Series 8000 Super Module
Installation Guide

Unit 15, Riverside Business Centre, Victoria Street, High Wycombe, Bucks HP11 2LT
Web: www.casecomms.com Email: sales@casecomms.com
Tel (UK): 08700 263 740 Tel (International): +44 (0) 1494 833 740
Fax (UK): 08700 263 741 Fax (International): +44 (0) 1494 833 741

STATUTORY NOTICES

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them.

NS/1282/1/L/601830
NS/1282/1/L/601696

WARNINGS

The 8425 and 8525 have panels in front of the plug-in modules. These panels may only be removed by suitably qualified personnel for installation or maintenance purposes, and must be replaced afterwards. Removal under any other circumstance would invalidate the RFI (Radio Frequency Interference) and Safety Type Approvals.

Please refer to Appendix D of this manual for installation of KiloStream ports in the 8425 and 8525.

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computng device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

CE

Case Communications Ltd declare that this product conforms with the protection requirements of Council Directive 89/336/EEC on the approximation of the laws of the member states relating to electromagnetic protection.

All PCB assemblies contain Electrostatic Sensitive Devices (ESDs) which may be permanently damaged if incorrectly handled. This equipment must be handled in accordance with BS5783 code of practice for the handling of electrostatic sensitive devices

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Preface

This manual provides information for network managers to install the Series 8000 Super Module and its associated Port Access Module (PAM) in an 8425 or 8525 Packet Switch Exchange.

These modules will normally be installed by Case engineers. This guide is provided to users for background information, and to assist the Case-trained engineers to install additional modules.

It is assumed that the person installing the Super Module is familiar with the installation and configuration of the 8425 and 8525 PSEs.

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1 Introduction

1.1 The Modules

Figure 1-1 illustrates the modules discussed in this installation guide. These are the Series 8000 Super Module itself, and its active PAM (Port Access Module). The PAM comprises a CAM (Carrier Module) and up to three PIMs (Port Interface Modules).

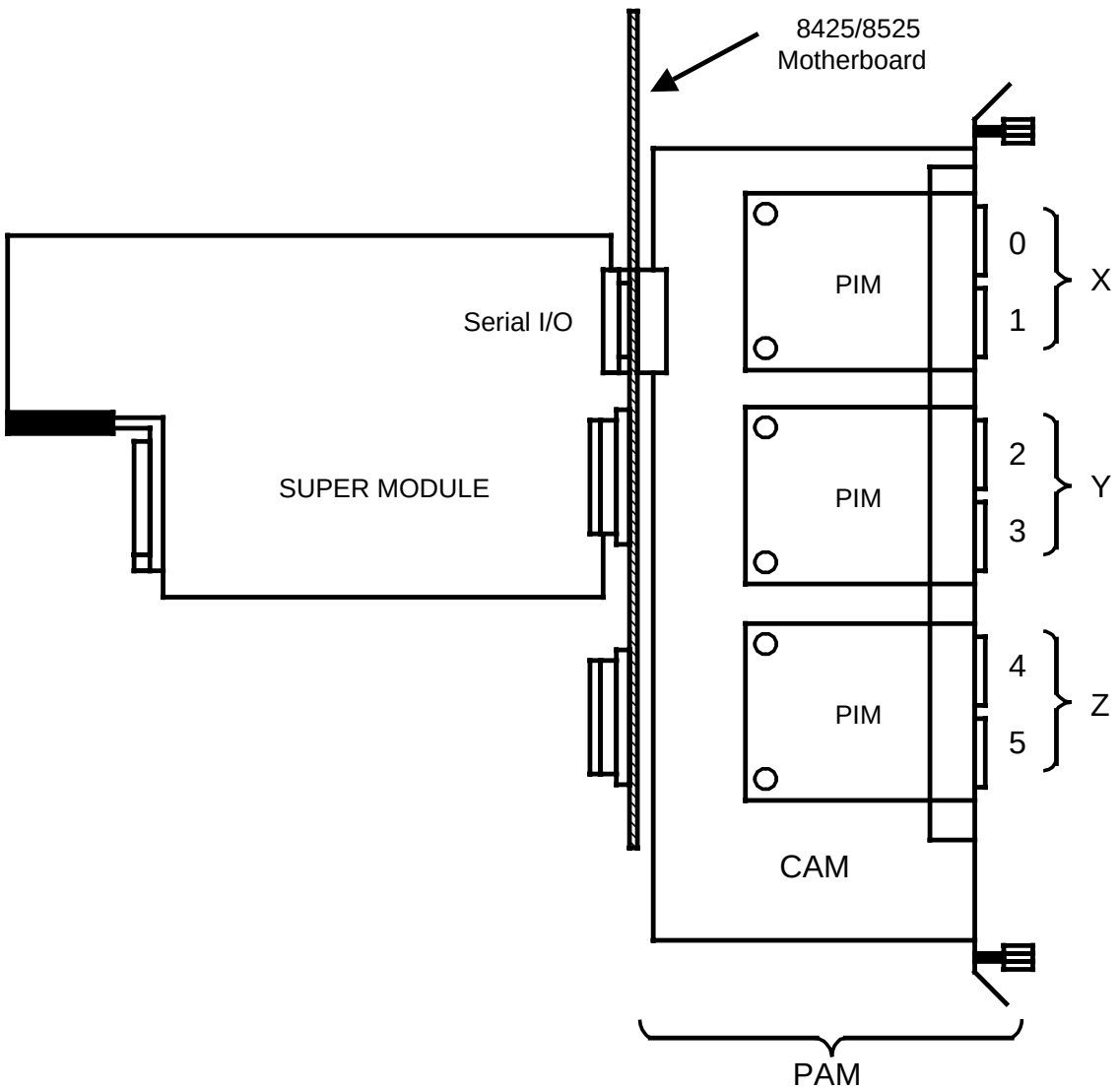

Figure 1-1 Super Module, CAM and PIM Layout

1.1.1 The Super Module

The Series 8000 Super Module consists of a multi-purpose processor card, that plugs into the Cray 8425 and 8525 Packet Switch Exchanges.

The Super Module is fitted with 8295 multiprotocol software. It can service up to six ports, which may run synchronous or asynchronous protocols depending on software.

1.1.2 The PAM (CAM and PIMs)

The CAM can carry up to three PIMs.

Each PIM provides the interface circuitry and physical connectors for two ports.

The types of PIM that can be used are listed in Table 1-1.

PIM TYPE	INTERFACE	CONNECTOR TYPE
PIM 1	V.24 DTE	2 x 25-way D-type male
PIM 2	X.21/V.36 DTE	2 x 15-way D-type male
PIM 3	V.35 DTE	2 x 15-way D-type male
PIM 4	X.21/V.36 DCE	2 x 15-way D-type female
PIM 5	V.24 DCE	2 x 25-way D-type female
PIM 6	X.21 DTE/DCE	1 x 15-way D-type male
		1 x 15-way D-type female
PIM 7	X.21 DTE/V.24 DTE	1 x 15-way D-type male
		1 x 25-way D-type female

Table 1-1 PIM Types

Note that in each case the designation DTE/DCE refers to the interface presented by each PIM to the attached equipment.

1.2 Compatibility

Cardframes Allowed: 8400, 8425, 8525

The Super Module cannot be used in an 8500 cardframe owing to mechanical incompatibility with the CAM.

PAMs Allowed: CAM X890-606011+1, 2 or 3 PIMs (any mix)

Do not connect Super Module to any type of PAM other than a CAM: permanent damage to the Super Module may occur.

Do not connect a CAM to any type of ACM other than an SP XIM or Super Module: permanent damage to the ACM and/or PIMs may occur.

The storage and operational environments of the Super Module and CAM are as stated in the 8425 and 8525 Installation Guides.

2 Physical Description

2.1 The Super Module

The Super Module (part number X890-606911) is ACM-shaped and consists of a 68000 processor, RAM, battery-backed RAM (BRAM) and EPROM. There are five LED indicators and a manager port on the front of the card, and two 96-way connectors on the rear, as shown in Figure 2-1.

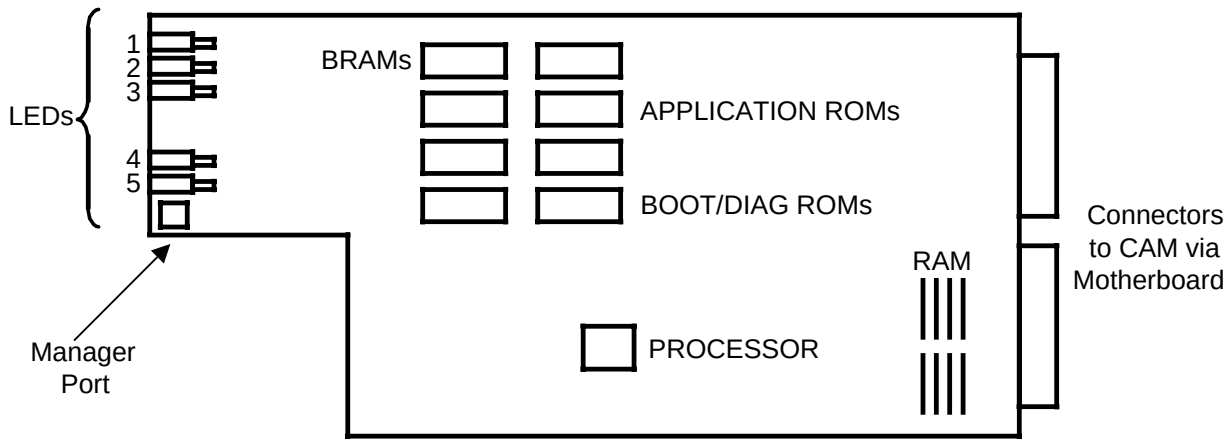

Figure 2-1 The Super Module

Indicators

The Super Module has five LED indicators at the front. When the module is powered up a number of these are illuminated.

