

DCX Ethergate
Reference Manual
(Level 2.2)

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WARNING

The DCX 860 and 870 incorporate a panel in front of the plug-in modules. This panel may only be removed by suitably qualified personnel for installation or maintenance purposes, and must be replaced afterwards. Removal under any other circumstance would invalidate any RFI (Radio Frequency Interference) and Safety Type Approvals.

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Preface

This manual provides information for DCX Network supervisors to install and use the Ethergate module. It forms part of the DCX Systems Documentation, and refers to other manuals in the series. It assumes that you will already have some knowledge of the DCX system obtained either from the systems documentation or from a Cray training course. A glossary is provided at the end of this manual.

Contents

1	Introduction	1-1
2	Installation	2-1
2.1	Physical Installation	2-1
2.2	Initial Configuration	2-3
2.3	Manager-defined Terminal Configuration	2-5
3	Concepts and Example	3-1
3.1	Seamless Connections	3-1
3.2	Multiple Sessions	3-2
3.3	Services	3-3
3.4	Profiles	3-5
3.5	Multiple Local IP Addresses	3-6
3.6	Example Application – Bulk Terminal Serving	3-7
4	Manager Procedures	4-1
4.1	Overview	4-1
4.2	How the Manager Works	4-2
4.2.1	Input	4-2
4.2.2	General Rules	4-2
4.2.3	Using Menus	4-3
4.2.4	Using Forms	4-3
4.2.5	Initial Entry to the Manager	4-6
4.2.6	Menu Hierarchy	4-7
4.3	Main Menu	4-8
4.3.1	Terminal Selection	4-8
4.3.2	Quit Manager	4-8
4.3.3	Logoff (and Logout)	4-8
4.4	Configuration Menu	4-9
4.4.1	Configure LAN IP Gateway Form	4-10
4.4.2	Configure General Information Form	4-12
4.4.3	Configure Messages Menu	4-15
4.4.4	Configure Profiles Menu	4-19
4.4.5	Configure Protocols Form	4-38

4.4.6	Configure Services Menu	4-42
4.4.7	Dump	4-53
4.4.8	Load	4-53
4.5	Control Menu	4-54
4.5.1	Ethernet	4-54
4.5.2	New Calls	4-55
4.5.3	Clear Connections	4-55
4.5.4	Control Services Menu	4-56
4.5.5	Software Control Menu	4-60
4.6	Status Screen	4-61
4.6.1	General Status Menu	4-62
4.6.2	Connection Status/Statistics Menu	4-64
4.6.3	Line Status/Statistics Menu	4-67
4.6.4	Software Status	4-70
4.7	Summary of Manager Commands	4-71
4.8	Item Definition	4-74
5	User Procedures	5-1
5.1	The User Environment	5-1
5.1.1	The User Welcome Screen	5-1
5.1.2	User Input	5-2
5.2	User Commands	5-4
5.2.1	Command Specifications	5-4
5.2.2	Call/Conn/Open	5-5
5.2.3	DISC/CLOSE	5-7
5.2.4	QUIT/LOGOFF	5-7
5.2.5	SESSION	5-7
5.2.6	STATUS	5-7
5.2.7	SET	5-8
5.2.8	DIRECTORY/CATALOGUE	5-9
5.2.9	HELP/?	5-10
5.2.10	LOGIN/LOGON	5-10

Appendices

A	Technical Specifications	A-1
A.1	Configuration Limits	A-1
A.2	Terminal Types	A-1
A.3	Cables	A-1
A.4	Standards and Approvals	A-2
B	Default Configuration	B-1
C	Ethernet and TCP/IP	C-1
C.1	Ethernet CSMA/CD Baseband	C-1
C.2	TCP/IP Protocols	C-4
C.3	IEEE 802.3 and Ethernet Differences	C-7
D	ASCII Conversion Table	D-1
E	Event Log Messages	E-1
F	Glossary	F-1

Figures

1-1	Typical Application	1-1
2-1	Front Panel Layout	2-1
2-2	Ethergate Card Layout	2-2
3-1	Example Application	3-6
4-1	Menu Hierarchy	4-7
C-1	Ethernet Topology	C-2
C-2	TCP/IP Protocol Stack	C-4

Tables

2-1	Link Settings	2-1
-----	---------------	-----

The DCX Ethergate is a component of the DCX range of Statistical Multiplexers, allowing interconnection between DCX and TCP/IP Ethernet Networks. It is a plug-in card which fits into the master bay of a DCX 840, 850, 860 or 870 taking up a single slot. Ethergate can be used in conjunction with other plug-in cards, for example, Etherlink and XGate to provide connectivity via SLIP (Serial Link IP) and X.25. Physical connection to the Ethernet 10 Mbps LAN is through a direct 'tap' into the LAN cable.

By using DCX gateway plug-in cards, users can make a connection to a service on any network via a single call from their terminal; this is commonly known as 'seamless connection'.

Figure 1-1 shows a typical network using Ethergate, Etherlink and XGate which provides PC/workstation/terminal access to or from host computers/resources on any of the connected media.

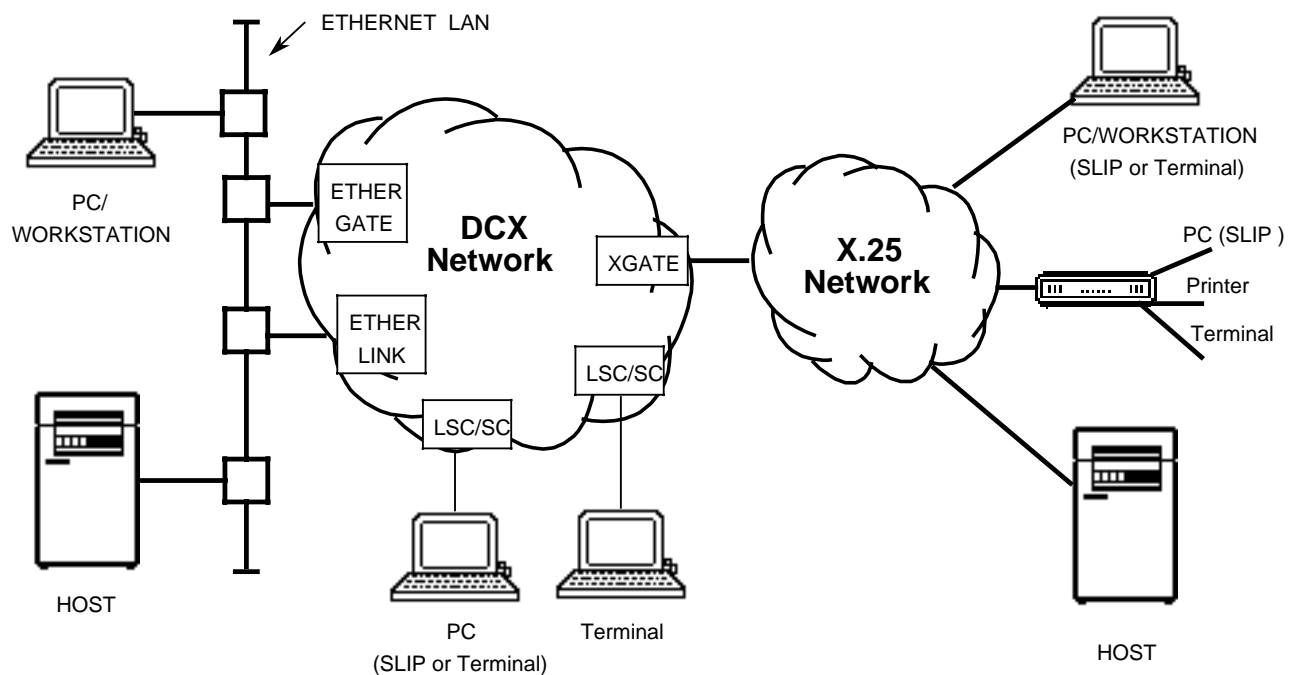


Figure 1-1 Typical Application - Example 1

Figure 1-2 shows a typical application for Ethergate, allowing DCX terminals to access host computers connected to an Ethernet LAN.

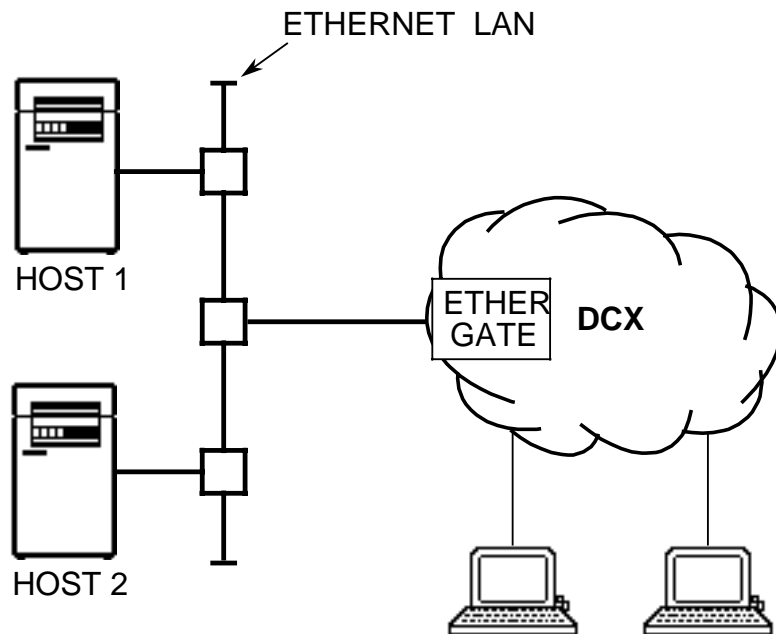


Figure 1-2 Typical Application - Example 2

2.1 Physical Installation

Ethergate is a single card which may be inserted in any slot of the master frame which supports high speed devices (e.g. ARQs), except the master ARQ slot or the STC slot, in a DCX 840, 850, 860 or 870 multiplexer. Its front panel is shown in Figure 2-1. For installation in a DCX 860 and 870, see page 0-2.

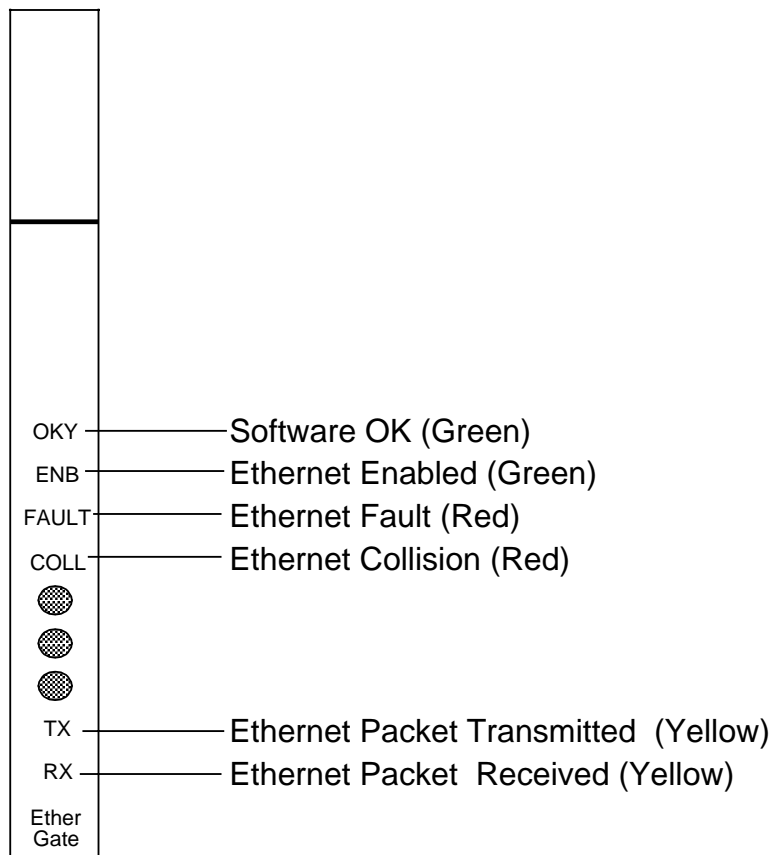


Figure 2-1 Front Panel Layout

1. Before inserting the card into a master frame, the various links and switches must be set as shown in Figure 2-2 and Table 2-1.

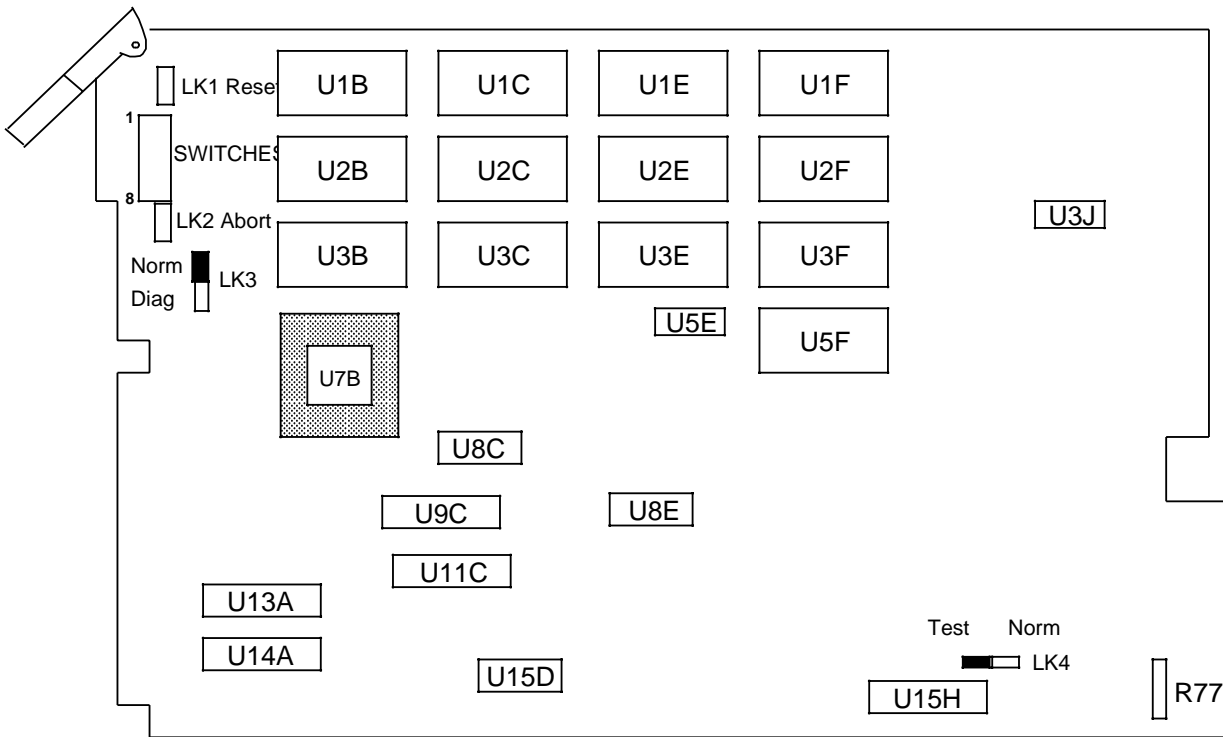


Figure 2-2 Ethergate Card Layout

LINK	FUNCTION	SETTING
LK1	Reset	None
LK2	Software Abort	None
LK3	Diag/Norm	Norm 2-3 (top)
LK4	*Test Norm	Norm 2-3 (left)
R77	802.3/other	802.3 present (See Appendix C)

* Not on all cards

Table 2-1 Link Settings

2. Ensure that Switch 1 on the 8-way switchbank (see Figure 2-2) is open (top switch to right) and all other switches are closed (to left).
3. With power off, fit interconnect cable X840-408311 in the rear of the DCX frame.
4. Insert the card into the master frame.
5. Power-up the system.
6. When the green **ENB** light flashes, move Switch 1 to the closed (left) position. This operation causes the card to be 'cold started' ready for initial configuration.

2.2 Initial Configuration

After cold start, Ethergate is placed in an initial state ready for configuring. The default configuration is defined in Appendix B. (Cold start is normally only performed when the card is first installed. If it is found necessary to go back to the initial configuration, then a cold start can be performed from the user's terminal; see Section 4.5.5.)

Once the card has been installed it is necessary to assign a DCX Base and Size using the DCX Mapping and Test Panel (MTP) or Network Control and Access Module (NCAM). The Size of the device is equal to the number of Ethergate channels you wish to use, but must be at least 1. After allocating a Base and Size a connection should be established to Ethergate.

In a DCX without a USO, the Ethergate 'manager' can be contacted by mapping to an Ethergate channel and raising the V.24 control signal Data Terminal Ready (DTR). You can then log on to the manager by entering the logon command.

In a system fitted with a USO (except for USO2, not currently supported), the Ethergate mimics a remote USO node and can be assigned a node number. Therefore a USO route must be configured as if the Ethergate were a link to a remote node. E.g. if the Ethergate is link 3 and we assign 30 as its node number, a route to node 30 should be specified as using link 3. The Ethergate 'manager' can then be contacted by requesting 30.0.

In both of the above cases a password will be requested. Initially this is simply a carriage return. Ethergate will then request that a terminal type be specified. If the terminal type you are using is not listed or is not compatible with one of the types listed, then select the Mgr Defined option to define your terminal (see Section 2.3).

The actual configuration will depend upon the application that Ethergate is being used for. Below is a suggested order of configuration. Items shown in bold are the manager commands that will gain access to the relevant configuration screens. Items in brackets describe the shorter form of this.

conf gen	General configuration. Manager password, manager terminal type, node number, event log, channel, date and time.
conf prot	Protocol configuration. IP address. Other fields can be left as defaults, unless you are familiar with TCP/IP and wish to optimise these parameters to match your network.
conf mess wel	Welcome banner. Configure the welcome message that you desire. This will only be presented to users who enter dialogue with the gateway.
conf prof user (conf up)	User profile configuration. Configure each of the user profiles that you require. This generally divides into seamless users and dialogue users.
conf prof serv (conf sp)	Service profiles. Configure each of the service profiles.
conf serv dcx (conf dcx)	DCX services. Configure and enable each of the DCX services that you require.
conf serv lan (conf lan)	LAN services. Configure and enable each of the LAN services that you require.

Finally, before enabling the Ethernet line (**en eth**), you may wish to configure the following options.

conf mess gen	General messages such as COM and DISC can be changed to more personalised messages if required.
conf gen	The default user and service profiles may need to be changed.
conf prof term (conf tp)	The manager-defined terminal configuration may require completion and or personalising.
conf gate	Some services may exist on remote networks. It may be necessary to inform Ethergate of the address of other Gateways to contact when reaching remote services.

The above gives a very quick guide to configuring Ethergate. It is strongly advised that this manual be fully studied and the configuration planned before attempting to actually configure Ethergate, thus ensuring that the user's networking needs are fulfilled as effectively as possible.

2.3 Manager-defined Terminal Configuration

When a user logs on after a cold start, Ethergate will request selection of a Terminal Type. Option 5 of the menu allows the terminal characteristics to be defined to match the terminal in use. This is only necessary if you are not using one of the pre-defined terminal types.

The process used to define the terminal type is carried out in a TTY question and answer mode as follows. The information highlighted in bold shows an example for a VT100 type terminal.

Define Terminal Profile 5 - MgrDefined

Input Parameters

Enter Cursor Left Sequence : **^[[D**

Enter Cursor Right Sequence : **^[[C**

Enter Cursor Up Sequence : **^[[A**

Enter Cursor Down Sequence : **^[[B**

Output Parameters

Enter Initialise Device sequence : **^[C**

Enter Clear Screen & Home sequence : **^[[2J^[[1;1H**

Enter Clear Line Sequence : **^[[2K**

Enter Cursor Position Type : **ASCII**

Enter Cursor Position Offset : **1**

Enter Cursor Position String : **^[[%r;%cH**

Is the above correct? : **(Y,N,Q)**

Control characters are symbolised by a preceding ^, e.g. ^[is equivalent to an ESC character (see Appendix D). %r indicates the row address and %c the column address. Entering two carats (^) will represent one actual ^ and not a control sequence.

After the complete definition has been entered and **yes** has been entered to confirm the configuration, Ethergate will store these parameters into Terminal Profile 5 with the name **MgrDefined**. The manager will then use these characteristics from the newly configured Terminal Profile 5. If **yes** is not entered then the whole process will be repeated.

Once Terminal Profile 5 has been configured and entered, then the 'define' option will no longer be presented and future logons will be given the option of 'MgrDefined' (i.e. the name of Terminal Profile 5).

3.1 Seamless Connections

The DCX Ethergate provides facilities to ensure that the boundary between the two networks (DCX and LAN) is as invisible as possible, i.e. 'seamless'. This allows the two different networks to appear to the users as one and the same.

Seamless connections are achieved by automatically translating LAN addresses to DCX addresses and vice versa. The translation process takes DCX service numbers (short form address, SFAs) and maps them to specific IP/TCP addresses (sockets, see Appendix C). Therefore any standard DCX service can be converted to a standard LAN service address, using SFAs. Node.Port requests are not supported by Ethergate (the only exception to this is the request for Port 0, which is a supervisory request).

An example would be the use of Ethergate as an additional access to a VAX computer. The DCX service may call upon a number of DCX LSC ports and also an Ethergate card. The Ethergate card would upon receipt of a DCX call automatically contact the VAX over the Ethernet using an IP and TCP address. The user would be unaware of how they were actually connected.

Ethergate can also provide automatic address translation between an incoming IP/TCP address pair and a DCX SFA, Node.Port or channel number. In this case the IP address defaults to the DCX Ethergate's own IP address, however, the Ethergate can support over 100 different IP addresses.

3.2 Multiple Sessions

In some circumstances there are times when it would be advantageous to allow an operator at a terminal to change between two or more applications or services at the press of a key, e.g. a sales desk may require quick access to Sales Order Processing, Stock Control and Electronic Mail services.

