



***GLINK***<sup>TM</sup>

***PROFESSIONAL EDITION***  
***ENTERPRISE EDITION***

***User's***  
***Guide***

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Glink Enterprise Edition, version 8.6  
Glink Professional Edition, version 8.6  
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# Contents



# Introduction

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*Glink* is a terminal emulator designed for general-purpose communications work. *Glink Professional Edition* and *Glink Enterprise Edition* are Window 32-bit versions, supporting all the current versions of Windows, 32bit and 64bit. Android, iOS and Java versions of *Glink* are also available as separate packages.

*Glink* supports a subset of the ANSI 3.64 standard, and for work in VT environments, a separate VT102 mode is supplied for VT52, VT100, VT220, VT320, VT340 and VT420 support. Additional modes available are emulation of Prestel and Minitel terminals, IBM 3270, 3151 and 5250 emulation, and for the specific needs of the Bull user, there are VIP7301, VIP7800, VIP7700, DKU7107 and DKU7102 emulation modes. For more details refer to the *Emulations* section.

*Glink* also provides extensive support for the various asynchronous, synchronous and network communications server solutions available on the market today. Amongst the main TCP/IP protocols, *Glink* supports Telnet, Rlogin, TNVIP, TN3270, TN3270E and TN5250. DSA, ISO/DSA or RFC1006 connections may be obtained via the *G&R Host Links* products *Ggate* or *LDSA*. X.25 and TGX support is available via Atlantis, Cirel or Eicon cards or gateways. Dial-up or direct connections are also provided. For a full list of the supported communications interfaces and protocols, refer to the *Communications interfaces* section in the corresponding *Glink Administrator's guide*.

The emulator has built-in Kermit transfer functionality. All of the standard and Bull specific improvements to this protocol are supported. This includes sliding windows, long packets, all the Bull derivations such as GKRM, FTRAN. Additional facilities are provided for making file transfers using either plain text transfers or the Xmodem, Ymodem and Zmodem protocols and most normal variants of these (batch, Telink, etc). CompuServe B protocol is supported in automatic mode. IND\$FILE is supported for IBM 3270 connections.

## Introduction

Other functions provided by the emulator include:

- Command access - both locally and under host control
- Script language - over two hundred commands for automating often-used procedures or providing automatic login facilities
- LAN and WAN support
- Full-function dialing directory - for use with smart modems (Hayes-compatible)
- Macro keys - may be configured dynamically
- Capture and print functions
- Utilities for redesigning the keyboard layout to your own personal requirements
- Scrollback buffer which keeps up to 32766 pages of information in memory; cut, paste and edit functions
- File utilities - functions for accessing and manipulating local files and directories
- Online ASCII table both for PC and host character sets
- All parameters and options are immediately reconfigurable through easy-to-use menus.
- Context switching and local forms control
- Programmable interface to the emulator for application programs
- External Script extension DLL support
- DDE and OLE Automation support
- UVTI and HLLAPI DLL support
- Windows sockets
- Telephony API

# **Warranty**

While Gallagher & Robertson A/S have made every effort to ensure that this software package should function as described, no warranty of any kind, express or implied, is made by us. Gallagher & Robertson A/S shall not be liable for any damages, direct, indirect, special, or consequential arising from a failure of this program to operate in the manner desired by the user. Gallagher & Robertson A/S shall not be liable for any damage to data or property that may be caused directly or indirectly by the use of this program. In no event will Gallagher & Robertson A/S be liable to you for any damages, including lost profits, savings or other incidental or consequential damages arising from your use or inability to use the program, or for any claim by any other party. Any dispute arising in connection with this warranty will be settled under Norwegian law.

Gallagher & Robertson A/S confirm their intention that the software should function as described, and will make all reasonable efforts to ensure that errors in the software reported in writing to our office in Oslo be corrected in future releases of the software.

Gallagher & Robertson A/S grant you as a registered user of Glink a licence to use the software and to make those copies you deem necessary for your own security. The package itself remains the property of Gallagher & Robertson A/S and we expect you to take all reasonable precautions to ensure that illegal copies are not made by a third party.

# **Support**

Support is available from your local supplier rather than from Gallagher & Robertson A/S. For information about support numbers check the information screen in the program itself. This screen can be displayed using the **Help / About Glink** key.



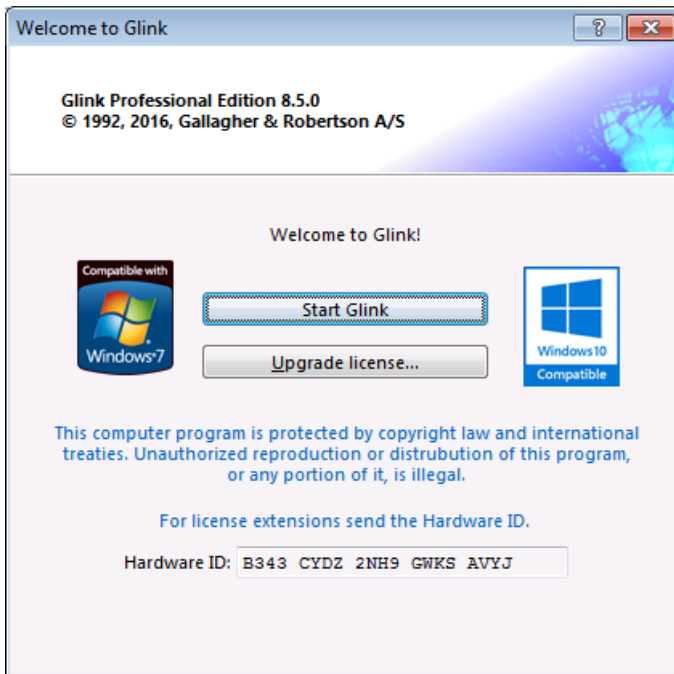
# Using the emulator

---

## Starting Glink for Windows

Glink for Windows is started in the normal way by double-clicking the Glink icon on your desktop (or by positioning yourself on the Glink icon and pressing ENTER).

The initial screen shown will depend upon which options you have chosen in your configuration, but will normally be a 'welcome' screen providing general information about the program:



Options are provided to enable you to suppress this menu, and also (for those using a modem) to present the dial directory as soon as the emulator is started up.

## Using the emulator

Note that if you have any problems or questions about the software, then relevant information will be provided if you select **About Glink** from **Help** in the Glink menu bar.

## Command line

As with other programs on the PC, one or more options may be specified on the command line to control different features of the emulator. These may be specified on the command line you use when starting the emulator (you can display the command line associated with a Glink icon by highlighting the icon, right clicking and selecting **Properties** from the menu).

Command line options can be put in a .glink file and used as a shortcut or an URL to start Glink, e.g.:

```
http://myweb.com/glink/startup.web/myhost.glink
```

You can also setup default command line options in the `GLINK.INI.GLINKDATA.` file (see also the `/T` parameter below) or add the `GLWNOPT` environment variable. Refer to the *Administrator's Guide* for information on environment variables.

## Basic command line options

Here is an overview of the basic command line parameters Refer to the *Administrator's Guide* for a full list of command line options and parameters.

Switch	Description
<code>/C file.ext *</code>	Specify name of configuration file or displays list of available configurations, *.glinkconfig
<code>/CD</code>	Specify name of configuration directory (%CommonDocuments%\Glink or GlinkExecDir)
<code>/D</code>	Don't connect at startup time
<code>/I parameter</code>	Input parameter to script \$PARAMETER
<code>/L x</code>	Language key for text files
<code>/N text</code>	Specify name to display in status line

<b>Switch</b>	<b>Description</b>
/O c:\dir	Specify name of script directory
/OU c:\dir	Specify name of user script directory
/P file.ext	Specify name of dial directory
/Rnn	Specify maximum number of rows to emulate
/R72	Use 72-line scroll mode
/S script.scr	Specify name of startup script
/U c:\dir	Specify name of user file directory (%MyDocuments%\Glink)
/V password	Specify password for dial directory
/X	Don't initialize modem

We will here deal with some of the more important of these in detail.

By default each user configuration file is located in the %MyDocuments%\Glink directory. You may change this by specifying the /U command line option. Starting GLINK with the command:

```
GL /U C:\GLUSE
```

for example, would tell GLINK that your 'user' files should be kept in the C:\GLUSE directory. This may be useful either simply because it allows you to keep your user files separate from the standard software, or because more than one person is sharing the same copy of the program and you wish to use multiple 'user directories'. The files affected by this parameter are the following:

```
DEF.glinkconfig  The configuration file
GLINK.PHO        The dial directory
```

If a user directory is specified then keyboard (\*.glinkxlit) and layout (\*.glinklayout) files may reside either in the standard GLINK directory or in the user directory. If a file exists in both then the file from the user directory will be used.

Additionally, if the help files are not found in the GLINK directory then the program will also search for them in this 'user' directory.

## Using the emulator

If you are using the alternate configuration file possibility then you may start the emulator using the `/C` parameter followed by a string with the site name: the extension `'glinkconfig'` is added to this to produce the name of the particular configuration file you wish to run from. For example, to use `CNX.glinkconfig` as your configuration file you would start the emulator with:

```
GL /C CNX
```

If you wish you may specify a complete file name. For example:

```
GL /C CNX.glinkconfig
```

(This also applies to the other options described further on in this section).

Another parameter allows you to insert an identifying text into the status line. This may be useful if you are running more than one copy of the emulator and need some way of seeing which one you are using easily. To use this option, start the emulator with (for example):

```
GL /N UNIX-host
```

A further parameter allows you to automatically start a script as soon as the emulator comes up. This parameter looks like:

```
GL /S Start.scrgl
```

where `START.SCRGL` is the name of the script file to execute. You may also use the `/O` parameter to specify a script directory that will be searched whenever a script cannot be found in the current directory. An alternate dial directory may be specified with the `/P` command line parameter.

More than one option may be specified in the same command line; and the order in which they are specified makes no difference (unless you specify the same option twice with different arguments, in which case the last value specified will be used). For example:

```
GL /S "GCOS 8.scrgl" /C CN1
```

Options using arguments requiring embedded spaces may use single apostrophes (`'`) or quotes (`"`) to mark the beginning and end of the argument. If the argument itself requires arguments, for example the `/S` option might need script parameters to be entered this way:



```
GL.EXE /S "'Connect to Host.scrgl' par1 par2 par3"
```

Then use single apostrophes (') inside the quotes (") for this purpose.

The command line also interprets **environment** variables using the standard %VARIABLE% syntax. As different Windows platforms and networks use different environment variables for the users logon name, Glink accepts \$USER\$ and \$USERNAME\$ in the same way as the NETSETUP program does, e.g.:

```
GL /U H:\$USER$\MYFILES /OU %TEMP%
```

Glink accepts \$GLINK\$ for the GLINK directory, e.g.:

```
GL /CD http://myhost.com/glink/config /U $GLINK$ /C myconfig
```

The above example would allow GLHOST.INI.GLINKDATA to be picked up from the URL and any changes would be saved and merged in from a local copy in the users GLINK directory. The config file would be picked up from the URL config directory.

Please refer to the below *Environment and internal %VARIABLE% parameters* section for a full list of the interpreted values.

## ***Environment and internal %VARIABLE% parameters***

Glink supports several parameters that will be replaced with their actual values at runtime. These parameters can be used in the Glink command line, **.glink** command file or in the Glink title text. For example, if Glink is installed in D:\Glwin and the users logon name is Peter, then the command line:

```
GL.EXE /CD $GLINK$\Configs /C $USER$.glinkconfig
```

would set the Glink configuration directory to D:\Glwin\Configs and the configuration file name to Peter.glinkconfig, thus loading the configuration from D:\Glwin\Configs\Peter.glinkconfig

The Glink title text below would prefix the title with the unique instance number of the current Glink session:

```
$INSTANCE$ - GLINK
```

## Using the emulator

Glink supports all system environment variables using the **%VARIABLE%** syntax, e.g. %TEMP%, %SystemRoot%, %APPDATA%.

Glink also supports some internal variables using the **\$VARIABLE\$** syntax, e.g. \$GLINK\$. The following internal variables are supported:

\$GLCFG\$	Glink configuration directory ( <b>/CD</b> )
\$GLINK\$	Glink program directory ( <b>GL.EXE</b> directory)
\$GLSCR\$	Glink script directory ( <b>/O</b> )
\$GLSUSE\$	Glink user script directory ( <b>/OU</b> )
\$GLUSE\$	Glink user file directory ( <b>/U</b> )
\$INSTANCE\$	Current Glink session instance number
\$USER\$	User's logon name
\$USERNAME\$	User's logon name
\$COMPUTER\$	Computer name

## Default command line options

Rather than always start your copy of GLINK with:

```
GL /U C:\MYFILES
```

You can configure default command line option in the GLINK.INI.GLINKADATA file or set the GLWINOPT environment variable.

## GLINK.INI.GLINKDATA file

The GLINK.INI.GLINKDATA file should reside in the Glink directory (the same directory as the GL.EXE executable).. You could create a GLINK.INI.GLINKDATA file and set default parameters by including a line like

```
[options]  
default=/U C:\MYFILES
```

## GLWINOPT environment variable

The GLWINOPT environment variable may be used to preset any or all of the above command line options. You could include the command:

```
SET GLWINOPT=/U C:\MYFILES
```

in your User or System environment and configure the Glink icon properties no parameters at all. Options specified on the command line or in the GLINK.INI.GLINKDATA will always override options set in the GLWINOPT variable.

### **Command line file (.glink)**

Command line options can be put in a .glink file and used as a shortcut to start Glink, e.g.:

```
c:\glwin\demo\glink\startup\dku7107_to_tp8test.glink
```

If the command line file is put on a web server, then you can also start Glink from a web page, e.g.:

```
http://myweb.com/glink/startup.web/dku7107_to_tp8test.glink
```

This is the basis of web-controlled Glink.

The .glink file extension is registered in the workstation's registry when the Glink downloadable package is installed. It is registered in a similar way to say a .doc file. When you click on it, Windows opens the associated program and passes the file as a command line parameter.

The .glink file is registered as being a valid file type that can be received from a web server. The web server is configured to tell the browser that the MIME file type of the .glink file is "application/x-glink". When executed, it will start Glink with the following command line

```
gl.exe /COMMAND dku7107_to_tp8test.glink
```

Typically the command line file will contain references to directories or files on the web-server:

```
/CD http://myweb.com/glink/config  
/O http://myweb.com/glink/script  
/C dku7107_to_tp8test.glinkconfig
```

## Using the emulator

When Glink starts up and recognizes a file located on the web-server, it connects to the web server, downloads it to the users temp directory and loads the file locally. The download of a remote file will only be done the first time, thereafter it will be read directly from the temp directory. When the user exits Glink, all the temporary files are removed. The whole operation is done completely transparently to the user.

## Configuration file: /C

The Glink configuration file has a default name of DEF.glinkconfig. The /C option allows you to select one of several alternate configuration files. You may either specify the name without the .glinkconfig extension, or the complete filename. For example:

```
/C MOD           Configuration file is MOD.glinkconfig
/C *             Displays list of available configurations,
                 *.glinkconfig
/C GLCONF.1      Configuration file is GLCONF.1
```

Configuration files are stored on the Glink 'user' directory (see the /U command line option).

## Configuration directory: /CD

The Glink configuration directory is normally the %CommonDocuments%\Glink or GlinkExecDir directory. If this option is used, then Glink searches for configuration files in this directory rather than the Glink directory before looking in the Glink 'user' directory. (see the /U command line option). This option may be useful in web controlled Glink environments where the main configuration files are on the web server, but the user may have some local configuration files such as a merged GLHOST.INI.GLINKDATA file.

```
GL /CD http://myhost.com/glink/config /U $GLINK$
```

## Don't connect: /D

This option tells Glink not to connect at startup. This option is useful when a /S startup script is being use to control the connection

***Input script parameter: /I***

This parameter is used to specify an initial script parameter which will be available to the first script file to be run after the emulator is started. More details are available in the *Script Reference Manual*.

***Language key: /L***

The language key specifies an alternate set of files to use for support of a different operating language. The following files must be available for such support to function correctly (x here is the language code specified after the /L parameter):

```
GLlx.DLL
```

For more information about the /L parameter, refer to the *Administrator's Guide*.

***Name for status line: /N***

This parameter allows you to insert an identifying text into the status line. This may be useful if you are running more than one copy of the emulator and need some way of seeing which one you are using easily.

To use this option, start the emulator with (for example):

```
GL /N VAX-host
```

This is the same option as is set with the script NAME command.

***Script directory: /O***

The /O parameter specifies the 'script directory', which will be searched whenever a script cannot be found in the current directory. For example:

```
GL /O F:\SCRIPTS
```

See the *Script Reference Manual* for a complete description of the script language.

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### **User script directory: /OU**

The /OU parameter specifies the 'user script directory', which will be searched before the normal script directory (set with /O above) whenever a script cannot be found in the current directory. For example:

```
GL /OU C:\MYSCRIPTS
```

### **Dial directory name: /P**

The Glink dial directory has a default name of GLINK.PHO. If you wish to use an alternate dial directory, then you can use the /P parameter. You can specify either just a file extension (in which case it will automatically be prefixed with GLINK.) or the full name:

```
/P PH2           Dial directory is GLINK.PH2  
/P GLPHONE.DIR  Dial directory is GLPHONE.DIR
```

The dial directory is stored on the Glink 'user' directory (see the /U command line option).

### **Rows on screen: /Rnn**

This parameter allows you to specify the maximum number of rows you wish to be able to emulate on-screen. A minimum of 43 rows will always be supported, but use of the /Rnn parameter can allow up to 99 rows on the emulation screen. Changes to the number of lines shown on the screen can be made both under host control and by use of the SET SCREEN LENGTH script command. Note however that if you wish 72-line scroll mode to be used in the VIP7800 emulation then you must use /R72 rather than any other value.

### **72-line scroll mode: /R72**

This parameter specifies that you wish 72-line scroll mode to be active for the VIP7800 emulation. If /R72 is not specified then only the normal 24-line emulation will be available. Note that 72-line scroll mode will only be active if the window resizing option (in **Settings / Screen / Window attributes**) is set to 'change displayed area'.

The scrolling functions on the real terminals consist of Next Segment and Previous Segment, which move a full screen at a time through the 72-line data space, and Scroll Up and Scroll Down, which move one line at a time. The equivalent commands in Glink are implemented as a combination of the ALT key and functions on the extra keypad between the main keyboard and the numeric keypad. The actual keys are as follows:

ALT+END	Next Segment
ALT+HOME	Previous Segment
ALT+PAGEUP	Scroll Down
ALT+PGEDOWN	Scroll Up

The real terminal has only one scrolling function, where the cursor follows along with the scrolling. Glink has additional scrolling functions that leave the actual cursor in place. These let you inspect the rest of the form without moving the 'real' cursor from its present position, and the screen will scroll automatically back to the cursor position as soon as data is entered. This functionality is supplied on the ALT+UP ARROW and ALT+DOWN ARROW keys (the arrow keys on the extra cursor pad, not in the numeric keypad).

### ***Startup script: /S***

This parameter allows you to automatically start a script file as soon as the emulator comes up. For example:

```
GL /S START.SCR
```

would run the script file START.SCR at startup time. See the *Script Reference Manual* for a complete description of the script language.

### ***User directory: /U***

The Glink user directory is normally the %MyDocuments%\Glink directory. It may also be found useful if you wish to keep your 'own' files separate from the standard files delivered with the emulator, or have more than one user sharing a single computer. The directory is specified with /U as follows:

```
GL /U C:\GLUSE
```

The above command would tell Glink that 'user' files should be kept in the C:\GLUSE directory. Files affected by this parameter are the following:

## Using the emulator

Configuration files	(default DEF.glinkconfig)
Dial directories	(default GLINK.PHO)
Appointment files	(default GLINK.APP)

If a user directory is specified then keyboard transliteration (\*.glinkxlit) and keyboard layout (\*.glinklayout) files may reside **either** in the standard Glink config directory (/CD) **or** in the user directory. If one of these files exists in both directories then the user directory takes precedence.

Additionally, if the help files are not found in the Glink directory then the program will also search for them in this 'user' directory.

## ***Password for dial directory: /V***

This parameter lets you specify the password for the dial directory directly from the command line, thus avoiding the password question that would otherwise be asked when the dial directory is called up. This may be found useful in the case where you want to run an unattended job with a password-protected dial directory (but be aware that this compromises security somewhat).

## ***No modem initialize: /X***

If the /X parameter is specified, then the modem will not be initialized at startup time. This can be used in the case where you have exited from Glink altogether but still have an active modem connection (where initializing the modem would almost certainly cause the connection to be dropped).



## ***Start up with a configuration list***

If Glink is started with the /C \* command line option, the user will be presented with a dialog box displaying a list of available configurations. Once the user has selected a configuration, the Glink window will be displayed and the session initiated. If the user cancels, Glink will terminate immediately.

Glink will generate the list of available configuration by enumerating the \*.glinkconfig and glwinc.\* files in the user (/U) and configuration (/CD) directories.

```
GL /C *
```

Glink will list available configurations for a specific directory only using for example:

```
GL /C c:\myconfigdir\*
```

You can specify which configuration will be preselected in the list by adding the configuration name after the '\*', the following example would select myconfig.glinkconfig:

```
GL.EXE /C c:\myconfigdir\*myconfig
```

The displayed list contains the following information for each configuration:

### **Configuration**

The configuration name is the abbreviated form of the configuration file name, generated by removing the path and \*.glinkconfig or glwinc.\* elements, e.g. C:\GlinkConfigs\MyHost.glinkconfig will be displayed as 'MyHost'.

### **Host**

This is the host name as specified in the Settings=>Communication option.

### **Description**

This is the Glink title text as specified in the Settings=>General=>Glink title bar text.

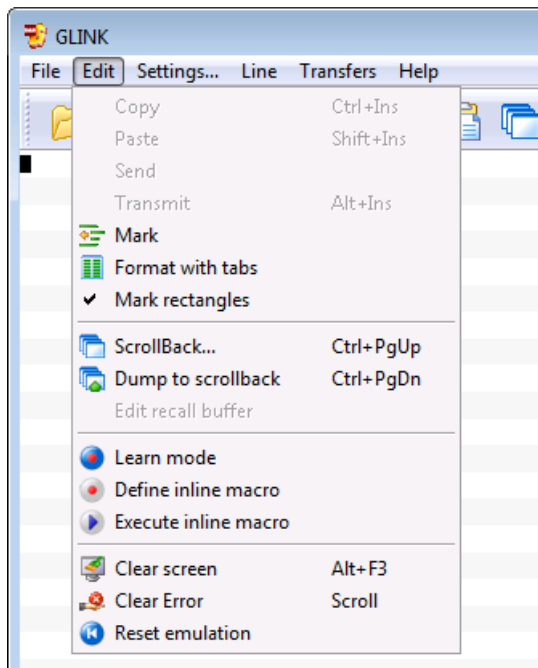
### **Path**

The full path for the configuration file.

## Basic usage

You may, in general, use the emulator the way you would use a 'normal' terminal. Some special considerations apply, however, because of the additional functions supplied by the emulator and because of the differences in the keyboard. The PC keyboard does not supply a line feed or transmit key. These have been assigned to the 'Num/-' and 'Num/Enter' keys on the PC. You will find these next to the numeric keypad at the right-hand side of the PC keyboard.

You interact with Glink by using your mouse and the Glink menu bar in the same manner you would with other Windows applications. Some of the functions are available from the keyboard, but all functionality is available by making selections from the menu bar in 'point-and-click' operations.



There is an extensive on-line help facility, accessible in either of two ways. You can select a field, check box or radio button on the screen and press F1 to receive a help message specific to the selection. You can also select Help from the Glink menu bar and search through an index of help topics.

## Summary of available Glink functions

This list provides only a brief description of each of the available functions; you will find a more complete description of each of these elsewhere in the documentation.

<i>Glink function</i>	<b>Key</b>	<b>Description</b>
132 cols swap key	Ctrl+right arrow.	Swap between left and right sides of 132 column-mode screen displayed on 80-column screen.
About Glink	Alt+F10.	Loads the 'About Glink' dialog box.
Add button on marked	Context menu.	Adds a pushbutton for the marked screen area.
Arabic controls	Alt+A.	Calls up the menu for insertion of Arabic controls.
ASCII table	Alt+F9.	Show the available character set (local or remote).
Call timer	Alt+F8.	Inspect the call timer.
Capture ASCII Data	Alt+V.	Start or stop capture of data from the line.
Chat mode toggle		Enter or exit ANSI chat mode.
Clear Error		Clears error conditions.
Clipboard with tabs		Toggles the state of the clipboard with tabs option.
Copy paragraph		Copies multiple lines to clipboard without CRLF between lines.
Cursor block		Sets block cursor.

## Using the emulator

<i>Glink function</i>	<b>Key</b>	<b>Description</b>
Cursor blink		Sets blinking cursor.
Cursor disable		Turns off the cursor.
Cursor enable		Turns on the cursor.
Cursor line		Sets line cursor.
Local dialog	Ctrl+F6.	Displays the Local dialog if the communications interface supports it. If the line is connected, then the interface Command menu will be displayed if supported.
Dial a number	Alt+N.	Enter the dial directory.
Display scrollbar	Ctrl+PgUp.	Show the scrollbar buffer.
Edit recall		Edit the command recall buffer (same as menu option)
Edit/Copy	Ctrl+C or Ctrl+Ins.	Equivalent to the copy selection in the Windows edit menu.
Edit/Cut	Ctrl+X or Shift+Del	Standard Windows cut command.
Edit/Paste	Ctrl+V or Shift+Ins.	Equivalent to the paste selection in the Windows edit menu.
Edit/Paste block	Context menu	Paste as block.
Edit/Paste send		Equivalent to the send selection in the Windows edit menu.
Edit/Paste transmit	Alt+Ins.	Equivalent to the transmit selection in the Windows edit menu.
EditUndo	Ctrl+Z.	Standard Windows undo command.

<i>Glink function</i>	<b>Key</b>	<b>Description</b>
Enter extended key		Calls dialog box for entry of extended characters for special applications.
Enter TX-Edit	Alt+Enter.	Enter 'edit mode' for the line currently being entered (VIP text modes only).
Exec inline macro	Alt+E.	Execute the current 'on the fly' macro.
File transfer	Alt+T.	Start a file transfer.
FTP client	Ctrl+Alt+F.	Starts the GlinkFTP FTP client program.
Hang up line	Alt+Y.	Hang up the current connection.
Help keyboard layout		Calls the help for the keyboard layout configuration.
Help lookup		Look up item in help file.
Help menu	Alt+H.	Show the current help menu.
Help menu commands		Show the help for menu commands.
Help on help		Show the help for help usage.
Help scripts		Show the help for the script language.
Help what's new		Show the help for new features in the program.
Host print toggle		Toggles the state of host printing.

## Using the emulator

<i>Glink function</i>	<b>Key</b>	<b>Description</b>
Inline macro	Alt+M.	Start/stop definition of 'on the fly' macro.
Kermit Server	Alt+Z.	Enter Kermit Server mode.
Keyboard mark		Starts keyboard marking.
Keyboard mark down	Shift+Down.	Starts keyboard marking, moving down.
Keyboard mark left	Shift+Left.	Starts keyboard marking, moving left.
Keyboard mark right	Shift+Right.	Starts keyboard marking, moving right.
Keyboard mark up	Shift+Up.	Starts keyboard marking, moving up.
Kill all		Kills all previous G&R DSA and DIWS sessions ('Ggate')
Learn mode		Starts the learning mode of the script language.
Local screen clear	Alt+F3.	Clear the emulator screen.
Mark rectangles		Toggles the state of the 'mark rectangles' option in the Edit menu.
Print screen	Alt+P.	Print the current emulator screen.
Print variables		Prints only the variable fields on the screen (same as menu option)
Printer setup		Calls the dialog box for printer configuration.

<i>Glink function</i>	<b>Key</b>	<b>Description</b>
Receive a file	PgDn (not assigned in VIP mode).	Receive a file from the host.
Reset APL mode		Turns off APL mode.
Reset emulation		Initializes the current emulation mode.
Reset error	Alt+R, also available on Scroll Lock.	Reset any error indication.
Reset local mode		Turns off local mode.
Restart comms	Ctrl+F7.	Restart the communications interface, disconnecting first if necessary.
Ruler toggle	Ctrl+period.	Toggles the state of the screen ruler.
Save in scrollbar	Ctrl+PgDn.	Save the current page into the scrollbar buffer.
Screen dump	Alt+W.	Dump the current screen to file.
Script command		Execute a single script command.
Scroll down	Alt+down arrow on the cursor pad.	Scroll the screen down locally when the physical screen is displaying fewer rows than are being emulated (applies to VIP 72-line mode only).
Scroll left	Alt+left arrow on the cursor pad.	Scroll the screen left locally when the physical screen is displaying fewer columns than are being emulated.

## Using the emulator

<i>Glink function</i>	<b>Key</b>	<b>Description</b>
Scroll right	Alt+right arrow on the cursor pad.	Scroll the screen right locally when the physical screen is displaying fewer columns than are being emulated.
Scroll up	Alt+up arrow on the cursor pad.	Scroll the screen up locally when the physical screen is displaying fewer rows than are being emulated (applies to VIP 72-line mode only).
Send a file	PgUp (not assigned in VIP mode).	Transmit a file to the host.
Send break	Alt+B.	Send a break signal to the host.
Send login name	Alt+F6.	Send the currently defined user name.
Send password	Alt+F7.	Send the currently defined password.
Set APL mode		Turns on APL mode.
Set local mode		Turns on local mode.
Setup menu	Alt+S.	Enter the system setup menu.
Show Files	Alt+F.	Enter the file display.
Show line buffer	Alt+F5.	Show the current contents of the line buffer.
Start a script	Alt+O.	Select a script file for execution.
Stop comms		Terminates the current connection.
Terminate		Leave the emulator. Default assignments are Alt+Q, Alt+X and Alt+F4.



<i>Glink function</i>	<b>Key</b>	<b>Description</b>
Toggle APL mode	Ctrl+F8.	Toggles state of APL mode.
Toggle Caps Lock	Caps Lock.	Toggles Caps Lock state.
Toggle debug mode		Toggles debugging mode.
Toggle insert mode	Ins.	Go in and out of insert mode.
Toggle local mode	Alt+L.	Go in and out of local mode.
Toggle Num Lock	Num Lock.	Toggles Num Lock state.
Toggle print logging	Ctrl+Alt+P.	Toggles print logging status.
Toggle Scroll Lock	Scroll Lock.	Toggles Scroll Lock state.
Toggles menu	Alt+U.	Show the emulator toggles menu.
Toplevel help menu	Alt+G.	Calls the main Glink menu (if configured).
TX-Edit back	Ctrl+up arrow.	Perform command recall looking backwards in the history buffer (VIP text modes only).
TX-Edit forward	Ctrl+down arrow.	Perform command recall looking forwards in the history buffer (VIP text modes only).
Unlock keyboard		Unlocks a keyboard that has been locked by the host machine.
Zoom	Status line	Changes the font and window size.
Zoom in		Increases the font and window size.
Zoom out		Decreases the font and window size.

## Summary of available keyboard functions

The following table shows the Glink function, the keystrokes that you use to call the function, and the menu path to use from the Glink menu bar. While you can perform most functions using your keyboard, it is more likely that you will be using your mouse to select from Glink's menu bar.

<i>Glink function</i>	<b>Key</b>	<b>Menu equivalent</b>
ASCII capture	ALT+V	File/Capture
ASCII table	ALT+F9	Help/Character tables
Local dialog	CTRL+F6	Line/Local dialog
Call timer	ALT+F8	Line/Time online
Chat mode (ANSI/VT102 only)	ALT+F4	Edit/Chat mode
Clear screen locally	ALT+F3	Edit/Clear screen
Define inline macro on/off	ALT+M	Edit/Define inline macro
Dial directory	ALT+N	Line/Directory
Minimize Glink	ALT+D	
Enter edit mode (VIP text mode only)	ALT+ENTER <sup>1</sup>	
Execute inline macro	ALT+E	Edit/Execute inline macro
File window	ALT+F	File/File Display
Hang up (disconnect)	ALT+Y	Line/Hangup line
Help menu	ALT+H	Help
Host name select (DEC LAT)	CTRL+F6	Line/Local dialog
Kermit server menu	ALT+Z	Transfer/Kermit server mode
Line buffer display	ALT+F5	Line/Line buffer

<i>Glink function</i>	<b>Key</b>	<b>Menu equivalent</b>
Local scroll down	ALT+DOWN ARROW <sup>1</sup>	ALT+DOWN ARROW <sup>1</sup>
Local scroll left	ALT+LEFT ARROW <sup>1</sup>	
Local scroll right	ALT+RIGHT ARROW <sup>1</sup>	
Local scroll up	ALT+UP ARROW <sup>1</sup>	
Macro keys	ALT+0 - ALT+9	
Manual file transfer	ALT+T	Transfer/File transfer menu
Print screen	ALT+P	File/Print screen
Program information	ALT+F10	Help/About Glink
Quit emulator	ALT+Q OR ALT+X	File/Exit
Recall line backwards (VIP text mode only)	CTRL+UP ARROW <sup>1</sup>	
Recall line forwards (VIP text mode only)	CTRL+DOWN ARROW <sup>1</sup>	
Receive a file (not in VIP mode)	PGDN	
Reconnect to host	CTRL+F7	Line/Restart interface
Ruler toggle (crosshair)	ALT+.	Crosshair on/off
Screen dump to file	ALT+W	File/Dump Screen
Send a file (not in VIP mode)	PGUP	
Send password	ALT+F7	Line/Password send
Send user name	ALT+F6	Line/Logon name send
Setup menu	ALT+S	Settings
Start a script	ALT+O	File/Script procedure

## Using the emulator

<i>Glink function</i>	<b>Key</b>	<b>Menu equivalent</b>
Switch left/right in 132-col	CTRL+RIGHT ARROW	
Toggle menu	ALT+U	Settings/Toggles
Scrollback buffer	CTRL+PGUP	Edit/Scrollback
Save page in scrollback buffer	CTRL+PGDN	Edit/Dump to scrollback
X.25 PAD command menu	CTRL+F6	Line/Local dialog

<i>Emulated key</i>	<b>PC KEY</b>
Backspace (ASCII 08 character)	BACKSPACE
Break	ALT+B
Clear	CTRL+HOME
Clear Tab	CTRL+TAB <sup>1</sup>
Del (ASCII 7F character)	CTRL+DEL
Delete attribute	CTRL+F10
Delete character	DEL
Delete line	ALT+K
Erase to end of line	END
Erase to end of page	CTRL+END
F2	F2
F2 (VIP mode only)	PGDN
F11	CTRL+F1
F11	F11 <sup>1</sup>
F12	CTRL+F2
F12	F12 <sup>1</sup>
Home	HOME
Home	KEYPAD/5 <sup>1</sup>
Initialize	ALT+I
Insert line	ALT+J
Insert mode	INS
Line Feed	NUM/-
Local	ALT+L
Next Segment	ALT+END <sup>1</sup>
NUL	CTRL+2

## Using the emulator

<i>Emulated key</i>	<b>PC KEY</b>
Previous Segment	ALT+HOME <sup>1</sup>
Reset	ALT+R
Scroll Down	ALT+PAGE UP <sup>1</sup>
Scroll Up	ALT+PAGE DOWN <sup>1</sup>
Set attribute	CTRL+F9
Set tab	ALT+TAB <sup>1</sup>
shifted F2	SHIFT+F2
shifted F2 (VIP mode only)	PGUP
shifted F11	ALT+F1
shifted F11	SHIFT+F11 <sup>1</sup>
shifted F12	ALT+F2
shifted F12	SHIFT+F12 <sup>1</sup>
Transmit	NUM/ENTER

Any of the above keys may be reconfigured.

