



by Honeywell



NetSOLO[®] Broadband Network Emergency Voice Evacuation System Installation/Operation Manual

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Important Limitations

While a fire alarm system may lower insurance rates, it is not a substitute for fire insurance!

An automatic fire alarm system- typically made up of smoke detectors, heat detectors, manual pull stations, audible warning devices, and a fire alarm control panel with remote notification capability - can provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

The Manufacturer recommends that smoke and/or heat detectors be located throughout a protected premise following the recommendations of the current edition of the National Fire Protection Association, Standard 72 (NFPA 72), manufacturer's recommendations, State and local codes, and the recommendations contained in the Guide for Proper Use of System Smoke Detectors, which are made available at no charge to all installing dealers. These documents can be found at <http://www.systemsensor.co/html/applct.html>. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off in as many as 35% of all fires. While fire alarm systems are designed to provide early warning against fire, they do not guarantee warning or protection against fire. A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons.

Smoke Detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in or behind walls, on roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second-floor detector, for example, may not sense a first-floor or basement fire.

Particles of combustion or "smoke" from a developing fire may not reach the sensing chambers of smoke detectors because:

- Barriers such as closed or partially closed doors, walls, or chimneys may inhibit particle or smoke flow.
- Smoke particles may become "cold," stratify, and not reach the ceiling or upper walls where detectors are located.
- Smoke particles may be blown away from detectors by air outlets.
- Smoke particles may be drawn into air returns before reaching the detector.

The amount of "smoke" present may be insufficient to alarm smoke detectors. Smoke detectors are designed to alarm at various levels of smoke density. If such density levels are not created by a developing fire at the location of detectors, the detectors will not go into alarm.

Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectronic sensing chambers tend to detect smoldering fires better than flaming fires, which have little visible smoke. Detectors that have ionizing-type sensing chambers tend to detect fast-flaming fires better than smoldering fires. Because fires develop in different ways and are often unpredictable in their growth, neither type of detector is necessarily best and a given type of detector may not provide adequate warning of a fire.

Smoke detectors cannot be expected to provide adequate warning of fires caused by arson, children playing with matches (especially in bedrooms), smoking in bed, and violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).

Heat detectors do not sense particles of combustion and alarm only when heat on their sensors increases at a predetermined rate or reaches a predetermined level. Rate-of-rise heat detectors may be subject to reduced sensitivity over time. For this reason, the rate-of-rise feature of each detector should be tested at least once per year by a qualified fire protection specialist. Heat detectors are designed to protect property, not life.

IMPORTANT! Smoke detectors must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, crippling its ability to report a fire.

Audible warning devices such as bells may not alert people if these devices are located on the other side of closed or partly open doors or are located on another floor of a building. Any warning device may fail to alert people with a disability or those who have recently consumed drugs, alcohol or medication. Please note that:

- Strobes can, under certain circumstances, cause seizures in people with conditions such as epilepsy.
- Studies have shown that certain people, even when they hear a fire alarm signal, do not respond or comprehend the meaning of the signal. It is the property owner's responsibility to conduct fire drills and other training exercise to make people aware of fire alarm signals and instruct them on the proper reaction to alarm signals.
- In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.

A fire alarm system will not operate without any electrical power. If AC power fails the system will operate from standby batteries only for a specified time and only if the batteries have been properly maintained and replaced regularly.

Equipment used in the system may not be technically compatible with the control panel. It is essential to use only equipment listed for service with your control panel.

Telephone lines needed to transmit alarm signals from a premise to a central monitoring station may be out of service or temporarily disabled. For added protection against telephone line failure, backup radio transmission systems are recommended.

The most common cause of fire alarm malfunction is inadequate maintenance. To keep the entire fire alarm system in excellent working order, ongoing maintenance is required per the manufacturer's recommendations, and UL and NFPA standards. At a minimum, the requirements of NFPA 72 shall be followed. Environments with large amounts of dust, dirt or high air velocity require more frequent maintenance. A maintenance agreement should be arranged through the local manufacturer's representative. Maintenance should be scheduled monthly.

Installation Precautions

Adherence to the following will aid in problem-free installation with long-term reliability:

WARNING - Several different sources of power can be connected to the fire alarm control panel. Disconnect all sources of power before servicing. Control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until manuals are read and understood.

CAUTION - System Re-acceptance Test after Software Changes: To ensure proper system operation, this product must be tested in accordance with NFPA 72 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring. All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

This system meets NFPA requirements for operation at 0-49° C/32-120° F and at a relative humidity 93% ± 2% RH (non-condensing) at 32° C ± 2° C (90° F ± 3° F). However, the useful life of the system's standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a normal room temperature of 15-27° C/60-80° F.

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment FACP operation and reliability depend upon proper installation.

Survivability

Per the National Fire Alarm Code, NFPA 72, all circuits necessary for the operation of the notification appliances shall be protected until they enter the evacuation signaling zone that they serve. Any of the following methods shall be considered acceptable as meeting these requirements:

- 1) A 2-hour rated cable or cable system
- 2) A 2-hour rated enclosure
- 3) Performance alternatives approved by Authority Having Jurisdiction (AHJ)

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning induced transients. Although no system is completely immune from lightning transients and interference, proper grounding will reduce susceptibility. Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes. Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Remove all electronic assemblies prior to any drilling, filing, reaming, or punching of the enclosure. When possible, make all cable entries from the sides or rear. Before making modifications, verify that they will not interfere with battery, transformer, or printed circuit board location.

Do not tighten screw terminals more than 9 in-lbs. Over-tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

This system contains static-sensitive components.

Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static suppressive packaging to protect electronic assemblies removed from the unit.

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FCC Warning

WARNING: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual may cause interference to radio communications. It has been tested and found to comply with the limits for Class A computing devices pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when devices are operating in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his or her own expense.

Canadian Requirements

This digital apparatus does not exceed the Class A limits for radiation noise emissions 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.

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Section 1: General Description

The NetSOLO[®] Broadband Networked fire alarm control panel and the NetSOLO[®] Broadband Emergency Voice Evacuation Systems are peer-to-peer, self-regenerating, token ring passing networks consisting of two (2) to sixty-four (64) nodes. The NetSOLO[®] System is of modular design. This design allows a wide range of configurations to provide four (4) basic sub-assemblies to form an integrated, distributed fire alarm system that can also include audio evacuation and fire command capability. The network communication conveys all fire alarm, audio evacuation, voice paging, and fire fighter communications over a single pair of wires or fiber-optic cable.

Wire can be run up to 3,000 feet between each node while fiber-optic cable can tolerate up to 8 dB loss between each node. A node can consist of the following:

- Model 7100 Series Fire Alarm Control Panel:

7100 Series

A 7100 Series Fire Alarm Panel can comprise the following sub-assemblies:

- an Intelligent Network Interface sub-assembly for unshielded, twisted-pair (INI-7100-UTP)
- a fiber-optic cable (INI-7100-FO)

For additional information, refer to the *7100 Series Fire Alarm Control Installation/Operation Manual P/N: 9000-0447*.

- An Intelligent Network Command Center (INCC) can comprise the following:
 - Intelligent Network Interface-Voice Gateway (INI-VGC) sub-assembly
 - one, (1) Network Graphic Annunciator (NGA)
 - one (1) to sixteen (16), fully programmable Addressable Switch sub-assemblies (ASM-16)
 - LED Driver sub-assemblies (ANU-48)
 - a microphone for paging and a telephone handset for fire fighter communications
(See “The INI-VGC-FO or INI-VGC-UTP” Section)
- An Intelligent Network Transponder (INX) can comprise the following:
 - Intelligent Network Interface-Voice Gateway (INI-VGX)
 - nine (9) amp power supply sub-assembly (PM-9/PM-9G)
 - one (1) to six (6) fully Programmable Addressable Switch sub-assemblies (ASM-16)
 - LED Driver sub-assemblies (ANU-48)
 - one (1) to four (4), AM-50 Series amplifiers, each amplifier providing either 25 V_{RMS} or 70.7 V_{RMS} audio output
(See “The INI-VGX-FO or INI-VGX-UTP” Section)

The NetSOLO[®] Broadband Emergency Voice Evacuation System is designed and tested to comply with the following:

- NFPA 13- Installation of Sprinkler Systems
- NFPA 16 Deluge Foam - Water Sprinkler Systems
- NFPA 72- National Fire Alarm Code
- NFPA 70- National Electrical Code
- NFPA 92A Smoke Control Systems Utilizing Barriers and Pressure Differences
- NFPA 101- Life Safety Code
- Americans with Disabilities Act (ADA)
- UL Standard 864, 9th Edition
- UL 1711 Standard for Amplifiers for Fire Protective Signaling Systems
- California State Fire Marshal
- New York City MEA

1.1 NetSOLO® Broadband Equipment

1.1.1 Intelligent Network Command Center (INCC)

The Command and Control Center is comprised of the following:

- one (1), INI-VGC-FO or INI-VGC-UTP
- one or more NGA Network Graphic Annunciators
- ANU-48 remote LED Driver or ASM-16 programmable switch sub-assemblies used for the speaker, telephone, and auxiliary control functions

Optional assemblies include a system voice paging microphone and fire fighter's handset.

1.1.2 Intelligent Network Transponder (INX or INX CAB-B)

The INX and the INX CAB-B cabinet enclosures house a distributed audio amplifier assembly comprised of the following:

- PM-9/PM-9G
- INI-VGX-FO or INI-VGX-UTP
- one (1) to four (4), AM-50 Series amplifiers (50 watt amplifiers)
 - three (3), main amplifiers maximum with one back-up amplifier, each amplifier providing either 25V_{RMS} or 70.7V_{RMS} audio output
- standby batteries up to 55 A/H capacity (with an external battery cabinet)



NOTE: The cabinet will accommodate batteries up to 12 A/H.

1.2 NetSOLO® Broadband Sub-Assemblies

1.2.1 Intelligent Network Interface-Voice Gateway, (INI-VGC)

The Intelligent Network Interface-Voice Gateway sub-assembly is factory programmed in two basic versions, each available for fiber-optic/copper wire combination.

- A. The INI-VGC-FO (copper-wire or fiber-optic) or INI-VGC-UTP (copper-wire only).
- B. INI-VGX-FO (copper-wire or fiber-optic) or INI-VGX-UTP (copper-wire only).

The INI-VGC-FO or INI-VGC-UTP

This sub-assembly is the NetSOLO Network interface for the Voice Evacuation Command Center (INCC). Installed in the INCC Command Center, this sub-assembly:

- Provides the connection to the system's microphone and fire fighter's handset
- Monitors and controls up to sixteen (16), ANU-48 or ASM-16 sub-assemblies for a total of 256 fully programmable control switches, and one (1), NGA.
- Includes one (1), Style 4 (Class B) signaling line circuit with a capacity of up to sixteen (16), AOM-TELF (fire fighter's communication circuit) sub-assemblies.
- Occupies one node on the NetSOLO® Broadband network.

The INI-VGX-FO or INI-VGX-UTP

This sub-assembly is the Network interface for the distributed audio amplifier sub-assemblies installed in the INX or the INX CAB-B cabinet enclosure. When the INX-VGX sub-assembly is installed in the INX or the INX CAB-B cabinet enclosure, this sub-assembly does the following:

- Monitors and controls up to six (6), ANU-48 or ASM-16 sub-assemblies for a total of (96) fully programmable control switches.
- Monitors and controls up to four (4), AM-50 Series amplifiers:
 - configured 3 main amplifiers maximum with 1 standby
 - 2 main amplifiers with 2 standbys
 - 1 main amplifier with 1 standby
 - 1, 2, or 3 main amplifiers with no standby
- Includes one (1), Style 4 (Class B) signaling line circuit with a capacity of up to sixteen (16), AOM-TELF (fire fighter communication circuits) and thirty-two (32), AOM-2SF (single-channel speaker circuits).
- MMO-6SF six-circuit single-channel speaker circuits modules are also supported, but each MMO-6SF takes up six addresses on the SLC.
- Provides one fire fighter communications riser.
- Stores up to sixteen (16), custom digital tones/messages with a combined, total length of three minutes.
- Occupies one node on the NetSOLO Broadband network.

1.2.2 Addressable Switch Sub-Assembly (ASM-16)

The ASM-16 is a configurable switch input sub-assembly with sixteen (16), switches and forty-eight (48), status LEDs. Each switch address is fully programmable to serve as:

- A System Control Switch, Reset, Silence, Alarm and Trouble Acknowledge, etc.
- A Voice Evacuation Speaker Circuit control switch
- A Fire Fighter Communication Circuit control switch
- An Auxiliary Control Circuit switch
- A status indicating LED, (red, green, and yellow)

1.2.3 AM-50 Series Amplifiers

The AM-50 Series amplifiers include an AM-50-25 and an AM-50-70 amplifier. Each AM-50 Series amplifier includes two (2), supervised channel outputs and an auxiliary audio input that can be used for a backup amplifier connection. The amplifiers provide 50 watts of audio transmitted through two (2), integral Class A/B speaker circuits. Each amplifier's supervised output can drive up to 50 watts. The following describe each amplifier.

(AM-50-25)

The AM-50-25 amplifier is a 50-watt Class D switching type audio output amplifier, with a standard voltage for audio output of 25V_{RMS}.

(AM-50-70)

The AM-50-70 amplifier is a 50-watt Class D switching audio output amplifier, with a standard voltage for audio output of 70.7V_{RMS}.



NOTE: 50 watts max. per AM-50-25 or AM-50-70 sub-assembly.

1.2.4 Power Supply Sub-Assembly- 9 Amperes (PM-9/PM-9G)

The PM-9/PM-9G is a 9 ampere regulated power supply with a battery charger that provides operating power to the distributed amplifier assembly installed in the INX or the INX CAB-B cabinet enclosure. The battery charger can maintain batteries up to 55 A/H (with an external battery cabinet). (Batteries not furnished).

1.2.5 Command Center Enclosure (INCC-E)

This enclosure houses the following:

- INI-VGC
- Fire Fighter Telephone Emergency Microphone
- NGA LCD Display
- one ASM-16 Switch Input
- ANU-48 Annunciator sub-assembly

1.2.6 Command Center Expander Enclosure (INCC-Ex)

This enclosure can be interconnected with other enclosures to provide added capacity for larger applications. It can accommodate up to six (6), ASM-16 sub-assemblies.

1.2.7 Transponder Enclosure (INI-X or INX CAB-B)

The INX and the INX CAB-B cabinet enclosures house the INI-VGX, PM-9/PM-9G, one (1) to four (4), AM-50 Series amplifiers, and batteries up to 12 A/H.

1.2.8 Remote LED Driver Sub-Assembly (ANU-48)

This sub-assembly provides output for up to forty-eight (48), remote LEDs. It mounts in the INCC enclosure or in a remote UL Listed annunciator.

1.2.9 LCD Display Annunciator Sub-Assembly (NGA)

The NGA sub-assembly occupies one node on the network. This sub-assembly mounts in the INCC enclosure and provides an LCD display of system events, together with system status indicating LEDs and the following touch-screen switches:

- Alarm Acknowledge
- Trouble Acknowledge
- Signal Silence
- System Reset

1.3 7100 Series Fire Alarm Control Panel Equipment

1.3.1 7100 Series Fire Alarm Control Panel Features

The 7100 Series is shipped unassembled. The shipping carton includes the 7100 Series Installation/Operating Manual, P/N: 9000-0447. The 7100 Series analog, addressable fire alarm control panel provides the following standard features:

- Two (2) Class B, Style 4 Signaling Line Circuits (SLC)
- Two (2) Class B, Style Y Notification Appliance Circuits (NAC)
- Alarm and Trouble Form “C” dry contacts
- Accommodates 99 Gamewell-FCI Approved, UL Listed compatible analog, addressable sensors per SLC (198 total per 7100 System)
- Accommodates 98 Gamewell-FCI Approved, UL Listed compatible addressable monitor and control modules per SLC (196 total per 7100 System)
- 80-character alphanumeric display with password protected system access functions and system diagnostic LEDs
- 280 Event History Log (4100 events when the NGA is installed in the system), non-volatile
- Resettable and non-resettable external power outputs rated 1A @ 24 VDC
- Alarm Verification and Positive Alarm Sequence
- Multi-level Alarm Processing
- NAC coding
- Programmable Trouble Reminder
- Integral RS-232 Port
- Power Limited Circuits



NOTE: In systems that do not use an INCC, NGA or INX node, a single 7100 node must be configured as the Fire Alarm Command / Control Center, by programming in the CAMWorks™ application programming tool. Also, the appropriate label or suitable indication must identify this node as the Control Center.

In addition, optional features include the following:

- Class A Optional Module (CAOM) with Disconnect Switches for System NACs and SLCs
- Digital Alarm Communicator Transmitter (DACT) built-in to Model FC7100-2D
- Municipal Circuit Optional Module (MCOM)
- LCD-7100 Remote 80-character alphanumeric display (up to 5 per 7100 FACP)
- LDM-7100 LED Display Driver providing 33 outputs (up to 5 per 7100 FACP)

Each 7100 fire alarm control panel converts into an NetSOLO Network node by the addition of an INI-7100 UTP or INI-7100 FO (see Section 1.3.2).

1.3.2 INI-7100 UTP, Intelligent Network Interface, Unshielded, Twisted-Pair

NetSOLO Broadband Network interface to the 7100 FACP using copper wire network terminations only. It occupies one node on the NetSOLO Broadband network.

Section 2: Installation

2.1 Installation Requirements

All components of the NetSOLO® Broadband System should be located per the following requirements:

- Installations are to be indoors only protected from rain, water, and rapid changes in temperature that could cause condensation. Equipment must be securely mounted on rigid, permanent walls
- Temperature shall not exceed the range of 32° - 120° F (0° - 49° C)
- Operating humidity not to exceed with 93% non-condensing at 90° F (32° C)
- There should be adequate space around the installation to allow easy access for operation and servicing.
- All NetSOLO assemblies and components are to be located in conformance to local and national codes.
- All installation field wiring shall be connected in conformance to local and national codes.

2.2 INCC Command Center

The INCC Command Center must be mounted close-nipped to a UL Listed 24 VDC power supply Listed for Fire use such as the Gamewell-FCI Model 7100 Listed per UL Standard 864, 9th Edition.

2.2.1 Special Provisions for Multiple Command Center Applications

When more than one Command Center is implemented in a system, provisions must be made to indicate the “Active” or primary Command Center per the NFPA requirements. Only the “Active” primary Command Center is enabled to manually control system functions. Other Command Center(s) will act as an annunciator only when they are not in the “Active mode of operation.

2.2.2 Indication of the “Active” Command Center

The Active Command Center must have a suitable indication that it is currently enabled to control system functions. These methods include the following:

- Lighted signage controlled by an output module.
- An indicator light appears that is driven by an ANU-48 as part of a graphic annunciator.
- An indicator light provided by an ASM-16.
- A text message displayed on an NGA if the system is so equipped.

Each of these methods requires custom CAM programming to light/extinguish the Command Center “Active” status indicator method implemented.

2.2.3 Transferring Command Center Active Status to a Secondary Command Center

If required, the “Active” status of a primary Command Center may be transferred to an alternate or secondary Command Center through a variety of programmable methods. An ASM-16 switch, ANU-48 switch input from a toggle switch, a key switch, a monitor module, or any other suitable method can be implemented to serve as a Command Center Active selector switch input that has been configured, for this purpose, with the CAMWorks™ Application Programming tool.

2.3 Unpacking and Inspecting Components

All components of the NetSOLO Broadband are shipped disassembled. Remove all sub-assemblies and accessories from their shipping carton to access the enclosure. Remove and inspect the enclosure for shipping damage. Inspect all electronic sub-assemblies for damage without removing them from their anti-static protective bags. If any pieces are found damaged, notify the shipping carrier immediately. Report missing components to Gamewell-FCI Customer Service.

2.4 INCC-E Backbox (Single Backbox Application)

1. Prepare the mounting site by pre-drilling for fasteners as needed using the dimensions shown in Figure 2.4.1. Mounting hardware should be #10 to 1/4" in diameter.
Fasteners must be anchored into solid materials unless backed by studs or equivalent support. Mountings to concrete walls should be backed by plywood to insulate the equipment from possible condensation.
2. Position the enclosure so that the keyhole-shaped mounting holes at the top of the enclosure can pass through the fastener heads.
3. Insert the top fasteners halfway and hang the backbox on the fasteners.
4. Insert the two (2) bottom fasteners and tighten all four (4) fasteners to complete the installation.

For additional information, refer to the *INCC-E Installation Instructions*, P/N 9000-0547.

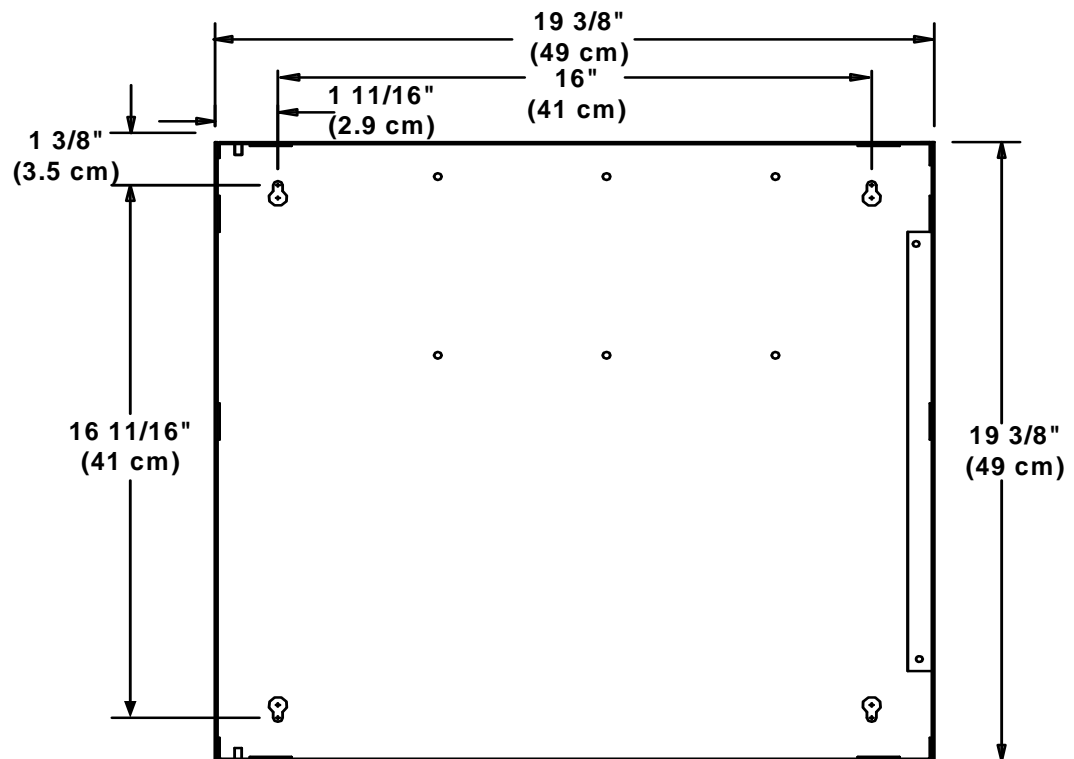


Figure 2.4.1 NetSOLO Broadband Backbox

2.5 INCC-E Backbox (Multiple Backbox Application)

1. When two or more INCC-E enclosures are required, the first backbox is installed per the instructions in Section 2.4. Additional backboxes require a separation of $\frac{3}{4}$ " between adjacent enclosures to ensure clearance for the doors.
2. Remove the 1 $\frac{1}{4}$ " diameter knockouts from adjacent boxes prior to mounting to permit wiring from box to box and to peripheral devices in the field. Refer to Figure 2.5.1 and Figure 2.5.2.

