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Tek-CARE3000
Nurse Call System

Audio-Visual Nurse Call System

Installation and Operation Manual

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Tek-CARE3000 Nurse Call System

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System Introduction

This manual provides complete operating instructions for all Tek-CARE3000 system equipment, as well as drawing references for use in locating and describing all controls and indicators.

The Tek-CARE3000 Nurse Call System is a supervised microprocessor-based nurse call system that provides a complete range of two-way audio and visual signaling, combined with programmable system configuration and information tools. These functions permit easy communication between facility staff and patients, as well as between staff members.

The NC331 Tek-CARE Hub is a GEN3 module designed as part of the Tek-CARE platform. This module is capable of connecting to Tek-CARE3000 stations and adding masters such as the NC415G3 and NC404TS Master Stations.

The master station(s) comprise the nursing control station where patient calls are registered and displayed in order of priority and time of origin. The master station provides features to monitor staff, as well as all patient call activity, with an easy-to-use interface for programming the master, system, and remote station configurations.

The system is completed by a variety of patient stations and peripheral devices to meet all staff and patient needs. The equipment uses a simplified wiring scheme and plug-in modular components, allowing them to be expanded and interchanged as needed in existing and new facilities.

> **NOTE**: The Tek-CARE3000 Nurse Call System is not tested as a fire alarm system and is not intended as a primary means of evacuation.

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A Word about ESD (Electrostatic Discharge)

What Is It? Static electricity is a result of triboelectric charging of two dissimilar nonconductive materials that are rubbed together, such as rubbing your feet on a carpet on a cold winter day or in a dry climate. The resulting charge is detected when you reach out to touch a doorknob or some other metallic object. The resulting discharge may only be startling or, in severe cases, it may even be painful. The actual electrical charge is dependent on the materials being rubbed together, humidity, the rate of separation, and other factors.

What Can It Do? While this effect may be disturbing to humans, the effect on electronic equipment is often more serious, ranging from operational disruption to actual component damage. These effects result from the high voltages that may be developed. The simple act of walking across a carpet may develop as much as 30,000 volts, and changing a bed sheet may create a charge of 100,000 volts or more. Such voltages readily cause arcing (the spark that can be observed when you grab a doorknob after walking across a carpet, etc.). The arcing is evidence of the discharge path. Due to the high voltage involved, the discharge current can jump to any nearby metallic or nonmetallic object. If the discharge is to or through an electronic device, such as the nurse call system, the operation of the device may be affected. If the discharge current passes through internal components, these components may be damaged or their operation degraded.

What Can We Do About It? The manufacturer of the nurse call equipment has already taken steps to protect the equipment from electrostatic discharge (ESD) effects. Our peripheral equipment has been tested and listed by UL® to withstand discharges of up to 30K volts. However, since the cause is not in the equipment, but in the environment, further measures are required of the installer and the user to achieve complete protection.

What the Installer Can Do: In humid climates or in places where the relative humidity is kept at 65% or greater, there will likely be few problems with ESD. Where problems may occur the following measures can be taken.

- Ground all exposed metal surfaces. Grounding should be to a #16 gauge or larger conductor.
- Install nurse call system wiring in metal conduit. This conduit may be used to ground panels.
- Use shielded cable (where specified) for nurse call system station-to-station wiring. The use of open conductors invites inductive coupling of discharge currents, which can cause the same problems as direct discharge currents.
- Ground your body before handling system components. This can be done by using a wrist strap, or simply by contacting a grounded metal surface. Use caution to avoid hazardous voltages while grounded.

What the User Can Do: The most common generation of ESD in hospitals is due to changing linen on hospital beds while the patient call cord or pillow speaker is still connected to the nurse call system. The following precautions will help.

Remove the call cord or pillow speaker from the bed before changing the linen. It will be necessary for the nursing staff to discharge themselves by contacting a grounded metal object before placing the call cord or pillow speaker back on the bed; otherwise a spark will jump to the nurse call equipment, causing the very damage they are trying to avoid. To avoid a shock while discharging static electricity on the body, hold a metal object, such as a key, and use that object to contact the grounded surface.

This information is provided to make you aware of ESD problems so that precautions may be taken to avoid damage and disruption of system operation.

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System Installation Overview

Step 1: Read the following information prior to installing the Tek-CARE3000 system equipment. The installer must be familiar with the system and its installation requirements and guidelines, and must have successfully completed the TekTone Training Program for system installation. In general, the installation will proceed along the lines spelled out below.

Step 2: Determine equipment locations.

Step 3: Install system wiring.

Step 4: Install housings.

Step 5: Use a cable tester capable of testing both 6P6C modular connectors and 8P8C modular connectors to check integrity of cable and connections. This is a critical and necessary step to avoid installation problems later.

Step 6: Set addresses of patient, staff and duty stations, and corridor lights.

Step 7: Connect equipment to system wiring.

Step 8: Verify connections.

Step 9: Perform full operational test of the system, including all peripheral devices.

Step 10: Read IL1150 LS450 ConfigTool 2.0 Programming Software Installation & Operating Instructions, configure and test the system.

Step 11: Train system operators.

TIP: Before the above process begins, consider this brief comment on troubleshooting. The transition between **Step 8** and **Step 9** is a very important one. It is during this phase of the installation process that the system is first powered up with field wiring, patient stations and peripheral devices. This is the time when most installers encounter problems with wiring and equipment. To reduce troubleshooting time and prevent damage to the system components, the installer must take the following precautions:

- Do not connect the entire system together for initial power up. It is suggested that just the central equipment and the first master station be connected for test. Next, connect the remaining master stations one by one, until all are connected and functional. This allows the installer to establish a “known-good” test point to work from, as well as immediately identifying problems as they are introduced to the system.
- Do not connect all patient station runs to the central equipment at once. Connect individual runs to the central equipment one by one until all are connected and functional. This allows the installer to more easily locate and recognize problems in the field with wiring or equipment.

These procedures may appear to take longer to perform than it would to connect the entire system together and power it up, but following them reduces troubleshooting time.

Installation Concerns

When installing the Tek-CARE3000 system, organization is key. As you install the system, note the DIP switch address and physical location of each hub/module, master, and station. Keeping detailed records throughout the installation process will greatly simplify system programming and setup. Programming worksheets are included at the end of this manual.

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Tek-CARE3000 System Components



NC475 Tek-CARE Central Equipment: The NC475 Tek-CARE Central Equipment is a connection point for the NC415G3 and NC404TS Master Stations. The NC475 also includes the Tek-CARE Reporting system, and can be licensed for connections to other TekTone hardware on the Tek-CARE Network. In addition, the NC475 can also connect to the facility's LAN, enabling the use of the Tek-CARE Staff App for mobile devices, Tek-CARE TV app, as well as the Tek-CARE Event Monitor App for Windows, which runs on facility PCs.



NC331 Tek-CARE Hub: The NC331 Tek-CARE Hub is a networked device that provides support for the Tek-CARE3000 System, with one audio channel per port (4 ports).

The NC331 network is created by using the NC554/15 PoE Network Switch.



NC554/15 PoE Network Switch: The NC554/15 PoE Network Switch provides communication and power to NC331 Hubs in the field while interfacing with the NC475 Tek-CARE Central Equipment at the system head-end.

The NC554/15 is a managed switch supporting uninterruptable Power-Over-Ethernet (PoE) to help optimize the performance and troubleshooting of the network. The power supply for the device and PoE demands is included as shipped.



NC415G3 Master Station: The NC415G3 is a touchscreen master station used to interact with the Tek-CARE3000 system. The NC415G3 Master Station displays calls and provides limited programming and configuration ability for the Tek-CARE3000 system. The NC415G3 uses a five-inch LCD touchscreen to provide audible and visual annunciation of system calls. The NC415G3 may be mounted using the IH415D desk stand or wall-mounted using the IH415W wall-mount bracket.



NC404TS Master Station: The NC404TS is a full-featured touchscreen master station designed for use on the Tek-CARE system. The NC404TS provides UL-approved call annunciation, audio connection, and interaction with the Tek-CARE system. The NC404TS may be zoned to display all calls from a system, or a custom subset of call types and stations or transmitters.

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IR330 Staff/Duty Station: The IR330 is a versatile station which can be used as a Staff or Duty call station. The tri-color LEDs produce visual call annunciation, while master call tones provide audible call annunciation for Duty function. The IR330 has two push buttons: Call and Reset.





IR331 Single, IR332 Dual Patient Stations: The IR331 Single Patient Station provides reliable full-duplex, hands-free communication between patient and nurse. Calling the nurse is accomplished by pressing the call cord button or the nurse button on the pillow speaker. The IR331 includes four dry contacts, a single DIN jack for a call cord, and a Reset button. To remove the call cord or pillow speaker without alarm, hold down the Reset button for three seconds before pulling out the plug.

The IR332 Dual Patient Station has the same specifications and functions as the IR331, but has eight dry contacts and two DIN jacks for an additional call cord.



IR434G3 Multipurpose Station: The IR434G3 Multipurpose Station provides audible, visual, and digital communications to and from the Tek-CARE3000 equipment when receiving or sending signals to remotely connected devices.

The IR434G3 includes inputs for contact closures and various types of emergency call switches for these systems, along with four programmable N.O. Dry Contact Outputs. It also provides an output to a speaker or paging amplifier and a corridor lamp. It does not have the controls, LEDs or speakers normally associated with patient, staff or duty stations.



IH431S Surface Backbox: The IH431S is a surface-mounting backbox for Tek-CARE3000 stations. Stations snap-fit to the box so no screws are needed to mount stations to the backbox. The IH431S is constructed of durable ABS plastic, and mounting holes align with 2- and 3-gang electrical boxes.

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SF431PSG3 Pillow Speaker: The SF431PSG3 Pillow Speaker provides call placement and audio communication to the Tek-CARE System and offers remote control for hospital-grade TVs.

The pillow speaker also supplies two-way, hands-free communication with the master station, and automatic silencing of TV audio while the intercom is in use. Water, Pain, Toilet, two light control buttons (typically ROOM and READ lights) and two additional programmable controls A & B (ex. temperature up/down). Can be used with SF401A series call cords.



LI484P5 Multicolor Corridor Light: The LI484P5 Multicolor Corridor Light with four multicolor LEDs provides visual indications of calls originating from patient, staff, duty, bath, emergency, presence and code call stations. Default patient priority and staff presence are indicated by amber, green, red and white, but may be reprogrammed. When used with a patient or staff station, the LI484P5 indicates all calls originating from that room and displays the highest priority call from the station.



SF131 Single Patient Station: The SF131 Single Patient Station includes one DIN jack for a call cord, a call-assurance LED, and a single button to reset calls. Pressing the call cord's button registers a call at the NC415G3/ NC404TS Master Station and all associated dome and zone lamps. These stations can replace the legacy SF121 stations.

A cord-out call is registered if the call cord is accidentally removed from the call cord jack. The JK401 Dummy Plug is required when a station does not have a call cord plugged in, to prevent the station from placing a cord-out call.

The station assembly snaps onto a wall mounting plate leaving no visible screw holes.



SF133A Water-Resistant Emergency Pull-Cord Station: The SF133A Water-Resistant Emergency Pull-Cord Station includes a call button, optional pull cord, an LED for call indication, and a reset button. The optional pull cord is six-feet long and can be adjusted to a smaller length as needed.

When a call is placed, it is registered at the master station, room controller with dome light, zone lights, and duty station. Standard button caps for call types include: CALL, EMERG, CODE, RESET, ROUND, and CHECK-IN. Custom call types can be created using the LS450 ConfigTool software. For humid or wet locations, the SF133GK Gasket Kit ***must*** be installed with the SF133A to provide a proper seal.

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IH131 and IH132 SF130-series Adapter Plates: The IH131(single) and IH132 (double) are adapter plates that are mounted onto existing plaster rings or electrical boxes for an easy retrofit. The mounting plate for an SF130-series station is attached to the IH131/2, with the station snapping onto its mounting plate for simple installation.



IR160 Audio Station: The IR160 Audio Station provides a speaker and microphone for two-way communication between facility staff and residents. IR160 Audio Stations require three connections, one to the two-pin header that connects to the addressable station, one for audio connection and the other for data connection. The IR160 Audio Station can be installed as a standalone speaker, but is most commonly installed with an SF120-series station in a dual-gang plastic mounting kit such as the IH122K Dual-Gang Mounting Kit.



PM123 Auxiliary Input Module: The PM123 is a module used to monitor N.O. Dry Contacts such as door switches, emergency push buttons, and alarm contact outputs. The PM123 is designed to be installed out of sight. Up to two individual contacts can be monitored with a single PM123. The PM123 may also be used as an auxiliary check-in device. N.O. contacts such as door switches, motion detectors, or pressure pads may be used with the PM123 to satisfy a resident check-in requirement on the system.



SF124 Staff Peripheral Station: The SF124 Staff Peripheral Station provides staff presence, staff request and staff rounding with programmable schedules, if so configured. Pressing a presence button activates an associated colored lamp on the associated corridor light. The connection to the IR43xG3-series station is supervised. Two-wire connections provide simple wiring.



SF126DC Dry Contact Output Module: The Normally Open (N.O.) Dry Contact Module provides a two-pin header for a relay/device connection and another for the station connection. Upon initiation it will provide one of four programmable output behaviors; from the master station, either a 5-second on or a toggle on/off output, or at the station, a local or zone output. The SF126DC can be mounted individually or with another SF120 peripheral, depending on the application.



IR160V Remote Speaker/Microphone Panel: The IR160V panel separates audio from another station.

A connected station can be located outside the ward, with an IR160V Remote Speaker/Microphone Panel and an SF123V Vandal 2-Button Station inside the ward.

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SF123V Vandal 2-Button Station: The SF123V Vandal 2-Button Station has two large, low-profile, vandal resistant push buttons for Call and Cancel, and is also equipped with a call assurance LED.

The SF123V serves as a peripheral staff emergency switch when used with a staff emergency station. Up to six peripheral SF123V Vandal 2-Button Stations may also be located within the ward to provide additional call points.

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Station Hub Equipment Requirements

Locate Tek-CARE3000 system equipment in accordance with the following information. The installation of all system equipment, cabling and enclosures must be in accordance with the National Electrical Code (ANSI/NFPA 70-1999), the Health Care Facilities Code (ANSI/NFPA 99-1999), and all applicable state and local codes.

