

SIT Hand Held Terminal **User Manual**



TOL-O-MATIC, INC
Excellence in Motion[®]

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INTRODUCTION

The SIT is a hand held ASCII terminal for use with computers or computer controlled instruments and industrial machinery. It features a 45 key keypad with tactile feedback, and a liquid crystal alphanumeric display showing 4 rows of 20 columns. The terminal provides user selectable communications parameters, programmable function keys, and other features which make it ideal for industrial applications requiring flexibility and solid, reliable operation.

DISPLAY OPTIONS

The standard display employs a reflective twisted-nematic type liquid crystal. This display is useable over a angle of approximately 45 degrees. For applications which require a greater viewing angle, a reflective supertwisted-nematic display is available. This display is useable over a viewing angle of approximately 90 degrees.

A backlighted display is available for applications where the ambient light level would produce the use of a reflective type display. The Backlight adds approximately 100 milliamperes to the current requirement of the terminal.

OPERATING CONFIGURATION

The SIT is readily adapted to many diverse applications due to it's user-settable operating parameters and programmable function keys. All setup functions performed with the help of on-screen menus. Access to these menus may be locked out to prevent unwanted changes.

Parameter settings and data for the programmable function keys are stored in the terminals built-in nonvolatile memory. This insures that the chosen configuration will be retained when power is removed. Any time data is stored in the nonvolatile memory the message "SAVING DATA" appears. When the terminal has finished saving data, and all the keys are released, the display is cleared.

DELIVERY CONFIGURATION

Each adjustable parameter and programmable function key is assigned an initial value by Tol-O-Matic. These values are stored in the terminals permanent memory, and can be transferred to the nonvolatile memory at any time.

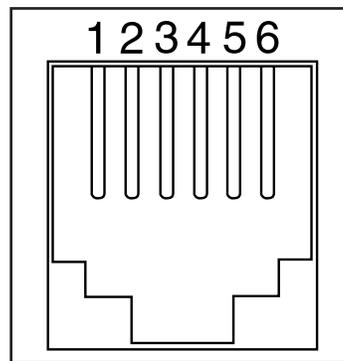
Factory Settings

9600 Baud
8 Data Bits
Even Parity
Display PE - Enabled
Repeat - Fast
Echo - Enabled
Handshake - Enabled
Self Test - Disabled

CONNECTING THE SIT

A six pin modular connector is provided for all connections to the terminal. Although this connector is similar to the popular modular telephone connector, the terminal is in no way compatible with telephone lines or signals. Connecting the SIT to a telephone line will damage the unit, and will void the warranty.

The pinout of the connector is shown below. The connector is shown from outside the terminal. IN indicates an input to the terminal. OUT indicates an output from the terminal.



PIN	RS-232C
#1	+ SUPPLY IN
#2	HANDSHAKE IN
#3	HANDSHAKE OUT
#4	DATA IN
#5	DATA OUT
#6	COMMON

Caution: Standard cables with modular connectors on both ends will reverse the signals.

NOTE: For customers that will use the Aux. Port on the SSC Controller to communicate with the SIT hand-held operator interface, the following should be noted.

You must have a 9-pin straight through gender changer connector (i.e. male-to-male type), as both hardware 9-pin connectors on SSC Aux. Port and SIT are female type connectors. Also pins 2 and 3 need to be switched on gender changer connector for communicating between SSC and SIT.

DISPLAY OPERATION

The terminal screen displays the standard ASCII 96 character set, consisting of upper and lower case alphabets, numerals 0 through 9, and punctuation characters.

Received characters are placed into the display at the cursor location. In the absence of commands which alter the cursor location, the cursor moves from left to right as the characters are received.

When a character is written in the last position in any of the first three rows, the cursor moves to the leftmost position on the next row.

When a character is written in the last position on the bottom row, the cursor temporarily becomes invisible. The next character received causes the contents of the display to be scrolled up one row, and that character is placed in the leftmost position on the new bottom row. The cursor then appears in the second column of the bottom row.

