The Q7700A,B Network Interface Unit provides monitoring and diagnostics and local and remote configuration and control of the BCS 7700 and 7800 SERIES devices with an IBM® equivalent personal computer. The Q7700 also provides local and remote configuration and control of the BCS 7700.

FEATURES

- Connect up to six BCS 7700 controls and up to 222 multi-dropped 7800 SERIES devices or combinations of the systems.
- Local and remote annunciation of BCS 7700 and 7800 SERIES safety shutdowns.
- Autodial-out on BCS 7700 and 7800 SERIES alarms for up to three telephone numbers.
- Personal computer user-friendly, menu driven, Microsoft® Windows™ software-based user interface.
- On-line data logging.
- Modular construction.
- Access controlled with password protection.
- Light Emitting Diode (LED) status interface.
- 9,200 selectable baud personal computer/printer interface.
- 19,200 selectable baud modem interface.
- Fault-dating and time-stamping internal software clock.
- Dial-out override for maintenance-induced alarms.
- Dedicated RS-232 external modem port.
- Universal power supply (Q7700B only).

APPLICATION

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SPECIFICATIONS

Models:
Q7700A,B Network Interface Unit:
Q7700A1014 Network Interface Unit, 120 Vac only.
Q7700B1004 Network Interface Unit with Universal 100 to 250 Vac power supply.

NOTE: 208670 Power Cord provided with 208289 Universal 100 to 250 Vac Power Supply is equipped with a standard U.S. 120 Vac plug. Adapter plugs for other power systems, if needed, can be obtained locally.

Electrical Ratings:
Voltage and Frequency:
Q7700A: 120 Vac (+10%/-15%), 50/60 Hz.
Q7700B: 100 to 250 Vac, 50/60 Hz.

Universal Power Supply (Q7700B only):
Rated Voltage: 100 to 250 Vac, 50/60 Hz.
Rated Input: 0.7A to 0.3A.
Secondary Voltages: +5V, +12V, -12V.
Secondary Current: 4.0A, 1.0A, 0.6A maximum.

Electrical Connectors:
RS-232C port, 25 D pin connector for local communications.
RS-232 port, 9 D pin connector for remote communications.

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:
Q7700A: 4 lb, 5 oz unpacked, without ControlBus™ Modules.
Q7700B: 5 lb, 13 oz unpacked, including power supply and cord, without ControlBus™ Modules.

Fig. 1. Network Interface unit dimensions in in. (mm).

Approvals:
Canadian Standards Association: LR95329.
Factory Mutual: J.I. 2Q2A5.AF.

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 (800) 328-5111
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.
**Accessories:**
QM4520A: RS-232C to RS-485 Converter.
QS7700A: ControlBus™ Module for BSC7700.
QS7800A: ControlBus™ Module for 7800 SERIES.
QS7800B: ControlBus™ Module for multi-drop 7800 SERIES.
ZM7850A: Combustion System Manager® Software for personal computer.
200603: ControlBus™ Module Electrical Connector.
202433: Slot Inserts, ControlBus™ Slots.
221237/1698: Cover Assembly, Base Unit.
221240/1698: Cover Assembly, Electrical Enclosure.
209164: Power Supply, panel mounting, 85 to 132 Vac or 170 to 264 Vac input voltage, switchable; 1.4A maximum input current; 24 Vdc (±10%) output voltage; 3A maximum output current.
209162: Power Supply, DIN-Rail mounting, 110 Vac input voltage; 225 mA input current; 24 Vdc (±1%) output voltage; 1A output current.
209163: Power Supply, DIN-Rail mounting, 220 Vac input voltage; 225 mA input current; 24 Vdc (±1%) output voltage; 1A output current.
208670: IEC 120V power cord for universal power supply (obtain other plug configuration locally).
208289: Universal Power Supply, 100 to 250 Vac, 50/60 Hz. Null Modem Adaptor (obtain locally).

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**CAUTION**

**Electrical Interference Hazard.**

Can cause interference with radio communications.

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, users 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.
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.
3. Installer must be a trained, experienced service technician.
4. After installation, check out the product as provided in these instructions.
5. Repairs are to be made only by the manufacturer.
6. If trouble develops, disconnect the equipment from the jack and determine the cause of the fault. Reconnect only when the problem is corrected.

