

QTERM-B30 USER'S MANUAL

Revision 3

QSI CORPORATION
2212 South West Temple #50
Salt Lake City, Utah 84115-2648
USA

Phone 801-466-8770
Fax 801-466-8792
Email info@qsicorp.com
Web www.qsicorp.com

8311E2 - Printed in USA

© Copyright QSI Corporation 1997 - 2009

QTERM, QTERM-B30, JSETUP, and JDEMO are trademarks of QSI Corporation.

Manual Updated 15 October 2009

FCC COMPLIANCE STATEMENT

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

Any modification to this device (including any changes to the recommended antenna configuration) that are not expressly approved by QSI could void the user's authority to operate this device.

FOREWORD

The QSI Corporation QTERM-B30 is a data-entry terminal for industrial applications. The QTERM-B30 is available with several options; this manual discusses all versions and their operations.

The sections of this manual are:

- Chapter 1 Quick Start.** If you wish to start using your QTERM-B30 immediately, this chapter will show you how to connect to the terminal and how to run the example software.
- Chapter 2 QTERM-B30 Software.** This chapter provides a detailed listing of the QTERM-B30 commands and discusses how to use them.
- Chapter 3 Using JDEMO and JSETUP.** This chapter describes how to use the JDEMO program to demonstrate some of the features of the QTERM-B30, and using the JSETUP program to set basic terminal parameters such as key-click and auto-wrap so that they become permanent power-up defaults.
- Chapter 4 QTERM-B30 Hardware.** This chapter discusses the hardware of the QTERM-B30, including dimensional drawings, interface specifications, connector pin assignments and environmental specifications.
- Appendix A ASCII Chart.** This is a true 7-bit ASCII chart, along with mnemonic definitions.
- Appendix B QTERM-B30 Character Chart.** This is a 256-character chart showing how the QTERM-B30 handles every character it receives. The lower half is similar to, but not the same as, the true ASCII chart in Appendix A.
- Appendix C QTERM-B30 Command Summary.** This is an abbreviated summary of QTERM-B30 software commands.

Please note that throughout this manual the character € represents the ESCAPE character, or ASCII 1Bh.

CONTENTS

CHAPTER 1. QUICK START	1
1.1. Power-on Setup	1
1.2. Connect the Communications Lines	1
1.3. Apply Power	2
1.4. Communicate	2
1.5. Running JDEMO	2
CHAPTER 2. QTERM-B30 SOFTWARE	3
2.1. Operation	3
2.1.1. Handshaking	3
2.1.2. Commands vs Default Parameters	3
2.2. Software Commands	3
2.2.1. Bell (^G) - 07h	4
2.2.2. Backspace (^H) - 08h	4
2.2.3. Horizontal Tab (^I) - 09h	4
2.2.4. Line Feed (^J) - 0Ah	4
2.2.5. Vertical Tab (^K) - 0Bh	4
2.2.6. Form Feed (^L) - 0Ch	4
2.2.7. Carriage Return (^M) - 0Dh	4
2.2.8. XON (^Q) - 11h	5
2.2.9. XOFF (^S) - 13h	5
2.2.10. Delete - 7Fh	5
2.2.11. Cursor Up - € A	5
2.2.12. Cursor Down - € B	5
2.2.13. Cursor Right - € C	5
2.2.14. Cursor Left - € D	5
2.2.15. Clear Screen - € E	5
2.2.16. Cursor Home - € H	5
2.2.17. Set Cursor Position - € I # *	5
2.2.18. Erase to End of Screen - € J	5
2.2.19. Erase to End of Line - € K	5
2.2.20. Set Contrast - € L #	5
2.2.21. Reset Terminal - € M	5
2.2.22. Query Version - € N	5
2.2.23. Buzzer On/Off/Beep - € O #	6
2.2.24. LEDs On/Off - € P #	6
2.2.25. Auto Wrap Mode - € R #	6
2.2.26. Auto Scroll Mode - € S #	6
2.2.27. Auto Line Feed Mode - € T #	7
2.2.28. Backlight On/Off/Toggle - € V #	7
2.2.29. Query Status - € W	7
2.2.30. Query Cursor Position - € X	7
2.2.31. Query Character - € Y	7
2.2.32. Key Click/Repeat Mode - € a #	7
2.2.33. Set Cursor Mode - € b #	7
2.2.34. Set Shift Mode - € c #	7
2.2.35. Save Configuration to EEPROM - € i	7

2.2.36.	Transmit Buffer Flush - € k	7
2.2.37.	XON/XOFF Mode - € l #	8
2.2.38.	User Area Read/Write - € m #	8
2.2.39.	Restore Default Parameters - € r	8
2.2.40.	Verify Manufacturer I.D. Bytes - € u # *	8
2.2.41.	Power-On Setup Mode - € x *	8
2.3.	Default Configuration	8
CHAPTER 3.	USING JDEMO AND JSETUP	11
3.1.	JDEMO	11
3.2.	JSETUP	11
3.2.1.	Setting Parameters	11
3.2.2.	Using JSETUP to Change Parameters	11
3.2.3.	Modifying the Data File	11
3.2.4.	Running JSETUP	11
CHAPTER 4.	QTERM-B30 HARDWARE	13
4.1.	QTERM-B30 Terminal	13
4.2.	Interfaces	13
4.2.1.	EIA-232 Interface	13
4.2.2.	EIA-422 Interface	14
4.3.	LCD Display	14
4.4.	Keypad	14
4.5.	Keypad Backlight	14
4.6.	LEDs	14
4.7.	Buzzer	15
4.8.	Voltage Regulator	15
4.9.	QTERM-B30 Specifications	15
APPENDIX A.	ASCII CHART	17
APPENDIX B.	QTERM-B30 CHARACTER CHART	19
APPENDIX C.	QTERM-B30 COMMAND SUMMARY	21

Chapter 1.

