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TM8701
INSTALLATION GUIDE

UPS–TERMINAL

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November 1990

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Preface

This manual is intended to provide the information necessary to install the TM8701 Microterminal. Chapter 1 contains information concerning mechanical installation and hardware configuration. Chapter 2 provides electrical wiring information. Chapter 3 deals with setup of communication parameters and other options necessary to begin on-line operation. Refer to the Burr-Brown ***Data Collection Terminal Users Manual*** for information on terminal programming and functionality.

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Chapter 1
Mechanical Installation

UNPACKING

The TM8701 base unit, modules and accessories may be in separate boxes. These boxes should be retained and used if there is ever a need to ship the units. Special care should be taken with the option modules. These modules are shipped in special antistatic plastic bag with a small sheet of silver saver paper. This packaging protects the module and its elastomeric connectors. To insure proper operation of the TM8701, it is important to always store unused modules in their original packaging to prevent static damage to components and oxidation of connector surfaces.

Inspect all received parts for damage and report problems to the carrier. Do not attempt to use a TM8701 with a damaged case or display.

CAUTION: As with all electronic equipment, it is important to avoid static discharge to modules, electronic components, and interface connectors. It is good practice to touch a grounded metal surface before making connections to the TM8701 or handling its option modules.

HARDWARE CONFIGURATION

Selecting the Communications Interface

The TM8701 permits the user to choose either an RS-232 or an RS-422 communications interface. A socket on the circuit board accepts a jumper plug that selects either interface protocol. To change from one communication protocol to the other, follow the instructions and diagram on the following page.

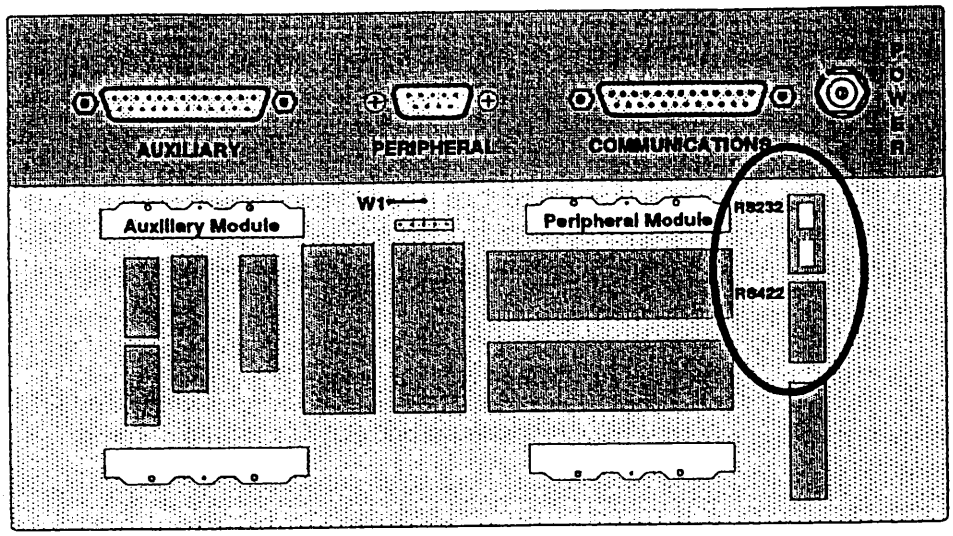
CAUTION: Check that power is disconnected before proceeding.

1. Place the terminal face down on a flat surface. Remove the rear cover by removing the four screws which secure the rear it in place.

2. Carefully remove the jumper from the socket it is currently installed in and insert it into the desired socket.

3. Reinstall the rear cover.

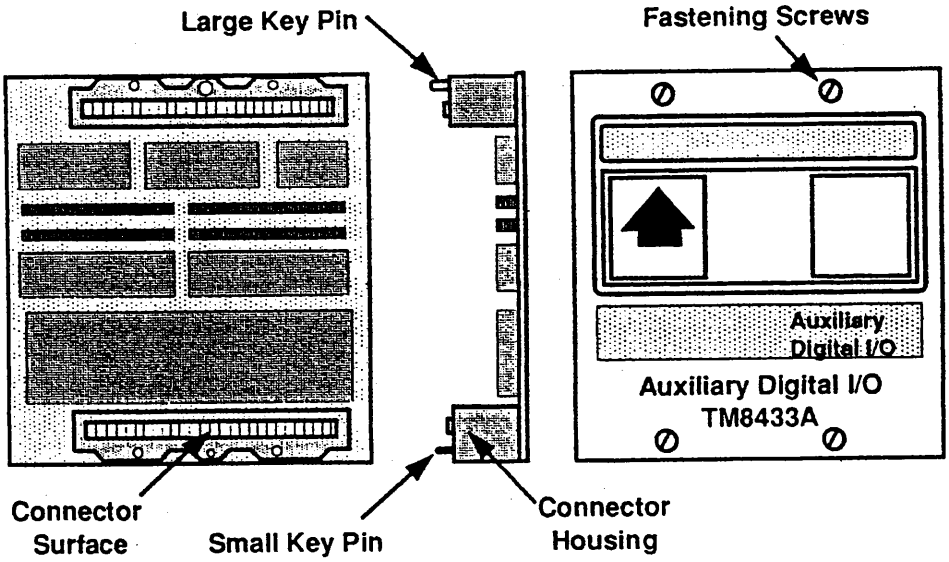
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Communication Jumper Locations

Module Installation

TM8701 option modules are small printed circuit boards with the electronic components necessary to add a particular capability to the terminal. Before attempting to install the module, hold it by the edges and inspect it to identify the module's features with the aid of the diagram below:



Module Construction

Modules are installed by engaging the key pins in their corresponding holes on the terminal's main printed circuit board and then tightening the four fastening screws to secure the module in place. The size and location of key pins on each module are designed to prevent a module from being placed in the terminal upside down or in the wrong location.