When visible, the cursor takes the form of a blinking block with a non-blinking underscore.

KEYPAD OPERATION

The standard keypad is comprised of the uppercase alphabet, digits 0 through 9, punctuation marks and symbols as well as keys for escape, space, backsp and enter. There are five user-programmable function keys. Modifier keys are shift and ctrl.

OPERATING MODES

The SIT has two operating modes. One is using the main serial port which enables the user the full range of commands to the controller. This is a terminal mode, where the user can program the controller and query it for current status. The user can also respond to the program running in the controller. For example, the program prompts for velocity, distance, part number, etc.

The second mode is using the auxiliary port. This uses a gender changer (refer to *Connecting the SIT* section), and changes the communication parameters as stated below. This mode allows the user to respond only to the program running in the controller. The program prompts for velocity, distance, part number, etc, the same as in terminal mode.

SETTABLE PARAMETERS

This section discusses each of the configuration parameters in detail. A summary of the parameters and their initial delivery values is shown.

PARAMETER	PRESET	OPTIONS
BAUD	9600	300-600-1200-2400-4800-9600
DATA BITS	8	7-8
PARITY	EVEN	EVEN-ODD-MARK-SPACE-IGNORE
DISPLAY PE	ENABLED	ENABLED-DISABLED
REPEAT ECHO	DISABLED	SLOW-FAST-DISABLED

ECHO	DISABLED	ENABLED-DISABLED
HANDSHAKE	ENABLED	ENABLED-DISABLED
SELF TEST	DISABLED	ENABLED-DISABLED

To be able to plug and play as terminal mode on the main port, configure the parameters to the following settings:

PARAMETER	PRESET	OPTIONS
BAUD	9600	300-600-1200-2400-4800-9600
DATA BITS	7	7-8
PARITY	IGNORE	EVEN-ODD-MARK-SPACE-IGNORE
DISPLAY PE	DISABLED	ENABLED-DISABLED
REPEAT ECHO	FAST	SLOW-FAST-DISABLED
ECHO	ENABLED	ENABLED-DISABLED
HANDSHAKE	ENABLED	ENABLED-DISABLED
SELF TEST	ENABLED	ENABLED-DISABLED

Baud -

The data rate used. The SIT can be set to 300, 600, 1200, 2400, 4800 or 9600 BAUD.

Data Bits -

The number of bits in each character. Either 7 or 8 data bits can be selected.

Parity -

When enabled, an extra bit is added to each character the terminal sends. This bit is used by the receiving device to perform a simple error check on incoming data. The SIT can be set to transmit an even, odd, mark or space parity bit. With any of these settings, the receiver in the terminal will perform the corresponding check on incoming data. In addition, the parity option can be set to ignore. Selecting the ignore still causes the transmitter to add a parity check bit to each character, but the value of that bit is indeterminate.

Display PE -

When Parity is set to even, odd, mark or space and this option is set to enabled, any character received containing a parity error is not displayed. Instead, a special parity error symbol is displayed as received.

Repeat -

The SIT can be set to repeat a keypad character while the key remains pressed at a slow or fast rate. The slow repeat rate is approximately 10 characters per second, while the fast rate is about 18 characters per second.

There is a short delay between the initial character and the start of the repeat. When set to disabled, key repeat is disabled.

Echo -

When set to enabled, characters sent by the terminal are also written to the display. This enables the terminal to be used in half-duplex installations. When set to disabled, only characters received by the terminal are displayed.

Handshake -

This setting controls the operation of the two handshake lines available in models equipped with the RS-232 interface. When set to enabled, the terminal will not send characters unless the handshake input line is asserted. Instead, the terminal will beep to indicate that it cannot transmit. Also, if the terminal is temporarily unable to process incoming characters, it will assert the handshake output line. Any characters sent to the terminal ignores the state of the handshake input line and the handshake output line is always asserted.

