ascom

OM4x2

MTU442MM

User Guide

ascom

User Guide

OM4x2

ascom Part Number :

1/219/001/610

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Note   This document does not claim integrity and accuracy in detail

This documentation is protected by copyright.

Changes to this document may be made at anytime.

Caution – hazardous voltages inside

The side panel of the desktop unit may not be detached from the housing while the mains power lead (230V ac or 115V ac) is still connected!

Caution – Laser Product

The Optical Interface is classified as a CLASS 1 LASER PRODUCT.

Caution – Electrostatic sensitive device

When handling the card version of the OM4 x 2, Electrostatic precautions should be used at all times.

Declaration of conformity

The transmission equipment detailed in this document meets the essential requirements of the Radio & Telecommunication Terminal Equipment Directive 1999/05/EC

Radiation Emissions Warning
This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

1 Contents

2 Guidance notes concerning demonstration installations.

Whilst our unit will function as expected in normal operation, there have been some cases during testing where the operator has required some guidance. We have tried to set out below the most common problems encountered.

2.1 Dust on the optical connections.

Repeated insertions of optical connectors to the unit's optical port may cause a build up of dust on the face of the fibre resulting in the units failing to communicate. This can be avoided by the correct handling of optical connectors. The optical fibre should never be placed, unprotected, on the desk surface where dust can be attracted onto the end of the fibre cord. If this precaution isn't taken, then the dust may pass onto the internal surfaced of the optical port when the fibre is plugged into it, and then becomes difficult to remove.

As a precaution against dust entering the unit, the face of the optical fibre must be wiped before the connector is inserted into the optical port. It is also advisable to discharge a sharp blast of compressed air to the optical port itself. This procedure must be carried out every time an optical cable is connected to the unit to ensure that it functions correctly. Failure to do this may cause degradation to the performance of the unit including the possibility of complete failure. (We recommend a can of compressed air, and a small quantity of optical wipes are made available)

2.2 ITU and ETSI response functions.

When testing the units with ITU or ETSI response functions programmed, it must be remembered that both of these response functions require specific framing and CRC patterns. Whilst this is intentional under operational conditions, it can prove a source of some confusion during demonstration, and acceptance testing.

For example, both ITU and ETSI response functions expect the received data signal to be a framed signal. If this is not detected, it is not a valid data pattern according to the rules, and the unit will therefore treat it in the same way as loss of signal. This will cause the appropriate fault procedure to be applied, which will result in the traffic being blocked.

Please use the appropriate data patterns during testing, demonstration and evaluation. If in doubt, unless ITU or ETSI response functions are specifically required, we suggest that you select 'Basic' response function, which allows unframed data. Where ITU or ETSI response functions are required, ensure that your tester is set to Framed data, with CRC-4 generation.

2.3 ETSI loopback bits.

Most bit error rate testers insert all ones into the Sa bits. However, according to the ETSI standard, this is a loopback request, and consequently, when the unit is set to ETSI response function, the unit will respond to this pattern by initiating test mode. To prevent this, the Sa6 bits must be set to their default condition (all zeros). If your bit error rate tester is not capable of setting the Sa6 bits, then it is unsuitable for use with the ETSI response functions. Choose either ITU, or basic response functions instead.

3 Introduction

3.1 Description

The Ascom OM4x2 provides a cost effective and manageable approach to delivering digital lines into customer premises. The OM4x2 takes four co-directional G.703 signals and condenses them onto a single 1300nm optical fibre - providing a highly integrated solution with low commissioning costs.

Its flexible data format and comprehensive range of monitoring functions make Ascom's OM4x2 the ideal choice for low maintenance installations.

Remote management is catered for with both TNS and SNMP supported. Comprehensive menus allow quick and easy access to all statistical and control information. A VT100 terminal connection is also provided for those preferring localised management.

The customer unit has all the functionality necessary to provide leased line and PABX connectivity. There are minimal stock options. One unit covers most requirements and is available in Card or desktop versions.

The customer unit has both 75ohm and 120ohm connectors fitted as standard. This allows Network Operators greater flexibility in providing for differing customer needs.

Simple provisioning of Primary Rate ISDN (PRI) access is possible, with full NT1 functions included as standard.

Various G.703 framing options may be programmed. The unit can be set for unframed, framed, and framed with CRC-4 access. The OM4x2 framing may be fixed to one type, or configured to auto-detect.

The OM4x2 Desktop and Card units are fully manageable and configurable from the exchange unit, either by a VT100 terminal, SNMP connection, or remotely via a modem connection. A local terminal port is provided for on-site maintenance and configuration. Alarm inputs, outputs and transparent auxiliary channels allow for a flexible installation

Mains power is supplied to the Desktop unit via an IEC mains connector. A cable clamp can be provided to prevent the unit from being unplugged.

3.2 Mechanical Concept – Desktop unit.
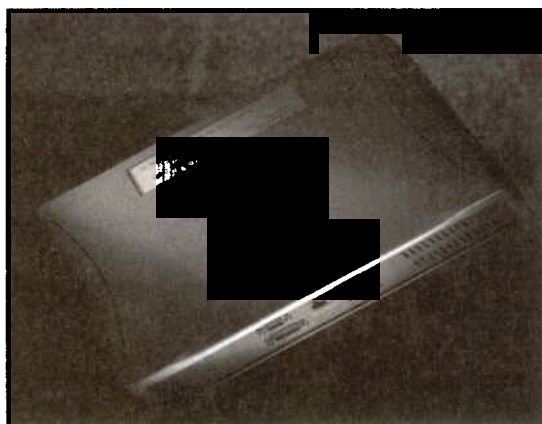
The line equipment desktop unit is accommodated in a plastic moulded housing. Indication elements are located on the top of the unit. Cables are plugged into the front and rear of the unit.

The dimensions of the desktop unit are:

(W x H x D) 350 x 72 x 260 mm.

3.3 Mechanical concept – Card Version.
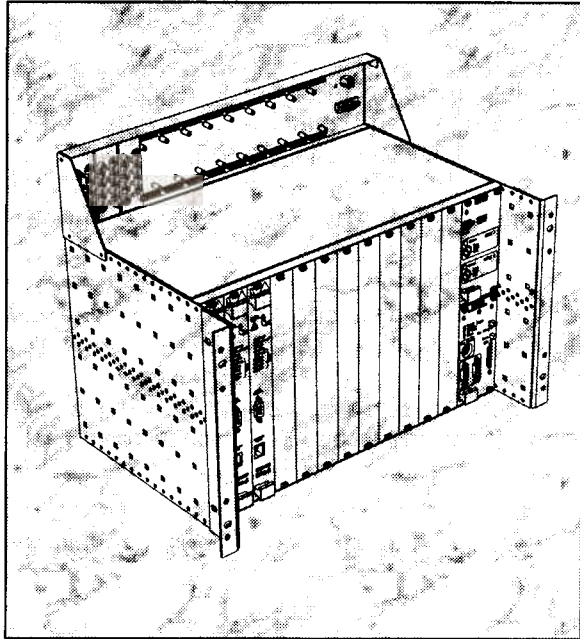
The OM Rack is compatible with the existing AM2048 and AM1024 range of products, allowing copper (HDSL) and optical products to be housed along side each other in the same sub-rack.

The OMRack features Dual Redundant –48V DC power inlets. Either of which is capable of powering the entire rack.

An external mains to DC converter is available for those applications requiring the OMRack to be powered from the mains.

The dimensions of the OM Rack are;

19"wide x 8VU high
(ETSI variant available)
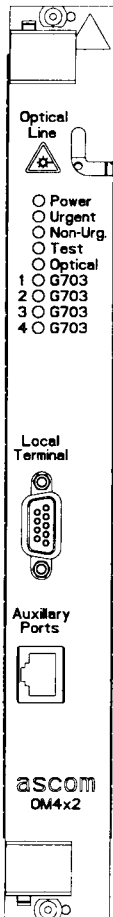
The OM4x2 line card has a number of interface connection options - BNC or BT type-43 for 75ohm and RJ45 connectors for 120ohm termination.

Traffic connectors are located on a separate connection panel. This allows for easy connection of new cables and services without the need to disturb installed line cards and existing traffic. Alternatively, for ease of maintenance, the line card can be removed, without the need to unplug cables.

The chassis mounted Network element card handles all Network Management functions. SNMP, TNS, and PPP connections are provided to each line card and its distant partner, allowing full control, statistical review, status monitoring and alarm generation of all cards.

Slim line cards allow up to 12 line cards per sub rack. This means up to 48 E1 lines can be provisioned from a single chassis. Equipment density is therefore high, maximising the available space.
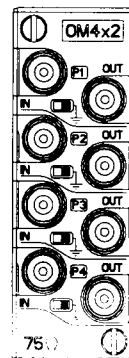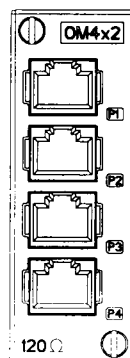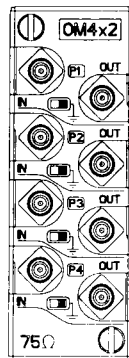
4 Installation

The desktop units will require cable connections to be made prior to the power on sequence, this will involve connecting up the relevant cables to the front and rear of the unit. It is recommended that the user read through this manual prior to set up to gain an understanding of the operation of both the units and the software used to control the units.

4.1 Connecting Mains Power to the units

The OM4x2 units require either 110 / 230V ac or –48V dc to enable the power up sequence to begin.
On the desktop unit, there are four LED's: Power, Fault, Test and UPS. When power is applied to the unit, all four LED's illuminate for approximately 3 seconds. Then the Fault, Test and UPS LED's will go off but the Power LED will stay illuminated, whilst the power remains on.
On the Card version there are nine LED's: Power, Urgent (Alarms), Non Urgent (Alarms), Test, Optical, 1 G.703, 2 G.703, 3 G.703, 4 G.703. When the card is inserted into the Rack the power is automatically applied to the card and the Power and Test LED's illuminate for approximately 3 seconds. The test LED will then go off but the Power LED will remain on until the Card is removed from the Rack or the power supply to the Rack is lost.

The Desktop unit and Card unit will then be in a ready state for customer configuration.

4.2 Connecting to the terminal port

To configure the units, a VT100 terminal or PC running a VT100 emulation program must be connected to the 9-way serial terminal port on the front of the unit. When using a PC, any VT100 emulation software should be suitable although Ascom recommend using the Teraterm software provided, or the HyperTerminal program associated with Microsoft Windows.

4.2.1 Local terminal port connector

9-way female D-type connector located on the front panel (labelled *HHT*)
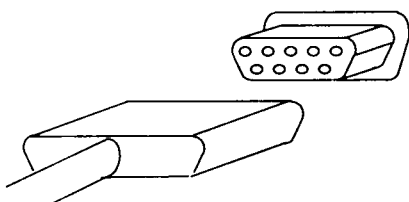
Local terminal interface 9 way female D-type (DCE interface)		Signal direction
1	-	-
2	Receive	out
3	Transmit	in
4	DTR	in
5	Ground	-
6	DSR	out
7	RTS	in
8	CTS	out
9	-	-

Note – The local terminal port connector is a DCE interface.
(DCE's transmit their data on the wire named RECEIVE)

4.2.2 Cable requirements

Use a straight through cable to connect your terminal, or modem.

OM4x2 connector (DCE interface)		Signal direction	Terminal, or modem connection (DTE interface)		
9 way male D-type			9 way female D-type		25 way female D-type
1	-	————	1	-	8
2	Receive	out ——▶ in	2	Receive	3
3	Transmit	in ◀—— out	3	Transmit	2
4	DTR	in ◀—— out	4	DTR	20
5	Ground	————	5	Ground	7
6	DSR	out ——▶ in	6	DSR	6
7	RTS	in ◀—— out	7	RTS	4
8	CTS	out ——▶ in	8	CTS	5
9	-	————	9	-	22

Suitable cables are PC-AT serial port extender cables, or PC-AT serial mouse extender cables. The serial ports on most terminals and PC's are configured as DTE interfaces.

