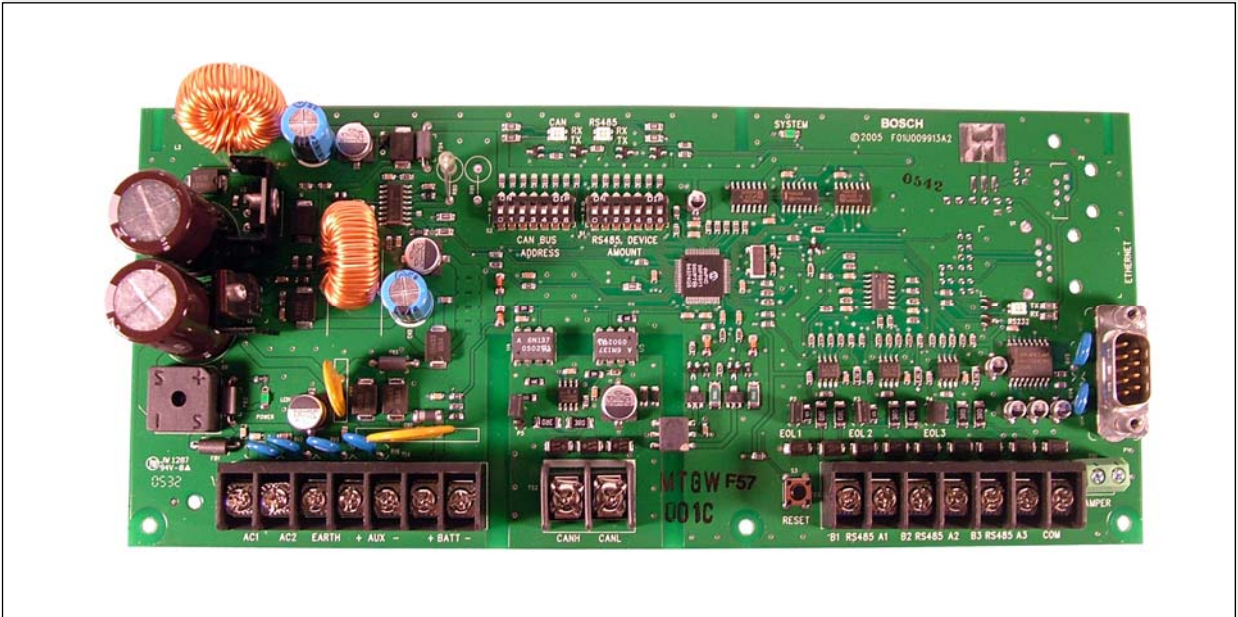


MTGW



EN | Installation Guide
CAN-RS-485 BUS
Gateway



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 an application based on Microsoft® Windows®, 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	Six Zone Keypad Controller
IUI-DS12R	Twelve Zone Keypad Controller
MT1-1	Single Zone Input Module
ICP-MT1-2	Two Zone Input Module
MT1-8	Eight Zone Input Module
ICP-MT2-8	Eight Relay Output Module
ICP-MT3-1	One Input/One Output Module

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.

To set the DIP switch address on this device, refer to *Section 4.0 Setting DIP Switches* on page 5.

1.3 MTGW Overview

The MTGW CAN RS-485 Bus Gateway is used in Bosch Security Systems, Inc. Multi-tenant Systems (MTS) to convert data sent over an RS-485 Bus into a format usable by a Controller Area Network (CAN) bus, and to convert CAN bus data into a format usable by an RS-485. This data includes events that occur at devices attached to an RS-485 and commands sent from the Multi-tenant Receiver (MTR) Central Receiver to the devices. The MTGW can buffer up to 64 events for conversion. It also monitors the connection status of the entire CAN and RS-485 nodes. Each Multi-tenant Gateway (MTGW) has three separate RS-485 buses. The MTGW has one RS-232 interface for upgrading firmware.

2.0 Wiring



- Install the MTGW according to this document to avoid damage to the devices.
- Remove power to the MTGW before connecting or removing it.
- Perform a system test after the installation to verify that all functions work properly.

One MTGW has three isolated RS-485 bus terminal pairs. Each MTGW can support up to 120 RS-485 devices, including the DS6R2 Keypad Controller, MT1-1 Single Zone Input Module, MT1-8 Eight Zone Input Module, IUI-DS12R Twelve Zone Keypad Controller, ICP-MT1-2 Two Zone Input Module, ICP-MT2-8 Eight Relay Output Module, and ICP-MT3-1 One Input/One Output Module. Divide the devices as evenly as possible across all three terminals for improved system loading and fault tolerance. Refer to *Table 2* and *Figure 1*.