WARNING

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

1. Disconnect power supply before beginning installation to prevent electrical shock and equipment damage; more than one disconnect may be required.
2. Do not plug or unplug any Network Interface Unit ControlBus™ Module or electrical connectors with the power on. Power must be off to protect against equipment damage.
3. For your own protection, make sure that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This is particularly important in rural areas.
4. Do not attempt to make electrical ground connections. Contact the appropriate electrical inspection authority, or electrician, as appropriate.

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 environment that contains up to 85 percent relative humidity, continuous, noncondensing. Condensing moisture can result in improper operation.

Vibration

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

Weather

The Network Interface Unit is not designed to be weather tight. Provide suitable weather protection when it is installed outdoors.

Mounting the Network Interface Unit

NOTE: For installation dimensions, see Fig. 1.

Mount the Network Interface Unit either vertically or horizontally. Do not mount the Network Interface Unit with the Interface ControlBus™ Module edge connector slots facing down.

The Network Interface Unit can be mounted on the outside of an electrical enclosure or in any location that can support the unit. Be sure to allow clearances for servicing, installation and removal of the wiring compartment cover, base unit cover, electrical connectors and ControlBus™ Module:

a. Allow an additional 2-1/2 in. (64 mm) minimum below the unit for electrical connector installation.
b. Allow an additional 1-1/2 in. (38 mm) minimum on each side of the unit for electrical housing cover insertion and wiring.

1. Using the base of the unit as a template, mark the four screw locations on the mounting surface.
2. Drill pilot holes and insert four number 8 mounting screws.
3. Place unit foot mounts over the screws and securely tighten the screws.

WIRING

All wiring must comply with all applicable electrical codes, ordinances and regulations, including NEC Class 1 (line voltage). See Fig. 2 for proper system wiring. Use the recommended size and type of wire:

1. Number 14 copper conductors TW60C, THW75C or THHN90C for line voltage power terminals (Q7700A). Terminal identification numbers are:
   a. Line voltage supply—L1 (black).
   b. Line voltage common—L2 (white).
   c. Earth ground—G (green).
2. Belden® 8723 or equivalent twisted pair shielded cable for ControlBus™ Communication terminals (A), (B)
Earth Grounding

Q7700A
Connect the earth ground terminal (G) to the metal control panel, using as short a wire as is practical. The ground wire must be capable of carrying a fault current equal to the rating of the protective fuse. Number 14 copper wire is adequate, but wide metal straps or brackets are preferred rather than copper leadwires.

Q7700B
The Q7700B is grounded through the ground lead of the International Electrotechnical Commission (IEC) input connector, using a standard IEC cord. Plug the IEC cord into a grounded electrical outlet.

Recommended Wire Routing
The ControlBus™ shield must be connected to earth ground of the electrical connector on the Network Interface Unit. Failure to connect the shield to earth ground can result in improper communication with the ControlBus™.

1. BCS 7700 System:
   a. Do not route the ControlBus™ shielded cable in conduit with line voltage circuits.
   b. Do not route the ControlBus™ shielded cable close to the ignition transformer.
   c. Route the ControlBus™ shielded cable outside of conduit only if properly supported and protected from damage.
   d. Route the ControlBus™ shielded cable so that all devices are connected in series (A-A, B-B, C-C, etc). The BC7700 Chassis Module must be at one end of the series string. The order of interconnection of all other devices is not important, except that the device on the far end of the series string must be terminated with a 120 ohm, 1/4 watt resistor between terminals A and B. (See Fig. 2.)

2. 7800 SERIES:
   a. Do not route the ControlBus™ shielded cable in conduit with line voltage circuits.
   b. Do not route the ControlBus™ shielded cable close to the ignition transformer.
   c. Route the ControlBus™ shielded cable outside of conduit only if properly supported and protected from damage.
   d. Route the ControlBus™ shielded cable so that all devices are connected in a daisy chain configuration (1(a)-1(a), 2(b)-2(b), 3(c)-3(c), etc). The order of interconnection of all other devices is not important, except that the modules on the closest and farthest end of the daisy chain configuration string may require terminating with a 120 ohm, 1/4 watt resistor across terminals 1 and 2 of the electrical connectors. See Fig. 3.

