DC3X00

User Manual

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Metrodata DC3X00 User Manual

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1 INTRODUCTION

1. 1 About the DC3X00

The DC3X00 is used to interface between a fractional E1 (2.048Mbit/s) Nx64K service and an X.21 or V.35 port which connects to a bridge or router. The model DC3000 has an X.21 interface, and the model DC3200 has a V.35 interface. Both models are described in this manual. There is a choice of either BNC or RJ45 connectors for the E1 service on the rear panel of the unit. DC3X00's are used in pairs, one on either side of a WAN (Wide Area Network) link.

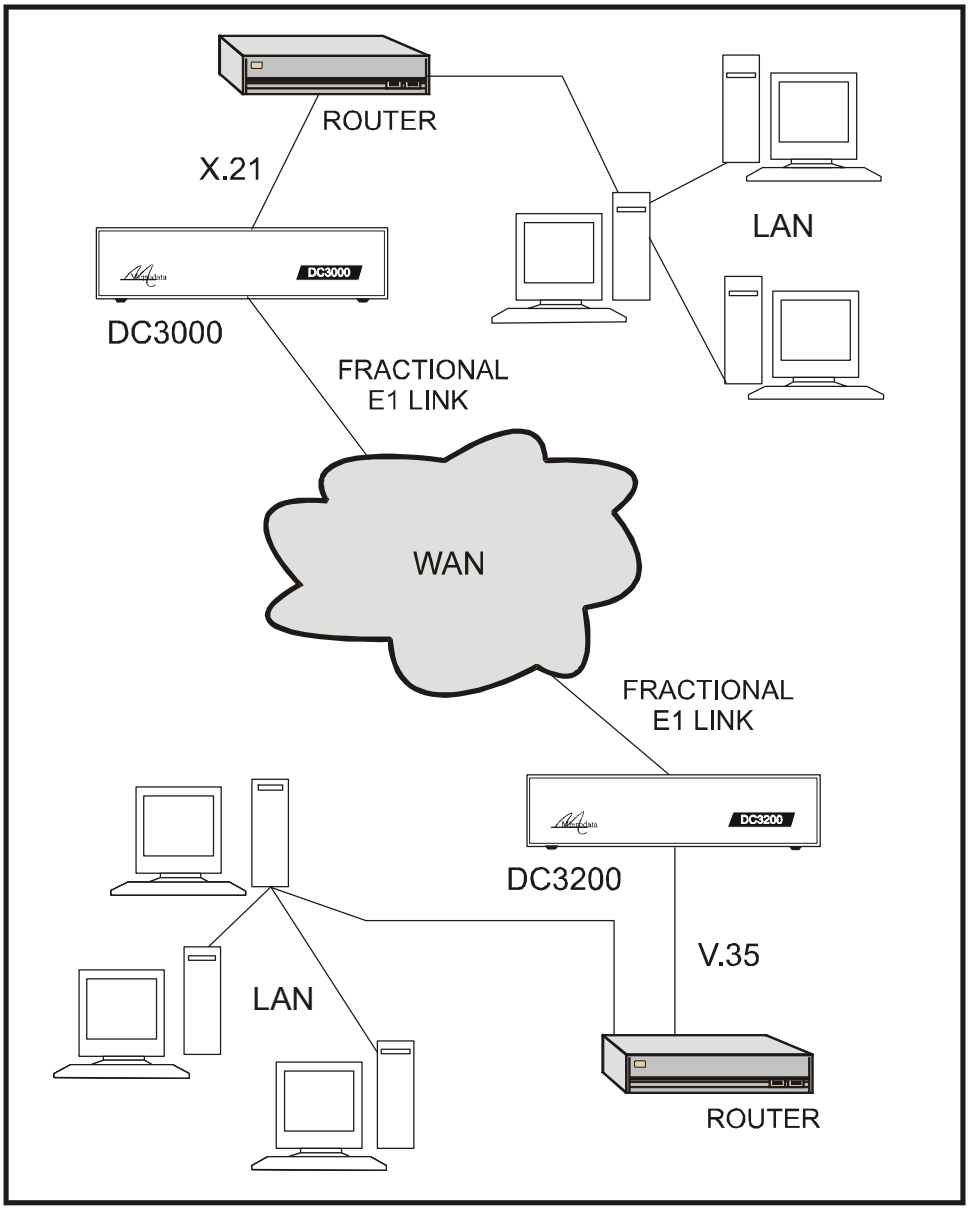

Figure 1.1 DC3X00 installation

1. 2 Safety

The DC3X00 should not be connected to cabling which would be required by BS6701 to be equipped with over-voltage protection. The following ports are designated SELV (Safety Extra Low Voltage) within the scope of EN41003:

X.21 port
V.35 port
Fractional E1 Line port (BNC or RJ45)
Alarm extension RJ45 port

These ports should only be connected to SELV ports on other equipment in accordance with EN60950 clause 2.3.

1. 3 Electromagnetic Compatibility

In order to ensure EMC compliance all signal and data cables and connectors must use a screened connector shell with a screened cable. The cable screen must be terminated to the screened connector shell and not connected to any pins of the connector. Failure to use the correct connector may compromise EMC compliance.

1. 4 EN50022 Declaration

The DC3X00 is a Class A product. In a domestic environment it may cause radio interference in which case the user may be required to take adequate measures.

1. 5 FCC Declaration

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

1. 6 Power supply

The DC3X00 is powered by a mains power supply with an input voltage range 100-250 VAC/ 50-60 Hz.
An alternative -48V DC power supply unit is available.
Further details are given in Section3.

Safety notes:
Excessive voltages are present inside the unit. There are no user serviceable parts inside the unit, and the cover should not be removed by unqualified personnel. The unit must not be exposed to damp or condensing conditions. The DC3X00 must be connected to safety earth for correct operation.

