

USER MANUAL

MODEL 1184 & MODEL 1185 *Kilolight™* Single Fiber Modems



PATTON
Electronics Co.



An ISO-9001
Certified
Company

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1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 1184 and 1185 components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

1.1 RADIO AND TV INTERFERENCE

The Model 1184 and 1185 generate and use radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. The Model 1184 and 1185 have been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the Model 1184 or 1185 do cause interference to radio or television reception, which can be determined by disconnecting the unit, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

1.2 CE NOTICE

The CE symbol on your Patton Electronics equipment indicates that it is in compliance with the Electromagnetic Compatibility (EMC) directive and the Low Voltage Directive (LVD) of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

2.0 GENERAL INFORMATION

1.3 SERVICE

All warranty and non-warranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Service at (301) 975-1007, at our web site at <http://www.patton.com>, or at support@patton.com.

NOTE: Packages received without an RMA number will not be accepted.

Patton Electronics' technical staff is also available to answer any questions that might arise concerning the installation or use of your Model 1184 or 1185. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

Thank you for your purchase of this Patton Electronics product. This product has been thoroughly inspected and tested and is warranted for One Year parts and labor. If any questions or problems arise during installation or use of this product, please do not hesitate to contact Patton Electronics Technical Support at (301) 975-1007;

2.1 FEATURES

- **Model 1184:** Synchronous data rates: 4.8 - 128 kbps
Asynchronous data rates: 0-19.2 kbps
- **Model 1185:** Synchronous data rates: 2.4 - 256 kbps
Asynchronous data rates: 0 - 38.4 kbps
- Full duplex operation over a single multi-mode fiber optic cable
- Point-to-point distances up to 3 miles
- Internal, external or receive recovered clocking options
- Field Replaceable DTE-DCE QuickConnect™ interface modules: V.24/RS-232, V.35, RS-422/530, X.21 and G.703
- V.54 compliant local and Remote Digital Loopback tests
- 8 Front Panel LED Status Indicators
- Available with ST or SMA Fiber Connectors
- Made in the U.S.A.

2.2 DESCRIPTION

The Patton Model 1184 and 1185 are designed for high speed RS-232 communication over a single multi-mode fiber. Operating up to 128 kbps synchronous and 19.2 kbps asynchronous data rates, Model 1184 is perfect for campus applications where data integrity is a must. And Model 1185 is even faster at a bursty 256 kbps synchronous or 38.4 kbps async.! Synchronous clocking options include internal, external, or receive recovered clock.

Both Models 1184 and 1185 feature replaceable Patton's DCE-DTE QuickConnect™ interface modules. Available interfaces include V.24/RS-232, V.35, RS-422/530, X.21, Ethernet Bridge and G.703. Fiber connections are made using a ST or SMA type interface.

The Model 1184 and 1185 also incorporate V.54 compliant local and remote loopback test modes that are activated by a convenient front panel switch. LED status indicators monitor interface data and control signals as well as test mode status. Available with options for AC or DC power supply, the Models 1184 and 1185 conveniently fit in a wide range of applications and power supply environments.

3.0 CONFIGURATION

Both Models 1184 and 1185 use a mini DIP switch package that allows configuration to a wide range of applications. These switches are located on the bottom side of the PC board. Figure 1 shows the switch locations with respect to the other components on the PC board. Because all eight switches are externally accessible, there is no need to open the case to configure the unit.

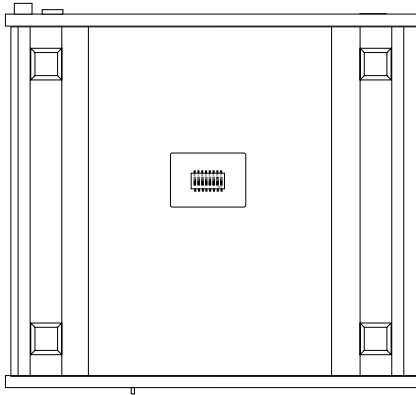


Figure 1. Underside of Model 1184/1185, Showing Location of DIP Switches

3.1 CONFIGURATION SET “S1”

The switches shown in Figure 2 below and on DIP switch S1 are used to set the async or sync data rates, LAL and DL diagnostic functions and the clock mode setting. The default settings for DIP switch S1 are shown in the table on page 6. Following the table are detailed descriptions for each switch.

