Bull DPX/20

Open Terminal Management (OTM)
VIP7800 Terminal Emulation User's Guide

AIX

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Software

July 1995

BULL S.A. CEDOC
Atelier de Reproduction
FRAN–231
331 Avenue Patton BP 428
49005 ANGERS CEDEX
FRANCE

ORDER REFERENCE
86 A2 34PE 04

Printed in France

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About this Book

This guide contains the information for configuring, administering and using VIP7800 Terminal Emulation running under the Open Terminal Manager (OTM) product.

This book is for the users of the OTM product running with VIP7800 emulation.

The OTM Product

The OTM product covers the emulations necessary to connect DPX/20, Unix machines to other Bull machines using the different GCOS operating systems as well as to IBM machines through the Bull/IBM gateway.

This present manual complements the OTM Administrator and User's Guide by providing detailed instructions for implementation of the VIP7800 emulation. Additional emulations and other connections provided through OTM are described in manuals listed below.

The OTM Manual Set

1. The OTM Administrator and User's Guide, ref: 86 A2 31PE.
2. The OTM TWS2107 Terminal Emulation User's Guide, ref: 86 A2 33PE.
3. The OTM VIP7800 Terminal Emulation User's Guide, ref: 86 A2 34PE.
4. The various manuals for the Bull Affinity product for connection to PCs, refer to Affinity documentation.
5. The CPI–Css for Bull Systems User's Guide (emulation tailoring for applications), ref: 86 A2 32PE.
6. The various Software Release Bulletins (SRB) delivered with each software release.

Software Requirements

OSI Stack layers.

The AIX Version 4.1 of UNIX.

Organization of this Book

Chapter 1. **Introduction**
provides VIP7800 emulation concepts and architecture.

Chapter 2. **Startup and Configuration**
describes initialization and configuration of VIP7800.

Chapter 3. **Using the Terminal Emulator**
explains the procedures for using the VIP7800 terminal emulator.

Chapter 4. **The Script Utility**
describes the use of the Script Utility.

Appendix A **Messages**
lists error messages and return codes.

Appendix B **VIP7800 Commands**
provides a summary of the VIP7800 commands.

Appendix C **Printer Commands**
provides a summary of printer commands.

Appendix D **Keyboards**
lists functions and keyboard layout for the different emulations available.

Conventions

The generic term DPX is used throughout this guide, meaning by this DPX/20.

As OTM is available also on Bull DPX/2 systems, whenever the use of the generic term DPX could be misleading or not precise enough, the complete name is used (DPX/20 or DPX/2).

The name Qxxx is used to designate the Bull Questar family of terminals.

Related Publications

VIP7800 Family Display Terminals User's Reference Manual

Table of Contents

Chapter 1. Introduction

VIP7800 Emulation Summary

This chapter covers the following topics:

VIP7800 Emulation Overview

VIP7800 Emulation is a part of the Open Terminal Management (OTM) product. OTM enables DPX/20 users to communicate with Bull GCOS applications. In the case where VIP7800 emulation is needed, this VIP7800 emulation module must be used as a part of OTM.

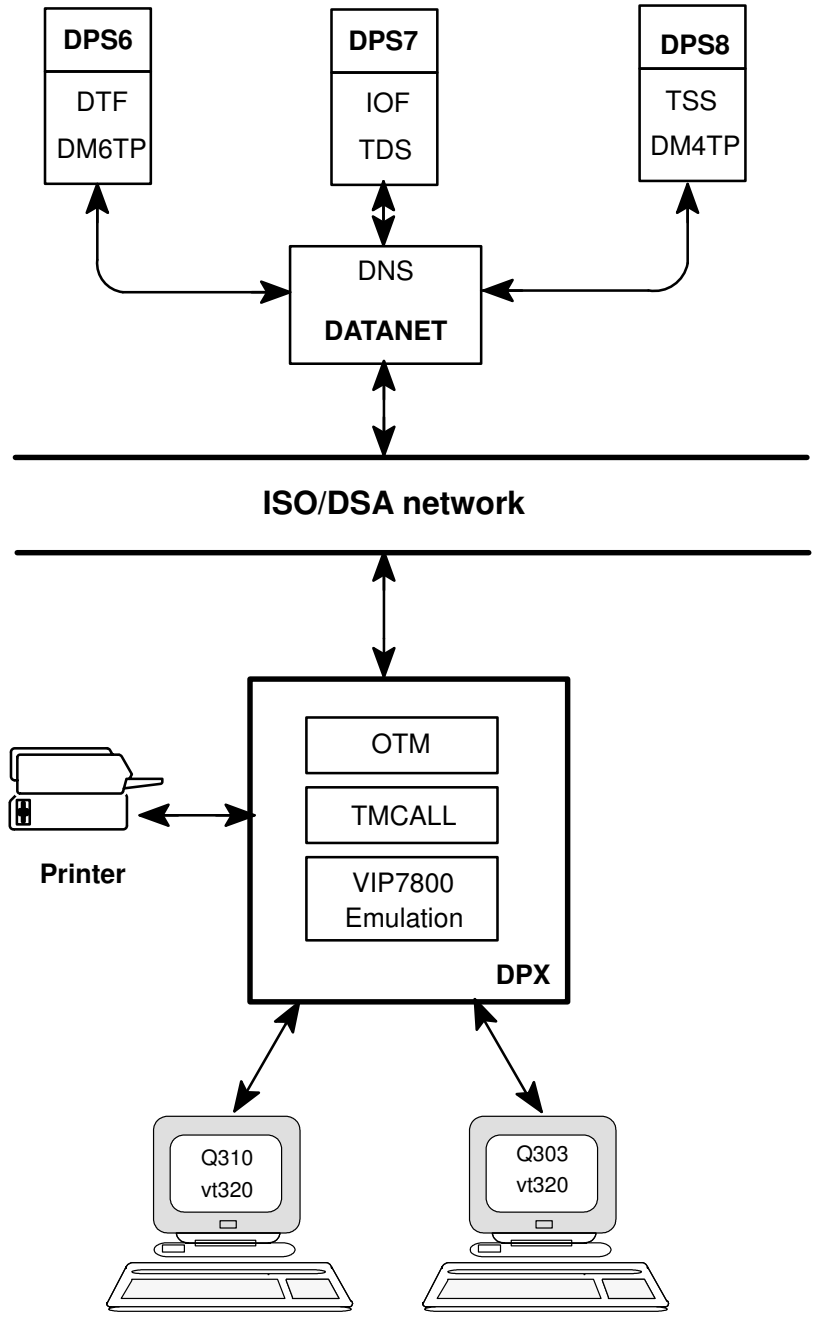

Figure 1. The VIP7800 Emulation Connections in OTM

Additional Functions Offered by the Emulation

The VIP7800 terminal emulator, in addition to supporting all standard features of the emulated VIP terminal, offers additional capabilities which will increase the number of its potential users.

Printer Emulation

The PC–VIP program completely emulates the printer access in VIP78xx mode. It is also possible to redirect the printer output or the screen hardcopy to a disk file for further local processing.

Programmability

The separation between the line protocol module and the one which executes the function of the terminal emulator is more profitable since it provides openings for further applications without altering the package structure.

In this way the product is more easily expandable. In particular, it is open to specific user implementations that can be inserted at any level.

Script Function

To let the user simplify some operations, for example, the login procedure, an effective automatic control of the message exchanges, between Host and terminal, we have introduced.

The user must create a file detailing any necessary replies to all possible messages from the Host. The emulator may be requested to initiate this automatic dialogue.

When this batch file is launched, the unique linked path will be automatically executed.

UNIX Cooperation

To facilitate the cooperation between the emulator and the UNIX applications, a means of moving between the emulator environment and UNIX has been developed. The user may open a shell, passing control to the UNIX command interpreter while holding the emulator frozen in memory.

Soft Keys

In the configuration phase, it is possible to personalize ten function keys. Each may be associated with a string of characters to be sent down the line, or an automatic script session, or the request of execution of a program or a command file in UNIX environment.

The possibility of activating UNIX programs facilitates complex procedures in which the terminal emulator is used to enter the environment and a UNIX program is used ”to capture” the data.

The VIPEMU Software Modules

The vipemu product is composed of the following software modules:

vipemu	Vip Terminal Emulator;
lpdrv	Printer Interface;
vipemutab	System configuration file;
***.cfg	Vipemu configuration files;
***.spt	Script batch files;
***.hlp	Help files.

vipemu	This module causes the video and keyboard to behave as if they belonged to a native VIP terminal.
lpdrv	This is the driver that the emulator uses to send printouts, received from the line and keyboard, to the system spooler.
vipemutab	This is the system configuration file. It must be present in the ”/etc” directory. The file vipemutab creates correspondences between the physical terminal name and the logical name used by vipemu. See *OTM Administrator and User’s Guide*, Appendix ”C”, for a description of vipemutab.
ttytype	This file contains correspondences between logical names used by VIPEMU and emulation modes to consider.
***.cfg	The different configurations are stored in these files. The default name is ”vip.cfg”. Each time that a new configuration is stored by Vip Setup, the file ”vipttyNN.cfg” is either created, for the first time only, or else subsequently updated. The characters ”NN” correspond to the number of the terminal on which vipemu is running.
***.spt	These files contain the user–written dialogues, between the Bull host and the emulator, used by the script utility.
***.hlp	These files contain help information that may be used during the emulation.

System Configuration

No matter which protocol is used to connect vipemu to the system, the only information in the system about the external environment is contained in the file */etc/vipemutab*. vipemu requires the following information:

The following definitions must be contained in the */etc/vipemutab* file:

- Names of the terminals from which the emulator will be launched.
- Types of the terminals from which the emulator will be launched, can be one of:
    - hds3
    - hds220
    - pc100
    - vt100
    - vt200
    - vt220
    - vt320
    - vtu010
- Name of the pseudo–driver through which the emulator is connected to the requested server. The name is of the form etyXX, where XX refers to the pseudo tty which is found in the system file */etc/inittab*. For example:

```
ttye0  where  XX=0 ;
ttye13  where  XX=13.
```

  All usable tty(s) ttyeXX are stored in the */etc/inittab* file but only 8 will be activated (”respawn”) at installation time (ttye0 –> ttye7).

The following example, of an entry in */etc/vipemutab*, associates a work station on the tty1 line, of terminal type vt320, and the pseudo–driver ety0.

```
          ..
tty1|vt320|ety0
          ..
```

The default contents of the */etc/vipemutab* supplied on the diskette are only intended as a guide. It must be modified to represent the disposition of your terminals.

The information which connects the pseudo tty to the terminals described below must be inserted in the */etc/ttytype* file.

- Pseudo tty name (ttyeXX).
- Terminal type of emulation, either hw40 or hw78. It must be configured in the file */etc/ttytype*. There is a free choice between hw40 and hw78. It is recommended to select hw78 in cases when the emulator will be used with applications written for VIP7874 terminals that cannot handle UNIX_mode. Otherwise, select hw40.

The following example of an entry in */etc/ttytype*, associates a pseudo work station ttye0, with the emulation terminal type hw40.

```
          ..
ttye0|hw40
```

According to */etc/vipemutab* example, here is described vt320 compliant terminal releveant with tty1 for which hw40 emulation must be considered using ety0 pseudo-driver.

Notes:

1. Unlike the host, vipemu can distinguish between a native VT200 terminal and a Bull BDS74XX. If you wish to use the ”enhancements”, offered by the BDS74XX, you need only replace the entry for vt200 with hds3 in the *vipemutab* file.
2. Similarly, unlike the host, vipemu can distinguish between a native VT100 terminal and a PC running the Locus VT100 emulator. To have an exact correspondence between the commands and the PC keyboard, you must replace the entry for vt100 with pc100 in the *vipemutab* file.

Printer Configuration

If you wish to use the vipemu printer emulation to its full extent, the host system must be configured with a printer spooler.

Work Station Configuration

When the emulation is activated, vipemu reconfigures the terminal in such a way as to exploit to the full the capabilities offered by the terminal. However, some parameters cannot be modified from software. The user must configure these by means of the local setup.

The following is a list of manual modifications necessary for each terminal type supported by the emulation.

- VT200 native or compatible
- VT320 native or compatible
- PC emulating a VT100 by means of the Locus PC–Interface
- None

BDS74XX

The BDS74XX terminal emulates all the effects of a VT200. Additionally, it can handle a ”user line” situated on the 25th row of the video. It is possible to utilize the ”user line” as the ”status line” of the VIP7874.