3. 7800 SERIES Multi-drop:
   a. Do not route the ControlBus™ shielded cable in conduit with line voltage circuits.
   b. Do not route the ControlBus™ shielded cable close to the ignition transformer.
   c. Route the ControlBus™ shielded cable outside of conduit only if properly supported and protected from damage.
   d. Route the ControlBus™ shielded cable so that all devices are connected in a daisy chain configuration (1(a)-1(a), 2(b)-2(b), 3(c)-3(c), etc). The order of interconnection of all other devices is not important, except that the modules on the closest and farthest end of the daisy chain configuration string may require terminating with a 120 ohm, 1/4 watt resistor across terminals 1 and 2 of the electrical connectors. See Fig. 4. Refer to Specification Sheet, form 65-0091, for detailed wiring instructions for the S7810B Module.

4. Maximum wire lengths:
   a. RS-232C connector can be run a maximum of 50 feet (15 meters) from the Network Interface Unit to the local personal computer.
   b. RS-485 ControlBus™ interface can be run a maximum of 4000 feet (1220 meters).

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\[\text{Fig. 2. BCS 7700 Network Interface wiring.}\]
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.

CONNECT PIGTAIL LEADWIRES (Q7700A ONLY): BLACK—L1 WHITE—L2 GREEN—GROUND

THE SYSTEM CONTROLBUS MUST BE ROUTED SO THAT ALL DEVICES ARE CONNECTED IN DAISY CHAIN CONFIGURATION (A-1, B-2, C-3).

UP TO SIX SYSTEMS CAN BE INTERFACED WITH THE NETWORK INTERFACE UNIT. EACH SYSTEM MUST RESIDE ON ITS OWN CONTROLBUS. NO TWO SYSTEMS SHOULD RESIDE ON ONE CONTROLBUS.

THREE-WIRE SHIELDED CABLE AND 120 OHM TERMINATING RESISTOR ARE REQUIRED FOR CONNECTIONS MORE THAN 100 FEET. CABLE SHIELD MUST TERMINATE TO EARTH GROUND AT BOTH ENDS. IF SHIELDED CABLE IS NOT USED, TWISTED PAIR WIRE PLUS A GROUND WIRE MUST BE USED.

TERMINATIONS 1, 2 AND 3 ARE LOCATED ON THE S7800 DISPLAY MODULE OR S7810 DATA CONTROLBUS MODULE™.

Fig. 3. 7800 SERIES Network Interface wiring.

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.

CONNECT PIGTAIL LEADWIRES (Q7700A ONLY): BLACK—L1 WHITE—L2 GREEN—GROUND

THE SYSTEM CONTROLBUS™ MUST BE ROUTED SO THAT ALL DEVICES ARE CONNECTED IN A DAISY CHAIN CONFIGURATION. RECOMMENDED THAT THE QS7800B CONTROLBUS™ MODULE BE LOCATED AT ONE END OF THE DAISY CHAIN. REFER TO SPECIFICATIONS, FORM 65-0228, FOR DETAILED WIRING INSTRUCTIONS FOR THE S7810B MODULE.

TWISTED PAIR SHIELDED CABLE REQUIRED. CABLE SHIELD MUST BE TERMINATED TO EARTH GROUND.

EACH RELAY MODULE REQUIRES ITS OWN S7810B, WITH A MAXIMUM OF 31 DEVICES PER CONTROLBUS™ MODULE WITHOUT RS-485 REPEATER, A MAXIMUM OF 61 PER CONTROLBUS™ MODULE, WHEN USING AN RS-485 REPEATER. A MAXIMUM OF 222 DEVICES IS ALLOWED PER NETWORK INTERFACE UNIT.

ALTERNATE WIRING CONFIGURATION. REFER TO SPECIFICATIONS FORM 65-0228 FOR DETAILED WIRING INSTRUCTIONS FOR THE S7810B MODULE.

Fig. 4. 7800 SERIES Multi-drop Network wiring.
Procedure

**WARNING**

*Electrical Shock Hazard.*
Can cause serious injury, death or equipment damage.
Disconnect power before wiring to prevent electrical shock or equipment damage.

