QTERM–J10/N15
USER'S MANUAL
REVISION 13

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-J10 and QTERM-N15 are data-entry terminals for industrial applications. The QTERM-J10 and QTERM-N15 are available with several options; this manual discusses all versions and their operations.

The QTERM-J10 and QTERM-N15 are CE Certified products. They have been assessed against the requirements of EN 50082-1: 1992, EN55022: 1987, and EN 60950 (including Amendments Numbers 1, 2, and 3). Based on conformity with these requirements, the QTERM-J10 and the QTERM-N15 are deemed in compliance with all applicable CE directives.

The sections of this manual are:

Chapter 1   **Quick Start.** If you wish to start using your QTERM immediately, this chapter will show you how to connect to the terminal and how to run the example software.

Chapter 2   **QTERM Software.** This chapter provides a detailed listing of the QTERM 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-J10 and QTERM-N15, 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-J10/N15 Hardware.** This chapter discusses the hardware of the QTERM-J10 handheld, QTERM-J10 panel-mount and QTERM-N15 panel-mount 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 Character Chart.** This is a 256-character chart showing how the QTERM 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 Command Summary.** This is an abbreviated summary of QTERM software commands.

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

CHAPTER 1.

QUICK START

There are only four steps required to communicate with the QTERM-J10 or QTERM-N15:

- 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.

1.1   Power-On Setup

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

'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.

- Hold down any key and apply power to the QTERM (you do not need to connect the transmit and receive lines).

- The version of software in the QTERM 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.

1.2   Connect The Communications Lines

When the desired data format is displayed, press the *enter* key.The EIA-232 device has one transmit and one receive line, while the EIA-422 device has two transmit and two receive lines.

Table 1-1 shows the connector pin assignments for both the handheld and panel-mount QTERMs. The receive and transmit directions shown in the table are with respect to the QTERM. Refer to this table to connect your host communications lines to the correct pins. Figure 1-1 shows the pin numbering of a modular connector (both jack and plug), and the panel mount interface plug.

(If you are using an IBM-style PC, you cannot connect an EIA-422 QTERM-J10 directly to the computer's COM port; you must provide an interface device.)

Figure 1-1. QTERM Connector Pin Assignments.

Table 1-1. QTERM Pin Assignments.

6-pin Modular Connector	DB9 Female	Panel-Mount 6 x 1 2 mm Pin	QTERM EIA-232 Function	QTERM EIA-422 Function
1	3	1	receive	+receive
2	6	2	no connection	-receive
3	2	3	transmit	+transmit
4	1	4	no connection	-transmit
5	9	5	power	power
6	5	6	ground	ground

1.3   Apply Power

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

WARNING: Power supplied to the QTERM 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 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 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 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 display. If you press keys on the keypad, the QTERM will transmit the appropriate codes to the host computer. Any software commands sent by the host will be processed by the QTERM.

1.5   Running JDEMO

To demonstrate some of the features of the QTERM, run the JDEMO program included with this users manual:

- Connect your QTERM 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.

- Run the JDEMO program.

- Follow the on-screen instructions to demonstrate the use of some of the features of the QTERM terminal.

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

CHAPTER 2.

QTERM SOFTWARE

2.1   Operation

The operation of the QTERM is quite simple:

- Power is applied to the QTERM.

- Commands or data can be transmitted to the QTERM. Commands are executed as required; data is displayed.

- When a key is pressed, the QTERM transmits the appropriate character to the host.

The QTERM 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 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's capabilities.

The QTERM'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 (13h). The QTERM 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 will start transmitting the characters in the buffer.

The QTERM's receive buffer is large enough to accept a maximum of 32 characters or software commands without overrunning the buffer. However, some operations can take a longer time to execute, such as scrolling the entire screen up one line. In this case, the QTERM 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's receive buffer. The two easiest ways to do this are to use a slower baud rate (which gives the QTERM more time to process each byte), or add delays to your code after each write to the QTERM.

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, you can program your host to control the QTERM 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.

Table 2-1. QTERM-J10 and QTERM-N15 Software Commands.

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

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

Be sure to read the file READ.ME on your distribution disk for any late changes to this manual.