In order to use the 25th row of the BDS74XX as ”status line”, execute the following operations.

- Press the setup key.
- Select the terminal menu.
- In the entry status line, select the option on.

BDS71XX

There are two modifications necessary for this type of terminal. The first makes the character CR move the cursor to the start of the same row, (CR), and not to the start of the succeeding row, (CR+LF). The second disables ”wraparound” at the end of a row.

To perform the modifications, execute the following operations:

- Enter ”setup” mode by pressing the keys [shift][setup],
- Select the menu named ”General”,
- Select the option CR from the CR entry,
- Select the option OFF from the Auto NL entry,
- Select the menu named Keyboard,
- Select the option REMOTE from the Fkey entry.

Once the system has been configured, the user can execute the **vipemu** command.

Chapter 2. Configuration

Configuration Summary

The information in this chapter is organized as follows:

Introduction

Before using vipemu, the user must configure the emulator. This is done using the Setup Program. Press the <Vip Setup> function key. A series of menus will be activated through which the appropriate parameters can be selected.

Setup Program Menus

Vip Setup uses three different types of menu: vertical selection, horizontal selection and value selection.

Vertical Selection

In this type of menu, a series of options is displayed, and one option is chosen by moving the cursor vertically.

Use the cursor arrows to highlight, in inverse video, the option you wish to select:

Press ENTER to select the option,

Press TAB to return to the previous menu,

Press the <Vip Setup> key to exit from the configurator program without changing the configuration file.

Horizontal Selection

Usually Vip Setup menus have more than one function. Alternative options are displayed on the same line beside the selection description.

The cursor motion arrow keys are used as follows:

- LEFT or RIGHT highlights the selected option;
- UP or DOWN confirms the choice and moves the ”cursor” to the previous or to the next option.

Other function keys provided are:

- ENTER to display the next menu,
- TAB to return to the previous menu,

- Vip Setup to exit from the Vip Setup program without changing the configuration file.

In this type of menu, the inverse video fields are used to highlight the choices already made. The reverse blinking video is used to show the ”cursor” position.

This type of selection is used when the input will be a numeric value or a sequence of characters (e.g. a file name).

Value Selection

If numeric input is requested, the first character typed clears the field. If the user moves to another field, the input value is checked and if it is outside the range, the value is reset to the nearest limit.

If character input is requested, the user may press any of the alphanumeric keys, and the BACKSPACE, which moves the cursor one position back.

Activating the Configuration

After having entered the emulation, press the key associated to the Vip Setup function. The configurator reads and displays the configuration contained in the file *vipttyNN.cfg*, or in the file *vip.cfg* if it is the first access.

This is a ”vertical” selection menu. It is used to select one of the following configuration options:

- terminal setup,
- customized keys,
- printer adapter,
- script file.

Terminal setup	Selects all the presentation video parameters for the VIP terminal emulation.
Customized keys	Selects the VIP emulation action for each of the ten programmable function keys.
Printer adapter	Selects the kind of printer to be used in the emulation.
Script file	Selects the SCRIPT utility parameters.
Updating Setup	Updates the options selected in the configuration file.
Exit Setup	Exits from the configuration program.

Terminal Setup

Selects the configuration of the terminal setup parameters.

VIP Family Emulation

Selects the terminal emulation mode. It can work both strictly in VIP78XX mode and in ”chameleon” mode:

7800	selects the single VIP78XX mode. The emulation will discard any command sequence not included in this terminal family;
7800 + 7700	enables the terminal emulation to recognize and process the principal escape sequences of the VIP77XX family, even if it is mainly used as a VIP78XX terminal;
7700 +7800	enables the terminal emulation to recognize and process the principal escape sequences of the VIP78XX family, even if it is mainly used as a VIP77XX terminal.

The 7800 option must be selected.

Communication Mode

Selects the type of emulated terminal:

asynchronous	Select this option, and vipemu will emulate VIP78XX family in asynchronous mode;
synchronous	Select this option, and vipemu will emulate VIP78XX family in synchronous mode.

The asynchronous option must be selected.

Terminator Character

Selects the terminator character for all messages transmitted by the terminal when it is in ’TEXT’ and ’FORM’ mode.

CR+LF in Text

Selects the CR+LF characters at the end of each screen line.

Space Suppress

Suppresses the transmission of spaces at the end of each screen line.

Roll Mode

Selects automatic scrolling of the screen when an LF is found at the end of the last line.

Terminal Mode

Selects the terminal mode of the emulation:

CHAR	(asynchronous mode only) when a key is pressed, it is immediately transmitted and displayed on the screen;
ECHO	(asynchronous mode only) when a key is pressed, it is immediately transmitted. Its display on the screen is a host task;
TEXT	the key is buffered, but data transmission begins only after pressing one of transmission keys;
TX_RET	the key is buffered, but the data transmission begins only after pressing a transmission key or the <RET> key.

Transmit Mode

Selects the data transmission mode of the emulation:

BLOCK	selects the data transmission in blocks of predetermined length. A block is transmitted when it is full;
NON_BLOCK	selects the data transmission in single character or in blocks of variable length, depending on the TERMINAL MODE selected.

Auto_lf

This selection causes an LF to be inserted after each CR generated from the keyboard (<RET> key).

Data Space 72 Lines

Selects the dimension of the internal data buffer of the VIP emulator. The standard value is a normal display: 24 rows by 80 columns.

By selecting this option, the dimension of the buffer is enlarged to 72 rows by 80 columns. This option is equivalent to the installation on the native VIP terminal of the following firmware:

```
VDF7811 72-Line Scroll Option
```

and the support of the following commands:

- scroll up (SU)
- scroll down (SD)
- next segment (NS)
- previous segment (PS)

that are otherwise disabled.

Tabulation Mode

If immediate is selected, the cursor will move to the next unprotected field when the current one is filled and the terminal is in mask mode.

If delay is selected, the cursor moves to the next field even if it is protected.

Drop DTR in Local

When this option is selected, putting the terminal in LOCAL mode will cause the line to be disconnected.

Cursor Mode

Selects the mode in which the cursor will be visualized on the screen: UNDERLINE or BLOCK.

Target Video Size

This option selects the size of terminal video on which the VIP7800 EMU is running. It may only be used with VT200 native or compatible terminals. If the terminal is a BDS3, it is not sufficient to select the ”25x80” option. The user must also select ”25th line : ON” in the local setup to access to the 25th user line.

Graphic Characters Set

To use the graphic set of the terminal on which vipemu is running, select the option ”able”.

To use the graphic set composed of the ascii characters + , – and ! select the disable option. This option is valid for the following terminals:

- VT200
- VT320
- BDS74XX
- BDS71XX
- PC with VT100 Locus Emulator

Customized Keys

This menu allows the user to program the numeric keys of the first row of the alphanumeric keyboard like function keys. The function is executed by the sequence [MAGIC] [N], where N is a numeric key. See Chapter 3 for an explanation of the MAGIC keys. For each key, the menu shows any pre–existing value. Otherwise, the key must be configured to the type of function to be used, as follows:

SHL	for a UNIX command;
VIP	for a standard VIP command;
SPT	for a script batch file. For a more complete explanation, refer to the script utility section.

Each function key can be associated with a string up to twenty characters in length. Each control character, from 0 to 1F hexadecimal, is displayed with the character '^' followed by the corresponding ASCII code.

Note: Insert the UNIX commands with the <CR> character included, as you would type it on the command line. Insert the standard VIP commands, bearing in mind that the emulator will execute these commands as if the TRANSMIT key were pressed at the end of the commands.

Printer Adapter Setup

This is a ”horizontal” selection menu used to configure the parameters of the printer.

Printer Device Service

Selects the channel to which a printout is redirected:

NUL	If this option is selected, the printout is lost;
LPT	If this option is selected, the printout is sent to the system printer spooler;
FILE	If this option is selected, the printout is written to a file.

File Oriented Pathname

This may be used only after FILE has been selected. It is the full pathname of the file to which the printout will be written.

Start Message Code

Selects, before each printing operation, the insertion of:

cr	carriage return;
cr/lf	carriage return and line feed;
cr/ff	carriage return and form feed;
cr/vt	carriage return and vertical tabulation.

End of Message Code

Selects, after each printing operation, the insertion of:

cr	carriage return;
cr/lf	carriage return and line feed;
cr/ff	carriage return and form feed;
cr/vt	carriage return and vertical tabulation.

Print Mode

Selects the printing of all the screen characters or only the unprotected ones.

Device Type

Selects the printer model. This selection does not affect the printer functioning: it is only used to compile PENQ and PDENQ messages to be sent to the host.

Updating Setup

This menu gives the user the possibility of recording all the data, inserted in the previous menus, in the configuration file, *viptty*NN*.cfg*, where NN is the number corresponding to the terminal on which the emulator is running.

During this operation the terminal executes a general reset, clearing all the information on the screen.

Exit Setup

Select this option to exit from the SETUP without saving any changes. The terminal state will not be modified.

Chapter 3. Using the Terminal Emulator

Using the Terminal Emulator Summary

This chapter describes the terminal emulator software and its use on different terminals:

The Keyboard

The following paragraphs briefly describe the keyboard functions.

The emulator software uses its own keyboard driver which allows combinations of keys not used on standard keyboards. Often there are fewer keys on the target host terminals than on the keyboards being emulated.

As it is not possible to have a one–to–one mapping between each VIP function and a host key, in some cases a sequence of two host keys has been assigned to one VIP function. Note that the keys must be pressed sequentially, not simultaneously.

The first of these two keys will be referred to as the MAGIC key, in the following sections of this document.

Furthermore, with certain keyboards, it was necessary to use two different MAGIC keys.

Where possible, a one–to–one correspondence was maintained between the host key names and the VIP emulator sequences.

Otherwise, the assignment criteria, in descending order of priority, were the following:

- One–to–one assignment, or the most convenient mode remaining, for the most commonly used keys. For example:
  - Clear
  - Break
  - Transmit
- Free use will be made of the small, data–entry numerical keypad, if there is one.
- Where possible, a key will be chosen because its physical position on the keyboard is close to the key being emulated on the native VIP terminal.

Based on the rules, the VIP functions are assigned to the same keys on the host keyboard, where such keys exist. If the keys are not present, the MAGIC key is used in conjunction with a key from the numerical keypad, or a function key.

The CUSTOM functions of the emulator are invoked by using the MAGIC key and a letter key. For example:

Help	[MAGIC]+[”H”]
Quit	[MAGIC]+[”Q”]

Magic Keys

The Magic keys on different terminals are:

– VT200	MAGIC = Do
– VT320	MAGIC = Do
– BDS74XX	MAGIC = Do
– BDS71XX	MAGIC = PF3
– PC emul. VT100	MAGIC1 = F1
	MAGIC2 = F2

Command Sequences

The terminal emulator accepts and executes all command sequences of the VIP7800 terminals, described in the following manual:

- ”VIP7800 FAMILY DISPLAY TERMINALS USER’S REFERENCE MANUAL”

If a VIP escape sequence is entered from a host keyboard, and it is completely identical to a host sequence, it is interpreted as that host sequence. Otherwise, the sequence is interpreted as a VIP sequence.

The function [MAGIC]+[E] was created to resolve this problem. This function generates the ASCII ESC character and passes it transparently to the emulator.

Help Function

To facilitate the use of the terminal emulator a keyboard function, [Help] or [Magic]+[H], was developed.

This displays the table of assignments between the original VIP functions and the keyboard sequences used to obtain them.

This table is divided into pages in which the functions are grouped according to their functionality.

The help information is contained in files in the directory */usr/emu*. If these files do not exist, or if they are not found, the emulator will not signal an error, but the <help> function will be disabled.

Handling Special Differences

Video Attributes

Differences, between the hardware of VIP terminals and the host terminals, mean that some video attributes must be handled differently.

The terminals, VT200, VT320, BDS74XX, and PC, have the following limitations:

- the VIP attribute ”low intensity” is changed to ”normal intensity”;
- the VIP attribute ”normal intensity” is changed to ”highlight”;
- the ”underline” attribute is not visible when it occurs with the ”reverse” attribute;

The BDS71XX terminal has the following limitation:

- attributes are not handled because the attribute marker occupies one physical position.

Graphics

Differences, between the firmware of VIP terminals and the host terminals, mean that graphics characters must be handled differently.