1. Refer to Fig. 2 through 4 for proper wiring.
2. Remove power from the control panel before beginning wiring by opening the main disconnect. More than one disconnection can be required.
3. Select a mounting location for the Network Interface Unit:
   a. Near a phone line.
   b. Within 4000 feet (1220 meters) or (8000 feet (2440 meters) using an RS-485 repeater of all BCS 7700 and 7800 SERIES controls to be connected to the Network Interface Unit.
   c. Within 50 feet (15 meters) of the personal computer that will be connected to the 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. 5.
5. Route the ControlBus™ RS-485 cable for a BCS 7700 System so that all devices are connected in a daisy chain configuration (A-A, B-B, C-C, etc). The BC7700 Chassis Module must be at one end of the string. The interconnection of all other devices is not important, except that the device on the farthest end of the daisy chain configuration string must be terminated with a 120 ohm, 1/4 watt resistor between terminals A and B. Remove any other termination resistors and install a 120 ohm, 1/4 watt resistor at the final device in the string.
6. Route the ControlBus™ RS-485 cable for a 7800 SERIES System so all devices are connected in a daisy chain configuration, 1(a)-1(a), 2(b)-2(b), 3(c)-3(c). The interconnection order of all other devices is not important, except that the modules on the closest and farthest ends of the daisy chain configuration may have to be terminated with a 120 ohm, 1/4 watt resistor across terminals 1 and 2 of the electrical connectors.
7. Route the ControlBus™ RS-485 cable for a 7800 SERIES multi-drop system so that all devices are connected in series.
8. Connect L1, L2 and Ground (GND) to the pigtales (Q7700A only).
9. Connect the IEC cord from the Q7700B Universal Power Supply to a grounded power outlet. Connect the output of the universal power supply to the input power connection of the Q7700B.
10. Recheck all wiring against Fig. 2 through 4 (as applicable).
11. Install the covers, power wiring and Network Interface Unit.
12. Connect the Network Interface Unit to a modem. See Fig. 6.
13. Connect the Com 1 or Com 2 port of the personal computer to the RS-232C port on the Network Interface Unit. See Fig. 7.
14. Make sure loads do not exceed terminal ratings. Refer to the label on the Network Interface Unit or to the Specification section.
15. Restore power to the Network Interface Unit.

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**Fig. 5. ControlBus™ Card mounting.**

**Fig. 6. Connecting Network Interface Unit to modem.**
OPERATION

Personal Computer Requirements for Combustion System Manager® Software

The personal computer (PC) for this system should be an IBM® or equivalent computer using the 486 CPU with the following software resident on the PC:

1. DOS Version 5.0 or higher.
2. Windows Version 3.1 or Windows 95.

The PC should have 8-megabyte random access memory (RAM), a 40- to 80-megabyte hard drive and one diskette drive, 1.4 megabyte, 3.5 in.

NOTE: The more storage space that is available on the pc, the greater the data logging capabilities. Applications that require large amounts of data logging should use a PC with a 120 megabyte or larger hard disk.

Graphics: SVGA or VGA graphics adapter card.

Screen: Color.

Printer: Windows™ compatible printer. Xon-Xoff handshake control one-stop one-start bit, no parity (optional printer for the Network Interface Unit).

Mouse: Windows™ compatible mouse.

Ports: Two serial ports (one mouse and one communications) and one parallel.

Network Interface Unit Programmed Parameters

The Network Interface Unit has parameters that require user programming. Programming the Network Interface Unit is accomplished with an IBM® or equivalent personal computer using the Combustion System Manager® Software. The parameters are:

1. Network Interface Unit Password—A password is required to change parameters of the Network Interface Unit. This password is stored in the Communication Interface. The Combustion System Manager® Software prompts for this password before connecting to the Communication Interface. When the password is entered, writing is enabled; otherwise, writing is disabled. However, reading the points is always allowed.

2. Location Text Identification—When using the Combustion System Manager™ Software on a personal computer, a location text identification can be established for the Network Interface Unit. This identification can be an allphanumeric string of fifteen characters, with no spaces in the string of characters.

3. Modem Configuration—
   a. Dial-out Selection—The Network Interface Unit automatically dials out on a BCS 7700 or 7800 SERIES system fault. The Network Interface Unit will dial up to three telephone numbers as configured with the Combustion System Manager® Software for personal computer. The sequence of telephone numbers is based on a user-programmed dial-out sequence.
   b. Telephone Numbers—A thirty-five character telephone number can be programmed using the Combustion System Manager™ personal computer software.