NC331 Master & Station Hub

The NC331 provides improved features, electronics, and packaging, and is networkable with GEN2 (NC120, NC356CE, NC455CE) and GEN3 (NC435G3) modules on the Tek-CARE platform. The NC331 is powered directly from the NC554/15 PoE Network Switch that draws its power from a generator-backed emergency circuit of the facility. When a UPS is in place, it will provide backup batteries for short-term operation of the NC554/15 during switchover to generator power.

Figure 1 - NC331 Tek-CARE Hub



The NC331 provides connections for Tek-CARE3000 room stations and/or master stations. The NC331 has four 8P8C connections for station and/or master runs on the rear of the module. Another 8P8C port provides the connection to the NC554/15 PoE Network Switch establishing connections to other modules that are on the Tek-CARE Network. There are 250 available addresses for modules and/or hubs to be networked on the Tek-CARE system using the NC554/15 switch. See **Figure 6 on page 25** for illustrated connection details.

The following module configurations are available:

- Support for 12 patient stations

  -or-

- Support for 2 NC415G3 or NC404TS touchscreen master stations

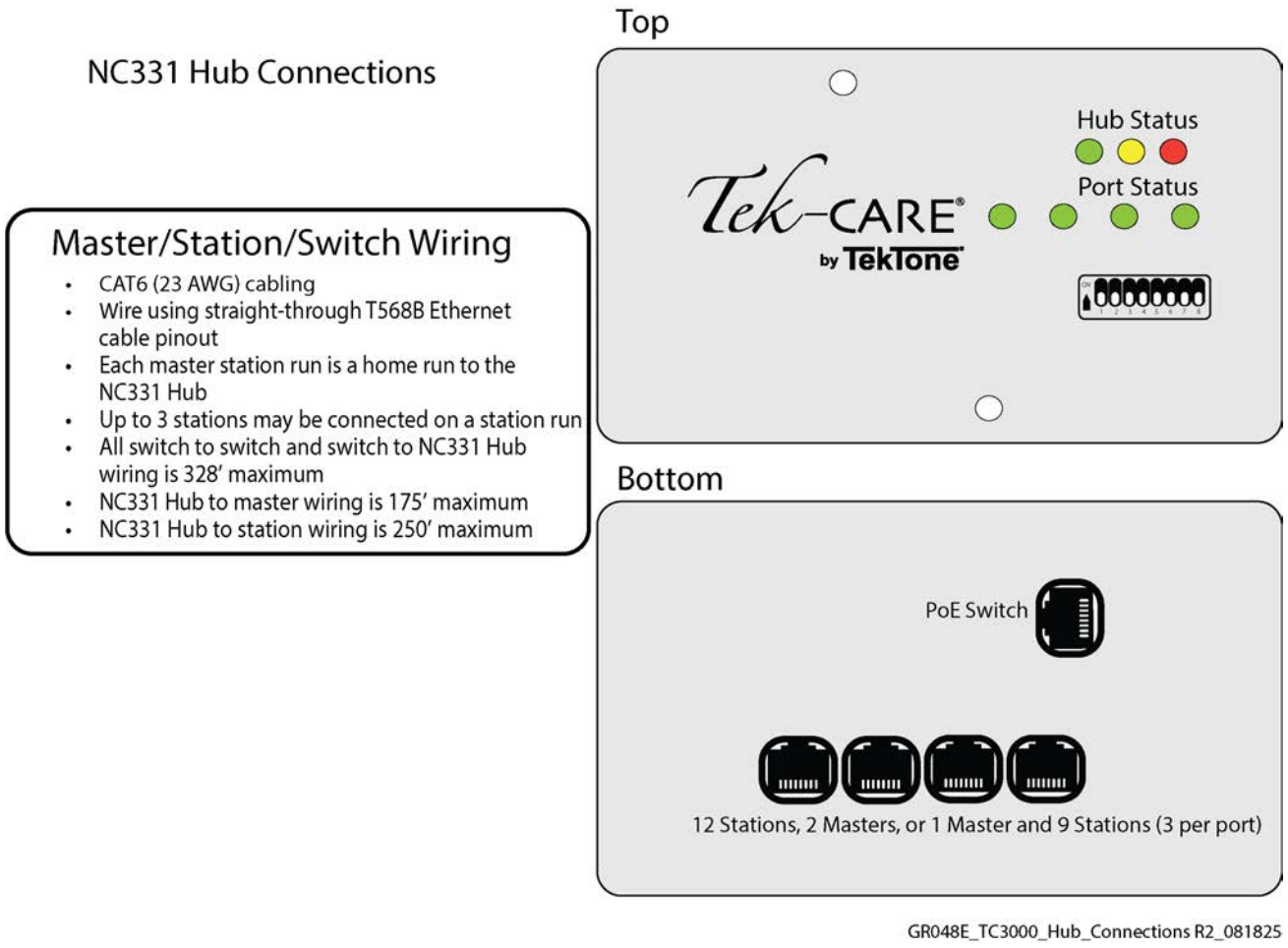
  -or-

- Support for 1 NC415G3 or NC404TS touchscreen master station and 9 patient stations (3 per port).

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Note the 8-position DIP switch on the front of the hub. This switch is used to set the address of the hub. Each switch has a value, and when moved to the up position that value will count toward the hub's address.

Figure 2 - Hub Connections



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Master Station Requirements

NC415G3 and NC404TS Master Station Requirements

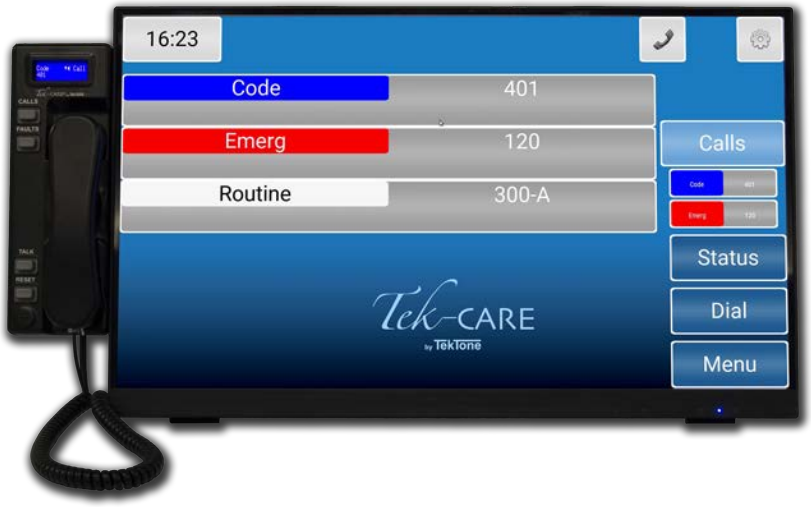
NC415G3/NC404TS Master Station: The NC415G3 and NC404TS are used by the facility staff to interact and communicate with patients through the nurse call system. The staff may answer calls via loudspeaker or by using the handset for calls that require more privacy. Both of these masters are typically located on a desk or countertop or can be wall mounted, within easy reach of the facility staff. The operating environment for the master station is approximately 26°C and relative humidity not exceeding 80%.

For port information & wiring connections for both master stations, see **Master Station Ports on page 30**.

NC415G3 Master Station



NC404TS Master Station



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Tek-CARE3000 Station Requirements

Tek-CARE3000 Stations (General Information)

All Tek-CARE3000 devices have electronics that are mounted on a flame-retardant (UL®94V-0 HB) plastic panel. Users must observe ESD precautions when handling these devices as they may be damaged if improperly handled. Tek-CARE3000 addressable stations and SF120/SF130-series peripherals are supervised. Each addressable station will have a unique address that will be discoverable through the ConfigTool. Plug-on connectors are provided for easy installation.

Each addressable station can support up to six SF120/SF130-series peripherals.

Tek-CARE3000 addressable stations are mounted with 2- or 3-gang backboxes (electrical box and ring or masonry box) with a minimum box depth of 2.5". The minimum clearance from current-carrying parts to dead-metal parts must be no less than 0.5". **DO NOT** ground backboxes.

Tek-CARE3000 addressable stations are typically located for convenience—most commonly at the head of the patient's bed, unless specified otherwise. Locate addressable stations so that station runs do not exceed 250 total cable-feet per run; and so that furniture, curtains, and other features do not interfere with audio communication. Stations are home runs to the hubs. The operating environment for addressable stations is 10-40°C with relative humidity not exceeding 80%. See **Figure 11 on page 29** for an example of a room wiring diagram.

IR330 Staff/Duty Station

The IR330 is a versatile station which can be used as a Staff or Duty call station. The tri-color LEDs produce visual call annunciation, while master call tones provide audible call annunciation for Duty function. The IR330 provides a communication point for staff members to call the master station for staff-to-staff communication. A programmable **CALL** button, **RESET** button, call-placed indicator, and in-use status indicator are provided. The Staff station is field programmable to function as a resident station.

IR331 Single, IR332 Dual Patient Stations

The IR331 and IR332 provide reliable hands-free communication between the patient and facility staff. The IR331 includes one 8-pin DIN for pillow speaker or call cord. The IR332 includes two 8-pin DIN for pillow speaker or call cord.

Call cord presence is supervised, and the system provides an indication when a cord has been removed and not replaced. To avoid a cord out call when removing a cord, hold down the **RESET** button until the yellow call light is illuminated, then remove the cord. The patient stations have indicators for call placement assurance and in-use status. **RESET** button is also provided to reset calls locally.

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IR434G3 Multipurpose Stations

Practical applications for the IR434G3 include: an input for ICU code emergency call stations, a corridor paging amplifier interface, a control point for exit/entry doors and narcotics cabinets, an input for bath emergency call stations in public bath areas, or an access control input/output for a remote door intercom station. The IR434G3 may be connected directly to a 60 Ohm, 1 Watt speaker for paging. If connected to overhead paging, a transformer must be used. Always use grounded, shielded transformers to prevent current leakage to the nurse call system's isolated circuits. The IR434G3 provides the same peripheral inputs and corridor light indications as patient stations, but does not have the controls, LEDs or speakers associated with patient stations. The IR434G3 also provides four programmable N.O. Dry Contact Outputs.

IR160V Vandal Remote Speaker/Microphone Panel

The IR160V panel separates audio from another station. A connected station can be located outside the ward, with an IR160V Remote Speaker/Microphone Panel and an SF123V Vandal 2-Button Station inside the ward.

Call Cords and Pillow Speakers

SF401B	Push button call cord, 8' cord, DIN plug, oxygen safe, waterproof
SF401B/10	Push button call cord, 10' cord, DIN plug, oxygen safe, waterproof
SF401B/20	Push button call cord, 20' cord, DIN plug, oxygen safe, waterproof
SF401G	Squeeze bulb call cord, 6' cord, DIN plug, oxygen safe, geriatric
SF431PSG3	Pillow speaker, DIN plug, intercom, and controls for lights, digital TV, Aux buttons

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Corridor Light Requirements for Addressable Stations

LI484P5 Four-LED Corridor Lights

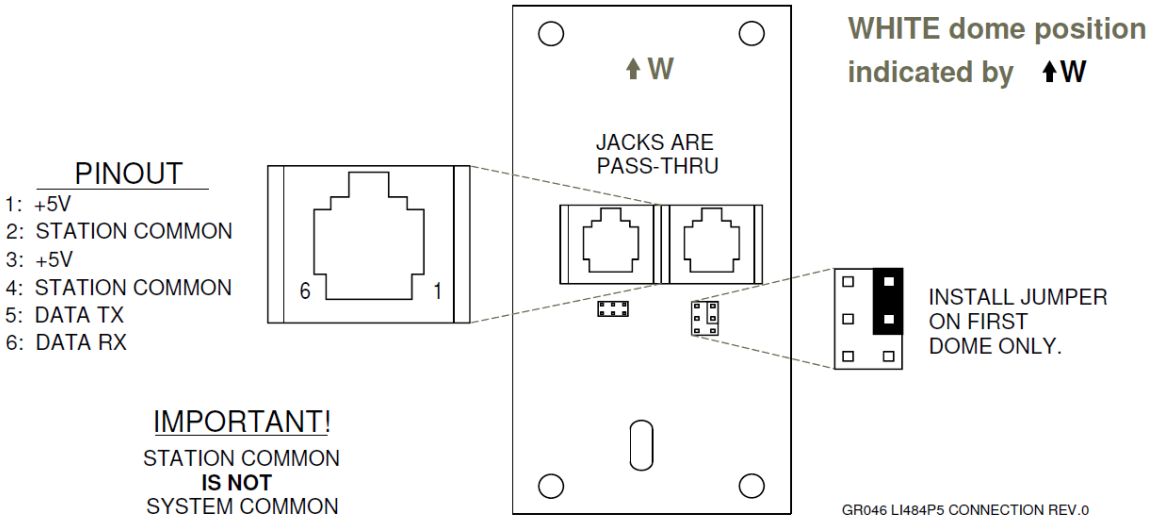
LI484P5 corridor lights provide visual indication from addressable stations and associated peripheral devices. Four multicolored LEDs can each be programmed to display up to eight different colors, allowing the LI484P5 to indicate all system call types with various flash rates and color combinations. Up to two LI484P5 corridor lights may be connected to each addressable station with a limitation of 16 per run; both connected corridor lights display calls using the same flash rate and color combinations. When connected to an IR330 Duty Station, the corridor light functions as a zone light. When used with a PM424ZP5 Zone Light Module, the corridor light functions as an addressable standalone zone light. LI484P5 lights use a standard single- or dual-gang ring. Locate the corridor light above or beside the doorway of its associated room, and mount it so that unobstructed visibility is provided. When used as zone lights, mount them at corridor heads or junctions so that facility staff can readily identify the associated zone area.

Standalone LI484P5/PM424ZP5 zone lights connect to the station bus; other LI484P5 corridor and zone lights must be within 50 cable-feet of their associated stations.

> **NOTE:** Two slots are provided in the LI484P5 plastic assembly to aid in separating the base from the lens. Please be careful not to insert a tool too far into the slot due to possible component damage.

> **NOTE:** When initially powering up the nurse call system, the dome lights may start flashing slowly. This occurs when the LI484P5 is updating its firmware and is normal operation. Once the update is complete, the domes will stop flashing.