- On a PC with VT100 Locus emulation, the graphic set is not the same as VIP7874 graphic sets.

The graphic set, on any terminal, must be activated with <Vip Setup> before it can be used.

Local Keys

vipemu redefines the keys of its host terminal, to exploit the host keyboard to the full. Some host keys may not be redefined, because they cause a ”local” effect, without producing a control sequence. Avoid using the following keys, on the particular terminals:

```
VT200 native or compatible
BDS74XX keys:                   Hold Screen
                                Compose Character
BDS71XX keys :                  Ctrl Home
                                Ctrl down arrow
                                Ctrl left arrow
                                Ctrl backspace
PC with VT100 Locus emulator
                keys :          Scroll Lock
                                Cntl PgDn
                                Cntl PgUp
```

Status Line

The vipemu emulates VIP terminals which have 25 rows. To run on a host terminal with 24 rows, the 25th row, the Status Line, must be handled differently. Except for the BDS74XX terminal, which does have 25 rows, vipemu displays the contents of the Status Line on the first row of the terminal, when the <status line> key is pressed. Pressing the <status line> key again, causes the previous first line to be redisplayed. When the Status line is visible it will disappear automatically in the following situations:

- when the cursor must go to the first row;
- when the following commands are used, whether from line or from keyboard:

RES	Reset;
CLR	clear;
RIS	reset to initial state;
PS	previous segment;
NS	next segment.

If the status line is not visible, it will be displayed in the following situations:

- when an error is signalled that changes the status line;
- when the following commands are used, whether from line or from keyboard:

SLL	status line lock
SLS	status line set

If the host terminal has 25 rows, this option must be configured in VIP–SETUP, as explained beginning on page 2–1.

Emulator Activation

The following is the syntax of the command used to launch vipemu:

vipemu –[chpt]

Each option used has an associated directory:

–c<config_dir>

–h<help_dir>

–p<lpdrv_path>

–t<config_dir>

Each option given changes the default pathname used by vipemu, in the following way:

c	the directory where, *vip.cfg* or *vipttyNN.cfg* resides, which contains the parameters for the terminal videos. If nothing is specified, the default pathname is */usr/emu*.
h	directory of the help file. If nothing is specified, the default directory is */usr/emu*.
p	pathname of the printer driver. If nothing is specified, the default pathname is */usr/bin/lpdrv*.
t	directory of the configuration system file, vipemutab. If nothing is specified, the default directory is */etc*.

The default values are the following:

c	*/usr/emu*
h	*/usr/emu*
p	*/usr/bin/lpdrv*
t	*/etc*

Chapter 4. The Script Utility

Script Utility Summary

This chapter is organized as follows:

Introduction

This chapter describes the script utility that automatically controls message exchanges between the terminal and the host. The script utility may be used in several ways. It is a batch program which may execute any command while the terminal emulator is running. The user must create a file, containing all the possible messages, and their replies, as if the same characters were typed at the keyboard. The syntax of a script command is described in this chapter.

Script Activation

The user has to prepare a source file named script–pathname with the ".spt" suffix. When this is done, the script utility can be executed in one of the four following ways:

- at the launch of the terminal emulator, by typing the command:

```
vipemu -s<script-pathname>
       Press Return
```

- at the launch of the terminal emulator, if a script file has been configured. (See VIPEMU Software Modules, on page 1-4.)
- during the execution of the terminal emulator, by typing one of the ten programmable keys to which a script file has been configured. (See Customized Keys, on page 2–5.)
- during the execution of the terminal emulator, by typing the command [MAGIC]+[V]. A menu is displayed which requests the name of a script file to be executed.

In each case, if the script file name does not exist or it does not have the ".spt" file type, the terminal emulator will display the following messages:

```
file not found in current directory
strike any key to continue
```

and the program will end.

Background Execution

The name in Vip Setup, or if the vipemu command is launched with the script file name as a parameter. During the script execution with the hidden option set:

- the blinking message:

```
SCRIPT ON LINE
```

- indicates that the script utility is executing.
- The function key Break , [MAGIC]+[B], is active and, if typed, will abort the process.
- the status line is updated.
- any error messages are displayed.

Logic

Before launching the batch file, the terminal locks the keyboard. Any attempt to enter keyboard characters will be fruitless, and signaled by a buzzer ring. The only key still active is ”Break”, ([MAGIC]+[B]), which may be used to interrupt the batch file, at any moment, if required. The execution starts by transmitting the message associated with label ”START”. The terminal waits for characters to be received from host. The characters coming from the line, make up a string which is compared with all these messages anticipated by the user as being possible replies. It is not necessary to write all the characters of the host reply. It is only necessary that there are sufficient characters to distinguish one reply from another. Until the first complete string match occurs, the program waits for:

- the next character;
- the character reception timer expiring.

In the first case, the comparison test is repeated.

In the second case, the program executes the TIME–OUT procedure. If there is no procedure to handle TIME–OUT, the batch file aborts.

Once the reply coming from host has been identified, the message, in the line with the associated label, will be transmitted and the above procedure will be repeated. The batch file will only terminate if one of the two following situations occur:

- the label EXIT or the label QUIT has been reached and identified,
- the reception character timer has expired and this was not anticipated in the script file.

In the first case, the terminal emulator remains active, the keyboard is enabled and the batch file terminates normally.

In the second case the emulation aborts.

Syntax

The script file can understand and recognize the following two structures:

- comment records,
- dialogue description records.

The first structure is used to insert comments in the batch file.

A ”comment record” is a line in which the first meaningful character is a semi–colon, ”;”.

The format of the second structure is the following:

```
label and message-to-be-transmitted
reply-from-host and label
        ------
reply-from-host and label
```

This structure can be repeated, but must always be composed of only one message to be transmitted and one or more possible replies. The syntax of a message to be transmitted is the following:

```
LABEL:|TEXT TO BE TRANSMITTED|
```

If no transmission is required, the syntax is the following:

```
LABEL:
```

In all other cases, the pipeline characters, ”|”, are mandatory and delimit the message. The colon character, ”:”, is mandatory and delimits the label. The syntax used to describe a reply from the host is the following:

```
|TEXT TO BE COMPARED|LABEL
```

or

```
<TIMEOUT>LABEL
```

The characters ”|”, ”>” and ”<” are mandatory and delimit the messages. The final label is mandatory.

Labels

Inside the batch file, there are the following types of label:

- a link to the next record to be transmitted. For example:

```
|text to be transmitted|REPEAT
        ---
        ---
REPEAT:|text to be transmitted
```

The batch file scanning is strictly sequential. If, while looking for a label, the program finds the end of the file, scanning restarts from the head of the file.

- A reserved label ”QUIT”, which defines end of the script dialogue.
- A reserved label ”EXIT”, which defines the end of the script dialogue and of the emulation.
- A mandatory reserved label ”START”, which defines the beginning of the script dialogue.

There must be at least one ”EXIT” or ”QUIT” label in the file. The maximum length allowed for a label is 8 characters.

Text to be Transmitted

The text to be transmitted or received can contain any ASCII between 0 and 7F hexadecimal. The control characters between 0 and 1f hexadecimal must be described using the form:

```
CONTROL + character
```

In the table below, the tilde character ”~” is the CONTROL character.

Note: The character NUL is not accepted, because it indicates the end of the string and can cause comparison errors between messages. If the messages contain the ASCII character ”~”, this must be doubled.

Control Characters and Script Sequences

This table shows the control characters and script sequences.

00	nul	—	12	dc2	~R
01	soh	~A	13	dc3	~S
02	stx	~B	14	dc4	~T
03	etx	~C	15	nak	~U
04	eot	~D	16	syn	~V
05	enq	~E	17	etb	~W
06	ack	~F	18	can	~X
07	bel	~G	19	em	~Y
08	bs	~H	1a	sub	~Z
09	ht	~I	1b	esc	~[
0a	lf	~J	1c	fs	~\
0b	vt	~K	1d	gs	~]
0c	ff	~L	1e	rs	~^
0d	cr	~M	1f	us	~–
0e	so	~N	7e	~	~~
0f	si	~O	7f	de	~{
10	dle	~p	Break code		~}
11	dc1	~Q			

Here is a simple example:

```
|move the cursor to next line ~J ~M|
```

The maximum length allowed for a message is 80 characters. A null message, containing only "||" is allowed:

- when, in reception, the script process should not wait for any character, but should jump immediately to the associated label.
- on transmission, to send an empty transmission.

Specific pseudo–messages have been created to handle the most common errors. These pseudo–messages are delimited by "< >". To handle the condition where no reply comes from the host, insert the following line as a possible reply:

```
<TIMEOUT>label
```

If the character reception timer expires and this kind of reply was not present in the file, the script process aborts. This time–out value, in seconds, is configurable from Vip Setup, and has a default of 30 seconds.

Reserved Words

The labels START, EXIT, and QUIT, are always reserved. However, the word TIME–OUT is reserved only when delimited by "< >".

Function Key Transmission

To transmit one of the VIP7874 function keys, it is necessary to insert the escape sequence associated with that key in the script message. See the following table.

The message to be transmitted may contain the escape sequence of only one function code. If it is necessary to transmit more than one function code, they must be transmitted as separate messages.

Also, the escape sequence of a function code may not be transmitted together with other escape sequences or ASCII characters. If this were attempted, the batch file would abort and the following error message would be displayed:

```
no more fccs allowed
```

FUNCTION KEYS	ESC.SEQ.	SCRIPT MESS.
F1	esc 0	~[0
F2	esc 2	~[2
F3	esc 6	~[6
F4	esc 8	~[8
F5	esc :	~[:
F6	esc <	~[<
F7	esc >	~[>
F8	esc P	~[P
F9	esc R	~[R
F10	esc T	~[T
F11	esc \\	~[\
F12	esc \\	~[\
F13	esc !	~[!
F14	esc ”	~[”
SHIFT F1	esc 1	~[1
F2	esc 5	~[5
F3	esc 7	~[7
F4	esc 9	~[9
F5	esc ;	~[;
F6	esc =	~[=
F7	esc ?	~[?
F8	esc Q	~[Q
F9	esc S	~[S
F10	esc V	~[V
F11	esc]	~[]
F12	esc _	~[_
F13	esc !	~[!
F14	esc ”	~[”

Syntax and Line Errors

During the execution of the script file, these kinds of error may occur:

- SYNTAX errors;
- LINE errors:

```
TIME-OUT
RECEPTION OVERFLOW.
```

In the case of syntax errors, the batch file contains phrases which are not coherent with the grammar required. In this case, the script program aborts. In case of line errors, the behaviour of the batch file depends on its logical flow. If the management of such errors has been foreseen, they are handled accordingly. Otherwise, the script file aborts.

The errors are signalled as follows:

```
script-file:nnn--message
```

where:

script–file	indicates the file name, with ".spt" file type, that the utility is using.
nnn	is the line number of the script file on which the error has been found.
message	is a description of the error

The complete explanation of these error messages is found in Appendix A.

Script File Example

The following is the script file of a hypothetical dialogue.

```
; This is an example which describes
; the syntax of the batch script file
;
;
; The dialogue starts at the label START
;
START:|HELLO TAXI?|
; the anticipated answers are
|YES|ADDRESS
|NO,YOU GOT THE WRONG NUMBER|SORRY
; no answer
<TIMEOUT>TRYAGAIN
;
; first recall
;
TRYAGAIN:|HELLO TAXI?|
|YES|ADDRESS
; I give up
<TIMEOUT>EXIT
; successful link
ADDRESS:|COME TO 21, ROME STREET|
|ALL RIGHT|EXIT
;
; line fallen down
<TIMEOUT>EXIT
;
; wrong link management
SORRY:|I AM SORRY|
; no answer foreseen
||EXIT
```

Appendix A. Messages

This chapter lists all the error and alarm messages of the vipemu emulation.

A distinction has been made between error messages related to the emulation environment and the ones occurring during the configuration for the VIP7800 emulator.

The messages are listed in alphabetical order.

A short hypothesis, about the probable cause, is given.

Messages Summary

Configuration Messages

/etc/vipemutab not found

vipemu did not find the system configuration file. The default directory is */etc*.

Check the vipemu installation or use the ”–t” option.

/etc/vipemutab, line NNN syntax error

Check the contents of the *vipemutab* file at line NNN. The syntax for a line in this file is described in System Configuration, on page 1-5.

tty <name> type conflict

Check the contents of the *vipemutab* file. The terminal type associated with the TTY on which the user was working was not coherent.

tty type <name> not supported

vipemu was launched on a terminal type not supported by the emulator.