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If a TM8426 Laser Interface Module is being installed, then jumper W1 must be removed. Refer to the Peripheral section of Chapter 2 for the TM8426 Installation procedure.

Always use the following procedure when installing option modules. Check that power is disconnected before proceeding.

1. Place the terminal with its keyboard face down on a flat surface. Remove the four screws that secure the rear cover.

2. Determine the correct location. An auxiliary module cannot be installed in a location designed for a peripheral module or vice versa. Inside the terminal you will see an electronic printed circuit board with white outlines printed in the shape of the module connector housings. Within each of these outlines are three holes, two threaded screw holes and a center key hole. Note that the key holes have larger and smaller diameters, corresponding to the key pins on the modules themselves.

3. Handle the module properly. The module may be handled by grasping the edges of its printed circuit board or the heads of the fastening screws. Note that the fastening screws are captive, or retained by the connector housing. You should not attempt to remove the screws completely from this housing while installing or removing modules. Again, be certain to touch a grounded metal surface before handling the module to make sure you discharge static electricity.

4. Place the module carefully in its location. Lower the module into its proper location, making sure that the small key pin is aligned with the small key hole, and the large key with the large hole. Move the module gently from side to side until the key pins engage in their corresponding holes on the printed circuit board.

5. Tighten the fastening screws. Use a small size screwdriver to avoid slipping off the screw heads and to prevent overtightening. Give each screw a few turns to seat the module and then go back and tighten each screw until moderate resistance is felt. **Do not Overtighten.**

6. Don't force it!! Modules should install easily. If you encounter resistance, STOP, remove the module, check the orientation and location and begin again.

FUNCTION KEY LABELING

The function key label (F1,F2 ... F16) can be replaced with application specific labeling and company logos. The reverse side of the label strip has a blank, printable surface which will readily accept permanent marking. Alternatively, a custom label can be inexpensively produced to match the TM8701's color scheme (Pantone 412U with 421C lettering).

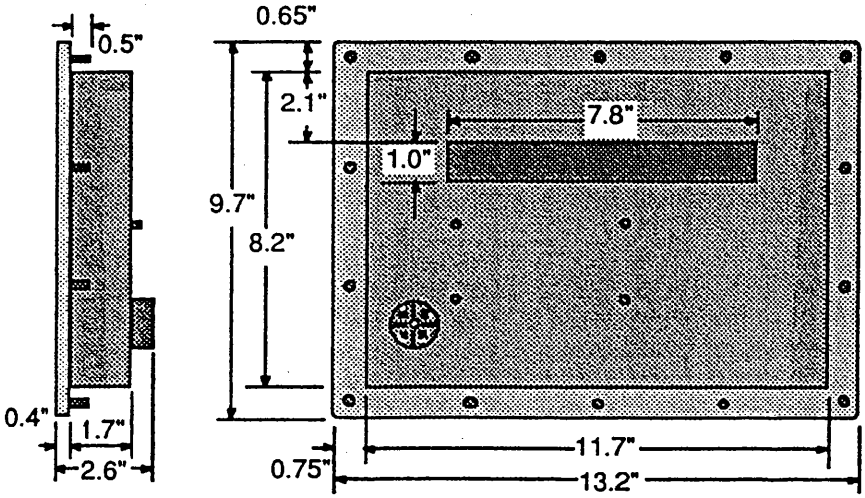
The label strip cover can be removed by inserting a small flat blade screwdriver between it and the rubber face at the center of the cover and prying up until it can be grasped and removed.

Reinstall the label and cover by inserting one end and bending the strip until the other end can be inserted. Then press the cover firmly in place until it rests flush with the rubber surface. The fit is designed to be tight to minimize contamination of the label area.

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MOUNTING

The TM8701 is designed to be capable of achieving a NEMA 4 (and IP66) seal rating when properly installed. This involves proper enclosure preparation and use of the TM8448 Mounting Kit. The following diagram gives mechanical dimensions of the TM8701 case. Enclosure preparation is described in the Mounting Kit section.



Mechanical Dimensions

TM8448 MOUNTING KIT

The TM8448 Mounting Kit allows the TM8701 to be mounted in industrial enclosures and instrument panels. The molded seals on the terminal's mounting surface are capable of sealing to smooth or lightly textured panels.

