

## QS7800B Network Interface ControlBus™ Module for Multi-Dropping 7800 SERIES Relay Modules

PRODUCT DATA



### APPLICATION

The QS7800B Network Interface ControlBus™ Module allows remote monitoring and diagnostics of multi-dropped 7800 SERIES Relay Modules.

### FEATURES

- Up to six ControlBus™ Modules per Network Interface Unit. (Maximum of 222 multi-dropped subnetworks per Q7700 Network Interface Unit).
- Up to 31 multi-dropped 7800 SERIES subnetworks per QS7800B ControlBus™ Module without using an RS-485 repeater.
- Up to 61 multi-dropped 7800 SERIES subnetworks per QS7800B ControlBus™ Module using an RS-485 repeater.
- Local and remote annunciation of 7800 SERIES Relay Module faults.
- Personal computer user interface.
- Microsoft® Windows™ based Combustion System Manager® user interface.
- Modular construction.

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## SPECIFICATIONS

**Models:** QS7800B1000 Network Interface ControlBus™  
Module for use with the S7810B Multi-Drop Switch Module  
and Q7700A1014 and Q7700B1004 Network Interface  
Unit.

**Electrical Ratings:**  
ControlBus™ Communication.  
Current Draw: 75 mA.

**Electrical Connectors:** ControlBus™ Three-Prong Electrical  
Connector.

**Environmental Ratings:**  
Ambient Temperature:  
Operating: 32°F to 130°F (0°C to 54°C).  
Storage: -30°F to +150°F (-34°C to +66°C).  
Humidity: Operating 85 percent relative humidity, continuous,  
noncondensing.  
Vibration: Continuous 0.5G.  
Enclosure: NEMA 1.

**Dimensions:** See Fig. 1.

**Weight:** 8 oz (unpacked).

**Accessories:**  
221237/1698 Cover Assembly, Q7700 Network Interface Unit.  
221240/1698 Cover Assembly, Q7700 Electrical Enclosure,  
Network Interface Unit.  
202433 Slot Inserts, ControlBus™ Slots Base Unit.  
200603 ControlBus™ Electrical Connector.

**Approvals:**  
Underwriters Laboratories Inc: File No. MP268, Guide No.  
MCCZ2.  
Canadian Standards Association: LR80141 .  
Federal Communications Commission: Part 15, Class A Emis-  
sions, Part 68.  
FCC: Registration Number HS92SJ-10735-DT-E.  
Canadian Department of Communication: CS-03, Certification  
Number 573-3459A.

### IMPORTANT

*This equipment complies with the requirements in part 15 of FCC rules for a Class A computing device. Operation of this equipment in a residential area can cause unacceptable interference with radio and television reception that requires the operator to take whatever steps are necessary to correct interference.*

**Warning:** This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the Instructions Manual, may cause interference with radio communication. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case, user at their own expense will be required to take whatever measures may be required to correct the interference. Any unauthorized modification of this equipment may result in the revocation of the owner's authority to continue its operation.

**Canadian EMI:** This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

## INSTALLATION

### When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.

## ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Relations  
Honeywell, 1885 Douglas Drive North  
Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

3. Installer must be a trained, experienced service technician.
4. Check out the product after installation, as provided in the Q7700 Network Interface Unit instructions, form 63-2278 and S7810B instructions, form 65-0228.
5. Make sure that only the manufacturer makes repairs.
6. If trouble develops, disconnect the equipment from the modem and determine the cause of the fault. Reconnect only when the problem is corrected.
  - a. Allow for an additional 2-1/2 inches (64 mm) minimum below the Network Interface Unit for electrical connector installation.
  - b. Allow for an additional 1-1/2 inches (38 mm) minimum on each side for electrical housing cover insertion and wiring.

## WARNING

**.Electrical Shock Hazard.  
Can cause severe injury, death or equipment damage.**

Disconnect power supply before beginning installation to prevent electrical shock and equipment damage. More than one power supply disconnection can be involved.

## Humidity

Install the Network Interface Unit where the relative humidity never reaches the saturation point. The Network Interface Unit is designed to operate in an 85 percent relative humidity continuous noncondensing moisture environment. Condensing moisture can result in improper operation.

## Vibration

Do not install the Network Interface Unit where it can be subjected to excessive vibration in excess of 0.5G continuous maximum vibration.

## Weather

The Network Interface Unit is not designed to be weather tight. When installed outdoors, provide protection for the Network Interface Unit.

## Mounting the Network Interface Plug-in Card

For installation dimensions, see Fig. 1.