Check the system configuration or change the work station.

/etc/vipemutab: tty name <name> not configured

Check the contents of the vipemutab file. The name of the terminal, on which the user was working, was not in the *vipemutab* file.

/etc/inittab, line NNN: pseudo <name> not found

Check the contents of the *inittab* file. There was no line that configures the pseudo–tty with the terminal on which vipemu runs.

/etc/inittab, line NNN: gettyemu command not found

Check the contents of the *inittab* file. The **gettyemu** command, that configures the pseudo–tty, was missing at line NNN.

/etc/inittab, line NNN: pseudo–tty name not found

Check the contents of the *inittab* file. The name of the pseudo–tty, that must follow the **gettyemu** command, was not configured at line NNN.

/etc/ttytype: pseudo–tty name <name> not found

Check the contents of the *ttytype* file. The name of the pseudo–tty associated with the terminal was not configured.

/etc/ttytype: tty <name> not yet supported

Check the contents of the *ttytype* file. The type of terminal, associated with the pseudo–tty, was neither hw40 nor hw78.

<configuration file> open error

vipemu did not find either the default configuration file *vip.cfg*, or the specific configuration file associated with the terminal on which the user was working.

<configuration file> read error

vipemu could not read either the default configuration file *vip.cfg*, or the specific configuration file associated with the terminal on which the user was working.

Printer handler fork error

vipemu cannot create the specified process.

Emulator Messages

Alpha Field

In FORM mode, the user tried to insert a non–alphabetic character in an unprotected ALPHA–ONLY field or in a MODIFY–TRANSMIT field.

Alpha/Digit Field

In FORM mode, the user tried to enter a non–alphabetic or a non–digit character in an unprotected or MODIFY–TRANSMIT field, with both the ALPHA–ONLY and DIGIT–ONLY attributes set.

Alpha/Numeric Field

In FORM mode, the user tried to enter a non–alphabetic or non–numeric character in an unprotected or MODIFY–TRANSMIT field, with both the ALPHA–ONLY and NUMERIC–ONLY attributes set.

Data Overflow

- The user tried to enter an ASCII or graphic character, or an attribute in column 81, or a CR/LF on the last line, 24 or 72, of the data buffer, without having set the ROLL MODE option.
- An LF was received when the cursor was in the last line, 24 or 72, of the data buffer and the terminal had not the ROLL MODE option set.
- The command INSERT LINE was received but the last data buffer line was not empty.

Digit Field

In FORM mode, the user tried to enter a NON–DIGIT character in an unprotected or MODIFY–TRANSMIT field, with the attribute DIGIT–ONLY set.

Entry Required

- While in FORM mode, the user tried to enter a TAB (HT), when the cursor was in an unprotected or MODIFY–TRANSMIT field containing only spaces, and the field had the ENTRY–REQUIRED attribute set.
- While in FORM mode, the user tried to enter a space in the last position of an unprotected or a MODIFY–TRANSMIT field containing only spaces, and the ENTRY–REQUIRED attribute was set.
- While in FORM mode, the user tried to execute the command TRANSMIT (TXD), when one or more unprotected or MODIFY–TRANSMIT fields contained only spaces, and the ENTRY–REQUIRED attribute was set. The cursor was positioned on the first wrong field.

Fill Required

- While in FORM mode, the user tried to enter a TAB (HT) when the cursor was in an unprotected or MODIFY–TRANSMIT and FILL–REQUIRED field containing some, but not all, characters different from space.
- While in FORM mode, the user tried to enter a space in the last position of an unprotected or MODIFY–TRANSMIT and FILL–REQUIRED field containing some, but not all, characters different from space.
- While in FORM mode, the user tried to enter the command TRANSMIT (TXD), when one or more unprotected or MODIFY–TRANSMIT and FILL–REQUIRED fields contained some, but not all, characters different from space. The cursor moved to the first wrong field.

Invalid Command

- The user attempted to use commands not recognized by the terminal when it was in RESTRICTED OPERATION MODE.
- attempt to use commands valid only for SYNCHRONOUS emulation when the terminal was configured in ASYNCHRONOUS.
- The user attempted to use commands valid only for the ASYNCHRONOUS emulation when the terminal was configured in SYNCHRONOUS.
- While in INSERT MODE, the user tried to enter data, ASCII or graphic, when the cursor was either in column 81, or in a protected field when the terminal was in FORM MODE.
- Erroneous entry of parameters or of the number of parameters of a command.
- When using the command ATTRIBUTE (ATR), the attribute character was not one of those allowed, or the terminal was set to FORM MODE.
- When, while the terminal was set to RESTRICTED OPERATION MODE, the user tried to use the CLEAR key.
- When, while the terminal was set to RESTRICTED OPERATION MODE, the user tried to use the RESET key.
- When using the command CURSOR POSITION BINARY (CPB), the parameters for row and column were wrong or missing, or the cursor was in the status line.
- When using the command CURSOR POSITION DECIMAL (CPD), the parameters for row and column were wrong or missing, or the cursor was in the status line.
- When, while the cursor was in the status line, the user tried to enter the command CURSOR REQUEST BINARY (CRB).
- When, while the cursor was in the status line, the user tried to enter the command CURSOR REQUEST DECIMAL (CRD).
- When, while the cursor was in the status line, the user tried to enter CURSOR DOWN (CUD), CURSOR HOME (CUH) or CURSOR UP (CUU).
- When using the command DELETE ATTRIBUTE (DAT), the cursor was in column 1 or 81, or the terminal was set to FORM MODE, or the keyboard was set to RESTRICTED OPERATION MODE.
- When using the command DELETE CHARACTER (DCH), either the cursor was in column 81, or the terminal was set to FORM MODE and the cursor was in a protected field.
- When using the command DELETE LINE (DL), either the cursor was in the status line, or the terminal was set to FORM MODE.
- When, while the cursor was in the status line, the user tried to enter the command DATA SPACE HOME (DSH).
- When, while the terminal was set to RESTRICTED OPERATION MODE, the user tried to use the ESCAPE key.
- When, while the cursor was in a protected field or the terminal is set to FORM MODE, the user tried to enter the command ERASE TO END OF FIELD (EOF).
- When, while the cursor was in the status line, the user tried to enter the command ERASE TO END OF PAGE (EOP).
- When using the command ECHOPLEX (EP), the terminal was in local, or the terminal was set to TEXT MODE, or FORM MODE.
- When, while the terminal was set to RESTRICTED OPERATION MODE, the user tried to set FORM MODE with the sequence ([MAGIC]+[F]).

- When using the command INSERT LINE (IL), either the cursor was in the status line, or the terminal was set to FORM MODE.
- When using the commands NEXT SEGMENT (NS) or PREVIOUS SEGMENT (PS), either the cursor was in the status line, or the option to set the internal data buffer to 72 rows was not selected.
- When, while the terminal was set to FORM MODE, the user tried to enter the command ROLL MODE SET (RMS).
- When using the command SET BLOCK TRANSMIT (SBT), either the parameters were wrong or missing, or the terminal was set to CHAR MODE.
- When, while the terminal was set to CHAR MODE or FORM MODE, the user tried to enter the command SET TRANSMISSION POINTER (STP).
- When using the command SCROLL UP (SU) or SCROLL DOWN (SD), either the cursor was in the status line, or the option to set the internal data buffer to 72 rows was not selected.
- When using the command TAB CLEAR (TBC), either the cursor was in column 81, or the terminal was set to FORM MODE.
- When, while the terminal was set to FORM MODE, the user tried to enter the command TAB INITIALIZE (TBI).
- When using the command TAB SET (TBS), either the cursor was in column 81, or the terminal was set to FORM MODE.
- When, while the terminal was set to BLOCK TRANSMIT MODE, the user tried to enter the command TRANSMIT NEXT BLOCK (TNB).
- When, while the cursor was in the status line, the user tried to enter the command TEXT RESULT DISPLAY (TRD).
- When, while the terminal was set to CHAR MODE or FORM MODE, the user tried to enter the command TRANSMIT ON RETURN SET (TRS).
- When, while the terminal was set to CHAR MODE, the user tried to enter the command TRANSMIT ALL (TXA).

Numeric Field

When, while the terminal was set to FORM MODE, the user tried to insert a non–numeric character in an unprotected or MODIFY–TRANSMIT field.

Printer Messages

Printer Buffer Ovf

Printer Buffer Overflow – The data sent to the printer buffer exceeded the size of the buffer area left free.

Printer Busy

Data was still being sent to the printer buffer.

Printer Busy/Fault

When, while data was still being sent to the printer buffer, another printer request was received, that was neither PENQ nor PRES.

Printer Fault

The printer was not ready to print for one of the following reasons:

- PRINTER OUT OF PAPER
- PRINTER IN LOCAL MODE.

Printer Off Line

The printer was switched off or it was not connected.

Printer Invalid Cmd

Printer Invalid Command – When, in one of the following commands, the parameters were wrong or missing:

PRINT CONTROL CHARACTERS (PCC)

PRINTER DELAYED STATUS REQUEST (PDENQ)

PRINT DATA SPACE (PDS)

PRINTER STATUS REQUEST (PENQ)

PRINT HOST DATA (PHD)

PRINT MULTIPLE COPIES (PMC)

PRINT REPEATED CHARACTER (PRC)

PRINT TRANSPARENT DATA (PTD)

- When the command PRINT DATA TERMINATOR (PDT) was not preceded by PHD, PTA or PTD.
- When the command PRINT REPEATED CHARACTERS (PRC) was not preceded by PHD, PTA or PTD.

Script Utility Error Messages

The following is a brief description of the error messages, along with the indication of their most probable causes.

Answer Option Too Long

The answer to be compared, at the line specified, overflows the maximum length allowed of 80 characters.

Control Char Not Allowed

The character which follows the ”~”, that should describe a control character, is not in the range ”@” (40 HEX) to ”–” (5f HEX).

Label Not Found

The label you have referred to is not present in the file. Remember that :

- the labels are associated in a sequential path, from the line examined to the end of the file, and then from the beginning of the file returning to the starting line.
- a label written in upper case letters is distinct from one written in the same letters, but in lower case.

Label Too Long

The label is too long. The maximum length allowed is 8 characters.

No Answer Options Listed

The message to be transmitted, at the specified line, is not followed by a list of replies to be checked.

No More FCCS Allowed

The message to be transmitted is composed of characters and a function code, or of more than one function code. Note that:

- The escape sequences of an fcc cannot be transmitted together with other escape or ASCII character sequences,
- A sequence of two or more fccs may not be transmitted in the same message,
- The break code must be transmitted alone.

Receiver Buffer Overflow

An overflow has occurred in the buffer used for line reception.

Time–Out Expired

The character reception time has expired. If the response times of a line are too long, its time–out value may be increased to a maximum of 255 seconds, using the Vip Setup configurator. The default is 30 seconds.

Unmatched Label Delimiter

The label, at the specified line, does not have the delimiter ”:”.

Appendix B. VIP7800 Commands

VIP7800 Commands Summary

VIP7800 Standard Commands

This chapter describes the standard VIP7800 commands used in the vipemu emulation.

Each description contains:

- The COMMAND NAME and its corresponding MNEMONIC in the Bull environment;
- The HEXADECIMAL and ASCII codes for its escape sequence;
- The KEY SEQUENCE to activate it, if it exists.

The commands are listed in alphabetical order, according to their MNEMONIC.