4.2.3 VT100 Interface Settings

The default settings for the serial port connection are as follows;

Baud Rate – 19200bps
Data Bits – 8
Parity – None
Stop Bits – 1
Handshake – Xon/Xoff

4.2.3.1 Using the Windows based "HyperTerminal"

In its default condition "HyperTerminal" will not display the menu screens correctly. Please use the following settings:

File->Properties-> Connect to->configure:	19200, 8, None, 1, Xon/Xoff
File->Properties->Settings:	Terminal keys, VT100, 500
File->Properties->Settings->Terminal setup:	Underline, character set = ASCII.
View-> Font:	Terminal, Regular, 14

Once configured, the screen will automatically display the following screen:

```
      aaaaa     sssss    cccc    oooo    mm mm
          a   s     s  c     c  o      o  m  m  m
          a   s         c        o      o  m  m  m
      aaaa a   sssss    c         o      o  m  m  m
      a    a         s  c         o      o  m  m  m
      a    aa  s     s  c     c   o      o  m  m  m
      aaaa a   sssss    cccc     oooo    m  m  m

  ttttt   eeee   l       eeee    cccc    oooo    mm mm
    t     e   e  l     e     e  c     c  o      o  m  m  m
    t     e      l     e         c        o      o  m  m  m
    t     eeeee  l     eeeee     c        o      o  m  m  m
    t     e      l     e         c        o      o  m  m  m
    t     e   e  l     e     e  c     c   o      o  m  m  m
    t     eeee   llll   eeee    cccc    oooo    m  m  m


                   OM4x2

           Press space-bar to continue
```
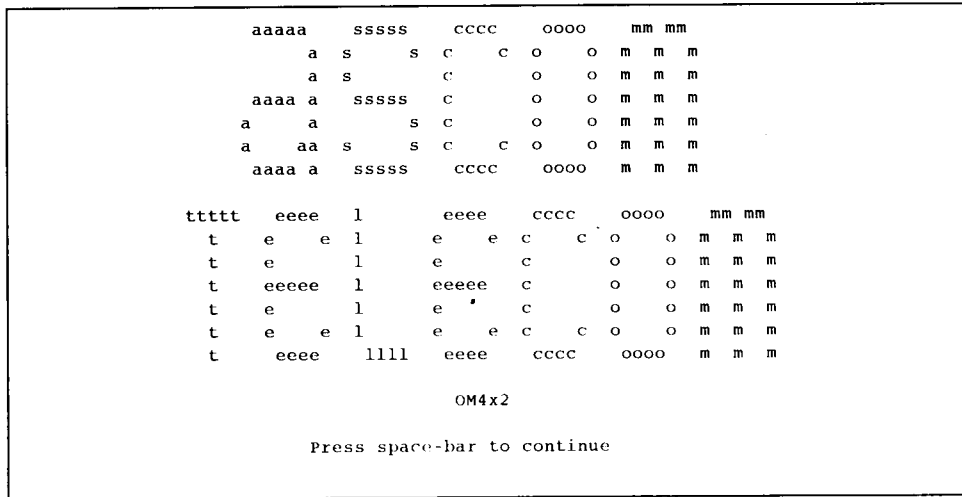
4.2.4 Local terminal port configuration

To view or configure the terminal port settings, move to the "Serial Communications" screen (see section 8). The selection displayed can be altered using the spacebar (See section 7.3). The factory standard configuration is:

```
OM4x2                                        Fri 18 Feb 2000 00:34:34
                    Configuration > Serial Communications
Urgent Alarm:On    Non-Urgent Alarm:Off


     Baud Rate      Data Bits      Parity     Stop Bits      Handshake
       2400 ( )      7 ( )       None (*)        1          None  ( )
       4800 ( )      8 (*)       Odd ( )                   Xon/Xoff (*)
       9600 ( )                  Even ( )
      19200 (*)



             Press Return to Accept or Escape to Cancel

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Default
```
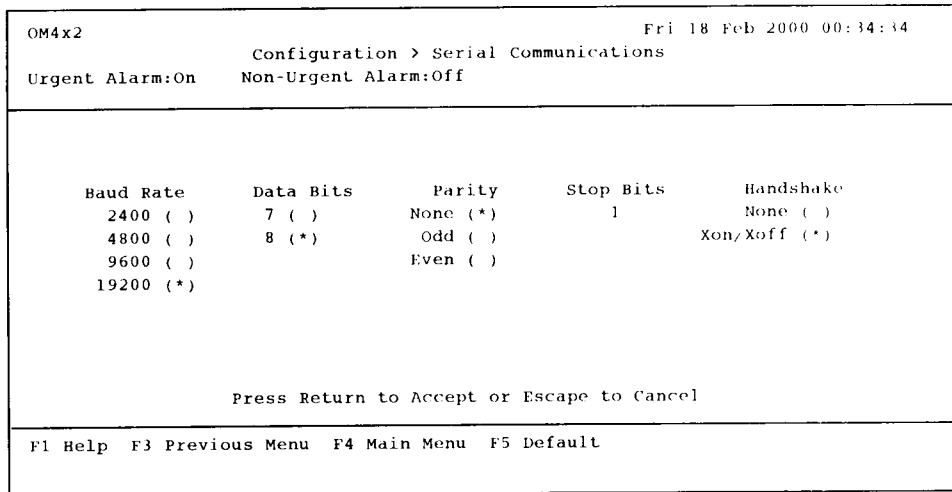
If the baud rate has been set incorrectly, HyperTerminal will not display any characters (other terminal emulators may show incorrect characters) and can cause confusion. If the setting has been changed, please try setting each baud rate in turn on the terminal emulator settings.

4.3 Connecting to the Optical Port

Single optical port
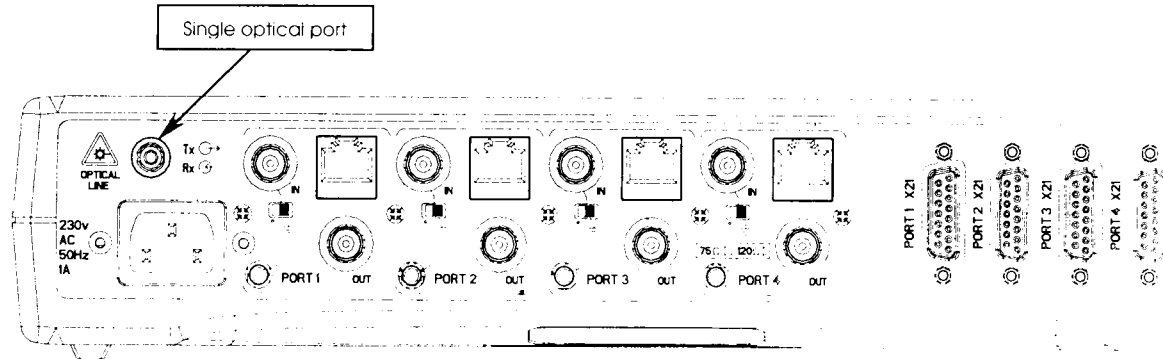
Warning – high level of invisible laser light. Never look into the optical port, or the optical cable. Permanent eye damage may occur.

Class 1 laser device.

In common with most communication lasers, this product produces a high level of light. Looking directly into the optical port will damage your eyes. Normally the human eye would respond to bright light by reducing its pupil size. The blink aversion reflex would further limit the amount of damage done. However, the laser light produced is of a very short wavelength – in the far infrared region of the spectrum, and unfortunately the human eye can neither see light of this wavelength, or respond to it. If you look into the optical port, you will not see the infrared light, but your eyes will be damaged by it.

4.3.1 Types of fibre optic connector

4.3.1.1 FC-SPC
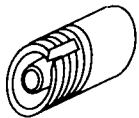
This connector is more commonly used on single-mode cable. To connect - align the centre of the fibre plug with the centre of the optical connector (on the rear panel. Push the plug in gently. Rotate to align the keyway. The plug should now go in a little more. Make sure the keyway is correctly located by rotating the plug to the left and to the right. Only a little movement should be allowed. Once in place secure the plug by turning the locking ring clockwise. Taking care not to over-tighten the locking ring excessive pressure will cause misalignment, finger tight is more than ample.

4.3.1.2 ST
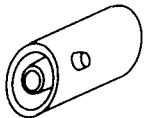
This connector is commonly used on multi-mode cable. Its construction is similar to the BNC connection found on the user ports. To connect - align the centre of the fibre plug with the centre of the connector. Push gently, aligning the slot in the locking ring with the round pegs on the connector. Push fully home, then rotate the locking ring to secure.

4.3.1.3 Problems with the optical port

The vast majority of problems are caused by dust contamination of the optical window. Before installing the optical plug, its end must be cleaned with an approved disposable optical wipe. The optical connector on the unit must be cleaned by blowing clean (oil and dust free) compressed air down the centre of the optical connector.

4.3.2 Optical performance

Optical port specification		
Maximum link budget	24 dB single-mode 16 dB multi-mode	The maximum attenuation allowed for reliable communications. Attenuation is a characteristic of the optical fibre. The better quality of optical fibre the longer the available range.
Minimum link attenuation	0 dB	The minimum attenuation allowable for reliable communications. A figure of 0dB means the unit does not require external attenuators for short distances.
Transmit power	-4 dBm	The amount of light power transmitted by the laser into the optical fibre.
Receive sensitivity	-28 dBm single-mode -20 dBm multi-mode	The minimum amount of light received by the unit for reliable communications.
Optical wavelength	1300nm	Both the transmitter and receiver operate on an optical wavelength of 1300nm.
Number of fibre connectors	1	The unit uses the same fibre for transmit and receive.
Optical connectors	FC-SPC or ST	Normally FC-SPC connectors are used on single-mode fibre. ST connectors being the choice for multi-mode fibre.
Acceptable fibre	Single-mode or multi-mode	Multi-mode cable has an inherently larger attenuation figure, and as such has a lower range. The range differs with the choice of cable.
Preferred choice	Cables designed to G.652	Ideally choose single-mode cables designed to the international standard G.652. The unit will operate with a variety of cables, however the range and reliability may be effected.
Laser classification	Class 1	International organisations have produced classification systems to indicate the level of optical hazard. Class 1 is the safest. However, we stipulate the unit is only installed by professionally trained service personal.

4.3.3 Range

The range achieved will depend upon the optical fibre used. The better the quality of fibre, the further the range. Typical figures are given below:

Id	Attenuation	Range	
Cable A	0.35 dB/Km	65.7 Km	Premium single-mode optical fibre.
Cable B	0.40 dB/Km	57.5 Km	Standard single-mode optical fibre.
Cable C	1.00 dB/Km	15.0 Km	Multi-mode optical fibre.
Cable D	2.40 dB/Km	6.25 Km	Poor quality cable.

Range = Link budget – Connector losses – Splice losses

Attenuation

Note – In the above figures, the attenuation of both the splices and optical connectors has been assumed to total 1.0 dB.

4.3.4 Finding out what's wrong

Use the Performance > Optical Port screen to quickly identify faults.

LOS indicates that no signal is present

```
OM4x2                                                    Sun 04 Jan 1970 19:56:15
                              Performance > Optical       .
Urgent Alarm:On      Non-Urgent Alarm:Off

Subsystem: Customer

                                        .
                                       Start Time

  LOS Detected [ ]

           Available  Seconds 329454        Trip Counter 329454
         Unavailable  Seconds 0             Trip Counter 0
    Severely Errored  Seconds 0             Trip Counter 0
             Errored  Seconds 0             Trip Counter 0
          Error Free  Seconds 329454        Trip Counter 329454


 F1 Help  F3 Previous Menu  F4 Main Menu  F7 Previous Subsystem
 F8 Next Subsystem  F9 Reset Trips  F10 Reset System Counters
```

Counters start once a signal has been detected. Otherwise, initially, they remain frozen.

Alarm	Problem	Cause
LOS detected	Incoming signal is not present. (LOS mean Loss Of Signal)	• Optical cable is broken. • Optical cable is faulty. • Remote partner unit not powered on. • Dirt on optical connectors.

4.4 Connecting to the E1 User Ports

Four E1 user ports

The X.21 interfaces are located separately, but are logically part of the four user ports

Switches select between 75Ω and 120Ω interfaces. Each port has its own

BNC's are active when 75Ω interface is selected

RJ45 is active when 120Ω interface is selected
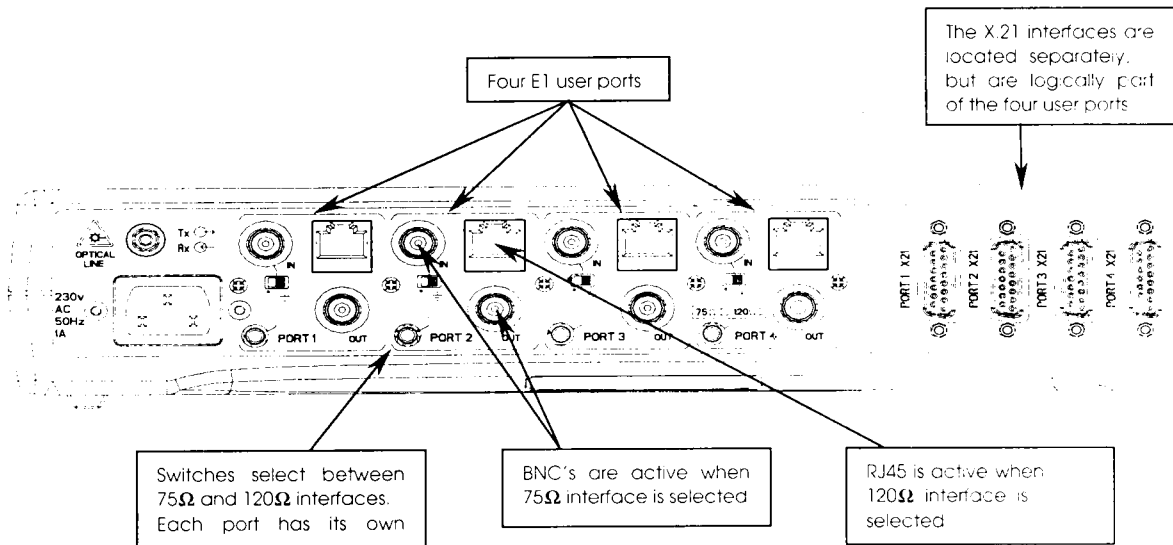
Note – The X.21 interfaces are not fitted to some models.
Each of the four user ports have the same group of common components:

Component	Marking	Function
BNC connector	In	Receive G.703 data, with 75ohm impedance.
BNC connector	Out	Transmit G.703 data, with 75ohm impedance.
RJ45 connector		Transmit and receive G.703 data, with 120ohm impedance.
15 way D-type	X.21	Transmit and receive X.21 data.
Push switch	75ohm/120ohm	Selects between 75ohm and 120ohm connectors. Out = 75ohm connectors are active. In = 120ohm connectors are active.
Slide switch	• ⏚	Selectively make(⏚), or break (•) the earth connection to this port's Receive BNC. Some earth loops can cause transmission problems. Breaking the earth connection may help solve these problems.