LED 1 (RED)	ON:	Power-up tests in progress.
	FLASHING:	Hardware failure.
	OFF:	Normal.
LED 2 (YELLOW)	OFF:	Normal
LED 3 (GREEN)	ON:	Link A (port 0) 'up'.
	FLASHING:	Link A (port 0) 'down'.
	OFF:	Power failure.

LED 4 (GREEN) is the processor activity indicator. If when the module is powered up this LED is extinguished, it implies that the processor has stopped since a serious software error has occurred.

LED 5 (GREEN) is the DMA Activity indicator. If when the module is powered up this LED remains permanently lit, it implies that a serious software/hardware error has occurred. In normal use, it will remain off, or glow dimly and intermittently.

2.2 The PAM (CAM and PIMs)

An active PAM consists of a CAM (Carrier Module part number X890-606011) on which can be mounted up to three PIMs (Port Interface Modules) of various types.

The PIM positions are referenced X to Z, top to bottom, as viewed from the rear of the card. PIM X supports ports 0 and 1, PIM Y ports 2 and 3, and PIM Z ports 4 and 5. (These port numbers are as defined by the current X.25 operational software.) See Figure 1-1.

3 Installation

3.1 Preliminary

After unpacking, inspect for damage and check that the following are present:

A Super Module part number X890-606911 with software (this can be identified by a label below **LED 5**).

A CAM part number X890-606011.

A cable for connecting the manager port to an asynchronous terminal.

One or more PIMs.

The appropriate reference manual for the module's software.

3.2 Fitting the Super Module

Install the Super Module into the 8425 or 8525 in accordance with the instructions for installing an ACM card in the relevant installation guide.

Note that the Super Module does not require a UPM card in the lower half of the 8425/8525 unit.

The Super Module may be added or removed whilst the PSE is powered on. Insert only one card at a time (allow a few seconds).

3.2.1 Power-Up Sequence

When the Super Module is plugged into a powered-up 8425 or 8525 unit, or when the parent 8425 or 8525 is powered up, the indicators go through the following sequence:

1. The green watchdog indicator (**LED 4**) should illuminate solidly. The top three indicators (**LEDs 1** to **3**) should illuminate solidly for a moment, and then start cycling on and off for a few seconds while power-up diagnostics are being performed. (Power-up diagnostics are described in Section 3.5.)

2. Eventually, the following should result.

   The red and yellow indicators (**LEDs 1** and **2**) should extinguish and the green (**LED 3**) should remain on or flashing. If the red indicator remains on or flashing then the Super Module is faulty.

3.3 Fitting PIMs to the CAM

A CAM carries up to three PIMs which offer a choice of physical interface in groups of two ports.

There are different ways in which PIMs are attached to the CAM bracket, depending on the PIM type.

Caution: Ensure that the CAM and PIMs are suitably protected from static discharge during these procedures.

3.3.1 Port Allocation

PIMs are numbered X to Z starting from the top position on the CAM.

Physical port numbers correspond to PIMs thus:

Port No.	PIM Position
0, 1	X
2, 3	Y
4, 5	Z

3.3.2 PIM1 (V.24)

PIM1 has two 25-way D-type connectors which mount directly on the CAM bracket. The PIM itself has no metalwork attached. To fit:

1. Remove the four jacking posts from the two 25-way D-type connectors on PIM1 (these are fitted finger-tight for shipment).
2. Remove the fixings of any PIM(s) already fitted to the CAM.
3. Detach the CAM bracket by removing the four fixing screws.
4. Remove the blanking cover and plug the PIM1 into the desired location on the CAM PCB, taking care to align the connectors properly.
5. Refit the CAM bracket.
6. Refit all PIM-to-CAM bracket fixings. Tighten fully, as RFI shielding effectiveness depends on ground continuity from PIM to CAM bracket to equipment chassis.

3.3.3 PIM2 (X.21/V.36 DTE)

PIM2 has two 15-way D-type connectors which mount indirectly on the CAM bracket via a small bracket attached to the PIM. To fit:

1. Remove the four fixing screws from the PIM bracket (these are fitted finger-tight for shipment). Do not remove the jacking posts retaining the PIM bracket.
2. Remove the fixings of any PIM(s) already fitted to the CAM.
3. Detach the CAM bracket by removing the four fixing screws.
4. Remove the blanking cover and plug the PIM2 into the desired location on the CAM PCB, taking care to align the connectors properly.
5. Refit the CAM bracket.
6. Refit all PIM-to-CAM bracket fixings. Tighten fully, as RFI shielding effectiveness depends on ground continuity from PIM to CAM bracket to equipment chassis.

3.3.4 PIM3 (V.35)

PIM3 has two 15-way D-type connectors which mount indirectly on the CAM bracket via a small bracket attached to the PIM. To fit, follow the procedure detailed for PIM2 above.

3.3.5 PIM4 (X.21/V.36 DCE)

PIM4 has two 15-way D-type connectors which mount indirectly on the CAM bracket via a small bracket attached to the PIM. To fit, follow the procedure detailed for PIM2 above.

3.3.6 PIM5 (V.24 DCE)

PIM5 has two 25-way D-type connectors which mount directly on the CAM bracket. The PIM itself has no metalwork attached. To fit, follow the procedure for PIM1 (Section 3.3.2) above.

3.3.7 PIM6 (X.21 DTE/DCE)

PIM6 has two 15-way D-type connectors which mount indirectly on the CAM bracket via a small bracket attached to the PIM. To fit, follow the procedure for PIM2 (Section 3.3.3) above.

3.3.8 PIM7 (X.21 DTE/V.24 DTE)

PIM7 has both 15-way and 25-way D-type connectors which mount both directly and indirectly via a small bracket attached to the PIM. To fit:

1. Remove the two fixing screws from the PIM bracket (these are fitted finger-tight for shipment). Do not remove the jacking posts retaining the PIM bracket.
2. Remove the fixings of any PIM(s) already fitted to the CAM.
3. Detach the CAM bracket by removing the four fixing screws.
4. Remove the blanking cover and plug the PIM7 into the desired location on the CAM PCB, taking care to align the connectors properly.
5. Refit the CAM bracket.
6. Refit the PIM-to-CAM bracket fixings. Tighten fully, as the RFI shielding effectiveness depends on ground continuity from PIM to CAM bracket to equipment chassis.

3.4 Connecting the Super Module Ports

3.4.1 General

The Super Module (PIM) ports can be connected using the standard Cray cables listed in Appendices C and D. If non-standard cables are required for a particular installation, refer to Appendix B for details of each interface type.

3.4.2 Connecting Super Module to XIM

It is necessary to have at least one interconnection between the Super Module and an X.25 XIM, HP/XIM or SP/XIM port somewhere in the 8425/8525. If there is one such connection it should be to the Super Module's composite port (port 0). The type of cable to be used depends on the type of PIM; however, use of V.24 for this purpose is not recommended as it limits the data rate to 19.2 kbps.

3.4.3 Public Digital Services

For connection to UK public digital services' network termination units (NTUs), refer to Appendix D, which gives the required statutory and technical information on permissible interfaces, pin-outs and cabling.

For information concerning any statutory requirements for connections to public digital services in countries other than the UK, please contact your distributor or Cray Customer Services.

3.5 Power-Up Diagnostics

The power-up diagnostics provide a quick self-test facility for the Super Module. They are executed following a hardware reset. The power-up diagnostics test, briefly, all of the major hardware components to give confidence that the card is working correctly.

The tests are run in the order that they are described below, and if all is well control is passed to the application software. If any tests fail however, the LEDs will display an error code for around 20 seconds whereupon the card will restart and retest. Table 3-1 gives the error code meanings.

