G-Converter Nx64 SNMP Configuration (Front Card):
MTU200CF-N64

G-Converter Nx64 SNMP and Manual Configuration (Front Card):
MTU200CF-N64M

G-Converter Rear Card
75 Ohm BNC X.21: **MTU200CR-X21-75**
75 Ohm BNC V.35: **MTU200CR-V35-75**

120 Ohm RJ45 X.21: **MTU200CR-X21-75**
120 Ohm RJ45 V.35: **MTU200CR-V35-75**
Rev 3.0

G-Converter Nx64 and Nx64 (M) Channel Cards

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SALES: **(0118) 965 5100**
FAX: **(0118) 965 5001**
ADDRESS: **464 Basingstoke Road, Reading, Berkshire RG2 0QN**
WEB: **www.blackbox.co.uk**

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Fax: 027259212
Web Site: www.blackbox.be

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Black Box Catalog Australia PTY LTD

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Fax: 0398702955

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Web Site: www.blackbox.com.br

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Tel: 0416-736-8000
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Web Site: www.blackbox.com

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Black Box De Mexico S.A. de C.V

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Fax: 03-3820-5010
Web Site: www.blackbox.co.jp/

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Fax: 00 562 225 1002
Web Site: www.Blackbox.cl

G-Converter Nx64 and Nx64M
G.703 to X.21/V.35 Converter Card

User Manual

CE

WARNING - BEFORE INSTALLATION, PLEASE REFER TO SAFETY INSTRUCTIONS IN APPENDIX A, AND EMC INSTRUCTIONS IN APPENDIX C

The following declaration is made assuming the G-Converter Nx64 also G-Converter Nx64 (M) Channel Cards have been installed correctly in an G-Converter ChassisCard Cage.
Certified Compliant in the EC, when fitted in accordance with the installation instructions, against the following directives/standards:

Low Voltage Directive (73/23/EEC and amendment 93/68/EEC)

EN60950 : 1992 (Safety)

Electromagnetic Compatibility directive (89/336/EEC and subsequent amendments to date):

EN55022 : 1994 (Emissions)
EN55024 : 1998 (Immunity)

Telecommunications Terminal Equipment directive (91/263/EEC and amendment 93/68/EEC) where indicated in approvals requirements section.

Contents

Introduction

This manual provides information covering installation and set-up procedures of the G-Converter Channel Card, types G-Converter Nx64 and G-Converter Nx64 (M)

These cards are designed to be used in conjunction with a G-Converter Chassis System for which there is a separate manual.

G-Converter Nx64 (M) Channel Cards are interface adapters that will convert between a G.703/G.704 link and an X.21/V.11 interface or optionally V.35.

The intended use of these units is to terminate G.703/704 links. These units have the ability to operate at DCE rates between zero and 2048Kbps in 64k steps. Selection of these DCE rates is conveyed across the G.703/G.704 link from the central site management unit by a proprietary in-band-signalling scheme.

Two variants of the G-Converter Nx64 Channel Cards are available: G-Converter Nx64 and G-Converter Nx64 (M).

G-Converter Nx64

The G-Converter Nx64 is configured and managed via the Manager Card housed in the G-Converter Chassis .The G-Converter Nx64 Channel Card has a tri-coloured LED mounted on the front panel, this indicates the card status, additional information is available from the Management System.

G-Converter Nx64 (M)

The G-Converter Nx64 (M) incorporates two rotary switches accessible through the front panel. In addition to the tri-coloured LED there is also a dual seven-segment LED display on the front panel. Operation of the rotary switches permits the G-Converter Nx64 (M) Channel Cards to be operated without a Manager Card. If preferred the G-Converter Nx64 (M) may be managed by the Manager Card, this is achieved by selection of onboard DIL switches.

Functional Overview

G-Converter Channel Cards provide interface and rate conversion between G.703 data stream and X.21/V.11 or optionally V.35 interface.

The E1 connection is via either an RJ45 connector offering a120-Ohm balanced impedance or two BNC connectors offering an unbalanced 75-Ohm impedance. The N x 64Kbps,X.21/V.11 connection is via a 15 way D type connector. V.35 connection is also available on a 15 way D type connector, a conversion cable providing MRAC connection is available as an option.

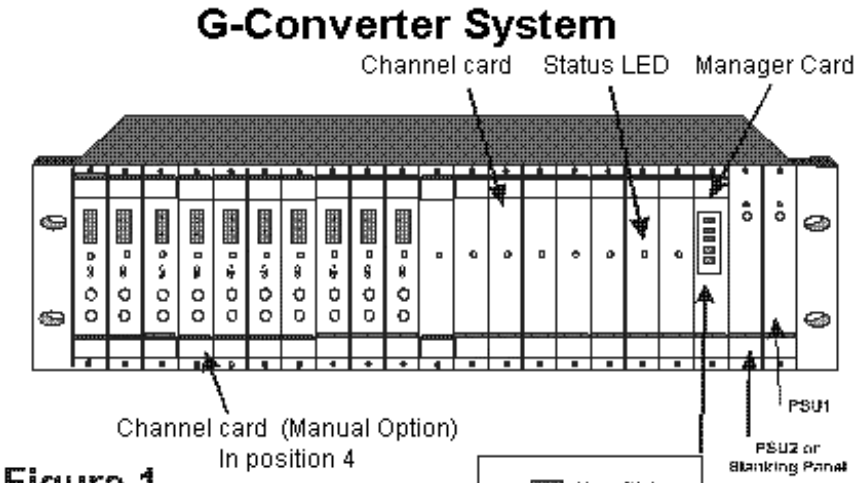


Figure 1

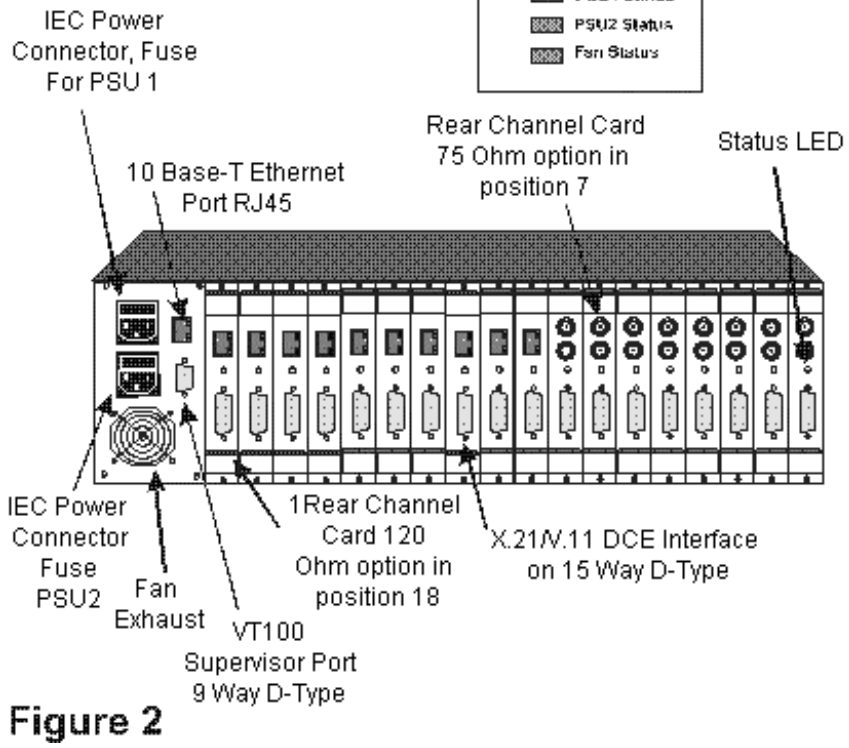


Figure 2

Typical applications

Typically the G-Converters are used to connect a router with an X.21/V.11 or V.35 interface to an E1 circuit with G.703 interface. Additionally both versions offer the ability to reduce the data rate of the X.21 or V.11/V.35 interfaced connection in 64Kbps steps.

Installation

BEFORE INSTALLATION, PLEASE REFER TO THE SAFETY WARNINGS, APPROVAL REQUIREMENTS AND EMC REQUIREMENTS IN THE APPENDICES.

Environmental Considerations

The equipment may only be operated under the following atmospheric conditions:

Temperature: 0 to 40 degrees centigrade.
Humidity: 0% to 90% non-condensing.

Installation in to the G-Converter Chassis

The G-Converter Channel Cards are plugged into slots numbered 1 to 18 of the Card Cage. The card is divided into 2 pieces the longer card is plugged into the backplane from the front of the G-Converter Chassis; the shorter card with connectors is plugged into the backplane from the rear of the Card Cage**. It is essential that the front and rear cards are plugged into sockets in the backplane with the same number.**

There are 4 variants of rear card:

1. 120 Ohm, RJ45 E1 connection,15 way D type X.21/V.11 data connection
2. 120 Ohm, RJ45 E1 connection, 15 way D type V.35 data connection.*
3. 75 Ohm, Dual BNC E1 connection, 15 way D type X.21/V.11 data connection
4. 75 Ohm, Dual BNC E1 connection, 15 way D type V.35 data connection.*

* Converter cable to MRAC connector available as an option.

After plugging the cards into the Card Cage, they should be retained by the screws provided in the front and rear panels.

G.703 Interface Presentation 120Ohm.

A shielded RJ45 connector is provided on the rear of the G-Converter Nx64 Channel Card. The port is compliant with TBR12. A pin out of this connector is given in Appendix D.

G.703 Interface Presentation 75Ohm

Dual 75 Ohm BNC connectors are provided with this option. This port is compliant with PD7024. See Appendix E.

X.21/V.11 DCE interface.

This interface is presented on a 15 way D-type female connector. A pin out of this connector is given in Appendix G.

V.35 DCE Interface

This interface is presented on a 15-way D-type female connector. A pin out of this connector is given in Appendix H.

Configuration and Use - G-Converter Nx64

There are no switches or configuration links on the G-Converter Nx64 Channel Card. All the management and configuration is performed through the G-Converter Chassis Manager Card. This allows the G-Converter Nx64 Channel Card to be configured either by SNMP, data terminal (VT100) via the supervisor port or Telnet.

Use of these management media are covered in the G-Converter Chassis user manual and repeated below.

This manual will cover the specific configuration and management of the G-Converter Nx64 Channel Card.

Supervisor Port (terminal management)

This RS232 option is presented on a female 9 Way-D connector. It can support VT52, VT100, ADDSVP, ADM3A, H1500, N8009, and TVI920 terminal emulation modes. Selection of the required option is made on the power up screen.

Supervisor Terminal Requirements

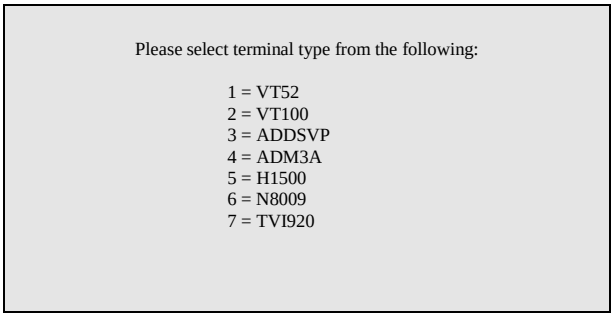
The terminal should be configured as follows:

8 bits per character, no parity, one stop bit, speed 19.2 Kbps.