Parts List

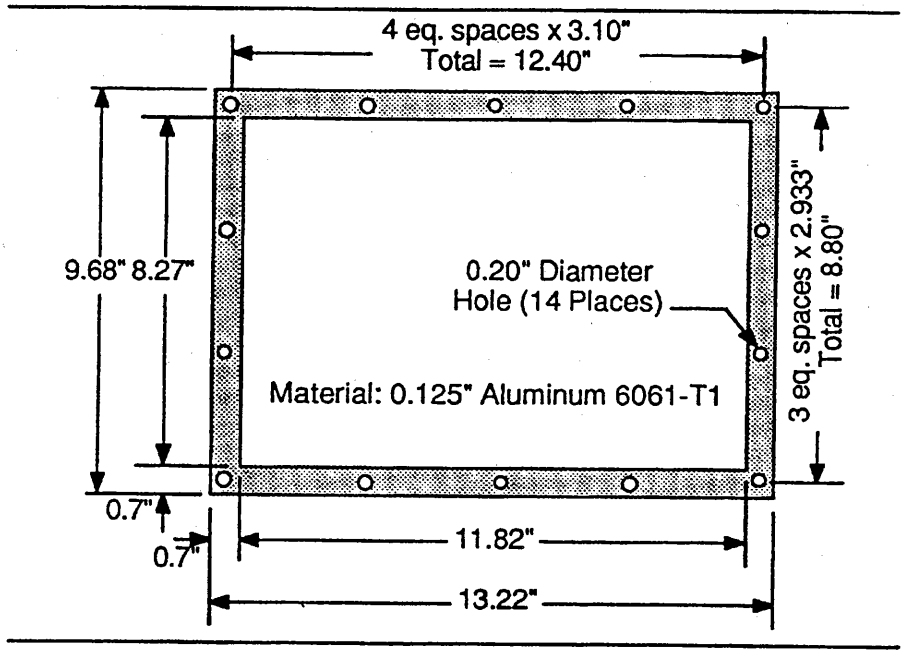
Quantity	Description
1	Backing Plate
14	#8-32 Locknut

Assembly Sequence

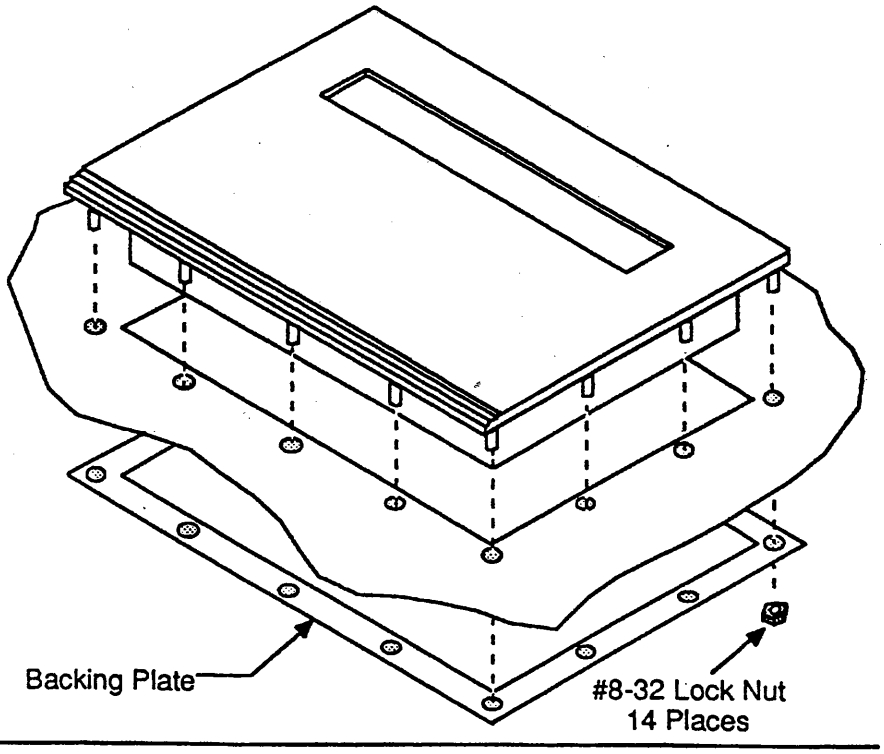
1. To mount the terminal, prepare a cutout in the panel using the backing plate as a template.
2. Drill 0.2" holes for clearance of #8 threaded hardware using the backing plate as a template.
3. Insert the TM8701 case through the front of the panel.
4. While holding the terminal in place, slide the backing plate over the threaded studs and install the locknuts provided with the kit.

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5. Torque all locknuts to 12 inch pounds. Any sequence can be used, however, each nut should be torqued twice to ensure proper sealing.