LED DISPLAY			MEANING
1 (RED)	**2 (YELLOW)**	**3 (GREEN)**	
On	On	On	CPU not running
On	Off	Off	Testing in progress
Flash	Off	Flash	EPROM checksum failure
Flash	Off	Off	BRAM failure
Flash	Fast Flash	Flash	SCC failure
Flash	Off	On	DRAM failure
Flash	Fast Flash	On	PTM failure
Flash	On	Flash	IUSC failure
Flash	Flash	Fast Flash	XILINX failure
Flash	Flash	On	Application CSUM failure
Fast Flash	Fast Flash	Fast Flash	Exception fault
Off	Off	On/Flash	Software OK

Table 3-1 Power-Up Error Codes

LED Test

A brief LED test takes place during which time the three LEDs are flashed ON and OFF alternately in a walking pattern. This continues for around 5 seconds. At the end of the test all LEDs are extinguished, and **LED 1** (red) is then turned ON to indicate further testing in progress.

EPROM Checksum Test

To ensure that the correct EPROMs are fitted, and also that they have been programmed correctly, an auto-sizing, Add and XOR checksum test is performed.

Action/Possible faults

Check that the correct EPROMs are fitted, and are in the correct positions and orientation.

Check for bent pins on all IC legs on the EPROMs.

Application PROM Test

To ensure that the correct application EPROMs are fitted, an ADD and XOR checksum test is performed. In addition a blank or missing device is also checked for.

Action/Possible faults

Check that the Application EPROMs are actually fitted.

Check that they are the correct EPROMS, in the correct locations, and in the correct orientation.

Check that there are no bent pins.

DRAM Test

A simple read/write access test to every location in the DRAM is performed. The data 55AA is written to each location, read back and compared. This is then repeated with the data inverted. This process is repeated for every location. After each location has been tested, its address is written and a check is performed to ensure that each location is unique.

Action/Possible faults

Faulty DRAM or associated circuitry.

BRAM Test

A simple, non-destructive read/write test of every location in the BRAM is performed. A test pattern of 55AA is written to each location and then

read back and compared. This process is repeated with the data inverted. This is then repeated for each location.

Action/Possible faults

Check that the BRAM shorting link is in the correct position.

Faulty BRAM circuitry.

IUSCC Test

This test checks that each IUSCC may be accessed, and that read and write cycles operate correctly.

Action/Possible faults

Faulty IUSCC or associated circuitry.

PTM Test

A simple read/write access test. The device is initialised and then the data 55AAAA55 is written to the counter register. It is ready back and compared before the process is repeated with the data inverted.

Action/Possible faults

Faulty PTM or associated circuitry.

SCC Test

A simple read/write access test. The data 55 is written to the counter low byte register. It is read back and compared before being inverted and the process repeated.

Action/Possible faults

Faulty SCC or associated circuitry.

Exception Fault

It is possible that faulty hardware may generate invalid exceptions and terminate proceedings with an exception error display.

Action/Possible faults

Check that all socketed devices are in the correct location and orientation, and that there are no bent pins.

4 Logging On

You can control the Super Module either from a local terminal, or over the X.25 network.

4.1 Locally

A VT100 compatible terminal is required, which is referred to as the 'manager terminal'. It must have the following attributes:

speed:	1200, 2400, 4800, 9600 or 19k2 bps
data bits:	8
parity:	none
stop bits:	1

1. Connect the manager terminal to the Super Module manager port with cable X870-401511 (see Appendix C for details).
2. Enter **<CR>**. A prompt message will be displayed. Type **99L** and enter **<CR>**. A screen will be displayed.
3. At the password prompt, enter **<PF1>**. The 8295 will display the top level menu will be displayed.

4.2 From X.25

The 8295 'manager' software may be accessed remotely from an X.25 triple-X PAD. If the triple-X PAD's X.3 parameters are configurable then the following values are recommended:

Parameter 2: 0 (echo off)
Parameter 3: 2 (packet forwarding on CR)
Parameter 4: 4 (packet forwarding on timeout)

The 8425/8525 mini-PAD is ideally suited for remotely logging on to the Super Module.

4.2.1 Connecting to the PSE

An X.25 port on the 8425/8525 must be attached to the Super Module's composite port, as described in Section 3.4.2.

The 8425/8525 and Super Module composite port should be configured via the 'manager', so that the link comes up and calls can be made to the module.

Note that the Super Module composite port defaults to level 2 DTE, level 3 DTE with INSVC=LCN 1 and 2-way SVC=LCN 1024 to 1031.

1. Make a call using an X.121 address that matches the Super Module manager's address. The default subaddress is 99.
2. A welcome screen will be displayed and prompt for a password. Enter the correct password followed by **<PF1>**. The top-level menu will be displayed.
3. If the password is incorrectly entered three times, or it takes longer than a minute to enter it, then the call will be automatically cleared.

Refer to the relevant user guide for configuration information.

Appendix A Specification Summary

Power Supply	Obtained from 8425/8525 unit
Power Consumption	10 watts

Environment

Ambient Temperature	Operating: +5°C to +40°C Storage: –25°C to +55°C
Relative Humidity	5% to 95% non-condensing at +40°C
Altitude	Up to 40,000 feet

Appendix B Interface Specifications

PIM1 **Synchronous V24/RS-232-C DTE**

Part Number	X890-605611
Interfaces	2 × 25-way D-type plug (male) DTE
Controls In	CTS, RI, DCD, DSR
Controls Out	DRS, BO, RTS, DTR
Clocks	RxC, TxC, XTxC
Clocking Speeds	Up to 19200 baud

Pin	Signal	Description
2	TxD	Transmit Data
3	RxD	Receive Data
4	RTS	Request To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
7	GND	Signal Ground
8	DCD	Data Carrier Detect
15	TxC	Transmitter Clock
17	RxC	Receiver Clock
20	DTR	Data Terminal Ready
22	RI	Ring Indicator
23	DRS	Data Rate Select
24	XTxC	Transmitter Clock, DTE source
25	BO	Busy Out

PIM2	**Synchronous X.21 DTE**
Part Number	X890-605711
Interfaces	2 × 15-way D-type plug (male) DTE
Controls In	Indication
Controls Out	Control
Clock	Signal Element Timing 'S'
Clock Source	External
Clocking Speeds	Up to 256000 baud

PIM2	**Synchronous V.36 DTE**
Part Number	X890-605711
Interfaces	2 × 15-way D-type plug (male) DTE
Controls In	DCD
Controls Out	RTS, DTR*
Clocks	RxC, TxC
Clocking Speeds	Up to 256000 baud

Pin	**X.21 Signal**	**Description**	**V.36 Equivalent Signals***
2	T(A)	Transmit Data+	TxD(A)
3	C(A)	Control+	RTS(A), DTR(A)
4	R(A)	Receive Data+	RxD(A)
5	I(A)	Indication+	DCD(A)
6	S(A)	Clock+	RxC(A), TxC(A)
8	G	Signal Ground	SGND
9	T(B)	Transmit Data –	TxD(B)
10	C(B)	Control –	RTS(B), DTR(B)
11	R(B)	Receive Data –	RxD(B)
12	I(B)	Indication –	DCD(B)
13	S(B)	Clock –	RxC(B), TxC(B)

* using V.36 DCE cable of Figure C-7.

PIM3 **Synchronous V.35 DTE**

Part Number	X890-605811
Interfaces	2 × 15-way D-type plug (male) DTE
Controls In	CTS, DCD
Controls Out	RTS
Clocks	RxC, TxC, XTxC
Clocking Speeds	Up to 256000 baud

Pin	Signal	Description
1	DCD	Data Carrier Detect
2	TxD(A)	Transmit Data+
3	RTS	Request To Send
4	RxD(A)	Receive Data+
5	RxC(A)	Receive Clock+
6	TxC(A)	Transmit Clock+
7	XTxC(A)	Transmit Clock+ (DTE source)
8	GND	Signal Ground
9	TxD(B)	Transmit Data –
11	RxD(B)	Receive Data –
12	RxC(B)	Receive Clock –
13	TxC(B)	Transmit Clock –
14	XTxC(B)	Transmit Clock – (DTE source)
15	CTS	Clear To Send

PIM4 **Synchronous X.21 DCE**

Part Number	X890-605911
Interfaces	2 × 15-way D-type plug (female) DCE
Controls In	Control
Controls Out	Indication
Clock	Signal Element Timing 'S'
Clock Source	Internal
Clocking Speeds	2400, 4800, 7200, 9600, 19200, 48000, 64000, 128000 and 256000 baud

PIM4 **Synchronous V.36 DCE**

Part Number	X890-605911
Interfaces	2 × 15-way D-type plug (female) DCE
Controls In	RTS
Controls Out	DCD
Clocks	RxC, TxC
Clocking Speeds	2400, 4800, 7200, 9600, 19200, 48000, 64000, 128000 and 256000 baud

Pin	Signal	Description	V.36 Equivalent Signals*
2	T(A)	Transmit Data+	TxD(A)
3	C(A)	Control+	RTS(A)
4	R(A)	Receive Data+	RxD(A)
5	I(A)	Indication+	DCD(A)
6	S(A)	Clock+	RxC(A), TxC(A)
8	G	Signal Ground	SGND
9	T(B)	Transmit Data –	TxD(B)
10	C(B)	Control –	RTS(B)
11	R(B)	Receive Data –	RxD(B)
12	I(B)	Indication –	DCD(B)
13	S(B)	Clock –	RxC(B), TxC(B)

* using V.36 DTE cable of Figure C-8.

