MRDT Display Terminal

Installation and Specification

1. General:

The MRDT integrates a 2 line x 16 character back-lit LCD display with a 16-position keypad and a reader port. This highly functional I/O device can communicate to the system controller via a 2-wire RS-485 interface. It can also communicate to an MR52 reader interface with a TTL interface.
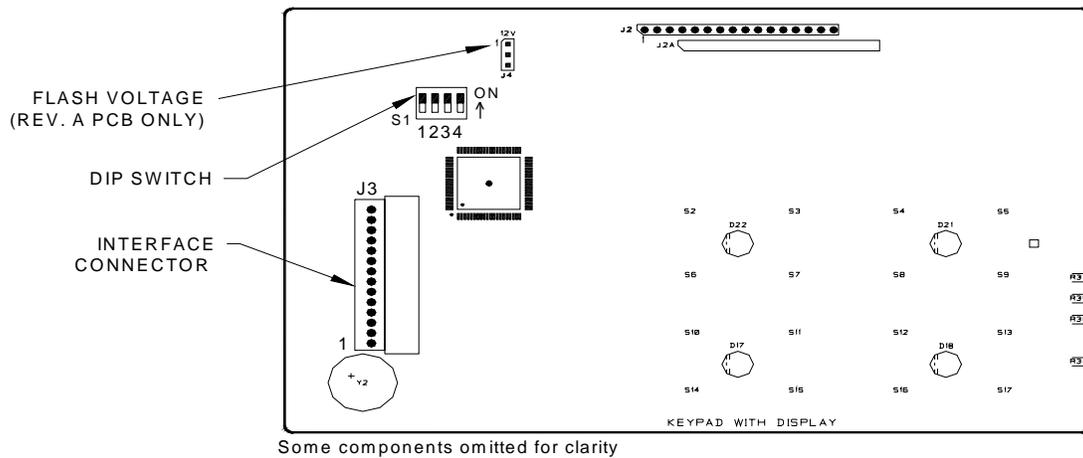

Some components omitted for clarity

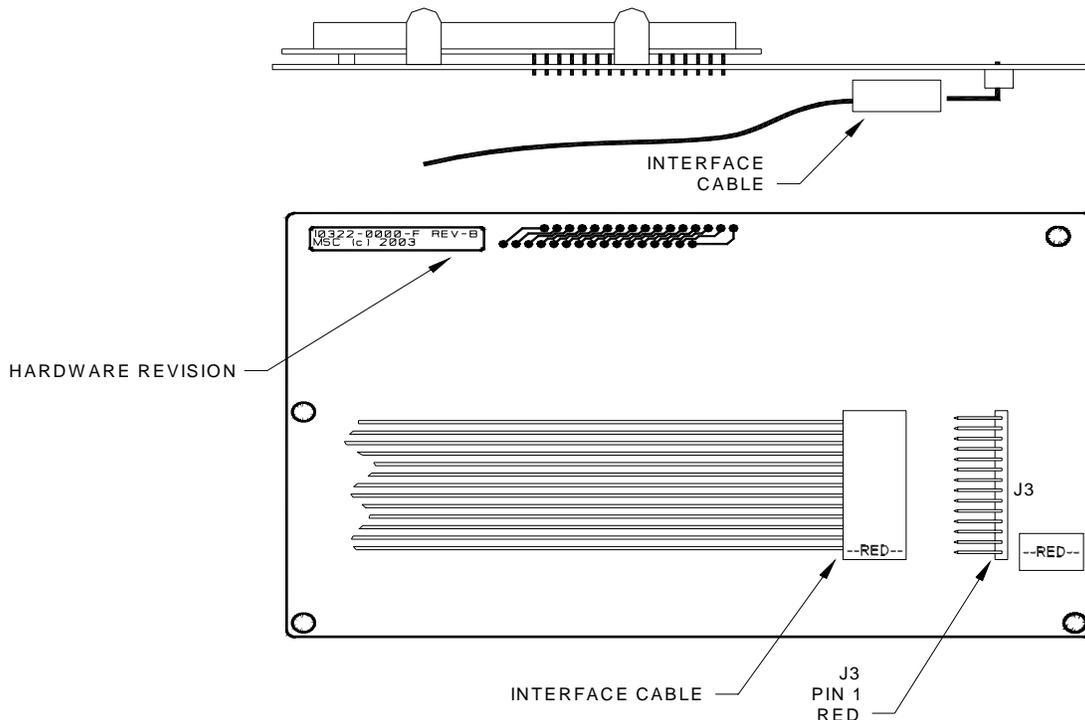Figure 1-1: Component Location

Figure 1-2: Rear and Side View of MR-DT Circuit Board

Information subject to change without notice.

