AMANO ®

MTX System

MTX-OD/MTX-10/MTX-20 Data Collection System

Operations Manual

Chapter 1: Introduction

The MTX System consists of a data collection terminal (MTX-10 or MTX-20), communications software (MTX-COM), and programming software (MTX-PRO). Typical applications include Time & Attendance, Job Costing, Statistical Data Collection or Access Control.

Data can be input to an MTX terminal through the use of a Magnetic-Stripe Card, Proximity Card, or Bar Code Card, Label, and Sheet. In addition, the MTX-20 terminal is equipped with a keyboard for manual data entry.

MTX-PRO

Configures the terminal hardware
Determines a key configuration and a card format
Creates the terminal operation process
Downloads the .exe file and tables to the MTX terminals

Application Software

1. Time & Attendance
2. Job Costing
3. TruTime
4. etc.

MTX-COM

1. Creates the validation schedule tables
2. Sets up the system configuration
3. Downloads the files to the terminal(s)
4. Polls the data from the terminal(s)
5. Downloads the predefined .exe files and tables

Download. Exe & Table File
Poll Transaction Data
Download Validation Table File

MTX-10

TOS runs the .exe File

MTX-20

Magnetic Stripe Card
Bar Code Card
Proximity Card

Key Input

Magnetic Stripe Card
External Reader MTX-EX
Bar Code Wand
Bar Code Sheet
Bar Code Card

Proximity Card
Externally Mounted Proximity Card Reader
Bar Code Scanner

The terminal has been designed using a modular structure that provides a variety of interchangeable features. This allows the terminal to be modified and upgraded quickly at a reasonable cost. For example, to upgrade an MTX-10 to an MTX-20, only the front panel needs to be replaced. Other electronics, such as the PCB or ROM, are not affected. Additional features such as the Card Readers, Full Power Reserve and Signal Kit Modules can also be changed or added without difficulty.

The terminal is completely configurable using the Windows™-based MTX-PRO software. Through the use of software, you can customize the MTX to meet your specific needs. When set to your specifications, MTX-PRO prepares an application program for the terminal which can then be downloaded to the terminal. The terminal firmware includes an operating system called TOS (Terminal Operating System) which allows the terminal to run an application program (.exe) file similar to a PC.

MTX-COM is a communications program that enables you to remotely control, retrieve, and utilize the data that is input and stored in the terminal. These operations can also be performed by Amano's time and attendance software, TruTime. Both TruTime and MTX-COM contain the necessary commands that can allow you to effectively communicate with an MTX terminal. Both programs also contain template application files created in MTX-PRO for use with the terminal.

Chapter 2: Specifications and Features

The MTX-10 and MTX-20 terminal hardware and software have modular-type structures with the only difference being the front panel.

External View

MTX-10

Main Case

LCD Display
(7 segments, 6 digits)

Lock

Wall Mount Plate

Card Reader
Mag-stripe Card ANSI
Track 2, 3
or
Bar Code Card
Interleaved 2 or 5 and
Code 3 of 9

Wall Mount Transformer

MTX-10 Front Panel

MTX-20

LCD Display
(4-lines of 20
alphanumeric
characters
per line)

**Lock,
Wall Mount Plate,
Card Reader,
Main Case and Transformer
are identical to the
MTX-10.**

MTX-20 Front Panel

Keyboard 24
(6w x4h configurable)

Common Features and Specifications

Card Reader

The following card readers are available:

- **Magnetic Stripe Slot Reader:** ANSI Track 2 or Track 3

- **Bar Code Slot Reader:** Interleaved 2 of 5 and Code 39 formats

- **Proximity Card Reader:** 26-bit Weigand proximity cards

- **External Magnetic Stripe Slot Reader:** ANSI Track 2

- **Modified Magnetic Stripe Slot Reader:** This reader is available for terminals with an externally mounted Proximity Card reader, and can only read ANSI Track 2.

- **Modified Bar Code Slot Reader:** This reader is available for terminals with an externally mounted Proximity Card reader, and can read Interleaved 2 of 5, and Code 39 formats.

- **Bar Code Wand Reader:** Interleaved 2 of 5, and Code 39.

- **Bar Code Scanner:** Code 39 and Same Code Format (UPC, EAN, Code 128, Interleaved 2 of 5, and Code 39)

TOS (Terminal Operating System)

The TOS is designed exclusively for the MTX and does not support a disk operating system such as MS-DOS, OS/2, etc. It only partially supports MS-DOS in its capacity to complete the functions required by Microsoft "C' standard I/O and the dynamic allocation library functions. Put simply, the TOS is a real-time, multi-tasking engine which controls and monitors the terminal's operations. The MTX can also run an executable file which has been created using the standard "C" language. The file can then be downloaded from the PC to the MTX terminal with MTX-COM, MTX-PRO, or TruTime.

CPU

V25 NEC 16-bit 16MHz Micro controller.

Memory

The MTX has two types of memory: Static RAM (SRAM) and Flash ROM. The Flash ROM is used to store the Terminal Operating System (TOS), downloaded application files (.exe) and validation tables. SRAM is used for the working buffers of the TOS, application files, and validation tables. Transaction data is shared by both SRAM and Flash ROM.

Flash ROM	
Application Files (.exe) and Validation Tables	128 KB
TOS	128 KB
Transaction Data	256 KB
Total	512 KB

SRAM	
TOS Working Buffer	16 KB
Application File (.exe) Working Buffer	16 KB
Transaction Data	480 KB
Total	512 KB

Power Supply

The MTX uses a wall mount type of transformer, with the following specifications:

- **Input Voltage:** 120 VAC ± 10%, 60Hz

- **Output Voltage:** 13.5 VAC, 0.6 A

- **Power Consumption:** Typical applications require approximately 3W, with a maximum of 6W.

Clock Accuracy

- Within ± 3 seconds (at normal temperature)

Power Failure Protection

- The MTX has a built-in lithium battery that protects the memory and internal configuration of the terminal for up to two years of accumulated use.

Ambient Environmental Conditions

Ambient Temperature: -5°C (23°F) to 40°C (104°F) without Internal Heater Option. -20°C (-4°F) to 40°C (104°F) with Internal Heater Option

Humidity: 30% (non-condensing)to 100% (indirect light rainfall)

Communications

The MTX terminal communications setup has been designed for ease of use. You are not required to set the Baud Rate, as it is adjusted automatically. You also do not need to set the Parity Bit, Stop Bit, or Code Length as they are permanently fixed. You are required to set the Communication Type for the MTX using either MTX-COM, MTX-PRO, or TruTime software. The Communication Types available are RS-485 only, RS-232C only, RS-232C/RS-485, Modem, or Ethernet connection. For an RS-485 connection, you can use either a 4-wire line or a 2-wire line.

Baud Rate

The MTX will automatically adjust the Baud Rate to match your PC or Modem. The range is from 1200 to 19200 bps.

Parity Bit: 8 bit, Fixed

Stop Bit: 1 bit, Fixed

Parity: Non Parity

Serial Number

Each MTX terminal has a (10 digit) Serial Number, which is also called the Terminal ID. It is used for Terminal Number assignment and tracking the version of TOS. This unique number is "written" in the Flash ROM when the MTX is prepared for shipping and is displayed on a label inside the machine. You will also see the number appear in the display of the MTX-20 when it is powered on or reset.

Terminal Number

MTX-COM, MTX-PRO, and TruTime automatically assign the Terminal Number to the MTX after "reading" the Serial Number.

Modular Structure

The modular structure of the terminal allows for ease of installation, upgrading, and multiple mounting orientations.
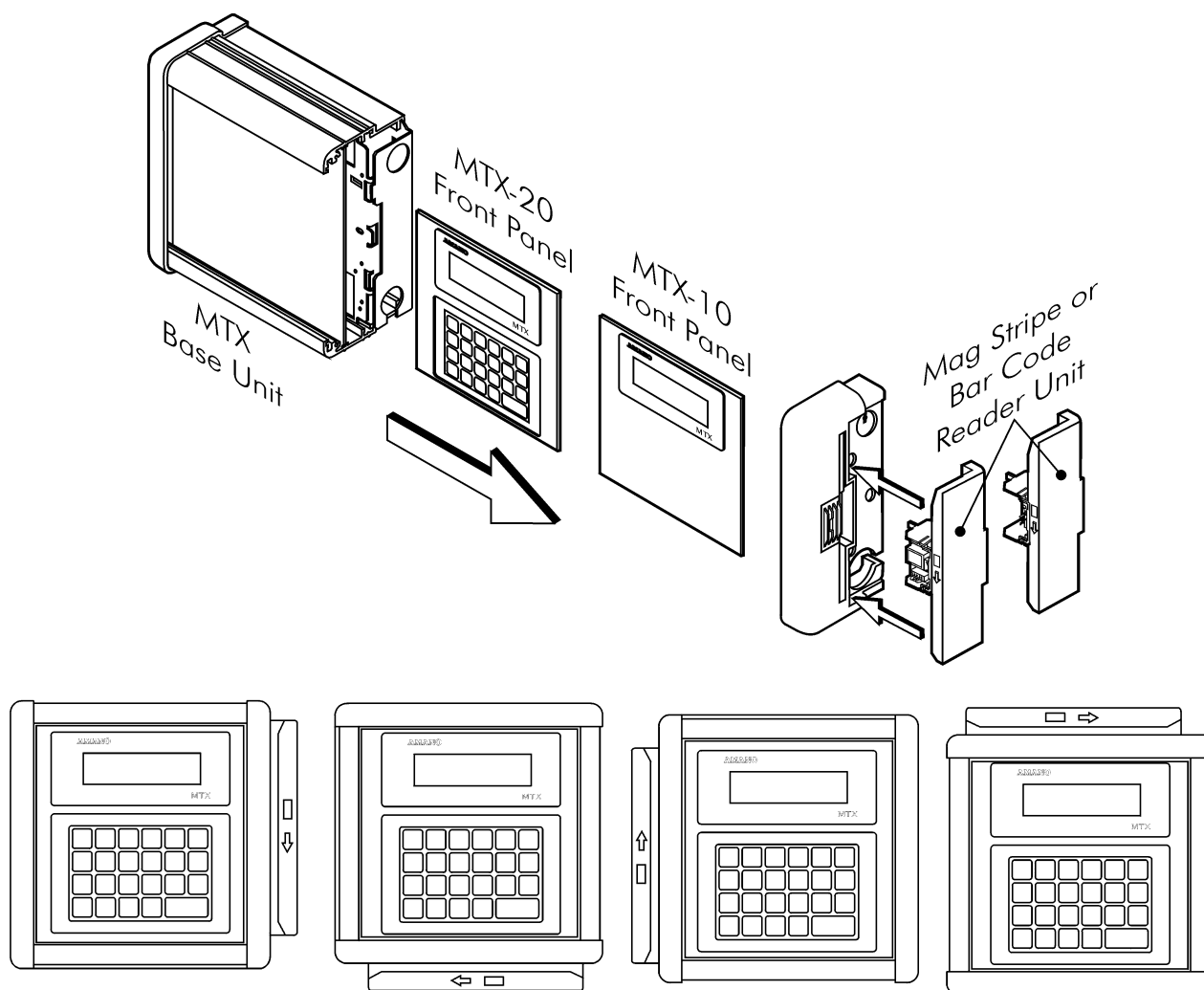
Setting the Time/Date and Daylight Saving Time

The time, date and daylight saving time can be set from your PC using MTX-PRO, MTX-COM, or TruTime.

Full Power Reserve Option

The Full Power Reserve Option is designed to provide up to three hours of back-up power (time may vary depending on options installed) for full operation of the terminal during a power failure. Power is provided by a rechargeable battery pack consisting of six "AA" Nickel Cadmium batteries.

Internal Heater Option

Heating Element: Three power resistors, 33W, 7W, forced flow of air by fan. Clear flat heater for LCD display, 28W.

Transformer: An external transformer is required to power the Internal Heater the transformer specifications are:

- **Dimensions:** 6.30" High x 4.72" Wide x 3.66" Deep case

- **Input Voltage:** 120 VAC ± 10%, 60Hz

- **Output Voltage:** 14 VAC ± 10%, 2A

- **Humidity:** Up to 100% (direct light rainfall)

Temperature Control Disc Thermostat: Close @ 40°± 8°F (4.5°± 4.5°C), Open @ 60°± 5°F (15.6°± 2.8°C)

MTX-10 Unique Features and Specifications

Display

The MTX-10 has a simple six digit, seven segment LCD display. The MTX-10 is not equipped with a keyboard.
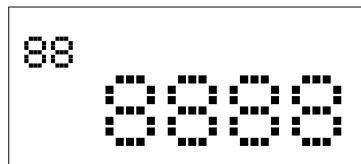
The MTX-10 shows the date/time and can also show six digit numbers or symbolized alpha characters.
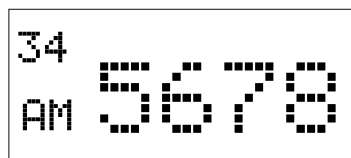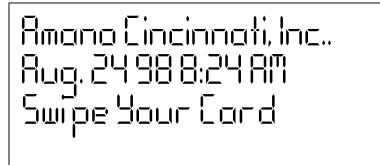
The displayed information is determined by the application created and downloaded from MTX-PRO, MTX-COM, or TruTime. If an application file is not downloaded to the MTX-10, the operating system will only display the time and date.

MTX-20 Unique Features and Specifications

Display

The MTX-20 has a character display (4 lines for up to 20 alpha-numeric characters per line) and a configurable keyboard (6 columns x 4 rows).

```
Amano Cincinnati, Inc..
Aug. 24 98 8:24 AM
Swipe Your Card
```

The MTX-20 can display any alpha-numeric character (ASCII characters), time (12 or 24 hour) or date (any format) depending on the .exe files & tables created and downloaded from MTX-PRO or MTX-COM software. The available time display formats, which are automatically incremented by TOS, are AM/PM and 24 hour.

The available Date display formats, which are automatically incremented by TOS, are as follows:

- **Order:** M/D/Y, D/M/Y, Y/M/D

- **Year:** 1995, '95, None

- **Month:** 01, Jan, None

- **Date:** Date and Day of the Week

You may program the Time or Date to overlap with other characters in MTX-PRO. When MTX-PRO increments the time or date, the time or date will override the overlapped characters.

Keyboard

The keyboard face of the MTX-20 is configurable. You have the option of configuring the keyboard to your own specifications using MTX-PRO, or you may use the predefined files available in MTX-COM, or TruTime.

MTX-PRO

1. Create the entire application, then download the .exe files and tables

2. Print the Keyboard Sheet

MTX-20

3. Cut out the Keyboard Sheet

4. Insert the Keyboard Sheet into the MTX-20 front panel

Specifications and Features MTX-SYSTEM
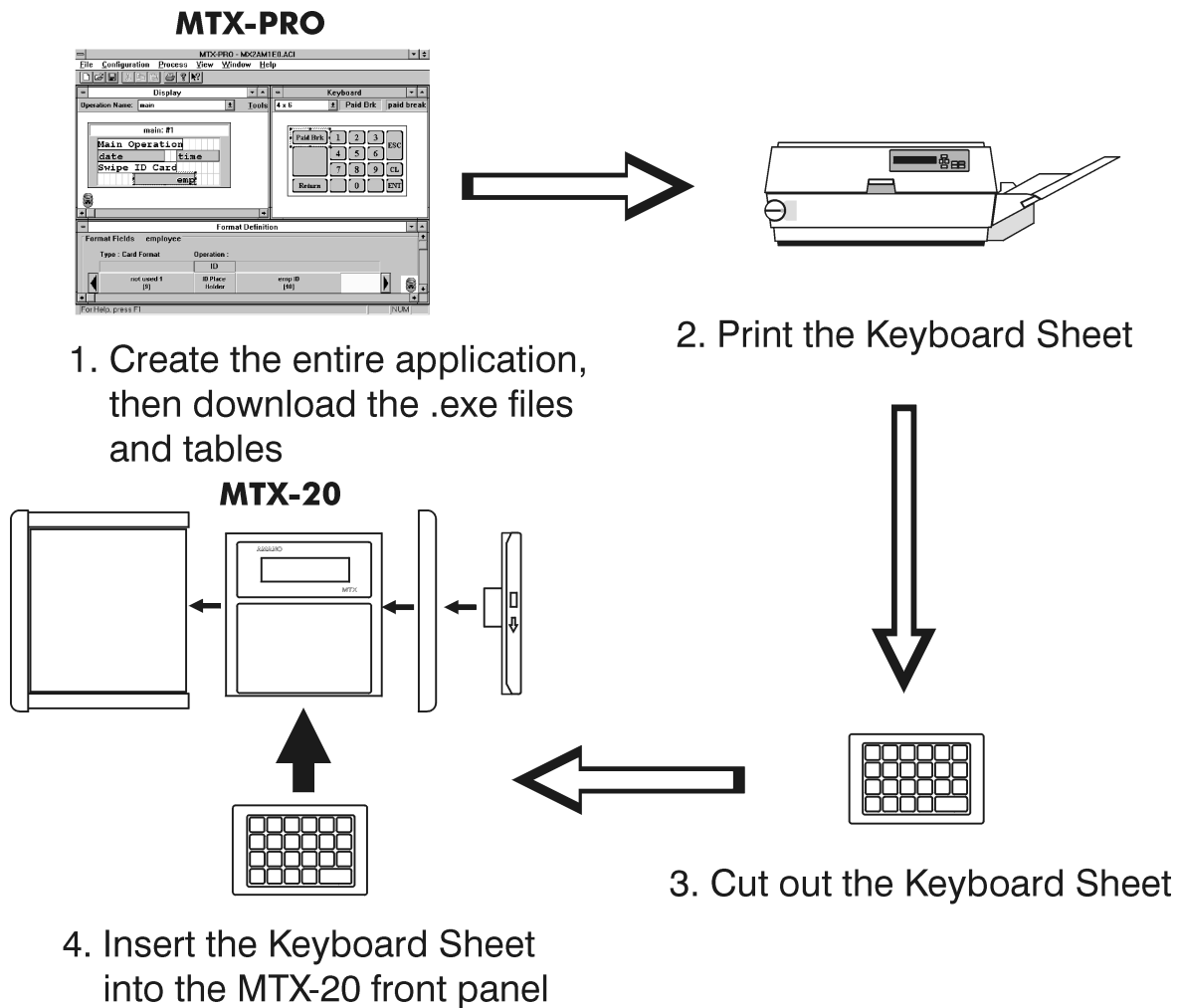
This chapter discusses the components, mounting, installation, and the communications that can be used with your MTX terminal.

Components

Check to make certain you have all the appropriate components which are shipped with your MTX terminal.
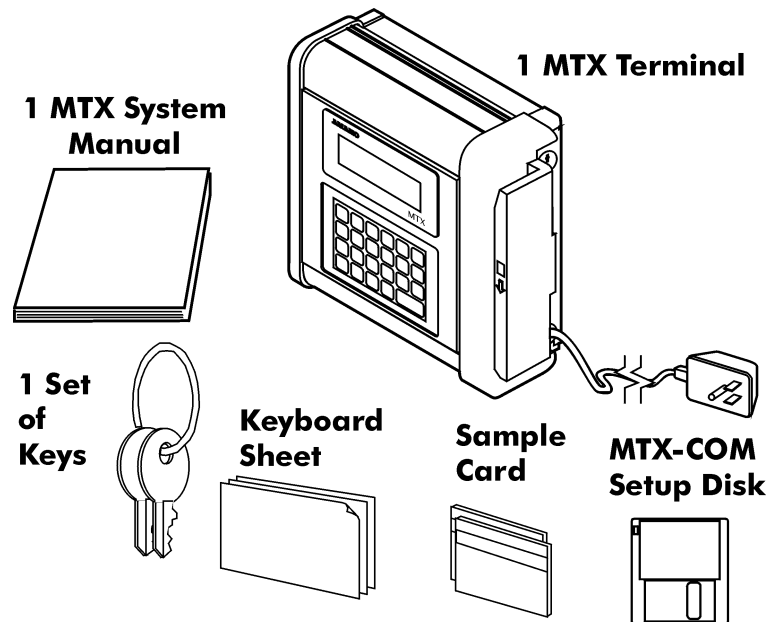
Choosing An Installation Site

Select an appropriate site for your terminal and avoid the following problem areas:

Jumper Settings

Terminals MTX built as of October 2000 have six jumpers. Their functions and designations are as follows:

Jumper	Function	Factory Setting
J1	Two or Four Wire RS-485 Connection	ON
J2	Two or Four Wire RS-485 Connection	ON
J3	Lithium Battery on PCB	OFF
J4	Terminating Resistor	ON
J8	Communications	OFF
J9	Communications	OFF

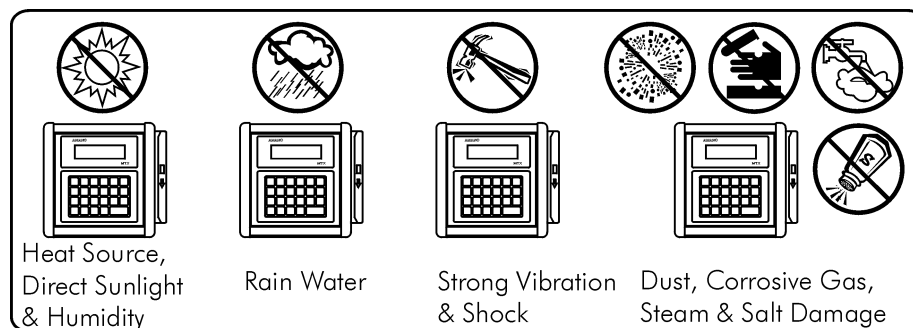**J1 and J2(RS-485 Two or Four Wire Connection):** These two Jumpers are used to set the type of RS-485 connection. They are both factory set to ON, which corresponds to a two wire RS-485 connection. When a four wire RS-485 connection is used, both jumpers (J1 and J2) must be set to OFF.

J3 (Battery): This jumper corresponds to the lithium battery on the PCB. It is factory set to OFF, but must be set to ON when the terminal is installed. The battery can keep the clock running and maintain the RAM memory contents during a power outage for up to two years of accumulated time.

J4 (Terminating Resistor): This jumper must be set to ON when a terminal is the first or end terminal in a communications line.

Communications (J8 and J9): These jumpers are factory set to OFF and should only be turned ON if the MTX terminal is connected to other terminal types over an RS-485 line, and is experiencing communications problems.

Jumper Locations

The jumpers are located in the larger PC board cutout on the side of the slot reader.
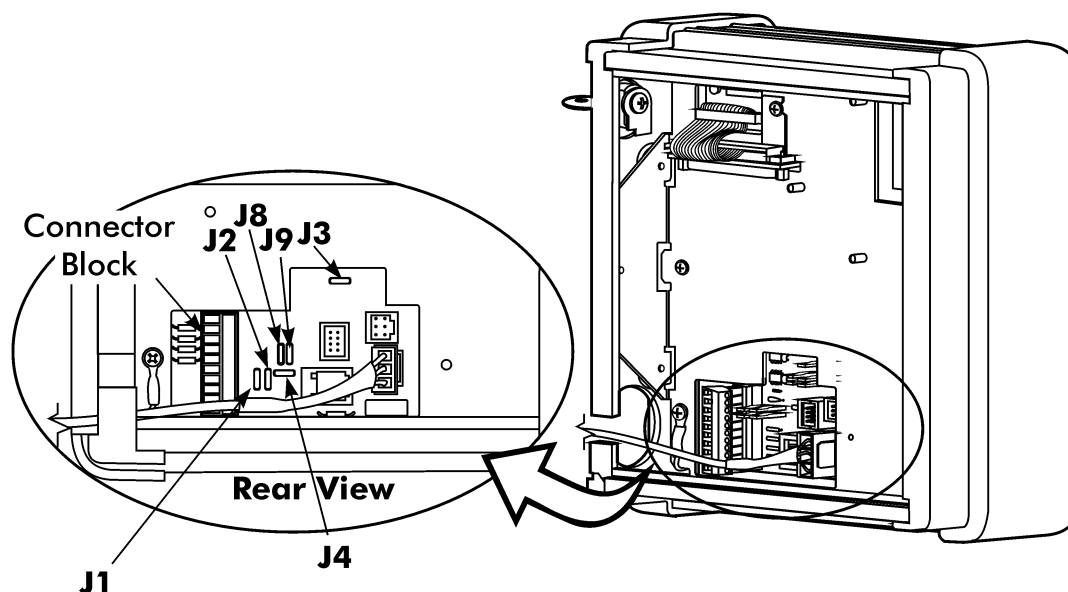
You must remove the wall mount plate to access the jumpers. Refer to the *Wall Mounting* instructions for removal and installation of the wall mount plate.

Communications Setup

Since the baud rate and terminal number are set using MTX-PRO, MTX-COM or TruTime, and most of the other communication parameters are fixed in the MTX, the communication setup is minimal.

Three types of line communications are supported: RS-232C, RS-232C/RS-485 converter type and RS-485. You must select one of these communications types using the MTX-PRO, MTX-COM or TruTime. The default setting (from the factory) is RS-232C/RS-485 converter type. Once a communication type is set, proper connections must be made and the jumpers **J1** and **J2** must be set accordingly. Please note that the RS-232C connection is independent of the **J1** and **J2** settings.

Cable Installation

Before making connections, make sure the power is disconnected from the terminal. Access to the RS-232C and RS-485 connectors is accomplished by removing the wall mount plate. Refer to the Wall Mounting instructions for removal and installation of the wall mount plate.

RS-232C Cable: A 25 pin male connector is provided on the rear panel of the terminal. Refer to the wiring configurations for a more detailed description of the PIN configurations.
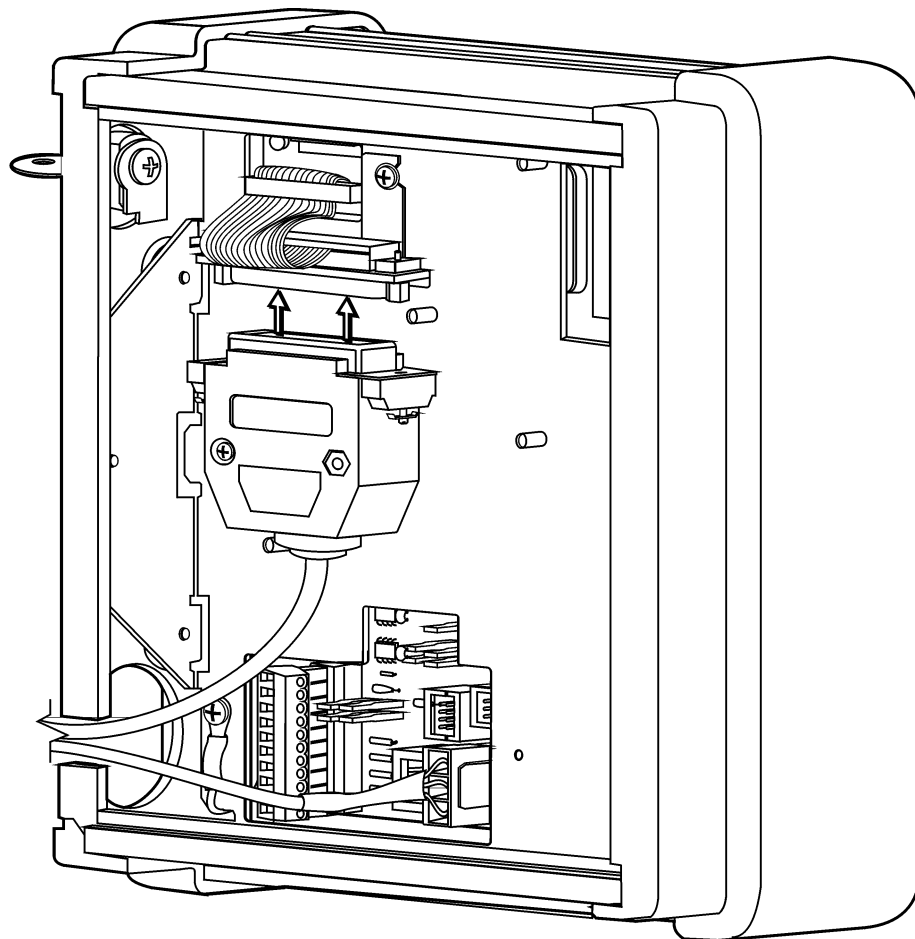
RS-485 Connections: A terminal block is provided for two and four wire RS-485 connections. The terminal block is removable for making connections and is keyed to avoid confusion.
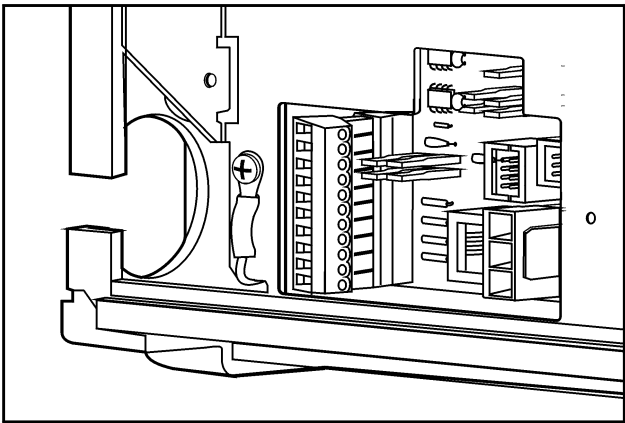
Direct RS-232C Connection

A single terminal is connected to a Host PC via an RS-232C cable. This connection is recommended for a single terminal within fifty feet of the Host PC.