A 'modem' or 'straight' serial cable is suitable for connection of the Supervisor port (the Supervisor port pin-out out is described in Appendix C).

Supervisor Terminal Emulation

The Manager Card supports several terminal emulations. When connection is made between the terminal and the RS232 Supervisor port, the following screen will appear:

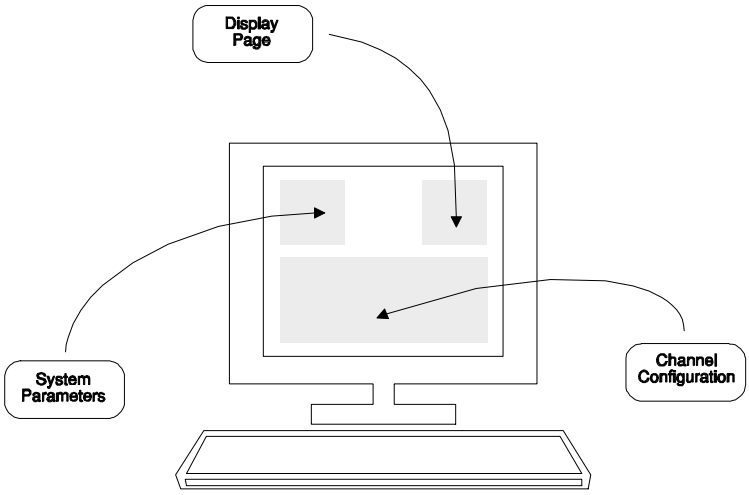


The terminal type or emulation in use should be selected by pressing the relevant number key on the PC or terminal. The terminal will then show the basic configuration screen for the chassis's set-up.

You may return to this screen at any time by pressing '**CTRL**' and '**E**' at the same time.

General set-up Display Layout

There are three main areas on the Supervisor set-up screen used to change parameters for the Card Cage System:



Upper left –
System parameters

Upper right –
Other **display pages** which may be selected.

Bottom –
Configuration.

Typical Configuration Display

```
Telnet - 10.0.0.154
Connect  Edit  Terminal  Help
 16:01 24/08/2000                  Rack System                              V1.06
================================================================================

System Name    : Blackbox                          *  Slots 1-18     :
Location       :>Reading                             Ethernet       :
IP Address     : 10.0.0.154                          IP             :
Subnet Mask    : 0.0.0.0                             Alarms         :
Gateway        : 0.0.0.0           (modified)        Events         :
                                                     Telnet         :

      Slot  1 : G-SYS 1 120R, X.21 Er    Slot 10 :
      Slot  2 : G-SYS 1 120R, X.21 Er    Slot 11 : G-SYS 1
      Slot  3 : G-SYS 1 120R, X.21 Ok    Slot 12 :
      Slot  4 :                          Slot 13 :
      Slot  5 :                          Slot 14 :
      Slot  6 :                          Slot 15 : G-SYS 1 120R, X.21 Ok
      Slot  7 :                          Slot 16 : G-SYS 1 120R, X.21 Ok
      Slot  8 :                          Slot 17 : G-SYS 1 120R, X.21 Ok
      Slot  9 :                          Slot 18 : G-SYS 1 120R, X.21 Er


              Cursor keys to move, CTRL-U to save, ESC to abandon
================================================================================
 Enter string followed by <CR>
```

General Keyboard Conventions

Only a few keys are required to configure the chassis and are summarised as follows:

→ (Right arrow)	Moves the cursor to the next field to the right.
← (Left arrow)	Moves the cursor to the next field to the left.
↑ (Up arrow)	Moves the cursor to the next field upwards.
↓ (Down arrow)	Moves the cursor to the next field downwards.
+ (Plus) or <SPACEBAR>	Toggles the parameter value up to the next available setting.
– (Minus)	Toggles the parameter value down to the next available setting.
<ENTER> or <RETURN>	Accepts the current display page (otherwise the same as ↓).
<CTRL> and U	Updates all changes.
<ESC>	Abandons all changes since the last <CTRL> U.
<CTRL> and P	Refresh screen.

Cursor Movement

The cursor symbol ">" is moved around the screen to the required field using the **arrow keys**.

Parameter Changing

If it is possible to modify the field over which the cursor is placed, an appropriate message is shown at the bottom of the screen. No message will appear if the field is non-configurable.

Pressing the **Space** bar, the "+" key or the "-" key will cycle through the choices available for a parameter.

Accepting all changes and Updating the Configuration

If "**Control**" and "**U**" are pressed at the same time after the configuration has been altered, the configuration is updated at the local and remote end as necessary and held in non-volatile Memory.

Abandoning Changes

Pressing **ESC** at any point before a configuration is updated will cause the message "**Abandon Changes? (y/n)**" to appear at the bottom of the screen. If "**n**" is selected, the message will disappear and editing may continue. If "**y**" is pressed, all modifications will be abandoned and the last updated configuration will be re-printed on the screen.

Changing the Configuration Page

The Configuration Page required, e.g. "Alarms", is selected by moving the cursor to the **upper right area** and pressing Enter when alongside the required page. The currently selected page is indicated by a '*'.

Restoring the Factory Default Configuration

The system may be reset to the factory default configuration by pressing **CTRL-R** four times when the cursor is on the Terminal emulation page (see page 13). A 'Confirm' message will be displayed before the configuration is reset. The previous configuration will be lost.

10 Base-T Port (Telnet Management)

This method uses the 10 Base-T RJ45 (Ethernet) port. When a Telnet compatible PC is connected to this port a management platform identical to that available via the Supervisor Port is supported.

Before Telnet or SNMP management is used, it is essential that the notes relating to Supervisor Port Management be studied. (See pages13-16).

To enable SNMP or Telnet management, information must be added to the Manager Card via the Supervisor Port. The user must first set up various parameters namely IP address, Subnet Mask and Gateway.

The information required is:

System Name

A text field to identify the system. May be up to 32 characters.

Location

A text field to identify the location of the system. May be up to 32 characters.

IP Address

The IP address of the system. This must be set from the supervisor port to enable SNMP or Telnet access.

Subnet Mask

The Subnet mask of the local network. This must be set from the supervisor port before SNMP and Telnet access is required.

Gateway

The IP address of the default gateway from the local network.

To assist the process of adding this information, the relating to Supervisor port management is detailed below.

Supervisor Terminal Requirements

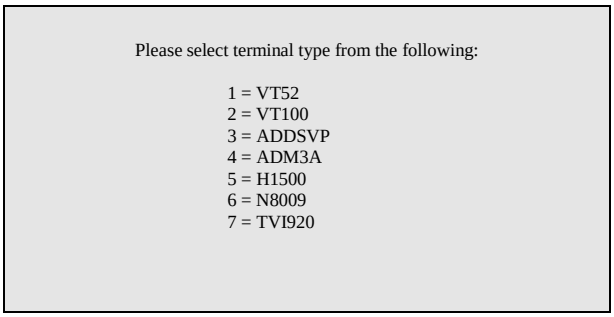
The terminal should be configured as follows:

8 bits per character, no parity, one stop bit, speed 19.2 Kbps.

A 'modem' or 'straight' serial cable is suitable for connection of the Supervisor port (the Supervisor port pin-out out is described in Appendix C).

Supervisor Terminal Emulation

The Manager Card supports several terminal emulations. When connection is made between the terminal and the RS232 Supervisor port, the following screen will appear:

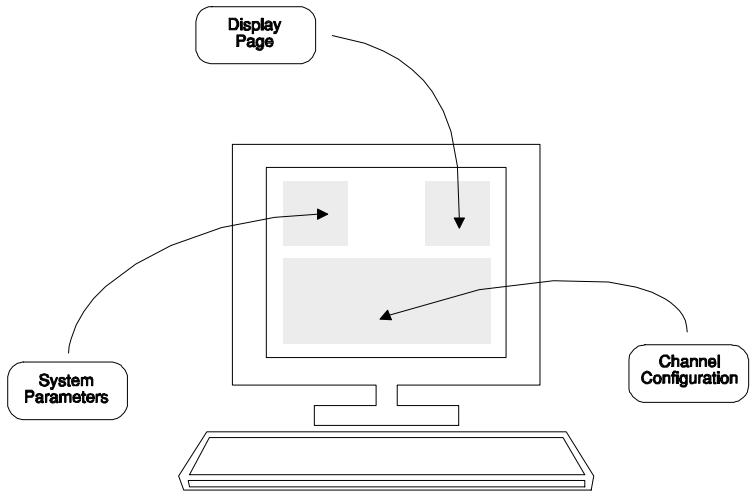


The terminal type or emulation in use should be selected by pressing the relevant number key on the PC or terminal. The terminal will then show the basic configuration screen for the chassis's set-up.

You may return to this screen at any time by pressing '**CTRL**' and '**E**' at the same time.

General set-up Display Layout

There are three main areas on the Supervisor set-up screen used to change parameters for the Card Cage System:



Upper left –
System parameters

Upper right –
Other **display pages** which may be selected.

Bottom –
Configuration.

Typical Configuration Display

```
Telnet - 10.0.0.154
Connect  Edit  Terminal  Help
 16:01 24/08/2000                  Rack System                              V1.06
================================================================================

System Name    : Blackbox                            *  Slots 1-18     :
Location       :>Reading                                Ethernet       :
IP Address     : 10.0.0.154                             IP             :
Subnet Mask    : 0.0.0.0                                Alarms         :
Gateway        : 0.0.0.0             (modified)         Events         :
                                                        Telnet         :

      Slot  1 : G-SYS 1 120R, X.21 Er    Slot 10 :
      Slot  2 : G-SYS 1 120R, X.21 Er    Slot 11 : G-SYS 1
      Slot  3 : G-SYS 1 120R, X.21 Ok    Slot 12 :
      Slot  4 :                          Slot 13 :
      Slot  5 :                          Slot 14 :
      Slot  6 :                          Slot 15 : G-SYS 1 120R, X.21 Ok
      Slot  7 :                          Slot 16 : G-SYS 1 120R, X.21 Ok
      Slot  8 :                          Slot 17 : G-SYS 1 120R, X.21 Ok
      Slot  9 :                          Slot 18 : G-SYS 1 120R, X.21 Er


              Cursor keys to move, CTRL-U to save, ESC to abandon
================================================================================
 Enter string followed by <CR>
```

General Keyboard Conventions

Only a few keys are required to configure the chassis and are summarised as follows:

→ (Right arrow)	Moves the cursor to the next field to the right.
← (Left arrow)	Moves the cursor to the next field to the left.
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+ (Plus) or <SPACEBAR>	Toggles the parameter value up to the next available setting.
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Cursor Movement

The cursor symbol ">" is moved around the screen to the required field using the **arrow keys**.

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If it is possible to modify the field over which the cursor is placed, an appropriate message is shown at the bottom of the screen. No message will appear if the field is non-configurable.

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If "**Control**" and "**U**" are pressed at the same time after the configuration has been altered, the configuration is updated at the local and remote end as necessary and held in non-volatile Memory.

Abandoning Changes

Pressing **ESC** at any point before a configuration is updated will cause the message "**Abandon Changes? (y/n)**" to appear at the bottom of the screen. If "**n**" is selected the message will disappear and editing may continue. If "**y**" is pressed, all modifications will be abandoned and the last updated configuration will be re-printed on the screen.