1. 7 FCC Declaration

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide

reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radiocommunications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at its own expense.

1. 8 Technical Overview

The DC3X00 is used on unframed E1/G.703, framed E1/G.704 (CRC4) or E1/G.704 (no CRC4*)* digital services. Technical overviews of G.703 and G.704 are provided.

1 . 8. 1 G.703 Signal Transmission

The signal is transmitted on 75 ohm unbalanced coax or 120 ohm balanced twisted pair. The signal has alternate mark inversion (AMI) characteristics in accordance with G.703. A mark is transmitted as a 0.5 unit interval (UI) wide pulse of amplitude 2.37V on 75 ohm coax, or 3.0V on 120 ohm twisted pair. Alternate marks have opposing polarity so that '111' is transmitted as a positive pulse, a negative one and then another positive one. The pulses have a duration of 50% so that strings of '1s' can be identified as a series of pulses. This is because clocking information is derived from the transmitted signal. In addition, strings of zeros are replaced with high-density binary 3 (HDB3) code words to ensure pulse density (and therefore clocking information) and an average DC potential of 0V.

The transmission rate is 2.048 Mbps. The worst case delay through the DC3X00 is 2 milliseconds, and the worst case round trip delay is 8 milliseconds.

1 . 8. 2 G.704 Framing

Groups of 248 bits are grouped into frames together with an 8-bit overhead at the start of the frame called *TIME SLOT 0* (TS0). The frame length is therefore 256 bits, and the frame repetition rate is 8KHz. The 248 bits of payload are divided into 31 timeslots of 8 bits each (TS1 - TS31). With the data in each timeslot regarded as an individual channel, 31 channels may be multiplexed together into one E1 trunk. As well as dividing the trunk between payload and overhead, groups of frames are associated into multi-frames. A synchronisation pattern is spread across the multiframe. Frames are alternately *FAS* (Frame Alignment Signal*)* and *NFAS* (Non Frame Alignment Signal) frames*.*

1 . 8. 3 E1 Path Overhead

8 bits are used for path overhead and provide framing, alarm information, error detection and management. The bits of TS0 are used alternatively by the FAS and NFAS frames as follows:

Bit No	Function
FAS Frame	
1	CRC bit
2 to 8	Frame alignment signal (FAS) 0011011
NFAS Frame	
1	International bit : contains CRC multi-frame alignment signal and remote block error (REBE) information
2	NFAS bit
3	Remote alarm indication (RAI)
4 to 8	National bits

Figure 1.2 E1 Path overhead

1. 9 DTE Nx64K Payload

The DC3X00 permits the 2.048Mbits/s E1 LINE port to operate with multiple channels of Nx64Kbit/s where N may vary between 1 and 31. There are restrictions placed upon the utilisation of bandwidth:

Timeslots used must form a contiguous block

The total number of timeslots allocated must be less than or equal to 31 (or 30 if Timeslot 16 is by-passed).

If Timeslot 16 by-pass is *ENABLED* by setting the bit-switch labelled *BYP16* to *ON,* Timeslot 16 is by-passed in allocating channels sequentially to timeslots; i.e. you could then select Timeslots ….14,15,17,18…….

2 DESCRIPTION OF PARTS

2. 1 Rear panel

All connections into and out of the DC3X00 are made through the rear panel. The rear panels are shown in schematic form below.

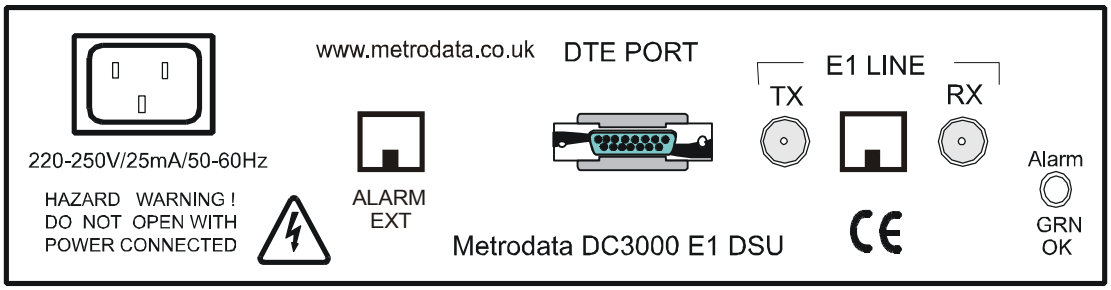

Figure 2.1 DC3000 rear panel (100-250 VAC supply)

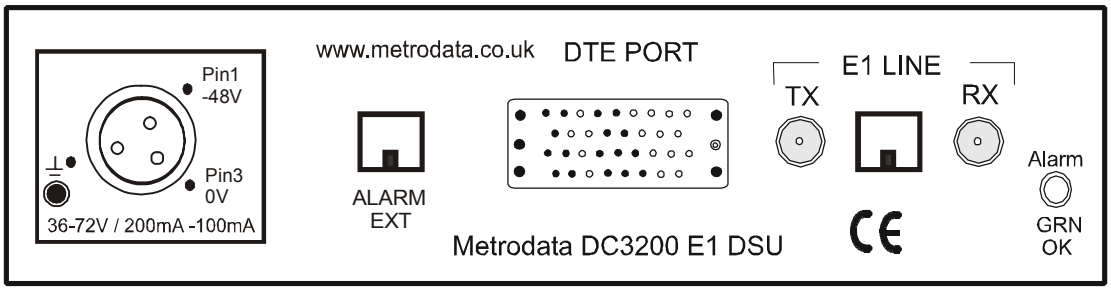

Figure 2.2 DC3200 rear panel (-48VDC supply)

2. 2 Status display - rear panel

There is a status LED on the right hand side of the rear panel which indicates the status of the unit as shown in the figure below.