MTX Terminal

IBM Compatible

RS-232C Cross Cable
Max. 50 ft.

The RS-232C Cross Cable wiring diagrams are as follows:

RS-232C (25p - 25p) Cable

RS-232C (9p - 25p) Cable

Dsub 25p

Dsub 25p

Dsub 9p

Dsub 25p
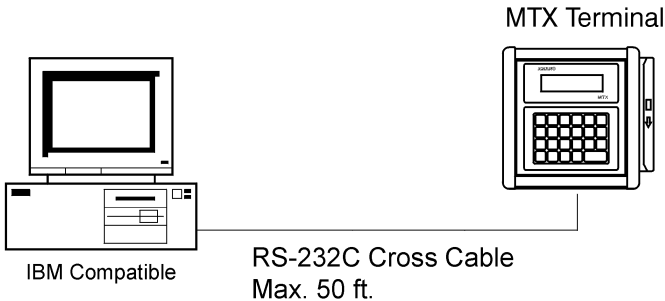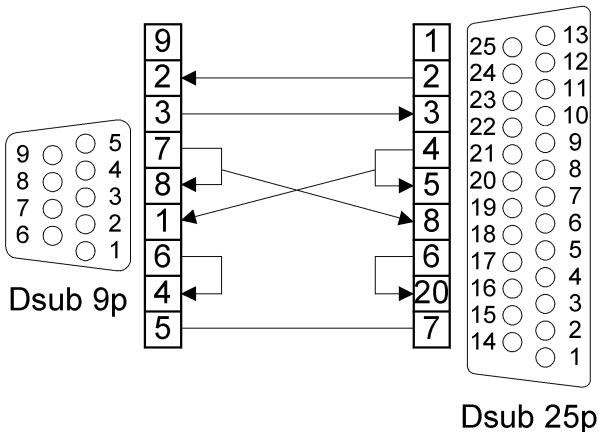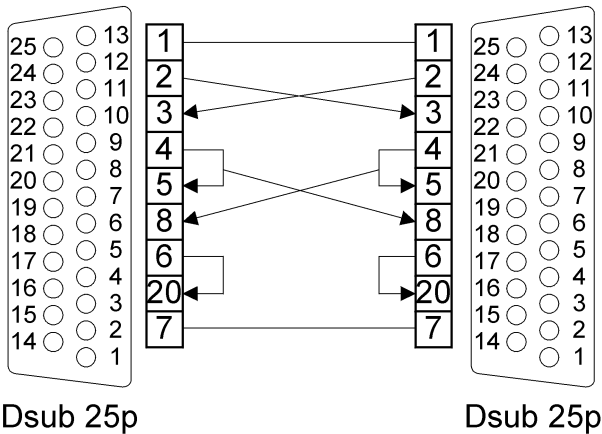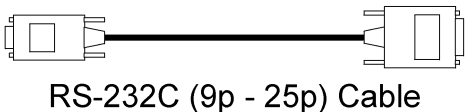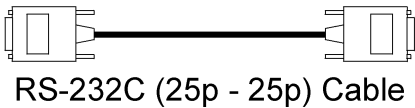
Four Wire MTX-20 Converter Connection

In this configuration, multiple MTX terminals (up to 31) are connected together with four wire connection cables. This is the recommended method of connection for multiple terminals if the first terminal is within fifty feet of the Host PC. The first terminal can be connected to the Host PC via an RS-232C cable, modem, or Ethernet.

J1: OFF
J2: OFF
J3: ON
J4: OFF

J1: OFF
J2: OFF
J3: ON
J4: ON

Middle MTX Terminal(s)

Last MTX Terminal

Straight Cable
Shielded Twisted Pair
24 - 26 AWG

From 1st
MTX Terminal

SHIELD*

SHIELD*

* NOT REQUIRED

The RS-232C Cross Cable wiring diagrams are as follows:

RS-232C (25p - 25p) Cable

RS-232C (9p - 25p) Cable

Dsub 25p

Dsub 25p

Dsub 9p

Dsub 25p
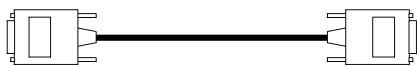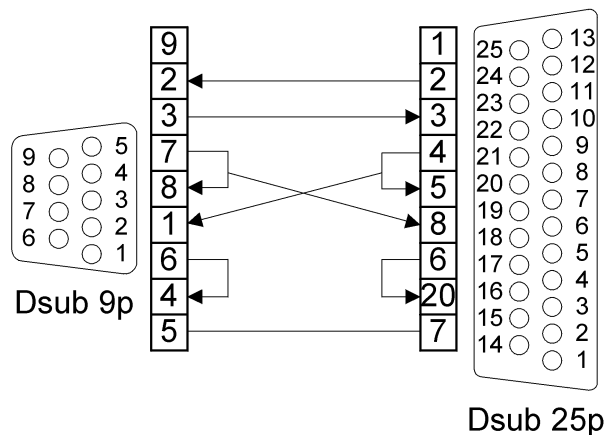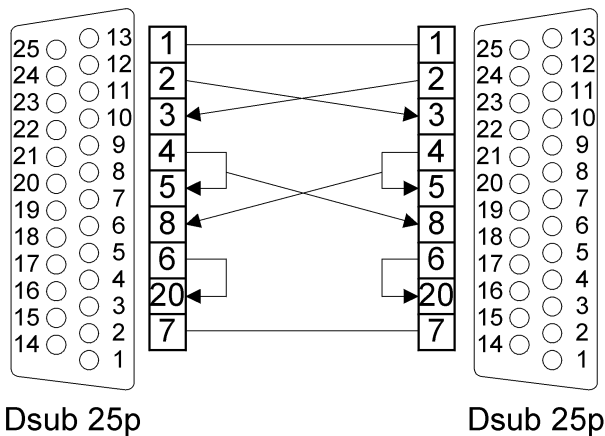
Two Wire MTX-20 Converter Connection

In this configuration, multiple MTX terminals (up to 31) are connected together with two wire connection cables. This method should only be used if a four wire connection can not be used and the first terminal is within fifty feet of the Host PC. The first terminal can be connected to the Host PC via an RS-232C cable, modem, or Ethernet.

J1: ON
J2: ON
J3: ON
J4: ON

1st MTX Terminal

RS-232C
Cross Cable
Max. 50 ft.

To Middle
MTX Terminal(s)

IBM Compatible

J1: ON
J2: ON
J3: ON
J4: ON

1st MTX Terminal

J1: ON
J2: ON
J3: ON
J4: OFF

Middle MTX Terminal(s)

RS-232C
Cross Cable

Straight Cable
Shielded Twisted Pair
24 - 26 AWG

To Last
MTX Terminal

SHIELD*

1
2
3
4
5
6
7
8
9
10

1
2
3
4
5
6
7
8
9
10

SHIELD*

* NOT REQUIRED

J1: ON
J2: ON
J3: ON
J4: OFF

J1: ON
J2: ON
J3: ON
J4: ON

Middle MTX Terminal(s)

Last MTX Terminal

From 1st
MTX Terminal

Straight Cable
Shielded Twisted Pair
24 - 26 AWG

SHIELD*

SHIELD*

* NOT REQUIRED

The RS-232C Cross Cable wiring diagrams are as follows:

RS-232C (25p - 25p) Cable

RS-232C (9p - 25p) Cable

Dsub 25p

Dsub 25p

Dsub 9p

Dsub 25p
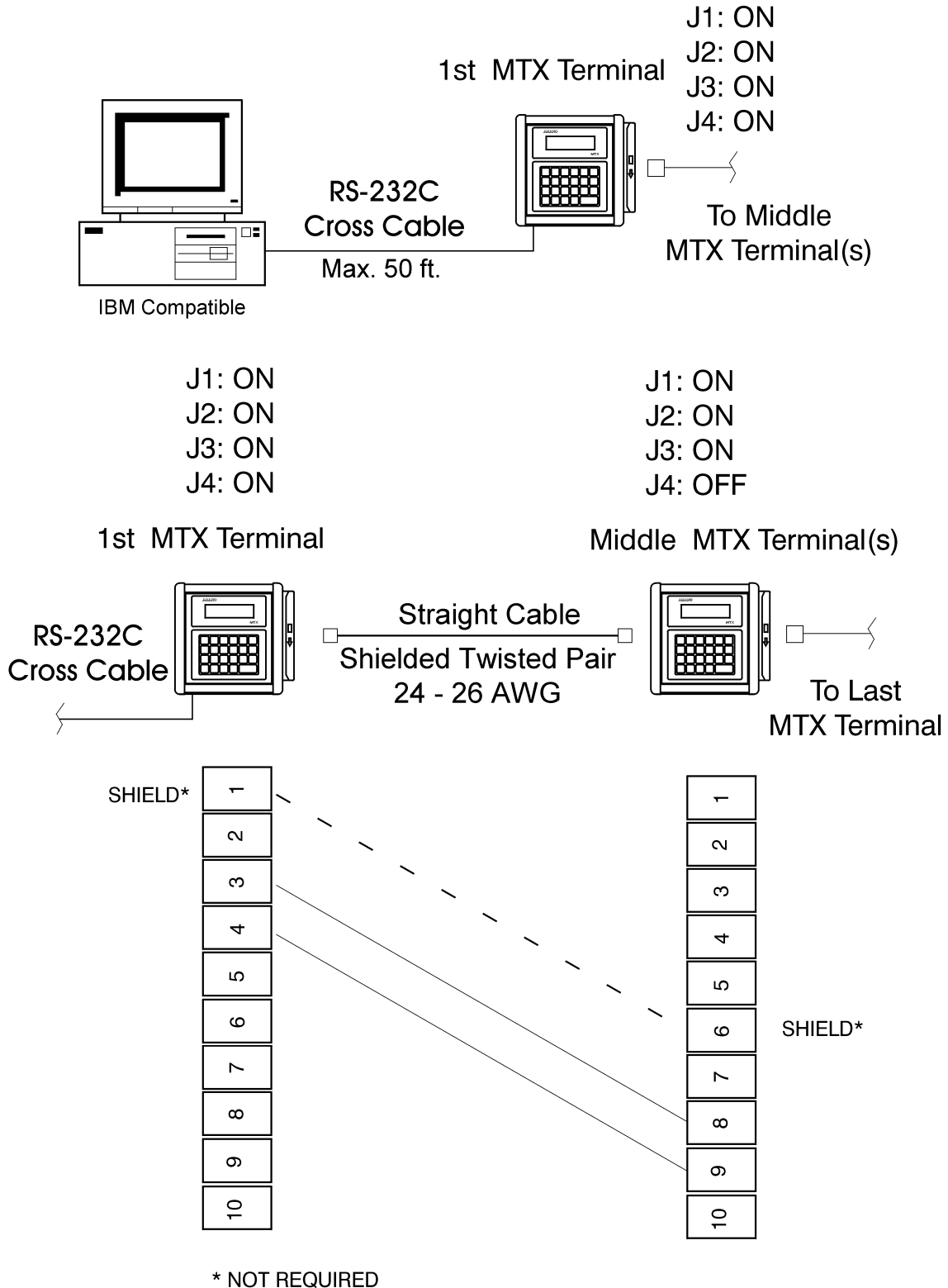
Four Wire MTX-20 Line Driver (LD-485A-MP) Connection

In this configuration, multiple MTX terminals (up to 31) are connected together with four wire connection cables. A Line Driver (LD-485A-MP) is connected to the initial terminal via a four wire connection to amplify the signal received from the Host PC. The Line Driver is connected to the Host PC via an RS-232C Straight Cable. This is the recommended method of connection for multiple terminals when the first terminal is greater than fifty feet from the Host PC.

S2: ON   W8: Half   W9: ON
W15: B-C   W16: A-B   W18: B-C
W17: A 1ms at 19.2k or 9600 bps
        B 100ms at 4800 - 1200 bps
DCE: Put the DIP shunt jumper in socket
        XW1A with all Dip switches ON.

J1: OFF
J2: OFF
J3: ON
J4: OFF

1st MTX Terminal

LD485A

Shielded Twisted Pair
24 - 26 AWG

To Middle
MTX Terminal(s)

RS-232C
Straight Cable
Max. 50 ft.

IBM Compatible

TXA
TXB
RXA
RXB

1
2
3
4
5
6
7
8
9
10

J1: OFF
J2: OFF
J3: ON
J4: OFF

J1: OFF
J2: OFF
J3: ON
J4: OFF

From
LD-485A
Line Driver

1st MTX Terminal

Middle MTX Terminal(s)

Straight Cable
Shielded Twisted Pair
24 - 26 AWG

To Last
MTX Terminal

SHIELD*

1
2
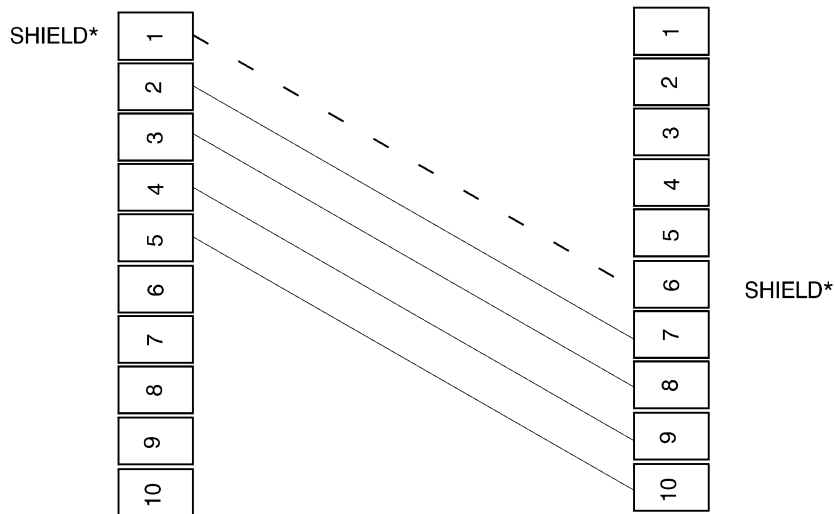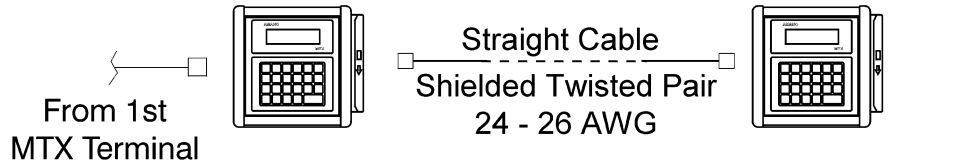3
4
5
6
7
8
9
10

1
2
3
4
5
6
7
8
9
10

SHIELD*

* NOT REQUIRED

J1: OFF
J2: OFF
J3: ON
J4: OFF

J1: OFF
J2: OFF
J3: ON
J4: ON

Middle MTX Terminal(s)

Last MTX Terminal

From 1st
MTX Terminal

Straight Cable
Shielded Twisted Pair
24 - 26 AWG

SHIELD*

1
2
3
4
5
6
7
8
9
10

SHIELD*

1
2
3
4
5
6
7
8
9
10

* NOT REQUIRED

The RS-232C Straight Cable wiring diagrams are as follows:

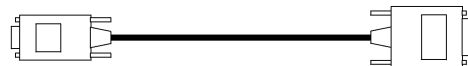RS-232C (25p - 25p) Cable

Dsub 25p

Dsub 25p

RS-232C (9p - 25p) Cable

Dsub 9p

Dsub 25p

Two Wire MTX-20 Line Driver (LD-485A-MP) Connection

In this configuration, multiple MTX terminals (up to 31) are connected together with two wire connection cables. A Line Driver (LD-485A-MP) is connected to the initial terminal via a two wire connection to amplify the signal received from the Host PC. This method should only be used if a four wire connection can not be used and the first terminal is greater than fifty feet away from the Host PC. The Line Driver is connected to the Host PC via an RS-232C Straight Cable.

S2: ON   W8: Half   W9: ON
W15: B-C   W16: A-B   W18: B-C
W17: A 1ms at 19.2k or 9600 bps
       B 100ms at 4800 - 1200 bps
DCE: Put the DIP shunt jumper in socket
       XW1A with all Dip switches ON.

J1: ON
J2: ON
J3: ON
J4: OFF

1st MTX Terminal

LD485A

Shielded Twisted Pair
24 - 26 AWG

To Middle
MTX Terminal(s)

RS-232C
Straight Cable

Max. 50 ft.

IBM Compatible

TXA
TXB
RXA
RXB

J1: ON   J1: ON
J2: ON   J2: ON
J3: ON   J3: ON
J4: OFF   J4: OFF

1st MTX Terminal   Middle MTX Terminal(s)

Straight Cable
Shielded Twisted Pair
24 - 26 AWG

From LD-485A
Line Driver

To Last
MTX Terminal

SHIELD*

SHIELD*

* NOT REQUIRED

J1: ON
J2: ON
J3: ON
J4: OFF

J1: ON
J2: ON
J3: ON
J4: ON

Middle MTX Terminal(s)

Last MTX Terminal

Straight Cable
Shielded Twisted Pair
24 - 26 AWG

From 1st
MTX Terminal

SHIELD*

SHIELD*

* NOT REQUIRED

The RS-232C Straight Cable wiring diagrams are as follows:
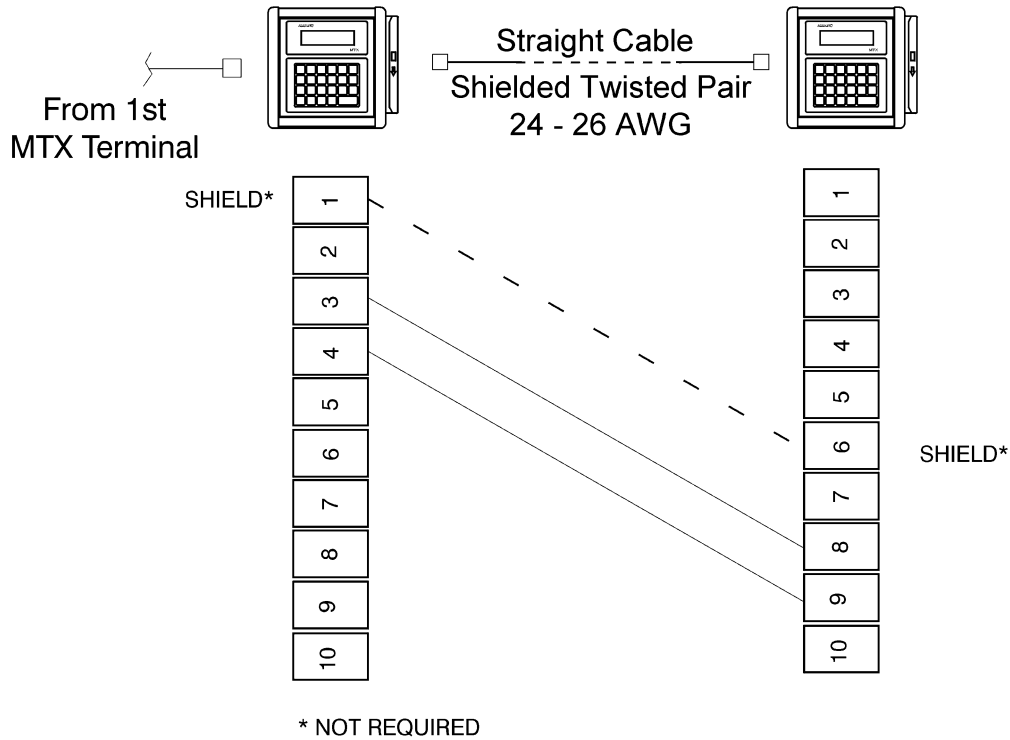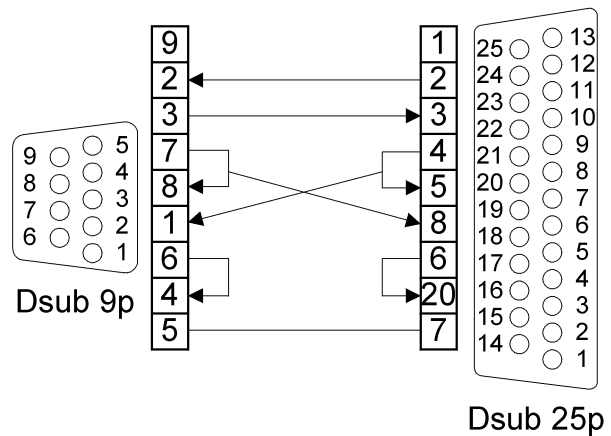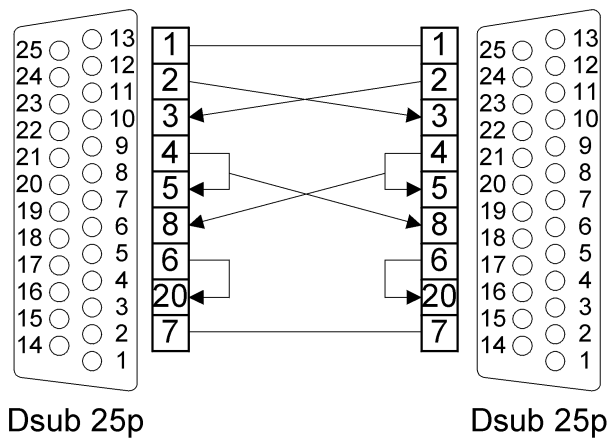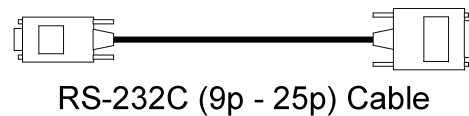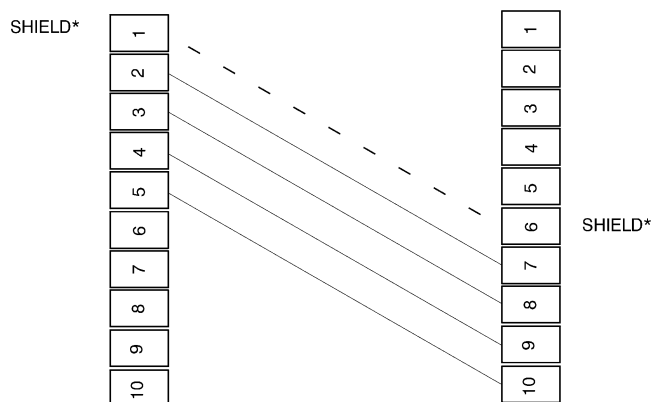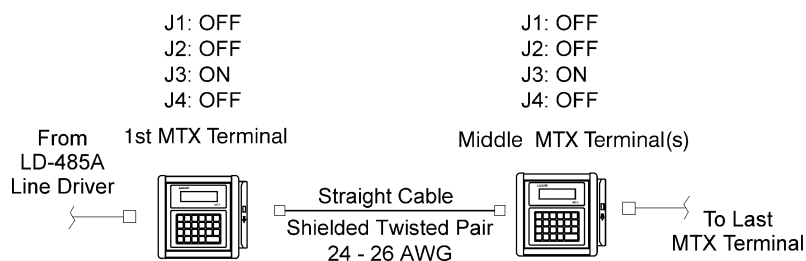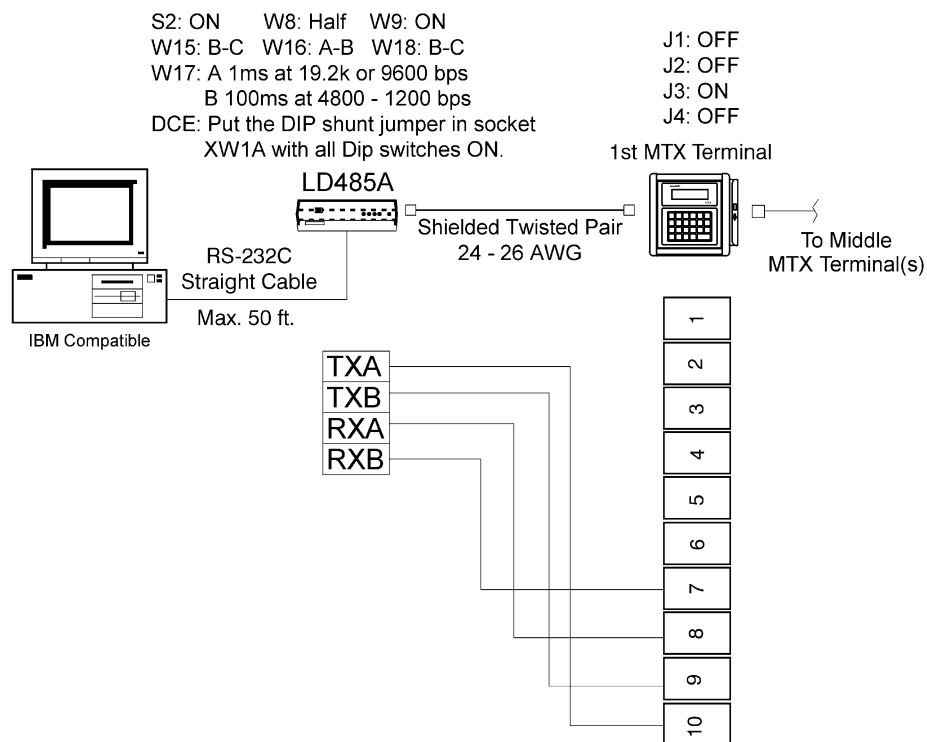
RS-232C (25p - 25p) Cable

Dsub 25p

Dsub 25p

RS-232C (9p - 25p) Cable

Dsub 9p

Dsub 25p

Cards Used With Slot Reader

The Magnetic Stripe Slot Reader available for the MTX can read either a Bar Code type or a Magnetic Stripe type card.

Magnetic Stripe Card

Magnetic Stripe Track
The MTX reads only Track 2 and Track 3 of a Magnetic Stripe type card (ANSI x 4.13). The track to be used must be specified using MTX-PRO, MTX-COM, or TruTime. The optional External Reader, MTX-EX, can only read Track 2 of a Magnetic Stripe Card.

Card Type
Both low energy (300 oersted) and high energy (3600 oersted) cards can be read by the MTX.