Multiple sessions provide such a capability. The DCX Ethergate can allow users to make more than one outgoing connection. The user then simply switches between the sessions by pressing appropriate keys. The keys are known as Hot-Keys and are completely user- or manager-definable.

3.3 Services

The DCX Ethergate has three basic types of service: DCX Services, LAN Services and Permanent Services. Ethergate Services describe the address of the service, an optional password, and connection characteristics (via profiles). Each service has a name. In the case of DCX and LAN services this name can be used by users to connect to their required destinations.

A **DCX Service** contains a DCX address. This can be a Short Form Address (preferably), a specific Node.Port, a specific Ethergate channel or a group of Ethergate channels. Users can be connected to the service by two basic methods. The first allows the user to specify the name of the service, the second is automatic, or seamless, selection. This occurs when an incoming LAN call is received with an IP address/TCP port pair that matches the IP address/TCP port pair specified in the service; e.g. it is possible to configure a DCX service called Bluegate for access into an IBM system with a TCP port of 100 and using the DCX Ethergate's own IP address by default. When an incoming LAN call for TCP port 100 and the Ethergate's own IP address arrives the Ethergate will automatically call the Bluegate DCX address.

A **LAN Service** contains a LAN socket address (IP address and TCP port). Again, like the DCX service, this can be selected either by name or automatically by an incoming DCX call to a specified SFA; e.g. it is possible to configure a LAN service called VAX with an SFA of 100. When a call from a DCX for SFA 100 arrives at the Ethergate it will automatically call the VAX LAN address.

The third type of service is the **Permanent Connection Service**. Ethergate can be configured to permanently connect a DCX address to a LAN socket. The DCX address can be an SFA, a Node.Port or an Ethergate channel number. If either connection fails (LAN or DCX), then the other will be cleared and the two connections re-established, except for 840-type directly-mapped DCX channels when Ethergate can be configured to hold on to the LAN call. A retry time can be configured to set the rate at which the Ethergate will attempt to connect the addresses after an unsuccessful connection attempt.

After a service is created it must then be enabled. A disabled service cannot be connected to, and in the case of permanent connection, no connection will be made. When enabling a service it is first checked for any inconsistencies. If there are any then the service will not be enabled and the manager is informed of the error.

Both the LAN and DCX services have a special case to allow users to enter dialogue. If the service is specified without a destination (e.g. LAN service without IP address and TCP port) but have a specified incoming address (i.e. SFA for LAN services and TCP port for DCX services), then when an incoming call matches this incoming address Ethergate will enter dialogue using the specified (or default) user profile. For example, if a DCX service called LAN-DIALOGUE is configured with a TCP port of 23 and without a DCX service, then when an incoming LAN call for TCP port 23 arrives the user will enter dialogue with Ethergate. The service could also be configured with a password, in which case the user will be requested to enter the password before entering dialogue.

Note that Ethergate can only enter dialogue with a maximum of 24 simultaneous users. In DCX 840 systems with users permanently mapped to Ethergate channels, it is recommended that a maximum of 24 users are mapped to dialogue channels to prevent a situation arising where users remain in a connected but X-OFFed state.

As described above, DCX services handle calls from the LAN to DCX, whilst LAN and Permanent Connection Services both place calls out to the LAN. For these services it is also possible to specify the local IP address to be used for the connection, i.e. additional IP addresses to be supported by the DCX Ethergate. This facility, in conjunction with the ability to handle incoming LAN calls to an IP address other than the Ethergate's own address, provides full flexibility in the routing of LAN calls by both TCP port and IP address. The DCX Ethergate can be configured to have a single IP address or over one hundred different ones, to suit the application.

3.4 Profiles

Profiles are used within Ethergate to define sets of characteristics that should be applied in given circumstances. There are three types of profile: a User Profile that describes the characteristics to be applied to a user, a Service Profile that describes the characteristics of a connection to a service, and a Terminal Profile used to describe the characteristics of a manager's terminal. All profiles can be given a name to aid clarity.

The **User Profile** defines the Hot-Key Sequences, the maximum number of simultaneous sessions the user can hold, whether or not the user is allowed to login to the manager facilities and whether all services must be specified by name and not address. Additionally an inactivity timer can be set so that users will be disconnected from Ethergate if they are inactive for too long. This can help prevent users leaving terminals unattended but still using valuable resources. A User Profile is referenced by a service.

A **Service Profile** defines the service connection characteristics including the Initial sequence that will be sent to the service upon connection (e.g. **LOGIN SALES**) and the refresh sequence that will be sent whenever the service is selected (e.g. entered by Hot-Key). This refresh sequence would request that the service re-display the image on the user's screen. An inactivity timer can be set so that the service will be disconnected if it is inactive for too long. This can help prevent users staying logged in to costly services and not using them. A Service Profile is referenced by a service.

Terminal Profiles are provided to allow different types of terminal to manage Ethergate successfully. There are four pre-defined profiles for the more popular terminals (VT100/ANSI, ADM3A, IBM 3101 and CIPHER 2605), and four manager-definable profiles. Each profile describes both the input sequences for recognition of various functions (e.g. Submit Form), and output sequences for screen control. The Terminal Profile can be selected whenever the manager facilities are accessed, or can be specified within the general configuration form.

3.5 Multiple Local IP Addresses

DCX Ethergate has a single IP address in its default mode of operation. All TCP calls made to or from the Ethergate use the same local IP address (configured in the Conf Prot form). In this mode of operation, callers from LAN hosts select different DCX services using the TCP port number (only).

It can, however, be useful to distinguish DCX services by IP address (and TCP port number), rather than just by TCP port number. It can also be useful when calling a remote LAN host, to use a local IP address that is different for each LAN/Permanent Connection Service. Ethergate allows this by providing an optional source or local IP address in each of the service types.

When so configured, Ethergate will act in all ways as if it has multiple IP addresses: its own, plus all the different source or local addresses configured in enabled services.

A LAN device can thus place a call to a DCX service by using an IP address unique to that service. Similarly, it can be arranged for all calls made using a particular LAN service to use another IP address.

3.6 Example Application - Bulk Terminal Serving

Figure 3-1 shows an example application for a DCX Ethergate. It refers to information explained in the System Management chapter (4). It is recommended that this section be scan-read first and then read more thoroughly when the System Management chapter has been understood.

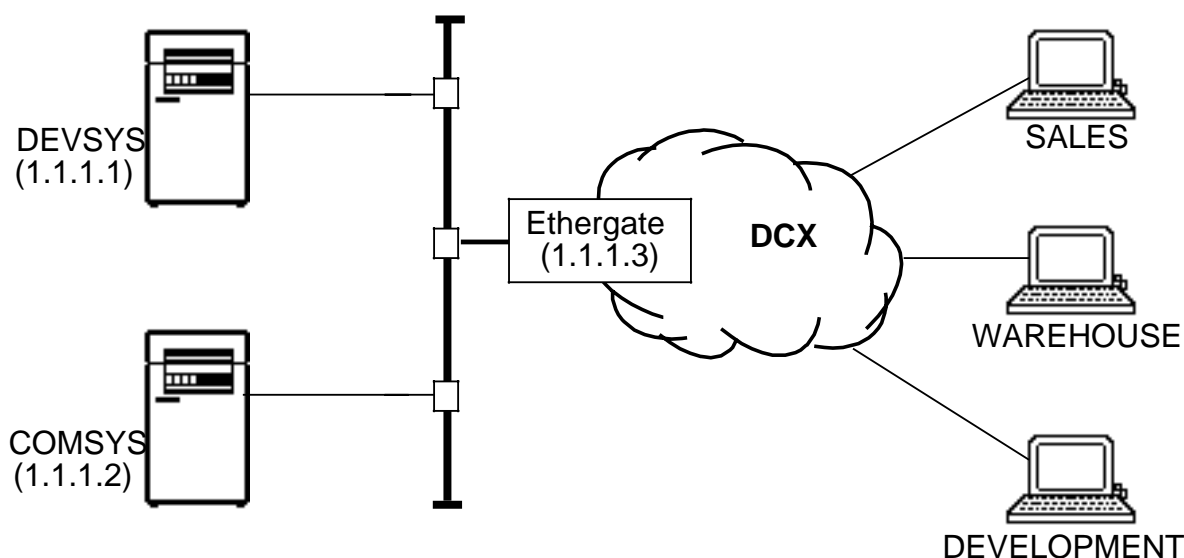


Figure 3-1 Example Application

Figure 3-1 shows a network with two host computers, one for development (DEVSYS) and one for commercial use (COMSYS). The development system has one service which is called DEVSYS. The commercial system has two services, SALES and STOCK. Each system has its Internet (IP) address indicated in brackets.

In the network there are three groups of users: Sales staff, Warehouse staff and Development staff. The Sales staff require quick access to both the SALES and STOCK services. The Warehouse staff and the Development staff require access to a single service and will connect to these directly. The Sales staff however will use the Ethergate's Multi-Session capability to switch between SALES and STOCK. The sales terminals are VT100s.

The following can then be configured:

The Ethergate IP address should be set to 1.1.1.3 using the `conf prot` command.

Two user profiles are required, one for the seamless connections (Warehouse and Development) and one for the dialogue connections (Sales).

To edit each user profile, enter the **conf up ed** command followed by the profile number, and complete the forms as follows:

```
Ethergate (N0)                CONFIGURE USER PROFILE FORM (Page 1)                REL x.y
-----
Name : Seamless                                Number : 1
Escape seq :                                     Txt :
Disc. seq :                                       Txt :
Switch seq1 :                                    Txt :
Switch seq2 :                                    Txt :
Switch seq3 :                                    Txt :
Switch seq4 :                                    Txt :

Directory banner      : ENABLE                Manager Login       : ENABLE
Free Service selection : ENABLE                Session Quota      : 1
Inactivity disc. time :                          Parity              : EVEN
Disc. Pending Timeout : 30                    Validate before disc. : DISABLE
Output Welcome always : DISABLE

See next page for TELNET/TCP options ...

-----
PF2 - Help           ^B - Prev Page           ^R - Restore
PF1 - Submit         ^F - Next Page          ^C - Abort
-----
```

This profile (named Seamless) does not allow dialogue to be entered, or allow more than one session to be created. It is therefore suitable for use both by Development and Warehouse staff.

TELNET Options -

Use TELNET : **ENABLED** (DISABLED overrides other TELNET options)
Go-Ahead : **NOT SUPPRESSED** Binary : **ENABLED**
CR map : **CR** Break map : **DISABLED**
Timing Mark : **WONT**

TCP Options -

Keep Alive Time : **30**

PF2 - Help ^B - Prev Page ^R - Restore
PF1 - Submit ^F - Next Page ^C - Abort

```

Ethergate (N0)                CONFIGURE USER PROFILE FORM (Page 1)                REL x.y
-----
Name : MultiSess                                Number : 2

Escape Seq   : ^[^[OS                            Txt   : ESC PF4
Disc. Seq    :                                     Txt   :
Switch Seq1  : ^[^[OP                            Txt   : ESC PF1
Switch Seq2  : ^[^[OQ                            Txt   : ESC PF2
Switch Seq3  :                                     Txt   :
Switch Seq4  :                                     Txt   :

Directory banner      : ENABLE                    Manager Login        : ENABLE
Free Service selection : ENABLE                    Session Quota        : 4
Inactivity disc. time : 30                          Parity                : NONE
Disc. Pending Timeout : 30                          Validate before disc. : DISABLE
Output Welcome always : DISABLE

See next page for TELNET/TCP options ...

-----
PF2 - Help                ^B - Prev Page                ^R - Restore
PF1 - Submit              ^F - Next Page                ^C - Abort
-----

```

This profile (named MultiSess) allows the Sales staff to enter dialogue with the Ethergate by pressing the **ESC** key followed by the **PF4** key. They can then select a second service e.g. **STOCK**, switching between the two using **ESC PF1** for the first service (**SALES**) and **ESC PF2** for the second service (**STOCK**).

Three service profiles are then used, one for standard communications to a host for Development, and two with automatic login sequences for the Sales and Stock applications.

To edit each service profile enter the **conf sp ed** command followed by the profile number, and complete the forms as follows:

Name : **Standard** Number : **2**

Service Will Echo : **YES** Service Data Rate : **1200**
Service Parity : **EVEN**

Inactivity Disc. Time :

Validate Data Receipt on DCX : **DISABLE** Validate before disc. : **DISABLE**
Use Disc. Pending Timeout : **ENABLE** Disc. Pending Timeout Value : **30**

Initial seq :
Refresh seq :

See next page for TELNET/TCP options ...

PF2 - Help ^B - Prev Page ^R - Restore
PF1 - Submit ^F - Next Page ^C - Abort

Name : **SalesLogin** Number : **3**

Service Will Echo : **YES** Service Data Rate : **9600**
Service Parity : **EVEN**

Inactivity Disc. Time :

Validate Data Receipt on DCX : **DISABLE** Validate before disc. : **DISABLE**
Use Disc. Pending Timeout : **ENABLE** Disc. Pending Timeout Value : **30**

Initial seq : **LOGIN SALES^M**
Refresh seq :

See next page for TELNET/TCP options ...

PF2 - Help ^B - Prev Page ^R - Restore
PF1 - Submit ^F - Next Page ^C - Abort

This profile (SalesLogin) will send LOGIN SALES followed by a Carriage Return when first connecting to the host computer.

Name : **StockLogin** Number : **4**
Service Will Echo : **YES** Service Data Rate : **9600**
Service Parity : **EVEN**
Inactivity Disc. Time :
Validate Data Receipt on DCX : **DISABLE** Validate before disc. : **DISABLE**
Use Disc. Pending Timeout : **ENABLE** Disc. Pending Timeout Value : **30**
Initial seq : **LOGIN STOCK^M**
Refresh seq :

See next page for TELNET/TCP options ...

PF2 - Help ^B - Prev Page ^R - Restore
PF1 - Submit ^F - Next Page ^C - Abort

This profile (StockLogin) will send LOGIN STOCK followed by a Carriage Return when first connecting to the host computer.

Each service can then be configured using the **conf lan ed** command followed by the service name and completing the forms as follows:

```
Ethergate (N0)                CONFIGURE LAN SERVICE FORM                REL x.y
-----

Name      : DevSys                                SFA :      1
Dest IP Address : 001.001.001.001                TCP Port :    23
Src IP Address  :                               (optional, instead of gate's IP addr)
Password       :                               Max SFA :
Hold LAN Sessions on Abnormal Failure : DISABLE
User Prof      : Seamless                        Service Prof :    Standard

-----
PF2 - Help                                ^R - Restore
PF1 - Submit                              ^C - Abort
-----
```

This service makes use of DCX Short Form Address 1. The relevant DCX nodes should be configured to route this SFA to the Ethergate. A DCX name called DEVSYS should then be configured to use this SFA on the appropriate DCX nodes.

```

Ethergate (N0)                CONFIGURE LAN SERVICE FORM                REL x.y
-----
Name      : Sales                SFA      : 2
Dest IP Address : 001.001.001.002    TCP Port : 23
Src IP Address  :                (optional, instead of gate's IP addr)
Password       :                Max SFA   :
Hold LAN Sessions on Abnormal Failure : DISABLE
User Prof      : MultiSess          Service Prof : SalesLogin
-----
PF2 - Help                ^R - Restore
PF1 - Submit              ^C - Abort
-----

```

This service makes use of DCX Short Form Address 2. The relevant DCX nodes should be configured to route this SFA to the Ethergate. A DCX name called SALES should then be configured to use this SFA on the appropriate DCX nodes.

```

Ethergate (N0)                CONFIGURE LAN SERVICE FORM                REL x.y
-----

Name      : Stock                                SFA      :    3

Dest IP Address : 001.001.001.002                TCP port :    23

Src IP Address  :                                (optional, instead of gate's IP addr)

Password       :                                Max SFA  :

Hold LAN Sessions on Abnormal Failure : DISABLE

User Prof     : Seamless                        Service Prof : StockLogin

-----

PF2 - Help                                ^R - Restore
PF1 - Submit                                ^C - Abort
-----

```

This service makes use of DCX Short Form Address 3. The relevant DCX nodes should be configured to route this SFA to the Ethergate. A DCX name called **STOCK** should then be configured to use this SFA on the appropriate DCX nodes.

Once all these items have been configured, then the services and Ethernet should be enabled (**en lan DevSys**, **en lan Sales**, **en lan Stock**, **en eth**).

The above configuration allows the Development staff to contact DCX and simply enter the service name **DEVSYS**, which will then automatically connect them to the Development system over the Ethernet network. Warehouse staff also follow the same procedure using the **STOCK** service name; in this case they will be connected to the commercial system and logged in as **STOCK**.

The Sales staff will contact the DCX and enter the **SALES** service name. This will automatically route them to the **SALES** service on the commercial system. They may then enter **ESC PF4** on the keyboard. This will bring them into dialogue with Ethergate, which will then request that they enter a service (e.g. **STOCK**). Upon entering **STOCK**, Ethergate will connect them to the **STOCK** service while leaving the **SALES** service available on session 1. The user can then switch between service by pressing **ESC PF1** for **SALES** and **ESC PF2** for **STOCK**.

4.1 Overview

System management is carried out by a supervisor or manager. The Ethergate software 'manager' facilities provide the dialogue between the supervisory/managerial user and Ethergate. It is an intelligent, command-driven, menu/form based system and provides the ability to configure, monitor and control the various aspects of Ethergate.

The 'manager' environment provides you with access to all the configuration, control and status functions with a minimum of input. This is performed by using a system of menus to display choices, and forms to enter configuration data. All commands within the system may be accessed from any menu, and any menu can be reached directly from any other. The forms are simple and easy to use, without overwhelming you with irrelevant information. The manager combines the menus, forms and commands in a context-sensitive way to give a fully-featured control point for Ethergate.

You can control the Ethergate manager by using one of a number of terminal types (e.g. VT100), whose characteristics are already pre-configured in Ethergate.

4.2 How the Manager Works

4.2.1 Input

Input to the manager is very simple. You enter the command or information as an ASCII string, then terminate and submit it for evaluation by entering Carriage Return or Line Feed.

The editing functions available are:

Deleting a Character

When a delete (**DEL**) or backspace (**BS**) character is entered, the character to the left of the current cursor position is removed and all characters to the right of the deleted character are moved left one position.

Cancelling a Line

When a control-U (**^U**) or a control-X (**^X**) character is entered then the entire input line is cancelled.

Left-Right Cursor Keys

When a cursor key is entered then the current cursor position is moved in that direction. If however, the cursor is at the leftmost or rightmost position within the text on the current line, then no action is taken. If a character is entered when there are characters to the right of the cursor, then those characters are moved right one position and the new character is inserted at the cursor position. The cursor will then move right one position.

Repeating a Line

When **^R** is entered then the previously submitted command line is recalled and replaces the current line, ready for re-submission or editing.

4.2.2 General Rules

Each input line can contain more than one command, with commands being separated by a semicolon (;).

All commands are accepted in any mix of upper and lower case and can be terminated by a space, comma or semicolon.

If the Ethergate finds an error within an input line then any further commands on that line are abandoned and the user is informed of the failure.

When a command is processed any additional information required is prompted for, and if the prompt has an associated menu then the new menu will be displayed with the prompt.

Menus are only changed when it is necessary to assist and prompt the user in the selection of commands, actions or items. The user can specify and carry out a complete command without affecting the currently selected menu.

4.2.3 Using Menus

Menus are available as a general prompting aid. The information displayed in a menu can be either *static* or *dynamic*. Dynamic information refers to information calculated or derived at the time of display (e.g. status) and may be automatically updated.

Within each menu there are special functions that can be accessed by entering their associated key sequences. Their functions are:

- Help (^W) - Provides a simple guide to the current menu and the selections it contains.
- Main Menu (^G) - Causes the Main Menu to be displayed.
- Prev Menu (^L) - Causes the previous menu to be displayed. (N.B. This is chronological and not necessarily hierarchical).
- NextPage (^N or ^F) - If the current menu has more than one page, then this sequence will cause the next page to be displayed.
- PrevPage (^B) - If the current menu has more than one page, then this sequence will cause the previous page to be displayed.

Both NextPage and PrevPage are cyclic, e.g. if there are two pages and page 2 is currently displayed, when NextPage is entered, then page 1 will be displayed.

4.2.4 Using Forms

Generally the configuration is entered via forms. Forms are an easy way of presenting and entering information.

Ethergate uses standard form handling throughout. There are several types of fields found in a form: the *Constrained List*, *Free Format Text*, *Free Format Blind Text*, and the *Information only* fields. The constrained list is a list of valid entries for the field, e.g. a directory banner field may only contain ENABLE or DISABLE. It is possible to sequence backward and forward through these lists, or if desired you can enter the value directly. The free format text field is exactly that. You just enter text, (e.g. a name). The Free format blind text is similar to a free format field, except that the text is not visible to you (e.g. as in a password). The information only field presents configuration information that cannot be changed using this form.

When in a form, several special keys sequences may be used. They are:

- Help (^W) - Provides a simple guide to this form and the selections it contains.
- CursorUp () - Moves geographically upwards one field.
- CursorDown () - Moves geographically downwards one field.
- CursorLeft () - Moves geographically left one space, or when at the left edge of a field or when on a constrained list field, then moves left one field.
- CursorRight () - Moves geographically right one space, or when at the right edge of a field or when on a constrained list field, then moves right one field.
- TAB or CR - Moves to the next sequential field (not geographic).
- Submit (^E) - Submits the form for validation and entry into the system.
- Abort (^C) - Exits the form without validating or updating the system.
- NextPage (^N or ^F) - If this form has more than one page, then this sequence will cause the next page to be displayed.
- PrevPage (^B) - If this form has more than one page, then this sequence will cause the previous page to be displayed.
- Main Menu (^G) - Causes the Main Menu to be displayed and the form to be aborted.
- Prev Menu (^L) - Causes the previous menu to be displayed and the form to be aborted.