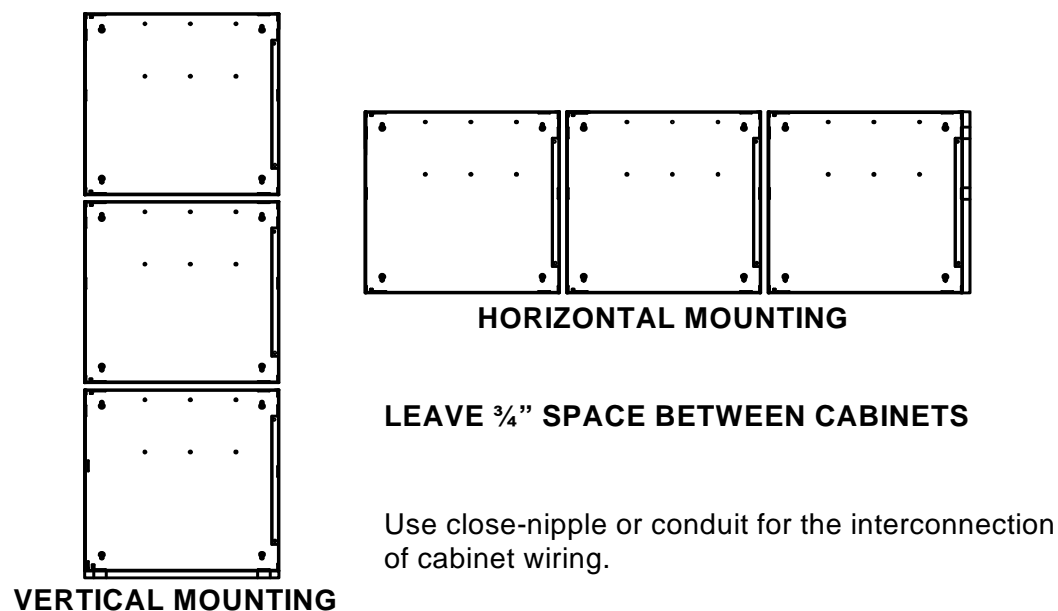


Figure 2.5.1 INCC-E Backbox Installation

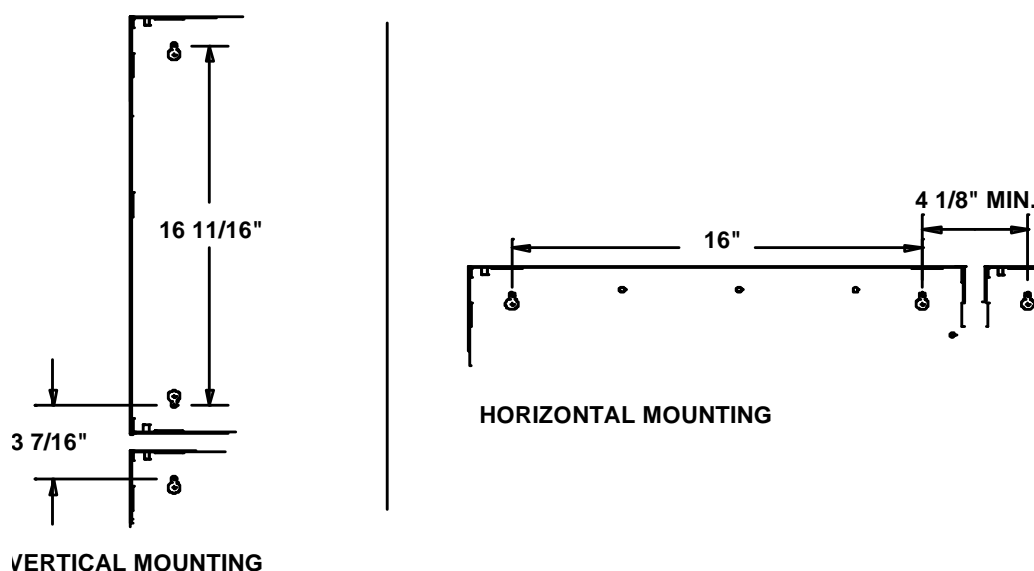


Figure 2.5.2 INCC-E Backbox Installation

2.6 NetSOLO Broadband Intelligent Network Command Center Assembly (INCC)

General

The INCC Intelligent Network Command Center uses a modular approach. Consequently, the contents of an INCC assembly will vary depending upon the project's specific requirements. It occupies one (1), node on the network without an NGA installed, and occupies two (2), nodes with an NGA installed. The following list the INCC assembly options:

- At a minimum, an INCC enclosure assembly must include the following:
 - one (1), INI-VGC-FO or INI-VGC-UTP
 - one (1), ASM-16 switch sub-assembly
 - one (1), backbox
 - one (1), INCC inner door
 - one (1), INCC outer full plexiglas door
- The standard INCC inner door provides six (6), bays to accommodate the following units:
 - up to six (6), ASM-16 or ANU-48 sub-assemblies
 - one (1) NGA
- Each INI-VGC-FO or INI-VGC-UTP can support up to sixteen (16), NGA, ASM-16, or ANU-48 sub-assemblies. These additional sub-assemblies can be mounted in extra backboxes. Unused bays can be covered with blank faceplates.
- An optional voice-paging microphone assembly occupies one standard bay in place of an ASM-16/ANU-48.
- An optional fire fighter's telephone handset assembly occupies two (2), standard bays and requires the use of the INCC-T inner door, which combines two bays to accommodate the telephone assembly. See Figure 2.6.1.

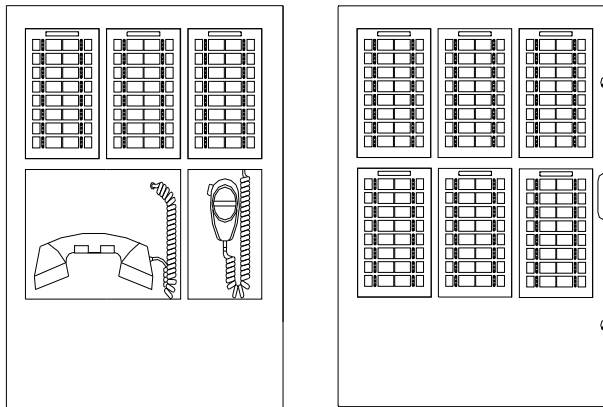


Figure 2.6.1 Typical INCC Command Center

2.6.1 Intelligent Network Interface (INI-VGC to INCC Installation)

**CAUTION: STATIC SENSITIVE EQUIPMENT**

THIS SUB-ASSEMBLY IS A STATIC SENSITIVE, ELECTRONIC DEVICE. TO MINIMIZE THE POSSIBILITY OF DAMAGE, ALWAYS USE A GROUNDED WRIST STRAP OR MAINTAIN CONTACT WITH GROUND WHILE HANDLING THIS EQUIPMENT.

1. Unpack the INI-VGC sub-assembly from its shipping carton and remove it from its anti-static bag. Locate the six (6), mounting standoffs at the top center of the INCC-E backbox.
2. Use the six (6), screws provided to secure the sub-assembly to the backbox at each corner, top center, and bottom center.
3. Position the sub-assembly so that the component side is facing up, the four (4), ST fiber-optic cables are positioned to the lower left, and the four 4-pin terminal blocks run down the right side of the board.

For additional information, refer to the *INI-VG Series Installation Instructions*, P/N 9000-0549.

2.6.2 Inner Door (INCC)

For information on the installation of the INCC inner door, refer to the *INCC Installation Instructions*, P/N 9000-0546.

2.7 NetSOLO[®] Broadband Intelligent Network Transponder (INX or INX CAB-B)

General

The INX or the INX CAB-B Intelligent Network Transponder can house one (1) to four (4), 50-watt, AM-50 Series amplifiers. These amplifiers can be configured in either of the following ways:

- one, two, or three main amplifiers with or without a common shared redundant standby amplifier
- two (2), primary amplifiers, each amplifier includes its own standby amplifier.

Power for the INX, the INX CAB-B and/or the INCC assembly is provided by a PM-9/PM-9G power supply. The PM-9/PM-9G is a 9 amp supply that has an integral battery charger that can maintain and supervise batteries up to 55 A/H (with an external battery cabinet).



NOTE: 12 A/H batteries will fit inside the INX or the INX CAB-B cabinet. Use a BC-1 battery cabinet for larger batteries).

The interface to the NetSOLO[®] Broadband network is connected through an INI-VGX sub-assembly. This sub-assembly supervises and controls the AM-50 Series amplifier sub-assemblies and PM-9/PM-9G power supplies. It stores up to sixteen (16), custom digital tones/messages with a combined, total length of three minutes. There is one Signaling Line Circuit (SLC) to support up to sixteen (16), AOM-TELF fire fighter intercom circuits and thirty-two (32), AOM-2SF (single-channel speaker circuits). MMO-6SF six-circuit single-channel speaker circuits modules are also supported, but each MMO-6SF takes up six addresses on the SLC.

For additional information, refer to the *INX and INX CAB-B Installation Instructions*, P/N 9000-0545.

2.7.1 PM-9/PM-9G Power Supply Sub-assemblies

1. Unpack the PM-9/PM-9G from its shipping carton and remove it from its static shield bag.
2. Align the sub-assembly with the six (6), mounting standoffs located at the top of the INX or the INX CAB-B backbox as shown in Figure 2.7.1.1.
3. To secure the sub-assembly, use the six (6), screws provided.

For additional information on this sub-assembly, refer to the following documents:

PM-9 Installation Instructions, P/N 9000-0548

PM-9G Installation Instructions, P/N 9001-0055

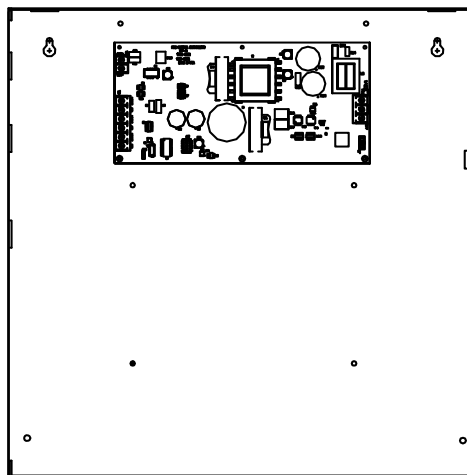


Figure 2.7.1.1 PM-9/PM-9G Sub-Assembly

4. Install the 10-pin ribbon cable supplied with the PM-9/PM-9G into J1.

2.8 NetSOLO INX Cabinet Installation Instructions

The NetSOLO INX Cabinet assembly typically includes the following:

- Backbox
 - PM-9/PM-9G sub-assembly
- INI-VGX Mounting Plate
 - INI-VGX sub-assembly
 - AM-50 Series amplifiers (maximum of 4 amplifiers)
- INX Outer Door
- Hardware Kit

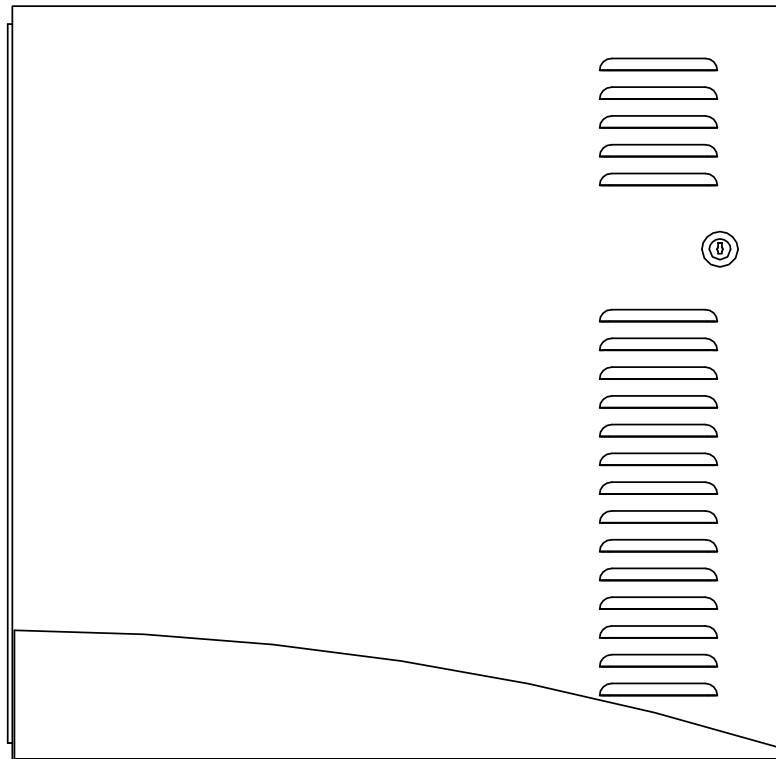


Figure 2.8.1 NetSOLO INX (Standard View)

2.8.1 NetSOLO INX Cabinet Backbox Installation

1. Prepare the mounting site by pre-drilling four (4), #10 screws mounted to the studs, using the dimensions shown in Figure 2.8.1.1. Use four (4), #10 screws.

NOTE: If the fasteners are anchored to a wallboard, use #10 wall anchors. Mountings to concrete walls should be backed by plywood to insulate the equipment from possible condensation.

2. Secure with two (2), #10 screws in the two-hole mounting pattern as shown in Locations 1 and 2 of Figure 2.8.1.1.
3. Set the backbox over the top, two-hole mounting pattern, and hang the backbox on the two screw heads.
4. Insert and secure two (2), #10 screws in the two-hole mounting pattern as shown in Locations 3 and 4 of Figure 2.8.1.1.



NOTE: Add knockouts to the left and right side of the rear panel of the backbox. Do not add knockouts in the centre or top of the backbox, behind or below the batteries. To add larger knockouts, increase the size of the existing knockouts.

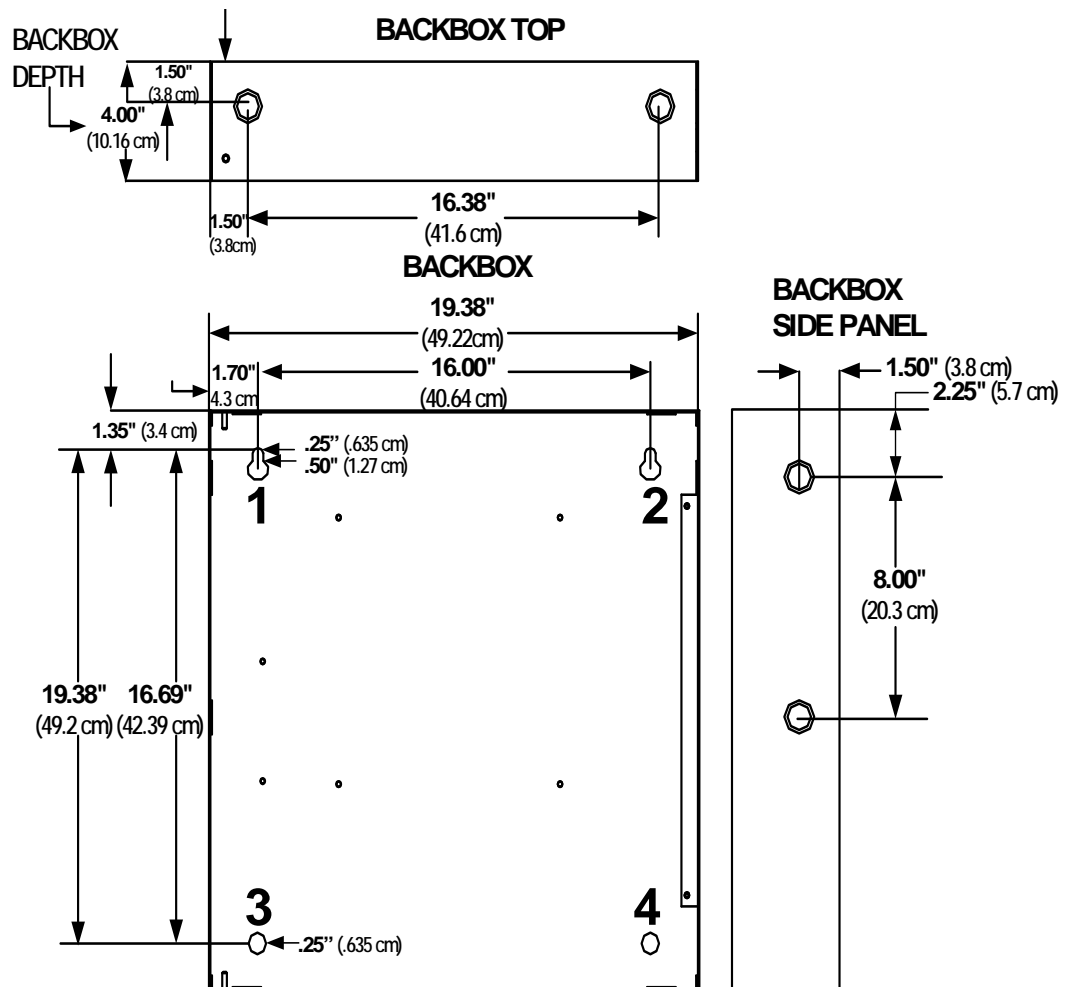


Figure 2.8.1.1 NetSOLO INX Cabinet Backbox Installation

2.8.2 PM-9/PM-9G to Backbox Installation

1. Mount the PM-9/PM-9G sub-assembly on the PEM standoffs in the backbox and secure with six (6), (#4-40 x 1/4" (.635 cm) LG SEMS) screws as shown in Locations 1 thru 6 in Figure 2.8.2.1.

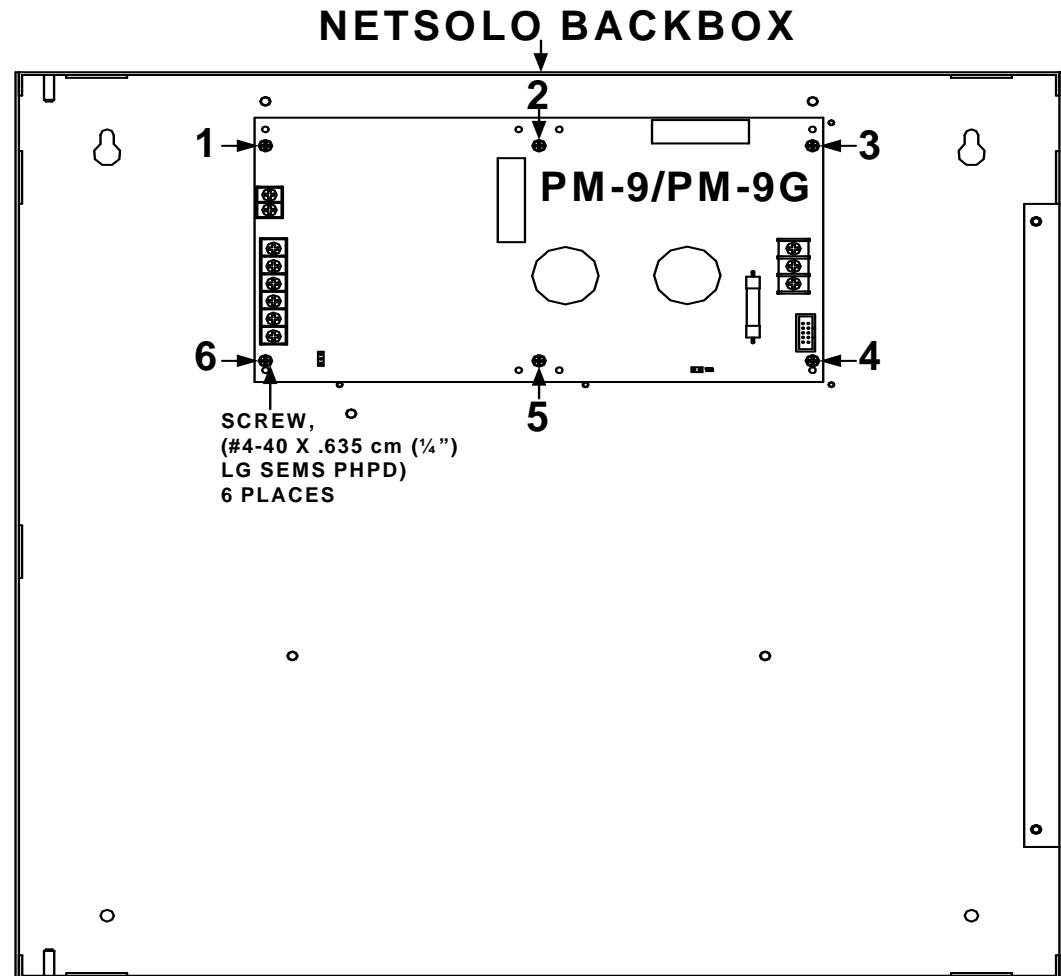


Figure 2.8.2.1 PM-9/PM-9G Sub-Assembly to Backbox Installation

2.8.3 NetSOLO INX Mounting Plate Installation

1. Position the INI-VGX sub-assembly over the six (6) mounting PEM standoffs on the top part of the INX Mounting Plate.
2. Mount the INI-VGX sub-assembly on top of the INX Mounting Plate and secure with six (6) screws, (#4-40 x 1/4" (.635 cm) LG SEMS PHPD) in the six-hole mounting pattern as shown in Location 1 of Figure 2.8.3.1.
3. Connect the 10-pin ribbon cable leading from PM-9/PM-9G J1 to INI-VGX J4 (SDA/SCL).
4. Connect the 20-pin ribbon cable to J16 (Signals In/Out) of the INI-VGX.
5. Mount the first set of the two (2) AM-50 Series amplifiers over the PEM standoffs on the INX Mounting Plate and secure with eight (8), standoffs M/F, .1/4" (.635 cm) HEX, 1.38" (3.5 cm) LG) in the eight-hole mounting pattern as shown in Location 2 of Figure 2.8.3.1



NOTE: Before you install the 2nd set of AM-50 Series amplifiers, you must connect the ribbon cables. For information on the 3rd and 4th AM-50 Series amplifiers ribbon cable installations, refer to Section 2.10.3 and Section 2.10.4.

6. Mount the second set of the two (2), AM-50 Series amplifiers on top of the first set of the two (2), AM-50 Series amplifiers, and secure with eight (8) screws, (#4-40 x 1/4" (.635 cm) LG SEMS PHPD) into the eight (8), standoffs as shown in Location 3 of Figure 2.8.3.1.