1. Mount the ControlBus™ Module in the Network Interface Unit (see Fig. 2). Do not mount the Network Interface Unit with the Interface ControlBus™ Module edge connector slots facing down.
2. Insert the ControlBus™ Module with the electrical connector facing out from the Network Interface Unit.
3. Grasp the ControlBus™ Module and align the plug-in edge card with the connector in the bottom of the Network Interface Unit.
4. Firmly insert the ControlBus™ Module into the Network Interface Unit.
5. Select a location that can support the Network Interface Unit. Be sure to allow clearances for servicing, installing and removing the wiring compartment cover, Network Interface Unit cover, electrical connectors and ControlBus™ Modules.

## WIRING

### Wiring Requirements

## WARNING

**Electrical Shock Hazard.  
Can cause severe injury, death or equipment damage.**

1. Wiring must comply with all applicable codes, ordinances and regulations.
  2. Refer to Fig. 6 for proper system wiring.
  3. Do not plug or unplug any Network Interface Unit ControlBus™ Module or electrical connectors with the power on. Make sure that power is off to protect against equipment damage.
1. All wiring must comply with all applicable electrical codes, ordinances, and regulations.
  2. Recommended wire size and type for ControlBus™ communication is shielded 22 AWG twisted pair cable (Belden 8723 or equivalent). Terminal identification numbers and letters are shown in Table 1.

**Table 1. QS7800B and S7810B Terminals and Identification.**

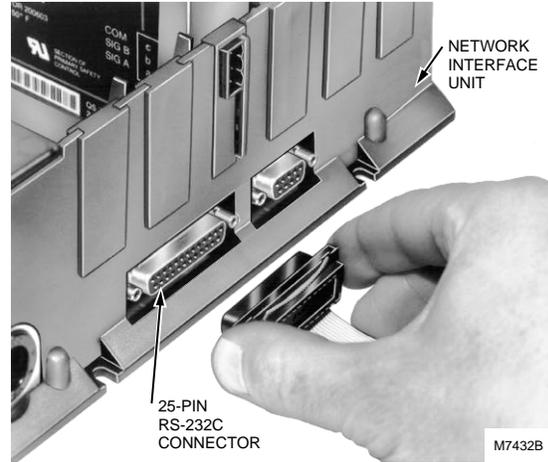
Signal	QS7800B Terminals	S7810B Terminals
Multi-Drop Data+	a	7
Multi-Drop Data-	b	8
Multi-Drop Ground	c	6

3. Wire Routing:
  - a. Do not route the ControlBus™ cable in conduit with line voltage circuits.
  - b. Do not route the ControlBus™ cable close to the ignition transformer.
  - c. Route the ControlBus™ cable outside of conduit if properly supported and protected from damage.
  - d. Route the ControlBus™ cable so that all devices are connected in a daisy chain configuration. See Fig. 6.
4. Maximum wire lengths can be 4000 ft (1219 m) for the ControlBus™ RS-485 interface under ideal conditions.

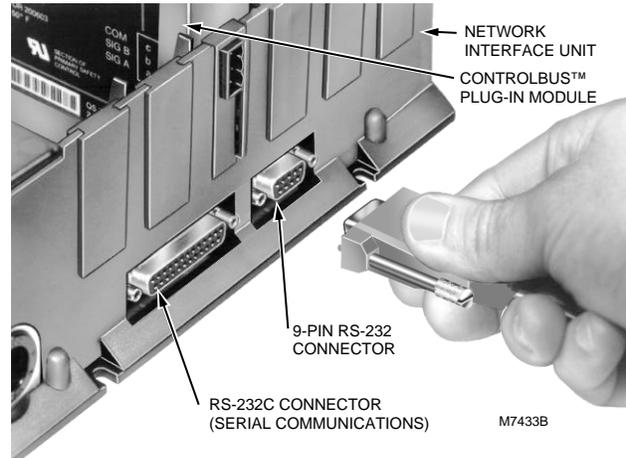
## Procedure

1. Refer to Fig. 6 for proper wiring.
2. Be sure that power is removed from the control panel by opening the main disconnect before beginning wiring to the electrical connectors. More than one disconnection can be involved.
3. Select the location of the Network Interface Unit to be mounted:

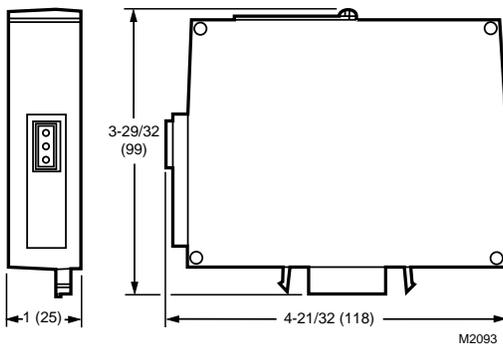
- a. Near a phone line.
  - b. Within 4000 ft (1219 m) of all Relay Modules connected to the Network Interface Unit.
  - c. Within 50 ft (15 m) of the personal computer connected to the 25-pin RS-232 port of the Network Interface Unit.
4. Mount the Network Interface Unit and insert the ControlBus™ Module into the Network Interface Unit slot, see Fig. 2 and 5.
- Route the ControlBus™ cable so that all devices are connected in a daisy chain configuration. It is recommended that the QS7800B ControlBus™ Module be at one end of the daisy chain.
5. Connect L1, L2 and Ground (GND) to the pigtails (Q7700A only).
  6. Insert the plug-in cards into the open slots of the Network Interface Unit, starting with slot one.
  7. Install the covers, power wiring compartment and Network Interface Unit.
  8. Connect the serial port of the modem to the 9-pin RS-232 connector of the Network Interface Unit (see Fig 4).
  9. Connect the serial port of the personal computer to the 25-pin RS-232C port on the Network Interface Unit for local personal computer application, see Fig. 3.
  10. Do not exceed 600 mA current draw, six card maximum, total capacity of the plug-in cards. Refer to the ControlBus™ Module device label and this specification for individual loads.
  11. Recheck all wiring with Fig. 6.
  12. Restore power to the Network Interface Unit.



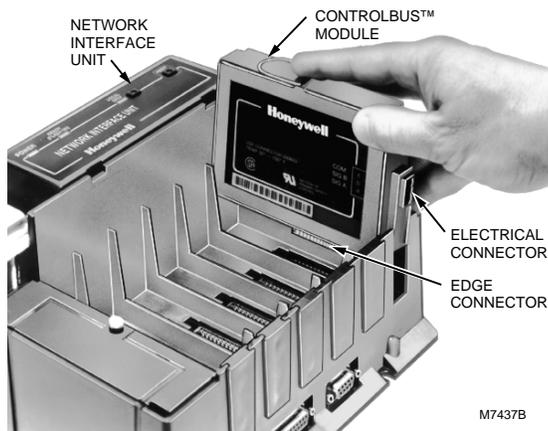
**Fig. 3. RS-232 Interface insertion (serial communications).**



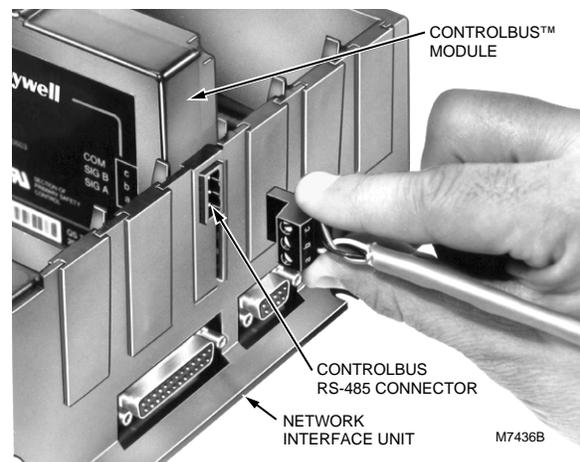
**Fig. 4. Modem insertion, Network Interface Unit.**