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The Configuration Page required, e.g. "Alarms", is selected by moving the cursor to the **upper right area** and pressing Enter when alongside the required page. The currently selected page is indicated by a '*'.

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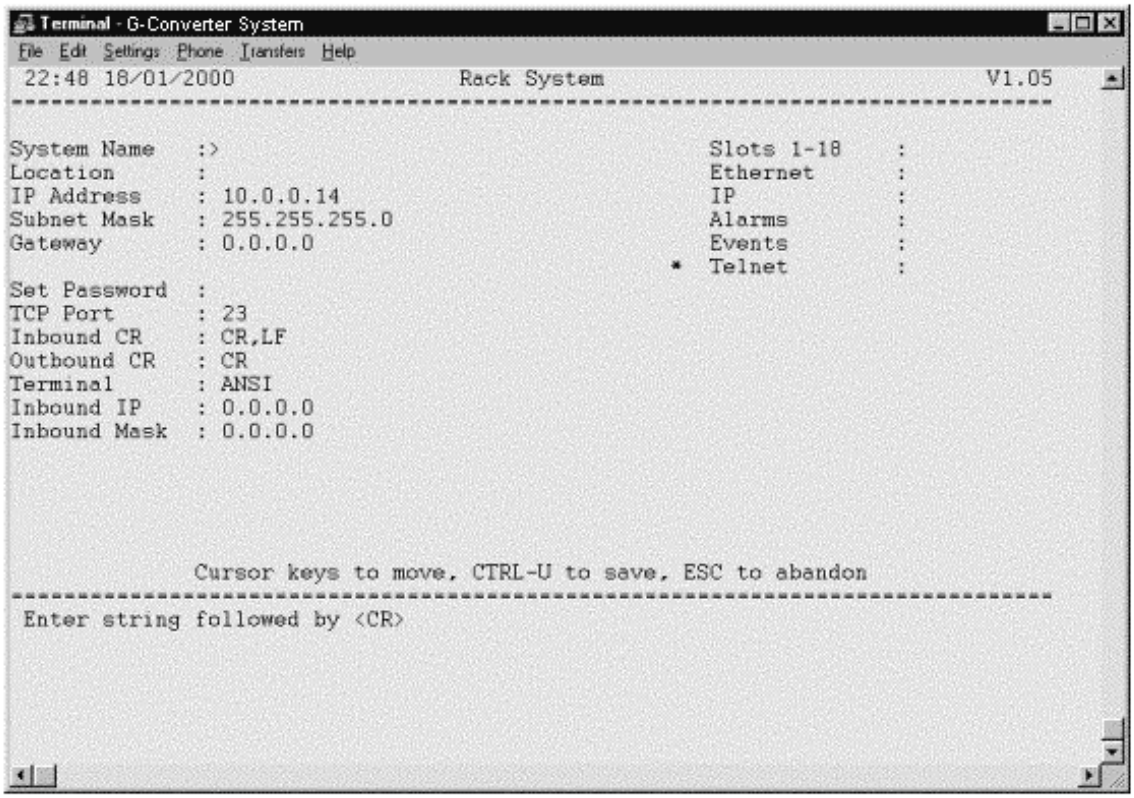
The system may be reset back to the factory default configuration by pressing **CTRL-R** four times when the cursor is on the Terminal emulation page (see page 13). A 'Confirm' message will be displayed before the configuration is reset. The previous configuration will be lost.

Telnet Screen



The Telnet screen allows Telnet specific parameters to be set.

Set Password Telnet password (Blank = no password)

TCP Port TCP port being used (Read only)

Inbound CR Specify CR > CR, LF translation on input stream.

Outbound CR Specify CR > CR, LF translation on output stream.

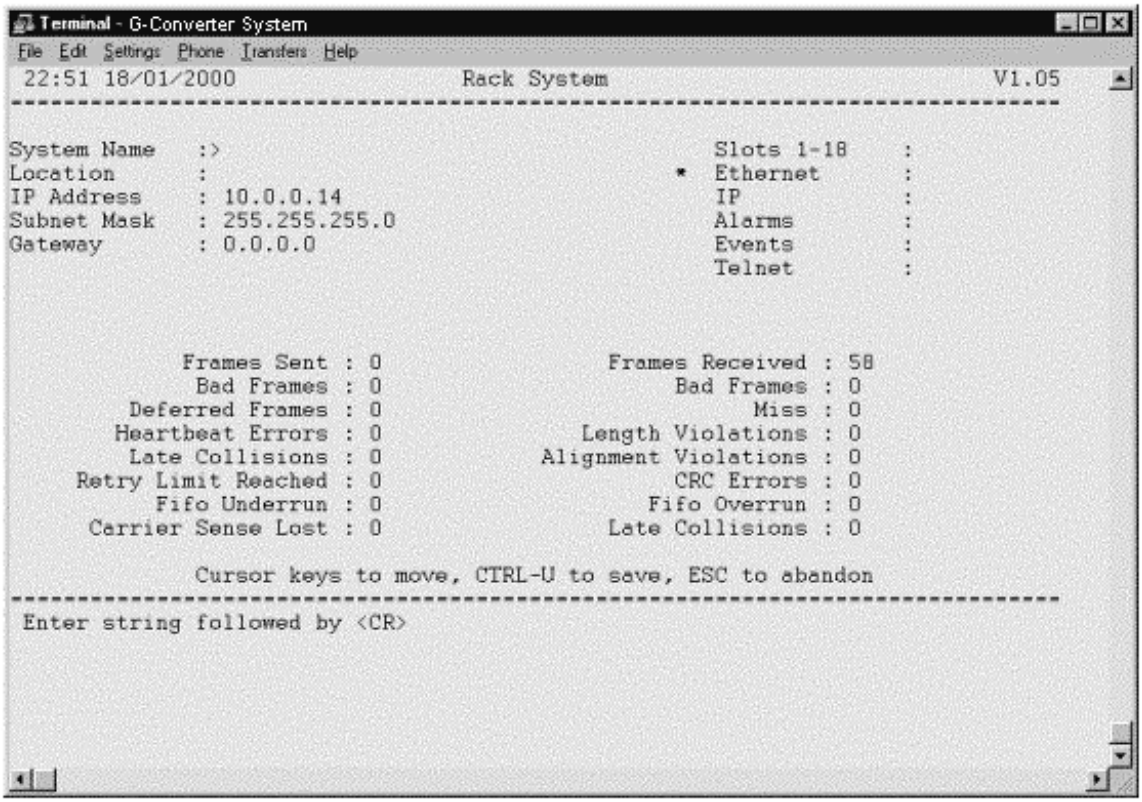
Terminal Terminal type (Read Only)

Inbound IP* Telnet allowed only from this IP address

Inbound Mask* Mask for inbound only from this address

*Setting a bit to 1 in an inbound mark means the corresponding bits specified in Inbound IP and the IP address from which the Telnet is being established must match for a Telnet connection to be permitted.

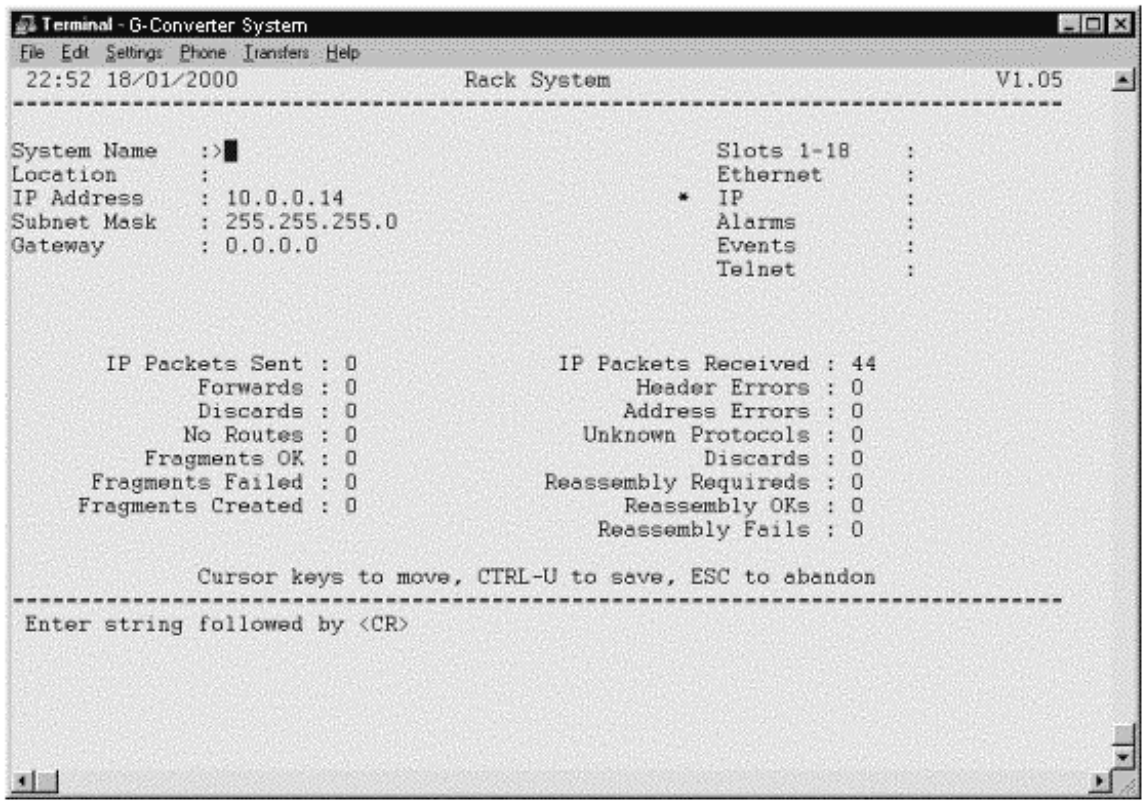
Ethernet Screen



The Ethernet page displays Ethernet Statistics for the unit.

The TX statistics are on the left, RX statistics on the right. The statistics shown are from the most recent “power on”; the statistics are not stored in a no-volatile memory.