---

<sup>1</sup> These keys are supported for the enhanced keyboard only. Enhanced keyboard keys combined with the ALT key refer to the **gray** keys, not to the keys on the numeric keypad, in those cases where there is an alternative.

**IBM 3270/5250 keyboard**

<i>Emulated key</i>	<b>PC key</b>
Backspace	BACKSPACE
Backtab	SHIFT+TAB
Clear	PAUSE OR CTRL+HOME
Delete character	DEL
Dup	CTRL+D
Enter/New line	NUM/- (also ENTER if option not set)
Erase input	CTRL+END
Erase to end of field	END
Home	HOME
Insert mode toggle	INS
PF1 to PF12	F1 to F12
PF13 to PF24	SHIFT+F1 to SHIFT+F12
Reset	LEFT CTRL OR SCROLL LOCK
Send	RIGHT CTRL OR NUM/ENTER if option set)
Tab	TAB
<b><i>3270-specific keys</i></b>	
Alpha override	CTRL+A
Break (ATTN)	ESC OR ALT+B
Cursor select	CTRL+C
Field mark	CTRL+F
PA1 to PA3	CTRL+F1 to CTRL+F3
SYSREQ	SHIFT+ESC OR CTRL+S
<b><i>5250-specific keys</i></b>	
Break (ATTN)	ESC, ALT+B OR BREAK

## Using the emulator

<i>Emulated key</i>	<b>PC key</b>
Field Exit	CTRL/NUMENTER or RIGHTCTRL
Field Minus	CTRL/NUM-
Field Plus	CTRL/NUM+
Help	ALT+HOME
HostPrint	UNASSIGNED (ESC+P)
Test Request	CTRL+T or ALT+DEL
Roll Down	PGUP
Roll Up	PGDN
SYSREQ	SHIFT+ESC, CTRL+S or ALT+END



## Local keyboard entry

The previous summaries apply to keys that may be used when running as a terminal. Note that in several cases, such as when you are asked for the name of a file, or filling out a field in your appointments book, then the LOCAL editing keys apply to entering data in the field concerned. Here is a summary of the keys that you may use to enter data into such fields:

<i>PC key</i>	<b>Action</b>
HOME	moves to the first character of the field
END	moves to the character after the last
LEFT ARROW	moves one character to the left
RIGHT ARROW	moves one character to the right
UP ARROW	moves to previous field in multiple-choice menus
DOWN ARROW	moves to next field in multiple-choice menus
INS	toggles 'insert mode'
DEL	deletes the character under the cursor
BACKSPACE	deletes the character to the left of the cursor
CTRL+END	deletes the field from the current position
F1	provides context-sensitive help
F3	gets back the last value you entered in a field
ENTER	exits, entering the value into the field
ESC	exits without entering a value

These keys apply whenever the emulator asks you for data locally, in one of its popup windows on the screen.

## Using the mouse

Use of the mouse in parts of the screen other than the main emulator window follows normal Windows usage for resizing and moving the Glink window, selecting menu options, and the like. Information about this type of function is available in your standard Windows manuals and help files.

Use of the mouse in the emulator window also follows normal practice, but we shall here summarize some of the important differences and a number of additional functions that are slightly 'non-standard'.

**Moving the cursor** is done by left-clicking the location to which you wish to move. Note that this functionality is only available for those emulations where the cursor may be freely moved locally, usually those operating in TEXT or FORM mode.

**Marking of an area of text** on the screen is done by pressing the left mouse button at the start of the area to be marked and keeping it pressed while moving the mouse to the other end of the area to be marked. Then release the left mouse button. Depending on the setting you have chosen for 'mark rectangles' in the Edit menu either a rectangular area will be marked, or all text between the starting and ending position on a line by line basis. If you wish to mark using the other style of marking, you may either change the setting of this option or hold down the `CTRL` key when you press the left mouse button.

**Extending the marked area** on the screen is done by pressing the `SHIFT` key when you press the left mouse button. The start of the previous mark is remembered and you may now choose a different endpoint.

**Marking a single word or filename** is done by **double-clicking** the word you wish to mark. Wrapping will occur if the word extends to the next line, however, a CR/LF will still be inserted in the normal way at the end of the line when the text is copied to the clipboard.

**Removing a mark** is done by clicking just once anywhere in the window.

Using the **right-hand** mouse button in the main emulator and scrollbar windows provides the most-often used functions in a floating menu.

The **middle** mouse button (or mouse wheel) is used to gain direct access to the scrollbar window, and your mouse wheel may be used in the normal way to scroll that window.

Any of these functions may be disabled if a script that traps mouse actions is running.

The **floating menu** which is displayed when clicking the right-hand mouse button in Glink's main or scrollbar windows, contains some frequently used commands plus a few extra commands which are only enabled when there is a marked area. These commands are:

**Print marked**                      prints the marked area

The print is done in the same way as the Print screen command.

**Mail marked**                      e-mails the marked area.

This command uses MAPI to display your e-mail system. The marked area will be used as the text of your message. If Glink is unable to load the MAPI modules, then this option will remain disabled.

**Process marked**                  executes the associated application

The Process marked option allows you to execute the associated application if it is a file name, or start your Web browser if it is a URL. You can use the double clicking functionality mentioned above to automatically select a word or filename. The marked area will be treated as a contiguous string. All leading and trailing spaces will be removed as will any superfluous quotes and brackets.

**Lookup marked...**              passes the marked text for internet search

The Lookup marked option allows you to pass the marked text to one of a number of internet search functions. For example you could mark an address and then look up the address using Google maps, or mark a name and search for it on LinkedIn. The search engines delivered with the program are fixed but you may change them by (1) saving your current configuration (2) manually editing the `def.glinkconfig.ini.glinkdata` file and changing the lines that start with `LUn`. You can specify as many (or as few) search engines as you need; and the marked text will be inserted into the URL where you provide a `%1` indicator.

You may add your own favourites to this floating menu by using the `CONTEXT` script command. You can use the script command to send a macro, perform a Glink menu command or simply execute a script, for example:

```
CONTEXT MAIN ADD "=perform copy;perform pxmt" "Copy and xmit"
```

## Using the emulator

The main Glink windows floating menu also allows you to move the cursor to the mouse location.

**Move cursor** moves the cursor to the mouse position

This option is only enabled if the current emulation mode supports moving the cursor to any part of the screen. The only supported modes are FORM, TEXT and TX-RET mode.

## VIP edit mode

Glink supports a form of command recall when running in VIP TEXT mode with the TX-RET (Transmit on return) option selected. All messages sent in this mode are logged in a 'history buffer' unless they are longer than 255 characters, in which case they are not saved. Invocation of edit mode using the default keyboard layout is done with one of the following keys:

CTRL+PAGEUP	move back in history buffer
CTRL+PAGEDOWN	move forward in history buffer
ALT+ENTER	invoke edit mode on current line being typed

These three keys are configurable with the keyboard layout setup. Entering CTRL+PAGEUP or CTRL+PAGEDOWN with typed data will confine recall to those commands starting with the typed data (case-insensitive comparison). Recall of previously entered commands (or use of the ALT+ENTER key to invoke edit mode directly) takes the emulator into 'edit mode'. In 'edit mode' the normal emulation for the keyboard is suspended in order to allow you to make any necessary modifications to the command before sending it to the host.

You may also edit the contents of the history buffer at any time using either the Edit/Edit recall buffer command in the main menu, or by pressing the F1 key any time you are actually working in edit mode. You may edit anything you choose, including copying and pasting. You will also be positioned at the command where you left the caret on exiting the edit window.

Once you are in edit mode, the following keys are active:

<i>Edit key</i>	<i>Action</i>
ALPHANUMERIC KEYS	typed data inserted into the current line, moving the cursor forward
ESC	clears current command and turns off edit mode
ENTER or NUM+	sends current command after moving cursor to the end of the command
LEFT ARROW	moves one character to the left unless at start
RIGHT ARROW	moves one character to the right unless at end
HOME	moves to start of command
END	moves to end of command
CTRL+LEFT	moves back one word
CTRL+RIGHT	moves forward one word
BACKSPACE	deletes the character behind the cursor
CTRL+BACKSPACE	deletes from the start of the word to the cursor
DEL	deletes the character under the cursor
CTRL+DEL	deletes from the cursor to the end of the word
CTRL+END	deletes from the cursor to the end of the command
CTRL+HOME	deletes from the start of the command to cursor
UP or CTRL+UP	recalls previous command from the history buffer
DOWN or CTRL+DOWN	recalls the next command from the history buffer
ALT+HOME	moves to beginning of history buffer
ALT+END	moves to end of history buffer
F1	invokes editor for history buffer

## *The dial directory*

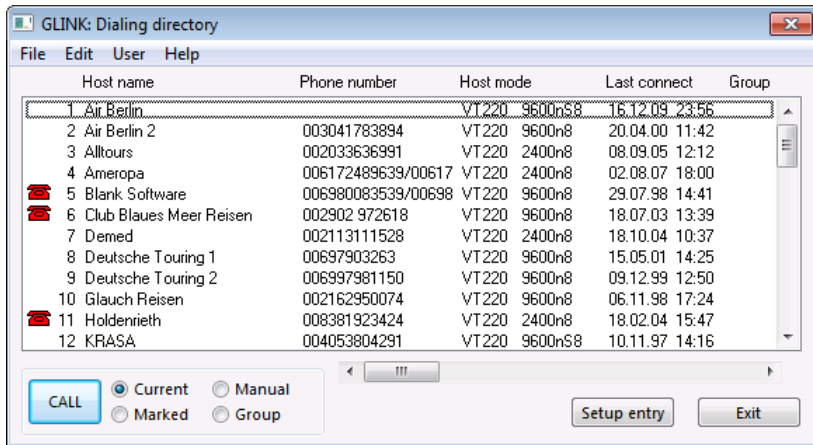
Glink provides a dial directory that can automate most of your telephone calls for you, if you are using a 'smart modem' for your communications work. If you do not have such a modem, then this section is probably not for you, although you may use some of the functions provided nonetheless.

Functions supported by the dial directory include:

- multiple directories with up to 999 entries in each
- password protection for the entire directory
- automatic call of any number in the directory
- manual dial to a number not in the directory
- attached scripts provide auto login function
- automatic redial to systems that are busy
- automatic logging of date and time of last call
- automatic logging of date and time of last attempted call
- automatic logging of total number of calls to each system
- logging of duration of call and total time used
- periodic totals for time used and number of calls
- optional log file records each call as it is made
- user defined comment for each system shown on-screen
- configuration of alternate number if main number is busy
- configuration of host type in detail
- configuration of line parameters for each host
- circular dial queue to dial through selected hosts
- configuration of password for each host to use in script
- dial entries may be called in from scripts
- packing, rearranging and sorting functions built in
- flexible formatting of directory to printer
- full support for international dial codes

To view the dial directory, press the `ALT+N` key or select `Line/Directory` from the Glink menu bar. If this is the first time you are using the function, you will see a blank page in that you as yet have no entries in the directory. Note that if you wish the emulator to start up in the dial directory there is a setup option provided for you to specify this.

A typical dial directory screen might look like this, once you have entered some telephone numbers:



You may move around the dial directory using the up and down arrow keys, and also the `PGUP` and `PGDN` keys. In that more information is stored about each system than can be displayed comfortably on a single page, the left and right arrow keys provide you with a choice of four different sets of data about each system. Press the `ESC` key or click on the 'Exit' button to remove the dial directory window.

## Entering data into the directory

To enter a system into the directory, click on the 'Setup entry' button in the dial directory window. You are provided with a window where you can enter the relevant data for a particular host system.

You position yourself on the item you wish to enter or change using the mouse or the up and down arrow keys.

An explanation of how the different fields are used follows in the table below.

## Using the emulator

<i>Field name</i>	<b>Description</b>
<b>Host name</b>	The name you wish to use for this system, and which will appear in the dial directory. In addition, this name will appear in the status line while you are connected to the system if you have selected that particular option in the setup menus.
<b>Phone number</b>	The number to call for this system (alternatively a network address).
<b>Alternative number</b>	An alternative number to use if the call on the phone number first number fails for any reason. May be left blank.
<b>Group (Dialing group)</b>	Systems may be grouped using this option by clicking on the 'Group' radio button, and then click on the 'Call' button.
<b>Baud rate (Line speed)</b>	Line speed at which this system runs. If you leave this option set at 'default' the system will use the speed configured in the communications setup menu; otherwise the program will set the port to this speed before contacting the host system.
<b>Parity</b>	Parity setting for this system.
<b>Strip parity on input</b>	Corresponds to the option in the comms setup.
<b>Comms port</b>	Which communications port you wish to use. If you only have one communications port you are using with Glink, just leave this option set to the default.
<b>Script name</b>	The name of a script file to use for automatic login to this system. May be left blank.
<b>Login name</b>	User name for this system. This may be called from a script file using the \$LOGIN variable, used interactively with by selecting <code>Line/Logon name send</code> from the Glink menu bar.



<i>Field name</i>	<b>Description</b>
<b>Password</b>	Password for this system that may be called from a script file using the \$PASSWORD variable, or used interactively either by selecting <code>Line/Password send</code> from the Glink menu bar or by pressing <code>ALT+F7</code> while logged on. The actual password is not shown unless you are positioned on this field. This allows you to edit the other options without necessarily disclosing your password to onlookers.
<b>Host mode</b>	ANSI, VT102/220, VIP, IBM 3270, Prestel, Minitel mode, depending on the host you are logging into.
<b>Eight-bit host</b>	Specify depending upon whether this host can use extended ASCII or not.
<b>Keyboard</b>	Which keyboard transliteration to use for this host.
<b>Layout (F-key definition)</b>	Alternative keyboard layout for this host.
<b>Default protocol</b>	May be set to override the default file transfer protocol defined in file transfer setup.
<b>Extra modem command</b>	If you need to send an additional command to the modem before contacting this system, enter the command here. This can be used for example to select MNP or not depending upon whether this is implemented on the system you are calling.
<b>Comments</b>	Here you may enter any data you wish. This will be shown on the screen for this system under the normal entry. May be left blank.

### **Calling a single system**

To make a call, select the system you wish to call and press the `ENTER` key.

Clicking on the 'Call' button has the same effect as pressing `ENTER`. Make sure that the 'Current' radio button is selected if you are only calling a single system.

A window will open showing you the most relevant information about the computer you are calling to, and will also provide you with continuous information about the progress of the call.

You may abandon the call at any time by pressing the `ESC` key or clicking on the 'Cancel' button.

If the call is unsuccessful for some reason (for example, if the telephone number is busy), then the emulator will pause for a predefined time (see the section on Setup), and redial the number. This process will be repeated until a connection is made or until the process is terminated manually.

When the connection has been made, the windows will disappear and you will be in contact with the system. If you have specified a script in connection with this entry in the dial directory, then this will be started automatically for you. Also several of the emulator options are reset to their default values (for example insert and graphics mode).

You can 'put away' the dial window by clicking on the minimize button. The window will shrink down to an icon, and signal you visually (and possibly audibly) when the connection has been made. A setup option is also provided to tell Glink that you wish the emulator to pop up from the minimized state if you would rather be warned in a slightly more noticeable way.

### **Calling marked numbers**

If you wish to call more than one system, any or all of which may be difficult to reach, you can use the circular dial function to do this. You must first 'mark' the systems you wish to call.

You mark the systems by selecting them in the list box containing the systems you have configured. From the dial directory's Edit menu, you can select Mark all entries or Unmark all entries.

When you are ready to dial, select the 'Marked' radio button and then click on the 'Call' button. The emulator dials through the marked systems, one at a time, until one of the systems has been reached. At this time the mark is removed for that system, so when you have finished working with the system you reached, you will only have to repeat the call operation to redial the remaining systems in the 'queue'.

### ***Calling a group of numbers***

If there are particular groups of systems for which you will often need the circular redial function, then you should define a 'dial group' using the option provided in each dial directory entry.

To start a group dial, select the 'Group' radio button in the call box, and click on the 'Call' button. You will be asked for the identifying letter(s) for the group(s) to which you wish to dial.

In the same way as for calling marked systems, the first system reached will be removed from the list, so you can continue calling the other members of the group. The group dial function works by comparing the letters you specify when calling the function to the letters specified in each entry. Any entry that contains any letter in common with the specified set of letters will be included in the group. Each such entry will be marked (any systems not matching will be unmarked). Once this has been done, the call is processed in exactly the same way as when you mark systems manually and use the function for calling marked numbers.

### ***Calling a number manually***

If you have a number you wish to dial once only and don't want to enter it in the dial directory, select the 'Manual' radio button and click on the 'Call' button. A small window will open allowing you to enter the number you wish to dial. The rest of the call will proceed in the same as way as when placing a call to an entry in the dial directory, with the exception that Glink will use whatever parameters you currently are using.

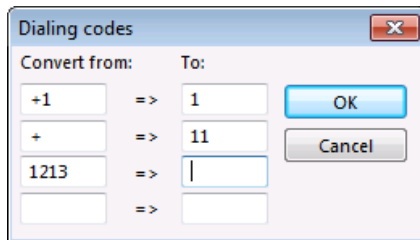
## Calling a non-data number

The dial directory may also be used to place normal 'voice' calls if you have a telephone apparatus connected to your modem. To do this, simply dial the number in the normal way. As soon as the text 'Waiting for connect' appears, lift your telephone receiver and press `ESC` to disconnect Glink from the line. This applies only if you have not set the 'simple dial' option. If you have, then you must wait for the dial operation to finish, either by listening through the modem loudspeaker or by just guessing.

## Dial directory codes

The emulator supports use of configurable dial codes with the `User/Codes` selection from the dial directory menu bar. This is of use for those who will move from one calling area to another and wish to use the same dial directory without having to change the numbers that have been defined there.

The way this function works is that you may define one or more 'abbreviations' and 'equivalents' in the Dial codes screen. Every time you dial a number, this list is checked (from top to bottom). If the beginning of the number you are about to dial matches the abbreviation then that abbreviation will be replaced by its defined equivalent. An example will make this clearer. In the United States (international code 1) you dial numbers abroad by first using 011 and then the country code. Internally in the USA, you must also add a leading 1 in front of the area code when calling outside your own area, while numbers that are local may be used with no prefix at all. Let's assume that you live in Los Angeles (area code 213) and are setting up three numbers, one in Norway (international code 47), one in Los Angeles, and one in Miami (area code 305). You would set up the following in your dial codes:



All numbers you add to the dial directory may now be specified in 'international' format. In other words, a number in Los Angeles would be defined as '+1 213 852 1234' rather than just '852 1234' (which is what you would actually dial). Using this convention, you can see that the first rule will replace the '+1' with '1', and the third rule will then remove the '1213' that results from this replacement (spaces are not counted during the comparison). If you should dial a number abroad, then the leading plus sign will just get replaced by the international dial code, while other numbers in the USA will receive an extra '1' at the front, just as we needed.

If you now should want to use your dial directory in Miami, the **only** change you have to make (assuming that you have coded all your telephone numbers correctly) will be to change the third rule so as to remove '1305' instead of removing '1213'. Should you wish to use your dial directory in another country altogether, it's almost as simple; rule number one would be changed to reflect the country code for the country you are in, rule number two to give the local code specifying international access, and rule number three to strip the local area code.

## ***Dial directory abbreviations***

Besides providing dial code conversion as described above (which is basically designed to allow you to configure telephone numbers in such a way as to allow you to use your dial directory irrespective of where you are calling from simply by modifying entries in the Dial codes screen), Glink provides you with up to 6 abbreviations that can be used with the numbers configured in the dial directory. These abbreviations are configured not in the dial directory itself, but in the `Settings/Modem/Strings` menu.

The abbreviations are defined on the letters A to F, and up to 24 characters may be defined on each. The resulting 'telephone' number will also be passed through any options configured in the Dial codes screen described above; this is done after any abbreviations have been processed. In contrast to the Dial codes options, these dial abbreviations may be used anywhere inside the telephone number configured in the dial directory, not just at the start of the string.

## Using the emulator

Dial abbreviations may be found useful in many different circumstances. An example would be use of a credit card number or 'password' that has to be typed in after the phone number and is needed for more than one system (or results in a telephone number that is too long to insert in the normal slot provided in the dial directory; while the numbers and abbreviations themselves are limited to 24 characters, the resulting number that is actually used to dial with may be anything up to 60 characters in length). Another use related to the Dial code option could be an abbreviation for your local area code if you are using 'complete' telephone numbers so as to make your dial directory portable. Referring to the example given for the Dial code screen, if your local code was in fact '+1 213' then you could define the A abbreviation as '+1 213' and enter local numbers in the form 'A123 4567'. In that dial code expansion is performed after abbreviation expansion then this will still work even when you dial from another area.

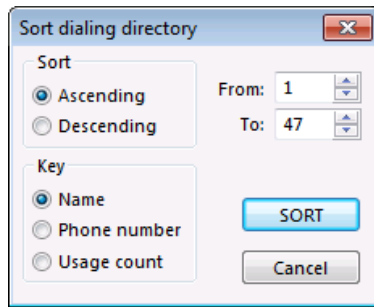
Expansion of abbreviations is performed from left to right inside the number and is not recursive. In other words, if an abbreviation contains a letter corresponding to another abbreviation then that letter will not be expanded. This is done so that the default abbreviations will leave any of the letters A to F unchanged in that some modems provide extra functions inside a dial string that use one of these letters. If your modem does this then you will want to leave the abbreviation corresponding to that particular letter set to the default value of translating the letter to itself.

## *Finding a particular entry*

If your dial directory grows large, then it may be difficult to locate the entry you are looking for. Glink provides a simple searching function to deal with this problem. Press `CTRL+SHIFT+F` and a window will appear asking you what you wish to search for. Enter any string here and Glink will search for the first system which contains this string anywhere in the host name (the search is case independent). If this was not the entry you were looking for, then press `ALT+F` again and the next entry containing the given string will be shown.

## *Sorting the directory*

Any portion of the dial directory may be sorted on one of several criteria. To call the sorting function by selecting `File/Sort` directory from the Dial directory menu bar. A 'sort window' will appear:



Options in this menu may be selected by pressing the first letter of the option in the menu, by using up and down arrow to select in the bottom half, or by using left and right arrow to select in the top half. Pressing `ESC` terminates the sort function with no action, while pressing `ENTER` will start the sort with the options currently highlighted.

Sorting may be done in normal or reverse order, and using the host name, the telephone number or the usage count for the systems being sorted. Either the entire directory may be sorted (this is the default) or a section of the directory, specified by entering the numbers of the first and last entries to sort.

Use of the sort function on various groups with various criteria can make your dial directory easier to use; experiment with the functions to see which arrangement works best for you. For example, you could start by sorting the entire directory descending on usage count so as to get your 10 most often used numbers onto the first page of the directory. Follow this by sorting all except the first ten on telephone number to separate out international calls, and then sort alphabetically inside each of the domestic and international groups.

## ***Dial directory passwords***

In that the dial directory contains valuable information, such as login names and passwords, you may wish to protect the directory with a separate password. To use this function, select `User/Password` from the Dial directory menu bar.

The system will ask you for the password you wish to use (twice to be absolutely certain that you don't make a typing error) and this will then have to be supplied later when the dial directory is used. The password itself is only stored in encrypted form; this means that if you should lose the password then you will not be able to use your dial directory.

## Using the emulator

### **SAVE THE PASSWORD IN A SAFE PLACE!**

The encryption is such that we will not be able to retrieve your dial directory data if the password is lost. When the password has been accepted, all login names and passwords in the dial directory will also be encrypted, and there is intentionally no function provided that will decrypt these without the original password. An option in the modem setup menu does allow you to disable the password checking - in this case you will be allowed to use the directory but your passwords and login names will be irretrievably lost!

Another option in the modem setup menu allows you to specify whether or not you wish to have to specify the password every time the dial directory is used or just at the start of each Glink session. The default is to only ask for the password the first time that you use the dial directory in a given session. However, if you are in the habit of leaving your terminal unattended while Glink is still running, you may wish to have the added security that this option provides.

You may change your password at a later time simply by using the Password function again. In this case, the emulator will ask you to confirm your original password first.

If you use a script to log into your host machine, then the login names and passwords will be available to the script through the built-in `$LOGIN` and `$PASSWORD` variables. This helps ensure that you never leave your passwords available in clear-text on your hard disk.

Note also that when you are viewing the main dial directory and have selected the page containing passwords, then the passwords will NOT be shown unless you specifically ask for this. You can select `User/Password visibility` from the Dial directory menu bar to toggle password visibility in this screen.

## ***Login name***

The login name default is a 'general' login name for the entire directory. This name will be used for all dial directory entries that do not have a separate name specified for them. The Login name screen is available when you select `User/Login name default` from the Dial directory menu bar.



## ***Initialize statistics***

The emulator keeps track of several statistics about each entry in the dial directory. This includes number of calls and time logged on, amongst other data. These particular statistics are also collected as periodic totals (you may see these by clicking the 'Display' button). To start a new 'period' select `File/Initialize statistics` from the Dial directory menu bar. This will reset the periodic total for every entry in the directory (while preserving the accumulated total, of course).

## ***Printing the directory***

The dial directory may be sent to your printer with the `ALT+P` key (or by selecting `File/Print directory` from the Dial directory menu bar under Windows). When you use the print function, you will see a list of the various pieces of information that you may print out, together with the normal width of the field. Select the items you wish to include in the printout, selecting them in the order (left to right) you wish them to appear. Adjust the default field width for any of the fields by pressing the 'Wider' and 'Narrower' buttons. When you are ready to print click on the 'Print' button. `ESC` will exit from the print menu without printing, in the normal way. The configured codes (or files) from the printer setup menu will be sent before and after the data sent to the printer.

## ***Moving to another dial directory***

You may if you wish use multiple dial directories (see the command line `/P` switch; this allows you to select a particular directory other than the default '`GLINK.PHO`' when you start up). To switch to another directory while using Glink simply use the dial directory `ALT+J` function, which will ask you for the name of the directory you wish to switch to.

## ***Dial directory functions***

Several keys are provided to enable you to organize your directory in the exact way you wish. When using these functions, remember that if you have used the '`DIAL n`' syntax in any scripts then the scripts may have to be updated to reflect the changed positions of entries that may have been moved.

## Using the emulator

- The `ALT+M` key lets you move an entry to any other unoccupied position in the directory. The previous position is left empty. Under Windows, this is accomplished by selecting `Edit/Cut` entry from the Dial directory menu bar, followed by `Edit/Paste` entry.
- The `ALT+C` key lets you copy an entry to any other unoccupied position in the directory. The previous position is not changed. This is useful if you wish to use an entry as a basis for making a new entry. Statistical information in the copy is zeroed. Under Windows, this is accomplished by selecting `Edit/Copy` entry from the Dial directory menu bar, followed by `Edit/Paste` entry.
- The `ALT+O` key lets you open a space at the current position in the dial directory. The current entry and all entries below it are moved down until an empty entry is found. Under Windows, this is accomplished by selecting `Edit/Open space` from the Dial directory menu bar.
- The `ALT+U` key allows you to 'close up' a space in the dial directory. This key may only be used when you are pointing at an empty position that is immediately followed by an occupied position. The occupied position and all occupied positions following it until the next following vacant position are all moved up one position. Under Windows, this is accomplished by selecting `Edit/Close up space` from the Dial directory menu bar.
- The `ALT+K` key will compress your directory into the minimum space by moving up all entries to fill unoccupied positions. Under Windows, this is accomplished by selecting `File/Pack directory` from the Dial directory menu bar.
- The `DEL` key deletes the entry to which you are pointing. NOTE that if you delete an entry by accident, you may retrieve it simply by pressing the `DEL` key once more. Under Windows, this is accomplished by selecting `Edit/Cut` entry from the Dial directory menu bar. (To retrieve an accidentally deleted entry, select `Edit/Paste` entry before cutting or copying anything else.)
- The `F10` key provides a help page summarizing the keys you have available in the dial directory. Under Windows, select `Help` from the Dial directory menu bar.

## Telephone exchanges

One of the more difficult things to get working with a PC and modem is to dial through a telephone exchange. Typical problems that arise are the inability of the exchange to handle tone dialing, and failure of the modem to recognize either the local or the main dial tone. Such problems are best resolved by experimenting manually with dial commands. Your modem manual will explain in detail what the various commands do. Some things to try are:

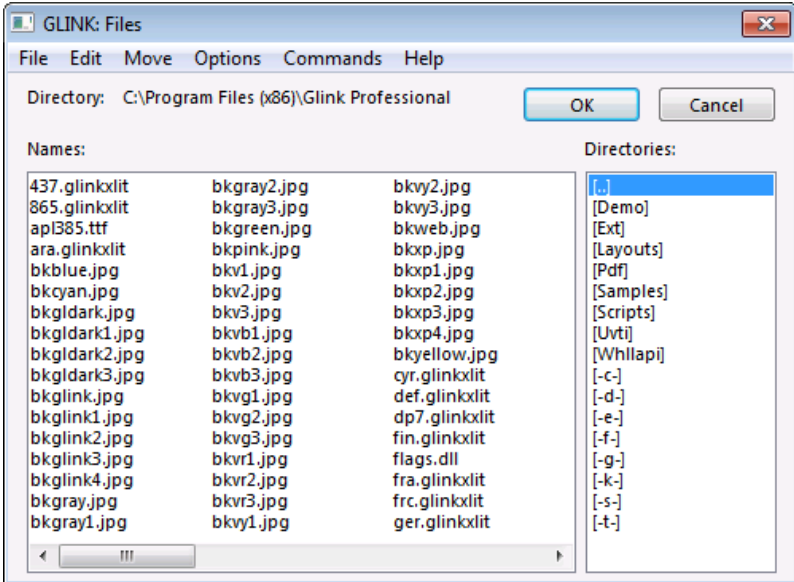
- ATDT0Wnnnnnnn                    dial zero, wait for new tone
- ATDP0Wnnnnnnn                    dial zero (pulse), wait for new tone
- ATDT0,,,,,nnnnnn                dial zero, wait two seconds
- ATDP0,,,,,nnnnnn                dial zero (pulse), wait two seconds

If none of these work then the modem may not be recognizing the first dial tone. Check your modem manual to see which command is needed to set 'blind dial' (i.e. wait for a predefined period and then dial anyway). On most modems, this will be an ATXn command, where n varies from modem to modem.

If you needed an Xn command then you should add the appropriate command to your modem initialization string (modem strings menu in the setup, add the Xn to the end of the string that is there already). In any case, when you have found out which of the above dial commands work for you then you should include the correct string (the part before the number 'nnnnnn') as your 'dial string' in the modem strings menu.

## The file display

Selecting **Files/File display** from the Glink menu bar provides you with a standard dialog showing the files in your current PC directory. This may be useful either for positioning yourself correctly in the file system preparatory to file transfers, or for performing basic file operations without the need of switching to a separate window.



To customize your own file lister, editor, or print programs onto the 'commands' menu, you may specify these as command line options (or better, as options in the GLWINOPT environment variable). The options `/FL`, `/FE`, and `/FP` respectively specify the names of your own favourite programs for each of these purposes. If your file lister were called 'showfile', your editor 'editfile', and your print spooler 'spool' you would use the following options when starting the program:

```
/FL showfile /FE editfile /FP spool
```

Double-clicking files in the file display will perform whatever action has been associated with the file type (as in the File Manager). If there is no association then the configured list program will be called.

## ***The file display menu bar***

The file display menu bar contains six selections: File, Edit, Move, Options, Commands, and Help.

### ***File***

The following selections are available when you select File from the File display menu bar:

Copy file(s)	Copies one or many files into one or many file(s) or into a named directory. To copy one or more files, you first mark (or select) the file(s) to copy.
Move file(s)	Moves files from one directory to another on the same drive. Works like copy.
Rename file	Renames the selected file or directory.
Erase file(s)	Erases one or multiple files or directories.
Print file(s)	Prints the file(s) you have selected using the program configured with the /FP option. If /FP was not used, the file will be printed using the configured printer options.
Printer setup	Allows you to choose which printer to use.
Attributes	Allows you to view and/or change the attributes for the selected file. Refer to your DOS manual for the meaning of the file attributes.
New directory	Creates a new directory with the pathname you specify.

### ***Edit***

The following selections are available when you select Edit from the File display menu bar:

Mark all files	Sets marks on all filenames in the current directory.
----------------	---

## Using the emulator

Unmark all files      Removes all marks in the current directory.

## Move

The following selections are available when you select Move from the File display menu bar:

Home directory      Jump back to the directory you were in when you entered the file display.

Script directory      Jump directly to the script directory (defined with the /O command line parameter).

User script directory      Jump directly to the user script directory (the one defined with the /OU command line parameter).

## Options

The following selection is available when you select Options from the File display menu bar:

Show hidden files      Check this item if you want hidden files to be included in the display.

## Commands

The following selections are available when you select Commands from the File display menu bar:

List file      List the selected file using the program configured with the /FL command line option (NOTEPAD is the default).

Edit file      Edit the selected file using the program configured with the /FE command line option (NOTEPAD is the default).

Execute file	Run the selected program. If the program is not an executable file, the option is unavailable. If the program is executable, you will be prompted for optional parameters before the program starts.
Command	Run a program of your choice. You can enter a complete command line, and may insert the name of the file to which you are pointing by using a percent sign (%) in the command line.

## ***The scrollbar buffer***

The scrollbar buffer is a device for saving data that has 'disappeared' from your screen. Normally this applies to data that has been 'scrolled' off the top of your screen (hence the name 'scrollback') when new lines appear at the bottom. You may also optionally add the entire current page on your screen to the scrollbar buffer by pressing the `CTRL+PGDN` key at any time. This may be useful if you are talking to a 'page' oriented system or forms package. Optionally, using the configuration menus, you may also tell the emulator to save data from the current screen whenever the screen is cleared by the host machine.

The text is saved in memory as a continuous buffer. The amount of data that may be placed there is determined by a setting in the setup menus, and is five pages of data in the delivered version of the emulator. However, depending upon how much memory you have available, you may configure up to 32766 pages for your scrollbar buffer.