Table 2: Power and Wiring Specifications*

Power Supply	Input 18.5 VAC provided by transformer (included)	
Accessory Output Power	500 mA maximum	
Battery	12 V battery connectors; chargeable; battery status is monitored Recommended battery: 12 VDC, 7 Ah sealed lead-acid (at least 12 V 3 Ah)	
Wiring	CAN bus interface	Connect the CAN Bus to the MTR Central Receiver with at least 1.5 mm (16 AWG) shielded twisted-pair wire; maximum length, 2000 m (6500 ft).
	RS-485 Bus 1	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 monitored.
	RS-485 Bus 2	
	RS-485 Bus 3	
* Refer to <i>Table 3</i> on page 4 for detailed specifications.		

Figure 1: System Diagram

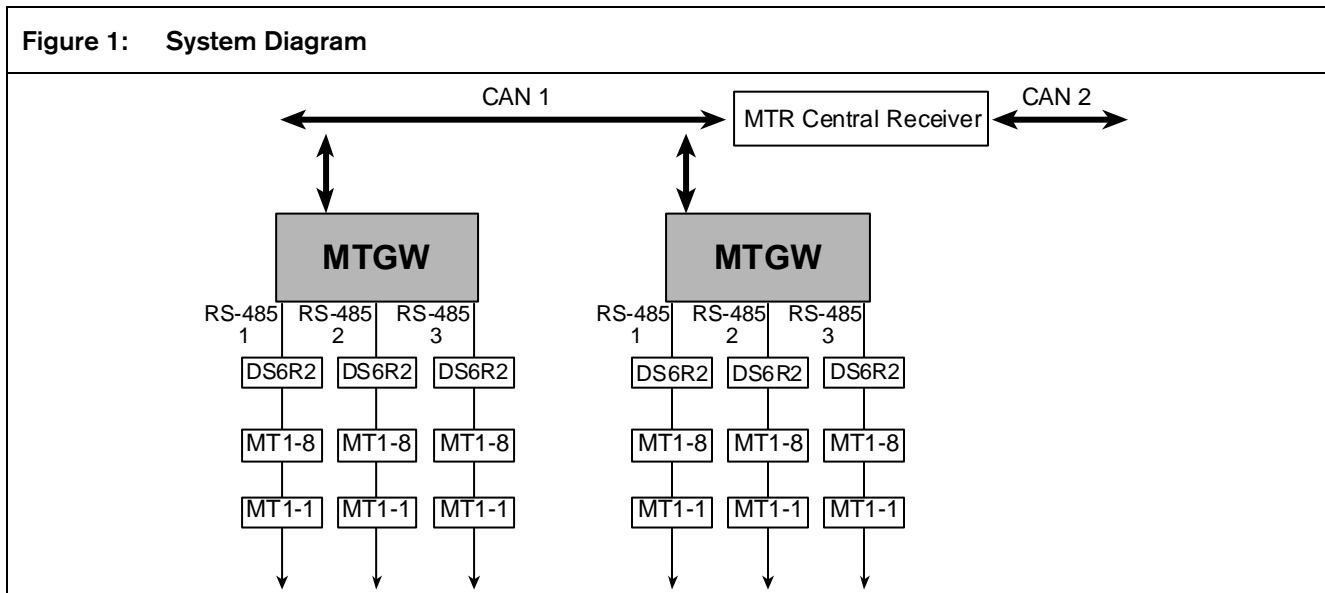


Figure 2: MTGW Circuit Board and Interface Description

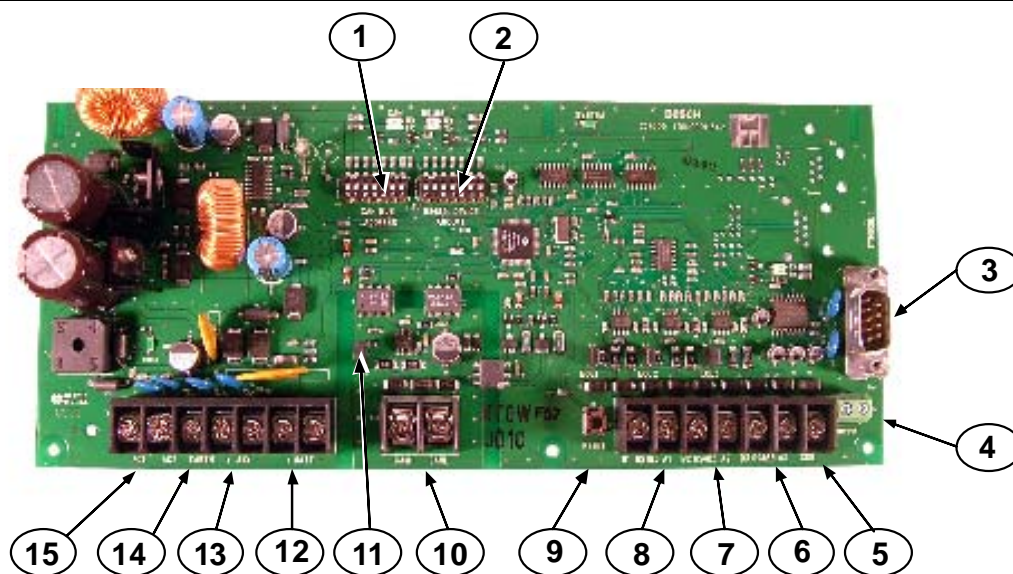


Table 3: MTGW Description and Specifications

Figure 2 Callouts	Callout Description	Description and Specifications	
1	CAN BUS ADDRESS	DIP switch address of the MTGW on the CAN bus (refer to <i>Section 4.0 Setting DIP Switches</i> on page 5).	
2	RS-485 DEVICE AMOUNT	DIP switch addressing for the amount of installed RS-485 devices (refer to <i>Section 4.0 Setting DIP Switches</i> on page 5).	
3	RS-232 programming port	RS-232 programming port; use to upgrade MTR firmware (refer to <i>Section 3.0 MTGW Firmware Upgrade</i> on page 5).	
4	TAMPER	Tamper switch terminals (2); connect to tamper switch wires in the MTGW's enclosure	
5	COM	Common ground (optional)	
6	RS-485 A3 and B3	RS-485 Bus 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 monitored. Use standard CAN or RS-485 repeaters to increase the wiring run for both the CAN Bus and RS-485 bus. Multi-repeaters can be used in one system. Avoid branch wiring (T-taps or star topology) the CAN and RS-485 bus.
7	RS-485 A2 and B2	RS-485 Bus 2	
8	RS-485 A1 and B1	RS-485 Bus 1	
9	RESET	Reset Button	
