Installation KI-2093K

Responder® 4000 Component Installation Guide

Rauland-Borg Corporation
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Rauland-Borg Corporation

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Introduction

In the following chapters, you'll learn how to:

- ✓ Mount Network/Control and Field components (Lights, Controllers, Stations)
- ✓ Install Network/Control and Field components (Lights, Controllers, Stations)
- ✓ Create System Cabling
- ✓ Connect Network/Control and Field components
- ✓ Initialize and Test Network/Control and Field components

Check the Appendices for Component Summary, Location Summary, and other relevant summary information. Information regarding system configuration and use can be found in those documents collected in the Responder® 4000 Main Manual, KI-2109.

Revision History

This is the "K" release of this document. It has been reformatted and includes the following changes:

- ✓ The "Component Listing" chapter has been added to comply with IEC 60601-1.
- ✓ The "Electromagnetic Compatibility" appendix chapter has been added.
- ✓ Various **essential** warnings have been added to the Alerts, Precautions, and Limitations section.
- ✓ IEC 60601-1 compliance information regarding has been added.
- ✓ The Model NC4JACK has been added as being UL Listed when used with the R4KFAM used in Supervision Mode with 27K ohm Resistor across the input dry contact
- ✓ The R4K18A/18C/18L and R4K28A/28C/28L Export Only Station were added
- ✓ 10 new SLIM Stations were added to the manual as UL1069 listed Stations

Alerts, Precautions, and Limitations

- ✓ Use an approved static-control wrist strap when installing components. For best results; attach the strap to a known ground other than a back box.
- ✓ Be sure to turn off all power to the system before installing components.
- ✓ If using a back box, make sure it's free of protruding tabs, screws, and debris. Allow at least 1/2" clearance around all the circuit boards.
- ✓ Verify that all DIP switch settings are correct. If you are replacing existing components, be sure to duplicate settings.
- ✓ Insulate any unused conductors to prevent shorts.
- ✓ Use only Rauland-supplied plugs for modular connections, and follow the instructions in the Interconnect Cabling section below.
- ✓ Note: additional information regarding grounding has been added for the following components: HSS400, HSS433; DCV100, DCV116, and DCA200. Other grounding requirements remain the same.
- ✓ **WARNING**: Risk of Electrical Shock Hazard. When connecting computer equipment to the Serial Port Adaptor (R4KSPA), it shall be verified that the computer equipment is certified according to the respective IEC Standard (i.e. IEC 60950-1 for information technology equipment or IEC 60601-1 for medical electrical equipment). All combinations of equipment must be installed in accordance with Situation 1b of Table BBB.201 in the Standard for Medical Electrical Systems, IEC 60601-1-1.
- ✓ **WARNING**: Risk of Electrical Shock or Fire Hazards. Do not connect any equipment or items to the system other than those described in this manual.
- ✓ **WARNING**: Risk of Electrical Shock Hazard. For IEC 60601-1 certified systems, dry contacts can only be connected to an isolated low voltage circuit of an IEC 60601-1 certified medical device.

IEC 60601-1 Equipment Classifications

Classification	Comment
Type of Protection Against Electric Shock	Class I
Degree of Protection Against Electric Shock	Type B Applied Parts
Equipment not suitable for use with flammable anesthetic mixture with air or with oxygen or nitrous oxide	

Table 1: IEC 60601-1 Equipment Classifications

Definition of Symbols Used on the Equipment

Symbol	Meaning
	Attention Consult Accompanying Documents
	Type B Applied Part
	Protective Earth Terminations
IPX3	Ingress Protection Rating 3, Spraying Water

Table 2: Symbol Definitions

Environmental Conditions for Transport and Storage

Condition	Value
Temperature range	-40ºF (-40ºC) to 158ºF (70ºC)
Relative humidity range	10% to 100%
Atmospheric pressure range	14.76 inHg (500 hPa) to 31.30 inHg (1060 hPa)

Table 3: Environmental Conditions for Transport and Storage

Cleaning

Refer to Rauland-Borg Application Note HAN0048 for information regarding product cleaning.

Preventive Inspection and Maintenance to be Performed by the End User

There is no recommended preventative maintenance or inspection to be performed by the End User.

Preventive Inspection and Maintenance to be Performed by a Qualified Technician

R4KBK400 Rechargeable Battery Back-up should be routinely tested every three (3) months or replaced every 12 months. (For instructions, see the “Battery Replacement” section.)

Tools and Supplies

You’ll need the following tools to install many system components:

- ✓ Flathead and Phillips screwdrivers
- ✓ Standard Wire Cutter
- ✓ Standard Wire Stripper
- ✓ R4KCRIMP K-Bus Connector Crimp Tool
- ✓ R4KCONN6 & R4KCONN8 K-Bus Connector Kits
- ✓ G0394 Patch Cable Tool
- ✓ CAT 5 UTP (plenum or non-plenum) Cable

2

Getting Started

Before you install any Stations, Corridor Light/Domeless Controllers or Consoles, you'll need to configure your system, print out a K-Bus Location Worksheet, and complete the Power Calculation Spreadsheet. (See Appendix C, Power Requirements, for instructions on the use of the Power Calculation Spreadsheet.)

3

UL Component Listing

Responder 4000 components are certified to the following standards UL1069 and IEC60601-1/CAN/CSA C22.2 No. 601.1 as follows:

Network and Control Equipment

Model Designation	Description	UL1069	IEC 60601
R4KBK400	Rechargeable Battery Back-Up	Yes	Yes
R4KDLC2	Dual Lighting Controller	Yes	No
R4KFAM	Fire Auxiliary Module	Yes	No
R4KFB1	Feature Bed Interface	Yes	No
R4KNIM	Network Interface Module	Yes	Yes
R4KPA25	25W Paging Amp	Yes	Yes
R4KPIP	Peripheral Interface Port	Yes	Yes
R4KPLI	Phone Line Interface	Yes	No
R4KPR400	Power Supply	Yes	Yes
R4KRSPIP	Reporting Software PIP	Yes	Yes
R4KSLC1	Single Lighting Controller	Yes	No
R4KSPA	Serial Port Adapter	Yes	Yes
R4KXBA	X-Bus Adapter	Yes	Yes
R4KMQC	Marquee Controller	Yes	Yes
R4KTMB	K-Bus Termination Board	Yes	Yes
R4KTVR1	Digital TV Isolation Module	Yes	No
R4KKBS	K-Bus Y Splitter	Yes	Yes
R4KKBSP	K-Bus Splitter with Power	Yes	Yes

Table 1: Network and Control Equipment Listing

Corridor Lights

Model Designation	Description	UL1069	IEC 60601
CLV122	R4K 2 Bulb Visual Corridor Light	Yes	Yes
CLV144	R4K 4 Bulb Visual Corridor Light	Yes	Yes
CLA222	R4K 2 Bulb Audio Corridor Light	Yes	Yes
CLA244	R4K 4 Bulb Audio Corridor Light	Yes	Yes
CLA214D	R4K Duty Corridor Light	Yes	Yes

Table 2: Corridor Lights Listing

Domeless Controllers

Model Designation	Description	UL1069	IEC 60601
DCV100	R4K Six Station Visual Domeless Controller	Yes	Yes
DCV116	R4K Sixteen Station Visual Domeless Controller	Yes	Yes
DCA200	R4K Six Station Audio Domeless Controller	Yes	Yes
DCA216	R4K Sixteen Station Audio Domeless Controller	Yes	Yes
DCA214D	R4K Duty Domeless Controller	Yes	Yes

Table 3: Domeless Controller Listing

Consoles

Model Designation	Description	UL1069	IEC 60601
R4K4020	LCD Console	Yes	Yes
R4KANN	Annunciator Panel	Yes	Yes

Table 4: Console Listings

Accessories

Model Designation	Description	UL1069	IEC 60601
CCDIN	Call Cord – Din Connector	Yes	Yes
CLAR4	R4K 4 Pt Relay Kit	Yes	Yes
NCDSTV	Pillow Speaker	Yes	No
NCESTV	Pillow Speaker	Yes	No
NCLV/120/240	Low Voltage Light Control	Yes	No
NCSAV	DIN Cord Saver	Yes	No
RS1010	LCD Console	Yes	No
R4KCAL	R4K Call Assurance Light	Yes	Yes
R4KCSC	Button Station Cover	Yes	Yes
R4KDSB	Station Bracket and Strain Relief	Yes	Yes
R4KGRD	Station Guard and Strain Relief	Yes	Yes
R4KOUT4R	R4K Visual Relay Output Control	Yes	No
R4KOUT4S	R4K Audio Solid State Relay Output Control	Yes	No
R4KRECP	R4K Console Receptacle	Yes	Yes

Table 5: Accessory Listings

Stations

Model Designation	Description	UL1069	IEC 60601
HSS400	High Security Station ¼" Jack	Yes	No
HSS401	High Security Station w/Switch	Yes	Yes
HSS433	High Security Push Button Station	Yes	Yes
R4K11V	Single Bed Visual Station	Yes	Yes
R4K12A	Single Bed (w/ speaker)	Yes	Yes
R4K12AHZ	Horizontal Single Bed (w/ speaker)	Yes	Yes
R4K13VA	Single Bed Enhanced Audio (w/ speaker)	Yes	Yes
R4K13VAHZ	Horizontal Single Bed Enhanced (w/ speaker)	Yes	Yes
R4K14SA	Staff Assist Bed Station	Yes	Yes
R4K15V	SLIM ¼" Jack & Button Station	Yes	No
R4K16LV	Single Bed Enhanced Visual	Yes	Yes
R4K17V	SLIM Enhanced Single Bed Station	Yes	No
R4K18A	Single Bed Multi-Button Station for Export	No	Yes
R4K18C	Single Bed Multi-Button Station for Canada	No	Yes
R4K18L	Single Bed Multi-Button Station for Latin America	No	Yes
R4K21V	Dual Bed Visual Station	Yes	Yes
R4K22A	Dual Bed Station (w/ speaker)	Yes	Yes
R4K23VA	Dual Bed Enhanced Audio Station (w/ speaker)	Yes	Yes
R4K25LV	Dual Bed Enhanced Visual	Yes	Yes
R4K28A	Dual Bed Multi-Button Station for Export	No	Yes
R4K28C	Dual Bed Multi-Button Station for Canada	No	Yes
R4K28L	Dual Bed Multi-Button Station for Latin America	No	Yes
R4K2JACK	SLIM Dual ¼" Jack Station	Yes	No
R4KCB10	Code Station	Yes	No
R4KCB12	Code Station	Yes	Yes
R4KCB13	SLIM Code Station	Yes	No
R4KCNCL	Cancel Station	Yes	Yes
R4KDY	Duty Station (w/ speaker)	Yes	Yes
R4KDTY2	SLIM Duty Station	Yes	No
R4KESR	Emergency Staff Registration Station	Yes	Yes
R4KMST	Marquee Speaker	Yes	Yes
R4KPB11	Push-for-Help Station	Yes	Yes
R4KPB12	SLIM Single Button Station	Yes	No
R4KPB22	Dual Pushbutton Station	Yes	Yes
R4KPB23	SLIM Dual Button with Code Station	Yes	No
R4KPB44	Four Button Station	Yes	Yes
R4KPC10	Pullcord Station	Yes	Yes
R4KPC11	SLIM Pullcord Station	Yes	No
R4KRA1	Residence Assist Station	Yes	Yes
R4KSAR	SLIM Push-For-Help/Staff Registration Station	Yes	No
R4KSPK	SLIM Speaker Station	Yes	No
R4KSR1	Staff Registration Station	Yes	Yes
R4KSS	Staff Station (w/ speaker)	Yes	Yes
NC4JACK	Auxiliary 4 Input Station	Yes	No

Table 6: Station Listings

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Component Location

In the following chapter, you'll learn where to locate and how to physically install Network and Control Equipment, Corridor Lights, Domeless Controllers, Consoles, Marquees, and Stations.

Component Location

We recommend installing system components in the following locations, unless prohibited by code:

Network and Control Equipment

The following Network and Control Equipment is typically located in a well-ventilated Service/Telecom Closet:

Model Designation	Description
R4KBK400	Rechargeable Battery Back-Up
R4KNIM	Network Interface Module
R4KPA25	25W Paging Amp
R4KPIP	Peripheral Interface Port
R4KPLI	Phone Line Interface
R4KPR400	Power Supply
R4KRSPIP	Reporting Software PIP
R4KSPA	Serial Port Adapter
R4KXBA	X-Bus Adapter

Table 7: Network and Control Equipment Location

Other Network and Control Equipment is typically located in remote locations, as indicated:

Model Designation	Description	Location
R4KMQC	Marquee Controller	Wall-mounted anywhere necessary
R4KTMB	K-Bus Termination Board	Anywhere necessary
R4KKBS	K-Bus Y Splitter	Anywhere necessary
R4KKBSP	K-Bus Splitter with Power	Anywhere necessary

Table 8: Network and Control Equipment Location (continued)

Corridor Lights

Corridor Lights are typically installed above an entrance door, within line of sight, at 80” above the finished floor.

Domeless Controllers

Since they are not seen by the end-user, Domeless Controllers may be installed wherever necessary—in a ceiling or attached to a back box, for instance.

Consoles

Consoles and Annunciator Panels are either surface (desk) or wall-mounted. In order to mount the consoles, you may need either the R4KWM11 or R4KWM22 wall-mount accessories or the R4KDM22 desk-mount accessory.

Note: *Two (2) R4KDM22s are required for each console or annunciator panel.

Model Designation	Description	Wall-Mount Option	Desk-Mount Option
R4K4020	LCD Console	R4KWM11	R4KDM22*
R4KANN	Annunciator Panel	R4KWM22	R4KDM22*

Table 9: Console mounting options

See Appendix F for complete details and instructions.

Marquees

Marquees are typically mounted wherever convenient and useful.

Stations

Bed Stations are typically located in the Head Wall, 46” above the finished floor. Other stations (Pushbutton and Pullcord) are located in any convenient location, also 46” above the finished floor. Stations should be mounted at least 1 inch apart to allow them to snap on and be removed from the backplate.

Model Designation	Description	Wall-Mount Option
HSS400	High Security Station ¼" Jack	Headwall, 46" above finished floor
HSS401	High Security Station w/Switch	Headwall, 46" above finished floor
HSS433	High Security Push Button Station	Headwall, 46" above finished floor
NCSAV	DIN Cord Saver	In front of station
NC4JACK	Auxiliary 4 Input Station	Headwall, 46" above finished floor
R4K11V	Single Bed Visual Station	Headwall, 46" above finished floor
R4K12A	Single Bed (w/ speaker)	Headwall, 46" above finished floor
R4K12AHZ	Horizontal Single Bed (w/ speaker)	Headwall, 46" above finished floor
R4K13VA	Single Bed Enhanced Audio (w/ speaker)	Headwall, 46" above finished floor
R4K13VAHZ	Horizontal Single Bed Enhanced (w/ speaker)	Headwall, 46" above finished floor
R4K14SA	Staff Assist Bed Station	Headwall, 46" above finished floor
R4K15V	SLIM ¼" Jack & Button Station	Headwall, 46" above finished floor
R4K16LV	Single Bed Enhanced Visual	Headwall, 46" above finished floor
R4K17V	SLIM Enhanced Single Bed Station	Headwall, 46" above finished floor
R4K21V	Dual Bed Visual Station	Headwall, 46" above finished floor
R4K22A	Dual Bed Station (w/ speaker)	Headwall, 46" above finished floor
R4K23VA	Dual Bed Enhanced Audio Station (w/ speaker)	Headwall, 46" above finished floor
R4K25LV	Dual Bed Enhanced Visual	Headwall, 46" above finished floor
R4K2JACK	Dual ¼" Jack Station	Headwall, 46" above finished floor
R4KCB12	Code Station	46" above finished floor
R4KCB13	SLIM Code Station	46" above finished floor
R4KCNCL	Cancel Station	46" above finished floor
R4KCSC	Button Station Cover	Over station
R4KDLC2	Dual Lighting Controller	Behind station
R4KDY	Duty Station (w/ speaker)	46" above finished floor
R4KDTY2	SLIM Duty Station	46" above finished floor
R4KDSB	Station Bracket and Strain Relief	Behind station
R4KESR	Emergency Staff Registration Station	46" above finished floor
R4KFAM	Fire Auxiliary Module	Headwall
R4KFB1	Feature Bed Interface	Headwall
R4KGRD	Station Guard and Strain Relief	Over station
R4KMST	Marquee Speaker	46" above finished floor
R4KPB11	Push-for-Help Station	46" above finished floor
R4KPB12	SLIM Single Button Station	46" above finished floor
R4KPB22	Dual Pushbutton Station	46" above finished floor
R4KPB23	SLIM Dual Button with Code Station	46" above finished floor
R4KPB44	Four Button Station	46" above finished floor
R4KPC10	Pullcord Station	46" above finished floor
R4KPC11	SLIM Pullcord Station	46" above finished floor
R4KRA1	Residence Assist Station	46" above finished floor
R4KSAR	SLIM Push-For-Help/Staff Registration Station	46" above finished floor
R4KSLC1	Single Lighting Controller	Behind station
R4KSPK	SLIM Speaker Station	46" above finished floor
R4KSR1	Staff Registration Station	46" above finished floor
R4KSS	Staff Station (w/ speaker)	46" above finished floor
R4KTVR1	Digital TV Isolation Module	Behind station

Table 10: Station Location

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Component Mounting Overview

In the chapter that follows, you'll learn how to connect, test, and initialize all system components.

Component Mounting

We recommend mounting system components in the following manner, unless otherwise dictated by code:

Network and Control Components

You have the following mounting options for Network and Control Components:

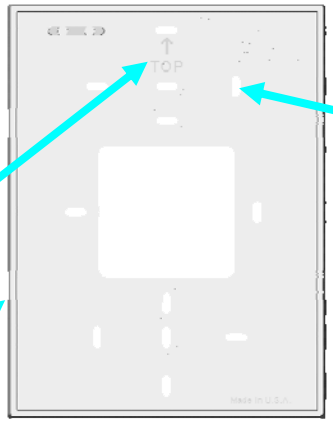
Model Designation	Description	Mounting Options
R4KBK400	Rechargeable Battery Back-Up	NC2828 or Wall-Mount
R4KNIM	Network Interface Module	NC2828 or Wall-Mount
R4KPA25	25W Paging Amp	NC2828 or Wall-Mount
R4KPIP	Peripheral Interface Port	NC2828 or Wall-Mount
R4KPLI	Phone Line Interface	NC2828 or Wall-Mount
R4KPR400	Power Supply	NC2828 or Wall-Mount
R4KRSPIP	Reporting Software PIP	NC2828 or Wall-Mount
R4KSPA	Serial Port Adapter	NC2828 or Wall-Mount
R4KTMB	K-Bus Termination Board	NC2828 or Wall-Mount
R4KXBA	X-Bus Adapter	NC2828 or Wall-Mount

Table 11: Network and Control Equipment Mounting

When installing R4K system for IEC 60601-1 compliance and 240 VAC line voltage NC2814 back box should be used instead of NC2828.

Stations and Corridor Lights

All Stations and Lights—except the Pullcord station (R4KPC10)—are mounted in the same way, using the Standard Station and Corridor Light Wall Plate (included). The wall plate can be screwed to single-gang back box (U.S. or foreign) or surface-mounted:

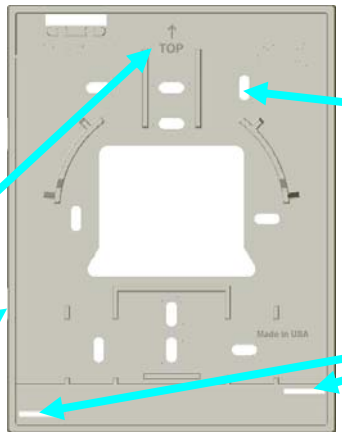


Make sure to orient the plate "Top" up.

Make sure the corridor light snaps snugly and completely to the Wall Plate.

Use the appropriate holes to mount the components to a single gang backbox or directly to a wall.

Figure 1: Corridor Light Wall Plate



Make sure to orient the plate "Top" up.

Make sure the component snaps snugly and completely to the Wall Plate.

Use the appropriate holes to mount the components to a single gang backbox or directly to a wall.

Use the appropriate slots to mount the optional clear station cover bracket.

Figure 2: Standard Station Wall Plate

Pullcord Station (R4KPC10)

The R4KPC10 Pullcord Station is shipped with its own water-resistant Wall Plate:

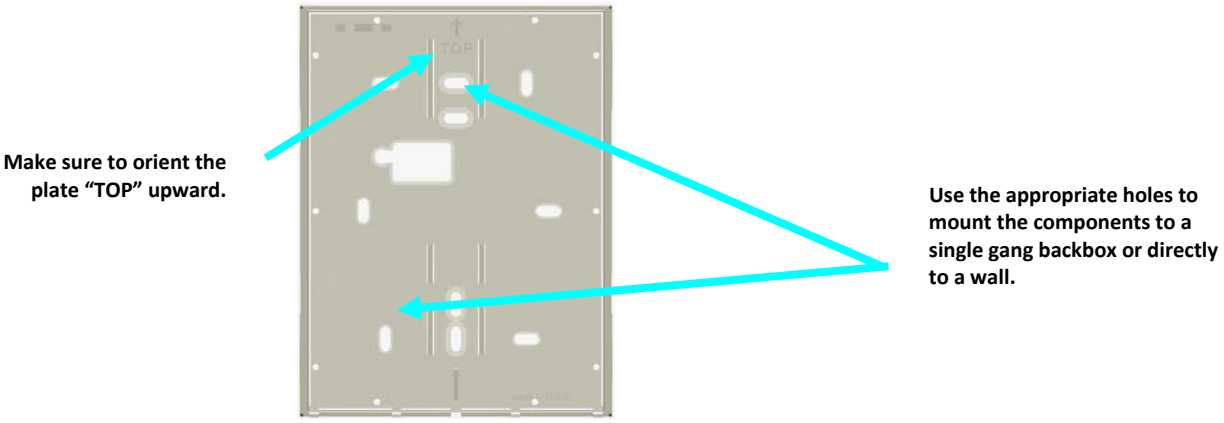


Figure 3: R4KPC10 Pullcord Station Wall Plate

The wall plate can be screwed to a single-gang back box (U.S. or foreign) or surface mounted.

Run a bead of waterproof, silicone caulk around the top and side edges of the Pullcord Station face, once it is snapped to the wall plate. Do **NOT** caulk the bottom of the unit—as it is designed to release moisture.

Station Cover

You can mount the Clear Station Cover as follows:

1 Remove the station wall plate from the wall.
2 Align and insert the metal swing bracket tabs to the openings in the bottom of station wall plate.
3 Use a pair of pliers to rotate the tabs to lock the bracket in place.
4 Reinstall the plate on the wall.
5 Attach the station.
6 Snap the clear station cover to the bracket.

Figure 4: Plastic Station Cover

Domeless Controllers

You can mount any of the Domeless Controllers (DCV100, DCV116, DCA200, and DCA216) in any convenient location using one of the supplied Mounting Boxes:

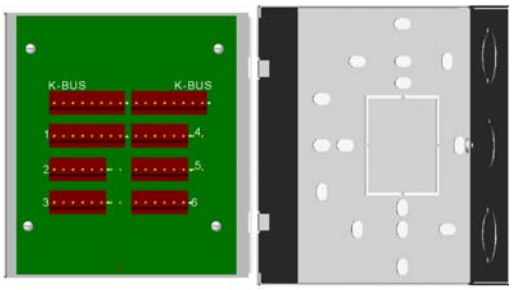


Figure 5: DCV100/DCA200 Domeless Controller Mounting Box

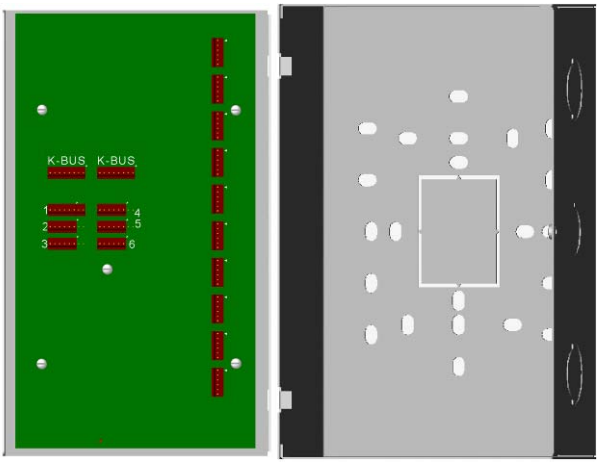


Figure 6: DCV116/DCA216 Domeless Controller Mounting Box

Consoles

You can either surface (desk) or wall-mount Consoles and Annunciator panels using the R4KWM11 or R4KWM22:

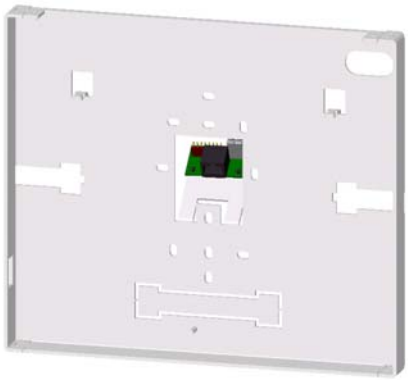


Figure 7: R4KWM11 Mounting Accessory

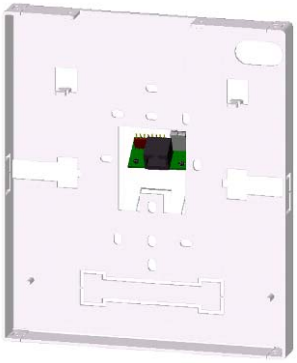


Figure 8: R4KWM22 Mounting Accessory

The R4KDM22 Desk Mount Kit is a kit that allows the R4K4020 LCD Console or R4KANN Annunciate Panel to sit on a desk at an angle.

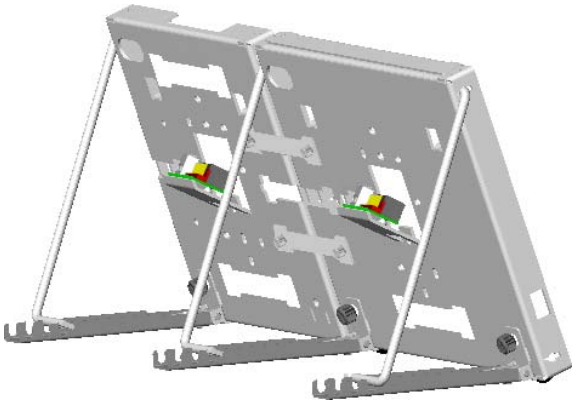


Figure 9: R4KDM22 Desk Mount Accessory shown with R4KWM11 and R4KWM22

The Consoles or Panels are typically located in an area where ambient noise does not normally exceed 70dB and ambient light levels do not exceed 80 foot candles.

Marquees and the Marquee Controller

Follow the mounting instructions that accompany the Marquee unit.

Figure 10: Scrolling Marquee

The Marquee Controller comes in a wall mountable box. It offers both ½" and ¾" knock-outs for conduit connection. Its center knock-out also allows use of a standard single/dual-gang back-box.

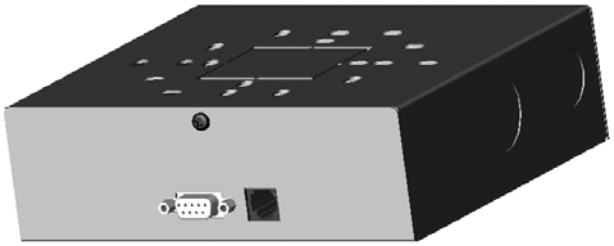


Figure 11: Marquee Controller

Removing Corridor Lights or Stations

In the event you need to remove a corridor light or station from its base, you must use the CL removal tool:

The CL/Station Removal Tool Itself

The R4KCRIMP Crimp Tool houses the pop-out CL/Station Removal Tool:

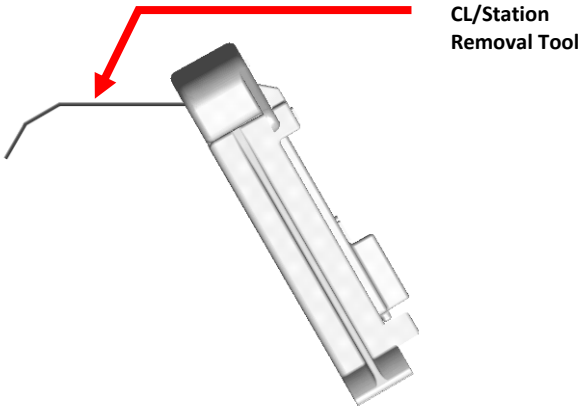


Figure 12: R4KCRIMP with CL/Station Removal Tool

Using the Tool

Here's how to use the tool (these directions apply to the corridor lights and stations):

1 Insert the Removal Tool in the center of either of the **long sides**, between the Base Plate and Corridor Light assembly:

Retention snaps

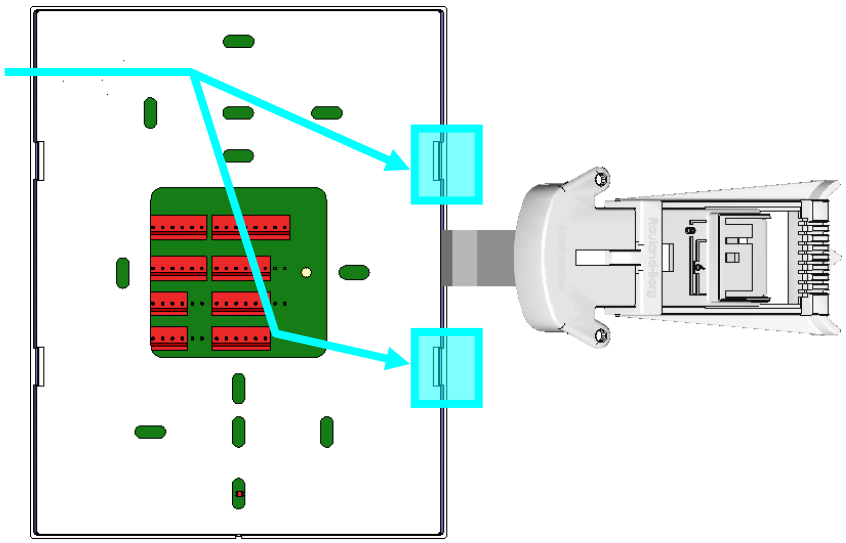


Figure 13: Back side view of the Corridor Light showing the Corridor Light/Station removal tool inserted between Base Plate and Corridor Light assembly.

➢ **Caution**: take care not to insert the tool behind the plastic base plate.

2 Run the tool toward one of the retention snaps.

3 When you feel resistance to the snap, rotate the tool parallel to the ceiling/wall and away from the snap (shown as clockwise below). Avoid using the tool as a lever, as this could damage the ceiling panel or the unit itself.

Back side view of the Corridor Light showing the retention snap dislodging as the tool is rotated.

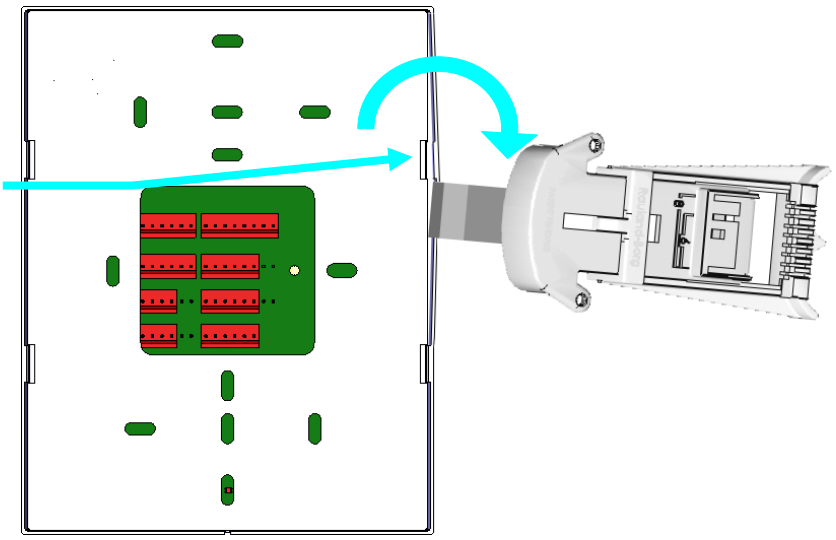


Figure 14: Rotate the tool parallel to the ceiling/wall and away from the snap.

➢ The CL assembly should begin to dislodge.

4 Run the tool to the other retention snap.

5 When you feel resistance to the snap, rotate the tool parallel to the ceiling/wall and away from the snap (shown as counter-clockwise below). Avoid using the tool as a lever, as this could damage the ceiling panel or the unit itself.

Back side view of the Corridor Light showing the second retention snap dislodging as the **tool is rotated.**

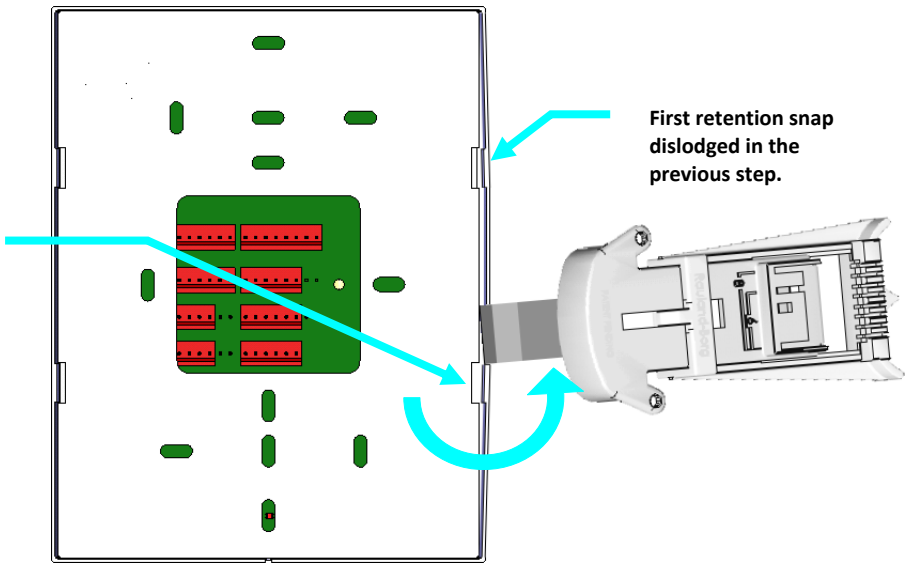


Figure 15: Rotate the tool parallel to the ceiling/wall and away from the snap.

- One half of the CL assembly should now be dislodged.

7 Slowly pull the entire assembly away from the base plate.

SLIM Station Installation

SLIM Station Assembly and Disassembly

The SLIM-Style Stations come in two parts – the front Face Plate and the rear Base Plate – which snap together to form a station. The Base Plate contains the station's electronics and connectors and mounts to the backbox. The Face Plate contains the station's buttons or actuating device. The two parts of the SLIM-Style Stations are held together by four snap tabs; two on the left side and two on the right side of the station. A special tool Part No. 350007, Station Removal Tool is required to safely open the snap tabs without damaging the plastic; that will allow the stations to be separated for installation or removal.

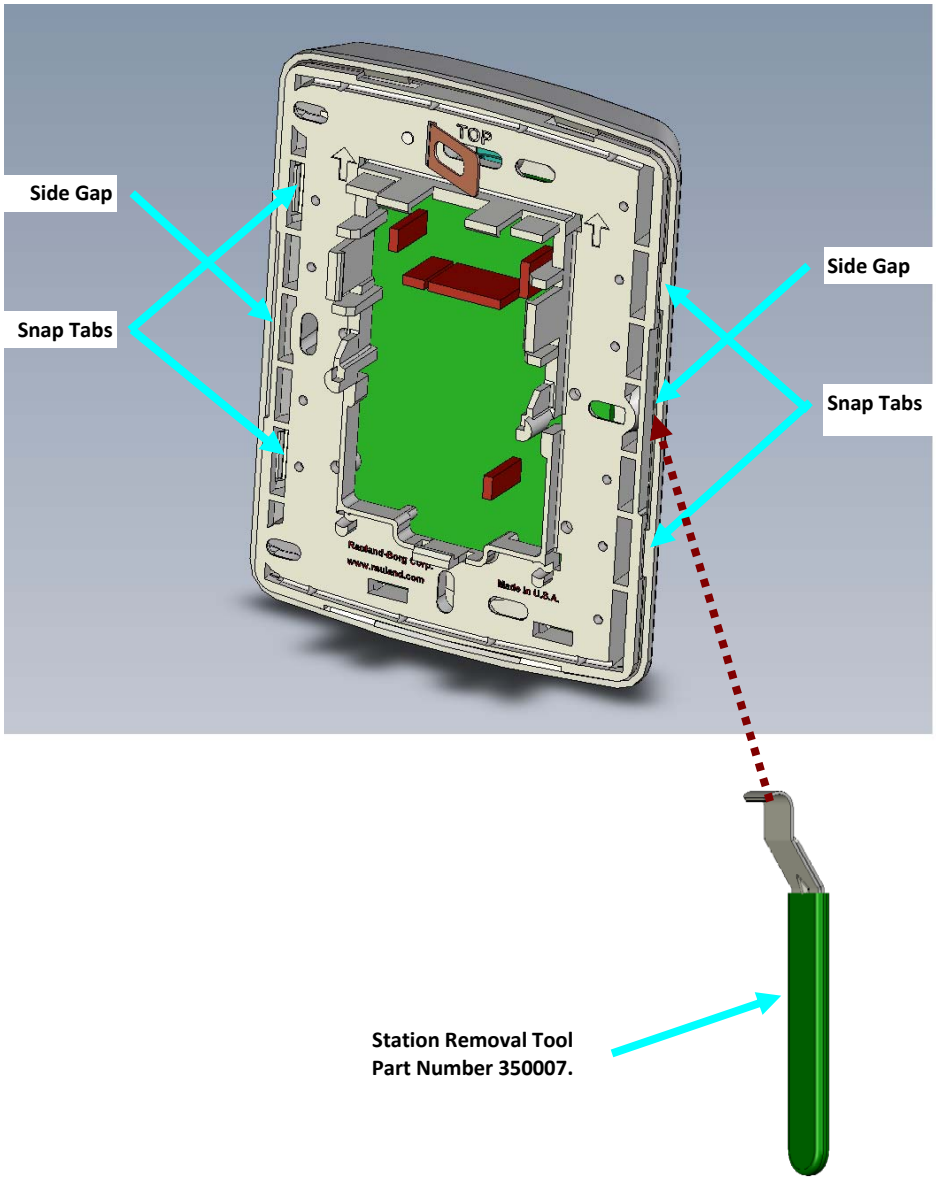


Figure 16: SLIM-Style Stations Snap Tab locations and Station Removal Tool

To remove the Face Plate of a SLIM-Style Station, insert the tip of the Station Removal Tool underneath the edge and near the center of the gap between the two snap tabs on one side of the station, then pull and turn slightly on the tool until the Snap Tabs on that side open up and separate from the Face Plate. Repeat this for the other side of the station until the Face Plate is loose and can be easily removed from the Base Plate. Note: Opening both of the snap tabs on the same side of the SLIM-Style Station usually is sufficient to free the Face Plate to remove it.

SLIM-Style Station Button Removal / Installation

The buttons on the front of the SLIM-Style stations are removable and changeable to correspond with different call-in functions. To remove a button, gently squeeze the Snap Tabs on the rear of the button until they clear the Face Plate openings, then push it out from the opening. To install a button, align the Positioning Tabs on the rear of the button

with the Positioning Recesses on the front of the Face Plate and firmly press the button into the opening. Note: The Cancel button does not have Positioning Tabs.

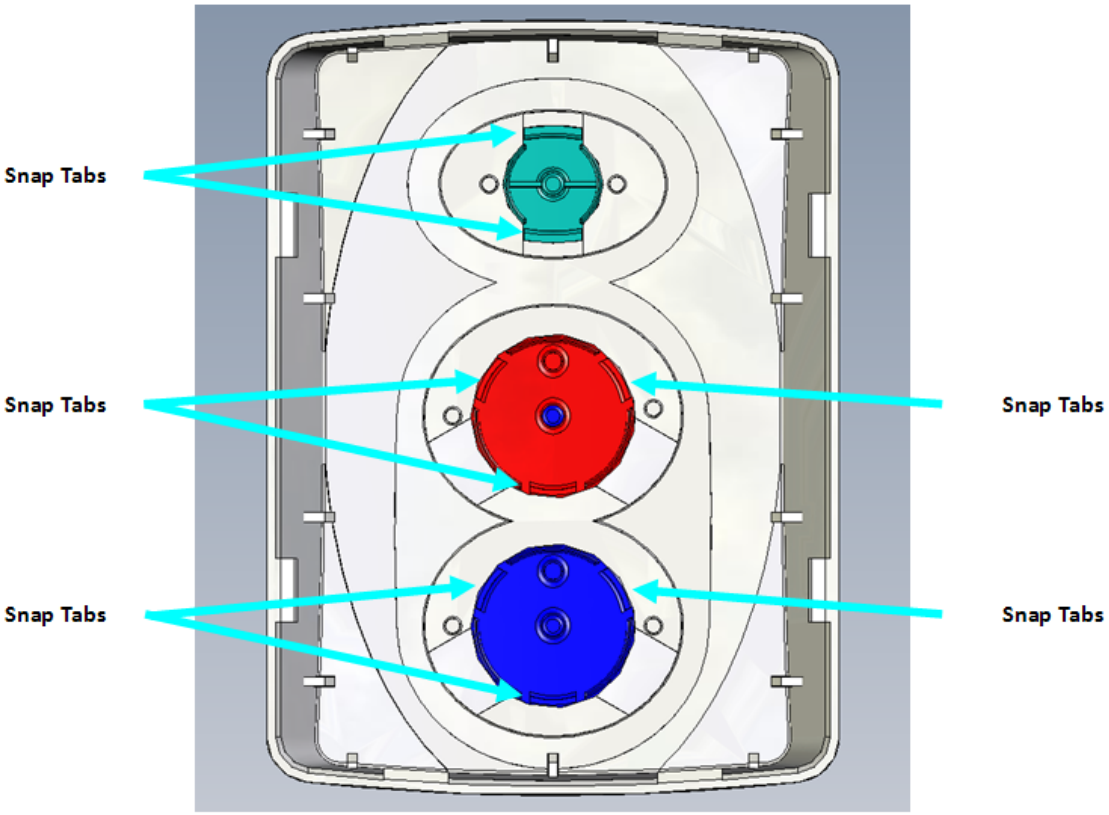


Figure 17: SLIM-Style Station Face Plate and Buttons, Rear View

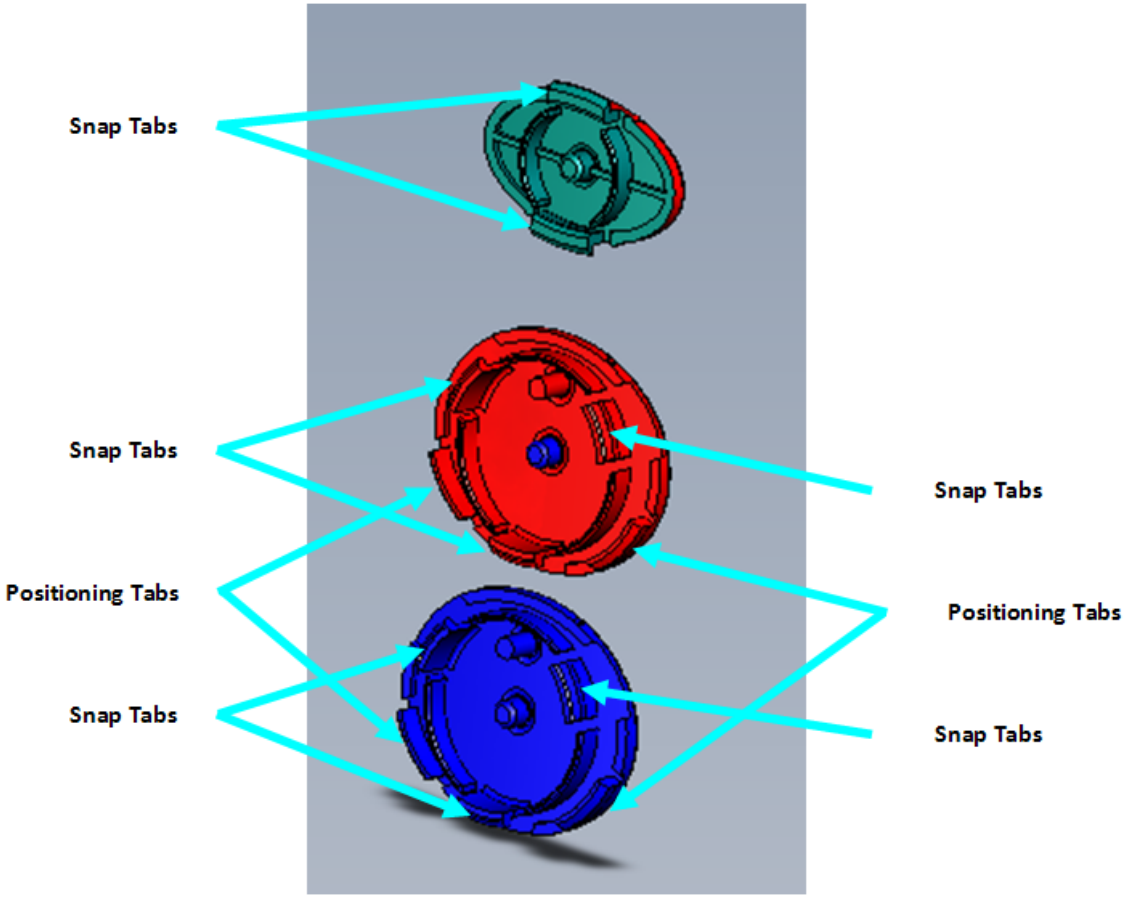


Figure 18: SLIM-Style Station Buttons, Rear View

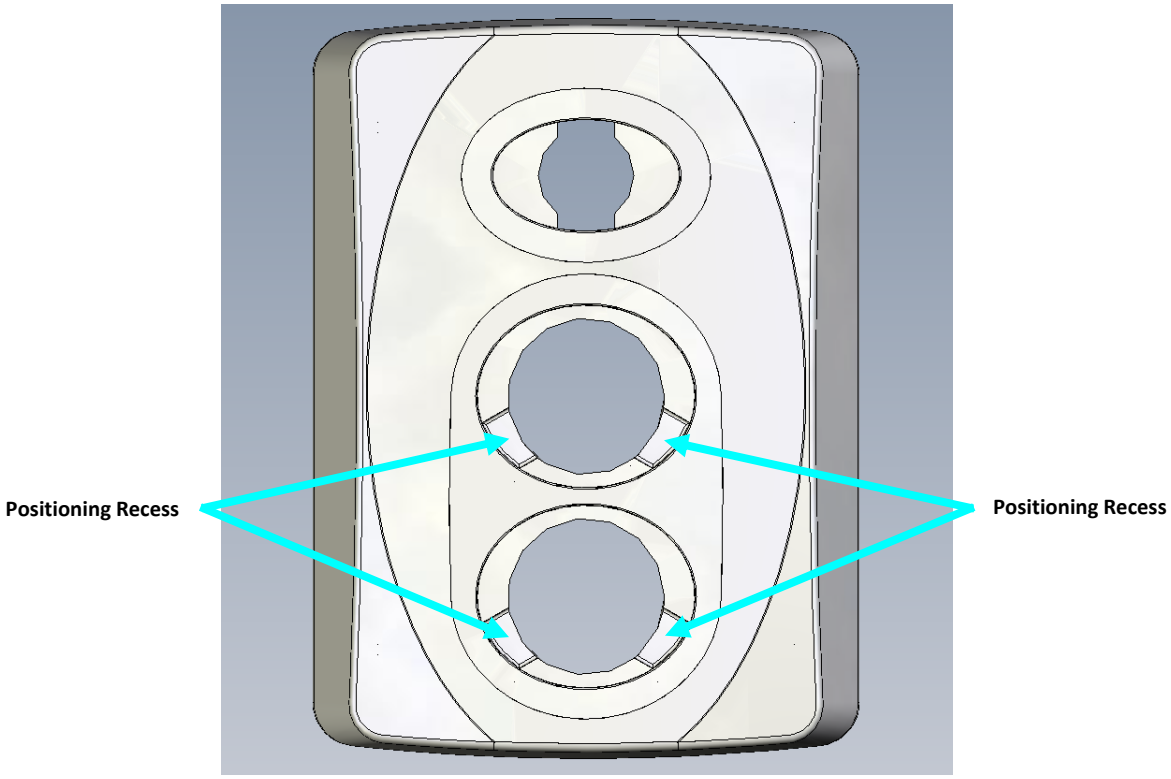


Figure 19: SLIM-Style Station Face Plate, Front View

Infection Control Seal Overlay

Clear, die-cut, self-adhesive and anti-microbial Infection Control Seal overlays are available for the SLIM-Style stations that protect the station buttons from bacterial contamination and moisture; and provide an easy-to-clean surface for the station. The Infection Control Seal overlays fit in the recesses that surround the station buttons on the SLIM-Style Station Face Plates and should be installed after the stations are mounted.