PIM5 Synchronous V.24/RS-232-C DCE

Part Number	X890-607311
Interfaces	2 × 25-way D-type plug (female) DCE
Controls Out	CTS, RI, DCD, DSR
Controls In	DRS, BO, RTS, DTR
Clocks	RxC, TxC, XTxC
Clocking Speeds	Up to 19200 baud

Pin	Signal	Description
2	TxD	Transmit Data
3	RxD	Receive Data
4	RTS	Request To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
7	GND	Signal Ground
9	DCD	Data Carrier Detect
15	TxC	Transmitter Clock
17	RxC	Receiver Clock
20	DTR	Data Terminal Ready
22	RI	Ring Indicator
23	DRS	Data Rate Select
24	XTxC	Transmitter Clock, DTE source
25	BO	Busy Out

PIM6 port a	**Synchronous X.21 DTE**
Part Number	X890-607211
Interface	15-way D-type plug (male) DTE
Controls In	Indication
Controls Out	Control
Clock	Signal Element Timing 'S'
Clock Source	External
Clocking Speeds	Up to 256000 baud

Pin	X.21 Signal	Description
2	T(A)	Transmit Data+
3	C(A)	Control+
4	R(A)	Receive Data+
5	I(A)	Indication+
6	S(A)	Clock+
8	G	Signal Ground
9	T(B)	Transmit Data –
10	C(B)	Control –
11	R(B)	Receive Data –
12	I(B)	Indication –
13	S(B)	Clock –

PIM6 port b **Synchronous X.21 DCE**

Part Number	X890-607211
Interface	15-way D-type plug (female) DCE
Controls In	Control
Controls Out	Indication
Clock	Signal Element Timing 'S'
Clock Source	Internal
Clocking Speeds	2400, 4800, 7200, 9600, 19200, 48000, 64000, 128000 and 256000 baud

Pin	Signal	Description
2	T(A)	Transmit Data+
3	C(A)	Control+
4	R(A)	Receive Data+
5	I(A)	Indication+
6	S(A)	Clock+
8	G	Signal Ground
9	T(B)	Transmit Data –
10	C(B)	Control –
11	R(B)	Receive Data –
12	I(B)	Indication –
13	S(B)	Clock –

PIM7 port a	**Synchronous X.21 DTE**
Part Number	X890-607111
Interface	15-way D-type plug (male) DTE
Controls In	Indication
Controls Out	Control
Clock	Signal Element Timing 'S'
Clock Source	External, Internal
Clocking Speeds	Internal: 2400, 4800, 7200, 9600, 19200, 48000, 64000, 128000 and 256000 External: up to 256000

Pin	**X.21 Signal**	**Description**
2	T(A)	Transmit Data+
3	C(A)	Control+
4	R(A)	Receive Data+
5	I(A)	Indication+
7	CLK(A)	Clock Out+
6	S(A)	Clock+
8	G	Signal Ground
9	T(B)	Transmit Data –
10	C(B)	Control –
11	R(B)	Receive Data –
12	I(B)	Indication –
13	S(B)	Clock –
14	CLK(B)	ClockOut –

PIM7 port b **Synchronous V.24/RS-232-C DCE**

Part Number	X890-607111
Interface	25-way D-type plug (female) DCE
Controls Out	CTS, RI, DCD, DSR
Controls In	DRS, BO, RTS, DTR
Clocks	RxC, TxC, XTxC
Clocking Speeds	Up to 19200 baud

Pin	Signal	Description
2	TxD	Transmit Data
3	RxD	Receive Data
4	RTS	Request To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
7	GND	Signal Ground
9	DCD	Data Carrier Detect
15	TxC	Transmitter Clock
17	RxC	Receiver Clock
20	DTR	Data Terminal Ready
22	RI	Ring Indicator
23	DRS	Data Rate Select
24	XTxC	Transmitter Clock, DTE source
25	BO	Busy Out

Appendix C Cables

This appendix gives the part number and pinout for all available standard cables.

PIM TYPE	PIM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PIM1/7	DTE	DCE	3M	X890-403111	C-1
PIM1/7	DTE	DCE	5M	X890-408611	C-1
PIM1/7	DTE	DTE	3M	X890-403011	C-2
PIM1/7	DTE	DTE	5M	X890-408711	C-2

Refer to the Series 8000 Xpress PSE User Guide for V.54 cable applications.

Table C-1 V.24 Cables

PIM TYPE	PIM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PIM2/6/7	DTE	DCE	3M	X890-401011	C-4
PIM2/6/7	DTE	DCE	5M	X890-408811	C-4
PIM2/6/7	DCE	DTE	3M	X890-401011	C-4
PIM2/6/7	DCE	DTE	5M	X890-408811	C-4

Note that X.21 DTE and DCE cables are identical. To change a port from a DCE connection to a DTE connection, replace the PIM2 with a PIM4, or use an alternative port on PIM6.

Table C-2 X.21 Cables

PIM TYPE	PIM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PIM3	DTE	DCE	3M	X890-403411	C-5
PIM3	DTE	DCE	5M	X890-409411	C-5
PIM3	DTE	DTE	3M	X890-403311	C-6
PIM3	DTE	DTE	5M	X890-409511	C-6

Table C-3 V.35 Cables

PIM TYPE	PIM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PIM2/6/7	DTE	DCE	3M	X890-406611	C-7
PIM2/6/7	DTE	DCE	5M	X890-409011	C-7
PIM2/6/7	DCE	DTE	3M	X890-406711	C-8
PIM2/6/7	DCE	DTE	5M	X890-409111	C-8

Table C-4 V.36 Cables

PIM TYPE	PIM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PIM1/7	V.24 DTE	V.24 NTU	5M	X818-401211	D-1
PIM2/5/6	X.21 DTE	X.21 NTU	5M	X890-408411	D-2
PIM3	V.35 DTE	V.35 NTU	5M	X818-401311	D-3

Refer to Appendix D for cable pinout diagrams.

Table C-5 UK PSS/KiloStream NTU Cables

INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
8-way DIN	DTE	0.7M	X870-401511	C-9

