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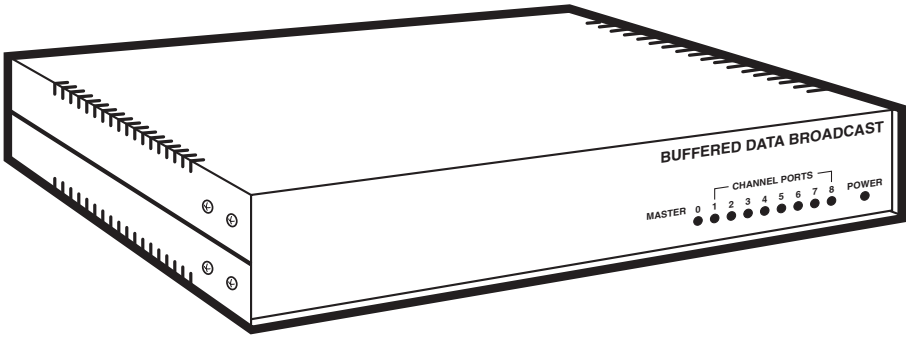
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JULY 1999
TL160A-R2
TL160-C
TL484
TL485

Buffered Data Broadcast



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This digital apparatus does not exceed the Class A limits for Radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

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CE

This product is CE certified. This certificate indicates that the product is suitable for use in commercial and light industrial environments as defined in EN 50081-1:1992.

NOTE

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1. Specifications

Interface — Asynchronous RS-232/V.24

Connectors — (5) DB25S (4-Port model, part number TL160A-R2)
(4) DB25S (4-Port expansion card, part number TL160-C)

Pins Supported —

Pin #	Name
1	Frame Ground
2	Transmit Data
3	Receive Data
4	Request To Send
5	Clear To Send
6	Data Set Ready
7	Signal Ground
8	Received Line Signal Detector
20	Data Terminal Ready
22	Ring Indicator

Data Rates — 110 to 19,200 bps (each port individually selectable)

Memory — 32K expandable to 64K with the expansion IC (part number TL484)

Indicators — (1) Power LED, (9) Port activity LEDs

Power Supply — Wallmount transformer, 115 VAC, 60 Hz, 175 mA, 20 Watts or 230 VAC, 50 HZ, 90 mA, 20 watts

Dimensions — 2.3"H x 12.1"W x 11.2"D (5.8 cm x 30.7 cm x 28.4 cm)

Weight — 4-Port unit: 7.5 lb. (3.4 kg); 4-Port unit with expansion board: 8.1 lb. (3.7 kg); Wallmount power supply: 2.1 lb. (0.95 kg)

Enclosure — Steel

Operating Temperature — 32° to 113° F (0° to 45° C)

Storage Temperature — -4° to 158° F (-20° to 70° C)

Humidity — 0 to 95% noncondensing

Mean Time Between Failures (Ground Benign Environment) — 4-Port unit: 20,000 hours; 4-Port unit with expansion card: 16,000 hours

2. Introduction

The Buffered Data Broadcast receives asynchronous data from a host and distributes it to up to four devices—or eight, using the expansion card. The four or eight devices can also transmit data to the host.

The unit has an internal buffer that is dynamically allocated to the individual ports. If a slow device cannot accept data as quickly as the other devices, the Data Broadcast's internal buffer will adjust itself so that the Data Broadcast will keep outputting data. The channel ports can continue to receive information from the host (as long as the Buffered Data Broadcast has internal buffer available) and broadcast data to all, without being held up by a slower device.

Dynamic allocation means that a varying amount of buffer is given to each port as it needs it, as opposed to having a set size of buffer for each port. Additional buffer can be "shifted" to ports that are receiving information faster than they can transmit it out to another port(s). This allows the most efficient use of the buffer, thus increasing system throughput.

The dynamic allocation works in both directions—when a host is transmitting to the ports and when the ports are transmitting to the host. The ports transmit to the host one port at a time. If a port is transmitting to the host and another port tries to transmit to the host, the other port's data is buffered and its request to link to the host is placed in a queue. When the port that is sending information is done, the Buffered Data Broadcast then goes to the next port in the queue and sends all its information, then it goes to the next port in queue and sends that information. This procedure continues as long as there is information to be sent to the host.

You can also make a one-to-one link between a channel port and the master port when the channel port has data to send to the master port. When no channel port is linked to the master port, the master port's data will be broadcast to all channel ports.

Each port is individually configurable for word structure, baud rate, flow control, and DTE or DCE operation.

The standard Buffered Data Broadcast (Model TL160A) supports four slave devices and one master device. The unit has 32K of RAM, with approximately 29.4K devoted to buffering. You can expand your unit's channel port capacity and/or RAM by acquiring the following items:

- 4-Port Expansion Board (Model TL160-C)—provides 4 additional input ports.
- RAM Upgrade (Model TL484)—provides 32K of additional RAM with 25.4K additional bytes of buffer.

3. Installation

Installation consists of the following steps:

1. Setting the internal DIP switches (Section 3.1)
2. Setting the DTE/DCE shunt jumpers (Section 3.2)
3. Installing the expansion card (optional—Section 3.3).
4. Installing the RAM Upgrade integrated circuit chip (optional—Section 3.4).
5. Connecting devices to the ports and powering up after the switches and jumpers have been set (Section 3.5)

3.1 Setting the Internal DIP Switches

Remove the cover to access the DIP switches. You'll need a small Phillips head screwdriver. Six (6) screws attach the cover to the chassis, three on each side of the unit. Fig. 3-1 shows the location of the DIP switches on the standard unit (part number TL160A-R2), and Fig. 3-2 shows the location of the DIP switches on the 4-Port Expansion Card (part number TL160-C).

CAUTION

Remove power from the Buffered Data Broadcast when changing the internal switch settings. Power on to activate the changes. While the Buffered Data Broadcast is reinitializing, no data can be processed.

3.1.1 Port Configuration DIP Switches

You can configure individual ports for the following options:

- Baud Rate
- Parity
- Data Bits per Word
- Flow Control
- Enable/Disable

The DIP switches that correspond to each port as follows:

On the standard 5-port board (as shown in Fig. 3-1):

SWA	-	Master Port 0
SWB	-	Channel Port 1
SWC	-	Channel Port 2
SWD	-	Channel Port 3
SWE	-	Channel Port 4

On the 4-port expansion board (as shown in Fig. 3-2):

SWH - Channel Port 5
SWI - Channel Port 6
SWJ - Channel Port 7
SWK - Channel Port 8

Table 3-1 gives the switch position settings for each Port DIP switch.