Status LED	Meaning
Off	No mains power present
Red steady	LOS
Red/Off flashing	LOS and DTE Alarm
Red/Green flashing	LOF or AIS Alarm
Red/Green/Off flashing	AIS and DTE Alarm
Green/Red/Off flashing	LOF and DTE Alarm
Green/Off flashing	DTE Alarm
Green steady	DC3X00 is operating normally

Figure 2.3 Rear panel status LED

Notes:
If the LED flashes red/green, disconnect the DTE (X.21 or V.35) signal to the DC3X00 in order to distinguish between LOF and AIS alarms. The loss of the DTE signal will then cause either the red/green/off or the green/red/off sequence to occur, depending upon the condition which has occurred.

2. 3 Power supply

The DSU is powered by a mains supply with an input voltage of 100-250VAC, 50-60Hz, 35-15 mA. The input power consumption is approximately 3.5 watts. The DC3X00 is provided ex-factory with a 250mA internal fuse. Mains power is connected via the IEC inlet on the rear of the unit.

An alternative -48VDC powered unit is available. The input voltage and current ranges are minus 36 to minus 72 volts DC, 100-50mA. A Buccaneer type socket is fitted to the rear panel, and a plug is provided with the unit for the customer's own wiring. The connections are labelled on the rear panel of the DC3X00.

On some units, an additional Ground stud may be located on the rear panel to permit a separate Ground connection to be made.

Pin no	Connection
1	-48VDC
2	Ground
3	0VDC

Figure 2.4 -48VDC connections

Note: The DSU must be connected to mains safety earth for correct operation.

2. 4 Unbalanced E1 Line port (BNC)

The network is connected to the BNC connectors at the rear of the unit as shown below :

Pin	Function
Tip	Signal
Ring	Shield

Figure 2.5 BNC connection

Cable lengths should be restricted to those defined below:

Cable	Max Length (metres)
UR202	720
RG59U	600
BT2002	650
BT2003	680

Figure 2.6 Cable lengths

Note: The total maximum attenuation of each of the cables attached to the network port must not exceed 6dB when measured at 1·024 MHz. The frequency/attenuation characteristic of the cables attached to the network port shall follow a root frequency law.

2. 5 Balanced RJ45 E1 Line (Network) Port

The layout of the female RJ45 network port mounted on the rear panel is shown below:

Pin	Function
1	Tx tip
2	Tx ring
3	Tx shield
4	Rx tip
5	Rx ring
6	Rx shield
7	Not connected
8	Not connected

Figure 2.7 RJ45 network port layout

2 . 5. 1 Connecting to a terminal device

A connecting cable from the network port to a terminal port such as a router or a PABX is straight through. Connections are defined in the table below.

DSU port pin	DSU port function	Terminal port pin	Terminal port function
1	Tx tip	1	Rx tip
2	Tx ring	2	Rx ring
3	Tx shield	3	Rx shield
4	Rx tip	4	Tx tip
5	Rx ring	5	Tx ring
6	Rx shield	6	Tx shield
7	Not connected	Not connected	Not connected
8	Not connected	Not connected	Not connected

Figure 2.8 Connection from DSU to terminal device

2 . 5. 2 Connecting to a network device

A connection from the network port to a network device such as an E1 line or an NTU requires a crossover cable. Connections are defined in the table below.

DSU port pin	DSU port function	Network port pin	Network port function
1	Tx tip	4	Rx tip
2	Tx ring	5	Rx ring
3	Tx shield	6	Rx shield
4	Rx tip	1	Tx tip
5	Rx ring	2	Tx ring
6	Rx shield	3	Tx shield
7	Not connected	Not connected	Not connected
8	Not connected	Not connected	Not connected

Figure 2.9 Connection from DSU to network device

2 . 5. 3 RJ45 Connector layout

Figure 2.4 shows both the plug and socket head on so that any connecting wires are behind the connector. The connector numbering is shown.