2. Wiring:

The MRDT requires 12Vdc ±15% for power and the power source must be filtered.

The MRDT communicates to a controller (SCP, AP3402, or AP3502) via a half duplex multi-drop 2-wire RS-485 interface or to a MR52 via TTL signals on its reader port.
SCP: The RS-485 interface connects to the SCP SIO serial communication bus , TR+ and TR-, see figure   2-1C.
AP3402 or AP3502: The RS-485 interface connects to the reader port , TR+ to CLK and TR- to DAT, see figure 2-1B.
MR52: The TTL signals connect to the MR-52 reader port, see figure 2-1D.

Cable requirements:
RS-485: The total cable length is limited to 4,000 feet (1,200 meters). A 1-pair twisted, shielded cable of 24AWG with an impedance characteristic of 120 ohms is required. The last device on each end of the cable should have the termination installed (set switch S1-1 to ON).
TTL: The total cable length is limited to 500 feet (152 meters). A 4-conductor, 18AWG, non-twisted cable is required.

J3	Color	Signal Description		Connections
1	RED	12VDC Input		Input Power Connections
2	BLACK	Ground		
3	BLUE	RS-485 TR+		2-Wire RS-485 Connections
4	GRAY	RS-485 TR-		SIO Bus or APC Reader Port
5	GREEN	TTL data, Connect to MR-52 DATA 0		
6	WHITE	TTL data, Connect to MR-52 DATA 1		MR-52 Connections
7	BROWN	TTL data, Connect to MR-52 LED		
8	ORANGE	TTL data, Connect to MR-52 Buzzer		
9	RED	12VDC Pass Through for External Reader		
10	GREEN	Reader DATA or DATA 0		Optional
11	WHITE	Reader CLOCK or DATA 1		External
12	BROWN	Reader LED		Reader
13	ORANGE	Reader Buzzer		Connections
14	BLACK	Ground		

Table 2-1: Interface Wiring Harness Configuration

3. Configuration:

Hardware Identification:

The hardware revision maybe determined in one of two ways:

1) Simultaneously press the center two keys of the top row on the keypad. The last character on the right of the top line is the hardware revision, see section 4.
2) Remove the MRDT body from the mounting plate. The circuit board revision is located on the backside of the board in the upper left hand corner, see figure 1-2.

There are no operational differences between revision A and B units.
However, they do require different hardware setup and firmware; see below.

Board revision:
Revision A:
•   Uses firmware series 1.2X through 1.3X.
•   Jumper J4 must be in the 12V (1 & 2) position to program the flash memory.
Revision B:
•   Uses firmware series 1.4X and higher.
•   Jumper J4: deleted, no action required to enable programming of the flash memory.

Hardware Configuration:

S1-1	S1-2	S1-3	S1-4	Description
OFF				RS-485 – No Termination
ON				RS-485 – 120 ohms Termination
	OFF			Use Configuration Settings
	ON			Forces 38400 baud & address 31
		OFF		Allow Software Configuration at startup
		ON		Disable Software Configuration at startup
			OFF	NOT USED

Table 3-1: S1 DIP Switch Configuration

S1-1: Proper termination practices must be followed to insure proper operation. If the MRDT is the last device on the RS-485 bus, termination should be set to ON.

S1-2: Used for testing. This switch forces the baud rate to 38,400 and the address to 31.

S1-3: When set to ON, this disables the ability to use the keypad for changing the configuration. This decreases the possibility of unauthorized persons from altering the configuration.

S1-4: Not used.

Jumpers:

J1, J5, J6   Factory use only. Always open.
J4   Always install jumper between pins 1 & 2 = 12V. Revision A board only.

Software Configuration:

Configuration of the MRDT is performed at the keypad during the start-up process. When power is applied, the screen will flash a message: "Press two keys for Setup." Switch S1-3 set to the ON position disables the programming feature, see "Hardware Configuration" section, Table 3-1. If the two keys are pressed simultaneously, the setup screen will appear. The following list describes each setting:

Communication: The MRDT can be connected to the system via three possible interfaces.
                                  Reader Port = Connects to an MR52 reader port only via TTL level signaling, see figure 2-1D.
                                  RS-485 = Connects to AP3402 or AP3502 reader port via 2-wire RS-485, see figure 2-1B.
                                  RS-485 = Connects to SCP SIO serial bus via 2-wire RS-485 channel, see figure 2-1C.

Baud rate (if RS-485):   This selection should match with the baud rate of the processor.

Comm. Address (if RS-485):   The comm address should be set to a unique value for the RS-485 bus. The valid range is 0-31.

Backlight: This setting defines the behavior of the display's backlight.
                                  00 = always off
                                  99 = always on
                                  01-98 = number of seconds the backlight remains on after last keystroke.