QUICK START

There are only four steps required to communicate with the QTERM-B30:

- use *Power-on Setup* to set the display contrast, baud rate, and data format
- connect to your host transmit, receive and ground lines
- apply power
- transmit and receive with the QTERM-B30

1.1. Power-on Setup

The *Power-on Setup* procedure is used to configure the QTERM-B30's display contrast, baud rate and data format. You use three different QTERM-B30 keys to do this configuration (Figure 1-1):

- '1' - this is the *up* key
- '2' - this is the *down* key
- '3' - this is the *enter* key

To perform the *Power-on Setup* follow these steps:

- Disconnect the power supply to the QTERM-B30.
- Hold down any key and apply power to the QTERM-B30 (you do not need to connect the transmit and receive lines).
- The version of software in the QTERM-B30 will be displayed for a few seconds, after which you can adjust the display contrast.
- Set the desired display contrast using the *up* and *down* keys. When the display is at a contrast you like, press the *enter* key.
- Set the desired baud rate using the *up* and *down* keys. When the desired baud rate is displayed, press the *enter* key.
- Set the desired data format using the *up* and *down* keys. When the desired data format is displayed, press

the *enter* key.

1.2. Connect the Communications Lines

The EIA-232 device has one transmit and one receive line, while the EIA-422 device has two transmit and two receive lines.

Figure 1-1 shows the connector pin assignments for the QTERM-B30; Table 1-1 lists the pin assignments. The receive and transmit directions shown in the table are with respect to the QTERM-B30. Refer to this figure or table to connect your host communications lines to the correct pins.

(If you are using an IBM-style PC, you cannot connect an EIA-422 QTERM-B30 directly to the computer's COM port; you must provide an interface device.)

1.3. Apply Power

Table 1-1 shows the pin assignments for the power and ground lines. Connect your DC power supply to the

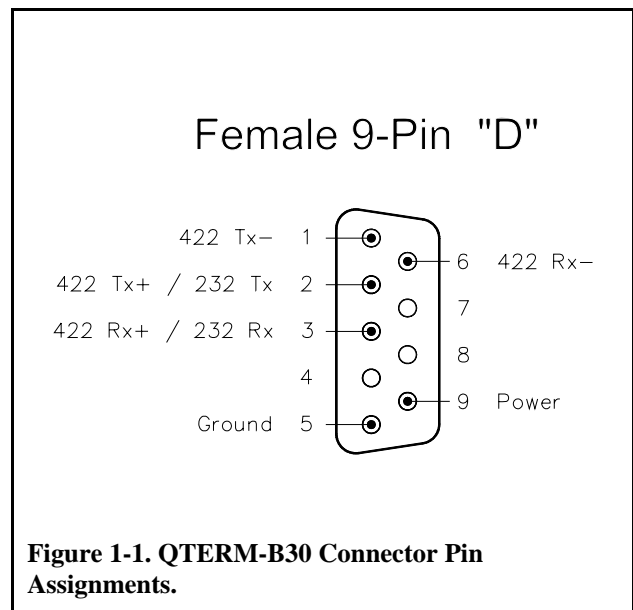


Table 1-1. QTERM-B30 Pin Assignments.

9-pin "D"	QTERM-B30 EIA-232 Function	QTERM-B30 EIA-422 Function
1	no connection	-transmit
2	transmit	+transmit
3	receive	+receive
4	no connection	no connection
5	ground	ground
6	no connection	-receive
7	no connection	no connection
8	no connection	no connection
9	power	power

appropriate two pins.

WARNING: Power supplied to the QTERM-B30 must be from an SELV power source, and should have a current limit on its output of 5 Amperes. If you did not order the regulator option, the supply to the QTERM-B30 must provide a minimum of 4.75 volts DC and be limited to a maximum of 5.25 volts DC. If you did order the regulator option, the supply to the QTERM-B30 must provide a minimum of 7.5 volts DC and be limited to a maximum of 24 volts DC. Limiting may be inherent to the supply, or may be provided by supplementary overcurrent devices.



If the QTERM-B30 does not respond, or exhibits abnormal behavior on power up, disconnect power and contact QSI for technical support.

1.4. Communicate

At this point, characters which are transmitted by the host will be displayed on the QTERM-B30 display. If you press keys on the keypad, the QTERM-B30 will transmit the

appropriate codes to the host computer. Any software commands sent by the host will be processed by the QTERM-B30.

1.5. Running JDEMO

To demonstrate some of the features of the QTERM-B30, run the JDEMO program that is included with this manual:

- Connect your QTERM-B30 to the serial COM port on an IBM-style PC. (If you have an EIA-422 QTERM, you will need to provide an interface unit such as QSI's QCOM-2; *you cannot directly connect an EIA-422 QTERM to the COM port on an IBM-style computer!*)
- Copy the file JDEMO.EXE to your hard disk.
- Apply power to the QTERM-B30
- Run the JDEMO program.
- Follow the on-screen instructions to demonstrate the use of some of the features of the QTERM-B30 terminal.

JDEMO will allow you to exercise many of the features of the QTERM-B30. It includes a terminal emulator so that you can also communicate directly with the terminal.

Chapter 2.

QTERM-B30 SOFTWARE

2.1. Operation

The operation of the QTERM-B30 is quite simple:

- Power is applied to the QTERM-B30.
- Commands or data can be transmitted to the QTERM-B30. Commands are executed as required; data is displayed.
- When a key is pressed, the QTERM-B30 transmits the appropriate character to the host.

The QTERM-B30 has many additional capabilities which are accessed using software commands from the host which are described in this chapter.

2.1.1. Handshaking

The QTERM-B30 has buffers for both receiving and transmitting characters. However, these buffers may not be large enough for some applications. If this is the case for your application, then your host must use XON / XOFF handshaking to make optimal use of the QTERM-B30's capabilities.

The QTERM-B30's transmit buffer (20 bytes long) is used when a host does not wish to receive characters for a period of time. The host sends an XOFF character to the QTERM-B30 (13h). The QTERM-B30 starts placing characters into the transmit buffer rather than transmitting them. When the host is ready to receive characters, it sends an XON character (11h), at which time the QTERM-B30 will start transmitting the characters in the buffer.

The QTERM-B30's receive buffer is large enough to accept a maximum of 32 characters or software commands. However, some operations can take a longer time to execute, such as scrolling the entire screen up one line. In this case, the QTERM-B30 will send an XOFF to the host when it has only eight bytes empty in its buffer. When it has processed input data to the point that the buffer only has eight bytes used, it will send an XON, and the host can resume transmitting.

