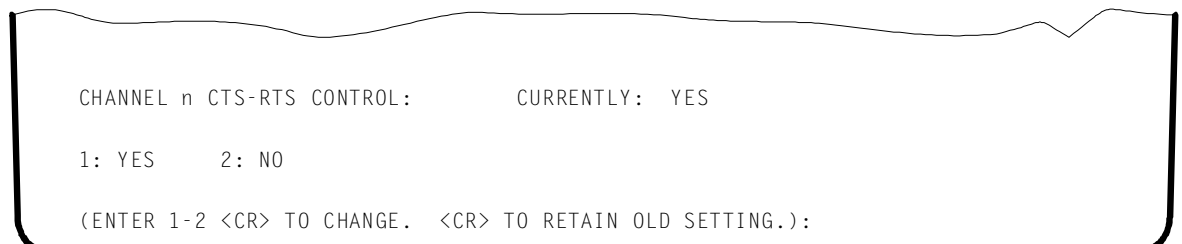
PRESS: RETURN

TYPE: 7

from the *CHANNEL PARAMETERS* Menu

PRESS: RETURN

The terminal displays:



This parameter selects the maximum block size of the channel frames and is used for internal buffering only. The 3028 Turbo (CTS 2031 Turbo) does no checking to verify that this block size is not exceeded; however, the user should be as accurate as possible. Choosing a value smaller than the actual maximum block size may cause the 3028 Turbo (CTS 2031 Turbo) to underrun excessively to the channel. Choosing a value larger than the actual maximum block size may cause delays leading to time-outs.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

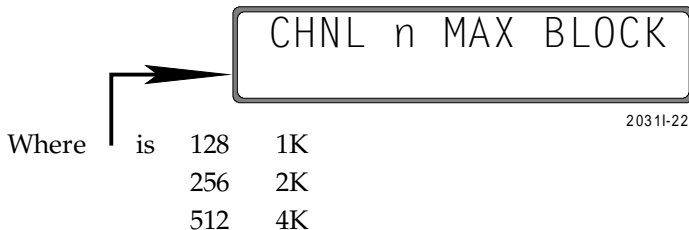
PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n MAX BLOCK* displays on the second line

PRESS: SELECT

The LCD displays:



PRESS: NEXT or LAST

until desired option appears on the second line

PRESS: SELECT

Terminal Access

To access the *MAX BLOCK* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 8

from the *CHANNEL PARAMETERS* Menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n MAX BLOCK          CURRENTLY: 256

1: 128      3: 512      5: 2K
2: 256      4: 1K       6: 4K

(ENTER 1-6 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20311-11

Flow Control

This parameter, also known as buffer overflow protection, is a means of preventing data loss in high-traffic periods. The use of "in-band" flow control characters is inconsistent with SDLC/HDLC operations, so there are only two choices for this parameter, none or CTS-/CTS+.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL PARAMETERS* displays on the second line

PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number


PRESS: SELECT

PRESS: NEXT or LAST

until *CHNL n FLOW CTL* displays on the second line

PRESS: SELECT

The LCD displays:

Where  is NONE
CTS-/CTS+

20311-23

PRESS: NEXT or LAST

until desired option appears on the second line

PRESS: SELECT

Terminal Access

To access the *FLOW CONTROL* parameter from the Main Menu:

TYPE: 1

PRESS: RETURN

TYPE: n (n = channel number)

PRESS: RETURN

TYPE: 9

from the **CHANNEL PARAMETERS** Menu

PRESS: RETURN

The terminal displays:

```

CHANNEL n FLOW CTL:      CURRENTLY:  NONE

1: NONE      2: CTS- /CTS+

(ENTER 1-2 <CR> TO CHANGE.  <CR> TO RETAIN OLD SETTING.):

```

20311-12

This option delivers a display of the current and peak buffer utilization statistics and the counts of errors and anomalies encountered for each of the eight channel ports (whether they are configured as ASYNC or SDLC/HDLC). For ASYNC channels, the last two statistics (Abort and Bad CRC) will always be set to 0.