TM8448 Backing Plate

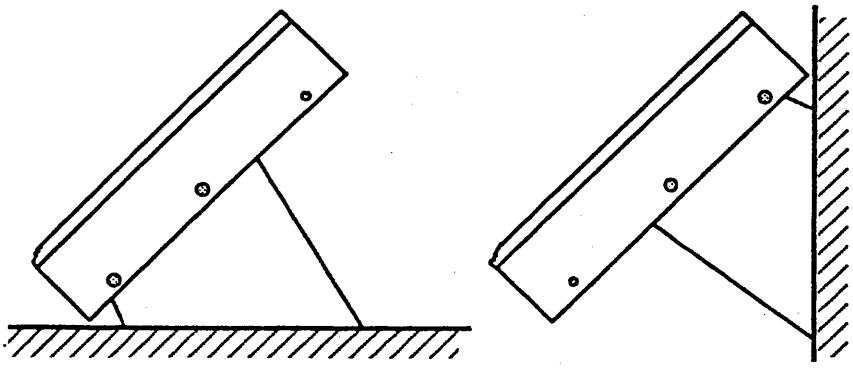


TM8448 Mounting Kit Installation

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TM8447 DESK/WALL STAND

For applications not requiring hoseproof installation the TM8701 may be wall mounted or desktop mounted using the TM8447 Tilt stand. The following diagram illustrates the two basic mounting configurations. The terminal's mounting angle can be adjusted to 30, 37.5 or 45 degrees with either mounting method.



TM8447 Mounting Orientations

Parts List

Quantity	Description
1	Tilt Stand Box
1	Tilt Stand Bracket
2	#6-32 locknut
13	#8-32 locknut
6	#6-32 phillips head screw
1	Foam washer w/adhesive backing
1	Wandholder
4	Rubber foot w/adhesive backing

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Assembly Sequence

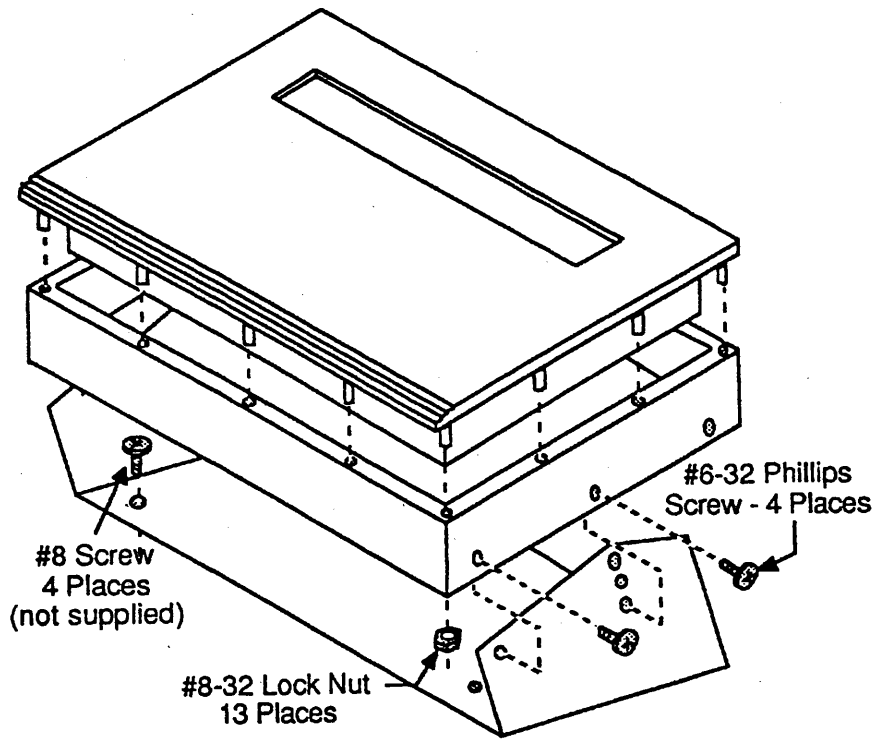
1. Slide TM8701 into Tilt Box making sure the rounded upper corners of each part are aligned.

2. Mount terminal to Tilt Box using #8-32 locknuts. Torque to 12 inch-pounds.

3. Mount tilt bracket to desk or wall using up to #8 hardware (not supplied). Mounting holes are on 5.50" x 11.00" centers. For desk use without fixed mounting, apply 4 rubber adhesive feet to underside of bracket.

4. Mount terminal/tilt box assembly to bracket using #6-32 phillips screws. Install fixed position outer screws first, then middle screw to adjust tilt to desired angle. Three tilt angles are possible; 30°, 37.5° and 45°. The 30° angle is set by installing the screws in the lowest hole. The middle hole sets 37.5° and the top hole sets the angle at 45°. The wandholder, if used, should be installed at this time.

5. Install remaining #6-32 phillips screws and locknuts in the unused holes in the tilt box.



Tilt Stand Assembly

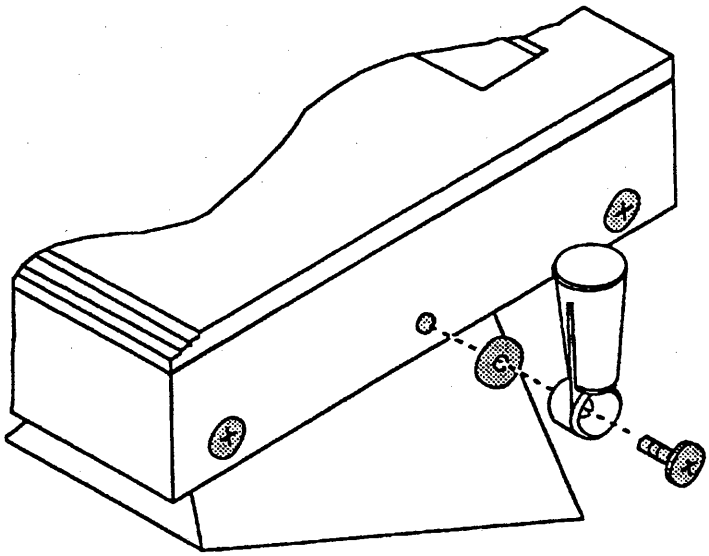
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Wandholder Installation

1. The wandholder should be installed after the desired tilt angle has been set. The wandholder can be mounted at any of the 3 screw locations on either side of the tilt stand box.

