

FireNET

FN-4127-NIC Network Interface Card

Installation and Operation Manual



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Section 1 – Introduction

The FN-4127-NIC is a network interface card that enables information to be transmitted between control panels using a secure network connection. The FN-4127-NIC is listed as compatible for use with the FireNET and FireNET Plus analog fire alarm control panels.

1.1 Limitations of Fire Alarm Systems

Follow Recommended Installation Guidelines: To achieve early fire detection, fire detection sensors should be installed in all rooms and areas of a house, apartment, or building in accordance with the recommendations of the National Fire Protection Association Standard 72 (NFPA 72), manufacturer's recommendations, state and local codes, and the recommendations contained in Guide for the Proper Use of System Smoke Detectors, which is made available at no charge to all installing dealers. Generally, the standards and recommendations include the following (but installers should refer to the specific guidelines above before installing):

- Sleeping Rooms: Smoke detectors should be installed in every sleeping room.
- Hallways: More than one smoke detector should be installed in a hallway if it is more than 30 feet long.
- At least Two Smoke Detectors: There should never be less than two smoke detectors per apartment or residence.
- Smoke Detectors in Alarm, Electrical, or Phone Locations: Smoke detectors should be located in any room where an alarm control is located or an alarm control connects to an electrical source or phone line. If detectors are not so located, a fire within the room could prevent the alarm control from reporting a fire.
- Notification Systems: All fire alarm systems require notification devices, including sirens, bells, horns, and/or strobes. In residential applications, each automatic alarm initiating device when activated should cause the operation of alarm notification device that should be clearly audible in all bedrooms over ambient or background noise levels (at least 15dB above noise) with all intervening doors closed.
- Alarm in Every Bedroom and Level of Residence: A smoke detector with an integral sounder (smoke alarm) should be located in every bedroom and an additional notification device should be located on each level of a residence.
- Maintenance: A maintenance agreement should be arranged through the local manufacturer's representative and maintenance should be performed annually by authorized personnel only. To keep a 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 Chapter 7 of NFPA 72 (1999) shall be followed.

- Test Weekly: The alarm system should be tested weekly to make sure all sensors and transmitters are working properly. The most common cause of an alarm system not functioning when a fire occurs is inadequate maintenance.

Alarms Cannot Guarantee Warning or Protection: Fire alarm system cannot guarantee warning or protection against fire in every potential situation. A study by the Federal Emergency Management Agency (an agency of the United States government) indicated that smoke detectors may not go off or give early warning in as many as 35% of all fires.

Limitation on Fire Alarm Effectiveness: A fire alarm system may not provide timely or adequate warning, or simply may not function, for a variety of reasons. For example:

- No Detection: Particles of combustion or smoke from a developing fire may not reach the sensing chambers of smoke detectors because:
 1. **Barriers** (such as closed or partially closed doors, walls, or chimneys) may inhibit particle or smoke flow.
 2. Smoke particles may become **cold, stratify, or not reach** the ceiling or upper walls where detectors are located.
 3. Smoke particles may be **blown away** from detectors by air outlets.
 4. Smoke particles may be **drawn into air returns** before reaching the detector.
- No Multi-Floor Detection: In general, smoke detectors on one level of a structure cannot be expected to sense fires developing on another level.
- Insufficient Smoke: 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 the detector, the detector will not go into alarm.
- Smoldering vs. Flaming Fires: Smoke detectors, even when working properly, have sensing limitations. Detectors that have photoelectric 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.
- False Alarms and Pre-Fire Disconnection: Smoke detectors are subject to false alarms and nuisance alarms and may have been disconnected by users. For example, a smoke detector located in or near a kitchen may go into nuisance alarm during normal operation of kitchen appliances. In addition, dusty or steamy environments may cause a smoke detector to falsely alarm. If the location of a smoke detector causes an abundance of false alarms or nuisance alarms do not disconnect the smoke detector, call a professional to analyze the situation and recommend a solution.
- Fast Fires and Explosions: Smoke detectors cannot be expected to provide adequate warning of fires caused by arson and children playing with matches (especially within bedrooms), smoking in bed, violent explosions (caused by escaping gas, improper storage of flammable materials, etc.).
- Heat Detectors: Heat detectors do not sense particles of combustion and are designed to alarm only when heat on their sensors increases at a

predetermined rate or reaches a predetermined level. Heat detectors are designed to protect property, not life.