Note - The 75ohm BNC connection is also known as unbalanced G.703, whilst the 120ohm connection is known as balanced G.703.

4.4.1 Pin assignments

4.4.1.1 Unbalanced G.703 interface

The BNC's are 75ohm connections conforming the international standard G.703 for unbalanced connection at 2.048Mbps.
There are 2 BNC's per interface. One for transmit data (marked OUT) and one for receive data (marked IN).

Cables are normally wired 'crossed-over'. Connect the OUT (Tx) BNC of this unit to the IN (Rx) BNC of the terminal equipment. Similarly cross-connect the remaining connectors, IN (Rx) to OUT (Tx).

BNC co-ax connector	
Connector inner	Signal
Connector outer	Ground
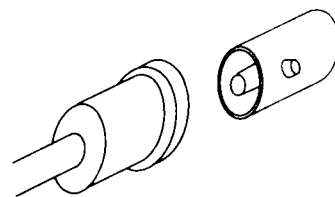
4.4.1.2 Balanced G.703 interface

The 8 way RJ45 connectors present a balanced 120ohm Interface conforming to the G.703 standard.

8 way RJ45 connector		Signal direction
1	Transmit a	out
2	Transmit b	out
3	Transmit ground	-
4	Receive a	in
5	Receive b	in
6	Receive ground	-
7	not used	-
8	not used	-

Cables are normally wired 'crossed-over'. The transmit pair, on pins 1&2, connect to the receive pair of the terminal equipment (pins 4&5).

4.4.1.3 X.21 interface

The 15 way D-type connectors present a X.21 DCE interface.

Note – A DCE interface also generates the clock for the link. It transmits data onto the X.21 signal named RECEIVE.

Connection to a DTE requires a straight through cable. (Most terminal equipment are configured as DTE's)
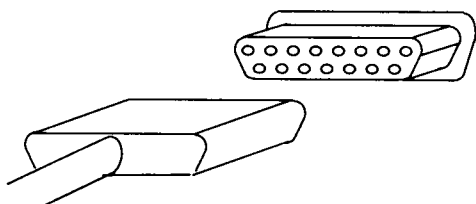
15 way D-type connector for the X.21 interface. (DCE interface)		
1	-	-
2	Transmit A	in
3	Control A	in
4	Receive A	out
5	Indication A	out
6	Timing A	out
7	Byte timing A	out
8	Ground	
9	Transmit B	in
10	Control B	in
11	Receive B	out
12	Indication B	out
13	Timing B	out
14	Byte timing B	out
15	-	-

4.4.2 Configuring the user ports

The unit is supplied with all four user ports disabled. These user ports must be enabled prior to use. Disabled ports block traffic, replacing it with AIS patterns. To configure the ports, you must logon to the user port as described in section 5, and follow the menus to 'Configuration->User Port' as shown in section 8. Section 7 explains how to change the data on the configuration screen.

```
Toggle this check box to                              Select the X.21
[X] to enable this port                               interface here


  OM4x2                                            Fri 18 Feb 2000 00:57:34
                        Configuration > User Ports
  Urgent Alarm:On     Non-Urgent Alarm:Off

  Subsystem : Customer                                  Port : 1

                    Interface               Response Functions
       Enable [X]   75/120 Ohm Switch (*)         Basic ( )
       Invert [ ]              X.21 ( )           I.431 ( )
                                                  ETSI (*)

                       Framing                 CRC Checking
                        On (*)                     On (*)
                        Off ( )                    Off ( )
                        Auto ( )                   Auto ( )

                 Press Return to Accept or Escape to Cancel
  F1 Help   F3 Previous Menu   F4 Main Menu   F5 Previous Channel
  F6 Next Channel
```

Inverting the traffic may prove useful when testing the line. This prevents the customer from gaining full access.

All 4 User Ports are configured independently

4.4.2.1 Explanation of the controls on this screen.

Button	Function		
Enable	A disabled user port will prevent the customer from gaining useful access. AIS is continually transmitted, both towards the customer, and the exchange. The incoming traffic is blocked. No monitoring takes place and no response functions are active. Disabling a port disconnects it logically from the network. An enabled port will give the customer full access.		
Invert	An inverted user port passes data normally, but the data is mirrored (all the 0's become 1's, and all the 1's become 0's). This is useful commissioning a line, when the link must be active, but the customer should not have full access yet. However, you must, at the very minimum, use test equipment that is capable of accepting inverted test patterns. Note – the inversion takes place on the way out of the unit. For the unit to recognise the framing structure it must receive the correct non-inverted sense. However, the unit will then invert the framing on the way out. It may be best to consider not using framing whilst in this test mode.		
Framing	Turing framing OFF makes this port transparent to data content. When turned ON the incoming data is monitored and corrected for framing errors, but the data must contain valid frame signals. Framing must be ON for the Response functions and CRC checking to operate.		
CRC checking	The incoming data can be checked for CRC errors. If it is OFF, CRC errors are ignored, passing transparently through this unit. Whilst ON, CRC errors are monitored, recorded and corrected.		
Response functions	Differing international standards require the unit to respond to fault conditions differently.		
	BASIC	Designed for transparent (unframed) data. The unit will not respond to framing errors, or CRC errors. The most basic of responses are active, generally AIS is generated in response to all traffic effecting faults, e.g. fibre break	
	I.431	Simple responses for framed data. Correctly responds to events, such as framing synchronisation loss, in a controlled and standardised manner.	
	ETSI	Required for Primary Rate ISDN Access (PRA). The responses follow the ETS 300 233 standard. Similar to the I.431 setting, but more complex and with additional functionality. Includes a message passing system controlling loopbacks and fault reporting to the exchange. *Note* – the Sa5 & Sa6 bits are not passed transparently in this mode.	
Interface	To enable the X.21 interfaces select them here. Otherwise the rear panel switch controls the selection of the 75ohm BNC's, or the 120ohm RJ45 interfaces.		

4.4.2.2 Example configurations

1. Transparent 2.048Mbps leased line.

   75ohm BNC unbalanced presentation.
   No framing.
   No CRC checking.

```
OM4x2                                              Sat 03 Jan 1970 22:14:41
                          Configuration > User Ports
Urgent Alarm:On     Non-Urgent Alarm:Off

Subsystem : Customer                                   Port : 1

                       Interface              Response Functions
          Enable [X]   75/120 Ohm Switch (*)         Basic (*)
          Invert [ ]             X.21 ( )            1.431 ( )
                                                      ETSI ( )


                         Framing              CRC Checking
                         On ( )                    On ( )
                         Off (*)                   Off (*)
                         Auto ( )                  Auto ( )

               Press Return to Accept or Escape to Cancel

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel
```

```
OM4x2                                              Sat 03 Jan 1970 22:14:46
                          Performance > User Port
Urgent Alarm:On     Non-Urgent Alarm:Off

Subsystem: Customer          Port Type: G703 75 Ohm      Framing: Off
Port: 1                      Response Function: Basic         CRC: Off

     AIS Detected [ ]          EBER > 10E-3 [ ]      Framing Detected [ ]
     LOS Detected [ ]          EBER > 10E-6 [ ]          CRC Detected [ ]

        Line Code Violations 180          Trip Counter 0
             CRC Error Count 0            Trip Counter 0
            Available Seconds 251772      Trip Counter 69
          Unavailable Seconds 0           Trip Counter 0
      Severely Errored Seconds 5          Trip Counter 0
              Errored Seconds 1           Trip Counter 0
           Error Free Seconds 251766      Trip Counter 69

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel  F7 Previous Subsystem  F8 Next Subsystem  F9 Reset Trip
F10 Reset System Counters
```

2. Framed 2.048Mbps PABX connection.

   75ohm BNC, unbalanced presentation.
   No CRC checking.

```
OM4x2                                              Sat 03 Jan 1970 22:14:41
                          Configuration > User Ports
Urgent Alarm:On     Non-Urgent Alarm:Off

Subsystem : Customer                                   Port : 1

                       Interface              Response Functions
          Enable [X]   75/120 Ohm Switch (*)         Basic (*)
          Invert [ ]             X.21 ( )            1.431 ( )
                                                      ETSI ( )


                         Framing              CRC Checking
                         On (*)                    On ( )
                         Off ( )                   Off (*)
                         Auto ( )                  Auto ( )

               Press Return to Accept or Escape to Cancel

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel
```

```
OM4x2                                              Sat 03 Jan 1970 22:14:46
                          Performance > User Port
Urgent Alarm:On     Non-Urgent Alarm:Off

Subsystem: Customer          Port Type: G703 75 Ohm      Framing: On
Port: 1                      Response Function: Basic         CRC: Off

     AIS Detected [ ]          EBER > 10E-3 [ ]      Framing Detected [ ]
     LOS Detected [ ]          EBER > 10E-6 [ ]          CRC Detected [ ]

        Line Code Violations 180          Trip Counter 0
             CRC Error Count 0            Trip Counter 0
            Available Seconds 251772      Trip Counter 69
          Unavailable Seconds 0           Trip Counter 0
      Severely Errored Seconds 5          Trip Counter 0
              Errored Seconds 1           Trip Counter 0
           Error Free Seconds 251766      Trip Counter 69

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel  F7 Previous Subsystem  F8 Next Subsystem  F9 Reset Trip
F10 Reset System Counters
```

3. Primary rate ISDN access.

```
OM4x2                                              Sat 03 Jan 1970 22:13:41
                             Configuration > User Ports
Urgent Alarm:On    Non-Urgent Alarm:Off

Subsystem : Customer                                   Port : 1

                        Interface               Response Functions
          Enable [X]    75/120 Ohm Switch (*)         Basic ( )
          Invert [ ]                 X.21 ( )          I.431 ( )
                                                        ETSI (*)

                             Framing              CRC Checking
                              On (*)                   On (*)
                             Off ( )                  Off ( )
                            Auto ( )                  Auto ( )

             Press Return to Accept or Escape to Cancel

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel
```

```
OM4x2                                              Sat 03 Jan 1970 22:14:46
                             Performance > User Port
Urgent Alarm:On    Non-Urgent Alarm:Off

Subsystem: Customer          Port Type: G703 75 Ohm       Framing: On
Port: 1                    Response Function: ETSI              CRC: On

     AIS Detected [ ]           EBER > 10E-3 [ ]      Framing Detected [ ]
     LOS Detected [ ]           EBER > 10E-6 [ ]          CRC Detected [ ]

          Line Code Violations 180          Trip Counter 0
               CRC Error Count 0            Trip Counter 0
             Available Seconds 251772       Trip Counter 69
           Unavailable Seconds 0            Trip Counter 0
        Severely Errored Seconds 5          Trip Counter 0
               Errored Seconds 1            Trip Counter 0
            Error Free Seconds 251766       Trip Counter 69

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel  F7 Previous Subsystem  F8 Next Subsystem  F9 Reset Trip
F10 Reset System Counters
```

4. Framed X.21 service with CRC checking and I.431 response functions.

```
OM4x2                                              Sat 03 Jan 1970 22:14:41
                             Configuration > User Ports
Urgent Alarm:On    Non-Urgent Alarm:Off

Subsystem : Customer                                   Port : 1

                        Interface               Response Functions
          Enable [X]    75/120 Ohm Switch ( )         Basic ( )
          Invert [ ]                 X.21 (*)          I.431 (*)
                                                        ETSI ( )

                             Framing              CRC Checking
                             Off (*)                  Off (*)
                              On ( )                   On ( )
                            Auto ( )                  Auto ( )

             Press Return to Accept or Escape to Cancel

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel
```

```
OM4x2                                              Sat 03 Jan 1970 22:14:46
                             Performance > User Port
Urgent Alarm:On    Non-Urgent Alarm:Off

Subsystem: Customer          Port Type: X.21             Framing: On
Port: 1                    Response Function: I.431           CRC: On

     AIS Detected [ ]           EBER > 10E-3 [ ]      Framing Detected [ ]
     LOS Detected [ ]           EBER > 10E-6 [ ]          CRC Detected [ ]

          Line Code Violations 180          Trip Counter 0
               CRC Error Count 0            Trip Counter 0
             Available Seconds 251772       Trip Counter 69
           Unavailable Seconds 0            Trip Counter 0
        Severely Errored Seconds 5          Trip Counter 0
               Errored Seconds 1            Trip Counter 0
            Error Free Seconds 251766       Trip Counter 69

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel  F7 Previous Subsystem  F8 Next Subsystem  F9 Reset Trip
F10 Reset System Counters
```

4.4.2.3 Finding out what's wrong

Use the performance > User Port screen to quickly identify faults.