XON/XOFF handshaking can also be disabled (by software command) if you do not wish to use it. However, if you do not use handshaking, you must take extra care that you do not overrun the QTERM-B30's receive buffer. The two easiest ways to do this are to use a slower baud rate (which gives the QTERM-B30 more time to process each byte), or add delays to your code after each write to the QTERM-B30.

2.1.2. Commands vs Default Parameters

There are numerous parameters which can be changed by software commands. For example, key repeat can be disabled by the *Key Repeat/Click On/Off* command. Once a parameter has been changed by a software command, it does not get stored in EEPROM; therefore, when power is turned off, the new value is lost and when the terminal is turned on again, the default parameter value is re-loaded.

If you wish to have the parameter value permanently stored and used at power up, you can use the *Save Configuration to EEPROM* command. This saves all currently-set parameters to the EEPROM, which makes them the current power-on defaults. If you wish to return to the factory-default settings for all parameters, you can use the *Restore Factory Defaults* command. This will reset all parameters (except baud rate and data format) to a pre-defined default value, and also store these values in EEPROM as the current power-on defaults.

2.2. Software Commands

Once you have your host communicating with your QTERM-B30, you can program your host to control the QTERM-B30 using software commands.

Table 2-1 lists the commands available. Each command is discussed in detail below, and a command summary, including execution times, is given in Appendix C.

The notation € in this chapter always means the one-byte ASCII escape character (1Bh = 27 decimal).

2.2.1. Bell (^G) - 07h

This causes the buzzer to beep for one-half second. Note that sending this command is identical to sending the *Buzzer*

Table 2-1. QTERM-B30 Software Commands.

Command	Code	Command	Code
Bell (^G)	07h	Query Version	⌘ N
Backspace (^H)	08h	Buzzer On/Off/Beep	⌘ O..
Horizontal Tab (^I)	09h	LEDs On/Off	⌘ P..
Line Feed (^J)	0Ah	Auto Wrap Mode	⌘ R..
Vertical Tab (^K)	0Bh	Auto Scroll Mode	⌘ S..
Form Feed (^L)	0Ch	Auto Line Feed Mode	⌘ T..
Carriage Return (^M)	0Dh	Backlight On/Off/Toggle	⌘ V..
XON (DC1 or ^Q)	11h	Query Status	⌘ W
XOFF (DC3 or ^S)	13h	Query Cursor Position	⌘ X
Delete	7Fh	Query Character	⌘ Y
Cursor Up	⌘ A	Key Repeat/Click Mode	⌘ a..
Cursor Down	⌘ B	Set Cursor Mode	⌘ b..
Cursor Right	⌘ C	Set Shift Mode	⌘ c..
Cursor Left	⌘ D	Save Config to EEPROM	⌘ i
Clear Screen	⌘ E	Transmit Buffer Flush	⌘ k
Cursor Home	⌘ H	XON/XOFF Mode	⌘ l..
Set Cursor Position	⌘ I..	User Area Read/Write	⌘ m..
Erase to End of Screen	⌘ J	Restore Default Parameters	⌘ r
Erase to End of Line	⌘ K	Verify Manufacturer I.D. Bytes	⌘ u..
Set Contrast	⌘ L..	Power-On Setup Mode	⌘ x..
Reset Terminal	⌘ M		

On/Off/Beep command (ESC O B).

2.2.2. Backspace (^H) - 08h

Causes a non-destructive backspace, i.e., characters are not erased as the cursor is backspaced over them. With auto wrap mode off, the backspace stops at the left edge of the current display line. With auto wrap mode on, the cursor will wrap to the last position on the previous line. The command is ignored if the cursor is at the home position. See also the *Delete* command (7Fh).

2.2.3. Horizontal Tab (^I) - 09h

Moves the cursor right to the next tab column. The tab spacing is every four columns.

With auto wrap on, the cursor will wrap down to the first column in the line below when it is tabbed beyond the last

column in the current line. If auto wrap is off, the cursor will stop at the end of the current line. If auto scroll and auto wrap are both on, then the display will scroll up as the cursor is tabbed beyond the last column in the last line.

2.2.4. Line Feed (^J) - 0Ah

Moves the cursor down one line without changing its

horizontal position. When auto scroll mode is on and a line feed is performed on the last line, the display will scroll up with the horizontal cursor position unaltered.

2.2.5. Vertical Tab (^K) - 0Bh

Performs the same function as *Line Feed*.

2.2.6. Form Feed (^L) - 0Ch

Performs the same function as *Line Feed*.

2.2.7. Carriage Return (^M) - 0Dh

Moves the cursor to left edge of the display on the current line. If auto line feed mode is on, then the cursor moves to the left edge of the next line. If auto scroll and auto line feed

are both on, a carriage return on the last line will cause the display to scroll up and the cursor to be positioned at the left edge of the last line.

2.2.8. XON (^Q) - 11h

Enables the QTERM-B30 to transmit keys pushed after receiving an XOFF. XON is used to re-enable QTERM-B30 transmission after an XOFF has disabled it, allowing

handshaking with the host system.

2.2.9. XOFF (^S) - 13h

Disables all QTERM-B30 transmission except for information requested via the *Query Status* command (ESC W). After receiving an XOFF command, the QTERM-B30 stores characters typed on the keypad in a transmit buffer. These characters will be transmitted when an XON is received. If the buffer becomes full before an XON is received, additional characters which are typed will be ignored.

2.2.10. Delete - 7Fh

Delete works in the same way as *Backspace* (08h, ^H), except that characters are erased as the cursor moves over them.

2.2.11. Cursor Up - € A

Moves the cursor up one line without changing its horizontal position. Has no effect if the cursor is on the first line.

2.2.12. Cursor Down - € B

Moves the cursor down one line without changing its horizontal position. Has no effect if the cursor is on the last line.

2.2.13. Cursor Right - € C

Moves the cursor right one space without changing its vertical position. Has no effect if the cursor is at the right-most position on the current line.

2.2.14. Cursor Left - € D

Moves the cursor left one space without changing its vertical position. Has no effect if the cursor is at the left-most position on the current line.

2.2.15. Clear Screen - € E

Clears the display and moves the display cursor to home (the left-most position in the top line of the display).

2.2.16. Cursor Home - € H

Moves the cursor to the home (top left) position on the display.