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

2.2.2   Backspace (^H) - 08h

Causes a nondestructive 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 to transmit keys pushed after receiving an XOFF. XON is used to re-enable QTERM transmission after an XOFF has disabled it, allowing handshaking with the host system.

2.2.9   XOFF (^S) - 13h

Disables all QTERM transmission except for information requested via the *Query Status* command (ESC W). After receiving an XOFF command, the QTERM 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 - ℰ 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 - ℰ 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 - ℰ 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 - ℰ 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 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 - ℰ H

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

2.2.17   Set Cursor Position - ℰ I # *

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

ℰ 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 19, starting at the left.)

2.2.18   Erase to End of Screen - ℰ 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 - ℰ 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 - ℰ L #

This command sets the display contrast. It has the form ℰ *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 - ℂ M

Resets the QTERM 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 - ℂ N

This tells the QTERM 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 - ℂ O

This command controls the buzzer. It has the form ℂ 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 Auto Wrap Mode - ℂ 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

2.2.25 Auto Scroll Mode - ℂ 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

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

2.2.26 Auto Line Feed Mode - ℂ T

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

2.2.27   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

2.2.28   Query Status - ℉ W

The Query Status command (℉W) returns a character indicating the number of characters presently in the QTERM-J10 transmit buffer (0 to 20). Table 2-2 shows what character is returned for each number of characters in the transmit buffer.

2.2.29   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.

2.2.30   Query Character - ℉ Y

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

2.2.31   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 beeps are 50 ms long; the key repeat rate is ten per second.

2.2.32   Set Cursor Mode - ℉ b

The QTERM 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

2.2.33   Set Shift Mode - ℉ c

The shift key on the QTERM 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.

2.2.34   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.

2.2.35   Transmit Buffer Flush - ℉ k

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

2.2.36   XON/XOFF Mode - ℉ l

This command enables or disables the XON/XOFF operation of the QTERM. 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 to fill up the receive buffer, additional characters will be ignored.

2.2.37 User Area Read/Write - ℭ m

This command allows you to store your own information (such as serial numbers or parameters) in the QTERM non-volatile 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 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:

ℭ 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.

2.2.38 Restore Default Parameters - ℭ 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).

2.2.39 Verify Manufacturer ID Code - ℭ u # *

This command is used to verify the Manufacturer ID (MID) Code which is pre-programmed into the terminal at the factory. # and * can be any two bytes. When ordering a QTERM from the factory, the customer is given the option to use this feature and will be assigned a two byte MID 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), MID Code match.
15h - Negative Acknowledge character (NAK), MID Code does not match.

2.2.40 VFD Display Intensity - ℭ w

This command is only applicable to terminals configured with the optional VFD display. There are four valid values for #:

@ - for display intensity 100%
A - for display intensity 75%
B - for display intensity 50%
C - for display intensity 25%

2.2.41 Power-On Setup Mode - ℭ 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-J10 and the QTERM-N15 is as follows:

- operates at 9600 baud, 8 data bits, 1 stop bit, no parity
- contrast is set to optimal for a 90° viewing angle
- auto wrap is on
- auto scroll is on
- auto line feed is on
- 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 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. When you execute this file, your QTERM 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 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 con-

tains 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, 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.

QTERM-J10/N15 HARDWARE

4.1   QTERM-J10 Handheld Terminal

The dimensions of the QTERM-J10 handheld terminal are shown in Figure 4-2.. This figure also shows the standard keypad legend for the keys on the 40-key keypad.

The housing is made from impact-resistant ABS, and is colored black. The housing is not waterproof, but it can be subjected to moderate rain or splash without harm.