LOS indicates that no signal is present

AIS indicates that the Terminal equipment has a serious fault

Bit errors indicate a poor connection

```
OM4x2                                              Sat 03 Jan 1970 22:14:46
                              Performance > User Port
    Urgent Alarm:On      Non-Urgent Alarm:Off

    Subsystem: Customer           Port Type: X.21              Framing: On
    Port: 1                 Response Function:, I.431              CRC: On

        AIS Detected [ ]          EBER > 10E-3 [ ]       Framing Detected [ ]
        LOS Detected [ ]          EBER > 10E-6 [ ]          CRC Detected [ ]

            Line Code Violations 180         Trip Counter 0
                   CRC Error Count 0         Trip Counter 0
                Available Seconds 251772     Trip Counter 69
              Unavailable Seconds 0          Trip Counter 0
        Severely Errored Seconds 5           Trip Counter 0
                  Errored Seconds 1          Trip Counter 0
               Error Free Seconds 251766     Trip Counter 69

    F1 Help   F3 Previous Menu   F4 Main Menu   F5 Previous Channel
    F6 Next Channel   F7 Previous Subsystem   F8 Next Subsystem   F9 Reset Trip
    F10 Reset System Counters
```

Counters start once a signal has been detected. Otherwise, initially, they remain frozen

Alarm	Problem	Cause
LOS detected	• Incoming signal is not present. (LOS means Loss Of Signal)	• Check wiring. • Cables are broken. • Cables wired incorrectly. • Major fault within terminal equipment. • Terminal equipment not powered on.
	• Incoming signal is too small.	• Cables are faulty • Cable of insufficient quality. • Cable too long. • Too many connections.
AIS detected	• Alarm Indication Signal detected. (AIS is transmitted by equipment that have a major fault)	• Check terminal equipment.
EBER > 10E-6	Small number of bit errors	• Electrically active environment. • Earth grounding problem.
EBER > 10E-3	High number of bit errors.	• Cables are faulty • Cables of insufficient quality. • Cables are too long.

5 Logon procedure

```
       aaaaa    sssss    cccc    oooo     mm mm
          a  s      s  c     c  o     o   m  m  m
          a  s         c        o     o   m  m  m
       aaaa a    sssss    c        o     o   m  m  m
       a    a         s  c        o     o   m  m  m
       a    aa   s      s  c     c  o     o   m  m  m
       aaaa a    sssss    cccc    oooo     m  m  m

   ttttt   eeee   l      eeee    cccc     oooo     mm mm
      t    e   e  l      e    e  c     c  o     o   m  m  m
      t    e      l      e        c        o     o   m  m  m
      t    eeeee  l      eeeee    c        o     o   m  m  m
      t    e      l      e        c        o     o   m  m  m
      t    e   e  l      e    e  c     c  o     ρ   m  m  m
      t       eeee   llll   eeee    cccc     oooo     m  m  m

                    OM4x2

         Press space-bar to continue
```

1. Connect the terminal

```
       aaaaa    sssss    cccc    oooo     mm mm
          a  s      s  c     c  o     o   m  m  m
          a  s         c        o     o   m  m  m
       aaaa a    sssss    c        o     o   m  m  m
       a    a         s  c        o     o   m  m  m
       a    aa   s      s  c     c  o     o   m  m  m
       aaaa a    sssss    cccc    oooo     m  m  m

   ttttt   eeee   l      eeee    cccc     oooo     mm mm
      t    e   e  l      e    e  c     c  o     o   m  m  m
      t    e      l      e        c        o     o   m  m  m
      t    eeeee  l      eeeee    c        o     o   m  m  m
      t    e      l      e        c        o     o   m  m  m
      t    e   e  l      e    e  c     c  o     o   m  m  m
      t       eeee   llll   eeee    cccc     oooo     m  m  m

                    OM4x2

Login (Configuration, Test, Read only):
```

2. Press the space bar.

Note — If the local terminal is connected after the unit is turned on this screen may be missed

```
       aaaaa    sssss    cccc    oooo     mm mm
          a  s      s  c     c  o     o   m  m  m
          a  s         c        o     o   m  m  m
       aaaa a    sssss    c        o     o   m  m  m
       a    a         s  c        o     o   m  m  m
       a    aa   s      s  c     c  o     o   m  m  m
       aaaa a    sssss    cccc    oooo     m  m  m

   ttttt   eeee   l      eeee    cccc     oooo     mm mm
      t    e   e  l      e    e  c     c  o     o   m  m  m
      t    e      l      e        c        o     o   m  m  m
      t    eeeee  l      eeeee    c        o     o   m  m  m
      t    e      l      e        c        o     o   m  m  m
      t    e   e  l      e    e  c     c  o     o   m  m  m
      t       eeee   llll   eeee    cccc     oooo     m  m  m

                    OM4x2

Login (Configuration, Test, Read only):*
Password:
```

3. Select the desired mode.

Press <C> then <return> for
　　　　Configuration mode.
Press <T> then <return> for
　　　　Test mode.
Or press <R> then <return> for
　　　　Read-only mode.

```
       aaaaa    sssss    cccc    oooo     mm mm
          a  s      s  c     c  o     o   m  m  m
          a  s         c        o     o   m  m  m
       aaaa a    sssss    c        o     o   m  m  m
       a    a         s  c        o     o   m  m  m
       a    aa   s      s  c     c  o     o   m  m  m
       aaaa a    sssss    cccc    oooo     m  m  m

   ttttt   eeee   l      eeee    cccc     oooo     mm mm
      t    e   e  l      e    e  c     c  o     o   m  m  m
      t    e      l      e        c        o     o   m  m  m
      t    eeeee  l      eeeee    c        o     o   m  m  m
      t    e      l      e        c        o     o   m  m  m
      t    e   e  l      e    e  c     c  o     o   m  m  m
      t       eeee   llll   eeee    cccc     oooo     m  m  m

                    OM4x2

Login (Configuration, Test, Read only):*
Password:*********
```

3. Enter the password. Then press
　　<return>.

```
Operating Instructions

[ ] = checkbox, use SPACEBAR to toggle its state.

( ) = radiobutton, use SPACEBAR to turn it on.

< > = editfield, type using characters appropriate to that field.

Use TAB and arrow keys to move around the screen.

If function keys F1-F10 not supported then use cntrl 'F' followed by 1-9 & 0.

Hide this message next time you login y/N ?
```

4. Press <y> to skip this screen next time you logon.
Otherwise press <N>

```
OM4x2                                   Thu 17 Feb 2000 18:06:07
                            Management Menu
Urgent Alarm:On     Non-Urgent Alarm:Off


                        A Alarms
                        C Configuration
                        I Information
                        L Logout
                        P Performance
                        S Security
                        T Test

                        Type selection:

F1 Help
```

6 Logoff procedure

```
OM4x2                                   Thu 17 Feb 2000 20:41:28
                            Management Menu
Urgent Alarm:On     Non-Urgent Alarm:Off


                        A Alarms
                        C Configuration
                        I Information
                        L Logout
                        P Performance
                        S Security
                        T Test

                        Type selection:L

Are you sure ? (y/N)
```

1. Press F4 from any menu. This jumps to the top level menu.
2. Press <L> to initiate the logout.
3. Press <y> to finalise the logout.

```
Monitoring Mode is off.
```

Note – if monitoring mode is ON this screen will now display alarms as they are generated. Otherwise it will go back to the very first logon screen, after a short delay.

7 Menu Screen

There are 3 types of menu screens, navigation screens, which guide the user down through the menu topology, configuration screens which allow the user to turn functions ON and OFF, and information screens, which provide information on the status of the unit.

7.1 Navigation screens

Global alarm states

Screen name •

Time and date

```
OM4x2                                    Thu 17 Feb 2000 19:38:34
                        Configuration Menu
Urgent Alarm:On     Non-Urgent Alarm:Off




                    M  Master/Slave
                    C  Serial Communications
                    O  Monitoring
                    S  System
                    N  Subsystem Names
                    U  User Port

                        Type selection:


 F1 Help   F3 Previous Menu   F4 Main Menu
```

Functions keys change as you change screens
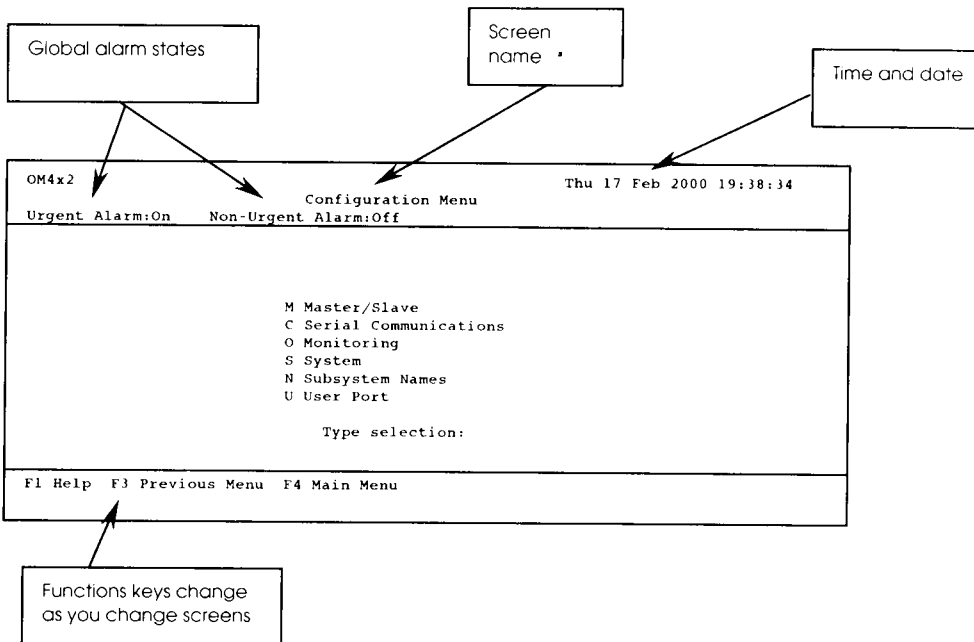
Pressing the appropriate key activates its associated menu. There is no need to press <return> (In fact pressing <return> will, in most cases, have the undesired effect of exiting the selected screen)

7.2 Information Screens

```
OM4x2                                      Sat 03 Jan 1970 22:14:46
                        Performance > User Port
Urgent Alarm:On     Non-Urgent Alarm:Off

Subsystem: Customer          Port Type: G703 75 Ohm      Framing: On
Port: 1                 Response Function: ETSI               CRC: On

    AIS Detected [ ]         EBER > 10E-3 [ ]    Framing Detected [X]
    LOS Detected [ ]         EBER > 10E-6 [ ]        CRC Detected [ ]

        Line Code Violations 180        Trip Counter 0
             CRC Error Count 0          Trip Counter 0
           Available Seconds 251772     Trip Counter 69
         Unavailable Seconds 0          Trip Counter 0
    Severely Errored Seconds 5          Trip Counter 0
             Errored Seconds 1          Trip Counter 0
          Error Free Seconds 251766     Trip Counter 69


 F1 Help  F3 Previous Menu  F4 Main Menu   F5 Previous Channel
 F6 Next Channel  F7 Previous Subsystem  F8 Next Subsystem  F9 Reset Trip
 F10 Reset System Counters
```

(X) shows the alarm detector is active

More functions keys are available in this screen

Trip counters can be reset

7.3 Configuration screens

7.3.1 Entering data

```
Check boxes turn functions                    Grey boxes are for
ON and OFF.                                    information.
                                               These can not be selected
```

```
OM4x2                                    Thu 17 Feb 2000 18:46:02
                    Configuration > User Ports
Urgent Alarm:On      Non-Urgent Alarm:Off

Subsystem : Customer                          Port : 1


                    Interface          Response Functions
        Enable [X]   75/120 Ohm Switch (*)        Basic ( )
        Invert [ ]              X.21 ( )           I.431 ( )
                                                    ETSI (*)


                    Framing              CRC Checking
                    Off (*)                  Off (*)
                     On ( )                   On ( )
                    Auto ( )                 Auto ( )

            Press Return to Accept or Escape to Cancel

F1 Help   F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel
```

```
Radio buttons select one
and only one of multiple
choices
```

7.3.2 Moving between check boxes.

Select check boxes and radio buttons in the same way.
Pressing either the right cursor key, or the <TAB> key cycles through the check boxes. Use the left cursor, or <BACK TAB> key to cycle backwards.