Self Test -

When set to enabled, the SIT will conduct a self test when first turned on. The display is exercised and the internal RAM and ROM are checked. Any errors encountered are reported on the display. In units equipped with the internal battery option, this test also verifies the operation of the power saver circuitry. If the power on/off button is released prior to test completion, the terminal will turn itself off at the end of the test. To prevent this, hold the power on/off button down until the test is completed.

SETTING THE PARAMETERS

To access the set parameters menu, press F1 while holding the ctrl and shift keys. The menu now appears on the lower three lines of the display. The parameter selected and it's current setting are shown on the top line. To move through the possible values for this parameter, press F1. To move through the list of parameters, press F2 to move forward, or F3 to move backward. Both F4 and F5 return to terminal mode. Exiting without saving the settings will leave any new settings in effect until power is removed.

The Terminal may be returned to the delivery configuration by applying power while simultaneously holding down the ctrl, shift and F1 Keys. After the "saving data" message has appeared, the keys can be released. This procedure returns all of the parameters and the programmable function keys to the delivery configuration. Any changes made to the parameters characters previously programmed into the function keys will be lost.

FUNCTION KEYS

The five function keys work with the shift and ctrl keys to provide a total of 15 programmable keys. Each key may be programmed with any single character, including non-printing character. All programmable function key settings are stored in the SIT nonvolatile memory.

The table below shows the function key characters at delivery. The notation *Hnn* indicates hexadecimal representation.

KEY	ALONE	SHIFT	CTRL
F1	H11	a	f
F2	H12	b	g
F3	H13	c	h
F4	H14	d	i
F5	H15	e	j

PROGRAMMING THE FUNCTION KEYS

To program a function key, hold the ctrl and shift keys while pressing F2. The terminal then will display the prompt "press function key to define?" Select which function key to program by pressing that key, while holding the shift or ctrl key if appropriate. The terminal will then display the current programmed data for that function key. Data is displayed in hexadecimal notation, with an upper case H prepended. the name of the function key is selected. For example, "sF1" indicates the shift F1 combination. A menu appears in the bottom row of the display. You may move on to change the data for that function key by pressing F1, or select a different function key by pressing F3. Press F5 to return the SIT to terminal mode, leaving the function key characters unchanged.

In the function key programming menu, labels for the programming keys occupy the bottom row of the display, and the name of the function key being programmed is displayed in the top row. Any valid hexadecimal digit key pressed will be entered into the function key (0-9 or A-F). F3 is a "rubout" key, and permits backspace editing of entries. Press F1 to return to terminal mode without saving any changes. In order for function key programming to take effect you must save the new data in SIT's nonvolatile memory. Changes to function key data are saved by pressing F5

LOCKING OUT THE CONFIGURATION MENUS

For those applications in which access to the settable parameters and function keys features is undesirable, the SIT provides a menu lockout feature. To disable access to these features, hold the ctrl, shift and F5 keys and apply power to the terminal. After the "saving Data" message has appeared, the keys can be released. The lockout state is stored in the built-in nonvolatile memory. to regain access to the menus, repeat this procedure.

On delivery, access to both menus is enabled.

HOST CONTROL OF THE SIT

The SIT has been designed to allow it to be controlled by the device to which it is connected, referred to in this manual as the host. By sending the terminal special character sequences begin with the ASCII escape character, they are sometimes called escape sequences.

In the following description of escape sequences, ESC is used to indicate the ASCII escape character, hexadecimal 1B. Any occurrence of a numeric parameter is indicated by the notation pn. Escape Sequences are required to be sent to the terminal exactly as shown, with no embedded blanks permitted at any time.

HOST COMMANDS

Cursor Movement Commands

CURSOR UP	ESC	A
CURSOR DOWN	ESC	B
CURSOR RIGHT	ESC	C
CURSOR LEFT	ESC	D

In the above sequences, the cursor moves one position in the indicated direction. The cursor will not cause the display to scroll.

