



8525 Installation Guide

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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/JJ601 696

WARNINGS

The 8525 has 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 G of this manual for installation of KiloStream ports in the 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 computing 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.

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Preface

This guide describes the installation procedures for the Case 8525 X.25 Packet Switching Exchange (PSE), which can handle a maximum of 96 ports.

Case 8525 PSES will normally be installed by Case engineers. This guide is provided to users for background information, and to assist their Case-trained engineers to install additional modules.

Before reading this guide, you will need to be familiar with 8525 terms and operation as provided in the Case Series 8000 Xpress PSE Family Overview, and the Cray Series 8000 User Guide.

STATUTORY NOTICES (continued)

MAINS LEAD - IMPORTANT FOR UK USE

The wires in the mains lead of this apparatus are **coloured** in accordance with the following code:

Green & Yellow: Earth Blue: Neutral Brown: Live

As these **colours** may not correspond with the **coloured** markings identifying the terminals in your plug, proceed as follows:

The wire which is **coloured** Green & Yellow must be connected to the terminal in the **plug** which is marked by the letter E or by the safety **earth** symbol \perp , or **coloured** green, or green & yellow.

The wire which is **coloured** Blue must be connected to the terminal in the plug which is marked with the letter N or **coloured** black.

The wire which is **coloured** Brown must be connected to the terminal in the plug which is marked with the letter L or **coloured** red.

If the **moulded** mains plug is removed from the lead of this equipment, the plug must be disposed of immediately.

This apparatus does not rely on a protective earth for protection. (Class II).

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The 8525 PSE is provided with or without a standard cabinet which can house a variety of hardware configurations. Each cabinet is supplied with all units already installed except for the cards, PSUS and cables.

1.1 System Construction

The 8525 comprises a cardframe with a number of modular subassemblies which can be easily removed, without the need for dismantling the whole unit. These are:

- A 17-slot split-level cardframe for standard Case Series 8000 cards.
- A disk subassembly with two 3½ inch disk drives.
- From two to five power supply units.
- A fan tray for system cooling.

Each of these subassemblies functions separately, connecting with the other subassemblies through the system backplane or the Mains Distribution Unit.

Figures 1-1 and 1-2 illustrate front and rear views.

1.2 The Basic Unit

The basic feature build contains the following:

- 17-slots in an RFI-tight rackmount cardframe
- Two PSUS (PSU2 type, i.e. 275W capability)
- Three dummy PSUS
- Mains lead
- Disk subassembly
- Fan tray
- UPM3/UM/PAM1 cardset for the node manager
- Manager terminal cables and printer cables
- Version 5.3 or later operational software
- Manuals (Series 8000 Xpress PSE Family Overview, Series 8000 Xpress PSE User Guide, and this Installation Guide)

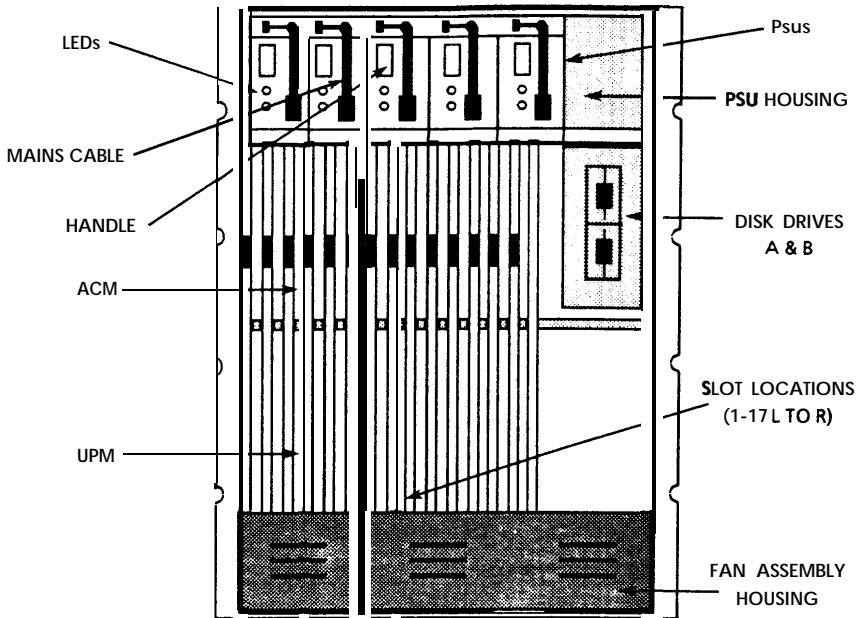


Figure 1-1 8525 Front (door and front cover plate removed)

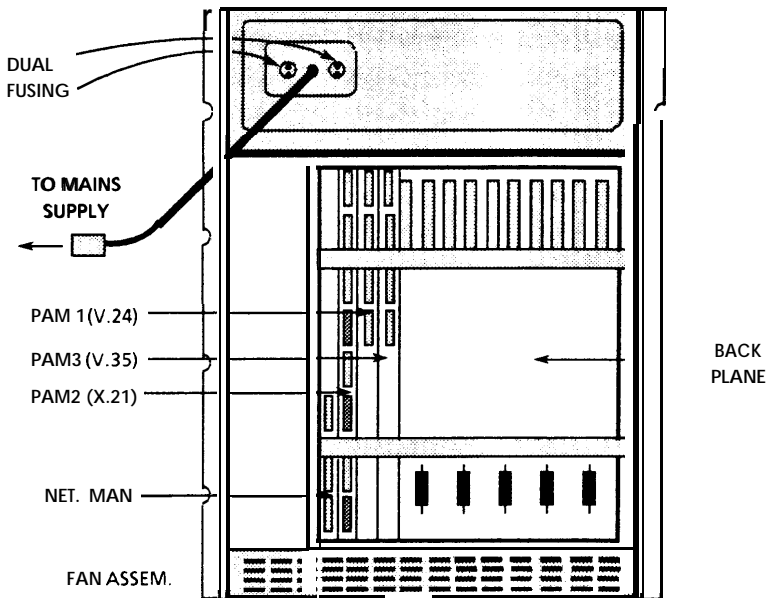


Figure 1-28525 Rear

1.3 Optional Cards

The 17 available slots can be used for the optional cards that are described in Chapter 3.

1.4 Floppy Disk Subsystem

The system uses 3.5 inch double-sided high density disks. The minimum software version used is Version 5.3.

1.4.1 Removal of Floppy Disk Assembly

The disk assembly is accessed by unscrewing the five captive screws on the door in the centre section of the unit. Open the door and then unscrew the two captive screws on the disk assembly. The assembly plugs directly into the motherboard that supplies the signals and power.

In case of faults the whole assembly can be removed and replaced. The re-assembly is the reverse procedure.

Note that the door forms part of the RFI seal. Always re-tighten the screws.

1.5 Fan Tray Assembly

Fan failures are indicated by the red LED in the bottom section of the cardframe. A green LED indicates all is well. Access to the fan tray and dust filter is gained from the front, by unscrewing the three captive screws to allow the compartment door to drop down.

First withdraw the fan tray by about 2 inches, and then remove the connector on the right hand side.

Wait until the fans stop rotating

The fan tray can then be completely removed and a new one put in. The fans are 12V only, and this operation can be done for short periods with the node alive.

The dust filter should be cleaned every 6 months. It is located above the fan tray and just pulls out.

1.6 Cabinet Configuration

If a cabinet is required, it is recommended that 8525 /BU2/Vn is purchased. This will come with all the runners, fixings, main leads etc in addition to the cabinet and 8525 Basic Unit.

Alternatively, it is possible to mount an 8525 in any cabinet provided the following points are observed:

The cabinet must have at least 18U of usable height with forced air ventilation at the top.

1U must be left above the 8525 for airflow.

If it is an 800 mm deep cabinet, then it is recommended that the side ears on the 8525 cardframe are moved to the in-board position so that the cardframe juts out by 1 inch. This is to take maximum advantage of the space, and maintains clearance at the rear. Alternatively use a 900 mm cabinet.

Use runners capable of supporting 100 kg.

Use the handles (X890-904203) to load the cardframe. These fit into the slots along the bottom (several positions).

This is a two-man lift operation.

Tie the cables when fitted to the tie bar at the bottom, rear of the cardframe.

2.1 Backplane

The backplane is a large PCB at the rear of the cardframe, to which all the component parts of the system connect. It carries all the intermodule data traffic between the various UPMS and provides a power distribution system for the unit.