7.3.3 Turning functions on and off.

Find the appropriate check box associated with the function you want to change. Move the cursor to that check box. Then press the space bar to change the box. Repeat for all other required changes. Press the <return> key to accept the configuration.

Note – The configuration is not accepted until the <return> key is pressed. In this way mistakes can be corrected before the data is entered. However, beware, if you exit the screen before pressing <return> the changes are cancelled. Pressing the <return> key makes the changes and exits the screen, so you may want to make more than one change to the screen before pressing the <return> key.

```
Enable [X]  →  Enable [_]
```
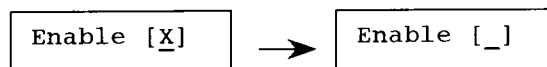
For example: To disable a port – move the cursor to the check box, press the space bar. Then press <return>.

7.3.4 How radio buttons work

These are multiple choice check boxes. Only one can be active.
In this example "Framing" can be set to one of three possible options; ON, OFF, or Auto. It would not make sense to set it to be both ON and OFF at the same time, so we only allow one of the three options to be set.

```
Framing              Framing
 Off (*)              Off ( )
  On (_)               On (*)
Auto ( )             Auto ( )
```
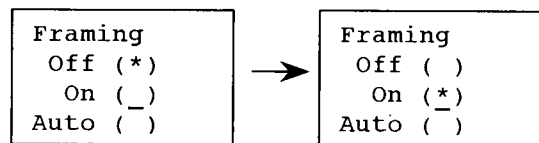
To change the framing from ON to OFF – move the cursor to the OFF box, and press the space bar. Remembering to press <return>, once all the changes have been made.

8 Menu Topology

Top level	Sub level	Description
Alarms	Status	Displays the current alarm status.
	History	Review the fault log. View recorded alarm events.
	Severity Level Settings	Set fault level. Configure Urgent & Non urgent alarm sources.
Configuration	Master / Slave	Master / slave configuration.
	Serial Communications	Local terminal set-up - baud rate, parity, handshake.
	Monitoring Mode	Configures monitoring mode.
	System	Set date, time and menu timeout.
	Subsystem Names	Enter name, description and location of this unit.
	User Port	Configure each E1 port - enable, invert, ETSI, I.431, framing, CRC.
Information	Hardware	Displays the designation of the hardware.
	Software	Displays the designation of the software
Logout		Logout of the menus and enter monitoring mode.
Performance	Optical Transmission Line	Performance counters for the optical line.
	User Port	AIS, LOS, LFA, BER, performance counters.
Security		Change passwords.
Test	Loopback Tests	Enables various loopbacks.
	PRBS Tests	Bit error rate tests.

8.1 Alarms

8.1.1 Alarm status screen

Alarms	Status	Displays the current alarm status.
	History	Review fault log. View recorded alarm events.
	Severity Level Settings	Set fault level. Configure Urgent & Non urgent alarm sources.

Urgent alarm is active

```
OM4x2
                              Alarm > Status        Tue 17 Feb 2000 00:03:12
Urgent Alarm:On     Non-Urgent Alarm:Off

 Display Filters:  Level 1 [X] 2 [ ] 3 [ ] 4 [X] 5 [X] Status=Off/Update [X]

No.| Subsystem |          Alarm Description      | Level | Status |A
001| Customer  | User Port 4 - Sync Loss         |   5   |  On    |
002| Customer  | Auxiliary Alarm 1               |   5   |  On    |A
003| Customer  | Auxiliary Alarm 2               |   5   |  On    |
004| Customer  | Auxiliary Alarm 3               |   5   |  On    |
005| Customer  | Auxiliary Alarm 4               |   5   |  On    |
006| Customer  | User Port 4 - BER > 10E3        |   5   |  On    |
007| Customer  | User Port 1 - Sync Loss         |   1   |  On    |
   |           |                                 |   5   |  Off   |
   |           |                                 |       |        |
   |           |         Press Escape to Exit    |       |        |
F1 Help  F2 History  F3 Previous Menu  F4 Main Menu  F5 Clear
F6 Acknowledge  F7 Previous Page  F8 Next Page  F10 Update
```

Display filter hides alarms not of interest. Only alarm levels marked [x] are shown.

'Auxiliary alarm 1 has been acknowledged (muted).

'User port 1 – Sync Loss' alarm has been active, but is currently inactive.

7 alarms logged. Not all are currently active.

Level 4&5 alarms activate the URGENT alarm

Field	Description
No.	Each entry is given a number.
Subsystem	Identifies which unit the alarm occurred on. The name is configured in the Configuration->Subsystem name screen.
Alarm description	Refer to Section 8.1.3.2 for description of the various alarms.
Level	Shows the alarm severity. Configure in Alarms->Severity Level Settings. 1=Record in fault log only, 2&3=Active Non-Urgent alarm, 4&5=Active Urgent alarm.
Status	ON = alarm currently active. OFF = Transient alarm. Alarm is currently inactive, but has previously been active. Press F5 to clear.
A	Indicates that the alarm has been acknowledged, this mutes the alarm source. Once an alarm has been acknowledged it can no longer generate either the Urgent or Non-urgent alarm.

8.1.1.1 F5 Clear

To remove an alarm off the list. Use the cursors to highlight it. Then press F5 to clear the line. Only inactive alarms (marked OFF) can be removed from the list.

8.1.1.2 F6 Acknowledge

To acknowledge an alarm. Use the cursors to highlight it. Press F6 to acknowledge the alarm. Acknowledged alarms are muted, i.e. they generate neither URGENT or Non-URGENT alarms. To clear the acknowledgement, fix the fault then clear (F5) the alarm.

8.1.1.3 F10 Update

This screen is set to automatically update by default. However if the Status = Off/Update field has been turned off, it will be necessary to update this screen manually. Press F10 to manually Update.

8.1.1.4 Display Filters: Level 1 [ ] 2 [ ] 3 [ ] 4 [X] 5 [X]

If many alarms are active the user may wish to concentrate on investigating the higher priority alarms first. To hide alarms select the appropritate display filter boxes - [X] means alarms of that level are displayed, [ ] means alarms of that level are hidden. Note - Hidden alarms still generate Urgent and Non-urgent alarms.

8.1.1.5 Status = Off/Update [X]

To turn off automatic updates of this screen. Use the cursors to select the Status = Off/Update [X] field. Pressing the space bar toggles the setting. The screen will not update until manually refreshed - press F10 to manually update.

8.1.2 Alarm history screen

Alarms ──────► Status   Displays the current alarm status.

       ────► History   Review fault log. View recorded
                                   alarm events.

       ────► Severity Level Settings   Set fault level. Configure Urgent
                                       & Non urgent alarm sources.
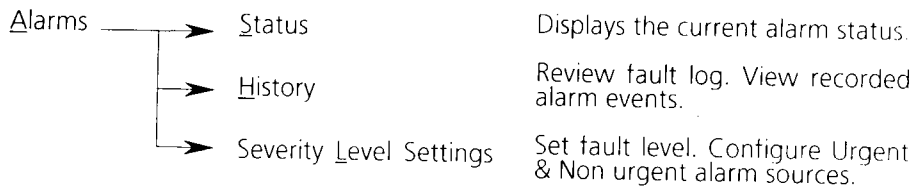
```
OM4x2                                              Tue 17 Feb 2000 00:39:10
                              Alarm > History
Urgent Alarm:On      Non-Urgent Alarm:Off

                Display Acknowledged Faults [X]        Subsystem [ ]
No.| Subsystem |          Fault Description          |  Time  |   Date   |A
001| Customer  | User Port 1 - Sync Loss         ON|00:10:45|17/02/2000|
002| Customer  | User Port 1 - Sync Loss        OFF|00:10:54|17/02/2000|




                       Press Escape to Exit

F1 Help  F2 Show Id/Name  F3 Previous Menu  F4 Main Menu  F5 Clear History
F7 Previous Page  F8 Next Page  F9 Dump  F10 Update
```

'User Port 1' alarm went active at 10 minutes past midnight on the 17" of February 2000.

'User Port 1' alarm went inactive 9 seconds later.

2 alarm events have occurred

Field	Description
No	Each entry is given a number.
Subsystem	Identifies which unit the alarm occurred on. The name is configured in the Configuration->Subsystem name screen.
Fault description	Refer to Section 8.1.3.2 for description of the various alarms. The ON suffix indicates the record shows the time and date the alarm went active. OFF indicates when the alarm became inactive.
Time	Records the exact time the event occurred.
Date	Records the date the event occurred.
A	Indicated that the alarm has been acknowledged, this mutes the alarm source. Once an alarm has been acknowledged it can no longer generate either the Urgent or Non-urgent alarm.

8.1.2.1 F2   Show Id/Name

Toggles the 'subsystem' display field between name and ID.

8.1.2.2 F5   Clear History

Removes ALL entries from the fault log.

8.1.2.3 F9   Dump

Produces a continual listing of the fault log. Useful when capturing to a file.

8.1.2.4 F10 Update

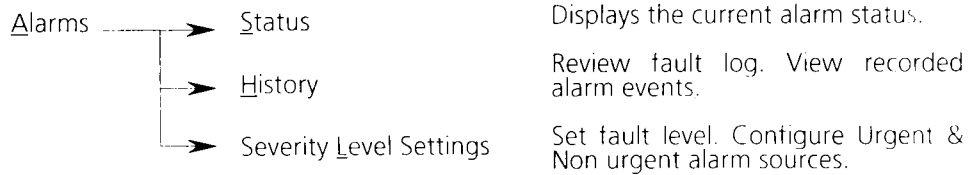The screen is not updated in real time. Events that occur after first entering the screen are not displayed. To manually update the screen with recent events, press F10.

8.1.2.5 Display Acknowledged Faults [X]

Events occurring after an alarm has been acknowledged can be hidden. Acknowledging an alarm does not effect the previously logged records, but future events are recorded as acknowledged.

8.1.3 Alarm severity level settings

Alarms ⟶ Status   Displays the current alarm status.

⟶ History   Review fault log. View recorded alarm events.

⟶ Severity Level Settings   Set fault level. Configure Urgent & Non urgent alarm sources.

```
OM4x2                                          Thu 17 Feb 2000 00:47:42
                    Alarm > Severity Level Settings
Urgent Alarm:On     Non-Urgent Alarm:Off


  Id|                     Fault Description              | Level
  001|Cold Boot                                           <1>
  002|Warm Boot                                           <1>
  003|Power Fail                                          <5>
  004|Operating on UPS                                    <5>
  005|Battery Low                                         <5>
  006|Battery Conditioning Test                           <1>
  007|Battery Discharge Test                              <1>
  008|User Port %n - AIS                                  <3>
  009|User Port %n - LOS                                  <1>
  010|User Port %n - BER > 10E3                           <1>

                 Press Return to Accept or Escape to Cancel

  F1 Help  F3 Previous Menu  F4 Main Menu  F5 Default  F7 Previous Page
  F8 Next Page
```

Alarm severity can be individually programmed for every alarm

Levels 4&5 alarms activate the URGENT alarm.

Levels 2&3 alarms activate the Non-URGENT alarm.

Id's 11 to 20 are on screen 2. Press F8 to scroll down.

Level 1 alarms are only recorded in the fault log

Field	Description
Id	Each alarm is given a unique number.
Fault description	Refer to Section 8.1.3.2 for description of the various alarms.
level	The severity level for each alarm is configurable. Alarms can be filtered in the alarm screen based on severity level. The non-urgent and urgent alarms are based on the severity level.

5 (highest priority)	Generate the URGENT alarm. Fault recorded in the fault log
4	Generate the URGENT alarm. Fault recorded in the fault log
3	Generate the Non-URGENT alarm. Fault recorded in the fault log
2	Generate the Non-URGENT alarm. Fault recorded in the fault log
1	Fault recorded in the fault log.
0 (lowest priority)	Alarm disabled. Not logged or displayed

8.1.3.1 F5 Default

To restore the default alarm severity level to an alarm – use the cursors to highlight the desired line. Then press F5 to restore its default alarm severity level.