10	CANH and CANL	CAN bus interface	Connect the CAN Bus to the MTR Central Receiver with at least 1.5 mm (16 AWG) shielded* twisted-pair wire; maximum length 2000 m (6500 ft).
11	EOL jumper	CAN bus EOL jumper. This jumper must be closed on the last MTGW on the bus.	
12	BATT + and -	12 V battery connectors; chargeable; battery status is monitored Recommended battery: 12 VDC, 7 Ah sealed lead-acid (at least 12 VDC 3 Ah)	MTGW Current Draw: 100 mA standby Up to 1500 mA @ 13.5 V ± 5% when using both the battery charging and auxiliary outputs
13	AUX + and -	Accessory output power 500 mA maximum	Output: 13 VDC ± 5% for battery charging and auxiliary power
14	EARTH	Earth ground	
15	AC1 and AC2	Power Supply: Input 18.5 VAC provided by transformer (included)	

* To terminate shielded twisted-pair wire, ground the bus by connecting the wire to the MTGW's COM terminal.

3.0 MTGW Firmware Upgrade

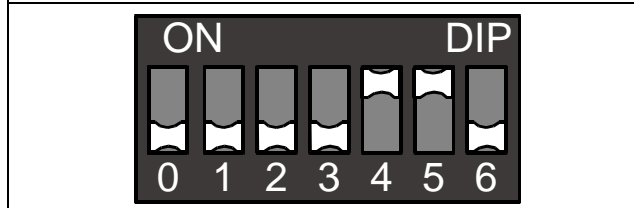
Upgrade the MTGW firmware using MTRAM, a Windows PC application software with a Chinese and English interface. It is provided as a separate tool in the *Multi-tenant Software (MTSW) CD* (P/N: F01U011231).

1. Connect the PC COM port to the RS-232 port, *Figure 2, Item 3* on page 4 using an RS-232 cable. The cable is included with the MTR.
2. Insert the MTSW CD into a PC that supports Windows® 98/2000/XP.
3. Select **System→Management→Firmware Utilities→Manual Upgrade Wizard**, then select **MTGW** and follow the software’s instructions to finish the firmware upgrade. MTRAM opens automatically and guides you through the installation.
4. Press the RESET button on MTGW to start the upgrade. Refer to *Figure 2, Item 9* on page 4.

4.0 Setting DIP Switches

Setting a DIP switch to ON (up) equals the binary digit 1. Setting the DIP switch in a down (off) position equals the binary digit 0. DIP switches set the binary address according to the order of the switches 0, 1, 2, 3, 4, 5, 6. In *Figure 3*, the binary address is 0000110, which is address 006 (refer to *Table 5* on page 6).