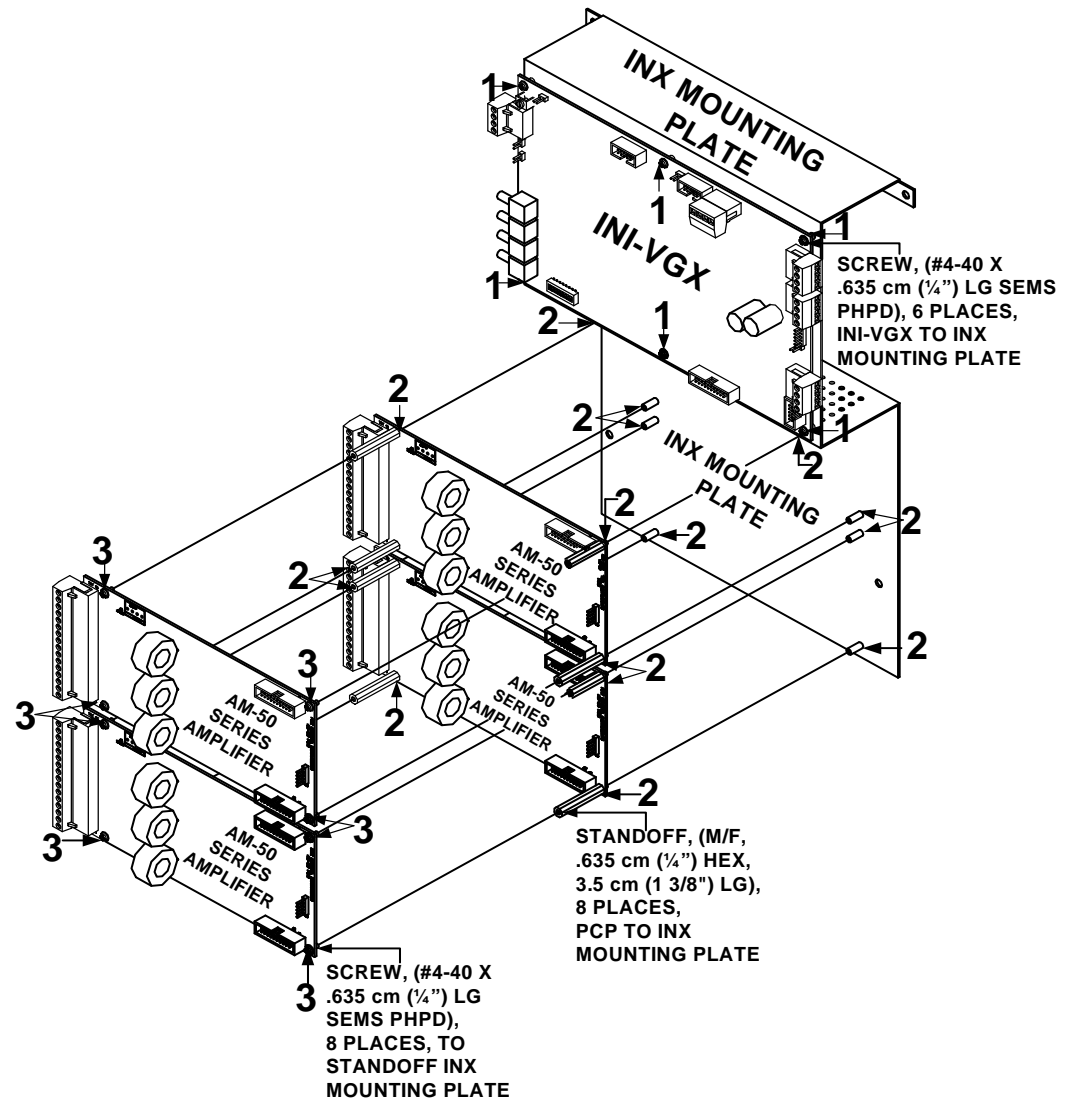


Figure 2.8.3.1 NetSOLO INX Mounting Plate Installation

2.8.4 NetSOLO INX Cabinet, INX Mounting Plate to Backbox Installation

1. Mount the INX sub-assemblies Mounting Plate to the studs in the backbox and secure with five (5) nuts (#10 HEX, KEPS) as shown in Location 1 of Figure 2.8.4.1.
2. Position and mount the INX Outer Door on the backbox, and secure with four (4), (#10 HEX, KEPS) nuts in the four-hole mounting pattern on the left side of the backbox. See Locations 2 thru 5 of Figure 2.8.4.1.

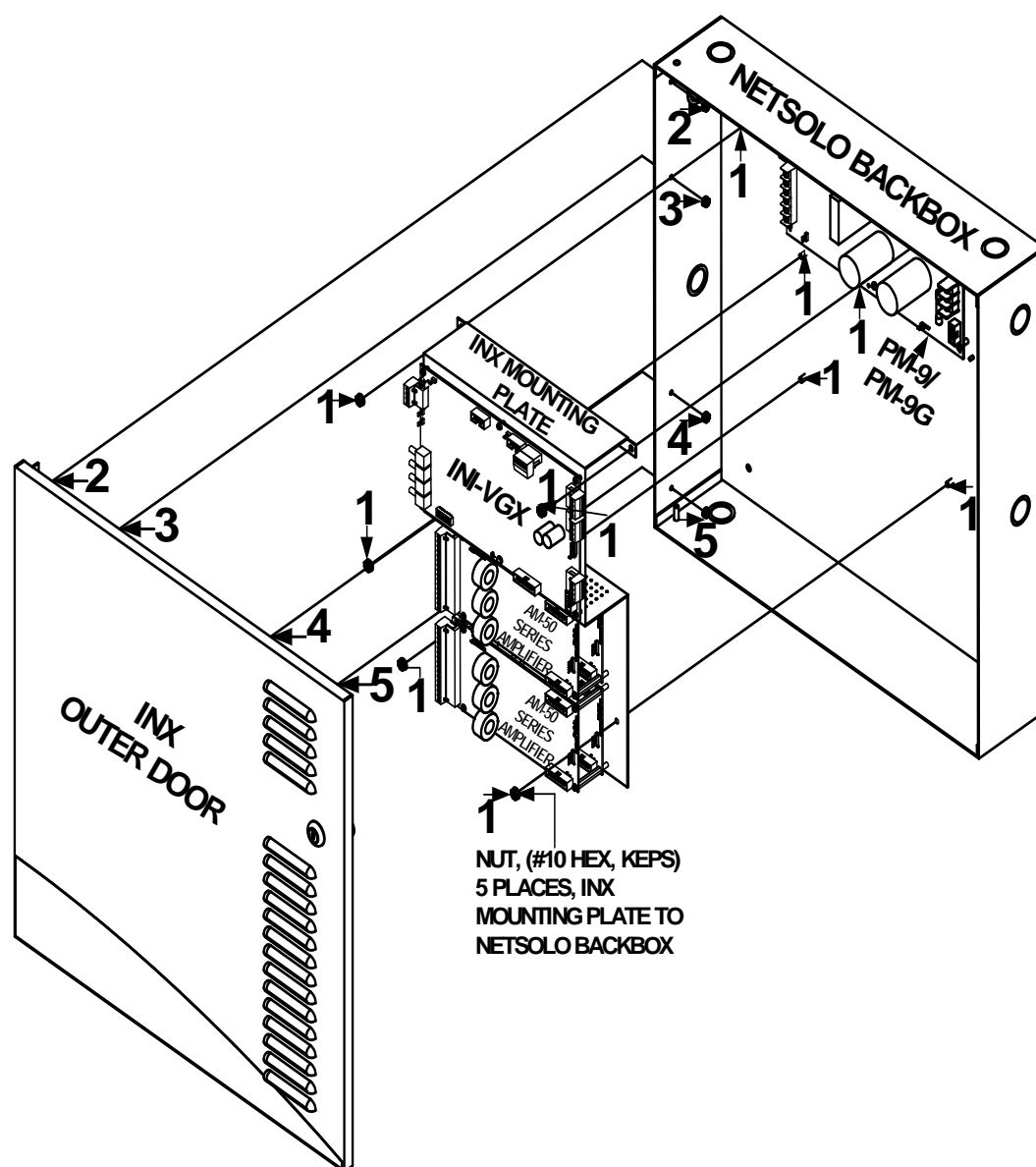


Figure 2.8.4.1 NetSOLO INX Cabinet INX Mounting Plate to Backbox Installation

2.9 INX CAB-B Cabinet Installation Instructions

The INX CAB-B Cabinet assembly typically includes the following:

- Backbox
- INX CAB-B Mounting Plate
 - PM-9/PM-9G sub-assembly
- PM-9/INI-VGX Mounting Plate
 - INI-VGX sub-assembly
- AM-50 Series amplifiers (maximum of 4 amplifiers)
- INX Outer Door
- Hardware Kit

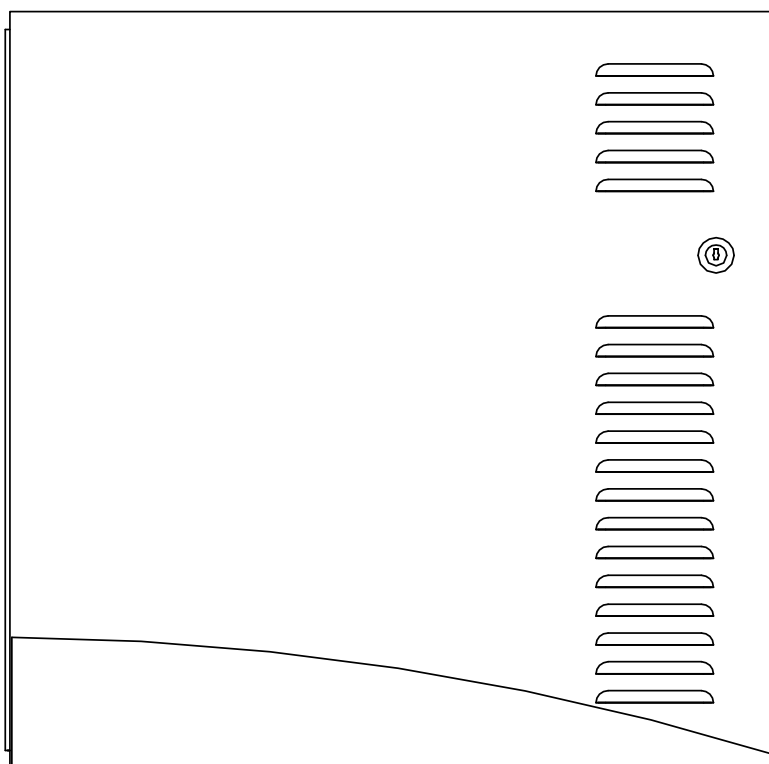


Figure 2.9.1 INX CAB-B Standard View

2.9.1 INX CAB-B Cabinet Backbox Installation

1. Prepare the mounting site by pre-drilling four (4), #10 screws mounted to the studs, using the dimensions shown in Figure 2.9.1.1. Use four (4), #10 screws.

NOTE: If the fasteners are anchored to a wallboard, use #10 wall anchors. Mountings to concrete walls should be backed by plywood to insulate the equipment from possible condensation.

2. Secure with two (2), #10 screws in the two-hole mounting pattern as shown in Locations 1 and 2 of Figure 2.9.1.1.
3. Set the backbox over the top, two-hole mounting pattern, and hang the backbox on the two screw heads.
4. Insert and secure two (2), #10 screws in the two-hole mounting pattern as shown in Locations 3 and 4 of Figure 2.9.1.1.



NOTE: Add knockouts to the left and right side of the rear panel of the backbox. Do not add knockouts in the centre or top of the backbox, behind or below the batteries. To add larger knockouts, increase the size of the existing knockouts.

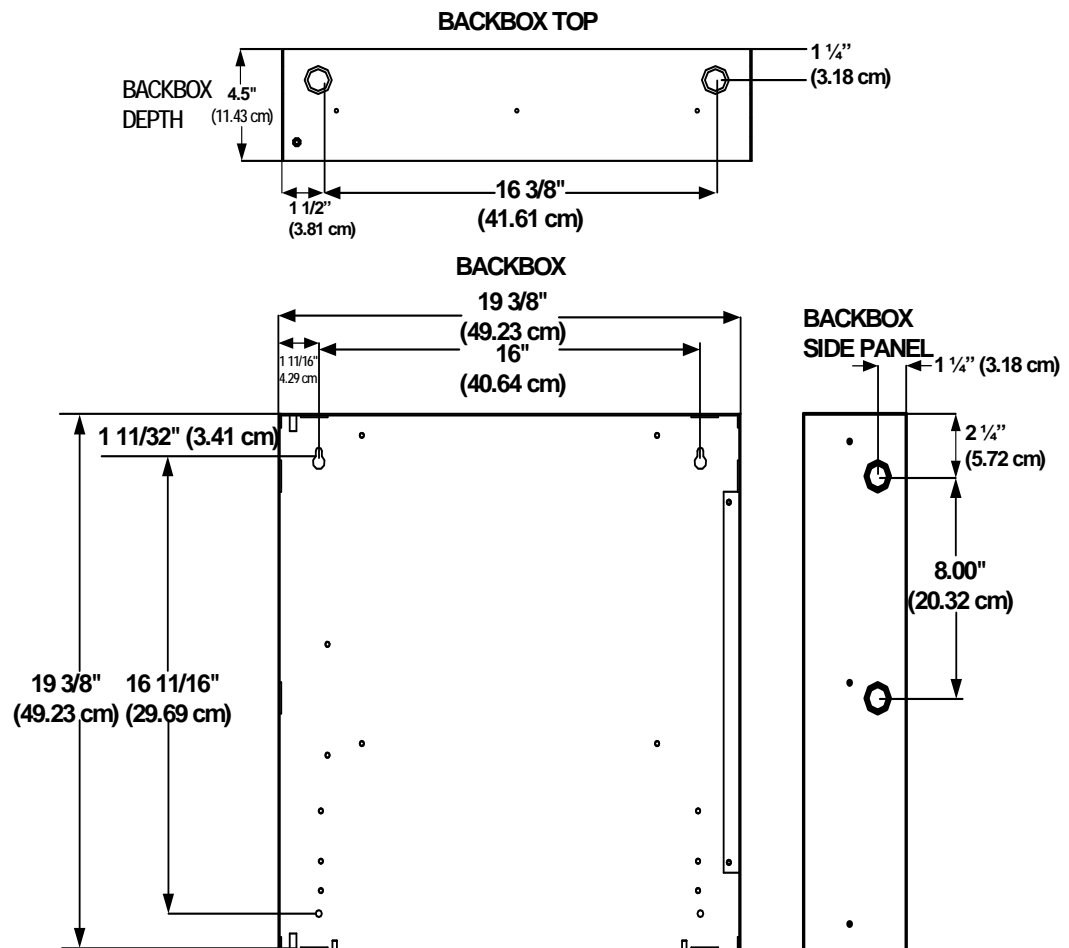


Figure 2.9.1.1 INX CAB-B Cabinet Backbox Installation

2.9.2 INX CAB-B Mounting Plate Installation

1. Mount the PM-9/PM-9G sub-assembly in the six-hole mounting pattern on the top part of the INX CAB-B Mounting Plate and secure using the standoffs (M/F, 1/4" HEX, 4-40 x 2 1/4") as shown in Location 1 of Figure 2.9.2.1.
2. Position the PM-9/INI-VGX Mounting Plate over the six (6), mounting studs on top of the PM-9/PM-9G sub-assembly.
3. Mount the PM-9/INI-VGX Mounting Plate on top of the PM-9/PM-9G sub-assembly and secure with six (6) screws, (#4-40 x 1/4" (.635 cm) SEMS PHPD) in the six-hole mounting pattern as shown in Location 2 of Figure 2.9.2.1.



NOTE: Mount the PM-9/INI-VGX Mounting Plate on top of the PM-9/PM-9G sub-assembly, before you mount the INI-VGX sub-assembly to the PM-9/INI-VGX Mounting Plate.

4. Mount the INI-VGX sub-assembly on top of the PM-9/INI-VGX Mounting Plate and secure with six (6) screws, (#4-40 x 1/4" (.635 cm) SEMS PHPD) in the six-hole mounting pattern as shown in Location 3 of Figure 2.9.2.1.
5. Connect the 10-pin ribbon cable leading from the PM-9/PM-9G J1 to the INI-VGX J4 (SDA/SCL).
6. Connect the 20-pin ribbon cable to J16 (Signals In/Out) of the INI-VGX.
7. Mount the first set of the two (2) AM-50 Series amplifiers over the PEM standoffs on the INX CAB-B Mounting Plate and secure with eight (8), standoffs (M/F, 1/4" (.635 cm) HEX, 4-40 x 1.38") in the eight-hole mounting pattern as shown in Location 4 of Figure 2.9.2.1.



NOTE: Before you install the 2nd set of AM-50 Series amplifiers, you must connect the ribbon cables. For information on the 3rd and 4th AM-50 Series amplifiers ribbon cable installations, refer to Section 2.10.3 and Section 2.10.4.

8. Mount the second set of the two (2), AM-50 Series amplifiers on top of the first set of the two (2), AM-50 Series amplifiers, and secure with eight (8) screws, (#4-40 x 1/4" (.635 cm) SEMS PHPD) into the eight (8), standoffs as shown in Location 5 of Figure 2.9.2.1.

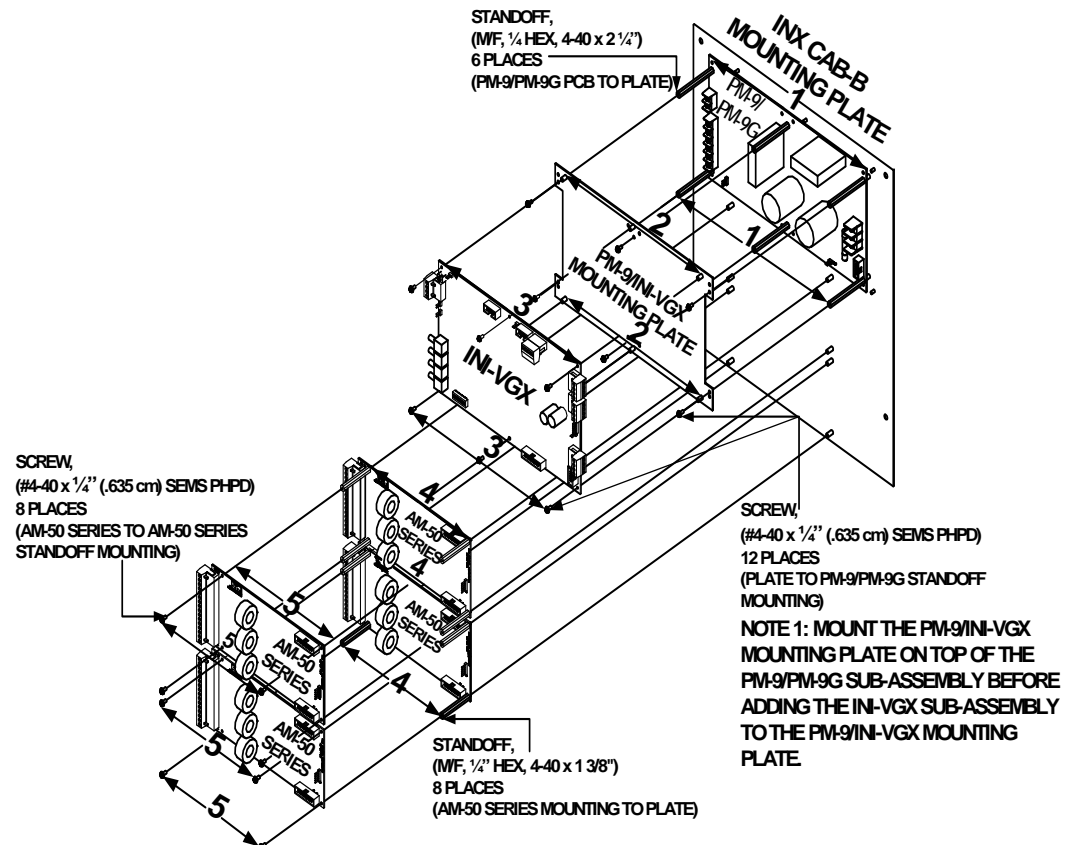


Figure 2.9.2.1 INX CAB-B Mounting Plate Installation

2.9.3 INX CAB-B Mounting Plate to Backbox

1. Mount the INX CAB-B Mounting Plate to the studs in the backbox and secure with four (4) nuts (#10 HEX, KEPS) as shown in Location 1 of Figure 2.9.3.1.
2. Position and mount the INX Outer Door on the backbox, and secure with four (4), (#6 HEX, KEPS) nuts in the four-hole mounting pattern on the left side of the backbox. See Locations 2 thru 5 of Figure 2.9.3.1.

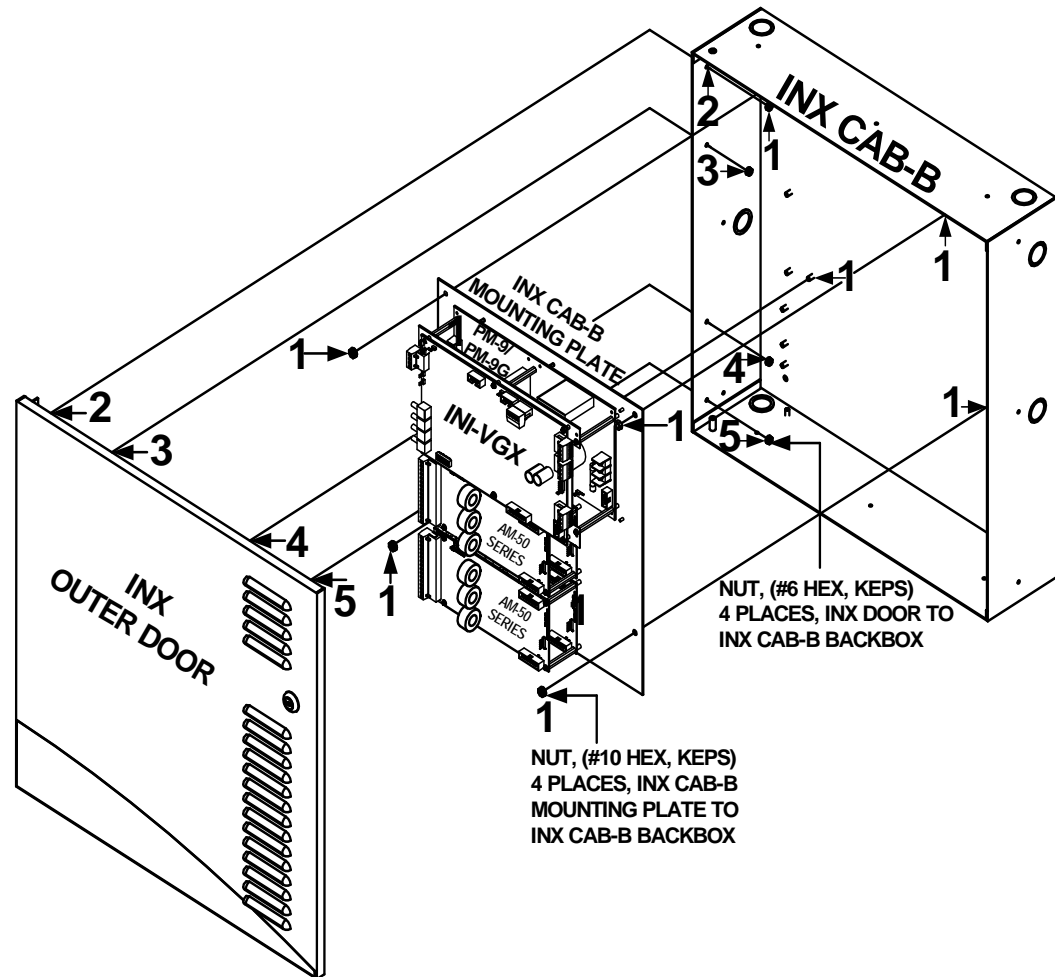


Figure 2.9.3.1 INX CAB-B Mounting Plate to Backbox Installation

2.10 AM-50 Series Amplifiers Sub-Assembly Installation

Each NetSOLO INX and INX CAB-B cabinet enclosure can house four (4), AM-50 Series amplifiers sub-assemblies. The first and second amplifiers mount directly on the INX or the INX CAB-B sub-chassis mounting plate. If required, the third and fourth amplifiers can be stacked above the first pair of AM-50 Series amplifiers. For information on the amplifier ribbon cable installation, refer to Section 2.10.1 thru Section 2.10.4.