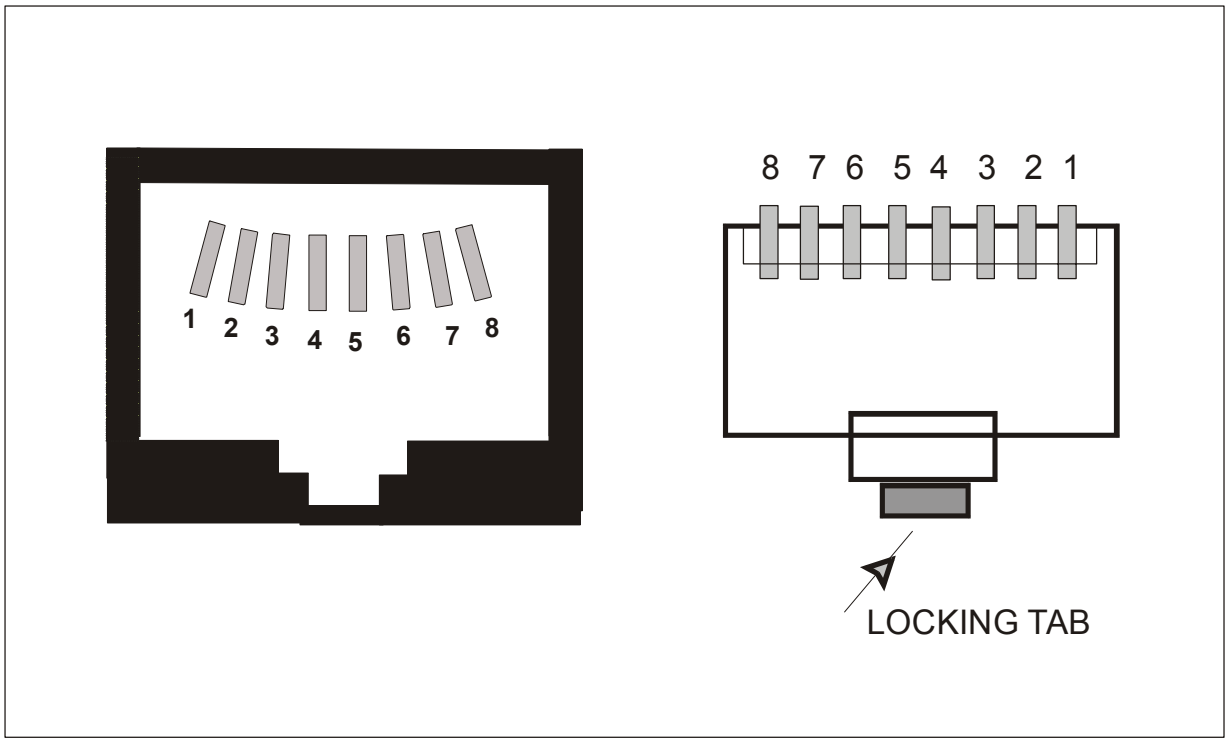

Figure 2.10 RJ45 layout

2 . 5. 4 Cable lengths and types

Cable lengths should be restricted to those defined below:

Cable	Max Length (metres)
Belden 8132 (28 AWG)	175
Belden 9841 (24 AWG)	300

Figure 2.11 Cable lengths

Note: The total maximum attenuation of the cable attached to the network port must not exceed 6dB when measured at 1·024 MHz. The frequency/attenuation characteristic of the cables attached to the network port shall follow a root frequency law. This port type is approved to CTR12, CTR13.

2. 6 Alarm Extension (RJ45)

The alarm extension is an RJ45 female socket mounted on the rear panel of the unit. It allows the connection of major and minor alarm relay contacts to a remote indicator such as a bell or a lamp. The alarm relay port is regarded as a SELV port within the scope of EN41003. Mains power failure is registered via Normally closed contacts as a major alarm.

Pin	Function
1	Major Normally Closed
2	Major Normally Open
3	Major common
4	Not connected
5	Minor Normally Open
6	Minor Normally Closed
7	Minor common
8	Ground

Figure 2.12 RJ45 alarm extension layout

2. 7 X.21 DTE Port

The X.21 DTE port is equipped with a 15-way female D-type connector in accordance with ISO 4903. The connections are shown below.
Note: The X.21 port is regarded as a SELV port within the scope of EN 41003.

Pin No	Function	Definition	CCT No.
1	Chassis	Shield	101
2	Tx(A)	Transmit (A)	103
3	C(A)	Control (A)	107
4	Rx(A)	Receive (A)	104
5	I(A)	Indication (A)	109
6	S(A)	Signal timing (A)	115
7	X(A)	DTE Signal timing (A)	113
8	Ground	Ground	102
9	Tx(B)	Transmit (B)	103
10	C(B)	Control (B)	107
11	Rx(B)	Receive (B)	104
12	I(B)	Indication (B)	109
13	S(B)	Signal timing (B)	115
14	X(B)	DTE Signal timing (B)	113
15	Not connected		

Figure 2.13 X.21 DTE port connector layout

2. 8 V.35 DTE Port

The V.35 DTE port is equipped with a 34-way M rack female connector in accordance with ISO 4903. The connections are shown below.

Note: The V.35 port is a SELV port within the scope of EN 41003.

Pin	Function	Definition	CCT No.
A	Chassis	Chassis ground	101
B	Ground	Signal ground	102
C	RTS	Request to send	105
D	CTS	Clear to send	106
E	DSR	Data set ready	107
F	DCD	Data Carrier detect	109
H	DTR	Data terminal ready	108.2
P	Tx(A)	Transmit data(A)	103
R	Rx(A)	Receive data(A)	104
S	Tx(B)	Transmit data(B)	103
T	Rx(B)	Receive data(B)	104
U	XClk(A)	Terminal timing(A)	113
V	RxClk(A)	Receive timing(A)	115
W	XClk(B)	Terminal timing(B)	113
X	RxClk(B)	Receive timing(B)	115
Y	TxClk(A)	Transmit timing(A)	114
AA	TxClk(B)	Transmit timing(B)	114

Figure 2.14 V.35 DTE port connector layout

3 INSTALLATION & SET-UP

3. 1 Setting-up the Bit-switches

It is recommended that the two sets of 8-gang bit-switches labelled SW1 and SW2 on the base of the unit are set-up before making any connections to the unit. There is an explanatory label on the unit's base which defines the bit-switch set-up options and alarms.