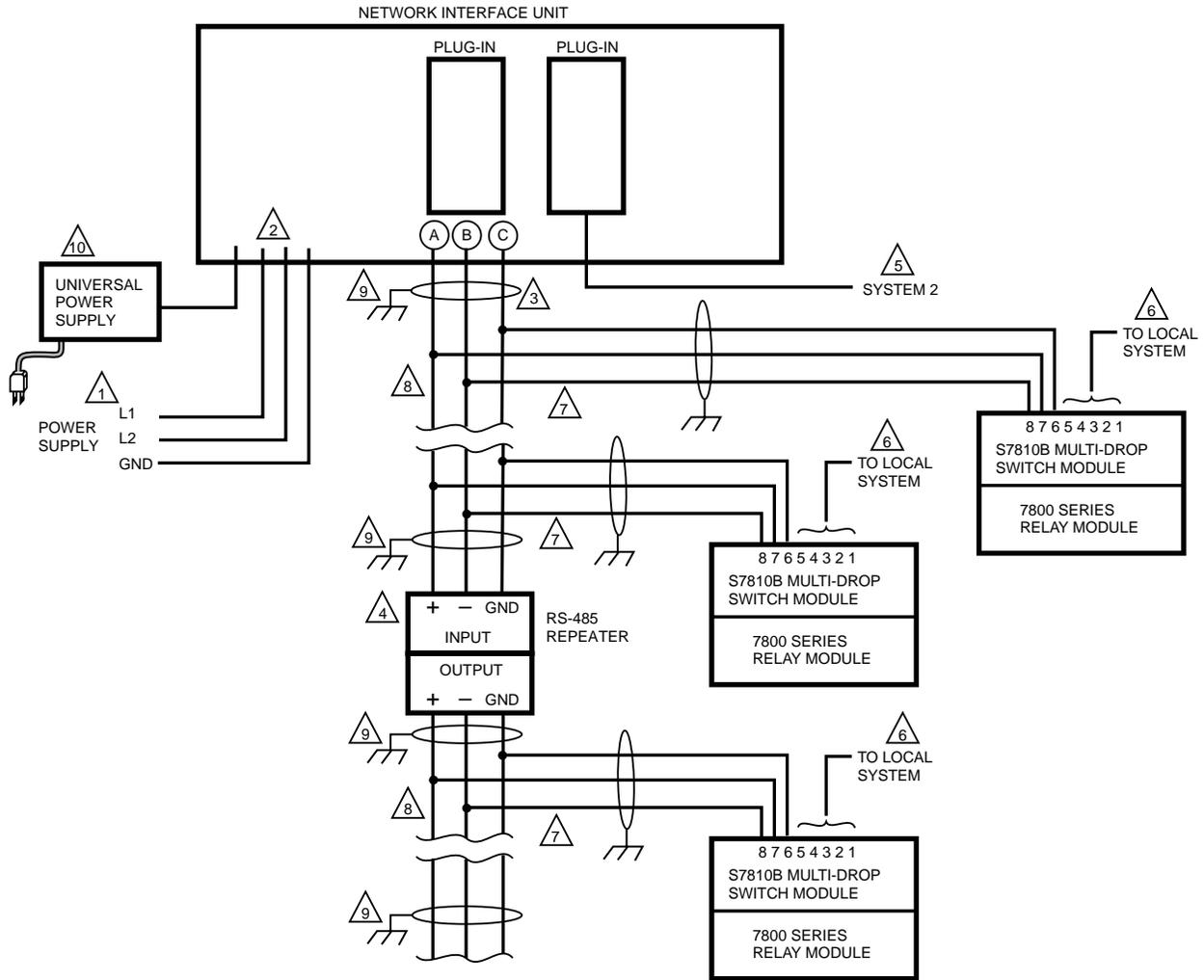
**Fig. 1. QS7800B Network Interface ControlBus™ Module dimensions in in. (mm).**