- Unheeded Warning: Warning devices (including horns, sirens, and bells) may not alert people or wake up sleepers who are located on the other side of closed or partially open doors. A warning device that activates on a different floor or level of a dwelling or structure is less likely to awaken or alert people. Even persons who are aware may not notice the warning if the alarm is muffled by noise from a stereo, radio, air conditioner or other appliance, or by passing traffic. Audible warning devices may not alert the hearing impaired (strobes or other devices should be provided to warn these people). Any warning device may fail to alert people with a disability, deep sleepers, people who have recently used alcohol or drugs, or people on medication or sleeping pills.
 - Strobes: Strobes can under certain circumstances, cause seizures in people with conditions such as epilepsy.
 - Drills: 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 exercises to make people aware of fire alarm signals and instruct on the proper reaction to alarm signals.
 - Hearing Loss: In rare instances, the sounding of a warning device can cause temporary or permanent hearing loss.
- Telephone Transmissions Problems: Telephone lines needed to transmit alarm signals from a premises to a central station may be out of service or temporarily out of service. For added protection against telephone line failure, backup radio transmission systems are recommended.
- System Failure With Age or Lack of Maintenance: System components, though designed to last many years, can fail at any time. As a precautionary measure, it is recommended that smoke detectors be checked, maintained, and replaced per manufacturer's recommendations.
- Electrical Power Problems: System components will not work without electrical power. If system batteries are not serviced or replaced regularly, they may not provide battery backup when AC power fails.
- High Air Velocity or Dusty or Dirty Environments: Environments with high air velocity or that are dusty or dirty require more frequent maintenance.

Importance of Maintenance: In general, fire alarm systems and devices will not work without power and will not function properly unless they are maintained and tested regularly.

Alarm is Not Substitute for Insurance: While installing a fire alarm system may make the owner eligible for a lower insurance rate, an alarm system is not a substitute for insurance. Property owners should continue to act prudently in protecting the premises and the people in their premises and should properly insure life and property and buy sufficient amounts of liability insurance to meet their needs.

Section 2 – General Wiring Specifications

Care should be taken when wiring the system to avoid situations that would contribute to inducing electrical noise from one wire to another. Induced noise can interfere with telephone communications or cause erratic system operation. Follow these general guidelines to plan your system wiring prior to installation.

- Route high and low voltage wiring separately. Maintain a minimum 2" separation between high and low voltage wiring throughout the building.
- Route control panel wiring around the perimeter of the control panel enclosure. A minimum .25" separation is required between high and low voltage wiring.
- Identify which group each wire or cable is associated with from the list below. Isolate each group's wiring as much as possible. Avoid running a single multi-conductor cable for multiple groups of conductors.
 - AC Power - Main Power Supply
 - Notification Appliances
 - SLC Circuits
 - Relay Outputs
 - Voltage Outputs
 - Remote Control and Auxiliary Inputs
 - Network Wiring (Shielded wire required)
 - RS485 Bus Wiring (Shielded wire required)
- Keep wiring from different groups separated as much as possible. If you must share the same conduit with different conductor groups consider using shielded cable.
- If shielded cable is used terminate the shield to the earth ground terminal block in the main control panel and leave open at field side of cable. Do not ground at both ends of cable.

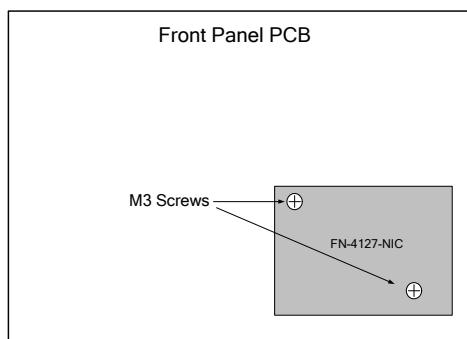
Section 3 – Installing the FN-4127-NIC Network Interface Card

3.1 Overview of the FN-4127-NIC

The FN-4127-NIC Network Interface Card enables information to be transmitted between control panels using a secure network connection. Up to sixty-four nodes (control panels and/or network annunciators) can be connected together. The system can be configured such that selected information can be displayed or acted upon at each node.

3.1.1 FireNET 4127 Installation

To enable control panels to be connected together as a network, a network card must be installed in each panel. This card connects to the FN-4127 on the display circuit board that is on the front door of the control panel. The network card is held in place by two M3 screws.

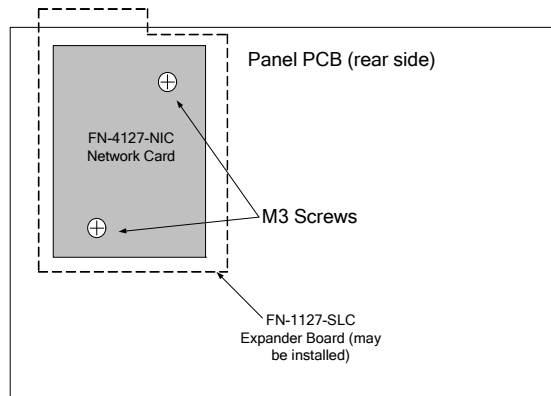


The network card is installed in the exact same fashion for the FN-LCD-N Network LCD annunciator.

