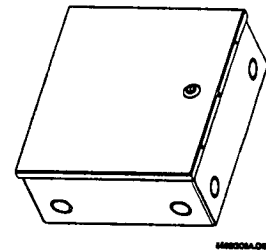


SuperBus® 2000 Analog Addressable Smoke Loop Module

Document Number: 466-1410 Rev. B
June 2000



Installation Instructions

Product Summary

The ITI® SuperBus® 2000 Analog Addressable Smoke Loop Module increases Advent® Fire panel capabilities to include the following smoke sensors and input modules listed in Table 1.

Table 1. Compatible Sensors and Modules

Compatible Sensors	Compatible Modules
System Sensor® 2251 and 2251T Photoelectric Smoke Sensor	System Sensor M5000M Monitor Module
System Sensor 1251 and 1251 A Ionization Sensor	System Sensor M500X Fault Isolator Module
System Sensor 3251 Photo and Ion Smoke Sensor	System Sensor MC500CH Control Module
System Sensor 5551 Temperature (Heat) Sensor	

The smoke loop module provides a Class B (style 4), Class A (style 6), or Class A (style 7) Signaling Line Circuit (SLC) with a 198 device capacity (up to 99 detectors and 99 input modules). Input modules can be configured with Class A (style D) initiating device circuits.

Ion, photo, thermal, and combination sensor types are supported as well as both monitor and control type input modules.

Power for the module is provided by the Advent panel or the 24V Smoke Loop Snapcard.

Features

- Up to 16 pre-defined sensor environment sensitivity settings (see Table 5).
- Automatic sensor/module type detection and automatic address detection and fault discrimination.
- Specific sensor type and condition maintenance/trouble reports.
- Smoke sensor smoke/no smoke differentiation.

- Advanced analog signal processing for reliable communications.
- Automatic sensor signal drift compensation.
- Automatic sensor alarm test.
- Sensor LED blink control for theater, sleeping area, and other locations.
- SuperBus 2000 automatic addressing panel data bus.

Figure 1 shows the main module components and Table 2 describes them.

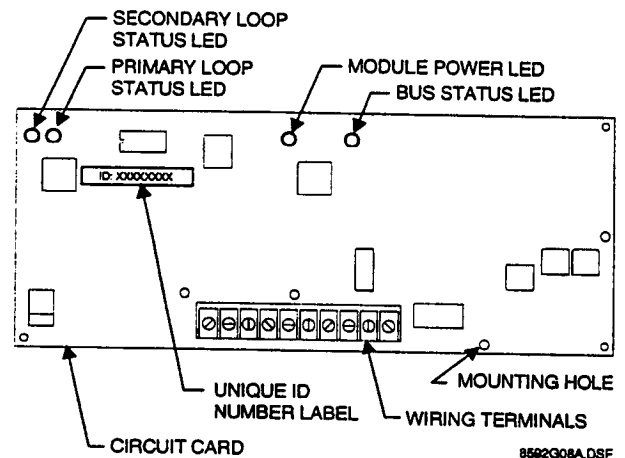


Figure 1. Module Circuit Board Components

Table 2. Module Component Descriptions

Component	Function
Secondary Transmit LED	Indicates secondary loop transmission and trouble.
Primary Transmit LED	Indicates primary loop transmission and trouble.
Module Power LED	Indicates module power status.
Bus Status LED	Flashes to indicate normal communication with the panel bus.

Table 2. Module Component Descriptions (continued)

Component	Function
Unique ID Number Label	Identifies modules unique identification number.
Wiring Terminals	Used for panel SuperBus and module input loop connections.

Table 3. Maximum Wire Length Recommendations (continued)

Total Device Current Draw (A)	22 Gauge (AWG)	18 Gauge (AWG)	16 Gauge (AWG)	14 Gauge (AWG)
1.6	20	49	78	123
1.7	18	46	73	116
1.8	17	44	69	108
1.9	16	41	66	104
2.0	15	39	63	99
2.1	14.5	37	60	94
2.2	14	36	57	90
2.3	13.5	34	54	86
2.4	13	33	52	82
2.5	12.5	32	50	79
2.6	12	30	48	76
2.7	11.5	29	46	73
2.8	11	28	45	70
2.9	10.5	27	43	68
3.0	10	26	42	66

Installation Guidelines

- Each analog addressable sensor or module must be set to a unique non-zero address.
- Maximum module current draw is 700 mA. Do not exceed total output power for the for the power supplying device.
- Use 4-conductor, 18-gauge or larger stranded wire.