The backplane also carries a series of DIL switches located on the lower part of the backplane beneath the UPM connector module (as shown in Figure 2-1), and necessitate the removal of UPM cards 15,16 and 17 for access. These switches must be set to ON (down position) at all times when the unit is operational.

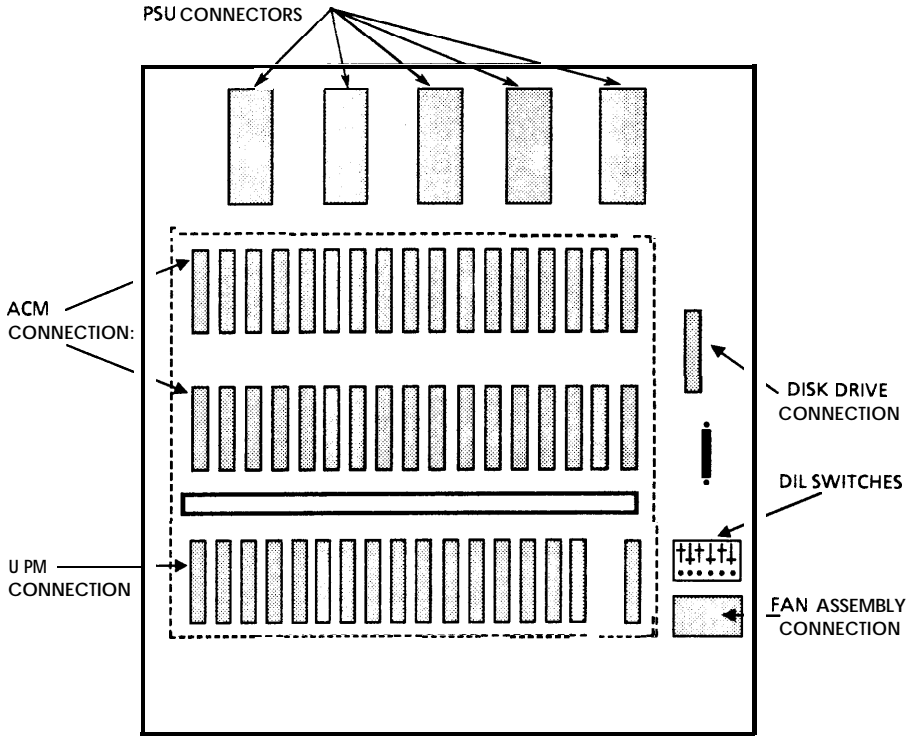


Figure 2-1 8525 System Backplane

2.2 Floppy Disk Subassembly

The 8525 uses 3.5 inch double-sided hi-density floppy disks.

The two disk drive units are mounted behind the door in the centre section of the unit (see Figure 1-1).

The disk assembly plugs into the motherboard, which supplies the signals and power.

2.3 Power Supply Units and Dummies

The PSU(s) (a maximum of five) are housed in the top section of the cardframe (see Figure 1-1). To reveal the PSU LEDs or to access the units, three captive screws must be undone.

Table 2-1 shows the maximum numbers of slots and ports that can be served.

NO OF TYPE 2 PSU(S)	WITH PSU REDUNDANCY		WITHOUT PSU REDUNDANCY	
	Max No of Slots	Max No of Ports	Max No of Slots	Max No of Ports
1	N/A	N/A	4	12
2	4	12	9	32
3	9	32	14	52
4	14	52	17	64
5	17	64	N/A	N/A

Table 2-1 PSU Loading

Note that the above table is concerned only with those card types listed in the Parts List (Appendix D). For other types of cards, refer to the documentation supplied with those cards.

Each PSU incorporates a mains inlet socket at the front to which the mains cable from the cardframe is connected (see Figure 1-1). These cables connect the PSUS to the system MDU (Mains Distribution Unit). The MDU is itself connected to the system's mains input via a filter which is located at the top left of the cardframe.

Each PSU constantly informs the system of its operating state, i.e. whether it is functioning as required or is faulty. This is achieved by a "PSU GOOD" signal which is negated by the PSU when a fault occurs.

Each PSU also has two LED status indicators; the green LED indicates that the 5V output is functioning, and the red LED indicates the status of all other outputs (this should be off for correct operation).

When a faulty PSU is detected an alarm is reported to the Manager Terminal (if connected). The PSU should then be removed and replaced with one in working order.

PSUS can be added to or withdrawn from a live system without any adverse effect provided that all load requirements are met during all transactions.

The loading requirements, as shown in Table 1-1, must be met at **all** times.

2.3.1 **Dummy PSUS**

If the system requirement does not necessitate a full complement of PSUS, 'dummy PSUs' must fill the empty slots. The dummy PSU provides a permanent 'PSU GOOD' signal to the system to maintain functionality. The dummy PSU has a mains IEC inlet into which the appropriate mains lead should be connected even though the dummy makes no connection itself to the mains input. It has no LEDs.

2.3.2 **Redundancy**

If redundancy is required, an extra PSU over and above the port requirements must be installed. Whenever the system is powered up, or an additional card is plugged in, the event log will remind you of the number of PSUS required for basic operation and redundancy (see Table 2-1).

2.4 Mains Inlet

The mains inlet to the cardframe is via a flying lead arrangement at the rear of the unit (see Figure 1-2).

The mains inlet assembly comprises a 3-core mains cable approximately 3 metres in length with fuseholder mounted on the mains inlet panel.

The fuseholders hold 10A 20mm fuses (A31O-125O1O). There are both live and neutral fuses to comply with all European and North American regulations.

The other end of the mains lead is terminated with a 13A 3-pin mains plug.

3.1 ACM/UPM Cards

Each slot of the cardframe can accommodate a module-pair comprising an Application Connector Module and a Universal Processor Module to form an ACM/UPM combination which is referred to as an 8525 'card'. The two modules are interconnected via a 96-way DIN connector as shown in Figure 3-1.

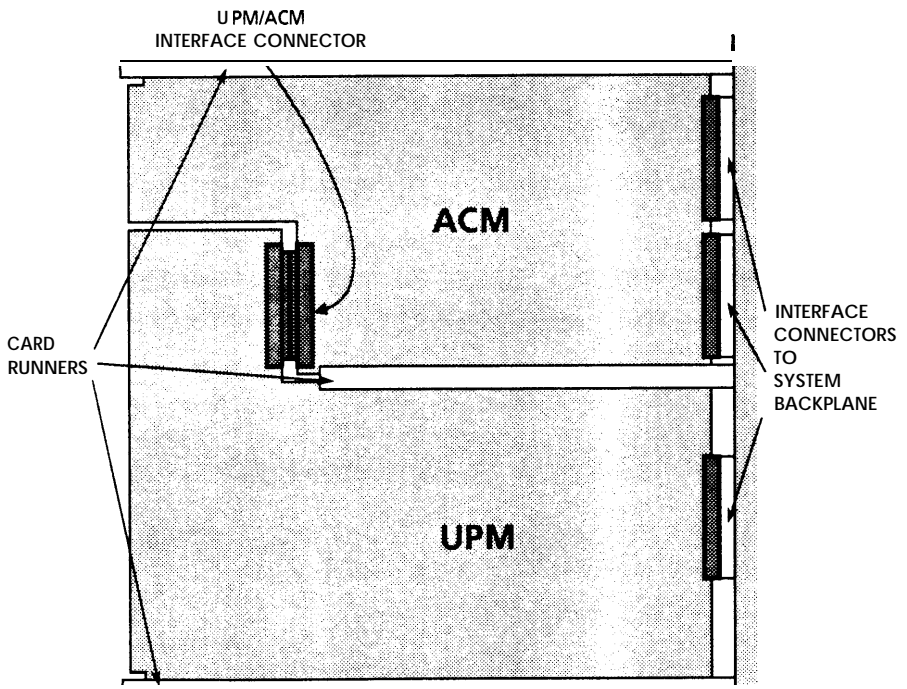


Figure 3-1 ACM/UPM Module Pair

ACMS are installed first in the upper level of the cardframe, UPMS next in the lower level, as shown.

3.2 Application Connector Modules (ACMS)

There are two types of ACM: Utility Modules (UMs), and X.25 Interface Modules (XIMs).

3.2.1 Utility Module (UM)

A UM is to be installed in the upper level of slot **17** of the cardframe. Only one UM is required per cardframe. The UM is a passive card with both its address and data buses under the control of the UPM processor.