CHANNEL STATISTICS

Also, channel exceptions mean different things depending on whether the channel is ASYNC or SDLC/HDLC.

The statistics recorded include:

CURRENT BUFFER UTILIZATION. This percentage amounts to current buffer usage for this channel.

PEAK BUFFER UTILIZATION. This percentage indicates the channel's buffer usage when all channels together were at the highest total utilization since the last statistics reset.

CHANNEL EXCEPTIONS. This is a count of the number of exceptions which have occurred since the last statistics reset or since the channel was configured for SDLC/HDLC (the statistics are reset when the type is changed from ASYNC to SDLC/HDLC or vice versa).

Exceptions include receiver overrun

Input from a channel could not be serviced in time to preserve the line rate

Transmission underrun

No data available from the link when transmitting a frame onto a channel

Receive buffer not available

A buffer to store the character from the channel before packet assembly was not available.

ABORTS. The number of aborts received from the channel.

BAD CRCs. The number of frames received from the channel containing a CRC error.

Front Panel Access

From the *COMMAND MODE* display:

PRESS: NEXT or LAST

until *CHNL STATISTICS* displays on the second line

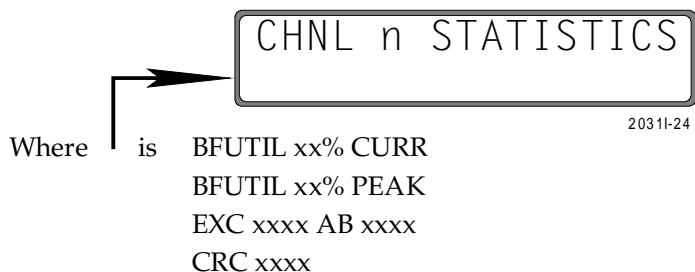
PRESS: SELECT

PRESS: NEXT or LAST

to choose a channel number

PRESS: SELECT

The LCD displays:



PRESS: NEXT or LAST

until desired option appears on the second line

PRESS: SELECT

Terminal Access

To access the *CHANNEL STATISTICS* parameter from the Main Menu:

TYPE: 5

PRESS: RETURN

The terminal displays:

```

CHANNEL STATISTICS:
                CH1  CH2  CH3  CH4  CH5  CH6  CH7  CH8  TOTAL
CURRENT BUFFER UTIL:  02%  02%  02%  02%  02%  02%  02%  02%  16%
PEAK BUFFER UTIL:    02%  02%  02%  02%  02%  02%  02%  02%  16%
CHANNEL EXCEPTIONS:  0000  0000  0000  0000  0000  0000  0000  0000  00000
FLOW CONTROLS:      0000  0000  0000  0000  0000  0000  0000  0000  00000
REV FLOW CONTROLS:  0000  0000  0000  0000  0000  0000  0000  0000  00000
ABORTS:             0000  0000  0000  0000  0000  0000  0000  0000  00000
BAD CRCS:           0000  0000  0000  0000  0000  0000  0000  0000  00000

```

(ENTER <CR> TO EXIT.)

20311-13

All Channel status functions remain valid except that Reverse Flow Control will not be displayed since it does not apply for SDLC/HDLC channels.

CHANNEL STATUS (CHNL STATUS)

The requirements for asynchronous channels as described in the Channel Type section apply for SDLC/HDLC channels.

GENERAL SYSTEM REQUIREMENTS

Note

Supervisory access, both local and remote, is restricted to asynchronous channels.

The CRC-CCITT polynomial $X^{16}+X^{12}+X^5+1$ is used for generating the frame check sequence characters in each frame.

Cyclic Redundancy Check

The multiplexer recognizes the occurrence of 7 consecutive 1 bits within an incoming SDLC/HDLC frame as an abort, and the multiplexer will discard all further input on that channel until an opening flag is recognized. The abort is propagated to the remote DTE as 7 to 13 one (1) bits.