2. Remove backing from foam washer and apply adhesive side to wandholder mounting surface.

3. Insert #6-32 phillips through wandholder as shown and install assembly to tilt stand box in the desired location.



TM8447 Bar Code Wand Holder Installation

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Slot Reader Installation

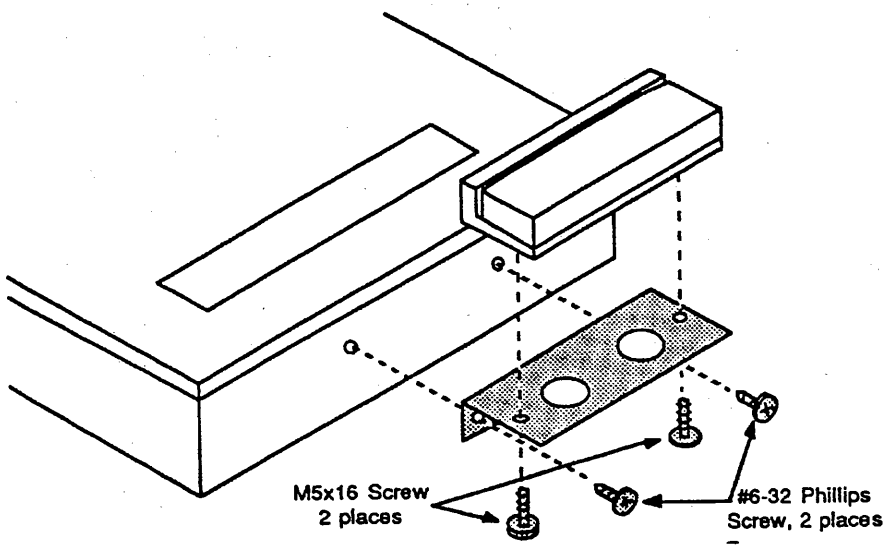
PARTS LIST

Quantity	Description
1	Slot Reader mounting bracket
2	#6-32 phillips screw
2	M5x16 metric screw

1. The Slot Reader can be installed at any time in the assembly process. Mount bracket to tilt stand box using #6-32 screws.

2. Mount slot reader module to bracket by passing cable assembly through the corresponding hole in the bracket and securing the slot reader with two M5x16 metric screws provided.

3. Plug slot connector into TM8701 peripheral connector. Fold excess cable and store in area between the terminal rear cover and the tilt stand box.

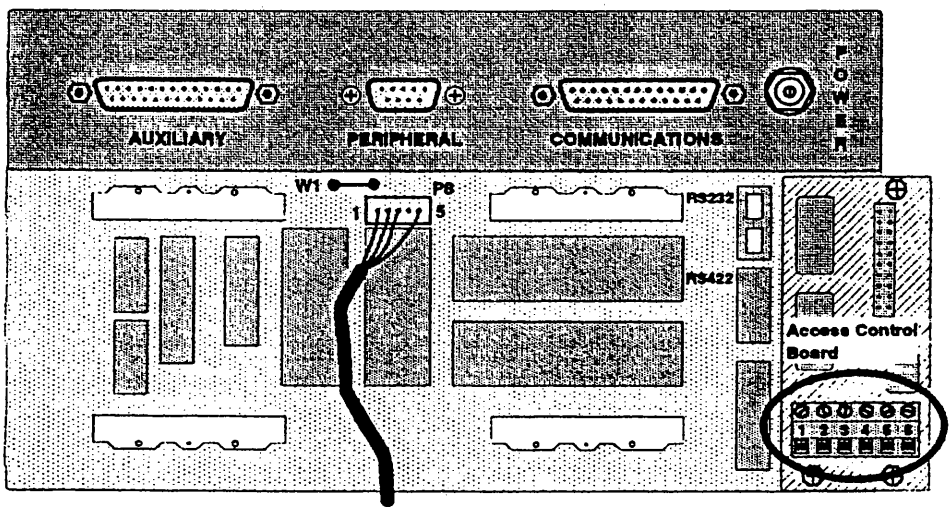


TM8447 Slot Reader Installation

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Chapter 2
Electrical Wire Installation

There is a row of four interface connectors on the TM8701 rear panel. The following diagram indicates the location of each of these connectors:



TM8701 Connector Locations

POWER

It is recommended that power be supplied to the unit by the TM8443 power pack (12VDC, 1.2Amp, regulated). For connecting power from other sources, a barrel-type mating connector (Switchcraft P/N 760) is required. The connector should be wired so that the center is positive and the outside is ground. External DC power should be regulated and should range between 9 and 12 volts.