For additional information on the AM-50 Series amplifiers, refer to the *AM-50 Series Installation Instructions*, P/N 9000-0544.



CAUTION: STATIC SENSITIVE EQUIPMENT

THIS SUB-ASSEMBLY IS A STATIC SENSITIVE ELECTRONIC DEVICE. TO MINIMIZE THE POSSIBILITY OF DAMAGE, ALWAYS USE A GROUNDED WRIST STRAP OR MAINTAIN CONTACT WITH GROUND WHILE HANDLING THIS EQUIPMENT.

2.10.1 Single Amplifier Ribbon Cable Installation

2.10.1.1 One AM-50 Series Amplifier Installed to the INX or the INX CAB-B Mounting Plate

If one amplifier is required, do the following:

1. Unpack the AM-50 Series amplifier from its shipping carton and remove it from its anti-static bag.
2. Position the AM-50 Series amplifier on the INX or the INX CAB-B Mounting Plate located directly below the INI-VGX sub-assembly.
3. To install the AM-50 Series amplifier to the INX or the INX CAB-B Mounting Plate, secure the four (4), screws (4-40 x 1/4" (.635 cm) L SEMS PHPD) (provided in the Hardware Kit) in the four-hole mounting pattern.
4. Connect the 20-pin ribbon cable leading from J16 of the INI-VGX to J1 of the AM-50 Series amplifier.

Figure 2.10.1.1.1 illustrates the AM-50 Series single amplifier ribbon cable connection.

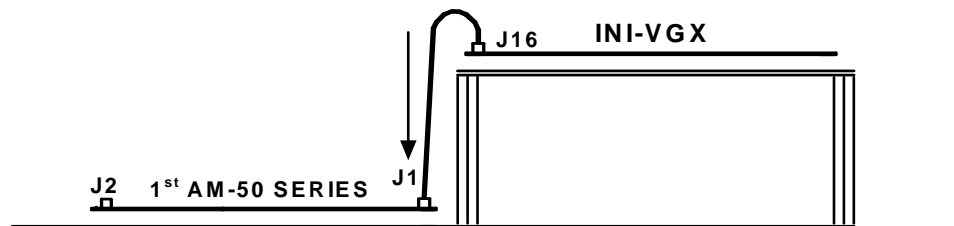


Figure 2.10.1.1.1 AM-50 Series Single Amplifier Ribbon Cable Connection

2.10.2 Two Amplifier Ribbon Cable Installation

2.10.2.1 Two AM-50 Series Amplifiers Installed to the INX or INX CAB-B Mounting Plate

If two amplifiers are required, do the following:

1. Mount the first amplifier per the instructions in Section 2.10.1.
2. Position the second AM-50 Series amplifier directly below the first amplifier on the INX or the INX CAB-B Mounting Plate, and secure the second amplifier to the INX or the INX CAB-B Mounting Plate, using the four (4), screws (4-40 x 1/4" (.635 cm) SEMS PHPD) (provided in the Hardware Kit) in the four-hole mounting pattern.
3. Connect the 20-pin ribbon cable leading from J16 of the INI-VGX to J1 of the first amplifier.
4. Connect the 20-pin ribbon cable leading from J1 of the second amplifier to J2 of the first amplifier.

Figure 2.10.2.1.1 illustrates the AM-50 Series two amplifiers ribbon cable connection.

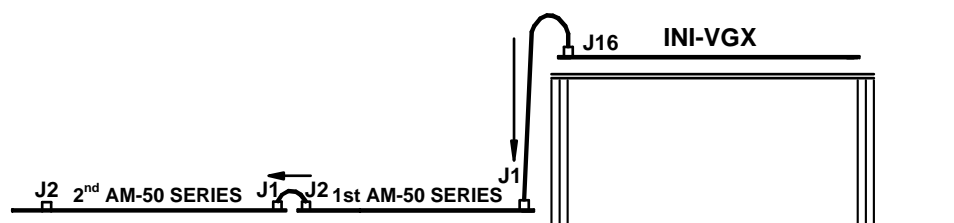


Figure 2.10.2.1.1 AM-50 Series Two Amplifier Ribbon Cable Connection

2.10.3 Three Amplifier Ribbon Cable Installation



NOTE: It is recommended that after the first two amplifiers are connected, install the ribbon cables before proceeding.
Always attach the ribbon cable of the first AM-50 Series amplifier from J1 to the J16 cable leading from the INI-VGX.

2.10.3.1 Three AM-50 Series Amplifiers Installed to the INX or the INX CAB-B Mounting Plate

If three amplifiers are required, do the following:

1. Position the second amplifier directly below the INX-VGX on the INX or the INX CAB-B Mounting Plate, and secure the second amplifier using the four (4) standoffs (1/4" (.635 cm) HEX, 4-40 x 1 3/8") (provided in the Hardware Kit) to the four (4), mounting studs on the INX or the INX CAB-B Mounting Plate.
2. Position the third amplifier directly below the second amplifier on the INX or the INX CAB-B Mounting Plate, and secure the third amplifier using the four (4) standoffs (1/4" (.635 cm) HEX, 4-40 x 1 3/8") to the four (4), mounting studs on the INX or the INX CAB-B Mounting Plate.
3. Place the first amplifier above the second amplifier and secure the first amplifier to the standoffs, using the four (4), screws (4-40 x 1/4" (.635 cm) SEMS PHPD).
4. Connect the 20-pin ribbon cable leading from J16 of the INI-VGX to J1 of the first amplifier.
5. Connect the 20-pin ribbon cable leading from J2 of the first amplifier to J1 of the second amplifier.
6. Connect another 20-pin ribbon cable leading from J2 of the second amplifier to J1 of the third amplifier.

Figure 2.10.3.1.1 illustrates the AM-50 Series three amplifiers ribbon cable connection.

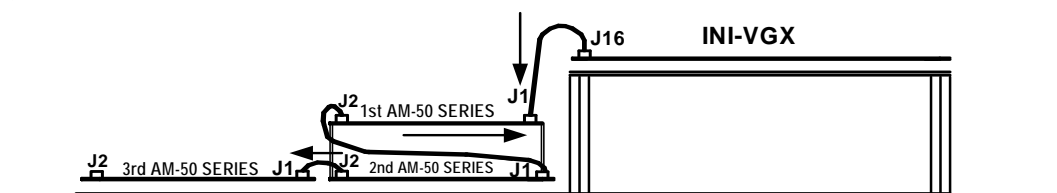


Figure 2.10.3.1.1 AM-50 Series Three Amplifiers Ribbon Cable Connection

2.10.4 Four Amplifier Ribbon Cable Installation



NOTE: It is recommended that after the first two amplifiers are connected, install the ribbon cables before proceeding. Always attach the ribbon cable of the first AM-50 Series amplifier from J1 to the J16 cable leading from the INI-VGX.

2.10.4.1 Four AM-50 Series Amplifiers Installed to the INX or INX CAB-B Mounting Plate

If four amplifiers are required, do the following:

1. Position the second amplifier directly below the INX-VGX on the INX or the INX CAB-B Mounting Plate, and secure the second amplifier using the four (4) standoffs (1/4" (.635 cm) HEX, 4-40 x 1 3/8") (provided in the Hardware Kit) to the four (4), mounting studs on the INX or the INX CAB-B Mounting Plate.
2. Position the third amplifier directly below the second amplifier on the INX or the INX CAB-B Mounting Plate, and secure the third amplifier using the four (4) standoffs (1/4" (.635 cm) HEX, 4-40 x 1 3/8") to the four (4), mounting studs on the INX or the INX CAB-B Mounting Plate.
3. Place the first amplifier above the second amplifier and secure the first amplifier to the standoffs, using the four (4), screws (4-40 x 1/4" (.635 cm) SEMS PHPD).
4. Place the fourth amplifier above the third amplifier and secure the fourth amplifier to the standoffs using the four (4), screws (4-40 x 1/4" (.635 cm) SEMS PHPD).
5. Connect a 20-pin ribbon cable leading from J16 of the INI-VGX to J1 of the first amplifier. Connect another 20-pin ribbon cable leading from J1 of the second amplifier to J2 of the first amplifier.
6. Connect the 20-pin ribbon cable leading from J2 of the second amplifier to J1 of the third amplifier.
7. Connect the 20-pin ribbon leading from J2 of the third amplifier to J1 of the fourth amplifier.

Figure 2.10.4.1.1 illustrates the AM-50 Series four amplifiers ribbon cable connection.



NOTE: The fourth amplifier can only serve as a standby amplifier.

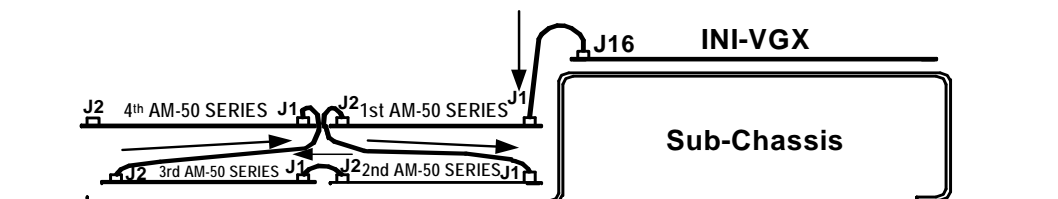


Figure 2.10.4.1.1 AM-50 Series Four Amplifiers Ribbon Cable Connection

Section 3: Wiring

3.1 Power Connections

Connection of the power supply to the 120/240 VAC power source must be made in compliance with the National Electrical Code, NFPA 70, Article 760, the applicable NFPA Standards, and according to the requirements of the Authority Having Jurisdiction. Such requirements include:

- Connections must be made to a dedicated branch circuit.
- Connections must be mechanically protected.
- All means of disconnecting the circuit must be clearly marked:
"FIRE ALARM CIRCUIT CONTROL."
- Connections must be accessible only to authorized personnel.

3.2 Intelligent Network Interface (INI-7100)

The 7100 BSM Basic System sub-assembly must be equipped with either an INI-7100 UTP or an INI-7100 FO sub-assembly in order to act as a node on the NetSOLO® Broadband Network.

3.2.1 INI-7100 UTP

The INI-7100 UTP provides terminal block connections for a twisted, unshielded pair of wires. Figure 3.2.1.1 illustrates the typical wiring between nodes. Table 3.2.1.1 lists the INI-7100-UTP wiring.



NOTE: Note the maximum distance of 3,000 feet between each node. Refer to Table 3.2.1.1 for specific wiring connections.

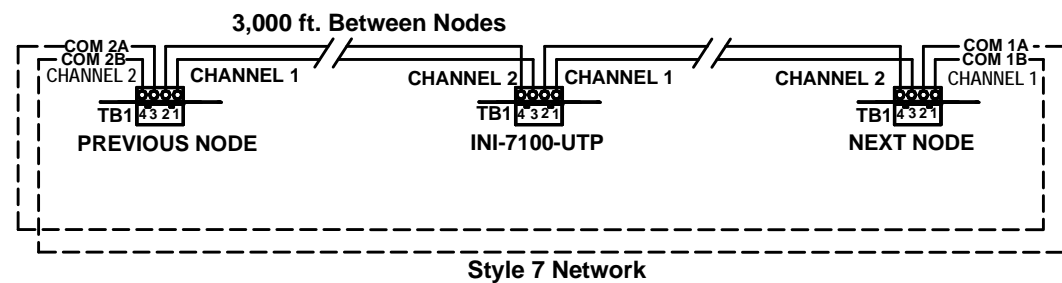


Figure 3.2.1.1 INI-7100 UTP Wiring Connections

Designation	Connections
INI-7100 TB1-1 (Com 1B) to:	Next INI-7100 TB1-3 (Com 2A) or Network Node
INI-7100 TB1-2 (Com 1A) to:	Next INI-7100 TB1-4 (Com 2B) or Network Node
Use:	
Equivalent non-shielded, twisted-pair- 3,000 ft. maximum between nodes	

Table 3.2.1.1 INI-7100 UTP Wiring Connections



NOTE: The use of fiber-optic cable is not permitted in New York City.

3.2.2 INI-7100 FO

The INI-7100 FO adds four (4) standard ST connectors for the fiber-optic cable while retaining the capacity to accommodate copper wire.

Connect the INI-7100 sub-assemblies in consecutive order of addressing to allow the fastest network communication. No star configurations or T-tapping on the NetSOLO network is permitted. Figure 3.2.2.1 illustrates a typical fiber-optic network.

Table 3.2.2.1 lists specific fiber-optic cable connections between the nodes.

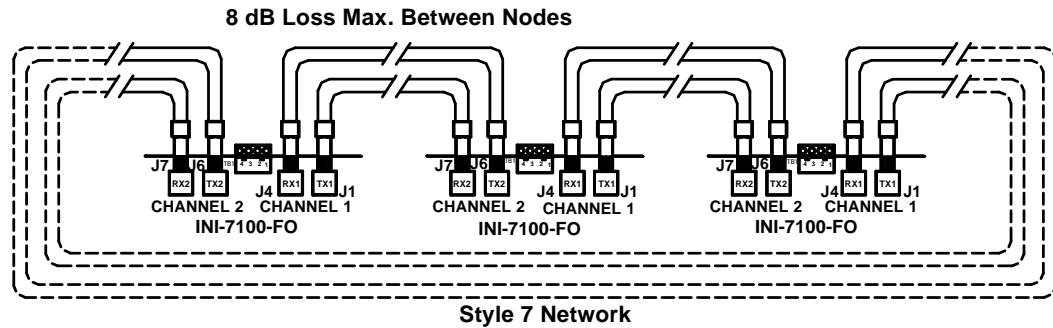
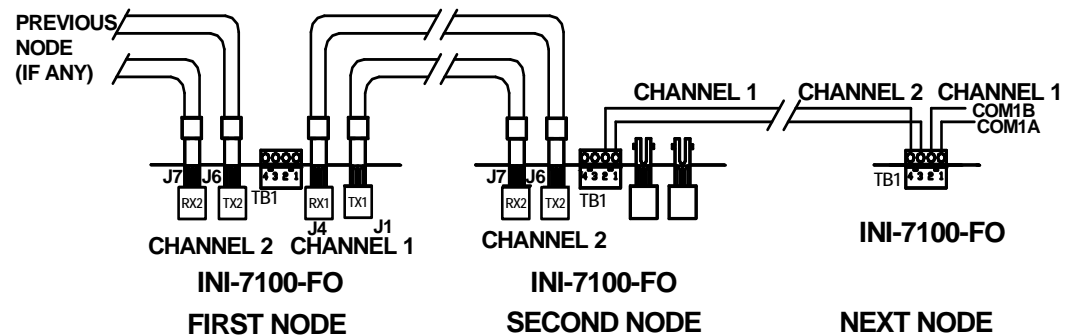


Figure 3.2.2.1 INI-7100 Fiber-Optic Network Configuration

Designation	Connections
INI-7100 Connector J1 (TX1) to	Next INI-7100 Connector J7 (RX2) or Network Node
INI-7100 Connector J4 (RX1) to	Next INI-7100 Connector J6 (TX2) or Network Node
Fiber-optic cable specifications:	
Up to 200 microns (optimized for 62.5 / 125 microns), Standard ST Connectors	
Up to 8 dB loss max. between nodes	

Table 3.2.2.1 Fiber-Optic Connections: INI-7100 FO

The INI-7100 FO can accommodate both fiber-optic cable connections and copper wire as shown Figure 3.2.2.1. This feature is useful for applications where the NetSOLO network covers multiple buildings. The NetSOLO wiring within a building can be run on copper wire. Connections between buildings can be run on fiber-optic cable for the best protection against transients and ground fault conditions. See Figure 3.2.2.2 for an example of a network using both types of connections.



NOTE: The use of fiber-optic cable is not permitted in New York City.

3.2.3 Addressable Switch Sub-assembly (ASM-16)

**CAUTION: STATIC SENSITIVE EQUIPMENT**

THIS SUB-ASSEMBLY IS A STATIC SENSITIVE ELECTRONIC DEVICE. TO MINIMIZE THE POSSIBILITY OF DAMAGE, ALWAYS USE A GROUNDED WRIST STRAP OR MAINTAIN CONTACT WITH GROUND WHILE HANDLING THIS EQUIPMENT.

1. Unpack the ASM-16 sub-assembly from its shipping carton.



NOTE: For new installations, temporarily remove the INCC inner door from the INCC-E backbox and place the sub-assembly face down on a flat surface.

2. It is recommended that the switch label be prepared and inserted between the ASM-16 faceplate overlay and the back plate at this time. Any subsequent alterations to the switch labels will require the ASM-16 be removed from the inner door assembly to gain access to the label.
3. Place the ASM-16 sub-assembly in position in the desired location in the inner door.
4. To fasten the sub-assembly in place, install a Kep nut over the mounting studs located at each corner. Do not tighten the nuts until all adjacent assemblies have been set in place.
For additional information, refer to the *ASM-16 Installation Instructions* for this sub-assembly, P/N 9000-0550.
5. Plug the RS-485 interconnect ribbon cable into the INI-VG Series sub-assembly Connector J3.
6. Plug the other end of the ribbon cable into J2 of the first ASM-16 (or ANU-48).
Continue the RS-485 bus between each additional ASM-16 as needed.
7. Extend the RS-485 bus as needed to sub-assemblies in adjoining expansion cabinets.



NOTE: For wiring details, see the ASM-16 or ANU-48 Wiring Connections (Table 3.2.4.1 and Figure 3.2.4.1).

3.2.4 ASM-16 or ANU-48 Wiring Connections

For the ASM-16, ANU-48, INI-VG Series, or remote enclosure installations, Table 3.2.4.1 use the wiring connections in, and refer to Notes A-F in Figure 3.2.4.1 for the ribbon cable and hardware locations.

ASM-16 or ANU-48 to ASM-16 or ANU-48 Wiring				
Designation		Description	Designation	
From ASM-16 or ANU-48		Ribbon Cable	To ASM-16 or ANU-48	
J1		Ribbon Cable	Connect To:	
			J1,J2	- ANU-48
			J3	- INI-VGC, INI-VGX, INI-VGE
			J1,J2,J3 - ASM-16	
J2		Ribbon Cable	Connect To:	
			J1,J2	- ANU-48
			J3	- INI-VGC, INI-VGX, INI-VGE
			J1,J2,J3 - ASM-16	
J3		Ribbon Cable	Connect To:	
			J1,J2	- ANU-48
			J3	- INI-VGC, INI-VGX, INI-VGE
			J1,J2,J3 - ASM-16	
J4		Emulator	Factory Use Only	
J5		Factory Use Only		
JMP1		Termination	Install Jumper only if the last device is on RS-485 bus.	
Note: See Note A in Figure 3.2.4.1 for the ribbon cable connection.				
ASM-16 or ANU-48 to ASM-16 or ANU-48 Wiring				
From ASM-16 or ANU-48			RS-485 COM A from previous device/to next device. Connect To:	
TB1-1	COMM A	Single Discrete Wire	TB6-3 INI-VGC, INI-VGX, INI-VGE	
			TB1-1 ASM-16, ANU-48	
			TB1-1 LCD-7100	
TB1-2	COMM B	Single Discrete Wire	RS-485 COM B from previous device/to next device. Connect To:	
			TB6-2 INI-VGC, INI-VGX, INI-VGE	
			TB1-2 ASM-16, ANU-48	
			TB1-2 LCD-7100	
TB1-3	+24V	Single Discrete Wire	Connect To:	
			TB1-3	+24V
			TB6-1 INI-VGC, INI-VGX, INI-VGE	
TB1-4	GND	Single Discrete Wire	Connect To:	
		Common	TB1-4	GND
			TB6-4 INI-VGC, INI-VGX, INI-VGE	
Note: See Note B in Figure 3.2.4.1 for the hardwire connection.				
INI-VGC, INI-VGX or INI-VGE Wiring				
From INI-VGC, INI-VGX or INI-VGE			To ASM-16 or ANU-48	
J3 RS-485 Local		Ribbon Cable	J1, J2 or J3	
Note: See Note C in Figure 3.2.4.1 for the ribbon cable connection.				
From INI-VGC, INI-VGX or INI-VGE			To ASM-16 or ANU-48	
ASM-16 or ANU-48 to ASM-16 or ANU-48 Wiring				
Designation		Description	Designation	
TB6 RS-485 Remote			ASM-16 or ANU-48 TB-1	
TB6-1	+24V	Single Discrete Wire	TB1-3	+24V
TB6-2	COMM B	Single Discrete Wire	TB1-2	COMM B
TB6-3	COMM A	Single Discrete Wire	TB1-1	COMM A
TB6-4	GND	Single Discrete Wire	TB1-4	GND
Note: See Note D in Figure 3.2.4.1 for the hardwire connection.				
Note 1:				
JMP1 - Termination leave out.				
JMP2 - Factory Programming leave in.				
JMP3 - Factory programming leave in.				
JMP4 - External Buzzer Connector.				

Table 3.2.4.1 ASM-16 or ANU-48 Wiring Connections

3.2.4 ASM-16 and ANU-48 Wiring Connections (Continued)

Figure 3.2.4.1 illustrates the ASM-16 and ANU-48 wiring connections.