- Restore (^R)** - Restores the field to its current configuration state (or initial state).
- Space** - When the cursor is at a constrained list, the list is sequenced forward one item.
- Backslash (\)** - When the cursor is at a constrained list, the list is sequenced backward one item.
- <Text>** - When in a free format text field, the character will be entered into the field with the standard line editing features.
- When in a constrained list field, the field will be cleared and the text entered. The field then behaves like a free format text field.
- Clear (^X or ^U)** - Clears the field of any text. (Restores a constrained list.)
- DEL or BS** - When in a free format text field, the character to the left of the cursor is deleted and any characters to the right of this character are shuffled left one position.

There are a few rules to be observed. These are:

- When an attempt is made to leave a field, the field is validated on its own (i.e. not against other dependent fields). If this validation is unsuccessful, the system will restore the field, bleep at the user and then place the cursor at the start of the field. (If the field was a constrained list in free format mode, then it is returned to *list* mode.)
- When a field is full and an attempt is made to enter more characters, the characters are ignored, and the system will respond with a bleep.
- Control characters, where applicable, may be embedded into a free format field in the standard way, i.e. with a preceding carat (^) and a carat being entered twice for a single ^.

In the following text, form fields are described with the type and size of field specified in brackets, e.g. (Free Format Text, 20) indicates a Free Format text field with a width of 20 characters. Fields indicated as optional may optionally be completed by the user. In many cases the field will default to a specified value.

4.2.5 Initial Entry to the Manager

After connecting to Ethergate, you can gain entry to the manager by using the `logon` command. Once you have logged on, then the manager will assume it is communicating with a terminal of the type configured as the 'manager terminal type'. If one has not already been configured (e.g. after cold start), then you are presented with the following terminal selection menu (in TTY mode):

```
Terminal Selection Menu
```

```
1 - VT100  
2 - ADM3A  
3 - CIPHER2605  
3 - IBM3101  
5 - Define
```

```
Enter selection number:
```

If you enter 5 (Define) then a minimum set of the terminal parameters are prompted for in a teletype mode (see Section 2.3 Manager-defined Terminal Configuration).

Ethergate will then use the selected terminal characteristics and display the Main Menu.

4.2.6 Menu Hierarchy

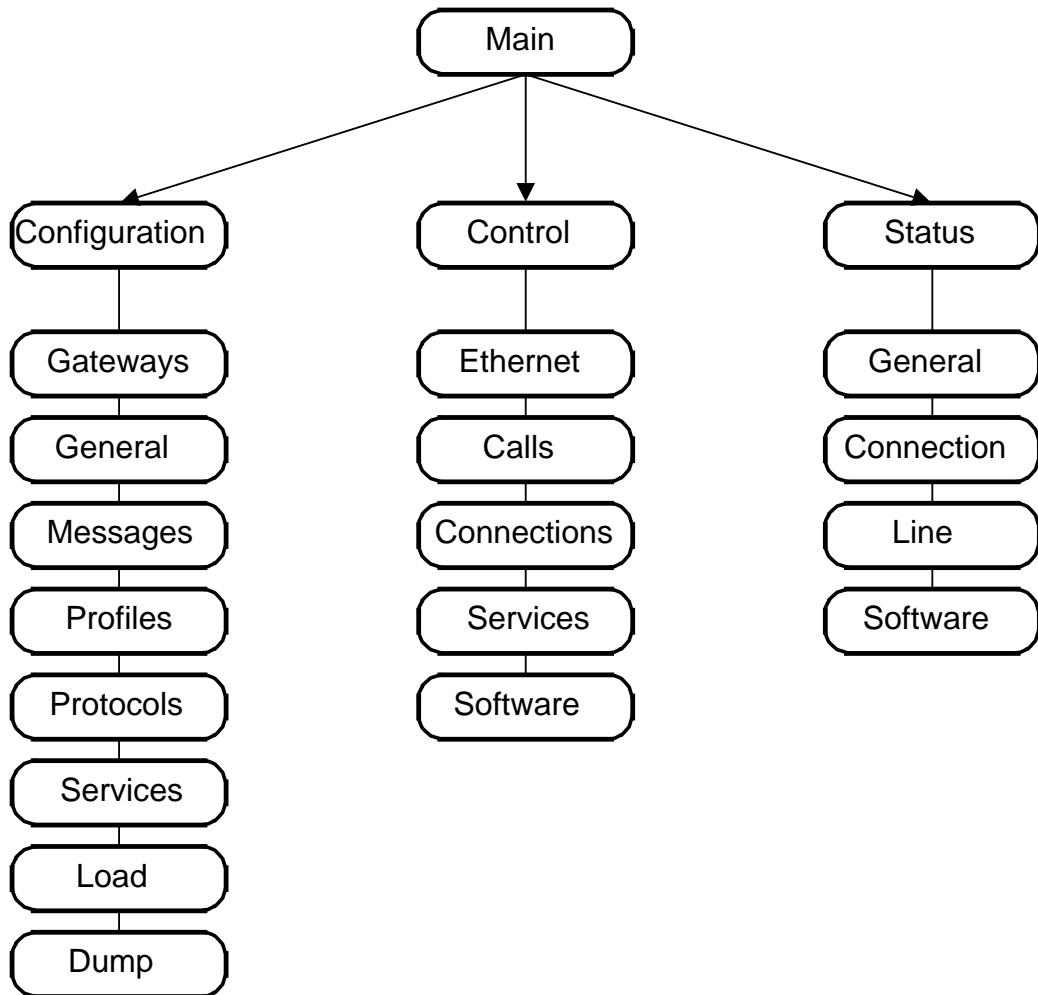


Figure 4-1 Menu Hierarchy

The Main, Configuration, Control and Status Menus are described in Sections 4.3, 4.4, 4.5 and 4.6 respectively.

4.3 Main Menu

```
Ethergate                MAIN MENU                Rel x.y
-----
                                CONF  -  Configuration menu
                                CONT  -  Control menu
                                STAT  -  Status menu
                                TERM  -  Terminal selection
                                QUIT  -  Quit Manager
                                LOGOFF -  Logoff Gateway

-----
PF2 - Help                PF4 - Main Menu
                          PF3 - Prev Menu
-----
Enter command:
```

From this menu it is possible to execute commands directly, or to enter other menus (the Configuration, Control and Status Menus are described in Sections 4.4, 4.5 and 4.6 respectively). The top right hand side of the manager screen displays **Rel x.y** where **x** is the version number and **y** is the software issue.

4.3.1 Terminal Selection

Within the Main Menu it is possible to re-invoke the terminal selection procedure by entering the **term** command.

4.3.2 Quit Manager

The **quit** command causes Ethergate to leave manager mode and return to user mode.

4.3.3 Logoff (and Logout)

The **logoff** and **logout** commands log you out of the manager and disconnect you from Ethergate.

4.4 Configuration Menu (conf command)

The Configuration Menu displays the options that are available for configuring Ethergate.

```
Ethergate                                CONFIGURATION MENU                                Rel x.y
-----
                                         GATE      - Gateways
                                         GEN       - General
                                         MESS     - Messages
                                         PROF     - Profiles
                                         PROT     - Protocols
                                         SERV     - Services

LO - Load Config                        DU - Dump Config
-----
PF2 - Help                               PF4 - Main menu
                                         PF3 - Prev menu
-----
(conf) Configure what :
```

To the left hand side of the **Configure what :** prompt a display in brackets shows that the **conf** command has been partially completed. Therefore commands that are entered here become part of the **conf** command, e.g. entering **gate** command here is the same as entering **conf gate** from anywhere else in the system.

4.4.1 Configure LAN IP Gateway Form (conf gate command)

When Ethergate is required to contact services that do not reside on the local network, then it is necessary to send information via a third party gateway. It is important to configure a default gateway when Ethergate is used in this manner, otherwise misoperation may occur. This form allows you to specify the gateway routing to a remote service.

```
Ethergate                CONFIGURE GATEWAYS FORM                Rel x.y
-----
Default Gateway  :
Destination Address      Gateway Address
                        -
                        -
                        -
                        -
                        -
                        -
                        -
                        -
                        -
-----
PF2 - Help                ^R - Restore
PF1 - Submit              ^C - Abort
-----
```

Default Gateway (Free Format Text,20)

This is an optional field, and contains an Internet address of the default gateway.

Destination Address (Free Format Text,20)

This is an optional field, and contains an Internet address mask.

Gateway Address (Free Format Text,20)

This field corresponds to its adjacent Destination Address, and must be present when the corresponding field is present. This field contains an Internet address of the gateway to be used to reach the specified destination.

This gateway table allows datagrams to be sent to the relevant gateway for any given destination address that does not reside physically on the local network. If a match is not found within the destination address mask list then the default gateway is used. Therefore if there is only one external gateway on the local network, then only that default gateway need be configured.

The destination mask is entered as a left-justified Internet address with one to four numbers, e.g.

1
1.1
1.1.1
1.1.1.1

This mask is then matched against the required destination Internet address, and if successful then the gateway address will be used as a first stepping stone towards the goal.

Any matching conflict is resolved by using match significance, for example:

If a destination Internet address is 1.2.3.4 and there are two destination address masks, 1 and 1.2, then the mask 1.2 has more significance and will be used to determine the gateway address.

4.4.2 Configure General Information Form (conf gen command)

```
Ethergate                CONFIGURE GENERAL INFORMATION FORM                Rel x.y
-----
Node Number :

Default User prof      :                Default Service prof      :
Manager Password      :                Verify Password          :
Manager Terminal Type :

Event Log Channel      :                Event Log Mode           : 850 BINARY
Event Log Data Rate    :  AUTO                Event Log Parity         :  EVEN

PMC Link Down Handling :  DROP CALLS                Logout Timeout          :
Outstanding DCX Data Validates :  2
Held Printer Inactivity Timeout :  30

Date                   :                (23 AUG 1988)
Time                   :                (14.30)

-----
PF2 - Help                ^R - Restore
PF1 - Submit                ^C - Abort
-----
```

This form allows you to configure items that do not directly associate with other parts of the configuration, or warrant a form of their own.

Node Number (Free Format Text)

This is a mandatory field. A number between 1 and 255 should be entered; this is used for USO routing purposes.

Default User Profile (Free Format Text,15)

This is a mandatory field. It contains a user profile number or name. This profile is used whenever a user establishes a connection to Ethergate and no direct method of obtaining a profile has been established (e.g. no profile specified in service table).

Default Service Profile (Free Format Text,15)

This a mandatory field. It contains a service profile number or name. This profile is used whenever a user establishes a new session to a service, and no direct method of obtaining a profile is available (e.g. user specifying the service address without using the service table, or in the service table, the service profile was not specified).

Manager Password/Verify Password (Free Format Blind Text,12)
These are mandatory fields. The two fields must be identical and are provided as a protection from entering incorrect information.

Manager Terminal Type (Free Format Blind Text,15)

This is an optional field. It contains a terminal profile number or name. If this field is empty then, after manager password verification, the user is given a simple teletype menu of terminals from which to select. If this field contains a valid terminal type then no terminal selection menu will be given and the terminal profile specified will be adopted automatically.

Event Log Channel (Free Format Text,3)

This is an optional field. It contains the DCX channel number of the Ethergate to which the event log will be output.

If this field is empty, then no event log output will be generated. If present, then the event log output will be generated on the channel specified. The event log should not be a USO mapped port; instead a PMC should be configured.

Event Log Mode (Constrained List)

This sets the event log output mode. It may contain one of the following:

- 850 BINARY - Standard USO messages in binary format
- 850 TEXT - Standard USO messages in text format.

For a list of generated messages see Appendix E.

Event Log Data Rate (Constrained List)

This field selects the speed at which event log data is output to the DCX Event log channel.

Event Log Parity (Constrained List)

This allows you to define the parity of the text forming the event log message.

- NONE - No parity is generated.
- EVEN - Generate EVEN parity.
- ODD - Generate ODD parity.
- MARK - Generate MARK parity.
- SPACE - Generate SPACE parity.
- STRIP - No parity is generated.

PMC Link Down Handling (Constrained List)

This field selects how Ethergate will react to DCX Link Down codes received from DCX on permanently mapped connections (PMCs).

DROP CALLS - Any PMC call on which a Link Down occurs will be cleared.

HOLD CALLS - Link Down on a PMCs will be ignored.

Logout Timeout (Free Format Text,4)

This field is optional. It contains a number from 1 to 9999 seconds. This value (when present) represents the time period that is allowed to elapse *after* the sending of the LOGOUT message (specified in the General Message Form, Section 4.3.3) to the service *before* the service session will be cleared. If the service fails to disconnect in this time, Ethergate terminates the call. (Normally, the logout message will result in the service clearing the session from its end). If this timeout expires (and the service is cleared by Ethergate) an Event Log message is generated (see Appendix E).

Outstanding DCX Data Validates (Free Format Text,1)

The number of unconfirmed DCX VAL codes that will be sent out. This is relevant to DCX Services with a Service Profile which enables Data Receipt Validation. After each block of data is output to the DCX, Ethergate adds a DCX VAL code. The far end will respond with a VAL Confirm code when it receives the VAL (and thus all the data preceding it). When Ethergate has sent out this many unconfirmed VAL codes on a channel, it will flow-control output of data to the DCX channel until a VAL confirm is received.

Held Printer Inactivity Timeout (Free Format,4)

The number of seconds for which a call to a Held Printer DCX Service type will be held 'open', with no LAN user. See the DCX Service for more on Held Printers. If set to zero, the DCX Service call will be held 'open' indefinitely.

Date (Free Format Text,2; Constrained List; Free Format Text,4)

The date is entered as a day number in decimal, a month in text (constrained list) and a year in decimal. These fields are always blank upon entry to the form. Only the fields that contain information will cause the corresponding item to change, e.g. by entering a month, then only the month will change, leaving the year and day of month alone.

The date in brackets () is the current date.

Time (Free Format,2; Free Format,2)

The time is entered as an hour in decimal and a minute in decimal (this is two fields). These fields are always blank upon entry to the form. Only the

fields that contain information will cause the corresponding item to change, e.g. by entering a minute, then only the minute will change, leaving the hour alone. Time is entered in 24-hour format.

The time in brackets () is the current time.

4.4.3 Configure Messages Menu (conf mess command)

```
Ethergate                CONFIGURE MESSAGES MENU                Rel x.y
-----
                                WEL - Welcome Banner

                                GEN - General Messages

-----
PF2 - Help                                PF4 - Main Menu
                                           PF3 - Prev Menu
-----
(conf mess) Enter message type:
```

This menu allows you to enter the edit welcome banner editor, and to configure general messages.

The edit welcome banner editor can be entered by using the **conf mess wel** command.

```

Ethergate                               EDIT WELCOME BANNER                               INSERT (0) 1
-----
WW      WW  EEEEE  LL    CCCC   OOOOO  MMM      MMM  EEEEE
WW      WW  EE     LL    CC     OO   00  MM MM  MM  MM  EE
WW  WW  WW  WW  EEEE  LL    CC     OO   OO  MM   MM  MM  EEEE
WW  WW  WW  WW  EE    LL    CC     OO   OO  MM      MM  EE
  WW      WW  EEEEE  LLLLLL CCCC   OOOOO  MM      MM  EEEEE

      T O T H E  C R A Y  D A T A  N E T W O R K

-----
PF2 - Help                ^B - Prev page
PF1 - Submit              ^F - Next page                ^C - Abort
-----

```

The welcome banner editor operates in simple 'screen' mode. You are presented with a copy of the welcome banner ready for editing. The following functions can then be performed:

- Cursor Left** - Move left one character: if at left hand side of line, then the cursor remains in the left-most column.
- Cursor Right** - Move right one character: if at right hand side of line, then the cursor remains in the right-most column.
- Cursor Up** - Move up one line, maintaining the current horizontal position.
- Cursor Down** - Move down one line, maintaining the current horizontal position.
- Clear (^U or ^X)** - Delete the current line, shuffling text up one line.
- Return (^M)** - Insert a new text line, splitting the current line if necessary.

- <Text> - Insert the character, shuffling characters to the right.
- Delete (DEL) - Delete a character to the left of the current position, shuffling characters left one position. If at the left hand side of line, then remove 'newline' and concatenate this line with the previous line.
- Backspace (BS)
- Submit (^E) - Submit welcome banner into system and leave editing.
- Abort (^C) - Abort editing without submission to the system.
- NextPage (^N or ^F) - If the text spans more than one page the next page is displayed; if this is the last page there is no effect.
- PrevPage (^B) - If the text spans more than one page the previous page is displayed; if this is the first there is no effect.
- Restore (^R) - This will re-instate the current system copy of the welcome banner into the edit buffer.

The banner may contain embedded control characters in the standard way (e.g. ^G = Control-G, and ^^ = a single ^).

By default each line of the banner will be output with a terminating Carriage Return (^M) and Line Feed (^J). This can be suppressed by ending the text line with a backslash \. A backslash will be output if it is terminated by two backslashes \\.

The banner can be a maximum of 78 characters wide with the maximum number of lines being limited by space. The maximum space is approx 2000 characters.

The **configure general messages form** can be entered by using the **conf mess gen** command.

```
Ethergate                CONFIGURE GENERAL MESSAGE FORM                Rel x.y
-----
COM      : Com
DISC     : Disc
WAIT     : Wait
BUSY     : Busy
DER      : Der
NC       : Nc
PROMPT   : >
LOGOUT   :

-----
PF2 - Help                ^R - Restore
PF1 - Submit              ^C - Abort
-----
```

COM/DISC/WAIT/BUSY/DER/NC (Free Format Text,59)

These fields are optional. They may contain embedded control characters. Entered text will be output in replacement for the standard text (COM, DISC etc.).

PROMPT (Free Format Text,59)

This field is mandatory. It may contain embedded control characters. Entered text will be output in user dialogue as a prompt to enter the next command.

LOGOUT (Free Format Text,99)

This field is optional and may contain embedded control characters. This string is sent to the service whenever the Logout Timeout (specified in the General Information Form, Section 4.4.2) is not zero/blank *and* an abnormal disconnection event occurs (i.e. an event not initiated by the user such as a forced clear by a USO or an inactivity timeout expiry). If used, the message can be sent so as to clean up any activity that might be in progress at the service/host. It is expected that the test will cause the service to issue a disconnection back to the Ethergate. If it doesn't, Ethergate will clear the service after the Logout Time has elapsed.

4.4.4 Configure Profiles Menu (conf prof command)

```
Ethergate                                CONFIGURE PROFILES MENU                                Rel x.y
-----
                                         USER - User Profiles
                                         SERV - Service Profiles
                                         TERM - Terminal Profiles

-----
PF2 - Help                                PF4 - Main Menu
                                           PF3 - Prev Menu
-----
(conf prof) Enter profile type:
```

This menu allows you to choose menus for user profiles, service profiles and terminal profiles.

4.4.4.1 Configure User Profiles Menu (conf prof user or conf up command)

```
Ethergate                                CONFIGURE USER PROFILES MENU                                Rel x.y
-----
|      1      | |      2      | |      3      | |      4      |
| def-user   | |             | |             | |             |
|-----|-----|-----|-----|
|      5      | |      6      | |      7      | |      8      |
|-----|-----|-----|-----|

ED - Edit                                CO - Copy                                CL - Clear
-----
PF2 - Help                                ^B - Prev page                                PF4 - Main Menu
                                           ^F - Next page                                PF3 - Prev Menu
-----
(conf up) Enter action:
```

This menu displays 8 profiles at a time. When a profile has a name then that is also displayed; if not then only the number will be present.

You can specify an action to be carried out on a user profile. When an action is entered you will be prompted to specify the profile(s) required.

The edit action will request a single profile, and will enter the configure user profile form.

The copy action will request two profiles, a source profile and a destination profile; the contents will then be copied (except the name).

The clear action will request a single profile and will then clear the profile to the initial default values.

4.4.4.2 Configure User Profile Form (conf up ed command)

```
Ethergate (N0)                CONFIGURE USER PROFILE FORM (Page 1)                Rel x.y
-----
Name      :                               Number : 1

Escape seq  :                               Txt      :
Disc. seq   :                               Txt      :
Switch seq1 :                               Txt      :
Switch seq2 :                               Txt      :
Switch seq3 :                               Txt      :
Switch seq4 :                               Txt      :

Directory banner      : DISABLE           Manager Login       : ENABLE
Free Service selection : DISABLE           Session Quota       : 4
Inactivity disc. time :                               Parity              : EVEN
Disc. Pending Timeout : 30                 Validate before disc : DISABLE
Output Welcome always : DISABLE

See next page for TELNET/TCP options ...

-----
PF2 - Help           ^B - Prev Page       ^R - Restore
PF1 - Submit         ^F - Next Page       ^c -  Abort
-----
```

```
Ethergate (N0)                CONFIGURE USER PROFILE FORM (Page 2)                Rel x.y
-----
TELNET Options -
  Use TELNET      : ENABLED (DISABLED overrides other TELNET options)
  Go-Ahead        : NOT SUPPRESSED           Binary              : DISABLED
  CR map          : CR-NUL                   Break map           : DISABLED
  Timing Mark     : WONT

TCP Options -
  Keep Alive Time :

.

-----
PF2 - Help           ^B - Prev Page       ^R - Restore
PF1 - Submit         ^F - Next Page       ^c -  Abort
-----
```

This form allows you to specify a set of characteristics to be adopted by a user of Ethergate (the user is the originator of a call to Ethergate: this can be a Terminal, or a Host).

Name (Free Format Text,15)

This field is optional. It contains an alphanumeric name unique to user profiles.

Number (Information)

This displays the current profile number.

Escape Seq (Free Format Text,20)

This field is optional. The string must begin with a control character and may contain embedded control characters. It is used to define the key sequence required to indicate an escape to dialogue.