2.2.17. Set Cursor Position - € I # *

Positions the cursor to the specified location. The command has the form € I # *, where # sets the row and * sets the column. For example, the string:

€ I B D

sets the cursor to row 2 (third row) and column 4 (fifth column). See Table 2-2 for a complete list of valid codes and cursor positions. (Note that rows are numbered 0 to 3, starting at the top, and columns are numbered 0 to 39, starting at the left.)

2.2.18. Erase to End of Screen - € J

Erases from the current cursor position to the end of the screen. The cursor position is unchanged.

2.2.19. Erase to End of Line - € K

Erases all displayed characters from the current cursor position to the end of the line. The cursor position is unchanged.

2.2.20. Set Contrast - € L

This command sets the display contrast. It has the form € L #, where # is in the range of 40h to 7Fh ('@' to DEL). The smaller the ASCII value of the character, the lower the contrast. The higher the ASCII value of the character, the higher the contrast.

2.2.21. Reset Terminal - € M

Resets the QTERM-B30 to its power-up state. This includes clearing all input and output buffers and the display, and resetting all parameters to the default configuration.

2.2.22. Query Version - € N

This tells the QTERM-B30 to transmit its software version to the host. The version will consist of four ASCII characters in the format vx.y, where x and y are single ASCII digits.

2.2.23. Buzzer On/Off/Beep - € O

This command controls the buzzer. It has the form € O #, where # is:

- @ - turn buzzer off
- A - turn buzzer on
- B - beep for ½ second

The fixed duration beep command (ESC O B) is identical to

sending a *Bell* command (07h, ^G).

2.2.24. LEDs On/Off - ⌘ P

This controls the LEDs on the front panel. These LEDs are numbered 1-4 from left to right. LED1 is colored red, and LEDs 2-4 are green. Any of these LEDs can be set to on or off. Optionally, LED1 (the red one) can be hard-wired to the power supply to be used as a power-on indicator.

The valid values for # are:

@ -turn LED1 off
 A -turn LED2 off
 B -turn LED3 off
 C -turn LED4 off
 H -turn LED1 on
 I -turn LED2 on
 J -turn LED3 on
 K -turn LED4 on

2.2.25. Auto Wrap Mode - ⌘ R

The auto wrap mode determines what happens when the cursor moves past the end of a line. With auto wrap off, the cursor stays at the last position in the line. With auto wrap on, the cursor moves down to the first position in the next line.

If the cursor moves past the end of the last line, and auto wrap is on, then the action depends on the auto scroll mode. If auto scroll is off, the cursor will wrap to the first position of the line, but the display will not scroll. Otherwise, the display will scroll, and the cursor will return to the first position in the last line.

Valid values for # are:

@ - auto wrap off
 A - auto wrap on

2.2.26. Auto Scroll Mode - ⌘ S

Auto scroll mode determines what happens when the cursor moves past the end of the last line. With auto scroll off, the cursor will stay in the last position. With auto scroll on, the display scrolls (i.e. every lines moves up, and the last line becomes blank), and the cursor moves to the first position in the last line.

Valid values for # are:

@ - auto scroll off
 A - auto scroll on

2.2.27. Auto Line Feed Mode - ⌘ T

Table 2-2. Cursor Position and Query Status Characters.

ASCII Char	Hex Value	Decimal Value	Query & Set Cursor Position (row col)		Query Status (chars)
-----	-----	-----	----	----	-----
@	40h	64	0	0	0
A	41h	65	1	1	1
B	42h	66	2	2	2
C	43h	67	3	3	3
D	44h	68		4	4
E	45h	69		5	5
F	46h	70		6	6
G	47h	71		7	7
H	48h	72		8	8
I	49h	73		9	9
J	4Ah	74		10	10
K	4Bh	75		11	11
L	4Ch	76		12	12
M	4Dh	77		13	13
N	4Eh	78		14	14
O	4Fh	79		15	15
P	50h	80		16	16
Q	51h	81		17	17
R	52h	82		18	18
S	53h	83		19	19
T	54h	84		20	20
U	55h	85		21	
V	56h	86		22	
W	57h	87		23	
X	58h	88		24	
Y	59h	89		25	
Z	5Ah	90		26	
[	5Bh	91		27	
\	5Ch	92		28	
]	5Dh	93		29	
^	5Eh	94		30	
␣	5Fh	95		31	
␣	60h	96		32	
a	61h	97		33	
b	62h	98		34	
c	63h	99		35	
d	64h	100		36	
e	65h	101		37	

With auto line feed off, when a carriage return is received the cursor returns to the first position in the current line. With auto line feed on, the cursor moves to the first position in the next line, i.e. it acts as if both a carriage return and a linefeed had been received.

Valid values for # are:

@ - auto line feed off
 A - auto line feed on

2.2.28. Backlight On/Off/Toggle - ⌘ V

This command turns the backlight on and off. Valid values for # are:

- @ - backlight off
- A - backlight on
- B - backlight toggle

2.2.29. Query Status - € W

The Query Status command (€ W) returns a character indicating the number of characters presently in the QTERM-B30 transmit buffer (0 to 20). Table 2-2 shows what character is returned for each number of characters in the transmit buffer.

2.2.30. Query Cursor Position - € X

Returns the cursor position as two ASCII characters. These two characters are defined in the same way as for the *Set Cursor Position* (€ I) command. See Table 2-2 for a detailed listing.

2.2.31. Query Character - € Y

Returns the character value for the character at the current cursor position.

2.2.32. Key Click/Repeat Mode - € a

This selectively enables and disables both key repeat and key click. Valid values for # are:

- @ - click off, repeat off
- A - click off, repeat on
- B - click on, repeat off
- C - click on, repeat on

Key clicks are 50 ms long; the key repeat rate is ten per second.