8.1.3.2 Alarm sources

Fault description	Definition
Cold Boot	Restart activated by power failure.
Warm Boot	Restart activated by the software.
Power Fail	This alarm indicated that the mains input has failed. Unless the UPS has been installed the unit will shut down.
Operating on UPS	Mains has failed – internal UPS supplying power.
Battery Low	Internal UPS battery nearing exhaustion. The unit will shut down shortly.
Battery Conditioning Test	Short discharge test initiated periodically by the software. Helps extend the life of the battery.
Battery Discharge Test	Manual Test - simulates mains failure. Used to determine the current hold up time of the UPS battery.
User Port %n – AIS	AIS detected on user port (applies to all 4 ports).
User Port %n - LOS	LOS detected on user port (applies to all 4 ports).
User Port %n - BER > 10E3	High bit error rate on user port (applies to all 4 ports).
User Port %n - BER > 10E6	Low bit error rate on user port (applies to all 4 ports).
Auxiliary Alarm %n	Auxiliary alarm input active (applies to all inputs).
Security - password rejected	Failed logon attempt.
H/W - Configuration Changed	Reserved.
H/W - Configuration Memory Fail	Error whilst retrieving stored configuration.
Optical Port LOS	Sync loss detected on optical port

8.2 Configuration

8.2.1 Master/Slave configuration

Configuration		
→ Master / Slave	Master / slave configuration.
→ Serial Communications	Local terminal set-up - baud rate, parity, handshake.
→ Monitoring Mode	Configures monitoring mode - report fault, ring bell.
→ System	Set date, time and menu timeout.
→ Subsystem Names	Enter name, description and location of this unit
→ User Port	Configure each E1 port - enable, invert, ETSI, L431, framing, CRC.

```
OM4x2                                    Fri 18 Feb 2000 00:33:01
             Configuration > Master/Slave Operation
Urgent Alarm:On    Non-Urgent Alarm:Off



              Master ( )  ◄──────────────   Line card must be the master

              Slave  (*) ◄


                                           Customer unit must be the slave

              Press Return to Accept or Escape to Cancel
F1 Help  F3 Previous Menu  F4 Main Menu  Use TAB to select fields
```

Default settings	
Line card	Master
Customer unit	Slave

The master unit is in charge of managing the link, making sure faults are dealt with correctly and gathering statistical information. There must be one, and only one Master. In normal operation this must be the line card.

If two units of the same type are used, one must be changed to Master, and the other to slave. In line card to line card operation both will default to Master – one has to be changed to slave. In customer unit to-customer unit operation both will default to slave – one has to be changed to Master. Normally the unit connected to the customer will be configured as the slave.

Special note - In ETS 300 233 operation the Master becomes the LT and the slave becomes the NT1. To provide primary rate ISDN access the slave unit (NT) must be connected to the customer and the Master unit (LT) must be connected to the exchange.

8.2.2 Local terminal communications set-up

Configuration

Menu item	Description
Master / Slave	Master / slave configuration.
Serial Communications	Local terminal set-up - baud rate, parity, handshake
Monitoring Mode	Configures monitoring mode - report fault, ring bell
System	Set date, time and menu timeout.
Subsystem Names	Enter name, description and location of this unit.
User Port	Configure each E1 port - enable, invert, ETSI, I.431, framing, CRC.

```
OM4x2                                          Fri 18 Feb 2000 00:34:34
                    Configuration > Serial Communications
Urgent Alarm:On    Non-Urgent Alarm:Off



    Baud Rate       Data Bits       Parity      Stop Bits      Handshake
      2400 ( )       7 ( )        None (*)         1           None ( )
      4800 ( )       8 (*)        Odd  ( )                     Xon/Xoff (*)
      9600 ( )                    Even ( )
     19200 (*)



                  Press Return to Accept or Escape to Cancel

F1 Help  F3 Previous Menu  F4 Main Menu  F5 Default
```

Field	Description
Baud rate	Speed at which characters are sent and received from the local terminal. Higher numbers mean faster speed. If characters are being corrupted try a lower speed.
Data bits	Some terminals require 7 bit data if parity is turned on. Most prefer 8 bits.
Parity	Provides a means of checking characters for errors (but does not correct them).
Stop bits	1 stop bit is standard.
Handshake	Turning this on allows your local terminal to control the rate at which characters are being sent. Useful if your terminal can not keep up with the rate at which characters are produced.

8.2.2.1 Procedure to follow, when changing settings.

1.   Make all the desired changes to this menu, by using the cursor to move to the appropriate check box then press the space bar to change the selected field.

2.   Once all the desired changes have been made, press the <return> key to accept the changes. The unit will now implement these changes.

3.   A message will appear: "Change your terminal to new settings.... Press Escape to continue".

4.   Referring to the user manual for your terminal – change its communications set-up in the same way you changed this menu.

5.   Press the <Escape> key.

Notes – a) The OM4x2 tries to change baud rates smoothly. However if the new screen is not displayed correctly you may have to reset your local terminal.

b) If the characters still appear corrupt then choose a lower baud rate.

8.2.3 Monitoring mode

Configuration

→ Master / Slave   Master / slave configuration.

→ Serial Communications   Local terminal set-up - baud rate, parity, handshake.

→ Monitoring Mode   Configures monitoring mode - report fault, ring bell.

→ System   Set date, time and menu timeout.

→ Subsystem Names   Enter name, description and location of this unit.

→ User Port   Configure each E1 port - enable, invert, ETSI, I431, framing, CRC.

```
OM4x2                                              Fri 18 Feb 2000 00:35:54
                           Configuration > Monitoring
Urgent Alarm:On      Non-Urgent Alarm:Off




           Monitoring Mode

                      Report Faults [ ]

                  With Warning Bell [ ]


                Press Return to Accept or Escape to Cancel

F1 Help  F3 Previous Menu  F4 Main Menu
```
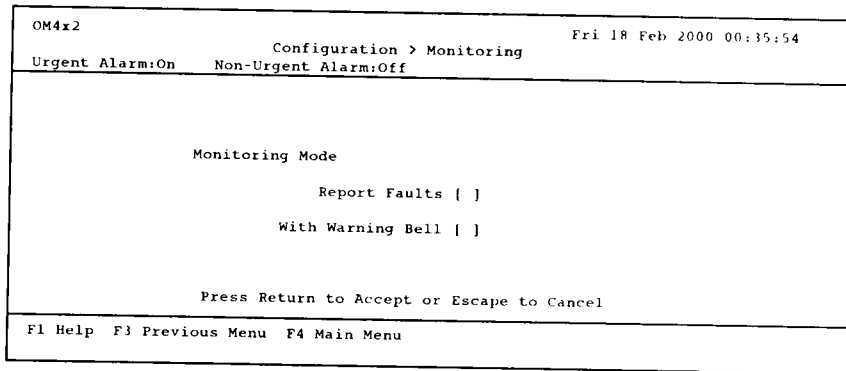
Field	Description
Report faults	When logged off – prints alarms and faults as they occur.
With warning bell	Rings the bell each time a new fault is detected.

Monitoring mode is a special mode that can operate when the user has logged off. It is designed to connect to a printer or an unattended terminal. As alarms and faults are detected they are printed on the screen (one line per fault). Over time a complete list of faults will be seen.

Note – The fault log can also be viewed and printed from the Alarms->History menu.

Alarms listed as they occur →

```
Monitoring Mode is on.
Monitoring Bell is on.
Customer  :F1:Cold Boot                           :Fri 18 Feb 2000 00:00:01
Customer  :F5:Auxillary Alarm 1               ON  :Fri 18 Feb 2000 00:00:01
Customer  :F5:Auxillary Alarm 2               ON  :Fri 18 Feb 2000 00:00:01
Customer  :F5:Auxillary Alarm 3               ON  :Fri 18 Feb 2000 00:00:01
Customer  :F5:Auxillary Alarm 4               ON  :Fri 18 Feb 2000 00:00:01
Customer  :F1:User Port 1 - BER > 10E6        ON  :Fri 18 Feb 2000 00:00:02
Customer  :F1:User Port 1 - BER > 10E3        ON  :Fri 18 Feb 2000 00:00:03
Customer  :F1:User Port 1 - BER > 10E3        OFF :Fri 18 Feb 2000 01:06:10
Customer  :F1:User Port 1 - BER > 10E6        OFF :Fri 18 Feb 2000 01:06:10
```

Events are marked ON when the alarm goes active, and OFF when the alarm clears.

Exact time and date of the event.

8.2.4 Date and time set-up

Configuration ──────▶ Master / Slave   Master / slave configuration.

                      Serial   Local terminal set-up - baud rate, parity, handshake.
                ──▶   Communications

                ──▶   Monitoring Mode   Configures monitoring mode - report fault, ring bell.

                ──▶   System   Set date, time and menu timeout.

                ──▶   Subsystem Names   Enter name, description and location of this unit.

                ──▶   User Port   Configure each E1 port - enable, invert, ETSI, I.431,
                                              framing, CRC.

```
OM4x2                                            Fri 18 Feb 2000 00:37:50
                             Configuration > System
Urgent Alarm:On     Non-Urgent Alarm:Off



                        Date <18/02/2000>

                   Time (24Hr) <00:37>

              Inactive Time-Out (min) <15>    ◀────────────────



                 Press Return to Accept or Escape to Cancel

F1 Help   F3 Previous Menu   F4 Main Menu
```

> Menus will automatically time-out after a predetermined interval of inactivity

Field	Description	
Date	Enter the new date in the format shown above.	Day/Month/Year
Time	Enter the new time in the format shown above.	Hours:Minutes
Inactive Time-Out	If the unit is left unattended the menus will automatically time-out. The lower level menus will jump back one level. The top level menu will log the user out. Pressing keys resets the time-out period.	

Notes

a) The time and date are changed at the exact moment the <return> key is pressed.

b) Setting the "Inactive Time-Out" to 0 stops the menus from timing out.

8.2.5 Subsystem names

Configuration ———→ Master / Slave   Master / slave configuration.

Serial
Communications   Local terminal set-up - baud rate, parity, handshake.

Monitoring Mode   Configures monitoring mode - report fault, range etc.

System   Set date, time and menu timeout.

Subsystem Names   Enter name, description and location of this unit

User Port   Configure each E1 port - enable, invert, HSL 143', framing, CRC.

```
OM4x2                                    Fri 18 Feb 2000 00:57:04
                        Configuration > Subsystem Names
Urgent Alarm:On     Non-Urgent Alarm:Off

Subsystem No: 1


                         Name <Customer  >

                   Description <Newcon Oils        >

                     Location <London E4           >



              Press Return to Accept or Escape to Cancel

F1 Help  F3 Previous Menu  F4 Main Menu  Use TAB to select fields
```

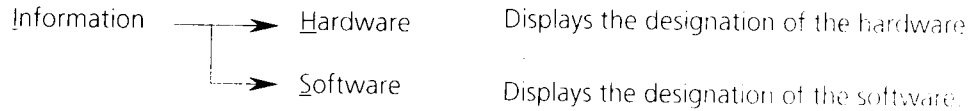| Field	Description
Name	10 characters displayed on most menus. Used to identify the unit.
Description	Text field. For information only.
Location	Text field. For information only.

8.2.6 User port configuration

Configuration ————→ Master / Slave   Master / slave configuration.

→ Serial Communications   Local terminal set-up - baud rate, parity, handshake.

→ Monitoring Mode   Configures monitoring mode - report fault, ring bell.

→ System   Set date, time and menu timeout.

→ Subsystem Names   Enter name, description and location of this unit.

→ User Port   •   Configure each E1 port - enable, invert, ETSI, I.431, framing, CRC.

```
OM4x2                                          Fri 18 Feb 2000 00:57:34
                          Configuration > User Ports
Urgent Alarm:On      Non-Urgent Alarm:Off                         ┌─────────────────────┐
                                                                 │ Selected User Port  │
Subsystem : Customer                            Port : 1  ◄──────┘
                                                                 
              Interface                    Response Functions
      Enable [X]    75/120 Ohm Switch (*)        Basic ( )
      Invert [ ]                X.21 ( )         I.431 ( )
                                               ETSI (*)

                      Framing               CRC Checking
                      On (*)                   On (*)                ┌──────────────────┐
                      Off ( )                  Off ( )               │ You can make     │
                      Auto ( )                 Auto ( )              │ changes to all four
                                                                    │ user ports before
          Press Return to Accept or Escape to Cancel  ◄─────────────│ pressing <return> to
                                                                    │ accept.          │
                                                                    └──────────────────┘
F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel
```

F5 & F6 cycle between the four user ports

Field	Description
Enable	Turns this user port ON, or OFF. When OFF all traffic on this port is blocked, replaced with AIS.
Invert	Inverts the data pattern on this port. Useful when running bit error rate tests, without giving the customer full access.
75/120 Ohm switch	On the customer unit this allows the position of the 75ohm/120ohm interface selection switch to determine the interface type.
X.21	Activates the X.21 interface for this port.
Response functions	The unit can be programmed to behave differently under fault conditions.
	Basic – Simple response to most traffic effecting conditions.
	I.431 – Responses conform to the international standard I.431
	ETSI – Responses conform to the international standard ETS 300 233, used for Primary rate ISDN access.
Framing	If the service provided requires framed data, set this value to ON. The port will be monitored for framing errors.
CRC checking	If the service provided requires the framed data to have a CRC-4, set this value to ON. The port will be monitored for CRC errors. Note - Framing must be set to ON for CRC checking procedures to work correctly.