The UM provides the node access to the dual floppy disk drive system, a battery-backed calendar/clock that provides node/network time, and 3 serial asynchronous ports for the node management function.

The bootstrap firmware and the self-test diagnostics share two EPROMs, the bootstrap firmware downloading the application software from the dual disk drive unit to the attached UPM'S dynamic RAM using a channel of the UPM's DMAC. As for all ACMs, the production test diagnostics are invoked when running the attached UPM'S diagnostics. The EPROMs also contain routines that are called by the application software (typically floppy disk access routines).

Information concerning the UM application and hardware revisions are stored in non-volatile RAM.

A relay is also mounted on the UM, serving as a possible indicator of an alarm condition at a remote site.

The UM also provides a software-readable bit which, when asserted, reports that a PSU in the cardframe has failed.

The front edge of the UM is fitted with a 10-segment LED bar graph providing status information, five test points (required for UM initialisation prior to production testing) and a card ejector. A recess on the lower front of the UM carries a forward-facing 96-way female DIN connector which mates with the parent UPM via the UPM/ACM interface connection.

On the rear of the card there are two connectors, the lower of these being a 96-way female DIN connector, and the upper a 64-way connector which provides the connection to the dual disk drive subsystem via the system backplane (see Figure **3-1**).

3.2.2 X.25 Interface Modules (XIMs)

The XIM cards plug into the upper level of any available slot other than slot 17 (UM slot) in the cardframe. The XIM is a passive card (that is, it has no onboard processor). Its address and data busses are under the control of the processor located on the attached UPM, with communication taking place over the UPM/XIM interface connector (see Figure 3-1).

There are three versions of XIM, differing only in their serial electrical interface characteristics:

XIM1 : V.24
XIM2 : X.21/V.36
XIM3 : V.35

Each XIM is capable of supporting four serial ports where transfer between port and memory is via two SCC (dual Serial Communication Controller) devices supported by two DMACs and a PPI (Programmable Peripheral Interface).

The bootstrap firmware and the production test diagnostics share the two EPROMs. (The XIM diagnostics, being effectively an extension of the UPM diagnostics tests, are invoked when the UPM diagnostics are running. See Appendix E.)

Information concerning the XIM application and hardware revisions are stored in a non-volatile RAM.

On the front edge of the card is a red LED (Bus Error Indicator) and card ejector with the lower part of the front edge carrying a 96-way female DIN connector which forms one half of the UPM/ACM interface connection.

The rear edge has two DIN connectors for the backplane; the upper one a 64-way male serial I/O interface and the lower a 96-way female interface (see Figure 3-1).

3.3 Universal Processor Modules (UPMs)

The UPM has a single onboard processor with access to all the onboard memory and peripherals via the UPM address and data buses. On request, control of these buses is acquired by the onboard Direct Memory Access Controller (DMAC) for intermodule communication using packet switching techniques managed by the onboard custom gate array.

In addition to its own onboard addressing capabilities the UPM has offboard addressing capabilities to the passive Active Connector Module (ACM) attached to it.

The bootstrap firmware and the production test diagnostics share the UPM's two EPROM devices. Selection between the two is made by shorting/not shorting a two pin header (this is the only user configuration requirement of the UPM).

Information concerning the UPM application and hardware revisions are stored in a non-volatile RAM.

Located at the front of the card is a 7-segment LED display used largely for diagnostic purposes, a green indicator LED (software watchdog), two 2-pin shortable headers (reset and software abort), four voltage test pins (+ 5V, + 12V, -12V, OV), a modular-jack-type diagnostic terminal socket, and two card ejectors.

There are three versions of UPM:

UPM1 has 1 Mbyte of dynamic memory (DRAM).

UPM2 has 2 Mbytes of DRAM.

UPM3 has an increased processing capability and a future capability of 16 Mbytes of DRAM.

Slot 17, where the UM resides, should contain a UPM3. Although a UPM2 will operate correctly, performance will be degraded, resulting in a substantially longer booting-up time.

The remaining slots (i.e. 'XIM' slots) may contain any combination of UPMS in accordance with Table 3-1.

SLOTS 1-16 (XI MS)			
SOFTWARE VERSION	UPM1	UPM2	UPM3
5.3	x	X _{1,3}	X ₂

X denotes UPM supported by this software version

1 Only needed in a bay with the majority of slots loaded and a heavily loaded data path

2 Needed for High Speed Operation

3 Needed to maintain Network Data Integrity

The 8525 should only be loaded with software versions 5.3 and above.

Table 3-1 UPM Card Applicability

Note that the above table is concerned only with those card types listed in the Parts List (Appendix D). For other types of cards, refer to the documentation supplied with those cards.

3.4 Port Access Modules (PAMs)

The PAMs provide the physical interface connectors for the ports of the ACMS (the UM and all XIMs), one PAM supporting one ACM. The PAMs slot in at the rear of the cardframe, each plugging directly into a connector which has its other end connected to the I/O port of the ACM in the same slot at the front of the cardframe (see Figure 1-2).

A list of available PAMs is given in Table 3-2.

PAM TYPE	CONNECTOR TYPE	ACM INTERFACE
PAM1 (level 12)	3 x 25-way D-type (female)	UM V.24
PAM1 (level 11)	4 x 25-way D-type (male)	XIM1 V.24
PAM2 (level 12)	4 x 15-way D-type (male) 4 x 15-way D-type (female)	XIM2 X.21/V.36
PAM3	4 x 15-way D-type (male)	XIM3 V.35

Table 3-2 PAM Types

PAM1 (level 12) supports three manager channels. The manager terminal should be connected to channel 1 (channel 2 is the printer port and channel 3 is not used).

3.5 Adding and Removing Cards

3.5.1 The Main Cards

The main cards are accessed by unscrewing the five captive screws on the front door in the centre section of the unit. Note that the door forms part of the RFI seal: always re-tighten the screws.

Cards may be added and removed whilst the system is powered up, provided that the following procedures are carefully followed.

The recommended way to plug cards into a live system is as follows:

1. Separate the ACM from the UPM.
2. Slide the ACM between the upper runners until the connectors are aligned, then push firmly home to minimise bounce at the connector pins.
3. Slide the UPM between the lower runners and push home similarly.
4. Allow each pair of modules (ACM/UPM) to fully load (i.e. display r) before inserting the next pair.

To remove the combination:

1. Reset the UPM module of the pair by shorting the RST link (marked on the board).
2. Carefully slide out the UPM taking care to separate the connections cleanly.
3. Carefully slide out the ACM similarly.

3.5.2 Port Access Modules (PAMs)

The PAM cards are accessed by unscrewing the two RFI screening bars on the rear of the unit. Each PAM can then be withdrawn by unscrewing the two knurled screws at either end and withdrawing the PAM from the unit.

Note that the two RFI screening bars form part of the RFI seal: always replace and re-tighten the screws.

4.1 Introduction

This section gives instructions on how to install an 8525 up to the point where the unit is switched on and operational software loaded. (Section 5 covers the loading of the software and Section 6 troubleshooting.) The configuration of the unit is beyond the scope of this document and reference should be made to the Series 8000 Xpress PSE User Guide relevant to the version of the software being installed.

It is assumed that the 8525 has been unpacked and is in standard pre-installation state with the fantray, disk assembly and requisite number of PSUS installed.

4.2 Site Preparation

The 8525 is not particularly fussy as regards site requirements, being designed to operate in an office rather than computer room environment. However, the following points should be noted with reference to the environmental information given in Appendix F:

- **Space.** Ensure that there is sufficient space for access to the front and rear of the unit for the installation of cards and cables.
- **Environment.** The location must be reasonably free from dust, fumes, vibration, excessive radiated electrical noise etc.
- **Ventilation. 8525** units are provided with ventilation grilles and fans to provide adequate airflow. Care must be taken not to obstruct these grilles or significantly restrict the airflow around the unit.
- **Power.** The 8525 must be placed near the mains supply socket to which it is to be connected. The mains supply socket must also be visible and easily accessible. This is because the 8525 does not have an ON/OFF power switch and relies on disconnecting the plug from the mains socket as the only form of mains disconnection.

All 8525 builds include an effective mains filter; however, it is recommended that the system be connected to a reasonably clean mains – supply. If current breakers are used, they should be of type **3** or **4** with thermal delay and **90** Amp² second inrush characteristics. The 8525 system can operate from a 5 amp (1.2 kVA) supply.