The QTERM-J10 handheld terminal uses a 6-pin modular connector, exiting from the bottom of the housing. If desired, the modular connector can easily be switched to exit from the top of the QTERM-J10 housing.
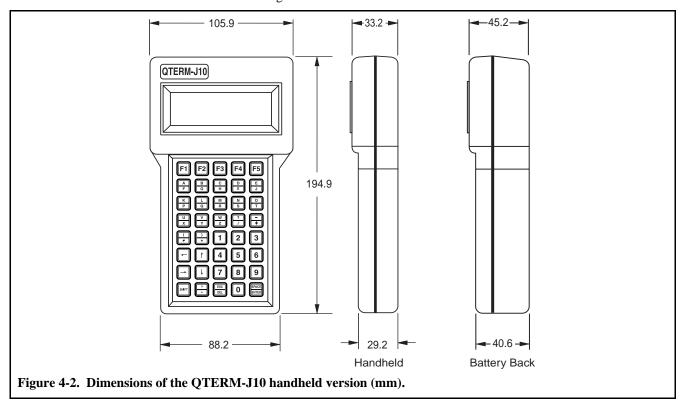
The pin assignments for the connectors for each of the available interfaces are shown in Table 4-1.. Figure 4-2.
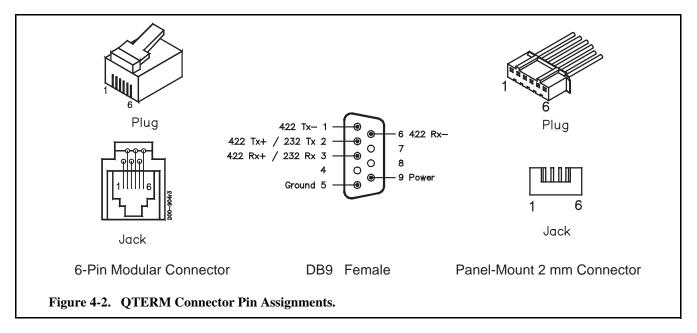
shows the pin numbering for the connectors used on the QTERM-J10. For reference, Table 4-4. (at the end of this chapter) shows the pin assignments used by the COM ports on PC-style computers for both DB25 and DB9 connectors.

4.2   QTERM-J10 Panel-Mount Terminal

The panel-mount QTERM-J10 is mounted directly onto your instrument or enclosure. Figure 4-2. shows the dimensions of the panel-mount QTERM-J10 along with the standard keypad legend for the 24-key keypad.

The QTERM-J10 is mounted to the panel by placing the terminal into the panel cutout, and attaching the mounting brackets behind the panel with the four self-tapping screws. A mounting gasket is provided in order to seal the front

Figure 4-2. Dimensions of the QTERM-J10 handheld version (mm).

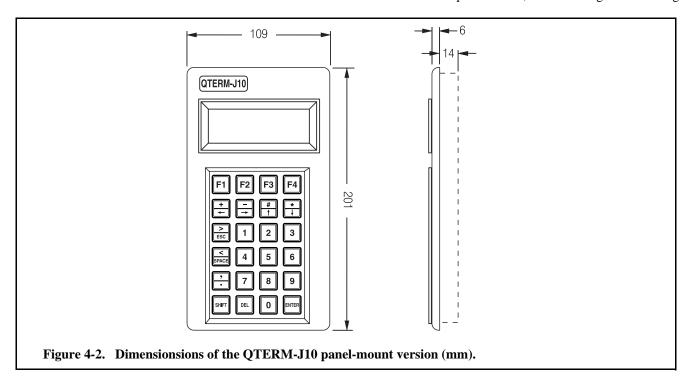**Figure 4-2. QTERM Connector Pin Assignments.**