Figure 3 - LI484P5 Corridor Light Pinout



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PM424ZP5 Zone Light Module for LI484P5

Adding a PM424ZP5 Zone Light Module to an LI484P5 corridor light converts the LI484P5 to an addressable standalone zone light on the station bus. See **Figure 5 on page 20** for the PM424ZP5 and LI484P5 wiring diagram. See the figure below for the PM424ZP5 connections. Each zone light requires a unique address, which is set using on-board DIP switches. (For addressing, see **Equipment Configuration and Settings on page 35**.) The PM424ZP5 includes inputs for up to four SF120 peripherals or input for one legacy bath and one code switch. See **Wiring Installation on page 24** for additional details.

> **NOTE**: For a secondary (zone) dome, connect a second LI484P5 to the primary zone dome for additional local annunciation. The 2-pin shunt is installed for the primary and removed for the secondary (zone) dome.

Choose either SF120 or SF300 style peripherals with the SF Type Selector Switch.

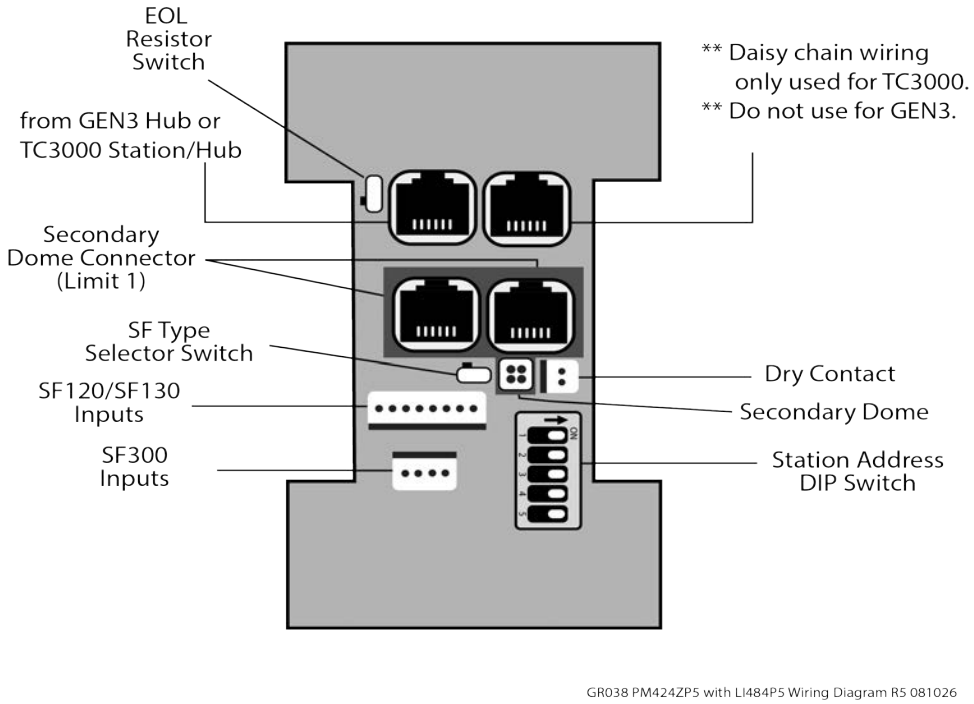
The N.O. Dry Contact provides a two-pin header to be used for devices such as buzzers, etc. and provides a steady closure for the duration of the call.

Slide the EOL Resistor switch to the ON position if the PM424ZP5 is the last addressable station on the station cable run.

Default behaviors for the SF120/SF130 points are:

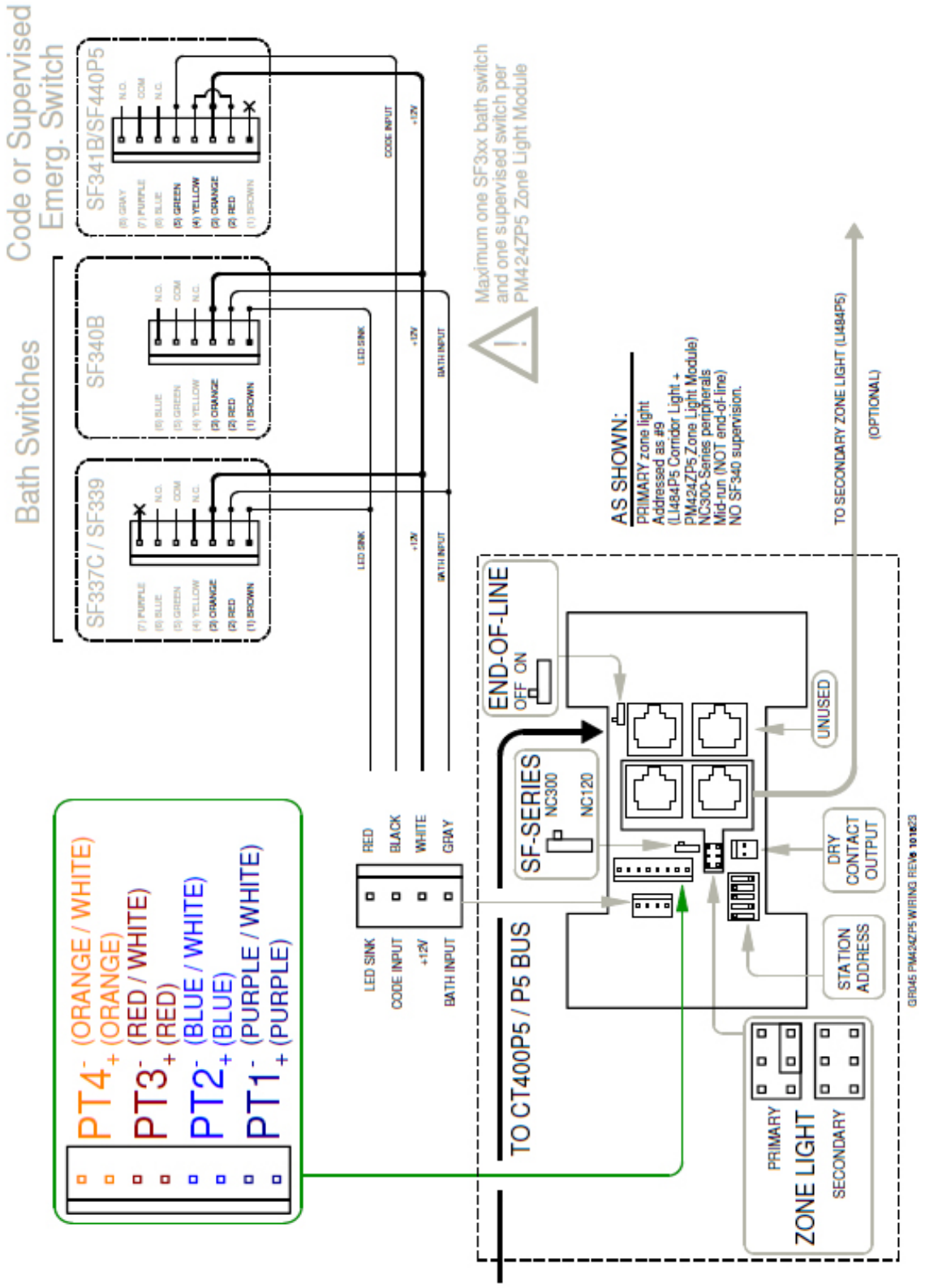
Point 1	Point 2	Point 3	Point 4
SF131	SF133A (SF123)	SF133A (SF123)	SF133A (SF123)

Figure 4 - PM424ZP5 Zone Light Module Connections



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Figure 5 - PM424ZP5 Wiring



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Peripheral Requirements for Addressable Stations

IR160 Audio Station

The IR160 Audio Station provides a speaker and microphone for two-way communication between facility staff and residents. IR160 Audio Stations require two connections, one to the two-pin header that connects to the addressable station, and one for audio connection.

IR160V Vandal Remote Speaker/Microphone Panel

The IR160V Remote Speaker/Microphone Panel provides two-way audio communication with resident room. The IR160V is also equipped with audio LED that illuminates with audio connection, and has a steel mesh for speaker protection.

PM123 Auxiliary Input Module

The PM123 is a module used to monitor N.O. Dry Contacts such as door switches, emergency pushbuttons, and alarm contact outputs. The PM123 is designed to be installed out of sight. Up to two individual contacts can be monitored with a single PM123. The PM123 may also be used as an auxiliary check-in device. N.O. Contacts such as door switches, motion detectors, or pressure pads may be used with the PM123 to satisfy a resident check-in requirement on the system.

SF120/SF130-Series Peripheral Devices for Addressable Stations (General Information)

There are 6 points which are the 6 physical connections on the rear of each addressable station.

The SF120/SF130-series peripheral devices′ electronics are mounted on flame-retardant (UL® 94V-0) plastic faceplate. Mount each SF120/SF130-series peripheral device within 100 feet of the addressable station to which it is connected. Up to six peripherals may be connected to each addressable station. These devices are typically mounted on single-gang rings or boxes. The operating environment is 0°C–60°C. See **Tek-CARE3000 Station Connections on page 27** for more information.

SF131 Single Patient Station

The SF131 Single Patient Station includes one DIN jack for a call cord, a call-assurance LED, and a single button to reset calls. Pressing the call cord’s button registers a call at the NC415G3/ NC404TS Master Station and all associated dome and zone lamps. These stations can replace the legacy SF121 stations.

A cord-out call is registered if the call cord is accidentally removed from the call cord jack. The JK401 Dummy Plug is required when a station does not have a call cord plugged in, to prevent the station from placing a cord-out call.

SF133A Water-Resistant Emergency Pull-Cord Station

The SF133A Water-Resistant Emergency Pull-Cord Station includes a call button, optional pull cord, an LED for call indication, and a reset button. The optional pull cord is six-feet long and can be adjusted to a smaller length as needed.

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When a call is placed, it is registered at the master station, room controller with dome light, zone lights, and duty station. Standard button caps for call types include: CALL, EMERG, CODE, RESET, ROUND, and CHECK-IN. Custom call types can be created using the LS450 ConfigTool software. For humid or wet locations, the SF133GK Gasket Kit ***must*** be installed with the SF133A to provide a proper seal.

SF123V Vandal 2-Button Station

The SF123V Vandal 2-Button Station has two large, low-profile, vandal resistant push buttons for Call and Cancel. The SF123V is also equipped with call assurance LEDs.

SF124 Staff Peripheral Station

The SF124 station has four configurable push buttons. The functions of the SF124 include staff presence, staff request and staff rounding with programmable schedules. For more information on the rounding feature, refer to IL855 LS450 ConfigTool Manual. Keep peripheral station wiring to 50 feet.

Current button layout options:

- L1, L2, Staff Emergency, L3 (Default)
- L1, L2, Staff Emergency, Reset
- L1, L2, L3, Reset
- L1, Code, Staff Emergency, Reset
- Rounding, Code, Staff Emergency, Reset

Button labels can be generated within the LS450 ConfigTool under **Tools→Generate Label Images**. Select the **Points** page to configure the point that is wired to the station. Then select the SF124 and choose the desired function for the presence station.

> **NOTE**: There is no default point specifically assigned to the SF124. TekTone suggests using point 6 (green/green-white), which will not create a call/fault until properly programmed as points 1-5 will.

Once finished with the **Points** page, select **Apply** and save the configuration.

To place a presence call on the station, press the button once. To clear the presence, press the button again.

To place a request call, press and hold down the button. Press the button again to reset the call in the room. If there is an ongoing routine bed call, pressing the presence button will set a presence status and clear the bed call.

When the rounding button behavior is selected, the button can be used in conjunction with programmed schedules to provide a staff rounding function.

If a button configuration that includes RESET has been applied, pressing it will clear all active calls in the room.

SF126DC Dry Contact Output Module

The N.O. Dry Contact Module provides a two-pin header for a relay/device connection and another for the station connection. Upon initiation it will provide one of four programmable output behaviors; from the master station, either a 5-second on or a toggle on/off output, or at the station, a local or zone output.

The SF126DC can be mounted individually or with another SF120 peripheral, depending on the application. Use applications for the SF126DC may include:

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- Triggering an input on a security alarms panel for offsite monitoring
- Activating strobes and sirens
- Activating pre-recorded messages on 3rd-party equipment

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Wiring Installation

The following is a list of important wiring installation items critical to a successful installation. Use crimp-style connectors for all wire connections. Do not use wire nuts. **Make sure to test all cables with an Ethernet cable tester for reliable connections before installing them in the facility.**

Cabling for master station ports, patient station ports and serial ports is described separately, including the connection specifics.