The maximum allowable current draw of the terminal, optional modules and peripherals is 500mA. If a helium-neon laser scanner (BCL142, BCL144, BCL145 or BCL146) is used 12VDC at 1.2A is required. The TM8443 power pack is recommended for helium-neon laser applications. Power may also be connected to special pins on the host communications connector. Power connected at this point must be 9-12 volts on pin 15. Use pin 1 as the supply return.

Model	Description	Current Required
TM8701-2000	Microterminal	250mA
TM8701-2001	w/Access Control Option	350mA
TM8701-2002	w/Access Control Option	350mA

The TMJ2 communications junction box and TMK9xx RS-422 drop cables may be used to distribute power and communications signals to two Burr-Brown microterminals. The TMJ4 remote-powered communications junction box may also be used to distribute power and communications from a central site.

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:OMMUNICATION

ıe host interface is connected through a female DB-25 connector. The pinout of this ınnector is dependent on the position of the communication jumper in the unit. Please note at there are three non-standard signals present on this connector: pins 14 and 15 are ınnected to the unit's power regulator, and pin 10 is an active high digital output signal hich is activated when the internal beeper is sounded. Care should be taken that these ;nals are not accidentally connected to communications circuits of the host system.

PIN #	FUNCTION	PIN #	FUNCTION
1	Ground	14	+5VDC
2	TX Data	15	Power Input
3	RX Data	16	N/C
4	RTS	17	N/C
5	CTS	18	N/C
6	N/C	19	N/C
7	Signal Ground	20	DTR
8	N/C	21	N/C
9	N/C	22	N/C
10	Beeper	23	N/C
11	N/C	24	N/C
12	N/C	25	N/C
13	N/C		

RS-232 Pin Assignments

PIN #	FUNCTION	PIN #	FUNCTION
1	Ground	14	+5VDC
2	B	15	Power Input
3	A	16	N/C
4	B'	17	N/C
5	A'	18	N/C
6	N/C	19	N/C
7	Signal Ground	20	N/C
8	N/C	21	N/C
9	N/C	22	N/C
10	Beeper	23	N/C
11	N/C	24	N/C
12	N/C	25	N/C
13	N/C		

RS-422 Pin Assignments

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PERIPHERAL

The TM8701 terminal can directly support a bar code wand or slot reader connected to the peripheral input connector. A magnetic stripe reader or moving beam scanner is supported with the addition of an optional peripheral module.

Dual Peripheral Operation

A terminal can support two bar code scanners with the use of the TMPY02 peripheral splitter box. Refer to the ***TMPY02 Peripheral Splitter Box*** Installation Instructions (MB51572) for details on this product. A second bar code wand, slot reader or moving beam scanner with integral decoder does not require an additional module. However, jumper W1 must be intact for proper operation of this configuration. See the TM8701 Connector Locations illustration at the beginning of this chapter.

A TM8426 Laser Interface module must be installed for operation of certain moving beam scanners (including the BCL142, BCL144, BCL145 and BCL146). Refer to the ***Moving Beam Bar Code Input Devices*** data sheet (Burr-Brown #PDS-1021) for complete information on all moving beam scanners.

The following steps must be taken for proper operation of this configuration:

1. Jumper W1 must be removed. Clip W1 with wire cutters and spread the wires to ensure that continuity is eliminated.

2. Install the TM8426 module at the peripheral module location

3. Use one TM8443 power supply or one TMJ4 remote-powered junction box for each terminal.

A terminal with a magnetic stripe reader and module may also support a bar code wand, slot reader or moving beam scanner with integral decoder (i.e. no TM8426 module). The terminal firmware version must be V03.00 or later for the dual mag-stripe and bar code capability.

The TMA024 dual peripheral board should be used to provide a second 9-pin peripheral connector. The TMA024 may be mounted to the TM8701's rear cover using the #4-40 screws provided with the unit. An illustration on the following page shows the mounting location. Plug the mag-stripe connector into the lower, "module" input and the bar code connector into the upper "direct" input. The beeper assembly may be temporarily removed (unscrew counter-clockwise) while installing the TMA024 and replaced once the connections are made.

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PIN #	FUNCTION	PIN #	FUNCTION
1	I/O 0	14	I/O 1
2	I/O 2	15	I/O 3
3	I/O 4	16	I/O 5
4	I/O 6	17	I/O 7
5	I/O 10	18	I/O 11
6	I/O 12	19	I/O 13
7	I/O 14	20	I/O 15
8	I/O 16	21	I/O 17
9	Ground	22	Ground
10	Ground	23	Ground
11	OS 0	24	IS 0
12	IS 10	25	OS 10
13	N/C		

TM8433A Digital I/O Module Pin Assignments

ACCESS CONTROL

Two versions of the access control option are available: the TM8701-xxx1, which has two form C reed relays and the TM8701-xxx2, which has two form A mercury wetted reed relays. The form C relays to provide both normally open and normally closed contacts. The form A relays provide only normally open contacts but have a much higher power handling capability. The maximum ratings are as follows:

Parameter	Form C Relay	Form A Relay (Mercury wetted)
Switching Power	3 Watts	50 Watts
Switching Voltage	30 VDC	48 VDC
Switching Current	0.2 Amps	1.0 Amps
Carry Current	0.5 Amps	2.0 Amps

Access Control Relay Ratings

The printed circuit board includes a six position screw-clamp type connector for connection to the two relays.