For more details about each command, see the following manual:

- ”VIP7800 FAMILY DISPLAY TERMINALS USER’S REFERENCE MANUAL”

ATTRIBUTE

```
MNEMONIC     : ATR
HEXADECIMAL  : 1B  73
ASCII        : ESC s
KEY SEQUENCE : [MAGIC]+[A]+attribute
Visual attribute                  attribute
BLINK                             B,b
HIDE                              H,h
INVERSE VIDEO                     I,i
LOW INTENSITY                     L,l
UNDERLINE                         _
CYAN      color                   C,c
GREEN     color                   G,g
RED       color                   S,s
MAGENTA   color                   V,v
BLUE      color                   X,x
YELLOW    color                   Y,y
WHITE     color                   W,w
RESTORE                           R,r
OMIT PRINT                        O,o
UNPROTECTED                       U,u
```

```
DIGIT ONLY                          D,d
NUMERIC ONLY                        N,n
ALPHA ONLY                          A,a
ENTRY REQUIRED                      E,e
FILL REQUIRED                       F,f
JUSTIFY RIGHT                       J,j
TRANSMIT ALWAYS                     T,t
MODIFIED TRANSMIT                   M,m
PROTECTED                           P,p
```

AUTO LF

```
MNEMONIC     : ALF
HEXADECIMAL  :
 ASCII        :
KEY SEQUENCE :
VT200          [ MAGIC ]+[ CR ]
BDS74XX        [ MAGIC ]+[ CR ]
BDS71XX        [ MAGIC ]+[ CR ]
PC-VT100       [ MAGIC1]+[ CR ]
```

BACK SPACE

```
MNEMONIC     : BS
HEXADECIMAL  : 08
ASCII        : BS
KEY SEQUENCE : [CNTL][H] or [BACKSPACE]
```

BELL

```
MNEMONIC     : BEL
HEXADECIMAL  : 07
ASCII        : BEL
KEY SEQUENCE : [CNTL][G]
```

BELL DISABLE

```
MNEMONIC     : BLD
HEXADECIMAL  : 1B  67
ASCII        : ESC g
KEY SEQUENCE : [MAGIC]+[E] + [G]
```

BELL ENABLE

```
MNEMONIC     : BLE
HEXADECIMAL  : 1B  68
ASCII        : ESC h
KEY SEQUENCE : [MAGIC]+[E]+[H]
```

BLOCK TRANSMIT COMMAND

```
MNEMONIC     : BTC
HEXADECIMAL  : 1B  5B  54
ASCII        : ESC [ T
KEY SEQUENCE : [MAGIC]+[E]+["["]+[T]
```

Synchronous connection only.

BREAK

```
MNEMONIC     : BREAK
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE : [MAGIC]+[B]
```

CAPS LOCK

```
MNEMONIC     : CAPS LOCK
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE : [CAPS LOCK]
```

CARRIAGE RETURN

```
MNEMONIC     : CR
HEXADECIMAL  : 0d
ASCII        : CR
KEY SEQUENCE : [RET] or [CAR RETURN]
```

CHARACTER MODE

```
MNEMONIC     : CM
HEXADECIMAL  : 1B  6B
ASCII        : ESC K
KEY SEQUENCE : [MAGIC]+[C]
```

Asynchronous connection only.

CLEAR

```
MNEMONIC     : CLR
HEXADECIMAL  : 1B  60
ASCII        : ESC '
KEY SEQUENCE :
VT200                    [PF4]
BDS74XX                  [PF4]
BDS71XX          [ MAGIC ]+[PF4]
PC-VT100         [ MAGIC1]+[END]
```

CONTROL

```
MNEMONIC     : CTL
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE : [CNTL]
```

CURSOR BACK TAB

```
MNEMONIC     : CBT
HEXADECIMAL  : 1B  5B  5A
ASCII        : ESC [ Z
KEY SEQUENCE :
VT200                    [FIND]
BDS74XX                  [FIND]
BDS71XX            [ SHF ] [TAB]
PC-VT100         [ MAGIC1]+[TAB]
```

CURSOR BACKWARD

```
MNEMONIC     : CUB
HEXADECIMAL  : 1B  44
ASCII        : ESC D
KEY SEQUENCE : [Left arrow]
```

CURSOR DOWN

```
MNEMONIC     : CUD
HEXADECIMAL  : 1B  42
ASCII        : ESC B
KEY SEQUENCE : [Down arrow]
```

CURSOR FORWARD

```
MNEMONIC     : CUF
HEXADECIMAL  : 1B  43
ASCII        : ESC C
KEY SEQUENCE : [Right arrow]
```

CURSOR HOME

```
MNEMONIC     : CUH
HEXADECIMAL  : 1B  48
ASCII        : ESC H
KEY SEQUENCE :
VT200          [ MAGIC ]+[FIND]
BDS74XX        [ MAGIC ]+[FIND]
BDS71XX                  [HOME]
PC-VT100                 [HOME]
```

CURSOR POSITION BINARY

```
MNEMONIC     : CPB
HEXADECIMAL  : 1B 66 Pc Pl
ASCII        : ESC f col line
KEY SEQUENCE : [MAGIC]+[E]+[F]+Pc+Pl
```

CURSOR POSITION DECIMAL

```
MNEMONIC     : CPD
HEXADECIMAL  : 1B 5B LLL CCC 66
ASCII        : ESC [ LLL CCC f
KEY SEQUENCE : [MAGIC]+[E]+["["] + LLL+CCC + [f]
```

CURSOR REQUEST BINARY

```
MNEMONIC     : CRB
HEXADECIMAL  : 1B  6E
ASCII        : ESC n
KEY SEQUENCE : [MAGIC]+[E]+[N]
```

CURSOR REQUEST DECIMAL

```
MNEMONIC     : CRD
HEXADECIMAL  : 1B  5B  52
ASCII        : ESC [ R
KEY SEQUENCE : [MAGIC]+[E]+["["][R]
```

CURSOR UP

```
MNEMONIC     : CUU
HEXADECIMAL  : 1B  40
ASCII        : ESC A
KEY SEQUENCE : [Up arrow ]
```

DATA SPACE HOME

```
MNEMONIC     : DSH
HEXADECIMAL  : 1B  5B  48
ASCII        : ESC [ H
KEY SEQUENCE :
VT200        [ MAGIC ]+[ Prev Screen ]
BDS74XX      [ MAGIC ]+[ Prev Screen ]
BDS71XX      [ MAGIC ]+[ HOME ]
PC-VT100     [ MAGIC1]+[ HOME ]
```

DELAYED ENQUIRY

```
MNEMONIC     : DENQ
HEXADECIMAL  : 1B  5B  79
ASCII        : ESC [ Y
KEY SEQUENCE : none
```

DELETE ATTRIBUTE

```
MNEMONIC     : DAT
HEXADECIMAL  : 1B  5B  51
ASCII        : ESC [ Q
KEY SEQUENCE : [MAGIC]+[D]
```

DELETE CHARACTER

```
MNEMONIC     : DCH
HEXADECIMAL  : 1B  5B  50
ASCII        : ESC [ P
KEY SEQUENCE :
VT200              [ REMOVE ]
BDS74XX            [ REMOVE ]
BDS71XX  [ MAGIC ]+[ ”8” numeric keypad]
PC-VT100           [DEL]
```

DELETE LINE

```
MNEMONIC     : DL
HEXADECIMAL  : 1B  5B  4D
ASCII        : ESC [ M
KEY SEQUENCE :
VT200      [ MAGIC ]+[ REMOVE ]
BDS74XX    [ MAGIC ]+[ REMOVE ]
BDS71XX    [ MAGIC ]+[ ”5” numeric keypad]
PC-VT100   [ MAGIC1]+[ DEL ]
```

ECHOPLEX

```
MNEMONIC     : EP
HEXADECIMAL  : 1B  6D
ASCII        : ESC M
KEY SEQUENCE : [MAGIC]+[E]+[M]
```

Asynchronous connection only.

ENQUIRY

```
MNEMONIC     : ENQ
HEXADECIMAL  : 05
ASCII        : ENQ
KEY SEQUENCE : none
```

ERASE TO END OF FIELD

```
MNEMONIC     : EOF
HEXADECIMAL  : 1B  4B
ASCII        : ESC K
KEY SEQUENCE :
VT200               [ PF3 ]
```

```
BDS74XX             [ PF3 ]
BDS71XX   [ MAGIC ]+[”9” numeric keypad]
BDS74XX             [ F12 ]
PC-VT100  [ MAGIC1]+[ Right arrow ]
```

ERASE TO END OF PAGE

```
MNEMONIC     : EOP
HEXADECIMAL  : 1B  4A
ASCII        : ESC J
KEY SEQUENCE :
VT200      [ MAGIC ]+[ PF3 ]
BDS74XX    [ MAGIC ]+[ PF3 ]
BDS71XX    [ MAGIC ]+[”6” numeric keypad]
BDS74XX      [ SFT ]+[ F12 ]
PC
-VT100   [ MAGIC1]+[ Left arrow ]
```

FORM MODE

```
MNEMONIC     : FM
HEXADECIMAL  : 1B  5B  68
ASCII        : ESC [ h
KEY SEQUENCE : [MAGIC]+[F]
```

FUNCTION CODE

```
MNEMONIC     : FX/SFX
HEXADECIMAL  :
ASCII        :
KEY SEQUENCE :
```

Function code 1..12:

```
VT200    F1..F09            [ F06 ]..[ F14 ]
VT200    F9..F12            [ F17 ]..[ F19 ]
VT200        F13  [ MAGIC1]+[”Y”]
VT200        F14  [ MAGIC1]+[”U”]
BDS74XX  F1..F09            [ F06 ]..[ F14 ]
BDS74XX  F9..F12            [ F17 ]..[ F19 ]
BDS74XX      F13  [ MAGIC1]+[”Y”]
BDS74XX      F14  [ MAGIC1]+[”U”]
BDS71XX  F1..F10            [ F01 ]..[ F10 ]
BDS71XX      F11            [ PF1 ]
BDS71XX      F12            [ PF2 ]
BDS71XX      F13  [ MAGIC ]+[”Y”]
BDS71XX      F14  [ MAGIC ]+[”U”]
PC-VT100 F1..F10  [ MAGIC1]+[”1”..”0”]
```

```
PC-VT100     F11  [ MAGIC1]+[”-”]
PC-VT100     F12  [ MAGIC1]+[”=”]
PC-VT100     F13  [ MAGIC1]+[”Y”]
PC-VT100     F14  [ MAGIC1]+[”U”]
```

Shift function code 1..12:

```
VT200             [ MAGIC ]+[ F06 .. F19 ]
BDS74XX           [ MAGIC ]+[ F06 .. F19 ]
BDS71XX  F1..F10  [ MAGIC ]+[ F01 ]..[ F10 ]
BDS71XX      F11  [ MAGIC ]+[ PF1 ]
BDS71XX      F12  [ MAGIC ]+[ PF2 ]
PC-VT100     F01  [ MAGIC1]+[ ”!” ]
PC-VT100     F02  [ MAGIC1]+[ 0x40]
PC-VT100     F03  [ MAGIC1]+[ ”#” ]
PC-VT100     F04  [ MAGIC1]+[ ”$” ]
PC-VT100     F05  [ MAGIC1]+[ ”%” ]
PC-VT100     F06  [ MAGIC1]+[ ”^” ]
PC-VT100     F07  [ MAGIC1]+[ ”&” ]
PC-VT100     F08  [ MAGIC1]+[ ”*” ]
PC-VT100     F09  [ MAGIC1]+[ ”(” ]
PC-VT100     F10  [ MAGIC1]+[ ”)” ]
PC-VT100     F11  [ MAGIC1]+[ ”_” ]
PC-VT100     F12  [ MAGIC1]+[ ”+” ]
```

HORIZONTAL TAB

```
MNEMONIC     : HT
HEXADECIMAL  : 09
ASCII        : HT
KEY SEQUENCE : [TAB]
```

INSERT LINE

```
MNEMONIC     : IL
HEXADECIMAL  : 1B  5B  4C
ASCII        : ESC [ L
KEY SEQUENCE :
VT200      [ MAGIC ]+[ Insert Here ]
BDS74XX    [ MAGIC ]+[ Insert Here ]
BDS71XX    [ MAGIC2]+[”4” numeric keypad]
PC-VT100   [ MAGIC1]+[ INS ]
```

INSERT MODE

```
MNEMONIC     : IM
HEXADECIMAL  : 1B  5B  49
ASCII        : ESC [ I
```

```
KEY SEQUENCE :
VT200                [ Insert Here ]
BDS74XX              [ Insert Here ]
BDS71XX    [ MAGIC2]+[”7” numeric keypad]
PC-VT100             [ INS ]
```

INSERT MODE RESET

```
MNEMONIC     : IMR
HEXADECIMAL  : 1B  5B  4A
ASCII        : ESC [ J
KEY SEQUENCE :
VT200                [ Insert Here ]
BDS74XX              [ Insert Here ]
BDS71XX    [ MAGIC2]+[”7” numeric keypad]
PC-VT100             [ INS ]
```

KEYBOARD IDENTIFICATION REQUEST

```
MNEMONIC     : KIB
HEXADECIMAL  : 1B  5B  7B
ASCII        : ESC [ {
KEY SEQUENCE : none
```

KEYBOARD LOCK

```
MNEMONIC     : KBL
HEXADECIMAL  : 1B  5B  58
ASCII        : ESC [ X
KEY SEQUENCE : none
```

KEYBOARD UNLOCK

```
MNEMONIC     : KBU
HEXADECIMAL  : 1B  5B  57
ASCII        : ESC [ W
KEY SEQUENCE : none
```

LINE FEED

```
MNEMONIC     : LF
HEXADECIMAL  : 0A
ASCII        : LF
KEY SEQUENCE : [CNTL][M] or [ LF ]
```

LINE GRAPHICS RESET

```
MNEMONIC     : LGR
HEXADECIMAL  : 1B  46
ASCII        : ESC F
KEY SEQUENCE : [MAGIC]+[E]+[F]
```

LINE GRAPHICS SET

```
MNEMONIC     : LGS
HEXADECIMAL  : 1B  47
ASCII        : ESC G
KEY SEQUENCE : [MAGIC]+[E]+[G]
```

LOCAL

```
MNEMONIC     : LCL
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE : [MAGIC]+[L]
```

NEXT SEGMENT

```
MNEMONIC     : NS
HEXADECIMAL  : 1B  5B  32  73
ASCII        : ESC [ 2 s
KEY SEQUENCE :
VT200               [ Next Screen ]
BDS74XX             [ Next Screen ]
BDS71XX   [ MAGIC ]+[”.” numeric keypad]
PC-VT100  [ MAGIC1]+[ PgDn ]
```

Valid with 72 line option only.