4. Date and Time Stamp—The Network Interface Unit provides a date and time indication stamp of BCS 7700 or 7800 SERIES fault. The date and time stamp is organized by month : day : year and hours : minutes. The time stamp is a twenty-four hour clock; eg, 18:00 is 6:00 PM.

5. Local (RS-232C) Port Configuration—The local RS-232C port is configurable for either a personal computer interface or an ASCII device (printer). If configured for a personal computer, the Network Interface Unit transmits data through the interface with the Combustion System Manager™ Software. When configured for an ASCII device, data is transmitted in an ASCII character string.

NOTE: Pressing the Local Only switch for more than nine seconds (the Local Only LED flashes once) causes the local port to be reconfigured for a personal computer.

The 25-pin RS-232C port of the Network Interface Unit is physically configured to support a personal computer. Depending on the cable type, leadwires (lines 2 and 3) of the RS-232 interface cabling may require switching. This can also be accomplished with a null modem adaptor.
Modem Initialization Description

The Q7700 modem interface can be used with most types of Hayes compatible modems (Hayes is a registered trademark of Hayes Microcomputer Products, Inc.). Below is a summary of the characteristics required of the modem. In modern modems, these characteristics typically are programmable and the default factory-configuration may not be correct; then the Q7700’s modem initialization string can be used to command the required configuration. Another alternative is to use the modem’s independent ability to store (and recall on power-up) a particular configuration and to send the desired configuration commands via an ASCII terminal or PC telecommunication software that emulates an ASCII terminal. Both of these alternatives require the operator to understand the modem command language.

The Q7700 contains both a built-in modem initialization string and a user-programmable modem initialization string. Whenever the modem port is reset, the built-in string is sent first, followed by the programmable string; thus, the programmable string can override the built-in string.

The built-in modem initialization string is:

```
ATVXES7=60S2=255
```

Which breaks down into the following modem commands:

1. T—Attention, the prefix for all commands.
2. V—Use numeric result codes.
3. X—Ignore dial tone, send CONNECT when connected.
4. E—Inhibit command echo.
5. S7=60—Wait 60 seconds for carrier.

The modem interface uses the five modem control signals described below. In this description, “on” refers to the asserted condition and “off” refers to the unasserted condition of the signal. Because these signals are all active-low, the “on” condition is a more negative voltage than the “off” condition, as specified by the RS-232 standard.

- **DTR**—Data Terminal Ready (output from Q7700).
- **RTS**—Ready To Send (output from Q7700).
- **DSR**—Data Set Ready (input to Q7700).
- **CTS**—Clear To Send (input to Q7700).
- **CD**—Carrier Detect (input to Q7700).

DTR is turned on by the Q7700 when it is ready to interact with a modem, and is turned off whenever it is not ready. The Q7700 also turns off DTR to indicate that the modem should hang up when the Q7700 completes a phone call that it initiated.

RTS is turned on by the Q7700 when it is ready to interact with a modem, and is turned off whenever it is not ready. During the process of resetting the modem port, the RTS signal is actually turned on before the DTR is turned on, but can be ignored during this time. In fact, because the RTS signal is not used by the Q7700 to control the flow of data that it receives (it can keep up with data that it receives at up to 19,200 baud) and since the ready/not-ready indication is also provided by DTR, the RTS signal can be ignored by the modem.

Normally, the DSR signal from the modem should either be turned on and off in response to DTR, or it should be on continuously whenever the modem is connected. However, the Q7700 also operates normally if the DSR signal is continuously off and never turned on. The Q7700 detects only transitions of DSR from on to off, and when this event is detected, it responds by performing the modem port reset process.

The CTS signal can be turned on and off in response to RTS or DTR, or it can be continuously on whenever the modem is connected.

**NOTE:** The hardware design supports the modem’s use of this line to perform active control of data flow from the Q7700 to the modem. If it is turned off, the Q7700 transmitter is turned off, and turning it on allows data to flow from the Q7700.