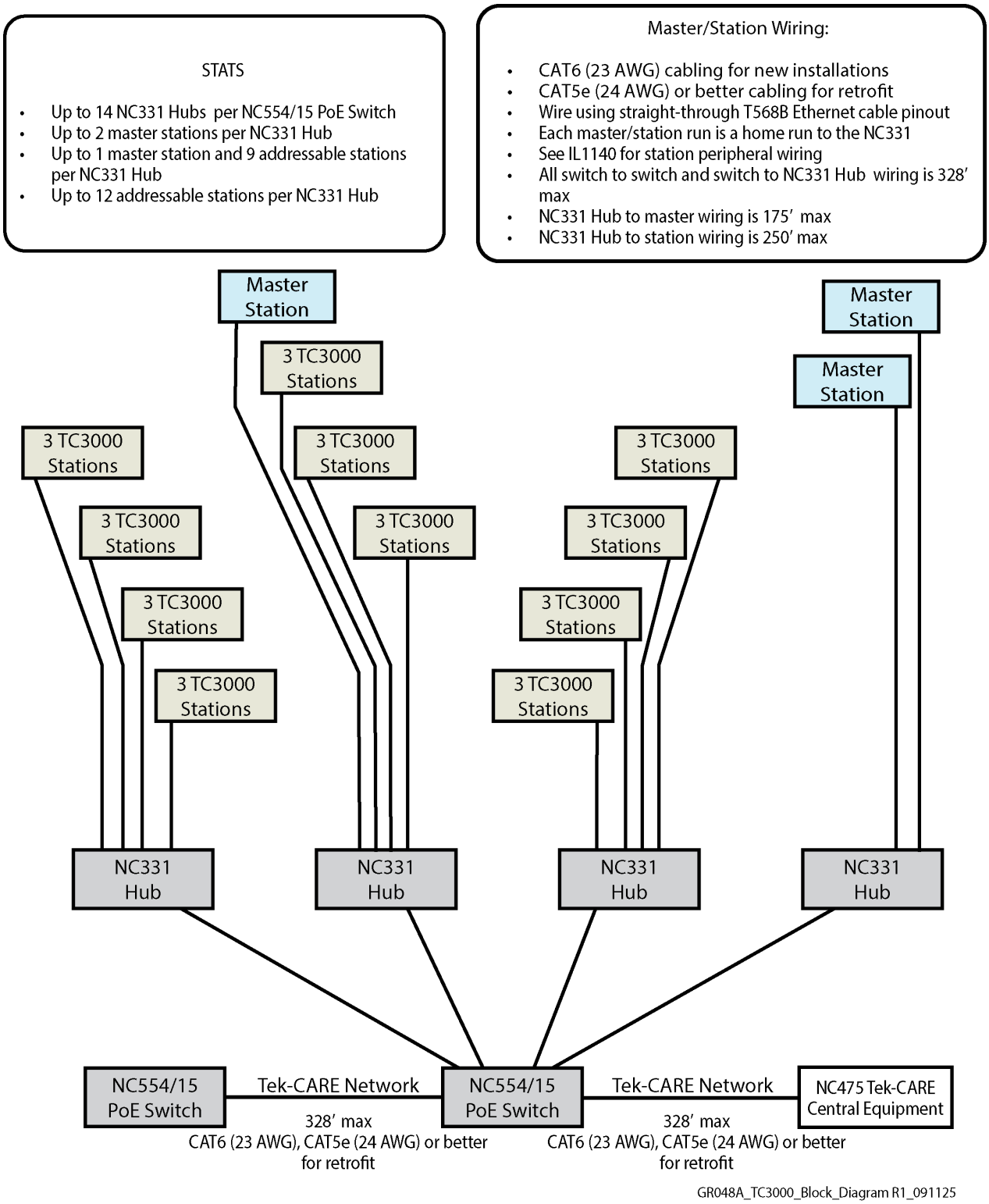
Tek-CARE Networks

NC331 Wiring

There are 250 available addresses for modules and/or hubs to be networked on the Tek-CARE system. Wire the Tek-CARE Network cable using the T568B straight-through Ethernet cable pinout using CAT6 (23 AWG) cable. Maximum cable length is 328 feet. Create a distributed network by placing and interconnecting an NC554/15 PoE Network Switch for every group of modules as the system layout demands. Use a fiber extender option to extend this distance over a fiber optic connection.

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Figure 6 - Tek-CARE3000 Block Wiring Diagram



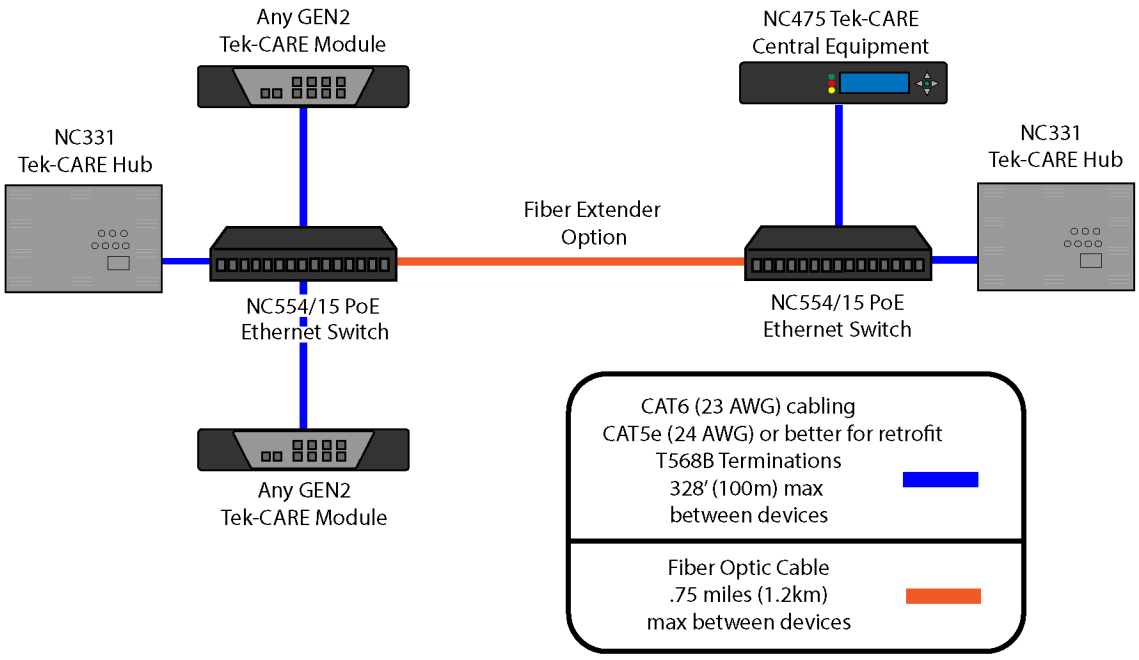
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Fiber Extender Option

When the Tek-CARE Network must be extended more than 328 feet, a fiber extender option should be used.

Fiber optic cabling must be installed and terminated by a properly trained technician. Connect a T586B straight-through Ethernet cable from an NC554/15 PoE Switch on the Tek-CARE Network to the fiber extender option, and connect SC-terminated multimode fiber to the fiber ports on the NC554/15. At the other end of the fiber cable, place another NC554/15 or master station. The fiber link is now active. See below for a Tek-CARE Network using the fiber extender option.

Figure 7 - Tek-CARE Network



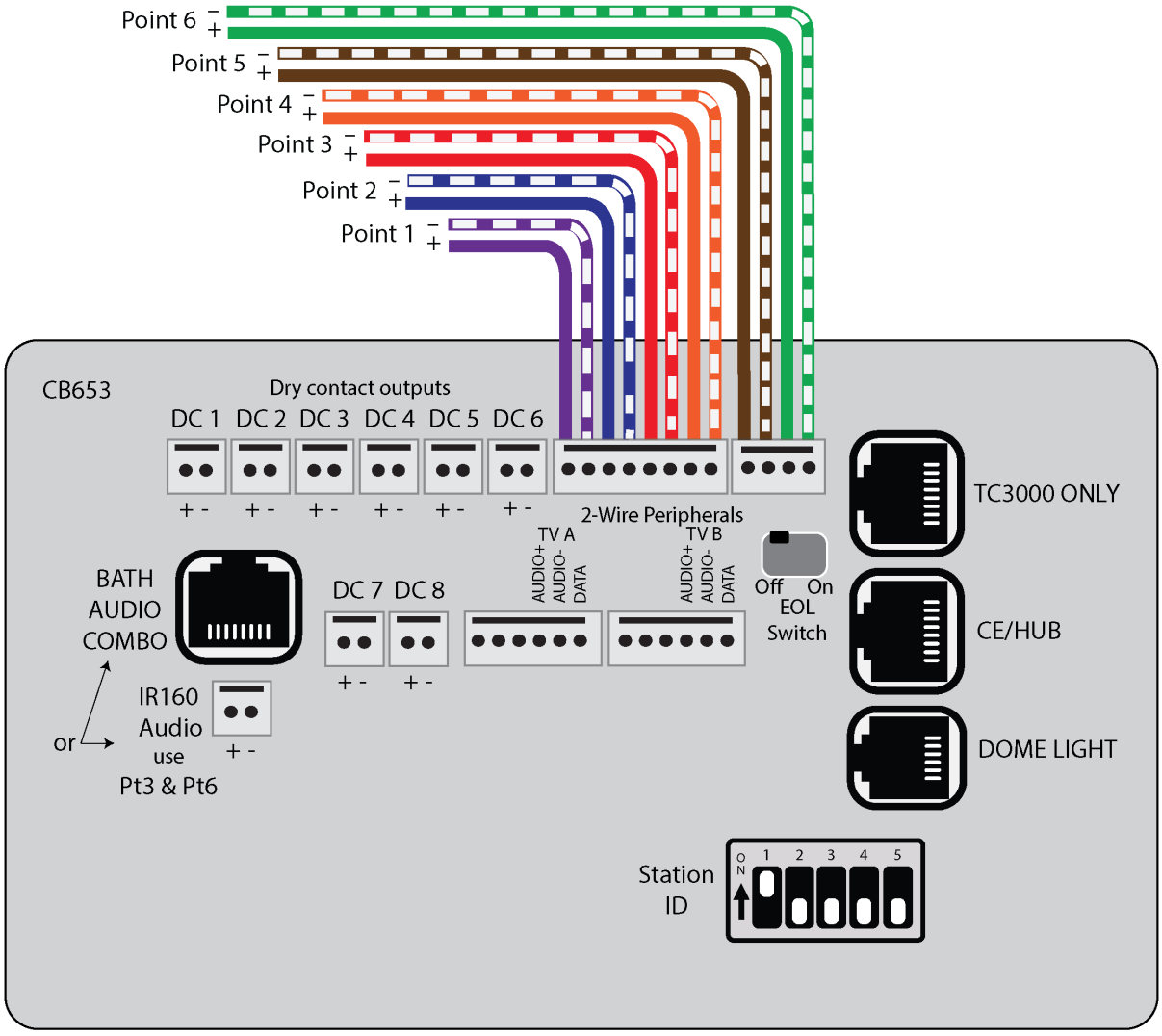
GR027A Tek-CARE3000 Network R3 091725

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Tek-CARE3000 Station Connections

The figure below illustrates the various connections from the addressable station to other peripherals, modules, and ports.

Figure 8 - Addressable Station Connections



GR048B 3000 Station Connections R2 111925

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Figure 9 - Dry Contact Outputs for Pillow Speakers

Dry Contact	Pillow Speaker Side	Button
DC1	A	
DC2	A	
DC3	B	
DC4	B	
DC5	A	
DC6	A	
DC7	B	
DC8	B	

SF120-series Peripheral Wiring

When installing wiring to peripherals, use 22-18 AWG cable. Do not exceed 100 feet of cabling from patient station to peripheral (note: do not exceed 50 feet of cabling for the SF124). Only one peripheral may be connected to each point. Do not connect multiple stations together on the same point wiring. Up to six peripherals may be connected to an addressable station using the header on the back of the station. The leads on the header are paired together to form a point on the addressable station.

The table below shows the six available points on the header. The point connections are arranged +-, +-, etc., with each pair of +- connections making up one point.

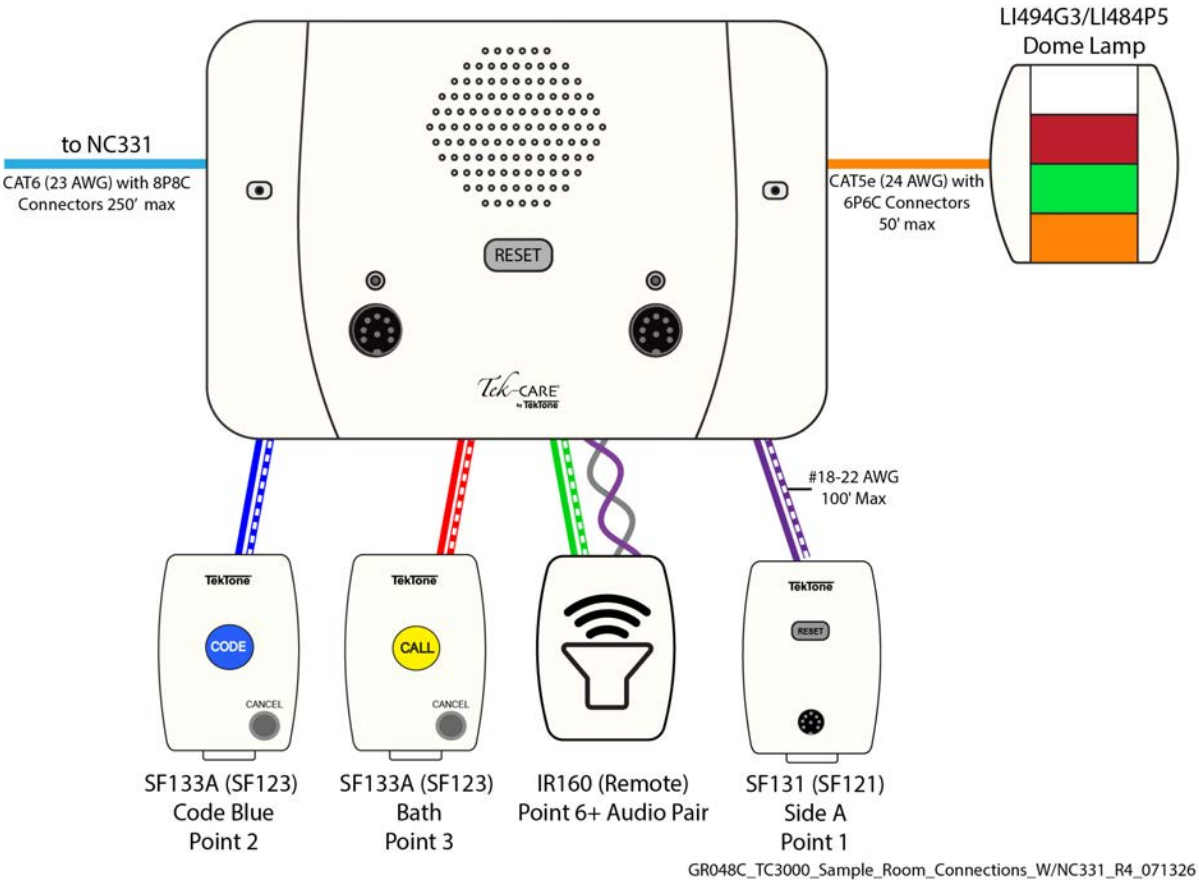
Figure 10 - Points Table

Point 1		Point 2		Point3		Point 4		Point 5		Point 6	
+	-	+	-	+	-	+	-	+	-	+	-
Purple	Purple White Stripe	Blue	Blue White Stripe	Red	Red White Stripe	Orange	Orange White Stripe	Brown	Brown White Stripe	Green	Green White Stripe
SF131/SF121		SF133A/SF123		SF133A/SF123		SF133A/SF123		PM123		IR160	
ROUTINE-A		CODE		BATH		EMERGENCY		AUX 1A/1B		SPEAKER	