**Fig. 2. ControlBus™ Module mounting.**



**Fig. 5. ControlBus™ RS-485 interface insertion.**



- 1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED. Q7700A1014, 120V, 50/60 HZ; Q7700B1004, UNIVERSAL POWER SUPPLY, 100 TO 250V, 50/60 HZ.
- 2 CONNECT PIGTAIL LEADWIRES (Q7700A ONLY):  
BLACK—L1  
WHITE—L2  
GREEN—GROUND
- 3 MULTI-DROP RS-485 COMMUNICATION BUS. UP TO 31 S7810B MULTI-DROP SWITCH MODULES (SUBNETWORKS) CAN BE CONNECTED TO A SINGLE QS7800B CONTROLBUS™ MODULE WITHOUT AN RS-485 REPEATER. UP TO 61 S7810B MULTI-DROP SWITCH MODULES (SUBNETWORKS) CAN BE CONNECTED TO A SINGLE QS7800B CONTROLBUS™ MODULE WITH AN RS-485 REPEATER.
- 4 INSTALL THE REPEATER BETWEEN THE 30TH AND 31ST SUBNETWORKS.
- 5 UP TO SIX QS7800B CONTROLBUS™ MODULES CAN BE INTERFACED WITH THE NETWORK INTERFACE UNIT. MAXIMUM OF 222 MULTI-DROP SUBNETWORKS CAN BE INTERFACED WITH A SINGLE Q7700 NETWORK INTERFACE UNIT.
- 6 LOCAL SYSTEM (SUBNETWORK). REFER TO S7810B MULTI-DROP SWITCH MODULE INSTRUCTIONS, FORM 65-0228, FOR WIRING INSTRUCTIONS.
- 7 THE SUBNETWORKS MUST BE WIRED IN A DAISY CHAIN CONFIGURATION. IT IS RECOMMENDED THAT THE QS7800B CONTROLBUS™ MODULE BE AT ONE END OF THE DAISY CHAIN.
- 8 22 AWG (OR LARGER) TWISTED PAIR SHIELDED CABLE (BELDEN 8723 OR EQUIVALENT) IS RECOMMENDED. CABLE SHIELD MUST BE GROUNDED AT EACH END.
- 9 MULTI-DROP COMMUNICATION BUS TERMINATION RESISTORS:  
A. WITHOUT RS-485 REPEATER: MODULES AT THE CLOSEST AND FARTHEST END OF THE DAISY CHAIN REQUIRE TERMINATION RESISTORS. INSTALL A 120 OHM, 1/4 WATT, RESISTOR BETWEEN TERMINALS a AND b OF THE QS7800B CONTROLBUS™ MODULE. INSTALL A 120 OHM, 1/4 WATT, RESISTOR BETWEEN TERMINALS 7 AND 8 OF THE LAST S7810B MULTI-DROP SWITCH MODULE IN THE DAISY CHAIN.  
B. WITH RS-485 REPEATER: WHEN AN RS-485 REPEATER IS USED, TWO DAISY CHAIN CONFIGURATIONS ARE EFFECTIVELY FORMED. MODULES AT THE CLOSEST AND FARTHEST END OF EACH DAISY CHAIN REQUIRE TERMINATION RESISTORS. INSTALL A 120 OHM, 1/4 WATT, RESISTOR BETWEEN TERMINALS a AND b OF THE QS7800B CONTROLBUS™ MODULE. INSTALL A 120 OHM, 1/4 WATT, RESISTOR BETWEEN INPUT TERMINALS DATA+ AND DATA- OF THE RS-485 REPEATER. INSTALL A 120 OHM, 1/4 WATT, RESISTOR BETWEEN OUTPUT TERMINALS DATA+ AND DATA- OF THE RS-485 REPEATER. INSTALL A 120 OHM, 1/4 WATT, RESISTOR BETWEEN TERMINALS 7 AND 8 OF THE LAST S7810B MULTI-DROP SWITCH MODULE IN THE SECOND DAISY CHAIN.
- 10 FOR Q7700B NETWORK INTERFACE UNIT.

M11347A

Fig. 6. Multi-drop wiring.

## BUILDING A MULTI-DROP NETWORK

### Guidelines

The subnetwork addressing in the Q7700 Network Interface Unit (NIU) is not contiguous. It is divided into two blocks, containing 198 and 24 addresses, respectively. A maximum multi-drop configuration would include 222 subnetworks (198 plus 24) on a single Q7700 NIU. Because the 24 subnetworks are not contiguous, connect them to a separate Q7700 NIU slot.

One QS7800B ControlBus™ Module card supports up to 31 multi-drop subnetworks without using an RS-485 repeater. If an RS-485 repeater is used, up to 61 multi-drop subnetworks can be supported by one QS7800B card. The RS-485 repeater must be installed between the 30th and 31st subnetwork.

Each subnetwork includes one 7800 SERIES controller with or without an S7800 Keyboard Display Module and/or an S7830 Expanded Annunciator. An S7810B1007 Multi-Drop Switch Module is required in each subnetwork. See Fig. 6 for wiring information.

Subnetworks can be spread evenly (balanced) across the NIU slots. This will help to speed communications.

It is recommended that the multi-drop network be built starting with slot number 1 of the NIU, according to the guidelines above.

Record the serial number and physical location of each S7810B Multi-Drop Switch. This data will be useful when commissioning the ZM7850 Combustion System Manager (CSM) software. (Reference CSM manual, form 65-0102, for CSM commissioning.)

### Examples

#### Network with Maximum of 198 Subnetworks:

NIU Slot Numbers	1	2	3	4	5	6	Total
Number of Subnetworks	61	61	61	15	Open	Open	198
Subnetworks Balanced	33	33	33	33	33	33	198

The open NIU slots can be used for other QS7800 ControlBus™ Module Cards.

#### Network with Maximum of 222 Subnetworks:

NOTE: For networks that have more than 198 subnetworks, the last NIU card slot must have the 199th through 222nd subnetwork attached to it.

NIU Slot Numbers	1	2	3	4	5	6	Total
Number of Subnetworks	61	61	61	15	24	Open	222
Subnetworks Balanced	40	40	40	39	39	24	222

The open NIU slot can be used for other QS7800 ControlBus™ Module Cards.



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