CD must be turned on by the modem to indicate that the modem has established a carrier with the modem at the other end of the telephone line. When the PC/modem at the other end hangs up, the modem connected to the Q7700 must turn off CD to indicate that the call was terminated.
Modem Port Reset

Events that cause a modem port reset are:

1. power-up,
2. pressing the Q7700 reset button,
3. holding the Q7700 Local/Remote button for more than 9 seconds,
4. Modem changes its Data Set Ready (DSR) signal from on to off,
5. Completion of a received phone call (remote PC hangs up),
6. Completion of a dial-out phone call (Q7700 completes sending),
7. writing a new value to one of the parameters:
   a. number of rings before answering.
   b. pulse or tone dial.
   c. modem initialization string.
   d. dial-out site information.
   e. password for local connections.
   f. type of device connected to the local port.
   g. local or modem port baud rate.
   h. password for outside connections.
   i. site name for reporting faults.

The following procedures describe the modem port reset process:

1. Q7700 turns off RTS and DTR.
2. Q7700 turns on RTS.
3. Q7700 waits two seconds.
4. Q7700 turns on DTR.
5. Modem turns on CTS and DSR (unless already on).
6. Q7700 begins to monitor CTS and DSR for the on condition.
7. Q7700 sends ATZ, which commands the modem to reload its stored configuration.
8. Modem sends OK (within five seconds after ATZ).
9. Q7700 sends the built-in initialization string, which includes a command for the modem to use numeric codes.
10. Modem sends the OK numeric code 0 (within five seconds).
11. If the programmable modem initialization string is not null, the Q7700 sends it.
12. Modem sends the OK numeric code 0 (within five seconds).

The modem port now waits for one of two conditions to occur: either an incoming call is received, or the Q7700 decides to make a call.

1. If the modem receives an incoming call:
   a. Each time the phone rings the modem sends the RING numeric code “2” that indicates the phone is ringing.
   b. When the Q7700 detects the right number of rings (according to its programmable “number of rings before answering” parameter) it sends the command “ATA” to command the modem to answer.
   c. The modem answers the call and, assuming that it establishes a connection with a remote modem, the modem connected to the Q7700 turns on its CD signal and sends the CONNECT numeric code “1”.
   d. The Q7700 communicates with the remote PC until the remote PC hangs up and the modem connected to the Q7700 turns off either the CD signal or the DSR signal.
   e. The Q7700 does a modem port reset, starting with step 1.
2. If the Q7700 makes an outgoing call, it performs the following steps:
   a. Q7700 sends a command to cause the modem to dial a number using either tone or pulse dialing, depending on the Q7700’s programmable pulse or tone parameter. The command to dial using tones is ATDT... and the pulse dial command is ATDP..., where ... represents the phone number.
   b. Assuming a remote modem answers the call and a connection is established, the modem connected to the Q7700 turns on its CD signal and sends a the CONNECT numeric code “1”.
   c. The Q7700 communicates with the remote PC or printer until it is done, then
   d. The Q7700 does a modem port reset, starting with step 1 above.

Point Write Control

The Network Interface Unit receives a password from the personal computer software. With successful receipt of the password, the Network Interface Unit allows points to be changed with write privileges; otherwise, points can be read but not changed.

Clock/Calendar

The Network Interface Unit provides a capacitor-backed time clock/calendar. The Network Interface Unit provides a date and time stamp of fault messages received. If power is lost, the time clock/calendar retains its date and time for up to four days.
Local Operations (25-pin RS-232C Serial Communications)

The Network Interface Unit local port provides communication with personal computers for intrabuilding or boiler room communications. Local communication is accomplished via the 25-pin RS-232C connector. RS-232C is an electronic standard for interfacing serial data transmissions. The local port transmits data at a selectable baud rate, programmed for ASCII devices. For a personal computer connected to the local site, the Network Interface Unit communicates at a selectable baud rate.

NOTE: The local RS-232C port is configurable for either a personal computer interface or an ASCII device (printer). When configured for a personal computer, the Network Interface Unit transmits data through interface with the Combustion System Manager® Software. When configured for an ASCII device, data is transmitted in an ASCII character string. The 25-pin RS-232C port of the Network Interface Unit is physically configured to support a personal computer. Depending on the cable type, leadwires (lines 2 and 3) of the RS-232 interface cabling can require switching. This can be accomplished with a null modem adaptor.

Fault Dial-Out Sequence

The Network Interface Unit supports up to three telephone numbers for automatic dial-out on BCS 7700 or 7800 SERIES Alarms. The Network Interface Unit dials three numbers and begins dial-out at the end of a programmed delay period. Dial-out is discontinued when a successful connection is made to a remote location or when no successful connection is made after 32 attempts (approximately eight hours). See Table 1.