NOTE: If the unit is not using a port, disable it via switch position 8. If it is not disabled, the throughput of the Buffered Data Broadcast will slow down or stop.

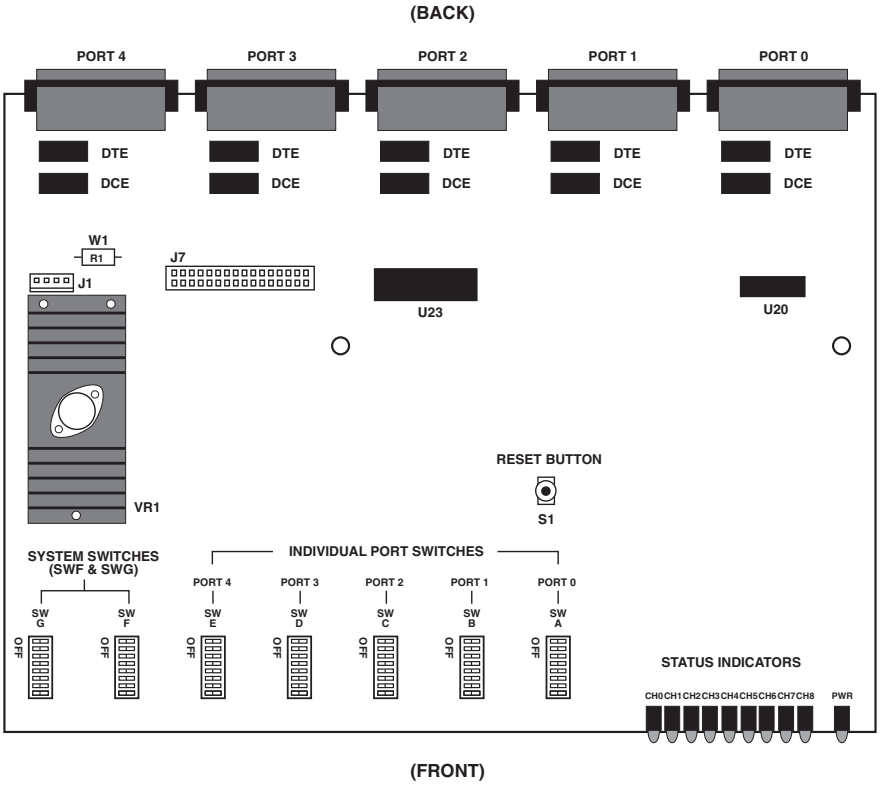


Fig. 3-1. Standard Unit Switch and Jumper Locations.

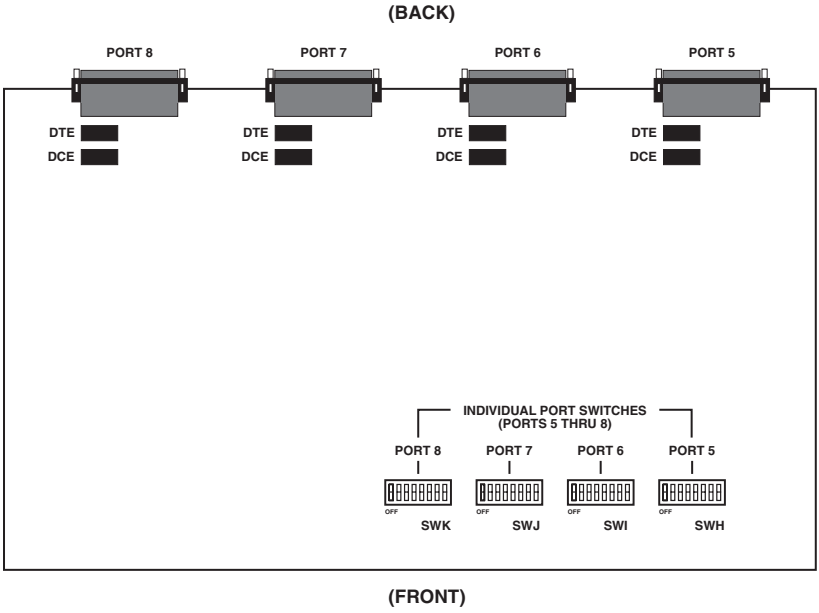


Fig. 3-2. Expansion Card Switch And Jumper Locations.

Table 3-1. Channel Port Switch Settings (SWB-E and SWH-K).

SWITCH POSITION								
OPTION	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
BAUD RATE (BPS)								
110	ON	ON	ON					
300	OFF	ON	ON					
600	ON	OFF	ON					
1200	OFF	OFF	ON					
2400	ON	ON	OFF					
4800	OFF	ON	OFF					
9600	ON	OFF	OFF					
19,200	OFF	OFF	OFF					
PARITY								
None				ON	ON			
Even				OFF	ON			
Odd				ON	OFF			
None				OFF	OFF			
DATA BITS PER WORD								
8						ON		
7						OFF		
FLOW CONTROL								
Hardware								
(DTR or CTS)							ON	
Software							OFF	
(X-ON/X-OFF)								
Port disabled								ON
Port enabled								OFF

Table 3-2. Master Port Settings (SWA—see note, next page).

SWITCH POSITION								
OPTION	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
BAUD RATE (BPS)								
110	ON	ON	ON					
300	OFF	ON	ON					
600	ON	OFF	ON					
1200	OFF	OFF	ON					
2400	ON	ON	OFF					
4800	OFF	ON	OFF					
9600	ON	OFF	OFF					
19,200	OFF	OFF	OFF					
PARITY								
None				ON	ON			
Even				OFF	ON			
Odd				ON	OFF			
None				OFF	OFF			
DATA BITS PER WORD								
8						ON		
7						OFF		
FLOW CONTROL								
Hardware (DTR or CTS)							ON	
Software (X-ON/X-OFF)							OFF	
One-to-one channel to Master Port link								ON
Master port always broadcast to all channel ports								OFF

***NOTE: The Master port settings (SWA) are the same as the Channel port settings except for Switch 8. The Master port settings for Switch 8 are as follows:**

ON—make a one-to-one link between a Channel port and the Master port when a Channel port has data to send to the Master port. When no Channel port is linked to the Master port, the Master port's data will be broadcast to all Channel ports.

OFF—the Master port will always broadcast to all Channel ports, even when a Channel port is sending data back to the Master port.