Note that every time a new line is inserted into the scrollbar, a line will 'fall off' from the beginning of the buffer.

To inspect or manipulate the scrollbar buffer, press the `CTRL+PGUP` key (or select the ScrollBack option under the Edit selection on the Glink menu bar). This will show you the most recent data that has been inserted there. A help menu is available as usual by pressing `F1` or by selecting Help from the Glink menu bar. Using help will remind you of which functions you now may use, and how to use them. The first (and easiest) functions to use are those which simply move around the buffer. You can use the mouse of the following key assignments.

UP ARROW	moves back one line
DOWN ARROW	moves forward one line
PGUP	moves back one page
PGDN	moves forward one page
HOME	moves to the first page
END	moves to the last page



## ***Searching for a text***

You select the Search option from the Scrollback window menu bar. In the Search screen you specify the string to search for, the direction of the search (up or down) and whether the search is case-sensitive. When you have finished, click on the 'Search' button, or return to the Scrollback window by clicking on 'Cancel'. Click on the 'Search' button again to continue the search.

## ***Saving scrollbar to file***

Two functions are provided to allow you to write parts of the buffer to a file, for working with later. `File/Save page` from the Scrollback menu bar will save the current page you are viewing. `File/Save All` from the Scrollback menu bar will save the entire contents of the buffer. In both cases, a window will pop up asking you for the name of the file to save to. The file is saved as a standard text file that may be processed by most programs and editors. Any data already on the file is preserved, thus allowing you to perform multiple saves to the same file by repeated use of these functions.

## ***Marking a portion of the buffer***

Several of the more advanced functions described below work on a selected, or 'marked', portion of the scrollbar buffer. In order to use these functions, you must know how to 'mark' the piece of the buffer you wish to use.

When you call up one of these functions, a 'cursor' will appear in the scrollbar screen (it will usually appear in the top left-hand corner). You may position the cursor with any of the positioning keys mentioned previously, and in addition may use the left and right arrow keys. If you try to move the cursor out of the current screen, then the emulator will move through the buffer in order to keep the cursor inside the current page being viewed. The emulator also provides 'wraparound' in the horizontal direction, so moving left out of the first column will take you to the last column directly.

## Using the emulator

The piece that you mark will be a rectangular 'box' which may be any size you like, up to and including the entire scrollbar buffer. To start marking, simply move the cursor to the top left hand corner of the box you want, and press the `ENTER` key. When you continue moving the cursor, you will find that it leaves a 'trail' behind it, showing you which area is the one you currently are marking. Just move the cursor to the bottom right-hand corner of the box (at which point you should see the exact portion you intend to mark highlighted for you), and press `ENTER` again. At this point, the emulator will perform whichever function it is you required.

If at any point you change your mind and don't wish to mark anything (or decide to mark something else) then just press the `ESC` key, and you will be back in the normal scrollbar mode.

Under Windows, you will probably be marking text using your mouse. In this case, you point the mouse arrow where you want to begin marking and press the left mouse button. Keeping the left button pressed, move the mouse pointer to the end of the text block you are marking. Release the left button. You can choose to mark all text from the starting position to the ending position (line-by-line) or mark a rectangular area beginning at the start point (`Edit/Mark rectangles` from either the Glink menu bar or the Scrollback menu bar). If you prefer to use the keyboard to mark text, select `Edit/Mark` from either the Glink menu bar or the Scrollback menu bar.

## ***Transmitting a marked block***

This function allows you to do an immediate transfer of data from your scrollbar buffer to the host. (Note that the data transfer is effected by using the Windows Clipboard.) The transfer follows the rules for ASCII transfer described in the *File transfer* chapter on page 81, and all setup options that have been set for this type of transfer will apply. As soon as you have marked the block in the way described earlier, the transfer will start.

This function can be useful in many different situations, and is best illustrated with a couple of practical examples.

### ***Example 1***

You are using Glink on a dial-up line and are in the middle of entering a message when the connection fails. You have the message you wrote there on your screen, but without the scrollbar buffer you would have to log in again and rewrite the whole message. Proceed as follows:

1. Log back on to the system.
2. Proceed just as if you were going to type the message again.
3. When you get to the point where you would normally type the message, press `CTRL+PGUP`.

Mark the piece of message you have already written in the scrollbar and copy it to the Clipboard, either with the menu option or by pressing `CTRL+INS`. Select either `Edit/Send` or `Edit/Transmit` from the Scrollback menu bar to send the marked text to the host.

### **Example 2**

You are using Glink to access a database that has just presented you with a very interesting page of data. You would like to send this as part of a message to a friend you know would like to see the data. However, some of the data is confidential and you do not have the time to start editing a save of that particular screen and learning about ASCII transfers. Proceed as follows:

1. Log into your mail system.
2. Start entering the message to your friend.
3. When you get to the point where you want to insert the data, press `CTRL+PGUP`.

Mark the relevant piece of text in the scrollbar buffer and copy it to the Clipboard, either with the menu option or by pressing `CTRL+INS`. Select either `Edit/Send` or `Edit/Transmit` from the Scrollback menu bar to send the marked text to the host.

### **Saving a marked block to file**

Mark the text that you wish to save and select `File/Save` marked from the Scrollback menu bar.

### **Mailing a marked block**

If your PC is configured to use a MAPI compliant mail system, you may use the `File/Mail` marked option from the Scrollback menu bar. This option is only enabled once an area of the Scrollback buffer has been marked. When selected, this option will initiate your mail system's Send dialog box with the marked area pre-included in the message text.

### **Scrollback buffer bookmarks**

The scrollback buffer allows you to set up to ten 'bookmarks' so that you may remember a particular page and skip back to it quickly. To set a bookmark, you may press either `CTRL` or `SHIFT` together with any of the keys 0 to 9 (on the main keyboard). This will set a bookmark at the current position to which you may jump at a later time by pressing the appropriate number key (without `CTRL` or `SHIFT`). You may also jump to a bookmark by selecting the equivalent option in the Scrollback menu bar.

If you press `CTRL` rather than `SHIFT` when setting the bookmark, a dialog box is displayed that allows you to enter a name for the bookmark (up to 12 characters in length). This name will be displayed in the menu next to the bookmark number.

Finally, if a line associated with a bookmark scrolls out of the top of the scrollback buffer, the bookmark is deleted.

### **Additional functions**

You can print the contents of the entire scrollback buffer, of the displayed page or of a marked block in the scrollback buffer. These three functions are available when you select File from the Scrollback menu bar.

You can also paste or insert the contents of the Clipboard into the main emulation screen. The effects of this vary depending on which emulation mode you are in. Both of these functions are available when you select Edit from the Scrollback menu bar.

An additional function in the Edit menu allows you to delete marked lines from the scrollback buffer. If only part of a line is marked the entire line will still be removed. If lines that are marked are actually in the current screen you will not be able to delete them until they have scrolled off.

## ***Leaving the scrollbar function***

To leave the scrollbar display and return to the normal editing screen, just select `File/Exit` from the Scrollback menu bar. If you are running in VIP TEXT mode you may, however, wish to exit from the scrollbar to normal emulation mode but leave the particular scrollbar page you were looking at on the screen; a special function is provided for this, `Edit/Mark current page` followed by `Edit/Insert on main screen`. You may also minimize the Scrollback screen to an icon by clicking on the 'minimize' button. Double-clicking the icon will restore the screen. Alternatively, you may simply leave the scrollbar screen visible and return to the emulator window by clicking on it.

## ***User toggles***

Some of the more commonly used 'switches' are directly accessible via their own menu. Many of these are accessible from other keys and menus, but it's easier to have one place to go to toggle these switches. In addition, several of the 'main' functions (for example, those on the setup menus) can result in the transmission of codes to the host. The toggle menu will only set the corresponding function locally, which may often be what is required. Note that changes that you make in the Toggles screen are only in effect for the current Glink session (or until you change them again). In other words, changes to the Toggle switches do not affect your startup options. The Toggle screen is called up by selecting `Settings/Toggles` from the Glink menu bar.

To change the setting of one of the options listed on the Toggles screen, select the option and change the value. When you are satisfied with your choice, return to the emulator. There is online help explaining the use of each of these options: press `F1` for context-sensitive help or select `Help` from the Glink menu bar.

The actual menu presented will contain only those toggles that are relevant for the current emulation mode.

The following explains the switches that you can toggle using the Toggles screen.

### ***Auto Line Feed***

This option controls the current setting of the Auto Line Feed option. When it's selected, Glink will append a linefeed character to each incoming CR character; this should be used in situations where you see data coming from the host being written repeatedly in the same line of the screen. The opposite also applies; if output from the host is displayed with double spacing this may well be because this option has been selected when it should not have been. The initial setting for this option is controlled by the emulator settings menu item for Auto Linefeed In.

### ***Auto Wrapping***

This option controls whether or not the emulator should 'wrap' data ('wrapping' means that the emulator skips to the next line when the current line fills up).

### ***Automatic Tabbing***

This option controls automatic tabbing in VIP7700 and VIP7800 forms. When it's selected, each time the last character of a variable field on the screen is filled out, the cursor will move automatically to the first character of the next field. If the option is not selected then the cursor will remain in the position immediately following the variable field when the last character is typed. The option may be selected permanently using the auto tabbing option in the VIP emulation options menu.

### ***Cursor Application mode***

Cursor application mode affects the codes sent by the cursor keys when the program is emulating a VT102/220 terminal. In some circumstances a host machine may assume a different setting for this mode to the one currently active, in which case this option allows you to switch to the correct mode.

## **Echoplex**

The echoplex setting controls whether or not the characters you type at the keyboard are displayed on the screen by the emulator. Many asynchronous host machines work in 'echoplex' mode, which means that data you type in is first sent to the host machine, and then the host machine sends the characters that should be displayed on the screen back to you. Not until the characters have made the round trip will you see the data you have typed in (this normally happens so fast that most of the time you don't notice this going on).

If everything you type appears doubled, then you probably have the echoplex setting off, and it should be on. If you don't see what you are typing at all, on the other hand, one possible explanation could be that you have the echoplex setting turned on when it should be off.

The initial setting of the echoplex option is controlled by an option in the emulator setup menu.

## **Font**

This selection allows you to choose a different display font. The font used initially by Glink is set using the Window attributes setup menu.

## **Graphics mode**

Normally graphics mode is controlled completely by the host machine to which you are connected. It can sometimes happen that the setting gets out of synchronization, resulting in a display consisting of graphic characters instead of text. One time this often happens is when you are using a noisy telephone line, or as you disconnect from a dial-up line. This option allows you to reset a graphics mode that has been set erroneously.

## **Insert mode**

Insert mode controls whether or not characters you type (or that are sent by the host) are inserted into the displayed text, or overwrite the displayed text. Insert mode may also be controlled using the `INSERT` key.

### **Keyboard Lock**

The host machine may choose to prevent you from using the keyboard while data is being sent to the screen, to ensure that you don't destroy the formatting of the screen. The host will also normally *unlock* your keyboard afterwards, but this may not happen for various reasons. This option allows you to manually unlock your keyboard in order that you may continue.

### **Local mode**

This option toggles local mode. When the program operates in local mode, nothing you type will be sent to the host machine, and all incoming host data discarded.

### **Roll Mode**

This setting controls whether or not the emulator should operate in roll mode, scrolling the screen as new lines are received. Normally you will be in roll mode except when working with a host application using full-screen menus, and will be able to retrieve data that has scrolled off the screen using the scrollbar buffer.

The initial setting of the roll mode option is controlled by the option in the emulation setup menu.

### **Screen Width**

This option lets you choose between screen widths of 40, 80 and 132 columns (normally the choice of emulation mode will set this correctly for you).

### **Space Suppression**

This controls the setting of the VIP space suppression state, which decides whether spaces at the ends of lines should be sent to the host. This is normally set by the host machine to which you are connected. The initial setting for space suppression is controlled by an option in the emulation setup menu.



## Typeahead mode

This controls the current setting for typeahead mode, which is explained in more detail in the *Administrator's Guide* under the description of how to set the initial state of the option. Typeahead mode is only available under the VIP emulation's TEXT and TX-RET modes.

## VT100 keypad mode

VT100 keypad mode affects the codes sent by the keys on the numeric keypad when the program is emulating a VT102/220 terminal. In some circumstances a host machine may assume a different setting for this mode to the one currently active, in which case this option allows you to switch to the correct mode.

## VIP mode

This controls the current mode of the VIP emulation. As with many of the other options in the toggles screen, this is normally controlled by the host machine, but is provided here for convenience. In VIP7700 mode, there are only two choices, text mode and forms mode. In VIP7800 mode there are more.

**CHAR** mode means that data is sent to the host character by character and simultaneously displayed on the local screen.

**ECHO** mode means that data is sent to the host character by character, but not displayed on the local screen (it will normally be displayed by the host).

**TEXT** mode means that data is just displayed on the local screen, and not transmitted until you press the transmit key (normally this will be the `ENTER` key). You may edit the data locally before transmitting it.

**TX-RET** mode is the same as TEXT mode, except that you press the Enter key to send the data, and the data is sent to the host with a CR delimiter instead of the ETX delimiter used in TEXT mode.

**FORMS** mode is used when the host displays a formatted screen. You may only enter data in designated fields, and move from field to field using the `TAB` and `BACKTAB` (`SHIFT+TAB`) keys. The contents of the form are sent to the host when you press the `TRANSMIT` key.

## ***Dumping the screen to your printer***

You may dump the present screen image to your local printer at any time by pressing the 'print screen' key, ALT+P, or by selecting File/Print screen from the Glink menu bar. The options that you specified for the 'screen dump to file' will of course also apply here. Note that this function will not dump the bottom (status) line of the screen to the printer, in contrast to the standard screen printing function.

## ***Dumping the screen to file***

You may dump the present screen image to a local file on your PC at any time by pressing the 'write screen' key, ALT+W, or by selecting File/Dump screen from the Glink menu bar. A small window will open on your screen to ask you for the name of the file upon which the screen image is to be written. If this file already exists then the image will be appended to the end of the file; otherwise, a new file will be created. One of two different formats may be used, the default where the dump will simply consist of one line for each line of the screen with a (CR) (LF) record separator at the end of each line, and another basically the same but starting with a form feed (hex 0C) character and with trailing blank lines suppressed. This format can be useful if the dump is going to be copied directly to your printer. You can choose which format to use in the general setup menu.

## ***Capturing data from the host to a file***

You may at any time turn on and off the 'data capture' function by pressing the 'data capture' key, ALT+V, or selecting File/Capture from the Glink menu bar. While capturing data, the emulator will write all data characters coming from the line not only to your screen, but also to a capture file. When you start the capture function, you will be asked for the name of the capture file. If the file exists already then the data will be appended at the end of the file, leaving whatever data is already there intact, this allows you to save several pieces of data to the same file.

While you are capturing data, you will be reminded of this in the status line at the bottom of the screen. Pressing `ALT+V` again (or by clicking `File/Capture` from the menu bar) stops the capture function. Stopping and starting may be repeated as many times as is needed. Note that only ASCII characters are dumped to the file. Control sequences are suppressed, except for the HT, FF and LF characters (which will start a new line on the capture file; however see the 'Capture delimiter' option in the file transfer setup menu).

Note also that you may produce a printer log of your session by turning on the capture function and specifying a file name of 'PRN'. `ALT+V` will then have the effect of turning the printer log on and off.

## ***Local clear screen***

The `ALT+F3` key (or `Edit/Clear screen`) will clear the screen on your PC immediately. This is NOT the same as the 'emulator' clear screen key, which sends the 'clear screen' control sequence to the host machine. The clear screen function only has a local effect and does not send any data to the host machine.

## ***ANSI chat mode***

The `ALT+F4` key (in Windows, the chat mode option is available by selecting `Line` from the Glink menu bar or by pressing `CTRL+SHIFT+F4`) is only effective when used under ANSI or VT102/220 emulation modes. In VIP mode it will have no effect. Pressing the key (or selecting the menu option) will provide you with a 'split-screen' mode, where data that you type will be shown on the bottom half of the screen and data received from the host machine will be displayed in the upper half of the screen. This mode should only be used when the person at the other end of the line is using an equivalent software solution. To exit chat mode, just press `ALT+F4` or toggle the menu option off again. In this case you may wish to press `ALT+F3` afterwards to 'clean up' the screen, but the screen contents will otherwise be left as they are so as to let you copy anything you wish to save from the current screen.

## The ASCII Table

The `ALT+F9` key provides you with a useful reference table, showing you the entire ASCII character set. This table is also available by selecting `Help/Character tables` from the Glink menu bar. Click on the relevant button to step through the character set shown in decimal or in hexadecimal, and as seen by both your PC and from the host machine. The host character set shown will depend upon what you have selected for your keyboard file; when you look at the host table the currently active keyboard file will be displayed in the title line.

If you wish to enter a character that's not on your keyboard then there are two ways to do it. First, you can look at the character in the decimal display for the PC and note the corresponding decimal code. When you are back in the emulator, press (but don't release) the `ALT` key, and type first a zero, and then the decimal number you noted on the numeric keypad. Only when you have typed the entire number should you release the `ALT` key.

Alternatively, you can just select the character you need and press `ENTER` (or click the left mouse button). A line will appear on the screen with the character you wish to enter. This process may be repeated as often as you like, and characters that are available directly from the keyboard may be inserted in the string to be sent just by putting the cursor in the appropriate place and typing them. Characters entered unintentionally may be deleted using the backspace key.

If you have entered any such characters, then the entire string shown will be sent when you exit from the ASCII table window by clicking on the 'OK' button or by pressing the `ENTER` key.

Returning to the emulator (without sending any string of characters that may have been selected) is accomplished using the `ESC` key or by clicking on the 'Cancel' button.

## The call timer

The `ALT+F8` key is provided for those using a dial-up modem; it provides you with the elapsed time since the last time you made a call using the dial directory. Remove the window with the `ESC` key. Pressing the `ENTER` key while the window is up will reset the timer to zero. This option is available by selecting `Line/Time online` from the Glink menu bar.

## ***The 'send name' and 'send password' keys***

The Send name function (`ALT+F6` key, or `Line/Logon name send` from the Glink menu bar) sends the current user name as defined by the dial directory. This is the user name defined in the last entry you used, or if none was defined there then the 'default' user name specified with the dial directory `ALT+L` function. You would normally send this using a login script, but `ALT+F6` gives you the additional possibility of sending the name manually.

The Send password function (`ALT+F7` key, or `Line/Password send` from the Glink menu bar) sends the currently defined password from the last used dial directory entry. This would also normally be sent by your login script, but can be useful to have on the keyboard, especially if changing your password on the host; most host machines will ask for your old password in this case. Perform this task in the following order: call up the change password function on the host and press `ALT+F7` when asked for your old password. At this point enter the dial directory and modify the password that is defined there for this particular host. Exit from the dial directory and use `ALT+F7` (which will now send the new password) to provide the host with the changed password. If the host asks twice, simply use `ALT+F7` twice.

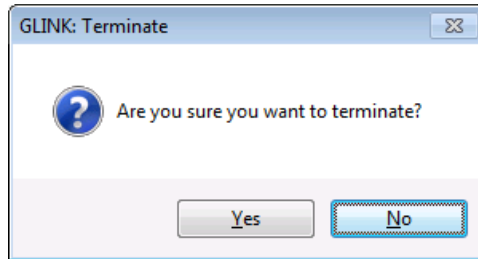
## ***Dumping the line buffer***

To assist programmers in debugging problems with command sequences received from the line, the `ALT+F5` key allows you to inspect the contents of the line buffer. You can also display the line buffer by selecting `Line/Line buffer` from the Glink menu bar. From the Line Buffer window you can select 'Normal' (compressed) or 'Expanded'. Click on the 'Dump' button to dump the contents to a file.

For debugging of more complex control sequences sent from the host, you should use the built-in debugging mode. Simply toggle the `File/Debug mode` selection in the Glink menu bar. This will provide you with extensive debugging information in a separate window.

## Leaving the emulator

Terminate Glink for Windows by selecting File/Exit from the Glink menu bar, or by pressing ALT+F4. (To accommodate those accustomed to the DOS version, the ALT+X and ALT+Q keys also have this function.) Unless you have specified otherwise (in the Settings/General screen), you will be prompted for confirmation.



If you have changed any of your configuration options while using Glink, and not saved these using the ALT+S key in the main configuration setup menu, then you will at this point be presented with a window asking whether or not the new (changed) configuration should be saved. Answering Yes will save the configuration file back to disk for you. Here again you may use the ESC key to go back into the emulator if you wish to defer the decision.

## The status line

While you are running the emulator, the current status of a number of useful items of information is kept in the bottom line (line 25) of your screen. These are things like the emulation mode, graphics mode, insert mode, auto-Lf status and so on. The emulator also displays **CAPS** if the **CAPSLOCK** key is active and **NUML** if the **NUMLOCK** key is active. A time-of-day clock is displayed in the status line (unless this has been disabled in the screen setup menu), also the current row and column for the cursor position (at the very end of the line). The small indicator to the left of the row and column display shows the status of your communications line. A small circle (degree sign) shows **DSR** active, a small block shows **DCD** active, and a large block shows both active.

The exact layout of the status line is described in the table below.

<i>Col.</i>	<i>Contents</i>
01-16	Glink version or error indication
17-21	<b>ECHO/CHAR/TEXT/TXRT/FORM</b> depending on mode
22-28	<b>INSERT</b> if set
29-33	<b>ROLL</b> if set
34-39	<b>LOCAL</b> if in local mode or system ID
40-48	<b>GRAPHICS</b> if in graphics mode
49-56	<b>AUTO-LF</b> if in auto-Lf mode
57-61	<b>CAPS</b> when caps lock set
62-66	<b>NUML</b> when numlock set
74-76	row indicator
78-80	column indicator

Columns 17 to 39 apply only if the option to provide the host name to which you are currently connected (see the configuration section) has not been enabled. If it has then the host name will appear in these positions.

## Using the emulator

The status line may also be used at times to provide information about the status of the program; in particular use of DEBUG, ASCII capture, printer logging and the like.

## *The status bar*

An extra status line is provided underneath the main window (unless it has been disabled with a setup option). This provides several additional items of information that are not always available on the real terminal. The full list of fields implemented in the extra status bar is as follows:

- Error message, message from host or message from modem
- Current host name
- Currently executing script
- Debug status
- Capture status
- Print log status
- System ID (set with script NAME command)
- Remote time of day (if enabled by host)
- Time of day
- Printer session / output waiting for timeout indicator
- Line status indicator

The printer icon shows whether a printer session is active for Ggate connections, and is also animated if there is printer output waiting for a timeout to occur (in which case you may force immediate printer output by left-clicking the icon).

The line status indicator shows the current state as follows:

Red	Offline (no signals on serial interface)
Green	Online (DSR and DCD signals on serial interface)
White	DSR signal only on serial interface
Black	DCD signal only on serial interface
Yellow	Waiting for typeahead
Dark yellow	Waiting in a script



## ***Resetting error status***

If the emulator should encounter an error in the data coming from the line, or find an error in a field you have typed into a form, an error message will be displayed at the start of the status line. In contrast to the standard terminal, the display of this message will not prevent you typing. However, it will not be reset until you do so manually, or until the host sends a reset sequence. To manually reset the error status select `Edit/Clear Error` from the Glink menu bar, or press the `SCROLLLOCK` key.

Note that there is an option in the general setup menu to disable the use of error messages. If this option is turned on then you will have no need to reset error status.



# ***Emulations***

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## ***General***

Glink supports a subset of the ANSI 3.64 standard, and for work in VT environments, a separate VT102 mode is supplied for VT52, VT100, VT220, VT320, VT340 and VT420 support. Additional modes available are emulation of Prestel and Minitel terminals, IBM 3270, 3151 and 5250 emulation, and for the specific needs of the Bull user, there are VIP7301, VIP7800, VIP7700, DKU7107 and DKU7102 emulation modes.

## ***Bull emulations***

### ***DKU emulations***

Support is provided both for the synchronous (DKU7107, DKU7211) and asynchronous (DKU7102) models of the Bull Questar terminal series, and an additional VIP7700 mode for applications requiring exact compatibility with the older terminal models.

### ***VIP emulations***

Glink supports all functions of the 7301 and 7800 series of terminals for Bull users, including the word processing mode of the 7301 terminals and the text and form modes of the 7800 terminals. Glink has additional support for compatibility with the HDS/BDS-2 or 8301 series of terminals (the ANSI mode provided is compatible with the ANSI option provided by the HDS/BDS terminal). The emulator supports all national character sets and in addition will support either the international DO11/DSA156 character set, or the internal IBM-PC character set. Seven-color attributes in VIP mode may be used compatibly with other PC emulators supplied by Bull, also via the CAT color attribute command. In ANSI mode colors are supported using the normal ISO 6429 standard.

# ***IBM emulations***

The IBM 3270 emulation may be used for IBM mainframe connections using the standard TN3270 or TN3270E protocol over TCP/IP or using Ggate/DSA connections via Bull's front-end DSA/SNA gateway. The 5250 emulation supports TN5250 and may be used to connect to AS400 or the 3151 emulation for asynchronous connections.

# ***VT and ANSI emulations***

For general-purpose communications usage, the ANSI mode of the emulator tackles most of the systems you are likely to encounter. This includes most services available over packet-switched or TCP/IP networks, remote devices that are configured and controlled using Telnet and also most bulletin board systems.

For connections to hosts that require more specific emulation (VAX, UNIX and Linux systems) a specific VT-xxx mode may be needed. The VT-xxx emulation covers the VT52, VT100, VT220, VT320 VT340 and VT420 models; including 132-column mode, double height, double width and Regis graphics. After selecting VT-xxx mode you must enter the communications setup dialog box and select the Terminal response needed by your host (this can vary depending on the host configuration).

If you are using the VT emulation to access applications which use the DEC Technical Character set (used in technical applications such as schematic diagrams and mathematical applications using mathematical symbols or Greek characters), then you need to use a Windows font rather than a built-in Glink font. Enter Settings/Screen/Fonts and check the box for using Windows fonts. This enables the Font name field.

This field defines the name of the Windows font you wish to use in the emulator window. Note that only non-proportional fonts (fixed fonts) will display as intended by most host applications. You can restrict the range of fonts to only display fixed fonts by checking the option.

If you leave the Font name field blank Glink allows Windows to choose the font. Windows normally chooses Lucida Console, because Sans-Serif fonts are generally considered as being more suitable for display, particularly on low resolution screens. The next time you look in the font dialog configuration box you will see the font that Windows chose. You can override Windows and choose any of the fonts in the list. Courier New is a Serif font that displays the Greek letters in the DEC Technical set using glyphs that are closer to the printed representation.

## ***Minitel and Prestel emulations***

### ***Minitel (Teletel) emulation***

The Minitel terminal has a number of extra keys that do not exist on the PC keyboard, and for that reason, while you are in Minitel mode these functions have been made available both on the function keys F1 to F9 and on the keys most closely corresponding to the equivalent Minitel functions. If you are planning to make extensive use of the Minitel emulation you will probably find it convenient to make yourself a 'keyboard' overlay over the function key equivalents to help you remember keys that are seldom used. The following equivalents have been used:

<b>Key</b>	<b>Function key</b>	<b>Function</b>
Enter	F1	Send (Envoi)
PgUp	F2	Return (Retour)
Ins	F3	Repeat (Répétition)
F10	F4	Help (Guide)
Del	F5	Cancel (Annulation)
Home	F6	Index (Sommaire)
Backspace	F7	Correct (Correction)
PgDn	F8	Continue (Suite)
Ctrl/End	F9	Disconnect (Fin/Connection)

## **Emulations**

When you run in Minitel mode, the capture function works in a slightly different way in comparison with the normal capture. This has been done because Minitel applications are in general 'screen-oriented' rather than 'line-oriented', and the contents of a normal capture file will in general be less than useful. Rather than capture data as it comes over the line, therefore, Glink will perform the equivalent of a screen dump each time you use one of the function keys above, with the exception of the Repeat, Cancel and Correct keys.

## ***Prestel (Viewdata) emulation***

Use of Prestel mode should be reasonably straightforward. However, there is one small addition to the standard emulator functionality that is intended to make it easier to use in practice, and that is that the F1, F2 and F3 keys have been reprogrammed to send '\*', '\_ ', and '# ' respectively. As you probably know, the sequence '\*123\_ ' (sometimes '\*123# ') to pick up screen 123 is extensively used inside Prestel systems. In Glink, this sequence becomes F1 "123" F2 (or F1 "123" F3), making it considerably easier to type.





# File transfer

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## General

File transfers are used for transferring data from your PC to the host machine you are working with, or alternatively from the host machine to your PC. They may also be used to transfer data from one PC to another. There are several ways of doing this; the method used is called the file transfer 'protocol'.

The emulator supports many different file transfer protocols — ASCII (text transfer), FTP, Kermit (both text and binary), UFT, IND\$FILE, Xmodem (using either checksum or CRC protocols), Ymodem, Ymodem batch, Zmodem, Modem7, and Telink. Protocols from Xmodem onwards may only be used on systems that run the line at 8 bits no parity, and will therefore not be usable on systems running 7 bits even parity, which will have to run using Kermit. Many of these protocols will require some preliminary setup of transfer parameters in the setup menus; see the *Administrator's Guide* for a discussion of these.

An ASCII file transfer consists of sending or receiving the file one line at a time and simply 'recording' the result. The Kermit protocol is a transfer protocol designed at Columbia University that allows you to transfer any kind of file between any two machines that have implemented the protocol. It provides extensive error checking facilities that make it extremely resilient, even on very bad lines.

The IND\$FILE transfer protocol is specific to the IBM environment and is only available under the IBM3270 emulation.

The Bull UFT (Unified File Transfer) protocol has been added to the set of file transfer protocols supported by Glink when it is using the new DGA (Direct GCOS Access) protocol.

The Xmodem protocol is a direct binary transfer of a file image and can therefore only be used on a connection to an 8-bit system. It was originally designed by Ward Christensen (and is often also called the Christensen protocol). Error checking is provided, but not as extensively as in Kermit.

## File transfer

The remaining protocols are developments and improvements to the original Xmodem protocol. Ymodem, more properly termed Xmodem-1K, is more or less the same as Xmodem, except that blocks of 1024 characters are sent instead of the 128 used by Xmodem. It should therefore only be used on a good communications line; otherwise, the cost of retransmitting a block becomes too high. Ymodem batch (or 'true' Ymodem) is an extension to the Ymodem protocol that also transfers the file name and exact file size (both Xmodem and Ymodem add extra bytes at the end of files that have been transferred with these protocols). Ymodem-G is yet another version of the same thing, but can only be used on communications lines that are guaranteed error-free, either because you are using a modem with error correction or because you have a directly connected machine. Ymodem-G does no error checking at all, and therefore requires not only that the communications line be error-free but also that you have a reliable communications interface in the PC. This is often not the case at high speeds unless you are using a LAN interface or have a serial port that uses a modern 'buffered' interface like the NEC16550. See the communications setup documentation in the *Administrator's Guide* for further information about such interfaces. Zmodem, if it's available on your host, is even faster than Ymodem, especially over packet networks, as it uses the same 'windowing' technique as Kermit can, but does not have so many overhead characters in its protocol.

All file transfers may be started automatically by the host. For a list of the command sequences refer to the *Command extensions* appendix in this guide, on page 153. Where the host has not had this facility added, file transfers must be started manually (once the transfer has been started at the other end). This is done by selecting `Transfers/File transfer` menu from the Glink menu bar.

From the File transfer menu, you should now select the direction and type of transfer you wish to perform.

Initially the options are set to Receive and ASCII (text), but once they are moved to another pair of options, they will remain there until moved. This will help you to perform repeated file transfers where the same option is to be used each time.

If you decide not to perform the transfer after all, you may return to the emulator simply by pressing the `ESC` key. Otherwise, if you wish to continue with the transfer, press `ENTER` and in most cases you will see a file name window open on the screen.

Note that this window will not appear in those cases where you are receiving a file from the host at the other end and the transfer protocol itself can send the file name. This is the case for all protocols with the exception of ASCII, Xmodem, and Ymodem.

Here you may enter the name of the file you wish to send or receive. All normal editing keys may be used to edit the name. If you decide at this point not to continue after all, note that you may exit back to the emulator using the `ESC` key from this window as well. Normally a file name will be displayed in the window for you to edit. The emulator will in many cases 'guess' the correct name for you from the commands you have typed while communicating with the host machine.

If you are not sure of the name of the file, then clicking on the 'File selector' button will give you a window containing the names of all files in your current directory. Select the file and press `ENTER`; the name of the file you selected will be entered into the file name window automatically for you. If you do not wish to choose a name then you may simply press `ESC` to exit from the directory window. For more information about using the 'files' window, see the discussion earlier in this guide.

If you are sending a file to the host, the emulator will first check that the file exists. If it does not then an error message will be issued and you will be given a chance to retype the file name. Alternatively, you may type `ESC` to return to the emulator.

If you are receiving a file then the emulator will check to make sure that the file does *not* exist. If it does then you will be asked whether you wish to overwrite the existing file. If you answer No, you will be allowed to choose another file name.

## **ASCII transfers**

ASCII transfers are pure text transfers between you and the host machine. When you send a file, the contents of the file are sent to the host machine just as though you had typed the file in yourself. When you receive a file, you will get on the file more or less what you see on your screen. Any transliteration you may have specified will be active during ASCII transfers. This will ensure that the characters the host thinks it is sending or receiving will be the correct ones relative to your PC.

### **ASCII Capture**

ASCII capture means that any data sent from the host will not only be displayed on your screen but also written to a file on your PC. The status line will remind you that at any time you wish to stop the writing of data to this file you may use the `ALT+V` key to turn off the function. Once you have started the transfer and specified a file name, you may use the `ALT+V` function as often as you wish to turn the recording of data on and off. You may even use the function without entering the file transfer menu at all; in this case the program will ask you for the name of the capture file the first time you use the `ALT+V` key. Starting the ASCII capture via the file transfer menu will start a new 'capture' file (the normal system of asking you whether you want to overwrite the file applies); using the `ALT+V` function will simply append the data to the file already started.

While doing an ASCII capture, only ASCII characters are written to the file. Control sequences are suppressed, except for the HT, FF and LF characters (which will start a new line on the capture file; however see the 'Capture delimiter' option in the file transfer setup menu).

### **ASCII Upload**

ASCII upload sends the contents of a PC file to the host. The transmit option of the edit menu also starts an ASCII upload to transmit the contents of the clipboard. Before using upload for a file or the clipboard, you should study the options available to you in the file transfer setup menus. The defaults that are set up the first time you use the emulator may not always work.

The host may need a short pause after each character (character pacing) because it cannot handle a continuous stream of characters. Some hosts will need a short pause after each line (line pacing) because they need time to handle a line of data. Host editors may request each new line by sending a 'prompt' character that you must wait for. All of these may be configured in the file transfer setup menus.