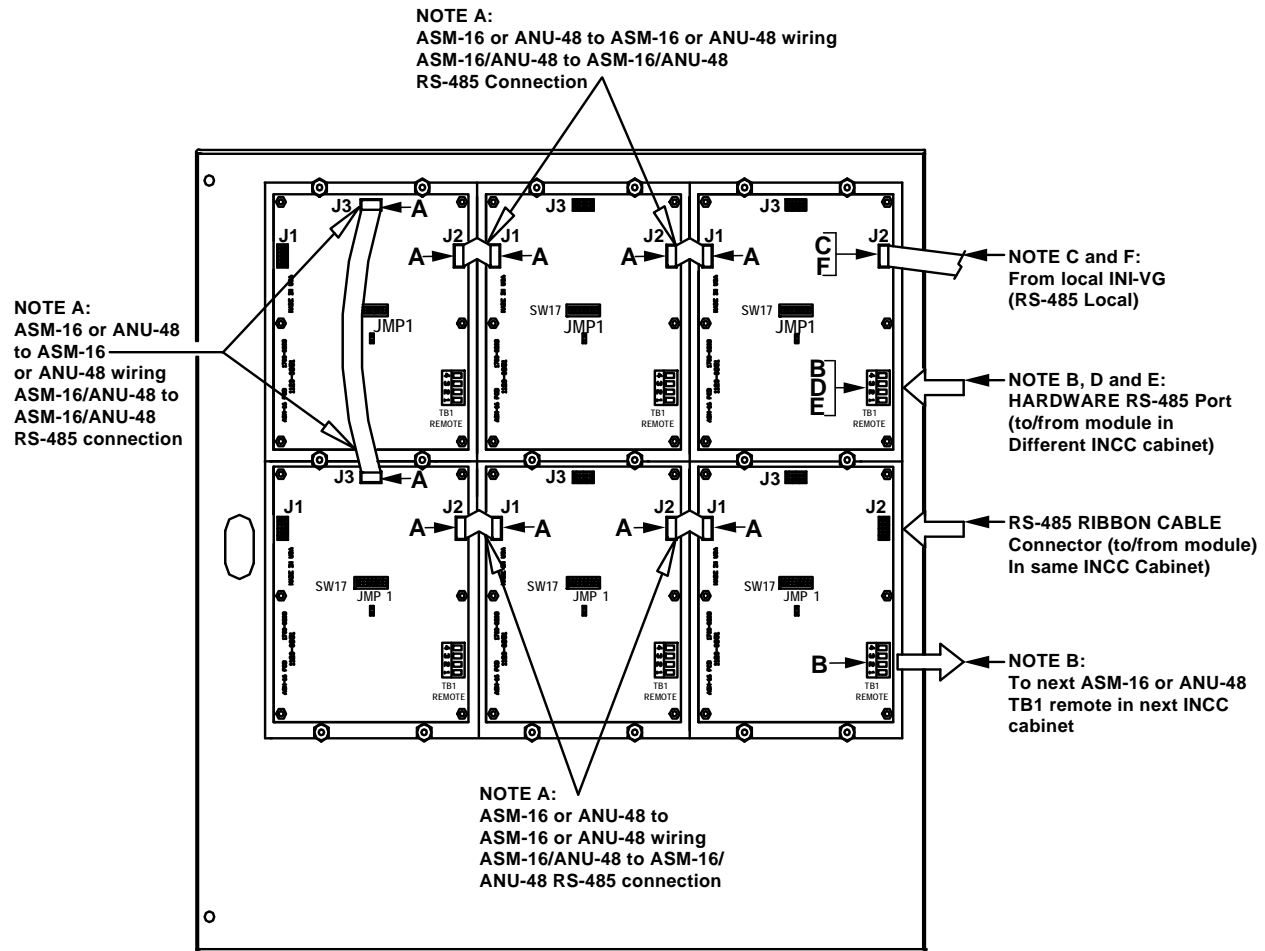


Figure 3.2.4.1 ASM-16 and ANU-48 Wiring Diagram



NOTE: For additional information on the ASM-16 wiring connections, refer to the *ASM-16 Installation Instructions (P/N 9000-0550)*.

3.2.5 ANU-48 Remote LED Driver Wiring Connections


CAUTION: STATIC SENSITIVE EQUIPMENT

THIS SUB-ASSEMBLY IS A STATIC SENSITIVE ELECTRONIC DEVICE. TO MINIMIZE THE POSSIBILITY OF DAMAGE, ALWAYS USE A GROUNDED WRIST STRAP OR MAINTAIN CONTACT WITH GROUND WHILE HANDLING THIS EQUIPMENT.

1. Unpack the ANU-48 sub-assembly from its shipping carton. Remove the unit from its static-shielded bag, observing proper static protection measures.



NOTE: For new installations, temporarily remove the INCC Inner Door from the INCC-E backbox and place it face down on a flat surface.

2. Place the ANU-48 sub-assembly in position in the desired location in the inner door.
3. To fasten the assembly in place, install the nuts (provided in the Hardware Kit) over the mounting studs located at each corner. Do not tighten the nuts until all adjacent assemblies have been set in place.
For additional information, refer to the *ANU-48 Installation Instructions, P/N 9000-0564*.
4. Plug the RS-485 interconnect ribbon cable into the INI-VG Series sub-assembly connector J3. Plug the other end of the ribbon cable into J1 of the first ANU-48.
Install the ribbon cables from J2 of the first ANU-48 board to J1 of the next, and continue.
5. Extend the RS-485 bus as needed to sub-assemblies in adjoining expansion cabinets.

Note 1: The annunciator may be located up to 3,000 feet from the panel and up to fifteen (15), additional annunciators can be connected, configured identically with the first. See Table 3.2.5.1 for resistance limitations for the connecting circuit.

Note 2: If more than four (4), ANU-48 modules are installed, an external regulated and power-limited power supply Listed for use with fire protective signaling units is required.

Note 3: For wiring details, see the ASM-16 and ANU-48 Wiring Connections Table 3.2.4.1 and Figure 3.2.4.1).

Quantity of ANU-48 modules	1	2	3	4
Max resistance of 24 VDC power circuit (ohms) to most distant ANU	40	20	14	10

Table 3.2.5.1 Resistance Limitations

For additional information on the ASM-16 wiring connections, refer to the *ASM-16 Installation Instructions (P/N 9000-0550)*.

3.2.6 Voice Paging Microphone Assembly (Optional)

1. Unpack the pre-assembled Voice Paging Microphone assembly from its shipping carton.



NOTE: For new installations, temporarily remove the INCC inner door from the INCC-E backbox and place it face down on a flat surface.

2. The Microphone assembly occupies one bay of the inner door. Place the Microphone assembly in position in the desired location in the inner door.
3. Fasten the assembly in place by installing a nut (provided with the Hardware Kit) over the mounting studs located at each corner.



NOTE: Do not tighten the nuts until all adjacent assemblies are set in place.

4. Remove the jumpers that are installed on the INI-VGC J15 header.
5. Connect the six-pin connector of the coiled cord to J15 on the INI-VGC, labeled "Microphone."



NOTE: Be sure to position the connector so that the gray jumper spans the top two pins on the INI-VGC J15 (Pins 6 and 5 counting from the top down). See Figure 3.2.6.1 for details.

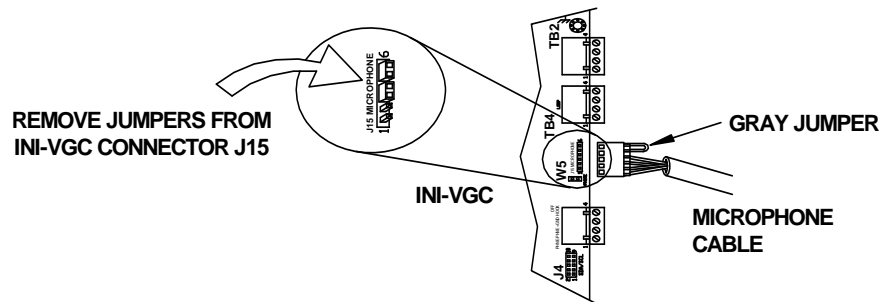


Figure 3.2.6.1 Voice Paging Microphone Connections

3.2.7 Fire Fighter's Intercom Handset Assembly (Optional)

1. Unpack the handset assembly from its shipping carton. Be sure to use the INCC-T inner door to accommodate the assembly.



NOTE: For new installations, temporarily remove the inner door from the INCC-E backbox and place it face down on a flat surface.

2. The handset assembly occupies two bays of the INCC-IDT inner door. Place the handset assembly in position on the inner door.
3. To fasten the assembly in place, install a Kep nut over the mounting studs located at each corner. Do not tighten the nuts until all adjacent assemblies have been set in place.
4. Plug the pre-assembled four-pin terminal block that terminates the phone cable into the INI-VGC TB5.
5. Remove INI-VGC jumper W5 to enable the local handset connection, see Figure 3.2.7.1

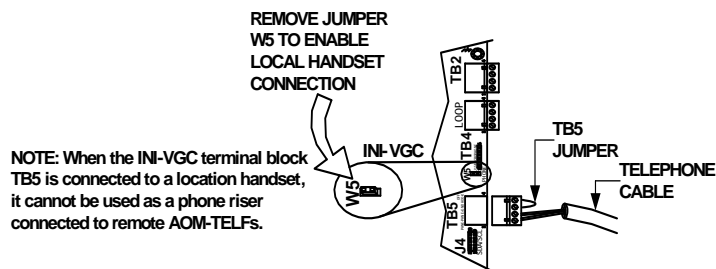


Figure 3.2.7.1 Fire Fighter's Intercom Handset Connections

3.2.8 LCD Annunciator Sub Assembly, (NGA)



CAUTION: STATIC SENSITIVE EQUIPMENT

THIS SUB-ASSEMBLY IS A STATIC SENSITIVE ELECTRONIC DEVICE. TO MINIMIZE THE POSSIBILITY OF DAMAGE, ALWAYS USE A GROUNDED WRIST STRAP OR MAINTAIN CONTACT WITH GROUND WHILE HANDLING THIS EQUIPMENT.

1. Unpack the NGA sub-assembly from its shipping carton. Remove the unit from its static-shielded bag, observing proper static protection measures.



NOTE: For new installations, temporarily remove the INCC inner door from the INCC-E backbox and place it face down on a flat surface.

2. Place the NGA sub-assembly in position in the upper left opening in the inner door.
3. To fasten the assembly in place, install the nuts (provided in the Hardware Kit) over the mounting studs located at each corner.



NOTE: Do not tighten the nuts until all adjacent assemblies have been set in place.

For additional information, refer to the *NGA Installation Instructions, P/N 9000-0568*.

4. Plug the ARCNET interconnect ribbon cable into the INI-VG Series subassembly Connector J7.



CAUTION: WIRING RESTRICTION

DO NOT CONNECT TO J3!

5. Plug the other end of the ribbon cable into J4 of the NGA.

3.2.9 NGA Wiring Connections

Table 3.2.9.1 and Figure 3.2.10.1 illustrate the NGA electrical connections.

Designation	Description	Comments
TB1-1		NGA TB1-1 24 VDC IN (+) from ILI/ILI95-MB TB3-6 or RPT-E3 TB4-3
TB1-2		NGA TB1-2 SYS GND IN (-) from ILI/ILI95-MB TB3-7 or RPT-E3 TB4-4
TB1-3		NGA TB1-3 Differential ARCNET COM A IN from RPT-E3 TB3-3 or ANX TB2-3
TB1-4		NGA TB1-4 Differential ARCNET COM B IN from RPT-E3 TB3-4 or ANX TB2-4
TB1-5		24 VDC OUT (+) to next device
TB1-6		SYS GND OUT (-) to next device
TB1-7		Differential ARCNET COM A OUT to next device
TB1-8		Differential ARCNET COM B OUT to next device
TB1-9	RxD	RxD to computer DB9 PIN 3, Printer DB25 PIN 2, or RS-232 RxD GRN download cable
TB1-10	Supervision	SUPV to computer DB9 PIN 9, Printer DB25 PIN 20, or RS-232 Supv download cable
TB1-11	TxD	TxD to computer DB9 PIN 2, Printer DB25 PIN 3, or RS-232 TxD BLK download cable
TB1-12	GND	GND to computer DB9 PIN 5, Printer DB25 PIN 7, or RS-232 GND RED download cable
J1	Internal use	To overlay
J2		Factory use only
J3	Program	Factory use only
J4	RS-485	Connects to J7 of INI-VG
J5	Internal use	To overlay
J6	Internal use	
J7	Internal use	
W1		Factory use only
W2		Factory use only
W3		Factory use only
W4		ARCNET TERM OFF
W5		RS-485 TERM OFF

Table 3.2.9.1 NGA Wiring Connections

3.2.10 NGA Wiring Diagram

Figure 3.2.10.1 illustrates the NGA field wiring connections.

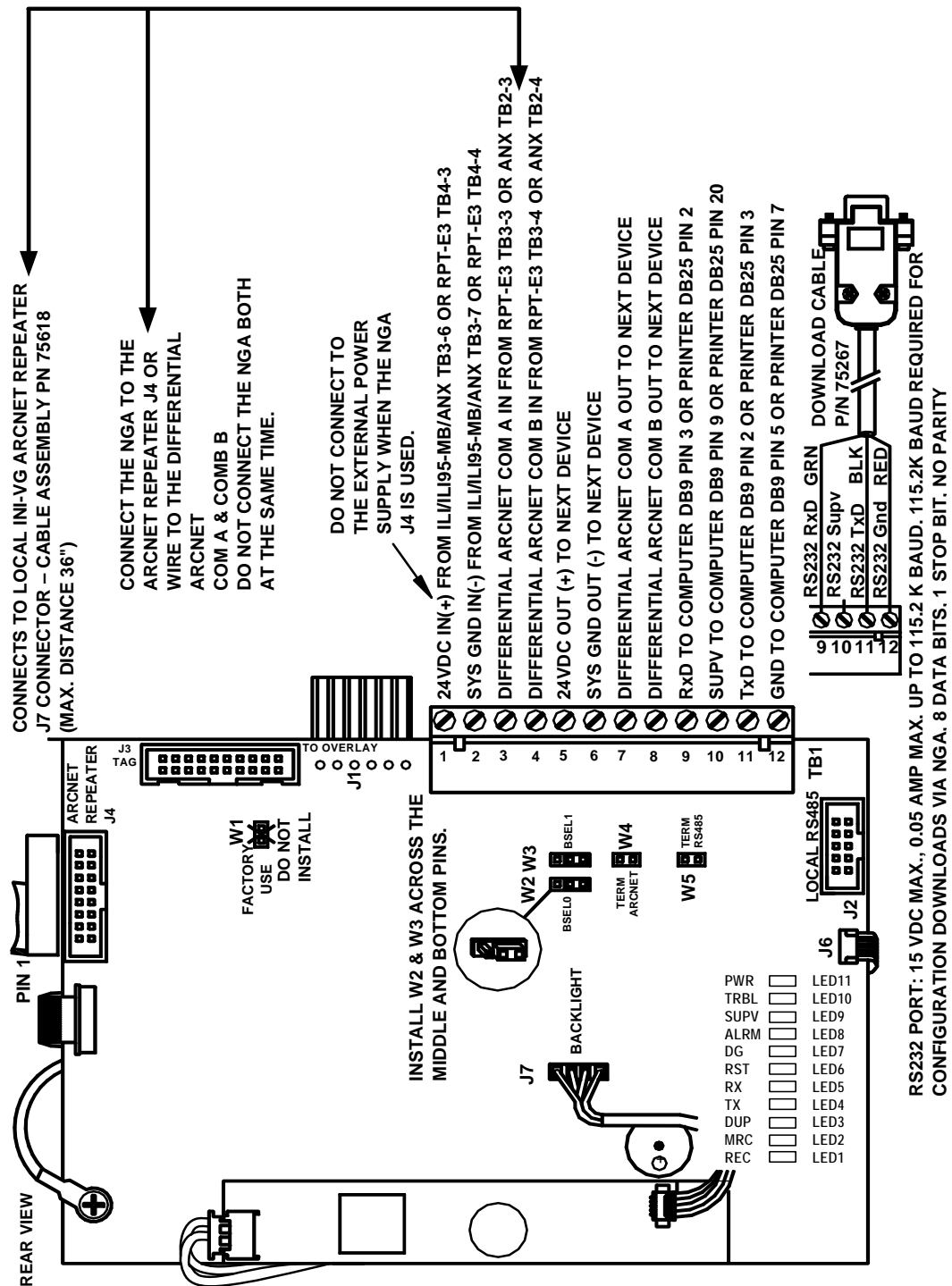


Figure 3.2.10.1 NGA Wiring Diagram

3.3 Intelligent Network Interface, Voice Gateway (INI-VG Series)

There are two network interface types of the INI-VG Series used in the NetSOLO[®] Broadband System.

- The INI-VGC-FO (fiber-optic and unshielded, twisted-pair wires) or INI-VGC-UTP (unshielded, twisted-pair wires only) are the network interface sub-assembly used only with the INCC Voice Command Center. (See Section 3.3.1)
- The INI-VGX-FO or INI-VGX-UTP is the network interface sub-assembly used only with the distributed amplifier assembly that is installed in the INX or the INX CAB-B cabinet enclosure. (See Section 3.3.3)

3.3.1 INI-VGC-FO or INI-VGC-UTP

In the INCC, the INI-VGC sub-assembly connects to the system microphone and the Fire Fighter Telephone Handset. It supervises and controls one (1) NGA and up to sixteen (16), ASM-16/ANU-48 sub-assemblies. Figure 3.3.2.1 shows all connections available on the INI-VGC and their functions. The INI-VGC contains the following:

- one (1) NGA
- up to sixteen (16), ASM-16 or ANU-48 sub-assemblies
- one Class B, Style 4, signaling line circuit
- up to sixteen (16), AOM-TELF Telephone Modules

3.3.2 INI-VGC Wiring Connections

Figure 3.3.2.1 illustrates the wiring connections for the INI-VGC sub-assembly.

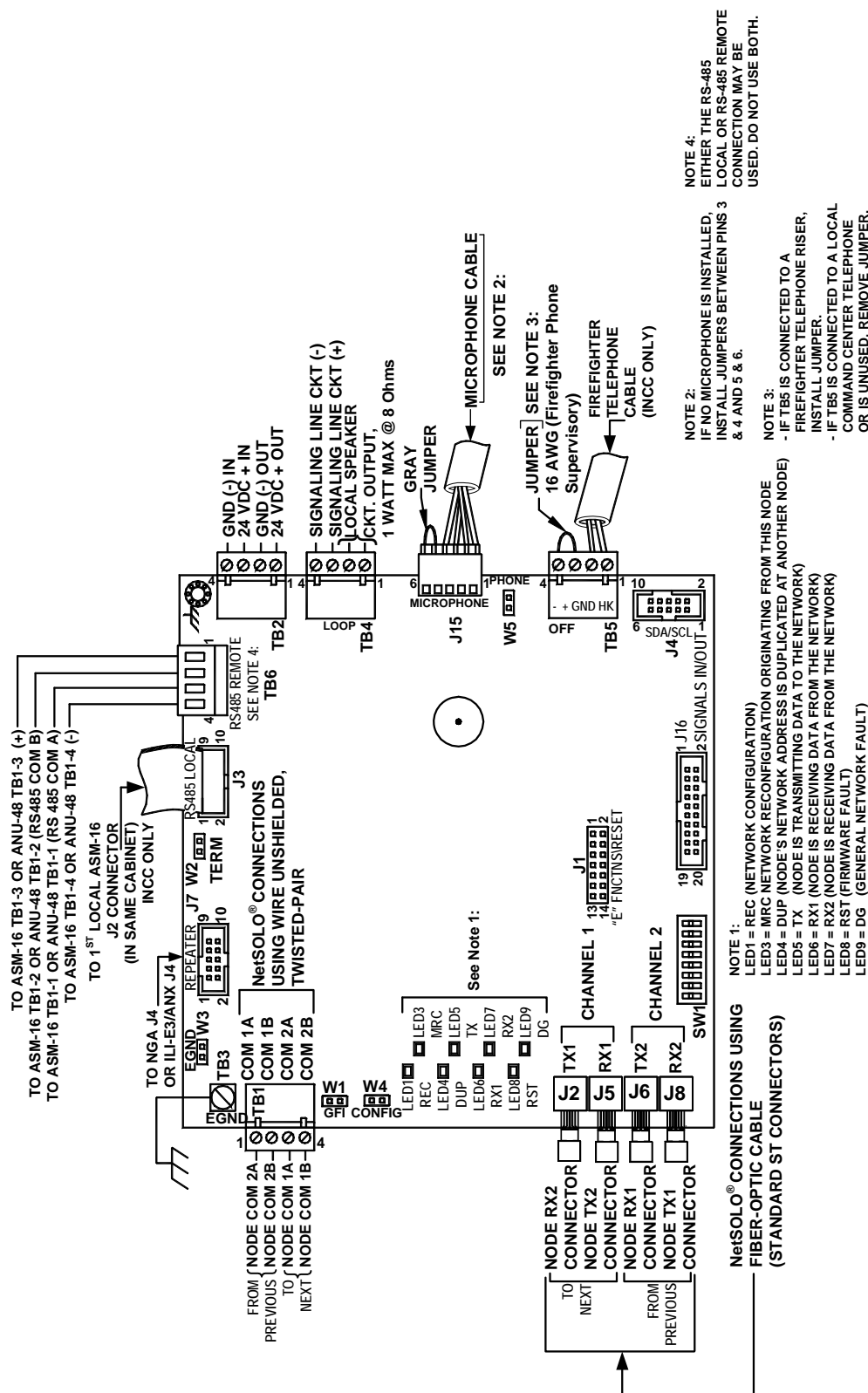


Figure 3.3.2.1 INI-VGC Wiring Diagram

3.3.2 INI-VGC Wiring Connections (Continued)

Table 3.3.2.1 includes the power consumption calculations for the INI-VGC-FO or INI-VGC-UTP.

Qty	Sub-Assembly	Description	Supv. Current	Alarm Current	Total Supv. Current	Total Alarm Current
	INI-VGC-FO or INI-VGC-UTP	Intelligent Network Voice Gateway-Command Center	0.150 A	0.150 A		
	ASM-16	Addressable Switch Sub-assembly	0.011 A †	0.011 A ‡		
	ANU-48	Remote LED driver Sub-assembly	0.011 A †	0.011 A ‡		
	NGA	LCD Display Sub-assembly	0.200 A*	0.200 A		
	Telephone	Fire Fighter's Telephone Handset	0.020 A	0.020 A		
	Microphone	Voice Paging Microphone	0.001 A	0.001 A		
	AOM-TELF	Addressable Output Module-Telephone	0.002 A	0.065 A		
				Total:		

NOTES:

The total supervisory and alarm currents determined above must be added to the standby battery calculations for the power supply providing the operating voltage to the INCC. Typically, this is a PM-9/PM-9G power supply.

† Add 0.003 A for each LED that is to be lit for alarm, trouble or supervisory conditions.

‡ Add .003 A for each LED to be lit for any condition when powered internally. When powered externally, each driver circuit provides a maximum of .050 amp with a maximum of 2.4 amps per ANU-48 module (48 circuits). This must be added to the calculations for the external power supply batteries.

* During a power failure, the supervisory current is 0.045 A, and the alarm current is 0.200 A. (Back lighting is extinguished during a power failure and operates only in alarm).

Table 3.3.2.1 INI-VGC-FO or INI-VGC-UTP Power Consumption Calculation Chart

3.3.3 INI-VGX-FO or INI-VGX-UTP

In the INX or the INX CAB-B cabinet enclosure, the INX-VGX sub-assembly does the following:

- Supervises the internal PM-9/PM-9G power supply
- Supervises and controls up to four (4), AM-50 Series, 50-watt amplifiers
- Stores up to sixteen (16), programmable messages and tones

The INI-VGX sub-assembly has one (1), Signaling Line Circuit (SLC) wired Style 4 (Class "B") only. This SLC supports the following:

- Up to sixteen (16), AOM-TELF Fire Fighter Intercom circuits
- Up to thirty-two (32), AOM-2SF (single-channel speaker circuits)
- MMO-6SF six-circuit single-channel speaker circuit modules are also supported, but each MMO-6SF takes up to six (6) addresses on the SLC

The INI-VGX operates with the following:

- One (1) NGA (optional)
- Up to six (6) ASM-16 or ANU-48 modules (optional)
- Sixteen (16) AOM-TELF fire fighter intercom circuits
- Up to (32) AOM-2SF (single-channel speaker circuits) or MMO-6SF (six-circuit single-channel speaker circuit modules)

Figure 3.3.4.1 shows the INI-VGX wiring connections.

