The General Purpose Interface ControlBus™ Module allows third party systems to interface with 7800 SERIES Controls. The QS7850 General Purpose Interface Module, along with the Q7700 Network Interface Unit, has the unique ability to tie burner controls into one network and offer a simple interface into this network for third party systems. Systems integrators, building automation systems and industrial control systems can therefore access digital and analog information from all of these systems using a single RS-485 cable. For example, the flame signal of your boiler or oven can be monitored continuously and displayed on your building or industrial workstation. Because multiple QS7850 Modules (up to 31) can be tied together, a total of 155 Controllers can reside on one network.

FEATURES

- RS-485 interface to building automation systems and industrial control systems.
- Supports ASCII or binary protocol.
- Supports a dumb terminal interface.
- Up to 31 General Purpose Interface ControlBus™ Modules can reside on a single RS-485 bus.
SPECIFICATIONS

Models:
QS7850A1006 General Purpose Interface ControlBus™ Module for use with the Q7700A1014 Network Interface Unit.

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

Electrical Connectors (Included):
Part no. 200603 ControlBus™ Three-Prong Electrical Connector.

Environmental Rating:
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% RH continuous, noncondensing.
Vibration: Continuous 0.5G environment.

Enclosure:
NEMA 1.

Dimensions:
See Fig. 1.

Weight:
8 ounces (unpacked).

Fig. 1. ControlBus™ dimensions in in. (mm).

Accessories:
Part no. 206610A Disk Accessory, contains point tables for devices that can be included in the network.

Part no. 221237/1698 Cover Assembly, Q7700 Base Unit.
Part no. 221240/1698 Cover Assembly, Q7700 Electrical Enclosure.
Part no. 202433 Slot Inserts, ControlBus™ Slots.
Part no. 200603 ControlBus™ Module Electrical Connector.

Approvals:
Canadian Standards Association: LR95329-3.
Factory Mutual: 1Y4A1.AF.

CAUTION

Equipment Damage Hazard.
Can cause serious radio frequency interference.
This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, can cause interference to radio communications. It has been tested and found to comply with the limits for a Class A FCC rules computing device, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operating this equipment in a residential area is likely to cause interference; in which case, users at their own expense are required to take whatever measures are required to correct the interference.

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 marked on the product to make sure the product is suitable for your application.
3. The installer must be a trained, experienced Flame Safeguard service technician.
4. Check out the product after installation, as provided in the Network Interface Unit Instructions, form 63-2278.
5. Ensure that only the manufacturer makes repairs.

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 Honeywell Automation and Control Products Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care
   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.
**WARNING**

Electric Shock Hazard. Can cause severe injury, death or property damage.
1. Disconnect power supply before beginning installation to prevent electrical shock and equipment damage. More than one power supply disconnect can be involved.
2. Wiring must comply with all applicable codes, ordinances and regulations.
3. Refer to Fig. 4 for correct system wiring.
4. Do not plug or unplug any Network Interface Unit ControlBus™ Module or electrical connectors with the power on. Be sure power is off to protect against equipment damage.

**Humidity**

Install the general purpose interface card where the relative humidity never reaches the saturation point. The general purpose interface card is designed to operate in an 85% RH continuous, non-condensing, moisture environment. Condensing moisture can result in improper operation.

**Vibration**

Do not install the general purpose interface card where it can be subjected to vibration in excess of 0.5G continuous maximum vibration.

**Weather**

The general purpose interface card is not designed to be weather tight; when installed outdoors, the card must be protected.

**Mounting the Network Interface Unit Plug-in Card**

**NOTE:** 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 Network Interface Unit edge connector slots facing down.
2. Insert the ControlBus™ Module with the electrical connector facing out from the Network Interface Base 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, installation and removal of the wiring compartment cover, Network Interface Unit cover, electrical connectors and ControlBus™ Modules.
   a. Allow for an additional 2-1/2 in. (64 mm) minimum below the Network Interface Unit for electrical connector installation.
   b. Allow for an additional 1-1/2 in. (38 mm) minimum on each side for electrical housing cover insertion and wiring.
6. Remove the ControlBus™ Module by using the wire loop. Firmly grasp the wire loop and pull the module from the Network Interface Unit.

![Fig. 2. ControlBus™ Module mounting.](image)

**WIRING**

**Requirements**

1. All wiring must comply with all applicable electrical codes, ordinances and regulations.
2. Use the recommended wire size and type for ControlBus™ RS-485 communication, which is twisted pair shielded cable, Beldon 8723 or equivalent.
   a. Non-inverted Tx/Rx.
   b. Inverted Tx/Rx.
   c. Ground.
3. Use the following specifications for ControlBus™ RS-485 communication:
   a. Eight data bits.
   b. No parity.
   c. One stop bit.
   d. 9600 bauds.
4. Multiple General Purpose Interface ControlBus™ Modules must be wired in a daisy chain configuration, 1[a]-1[a], 2[b]-2[b], 3[c]-3[c]. The order of interconnection of all the devices is not important but be aware that modules on the closest and farthest end of the daisy chain configuration string require a 120 ohm (1/4 watt minimum) resistor termination across terminals 1 and 2 of the electrical connectors for any connections more than 100 feet; see Fig. 5.
   a. Do not route the ControlBus™ cable in conduit with line voltage circuits.
   b. Avoid routing the ControlBus™ cable close to the ignition transformer.
   c. Route the ControlBus™ cable outside of the conduit if properly supported and protected from damage.
   d. Wire the ControlBus™ cable in a daisy chain configuration, 1[a]-1[a], 2[b]-2[b], 3[c]-3[c]. The order of interconnection of all the devices is not important but be aware that modules on the closest and farthest end of the daisy chain configuration string require a 120 ohm (1/4 watt minimum) resistor termination across terminals 1 and 2 of the electrical connectors for any connections over 100 feet.
5. Maximum wire lengths can be 4000 feet for the ControlBus™ RS-485 Interface under ideal conditions.