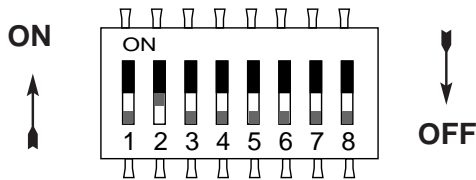


Figure 2. Close Up of Configuration Switches

1184 AND 1185 S1 SUMMARY TABLE		
Position	Function	Factory Default
S1-1*	Data Rate	Off
S1-2*	Data Rate	Off
S1-3*	Data Rate	Off
S1-4*	Data Rate	On
		} 64 kbps
S1-5	Clock Source	On
S1-6	Clock Source	On
		} Internal
S1-7	DTE Control of DL	Off Disabled
S1-8	DTE Control of LAL	Off Disabled

*NOTE: Both Models 1184 and 1185 use Switches S1-S4 to set the async or sync data rate. Refer to the sections below to set the Model 1184 or 1185 rates.

Switch S1-1 through S1-4 (Model 1184): Async/Sync Data Rate

On Model 1184 Switches S1-1, S1-2, S1-3 and S1-4 set two parameters: synchronous or asynchronous data rate and the maximum transmission distance between two Model 1184s.

S1-1	S1-2	S1-3	S1-4	Data Rate (kbps)	Max. Distance in miles (km)	
On	Off	Off	On	0-19.2	3.0 (4.8)	Async Setting
Off	On	On	Off	4.8	3.0 (4.8)	Sync Settings
Off	On	On	On	9.6	3.0 (4.8)	
On	Off	On	Off	14.4	1.5 (2.4)	
On	Off	On	On	19.2	3.0 (4.8)	
Off	Off	On	Off	28.8	1.5 (2.4)	
Off	Off	Off	Off	32.0	3.0 (4.8)	
Off	On	Off	Off	56.0	1.5 (2.4)	
Off	Off	Off	On	64.0	3.0 (4.8)	
On	On	On	On	128.0	3.0 (4.8)	

Switch S1-1 through S1-4 (Model 1185): Async/Sync Data Rate

On Model 1185 Switches S1-1, S1-2, S1-3 and S1-4 set two parameters: synchronous or asynchronous data rate and the maximum transmission distance between two Model 1185s.

<u>S1-1</u>	<u>S1-2</u>	<u>S1-3</u>	<u>S1-4</u>	<u>Data Rate (kbps)</u>	<u>Max Distance in miles (km)</u>	
On	Off	Off	On	0-19.2	3.0 (4.8)	} Async Settings
On	Off	Off	Off	0-38.4	1.5 (2.4)	
On	On	On	Off	2.4	1.5 (2.4)	} Sync Settings
Off	On	On	On	9.6	3.0 (4.8)	
On	Off	On	Off	14.4	1.5 (2.4)	
On	Off	On	On	19.2	3.0 (4.8)	
Off	Off	On	Off	28.8	1.5 (2.4)	
Off	Off	On	On	38.4	3.0 (4.8)	
On	On	Off	On	48.0	3.0 (4.8)	
Off	On	Off	Off	56.0	1.5 (2.4)	
Off	Off	Off	On	64.0	3.0 (4.8)	
Off	On	On	Off	72.0	1.5 (2.4)	
Off	Off	Off	Off	128.0	1.5 (4.8)	
On	On	Off	Off	144.0	1.5 (2.4)	
Off	On	Off	On	192.0	1.5 (2.4)	
On	On	On	On	256.0	1.5 (2.4)	

Switches S1-5 and S1-6: Clock Source

Switches S1-5 and S1-6 are set in combination to determine Model 1184 and 1185 transmit clock source.