<table>
<thead>
<tr>
<th>Dial-out Sequence Phone Number</th>
<th>Initial Dial-out Delay</th>
<th>Dial-out Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to three.</td>
<td>0 to 120 minutes</td>
<td>1. Disabled. 2. Until call is answered by any remote location. 3. Until call is answered by remote location No. 1, No. 2, or No. 3. 4. Until there are no active faults or after 32 dial-out attempts.</td>
</tr>
</tbody>
</table>

Status Interrogation

The Network Interface Unit permits on-line interrogation of the Network Interface Unit, BCS 7700 and 7800 SERIES status. Status can be viewed by selecting points and reading or by selecting user predefined groups for each location and reading them.

Data Logging

The Network Interface Unit supports on-line data logging from the local (RS-232C) port or remote (9-pin RS-232 format) connector of predefined groups.

LOCAL ONLY Switch (See Fig. 8)

The Network Interface Unit allows overriding of dial-out on BCS 7700 or 7800 SERIES Alarms. The LOCAL ONLY switch toggles the Network Interface Unit from a Local and Remote fault reporting mode to a Local Only RS-232C port reporting mode. If a BCS 7700 or 7800 SERIES Alarm exists for more than 30 minutes, the Network Interface Unit overrides the LOCAL ONLY switch and auto-dials based on the user programmed dial-out sequence. The LOCAL ONLY switch is bypassed if it remains in the Local Only mode for eight hours.

NOTE: If the LOCAL ONLY switch is pressed for more than nine seconds, all of the Network Interface Unit parameters are reverted back to the factory-configured default state.

RESET Switch (See Fig. 8)

The Network Interface Unit RESET Switch terminates all Network Interface Unit activity. The RESET switch is used to clear Network Interface Unit activity during system troubleshooting.

Status Indicators (See Fig. 8)

Power ON-OFF

POWER LED is energized when the Network Interface Unit is powered.

Local Only

LOCAL ONLY LED is energized whenever the Remote reporting of BCS 7700 or 7800 SERIES alarms are bypassed.

Ready

READY LED is pulsed when the Network Interface Unit is operating correctly. When the READY LED is on or off constantly, an internal Network Interface Unit fault occurred.

Typical Applications

Generally, the Network Interface Unit is used in six basic configurations: local communication (Fig. 9), remote communication (Fig. 10), local and remote communication (Fig. 11), multiple BCS 7700 or 7800 SERIES installed (Fig. 12). Local communication is used for on-site equipment monitoring and data logging. Data logging can be accomplished remotely, but telephone line access is required and phone rates can make this expensive. Remote telecommunication is normally used for remote and automatic fault annunciation. If there is a fault occurrence, the Network Interface Unit automatically dials up remote reporting locations and provides indication of the fault via the Combustion System Manager® Software for personal computer.
Fig. 8. Network Interface Unit.

CHECKOUT

1. With power applied, make sure the READY LED flashes.
2. If the READY LED does not flash, reset the Network Interface Unit with the RESET switch.

IMPORTANT
If equipment malfunctions, direct all inquiries to the local BCS 7700 OR 7800 SERIES System distributor, or Honeywell Inc., 1985 Douglas Drive North, Golden Valley, Minnesota 55422, or Honeywell Limited, 35 Dynamic Drive, Scarborough, Ontario, Canada M1V 4Z9.
Fig. 9. Single BCS 7700, 7800 SERIES (single and multi-dropped), local Combustion System Manager® communications.
Fig. 10. Single BCS 7700 and 7800 SERIES (single and multi-dropped), remote Combustion System Manager® communications.
Fig. 11. Single BCS 7700 and 7800 SERIES (single and multi-dropped), local and remote Combustion System Manager® communications.
Fig. 12. Multiple BCS 7700 and 7800 SERIES (single and multi-dropped) communications.

NOTE: ANY COMBINATION OF THE ABOVE DEVICES IS POSSIBLE. UP TO A MAXIMUM OF SIX CONTROLBUS™ MODULE CONNECTIONS ARE ALLOWED.

COULD BE MULTI-DROPPED 7800 SERIES USING QS7800B CONTROLBUS™ MODULE WITH S7810B MULTI-DROP SWITCH.