NO OPERATION

```
MNEMONIC     : NOP
HEXADECIMAL  : 1B  5B  78
ASCII        : ESC [ x
KEY SEQUENCE : [MAGIC]+[E]+[”[”]+[x]
```

NON–ECHOPLEX

```
MNEMONIC     : NEP
HEXADECIMAL  : 1B  6C
ASCII        : ESC l
KEY SEQUENCE : [MAGIC]+[E]+[L]
```

Asynchronous connection only.

PREVIOUS SEGMENT

```
MNEMONIC     : PS
HEXADECIMAL  : 1B  5B  33  73
ASCII        : ESC [ 3 s
KEY SEQUENCE :
VT200               [ Prv Screen ]
BDS74XX             [ Prv Screen ]
BDS71XX   [ MAGIC ]+[”3” numeric keypad]
PC-VT100  [ MAGIC1]+[ PgUp ]
```

Valid with 72 line option only.

PROCESS BEFORE VERIFY

```
MNEMONIC     : PBV
HEXADECIMAL  : 1B  5B  55
ASCII        : ESC [ U
KEY SEQUENCE : [MAGIC]+[E]+["[”]+[U]
```

Synchronous connection only.

RESET

```
MNEMONIC     : RES
HEXADECIMAL  : 1B  65
ASCII        : ESC e
KEY SEQUENCE :
VT200        [ PF1 ]
BDS74XX      [ PF1 ]
BDS71XX      [ PF4 ]
PC-VT100     [ END ]
```

RESET BLOCK MODE

```
MNEMONIC     : RBM
HEXADECIMAL  : 1B  5B  45
ASCII        : ESC [ E
KEY SEQUENCE : [MAGIC]+[E]+["[”]+[E]
```

Synchronous connection only.

RESET TO INITIAL STATE

```
MNEMONIC     : RIS
HEXADECIMAL  : 1B  63
ASCII        : ESC c
KEY SEQUENCE :
VT200        [ MAGIC ]+[ PF1 ]
BDS74XX      [ MAGIC ]+[ PF1 ]
BDS71XX      [ MAGIC ]+[ PF4 ]
PC-VT100     [ MAGIC2]+[ END ]
```

RESET MODIFIED INDICATORS

```
MNEMONIC     : RMI
HEXADECIMAL  : 1B  59
ASCII        : ESC Y
KEY SEQUENCE : [MAGIC]+[E]+[Y]
```

RESET VISUAL ATTRIBUTE

```
MNEMONIC     : RVA
HEXADECIMAL  : 1B  7B  ATTRIBUTE
ASCII        : ESC {   ATTRIBUTE
KEY SEQUENCE : [MAGIC]+[E]+["{"] + ATTRIBUTE
ATTRIBUTE       MEANING
B/b           BLINK
I/i           INVERSE
"_"           UNDERSCORE
L/l           LOW INTENSITY
H/h           HIDE (BLANK)
O/o           OMIT PRINT
```

RESTRICTED OPERATION RESET

```
MNEMONIC     : ROR
HEXADECIMAL  : 1B  5B  69
ASCII        : ESC [ i
KEY SEQUENCE : none
```

RESTRICTED OPERATION SET

```
MNEMONIC     : ROS
HEXADECIMAL  : 1B  5B  6A
ASCII        : ESC [ j
KEY SEQUENCE : [MAGIC]+[E]+["["]+[J]
```

RIGHT JUSTIFY FILL

```
MNEMONIC     : RJF
HEXADECIMAL  : 1B 58 char
ASCII        : ESC x char
KEY SEQUENCE : [MAGIC]+[E]+[X]+fill char
```

ROLL MODE RESET

```
MNEMONIC     : RMR
HEXADECIMAL  : 1B  71
ASCII        : ESC q
KEY SEQUENCE : [MAGIC]+[E]+[Q]
```

ROLL MODE SET

```
MNEMONIC     : RMS
HEXADECIMAL  : 1B  72
ASCII        : ESC r
KEY SEQUENCE : [MAGIC]+[E]+[R]
```

SCROLL DOWN

```
MNEMONIC     : SD
HEXADECIMAL  : 1B 5B 31 73
ASCII        : ESC [ 1 s
KEY SEQUENCE :
VT200          [ MAGIC ]+[ Down arrow ]
BDS74XX        [ MAGIC ]+[ Down arrow ]
BDS71XX        [ MAGIC ]+[ Down arrow ]
PC-VT100               [ PgDn ]
```

Valid with 72 line option only.

SCROLL UP

```
MNEMONIC     : SU
HEXADECIMAL  : 1B 5B 30 73
ASCII        : ESC [ 0 s
KEY SEQUENCE :
VT200          [ MAGIC ]+[ Up arrow ]
BDS74XX        [ MAGIC ]+[ Up arrow ]
BDS71XX        [ MAGIC ]+[ Up arrow ]
PC-VT100               [ PgUp ]
```

Valid with 72 line option only.

SET BLOCK TRANSMIT

```
MNEMONIC     : SBT
HEXADECIMAL  : 1B 5B nnnn 46
ASCII        : ESC [ nnnn F
KEY SEQUENCE : [MAGIC]+[E]+["[”]+[n]+[n]+[n]+[n]+[F]
```

Synchronous connection only.

SET COLOR ATTRIBUTE

```
MNEMONIC     : CAT
HEXADECIMAL  : 1B  5F  CCC  76
ASCII        : ESC [ CCC v
KEY SEQUENCE : [MAGIC]+[E]+["[”]+CCC+[v]
CCC              Visual color
000              default color
001              Blue
002              Green
003              Cyan
004              Red
005              Magenta
006              Yellow
007              White
```

SET TRANSMISSION POINTER

MNEMONIC : STP

HEXADECIMAL : 1B 4D

ASCII : ESC M

KEY SEQUENCE : [MAGIC]+[E]+[M]

SPACE SUPPRESS RESET

MNEMONIC : SSR

HEXADECIMAL : 1B 5B 64

ASCII : ESC [d

KEY SEQUENCE : [MAGIC]+[E]+[”[”]+[D]

SPACE SUPPRESS SET

MNEMONIC : SSS

HEXADECIMAL : 1B 5B 65

ASCII : ESC [e

KEY SEQUENCE : [MAGIC]+[E]+[”[”]+[E]

STATUS LINE LOCK

MNEMONIC : SLL

HEXADECIMAL : 1B 4F

ASCII : ESC o

KEY SEQUENCE : [MAGIC]+[E]+[O]

STATUS LINE RESET

MNEMONIC : SLR

HEXADECIMAL : 1B 76

ASCII : ESC v

KEY SEQUENCE : [MAGIC]+[E]+[V]

STATUS LINE SET

MNEMONIC : SLS

HEXADECIMAL : 1B 77

ASCII : ESC w

KEY SEQUENCE : [MAGIC]+[E]+[W]

TAB CLEAR

MNEMONIC : TBC

HEXADECIMAL : 1B 5B 67

ASCII : ESC [g

KEY SEQUENCE :

VT200 [MAGIC]+[”7” numeric keypad]

BDS74XX [MAGIC]+[”7” numeric keypad]

BDS71XX [MAGIC]+[”-” numeric keypad]

PC-VT100 [MAGIC2]+[HOME]

TAB INITIALIZE

```
MNEMONIC     : TBI
HEXADECIMAL  : 1B  5B  4E
ASCII        : ESC [ N
KEY SEQUENCE :
VT200     [ MAGIC ]+[ ”8” numeric keypad]
BDS74XX   [ MAGIC ]+[ ”8” numeric keypad]
BDS71XX   [ MAGIC ]+[ TAB ]
PC-VT100  [ MAGIC2]+[ Up arrow ]
```

TAB SET

```
MNEMONIC     : TBS
HEXADECIMAL  : 1B  70
ASCII        : ESC p
KEY SEQUENCE :
VT200     [ MAGIC ]+[ ”9” numeric keypad]
BDS74XX   [ MAGIC ]+[ ”9” numeric keypad]
BDS71XX   [ MAGIC ]+[ ”,” numeric keypad]
PC-VT100  [ MAGIC2]+[ PgUp ]
```

TEXT MODE

```
MNEMONIC     : TM
HEXADECIMAL  : 1B  5B  6C
ASCII        : ESC [ l
KEY SEQUENCE : [MAGIC]+[T]
```

TIME OF DAY

```
MNEMONIC     : TOD
HEXADECIMAL  : 1B  5B  HHnn  74
ASCII        : ESC  [  hhnn  t
KEY SEQUENCE : [MAGIC]+[E]+[”[”]+hhnn+[t]
```

TIME OF DAY RESET

```
MNEMONIC     : TODR
HEXADECIMAL  : 1B  5B  74
ASCII        : ESC [ t
KEY SEQUENCE : [MAGIC]+[E]+[”[”]+[t]
```

TRANSMIT ALL

```
MNEMONIC     : TXA
HEXADECIMAL  : 1B  74
ASCII        : ESC t
KEY SEQUENCE :
VT200     [ MAGIC ]+[ Enter numeric keypad]
BDS74XX   [ MAGIC ]+[ Enter numeric keypad]
BDS71XX   [ MAGIC ]+[ Enter numeric keypad]
PC-VT100  [ MAGIC1]+[ F4 ]
```

TRANSMIT DATA

```
MNEMONIC     : TXD
HEXADECIMAL  : 1B  69
ASCII        : ESC i
KEY SEQUENCE :
VT200        [ Enter numeric keypad]
BDS74XX      [ Enter numeric keypad]
BDS71XX      [ Enter numeric keypad]
PC-VT100     [ F4 ]
```

TRANSMIT NEXT BLOCK

```
MNEMONIC     : TNB
HEXADECIMAL  : 1B  49
ASCII        : ESC I
KEY SEQUENCE : none
```

TRANSMIT ON RETURN RESET

```
MNEMONIC     : TRR
HEXADECIMAL  : 1B  5B  41
ASCII        : ESC [ A
KEY SEQUENCE : [MAGIC]+[E]+[”[”]+[A]
```

TRANSMIT ON RETURN SET

```
MNEMONIC     : TRS
HEXADECIMAL  : 1B  5B  42
ASCII        : ESC [ B
KEY SEQUENCE : [MAGIC]+[E]+[”[”]+[B]
```

VERIFY BEFORE PROCESS

```
MNEMONIC     : VBP
HEXADECIMAL  : 1B  5B  56
ASCII        : ESC [ V
KEY SEQUENCE : [MAGIC]+[E]+[”[”]+[V]
```

Synchronous connection only.

Commands not Emulated

BLOCK TRANSMIT AUTOMATICALLY	[BTA]
DISCONNECT	[DEOT]
FIRMWARE VERSION DISPLAY	[FVD]
TEST RESULT DISPLAY	[TRD]

Non–Standard VIP Commands

This section describes other commands and functions found on vipemu that are not on the standard VIP.