Card Size

Card Thickness = 0.03" (0.8 mm)

Track 1, 210 bpi, 7 bits/chr 79 chr

Track 2, 75 bpi, 5 bits/chr 40 chr

Track 3, 210 bpi, 5 bits/chr 107chr
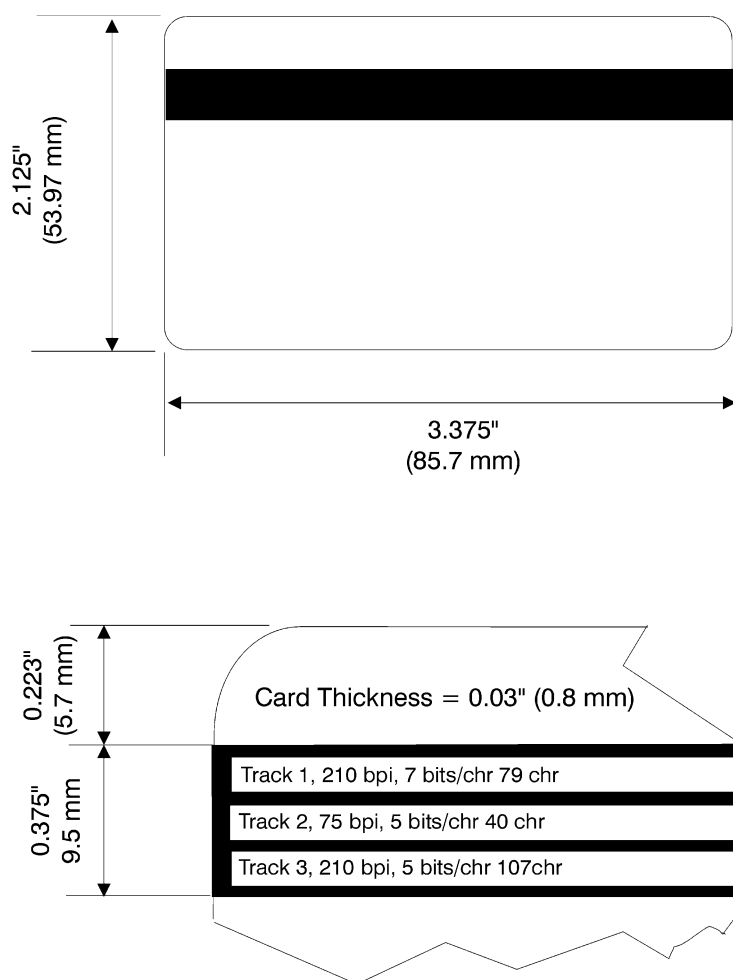
Card Data Format

The card data format information must be defined and downloaded to the MTX using MTX-PRO, MTX-COM or TruTime software.

Track 2: Limited to 40 characters, including Start & End Sentinel and LRC.
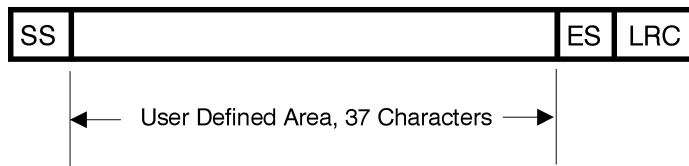
SS		ES	LRC

←———— User Defined Area, 37 Characters ————→

SS = Start Sentinel Hex **B** or **C**

ES = End Sentinel Hex **F**

LRC = Longitudinal Redundancy Check Character

Track 3: Limited to 108 characters, including Start & End Sentinel and LRC.
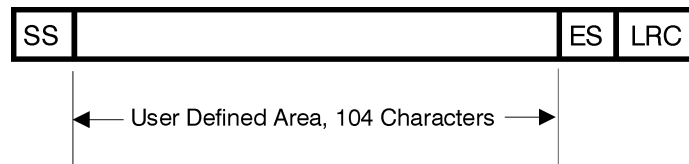
SS		ES	LRC

←———— User Defined Area, 104 Characters ————→

SS = Start Sentinel Hex **B** or **C**

ES = End Sentinel Hex **F**

LRC = Longitudinal Redundancy Check Character

Bar Code Card

The MTX can read code Interleaved 2 of 5 and Code 39 (Code 3 of 9) type bar code cards.

Dimensions
The following are recommendations to ensure the best results when using the MTX Bar Code Slot Reader.
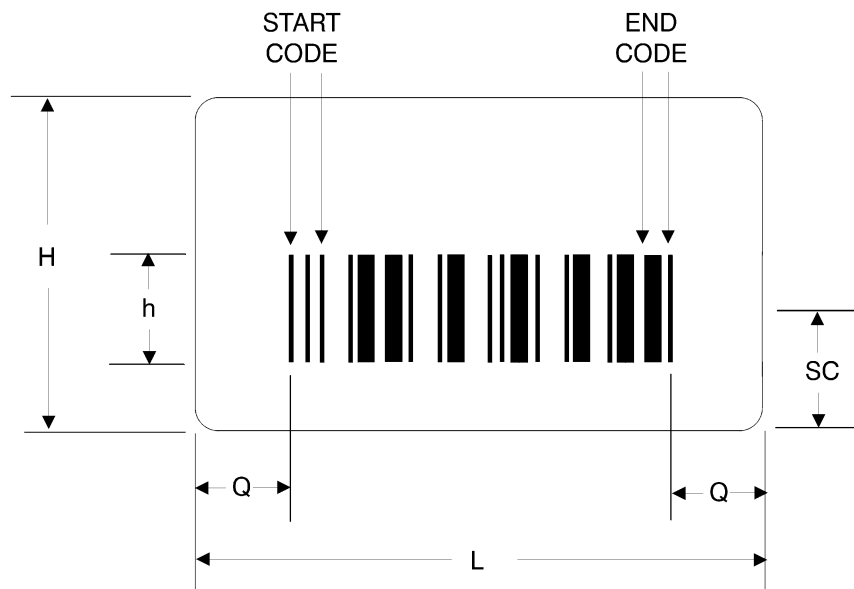
L = 3.375" (85.7 mm)

H = 2.215" (56.3 mm)

SC (Scan Height) = 0.43" (11 mm)

Q (Quiet Zone) = 0.4" (10.2 mm) and must be white.

h (Bar Code Height) = 0.3" (7.6 mm)

Maximum Total Card Thickness = 0.39" (1 mm)

Laminate Thickness One Side = 0.007" (0.18 mm)
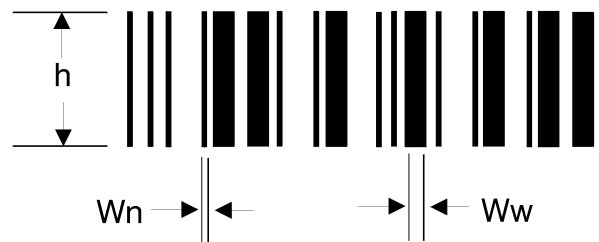
Wn(Narrow Bar Width) = More than 0.008" (2)

Ww/Wn (Narrow to Wide Bar Ratio) = More than 2.25

Print Contrast Ratio = More than 0.7 PCS

Data Format
The Bar Code card data format information is defined in MTX-PRO, and can be downloaded to the MTX terminal using MTX-PRO, MTX-COM, or TruTime.
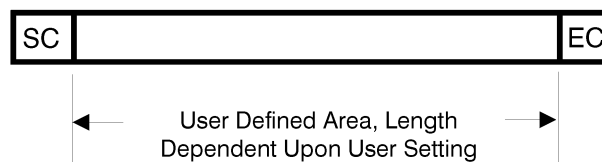
SC = Start Character
EC = End Character

Keyboard Sheet for the MTX-20

The keyboard face of the MTX-20 is configurable. You have the option of configuring the keyboard to your own specifications using MTX-PRO, or you may use the predefined files available in MTX-COM, or TruTime.

MTX-PRO

1. Create the entire application, then download the .exe files and tables

2. Print the Keyboard Sheet

MTX-20

3. Cut out the Keyboard Sheet

4. Insert the Keyboard Sheet into the MTX-20 front panel
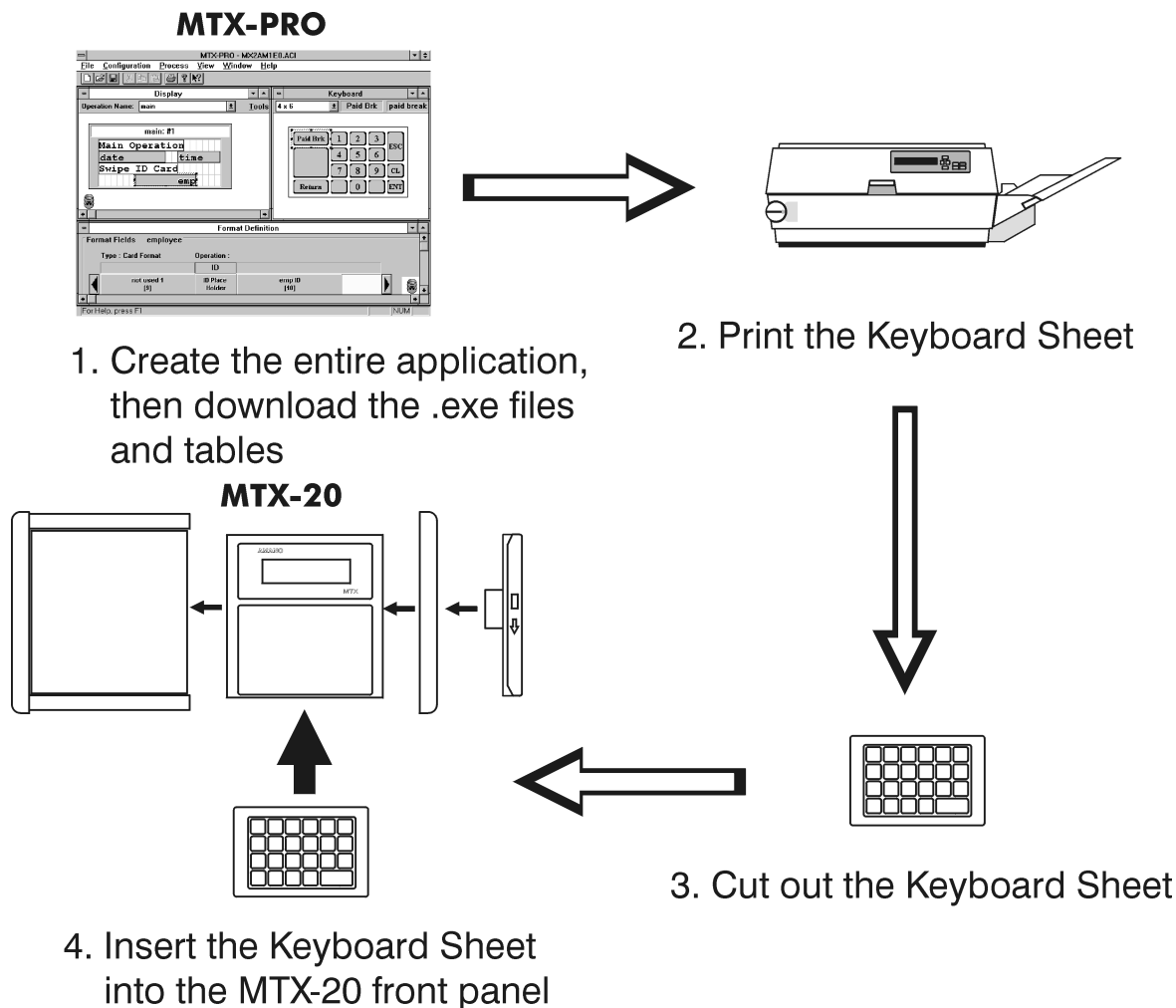
Configuration
To complete the keyboard configuration, you must specify the following items using MTX-PRO. This is accomplished by selecting the Hardware Configuration command from the Configuration Menu, and specifying MTX-OD20 as the Machine Type.

Key Label
You may label each key with up to any eight alpha-numeric character combinations you wish.

Key Type

You must select the key type to define how each key will perform. The available key types are as follows:

Value Key: An input-type key which, when pressed, will display the value you have set. The value may be set for up to 20 alpha-numeric characters.

Operation Key: An Operation Key is a key with a specific operation assigned to it. When the key is pressed, it "calls" an operation into action.

Control Key: A key with a specific control function assigned to it. A Control Key may be assigned one of the following functions:

Clear: Clears the value input by the value keys.

Enter: Enters the value input by the value key.

⬆ Arrow: Shows the previous value in the input table.

⬇ Arrow: Shows the next value in the input table.

➔ Arrow: Moves the cursor to the right on the field set to input key values.

⬅ Arrow: Moves the cursor to the left on the field set to input key values.

ESC: Jumps the cursor to the beginning of the field in the operation.

Keyboard Sheet Installation

To change or install a new Keyboard Sheet, perform the following:

1. Disconnect power from the terminal, remove the terminal from the wall mount plate, and disable the Full Power Reserve option if equipped.

2. Remove the Magnetic Stripe or Bar Code Reader from the unit.

3. Using a Phillips head screwdriver, remove the three mounting screws that hold the side panel (reader side) in place, and set them aside. Remove the side panel from the unit.

4. If your terminal is equipped with an Internal Heater, carefully pull the existing keyboard sheet through the slot in the bottom of the front panel.

5. If your terminal is not equipped with an Internal Heater, remove the blue LCD panel connector from the **LCD/KEY (CN9)** connector on the PC Board. The **LCD/KEY (CN9)** connector is a white connector located near the **READER (CN8)** connector on the PC board. Carefully slide the front panel out of the unit, and pull the existing keyboard sheet through the slot in the bottom of the front panel.

6. Insert the new keyboard sheet into the front panel.

7. Reinstall the front panel (if necessary) and make the appropriate connections.

8. Reinstall the side panel on the terminal and secure it in place.

9. Reinstall the Magnetic Stripe or Bar Code Reader on the terminal.

10. Enable the Full Power Reserve option if equipped, reconnect power to the terminal, and secure the terminal to the wall mount plate.

Terminal Mounting

MTX-10 and MTX-20 terminals not equipped with the Internal Heater Option can be mounted in a number of different positions and orientations.
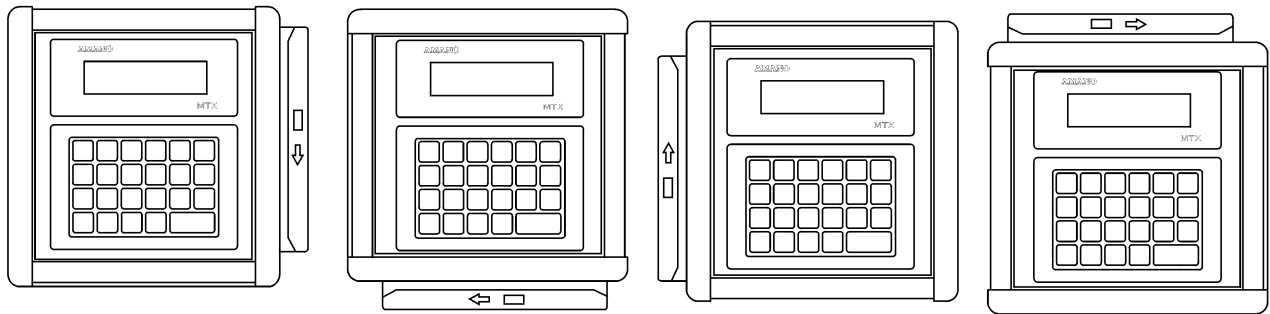
Terminals equipped with the Internal Heater option can only be mounted in the following position:
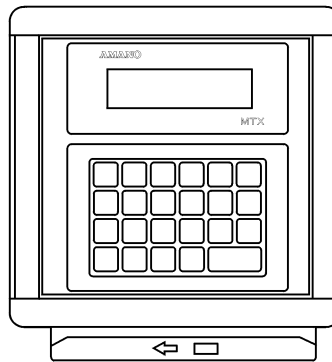
Changing Terminal Orientation

To change the orientation of the terminal face and the Mag Stripe or Bar Code Reader, perform the following:

1. Disconnect power from the unit, remove the terminal from the wall mount plate, and disable the Full Power Reserve option if equipped.

2. Remove the Magnetic Stripe or Bar Code Reader from the unit.

3. Using a Phillips head screwdriver, remove the three mounting screws that hold the side panel (reader side) in place, and set them aside. Remove the side panel from the unit.

4. Remove the blue LCD panel connector from the LCD/KEY (CN9) connector on the PC Board. The LCD/KEY (CN9) connector is a white connector located near the READER (CN8) connector on the PC board.

5. Carefully slide the front panel out of the unit.
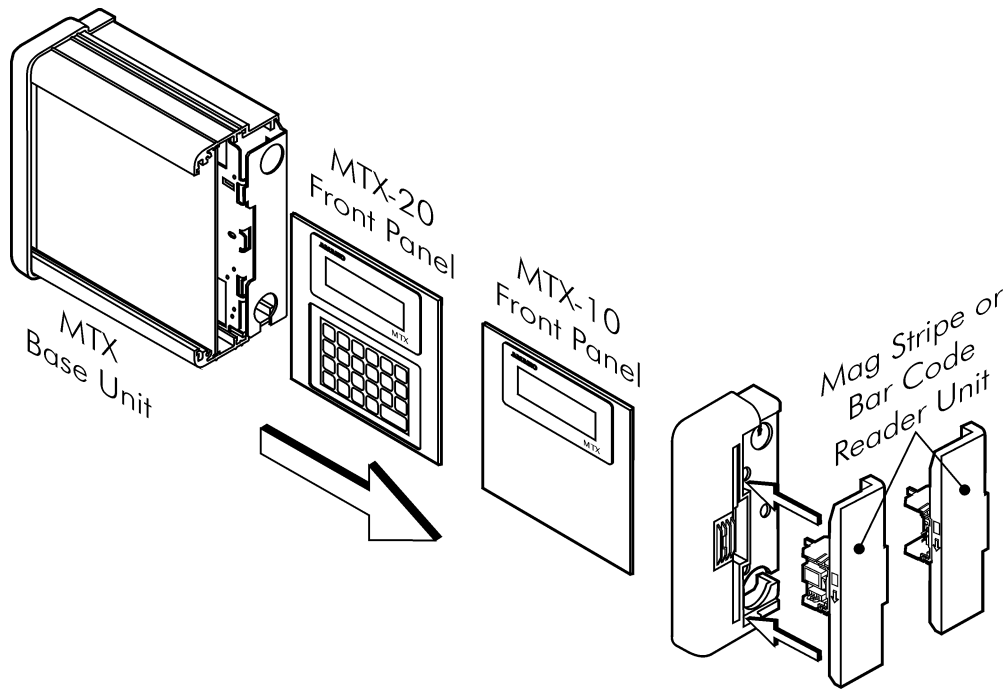
6. For MTX-20 terminals, you can change the keyboard by sliding out the keyboard sheet from the slot in the bottom of the front panel.

7. Reinstall the front panel with the orientation you want, and reconnect the blue LCD panel connector to the LCD/KEY (CN9) connector on the PC Board.

8. Reinstall the side panel on the terminal and secure it in place.

9. Reinstall the Magnetic Stripe or Bar Code Reader on the terminal.

10. Enable the Full Power Reserve option if equipped, reconnect power to the terminal, and secure the terminal to the wall mount plate.

Wall Mounting

The MTX should be installed on an appropriate wall. Please install the machine with the power cord unplugged.

1. Insert the key into the keyhole on the side of the case. Turn the key clockwise 90°.

Slide wall mount plate to remove

Turn Clockwise
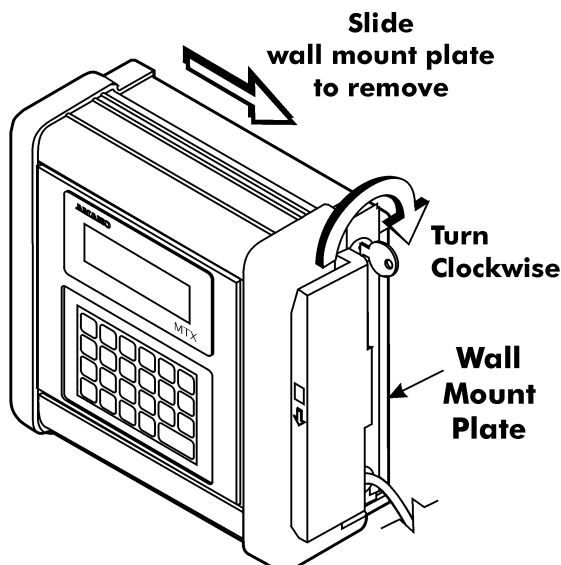
Wall Mount Plate

Rear view (with plate removed)

Key
To unlock, turn clockwise
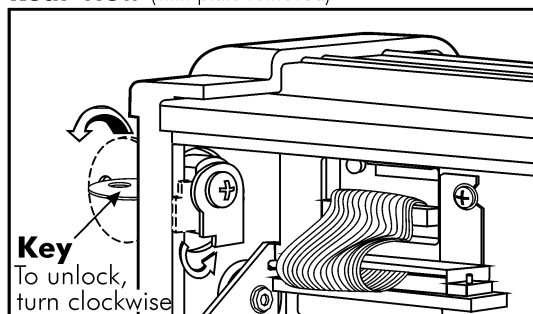
2. Open the upper part of the unit towards the front and disconnect the power cord from the unit. Remove the wall mount plate.

① Remove the Wall Mount Plate.
Install top screw and hang Wall Mount Plate.
Install the bottom screw.

② Slide unit back onto Wall Mount Plate

③ Lock by turning key counter-clockwise
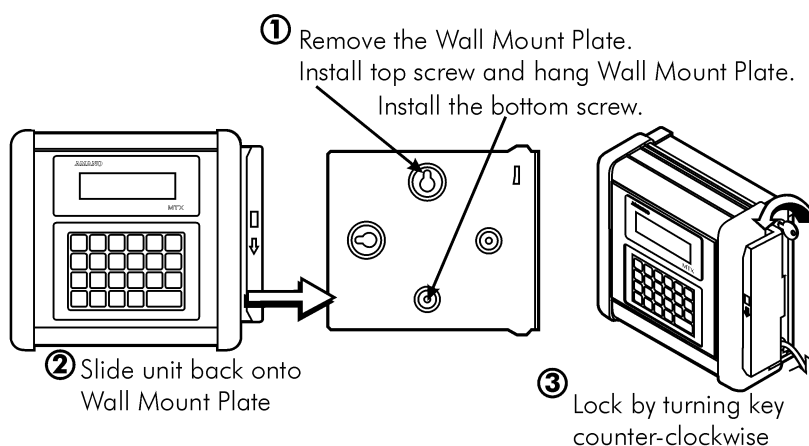
3. Use the appropriate screw and anchor hardware (the type will vary depending on the mounting surface such as concrete or plaster board). Install the top screw first until the head is approximately one quarter of an inch from the wall. Hang the wall mount plate and install the bottom screw.

4. If your terminal is equipped with the Internal Heater Option, you must install a piece of self-adhesive thermal insulation (provided) on the wall plate.

5. Attach the unit to the wall mount plate. Close the case and lock it.

Installing your MTX

Chapter 4: External Magnetic Reader

The External Magnetic Card Reader, MTX-EX is an optional, remotely mounted reader used in conjunction with the optional Signal Kit, so that the MTX terminal can be used as an access control device.
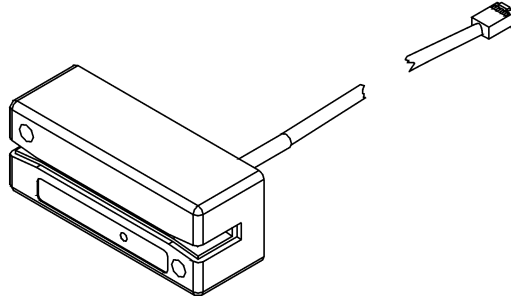
The MTX-EX is a rugged metal-housed card reader that is configured to read ISO Track 2 of a magnetic stripe card. The reader incorporates a heated magneto resistive read head, an LED indicator, and encapsulated electronics that allow for operation in harsh environments. The MTX-EX connects to the MTX terminal via a dedicated connector labeled **EXT. READER (CN3)** on the terminal.

EXT. READER
(CN3)

Rear View
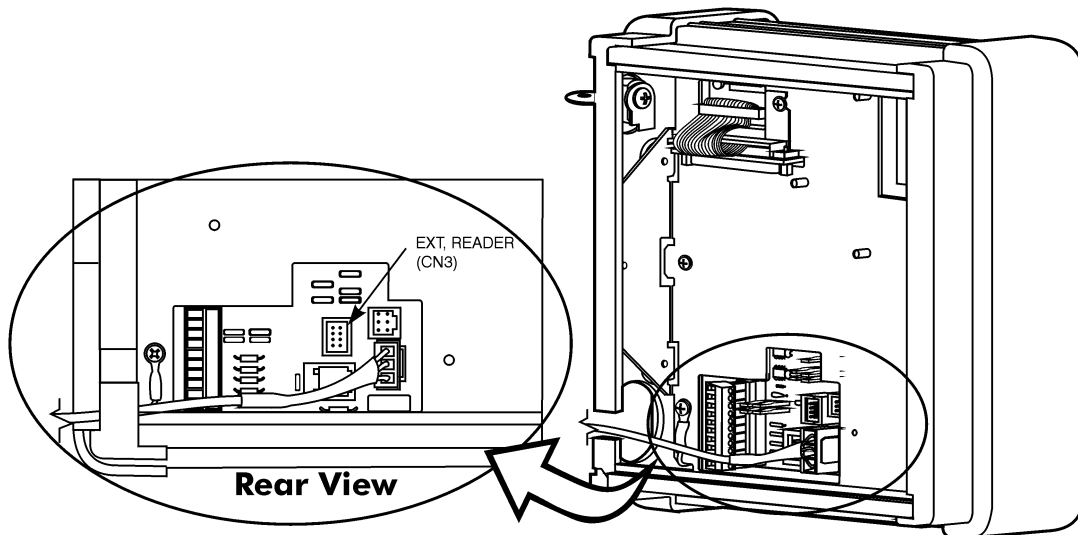
The dimensions of the MTX-EX are as follows:

0.354" (9 mm) DIA., 2 PLACES
FRONT FIXING M4 X 50
BOLT OR SCREW (SNAP IN
COVER BUTTON)

LED

1.535" (39 mm)

CABLE

CABLE

2.560" (66 mm)

1.791" (45.5 mm)

0.945" (24 mm)

0.453" (11.5 mm)

3.543" (90 mm)

4.449" (113 mm)
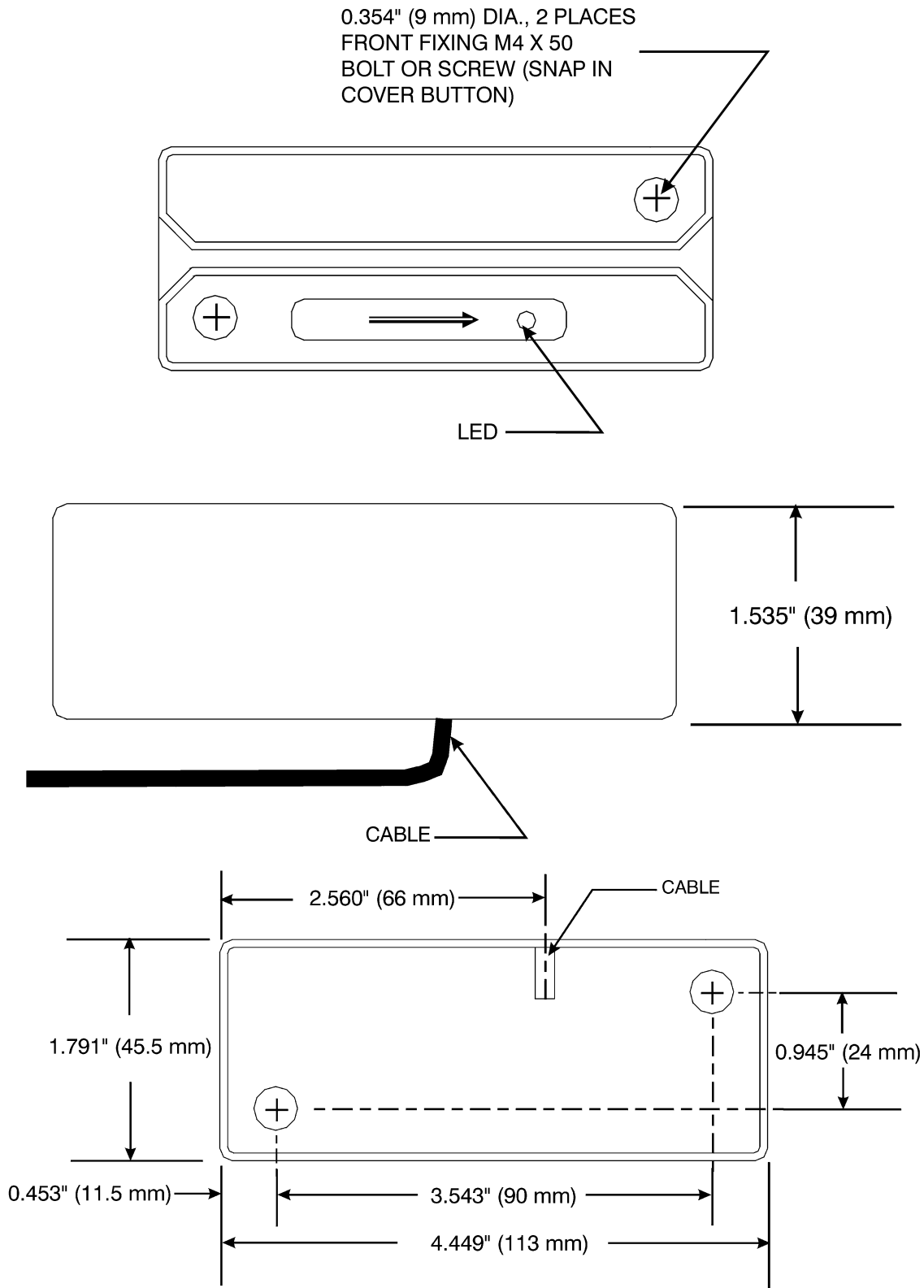
The MTX-EX includes all the necessary hardware for mounting and connecting the reader to the terminal. Hardware includes mounting screws, screw caps, and a standard cable attached to the reader and terminated with a connector.