edge of the terminal. Figure 4-2. shows the assembly diagram, along with the panel cutout dimensions required for mounting.
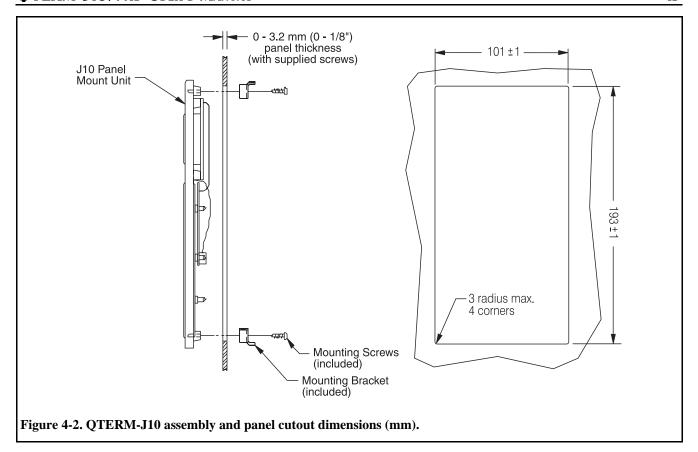
Connection to the panel-mount QTERM-J10 is made via a DB9 female connector which is accessible from the rear of the mounting cover. The pin assignments for the DB9 connector on the QTERM-J10 are shown in Table 4-1.. The connector pin numbering is shown in Figure 4-2.**.**
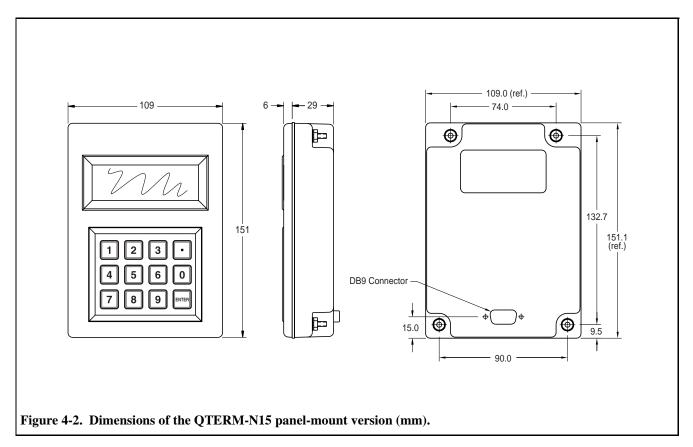
4.3   QTERM-N15 Panel Mount Terminal

The panel-mount QTERM-N15 is mounted directly onto your instrument or enclosure. Figure 4-2. shows the dimensions of the QTERM-N15 along with the standard keypad legend for the keypad.
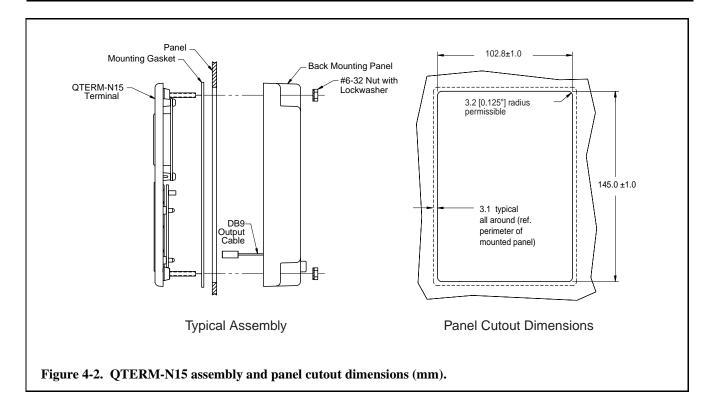
The QTERM-N15 is mounted to the panel by placing the terminal into the panel cutout, and attaching the mounting

Figure 4-2.   Dimensionsions of the QTERM-J10 panel-mount version (mm).

0 - 3.2 mm (0 - 1/8")
panel thickness
(with supplied screws)

J10 Panel
Mount Unit

101 ±1

193 ± 1

3 radius max.
4 corners

Mounting Screws
(included)

Mounting Bracket
(included)

Figure 4-2. QTERM-J10 assembly and panel cutout dimensions (mm).

109

6   29

151

109.0 (ref.)

74.0

132.7

151.1
(ref.)

DB9 Connector

15.0

9.5

90.0

Figure 4-2. Dimensions of the QTERM-N15 panel-mount version (mm).

brackets behind the panel with the four self-tapping screws.

Figure 4-2. QTERM-N15 assembly and panel cutout dimensions (mm).

A mounting gasket is provided in order to seal the front edge of the terminal. Figure 4-2. shows the assembly diagram, along with the panel cutout dimensions required for mounting.

Connection to the panel-mount QTERM-N15 is made via a DB9 female connector which is accessible from the rear of the mounting cover. The pin assignments for the DB9 connector on the QTERM-N15 are shown in Table 4-1.. The connector pin numbering is shown in Figure 4-2..

4.4   Interfaces

4.4.1   EIA-232 Interface

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

The QTERM does not monitor or control any of the EIA-232 modem-control lines (such as RTS and DTS). Handshaking between the host computer and the QTERM 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.

4.4.2   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 uses four communication lines and two power lines.