<u>S1-5</u>	<u>S1-6</u>	<u>Setting</u>	<u>Description</u>
On	Off	Internal	Transmit clock generated internally
On	On	Internal	Transmit clock generated internally
Off	On	External	Transmit clock derived from terminal interface
Off	Off	Received Recover	Transmit clock derived from the received line signal

NOTE: Because communication between two Model 1185s is always synchronous, **you must set these switches whether your application is async or sync.** For X.21 or Async applications, please configure one unit for internal clock mode and the other for receive recover clock mode.

Switch S1-7: DTE Control of DL

The setting for Switch S1-7 determines whether DTE control of remote digital loopback test is enabled or disabled. If DTE control is disabled, the DL test can only be initiated by the front panel switch. If DTE control is not available, set switch S1-7 to the Off position.

<u>S1-7</u>	<u>Setting</u>	<u>Description</u>
On	Enabled	Respond to DL requests from DTE
Off	Disabled	Ignore DL requests from the DTE

Switch S1-8: DTE Control of LAL

The setting for switch S1-8 determines whether DTE control of local analog loopback test is enabled or disabled. If DTE control is disabled, the LAL test can only be initiated by the front panel switch. If DTE control is not available, set switch S1-8 to the Off position.

<u>S1-7</u>	<u>Setting</u>	<u>Description</u>
On	Enabled	Respond to LAL requests from DTE
Off	Disabled	Ignore LAL requests from the DTE

4.0 INSTALLATION

Once the Model 1184 or 1185 is properly configured, it is ready to connect to the fiber interface, to the serial port, and to the power source. This section tells you how to make these connections.

4.1 CONNECTION TO THE FIBER INTERFACE

The Model 1184 supports communication between two terminal equipment at distances to 3 miles (4.8km) and data rates to 128 kbps (sync) or 19.4 kbps (async). Model 1185 also supports distances up to 3 miles (4.8km), but at rates up to 256 kbps (sync) or 38.4 (async). Figure 3 shows the position of the interface connectors on the Model 1184 or 1185 back panel.

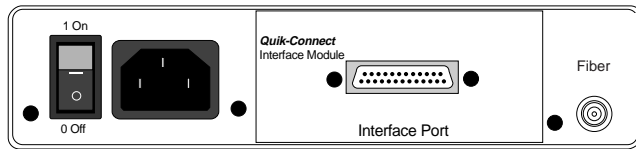


Figure 3. Rear Panel of Model 1184/1185, Showing Interface and Power Connectors

These short range modems are designed to work in pairs. You will need one at each end of single 50 or 62.5 micron multi-mode fiber cable. The fiber cable connects to each Model 1184 or 1185 using either an ST or an SMA connector. Figure 4 below shows a close-up of both connector types.

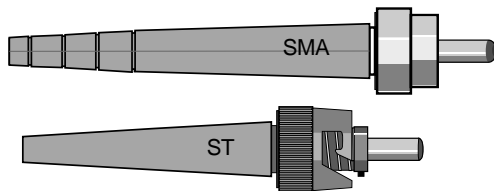


Figure 4. Close-up of ST and SMA Connectors

4.2 CONNECTION TO THE SERIAL PORT

The serial port interface on the Model 1184 and 1185 uses interchangeable QuickConnect™ Modules. Each QuickConnect™ Module has a 50-pin card edge connector on one side and a serial port interface on the other. Figure 2 below shows how a QuickConnect™ Module plugs into the back of the Model 1184/1185.