The cable attached to the MTX-EX is nine feet, however extension lengths of 25, 50, and 100 feet are available. Each extension cable is terminated at one end with a connector which allows it be connected to the MTX terminal. The other end of the cable can be cut to the desired length, and connected to the MTX-EX Reader with terminals provided. The cable is color-coded to match the original MTX-EX cable.

To connect the MTX-EX to the terminal, perform the following:

1. Disconnect power to the terminal, remove the unit from the wall mount plate, and disable the Full Power Reserve Option if equipped.

2. Connect the MTX-EX to the connector labeled **EXT. READER (CN3)** on the terminal.

3. Verify that Jumper, **J6** is ON and Jumper, **J5** is OFF.

4. Enable the Full Power Reserve option if equipped, reconnect power to the terminal, and secure the terminal to the wall mount plate.

5. For proper operation, an application file that accepts and saves external swipes must be downloaded to the terminal. This can be accomplished through MTX-COM, MTX-PRO, or TruTime.

```
Terminal Application Info.                                    [X]

   Directory:    C:\MTX                                    [ Close ]

   File Name:    diagnos.aci        [▲]
                 mx1ab1e1.aci              [ Browse... ]    [ Help ]
                 mx1ab1t1.aci        [▼]

   ┌─ Hardware Configuration: ──────────────────────────────────┐
   │  Reader[s]:  ☑ Slot Reader    [ Reader Type ]   Communication Line: │
   │              ☐ Barcode Wand   [ Barcode Type ]  [ CONVERTER    ▼ ]  │
   │                                                             │
   │  Options:    Ethernet              [▲]                      │
   │              Full Power Reserve          [ Create Program File ]    │
   │              External Reader       [▼]                      │
   └─────────────────────────────────────────────────────────────┘
   ┌─ Application Info.: ──────────────────────────────────────┐
   │         Date Created: Sat Mar 16 00:00:00 1996            │
   │  ┌──────────────────────────────────────────────────┐    │
   │  │ MTX-20, (Mag stripe)                             │    │
   │  │ *Test displaying date and time in different      │    │
   │  │ formats.                                          │    │
   │  │ *Test card swiping(This operation will create    │    │
   │  │ transactions and check repeat punch protection)  │    │
   │  │ *Test the beep and wait functions.               │    │
   │  │ *Test range table.                               │    │
   │  │ *Test ID validation table(Download fron MTXCOM)  │    │
   │  │ *Test schedule validation table(Download from    │    │
   │  └──────────────────────────────────────────────────┘    │
   └──────────────────────────────────────────────────────────┘
```

6. Swipe a valid magnetic card in the external reader. Note the color of the LED when swiping the card. If the swipe is valid, the LED will change from red to green, and then back to red.

7. Poll the MTX terminal to verify that the swipe is in the memory of the terminal. This can be accomplished through MTX-COM, MTX-PRO, or TruTime.

External Magnetic Reader

Chapter 5: Optional Signal Kit

The optional Multiple Relay Circuit, Signal, and Access Control Kit enables your MTX Terminal to be used to activate an audible device such as a bell, or an access control device. When used with the optional MTX-EX External Reader, the terminal can be used for both data collection and access control. Up to two Signal kits can be installed depending upon the hardware in the terminal.
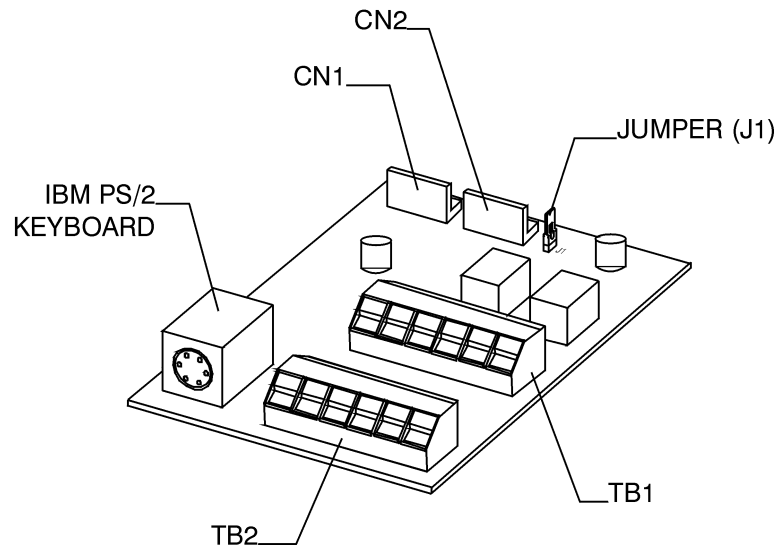
Installation

The mounting location of the kit is dependent upon the hardware installed. For terminals equipped with a Heater Option, the mounting location of the Signal Kit is as follows:
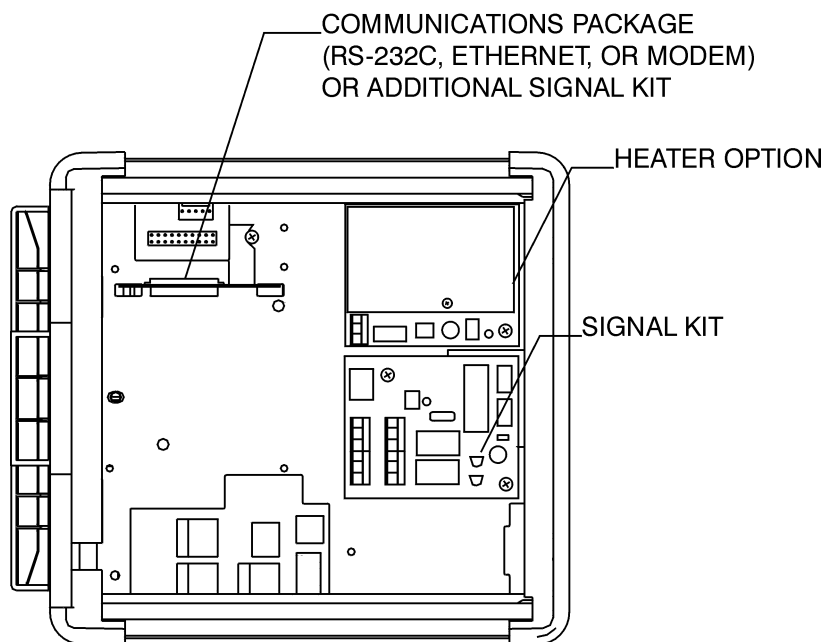
For all other applications, the mounting location of the Signal Kit is as follows:

COMMUNICATIONS PACKAGE
(RS-232C, ETHERNET, OR MODEM)
OR ADDITIONAL SIGNAL KIT

SIGNAL KIT

FULL POWER
RESERVE OPTION
PC BOARD

BATTERY PACK AND
MOUNTING BRACKET
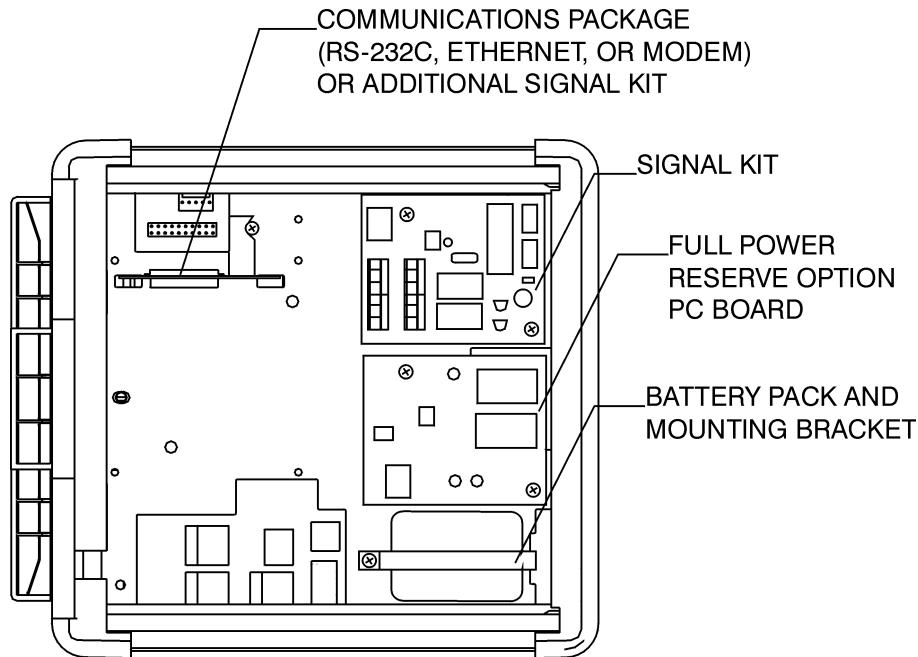
To install a Signal Kit, perform the following:

1. Disconnect power to the terminal, remove the unit from the wall mount plate, and disable the Full Power Reserve Option if equipped.

2. Verify that the terminal Jumper, **J1** on the Signal Kit PC board is set to OFF. With this setting, the **Address (ID) = 0**.

JUMPER "OFF" CONDITION
ID = 0
J1 = OFF

J1
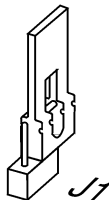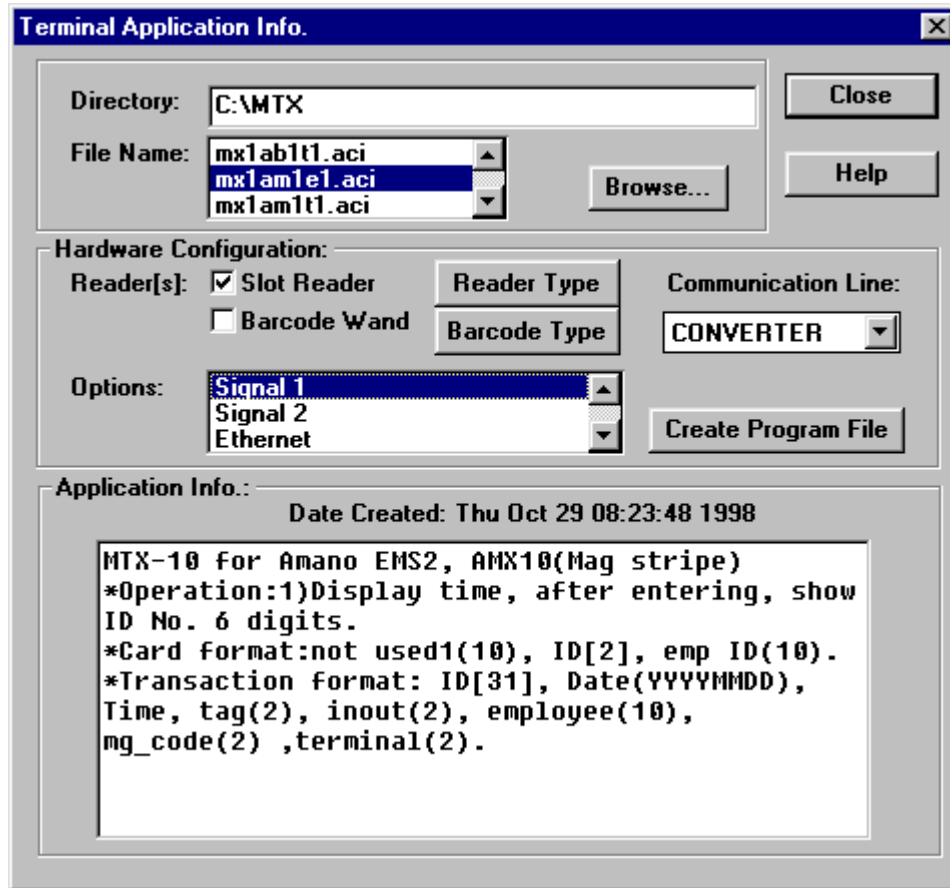
3. Install the Signal Kit in the location provided and secure it in place with the hardware provided. Connect the cable from **CN2** of the module to the I²C connector, **CN10** in the terminal. **CN10** is located on the PC board near the RS-232C connector.

4. Make the proper electrical connections for your equipment according to the wiring diagrams provided.

5. Enable the Full Power Reserve option if equipped, reconnect power to the terminal, and secure the terminal to the wall mount plate.

6. For proper operation, an application file that recognizes the Signal Kit must be downloaded to the terminal. This can be accomplished using MTX-COM, MTX-PRO or TruTime. For a single Signal Kit you must select **Signal 1** from the **Options** list.

```
Terminal Application Info.                                    [X]

  Directory:   C:\MTX                                      [Close]

  File Name:   mx1ab1t1.aci    [▲]
               mx1am1e1.aci          [Browse...]           [Help]
               mx1am1t1.aci    [▼]

  ┌ Hardware Configuration: ─────────────────────────────────────┐
  │ Reader[s]:  ☑ Slot Reader    [Reader Type]   Communication Line: │
  │             ☐ Barcode Wand   [Barcode Type]  [CONVERTER  ▼]   │
  │                                                               │
  │ Options:    Signal 1         [▲]                              │
  │             Signal 2                         [Create Program File] │
  │             Ethernet         [▼]                              │
  └───────────────────────────────────────────────────────────────┘
  ┌ Application Info.: ──────────────────────────────────────────┐
  │            Date Created: Thu Oct 29 08:23:48 1998             │
  │  ┌─────────────────────────────────────────────────────────┐ │
  │  │ MTX-10 for Amano EMS2, AMX10(Mag stripe)               │ │
  │  │ *Operation:1)Display time, after entering, show        │ │
  │  │ ID No. 6 digits.                                        │ │
  │  │ *Card format:not used1(10), ID[2], emp ID(10).         │ │
  │  │ *Transaction format: ID[31], Date(YYYYMMDD),           │ │
  │  │ Time, tag(2), inout(2), employee(10),                  │ │
  │  │ mg_code(2) ,terminal(2).                                │ │
  │  └─────────────────────────────────────────────────────────┘ │
  └───────────────────────────────────────────────────────────────┘
```

If you are installing a second Signal Kit, you must connect **CN2** of the second module to the **CN1** of the first module with the cable provided and set Jumper **J1** to ON and the **Address (ID) =1**.

JUMPER "ON" CONDITION
ID = 0
J1 = OFF
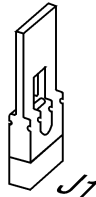
When downloading the application file to the terminal, you must select **Signal 1** and **Signal 2** from the Options list.

Terminal Application Info.

Directory: `C:\MTX`

File Name:
```
mx1ab1t1.aci
mx1am1e1.aci
mx1am1t1.aci
```

Browse...   Close   Help

Hardware Configuration:

Reader[s]: ☑ Slot Reader   [Reader Type]   Communication Line:
☐ Barcode Wand   [Barcode Type]   `CONVERTER` ▼

Options:
```
Signal 1
Signal 2
Ethernet
```
[Create Program File]

Application Info.:

Date Created: Thu Oct 29 08:23:48 1998

```
MTX-10 for Amano EMS2, AMX10(Mag stripe)
*Operation:1)Display time, after entering, show
ID No. 6 digits.
*Card format:not used1(10), ID[2], emp ID(10).
*Transaction format: ID[31], Date(YYYYMMDD),
Time, tag(2), inout(2), employee(10),
mg_code(2) ,terminal(2).
```

Wiring

Connections to **TB1** (Output) and **TB2** (Input) are made as follows:

WIRE   8 mm STRIP   SCREW DRIVER

TB 1, TB 2
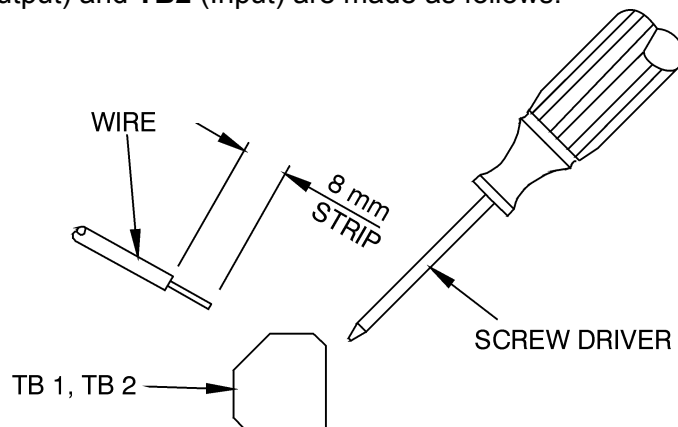
The wiring diagram for **TB1** (Output) is a follows:

DRY CONTACT OUTPUT FOR
CONNECTION TO A CLASS
2 CIRCUIT ONLY
(30VDC, 5Amps MAX)

OUTPUT 1   OUTPUT 2

N.O. | N.C.   N.O. | N.C.

| 1 | 2 | 3 | 4 | 5 | 6 |

TB1
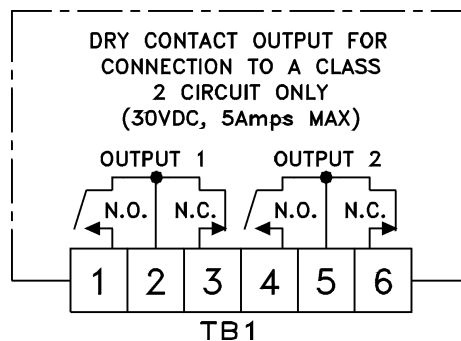
The wiring diagrams for **TB2** (Input) are:
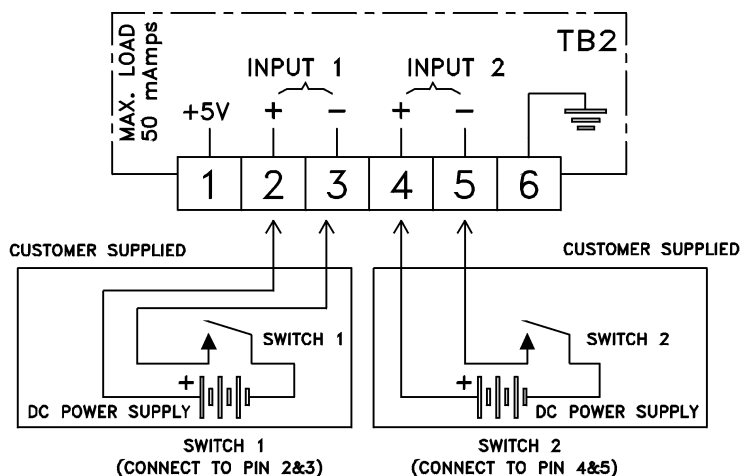
EXAMPLE 1
USING AN EXTERNAL D.C. POWER SUPPLY, HOOK UP THE
SWITCH AND CIRCUIT AS SHOWN. TAKE CARE TO MATCH D.C.
POLARITY AT THE TB2 TERMINAL BLOCK.

AMX-107500
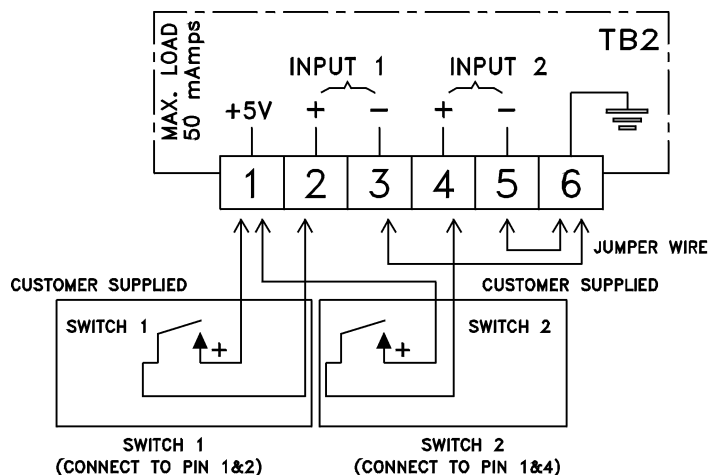
EXAMPLE 2
IF MAXIMUM LOAD DOES NOT EXCEED 50 mAmps AND AN
EXTERNAL POWER SUPPLY IS NOT AVAILABLE, THEN THE
INTERNAL MTX 5 VDC POWER SUPPLY CAN BE USED.

FOR INPUT 1 AND INPUT 2
    INPUT REQUIREMENTS
       2mAmps at 5VDC
       5mAmps at 12VDC
      10mAmps at 24VDC

Chapter 6: Modem Option Kit

The High-Speed Modem Option Kit is an optional means of communication between the MTX terminal and a host computer. It is used when a direct (RS-232C, RS-485) or Ethernet connection is not applicable.

**TO CONNECTOR CN5
ON MTX TERMINAL**

CN1   **CN2**

TELEPHONE
CABLE

MOUNTING
SCREWS (4)
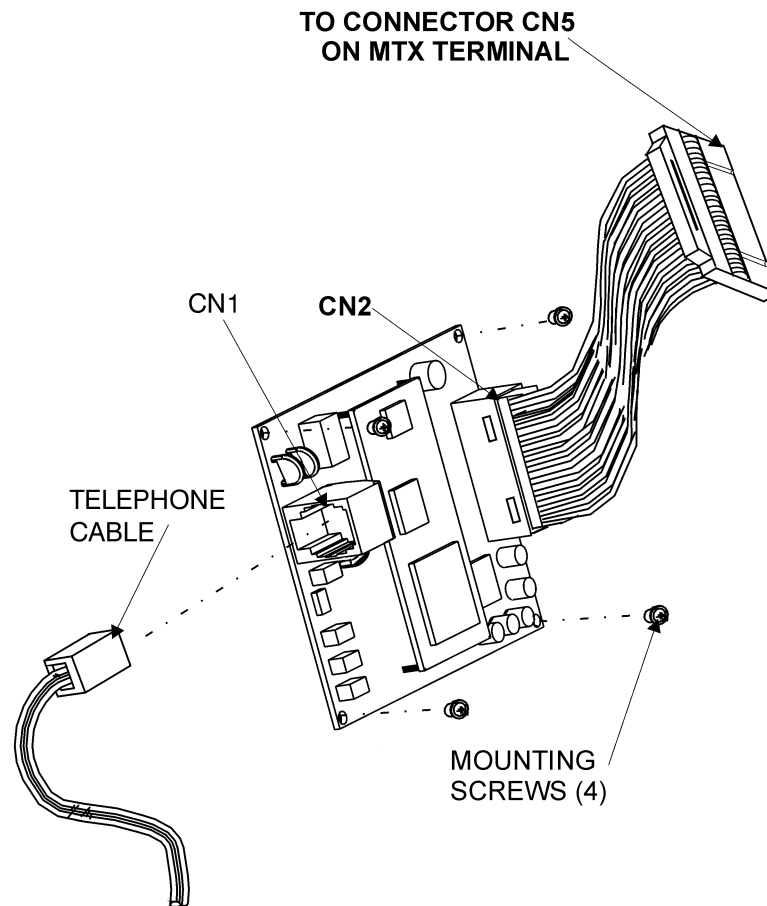
Installation

Installation of the High-Speed Modem Kit is as follows:

1. Disconnect power to the terminal, remove the unit from the wall mount plate, and disable the Full Power Reserve Option if equipped.

2. Disconnect the RS-232C cable from the **CN5** connector of the terminal.

3. Loosen the screw that holds the RS-232C connector bracket assembly and remove it from the terminal.

4. Install the (4) standoffs in the same area of the terminal that was occupied by the RS-232C connector bracket assembly. Install the modem over the standoffs and secure it in place with the (4) mounting screws.

MODEM

STANDOFF (4)

CN5
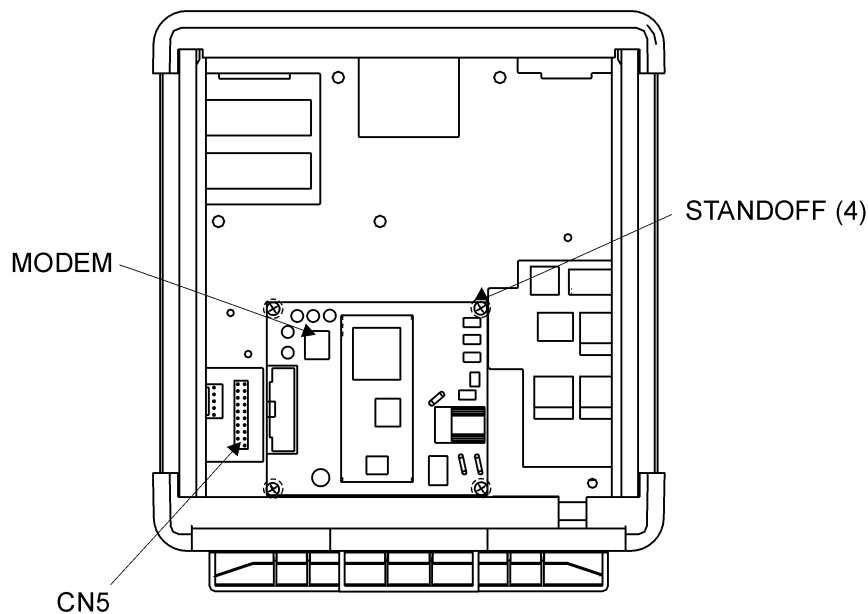
5. Connect **CN2** on the modem to **CN5** on the terminal using the cable.

6. Insert the telephone cable into **CN1** (RJ11 connector) on the modem.

7. Enable the Full Power Reserve option if equipped, reconnect power to the terminal, and secure the terminal to the wall mount plate.

Modem Configuration

A High-Speed 14,400 bps (bits per second) modem has been designed for the MTX. This new modem can be configured to auto-answer after a specific number of rings.

Note: This modem configuration is only available in MTX units with TOS version 1.55 and higher.