4.4.3   5-volt Buffered Interface

When used to communicate with another 5-volt Buffered device, the QTERM can operate at distances up to about 5 meters. The advantage of the 5-volt Buffered QTERM is that it draws less current than the EIA-232 version, and uses the same 5-volt logic levels that come directly out of a UART (i.e. the idle state is at 5 volts, and the active state is at 0 volts).

4.5   LCD Display

The QTERM display is a 4-line by 20-character supertwist 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.

Table 4-1. QTERM Pin Assignments.

6-pin Modular Connector	DB9 Female	Panel-Mount 2 mm Connector	QTERM EIA-232/5-volt Buffered Function	QTERM EIA-422 Function
1	3	1	receive	+receive
2	6	2	no connection	-receive
3	2	3	transmit	+transmit
4	1	4	no connection	-transmit
5	9	5	power	power
6	5	6	ground	ground

Appendix B is a chart which shows what the QTERM 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.

If you ordered the backlight, the software commands shown in Chapter 2 will allow you to turn the backlight on and off. Without the backlight, these commands have no effect.

4.6   Keypad

The QTERM-J10 is available with an 18-key, 24-key or a 40-key keypad. The QTERM-N15 comes with a 12-key keypad. When each key is pressed, the QTERM will send a single ASCII character through the serial interface. Some keys such as F1-F5 and the arrow keys do not have an ASCII printable equivalent, so instead they will send a single lower case letter. Each keypad has a graphic overlay with labels for each key. Table 4-3. lists the default values assigned to each key for all three keypad versions.

The keypad utilizes membrane dome keys for long life and tactile feedback to the operator. Each of the keys sends one or two bytes when pressed.

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

4.7   Other Options

4.7.1   Buzzer Option

If you order the buzzer option, the QTERM includes an audio buzzer which is used for key beeps, and for beeping in response to a "bell" character (^G, 07h).

4.7.2   Regulator Option

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

4.8   QTERM Specifications

Environmental characteristics of the QTERM-J10 and QTERM-N15 are:

- -10 to +60 °C operating temperature range
- -40 to +85 °C storage temperature range
- 0 to 95% non-condensing humidity range

Table 4-2. QTERM-J10/N15 Current Consumption.

Version	Ireg (mA)
EIA-232 Version	28
EIA-422 Version	25
Add for regulator	6
Add for backlight	60

Table 4-3. Key Assignments.

Key	ASCII Char	Hex Byte	Key	ASCII Char	Hex Byte	Key	ASCII Char	Hex Byte
F1	e	65h	Q	Q	51h	0	0	30h
F2	f	66h	R	R	52h	1	1	31h
F3	g	67h	S	S	53h	2	2	32h
F4	h	68h	T	T	54h	3	3	33h
F5	i	69h	U	U	55h	4	4	34h
A	A	41h	V	V	56h	5	5	35h
B	B	42h	W	W	57h	6	6	36h
C	C	43h	X	X	58h	7	7	37h
D	D	44h	Y	Y	59h	8	8	38h
E	E	45h	Z	Z	5Ah	9	9	39h
F	F	46h	/	/	2Fh	SPACE		20h
G	G	47h	-	-	2Dh	ENTER		0Dh
H	H	48h	+	+	2Bh	UP	a	61h
I	I	49h	(	(	28h	DOWN	b	62h
J	J	4Ah	)	)	29h	RIGHT	c	63h
K	K	4Bh	#	#	23h	LEFT	d	64h
L	L	4Ch	*	*	2Ah	SHIFT		N/A
M	M	4Dh	,	,	2Ch	BACK		7Fh
N	N	4Eh	.	.	2Eh	HOME	j	6Ah
O	O	4Fh	ESC		1Bh	CLEAR	k	6Bh
P	P	50h	DEL		7Fh			

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

COM Ports with Male DB25 Connectors		COM Ports with Male DB9 Connectors	
Pin	**Function**	**Pin**	**Function**
2	PC transmit	1	CD *
3	PC receive	2	PC receive
4	RTS *	3	PC transmit
5	CTS *	4	DTR *
6	DSR *	5	ground
7	ground	6	DSR *
8	CD *	7	RTS *
20	DTR*	8	CTS *
22	RI *	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 pull-up resistor (about 300 ohms).

APPENDIX A.

ASCII CHART

Least Significant Digit (hex)	Most Significant Digit (hex)							
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
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

0345R3

APPENDIX B.