GR041A Points Table GEN3 Stations R4 071326

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Figure 11 - Sample Room Wiring with Addressable Station



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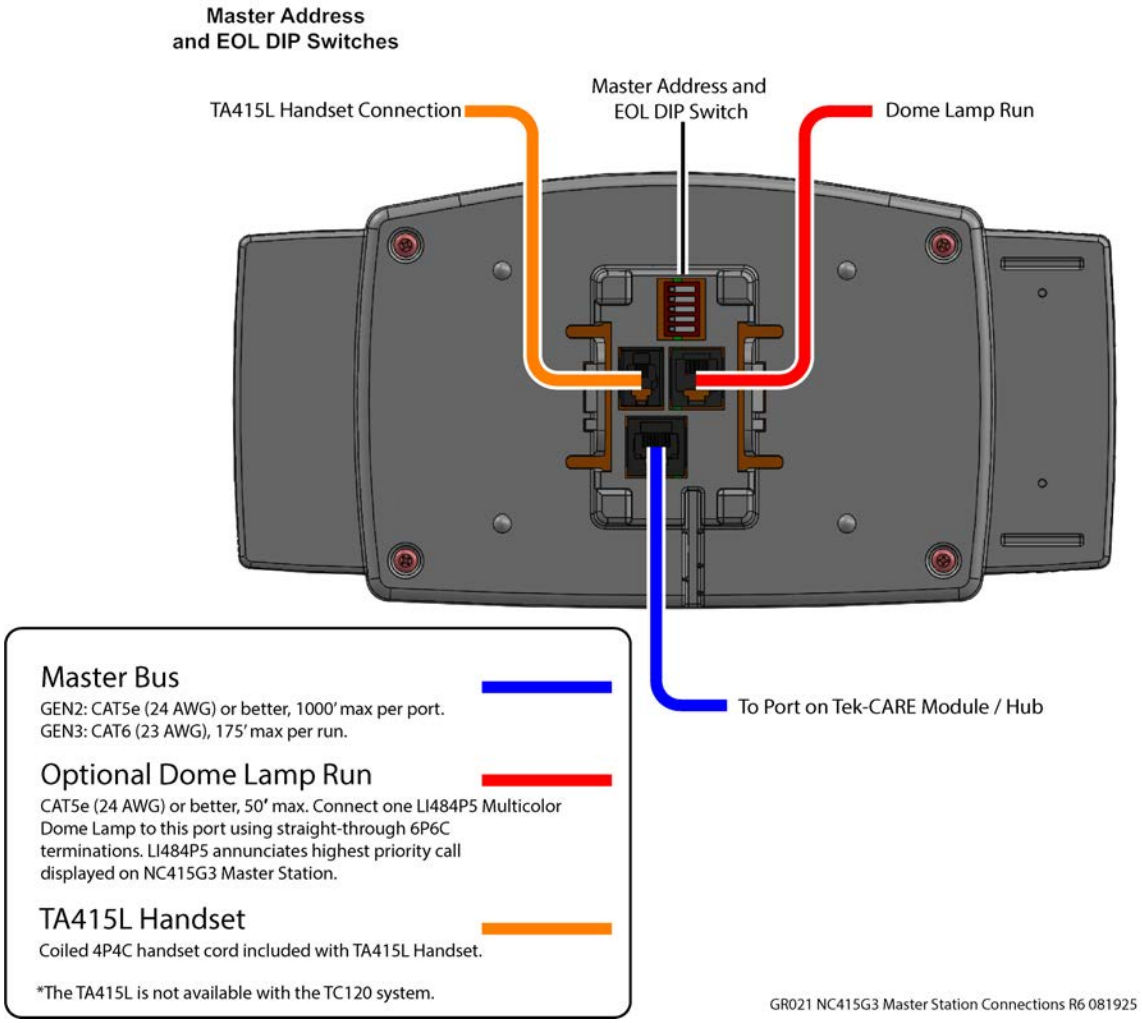
Master Station Ports

Each master station port supports either one NC415G3 or one NC404TS master station and a maximum of 175 feet of interconnecting cable. CAT6 (23 AWG) wiring is recommended for the master station. Wire the 8P8C connectors for the NC415G3 or NC404TS Master Stations according to the T568B standard.

> **IMPORTANT:** The audio bus on the Tek-CARE3000 system supports one concurrent audio connection per port. If a master station attempts to connect to an audio bus that is already in use, the connection will fail.

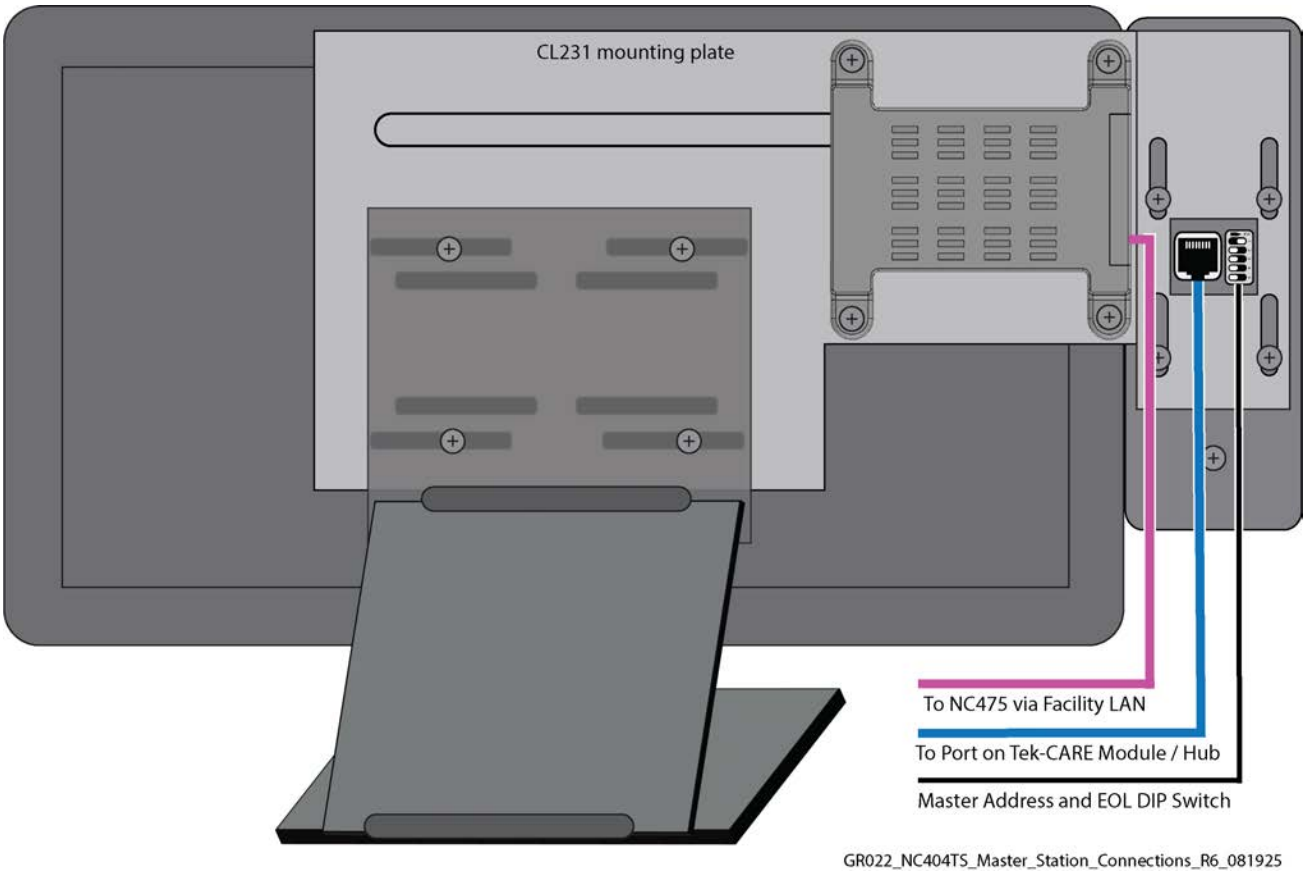
There can be a maximum of 2 NC415G3 or NC404TS master stations per NC331 Hub. Each master station is assigned a hardware address of zero using the DIP switches on the back of the master (all DIP switches off.) All NC415G3 or NC404TS master stations should have DIP switch 5 turned ON for the EOL resistor.

Figure 12 - NC415G3 Master Station Connections



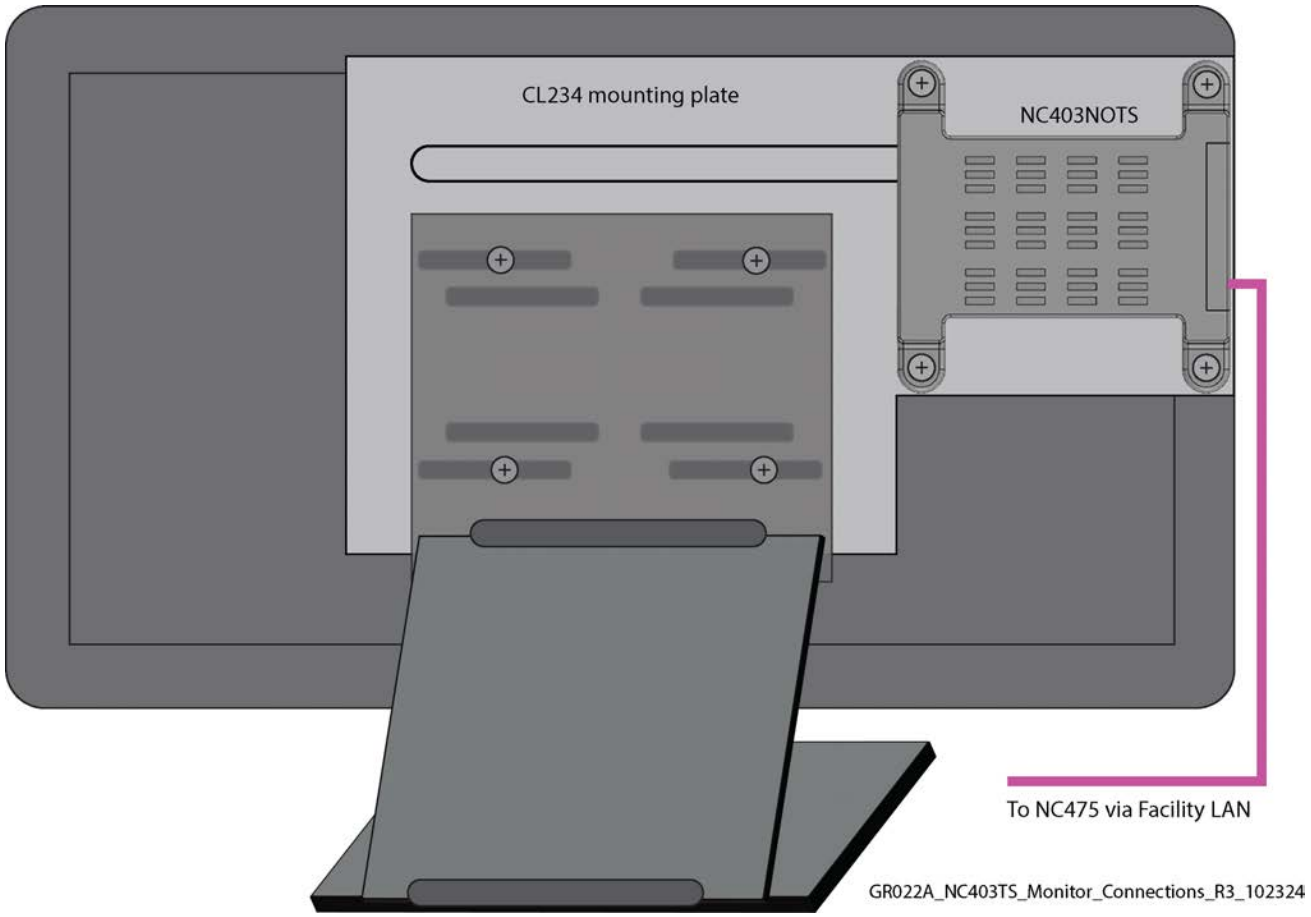
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Figure 13 - NC404TS Master Station Connections



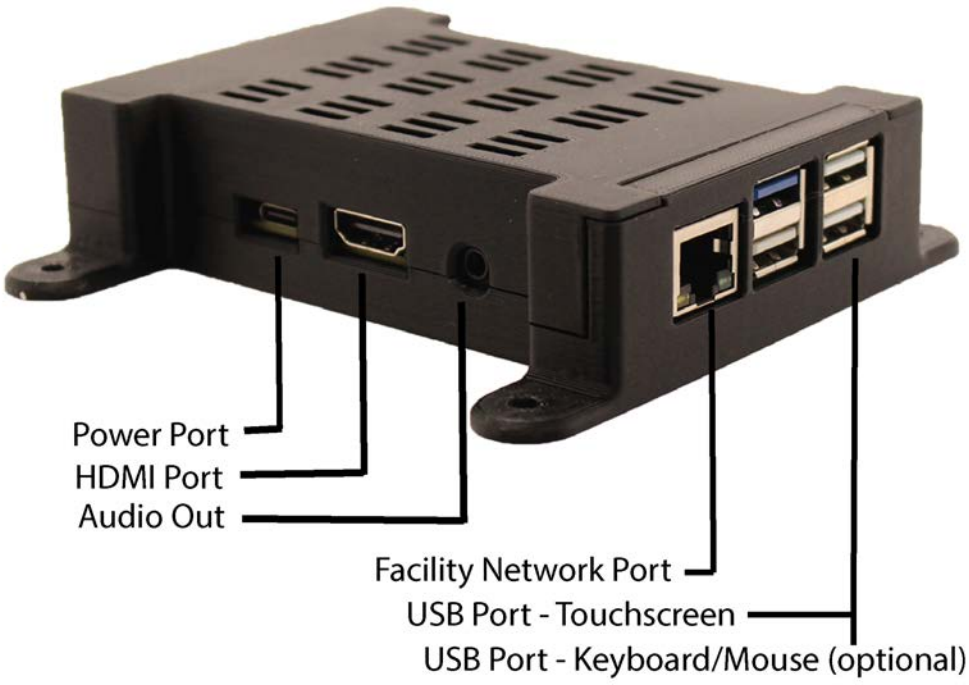
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Figure 14 - NC403/4TS Monitor Connections



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Figure 15 - NC403/4TS Controller Port ID



GR022B_NC403/4TS_Controller_Port_ID_R1_102224

For more information on connections for the NC404TS, see IL1052 NC404TS Installation Manual.