3.1.2 System Option Switches

Breaking A Channel-To-Master Port Link

You can break the link from the Channel port to the Master port using two different methods:

- Break Character
- Timeout Period

Break Link Character

If you choose the Break Character method, the Break Character must be selected by switch F. The link is broken when the break character is transmitted to the host port from the Channel port (not when it is received by the Channel port). See Appendix A for the settings of switch F to select the Break Character.

NOTE: If the Break Character option is enabled and the Break Character is the "NULL" (00 hex) character, a break sequence (the break sequence is generated by pressing the "break" key on most keyboards) will still break the link.

Data Traffic Timeout Period

You can set a timeout period via switches 1-4 of DIP switch G. The timeout period can range from 1 second to 60 minutes. When no data is received, buffered, or transmitted between the Channel port and the Master port for that specified period of time, the Buffered Data Broadcast will break the link. Table 3-3 gives the settings for DIP switch G.

Table 3-3. DIP Switch G Settings.

SWITCH POSITION								
OPTION	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
DATA TRAFFIC TIMEOUT PERIOD								
DISABLED	ON	ON	ON	ON				
1 second	OFF	ON	ON	ON				
3 seconds	ON	OFF	ON	ON				
10 seconds	OFF	OFF	ON	ON				
15 seconds	ON	ON	OFF	ON				
25 seconds	OFF	ON	OFF	ON				
1 minute	ON	OFF	OFF	ON				
3 minutes	OFF	OFF	OFF	ON				
5 minutes	ON	ON	ON	OFF				
7 minutes	OFF	ON	ON	OFF				
10 minutes	ON	OFF	ON	OFF				
15 minutes	OFF	OFF	ON	OFF				
20 minutes	ON	ON	OFF	OFF				
30 minutes	OFF	ON	OFF	OFF				
45 minutes	ON	OFF	OFF	OFF				
60 minutes	OFF	OFF	OFF	OFF				
SYSTEM RECOVERY TIMEOUT								
Disabled					ON	ON	ON	
15 seconds					OFF	ON	ON	
1 minute					ON	OFF	ON	
5 minutes					OFF	OFF	ON	
10 minutes	ON	ON	OFF					
20 minutes	OFF	ON	OFF					
30 minutes	ON	OFF	OFF					
60 minutes	OFF	OFF	OFF					
Position 8 must be ON						ON		

System Recovery

DIP switch G also controls a System Recovery function. If a port stops the Buffered Data Broadcast from sending data (via the flow control method), and does not signal the Buffered Data Broadcast to resume transmission, the Buffered Data Broadcast's internal memory will be "locked up." One malfunctioning device could tie up a lot of memory and prevent transmission of data to the other devices. The Buffered Data Broadcast will recover when any port has been flow controlled off for a period of time selected via switch positions 5, 6, and 7 of DIP switch G. You can disable or set the recovery time from 15 seconds to one hour (see Table 3-2). The Buffered Data Broadcast will free up any locked memory in one of two ways:

- *System Recovery Port with Hardware Flow Control*: The data to be transmitted out this port will be electronically deleted and the internal memory will be cleared.
- *System Recovery Port with Software Flow Control*: The Buffered Data Broadcast will change its internal transmission status (X-ON) and begin transmitting the buffered data out this port.

3.2 DTE/DCE Jumper Settings

You can set each port for DTE or DCE operation. To do this, place the shunt jumper into the appropriate socket. The sockets for a particular port are located directly behind the port. See Fig. 3-1 and 3-2 for the location of the jumper sockets. See Table 3-4 for a comparison of DTE versus DCE signals.

Table 3-4. DTE Versus DCE Signal Directions

DATA BROADCAST CONFIGURED AS		Signal Direction
DTE	DCE	
TXD (2)	RXD (3)	Output from Buffered Data Broadcast
RXD (3)	TXD (2)	Input to Buffered Data Broadcast
RTS (4)	DCD (8)	Output from Buffered Data Broadcast
CTS (5)	DTR (20)	Input to Buffered Data Broadcast
N/A	DSR (6)	Output from Buffered Data Broadcast
DCD (8)	RTS (4)	Input to Buffered Data Broadcast
DTR (20)	CTS (5)	Output from Buffered Data Broadcast
RI (22)	N/A	Input to Buffered Data Broadcast

3.3 Installing the Expansion Card

The 4-Port Expansion Card (part number TL160-C) includes the following hardware:

- 2 standoffs
- 8 screwlocks
- 1 screw

Follow the steps listed below and refer to Fig. 3-3 to install the 4-Port Expansion Card:

1. Disconnect power from the Buffered Data Broadcast.

2. Remove the six screws from the sides of the unit and the three screws from the rear panel. Lift the cover from the unit.

3. Remove the screw located near IC chip U23 on the main circuit board. Do not discard this screw.

4. Insert a spacer in the hole where the screw from step 3 was installed.

5. Insert the other spacer in the hole located near IC U20 on the main circuit board.

6. Line up the port connectors on the 4-Port Expansion Card with the holes in the back cover. Make sure the pin connector on the bottom of the 4-Port Expansion Card is aligned properly with the pin socket on the main circuit board. Carefully press the top pin connector into the lower pin socket.

CAUTION

DO NOT FORCE THESE CONNECTORS TOGETHER. Excessive force may damage the pins. Realign the connectors and try again if the connectors do not fit together easily.

7. Install the eight screwlocks through the back panel into the holes of each port's RS-232 connector on the 4-Port Expansion Board.