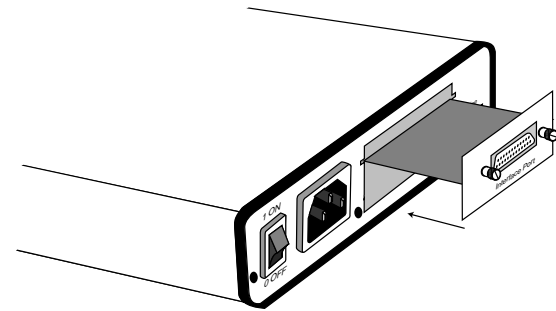


Figure 5. Installation of Model 1184/1185 Plug-in Serial Interface Module

4.2.1 Changing QuickConnect™ Modules

When you purchase a particular version of the Model 1184 or 1185, it should be shipped to you with the appropriate QuickConnect™ Module already installed. If you need to install a different QuickConnect™ Module, follow these steps:

Removing the Existing QuickConnect™ Module

- 1) Turn the power switch off. Leave the power cord plugged into a grounded outlet to keep the unit grounded.
- 2) Loosen the two thumbscrews on the module by turning them counterclockwise.
- 3) Grasp the two thumbscrews and gently pull the module from the unit. Apply equal force to the thumbscrews to keep the module straight during the removal process.

Installing the New QuickConnect™ Module

- 1) Make sure the power switch is off. Leave the power cord plugged into a grounded outlet to keep the unit grounded.
- 2) Hold the module with the faceplate toward you and align the module with the guide slots in the rear panel of the Model 1184/1185.
- 3) While keeping the module's faceplate parallel with the Model 1184/1185 rear panel, slide the module straight in—so that the card edge contacts line up with the socket inside the chassis.

NOTE: The card edge connector should meet the socket when it is almost all the way into the chassis. If you encounter a lot of resistance, remove the module and repeat steps 2 & 3.

- 4) With the card edge contacts aligned with the socket, firmly seat the module by using your thumbs to apply pressure directly to the right and left edges of the module faceplate. Applying moderate and *even* pressure should be sufficient to seat the module. You should hear it “click” into place.
- 5) To secure the module in place, push the thumbscrews into the chassis and turn the screws clockwise to tighten.

4.2.2 Connection to a “DTE” Device

The serial port on most QuickConnect™ interface modules (all except the X.21 module) are hard-wired as DCE. Therefore these modules “want” to plug into a DTE such as a terminal, PC or host. When making the connection to your DTE device, use a **straight through** cable of the shortest possible length—we recommend 6 feet or less. When purchasing or constructing an interface cable, please refer to the pin diagrams in **Appendix D** as a guide.

4.2.3 Connection to a “DCE” Device

The serial port on most QuickConnect™ interface modules is hard-wired as a DCE (all except the X.21 module). Therefore you must use a *null modem* cable when connecting to a modem, multiplexer or other DCE device. This cable should be of the shortest possible length—we recommend 6 feet or less. When purchasing or constructing a null modem interface cable, use the pin diagrams in **Appendix D** as a guide.

NOTE: Pin-out requirements for null modem applications vary widely between manufacturers. If you have any questions about a specific application, contact Patton Technical Support at **(301) 975-1007**; support@patton.com; or at <http://www.patton.com>.

4.2.4 Re-configuring the X.21 QuickConnect™ Module

The serial port on the X.21 QuickConnect™ Module is default wired as a DCE, but may be switched to a DTE. This is done by reversing the orientation of the DCE/DTE strap, as described below:

To reverse DCE/DTE orientation, remove the module according to the instructions in **Section 4.2.1**. The DCE/DTE strap is located on the bottom side of the module's PC board. The arrows on the top of the strap indicate the configuration of the X.21 port (for example, if the DCE arrows are pointing toward the DB-15 connector, the X.21 port is wired as a DCE). Reverse the DCE/DTE orientation by pulling the strap out of its socket, rotating it 180°, then plugging the strap back into the socket. You will see that the DCE/DTE arrows now point in the opposite directions, showing the new configuration of the X.21 port. Reinstall the module according to the instructions in **Section 4.2.1**.

4.3 POWER CONNECTION

The Model 1184/1185 is available with three power supply options:

Standard AC Power Supply option (**Model 1184/1185**, or **1184/1185-230**) is switchable between 100 and 253 VAC and is available with a variety of domestic and international power cords. (See **Appendix C**).