To install a network card, the AC and battery power must first be switched off and the metal cover over the front panel PCB (printed circuit board) removed. The network card can then be plugged into the two connectors (J1 and J3) in the bottom right of the main panel PCB and secured in position with the M3 screws. Re-install the metal cover after the network card has been installed.

3.1.2 FireNET *Plus* Installation

The network card connects to the FireNET Plus on the rear of the main control board and is held in position by two M3 screws. If an FNP-1127-SLC expander card has been installed, the network card must be mounted on top of the FNP-1127-SLC expander.



To install a network card, the AC and battery power must first be switched off. Next, the display panel must be opened to expose the back of the circuit board. The network card can then be plugged into the two connectors on the top left of the control board PCB (or plugged into the connectors on the FNP-1127-SLC card, if installed). The network card must then be secured in position with the M3 screws.

ALWAYS OBSERVE STATIC PRECAUTIONS WHEN HANDLING CIRCUIT BOARDS!

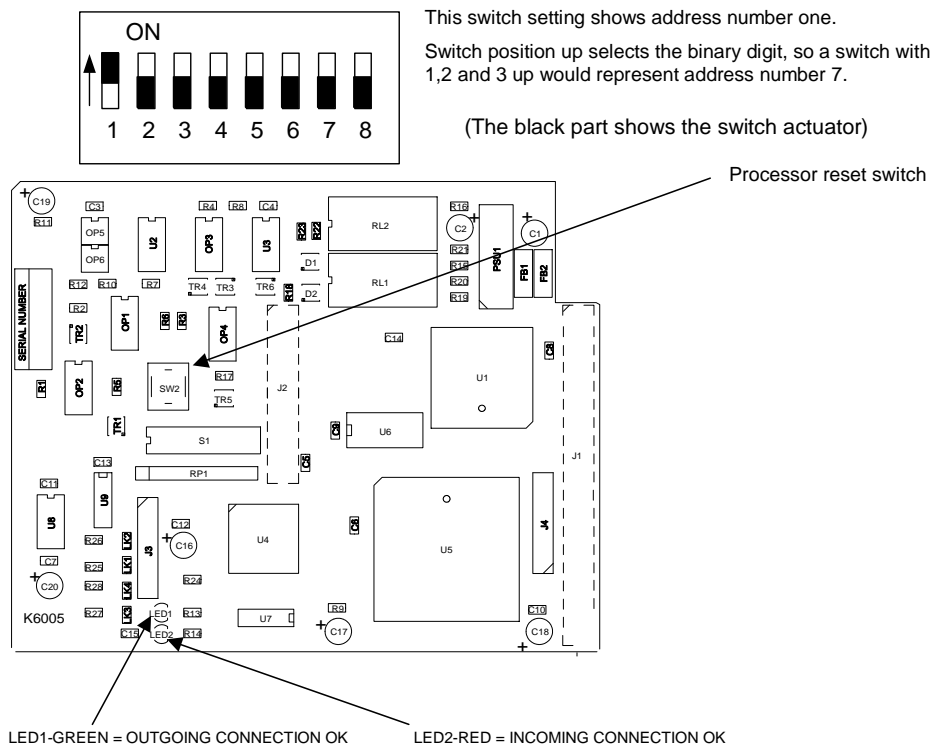
3.1.3 Addressing the FN-4127-NIC Network Card

Each network node must be allocated a unique network address. This is done by setting the DIP switches on the network card to the required binary number as shown below. It is important that each node has a different address for correct operation so care must be taken to set and record the network card address for each panel. Always set the address on the DIP switches with power to the panel **switched off**.

This switch setting shows address number one. Switch position up selects the binary digit, so a switch with 1,2 and 3 up would represent address number 7.

The network card has a green and a red LED indicator to show the status of the incoming and outgoing communications. Under normal circumstances, both LEDs will be lit, indicating that

the card is communicating properly. If one or both of the LEDs are not lit then the connection to neighboring panels is not functioning properly.