High-Speed Modem Setup

1. Refer to the key mapping for the Diagnostics Mode in section **11-5**.

2. To access the Diagnostics Mode, press the reset button (on the back of the unit) and the ENT key (last row on the bottom, last key on the right) simultaneously. The MTX will display the Diagnostics Mode menu.

```
    DIAGNOSTICS
1.Hardware Test
2.Firmware Info
3.Software Info
```

3. Select *Hardware Test.*

```
Hardware Tests
1.Memory
2.MODEM
3.Key   Readers
```

4. Select *MODEM*.

    Note: This selection will not be available with the old-style 2400 bps modem.

```
      MODEM Steup
1.Auto Answer
2.Write Setting
```

There are two selections in the Modem Setup Menu:

1. Auto Answer
   You may configure the number of rings before the Modem auto-answers. The Default is 1 ring, the maximum is 5.

```
Rings to Auto Answer

    Enter 1→ 5 1
```

2. Write Setting
   Select this option to save your setup parameters and program the modem.

Chapter 7: Ethernet Option Board

The Ethernet Option Board is designed to connect an MTX terminal over an Ethernet Network using TCP/IP protocols. The Ethernet Board is installed in the terminal with hardware provided and uses a serial RS-232C interface to communicate with the MTX terminal at a speed of 19.2 K baud, and a network interface speed of 10 Mbit.
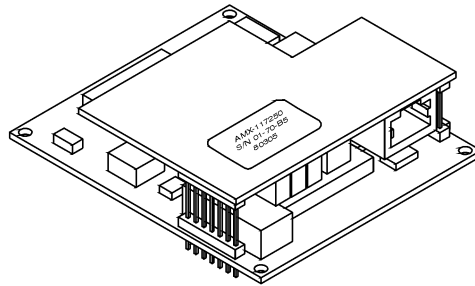
Serial Number

The Serial Number of the Ethernet Option board is used in the Network Hardware Address. The Serial Number is found on the label affixed to the Ethernet Option board.
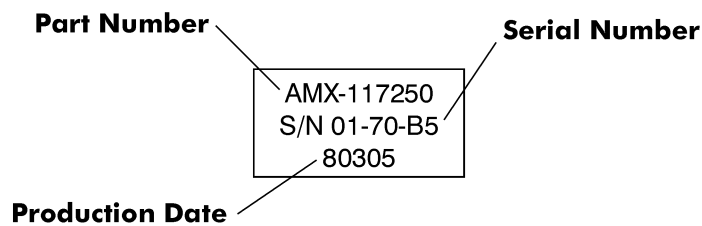
Network Hardware Address

The Hardware Address of the Ethernet Option board utilizes the Serial Number of the Ethernet Option board. The address is six bytes long and the first three bytes of the address have the form:

00-20-4A

The remaining three bytes are the Serial Number of the Ethernet Option board. For example, if the Serial Number of the Ethernet Option board is 01-70-B5, the address would have the form:

00-20-4A-01-70-B5

Network Protocol

The Internet Protocol (IP) defines addressing, routing, and handling of data blocks over the network. The Transmission Control Protocol (TCP) assures that no data is lost or duplicated, and that everything sent into the connection on one side arrives at its target exactly as it was sent. The Ethernet Option board has one IP address, which is selected by the port number, and must be unique.

Networks using Dynamic Host Configuration Protocol are not supported. The Ethernet Option Board must have a static IP Address. Every TCP connection is defined by its source and destination port number. These port numbers are necessary to address different applications or channels on a network host. Port 9999 (decimal format) is used for remote configuration of the Ethernet Option board.

Installation

Before installing the Ethernet Option board, ensure that power has been disconnected from the terminal, the terminal has been removed from the wall mount plate, and Full Power Reserve Option (if equipped) has been disabled. Attach the Ethernet Option board, hardware, and cables as shown.
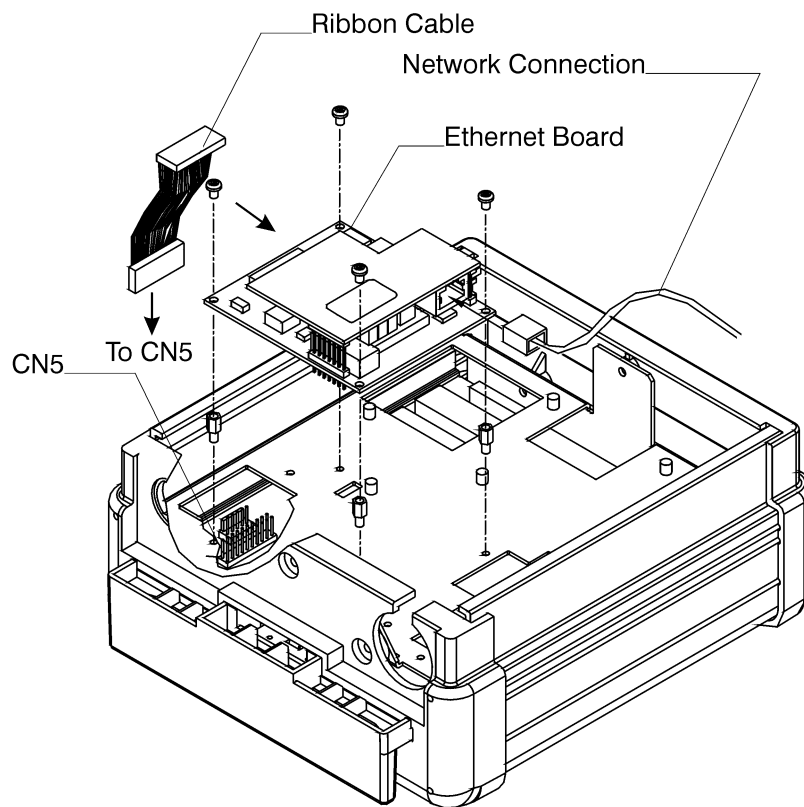
Once the Ethernet Option board has been installed, and the connections are secure, enable the Full Power Reserve Option (if equipped), Enable the Full Power Reserve option if equipped, reconnect power to the terminal, and secure the terminal to the wall mount plate.

Setting the IP Address from the MTX keypad

The Ethernet Board IP Address can be configured using the MTX keypad (TOS v1.55 or higher). To begin configuration, you must enter the NET DIAGNOSTICS mode.

1. Install the default paper keypad insert (if equipped).

2. Press the reset button (on the back of the unit) and the BACK key (last row on the bottom, second to last key from the right) simultaneously. The MTX will open the NET DIAGNOSTICS menu. The red LED will blink 4 times, following that, the red and green LED (channel1) will blink 4 times.

```
NET DIAGNOSTICS
  1.IP Config.
  2.Write IP
  3.Read IP
```

3. There are three selections in the NET DIAGNOSTICS Menu.

   1. IP Config
   You may configure the MTX Terminal IP address, gateway IP address and subnet mark by pressing the appropriate button.

```
IP Configuration
  1.Terminal IP
  2.Gateway IP
  3.Subnet Mask
```

   Enter the Address. Use the ENT key to move between spaces.

```
   Terminal  IP

 192.168.000.001
```

   2. Write IP
   Use this option to save your IP configuration parameters to the ethernet board. If the write is successful, the following message will be displayed:

```
   IP Write
Program Finished
ESC  for EXIT
```

   If the write is unsuccessful, the following message will be displayed:

   In this event, check the RS-232 connection between the MTX terminal and the ethernet board.

```
   IP Write
Unsuccessful
ENT  to Try Again
ESC  for EXIT
```

   3. Read IP
   You may read the IP address currently programmed on the ethernet board.

   Note: Older versions of the Ethernet board may not support this feature.

   If read successfully, the following screen will be displayed:

```
      IP Read
 IP:192.168.000.026
 GW:000.000.000.000
 MASK:255.255.252.000
```

If read unsuccessfully, the following screen will be displayed:

You must press the reset button.

```
IP Read
Unsuccessful!
RESET&RE-ENTER TO
NET DIAGNOSTICS MODE
```

NOTE: If the red LED is blinking and the green led (channel 1) blinks 5 times, no IP address is configured on the board.

Establishing a Network Hardware Connection

To perform this procedure, the MTX terminal must be powered on, functioning correctly, and attached to a network via ethernet CAT5 cabling. In addition, an IP address that is to be assigned to the terminal must be obtained by your network administrator. To set the IP Address of the terminal, perform the following:

1. Obtain the Serial Number of the Ethernet board. The Serial Number is located on a label that is fixed to the board. This number will be used to set the Hardware Address.

2. The Hardware Address is obtained by combining the Hardware Address prefix with the Serial Number of the Ethernet board. For example, an Ethernet board with the Serial Number 01-70-B5 will have a Hardware Address of 00-20-4A-01-70-B5.

3. Using the IP Address obtained from your network administrator, and the Hardware Address, you can now assign an IP address to the Ethernet board on the terminal. In Windows 95/98, open the MS-DOS prompt by selecting it from the Start Menu. In Windows 2000, select Start Menu|Run and type "cmd".
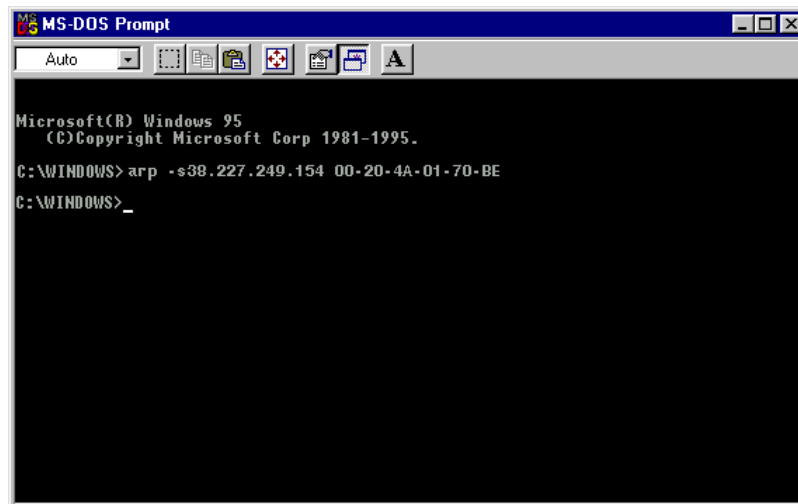
At the prompt, type **arp -s [IP Address] [Hardware Address]**. For example, if the Hardware Address is **00-20-4A-01-70-B5** and the IP Address obtained from your network administrator is **38.227.249.154**, you would then type **arp -s 38.227.249.154 00-20-4A-01-70-B5** at the prompt. This command will assign an IP Address to the Ethernet board.

Connecting to Hardware via Telnet (Win 95/98)

In order to use the Ethernet board with TruTime, the board must be configured. This is accomplished through multiple telnet sessions to the terminals. To configure the terminal for use with TruTime, perform the following:

1. Initiate a telnet session by selecting **Start|Run**. Type "**Telnet**" in the run programs dialog box.
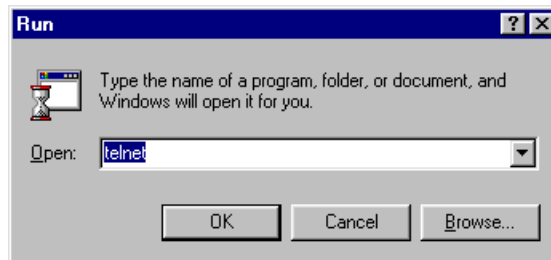
2. Choose the Remote Session from the Connect menu. Type in the IP Address next to the **Host Name**. Enter **1** in the **Port** field, and set the **term type** to **vt100**.

3. Click on the **Connect** button. A **Connect Failed!** message should appear. Click on the **OK** button to continue.
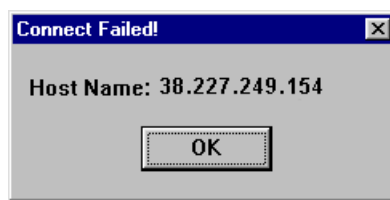
4. Initiate another telnet session to the same IP Address, but this time set the **Port** field to **9999**.
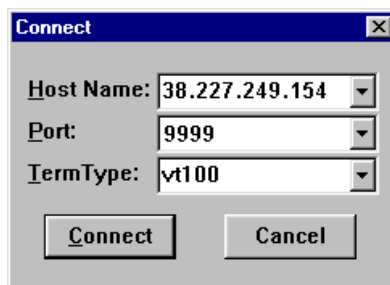
5. A Telnet window will appear. Press the **Enter** button to enter the Setup Mode.

Connecting to Hardware via Telnet (Win 2000)

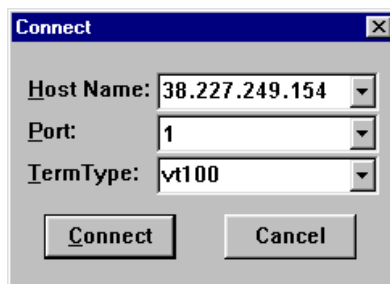In order to use the Ethernet board with TruTime, it must be configured. This is accomplished through multiple telnet sessions to the terminals. To configure the terminal for use with TruTime, perform the following:

1. Initiate a telnet session by selecting **Start|Run**. Type "**Telnet**" in the run programs dialog box.

2. The telnet window will appear. Type "**set term vt100**" and press Enter.

3. Type "**open**", add a space, enter the IP Address, add a space after the address, and type "**1**". Press Enter. A "**Connect Failed**" message should appear.
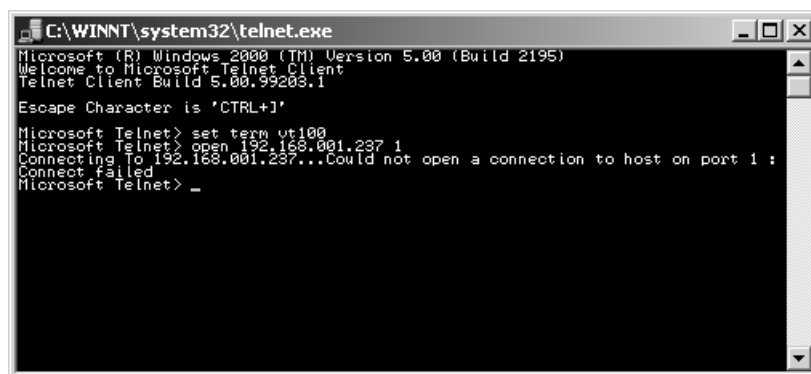
4. Type "**open**", add a space, enter the IP Address again, add a space after the address, and type "**9999**". Press Enter.

5. A Telnet window will appear. Press the **Enter** button to enter the Setup Mode.

Hardware Setup Mode (Via Telnet)

After successfully connecting to the hardware via Telnet, perform the following steps:

1. Choose option **0** from the **Change Setup** prompt to configure the following:

```
 Telnet - 38.227.249.154
Connect  Edit  Terminal  Help

  Change Setup (0 Basics, 1 or 2 for Channel, 8 exit, 9 save and exit) ? ) 0
IP Address : (038) 38.(227) 227.(249) 249.(154) 154
Set Gateway IP Adress (N) N

Netmask: Number of Bits for Host Part (O=default) (00) 00
change telnet config pasword (N) N

***basic parameters
   Hardware: Ethernet Autodetect TPI
   IP addr 038.227.249.154, no gateway set
```
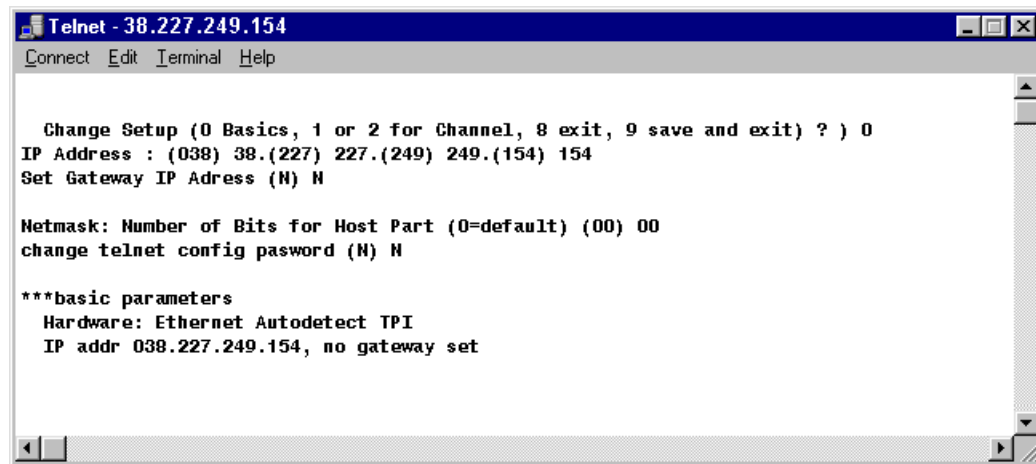
Ethernet Interface AUI: Set to **N**
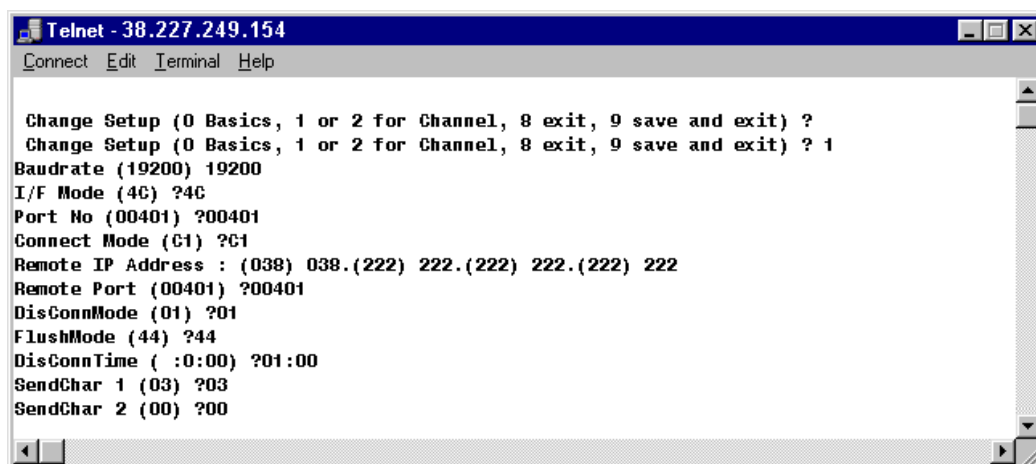
IP Address: This value must be unique. If it must be changed, it can be set here. Otherwise, the IP Address will remain set to its previous value.

Set Gateway IP Address: This should be set to **N**. However, if the terminal will be sending packets through a router/gateway to a TruTime client, this must be set to the router address that connects to segments of the LAN that the TruTime client is located in.

Netmask: Number of Bits for Host Part: This should be set to **00**.

Change telnet config password: This should be set to **N**. However, if you want to prevent unauthorized access to the setup menu, a password can be set.

2. Once the Basic Parameters have been set, Channel 1 must be configured. Channel 1 is used for communication between TruTime and the Ethernet board.

```
 Telnet - 38.227.249.154
Connect  Edit  Terminal  Help

 Change Setup (0 Basics, 1 or 2 for Channel, 8 exit, 9 save and exit) ?
 Change Setup (0 Basics, 1 or 2 for Channel, 8 exit, 9 save and exit) ? 1
Baudrate (19200) 19200
I/F Mode (4C) ?4C
Port No (00401) ?00401
Connect Mode (C1) ?C1
Remote IP Address : (038) 038.(222) 222.(222) 222.(222) 222
Remote Port (00401) ?00401
DisConnMode (01) ?01
FlushMode (44) ?44
DisConnTime ( :0:00) ?01:00
SendChar 1 (03) ?03
SendChar 2 (00) ?00
```

To configure **Channel 1**, select option 1 from the **Change Setup** menu. This will allow you to configure the following:

Baud Rate: This should be set to **19200**

I/F Mode: This should be set to **4C**

Flow: This should be set to **00**

Port No: The Port Number is the source of the TCP connection, and it is the number used to identify the channel for remote connections. This should be set to **00401**

Connect Mode: This should be set to **C1**

Remote IP Address: This is the IP Address of the Host PC

Remote TCP Port: This parameter defines the port number on the target host to which a connection is attempted. This should be set to **00401**

DisConnMod: This should be set to **01**

FlushMode: This should be set to **44**

DisConnTime: This parameter controls inactivity time. If the time expires without activity, the connection will be dropped. This should be set to **01:00** (Enter **01** then press **ENTER**, **00** then press **ENTER**).

SendChar1: This should be set to **03**

SendChar2: This should be set to **00**

```
Telnet - 38.227.249.154
Connect  Edit  Terminal  Help

 Change Setup (0 Basics, 1 or 2 for Channel, 8 exit, 9 save and exit) ?
 Change Setup (0 Basics, 1 or 2 for Channel, 8 exit, 9 save and exit) ? 1
Baudrate (19200) 19200
I/F Mode (4C) ?4C
Port No (00401) ?00401
Connect Mode (C1) ?C1
Remote IP Address : (038) 038.(222) 222.(222) 222.(222) 222
Remote Port (00401) ?00401
DisConnMode (01) ?01
FlushMode (44) ?44
DisConnTime ( :0:00) ?01:00
SendChar 1 (03) ?03
SendChar 2 (00) ?00
```

3. Once Channel 1 has been configured, select option **9** from the **Change Setup** menu. This will save the parameters that were just entered. The following screen will appear indicating that all the parameters were saved.
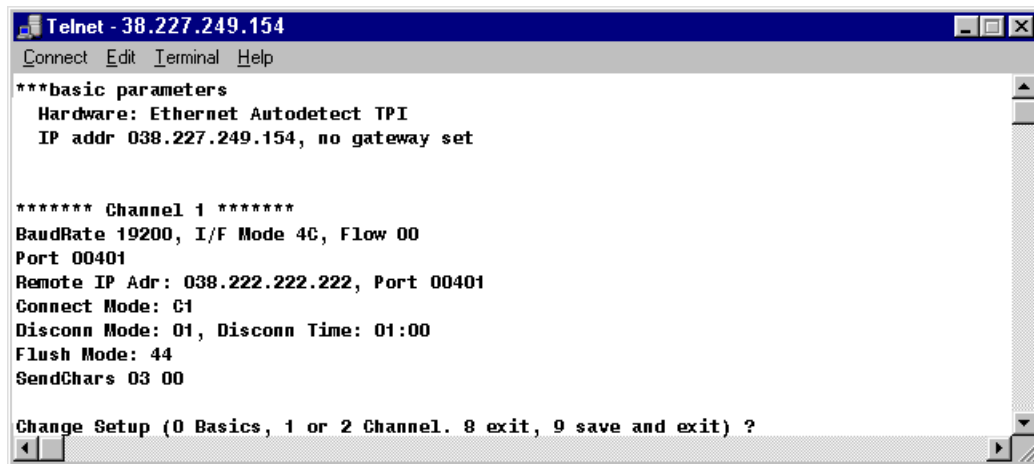
TruTime Configuration

TruTime can be configured to communicate with the MTX Ethernet Terminal in the MTX Polling/Download module which is accessed by selecting the Communications tab. To configure TruTime to communicate with the terminal, perform the following:

1. Open the MTX Polling/Download module and select **Location Setup**.

2. Select the **New** command and type a **Location Name** where the terminal will be located.

3. Select a time zone offset if necessary.

4. Enter the IP address of the terminal.
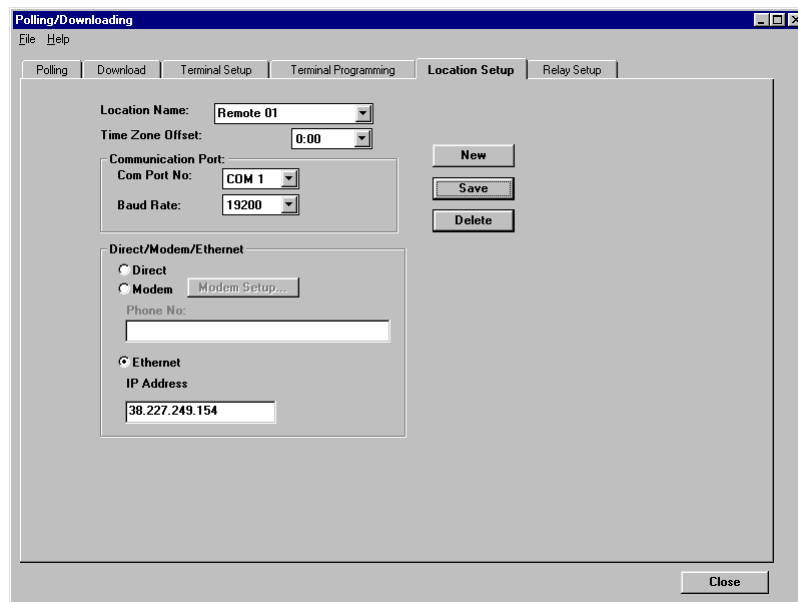
5. To check the communications between TruTime and the terminal, click on the **Terminal Setup** tab.
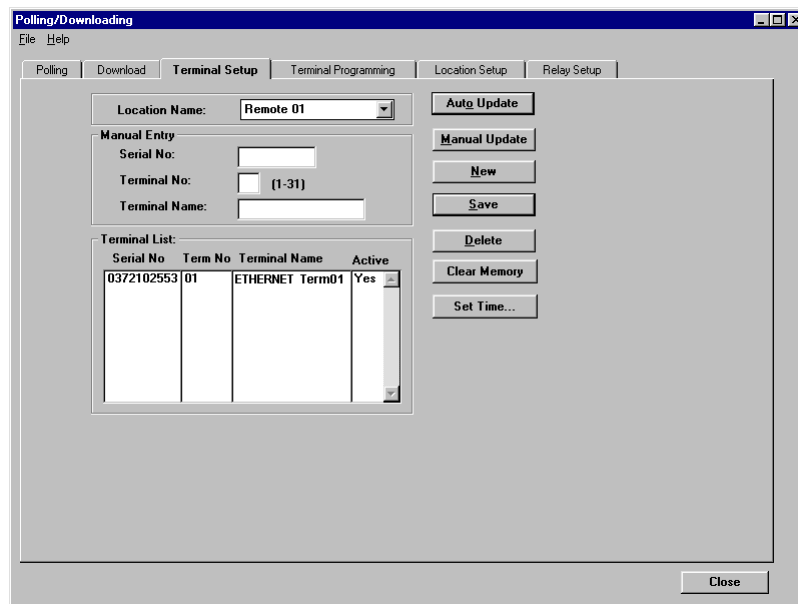
6. Select the location of the terminal from the drop down list and click on the Auto Update button. If communications are successful, the following message will appear:
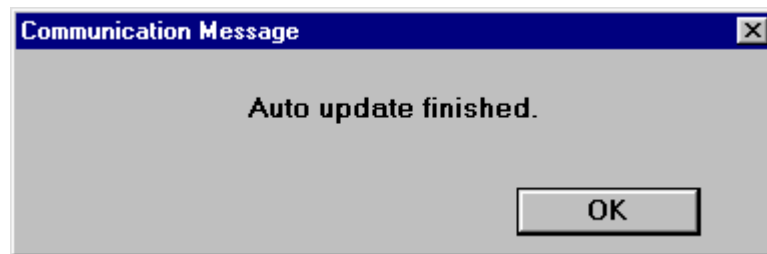
If it fails, check the Ethernet board parameters, TruTime client IP Address, and wiring connections.

7. Once communications have been established, TruTime can poll, download, or utilize all the other functions in the MTX Polling/Download module.

Status Indicators

The Ethernet Option board is equipped with four LED Status Indicators and a Reset button. The LED's labeled **D1**, **D2**, and **D3** are status indicators, and **D4** is a Link Indicator.
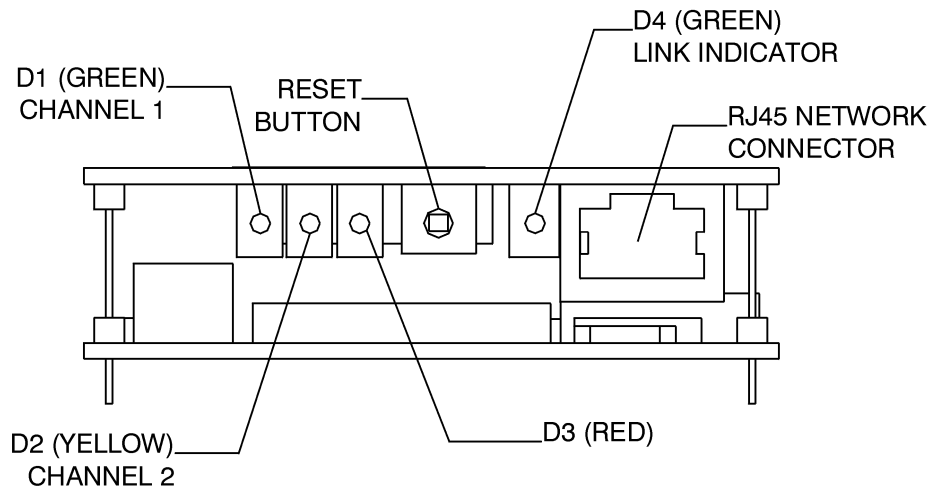
The Status Indicators are provided for troubleshooting communications problems between the network and the terminal. The following chart describes the functions of the Status Indicators:

D1 (Green) Channel 1	D2 (Yellow) Channel 2	D3 (Red)	Status
ON	OFF	OFF	Channel ide, no connection
Blinking (1 sec. Cycles)	OFF	OFF	Connected over the network
Blinks 1 Time	OFF	ON	EPROM Checksum error
Blinks 2 Times	OFF	ON	RAM error
Blinks 4 Times	OFF	ON	EPROM Checksum error
Blinks 5 Times	OFF	ON	IP Address already in use
Blinks 4 Times	OFF	Blinking	Network connection is faulty*

* This will only appear after reset

The **Reset** button is used to reset the Ethernet board and your terminal. If you terminal is equipped with a type AMTM-1B PC board, only the Ethernet board will be reset.