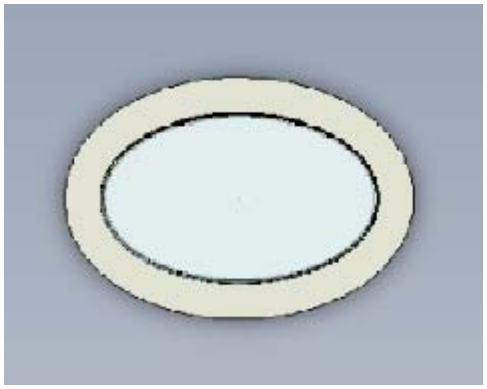


Figure 20: Infection Control Seal, Cancel Button

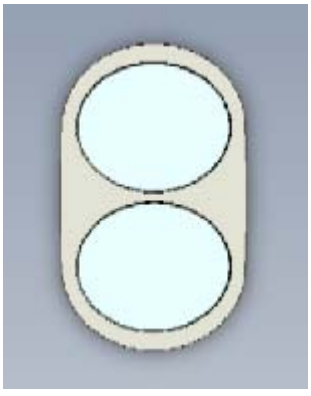


Figure 21: Infection Control Seal, Dual Call Button

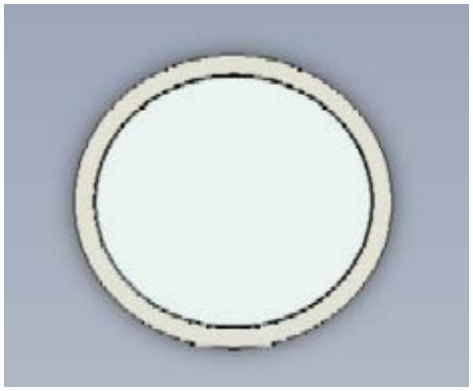


Figure 22: Infection Control Seal, Single Large Call Button

The following shows the SLIM-Style station uses and quantities for the Infection Control Seal overlays:

	Infection Control Seal Overlay Part Number & Quantity Used		
SLIM-Style Station Model Number	**P/N 350011 Cancel Button)**	**P/N 350012 (Dual Call Button)**	**P/N 350013 (Single Large Call Button)**
R4K15V, R4K17V, R4K2JACK, R4KPC11	1	(none)	(none)
R4KPB23, R4KSAR	1	1	(none)
R4KCB13, R4KPB12, R4KDTY2	1	(none)	1

Note: The Model R4KPC11 comes with the Infection Control Seal overlay installed on it; the Infection Control Seal overlays must be ordered separately for the other SLIM-Style station models. Each Part Number 3500xx is a kit that contains ten (10) overlays.

Overlay Installation

1. Use a clean cloth to remove any dust or dirt from around the button(s) and its recess.
2. Peel the protective backing away from the adhesive on the rear of the overlay.
3. Position and smooth the overlay onto the recess around the button(s) on the front of the Station Faceplate.

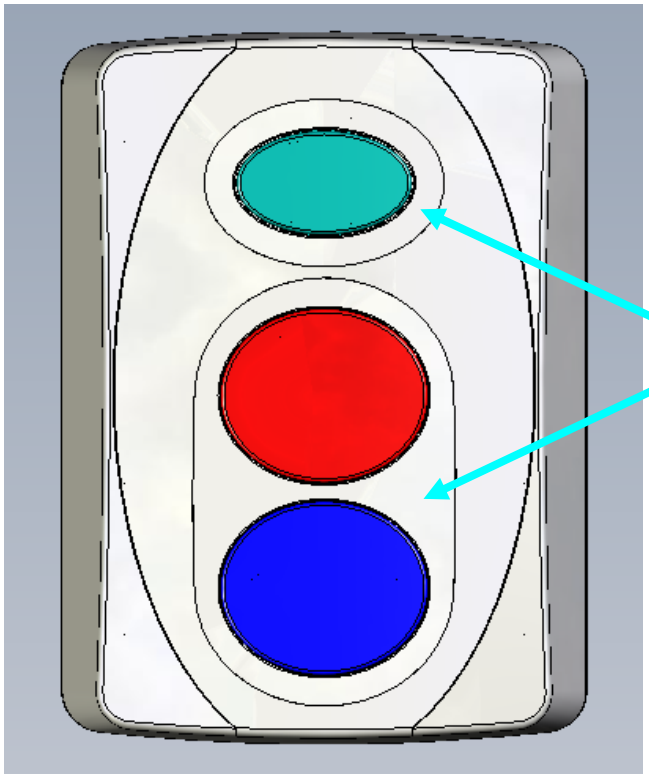


Figure 23: SLIM-Style Station Face Plate, Overlay Recesses

Other Things You Should Know

Special Connection Precaution

If a SLIM-Style station is used on a CLAR4 module Port 1, the monitor LED may incorrectly turn on when there is an active audio call on one of the other ports. To prevent this from happening, do not use Port 1 on a CLAR4 module if other unused ports are available on it. Alternately, cut the white with green stripe wire that connects to the station connector pin 4.

6

Using the NC2828 Equipment Cabinet

In the following chapter, you'll learn how to use the NC2828 Component Cabinet to mount most Network and Control equipment. The cabinet offers 2 rows of 25 mounting hole columns:

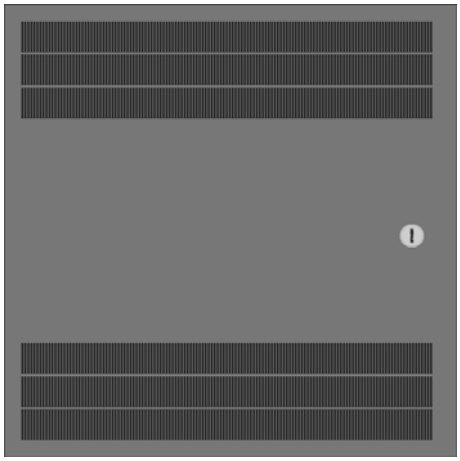


Figure 24: NC2828 Equipment Cabinet, Closed

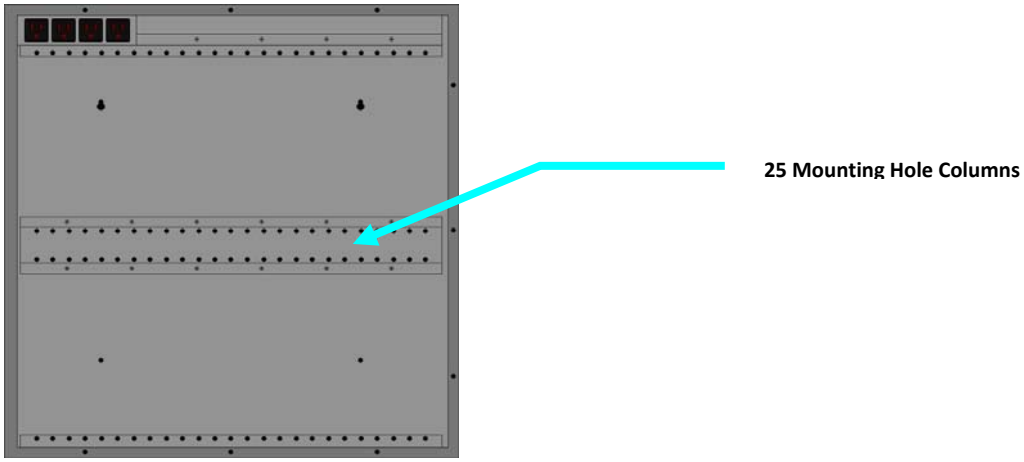


Figure 25: NC2828 Equipment Cabinet, Inside View

Components occupy space in the NC2828 as indicated:

Model Designation	Description	NC2828 Hole Columns
R4KBK400	Rechargeable Battery Back-Up	2
R4KNIM	Network Interface Module	8
R4KPA25	25W Paging Amp	2
R4KPIP	Peripheral Interface Port	6
R4KRSPIP	Reporting Software PIP	6
R4KPLI	Phone Line Interface	8
R4KPR400	Power Supply	4✓
R4KSPA	Serial Port Adapter	0 (fits on R4KPIP) [1]
R4KTMB	K-Bus Termination Board	4❖
R4KXBA	X-Bus Adapter	6

[1] The R4KSPA has can also be mounted in a cabinet using the supplied adapter plate. This mounting method uses 4 columns.

✓ You must mount the Power Supply on the bottom row.

❖ You must connect the R4KTMB at top or bottom.

Mounting the Cabinet

The NC2828 Equipment Cabinet can be surface or flush mounted as follows:

Surface Mount

Make sure the mounting area is smooth and free of obstacles.

To mount the cabinet on a wall surface:

1 Line up the cabinet's two mounting holes (16" spacing) with wall studs.

2 Use wall anchors capable of supporting the cabinet and its contents (approximately 80 lbs.) if you do not find/use studs.

3 Wire AC receptacles (see the Electrical Installation section, immediately below).

4 Slide the receptacle cover plate over the AC Outlet Enclosure, and secure the cover with the #6 Slotted Hex Head screw (provided) once it's properly wired.

5 Attach door by sliding hinges down onto hinge posts after all equipment is mounted.

Flush Mount

Make sure the opening can accommodate the unit's 5" depth and mount as follows:

To flush mount the cabinet:

1 Remove cabinet door.

2 Attach the trim plate to the cabinet assembly using the 14 provided sheet metal screws.

3 Slide the cabinet with trim plate into wall recess.

4 Secure the cabinet to the structure using two appropriate mounting screws or anchors.

5 Wire AC receptacles as indicated in the section entitled Electrical Installation (immediately below).

6 Slide the receptacle cover plate over the AC Outlet Enclosure.

7 Once it's properly wired, secure the cover with the provided #6 Slotted Hex Head screw.

8 After all equipment is mounted, attach the door by sliding its hinges down onto hinge posts.

Electrical Installation

- ✓ Observe wire polarity (hot, neutral, and earth) when wiring.
- ✓ Strip at least 3/8" of insulation from the end of each power connection.

AC Wiring

The AC Power Mains should be brought into the AC Outlet Enclosure and connected to the AC receptacle wires using electrical wire nuts as follows:

From the Power Source	Purpose	At the Cabinet
Wire Color		Wire Color
120V		
Black	120V AC (Hot)	Black
White	120V AC (Neutral)	White
Green (Earth)	Earth (Ground)	Green (Ground Terminal)
250V (using R4KHVK)		
Brown	250V AC (Hot)	Brown
Blue	250V AC (Neutral)	Blue
Green/Yellow	Earth (Ground)	Green/Yellow

Table 12: NC2828 Wiring Table

Wire the AC receptacle to a reliable AC source with a dedicated 15A circuit breaker. Make sure to connect the green (green/yellow) ground wire to the grounding bolt of the chassis. The receptacle ground wire should be placed on top of the chassis ground wire nut.

The system's maximum electrical rating is:

- ✓ 120V AC, 50-60 Hz, 7.5A
- ✓ 250V AC, 50-60 Hz, 3.75A

7

Interconnect Cabling

In the following chapter, you'll learn how to make the cables necessary to interconnect:

- ✓ Network Interface Modules, Peripheral Interface Ports, and, in mixed systems, NCGCMs
- ✓ Consoles and Receptacles
- ✓ Corridor Lights, Domeless Controllers, Termination Boards, Phone Line Interfaces, Marquee Controllers
- ✓ Stations (Bed, Pushbutton, Pullcord, Staff, Duty, etc.)

Cable Stock

You can create all Responder® 4000 system cables using the same 4 pair CAT-5 wire (plenum or non-plenum, as code necessitates).

Cable-Making Basics & Precautions

- ✓ **X-Bus Interconnect**: Do not use any crimpers/dies other than the G0394 Eight-pin modular plug terminating tool used to create X-Bus Interconnect Cables. (The use of any other crimping tools may void system, device, and/or station warranties, and invalidate UL Listing.)
- ✓ **X-Bus Interconnect**: Do not substitute commonly available "clear" modular plugs for the required "blue tint" plugs when creating X-Bus Interconnect Cables. (Clear plugs are designed for use with stranded wire only—and will not work reliably with solid wire.)
- ✓ Inspect tools. (Failure to perform periodic inspection and maintenance on any of the tools may result in defective terminations, short-circuiting, or intermittent connections.)
- ✓ Replacement terminating tools are available through Rauland customer service.
- ✓ Double-check wiring order before inserting wires into plugs.
- ✓ Never use a suspect crimp! Plugs are cheap, misconnects are not. If you are unsure about your work, begin again.

- ✓ Inspect the modular crimps thoroughly. (The individual conductors must appear "butted" against the plug end.)
- ✓ Test all cables/terminations before use.

Connector Signals

Connector Signals (RESPONDER® 4000 and Common Office Cables)*							
Station R4KCONN8	**Station R4KCONN6**	**K-Bus R4KCONN8**	**K-Bus (8-Position Modular)**	**R4KSPA Port Cable (8-Position Modular)**	**X-Bus (8-Position Modular)**	**10BaseT & 100BaseTX (8-Position Modular)**	**USOC RJ11 (6-Position 2-Contact Modular)**
+16 VDC		+16 VDC	+16 VDC	+16 VDC	0 VDC		
■ BRN/WHT		☐ WHT/BLU	■ BRN/WHT	■ BRN/WHT	■ BRN/WHT	■ BRN/WHT	
0 VDC		0 VDC	0 VDC	0 VDC	0 VDC		
☐ WHT/BRN		■ BLU/WHT	☐ WHT/BRN	☐ WHT/BRN	☐ WHT/BRN	☐ WHT/BRN	
Signal	+16 VDC	71 Vp-p Audio (–)	71 Vp-p Audio (+)	5 V RS422 TXD (+)	5 V RS485 Data (+)	5 V RX (+)	
■ GRN/WHT	■ GRN/WHT	☐ WHT/ORG	■ ORG/WHT	■ ORG/WHT	■ ORG/WHT	■ ORG/WHT	
Monitor LED	0 VDC	71 Vp-p Audio +	5 V RS485 Data +	16 V Control Out	0 VDC		-48 VDC Tip
☐ WHT/GRN	☐ WHT/GRN	■ ORG/WHT	☐ WHT/BLU	☐ WHT/BLU	☐ WHT/BLU	☐ WHT/BLU	☐ WHT/BLU
Call Assurance 1 Signal	Signal	5 V RS485 Data (–)	5 V RS485 Data (–)	16 V Control In (–)	0 VDC		0 V Ring
■ ORG/WHT	■ ORG/WHT	☐ WHT/GRN	■ BLU/WHT	■ BLU/WHT	■ BLU/WHT	■ BLU/WHT	■ BLU/WHT
Call Assurance 2 Signal	Monitor LED	5 V RS485 Data (+)	71 Vp-p Audio (–)	5 V RS422 TXD (–)	5 V RS485 Data (–)	5 V RX (–)	
☐ WHT/ORG	☐ WHT/ORG	■ GRN/WHT	☐ WHT/ORG	☐ WHT/ORG	☐ WHT/ORG	☐ WHT/ORG	
3 Vp-p Audio	Call Assurance 1 Signal	0 VDC	0 VDC	5 V RS422 RXD (+)	0 VDC	5 V TX (+)	
■ BLU/WHT	■ BLU/WHT	☐ WHT/BRN	■ GRN/WHT	■ GRN/WHT	■ GRN/WHT	■ GRN/WHT	
3 Vp-p Audio	Call Assurance 2 Signal	+16 VDC	+16 VDC	5 V RS422 RXD (–)	0 VDC	5 VTX (–)	
☐ WHT/BLU	☐ WHT/BLU	■ BRN/WHT	☐ WHT/GRN	☐ WHT/GRN	☐ WHT/GRN	☐ WHT/GRN	

Table 13: Connector Signals

Caution: the arrow on the R4KCONN6/8 Socket does **not** designate position 1. Use the alignment arrows on the connector and board to determine the mating direction.

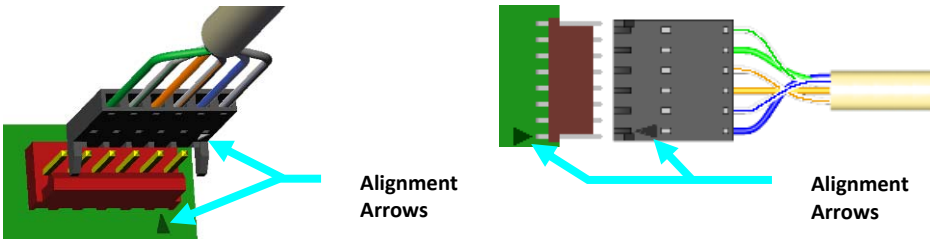


Figure 26: Station/Corridor Light connector/board alignment arrows

Modular Cable Miswiring Consequences					
	K-Bus	**R4KSPA**	**X-Bus**	**10BaseT**	**Phone Line**
K-Bus	OK				
R4KSPA	Talk audio may damage data transceiver	OK			
X-Bus	Talk audio may damage data transceiver	No permanent damage.	OK		
10BaseT	16 VDC may burn 10BaseT TX transformer	No permanent damage	No permanent damage	OK	
Phone Line	No permanent damage	-48 VDC may damage control signals	No permanent damage	Not nurse call related	OK

Table 14: Miswiring Consequences

X-Bus Interconnect and Patch Cables

In order to interconnect R4KNIM Network Interface Modules with each other, R4KPIP Peripheral Interface Port or Responder® IV NCGCM Group Control Modules, you'll have to create X-Bus interconnect cables. In order to connect Consoles to Console Receptacles (when they are separated by more than 6 feet) and R4KSPAs (to R4KNIM), you'll have to purchase or create standard patch cables. Off-the-shelf commercial patch cables that meet the TIA/EIA T568A standard may also be used.

What You'll Need

- ✓ Rauland's G4401 termination kit (4-pair, "black dot" crimp tool, G0394; Cable Jacket Stripper, G0395)
- ✓ Rauland's "blue tint" SM0399 4-pair modular plugs modular
- ✓ Standard Wire Cutters

✓ Plenum or non-plenum CAT5 (according to code)

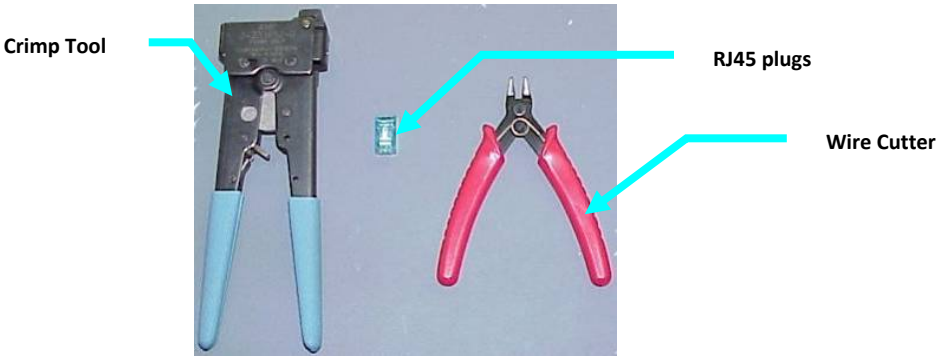


Figure 27: Patch Cable Equipment

Preparing the Cable

There are 4 steps in preparing cable:

Step 1. Measuring cable length

Step 2. Stripping the appropriate length of cable jacket

Step 3. Arranging the conductors

Step 4. Cutting conductors to correct size

Measuring the Cable

Before stripping, cutting, and crimping, determine point-to-point cable length—allowing for a 12” service loop.

Stripping the Jacket

Use an available wire cutter and the G0395 supplementary stripper to cut and strip the cable.

To strip the cable:

1 Use your cable cutter or crimper (if available) to create a straight and even cable:

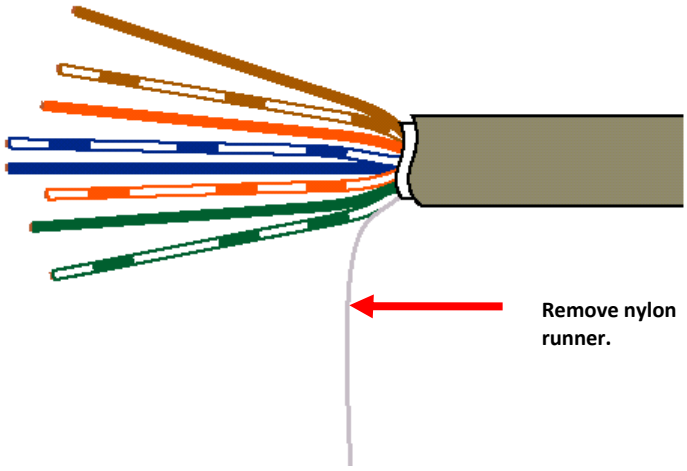


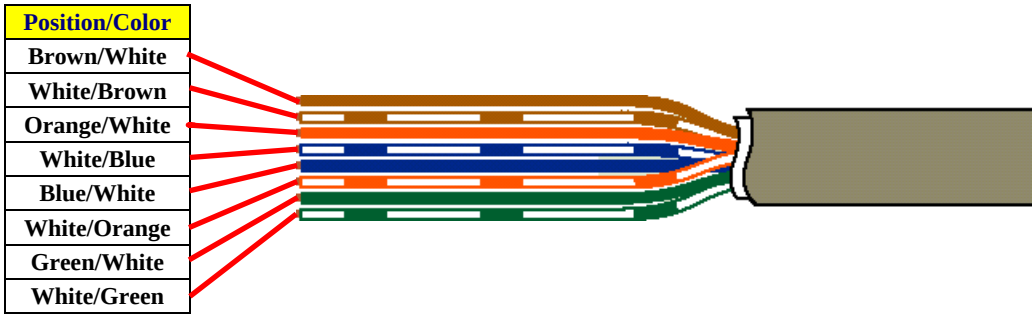
Figure 28: Stripping cable and preparing the wires

2 Use the supplementary stripper to strip 2” of jacket from the cable.

The cable jacket is initially stripped to 2” to allow for easy conductor arrangement.

3 Cut any excess nylon runner string.

➢ The conductors within the cable must be untwisted and arranged in proper order before cutting to necessary crimping length. (For proper conductor order, consult the table immediately below.)



Position/Color
Brown/White
White/Brown
Orange/White
White/Blue
Blue/White
White/Orange
Green/White
White/Green

Table 15: X-Bus Blue Plug Wire Position

4 Cut conductors to ½” beyond the jacket:

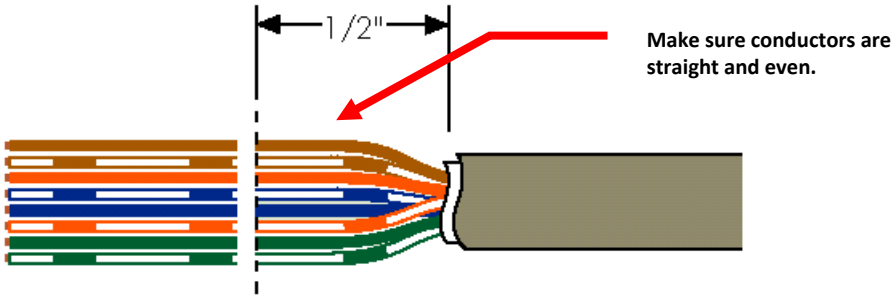


Figure 29: Prepare Conductors

Making the Connection

Once the cable is prepared, complete the crimping as follows:

1 Select the “black dot” tool.

2 Make sure the plug’s pins are facing the “inside” of the tool and that the plug’s opening is facing up.

Figure 30: Orient Plug

3 Arrange and insert the individual conductors into the plug as follows—making sure that the jacket itself is pushed securely into and stops inside the plug and that the individual wires are pushed all the way to the end of the plug:

➢ **Important:** wires that are not inserted completely will cause intermittent connections.

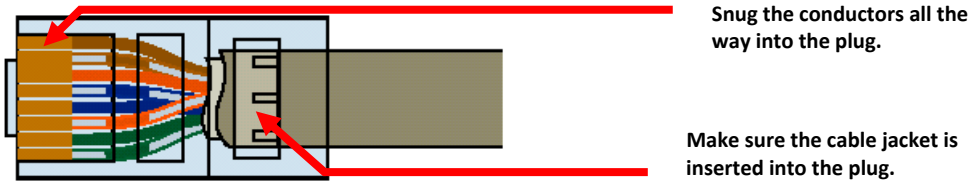


Figure 31: Arrange, Insert, and Butt Conductors

4 Open the tool handle. (To open a partially opened handle, squeeze the handles together fully and then release.)

5 Orient and fully insert the appropriate plug into the correct die—making sure the cable and the individual conductors fit securely into the plug.

6 Squeeze the handle until the ratchet action is complete and the handle opens fully.

➢ **Important**: complete the entire crimp. Do not attempt to use the ratchet release to interrupt a crimp in progress. Throw away suspect crimps.

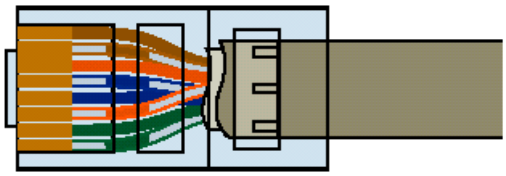


Figure 32: Inspect Complete Cable

Tool Maintenance

In order insure Amp crimper reliability, maintain it as follows:

✓ Inspect dies. Replace worn, nicked, pitted, or otherwise faulty dies.

✓ Use compressed air to clean dies after a full day's use. (If necessary, use a commercial degreaser.)

✓ Clean the ratchet handle with a soft rag.

✓ Lubricate all pins, pivots, and bearing surfaces sparingly with fresh SAE 20 motor oil. (**Never** apply oil—or any substance other than cabling—to the dies.)

✓ Order tool replacement parts from AMP Incorporated (Harrisburg, PA—1-800-526-5142.)

Custom K-Bus and Station Connect Cables

You'll use custom cable to connect Stations and K-Bus devices:

✓ Stations to Corridor Lights/Controllers

✓ Corridor Lights/Controllers to Termination Boards

✓ Corridor Lights/Controllers to Corridor Lights/Controllers

✓ Consoles Receptacles to Termination Boards

✓ Corridor Lights/Controllers to Feature Bed Interface

- ✓ Paging Amp to Termination Boards/Console Receptacle
- ✓ Phone Line Interface to Termination Board

Creating Custom Station Connect/K-Bus Cables

Here's what you'll need and how to make Station Connect and K-Bus cables:

What You'll Need

You'll need the following tools and supplies:

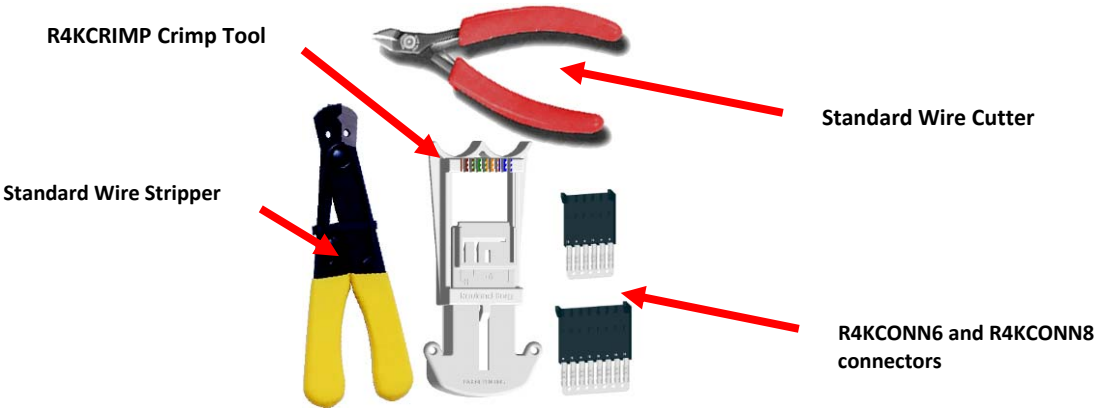


Figure 33: K-Bus Cable Equipment

- ✓ CAT5 (plenum or non-plenum, as required by code)
- ✓ R4KCRIMP Crimp Tool
- ✓ R4KCONN6 R4KCONN8 Connectors
- ✓ Standard Wire Cutter
- ✓ Standard Wire Stripping Tool

Step by Step

You'll need CAT5 cable and 8-pin connectors to create K-Bus cabling (6-pin connectors are only used for visual station connections):

1 Use the cable cutter to create a straight and even cable.

Figure 34: Straight and Even Cable

2 Use a knife or wire cutter to cut the cable jacket about 1".

Figure 35: Jacket Stripping

3 Strip 2 to 3 inches of the jacket from the cable by pulling the runner and cutting off the excess jacket:

Figure 36: Exposed Conductors with Cable Runner

Reminder/Alert

Using the above method will prevent nicking the cable insulators.

4 Remove the cable runner.

5 Separate and untwist the pairs:

Figure 37: Untwisted Conductors

6 Load either a 6 or 8-pin connector into the Crimp Tool:

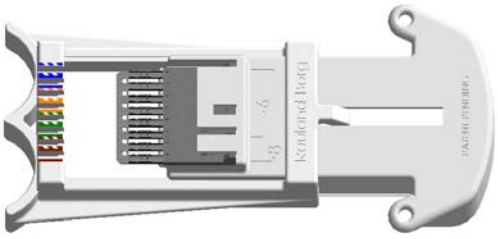


Figure 38: Connector Loading

7 Insert 6 or 8 conductors into the Crimp Tool as necessary.

- Make sure to match the printed conductor colors to the colors printed on the crimp tool:

Color
White/Blue
Blue/White
White/Orange
Orange/White
White/Green
Green/White
White/Brown
Brown/White

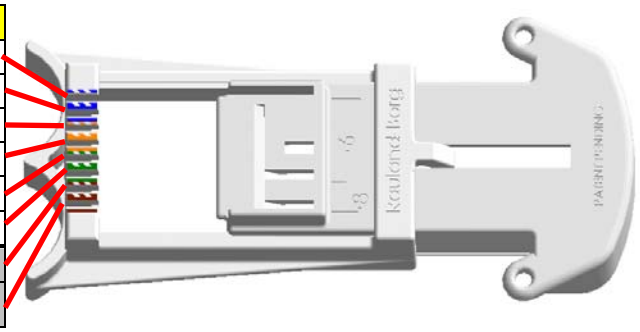


Table 16: Connector Coding

8 Hold the Crimp Tool between two fingers of one hand, and guide each conductor into its designated position with two fingers of the other:

Match colors printed on tool.

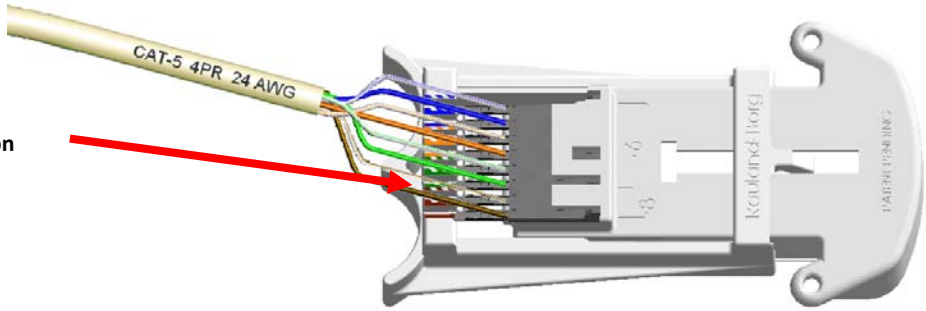
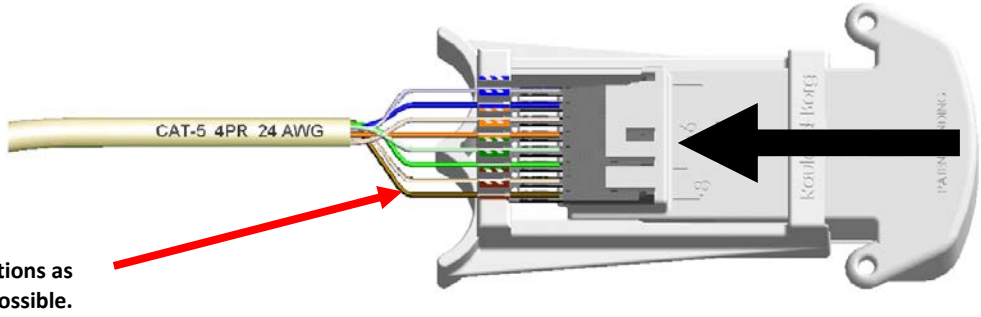


Figure 39: Insert Conductors

- Keep the untwisted section as short as possible.

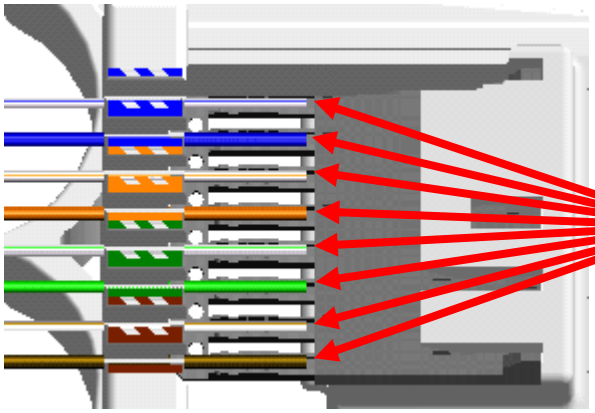
9 Once all of the conductors are in place, close the tool:

Keep untwisted sections as short as possible.



Reminder/Alert:

Avoid pushing the wires into the connector too far. To seat the connector properly, make sure the ends of the wires are flush with the plastic body before completing the crimp.



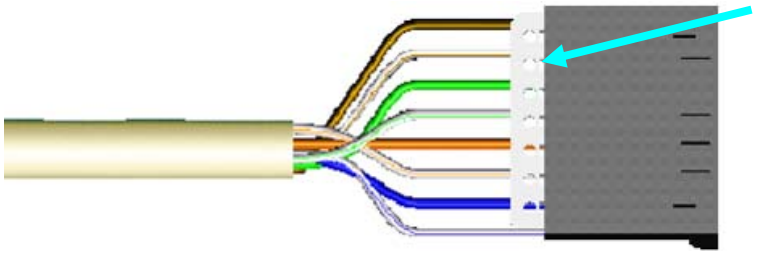
Avoid pushing the wires into the connector too far. To seat the connector properly, make sure the end of the wires are flush with the plastic body before completing the crimp.

Figure 40: Seating Connectors

10 Remove cable/connector combination.

11 Remove metal guide tab:

Reminder: remove metal guide tab.



Metal Guide Tab.

Figure 41: Remove Metal Guide Tab

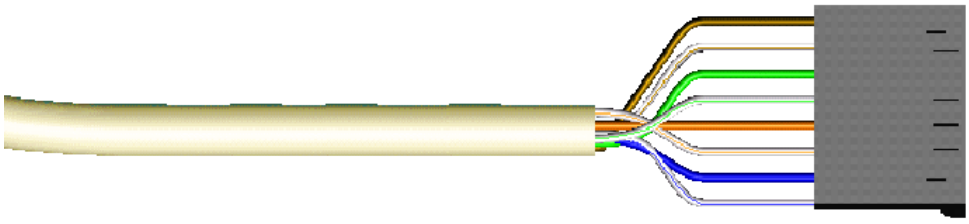


Figure 42: Completed Crimp

Others Things You Should Know

Devices providing a dry contact can connect directly to a Corridor Light/Domeless Controller. For instructions, see the Dry Contact connections entry in the Accessories section below.

✓ Visually inspect each cable prior to plugging it into any system component in the

following manner:

- ✓ Check that the metal guide tab is removed!
- ✓ Check the wire colors for the proper order.
- ✓ Use the STM-8 tester to verify there are no opens or shorts in the cable.

Cable Tester

We **highly recommend** that you purchase the optional Siemon STM-8 Modular Cable Tester. The portable tester—consisting of "master" and "remote" units (powered by a 9V battery)—retails for about $200. To use the tester, you'll also need a Rauland supplied adapter to test custom K-Bus and station connect cables.

Figure 43: Siemon STM-8 Modular Cable Tester

Testing Procedure

Test each cable prior to plugging it into any system component in the following manner:

To test Modular Cable Terminations

1 Press the button on the STM-8 to change the mode to T568A.
2 Connect one end of the cable to the master unit.
3 Connect the other end of the cable to the remote unit.

➢ If the cable is well-made and usable, the display should show the following:

Indications	Master LCD Segments							
LCD Segment	1	2	3	4	5	6	7	8
Screen 1	T	5	6	8	A			
Screen 2	R	E	M	O	T	E		A
Screen 3				C	C			
Screen 4			C			C		
Screen 5	C	C						
Screen 6							C	C
Screen 7				T	T			
Screen 8			T			T		
Screen 9	T	T						
Screen 10							T	T
Screen 11	P	A	S	S				

Figure 44: Cable Test Read-Out

4 Repeat test for all cables.

5 Re-terminate cables if the display shows the following:

✓ OO (Open Pair)

✓ RR (Reversed Polarity)

✓ SS (Short)

✓ ?? (Unknown M—Multiple Errors)

✓ XX (Split Pair)

To test Custom K-Bus and Station Connect Cable Terminations

1 Attach the R4KSTAC cables to the modular plugs of the master and remote units.

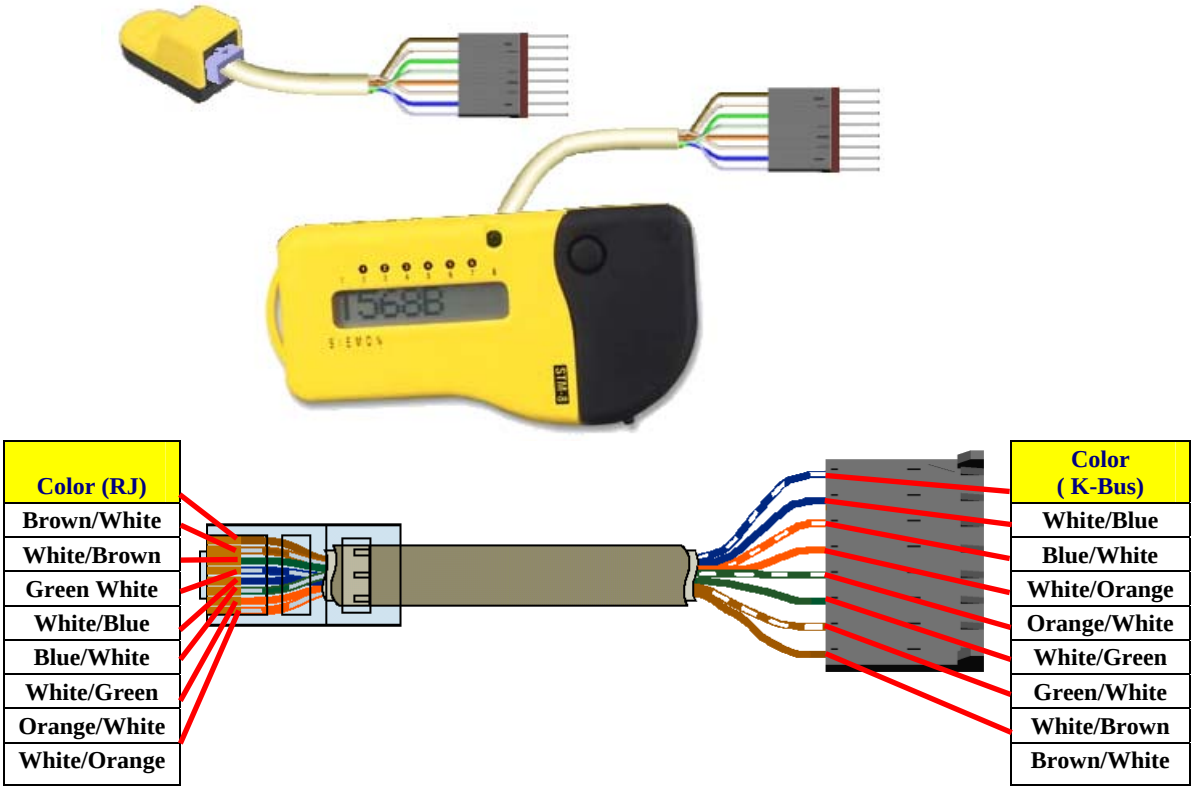


Figure 45: R4KSTAC cables attached to the STM-8 tester

2 Press the button on the STM-8 to change the mode to T568B.

3 Connect one end of the cable to the master unit.

4 Connect the other end of the cable to the remote unit.

➢ If the 8-pin cable is well-made and usable, the display should show the following:

Indications	Master LCD Segments							
LCD Segment	1	2	3	4	5	6	7	8
Screen 1	T	5	6	8	B			
Screen 2	R	E	M	O	T	E		A
Screen 3				C	C			
Screen 4	C	C						
Screen 5			C			C		
Screen 6							C	C
Screen 7				T	T			
Screen 8	T	T						
Screen 9			T			T		
Screen 10							T	T
Screen 11	P	A	S	S				

Figure 46: Cable Test Read-Out (8-pin K-bus Cable)

➢ If the 6-pin cable is well-made and usable, the display should show the following:

Indications	Master LCD Segments							
LCD Segment	1	2	3	4	5	6	7	8
Screen 1	T	5	6	8	B			
Screen 2	R	E	M	O	T	E		A
Screen 3				C	C			
Screen 4	C	C						
Screen 5			C			C		
Screen 6							O	O
Screen 7	C	N	T	__	F	A	I	L

Figure 47: Cable Test Read-Out (6-pin K-bus Cable)

4 Repeat test for all cables.

5 Re-terminate cables if the display shows the following:

- OO (Open Pair)
- RR (Reversed Polarity)
- SS (Short)
- ?? (Unknown M—Multiple Errors)
- XX (Split Pair)

6 Visually inspect each cable prior to plugging it into any system component in the following manner:

- Check that the metal guide tab is removed!
- Check the wire colors for the proper order.

8

Network & Control Components

In the following chapter you'll find installation tear sheets for the following Network & Control Components:

- ✓ R4KNIM Network Interface Module
- ✓ R4KPIP Peripheral Interface Port
- ✓ R4KRSPIP Reporting Software PIP
- ✓ R4KSPA Serial Port Adapter
- ✓ R4KPLI Phone Line Interface
- ✓ R4KXBA X-Bus Adapter
- ✓ R4KPA25 25W Paging Amp
- ✓ R4KBK400 Rechargeable Battery Back-Up
- ✓ R4KPR400 Power Supply
- ✓ R4KTMB K-Bus Termination Board
- ✓ R4KKBS K-Bus Y Splitter
- ✓ R4KKBSP K-Bus Splitter with Power

R4KNIM Network Interface Module
(Audio/Visual Network Compatible)

Making Connections/Interconnect

The Network Interface Module makes two required and one optional connections: 1) to the R4KPR400 Power Supply [required], 2) to the K-Bus [required], and 3) to other R4KNIMs and/or optional R4KPIPs.

Power Connect

Connect the R4KNIM to the power supply via 18AWG wire.

K-Bus Connect

Connect the module to the K-Bus using CAT5 UTP cable terminated with an 8-pin R4KCONN8 plug:

K-Bus Connect

Connect the module to the K-Bus using CAT5 UTP cable terminated with an 8-pin R4KCONN8 plug:

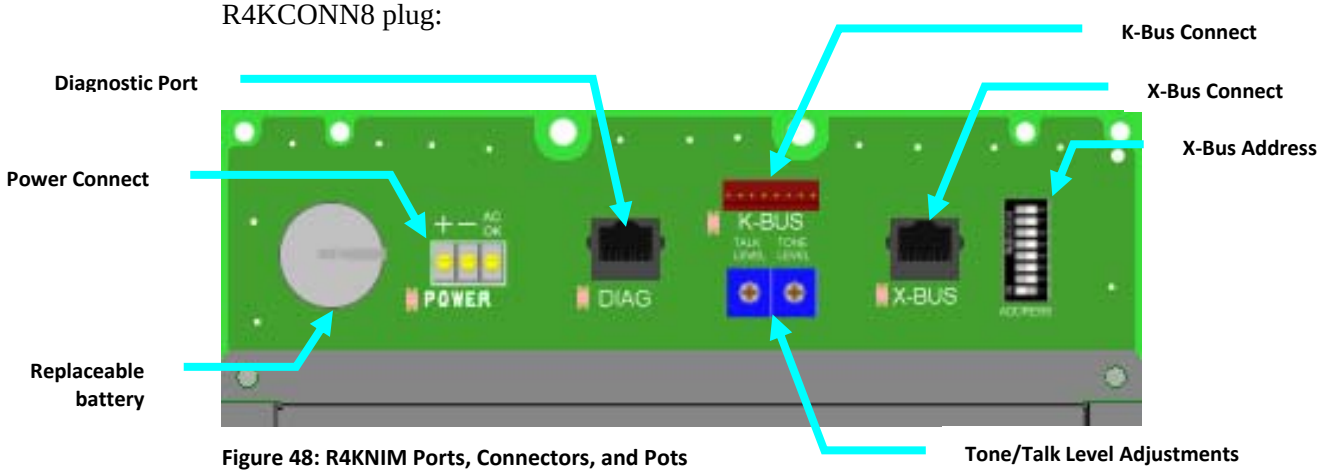


Figure 48: R4KNIM Ports, Connectors, and Pots

X-Bus Connect

Connect the module to the X-Bus using CAT5 UTP patch cable. If necessary, use the X-Bus Splitter (SF0720) to extend the X-Bus to other Responder® 4000 devices (R4KNIM, R4KPIP, R4KRSPIP):

Figure 49: X-Bus Splitter (8-pin version)

Once you've connected X-Bus devices using the splitter, make sure each is operating correctly. (If necessary, check the X-Bus heartbeat LED on suspect devices.) Be sure to install the end of line resistors at each end of the X-Bus.

Getting it Ready

Once you've made the appropriate connections, prepare the unit as follows:

Set X-Bus Address

Before you download configuration data to the device, you'll need to set the X-Bus Address. You should always work from an X-Bus worksheet, which helps you to keep track of component address assignments. You can find blank worksheet pages in KI-2104, the Responder® 4000 System Planning Guide.

To Set the Address

1 Find the address on the X-Bus Address Worksheet.

2 Set the Dipswitch to the correct address (valid binary X-Bus addresses are 0-63):

Figure 50: X-Bus Address Dipswitch (address 1 shown)

Adjust the Audio Levels

Once you have connected all of the stations, you should adjust the tone level for preannounce room tones. The talk level potentiometer will adjust the audio level on all incoming X-Bus audio (i.e. from another R4KNIM/K-Bus). It is recommended to adjust the level to match the talk level of R4K4020 consoles on the K-Bus.

Extending the X-Bus to 1400 feet

All Responder® 4000 X-Bus devices are capable of "Long X-Bus" operation. In order to extend the X-Bus to 1400 feet, all devices connected to the X-Bus must be capable of "Long X-Bus" operation and have Dipswitch 7 turned "ON". The factory default setting for Dipswitch 7 is "OFF". This will limit the X-Bus to 1000 feet.

Confirming it Works

The R4KNIM is equipped with 4 "heartbeat" LED's, which confirm proper operation:

Heartbeat LED's	
X-Bus Heartbeat Rate	**What it Means**
Fast blink	No other X-Bus devices connected
Slow blink	X-Bus Master
Solid	X-Bus Slave
K-Bus Heartbeat Rate	**What it Means**
Solid Off	Bootstrap/not transmitting
Slow blink	Transmitting
Diagnostic Heartbeat Rate	**What it Means**
Solid Off	Not transmitting
Blink	This port is transmitting or receiving data
Power Heartbeat Rate	**What it Means**
Single blink	Normal activity – Operational mode
Triple blink	Bootstrap mode (Do not interrupt power)

Table 17: Heartbeat LED's

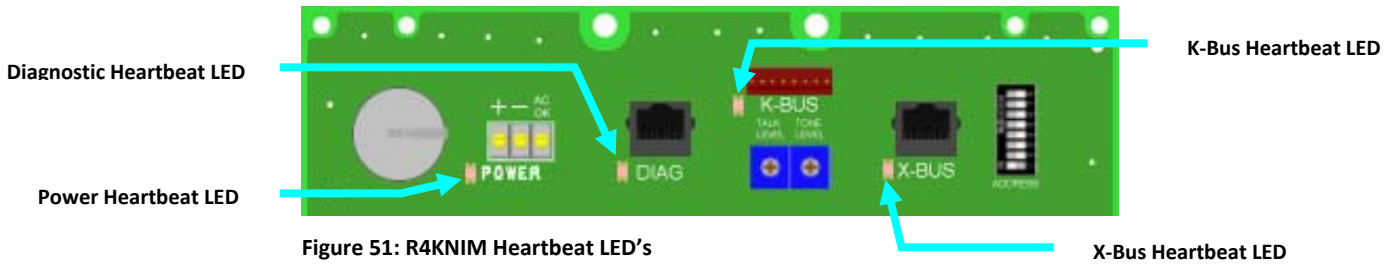


Figure 51: R4KNIM Heartbeat LED's

Others Things You Should Know

- ✓ No more than 25 R4KNIMs can be used in a Responder® 4000 network.
- ✓ The module provides one X-Bus port. (Use the SF0720, 4-pair t-tap to split the signal.)
- ✓ The module provides one K-Bus port. (Use the R4KTMB to split the signal).
- ✓ You can replace the battery with Rauland part #BD0105, if necessary.
- ✓ The AC OK signal should be connected to the R4KPR400 to properly monitor the AC power source.
- ✓ In order to extend the X-Bus to 1400 feet, all devices connected to the X-Bus must be capable of "Long X-Bus" operation and have Dipswitch 7 turned "ON".
- ✓ Keep the X-Bus as short as possible; never exceed 1,400 feet.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.

R4KPIP Peripheral Interface Port/ R4KRSPIP Reporting Software PIP
(Audio/Visual Network Compatible)

Making Connections/Interconnect

The Peripheral Interface Port connects to the R4KPR400, X-Bus, and one of two serial devices: 1) a Configuration PC, or 2) an approved Pocket Page terminal. The Reporting Software PIP connects to the R4KPR400, X-Bus, and a Reporting Software PC.

Power Connect

Connect the module to the power supply via 18AWG wire.

