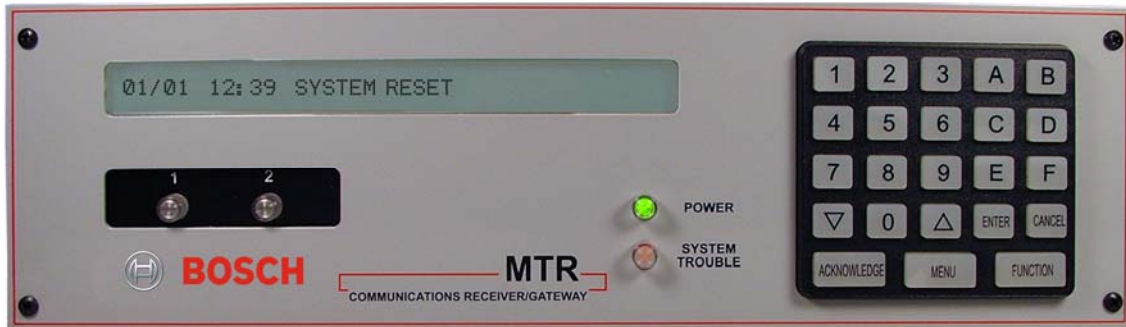


MTR



EN

Installation and Programming
Guide

Communications
Receiver



BOSCH

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1.0 Overview

1.1 Multi-Tenant System (MTS) Overview

MTS is a distributed security system for monitoring and controlling a large number of small sites. Examples include apartment and condominium complexes, retail plazas, office buildings, and educational and hospital campuses.

A typical MTS installation consists of the following components:

- **MTSW Security Station Software:** MTSW is a Microsoft® Windows-based application installed on a PC and monitored by guard station personnel.
- **MTR Communication Receiver:** The MTR receives and handles alarm events from devices connected to the CAN RS-485 bus. It monitors and reports CAN bus status and other system internal events, and interfaces with MTSW to synchronize system data.
- **MTGW CAN RS-485 Bus Gateway:** The MTGW converts data back and forth from an RS-485 format to a Controller Area Network (CAN) bus format. The system supports up to 100 MTGWs on each CAN bus line. The MTGW provides three RS-485 loops that support a total of 120 RS-485 devices spread across the three loops.
- **RS-485 Bus Devices:** Refer to *Table 1* for a list of supported RS-485 devices.

RS-485 Device	Description
DS6R2	6-zone self-contained control panel
DS12R	12-zone self-contained control panel
MT1-1	Single-zone input device
MT1-2	Two-zone input device
MT1-8	8-zone input device
MT2-8	8-output device
MT3-1	Single-zone input/output device

CAN bus wiring requirements are as follows:

- **CAN Bus Interface:** Connect the CAN bus to the MTR Communication Receiver with at least 1.5 mm (16 AWG) shielded twisted-pair wire; maximum length: 2000 m (6500 ft).
- **RS-485 Buses 1-3:** Use at least 1.0 mm (20 AWG) shielded twisted-pair wire for the RS-485 bus; maximum length: 1200 m (3900 ft). RS-485 bus wiring status is supervised.

1.2 MTS Device Address

You must assign an address to each device in the system. The address consists of at least four segments. For example:

1.2.5.3.6

- **1:** This segment identifies the number assigned to the MTR central receiver (1 to 99).
- **2:** This segment identifies the CAN bus number occupied by the MTGW (1 or 2).
- **5:** This segment identifies the MTGW's CAN bus address (1 to 100).
- **3:** This segment identifies the device's RS-485 address (1 to 120).
- **6:** This segment identifies the zone number of an input or output device connected to the RS-485 device.