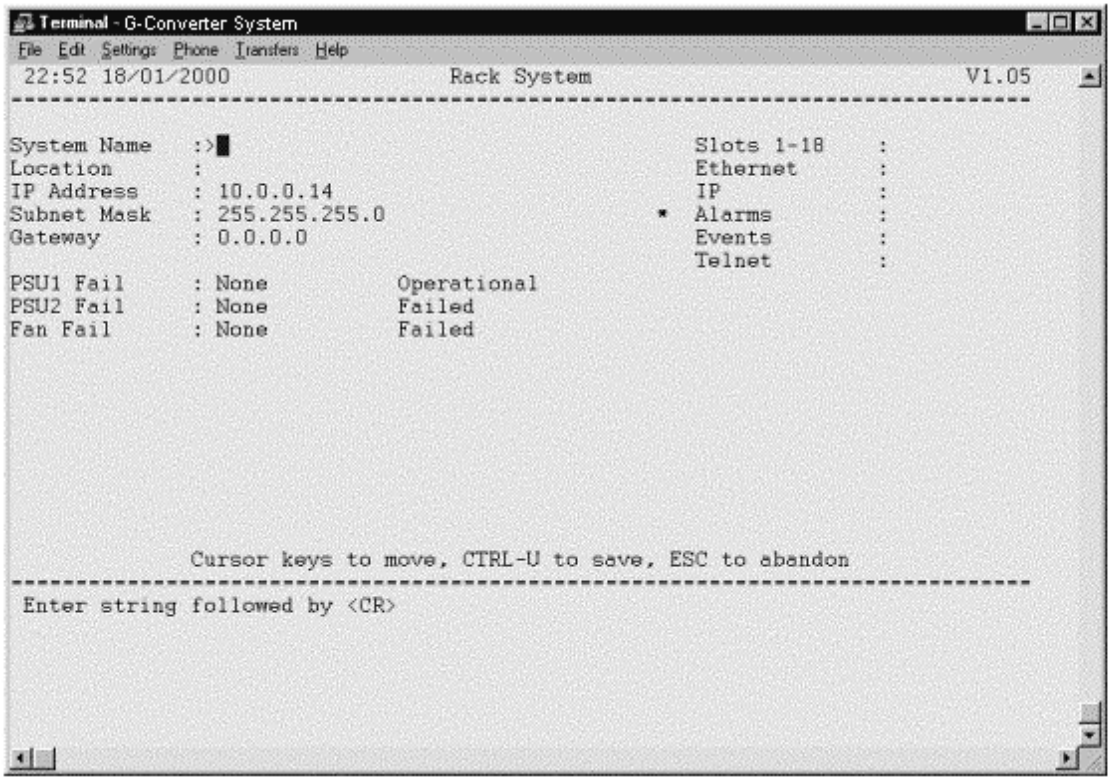
IP Screen



The IP page displays the IP Statistics for the unit.

The TX statistics are on the left, RX statistics on the right. The statistics shown are since power on and are self-explanatory.

Alarms Screen

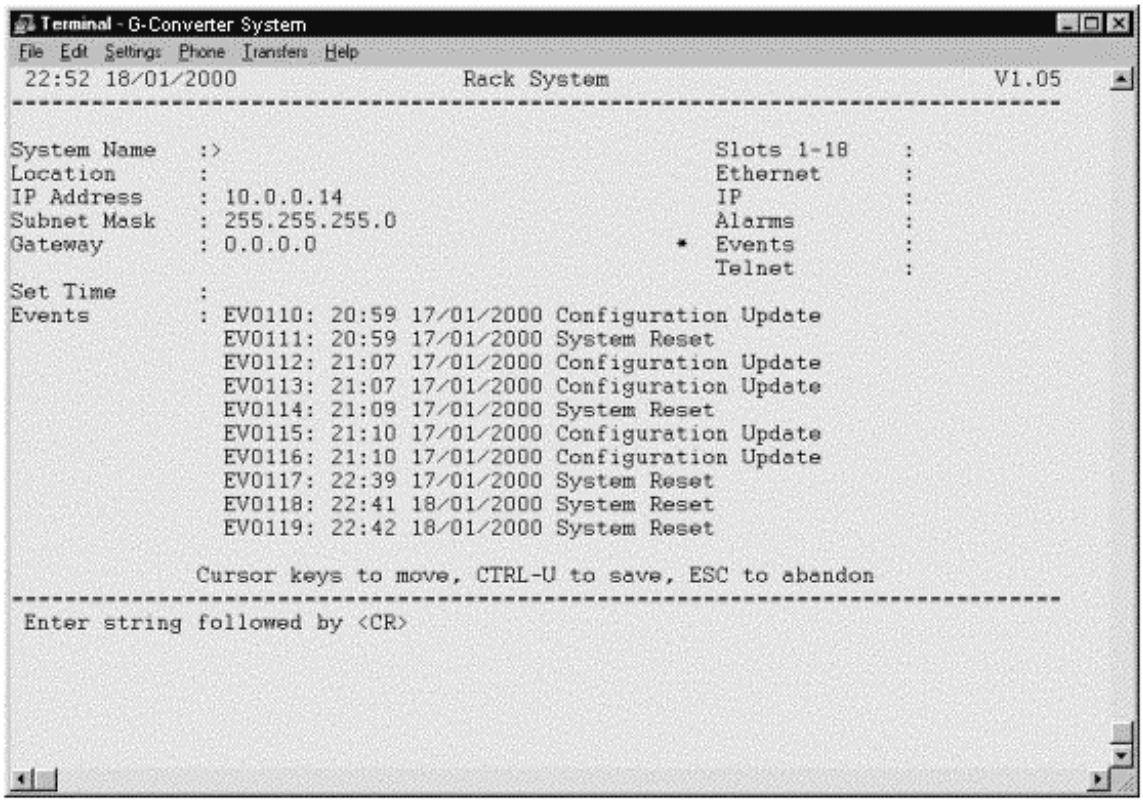


The Alarms page shows the current alarms status of the chassis, not the individual C The level of alarm for each fault condition can be configured from here as minor. The options are;

No action:	Fault condition is not reported
Log only:	Fault condition is recorded in event log.
Minor:	as “Log only” but minor alarm is illuminated on the front panel and an SNMP trap(s) will be sent if configured.
Major:	as “Log only” but major alarm is illuminated on the front panel and an SNMP trap(s) will be sent if configured.

Events Screen

The Events Page shows events stored in the Event Log. The Event Log can hold 672 events. If this number is exceeded, the oldest events are overwritten.



The information given is event number, time and date and a text string detailing the nature of the event. The system clock is also set from this screen. Enter a string in the format hh—mm—ss dd/mm/yy. A two-digit year is used representing a 100-year window from 1996 to 2095.

SNMP Management

To enable SNMP or Telnet management, information must be added to the Manager Card via the Supervisor Port. The user must first set up various parameters namely IP address, Subnet Mask and Gateway.

The information required is:

System name

A text field to identify the system. May be up to 32 characters.

Location

A text field to identify the location of the system. May be up to 32 characters.

IP Address

The IP address of the system. This must be set from the Supervisor port to enable SNMP or Telnet access.

IP Address

The Subnet mask of the local network. This must be set from the Supervisor port before SNMP and Telnet access is required.

Gateway

The IP address of the default gateway from the local network.

To assist the process of adding this information, the relating to Supervisor port management is detailed below.

Supervisor Terminal Requirements

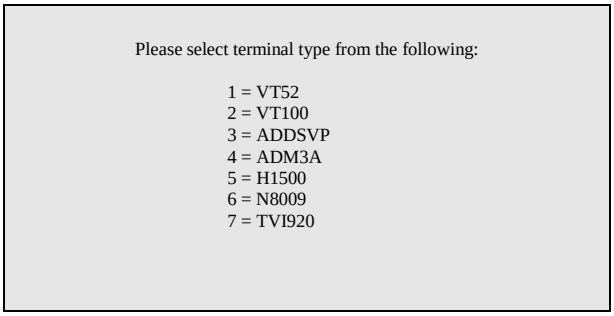
The terminal should be configured as follows:

8 bits per character, no parity, one stop bit, speed 19.2 Kbps.

A ‘modem’ or ‘straight’ serial cable is suitable for connection of the Supervisor port (the Supervisor port pin-out out is described in Appendix C).

Supervisor Terminal Emulation

The Manager Card supports several terminal emulations. When connection is made between the terminal and the RS232 Supervisor port, the following screen will appear:

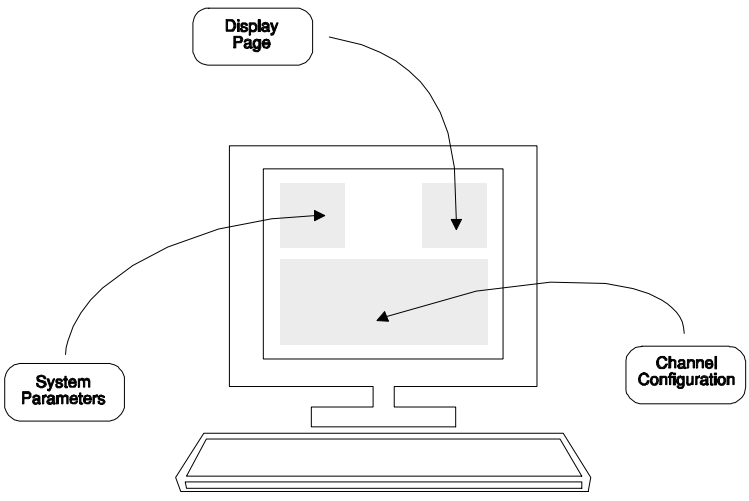


The terminal type or emulation in use should be selected by pressing the relevant number key on the PC or terminal. The terminal will then show the basic configuration screen for the chassis's set-up.

You may return to this screen at any time by pressing '**CTRL**' and '**E**' at the same time.

General set-up Display Layout

There are three main areas on the Supervisor set-up screen used to change parameters for the Card Cage System:

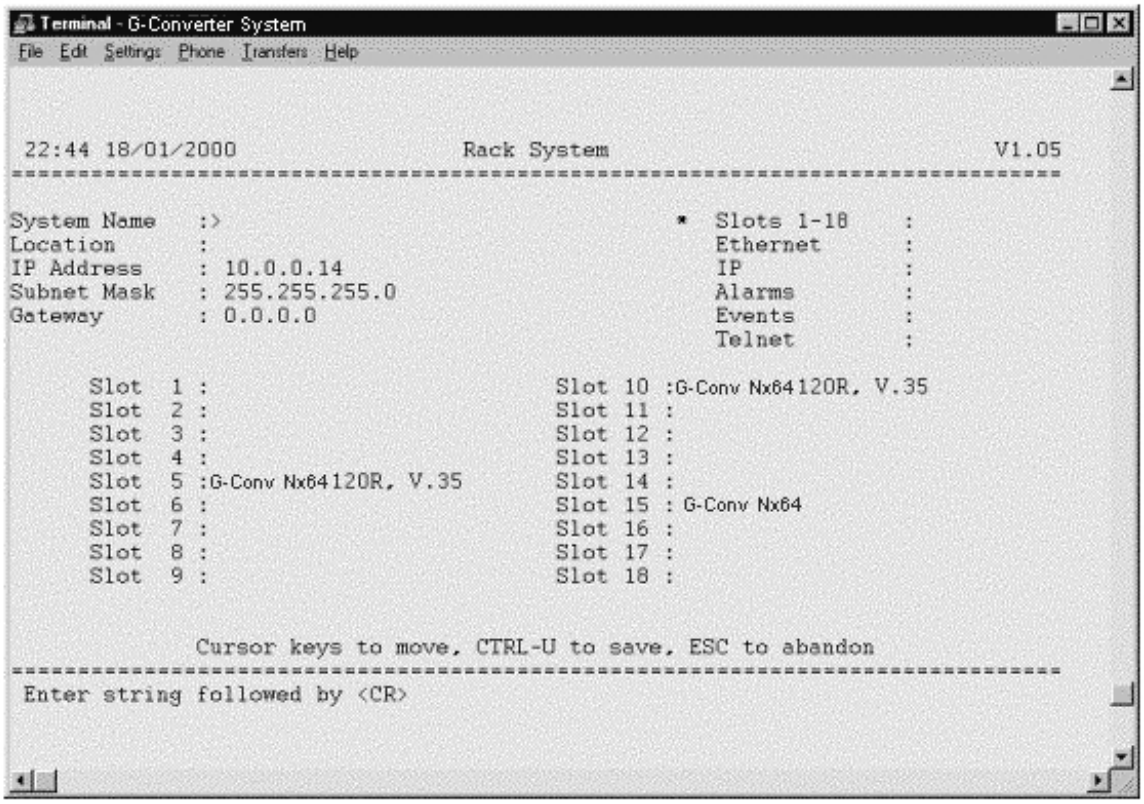


Upper left –
System parameters

Upper right –
Other **display pages** which may be selected.