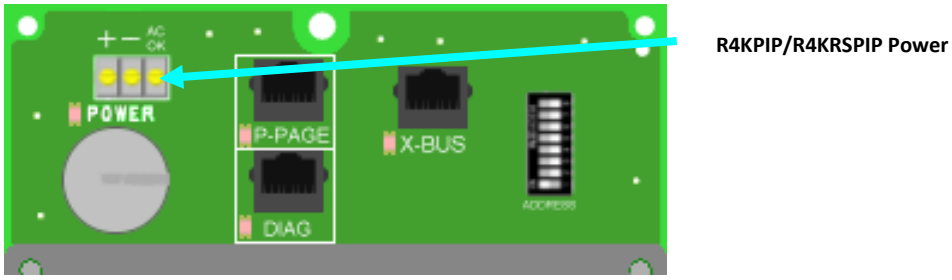


Figure 52: R4KPIP/R4KRSPIP Power Connector

X-Bus Connect

Connect the module to the X-Bus using CAT5 UTP patch cable. If necessary, use the X-Bus Splitter (SF0720) to extend the X-Bus to other Responder® 4000 devices: (R4KNIM, R4KPIP, R4KRSPIP):

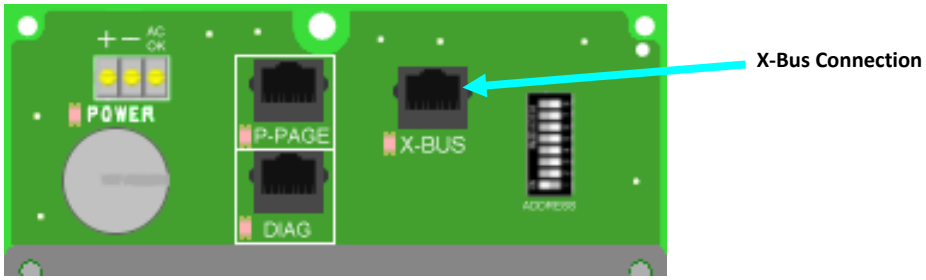


Figure 53: R4KPIP/R4KRSPIP X-Bus Jack

Once you've connected X-Bus devices using the splitter, make sure each is operating correctly. (If necessary, check the X-Bus heartbeat LED on suspect devices.)

Serial Device Connect

Connect the R4KSPA to the pocket pager or diagnostics modular jack. See R4KSPA for connection to the serial device.

Getting it Ready

Once you've made the appropriate connections, prepare the unit as follows:

Set X-Bus Address

Before you download configuration data to the device, you'll need to set the X-Bus Address. You should always work from an X-Bus worksheet, which helps you to keep track of component address assignments. You can find a blank worksheet in KI-2104, the *Responder® 4000 System Planning Guide*.

To Set the Address

1 Find the address on the X-Bus Address Worksheet.

2 Set the Dipswitch to the correct address (valid binary X-Bus addresses are 0-63):

Figure 54: X-Bus Address Dipswitch (address 1 shown)

Extending the X-Bus to 1400 feet

All Responder® 4000 X-Bus devices are capable of "Long X-Bus" operation. In order to extend the X-Bus to 1400 feet, all devices connected to the X-Bus must be capable of "Long X-Bus" operation and have Dipswitch 7 turned "ON". The factory default setting for Dipswitch 7 is "OFF". This will limit the X-Bus to 1000 feet.

Confirming it Works

The R4KPIP/R4KRSPIP is equipped with 4 "heartbeat" LED's, which confirm proper operation:

Heartbeat LED's	
X-Bus Heartbeat Rate	**What it Means**
Fast blink	No other X-Bus devices connected
Slow blink	X-Bus Master
Solid	X-Bus Slave
P. Page Heartbeat Rate	**What it Means**
Solid Off	Bootstrap/not transmitting
Slow blink	Transmitting
Diagnostic Heartbeat Rate	**What it Means**
Solid Off	Not transmitting
Blink	This port is transmitting or receiving data
Power Heartbeat Rate	**What it Means**
Single blink	Normal activity – Operational mode
Triple blink	Bootstrap mode (Do not interrupt power)

Table 18: Heartbeat LED's

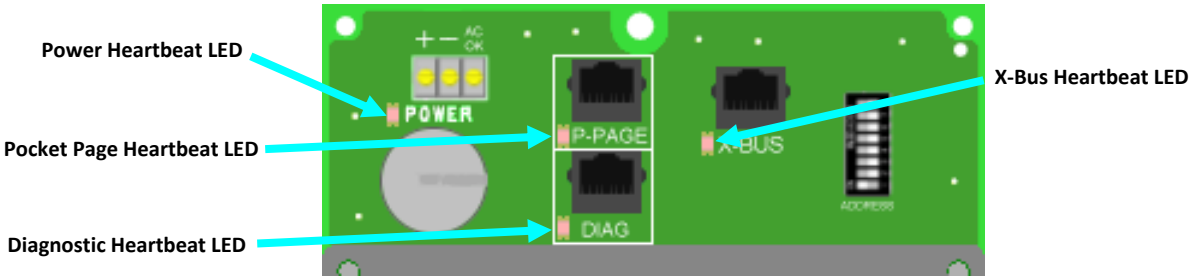


Figure 55: R4KPIP/R4KRSPIP Heartbeat LED's

Others Things You Should Know

- ✓ You cannot connect more than one Pocket Paging Terminal or Reporting Software PC to any single system (regardless of size).
- ✓ In order to extend the X-Bus to 1400 feet, all devices connected to the X-Bus must be capable of "Long X-Bus" operation and have Dipswitch 7 turned "ON".
- ✓ Keep the X-Bus as short as possible; never exceed 1,400 feet.
- ✓ Keep the cable between the R4KSPA and R4KPIP/R4KRSPIP as short as possible; never exceed 1,000 feet.
- ✓ The R4KRSW PC requires a serial communication port to connect to the R4KSPA.

R4KSPA Serial Port Adapter
(Visual Only and Audio/Visual Network Compatible)

Making Connections/Interconnect

The Serial Port Adapter makes two types of connections: 1) to an R4KNIM Network Interface Module OR an R4KPIP/R4KRSPIP and 2) to a serial device (Pocket Page Terminal, Configuration PC).

Warning

Do **not** attempt to use more than one of the serial ports at any time.

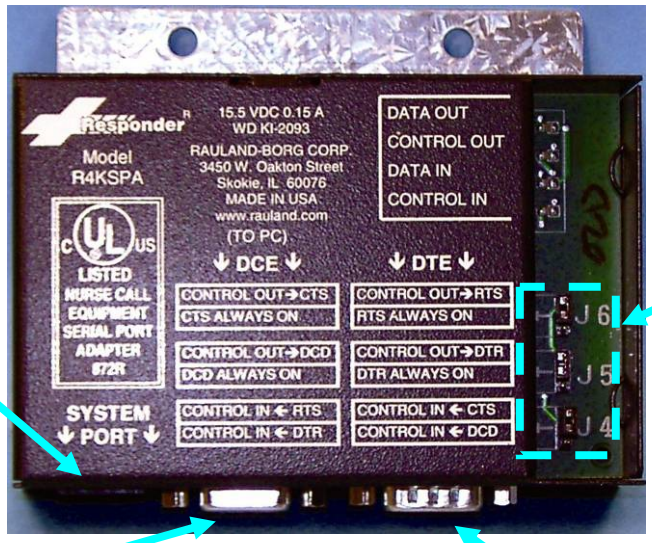
Risk of Electrical Shock Hazard - When connecting computer equipment to the Serial Port Adaptor (R4KSPA), it shall be verified that the computer equipment is certified according to the respective IEC Standard (i.e. IEC 60950-1 for information technology equipment or IEC 60601-1 for medical electrical equipment). All combinations of equipment must be installed in accordance with Situation 1b of Table BBB.201 in the Standard for Medical Electrical Systems, IEC 60601-1-1.

K-Bus Connect

Connect the R4KSPA to the R4KNIM Network Interface Module or R4KPIP/R4KRSPIP via the front panel RJ45 jack—using the supplied 7-foot patch cable.

Serial Device Connect

Connect the R4KSPA to a Pocket Page Terminal OR Configuration/Reporting Software PC using either the supplied 6-foot serial cable or a custom cable of your own creation (custom cables cannot exceed 50 total feet).



The jumpers allow the R4KSPA to connect to many devices.

Run a patch cable from the R4KSPA to R4KNIM or R4KPIP/R4KRSPIP.

Run a standard serial cable from the R4KSPA to the Configuration PC or DCE Pocket Page terminal.

Run a standard serial cable from the R4KSPA to a DTE Pocket Pager terminal.

Figure 56: R4KSPA Front Panel

To Setup a U.S. Robotics V.92 Modem

This procedure uses a PC with a terminal emulation program such as HyperTerm to configure a U.S. Robotics V.92 modem for use on the Responder® 4000 system. If two phone lines and a second PC with a modem and terminal emulation program are available, the USR modem can be tested before being installed (recommended).

1 Set the modem's DIP switches (same as default settings for a new modem out-of-the-box):

- 1 = UP
- 2 = UP
- 3 = DOWN
- 4 = UP
- 5 = DOWN
- 6 = UP
- 7 = UP
- 8 = DOWN

2 Use a PC terminal program (HyperTerm) at 38.4K N 8 1. Connect the PC's COMx: port to the USR modem's RS-232 connector. Type “AT&F1S0=1Y0&W0”and hit ENTER. Verify the modem replies with “OK.” This loads a default hardware flow control template, sets the auto-answer ring count = 1, specifies that NVRAM profile 0 should be loaded on power-up, and writes the current settings to NVRAM profile 0. If you want the modem to answer after a different number of rings, change the "1" in "S0=1" to the desired number.

3 Change the following 4 DIP switches to enter "dumb" mode:

- 3 = UP = suppress result codes (no ring, connect or disconnect messages will be sent to the R4KNIM).

- 4 = DOWN = don't echo characters while off-line (nothing the R4KNIM sends will get echoed back to the R4KNIM).
- 5 = UP = enable auto-answer.
- 8 = UP = dumb mode, ignore AT commands.

The resulting DIP switch settings are:

- 1 = UP
- 2 = UP
- 3 = UP
- 4 = DOWN
- 5 = UP
- 6 = UP
- 7 = UP
- 8 = UP

4 Cycle power to the modem.

5 On the PC terminal program, type "AT" and hit ENTER. Verify no response from the modem.

Steps 6 - 9 apply only if 2 phone lines and a second PC with a modem are available.

6 Call the USR modem from another PC terminal program at 38.4K N 8 1. Verify that the modems connect.

7 The calling PC's terminal program should display the connect speed and maybe some protocol negotiation status messages, whereas the USR modem PC's terminal program should not display "RING" or "CONNECT ..." It should only display characters typed on the calling PC's terminal program.

8 Verify the ability to type text on both PCs and have it appear correctly on the other PC.

9 On the calling PC's terminal program, type "+++" then wait for "OK", then type “ATH” and hit ENTER to hang up. The USR modem PC's terminal program should not display any disconnect message.

10 Use a DB-9 female to DB-25 male RS-232 cable from the R4KSPA DTE connector to the USR modem

11 On the R4KSPA, make sure that jumpers J5 and J6 are on the lower pair of pins, labeled "… ALWAYS ON." This will hold RTS and DTR true as long as the R4KNIM is powered. If the R4KNIM loses power while the modem is connected, the modem will drop the phone connection.

Getting it Ready

The R4KSPA jumpers are set at the factory to work with most serial devices. Here is a table of jumper settings for the serial ports (factory default shown):

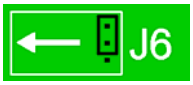
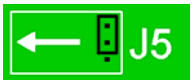
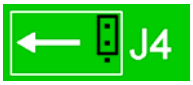
R4KSPA Jumpers		
↓ DCE (PC Connection) ↓	↓ DTE ↓	
CTS = CONTROL OUT	RTS = CONTROL OUT	
CTS = ALWAYS ON	RTS = ALWAYS ON	
DCD = CONTROL OUT	DTR = CONTROL OUT	 *
DCD = ALWAYS ON	DTR = ALWAYS ON	
CONTROL IN = RTS	CONTROL IN = CTS	
CONTROL IN = DTR	CONTROL IN = DCD	

Table 19: R4KSPA Jumpers (factory default shown)

*** Visiplex and Motorola Peoplefinder transmitters are DCE devices and require the J5 jumper to change to DCD = ALWAYS ON (bottom two pins). For best performance, be sure to change CTS = Device Ready in the Pocket Page Port Settings on the System Options Screen. For instructions, consult KI-2105, the *Responder® 4000 Configuration Guide*. WaveWare transmitters work with factory default settings.**

Confirming it Works

Make sure that the DATA IN and DATA OUT LEDs flash as data is passed to and from the R4KSPA.

Others Things You Should Know

- ✓ WaveWare SPS5/PGE-112 and many other paging transmitters work with the default settings.
- ✓ Visiplex and Motorola Peoplefinder transmitters are DCE devices and require the J5 jumper to change to DCD = ALWAYS ON.
- ✓ Keep the X-Bus as short as possible; never exceed 1,400 feet.
- ✓ Keep the cable between the R4KSPA and R4KNIM/R4KPIP/R4KRSPIP as short as possible; never exceed 1,000 feet.
- ✓ Never use a serial cable connection to a Pocket Page Terminal, Configuration PC or R4KRSW PC that exceeds 50 total feet.
- ✓ Do NOT attempt to use more than one serial port from the R4KSPA at a time. Use either the DCE port or the DTE port, not both.

R4KPLI Phone Line Interface
(Audio/Visual Network Compatible)

The R4KPLI Phone Line Interface consists of two identical PLI Stations housed in a single enclosure. Each PLI Station provides the interface between a K-Bus and a phone. A PLI Station can be connected to a variety of telephone equipment, although it is most useful when used with a wireless (cordless) phone with built-in Caller ID capability.

The use of wireless phones is considered a secondary means of informing staff members of patient calls. All sources of patient calls must still be covered by one or more supervised, UL-Listed nurse call Consoles and/or Duty Stations. These devices are the primary means of annunciating calls and they should be located where staff members can see and hear them.

Making Connections

Power Connection

A single terminal strip on the R4KPLI module supplies power to both its PLI Stations.

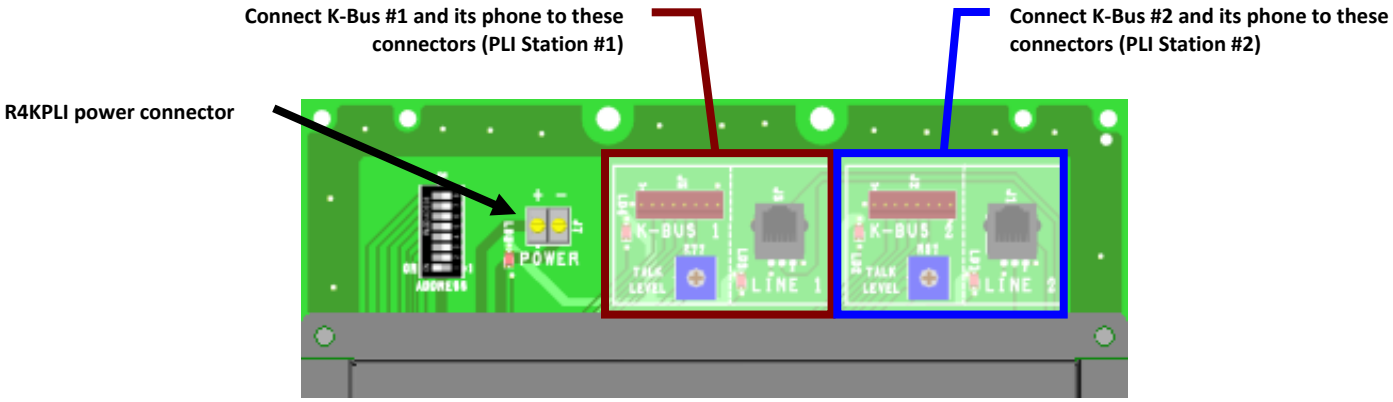


Figure 57: R4KPLI connections

Connect the module to a R4KPR400 power supply using 18-16 AWG wire.

K-Bus Connections

If only one of the PLI Stations is required for an installation, Station 1 must be used. This station has the ability to receive updated firmware for the entire R4KPLI module from an R4KNIM. Station 2 does not support this feature.

Only one PLI Station is allowed per K-Bus and the station's K-Bus Address is fixed at 230. The Address dipswitch on the module is intended for possible future product enhancements and it currently has no function.

Connect each PLI Station to its own K-Bus (R4KTMB) using CAT5 UTP cable terminated with 8-pin R4KCONN8 connectors. Since a PLI Station is similar in function to a Console,

it should be connected to the "CONSOLES" side of an R4KPA25 paging amplifier when this amplifier is present. A PLI Station cannot initiate a page within the nurse call system.

Phone Connections

The PLI Station's Line jack is wired as a USOC RJ-11 circuit with "Ring" in position 3 and "Tip" in position 4. Connect the station to its associated telephone equipment using CAT3 (or better) UTP cable terminated with standard 6-position modular plugs (available as part of the NCONBLUE connector kit).

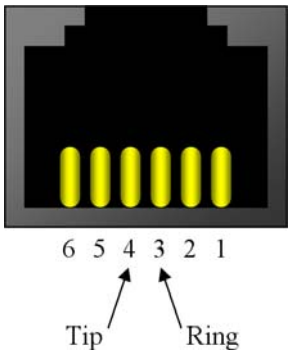


Figure 58: Line Jack Detail

The equipment that is connected to this interface is **not** considered to be part of the UL system configuration unless the equipment in question complies with the standard for Hospital Signaling and Nurse Call Equipment, UL 1069.

Specifying Phone System Administration

As shown in Figure 59, Figure 60, and Figure 61, a PLI Station can be connected to a variety of telephone equipment. When a single line handset is dedicated to the nurse call system, little or no administration is required. As the number of calling options available to the user increases, it is critical to ensure that the user can explicitly select the nurse call system as a destination for a call.

Low Cost, Single Line Cordless Phone

The PLI Station can be connected to a low cost, single line cordless phone. When the nurse call system directs a patient call to the PLI Station, the cordless phone starts to ring and it displays the call description after the first ring. To place a call from the phone, the user presses the Line key on the phone (which takes the phone "off-hook") and dials the number of another station within the nurse call system. Since the phone only supports a single line, it can only answer or originate calls that involve the nurse call system.

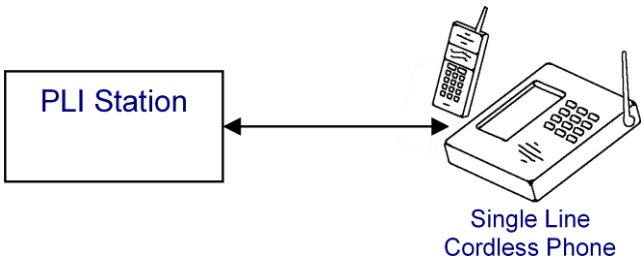


Figure 59: Single line cordless phone configuration

Multi-Line Key Phone

A multi-line key phone configuration has a separate Line key for each incoming line it supports. In this example, one of the phone's lines is connected to a PLI Station and the other lines are connected to outside lines from a Central Office (CO) owned by the facility's local phone carrier. The phone can answer and originate calls from both the nurse call system and the CO, depending on which Line key the user presses. Many wireless key systems support multiple wireless phones and allow "intercom" calls between phones. Calls between phones are routed within the key system's base station and they do not involve the PLI Station or the CO.

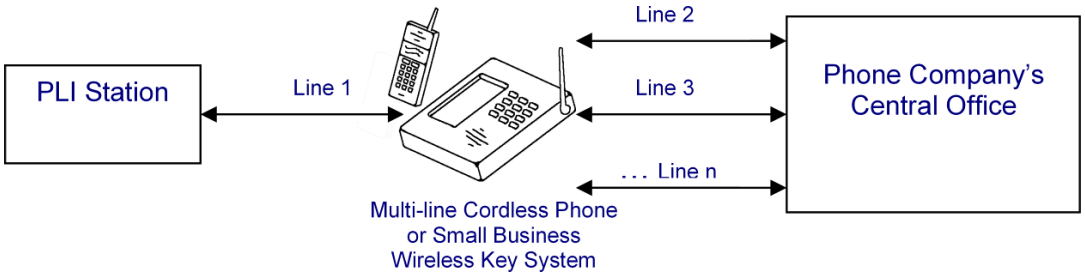


Figure 60: Multi-line key phone configuration

Some multi-line key phone systems provide a feature that uses a single Line key to "hunt" for an available trunk line from the CO. This hunting feature will not function correctly with a mixture of CO trunks and PLI Stations connected to the phone system. When the user tries to place a call, it cannot be determined if the call will be directed to the nurse call system or the CO. If the trunks can be divided into groups, the CO trunks can form one group and the PLI Stations can be assigned to another group. The user can then press one of two Line keys to hunt within one of these two groups when dialing.

A 2-wire Analog Trunk Line of a PBX

The next illustration is the most versatile option for interfacing a wireless phone to a PLI Station. The PLI Station is wired to one 2-wire analog trunk line of a PBX. In order for the wireless phone to show the call display from the PLI Station, the Line Card installed in the PBX must be capable of decoding an incoming Type 2 Caller-ID message. The interaction between the PLI Station and the wireless phone is highly dependent on how the PBX is administered. For a phone to display inbound calls from the PLI Station, the PBX must be administered to direct calls from the PLI Station's trunk line to the phone. This "line coverage" (defined in the PBX) forwards the PLI Station's "room coverage" (defined in the Responder® 4000 configuration) to a single wireless phone. **The user of the phone inherits the room coverage of the PLI Station and cannot dynamically customize this coverage to his or her individual preference.**

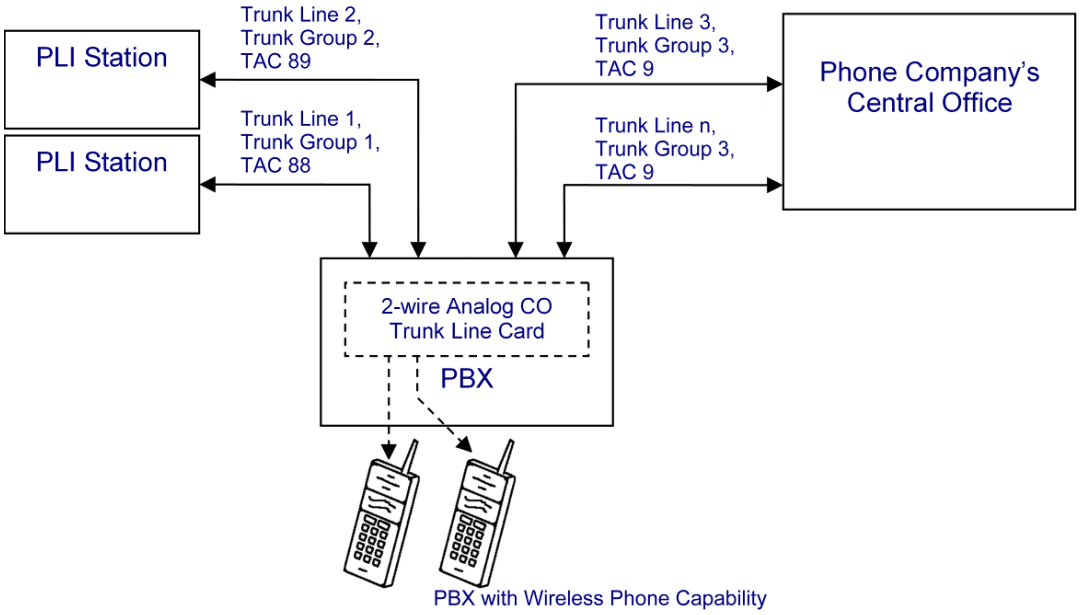


Figure 61: Wireless PBX configuration

To place an outbound call using the configuration shown in Figure 61, the wireless phone user must first enter a Trunk Access Code (TAC). The trunk lines that connect to the Central Office are typically administered into a "Trunk Group" that selects the first available outbound trunk line when the user dials a TAC of "9". Each trunk line wired to a PLI Station must be isolated in its own "Trunk Group" (containing only one trunk line) and assigned a unique TAC. If a wireless phone user wishes to originate a call to a destination outside of the facility, the user dials "9" followed by the remaining digits of the destination's Directory Number. To dial into the nurse call system, the user dials the TAC for a PLI Station ("88", for example) followed by the dialing number of the desired station within the nurse call system. Users can place calls between phones by simply dialing the extension (Directory Number) assigned to the destination phone. The numbering plan for a PBX restricts the digits used for extensions so that the PBX cannot mistake the first few digits of an extension for a TAC.

The recommended administration for a PBX used with PLI Stations can be summarized as follows:

- ✓ Each PLI Station is connected to a 2-wire analog CO Trunk Line.
- ✓ Each of these Trunk Lines is assigned to its own Trunk Group.
- ✓ Each of these Trunk Groups is assigned its own unique TAC.
- ✓ Each of these Trunk Groups is administered to direct inbound calls to a single phone.

This arrangement creates a 1-to-1 correspondence between PLI Stations and phones.

Application Planning

Specifying Phone System Connections

The Line connection for a PLI Station mimics an analog Foreign Exchange Station (FXS) port and it should be connected to a telephone device having the complementary Foreign

Exchange Office (FXO) personality such as a 2-wire, analog, single line phone. The following table details the specifications for the Line connection:

R4KPLI Line Specifications	
DC Characteristics	
Off-Hook Detection Method	Loop Start
Loop Feed	Nominal -24 VDC with 50 mA current limit
Forced Disconnect (Disconnect Supervision)	The Loop Feed current is interrupted for 1 second when a call that was answered at a PLI Station is canceled at the patient station.
AC Characteristics	
Nominal Impedance	600 ohms
CLASS* Support	Generates Caller ID signaling in Multiple Data Message Format (MDMF) between first and second ring. Calling Number Delivery and Calling Name Delivery.
DTMF Detection	
Minimum On Time	50 ms
Minimum Off Time	50 ms
Ring Generator	
Ring Waveform	Nominal 85 VRMS, 20 Hz sine wave
Maximum Ringer Load	2.0B REN (Ringer Equivalence Number)
Cadence	2 seconds on, 4 seconds off

Note: the open circuit Loop Feed voltage is 24 VDC. Some multi-line key phone systems measure the voltage on a phone line to determine if another telephone device (telephone, modem, or fax machine) has already seized this line. Lines with a low voltage measurement are marked as "busy" or "in use". Most systems assume that a line voltage below 12 VDC indicates that a line is in use but some systems set this voltage threshold closer to 48 VDC. This higher voltage threshold is not compatible with a PLI Station and it will interfere with attempts to dial into the nurse call system through a PLI Station. You may be able to defeat this feature within the phone system or adjust the threshold voltage that it uses to sense a seized line.

UL-Listed Equipment—connect **only** to **listed** phone equipment. If the phone equipment also connects to the exposed cable plant of the Telecommunications Network, it must provide electrical isolation from this network.

Call Waiting Tones

Once a user has connected to a PLI Station's line, the PLI Station does not report any additional nurse call activity within its coverage until the user disconnects. The *PLI Station* does *not* provide any "Patient Call Waiting" tone while the station is "off-hook". However, a multi-line key system or PBX may be able to provide a "Call Waiting" tone if the user is connected to another line and the PLI Station's line starts ringing. Conversely, this feature could also provide a "Call Waiting" indication when the user is connected to a PLI Station and another line starts ringing.

*CLASS is a service mark of Bellcore.

A patient call can be placed on hold for a *maximum of 20 seconds*. If the nurse call system does not detect a voice coming from the handset for 20 seconds, it will assume that the user has disconnected and it will cancel the patient call. The nurse call system will also disconnect a patient call that has been connected for more than *5 minutes*, regardless of voice activity.

A Word About Caller ID

Caller ID information is sent as a data message between the first and second bursts of ringer voltage while a PLI Station is ringing. Because the first ring burst lasts for 2 seconds and the data message requires an additional second for transmission, the call display appears approximately 3 seconds after the phone connected to the PLI Station begins to ring. If the call is answered before this three-second period has elapsed, the call display will not appear on the phone.

If a single line analog phone with Caller ID capability is directly connected to a PLI Station, the phone should have no difficulty displaying call information from the nurse call system. In more complicated installations, the existing phone equipment may provide features that "look like" Caller ID to an end user, but are not compatible with the Caller ID messages generated by a PLI Station.

Two features of this type are present on most multi-line key phone systems and PBXs. When calls are placed between stations connected to the phone system (internal or "intercom" calls), the text label administered in the phone system for one station appears on the other station's phone. Similarly, an external (trunk) line can also have a text label administered for it within the phone system and this static label can be displayed on a phone when that line is ringing. The existence of these features *does not* guarantee that the phone system can dynamically decode and display Caller ID messages sent on inbound calls from external sources while the external line is ringing.

Another feature that is frequently present on large PBXs is Caller ID signaling over a digital (T1 or E1) interface. Although this interface does provide Caller ID for inbound calls from external sources, a PLI Station is not designed to connect to this type of interface and cannot communicate through it.

Most phone systems support the display of Caller ID information on proprietary digital phones connected to digital station ports. It is far less common for a phone system to pass Caller ID information on to an analog phone connected to an analog station port. Some phone system vendors offer enhanced analog station cards that implement this feature for an additional fee. While analog phones with integral Caller ID are attractively priced, the added cost of an enhanced analog station card may make phones with a digital interface a more economical choice.

In order for a phone and its associated phone system to use the Caller ID information generated by a PLI Station, the following conditions must be met:

- ✓ The phone system must support 2-wire analog CO trunks.
- ✓ The phone system must be able to decode Caller ID (CLASS) signaling on these trunks.
- ✓ The phone system must be able to forward the decoded Caller ID message to the phone through its station port.
- ✓ The phone itself must be able to display the Caller ID message.

Confirming It Works

The R4KPLI is equipped with 4 “heartbeat” LEDs that blink to report the status of the module as a whole, as well as the state of each PLI Station.

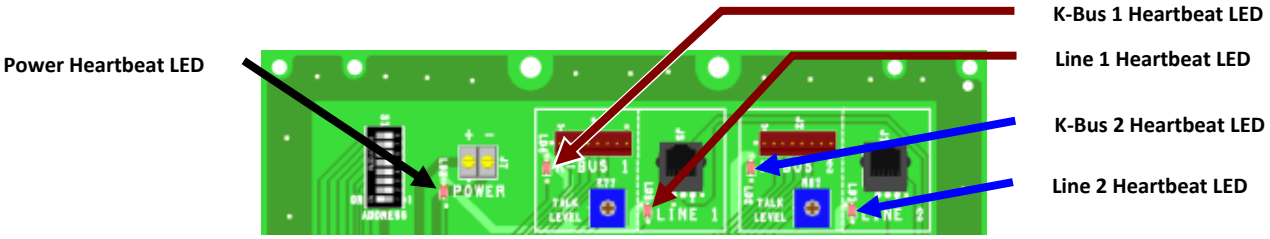


Figure 62: R4KPLI heartbeat LEDs

Status LEDs	
Power Heartbeat LED	**What it Means**
Single blink	Normal activity – Operational mode.
Triple blink	Bootstrap mode (Do not interrupt power).
K-Bus Heartbeat LED	**What it Means**
3 blinks every 3.2 seconds	No K-Bus activity for has been detected in the past 10 seconds.
2 blinks every 3.2 seconds	K-Bus activity is present, but the R4KNIM has not recognized this device as part of the system configuration.
1 blink every 3.2 seconds	Normal activity. The R4KNIM has recognized this device as part of the system configuration, initialized it, and continues to monitor it.
Line Heartbeat LED	**What it Means**
Solid off	The phone equipment is “on-hook” (idle).
Solid on	The phone equipment is “off-hook” (active).
Rapid blink	The PLI Station is ringing the phone equipment.

Table 20: R4KPLI Heartbeat LEDs

Talk Level Adjustments

Each PLI Station has a potentiometer adjustment for its K-Bus Talk Level. After installation, configuration, and testing of the R4KPLI is complete, set the Talk Levels of the PLI Stations to match the levels set for the R4K4020 LCD Consoles used in the nurse call system.

Automatic Firmware Update

Note that when a triple blink pattern is displayed on the Power Status LED, the R4KPLI module is in Bootstrap Mode. While in this state, its firmware is being updated to match the firmware image stored in the R4KNIM connected to PLI Station 1. This update will occur immediately after the R4KPLI has powered up and been analyzed by the R4KNIM. PLI Station 2 is taken out of service while R4KPLI module is being updated.

The firmware update process will proceed for several minutes while a triple blink pattern is displayed on the Power Status LED. The blinking pattern will then freeze for approximately 30 seconds while the final step of the update takes place.

Do not interrupt power to the R4KPLI during the final step of the firmware update. Doing so may damage the firmware image within the R4KPLI and this damage can only be repaired at the factory.

After the firmware update has completed, the R4KPLI will reset itself and return to Operational Mode with a single blink pattern displayed on its Power Status LED.

Self-Test Procedure

The R4KPLI firmware includes a self-test mode that can be used to verify that the K-Bus and Phone Line interfaces of both PLI Stations are working properly. In addition, this procedure can test the phone system connected to each PLI Station.

The procedure is as follows:

1 Disconnect the K-Bus cables from both PLI Stations.

2 Connect a short K-Bus cable between the two K-Bus connectors associated with the two PLI Stations.

3 Verify that a working phone is connected to each PLI Station. If you suspect that a fault is present in the facility's phone system, connect a known-good, single line, Caller ID capable, analog phone directly to the PLI Station's Line jack.

4 Verify that the K-Bus Status LEDs for both PLI Stations are showing a triple blink pattern.

5 Take the phone connected to PLI Station 1 "off-hook" and dial the following string of twelve DTMF digits in order: "123456789*0#". The PLI Station will be sending a Reorder Tone (Fast Busy Tone) to the phone, but it will still accept these digits. The R4KPLI only supports Tone dialing. In response to this command, PLI Station 1 will send a K-Bus data message to PLI Station 2.

6 PLI Station 2 will begin to ring its phone and the phone will show "Testing" on its Caller ID display between the first and second rings. In addition, all of the status LEDs will flash in unison to indicate that Self-Test Mode is active.

7 Take the phone connected to PLI Station 2 "off-hook". PLI Station 1 will lock its audio circuitry into the Talk direction and PLI Station 2 will lock into the Listen direction. Talk from PLI Station 1 to PLI Station 2 to verify that the K-Bus audio circuitry is functioning.

8 Put both phones back "on-hook" to cancel the test in this direction.

9 Repeat Steps 0 through 0, swapping the roles of PLI Station 1 and PLI Station 2 so that PLI Station 2 initiates the phone call. This tests all of the K-Bus and Line circuitry in the opposite direction.

10 Disconnect the cable you installed in Step 2.

11 Reconnect the cables you removed in Step 1.

12 Verify that K-Bus Status LEDs for the PLI Stations in use return to the single blink pattern.

Other Things You Should Know

- ✓ Each R4KPLI supports a total of 2 independent K-Buses.
- ✓ The system supports a maximum of 1 R4KPLI per K-Bus (R4KNIM).
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.

R4KXBA X-Bus Adapter
(Audio/Visual Network Compatible)

The R4KXBA is a 2-port X-Bus Adapter module that connects two X-Bus systems or system segments. The Responder® 4000 to Responder® IV connection will permit Responder® 4000 calls to be annunciated on the Responder® IV system consoles.

Only one R4KXBA can be used in a system. For example, it is **not possible** to link two separate Responder® 4000 systems into a Responder® IV system. Also, it is **not possible** to have a Responder® IV to Responder® IV X-Bus bridge and also link a Responder® 4000 system to it.

Making Connections

Power Connect

Connect the R4KXBA to the power supply (R4KPR400) via 18AWG wire.

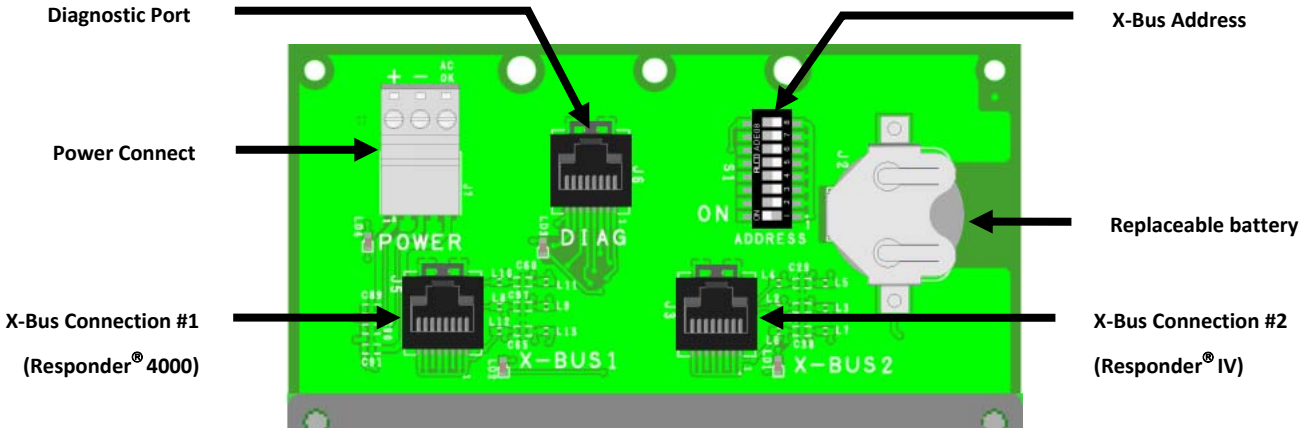


Figure 63: R4KXBA connections

X-Bus Connections

Connect the module to the Responder® 4000 or Responder® IV X-Bus using CAT5 UTP cable terminated with an 8-pin modular plug. In a mixed system (Responder® 4000 to Responder® IV), the Responder® 4000 is connected to the left-side X-Bus connector and the Responder® IV is connected to the right-side X-Bus connector. Be sure to use X-Bus Splitters (SF0720) and **end of line resistors on each X-Bus.**

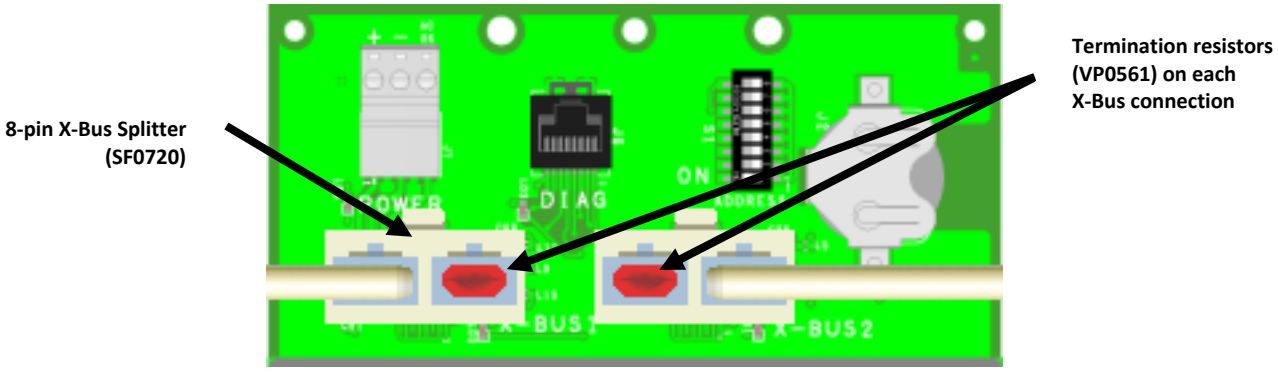


Figure 64: R4KXBA with X-Bus Splitters (8-pin version) and termination resistors

Getting it Ready

Once you've made the appropriate connections, prepare the unit as follows:

Set X-Bus Address

Before you download configuration data to the device, you'll need to set the X-Bus Address. You should always work from X-Bus worksheets, which helps you to keep track of component address assignments. You can find blank worksheet pages in KI-2104, the Responder® 4000 System Planning Guide.

R4KXBA Personalities

The R4KXBA can take on one of three personalities in an X-Bus wired system as determined by the X-Bus address. It can be a bridge between a single Responder® 4000 and a single Responder® IV, bridge between two Responder® IV system segments or bridge between two Responder® 4000 system segments. To select the proper personality set the dip switch accordingly:

- ✓ Address 0-56 = Responder® 4000 to Responder® IV bridge
- ✓ Address 57-60 = Responder® IV to Responder® IV X-Bus bridge
- ✓ Address 61-63 = Responder® 4000 to Responder® 4000 X-Bus bridge

When used on a mixed system (Address 0-56 = Responder® 4000 to Responder® IV), the R4KXBA will consume 8 consecutive X-Bus addresses on the Responder® IV, starting with the address on the dipswitch. It will only consume the single X-Bus address on the Responder® 4000 side. No other devices in the system can occupy these address locations. The Responder® IV configuration must be set to map Responder® 4000 rooms into zone 255 of the Responder® IV system

On non-mixed systems, Responder® 4000 to Responder® 4000 or Responder® IV to Responder® IV (Address 57-63), it will only consume the single address. This address must be accounted for on each side of the R4KXBA, i.e. not duplicated.

To Set the Address

1 Determine the R4KXBA personality and record it on the X-Bus Address Worksheet.

2 Set the Dipswitch to the correct address (valid binary X-Bus addresses are 0-63):

Figure 65: X-Bus Address Dipswitch (address 56 shown)

Extending the X-Bus to 1400 feet

Most Responder® IV and all Responder® 4000 X-Bus devices are capable of "Long X-Bus" operation. In order to extend the X-Bus to 1400 feet, all devices connected to the X-Bus must be capable of "Long X-Bus" operation and have Dipswitch 7 turned "ON". The factory default setting for Dipswitch 7 is "OFF". This will limit the X-Bus to 1000 feet.

If all devices on each side of the R4KXBA have the long X-Bus enabled, the X-Bus can extend to 2800 feet (1400 feet on each side of the R4KXBA).

Confirming it Works

The R4KXBA is equipped with 4 "heartbeat" LEDs, which confirm proper operation:

Heartbeat LED's	
X-BUS 1 Heartbeat LED Responder®4000	**What it Means**
Fast blink	No other X-Bus devices connected
Slow blink	X-Bus Master
Solid	X-Bus Slave
X-BUS 2 Heartbeat LED Responder®IV	**What it Means**
Fast blink	No other X-Bus devices connected
Slow blink	X-Bus Master
Solid	X-Bus Slave
DIAG Heartbeat LED	**What it Means**
Solid Off	Not transmitting
Blink	This port is transmitting or receiving data
POWER Heartbeat Rate	**What it Means**
Single blink	Normal activity – Operational mode
Triple blink	Bootstrap mode (Do not interrupt power)

Table 21: R4KXBA Heartbeat LED's

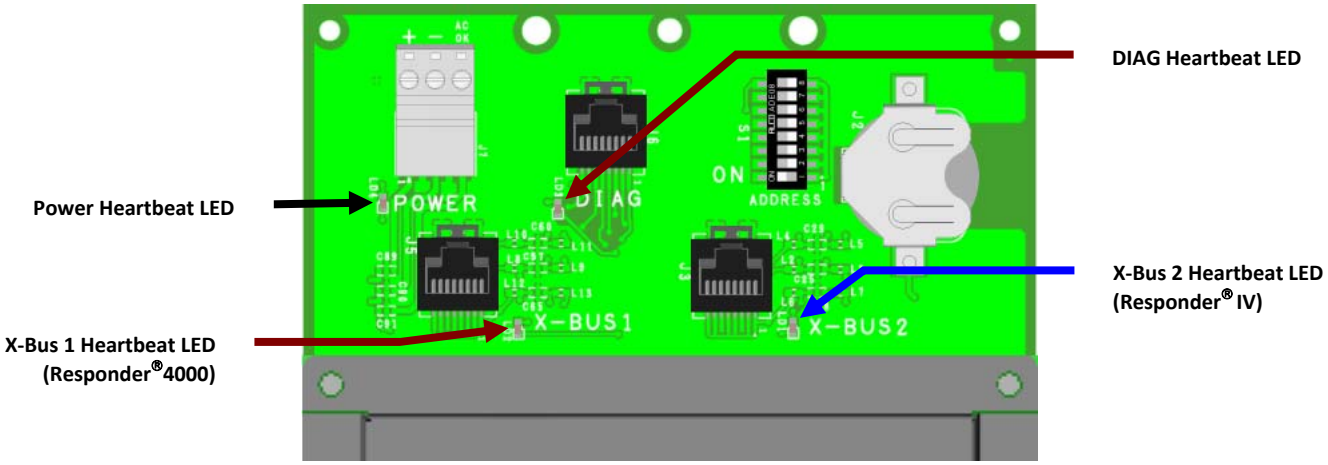


Figure 66: R4KXBA heartbeat LED's

Automatic Firmware Update

Note that when a triple blink pattern is displayed on the Power Status LED, new firmware is being downloaded into the R4KXBA.

Do not interrupt power to the R4KXBA during the final step of the firmware update. Doing so may damage the firmware image within the R4KXBA and this damage can only be repaired at the factory.

Other Things You Should Know

- ✓ The R4KXBA is a Responder® 4000 device. Even when used as a Responder® IV to Responder® IV bridge, it is still serviced using R4KWARE.
- ✓ The R4KXBA is a Responder® 4000 device and must be powered via an R4KPR400 even when used as a bridge between two Responder® IV system segments.
- ✓ The R4KXBA is not visible to the Responder® IV devices and the Responder® IV devices are not visible to the R4KXBA. It is harmless to leave the R4KXBA connected and operational while servicing.
- ✓ The Responder® IV system and the Responder® 4000 system are serviced separately.
- ✓ The R4KXBA must be operational to act as an X-Bus extender. Therefore, while in bootstrap, the left and right sides of the X-Bus are completely disconnected.
- ✓ The R4KXBA does not support Responder® IV to Responder® IV code loads across itself. To do multiloads and remote firmware loads, you must connect to each side separately (i.e. download to each Responder® IV as if it stood alone). The R4KXBA does support Responder® IV to Responder® IV database loads across itself.
- ✓ In a mixed system (Responder® 4000 and Responder® IV), the diagnostic connection from the PC (for Responder® 4000 code-loading) can be to any Responder® 4000 device, including the R4KXBA, through the DIAG port.

- ✓ Between two Responder® 4000 systems, the diagnostic connection from the PC must be to the R4KXBA DIAG port.
- ✓ R4Ware must be version 7.04 or higher and R4KWARE must be version 2.01 or higher.
- ✓ Note that when the R4KXBA is used to extend the length of an X-Bus in an all Responder® 4000 or Responder® IV system, both sides of the R4KXBA become part of a single large system (i.e., two system segments linked together) that share a common database and bus device addressing limitations.

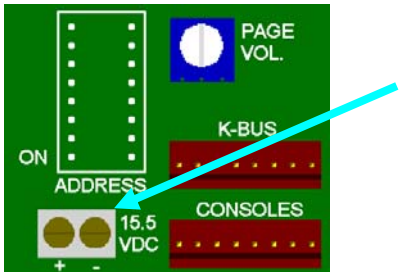
R4KPA25 25W Paging Amp
(Audio/Visual Network Compatible)

Making Connections/Interconnect

The Power Amp makes connection to: 1) to the R4KPR400 Power Supply, 2) R4K4020(s) or R4KNIM, and 3) K-Bus.

Power Connect

If the module is located within 10 feet of the R4KPR400, make connection to the R4KPR400 Power Supply using 16AWG wire. If the module is located between 10 and 50 feet of the R4KPR400, make connection to the R4KPR400 Power Supply using 14AWG wire. (Never locate the Paging Amp further than 50 feet from the Power Supply.)



R4KPA25 power connector

Figure 67: R4KPA25 Power Connector

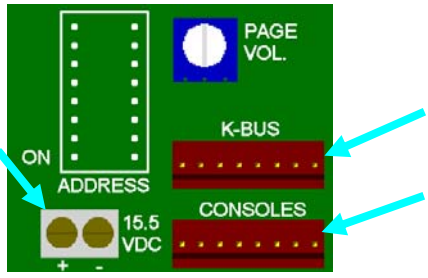
Console Connect (INPUT)

When using an R4KPA25 on a K-Bus with more than one R4K4020, connect all of the consoles to a designated “console” R4KTMB. Connect the R4KRECP or “console” R4KTMB to the “CONSOLE” header using CAT-5 cable terminated with an 8-pin R4KCONN8 plug. Systems that employ more than one R4KNIM require more than one paging amp. In such cases, plug the R4KNIM into the “CONSOLE” header on its K-Bus.

K-Bus Connect (OUTPUT)

Connect the corridor light/station R4KTMB to the “K-BUS” header using CAT5 cable terminated with an 8-pin R4KCONN8 plug.

Run power from the Power Supply or a R4KTMB Termination Board.



Run an 8-Pin Connect cable from the PA’s K-Bus header to the K-Bus R4KTMB.

Run an 8-Pin Console Connect cable from the Receptacle (R4KRECP) or R4KTMB to this header.

Figure 68: Console to Paging Amplifier Connection

Getting it Ready & Confirming it Works

Once you've made the appropriate connections, prepare the unit as follows:

1 Look at the Status LED.

➢ It should double blink for normal operation at power-up.

2 Place a page from a console.

➢ The PAGE LED should light steadily.

3 Adjust the PAGE VOL. potentiometer on the R4KPA25 to a suitable level.

4 Cancel the page.

➢ The PAGE LED should turn off, and the Status LED should change to single blink mode for 5 $^{1}/_{2}$ minutes.