CURSOR POSITION ESC Y Pr Pc

In the above sequence, pr is the row number and pc is the column number of the target cursor location. These parameters are formed by adding hexadecimal 1F to the row and column numbers. Row and column numbers are absolute, with row 1, column 1 (Pr = H20, Pc = H20) representing the upper left corner of the display.

CURSOR HOME ESC H

Note that this command is functionally equivalent to cursor Position command with Pr = H20 and Pc = H20.

Erasing

Clear display and Home	ESC	E
Clear Display	ESC	I
Cursor to end of Display	ESC	J
Cursor to End of Line	ESC	K
Line Containing Cursor	ESC	M

Note that the erase commands include the character at the cursor location. The last four do not alter the cursor position.

Sounds

Short Bell	ESC	T
Long Bell	ESC	L
Click	ESC	P
Alert	ESC	Q

These commands cause the SIT to emit the indicated sound through the built-in speaker. There is no "buffering" of commands which generate sounds. Since these sounds can last many character times, to produce a properly spaced chain of any of these sounds the host must delay short time between issuing these commands.

Cursor Style

Underscore Cursor On	ESC	F
Underscore Cursor Off	ESC	G
Blinking Cursor On	ESC	R
Blinking Cursor Off	ESC	S

These commands may be used to establish the presence and style of the cursor

Key Click Control

Key Click Enable	ESC	U
Key Click Disable	ESC	V

These commands may be used to enable and disable the audible keyclick.

Identify

Send terminal IS	ESC	Z
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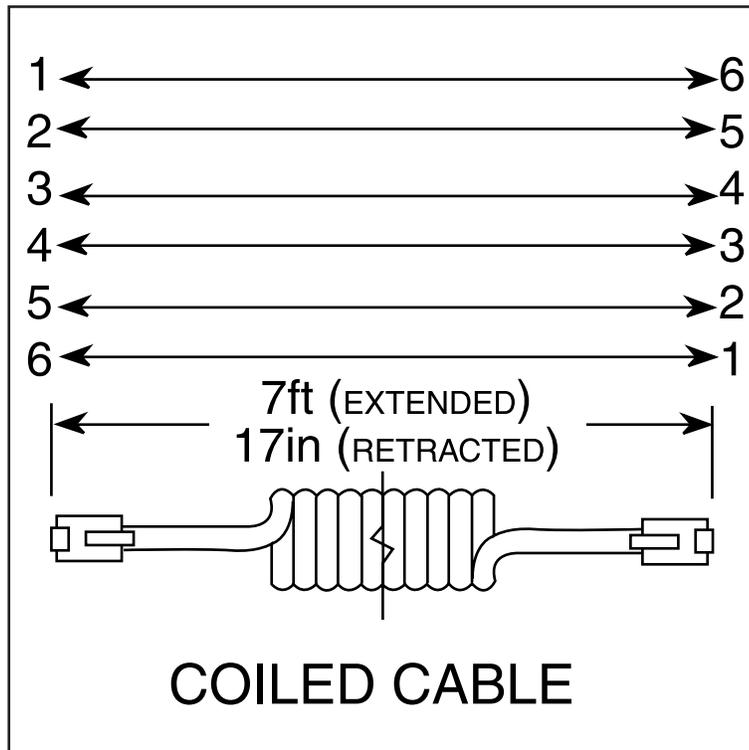
This Command causes the terminal to reply with a device identification string of the form 'TTI nnnn,' where nnnn is the four digit hexadecimal format checksum of the firmware in the terminal.

CONTROL CODE	HEX	DEC	ASCII	FUNCTION
Ctrl + G	07	7	BEL	Sounds Bell
Ctrl + H	08	8	BS	Back Space Cursor
Ctrl + J	0A	10	LF	Line Feed
Ctrl + K	0B	11	VT	Cursor Down
Ctrl + M	0D	13	CR	Cursor Left to Column 1
Del	7F	127	DEL	Delete Char. At Cursor

All other codes will be ignored.