8. Install the screw from step 3 through the 4-Port Expansion Board into either spacer.

9. Install the screw provided with the 4-Port Expansion Card through the 4-Port Expansion Board into the other spacer.

10. The 4-Port Expansion Board is now installed.

11. Replace the cover and screws that were removed in step 2.

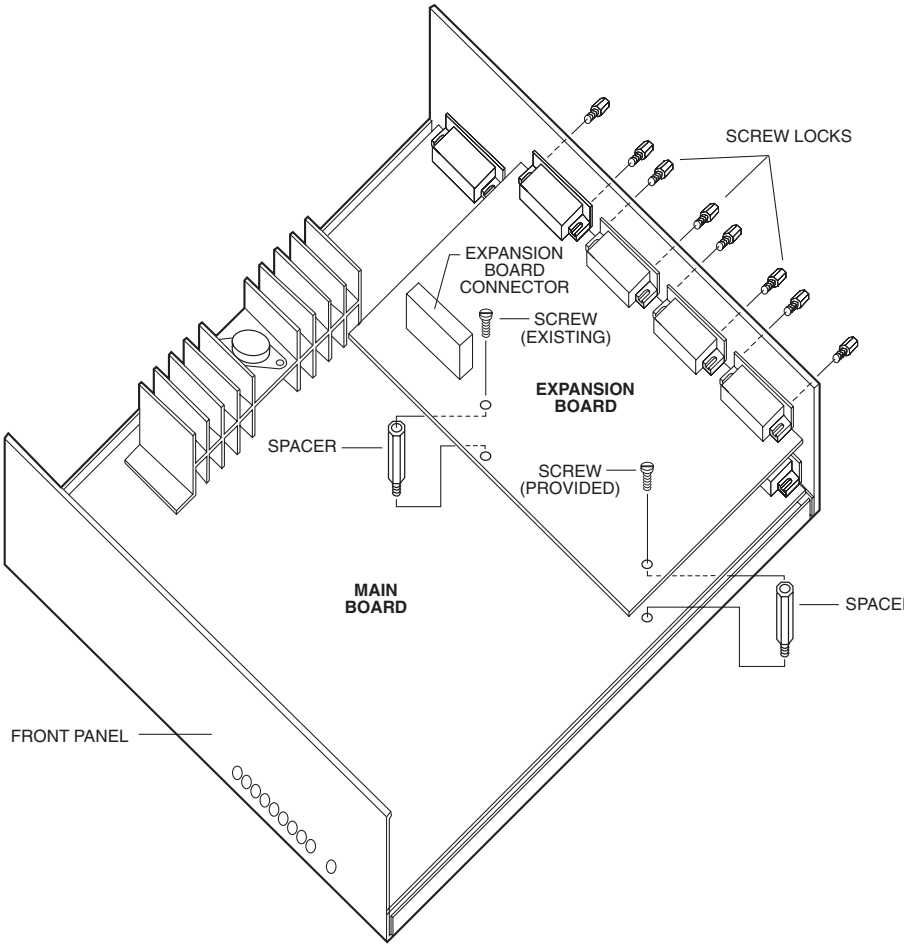


Fig. 3-3. Installing the Expansion Card.

3.4 Installing the RAM Upgrade

Follow the steps below to install the RAM upgrade integrated circuit chip (part number TL484).

CAUTION

The IC is susceptible to static discharge and could be permanently damaged if not handled properly. Do not remove the IC from its packing container until you are ready to use it. Discharge any static electricity from yourself before you begin the replacement procedure.

1. Disconnect power from the Buffered Data Broadcast.
2. Position the IC so that its notch is lined up with the notch in socket U6, as shown in Fig. 3-4.
3. Place the IC on top of the socket, making sure all of the pins are lined up with their respective receptacle holes.
4. Occasionally, the distance from one row of pins to the other row on the new IC may be wider than the distance between the rows in the socket. If this is the case, lay the IC on its side and on top of a flat surface with the pins facing toward you. Gently press down on the IC, bending all of the pins slightly inward. This will decrease the distance between the rows of pins and allow the IC to be inserted in the socket.
5. Gently press the IC into the socket. Continue to press downward on the IC until it is fully seated.

The IC is now installed and ready for operation.

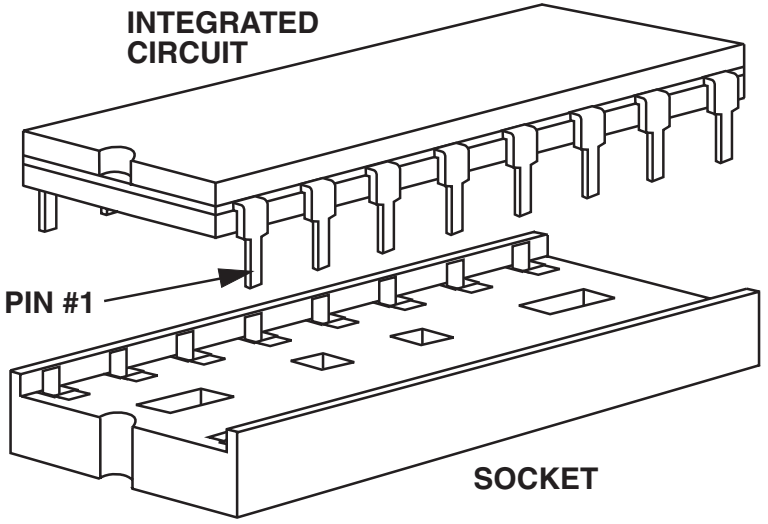


Fig. 3-4. Integrated Circuit and Socket Orientation.

6. If the IC does not function correctly, remove the IC as described below:

a. Insert a small screwdriver between the IC and its socket.

b. Very gently pry one end of the IC partially up from the socket.

c. Insert the screwdriver at the other end of the IC and very gently pry that end of the IC partially up from the socket.

d. Continue to alternately pry one end, and then the other, up from the socket until the IC is free.

7. Check for bent pins or any other physical damage. If a pin is bent, straighten the pin with a small screwdriver or pliers and then re-insert the IC.

3.5 Connecting Devices to Channel and Master Ports

Once you have configured the internal switches (Sections 3.1 and 3.2) and jumpers, you are ready to connect your devices to the Buffered Data Broadcast.

1. Verify that the power-supply connector is properly attached to the 4-pin male connector on the Buffered Data Broadcast printed circuit board assembly.
2. Position the unit's cover back in place.
3. Connect the channel device cables to Channel Ports 1-4 (or 1-8) of the Buffered Data Broadcast.
4. Connect the operator console cable to Master Port 0 of the Buffered Data Broadcast.
5. Plug the wall mount power supply into a suitable outlet.

3.6 Front-Panel Indicators

Ten LEDs are located on the unit's front panel: 9 port LEDs and 1 Power LED.

The POWER LED will be lit when power is present.

The Port Status LEDs will be flashing when data is passing through the corresponding port. If the LED is lit solid, a buffer overflow or a system recovery timeout has occurred at that port. If this occurs, make sure the flow-control options are set correctly and be sure the device connected to that port is powered on.

Appendix: Switch F Settings

This appendix lists all Break Characters that you can set via switch F. If the Break Character option is enabled and the Break Character is the "NUL" (00 hex) character, a break sequence (the break sequence is generated by pressing the "break" key on most keyboards) will also break the link.