Status LED Rate	What it Means
3 blinks	No K-Bus activity
2 blinks	Normal activity
1 blink	Completed page within 5 $^{1}/_{2}$ minutes
No Blinks	No power

Table 22: Paging Amp Status LED

Others Things You Should Know

- ✓ If the STATUS LED triple blinks, the R4KPA25 is not wired properly or disconnected from the R4KNIM.
- ✓ All consoles, on a single K-Bus, that are going to be used for paging must connect to a designated console R4KTMB. The KB-IN of the console R4KTMB should be connected to the R4KNIM. The KB-OUT of the console R4KTMB should be connected to the paging amp CONSOLE header.
- ✓ Systems that employ more than one R4KNIM require one or more paging amp for each R4KNIM that uses paging. In such cases, each R4KNIM will plug into KB-IN on its own console R4KTMB. The paging amp K-Bus output connects to Stations/Corridor Lights through a dedicated R4KTMB.
- ✓ Wire no more than 16 rooms with audio paging on a single K-Bus run, and try to limit run total length to 400 feet.
- ✓ More runs from an R4KTMB "Group" of fewer rooms are better than 1 long run with all the rooms. To help minimize the audio voltage drop in a K-Bus run during an audio page, the paging amp wiring should use the **Star** K-Bus wiring technique.
- ✓ For long runs to the first room, 300 to 400 feet, limit the number of speakers on the run to 8 (e.g., assuming 1 speaker per room).
- ✓ The R4KPA25 K-Bus output from a single R4KNIM and R4KPA25 can connect to a maximum of 70 rooms using the **Star** K-Bus wiring technique.

R4KBK400 Rechargeable Battery Back-Up
(Audio and Visual Only Network Compatible)

Making Connections/Interconnect

The Battery Back-Up connects to the R4KPR400 Power Supply as illustrated:

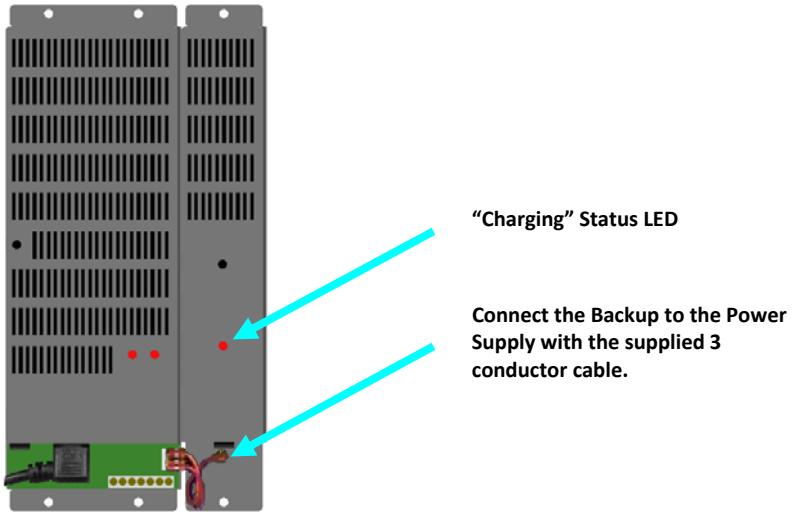


Figure 69: Interconnected R4KBK400 and R4KPR400

Wire Order

Observe the following wire order:

Position	Wire (Color)
1(top)	Charge (Orange)
2	Common (Black)
3	Battery (Red)

Table 23: R4KBK400 Wire Order Table

Getting it Ready & Confirming it Works

To insure proper back-up operation, the BK400 must be charged for 24 hours upon initial installation. A quick test, however, can be performed after 10 minutes.

Quick Test

1 Once you've made the appropriate connections, turn the R4KPR400 on.

2 Turn the R4KBK400 on.

➢ The CHARGING LED should illuminate.

3 After 10 minutes has elapsed, momentarily turn off the R4KPR400's AC switch.

➢ The R4KPR400's AC LED should turn off and the DC LED should remain on.

4 Return the R4KPR400's AC switch to the "On" position.

Maintenance/Full Test

Once installed and fully charged, a routine maintenance test should be performed once every 3 months. If this is not feasible, replace the battery once yearly.

1 Make sure the R4KPR400 Power Supply is turned on and powering the system.

2 Check that the R4KBK400 keyed plug is on the R4KPR400 Battery Back-up connector.

➢ The CHARGING LED on the R4KBK400 should illuminate.

3 Verify that the R4KBK400's rocker switch is in the "On" position

4 Measure the DC voltage at the R4KPR400 terminals with a digital voltmeter It should be above 15.5V.

5 Turn off the R4KPR400's AC switch for 10 minutes.

➢ The R4KPR400's DC LED should remain lit The DC voltage at the R4KPR400 terminals should also remain above 11.5V for the entire 10 minutes If not, the battery should be replaced.

6 Return the R4KPR400's AC switch to the "On" position.

Battery Replacement

1 Obtain a replacement battery from Rauland-Borg (part BD0111).

2 Unplug the R4KBK400's plug from the R4KPR400.

3 Remove the unit from the equipment cabinet.

4 Remove the cover screw and the cover housing.

5 Unplug the red, black and white battery leads from the printed circuit board terminals marked RED, BLK and WHT.

6 Remove the battery bracket using a 1/4" nut-driver and then the battery.

7 Replace old battery with Rauland Battery BD0111.

8 Reassemble, reinstall, and test unit.

9 Recycle old battery – Nickel-Cadmium Batteries must be disposed of properly.

Others Things You Should Know

✓ The BK400 must be charged for 24 hours upon initial installation.

✓ A routine maintenance test should be performed once every 3 months.

✓ This unit will allow the system to have uninterrupted power for ten minutes.

✓ These units can **not** be paralleled to exceed the ten minute maximum.

✓ Do not attempt to use any back-up or battery other than the R4KBK400. The use of any other back-up unit or battery will void all warranties.

R4KPR400 Power Supply
(Audio or Visual Only Network Compatible)

Making Connections

The Power Supply connects to 1) 120V AC power source, 2) various K-Bus and X-Bus devices, 3) to the optional Battery Backup unit (R4KBK400), and 4) to the optional Chassis Short and/or Power Fault Monitor.

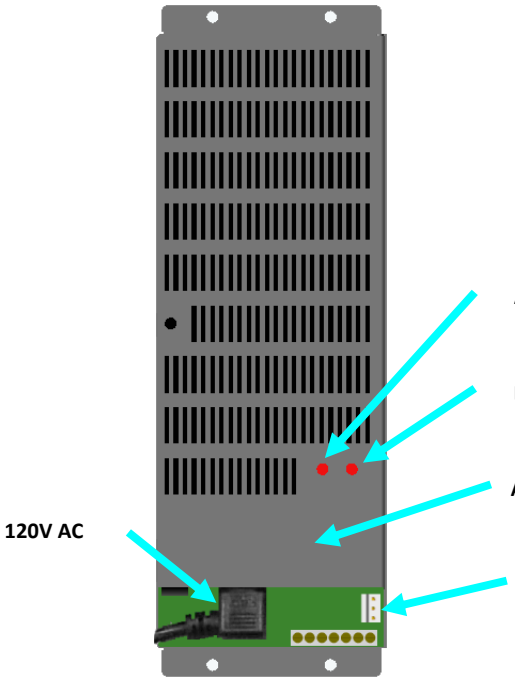


Figure 70: Power Supply

Power Source

Connect the Power Supply to a reliable 100V-250V, 50-60Hz AC source with a dedicated circuit breaker (minimum of 2.3A per R4KPR400).

Power Distribution

The unit supplies power via 3 outputs. The first terminal pair provides a maximum of 2.5 amps. The next two pairs (combined) provide up to 2.5 amps. Draw across all terminals cannot exceed the unit's 3.5 amp total. The "AC OK" connection must be connected to the R4KNIM for monitoring the AC supply to the R4KPR400.

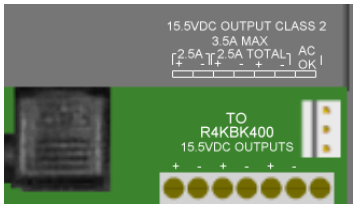


Figure 71: Power Supply outputs

K-Bus Devices

Connect the Power Supply to any K-Bus device that requires direct power: Termination Board (R4KTMB), Network Interface Module (R4KNIM), Peripheral Interchange Port (R4KPIP), Reporting Software PIP (R4KRSPIP), Phone Line Interface (R4KPLI), Paging Amp (R4KPA25), or Console Receptacle (R4KRECP).

Battery Backup

Connect the Power Supply to an optional Battery Backup unit (R4KBK400) using the supplied 3 conductor cable.

Chassis Short and/or Power Fault Monitor

Connect the CM300 and/or PM300 as instructed in KI-1473 and KI-1474. Each R4KPR400 (power supply) that will be monitored will require a PM300 to properly monitor the entire system, i.e., five R4KPR400s → five PM300s. Attach the red wire to the "+" terminal and the white wire to the "-" terminal on the R4KPR400. The CM300 has an additional green wire that should be connected to earth ground. One good source for earth ground is in the NC2828 cabinet.

Getting it Ready & Confirming it Works

Consult the power calculation spreadsheet and connect power accordingly. Once you've made the appropriate connections, prepare the unit as follows:

1 Turn the AC LINE switch on.

➢ The "AC PWR" LED should light.

Others Things You Should Know

- ✓ The "AC PWR" LED indicates AC power is being supplied to the R4KPR400.
- ✓ The "DC PWR" LED indicates DC power is being supplied to the screw terminals (either from the R4KPR400 or R4KBK400 Battery Back-up).
- ✓ The R4KPR400 can supply 2.5 amps per run, but the total output of the supply **cannot** exceed 3.5 amps.

R4KTMB K-Bus Termination Board
(Audio and Visual Only Network Compatible)

Making Connections

The R4KTMB serves as a K-Bus junction/hub. It provides 12 powered and 2 daisy-chain connections for the K-Bus ports.

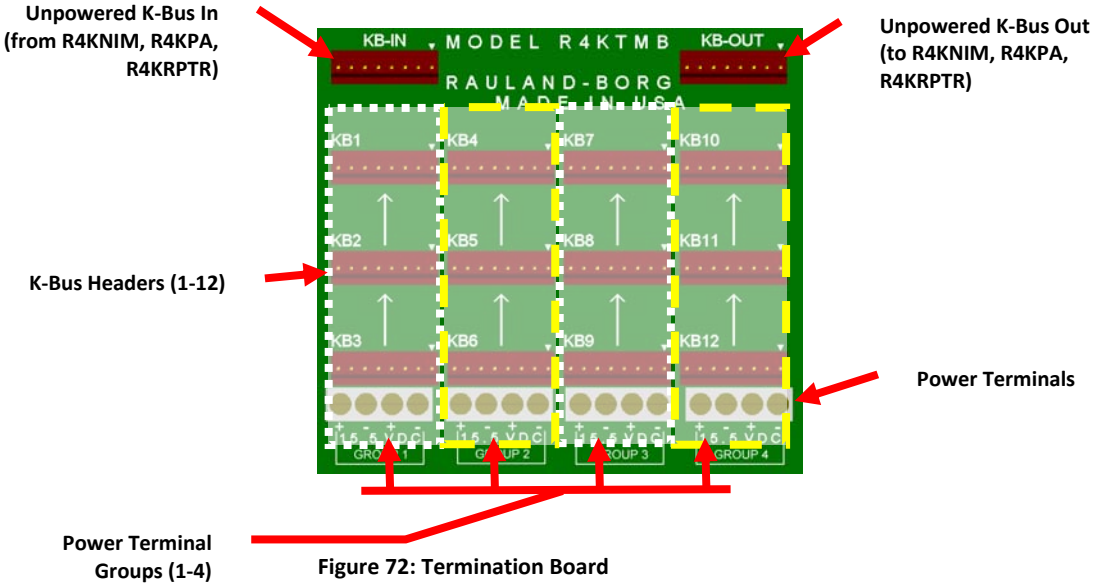


Figure 72: Termination Board

KB-IN/KB-OUT Connection

Connect R4KNIMs or R4KPA25s to the K-Bus via the unpowered (data/audio only) "KB-IN/KB-OUT" headers.

KB1-KB12 Connection

If you wish to extend power from the Termination Board to other K-Bus devices, you'll need to run 1, 2, 3, or 4 sets of power leads from the R4KPR400 Power Supply.

Mandatory: power the Corridor Lights, Domeless Controllers, Marquee controllers, and Consoles by way of the Termination Board.

Termination Board Power Groups

Power is distributed from the Power Terminals to the K-Bus headers as follows:

Terminal 1	Terminal 2	Terminal 3	Terminal 4
KB1	KB4	KB7	KB10
KB2	KB5	KB8	KB11
KB3	KB6	KB9	KB12

Table 24: Termination Board Power Distribution

Others Things You Should Know

- ✓ The termination board can distribute a maximum of 6 amps of power, total.
- ✓ Draw across each of the 3 K-Bus runs connected to a terminal should not exceed 2 amps, total.
- ✓ The audio and data are common for all of the KB#, K-Bus connections.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.

R4KKBS K-Bus Y Splitter
(Audio and Visual Only Network Compatible)

Making Connections

The R4KKBS serves as a K-Bus Y Splitter. It provides 3 parallel K-BUS ports.

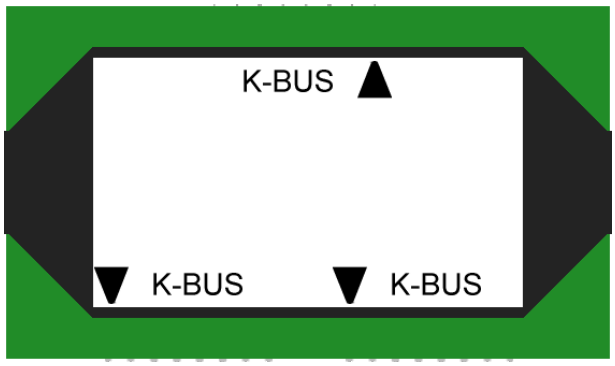


Figure 73: R4KKBS Board

K-BUS Connections

All 3 K-BUS connections on the R4KKBS carry audio, power and data.

Others Things You Should Know

- ✓ The R4KKBS can distribute a maximum of 2.0 amps of power.
- ✓ The power, audio and data are common for all of the K-Bus connections.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.

R4KKBSP K-Bus Splitter w/Power
(Audio and Visual Only Network Compatible)

Making Connections

The R4KKBSP serves as a remote K-Bus power splitter. It provides 1 K-BUS IN (data and audio only), POWER IN terminals and 2 K-BUS OUTPUT ports.

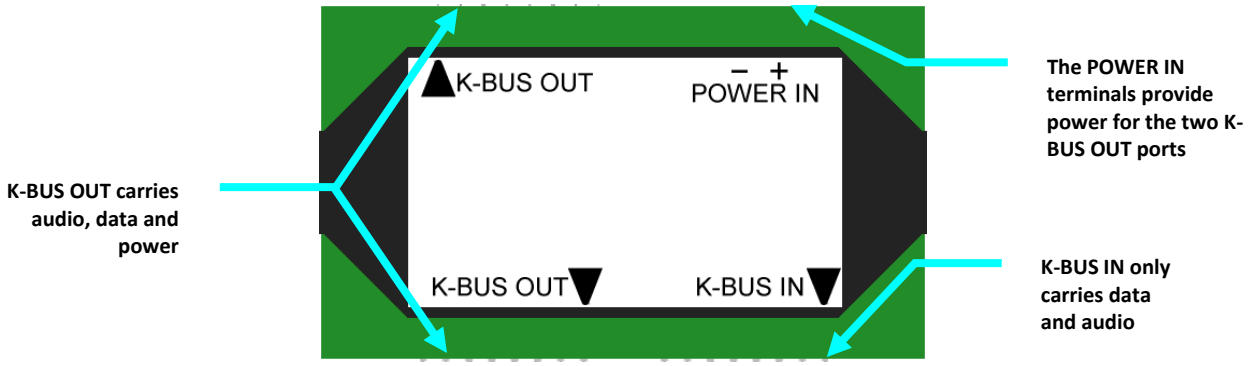


Figure 74: R4KKBSP Board

K-BUS IN & K-BUS OUT Connections

The R4KKBSP is intended for localizing power to remote devices. The K-BUS IN connection only carries audio and data. The audio and data is passed on to the K-BUS OUT connectors. The POWER IN supplies the power to the 2 K-BUS OUT connectors.

Others Things You Should Know

- ✓ The R4KKBS can distribute a maximum of 2.0 amps of power.
- ✓ The power, audio and data are common for all of the K-Bus connections.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.

9

Consoles, Annunciators, & Accessories

In the following chapter you'll find installation tear sheets for the:

- ✓ R4K4020 LCD Console
- ✓ R4KANN Annunciator Panel
- ✓ R4KMQC Marquee Controller
- ✓ R4KRECP Console Receptacle

R4K4020 LCD Console
(Audio/Visual Network Compatible)

Making Connections

The LCD Console makes one required and two optional connections: 1) to the required R4KRECP Console Receptacle, 2) to the optional R4KANN Annunciate Panel, and 3) to an optional Paging Amplifier.

Receptacle Connect (required)

Run a standard CAT5 patch cable (included) between the Console and the Console Receptacle:

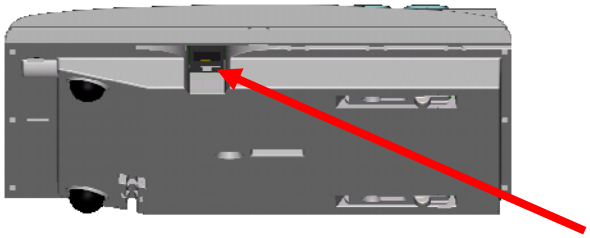


Figure 75: Console K-Bus Connector

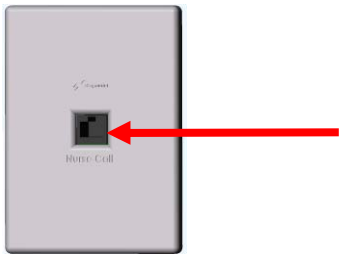


Figure 76: Console to Receptacle Connection

R4K4020/R4KANN Cluster Connect (Optional)

Run a standard CAT5 patch cable between the Console and the Annunciate Panel:

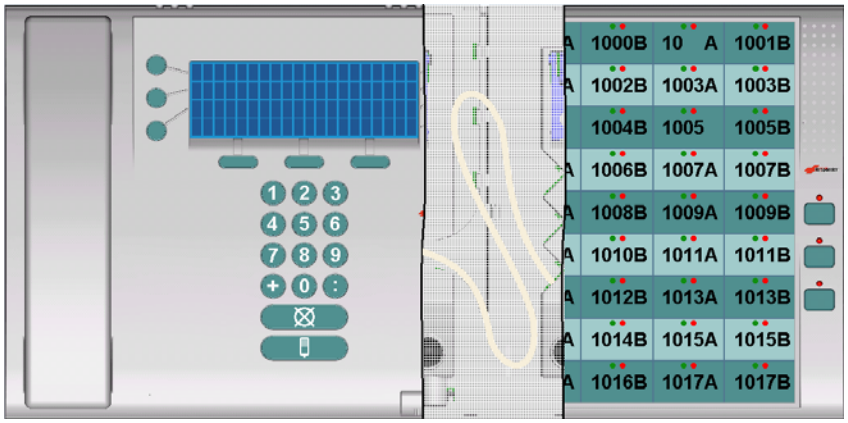
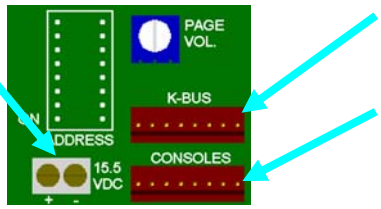


Figure 77: R4K4020/R4KANN Cluster Connect (cut-away view)

Amplifier Connect (optional)

Should you wish to use an optional Paging Amplifier, run the K-Bus from the R4K4020 R4KRECP to the "CONSOLES" connection on the Paging Amplifier:

Run power from the Power Supply or a R4KTMB Termination Board.



Run an 8-Pin Station Connect cable from the PA's K-Bus header to the K-Bus.

Run an 8-Pin Console Connect cable from the Receptacle (R4KRECP) to this header.

Figure 78: Console to Paging Amplifier Connection

Getting it Ready & Confirming it Works

Once you've made the appropriate connections, prepare the unit as follows:

Set K-Bus Address

Before you download configuration data to the device, you'll need to set the K-Bus Address. You should always work from a K-Bus worksheet, which helps you to keep track of component address assignments. You can find a blank worksheet page in Appendix D.

To Set the Address

1 Find the address on the K-Bus Address Worksheet.

2 Set the Dipswitch to the correct address (this is a binary number):

K-Bus Address: "Up" is "ON"; "Down is "Off"

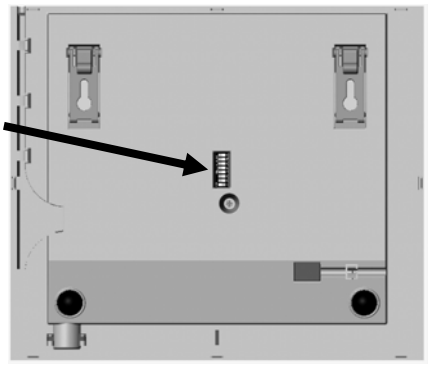


Figure 79: Console K-Bus Address Dipswitch (address 1 shown)

Adjust the levels

Once you have installed the console and all rooms, you should adjust the audio levels, handset VOX controls, and LCD contrast.

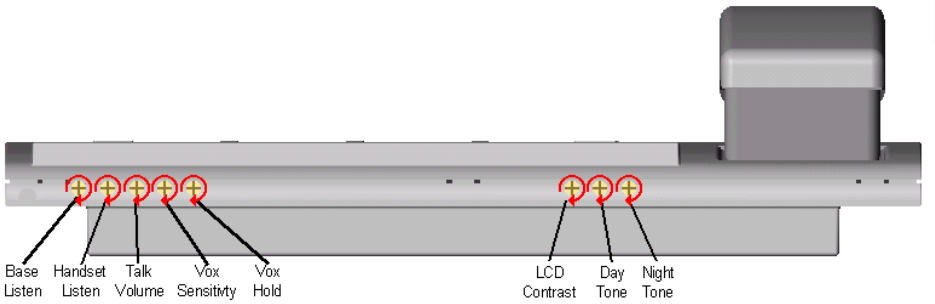


Figure 80: LCD Console (Rear View)

Firmware Updates

The R4KNIM will automatically detect the firmware version of the R4K4020 and change it if necessary. During a firmware update the display will warn you to **not** remove power during this operation.

Installer-Support Menu Functions

There are three LCD menu levels: 1) regular function, 2) password-protected function, and 3) support/diagnostic function. The user has access to the regular and password-protected function menus (provided they are furnished a user-password); while the installer or other trained support personnel have access to the support/diagnostic function menu.

To access the support/diagnostic function menu:

✓ Enter the "+248007+" password string, using the LCD console dialpad.

The Installer-Support password and menu cannot be changed. If the "+248007+" password is coincidentally used as the password-protected-menu password, then the system will automatically change the Installer-Support password to "+248008+".

The following functions may be accessed by pressing the softkey with the corresponding label from within the Installer-Support menu:

- ✓ **ver:** queries the operational-firmware version of the R4KNIM. This may be used to check that the R4KNIM has expected firmware. Usually such checking will instead be done via a PC attached to a diagnostic port anywhere in the system.
- ✓ **level**: examines or sets the amount of diagnostic logging for the R4KNIM. You may be asked by Rauland Technical Support to use this entry. Further instructions will be provided.
- ✓ **trouble:** turns trouble-pocket-paging ON or OFF. System configuration allows up to 10 CAP-codes to be entered as Trouble-pocket-pagers. Pages are sent to these pagers whenever a corridor-light or R4KNIM or other system device goes offline.
- ✓ To avoid network-trouble-pages during installation (when unplugging devices is common and necessary), you can press “troubl” to disable this pocket-paging feature.
- ✓ Be sure, however, to press the softkey associated with “troubl” again to enable the feature before exiting.

Do not use any of the other functions you may accidentally access by scrolling through all available options. These additional functions should **only** be used as directed by Rauland Technical-Support.

After a few seconds of inactivity, the Installer-Support menu will automatically disappear and the LCD will return to its normal idle state.

Others Things You Should Know

- ✓ The system supports a maximum combination of 30 R4K4020s, R4KANNs, R4KPLIs and/or R4KMQCs per K-Bus (R4KNIM). I.e., the total number of physical devices of these three models combined cannot exceed 30 attached to an R4KNIM.
- ✓ The system supports a maximum combination of 20 R4K4020s and R4KANNs per K-Bus (R4KNIM).
- ✓ The system supports a maximum of 10 console clusters per K-Bus.
- ✓ A cluster is a grouping of console panels (models R4K4020 and/or R4KANN). The panels are physically co-located (and thought of as a single “console” by end-user staff) and are related by configuration so that, e.g., tone-muting and day-night tone selection from one panel will affect all the panels – the whole “console.”
- ✓ A cluster consists of 1-18 R4KANNs or else 1 R4K4020 and 0-17 R4KANNs.
- ✓ A single R4KANN or a single R4K4020 is considered a cluster.
- ✓ As a consequence, there can never be more than 10 R4K4020s on a K-Bus.
- ✓ An R4KMQC is not considered a cluster or any part of a cluster.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.
- ✓ One Console can be connected up to 450 feet from the power supply before requiring extra power.
- ✓ Use 16 AWG wire if you plan to position consoles less than 700 feet from the

R4KPR400; use 14 AWG wire if you plan to position consoles between 700 and 1000 feet from the R4KPR400. Always factor in the length of the wire used to connect the R4KRECP.

R4KANN Annunciator Panel
(Audio or Visual Only Network Compatible)

Making Connections

You can create a Multiple R4KANN Cluster by connecting up to 18 Annunciator Panels or one (1) LCD Console and up to 17 Annunciate Panels.

Multiple R4KANN Cluster Connect

Run a standard, supplied CAT5 patch cable (included) between the Annunciator Panel and the console or annunciator:

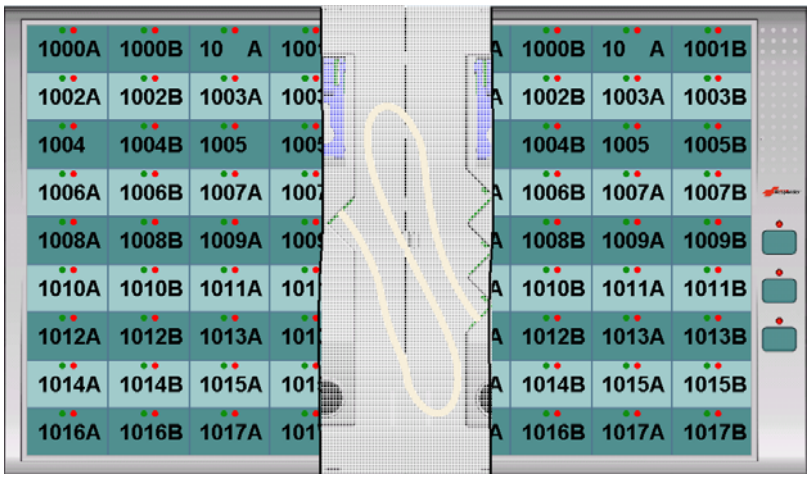


Figure 81: Multiple Annunciate Panel Cluster Connect (cut-away view)

Should you wish to cluster more than 3 R4KANNs, you must provide additional power. See Appendix C for further information.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections, prepare the unit as follows:

Set K-Bus Address

Before you download configuration data to the device, you'll need to set the K-Bus Address. You should always work from a K-Bus worksheet. You can find a blank worksheet in Appendix D.

To Set the Address

1 Find the address on the K-Bus Address Worksheet.

2 Set the Dipswitch to the correct address (this is a binary number).

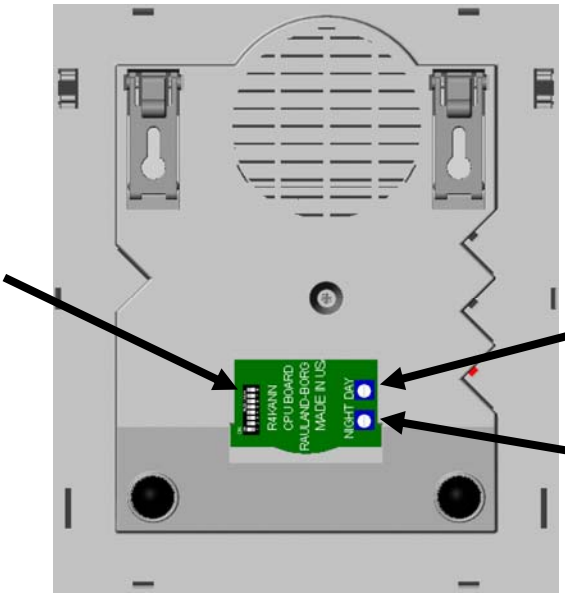


Figure 82: R4KANN Annunciate Panel Tone Pots

Adjust Tone Levels

The panel provides both Day and Night Tone level adjustments:

To adjust the tone levels

1 Press the day tone button. .

2 Place a call from a station within the panel's coverage area.

3 Rotate the Day Tone pots (beneath back cover) to a suitable position.

4 Repeat procedure for Night Tones.

Power On

For the first 5 seconds after applying power, the R4KANN displays the firmware version number (major.minor) by lighting the pair of LEDs in the 4 columns. Columns 1 and 2 (left) are the major version number and columns 3 and 4 make up the minor version number. Since there are 9 rows of LEDs, we light the red and green LED pair in the row corresponding to the digit, 1 = top row, 9 = bottom row. If the digit for the column = 0, no LEDs in that column are lit. For example, version 1.47 will have column 1 off, column 2 row 1 on, column 3 row 4 on and column 4 row 7 on.

After 5 seconds with the firmware version number display, the R4KANN does an LED display test for 4 seconds. Then the R4KANN enables K-Bus.

Firmware Updates

The R4KNIM will automatically detect the firmware version of the R4KANN and change it if necessary. During a firmware update the LED array lights in a circular pattern, clockwise. Do not remove power during this operation!

R4KANN Self Tests

When the R4KANN is powered up with **DIP switch 8 on**, only the power/logo LED will be on. Normally, the Day Tone or Night Tone LED will be on in addition to the power/logo LED. Press the Day Tone key to step through 19 LED test patterns in a "forward" direction. Pressing the Day Tone key at step 19 "wraps around" to step 1.

The 19 steps are:

- ✓ All LEDs on.
- ✓ Row 1 red and green LEDs on.
- ✓ Row 2 red and green LEDs on.
- ✓ Row 3 red and green LEDs on.
- ✓ Row 4 red and green LEDs on.
- ✓ Row 5 red and green LEDs on.
- ✓ Row 6 red and green LEDs on.
- ✓ Row 7 red and green LEDs on.
- ✓ Row 8 red and green LEDs on.
- ✓ Row 9 red and green LEDs on.
- ✓ Column 1 green LEDs on.
- ✓ Column 1 red LEDs on.
- ✓ Column 2 green LEDs on.
- ✓ Column 2 red LEDs on.
- ✓ Column 3 green LEDs on.
- ✓ Column 3 red LEDs on.
- ✓ Column 4 green LEDs on.
- ✓ Column 4 red LEDs on.
- ✓ All LEDs off except the power/logo LED.

1 Press the Mute key to initiate the Tone test. All the LEDs except the power/logo LED will be turned off.

2 Press the Day Tone key to sound call tone 1 at the day tone level. The Day Tone LED will be turned on.

3 Press the Night Tone key to sound call tone 2 at the night tone level. The Night Tone LED will be turned on. Press the Mute Tones key to test the CPU fail beeper. The microprocessor will stop scanning the keypad and LED array for about 3 seconds, which removes the "tickle" input from the CPU fail circuit. It will sound a **loud**, 50%

duty cycle alarm beep. After about 3 seconds, the microprocessor resumes normal operation and the Mute Tones LED will be turned on.

To exit the test mode, turn DIP switch 8 off. It is not necessary to cycle power. Changing any other DIP switch position will force the R4KANN back to the start of the test.

Others Things You Should Know

- ✓ The system supports a maximum combination of 30 R4K4020s, R4KANNs, R4KPLIs and/or R4KMQCs per K-Bus (R4KNIM). I.e., the total number of physical devices of these three models combined cannot exceed 30 attached to an R4KNIM.
- ✓ The system supports a maximum combination of 20 R4K4020s and R4KANNs per K-Bus (R4KNIM).
- ✓ The system supports a maximum of 10 console clusters per K-Bus.
- ✓ A cluster is a grouping of console panels (models R4K4020 and/or R4KANN). The panels are physically co-located (and thought of as a single “console” by end-user staff) and are related by configuration so that, e.g., tone-muting and day-night tone selection from one panel will affect all the panels – the whole “console.”
- ✓ A cluster consists of 1-18 R4KANNs or else 1 R4K4020 and 0-17 R4KANNs.
- ✓ A single R4KANN or a single R4K4020 is considered a cluster.
- ✓ As a consequence, there can never be more than 10 R4K4020s on a K-Bus.
- ✓ An R4KMQC is not considered a cluster or any part of a cluster.
- ✓ Should you wish to cluster more than 3 R4KANNs, you must provide additional power.
- ✓ You can use the R4KWM22 or screw holes on the support leg to mount the R4KANN to a wall.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.
- ✓ You can place a single annunciate panel up to 450 feet from its Power Source without adding an additional power source.
- ✓ Use 16 AWG wire if you plan to position consoles less than 700 feet from the R4KPR400; use 14 AWG wire if you plan to position consoles between 700 and 1000 feet from the R4KPR400. Always factor in the length of the wire used to connect the R4KRECP.

R4KMQC Marquee Controller
(Audio and Visual Only Network Compatible)

Making Connections

The Marquee Controller makes three connections: 1) to the K-Bus, 2) to the R4KMST station and 3) to an approved Marquee.

K-Bus and Station Connect

Connect the controller to the K-Bus using CAT5 UTP cable terminated with an 8-pin R4KCONN8 plug. Connect the controller to the Station using CAT5 UTP cable terminated with an 8-pin R4KCONN8 plug:

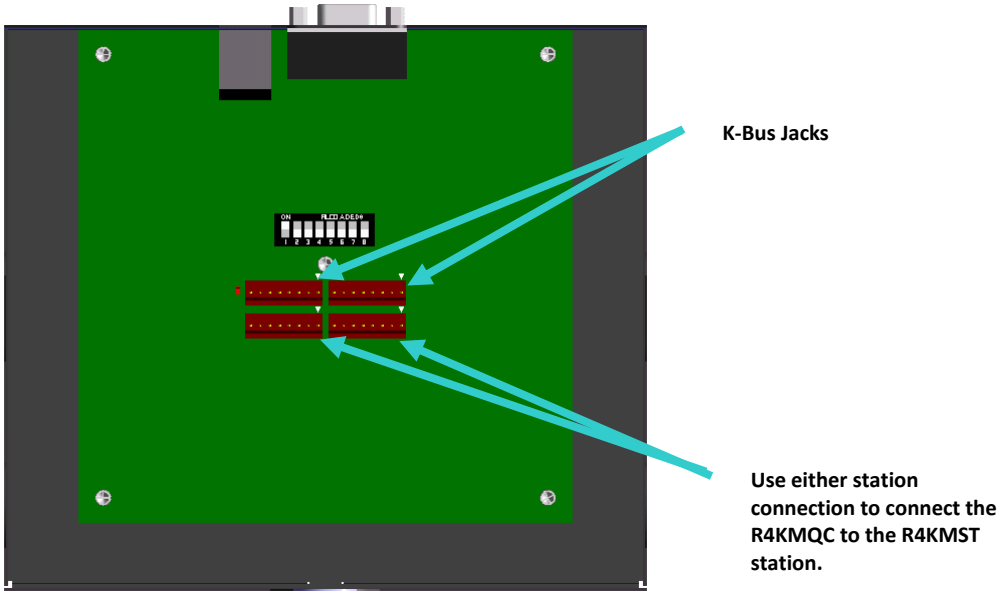


Figure 83: K-Bus & Station Jacks

Use the bottom two 8-pin headers for R4KMST connections. **Mistakenly plugging an active K-Bus cable into the station headers will damage the R4KMQC.** Use the top two 8-pin headers for K-Bus connections. Mistakenly plugging an R4KMST into the K-Bus headers could damage the speaker.

Marquee Connect

Connect the controller to an approved Marquee via the RS232 **or** RS485 Serial Port (The RS232 and RS485 ports could be used at the same time **as long as the marquees are the same type**):

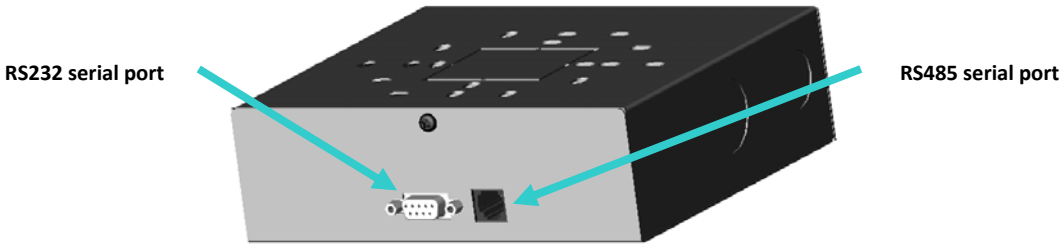


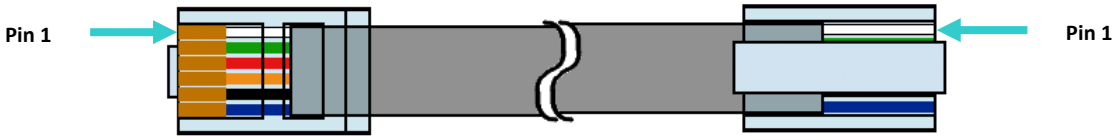
Figure 84: RS232 and RS485 Jacks

A straight DB9 female to DB9 male RS232 cable is used to connect to the marquee.

Pin	Cable Connection	Pin
1	----------	1
2	----------	2
3	----------	3
4	----------	4
5	----------	5
6	----------	6
7	----------	7
8	----------	8
9	----------	9

Figure 85: Straight DB9 female to DB9 male serial cable (RS-232)

A straight, 6-pin RJ to 6-pin RJ, RS485 cable is used to connect the marquee.



Pin	Color	Cable Connection	Color	Pin
1	White	----------	White	1
2	Green	----------	Green	2
3	Red	----------	Red	3
4	Orange	----------	Orange	4
5	Black	----------	Black	5
6	Blue	----------	Blue	6

Figure 86: Straight 6-pin RS-485 cable (flat cable shown)

One R4KMQC can support up to 4 marquees on the RS-485 connection (controller group). The length of the line could be several hundred feet if necessary, although it is best to keep it as short as possible to reduce possible noise problems.

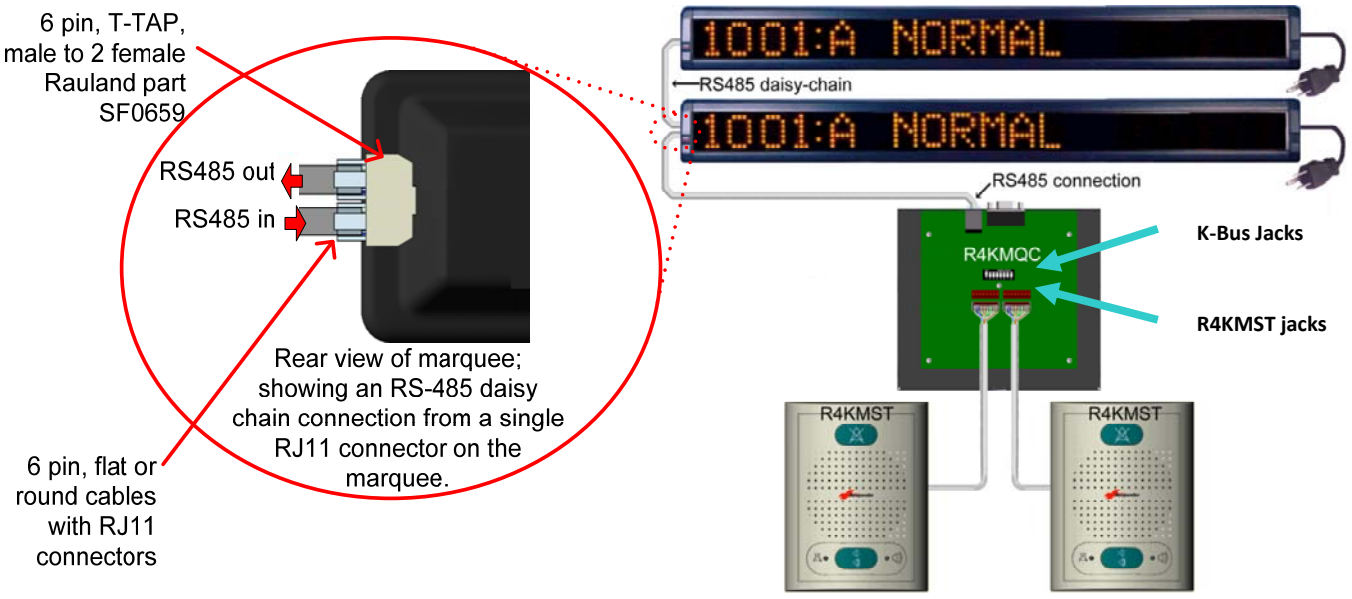


Figure 87: One R4KMQC connected to multpile marquee signs (4 max.)

Getting it Ready

Once you've made the appropriate connections, prepare the unit as follows:

Set K-Bus Address

Before you download configuration data to the device, you'll need to set the K-Bus Address. You should always work from a K-Bus worksheet, which helps you to keep track of component address assignments. You can find blank worksheet pages in Appendix D, K-Bus Address Worksheet.

To Set the Address

1 Find the address on the K-Bus Address Worksheet.

2 Set the Dipswitch to the correct address (this is a binary number):

Figure 88: Console K-Bus Address Dipswitch (address 1 shown)

Confirming it Works

All K-Bus devices are equipped with a "heartbeat" LED, which confirms proper operation:

LED Heartbeat Rate	What it Means*	Take this Action
Continuous Flash: 200 msec on 200msec off	Dipswitch is set outside of the acceptable range: 0-150 for CLs/DCs and 0-30 for LCDs, ANNs, and MQCs.	Set Dipswitch to acceptable address.
3 blinks every 3.2 seconds	No K-Bus activity for 10 seconds	Check K-Bus connection
2 blinks every 3.2 seconds	K-Bus activity is present, but not for this device	Check software configuration
1 blink every 3.2 seconds	Normal activity during the first 60 seconds or less after power up	None required
No Blinks	Normal activity	None required

***The more blinks you see, the more serious the problem.**

Check the heartbeat LED for component status.

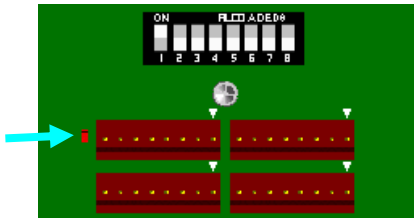


Figure 89: R4KMQC Heartbeat LED

Others Things You Should Know

- ✓ The system supports a maximum combination of 30 R4K4020s, R4KANNs, R4KPLIs and/or R4KMQCs per K-Bus (R4KNIM). I.e., the total number of physical devices of these three models combined cannot exceed 30 attached to an R4KNIM.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.
- ✓ The RS485 port allows each controller to drive up to 4 marquees.
- ✓ The RS232 port allows each controller to drive only one marquee.
- ✓ Use the top button on the R4KMST to mute the tone until another call is received.
- ✓ Use the bottom button on the R4KMST to toggle between the high/low tone levels.
- ✓ All signs in a controller group (multiple signs connected to one R4KMQC) must be the same type. Different sign types (manufacturers) can be used in the system, but each one or group requires a configured R4KMQC.
- ✓ The RS232 and RS485 port could be used at the same time **as long as the marquees are the same type**.

R4KRECP Console Receptacle
(Audio and Visual Only Network Compatible)

Making Connections

The Console Receptacle is connected to the K-Bus and to 1) the R4K4020 LCD Console or 2) the R4KANN Annunciator Panel.

The unit can be mounted to any standard single gang back box using its own wall plate:

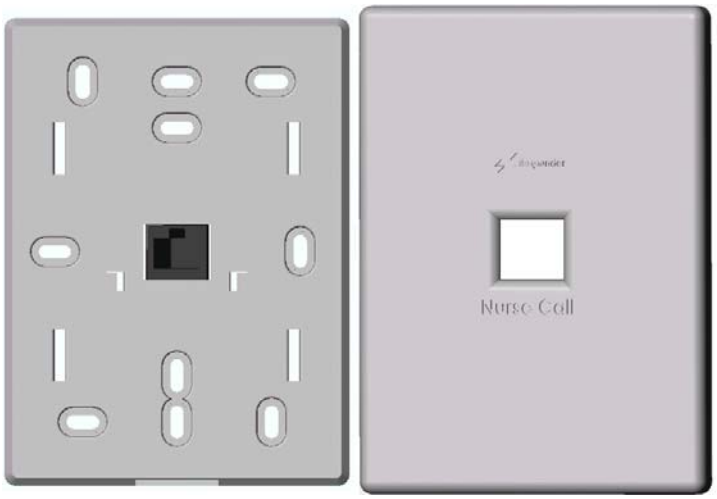


Figure 90: Receptacle and Face Plate

Console/Annunciator Connect

Run a standard CAT5 UTP patch cable between the Receptacle and the console or annunciator:

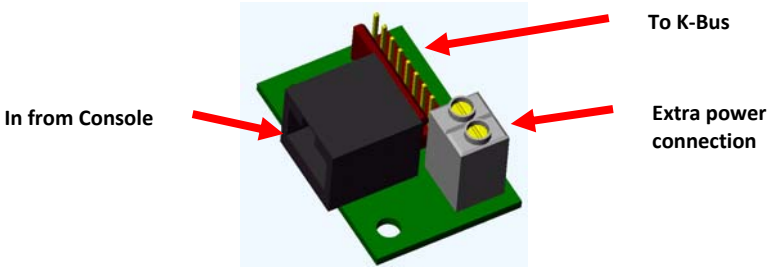


Figure 91: Receptacle to Console Connection

Getting it Ready & Confirming it Works

Once you've made the appropriate connections, prepare the unit as follows:

1 Connect the console or annunciator panel.

2 Test connection and cable if you notice any abnormal functions.

Others Things You Should Know

- ✓ Each console comes with a R4KRECP patch cable. If you require a longer cable, replace this patch cable with one of your own creation.
- ✓ You can place a single annunciate panel up to 450 feet from its Power Source without adding an additional power source.
- ✓ Use 16 AWG wire if you plan to position consoles less than 700 feet from the R4KPR400; use 14 AWG wire if you plan to position consoles between 700 and 1000 feet from the R4KPR400. Always factor in the length of the K-Bus wire used to connect the R4KRECP.

10

Corridor Lights, Domeless Controllers, & Accessories

In this chapter you'll find installation tear sheets for the following Corridor Lights, Domeless Controllers, & Accessories:

- ✓ DCV100 Six Station Visual Domeless Controller
- ✓ R4KOUT4R Visual Output Controller
- ✓ DCV116 Sixteen Station Visual Domeless Controller
- ✓ CLV122 Two Bulb Visual Corridor Light
- ✓ CLV144 Four Bulb Visual Corridor Light
- ✓ DCA200 Six Station Audio Domeless Controller
- ✓ R4KOUT4S Audio Output Controller
- ✓ DCA216 Sixteen Station Audio Domeless Controller
- ✓ CLA222 Two Bulb Audio Corridor Light
- ✓ CLA244 Four Bulb Audio Corridor Light
- ✓ DCA214D Duty Domeless Controller
- ✓ CLA214D Duty Corridor Light
- ✓ R4KCAL Call Assurance Light
- ✓ CLAR4 Audio Corridor Light Add-On

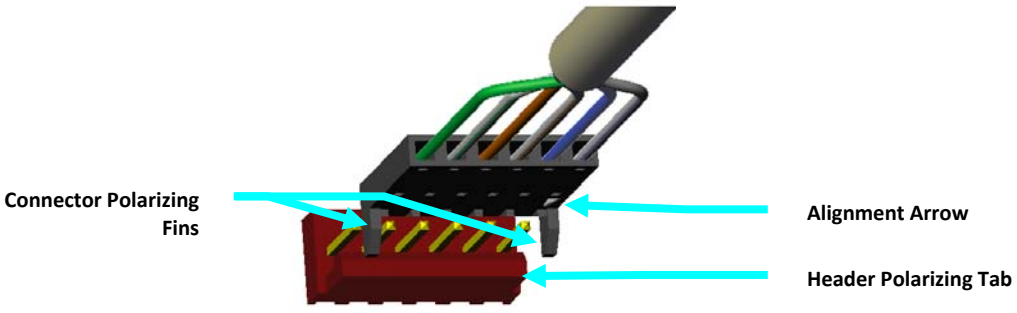


Figure 92: Station/Corridor Light connector mating direction

DCV100, Six Station Visual Domeless Controller
CLV122 Two Bulb Visual Corridor Light
CLV144 Four Bulb Visual Corridor Light
(Visual Only Network Compatible)

The DCV100, Six Station Visual Domeless Controller; CLV122, Two Bulb Visual Corridor Light; and CLV144, Four Bulb Visual Corridor Light make identical connections.

Making Connections

The DCV100, Six Station Visual Domeless Controller; CLV122, Two Bulb Visual Corridor Light; and CLV144, Four Bulb Visual Corridor Light each make two types of connections: 1) to the K-Bus and 2) to room stations.

K-Bus Connect

Before you install any Corridor Light/Domeless Controllers, you'll need to configure your system, print out a K-Bus Location Worksheet, and complete the Power Calculation Spreadsheet. (See Appendix C, Power Requirements, for instructions on the use of the Power Calculation Spreadsheet.) Connect the Controller/Corridor Lights to the K-Bus via one of the available K-Bus headers. Use the other available K-Bus header if you wish to extend the K-Bus run.