Bottom –
Configuration.

Typical Configuration Display



General Keyboard Conventions

Only a few keys are required to configure the chassis and are summarised as follows:

→ (Right arrow)	Moves the cursor to the next field to the right.
← (Left arrow)	Moves the cursor to the next field to the left.
↑ (Up arrow)	Moves the cursor to the next field upwards.
↓ (Down arrow)	Moves the cursor to the next field downwards.
+ (Plus) or <SPACEBAR>	Toggles the parameter value up to the next available setting.
– (Minus)	Toggles the parameter value down to the next available setting.
<ENTER> or <RETURN>	Accepts the current display page (otherwise the same as ↓).
<CTRL> and U	Updates all changes.
<ESC>	Abandons all changes since the last <CTRL> U.
<CTRL> and P	Refresh screen.

Cursor Movement

The cursor symbol ">" is moved around the screen to the required field using the **arrow keys**.

Parameter Changing

If it is possible to modify the field over which the cursor is placed, an appropriate message is shown at the bottom of the screen. No message will appear if the field is non-configurable.

Pressing the **Space** bar, the "+" key or the "-" key will cycle through the choices available for a parameter.

Accepting all changes and Updating the Configuration

If "**Control**" and "**U**" are pressed at the same time after the configuration has been altered, the configuration is updated at the local and remote end as necessary and held in non-volatile Memory.

Abandoning Changes

Pressing **ESC** at any point before a configuration is updated will cause the message "**Abandon Changes? (y/n)**" to appear at the bottom of the screen. If "**n**" is selected the message will disappear and editing may continue. If "**y**" is pressed, all modifications will be abandoned and the last updated configuration will be re-printed on the screen.

Changing the Configuration Page

The Configuration Page required, e.g. "Alarms", is selected by moving the cursor to the **upper right area** and pressing Enter when alongside the required page. The currently selected page is indicated by a '*'.

Restoring the Factory Default Configuration

The system may be reset back to the factory default configuration by pressing **CTRL-R** four times when the cursor is on the Terminal emulation page (see page 13). A 'Confirm' message will be displayed before the configuration is reset. The previous configuration will be lost.

This method uses the 10Base–T RJ45 port (Ethernet) port. An SNMP management package i.e. (Open View, SNMP) can be used along with the supplied MIB to manage the Card Cage System.

If additional Channel Cards are installed after the initial installation, a new MIB may be required, please contact Black Box for information

The MIB must be compiled and installed in accordance with the instructions for the specific SNMP management application being used. You should refer to the user guide for your SNMP management software for more details.

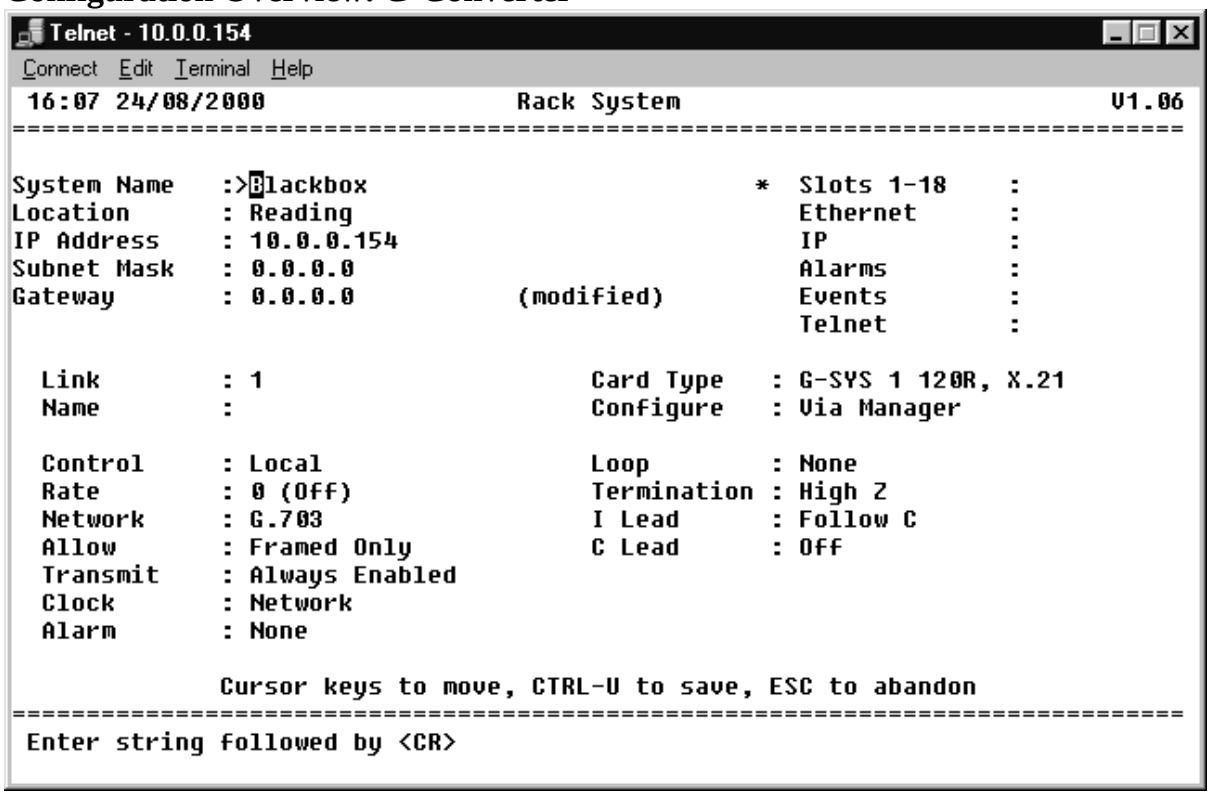
SNMP Enterprise MIB

The MIB allows the Card Cage to be remotely managed via the 10Base T Ethernet port. The Card Cage system is supplied with an Enterprise MIB. This file can be installed in to any SNMP management software. The MIB must be compiled in accordance with the SNMP management application being used. The Enterprise MIB is supplied as a 3.5" floppy disc.

Configuration and Use - G-Converter Nx64

An G-Converter Nx64 Channel Card has no front panel switches or display. All the management and set-up is performed via the Manager Card which MUST be fitted. The Screen that manages this card is

Configuration Overview. G-Converter



This section covers the parameters that can be configured and explains the significance of the messages.

Card Type

The G-Converter and G-Converter (M) can be supplied with four different types of interface. The option s are;

There are 4 variants of rear card:

1. 120 Ohm, RJ45 E1 connection,15 way D type X.21/V.11 data connection
2. 120 Ohm, RJ45 E1 connection, 15 way D type V.35 data connection.*
3. 75 Ohm, Dual BNC E1 connection, 15 way D type X.21/V.11 data connection
4. 75 Ohm, Dual BNC E1 connection, 15 way D type V.35 data connection.*

*Converter cable to MRAC connector available as an option.

The G-Converter front card will auto detect the type of rear card fitted and display it on the screen. In the case of the X.21 variant the control signals are “C” and “I”. In the case of the V.35 interface variants the control signals are FLAG1 O/P, FLAG2 O/P and FLAG3 I/P. The function of these signals is left for the user although if the supplied V.35 stub cable is used these signals take on the identity of CTS DSR and RTS respectively.

Name

A 32 alphanumeric field that can contain any user defined string. It can be used to identify which network the particular card is connected to e.g. London, Slough, etc

Control

The network speed of the X.21/V.35 interface is variable from 0Kbps to 2048Kbps. This speed is set by one of the G-Converter units at one end of the link. The G-Converter that sets this DCE speed is known as the “LOCAL” and the G-Converter that does not set the speed but obeys the LOCAL is known as the “REMOTE”. One G-Converter at the end of each link must be local and one must be remote. It is normal to configure the G-Converter Channel card as LOCAL and the G-Converter Stand unit alone as remote. (Although the roles could be reversed)

Rate

This is the N value for the DCE speed of the X.21/V.35 port to operate at. The speed of the port is Nx64Kbps giving a possible range of values of N from 0 to 32. Note only the G-Converter configured as LOCAL will respond to this instruction.

Network

The G-Converter Channel card is able to operate on either G.703 (unframed data) giving a maximum DCE X.21 Data rate of 2048Kbps, or G.704 (framed data) giving a maximum DCE data rate of 1984Kbps.

Transmit

The G-Converter G.703/704 Transmit circuit can be suppressed in the event of the G.703/704 receive circuit loosing clock. This may be a useful way of indicating to the other end there is a problem with the link.

Allow

Allow unframed operation. If unframed operation is allowed then the DCE will operate at 2048Kbps in the event of unrecognisable G.704 framing data. If **Allow** is turned off then in the event of unrecognisable G.704 farming data then the DCE will operate at 0Kbps. Use this option if the user application card connected to the DCE will not operate at 2048Kbps.

Control Flag(s)

Depending on the rear card type plugged into the G-Converter either the “C” “I” menu item is displayed or the “FLAG1 O/P FLAG2 O/P and FLAG3 I/P is displayed

X.21

When an X.21 interface variant is plugged in to the back of an G-Converter then this menu item is displayed. The “I” lead status is synthesised by the G-Converter Channel card since no information about the “I” lead is passed across the link. Status of the “I” lead is either

- I lead following C lead
- I lead active
- I lead inactive
- I lead following state of G.703 carrier flag

V.35

When the V.35 interface is selected the FLAG 1 O/P and FLAG 2 O/P can be individually controlled. For each FLAG O/P four choices are available to the user.

- FLAG x O/P following FLAG 3 I/P
- FLAG x O/P active
- FLAG x O/P inactive
- FLAG x O/P following state of G.703 carrier

Termination

On the X.21 Interface the receive data pins have the ability to have a 120 Ohm terminating resistor switch in. This feature may be useful if there is a termination problem with the X.21 circuit.

Loop

There are four choices available

None

This is the normal operating mode with no loopback in place

Local

When local loopback is selected, the data arriving at the DTE port is looped back to the DTE port. When set to local loopback, the received data and transmit data of the X.21 interface are looped. The DTE clock speed will always be determined by the management setting if the unit is set for remote or local operation.

Network

When network loopback is selected the data ariving at the G.703/704 port is looped back to the network.

Remote Loopback

A feature that allows a central site system containing a rack mounted G-Converter to be able to cause the "remote" stand alone G-Converter to enter a loopback mode is available.. When this feature is enabled it is possible for the central site, by passing a special command across the link, to request the remote G-Converter to enter loop back state. Once this state has been entered, it will remain in loopback for approximately 3 minutes. A timer will appear in this menu window The data and clock being outputted through the DCE port at the remote end will be suppressed and the data arriving at the X.21/V.35 drivers/receivers on the remote end will be looped back to the central site.