Universal Interface AC Power Supply option (**Model 1184/1185-UI**) operates in environments ranging from 85 to 256 VAC, with no re-configuration necessary (see **Appendix C** for available domestic and international power cords).

DC Power Supply option (**Model 1184/1185-DC**) operates in 48 VDC environments and is equipped with a 3-pin “terminal strip” style connector.

4.3.1 Connecting to an AC Power Source

The two AC power supply options—Standard and Universal—are equipped with a male IEC-320 power connection. A domestic (US) power supply cord is supplied with the unit at no extra charge. To connect the standard or universal power supply, follow these steps:

- 1) Attach the power cord (supplied) to the shrouded male IEC-320 connector on the rear of the Model 1184 or 1185.
- 2) Plug the power cord into a nearby AC power outlet.
- 3) Turn the rear power switch ON.

4.3.2 Connecting to a DC Power Source

The 48 VDC power supply option uses a 3-pin terminal block with spring-type connectors. Please refer to the Model 1090 Series Service Manual.

WARNING! There are no user-serviceable parts in the power supply section of the Model 1184/1185. Voltage setting changes and fuse replacement should only be performed by qualified service personnel. Any questions may be answered by contacting Patton Electronics Technical support at (301) 975-1007; support@patton.com; or http://www.patton.com.

5.0 OPERATION

Once the 1184 or 1185 is properly configured and installed, it should operate transparently. This section describes power-up, reading the LED status monitors, and using the built-in loopback tests.

5.1 POWER-UP

To apply power to the Model 1184/1185, first be sure that you have read **Section 4.3**, and that the unit is connected to the appropriate power source. Then power-up the unit using the rear power switch.

5.2 LED STATUS MONITORS

The Model 1184 and 1185 feature eight front panel LEDs that monitor power, the DTE signals, network connection and test modes. Figure 6 (below) shows the front panel location of each LED. Following Figure 6 is a description of each LED's function.

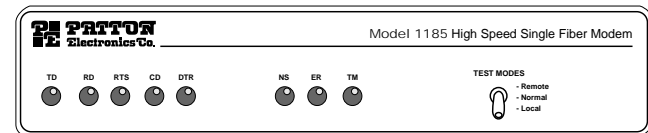


Figure 6. Model 1185 Front Panel

- | | |
|--------------------|--|
| TD & RD | Glows red to indicate an idle condition of Binary "1" data on the respective terminal interface signals. Green indicates Binary "0" data. |
| RTS | Glows green to indicate that the Request to Send signal from the DTE is active. |
| CD | Glows red if no carrier signal is being received from the remote modem. Green indicates that the remote modem's carrier is being received. |
| DTR | Glows green to indicate that the Data Terminal Ready signal from the terminal is active. |
| ER | Glows red to indicate the likelihood of a Bit Error in the received signal. |
| TM | Glows red to indicate that the Model 1185 has been placed in Test Mode. The unit can be placed in test mode by the local or remote user. For RDL, the TM LED will only glow red on the local unit. |
| NS | Glows red to indicate that the local Model 1184/1185 has not yet connected with the remote 1184/1185. |

5.3 DIAGNOSTICS

Model 1184 and 1185 are equipped with V.54 diagnostics that may be used to evaluate the condition of the local and remote units, as well as the twisted pair link between them: local loopback (LAL) and remote digital loopback (DL).

5.3.1 Local Analog Loopback

The Local Analog Loopback (LAL) test checks the operation of the local Model 1184 or 1185 and is performed separately on each unit. Any data sent to the local Model 1184/1185 in this test mode will be echoed (returned) back to the user device. (See Figure 7, below). For example, characters typed on the keyboard of a terminal will appear on the terminal screen.

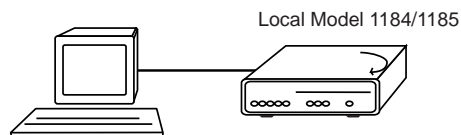


Figure 7. Local Analog Loopback

To perform a Local Analog Loopback test, follow these steps.