The characters in the extended ASCII range (indicated by an *) may vary according to your equipment. Therefore, the character for these switch settings is not listed. A "^" symbol means that you should press the control key and at the same time press the key for the character that follows the "^". ASCII control names are indicated within parentheses ().

Parity and word structure will not affect these switch settings if you configure each port correctly for its options (for example, if you are running 7 bits per word, set your port for 7 bits, not 8, and make sure switch position 8 of switch F is OFF).

Table A-1. Switch F Settings.

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
DISABLED			ON	ON	ON	ON	ON	ON	ON	ON
254	FE	*	OFF	ON	ON	ON	ON	ON	ON	ON
253	FD	*	ON	OFF	ON	ON	ON	ON	ON	ON
252	FC	*	OFF	OFF	ON	ON	ON	ON	ON	ON
251	FB	*	ON	ON	OFF	ON	ON	ON	ON	ON
250	FA	*	OFF	ON	OFF	ON	ON	ON	ON	ON

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
249	F9	*	ON	OFF	OFF	ON	ON	ON	ON	ON
248	F8	*	OFF	OFF	OFF	ON	ON	ON	ON	ON
247	F7	*	ON	ON	ON	OFF	ON	ON	ON	ON
246	F6	*	OFF	ON	ON	OFF	ON	ON	ON	ON
245	F5	*	ON	OFF	ON	OFF	ON	ON	ON	ON
244	F4	*	OFF	OFF	ON	OFF	ON	ON	ON	ON
243	F3	*	ON	ON	OFF	OFF	ON	ON	ON	ON
242	F2	*	OFF	ON	OFF	OFF	ON	ON	ON	ON
241	F1	*	ON	OFF	OFF	OFF	ON	ON	ON	ON
240	F0	*	OFF	OFF	OFF	OFF	ON	ON	ON	ON
239	EF	*	ON	ON	ON	ON	OFF	ON	ON	ON
238	EE	*	OFF	ON	ON	ON	OFF	ON	ON	ON
237	ED	*	ON	OFF	ON	ON	OFF	ON	ON	ON
236	EC	*	OFF	OFF	ON	ON	OFF	ON	ON	ON

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
235	EB	*	ON	ON	OFF	ON	OFF	ON	ON	ON
234	EA	*	OFF	ON	OFF	ON	OFF	ON	ON	ON
233	E9	*	ON	OFF	OFF	ON	OFF	ON	ON	ON
232	E8	*	OFF	OFF	OFF	ON	OFF	ON	ON	ON
231	E7	*	ON	ON	ON	OFF	OFF	ON	ON	ON
230	E6	*	OFF	ON	ON	OFF	OFF	ON	ON	ON
229	E5	*	ON	OFF	ON	OFF	OFF	ON	ON	ON
228	E4	*	OFF	OFF	ON	OFF	OFF	ON	ON	ON
227	E3	*	ON	ON	OFF	OFF	OFF	ON	ON	ON
226	E2	*	OFF	ON	OFF	OFF	OFF	ON	ON	ON
225	E1	*	ON	OFF	OFF	OFF	OFF	ON	ON	ON
224	E0	*	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
223	DF	*	ON	ON	ON	ON	ON	OFF	ON	ON
222	DE	*	OFF	ON	ON	ON	ON	OFF	ON	ON

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
221	DD	*	ON	OFF	ON	ON	ON	OFF	ON	ON
220	DC	*	OFF	OFF	ON	ON	ON	OFF	ON	ON
219	DB	*	ON	ON	OFF	ON	ON	OFF	ON	ON
218	DA	*	OFF	ON	OFF	ON	ON	OFF	ON	ON
217	D9	*	ON	OFF	OFF	ON	ON	OFF	ON	ON
216	D8	*	OFF	OFF	OFF	ON	ON	OFF	ON	ON
215	D7	*	ON	ON	ON	OFF	ON	OFF	ON	ON
214	D6	*	OFF	ON	ON	OFF	ON	OFF	ON	ON
213	D5	*	ON	OFF	ON	OFF	ON	OFF	ON	ON
212	D4	*	OFF	OFF	ON	OFF	ON	OFF	ON	ON
211	D3	*	ON	ON	OFF	OFF	ON	OFF	ON	ON
210	D2	*	OFF	ON	OFF	OFF	ON	OFF	ON	ON
209	D1	*	ON	OFF	OFF	OFF	ON	OFF	ON	ON
208	D0	*	OFF	OFF	OFF	OFF	ON	OFF	ON	ON

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
207	CF	*	ON	ON	ON	ON	OFF	OFF	ON	ON
206	CE	*	OFF	ON	ON	ON	OFF	OFF	ON	ON
205	CD	*	ON	OFF	ON	ON	OFF	OFF	ON	ON
204	CC	*	OFF	OFF	ON	ON	OFF	OFF	ON	ON
203	CB	*	ON	ON	OFF	ON	OFF	OFF	ON	ON
202	CA	*	OFF	ON	OFF	ON	OFF	OFF	ON	ON
201	C9	*	ON	OFF	OFF	ON	OFF	OFF	ON	ON
200	C8	*	OFF	OFF	OFF	ON	OFF	OFF	ON	ON
199	C7	*	ON	ON	ON	OFF	OFF	OFF	ON	ON
198	C6	*	OFF	ON	ON	OFF	OFF	OFF	ON	ON
197	C5	*	ON	OFF	ON	OFF	OFF	OFF	ON	ON
196	C4	*	OFF	OFF	ON	OFF	OFF	OFF	ON	ON
195	C3	*	ON	ON	OFF	OFF	OFF	OFF	ON	ON
194	C2	*	OFF	ON	OFF	OFF	OFF	OFF	ON	ON

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
193	C1	*	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
192	C0	*	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
191	BF	*	ON	ON	ON	ON	ON	ON	OFF	ON
190	BE	*	OFF	ON	ON	ON	ON	ON	OFF	ON
189	BD	*	ON	OFF	ON	ON	ON	ON	OFF	ON
188	BC	*	OFF	OFF	ON	ON	ON	ON	OFF	ON
187	BB	*	ON	ON	OFF	ON	ON	ON	OFF	ON
186	BA	*	OFF	ON	OFF	ON	ON	ON	OFF	ON
185	B9	*	ON	OFF	OFF	ON	ON	ON	OFF	ON
184	B8	*	OFF	OFF	OFF	ON	ON	ON	OFF	ON
183	B7	*	ON	ON	ON	OFF	ON	ON	OFF	ON
182	B6	*	OFF	ON	ON	OFF	ON	ON	OFF	ON
181	B5	*	ON	OFF	ON	OFF	ON	ON	OFF	ON
180	B4	*	OFF	OFF	ON	OFF	ON	ON	OFF	ON