3.3.4 INI-VGX Wiring Connections

Figure 3.3.4.1 illustrates the wiring connections for the INI-VGX sub-assembly.

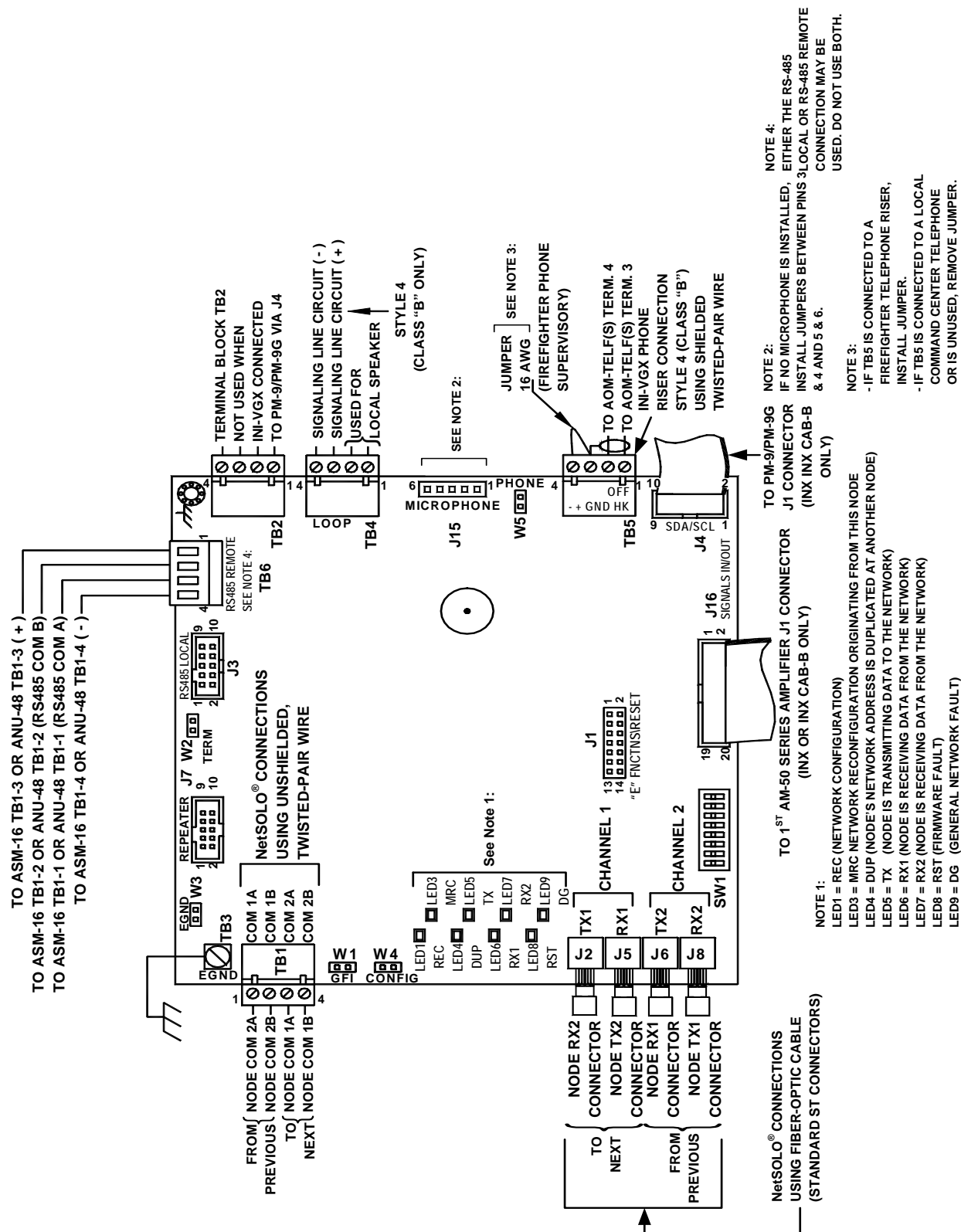


Figure 3.3.4.1 INI-VGX Wiring Diagram

3.3.5 INI-VG Series Wiring Connections

Table 3.3.5.1, Table 3.3.5.2 and Table 3.3.5.3 list the field wiring connections for the INI-VG Series.

Designation	Comments
Terminal Block 1- Network connection- using 16-18 AWG unshielded, twisted pair	
TB1-1	COM 1A connection
TB1-2	COM 1B connection
TB1-3	COM 2A connection
TB1-4	COM 2B connection
Terminal Block 2- External Power Connection	
TB2-1	24 VDC (+) power input from external power supply or PM-9/PM-9G TB4-1, TB4-3, TB4-5
TB2-2	GND (-) power input from external power supply or PM-9/PM-9G TB4-2, TB4-4, TB4-6
TB2-3	24 VDC (+) Power Out terminal-wiring terminal only, not a source of power
TB2-4	GND (-) Power Out terminal-wiring terminal only, not a source of power
TB3-1	Earth Ground
Terminal Block 4- Signaling Line Circuit Connections (See Notes 1, 2 and 3)	
TB4-1	Local Speaker (INCC, INX or INX CAB-B only) or Connect to ACT-1 (-) Terminal (INI-VGE only)
TB4-2	Local Speaker (INCC, INX or INX CAB-B only) or Connect to ACT-2 (+) Terminal (INI-VGE only)
TB4-3	Signaling Line Circuit (+), Style 4, Class "B"
TB4-4	Signaling Line Circuit (-), Style 4, Class "B"
Terminal Block 5- Fire Fighter Handset or Fire Fighter Phone riser connection (INI-VG)	
TB5-1	Fire Fighter Phone (-): Plugs into local Fire Fighter Handset-INI-VGC. Phone riser field wire connection to AOM-TELF Term 3- INI-VGX and INI-VGE
TB5-2	Fire Fighter Phone (+): Plugs into local Fire Fighter Handset- INI-VGC. Phone riser field wire connection to AOM-TELF Term 4- INI-VGX and INI-VGE
TB5-3	Telephone Plug Supervisory Loop (Connects to TB5-4). Connect only if the INI-VG Firmware is V2.0-006 or later.
TB5-4	Telephone Plug Supervisory Loop (Connects to TB5-4). Connect only if the INI-VG Firmware is V2.0-006 or later.
Terminal Block 6- RS-485 Remote Connection to ASM-16/ANU-48 in Separate Cabinet	
TB6-1	+ 24 VDC Supply - connects to remote ASM-16/ANU-48 TB1-3
TB6-2	RS-485 COM B - connects to remote ASM-16/ANU-48 TB1-2
TB6-3	RS-485 COM A - connects to remote ASM-16/ANU-48 TB1-1
TB6-4	System Common (-) connects to remote ASM-16/ANU-48 TB1-4
NOTE 1: The INI-VGC Signaling Line Circuit supports the AOM-TEL and AOM-TELF Telephone Modules.	
NOTE 2: The INI-VGX Signaling Line Circuit supports the AOM-TEL, the AOM-TELF Telephone Modules and the AOM-2S, AOM-2SF, MMO-6S, MMO-6SF Speaker Circuit Control Modules.	
NOTE 3: The INI-VGE Signaling Line Circuit supports the AOM-TEL, AOM-2SF, MMO-6SF Control Modules.	

Table 3.3.5.1 INI-VG Series Field Wiring Connections

3.3.5 INI-VG Series Wiring Connections (Continued)

Table 3.3.5.2 lists the INI-VG Series jumpers and cable connections. Table 3.3.5.3 lists the INI-VG Series Indicating and Diagnostic LEDs.

Designation	Description	Comments
J1	"E" FNCTNS/RESET	Factory use
J2	Fiber-Optic ST Channel 1 TX1	Connects to next node RX2 ST connector.
J3	RS 485 Local	Connects to 1st Local ASM-16/ANU-48 Connector J2.
J4	SDA/SCL	Connects to the PM-9/PM-9G Connector J1 in the INX or the INX CAB-B
J5	Fiber-Optic ST Channel 1 RX1	Connects to the next node TX2 ST connector.
J6	Fiber-Optic ST Channel 2 TX2	Connects from the previous node RX1 connector
J7	Repeater	Network Backplane. Connects to NGA connector J4. For optimum network communication, run this cable underneath the PM-9/PM-9G.
J8	Fiber-Optic ST Channel 2 RX2	Connects from previous node TX1 connector.
J15	Microphone	Connectors to microphone cable. If no microphone is installed, jumpers must be installed between pins 3 and 4, and 5 and 6.
J16	Signals In/Out	Connects to the 1st AM-50 Series Connector J1 in the INX or the INX CAB-B only.
W1	GFI	IN for ground fault indication Install the jumper to supervise for ground faults on network wiring between this INI-VG Series and any other nodes that are directly connected to this INI-VG Series.
W2	Termination	Install if the last ASM-16 or ANU-48 is connected to the RS-485 bus and has JMP1 installed. Otherwise, do not install.
W3	EGND	IN to enable earth ground reference circuit Jumper should only be installed if the INI-VG Series is being powered by a power supply that does NOT supervise for ground faults.
W4		Factory use. Do not install.
W5		Phone Filter Bypass. If TB5 is connected to a fire fighter telephone riser, install the jumper. If TB5 is connected to a local command center telephone or is unused, remove the jumper.

Table 3.3.5.2 INI-VG Series Jumpers and Cable Connections

Designation	Description	Comments
LED 1	REC	Network is reconfiguring
LED 3	MRC	This node is initiating a network reconfiguration
LED 4	DUP	Duplicate node address or address switch error
LED 5	TX	The sub-assembly is transmitting network data
LED 6	RX1	The sub-assembly is receiving network data on Channel 1
LED 7	RX2	The sub-assembly is receiving network data on Channel 2
LED 8	RST	Firmware fault
LED 9	DG	Trouble condition

Table 3.3.5.3 INI-VG Series Indicating & Diagnostic LEDs

3.3.6 INI-VG Series Power Connections

The INI-VGC, serving as the network interface and the control unit of an INCC Command Center, connects to its operating power via the Terminal Block TB1.

The INI-VGX serves as a network interface and control sub-assembly of a distributed amplifier assembly and is enclosed in an INX or INX CAB-B cabinet. It connects to its own dedicated PM-9/PM-9G power supply via the supplied ribbon cable connected between J4 of the INI-VGX-FO or INI-VGX-UTP and J1 of the PM-9/PM-9G.

Table 3.3.6.1 lists the INI-VG Series power connections.

Designation	Connections
INI-VGC-FO or INI-VGC-UTP, or (INI-VGX-FO or INI-VGX-UTP if J4 is not used)	
TB2-1	+24 VDC IN - from power supply or TB4-5 of PM-9/PM-9G
TB2-2	GND (-) IN – from power supply or TB4-2 of PM-9/PM-9G
TB2-3	+24 VDC OUT
TB2-4	GND (-) OUT
INI-VGX-FO or INI-VGX-UTP	
J4	SDA/SCL – to PM-9/PM-9G power supply J1

Table 3.3.6.1 INI-VG Series Power Connections

3.3.7 NetSOLO® Broadband Network Connections

The INI-VG Series can be connected to the NetSOLO[®] Broadband System using an unshielded, twisted-pair of wires, fiber-optic cable, or a combination of the two. Figure 3.3.7.1 illustrates the INI-VG Series connections to the NetSOLO Broadband System. Table 3.3.7.1 and Table 3.3.7.2 list the wiring connections.

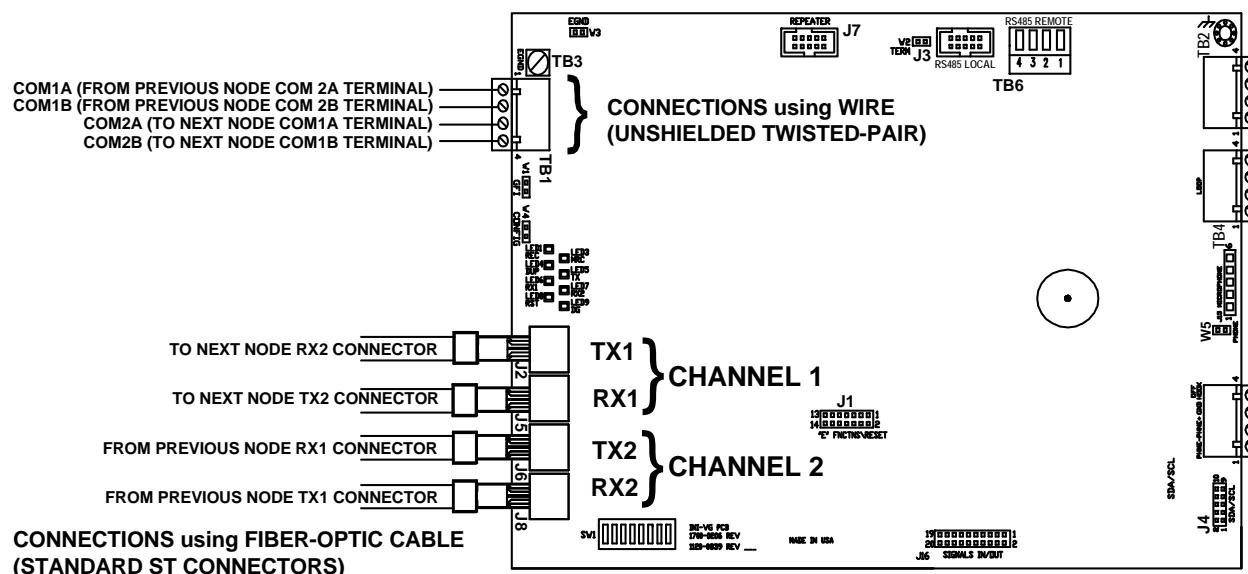


Figure 3.3.7.1 INI-VG Series Connections to the NetSOLO Broadband System

Designation	Description	Comments
TB1-1	COM 1A	To next node's TB1-3 (COM 2A)
TB1-2	COM 1B	To next node's TB1-4 (COM 2B)
TB1-3	COM 2A	From previous node's TB1-1 (COM 1A)
TB1-4	COM 2B	From previous node's TB1-2 (COM 1B)
Use 16-18 AWG unshielded, twisted-pair up to 3,000 feet (915 m) between nodes.		

Table 3.3.7.1 Network Wire Terminations

Designation	Comments
ST Connector J2 Channel 1 TX1	To next node's ST Connector J8 (RX2)
ST Connector J5 Channel 1 RX1	To next node's ST Connector J6 (TX2)
ST Connector J6 Channel 2 TX2	From previous node's ST Connector J5 (RX1)
ST Connector J8 Channel 2 RX2	From previous node's ST Connector J2 (TX1)
Fiber-optic cable: up to 200 microns (optimized for 62.5/ 125 microns)	
Up to 8 dB loss max. between nodes.	

Table 3.3.7.2 Network Fiber-Optic Cable Connections



NOTE: The use of fiber-optic cable is not permitted in New York City.

3.3.7 NetSOLO Broadband Connections (Continued)

Figure 3.3.7.2 illustrates the NetSOLO Broadband multiple connections.

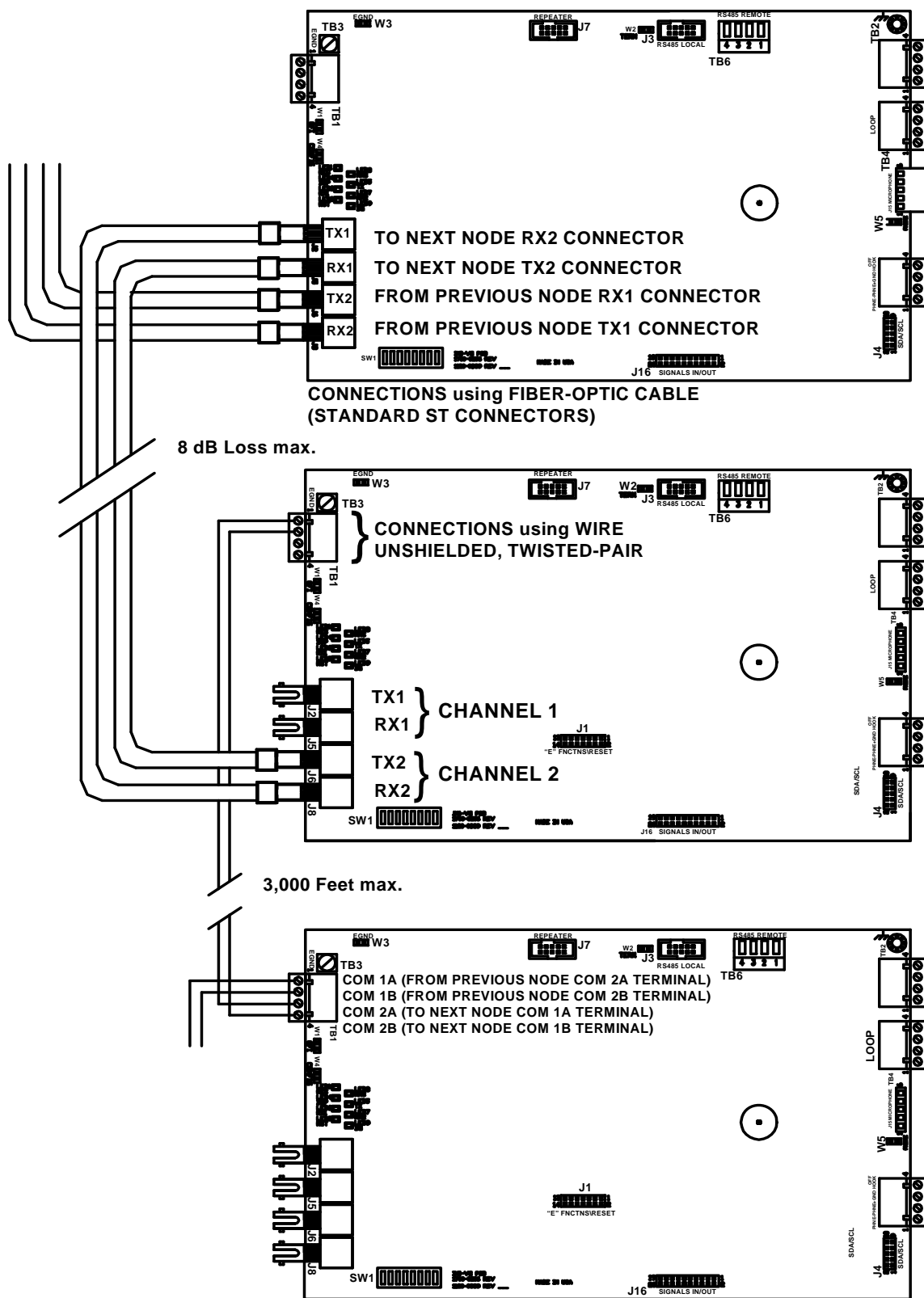


Figure 3.3.7.2 Multiple Network Connections

3.3.8 INI-VGX Signaling Line Circuit (INX only)

This sub-assembly, installed in the INX or INX CAB-B cabinet enclosure, provides one (1), Style 4 (Class B) Signaling Line Circuit (SLC). Up to sixteen (16), AOM-TELF Fire Fighter Intercom circuits and thirty-two (32), AOM-2SF Single-Channel speaker circuits can be connected to this SLC.

Figure 3.3.8.1 illustrates the INI-VGX signaling line circuit connections.

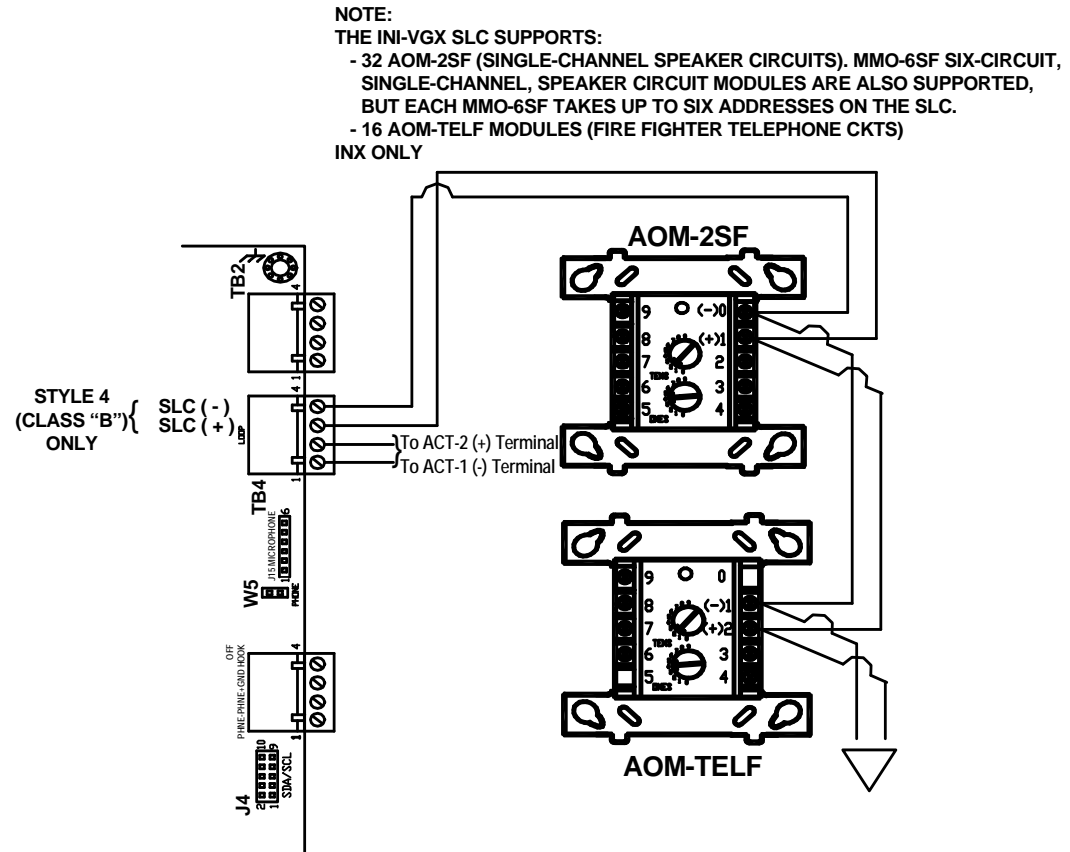


Figure 3.3.8.1 INI-VGX Signaling Line Circuit Connections

3.3.8.1. INI-VGX Signaling Line Circuit Specifications:

- 24 VDC nominal, power-limited and supervised
- 40 ohms max. wire resistance
- 0.5 μ F max. circuit capacitance
- 0.070 amp max. current

Use twisted unshielded wire, 18 AWG minimum.

3.3.9 INI-VGX Fire Fighter Intercom Riser Connections

The INI-VGX sub-assembly, installed in an INX or an INX CAB-B Transponder, provides a phone riser circuit on Terminal Block TB5 Terminals 3 and 4 that connects to the AOM-TELF Fire Fighter Phone circuit Terminals 3 and 4. Up to sixteen (16), AOM-TELFs can be connected to each INI-VGX phone riser.

Figure 3.3.9.1 and Figure 3.3.9.2 illustrate the wiring connections.