Table 3 lists the maximum wire length for various wire gauges.

Table 3. Maximum Wire Length Recommendations

Total Device Current Draw (A)	22 Gauge (AWG)	18 Gauge (AWG)	16 Gauge (AWG)	14 Gauge (AWG)
0.1	308	781	1,243	1,968
0.2	154	391	622	984
0.3	103	261	415	657
0.4	77	196	311	491
0.5	62	157	250	396
0.6	52	131	208	329
0.7	44	112	178	282
0.8	39	98	156	246
0.9	35	87	139	219
1.0	31	78	125	197
1.1	28	71	113	179
1.2	27	65	104	165
1.3	24	60	96	152
1.4	22	56	89	141
1.5	21	52	83	132

Tools and Supplies Needed

- Screwdriver
- 3/8-inch self-tapping screws (included)
- Wall anchors where needed (included)
- #6 panhead screws (included)
- Drill and bits for screws and/or anchors
- Case tamper switch (optional)

Installation

The module is wall surface mounted.



CAUTION

You must be free of static electricity before handling circuit boards. Wear a grounding strap or touch a base metal surface to discharge static electricity.

To mount the module on a wall:

1. Turn off panel power and disconnect backup battery(s).

2. Remove the enclosure cover and set it aside.
3. Remove the enclosure contents.
4. Place the enclosure on the wall and mark the four mounting hole locations.
5. Drill holes in the wall and insert the appropriate anchors.
6. Remove the wiring knockouts as necessary.
7. Secure the enclosure to the wall/anchors with panhead screws.

To mount the card onto the enclosure:

1. Snap the three plastic standoffs (included in the accessory kit) into the back of the circuit card as shown in Figure 2.

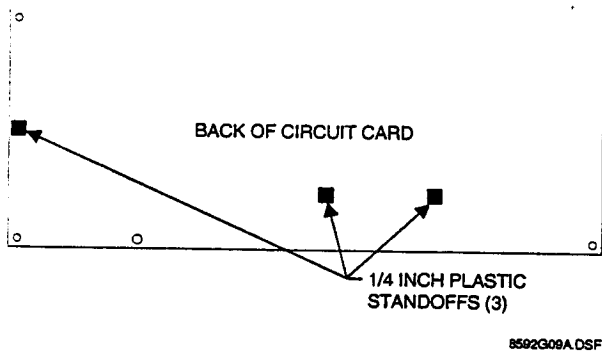


Figure 2. Installing the Board Standoffs

2. With the terminal strip up, slide the card into the three card slots in the left side of the enclosure as shown in Figure 3.
3. Secure the card to the enclosure with the included button-head machine screw.

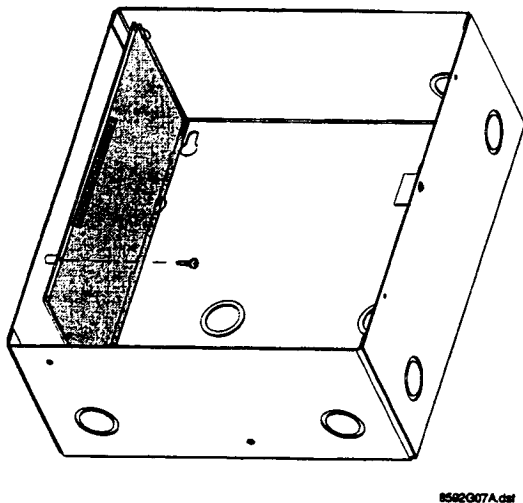


Figure 3. Installing the Card to the Enclosure

Installing a Case Tamper Switch

If the SuperBus module is visible and accessible location, you may want to add case tamper detection by installing a listed tamper in the enclosure and wiring the switch to one of the panel zone inputs. Then, if someone opens the cover, the switch opens and causes an alarm.

Setting the Analog Addressable Input Module/Sensor Address Switches

Refer to the addressable device *Installation Instructions* for setting the device address switches. Make sure that no devices are set to address "zero" and that no devices wired to the same loop have the same address setting. See Figure 4 for suggested device addressing. If needed, these suggestions will significantly aid in troubleshooting.