- **Cable Runs.** The routing of cables from the 8525 to the connected equipment should be pre-planned. A decision on whether the cables are to be laid across the floor, under a raised floor etc must be made. It is unwise to run data cables alongside or across mains cables or other sources of electrical noise.
- **Network Termination Units (NTUs).** The statutory requirements for connection of data communications equipment to public data networks and lines must be strictly observed (see Section 4.5.2).

4.3 Installing the Cards

Throughout the following procedure refer to Table 3-2 for the correct XIM/PAM combination for the type of physical interface required in each slot. There is no restriction on which interface variant (V.24, X.21, V.35 or V.36) can be placed in which slot as long as the correct XIM card type is paired with the correct PAM type.

1. See the instruction in Section 3.5.1 for accessing the main cards.
2. Insert the Node Manager Utility Module (UM) into the upper rightmost slot (slot 17) and a UPM3 processor card into the lower rightmost slot. Note that these manager cards must be in slot 17.
3. For each of the standard or high power XIMS purchased insert the requisite XIM card into one of the remaining upper slots and either a UPM1/2 (standard XIM) or UPM3 (high power XIM) into the lower slot.
4. Remove the RFI screening bars from the rear of the unit.
5. Remove the blanking plates at the rear of the unit from the slots occupied by the UM/UPM and XIM cards inserted above.
6. Insert and secure the requisite PAMs into the rear slots freed in step 5.
7. Once all connections have been made and the node is working (see following sections), replace the front door.
8. Replace the RFI screening bars.

4.4 Connecting the Manager Port(s)

1. Using the cable supplied, connect port 1 on the Node Manager's PAM to a VTIOO compatible terminal configured for 2400,4800 or 9600 baud, 8 + 1 data bits, no parity.
2. If required, using the cable supplied, connect port 2 on the manager PAM to a suitable serial printer. The printer port configuration can be set to match the printer once the node is live.

Do not use manager port 3.

4.5 Connecting the X.25 Ports

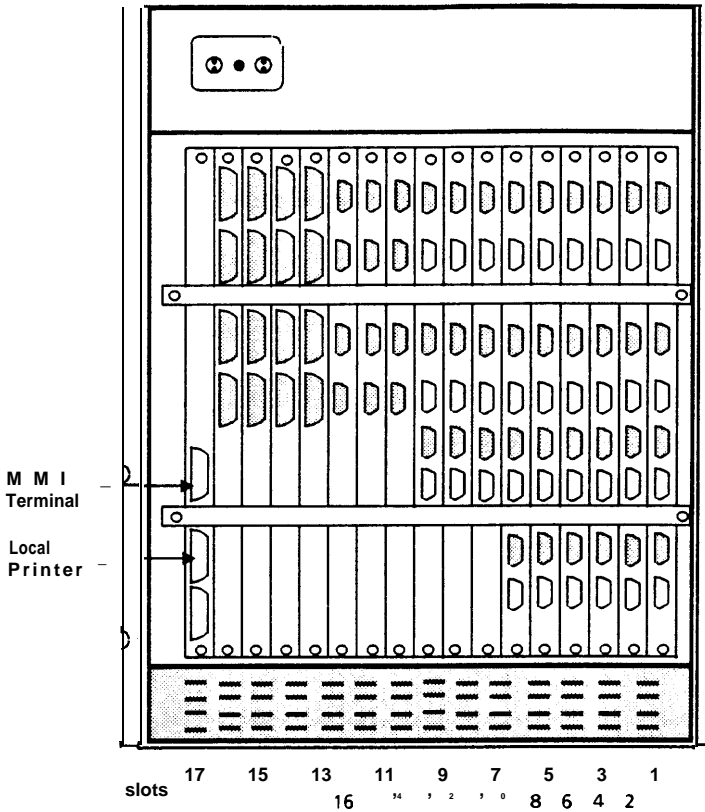
4.5.1 General





The X.25 ports can be connected using the standard Case cables listed in Appendix C. See Figure 4-1 for an example.

Do not make any X.25 connections to the manager ports.

4.5.2 UK PSS and KiloStream

For connection to UK PSS and KiloStream Network Termination Units (NTUs), please refer to Appendix G which gives the required statutory and technical information on permissible interfaces, pinouts and cabling.



-  25-way D-type Female Connector
-  25-way D-type Male Connector
-  15-way D-type Female Connector
-  15-way D-type Male Connector

Slot 1-6- PAM 2 Level 12- V.11/X.21
 7-9 - PAM2 Level 11 - V.11/X.21
 11-12 - PAM3V.35
 13-16- PAM 1 Level 11 - V.24
 17 - PAM 1 Level 12 -V.24 (Manager only)

Any DTE port (shaded) can be connected to **KiloStream/PSS** provided that:

- a) All other ports on the same PAM are only connected to equipment complying with **BS6301**.
- b) The correct cable is used (see Section 4.2).
- c) PAM2 ports are configured in software as X.21 (not **V.36**)

Figure 4-1 Example 8525 PAM Configuration Giving Permissible KiloStream/PSS Connections

This section explains how to power up the system from cold, and describes the resulting sequence of events. Error situations that may arise are also explained along with remedial action where possible.

5.1 Initializing the UM

The UM can be initialised for use in an 8525. This will cause the Node Manager to report on the correct number of slots. The 8525 UM upgrade disk (X010-500022) permits you to program the UM hardware with the device type of the node.

There are currently three defined device **types**:-

- . The 5-slot, 6-24 port 8325.
- . The 9-slot, 4-8 or 4-48 port 8425.
- . The 17-slot, 4-96 port 8525.

The UM must, of course, be initialised to the 17-slot device type.

The upgrade requires Disk A in Drive 'A', the UM upgrade disk in Drive 'B' and a 9600 bps manager terminal.

- Switch on the mains power. After successful completion of the hardware diagnostics (lasting approximately 3 minutes) the System Manager will load from the upgrade disk.
- If the system is already up and running, all you need do is reset the UPM in the UM slot (by shorting the RST link). This should cause the System Manager to load from the upgrade disk.
- Once the upgrade is loaded a menu-driven upgrade facility appears on the Manager terminal.

Having upgraded the UM device-type, replace the upgrade disk with disk B and reset the UPM. If originally powered from cold, the system will carry out a full system boot; if previously up and running, a warm restart will occur.

5.2 Booting Up the System

1. Place Disk A in Drive 'A' (the upper of the 2 drives), and Disk B in Drive 'B' (placing the correct disk in the correct drive is essential otherwise you could find the system booting-up unconfigured).
2. Switch on the mains power.

The system will now undergo a series of hardware diagnostics; if successful the Manager will proceed to boot-up itself and the rest of the system. The process takes approximately 5 to 10 minutes depending on the number of boards loaded in the cardframe. Details are given in Section 5.2.

3. Press [RETURN] on the Manager terminal, and it will display the "login" prompt. The printer, if one is attached to the system, will output events indicating the status of the boot-up. The system is now operational.

5.3 Initialisation Sequence

With the front door open the complete boot-up sequence can be observed, the LED on each board providing a running commentary on what is taking place.

Stage 1: The hardware is diagnostically tested

When the system is first powered on all of the UPMS indicate a "t". This means that hardware diagnostics are being performed. If the diagnostics fail, an error code is flashed on the LED. The code comes in two parts, the test number and the failure code. The characters "|" and "-" delimit the code. The exact syntax is therefore:

```
|<test number> - <failure code>|
```

The error code is repeated several times before "F" (for Failure) is displayed on the LED. An easy way to cause the diagnostics to fail is to boot up the system without any diskettes in the drives. See Appendix E for power-up diagnostic error codes.

Stage 2: The Manager code is loaded

After hardware diagnostics have completed successfully the UM will display "b" (for booting). This lasts a few seconds and then goes to "L". The Manager code is now being loaded. While this is taking place the other boards will only display a flashing dot.

Stage 3: The rest of the system is bootdup

Once the Manager is loaded, the UPM attached to the UM displays "i" (for initialisation). The other cards in the bay are polled to determine the topology of the bay. Each UPM indicates "P" to show that it is being polled. The XIMS are then loaded up in parallel. The UPMS will then display "L" (for loading). This takes roughly 3 minutes to complete.