Station Connect

Connect any Visual Bed (R4K11V, R4K21V), Pushbutton (R4KCB12, R4KCB10, R4KPB11, R4KPB22, R4KPB44, R4KRA1, R4KSR1, R4KESR), Pullcord (R4KPC10), or Cancel station (R4KCNCL) to the appropriate six (6-pin) Station Connect headers as illustrated:

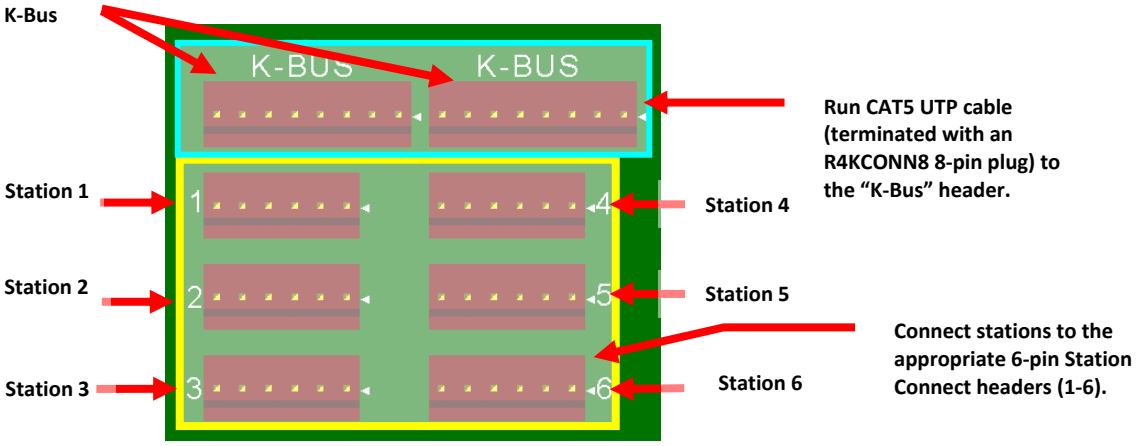


Figure 93: Visual Domeless Controller/Corridor Light Headers

Getting it Ready

Once you've made the appropriate connections, prepare the unit as follows:

Set K-Bus Address

Before you mount the component, you'll need to set the K-Bus Address. You should always work from a K-Bus worksheet, which helps you to keep track of component address assignments. You can find a blank worksheet in Appendix D.

To Set the Address

1 Find the address on the K-Bus Address Worksheet.

2 Set the Dipswitch to the correct address (this is a binary number):

Figure 94: K-Bus Address Dipswitch (address 1 shown)

Confirming it Works

All Domeless Controllers and Corridor Lights are equipped with a "heartbeat" LED, which confirms proper operation:

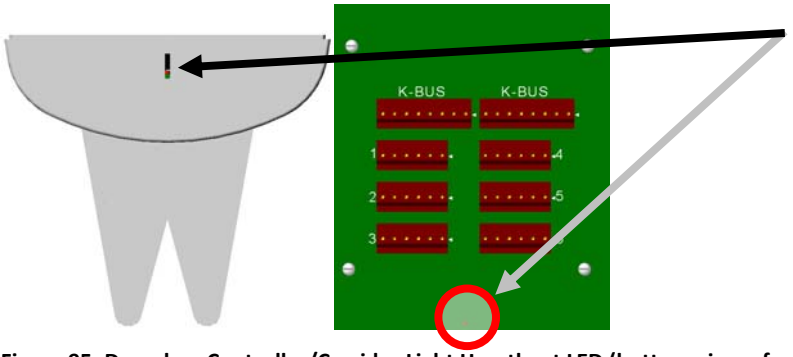


Figure 95: Domeless Controller/Corridor Light Heartbeat LED (bottom view of corridor light)

LED Heartbeat Rate	What it Means*	Take this Action
Continuous Flash: 200 msecs on 200 msec off	Dipswitch is set outside of the acceptable range: 0-150 for CLs/DCs and 0-30 for LCDs, ANNs, and MQCs.	Set Dipswitch to acceptable address.
3 blinks every 3.2 seconds	No K-Bus activity for 10 seconds	Check K-Bus connection
2 blinks every 3.2 seconds	K-Bus activity is present, but not for this device	Check software configuration
1 blink every 3.2 seconds	Normal activity during the first 60 seconds or less after power up	None required
No Blinks	Normal activity	None required

Table 25: K-Bus Heartbeat Legend

Corridor Light Self Tests

All Corridor Lights/Domeless Controllers come with self test. These tests can be accessed by removing the power from the CL/DC, changing the address as shown below, then applying power.

Address	Test	What it Does
255 (11111111)*	LED test “on”	Turns on all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn off.
254 (01111111) *	LED test “off”	Opposite of address 255. Turns off all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn on steady.
253 (10111111)*	Transceiver test	The CL/DC will transmit data and verify it. The heartbeat LED will turn on steady if it passes.
252 (00111111)*	EEPROM test	The CL/DC will write, read and verify a pattern to/from its EEPROM. The heartbeat LED will turn on steady if it passes.
251 (11011111)*	A/D comparator test	The CL/DC will verify its analog to digital comparator is working properly. The heartbeat LED will turn on steady if it passes.
250 (01011111)*	Watchdog test	In-house use only.
249 (10011111)*	CLA214D tone test #1	A CLA214D will produce a tone through an R4KDY attached to station position 1A/1B.
248 (00011111)*	CLA214D tone test #2	A CLA214D will produce and measure a tone decay. It will light the heartbeat LED if it passes.
247 (11101111)*	CLA214D tone test #3	In-house use only.

***1 = ON and 0 = OFF**

Table 26: Corridor Light/Domeless Controller self tests

“Fail-Safe” Corridor Light Operation

In the event a Corridor Light keeps a viable power connection, but loses communication with its R4KNIM, it will automatically enter “fail safe” mode. In this mode, it will provide visual call annunciation for those stations connected to its ports—using a factory-designated (and unalterable) blinking pattern. These calls will **not** display at covering Consoles, Pagers, and/or Marquees.

Fail-safe mode does **not** support audio communication nor does it apply to Domeless Controllers of any type. When expected communication is reestablished with head-end

components, the CL (and its controlled stations/output boards) reverts to normal operations.

Facilities that rely on Fail-Safe operation should avoid using Scramble Wiring, as the relationship between CLs and stations may be confusing.

Fail-Safe Light Patterns			
Station(s)	**Action**	**2-bulb corridor light**	**4-bulb corridor light**
R4K11V R4K12A R4K12AHZ R4K21V R4K22A R4K16LV R4K13VA R4K13VAHZ R4K25LV R4K23VA HSS400	Call	White - Solid	White - Solid
	Cord Out	White - Slow	White - Slow
R4K14SA	Call	White - Solid	White - Solid
	Cord Out	White - Slow	White - Slow
	Call (”HELP”)	Red - Fast	Red - Fast
R4KCB10 R4KCB12	Call	Red - Fast	Blue - Fast
R4KDY	Call	White - Solid	White - Solid
R4KPB11 HSS433	Call	Red - Fast	Red - Fast
R4KPB22	Call (”HELP”)	Red - Fast	Red - Fast
	Call (”CODE”)	Red - Fast	Blue - Fast
R4KPB44	White button	White – Solid	White – Solid
	Green button		Green – Solid
	Red button	Red – Solid	Red – Solid
	Blue button		Blue – Solid
R4KPC10	Call	Red - Slow	Red - Slow
R4KRA1	Call	White - Solid	White - Solid
R4KSR1	Register		Green Solid
R4KSS HSS401	Call	White - Solid	White - Solid
Dry Contact	Call	White - Slow	White - Slow
R4KESR	Call	Red - Slow	Red - Slow
	Register		Green Solid

Table 27: Fail-Safe Corridor Light Patterns

Others Things You Should Know

- ✓ Use the CL Removal Tool (R4KCRIMP) to remove the corridor light from its back plate. (See “Removing Corridor Lights” above.)

- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.
- ✓ See page 22 for proper instructions on removing a Corridor Light.
- ✓ To comply with IEC 60601-1, the DCV100 controller's chassis must be properly grounded to the building's earth ground.

R4KOUT4R Visual Output Controller
(Audio/Visual Network Compatible)

Adding an R4KOUT4R to an existing DCV100 can be performed in the field. The R4KOUT4R **cannot** be added to a DCA200.

Making Connections

The R4KOUT4R Visual Output Controller makes two types of connections: 1) to the DCV100 and 2) to control external devices.

DCV100 Connection

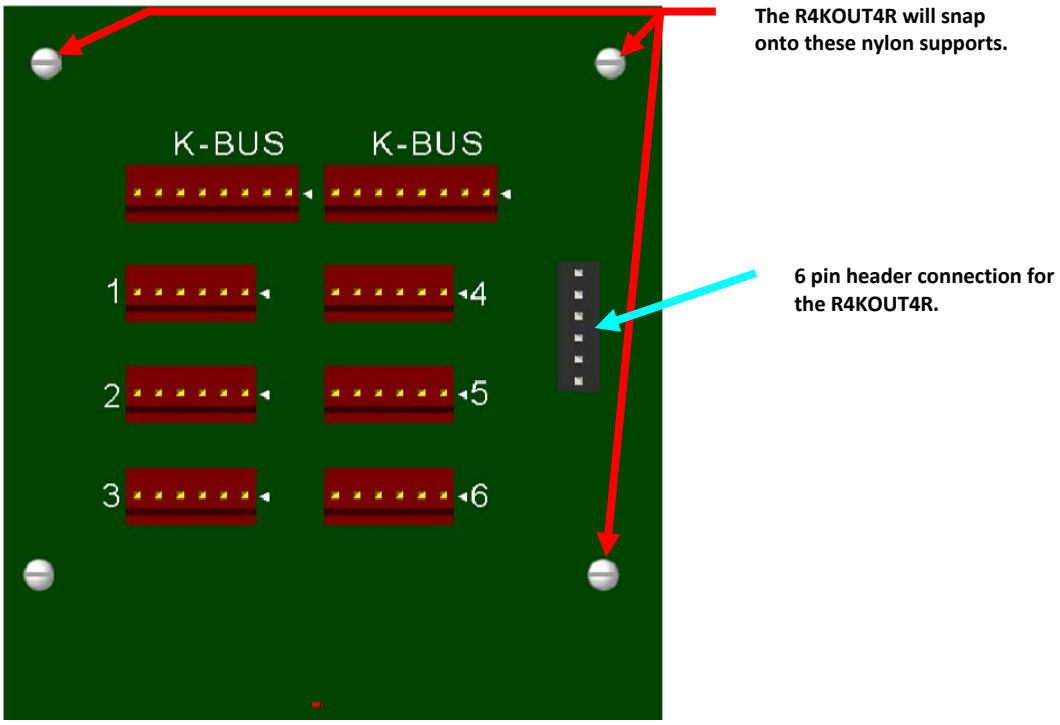


Figure 96: DCV100+R4KOUT4R connection

The R4KOUT4R plugs onto a DCV100 via 3 nylon supports. It makes an electrical connection through the 6 pin R4KOUT4R header on DCV100.

External Device Connect

The R4KOUT4R board has four Output Connect headers. Connect the devices to be controlled to the appropriate 6-pin headers as illustrated:

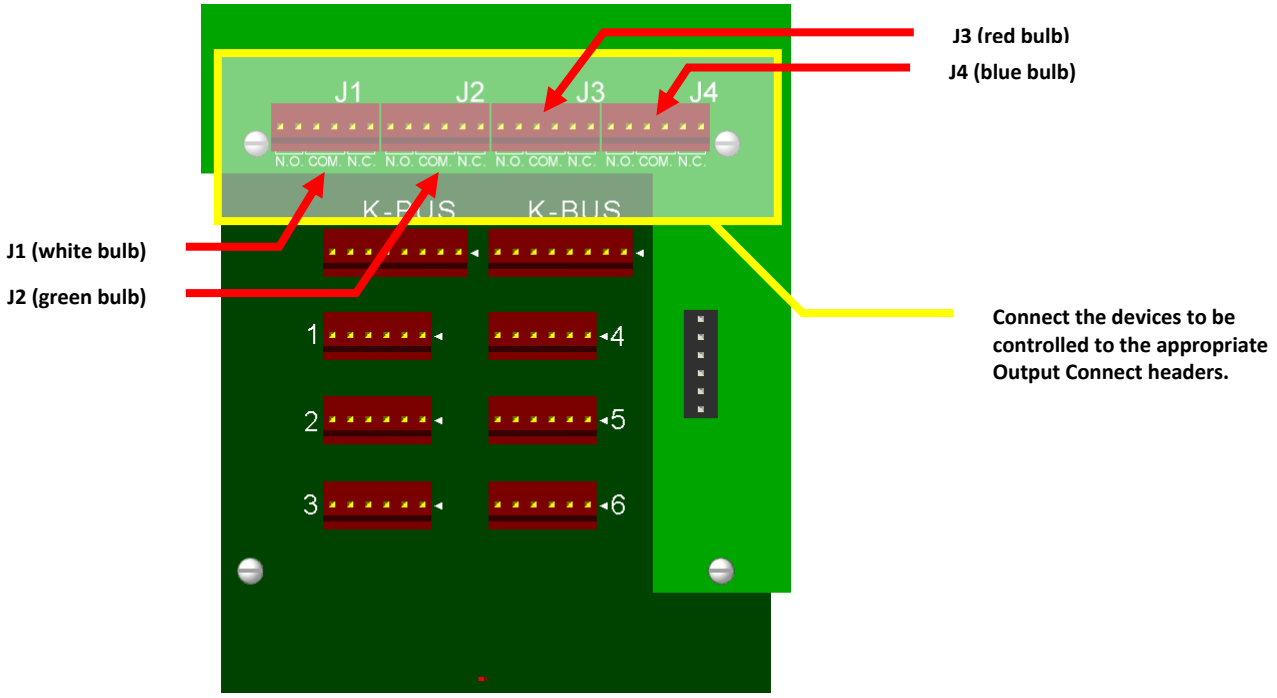
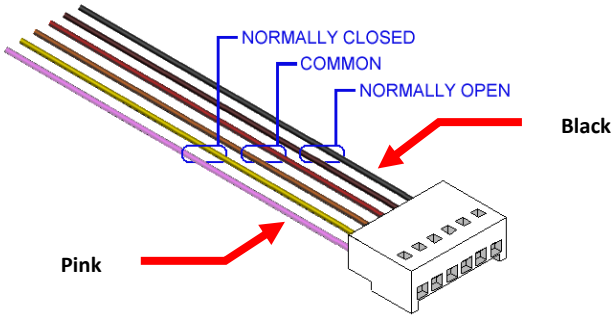


Figure 97: Visual Domeless Controller DCV100+R4KOUT4R Headers

Output Connection Wiring

Connect the output pigtail connection as follows:



Wire	Cable Connection
Black	Normally Open
Brown	Normally Open
Red	Common
Orange	Common
Yellow	Normally Closed
Pink	Normally Closed

Figure 98: Output pigtail

Each contact has two wires to carry the maximum power through the R4KOUT4R. Be sure to connect both wires to the load as shown in the wiring example below. The following example uses the normally closed contacts and opens when activated at the console. See KI-2105 Configuration Guide for instructions on programming the R4KOUT4R.

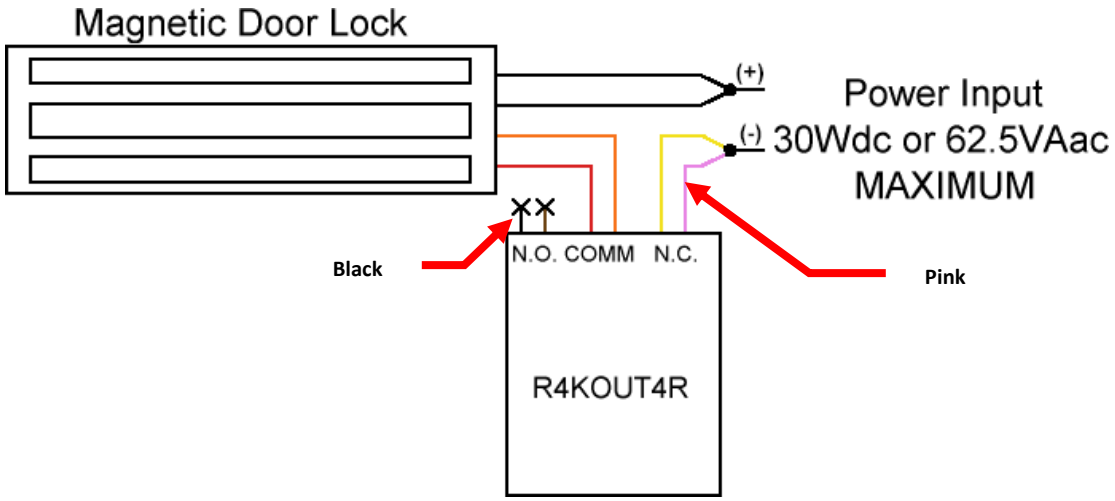


Figure 99: R4KOUT4R wiring example

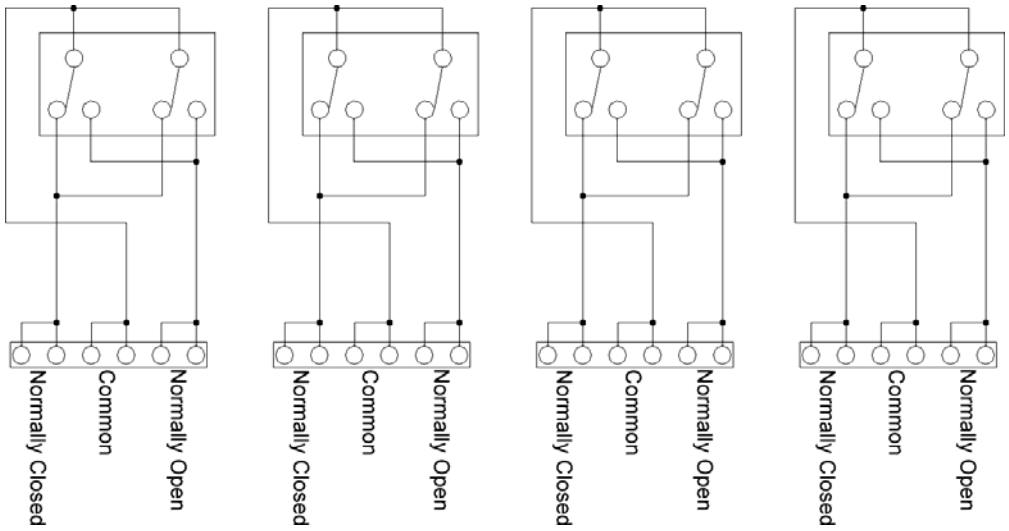


Figure 100: R4KOUT4R equivalent circuit

Confirming it Works

1 Place calls from each of the stations associated with the DCV100+R4KOUT4R.

2 Verify the relays close:

- You should hear the relay click.
- With nothing connected to the output pigtail, the outputs should measure <10 ohms when closed and an open circuit when opened.

"Fail-Safe" Operation

In the event a DCV100 and R4KOUT4R keep a viable power connection, but lose communication with their R4KNIM, they will automatically enter "fail-safe" mode. In this mode, the R4KOUT4R will act in one of four ways:

Normal: The relay will be controlled by locally connected stations.

Freeze: The relay will lock in the state it was in prior to disconnection.

ON: The relay engages (closes).

OFF: The relay disengages (opens).

For instructions on how to program these options, consult KI-2105, the *Responder® 4000 Configuration Guide*.

The "fail-safe' operation of R4KOUT4R and R4KOUT4S relays and switches should be considered when they are used to control security devices (i.e. door locks).

Others Things You Should Know

- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.
- ✓ Each of the four contacts is rated at 220 Vdc/250Vac and 1.0A, but limited to 30Wdc or 62.5VAac.
- ✓ The relay contacts will operate a minimum of 100,000 times at 1.0A.
- ✓ The R4KOUT4R relays are prohibited from blinking. It will treat all corridor light blink patterns in the R4KWARE GUI as a solid on condition.

DCV116 Sixteen Station Visual Domeless Controller
(Visual Only Network Compatible)

Making Connections

The Sixteen Station Visual Domeless Controller makes two types of connections: 1) to the K-Bus and 2) to room stations.

K-Bus Connect

Before you install any Corridor Light/Domeless Controllers, you'll need to configure your system, print out a K-Bus Location Worksheet, and complete the Power Calculation Spreadsheet. (See Appendix C, Power Requirements, for instructions on the use of the Power Calculation Spreadsheet.) Connect the Controller to the K-Bus via one of the available K-Bus headers. Use the other available K-Bus header if you wish to extend the K-Bus run.

Station Connect

Connect any Visual Bed (R4K11V, R4K21V), Pushbutton (R4KCB12, R4KCB10, R4KPB11, R4KPB22, R4KPB44, R4KRA1, R4KSR1, R4KESR), Pullcord (R4KPC10), or Cancel station (R4KCNCL) to the appropriate six (6-pin) Station Connect headers as illustrated:

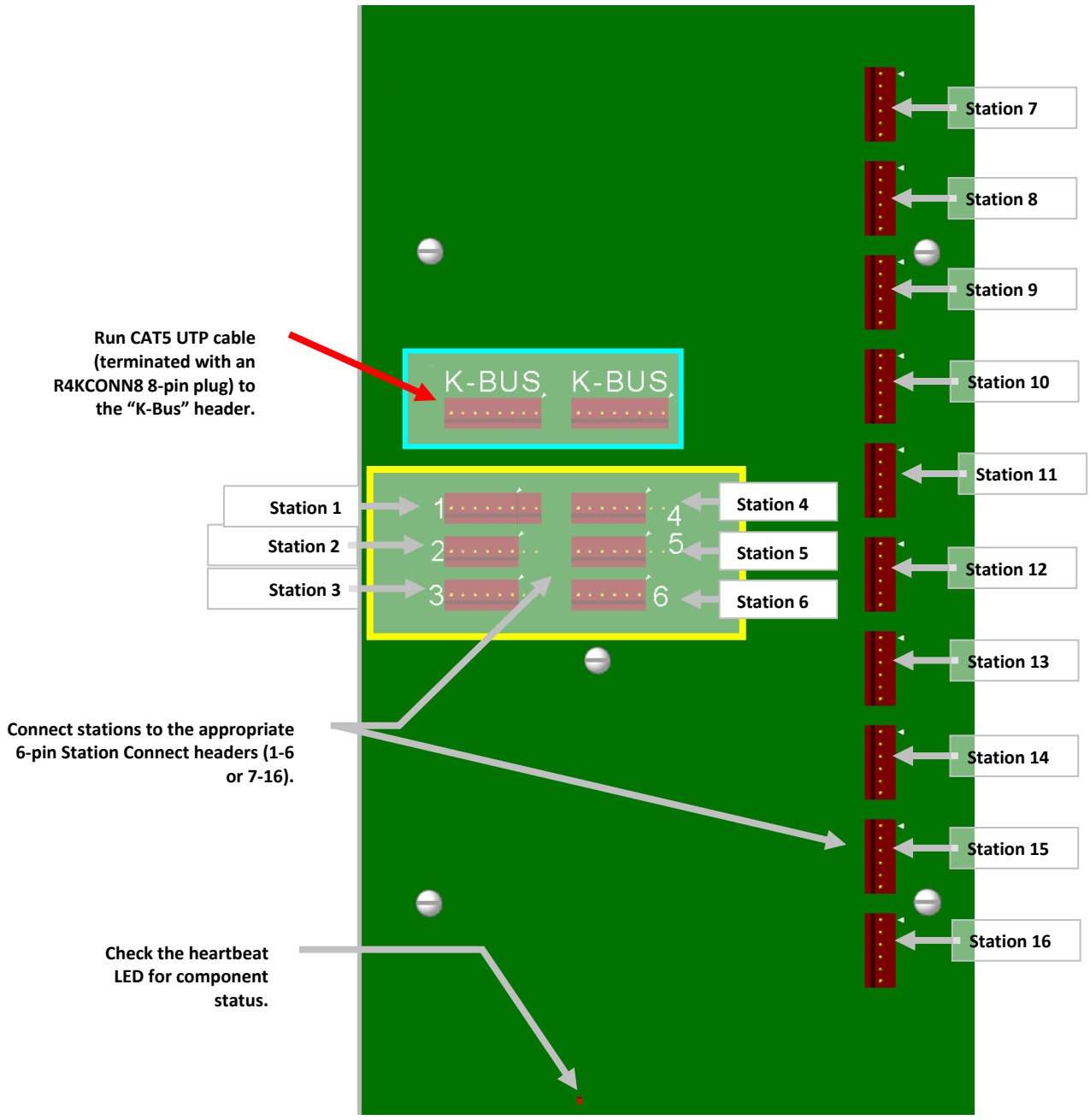


Figure 101: Sixteen Station Visual Domeless Controller Headers

Getting it Ready

Once you've made the appropriate connections, prepare the unit as follows:

Set K-Bus Address

Before you mount the component, you'll need to set the K-Bus Address. You should always work from a K-Bus worksheet, which helps you to keep track of component address assignments. You can find a blank worksheet in Appendix D.

To Set the Address

1 Find the address on the K-Bus Address Worksheet

2 Set the Dipswitch to the correct address (this is a binary number):

Figure 102: K-Bus Address Dipswitch (address 1 shown)

Confirming it Works

All Domeless Controllers and Corridor Lights are equipped with a "heartbeat" LED, which confirms proper operation:

LED Heartbeat Rate	What it Means*	Take this Action
Continuous Flash: 200 msec on 200msec off	Dipswitch is set outside of the acceptable range: 0-150 for CLs/DCs and 0-30 for LCDs, ANNs, and MQCs.	Set Dipswitch to acceptable address.
3 blinks every 3.2 seconds	No K-Bus activity for 10 seconds	Check K-Bus connection
2 blinks every 3.2 seconds	K-Bus activity is present, but not for this device	Check software configuration
1 blink every 3.2 seconds	Normal activity during the first 60 seconds or less after power up	None required
No Blinks	Normal activity	None required

Table 28: K-Bus Heartbeat Legend

Corridor Light Self Tests

All Corridor Lights/Domeless Controllers come with self test. These tests can be accessed by removing the power from the CL/DC, changing the address as shown below, then applying power.

Address	Test	What it Does
255 (11111111)*	LED test “on”	Turns on all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn off.
254 (01111111) *	LED test “off”	Opposite of address 255. Turns off all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn on steady.
253 (10111111)*	Transceiver test	The CL/DC will transmit data and verify it. The heartbeat LED will turn on steady if it passes.
252 (00111111)*	EEPROM test	The CL/DC will write, read and verify a pattern to/from its EEPROM. The heartbeat LED will turn on steady if it passes.
251 (11011111)*	A/D comparator test	The CL/DC will verify its analog to digital comparator is working properly. The heartbeat LED will turn on steady if it passes.
250 (01011111)*	Watchdog test	In-house use only.
249 (10011111)*	CLA214D tone test #1	A CLA214D will produce a tone through an R4KDY attached to station position 1A/1B.
248 (00011111)*	CLA214D tone test #2	A CLA214D will produce and measure a tone decay. It will light the heartbeat LED if it passes.
247 (11101111)*	CLA214D tone test #3	In-house use only.

***1 = ON and 0 = OFF**

Table 29: Corridor Light/Domeless Controller self tests

Others Things You Should Know

- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.
- ✓ To comply with IEC 60601-1, the DCV116 controller’s chassis must be properly grounded to the building’s earth ground.

DCA200, Six Station Audio Domeless Controller
CLA222, Two Bulb Corridor Light
CLA244, Four Bulb Corridor Light
(Audio/Visual Network Compatible)

The DCA200 Six Station Audio Domeless Controller; CLA222 Two Bulb Corridor Light; and the CLA244, Four Bulb Corridor Light make identical connections.

Making Connections

The DCA200 Six Station Audio Domeless Controller; CLA222 Two Bulb Corridor Light; and the CLA244, Four Bulb Corridor Light each make two types of connections: 1) to the K-Bus and 2) to room stations.

The Controller and Corridor Lights connect to the K-Bus and to a variety of Stations.

K-Bus Connect

Before you install any Corridor Light/Domeless Controllers, you'll need to configure your system, print out a K-Bus Location Worksheet, and complete the Power Calculation Spreadsheet. (See Appendix C, Power Requirements, for instructions on the use of the Power Calculation Spreadsheet.) Connect the Controller to the K-Bus via one of the available K-Bus headers. Use the other available K-Bus header if you wish to extend the K-Bus run.

Station Connect

Connect one Bed Station (R4K12A, R4K13VA, R4K22A, R4K23VA, R4K14SA) or Staff Station (R4KSS) to the 8-pin Audio Station Connect header, if desired, and/or connect any combination of Pushbutton (R4KCB12, R4KCB10, R4KPB11, R4KPB22, R4KPB44, R4KRA1, R4KSR1, R4KESR), Pullcord (R4KPC10), or Cancel (R4KCNCL) stations to the appropriate (6-pin) Station Connect headers as illustrated:

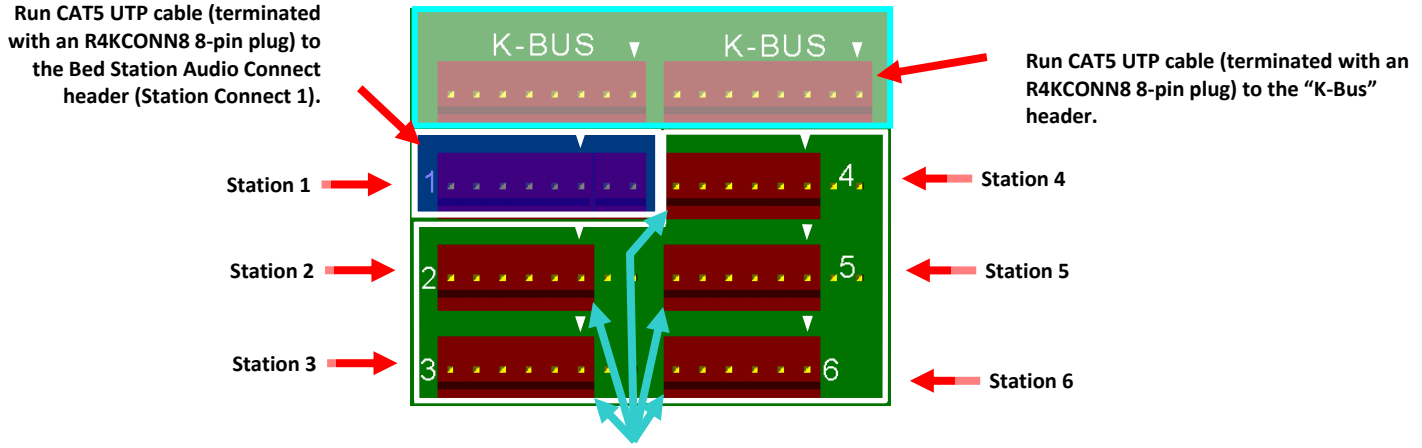


Figure 103: Six Station Audio Domeless Controller Connections

Getting it Ready

Once you've made the appropriate connections, prepare the unit as follows:

Set K-Bus Address

Before you mount the component, you'll need to set the K-Bus Address. You should always work from a K-Bus worksheet, which helps you to keep track of component address assignments. You can find a blank worksheet in Appendix D.

To Set the Address

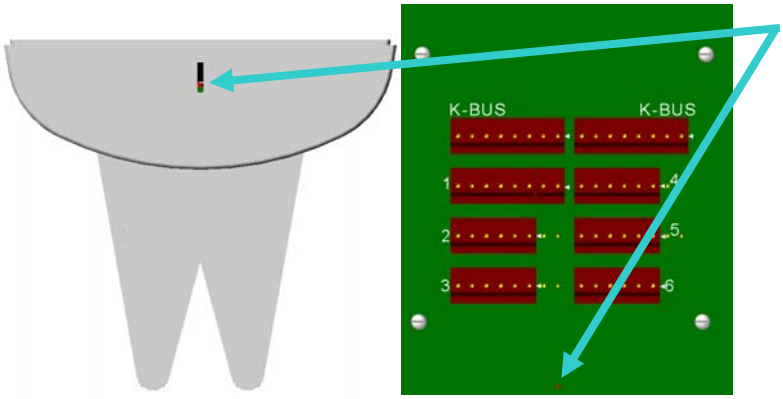
1 Find the address on the K-Bus Address Worksheet

2 Set the Dipswitch to the correct address (this is a binary number):

Figure 104: K-Bus Address Dipswitch (address 1 shown)

Confirming it Works

All Domeless Controllers and Corridor Lights are equipped with a "heartbeat" LED, which confirms proper operation:



Check the heartbeat LED for component status.

Figure 105: Domeless Controller/Corridor Light Heartbeat LED (bottom view of corridor light)

LED Heartbeat Rate	What it Means*	Take this Action
Continuous Flash: 200 msec on 200msec off	Dipswitch is set outside of the acceptable range: 0-150 for CLs/DCs and 0-30 for LCDs, ANNs, and MQCs.	Set Dipswitch to acceptable address.
3 blinks every 3.2 seconds	No K-Bus activity for 10 seconds	Check K-Bus connection
2 blinks every 3.2 seconds	K-Bus activity is present, but not for this device	Check software configuration
1 blink every 3.2 seconds	Normal activity during the first 60 seconds or less after power up	None required
No Blinks	Normal activity	None required

Table 30: K-Bus Heartbeat Legend

Corridor Light Self Tests

All Corridor Lights/Domeless Controllers come with self test. These tests can be accessed by removing the power from the CL/DC, changing the address as shown below, then applying power.

Address	Test	What it Does
255 (11111111)*	LED test “on”	Turns on all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn off.
254 (01111111) *	LED test “off”	Opposite of address 255. Turns off all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn on steady.
253 (10111111)*	Transceiver test	The CL/DC will transmit data and verify it. The heartbeat LED will turn on steady if it passes.
252 (00111111)*	EEPROM test	The CL/DC will write, read and verify a pattern to/from its EEPROM. The heartbeat LED will turn on steady if it passes.
251 (11011111)*	A/D comparator test	The CL/DC will verify its analog to digital comparator is working properly. The heartbeat LED will turn on steady if it passes.
250 (01011111)*	Watchdog test	In-house use only.
249 (10011111)*	CLA214D tone test #1	A CLA214D will produce a tone through an R4KDY attached to station position 1A/1B.
248 (00011111)*	CLA214D tone test #2	A CLA214D will produce and measure a tone decay. It will light the heartbeat LED if it passes.
247 (11101111)*	CLA214D tone test #3	In-house use only.

***1 = ON and 0 = OFF**

Table 31: Corridor Light/Domeless Controller self tests

“Fail-Safe” Corridor Light Operation

In the event a Corridor Light keeps a viable power connection, but loses communication with its R4KNIM, it will automatically enter “fail safe” mode. In this mode, it will provide visual call annunciation for those stations connected to its ports—using a factory-designated (and unalterable) blinking pattern. These calls will **not** display at covering Consoles, Pagers, and/or Marquees.

Fail-safe mode does **not** support audio communication nor does it apply to Domeless Controllers of any type. When expected communication is reestablished with head-end components, the CL (and its controlled stations/output boards) reverts to normal operations.

Facilities that rely on Fail-Safe operation should avoid using Scramble Wiring, as the relationship between CLs and stations may be confusing.

Fail-Safe Light Patterns			
Station(s)	**Action**	**2-bulb corridor light**	**4-bulb corridor light**
R4K11V R4K12A R4K12AHZ R4K21V R4K22A R4K16LV R4K13VA R4K13VAHZ R4K25LV R4K23VA HSS400	Call	White - Solid	White - Solid
	Cord Out	White - Slow	White - Slow
R4K14SA	Call	White - Solid	White - Solid
	Cord Out	White - Slow	White - Slow
	Call (”HELP”)	Red - Fast	Red - Fast
R4KCB10 R4KCB12	Call	Red - Fast	Blue - Fast
R4KDY	Call	White - Solid	White - Solid
R4KPB11 HSS433	Call	Red - Fast	Red - Fast
R4KPB22	Call (”HELP”)	Red - Fast	Red - Fast
	Call (”CODE”)	Red - Fast	Blue - Fast
R4KPB44	White button	White – Solid	White – Solid
	Green button		Green – Solid
	Red button	Red – Solid	Red – Solid
	Blue button		Blue – Solid
R4KPC10	Call	Red - Slow	Red - Slow
R4KRA1	Call	White - Solid	White - Solid
R4KSR1	Register		Green Solid
R4KSS HSS401	Call	White - Solid	White - Solid
Dry Contact	Call	White - Slow	White - Slow
R4KESR	Call	Red - Slow	Red - Slow
	Register		Green Solid

Table 32: Fail-Safe Corridor Light Patterns

Others Things You Should Know

- ✓ You can use the CLAR4 Audio Corridor Light Add-On module to increase the audio station capacity to 4.
- ✓ Use the CL Removal Tool (R4KCRIMP) to remove the corridor light from its back plate. (See “Removing Corridor Lights” above.)
- ✓ Before you install any Corridor Light/Domeless Controllers you’ll need to configure your system and print out a component location map and power calculation worksheet.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.
- ✓ See page 22 for proper instructions on removing a Corridor Light.
- ✓ To comply with IEC 60601-1, the DCA200 controller’s chassis must be properly grounded to the building’s earth ground.

R4KOUT4S Audio Output Controller
(Audio Network Compatible)

Adding an R4KOUT4S to an existing DCA200 can be performed in the field. The R4KOUT4S should be used in applications that require fast turn on/off times and/or many actuations in the life of the product (i.e. lighting incandescent bulbs).

Making Connections

The R4KOUT4S, Audio Output Controller makes two types of connections: 1) to the DCA200 and 2) to control external devices.

DCA200 Connection

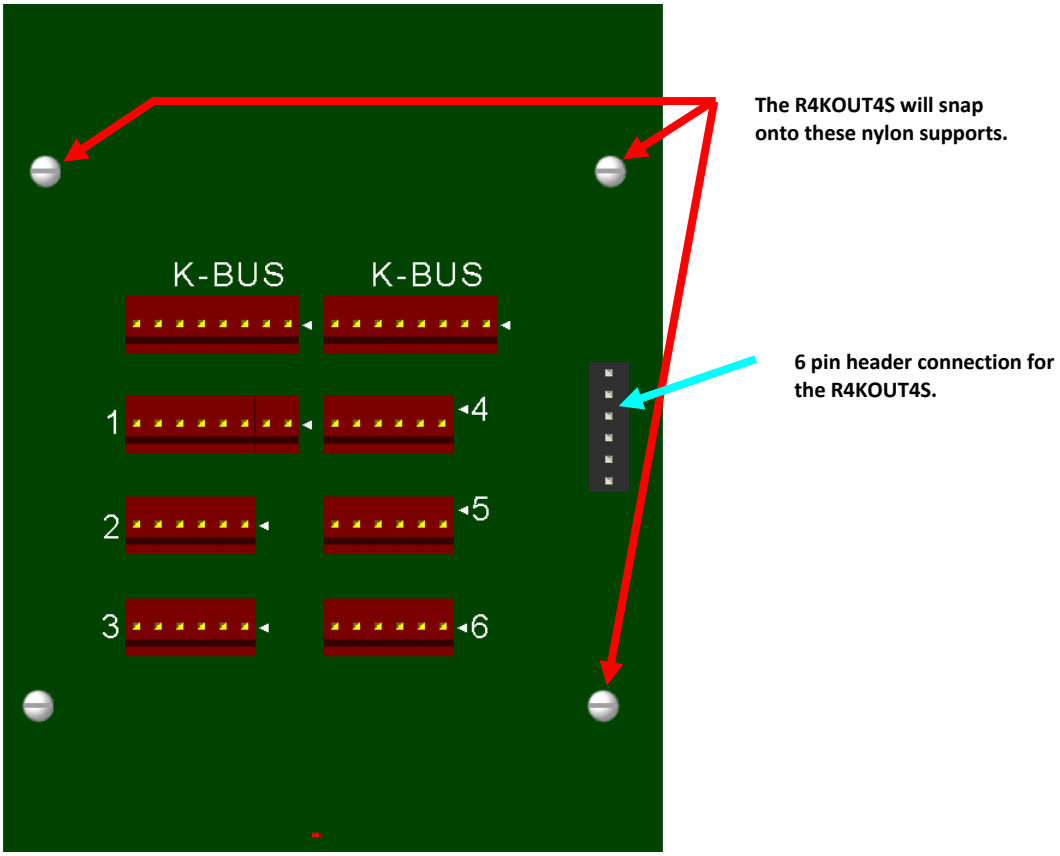
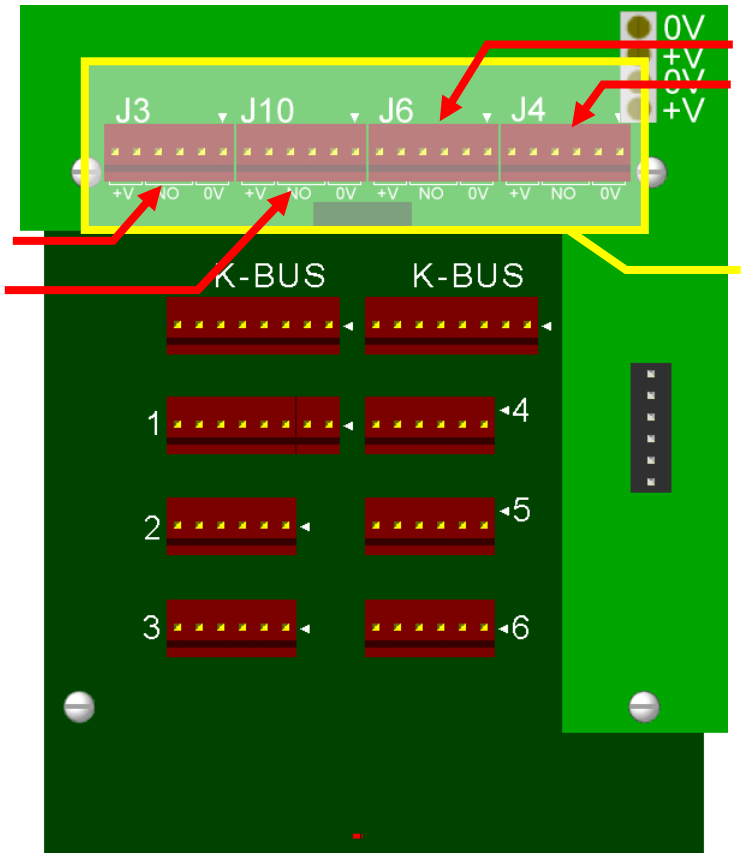


Figure 106: DCA200+R4KOUT4S connection

The R4KOUT4S plugs onto a DCA200 via 3 nylon supports. It makes an electrical connection through the 6 pin R4KOUT4S header on the DCA200.

External Device Connect

The R4KOUT4S board has four Output Connect headers and connects on the component side of the DCA200 board. Connect the devices to be controlled to the appropriate 6-pin headers as illustrated:



J3 (red bulb)

J4 (blue bulb)

J1 (white bulb)

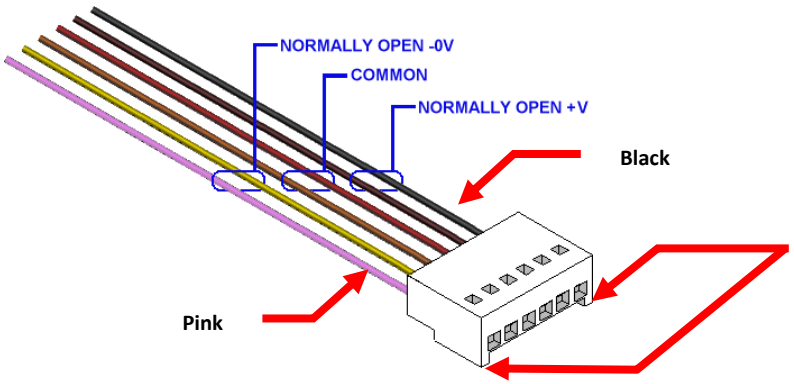
J2 (green bulb)

Connect the devices to be controlled to the appropriate Output Connect headers.

Figure 107: Audio Domeless Controller DCA200+R4KOUT4S Headers

Output Connection Wiring

Connect the output pigtail connection as follows:



Key tabs on the connector must match the board header

Wire	Cable Connection
Black	Normally Open +V
Brown	Normally Open +V
Red	Common
Orange	Common
Yellow	Normally Open -0V
Pink	Normally Open -0V

Figure 108: Output pigtail

Each contact has two wires to allow maximum current through the R4KOUT4S control points. Be sure to connect both wires to the load as shown in the wiring example below. The following example uses the +V and common contacts to light incandescent bulbs. See KI-2105 Configuration Guide for instructions on programming the R4KOUT4S.

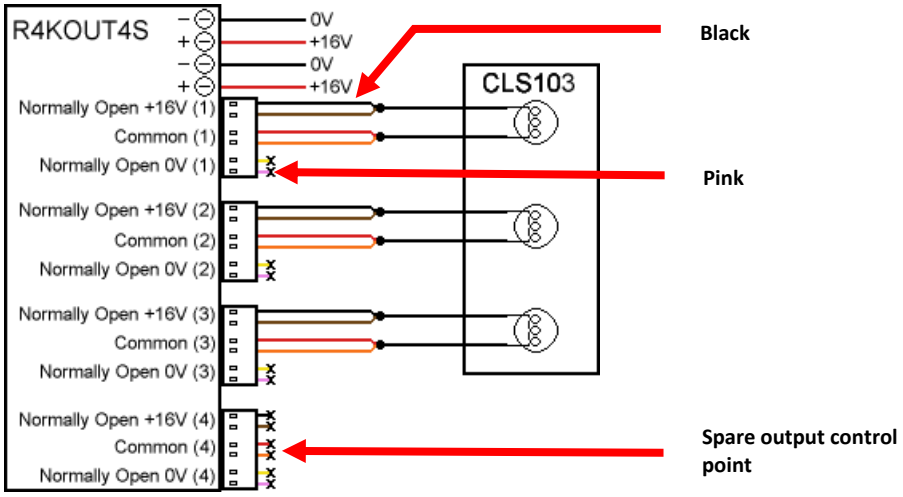


Figure 109: R4KOUT4S wiring to a CLS103

The lamp power is supplied by a separate DC power supply, not assumed to be common to the DCA200+R4KOUT4S. In the case of incandescent lamps, the power requirements can be substantial at 200 mA or more per bulb.

Jumper settings

The R4KOUT4S has 4 output jumpers. These jumper options are intended for use with lamps and relays. For protection a “flyback” diode is included between the “Normally Open +V” and “Common” contacts. Common power “+V” and ground “0V” are routed to the output connectors to make wiring easier.

Removing the jumpers removes the external power supply from the common power and grounds. The outputs are then independent for selected output loads. Depending on loads to be switched, additional diodes may be added and power supplied separate.

Below is an equivalent circuit, shown with and without the jumpers (J8, J9, J10, and J11) and the connections highlighted. Each point is controlled by a solid state switch (SSS) that is similar to an open circuit relay with a measurable series resistance. The connectors look

as the equivalent circuits shown with a 17 ohm resistor in series “with the jumper” and SSS ON and a greater than 1 Mohm resistance when the SSS is off.

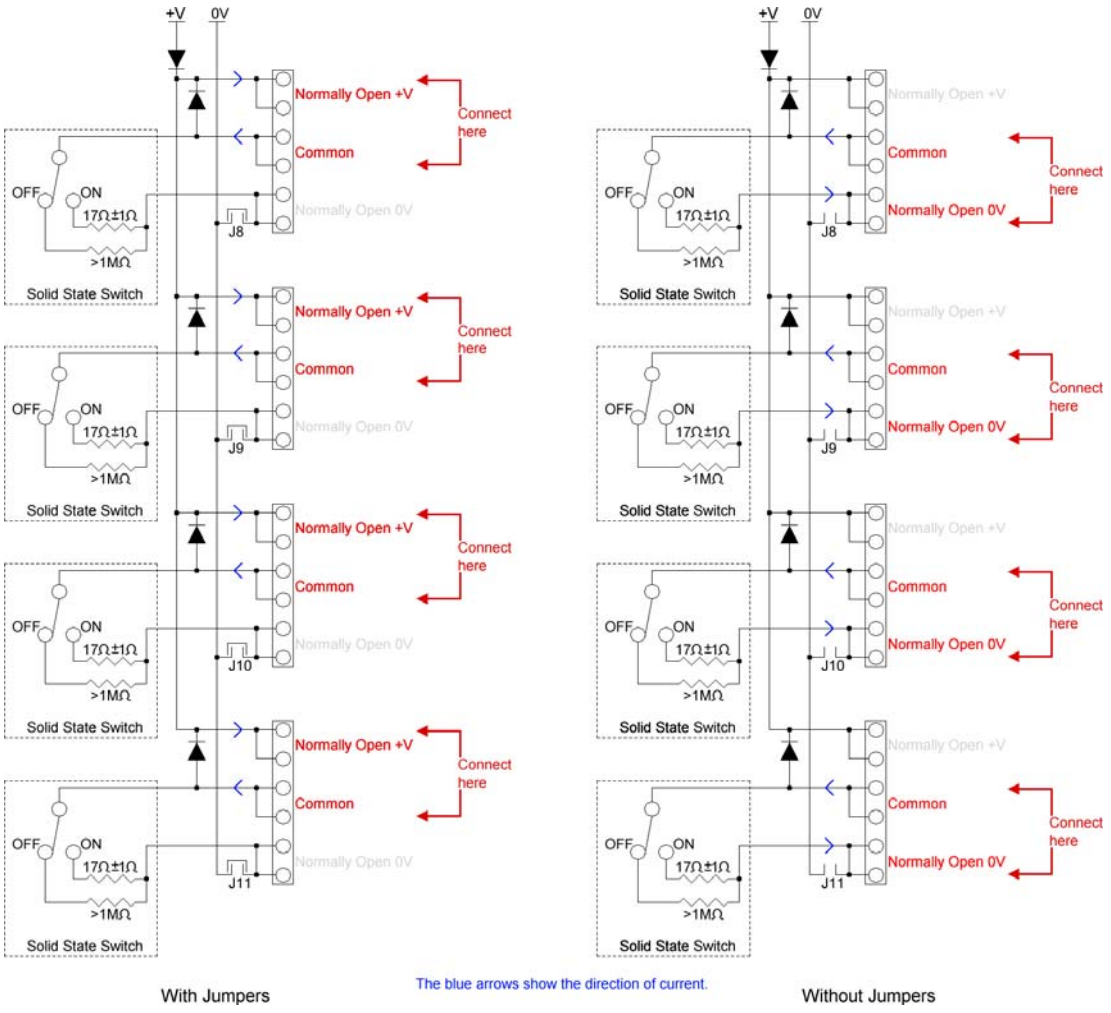


Figure 110: R4KOUT4S equivalent circuit with and without jumpers

Confirming it Works

1 Place calls from each of the stations associated with the DCA200+R4KOUT4S.

2 Verify the relays close:

- With nothing connected to the output pigtail, you should be able measure the resistances shown in the picture above.