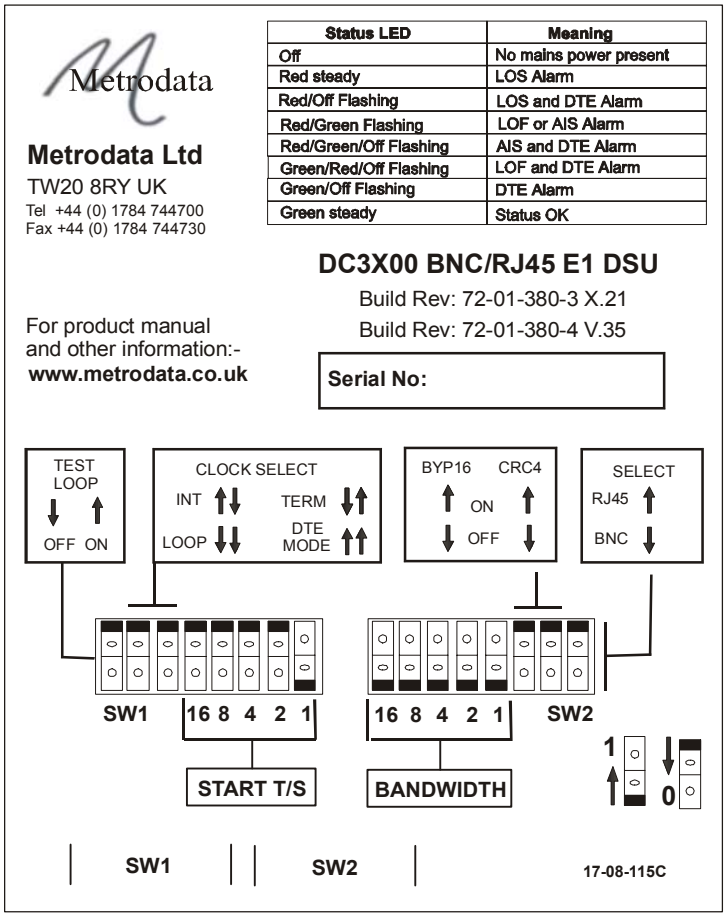

Figure 3.1 DC3X00 Base Panel label

Parameter	Label	Unit	Options
E1 Line connector	Select	Up Down	RJ45 BNC
Framing	CRC4	On Off	CRC4 No CRC4
By-pass T/S16	BYP16	On Off	By-Pass T/S16 T/S 16 Carries Payload
Bandwidth	Bandwidth	Binary	Switch 2 Binary Switches 0-31
Start timeslot	Start T/S	Binary	Switch 1 Binary Switches 0-31
Timing	Clock select	Position	Internal, Terminal, Loop, DTE Mode
Test	Test Loop	On Off	Run Test Loop No test

Figure 3.2 Bit-switch definitions

3 . 1. 1 Select RJ45/BNC

This single switch is used to select which type of connector is to be used to connect the E1 line.

3 . 1. 2 CRC4 and T/S 16 bypass

These two switches define whether CRC4 checking is to be done on the E1 line, and whether T/Slot 16 is to be bypassed.

CRC4	Comment		
On (Enabled)	TS0 for framing info & CRC4 data integrity check on frame		
Off (Disabled)	TS0 for framing info, no data integrity check on frame		
By-pass T/S16	**No of payload T/Slots**	**Bandwidth nx64K**	**Comment**
On	30 max	(n =1-30) x 64K	TS16 by-passed for payload
Off	31 max	(n =1-31) x 64K	TS16 can carry payload

Figure 3.3 CRC4 & Timeslot options

3 . 1. 3 Framing

UNFRAMED mode can be selected by setting the *BANDWIDTH* bit-switches to 0 (zero). When this is done, the *START T/S* switches have no effect, and the unit remains in *UNFRAMED* mode.

In *G.704(no CRC4)* mode, TS0 is used to provide framing information. Bit 1 in TS0 is set to 1 and no data error checking occurs.

In *G.704(CRC4)* mode, TS0 is used to provide framing information and a Cyclic Redundancy Check (CRC) is performed to test for data errors. Note that *FALLBACK* can occur from *G.704(CRC4)* mode.

Fallback is a mechanism used in a CRC4 environment which allows G.704 framing to be maintained in the presence of high levels of CRC errors. In effect the receiver falls back to *G.704 (no CRC4)* mode. This allows traffic to pass from a CRC4 framed device to a non-CRC4 device without generating a Loss of Frame alarm (LOF).

3 . 1. 4 Timeslot 16 by-pass & bandwidth

With Timeslot 16 by-pass *OFF*, TS16 may be used for payload. With by-pass *ON*, TS16 is always left idle. Thus, if by-pass is O*N* and *START TIMESLOT* is set to 15 and *N* is set to 2, then TS15 and TS17 are used and TS16 is by-passed.

3 . 1. 5 Setting Up Start T/S and Bandwidth

The 5 binary switches for *START TIMESLOT* and *BANDWIDTH* permit numbers from 0-31 to be set-up. The decimal values of each switch are shown on the label. Thus, a *START T/S* of 11 and a *BANDWIDTH* of 4 would be set up as below.

Start T/S	Bandwidth
01011	00100

Figure 3.4 Binary set-up

Permitted *BANDWIDTH* values are 1-30 with Bypass *ON* and 1-31 with Bypass *OFF.*

3 . 1. 6 Timing

TIMING determines the source for the *LINE E1* transmit clock, and is set by two bit-switches. The options are *INT* (*INTERNAL), LOOP, TERM (TERMINAL),* or *DTE MODE.*

Note that the DTE clock must be accurate to within ±50 ppm. of the Nx64K value. If the DTE clock is out of specification the E1 transmitter will free-run at 2·048 MHz.

The recommended timing mode for the DC3X00 pair at either side of the WAN is **Internal** at one end of the link and **Loop** at the other end.