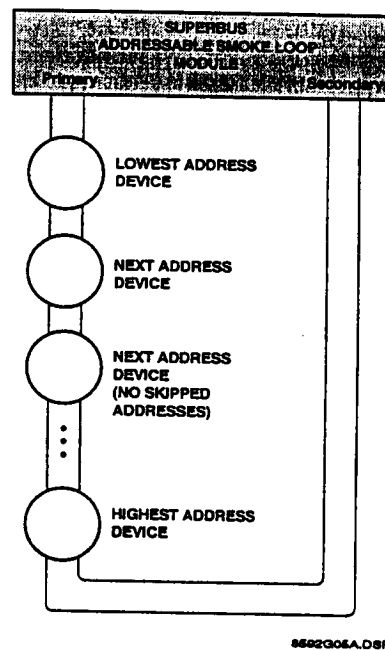


Figure 4. Suggested Addressing

Advent Panel Wiring

This section describes how to wire the module to the Advent panel and how to connect hardwire sensors to the module. Figure 5 demonstrates Class B/Style 4 wiring; Figure 6 demonstrates Class A/Style 6 wiring; Figure 7 demonstrates Class A/Style 7 wiring (with fault isolator modules); Figure 8 demonstrates Class A/Style D wiring for an initiating device circuit (with a monitor module).

To wire the module to the panel:

1. Turn off power to the panel.

2. Disconnect the panel power transformer and backup battery(s).
3. Wire the module to the panel SuperBus wiring harness as shown in Figure 5.
4. Plug the wiring harness into either panel SuperBus connector.

To connect a device to the module (Class B/Style 4):

Connect smoke loop devices to the primary loops as shown in Figure 5.

To connect a device to the module (Class A/Style 6):

Connect smoke loop devices to the primary and secondary loops as shown in Figure 6.

To connect a device to the module using M500X fault isolator modules (Class A/Style 7):

1. Connect the device to the M500x fault isolator module using the primary and secondary loops as shown in Figure 7.
2. Secure the fault isolator module to the electrical box.

Note

In general, up to 25 addressable devices may be grouped between isolator modules. However, be aware that one System Sensor 3251 is equivalent to 12 addressable devices. For example, thirteen 2251 modules may be grouped between two isolator modules.

To wire an initiating device circuit using a M500M monitor module (Class A/Style D):

1. Connect the initiating device circuit to the M500M monitor module as shown in Figure 8.
2. Secure the monitor module to the electrical box.

Power Up and Bus Communication

This section describes how to power up the panel and the module and get them communicating with each other.

To power up the Advent panel and the module:

1. Verify that all wiring between the panel, touchpad, and module is correct.
2. Connect the panel battery and plug in the panel transformer. Alphanumeric touchpad displays should come on.

Note

If this is the first time the panel is powered up, the panel automatically adds (learns) the unit number of all bus devices when power is first applied. Continue with Step 8.

3. Press **8** for the *System Menu*.
4. Press **0** for the *Program Menu*.
5. Enter your access code (default is **0123**).

6. Enter item number **48001** to add (learn) SuperBus devices.
7. Press ***** to return to the *Main Menu*.
8. The green Power LED on the module should be on and the red Bus Status LED should flash to indicate successful communication with the panel. The module will begin its three minute loop initialization period:

The red Secondary Transmit LED should turn on for three seconds and off for three seconds for the first minute of initialization.

Both green Primary and red Secondary Transmit LEDs will then flash rapidly for 2 minutes to indicate System Sensor type addressable device (if any) initialization.

The green Primary Transmit LED will then continue to flash rapidly indicating normal primary port scan operation.

After scan is complete "new analog head" will be displayed on the keypad. Smoke detectors are now ready to be learned in.

If a loop short is detected, the red or green Transmit LED will stay steady on or off.

Note

If the green power LED is not on or the red bus status LED does not flash, turn off the panel power and verify that the SuperBus wiring is correct.

Programming/Operating the Module

Refer to Table 2 and the panel *Installation Instructions* for module and smoke loop input programming and operation.

Testing

To test the SuperBus module:

1. Verify that all wiring at the panel and the module is correct.
2. Connect panel AC transformer and backup battery.
3. Refer to the panel and sensor documentation for proper module and sensor testing.

Troubleshooting

Module green power status LED stays off.

Check module and panel power wiring.

Module red Bus Status LED stays off.

1. Check SuperBus wiring and connections.
2. Check panel/module/input programming.

Module red Bus status LED does not flash.