Procedure
1. Refer to Fig. 4 and 5 for proper wiring.
2. Be sure power is removed from the control panel by opening the main disconnect before beginning wiring to the electrical connectors. More than one disconnect can be involved.

Fig. 3. ControlBus™ RS-485 Interface insertion.

3. Refer to form 63-2278 for instructions to install the Network Interface Unit.
4. Mount the Network Interface Unit and insert the General Purpose Interface ControlBus™ Module into the Network Interface Unit slot; see Fig. 2 and 3.
5. Wire multiple general purpose interface cards in a daisy chain configuration, 1[a]-1[a], 2[b]-2[b], 3[c]-3[c]. The order of interconnection of all other devices is not important but be aware that modules on the closest and farthest end of the daisy chain configuration string can require a 120 ohm (1/4 watt minimum) resistor termination across terminals 1 and 2 of the electrical connectors for any connections more than 100 feet.
6. Insert other ControlBus™ cards into any open slots of the Network Interface Unit. The following ControlBus™ Module cards are available for use with the Network Interface Unit and the General Purpose Interface ControlBus™ Module:
   a. QS7800A1001 Module Card for 7800 SERIES Control.
7. Connect the General Purpose Interface ControlBus™ Module to the third party system using a RS-485 cable. See Fig. 3 and 4.
8. Restore power to the Network Interface Unit.

Fig. 4. Network Interface Unit wiring.
Fig. 5. Wiring multiple general purpose interface cards on the same RS-485 bus.

OPERATION

Introduction

Traditionally, flame safeguard systems and other equipment controls are installed and used with minimal communication with other systems operating within a building or an industrial plant. Electro-mechanical controls and first generation microprocessor-based controls (the RA890, R4140 and BC7000 are classic examples) did not have the functionality to support communications. However, minimal communications with Building Automation Systems and Industrial Controls Systems were achieved using redundant wiring and contact closures. And the alarm contacts of flame safeguard controls are widely used.

The QS7850 General Purpose Interface (GPI) Card, along with the Q7700 Network Interface Unit, has the unique ability to tie primary controls, steam trap monitoring, and water conditioning into one network and offer a simple interface into this network for third party systems. System integrators, building automation systems and industrial control systems can, therefore, access digital and analog information from all of these systems using a single RS-485 cable.

For example, the flame signal of your boiler or oven can be monitored continuously and displayed on your building or industrial work station. Because multiple GPI Cards (up to 31) can be tied together, a total of 155 controllers can reside on one network.

The GPI Card supports either an ASCII or binary communication protocol. In both forms the primary function is to provide "read-point" and "write-point" commands that read and alter data items in the connected devices. The protocol also provides commands to set the GPI Card parameters. The two forms are equivalent in capability: there is corresponding binary command for every ASCII command and vice versa.

The ASCII protocol accepts commands and provides information in a simple form that is readable by both people and computers, and it isolates the user or the computer interface from many details by translating everything into ASCII messages. The binary protocol is for computers only and it requires a more detailed interface, but it can be more efficient for the interface developer, it can provide increased speed, and it includes the ability to detect message transmission errors.

The protocol definition and device information is available to any company that wants to create a system to communicate with the Q7700 Network Interface Unit or any device connected to it. This information is contained on a single IBM format 1.44 Mbyte floppy disk, part number 206610A. Except for a "read me" file, the contents of this disk are compressed in a "zip" file. Either the "PKUNZIP® " (a trademark of PKWARE Inc.) utility program or a compatible decompression utility is needed to de-compress these files, but this program is not included on the disk. The disk contains:

- The protocol specification
- Device and point description files for the control devices, calls to a library of access routines (both the program and the access routines are included in C language source form)
- Instructions and a ROM image file to convert any QSxxx card into a "Testcard" device that implements all of the data
- A PC program to test and demonstrate the GPI Card and its protocols. (An RS-232 to RS-485 adapter will be needed to connect the PC RS-232 port to the GPI Card RS-485 port.)
- A PC program to demonstrate the GPI Card binary to ASCII conversion of reply messages.
System integrators need part number 206610A accessory disc. This disk contains device numbers and point numbers for all controls that can be included in the network. There is also a Read Me file on the disk that contains detailed operating instructions.

The GPI Card functions as a responder to command messages coming from the third-party system. It does not initiate transmission except to acknowledge a command message and/or to reply to a command message. The GPI Card can reply to some types of command messages immediately, but others require the card to relay a message to the Network Unit and wait for a period of time for the reply before finally replying to the command message. The behavior in these situations is described in a Read Me file that is included on the accessory disk. Normally, the third-party system transmitting commands to the GPI Card always receives some kind of response within a certain time interval. If there is no response, the command-sending device can assume the GPI Card command did not receive the command.