The tables below provide detailed timing definitions

Clocking mode	Bit switch position	E1 Transmit clock source	V.35 Transmit timing	V.35 Receive timing
INT Internal	10	DC3X00 Internal oscillator	CCT114 Transmit timing A / B	CCT115 Receive timing A / B
LOOP	00	Derived from E1 line received clock	CCT114 Transmit timing A / B	CCT115 Receive timing A / B
TERM Terminal	01	Slaved to CCT 113 Terminal timing A / B	CCT 113 Terminal timing A / B	CCT115 Receive timing A / B
DTE Mode	11	Slaved to CCT 113 Terminal timing A / B	CCT 113 Terminal timing A / B	CCT 113 Terminal timing A / B

Figure 3.5 DC3200 timing signal definitions

Clocking mode	Bit switch position	E1 Transmit clock source	X.21 Transmit data timing	X.21 Receive data timing
INT Internal	10	DC3X00 Internal oscillator	CCT115 Signal timing A / B	CCT115 Signal timing A / B
LOOP	00	Derived from E1 line received clock	CCT115 Signal timing A / B	CCT115 Signal timing A / B
TERM Terminal	01	Slaved to CCT 113 DTE signal timing A / B	CCT 113 DTE signal timing A / B	CCT115 Signal timing A / B
DTE Mode	11	Slaved to CCT 113 DTE signal timing A / B	CCT 113 DTE signal timing A / B	CCT 113 DTE signal timing A / B

Figure 3.6 DC3000 timing signal definitions

3 . 1. 7 Line coding

Line coding is *HDB3* (High-Density Binary 3). This setting is built into the unit and cannot be altered. Therefore there is no bit-switch for ths item.

3 . 1. 8 Test Loop

This switch is used to initiate loop testing. It is fully described in the next section.

3. 2 Connecting up

Safety Notice: Ports that are identified as SELV in this manual should only be connected to SELV ports on other equipment in accordance with EN 60950 clause 2.3.

Step 1: Mounting.
The DC3X00 is housed in a convenient 1U table top enclosure.

Step 2: Set up bit-switches SW1 & SW2
These switches are located on the base of the unit and are used to specify the functionality required.

Step 2: DTE
Connect the DC3X00 to the DTE using either the 15-way X.21 connector (DC3000) or the 34 way M-rack connector (DC3200) labelled *DTE PORT* on the rear panel. The DSU should ideally be placed close to the DTE, with no more than 2m of cable connecting the two.

Step 3: E1 LINE (WAN)
Connect the WAN by means of either the two BNC bayonet connectors labelled E1 LINE Rx and E1 LINE Tx, or the single RJ45 connector located between the two BNC connectors. remember to set the *SELECT* bit-switch to the correct connector type before connecting.

Step 4: Power Supply
Finally, connect the main power lead and re-check all connections for security. Then turn on the power supply. Check the rear panel status LED to ensure that it is continuously lit (green).

Warning: Do not connect the DC3X00 to excessive voltages. Read the safety information before continuing.

4 ALARMS, TROUBLESHOOTING & TESTING

4. 1 Alarms

The Status LED on the DC3X00 rear panel shows a variety of alarm conditions as shown in the table below.

Status LED	Meaning
Off	No mains power present
Red steady	LOS
Red/Off flashing	LOS and DTE Alarm
Red/Green flashing	LOF or AIS Alarm
Red/Green/Off flashing	AIS and DTE Alarm
Green/Red/Off flashing	LOF and DTE Alarm
Green/Off flashing	DTE Alarm
Green steady	Status OK

Figure 4.1 Rear panel LED alarms

The definitions of each alarm and the unit's reponse to them is tabulated below.

Alarm	Alarm Definition	Response
LOS	Loss Of Signal: No data and therefore no clocking information.	E1 port transmits RAI if in framed mode. Indication *DE-ASSERTED*.
LOF	Loss Of Frame: Clocking information is there but the frame alignment pattern is faulty. **(Framed mode only)**	E1 port transmits RAI if in framed mode. Indication *DE-ASSERTED*.
AIS	Alarm Indication Signal: All 1's being received.	E1 port transmits RAI if in framed mode. Indication *DE-ASSERTED*.
RAI	Remote Alarm Indication: RAI signal being received **(Framed mode only)**	No response.
DTE	DTE Control signal absent	No response

Figure 4.2 Alarm responses & definitions

4. 2 Troubleshooting

Step 1: Establish and verify the E1 WAN link

Check the status LED on the rear panel of the unit at both ends of the link. If either is OFF, power is not present on that unit. Check the mains connection to the unit. If mains supply is satisfactory, we recommend that the unit be taken out of service and returned to a repair centre. Unqualified users should not open the DC3X00 .

DC3X00 with BNC connectors - Step 1A

If the status LED is *RED* or flashing RED/O*FF*, first check that the *SELECT* bit-switch on the base panel is set to BNC. If it is set correctly, try swapping the E1 LINE BNC connections at that unit.

If the status LED remains red or flashing red/off, try looping the BNC connections on the unit with a short piece of cable. If the status LED goes steady green or flashes green/off, red/green/off or red/green then the external BNC cabling is faulty. Check for cable continuity and network connections, etc.

DC3X00 with RJ45 connectors - Step 1B

If the status LED is red or flashing red/off, first check that the SELECT bit-switch is set to RJ45. If it is set correctly, check the connections on the RJ45 cable. Check for cable continuity and network connections, etc.

Step 2 Establish and verify the DTE link

If the status LED flashes *RED/GREEN*, this indicates that either an LOF or AIS Alarm is present. In order to distinguish between these, disconnect the DTE signal from the DC3X00. Then observe carefully the colour sequence of the LED:

a) If the status LED flashes *GREEN/RED/OFF*, an LOF Alarm is present. Check that the E1 configuration is compatible at either side of the link. Check especially that the operating mode set-ups as set by the base panel bit-switches are the same at both ends of the link.

b) If the status LED flashes *RED/GREEN/OFF*, an AIS Alarm is present. Check that the remote router port status is *UP* and that the remote router cable is in place.

If the status LED flashes *GREEN/OFF*, check that the local router port status is *UP* and that the local router cable is in place.