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
179	B3	*	ON	ON	OFF	OFF	ON	ON	OFF	ON
178	B2	*	OFF	ON	OFF	OFF	ON	ON	OFF	ON
177	B1	*	ON	OFF	OFF	OFF	ON	ON	OFF	ON
176	B0	*	OFF	OFF	OFF	OFF	ON	ON	OFF	ON
175	AF	*	ON	ON	ON	ON	OFF	ON	OFF	ON
174	AE	*	OFF	ON	ON	ON	OFF	ON	OFF	ON
173	AD	*	ON	OFF	ON	ON	OFF	ON	OFF	ON
172	AC	*	OFF	OFF	ON	ON	OFF	ON	OFF	ON
171	AB	*	ON	ON	OFF	ON	OFF	ON	OFF	ON
170	AA	*	OFF	ON	OFF	ON	OFF	ON	OFF	ON
169	A9	*	ON	OFF	OFF	ON	OFF	ON	OFF	ON
168	A8	*	OFF	OFF	OFF	ON	OFF	ON	OFF	ON
167	A7	*	ON	ON	ON	OFF	OFF	ON	OFF	ON
166	A6	*	OFF	ON	ON	OFF	OFF	ON	OFF	ON

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
165	A5	*	ON	OFF	ON	OFF	OFF	ON	OFF	ON
164	A4	*	OFF	OFF	ON	OFF	OFF	ON	OFF	ON
163	A3	*	ON	ON	OFF	OFF	OFF	ON	OFF	ON
162	A2	*	OFF	ON	OFF	OFF	OFF	ON	OFF	ON
161	A1	*	ON	OFF	OFF	OFF	OFF	ON	OFF	ON
160	A0	*	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON
159	9F	*	ON	ON	ON	ON	ON	OFF	OFF	ON
158	9E	*	OFF	ON	ON	ON	ON	OFF	OFF	ON
157	9D	*	ON	OFF	ON	ON	ON	OFF	OFF	ON
156	9C	*	OFF	OFF	ON	ON	ON	OFF	OFF	ON
155	9B	*	ON	ON	OFF	ON	ON	OFF	OFF	ON
154	9A	*	OFF	ON	OFF	ON	ON	OFF	OFF	ON
153	99	*	ON	OFF	OFF	ON	ON	OFF	OFF	ON
152	98	*	OFF	OFF	OFF	ON	ON	OFF	OFF	ON

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
151	97	*	ON	ON	ON	OFF	ON	OFF	OFF	ON
150	96	*	OFF	ON	ON	OFF	ON	OFF	OFF	ON
149	95	*	ON	OFF	ON	OFF	ON	OFF	OFF	ON
148	94	*	OFF	OFF	ON	OFF	ON	OFF	OFF	ON
147	93	*	ON	ON	OFF	OFF	ON	OFF	OFF	ON
146	92	*	OFF	ON	OFF	OFF	ON	OFF	OFF	ON
145	91	*	ON	OFF	OFF	OFF	ON	OFF	OFF	ON
144	90	*	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON
143	8F	*	ON	ON	ON	ON	OFF	OFF	OFF	ON
142	8E	*	OFF	ON	ON	ON	OFF	OFF	OFF	ON
141	8D	*	ON	OFF	ON	ON	OFF	OFF	OFF	ON
140	8C	*	OFF	OFF	ON	ON	OFF	OFF	OFF	ON
139	8B	*	ON	ON	OFF	ON	OFF	OFF	OFF	ON
138	8A	*	OFF	ON	OFF	ON	OFF	OFF	OFF	ON

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
137	89	*	ON	OFF	OFF	ON	OFF	OFF	OFF	ON
136	88	*	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
135	87	*	ON	ON	ON	OFF	OFF	OFF	OFF	ON
134	86	*	OFF	ON	ON	OFF	OFF	OFF	OFF	ON
133	85	*	ON	OFF	ON	OFF	OFF	OFF	OFF	ON
132	84	*	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON
131	83	*	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
130	82	*	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON
129	81	*	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
128	80	*	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
127	7F	(DEL)	ON	ON	ON	ON	ON	ON	ON	OFF
126	7E	~	OFF	ON	ON	ON	ON	ON	ON	OFF
125	7D	}	ON	OFF	ON	ON	ON	ON	ON	OFF
124	7C	|	OFF	OFF	ON	ON	ON	ON	ON	OFF

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
123	7B	{	ON	ON	OFF	ON	ON	ON	ON	OFF
122	7A	z	OFF	ON	OFF	ON	ON	ON	ON	OFF
121	79	y	ON	OFF	OFF	ON	ON	ON	ON	OFF
120	78	x	OFF	OFF	OFF	ON	ON	ON	ON	OFF
119	77	w	ON	ON	ON	OFF	ON	ON	ON	OFF
118	76	v	OFF	ON	ON	OFF	ON	ON	ON	OFF
117	75	u	ON	OFF	ON	OFF	ON	ON	ON	OFF
116	74	t	OFF	OFF	ON	OFF	ON	ON	ON	OFF
115	73	s	ON	ON	OFF	OFF	ON	ON	ON	OFF
114	72	r	OFF	ON	OFF	OFF	ON	ON	ON	OFF
113	71	q	ON	OFF	OFF	OFF	ON	ON	ON	OFF
112	70	p	OFF	OFF	OFF	OFF	ON	ON	ON	OFF
111	6F	o	ON	ON	ON	ON	OFF	ON	ON	OFF
110	6E	n	OFF	ON	ON	ON	OFF	ON	ON	OFF