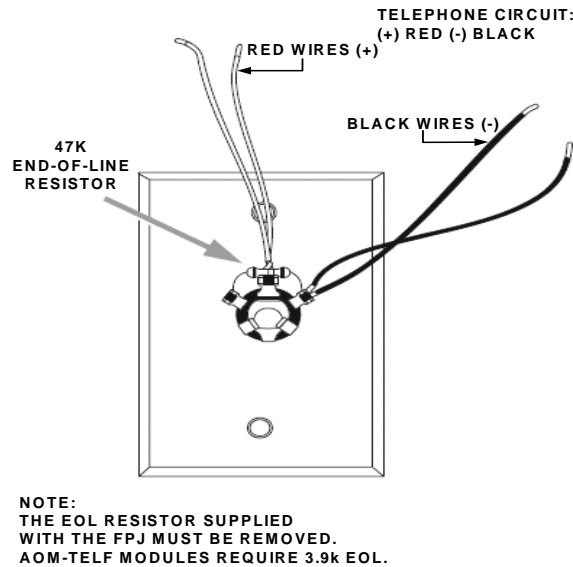


Figure 3.3.9.1. FPJ Series Firefighter's Phone Jack Wiring Connections

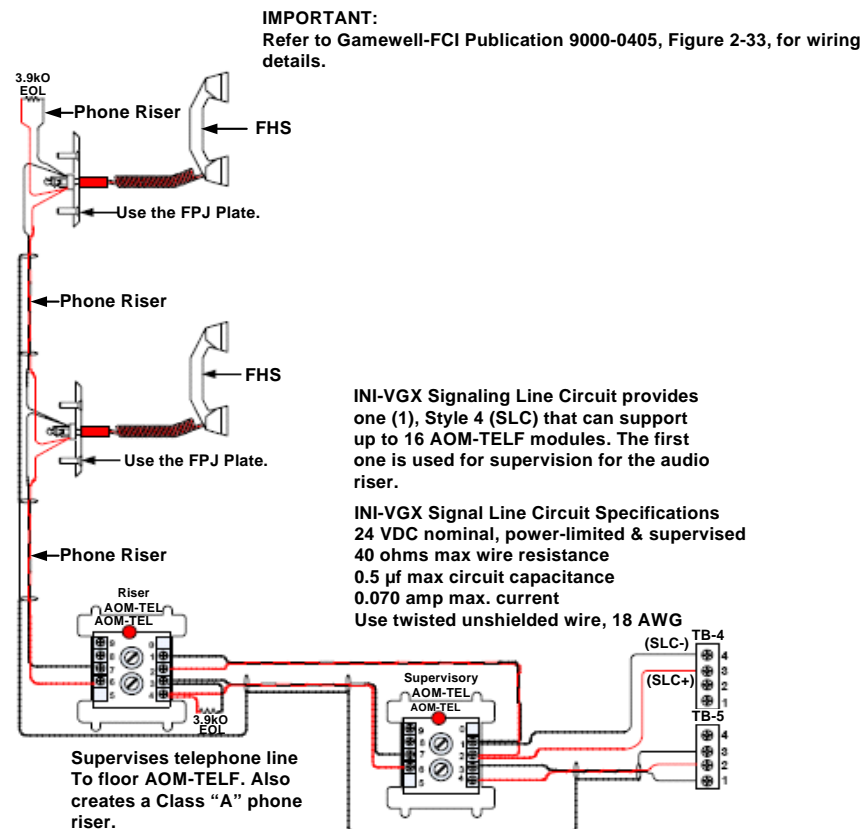


Figure 3.3.9.2 INI-VGX Intercom Riser Connections

3.3.10 INI-VGC Connections to Remote ASM-16 or ANU-48 Sub-Assemblies

An INI-VGC, installed in an INCC Command Center assembly, can support up to a total of sixteen (16), ANU-48 or ASM-16 sub-assemblies. The INCC cabinet has space for up to six (6), ASM-16/ANU-48 sub-assemblies (three (3) spaces are available, if a microphone and the fire fighter handset are included). The INI-VGC-FO or INI-VGC-UTP TB6 provide a hardwire connection between the INI-VGC and any ASM-16/ ANU-48 sub-assembly mounted in a different cabinet.

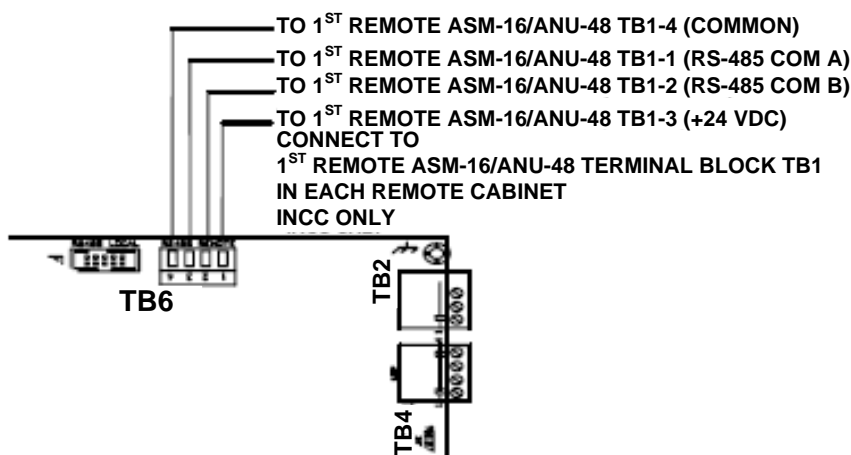


NOTE: For wiring details, see the ASM-16 or ANU-48 Wiring Connections (see Table 3.2.4.1 and Figure 3.2.4.1).

If the ASM-16/ANU-48s are mounted in the same cabinet as the INI-VGC, use a ribbon cable to connect the sub-assemblies.

Designation from INI-VGC	Designation to Remote ASM-16/ANU-48
INI-VGC TB6-1 (+ 24 VDC)	1st Remote ASM-16/ANU-48 TB1-3
INI-VGC TB6-2 (RS-485 COM B)	1st Remote ASM-16/ANU-48 TB1-2
INI-VGC TB6-3 (RS-485 COM A)	1st Remote ASM-16/ANU-48 TB1-1
INI-VGC TB6-4 (Common)	1st Remote ASM-16/ANU-48 TB1-4

Table 3.3.10.1 INI-VGC-FO or INI-VGC-UTP to Remote ASM-16/ANU-48s



NOTE:
 USE EITHER THE RS-485 LOCAL
 OR RS-485 REMOTE CONNECTION
 DO NOT USE BOTH.

Figure 3.3.10.1 INI-VGC Connections to Remote ASM-16 or ANU-48 Panels

3.3.11 INI-VG Series Earth Ground Connection

Connect the INI-VG Series TB3 to earth ground for full protection against transient voltages, power surges and to conform to the National Electrical Code, NFPA 70, Article 760. Use a cold water pipe or a ground-driven rod to ensure proper bonding. Panel neutral or conduit ground is not acceptable. Use 14 AWG minimum wire.

3.3.12 INI-VG Series Program Address Switch Settings

Use the INI-VG Series DIP Switch SW-1 to set the address that the sub-assembly will occupy on the network. Do not duplicate addresses with other sub-assemblies on the network. Figure 3.3.12.1 illustrates the INI-VG Series programming address switch settings.

For the fastest communication between nodes, set the addresses in consecutive order.

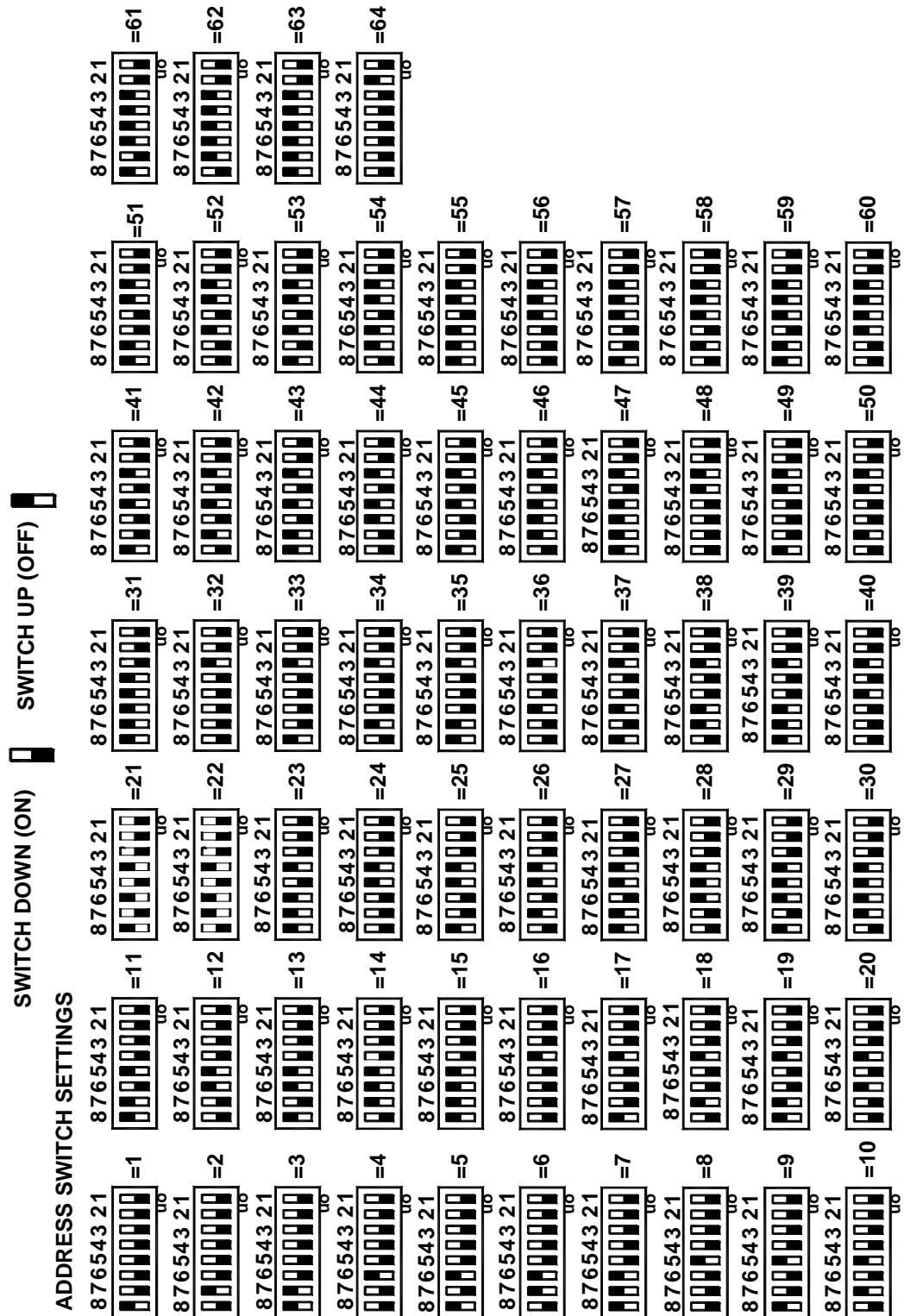


Figure 3.3.12.1 INI-VG Series Address Switch Settings

3.4 PM-9/PM-9G Power Supplies (INX or INX CAB-B only)

The PM-9/PM-9G Power Supply sub-assemblies are used to provide the operating voltage to an INX or an INX CAB-B Transponder assembly comprised of an INI-VGX-FO or INI-VGX-UTP and up to four (4), AM-50 Series amplifier sub-assemblies. In addition, the PM-9/PM-9G is capable of maintaining and supervising batteries up to 55 A/H (with an external battery cabinet). The INX or the INX CAB-B cabinet accommodates batteries up to 12 A/H. (Batteries not furnished). Figure 3.4.1 illustrates the PM-9/PM-9G sub-assembly.

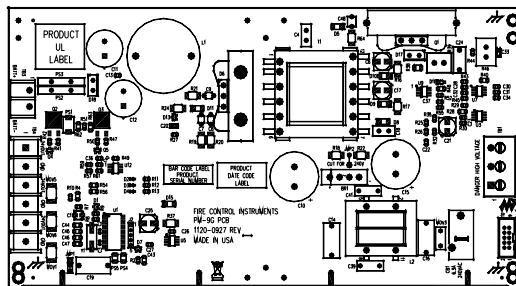


Figure 3.4.1 PM-9/PM-9G Sub-Assembly

PM-9 Connections

Table 3.4.1 lists the PM-9 wiring connections.

Designation	Description	Comments
TB1-1	HOT/BLK	Connect to hot, 120VAC, 60Hz - Non Power-limited
TB1-2	GND/GRN	Connect to ground and isolated earth ground - Non Power-limited
TB1-3	NEUT/WHT	Connect to neutral 120VAC, 60Hz
TB3-1	BATT+	Battery positive input - Non Power-limited
TB3-2	BATT -	Battery negative input - Non Power-limited
TB4-1	24VOUT	+24 VDC FWR Output to AM-50 Series amplifiers, TB1-2: used to power two (2), AM-50 Series amplifiers
TB4-2	GND	GND (-) Output to AM-50 Series amplifiers, TB1-1: used to power two (2), AM-50 Series amplifiers
TB4-3	24VOUT	+24 VDC FWR Output to AM-50 Series amplifiers, TB1-2: used to power the second pair of AM-50 Series amplifiers and INI-VG Series
TB4-4	GND	GND (-) Output to AM-50 Series amplifiers: TB1-1: to the second pair of AM-50 Series amplifiers and the INI-VG Series
TB4-5	24VOUT	+24 VDC FWR Output to other sub-assemblies: INI-VG Series
TB4-6	GND	GND (-) Output to the INI-VG Series
JMP1		IN for GND Fault Detection
J1		10-PIN Ribbon Cable Connect to Connector J1, or INI-VG Series Connector J4
JMP2		Factory Use Only
LED 2	Green	Lights to indicate AC power
LED 3	Yellow	Lights to indicate no or low battery fault
LED 4	Yellow	Lights to indicate ground fault
NOTE: AC "Brown Out" condition indicated by:		
LED 2 (grn) OFF		
LED 3 (yel) LIT		
LED 4 (yel) LIT		

Table 3.4.1 PM-9 Terminals, Jumpers & LEDs

PM-9G Connections

Table 3.4.2 lists the PM-9G wiring connections.

Designation	Description	Description
TB1-1	HOT/BLK	Connect to hot, 240 VAC, 50/60 Hz - Non Power-limited
TB1-2	GND/GRN	Connect to ground and isolated earth ground - Non Power-limited
TB1-3	NEU/WHT	Connect to neutral 240 VAC, 50/60 Hz
TB3-1	BATT+	Battery positive input - Non Power-limited
TB3-2	BATT -	Battery negative input - Non Power-limited
TB4-1	24 VOUT	+ 24 VDC FWR Output to AM-50 Series amplifiers, TB1-2: used to power two (2) AM-50 Series amplifiers
TB4-2	GND	GND (-) Output to AM-50 Series amplifiers, TB1-1: used to power two (2), AM-50 Series amplifiers
TB4-3	24 VOUT	+ 24 VDC FWR Output to AM-50 Series amplifiers, TB1-2: used to power the second pair of AM-50 Series amplifiers and the INI-VG Series
TB4-4	GND	GND (-) Output to AM-50 Series amplifiers TB1-1: to the second pair of AM-50 Series amplifiers and the INI-VG Series
TB4-5	24 VOUT	+ 24 VDC FWR Output to other sub-assemblies: INI-VG Series
TB4-6	GND	GND (-) Output to INI-VG Series
JMP1		IN for GND Fault Detection
J1		10-PIN Ribbon Cable Connect to the Connector J1 or INI-VG Series Connector J4
JMP2		Factory Use Only
LED 2	Green	Lights to indicate AC power
LED 3	Yellow	Lights to indicate no or low battery fault
LED 4	Yellow	Lights to indicate ground fault
NOTE 1: AC "Brown Out" condition indicated by: LED 2 (grn) OFF - LED 3 (yel) LIT - LED 4 (yel) LIT		

Table 3.4.2 PM-9G Terminals, Jumpers & LEDs

3.4.1 PM-9/PM-9G AC Connections

The following power source connections must be made in compliance with the National Electrical Code, NFPA 70, Article 760, the applicable NFPA Standards, and according to the requirements of the Authority Having Jurisdiction (AHJ).

- PM-9 connection of 120 VAC, 60 Hz
- PM-9G connection of 240 VAC, 50/60 Hz

Such requirements include:

- Connections must be made to a dedicated branch circuit.
- Connections must be mechanically protected.
- All means of disconnecting the circuit must be clearly marked:
"FIRE ALARM CIRCUIT CONTROL"
- Connections must be accessible only to authorized personnel.

PM-9

The PM-9 can draw up to 4.6 amps max. @ 120 VAC 60 Hz when under full load. See Figure 3.4.3.1 for the AC wiring and ground connections. See Table 3.4.2.1 for the AC input and the battery connections.

PM-9G

The PM-9G can draw up to 2.4 amps max. @ 240 VAC 50/60 Hz when under full load. Figure 3.4.3.2 illustrates the PM-9G AC power connections. See Table 3.4.2.1 for the AC input and the battery connections.



NOTE: Always apply AC power first, then connect the batteries.

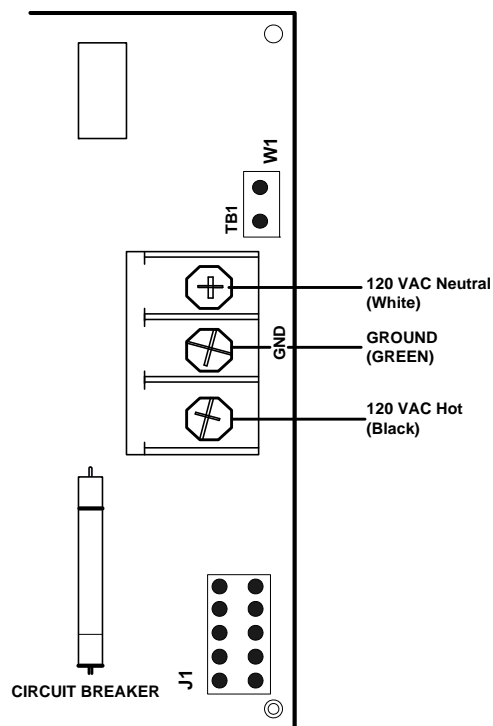


Figure 3.4.3.1 PM-9 AC Power Connection

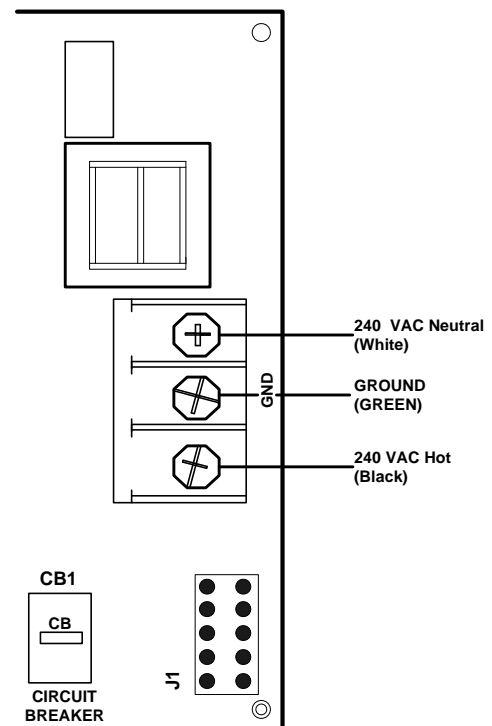


Figure 3.4.3.2 PM-9G AC Power Connection

3.4.2 PM-9/PM-9G Battery Connections

Connect a pair of 12 VDC batteries in series to PM-9/PM-9G TB3. TB3-1 (top) is Battery Positive and TB3-2 (bottom) is Battery Negative.

Be sure to observe polarity. Check connections before applying battery power. Apply the AC power first, then the battery power. To remove the power, remove the batteries, then remove the AC power.

The PM-9/PM-9G has a battery charging circuit that is capable of maintaining batteries up to 55 A/H (with an external battery cabinet). The INX and INX CAB-B cabinets will accommodate batteries up to 12 A/H. Table 3.4.2.1 lists the PM-9/PM-9G Standby Battery Calculation Chart.

Qty	Sub-Assembly	Description	Supv. Current	Alarm Current	Total Supv. Current	Total Alarm Current
	PM-9 (See Notes 5 & 6)	Power Supply	0.050 A	0.050 A		
	PM-9G (See Notes 5 & 6)	INX Power Supply Sub-assembly, 9 amp	0.027	0.050		
	INI-VGX, INI-VGC	Intelligent Network, Voice Gateway	0.150	0.150		
	AM-50-25	Amplifier Sub-assembly, 50 Watt, 25V _{RMS}	0.086 normal standby	2.206 amp alarm @ 50 W max. output		
	AM-50-70	Amplifier Sub-assembly, 50 Watt, 70.7V _{RMS}	0.049 amp normal standby	2.30 amp alarm @ 50 watt max. output		
	ASM-16	Addressable Switch Sub-assembly	0.011 (See Note 1)	0.011 (See Note 1)		
	ANU-48	Remote LED driver Sub-assembly	0.011 (See Note 2)	0.011 (See Note 2)		
		Addressable Modules:				
	AOM-TELF	Addressable Output Module- Telephone	0.0024	0.0075		
	AOM-2SF	Addressable Output-Supervised Control Module	0.00035 Clip 0.000375 Velociti	0.0065		
	MMO-6SF	Addressable Output Module	0.0022	0.035		
A	Total supervisory current (See Note 4)					
B	Enter number of standby hours required					
C	Multiply Line A by hours in Line B					
D	Total alarm current					
E	Enter alarm sounding period in hours ** (0.25 hr)					
F	Multiply Line D by Line E					
G	Add Line C & Line F					
H	Multiply Line G by 1.2 to arrive at total ampere/hours required (See Note 3)					
NOTE 1: Add .003 amp for any LED to be lit for any condition when powered internally.						
NOTE 2: Add .003 amp for any LED to be lit for any condition when powered internally. When powered externally, a max. output current of .050/point is available for a maximum total output of 2.4 amps/ANU-48.						
NOTE 3: For Emergency Voice/Alarm Communication service, the system shall be capable of operating the system for 24 hours under a maximum normal load and then operating the system during an alarm condition for a period of 2 hours. Fifteen (15) minutes of evacuation alarm operation at maximum alarm load shall be considered the equivalent of 2 hours of alarm operation.						
NOTE 4: Use the next size battery with a capacity greater than required. (Use only Gamewell-FCI Models: B-1, B-7R, B-17R, B-55R, BAT-1270, BAT-12120, BAT-12260, or BAT-12550 batteries). When using 55 A/H batteries, the maximum standby current for 60 hours is .560 A. The system batteries must be replaced as a set.						

Table 3.4.2.1 PM-9/PM-9G Standby Battery Calculation Chart

Qty	Sub-Assembly	Description	Supv. Current	Alarm Current	Total Supv. Current	Total Alarm Current
NOTE 5: Continuous standby loads in excess of .560 Amps up to 5 Amps may require Generator Backup or load shedding during an AC power failure.						
NOTE 6: Continuous standby loads in excess of .560 Amps up to 4 Amps may require Generator Backup or load shedding during an AC power failure.						