1. Re-initialize the module by turning panel power off and on.
2. Check panel/module/input programming.
3. Module circuit failure. Replace the module.

Module red Bus status LED blinks, but no sensor detection.

1. Panel and module are communicating correctly via the SuperBus.
2. Check panel/module/input programming.
3. Check for addressable sensor/module address conflicts.
4. Check module and sensor cables and connections.

Module Primary Transmit LED blinks, but no sensor detection.

1. Module and loop sensors are not communicating correctly.

2. Check module/input programming.
3. Check for addressable sensor/module address conflicts.
4. Check module and sensor cables and connections.

Module red Secondary Transmit LED blinks.

1. There is a break (open circuit) in the primary loop.
2. Check module/input device primary loop wiring.

Module green Primary and red Secondary Transmit LEDs stay on or off.

1. There is a short circuit in the loop.
2. Check module/input device loop wiring.

Addressable device LED does not flash.

1. Device is misaddressed, defaulted, or programmed not to blink.
2. Check device address setting or module blink programming.

Table 4. Analog Addressable Smoke Loop Trouble Codes

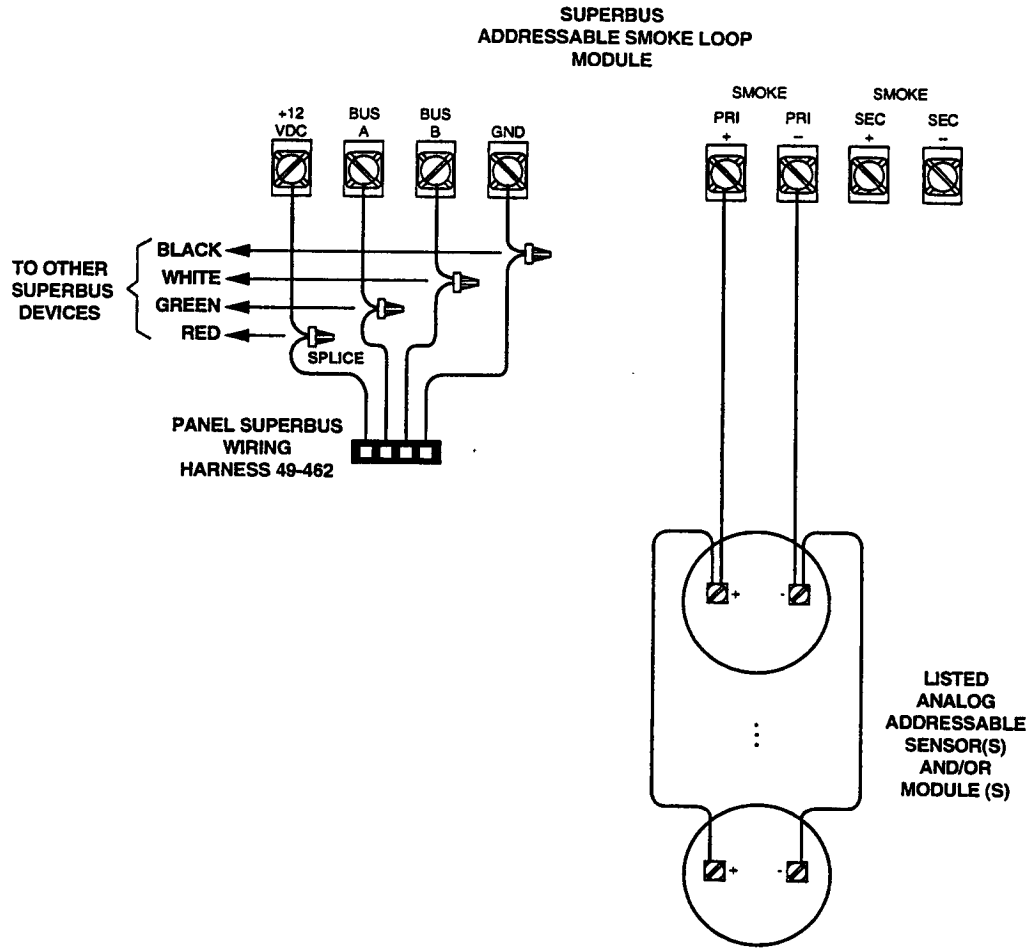
Code	Name	Description
1	EOL Resistor Shorted	This is the "alarm" state for the input zone of module (EOL resistor shorted). It also applies to virtual addresses that report Group Alarms
2	EOL Resistor Missing	Only applicable to modules. This is the "third" state for an input zone of a module. As the name implies, the circuit is open and the EOL resistor is not sensed.
16	Device at Address 0	A device is responding at the factory preset address. This indicates the installer has neglected to set one or more device addresses.
17	Address Conflict	Two or more devices share the same address.
18	Protocol Incorrect	If this trouble code occurs on initial start-up, it is a sign the installed sensor is O.E.M.-branded and is not compatible with this system. If the trouble code occurs after the system has been operating successfully, it is a sign the sensor/module is malfunctioning. An error in either PW1 and or PW3 can cause this condition
19	Inappropriate Sensitivity	This code applies only to optical-type sensors. This trouble code is returned if the background environment of the sensor is too "dirty" for the sensitivity setting selected. The user should select a less sensitive setting to minimize false alarms.
20	Device Type Altered	This code applies only to sensors. If the device type found at start-up differs from the device type found later, this trouble code is generated. If, after cleaning, the wrong sensor type is re-installed, the algorithm could generate false results.
34	Service Now	This trouble code applies to opticals and ions. The sensor has drifted so much that proper operation is compromised. The sensor should be cleaned.
35	Service Low Chamber	This trouble code applies only to optical-type sensors. This code is returned if the test PW4 of the sensor is less than a prescribed value. The sensor should be cleaned.
36	Service High Chamber	This trouble code applies only to optical-type sensors. This code is returned if the test PW4 of the sensor is greater than a prescribed value. The sensor should be cleaned.