1.3 MTR Overview

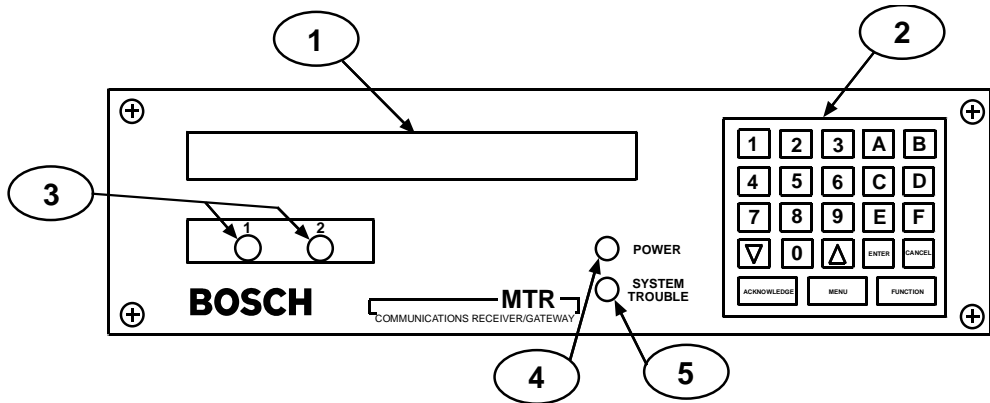
The Multi-Tenant Receiver (MTR) is the central receiver of the Bosch Security Systems, Inc. Multi-Tenant System (MTS). The MTR supports two separate Controller Area Network (CAN) buses, and communicates with the Multi-Tenant Gateway (MTGW) CAN/RS-485 using the CAN bus. The MTGW receives and handles the alarm events from the RS-485 terminal devices (for example, MT1-1, MT1-8, and DS6R), then forwards those events to the Multi-Tenant Software (MTSW) Central Management Software. The MTGW also monitors and reports the CAN bus status and other internal system events. Use the front panel keypad or the Multi-Tenant Remote Account Manager (MTRAM) programming software to program the MTR. Use the MTR firmware using the MTRAM programming software to upgrade the MTR. Refer to *Figure 1* and *Figure 2* on page 4, and to *Figure 3* on page 5.

1.4 MTR General Functions

- The MTR supports two separate CAN buses.
- Each CAN bus connects to a maximum of 100 MTGW CAN/RS-485 gateways.
- You can configure the number of MTGW modules connected to each CAN bus.
- The MTR forwards received MTGW events to the MTSW central management software.
- The MTR monitors MTGW status, reports MTGW trouble or trouble restorals in 15 sec.
- The MTR buffers up to 3000 internal and field events.
- The MTR's COM3 port connects to the MTSW management software.
- The MTR's COM4 port connects to the MTRAM programming software for programming MTR parameters or upgrading MTR firmware.
- The MTR monitors and reports system internal status. Refer to *Section 7.0 Appendix* on page 13.

2.0 Front Panel Description

Figure 1: Front Panel

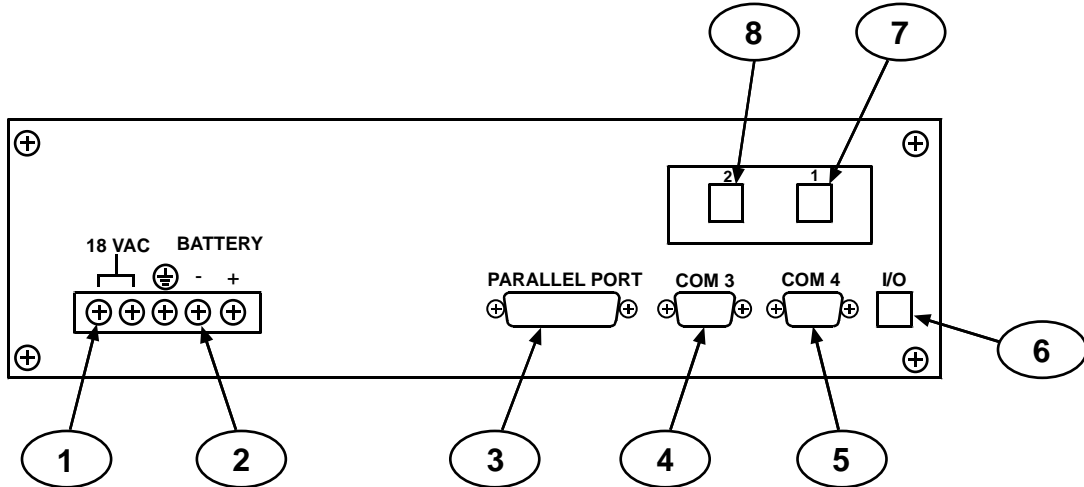


- 1 - Liquid crystal display (LCD) - Displays up to 80 characters of information (two lines of up to 40 characters each)
- 2 - 23-button keypad
- 3 - CAN bus 1 and 2 status indicators:
 - Red light ON indicates CAN bus trouble
 - Green light flashing indicates the CAN bus communicating
 - Green light off indicates normal and waiting for an event