Clock

The G-Converter has the ability to use as its clock source a clock supplied from the connected DTE. An external clock is supplied externally to the G-Converter via the EXT clock pins, of the 15 way D type connector (pins 7 and 14). The three clock modes are;

Network

This is the normal mode, in this mode the clock recovered from the G.703/704 network is used to transmit on the G.703/704 network and to clock the Data to the DTE interface.

External 2048KHz

In this mode the external clock, being supplied must be 2048Kbps +/- 50 ppm and the jitter content compliant with the requirements of TBR12 and PD 7024. The function of the G-Converter in this mode is identical to operation with recovered clock (network clock) with the exception that the clock source is from the external clock and not the G.703/4 link.

At all times the assumption is made that the clock being supplied to the G-Converter from the G.703/4 network is as per TBR12/PD7024 requirement.

External N x 64KHz

In this mode the external clock being supplied must be Nx 64Kbps +/- 50 ppm and the jitter content compliant with the requirements of TBR12 and PD 7024. The function of the G-Converter in this mode will measure the external clock and set the operation of the G-Converter to this speed. In this mode the unit will become a Local.

Alarm

The G-Converter Channel card is capable of generating an alarm in the event of either loss of carrier or loss of framing (only when G.704 network is selected)

The alarm can be handled in four ways;

None

No record in the event log, no major or minor traps generated, no manager LED indication.

Log only

Only logs alarms in the in event log.

Minor Alarm

Logs alarms in the event log and activates minor alarm trap Also illuminates minor alarm LED on the manager card.

Major Alarm

Logs alarms in the event log and activates major alarm trap. Also illuminates major alarm LED on the manager card.

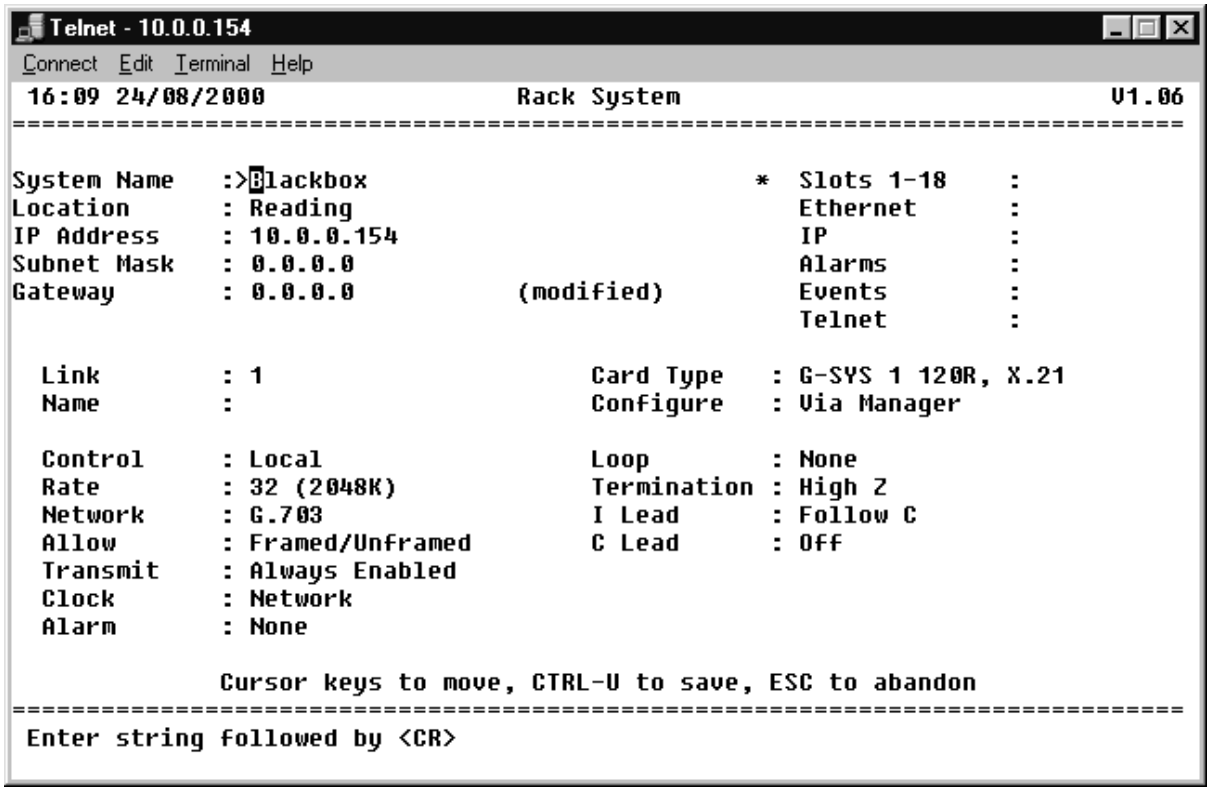
Operating Modes

The The G-Converter has four operating modes. Please see the following pages for examples.

Operating Mode 1

G.703 Transparent interface converter, data rate fixed at 2048Kbps,

In this mode the data is routed directly from the G.703 interface to the X.21/V.11 interface. In transparent mode the G-Converter Nx64 may be connected to other G.703 to X.21/V.11 converters. Set the Channel card to:



Mode 1 operation with 2048K data rate set

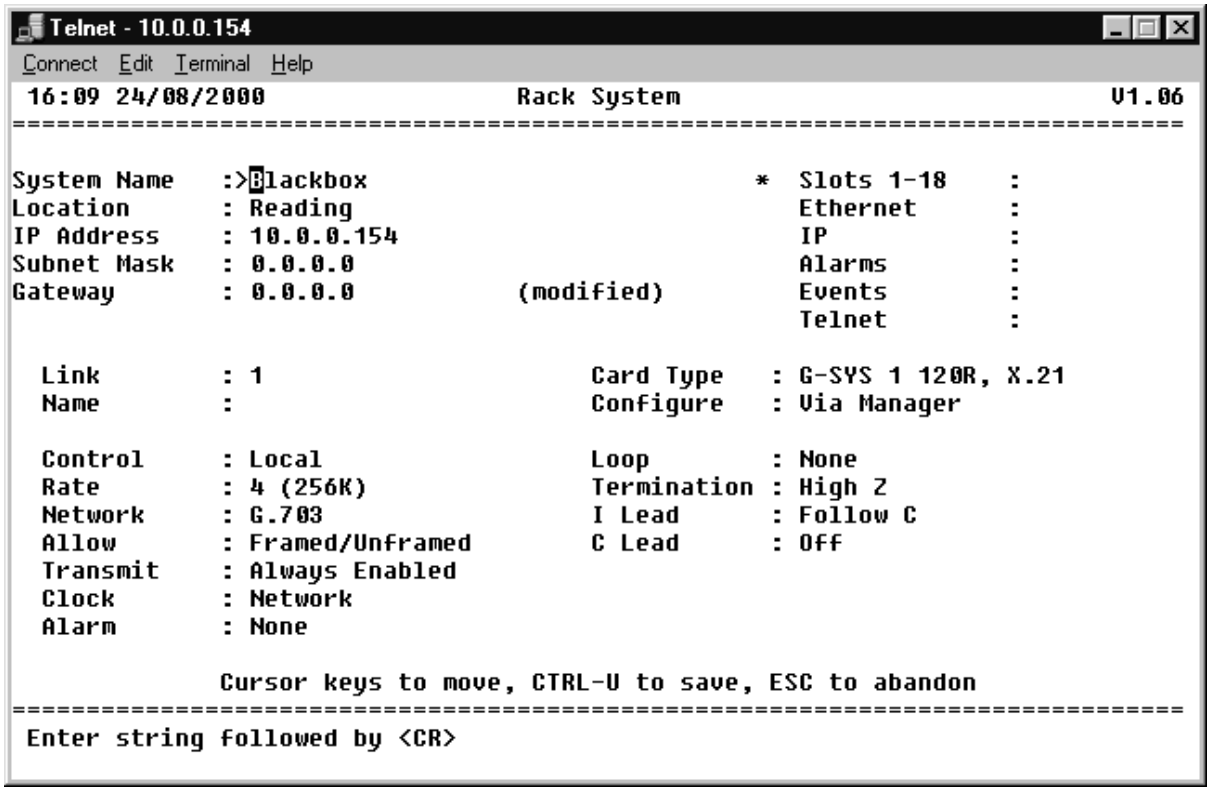
Operating Mode 2

G.703 Interface, data rate configurable between Zero and 2048Kbps.

When converters are to be set up as a pair, one unit MUST be configured as a Local unit and the other a Remote unit.

In this mode DCE data rates may be selected between 0bps and 2048Kbps in 64Kbps steps. A proprietary framing scheme is used to control the value of N.

It is recommended this mode is used only if data rates up to 2048Kbps are required as a fault condition on the G.703 link could force the DCE clock to operate at 2048Kbps. If the user equipment is only capable of running at say 256Kbps then this may cause problems.



Mode2 Operation with 256K Data rate set

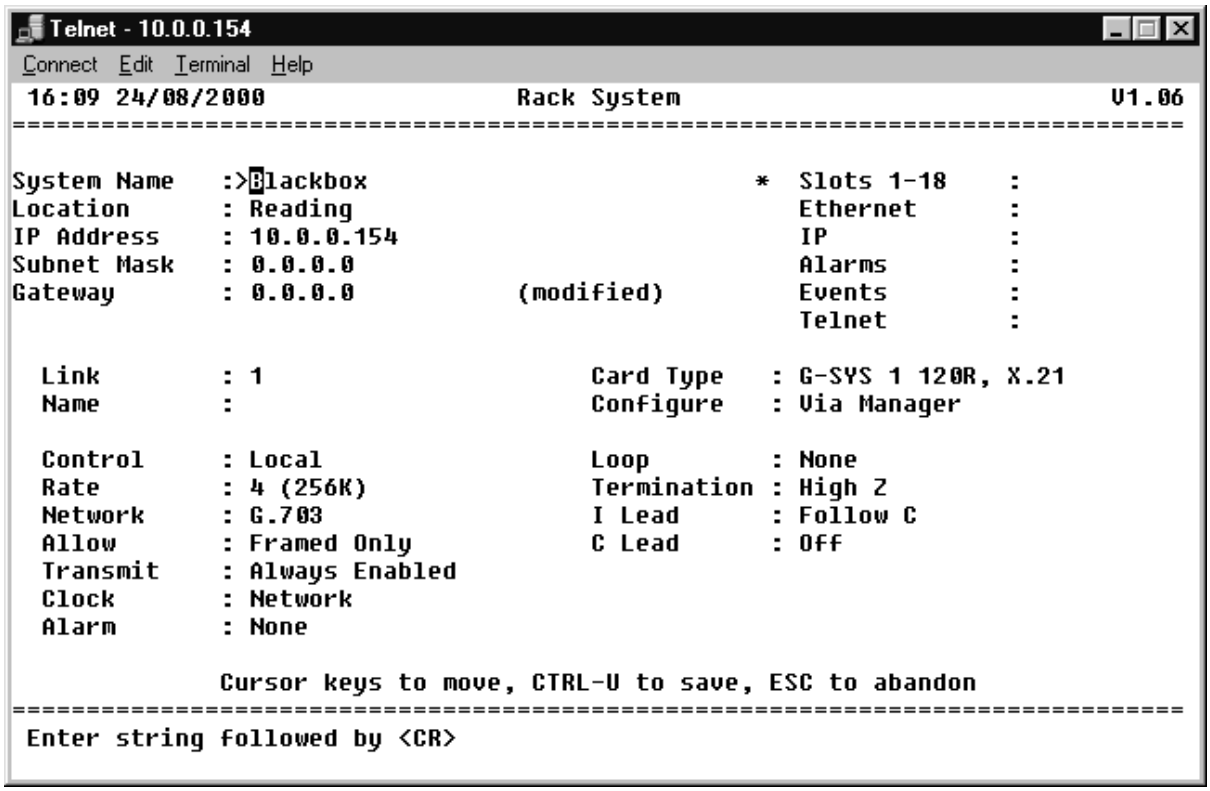
Operating Mode 3

G.703 Interface, data rate configurable between 0bps and 1984Kbps

When converters are to be set up as a pair, one unit MUST be configured as a Local and the other a Remote unit

In this mode data rates may be selected between 0bps and 1984Kbps in 64Kbps steps. A proprietary framing scheme is used to control the value of N.