“Fail-Safe” Operation

In the event a DCA200 and R4KOUT4S keep a viable power connection, but lose communication with their R4KNIM, they will automatically enter “fail-safe” mode. In this mode, the R4KOUT4S will act in one of four ways:

Normal: the relay will be controlled by locally connected stations.

Freeze: the relay will lock in the state it was in prior to disconnection.

ON: the relay engages (closes).

OFF: the relay disengages (opens).

For instructions on how to program these options, consult KI-2105, the *Responder® 4000 Configuration Guide*.

The "fail-safe' operation of R4KOUT4R and R4KOUT4S relays and switches should be considered when they are used to control security devices (i.e. door locks).

Others Things You Should Know

- ✓ You can use the CLAR4 Audio Corridor Light Add-On module in combination with the R4KOUT4S.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.
- ✓ Each of the four output contacts is rated at 28 Vdc, 300mA.
- ✓ The solid state switches have current limiting protection at 300 mA.
- ✓ The R4KOUT4S is not for AC use.

DCA216 Sixteen Station Audio Domeless Controller
(Audio and Visual Only Network Compatible)

Making Connections

The Sixteen Station Audio Domeless Controller connects to the K-Bus and to a variety of Stations.

K-Bus Connect

Before you install any Corridor Light/Domeless Controllers, you'll need to configure your system, print out a K-Bus Location Worksheet, and complete the Power Calculation Spreadsheet. (See Appendix C, Power Requirements, for instructions on the use of the Power Calculation Spreadsheet.) Connect the Controller to the K-Bus via one of the available K-Bus headers. Use the other available K-Bus header if you wish to extend the K-Bus run.

Station Connect

Connect one Audio Bed Station (R4K12A, R4K13VA, R4K22A, R4K23VA, R4K14SA) to the 8-pin Audio Station Connect header, if desired, and/or connect any combination of Pushbutton (R4KCB12, R4KCB10, R4KPB11, R4KPB22, R4KPB44, R4KRA1, R4KSR1, R4KESR), Pullcord (R4KPC10), or Cancel (R4KCNCL) stations to the appropriate (6-pin) Station Connect headers as indicated:

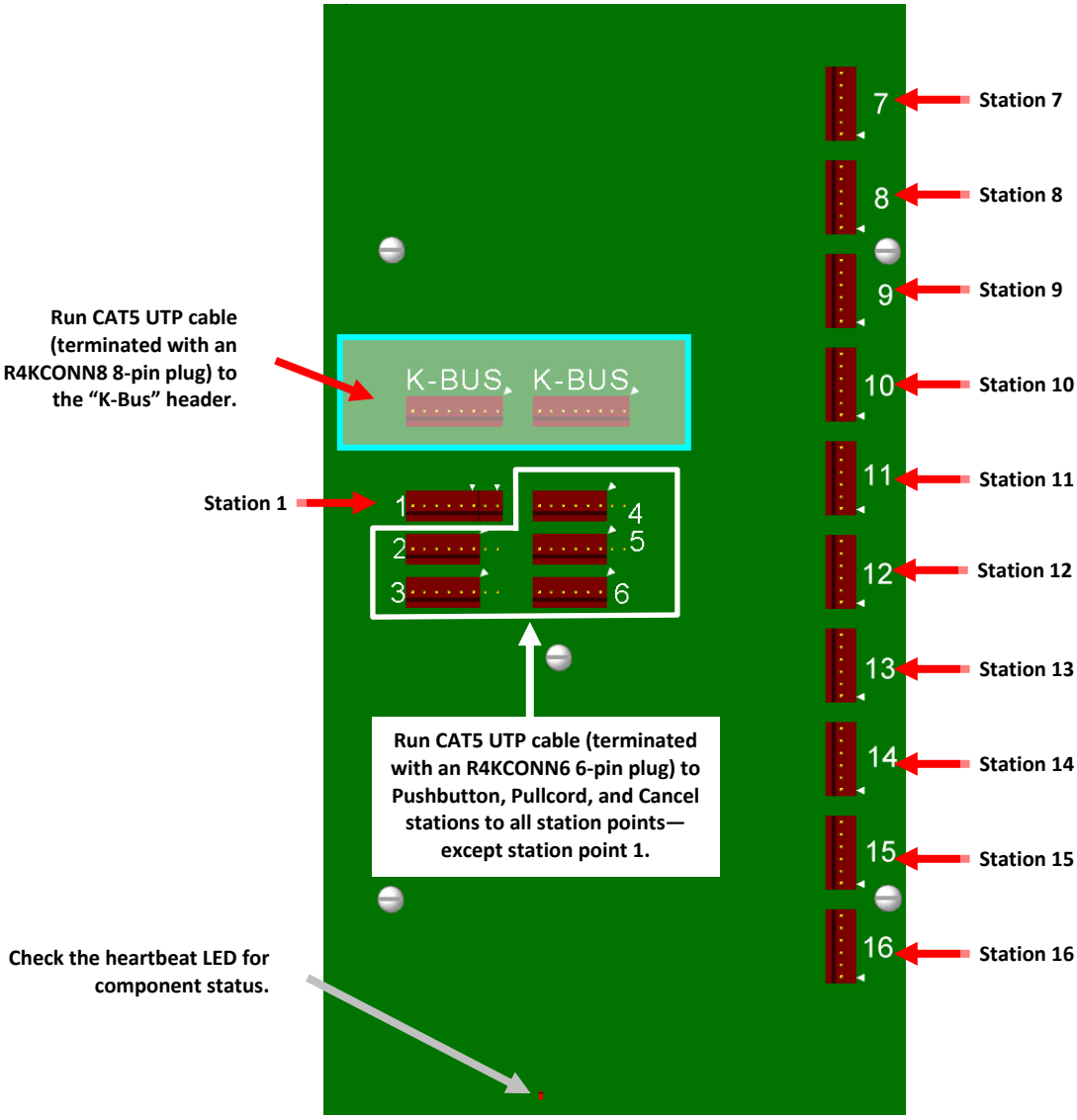


Figure 111: Sixteen Station Audio Domeless Controller K-Bus and Station Connect Headers

Getting it Ready

Once you've made the appropriate connections, prepare the unit as follows:

Set K-Bus Address

Before you mount the component, you'll need to set the K-Bus Address. You should always work from a K-Bus worksheet, which helps you to keep track of component address assignments. You can find a blank worksheet in Appendix D.

To Set the Address

1 Find the address on the K-Bus Address Worksheet.

2 Set the Dipswitch to the correct address (this is a binary number):

Figure 112: K-Bus Address Dipswitch (address 1 shown)

Confirming it Works

All Domeless Controllers and Corridor Lights are equipped with a "heartbeat" LED, which confirms proper operation:

LED Heartbeat Rate	What it Means*	Take this Action
Continuous Flash: 200 msec on 200msec off	Dipswitch is set outside of the acceptable range: 0-150 for CLs/DCs and 0-30 for LCDs, ANNs, and MQCs.	Set Dipswitch to acceptable address.
3 blinks every 3.2 seconds	No K-Bus activity for 10 seconds	Check K-Bus connection
2 blinks every 3.2 seconds	K-Bus activity is present, but not for this device	Check software configuration
1 blink every 3.2 seconds	Normal activity during the first 60 seconds or less after power up	None required
No Blinks	Normal activity	None required

Table 33: K-Bus Heartbeat Legend

Corridor Light Self Tests

All Corridor Lights/Domeless Controllers come with self test. These tests can be accessed by removing the power from the CL/DC, changing the address as shown below, then applying power.

Address	Test	What it Does
255 (11111111)*	LED test “on”	Turns on all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn off.
254 (01111111) *	LED test “off”	Opposite of address 255. Turns off all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn on steady.
253 (10111111)*	Transceiver test	The CL/DC will transmit data and verify it. The heartbeat LED will turn on steady if it passes.
252 (00111111)*	EEPROM test	The CL/DC will write, read and verify a pattern to/from its EEPROM. The heartbeat LED will turn on steady if it passes.
251 (11011111)*	A/D comparator test	The CL/DC will verify its analog to digital comparator is working properly. The heartbeat LED will turn on steady if it passes.
250 (01011111)*	Watchdog test	In-house use only.
249 (10011111)*	CLA214D tone test #1	A CLA214D will produce a tone through an R4KDY attached to station position 1A/1B.
248 (00011111)*	CLA214D tone test #2	A CLA214D will produce and measure a tone decay. It will light the heartbeat LED if it passes.
247 (11101111)*	CLA214D tone test #3	In-house use only.

***1 = ON and 0 = OFF**

Table 34: Corridor Light/Domeless Controller self tests

Others Things You Should Know

- ✓ You can use the CLAR4 Audio Corridor Light Add-On module to increase the audio station capacity to 4.
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.

DCA214D Duty Domeless Controller/ CLA214D Duty Corridor Light

(Audio and Visual Only Network Compatible)

Making Connections

The Duty Domeless Controller or Corridor Light connects to the K-Bus, the R4KDY, and a variety of other Stations.

K-Bus Connect

Connect the Controller to the K-Bus via one of the available K-Bus headers. Use the other available K-Bus header if you wish to extend the K-Bus run.

Station Connect

Connect the R4KDY to the 6-pin (1A) and 8-pin (1B) Duty Station Connect headers **and** any combination of Pushbutton (R4KCB12, R4KCB10, R4KPB11, R4KPB22, R4KPB44, R4KRA1, R4KSR1, R4KESR), Pullcord (R4KPC10), or Cancel (R4KCNCL) stations to the appropriate (6-pin) Station Connect headers as illustrated:

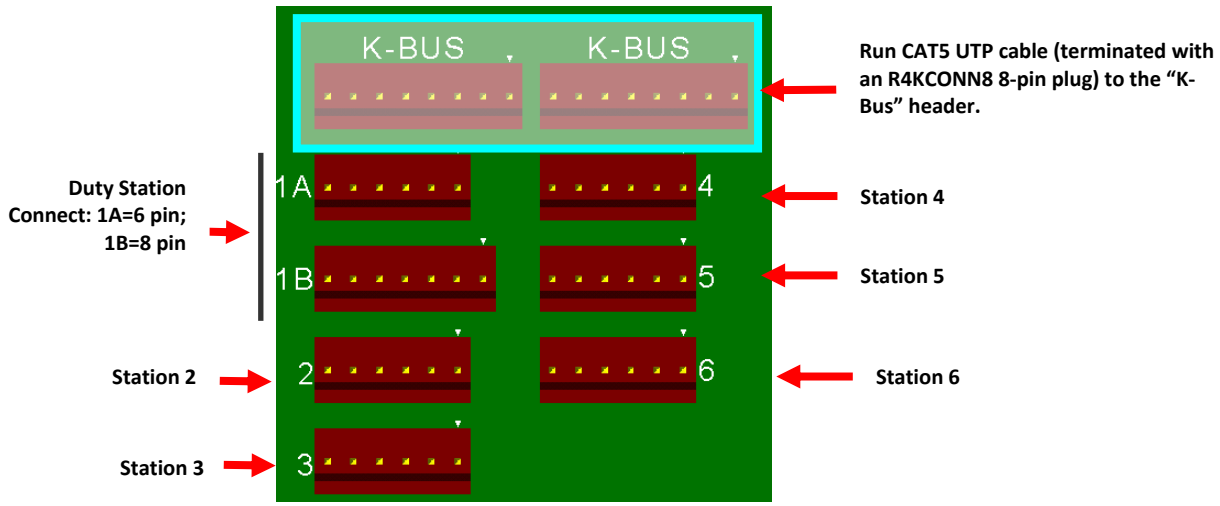


Figure 113: Duty Domeless Controller/Corridor Light Connections

Getting it Ready

Once you've made the appropriate connections, prepare the unit as follows:

Set K-Bus Address

Before you mount the component, you'll need to set the K-Bus Address. You should always work from a K-Bus worksheet, which helps you to keep track of component address assignments. You can find a blank worksheet in Appendix D.

To Set the Address

1 Find the address on the K-Bus Address Worksheet

2 Set the Dipswitch to the correct address (this is a binary number):

Figure 114: K-Bus Address Dipswitch (address 1 shown)

Confirming it Works

All Domeless Controllers and Corridor Lights are equipped with a "heartbeat" LED, which confirms proper operation:

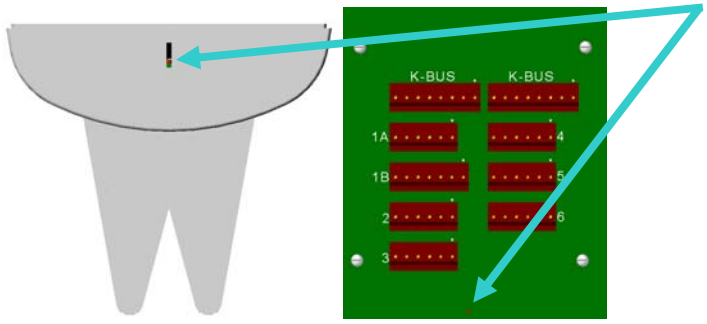


Figure 115: Domeless Controller/Corridor Light Heartbeat LED

LED Heartbeat Rate	What it Means*	Take this Action
Continuous Flash: 200 msec on 200msec off	Dipswitch is set outside of the acceptable range: 0-150 for CLs/DCs and 0-30 for LCDs, ANNs, and MQCs.	Set Dipswitch to acceptable address.
3 blinks every 3.2 seconds	No K-Bus activity for 10 seconds	Check K-Bus connection
2 blinks every 3.2 seconds	K-Bus activity is present, but not for this device	Check software configuration
1 blink every 3.2 seconds	Normal activity during the first 60 seconds or less after power up	None required
No Blinks	Normal activity	None required

Table 35: K-Bus Heartbeat Legend

Corridor Light Self Tests

All Corridor Lights/Domeless Controllers come with self test. These tests can be performed by removing the power from the CL/DC, changing the address as shown below, then applying power.

Address	Test	What it Does
255 (11111111)*	LED test "on"	Turns on all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn off.
254 (01111111) *	LED test "off"	Opposite of address 255. Turns off all CL/DC lamps and call assurance LEDs. The heartbeat LED will turn on steady.
253 (10111111)*	Transceiver test	The CL/DC will transmit data and verify it. The heartbeat LED will turn on steady if it passes.
252 (00111111)*	EEPROM test	The CL/DC will write, read and verify a pattern to/from its EEPROM. The heartbeat LED will turn on steady if it passes.
251 (11011111)*	A/D comparator test	The CL/DC will verify its analog to digital comparator is working properly. The heartbeat LED will turn on steady if it passes.
250 (01011111)*	Watchdog test	In-house use only.
249 (10011111)*	CLA214D tone test #1	A CLA214D will produce a tone through an R4KDY attached to station position 1A/1B.
248 (00011111)*	CLA214D tone test #2	A CLA214D will produce and measure a tone decay. It will light the heartbeat LED if it passes.
247 (11101111)*	CLA214D tone test #3	In-house use only.

***1 = ON and 0 = OFF**

Table 36: Corridor Light/Domeless Controller self tests

Others Things You Should Know

- ✓ Use the CL Removal Tool (R4KCRIMP) to remove the corridor light from its back plate. (See "Removing Corridor Lights" above.)
- ✓ Before you install any Corridor Light/Domeless Controllers, you'll need to configure your system, print out a K-Bus Location Worksheet, and complete the Power Calculation Spreadsheet. (See Appendix C, Power Requirements, for instructions on the use of the Power Calculation Spreadsheet.)
- ✓ Keep the K-Bus as short as possible; never exceed 5,000 feet.
- ✓ The CLAR4 **cannot** be used with the Duty Corridor Light.

R4KCAL Call Assurance Light
(Audio/Visual Network)

Making Connections

The Call Assurance Light makes two connections: 1) to the Corridor Light/Domeless Controller, 2) to an audio or non-audio bed station.

Connections

The connector combinations J1/J2 and J3/J4 are **identical**. There is no input connector or output connector. Use an 8 or 6 conductor Station Connect cable to connect to the Corridor Light/Domeless Controller and the Bed Station depending on whether or not the station has audio (8 conductor = audio, 6 conductor = non-audio).

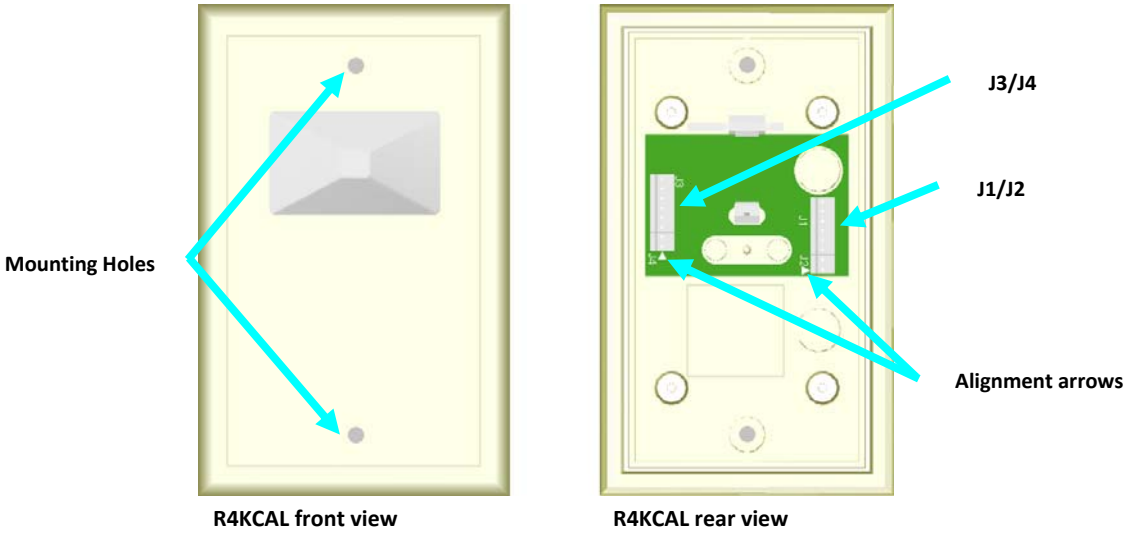


Figure 116: R4KCAL Connections

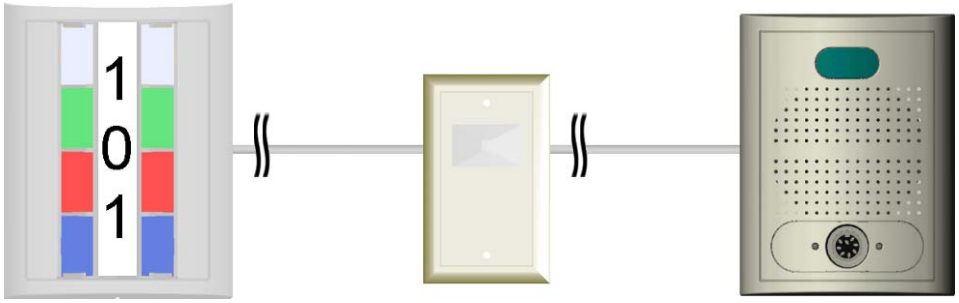


Figure 117: Normal wiring of the R4KCAL between the Corridor Light and Patient Station

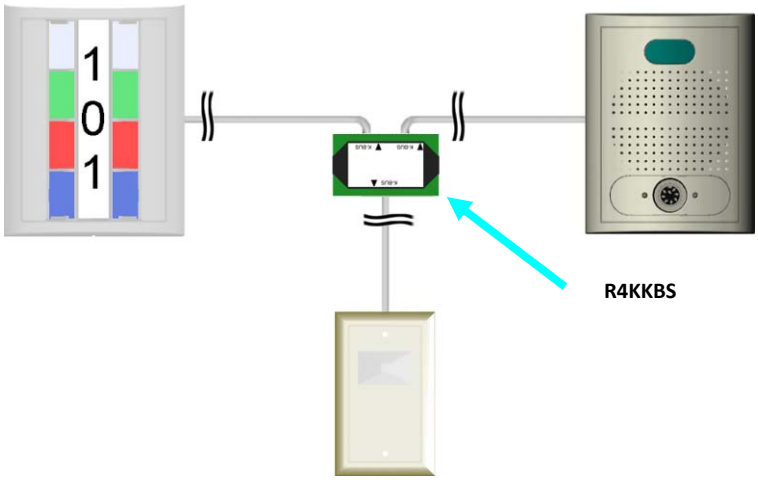


Figure 118: Optional wiring of the R4KCAL using an R4KKBS*

***Because the connector combinations J1/J2 and J3/J4 are identical on the R4KCAL, the R4KKBS can plug into either set.**

Mounting

The R4KCAL can be screwed directly to a single-gang back box with the supplied #6-32 × 11/2" screws. Make sure that no wiring is pinched against the back box and do not over-tighten the screws.

Confirming it Works

1 Place a call from the bed station.

2 Verify the call assurance LED is lit on the station and on the R4KCAL.

3 (Audio Bed stations only…) answer the call at the console to verify audio is operating through the R4KCAL.

Others Things You Should Know

- ✓ The connector combinations J1/J2 and J3/J4 are identical. There is no input connector or output connector.
- ✓ The R4KCAL can be used with audio and non-audio stations.
- ✓ The R4KCAL can be used with dual bed stations (requires 2 R4KCALs).
- ✓ The R4KCAL cannot be used with dual push button stations.
- ✓ The LEDs of the R4KCAL mirror the call assurance light of the bed station to which it is connected.
- ✓ The R4KCAL is invisible to the software and does not require any programming changes.
- ✓ The arrow on the R4KCONN6/8 Socket does not designate position 1. Use the alignment arrows on the connector and board to determine the mating direction.

CLAR4 Audio Corridor Light Add-On
(Audio/Visual Network Compatible)

Making Connections

The Audio Corridor Light Add-On "daughter board" provides 4 station audio paths. It plugs into the rear of any of the Audio Controllers or Corridor Lights (DCA200, DCA216, CLA222, CLA244) as indicated:

1. Ready the Mother Board

Corridor Light (CLA222, CLA244): Unsnap main Corridor Light PC board from the plastic housing.

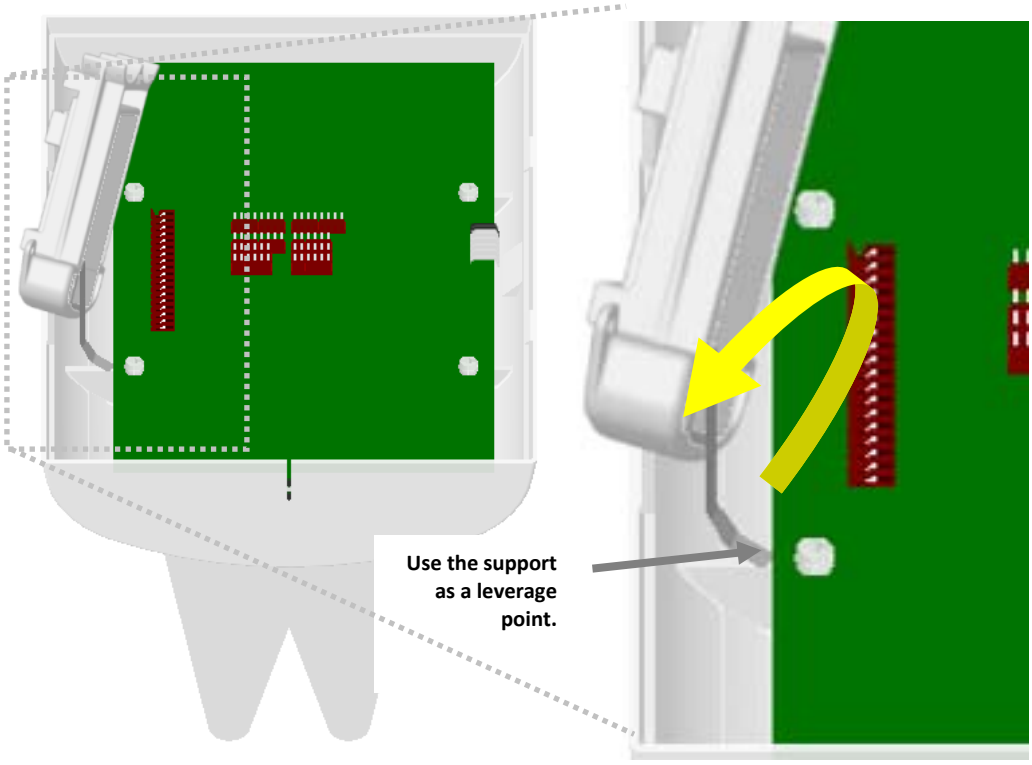


Figure 119: Station Removal

Note: Use the R4KCRIMP station removal tool to unsnap the main Corridor Light PC board from its plastic housing.

Domeless Controller (DCA200, DCA200+R4KOUT4S, DCA216): Remove Domeless Controller PC board from protective case:

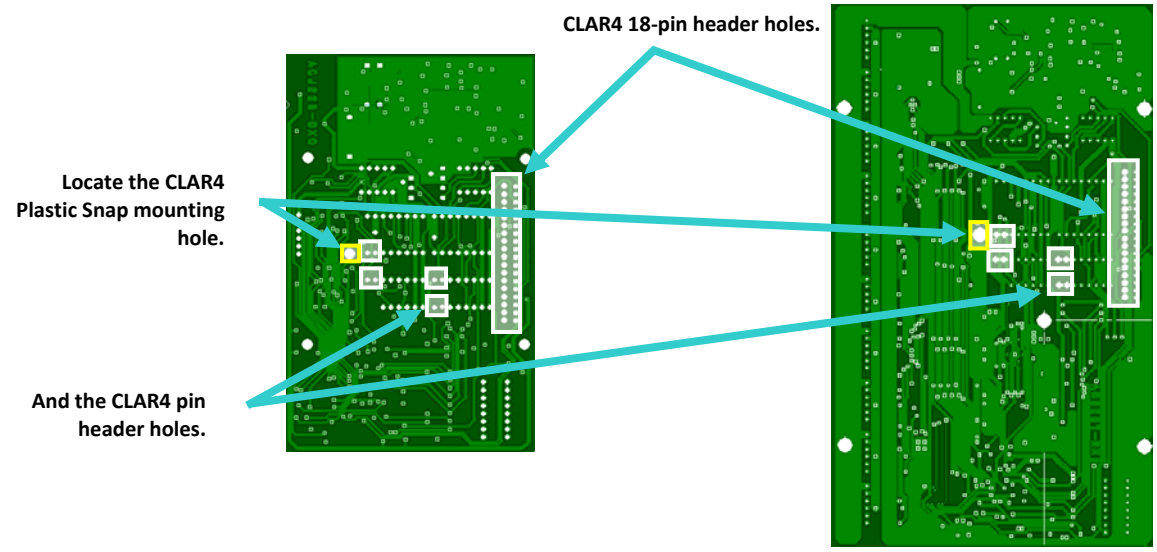


Figure 120: Audio Corridor Light/Domeless Controller Board

Figure 121: Audio Corridor Light/Domeless Controller Board

2. Position and Connect the Daughter Board

Position the CLAR4 so that the plastic snap lines up with the mounting hole and the pin headers align with the appropriate holes. Then press the unit into place.

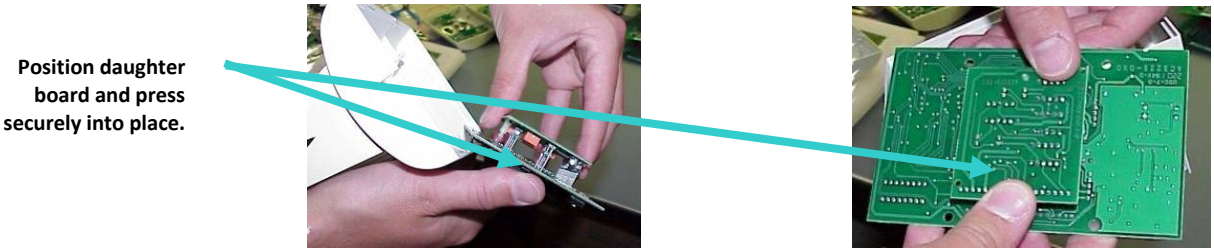


Figure 122: Audio Corridor Light Board

Figure 123: Domeless Controller Board

3. Verify Added Audio Points

The four new audio points will appear beside Station Connect headers 2-5.

Confirm the addition of 2 pins to Station Connect headers 2-5.

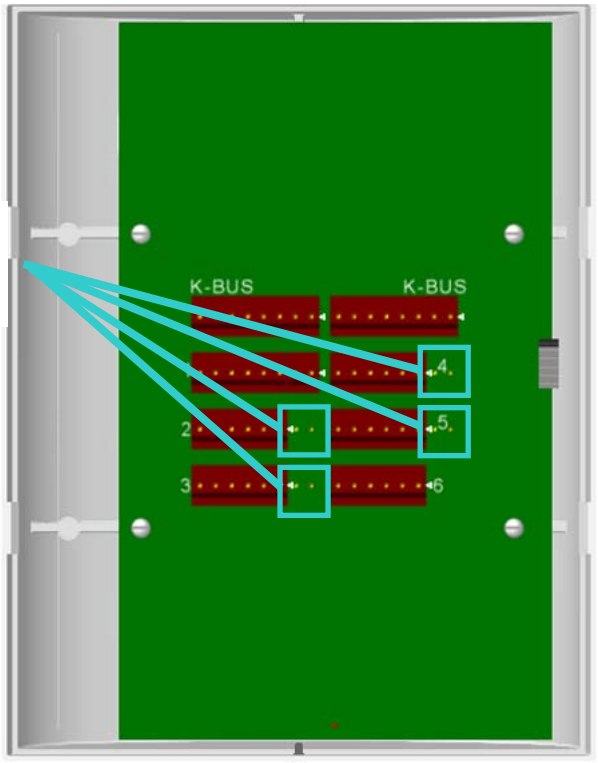


Figure 124: Corridor Light/Domeless Controller Board with CLAR4 Addition

Confirming it Works

1 Place calls from the console to each of the audio stations.
2 Verify the audio path and monitor (green) LED.

Others Things You Should Know

✓ Use only headers 2-5 for audio stations if you add the CLAR4. Do NOT use Station Connect header 1 for that purpose. An audio station connected to position 1 will send/receive audio any time the other connected audio stations are in communication.

11

Stations & Accessories

In this chapter you'll find installation tear sheets for the following Stations and Accessories:

- ✓ R4K11V Single Bed Visual Station
- ✓ R4K12A Single Bed (w/ speaker)
- ✓ R4K18A/18C/18L Single Bed Multi-Button Station
- ✓ R4K21V Dual Bed Visual Station
- ✓ R4K22A Dual Bed Station (w/ speaker)
- ✓ R4K16LV Single Bed Enhanced Visual Station
- ✓ R4K13VA Single Bed Enhanced Audio Station
- ✓ R4K25LV Dual Bed Enhanced Visual Station
- ✓ R4K23VA Dual Bed Enhanced Audio Station
- ✓ R4K28A/28C/28L Dual Bed Multi-Button Station
- ✓ R4K14SA Staff Assist Bed (w/ speaker)
- ✓ R4KCB10/R4KCB12 Code Station
- ✓ R4KDY Duty Station (w/ speaker)
- ✓ R4KPB11 Push-for-Help Station
- ✓ R4KPB22 Dual Pushbutton Station
- ✓ R4KPB44 Four Button Station
- ✓ R4KPC10 Pullcord Station
- ✓ R4KRA1 Residence Assist Station
- ✓ R4KESR Emergency Staff Registration Station
- ✓ R4KCNCL Cancel Station
- ✓ R4KSR1 Staff Registration Station
- ✓ R4KSS Staff Station (w/ speaker)
- ✓ HSS400 High Security Bed Station (w/ speaker)
- ✓ HSS401 High Security Staff Station (w/ speaker)

- ✓ HSS433 High Security Push Button Station
- ✓ R4KMST Marquee Speaker Station
- ✓ R4KSPK SLIM Speaker Station
- ✓ R4K17V SLIM Enhanced Single Bed Station
- ✓ R4K15V SLIM ¼" Jack & Button Station
- ✓ R4K2JACK SLIM Dual ¼" Jack Station
- ✓ R4KCB13 SLIM Code Station
- ✓ R4KPB12 SLIM Push Button Station
- ✓ R4KPB23 SLIM Staff Assist Code Station
- ✓ R4KSAR SLIM Push for Help/Staff Registration or Check-In Station
- ✓ R4KDTY2 SLIM Duty Station
- ✓ R4KPC11 SLIM Pull Cord Station

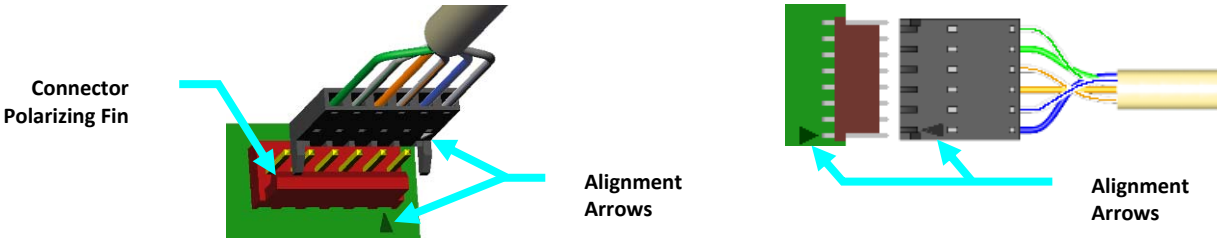


Figure 125: Station/Corridor Light connector/board alignment arrows

R4K11V Single Bed Visual Station
(Audio and Visual Only Network Compatible)

Making Connections/Interconnect

The Single Bed Visual Station makes one required and one optional connection.

Required Connection

Connect the Single Bed Station to either Corridor Light or Domeless Controller using a 6 conductor Station Connect cable as indicated:

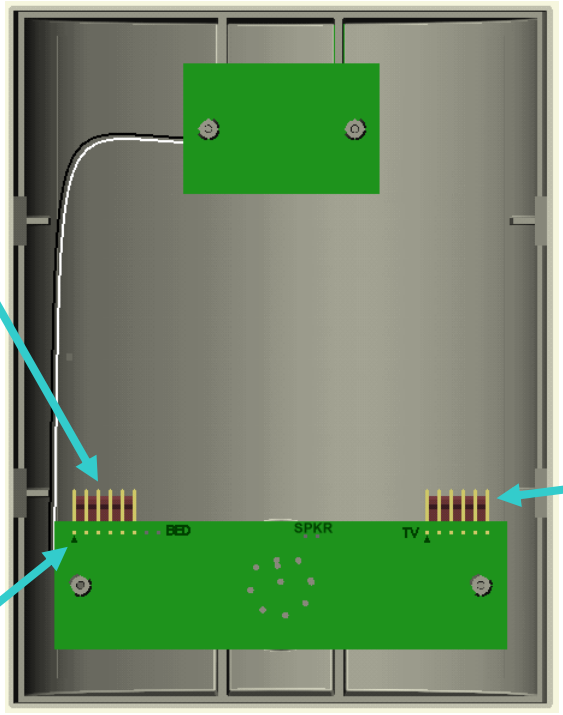


Figure 126: Single Bed Visual Station, Rear view

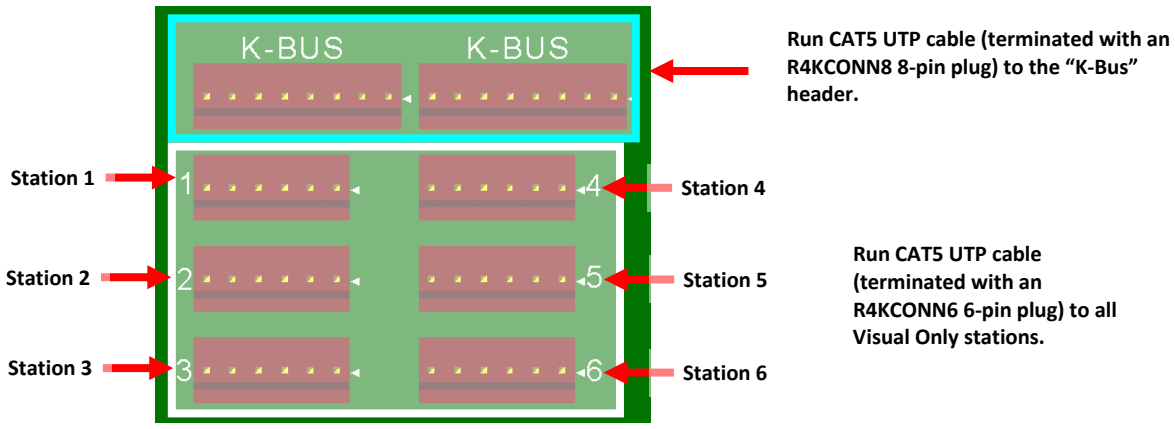
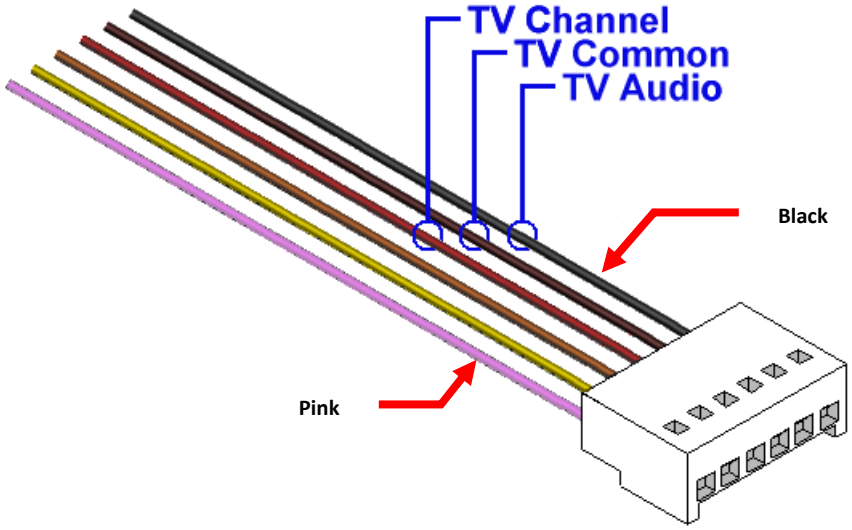


Figure 127: Corridor Light/Domeless Controller, PC Board

Optional TV Connection

You can also connect an optional TV to the station using the R4KTVA pigtail connection. The TV connection should be made as follows:



Wire	Cable Connection
Black	TV Audio
Brown	TV Common
Red	TV Channel
Orange	----------
Yellow	----------
Pink	----------

Figure 128: R4KTVA pigtail

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect a pillow speaker or CCDIN to the DIN jack.

2 Place a call.

3 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

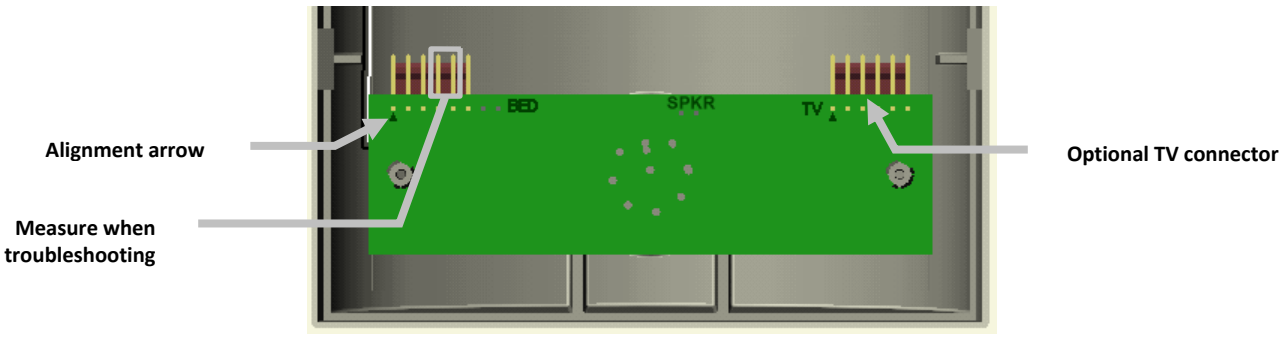


Figure 129: Single Bed Visual Station troubleshooting, Alignment arrow.

Others Things You Should Know

- ✓ TV audio will only sound through the pillow speaker.
- ✓ See page 26 for instructions on removing a Station.

R4K12A/R4K12AHZ Single Bed Audio Station
(Audio/Visual Network Compatible)

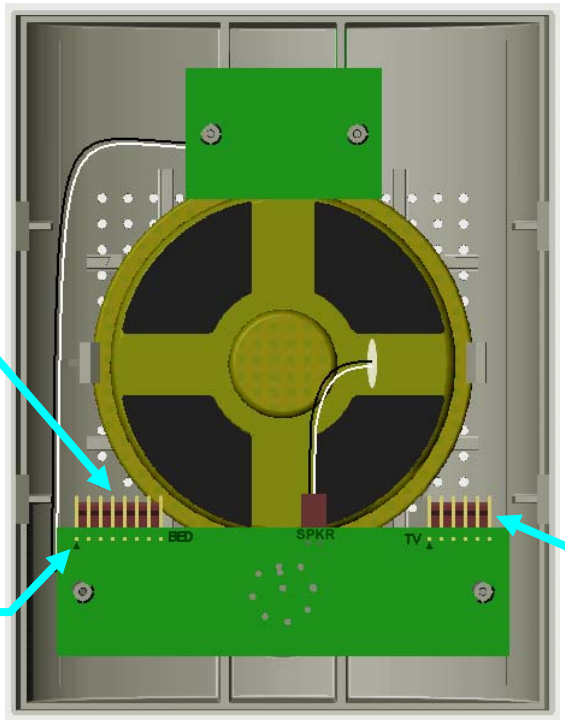
Making Connections

The Single Bed Audio Station makes one required and one optional connection.

Required Connection

Connect the Single Bed Audio Station to either an Audio Corridor Light (CLA222 or CLA244) or Domeless Controller (DCA200 or DCA216) using an 8 conductor Station Connect cable as indicated:

Run an 8 conductor Station Connect cable from this header to the appropriate open 8 pin header on an Audio Corridor Light or Domeless Controller.



Alignment arrow

Use a "header adapter" and punch-down tool to connect an optional TV to the station. Use only pins 4, 5, and 6 (1, 2, and 3 are unused).

Figure 130: Single Bed Audio Station, Rear View

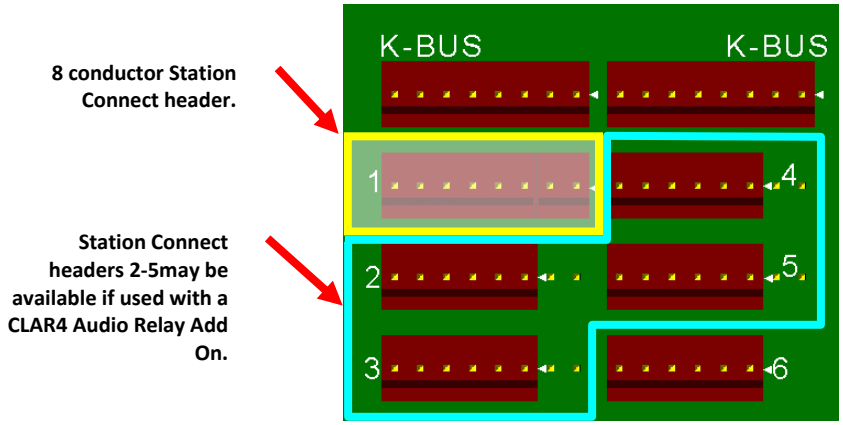
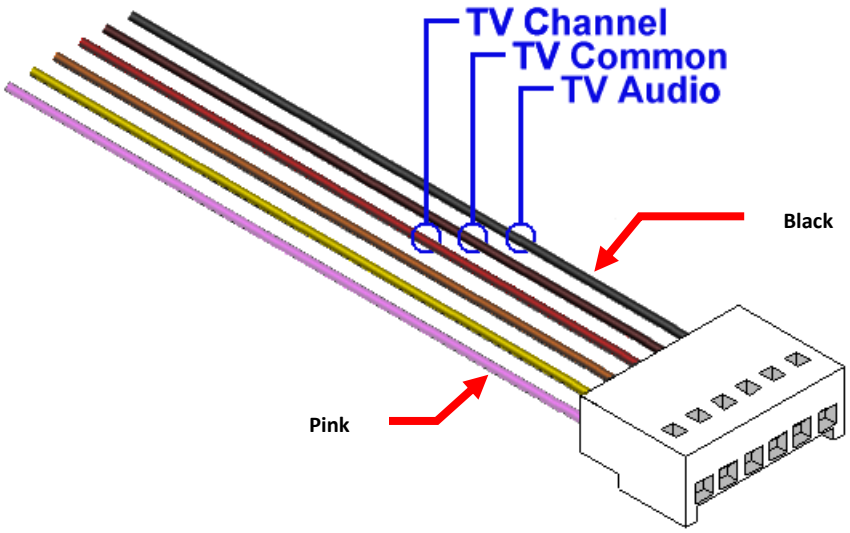


Figure 131: Audio Corridor Light/Domeless Controller

Optional TV Connection

You can also connect an optional TV to the station using the R4KTVA pigtail connection. The TV connection should be made as follows:



Wire	Cable Connection
Black	TV Audio
Brown	TV Common
Red	TV Channel
Orange	----------
Yellow	----------
Pink	----------

Figure 132: R4KTVA pigtail

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect a pillow speaker or CCDIN to the DIN jack.

2 Place a call.

3 Verify the call assurance (red) LED is lit and an audio path has been established to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/brown & green/white wires.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

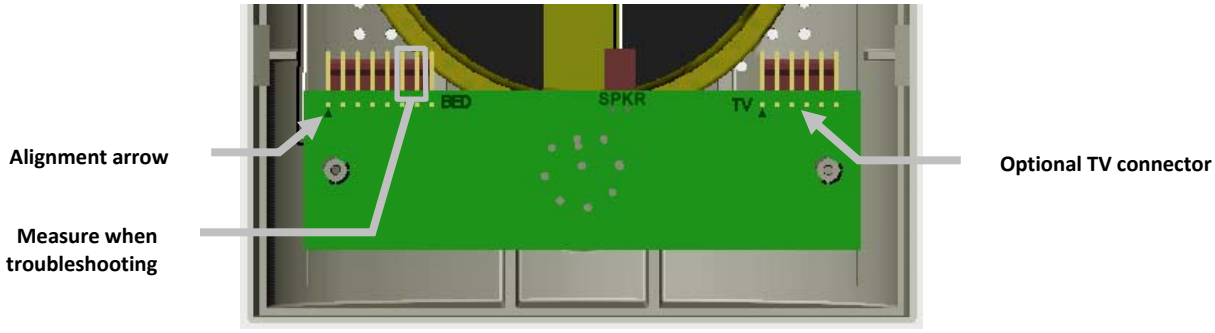


Figure 133: Single Bed Audio Station troubleshooting, Alignment arrow

Others Things You Should Know

- ✓ TV audio will only sound through the pillow speaker.
- ✓ TV audio is not muted during communication on the R4K12A.
- ✓ See page 26 for instructions on removing a Station.

R4K18A/18C/18L Single Bed Multi-Button Station
(Audio/Visual Network Compatible)

Making Connections

The Single Bed Audio Station makes three required connections.