While the upload is taking place, you have some control over what is happening from the keyboard. Any time you wish the upload to be aborted, you may press the `ESC` key in which case you will be returned to normal emulation mode. Any other key you press will also be sent to the host machine; this is most useful in the case where the upload is stopped because it has not received the 'prompt' character you specified.

## ***GlinkFTP transfers***

On TCP/IP networks the most popular method of transferring files uses the ftp protocol. Glink provides a separate ftp client program, GlinkFTP, for this purpose.

You can start the ftp client either from the transfer menu in Glink or directly from the Glink folder. Operations can then be done interactively, for more information check the GlinkFTP help file.

You may also use the script language to initiate ftp transfers, see the FTP script command.

## ***Kermit transfers***

The built-in Kermit is especially designed to facilitate transfer of data between mini and mainframe machines and the PC. It supports all the standard Kermit features defined in the June 1986 protocol definition from Columbia University, including 8th bit quoting (to enable you to transfer binary data over a 7-bit line), data compression, sliding windows, and long packets.

Users of Bull machines in the GCOS6, GCOS7 and GCOS8 series have a number of extra options open to them. Please consult the *DPS6000 Kermit* appendix on page 92 for more information about the G&R GKERM program for GCOS6, or refer to later sections of this chapter describing FTRAN usage on GCOS7 and GCOS8.

Text transfers should be used in all but special cases; the binary transfer would be used for example to backup or distribute PC software using the mainframe machine.

Normally, when using Kermit, you will have to start the Kermit on the host machine first. Consult your host's manual or help files to find out how to do this. When the host Kermit is ready to send or receive then you start the Glink Kermit program by selecting *Transfers/File transfer* menu from the Glink menu bar. If the direction of the transfer is *Host-->PC* then you will not need to specify a file name, as you will already have done this when starting the Kermit on the other machine. If sending a file then the name is specified in the file name window as shown above.

## File transfer

However you start the Kermit, a file transfer window will open. This indicates to you which options for the transfer are being used; the size of the file being transferred; what the effective transfer rate for the portion of the file that has already been sent is (in characters per second); how much has been transferred; how long the transfer has taken so far; and how long we expect the complete transfer will take (this estimate is revised automatically at periodic intervals throughout the transfer). A bar at the bottom of the file transfer window shows visually the amount of the file that has been transferred as well. This will always be shown in the case where you are transmitting a file to the host, but not always when you are receiving a file - this will depend upon how 'good' the host Kermit is.

Four of these numbers - bytes, records and packets transferred, and the retry count - will often appear as two separate numbers. The first of these applies to the file currently being transferred, while the second refers to the entire transfer.

While the transfer is running, you may force a 'retry' (send the current packet again or ask for the current packet again) if the transfer appears to have stopped. Do this by pressing the `ENTER` key. Note that if you need to do this often then other problems may be involved, usually the inability of the connection to handle either windowing or long packets - adjustment of these parameters in the Kermit setup menu may be advisable.

You may also terminate the transfer at any time by pressing the `ESC` key. This will tell Kermit to try to terminate the transfer in an 'orderly' fashion - note that this may take a few seconds to negotiate with the other machine involved.

## ***Kermit server operations***

Those who need server-type Kermit operations are provided with the 'Kermit server' key: `ALT+Z`. A window opens on the screen showing the list of available options. This screen can also be displayed by selecting `Transfers/Kermit server mode` from the `Glink` menu bar.

Firstly, an option is provided to operate `Glink` as a Kermit server. Advanced functions are not provided; the only commands supported from the remote computer are `send`, `receive`, `finish` and `logout`. The server may be terminated locally by pressing the `ESC` key.

In the same way, the other options should only be used when there is a remote Kermit server at the other end of the line. **THIS SERVER MUST BE STARTED FIRST!** Again, `send` and `receive` of files, `finish` and `logout` are the only options supported.

Normally, the sequence of operations you will use when operating via a server will be first to start the server at the other end, taking up the Kermit server menu in Glink, sending and receiving a number of files, and then logging out the server. Note that if you have used the `ALT+Z` menu to transfer at least one file, and `ESCAPE` out of the menu without logging out of the server at the other end, the server logout will be performed for you automatically.

This menu should only be used if you have some experience in dealing with Kermit operating in server mode.

### ***Bull Kermit (FTRAN)***

Bull hosts use a modified Kermit protocol, normally called FTRAN, but found on some systems as the 'PC' command. The general information about Kermit transfers still applies, and here we will confine ourselves to considering the differences between using this protocol and a more normal Kermit.

One major difference is that FTRAN transfers are 'host-initiated'. In other words, you do not need to start the transfer manually with ALT+T in Glink. Entering the host command will start a dialog between Glink and the host machine and you will receive prompts locally if they are required. The actual details of starting the transfer depend on the type of host machine; here we will consider the two main machine lines.

### ***FTRAN on DPS8000***

The FTRAN command on GCOS8 is used inside Time-Sharing (TSS) and may on some systems be called PC rather than FTRAN. In the following, we will be assuming that the FTRAN/PC command on your system is a reasonably new version; this applies in particular if you wish to transfer multiple files in the same transfer. Send the PC or FTRAN command by itself to check the version number of the program. If you receive a display that only identifies the software with a version similar to '8EC2.0' then you will need to contact Bull for an upgraded version. Versions that support transfer of multiple files will identify themselves with a date rather than a version number. In addition, earlier versions of FTRAN support only the FTRAN PC7800 command and not the 'send' or 'get' commands described below.

There are two main ways to use FTRAN. You may use either the command line interface where all parameters are specified in the command you type in, or the 'prompted' interface where you fill out the necessary information in input boxes on the screen. Using the command line, you may send a file to the host using the following syntax:

```
ftran get pc-name [host-name]
```

Both the PC filename and the optional host filename may be full pathnames if required. If a full pathname is not specified then the current directory will be assumed at each end. Additionally, if the PC file is not specified as a full pathname and the file does not exist in the current directory, then Glink will check to see if the file exists in the directory specified in the file transfer setup as the 'upload directory', sending the file from there if it's found.



Multiple files may also be sent to the host. This may be done either using 'wildcards', for example:

```
ftran get *.bat
```

which will send all files with an extension of 'bat' to the host, or using a text file containing a list of files to be sent, one filename per line, prepared using a standard text editor. If this file was called 'FILE.LST', for example, then you could send all files specified in that file using the command:

```
ftran get @FILE.LST
```

Note the commercial at (@) character used to prefix the file name in the command; this tells Glink that the file is a list of files rather than the name of the file to be sent.

The examples above assume that the file to be transferred is a text file. Binary files may be transferred in exactly the same way, but you should add ', i' after the file name. For example:

```
ftran get binary.exe,i
```

will transfer the file 'binary.exe' in binary mode instead of text mode.

Sending files from the host using the command line is done in much the same way:

```
ftran send host-name [pc-name]
```

Here the name of the file on the PC is optional. The name of the file on the host will be used if it's not specified. If you have specified a download directory in the file transfer setup menu, that's where the file will be placed. This also applies if you do specify a filename without at the same time specifying a full path for the PC name.

In the same way as for transferring files from the PC to the host, you may here specify wildcards in the name you specify for the host file in order to transfer multiple files in the same transfer, and should use ', i' after the file name if you wish to use binary mode for the transfer.

The 'prompted' interface for FTRAN is invoked using the command:

```
ftran pc7800
```

## File transfer

When this command is entered, a menu similar to the `ALT+T` menu described above will appear. Here you may choose both the direction of the transfer and the type of transfer (text or binary). Note that when you are using the prompted interface you should NOT add the `' , i '` to specify binary mode for the transfer; you specify the mode by selecting the correct option from the menu.

When you have selected the direction of the transfer and the transfer type, Glink will ask for the name of the file to be transferred. If you are sending from the host to the PC, this will be the name of the host file; if you are sending from the PC to the host then it will be the name of the PC file. After this you will be asked for the name of the destination file, unless you used wildcards in the name of the source file, in which case it will be assumed that the names of the different files to be transferred will be kept as they are. The same applies if you use a file list (in the same way as for the command line method), using a filename prefixed with a commercial at (`@`) character.

An additional method for transferring a file or selection of files from the PC is available in this case. When asked for the name of the PC file, you may click on the 'File selector' button to view a window containing the names of all files in your current directory. Select a file from this window and press the `ENTER` key. You may also mark several files (using the space key) before pressing `ENTER`. In this case, Glink will prepare the file list for you, and insert the name of that list file into the file name prompt in the correct format. The list of files will be placed on the file `FILES.GLK` in the Glink 'user' directory.

Some general points about GCOS8 file transfers: if you are transferring binary files with newer versions of the host software then an alternative binary encoding method (DPS8 data compression) is available, which in most cases will be superior to the standard Kermit encoding (for random binary data the overhead is reduced from 75% to 33%). This must be enabled with the corresponding option in the Kermit setup option. The default value for this option is `ON`, but in that the option should be `OFF` in other situations (notably when doing GCOS7 file transfers), if you are not sure about its setting, then it should be checked before transferring large binary files.

If you have a communications line of reasonable quality, you should also use 'long packets', also enabled with an option in the Kermit setup menu. The optimum length of packet will depend upon just how good the communications line is (the longer the packet size, the more time will be lost if retransmission should be necessary). Many of the communications interfaces supported by Glink may, however, be considered error-free for all practical purposes, and the packet length option should be set at its maximum value in these cases. Older versions of the FTRAN host software are somewhat limited with regard to packet length, while newer ones may be run with 512-byte packets (PC to host) and with 8000-byte packets (host to PC).

### **FTRAN on DPS7000**

This software does not provide as many options as does the GCOS8 version of the same thing. The command you use to start a file transfer on GCOS7 is roughly equivalent to the FTRAN PC7800 command described above for GCOS8, but is slightly different:

```
FTRAN MICROSYS
```

Use of this command is not permitted unless you have logged into the host application (for example IOF) via the MML system - a typical login would therefore be done as follows:

```
*$CN <parameters, depending on connect method>  
READY  
MICROFIT  
M: CN IOF;
```

Once you are logged into IOF, you may use the FTRAN MICROSYS command to initiate file transfers. These will provide you with the same menus as you would receive when connected to a GCOS8 system. Note, however, the following limitations of FTRAN on GCOS7 as compared with the equivalent software on GCOS8:

- Wildcards are NOT permitted. They are not supported by the GCOS7 software.
- You should NOT set the packet size to over 1000 characters; the GCOS7 software will accept the packet size but does not in fact handle it correctly.

## File transfer

- You **MUST** disable the DPS8 data compression option in the Kermit setup menu; the GCOS7 software does not handle this negotiation correctly.

### **GKERM on DPS6000**

The built-in Kermit is especially designed to facilitate transfer of data between the DPS6000 and the PC, when cooperating with the equivalent Kermit, *GKERM*, supporting the same extended set of functions for the DPS6000. When working together with Glink's Kermit, *GKERM* can assume total control of the transfer, which may therefore be done using a single DPS6000 command with no other form of intervention from the user. The most commonly used commands are the following:

- Text file      PC to DPS6000   GKERM   RG    pcfiler.txt
- Binary file    PC to DPS6000   GKERM   RGB   pcfiler.bin
- Text file      DPS6000 to PC   GKERM   SG    dps6filer.txt
- Binary file    DPS6000 to PC   GKERM   SGB   dps6filer.bin

Text transfers should be used in all but special cases; the binary transfer is used, for example, to backup or distribute PC software using the DPS6000 (or conversely to backup or distribute DPS6000 software using the PC).

The 'G' option should be used whenever you are using Glink together with the DPS6000 *GKERM*. In fact, using Server6, you normally will not even have to type the command - it will be preconfigured for you on one of your *GARDIR* user keys. For example, to configure the key 'K' to send the file to which are pointing to the PC using a text transfer you would include the following line in your *DIRUSE* file:

```
K>Transfer text file to PC>***GKERM SG %
```

Pointing at the file and pressing K is now all you have to do to transfer the file to your PC.

To function correctly on your DPS6000 the following files **MUST** be present on the directory >SYSLIB1 :

```
GKERM  
GLINE  
GL_ATD
```

In addition, these modules must have been 'installed' on your system using the `INSTALL.EC` utility delivered on your installation diskette.

The general format of the `GKERM` command on the `DPS6000` is as follows:

```
GKERM xyz filename
```

where `xyz` are single character options, and `filename` is the name of the file to be sent or received. When receiving a file the filename need not be specified, unless you are using the `G` option for `Server6`, in which case you must. A special format of the filename, `'*I'`, however, allows you to specify that the user be asked interactively to specify the filename. This interface is especially useful in that the user may in this case select the file name from Glink's standard file display by pressing `F10` while positioned in the filename entry box in the normal way. If you wish to limit the files that are displayed in response to the user request to a certain subset of files, you may specify wildcards in addition to the `'*I'`. For example, to receive a file that you already know has an extension of `'. TX'`, but where the user is to select just one of these, you could use the command:

```
GKERM rg *I*.TX
```

The following options are available:

Option	Description
<b>R</b>	receive a file
<b>S</b>	send a file
<b>M</b>	run in server mode
<b>A</b>	ASCII mode (default)
<b>B</b>	Binary mode
<b>C</b>	Cobol mode
<b>0</b>	(zero) do not use sliding windows
<b>1</b>	use primary line
<b>8</b>	use eight-bit transmission
<b>D</b>	log session to screen
<b>E</b>	extended transfer <code>DPS6000 -&gt; PC -&gt; DPS6000</code>
<b>G</b>	<code>Server6</code> mode
<b>L</b>	log session on <code>KERMIT.LOG</code>
<b>N</b>	No CRLF delimiters

## File transfer

Option	Description
<b>O</b>	send logout, not finish, to server
<b>P</b>	provide log information for primary line
<b>U</b>	terminate with real abort reason code when failed
<b>V</b>	other Kermit is a server
<b>W</b>	use sliding windows (default)
<b>X</b>	disable use of long packets
<b>Y</b>	use extra padding after CR
<b>Z</b>	'extra slow' option
<b>&gt;</b>	handle long logical records
<b>^x</b>	use special control character as start of packet
<b>!</b>	delete file on PC when successfully received

You must always specify at least R, S or M (the M option is not relevant when running Glink). The G option tells *GKERM* that you are running on the Glink software and that it may start Kermit automatically for you; this means that you don't have to go through the ALT+T sequence, etc.

When you send a file from the DPS6000, you may specify a full pathname for the DPS6000 file you wish to send to the PC. Only the last component (the file name) will be given to the PC and the file will be stored under this name in your current directory. If you are not in the correct directory then you may simply use the ALT+F file display to select the correct directory on the PC before doing the transfer. You may also use star-name conventions for the filename in order to transfer a batch of files (this applies in both directions).

When you receive a file from the PC using the G option, you also specify the name of the PC file you wish to receive on the DPS6000. This may also be a fully qualified pathname - however, if you are using a full pathname you should probably enclose it in single quote characters to avoid wrong interpretation of the string by the DPS6000 command parser. For example:

```
GKERM RG 'D:\DIR01\FILE004'
```

The C option is an alternative to the standard A and B options. This tells *GKERM* that the transfer is to be treated as a binary transfer (no transliteration of text for example) but that files are to be handled logical record by logical record rather than read physically. This option is especially useful for transferring data files which must be preserved transparently through the transfer but which must nonetheless be stored as sequential files on the DPS6000.

The **0** (zero) option indicates that sliding windows should not be used. In some cases, the use of windowing may cause excessive retransmissions; in such a case specifying the zero option may help, although it will inevitably slow the transfer down somewhat.

The **1** option is designed for usage with applications software that controls the communications line directly and is not applicable to PC usage of the Kermit.

The **8** option enables 8-bit transmissions. Normally the DPS6000 Kermit will assume that you are using a 7-bit, even parity connection and will therefore use 8-bit quoting to allow transmission of real binary data. If you are connected on an 8-bit no parity line (or if *GKERM* is being used in the X.25 environment; again, not relevant to PC usage) then the 8 option may be specified. (*GKERM* will, in fact, usually detect the 8-bit connection, but this option will tell *GKERM* that the line is 8-bit if all else fails.)

The **D** option displays all packets to the screen as they are sent or received by the DPS6000. This option is intended for usage in the X.25 environment and **must not** be used when running from a PC.

The **E** option is an extension of the G option. The file will first be transferred from the DPS6000 to the PC (using the same automatic startup feature as does the G option). If the transfer is successful, the single command

```
KUTIL filename
```

(where filename is the name of the file just transferred) will be executed on the PC. KUTIL will normally be a user-written program or .BAT file written specifically to handle files transferred in this way. When the KUTIL command on the PC terminates, the file will be transferred back to the DPS6000.

The **G** option is mentioned above and enables the auto up/download feature of the emulator.

The **L** option allows logging of all packets sent each way to a file called KERMIT.LOG in the DPS6000 working directory. This option may be found useful for debugging problems that may occur.

## File transfer

The **N** option for text transfers (types A and C) tells *GKERM* not to add a CRLF delimiter between each record as it is transmitted to the PC. Used on a transfer towards the DPS6000, this option will tell *GKERM* that each logical record on the DPS6000 should be filled to the predefined logical record size of the file, rather than splitting the records at the CRLF delimiter sent by the PC.

The **O** option overrides the normal 'finish' command sent when talking to another Kermit operating in server mode. If the O option is used, then *GKERM* will send a 'logout' command instead. This will normally terminate the session with the other machine.

The **P** option provides on-screen information about the progress of the file transfer when the *GKERM* is connected to the 'primary' line using the 1 option.

The **U** option tells *GKERM* to terminate with the correct return code in the case of a failed transfer. Normally a failed transfer will return -1, indicating that the error has already been reported, but the U option may be found useful for better control of transfers started from EC files or from your own programs if you need to have more information about the specific error condition.

The **V** option is used when the Kermit at the other end is a Kermit 'server'. This is not relevant for DPS6000/Glink transfers.

The **W** option enables use of sliding windows on the DPS6000 Kermit. This is, in fact, the default for *GKERM* (see the zero option). In earlier versions of *GKERM*, W had to be specified separately and was not recommended; improvements in the GL\_ATD program have made this more reliable.

The **X** option disables use of long packets. Long packets will in any case not be used unless you have enabled their use via the Kermit setup menu. Using long packets allows much more data to be sent in a single transmission and can significantly improve your throughput on a good connection. If you are getting excessive retransmissions when using long packets you can either reset the option in the Kermit menu, or use the X option for the present transmission only.

The **Y** option tells *GKERM* that additional 'padding' characters should be used at the end of each packet. This may be found necessary when connecting to hosts that have problems 'turning around' the communications line.



The **z** option should only be used in exceptional circumstances, and only for transfers towards the DPS6000. It slows the sending of characters from the DPS6000 down to just a few characters per second. This is for hosts that have extreme difficulty reading data over an asynchronous line.

The **>** option allows you to transfer files that contain long logical records. The maximum logical record size that will be handled will be 1024 rather than the normal 256.

The **^x** option allows you to override the normal SOH character used to start the Kermit packets. The character is specified in the same way as described elsewhere in this guide, with an alphabetic character taken from the corresponding position in the ASCII table to the control character needed. For example, a US character would be specified as **^\_**.

The **!** option tells a *GKERM* that is sending a file to Glink that the file on the PC should be deleted at the start of the transfer. Use of this option will override the setting of the 'file overwrite' option in the Glink file transfer setup menu. Used on a transfer from the PC to the DPS6000, it tells *GKERM* that the file on the PC should be deleted after it has been successfully transferred to the DPS6000.

### ***Kermit and VAX/VMS***

Kermit for VAX/VMS is Copyright (C) Trustees of Columbia University in the City of New York and can be collected from there (if not available on a local bulletin board system). The following Glink script will help you in installing Kermit on a VAX that does not already have a file transfer program installed.

```
*This routine uploads two text files:
*   VMSDEH.MAR
*   VMSMIT.HEX
*from the working directory on your PC to your own
*working directory on a VAX host.
*
*Thereafter it builds KERMIT.EXE - and you should
*be able to use the command:
*RUN KERMIT

    on key Ctrl-F10 retu

*First send vmsdeh.mar

sndl "deletexx/noconf vmsdeh.mar;*"
sndl "edit/tpu vmsdeh.mar"
rece "[End of file]"
set ASCII lpace 1
putf ASCII "vmsdeh.mar"
sndl "^Z"; rece "$"

*Then send vmsmit.hex
sndl "deletexx/noconf vmsmit.hex;*"
sndl "edit/tpu vmsmit.hex"
rece "[End of file]"
putf ASCII "vmsmit.hex"
sndl "^Z"; rece "$"

:BuildKermit
sndl "macro vmsdeh"
rece "$"; sndl "link vmsdeh"
rece "$"; sndl "run vmsdeh"
rece "type the file name"; sndl "vmsmit.hex"
rece "$"; sndl "rename vmsmit.exe Kermit.exe"
retu
```

With the current version of Kermit for VAX/VMS (3.3.126), you may run with 'long packets'. The following parameters, either entered interactively or permanently put into the `KERMIT.INI` file should give you improved throughput:

```
set send packet_length 1000
set receive packet_length 1000
```

If you are using the LAT interface and the PathWorks 4.0 option, you may find that you have to reduce the last parameter to 250 to avoid timing problems with the DEC host software.

## ***Kermit and file names***

When you receive a file using Kermit, most of the time the host will specify a name that's usable on the PC. This is not always the case however, and sometimes a host will provide a name that is not legal on the PC. Glink will attempt to convert the name provided by the host into something that is acceptable for the PC, and at the same time preserves as much information as possible from the name specified by the host.

The translation done by Glink is quite restrictive and will, amongst other things, remove foreign-language characters and override use of absolute pathnames (for the PC) if the host should specify one. If you know that the host is going to provide exact names for the PC target file (possibly including a full pathname) you should set the option in the Kermit setup menu for suppression of file name translation. In this case, Glink will pass the name specified by the host on to PC unchanged.

If you are letting Glink perform file name conversion then it may be useful to know some details of how this conversion is performed (especially if you need to know in advance what a particular filename will be converted to).

First Glink will strip off the last part of the name specified by the host. Only alphabetic, numerics, dollar, hyphen, underline, period, comma and semicolon will be considered for this part of the scan. As soon as a character is encountered that is not one of those specified (working from right to left in the file name) then the rest of the name will be discarded. Note that this will remove any drive and directory specification provided by the host, if present.

Next, if a comma or semicolon is present in what's left, the part of the name from (and including) the first comma or semicolon will be discarded, this time working from left to right.

## File transfer

The remaining name is then inspected; all periods except for the last one will be replaced with an underline character. If no periods were found in the name at all and the length of the name is more than eight characters, the part after the first eight characters will be checked. The last occurrence of hyphen, underline, or dollar will in this case be replaced with a period to mark an 'extension'. If none of these are found there, on the other hand, a period will be inserted after the eighth character of the name instead.

The resulting name should now have at most one period in it, and the name we are left with will be used. The first eight characters before the period and the first three after give the DOS 8.3 filename format.

In some circumstances with particularly strange host names, the above algorithm can result in a null file name. In this case, the file will be saved locally using 'KERMIT' as the name of the file.

In any case, assuming that a full pathname is not being used, if a download directory has been specified in the file transfer setup menu, then this will be used to place the file. If no download directory has been specified then the file will be placed in the current directory.

Some examples of file renaming using the above algorithm:

C:\DIR1\DIR2\FILE1	becomes	FILE1
AB910101XYZ	becomes	AB910101.XYZ
FILE.ABC.123	becomes	FILE_ABC.123
DISPLAYWRITE;4	becomes	DISPLAYW.RIT
FILE1-100-123-456	becomes	FILE1-10.456

## ***Xmodem and related file transfers***

The Xmodem family of protocols is supported for convenience when using the emulator to access 'foreign' systems that do not have Kermit. You will usually find that any system that does not support Kermit does at least have this possibility. These protocols may only be used when you are running with the parity set to 'no parity', otherwise errors will occur.

If the connection to the host is 'noisy', you should choose the Xmodem option, as this uses smaller blocks and is less prone to get line 'hits'. If the line is a good one then you should use Ymodem, or Ymodem-batch if available, as these are faster than Xmodem. As mentioned before, if the line is 'perfect', in other words you are using error-correcting modems or have a direct connection, then Ymodem-G is the protocol to choose. Note also that if you do have a reasonably good line and you are using 8-bit no parity to connect then you should choose one of these protocols in preference to Kermit, as they are a good deal faster in most typical cases.

If you are using Xmodem or Ymodem to transfer a file, then use of wildcards to transfer a group of files is not permitted. However, the other protocols in the family do support this, so when you are sending files you may specify file names with wildcards or use the file display to mark a group of files to be sent in the same way as described for the Kermit transfer.

## ***Zmodem transfers***

The emulator also supports the Zmodem protocol, which in general will be the fastest file transfer option if it's available on the system to which you are connected. This protocol uses a 'streaming' technique, which means that the contents of the file being transferred are sent continuously without waiting for acknowledgements from the host machine. The receiving Zmodem program will only reply if there has been a problem with the received data (note that this means that Zmodem can only run on full duplex connections).

If you are running on a UNIX system, you will probably find that your basic software installation does not include Zmodem software. Public domain versions are available via anonymous ftp from many Internet sites and you would be well advised to collect one of these.

If you are running in ANSI or VT102/220 mode, Zmodem downloads are detected automatically by the emulator. Just start the transfer on the host side and the Glink side of the transfer will start up with no need for user intervention. If you are connected to a system that uses the standard 'rz' command for receiving files then uploads are also automatic if you start them at the command prompt and wish to use default options for the transfer.

Zmodem may be run in both ASCII and binary modes. In binary mode, the file will be transferred with no conversion of any kind. In text mode the character set will be converted (if necessary) and line breaks changed to those appropriate for the receiving end of the transfer.

Zmodem will also provide recovery for failed transfers. If a Zmodem transfer fails (for example because the connection was lost) then you can turn on the option for 'crash recovery' and restart the transfer. Glink will check that the portion of the file already received matches and continue the transfer from the point at which it was interrupted.

## ***CompuServe transfers***

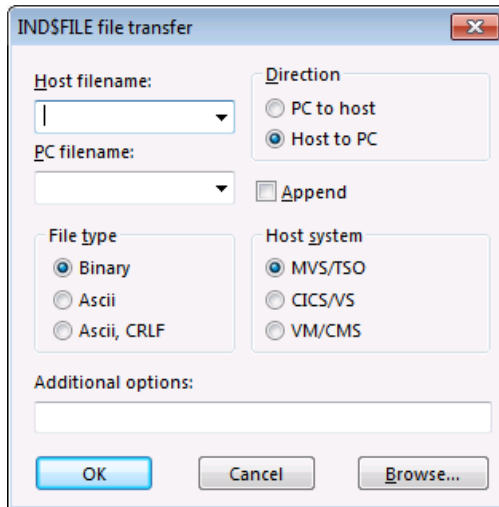
CompuServe has defined its own file transfer protocol, the B protocol. This exists in three forms - the old B protocol, the Quick-B protocol, and the B+ protocol. Glink supports all three of these when running in ANSI or VT102/220 mode. In that such file transfers are always started automatically from the CompuServe host, the B protocol does not appear in the normal file transfer menu. Also, the control sequences that are used by CompuServe to initiate the transfer may have a different meaning on other types of host machine. You must therefore enable CompuServe protocol specifically when you are intending to use it. This is done in one of two places. You can enable the protocol in general by selecting it as your default transfer protocol in the file transfer menu in setup (this is not recommended). Alternatively, you can enable it specifically for CompuServe by selecting B protocol as the default transfer protocol for the dialing entry you will use to contact CompuServe (recommended).

When using CompuServe, choose Quick-B protocol rather than the normal B protocol when asked. The Quick-B protocol is much faster, especially over packet switched networks.

# IND\$FILE transfers

IND\$FILE is specific to IBM host systems and may only be invoked from the IBM 3270 emulation. The transfer is actually controlled by the host and uses what are known as 'structured fields' for transmission of the actual file data. Note that for structured fields to be usable (and therefore for IND\$FILE to function correctly) the terminal type must be visible as an **extended** terminal type on the host system. Sometimes it will be sufficient to set such a type (last character should be **E**) in the IBM 3270 setup menu, but it will often also be necessary to configure as an extended 3270 either in your TN3270 server or at the host site.

The most basic way of starting an IND\$FILE transfer is to type in the necessary host command (for example `IND$FILE GET MYAREA.MYSET(MEMB1)`), in which case the host will start the transfer and the only data that will be required interactively will be the name of the local file on your PC. However, in that the command required to start such a transfer can contain several options, and also varies from host system to host system, starting a transfer from the menu bar (or with the script `PERFORM TRANSFER` command) will provide you with an easy-to-use dialog box where you can set up all necessary information:



When you have filled out the relevant information in this dialog box, the appropriate command will be sent to the host machine and the transfer will start automatically. In that you will already have provided a PC filename then the interactive entry of this name will obviously not be required.



The 'file type' specified in this dialog box does not influence local processing in Glink except that national language transliteration will be applied for ASCII files. It does however affect the host view of the file; 'binary' specifies that the images on the host and PC should be exactly the same, while ASCII implies a transliteration from EBCDIC on the host to ASCII on the PC. ASCII, CRLF implies additionally that record separators in the host file should be equivalent to CRLF delimiters in the PC file. Remember that because a command is sent to the host as a result of filling out the dialog box, you must always position yourself in a host menu where such a command is valid. Otherwise, you will just see an error message come back from the host.

For reference purposes, here is a list of the various commands that will be sent to the host as a result of the different combinations of options that may be chosen in the IND\$FILE dialog box:

Direction	File type	Host	Command
PC to host	Binary	MVS/TSO	IND\$FILE PUT hostfile
		CICS/VS	IND\$FILE PUT hostfile (BINARY
		VM/CMS	IND\$FILE PUT hostfile (RECFM F
	ASCII	MVS/TSO	IND\$FILE PUT hostfile ASCII
		CICS/VS	IND\$FILE PUT hostfile (ASCII
		VM/CMS	IND\$FILE PUT hostfile (ASCII
	ASCII, CRLF	MVS/TSO	IND\$FILE PUT hostfile ASCII CRLF
		CICS/VS	IND\$FILE PUT hostfile (ASCII CRLF
		VM/CMS	IND\$FILE PUT hostfile (ASCII CRLF
Host to PC	Binary	MVS/TSO	IND\$FILE GET hostfile
		CICS/VS	IND\$FILE GET hostfile (BINARY
		VM/CMS	IND\$FILE GET hostfile (
	ASCII	MVS/TSO	IND\$FILE GET hostfile ASCII
		CICS/VS	IND\$FILE GET hostfile (ASCII
		VM/CMS	IND\$FILE GET hostfile (ASCII
	ASCII, CRLF	MVS/TSO	IND\$FILE GET hostfile ASCII CRLF
		CICS/VS	IND\$FILE GET hostfile (ASCII CRLF
		M/CMS	IND\$FILE GET hostfile (ASCII CRLF

## ***UFT (Unified File Transfer)***

UFT implementations are provided on the entire range of Bull minicomputers and mainframe systems.

The G&R/Host Links product set provides UFT capability for the majority of UNIX, Linux and Windows servers.

UFT file transfers involve two DSA/OSI nodes. One of the nodes runs a UFT client, called a requester, and the other node runs a UFT server. The requester initiates the various file transfer requests and the server responds and performs the actions necessary to carry out the transfer.

The Glink UFT implementation includes the requester protocol enabling file transfer between:

- Glink UFT client and a G&R/GUFT server (called GUFTsrv)
- Glink UFT client and a Bull UNIX, GCOS6, GCOS7, or GCOS8 UFT server.

# Frequently-asked questions

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— *When I start Glink it appears to hang with a message saying 'Initializing modem'?*

Assuming that you have a modem, then this probably means that there is something wrong with the modem initialization string. Press `ESC` to get rid of the window and note what you have in the modem init string. Try typing the command manually and see if you receive an 'OK' message back from your modem. If you don't then consult your modem manual to discover which part of the string is causing problems.

— *Where is the 'Line-feed' key?*

It is on the `NUM/` – key at the right-hand side of your keyboard.

— *I don't get any color menus at all when I run the emulator on G&R Server6. What's wrong?*

You must use the correct device driver on the `DPS6000`, and it has probably not been configured correctly. You can start it yourself by executing the command:

```
GVIDEO -OFF;GVIDEO -DEV LINK -EC
```

Alternatively, you can simply reconfigure your `ENQ` string to '730G'. This will automatically be recognized by `Server6`.

— *When I type the codes for my country's national characters I get square brackets on my screen. How can I get the correct characters?*

Enable the keyboard file appropriate to your country using the Keyboard file option in the emulator setup menu. You are using the seven-bit national characters on your keyboard and these must be converted to the correct display characters.

— *When I type the codes for my country's national characters I get the right characters. But when I look at data typed in on other terminals I get the square brackets. How can I get both types of data to look correct?*

## Frequently asked questions

Same as the previous answer. The national keyboard file for your country will solve the problem, although the recommended way of running is to use the correct characters consistently. If you are running *Server6* you may also press the CTRL+F key until you reach the language of your choice and let *Server6* take care of the correct translation.

— *My country's national characters appear on my screen as graphics and Greek characters when I'm reading data sent by other users. And strange things happen when I try to use the national characters from my own keyboard...*

This sounds as though you are using the KPC keyboard and should be using KUS (KN2 or KML in Norway). If you are talking to a VAX or DPS6000 then it's almost certainly the case.

— *National characters sent by the BBS I'm talking to seem to mostly disappear or give peculiar results on my screen, even though things I type myself look OK?*

Probably the opposite case to the previous question - you are most likely on a system where you should be using KPC but have set up with one of the ISO keyboards. Also make sure that you are set up for 8bit no parity and have set the host mode to eight-bit as well, in that most BBS systems use these settings.

— *When I run Kermit the transfer stops after a few blocks when I'm sending files up to the DPS6000, and after about 30 blocks when receiving files. What's wrong?*

You probably need to set the 'host quote' option in the Kermit setup menu. Alternatively, you may have set the host quote option when you should not have done. See the relevant portion of this documentation.

— *When I run FTRAN on GCOS8 using another communications package the transfers go much faster than with Glink. Why is Glink so slow?*

Check that you have turned on the 'long packets' option in the Kermit transfer setup menu. Also, be sure that you have specified a reasonably large packet size (unless you are using a noisy dial-up line). Recommended packet size for older versions of FTRAN is 1000 bytes, for newer versions we recommend 1980 bytes, and that you set the option in the Kermit setup menu to override the host packet size. On a very good line, when transferring files from GCOS8 to the PC, set the packet size to 4000 or more. Also make sure that the option for 'DPS8 compression' is turned on for newer versions of FTRAN on GCOS8 and OFF for all other versions of FTRAN.