- 4 - Power LED indicator
- 5 - System trouble indicator

3.0 Back Plate Description

Figure 2: Back Plate

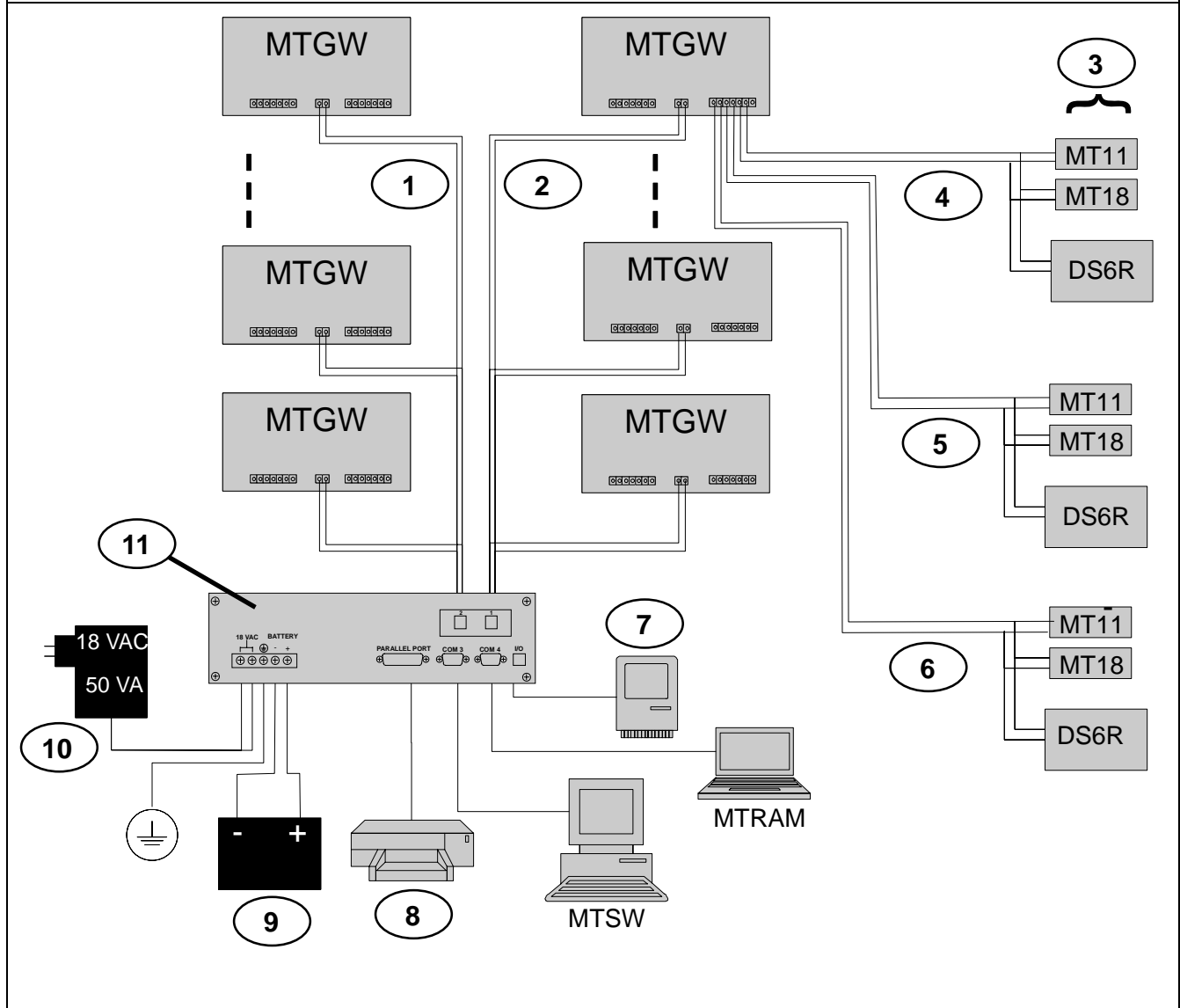


- 1 - 18 VAC/50 VA input power terminals
- 2 - 12 VDC chargeable battery terminals
- 3 - Parallel port printer interface
- 4 - COM3 RS-232 interface for MTSW central management software