Stage 4: All systems go

The UPMS attached to the XIMS will successively display "i" (for initialisation; the XIMS are now being fed configuration data), "o" (for operational), and very soon afterwards, "r" (for running). The UPM attached to the UM shows the same transitions but with a slight delay after the other UPMS. The system is operational when the UPM (UM) displays "r".

6.1 Alarms Screen

If there is a problem with the system, check whether you can log in.

- If the system can be logged into, the Node Manager software is operational and it is possible to establish the reason for failure of any of the other boards by examining the Alarms screen.
- If logging into the system proves to be a problem, the Manager software could have failed for any of the following reasons:

No disks in the drives.

The disks are write-protected or incorrectly formatted.

The disks contain no load files.

The Manager Terminal is not operational.

The UM failed its hardware diagnostics (indicated by an "F" on the attached UPM'S LED). It will be necessary to contact your supplier for advice in this instance.

If the failure is disk-related then try again with correctly formatted, write-enabled system disks. If the terminal does not respond, ensure that it is connected to the power source, and to the 8525 manager port. If the failure code indicates a hardware fault, then refer to the failure codes in Appendix C.

6.2 LED Display

If the system passes the diagnostics and loads the software, subsequent failures will be indicated on the LED display as a software error. This takes the form of a repeated 6-digit code. In this case the system will write diagnostic information to disk B. The disk should be copied and sent to your supplier for analysis.

Physical Level

Interface	Full duplex continuous carrier Synchronous V.24 (X.21 his), V.11 (X.21), V.36, V.35
Transmission rates	2400 to 64000
Clock	Modem or NTU supplies clock. 8525 will supply clocks with suitable crossover cable fitted
Number	4 to 96

Link Level

Framing	HDLC
Addressing	DTE or DCE addressing (selectable per link)
Procedure	LAPB
Parameters	k=1 to 7, 0 r1 to 127 N2 = 1-20 retries T1 = 1-200, 1/10 seconds T2 = T1 x 2/3 T3 = 1-250 1/10
Numbering	Modulo 8 or Modulo 128

Packet Level

Services	SVC or PVC
Numbering	Modulo 8 or Modulo 128
Data Fields	Octet aligned

Maximum logical channels	256 per XIM
Logical channel Nos. used	o to 4095
Address formats	Up to 15 digits
X.25 Variant	CCITT 1980/84/88, PSS, Tymnet
Routing	Calls routed on 14-digit X.121 addresses using operator-specified paths.
Packet size	16 to 4096 bytes

User Facilities

Flow control parameter negotiation	Yes/No
Throughput class negotiation	Yes/No
Fast select call acceptance	Yes/No
Default throughput class	75 to 48000 bps
Charging information	Yes/No
Reverse charge acceptance	Yes/No
D bit	Enforced/On Request/Disallowed
Local Charging Prevention	Yes/No
Call Redirection	Disabled/Incidental/Systematic
Call Deflection Allowed	Yes/No
Call Deflection (in data transfer) allowed *	Yes/No
Call Deflection Referral *	Disabled/Enabled
Gateway Port	Yes/No

* These facilities are required for Series 8000 ACS support (see X890-301551).

PAM1 (level 11) **Synchronous V.24/RS-232-C**

Part Number **X890-603911**
ACM Type Required **XIM1**
Interfaces **4 X 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 **2400,4800,7200,9600 & 19200 baud**
PTO Service Category **1**

PAM1 (level 12) **Asynchronous V.24/RS-232-C**

Part Number **X890-603912**
ACM Type Required **UM**
Interfaces **3 x 25-way D-type socket (female) DCE**
Controls In **DRS, BO, RTS, DTR**
Controls Out **CTS, DSR**
Speeds **4800,9600 & 19200 baud**

PAM2 **Synchronous X.21**

Part Number **X890-603711/12**
ACM Type Required **XIM2**
Interfaces **4 x 15-way D-type plug (male) DTE**
 2 or 4 X 15-way D-type socket (female) DCE
Controls In* **Indicate**
Controls Out* **Control**
Clock **Signal Element Timing "S"**
 (Source: external on DTE port and internal
 on DCE port)
Clocking Speeds **2400,4800,7200,9600, 19200,48000 &**
64000 **baud**

* Directions correct for DTE interface. Reverse for DCE interface.

PAM2**Synchronous V.36**

Part Number	X890-603711/12
ACM Type Required	XIM2
Interfaces	4 × 15-way D-type plug (male) DTE 2 or 4 × 15-way D-type socket (female) DCE
Controls In*	CTS, RI, DCD, DSR
Controls Out*	RTS, DTR
Clocks	RxC, TxC, XTxC
ClockingSpeeds	2400,4800,7200,9600, 19200,48000 & 64000 baud

* Directions correctforDTE interface. Reverse forDCE interface.

PAM3**Synchronous V.35**

PartNumber	X890-604011
ACMTypeRequired	XIM3
Interfaces	4 × 15-way D-type plug (male) DTE
Controls In	CTS, RI, DCD, DSR
Controls Out	RTS, DTR
Clocks	RxC, TxC, XTxC
Clocking Speeds	2400,4800,7200,9600, 19200,48000 & 64000 baud
PTO Service Category	2

This Appendix gives the Case part number and pinout for all available standard 8525 cables. Note that in all pinout diagrams the 8525 end of the cable is on the left.

PAM TYPE	PAM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PAM1 level 11	DTE	DCE	3M	X890-403 111	c-1
PAM1 level 11	DTE	DCE	5M	X890-40861 1	c-1
PAM1 level 11	DTE	DTE	3M	X890-40301 1	c-2
PAM1 level 11	DTE	DTE	5M	X890-40871 1	c-2
PAM1 level 11	DTE	V.54 DCE	3M	X890-40631 1	c-3
PAM1 level 12 (Manager)	DCE (Async.)	DTE (Async.)	3M	X890-4071 11	c-4

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

Table C-1 V.24 Cables

PAM TYPE	PAM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PAM2	DTE	DCE	3M	X890-40 1011	c-5
PAM2	DTE	DCE	5M	X890-40881 1	c-5
PAM2	DCE	DTE	3M	X890-401011	c-5
PAM2	DCE	DTE	5M	X890-40881 1	c-5

Note that 8525 X.21 DTE and DCE cables are identical. To change a port from a DCE connection to a DTE connection, the cable is removed from the PAM DTE port, reversed, and connected to the PAM DCE port.

Table C-2 X.21 Cables

PAM TYPE	PAM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PAM3	DTE	DCE	3M	X890-403411	C-6
PAM3	DTE	DCE	5M	X890-409411	C-6
PAM3	DTE	DTE	3M	X890-403311	c-7
PAM3	DTE	DTE	5M	X890-409511	c-7

Table C-3 V.35 Cables

PAM TYPE	PAM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PAM2	DTE	DCE	3M	X890-406611	C-8
PAM2	DTE	DCE	5M	X890-409011	C-8
PAM2	DCE	DTE	3M	X890-406711	C-9
PAM2	DCE	DTE	5M	X890-409111	C-9

Table C-4 V.36 Cables

PAM TYPE	PAM INTERFACE TYPE	REMOTE INTERFACE TYPE	LENGTH	PART NUMBER	PINOUT DIAGRAM
PAM1 level 11	V.24 DTE	V.24 NTU	5M	X818-401211	G-1
PAM2	X.21 DTE	X.21 NTU	5M	X890-408411	G-2
PAM3	V.35 DTE	V.35 NTU	5M	X818-401311	G-3

Refer to Appendix G for cable pinout diagrams.