Frame Abort

If a CRC error occurs on a frame received on an SDLC/HDLC channel, the condition is propagated to the remote multiplexer where a bad CRC is generated into the outgoing frame on the appropriate channel.

Erroneous CRC

ERROR CONDITIONS IN THE MULTIPLEXER

Receiver Overrun

If incoming data on an SDLC/HDLC channel cannot be removed from the line fast enough to maintain the channel speed, an overrun condition occurs and the current frame is considered to be lost. This condition is propagated to the remote end as a bad CRC.

No Buffer Available (for Output on Link)

If no output buffer is available for data from an SDLC/HDLC channel, the data is lost and transmission of the current frame from that channel is terminated. The remainder of the incoming frame is discarded. The remote multiplexer will detect either a transmission underrun condition (refer to Transmission Underrun section), in which case an abort will be inserted into the outgoing frame, or it will detect the start of the next frame on that channel before the current frame has terminated, in which case a BAD CRC will be generated into the outgoing frame.

Transmission Underrun

When transmitting on an SDLC/HDLC channel, if the multiplexer or the link cannot supply data fast enough to maintain the line rate on the channel, an underrun condition occurs and the current frame is considered to be lost. The multiplexer indicates this condition to the DTE by sending an abort on the channel.

RECOMMENDATIONS

DSR (Data Set Ready). Due to the sensitivity of SDLC/HDLC lines to DSR, it is recommended that this EIA signal be forced high on both 2031s.

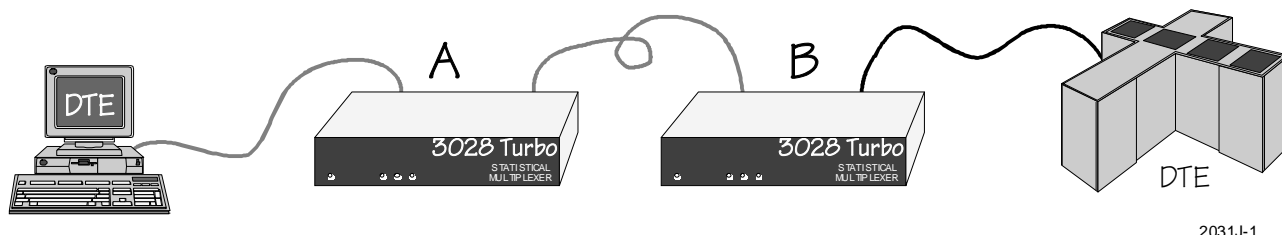
CTS (Clear To Send). As stated in the CTS-RTS section, it is recommended that both 2031s be configured for CTS-RTS. Table I-1 shows the priorities if the handling of the signal.

CHANNEL RESET. When a channel is reset via the CRT or Front Panel, all forced leads will be cleared. This means that DSR may drop. Although both the local and the remote channels will be reset, the leads will only be cleared on the local channel. Therefore, if a channel reset needs to be performed, it should be performed on the less critical side (the controller as opposed to the FEP, for example).

J. EIA Signal Exceptions

Care must be used when configuring the following EIA signal-related parameters.

EIA Signals received from multiplexer B's DTE (Figure J-1) will be output to multiplexer A's DTE only if EIA propagation is enabled for that channel on both multiplexer A and B.



2031J-1

Figure J-1. Multiplexer Configuration Example

Table J-1 lists the priority associated with EIA parameters.

- | |
|---|
| <ol style="list-style-type: none"> 1. Signal Forced 2. CTS-RTS 3. Out-of-Band Flow Control 4. EIA Propagation |
|---|

Table J-1. EIA Parameter Priorities

For example, suppose a channel is configured for CTS-RTS and CTS-/CTS+ flow control. The CTS output signal to that channel would always be the same as the RTS input signal, regardless of the flow control state. Another example; suppose a channel is configured for EIA propagation and CTS-/CTS+ flow control. The CTS output signal would match the DRSS input signal from the remote multiplexer, *except* when CTS needs to be low due to the flow control state.