Table 4. Analog Addressable Smoke Loop Trouble Codes (continued)

Code	Name	Description
48	Communication Failure	If the AALM is unable to communicate with one or more previously recognized analog addressable devices, a "communications failure" is signaled. This trouble code may be induced by removing a smoke sensor from its base. Also, this code can mean that a filterex device is dirty.
65	Malfunctioning Sensor Disable	The sensor must be replaced. After the sensor is replaced, the module must be power-cycled or the sensor renewed bit (in user bits) must be set.

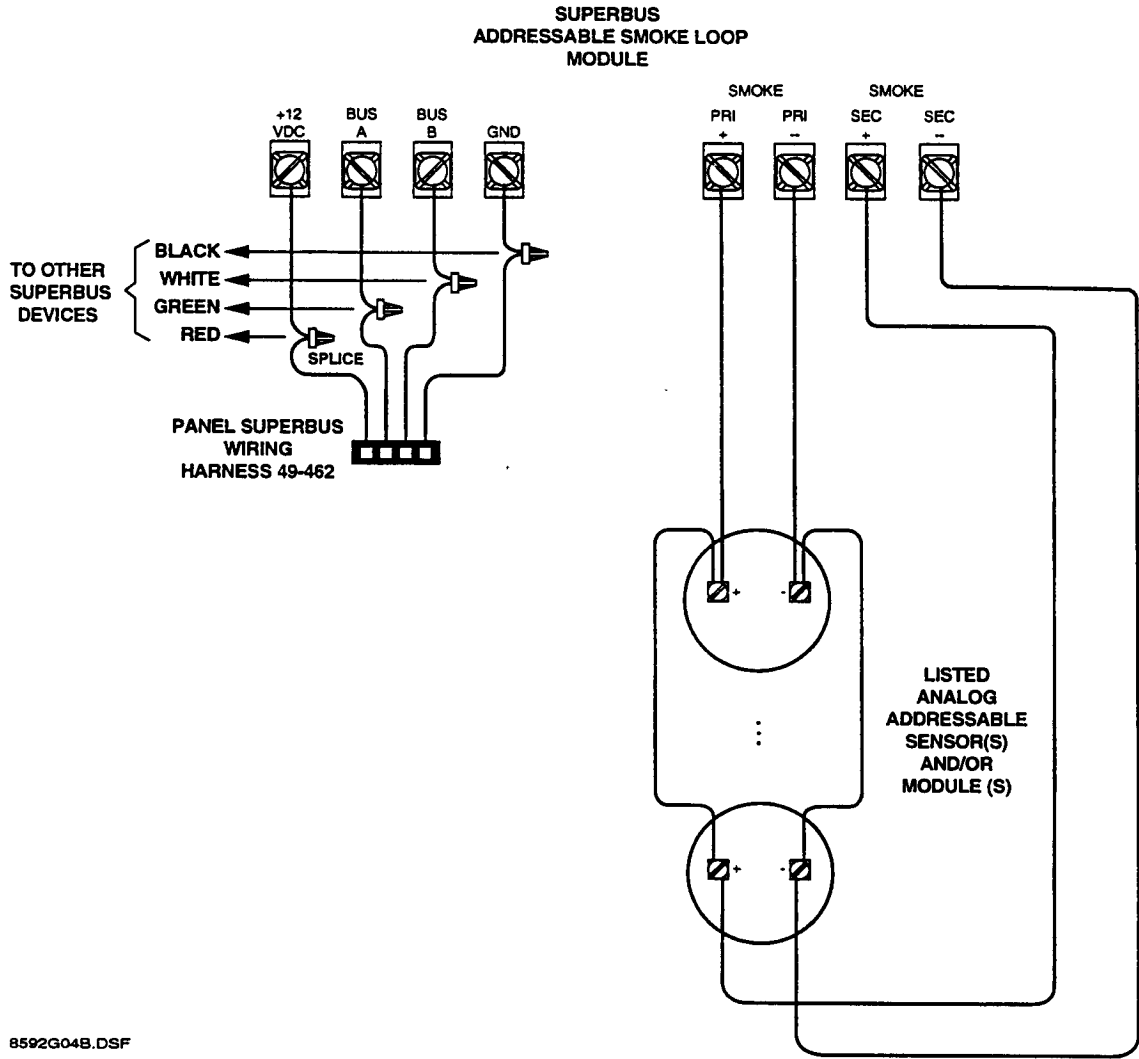
Table 5. Smoke Sensor Sensitivity Level Settings