Use this mode if you are sure you will not want to use N = 32 (i.e. 2048Kbps).



Mode 3 operation with 256K data rate set

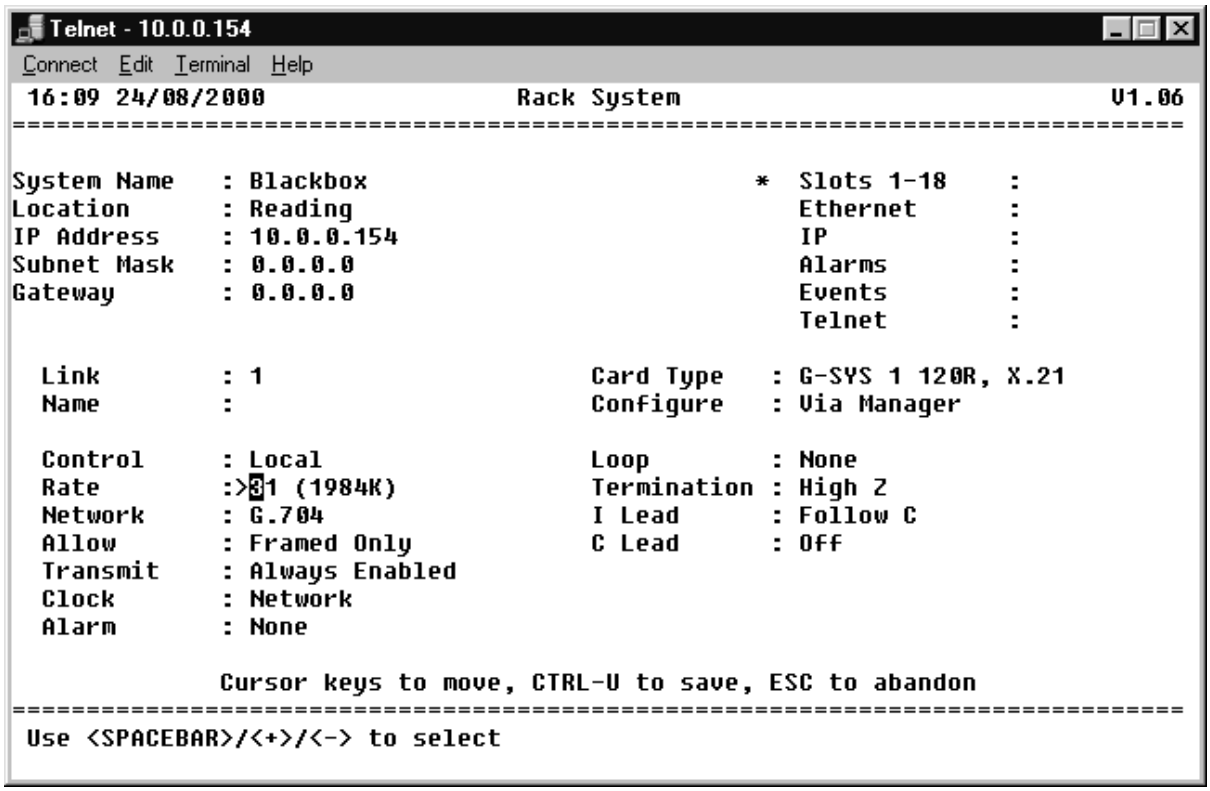
Operating Mode 4

G.704 Interface, data rate configurable between 0bps and 1984Kbps

When converters are to be set up as a pair, one unit MUST be configured as a Local unit and the other a Remote unit.

In this mode, all speeds are possible between 0bps and 1984Kbps in 64Kbps steps. A proprietary framing scheme is used to control the value of N.

Operating Mode 4 would be used if you were connected to a G.704 network. In this mode a fault condition on the G.704 link could force the DCE clock to operate at 0Kbps.



Mode 4 operation with 1984K data rate set.

Front panel LED indicator

The G-Converter Nx64 Channel Card has one LED indicator

LED COLOUR	STATUS	NOTES
RED	Link faulty	No RX Carrier established. CRC4 error detected. No framing synch found when Operating on a G.704 network.
ORANGE	LOOP	Either a Local loop or a remote
GREEN	Link good	Normal operation
OFF	No power	LED faulty, Unit faulty

Configuration and Use - G-Converter Nx64 (M)

Configuration Overview

The G-Converter Nx64 (M) is essentially the same, as an G-Converter Nx64 except that it may be operated in a Card Cage System that does not contain a Manager Card.

All the setting up can be implemented on internal DIL switches and front panel recessed rotary switches. A toggle switch controls the loop back function.

The "N" x 64k value is displayed on a pair of numeric indicators.

It is possible to configure an G-Converter Nx64 (M) to be managed by a Manager Card if the on board DIL switch is appropriately selected, it will behave in exactly the same way as an G-Converter Nx64 .

When an G-Converter Nx64 (M) is configured to be managed by its own internal switches it is still possible to interrogate the card via a Manager Card and display the settings and status, however any attempt to change the card set-up will not be successful.

An external clock input is provided on the DCE port to enable the G-Converter Nx64 (M) to be clocked from the connected DTE.

Configuration of the G-Converter Nx64 (M) is achieved in two simple stages involving internal and front panel switches. See Appendix J for switch location on G-Converter Nx64 (M).

G-Converter Nx64(M) Switch position

SW POSITION	FUNCTION	SETTING
SW1, 1	Selects either remote operation or local operation	Off = local On = remote
SW1, 2	Selects interface type	Off = G.703 On = G.704
SW1, 3	Allows unframed operation	On = unframed operation not permitted Off = unframed operation permitted[1]
SW1, 4 SW1, 5	Sets up operation of **X.** When X.21/V.11 interface set. **X**= I lead **Y**= C lead. When V.35 interface set **X**= FLAG 1 O/P, **Y**= FLAG 3 I/P	SW4, 4 = off, SW4, 5 = off, **X** follows **Y** SW4, 4 = on, SW4, 5 = on, **X** follows Carrier SW4, 4 = off, SW4, 5 = on, **X** = active SW4, 4 = on, SW4, 5 = off, **X** = inactive
SW1, 6	Sets G-Converter to permanent Transparent mode 2048Kbps	Off = permanent straight through[2] On = framed/unframed
SW1, 7	Sets G.70x TX off if no G.703 RX detected	Off=G.703 TX enabled always. On = G.703 TX disabled in the event of G.703 RX not being present[4]
SW1,8	Selects termination for the X.21 interface	Off = no termination on TX or S On = TX and S terminated in 120Ohms
SW1, 8	Use External Clock[3]	On = Use external clock. Off = do not use external clock.
SW5,1	Selects management	Off = Managed via switches On = Managed via manager
SW5, 2 SW5, 3	Sets up operation of FLAG 2 O/P "**X** " when set for V.35 interface	SW5, 2 = off, SW5, 3 = off, **X** follows Flag3 I/P SW5, 2 = on, SW5, 3 = on, **X** follows Carrier SW5, 2 = off, SW5, 3 = on, **X** = active SW5, 2 = on, SW5, 3 = off **X** = inactive
SW5,4	Sets Autobauding on or off	Off = External 2048KHz On = External N x 64KHz N.B for Autobauding SW5,5 must be set to on
SW5,5	Selects network clock source	Off = use network clock On = use external clock N.B for Autobauding SW5,5 must be set to on
SW5,6-8	Not used	Not used

Management Selection

When the Channel Card is set to be managed by Switches (Internal SW5/1 set to off) All the set up information is taken from the DILL switches and front panel recessed rotary switches. The setup information can be viewed from the Manager Card (via VT100, Telnet SNMP) but not altered. When the Channel Card is set to be managed by manager (Internal SW5/1 set to on) All the set up information is taken from the Manager Card, the unit behaves exactly as an G-Converter.

Management by switches

The equipment has four operating modes:.

Operating Mode 1

G.703 Transparent interface converter, data rate fixed at 2048Kbps,

Remove the cover of the unit(s), locate Internal Switch 4 and set as follows*:*

SW1,1	SW1,2	SW1,3	SW1,4	SW1,5	SW1,6	SW1,7	SW1,8
NR	NR	NR	NR	NR	OFF	OFF	OFF

N.B. NR = Not Relevant.

The external Loop switch (front panel) should be set as Normal.

In this mode the data is routed directly from the G.703 interface to the X.21/V.11 interface. The rotary switch settings are ignored and time slot 31 is not monitored. In transparent mode the G-Converter Nx64 may be connected to other G.703 to X.21/V.11 converters.

Operating Mode 2

G.703 Interface, data rate configurable between Zero and 2048Kbps.

SW1,1	SW1,2	SW1,3	SW1,4	SW1,5	SW1,6	SW1,7	SW1,8
✷	OFF	OFF	NR	NR	ON	OFF	OFF

N.B. NR = Not Relevant.

✷When converters are to be set up as a pair, one unit MUST be configured as a Local unit (SW1, 1 = Off) and the other a Remote unit (SW1, 1=On)

The external Loop switch (front panel) should be set as Normal.

In this mode DCE data rates may be selected between 0bps and 2048Kbps in 64Kbps steps. A proprietary framing scheme is used to control the value of N.

It is recommended this mode is used only if data rates up to 2048Kbps are required as a fault condition on the G.703 link could force the DCE clock to operate at 2048Kbps. If the user equipment is only capable of running at say 256Kbps then this may cause problems.

Operating Mode 3

G.703 Interface, data rate configurable between 0bps and 1984Kbps

SW1,1	SW1,2	SW1,3	SW1,4	SW1,5	SW1,6	SW1,7	SW1,8
✷	OFF	ON	NR	NR	ON	OFF	OFF

N.B. NR = Not Relevant.

✷When converters are to be set up as a pair, one unit MUST be configured as a Local unit (SW1, 1 = Off) and the other a Remote unit (SW1, 1=On)

The external Loop switch (front panel) should be set as Normal.