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Patient Station Ports on NC331 Master & Station Modules

The NC331 has four patient station ports depending on the module's port DIP switch settings. Each port supports up to 3 addressable devices (stations and zone lights). Maximum 12 total addressable devices per run; for station runs, the last station in a run (only) must have the EOL resistor switch ON.

Commons Bus

Terminate all CAT6 cables using the T568B straight-through Ethernet cable pinout. See the figure below. Run common bus between stations and modules. See **LI484P5 Four-LED Corridor Lights on page 18** for reference.

Figure 16 - T568B Standard Wiring



GR040 T-568B Pinout R0 072221

Dome Bus

Cables are wired straight-through: 1-1, 2-2, 3-3, 4-4, etc. Wire one twisted pair each to pins 1&2, 3&4 and 5&6. Standalone LI484P5/PM424ZP5 zone lights connect to the station bus; other LI484P5 corridor and zone lights must be within 50 cable-feet of their associated stations. Up to two LI484P5 corridor lights may be connected to each addressable station.

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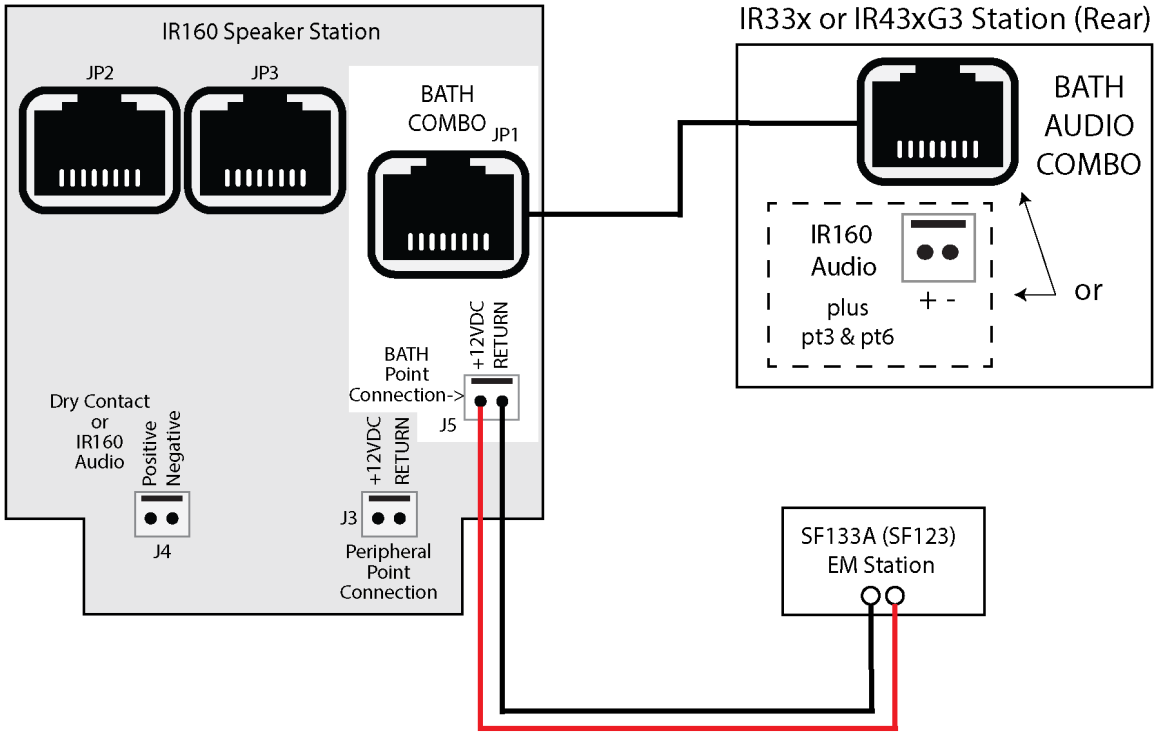
Equipment Configuration and Settings

Connecting SF120 & SF130 Peripherals

Station Connection Instructions

IR160 Audio Stations: IR160 stations are installed on single- or dual-gang mounting rings or backboxes using IH121K or IH122K housings. IR160 Audio Stations require two connections, one for audio and one for data connection. Connect the red wire on the IR160 to the positive wire of the desired point on the addressable station, and connect the black wire to the same point. Connect the purple and gray audio wires to the two-pin header which attaches to the station. See **- Sample Room Wiring with Addressable Station on page 29** for reference.

Figure 17 - IR160 Connections



GR012A IR160 Bath Combo Connections_R2_021626

SF131 & SF121 Single Patient Stations:SF131/SF121 stations are installed on single- or dual-gang mounting rings or backboxes using IH131 (for SF131) and IH121K (for SF121) housings. Connect the red lead from the station to the positive terminal on the desired point of the GEN3 addressable station and connect the black lead to the negative terminal of the desired point on the GEN3 addressable station. If possible, connect the patient station to Point 1. This is the default connection point for patient stations in a single-bed installation.

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SF133A Water-Resistant Emergency Pull-Cord Station: SF133A stations are easily installed by mounting the rear bracket to the mounting surface, then snapping the station onto the bracket. Programmable button caps are included with each SF133A (CALL, EMERG, CODE, RESET, ROUND, and CHECK-IN). Select the desired button cap and snap it onto the station button. See illustration below.

Figure 18 - SF133A Button Cap Install



If using the pull cord, install it before mounting the station.

See the illustration below for pull cord installation method, or visit www.tektone.com/pull-cord-attachment-method to view a short installation walkthrough.



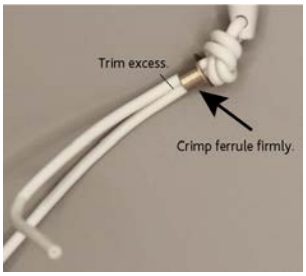
Insert pull cord through station plunger.



Tie both ends of the cord in an overhand knot.



Slide the knot into a close position under the plunger.



Thread both ends of the cord through the ferrule, and crimp firmly. Trim any excess cord.



Pass the pull cord through handgrip, followed by the ferrule.



Tie a tight overhand knot near the end of the cord.

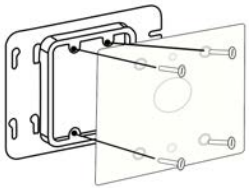


Pass the loose end of the cord through the ferrule, crimp the ferrule, and trim the excess cord.

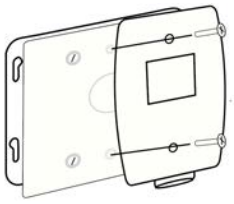
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When retrofitting to existing plaster rings or electrical boxes, the IH131/2 SF130-series Adapter Plates mount to a 2- or 3-gang plaster ring or masonry box, allowing for easy retrofit install of SF130-series stations. The IH131 and IH132 are mounted on the plaster ring or box, and the mounting plate for the SF130-series station is installed on the IH131/2. The station then snaps onto its mounting plate for simple installation. See the following page for illustration.

IH131 2-gang Install



Line up the outer, counter-sunk holes on the adapter plate with the holes on the ring/box, and secure them with the included HW388 flathead screws.

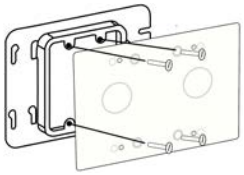


Once the plate is secured to the ring/box, use the middle holes to secure the mounting plate for the SF130-series station with the HW026 panhead device mounting screws (included with SF130-series stations).

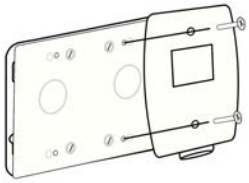


The adapter plate and station mounting plate will sit flush when installed correctly. Now, the SF130-series station can be easily snapped onto its mounting plate.

IH132 2-gang Install



Line up the inner, counter-sunk holes on the adapter plate with the holes on the ring/box, and secure them with the included HW388 screws.

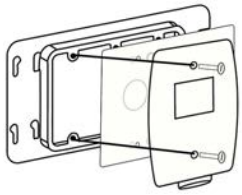


Once the plate is secured to the ring/box, use the middle, smallest holes to secure the mounting plate for the SF130-series stations with the HW026 device mounting screws (included with SF130-series stations).

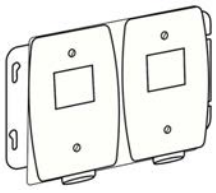


The adapter plate and station mounting plate will sit flush when installed correctly. Now, the SF130-series station can be easily snapped onto its mounting plate.

IH132 3-gang Install



Use the HW026 screws (included with SF130-series stations) to secure both the IH132 adapter plate and the SF130-series mounting plate to the ring/box. The screws will pass through the holes of the SF130-series station mounting plate, then the outermost holes on the IH132, to secure to the 3-gang ring/box. In this use-case, the HW388 screws included with the adapter plates will *not* be used.

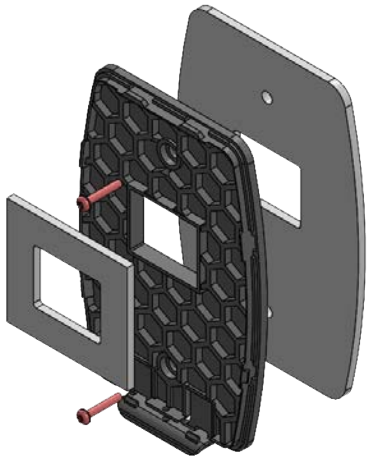


The adapter plate and station mounting plate will sit flush when installed correctly. Now, the SF130-series station can be easily snapped onto its mounting plate.

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If the SF133A is used in wet or humid locations, the SF133GK Gasket Kit ***must*** be installed with the SF133A to provide a proper seal. Peel the backing off of the double-sided tape on the smaller gasket and affix it to the inner part of the backplate as shown below. Then, affix the larger gasket to the mounting surface before installation of the backplate. Install the backplate over the gasket, then snap the station onto the backplate. See illustrstion below.

Figure 19 - SF133GK Gasket Kit Install



If the SF133A is used in dry locations, the SF133GK Gasket kit is not needed. Simply install the rear bracket onto the mounting surface using the two screw holes in the bracket, then snap the station onto the bracket.

- To use an SF133A as a **Code Blue** switch, connect it to **Point 2 (Blue and Blue/White)** on the addressable station.
- To use an SF133A as a **Bath Emergency** switch, connect it to **Point 3 (Red and Red/White)** on the addressable station.
- To use an SF133A as an **Emergency** switch, connect it to **Point 4 (Orange and Orange/White)** on the addressable station.
- If a custom call type is desired, note which point the SF133A station is connected to using the worksheet in the back of this manual. This information will be used during configuration setup.

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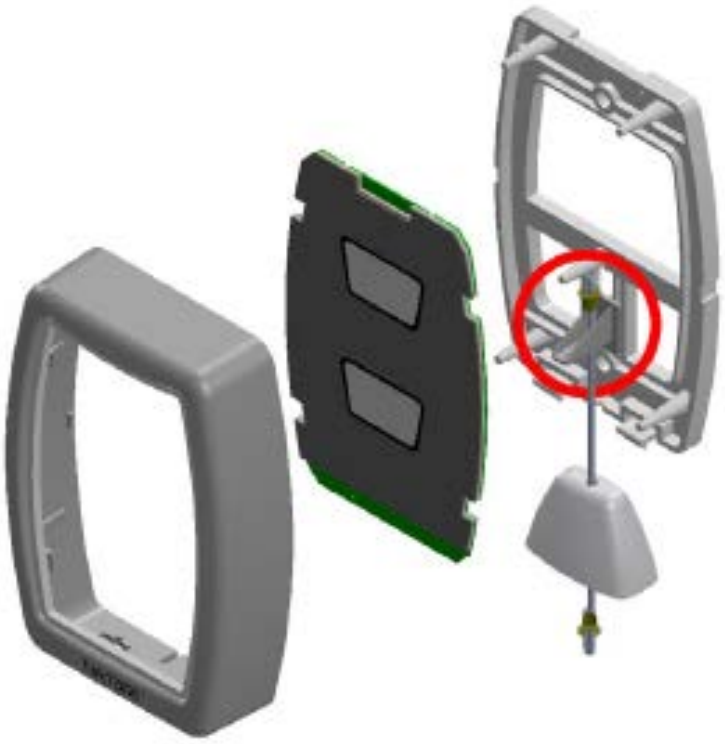
SF123 Customizable 2-Button Pull-Cord Station: SF123 stations are installed on single- or dual-gang mounting rings or backboxes using IH121K or IH122K housings. Slide the desired call type insert into the slot on the top of the station. Snap the circuit board into the front bezel by spreading the face of the bezel while placing the circuit board into the retaining clips.

Install the rear bracket on the wall or junction box using the two screw holes in the bracket. If a pullstring is used, push an end of the pullstring through the hole in the slider contained on the bracket. Use the included brass ferrule to crimp onto the string. Trim the string to the appropriate length and insert it through the hole in the plastic handle. Crimp the remaining ferrule onto the string below the handle. See**- SF123 Assembly below** for visual detail.

NOTE:Push the slider up into the retaining nibs on the rear bracket. Failure to push the slider up and secure it will result in station damage during installation.

- To use an SF123 as a **Code Blue** switch, connect it to **Point 2 (Blue and Blue/White)** on the addressable station.
- To use an SF123 as a **Bath Emergency** switch, connect it to **Point 3 (Red and Red/White)** on the addressable station.
- To use an SF123 as an **Emergency** switch, connect it to **Point 4 (Orange and Orange/White)** on the addressable station.
- If a custom call type is desired, note which point the SF123 station is connected to using the work-sheet in the back of this manual. This information will be used during configuration setup.