2.2.33. Set Cursor Mode - € b

The QTERM-B30 cursor can be an underline cursor, a block cursor, neither or both. When neither is selected, no cursor is visible to the user. Valid values for # are:

- @ - block off, underline off (no cursor)
- A - block off, underline on
- B - block on, underline off
- C - block on, underline on

2.2.34. Set Shift Mode - € c

The shift key on the QTERM-B30 can operate in one of two ways:

- FUNCTION MODE, where the shift key stays shifted for one additional key press only
- LOCK MODE, where the shift key stays shifted until it is pressed a second time

To indicate shift status, the cursor will change to a blinking block when shifted, and go back to current cursor status when not shifted. For either mode, this indicator can be enabled or disabled, and, if enabled, properly reflects the state of the shift key. Valid values for # are:

- @ - function mode, shift indicator enabled
- A - lock mode, shift indicator enabled
- B - function mode, shift indicator disabled
- C - lock mode, shift indicator disabled

Note that the shift indicator does not affect the shift operation itself, only the status indicator. Also note that any time you are using the blinking block cursor, the shift indicator will not be available.

2.2.35. Save Configuration to EEPROM - € i

This command causes all parameter values to be stored to EEPROM. Any existing parameter values in the EEPROM will be overwritten.

2.2.36. Transmit Buffer Flush - € k

If the host has transmitted an XOFF to the QTERM-B30, and the user has pressed any keys, this command will clear the buffer, so that when the host sends XON to the QTERM-B30, there will be nothing in the buffer for the QTERM-B30 to transmit to the host.

2.2.37. XON/XOFF Mode - € l

This command enables or disables the XON/XOFF operation of the QTERM-B30. The valid values for # are:

- @ - disable XON/XOFF operation
- A - enable XON/XOFF operation

If you disable XON/XOFF operation, then any keys pressed by the user will be sent to the host immediately. If the host sends data fast enough to the QTERM-B30 to fill up the receive buffer, additional characters will be ignored.

2.2.38. User Area Read/Write - € m

This command allows you to store your own information (such as serial numbers or parameters) in the QTERM nonvolatile EEPROM, then later read them from the terminal. There are two valid values for #:

@ - read user data
A - write user data (followed by data)

The QTERM-B30 can store a maximum of 16 bytes in the user data area.

READ DATA: if # = '@', the QTERM will transmit the data in the user area to the host in the following format:

. . . .

where # is a character in the range of 40h to 50h, and indicates that 0 to 16 bytes of user data will follow, and '. . . .' is the corresponding number of user bytes. These bytes will be exactly what was originally stored, so they may be any 8-bit value. If # = '@' (0 bytes to follow), then there was no data stored in the user area.

WRITE DATA: to write user data, use the format:

€ m A #

where # is in the range of 41h to 50h ('A' to 'P'), and indicates that from 1 to 16 bytes of data are to follow, and '. . . .' are the data bytes to be stored. These data bytes may be any 8-bit value.

After the entire string has been received, the QTERM will respond by transmitting one character to the host:

06h - Acknowledge character (ACK), data stored properly
15h - Negative Acknowledge character (NAK), data not stored

The only reason that the data would not be stored properly is if there was a hardware failure.

2.2.39. Restore Default Parameters - € r

This command will load a set of factory-default values for all parameters (except baud rate and data format) into memory, and write them to EEPROM making them the current power-up settings (see section 2.3 for a list of the factory defaults).

2.2.40. Verify Manufacturer I.D. Bytes - € u # *

This command is used to verify a set of identification bytes which are pre-programmed into the terminal at the factory. # and * can be any two bytes. When ordering a QTERM-B30 from the factory, the customer is given the option to use this feature and will be assigned a two byte identification code. When this command is sent, along with two bytes, the terminal will compare them to its internally stored byte pair, and respond with one of the following:

06h - Acknowledge character (ACK), I.D. bytes match.
15h - Negative Acknowledge character (NAK), I.D. bytes do not match.

2.2.41. Power-On Setup Mode - € x *

This command can be used to enable or disable the power-on setup feature. In some cases, it may be desirable to disable the power-on setup in order to protect the current baud rate and data format settings from being changed by the user. Valid values for # are:

@ -fully enable power-on setup
A -Allow contrast adjustment, but do not allow baud rate and data format adjustment.
B -disable entire power-on setup

2.3. Default Configuration

The default configuration of the QTERM-B30 is as follows:

- operates at 9600 baud, 8 data bits, 1 stop bit, no parity
- key click is on
- key repeat is enabled
- cursor is a line
- XON/XOFF is enabled
- power-on setup is fully enabled
- shift mode is "lock"
- backlight is off
- shift indicator is enabled

- contrast is set to optimal for a 90° viewing angle
- auto wrap is on
- auto scroll is on
- auto line feed is on

Chapter 3.

USING JDEMO AND JSETUP

3.1. JDEMO

On the disk that accompanies this manual, you will find a file called JDEMO.EXE. This program will demonstrate some of the features of the QTERM-B30. When you execute this file, your QTERM-B30 should be connected to a COM port on your PC. JDEMO will display a list of COM ports so that you can specify which COM port you are using. Then you will select the baud rate and data format the same way. Once you are done with the setup menus, then JDEMO will display a menu of the features that can be demonstrated.

3.2. JSETUP

3.2.1. Setting Parameters

There are two different ways to change the parameters of your QTERM-B30 and make them permanent.

You can send software commands as described in chapter 2, and then save the setting to EEPROM using the *Save Parameters to EEPROM* command (€ i).

You can store the commands necessary to change the parameters in a data file and load the data file into the terminal using JSETUP. The rest of this chapter deals with using JSETUP to configure your terminal.

3.2.2. Using JSETUP to Change Parameters

JSETUP is a program that is included with this manual on a PC-compatible disk. With JSETUP it is possible to change some of the terminal parameters and use the new values as the power-up default values. JSETUP works by reading the parameter values from an ASCII text file; this file's extension must be ".DAT".

A default example of this data file, called CONFIG.DAT, is included with JSETUP on the floppy disk. This file contains some ASCII strings that will be sent to the terminal which are actually software commands. These commands can be edited before running JSETUP to allow you to set some parameter values of the terminal.

3.2.3. Modifying the Data File

Using a standard DOS text file editor, you can edit the

CONFIG.DAT file. You can also change the name of the file as long as it retains the .DAT extension. Any line beginning with a semi-colon will be ignored as a comment. Each line in the data file will be sent to the terminal exactly as it is typed with the following exceptions:

The € character is represented by <esc>.

Any hex value can be sent using the brackets to enclose the value, such as <x0D> for a carriage return.

When you are done editing the data file, save it to disk.