8.3 Information

8.3.1 Hardware information

Information ———→ Hardware   Displays the designation of the hardware

        ┊———→ Software   Displays the designation of the software.

```
OM4x2                                                    Tue 22 Feb 2000 17:34:17
                              Information > Hardware
Urgent Alarm:On      Non-Urgent Alarm:Off




                          Hardware Rev: 01
                             Unit type: Standalone

                  Xilinx Firmware Rev: 2




                         Press Escape to Exit

F1 Help  F3 Previous Menu  F4 Main Menu
```
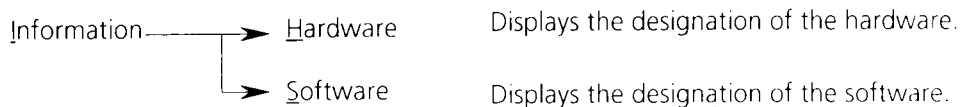
Field	Description
Unit type	Customer units will display "Standalone" Line card units will display "Line card"
Hardware Rev	Indicates the build number for the hardware platform.
Xilinx Firmware Rev	Relates to the firmware verion being run.

Please quote these figures when contacting our technical support department.

8.3.2 Software information

Information ──────► Hardware   Displays the designation of the hardware.

└──► Software   Displays the designation of the software.

```
OM4x2                                        ▪   Tue 22 Feb 2000 17:36:11
                         Information > Software
Urgent Alarm:On     Non-Urgent Alarm:Off

Subsystem: LT


              Software Version: c.95 2000 10 03 OM4x2 App

                Booter Version: 0.07 2000 07 14 OM4x2 Bootstrap




                      Press Escape to Exit

F1 Help  F3 Previous Menu  F4 Main Menu  F8 Next Subsystem
```

Field	Description
Software version number	Displays the version number for the software being run.
Booter version	Displays the version number for the boot-strap loader.

Please quote these figures when contacting our technical support department.

8.4 Logout

Logout ─────────────➤ Logout of the menus and enter monitoring mode.

```
OM4x2                                        Tue 22 Feb 2000 17:49:13
                            Management Menu
Urgent Alarm:On      Non-Urgent Alarm:Off          .


                         A Alarms
                         C Configuration
                         I Information
                         D Debug
                         L Logout
                         P Performance
                         S Security
                         T Test

                     Type selection:I.


Are you sure ? (y/N)
```
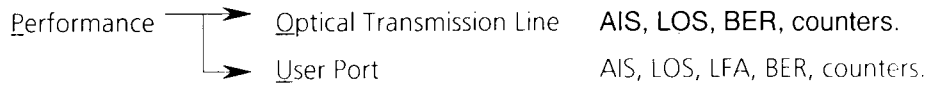
Please refer to section 6 covering "Logoff Procedures" for more information.

If monitoring mode has been activated, a list of alarm events will be displayed as they happen. Otherwise the first logon screen will be displayed – after a short delay.

8.5 Performance

8.5.1 Optical performance

Performance ──────► Optical Transmission Line   AIS, LOS, BER, counters.
              └────► User Port   AIS, LOS, LFA, BER, counters.

```
OM4x2                                    .           Sat 03 Jan 1970 22:14:46
                            Performance > User Port
Urgent Alarm:On      Non-Urgent Alarm:Off

Subsystem: Customer


         LOS Detected [ ]


          Available Seconds 251772        Trip Counter 69
        Unavailable Seconds 0             Trip Counter 0
   Severely Errored Seconds 5             Trip Counter 0
            Errored Seconds 1             Trip Counter 0
         Error Free Seconds 251766        Trip Counter 69


F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel  F7 Previous Subsystem  F8 Next Subsystem  F9 Reset Trip
F10 Reset System Counters
```
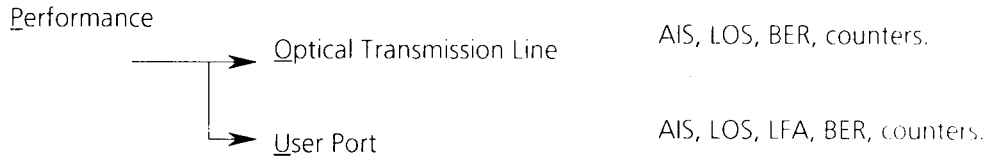
Counters remain at 0 until a signal is first detected.

Field	Description
LOS detected	Incoming optical signal failed, or been disconnected.
Available seconds	Total time the optical link has been in service.
Unavailable seconds	Total time this optical link has been out of service.
Severely errored seconds	Total time this optical link has suffered heavy errors.
Errored seconds	Total time this optical link has suffered light errors.
Error free seconds	Total time this optical link has been error free.
Trip counters	These are restable counters useful whilst fixing, or testing the link. Press F9 to reset the counters.

8.5.2 User port performance

Performance

→ Optical Transmission Line　　　AIS, LOS, BER, counters.

→ User Port　　　AIS, LOS, LFA, BER, counters.

| Alarms marked [X] are active | | Interface type of selected user port is displayed here |

The alarm flags are shown in real time

```
OM4x2                                            Sat 03 Jan 1970 22:14:46
                      Performance > User Port
Urgent Alarm:On    Non-Urgent Alarm:Off

Subsystem: Customer         Port Type: G703 75 Ohm        Framing: Off
Port: 1               Response Function: Basic                 CRC: Off

    AIS Detected [X]         EBER > 10E-3 [ ]        Framing Detected [ ]
    LOS Detected [ ]         EBER > 10E-6 [ ]            CRC Detected [ ]

      Line Code Violations 180          Trip Counter 0
           CRC Error Count 0            Trip Counter 0
         Available Seconds 251772       Trip Counter 69
       Unavailable Seconds 0            Trip Counter 0
   Severely Errored Seconds 5           Trip Counter 0
           Errored Seconds 1            Trip Counter 0
        Error Free Seconds 251766       Trip Counter 69


F1 Help  F3 Previous Menu  F4 Main Menu  F5 Previous Channel
F6 Next Channel  F7 Previous Subsystem  F8 Next Subsystem  F9 Reset Trip
F10 Reset System Counters
```

Use the resettable counters whilst diagnosing a problem

Counters remain at 0 until a signal is first detected

Use F5 and F6 to cycle between ports

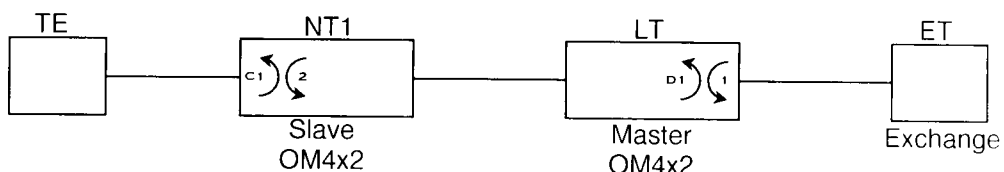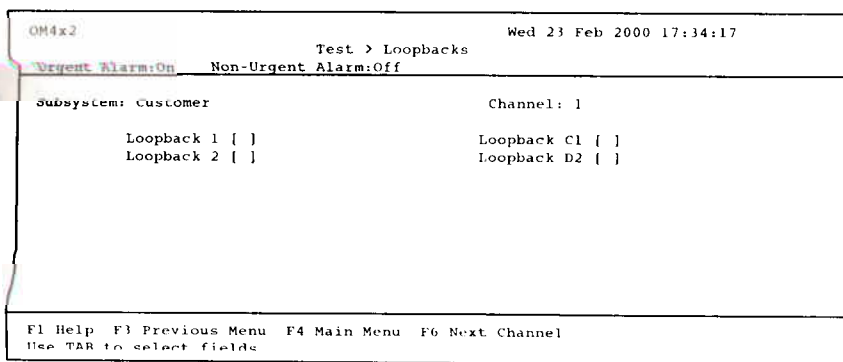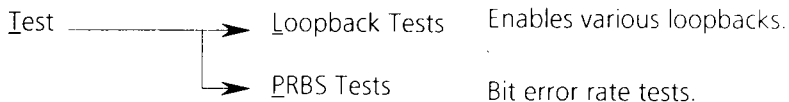| Field	Description
AIS Detected	Equipment sends the Alarm Indication Signal when a serious fault occurs preventing them transmitting real data. Detecting this signal means there is serious fault with equipment upstream of this unit.
LOS Detected	Incoming signal lost. Either the connection between this unit and the upstream equipment has been broken, or the upstream equipment has failed.
EBER > 10E-3	Incoming data contains a high number of bit errors. Active if more than 2048 line code violations are detected within one second.
EBER > 10E-6	Incoming data contains a low number of bit errors. Active if more than 2 line code violations are detected within one second.
Framing Detected	Indicates that the user port data contains a valid frame signal.
CRC Detected	Indicates that the user port data contains a valid CRC signal.
Line Code violations	This counter record the total number of line code violations detected.
CRC Error Count	Counter to record the total number of CRC4 errors detected.
Available seconds	Counter to record the total time this user port has been in service.
Unavailable seconds	Counter to record the total time this user port has been out of service.
Severely errored seconds	Counter to record the total time this user port has suffered heavy errors.
Errored seconds	Counter to record the total time this user port has suffered light errors.
Error free seconds	Counter to record the total time this user port has been error free.
Trip counters	These are restable counters useful whilst fixing, or testing the link. Press F9 to reset the counters.
Port type	Indicates the selected interface type. On the customer unit this reflects the position of the interface selection switch. On the line card this reflects the type of interface module fitted.

8.6 Security (change passwords)

Security ————————————————➤ Change passwords.

```
OM4x2                                     Wed 23 Feb 2000 17:34:17
                          Security > System
Urgent Alarm:On     Non-Urgent Alarm:Off




                       Old Password [          ]
                       New Password [          ]
                   Confirm Password [          ]



              Press Return to Accept or Escape to Cancel

F1 Help   F3 Previous Menu   F4 Main Menu

```
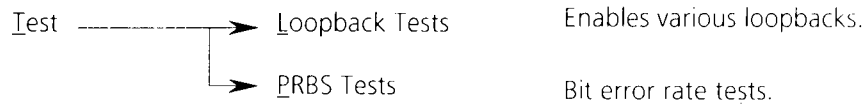
8.7   Test

8.7.1   Setting data loopbacks

Test ────────▶ Loopback Tests   Enables various loopbacks.

               └──▶ PRBS Tests   Bit error rate tests.

```
OM4x2                                    Wed 23 Feb 2000 17:34:17
                            Test > Loopbacks
 Urgent Alarm:On     Non-Urgent Alarm:Off

 Subsystem: Customer                    Channel: 1

        Loopback 1 [ ]                  Loopback C1 [ ]
        Loopback 2 [ ]                  Loopback D2 [ ]




 F1 Help  F3 Previous Menu  F4 Main Menu  F6 Next Channel
 Use TAB to select fields
```

```
TE            NT1             LT            ET
┌───┐       ┌─────┐        ┌─────┐       ┌───┐
│   │───────│ c1)(2 │──────│ d1)(1 │─────│   │
└───┘       └─────┘        └─────┘       └───┘
             Slave          Master       Exchange
             OM4x2          OM4x2
```

Notes

- All loopbacks are controllable from either the master, or slave. Loopbacks 1 & 2 are controllable both in-band (via the Sa6 bits in ETSI mode) and via the management system. Loopbacks C1 & D1 are only controllable by the OM4x2 management system (i.e., local terminal, network element, SNMP, or TNS)

8.7.2 Using the bit error testers

Test ————————➤ Loopback Tests   Enables various loopbacks.

            └——➤ PRBS Tests   Bit error rate tests.

```
OM4x2                                        Wed 23 Feb 2000 17:34:17
                            Test > PRBS        ■
Urgent Alarm:On     Non-Urgent Alarm:Off

Subsystem: Customer                              Port : 1


                      Towards User Port [ ]
                Towards Optical Interface [ ]


         Bit Errors 0                 Severely Errored Secs 2587
      Available Secs 6642                    Errored Secs 1368
    Unavailable Secs 0                     Error Free Secs 2677



F1 Help  F3 Previous Menu  F4 Main Menu  F5 Next Channel
F6 Previous Channel  F9 Inject Error
```

The Ascom OM4x2 contains four in-built Bit error rate testers. These will be made available in a future upgrade.

9 Uninterruptable Power Supply Module

The OM4x2a customer unit can be fitted with an optional UPS module. This will automatically power the unit in the event of a mains power failure. Its internal battery has a capacity of greater than 5 hours, with a fresh battery obtaining between 10 and 12 hours of operation.

9.1 Safety warnings

- Only trained service personnel are permitted to install the UPS module.
- The mains supply must be disconnected before opening the battery compartment on the OM4x2a customer unit.
- Never open the UPS module.
- In case of fault return the complete unit to Ascom Telecommunications Limited, or one of its authorised representatives.
- Never install the OM4x2 customer unit with the battery compartment facing downwards.
- Never operate the unit in an ambient temperature above 45°C.
- Never operate the unit in a sealed room, or cabinet.

The UPS module contains a Valve Regulated sealed Lead Acid battery (VRLA). We have designed the unit to be safe under normal operating conditions. However if the unit is subjected to extremes the contents of the battery may become exposed (e.g. if the unit is crushed, or dropped from a great height). If this occurs the battery must be handled in a safe manner taking into consideration the hazards involved.
The battery may include, but is not limited to, the following substances in its construction.