Chapter 8: Full Power Reserve Option

The Full Power Reserve Option is designed to provide up to three hours of backup power (backup time may vary depending on the options installed) for full operation of your MTX terminal during a power failure. Reserve power is provided by a standard Nickel-Cadmium battery pack which consists of six size "AA" batteries.

The Full Power Reserve Option consists of a battery pack, a mounting bracket, a PC board, and the necessary cables and hardware for installation on the terminal.

Installation

To install the Full Power Reserve Option, you must first disconnect power to the terminal and if necessary, remove the terminal from the wall mount plate. Install the battery back in the space provided and secure it in place with the mounting bracket.

BATTERY PACK
AND MOUNTING
BRACKET

FULL POWER
RESERVE BOARD

COMMUNICATIONS
PACKAGE(RS-232C,
MODEM, OR ETHERNET)

MOUNTING
BRACKET

TO CONNECTOR CN1
ON FPR PC BOARD
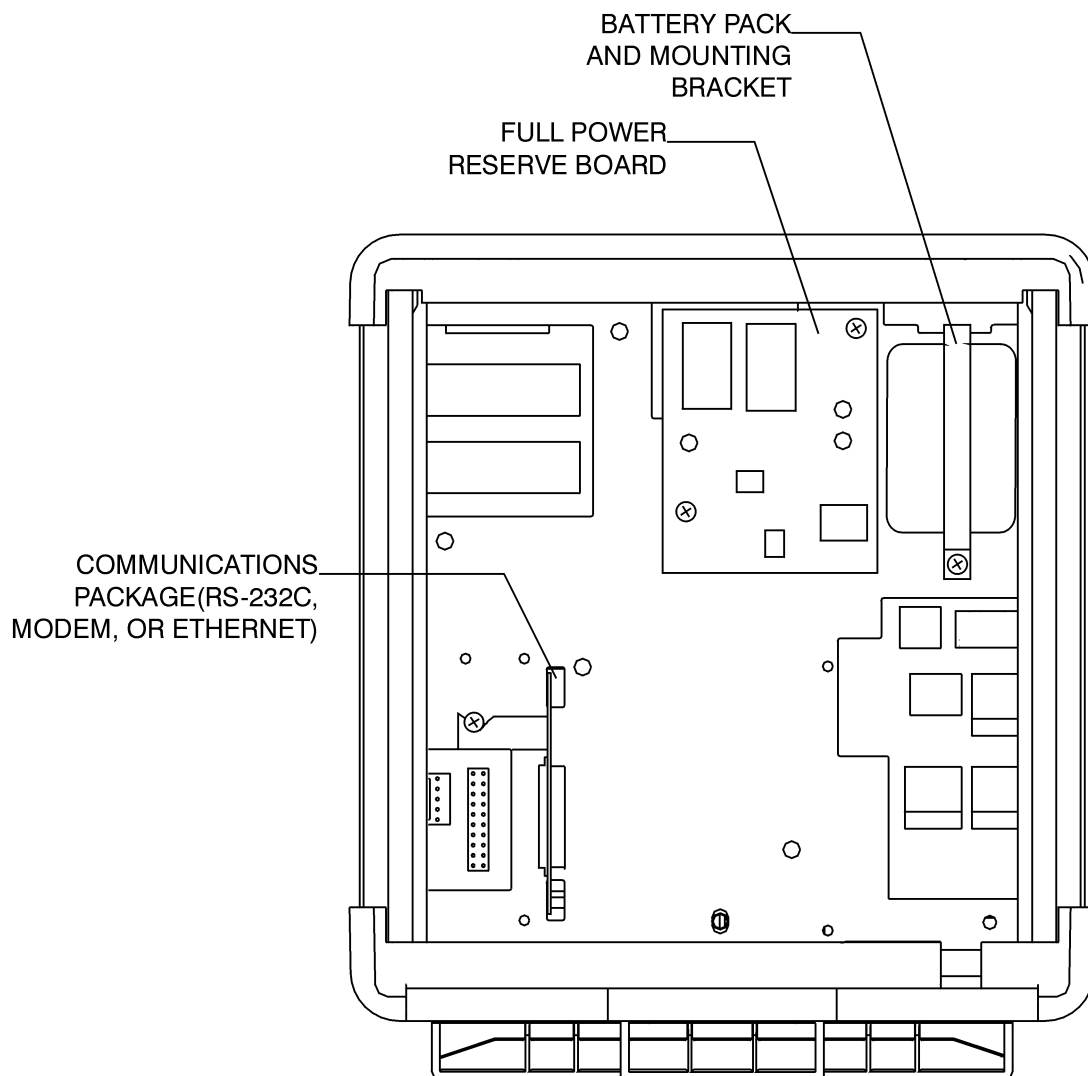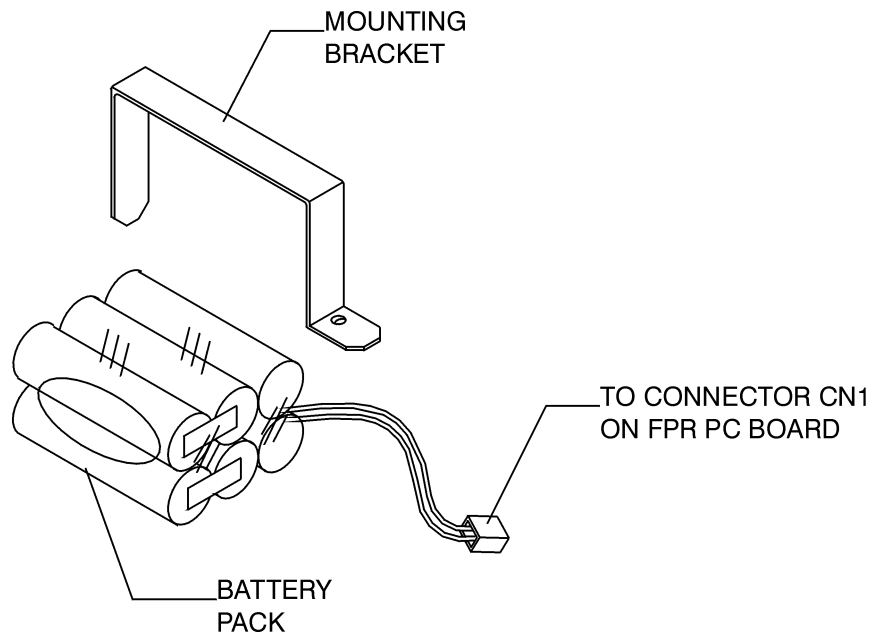
BATTERY
PACK

Attach the Full Power Reserve PC Board to the terminal with the hardware provided, and connect one end of the cable provided to connector CN2 on the PC board and the other end to the connector CN1 (labeled "Battery Backup") on the terminal.

CONNECTOR CN2 TO
CONNECTOR CN1
"BATTERY BACKUP" ON TERMINAL

FPR PC BOARD
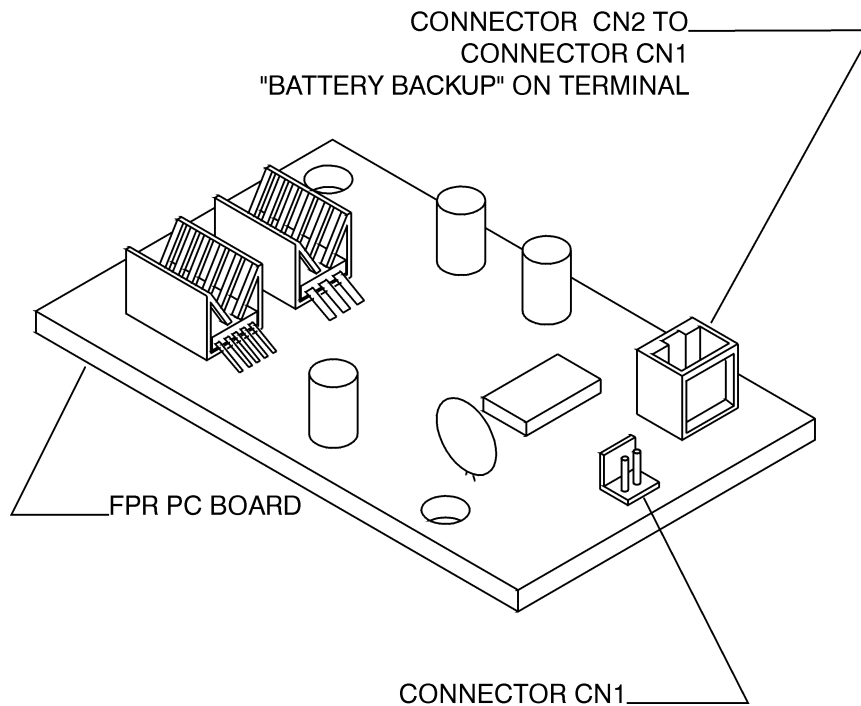
CONNECTOR CN1

Connect the wire from the battery pack to connector CN1 (labeled "Battery" on the Full Power Reserve PC Board).

With the Full Power Reserve board installed in the terminal, reconnect power to the terminal, and secure the terminal to the wall mount plate.

For proper operation, an application file that enables the terminal to recognize the Full Power Reserve Option must be downloaded to the terminal. This can be accomplished through MTX-COM, MTX-PRO, or TruTime.
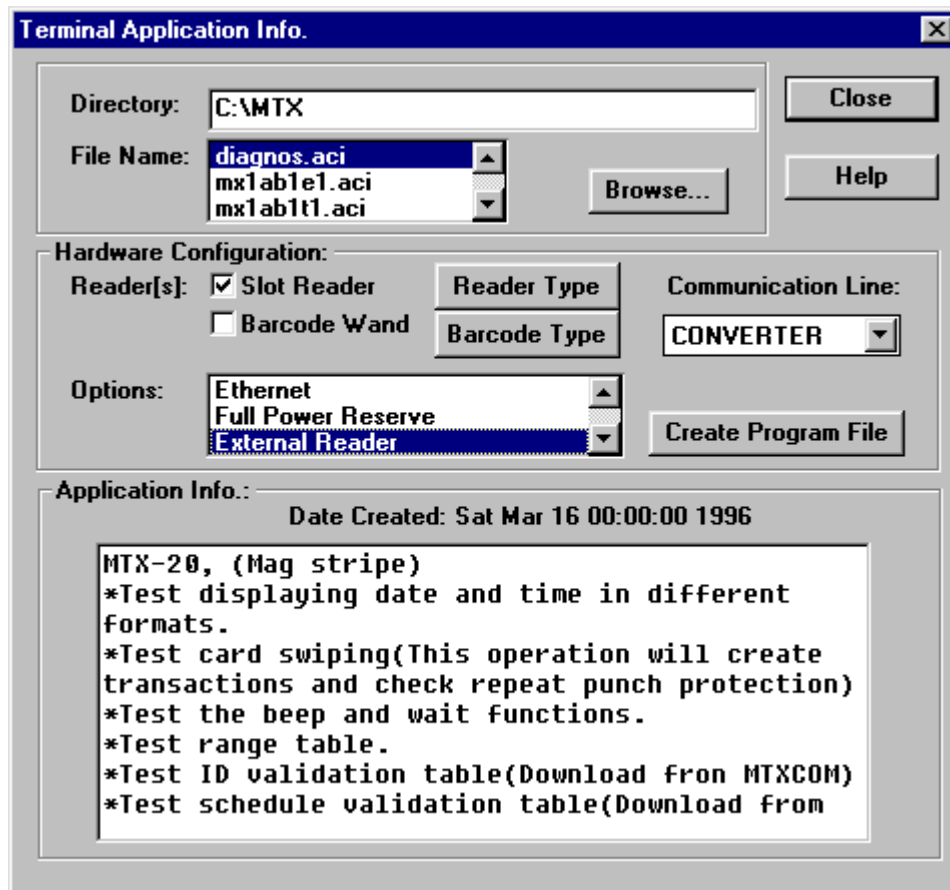
Disabling Full Power Reserve

The Full Power Reserve Option is disabled by removing the connection between the battery pack and connector CN1 (labeled "Battery" on the PCB).

Operation

During normal terminal operation, the Full Power Reserve Option monitors the input current to the terminal while charging and maintaining the backup batteries. When power is interrupted, it supplies 5 VDC to the terminal and monitors the battery pack for discharge. When the battery pack has discharged below a specified level, backup power will be disconnected from the terminal. This is done to prevent the batteries from deep discharge, prolong battery life, and halt the eventual creep of the electrolyte if the battery is connected for a long time without charging. In addition, it ensures that power does not drop below the specified voltage level of the terminal.

If your MTX terminal is going to be disconnected from the AC power source for an extended period of time, the Full Power Reserve Option should be disabled. This will ensure a longer battery life and prevent damage to the terminal.

The Full Power Reserve Option can not be used with terminals that are equipped with the Heater Option

.

Chapter 9: Internal Heater Option

The Heater Option is designed to provide reliable operation of the MTX terminal at temperatures as low as -20°C (-4°F). This is a factory installed option available for both the MTX-10 and MTX-20 terminals with Mag-stripe Readers. In addition, the Full Power Reserve Kit can not be used with MTX terminals equipped with the Heater Option.

Use of these terminals requires an external 14VAC, 2A, weather-resistant transformer (provided). Installation also requires that a piece of self-adhesive thermal insulation (provided) be placed on the wall plate to protect the circuitry inside the terminal.

The Heater is controlled by a thermal switch which turns the heater on when the temperature drops below 40°± 8°F (4.5°± 4.5°C) and turns if off when the temperature rises to 60°± 5°F (15.6°± 2.8°C). At very low temperatures, the heater will continually operate to keep the inside temperature of the terminal above its safe operation level of 32°F.

HEATER

FLAT HEATER

THERMAL SWITCH

FRONT PANEL
SECTION (MTX-20)
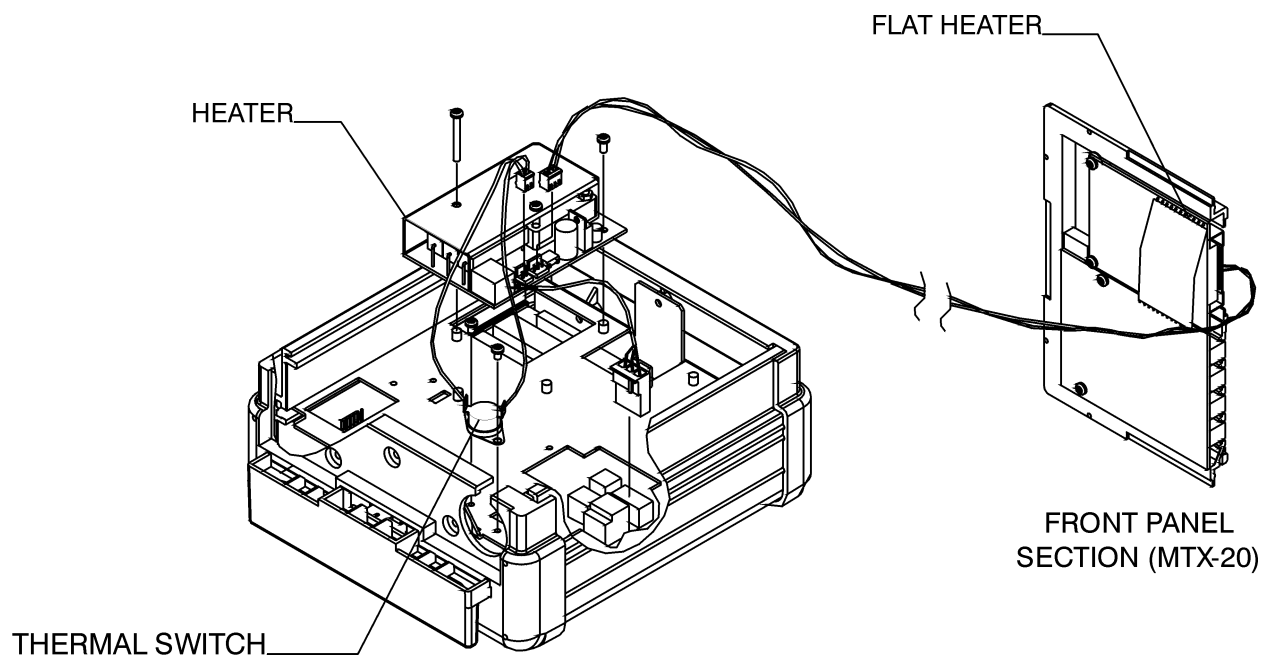
MTX-20 terminals equipped with the Heater Option also have an additional flat heater that is inserted behind the LCD display. This additional heater protects the display from cold temperatures by maintaining a constant temperature.

External Transformer

The External Transformer should be conveniently positioned in the vicinity of the terminal. The ABS plastic case allows the transformer to be mounted in outdoor environments. The mounting dimensions for the case are as follows:

REAR PANEL OF CASE

3.54" (90 mm)

4 mm DIA.
4 PLACES

5.83" (148 mm)
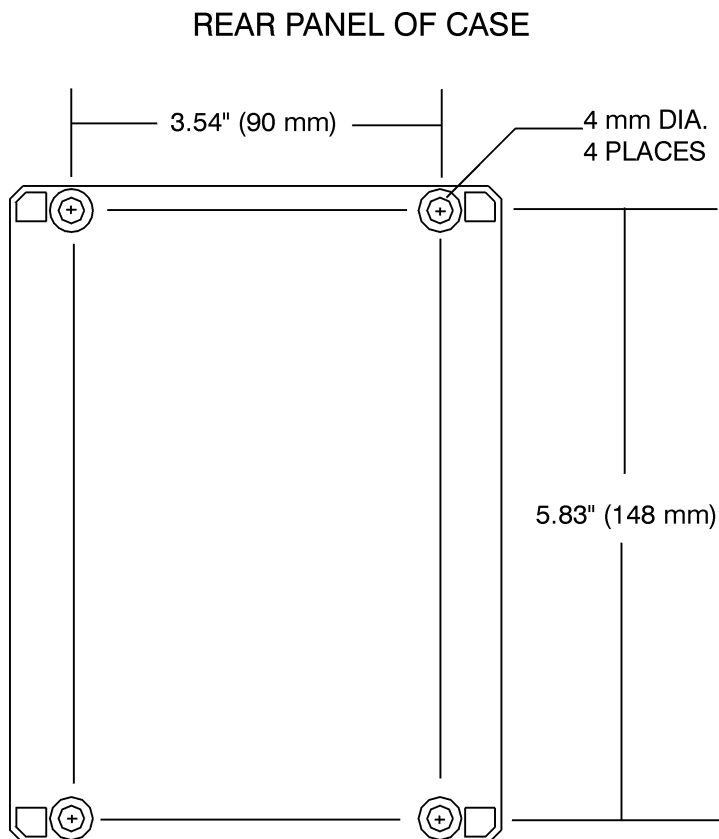
Once the transformer case has been positioned, the transformer should be wired as follows:

Terminal Number	Connection
1,2	Power In, 115 VAC, 60 Hz
3	No Connection
4	GND
5	GND
6,7	Power Out, 14 VAC, 2.0 A

All connections to and from the transformer should be NEC Class II, and be performed by a qualified service technician. A hole and coupling for connecting electrical conduit are provided for on the transformer case. An additional coupling is included with the case if an extra connection is needed.

The transformer case is equipped with a gasket that seals and protects the transformer from moisture and other external conditions. To seal the transformer, install the cover, screws and endcaps that are provided.
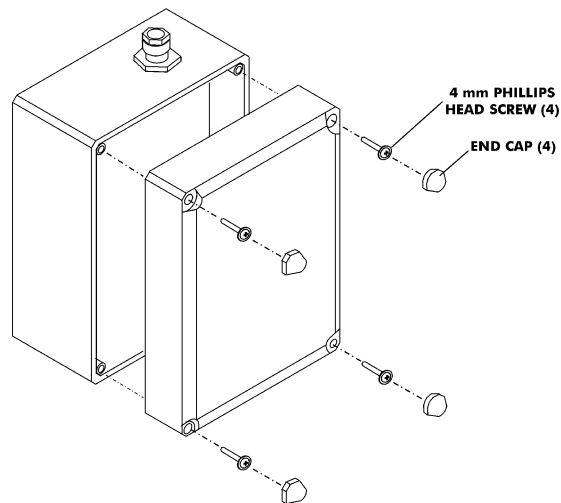
Heater Wiring

Before attempting to make the electrical connections to the Heater Module, ensure that power has been disconnected from the terminal, and the terminal has been removed from the wall mounting plate. The electrical connections to the Heater Module are connected to the terminal block mounted on the Heater's PC Board.
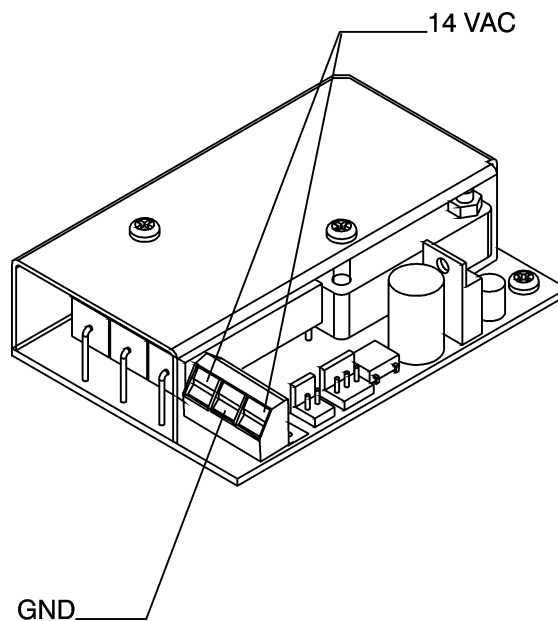
The two outer terminals of the terminal block are for 14 VAC input, while the middle terminal is for the ground (GND) connection. These connections are to be performed with power disconnected from the terminal.

After connections have been made to the Heater Module, feed the wires through the cut out in the side wall of the terminal, reconnect power to the terminal, and reinstall the terminal to the wall mount plate if applicable.

Chapter 10: Operation

It is critical to the operation of the MTX terminal that the application files and tables are created and downloaded to the MTX. Without these components, the MTX can only run the diagnostics software and display the time and date. If you wish to use the predefined files prepared in MTX-COM or TruTime, please refer to the MTX-COM manual or contact TruTime Support. If you wish to create your own operation program for the MTX, you will need to use MTX-PRO.

Basic Concepts

Following are the basic concepts you will need in order to operate the MTX terminal.

Label: The display of a block of characters written using MTX-PRO or predefined application files and tables from MTX-COM or TruTime.

Field: Represents the event specified by the action you want the MTX to perform. When the application file of the MTX performs the instructions (action) of the field, it moves to the next field and performs the next action. For example, you can create a field where the MTX is waiting for an ID card to be swiped before proceeding to another action. Once a card is swiped, the MTX verifies whether or not the ID is valid. If the card is valid, the MTX will save the data and then move to the next field.

Screen: The screen of the terminal displays the labels and fields at the same time.

Operation: An operation is a group of actions performing like a program routine. An operation can contain multiple screens and have multiple fields to be executed, with multiple labels shown. The application can then return to the first field or it can jump to another operation.

Card Format: When a card is swiped, the MTX application file must determine whether the card is valid or not and what data it must store. You must specify the card format before operation, indicating what type of card and data should be accepted in the field.

Format: You must specify the data format structure to indicate what order the input data is to be placed into the data string that is stored in the MTX.

Key Definition: You must configure the individual key switches to act as a value key to input data, as an operation key, or as a control key.

Internal Heater Option

Chapter 11: Proximity Reader Options

The Proximity Reader option for the MTX enables a terminal to read and accept 26-bit proximity badges. The options available are as follows:

- A terminal mounted HID or Motorola Proximity Reader
- An externally mounted HID or Motorola Proximity Reader used in conjunction with a modified terminally mounted BarCode or Magnetic Card Slot Reader
- An internally mounted Proximity Option Board enabling the connection of another vendor's externally mounted Proximity Reader

The MTX terminal uses a Wiegand interface to connect to the Proximity Reader. This allows flexibility when selecting proximity readers and eliminates the need to issue new or duplicate badges when using an MTX terminal. The chart below lists types and combinations of readers that can be used on a single terminal.

Terminal Mounted **Externally Mounted**	**Magnetic Slot Reader**		**Barcode Slot Reader**		**Proximity Reader**	
	Standard (AMX-104970)	Modified (AMX-125570)	Standard (AMX-106171) (AMX-106271)	Modified (AMX-125670) (AMX-125770)	HID (AMX-124970)	Motorola (AMX-125070)
Wand Reader (ACC-600360) (ACC-600370)	YES	YES	YES	NO	YES	YES
Magnetic Slot Reader (AMX-118750)	YES	YES	NO	NO	NO	NO
HID Proximity Reader (AMX-124970)	NO	YES	NO	YES	NO	NO
Motorola Proximity Reader (AMX-125070)	NO	YES	NO	YES	NO	NO
BarCode Scanner (AMX-126670)	YES	YES	YES	NO	YES	YES
TOS Version	ALL	ALL	ALL	ALL	1.50 or Higher	1.50 or Higher

The specifications for each are:

	HID Model	**Motorola Model**	**Proximity Option Board**
Power Requirements	12 VDC ± 10%, 50 mA	12 VDC ± 10%, 65 mA	Input: 5 VDC ± 10%, 300 mA Output: 12 VDC ± 10%, 100 mA[1,2]
Interface	Wiegand, TTL Voltage Level	Wiegand, TTL Voltage Level	Wiegand, TTL Voltage Level
Max. Read Distance	Up to 5 "(depending on card type)	Dependent upon reader and card type used	Dependent upon reader and card type used
Dimensions	152 mm L x 55 mm W x 84 mm D (6.0" x 2.1" x 3.3")	140 mm L x 35 mm W x 84 mm D (5.5" x 1.4" x 3.3")	82 mm L x 55 mm W x 20 mm D (3.2" x 2.1" x 0.78")
Weight	12.5 oz[3]	10.5 oz[3]	1.6 oz
Mounting	Terminal mounted using bracket provided or externally mounted up to 500 feet away[4]	Terminal mounted using bracket provided or externally mounted up to 500 feet away[4]	Mounts in any available location for option boards. Connector plugs into CN3 on the terminal

Basic Concepts

When properly configured, the MTX terminal can accept an industry standard 26-bit proximity card. The structure of this format is:

ECCCCCCNNNNNNNNNNNNNNNNO

E = Even parity bit for the first twelve bits, labeled "C" through "N"
C = Facility code (Eight bits, range 0 to 255)
N = Card number (Sixteen bits, range 0 to 65,535)
O = Odd parity bit for the last twelve "N" bits

Since only one card format can be programmed into the terminal, proximity card transactions are decoded and translated into a format that emulates the standard ACI magnetic card. The standard ACI magnetic card format is:

BxxxxxxxxxxIxxxxxxxxxxF

B = Start sentinel (First character)
x = Card number (Digits thirteen through 22 used and two through eleven not used)
I = ID holder (Digit twelve)
F = End sentinel

When translated to the standard ACI magnetic card format, the 26-bit proximity card number becomes:

B0000000000200cccnnnnnXF

B = Beginning of the card (First bit of magnetic card format)
0 = Ten leading "0"'s (Digits two through eleven of magnetic card   format)
2 = ID place holder, fixed to "2", and followed by two "0"'s
c = Facility code, range 000 to 255
n = Card number, range 00000 to 65,535
X = Signature character for external reader
F = End character

This emulation allows the use of two different readers and cards to be used with one terminal.