3.2.4. Running JSETUP

To run JSETUP, first you must connect your terminal to your PC's COM port and supply power to it. If you do not have an EIA-232 QTERM-B30, you will need an interface unit. See Chapter 1 for more information on powering your terminal and communicating with it.

When you are ready to configure your terminal, run the JSETUP.EXE program. You will have the option to select the COM port to which your terminal is connected, as well as the baud rate and data format if needed.

When you select the upload option, JSETUP will ask you for the file name of the data file you wish to use. Type in the filename but do not type the ".DAT" extension. JSETUP will then read the text from the data file and send it to the terminal. When JSETUP is done, you will return to the main menu. At this point your terminal is done being configured, and you can exit the program.

If the very last command in your data file is the <esc>i command, then the settings that were programmed into the terminal will now remain as the new defaults every time the terminal is powered up. If you wish to restore the terminal to its original factory default configuration, you can issue the *Restore Factory Defaults* software command (€ r). This will return all the parameters to the original factory default *except* for baud rate and data format.

Chapter 4.

QTERM-B30 HARDWARE

4.1. QTERM-B30 Terminal

The dimensions of the QTERM-B30 terminal are shown in Figure 4-1. This figure also shows the standard keypad legend for the keys.

The housing is cast from aluminum, and is coated with a durable black powder coat paint. The housing is not waterproof, but it can be subjected to moderate rain or splash without harm.

The QTERM-B30 terminal uses a 9-pin “D” connector, exiting from the rear of the housing (Figure 4-2). The pin assignments for the connector for each of the available interfaces are shown in Table 4-1. Figure 4-2 shows the location of the connector on the QTERM-B30. For reference, Table 4-4 (at the end of this chapter) shows the

pin assignments used by the COM ports on PC-style computers for both 25-pin and 9-pin “D” connectors.

4.2. Interfaces

4.2.1. EIA-232 Interface

With proper cables and good grounding, the EIA-232 interface on the QTERM-B30 can communicate up to about 15 metres.

The QTERM-B30 does not monitor or control any of the EIA-232 modem-control lines (such as RTS and DTS). Handshaking between the host and the QTERM-B30 is done using software XON/XOFF commands. The XON/XOFF operation can be disabled (via software commands) if you do not wish to have it operate.

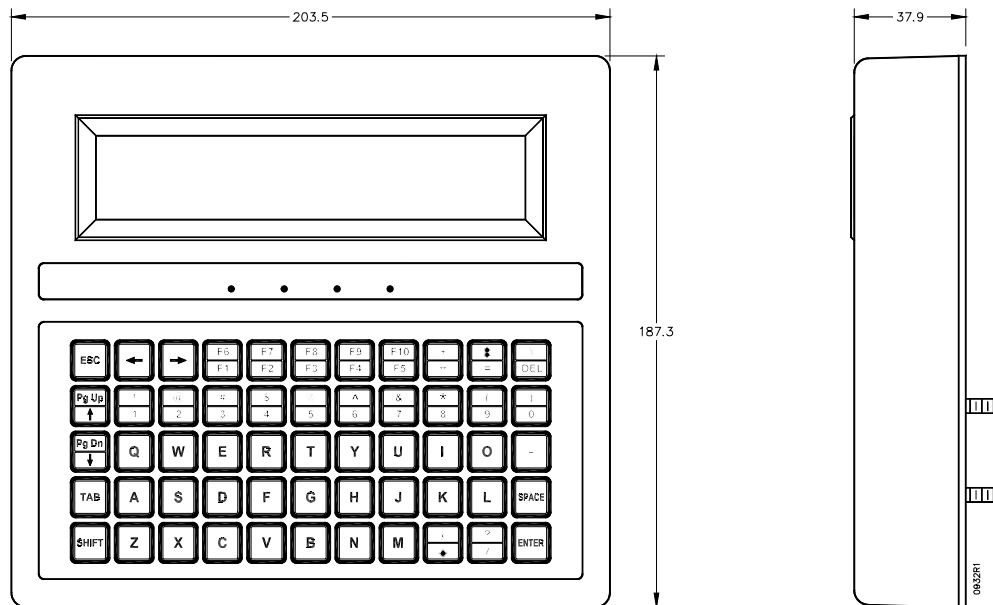


Figure 4-1. Dimensions of the QTERM-B30.

4.2.2. EIA-422 Interface

With proper cables and grounding, the EIA-422 interface can communicate up to a distance of about 1,000 meters. The EIA-422 version of the QTERM-B30 uses four communication lines and two power lines.

4.3. LCD Display

The QTERM-B30 display is a 4-line by 40-character super-twist backlit LCD unit. The entire 128-byte ASCII character set can be displayed. Hosts which transmit 8-bit data can also display an additional 64 characters including Greek letters, katakana characters, non-English alphabetic characters and math symbols.

Appendix B is a chart which shows what the QTERM-B30 does with every possible 8-bit value it can receive. Note that the ASCII portion of the chart (the first 128 characters) is similar, *but not identical*, to the true ASCII chart shown in Appendix A.

4.4. Keypad

The QTERM-B30 comes with a 55-key membrane keypad utilizing poly-dome keys for long life and tactile feedback to the operator. When each key is pressed, the QTERM-B30 will send one or two ASCII characters through the serial interface. Function keys such as F1-F10 and the arrow keys do not have an ASCII printable equivalent, so instead they will send a function code (01h), followed by the key value. Table 4-3 lists the values assigned to each key which has a special non-printable equivalent.

Software commands allow you to control both key clicks (on or off) and key repeat (on or off).