## Frequently asked questions

— *When I run Kermit I always get several retries when the transfer starts up. Is there something wrong with my communications line?*

No. Rather than wait for the line to time out, the emulator always starts off with a retransmission. This allows the transfer to start up immediately rather than have to be 'pushed'. So the retransmissions at the start of the transfer are perfectly normal.

— *When I transfer a file from the DPS6000 to my PC the file transfer stops before all the data has been transferred.*

The status window shows the size of the file as it exists on the DPS6000. In general the file will require less space on the PC as the format of the file is different. The entire contents have been transferred nonetheless, so long as the transfer terminates normally.

— *How can I transfer my pseudographic drawings between TED and my PC editor?*

Just transfer the file. Glink will take care of the graphics for you. And `SERVER6` will be able to print them on your printer.

— *Sometimes when I dial up the DPS6000 from a remote location with my 'smart' modem I have to wait for over 30 seconds after getting connected before I see the login message. Why does it take so long?*

The first thing the DPS6000 does when you dial in is to ask the terminal to identify itself. When using a smart modem with auto speed detection and speed conversion it can happen that the first few characters to be sent to you get 'lost'. In this case you have to wait for the DPS6000 to ask again; this usually takes about 30 seconds from the initial enquiry.

— *When I transfer a file from my PC to the DPS6000 I can't read the file into TED, and GARDIR says that it's a 'program' file.*

Always use ASCII transfers for text files. If you use binary transfer the file will be sent up as an image of the PC file. DPS6000 programs can't read this format. On the other hand if you are just using the transfer to use the DPS6000 as a backing store for your PC files, then its perfectly OK to do a binary transfer; when you send the file back (also using binary transfer) it will look OK again.

— *When I start up Glink nothing happens at all; I can't seem to get into contact with the host machine, or even type any characters.*

## Frequently asked questions

Try using `ALT+L` to go into local mode. If you now can type data and see it on the screen, then you have a communications problem; if you still cannot see the data you are typing then you have an incompatibility problem (your PC is not a 'close' compatible). With communications problems, you should recheck your cabling; this is the most common reason for not being able to communicate. There is a possibility that lack of ability to communicate may also be caused by 'incompatibility'. Any case of suspected incompatibility should be reported back to us; we may be able to help.

— *When I use the ASCII capture function I don't seem to be getting the correct data. The lines are not divided up properly, and some lines are even repeated.*

The ASCII capture function can only work correctly when the host machine is sending 'line-at-a-time' output. If you run a product that runs in full-screen mode then updates will be made using control sequences, and not necessarily sequentially down the screen. For this type of application use the screen dump function and capture the 'screens' of information you are interested in. If you are using *GARPAD* for X.25 communications the easiest way out of the problem is to use *GARPAD*'s log function and transfer the log to your PC with Kermit at the end of your session if necessary. If you must capture directly to your PC then use a 'non-screen' product like *PADCON* instead.

— *In VIP mode, the Del key does not act like the delete character key on my 7800 terminal.*

The `DEL` key defaults to the same function as was assigned to the `DEL` key on a 7200 terminal. The delete character key is by default placed on `CTRL+LEFT ARROW`, but may be moved using the keyboard layout setup.

# Command list (VIP)

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This is a list of the commands currently supported by the emulator when running in VIP mode. For a full explanation of each command, refer to the documentation for the VIP7301 or HDS/BDS-2 terminals.

## VIP commands (Mnemonic sort)

Mnemonic code	VIP commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
ALT	Alternate shift	-	-
APC	Aux port connect	esc a	1B 61
APD	Aux port disconnect	esc b	1B 62
ATR	Attribute	esc s a	1B 73 a
AUTO LF	Auto line feed	-	-
BEL	Bell	bel	07
BLD	Bell disable	esc g	1B 67
BLE	Bell enable	esc h	1B 68
BRK	Break	-	-
BS	Back space	bs	08
CAPS LOCK	Caps lock	-	-
CAT	Color attribute	esc [ nnn v	1B 5B nnn 76
CBT	Cursor back tab	esc [ Z	1B 5B 5A
CLR	Clear	esc `	1B 60
CPB	Cursor pos binary	esc f c r	1B 66 c r
CPD	Cursor pos decimal	esc [ rrrccc f	1B 5B rrrccc 66

## VIP command list

Mnemonic code	VIP commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
CM	Character mode	esc k	1B 6B
CR	Carriage return	cr	0D
CRB	Cursor rqst binary	esc n	1B 6E
CRD	Cursor rqst decimal	esc [ R	1B 5B 52
CTL	Control	-	-
CUB	Cursor backward	esc D	1B 44
CUD	Cursor down	esc B	1B 42
CUF	Cursor forward	esc C	1B 43
CUH	Cursor home	esc H	1B 48
CUU	Cursor up	esc A	1B 41
DAT	Delete attribute	esc [ Q	1B 5B 51
DCH	Delete character	esc [ P	1B 5B 50
DEL	Delete	del	7F
DENQ	Delayed enquiry	esc [ y	1B 5B 79
DFL	Define fixed lines	esc [ nn z	1B 5B n n 7A
DL	Delete line	esc [ M	1B 5B 4D
DSH	Data space home	esc [ H	1B 5B 48
ENQ	Enquiry	enq	05
EOF	Erase end of field	esc K	1B 4B
EOP	Erase end of page	esc J	1B 4A
EP	Echoplex	esc m	1B 6D
ERM	End row/col maint.	esc [ a	1B 5B 61
ESC	Escape	esc	1B
FM	Forms Mode	esc [ h	1B 5B 68
F1	Function key 1	esc 0	1B 30



## VIP command list

Mnemonic code	VIP commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
F2	Function key 2	esc 2	1B 32
F3	Function key 3	esc 6	1B 36
F4	Function key 4	esc 8	1B 38
F5	Function key 5	esc :	1B 3A
F6	Function key 6	esc <	1B 3C
F7	Function key 7	esc >	1B 3E
F8	Function key 8	esc P	1B 50
F9	Function key 9	esc R	1B 52
F10	Function key 10	esc T	1B 54
F11	Function key 11	esc \	1B 5C
F12	Function key 12	esc ^	1B 5E
FS1	Shifted FK 1	esc 1	1B 31
FS2	Shifted FK 2	esc 5	1B 35
FS3	Shifted FK 3	esc 7	1B 37
FS4	Shifted FK 4	esc 9	1B 39
FS5	Shifted FK 5	esc ;	1B 3B
FS6	Shifted FK 6	esc =	1B 3D
FS7	Shifted FK 7	esc ?	1B 3F
FS8	Shifted FK 8	esc Q	1B 51
FS9	Shifted FK 9	esc S	1B 53
FS10	Shifted FK 10	esc V	1B 56
FS11	Shifted FK 11	esc ]	1B 5D
FS12	Shifted FK 12	esc _	1B 5F
FTC	File transfer control	esc [ C	1B 5B 43
FVD	Firmware version disp	esc z	1B 7A

## VIP command list

Mnemonic code	VIP commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
HT	Horizontal tab	ht	09
IL	Insert line	esc [ L	1B 5B 4C
IM	Insert mode	esc [ I	1B 5B 49
IMR	Insert mode reset	esc [ J	1B 5B 4A
KBL	Keyboard lock	esc [ X	1B 5B 58
KBU	Keyboard unlock	esc [ W	1B 5B 57
KIR	Keyboard ID reqst	esc [ {	1B 5B 7B
LCL	Local	-	-
LF	Line feed	lf	0A
LGR	Line graphics reset	esc F	1B 46
LGS	Line graphics set	esc G	1B 47
MC	Media copy	esc i	1B 69
MLL	Maint. line lock	esc }	1B 7D
MLS	Maint. line set	esc ~	1B 7E
NEP	Non-echoplex	esc l	1B 6C
NOP	No operation	esc [ x	1B 5B 78
NSEG	Next segment	esc [ 2 s	1B 5B 32 73
NUML	Numeric lock	-	-
PCC	Print control character	esc [ = c p	1B 5B c 70
PDENQ	Printer delayed enquiry	esc [ 9 p	1B 5B 39 70
PDS	Print data space	esc [ 0 p	1B 5B 30 70
PDT	Print data terminator	esc [ < p	1B 5B 3C 70
PENQ	Printer enquiry	esc [ 8 p	1B 5B 38 70
PHD	Print host data	esc [ 3 p	1B 5B 33 70
PKL	Print key lock	esc [ ; l p	1B 5B 3B 31 70

## VIP command list

Mnemonic code	VIP commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
PKU	Print key unlock	esc [ ; 0 p	1B 5B 3B 30 70
PLAR	Print log all reset	esc [ ; 4 p	1B 5B 3B 34 70
PLAS	Print log all set	esc [ ; 5 p	1B 5B 3B 35 70
PLMR	Print log mode reset	esc [ ; 2 p	1B 5B 3B 32 70
PLMS	Print log mode set	esc [ ; 3 p	1B 5B 3B 33 70
PMC	Print multiple copies	esc [ 7 n p	1B 5B 37 n 70
PMS	Print mode unprotected	esc [ 5 0 p	1B 5B 35 30 70
PMS	Print mode all	esc [ 5 1 p	1B 5B 35 31 70
PMS	Print mode no underline	esc [ 5 2 p	1B 5B 35 32 70
PMS	Print mode underline	esc [ 5 3 p	1B 5B 35 33 70
PRC	Print repeated chars	esc [ ? nnn cc p	1B 5B 3F nnn cc 70
PRES	Printer reset	esc [ 2 p	1B 5B 32 70
PSEG	Previous segment	esc [ 3 s	1B 5B 33 73
RBM	Reset block mode	esc [ E	1B 5B 45
RES	Reset	esc e	1B 65
RIS	Reset initial state	esc c	1B 63
RJF	Right justify fill	esc X c	1B 58 c
RMI	Reset modified inds	esc Y	1B 59
RMR	Roll mode reset	esc q	1B 71
RMS	Roll mode set	esc r	1B 72
ROR	Restricted ops reset	esc [ i	1B 5B 69
ROS	Restricted ops set	esc [ j	1B 5B 6A
SBL	Set blinking	esc "	1B 22
SBT	Set block transmit	esc [ nnn F	1B 5B nnn 46
SCD	Scroll down	esc [ 1 s	1B 5B 31 73

## VIP command list

Mnemonic code	VIP commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
SCU	Scroll up	esc [ 0 s	1B 5B 30 73
SHI	Set high intensity	esc 3	1B 33
SHIFT	Shift	-	-
SIN	Set invisible	esc @	1B 40
SLC	Set lower case	esc [ n	1B 5B 6E
SLI	Set low intensity	esc 4	1B 34
SLL	System line lock	esc O	1B 4F
SLR	System line reset	esc v	1B 76
SLS	System line set	esc w	1B 77
SM64	Set Mode ANSI	esc [ 5 q	1B 5B 35 71
SM73	Set Mode 7300	esc [ 3 q	1B 5B 33 71
SM77	Set Mode 7700	esc [ 2 q	1B 5B 32 71
SM78	Set Mode 7800	esc [ 1 q	1B 5B 31 71
SM83	Set Mode 8300	esc [ 4 q	1B 5B 34 71
SRC	Save row/col position	esc [ O	1B 5B 4F
SRL	Scroll left	esc [ b	1B 5B 62
SRM	Start row/col maint.	esc [ Y	1B 5B 59
SRR	Scroll right	esc [ c	1B 5B 63
SS2	Single shift 2	ss2	19
SSR	Space suppress reset	esc [ d	1B 5B 64
SSS	Space suppress set	esc [ e	1B 5B 65
STP	Set transmit pointer	esc M	1B 4D
SUC	Set upper case	esc [ m	1B 5B 6D
SWP	Set window position	esc [ rrrccc ~	1B 5B rrrccc 7E
TBC	Tab clear	esc [ g	1B 5B 67

## VIP command list

Mnemonic code	VIP commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
TBI	Tab initialize	esc [ N	1B 5B 4E
TBS	Tab set	esc p	1B 70
TM	Text mode	esc [ l	1B 5B 6C
TNB	Transmit next block	esc I	1B 49
TOD	Time of day set	esc [ hhmm t	1B 5B hhmm 74
TRD	Test results display	esc Z	1B 5A
TRR	TX-return reset	esc [ A	1B 5B 41
TRS	TX-return set	esc [ B	1B 5B 42
TX1	Special transmit line	esc L	1B 4C
TXA	Transmit all	esc t	1B 74
TXD	Transmit data	esc i	1B 69
UMS	UNIX mode set	esc [ D	1B 5B 44
UMR	UNIX mode reset	esc [ G	1B 5B 47
US	Unit separator	us	1F
WPM	Word processing mode	esc [ K	1B 5B 4B
WPMR	WP mode reset	esc [ ]	1B 5B 5D

**VIP commands (ASCII sort)**

Mnemonic code	VIP commands ASCII sort	ASCII sequence	Hexadecimal sequence
ALT	Alternate shift	-	-
AUTO LF	Auto line feed	-	-
BRK	Break	-	-
CAPS LOCK	Caps lock	-	-
CTL	Control	-	-
LCL	Local	-	-
NUML	Numeric lock	-	-
SHIFT	Shift	-	-
ENQ	Enquiry	enq	05
BEL	Bell	bel	07
BS	Back space	bs	08
HT	Horizontal tab	ht	09
LF	Line feed	lf	0A
CR	Carriage return	cr	0D
SS2	Single shift 2	ss2	19
ESC	Escape	esc	1B
SBL	Set blinking	esc "	1B 22
F1	Function key 1	esc 0	1B 30
FS1	Shifted FK 1	esc 1	1B 31
F2	Function key 2	esc 2	1B 32
SHI	Set high intensity	esc 3	1B 33
SLI	Set low intensity	esc 4	1B 34
FS2	Shifted FK 2	esc 5	1B 35

## VIP command list

Mnemonic code	VIP commands ASCII sort	ASCII sequence	Hexadecimal sequence
F3	Function key 3	esc 6	1B 36
FS3	Shifted FK 3	esc 7	1B 37
F4	Function key 4	esc 8	1B 38
FS4	Shifted FK 4	esc 9	1B 39
F5	Function key 5	esc :	1B 3A
FS5	Shifted FK 5	esc ;	1B 3B
F6	Function key 6	esc <	1B 3C
FS6	Shifted FK 6	esc =	1B 3D
F7	Function key 7	esc >	1B 3E
FS7	Shifted FK 7	esc ?	1B 3F
SIN	Set invisible	esc @	1B 40
CUU	Cursor up	esc A	1B 41
CUD	Cursor down	esc B	1B 42
CUF	Cursor forward	esc C	1B 43
CUB	Cursor backward	esc D	1B 44
LGR	Line graphics reset	esc F	1B 46
LGS	Line graphics set	esc G	1B 47
CUH	Cursor home	esc H	1B 48
TNB	Transmit next block	esc I	1B 49
EOP	Erase end of page	esc J	1B 4A
EOF	Erase end of field	esc K	1B 4B
TX1	Special transmit line	esc L	1B 4C
STP	Set transmit pointer	esc M	1B 4D
SLL	System line lock	esc O	1B 4F
F8	Function key 8	esc P	1B 50

## VIP command list

Mnemonic code	VIP commands ASCII sort	ASCII sequence	Hexadecimal sequence
FS8	Shifted FK 8	esc Q	1B 51
F9	Function key 9	esc R	1B 52
FS9	Shifted FK 9	esc S	1B 53
F10	Function key 10	esc T	1B 54
FS10	Shifted FK 10	esc V	1B 56
RJF	Right justify fill	esc X c	1B 58 c
RMI	Reset modified inds	esc Y	1B 59
TRD	Test results display	esc Z	1B 5A
TRR	TX-return reset	esc [ A	1B 5B 41
TRS	TX-return set	esc [ B	1B 5B 42
FTC	File transfer control	esc [ C	1B 5B 43
UMS	UNIX mode set	esc [ D	1B 5B 44
RBM	Reset block mode	esc [ E	1B 5B 45
SBT	Set block transmit	esc [ nnn F	1B 5B nnn 46
UMR	UNIX mode reset	esc [ G	1B 5B 47
DSH	Data space home	esc [ H	1B 5B 48
IM	Insert mode	esc [ I	1B 5B 49
IMR	Insert mode reset	esc [ J	1B 5B 4A
WPM	Word processing mode	esc [ K	1B 5B 4B
IL	Insert line	esc [ L	1B 5B 4C
DL	Delete line	esc [ M	1B 5B 4D
TBI	Tab initialize	esc [ N	1B 5B 4E
SRC	Save row/col position	esc [ O	1B 5B 4F
DCH	Delete character	esc [ P	1B 5B 50
DAT	Delete attribute	esc [ Q	1B 5B 51



## VIP command list

Mnemonic code	VIP commands ASCII sort	ASCII sequence	Hexadecimal sequence
CRD	Cursor rqst decimal	esc [ R	1B 5B 52
KBU	Keyboard unlock	esc [ W	1B 5B 57
KBL	Keyboard lock	esc [ X	1B 5B 58
SRM	Start row/col maint.	esc [ Y	1B 5B 59
CBT	Cursor back tab	esc [ Z	1B 5B 5A
WPMR	WP mode reset	esc [ ]	1B 5B 5D
ERM	End row/col maint.	esc [ a	1B 5B 61
SRL	Scroll left	esc [ b	1B 5B 62
SRR	Scroll right	esc [ c	1B 5B 63
SSR	Space suppress reset	esc [ d	1B 5B 64
SSS	Space suppress set	esc [ e	1B 5B 65
CPD	Cursor pos decimal	esc [ rrrccc f	1B 5B rrrccc 66
TBC	Tab clear	esc [ g	1B 5B 67
FM	Forms Mode	esc [ h	1B 5B 68
ROR	Restricted ops reset	esc [ i	1B 5B 69
ROS	Restricted ops set	esc [ j	1B 5B 6A
TM	Text mode	esc [ l	1B 5B 6C
SUC	Set upper case	esc [ m	1B 5B 6D
SLC	Set lower case	esc [ n	1B 5B 6E
PDS	Print data space	esc [ 0 p	1B 5B 30 70
PRES	Printer reset	esc [ 2 p	1B 5B 32 70
PHD	Print host data	esc [ 3 p	1B 5B 33 70
PMS	Print mode unprotect	esc [ 5 0 p	1B 5B 35 30 70
PMS	Print mode all	esc [ 5 1 p	1B 5B 35 31 70
PMS	Print mode no underline	esc [ 5 2 p	1B 5B 35 32 70

## VIP command list

Mnemonic code	VIP commands ASCII sort	ASCII sequence	Hexadecimal sequence
PMS	Print mode underline	esc [ 5 3 p	1B 5B 35 33 70
PMC	Print multiple copies	esc [ 7 n p	1B 5B 37 n 70
PENQ	Printer enquiry	esc [ 8 p	1B 5B 38 70
PDENQ	Printer delayed enquiry	esc [ 9 p	1B 5B 39 70
PKU	Print key unlock	esc [ ; 0 p	1B 5B 3B 30 70
PKL	Print key lock	esc [ ; 1 p	1B 5B 3B 31 70
PLMR	Print log mode reset	esc [ ; 2 p	1B 5B 3B 32 70
PLMS	Print log mode set	esc [ ; 3 p	1B 5B 3B 33 70
PLAR	Print log all reset	esc [ ; 4 p	1B 5B 3B 34 70
PLAS	Print log all set	esc [ ; 5 p	1B 5B 3B 35 70
PDT	Print data terminator	esc [ < p	1B 5B 3C 70
PCC	Print control character	esc [ = c p	1B 5B 3D c 70
PRC	Print repeated chars	esc [ ? nnn cc p	1B 5B 3F nnn cc 70
SM78	Set Mode 7800	esc [ 1 q	1B 5B 31 71
SM77	Set Mode 7700	esc [ 2 q	1B 5B 32 71
SM73	Set Mode 7300	esc [ 3 q	1B 5B 33 71
SM83	Set Mode 8300	esc [ 4 q	1B 5B 34 71
SM64	Set Mode ANSI	esc [ 5 q	1B 5B 35 71
SCU	Scroll up	esc [ 0 s	1B 5B 30 73
SCD	Scroll down	esc [ 1 s	1B 5B 31 73
NSEG	Next segment	esc [ 2 s	1B 5B 32 73
PSEG	Previous segment	esc [ 3 s	1B 5B 33 73
TOD	Time of day set	esc [ hhmm t	1B 5B hhmm 74
CAT	Color attribute	esc [ nnn v	1B 5B nnn 76
NOP	No operation	esc [ x	1B 5B 78

## VIP command list

Mnemonic code	VIP commands ASCII sort	ASCII sequence	Hexadecimal sequence
DENQ	Delayed enquiry	esc [ y	1B 5B 79
DFL	Define fixed lines	esc [ nn z	1B 5B n n 7A
KIR	Keyboard ID reqst	esc [ {	1B 5B 7B
SWP	Set window position	esc [ rrrccc ~	1B 5B rrrccc 7E
F11	Function key 11	esc \	1B 5C
FS11	Shifted FK 11	esc ]	1B 5D
F12	Function key 12	esc ^	1B 5E
FS12	Shifted FK 12	esc _	1B 5F
CLR	Clear	esc `	1B 60
APC	Aux port connect	esc a	1B 61
APD	Aux port disconnect	esc b	1B 62
RIS	Reset initial state	esc c	1B 63
RES	Reset	esc e	1B 65
CPB	Cursor pos binary	esc f c r	1B 66 c r
BLD	Bell disable	esc g	1B 67
BLE	Bell enable	esc h	1B 68
MC	Media copy	esc i	1B 69
TXD	Transmit data	esc i	1B 69
CM	Character mode	esc k	1B 6B
NEP	Non-echoplex	esc l	1B 6C
EP	Echoplex	esc m	1B 6D
CRB	Cursor rqst binary	esc n	1B 6E
TBS	Tab set	esc p	1B 70
RMR	Roll mode reset	esc q	1B 71
RMS	Roll mode set	esc r	1B 72

## VIP command list

Mnemonic code	VIP commands ASCII sort	ASCII sequence	Hexadecimal sequence
ATR	Attribute	esc s a	1B 73 a
TXA	Transmit all	esc t	1B 74
SLR	System line reset	esc v	1B 76
SLS	System line set	esc w	1B 77
FVD	Firmware version disp	esc z	1B 7A
MLL	Maint. line lock	esc }	1B 7D
MLS	Maint. line set	esc ~	1B 7E
US	Unit separator	us	1F
DEL	Delete	del	7F

## VIP attribute commands

Here is the table of attributes that are used with the ATR command. This one is useful in connection with the VIP attribute conversion menu in the color setup:

Command letter	Attribute type
A	Alphabetic
B	Blinking
C	Cyan
D	Digit
E	Must Enter
F	Must Fill
G	Green
H	Hide
I	Inverse
J	Right Justify
K	not assigned
L	Low intensity
M	Modify transmit
N	Numeric
O	Omit print
P	Protected (reset)
Q	not assigned
R	Reset
S	Red
T	Transmit protect
U	Unprotected
V	Magenta

## VIP command list

Command letter	Attribute type
W	White
X	Blue
Y	Yellow
Z	not assigned
[	(user input)
\	not assigned
]	not assigned
^	not assigned
_	Underlined
+	Numeric sign (numeric edit)
\$	Currency (numeric edit)
9	Numeric Digit (numeric edit)
0	Numeric Fill (numeric edit)
.	Decimal Justify (numeric edit)
,	Decimal Justify (numeric edit)
1	Double height row (column 1 only)
2	Double width row (column 1 only)

Numeric edit attributes define subfields of an existing unprotected field and do not in themselves terminate the unprotected field. They are mutually exclusive; each position of a numeric edit field can only have one of these attributes.

# Command list (DKU)

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This is a list of the commands currently supported by the emulator when running in DKU7107 mode.

## DKU commands (Mnemonic sort)

Mnemonic code	DKU commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
ADR EM	Address entry marker	dc3	13
ALT	Alternate shift	-	-
BEL	Bell	bel	07
Blank	Set blanking	~	7E
Blink	Set blinking	^	5E
BRK	Break	-	-
BS	Back space	bs	08
CAPS LOCK	Caps lock	-	-
COO	Cursor on/off Cursor on Cursor off	esc [ Pn r esc [ 0 r esc [ 1 r	1B 5B 3x 72 1B 5B 30 72 1B 5B 31 72
CR	Carriage return	cr	0D
CSI	Control sequence intro	esc [	1B 5B
CTL	Control	-	-
DAQ	Define area qualifier	esc [ P1; P2 o	1B 5B 3x 3B 3y 6F
DCS	Device control string	esc P	1B 50
DEL	Delete	del	7F
DM	Diagnostic mode	esc O	1B 4F

## ANSI command list

Mnemonic code	DKU commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
DSR	Device status request	esc [ Pn n	1B 5B 3x 6E
	Transmits cursor pos	esc [ 6 n	1B 5B 36 6E
	Immediate With next transmit	esc [ 6 1 n	1B 5B 36 31 6E
EA	Erase area	esc [ Pn N	1B 5B 3x 4E
	Cursor to end of field	esc [ 0 N	1B 5B 30 4E
	Start field to cursor	esc [ 1 N	1B 5B 31 4E
	Entire variable field	esc [ 2 N	1B 5B 32 4E
ED	Erase data	esc [ Pn J	1B 5B 3x 4A
	Cursor to end page	esc [ 0 J	1B 5B 30 4A
	Start page to cursor	esc [ 1 J	1B 5B 31 4A
	Entire page	esc [ 2 J	1B 5B 32 4A
EL	Erase on a line	esc [ Pn K	1B 5B 3x 4B
	Cursor to end line	esc [ 0 K	1B 5B 30 4B
	Start line to cursor	esc [ 1 K	1B 5B 31 4B
	Entire line	esc [ 2 K	1B 5B 32 4B
ESC	Escape	esc	1B
ETX	Store end of text	esc U	1B 55
F1	Function key 1	esc [ 1 u	1B 5B 31 75
F2	Function key 2	esc [ 2 u	1B 5B 32 75
F3	Function key 3	esc [ 3 u	1B 5B 33 75
F4	Function key 4	esc [ 4 u	1B 5B 34 75
F5	Function key 5	esc [ 5 u	1B 5B 35 75
F6	Function key 6	esc [ 6 u	1B 5B 36 75
F7	Function key 7	esc [ 7 u	1B 5B 37 75
F8	Function key 8	esc [ 8 u	1B 5B 38 75
F9	Function key 9	esc [ 9 u	1B 5B 39 75
F10	Function key 10	esc [ : u	1B 5B 3A 75
F11	Function key 11	esc [ ; u	1B 5B 3B 75
F12	Function key 12	esc [ < u	1B 5B 3C 75



## ANSI command list

Mnemonic code	DKU commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
FF	Form feed (clear)	ff	0C
FM	Forms mode	esc M	1B 4D
FS	Fixed field start	fs	1C
FWD SP	Forward space	dc2	12
GS	Variable field start	gs P	1D x
HOME	Cursor home	dc4	14
HT	Horizontal tab	ht	09
LF	Line feed	lf	0A
LSR3	Locking shift 3	esc	1B 7C
MW	Message Wait	esc R	1B 52
NM	Normal mode	esc N	1B 4E
NOP	Glink extensions	esc [ x	1B 5B 78
PFF	Print all fields	esc Y	1B 59
PTRA	Print transparent	esc Z	1B 5A
PVF	Print variable fields	esc X	1B 58
RIS	Reset initial state	esc c	1B 63
RLF	Reverse line feed	dc1	11
RM	Reset mode Same as Set mode	esc [ P ; P 1	1B 5B 3x 3B 3y 6C
RS	Repeat fields	rs P	1E x
SCP	Select partition Status line First 24 screen lines	esc [ Pn v esc [ 0 v esc [ 1 v	1B 5B 3x 76 1B 5B 30 76 1B 5B 31 76
SF1	Shifted function key 1	esc [ 1 1 u	1B 5B 31 31 75
SF2	Shifted function key 2	esc [ 1 2 u	1B 5B 31 32 75
SF3	Shifted function key 3	esc [ 1 3 u	1B 5B 31 33 75

## ANSI command list

Mnemonic code	DKU commands Mnemonic sort	ASCII sequence	Hexadecimal sequence
SF4	Shifted function key 4	esc [ 1 4 u	1B 5B 31 34 75
SF5	Shifted function key 5	esc [ 1 5 u	1B 5B 31 35 75
SF6	Shifted function key 6	esc [ 1 6 u	1B 5B 31 36 75
SF7	Shifted function key 7	esc [ 1 7 u	1B 5B 31 37 75
SF8	Shifted function key 8	esc [ 1 8 u	1B 5B 31 38 75
SF9	Shifted function key 9	esc [ 1 9 u	1B 5B 31 39 75
SF10	Shifted function key 10	esc [ 1 : u	1B 5B 31 3A 75
SF11	Shifted function key 11	esc [ 1 ; u	1B 5B 31 3B 75
SF12	Shifted function key 12	esc [ 1 < u	1B 5B 31 3C 75
SGR	Set graphic rendition	esc [ P ; P m	1B 5B 3x 3B 3y 6D
SHIFT	Shift	-	-
SI	Shift in to characters	Si	0F
SM	Set mode Monochrome 4 color A 4 color B 7 color Extended char set SDP visual attributes	Esc [ P ; P h ? 0 ? 1 ? 2 ? 3 ? < ? =	1B 5B 3x 3B 3y 68 3F 30 3F 31 3F 32 3F 33 3F 3C 3F 3D
SO	Shift out to graphics	So	0E
SR	Transmit STX - ETX	esc o	1B 6F
SS2	Single shift 2	esc E	1B 45
SS2P	Single shift 2 printer	ss2	19 (printer only)
ST	String terminator	esc \	1B 5C
STX	Store start of text	esc T	1B 54
TAB CLEAR	Clear all tabs	esc 2	1B 32
TAB SET	Set tab at cursor	esc 1	1B 31

***DKU commands (ASCII sort)***

Mnemonic code	DKU commands ASCII sort	ASCII sequence	Hexadecimal sequence
ALT	Alternate shift	-	-
BRK	Break	-	-
CAPS LOCK	Caps lock	-	-
CTL	Control	-	-
SHIFT	Shift	-	-
BEL	Bell	bel	07
BS	Back space	bs	08
HT	Horizontal tab	ht	09
LF	Line feed	lf	0A
FF	Form feed (clear)	ff	0C
CR	Carriage return	cr	0D
SO	Shift out to graphics	So	0E
SI	Shift in to characters	Si	0F
RLF	Reverse line feed	dc1	11
FWD SP	Forward space	dc2	12
ADR EM	Address entry marker	dc3	13
HOME	Cursor home	dc4	14
SS2P	Single shift 2 printer	ss2	19 (printer only)
ESC	Escape	esc	1B
TAB SET	Set tab at cursor	esc 1	1B 31
TAB CLEAR	Clear all tabs	esc 2	1B 32
SS2	Single shift 2	esc E	1B 45
FM	Forms mode	esc M	1B 4D

## ANSI command list

Mnemonic code	DKU commands ASCII sort	ASCII sequence	Hexadecimal sequence
NM	Normal mode	esc N	1B 4E
DM	Diagnostic mode	esc O	1B 4F
DCS	Device control string	esc P	1B 50
MW	Message Wait	esc R	1B 52
STX	Store start of text	esc T	1B 54
ETX	Store end of text	esc U	1B 55
PVF	Print variable fields	esc X	1B 58
PFF	Print all fields	esc Y	1B 59
PTRA	Print transparent	esc Z	1B 5A
CSI	Control sequence intro	esc [	1B 5B
ED	Erase data Cursor to end page Start page to cursor Entire page	esc [ Pn J esc [ 0 J esc [ 1 J esc [ 2 J	1B 5B 3x 4A 1B 5B 30 4A 1B 5B 31 4A 1B 5B 32 4A
EL	Erase on a line Cursor to end line Start line to cursor Entire line	esc [ Pn K esc [ 0 K esc [ 1 K esc [ 2 K	1B 5B 3x 4B 1B 5B 30 4B 1B 5B 31 4B 1B 5B 32 4B
EA	Erase area Cursor to end of field Start field to cursor Entire variable field	esc [ Pn N esc [ 0 N esc [ 1 N esc [ 2 N	1B 5B 3x 4E 1B 5B 30 4E 1B 5B 31 4E 1B 5B 32 4E
SM	Set mode Monochrome 4 color A 4 color B 7 color Extended char set SDP visual attributes	Esc [ P ; P h ? 0 ? 1 ? 2 ? 3 ? < ? =	1B 5B 3x 3B 3y 68 3F 30 3F 31 3F 32 3F 33 3F 3C 3F 3D
RM	Reset mode Same as Set mode	esc [ P ; P l	1B 5B 3x 3B 3y 6C

## ANSI command list

Mnemonic code	DKU commands ASCII sort	ASCII sequence	Hexadecimal sequence
SGR	Set graphic rendition	esc [ P ; P m	1B 5B 3x 3B 3y 6D
DSR	Device status request Transmits cursor pos Immediate With next transmit	esc [ P n n esc [ 6 n esc [ 6 1 n	1B 5B 3x 6E 1B 5B 36 6E 1B 5B 36 31 6E
DAQ	Define area qualifier	esc [ P1; P2 o	1B 5B 3x 3B 3y 6F
COO	Cursor on/off Cursor on Cursor off	esc [ P n r esc [ 0 r esc [ 1 r	1B 5B 3x 72 1B 5B 30 72 1B 5B 31 72
F1	Function key 1	esc [ 1 u	1B 5B 31 75
F2	Function key 2	esc [ 2 u	1B 5B 32 75
F3	Function key 3	esc [ 3 u	1B 5B 33 75
F4	Function key 4	esc [ 4 u	1B 5B 34 75
F5	Function key 5	esc [ 5 u	1B 5B 35 75
F6	Function key 6	esc [ 6 u	1B 5B 36 75
F7	Function key 7	esc [ 7 u	1B 5B 37 75
F8	Function key 8	esc [ 8 u	1B 5B 38 75
F9	Function key 9	esc [ 9 u	1B 5B 39 75
F10	Function key 10	esc [ : u	1B 5B 3A 75
F11	Function key 11	esc [ ; u	1B 5B 3B 75
F12	Function key 12	esc [ < u	1B 5B 3C 75
SF1	Shifted function key 1	esc [ 1 1 u	1B 5B 31 31 75
SF2	Shifted function key 2	esc [ 1 2 u	1B 5B 31 32 75
SF3	Shifted function key 3	esc [ 1 3 u	1B 5B 31 33 75
SF4	Shifted function key 4	esc [ 1 4 u	1B 5B 31 34 75
SF5	Shifted function key 5	esc [ 1 5 u	1B 5B 31 35 75
SF6	Shifted function key 6	esc [ 1 6 u	1B 5B 31 36 75

## ANSI command list

Mnemonic code	DKU commands ASCII sort	ASCII sequence	Hexadecimal sequence
SF7	Shifted function key 7	esc [ 1 7 u	1B 5B 31 37 75
SF8	Shifted function key 8	esc [ 1 8 u	1B 5B 31 38 75
SF9	Shifted function key 9	esc [ 1 9 u	1B 5B 31 39 75
SF10	Shifted function key 10	esc [ 1 : u	1B 5B 31 3A 75
SF11	Shifted function key 11	esc [ 1 ; u	1B 5B 31 3B 75
SF12	Shifted function key 12	esc [ 1 < u	1B 5B 31 3C 75
SCP	Select partition Status line First 24 screen lines	esc [ Pn v esc [ 0 v esc [ 1 v	1B 5B 3x 76 1B 5B 30 76 1B 5B 31 76
NOP	Glink extensions	esc [ x	1B 5B 78
ST	String terminator	esc \	1B 5C
RIS	Reset initial state	esc c	1B 63
SR	Transmit STX - ETX	esc o	1B 6F
LSR3	Locking shift 3	esc	1B 7C
FS	Fixed field start	fs	1C
GS	Variable field start	gs P	1D x
RS	Repeat fields	rs P	1E x
Blink	Set blinking	^	5E
Blank	Set blanking	~	7E
DEL	Delete	del	7F

# DKU attribute tables

## Graphic renditions (SGR)

Several SGR parameters can be used in the same sequence, separated by semicolons. There are two modes for visual graphics.