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
109	6D	m	ON	OFF	ON	ON	OFF	ON	ON	OFF
108	6C	l	OFF	OFF	ON	ON	OFF	ON	ON	OFF
107	6B	k	ON	ON	OFF	ON	OFF	ON	ON	OFF
106	6A	j	OFF	ON	OFF	ON	OFF	ON	ON	OFF
105	69	i	ON	OFF	OFF	ON	OFF	ON	ON	OFF
104	68	h	OFF	OFF	OFF	ON	OFF	ON	ON	OFF
103	67	g	ON	ON	ON	OFF	OFF	ON	ON	OFF
102	66	f	OFF	ON	ON	OFF	OFF	ON	ON	OFF
101	65	e	ON	OFF	ON	OFF	OFF	ON	ON	OFF
100	64	d	OFF	OFF	ON	OFF	OFF	ON	ON	OFF
99	63	c	ON	ON	OFF	OFF	OFF	ON	ON	OFF
98	62	b	OFF	ON	OFF	OFF	OFF	ON	ON	OFF
97	61	a	ON	OFF	OFF	OFF	OFF	ON	ON	OFF
96	60	‘	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
95	5F	_	ON	ON	ON	ON	ON	OFF	ON	OFF
94	5E	^	OFF	ON	ON	ON	ON	OFF	ON	OFF
93	5D	]	ON	OFF	ON	ON	ON	OFF	ON	OFF
92	5C	\	OFF	OFF	ON	ON	ON	OFF	ON	OFF
91	5B	[	ON	ON	OFF	ON	ON	OFF	ON	OFF
90	5A	Z	OFF	ON	OFF	ON	ON	OFF	ON	OFF
89	59	Y	ON	OFF	OFF	ON	ON	OFF	ON	OFF
88	58	X	OFF	OFF	OFF	ON	ON	OFF	ON	OFF
87	57	W	ON	ON	ON	OFF	ON	OFF	ON	OFF
86	56	V	OFF	ON	ON	OFF	ON	OFF	ON	OFF
85	55	U	ON	OFF	ON	OFF	ON	OFF	ON	OFF
84	54	T	OFF	OFF	ON	OFF	ON	OFF	ON	OFF
83	53	S	ON	ON	OFF	OFF	ON	OFF	ON	OFF
82	52	R	OFF	ON	OFF	OFF	ON	OFF	ON	OFF

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
81	51	Q	ON	OFF	OFF	OFF	ON	OFF	ON	OFF
80	50	P	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF
79	4F	O	ON	ON	ON	ON	OFF	OFF	ON	OFF
78	4E	N	OFF	ON	ON	ON	OFF	OFF	ON	OFF
77	4D	M	ON	OFF	ON	ON	OFF	OFF	ON	OFF
76	4C	L	OFF	OFF	ON	ON	OFF	OFF	ON	OFF
75	4B	K	ON	ON	OFF	ON	OFF	OFF	ON	OFF
74	4A	J	OFF	ON	OFF	ON	OFF	OFF	ON	OFF
73	49	I	ON	OFF	OFF	ON	OFF	OFF	ON	OFF
72	48	H	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF
71	47	G	ON	ON	ON	OFF	OFF	OFF	ON	OFF
70	46	F	OFF	ON	ON	OFF	OFF	OFF	ON	OFF
69	45	E	ON	OFF	ON	OFF	OFF	OFF	ON	OFF
68	44	D	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
67	43	C	ON	ON	OFF	OFF	OFF	OFF	ON	OFF
66	42	B	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF
65	41	A	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
64	40	@	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
63	3F	?	ON	ON	ON	ON	ON	ON	OFF	OFF
62	3E	>	OFF	ON	ON	ON	ON	ON	OFF	OFF
61	3D	=	ON	OFF	ON	ON	ON	ON	OFF	OFF
60	3C	<	OFF	OFF	ON	ON	ON	ON	OFF	OFF
59	3B	;	ON	ON	OFF	ON	ON	ON	OFF	OFF
58	3A	:	OFF	ON	OFF	ON	ON	ON	OFF	OFF
57	39	9	ON	OFF	OFF	ON	ON	ON	OFF	OFF
56	38	8	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
55	37	7	ON	ON	ON	OFF	ON	ON	OFF	OFF
54	36	6	OFF	ON	ON	OFF	ON	ON	OFF	OFF

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
53	35	5	ON	OFF	ON	OFF	ON	ON	OFF	OFF
52	34	4	OFF	OFF	ON	OFF	ON	ON	OFF	OFF
51	33	3	ON	ON	OFF	OFF	ON	ON	OFF	OFF
50	32	2	OFF	ON	OFF	OFF	ON	ON	OFF	OFF
49	31	1	ON	OFF	OFF	OFF	ON	ON	OFF	OFF
48	30	0	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF
47	2F	/	ON	ON	ON	ON	OFF	ON	OFF	OFF
46	2E	.	OFF	ON	ON	ON	OFF	ON	OFF	OFF
45	2D	-	ON	OFF	ON	ON	OFF	ON	OFF	OFF
44	2C	‘	OFF	OFF	ON	ON	OFF	ON	OFF	OFF
43	2B	+	ON	ON	OFF	ON	OFF	ON	OFF	OFF
42	2A	*	OFF	ON	OFF	ON	OFF	ON	OFF	OFF
41	29	)	ON	OFF	OFF	ON	OFF	ON	OFF	OFF
40	28	(	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
39	27	‘	ON	ON	ON	OFF	OFF	ON	OFF	OFF
38	26	&	OFF	ON	ON	OFF	OFF	ON	OFF	OFF
37	25	%	ON	OFF	ON	OFF	OFF	ON	OFF	OFF
36	24	$	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
35	23	#	ON	ON	OFF	OFF	OFF	ON	OFF	OFF
34	22	“	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
33	21	!	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
32	20	(space)	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
31	1F	(US)	ON	ON	ON	ON	ON	OFF	OFF	OFF
30	1E	(RS)	OFF	ON	ON	ON	ON	OFF	OFF	OFF
29	1D	(GS)	ON	OFF	ON	ON	ON	OFF	OFF	OFF
28	1C	(FS)	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
27	1B	(ESC)	ON	ON	OFF	ON	ON	OFF	OFF	OFF
26	1A or ^Z	(SUB)	OFF	ON	OFF	ON	ON	OFF	OFF	OFF

Table A-1. Switch F Settings (continued).