Figure 20 - SF123 Assembly



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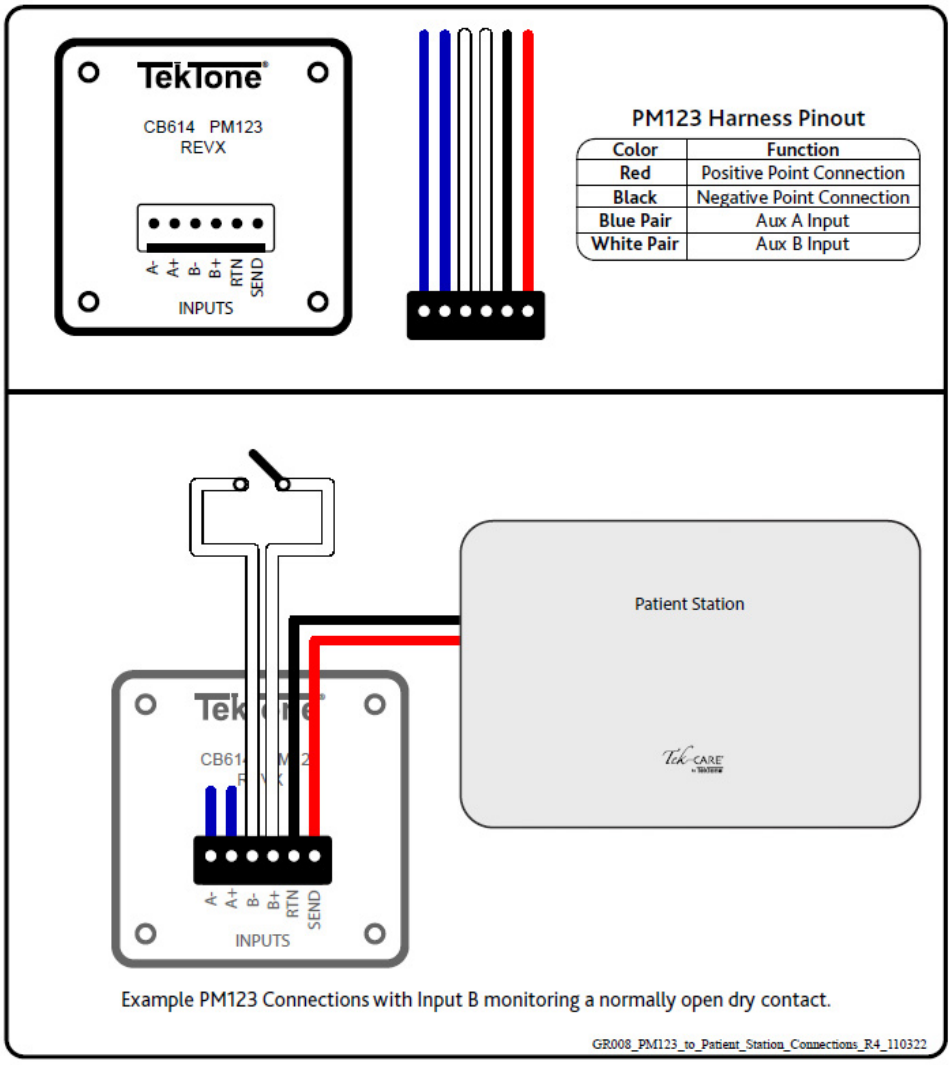
PM123 Auxiliary Input Module: The PM123 can support up to two inputs - which are both momentary by default. These devices can be set to latching switches under the **Behaviors** page for the Aux input within the LS450 ConfigTool. Note the PM123 harness and six wires. Connect the wiring from the addressable station and switches to the PM123 module. Connect the positive terminal of the desired point on the addressable station to the **Send** terminal, and connect the negative point of the desired point to the **Return** terminal. If possible, connect the PM123 module to point 5, which is the default connection point for the PM123.

Connect the Normally Open Dry Contact to be monitored to **Contact 1** or **Contact 2**.

There are three available functions for the PM123 in the ConfigTool, **Aux Input 1** (with **A** and **B** sides), **Aux Input 2** (with **A** and **B** sides), and **Aux Check In**. Aux Inputs are non-latching by default. The LS450 ConfigTool can be used to configure the Aux 1A/1B to be latching.

Note that **Contact 1** will appear as **Aux Input 1A** or **Aux Input 2A** in the ConfigTool software depending on the function selected. **Contact 2** will appear as **Aux Input 1B** or **Aux Input 2B.**

Figure 21 - PM123 Connections



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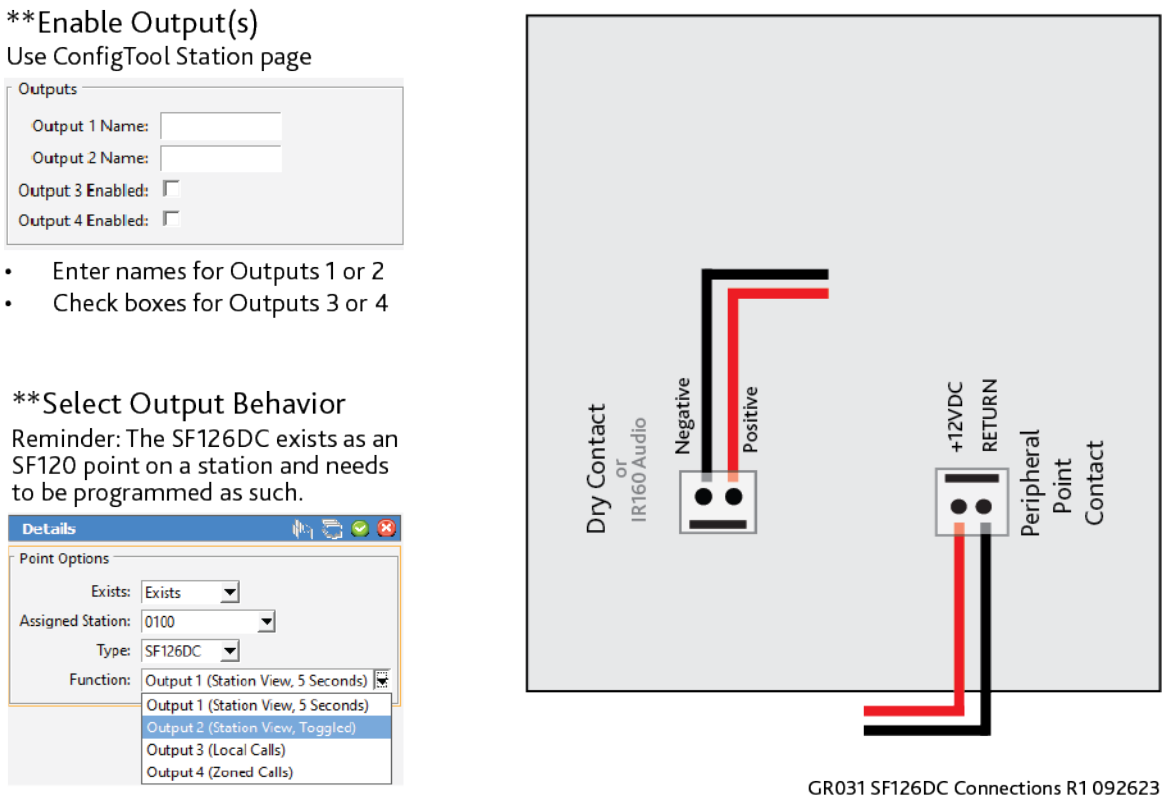
SF126DC Dry Contact Output Module: The N.O. dry contact module provides a two-pin header for a relay/device connection and another for the station connection. Upon initiation it will provide one of four programmable output behaviors; from the master station, either a 5-second on or a toggle on/off output, or at the station, a local or zone output.

The SF126DC can be mounted individually or with another SF120 peripheral, depending on the application. Use applications for the SF126DC may include:

- Triggering an input on a security alarms panel for offsite monitoring
- Activating strobes and sirens
- Activating pre-recorded messages on 3rd-party equipment

NOTE: For IR430G3, IR434G3, and IR436G3, these four dry contact outputs are hard coded on the stations and labeled as DC1 through DC4.

Figure 22 - SF126DC Connections



SF120-Series Vandal/Psychiatric Stations: SF120-series vandal stations are installed on a single-gang ring with a dual-gang box. Connect the red lead from the station to the positive terminal on the desired point of the addressable station and connect the black lead to the negative terminal of the desired point on the addressable station. See **- Addressable Station Connections on page 27** for reference.

NOTE: These devices require grounded backboxes. This is critical for protection against electrostatic discharge (ESD).

NOTE: Consider additional depth required for cable connectors.

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Duty Station Configuration

The IR330 can be either a Staff or a Duty station. To use as a Duty station, select the desired pre-configured Annunciation scheme in the ConfigTool.

When the IR330 is configured as a Duty station, DIP switch #5 controls volume. OFF is high volume and is the default, ON makes the volume lower. When changing tone volume from one level to another, the station should then be power cycled (reset/reboot module or unplug/plug-in station) for the adjustment to take effect.

Master Stations

The master station's 4- or 5-digit address is assigned automatically upon port connection, as follows:

- The first 2- to 3-digits are the Hub number
- The next digit is an "M" (for master)
- The last digit is the hub port that the master station is plugged into (0-3)

NOTE: Master station DIP switch is always 0, with the EOL switch always ON

If the master station is being connected to a port previously configured with another master station, the previous master's configuration will be automatically transferred into the new unit if the address remains the same.

Tek-CARE 2 Master Station Default Addressing		
Hub # (X)XX	**Port #**	**Default Address**
Ex: 05	0	05M0
	1	05M1
	2	05M2
	3	05M3
Ex: 25	0	25M0
	1	25M1
	2	25M2
	3	25M3
Ex: 155	0	155M0
	1	155M1
	2	155M2
	3	155M3
***DIP switch address is always 0.**		
***EOL switch (DIP switch 5) always ON.**		

Switch "ON" = Value		
1	=	1
2	=	2
3	=	4
4	=	8
5	=	16
6	=	32
7	=	64
8	=	128

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Addressable Stations

Each station must have a unique 4- or 5-digit address, which is its default name. The first two to three digits are the module number of the NC331 Hub (addresses 0-250); the last two digits are its station number, which is based on its port number on the hub (00-03), and the station's DIP switch (0-2) The station's 5-switch DIP switch uses a binary configuration method (DIP switch 1=1, DIP switch 2=2, DIP switch 3=4, DIP switch 4=8, DIP switch 5=16). A run of 3 stations should be addressed 0, 1, and 2. The farthest out station on every run should have its EOL on.

See the programming worksheets in the back of this manual to document station details.

Tek-CARE 2 3000 Room Station Default Addressing			
Hub # (X)XX	**Port #**	**DIP Switch**	**Default Address**
Ex: 05	0	00	0500
		01	0501
		02	0502
	1	00	0503
		01	0504
		02	0505
	2	00	0506
		01	0507
		02	0508
	3	00	0509
		01	0510
		02	0511
***EOL switch always ON for last station on run.**			

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System Maintenance Instructions

IMPORTANT: Certain maintenance and upgrade operations may require the nurse call system to be deactivated. Facility staff must be notified before system deactivation and be given an estimated length of time that the system will be off.

Master Station

The only user serviceable parts are the handset and cord. To replace the handset:

- To remove the handset from the cord, depress the modular jack's locking tab and pull the cord away from the handset. This should occur easily if the locking tab is properly depressed.
- Insert the cord into a new handset. Gently pull on the cord to ensure that the locking tab is engaged and the cord does not pull out.
- Test the new handset by placing a call to a patient station, using the handset for communication.

To replace the cord:

- To remove the handset from the cord, depress the modular jack's locking tab and pull the cord away from the handset. This should occur easily if the locking tab is properly depressed.
- To remove the cord from the master station base, depress the modular jack's locking tab and then pull the cord away from the master station base. This should occur easily if the locking tab is properly depressed.
- Insert the new cord into the handset. Gently pull on the cord to ensure that the locking tab is engaged and the cord does not pull out.
- Insert the new cord into the master station base. Gently pull on the cord to ensure that the locking tab is engaged and the cord does not pull out.

Audio Adjustments

Once installation and configuration are complete, adjustments can be made to change or improve the volume and quality of the audio on the Tek-CARE3000 system.

There are two adjustments that can be made by installers to affect the audio of the system. Speaker volume and microphone gains can be adjusted for each station using the LS450 ConfigTool software.

Station Volume and Gain Adjustment

Before adjusting the volume and gain of a station, perform a complete system test and check the audio quality of each room. This will require two people, one in the room, and one at a master station.

- Place a call from the room, and answer the call at the master station, either with the handset or the push-to-talk button.
- Once the call has been answered, have a brief conversation between the room and the master station. If the station audio in the room produces adequate volume, and the return audio from the station is satisfactory at the master station, continue with the test.
- If audio is too quiet in the room, note the Station ID before moving on so that it can be adjusted later. The volume of the IR160 is controlled by the **Speaker Volume** setting in the ConfigTool.

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- If audio from the station is too low at the master station, try turning the volume up on the screen of the master station. If the audio is still too quiet, note the Station ID. The **Mic Gain** setting can be edited in the ConfigTool to improve audio in this direction.
- Continue the walk test of the facility, and note any problem areas for adjustment.

Once all of the stations have been tested for audio volume, adjust them as needed on the **Stations** tab of the **Field Devices** page within the LS450 ConfigTool software.

Patient Station Call Cords

Call cords may be replaced if a problem is encountered. To do so perform the following steps:

- To remove the call cord, firmly grip the plug and pull straight away from the patient station. To avoid a cord out call during this procedure, hold down the **RESET** button until the yellow call light is illuminated, then remove the cord.

  NOTE: A dummy plug is required for SF121 patient stations.

- To insert the new call cord, hold the plug and push the end straight into the call cord jack on the patient station.
- Test the cord by pressing the button on the other end. This should initiate a call and light the call indicator. Press the **RESET** button on the patient station to reset the call. Observe the station for 10 seconds to ensure that no cord out call occurs.

Patient Station Pillow Speakers

Pillow speakers may be replaced if a problem is encountered. To do so perform the following steps:

- To remove the pillow speaker, firmly grip the plug and depress the locking tab. Pull straight away from the patient station. To avoid a cord out call during this procedure, hold down the **RESET** button until the yellow call light is illuminated. While continuing to depress the **RESET** button, remove the cord.
- To insert the new pillow speaker, hold the plug and push the end straight onto the call cord jack on the patient station.
- Test the pillow speaker by depressing the red **NURSE CALL** button. This should initiate a call and light the call indicator. Press the **RESET** button on the patient station to reset the call. Observe the station for 10 seconds to ensure that a cord out call does not occur.