Pin#	Description	Form C Relay	Form A Relay (Mercury Wetted)
1	Relay #1	Normally closed	Normally open
2		Common	Common
3		Normally open	Normally open
4	Relay #2	Normally closed	Normally open
5		Common	Common
6		Normally open	Normally open

Access Control Pin Assignments

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Chapter 3
Terminal Setup

TERMINAL SELF-TEST

When the module installation is complete, perform the following steps to run the terminal self-test:

1. Turn the terminal power on.

2. Listen for the beep and look for this message. Note that V03.00 may not be displayed on your terminal. The exact display will vary with the firmware version installed in your terminal.

   TM8701 V03.00 Self-Test OK

3. Observe the module ID message. Make sure the modules you installed are correctly displayed.

Communication	Peripheral	Auxiliary
RS-422	Dual Bar code	Name

If the test fails, turn power Off and perform the following checks. Run the self-test after each check.

1. Ensure that all modules are installed correctly with their fastening screws tightened correctly. Loosen the screws and retighten them as described in the module installation section.

2. Remove the module(s) one at a time and check that the connector surface has not become loose and that it is clean. Connector surfaces may be cleaned with a cotton swab moistened with alcohol. Clean the module and the board connector surfaces. Allow them to dry before reinstalling the module.

If the self-test fails, contact your Burr-Brown representative for service.

LOCAL SETUP

Communications and operating parameters of the TM8701 are selected interactively from the keyboard and stored in the unit's non-volatile battery-backed RAM so they may be recalled automatically the next time the terminal powers up.

Setup selections are made in a special Setup mode which guides the operator through the various categories and choices using the display and function keys. After the initial setting of parameters, Setup need only be entered when an option is to be changed. In order to guard against accidental changes by untrained operators, the Setup mode is entered with a multiple key sequence keyed in after the terminal's power-up self-test routine.

With the exception of communications-related parameters, all of the terminal's operating characteristics can also be altered by commands from the host computer or transaction processor.

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Entering Setup Mode

The following sequence is used to enter the local setup mode.

1. Apply power to the terminal.

2. Wait for beep tone and Self-Test message:

   TM8701 V03.00 Self Test Ok

   The terminal's firmware version is indicated by the V03.00 message and will vary depending on the installed firmware revision.

3. Wait for module identification message:

Communication	**Peripheral**	**Auxiliary**
RS-422	**Dual Bar code**	**Name**

4. Press 2nd key, followed by ENTER.

You have five seconds to press these keys after the module identification message appears. If no key is pressed, the terminal will begin normal operation. Note that if the keyboard layout has been redefined, the Setup function may have been moved to another key.

Several keys are used by the terminal operator when in Setup mode:

NEXT (F1) Displays the next Setup category and its currently selected option on the top line of the display.

PREV (F2) Displays the previous Setup category and its currently selected option on the top line of the display.

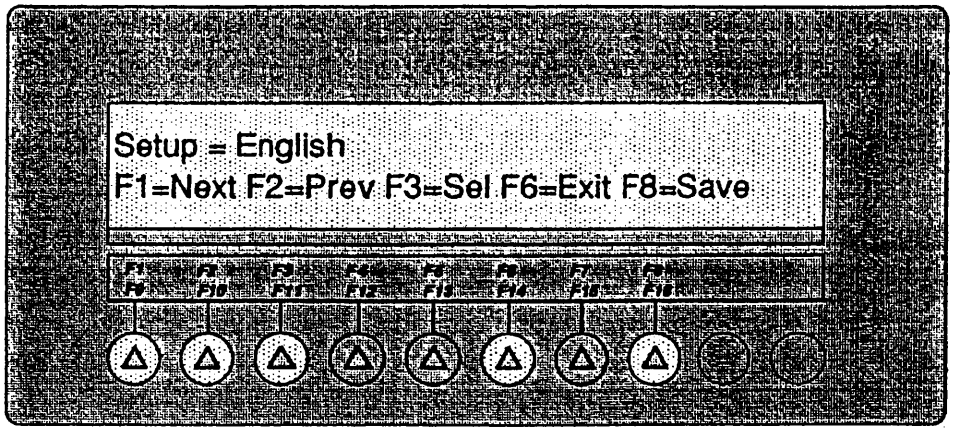
SEL (F3) Selects and displays the next option for the current category. Used to step through the choices in any particular category.

EXIT (F6) Leave Setup and begin normal operation. Exit leaves selected options in volatile memory and does not save them in battery-backed RAM.

SAVE (F8) Saves the current configuration in battery-backed RAM but does not Exit.

These keys and their functions are displayed on the protected bottom line of the display. The category and currently selected option are shown on the first line of the display. For example:

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TM8701 Setup Function Keys

Setup Categories and Options

Following is a listing of the Setup categories and the available options. Note that some selections are not required for certain terminal modes and will not be prompted for.

The setup category selects the language in which prompts will be displayed.