Required Connections

Connect the Single Bed Audio Station to either an Audio Corridor Light (CLA222 or CLA244) or Domeless Controller (DCA200 or DCA216) using an 8 conductor Station Connect cable and two, 6 conductor Station Connect cables as indicated:

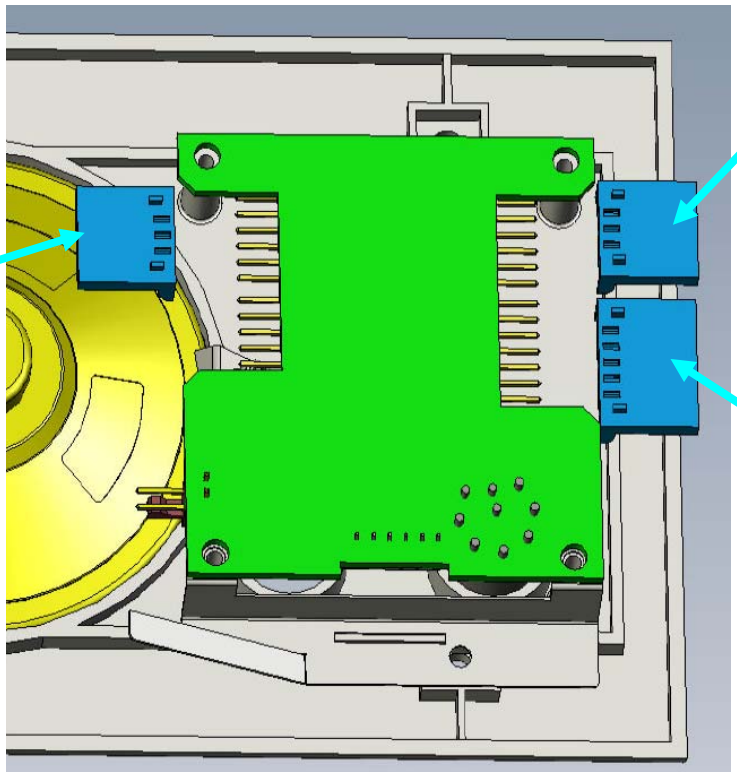


Figure 134: Single Bed Multi-Button Station, Rear View

The connectors are not interchangeable. They must be connected to the corridor light port which they are programmed to connect in order to cancel calls properly.

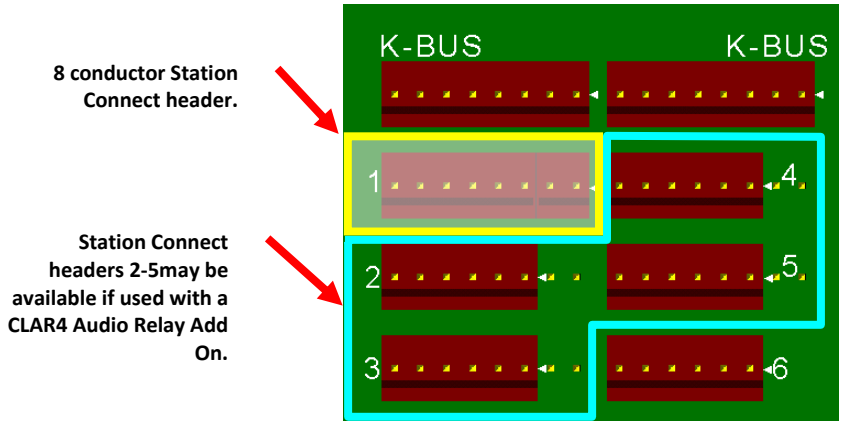


Figure 135: Audio Corridor Light/Domeless Controller

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect a pillow speaker or CCDIN to the DIN jack.

2 Place a call.

3 Verify the call assurance (red) LED is lit and an audio path has been established to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/brown & green/white wires for the 8 pin bed cable and the white/green & orange/white wires for the 6 pin cables.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the bed cable will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

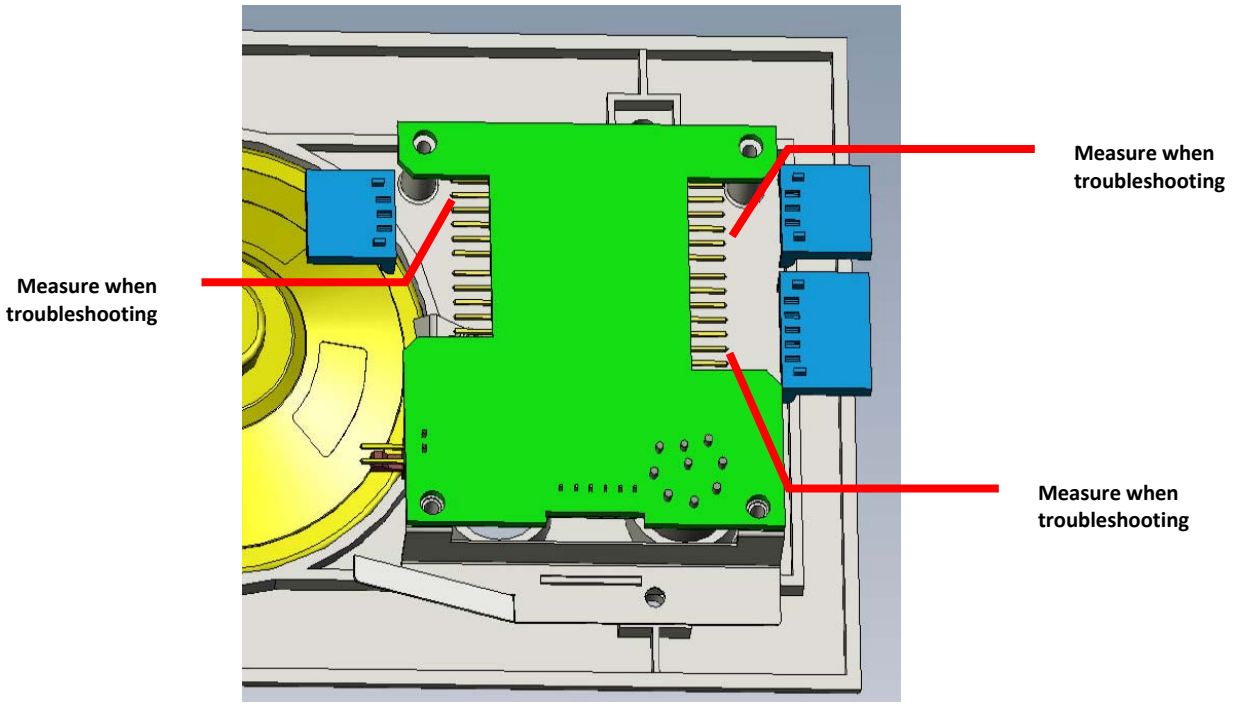


Figure 136: Single Bed Multi-Button Station troubleshooting,

Others Things You Should Know

- ✓ See page 27 for instructions on removing a Station.
- ✓ The station should be programmed with room wide cancel in order to function properly in the room.

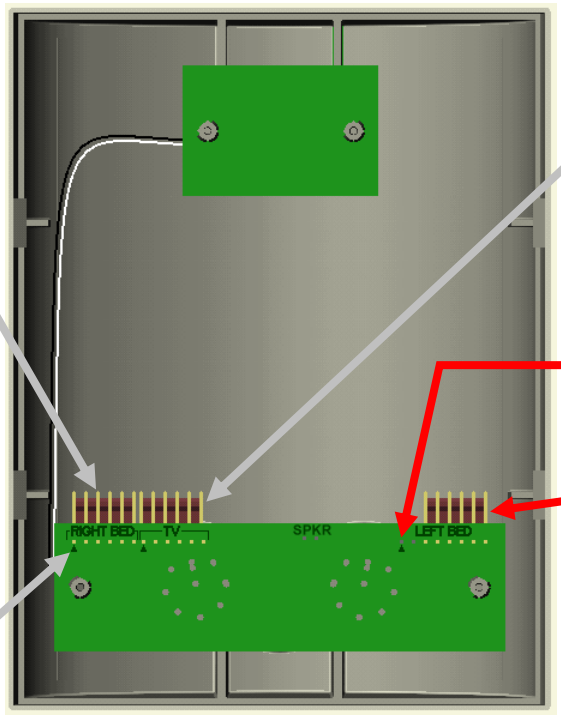
R4K21V Dual Bed Visual Station
(Audio and Visual Only Network Compatible)

Making Connections

The Visual Dual Bed Station makes two required and one optional connection.

Required Connections

Connect the Visual Dual Bed Station to either a Corridor Light or Domeless Controller using two 6 conductor Station Connect cables (Left/Right Bed) as indicated:



Use a "header adapter" and punch-down tool to connect an optional TV to the station. Use pins 1, 2, and 3 for the right bed and pins 4, 5, and 6 for the left bed.

Run a 6 conductor Station Connect cable from the Right Bed header to the appropriate open header on a Corridor Light or Domeless Controller.

Left Bed Alignment arrow

Run a 6 conductor Station Connect cable from the Left Bed header to the appropriate open header on a Corridor Light or Domeless Controller.

Right Bed Alignment arrow

Figure 137: Dual Bed Visual Station, Rear View

The right bed and left connectors are not interchangeable. They must be connected to the corridor light port which they are programmed to connect in order to cancel calls properly.

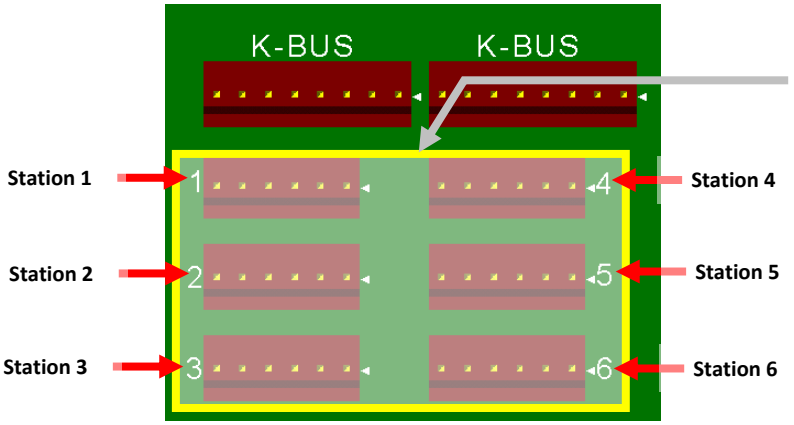
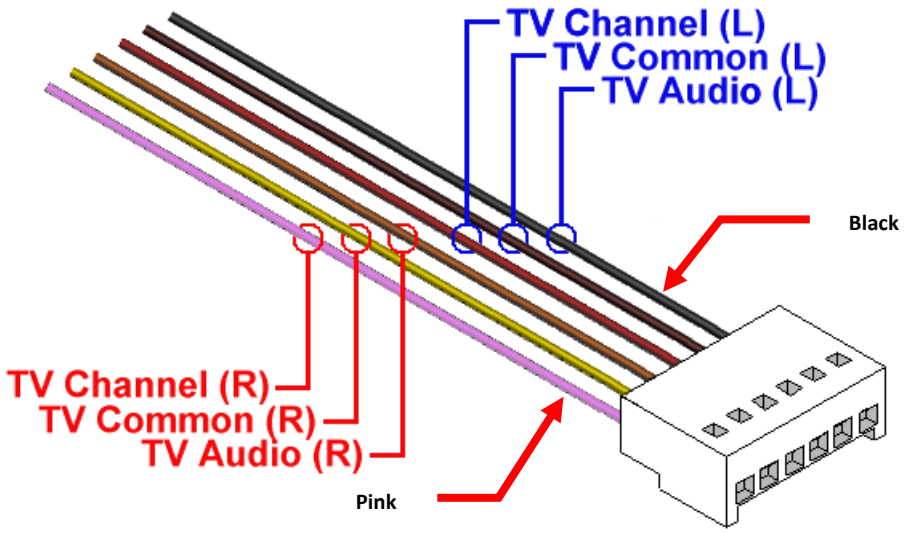


Figure 138: Corridor Light/Domeless Controller, PC Board

Optional TV Connection

You can also connect an optional TV to the station using the R4KTVA pigtail connection as follows:



Wire	Cable Connection
Black	TV Audio (left)
Brown	TV Common (left)
Red	TV Channel (left)
Orange	TV Audio (right)
Yellow	TV Common (right)
Pink	TV Channel (right)

Figure 139: R4KTVA pigtail

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect pillow speakers or CCDINs to each of the DIN jacks.

2 Place a call from each accessory.

3 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

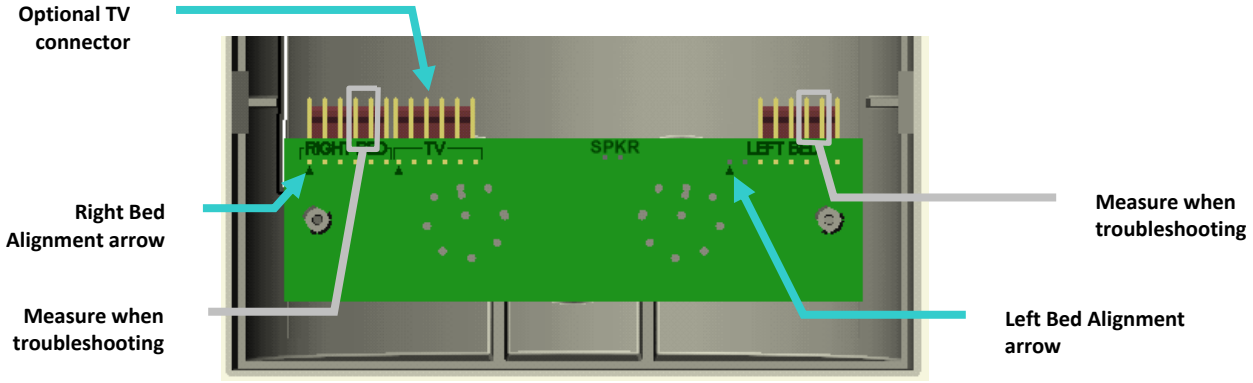


Figure 140: Dual Bed Visual Station troubleshooting, Alignment arrows

Others Things You Should Know

- ✓ TV audio will only go through the pillow speaker(s).
- ✓ See page 26 for instructions on removing a Station.

R4K22A Dual Bed Audio Station
(Audio/Visual Network Compatible)

Making Connections

The Dual Bed Audio Station makes two required and one optional connection.

Required Connections

Connect the Dual Bed Audio Station to either an Audio Corridor Light (CLA222 or CLA244) or Domeless Controller (DCA200 or DCA216) using an 8 conductor Station Connect cable (Left Bed) and 6/8 conductor Station Connect cable (Right Bed) as indicated:

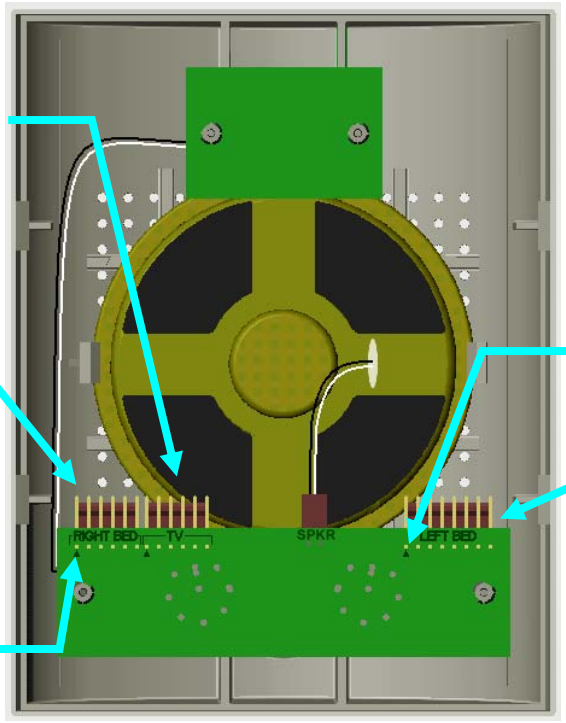


Figure 141: Dual Bed Audio Station, Rear View

The right bed connection of an R4K22A does not carry audio and requires a 6 conductor Station Connect cable.

The right bed and left connectors are not interchangeable. They must be connected to the corridor light port which they are programmed to connect in order to cancel calls properly.

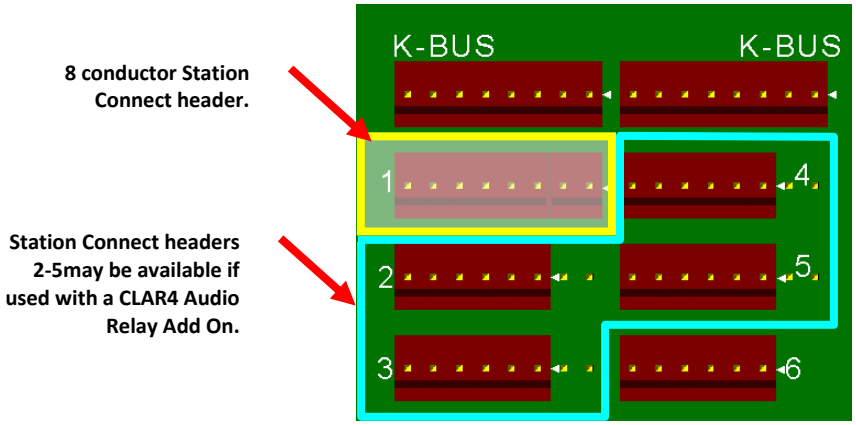
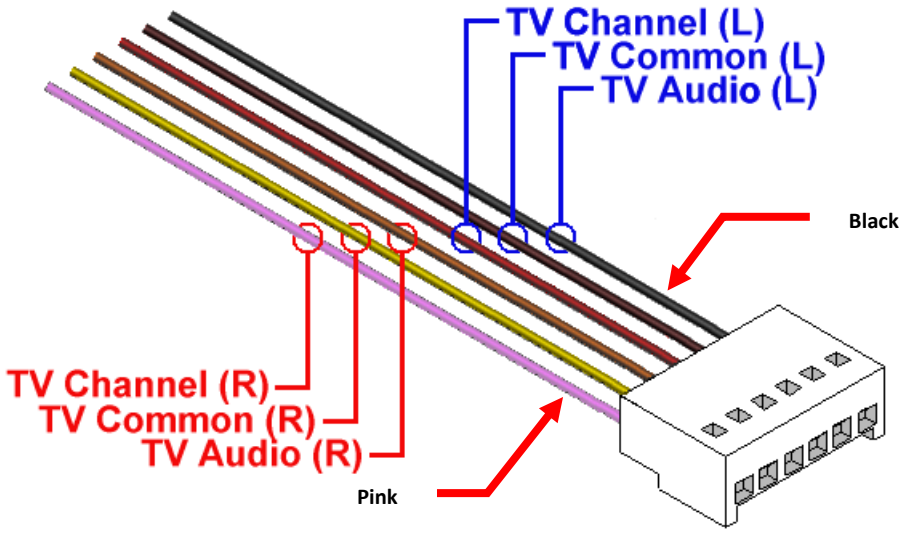


Figure 142: Audio Corridor Light/Domeless Controller

Optional TV Connection

You can also connect an optional TV to the station using the R4KTVA pigtail connection. The TV connection should be made as follows:



Wire	Cable Connection
Black	TV Audio (left)
Brown	TV Common (left)
Red	TV Channel (left)
Orange	TV Audio (right)
Yellow	TV Common (right)
Pink	TV Channel (right)

Figure 143: R4KTVA pigtail

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect pillow speakers or CCDINs to the DIN jacks.

2 Place a call from each accessory.

3 Verify the call assurance (red) LED is lit and an audio path has been established to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cables from the corridor light.

3 Measure the resistance of the white/brown & green/white wires for the left bed and white/green & orange/white wires for the right bed.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

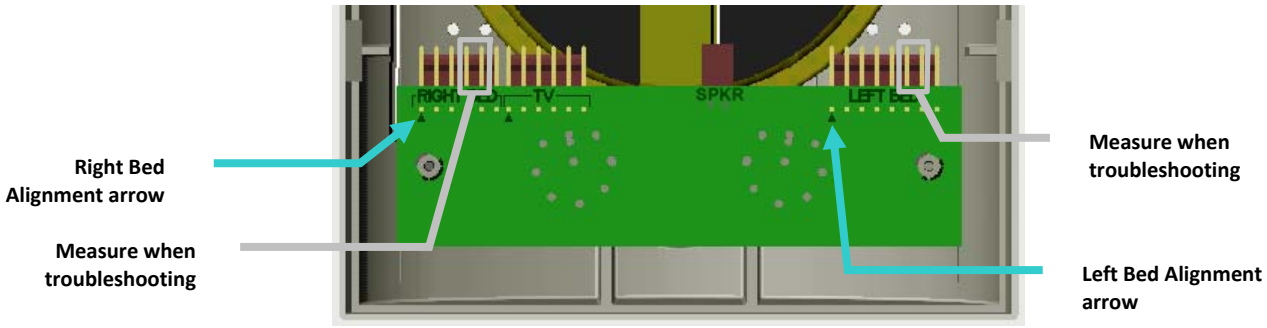


Figure 144: Dual Bed Audio Station troubleshooting, Alignment arrows.

Others Things You Should Know

- ✓ TV audio will only go through the pillow speaker(s).
- ✓ TV audio is not muted during communication on the R4K22A.
- ✓ See page 26 for instructions on removing a Station.

R4K28A/28C/28L Dual Bed Multi-Button Station
(Audio/Visual Network Compatible)

Making Connections

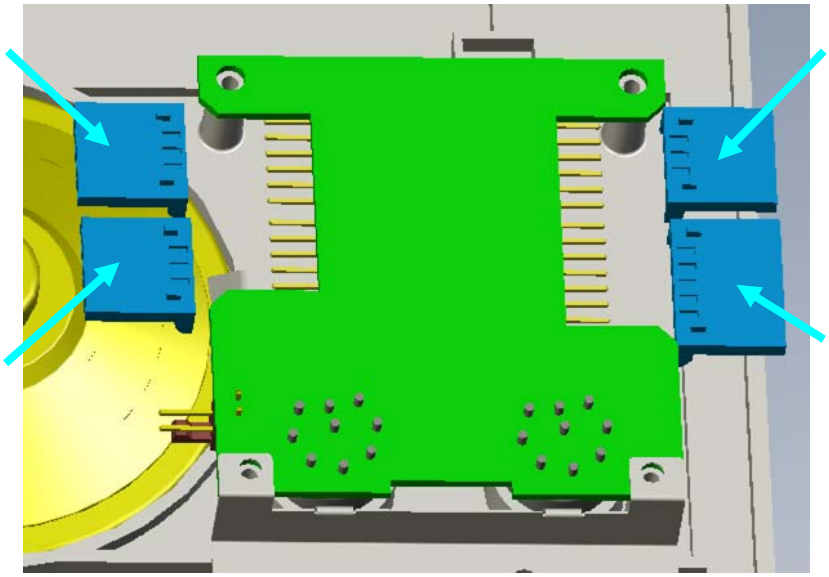
The Dual Bed Audio Station makes 4 required connections.

Required Connections

Connect the Dual Bed Audio Station to either an Audio Corridor Light (CLA222 or CLA244) or Domeless Controller (DCA200 or DCA216) using an 8 conductor Station Connect cable (Left Bed) and three 6/8 conductor Station Connect cables (Right Bed, SR, and CB) as indicated:

Run a 6/8 conductor Station Connect cable from this header to the appropriate header on an Audio Corridor Light or Domeless Controller programmed as a R4KSR1.

Run a 6/8 conductor Station Connect cable from this header to the appropriate header on an Audio Corridor Light or Domeless Controller programmed as a R4K22A Bed Right.



Run a 6/8 conductor Station Connect cable from this header to the appropriate header on an Audio Corridor Light or Domeless Controller programmed as a R4KCB12.

Run an 8 conductor Station Connect cable from this header to the appropriate 8 pin header on an Audio Corridor Light or Domeless Controller programmed as a R4K22A Bed Left.

Figure 145: Dual Bed Multi-Button Station, Rear View

The right bed connection of an R4K22A does not carry audio and requires a 6 conductor Station Connect cable.

The connectors are not interchangeable. They must be connected to the corridor light port which they are programmed to connect in order to cancel calls properly.

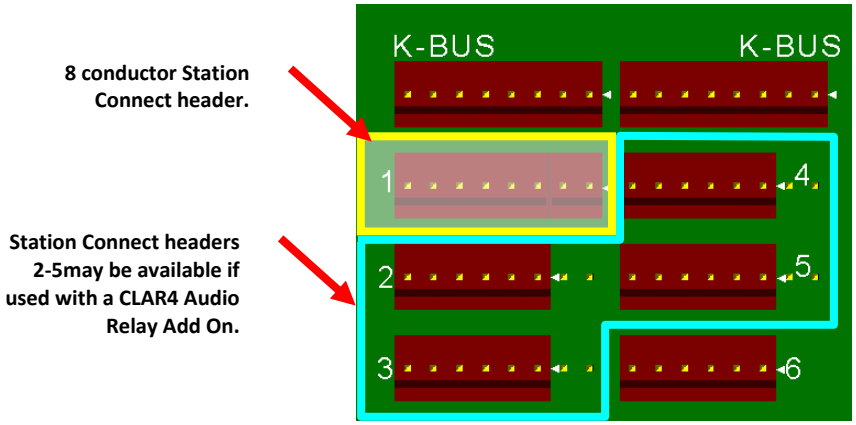


Figure 146: Audio Corridor Light/Domeless Controller

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect pillow speakers or CCDINs to the DIN jacks.

2 Place a call from each accessory.

3 Verify the call assurance (red) LED is lit and an audio path has been established to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cables from the corridor light.

3 Measure the resistance of the white/brown & green/white wires for the 8 pin left bed and white/green & orange/white wires for the 6 pin right bed, SR, and CB.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the left bed and right bed will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

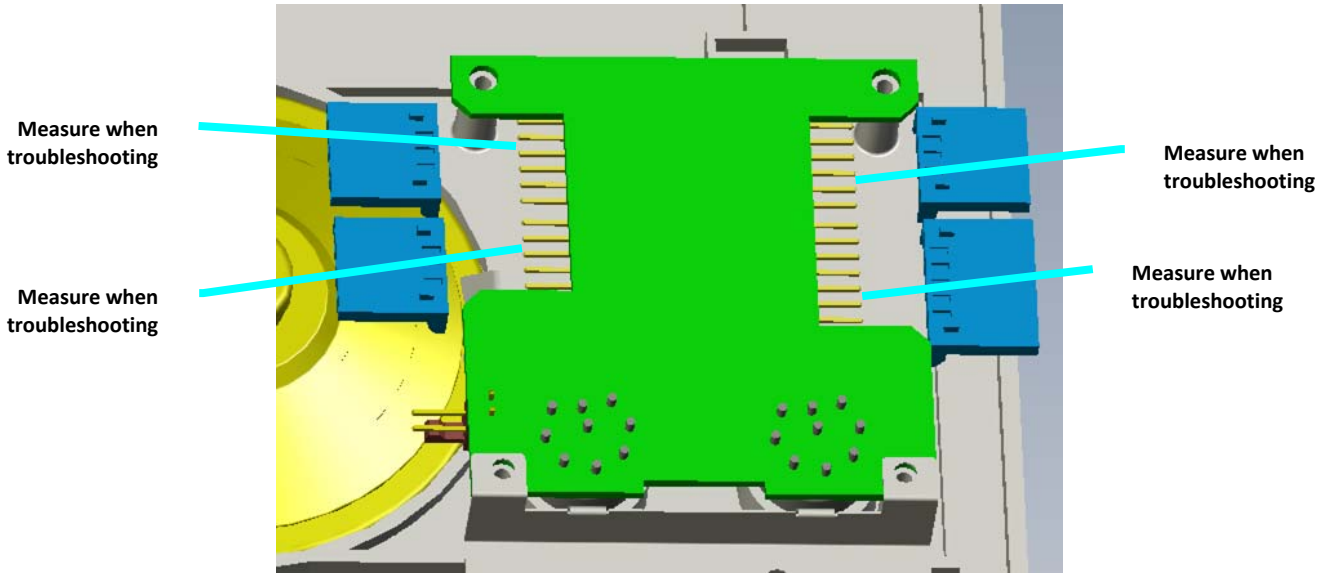


Figure 147: Dual Bed Audio Station troubleshooting

Others Things You Should Know

- ✓ See page 26 for instructions on removing a Station.
- ✓ The cancel policy for the area should be programmed with room wide cancel in order to function properly in the room.

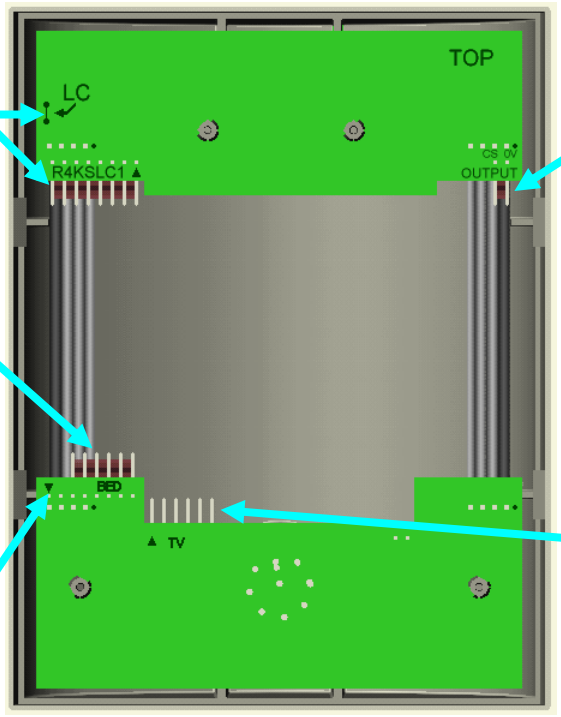
R4K16LV Single Bed Enhanced Visual Station
(Audio and Visual Only Network Compatible)

Making Connections/Interconnect

The Single Bed Enhanced Visual Station makes one required and three optional connections.

Required Connection

Connect the Single Bed Enhanced Visual Station to either Corridor Light or Domeless Controller using a 6 conductor Station Connect cable as indicated:



Optional: cut the "LC" board trace and use the eight pin connector to connect to an R4KSLC1 Single Lighting Controller.

Required: run a 6 conductor Station Connect cable from this header to the appropriate header on a Corridor Light or Domeless Controller.

Alignment arrow

Optional: use the two pin connector to connect to a radio stepper or a single low voltage controller.

Optional: use an R4KTVA pigtail to connect an optional TV to the station.

Figure 148: Single Bed Enhanced Visual Station, Rear view

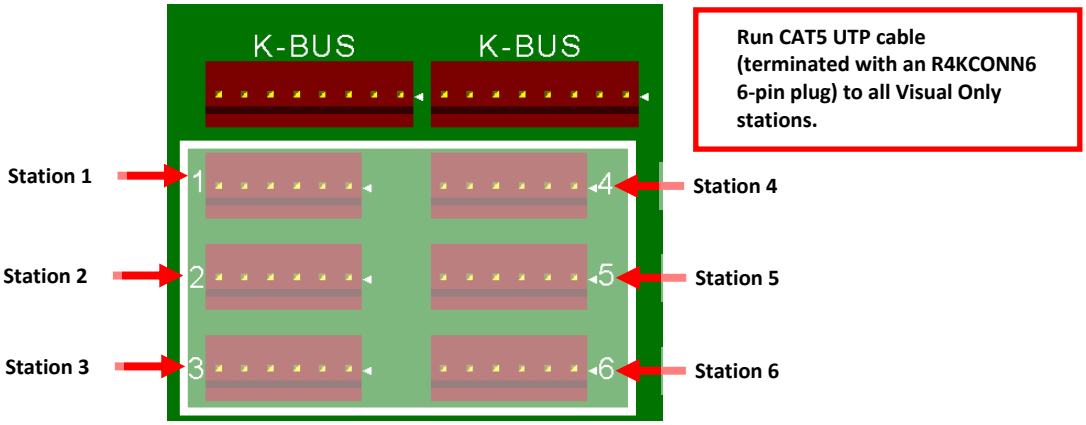
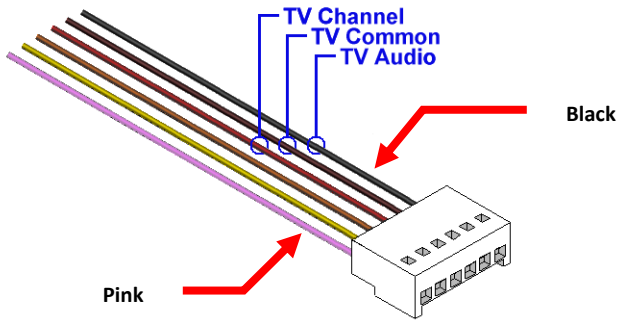


Figure 149: Corridor Light/Domeless Controller, PC Board

Optional TV Connection

You can connect an optional TV to the station using the R4KTVA pigtail connection. The TV connection should be made as follows:



Wire	Cable Connection
Black	TV Audio
Brown	TV Common
Red	TV Channel
Orange	----------
Yellow	----------
Pink	----------

Figure 150: R4KTVA pigtail

Optional Radio Stepper Connections

The RS1010 will only work with the NCESVA pillow speaker. Do not attempt to use it with any other pillow speaker.

You can connect an optional RS1010 Radio Stepper to the station using the two pin "OUTPUT" connector and an R4KTVA. Before connecting the Home In wire of the RS1010, measure the voltage between the TV Common and TV Channel wires. It should measure at least 12VDC. If TV Channel measures less than 12VDC, connect the Home In wire to the 24VDC of the RS1010. The 24VDC power supply is required to power the RS1010. The R4KPR400 can not be used to power the RS1010. The Radio Stepper connection should be made as follows:

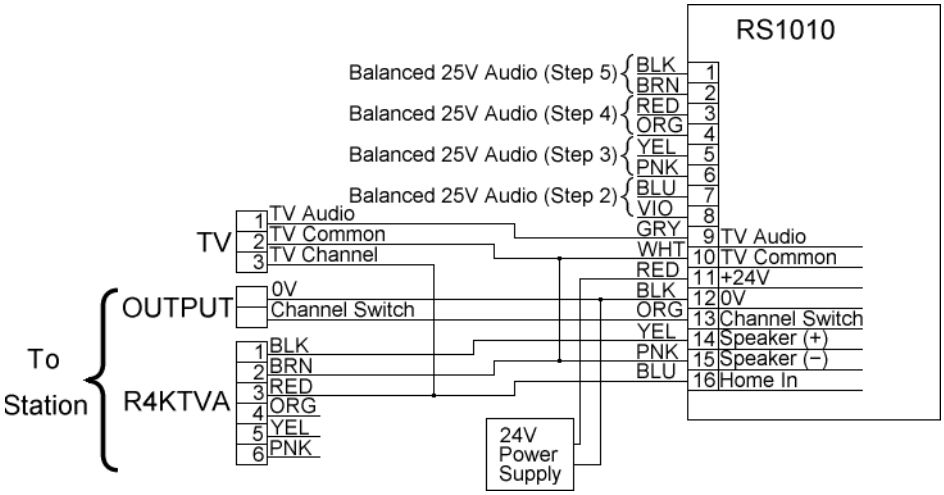


Figure 151: R4K16LV connection to RS1010 Radio Stepper

Optional Lighting Controller Connections

You can connect an optional single lighting controller to the station using the two pin "OUTPUT" connector. In this case the RS1010 Radio Stepper can not be used. The Lighting Controller connection should be made as follows:

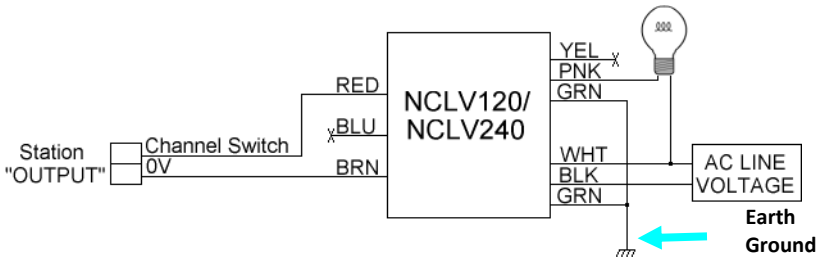


Figure 152: Single NCLV120/NCLV240 connections

As a second option for lighting control, an optional R4KSLC1 Single Lighting Controller Module can be connected to the station using the eight pin "R4KSLC1" connector. **You must cut the "LC" trace on the R4K16LV board to make this connector active.** This allows for the control of multiple lights in the room/bed area.

The "LC" trace should only be cut when adding a lighting control module. Once cut the station will not respond to any pillow speaker or call cord button presses without the lighting control module. A wire can be soldered across the trace if it is inadvertently cut.

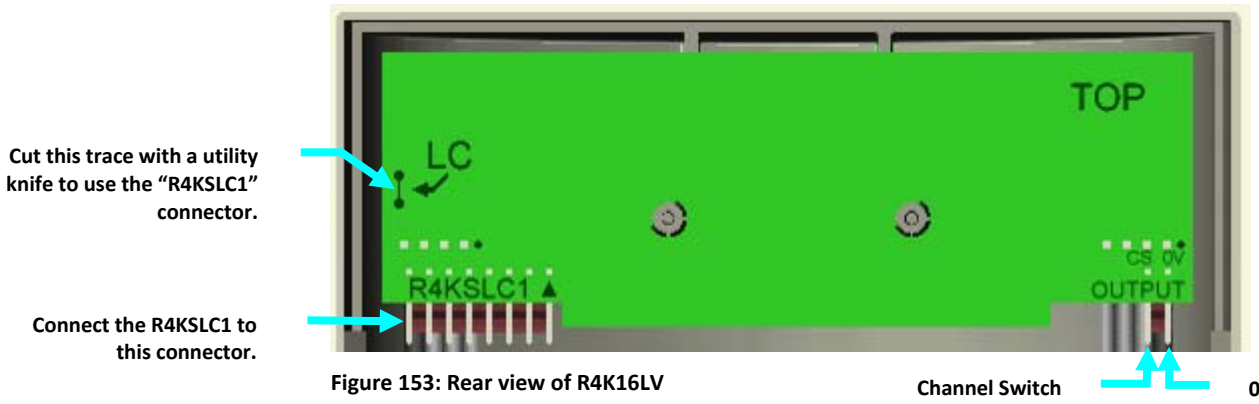


Figure 153: Rear view of R4K16LV

The R4KSLC1 Single Lighting Controller Module connection should be made as follows:

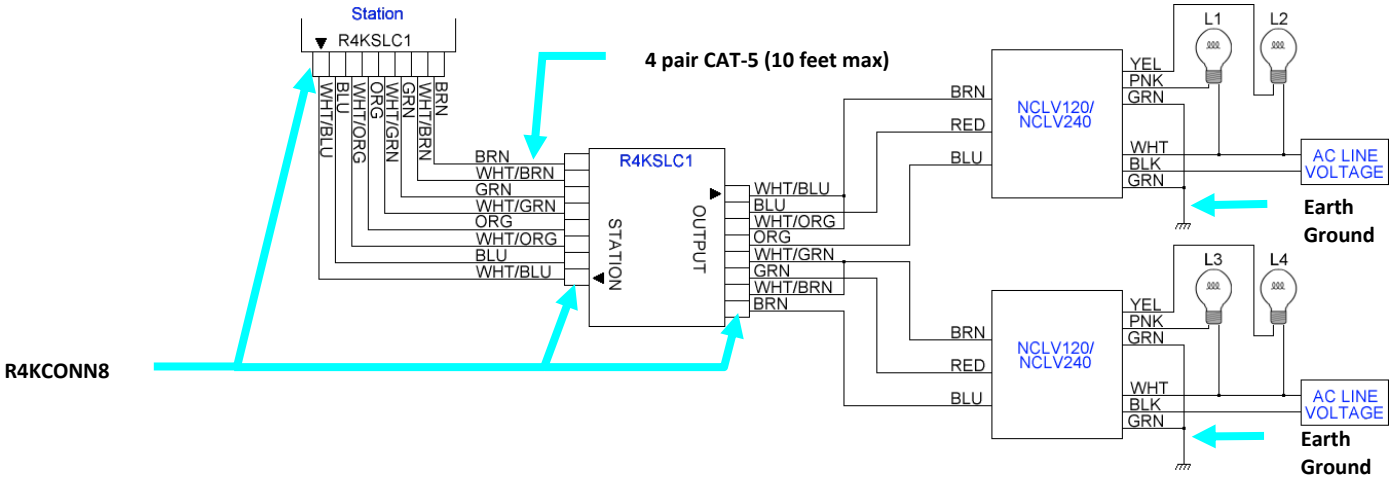


Figure 154: R4LSLC1 to NCLV120/NCLV240 connection

The R4KSLC1 will fit in a quad electrical box and must be within 10 feet of the R4K16LV.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect a pillow speaker or CCDIN to the DIN jack.

2 Place a call.

3 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

➢ A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.

➢ With the DIN call cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

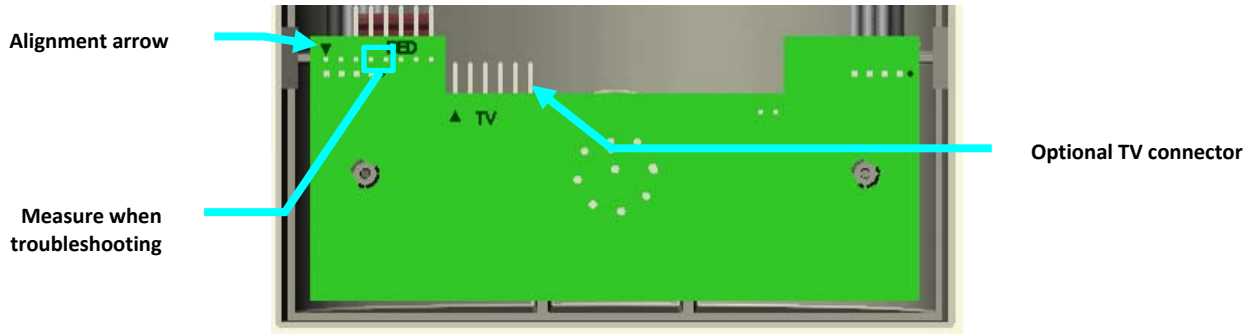


Figure 155: Single Bed Visual Station troubleshooting, Alignment arrow.

Reducing ESD Problems

The required testing limit for electrical discharges is 8,000 (8KV) volts. However, electrical discharges can exceed this limit in certain areas. Because the "Enhanced" stations have electrostatic discharge (ESD) sensitive components, we have provided a ground connection that can protect the station from discharges up to 25,000 (25kV) volts.

Attaching a Ground Wire

The ground wire (22AWG) must be soldered to the board as shown in the picture below.

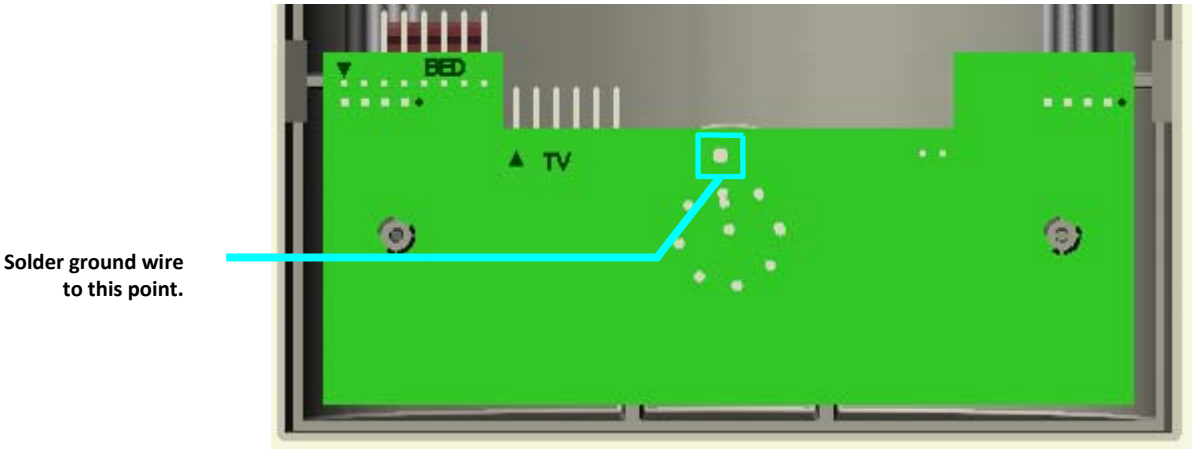


Figure 156: Attaching a ground wire.

Grounding the Ground Wire

The loose end of the ground wire must be securely attached to a known ground connection. Connecting the ground wire to a metal back-box that is not connected to Earth ground will not protect the station.

Others Things You Should Know

✓ TV audio will only sound through the pillow speaker.

- ✓ To protect the station from ESD over 8kV, connect a wire between the station and a known ground connection.
- ✓ See page 26 for instructions on removing a Station.

R4K13VA/R4K13VAHZ Single Bed Enhanced Audio Station

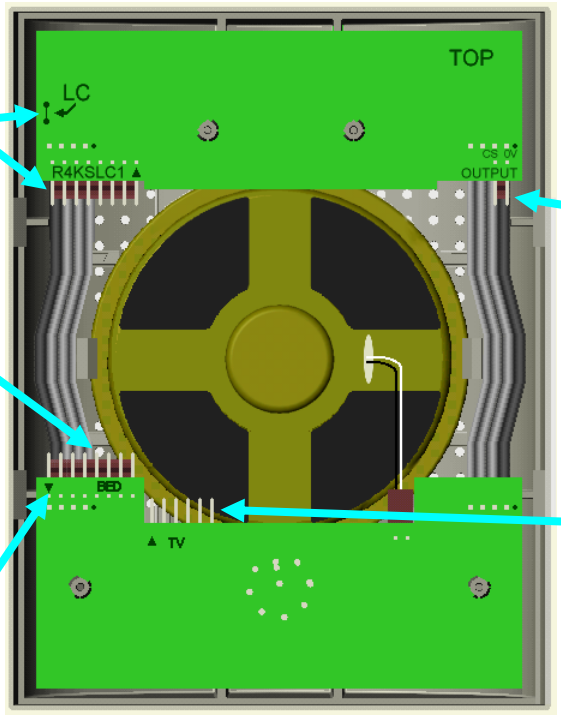
(Audio/Visual Network Compatible)

Making Connections/Interconnect

The Single Bed Enhanced Audio Station makes one required and two optional connections.

Required Connection

Connect the Single Bed Enhanced Audio Station to either Corridor Light or Domeless Controller using an 8 conductor Station Connect cable as indicated:



Optional: cut the "LC" board trace and use the eight pin connector to connect to an R4KSLC1 Single Lighting Controller.

Required: run an 8 conductor Station Connect cable from this header to the appropriate header on a Corridor Light or Domeless Controller.

Alignment arrow

Optional: use the two pin connector to connect to a radio stepper or a single low voltage controller.

Optional: use an R4KTVA pigtail to connect an optional TV to the station.

Figure 157: Single Bed Enhanced Audio Station, Rear view

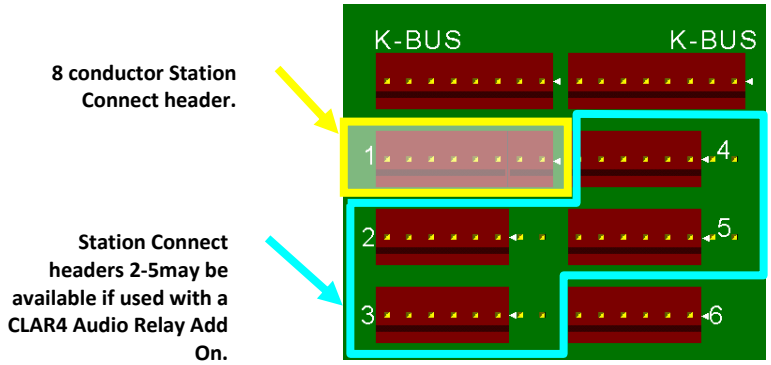
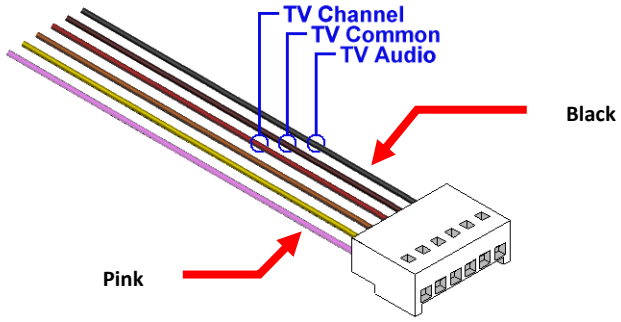


Figure 158: Audio Corridor Light/Domeless Controller PC Board

Optional TV Connection

You can connect an optional TV to the station using the R4KTVA pigtail connection. The TV connection should be made as follows:



Wire	Cable Connection
Black	TV Audio
Brown	TV Common
Red	TV Channel
Orange	----------
Yellow	----------
Pink	----------

Figure 159: R4KTVA pigtail

Optional Radio Stepper Connections

The RS1010 will only work with the NCESVA pillow speaker. Do not attempt to use it with any other pillow speaker.