Set Level	Obscuration Level	Ion Type Sensor	Photo Type Sensor	Combination Type Sensor	Typical Environment
0	0.10	Not allowed	Not Allowed	Not allowed	Extremely Clean "Clean-Room"
1	0.20	With 90 day test approval only.			:
2	0.40				:
3	0.56	OK			:
4	0.61	OK			:
5	0.80	OK	OK	OK	:
6	1.00	OK	OK	Not Allowed	Typical Non-smoking
7	1.20	OK	OK		Typical Smoking
8	1.33	OK	OK		:
9	1.50	Not allowed	OK	OK	Manufacturing
10	1.75		OK	Not Allowed	:
11	2.00		OK		Kitchen
12	2.20		OK	OK	:
13	2.50		OK	Not Allowed	:
14	2.90		OK	OK	:
15	3.60		OK	OK	OK



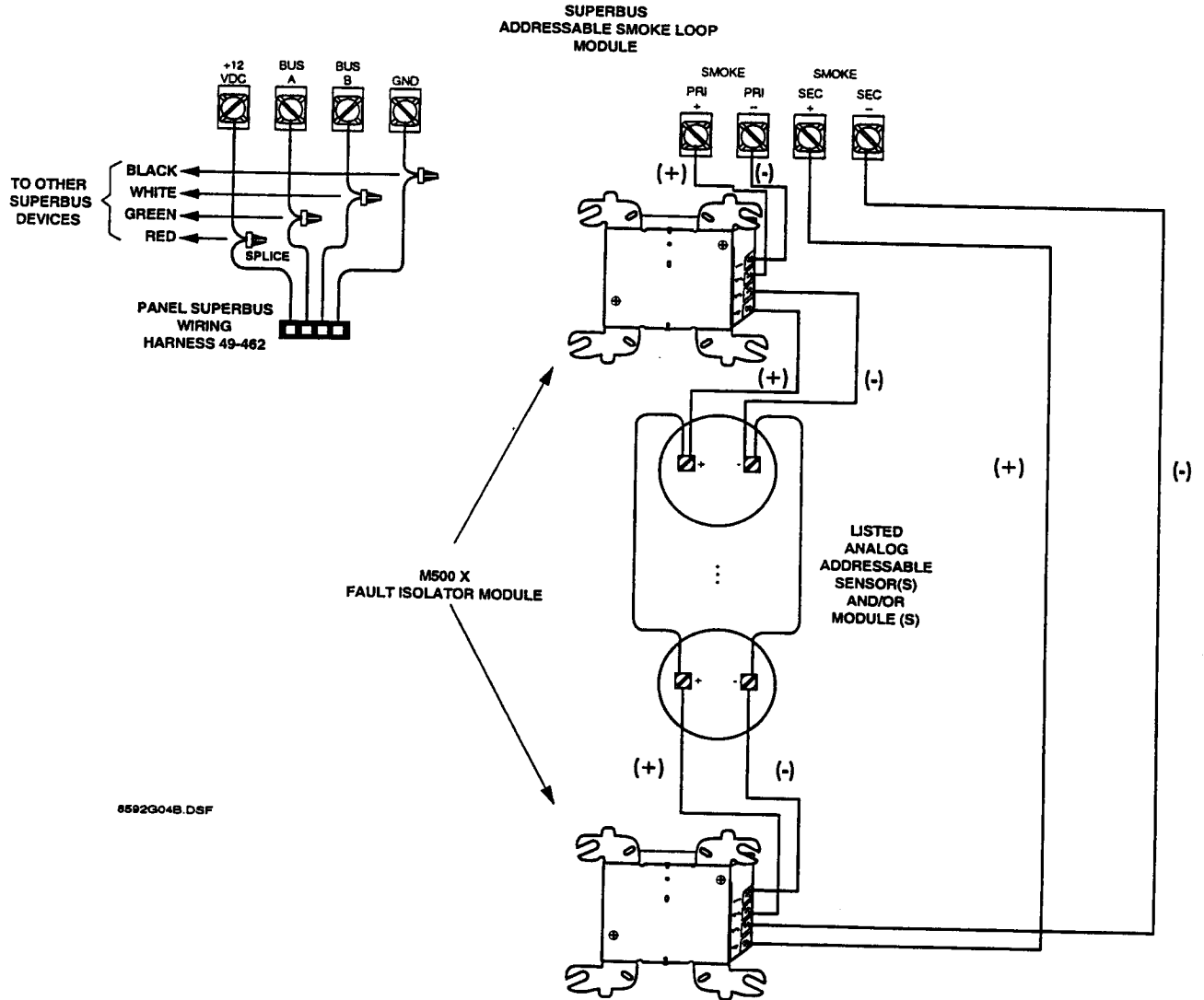
6592G04B.DSF

Figure 5. Connecting the Device to the Module Using Class B/Style 4 Wiring



8592G04B.DSF

Figure 6. Connecting the Device to the Module Using Class A/Style 6 Wiring



8592G04B.DSF

In general, up to 25 addressable devices may be grouped between isolator modules. However, for the purposes of determining the number of devices between these modules, one System Sensor 3251 is equivalent to 12 addressable devices. For example, thirteen 2251s and one 3251 may be grouped between two isolator modules.

Figure 7. Connecting Fault Isolator Modules to the Device Using Class A/Style 7 Wiring