QTERM CHARACTER CHART

The chart on the next page shows how the QTERM 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 to display the dot pattern at the current cursor location.

Numbers in circles refer to these notes:

Œ These bytes are always ignored.

œ 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	@	P	`	p	①	①	②	—	ヲ	ミ	ゆ	p
	1	①	XON	!	1	A	Q	a	q	①	①	。	ア	チ	ム	ä	q
	2	①	①	"	2	B	R	b	r	①	①	「	イ	ツ	メ	β	θ
	3	①	XOFF	#	3	C	S	c	s	①	①	」	ウ	テ	モ	ε	∞
	4	①	①	$	4	D	T	d	t	①	①	、	エ	ト	ヤ	μ	Ω
	5	①	①	%	5	E	U	e	u	①	①	・	オ	ナ	ユ	σ	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	ア	キ	ヌ	ラ	q	π
	8	BS	①	(	8	H	X	h	x	①	①	ィ	ク	ネ	リ	√	x̄
	9	HT	①	)	9	I	Y	i	y	①	①	ゥ	ケ	ノ	ル	¹	y
	A	LF	①	*	:	J	Z	j	z	①	①	エ	コ	ハ	レ	j	千
	B	LF	ESC	+	;	K	[	k	{	①	①	オ	サ	ヒ	ロ	×	万
	C	LF	①	,	<	L	¥	l	|	①	②	ヤ	シ	フ	ワ	¢	円
	D	CR	①	-	=	M	]	m	}	①	②	ユ	ス	ヘ	ン	£	÷
	E	①	①	.	>	N	^	n	→	①	②	ヨ	セ	ホ	゛	ñ	②
	F	①	①	/	?	O	_	o	DEL	①	②	ツ	ソ	マ	゜	ö	▓

(Notes Œ and œ are on the previous page.)

APPENDIX C.

QTERM COMMAND SUMMARY

This appendix is an abbreviated summary of all of the available QTERM software commands. More detailed descriptions of the commands are in Chapter 2. If a command parameter is out of the valid range, the QTERM 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	typical
		35	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	
Clear Screen	ESC E	4.4	
Cursor Home	ESC H	3.7	
Set Cursor Position	ESC # *	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	if cursor is on row 3
		12.0	if cursor is on row 2
		18.0	if cursor is on row 1
		24.0	if cursor is on row 0

Command	String	Timing (ms)	Notes & Parameters
Erase to End of Line	ESC K	3.0	typical
		5.8	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 1/2 second
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 Mode	ESC V #	1.2	# = @ backlight off
			A backlight on
			B backlight toggle
Query Status	ESC W	0.5	time to load the characters into transmit buffer
			see Table 2-2 for returned values
Query Cursor Position	ESC X	0.5	time to load the characters into transmit buffer
			see Table 2-2 for returned values
Query Character	ESC Y	0.5	time to load the characters into transmit buffer
Key Repeat/Click Mode	ESC a #	1.2	# = @ click off, repeat off
			A click off, repeat on
			B click on, repeat off
			C click on, repeat on
Set Cursor Mode	ESC b #	1.2	# = @ block off, underline off (no cursor)
			A block off, underline on
			B block on, underline off
			C block on, underline on
Set Shift Mode	ESC c #	1.2	# = @ function mode, shift indicator enabled
			A lock mode, shift indicator enabled
			B function mode, shift indicator disabled
			C lock mode, shift indicator disabled
Save Configuration to EEPROM	ESC i	6.0	
Transmit Buffer Flush	ESC k	1.2	
XON/XOFF Mode	ESC 1 #	1.2	# = @ disable XON/XOFF operation
			A enable XON/XOFF operation

Command	String	Timing (ms)	Notes & Parameters
User Area Read/Write	ESC m #	depends on baud rate	
Restore Default Parameters	ESC r	3.0	
Verify MID Code	ESC u # *	2.0	# and * are the bytes you want to compare
VFD Display Intensity	ECS w #	1.2	# = @ display intensity 100% A display intensity 75% B display intensity 50% C display intensity 25%
Power-On Setup Mode	ESC x #	1.2	# = @ power-on setup fully enabled A only contrast adjustment allowed B power-on setup fully disabled