Disc. Seq (Free Format Text,20)

This field is optional. The string must begin with a control character and may contain embedded control characters. It is used to define the key sequence required to indicate disconnect from service (session).

Switch Seq1/2/3/4 (Free Format Text,15)

These fields are optional. The strings must begin with a control character and may contain embedded control characters to be used to define the key sequence required to indicate that a switch to that session number is required.

Txt (Free Format Text,11)

These fields are optional. They correspond to their adjacent key sequence fields. They are used to describe the key sequence the user must use in a more friendly way, e.g. PF1 instead of ^[OP.

Directory Banner (Constrained List)

This specifies whether a user automatically receives a directory listing after receiving the Welcome banner.

- ENABLE** - Directory listing is output
- DISABLE** - No directory listing is output

Manager Login (Constrained List)

This specifies whether a user using this profile can enter manager dialogue via the login/logon command.

- ENABLE** - Manager can be entered from dialogue
- DISABLE** - Manager cannot be entered from dialogue

Free Service Selection (Constrained List)

This controls whether a user is allowed to specify a service directly, if the service is not in the service tables.

- ENABLE** - Services may be specified directly (i.e. Node.Port, Internet Address etc.)
- DISABLE** - Only services contained in the Service tables may be specified

Session Quota (Free Format Text,2)

This field selects the maximum number of simultaneous sessions that the user can establish when using the profile. It can range from 1 to 4. (This is especially important when a user from the LAN is connecting to DCX services and consuming valuable channels.)

Inactivity Disc. Time (Free Format Text,4)

This field is optional. It contains a number from 1 to 9999 (minutes).

This value when present represents the time period that is allowed to elapse when no activity is taking place in user dialogue (user input or system output) before the user will be logged out and all connections lost.

Parity (Constrained List)

This allows you to define the parity of data output to the user either for text generated in dialogue mode or data received from the (LAN or DCX) service.

- ODD** - Generate ODD parity
- EVEN** - Generate EVEN parity
- MARK** - Generate MARK parity
- SPACE**- Generate SPACE parity
- STRIP** - Strip off parity bit from received data
- NONE** - Transparent from user

Any of these options cause Ethergate to ignore incoming parity.

Disc. Pending Timeout (Free Format,3)

This field is optional. This is the period of time in seconds for which Ethergate will hold off a pending disconnection in order to ensure that all data received from the LAN is sent to the device (and optionally allow for the Validate/Validate Confirm handshake to occur). The maximum timeout is 5 minutes (300 seconds).

Validate before Disc. (Constrained List)

The Validate/Validate Confirm handshake is for USO-type connections

only and operates during normal disconnection where data integrity may be required. If enabled, Ethergate on receiving disconnect request from the LAN, will send a Validate Request after sending all pending data to the DCX channel and await a Validate Confirm from it, before disconnecting the DCX device.

Output Welcome always (Constrained List)

The Output Welcome always option allows the directory of services and welcome banner to be output only on the first connection or as the user switches from a session back to dialogue so that the user has the option to choose a new service. Selecting this option will also redisplay the welcome banner if the user enters an invalid input.

Use TELNET (Constrained List)

This field is used to enable or disable the TELNET protocol for this user connection.

- ENABLED** - TELNET processing enabled
- DISABLED** - TELNET processing disabled

Go-Ahead (Constrained List)

This field selects whether a Suppress Go-Ahead TELNET option is sent. It is only used when the user connection is on the LAN.

- SUPPRESSED** - Enable the use of Suppress Go-Ahead
- NOT SUPPRESSED** - Disable/Don't use Suppress Go-Ahead

Binary (Constrained List)

This field selects whether the Binary TELNET option should be negotiated. It is only used when the user is on the LAN. With Binary mode enabled, the connection is requested to use a full 8-bit data path. With Binary mode disabled, standard TELNET ASCII connection (7-bit data path) is established.

- ENABLED** - Binary TELNET option negotiated
- DISABLED** - Don't use TELNET Binary option

CR map (Constrained List)

This field selects whether CR (Carriage Return) is to be translated before sending to the LAN. TELNET specifies that a CR character should never be sent on its own, but as part of a sequence: CR-LF (Carriage Return-Line Feed) whenever it is meant as 'new line'; or as CR-NUL (Carriage Return-Null) whenever it is meant as 'back to start of the current line'. This has been implemented differently by different vendors' devices, so we allow it to be configured here to work with as many devices as possible. This is

only used when the user is on the LAN. If Binary mode has been enabled, CR is always sent unchanged.

- CR - CR is sent to the LAN unchanged
- CR-LF - CR is sent to the LAN as CR-LF
- CR-NUL - CR is sent to the LAN as CR-NUL and CR-NUL received from the LAN is sent to DCX as CR.

Break Map (Constrained List)

This field indicates whether Break is to be transmitted by Ethergate, and selects the TELNET character that is to be used to indicate a Break character on the LAN.

- BREAK - Translate DCX Break to TELNET BREAK
- INTERRUPT - Translate DCX Break to TELNET INTERRUPT-PROCESS
- DISABLED - No Break character sent to DCX or LAN.

Timing Mark (Constrained List)

This field indicates how the Ethergate will respond to TELNET DO TIMING MARK options received from the LAN on a call.

- WONT - Respond at once with a WONT TIMING MARK
- WILL - Respond with a WILL TIMING MARK once the data already received by the Ethergate have been 'fully processed'. If the LAN side is currently mapped through to the DCX, this means the WILL TIMING MARK is sent once the data have been written out to the DCX. If mapped to Ethergate user dialogue or the Manager, the WILL TIMING MARK is sent once the data have been absorbed.

This can be a useful facility to prevent the closure of a call before all data have been sent to the DCX (when supported by the remote LAN host).

Keep Alive Time (Free Format ,4)

This field is optional. It contains a number from 1 to 9999 (seconds).

This value, when present, represents the time period between sending TCP Keep Alives. If the retries expire without an acknowledgement to the Keep Alives, then the session will be closed. If this field is not present Keep Alives are not sent.

4.4.4.3 Configure Service Profiles Menu (conf prof serv or conf sp command)

```
Ethergate                                CONFIGURE SERVICE PROFILES MENU                                Rel x.y
-----
|      1      | |      2      | |      3      | |      4      |
|  default  | |           | |           | |           |
-----
|      5      | |      6      | |      7      | |      8      |
-----

ED - Edit                                CO - Copy                                CL - Clear
-----
PF2 - Help                                ^B - Prev page                            PF4 - Main Menu
                                           ^F - Next page                            PF3 - Prev Menu
-----
(conf sp) Enter action:
```

This menu displays 8 profiles at a time. When a profile has a name then that is also displayed; if not then only the number will be present.

You can specify an action to be carried out on a service profile. Once selected, you will be prompted to specify the profile(s) required.

The edit action will request a single profile, and will enter the configure service profile form. The copy action will request two profiles, a source profile and a destination profile: the contents will then be copied (except the name). The clear action will request a single profile and will then clear the profile to the initial default values.

4.4.4.4 Configure Service Profile Form (conf sp ed command)

```
Ethergate (N0)          CONFIGURE SERVICE PROFILE FORM (Page 1)          Rel x.y
-----
Name      :                               Number      : 1

Service Will Echo      : YES              Service Data Rate   : 1200
Service Parity         : EVEN

Inactivity Disc. Time :

Validate Data Receipt on DCX : DISABLE   Validate before disc      : DISABLE
Use Disc. Pending Timeout   : ENABLE     Disc. Pending Timeout Value : 30

Initial seq            :
Refresh seq           :

See next page for TELNET/TCP options ...

-----
PF2 - Help             ^B - Prev Page        ^R - Restore
PF1 - Submit          ^F - Next Page        ^c - Abort
-----
```

```
Ethergate (N0)          CONFIGURE SERVICE PROFILE FORM (Page 2)          Rel x.y
-----
TELNET Options -
  Use TELNET           : ENABLED (DISABLED overrides other TELNET options)
  Go-Ahead             : NOT SUPPRESSED          Binary                 : DISABLED
  CR map               : CR-NUL                  Break map              : DISABLED
  Terminal Type        : None                    Timing Mark            : WONT

TCP Options -
  Keep Alive Time :

.

-----
PF2 - Help             ^B - Prev Page        ^R - Restore
PF1 - Submit          ^F - Next Page        ^c - Abort
-----
```

A service profile groups together all the characteristics that are specific to a service. It is used when establishing a session/connection to a service.

Name (Free Format Text,15)

This field is optional. It contains an alphanumeric name unique to a service profile.

Number (Information)

This field displays the current profile number.

Service will Echo (Constrained List)

This field takes the values:

- YES** For users on the DCX, the LAN session's Service Profile determines echoing. Ethergate sends TELNET DO ECHO, i.e. it tells the LAN host that it should be doing the echoing.

For users on the LAN, the DCX session's Service Profile determines echoing. Ethergate sends TELNET WILL ECHO, i.e. it tells the LAN host that it should not do echoing since the DCX host will do the echoing.
- NO** For users on the DCX, the LAN session's Service Profile determines echoing. Ethergate sends TELNET DONT ECHO to the LAN host *and Ethergate will echo all characters received from the DCX user back to the DCX.*

For users on the LAN, the DCX session's Service Profile determines echoing. Ethergate sends TELNET WONT ECHO to the LAN host, i.e. Ethergate tells the LAN host that the host should do echoing since the DCX host will not echo.

Note that in all cases the Ethergate instructs the LAN host using the TELNET ECHO option.

Service Data Rate (Constrained List)

This field selects the speed at which data is output to the DCX device.

Service Parity (Constrained List)

This allows you to define the parity of the outgoing data, either to the DCX Service or the LAN Service.

- NONE - Parity is unaltered and sent as received.
- EVEN - Generate EVEN parity.
- ODD - Generate ODD parity.
- MARK - Generate MARK parity.
- SPACE - Generate SPACE parity.
- STRIP - Strip off parity bit from received data.

Use TELNET (Constrained List)

This field is used to enable or disable the TELNET protocol for this service connection.

- ENABLED** - TELNET processing enabled.
- DISABLED** - TELNET processing disabled.

Go-Ahead (Constrained List)

This field selects whether a Suppress Go-Ahead TELNET option is sent. It is only used when the service connection is on the LAN.

- SUPPRESSED** - Enable the use of Suppress Go-Ahead.
- NOT SUPPRESSED** - Disable/don't use Suppress Go-Ahead.

Binary (Constrained List)

This field selects whether the Binary TELNET option should be negotiated. It is only used when the service is on the LAN. With Binary mode enabled, the connection is requested to use a full 8-bit data path. With Binary mode disabled, standard TELNET ASCII connection (7-bit data path) is established.

- ENABLED** - Binary TELNET option negotiated
- DISABLED** - Don't use TELNET Binary option

CR map (Constrained List)

This field selects whether CR (Carriage Return) is to be translated before sending to the LAN. TELNET specifies that a CR character should never be sent on its own, but as part of a sequence: CR-LF (Carriage Return-Line Feed) whenever it is meant as 'new line'; or as CR-NUL (Carriage Return - Null) whenever it is meant as 'back to start of the current line'. This has been implemented differently by different vendors devices, so we allow it to be configured here to work with as many devices as possible. This is only used when the service is on the LAN. If Binary mode has been enabled, CR is always sent unchanged.

- CR** - CR is sent to the LAN unchanged
- CR-LF** - CR is sent to the LAN as CR-LF
- CR-NUL** - CR is sent to the LAN as CR-NUL and CR-NUL received from the LAN is sent to DCX as CR.

Break Map (Constrained List)

This field indicates whether Break is to be transmitted by Ethergate, and selects the TELNET character that is to be used to indicate a Break character on the LAN.

- BREAK** - Translate DCX Break to TELNET BREAK
- INTERRUPT** - Translate DCX Break to TELNET INTERRUPT-

PROCESS

DISABLED - No Break character sent to DCX or LAN.

Inactivity Disc. Time (Free Format Text,4)

This field is optional. It contains a number from 1 to 9999 (minutes).

This value when present represents the time that is allowed to elapse when no activity is taking place on the service connection (input to or output from the service) before the service connection (session) will be disconnected. A user connected to this session will then be returned to dialogue (or in the case of a seamless call, will also be disconnected).

Validate Data Receipt on DCX (Constrained List)

This field can be set to **ENABLE** or **DISABLE**. When set to **ENABLE**, calls to DCX Services that select this service profile regulate data output to DCX using VAL/VAL Confirm DCX Control Codes. After each block of data sent to the DCX, Ethergate outputs a VAL code. When the far end receives the VAL (and thus the data preceding it), it responds with a VAL Confirm code. The Outstanding DCX Data Validates field on the CONFIGURE GENERAL INFORMATION FORM controls how many VALs (and hence data blocks) will be sent out before receiving confirmation of delivery to the far end. This thus provides a simple data acknowledgement scheme.

Validate before Disc. (Constrained List)

The Validate/Validate Confirm handshake is for USO-type connections only and operates during normal disconnection where data integrity may be required. If enabled, Ethergate on receiving disconnect request from the LAN, will send a Validate Request after sending all pending data to the DCX channel and await a Validate Confirm from it, before disconnecting the DCX device. This is only used when the Service is on DCX.

Use Disc. Pending Timeout (Constrained List)

This field affects Disc. Pending Timeout operation for DCX Services only. If set to **ENABLE**, the Disc. Pending Timeout Value is used at the tail-end of connections to ensure all data received from the LAN reach their destination. If set to **DISABLE**, no Timeout Value is used. **WARNING:** If **DISABLE** is used in conjunction with **Validate before Disc.**, the Ethergate will not disconnect the service until all data have been delivered, however long that may take. A session pending disconnect in this way cannot be forcibly cleared down by the Ethergate Manager, only receipt of a VAL confirm or a clear down from the DCX node itself will disconnect the session.

Terminal Type (Constrained List)

This field selects whether a terminal type identifier will be sent in the Telnet terminal type negotiation field. The option can be set to the standard terminal types plus an additional four custom terminals which are set in the Configure Protocol Menu. These four custom terminal types may be configured to send any string to the host when negotiating terminal type.

None	Terminal type negotiation not supported.
DEC-VT100	DEC-VT100 identifier sent when asked for terminal type.
DEC-VT220	DEC-VT220 identifier sent when asked for terminal type.
DEC-VT320	DEC-VT320 identifier sent when asked for terminal type.
IBM-3101	IBM-3101 identifier sent when asked for terminal type.
CUSTOM1	CUSTOM1 string identifier sent when asked for terminal type.
CUSTOM2	CUSTOM2 string identifier sent when asked for terminal type.
CUSTOM3	CUSTOM3 string identifier sent when asked for terminal type.
CUSTOM4	CUSTOM4 string identifier sent when asked for terminal type.

Timing Mark (Constrained List)

This field indicates how the Ethergate will respond to TELNET DO TIMING MARK options received from the LAN on a call.

WONT	- Respond at once with a WONT TIMING MARK
WILL	- Respond with a WILL TIMING MARK once the data already received by the Ethergate have been 'fully processed'. If the LAN side is currently mapped through to the DCX, this means the WILL TIMING MARK is sent once the data have been written out to the DCX. If mapped to Ethergate user dialogue or the Manager, the WILL TIMING MARK is sent once the data have been absorbed.

This can be a useful facility to prevent the closure of a call before all data have been sent to the DCX (when supported by the remote LAN host).

Keep Alive Time (Free Format Text,4)

This field is optional. It contains a number from 10 to 9999 (seconds). This value, when present, represents the time period between sending TCP Keep Alives. If the retries expire without an acknowledgement to the Keep Alives the session is closed. If this field is not present, Keep Alives are not sent.

Disc. Pending Timeout Value (Free Format, Number 3)

This field is optional. This is the period of time in seconds for which Ethergate will hold off a pending disconnection in order to ensure all data received from the LAN is sent to the device (and optionally allow for the Validate/Validate Confirm handshake to occur). The maximum timeout is 5 minutes. Setting a value of 0 indicates that the disconnection should occur at once. This is only used when the Service is on DCX.

Initial Seq (Free Format Text,39)

This field is optional. It may contain embedded control characters. This string is sent to the service when first connected.

Refresh Seq (Free Format Text,9)

This field is optional. It may contain embedded control characters. This string is sent to the service whenever the service is selected (excluding initial connection).

4.4.4.5 Configure Terminal Profiles Menu (conf prof term or conf tp command)

```
Ethergate                CONFIGURE TERMINAL PROFILES MENU                Rel x.y
-----
|      1      |      2      |      3      |      4      |
|  VT100     |  ADM3A     |  CIFER 2605 |  IBM3101   |
-----
|      5      |      6      |      7      |      8      |
-----
ED - Edit          CO - Copy          CL - Clear          VI - View
-----
PF2 - Help                                PF4 - Main Menu
                                           PF3 - Prev Menu
-----
(conf tp) Enter action:
```

This menu displays 8 profiles at a time. When a profile has a name then it is also displayed; if not then only the number will be present.

You can specify an action to be carried out on a terminal profile. Once selected, you will be prompted to specify the profile(s) required.

The edit action will request a single profile, and will enter the configure terminal profile form. The copy action will request two profiles, a source profile and a destination profile: the contents will then be copied (except the name). The clear action will request a single profile and will then clear the profile to the initial default values. The view action will enter the configure terminal profile form but will not allow the form to be submitted. Abort must be used to leave the form.

The first four profiles are fixed and cannot be edited, cleared or copied to. It is however possible to view, and copy from, the profiles. The view action requires a single profile.

4.4.4.6 Configure Terminal Profile Form (conf tp ed or conf tp vi command)

Page 1 of the terminal profile form is:

```
Ethergate          CONFIGURE TERMINAL PROFILE FORM (page 1)          Rel x.y
-----
Name   :                               Number : 1

                                GENERAL KEY SEQUENCES

Cursor Left   :                               Txt   :
Cursor Right  :                               Txt   :
Cursor Up     :                               Txt   :
Cursor Down   :                               Txt   :
Redisplay    :                               Txt   :          (^V)
Next Page     :                               Txt   :          (^N)
Previous Page :                               Txt   :          (^B)
Help          :                               Txt   :          (^Z)
Clear         :                               Txt   :          (^X and ^U)
Restore       :                               Txt   :          (^R)
Main Menu     :                               Txt   :          (^G)
Previous Menu :                               Txt   :          (^L)

-----
PF2 - Help          ^B - Prev page          ^R - Restore
PF1 - Submit        ^F - Next page          ^C - Abort
-----
```

Name (Free Format Text,15)

This field is mandatory. It contains an alphanumeric name unique to terminal profiles.

Number (Information)

This field displays the current profile number.

CursorLeft (Free Format Text,15)

This field defines the character sequence generated from the terminal to indicate a move cursor left.

CursorRight (Free Format Text,15)

This field defines the character sequence generated from the terminal to indicate a move cursor right.

CursorUp (Free Format Text,15)

This field defines the character sequence generated from the terminal to indicate a move cursor up.

CursorDown (Free Format Text,15)

This field defines the character sequence generated from the terminal to indicate a move cursor down.

Redisplay (Free Format Text,15)

^V can be generated from the terminal to indicate that a redisplay of the entire screen is required. This field allows an additional key sequence to be defined if required.

Next Page (Free Format Text,15)

^N or ^F can be generated from the terminal to indicate that a move to the next page is required. This field allows an additional key sequence to be defined if required.

Previous Page (Free Format Text,15)

^B can be generated from the terminal to indicate that a move to the previous page is required. This field allows an additional key sequence to be defined if required.

Help (Free Format Text,15)

^Z can be generated from the terminal to indicate that help is required. This field allows an additional key sequence to be defined if required.

Clear (Free Format Text,15)

^X or ^U can be generated from the terminal to indicate that a clear line/field operation is required. This field allows an additional key sequence to be defined if required.

Restore (Free Format Text,15)

^R can be generated from the terminal to indicate that a restore line/field is required. This field allows an additional key sequence to be defined if required.

Main Menu (Free Format Text,15)

^G can be generated from the terminal to indicate that a move to the Main Menu is required. This field allows an additional key sequence to be defined if required.

Previous Menu (Free Format Text,15)

^L can be generated from the terminal to indicate that a move to the previous menu is required. This field allows an additional key sequence to be defined if required.

Txt (Free Format Text,11)

This text corresponds to the adjacent key sequence and is used to represent the key sequence in menus etc. (e.g. PF1).

Page 2 of the configure terminal profile form is:

```
Ethergate                CONFIGURE TERMINAL PROFILE FORM (page 2)                Rel x.y
-----
                                FORM KEY SEQUENCES
Submit Form :                               Txt :
Abort Form  :                               Txt :
Back Tab    :                               Txt :

                                SCREEN CONTROL SEQUENCES
Initialise Device :
Clear Screen & Home :
Clear Line       :
Cursor Pos Type  : ASCII                    Offset : 0
Cursor Pos String :
Highlight On     :
Highlight Off    :

-----
PF2 - Help           ^B - Prev page           ^R - Restore
PF1 - Submit         ^F - Next page           ^C - Abort
-----
```

Submit Form (Free Format Text,15)

^E can be generated from the terminal to indicate that the current form should be submitted for entry into the system. This field allows an additional key sequence to be defined if required.

Abort Form (Free Format Text,15)

^C can be generated from the terminal to indicate that the current form should be aborted without entry into the system. This field allows an additional key sequence to be defined if required.

Back Tab (Free Format Text,15)

This field defines the character sequence generated from the terminal to indicate that a move to the previous field is required.

Txt (Free Format Text,8)

This text corresponds to the adjacent key sequence and is used to represent the key sequence in menus etc (e.g. PF1).

Initialise Device (Free Format Text,15)

This field defines the character sequence to be sent to the terminal to indicate that it should enter an initial state (as if after power up). It is sent to the terminal whenever the terminal profile is selected.