- 5 - COM4 RS-232 interface, connected with the MTRAM programming software
- 6 - Programmable input and output interface
- 7 - CAN Bus1 interface
- 8 - CAN Bus2 interface

4.0 System Wiring

Figure 3: System Wiring



- 1 - MTR CAN Bus 2 (can connect 100 MTGW)
- 2 - MTR CAN Bus 1 (can connect 100 MTGW)
- 3 - RS-485 Bus Devices
- 4 - MTGW RS-485 Bus 3
- 5 - MTGW RS-485 Bus 2
- 6 - MTGW RS-485 Bus 1

- 7 - Uninterruptible Power Supply
- 8 - Parallel Printer
- 9 - 12 VDC Battery
- 10 - Transformer
- 11 - MTR Rear Panel

5.0 Installing

5.1 Rack Mount Requirements

When the MTR is mounted in a rack, plug the AC transformer into an outlet inside the rack only if the outlet is wired according to Article 760 of the NEC. Rack mounting is required (per NFPA 72, 1-5.2.5.2) to meet the mechanical protection requirement when using the type of AC cord provided with the MTR. It is also required that a UL Listed rack for fire protective service be provided when used in UL Listed central stations.

5.2 Electrical Connections



Turn off the power before installing or wiring the MTR.

1. Connect CAN bus 1 or 2 to the corresponding MTR interface.
2. Connect the COM port of the PC running the MTSW central management software to MTR COM3.
3. For real-time printing, connect the parallel printer to the MTR PARALLEL PORT.
4. Connect 18 VAC/50 VA power to the MTR power interface.
5. Connect the 12 VDC rechargeable battery to the MTR battery interface.
6. Apply AC power.
7. Program the MTR parameters. Refer to *Section 6.0 Programming and Firmware Upgrading* on page 9.



Test the system after completing the MTR installation to ensure that all functions are normal.

5.3 Standby Power

During a loss of AC power, the MTR automatically switches to standby power. External batteries or an uninterruptible power supply (UPS) provide standby power. If there is adequate standby power, the MTR's operation is not interrupted, even if the power loss occurs during signal processing. When power supervision is enabled and a loss of AC power occurs, the primary reporting devices (such as printers and computers) show AC FAIL and the MTR's power indicator blinks. When AC power restores, the power indicator stops blinking and reporting devices show AC RESTORE.

5.4 Connecting External Batteries



Do not connect an external battery charger to the MTR or its battery.

Use the terminal on the rear panel to connect an external DC power source. During AC power outages, the external DC source supplies power to the MTR. Use a 12 VDC lead-acid battery for external backup power. *Table 2* on page 7 indicates MTR battery voltage displays for battery outage conditions.

Use only approved stationary standby batteries for UL applications. Battery wiring must run from the MTR through the UL Listed rack, exit from the rack through a conduit connection, and terminate at a UL Listed battery enclosure suitable for the size and number of batteries used for UL applications.

Battery Voltage	Display during AC power outage	Display if no battery when AC power is restored
Above 11.5 V	Battery OK	
11.5 V to 10.2 V	Battery Low	
Below 10.2 V	Battery Bad	Battery Missing

The standby current required by the MTR is listed in *Table 3*.

12 V Battery Standby Current	UPS AC Standby Current
330 mA	180 mA

5.4.1 Minimum Standby Battery

Table 4 shows the maximum standby current for common rechargeable battery capacities at 4-hour, 8-hour, and 24-hour standby periods. If the standby current is larger than the value listed, you must use the next larger capacity battery.