Figure 3: Binary Address 0000110



CAN BUS ADDRESS is the address of the MTGW on the CAN bus. The RS-485 DEVICE AMOUNT equals the number of RS-485 devices connected. Refer to *Figure 2, Items 1 and 2* on page 4. For **each** CAN Bus, you can connect up to 100 MTGWs. The highest binary address is 1100100, which corresponds to an address of 100.

You can connect 120 RS-485 devices. The highest binary amount for the RS-485 Bus is 1111000, which corresponds to 120. Use *Table 5* on page 6 to determine the appropriate address settings for the devices on your system.

For example:

Set the CAN BUS ADDRESS DIP switches as follows for an MTGW with the address of 10:
0 0 0 1 0 1 0

Set the RS-485 DEVICE AMOUNT DIP switches as follows for a total of 50 devices on all three buses:
0 1 1 0 0 1 0

5.0 System Status

Reapply power to the MTGW. *Table 4* indicates the system status. Use this table during the System Tests to determine if the system is operating correctly.

LED	Name	Status	Description
POWER	Power indicator	Off	No power
		On	Power on
SYSTEM	System indicator	Steady green or LED off	System trouble
		Flashes green at 1 sec intervals	System normal
CAN	CAN Bus indicator	Flashes red and green alternately	CAN Bus normal
		Steady red or green LED	CAN Bus trouble
RS-485	RS-485 Bus indicator	Flashes red and green alternately	RS-485 Bus normal
		Steady red or green	RS-485 Bus trouble

6.0 DIP Switch Addresses

Table 5: DIP Switch Addresses

Address*	DIP Switch Number ● = DIP switch ON							Address*	DIP Switch Number ● = DIP switch ON							Address*	DIP Switch Number ● = DIP switch ON								
	0	1	2	3	4	5	6		0	1	2	3	4	5	6		0	1	2	3	4	5	6		
001							●	041		●		●				●	081	●		●					●
002						●		042		●		●		●			082	●		●			●		
003						●	●	043		●		●		●	●		083	●		●			●	●	
004					●			044		●		●	●				084	●		●		●			
005					●		●	045		●		●	●		●		085	●		●		●		●	
006					●	●		046		●		●	●	●			086	●		●		●	●		
007					●	●	●	047		●		●	●	●	●		087	●		●		●	●	●	
008				●				048		●	●						088	●		●	●				
009				●			●	049		●	●				●		089	●		●	●				●
010				●		●		050		●	●			●			090	●		●	●		●		
011				●		●	●	051		●	●			●	●		091	●		●	●		●	●	
012				●	●			052		●	●		●				092	●		●	●	●			
013				●	●		●	053		●	●		●		●		093	●		●	●	●		●	
014				●	●	●		054		●	●		●	●			094	●		●	●	●	●		
015				●	●	●	●	055		●	●		●	●	●		095	●		●	●	●	●	●	●
016			●					056		●	●	●					096	●	●						
017			●				●	057		●	●	●			●		097	●	●					●	
018			●			●		058		●	●	●		●			098	●	●			●			
019			●			●	●	059		●	●	●		●	●		099	●	●			●	●		
020			●		●			060		●	●	●	●				100 ¹	●	●			●			
021			●		●		●	061		●	●	●	●		●		101	●	●			●		●	
022			●		●	●		062		●	●	●	●	●			102	●	●			●	●		
023			●		●	●	●	063		●	●	●	●	●	●		103	●	●			●	●	●	
024			●	●				064	●								104	●	●		●				
025			●	●			●	065	●						●		105	●	●		●			●	
026			●	●		●		066	●					●			106	●	●		●		●		
027			●	●		●	●	067	●					●	●		107	●	●		●		●	●	
028			●	●	●			068	●			●					108	●	●		●	●			
029			●	●	●		●	069	●			●		●			109	●	●		●	●		●	
030			●	●	●	●		070	●			●	●				110	●	●		●	●	●		
031			●	●	●	●	●	071	●			●	●	●			111	●	●		●	●	●	●	
032		●						072	●			●					112	●	●	●					
033		●					●	073	●			●			●		113	●	●	●					●
034		●				●		074	●			●		●			114	●	●	●			●		
035		●				●	●	075	●			●		●	●		115	●	●	●			●	●	
036		●			●			076	●			●	●				116	●	●	●		●			
037		●			●		●	077	●			●	●		●		117	●	●	●		●		●	
038		●			●	●		078	●			●	●	●			118	●	●	●		●	●		
039		●			●	●	●	079	●			●	●	●	●		119	●	●	●		●	●	●	
040		●		●				080	●		●						120 ²	●	●	●	●				

* The device's address.

¹ CAN Bus device: The highest address is 100

² RS-485 Device Amount: The highest address is 120

Notes

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