3.2 Cable Length

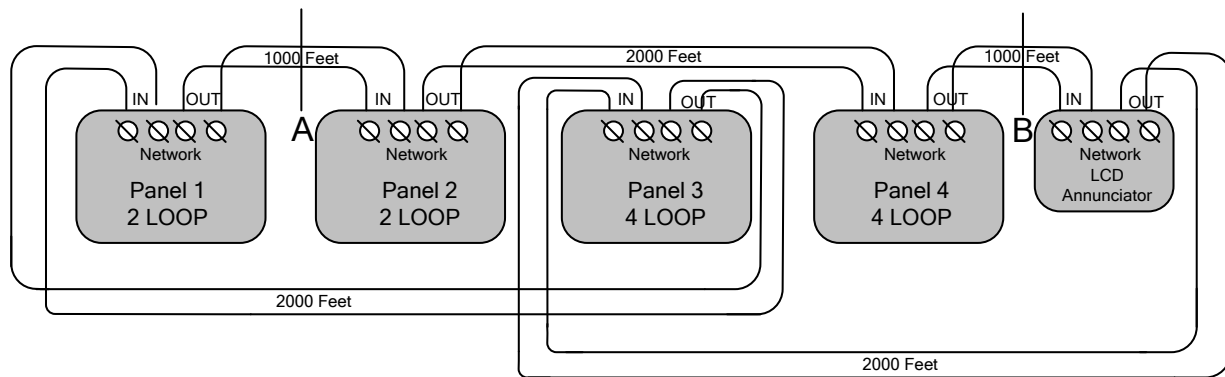
The FireNET network communications protocol has been designed to be extremely tolerant to interference and data corruption; however as with any system, limitations must be set to guarantee correct operation. The specified transmission distance limit for the communications method used is 4000 ft. (1200m). Because the data is re-transmitted at each network card, in theory, there can be 4000 ft. (1200m) between each card if required. The minimum cable size for the FireNET network is #20 AWG. The network communications uses RS485 technology.

Using the above cable distances however, does not take into account the failure of a network card to communicate with the system through total power failure or a card trouble. In this situation, the network card would disconnect itself from the network and connect the network cable such that it bypasses the card in question. This means that the total cable length between the cards either side of the disconnected one could be 8000 ft. (2400m), which is outside of the specification for the communications method used (RS485). This trouble scenario could clearly be extended to more network cards and this would add 4000 ft. (1200m) of cable length in each case.

A sensible trouble tolerance limit must therefore be suggested to enable the performance of the system to be predicted. Because of the nature of the fire protection system, its design is biased towards inherent reliability and failure of a network card, although possible, is very unlikely. Fire control panels also have substantial back up power systems. Therefore, the likelihood of a total power failure under operational conditions is also extremely rare. A suggested tolerance level of one card failure is therefore recommended. To guarantee operation of the system with one card failure it is necessary to arrange the network so that a failure will not introduce more than 4000 ft. (1200m) of cable between the two cards, which would be connected together by the failure. This means that the total cable length between adjacent nodes should not be more than 4000 ft. (1200m). It is not important how the 4000 ft. (1200 meters) is made up i.e. it could be 350 ft. (100m) and 3650 ft. (1100m) or 2000ft. (600m) and 2000ft. (600m).

Using these general rules and the specified or equivalent cable types will provide a guaranteed performance of networks with plenty of tolerance.

3.2.1 Wiring Scheme



When designing or installing a network of FireNET panels and annunciators, always be aware of the following:

1. The panel network must be wired as a ring (Class A).
2. There should be no more than 4000 ft. (1200m) maximum cable length between two adjacent segments.
3. A short circuit at **Point A** will automatically disconnect the shorted section and announce a trouble condition at all panels but the entire network will continue communicating.
4. A short circuit at **Points A and B** will automatically disconnect both sections and announce a trouble at all panels. Communication will continue where a connection exists; in this case, a network will be maintained between panels 1, 3 and the network annunciator, while another network will be maintained between panels 2 and 4.
5. Open circuit troubles should allow the network to continue operating in the same way as short circuit troubles.
6. Network cabling should be standard RS485 type for up to 64 nodes.
7. The minimum cable size for the FireNET Plus network is #20 AWG.

3.2.2 Cable Type

The cable type used for the network connection should be suitable for RS-485 applications. Minimum wire size should be 20ga. twisted, shielded, stranded. RS485 communications cable is typically standard Class 2 communications cable. However, depending on the AHJ, FPL or FPLR cable may be required. Follow local jurisdictional and AHJ requirements. NFPA 70 national electric code compliance may be required for network cabling depending on local jurisdiction, AHJ, regulations, and/or codes.

3.2.3 Proper Shield Termination of the Network Cable

In many installations, interference from RFI, EMI or other noise sources can create problems. In order to reduce the effects of such noise, terminate the shield to the earth ground terminal block in the main control panel. DO NOT ground the shield at both ends of the cable!

WARRANTY

Hochiki America Corporation manufactured equipment is guaranteed to be free from defects in materials and workmanship for a period of one (1) year from date of original shipment. HOCHIKI will repair or replace, at its option, any equipment which it determines to contain defective material or workmanship. Said equipment must be shipped to HOCHIKI prepaid. Return equipment will be prepaid by HOCHIKI. We shall not be responsible to repair or replace equipment which has been repaired by others, abused, improperly installed, altered or otherwise misused or damaged or exposed to conditions outside the products specifications in any way. Unless previously contracted by HOCHIKI, HOCHIKI will assume no responsibility for determining the defective or operative status at the point of installation, and will accept no liability beyond the repair or replacement of the product at our factory service department. Please contact HOCHIKI's Sales department for proper procedure for claims and return of merchandise.

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End of Manual

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