Table C-6 Manager Port Cable

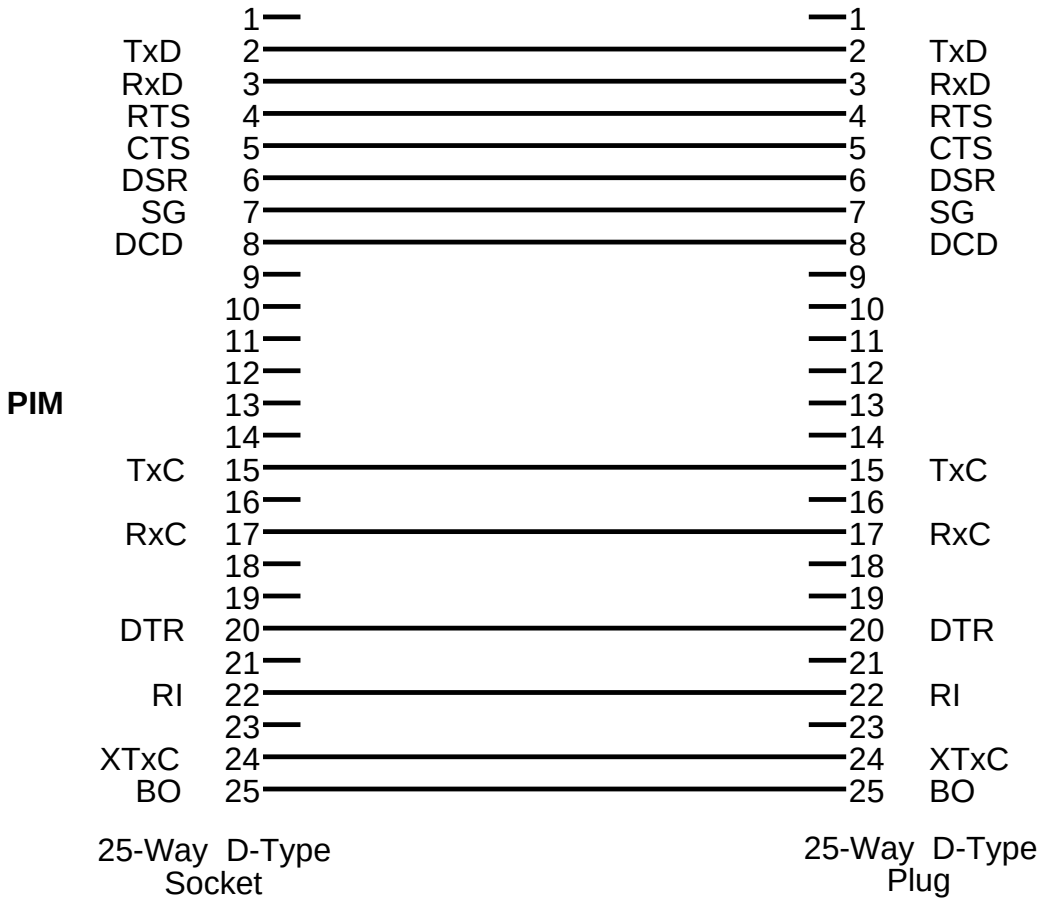

Figure C-1 V.24 DCE Cables X890-403111 and X890-408611

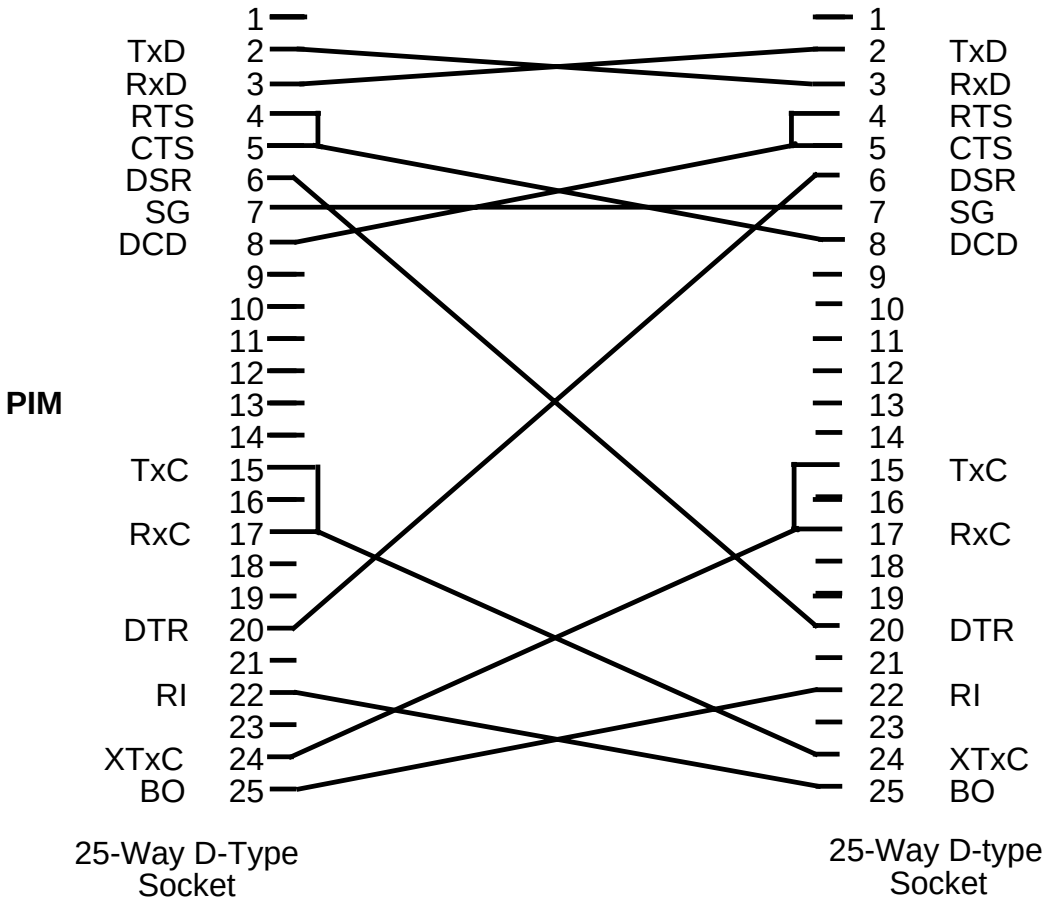

Figure C-2 V.24 DTE Cables X890-403011 and X890-408711

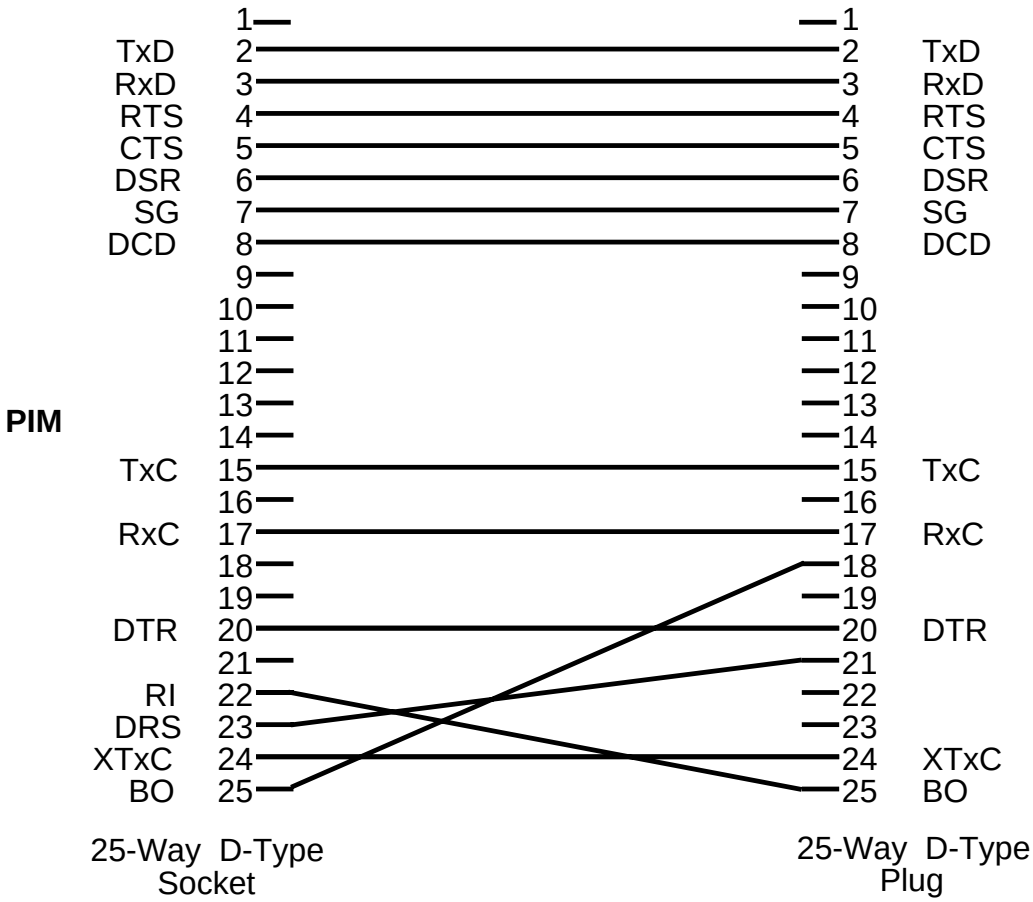

Figure C-3 V.54 DCE Cable X890-406311

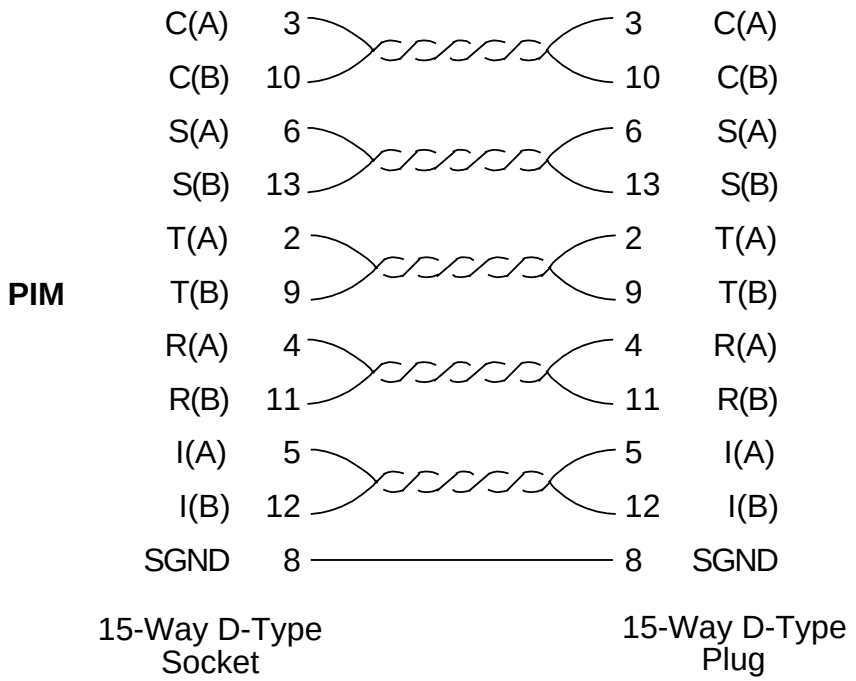

Figure C-4 X.21 Cables X890-401011 and X890-408811

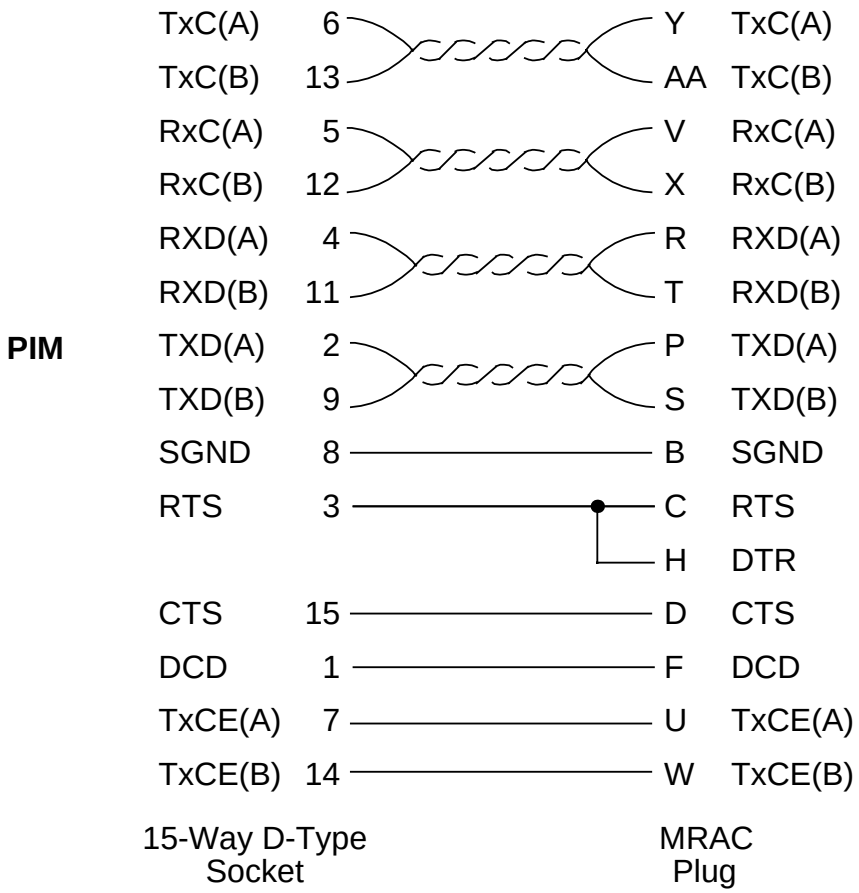

Figure C-5 V.35 DCE Cables X890-403411 and X890-409411

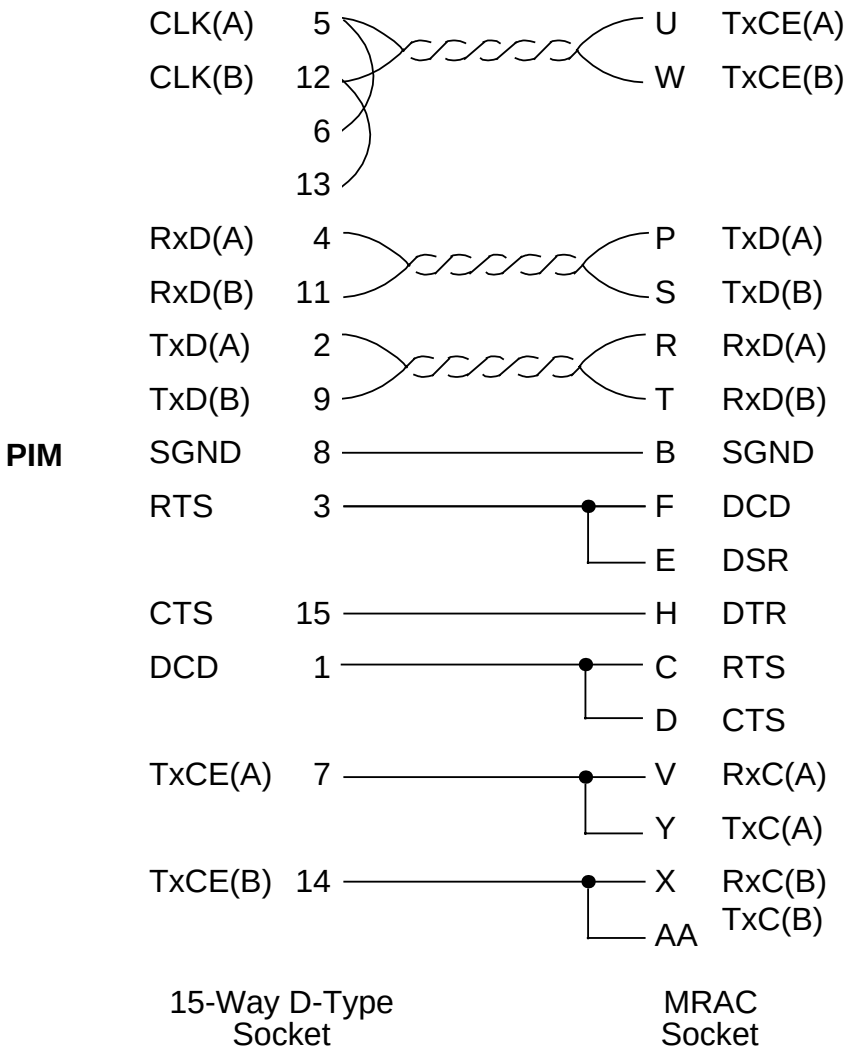

Figure C-6 V.35 DTE Cables X890-403311 and X890-409511

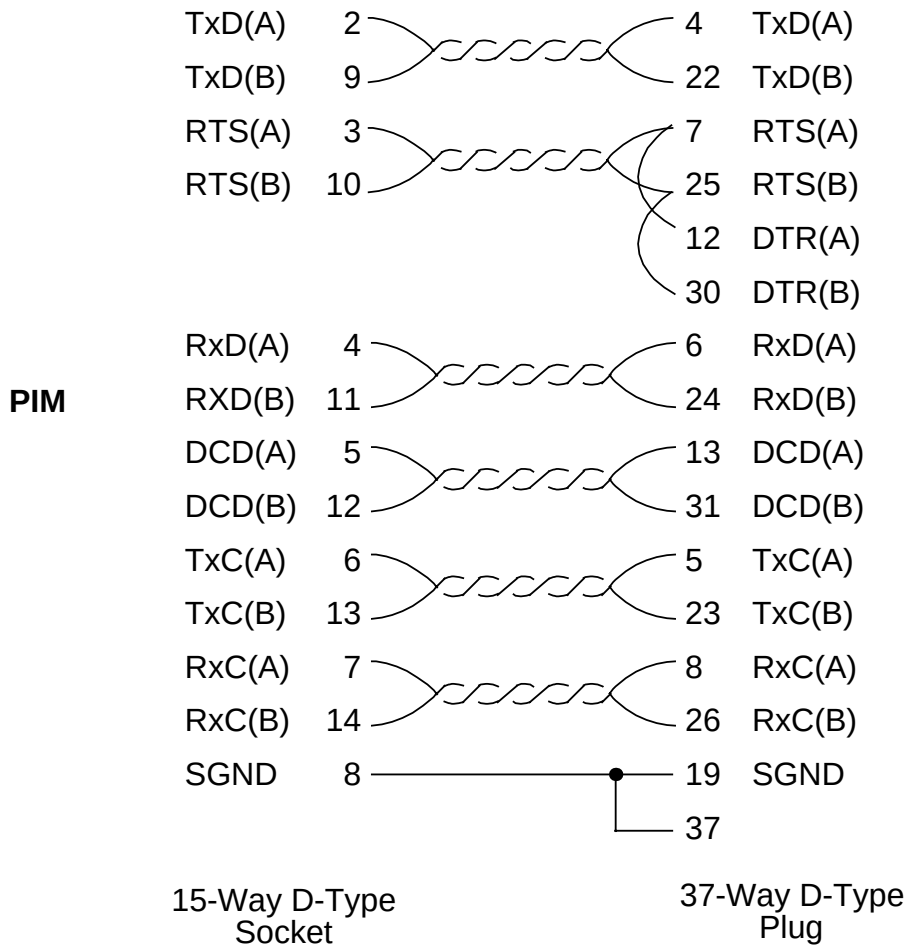

Figure C-7 V.36 DCE Cables X890-406611 and X890-409011

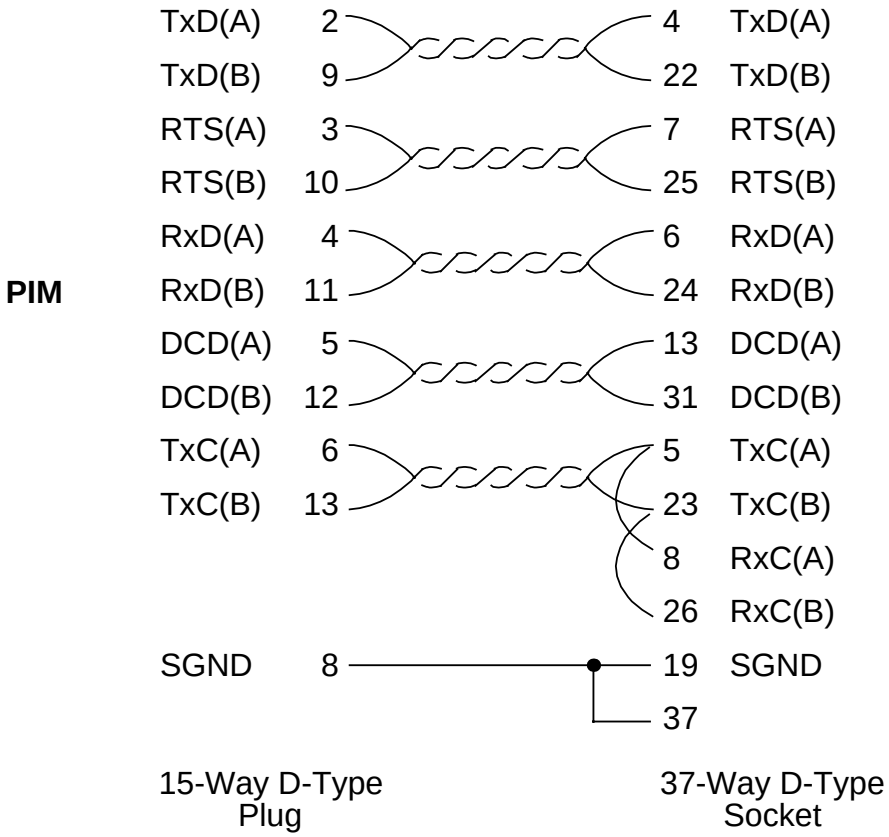

Figure C-8 V.36 DTE Cables X890-406711 and X890-409111

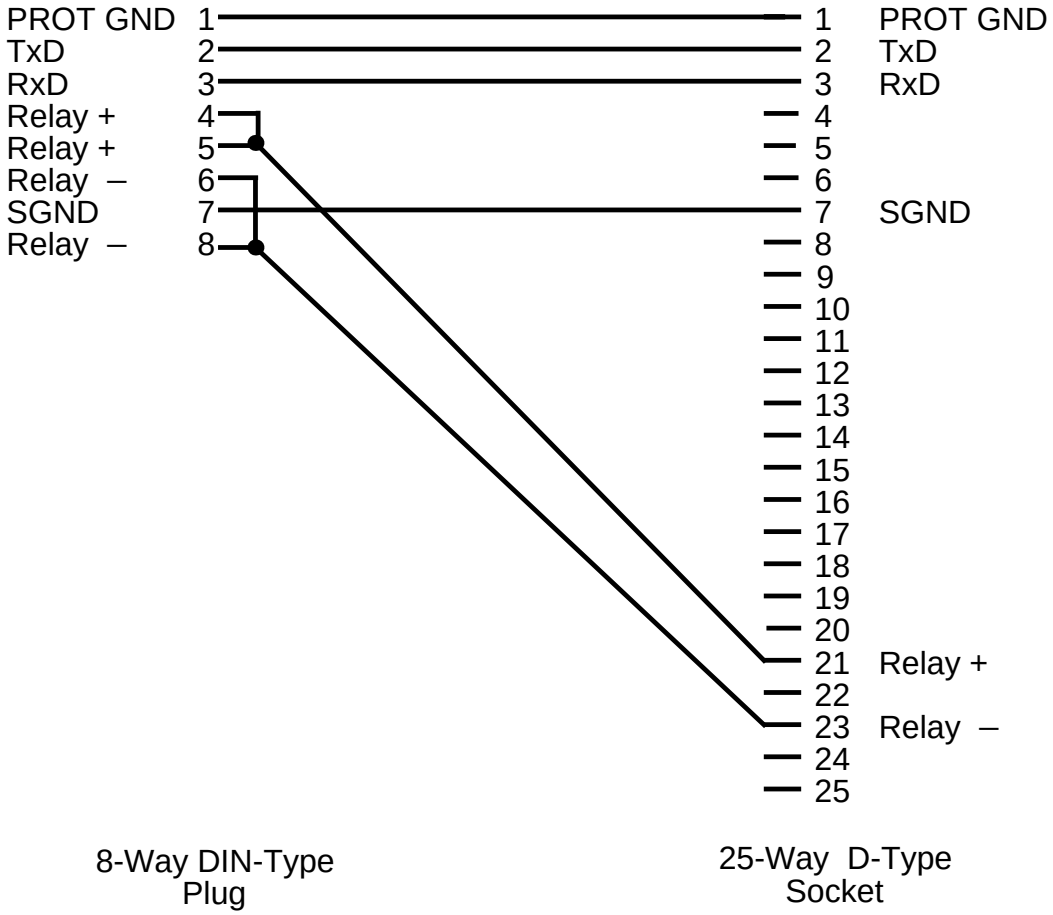

Figure C-9 V.24 to DIN 'Alarm & Diagnostic' Cable X870-401511

Appendix D UK PSS and KiloStream

D.1 General

Ports labelled "SAFETY WARNING See Instructions For Use" do not provide isolation sufficient to satisfy the requirements of the relevant parts of BS 6301. Apparatus connected to these ports must itself either be approved to the relevant parts of BS 6301 or have previously been evaluated against British Telecom (Post Office) Technical Guide 2 or 26 and been granted permission for attachment. **Other usage will invalidate any approval given to this apparatus**.

In order to meet the safety requirements of our PSS/KiloStream approval it is important to make sure that the equipment is correctly installed and maintained.