4.5. Keypad Backlight

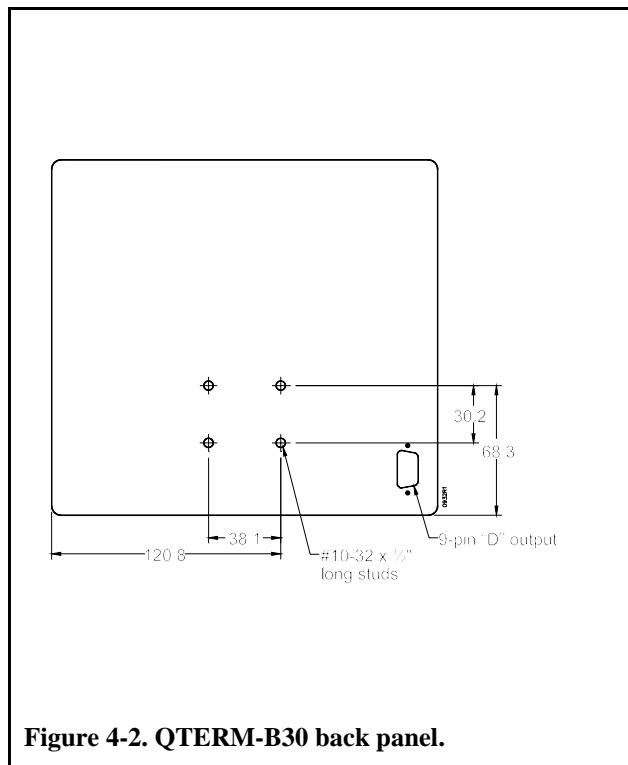


Figure 4-2. QTERM-B30 back panel.

The QTERM-B30 keypad comes with an optional keypad backlight which consists of a mat of optical fibers. This backlight uses high-brightness LEDs, which are software controlled and activated simultaneously with the LCD display backlight.

4.6. LEDs

The QTERM-B30 has four LEDs on the front which shine through holes in a black overlay. This allows the customer

to specify a custom logo and LED labels to be printed by QSI before the unit is shipped to the customer. There are three green LEDs and one red LED. These LEDs are

Table 4-1. QTERM-B30 Pin Assignments.

9-pin "D"	QTERM-B30 EIA-232 Function	QTERM-B30 EIA-422 Function
1	no connection	-transmit
2	transmit	+transmit
3	receive	+receive
5	ground	ground
6	no connection	-receive

software controlled (i.e., they can be turned on and off by the host computer). The red LED can also be modified to be used as an actual power indicator (contact QSI for more information on this modification).

4.7. Buzzer

The QTERM-B30 includes an audio buzzer which is used for key clicks, and for beeping in response to a “bell” character (^G, 07h).

4.8. Voltage Regulator

The standard QTERM-B30 requires a 5-volt regulated power source. An optional regulator allows the QTERM-B30 to be operated from a 7.5-volt to 24-volt DC source.

4.9. QTERM-B30 Specifications

Environmental characteristics of the QTERM-B30 are:

- +0 to +50 °C operating temperature range
- -40 to +85 °C storage temperature range
- 0 to 95% non-condensing humidity range

Table 4-2. QTERM-B30 Current Consumption (mA).

Version	Ireg
EIA-232 version	30
EIA-422 version	25
Add for backlight	150
Add for regulator	6

Table 4-3. Key Assignments.

Key	ASCII Codes	Key	ASCII Codes	Key	ASCII Codes
ESC	1Bh	DEL	7Fh	F4	01h, 3Eh
LEFT	01h, 4Bh	TAB	09h	F5	01h, 3Fh
RIGHT	01h, 4Dh	SPACE	20h	F6	01h, 40h
UP	01h, 48h	ENTER	0Dh	F7	01h, 41h
DOWN	01h, 50h	F1	01h, 3Bh	F8	01h, 42h
Pg-Up	01h, 49h	F2	01h, 3Ch	F9	01h, 43h
Pg-Dn	01h, 51h	F3	01h, 3Dh	F10	01h, 44h

Table 4-4. Pin assignments for PC-Style COM Ports.

COM Ports with Male
25-Pin "D" Connectors

Pin	Function
2	PC transmit
3	PC receive
5	CTS *
6	DSR *
7	ground
8	CD *
22	RI *

COM Ports with Male
9-pin "D" Connectors

Pin	Function
1	CD *
2	PC receive
3	PC transmit
5	ground
6	DSR *
8	CTS *
9	RI *

* - These lines normally can be left unconnected. Some PCs may require that one or more of them be pulled to 5 volts through a pullup resistor (about 300 ohms).

APPENDIX A.

ASCII CHART

		Most Significant Digit (hex)							
		0	1	2	3	4	5	6	7
Least Significant Digit (hex)	0	NUL	DLE	SP	0	@	P	`	p
	1	SOH	DC1	!	1	A	Q	a	q
	2	STX	DC2	"	2	B	R	b	r
	3	ETX	DC3	#	3	C	S	c	s
	4	EOT	DC4	\$	4	D	T	d	t
	5	ENQ	NAK	%	5	E	U	e	u
	6	ACK	SYN	&	6	F	V	f	v
	7	BEL	ETB	'	7	G	W	g	w
	8	BS	CAN	(	8	H	X	h	x
	9	HT	EM	)	9	I	Y	i	y
	A	LF	SUB	*	:	J	Z	j	z
	B	VT	ESC	+	;	K	[	k	{
	C	FF	FS	,	<	L	\	l	|
	D	CR	GS	-	=	M	]	m	}
	E	SO	RS	.	>	N	^	n	~
	F	SI	US	/	?	O	_	o	DEL

NUL = blank
 SOH = start of header
 STX = start of text
 ETX = end of text
 EOT = end of transmission
 ENQ = enquiry
 ACK = acknowledge
 BEL = bell
 BS = backspace
 HT = horizontal tab
 LF = line feed
 VT = vertical tab
 FF = form feed
 CR = carriage return
 SO = shift out
 SI = shift in
 SP = space
 DLE = data link escape
 DC1 = device control 1 (XON)
 DC2 = device control 2
 DC3 = device control 3 (XOFF)
 DC4 = device control 4
 NAK = negative acknowledge
 SYN = synchronization
 ETB = end of text block
 CAN = cancel
 EM = end of medium
 SUB = substitute
 ESC = escape
 FS = file separator
 GS = group separator
 RS = record separator
 US = unit separator
 DEL = delete/rubout

APPENDIX B.

QTERM-B30 CHARACTER CHART

The chart on the next page shows how the QTERM-B30 responds to each of the 256 possible values of characters which it can receive.

Where a dot pattern is shown, sending the corresponding code will cause the QTERM-B30 to display the dot pattern at the current cursor location.

Numbers in circles refer to these notes:

These bytes are always ignored.