Table C-5 UKPSS/KiloStreamNTUCables

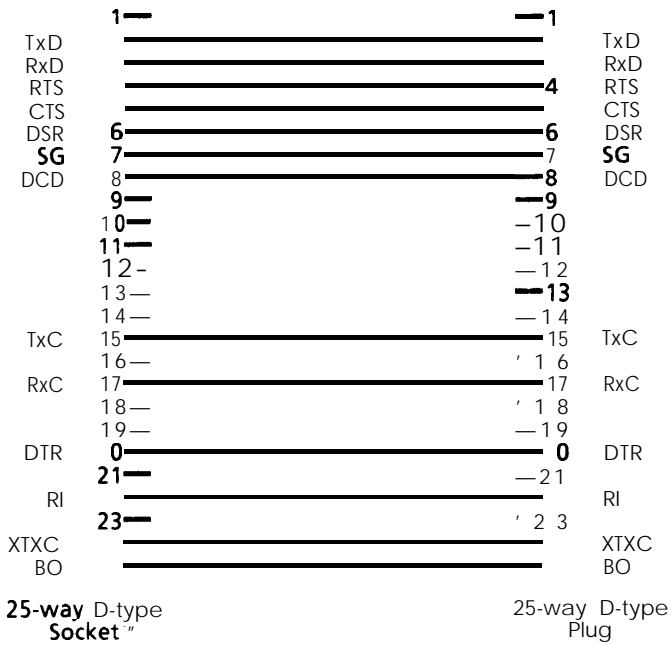


Figure C-1 V.24 DCE Cables X890 -403111 and X890-408611

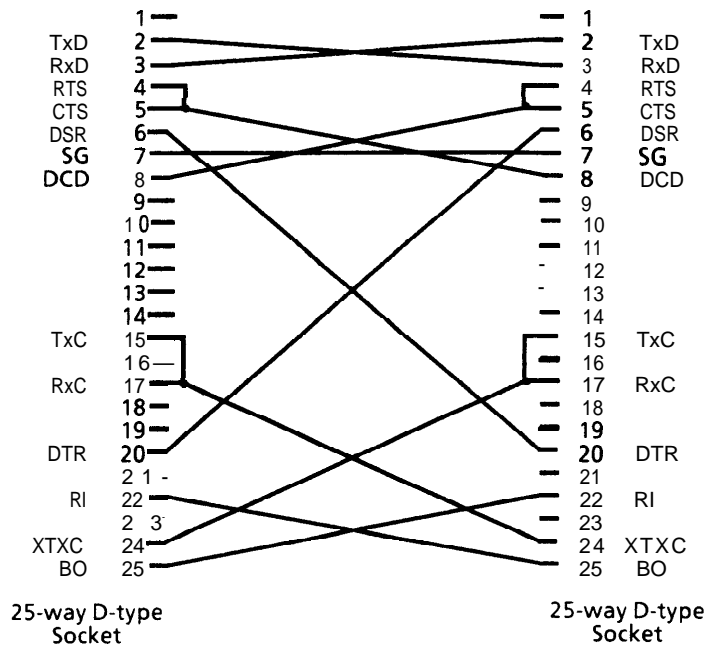


Figure C-2 V.24 DTE Cables X890-403011 and X890-408711

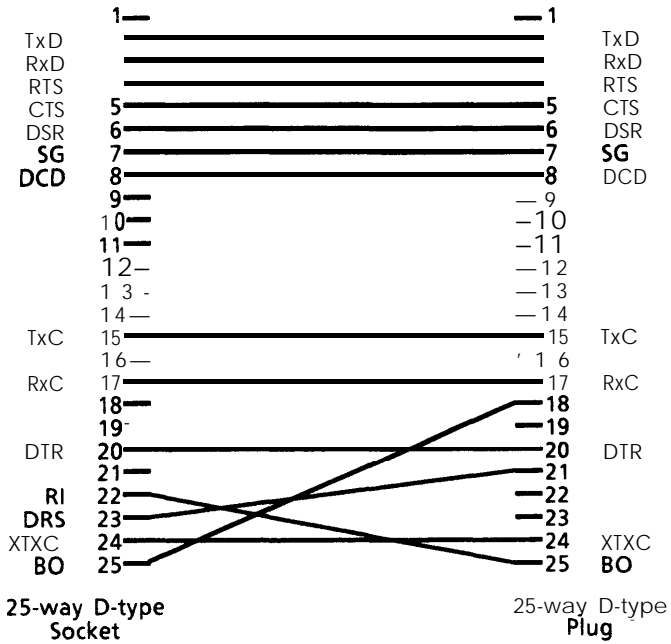


Figure C-3 V.54 DCE Cable X890-40631 1

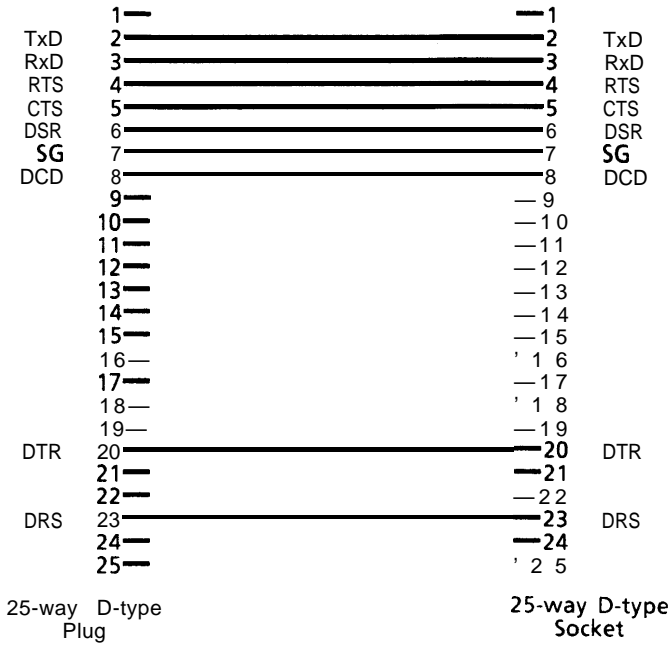


Figure C-4 Manager Cable X890-407111

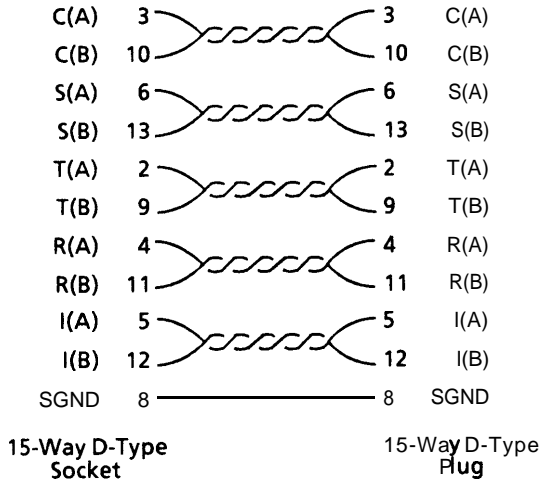


Figure C-5 X.21 Cables X890-401011 and X890-40881 1

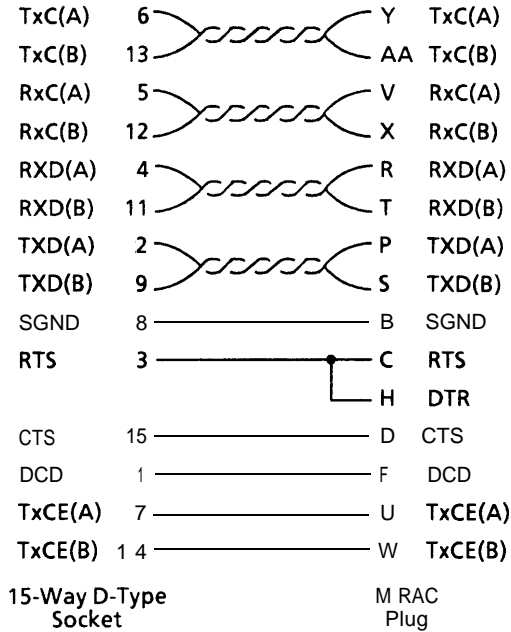


Figure C-6 V.35DCE Cables X890-403411 and X890-409411

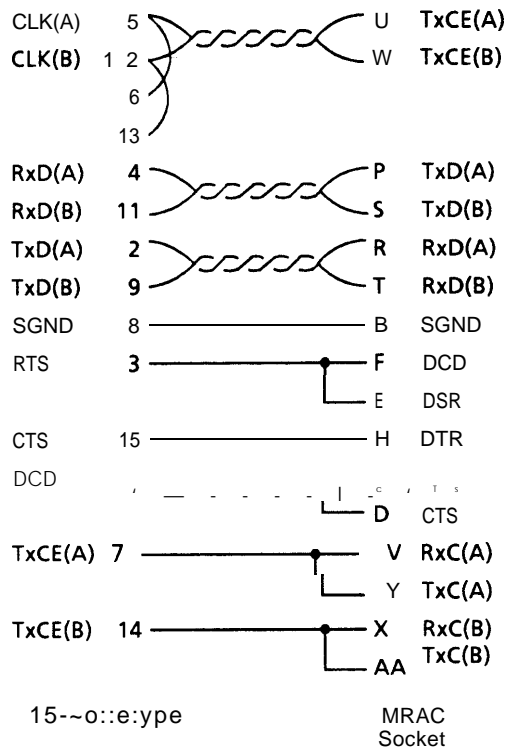


Figure C-7 V.35 DTE Cables X890-403311 and X890-409511

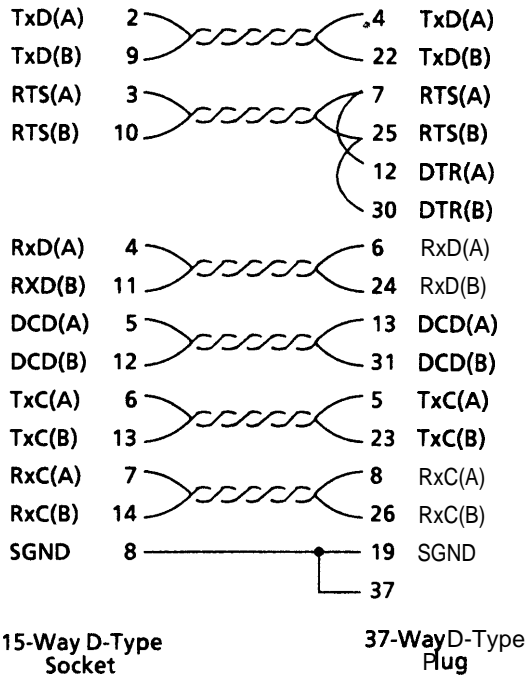


Figure C-8 V.36 DCE Cables X890-406611 and X890-409011

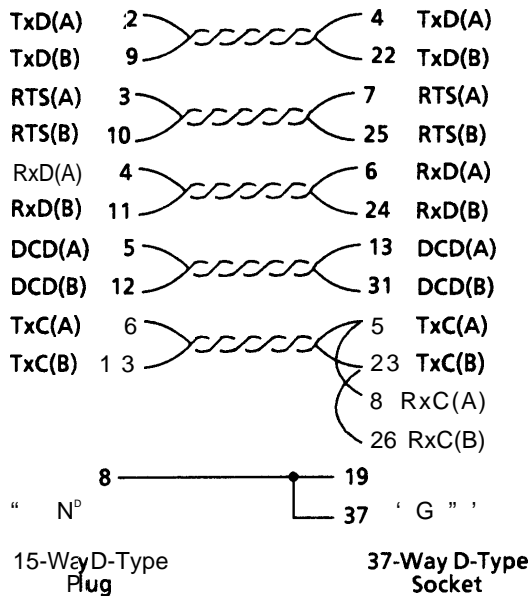


Figure C-9 V.36 DTE Cables X890-406711 and X890-409111

Appendix D

Parts List

General Assy.		X890-101411
Cardframe Assy.		F890-202711
Dual Disk Drive Assy.		X890-204111
Fan Tray Assy. (240V)		X890-202611
PSU 240V General Assy (PSU2)		X100-213511
Motherboard		X890-600211
Diskette (single) 3½" 2Mbyte		A800-500006
UPM1		X890-601011
UPM2		X890-603311
UPM3		X890-604811
UM		X890-601413
XIM1	V.24 X.25 interface module	X890-601311
XIM2	V.11/X.21 & V.36 X.25 interface module	X890-602411
XIM3	V.35 X.25 interface module	X890-602511
PAM1 (L 11)	V.2425-wayD-type	X890-603911
PAM1 (L 12)	Async. V.24 25-way D-type (UM to manager)	X890-603912
PAM2	V.11/X.21 & V.36 15-way D-type	X890-603711/12
PAM3	V.3515-wayD-type	X890-604011

For cable part numbers refer to Appendix C.

Appendix E Firmware Diagnostic Test Numbers

UPM Tests (Numbers 1-127 allocated)

- Test 1: EPROM Checksum
- Test 2: DRAM Data/Addressing
- Test 3: DRAM Refresh
- Test 4: Random Data Pattern
- Test 5: DRAM Execution
- Test 6: Bus Cycle and Software Watchdog
- Test 7: VIA Device
- Test 8: DRAM Parity
- Test 9: Vector Table Read/Write
- Test 10: No test
- Test 11: Novram Checksum, RAM Read/Write
- Test 12: DMAC reg. R/W, INT, memory transfer
- Test 13: Write Protection Mechanism
- Test 14: LED Segment Check
- Test 15: ULA non-DMA R/W Transfers
- Test 16: ULA Fly-by DMA R/W Transfers
- Test 17: ULA Flow thru DMA R/W Transfers
- Test 18: ULA Packet TX and RX
- Test 19: ULA TX Error Interrupt
- Test 20: ULA TX Nogo Interrupt and Counter
- Test 21: ULA Clock Fail Interrupt
- Test 22: ULA Supervisor/Data Flag Check
- Test 23: ULA RX/TX Length Counters
- Test 30: ULA System Test Reflector