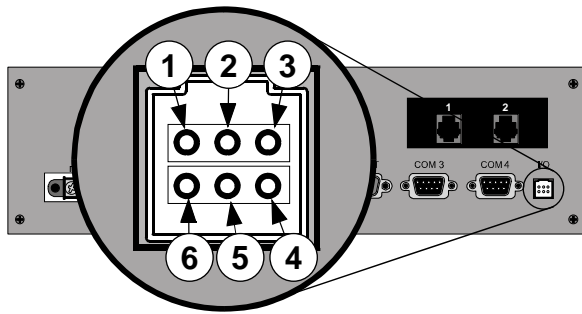
Rechargeable Battery Capacity	Maximum Standby Current (mA)		
	4 hr	8 hr	24 hr
4 Ah	800	400	130
7 Ah	1400	700	230
8 Ah	1600	800	265
10 Ah	2000	1000	330
12 Ah	2400	1200	400
14 Ah	2800	1400	465
18 Ah	3600	1800	600

5.4.2 Minimum Standby UPS Power

The minimum UPS power required (in watts) = Total UPS current x 120 (voltage) x required hours of standby + 20% (storage).

5.5 Input and Output Ports

Figure 4: MTR Back Panel Showing Input/Output Ports



1 - Ground 1	4 - Output 2
2 - Input 1	5 - Input 2
3 - Output 1	6 - Ground 2

5.5.1 UPS Monitoring through CPU Programmable Input Ports

Use the CPU programmable input port to connect the external UPS to the MTR for power monitoring. Connect the monitoring port from the UPS to matching pins on the MTR Input/Output port (*Figure 4*). Wiring must run from the MTR through the UL Listed rack, exit from the rack through a conduit connection, and terminate at the external UPS for UL applications.

5.5.2 Input Default Connection Configuration

- The I/O ports work with dry contact outputs.
- The open circuit input voltage on the input measures between 9 V and 12 V.
- UPS Battery OK (restore) - contacts closed
- UPS Battery Low input - contacts open

You can apply other output sources to the input wiring if you follow these guidelines:

- The maximum input voltage allowed without causing damage to the input is 24 VDC.
- For UPS “Battery OK” (restore), the input range must be between 0 V and 1 V.
- For UPS “Battery Low,” the input range must be between 3 V and 24 V.



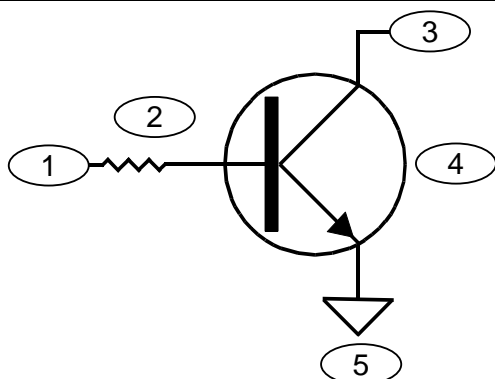
The programmable input voltage range is not defined for input voltages between 1 V and 3 V. This might cause unexpected results such as toggling between “Battery Low” and “Battery OK.” The input should be connected to logic level outputs.

5.5.3 Input Reverse Connection Configuration

If the input must be the opposite polarity for correct operation, place an external transistor circuit between the UPS output signal and the MTR I/O input (*Figure 5* on page 9).

Follow these guidelines for correct operation:

- The maximum input voltage allowed without damaging the input is 24 V.
- UPS Battery OK (restore) input range from the UPS operates between 5 V and 24 V.
- UPS Battery Low input range operates between 0 V and 0.5 V.

Figure 5: Input Wiring for Reverse Configuration

- 1 – From UPS Battery OK signal 5 to 24 V
- 2 – 22 k to 39 k
- 3 – To I/O input
- 4 – Any general purpose NPN transistor
- 5 – Battery Low signal 0 to 0.6V



Operating the input as an analog input between 0.5 V and 5 V might cause abnormal results. This input state is not defined and might change expected results



Reverse configuration is not for use in UL Listed applications.

6.0 Programming and Firmware Upgrading

6.1 MTR Keypad General Descriptions

- Press [MENU] to enter the programming main menu after password verification.
- Press [ENTER] to confirm the input or to open a sub menu.
- Press [CANCEL] to ignore the input or exit programming.
- Press [▲] to move to the previous menu or to move left one position.
- Press [▼] to move to the next menu or to move right one position.
- Press [ACKNOWLEDGE] to process events when operating the MTR in manual mode.
- [FUNCTION] is reserved for special functions.