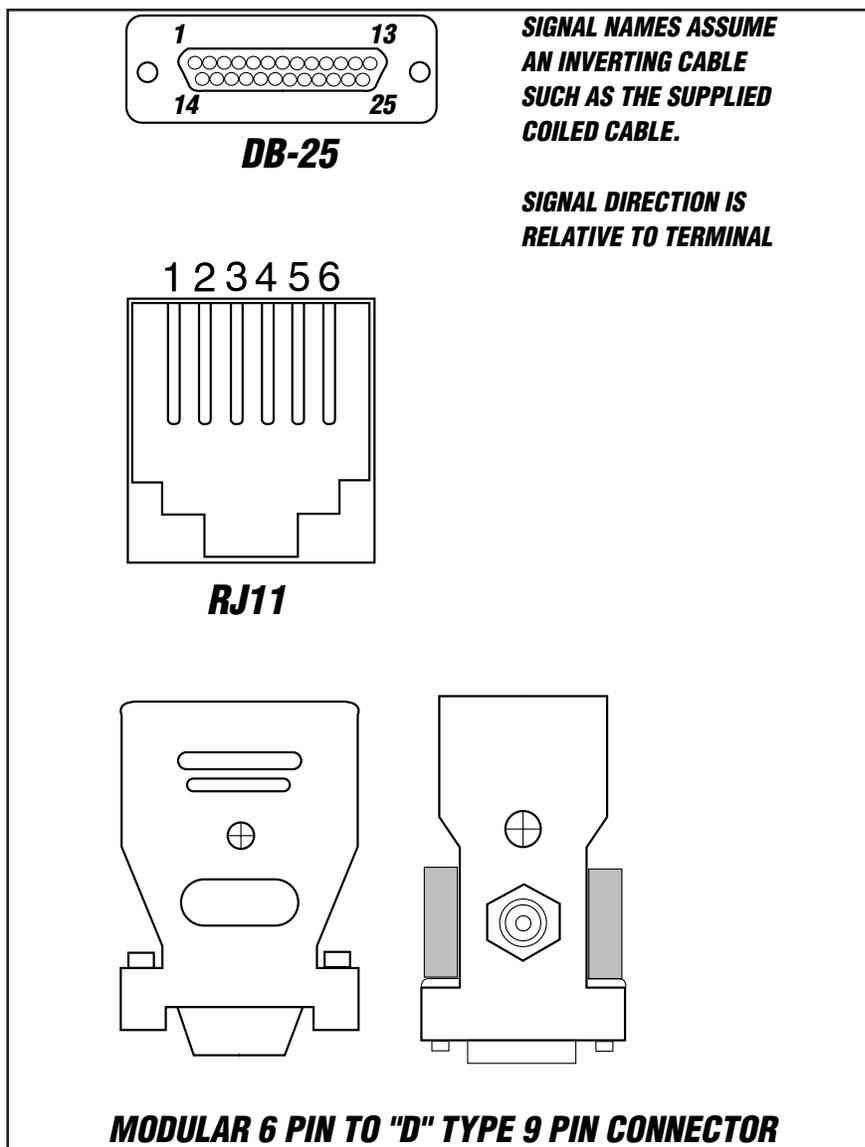
ACCESSORIES

The SIT is supplied with a 7ft. coiled cable. Connection to the SSC by the coiled cable can be done using the DB-25 Connector.