- Lead and lead alloy metals.
- Lead inorganic compounds.
- Electrolyte – Sulphuric acid.
- Separator – Glass Fibre.

9.2 Storage

- The unit must not be stored in an ambient temperature greater than 60°C.
- The unit must not be stored in an airtight enclosure.

9.3 Transportation

- Never transport the OM4x2a customer unit with the UPS module fitted.
- Always use the original packaging.

9.4 Environmental notices

The Valve Regulated sealed Lead Acid battery (VRLA) contained within the UPS module is recyclable
Please return the complete module to Ascom Telecom Limited for recycling, or one of our authorised representatives. Ensure the unit is appropriately packaged – ideally re-use the original packaging.

9.5 Installation

Installation may only be performed by trained service personnel.

- Disconnect the mains power cord.
- Remove the battery cover end cap. With the rear of the OM4x2 unit facing towards you the battery cover is the large removable section on the right-hand face of the unit (opposite side to the main input). Locate the 2 attachment screws on the right face of the unit. Unscrew these (they are captive). Prise off the whole end cap.
- Slide in the UPS module. The ventilation slots face outward.
- Re-attach the battery cover end cap.
- Re-connect the mains power cord.

Battery life will be maximised if the unit is installed away from sources of heat. For example, avoid installing the unit above a radiator, or in direct sunlight. If the choice is available, install the unit in a cool, air-conditioned room.

9.6 Maintenance

No servicing is required throughout the lifetime of the UPS module. The OM4x2 will automatically perform periodic conditioning cycles. The battery is sealed, and no maintenance is possible.

The design life is 5 years. However, heat adversely effects all battery based products, and this time may be shortened if the unit is installed in a hot environment.
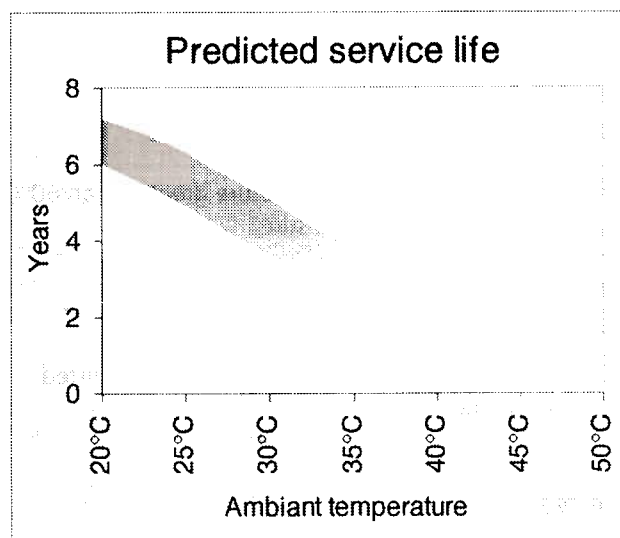
To determine if the unit requires replacing, initiate the 'UPS battery discharge test' from the menu system This internally disconnects the mains supply, operating the unit from the UPS battery until approximately 1 hour of charge remains. The menu system records the length of time the unit was able to run from the UPS module. The OM4x2 is not effected by running the test, and the G.703 traffic is not disrupted. There is no limit on the number of times the discharge test can be run, however excessive use will shorten the life of the battery.

9.7 Charging

The UPS module is fully automatic. No user management is required. Charging will automatically commence once mains power is restored. The mains power can be connected, or disconnected at any time without causing damage to the unit.
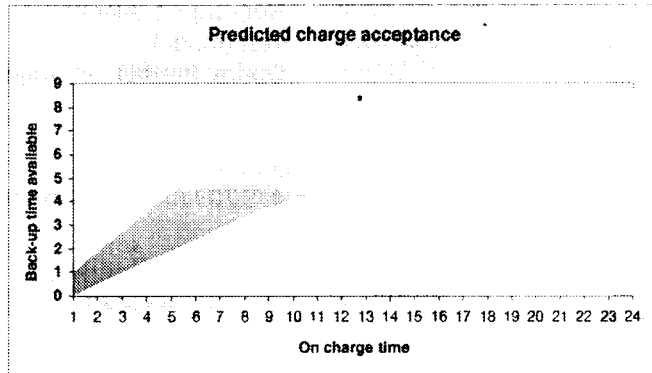
The UPS module must be recharged within 15 days of a mains failure. Leaving the unit to stand for a longer period will shorten the life of the battery.

9.8 Notes for conformance testing.

Before testing our UPS module, please ensure its battery is fully charged and well maintained. A battery that is flattened regularly, and left in a state of discharge will not perform to its maximum potential. Charge acceptance and hold-up time will be reduced.
The Ascom UPS module will fully charge within 24 hours, however the automatic conditioning of the battery takes longer. Please allow a full 5 days to restore the batteries maximum potential.

10 Specifications

Indicators

Desktop unit	Line-card unit
Power (good)	Power (good)
Urgent (alarm)	Urgent (Alarm)
Non-urgent (alarm)	Non-urgent (Alarm)
Test (mode)	Test (mode)
	Optical (traffic)
	1 G.703 (traffic)
	2 G.703 (traffic)
	3 G.703 (traffic)
	4 G.703 (traffic)

Interfaces available

<u>Desktop unit</u>
Port 1 G.703 75Ω tx
Port 1 G.703 75Ω rx
Port 1 G.703 120Ω

Port 2 G.703 75Ω tx
Port 2 G.703 75Ω rx
Port 2 G.703 120Ω

Port 3 G.703 75Ω tx
Port 3 G.703 75Ω rx
Port 3 G.703 120Ω

Port 4 G.703 75Ω tx
Port 4 G.703 75Ω rx
Port 4 G.703 120Ω

Optical Port
Hand held terminal port
Auxiliary channels
Automatic Protection Switching
Alarm outputs
Alarm inputs

<u>Linecard unit</u>
Optical port
Hand held terminal port
Auxiliary channels

75 Ohm Interface module
Port 1 G.703 75Ω tx
Port 1 G.703 75Ω rx

Port 2 G.703 75Ω tx
Port 2 G.703 75Ω rx

Port 3 G.703 75Ω tx
Port 3 G.703 75Ω rx

Port 4 G.703 75Ω tx
Port 4 G.703 75Ω rx

120 Ohm Interface module
Port 1 G.703 120Ω
Port 2 G.703 120Ω
Port 3 G.703 120Ω
Port 4 G.703 120Ω

Local terminal port specification

Connector -	Standard, 9-way D-Type
Electrical Protocol -	EIA232 (RS232/V.28)
Default Settings -	19200 bps, 1 stop, no parity
Maximum Baud rate -	19200 bps.
Suitable equipment -	VT100 terminal, palm top PC or dial up modem

User port specifications

Data rate -	2.048Mbps
Use -	E1, primary rate ISDN
Connections -	BNC, RJ-45 or BT type 43
Termination impedance -	75 ohm or 120 ohm
Intrinsic jitter -	0.07 UI peak to peak (20Hz – 100KHz)
Jitter transfer -	30dB at 100Hz (1.5 UI in)
	40dB at 1KHz (1.5 UI in)
	< 60dB at 10KHz (0.2 UI in)
Maximum tolerable input Jitter -	>20 UI in at 100Hz
	12 UI at 1KHz
	2.5 UI at 10KHz
Additional delay -	> 50 µS
Maximum traffic clock offset -	> ±150ppm

Response functions setting

ETS 300 233
I.431
Basic

Frame setting

Unframed
Framed
Framed with CRC-4
Framing Auto detection

Traffic Alarms

Traffic in fail (LOS)
AIS detected
BER>$1x10^3$
BER>$1x10^6$
Loss of frame alignment
Loss of multiframe alignment

Optical port specifications

Maximum link budget -	24 dB – Singlemode
	16 dB – Multimode
Minimum link attenuation -	0 dB
Transmit power -	-4 dBm
Receive sensitivity -	-28 dBm – Singlemode
	-20 dBm – Multimode
Optical wavelength -	1300nm
Optical connectors -	• FC-SPC, SC or ST
Fibre Types -	Single mode or multimode
Laser classification -	Class 1

Optical alarms

Traffic in fail

Alarm output

Function	Urgent & Non-urgent
Output type	Relay closure
No. of relays	2
Available modes	Normally open, normally closed & changeover
Isolation	Potential free
Max. working voltage	60V dc
Max. current	0.5A at 60V dc (resistive)
Connector	9-way D-type

Alarm input

Number of inputs -	6
Design use -	Detection of relay closure
Type -	Current sense
Trip resistance -	Make <5KΩ : Break >10KΩ
Connector -	9-way D-type

Auxiliary channels

Electrical protocol -	EIA232 (RS232/V.28)
Available circuits, Ch 1 -	Tx, Rx, CTS, RTS, DTR
Ch 2 -	Tx, Rx
Max. data rates : Tx/Rx -	> 9600bps
CTS/RTS signals -	> 2400bps
Connector -	8-way RJ-45

Protection Switching Interface

Customer Unit – 15-way D-type
Line card – Integrated in DSL-CO Rack

Management

Local terminal port, remote
modem connection, SNMP or TNS

Loopbacks

User port local & remote
Optical port local
(loop1 & loop 2 to ETS 300 233/I.3604)

Loopback control

• Via Management stations
• Via Sa6 bits to ETS 300233

Size

Customer unit	-	350x260x72mm
DSL-CO Rack	-	19" & ETSI Variant 8U high

Power Supply

		Input Voltage	Current	Power Consumption
Customer unit	-	110/230V ac (50/60Hz) option -48V dc	80/41mA nominal * 198mA	9.5W nominal. *
DSL-CO Rack	-	-48V dc	146mA	7W per line card

* The optional UPS module can draw a substantially higher figure whilst initially charging. Under which conditions the input power will rise to 17.5W (159/76mA) for a duration, falling back to the nominal figure as the battery charges.

Operating temperature

-10° – 50° C

Operating humidity

Maximum 95% non condensing

Standards

G.652 –	Optical fibre characteristics.
G.703 –	2.048Mbps electrical parameters.
G.704 –	Frame structure.
G.706 –	Framing algorithms.
G.823 –	Jitter and wander limits.
G.826 –	Error performance.
I.431 –	Primary rate ISDN layer 1.
M.3604 –	Maintenance principals.
ETS 300 011 –	PRI user-network interface
ETS 300 233 –	Primary rate ISDN access.
EN 60825 –	Optical safety.
EN 60950 –	Safety.
EN 41003 –	Telecommunication safety.
EN 55022 –	RF emissions limits.
EN 50082-1	Generic Immunity.
IEC 801-2 –	ESD protection.
IEC 801-3 –	RF susceptibility.
IEC 801-4 –	Fast burst transients.
ETS 300 019-1-3 –	Environmental.

11 Safety Statements and Compliance Notes

11.1 LVD Safety Statements

1.   This apparatus must be installed and maintained by SERVICE PERSONNEL.
2.   The mains plug on the equipment serves as a disconnect device, therefore a socket-outlet shall be installed near the equipment and shall be made accessible.

11.2 Safety Statements

The optical interface is classified as a CLASS 1 LASER PRODUCT
The mains input connection has an EXCESSIVE VOLTAGE safety status.
The G.703 75 ohm Digital Network Interface Port has a safety status of SELV.
The G.703 120 ohm Digital Network Interface Port has a safety status of SELV.
The Alarm IN & OUT Ports and AUX Channel Port have a safety status of SELV.
The Protection Switching Port and HHT Port have a safety status of SELV.

11.3 Telecommunication Specifications

The equipment is in conformity with the following Common Technical Regulations and National Standards:

Common Technical Regulations

CTR12   G.703 2Mbps, 120 ohms, unstructured
CTR13   G.703 2Mbps, 120 ohms, structured

UK National Standards

NTR4   G.703, 75 ohms.

12 Glossary Of Terms

AIS	Alarm Indication Signal.
ASCII	American Standard Code for Information Interchange
BERT	Bit Error Rate Test/Tester
CCITT	International Telegraph and Telephone Consultative Committee.
CRC	Cyclic Redundancy Check
DCE	Data Circuit-terminating Equipment.
DTE	Data Terminating Equipment.
E1	The European standard2.048Mbps digital carrier system
EBER	Effective Bit Error Ratio
ETSI	European Telecommunications Standards Institute
HDSL	High bit rate Digital Subscriber Line
ISDN	Integrated Services Digital Network
ITU	International Telecommunications Union
LED	Light Emitting Diode.
LFA	Loss of Frame Alignment
LOS	Loss Of Signal.
LT	Line Terminator
LTU	Line Terminating Unit.
NT1	Network Terminator for PRI/BRI
PPP	Point to Point Protocol
PRA	Primary Rate Access
PRBS	Pseudo Random Bit Sequence
PRI	Primary Rate ISDN
Sa6 bits	Message passing system used in Primary Rate Access
SNMP	Simple Network Management Protocol
UPS	Uninterruptable Power Supply
V28	CCITT specification. Electrical characteristics for unbalanced double--current interchange circuits.
X21	CCITT specification. Interface between DTE and DCE for synchronous operation on public data networks.