**VIP mode:** The SGR takes a space on the screen. The visual graphic is applied from the next position on the screen and applies until the next attribute, a downstream space or the end of the line.

**SDP mode:** The SGR takes no space on the screen, and applies to the following characters wherever they are written on the screen, until the next attribute.

### Attributes valid for both VIP and SDP mode

Parameter (ASCII)	Parameter (Hex)	Attribute type
0	30	Normal video
2	32	Low intensity
4	34	Underline
5	35	Blink
7	37	Inverse video
8	38	Blank
<	3C	Column separator

### Attributes valid only for SDP mode

Parameter (ASCII)	Parameter (Hex)	Attribute type
=	3D	Column separator off
>	3E	Neutral writer
22	32 32	Low intensity off
24	32 34	Underline off
25	32 35	Blink off

## ANSI command list

27	32 37	Inverse video off
28	32 38	Blank off

## Area qualification (DAQ)

Several DAQ parameters can be used in the same sequence, separated by semicolons.

The DAQ defines the start or end of a field. The DAQ does not occupy a position on the screen, and applies immediately. A field extends to the next DAQ, and is not limited by the end of the line. If not terminated the field ends at the end of the screen.

Parameter (ASCII)	Parameter (Hex)	Attribute type
0	30	Unprotected and transmittable
1	31	Protected and not transmittable
3	33	Numeric, can contain + - and monetary symbol
5	35	Right justified
8	38	Protected and transmittable
<	3C	Must fill
=	3D	Must enter
>	3E	Pure numeric, numerals 0 to 9
<3	3C 33	Printable
=1	3D 31	Read from badge reader
>1	3E 31	Signed field



## VIP fixed/variable fields (GS P, FS)

For historical reasons the DKU supports the definition of fixed variable field pairs using the same control sequences as the VIP7700 and VIP7760 terminals. FS indicates the start of a fixed field. GS indicates the start of a variable field. The character immediately following a GS is interpreted as area qualification (variable field type). The field attributes are indicated by bits in the character:

Bit	Value	Attribute type
7	0	Not used, always 0
6	1	Not used, always 1
5	0 1	Right justified Left justified
4	0 1	No repetition Repeating field
3	0 1	Alphanumeric Numeric (column 2 & 3 of ASCII table)
2	0 1	Transmittable Not transmittable
1	0 1	Printable Not printable

Thus:

GS 0 (1D 30) denotes a left justified, alphanumeric, transmittable, printable field.  
 GS 4 (1D 34) denotes a left justified, numeric, transmittable, printable field.  
 GS \$ (1D 24) denotes a right justified, numeric transmittable, printable field.

## Color decoding

The DKU generates color by decoding combinations of blink/underline/low intensity:

Terminal	DKU Color rendition table			
	Blink	Underline	Low	Color
7 color	No	No	No	White
	No	No	Yes	Turquoise
	No	Yes	No	Green
	No	Yes	Yes	Red
	Yes	No	No	Yellow
	Yes	No	Yes	Blue
	Yes	Yes	No	Violet
	Yes	Yes	Yes	Black
4 Color A		No	No	White
		No	Yes	Turquoise
		Yes	No	Green
		Yes	Yes	Red
4 Color B	No		No	White
	No		Yes	Turquoise
	Yes		No	Red
	Yes		Yes	White

# Command list (ANSI/VT102)

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The keyboard of the VT102 and later models of this terminal differs in several ways from the PC keyboard. Users of 'real' VT102 and VT220 host applications will need to know where the various keys on the VT102/220 terminals may be found on their PC.

One thing to note is 'application keypad' mode. The keys on the numeric keypad perform this function in Glink. However, in that these keys have to 'double up' as arrow keys on older PC keyboards, the numeric keypad will *only* operate in application keypad mode when NumLock is on. Without NumLock, the keys will operate normally. This applies only to the 'white' keys on the keypad, as these are the ones that have a dual purpose - the 'Num' keys will work in application keypad mode irrespective of the NumLock setting.

Number keys on the keypad send the equivalent codes. The Del key sends the code for (period) irrespective of whether the key is labelled with period or comma (this is to keep the layout as close as possible to the real terminal). NUM- sends the code for minus, while NUM+ sends the remaining code, which is for a (comma) on the actual terminal. In that many PCs don't have an ENTER key on the numeric keypad, the application keypad ENTER code may be sent using CTRL+ENTER. If you have an enhanced keyboard, then you don't need the CTRL+ENTER method; the keypad enter will function correctly.

The codes for PF1-PF4 are assigned to the function keys F1 through F4. If you are using an application that uses VT320 function keys F6 through F20, you will find F6 to F10 on the appropriate keys, while the codes for F11 through F20 are generated by pressing shift and a function key, e.g., F13 may be generated with SHIFT+F3.

This is a list of the commands currently supported by the emulator when running in ANSI/VT102 modes. For a full explanation of each command refer to the documentation for the VT102 terminal - this list is only intended as a rough guide.

**ANSI commands (mnemonic sort)**

Mnemonic code	ANSI/VT102 commands Sorted by mnemonics	ASCII sequence	Hexadecimal sequence
AK-0	App keypad 0	esc O p	1B 4F 70
AK-1	App keypad 1	esc O q	1B 4F 71
AK-2	App keypad 2	esc O r	1B 4F 72
AK-3	App keypad 3	esc O s	1B 4F 73
AK-4	App keypad 4	esc O t	1B 4F 74
AK-5	App keypad 5	esc O u	1B 4F 75
AK-6	App keypad 6	esc O v	1B 4F 76
AK-7	App keypad 7	esc O w	1B 4F 77
AK-8	App keypad 8	esc O x	1B 4F 78
AK-9	App keypad 9	esc O y	1B 4F 79
AK-(-)	App keypad minus	esc O m	1B 4F 6D
AK-(,)	App keypad comma	esc O l	1B 4F 6C
AK-(.)	App keypad period	esc O n	1B 4F 6E
AK-CR	App keypad Enter	esc O M	1B 4F 4D
ALN	Screen alignment	esc # 8	1B 23 38
ALT	Alternate shift	-	-
BEL	Bell	bel	07
BRK	Break	-	-
BS	Back space	bs	08
CAN	Cancel	can	18
CAPS LOCK	Caps lock	-	-
CBT	Cursor back tab	esc [ Z	1B 5B 5A
CNL	Cursor Next Line (SCO)	esc [ E	1B 5B 45

## ANSI command list

Mnemonic code	ANSI/VT102 commands Sorted by mnemonics	ASCII sequence	Hexadecimal sequence
CPL	Cursor Previous Line (SCO)	esc [ F	1B 5B 46
CR	Carriage return	cr	0D
CSI	Control Seq Intro	esc [	1B 5B
CTL	Control	-	-
CUB	Cursor backward	esc [ D	1B 5B 44
CUD	Cursor down	esc [ B	1B 5B 42
CUF	Cursor forward	esc [ C	1B 5B 43
CUP	Cursor position	esc [ H	1B 5B 48
CUU	Cursor up	esc [ A	1B 5B 41
DA	Device attributes	esc Z	1B 5A
DA	Device attributes	esc [ c	1B 5B 63
DCH	Delete character	esc [ P	1B 5B 50
DCS	Device control string	esc P	1B 50
DEL	Delete	del	7F
DHL	Double height, top	esc # 3	1B 23 33
DHL	Double height, bottom	esc # 4	1B 23 34
DL	Delete line	esc [ M	1B 5B 4D
DLE	Data link escape	dle	10
DMI	Disable manual input	esc `	1B 60
DSR	Device status	esc [ n	1B 5B 6E
DWL	Double width	esc # 6	1B 23 36
EA	Erase area	esc [ O	1B 5B 4F
ECH	Erase character	esc [ X	1B 5B 58
ED	Erase data	esc [ J	1B 5B 4A
EL	Erase line	esc [ K	1B 5B 4B

## ANSI command list

Mnemonic code	ANSI/VT102 commands Sorted by mnemonics	ASCII sequence	Hexadecimal sequence
EMI	Enable manual input	esc b	1B 62
ENQ	Enquiry	enq	05
ESC	Escape	esc	1B
FF	Form feed	ff	0C
HPA	Horizontal Pos Absolute (SCO)	esc [ G	1B 5B 47
HT	Horizontal tab	ht	09
HTS	Horizontal tab set	esc H	1B 48
HVP	Hor/vertical position	esc [ f	1B 5B 66
ICH	Insert character	esc [ @	1B 5B 40
IL	Insert line	esc [ L	1B 5B 4C
IND	Index	esc D	1B 44
LCL	Local	-	-
LF	Line feed	lf	0A
LS1R	Lock shift 1 (R)	esc ~	1B 7E
LS2	Lock shift 2	esc n	1B 6E
LS2R	Lock shift 2 (R)	esc }	1B 7D
LS3	Lock shift 3	esc o	1B 6F
LS3R	Lock shift 3 (R)	esc	1B 7C
MC/0	Print screen	esc [ 0 i	1B 5B 30 69
MC/4	End host print	esc [ 4 i	1B 5B 34 69
MC/5	Start host print	esc [ 5 i	1B 5B 35 69
NEL	Next line	esc E	1B 45
NUML	Numeric lock	-	-
PAM	App. keypad mode	esc =	1B 3D
PF1	App keypad PF1	esc O P	1B 4F 50

## ANSI command list

Mnemonic code	ANSI/VT102 commands Sorted by mnemonics	ASCII sequence	Hexadecimal sequence
PF2	App keypad PF2	esc O Q	1B 4F 51
PF3	App keypad PF3	esc O R	1B 4F 52
PF4	App keypad PF4	esc O S	1B 4F 53
PNM	Num. keypad mode	esc >	1B 3E
RC	Restore cursor	esc 8	1B 38
RC	Restore cursor	esc [ u	1B 5B 75
RI	Reverse Index	esc M	1B 4D
RIS	Terminal reset	esc c	1B 63
RM	Reset mode	esc [ l	1B 5B 6C
SHIFT	Shift	-	-
S7C	Select 7bit ctrls	esc sp F	1B 20 46
S8C	Select 8bit ctrls	esc sp G	1B 20 47
SC	Save cursor	esc 7	1B 37
SC	Save cursor	esc [ s	1B 5B 73
SCR	Scrolling region	esc [ r	1B 5B 72
SCS-0	Select G0 set (94)	esc ( x	1B 28 xx
SCS-1	Select G1 set (94)	esc ) x	1B 29 xx
SCS-1A	Select G1 set (96)	esc - x	1B 2D xx
SCS-2	Select G2 set (94)	esc * x	1B 2A xx
SCS-2A	Select G2 set (96)	esc . x	1B 2E xx
SCS-3	Select G3 set (94)	esc + x	1B 2B xx
SCS-3A	Select G3 set (96)	esc / x	1B 2F xx
SD	Scroll Down (SCO ANSI)	esc [ T	1B 5B 54
SGR	Set graphic rendition	esc [ m	1B 5B 6D
SI	Shift in	si	0F

## ANSI command list

Mnemonic code	ANSI/VT102 commands Sorted by mnemonics	ASCII sequence	Hexadecimal sequence
SM	Set mode	esc [ h	1B 5B 68
SM64	Set Mode ANSI	esc [ 5 q	1B 5B 35 71
SM73	Set Mode 7300	esc [ 3 q	1B 5B 33 71
SM77	Set Mode 7700	esc [ 2 q	1B 5B 32 71
SM78	Set Mode 7800	esc [ 1 q	1B 5B 31 71
SM83	Set Mode 8300	esc [ 4 q	1B 5B 34 71
SO	Shift out	so	0E
SS2	Single shift 2	ss2	19
SS2	Single shift 2	esc N	1B 4E
SS3	Single shift 3	esc O	1B 4F
ST	String terminator	esc \	1B 5C
SU	Scroll Up (SCO ANSI)	esc [ S	1B 5B 53
SWL	Single width/height	esc # 5	1B 23 35
TBC	Tab clear	esc [ g	1B 5B 67
VT	Vertical tab	vt	0B



**ANSI commands (ASCII sort)**

Mnemonic code	ANSI/VT102 commands Sorted by ASCII value	ASCII sequence	Hexadecimal sequence
ALT	Alternate shift	-	-
BRK	Break	-	-
CAPS LOCK	Caps lock	-	-
CTL	Control	-	-
LCL	Local	-	-
NUML	Numeric lock	-	-
SHIFT	Shift	-	-
ENQ	Enquiry	enq	05
BEL	Bell	bel	07
BS	Back space	bs	08
HT	Horizontal tab	ht	09
LF	Line feed	lf	0A
VT	Vertical tab	vt	0B
FF	Form feed	ff	0C
CR	Carriage return	cr	0D
SO	Shift out	so	0E
SI	Shift in	si	0F
DLE	Data link escape	dle	10
CAN	Cancel	can	18
SS2	Single shift 2	ss2	19
ESC	Escape	esc	1B
S7C	Select 7bit ctrls	esc sp F	1B 20 46
S8C	Select 8bit ctrls	esc sp G	1B 20 47

## ANSI command list

Mnemonic code	ANSI/VT102 commands Sorted by ASCII value	ASCII sequence	Hexadecimal sequence
DHL	Double height, top	esc # 3	1B 23 33
DHL	Double height, bottom	esc # 4	1B 23 34
SWL	Single width/height	esc # 5	1B 23 35
DWL	Double width	esc # 6	1B 23 36
ALN	Screen alignment	esc # 8	1B 23 38
SCS-0	Select G0 set (94)	esc ( x	1B 28 xx
SCS-1	Select G1 set (94)	esc ) x	1B 29 xx
SCS-2	Select G2 set (94)	esc * x	1B 2A xx
SCS-3	Select G3 set (94)	esc + x	1B 2B xx
SCS-1A	Select G1 set (96)	esc - x	1B 2D xx
SCS-2A	Select G2 set (96)	esc . x	1B 2E xx
SCS-3A	Select G3 set (96)	esc / x	1B 2F xx
SC	Save Cursor State	esc 7	1B 37
RC	Restore Cursor	esc 8	1B 38
PAM	App. keypad mode	esc =	1B 3D
PNM	Num. keypad mode	esc >	1B 3E
IND	Index	esc D	1B 44
NEL	Next line	esc E	1B 45
HTS	Horizontal tab set	esc H	1B 48
RI	Reverse Index	esc M	1B 4D
SS2	Single shift 2	esc N	1B 4E
SS3	Single shift 3	esc O	1B 4F
AK-0	App keypad 0	esc O p	1B 4F 70
AK-1	App keypad 1	esc O q	1B 4F 71
AK-2	App keypad 2	esc O r	1B 4F 72

## ANSI command list

Mnemonic code	ANSI/VT102 commands Sorted by ASCII value	ASCII sequence	Hexadecimal sequence
AK-3	App keypad 3	esc O s	1B 4F 73
AK-4	App keypad 4	esc O t	1B 4F 74
AK-5	App keypad 5	esc O u	1B 4F 75
AK-6	App keypad 6	esc O v	1B 4F 76
AK-7	App keypad 7	esc O w	1B 4F 77
AK-8	App keypad 8	esc O x	1B 4F 78
AK-9	App keypad 9	esc O y	1B 4F 79
AK-(-)	App keypad minus	esc O m	1B 4F 6D
AK-(,)	App keypad comma	esc O l	1B 4F 6C
AK-(.)	App keypad period	esc O n	1B 4F 6E
AK-CR	App keypad Enter	esc O M	1B 4F 4D
PF1	App keypad PF1	esc O P	1B 4F 50
PF2	App keypad PF2	esc O Q	1B 4F 51
PF3	App keypad PF3	esc O R	1B 4F 52
PF4	App keypad PF4	esc O S	1B 4F 53
DCS	Device control string	esc P	1B 50
DA	Device attr request	esc Z	1B 5A
CSI	Control Seq Intro	esc [	1B 5B
ICH	Insert character	esc [ @	1B 5B 40
CUU	Cursor up	esc [ A	1B 5B 41
CUD	Cursor down	esc [ B	1B 5B 42
CUF	Cursor forward	esc [ C	1B 5B 43
CUB	Cursor backward	esc [ D	1B 5B 44
CNL	Cursor Next Line (SCO)	esc [ E	1B 5B 45
CPL	Cursor Previous Line (SCO)	esc [ F	1B 5B 46

## ANSI command list

Mnemonic code	ANSI/VT102 commands Sorted by ASCII value	ASCII sequence	Hexadecimal sequence
HPA	Horizontal Pos Absolute (SCO)	esc [ G	1B 5B 47
CUP	Cursor position	esc [ H	1B 5B 48
ED	Erase data	esc [ J	1B 5B 4A
EL	Erase line	esc [ K	1B 5B 4B
IL	Insert line	esc [ L	1B 5B 4C
DL	Delete line	esc [ M	1B 5B 4D
EA	Erase area	esc [ O	1B 5B 4F
DCH	Delete character	esc [ P	1B 5B 50
SU	Scroll Up (SCO ANSI)	esc [ S	1B 5B 53
SD	Scroll Down (SCO ANSI)	esc [ T	1B 5B 54
ECH	Erase character	esc [ X	1B 5B 58
CBT	Cursor back tab	esc [ Z	1B 5B 5A
DA	Device attributes	esc [ c	1B 5B 63
HVP	Hor/vertical position	esc [ f	1B 5B 66
TBC	Tab clear	esc [ g	1B 5B 67
SM	Set mode	esc [ h	1B 5B 68
MC/0	Print screen	esc [ 0 i	1B 5B 30 69
MC/4	End host print	esc [ 4 i	1B 5B 34 69
MC/5	Start host print	esc [ 5 i	1B 5B 35 69
RM	Reset mode	esc [ l	1B 5B 6C
SGR	Set graphic rendition	esc [ m	1B 5B 6D
DSR	Device status	esc [ n	1B 5B 6E
SM78	Set Mode 7800	esc [ 1 q	1B 5B 31 71
SM77	Set Mode 7700	esc [ 2 q	1B 5B 32 71
SM73	Set Mode 7300	esc [ 3 q	1B 5B 33 71

## ANSI command list

Mnemonic code	ANSI/VT102 commands Sorted by ASCII value	ASCII sequence	Hexadecimal sequence
SM83	Set Mode 8300	esc [ 4 q	1B 5B 34 71
SM64	Set Mode ANSI	esc [ 5 q	1B 5B 35 71
SCR	Scrolling region	esc [ r	1B 5B 72
SC	Save cursor	esc [ s	1B 5B 73
RC	Restore cursor	esc [ u	1B 5B 75
SGR	Set graphic rendition	esc [ m	1B 5B 6D
ST	String terminator	esc \	1B 5C
DMI	Disable manual input	esc `	1B 60
EMI	Enable manual input	esc b	1B 62
RIS	Terminal reset	esc c	1B 63
LS2	Lock shift 2	esc n	1B 6E
LS3	Lock shift 3	esc o	1B 6F
LS3R	Lock shift 3 (R)	esc	1B 7C
LS2R	Lock shift 2 (R)	esc }	1B 7D
LS1R	Lock shift 1 (R)	esc ~	1B 7E
DEL	Delete	del	7F

## ANSI attribute commands

Here is the table of attributes that are used with the SGR command:

Parameter	Attribute type
0	Reset
1	Bold
2	Low intensity
4	Underline
5	Blinking
6	Blinking
7	Inverse
8	Concealed
10	Graphics off
12	Graphics on
21	End bold
22	End low intensity
24	End underline
25	End blinking
26	End blinking
27	End inverse
28	End concealed
30	Black foreground
31	Red foreground
32	Green foreground
33	Yellow foreground
34	Blue foreground
35	Magenta foreground

Parameter	Attribute type
36	Cyan foreground
37	White foreground
39	Default foreground
40	Black background
41	Red background
42	Green background
43	Yellow background
44	Blue background
45	Magenta background
46	Cyan background
47	White background
49	Default background

## ANSI mode commands

Here is the table of modes that are used with the SM/RM commands:

Parameter	Attribute type
?1	Cursor key mode
2	Keyboard lock
?3	132 columns
4	Insert mode
?5	Inverted screen
?6	Origin mode
?7	Autowrap
12	Echoplex
20	Auto LF
?25	Text cursor enable
?32	32-line mode*
?33	33-line mode*
?40	25-line mode*
?42	National mode

---

\* No longer supported, use Glink command extensions to set screen length



# Command extensions

---

Glink supports a series of extensions to the standard command set, which are designed to allow the host to control some of the functions in Glink from a remote location. These commands are supported on all the different emulations provided by the emulator.

Each command sequence is written as a VIP NOP command, with different parameter numbers. In other words, they are sent as the sequence:

```
ESC [ <n> x
1B 5B <n> 78
```

Some of the commands require an alphanumeric string in order to perform their function, and a special form of the command is provided to do this (the string should always be sent **before** calling the function in question):

```
ESC [ 1 7 x <alphanumeric string> CR
```

The following sequences are supported (the <delim> below will usually be a <CR> character, except when executing in VIP text or forms mode, in which case an <ETX> character will be sent instead):

<i>Sequence</i>	<b>Description</b>
ESC [ 1 1 x	Sets following Kermit transfer to BINARY
ESC [ 1 2 x	Sets following Kermit transfer to TEXT
ESC [ 1 5 x	Start Kermit PC -> Kermit server
*ESC [ 1 8 x	Start Kermit PC -> host
ESC [ 1 9 x	Start Kermit host -> PC
*ESC [ 2 8 x	Start Xmodem PC -> host
*ESC [ 2 9 x	Start Xmodem host -> PC
*ESC [ 3 8 x	Start Ymodem PC -> host
*ESC [ 3 9 x	Start Ymodem host -> PC

## Command extensions

<i>Sequence</i>	<i>Description</i>
*ESC [ 4 8 x	Start Zmodem PC -> host
ESC [ 4 9 x	Start Zmodem host -> PC
*ESC [ 5 8 x	Start Ymodem batch PC -> host
ESC [ 5 9 x	Start Ymodem batch host -> PC
*ESC [ 6 8 x	Start Modem7 PC -> host
ESC [ 6 9 x	Start Modem7 host -> PC
*ESC [ 7 8 x	Start Telink PC -> host
ESC [ 7 9 x	Start Telink host -> PC
*ESC [ 8 8 x	Start Ymodem-G PC -> host
ESC [ 8 9 x	Start Ymodem-G host -> PC
ESC [ 9 0 x	Reserved for internal use
ESC [ 9 1 x	Reserved for internal use
ESC [ 9 2 x	Set transparent printing (no translate)
ESC [ 9 3 x	Reset transparent printing
ESC [ 9 4 x	Version number enquiry (returns 'GVxxx' <delim>, xxx=release ID)
ESC [ 9 5 x	Toggle left/right view for VT102 132-cols
*ESC [ 9 6 x	Load named keyboard file
ESC [ 9 7 x	Serial number enquiry (returns '#ssss' <delim>, ssss=serial number)
*ESC [ 9 8 x	Execute Glink script
*ESC [ 9 9 x	Execute program or command
ESC [ 1 2 4 x - to - ESC [ 1 9 9 x	Set number of lines on-screen 24 - 99
ESC [ 5 0 0 x - to - ESC [ 7 5 5 x	Simulate special key with scan code 0 - 255 (consult IBM tech ref)

<i>Sequence</i>	<i>Description</i>
ESC [ 9 4 8 x	Terminate, but check with user if this would have happened on a user close command
ESC [ 9 4 9 x	Terminate, do not check with user
*ESC [ 9 5 0 x	Display message in status line (message is removed at next user keystroke)
*ESC [ 9 5 1 x	Display message in status line (message not removed until ESC [ 9 5 2 x sequence is sent from host)
ESC [ 9 5 2 x	Remove message from status line (sent using the ESC [ 9 5 1 x sequence)
*ESC [ 9 5 3 x	Display message in a window and wait for user keystroke
*ESC [ 9 5 4 x	Display message in a window asking for user input. User input is returned to host with CR or ETX terminator
ESC [ 9 5 5 x	Enable lock on transmit
ESC [ 9 5 6 x	Disable lock on transmit
ESC [ 9 6 0 x	Set line cursor
ESC [ 9 6 1 x	Set blink cursor
ESC [ 9 6 2 x	Set block cursor
ESC [ 9 7 1 x	Execute a TX-RET style return
ESC [ 9 7 4 x	End printing and flush output
ESC [ 9 7 5 x	Enquiry for current emulation mode (returns GInnn where nnn is the correct value to insert into the switch mode commands below)
ESC [ 9 7 6 x	Start print data
ESC [ 9 7 7 x	Stop print data
ESC [ 9 7 8 x	Start printer spooling
ESC [ 9 7 9 x	End printer spooling (enclose print blocks between these two commands for correct network spool)

## Command extensions

<i>Sequence</i>	<i>Description</i>
ESC [ 9 8 0 x	Switch to VIP7800 mode
ESC [ 9 8 1 x	Switch to ANSI mode
ESC [ 9 8 2 x	Switch to VT102 mode
ESC [ 9 8 3 x	Switch to Prestel mode
ESC [ 9 8 4 x	Switch to Minitel mode
ESC [ 9 8 5 x	Switch to VIP7700 mode
ESC [ 9 8 6 x	Switch to DKU7107 mode
ESC [ 9 8 7 x	Switch to IBM3270 mode
ESC [ 9 8 8 x	Switch to DKU7102 mode
ESC [ 9 9 0 x	Reserved for internal use
ESC [ 9 9 1 x	Reserved for internal use
*ESC [ 9 9 2 x	Save named context to file
*ESC [ 9 9 3 x	Restore named context from file
*ESC [ 9 9 4 x	Report available contexts
*ESC [ 9 9 5 x	Save named context/config to file
*ESC [ 9 9 6 x	Restore named context/config from file
ESC [ 9 9 7 x	Mode independent emulator reset

Those commands marked with an asterisk require a string containing the file name to be sent first (the execute DOS command sequence requires the DOS command to be sent first).

Note also that the 'execute DOS command' sequence will send a single <delim> back to the host when the DOS command finishes executing, in order that the host may synchronize itself with the PC.

For example, to start a text mode Kermit to send a file MYFILE.TXT from the PC to the host, the host could send the following sequence:

```
ESC [ 1 7 x M Y F I L E . T X T CR
ESC [ 1 2 x ESC [ 1 8 x
```

Another example: to start a word processor 'w' with MYFILE.TXT as its only parameter, the host could send:

```
ESC [ 1 7 x W SP M Y F I L E . T X T CR
ESC [ 9 9 x
```

When using the Kermit protocol, you may specify different names for the host and for the PC by using the format:

```
"PC-filename;Host-filename"
```

The context save and restore commands described above are provided for special-purpose applications. The 'context' referred to consists of the entire current status of the emulator, including the screen image and all form attributes. If the context has been saved with a configuration using the 995 call, it may be restored either with the 993 or with the 996 call, depending upon whether or not you wish to set the configuration at the same time. You may include a percent sign (%) in the filename used for the context save — this will be replaced with a number uniquely identifying the particular copy of Glink that is running. For a more general method of handling 'local forms', see the *TSM8 (local forms)* appendix on page 159.



# ***TSM8/TCS forms***

---

GLINK provides support for local VIP forms using the TSM8 standard or local DKU forms using the TCS local forms standard. Both these standards allow any form (or in fact any sequence of host commands) to be stored locally on the workstation (or on a file server that may be accessed from the workstation). Facilities are provided for version control, multiple applications, enquiry as to form presence, and multiple languages -- in short everything you need to use local forms while retaining full host control.

## ***TSM8 (local forms)***

From the user point of view, very little preconfiguration is required. An option in the VIP emulator setup (TSM8 enable) must be turned on, and the option immediately following (TSM8 forms directory) must be filled out with a valid path-name to a directory (which will be created if necessary). All local forms will be stored under this root directory. In general, the host will supply a subdirectory name under which the actual forms will be stored in order to isolate one application from another. An optional secondary forms directory may be specified as a reserve path for forms storage.

Once this has been done, all that's necessary is to log into a TSM8 application. Glink lets the host application know that it's TSM8 enabled by changing the fourth character of the enquiry reply string to 'R'. You may also need to ensure that the host has the terminal configured as a TSM terminal. As forms are accessed on the host, they will be stored locally, and the next time the same form is accessed it will be loaded from the local copy. If the host version of the form should be updated at some point the local copy will be updated automatically with no user intervention required.

If you have been using the TSM8R product for local forms functionality, note that the `SET FORMS` statement in your `AUTOEXEC.BAT` file that was used by that program is not required by Glink.

## TSM8/TCS remote forms

A brief summary of the commands used for TSM8 forms control follows:

<code>&lt;esc&gt;[800C</code>	Sets TSM mode
<code>&lt;esc&gt;[801C</code>	Sets TSS mode
<code>&lt;esc&gt;[802C&lt;d&gt;</code>	Sets TSM command delimiter the default is *)
<code>&lt;esc&gt;[808C&lt;string&gt;&lt;d&gt;</code>	Sets TSM application subdirectory
<code>&lt;esc&gt;[809C</code>	Resets TSM application subdirectory
<code>&lt;esc&gt;[810C&lt;formname&gt;&lt;d&gt;</code>	Requests TSM form load
<code>&lt;esc&gt;[811C&lt;formname&gt;&lt;d&gt;</code>	Requests TSM form store
<code>&lt;esc&gt;[812C</code>	Marker command

The 'delimiter', shown as `<d>` above, is used to mark the end of form and directory names. The default is '\*' but this may be overridden by the host using the command provided. Also, the following may be sent by Glink back to the host:

<code>&lt;esc&gt;[810Y&lt;form&gt;&lt;etx&gt;</code>	ACK for form (TSS mode only)
<code>&lt;esc&gt;[810N&lt;form&gt;&lt;etx&gt;</code>	NAK (form invalid or non-existent)

It is not our purpose here to give an exhaustive description of the technical side of the TSM8 procedures, but a brief description of how these commands are used follows.

First, the functionality operates in two different modes, TSS and TSM mode (set with the appropriate command). There are some basic differences between TSS and TSM mode:

- In TSS mode, an ACK is always sent as a response to a form load request. In TSM mode, no ACK is sent. Also, any NAK is delayed until the variable contents of the form have been sent (these are discarded). This means that some unnecessary data is sent the first time the form is loaded, but that TSM mode in general works faster than TSS mode.
- TSM mode provides language support for forms. Form names in TSS mode use the entire extension for the forms version number, while in TSM mode only the first two positions of the extension are used, the last position being reserved for an optional language key.
- TSS mode does not check validity of forms. TSM mode uses a checksum included after the forms data both to check that a form has been transmitted intact across the communications link, and that the local copy of the form has not been corrupted.



As you can see from this, TSM mode is the preferred method of operation.

Forms are always stored somewhere in the directory you have specified as the TSM forms directory in the VIP emulator setup menu. If the host specifies nothing else then the forms will be stored in the directory itself but more normally, the host will set the name of an application subdirectory using the command provided for this. This directory will be created by Glink as needed. The forms themselves will then be loaded from and stored to this subdirectory. The names of the forms consist of two parts, the name of the form itself and the version/language code. In TSS mode, this could be for example 'MYFORM.123' (version 123 of 'MYFORM'), while in TSM mode you would see 'MYFORM.12' (default version of 'MYFORM', version 12) or 'MYFORM.12F' (French-language version of 'MYFORM', version 12). When a request for a particular form is received by Glink and the version number requested is not the same as the version number of that form stored locally, then the local copy (or copies, if there are copies with the same version but different languages) will be deleted before the new form is stored.

Loading a form from the host is done by sending the form load request; this consists of the load form command, which in TSM mode will also be followed by any variable data, and a 'mark' command. If the form does not exist, Glink will respond with a NAK when the mark command is received, and will have discarded all data between the load form request and the mark command.

Storing a form from the host is done by sending first the store form request, then the data associated with the form, terminated with a mark command and finally a checksum calculated from the data just sent. No ACK or NAK command is sent at this point, in that the next load request will fail in any case and trigger a new store sequence.

## TSM8/TCS remote forms

A typical sequence in TSM mode may make things clearer:

<esc>[800C	(set TSM mode)
<esc>[802C	(set delimiter to " ")
<esc>[808CAPPDIR	(set application directory to APPDIR)
<esc>[810CMYFORM.02	(request for MYFORM.02)
(variable data)	(variable data always sent)
<esc>[812C	(marker at end of data) (Glink sends <esc>[810CNMYFORM<etx>
	to signal that the form was not found)
<esc>[811CMYFORM.02	(request for form store)(fixed data) (the form itself)
<esc>[812C<c>	(end of form mark and checksum) (variable data)
<esc>[812C	(end of variable data)
...	
<esc>[810CMYFORM.02	(new request for MYFORM.02) (variable data) (variable data always sent)
<esc>[812C	(marker at end of data, this time the form was loaded, no NAK is sent)

## TCS (local forms)

From the user point of view, very little preconfiguration is required. An option in the DKU emulator setup (TCS enable) must be turned on, and the option immediately following (TCS forms directory) must be filled out with a valid pathname to a directory (which will be created if necessary). All local forms will be stored under this root directory. In general, the host will supply a subdirectory name under which the actual forms will be stored in order to isolate one application from another.

### Overview

This section provides as detailed information as should be required to implement the TCS local forms facility in a terminal application. It does not pretend to be a complete specification, and contains only such material as is applicable to Glink.

### Addressing

Forms are manipulated using messages addressed to the terminal (**0x60**) address. In the TCS itself, messages other than a direct screen display can be addressed to the cluster as a whole (thus storing a form that subsequently may be used by any screen in the cluster, for example). This type of functionality is not provided in Glink.

### Commands

The following basic commands are provided. All commands are identified by two characters at the start of the message (immediately following the **<STX>** character).