6.2 Entering the Programming Mode from the Keypad

1. Press [MENU], then press [8][0][0][0][ENTER]. 8000 is the default manager password.
2. Select the desired menu or submenu, then press [ENTER].
3. Select the parameter item to change, then press [ENTER].
4. Enter the corresponding parameter value, then press [ENTER] to confirm or [CANCEL] to cancel.
5. Press [CANCEL] to exit from the programming mode.

6.3 Programming using MTRAM Programming Software

MTRAM runs on a PC with Microsoft® Windows® 98, 2000, or XP, and is used to program MTR parameters and upgrade MTR firmware.

1. Use an RS-232 cable to connect the COM port of the PC running MTRAM to the COM4 port on the MTR.
2. Program the MTR parameters and upgrade the MTR firmware using the MTRAM graphic user interface (refer to *Table 5*).

Table 5: MTR Programming Options

Menu Number	Menu	Values and Description
1	EVENT DATABASE	
1.1	Display Sort by Time and Date	Press the [▲][▼] keys to view alarm events. Press [ENTER] to see additional text, if necessary.
1.2	Display Current System Troubles	Press the [▲][▼] keys to view the current system troubles.
2	MTR CONFIGURATION	
2.1	Change Passwords	
2.1.1	Manager Password	Default: 8000 The Manager Password has the maximum access by default. Type in the new password and press [ENTER] to accept the change. The Manager now has full access to all programming options.
2.1.2	Supervisor Password 1	Default: 8001 The Supervisor has full access to all programming options.
2.1.3	Supervisor Password 2	Default: 8002
2.1.4	Operator Password 1	Default: 1234 The Operator has restricted access. The Operator can only view previously stored alarms and check the current firmware version.
2.1.5	Operator Password 2	Default: 1234
2.1.6	Operator Password 3	Default: 1234
2.2	Global	
2.2.1	Time Setup	
2.2.2	Date Setup	
2.2.3	Set Date Format	Default: 3 Selections: 1, 2, or 3 1 USA: date format: MM/DD/YYYY 2 Europe: date format: DD/MM/YYYY 3 China: date format: YYYY/MM/DD
2.2.4	Enable Input Commands	Default: 1 Selections: 0 or 1 0 Ignore all input commands. 1 Process all input commands. When enabled, the MTR processes any input commands sent from the computer connected to the COM3 port, but the MTSW software running on this computer must support these input commands.

Table 5: MTR Programming Options (continued)

Menu Number	Menu	Values and Description
2.2.5	Buzzer	Default: 3 Selections: 0 to 4 0 Buzzer off. 1 Buzzer on for any events. 2 Buzzer on for system trouble conditions. 3 Buzzer on for new events when automation link fails or for any system trouble conditions. 4 Buzzer on for new events when printer link fails or for any system trouble conditions.
2.2.6	CPU Programmable Output 1	Default: 0 Selections: 0 or 1 Use Outputs 1 and 2 to signal when the COM3 MTSW link fails. 0 Disable output. 1 Enable output when COM3 MTSW fails; disable output when COM3 MTSW is normal.
2.2.7	CPU Programmable Output 2	Default: 0 Selections: 0 or 1 Refer to 2.2.6 above for programming information.
2.2.8	CPU Programmable Input 1	Default: 0 Selections: 0 to 2 If you connect the MTR to an uninterruptible power supply (UPS), the AC Lost signal or the Low Battery signal supplied by the UPS can be monitored. 0 The UPS AC Lost or the Low Battery signal is not monitored. 1 Monitoring the UPS AC Lost. 2 Monitoring the UPS AC Low Battery.
2.2.9	CPU Programmable Input 2	Default: 0 Refer to 2.2.8 above for programming information.
2.2.10	Receiver Number	Default: 01 Selections: 01 to 99 Enter the MTR Receiver and Gateway Number.
2.2.11	External Parallel Printer	Default: 1 Selections: 0 or 1 0 Always Off: Printer is disabled. No reports are sent to this device. 1 Always On: All reports are sent to this printer.
2.2.12	Battery Supervision	Default: 1 Selections: 0 or 1 When Battery Supervision is 1 and the battery is disconnected or low, a BATTERY MISSING or BATTERY BAD message appears on the display, and the green or yellow power LED flashes. The Battery Supervision is 1 if no UPS is present. 0 Battery is not supervised. 1 Battery is supervised.
2.3	CAN Connection	
2.3.1	CAN Bus 1 Devices Amount	Default: 00 Selections: 00 to 100 00 CAN Bus 1 is disabled. 01 to 100 The total number of MTGW devices connected to CAN Bus 1.
2.3.2	CAN Bus 2 Devices Amount	Default: 00 Selections: 00 to 100 00 CAN Bus 2 is disabled. 01 to 100 The total number of MTGW devices connected to CAN Bus 2.
2.4	COM4 Connection	