When delivered from the factory for use in the UK the physical interfaces of ports which can be connected to PSS and KiloStream are given in Table D-1.

INTERFACE TYPE	PIM TYPE	LINE SPEED	CONNECTOR TYPE	CABLE PART NUMBER
V.24	1	$\leqslant$ 19200 bps	2 × 25-way D-type male (DTE)	X818-401211
X.21	2	$\leqslant$ 64 kbps	2 × 15-way D-type male (DTE)	X890-408411
V.35	3	$\leqslant$ 64 kbps	2 × 15-way D-type male (DTE)	X818-401311

Table D-1 Permissible UK PSS/KiloStream Connections

Connection to PSS and KiloStream NTUs must be made with the cables specified in Table D-1, and they must be installed by a competent engineer.

Note that PIM4 ports are prohibited from connection.

If **any** connections on a PAM are connected to PSS or KiloStream then **all other** connections on that PAM must be to apparatus that has either been approved to the relevant parts of BS 6301 or has previously been evaluated against British Telecom (Post Office) Technical Guide 2 or 26 and been granted permission for attachment. **Other usage will invalidate any approval given to this apparatus**. If there is any doubt as to the suitability of the equipment, then the advice of a competent engineer should be sought.

D.2 NET1 Considerations

The X.21 interfaces on Super Module **do not** provide 'DTE Uncontrolled NOT READY'.

V.24, X.21 and V.35 interfaces are approved for direct connection to digital networks using the cables specified in Table D-1.

The V.24 interface (PIM1 and PIM7) is for connection to PTO Service Category 1.

The V.35 interface (PIM3) is for connection to PTO Service Category 2.

The V.24 interface can only operate up to 9k6 bps for PSS connection, but up to 19k2 bps for KiloStream connection.