Table 3.4.2.1 PM-9/PM-9G Standby Battery Calculation Chart (Continued)

3.4.3 PM-9/PM-9G Power Connections to AM-50 Series Amplifiers (Non Power-Limited)

The PM-9/PM-9G Power Supply provides the operating voltage for the AM-50 Series amplifiers installed in the INX or the INX CAB-B Transponder assembly. Up to four (4), amplifiers can be powered by one PM-9/PM-9G. Terminal Block TB4 provides two sets of power outputs. Each power output is intended to connect to two (2), amplifiers

Figure 3.4.3.1 illustrates the power connections from the PM-9/PM-9G to the AM-50 Series amplifiers. Table 3.4.3.1 lists the PM-9/PM-9G to AM-50 Series amplifiers power connections.

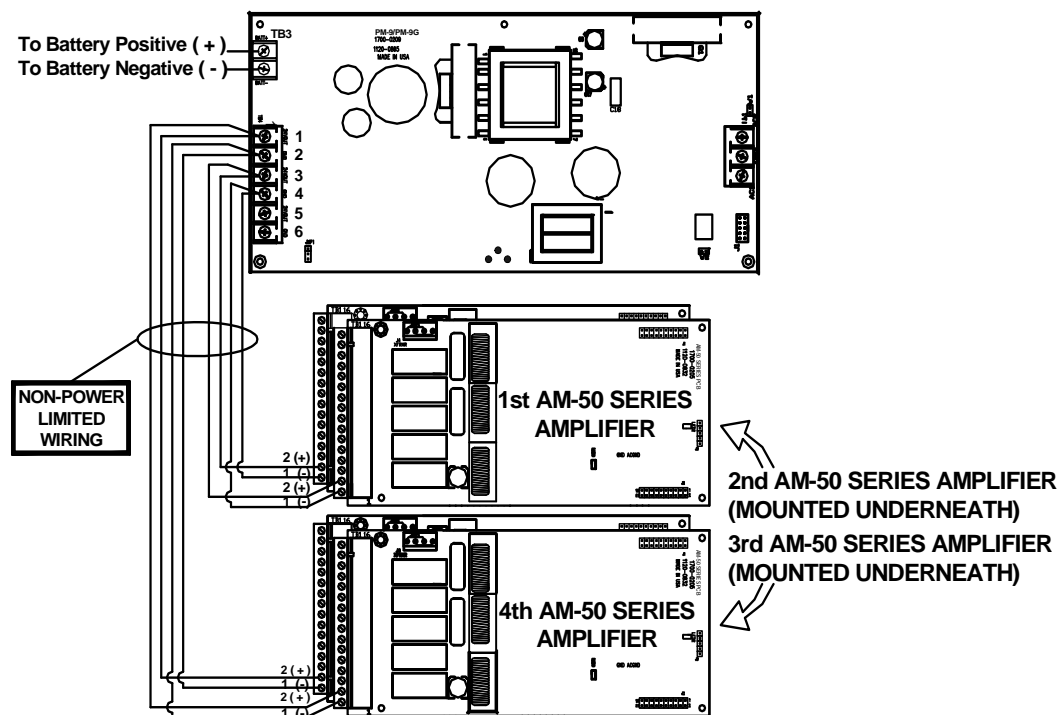


Figure 3.4.3.1 PM-9/PM-9G Power Connections to the AM-50 Series Amplifier

Designation for the Power Supply	Designation for the AM-50 Series Amplifiers
PM-9/PM-9G TB4-2 GND (-)	3rd AM-50 Series amplifier TB1-1 (-)
PM-9/PM-9G TB4-1 24 OUT (+)	3rd AM-50 Series amplifier TB1-2 (+)
PM-9/PM-9G TB4-4 GND (-)	1st AM-50 Series amplifier TB1-1 (-)
PM-9/PM-9G TB4-3 24 OUT (+)	1st AM-50 Series amplifier TB1-2 (+)
PM-9/PM-9G TB4-2 GND (-)	4th AM-50 Series amplifier TB1-1 (-)
PM-9/PM-9G TB4-1 24 OUT (+)	4th AM-50 Series amplifier TB1-2 (+)
PM-9/PM-9G TB4-4 GND (-)	2nd AM-50 Series amplifier TB1-1 (-)
PM-9/PM-9G TB4-3 24 OUT (+)	2nd AM-50 Series amplifier TB1-2 (+)

Table 3.4.3.1 PM-9/PM-9G to AM-50 Series Amplifiers Power Connections

3.4.4 AM-50 Series Amplifier Wiring Connections

The AM-50 Series amplifiers include two (2), fully supervised, individually activated speaker circuits wired Class B or Class A. Each circuit is capable of supplying up to 50 watts of power. The AM-50 Series amplifiers include the following sub-assemblies.

AM-50-25

The AM-50-25 is a 50-watt switching audio output amplifier, with a standard output of 25VRMS.

AM-50-70

The AM-50-70 is a 50-watt switching audio amplifier, with a standard output of 70.7VRMS

Figure 3.4.4.1 illustrates the AM-50 Series amplifier wiring connections.

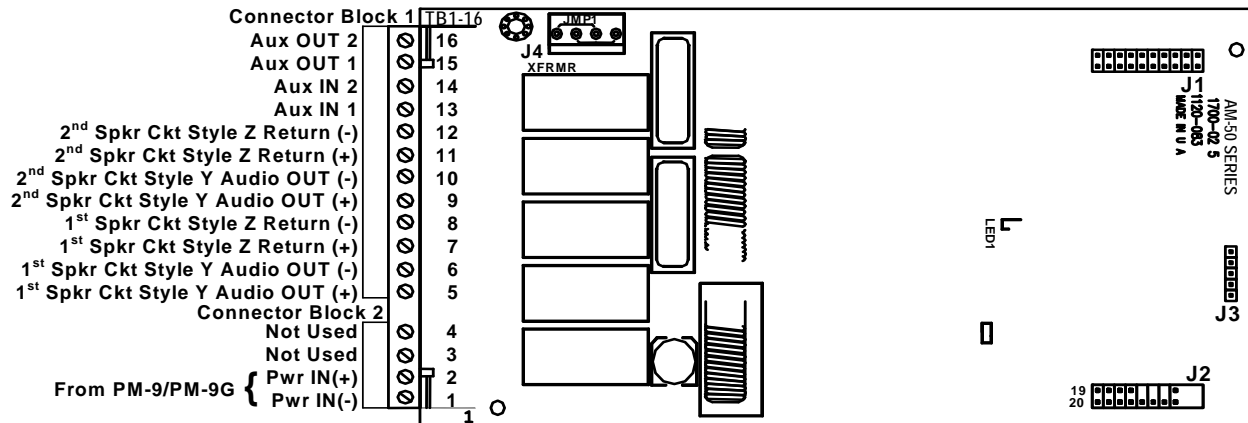


Figure 3.4.4.1 AM-50 Series Amplifier Sub-Assembly

Table 3.4.4.1 lists the AM-50 Series amplifier wiring connections.

Designation	Description	Comments
TB1-1	Ext Pwr IN (-)	Connect to PM-9/PM-9G TB4 "GND" terminal
TB1-2	Ext Pwr IN (+)	Connect to PM-9/PM-9G TB4 "24OUT" terminal
TB1-3		Not used
TB1-4		Not used
TB1-5	1st Spkr Ckt Audio OUT (+)	1st Speaker Ckt audio output, Style Y, Class B
TB1-6	1st Spkr Ckt Audio OUT (-)	1st Speaker Ckt audio output, Style Y, Class B
TB1-7	1st Spkr Ckt Style Z RETURN (+)	1st Speaker Ckt audio output, Style Z, Class A RETURN
TB1-8	1st Spkr Ckt Style Z RETURN (-)	1st Speaker Ckt audio output, Style Z, Class A RETURN
TB1-9	2nd Spkr Ckt Audio OUT (+)	2nd Speaker Ckt audio output, Style Y, Class B
TB1-10	2nd Spkr Ckt Audio OUT (-)	2nd Speaker Ckt audio output, Style Y, Class B
TB1-11	2nd Spkr Ckt Style Z RETURN (+)	2nd Speaker Ckt audio output, Style Z, Class A RETURN
TB1-12	2nd Spkr Ckt Style Z RETURN (-)	2nd Speaker Ckt audio output, Style Z, Class A RETURN
TB1-13	Aux IN 1	Connect to back-up amplifier TB1-5 or 9
TB1-14	Aux IN 2	Connect to back-up amplifier TB1-6 or 10
TB1-15	Aux OUT 1	Connect to next main amplifier TB1-13 (if any) (See Note)
TB1-16	Aux OUT 2	Connect to next main amplifier TB1-14 (if any) (See Note)
J1		Connect to INI-VGX J16 of 1st amp or J2 of previous amplifier
J2		Connect to J1 of next amplifier (if any)
J3		Factory use
J4		Factory use
LED 1	(green)	Light steady upon activation
LED 2	(green)	Speaker Circuit Active Indicating LED
LED 3	(green)	AM-50 Series Standby Indicating LED

Note: If there are no additional main amplifiers to be backed-up, then either install an EOL resistor across TB1-15 and 16 or connect back to the back-up amplifier's Style Z return (for the channel used) to provide aux audio input.

Table 3.4.4.1 AM-50 Series Terminations

3.4.5 AM-50 Series Amplifier Power Connections

The AM-50 Series amplifiers obtain the operating voltage from the PM-9/PM-9G power supply mounted in the same cabinet. Refer to Section 3.4.3 of this manual for details. Use only the power output of the PM-9/PM-9G sub-assembly as detailed in this manual.

3.4.6 AM-50 Series Speaker Circuit Connections

Each AM-50 Series amplifier provides two (2), separately programmable, loudspeaker circuits that may be wired Style Y (Class "B") or Style Z (Class "A").

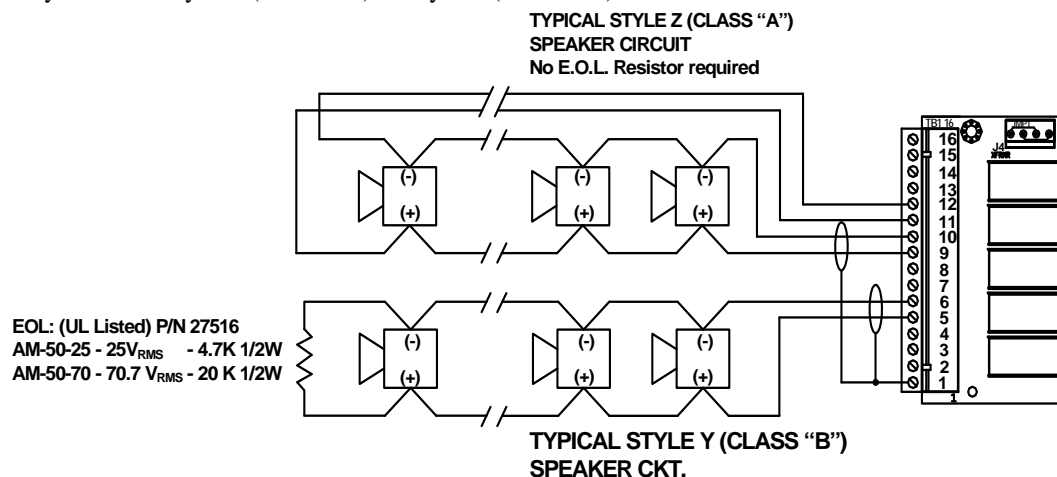


Figure 3.4.6.1 AM-50 Series Amplifiers Speaker Circuit Connections

Circuit Ratings

Voltage:	1.2 VDC (Supervisory)
	25 V _{RMS} (Alarm), power-limited
	70.7V _{RMS} (Alarm), power-limited
Current:	0.001 amp (Supervisory)
	2 amp RMS (Alarm)
	0.001 amp (Short)
Resistance	100 ohms (max.)
Capacitance	250 μ F max.

Use twisted, SHIELDED pair, 18 AWG. min. Make sure the shield is run continuously through the speaker circuits with no segments of the shield left floating.

3.4.6 AM-50 Series Speaker Circuit Connections (Continued)

Do not tie the shield to conduit or junction boxes in the field. Terminate the drain wire back at the panel's location to system negative. Use the AM-50 Series amplifiers, TB1-1 for a convenient termination point. Style Z circuits do not require an end-of-line resistor. This is included on the AM-50-25 and AM-50-70 amplifier.



NOTE: Strobe notification appliances should be connected to the notification appliance circuits of an associated, UL Listed supplementary notification appliance extender panel.

AM-50-25 Speaker Circuit Wiring

Table 3.4.6.1 can be used as a guide to determine the wiring requirements for each 25V_{RMS} speaker circuit.

Wire Gauge (AWG)	18	16	14	12	10
Cable Ohms @ 1,000 ft.	12.8	8	5.1	3.2	2
Load Power Watts	ft	ft	ft	ft	ft
50	55	87	138	218	349
25	109	173	275	436	697
10	272	433	688	1090	1741

Table 3.4.6.1 AM-50-25 Wiring Requirements

AM-50-70 Speaker Circuit Wiring

Table 3.4.6.2 can be used as a guide to determine the wiring requirements for each 70.7V_{RMS} speaker circuit.

Wire Gauge (AWG)	18	16	14	12	10
Cable Ohms @ 1,000 ft.	12.8	8	5.1	3.2	2
Load Power Watts	ft	ft	ft	ft	ft
50	462	737	1170	1855	2962
25	924	1472	2340	3710	5924
10	2310	3680	5848	9274	14808

Table 3.4.6.2 AM-50-70 Wiring Requirements

3.4.7 Connections between Main and Standby Amplifiers

The INX and the INX CAB-B Transponder assemblies can be configured as two main amplifiers. Each amplifier includes its own standby amplifier; or the assembly can be configured as three main amplifiers all sharing a common standby amplifier. Figure 3.4.7.1 illustrates the connections between the main AM-50 Series amplifiers and standby amplifiers.

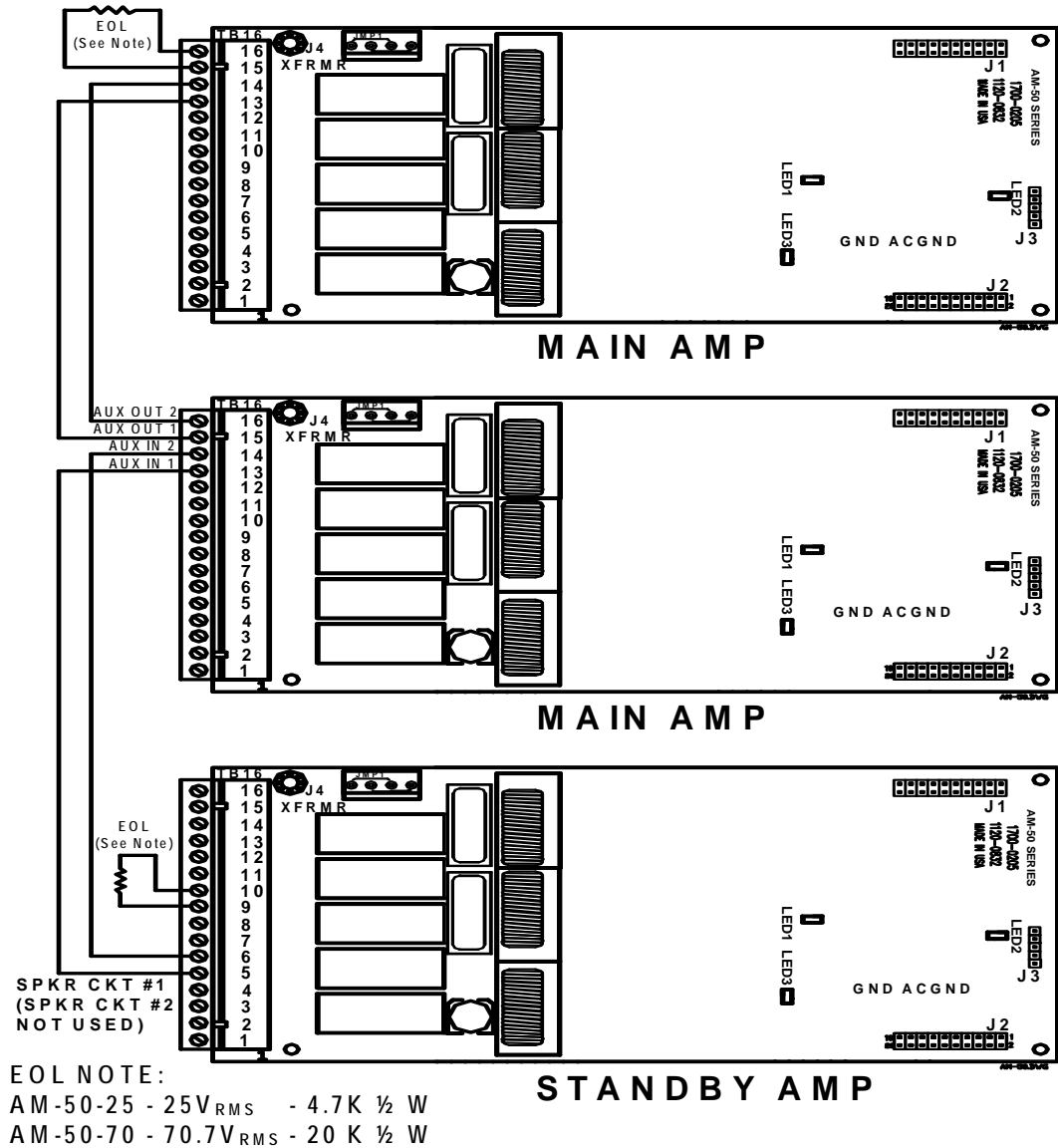


Figure 3.4.7.1 AM-50 Series Amplifiers Main and Standby Connections

Section 4: System Operation



NOTE: The evacuation system is programmed to provide a 1 KHz default evacuation tone.

4.1 NGA LED Indicators

(Optional for applications consisting of fewer than eight (8) 7100 nodes.

Table 4.1.1 lists the LEDs on the NGA.

Description	Comments
Green	Power On
Red	Alarm
Yellow	Supervisory
Yellow	System Trouble
Yellow	Ground Fault

Table 4.1.1 NGA LEDs

Table 4.1.2 lists the Diagnostic LEDs on the circuit board.

Designation	Description	Comments
LED1	REC	Network is reconfiguring
LED2	MRC	This node is initiating a network reconfiguration
LED3	DUP	Duplicate node address or switch error
LED4	TX	The sub-assembly is transmitting network data
LED5	RX	The sub-assembly is receiving network data
LED6	RST	Firmware fault
LED7	DG	Trouble condition

Table 4.1.2 Diagnostic LEDs



Figure 4.1.1 NGA Screen

4.2 NGA Switches

These touch-screen switches are used to control the NetSOLO Broadband panel. Access to these keys is enabled by unlocking the key switch. The switches are listed as follows:

- System Reset
- Silence System Outputs
- Acknowledge Alarm Events
- Trouble / Supervisory Off-Normal Acknowledge

4.3 System Reset

1. Operate the System Reset switch for five seconds until the alphanumeric display shows "Resetting..."
2. Release the System Reset Switch.

4.4 Acknowledge Alarm Events

1. Operate the Alarm Acknowledge Switch once to silence the audible sounder.
The flashing red Alarm indicating LED will light steadily.



NOTE: The NetSOLO Broadband is designed to acknowledge one alarm event at a time. Repeat this process for every alarm event on the system.

4.5 Silence System Outputs

1. Operate the Signal Silence Switch ONCE to silence all outputs programmed to be silenceable.



NOTE: Be sure to observe the status of the System Silence indicating LED.

- If it is OFF, press the System Silence switch to SILENCE.
- If it is ON, press the System Silence switch to UNSILENCE.

The subsequent alarm event will re-sound already silenced system outputs.

2. Press the System Silence Switch again to silence.

4.6 Trouble / Supervisory Off-Normal Acknowledge

1. Operate the Trouble Acknowledge Switch to silence the audible sounder. The flashing yellow Trouble indicating LED will light steadily.



NOTE: Subsequent trouble and off-normal events will re-sound the audible sounder. Operate the Trouble Acknowledge Switch again to acknowledge new events.

Section 5: Transient Over Voltage Protection

5.1 Routing of Power-Limited Field Wiring Circuits

UL Standard 864, (Control Units for Fire Protective Signaling Systems), requires that a minimum of 1/4 inch separation be maintained between power-limited circuits and non power-limited circuits. The control unit is designed so the required separation between these circuits (power-limited vs. non power-limited) is maintained at the field wiring terminals.

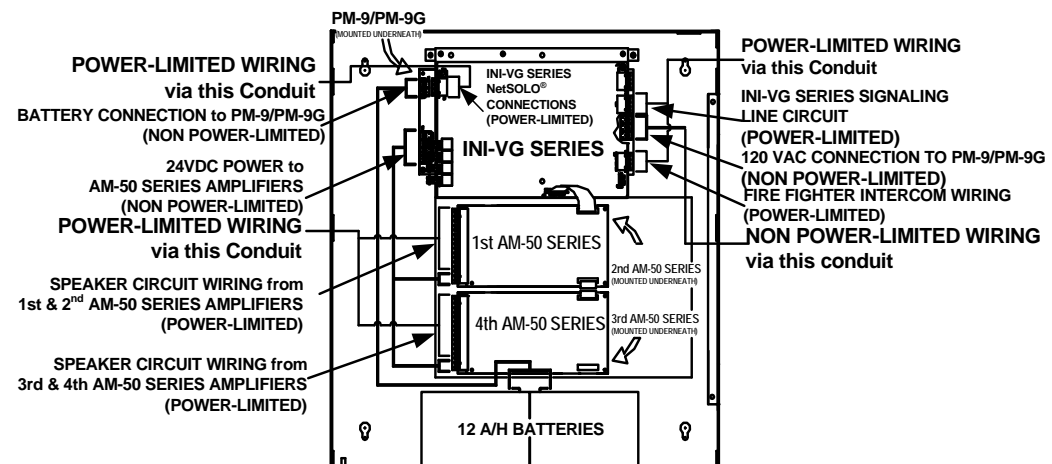
To fully comply with the intent of these requirements, however, the minimum 1/4 inch separation must also be maintained between the field wiring conductors of power-limited circuits and non power-limited circuits. This may be accomplished by routing the field wiring as shown in the following diagram.

Unless otherwise indicated on the unit, all field wiring circuits are power-limited except:

- AC power circuits
- Standby battery circuit
- Power supply output
- Municipal box (auxiliary) circuit



NOTE: Route all field wiring to maintain a minimum of 1/4 inch separation between power-limited and non power-limited circuit types. Additional conduit connections may be made in the respective power-limited and non power-limited areas of the enclosure if needed to maintain this required minimum separation.



Power-limited and non power-limited circuit wiring must remain separated in the cabinet. All power-limited circuit wiring must remain at least 0.25" (.64 cm) away from any non power-limited wiring. All power-limited and non power-limited wiring must enter and exit the cabinet through different knockouts and/or conduits. Power-limited wire must be type FPL, FPLR or FPLP according to Article 760 of the National Electrical Code.

Figure 5.1.1 Power-Limited Field Wiring

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Gamewell-FCI
12 Clintonville Road
Northford, CT 06472-1610 USA
203-484-7161
fax 203-484-7118

www.gamewell-fci.com

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