HID and Motorola Reader Mounting

The HID and Motorola Proximity Readers can be terminally or externally mounted. The mounting positions for terminally mounted readers are determined by terminal location.

Indoor Use: Each of the following reader positions are acceptable.
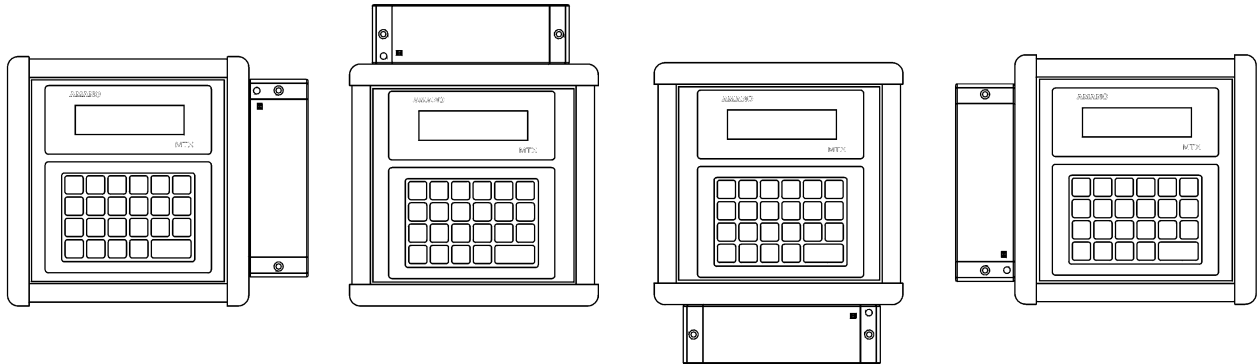
Outdoor Use: The reader must be positioned as shown.
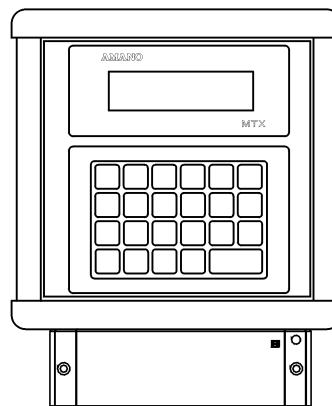
Externally mounted readers mounted too far from terminals require an extension cable. The maximum distance a reader can be mounted from the terminal is 500 ft. Actual distance will depend on the reader's specification, wiring and environment.
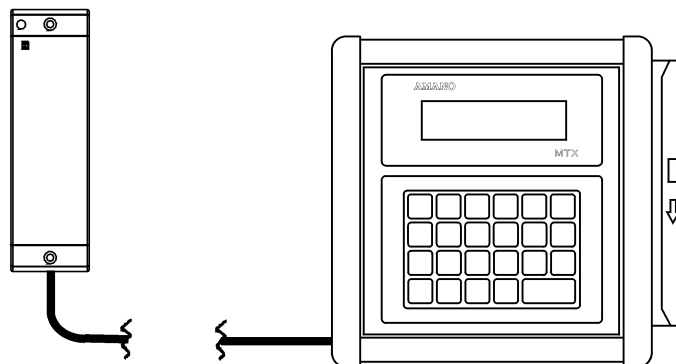
Externally mounting the proximity reader enables you to use a Bar code or Magnetic Card Slot Reader with the terminal.

Use with Magnetic Card Slot Reader

The Magnetic Card Slot Reader available for use with the HID and Motorola Proximity Readers are modified to read only Track 2 of a magnetic stripe type card. Because of the variations, a proximity card format has to be a magnetic stripe type card. Only magnetic stripe cards in ACI standard format can be used.

Use with Barcode card Slot Reader

Barcode card transactions, similar to that of a proximity card, are decoded and translated into the standard ACI magnetic card format. Because of this, a modified Barcode Slot Reader must be used on a terminal equipped with a proximity reader. However, a Wand Reader or Barcode Scanner cannot be used on a terminal with both the Bar code Slot and Proximity Reader installed. To make both proximity and barcode readers compatible with the terminal, only barcode cards in ACI standard format may be used.

The standard ACI external magnetic card format is:

ByyyyyyyyyyIxxxxxxxxxxF

B = Start sentinel (First character)
y = First ten digits (not used)
I = ID holder
x = Card number
F = End sentinel

The standard ACI barcode format is:

Ixxxxxxxx

I = ID holder
x = Card number

The emulated Barcode-Proximity format becomes:

B0000000000I00xxxxxxxxF

B = Start sentinel (First Character)
0 = Card number (digits two through eleven not used)
I = ID place holder, fixed to "2", and followed by two "0"'s
x = Card number (digits thirteen through 22)
F = End sentinel

The barcode's magnetic stripe is activated by configuring the External Reader as a Proximity type. You then have the option to select the 26 bit with Slot Barcode Reader option in the Hardware Configuration window of the MTX-PRO, the Terminal Application Info window of MTX-COM, or TruTime. Once the appropriate application (.aci) file is downloaded to the terminal, the Barcode will swipe into ACI magnetic card format.

Use with Barcode Card Wand Reader

The optional Barcode Card Wand Reader can be used with all Proximity Reader options except when a modified Barcode Slot Reader is installed on the terminal.

Converting to a Proximity Reader

If you are converting an existing MTX terminal to a Proximity Reader, the following steps can be used:

Convert From	Convert To	Required Equipment
Terminal Mounted Magnetic Slot Reader	Terminal mounted Proximity Reader	• (HID or Indala) Proximity Reader Kit • TOS Upgrade (If lower than 1.50)
Terminal mounted Barcode Slot Reader	Terminal mounted Proximity Reader	• (HID or Indala) Proximity Reader Kit • TOS Upgrade (If lower than 1.50)
Terminal mounted Barcode or Magnetic Slot Reader	Terminal mounted Barcode or Magnetic Slot Reader and external Proximity Reader	• Modified Magnetic or Barcode Slot Reader • Proximity Option Board Kit • TOS Upgrade (If lower than 1.50)
Existing Non-Amano Proximity Reader	Use with MTX	• Proximity Option Board Kit • TOS Upgrade (if lower than 1.50)
Existing Non-Amano Proximity Reader	Use with MTX, and terminal mounted Magnetic or Barcode Slot Reader	• Modified Magnetic or Barcode Slot Reader • Proximity Option Board Kit • TOS Upgrade (If lower than 1.50)

Proximity Option Board

The Proximity Option Board allows connection for non-Amano supplied standard Wiegand 26 bit proximity readers. With the Option Board, an externally mounted proximity reader can be installed up to 500 feet away from the terminal. Once again, actual distance will depend on the reader specification, wiring and environment.
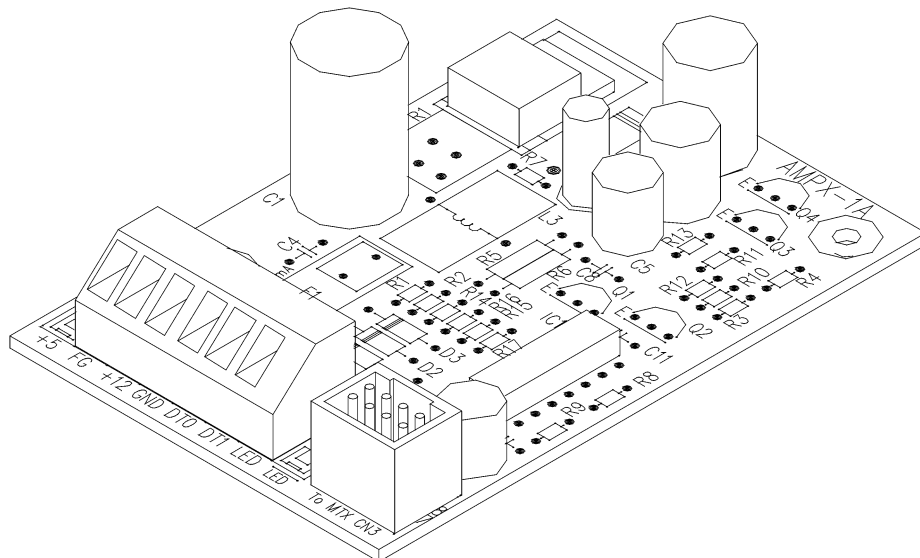
Electrical

The Proximity Option Board is equipped with its own power supply that converts 5 VDC supplied from the terminal's main PCB into 12 VDC. This additional current is then harnessed to power the Proximity Reader. This conversion enables compatibility with the Full Power Reserve (FPR) Option. When equipped, the FPR provides power backup if a power failure occurs.

Up to 100 mA can be drawn from the Proximity Option Board. If no other options are installed on the terminal, this limit can be expanded up to 150 mA. This is accomplished by replacing the 100 mA fuse on the board with a fuse rated at 150 mA.

If an external proximity reader requires more than 100 mA (or 150 mA if no other options are installed on the terminal), an external power supply should be used to power the external reader. Whenever this process is attempted, the ground (GND) and transmission signals (DO, D1, and LED) of the external reader should be connected to the Proximity Option Board. **Power from the external power supply should be connected only to the reader and not to the option board.**

The electrical connections of the proximity reader cable to the terminal block, CN1 on the proximity option board for the HID and/or Motorola reader, are as follows:

MOTOROLA READER		PROXIMITY OPTION BOARD
Wire Color	Elec. Connection	Terminal Name
Red	+DC	+12
Black	Ground	GND (-)
Green	Data 0	DTO (Data 0)
White	Data 1	DT1 (Data 1)
Shield	Shield Ground	FG (Frame Shield)
Brown	LED	LED

HID READER		PROXIMITY OPTION BOARD
Wire Color	Elec. Connection	Terminal Name
Red	+DC	+12
Black	Ground	GND (-)
Green	Data 0	DTO (Data 0)
White	Data 1	DT1 (Data 1)
Shield	Shield Ground	FG (Frame Shield)
Orange	Green LED	LED
Yellow	Beeper	Orange & Yellow tied together

Extension Cable

Externally mounted readers that are not mounted near terminals require an extension cable. The maximum distance a reader can be mounted away from a terminal is 500 ft., but actual distance will depend on the reader specification, wiring and environment. The recommended cables are:

- **Amano Proximity Reader:** Alpha 1296C, 1298C, Beldon 9536 or 9538 six or eight conductor wire. The cable must have a foil or braided shield.

- **Non-Amano Proximity Reader:** Refer to the reader manufacturer's documentation for the recommended cable specification.

All wiring must be NEC Class 2 compliant. If the section of cable containing the splices is to be installed inside a wall, outdoors, or any location exposed or in contact with another surface, the cables should be installed in a gang or junction box before the splices are made. A gang or junction box won't be needed if the spliced section of cable is installed in a NEMA type enclosure.

Mounting

The Proximity Option Board can be installed in any available option board mounting location.
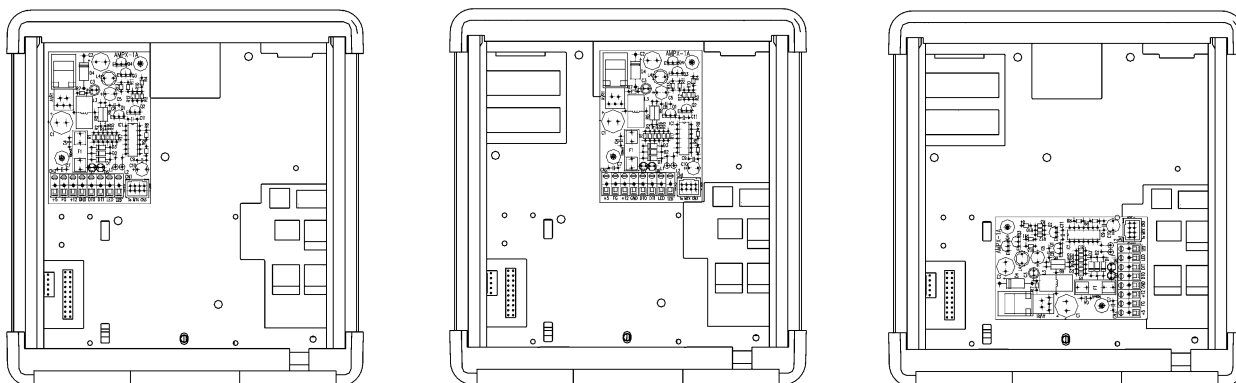
Installation of Proximity Options

Instructions for the installation of Proximity Option Boards are as follows:

1. Disconnect power to the terminal, remove the unit from the wall mount plate, and disable the Full Power Reserve Option if equipped.

2. Verify that Jumper **J6** is ON and Jumper **J5** is set to the OFF position.

3. Remove the standard Magnetic Stripe or Barcode Reader from the unit, if equipped.

4. Install and secure the Proximity Option Board in any available option board mounting location.
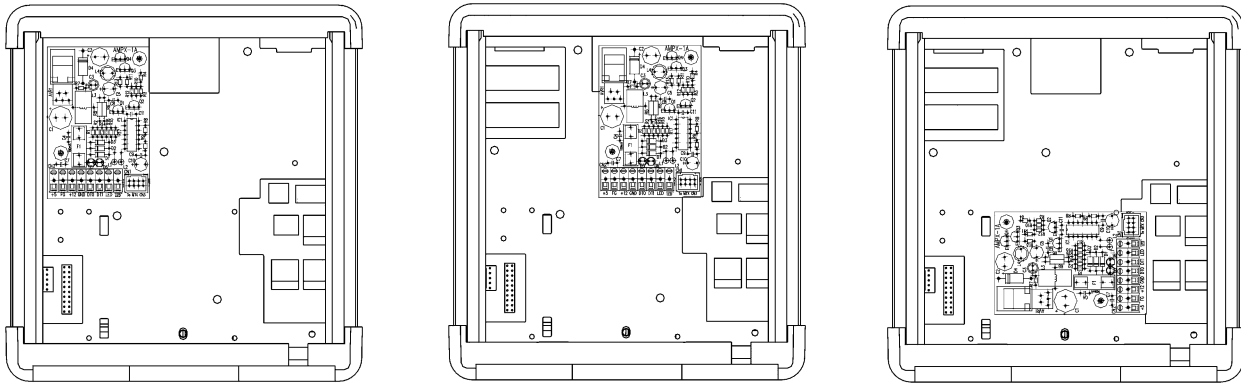
5. With the cables already provided, attach one end to the connector labeled **CN1** on the Proximity Option Board and the other end to the connector labeled **EXT. READER (CN3)** on the terminal.

TERMINAL BLOCK CN2

CONNECTOR CN1

EXT, READER
(CN3)

Rear View
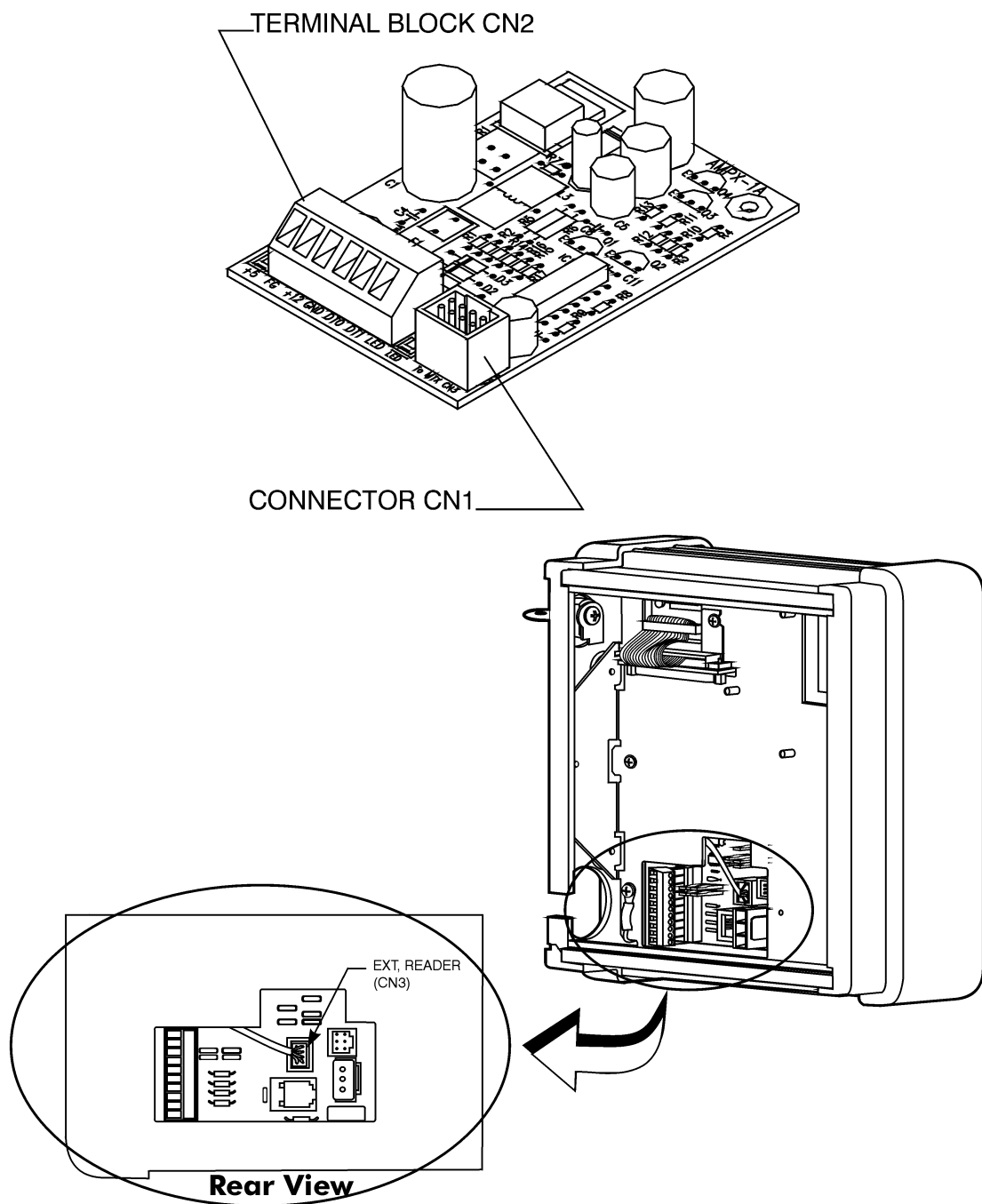
6. If you are mounting the Proximity Reader externally, proceed to step 8. For terminal mounting, slide the Proximity Reader cable through the opening of the side panel, and then slide the Proximity Reader bracket into place.
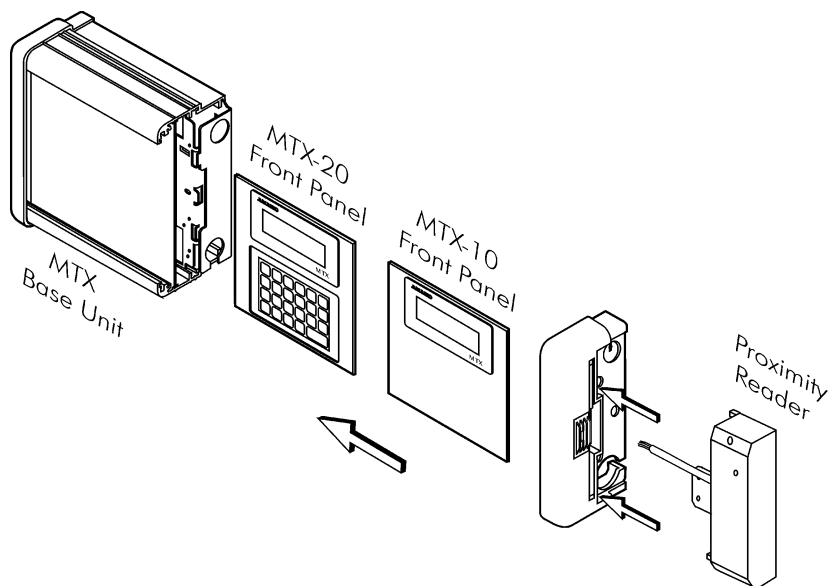
7. Secure the Proximity Reader bracket to the terminal frame with the two Phillips head screws provided. Proceed to step 9.

8. External readers should be mounted on a flat vertical surface. Do not install cables near or next to other heavy inductive loads such as electric lamps, motors or relays.

9. Instructions for connecting the Proximity Reader cable to the terminal block, **CN1** on the Proximity Option Board, are as follows:

Proximity Option Board	Proximity Reader
FG	Frame or Ground Shield
+12	+12 VDC
GND	(-) Ground
DT0	Data "0" In
DT1	Data "1" In
LED	LED or Beep Control (Active Low)
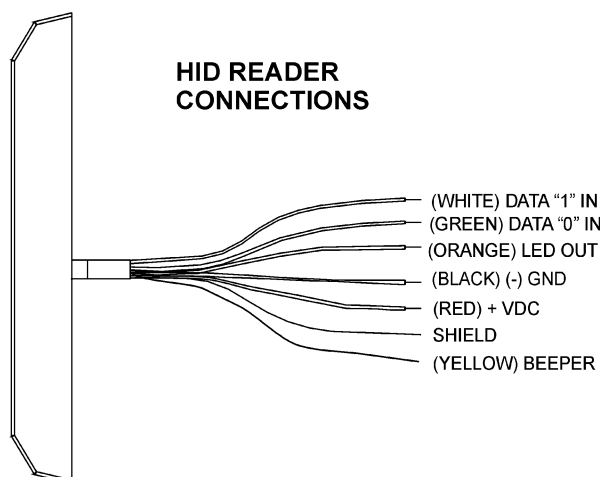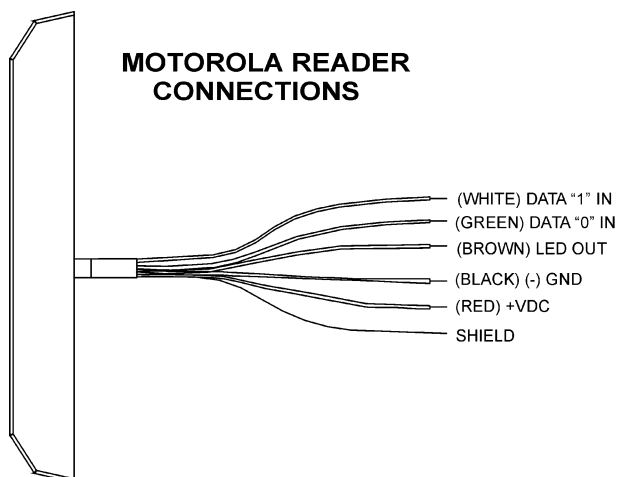
MOTOROLA READER CONNECTIONS

(WHITE) DATA "1" IN
(GREEN) DATA "0" IN
(BROWN) LED OUT
(BLACK) (-) GND
(RED) +VDC
SHIELD

HID READER CONNECTIONS

(WHITE) DATA "1" IN
(GREEN) DATA "0" IN
(ORANGE) LED OUT
(BLACK) (-) GND
(RED) + VDC
SHIELD
(YELLOW) BEEPER

10. Enable the Full Power Reserve option if equipped, reconnect power to the terminal, and secure the terminal to the wall mount plate.

11. For proper operation, you must select the External Reader option in the Reader(s) section of the Hardware Configuration screen, and download the application file that accepts and saves external swipes to the terminal. This can be accomplished through MTX-COM, MTX-PRO, or TruTime.

Hardware Configuration ☒

Application Name : DIAGNOS

[OK]

Machine Type [MTX-OD20 ▼]   Communication Line [CONVERTER ▼]   Cancel

Help

Keyboard : 4x6   Keyboard Options [External Keyboard
Display : 4 x 20 dot Matrix   Keyboard Module]

Reader[s] : ☒ Slot Reader   Special Readers [None ▼]
             ☐ Barcode Wand
             ☒ External Reader

Options [Signal 1   ☐ Time Card Printer
          Signal 2
          Full Power Reserve ☐ External Printer
          Ethernet]

---

12. Test the Proximity Reader with a valid proximity card.

13. Poll the MTX terminal using MTX-COM, MTX-PRO, or TruTime to verify that the swipe is in the memory of the terminal.

Chapter 12: Bar Code Scanner

The optional Bar Code Scanner available for use with the MTX is a high performance scanner that utilizes a bright and sharply focused aiming line, high resolution imaging, and fast reading speed. It is remotely mounted and decodes Bar Codes in the same format as a wand reader at a transmission rate of 25 inches per second. The scanner connects to the terminal via the dedicated **WAND READER (CN4)** connector, and can not be used on terminals equipped with both a Proximity and modified Bar Code or Magnetic Slot Reader.
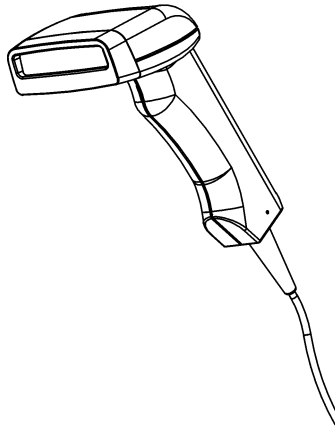
The scanner is factory calibrated to read Code 39 (Code 3 of 9) type format which is the Amano standard. In this mode, all other Bar Code types read are converted to Code 39 format.

The scanner can also be calibrated to Same Code format. In this mode, the scanner can directly read UPC (A and E), EAN (13 and 8), Code 128 and Interleaved 2 of 5 formats without any changes as well as Code 39. All other formats are translated to Code 39.

Specifications

Dimensions: 135 mm (5.3") L x 152 mm (6.0") H x 79 mm (3.1") W

Weight: 0.179 kg (0.395 lbs.)

Housing: Polycarbonate/ABS blend, UL 94VO

Light Source: 630 nm visible red LED

Scan Rate: Programmable to 270 scans per second

Skew Angle: ±30°

Pitch Angle: ±15°

Horizontal Velocity: 127 mm (5.0") per second

Minimum Reflectance Difference: 30%-LR/HD, 40%-PDF

Decode Rate: 270 decodes per second

Power Requirements: 5 VDC ±10% at scanner

Current Draw:

- **@270 s/s:** 275 mA Scanning, 125 mA Standby, 5 microA Low Power, and 550 mA In Rush
- **@67 s/s:** 150 mA Scanning, 125 mA Standby, 5 microA Low Power, and 550 mA In Rush

Temperature Ranges:

- **Operating:** 0°C (32°F) to 50°C (122°F)
- **Storage:** -36°C (-40°F) to 60°C (140°F)

Humidity: 0 to 95% non-condensing

Mechanical Shock: Operational after 25 drops from 1.35 m (5 ft) onto concrete

Vibration: Withstands 5G peak from 30 to 300 Hz

ESD Sensitivity: 15 kV to any external surface

Agency Compliance: FCC Class B, CE EMC Class B, CE Low Voltage Directive, EN60825-1, IEC60825-1 LED Safety: Class 1, UL, cUL. TUV Certified to EN60950, C-Tic

Installation

1. Disconnect power to the terminal, remove the unit from the wall mount plate, and disable the Full Power Reserve Option if equipped.

2. Connect the wand or scanner to the connector labeled **WAND READER (CN4)** on the terminal.
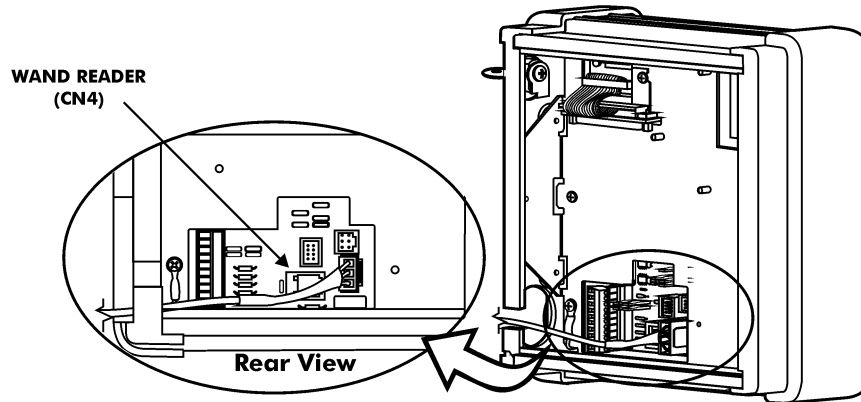
3. Enable the Full Power Reserve option if equipped, reconnect power to the terminal, and secure the terminal to the wall mount plate.