1. Activate LAL either by moving the front panel toggle switch DOWN to "Local", or; by raising the appropriate signal on the DTE interface. Once Local Analog Loopback is activated, the Model 1184/1185's transmit output is connected to its own receiver. The test LED should glow.

NOTE: Although the local Model 1184/1185 cannot communicate with the remote Model 1185/1185 in this mode, the synchronized connection between the two modems remains intact.

2. Verify that the data terminal equipment is operating properly and can be used for a test. If a fault is indicated, call a technician or replace the unit.
3. Perform a BER (bit error rate) test on each unit using a separate BER tester. If the BER test equipment indicates no faults but the data terminal indicates a fault, follow the manufacturer's checkout procedures for the data terminal. Also, check the interface cable between the terminal and the Model 1184/1185.

5.3.2 Remote Digital Loopback

The Remote Digital Loopback test checks the performance of both the local and remote Model 1184/1185, *and* the communication link between them. Any characters sent to the remote unit in this test mode will be returned back to the originating device (see Figure 7).

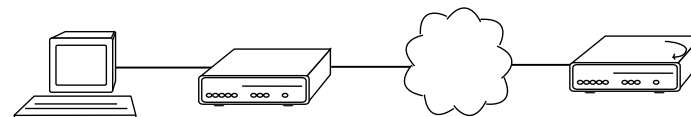


Figure 7. Remote Digital Loop

To perform an DL test, follow these steps:

1. Activate DL. This may be done in one of two ways: First, by moving the front panel toggle switch DOWN to "Remote". Or, second, by raising the DL signal on the terminal interface (for pin numbers, see Appendix D).
2. Perform a BER (bit error rate) test on the system, using BER testers on both ends.
3. If the BER test equipment indicates a fault and the Local Analog Loopback test was successful for both Model 1184 or 1185s, you may have a problem with the line between the units. You should inspect the line for proper connections.

APPENDIX A

SPECIFICATIONS

Transmission:	Asynchronous and Synchronous
Clocking:	Internal, external or derived from receive signal
Distance:	3 miles maximum (4.8km)
1184 Data Rates:	Asynchronous: 0 to 19.2 kbps Synchronous: 4.8, 9.6, 14.4, 19.2, 28.8, 32.0, 56.0, 64.0, 128.0 kbps
1185 Data Rates:	Asynchronous: 2.4 to 38.4 kbps Synchronous: 2.4, 9.6, 14.4, 28.8, 38.4, 56.0, 64.0, 72.0, 128.0, 144.0, 192.0, 256.0 kbps
Handshaking:	Software (XON/XOFF) or hardware (RTS/CTS). Both modes available at all times.
Connectors:	Either ST or SMA
Link Budget:	12 dB (62.5 micron), 8 dB (50.0 micron)
Diagnostics:	V.54 Compliant - Local Analog Loopback and Remote Digital Loopback bit error rate pattern
Fiber Modes:	Single 50 or 62.5 micron core, multi-mode fiber optic cable
LED Indicators Interface	TD, RD, RTS, DTR, ER, NS and TM
Modules:	EIA RS-232/CCITT V.24, RS-232/530, CCITT V.35, X.21, Ethernet Bridge and G.703
Power:	115/230 VAC (switch selectable), 50/60 Hz, 5 Watts; 85V - 256 VAC, 50/60 Hz (universal input option); 48 VDC (option). 5 Watts.
Regulatory Compliance:	FCC part 15 Class A UL 1950, EN60950 89/336/EEC, 73/23/EEC IEC 825 Class 1 equipment
Temperature Range:	0-50°C (32-122°F)
Altitude:	0-15,000 feet
Humidity:	5 to 95% non-condensing
Dimensions:	7.3" x 6.6" x 1.62" (mm x mm x mm)
Weight:	2.02 lbs. 1.0 Kg