Each description contains:

- The COMMAND NAME and its corresponding MNEMONIC;
- the HEXADECIMAL and ASCII codes for its escape sequence;
- The KEY SEQUENCE to activate it;

The commands are listed in alphabetical order, according to their MNEMONIC.

DISPLAY ALL

```
MNEMONIC     : DSPA
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE : [MAGIC]+[W]
```

This command displays the line traffic on a different tty. The default tty is the console. The user may specify another terminal, at installation time, by means of the [d] option of the command **vipemu**. For example:

```
> vipemu  -d/dev/tty11
```

The control characters, lower than 20H, are displayed in their corresponding hexadecimal format, 0xNN. Each transmitted character is displayed between pipe characters, ”| |”. Each received character is displayed between square brackets, ”[ ]”. The command can be activated at any moment. To cancel it, type the command again.

EMULATION END

```
MNEMONIC     : QUIT
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE : [MAGIC]+[Q]
```

This command aborts the VIP7800 terminal emulator program.

HELP

```
MNEMONIC     : HELP
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE : [MAGIC]+[H] or [HELP]
```

This command displays a file that contains all the commands and functions of the VIP7800 emulator.

PROGRAMMABLE FUNCTION KEYS

```
MNEMONIC     : TFX
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE :
VT200              [ MAGIC ]+[”0”..”9”]
BDS74XX            [ MAGIC ]+[”0”..”9”]
BDS71XX             [ FUNC ]+[”0”..”9”]
PC-VT100           [ MAGIC2]+[”1”..”0”]
```

In the configurator, it is possible to define an association between a programmable function key and a command string. The maximum length of the command string is 20 characters. To execute the command string, type the [MAGIC] key followed by a numeric key from the top row of alphanumeric keys on your keyboard. The string may contain any ASCII code from 0 to 255.

SCRIPT

```
MNEMONIC     : SCRIPT
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE : [MAGIC]+[V]
```

For a detailed description of this command, see the Script Utility, starting on page 4-1

STATUS LINE

```
MNEMONIC     : STLN
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE :
VT200                        [ F20 ]
BDS74XX                      [ F20 ]
BDS71XX           [ MAGIC ]+[Right arrow]
PC-VT100                     [ F3  ]
```

For a detailed description of this command, see Status Line, on page 3–4.

UNIX SHELL

```
MNEMONIC     : SHL
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE : [MAGIC]+[S]
```

This command is used to open a shell inside the emulator, returning control to UNIX while keeping the emulator active in background. To return the emulator to foreground, enter the command EXIT <CR>.

VIP SETUP

```
MNEMONIC     : VPSU
HEXADECIMAL  : none
ASCII        : none
KEY SEQUENCE :
VT200                [ PF2 ]
BDS74XX              [ PF2 ]
BDS71XX     [ MAGIC ]+[ ”0” numeric keypad ]
PC-VT100    [ MAGIC1]+[  F3 ]
```

For a detailed description of this command, see Setup Program Menus, on page 2–1.

Appendix C. Printer Commands

Printer Commands Summary

Standard Printer Commands

The printer support offered by this emulation package is similar to that of the ”BUFFERED PRINTER ADAPTER” of the VIP7800 family. This chapter will describe all the local and remote printer commands in the vipemu emulation. Each description contains:

- The COMMAND NAME and its corresponding MNEMONIC;
- the HEXADECIMAL and ASCII codes for its escape sequence;
- The KEY SEQUENCE to activate it, if there is one.

The commands are listed in alphabetical order, according to their MNEMONIC.

PRINT CONTROL CHARACTERS

```
MNEMONIC     : PCC
HEXADECIMAL  : 1B 5B 3D char 70
ASCII        : ESC [ = char p
KEY SEQUENCE : [MAGIC]+[e]+[”[”] [=] [char] [p]
```

This command selects the control characters for the printer before and after the commands PDS and PTA.

PRINTER ADAPTER DELAYED ENQUIRY

```
MNEMONIC     : PDENQ
HEXADECIMAL  : 1B 5B 39 70
ASCII        : ESC [ 9 p
KEY SEQUENCE : none
```

This command causes the terminal to transmit the four status bytes of the printer to the host when the print–out has finished.

PRINT DATA SPACE

```
MNEMONIC     : PDS
HEXADECIMAL  : 1B 5B 30 70
ASCII        : ESC [ 0 p
KEY SEQUENCE :
VT200                    [SELECT]
BDS74XX                  [SELECT]
BDS71XX       [ MAGIC ]+[ "P" ]
PC-VT100      [ MAGIC1]+[ "P" ]
```

This command sends the video buffer to the current printer device. Print control characters are transmitted before and after the data buffer. See the **PCC** command, on page C-1.

In FORM MODE, the protected fields are only printed if the PRINT MODE parameter has been set to ALL.

PRINTER DEVICE STATUS REQUEST

```
MNEMONIC     : PDSR
HEXADECIMAL  : 1B  5B  3B  3F  70
ASCII        : ESC [ ; ? p
KEY SEQUENCE : none
```

PRINTER DATA TERMINATOR

```
MNEMONIC     : PDT
HEXADECIMAL  : 1B 5B 3C 70
ASCII        : ESC [ < p
KEY SEQUENCE : none
```

This command is sent by the host to terminate the PHD and PTA commands.

PRINTER ADAPTER ENQUIRY

```
MNEMONIC     : PENQ
HEXADECIMAL  : 1B 5B 33 70
ASCII        : ESC [ 8 p
KEY SEQUENCE : none
```

This command is sent by the host to request the immediate transmission of the four printer status bytes.

PRINT HOST DATA

```
MNEMONIC     : PHD
HEXADECIMAL  : 1B 5B 33 70
ASCII        : ESC [ 3 p
KEY SEQUENCE : none
```

This command is used by the host to send data directly to the printer buffer without modifying the video data buffer.

PRINT KEY LOCK

```
MNEMONIC     : PKL
HEXADECIMAL  : 1B  5B  3B  31  70
ASCII        : ESC [ ; 1 p
KEY SEQUENCE : none
```

PRINT KEY UNLOCK

```
MNEMONIC     : PKU
HEXADECIMAL  : 1B  5B  3B  30  70
ASCII        : ESC [ ; 0 p
KEY SEQUENCE : none
```

PRINT LOG ALL RESET

```
MNEMONIC     : PLAR
HEXADECIMAL  : 1B  5B  3B  34  70
ASCII        : ESC [ ; 4 p
KEY SEQUENCE : [MAGIC][x]
```

This command resets the Print Log All mode. The terminal is returned to Log mode, if that were selected.

PRINT LOG ALL SET

```
MNEMONIC     : PLAS
HEXADECIMAL  : 1B  5B  3B  35  70
ASCII        : ESC [ ; 5 p
KEY SEQUENCE : [MAGIC][x]
```

This command sets the terminal in Log All mode. All the data and the commands, transmitted or received, are processed and simultaneously sent to the selected printer device. The data and messages of the status line and the synchronous protocol characters are not printed.

PRINT LOG MODE RESET

```
MNEMONIC     : PLMR
HEXADECIMAL  : 1B  5B  3B  32  70
ASCII        : ESC [ ; 2 p
KEY SEQUENCE : [MAGIC][x]
```

This command terminates the Log mode.

PRINT LOG MODE SET

```
MNEMONIC     : PLMS
HEXADECIMAL  : 1B  5B  3B  33  70
ASCII        : ESC [ ; 3 p
KEY SEQUENCE : [MAGIC][x]
```

This command sets the terminal in Log mode. All the printable data, transmitted and received, is processed and simultaneously sent to the selected printer device. The data and messages of the status line and the synchronous protocol characters are not printed.

PRINT MODE SET

```
MNEMONIC     : PMS
HEXADECIMAL  : 1B 5B 35 char 70
ASCII        : ESC [ 5 char p
KEY SEQUENCE : [MAGIC]+[E]+[”[”] [5] [char] [p]
```

This command selects the PRINT MODE parameter.

If char is ”0”, PRINT MODE is set to UNPROTECTED ONLY.

If char is ”1”, PRINT MODE is set to ALL.

Any other value of char is ignored.

PRINT REPEATED CHARACTERS

```
MNEMONIC     : PRC
HEXADECIMAL  : 1B 5B 3F NNN CC 70
ASCII        : ESC [ ? NNN CC p
KEY SEQUENCE : none
```

This command causes the character CC to be printed NNN times. If the character CC is unprintable, it will be treated solely as a TIME–FILLER and discarded by the emulator.

PRINTER ADAPTER RESET

```
MNEMONIC     : PRES
HEXADECIMAL  : 1B 5B 32 70
ASCII        : ESC [ 2 p
KEY SEQUENCE :
VT200         [ MAGIC ]+[SELECT]
BDS74XX       [ MAGIC ]+[SELECT]
BDS71XX       [ MAGIC ]+[”2” numeric keypad]
PC–VT100      [ MAGIC2]+[ ”P” ]
```

This command aborts the current report on the printer.

PRINT TRANSPARENT DATA

```
MNEMONIC     : PTD
HEXADECIMAL  : 1B 5B 34 p
ASCII        : ESC [ 4 p
KEY SEQUENCE : none
```

This command redirects data received from host to the current printer device, without altering the data on the video.

Standard Printer Commands Not Present

The following VIP7800 commands are not emulated in the vipemu. These commands are recognized by vipemu but are ignored.

AUXILIARY PORT CONNECT

```
MNEMONIC     : APC
HEXADECIMAL  : 1B 61
ASCII        : ESC a
KEY SEQUENCE : [MAGIC]+[E]+[A]
```

AUXILIARY PORT DISCONNECT

```
MNEMONIC     : APD
HEXADECIMAL  : 1B 62
ASCII        : ESC b
KEY SEQUENCE : [MAGIC]+[E]+[B]
```

AUXILIARY PORT PARALLEL

```
MNEMONIC     : APP
HEXADECIMAL  : 1B 64
ASCII        : ESC d
KEY SEQUENCE : [MAGIC]+[E]+[D]
```

PRINT MULTIPLE COPIES

```
MNEMONIC     : MPC
HEXADECIMAL  : 1B 5B 37 char 70
ASCII        : ESC [ 7 char p
KEY SEQUENCE : [MAGIC]+ [E]+["["]+[7]+[char]+[P]
```

PRINTER TRANSMIT ALL

```
MNEMONIC     : PTA
HEXADECIMAL  : 1B 5B 36 70
ASCII        : ESC [ 6 char p
KEY SEQUENCE : none
```

Non–Standard Printer Command

This section describes printer commands and functions available in VIPEMU, but not found in the standard VIP. The commands are listed in the alphabetical order of their MNEMONIC.

Each description contains:

- The COMMAND NAME and its corresponding MNEMONIC;
- The HEXADECIMAL and ASCII codes for its escape sequence;
- The KEY SEQUENCE to activate it.

PRINT LOGGING DATA

```
MNEMONIC     : PLMS-PLMR-PLAS-PLAR
HEXADECIMAL  : see Printer documentation
ASCII        : see Printer documentation
KEY SEQUENCE : [MAGIC]+[X]
```

This command is used to select, from the keyboard, the following functions:

PRINT LOG ALL SET/RESET

PRINT LOG MODE SET/RESET

From the menu, it is possible to select one of the following options:

Log ascii data — This selects the LOG MODE SET command which transfers all the printable characters coming from the line to the activated printer.

Log all data — This selects the LOG ALL SET command which transfers all the traffic coming from the line to the activated printer. The control characters are expanded to ASCII mnemonics.

Quit log command — This resets the two previous commands.

REDIRECT PRINT DEVICE

```
MNEMONIC     : RPD
HEXADECIMAL  : NONE
ASCII        : NONE
KEY SEQUENCE : [MAGIC]+[R] or [MAGIC1]+[R]
```

This command is used to re–direct the print device to another device or file. The user will be requested to supply the NAME of the new destination.

If the NAME is NUL, the print will be lost.

If the NAME is LPT, the print will be re–directed to the system printer spooler, if there is one.

Any other NAME re–directs the print to the disk–file with that NAME. This command modifies the type of standard device chosen in the configuration. The re–direction remains in force until the command [MAGIC]+[R] is typed again.

It should be noted that the re–direction is transparent to control characters. In the case where NAME is a file, it will contain escape sequences originally destined for the printer.

The above method has the following restrictions:

- The printer spooler must be configured, on the host system.
- If an error occurs, for instance, in writing to a file or the printer goes down, no message is sent to the user.