K. Rack-Mount Installation

The 3028 Turbo (CTS 2031 Turbo) Statistical Multiplexer has been designed as a standalone unit with open ventilation; however, the 3028 Turbo (CTS 2031 Turbo) units can also be rack-mounted in an open rack or in an enclosed cabinet, but *only* if proper ventilation is provided.

To rack-mount the 3028 Turbo (CTS 2031 Turbo) units, you need the rack-mount kit which is provided in the shipping container.

The air temperature in the cabinet must not exceed 45°C and the case temperature of the 3028 Turbo (CTS 2031 Turbo) must not exceed 50°C.

Since the reliability of the product depends on the temperature, the rise on the air temperature within the cabinet compared to the air temperature outside of the cabinet should not be more than 10°C. For every 10°C increase in temperature, a decrease of approximately 50% in the MTBF will occur.

L. Vorbereitungen zur Inbetriebnahme des Geräts

Zur Inbetriebnahme des Geräts folgt man den nachstehenden Anweisungen:

1. Mit entsprechender Sorgfalt nimmt man das Gerät aus der Verpackung und setzt es auf eine entsprechend vorbereitete Arbeitsplattform.
2. ANSCHUSSE

Entsprechend des gelieferten Gerätetypes ist eine der folgenden Anweisungen zum Anschluss des Geräts zu folgen:

Multiplexer als Allein-Stehende Gerät

Verbinde ein Ende des gelieferten "Composite Link" Kabels mit dem auf der Rückseite des Multiplexers angebrachten Stecker (Typ RS-232) mit der Bezeichnung "COMPOSITE" und das andere Ende mit dem Eingangs-Port des Modems (falls notwendig, entsprechende Informationen sind im Modem Handbuch zu finden). Vergleiche Abb. L-1.

1. Zum Anschluss des DTE-Geräts am Multiplexer sind die RS-232 Stecker "Port 1" bis "Port 8" zu benutzen. Der Anschluss erfolgt mit einem abgeschirmten Kabel (vom Kunden gestellt).
2. Das weibliche Ende des Netzkabels wird nun in den Steckkontakt auf der Rückendeckung eingeschaltet und das entgegenseitige Ende wird dann zur Stromquelle verbunden. Das Gerät ist betriebsbereit wenn das Licht unter "**POWER**" angeht.
3. Nachdem alle Anschlüsse hergestellt und ihrer Richtigkeit nach überprüft wurden, ist das Gerät zum Anschalten bereit. Das Anschalten des Geräts löst eine Selbst-Prüfung aus, die das Gerät einschliesslich aller notwendigen Anschlüsse auf ihre Richtigkeit und passende Functionalität hin überprüft.

Abb. L-1. Model 3028 Turbo (CTS 2031 Turbo)

Eine erfolgreiche Prüfung, d.h. werden keine Installations- oder Gerätefehler entdeckt, wird dies vermittels einer Anzeige am Multiplexer wie folgt kenntlich gemacht: SYSTEM READY. Zur selben Zeit zeigt der Modem die Grund-System-Konfiguration an, die vom Installations- oder Benienungspersonal entsprechend den örtlichen Betriebsanforderungen geändert werden kann. Im Falle einer erfolglosen Selbst-Prüfung ist die Anzeige: SYSTEM ERROR. Um geringfügige Storeinflüsse auszuschliessen, versucht man einen mehrmaligen Ein-Ausschalt Zyklus der Anlage zu unternehmen; kann die Anlage infolge fortgesetzter Schwierigkeiten nicht in Betriebszustand gesetzt werden, ist ein Anruf an den nächsten Firmenvertreter angeraten.

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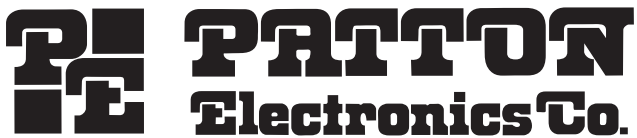
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