Clear Screen & Home (Free Format Text,15)

This field defines the character sequence to be sent to the terminal to indicate that it should clear the screen and place the cursor at the top left hand position. This must be specified to allow the manager to operate correctly.

Clear Line (Free Format Text,15)

This field defines the character sequence to be sent to the terminal to indicate that it should clear the current line and place the cursor at the left hand position. This must be specified to allow the manager to operate correctly. If not specified then Ethergate will position at the left hand side and then output a line of spaces followed by a re-position at the left hand side.

Cursor Pos Type (Constrained List)

This field defines the method of cursor positioning. This can be **ASCII** (normal) or **BINARY**. ASCII outputs the co-ordinates as displayable numbers (e.g. as for ANSI or VT100), BINARY outputs the actual binary value. This must be specified to allow the manager to operate correctly.

Offset (Free Format Text,5)

This field defines the offset to be added to the row and column numbers. The top left hand position is 0,0 internally. For a VT100 or ANSI device this would be 1, i.e. top left is 1,1. This must be specified to allow the manager to operate correctly.

Cursor Pos String (Free Format Text,15)

This field defines the character sequence to be sent to the terminal to move the cursor to a specified position. The string contains %r and %c to represent the row and column numbers respectively. %% will cause a single % to be output. For a VT100 or ANSI device this would be ^[[%r;%cH. This must be specified to allow the manager to operate correctly.

Highlight On (Free Format Text,15)

This field defines the character sequence to be sent to the terminal to indicate that the following characters should be output in a highlighted fashion.

Highlight Off (Free Format Text,15)

This field defines the character sequence to be sent to the terminal to indicate that the following characters should no longer be output in a highlighted fashion.

4.4.5 Configure Protocols Form (conf prot command)

This form allows each of the LAN protocols to be configured for correct operation.

```
Ethergate                CONFIGURE PROTOCOLS FORM                Rel x.y
-----
MAC Ethernet Address    : 00:00:6D:00:00:02    Framing Protocol : Ethernet
ARP Hold All Requests  : DISABLE
IP Internet address    : 001.001.001.001
  Subnet mask          :
  Fragmentation        : 576
  Time to Live         : 100
TCP Window size        : 512
  Max segment size     : 536
  Initial RTT          : 50 (10ths of a second)
  SYN Retries          : 3                    Backoff Algorithm : EXPONENTIAL
  Fast DCX Printer Connect: DISABLE
WARNING: Changes to parameters will only take effect after a warm start.
-----
^PF2 - Help            ^B - Prev page            ^R - Restore
^PF1 - Submit          ^F - Next page            ^C - Abort
-----
```

MAC Ethernet Address (Information)

This displays the fixed Ethernet address (hexadecimal).

MAC Framing Protocol (Constrained List)

This displays the MAC framing method.

Ethernet Ethernet (Xerox, DEC, Intel) framing standard

ARP Hold All Requests (Constrained List)

This field takes the values:

DISABLE Only ARP frames specifically addressed to the Ethergate will result in ARP table entries.

ENABLE Any ARP frame received by this Ethergate may generate an ARP table entry.

IP Internet Address (Free Format Text,20)

This is a mandatory field. It contains an Internet Address. This address represents the Internet Address of this device; it is used in the generation of IP datagrams and handling ARP packets. See Appendix C.2 TCP/IP protocols. Note that additional local IP addresses can be specified in the definition of DCX, LAN and Permanent Connection Services.

IP Subnet Mask (Free Format Text,20)

This defines the 'network' part of the IP address designed for this gate. Bit positions in this mask identify which bits in the IP address are significant when determining if an address for a destination device is on the same network. This can be used to route according to the Internet address classes (Class A = 255.0.0.0; Class B = 255.255.0.0; Class C = 255.255.255.0 – see Appendix C.2) but more flexibility is provided by this mask, as other ranges may be defined. Destinations whose IP address, masked by this value, do not correspond to our own IP address, masked by this value, are routed via gateways as defined in the gateway table – see 4.4.1.

IP Fragmentation (Free Format Text,6)

This is a mandatory field, but defaults to 576. It contains a number between 128 and 1500, which specifies the maximum IP datagram size, before fragmentation occurs.

IP Time to Live (Free Format Text,6)

This is a mandatory field, but defaults to 100. It contains a number between 2 and 255. It is used to prevent IP datagrams drifting aimlessly through a network. Any datagram that lives longer than this period, or passes through this many IP routers, is discarded.

TCP Window Size (Free Format Text,6)

This is a mandatory field, but defaults to 512. It contains a number between 128 and 4096 in bytes. It is used to determine the number of unacknowledged bytes that can be sent to Ethergate, i.e. the maximum number of bytes in transit across the network between the remote device and Ethergate.

TCP Max Segment Size (Free Format Text,6)

This is a mandatory field, but defaults to 536. It contains a number between 128 and 4120 in bytes. It defines the maximum size of a TCP

segment (packet). It is often set to ensure that TCP segments can be sent using single unfragmented IP datagrams.

TCP Initial RTT (Free Format Text,6)

This is a mandatory field, but defaults to 50. It contains a number between 2 and 999 in 10ths of a second. This is the round trip of the TCP link. It is used in assessing whether to re-transmit packets.

TCP SYN Retries (Free Format Text,2)

This is a mandatory field, defaulting to 3. It is the number of SYN retries sent out by Ethergate when placing a call to a LAN destination.

Fast DCX Printer Connect (Constrained List)

This field takes the values:

DISABLE Ethergate will not accept the LAN call to a DCX printer or Held printer until the DCX session is accepted. This option relies on the LAN re-transmit timeout to periodically retry the call, whilst the DCX session is completing.

Note that if the LAN Host disconnects from a non-Held Printer and then re-connects within 3 seconds, the re-connection will be ignored as the service is being 'busied out' to give the DCX port time to recover from the disconnection.

ENABLE Ethergate will accept the LAN call to a DCX printer or Held printer as soon as the DCX session is accepted. The DCX connection is allowed 35 seconds to complete before an RST is sent out on the LAN. Furthermore, any LAN re-transmit timeout to retry the call, whilst the DCX session is completing will be sent an RST.

Note that if the LAN Host disconnects from a non-Held Printer and then re-connects within 3 seconds, the re-connection will be ignored as the service is being 'busied out' to give the DCX port time to recover from the disconnection.

TCP Backoff Algorithm (Constrained List)

This field controls the time interval between SYN retries sent to the LAN:

EXPONENTIAL The first retry is sent out after $2 \times$ Initial RTT. The second after a further $4 \times$ Initial RTT, the third after a further $8 \times$ Initial RTT, etc.

LINEAR

The interval between SYN retries is fixed at $2 \times$ Initial RTT.

```
Ethergate (N0)                CONFIGURE PROTOCOLS FORM (Page 2)                Rel x.y
-----
TELNET Terminal Types
  Custom1  :
  Custom2  :
  Custom3  :
  Custom4  :

-----
^PF2 - Help                ^B - Prev page                ^R - Restore
^PF1 - Submit                ^F - Next page                ^C - Abort
-----
```

These four custom terminal types may be configured to send any string of characters to identify a terminal. You would only need to use this option if the pre-configured terminal types in the Configure Service Menu did not meet your requirements.

4.4.6 Configure Services Menu (conf serv command)

This menu allows each of the individual service menus to be accessed.

```
Ethergate                                CONFIGURE SERVICES MENU                                Rel x.y
-----
                                         DCX  -  DCX Service
                                         LAN  -  LAN Service
                                         PERM -  Permanent Connections

-----
PF2 - Help                                PF4 - Main Menu
                                           PF3 - Prev Menu
-----
(conf serv) Enter service type:
```

4.4.6.1 Configure DCX Services Menu (conf serv dcx or conf dcx command)

```
Ethergate                                CONFIGURE DCX SERVICES MENU                                Rel x.y
-----
Name                                     Name                                     Name
*<ServiceName>                          *<ServiceName>                          *<ServiceName>
*<ServiceName>                          *<ServiceName>                          *<ServiceName>
*<ServiceName>                          *<ServiceName>                          *<ServiceName>
*<ServiceName>                          *<ServiceName>                          *<ServiceName>
*<ServiceName>                          *<ServiceName>                          *<ServiceName>
*<ServiceName>                          *<ServiceName>                          *<ServiceName>
*<ServiceName>                          *<ServiceName>                          *<ServiceName>
*<ServiceName>                          *<ServiceName>                          *<ServiceName>

* = Service Disabled

ED - Edit      EN - Enable      CO - Copy      DI - Disable      DE - Delete
-----
PF2 - Help      ^B - Prev Page      PF4 - Main Menu
                  ^F - Next Page      PF3 - Prev Menu
-----
(conf dcx) Enter Action :
```

This menu displays up to a page of configured DCX services. An asterisk is displayed by the name to indicate that the service is disabled. You can specify an action to be carried out on a DCX service. Once selected, you will be prompted to specify the service required. The edit action will request a single service, and will enter the configure DCX service form. The copy action will request two services, a source service and a destination service (the destination service must **not** already exist); the contents will then be copied (except the name and TCP port). The delete action will not break any existing connections.

4.4.6.2 Configure DCX Service Form (conf serv dcx ed or conf dcx ed command)

```
Ethergate                CONFIGURE DCX SERVICE FORM                Rel x.y
-----
Name      :                TCP port      :
                Local IP Address      :
                (optional, instead of gate's IP addr)
DCX Dest   :
Service Type : NORMAL
Busy Out on Disconnection : DISABLE
840 Channel DTR Operation : DTR DISCONNECT
Password   :
User Prof. :                Service Prof :
The DCX destination may be entered as:-
                :SFA, Node.Port, Chan or Chan-Chan
-----
PF2 - Help                ^R - Restore
PF1 - Submit                ^C - Abort
-----
```

Name (Free Format Text,15)

This a mandatory field. It contains an alphanumeric name unique to DCX services.

TCP port (Free Format Text,6)

This is an optional field. It contains a number between 0 and 65535. The combination of TCP port and local IP address must be unique within the DCX services. It is used to reference this service, by incoming LAN calls.

Local IP Address (Free Format Text,20)

This is an optional field that can be specified if a TCP port number is configured. It specifies an additional IP address to be implemented by the Ethergate locally. When the service is enabled, the Ethergate will accept incoming calls from the LAN which specify this IP address and the TCP port as in the field above. When blank, this field defaults to the Ethergate's own IP address.

DCX Dest (Free Format Text,8)

This is an optional field. It contains one of four types of DCX service: an SFA, a Node.Port, an Ethergate channel number, or an Ethergate channel

range. If an SFA is specified, then the local USO must also have the SFA defined. The SFA range for a USO2 is 0-99, and for USO20, 25 or 30 is 0-255.

Service Type (Constrained List)

This field selects whether the service is specifically for a printer on a DCX channel. The field takes the following value:

- | | |
|---------------------|---|
| NORMAL | This is the default selection setting for (multi-user) DCX services. |
| PRINTER | This setting indicates that the service can only be used by one LAN user at a time. It is particularly appropriate for connections to printers attached to a DCX channel. A LAN user requesting this service will not be connected unless the DCX destination port is ready to accept the incoming call. |
| HELD PRINTER | As PRINTER but when a LAN user disconnects, the DCX half of the call is kept active (i.e. "held"). A subsequent LAN user connecting to this service is instantly connected to the DCX port, saving DCX call set-up time. A held printer service will disconnect after a number of seconds (given in the CONFIGURE GENERAL INFORMATION FORM if no LAN user re-connects). |

Busy Out on Disconnection (Constrained List)

This field determines whether the Ethergate should stop any new LAN calls using the same tcp port for a period of about 3 seconds after a previous call disconnects. If enabled on a PRINTER service type, calls from the LAN will be held in abeyance and the call will be attempted (on DCX) after the period has expired. If enabled on a NORMAL service type, calls from the LAN will be refused during this period. It is typically used for PRINTER service types to reduce to a minimum the number of times Ethergate reject calls to spool files output to a printer. The timeout period is chosen to be larger than the default Busy Out Delay at the USO ports. The settings are:

- | | |
|----------------|---------------------------|
| ENABLE | Implement Busy Out Delay. |
| DISABLE | No Busy Out Delay. |

840 Channel DTR Operation (Constrained List)

This field applies only to DCX 840 channel operation and controls the effect of DTR signals received by the Ethergate on the channel:

DTR DISCONNECT Disconnect call on a high-low DTR transition. DTR is ignored when the call is set up.

REQUIRE DTR DTR must be high to set up a call, and a high-low transition disconnects the call.

IGNORE DTR 3-wire operation (DTR is ignored).

Password (Free Format Blind Text,13)

This is an optional field. If the password is present then the user will be requested to confirm it prior to allowing a connection to take place.

User prof (Free Format Text,15)

This is an optional field. It contains a user profile number or name. If this service is selected automatically (i.e. by incoming LAN call's TCP port matching the above TCP port), then the user connection (originator Ethergate) will adopt the characteristics of this user profile. If no profile is specified, then the default user profile will be used.

Service prof (Free Format Text,15)

This is an optional field. It contains a service profile number or name. When this service is selected, then the session created will adopt the characteristics of this service profile. If no profile is specified, then the default service profile will be used.

4.4.6.3 Configure LAN Services Menu (conf serv lan or conf lan command)

```
Ethergate                                CONFIGURE LAN SERVICES MENU                                Rel x.y
-----
Name                                       Name                                       Name
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>

* = Service Disabled

ED - Edit      EN - Enable      CO - Copy      DI - Disable      DE - Delete
-----
PF2 - Help      ^B - Prev Page      PF4 - Main Menu
                  ^F - Next Page      PF3 - Prev Menu
-----
(conf lan) Enter action:
```

This menu displays up to a page of configured LAN services. An asterisk is displayed by the name to indicate that the service is disabled. You can specify an action to be carried out on a LAN service. Once selected, you will be prompted to specify the service required. The edit action will request a single service, and will enter the configure LAN service form.

The copy action will request two services, a source service and a destination service (the destination service must **not** already exist); the contents will then be copied (except the name). The delete action will request a single service and will then remove that service from the system. This action does **not** break existing connections.

4.4.6.4 Configure LAN Service Form (conf serv lan ed or conf lan ed command)

```
Ethergate                CONFIGURE LAN SERVICE FORM                Rel x.y
-----
Name      :                               SFA:

Dest IP Address      :                               TCP Port:
Src IP Address      :                               (optional, instead of gate's IP addr)

Password           :                               Max SFA:

Hold LAN Sessions on Abnormal Failure : DISABLE

User Prof         :                               Service Prof.:

-----
PF2 - Help                               ^R - Restore
PF1 - Submit                               ^C - Abort
-----
```

Name (Free Format Text,15)

This is a mandatory field. It contains an alphanumeric name unique to LAN services.

SFA (Free Format Text,6)

This is an optional field. It contains a DCX Short Form Address (SFA) and must be unique within the LAN services. It is used to reference this service, upon receiving DCX calls.

Destination IP Address (Free Format Text,20)

This is an optional field. It contains the Internet address of the service.

TCP port (Free Format Text,6)

This is an optional field. It contains the TCP port that this service resides on. It should be supplied when an Internet address is specified but will default to 23 if not.

Source IP Address (Free Format Text,20)

This is an optional field. It contains the Internet address of the originator. This allows the Ethergate to simulate multiple source IP addresses. If this

field is left blank then the Ethergate's normal IP address in the Configure Protocol menu is used.

Password (Free Format Blind Text,13)

This is an optional field. This password, when set, is requested from the user prior to allowing a connection to take place.

Max SFA (Free Format Text,2)

This is an optional field. If used, it is the maximum number of simultaneous DCX users who can establish a call using this service (i.e. SFA). It is used to regulate the number of users of a LAN service in the same way that a DCX SFA definition limits the number of destination ports available.

Hold LAN Sessions on Abnormal Failure (Constrained List)

If a DCX user has established one or more sessions on the LAN and is 'abnormally' disconnected (perhaps because of a DCX link failure), this field is used to determine whether the whole call should be disconnected or not. The settings are:

DISABLE – The LAN sessions are cleared (the default).

ENABLE – The LAN sessions are held active, awaiting a reconnection attempt by the original user. For the user to be re-attached to the held sessions, the reconnection must come from the same source DCX node and port and must request the same destination Short Form Address used to make the original call. When these conditions are met, the caller is put through to the LAN session that was in use at the time of the failure (which is sent the Service Refresh Sequence). If the last active session has already cleared or the user was in dialogue, the user is returned to dialogue. The status command can be used to see which sessions are still held and the session command (or a Hot Key) to switch to a session. Held sessions can be cleared by the Ethergate manager, by the LAN service or by session inactivity timeout.

Note: This option should only be enabled when the users on that service are connected via ARQs or Xbridge.

User prof (Free Format Text,15)

This is an optional field. It contains a user profile number or name. If this service is selected automatically (i.e. by a received DCX call's short form address matching), then the user connection (originator Ethergate) will

adopt the characteristics of this user profile. If no profile is specified, then the default user profile will be used.

Service prof (Free Format Text,15)

This is an optional field. It contains a service profile number or name. When this service is selected, then the session created will adopt the characteristics of this service profile. If no profile is specified, then the default service profile will be used.

4.4.6.5 Configure Permanent Connections Menu (conf serv perm or conf perm command)

```
Ethergate                CONFIGURE PERMANENT SERVICES MENU                Rel x.y
-----
Id            Internet Addr.        TCP port        DCX Destination
*1            <InternetAddr>        <port>         <DCX dest>
*2            <InternetAddr>        <port>         <DCX dest>
*3            <InternetAddr>        <port>         <DCX dest>
*4            <InternetAddr>        <port>         <DCX dest>
*5            <InternetAddr>        <port>         <DCX dest>
*6            <InternetAddr>        <port>         <DCX dest>
*7            <InternetAddr>        <port>         <DCX dest>
*8            <InternetAddr>        <port>         <DCX dest>
*9            <InternetAddr>        <port>         <DCX dest>
*10           <InternetAddr>        <port>         <DCX dest>

* = Connection Disabled

ED - Edit            EN - Enable            DI - Disable            DE - Delete
-----
PF2 - Help            ^B - Prev Page            PF4 - Main Menu
                       ^F - Next Page            PF3 - Prev Menu
-----
(conf perm) Enter action :
```

This menu displays up to a page of configured permanent connections. An asterisk is displayed by the Id to indicate that the service is disabled. You can specify an action to be carried out on a permanent connection. Once selected, you will be prompted to specify the connection Id required (an Id is displayed). The edit action will request a single Id, and will display the configure permanent connection form. The delete action will request a single Id and will then remove that permanent connection from the system, and break the connection if it is established.

4.4.6.6 Configure Permanent Connections Form (conf serv perm ed or conf perm ed command)

```
Ethergate                CONFIGURE PERMANENT CONNECTION FORM                Rel x.y
-----
DCX
Service                  :
Service profile          :
840 Channel DTR Operation : REQUIRE DTR

LAN
Internet address        :                TCP Port :
Src IP address          :                (optional, instead of gate's IP addr)
Service profile          :

Retry Time               :
LAN Connect only when data Rx'd : DISABLE

The service may be entered as:
                        :SFA, Node.Port or Channel

-----
PF2 - Help                ^R - Restore
PF1 - Submit              ^C - Abort
-----
```

DCX Service (Free Format Text,8)

This is a mandatory field. It contains one of three types of DCX service address, an SFA, a Node.Port, or an Ethergate channel number.

DCX Service profile (Free Format Text,15)

This is a mandatory field. It contains a service profile number or name. This represents the service characteristics of the connection from the Ethergate to the DCX network.

840 Channel DTR Operation (Constrained List)

This field applies only to DCX 840 channel operation and controls the effect of DTR signals received by the Ethergate on the channel:

DTR DISCONNECT Disconnect call on a high-low DTR transition.
DTR is ignored when the call is set up.

REQUIRE DTR DTR must be high to set up a call, and a high-low transition disconnects the call.

IGNORE DTR 3-wire operation (DTR is ignored).

LAN Internet address (Free Format Text,20)

This is a mandatory field. It contains the Internet address of the LAN service.

LAN TCP port (Free Format Text,6)

This is a mandatory field. It contains the TCP port that the LAN service resides on.

LAN Src IP Address (Free Format Text,20)

This is an optional field. It contains the Internet address of the originator. This allows the Ethergate to simulate multiple source IP addresses. If this field is left blank then the Ethergate's normal IP address in the Configure Protocol menu is used.

LAN Service profile (Free Format Text,15)

This is a mandatory field. It contains a service profile number or name. This represents the service characteristics of the connection from the Ethergate to the LAN.

Retry Time (Free Format Text,8)

This is a mandatory field. It contains a number between 10 and 999999 seconds. It is used to determine the period that must elapse before re-attempting to establish the connection after failing to establish the connection. (An attempt to re-connect will immediately take place upon disconnection from either the LAN or DCX connections.)

LAN Connect only when DCX Data Rx'd (Constrained List)

When this option is enabled the DCX connection will not be cleared by the Ethergate when the LAN call clears. Instead, the call will be placed on hold and will attempt to re-establish the LAN call when data is input from the DCX side. If the user wishes to connect to a different service they can disconnect in the normal manner using their disconnection event, i.e. CTRL T. If this option is disabled the Ethergate will disconnect the DCX side when the LAN call is cleared and the user will have to reselect their destination by entering their connection event.

This option is often required so that if the users application times out after a period of inactivity the DCX connection is not broken and only reconnects when the user types data.

4.4.7 Dump (conf du command)

The Ethergate configuration can be sent out to an ASCII file. The **conf du** command is used to perform this operation. Ethergate will request that the dump device be prepared and will then wait for a <Return> to indicate that the dump device is ready. Ethergate will then output the configuration information to the file. ESC can be used at any time to abort the dump.