Terminal Mode:	**Block** **Character**

The above category selects the terminal's operating mode as described later in this user's guide. Block mode must be selected for multidrop applications or when buffering of input and output messages is desired.

Address:	**00 (non-polled)** **01** **02** • • **32**

The address category selects the terminal's optional multidrop address and is displayed only if block mode was previously selected. If any address other than "00" is selected the terminal operates in polled mode, transmitting data only when requested by the host computer (see poll command).

Baud Rate:	**300** **600** **1200** **2400** **4800** **9600** **19200**

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Baud rate setting selects the communication speed for transmitting and receiving on the host interface. The baud rate must be set to match that of the host computer.

Data Format:
7 bits odd parity
7 bits even parity
7 bits mark parity
7 bits space parity
8 bits no parity

The data format category selects the communications word length and parity. The data format selected must be compatible with that used on the host computer. The parity bit is ignored if mark or space parity is selected. All formats generate one stop bit.

Line Terminator:
ETX
CR
LF
CRLF

The above category selects the line or message terminator. In block mode operation this character (sequence) defines the end of a received message block and is appended to any message transmitted from the terminal. In character mode the line terminator is the character (sequence) which is transmitted when the ENTER key is pressed.

Handshaking:
None (Data Leads Only)
Modem Control
XON/XOFF

Handshaking setting determines whether flow control handshaking is used by the terminal on its host interface. When None is selected only the TX data and RX data lines are used. When Modem Control is selected the terminal asserts RTS and DTR and responds to CTS. When XON/XOFF is selected the ASCII <DC1> and <DC3> control characters are used to control transmission in both directions. The XON/XOFF choice will appear only when Character mode operation has been selected. Modem Control applies only to RS-232 communication, the Modem Control setting is ignored for RS-422 use.

Turnaround Delay:
0 mS
10 mS
20 mS
30 mS
40 mS
50 mS
100 mS
250 mS
500 mS
1 S

The above category selects the communications turnaround delay used in block mode operation. Turnaround delay is the length of time the terminal will wait between a request to transmit data (such as the poll or echo commands) and the actual transmission of that data.

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Backlight: Off
On
Auto On/Off

The Backlight controls the operation of the display backlight. When Auto On/Off is selected the backlight will automatically turn off after 10 minutes of inactivity. The light will then come back on with any input from the keyboard, peripheral, or auxiliary input.

Input Display: Free Format
One message per line

Input Display setting controls the display of input messages in block mode. When Free Format is selected each new message is displayed beginning at the present cursor position. One message per line causes the terminal to begin a new line with each message received.

Auto Wrap: Off
On

The Auto Wrap setting controls the movement of the display cursor after it reaches the rightmost position of the virtual display. When Auto Wrap is On the cursor will automatically move to the first position of the next line. When set to Off the cursor will remain at the right boundary of the display until a <CR> or other cursor movement character is received.

Newline: No
Yes

The Newline setting determines how the display will handle the <CR> and <LF> control characters. When set to Yes a received <CR> or <LF> is expanded to a <CRLF> sequence, causing the display cursor to move to the first position of the next line.

Display Width: 40
80

The above category determines the width of the terminal's virtual display. When set to 80 the display window will scroll horizontally as well as vertically.

Local Echo: Off
On

Local Echo setting determines whether characters entered from the keyboard, peripheral or auxiliary input are written to the display before being transmitted. This selection is made only in character mode.

Key Repeat: Off
On

The Key Repeat category determines whether data entry keys will repeat if held down.

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Key Click: Off
On

When Key Click is set to On, the beeper is sounded to provide audible feedback for each key depression.

Peripheral mode: Off
Auto
Manual

The above category determines the operation of the optional peripheral scanner. When set to Auto, each code scanned is automatically transmitted. When the terminal is in Block Mode, or automatically terminated in character mode. Setting the mode to Off disables the scanner.

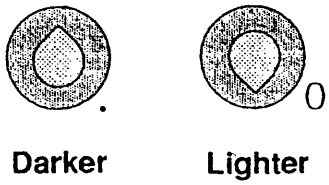
Symbology: Code 39
Full ASCII Code 39
Code 39 (Mod 43)
Interleaved 2 of 5
EAN/UPC
Code 128 (firmware V03.00 and later)
Auto Discriminate
Interleaved 2 of 5 w/check digit

The Symbology category selects the bar code symbology which can be read when a bar code scanner is used. When set to Auto Discriminate, the terminal will automatically identify and decode Code 39, Interleaved 2 of 5, UPC/EAN and Code 128. When any individual code is selected, the terminal will read only that code.

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DISPLAY CONTRAST ADJUSTMENT

The contrast or viewing angle of the LCD display is adjustable from the keyboard. Two special symbols are located on the keyboard to indicate the functions for making the display lighter and darker. To adjust the viewing angle, press the 2nd key and then hold down the appropriate Contrast Control key until the display is easily readable.



Contrast Control Keys

BEEPER ADJUSTMENT

The TM8701 contains an extremely loud audio alarm that can be adjusted for various volume levels. The beeper is located on the rear of the terminal. The volume can be attenuated about 20dB by rotating the shutter on the beeper's front.

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