Create form	<b>&lt;esc&gt;W</b>
Delete form or dataset	<b>&lt;esc&gt;Q</b>
Read catalogue	<b>&lt;esc&gt;V</b>
Display form	<b>&lt;esc&gt;B</b> or <b>&lt;esc&gt;C</b>

## Acknowledgments

Glink supports only 'Logical acknowledgement'. The 'Simple acknowledgement' scheme uses status messages that are part of the polled VIP protocol, and these are not useful in other environments where the VIP status messages are not visible to the host application. 'Logical acknowledgements' are application level messages, which can be received and acted on by the host. The logical messages are regarded as equivalent to the ACK, NAK and PGOF status messages used in the simple acknowledgement scheme.

All commands, with the exception of a successful form display via the `<esc>B` command, are answered with a positive or negative logical acknowledgement. This is done in the form of an empty message with the acknowledgement code in the first function code (FC1). The values for FC1 are chosen at configuration time on the TCS and can be configured in Glink via the `CFIX` script command. The values normally chosen are:

- 'a' (0x61) is equivalent to an ACK, and signifies correct completion of the command
- 'b' (0x62) is equivalent to a PGOF (Page Overflow) and signifies a logical error (logical NAK). In older TCS applications, this was defaulted to ' ' (0x60). There is an option in the DKU emulator setup (TCS logical NAK) to modify this value, or use the script command `CFIX 3070 $60`.
- 'c' (0x63) is equivalent to a NAK and signifies a physical error accessing the disk (physical NAK).

Physical errors reading or writing the disk do not occur in practice. This leaves us with the following two hex messages, where the entire VIP header is shown for completeness:

```
"ACK"      01 60 00 61 20 02 03
"NAK"      01 60 00 62 20 02 03   or
           01 60 00 63 20 02 03
```

The "NAK" above is the logical equivalent of the PGOF, see the Error messages below for possible reasons.

## Form and dataset names

Forms on the TCS are stored in a forms directory that consists of datasets, each dataset comprising up to 14 forms. A dataset **must** be specified, either explicitly:

**<dataset name>,<form name>**

or implicitly:

**<form name>**

in which case the dataset name used in the previous command is used (if none have been used then the current command is in error). We suggest that this model be mapped into a directory structure on the local file system, with the dataset name mapping to a subdirectory of the forms directory and the form name to a file name under this. Forms must be stored as a sequence of host data, and must also preserve the function codes sent with the original defining message. Both form and dataset names are limited to a maximum of eight characters.

## Specific commands

Commands are started with the **<esc>** character (**0x1B**) and are terminated by either the **<etx>** (**0x03**) or **<etb>** (**0x17**) character.

### Store form

HOST: **<esc>W[dataset,]formname<sp><form text><etx>**  
 PC: **ACK/NAK**

The dataset is created automatically if it does not already exist. If the form exists already then the command is rejected. Normally a delete form message will be sent immediately prior to the store form command for exactly this reason. Function codes sent with this message are stored along with the form (in Glink in the first two characters of the file on disk).

### Delete form

HOST: **<esc>Q[dataset,]formname<etx>**  
 PC: **ACK/NAK**

If the form deleted is the last form in the current dataset then the dataset is also deleted.

## **Delete dataset**

HOST: **<esc>Qdataset, \$ALL<etx>**  
PC: **ACK/NAK**

The dataset and all forms it contains are deleted.

## **Read dataset list**

HOST: **<esc>VINX1<etx>**  
PC: **INX1<sp><dataset1><dataset2>...<datasetn><etx>**

Dataset names are sent as 8-character fixed length strings, space-filled.

## **Read form list**

HOST: **<esc>V[dataset, ]CAT<etx>**  
PC: **<dataset><form1><form2>...<formN><etx>**  
**(or NAK)**

Dataset and form names are sent as 8-character fixed length strings, space-filled.

## **Display form**

### **Format 1:**

HOST: **<esc>B [dataset, ] formname<sp><text><etx>**  
PC: **normal formatted reply**  
**(or NAK)**

### **Format 2:**

HOST: **<esc>C [dataset, ] formname<sp><text><etx>**  
PC: **ACK/NAK**

The specified form is displayed (if possible, otherwise a NAK is sent). In the case of the **<esc>B** command, the form is ready for entry, for **<esc>C** an acknowledgement is returned to the host. Function codes are set from the stored copy of the form.

## Error messages

The following error messages may be displayed in the status line as the result of execution errors (others may be found on the real TCS but should not be applicable to an emulated environment):

**TCS: COMMAND ERROR**

The command could not be interpreted.

**TCS: UNKNOWN DATASET**

A dataset name is required but has not been defined, either explicitly or implicitly.

**TCS: FORM ALREADY EXISTS**

An attempt was made to create a form that already exists.

**TCS: UNKNOWN FORM**

The form specified does not exist.

## Example

The following sequence is the one most often seen in practice:

1. Host deletes form description (so as not to receive an error when storing it):

*Host to PC*

```
01 60 00 20 20 02 1B 51 44 42 30 31 2C 4B 41 30
30 31 32 20 03
```

(*Note:* trailing space after form name, not required by spec but seen in real traces)

*PC to Host*

```
01 60 00 61 20 02 03
```

(ACK, could be NAK if form was not in catalog)

2. Host stores new version of this form:

*Host to PC*

```
01 60 00 20 20 02 1B 57 44 42 30 31 2C 4B 41 30
30 31 32 20 1B 4E 0C 44 41 54 45 03
```

(*Note:* dataset name is not required, it could have been inherited from the delete command. The trailing space after the form name **is** however required, to separate the name from the actual data. The data here is intentionally not realistic...)

*PC to Host*

## TSM8/TCS remote forms

01 60 00 61 20 02 03  
(ACK)

3. Host requests form and adds variable data to it:

*Host to PC*

01 60 00 20 20 02 1B 42 44 42 30 31 2C 4B 41 30  
30 31 32 20 44 41 54 45 03

(*Note:* dataset name is not required here either. The trailing space after the form name **is** required, to separate the name from the actual (unrealistic) data).

*PC to Host*

01 60 00 20 20 02 52 45 50 4C 59 03

(in other words, normal data)



# Character equivalents

---

Hex	Octal	ASCII	Glink representations
00	000	NUL	^@ ^#000 ^&000 ^\$00
01	001	SOH	^A ^#001 ^&001 ^\$01
02	002	STX	^B ^#002 ^&002 ^\$02
03	003	ETX	^C ^#003 ^&003 ^\$03
04	004	EOT	^D ^#004 ^&004 ^\$04
05	005	ENQ	^E ^#005 ^&005 ^\$05
06	006	ACK	^F ^#006 ^&006 ^\$06
07	007	BEL	^G ^#007 ^&007 ^\$07
08	010	BS	^H ^#008 ^&010 ^\$08
09	011	HT	^I ^#009 ^&011 ^\$09
0A	012	LF	^J ^#010 ^&012 ^\$0A
0B	013	VT	^K ^#011 ^&013 ^\$0B
0C	014	FF	^L ^#012 ^&014 ^\$0C
0D	015	CR	^M ^#013 ^&015 ^\$0D
0E	016	SO	^N ^#014 ^&016 ^\$0E
0F	017	SI	^O ^#015 ^&017 ^\$0F
10	020	DLE	^P ^#016 ^&020 ^\$10
11	021	DC1	^Q ^#017 ^&021 ^\$11
12	022	DC2	^R ^#018 ^&022 ^\$12
13	023	DC3	^S ^#019 ^&023 ^\$13
14	024	DC4	^T ^#020 ^&024 ^\$14
15	025	NAK	^U ^#021 ^&025 ^\$15

## Character equivalents

Hex	Octal	ASCII	Glink representations
16	026	SYN	^V ^#022 ^&026 ^\$16
17	027	ETB	^W ^#023 ^&027 ^\$17
18	030	CAN	^X ^#024 ^&030 ^\$18
19	031	EM	^Y ^#025 ^&031 ^\$19
1A	032	SUB	^Z ^#026 ^&032 ^\$1A
1B	033	ESC	^[ ^#027 ^&033 ^\$1B
1C	034	FS	^\ ^#028 ^&034 ^\$1C
1D	035	GS	^] ^#029 ^&035 ^\$1D
1E	036	RS	^> ^#030 ^&036 ^\$1E
1F	037	US	^_ ^#031 ^&037 ^\$1F
40	100	@	@ ^#064 ^&100 ^\$40
5C	134	\	\ ^#092 ^&134 ^\$5C
5E	136	^	^^ ^#094 ^&136 ^\$5E
7F	177	DEL	^#127 ^&177 ^\$7F

### *Special-purpose escape sequences*

^*scriptname	Invoke a script in a macro
^*=command	Invoke script command in a macro
^!	Send current message delimiter (CR,EOT or ETX)
^#ddd	Decimal specification for characters in scripts
^&ooo	Octal specification for characters in scripts
^\$hh	Hex specification for characters in scripts or macros

# PC Codepage 437 - English

This is not the actual character set used by the IBM PC, in that control characters also have a representation in that character set. When Glink is using the PC character set, on the other hand, the first two columns of the character set are allocated to control characters. Note that if you are using any other emulation than the ANSI emulation then columns 8 and 9 are also allocated to control characters (see the *DEC Multinational character set* chapter on page 175).

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p	Ç	É	á	☐	Ł	⌚	α	≡
1	SOH	DC1	!	1	A	Q	a	q	ü	æ	í	☐	⌚	⌚	β	±
2	STX	DC2	"	2	B	R	b	r	é	Æ	ó	☐	⌚	⌚	Γ	≥
3	ETX	DC3	#	3	C	S	c	s	â	ô	ú			⌚	Π	≤
4	EOT	DC4	\$	4	D	T	d	t	ä	ö	ñ		-	⌚	Σ	
5	ENQ	NAK	%	5	E	U	e	u	à	ò	Ñ			⌚	σ	
6	ACK	SYN	&	6	F	V	f	v	â	û	ª			⌚	μ	÷
7	BEL	ETB	'	7	G	W	g	w	ç	ù	º	⌚			τ	≈
8	BS	CAN	(	8	H	X	h	x	ê	ÿ	ı	⌚	⌚	⌚	Φ	°
9	HT	EM	)	9	I	Y	i	y	ë	Ö	ƒ		⌚	⌚	Θ	·
A	LF	SUB	*	:	J	Z	j	z	è	Ü	ƒ		⌚	⌚	Ω	·
B	VT	ESC	+	;	K	[	k	{	ï	ç	½	⌚	⌚	■	δ	√
C	FF	FS	,	<	L	\	l		î	£	¼	⌚		■	∞	∞
D	CR	GS	-	=	M	]	m	}	ì	¥	ı	⌚	=	■	φ	²
E	SO	RS	.	>	N	^	n	~	Ä	£	«	⌚		■	ε	■
F	SI	US	/	?	O	_	o	DEL	Å	f	»	⌚	■	■	∩	

# PC Codepage 850 - Multilingual

This is not the actual character set used by the IBM PC, in that control characters also have a representation in that character set. When Glink is using the PC character set, on the other hand, the first two columns of the character set are allocated to control characters. Note that if you are using any other emulation than the ANSI emulation then columns 8 and 9 are also allocated to control characters (see the *DEC Multinational character set* chapter on page 175).

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
<b>0</b>	NUL	DLE	SP	0	@	P	`	p	Ç	É	á	☐	Ł	ø	Ó	—
<b>1</b>	SOH	DC1	!	1	A	Q	a	q	ü	æ	í	☐	⊥	Ð	β	±
<b>2</b>	STX	DC2	"	2	B	R	b	r	é	Æ	ó	☐	⊥	Ê	Ô	=
<b>3</b>	ETX	DC3	#	3	C	S	c	s	â	ô	ú		†	Ë	Ò	¾
<b>4</b>	EOT	DC4	\$	4	D	T	d	t	ä	ö	ñ	†	—	È	õ	¶
<b>5</b>	ENQ	NAK	%	5	E	U	e	u	à	ò	Ñ	Á	†	ì	Õ	§
<b>6</b>	ACK	SYN	&	6	F	V	f	v	å	û	ª	Â	ã	Í	μ	÷
<b>7</b>	BEL	ETB	'	7	G	W	g	w	ç	ù	º	À	Ã	Î	þ	¸
<b>8</b>	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	©	ℒ	Ï	ƒ	°
<b>9</b>	HT	EM	)	9	I	Y	i	y	ë	Ö	®	‡	ƒ	⌋	Ú	¨
<b>A</b>	LF	SUB	*	:	J	Z	j	z	è	Ü	¬		ℒ	ƒ	Û	·
<b>B</b>	VT	ESC	+	;	K	[	k	{	ï	φ	½	¶	¶	■	Ü	¹
<b>C</b>	FF	FS	,	<	L	\	l		î	£	¼	¶	¶	■	ý	³
<b>D</b>	CR	GS	-	=	M	]	m	}	ì	Ø	¡	¢	=		Ý	²
<b>E</b>	SO	RS	.	>	N	^	n	~	Ä	×	«	¥	¶	Ï	-	■
<b>F</b>	SI	US	/	?	O	_	o	DEL	Å	f	»	¶	¤	■	´	

# PC Codepage 865 - Nordic

This is not the actual character set used by the IBM PC, in that control characters also have a representation in that character set. When Glink is using the PC character set, on the other hand, the first two columns of the character set are allocated to control characters. Note that if you are using any other emulation than the ANSI emulation then columns 8 and 9 are also allocated to control characters (see the *DEC Multinational character set* chapter on page 175).

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p	Ç	É	á	☐	Ł	⌚	α	≡
1	SOH	DC1	!	1	A	Q	a	q	ü	æ	í	☐	⊥	⊟	β	±
2	STX	DC2	"	2	B	R	b	r	é	Æ	ó	☐	⊤	⊞	Γ	≥
3	ETX	DC3	#	3	C	S	c	s	â	ô	ú		⊥	⊞	Π	≤
4	EOT	DC4	\$	4	D	T	d	t	ä	ö	ñ	⊥	—	⊞	Σ	∫
5	ENQ	NAK	%	5	E	U	e	u	à	ò	Ñ	⊥	⊥	⊞	σ	∫
6	ACK	SYN	&	6	F	V	f	v	å	û	ª	⊥	⊞	⊞	μ	÷
7	BEL	ETB	'	7	G	W	g	w	ç	ù	º	⊞	⊥	⊥	τ	≈
8	BS	CAN	(	8	H	X	h	x	ê	ÿ	¿	⊞	⊞	⊥	Φ	°
9	HT	EM	)	9	I	Y	i	y	ë	Ö	¬	⊥	⊞	⊥	Θ	•
A	LF	SUB	*	:	J	Z	j	z	è	Ü	¬	⊥	⊞	⊞	Ω	·
B	VT	ESC	+	;	K	[	k	{	ï	ø	½	⊞	⊞	■	δ	√
C	FF	FS	,	<	L	\	l		î	£	¼	⊞	⊥	■	∞	∞
D	CR	GS	-	=	M	]	m	}	ì	Ø	¡	⊞	=	■	φ	²
E	SO	RS	.	>	N	^	n	~	Ä	£	«	⊥	⊥	■	ε	■
F	SI	US	/	?	O	_	o	DEL	Å	f	¤	⊞	⊞	■	∩	

# Windows ANSI character set

As with the DOS character sets, the first two columns of the character set are allocated to control characters. Windows also reserves columns 8 and 9 (with some few exceptions) and Glink uses these two columns in its built-in fonts to provide extra characters that are needed to display special characters when the host is using a different character set. Note that these are not available directly under any emulation other than the ANSI emulation in that these two columns are reserved for usage as control characters.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p	█		°	À	Ð	à	ð	
1	SOH	DC1	!	1	A	Q	a	q	⌈	‘	ı	±	Á	Ñ	á	ñ
2	STX	DC2	"	2	B	R	b	r	⌋	,’	¢	²	Â	Ò	â	ò
3	ETX	DC3	#	3	C	S	c	s	⌌	⌌	£	³	Ã	Ó	ã	ó
4	EOT	DC4	\$	4	D	T	d	t	⌍	⌍	¤	´	Ä	Ô	ä	ô
5	ENQ	NAK	%	5	E	U	e	u	⌎	≠	¥	µ	Å	Õ	å	õ
6	ACK	SYN	&	6	F	V	f	v	⌏			¶	Æ	Ö	æ	ö
7	BEL	ETB	'	7	G	W	g	w	⌐	·	§	·	Ç	×	ç	÷
8	BS	CAN	(	8	H	X	h	x	⌑	ƒ	¨	˘	È	Ø	è	ø
9	HT	EM	)	9	I	Y	i	y	⌒	J	©	ı	É	Ù	é	ù
A	LF	SUB	*	:	J	Z	j	z	⌓		ª	º	Ê	Ú	ê	ú
B	VT	ESC	+	;	K	[	k	{	⌔		«	»	Ë	Û	ë	û
C	FF	FS	,	<	L	\	l		█	f	¬	¼	Ì	Ü	ì	ü
D	CR	GS	-	=	M	]	m	}	█	ℳ		½	Í	Ý	í	ý
E	SO	RS	.	>	N	^	n	~	█	√	®	¾	Î	Þ	î	þ
F	SI	US	/	?	O	_	o	DEL	█	▒	⌞	¿	Ï	ß	ï	ÿ

# DEC multinational character set

This is the normal character set used both by the BDS/HDS and by VT102/220 terminals (there are some minor divergences but none that make a real difference in practice). The eight-bit control characters in this table apply to the VT102/220 emulation only.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	´	p		DCS		°	À	Ð	à	ð
1	SOH	DC1	!	1	A	Q	a	q		PU1	ı	±	Á	Ñ	á	ñ
2	STX	DC2	"	2	B	R	b	r		PU2	ç	²	Â	Ò	â	ò
3	ETX	DC3	#	3	C	S	c	s		STS	£	³	Ã	Ó	ã	ó
4	EOT	DC4	\$	4	D	T	d	t	IND	CRH	¤	´	Ä	Ô	ä	ô
5	ENQ	NAK	%	5	E	U	e	u	NEL	MW	¥	µ	Å	Õ	å	õ
6	ACK	SYN	&	6	F	V	f	v	SSA	SPA		¶	Æ	Ö	æ	ö
7	BEL	ETB	'	7	G	W	g	w	ESA	EPA	§	·	Ç	×	ç	÷
8	BS	CAN	(	8	H	X	h	x	HTS		¨	¸	È	Ø	è	ø
9	HT	EM	)	9	I	Y	i	y	HTJ		©	ı	É	Ù	é	ù
A	LF	SUB	*	:	J	Z	j	z	VTS		ª	º	Ê	Ú	ê	ú
B	VT	ESC	+	;	K	[	k	{	PLD	CSI	«	»	Ë	Û	ë	û
C	FF	FS	,	<	L	\	l		PLU	ST	¬	¼	Ì	Ü	ì	ü
D	CR	GS	-	=	M	]	m	}	RI	OSC		½	Í	Ý	í	ý
E	SO	RS	.	>	N	^	n	~	SS2	PM	®	¾	Î	Þ	î	þ
F	SI	US	/	?	O	_	o	DEL	SS3	APC	¯	¿	Ï	ß	ï	ÿ

# EBCDIC character set

This is the character set used by the IBM3270 emulation.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL				SP	&	-	ø	Ø	°	μ	^1	{ <sup>1</sup> }	<sup>1</sup>	\ <sup>1</sup>	0
1		SBA			NS	é	/	É	a	j	~ <sup>1</sup>	£	A	J	÷	1
2		EUA			â	ê	Â	Ê	b	k	s	¥	B	K	S	2
3		IC			ä	ë	Ä	Ë	c	l	t	·	C	L	T	3
4					à	è	À	È	d	m	u	©	D	M	U	4
5	PT	NL			á	í	Á	Í	e	n	v	§	E	N	V	5
6					ã	î	Ã	Î	f	o	w	¶	F	O	W	6
7					å	ï	Å	Ï	g	p	x	¼	G	P	X	7
8	GE		SA		ç	ì	Ç	Ì	h	q	y	½	H	Q	Y	8
9		EM	SFE		ñ	ß	Ñ	´ <sup>1</sup>	i	r	z	¾	I	R	Z	9
A					¢ <sup>1</sup>	! <sup>1</sup>	<sup>1</sup>	:	«	ª	¡	[	⌋	ı	2	3
B					.	\$ <sup>1</sup>	,	# <sup>1</sup>	»	º	¿	]	ô	û	Ô	Û
C	FF	DUP	MF	RA	<	*	%	@ <sup>1</sup>	ð	æ	Ð	¨	ö	ü	Ö	Ü
D	CR	SF			(	)	_	’	ý	,	Ý	¨	ò	ù	Ò	Ù
E		FM			+	;	>	=	þ	Æ	Þ	´	ó	ú	Ó	Ú
F					<sup>1</sup>	¬ <sup>1</sup>	?	" <sup>1</sup>	±	¤	®	×	õ	ÿ	Õ	DEL

<sup>1</sup>These characters may be affected by national transliteration.

Shaded areas denote characters used by hosts using the normal limited character set.



# Error texts

---

## **[90] Aborted by Operator.**

Class: File transfer

Cause: This message is displayed in the file transfer window when the transfer is aborted manually.

Action: None.

## **Access denied!**

Class: General

Cause: You have attempted to run an application from a file to which you do not have access, either because the file is in use by another user or because you have insufficient file system privileges to use the file.

Action: Check that you have sufficient privileges - if you do then wait until the application becomes available. On some systems setting the file attribute to 'read only' may be necessary if an application is to run simultaneously on different machines.

## **[5] Access to file denied.**

Class: File transfer

Cause: You have attempted to transfer a file to which you do not have access, either because the file is in use by another user or because you have insufficient file system privileges to use the file.

Action: Check that you have sufficient privileges - if you do then wait until the file becomes available.

## **ALPHA FIELD**

Class: Emulation

Cause: You have attempted to enter non-alphabetic data into a field that has been defined by the host as one in which only alphabetic characters may be entered. Alphabetic characters are defined as the characters A-Z, a-z, period, comma, hyphen and space.

Action: Enter valid data in the field.

## **Error texts**

### **ALPHA/DIGIT**

Class: Emulation

Cause: You have attempted to enter non-alphabetic/digit data into a field that has been defined by the host as one in which only alphabetic characters and digits may be entered. Alphabetic characters are defined as the characters A-Z, a-z, period, comma, hyphen and space. Digits are defined as the characters 0-9.

Action: Enter valid data in the field.

### **ALPHA/NUMERIC**

Class: Emulation

Cause: You have attempted to enter non-alphanumeric data into a field that has been defined by the host as one in which only alphanumeric characters may be entered. Alphanumeric characters are defined as the characters A-Z, a-z, 0-9, period, comma, hyphen, plus, and space.

Action: Enter valid data in the field.

### **BAD ADDRESS**

Class: Communication

Cause: The name of the server to which you are trying to connect has been specified in a format unacceptable to the underlying communications software. IP addresses for example must be specified as a.b.c.d where a, b, c, and d are numbers between zero and 255. For non-TCP/IP interfaces consult the appropriate documentation supplied with your workstation software.

Action: Correct the network address and reconnect.

### **Bad checksum.**

Class: File transfer

Cause: A block was transferred incorrectly in the current file transfer. This is detected automatically by the file transfer protocol, and the block is re-transmitted until it is transferred correctly, so there will be no error in the file that is stored on disk.

Action: None necessary.

### **Bad CRC check.**

Class: File transfer

Cause: A block was transferred incorrectly in the current file transfer. This is detected automatically by the file transfer protocol, and the block is re-transmitted until it is transferred correctly, so there will be no error in the file that is stored on disk.

Action: None necessary.

**Bad default parameters**

Class: Communications

Cause: The communications port has not been set up correctly in your WIN.INI or SYSTEM.INI file.

Action: Correct the error in your configuration and restart Windows.

**[94] Bad or unknown packet.**

Class: File transfer

Cause: A block was not recognized or was incorrectly transferred in the current file transfer. This is detected automatically by the file transfer protocol, and appropriate action will be taken. So long as the transfer terminates normally, the file that is stored on disk will be correct (if the error is unrecoverable the transfer will be terminated prematurely with an error status).

Action: None necessary.

**Bad Port ID**

Class: Communications

Cause: You tried to connect to a communications port that has not been configured for Windows.

Action: Make sure that all parameters for the communications port have been configured correctly in your SYSTEM.INI file.

**Bad sequence number.**

Class: File transfer

Cause: A block was transferred incorrectly in the current file transfer. The transfer must be terminated prematurely in that the file transfer protocol is unable to recover from this type of error.

Action: Retry the transfer (preferably with a different protocol if one is available).

**Block nesting error**

Class: Script language

Cause: A group directive in a dialog box group (or HGROUP or VGROUP) is incorrectly placed, or an IF statement block has not been terminated inside a SWITCH/ENDSWITCH pair.

Action: Correct and retry.

## Error texts

### ***Block synchronization error.***

Class: File transfer

Cause: A block was transferred incorrectly in the current file transfer. The transfer must be terminated prematurely in that the file transfer protocol is unable to recover from this type of error.

Action: Retry the transfer (preferably with a different protocol if one is available).

### ***BUFFER OVERFLOW***

Class: Communications

Cause: The buffer used to hold data coming from the line was not large enough and data has been lost. This is related to Glink not being able to process the data fast enough, or possibly because you performed some time-consuming operation that did not allow Glink to process data.

Action: Increase the buffer size set up in the communications options dialog box. Ensure that both your modem (or host connection) and Glink are set up with appropriate flow control options. Adjust the 'threshold' parameters so as to allow Glink to process data more efficiently. If all else fails reduce the line speed (or buy a faster PC!).

### ***Can't copy this file!***

Class: File display

Cause: The file you asked to be copied in the file window was not accessible for some reason.

Action: Check that you have access to the file and that it's not in use by another user.

### ***Can't erase this file!***

Class: File display

Cause: The file you asked to be erased in the file window was not accessible for some reason.

Action: Check that you have access to the file and that it's not in use by another user.

### ***Can't move this file!***

Class: File display

Cause: The file you asked to be moved in the file window could not be moved for some reason. Note that you will never be allowed to move a file across drives or to a filename that already exists.

Action: Use the copy function instead of the move function.

***Cannot connect to COM port!***

Class: Communications

Cause: Glink was unable to connect to the communications port. This could either be because the port does not exist, or because another application is using it in another window.

Action: Check that the port is correctly configured and is not being used by a DOS application.

***[0] Cannot open file.***

Class: File transfer

Cause: The local file could not be opened for some reason.

Action: Check that the file to be transferred exists and that you have access to it.

***Cannot open output file.***

Class: File transfer

Cause: The file to which you are receiving cannot be accessed or created. The most common cause of this error is specification of a 'download directory' that does not exist.

Action: Check that the download directory (if any) is correctly specified, and that you have write access to the area in which the file is to be written.

***Cannot write object file!***

Class: Script language

Cause: The script OBJECT statement was used to specify an output file for the compiled script. This file either has been incorrectly declared or could not be written to.

Action: Correct and retry.

***Communications buffer too small***

Class: Communication

Cause: The communications interface was unable to allocate the required minimum amount of memory. This will usually only be seen when running interfaces that require use of conventional memory (memory in the first physical 1Mb) to communicate with software loaded before Windows is started.

Action: Close one or more of the other applications you are running and retry. If this does not help, contact your system administrator; your machine probably needs to be reconfigured so as to either provide more conventional memory for Windows use or so as to reduce memory requirements for the communications interface.

## Error texts

### ***Connection refused by host***

Class: Communication

Cause: The host machine could not accept your call. The server software for the port to which you are trying to connect is either not running or is already handling the maximum number of connections it supports.

Action: Wait and retry the connection later.

### ***Connection to host timed out***

Class: Communication

Cause: The host machine did not answer your call. This can be for a variety of reasons, but usually is because (a) the host machine is down, (b) the server software is not running, (c) the network is unable to provide a connection to that host or (d) a filter between you and the host is preventing you from reaching that host. Unfortunately the communications interface does not provide more specific information about which of these is actually causing the problem.

Action: If you are running a TCP/IP interface, use the 'ping' utility to check that the host machine is actually alive.

### ***DATA OVERFLOW***

Class: Emulation

Cause: The application attempted to move past the end of the screen and the emulation is not set to 'roll mode' and therefore cannot scroll.

Action: Set the emulation to roll mode using the toggles menu. Some applications that switch between text and forms mode without resetting the roll mode state may also require use of the sticky roll mode option.

### ***DATA OVERRUN***

Class: Communication

Cause: The communications interface has reported loss of an incoming data character. The causes of this type of error are usually fairly technical in nature and are discussed at length in the description of the serial port interface elsewhere in this documentation.

Action: Discussed in the referenced documentation.

### ***[19] Device is write protected.***

Class: File transfer

Cause: The file you are receiving could not be written because the media you have specified is write-protected.

Action: Remove the write protection, or specify a different download path, and retry.

***Device not open***

Class: Communications

Cause: This error should never occur.

Action: Report the problem to your Glink support organization.

***[21] Device not ready.***

Class: File transfer

Cause: The file you are attempting to receive could not be written because the device is not able to access its media.

Action: If you are receiving a file to diskette make sure there is a diskette in the drive. If you are receiving to your hard disk then it probably needs checking and/or repairing.

***DIGIT FIELD***

Class: Emulation

Cause: You have attempted to write non-digit data into a forms mode field. Such fields may only contain the digits 0-9 or space characters.

Action: Enter valid data.

***Disconnected by host***

Class: Communication

Cause: The host machine has sent a normal disconnect command.

Action: None (if you were not expecting to be disconnected you may need to check with your system administrator as to why the disconnect command was sent).

***Disconnected by user***

Class: Communications

Cause: You selected the Line/Stop option or were running a script that disconnected you from the host machine intentionally.

Action: None

***Duplicate label.***

Class: Script language

Cause: You have used the same name (remembering that only the first 8 characters are significant) for two labels in the same script.

Action: Correct and retry.

## Error texts

### ***#ELSE with no matching #IFDEF***

Class: Script language

Cause: An #ELSE statement must be paired with a preceding #IFDEF (or #IFDEF) statement.

Action: Correct and retry.

### ***END OF FIELD***

Class: Emulation

Cause: You have attempted to enter data past the end of a forms mode field.

Action: If you would prefer the emulator to skip to the next field (rather than wait for you to press the TAB key) when you have filled a variable field, set the automatic tabbing option in the setup menu (to set the option permanently) or the equivalent toggle.

### ***END OF FORM***

Class: Emulation

Cause: You have attempted to tab past the last field in the form.

Action: None

### ***ENDBUILD with no corresponding BUILDMENU***

Class: Script language

Cause: The script BUILDMENU and ENDBUILD commands must always be paired.

Action: Correct and retry.

### ***#ENDIF with no matching #IFDEF***

Class: Script language

Cause: An #ENDIF statement must be paired with a preceding #IFDEF (or #IFDEF) statement.

Action: Correct and retry.

### ***Endswitch/endwhile statement missing***

Class: Script language

Cause: The end of the script file was reached without finding an ENDSWITCH statement to terminate an outstanding SWITCH statement (or the same situation exists with an unmatched WHILE statement).

Action: Correct and retry.



**ENTRY REQUIRED**

Class: Emulation

Cause: You have not entered data in the current field and the host application has defined that data *must* be entered there.

Action: Enter data in this field.

**Error in linkage to external routine**

Class: Script language

Cause: You have used an external script reference that could not be resolved. If the error occurs when the script is compiled this means that the external library used an incorrect designation for an input or output parameter. If the error occurs during script execution it means that the referenced DLL procedure is no longer available.

Action: Correct and retry.

**Error reading disk file!**

Class: Script language

Cause: An error occurred when a script command attempted to use one of the file input commands. This usually will only be caused by a damaged or defective disk or diskette.

Action: Restore the file and retry.

**[27] Error reading file.**

Class: File transfer

Cause: An error occurred while attempting to read a file that is to be transferred. This will usually only occur when the file itself is damaged in some way.

Action: Restore the file from backup and retry.

**Error sending modem command: <command>**

Class: Communication

Cause: The command displayed was not accepted by your modem.

Action: In the modem strings menu, correct the string that was in error. If necessary send the modem command in separate pieces to discover which of the commands in the string is not being accepted.

## **Error texts**

### **[84] Error writing file.**

Class: File transfer

Cause: An error occurred while attempting to write a file that is being received. This will usually only occur when the disk is damaged in some way or the disk becomes full while the transfer is in progress.

Action: If the disk is full, free disk space by releasing files and retry. Otherwise repair and/or replace the disk.

### **Error writing to disk!**

Class: Script language

Cause: An error occurred when a script command attempted to write to a file using one of the file output commands. This will usually only occur when the disk is damaged in some way or the disk becomes full while the script is executing.

Action: If the disk is full, free disk space by releasing files and retry. Otherwise repair and/or replace the disk.

### **Error writing to file.**

Class: File transfer

Cause: An error occurred while attempting to write a file that is being received. This will usually only occur when the disk is damaged in some way or the disk becomes full while the transfer is in progress.

Action: If the disk is full, free disk space by releasing files and retry. Otherwise repair and/or replace the disk.

### **Expected a numeric value.**

Class: Script language

Cause: The script command you executed requires a numeric parameter.

Action: Correct and retry.

### **External verb not in library**

Class: Script language

Cause: You have used an external reference in the script that was not found in the external DLL.

Action: Correct and retry

### **File is not open for input.**

Class: Script language

Cause: The script you are running has attempted to read from a file that has not been opened for input operations.

Action: Correct and retry.

***File is not open for output.***

Class: Script language

Cause: The script you are running has attempted to write to a file that as not been opened for output operations.

Action: Correct and retry.

***File is READ ONLY!***

Class: File display

Cause: The file you are trying to overwrite is set to READ ONLY.

Action: Change the file attribute with the File/Attributes menu item if you actually intend to overwrite the file.

***File name missing***

Class: Script language

Cause: You attempted to run a script file without specifying the name of the file to run.

Action: Specify a name for the script.

***[2] File not found.***

Class: File transfer

Cause: The file you are trying to transfer does not exist.

Action: Specify a valid file name for the transfer.

***File or path not found!***

Class: General

Cause: The file or directory you specified does not exist.

Action: Specify a valid pathname.

***FILL REQUIRED***

Class: Emulation

Cause: The host application has defined this field as a field that must be filled completely when data is entered there.

Action: Fill the field completely.

***FORM: NO FOLD***

Class: Emulation

Cause: You have pressed the 'fold line' key while in forms mode. Folding is only supported in text mode.

Action: None.

## **Error texts**

### ***FORM: NO PASTE***

Class: Emulation

Cause: You have pressed the 'paste' key while in forms mode. Pasting (of the emulator variety, not the Windows variety) is not supported in forms mode.

Action: None.

### ***FORM: NO TAB SET***

Class: Emulation

Cause: You have pressed the 'tab set' key while in forms mode. Tab setting is not supported in forms mode.