Appendix D. Keyboards

Keyboards Summary

Keyboard Layout for the BDS74XX

The following is an alphabetical list of the VIP functions and their assignments on the BDS74XX keyboards:

Magic		[Do]
Auto lf (toggle)	[magic]	[Return]
Back tab		[Find]
Break	[magic]	[”B”]
Character mode	[magic]	[”C”]
Clear		[PF4]
Clear reset (RIS)	[magic]	[PF1]
Cursor backward		[Left Arrow]
Cursor down		[Down Arrow]
Cursor forward		[Right Arrow]
Cursor up		[Up Arrow]
Data space home	[magic]	[Prev Screen]
Delete attribute	[magic]	[”D”]
Delete character		[Remove]
Delete line	[magic]	[Remove]
Erase to end of field		[PF3]
Erase to end of page	[magic]	[PF3]
Form mode	[magic]	[”F”]
Function keys F01 - F10		[F06] - [F17]
Function keys F11 - F12		[F18] - [F19]
Function key F13	[magic]	[”Y”]
Function key F14	[magic]	[”U”]
Home	[magic]	[Find]
Insert character (toggle)		[Insert_Here]
Insert line	[magic]	[Insert_Here]
Line feed	[Cntl]	[”J”]

Local (toggle)	[magic]	[”L”]
New line		[Car Return]
Next segment		[Next Screen]
Previous segment		[Prev Screen]
Print data space		[Select]
Printer reset	[magic]	[Select]
Reset		[PF1]
Scroll down	[magic]	[Down arrow]
Scroll up	[magic]	[Up arrow]
Set attribute	[magic]	[”A”]
Shift func. keys F01–F10	[magic]	[F06] – [F17]
Shift func. keys F11–F12	[magic]	[F18] – [F19]
Tab		[Tab]
Tab clear	[magic]	[keypad ”7”]
Tab init	[magic]	[keypad ”8”]
Tab set	[magic]	[keypad ”9”]
Text mode	[magic]	[”T”]
Transmit all	[magic]	[keypad Enter]
Transmit data		[keypad Enter]

Special emulator functions:

Display all	[magic]	[”W”]
Esc stand alone	[magic]	[”E”]
Help		[Help]
Log & log all	[magic]	[”X”]
Printer device redirect	[magic]	[”R”]
Programmable custom keys	[magic]	[”0”..”9”]
Quit terminal emulation	[magic]	[”Q”]
Script process	[magic]	[”V”]
Status line (toggle)		[F20]
UNIX shell	[magic]	[”S”]
VIP setup		[PF2]

Keyboard Layout for the BDS71XX

The following is an alphabetical list of the VIP functions and their assignments on the BDS71XX keyboard:

magic	[PF3]
Auto lf (toggle)	[magic][Return]
Back tab	[shift][Tab]
Break	[magic][”B”]
Character mode	[magic][”C”]
Clear	[shift][PF4]
Clear reset (RIS)	[magic][PF4]
Cursor backward	[Left Arrow]
Cursor down	[Down Arrow]
Cursor forward	[Right Arrow]
Cursor up	[Up Arrow]
Data space home	[magic][home]
Delete attribute	[magic][”D”]
Delete character	[magic][keypad ”8”]
Delete line	[magic][keypad ”5”]
Erase to end of field	[magic][keypad ”9”]
Erase to end of page	[magic][keypad ”6”]
Form mode	[magic][”F”]
Function keys F01 – F10	[F01] – [F10]
Function keys F11 – F12	[PF1] – [PF2]
Function key F13	[magic][”Y”]
Function key F14	[magic][”U”]
Home	[home]
Insert character (toggle)	[magic][keypad ”7”]
Insert line	[magic][keypad ”4”]
Line feed	[Line feed]
Local (toggle)	[magic][”L”]
Next segment	[magic][keypad ”.”]
New line	[Car Return]
Previous segment	[magic][keypad ”3”]
Print data space	[magic][”P”]
Printer device redirection	[magic][”R”]
Printer reset	[magic][keypad ”2”]
Reset	[PF4]
Scroll down	[magic][Down arrow]
Scroll up	[magic][Up arrow]
Set attribute	[magic][”A”]

Shift function keys F01 – F10	[shift][F01] – [F10]
Shift function keys F11 – F12	[shift][PF1] – [PF2]
Tab	[Tab]
Tab clear	[magic][keypad ”–”]
Tab init	[magic][tab]
Tab set	[magic][keypad ”,”]
Text mode	[magic][”T”]
Transmit all	[magic][keypad Enter]
Transmit data	[keypad Enter]

Special emulator functions:

Display all	[magic][”W”]
Esc stand alone	[ESC]
Help	[magic][”H”]
Log & log all	[magic][”X”]
Programmable custom keys	[func][”1”..”0”]
Quit terminal emulation	[magic][”Q”]
Script process	[magic][”V”]
Status line (toggle)	[magic][Right arrow]
UNIX shell	[magic][”S”]
VIP–setup	[magic][keypad ”0”]

Keyboard Layout for the VT100 Emulation

The following is an alphabetical list of the VIP functions and their assignments on the PC keyboard:

magic1	[F1]
magic2	[F2]
Auto lf (toggle)	[magic1][Return]
Back tab	[magic1][Tab]
Break	[magic1][”B”]
Character mode	[magic1][”C”]
Clear	[magic1][End]
Clear reset (RIS)	[magic2][End]
Cursor backward	[Left Arrow]
Cursor down	[Down Arrow]
Cursor forward	[Right Arrow]
Cursor up	[Up Arrow]
Data space home	[magic1][Home]
Delete attribute	[magic1][”D”]
Delete character	[Del]
Delete line	[magic1][Del]
Erase to end of field	[magic1][Right arrow]
Erase to end of page	[magic1][Left arrow]
Form mode	[magic1][”F”]
Function keys F01 - F10	[magic1][”1”..”0”]
Function key F11	[magic1][”-”]
Function key F12	[magic1][”=”]
Function key F13	[magic1][”Y”]
Function key F14	[magic1][”U”]
Home	[Home]
Insert character (toggle)	[Ins]
Insert line	[magic1][Ins]
Line feed	[Cntl][”J”]
Local (toggle)	[magic1][”L”]
New line	[Return]
Next segment	[magic1][PgDn]
Previous segment	[magic1][PgUp]
Print data space	[magic1][”P”]
Printer device redirection	[magic1][”R”]
Printer reset	[magic2][”P”]
Reset	[End]
Scroll down	[PgDn]

Scroll up		[PgUp]
Set attribute	[magic1]	[”A”]
Shift function F01	[magic1]	[”!”]
Shift function F02	[magic1]	[0x40]
Shift function F03	[magic1]	[”#”]
Shift function F04	[magic1]	[”$”]
Shift function F05	[magic1]	[”%”]
Shift function F06	[magic1]	[”^”]
Shift function F07	[magic1]	[”&”]
Shift function F08	[magic1]	[”*”]
Shift function F09	[magic1]	[”(”]
Shift function F10	[magic1]	[”)”]
Shift function F11	[magic1]	[”_”]
Shift function F12	[magic1]	[”+”]
Tab		[Tab]
Tab clear	[magic2]	[Home]
Tab init	[magic2]	[Up arrow]
Tab set	[magic2]	[PgUp]
Text mode	[magic1]	[”T”]
Transmit all	[magic1]	[F4]
Transmit data		[F4]

Special emulator functions:

Display all	[magic1]	[”W”]
ESC stand alone	[magic1]	[”E”]
Help	[magic1]	[”H”]
Log & log all	[magic1]	[”X”]
Programmable custom keys	[magic2]	[”1”..”0”]
Quit terminal emulation	[magic1]	[”Q”]
Script process	[magic1]	[”V”]
Status line (toggle)		[F3]
UNIX shell	[magic1]	[”S”]
Vip Setup	[magic1]	[F3]

Keyboard Layout for Q306 (PC Keyboard) Terminals vt320 Emulation

Following is an alphabetical list of the VIP functions and their assignments on a Q306 keyboard in vt320 emulation:

Magic	[F11]
Auto lf (toggle)	[magic][Return]
Back tab	[Home]
Break	[magic]["B"]
Character mode	[magic]["C"]
Clear	[keypad "-"]
Clear reset (RSI)	[magic][Num Lock]
Cursor backward	[Left Arrow]
Cursor down	[Down Arrow]
Cursor forward	[Right Arrow]
Cursor up	[Up Arrow]
Data space home	[magic][Page Up]
Delete attribute	[magic]["D"]
Delete character	[Delete]
Delete line	[magic][Delete]
Erase to end of field	[keypad "*"]
Erase to end of page	[magic][keypad "*"]
Form mode	[magic]["F"]
Function keys F01-F10	[F01] - [F12]
Function keys F11-F12	Not Applicable
Function key F13	[magic]["Y"]
Function key F14	[magic]["U"]
Home	[magic][Home]
Insert char. (toggle)	[Insert]
Insert line	[magic][Insert]
Line feed	[Cntl]["J"]
Local (toggle)	[magic]["L"]
New line	[Return]
Next segment	[Page Down]
Previous segment	[Page Up]
Print data space	[End]
Printer reset	[magic][End]
Reset	[Num Lock]
Scroll down	[magic][Down Arrow]
Scroll up	[magic][Up Arrow]
Set attribute	[magic]["A"]
Shift funct.keys F01-F10	[magic][F01] - [F12]

Shift funct. key F11–F12	Not Applicable
Tab	[Tab]
Tab clear	[magic][keypad ”7”]
Tab init	[magic][keypad ”8”]
Tab set	[magic][keypad ”9”]
Text mode	[magic][”T”]
Transmit all	[magic][keypad Enter]
Transmit data	[keypad Enter]

Special emulation functions:

Display all	[magic][”W”]
Esc stand alone	[magic][”E”]
Help	[F10]
Log & log all	[magic][”X”]
Printer device redirect	[magic][”R”]
Programmable custom keys	[magic][keypad ”0”..”9”]
Quit terminal emulation	[magic][”Q”]
Script process	[magic][”V”]
UNIX shell	[magic][”S”]
Vip Setup	[keypad ”/”]

Keyboard Layout for Q310 Terminals vt320 Emulation

Following is an alphabetical list of the VIP functions and their assignments on a Q310 keyboard in vt320 emulation:

Magic	[Do]
Auto lf (toggle)	[magic][Return]
Back tab	[Find]
Break	[magic]["B"]
Character mode	[magic]["C"]
Clear	[PF4]
Clear reset (RSI)	[magic][PF1]
Cursor backward	[Left Arrow]
Cursor down	[Down Arrow]
Cursor forward	[Right Arrow]
Cursor up	[Up Arrow]
Data space home	[magic][Prev Screen]
Delete attribute	[magic]["D"]
Delete character	[Delete]
Delete line	[magic][Delete]
Erase to end of field	[PF3]
Erase to end of page	[magic][PF3]
Form mode	[magic]["F"]
Function keys F01–F10	[F06] – [F17]
Function keys F11–F12	[F18] – [F19]
Function key F13	[magic]["Y"]
Function key F14	[magic]["U"]
Home	[magic][Find]
Insert char. (toggle)	[Insert]
Insert line	[magic][Insert]
Line feed	[Cntl]["J"]
Local (toggle)	[magic]["L"]
New line	[Return]
Next segment	[Next Screen]
Previous segment	[Prev Screen]
Print data space	[Select]
Printer reset	[magic][Select]
Reset	[PF4]
Scroll down	[magic][Down Arrow]
Scroll up	[magic][Up arrow]
Set attribute	[magic]["A"]
Shift funct.keys F01–F10	[magic][F06] – [F17]

Shift funct. key F11–F12	[magic][F18] – [F19]
Tab	[Tab]
Tab clear	[magic][keypad ”7”]
Tab init	[magic][keypad ”8”]
Tab set	[magic][keypad ”9”]
Text mode	[magic][”T”]
Transmit all	[magic][keypad Enter]
Transmit data	[keypad Enter]

Special emulation functions:

Display all	[magic][”W”]
Esc stand alone	[magic][”E”]
Help	[Help]
Log & log all	[magic][”X”]
Printer device redirect	[magic][”R”]
Programmable custom keys	[magic][keypad ”0”..”9”]
Quit terminal emulation	[magic][”Q”]
Script process	[magic][”V”]
UNIX shell	[magic][”S”]
Vip Setup	[PF2]

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