If problems persist, check the DTE cabling configuration. Running *TEST LOOPS* will help to isolate the problem area - see next section. Transmit and Receive data connections may be crossed, as may any of the handshaking and/or signalling lines.

Step 3: Bridge/Router configuration

As the DC3X00 is used in a variety of locations and with many different manufacturer's equipment it is impossible for us to cover all eventualities here, so please consult other manufacturer's operating manual for further information.

4. 3 Test Loop

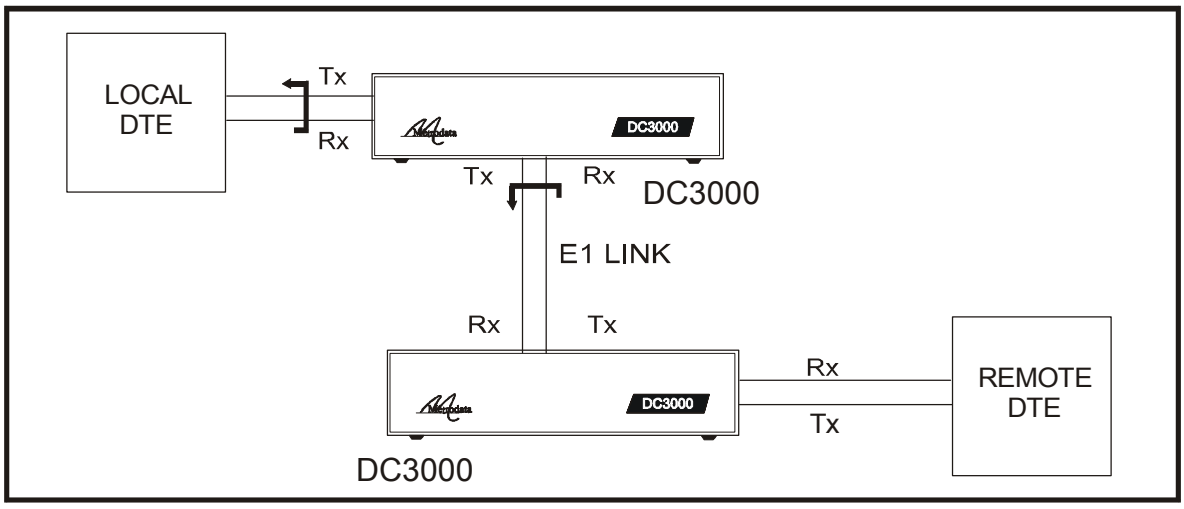

Figure 4.3 Test loop on local DC3X00

Set the local DC3X00 base panel bit-switch labelled *TEST LOOP* to the *ON* position. When the *TEST LOOP* is activated at the local DC3X00, the signal received at the E1 port is passed directly back to the link at the line interface. The signal from the DTE is looped adjacent to the DTE port. This effectively isolates the DC3X00 running the test and validates:

(a) the local DTE cable if the local DTE recognises its own transmissions.
(b) the remote DTE and its cable, the remote DC3X00 and the E1 link if the remote DTE recognises its own transmissions.

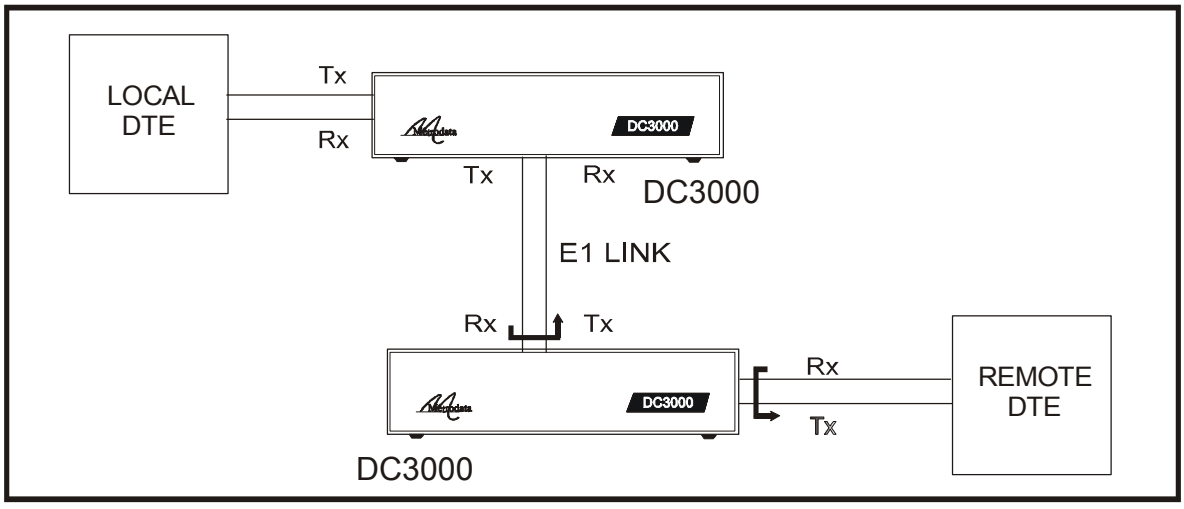

Figure 4.4 Test loop on remote DC3X00

Set the remote DC3X00 base panel bit-switch labelled *TEST LOOP* to the *ON* position. The test loop validates:

(a) the remote DTE cable if the remote DTE recognises its own transmissions.
(b) the local DTE and its cable, the local DC3X00 and the E1 link if the local DTE recognises its own transmissions.