This is a space character

Other notations in the chart are:

BEL	bell (beep) command
BS	backspace
HT	horizontal tab
LF	line feed
CR	carriage return
XON	XON character
XOFF	XOFF character
ESC	escape character
DEL	delete character

Note that, although the left half of this chart is similar to the ASCII chart in Appendix A, there are differences.

		Most Significant Digit (hex)															
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Least Significant Digit (hex)	0	①	①	②	0	a	P	`	P	①	①	②	—	9	3	0	p
	1	①	XON	!	1	A	Q	a	9	①	①	u	7	*	4	ä	q
	2	①	①	"	2	B	R	b	r	①	①	r	イ	ツ	×	ß	0
	3	①	XOFF	#	3	C	S	c	s	①	①	J	ウ	チ	€	8	0
	4	①	①	\$	4	D	T	d	t	①	①	\	I	ト	ハ	μ	0
	5	①	①	%	5	E	U	e	u	①	①	•	オ	ナ	1	0	Ü
	6	①	①	&	6	F	V	f	v	①	①	ヲ	カ	ニ	ヨ	ρ	Σ
	7	BEL	①	'	7	G	W	g	w	①	①	7	†	ヌ	ラ	q	π
	8	BS	①	(	8	H	X	h	x	①	①	イ	ウ	*	リ	γ	Σ
	9	HT	①	)	9	I	Y	i	y	①	①	0	ケ	ル	ル	ˆ	u
	A	LF	①	*	#	J	Z	j	z	①	①	エ	コ	ン	レ	i	≠
	B	LF	ESC	+	;	K	[	k	(	①	①	*	サ	ヒ	ロ	×	π
	C	LF	①	,	<	L	¥	l	l	①	②	ハ	シ	フ	ワ	0	π
	D	CR	①	—	=	M	]	m	}	①	②	ユ	ズ	へ	ン	ト	÷
	E	①	①	.	>	N	^	n	÷	①	②	ヨ	セ	ホ	ˆ	ñ	②
	F	①	①	/	?	O	_	o	DEL	①	②	ッ	リ	マ	°	ö	■

100351

(Notes and are on the previous page.)

APPENDIX C.

QTERM-B30 COMMAND SUMMARY

This appendix is an abbreviated summary of all of the available QTERM-B30 software commands. More detailed descriptions of the commands are in Chapter 3.

Refer to Table 2-2 for a complete list of acceptable parameter values for applicable commands. If a com-

mand parameter is out of the valid range, the QTERM-B30 ignores the entire command.

Note that the timing shown for the execution of the various commands is only approximate. Many factors can affect the execution time, so it is impossible to give exact figures.

Command	String	Timing (ms)	Notes & Parameters
display character		0.7 35	typical max
Bell (^G)	07H	0.6	
Backspace (^H)	08H	0.8	
Horizontal Tab (^I)	09H	0.8	1.1 ms worst case
Line Feed (^J)	0AH	0.8	up to 35 ms if auto scroll is on
Vertical Tab (^K)	0BH		same as line feed
Form Feed (^L)	0CH		same as line feed
Carriage Return (^M)	0DH	0.8	up to 35 ms if auto scroll is on
XON (^Q)	11H	0.4	
XOFF (^S)	13H	0.4	
Delete	7FH	1.2	
Cursor Up	ESC A	0.8	
Cursor Down	ESC B	0.8	
Cursor Right	ESC C	0.8	
Cursor Left	ESC D	0.8	
Command	String	Timing (ms)	Notes & Parameters

Clear Screen	ESC E	4.4	
Cursor Home	ESC H	3.7	
Set Cursor Position	ESC I # *	1.5	# = @ to C for row 0 to 3 * = @ to S for column 0 to 19
Erase to End of Screen	ESC J	6.0 12.0 18.0 24.0	if cursor is on row 3 if cursor is on row 2 if cursor is on row 1 if cursor is on row 0
Erase to End of Line	ESC K	3.0 5.8	typical maximum (cursor in column 0)
Set Contrast	ESC L #	1.2	# = @ to DEL for lightest to darkest
Reset Terminal	ESC M	300.0	
Query Version	ESC N	0.5	time to load characters into transmit buffer
Buzzer On/Off/Beep	ESC O #	1.2	# = @ turn buzzer off A turn buzzer on B beep for ½ second
LEDs On/Off	ESC P #	1.2	# = @ LED1 off A LED2 off B LED3 off C LED4 off H LED1 on I LED2 on J LED3 on K LED4 on
Auto Wrap Mode	ESC R #	1.2	# = @ auto wrap off A auto wrap on
Auto Scroll Mode	ESC S #	1.2	# = @ auto scroll off A auto scroll on
Auto Line Feed Mode	ESC T #	1.2	# = @ auto line feed off A auto line feed on
Display Backlight On/Off	ESC V #	1.2	# = @ backlight off A backlight on B backlight toggle
Query Status	ESC W	0.5	time to load characters into transmit buffer see Table 2-2 for returned values

Command	String	Timing (ms)	Notes & Parameters
---------	--------	----------------	--------------------

Query Cursor Position	ESC X	0.5	time to load characters into transmit buffer see Table 2-2 for returned values	
Query Character	ESC Y	0.5	time to load character into transmit buffer	
Key Repeat/Click Mode	ESC a #	1.2	# = @ A B C	click off, repeat off click off, repeat on click on, repeat off click on, repeat on
Set Cursor Mode	ESC b #	1.2	# = @ A B C	block off, underline off (no cursor) block off, underline on block on, underline off block on, underline on
Set Shift Mode	ESC c #	1.2	# = @ A B C	function mode, shift indicator enabled lock mode, shift indicator enabled function mode, shift indicator disabled lock mode, shift indicator disabled
Save Configuration to EEPROM	ESC i	6.0		
Transmit Buffer Flush	ESC k	1.2		
XON/XOFF Mode	ESC l #	1.2	# = @ A	disable XON/XOFF operation enable XON/XOFF operation
User Area Read/Write	ESC m #		timing depends on baud rate	
Restore Default Parameters	ESC r	3.0		
Verify manufacturer I.D.	ESC u # *	2.0	# and * are the bytes you want to compare	
Power-On Setup Mode	ESC x #	1.2	# = @ A B	Power-on setup fully enabled Only contrast adjustment allowed Power-on setup fully disabled