In this mode data rates may be selected between 0bps and 1984Kbps in 64Kbps steps. A proprietary framing scheme is used to control the value of N.

Use this mode if you are sure you will not want to use N = 32 (i.e. 2048Kbps).

When operating in this mode, a fault condition on the G.703 link will force the DCE clock to operate at 0Kbps and display “Er” on the display.

Operating Mode 4

G.704 Interface, data rate configurable between 0bps and 1984Kbps

SW1,1	SW1,2	SW1,3	SW1,4	SW1,5	SW1,6	SW1,7	SW1,8
✷	ON	NR	NR	NR	ON	OFF	OFF

N.B. NR = Not Relevant.

✷When converters are to be set up as a pair, one unit MUST be configured as a Local unit (SW1, 1 = Off) and the other a Remote unit (SW1, 1=On)

The external Loop switch (front panel) should be set as Normal.

In this mode, all speeds are possible between 0bps and 1984Kbps in 64Kbps steps. A proprietary framing scheme is used to control the value of N.

Operating Mode 4 would be used if you were connected to a G.704 network. In this mode a fault condition on the G.704 link could force the DCE clock to operate at 0Kbps and flash “Er” on the display.

Local Control

When the converter is configured as **Local** (Internal switch: SW1, 1 = off) the DCE rates are selected by using the two rotary switches located on the front of the unit. As the switch is rotated, using a screwdriver, the position of the switch sets the number "N" which is displayed on the seven-segment LED display. The two switches, identified as XIO and X1, are located at the left-hand side of the front panel. X10 selects tens, X1 selects units, permitting selection of N =0 to a maximum of 32. When local mode is selected the decimal point of the right hand digit of the seven-segment display is illuminated.

DCE rate allocation is N x 64Kbps, so an indication of N = 23 signifies a DCE rate of 1472Kbps. The information that N = 23 is encoded and transmitted across the link in time slot 31.

Remote Control

When the converter is configured as **Remote** (Internal switch SW5, 1 = on) the DCE rate is controlled by the control information being received in time slot 31. Configuration of the DCE speed on this remote unit is controlled by the 'Local' unit since the front panel switches will be deactivated, as outlined in the Introduction above.

Diagnostics

Loopbacks

G-Converter Nx64
The loop back is activated via SNMP, Terminal or Telnet

It is possible to apply loop backs either at the X.21 side of the converter or the G.703 link interface side of the converter. Simple functionality tests may be performed on a single G-Converter Nx64 Channel Card converter whilst disconnected from the Network.

A BERT tester configured as a DTE capable of generating test patterns should be connected to the "To DTE" port of the G-Converter Nx64 Channel Card.

With the Link interface disconnected, the LOOP on the G-Converter Nx64 Channel Card set to Local, the BERT tester will detect the clock being generated by the G-Converter Nx64 Channel Card and if the unit is operating correctly the looped back data should be error free. The clock speed will be determined by the SNMP setting.

Ensure that the "To DTE" port is providing data rates between 0 and 2048Kbps by selecting 0 to 31 with the SNMP. Note that during switching of DTE speed errors may be generated. This is acceptable as long as when the speed setting is in a steady state no errors are detected.

G-Converter Nx64 (M)
Loopbacks are selected by the front panel toggle switch.

Appendix A - Warnings

WARNING: ***This equipment relies on the EARTH/GROUND connection to ensure EMC compliance. It must not under any circumstances be operated without an earth connection, which could nullify its approval.***

WARNING: **INSTALLATION OF EQUIPMENT**

Installation of this equipment must only be performed by suitably trained service personnel.

This equipment allows connection only of suitably approved equipment to its ports, the safety status of which are defined below.

SELV Ports:

i) ***"To DTE"***

The above named ports are classified as SELV (Safety Extra Low Voltage) in accordance with in Clause 2.3 of EN60950 (BS7002, IEC950 as applicable), and **must only** be connected to equipment which similarly complies with the SELV safety classification.

TNV Ports:

i) ***Euro 120 ohm RJ45***

The above named ports are classified as TNV (Telecom Network Voltage) in accordance with Clause 6 of EN60950 (BS7002, IEC950 as applicable), and **must only** be connected to equipment, which similarly complies with the TNV safety classification.

Appendix B – Approval Requirements

The G-Converter Nx64 and G-Converter (M) Channel Card Converter carrying the BABT/CE168 assessment symbols and approval number, is approved for connection to the networks identified in this Appendix as follows:

G.703/G.704

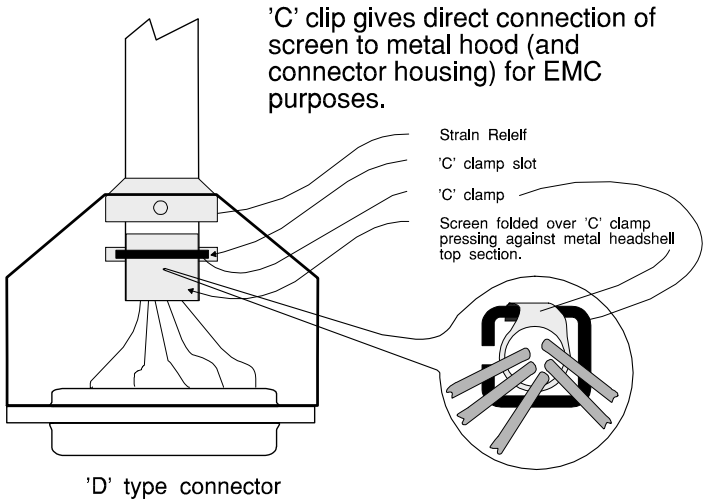
Throughout Europe (Pan European) to CTR12 and CTR13 via RJ45 Connector (120 Ohms Balanced) The 75 Ohms unbalanced variant is approved to PD7024.

Appendix C - EMC Requirements

To ensure compliance with the EMC directive, some care must be taken to ensure that the units are installed properly, using suitable screened cables and connections. The following must be observed:

This product relies on the use of screened cables for connection to the 9 Way 'D-Type' Supervisor port. The cable must have the foil or braid screen connected effectively to the metal headshell to ensure continued compliance.

The diagram below illustrates an example of a suitable screen connection. Note how the foil or braid screen is bent back over the 'C' clip to achieve a pressure contact of the screen against the shell:



It is important to keep the screen to shell connection as short as possible.

10 Base-T Supervisor Port Connections		
Description	**Type At Connector**	**RJ45 Socket**
TxP	Output	1
TxN	Output	2
RxP	Input	3
RxN	Input	6

Supervisor Port Connections		
Description	**Type At Connector**	**DCE – 9-Way D-Type Female Socket**
DCD	Output	1
RxD	Output	2
TxD	Input	3
DTR	N/C	4
Common	GND	5
DSR	Output	6
RTS	Input	7
CTS	Output	8
RI	N/C	9

Appendix D - G.703 120 Ohms Interface Pinout

COMPOSITE INTERFACE CONNECTIONS (EUROPE) USING 120 OHM BALANCED RJ45			
Name	**Description**	**Type at Connector**	**DTE – RJ45 Female**
RxA	RX Pair	Input	1
RxB	RX Pair	Input	2
TxA	TX Pair	Output	4
TxB	TX Pair	Output	5
S1	Shield Reference	-	3
S2	Shield Reference	-	6

Appendix E - G.703 75 Ohms Interface Pinout

COMPOSITE INTERFACE CONNECTIONS (UK) USING 75 OHM UN-BALANCED BNC			
Name	**Description**	**Type at Connector**	**DTE – BNC Female**
RxA	RX Pair	Input	Centre RX
RxB		Ground Reference	Outer RX
TxA	TX Pair	Output	Centre TX
TxB		Ground Reference	Outer TX

Appendix F – RJ45 E1 Crossover Cable

RJ45 CROSSOVER CABLE (EUROPE) USING 120 OHM BALANCED RJ45			
Name	**Description**	**DTE2 – RJ45 Male**	**DTE1 – RJ45 Male**
TxRxA	TXRX Pair	4	1
TxRxB		5	2
RxTxA	RXTX Pair	1	4
RxTxB		2	5
S1	Shield Reference	6	3
S2	Shield Reference	3	6

Appendix G – X.21/V.11 Data Channel Pinout

X.21/V.11 Data Channel connectors
(15 Way DB25 Type Configured DCE)

DATA CHANNEL CONNECTIONS			
Name	**Description**	**Type at Connector**	**DCE – DB15 Female**
Protective Ground		-	1
G	Signal Ground	-	8
T(A)	TxDa	Input	2
T(B)	TxDb	Input	9
R(A)	RxDa	Output	4
R(B)	RxDb	Output	11
S(A)	Clock a	Output	6
S(B)	Clock b	Output	13
I(A)	Indicate a	Output	5
I(B)	Indicate b	Output	12
C(A)	Control a	Input	3
C(B)	Control b	Input	10
X(A)	Ext Clock a	Input	7
X(B)	Ext Clock b	Input	14

Notes:

Connector shell and termination must be as specified in the EMC section contained in Appendix C.

Appendix H – V.35 DCE Pinout

15 Way female D type configured as DCE

DATA CHANNEL CONNECTIONS			
Number	**Name**	**Type at Connector**	**DCE – DB15 Female**
-	Protective Ground	-	1
102	Signal Ground	Bidirectional	8
See note 1	Flag 3 I/P	V.28 Input	15
113	ExtClk(A)	V.11 Input	7
113	ExtClk(B)	V.11 Input	14
115	RXClk(A)	V.11 Output	6
115	RXClk(B)	V.11 Output	13
114	TXClk(A)	V.11 Output	5
114	TXClk(B)	V.11 Output	12
104	RX(A)	V.11 Output	4
104	RX(B)	V.11 Output	11
See note 2	Flag 1 O/P	V.28 Output	3
See note 2	Flag 2 O/P	V.28 Output	10
103	TXD(A)	V.11 Input	2
103	TXD(B)	V.11 Input	9

Note 1. Input flag can be configured to be any V.28 input (to DCE) i.e. Request To Send RTS (105),

Note 2 Output Flags can be configured to any V.28 outputs (from DCE) i.e. Clear To Send CTS (106), Data Set Ready DSR (107) Data Carrier Detect DCD (109)

Connector shell and termination must be as specified in the EMC section contained in Appendix C.

Appendix I - V.35 Stub Cable

V.35 Stub cable			
15 way D type connector Male	**Name**	**Type**	**MRAC 34 pin Female**
1	Protective Ground	-	Shield
8	Signal Ground	Bidirectional	B
15	RTS(Flag 3 I/P)	V.28 Input	C
7	ExtClk(A)	V.11 Input	U
14	ExtClk(B)	V.11 Input	W
6	RXClk(A)	V.11 Output	V
13	RXClk(B)	V.11 Output	X
5	TXClk(A)	V.11 Output	Y
12	TXClk(B)	V.11 Output	AA
4	RX(A)	V.11 Output	R
11	RX(B)	V.11 Output	T
3	RFS (Flag 1 O/P)	V.28 Output	D
10	DSR(Flag 2 O/P)	V.28 Output	E
2	TXD(A)	V.11 Input	P
9	TXD(B)	V.11 Input	S

Connector shell and termination must be as specified in the EMC section contained in Appendix C.

Appendix J - Position of Switches on the G-Converter–1(M)