4. For proper operation, an application file that accepts input from a Bar Code Wand must be downloaded to the terminal. Make sure that the **Bar Code Wand** option is checked before downloading the application file in MTX-COM, MTX-PRO, or TruTime.

5. Aim the red illuminated beam over a Bar Code on a badge or card as shown and squeeze the trigger.

CORRECT   **INCORRECT**

6. Poll the terminal using MTX-COM, MTX-PRO, or TruTime to verify that the badge or card was correctly read by the terminal.

Calibration and Testing

The Bar Code Scanner is calibrated prior to shipping. If for some reason it should fail to read the test Bar Codes, it may need recalibration. To do so perform the following:

1. With the terminal powered ON, aim the scanner at the Code 39 or the Same Code format program below and press the trigger. These programs can also be found in the Wand Emulation section of the manufacturer's User's Guide that is shipped with your scanner.

Code 39 Format

Same Code Format

2. Reset the terminal by either removing power and holding down the ENT key when power is reapplied or removing the wall plate and simultaneously press the ENT key on the keyboard and the RESET (SW1) button inside the terminal. When the terminal is reset, the following screen will appear:

```
MTX -20  TOS V1.50
Serial#0010000000
Terminal#01
```

3. When the display appears, press the ENT key to enter the Menu Diagnostics mode. The Diagnostics Menu will appear.

```
     DIAGNOSTICS
  1.Hardware Test
  2.Firmware Test
  3.Software Info
```

In Menu Diagnostics mode the terminal uses the keyboard configuration below:

```
┌─────────────────────────────────────────────┐
│  ┌───┐ ┌───┐ ┌───┐ ┌───┐ ┌───┐ ┌───┐         │
│  │ 0 │ │ 1 │ │ 2 │ │ 3 │ │ 4 │ │ 5 │         │
│  └───┘ └───┘ └───┘ └───┘ └───┘ └───┘         │
│  ┌───┐ ┌───┐ ┌───┐ ┌───┐ ┌───┐ ┌───┐         │
│  │ 6 │ │ 7 │ │ 8 │ │ 9 │ │ a │ │ b │         │
│  └───┘ └───┘ └───┘ └───┘ └───┘ └───┘         │
│  ┌───┐ ┌───┐ ┌───┐ ┌───┐ ┌───┐ ┌───┐         │
│  │ c │ │ d │ │ e │ │ f │ │ # │ │ $ │         │
│  └───┘ └───┘ └───┘ └───┘ └───┘ └───┘         │
│  ┌────┐┌───┐┌────┐┌─────┐┌─────┐┌─────┐       │
│  │ESC ││ * ││ Up ││Down ││Back ││ ENT │       │
│  └────┘└───┘└────┘└─────┘└─────┘└─────┘       │
└─────────────────────────────────────────────┘
```
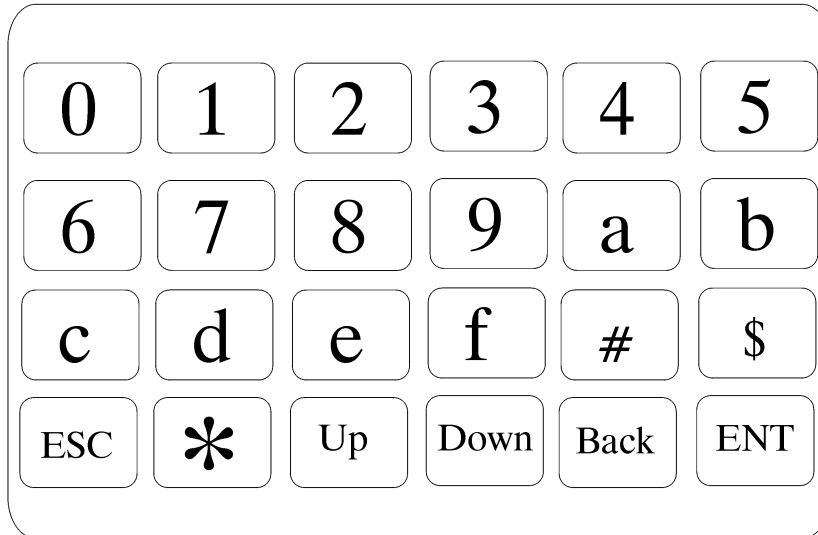
4. Press the **1 (ALL)** key to enter the Hardware Tests menu.

```
┌─────────────────────────┐
│     Hardware Tests       │
│    1.Memory              │
│    2.Display             │
│    3.Key&Reader          │
└─────────────────────────┘
```
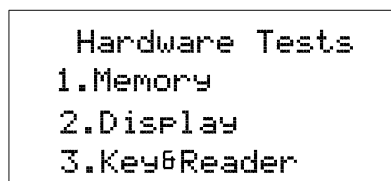
5. Press the **3 (2)** key to select the Key and Reader Test. A "Press key/swipe card" prompt will appear.

```
┌─────────────────────────┐
│ Press key/swipe card     │
│                          │
│                          │
│                          │
└─────────────────────────┘
```
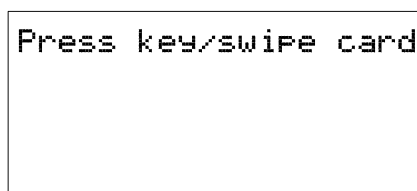
6. Aim the scanner at the test patterns below or on the sample bar code page in manufacturer's User's Guide and press the trigger.

Code 39

TEST –SHEET
Code 128

CODE 128
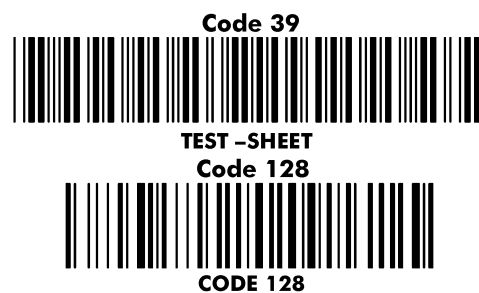
7. The Bar Code type or encoded number will appear in the display.

8. To exit the Key and Reader test, press the **ESC (TIP)** key.

9. Press the **ESC (TIP)** key to exit the Menu Diagnostics Mode.

Chapter 13: Maintenance and Diagnostics

Maintenance

Exterior

Use only a soft, clean cloth dampened with water and neutral detergent to lightly wipe the case. Do not use benzine, paint thinner or other chemicals for cleaning or spray insecticide over or near the case as this may cause permanent damage.

Exchanging the Reader Block

The life expectancy of the Magnetic Reader Head of the MTX terminal is 500,000 swipes. Once you reach this level, you may need to replace the Reader Block. To do so, perform the following:

1. Disconnect power to the terminal, remove the unit from the wall mount plate, and disable the Full Power Reserve Option if equipped.

2. Loosen and remove the Block Reader mounting screw shown.

Pull Reader Block from Terminal

Remove screw (turn counter-clockwise)
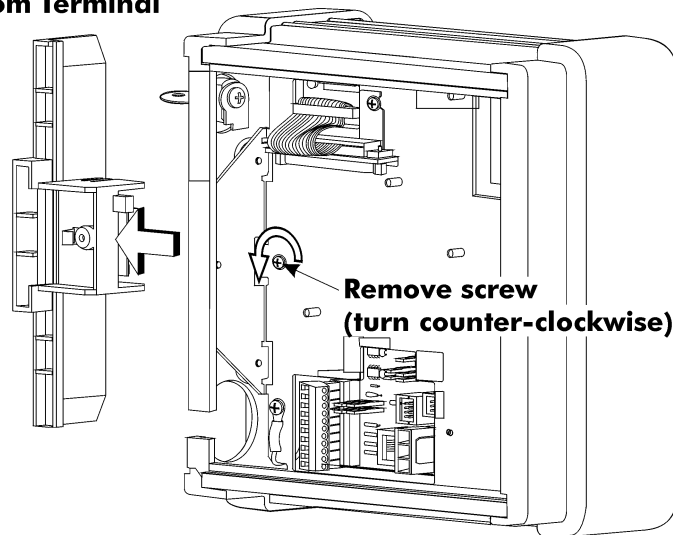
3. Pull the Reader Block from the case.

4. Slide the new reader into the terminal case as shown.
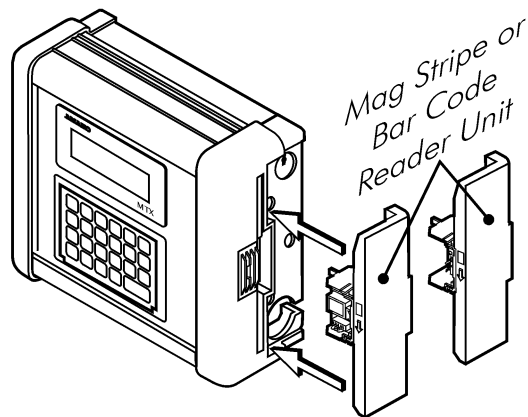
5. Install the Reader Block screw and secure.

6. Reconnect power to the terminal, reinstall the unit to the wall mount plate, and connect the Full Power Reserve Option if equipped.

7. Test to see if the reader is functioning properly by swiping a Mag Stripe or Bar Code card.

Reader Dip Switch Settings

Before installing a new or replacement Reader Block into the terminal case, check the Reader Dip Switches. These switches are located on the edge of the main PCB and are accessed by removing the Reader Block from the terminal.

MTX Terminal with Reader Block Removed
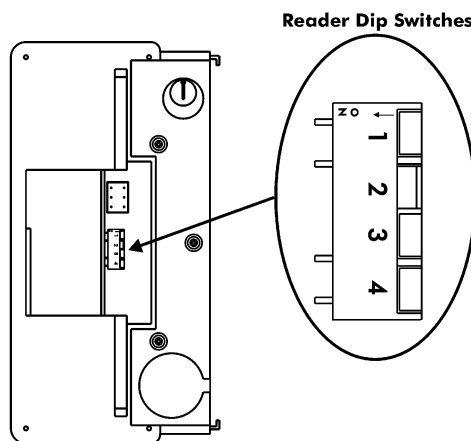
The default or factory settings for the Dip Switches are for use with Bar Code and Mag Stripe Track 2. They are as follows:

Reader	Switch 1	Switch 2	Switch 3	Switch 4
Bar Code or Mag Stripe Track 2	OFF	ON	OFF	OFF

However, they can be set for use with Magstripe Tracks 1 and 3 as follows:

Reader	Switch 1	Switch 2	Switch 3	Switch 4
Mag Stripe Tracks 1 and 3	ON	OFF	ON	ON

Note: Depending on the configuration of your Mag Stripe Reader, you may have to "flip" the position of the Mag Head to read Track 1 or Track 3. Verify the track you are reading by swiping a Mag Stripe card after the reader has been re-installed.

MTX-10 Diagnostics

Because the MTX-10 has a limited LCD display and no keyboard, the only diagnostics available are automatic. The display and memory tests are performed every time the terminal is powered on or reset.

One Beep Sounded: Memory OK/Display OK
Two Long Beeps Sounded: Memory OK/Display Not OK
Three Beeps Sounded: Memory Not OK/Display OK
Five Beeps Sounded: Memory Not OK/Display Not OK

If the display is OK, it will show all segments in the display window for about three seconds and then return to the normal mode.

If you have not downloaded the .exe files and tables, the time and date will be displayed.
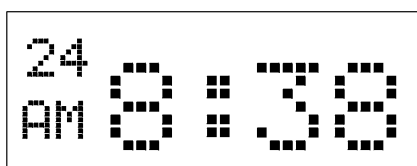
If the .exe files and tables were downloaded to the terminal, the terminal display will advance to the action created in MTX-PRO or TruTime.
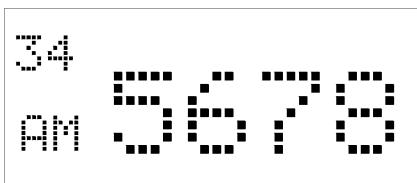
If your terminal does not respond accordingly, please contact your local Amano dealer.

MTX-20 Diagnostics

Auto Diagnostics

The MTX-20 has both Auto-Diagnostics and a Menu Diagnostics. The Auto-Diagnostic tests the display and memory every time the terminal is powered on or reset.
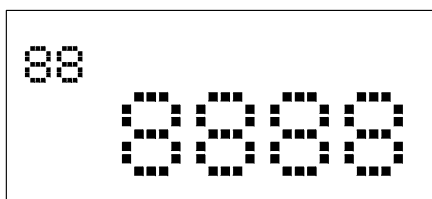
  One Beep Sounded: Memory OK/Display OK
  Two Long Beeps Sounded: Memory OK/Display Not OK
  Three Beeps Sounded: Memory Not OK/Display OK
  Five Beeps Sounded: Memory Not OK/Display Not OK

If the display is OK, it will display the terminal and serial numbers for about three seconds and then return to the normal mode.

```
MTX-20   TOS V1.50
Serial#0010000000
Terminal#01
```

If you have not downloaded the .exe files and tables, the time and date will be displayed.

```
MTX-20   TOS V1.50
Serial#0010000000
Terminal#01

01/01/1995   8:00 AM
```

If the .exe files and tables have been downloaded, the display will advance to the action created in MTX-PRO or TruTime.

```
Main Operation
01/01/1995    8:00AM
Swipe Your Card
```

If your terminal does not respond accordingly, please contact your local Amano dealer.

Menu Diagnostics

The Menu Diagnostics mode will help you determine if the terminal is working properly. To access the TOS's Menu Diagnostics the terminal must be reset. Resetting the terminal will not affect data in the terminal or its programming.

Resetting the terminal can be accomplished in two ways. The first method is to remove power to the terminal, and hold down the ENT key when power is reapplied. The other method is to remove the unit from the wall plate then simultaneously press the ENT key on the keyboard and the RESET (SW1) button inside the terminal. When the terminal is reset, the following screen will appear:

```
MTX -20   TOS V1.50
Serial#0010000000
Terminal#01
```

To enter the Menu Diagnostics mode, press the ENT key, and the Diagnostics Menu will appear. The Diagnostics Menu consists of the following; Hardware Test, Firmware Information and Software Information.

```
    DIAGNOSTICS
 1.Hardware Test
 2.Firmware Test
 3.Software Info
```

To exit the Menu Diagnostics Mode, press the **ESC (TIP)** key.

Basic Troubleshooting

If any of the following Diagnostic Tests should fail (excluding the RS-232C test), it is recommended that you recheck all connections to the terminal, check to see that all hardware is properly installed and configured, and perform the specific diagnostic test. If a "fail" condition persists, please contact your local Amano dealer.

To properly conduct this test you must connect a loop back connector to the RS-232C port. This connector is made from a male RS-232C connector and is wired as follows:
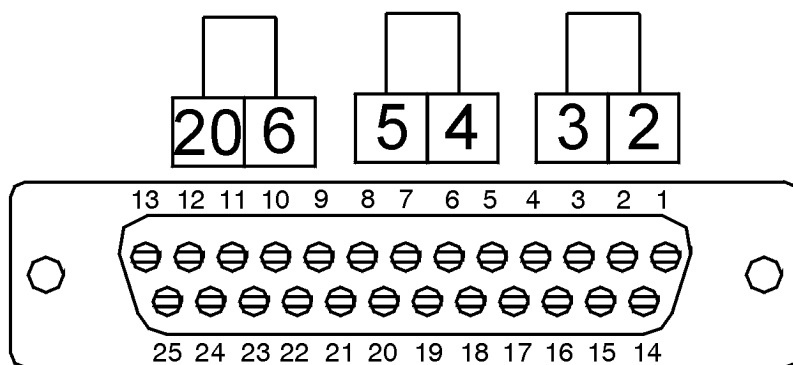
If a "fail" condition persists with the loop back connector, please contact your local Amano dealer.

The Menu Diagnostic mode uses a different keyboard configuration than that of Normal mode. The key mapping for the Menu Diagnostic mode is shown below.
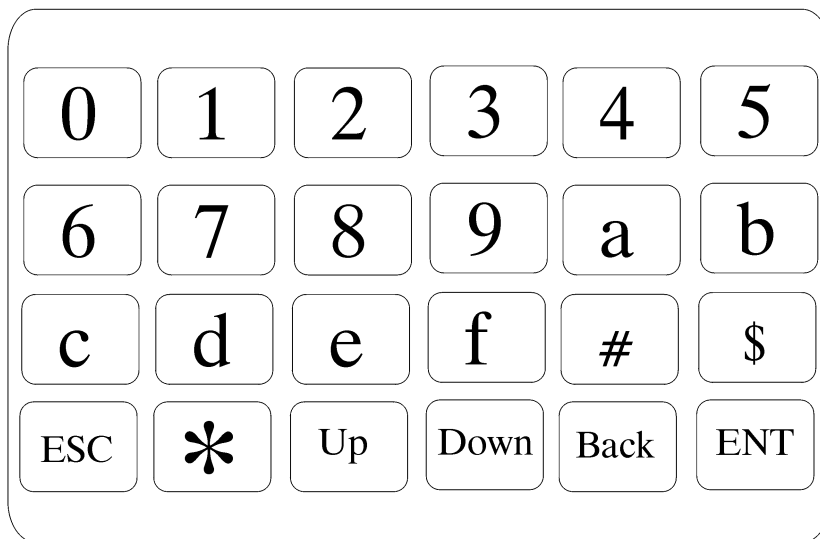
Hardware Tests

The Hardware Tests comprise of a menu of six different tests, displayed on two screens. Movement between screens is accomplished by pressing the **ENT** and **ESC** keys as shown on the Menu Diagnostic keyboard.

```
   Hardware Tests
  1.Memory
  2.Display
  3.Key&Reader
```

```
   Hardware Tests
  4.Communication
  5.Burn-in
  6.Password Entry
```

To select a specific test you must press the appropriate number key.

Memory Test

These tests will check the RAM (read/write) and Flash memory.

```
   Memory Tests
  1. Static RAM
  2. Flash
```

Static RAM: This will test the read/write memory. All test data is written to and read from the RAM devices, and displayed (how many KB the memory passed) in real time. The terminal should display a value of 512 KB. If there is a read/write memory error, it will also be displayed.

```
   Static RAM Test
    Present:512K
     512K Passed
```

Flash Memory Test: The presence of Flash memory is tested, and its capacity is displayed. A value of 512 KB should be displayed. Press the ESC key to return to the Diagnostic menu.

```
   Flash Memory
    Present:512K
```

Display Test

After selecting this option in the Hardware Tests menu, the display screen will alternately flash alpha-numeric characters and symbols every 0.5 seconds until the ESC key is pressed.

```
/0123456789;<=>?@AB
CDEFGHIJKLMNOPQRSTUV
WXYZ[Y]^_abcdefghij
klmnopqrstuvwxz {I}
```

Key & Reader Test

```
 Key & Reader Test
 1.Key & Reader
 2.External Mag
 3.Proximity
```

The selections are as follows:

Key & Reader: Choosing this selection will initiate the Keyboard & Card Reader test. This option should only be selected if your terminal has the following components:

- A keyboard
- A standard terminal mounted Magnetic Stripe Reader
- A standard terminal mounted Bar Code Reader

After initiating the test, a "Press key/swipe card" prompt will appear. When you press any key (except ESC) on the keyboard, the data of that key will be displayed on the screen. You may also swipe a card to display the data on the screen. To return to the previous menu, press ESC.

```
Press key/swipe card
```

External Mag: Choosing this selection will initiate the External Mag Stripe Reader test. After initiating the test, a "Press key/swipe card" prompt will appear. When you press any key (except ESC) on the keyboard, the data of that key will be displayed on the screen. You may also swipe a card to display the data on the screen. To return to the previous menu, press **ESC**.

```
┌─────────────────────────┐
│ Test: Key/Extern Mag    │
│                         │
│                         │
│                         │
│                         │
└─────────────────────────┘
```

Proximity: Selecting this option will enable you to access the Proximity Readers Test menu. To return to the previous menu, press **ESC**.

```
┌─────────────────────────┐
│     Prox Options        │
│ 1.Key/Prox & Mag        │
│ 2.Key/Prox & Barc       │
│                         │
└─────────────────────────┘
```

Key/Prox & Mag: Choosing this selection will initiate the Key/Prox and Mag Reader test. This test is used to determine if your keyboard and installed reader(s) are functioning properly. This option should only be selected if your terminal has the following components:

- A keyboard
- A terminal or externally mounted Proximity Reader
- A modified terminal mounted Magnetic Stripe Reader

```
┌─────────────────────────┐
│ Test:Key/Prox & Barc    │
│                         │
│                         │
│                         │
│                         │
└─────────────────────────┘
```

After initiating the test, a "Press key/swipe card" prompt will appear. When you press any key (except ESC) on the keyboard, the data of that key will be displayed on the screen. You may also swipe a card to display the data on the screen. To return to the previous menu, press ESC.
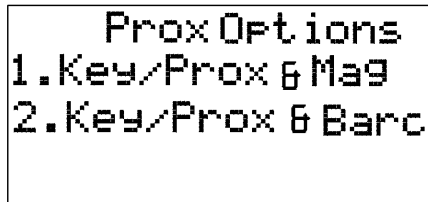
```
┌─────────────────────────┐
│ Press key/swipe card    │
│                         │
│                         │
│                         │
│                         │
└─────────────────────────┘
```

Communication Test

```
Communication Test
     1.RS232C
     2.RS485
```

RS-232C: To properly conduct this test you must connect a loop back connector to the RS-232C port. Without the connector, the test will fail.

```
Connect To RS 232:
   Press Key '1':
 RS232 Test Fail
```

This connector is made from a male RS-232C connector and is wired as follows:
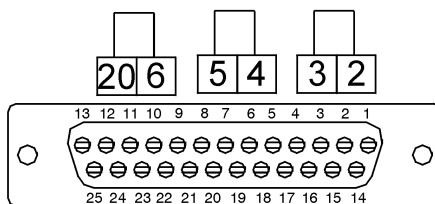
When prompted, press the **1** key. If the port is functioning properly, a "passed" message will appear on the display.

```
Connect To RS 232:
Press Key '1':
RS232 Test Passed
```

RS-485: An external connection is not required for this test. Press the 2 key and the test results will be displayed.

```
RS 485 Test
Press Key '2':
RS485 Test Passed
```

Burn-in Test: This test is used for factory production purposes.

Password Entry: This sub-menu is used to enable or disable password access to the Diagnostics Menu routines. Pressing the 1 key enables or disables password access. Pressing the 2 key, allows you to set your own four-digit password.

```
   Password:
1. Disable/Enable
2. Change
      8088 Disable
```

Firmware Information

The Terminal Operating System (TOS) of the MTX contains information about the options connected to the MTX, the status of some of the downloaded files and a log of any errors which have occurred within the MTX.

```
Firmware Info
 1. Options
 2. Status
 3. Error Log
```

Options: This selection will display the current I/O options of the terminal.

```
    Options
Display [4X20]
Keyboard [4X6]
```

Status: This option will display the status of the transaction data in the terminal.

```
     Status
No Transaction Data
```

Error Log: This option will display the number of errors that have occurred within the terminal.

Software Information

This menu is used to display information about the memory size and contents, the downloaded table size(s) and their contents, and the downloaded file size(s) and their contents.

```
┌─────────────────────────┐
│      Software  Info     │
│  1.Memory Watch         │
│  2.Files                │
│  3.Memory Commands      │
└─────────────────────────┘
```

Memory Watch: This is used to view the contents of downloaded tables and files.

Files: This will list the names of the current files and tables that have been downloaded to theMTX.

Memory Commands: These commands in this sub-menu are used to clear out specific memory groups. This sub-menu consists of two screens. Movement between screens is accomplished by pressing the **ENT** and **ESC** keys.

```
┌─────────────────────────┐   ┌─────────────────────────┐
│Memory Clear Command     │   │ 4.Ram Transaction       │
│   1.Clear All           │   │ 5.Flash Transaction     │
│   2.Flash Files         │   │ 6. Error Log            │
│   3.Ram Files           │   │                         │
└─────────────────────────┘   └─────────────────────────┘
```

Selecting any of these options will delete the selected group of files. A confirmation prompt will appear before each selection is deleted.

```
┌─────────────────────────┐
│ Are you sure _          │
│                         │
│                         │
│                         │
└─────────────────────────┘
```

Press the **ENT** key to continue or the **ESC** key to cancel the deletion.

Error Codes and Messages

In the event of an error, both the MTX-10 and MTX-20 will display error codes or messages. Because of its limited display, the MTX-10 will only display the code associated with the error. The MTX-20 will display the error code and message. Listed below are the error codes and messages that may appear in your terminal's display.

Error Code	Error Message	Condition
ER:001	Error! (Unknown error)	An error has occurred that is not in the Error List.
ER:002	Operation Key Only	A key other than the operation key was pressed when only an operation key can be accepted.
ER:003	No Input Table	A scroll-up or scroll-down key was pressed with no (selection) table.
ER:004	Wrong Card	A wrong ID card was used
ER:005	Wrong Card File	The terminal could not find a matching data field on the card.
ER:006 ER:007	Time has 4 char 0945 Hour has 2 char only	Key entry error. The number of digits entered for the time or hours is incorrect. The number or digits must match the data field.
ER:008 ER:009 ER:010 ER:046	Date has 8 char only Date has 4 char only Date has 6 char only Date has 3 char only	Key entry error. The number of digits entered for the date is incorrect. The number or digits must match the data field.
ER:011 ER:012 ER:013 ER:015 ER:016 ER:017 ER:018 ER:033 ER:034 ER:035 ER:036 ER:037 ER:038 ER:039 ER:040 ER:041 ER:042 ER:043 ER:044	Date: mmddyyyy Date: ddmmyyyy Date: yyyymmdd Date: ddmm Date: mmddyy Date: ddmmyy Date: yymmdd Date: ddyy Date: ddyyyy Date: mmyy Date: mmyyyy Date: yydd Date: yyyydd Date: yymm Date: yyyymm Date: dd Date: mm Date: yy Date: yyyy	Key entry error. The numbers entered for the calendar date are not in the correct order, format, or invalid.
ER:019 ER:020 ER:021 ER:022 ER:023	Time/Hour: 2359 Time/Hour: 2399 Hour (min): 59 Hour (min): 99 Hour: 23	Key entry error. The numbers entered for the time are not in the correct order, format, or invalid.

Error Code	Error Message	Condition
ER:024	Numeric Only	Only numeric data will be accepted as input.
ER:025	Alphanumeric only	Only alphanumeric data will be accepted as input.
ER:026	PIN code data	The terminal will only accept data from the keyboard that matches the PIN validation tables.
ER:027	Invalid ID!	A card or ID number does not match the ID validation table
ER:028	Dollar data	No decimal is required for entry. The terminal will automatically add a decimal point before the last two digits on the right.
ER:029	String key not allow	An assigned string key has been pressed when the terminal is expecting a date, time, or hours data type.
ER:030	Alpha data type	Only alpha data will be accepted as input.
ER:031	Ent, Up & Down key	Only the keys assigned to the Ent, Up, or Down functions will be accepted.
ER:032	Range error	The data entered is outside the validation table range
ER:045	Date: Enter key	Reserved
ER:047	Invalid schedule	A card or ID number does not match the Schedule validation table for a punch-in or use of the terminal.
ER:048	Mem full: not save	The memory in the terminal is full. Any data entered will not be saved. The terminal should be polled immediately.
ER:049	Mem <6k-Poll Data	This is a warning that the memory of the terminal is close to full capacity and there is less than 6 KB remaining. The terminal should be polled immediately.
ER:050	1ST punch only	The same card, ID number, or data was entered more than once within three minutes. If this occurs, the first punch will remain valid and the subsequent punches will be deleted.
ER:051	Override and update	The same card, ID number, or data was entered more than once within three minutes. If this occurs, only the last punch will remain valid. All previous punches will be overriden and deleted.
ER:052	Not find validation	There is no entry in the validation table for the card or ID number entered.

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