LED: Selects the LED drive type to match the reader connected to the reader port.
1-Wire: Standard 1-wire interface (High = RED, Low = GREEN)
2-Wire: Brown wire controls Red LED (High = Off, Low = On)
Orange wire controls Green LED (High = Off, Low = On)
(No Buzzer)
2W/Special: Use this mode when interfacing to Dorado (HID) reader model 780.

Once all configuration items are entered via the display, the configuration must be saved. If a mistake is made, answering NO to "save settings" will return you to the first screen of the configuration menu.

4. Status Display:

The MRDT can display a status report which allows the user to confirm the settings, read back the serial number, firmware revision number, and hardware settings. It also displays communication status as on-line or off-line. Simultaneously pressing the center two key of the top row on the keypad causes the status to be displayed:

```
(top line)
AAAAAAAAAA-BBBBB
^_____^_____^
          %        %
          |        |---firmware and hardware revision
          |---ten digit serial number
```

```
(lower line)
CCCCCCCCSW-X234 D
^_____^_____^__
        %         %     %
        |         |     |---off-line/on-line
        |         |---S1 DIP switch setting
        |---current operating mode
```

A = MRDT's ten digit serial number
B = Firmware revision level. The right most character represents the PCB revision level.
C = Current operating mode
        reader port mode = rdr port
        RS-485 mode = baud rate-address
SW-X234 = Current S1 DIP switch setting. X = switch S1-1 - not displayed.
D = ! = off-line, o = on-line.

5. Specifications:

The Display Terminal is for use in low voltage, class 2 circuits only.

Primary Power:
	Voltage:	12Vdc±15%
	Current:	175mA (Terminal only)

Reader Port:
	Power:	Pass Through
	Interface:	2-wire, Clock/Data or Data 1/Data 0
	LED control:	2-wire or 1-wire bi-color
	Buzzer control:	Available only in 1-wire LED control mode

Communication:

       RS-485:   4,000 feet (1,219 m) max. 24AWG, 120 ohms impedance
       TTL: 500 feet (152 m) max, 18AWG

Dimension:

       6.75" W x 5.00" L x 1.00" D (172mm W x 127mm L x 25mm D)

Weight:

       14 oz. (400g) nominal

Environment:

       Temperature: -20°C to +70°C, storage
                       0°C to 50°C, operating
       Humidity: 0% to 95% RHNC

Mounting: Surface mount or 3-gang box

Warranty:

Mercury Security Corporation warrants the product is free from defects in material and workmanship under normal use and service with proper maintenance for one year from the date of factory shipment. Mercury Security Corporation assumes no responsibility for products damaged by improper handling or installation. This warranty is limited to the repair or replacement of the defective unit.

There are no expressed warranties other than set forth herein. Mercury Security Corporation does not make, nor intends, nor does it authorize any agent or representative to make any other warranties, or implied warranties, and expressly excludes and disclaims all implied warranties of merchantability or fitness for a particular purpose.

Returned units are repaired or replaced from a stock of reconditioned units. Returns must be accompanied by a return authorization number (RMA) obtained from customer service, and prepaid postage and insurance.

Liability:

The Interface should only be used to control exits from areas where an alternative method for exit is available. This product is not intended for, nor is rated for operation in life-critical control applications. Mercury Security Corporation is not liable under any circumstances for loss or damage caused by or partially caused by the misapplication or malfunction of the product. Mercury Security Corporation's liability does not extend beyond the purchase price of the product.
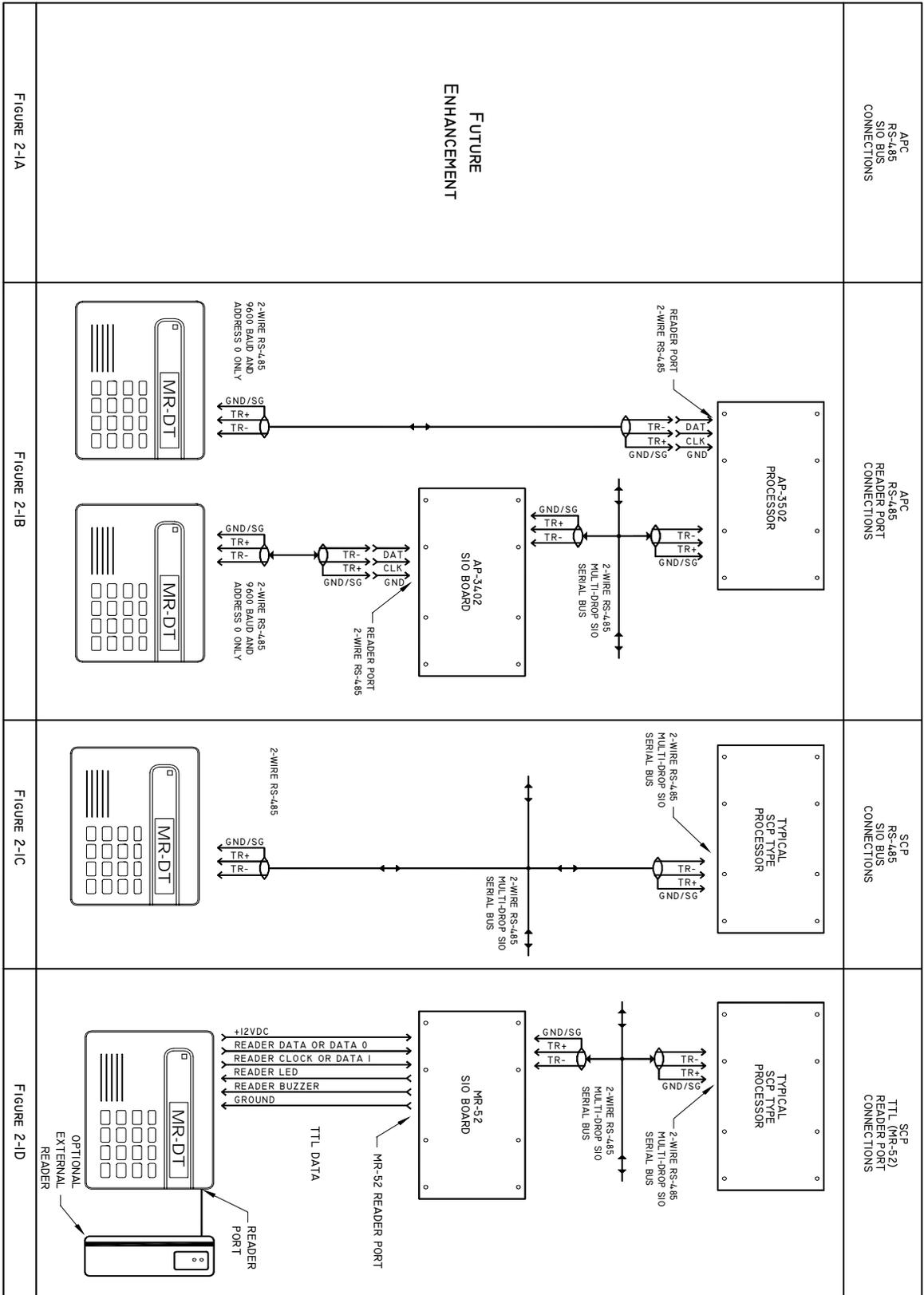
FIGURE 2-I: COMMUNICATION WIRING OPTIONS

FIGURE 2-IA

FUTURE
ENHANCEMENT

APC
RS-485
SIO BUS
CONNECTIONS

FIGURE 2-IB

MR-DT

2-WIRE RS-485
9600 BAUD AND
ADDRESS 0 ONLY

GND/SG
TR+
TR-

READER PORT
2-WIRE RS-485

TR-
TR+
GND/SG

DAT
CLK
GND

AP-3502
PROCESSOR

APC
RS-485
READER PORT
CONNECTIONS

MR-DT

GND/SG
TR+
TR-

2-WIRE RS-485
9600 BAUD AND
ADDRESS 0 ONLY

TR-
TR+
GND/SG

DAT
CLK
GND

AP-3402
SIO BOARD

READER PORT
2-WIRE RS-485

GND/SG
TR+
TR-

TR-
TR+
GND/SG

2-WIRE RS-485
MULTI-DROP SIO
SERIAL BUS

FIGURE 2-IC

MR-DT

2-WIRE RS-485

GND/SG
TR+
TR-

2-WIRE RS-485
MULTI-DROP SIO
SERIAL BUS

2-WIRE RS-485
MULTI-DROP SIO
SERIAL BUS

TR-
TR+
GND/SG

TYPICAL
SCP TYPE
PROCESSOR

SCP
RS-485
SIO BUS
CONNECTIONS

FIGURE 2-ID

MR-DT

OPTIONAL
EXTERNAL
READER

+12VDC
READER DATA OR DATA 0
READER CLOCK OR DATA 1
READER LED
READER BUZZER
GROUND

TTL DATA

READER
PORT

MR-52 READER PORT

MR-52
SIO BOARD

GND/SG
TR+
TR-

2-WIRE RS-485
MULTI-DROP SIO
SERIAL BUS

TR-
TR+
GND/SG

2-WIRE RS-485
MULTI-DROP SIO
SERIAL BUS

TYPICAL
SCP TYPE
PROCESSOR

SCP
TTL (MR-52)
READER PORT
CONNECTIONS