Table 5: MTR Programming Options (continued)

Menu Number	Menu	Values and Description
2.4.1	RS-232 Direct Access Permission	Default: 1 Selections: 0 or 1 Set the programming mode. 0 Disable RS-232 connection. 1 Enable RS-232 connection.
2.4.2	RS-232 Firmware Programming	Default: 1 Selections: 0 or 1 Set the programming mode. 0 Disable firmware programming. Enable only parameter programming. 1 Enable firmware and parameter programming.
2.5	COM3 MTSW Connection	
2.5.1	Retry Number	Default: 3 Selections: 0 to 5 Select the number of retransmission attempts if communication trouble occurs.
2.5.2	Baud Rate	Default: 1 Selections: 1 to 3 Select the data transmission baud rate for COM3. 1 38400 BPS 2 19200 BPS 3 9600 BPS
2.5.3	Data Bit	Default: 8 Selection: 8 The data transmission bit value for COM3.
2.5.4	Link Test	Default: 30 Selections: 00 to 99 00 Do not send the Link Test to the MTSW System. 01 to 99 The interval in seconds to send the Link Test to the MTSW System. Use the Link Test to verify the connection between the MTR and MTSW. The Link Test settings for the MTR and MTSW must match.
2.5.5	Automation Wait	Default: 04 Selections: 01 to 60 Enter the time in seconds the MTR waits for the ACK message from the MTSW System.
2.5.6	COM3 Output	Default: 1 Selections: 0 or 1 0 Disable COM3 output to MTSW System. MTR works in manual operation mode. 1 Enable COM3 output to MTSW System. MTR works in auto operation mode.
2.6	NETWORK Connection	
2.7	Return to Default	
3	FIRMWARE VERSION	
3.1	Firmware Version	
4	EXIT MENU	

7.0 Appendix

Table 6: MTR System Internal Events

Internal System Events	Printer Output
Set Time	TIME SET
Battery Missing	BATTERY MISSING
Battery Bad	BATTERY BAD
Battery Restore	BATTERY RESTORE
AC Fail	AC FAIL
AC Restore	AC RESTORE
Remote Parameter Program In	REMOTE PARM PROGRAM IN
Remote Parameter Program Successful	REMOTE PARM PROGRAM OK
Remote Software Program In	REMOTE SOFTWARE PROGRAM IN
Remote Software Program Successful	REMOTE SOFTWARE PROGRAM SUCCESS
Remote Program Failure	REMOTE PROGRAM FAILURE
Remote Program Denied	REMOTE PROGRAM DENIED
External PRT Error	EXTERNAL PRINTER ERROR
External PRT Restore	EXTERNAL PRINTER RESTORE
COM3 Error	COMPUTER ERROR
COM3 Trouble	COMPUTER TROUBLE
COM3 Restore	COMPUTER RESTORE
UPS AC Fail	UPS AC FAIL
UPS AC Restore	UPS AC RESTORE
UPS Battery Low	UPS BATTERY LOW
UPS Battery Restore	UPS BATTERY RESTORE
System Reset	SYSTEM RESET
CAN x Bus Fault	CAN x BUS FAULT
CAN x Bus Restore	CAN x BUS RESTORE
Data Error	DATA ERROR
Set Date	DATE SET

Notes

Notes

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