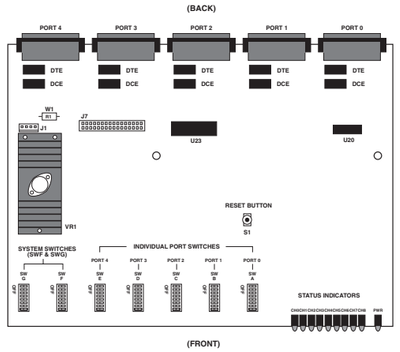
BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
25	19 or ^Y	(EM)	ON	OFF	OFF	ON	ON	OFF	OFF	OFF
24	18 or ^X	(CAN)	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
23	17 or ^W	(ETB)	ON	ON	ON	OFF	ON	OFF	OFF	OFF
22	16 or ^V	(SYN)	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
21	15 or ^U	(NAK)	ON	OFF	ON	OFF	ON	OFF	OFF	OFF
20	14 or ^T	(DC4)	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
19	13 or ^S	(DC3)	ON	ON	OFF	OFF	ON	OFF	OFF	OFF
18	12 or ^R	(DC2)	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
17	11 or ^Q	(DC1)	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
16	10 or ^P	(DLE)	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
15	0F or ^O	(SI)	ON	ON	ON	ON	OFF	OFF	OFF	OFF
14	0E or ^N	(SO)	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
13	OD or ^M	(CR)	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
12	0C or ^L	(FF)	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
11	0B or ^K	(VT)	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
10	0A or ^J	(LF)	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
9	09 or ^I	(HT)	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
8	08 or ^H	(BS)	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF

Table A-1. Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
7	07 or ^G	(BEL)	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
6	06 or ^F	(ACK)	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
5	05 or ^E	(ENQ)	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
4	04 or ^D	(EOT)	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
3	03 or ^C	(ETX)	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
2	02 or ^B	(STX)	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
1	01 or ^A	(SOH)	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
0	00 or break	(NUL)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF



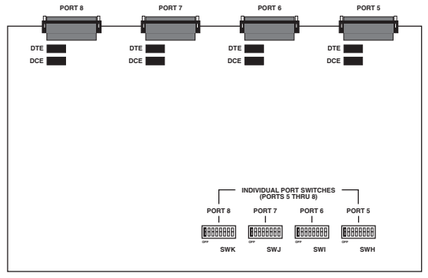
DIP Switch G Settings.

OPTION	SWITCH POSITION 1	2	3	4	5	6	7	8
DATA TRAFFIC TIMEOUT PERIOD								
DISABLED	ON	ON	ON	ON				
1 second	OFF	ON	ON	ON				
3 seconds	ON	OFF	ON	ON				
10 seconds	OFF	OFF	ON	ON				
15 seconds	ON	ON	OFF	ON				
25 seconds	OFF	ON	OFF	ON				
1 minute	ON	OFF	OFF	ON				
3 minutes	OFF	OFF	OFF	ON				
5 minutes	ON	ON	ON	OFF				
7 minutes	OFF	ON	ON	OFF				
10 minutes	ON	OFF	ON	OFF				
15 minutes	OFF	OFF	ON	OFF				
20 minutes	ON	ON	OFF	OFF				
30 minutes	OFF	ON	OFF	OFF				
45 minutes	ON	OFF	OFF	OFF				
60 minutes	OFF	OFF	OFF	OFF				
SYSTEM RECOVERY TIMEOUT								
Disabled					ON	ON	ON	
15 seconds					OFF	ON	ON	
1 minute					ON	OFF	ON	
5 minutes					OFF	OFF	ON	
10 minutes					ON	ON	OFF	
20 minutes					OFF	ON	OFF	
30 minutes					ON	OFF	OFF	
60 minutes					OFF	OFF	OFF	
Position 8 must be ON								ON

Channel Port Switch Settings (SWB-E and SWH-K).

OPTION	SWITCH POSITION 1	2	3	4	5	6	7	8
BAUD RATE (BPS)								
110	ON	ON	ON					
300	OFF	ON	ON					
600	ON	OFF	ON					
1200	OFF	OFF	ON					
2400	ON	ON	OFF					
4800	OFF	ON	OFF					
9600	ON	OFF	OFF					
19,200	OFF	OFF	OFF					
PARITY								
None				ON	ON			
Even				OFF	ON			
Odd				ON	OFF			
None				OFF	OFF			
DATA BITS PER WORD								
8						ON		
7						OFF		
FLOW CTRL								
Hardware (DTR or CTS)							ON	
Software (X-ON/X-OFF)								
Port disabled								ON
Port enabled								OFF

(BACK)



Master Port Settings (SWA).

OPTION	SWITCH POSITION 1	2	3	4	5	6	7	8
BAUD RATE (BPS)								
110	ON	ON	ON					
300	OFF	ON	ON					
600	ON	OFF	ON					
1200	OFF	OFF	ON					
2400	ON	ON	OFF					
4800	OFF	ON	OFF					
9600	ON	OFF	OFF					
19,200	OFF	OFF	OFF					
PARITY								
None				ON	ON			
Even				OFF	ON			
Odd				ON	OFF			
None				OFF	OFF			
DATA BITS PER WORD								
8						ON		
7						OFF		
FLOW CONTROL								
Hardware (DTR or CTS)							ON	
Software (X-ON/X-OFF)							OFF	
*One-to-one channel to Master Port link								ON
*Master port always broadcast to all channel ports								OFF

NOTE: Settings for DIP Switch F appear on the back of this page.

Buffered Data Broadcast
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Switch F Settings.

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
26	1A or ^Z	(SUB)	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
25	19 or ^Y	(EM)	ON	OFF	OFF	ON	ON	OFF	OFF	OFF
24	18 or ^X	(CAN)	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
23	17 or ^W	(ETB)	ON	ON	ON	OFF	ON	OFF	OFF	OFF
22	16 or ^V	(SYN)	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
21	15 or ^U	(NAK)	ON	OFF	ON	OFF	ON	OFF	OFF	OFF
20	14 or ^T	(DC4)	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
19	13 or ^S	(DC3)	ON	ON	OFF	OFF	ON	OFF	OFF	OFF
18	12 or ^R	(DC2)	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
17	11 or ^Q	(DC1)	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
16	10 or ^P	(DLE)	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
15	0F or ^O	(SI)	ON	ON	ON	ON	OFF	OFF	OFF	OFF
14	0E or ^N	(SO)	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
13	OD or ^M	(CR)	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
12	0C or ^L	(FF)	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
11	0B or ^K	(VT)	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
10	0A or ^J	(LF)	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF

Switch F Settings (continued).

BREAK LINK CHARACTER			SWITCH POSITION							
DECIMAL	HEX	ASCII	1	2	3	4	5	6	7	8
9	09 or ^I	(HT)	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
8	08 or ^H	(BS)	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
7	07 or ^G	(BEL)	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
6	06 or ^F	(ACK)	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
5	05 or ^E	(ENQ)	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
4	04 or ^D	(EOT)	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
3	03 or ^C	(ETX)	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
2	02 or ^B	(STX)	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
1	01 or ^A	(SOH)	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
0	00 or break	(NUL)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF



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