D.3 NTU Pin Assignments

Tables D-2 to D-4 show the V.24, X.21 and V.35 interface pin assignments presented to a PSS/KiloStream NTU at the NTU end of the cables specified in Table D-1. For the pinouts at the PIM end of the cables refer to Appendix B.

PIN NO.	DIRECTION	ASSIGNMENT
2	Output	Transmit Data (TxD)
3	Input	Receive Data (RxD)
4	Output	Request To Send (RTS)
5	Input	Clear To Send (CTS)
6	Input	Data Set Ready (DSR)
7	–	Signal Ground (SGND)
8	Input	Data Carrier Detect (DCD)
15	Input	Transmit Clock (TxC)
17	Input	Receive Clock (RxC)
20	Output	Data Terminal Ready (DTR)

Table D-2 V.24 Interface Pin Assignments (At NTU End of Cable X818-401211)

PIN NO.	DIRECTION	ASSIGNMENT
3	Output	Control (CA)
10	Output	Control (CB)
6	Input	Signal Element Timing (SA)
13	Input	Signal Element TIming (SB)
2	Output	Transmit Data (TA)
9	Output	Transmit Data (TB)
4	Input	Receive Data (RA)
11	Input	Receive Data (RB)
5	Input	Indication (IA)
12	Input	Indication (IB)
8	–	Signal Ground (G)

Table D-3 X.21 Interface Pin Assignments (At NTU End of Cable X890-408411)

PIN NO.	DIRECTION	ASSIGNMENT
Y	Input	Transmit Clock (TxCA)
AA	Input	Transmit Clock (TxCB)
V	Input	Receive Clock (RxCA)
X	Input	Receive Clock (RxCB)
R	Input	Receive Data (RxDA)
T	Input	Receive Data (RxDB)
P	Output	Transmit Data (TxDA)
S	Output	Transmit Data (TxDB)
B	–	Signal Ground
C/H	Output	Request To Send (RTS)
D	Input	Ready for Sending (RFS)
F	Input	Data Carrier Detect (DCD)

Table D-4 V.35 Interface Pin Assignments (At NTU End of Cable X818-401311)

D.4 Cable Pinouts

Figures D-1 to D-3 give the pinouts of the three PSS/KiloStream cables listed in Table D-1.