Action: None.

### ***FORM: NO UNFOLD***

Class: Emulation

Cause: You have pressed the 'unfold line' key while in forms mode. This function is not supported in forms mode.

Action: None.

### ***FRAMING ERROR***

Class: Communication

Cause: The communications driver has reported an error in the incoming data. This is usually something caused by line noise on a dialup line, but may also occur if you are not configured at the same speed as is actually being used on the line.

Action: Check that your line speed is set correctly. If necessary redial to get a better line.

### ***Function not implemented in this version***

Class: General

Cause: You have invoked a function that is only implemented in the DOS version of the emulator, or one that is not included with the version of the emulator you are running.

Action: None.

**General Protection fault**

Class: Application

Cause: The program has attempted to access an invalid memory address, or perform some other illegal action.

Action: This is almost certainly being caused either by a program error in Glink, a program error in one of the libraries being used by Glink, or by a bug in Windows itself. You should always report such errors. If they are reported with `GL.EXE` as the offending program then the fault should be reported to your Glink support apparatus; if they are reported with the name of a third-party DLL (for example `WINSOCK.DLL`) as the offending program then the report should be made to the relevant software supplier.

When reporting errors of this type to your Glink software support apparatus, the following material will be needed:

1. A `DRWATSON.LOG` dump describing the details of the problem.
2. Your `AUTOEXEC.BAT`, `CONFIG.SYS`, `SYSTEM.INI` and `WIN.INI` files.
3. Your Glink configuration file (usually `DEF.glinkconfig`).
4. A text description of the actions leading up to the error situation.

It will facilitate the support process if you can pack all of the above files into some kind of archive format (for example `ZIP` or `LZH`). If you do so remember to use a binary transfer when passing over the files!

**Gpipe error: <error text>**

Class: Communications

Cause: The logical connection between Glink and the LDSA line module has been broken (usually because of an unexpected error in that module).

Action: Reconnect. If the error situation persists then check with your comms support department.

**Host address not specified**

Class: Communication

Cause: You have attempted to connect to a host, but no host name or address has been specified.

Action: Specify a host name or address. The name of the field for this in the configuration setup will vary depending upon the interface you are using, and may be called IP address, Host INSID, Host name, Async server name, GLNET gateway, Net name/id or NCU address.

## Error texts

### ***Host is unreachable***

Class: Communication

Cause: The network software has reported that the host machine to which you are attempting to connect cannot be reached (the error is no more specific than that unfortunately).

Action: Contact your system administrator if the condition persists.

### ***Host machine is down***

Class: Communication

Cause: The network software has reported that the host machine to which you are trying to connect is not running.

Action: Retry the connect later. Contact your system administrator if the condition persists.

### ***Host not found***

Class: Communication

Cause: The network software has reported that it cannot find the host machine to which you are trying to connect. This is most likely because a name server cannot be found.

Action: If you have used a symbolic name in the IP address, try with a numeric IP address instead.

### ***Incorrect format for OLE named parameter***

Class: Script language

Cause: You have used a syntactically incorrect format when using an OLE verb that uses named parameters. Check the documentation of the OLE verb for a description of acceptable formats.

Action: Correct and retry.

### ***Incorrect format for OLE type declaration***

Class: Script language

Cause: You have used a syntactically incorrect format when using an OLE verb that uses typed parameters. Check the documentation of the OLE verb for a description of acceptable formats.

Action: Correct and retry.

### ***Increase max script variables to run this***

Class: Script language

Cause: This message should not be seen when running Glink for Windows.

Action: Contact your vendor.

**[91] Initial packet cannot be sent.**

Class: File transfer

Cause: The file transfer protocol was unable to negotiate with the host. This may either be because the file transfer has not been initiated correctly at the host side or because there is some problem with the connection that prevents the necessary negotiation from taking place.

Action: If you are sure that the host file transfer is operational, ensure that you are using the correct type of transfer for the interface you are using.

**[93] Initial packet not received.**

Class: File transfer

Cause: The file transfer protocol was unable to negotiate with the host. This may either be because the file transfer has not been initiated correctly at the host side or because there is some problem with the connection that prevents the necessary negotiation from taking place.

Action: If you are sure that the host file transfer is operational, ensure that you are using the correct type of transfer for the interface you are using.

**Input file cannot be opened.**

Class: File transfer

Cause: The file you have tried to send to the host machine is non-existent or inaccessible.

Action: Check that the file you have specified exists, that you have access to it, and that the file is not being used by another user.

**Invalid block header.**

Class: File transfer

Cause: A block was transferred incorrectly in the current file transfer. This is detected automatically by the file transfer protocol, and the block is re-transmitted until it is transferred correctly, so there will be no error in the file that is stored on disk.

Action: None necessary.

**Invalid byte size**

Class: Communications

Cause: The driver for the serial port you are using does not support the byte size and parity you selected in the communications setup menu.

Action: Select a parity and byte size that's supported by the driver.

## **Error texts**

### ***INVALID COMMAND***

Class: Emulation

Cause: The host machine sent an emulator command that could not be interpreted.

Action: Verify that you are using the correct emulation mode for the application you are running. Repeat the operation that caused the error message and if you get the same error report the problem to those responsible for the application. If you don't get the error the second time then you are possibly losing input data (most commonly because of problems with the serial port).

### ***Invalid configuration file - configuration not loaded!***

Class: General

Cause: You have specified a configuration file that has invalid or damaged contents. Glink cannot use the file.

Action: Use a valid configuration file.

### ***[15] Invalid drive specification.***

Class: File transfer

Cause: You have specified a non-existent disk drive in the file name you used for the file transfer.

Action: Correct the file name and retry.

### ***Invalid key name***

Class: Script language

Cause: The script you have attempted to execute specified an invalid key name in the KEYS (or similar) command.

Action: Correct and retry.

### ***Invalid or missing external DLL***

Class: Script language

Cause: You have used a reference to an external routine in a file that either does not exist or does not meet the criteria for such files (usually because it does not contain one of the two required entry points).

Action: Ensure that the DLL is correctly coded and that it's placed in the same directory as the GL.EXE program file.

### ***Keyboard file not found.***

Class: Script language

Cause: The KEYBOARD script command specified the name of a keyboard file that does not exist.

Action: Correct and retry.



***!label not supported***

Class: Script language

Cause: You may only CALL another script directly at a label if that script is available in source form.

Action: Use the source form of the script you are calling.

***LAST LN: NO FOLD***

Class: Emulation

Cause: You tried to use the 'fold line' key while positioned in the last line of the screen.

Action: Use the erase to end of line key in this situation.

***LAST LN: NO UNFOLD***

Class: Emulation

Cause: You tried to use the 'unfold line' while positioned in the last line of the screen.

Action: None - it can't be done!

***[90] Line disconnected.***

Class: File transfer

Cause: The file transfer failed because contact was lost with the host machine.

Action: Reconnect and retry.

***LINE ERROR***

Class: Communication

Cause: On those interfaces using a physical network card the specified port address is incorrect. For network interfaces there is an error in the network connection.

Action: Specify the correct physical port address or check that the network connection is properly set up.

***[92] Max retry count exceeded.***

Class: File transfer

Cause: The file transfer you were running failed because more than the configured maximum permissible number of errors occurred.

Action: Check that all file transfer parameters are set correctly and that you have a good connection before retrying.

## Error texts

### ***Maximum macro buffer size (650 chars) exceeded.***

Class: General

Cause: The total number of characters used in keyboard macros must not exceed 650.

Action: For long macros use script files with the ^\*scriptfile syntax.

### ***Maximum script file size (63Kb) exceeded.***

Class: Script language

Cause: Source script files may not be larger than 63Kb.

Action: Split the script into more than one piece, using either the INCLUDE statement to insert one piece inside the other, or CALL to transfer control between the separate pieces.

### ***Menu too large***

Class: Script language

Cause: The script being run attempted to specify more than the maximum of 22 items in a single menu.

Action: Correct and retry.

### ***Menus nested too deep***

Class: Script language

Cause: You have nested BUILDMENU or MENU statements to more than the maximum level of 10. This error can also occur in some cases where there is not enough memory to allocate dynamic structures.

Action: Correct and retry.

### ***Missing DLL***

Class: Communication

Cause: You have chosen one of the interfaces that require the presence of a DLL delivered with the Glink software, but the DLL is not present in the same directory as the GL.EXE program file.

Action: Ensure that the software has been installed correctly.

### ***Missing ENDDBOX statement***

Class: Script language

Cause: All DBOX script statements must be matched with a terminating ENDDBOX.

Action: Correct and retry.

***Missing #ENDIF***

Class: Script language

Cause: All #IFDEF and #IFNDEF script statements must be matched with a terminating #ENDIF.

Action: Correct and retry.

***Missing ENDIF statement***

Class: Script language

Cause: All script IF ... BEGIN constructs must be matched with a terminating ENDIF.

Action: Correct and retry.

***Missing ENDLIST statement***

Class: Script language

Cause: All script LIST statements (inside a DBOX control description) must be matched with a terminating ENDLIST.

Action: Correct and retry.

***Missing parenthesis***

Class: Script language

Cause: Left and right parentheses must match in script commands.

Action: Correct and retry.

***Modem not replying to command: <command>***

Class: Communication

Cause: The command displayed was not recognized by your modem.

Action: In the modem strings menu, correct the string that was in error. For most modems, this error will usually mean that you omitted to add the normal 'AT' command prefix.

***More memory needed to compile this script.***

Class: Script language

Cause: There was not enough memory available to compile the script.

Action: Terminate one or more applications and retry.

***More than 100 labels.***

Class: Script language

Cause: The script you attempted to run defined more than the maximum of 100 labels.

Action: Split the script into more than one script file.

## **Error texts**

### ***Named OLE parameters must be specified last!***

Class: Script language

Cause: You may mix positional and named parameters in the same OLE command, but if you do then you must specify all positional parameters first.

Action: Declare parameters in the correct order.

### ***NAK received***

Class: File transfer

Cause: The host machine found an error in data sent from Glink, most probably because the data was corrupted somewhere between you and the host, but possibly also because your file transfer setup is not correct for the host to which you are connected, or because the network path you are using does not support the file transfer type you are using.

Action: None if the message is sporadic, the file transfer protocol will correct this type of error. If the error is repeated and leads to failure of the transfer, make sure that your communications setup and connection are able to support the type of transfer you are attempting to perform.

### ***NET ERROR***

Class: Communications

Cause: An unexpected error condition prevented you from logging into the server, or disconnected you from an active session.

Action: Try to reconnect. If this fails then check with your system administrator to ensure that the server is running correctly and that there is not a network problem.

### ***NET FAILURE***

Class: Communications

Cause: A serious network error either prevented you from connecting to the host, or caused an active session to be disconnected.

Action: Check that your LAN connection and software setup is intact. If you can't find the problem then contact your system administrator.

### ***NetBIOS error number 00NN***

Class: Communication

Cause: Normal NetBIOS errors are translated by the emulator into something meaningful for the typical user. More obscure errors are reported using this message which includes the actual NetBIOS error code.

Action: Consult the list of NetBIOS error codes provided at the end of this section for more specific information about the cause of the error.

### ***NetBIOS not loaded***

Class: Communication

Cause: The communications interface you have chosen requires the NetBIOS interface to be present, and it is not.

Action: Choose a more appropriate communications interface. On some common setups use NET START NETBEUI in your AUTOEXEC.BAT file rather than NET START WORKSTATION.

### ***No active IF statement***

Class: Script language

Cause: Either the script ELSE or ENDIF statement was used with no matching prior IF statement.

Action: Correct and retry.

### ***No contexts to restore!***

Class: Script language

Cause: The script command CXRESTORE was used without a corresponding CXSAVE having been executed.

Action: Correct and retry.

### ***No external libraries found***

Class: Script language

Cause: You have tried to run a script that uses external references but there are no external libraries available.

Action: Ensure that the required external library is present in the same directory as the GL.EXE program file.

### ***No fields selected!***

Class: General

Cause: You asked for the dial directory to be printed without specifying any fields to print.

Action: Select at least one field for printing.

### ***No matching names found!***

Class: File transfer

Cause: You have specified files to transfer using wildcard characters ('?' and/or '\*') but no files matching your specification were found.

Action: Correct the file specification and retry.

## Error texts

### ***No memory for queues***

Class: Communications

Cause: Windows was unable to allocate memory for the serial port driver.

Action: Free up memory by closing some other application and retry.

### ***No memory for scrollbar buffer!***

Class: General

Cause: Memory could not be allocated for the scrollbar buffer, and the scrollbar function has therefore been disabled.

Action: Terminate one or more applications and restart the emulator.

### ***No pattern set.***

Class: Script language

Cause: The script you are running has used the MATCH statement when no patterns have been defined, or a WHEN or IF command has referred to an undefined pattern.

Action: Correct and retry.

### ***No printer configured, please check your printer setup***

Class: Printer

Cause: This message may appear if you have not configured a Windows printer in the Glink printer options.

Action: Select a printer in the Glink printer options and resave your Glink configuration.

### ***NO SESSIONS***

Class: Communication

Cause: The communications interface cannot provide any more connections to the host.

Action: Log out of one of your own connections if you already are connected, otherwise wait for other users to log out and retry.

### ***NO UNPROTECT FLD***

Class: Emulation

Cause: You have pressed a key in forms mode which attempts to position you in the form, but no variable fields have been defined by the host.

Action: None.

***Not enough memory!***

Class: General

Cause: There is not enough memory available to start the application you tried to execute, or to run the script you tried to start.

Action: Terminate one or more applications and retry.

***Not enough memory to save context!***

Class: Script language

Cause: The script you are running has attempted to save its context using the script CXSAVE command, and there was not enough memory available to complete the operation.

Action: Terminate one or more active applications and retry.

***Not enough OLE parameters***

Class: Script language

Cause: The OLE verb you are using requires more parameters than you have provided.

Action: Correct and retry.

***NUMERIC FIELD***

Class: Emulation

Cause: You have attempted to write non-numeric data into a forms mode field that has been defined by the host as accepting numeric data only. Numeric characters are defined as the characters 0-9, period, comma, hyphen, plus, and space.

Action: Enter valid data.

***OLE: <message text>***

Class: Script language

Cause: The OLE verb you attempted to execute was rejected by the target object for the reason shown in the message text.

Action: Correct and retry.

***OLE not supported in 16-bit***

Class: Script language

Cause: The OLE script command is only supported in the 32-bit version of the software.

Action: Upgrade and retry.

## Error texts

### ***OLE object does not exist***

Class: Script language

Cause: The OLE object you have referenced has not been initialized with an OLE CREATE or OLE CONNECT script command (or that command failed).

Action: Correct and retry, or add code checking for success of the OLE command that created the object.

### ***OLE object exists already***

Class: Script language

Cause: The OLE object you have tried to initialize with an OLE CREATE or OLE CONNECT script command is already active.

Action: Correct and retry.

### ***Operator retry.***

Class: File transfer

Cause: This message is displayed when a retransmission is forced by local action with the mouse or keyboard.

Action: None necessary.

### ***Other side timed out.***

Class: File transfer

Cause: No valid data was received from the host inside the configured timeout time. The file transfer protocol will ask for the data to be retransmitted.

Action: None, assuming the file transfer terminates normally.

### ***Page overflow: press a key***

Class: Emulation

Cause: The host application has sent more than a full page of data. The emulator pauses at this point and waits for you to press a key before continuing so that you may read the data already received.

Action: Press a key when you are ready to continue.



**PARITY ERROR**

Class: Communications

Cause: Parity checking has been enabled and a character was received with invalid parity. This is caused either by line noise or is a result of selecting the wrong parity in your communications setup. It may also be seen at disconnect time if stray line noise is received before the line actually disconnects, and is in such cases normal.

Action: Make sure that you have selected the correct parity setting for the host to which you are connecting. If this is correct and the problem still persists with no apparent ill effects then you may suppress the message with the option provided.

**[3] Path not found.**

Class: File transfer

Cause: The directory you specified for the current file transfer does not exist (this may be the download directory if you have configured one).

Action: Create the directory or specify a valid directory.

**Physical channel not configured**

Class: Communications

Cause: The physical channel you selected in the communications setup menu has not been configured or is not present.

Action: Select a valid physical channel.

**Port in use by another application!**

Class: Communications

Cause: The serial port is being used by another application.

Action: Close the application that is using the serial port and restart the interface with Line/Restart or CTRL+F7.

**Print error!**

Class: Printing

Cause: An error was reported from the printer when using the 'direct' print interface.

Action: Fix the printer problem before continuing.

## Error texts

### ***Printer does not support Windows (text) printing***

Class: Printing

Cause: Your Windows printer does not support sending data directly to it.

Action: Select the preferred 'Window (GUI)' printing in the Glink printer, otherwise upgrade your printer driver if newer versions support direct passthrough printing.

### ***PROTECTED FIELD***

Class: Emulation

Cause: You attempted to enter data into, or modify existing data in a field that has been defined by the host application as protected.

Action: Move to an unprotected field with the TAB key before entering data.

### ***Rejected by host; code XXXX***

Class: Communication

Cause: This is a general error message that is provided whenever an unusual error code is reported by the communications software being used. The code shown is the code provided by the underlying software, and is displayed in hexadecimal. Note that for X.25 interfaces this will often correspond to the clearing cause and diagnostics values. For the widely used Windows sockets and Microsoft/3+Open interfaces we provide complete tables of possible error codes at the end of this section. For other interfaces your network supplier should be able to provide you with an exhaustive list.

Action: If you receive the same code many times in a 'normal' situation, please ensure that information about which code you receive, which interface you are using, and what error condition was actually observed is passed to Gallagher & Robertson so that a translation of that particular code may be provided in a later release of the software.

### ***Retry maximum exceeded.***

Class: File transfer

Cause: The file transfer you were running failed because more than the configured maximum permissible number of errors occurred.

Action: Check that all file transfer parameters are set correctly and that you have a good connection before retrying.

### ***Script file not found.***

Class: Script language

Cause: You attempted to run a script using a filename that does not exist.

Action: Specify a valid file name when starting a script.

***Script must be recompiled!***

Class: Script language

Cause: You attempted to run a compiled script that was prepared with an earlier version of the software which is not compatible with the current version.

Action: Recompile the script with the new version of Glink.

***Script too large.***

Class: Script language

Cause: The script you attempted to run requires more than the maximum compiled size of 32K (when taking into account memory used by scripts that are already running).

Action: Make sure that you are not running a background script that is no longer required. Otherwise reduce the size of the script you are running by reorganizing into separate CALLED components.

***SERVER MISSING***

Class: Communications

Cause: The server to which you were trying to connect is not available. This may be either because it is not running or because it's being used on behalf of another user.

Action: Try again later. If you are still unable to connect, check with your system administrator to ensure that the server is running correctly.

***Server not responding***

Class: Communications

Cause: The server to which you were trying to connect is not responding to calls. This may be because it is not running, because it's being used on behalf of another user, or has some kind of software problem.

Action: Try again later. If you are still unable to connect, check with your system administrator to ensure that the server is running correctly.

***SIGN (+,-) ONLY***

Class: Emulation

Cause: You have attempted to enter data into a field that has been defined by the host as a 'sign' field. Such fields may only contain plus or minus.

Action: Enter valid data.

## Error texts

### ***Stack overflow.***

Class: Script language

Cause: You have used the GOSUB command without returning properly, or have nested GOSUB and/or CALL commands to a level of more than the maximum supported (20 levels).

Action: Check that all routines that you call with GOSUB return properly through a RETURN command. The most common cause of this error message is use of GOTO to return to main level in a routine that is called repeatedly. Note also the \$LEVEL internal variable that can be used to help debug this kind of problem, and the RETCALL and POPUP commands that can be used to help avoid some of the problems you may meet in practical script programming.

### ***START OF FORM***

Class: Emulation

Cause: You have attempted to back-tab from the first field in the form.

Action: None.

### ***Switch/while statement missing***

Class: Script language

Cause: An ENDSWITCH or ENDWHILE statement was encountered in a script procedure with no introductory SWITCH or WHILE command.

Action: Correct and retry.

### ***Target entry not empty!***

Class: Dial directory

Cause: You have attempted to paste a dial entry into a dial directory location that is not blank.

Action: Paste into an empty location and then clear the desired target location with Edit/Cut. Repeat the paste operation.

### ***TCS: Bad form directory***

Class: General

Cause: The host application has sent a DKU local form request, but the configured form directory is non-existent or inaccessible.

Action: Ensure that the form directory has been correctly configured and that the directory is accessible.

***TCS: Command error***

Class: General

Cause: The host application has sent a DKU local forms command that is syntactically incorrect.

Action: Correct the host application

***TCS: Form already exists***

Class: General

Cause: The host application is attempting to store a new form but a copy of the form is already stored.

Action: Correct the host application to delete the form before storing a new copy.

***TCS: I/O error reading form***

Class: General

Cause: The host application has made a local form request but there was an error reading the form from the disk.

Action: Delete the form and request a new copy from the host.

***TCS: Needs TCS enable in DKU setup***

Class: General

Cause: The host has sent a TCS local forms command but Glink was unable to satisfy the request. You must enter the setup menu for the DKU emulation, enable TCS and enter the name of the forms directory you wish to use for saving local forms.

***TCS: Not enough memory***

Class: General

Cause: The host application sent a local form request but there was not enough memory to complete the read operation.

Action: Close one or more applications and retry.

***TCS: Unknown dataset***

Class: General

Cause: The host application sent a request for a dataset that was not available in the local forms directory.

Action: Perform the host procedure defined in your application for collecting a new copy of a form in this dataset from the host.

## Error texts

### ***TCS: Unknown form***

Class: General

Cause: The host application sent a request for a form that was not available in the local forms directory.

Action: Perform the host procedure defined in your application for collecting a new copy of the form.

### ***Too many external DLLs in use***

Class: Script language

Cause: The script suite you are running references more external libraries than the maximum number (5 generic and 5 specific) that is supported by the script language.

Action: Merge one or more of the libraries into a single DLL.

### ***Too many IF statements***

Class: Script language

Cause: The script you attempted to run has IF statements nested to a level of more than the maximum of 50. This will usually be a case of a large number of missing ENDIF statements rather than actually exceeding the maximum allowed value.

Action: Correct and retry.

### ***Too many LISTS in dialog box***

Class: Script language

Cause: The script DBOX supports a maximum of 5 list boxes inside a single dialog box.

Action: Correct and retry.

### ***Too many menu items!***

Class: Script language

Cause: You have either tried to define more than 255 items inside a script DBOX statement, or more than 50 additional menu items with the ADDMENU statement.

Action: Correct and retry.

### ***Too many nested switches/whiles***

Class: Script language

Cause: SWITCH and WHILE statements may not be nested to a depth of more than 20 levels.

Action: Correct and retry.

***Too many OLE parameters***

Class: Script language

Cause: The OLE verb you are using does not support the number of parameters you have supplied.

Action: Correct and retry.

***Too many simultaneous OLE objects***

Class: Script language

Cause: The script language allows up to nine simultaneous active objects. You must free one of them before you can create another.

Action: Correct and retry.

***Transfer cancelled.***

Class: File transfer

Cause: This message is displayed when a file transfer is terminated manually.

Action: None.

***Transport service not loaded***

Class: Communication

Cause: This error is specific to the Atlantis interfaces and means that you are attempting to access a transport service which is not provided by the server (for example connecting to a Bull interface on a server that only provides X.25 transport services).

Action: Reconfigure the server software.

***TSM8/invalid form***

Class: General

Cause: An invalid local form was discovered in your TSM8 forms directory.

Action: None, the host machine will send the form again automatically.

***Unable to execute associated application: <command>***

Class: General

Cause: The Process marked command was unable to find an associated application for the marked text, or an error occurred trying to execute it.

Action: Check that the command is correct and that you have marked the correct area of the screen. Check that that you have configured an associated application in your system. Try executing the <command> directly from the Windows 'Run' menu.

## Error texts

### ***Unable to use the printer, please check your printer set-up***

Class: Printer

Cause: This message may appear if you have configured your Windows printer in the Glink printer options "Printer selection" as "Permanent", and is no longer available or is not responding.

Action: Check that the printer you have selected in the Glink printer options is still functional and available. If not, select another printer and resave your Glink configuration or use the "Current" or "Session" printer selection options.

### ***Undefined error opening comms port!***

Class: Communications

Cause: An unexpected error occurred when Glink attempted to communicate with the serial port.

Action: This error should never occur in normal usage, but may be seen if you are using a custom serial port driver. In this case, you need to report the error to the vendor.

### ***Undefined label***

Class: Script language

Cause: You have attempted to run a script file that references a label that has not been defined.

Action: Correct and retry.

### ***Unknown host name***

Class: Communication

Cause: The host name you wish to connect to is not known to the system (or the name server being used by the system).

Action: Check that the host name is correct. If it is and you still see this error message, use the numeric IP address for the host rather than the symbolic name.

### ***Unrecognized ON/RESET option.***

Class: Script language

Cause: The option specified in the ON or RESET statement displayed may not be used.

Action: Correct and retry.



***Unrecognized or missing keyword.***

Class: Script language

Cause: A word in the script statement displayed is misspelt or misplaced.

Action: Correct and retry.

***Unsupported baud rate***

Class: Communications

Cause: The driver for the serial port you are using does not support the baud rate you selected in the communications setup menu.

Action: Select a baud rate that's supported by the driver.

***VALIDATION ERROR***

Class: Script language

Cause: Not used

Action: None

***Value of numeric parameter out of range.***

Class: Script language

Cause: A numeric variable number, pattern number, or constant was outside the allowed range of values.

Action: Correct script and re-execute.

***Variable has already been used in another control***

Class: Script language

Cause: The same variable number was used in two different controls in a script DBOX statement.

Action: Correct script and re-execute.

***VIP NUMERIC ONLY***

Class: Emulation

Cause: You have attempted to enter non-numeric data into a field that has been defined by the host as 'VIP numeric'. Only characters in columns 2 and 3 of the ASCII table (press `ALT+F9` and select hexadecimal mode) may be entered in such fields.

Action: Enter valid data.

## **Error texts**

### ***Workstation software not loaded***

Class: Communications

Cause: Some part of the software required to run this interface is not present. If the part in question is a DLL then a separate error message naming the missing DLL has already been provided.

Action: Check your software setup against the information provided with your networking software and make sure that all necessary components have been loaded. In the case of a missing DLL, ensure that the DLL is available to Windows (in the Windows directory or somewhere on the PATH). If you are using Windows Sockets, make sure that the correct version of WINSOCK.DLL is being used.

### ***You are not connected***

Class: Communications

Cause: You tried to transmit data, but are not connected to any host machine.

Action: Connect to a host first, for example by pressing Ctrl/F7.

### ***You may only use up to 20 patterns***

Class: Script language

Cause: A maximum of 20 patterns may be used in a script.

Action: Correct script and re-execute.

## NetBIOS error codes

01	Illegal buffer length
03	Invalid command
05	Command timed out
06	Message incomplete
07	Data for one or more SEND.No.ACK was not received
08	Illegal local session number
09	No resource available
0A	Session closed
0B	Command cancelled
0D	Duplicate name in local name table
0E	Name table full
0F	Name has active session but is now de-registered
11	Local session table full
12	Session open rejected
13	Illegal name number
14	Cannot find name called or remote computer is busy
15	Name not found or cannot specify "*" or 00H
16	Name in use on remote computer
17	Name deleted
18	Session ended abnormally
19	Name conflict detected
1A	Incompatible remote device
21	Interface busy
22	Too many commands outstanding
23	Invalid Number in NCB_LANA_NUM field
24	Command completed while cancel occurring
26	Command not valid to cancel
30	Name defined by another environment, choose another name
34	Environment not defined, RESET must be issued
35	Required OS resources exhausted, retry later
36	Maximum applications exceeded
37	No service access points(SAPs) available for NetBIOS
38	Requested resource(s) not available
39	Invalid NCB address or length does not fit in segment
3A	RESET may not be issued from a NetBIOS adapter appendage
3B	Invalid NCB_DD_ID value
3C	NetBIOS attempted to lock user storage and the lock failed
3F	NetBIOS Device Driver open error
40-4E	Unusual network condition, retry later
50-FE	Adapter malfunction, retry later

# Windows Sockets error codes

Code	Hex	Name	Description
10004	2714	WSAEINTR	The (blocking) call was canceled via WSACancelBlockingCall()
10009	2719	WSAEBADF	The socket descriptor is not valid.
10013	271D	WSAEACCES	Permission denied for socket operation
10014	271E	WSAEFAULT	An invalid argument was supplied to Windows Sockets.
10022	2726	WSAEINVAL	An invalid call was made to the Windows Sockets API.
10024	2728	WSAEMFILE	No more socket descriptors are available.
10035	2733	WSAEWOULDBLOCK	The socket is marked as non-blocking and no connections are present to be accepted.
10036	2734	WSAEINPROGRESS	A blocking Windows Sockets call is in progress.
10037	2735	WSAEALREADY	The asynchronous routine being canceled has already completed.
10038	2736	WSAENOTSOCK	The descriptor is not a socket.
10039	2737	WSAEDESTADDRREQ	A destination address is required.
10040	2738	WSAEMSGSIZE	The datagram was too large to fit into the specified buffer and was truncated.
10041	2739	WSAEPROTOTYPE	The specified protocol is the wrong type for this socket.
10042	273A	WSAENOPROTOOPT	The option is unknown or unsupported.
10043	273B	WSAEPROTONOSUPPORT	The specified protocol is not supported.
10044	273C	WSAESOCKTNOSUPPORT	The specified socket type is not supported in this address family.
10045	273D	WSAEOPNOTSUPP	The referenced socket is not a type that supports connection-oriented service.
10046	273E	WSAEPFNOSUPPORT	The protocol has not been configured on this system.
10047	273F	WSAEAFNOSUPPORT	The specified address family is not supported by this protocol.
10048	2740	WSAEADDRINUSE	The specified address is already in use.
10049	2741	WSAEADDRNOTAVAIL	The specified address is not available from the local machine.
10050	2742	WSAENETDOWN	The Windows Sockets implementation has detected that the network subsystem has failed. Usually displayed by Glink as 'NET FAILURE'.
10051	2743	WSAENETUNREACH	The network address can't be reached from this host. There is probably a problem in the way you have set up TCP/IP routing for your PC (most likely you have not defined a default router).
10052	2744	WSAENETRESET	The connection must be reset because the host machine crashed or rebooted.
10053	2745	WSAECONNABORTED	The connection has been closed, probably due to a data transmission error or protocol error.
10054	2746	WSAECONNRESET	A existing connection was forcibly closed by the remote host. This normally results if the application on the remote host is suddenly stopped or the host is rebooted.
10055	2747	WSAENOBUFS	Not enough buffers available, or too many connections.
10056	2748	WSAEISCONN	The socket is already connected.
10057	2749	WSAENOTCONN	The socket is not connected.

<b>Code</b>	<b>Hex</b>	<b>Name</b>	<b>Description</b>
10058	274A	WSAESHUTDOWN	The socket has been shutdown
10059	274B	WSAETOOMANYREFS	
10060	274C	WSAETIMEDOUT	Attempt to connect timed out without establishing a connection. Usually displayed by Glink as 'Connection to host timed out'.
10061	274D	WSAECONNREFUSED	The attempt to connect was forcefully rejected, probably because the application you are trying to connect to is not active. Usually displayed by Glink as 'Connection refused by host'.
10062	274E	WSAELOOP	Too many symbolic links were encountered in translating the path name.
10063	274F	WSAENAMETOOLONG	
10064	2750	WSAEHOSTDOWN	The host machine is out of service. Usually displayed by Glink as 'Host machine is down'.
10065	2751	WSAEHOSTUNREACH	The host machine is unreachable. Usually displayed by Glink as 'Host is unreachable'.
10066	2752	WSAENOTEMPTY	
10067	2753	WSAEPROCLIM	The maximum number of processes using Windows Sockets has been reached.
10068	2754	WSAEUSERS	
10069	2755	WSAEDQUOT	
10070	2756	WSAESTALE	
10071	2757	WSAEREMOTE	
10091	276B	WSASYSNOTREADY	Indicates that the underlying network subsystem is not ready for network communication.
10092	276C	WSAVERNOTSUPPORTED	The version of Windows Sockets API support requested is not provided by this particular Windows Sockets implementation.
10093	276D	WSANOTINITIALISED	A successful WSASStartup() must occur before using this API.
10094	276E	WSAEDISCON	A socket shutdown is in progress.
11001	2AF9	WSAHOST_NOT_FOUND	Authoritative answer host not found. Usually displayed by Glink as 'Host not found'.
11002	2AFA	WSATRY_AGAIN	Non-authoritative answer host not found, or SERVERFAIL. Usually displayed by Glink as 'Server not responding'.
11003	2AFB	WSANO_RECOVERY	Non-recoverable errors, FORMERR, REFUSED, NOTIMP. Usually displayed by Glink as 'Server not responding'.
11004	2AFC	WSANO_DATA	Valid name, no data record of requested type. Usually displayed by Glink as 'Unknown host name'.

# Microsoft TCP/IP / 3+Open socket error codes

Error code	Description
0064 (ENOTSOCK)	Socket operation on non-socket
0065 (EDESTADDRREQ)	Destination address required
0066 (EMSGSIZE)	Message too long
0067 (EPROTOTYPE)	Protocol wrong type for socket
0068 (ENOPROTOOPT)	Protocol not available
0069 (EPROTONOSUPPORT)	Protocol not supported
006A (ESOCKTNOSUPPORT)	Socket type not supported
006B (EOPNOTSUPP)	Operation not supported on socket
006C (EPFNOSUPPORT)	Protocol family not supported
006D (EAFNOSUPPORT)	Address family not supported by protocol family
006E (EADDRINUSE)	Address already in use
006F (EADDRNOTAVAIL)	Can't assign requested address
0070 (ENETDOWN)	Network is down
0071 (ENETUNREACH)	Network is unreachable
0072 (ENETRESET)	Network dropped connection or reset
0073 (ECONNABORTED)	Software caused connection abort
0074 (ECONNRESET)	Connection reset by peer
0075 (ENOBUFS)	No buffer space available
0076 (EISCONN)	Socket is already connected
0077 (ENOTCONN)	Socket is not connected
0078 (ESHUTDOWN)	Can't send after socket shutdown
0079 (ETIMEDOUT)	Connection timed out
007A (ECONNREFUSED)	Connection refused
007B (EHOSTDOWN)	Networking subsystem not started
007C (EHOSTUNREACH)	No route to host
007D (EWOULDBLOCK)	Operation would block
007E (EINPROGRESS)	Operation now in progress
007F (EALREADY)	Operation already in progress
0080 (EBADVERSION)	Library/driver version mismatch
0081 (EINVALSOCK)	Invalid argument
0082 (ETOOMANYSOCK)	Too many open sockets
0083 (EFAULTSOCK)	Bad address in sockets call