4.4.8 Load (conf lo command)

The Ethergate configuration can be loaded from an ASCII file (e.g. from a Network Management Centre). The **conf lo** command is used to perform this operation. Ethergate will request that the load device be prepared and will then wait for a <Return> to indicate this is so. Ethergate is then ready to accept the ASCII file. ESC can be used at any time to abort the load.

4.5 Control Menu (cont command)

This menu allows you to control the Ethernet interface, New calls and Connections, and also allows you to access the Service and Software control menus.

```
Ethergate                                CONTROL MENU                                Rel x.y
-----
*  ETHER  -  Ethernet (EN/DI)
*  CALLS  -  New Calls (EN/DI)
   CONN   -  Clear connections/sessions (CL)
   SERV   -  Service control menu
   SOFT   -  Software control menu

* = Disabled    ! = Non-functional

EN - Enable          DI - Disable          CL - Clear
-----
PF2 - Help          PF4 - Main Menu
                   PF3 - Prev Menu
-----
(cont) Enter item or action:
```

You can either specify an action to be performed, followed by the item to be affected, or specify the item first and then the action. Each action can only be performed on certain items (displayed in brackets).

4.5.1 Ethernet(disable : eth di or di eth command) (enable : eth en or en eth command)

Disabling Ethernet will prevent any new calls to or from the LAN from being established. It will then clear all existing LAN calls and de-activate the Ethernet interface.

Enabling Ethernet will activate the Ethernet interface and allow new calls to establish. All enabled permanent connections will then be re-established.

4.5.2 New Calls (disable : calls di or di calls command)
(enable : calls en or en calls command)

Disabling calls bars calls from the LAN. New calls can also be disabled by disabling Ethernet (this is useful when preparing to disable the Ethernet interface without affecting connections in progress).

4.5.3 Clear Connections (conn cl command)

Connections can also be cleared by using the clear command (cl). If the specified connection is a user (source) then this will clear all the calls (sessions) associated with the user. Connections are identified by their channel number (<chanId>) or their TCB transmission control block number (<TCBId>). These numbers can be obtained from the status screens.

4.5.4 Control Services Menu (cont serv command)

```
Ethergate                CONTROL SERVICES MENU                Rel x.y
-----
                                DCX  -  DCX Service
                                LAN  -  LAN Service
                                PERM -  Permanent Connections

-----
PF2 - Help                                PF4 - Main Menu
                                           PF3 - Prev Menu
-----
(cont serv) Enter service type:
```

This menu allows you to choose the DCX, LAN or Permanent control service menu.

4.5.4.1 Control DCX Services Menu (cont serv dcx or cont dcx command)

```
Ethergate                                CONTROL DCX SERVICES MENU                                Rel x.y
-----
Name                                       Name                                       Name
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>
*<ServiceName>                           *<ServiceName>                           *<ServiceName>

* = Service Disabled

EN - Enable                               DI - Disable
-----
PF2 - Help                                ^B - Prev Page                               PF4 - Main Menu
                                           ^F - Next Page                               PF3 - Prev Menu
-----
(cont dcx) Enter Action :
```

This menu displays up to a page of configured DCX services. An asterisk is displayed by the name to indicate that the service is disabled. You can enable or disable DCX services. When a service is disabled then no calls can be made to it and it will not be displayed when you execute the DIRECTORY command (see Section 5.2.8). The enable and disable actions require a service to be specified. Existing connections will not be broken. Connections can be broken using the clear command (c) (see Section 4.5.3).

4.5.4.2 Control LAN Services Menu (cont serv lan or cont lan command)

```
Ethergate                                CONTROL LAN SERVICES MENU                                Rel x.y
-----
Name                                     Name                                     Name
* <ServiceName>                         * <ServiceName>                         * <ServiceName>
* <ServiceName>                         * <ServiceName>                         * <ServiceName>
* <ServiceName>                         * <ServiceName>                         * <ServiceName>
* <ServiceName>                         * <ServiceName>                         * <ServiceName>
* <ServiceName>                         * <ServiceName>                         * <ServiceName>
* <ServiceName>                         * <ServiceName>                         * <ServiceName>
* <ServiceName>                         * <ServiceName>                         * <ServiceName>
* <ServiceName>                         * <ServiceName>                         * <ServiceName>

* = Service Disabled

EN - Enable                               DI - Disable
-----
PF2 - Help                                ^B - Prev Page                               PF4 - Main Menu
                                           ^F - Next Page                               PF3 - Prev Menu
-----
(cont lan) Enter action :
```

This menu displays up to a page of configured LAN services. An asterisk is displayed by the name to indicate that the service is disabled. You can enable or disable LAN services. When a service is disabled then no calls can be made to it and it will not be displayed when you execute the DIRECTORY command (see Section 5.2.8). The enable and disable actions require a service to be specified. Existing connections will not be broken. Connections can be broken using the clear command (cl) (see Section 4.5.3).

4.5.4.3 Control Permanent Connections Menu (cont serv perm or cont perm command)

```
Ethergate                                CONTROL PERMANENT SERVICES MENU                                Rel x.y
-----
Id Internet Addr                        TCP port                        DCX Destination
*1 <ServiceName>                        <port>                         <DCX dest>
*2 <ServiceName>                        <port>                         <DCX dest>
*3 <ServiceName>                        <port>                         <DCX dest>
*4 <ServiceName>                        <port>                         <DCX dest>
*5 <ServiceName>                        <port>                         <DCX dest>
*6 <ServiceName>                        <port>                         <DCX dest>
*7 <ServiceName>                        <port>                         <DCX dest>
*8 <ServiceName>                        <port>                         <DCX dest>
*9 <ServiceName>                        <port>                         <DCX dest>
*10 <ServiceName>                       <port>                         <DCX dest>

* = Connection Disabled

EN - Enable                                DI - Disable
-----
PF2 - Help                                ^B - Prev Page                        PF4 - Main Menu
                                           ^F - Next Page                        PF3 - Prev Menu
-----

(cont perm) Enter action :
```

This menu displays up to a page of configured permanent connections. An asterisk is displayed by the name to indicate that the service is disabled. You can enable or disable a permanent connection. The enable/disable action will prompt for the Id of the connection required (an Id is displayed). When a permanent connection is disabled then any currently established connections are broken. While disabled, no attempt to reconnect the service will be made.

4.5.5 Software Control Menu (cont soft command)

```
Ethergate                SOFTWARE CONTROL MENU                Rel x.y
-----
                                COLD - Cold start
                                WARM - Warm start

                                WARNING! - WILL BREAK ALL CONNECTIONS, INCLUDING YOURS!
-----
PF2 - Help                                PF4 - Main Menu
                                           PF3 - Prev Menu
-----
(cont soft) Enter action :
```

This menu allows you to cold and warm start the Ethergate software. A cold start will destroy any current configuration and initialise the software to default values. A warm start will cause the software to restart in a similar manner to powering up. A severity warning message will be output and you will be requested to confirm the action before the restart is obeyed.

4.6 Status Screen (stat command)

The status command provides status and statistics on the operational aspects of the Ethergate for operators and engineers.

```
Ethergate                               STATUS MENU                               Rel x.y
-----
                                     GEN   -   Connections overview
                                     CONN  -   Detailed connections
                                     LINE  -   Line status
                                     SOFT  -   Software status
-----
PF2 - Help                               PF4 - Main Menu
                                           PF3 - Prev Menu
-----
(stat) Enter required status type :
```

This menu allows you to select general status of connections, more detailed and specific status of connections, line status (Ethernet and non-connection-based information) and software status.

4.6.1 General Status Menu (stat gen command)

```
Ethergate                      GENERAL CONNECTION STATUS                      Rel x.y
-----
User      Source                Session  Service                St Cntd  Idle
c 1       5.2                    t 123   ACCOUNTS                Ac 10:02  :30 *
                            t 124   TRILLIAN                 Ac 05:42  3:20
                            t 125   111.111.111.111        23 Ac 12:11  1:09
c 2       111.111.111.111       t 20    VAX11785                 Ac 20:30  :10 *
t 100     PERM_LP1               c 64    INFORMATION               Ac 01:20  :05 *
c 3       111.111.111.111       t 256   333.333.333.333        23 Ac 20:20  2:20 P

* = Currently selected                P = Permanent connection

-----
PF2 - Help                          ^B Prev - Page                    PF4 - Main Menu
                                     ^F - Next Page                    PF3 - Prev Menu
-----
(stat gen) Enter command :
```

This screen displays up to a page of connections.

User

This field identifies the user by the DCX channel number or TCP connection id (TCB). Both of these values can be used to gain further status from the Connection Status screen.

If the user is shown as just **c** or **t** (with no number), this indicates the call is clearing. If the user is shown as **c *** the DCX user has been disconnected, but the LAN sessions are being held active pending reconnection from the DCX user. A user of **t*** signifies a Held Printer, awaiting a LAN user to reconnect to it. A '+' symbol shows that a permanent connection is awaiting for data from the DCX side before placing the LAN call.

Source

This field displays information gained about the originator of the call (source) when the user contacted Ethergate i.e. the Node.Port address in an incoming DCX connect request, or Source Internet Address and TCP Port in the case of a LAN user. When the source is unknown (i.e. PMC) then no information is displayed.

Session

This field identifies the outgoing session within Ethergate, i.e. by the DCX channel number or TCP connection id (TCB). Both of these values can be used to gain further status from the Connection Status screen.

Service

This field displays the service description of the outgoing session. This can be the name of the service, an Internet address, or a DCX address.

St

This displays the current status of the session as follows:

- CN** - connecting
- CL** - clearing
- AC** - active
- AL** - allocated

Connecting means a call attempt is being made and the User is waiting for the call to be accepted by the Service.

Clearing means the connection has been broken and the Ethergate is waiting for the clear to be processed.

Active means that the connection is fully established.

Allocated means the service is reserved, but the connection cannot be established yet. This would be the case for a permanent service waiting for a DCX or LAN service to become available.

Cntd

This displays the amount of time that the session has been established, in minutes and seconds (MM:SS) or in hours (xxxh) or in hours and minutes (H:MMm).

Idle

This displays the amount of time that has elapsed without data passing between the session and the user, in either direction.

4.6.2 Connection Status/Statistics Menu (stat conn command)

```
Ethergate                      CONNECTION STATUS/STATISTICS                      Rel x.y
-----
                                TCB =
TELNET: Tx Data Chr           :           Rx Data Chars           :
        Tx Non Data          :           Rx Non-Data          :
TCP:    Local Ip address      :           Rem IP address       :
        Local Port            :           Rem Port              :
        Tx Packets            :           Rx packets         :
        Re-Transmit           :           Checksum errs       :
        Incoming Window       :           RTT                  :
        Outgoing Window       :
                                Chan =
CHAN:   Tx Data Chars         :           Rx Data Chars         :
        Tx state (rcvd)       :           Rx State (sent)       : Xon
TCB - Select TCB              Chan - Select Channel              RE - Reset Stats
-----
PF2 - Help                    PF4 - Main Menu
                               PF3 - Prev Menu
-----
(stat conn) Enter command :
```

This screen displays the connection-oriented information, i.e. TELNET and TCP statistics for the LAN side of a connection, and channel statistics for the DCX side. If a connection is in User Dialogue or Manager mode, or the session is not selected by the User, only the TCB or Channel information is displayed (according to the TCB or Channel number requested). The TCB and Channel numbers can be obtained from the General Status Menu (see 4.6.1).

TCB Command selects the LAN session be displayed e.g. **TCB 1** or **t 1**.

Chan Command selects the DCX session be displayed e.g. **Chan 20** or **c 20**.

RE Command resets the DCX/TCB statistics for the currently displayed connection.

TCB = TTT

This is the TCB number of the currently displaying TCP/TELNET connection.

TELNET:Tx Data Chr

This is the number of data characters that have been transmitted to the LAN from this TELNET connection.

TELNET:Rx Data Chr

This is the number of data characters that have been received from the LAN to this TELNET connection.

TELNET:Tx Non Data

This is the number of non data (special TELNET) characters that have been transmitted to the LAN from this TELNET connection.

TELNET:Rx Non Data

This is the number of non data (special TELNET) characters that have been received from the LAN to this TELNET connection.

TCP: Local IP address

This is the local IP address.

TCP: Rem IP address

This is the remote IP address.

TCP: Local port

This is the TCP port allocated locally, e.g. if this was an incoming standard TELNET connection, then it will very likely be 23.

TCP: Rem port

This is the TCP port allocated remotely, e.g. if this was an outgoing standard TELNET connection, then it will very likely be 23.

TCP: Tx/Rx Packets

The number of packets transmitted/received on this TCP connection.

TCP:Re-Transmit

The number of times TCP had to retransmit a packet for this connection.

TCP:Checksum errs

The total of TCP packets received with errors, for all connections.

TCP: RTT

The current value of the 'round trip time', in tenths of a second. This is the time between sending a packet and receiving and processing the acknowledgement for it.

TCP:Incoming Window

The current window size that we are reporting to the remote user/service on the LAN. A window size of zero indicates flow control, where we are not accepting any data.

TCP:Outgoing Window

The current window size reported by the remote user/service on the LAN.

CHAN: CC

This is the channel number of the currently displaying DCX connection.

CHAN: Tx Data Chr

The number of characters transmitted on this channel since the current connection was established.

CHAN: Rx Data Chr

The number of characters received on this channel since the current connection was established.

CHAN: Tx state

The Xon/Xoff state of the transmit path. Xoff indicates that Ethergate has been flow-controlled and is not allowed to send any more data.

CHAN: Rx state

The Xon/Xoff state of the receive path. Xoff indicates that Ethergate has flow-controlled the attached DCX and cannot receive any more data.

4.6.3 Line Status/Statistics Menu (stat line command)

```
Ethergate                               LINE STATUS/STATISTICS                               Rel x.y
-----
MAC:   Tx frames   : 0                       Rx frames   : 0
       CRC errors  : 0                       Long frames  : 0
       Overruns   : 0

IP:    Datagrams   : 0                       Checksum err : 0
       Short Pkts  : 0                       Version err  : 0

ARP - ARP Table                               RE - Reset stats
-----
PF2 - Help                                     PF4 - Main Menu
                                           PF3 - Prev Menu
-----
(stat line) Enter action :
```

This screen displays information about MAC and IP, i.e. the Ethernet line side. It is possible to enter the ARP status screen from here.

MAC: Tx frames, Rx frames

The number of frames transmitted and received on Ethernet.

MAC: CRC errors

The number of frames received from Ethernet with CRC errors.

MAC: Long frames

The number of frames received that exceed the maximum frame length.

MAC: Overruns

The number of times Ethergate has been overrun by incoming Ethernet frames.

IP: Datagrams

The number of datagrams that IP has sent/received.

IP: Checksum err

The number of IP datagrams that were received with checksum errors.

IP: Short Packets

The number of IP datagrams that were too small.

IP: Version err

The number of IP datagrams that had an incorrect version number.

4.6.3.1 ARP Status Table (stat line arp or stat arp commands)

```
Ethergate                               ARP TABLE STATUS                               Rel x.y
-----
Internet Address                         Ethernet Address
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
<InternetAddress>                       <EthernetAddress>
-----
PF2 - Help                               ^B - Prev Page                               PF4 - Main Menu
                                           ^F - Next Page                               PF3 - Prev Menu
-----
(stat arp) Enter command :
```

The ARP status table displays up to a page of Internet addresses and their corresponding Ethernet addresses that have been resolved by ARP.

Internet Address

The destination Internet Address of a device on the local network.

Ethernet Address

The corresponding Ethernet address.

ARP addresses are automatically discarded after a time period of 15 minutes.

Addresses waiting to be resolved will appear in the table with an Ethernet address of 00: 00: 00: 00: 00: 00.

4.6.3.2 Additional Local IP Addresses (stat line lip or stat lip commands)

```
Ethergate                      ADDITIONAL LOCAL IP ADDRESSES                      Rel x.y
-----
Internet Address                Enabled Services      Active Calls
Total (Src /Dest)              Total (Src /Dest)
001.000.010.006                1      (0 /1 )        1      (0 /1 )

-----
PF2 - Help                      ^B - Prev Page      PF4 - Main Menu
                                ^F - Next Page      PF3 - Prev Menu
-----
(stat lip) Enter command :
```

The Additional Local IP Addresses screen shows all the local IP addresses currently being supported by the Ethergate. Ethergate will thus respond to any ARP request for one of the above addresses. Addresses are added to the table when a DCX, LAN or Permanent Connection Service is enabled with a local/source IP address. The table indicates how many enabled services are currently using the address. It also shows the number of active TCP calls using the address. Entries are removed from the table when there are no enabled services *and* no active calls using the address.

4.6.4 Software Status (stat soft command)

```
Ethergate                SOFTWARE STATUS                Rel x.y
-----
Initial Trap Number      :-
Last Trap Number         :-

                                                                    RE - Reset Stats
-----
PF2 - Help                PF4 - Main Menu
                                                                    PF3 - Prev Menu
-----
(stat soft) Enter action :
```

This table is for use by service personnel. It provides information about recent software faults.

Initial Trap number

This is the number of the first software trap that occurred after the last reset status.

Last Trap number

These numbers are chronologically ordered from the most recent to the oldest software trap number (up to 5 numbers).

4.7 Summary of Manager Commands

Each command and its associated short form is summarised using the following notation:

- italic* - optional part
- (form) - command invokes a form
- (editor form) - command invokes the text editor form

conf	du			Dump configuration
conf	gate			Configure LAN gateways (form)
conf	gen			Configure general items, password etc. (form)
conf	lo			Load configuration
conf	mess	gen		Configure general messages, COM etc (form)
conf	mess	wel		Configure welcome banner (editor form)
conf	prof	serv	cl	Clear service profile (conf sp cl)
conf	prof	serv	co	Copy service profile (conf sp co)
conf	prof	serv	ed	Edit service profile (conf sp ed)
conf	prof	term	cl	Clear terminal profile (conf tp cl)
conf	prof	term	co	Copy terminal profile (conf tp co)
conf	prof	term	ed	Edit terminal profile (conf tp ed)
conf	prof	term	vi	View terminal profile (conf tp vi)
conf	prof	user	cl	Clear user profile (conf up cl)
conf	prof	user	co	Copy user profile (conf up co)
conf	prof	user	ed	Edit user profile (conf up ed)
conf	prot			Configure protocols (form)
conf	<i>serv</i>	dcx	co	Copy a DCX service
conf	<i>serv</i>	dcx	de	Delete a DCX service
conf	<i>serv</i>	dcx	di	Disable a service
conf	<i>serv</i>	dcx	ed	Edit a service (form)
conf	<i>serv</i>	dcx	en	Enable a DCX service
conf	<i>serv</i>	lan	co	Copy a LAN service
conf	<i>serv</i>	lan	de	Delete a LAN service
conf	<i>serv</i>	lan	di	Disable a LAN service
conf	<i>serv</i>	lan	ed	Edit a LAN service (form)
conf	<i>serv</i>	lan	en	Enable a LAN service
conf	<i>serv</i>	perm	de	Delete a permanent connection
conf	<i>serv</i>	perm	di	Disable a permanent connection
conf	<i>serv</i>	perm	ed	Edit a permanent connection (form)
conf	<i>serv</i>	perm	en	Enable a permanent connection

cont	calls	di		Disable new calls
cont	calls	en		Enable new calls
cont	conn	cl	chan	Clear connection/user on DCX side
cont	conn	cl	tcb	Clear connection/user on TCB side
cont	eth	di		Disable Ethernet
cont	eth	en		Enable Ethernet
cont	<i>serv</i>	dcx	di	Disable a DCX service
cont	<i>serv</i>	dcx	en	Enable a DCX service
cont	<i>serv</i>	lan	di	Disable a LAN service
cont	<i>serv</i>	lan	en	Enable a LAN service
cont	<i>serv</i>	perm	di	Disable a permanent connection
cont	<i>serv</i>	perm	en	Enable a permanent connection
cont	soft	cold		Cold start the software
cont	soft	warm		Warm start the software
cl	chan			Clear a DCX connection/user
cl	tcb			Clear a TCB connection/user
di	calls			Disable new calls
di	eth			Disable Ethernet
di	<i>serv</i>	dcx		Disable DCX service
di	<i>serv</i>	lan		Disable LAN service
di	<i>serv</i>	perm		Disable permanent connection
en	calls			Enable new calls
en	eth			Enable Ethernet
en	<i>serv</i>	dcx		Enable DCX service
en	<i>serv</i>	lan		Enable LAN service
en	<i>serv</i>	perm		Enable permanent connection
logoff				Logoff manager and disconnect
logout				Logoff manager and disconnect
quit				Quit manager and return to user dialogue
stat	conn			Connection status menu
stat	conn	chan		Select channel
stat	conn	re		Reset connections statistics
stat	conn	tcb		Select TCB
stat	gen			General status menu/screen

stat	line		Ethernet line status menu
stat	<i>line</i>	arp	ARP status menu
stat	<i>line</i>	lip	Additional local IP addresses
stat	line	re	Reset line statistics
stat	soft		Software status menu
stat	soft	re	Reset software statistics
term			Terminal selection

4.8 Item Definition

The following definitions describe parameters to various commands and are used throughout this document.

<Flag>

A flag is used to indicate a positive or negative response. A positive response can be indicated in several ways:

TRUE
ON
ENABLE
YES

A negative response is indicated using the inverse of these:

FALSE
OFF
DISABLE
NO

<Internet Address>

An internet address represents a 32 bit device address within a network or network of networks. The standard representation is four decimal numbers, with each number representing an individual octet, each number being separated by a dot.

<Number>.<Number>.<Number>.<Number> (e.g. 1.2.3.4)

Each number can be in the range 0 to 255.

N.B. A number can be entered in hex by preceding the hex number by 0x, e.g.