ADDRESSABLE SMOKE LOOP
MODULE

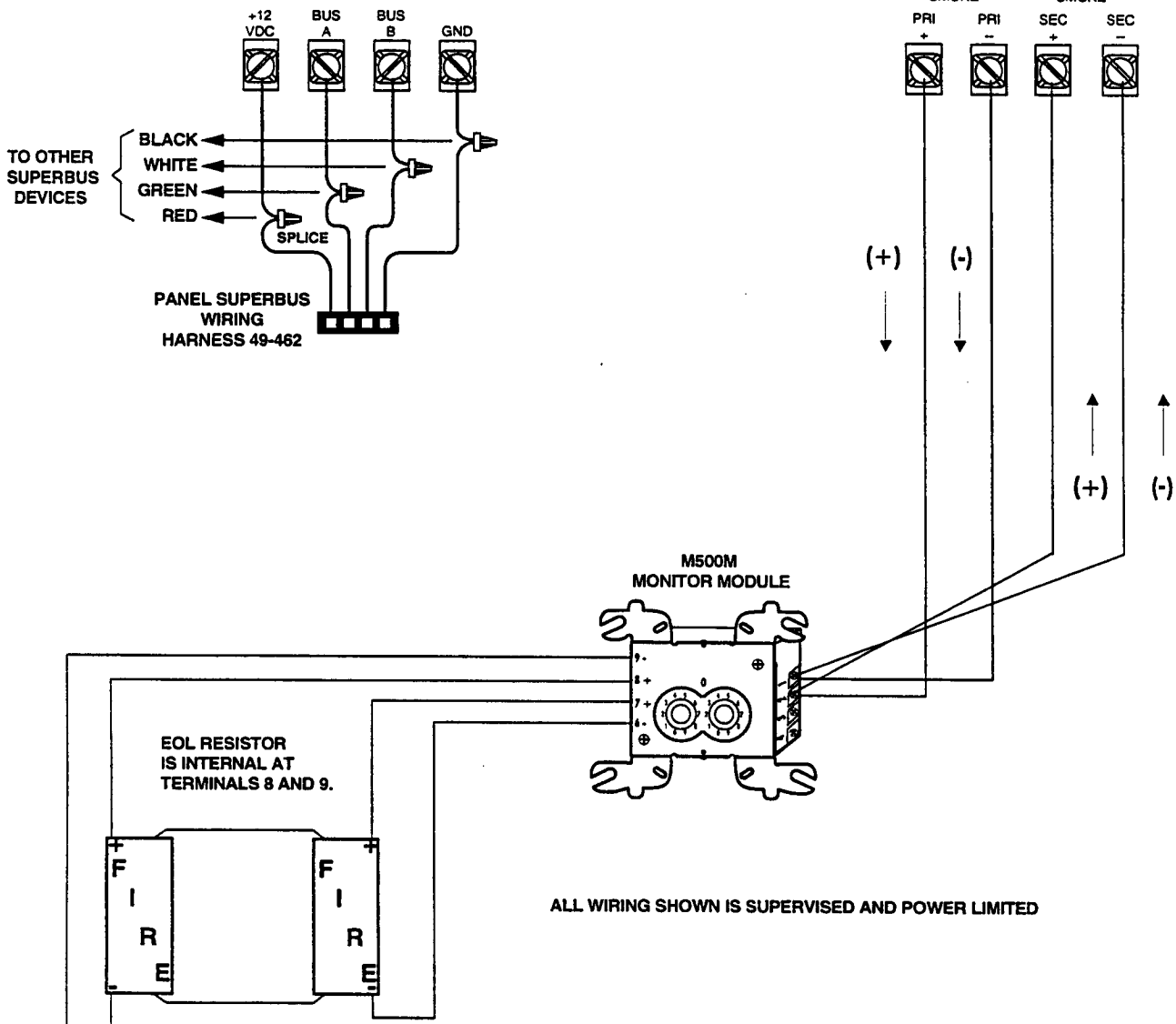


Figure 8. Connecting an Initiating Device Circuit to a Monitor Module Using Class A, Style D Wiring

Specifications

Compatibility: Advent (and Custom Versions) Fire/security panels. System Sensor 2251, 2251 T, 1251, 1251 A, 3251, and 5551 smoke sensors; M500M monitor module, M500X fault isolator module, and M500CH control module; B210 LP plug-in detector base, B501 plug-in detector base, and B524BI/B224BI plug-in isolator detector bases.

Power Requirements: 8.5 to 28 VDC (12-24 VDC nominal), 350 mA maximum (from panel).

Panel Data Bus: ITI SuperBus 2000, auto addressing digital data bus.

Module/Smoke Loop Inputs: One Style 4, 6, or 7 Signaling Line Circuit (SLC) with a 198 device capacity (up to 99 devices and 99 modules). Automatic "Style D" primary/secondary loop fault detection and switching.

Smoke Sensor Types: ion, photo, thermal, laser, and combination sensor types.

Sensitivity Settings: 16 settings ranging from 0.1 to 3.6% per foot obscuration level.

Input Module Types: monitor and control module types.

Storage Temperature: -30° to 140° F (-34° to 60° C).

Operating Temperature: 32° to 120° F (0° to 49° C).

Maximum Humidity: 90% relative humidity, noncondensing.

Approvals/Listings:

FCC Part 15

UL 864 for Commercial Fire Warnings (applied for)

ULC Canada Commercial Fire/Burglary Warning System (applied for)

CSFM California State Fire Marshall (applied for)

DOD Sensitive Compartment Information Fac. (applied for)

FM Factory Mutual (applied for)

MEA New York City Material Equipment Acceptance (applied for)

Complies with: NFPA 72 for National Fire Alarm Code.

Dimensions: 11.25" x 10" x 4.63" (H x W x D).

Case Material: 16 Gauge steel.

Case Color: "Fire" red powder-coated finish.

Mounting: Wall surface mounting.

Notices

This device complies with FCC Rules Parts 15 and 68. Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference that may be received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by Interactive Technologies, Inc. can void the user's authority to operate the equipment.



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WIRELESS

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