- Test 31-47: ULA Packet TX/RX for Test 30

UM Tests (Numbers **128-255** allocated)

Test 128: UM: Upper EPROM Checksum
Test 129: UM: Lower EPROM Checksum
Test 130: UM: UPM Interface and Address decoding
Test 131: UM: Novram
Test 132: UM: Novram Recall
Test 133: UM: Visual Status LED Test
Test 140: UM: Real Time Clock/UPM Interface
Test 141: UM: Battery-Backed RAM
Test 142: UM: RTC; No Interrupts
Test 143: UM: RTC; update ended Interrupt
Test 144: UM: RTC; all 3 Interrupts
Test 150: UM: SCC1/UPM Interface
Test 151: UM: SCC1; no Interrupts, Internal Clock
Test 152: UM: SCC1; TX Interrupt, Internal Clock
Test 153: UM: SCC1; RX Interrupt, Internal Clock
Test 154: UM: SCC1; no Interrupts, Baud Rate Clock
Test 155: UM: SCC2/UPM Interface
Test 156: UM: SCC2; no Interrupts, Internal Clock
Test 157: UM: SCC2; TX Interrupt, Internal Clock
Test 158: UM: SCC2; RX Interrupt, Internal Clock
Test 159: UM: SCC2; no Interrupts, Baud Rate Clock
Test 160: UM: Channel 1 RXD - TXD Loop Test
Test 161: UM: Channel 1 CTS - RTS Loop Test
Test 162: UM: Channel 1 CTS - BO Loop Test
Test 163: UM: Channel 1 DSR - DTR Loop Test
Test 164: UM: Channel 1 DSR - DRS Loop Test
Test 170: UM: Channel 2 RXD - TXD Loop Test
Test 171: UM: Channel 2 CTS - RTS Loop Test
Test 172: UM: Channel 2 CTS - BO Loop Test
Test 173: UM: Channel 2 DSR - DTR Loop Test
Test 174: UM: Channel 2 DSR - DRS Loop Test
Test 180: UM: Channel 3 RXD - TXD Loop Test
Test 181: UM: Channel 3 CTS - RTS Loop Test
Test 182: UM: Channel 3 CTS - BO Loop Test
Test 183: UM: Channel 3 DSR - DTR Loop Test
Test 184: UM: Channel 3 DSR- DRS Loop Test

Test 190: UM: Floppy Disk Controller/UPM Interface Test
Test 191: UM: FDC/Interrupts and DMA, Drive 1
Test 192: UM: FDC/Interrupts and DMA, Drive 2
Test 193: UM: FDC/Interrupts and DMA, Drive 3
Test 194: UM: FDC/Interrupts and DMA, Drive 4
Test 210: UM: Power-up RTC/No Interrupts
Test 211: UM: Power-up RTC/Update ended Interrupt
Test 231: UM: Power-up FDC/No Interrupts, Drive 1
Test 232: UM: Power-up FDC/No Interrupts, Drive 2
Test 233: UM: Power-up FDC/No Interrupts, Drive 3
Test 234: UM: Power-up FDC/No Interrupts, Drive 4
Test 235: UM: Power-up FDC/Interrupts and DMA, Drive 1
Test 236: UM: Power-up FDC/Interrupts and DMA, Drive 2
Test 237: UM: Power-up FDC/Interrupts and DMA, Drive 3
Test 238: UM: Power-up FDC/Interrupts and DMA, Drive 4
Test 251: UM: FDC/No Interrupts, Drive 1
Test 252: UM: FDC/No Interrupts, Drive 2
Test 253: UM: FDC/No Interrupts, Drive 3
Test 254: UM: FDC/No Interrupts, Drive 4