0x01.0x02.0xfd.0xa9 is equivalent to 1.2.253.169

<Key Def>

A key definition contains a string part (the key sequence) and a text part (the help text).

<String> <Text> e.g. "**^[OP**" "**PF1**"

<Name> (<ServiceName>, <ProfileName>)

A name is an ASCII name from one to fifteen characters. All names must start with an alphabetic character (A-Z). All letters are not case significant, but are stored in the correct case for visual clarity.

Names can be used to identify Services (LAN and DCX) and profiles (USER, SESSION, and TERMINAL). Names must be unique within a given context. This means that the name FRED cannot be used twice in with the context of LAN services, but can be used to represent a LAN service, DCX service, user profile, session profile and terminal profile all at the same time. This allows the utmost flexibility. It is however recommended that names be given some meaning, e.g. VT220 for a terminal profile.

<Number>

A number can be represented as a decimal or hexadecimal. A decimal number is entered in standard form, i.e. 100. A hexadecimal number can be entered by preceding the hex number by 0x, i.e. 0xa9 = 169.

<SessionId>

A SessionId identifies a session within the context of one user. It can be a session number (1 to 4) or a ServiceName.

<String> (<Text>)

A string is a series of characters, it may contain embedded control characters. Control characters are indicated by preceding the control character by a carat, e.g.

^G Control-G

A carat can be entered by typing two carats (^**^**).

When it is required to enter a string in a command line and not in a form, then it is necessary to delimit the string by using double quotes. This allows the sting to contain spaces and other item separators, e.g.

"This is an example string^M^J"

(A double quote can be entered into the string by typing two double quotes.)

<TCP port>

A TCP port is a number in the range 0 to 65535 (16 bits). The port refers to a logical device within a physical device (Internet Address). This number is often translated into a service, e.g. 23 is commonly used for the TELNET service on hosts that support TCP/IP.

<CHANId>

A DCX channel can be specified by:

CHAN <ccc>

where <ccc> is a decimal number in the range 1 to 64 (the maximum number of Gateway channels).

<TCBId>

A TCP connection can be specified by its Transmission Control Block (TCB) as:

TCB <ttt>

where <ttt> is a decimal number in the range 1 to 256 (the maximum number of TCP connections).

This section is self-contained, and provides instructions for every-day users of the Cray Ethergate network facilities.

5.1 The User Environment

A connection to a service is called a session. You are given the ability to hold more than one session simultaneously. You cannot *communicate* with all sessions simultaneously, but you can *switch between them* with ease.

It is possible to Hot-Key directly between sessions, escape into dialogue and disconnect a session.

When in dialogue you can obtain information about services, sessions and options, and can also change options, gain help and most importantly connect and disconnect to/from services.

5.1.1 The User Welcome Screen

When you connect to the system, you will probably be presented with a display that prompts you to select one of a number of services. This will have been set up by the system supervisor, and may look like the following example:

```
WW      WW      EEEEE  LL      CCCCC  OOOOO  MMM      MMM  EEEEE
WW      WW      EE      LL      CC      OO      OO  MM  MM  MM  MM  EE
WW  WW  WW      EEEE  LL      CC      OO      OO  MM      MM  MM  EEEE
WW  WW  WW  WW  EE      LL      CC      OO      OO  MM      MM  EE
  WW      WW      EEEEE  LLLLLL CCCCC  OOOOO  MM      MM  EEEEE

      T O T H E  E T H E R N E T  N E T W O R K

      Please select one of the following Services

MAIL          SALES          SPARES          STOCK

>
```

5.1.2 User Input

You can enter an ASCII string on your input line (shown by the > symbol), using any parity (incoming parity is ignored). The line is terminated and submitted for evaluation when you enter a Carriage Return or Line Feed (usually the RETURN or | or ENTER key).

While entering a line you may use the following editing facilities:

Delete a Character

When you enter a delete (DEL) or backspace (BS) character, the last character that you entered into the line is removed and backspace/space/backspace is echoed to your terminal (i.e. the last character is erased).

Delete a Line

When a control-U (^U) or a control-X (^X) character is entered then the entire input line is cancelled, and a backspace/space/backspace sequence is output for each character that was present in the input line (i.e. the line is erased ready for you to re-enter).

Repeat a Line

When a Control-R (^R) is entered then all the characters that were present in the previously submitted line are automatically entered as though you had typed it (i.e. your previous entry is repeated).

Illegal Characters

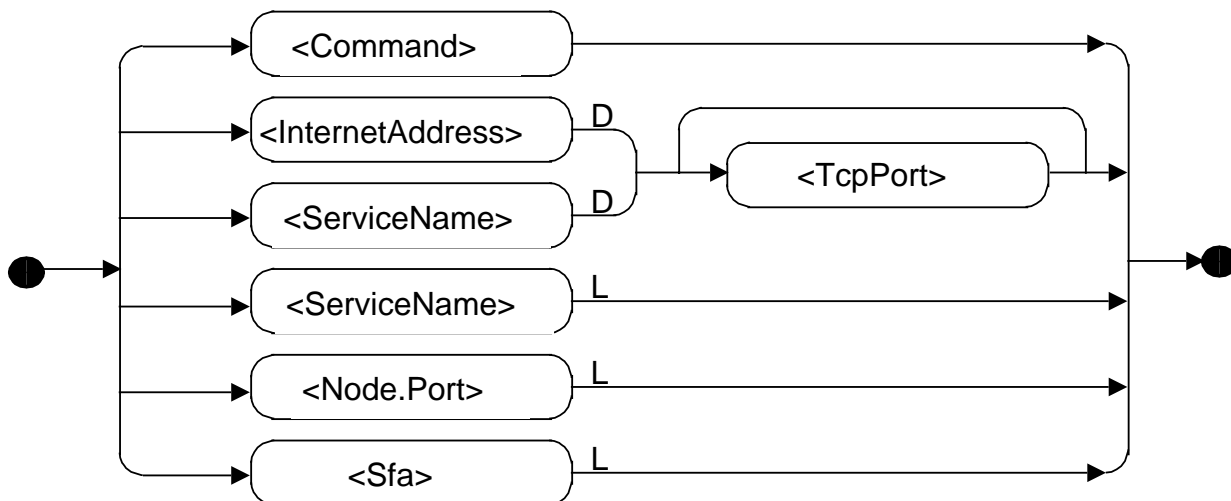
Any control character except those listed above will not be entered into the line. Instead a ^G (bell character) will be returned and your entry ignored. This will also occur if the current input line is too full of characters.

5.2 User Commands

5.2.1 Command Specifications

The following explanation will help you to understand the specifications of the commands that are available to you, all of which are described in the subsequent sub-sections.

When you submit an entry line with CR or LF, then the line is subject to the following evaluation:



(D = only available to DCX users connecting to LAN. L = only available to LAN users connecting to DCX.)

In an evaluation the priority of recognition is taken from top to bottom (i.e. commands before services). Each command has a minimum abbreviation which is shown by underlining the significant characters. An input line can contain more than one command, with commands being separated by a semicolon (;). All commands are accepted in upper and lower case, but case can be significant for some parameters to commands. Items can be terminated by space, comma or a semicolon, Any extra spaces between items are ignored. If an error is found with a command, and the input line contains more commands, then those commands are abandoned and the user informed of the command failure.

There are several commands available to you, including the ability to make/break connections, gain status information, and obtain help.

Make/Break connection commands:

CALL CONN OPEN SESSION
DISC CLOSE QUIT LOGOFF

Status/configure commands:

STATUS SET

Helpful commands:

HELP ? DIRECTORY CATALOGUE

Ancillary commands:

LOGIN LOGON

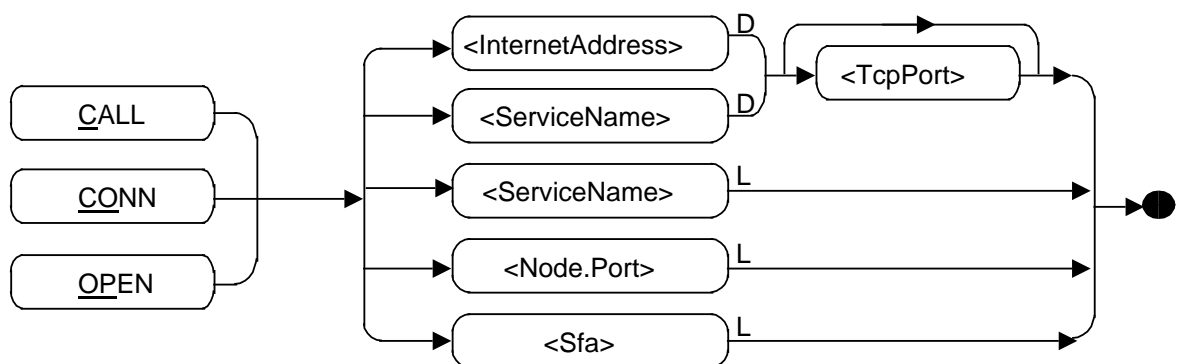
Many commands have synonyms; this is to allow users who are familiar with a particular environment to use Ethergate with ease.

The following sections describe the operations and syntax of the commands available to you. It is only necessary to follow the arrows to understand the syntax. There are however some minor points:

- When an arrow has a number associated with it, then it may only be repeated that many times.
- If a parameter is specified within <> brackets then it is a non-literal item defined elsewhere.

5.2.2 CALL/CONN/ OPEN

This command allows you to establish a connection to a service.



(D = only available to DCX users connecting to LAN. L = only available to LAN users connecting to DCX.)

Prior to connection, if a password has been set on the selected service, then you will be requested to enter the password. If you fail to enter the correct password (you are allowed three attempts) then you will be disconnected from Ethergate, losing any calls that you have established. Upon connection you are presented with a connection message.

Example:

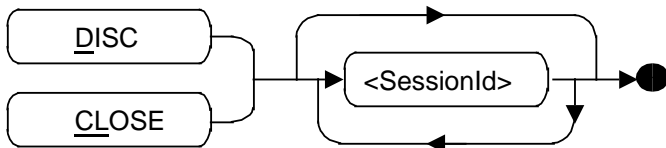
```
>CALL VAX
Enter password:
Connected to VAX [1].
```

You may then proceed with the connection.

When entering passwords, only an ASCII space will be echoed for every displayable ASCII character entered. It is possible to backspace and delete characters within a password.

5.2.3 DISC/CLOSE

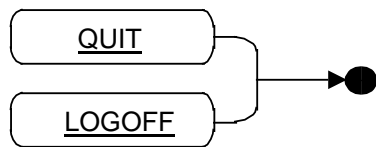
This command allows you to disconnect either the last session used, or a specified session by its SessionId.



The session is disconnected and you are then presented with a disconnection message. You will stay in dialogue.

5.2.4 QUIT/LOGOFF

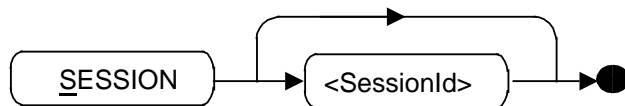
This command terminates all sessions and disconnects you from Ethergate.



You are not presented with disconnection messages for each session. The DCX or HOST to which you are attached will provide an appropriate message.

5.2.5 SESSION

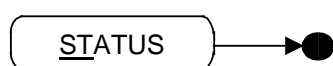
This command allows you to enter communication with the last session used or a specific session.



You will go directly into communication with the session selected. In general it is preferable to switch sessions using Hot-Keys.

5.2.6 STATUS

This command provides you with information about currently established sessions.



Session status is output as in the following example:

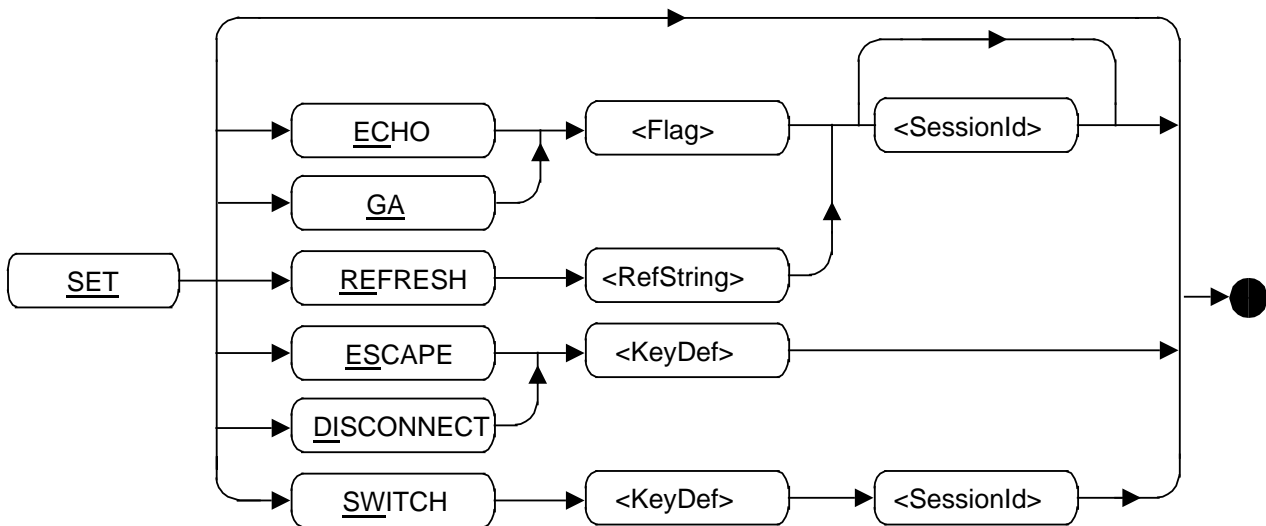
Sess	Service	TimeCnctd	TxChrs	RxChrs	State
1	DEVSYSA	3:25:10	2148	27352	Connected
2	MAIL	2:40:22	437	641	Connected
3	DEVSYSB	2:50:35	1292	600249	Connected
4	100.2.3	10:20	189	400	Connected

where:

- Sess** = Session number.
- Service** = Description of service at its highest level (i.e. displays name in preference to Internet Address).
- TimeCnctd** = HH:MM:SS
- Tx/RxChrs** = 0 to 2,000,000,000 data characters.
- State** = TCP/TELNET connection state (Internal).

5.2.7 SET

This command allows various operational parameters to be changed, or viewed.



If SET is entered on its own, then a list of current settings is output. Below is an example of the output:

Sess	ECHO	GA	SWITCH	REFRESH	TIMEOUT
1	Loc.	Dis.	PF1	^M	30
*2	Rem.	Dis.	PF2	^M	---
3	Rem.	Dis.	PF3	^M	---
4	Rem.	Dis.	PF4	^V	---

Escape = ^A
Disconnect = ^D
Dialogue Inactivity Timeout = 5 mins.

where * indicates the currently selected session (i.e. the session that will be entered if the SESSION command is used without any parameters, and the session that will be affected when SET command is used without a SessionId.)

The setting of ECHO to Rem implies that the attached service will provide echo (the echoing of characters, e.g. password entry, is then up to the service).

The use of the TELNET Suppress Go-Ahead feature can be selected by enabling GA suppression. Normally this would be disabled by default, but some applications may be using this TELNET option, and it is provided for such an occasion. This option has no effect when executed from a LAN user. It is only relevant in the case of a DCX user calling a TELNET service.

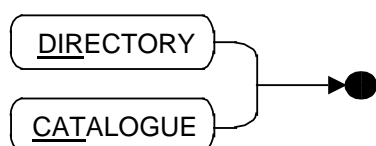
The REFRESH string is sent to the service when a session is re-selected. In some applications it is possible to request that your screen is updated (refreshed). For example the Cray Bluegate uses ^V to cause the screen to be refreshed. Therefore by setting the REFRESH string to ^V, whenever the user re-selects the Bluegate session, then a ^V will be transmitted to the Bluegate, causing the user's screen to be redisplayed automatically.

The ESCAPE, DISCONNECT and SWITCH key sequences (Hot-Keys) can be defined using this command. All key sequences are entered in the standard string format and may contain embedded control characters. It is not advisable to set duplicate key sequences. If there is any duplication then the following order of precedence is taken: ESCAPE before DISCONNECT before SWITCH1 before SWITCH 2 etc. The full key definition includes the text to describe the key sequence i.e. as above session switch 1 has the text PF1 and this relates to the control sequence [OP. If no text string is present then the ASCII representation of the key sequence is displayed (see ESCAPE and DISCONNECT).

N.B. In the above display two types of timeout are shown: the service inactivity timeout and the dialogue inactivity timeout. These values can only be set/changed by the manager, and are provided for information only.

5.2.8 DIRECTORY/CATALOGUE

This command lists the services that are available to you. The list is tabulated and sorted into alphabetical order.



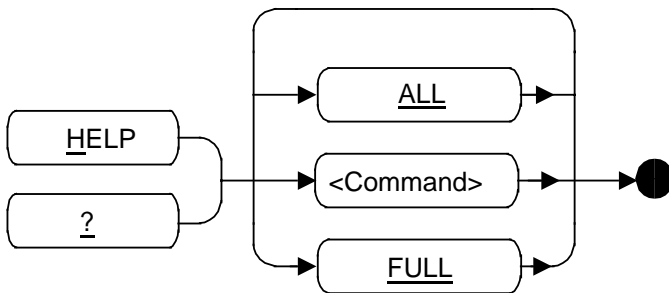
Typical output provided by this command:

Directory of services.

BARCODE	DEC	DEVSYSA	DEVSYSB
MAIL	MVAX	SEQUENT	

5.2.9 HELP/?

This command provides you with several levels of help.



Help without any parameters gives a list of all the commands available and advice on how to connect/disconnect to services.

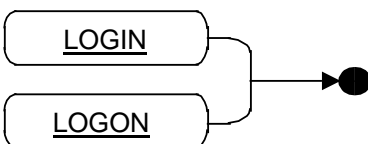
Help MORE gives general help on syntax and line editing commands.

Help <Command> gives the syntax definition of that command, and a brief description of its purposes.

Help FULL gives a list of all the commands and their specific help (as in Help <command>).

5.2.10 LOGIN/LOGON

This command allows access to the management facilities of Ethergate, but is restricted to personnel who know the manager password.



The password is entered in the same way as passwords for the CALL/OPEN/CONN commands. If you get the password wrong three times in succession then you will be disconnected from Ethergate and any calls will be cleared. (This facility can be barred from use by certain users by manager configuration of the User profiles.)

Appendix A Technical Specifications

A.1 Configuration Limits

Number of User Profiles	32
Number of Service Profiles	64
Number of Terminal Profiles	8
Number of Services	128 (sum of all services)
Maximum Simultaneous Sessions	128
Maximum Simultaneous Users	64
Maximum Simultaneous Users in Dialogue	24

A.2 Terminal Types

Pre-defined Profiles:	VT100/ANSI ADM3A CIFER 2605 IBM 3101
-----------------------	---

In addition, 4 profiles can be specified.

A.3 Cables

The cable to connect Ethergate (15-way D-type socket on the DCX rear panel) to the LAN Transceiver is not supplied with Ethergate.

A.4 Standards and Approvals

The Ethernet Physical Interface conforms to IEEE 802.3 10BASE5, electrical and mechanical specifications. Cheapernet or IEEE 802.3 10BASE2 can be connected to by using a Cray IEEE 802.3 10BASE2 Transceiver.

All LAN protocols operate to the relevant RFC (Request For Comment) documents. These documents are used within the ARPA community to define the protocols. The relevant RFCs are:

RFC 791 (IP)

Internet Protocol - DARPA Internet Program Specification.
Information Sciences Institute,
University Southern California. September 1981.

RFC 792 (ICMP)

Internet Control Message Protocol - DARPA Internet Program Specification.
Postel, J.
Information Sciences Institute,
University Southern California. September 1981.

RFC 793 (TCP)

Transmission Control Protocol - DARPA Internet Program Specification.
Postel, J.
University Southern California. September 1981.

RFC 826 (ARP)

An Ethernet Address Resolution Protocol.
Plummer, David C.
Network Working Group. November 1982.

RFC 854 (TELNET)

TELNET protocol specification.
Postel, J., Reynolds, J.
Network Working Group. May 1983
(Information Sciences Institute, University Southern California.)

RFC 855 (TELNET OPTIONS)

TELNET option specifications.

Postel, J., Reynolds, J.

Network Working Group. May 1983

(Information Sciences Institute, University Southern California.)

RFC 856 (TELNET BINARY OPTION)

TELNET Binary Transmission.

Postel, J., Reynolds, J.

Network Working Group. May 1983

(Information Sciences Institute, University Southern California.)

RFC 857 (TELNET ECHO OPTION)

TELNET Echo Option.

Postel, J., Reynolds, J.

Network Working Group. May 1983

(Information Sciences Institute, University Southern California.)

RFC 858 (TELNET GO-AHEAD OPTION)

TELNET Suppress Go-Ahead Option.

Postel, J., Reynolds, J.

Network Working Group. May 1983

(Information Sciences Institute, University Southern California.)

Other relevant documents:

The Ethernet: A Local Area Network: Data Link Layer and Physical Layer Specifications.

DEC/INTEL/XEROX Corporations.

Version 1.0. September 1980.

The Ethernet: A Local Area Network: Data Link Layer and Physical Layer Specifications.

DEC/INTEL/XEROX Corporations.

Version 2.0. September 1982.

IEEE 802.3 Standard 1985.

Carrier Sense Multiple Access with Collision Detect (CSMA/CD) Access Method and Physical Layer Specifications.

(10BASE5 and 10BASE2)

RFC 813

Window Acknowledgement Strategy in TCP

David D Clark

MIT Laboratory for Computer Science,
Computer Systems and Communications Group. July 1982.

DDN PROTOCOL HANDBOOK - Volume One

DOD MILITARY STANDARD PROTOCOLS

Defense Communication Agency - NIC 50004. December 1985.

DDN PROTOCOL HANDBOOK - Volume Two

DARPA INTER PROTOCOLS

Defense Communication Agency - NIC 50005. December 1985.