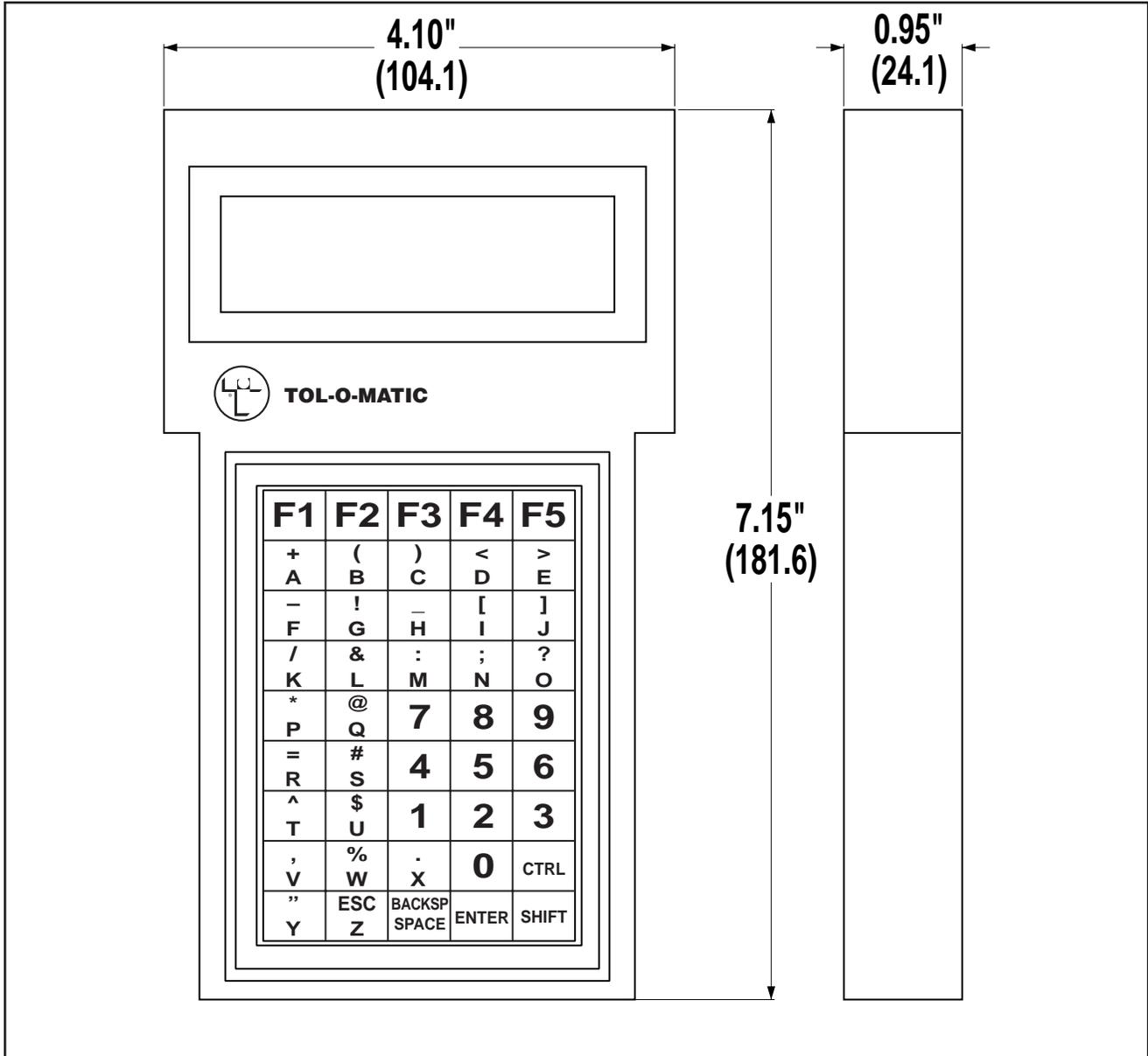


RJ11	DB25	RS-232C
WHITE (1)	9	+ SUPPLY IN
BLACK (2)	6	HANDSHAKE IN
RED (3)	7	HANDSHAKE OUT
GREEN (4)	2	DATA IN
YELLOW(5)	3	DATA OUT
BLUE (6)	5	COMMON

CABLE ADAPTERS



SIT DIMENSIONS





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