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User Component Cleaning and Care

To avoid damage to user components during cleaning, it is important to adhere to the following guidance. The cleaning product should be either sprayed on a soft cloth or be supplied as a cleaning wipe. Wipe down the accessible surfaces of the product avoiding cleaner accumulation or runoff.

Use a commercial health-care facility cleaner from among the following types:

1. 70% isopropyl alcohol (ex. PDI® Sani-Cloth®70).
2. Quaternary ammonium disinfectants (ex. PDI® Super Sani-Cloth®).
3. Hydrogen peroxide–based cleaners (ex. PDI® Super HyPerCide®).

NOTE:

- Do not submerge or spray liquid onto user components.
- Always avoid cleaning and disinfection solutions containing corrosive or skin moisturizing ingredients.
- Extensive rubbing during cleaning/disinfection may cause surface damage to the device.

Cleaning touch screen displays:

- Use a lint-free eyeglass cleaning cloth or microfiber cloth. Regular cloth fibers can make microscopic scratches on the touch screen and can damage the display over time.
- Do not use paper towels, tissues or camera lens paper as these are too abrasive for the touch screen.
- Do not spray the touch screen with any liquid. The electronics may be damaged if drops of moisture seep into the housing.

Replacement Part Numbers

Part #	Description	Used by
CA025	Handset Cord for NC415G3	Master Station
CA043	Handset Cord for NC404TS	Master Station
SF401B	8' Oxygen-safe Call Cord, DIN plug	Patient Stations
SF401B/10	10' Oxygen-safe Call Cord, DIN plug	Patient Stations
SF401B/20	20' Oxygen-safe Call Cord, DIN plug	Patient Stations
SF401EX	Strain Relief Cable, DIN plug	Patient Stations
SF401G	Geriatric Call Cord, DIN plug	Patient Stations
SF401GP	Geriatric Pad Call Cord, DIN plug	Patient Stations
TA415L	Handset for NC415G3	Master Station
TA415LB	Handset for NC404TS	Master Station

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System Troubleshooting Guide

This section covers general troubleshooting practices, as well as specific suggestions for various problems.

As mentioned in **System Installation Overview on page 7** of this manual, there are some general troubleshooting techniques that installation personnel must follow during the installation of the system equipment.

> **NOTE:** Installers must exercise care when troubleshooting problems that involve high current or high voltage damage. Installers must also exercise extreme caution and be aware of equipment or wiring that uses or handles high voltage, as these sources are potentially lethal.

Do not connect the entire system together for the initial power up. Connect only the central equipment and the first master station for testing. Then connect the remaining master stations one at a time until all are connected and functional. This allows the installer to establish a “known-good” test point to work from, and to immediately identify problems as they are introduced to the system.

Do not connect all patient station runs to the central equipment at one time. Connect individual runs to the central equipment one by one until all are connected and functional. This allows the installer to more easily locate and recognize the introduction of wiring or equipment problems in the field.

Direct Connection is a classic troubleshooting technique. If a problem is encountered, an installer may directly connect a master station or a patient station to the central equipment. If the problem ceases, then the source of trouble is located in the field (i.e., wiring or mounting related problems), whereas if the problem remains, it is equipment-based. This can also be applied to patient station peripheral devices, which can be directly connected at the patient station location. While this is not an absolute test, it can provide a strong indication of where to look when troubleshooting.

Swap Testing is another well-known method of problem identification. If a problem is identified, an installer can interchange a known good piece of equipment into the location in question and move the device having problems to the location that the known good device previously occupied.

> **NOTE**: If a device or wiring indicates high current or high voltage damage, this technique must be delayed until the source of the original problem is located. As an example, a patient station in one room that demonstrates a problem can be “swapped” with a station from another room that is known to be working acceptably. (Change the test station’s DIP switch address to agree with that of the station being replaced.) If the symptom follows the original problem device, the problem is equipment-based. If the problem remains in the original location, a field problem is indicated (i.e., wiring or mounting related problems). This technique can be applied to master stations, master station control equipment, central equipment ports, etc.

> **NOTE:** To avoid shorting out the station, do not hot swap addressable stations if they are mounted to a metal box or frame.

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NC331 Hub LEDs

The NC331 hub has 4 LEDs corresponding to the hub ports. The hub should have 4 green LEDs to show that the station ports are powered on.

Symptoms and Suggestions

Maintenance Fault Indication

- When the nurse call system has one or more faults, each assigned staff member will receive just one page and/or email for the Maintenance fault.
- If the nurse call system has intermittent faults, the Maintenance fault will latch on and be visible on event monitors and master stations. Use the Tek-CARE Reporting System to determine which intermittent fault occurred.
- When all other faults are resolved, perform a redetect on a master station to reset the Maintenance fault.

Code Fault Indication

- Confirm that the station actually has a code device connected to it.
- Verify the cabling between the code station and the room station.
- The peripheral and associated patient station can be swap tested with other “known-good” devices.

Station Fault Indication

- Determine whether the station fault is singular or a large group of addressable stations.
- If the faults are a large group, then examine the associated common wiring to that section of rooms for opens, shorts and grounds. The actual architectural room numbers can assist in the physical location. If the faults represent all of the stations on the patient station port, then the port may no longer be working. Swap testing between ports can be performed.
- If the fault is a single device, verify the local station wiring (connections and plug-on connector) for continuity, opens, shorts and grounds. The addressable station may also be swap tested with another “known-good” device for verification. (Change the test station’s DIP switch address to agree with that of the station being replaced.) Swapping the station with one from an unoccupied room can help isolate whether the problem lies in the local station or the local wiring.

Communication Fault Indication

- The master displaying this fault is no longer communicating with the central equipment.
- Swap test the master station with another “known-good” master station.
- Connect the master station directly to the central equipment using a short cable.
- Verify master-to-central-equipment connections.

Master Fault Indication

- The master name in the message is no longer communicating with the central equipment.
- Swap test the master station with another “known-good” master station.
- Connect the master station directly to the central equipment using a short cable.
- Verify master-to-central-equipment connections.

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Unsupported Remote Fault

- Change the behavior for the station. The addressable stations cannot have 120 virtual station behaviors.

Patient Station is Not Placing Calls

- Swap test the associated call cord.
- Swap test the patient station with another “known-good” patient station.
- If the problem encompasses an entire port, see **Station Fault Indication on the previous page**.

Patient Station has a Constant “Cord Out” Message

- Verify that the call cord is properly inserted.
- Swap test the call cord with another “known-good” call cord.
- Swap test the patient station with another “known-good” patient station. (Change the test station’s DIP switch address to agree with that of the station being replaced.)

Duty Station or Zone Light is Not Annunciating Calls

- This is a software-controlled feature. Zone light must be set to watch the desired zones.

Lamp Fault Indication

- Verify the connections between corridor light and patient station.
- Swap test the patient station with a “known-good” device. (Change the test station’s DIP switch address to agree with that of the station being replaced.)

LI484P5 Corridor Light is Not Lighting

- Verify LAMP versus LAMP2 jumper is set correctly.
- The patient station may also be swap tested. (Change the test station’s DIP switch address to agree with that of the station being replaced.) Check station circuit board for signs of high current damage.

Master Station is Not Displaying Calls/Not Handling Calls as Intended

- Review master’s programmed settings to verify information, especially zone settings and call filter settings.

Master Station Error Connecting/Will Not Boot Up

- Check that the master is connected to a hub port that is configured for masters, not stations.

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Pillow Speaker Intercom is Not Working and Audio is Coming From the Patient Station

- Verify that the pillow speaker is TekTone SF431PSG3/SF42KLA.
- Verify that the pillow speaker is properly inserted into the associated DIN jack. Also check the pins inside the jack for signs of bending that might prevent all connections from being made.
- Try the pillow speaker with another patient station that is known to be working correctly.
- Swap test the Pillow Speaker & Bed Interface Module or Pillow Speaker Module with a "known-good" module.
- Swap test the patient station with another "known-good" patient station. (Change the test station's DIP switch address to agree with that of the station being replaced.)

Emergency Switch or Code Call Switch is Not Placing Calls

- If the emergency or code call switch and wiring appear to be correct, then the patient station can also be swap tested with another "known-good" patient station.

Voltage Readings

The following readings can be taken using a standard voltage meter. All readings are taken using the system ground as a reference.

> **NOTE**: All readings shown below are approximations and must be used only as rough guidelines. This is due to the variables created by each job site, such as wire lengths, number of stations, etc.

Station Connections— Station Bus:

Wire#	Description	Voltage Reading, Mains Powered
1	Power	24 VDC
2	Common	0 VDC
3	Power	24 VDC
4	Common	0 VDC
5	Power	24 VDC
6	Common	0 VDC
7	Data	0-3 VDC
8	Data	0-3 VDC

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Tek-CARE3000 Addressable Programming Worksheets

Tek-CARE3000 Programming Worksheet		
NC331 Hub Address:	**NC331 Hub Address:**	**NC331 Hub Address:**
Station ☐ Master ☐	Station ☐ Master ☐	Station ☐ Master ☐
Port:	Port:	Port:
Type:	Type:	Type:
Behavior:	Behavior:	Behavior:
Default Name:	Default Name:	Default Name:
Location:	Location:	Location:
Point 1: Point 2:	Point 1: Point 2:	Point 1: Point 2:
Point 3: Point 4:	Point 3: Point 4:	Point 3: Point 4:
Point 5: Point 6:	Point 5: Point 6:	Point 5: Point 6:
Zones:	Zones:	Zones:
NC331 Hub Address:	**NC331 Hub Address:**	**NC331 Hub Address:**
Station ☐ Master ☐	Station ☐ Master ☐	Station ☐ Master ☐
Port:	Port:	Port:
Type:	Type:	Type:
Behavior:	Behavior:	Behavior:
Default Name:	Default Name:	Default Name:
Location:	Location:	Location:
Point 1: Point 2:	Point 1: Point 2:	Point 1: Point 2:
Point 3: Point 4:	Point 3: Point 4:	Point 3: Point 4:
Point 5: Point 6:	Point 5: Point 6:	Point 5: Point 6:
Zones:	Zones:	Zones:

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3000 Programming Worksheet		
NC331 Hub Address:	**NC331 Hub Address:**	**NC331 Hub Address:**
Station ☐ Master ☐	Station ☐ Master ☐	Station ☐ Master ☐
Port:	Port:	Port:
Type:	Type:	Type:
Behavior:	Behavior:	Behavior:
Default Name:	Default Name:	Default Name:
Location:	Location:	Location:
Point 1: Point 2:	Point 1: Point 2:	Point 1: Point 2:
Point 3: Point 4:	Point 3: Point 4:	Point 3: Point 4:
Point 5: Point 6:	Point 5: Point 6:	Point 5: Point 6:
Zones:	Zones:	Zones:
NC331 Hub Address:	**NC331 Hub Address:**	**NC331 Hub Address:**
Station ☐ Master ☐	Station ☐ Master ☐	Station ☐ Master ☐
Port:	Port:	Port:
Type:	Type:	Type:
Behavior:	Behavior:	Behavior:
Default Name:	Default Name:	Default Name:
Location:	Location:	Location:
Point 1: Point 2:	Point 1: Point 2:	Point 1: Point 2:
Point 3: Point 4:	Point 3: Point 4:	Point 3: Point 4:
Point 5: Point 6:	Point 5: Point 6:	Point 5: Point 6:
Zones:	Zones:	Zones:

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3000 Programming Worksheet		
NC331 Hub Address:	**NC331 Hub Address:**	**NC331 Hub Address:**
Station ☐ Master ☐	Station ☐ Master ☐	Station ☐ Master ☐
Port:	Port:	Port:
Type:	Type:	Type:
Behavior:	Behavior:	Behavior:
Default Name:	Default Name:	Default Name:
Location:	Location:	Location:
Point 1: Point 2:	Point 1: Point 2:	Point 1: Point 2:
Point 3: Point 4:	Point 3: Point 4:	Point 3: Point 4:
Point 5: Point 6:	Point 5: Point 6:	Point 5: Point 6:
Zones:	Zones:	Zones:
NC331 Hub Address:	**NC331 Hub Address:**	**NC331 Hub Address:**
Station ☐ Master ☐	Station ☐ Master ☐	Station ☐ Master ☐
Port:	Port:	Port:
Type:	Type:	Type:
Behavior:	Behavior:	Behavior:
Default Name:	Default Name:	Default Name:
Location:	Location:	Location:
Point 1: Point 2:	Point 1: Point 2:	Point 1: Point 2:
Point 3: Point 4:	Point 3: Point 4:	Point 3: Point 4:
Point 5: Point 6:	Point 5: Point 6:	Point 5: Point 6:
Zones:	Zones:	Zones:

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3000 Programming Worksheet		
NC331 Hub Address:	**NC331 Hub Address:**	**NC331 Hub Address:**
Station ☐ Master ☐	Station ☐ Master ☐	Station ☐ Master ☐
Port:	Port:	Port:
Type:	Type:	Type:
Behavior:	Behavior:	Behavior:
Default Name:	Default Name:	Default Name:
Location:	Location:	Location:
Point 1: Point 2:	Point 1: Point 2:	Point 1: Point 2:
Point 3: Point 4:	Point 3: Point 4:	Point 3: Point 4:
Point 5: Point 6:	Point 5: Point 6:	Point 5: Point 6:
Zones:	Zones:	Zones:
NC331 Hub Address:	**NC331 Hub Address:**	**NC331 Hub Address:**
Station ☐ Master ☐	Station ☐ Master ☐	Station ☐ Master ☐
Port:	Port:	Port:
Type:	Type:	Type:
Behavior:	Behavior:	Behavior:
Default Name:	Default Name:	Default Name:
Location:	Location:	Location:
Point 1: Point 2:	Point 1: Point 2:	Point 1: Point 2:
Point 3: Point 4:	Point 3: Point 4:	Point 3: Point 4:
Point 5: Point 6:	Point 5: Point 6:	Point 5: Point 6:
Zones:	Zones:	Zones:

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