DDN PROTOCOL HANDBOOK - Volume Three

SUPPLEMENT

Defense Communication Agency - NIC 50006. December 1985.

Appendix B

Default Configuration

The default configuration of Ethergate is as follows:

Gateways	None	
General	Default User Profile	1
Information	Default Service Profile	1
	Manager Password	carriage return
	Manager Terminal Type	none
	Event Log Channel	none
	Event Log Mode	850_BINARY
	Event Log Data Rate	AUTO
	Event Log Parity	NONE
	PMC Link Down Handling	DROP CALLS
	Logout Timeout	none
	Outstanding DCX Data	
	Validates	2
	Held Printer Inactivity	
	Timeout	30
	Date/Time	preset value
Messages	Welcome Banner	none
	General Text	Standard text (DISC etc)
	Prompt	>
	Logout	none
User Profiles	Key Sequences (all)	empty
(all)	Parity	EVEN
	Manager Login	ENABLE
	Directory Banner	DISABLE
	Free Service Selection	DISABLE
	Inactivity Disconnect Time	none
	Session Quota	4
	Disc. Pending Timeout	30
	Validate before disc.	DISABLE
	Output Welcome always	DISABLE
	Use TELNET	ENABLE
	Go-Ahead	NOT SUPPRESSED
	Binary	DISABLED

	CR map	CR-NUL
	Break Map	DISABLED
	Timing Mark	WONT
	TCP Keep Alive Time	NONE
Service Profiles (all)	Echo	YES
	Data Rate	1200
	Parity	EVEN
	Go-Ahead	NOT SUPPRESSED
	Binary	ENABLED
	CR map	CR-NUL
	Break Map	DISABLED
	Terminal Type	NONE
	Timing Mark	WONT
	TCP Keep Alive Time	none
	Inactivity Disconnect Time	none
	Validate Data Receipt on DCX	DISABLE
	Disc. Pending Timeout	30
	Validate before disc.	DISABLE
	Initial Sequence	empty
	Refresh Sequence	empty
Terminal Profiles (5-8)	Empty	
Protocols	MAC Ethernet Address	Pre-Programmed Prom
	MAC Protocol	Ethernet
	ARP Hold All Requests	DISABLED
	IP Internet address	1.1.1.1
	IP Subnet mask	255.0.0.0
	IP Fragmentation	576
	IP Time to Live	100
	TCP Window Size	512
	TCP Max Segment Size	536
	TCP Initial RTT	50
	SYN Retries	3
	Backoff Algorithm	EXPONENTIAL
DCX Services (1)	Name	LAN_DIALOGUE
	TCP port	23
	Local IP Address	none
	DCX Dest.	none
	Service Type	NORMAL

Busy out on disconnection	DISABLE
840 Channel DTR Operation	DTR DISCONNECT
Password	none
User profile	none
Service profile	none

LAN Services **None**

**Permanent
Connections** **None**

The following is a brief description of both Ethernet Local Area Networks and TCP/IP. Both are introductory and are provided as additional information. It is not necessary to understand these systems to make use of the DCX Ethergate successfully, and these sections may be skipped if required.

C.1 Ethernet - CSMA/CD Baseband

Ethernet is a Local Area Network technology that uses baseband signalling at 10 Megabits per second over a coaxial cable. The principle of operation is that of a common bus with a standard method of access. This method of access is known as Carrier Sense Multiple Access with Collision Detection (CSMA/CD). Access control in LAN terminology is known as Media Access Control (MAC). CSMA/CD operates with multiple stations attached to the bus: any station will first listen to establish if anyone else is transmitting before attempting to transmit. If the bus is free then it will start to transmit, checking if anyone else also starts transmitting at the same time – i.e. if a collision occurs. If a collision does occur then all stations involved in the collision will backoff using a pseudo-random exponential delay. This process is similar to that of a group of people holding a conversation, although some people don't always backoff!

Rather like people, it is often necessary to address the person we are talking to. Ethernet defines that each 'frame' of data be sent using a 48-bit destination address and a 48-bit source address, with each station on the Ethernet having its own unique 48-bit address. Upon receipt of a frame addressed to it, a station will continue to receive the entire frame. Frames can be transmitted to all stations on the network in one go, by using a well known 'Broadcast' address (all 1's). In this case all stations will receive the entire frame.

The CSMA/CD type of MAC is 'probabilistic' or 'non-deterministic'; this is because the ability of any one station to transmit information has a probability corresponding to the activity on the bus and the nature of that activity, thus preventing the pre-determination of performance or propagation delays for any given station on the network. This generally isn't a problem, but in some circumstances, (e.g. process control) this form of system is unsuitable. In these situations other technologies can be used, such as token ring and token bus, both of which provide a 'deterministic' element to performance.

Ethernet technology is currently the most popular system and has been standardised – firstly by the inventors Xerox, DEC and Intel; the specification is the DIX Ethernet Specification Version 1 and Version 2. The Institute of Electrical and Electronics Engineers (IEEE) has adopted, improved, and slightly modified this specification. The IEEE specification is the IEEE 802.3 - part of the 802 Local Area Networking standards. The differences between the DIX specification and the IEEE specification are detailed in C.3.

The topology of Ethernet is a tree structure of interconnecting segments. Each segment can be a maximum length of 500 m with a maximum of 1500 m between any two stations.

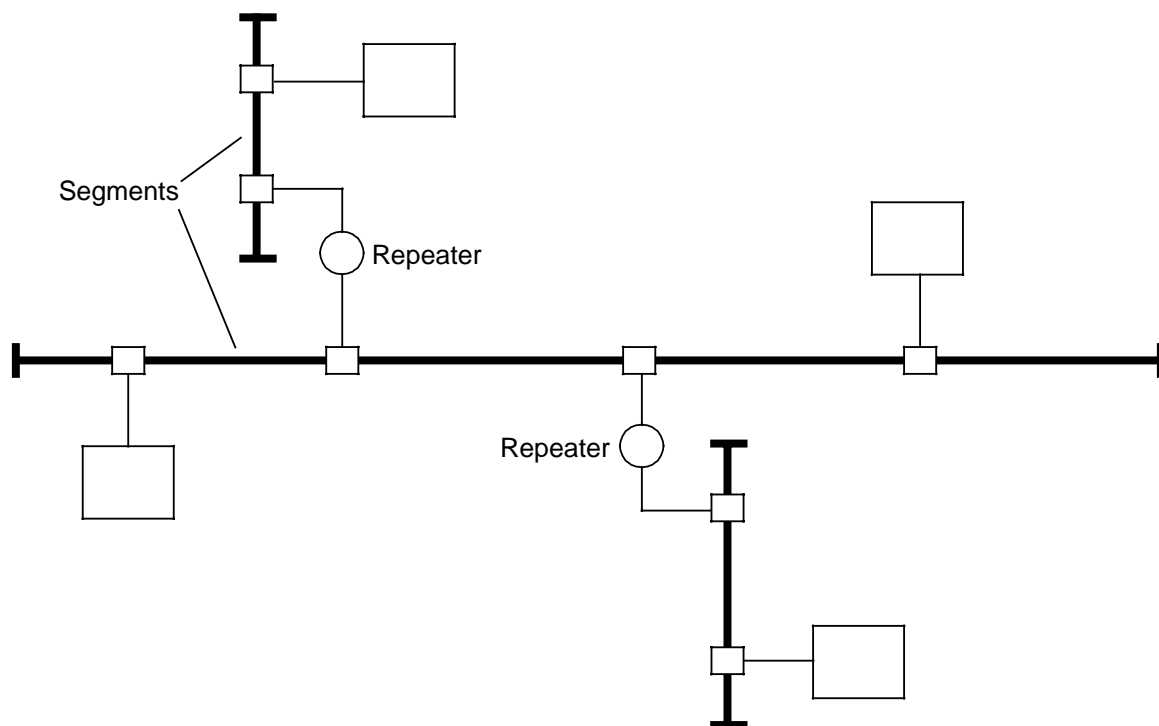


Figure C-1 Ethernet Topology

The IEEE standard allows the use of good quality coaxial cable ("yellow cable") or a thinner cheaper coaxial cable (RG58). These are known as Ethernet IEEE 802.3 10BASE5 and Thinwire Ethernet IEEE 802.3 10BASE2 (Cheapernet). Thinwire Ethernet has the disadvantage of reduced distance from 500 m segments to 185 m segments and a maximum number of nodes (taps) per segment from 100 to 30. Ethernet segments are connected together using repeaters or half-repeaters. A repeater simply connects two segments within a close proximity. A half-repeater uses some form of transmission line between the two halves (e.g. fibre optics); thus Ethernet networks can actually extend over 2 km (usual limit for fibre repeaters). No two stations within an Ethernet can have more than two* repeaters between them (or 4 half-repeaters). LANs can be further extended by using *bridges* or *routers*.

- * This number can be extended by some manufacturers' systems. Two is however the minimum supported on all Ethernet networks.

C.2 TCP/IP Protocols

TCP/IP is currently the de facto standard for LAN interworking. It was developed by researchers within and around the Advanced Research Projects Agency (ARPA) in the United States. It is currently the most popular non-proprietary protocol in use today. TCP and IP both refer to specific protocols within a complete suite of interworking protocols known as the "Internet Protocol Suite"; however the term TCP/IP has evolved by common use to describe the suite of protocols as a collective. The purpose of the Internet Protocol Suite is to allow co-operating computers to share resources across a network. Today thousands of networks of all kinds, LAN or not, use TCP/IP as their main communication method.

Most of the work and knowledge gained from the development and use of TCP/IP has led to the definitions of the OSI/ISO protocols. It is therefore not that difficult to show similarities with the OSI model and TCP/IP.

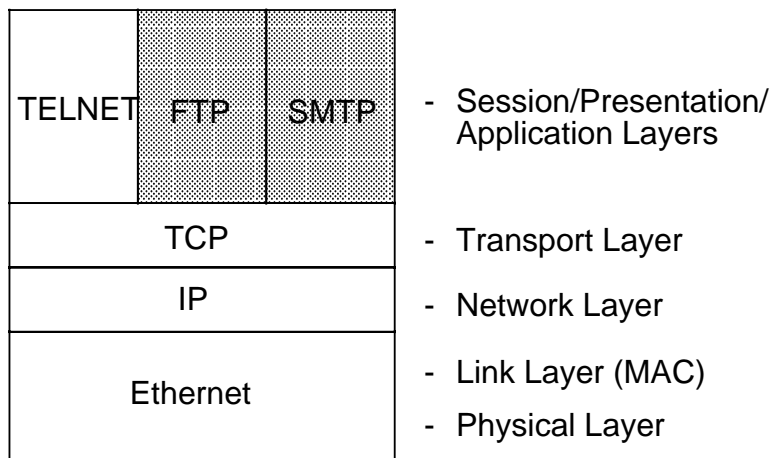


Figure C-2 TCP/IP Protocol Stack

The Internet Protocol Suite splits into two main areas - communication and application. The communication tower consists of a Connection-Less Internet Protocol (IP) and a Transmission Control Protocol (TCP). IP provides a connection-less datagram service for TCP, TCP then provides a connection-oriented error-free transmission service for applications. TCP is responsible for handling duplicate, out-of-sequence, missing and erroneous IP datagrams. TCP is very similar to the ISO Transport Layer Class 4 (ISO 8073). IP and TCP are then carried over any medium, in this case Ethernet. When operating IP over Ethernet a protocol called the Address Resolution Protocol (ARP) is used to convert IP addresses into Ethernet addresses.

The Internet Protocol (IP) layer is the common networking and inter-networking layer within the TCP/IP protocol suite. This allows a standard carrier network to deliver 'datagrams' independent of the higher layer protocols (applications), and conversely it allows an application to communicate without any knowledge of the underlying media/network. An internet address is a 4-octet number and is described in decimal e.g. 129.10.2.100. There are three classes of Internet address: A, B and C. Class A networks are usually used for very large networks that contain a great number of hosts (or sub-networks). The first octet of the address is used for the network number and ranges from 1 to 126. This leaves 3 octets for host number (16 million). Class B networks are for standard large networks and use two octets within the range 128.1 to 191.254. This leaves two octets for hosts (65 thousand). Class C networks use three octets in the range 192.1.1 to 223.254.254. This leaves one octet for hosts (254). When specifying a full TCP/IP service address such as a remote login on a host (TELNET), then a TCP port number must be specified (0-65536). The concatenation of an IP address and TCP port number is known as a socket. For example the standard TELNET remote login TCP port number is 23. Therefore to fully describe the service it is necessary to specify the host IP address and the TCP port number, e.g. 1.1.1.1 23.

Address Resolution Protocol (ARP) is used to translate IP addresses automatically into Ethernet addresses. This protocol allows all addressing to standardise on the IP address and removes the need for manager configure tables. The physical station address is found by broadcasting an ARP request to resolve the IP address. All stations on the local network will then receive the request. The station that recognises its own IP address then responds to the request indicating its Ethernet station address. The originator of the request then uses this information to transmit a datagram and also keeps a record of the address for future transmissions to the IP destination.

The TCP/IP protocol suite provides a myriad of applications, including functions for Remote Terminal serving, File Transfer and Electronic Mail, the most popular of which are TELNET, FTP and SMTP.

TELNET provides an ASCII Virtual Terminal interface; it allows remote login to hosts from other hosts and/or TCP/IP terminal servers running TELNET. To the host the user appears to be a directly attached ASCII terminal. ASCII is defined and allows entry into hosts whose native character set may be different (e.g. IBM-EBCDIC) without requiring different terminal equipment.

FTP is a File Transfer Protocol; it allows the transfer of ASCII or IMAGE files from one machine to another across the network. Again the use of ASCII allows a common interchange to take place, even if the hosts have different character sets. The image mode allows exact images of the files to be transferred without conversion.

SMTP is a Simple Mail Transfer Protocol; it allows user electronic mail to be transferred from machine to machine across a network, until it is delivered to the end user.

The above only describes a small subset of TCP/IP – as stressed earlier it is a 'suite' of protocols, both communications and applications. The more popular components of these protocols have been touched upon, but readers who wish to become more familiar should refer to the many texts on the subject of TCP/IP.

The DCX Ethergate supports Ethernet, IP, ARP, TCP and TELNET.

C.3 IEEE 802.3 and Ethernet Differences

In September 1980 Digital, Intel and Xerox (DIX) published "the blue book" Version 1.0: A Local Area Network, Data Link Layer and Physical Layer specifications. It was later revised as Version 2 in November 1982. Version 2.0 stated that it was an interim specification and the Ethernet Specification would now evolve with the Standards bodies (IEEE). In June 1983 the IEEE published its specification for Ethernet under the banner of IEEE 802.3.

The IEEE improved and modified the original specifications in the following ways:

1. **SQE Test.** The SQE test or heartbeat in the transceiver is a collision detection circuit which is turned on inside the transceiver after each transmission. However, DIX version 1.0 does not specify this feature, and therefore transceivers designed to that specification will fail to operate with units designed to use IEEE standards.
2. **Jabber Control Function.** IEEE 802.3 provides a Jabber Control feature that prevents stations on a network from continually transmitting. It will disconnect the station if an attempt is made to transmit for a longer period than a valid data packet would normally take to transmit. DIX version 1.0 does not provide this protection.
3. **Transformer Coupling.** The IEEE specification provides a more sensitive signal across the transceiver cable by specifying a half-step differential voltage drop across the transceiver input resulting in a zero voltage drop in the idle state on the transceiver input.
4. **Specific Range Values.** The IEEE specification defines more electrical tolerances than the DIX specification. These are input impedance, input capacitance, bias current, and collision detect thresholds.
5. **AUI Cable Earthing.** On IEEE 802-3, connect shield only to connector shell. Ethernet 1 & 2, tie pin 1 to connector shell and cable shield.

All of the above points do not prevent IEEE and DIX equipment operating on the same network (as long as IEEE stations use IEEE transceivers). However, there is a fundamental difference in the Data Link Layer of the DIX and IEEE specifications.

DIX defines that frames contain a 2 byte type field as opposed to a 2 byte length field in the ISO/IEEE specifications. The addressing parts of the frame are identical in both the IEEE and DIX specifications.

The type field has the advantage of using the same cabling for efficiently operating many different protocol sets (e.g. DECNet, DEC.LAT, TCP/IP etc) without fear of interference. The IEEE specifications however do not allow such flexibility.

In some vendor networks it is possible to intermingle the ISO framing with DIX framing, since most DIX frame types are equivalent to an illegal ISO length field (TCP/IP is an example), and most IEEE systems do not generate frames big enough for the length field to be a valid type field. Therefore the two protocol sets can often coexist on the same cabling. Furthermore, most vendors IEEE LAN bridges will transport complete Ethernet frames without regard to the length or type field contained within them. As a result most bridges (Cray bridges included) can be used with TCP/IP and IEEE 802.2 protocols.

The DCX Ethergate is designed to use IEEE 802.3 Transceivers and supports the Ethernet framing method for use on standard TCP/IP LANs.

Appendix D ASCII Conversion Table

Decimal to ASCII Control Characters

Dec	Hex	Name	Symbol
0	00	NULL	^@
1	01	SOH	^A
2	02	STX	^B
3	03	ETX	^C
4	04	EOT	^D
5	05	ENQ	^E
6	06	AK	^F
7	07	BEL	^G
8	08	BS	^H
9	09	HT	^I
10	0A	LF	^J
11	0B	VT	^K
12	0C	FF	^L
13	0D	CR	^M
14	0E	SO	^N
15	0F	SI	^O
16	10	DLE	^P
17	11	DC1	^Q
18	12	DC2	^R
19	13	DC3	^S
20	14	DC4	^T
21	15	NAK	^U
22	16	SYN	^V
23	17	ETB	^W
24	18	CAN	^X
25	19	EM	^Y
26	1A	SUB	^Z
27	1B	ESC	^[
28	1C	FS	^\
29	1D	GS	^]
30	1E	RS	^~ *
31	1F	US	^_

* This is specific to Ethergate and does not follow the standard ASCII convention.

Ethergate can generate the following Event Log messages:

- **Event Log Cancelled**
- **Event Log Port Changed from ppp to qqg**
- **Node nn status change [LOC] | [OFL] | [ONL] to [ONL] | [OFL]**
- **Port ppp [TO] | [FROM] nn.qqg - user DSCNX**
- **Port ppp [TO] | [FROM] nn.qqg - connected OK**
- **Port ppp [TO] | [FROM] nn.qqg - CNX failed**
- **SPVSR Logged-off**
- **[LOC] | [REM] SPVSR Logged-on at port nn.ppp**
- **SESSION TO/FROM nnn.ppp FORCED TO LOGOUT**

ARP	Address Resolution Protocol. A member of the 'Internet Protocol Suite'. See Appendix C for more information.
ARPA	Advanced Research Projects Agency. An American Academic community involved in research, often for the Military (DoD).
Baseband	Transmission of a signal at its original frequency, without modulation.
Broadband	Use of Multiple channels over the same medium using frequency division of the bandwidth.
CCITT	International Consultative Committee on Telegraph and Telephony (Comité Consultatif Internationale de Télégraphique et Téléphonique).
Cheapernet	Thinwire Ethernet (IEEE 10BASE2).
CLIP	Connection-Less Internet Protocol e.g. IP or CLNP.
CLNP	Connection-Less Network Protocol (ISO).
CRC	Cyclic Redundancy Check.
CSMA/CD	Carrier Sense Multiple Access with Collision Detection. A method of controlling access to a common bus. Carrier sense allows stations to detect when the bus is busy, with collision detect for the occasion when two stations simultaneously access a free bus.
DCX	Data Concentrator eXchange. An acronym for a Cray statistical multiplexer system.
DDN	Defense Data Network. An American Military TCP/IP and X.25 data network.
DEC	Digital Equipment Corporation. A major computer manufacturer.

DIX	DEC, Intel and Xerox; the group of co-operating companies that developed and standardised Ethernet.
DTR	Data Terminal Ready - A CCITT V24 interface signal. Normally pin 20 on a 25-way connector.
FDDI	Fibre Distribute Data Interface. ANSI definition of a fibre optic LAN at 100 Mbps.
FTP	File Transfer Protocol. A member protocol of the "Internet Protocol Suite". See Appendix C for more information.
IEEE	Institute of Electrical and Electronics Engineers.
Internet	A multiple-network network.
IP	Internet Protocol (ARPA, DDN).
ISO	International Standards Organisation.
LAN	Local Area Network; the subject of this document.
LLC	Logical Link Control.
LSAP	Link Service Access Point.
MAC	Media Access Control.
MAP	Manufacturing Automation Protocol.
MTP	Mapping and Test Panel - A DCX 840/850 control panel.
NCAM	Network Control and Access Module - A DCX 860 control management device.
NSAP	Network Service Access Point.
OSI	Open Systems Interconnection.
RG58	A low cost coaxial cable, often used to carry IEEE 802.3 10BASE2 Ethernet signals.
SAP	Service Access Point.
SFA	Short Form Address. A DCX number that is used to describe a service.
SMTP	Simple Mail Transfer Protocol. A member protocol of the "Internet Protocol Suite". See Appendix C for more information.

SOCKET	A concatenation of an IP address and a TCP port number. It identifies a logical point within a system.
TCP	Transmission Control Protocol.
TELNET	TELNET Virtual Terminal protocol. A member protocol of the "Internet Protocol Suite". See Appendix C for more information.
TOP	Technical Office Protocols.
TP	Transport Protocol. Usually followed by a class number e.g. TP4.
TSAP	Transport Service Access Point.
USO	User Switching Option. A DCX card that allows intelligent network routing.
WAN	Wide Area Network.
10BASE2 10BASE5	A qualification to the IEEE 802.3 Specification. The first number (10) represents the speed of the network and the second number the distance. See Appendix C for more information.