APPENDIX B

FACTORY REPLACEMENT PARTS AND ACCESSORIES

<u>Patton Model #</u>	<u>Description</u>
IM1/A.....	V.24 with DB25F
IM1/B.....	RS422/RS530 with DB25F
IM1/C.....	V.35 with M34F
IM1/D.....	X.21 with DB15F
IM1/E.....	V.35 with DB25F
IM1/F.....	G.703 with RJ45
IM1/G.....	High Speed Async w/DB-25F
IM1/I.....	Ethernet Bridge
0805US.....	American Power Cord
0805EUR.....	European Power Cord CEE 7
0805UK.....	United Kingdom Power Cord
0805AUS.....	Australia/New Zealand Power Cord
0805DEN.....	Denmark Power Cord
0805FR.....	France/Belgium Power Cord
0805IN.....	India Power Cord
0805IS.....	Israel Power Cord
0805JAP.....	Japan Power Cord
0805SW.....	Switzerland Power Cord
07M1090SVC.....	Service Manual

APPENDIX C

V.35 Interface Pin Description M/34 Female Connector

<u>Pin #</u>	<u>Signal</u>
B	SGND (Signal Ground)
C	RTS (Request to Send)
D	CTS (Clear to Send)
E	DSR (Data Set Ready)
F	CD (Carrier Detect)
H	DTR (Data Transfer Ready)
L	LLB (Local Line Loop)
M	TM (Test Mode)
N	DL (Remote Digital Loop)
P	TD(Transmit Data)
R	RD (Receive Data)
S	TD/ (Transmit Data-B)
T	RD/ (Receive Data-B)
U	XTC (External Transmit Clock)
V	RC(Receive Timing)
W	XTC/ (External Transmit Clock)
X	RC/ (Receive Timing)
Y	TC(Test Control-A)
AA	TC/ (Test Control-B)

APPENDIX C

(cont)

RS-232, RS-530 and V.35 Interface Pin Description (DB-25 Female Connector)

<u>Pin #</u>	<u>Signal</u>
1	FG (Frame Ground)
2	TD (Transmit Data)
3	RD (Receive Data)
4	RTS (Request to Send)
5	CTS (Clear to Send)
6	DSR (Data Set Ready)
7	SGND (Signal Ground)
8	CD (Carrier Detect)
9	RC/ (Receive Timing-B)
10	CD/ (Carrier Detect-B)
11	XTC/ (External Transmit Clock)
12	TC/ (Test Control-B)
13	CTS/ (Clear to Send)
14	TD/ (Transmit Data-B)
15	TC (Test Control-A)
16	RD (Receive Data)
17	RC (Receive Timing)
18	LLB (Local Line Loop)
19	RTS/ (Request to Send)
20	DTR (Data Transfer Rate)
21	DL (Remote Digital Loop)
22	DSR/ (Data Set Ready)
23	DTR/ (Data Transfer Rate)
24	XTC (External Transmit Clock)
25	TM (Test Mode)

APPENDIX C

(cont)

**X.21 Interface Pin Description
(DB-15 Female Connector)**

<u>Pin #</u>	<u>Signal</u>
1	Frame Ground
2	T (Transmit Data-A)
3	C (Control-A)
4	R (Receive Data-A)
5	I (Indication-A)
6	S (Signal Element Timing-A)
7	BT (Byte Timing-A)
8	SGND (Signal Ground)
9	T/ (Transmit Data-B)
10	C/ (Control-B)
11	R/ (Receive Data-B)
12	I/ (Indication-B)
13	S/ (Signal Element Timing-B)
14	BT/ (Byte Timing-B)

APPENDIX C

(cont)

**G.703 Interface Pin Assignment
(RJ45 8-Pin Modular)**

<u>Pin #</u>	<u>Signal</u>
1	RD+ (Receive Data Tip)
2	RD- (Receive Data Ring)
3	Not Used
4	TD- (Transmit Data Ring)
5	TD+ (Transmit Data Tip)
6	Not Used
7	Not Used
8	Not Used