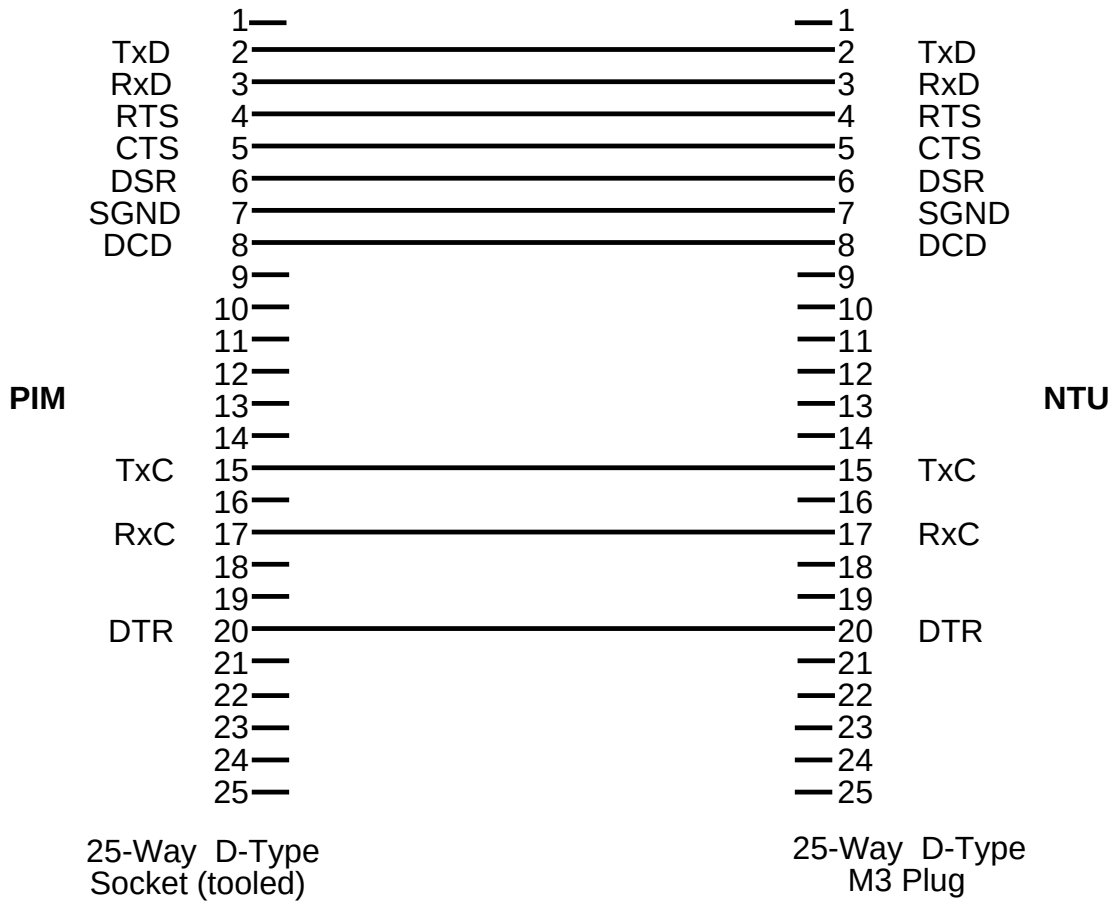

Figure D-1 V.24 PSS/KiloStream Cable Part Number X818-401211

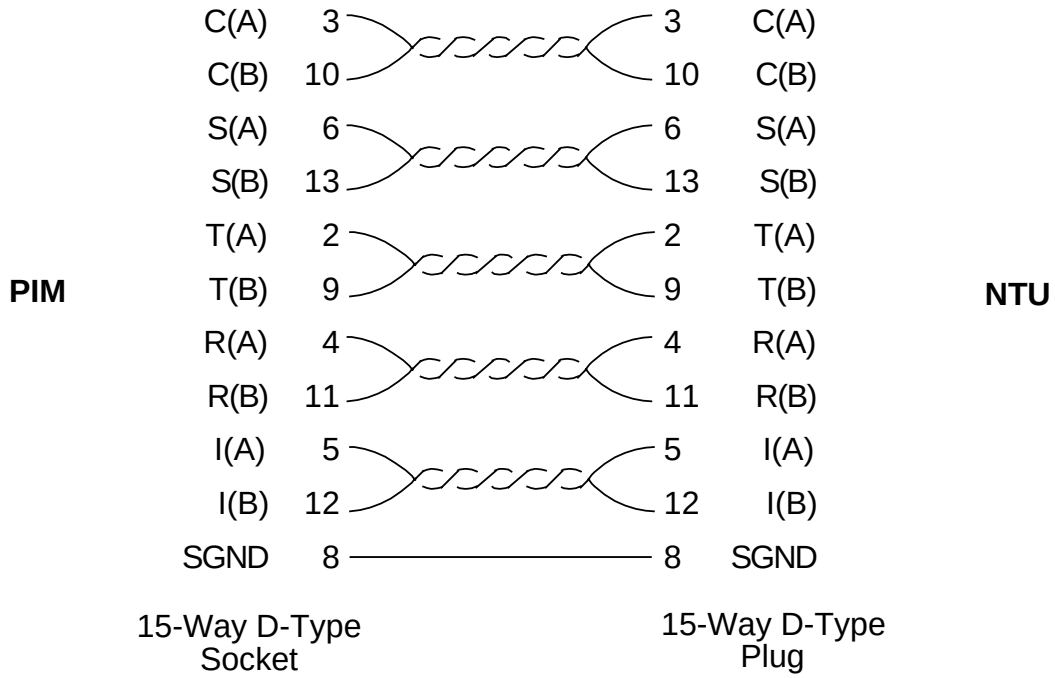

Figure D-2 X.21 PSS/KiloStream Cable Part Number X890-408411

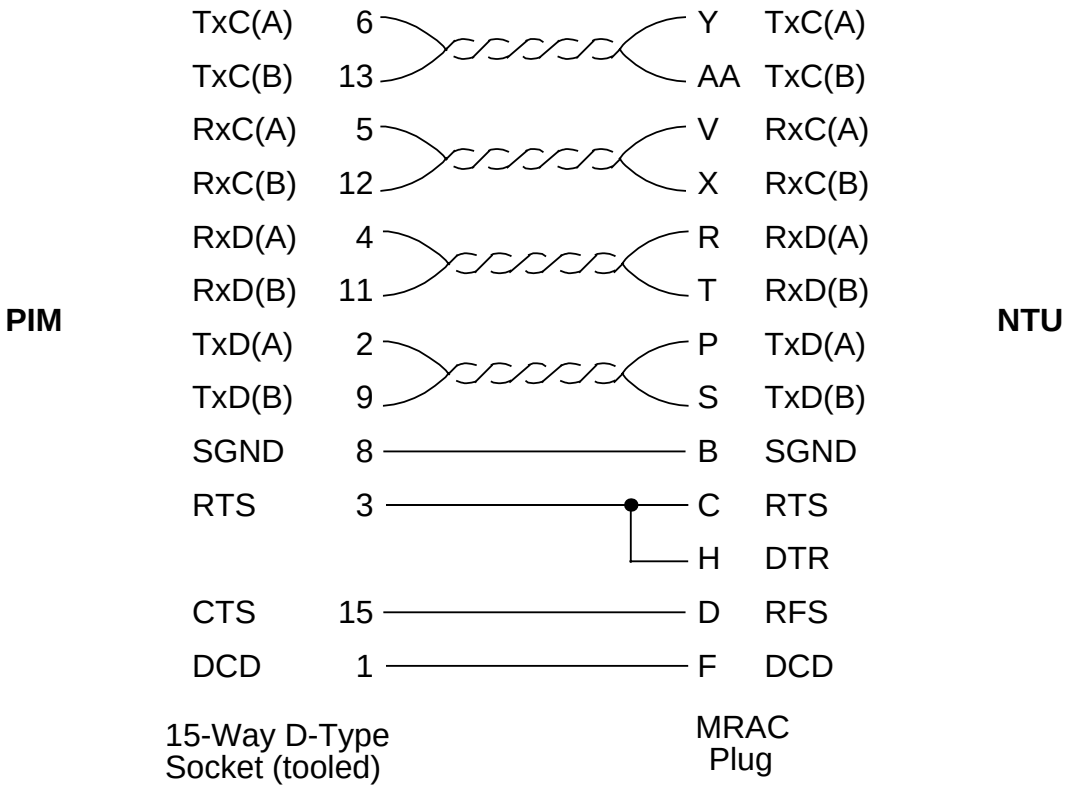

Figure D-3 V.35 PSS/KiloStream Cable Part Number X818-401311