XIM Tests (Numbers 128-255 allocated)

Test 128: XIM: Upper EPROM Checksum
Test 129: XIM: Lower EPROM Checksum
Test 130: XIM: NOVRAM Checksum and Read/Write
Test 131: XIM: NOVRAM Recall
Test 132: XIM: PPI
Test 133: XIM: SCCO
Test 134: XIM: SCC1
Test 135: XIM: DMACO
Test 136: XIM: DMAC1
Test 137: XIM: SCCO Interrupt
Test 138: XIM: SCC1 Interrupt
Test 139: XIM: DMACO Interrupt
Test 140: XIM: DMAC1 Interrupt
Test 141: XIM: DMACO Bus Error
Test 142: XIM: DMAC1 Bus Error
Test 143: XIM: Channel 1 DMAC1 - SCC1
Test 144: XIM: Channel 2 DMAC1 - SCC1
Test 145: XIM: Channel 3 DMACO - SCCO
Test 146: XIM: Channel 4 DMACO - SCCO

Test 150: XIM: Channel 1 TXD - RXD Loop
Test 151: XIM: Channel 1 RTS - CTS Loop
Test 152: XIM: Channel 1 DTR - DSR Loop
Test 153: XIM: Channel 1 DRS - DCD Loop
Test 154: XIM: Channel 1 BO - RI Loop
Test 155: XIM: Channel 1 DRS - TXC Loop
Test 156: XIM: Channel 1 TXCE - RXC Loop
Test 160: XIM: Channel 2 TXD - RXD Loop
Test 161: XIM: Channel 2 RTS - CTS Loop
Test 162: XIM: Channel 2 DTR - DSR Loop
Test 163: XIM: Channel 2 DRS - DCD Loop
Test 164: XIM: Channel 2 BO - RI Loop
Test 165: XIM: Channel 2 DRS - TXC Loop
Test 166: XIM: Channel 2 TXCE - RXC Loop
Test 170: XIM: Channel 3 TXD - RXD Loop
Test 171: XIM: Channel 3 RTS - CTS Loop
Test 172: XIM: Channel 3 DTR - DSR Loop
Test 173: XIM: Channel 3 DRS - DCD Loop
Test 174: XIM: Channel 3 BO - RI Loop
Test 175: XIM: Channel 3 DRS - TXC Loop
Test 176: XIM: Channel 3 TXCE - RXC Loop
Test 180: XIM: Channel 4 TXD - RXD Loop
Test 181: XIM: Channel 4 RTS - CTS Loop
Test 182: XIM: Channel 4 DTR - DSR Loop
Test 183: XIM: Channel 4 DRS - DCD Loop
Test 184: XIM: Channel 4 BO - RI Loop
Test 185: XIM: Channel 4 DRS - TXC Loop
Test 186: XIM: Channel 4 TXCE - RXC Loop
Test 231: XIM: Channel 1 Baud Rate Clock
Test 232: XIM: Channel 2 Baud Rate Clock
Test 233: XIM: Channel 3 Baud Rate Clock
Test 234: XIM: Channel 4 Baud Rate Clock
Test 235: XIM: Channel 1 SDLC End of Frame Int.
Test 236: XIM: Channel 2 SDLC End of Frame Int.
Test 237: XIM: Channel 3 SDLC End of Frame Int.
Test 238: XIM: Channel 4 SDLC End of Frame Int.
Test 250: XIM: Complete XIM Test with the appropriate Loopback
Plug for the particular XIM type under test.

Appendix F Environment Summary

Temperature	Operating: + 5°C to + 35°C Storage: -25°C to + 55°C
Humidity	0% to 95% RH, non-condensing
Cardframe Handling	Should be moved without cards and PSUS Use handles X890-904203
Power Required	220 VAC \pm 20%, 45-65 Hz 5 amp (1.2 kVA) It is recommended that the 8525 is connected to a reasonably clean mains supply. If current breakers are used they should be of type 3 or 4, with thermal delay and 90 amps ² seconds inrush characteristics
Earth Leakage	0.5 mA per PSU
Load	1.2 kVA
Heat Dissipation	0.9 kW per cardframe
Cardframe Dimensions	755 Hx440Wx640Dmm 28.7 H x 17.3 W x 25.2 D inches
UM Relay Contact	1 amp 30 VDC resistive load, contact normally open
Weight (5 PSUs, no cards or cabinet)	54 kg
Atmospheric Pressure Range	800-1100 mb

Appendix G UK PSS and KiloStream

G.1 General

Ports labelled “SAFETY WARNING See Instructions For Use” do not provide isolation sufficient to satisfy the requirements of the relevant ports 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 G-1. **Note that the following port types are prohibited from connection:**

- PAM1 level 12 (manager ports)
- PAM2 ports when configured in software as V.36
- PAM2 female (DCE) ports.

INTERFACE TYPE	PAM TYPE	XIM TYPE	CONNECTOR TYPE	CABLE PART NUMBER
V.24	PAM1 (Level 11)	XIM1	4 x 25-way D-type male (DTE)	X818-401211
X.21	PAM2	XIM2	4 x 15-way D-type male (DTE)	X890-40841 1
V.35	PAM3	XIM3	4 x 15-way D-type male (DTE)	X818-401311

Table G-1 Permissible UK PSS/KiloStream Connections

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.

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

G.2 NTU Pin Assignments

The pinout Tables G-2 to G-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 G-1. For the pinouts at the PAM end of the cables refer to Appendix B.2.

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 G-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 (1A)
12	Input	Indication (1B)
8		Signal Ground (G)

**Table G-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	RequestTo Send(RTS)
D	Input	ReadyforSending (RFS)
F	Input	Data Carrier Detect (DCD)

**Table G-4 V.35 Interface Pin Assignments
(AtNTUEndofCable X818-401311)**

G.3 Cable Pinouts

Figures G-1 to G-3 give the pinouts of the three available PSS/KiloStream cables. The 8525 end of each cable is on the left.

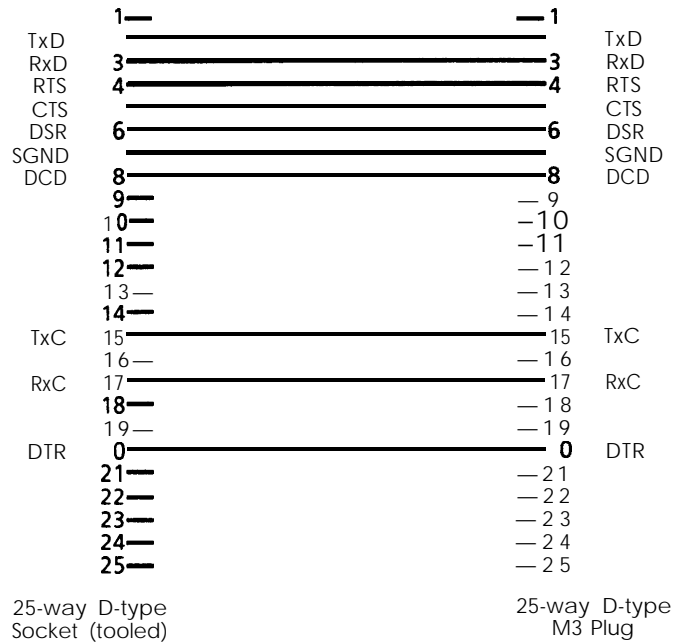


Figure G-1 V.24 PSS/KiloStream Cable Part Number X818-401211

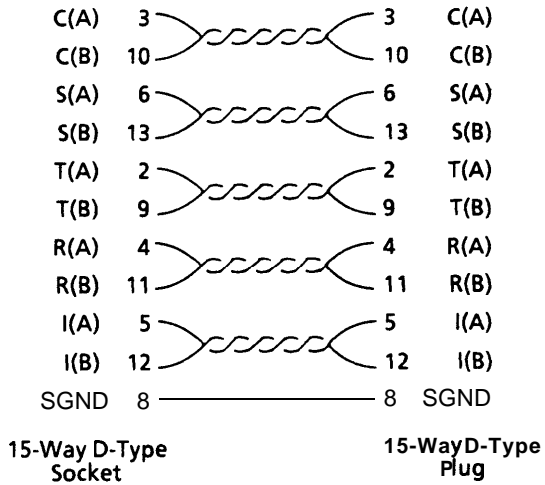


Figure G-2 X.21 PSS/KiloStream Cable Part Number X890-408411