5 DC3X00 SPECIFICATIONS

5. 1 DC3X00 Product Specification

Parameter	Definition
E1 LINE Interface	G.703 compliant, Sensitivity -10dB. Line coding HDB3. **Interface types:** 75 Ohm unbalanced coax (BNC) or 120 ohm balanced RJ45. Interface selected by bit-switch.
Jitter Tolerance	Per G.823.
Barrier	EN 41003 compliant barrier provided on the E1 interface.
Framing	G.704 compliant with optional CRC4 (set by bit-switch).
DTE Interface	**X.21 :** 15 way female DA15 per ISO 4903 **V.35 :** 34 way female M-rack
Clocking options	**E1 Line:** Internal, Terminal: DTE TT(circuit 113), Loop: E1 line receive clock DTE Mode: E1 transmit clock slaved to CCT113, with X.21 received data timed off CCT113
Diagnostics	Loop Test initiated by bit-switch
General	**Definition**
Power supply	100-250 VAC, 50-60 Hz, 35 -15 mA or -36 to -72 VDC, 100 - 50 mA
Dimensions	202 x 132 x 44 mm (w x d x h) Enclosure only 202 x 132 x 47 mm (w x d x h) Overall including feet
Environmental	**Range**
Ambient Temperature	0 degC to +50 degC
Storage Temperature	-20 degC to +70 degC
Relative Humidity	0% - 95% non condensing
Barometric Pressure	86 KPa - 106 KPa

5. 2 DC3X00 Clocking Diagram

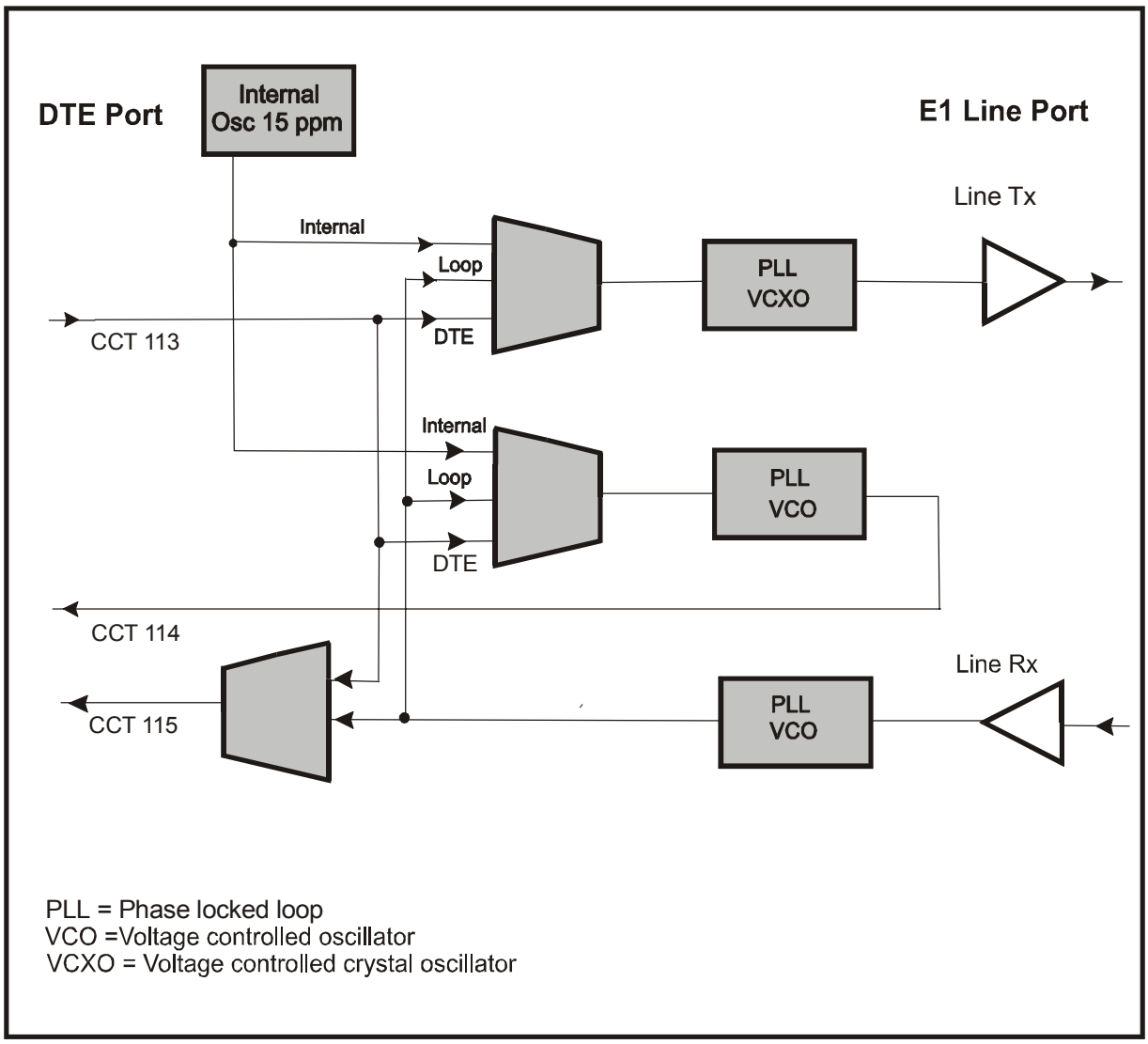

Figure 5.1 DC3X00 Clocking diagram

5. 3 Glossary

AIS	Alarm Indication signal
AMI	Alternate Mark Inversion
CRC	Cyclic Redundancy Check
DSU	Data Service Unit
DTE	Data Terminal Equipment
FAS	Frame Alignment Signal
HDB3	High-Density Binary 3
LAN	Local Area Network
LOF	Loss of Frame alarm
LOS	Loss of Signal alarm
NFAS	Non Frame Alignment Signal
RAI	Remote Alarm Indication
SELV	Safety Extra Low Voltage
T/S	Timeslot
WAN	Wide Area Network

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