You can connect an optional RS1010 Radio Stepper to the station using the two pin "OUTPUT" connector and an R4KTVA. Before connecting the Home In wire of the RS1010, measure the voltage between the TV Common and TV Channel wires. It should measure at least 12VDC. If TV Channel measures less than 12VDC, connect the Home In

wire to the 24VDC of the RS1010. The 24VDC power supply is required to power the RS1010. The R4KPR400 can not be used to power the RS1010. The Radio Stepper connection should be made as follows:

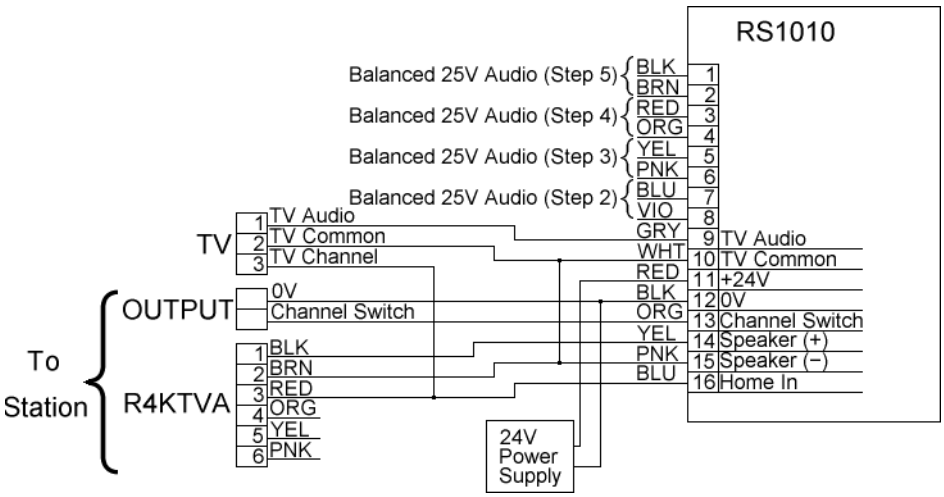


Figure 160: R4K13VA connection to RS1010 Radio Stepper

Optional Lighting Controller Connections

You can connect an optional single lighting controller to the station using the two pin "OUTPUT" connector. In this case the RS1010 Radio Stepper can not be used. The Lighting Controller connection should be made as follows:

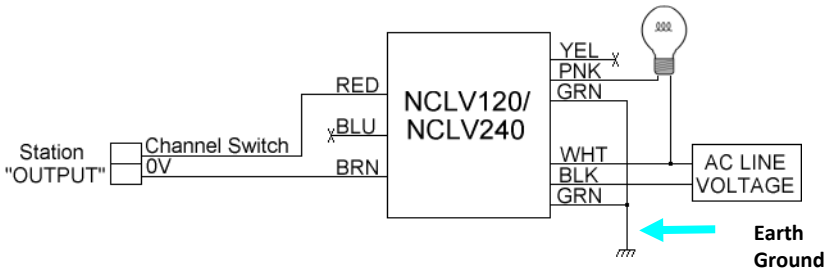


Figure 161: Single NCLV120/NCLV240 connections

As a second option for lighting control, an optional R4KSLC1 Single Lighting Controller Module can be connected to the station using the eight pin "R4KSLC1" connector. **You must cut the "LC" trace on the R4K13VA board to make this connector active.** This allows for the control of multiple lights in the room/bed area.

The "LC" trace should only be cut when adding a lighting control module. Once cut the station will not respond to any pillow speaker or call cord button presses without the lighting control module. A wire can be soldered across the trace if it is inadvertently cut.

Figure 162: Rear view of R4K13VA

The R4KSLC1 Single Lighting Controller Module connection should be made as follows:

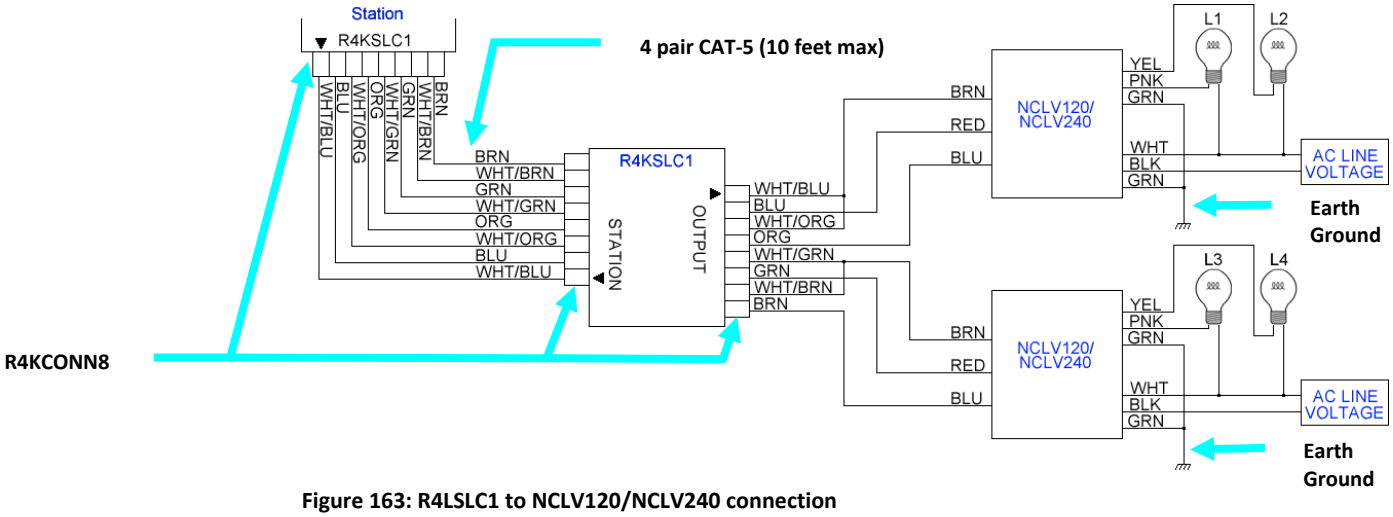


Figure 163: R4LSLC1 to NCLV120/NCLV240 connection

The R4KSLC1 will fit in a quad electrical box and must be within 10 feet of the R4K13VA.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect a pillow speaker or CCDIN to the DIN jack.

2 Place a call.

3 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

➢ A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.

➢ With the DIN call cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

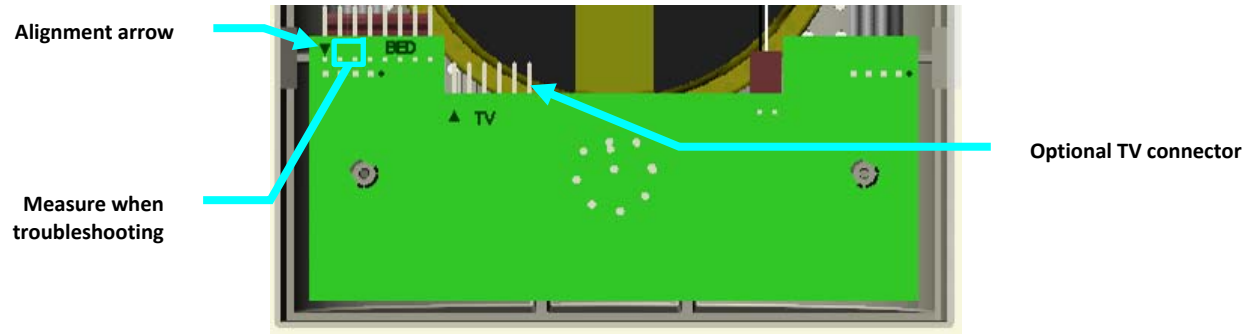


Figure 164: Single Bed Visual Station troubleshooting, Alignment arrow.

Reducing ESD Problems

The required testing limit for electrical discharges is 8,000 (8KV) volts. However, electrical discharges can exceed this limit in certain areas. Because the "Enhanced" stations have electrostatic discharge (ESD) sensitive components, we have provided a ground connection that can protect the station from discharges up to 25,000 (25kV) volts.

Attaching a Ground Wire

The ground wire (22AWG) must be soldered to the board as shown in the picture below.

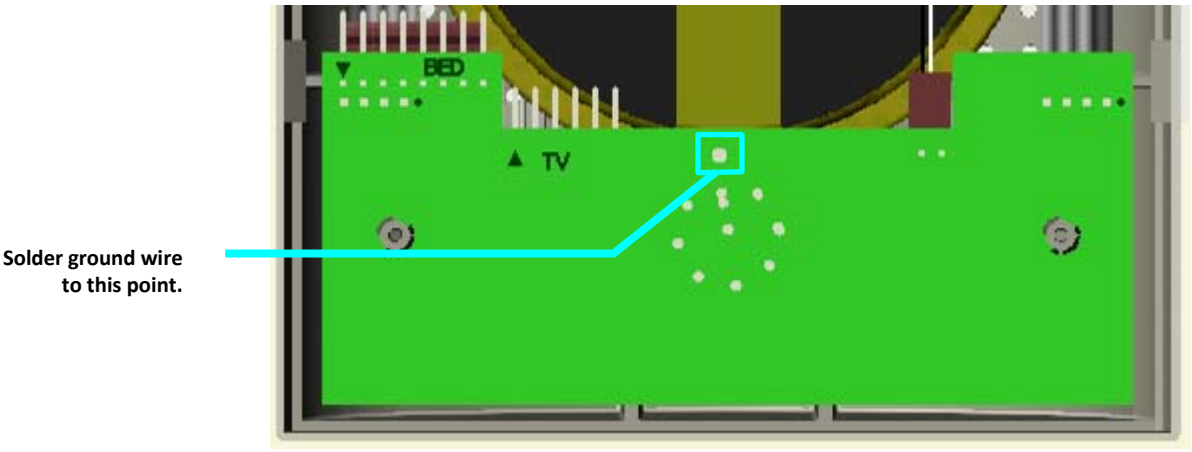


Figure 165: Attaching a ground wire.

Grounding the Ground Wire

The loose end of the ground wire must be securely attached to a known ground connection. Connecting the ground wire to a metal back-box that is not connected to Earth ground will not protect the station.

Others Things You Should Know

✓ TV audio will only sound through the pillow speaker.

- ✓ Nurse call audio will be muted at the wall speaker and transferred to the pillow speaker.
- ✓ To protect the station from ESD over 8kV, connect a wire between the station and a known ground connection.
- ✓ See page 26 for instructions on removing a Station.

R4K25LV Dual Bed Enhanced Visual Station
(Audio and Visual Only Network Compatible)

Making Connections/Interconnect

The Dual Bed Enhanced Visual Station makes two required and three optional connections.

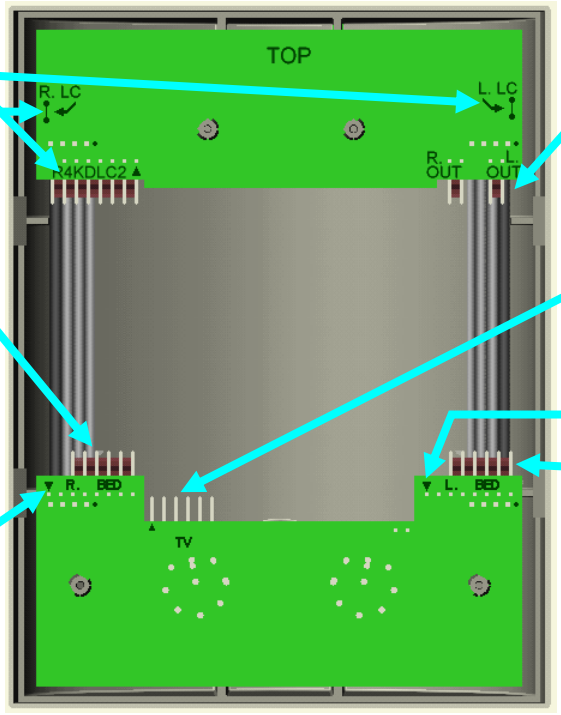
Required Connection

Connect the Dual Bed Enhanced Visual Station to either a Corridor Light or Domeless Controller using two 6 conductor Station Connect cables (Left/Right Bed) as indicated:

Optional: cut the "LC" board trace and use the eight pin connector to connect to an R4KDLC2 Dual Lighting Controller.

Required: run a 6 conductor Station Connect cable from the Right Bed header to the appropriate open header on a Corridor Light or Domeless Controller.

Right Bed Alignment arrow



Optional: use the two pin connectors to connect to radio steppers or two single low voltage controllers.

Optional: use an R4KTVA pigtail to connect an optional TV to the station.

Left Bed Alignment arrow

Required: run a 6 conductor Station Connect cable from the Left Bed header to the appropriate open header on a Corridor Light or Domeless Controller.

Figure 166: Dual Bed Enhanced Visual Station, Rear view

The right bed and left connectors are not interchangeable. They must be connected to the corridor light port which they are programmed to connect in order to cancel calls properly.

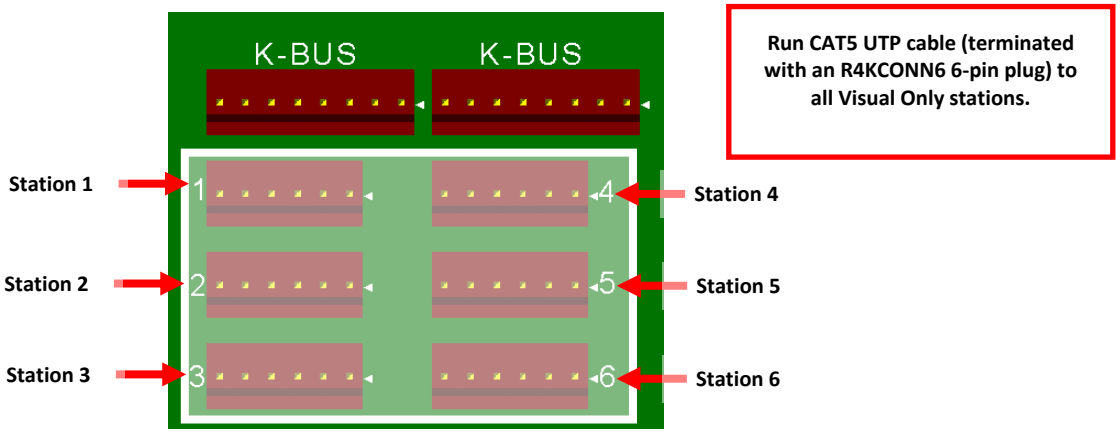
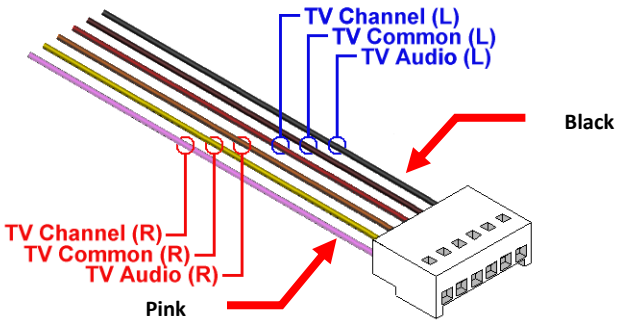


Figure 167: Corridor Light/Domeless Controller, PC Board

Optional TV Connection

You can also connect an optional TV to the station using the R4KTVA pigtail connection as follows:



Wire	Cable Connection
Black	TV Audio (left)
Brown	TV Common (left)
Red	TV Channel (left)
Orange	TV Audio (right)
Yellow	TV Common (right)
Pink	TV Channel (right)

Figure 168: R4KTVA pigtail

Optional Radio Stepper Connections

The RS1010 will only work with the NCESVA pillow speaker. Do not attempt to use it with any other pillow speaker.

You can connect optional RS1010 Radio Steppers to the station using the two pin "OUTPUT" connectors and an R4KTVA. Before connecting the Home In wire of the RS1010, measure the voltage between the TV Common and TV Channel wires. It should

measure at least 12VDC. If TV Channel measures less than 12VDC, connect the Home In wire to the 24VDC of the RS1010. The 24VDC power supply is required to power the RS1010. The R4KPR400 can not be used to power the RS1010. The Radio Stepper connection should be made as follows:

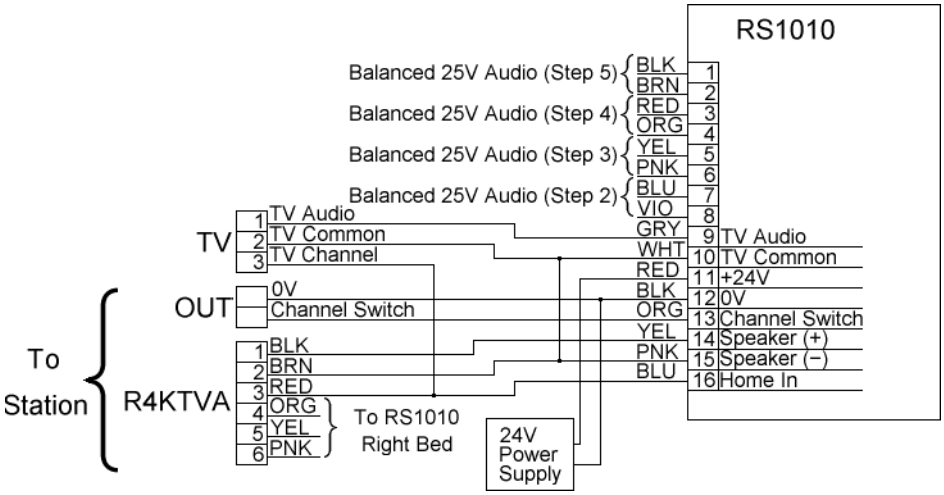


Figure 169: R4K25LV connection to RS1010 Radio Stepper

Optional Lighting Controller Connections

You can connect optional single lighting controllers to the station using the two pin "R OUT" and "L OUT" connectors. In this case the RS1010 Radio Stepper can not be used. The Lighting Controller connections should be made as follows:

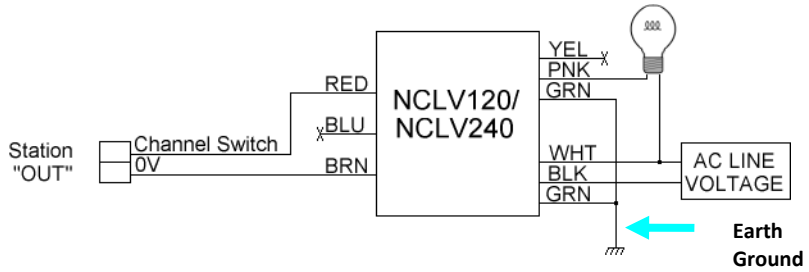


Figure 170: Single NCLV120/NCLV240 connections

As a second option for lighting control, an optional R4KDLC2 Dual Lighting Controller Module can be connected to the station using the eight pin "R4KDLC2" connector. **You must cut the "LC" trace on the R4K25LV board to make this connector active.** This allows for the control of multiple lights in the room/bed area.

The "LC" trace should only be cut when adding a lighting control module. Once cut the station will not respond to any pillow speaker or call cord button presses without the lighting control module. A wire can be soldered across the trace if it is inadvertently cut.

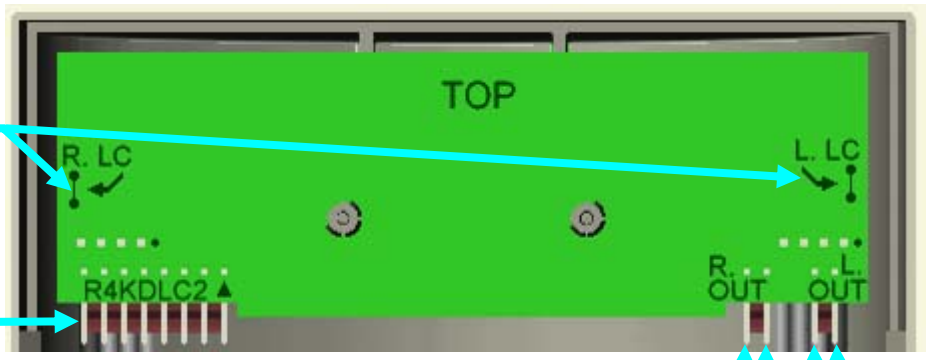


Figure 171: Rear view of R4K25LV

The R4KDLC2 Dual Lighting Controller Module connection should be made as follows:

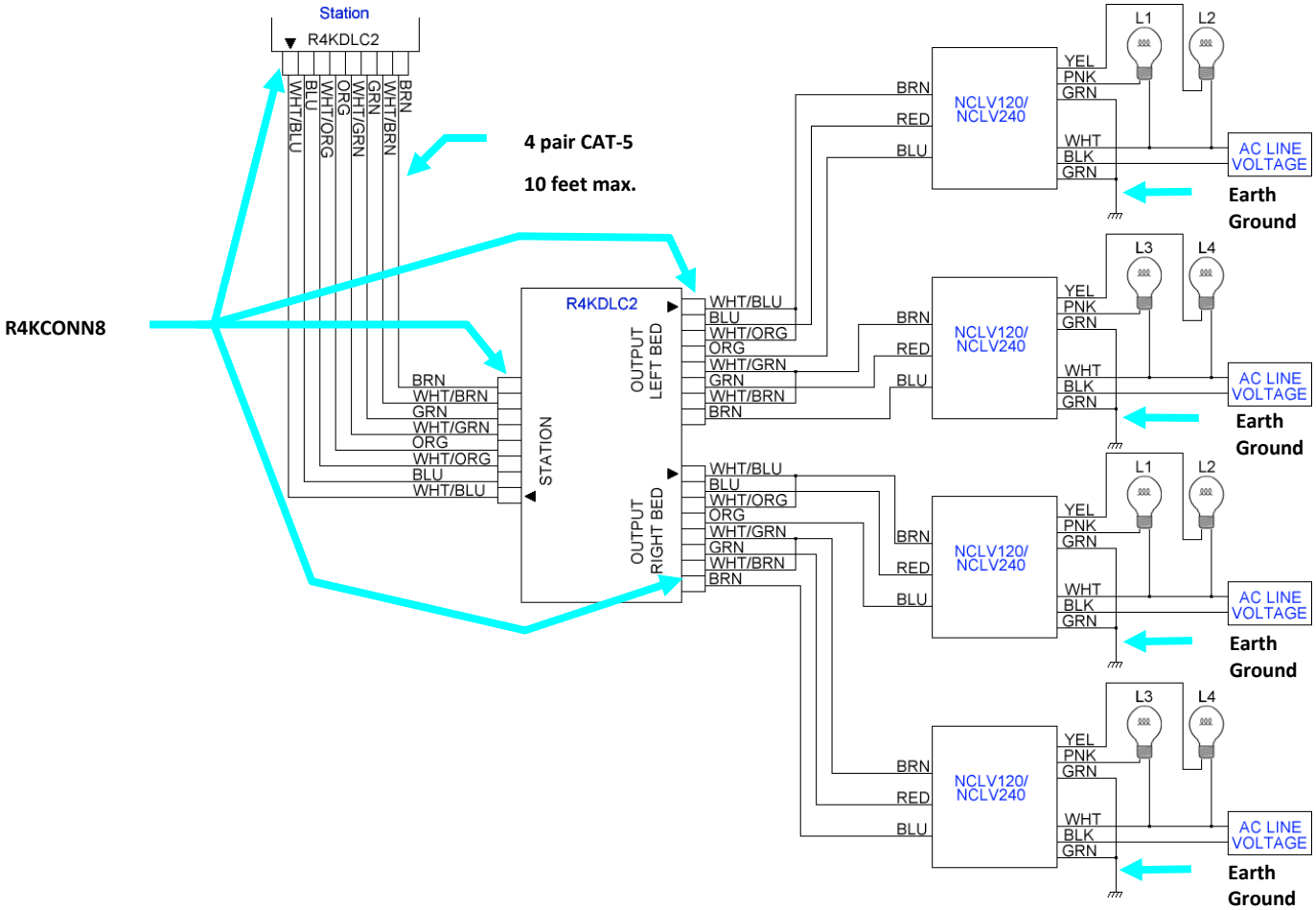


Figure 172: R4LDLC2 to NCLV120/NCLV240 connection

The R4KDLC2 will fit in a quad electrical box and must be within 10 feet of the R4K25LV.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect a pillow speaker or CCDIN to the DIN jack.

2 Place a call.

3 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

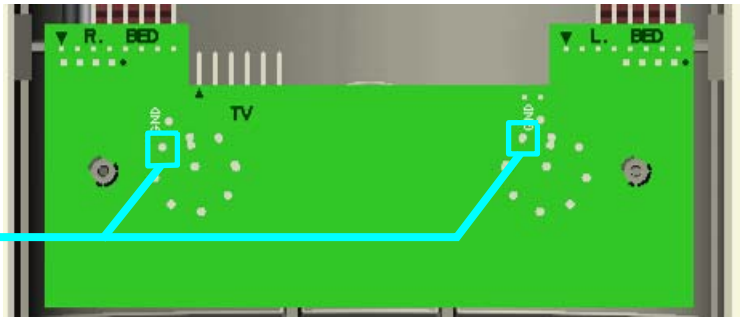
Figure 173: Dual Bed Enhanced Visual Station troubleshooting, Alignment arrows

Reducing ESD Problems

The required testing limit for electrical discharges is 8,000 (8KV) volts. However, electrical discharges can exceed this limit in certain areas. Because the "Enhanced" stations have electrostatic discharge (ESD) sensitive components, we have provided a ground connection that can protect the station from discharges up to 25,000 (25kV) volts.

Attaching Ground Wires

The ground wires (24AWG) must be soldered to the board as shown in the picture below.



Solder ground wires to these points.

Figure 174: Attaching ground wires.

Grounding the Ground Wires

The loose end of the ground wires must be securely attached to a known ground connection. Connecting the ground wires to a metal back-box that is not connected to Earth ground will not protect the station.

Others Things You Should Know

- ✓ TV audio will only sound through the pillow speaker.
- ✓ To protect the station from ESD over 8kV, connect a wire between the station and a known ground connection.
- ✓ See page 26 for instructions on removing a Station.

R4K23VA Dual Bed Enhanced Audio Station
(Audio/Visual Network Compatible)

Making Connections/Interconnect

The Dual Bed Enhanced Audio Station makes two required and three optional connections.

Required Connection

Connect the Dual Bed Enhanced Audio Station to either a Corridor Light or Domeless Controller with a CLAR4, using two 8 conductor Station Connect cables (Left/Right Bed) as indicated:

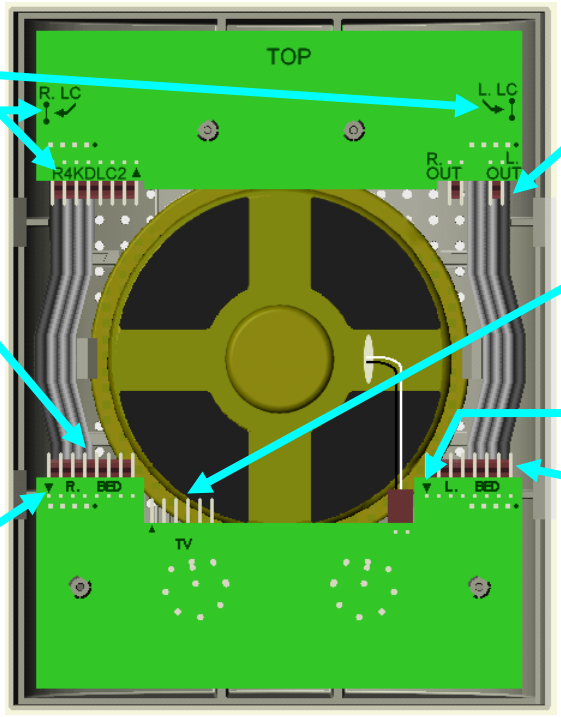
Optional

Cut the "LC" board trace and use the eight pin connector to connect to an R4KDLC2 Dual Lighting Controller.

Required

Run an 8 conductor Station Connect cable from the Right Bed header to the appropriate open header on a Corridor Light or Domeless Controller.

Right Bed Alignment arrow



Optional
Use the two pin connectors to connect to radio steppers or two single low voltage controllers.

Optional
Use an R4KTVA pigtail to connect an optional TV to the station.

Left Bed Alignment arrow

Required
Run an 8 conductor Station Connect cable from the Left Bed header to the appropriate open header on a Corridor Light or Domeless Controller.

Figure 175: Dual Bed Enhanced Visual Station, Rear view

Important

The R4K23VA requires a CLAR4 for routing audio to each pillow speaker. The right bed and left connectors are not interchangeable. They must be connected to the corridor light port which they are programmed to connect in order to cancel calls properly.

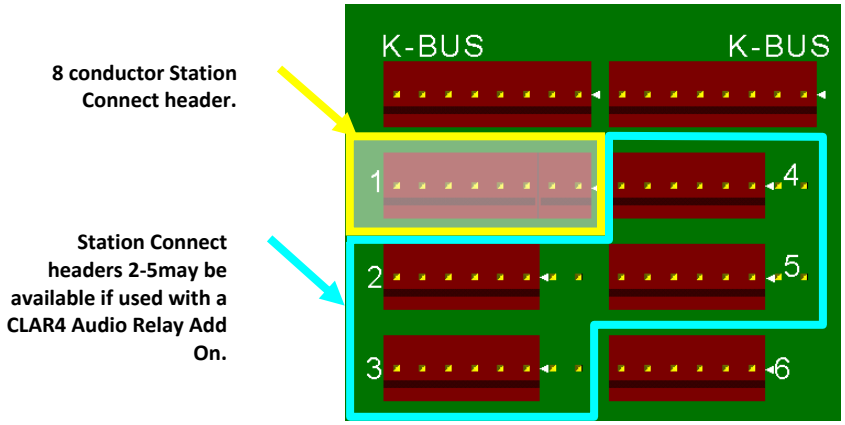
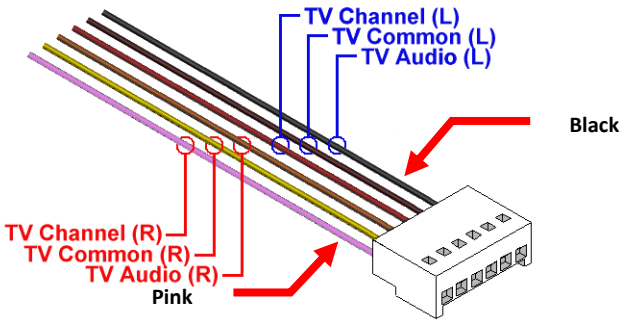


Figure 176: Audio Corridor Light/Domeless Controller PC Board

Optional TV Connection

You can also connect an optional TV to the station using the R4KTVA pigtail connection as follows:



Wire	Cable Connection
Black	TV Audio (left)
Brown	TV Common (left)
Red	TV Channel (left)
Orange	TV Audio (right)
Yellow	TV Common (right)
Pink	TV Channel (right)

Figure 177: R4KTVA pigtail

Optional Radio Stepper Connections

Warning

The RS1010 will only work with the NCESVA pillow speaker. Do not attempt to use it with any other pillow speaker.

You can connect optional RS1010 Radio Steppers to the station using the two pin "OUTPUT" connectors and an R4KTVA. Before connecting the Home In wire of the RS1010, measure the voltage between the TV Common and TV Channel wires. It should measure at least 12VDC. If TV Channel measures less than 12VDC, connect the Home In wire to the 24VDC of the RS1010. The 24VDC power supply is required to power the RS1010. The R4KPR400 can not be used to power the RS1010. The Radio Stepper connection should be made as follows:

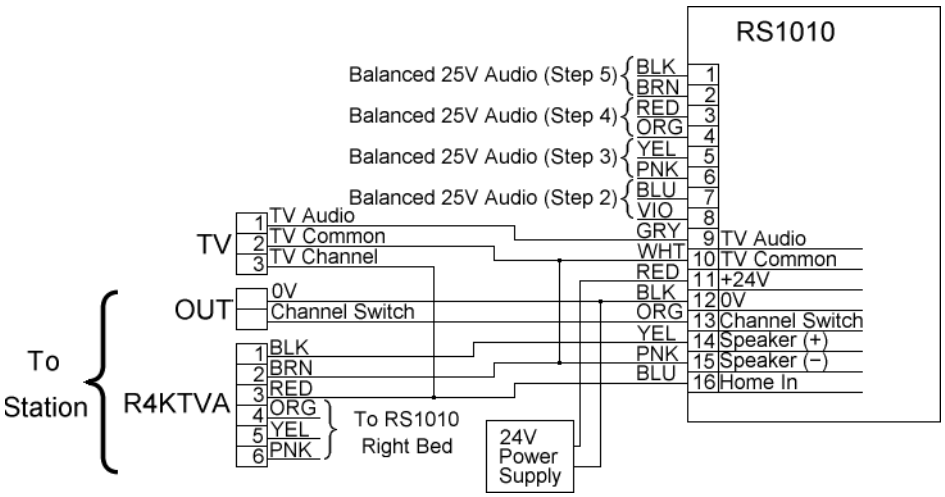


Figure 178: R4K23VA connection to RS1010 Radio Stepper

Optional Lighting Controller Connections

You can connect optional single lighting controllers to the station using the two pin "R OUT" and "L OUT" connectors. In this case the RS1010 Radio Stepper can not be used. The Lighting Controller connections should be made as follows:

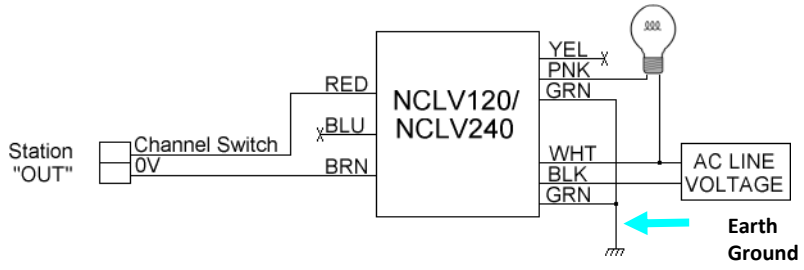


Figure 179: Single NCLV120/NCLV240 connections

As a second option for lighting control, an optional R4KDLC2 Dual Lighting Controller Module can be connected to the station using the eight pin "R4KDLC2" connector. **You must cut the "LC" trace on the R4K23VA board to make this connector active.** This allows for the control of multiple lights in the room/bed area.

Important:

The "LC" trace should only be cut when adding a lighting control module. Once cut the station will not respond to any pillow speaker or call cord button presses without the lighting control module. A wire can be soldered across the trace if it is inadvertently cut.

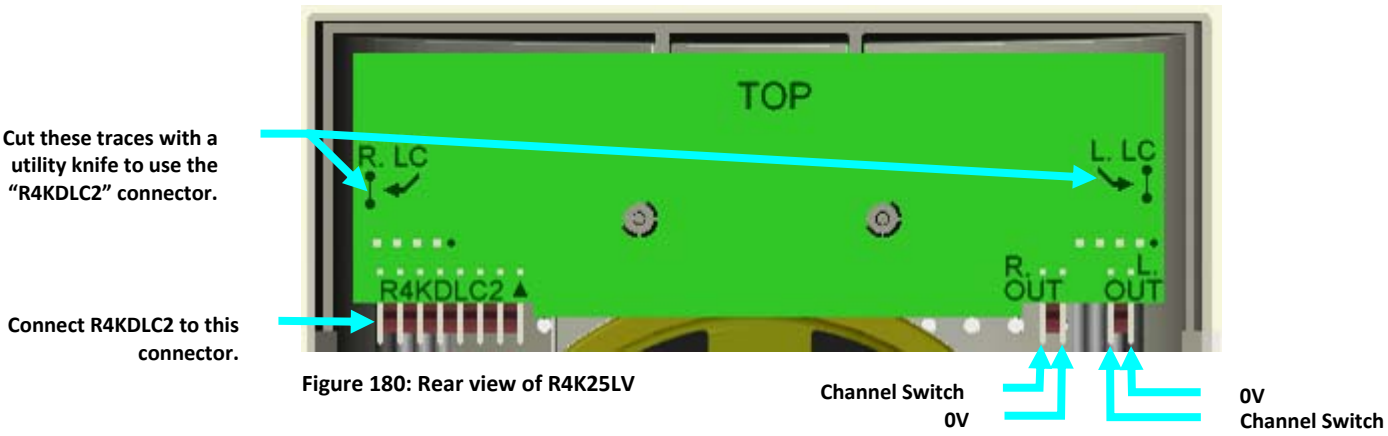


Figure 180: Rear view of R4K25LV

The R4KDLC2 Dual Lighting Controller Module connection should be made as follows:

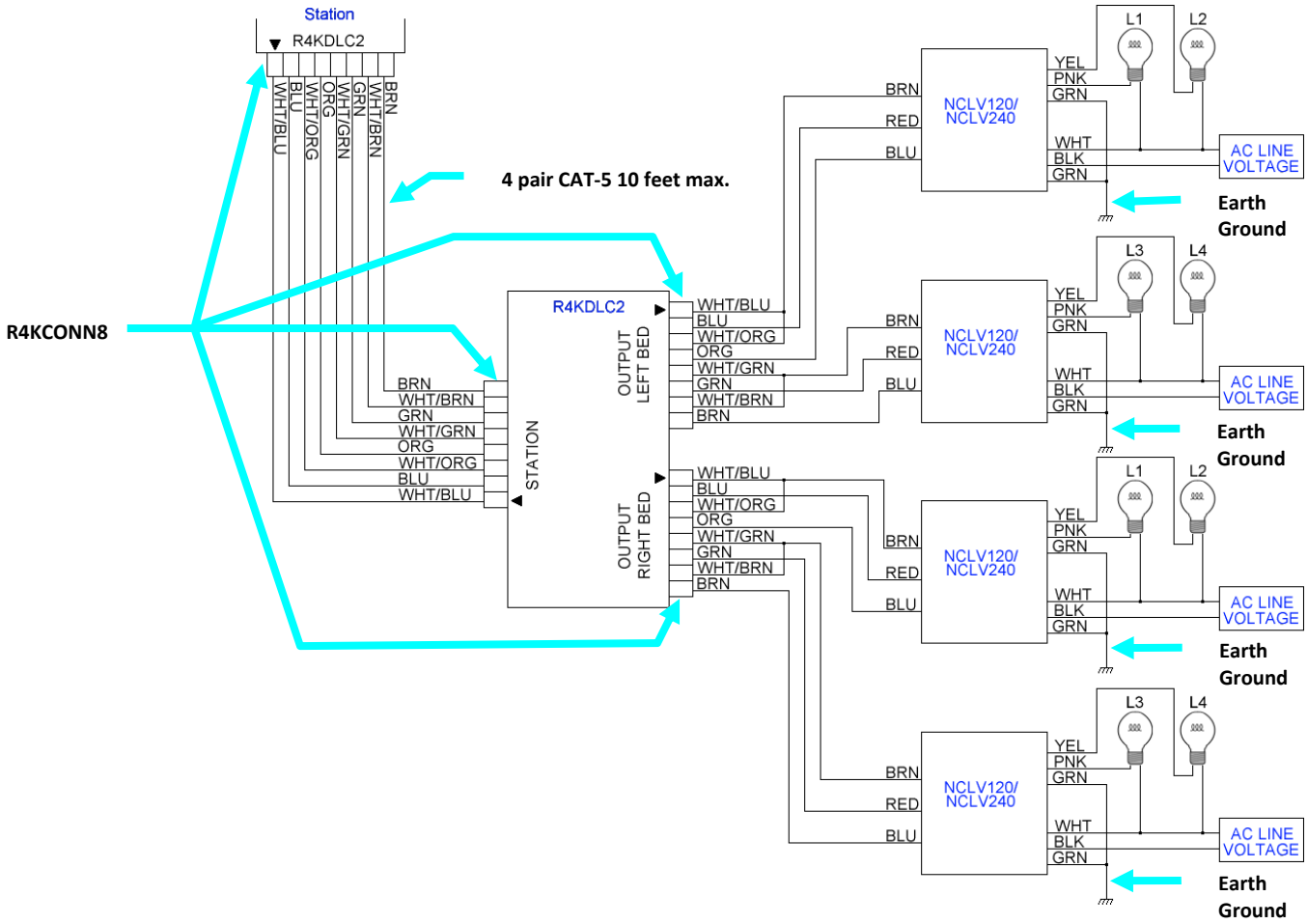


Figure 181: R4LDLC2 to NCLV120/NCLV240 connection

The R4KDLC2 will fit in a quad electrical box and must be within 10 feet of the R4K23VA.

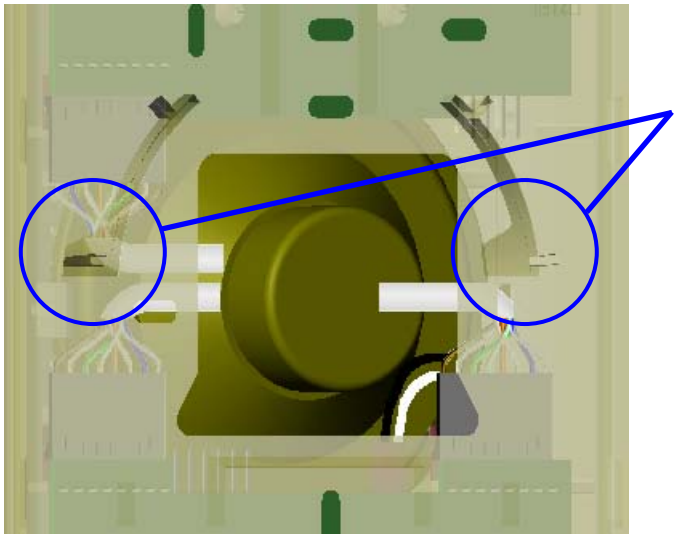


Figure 182: See-through view of R4K23VA/backplate and wiring

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect a pillow speaker or CCDIN to the DIN jack.

2 Place a call.

3 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

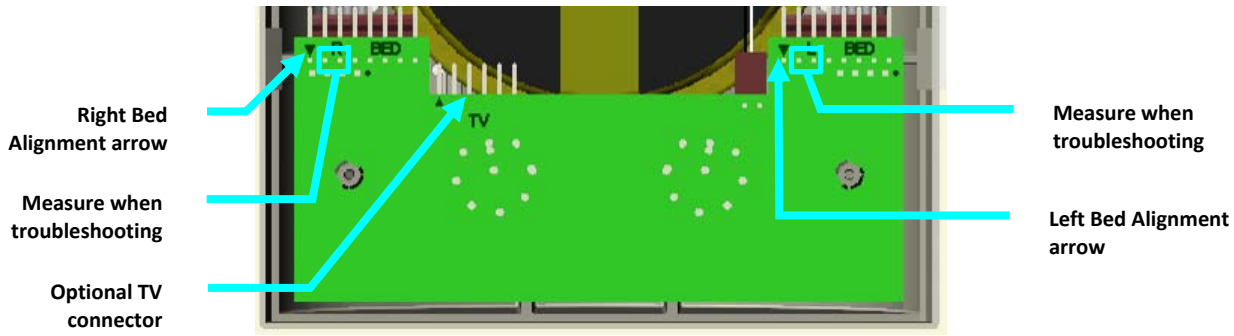


Figure 183: Dual Bed Enhanced Visual Station troubleshooting, Alignment arrows

Reducing ESD Problems

The required testing limit for electrical discharges is 8,000 (8KV) volts. However, electrical discharges can exceed this limit in certain areas. Because the "Enhanced" stations have electrostatic discharge (ESD) sensitive components, we have provided a ground connection that can protect the station from discharges up to 25,000 (25kV) volts.

Attaching Ground Wires

The ground wires (24AWG) must be soldered to the board as shown in the picture below.

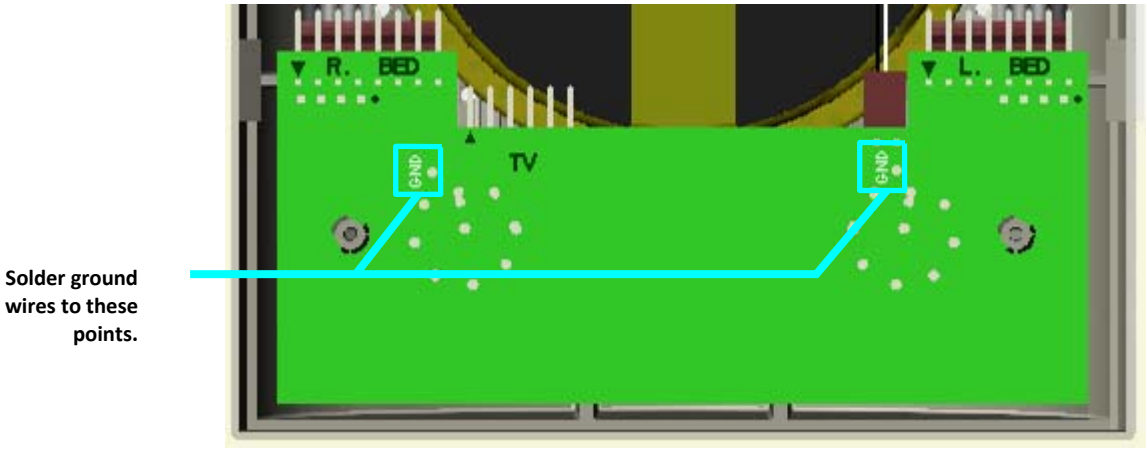


Figure 184: Attaching ground wires

Grounding the Ground Wires

The loose end of the ground wires must be securely attached to a known ground connection. Connecting the ground wires to a metal back-box that is not connected to Earth ground will not protect the station.

Others Things You Should Know

- ✓ TV audio will only sound through the pillow speaker.
- ✓ To protect the station from ESD over 8kV, connect a wire between the station and a known ground connection.
- ✓ Nurse call audio will be muted at the wall speaker and transferred to the pillow

speaker.

- ✓ The R4K23VA requires a CLAR4 for routing audio to each pillow speaker.
- ✓ Two R4KFB1s are required when used with an R4K23VA and multiple feature beds. The R4KFB1s will connect to Corridor Light/Domeless Controller points 2&3 and 4&5.
- ✓ See page 26 for instructions on removing a Station.

R4K14SA Staff Assist Bed Station
(Audio/Visual Network Compatible)

Making Connections

The Staff Assist Bed Station makes two required and one optional connection.

Required Connections

Connect the Staff Assist Bed Station to either an Audio Corridor Light (CLA222 or CLA244) or Domeless Controller (DCA200 or DCA216) using an 8 conductor Station Connect cable (DIN Jack) and 6 conductor Station Connect cable (Call Button) as indicated:

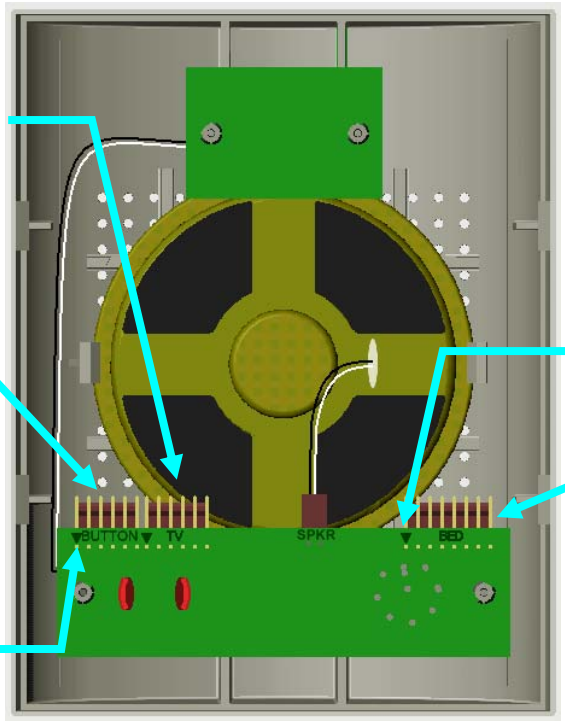


Figure 185: Staff Assist Bed Station, Rear View

The right bed and left connectors are not interchangeable. They must be connected to the corridor light port which they are programmed to connect in order to cancel calls properly.

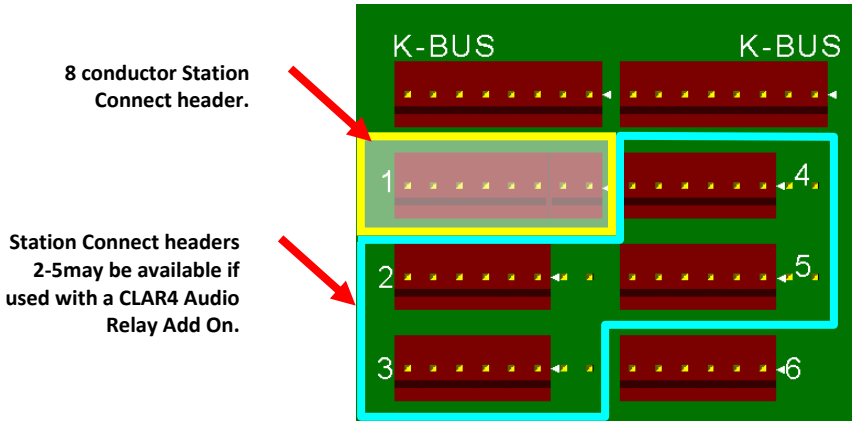
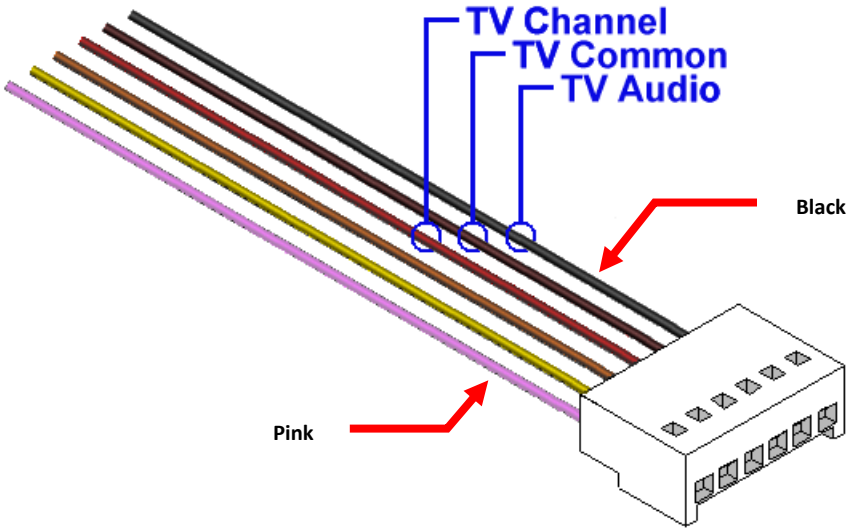


Figure 186: Audio Corridor Light/Domeless Controller

Optional TV Connection

You can also connect an optional TV to the station using the R4KTVA pigtail connection. The TV connection should be made as follows:



Wire	Cable Connection
Black	TV Audio
Brown	TV Common
Red	TV Channel
Orange	----------
Yellow	----------
Pink	----------

Figure 187: R4KTVA pigtail

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect a pillow speaker or CCDIN to the DIN jack.

2 Place a call.

3 Verify the call assurance (red) LED is lit and an audio path has been established to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cables from the corridor light.

3 Measure the resistance of the white/brown & green/white wires for the DIN Jack and white/green & orange/white wires for the Call Button.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the DIN Jack will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

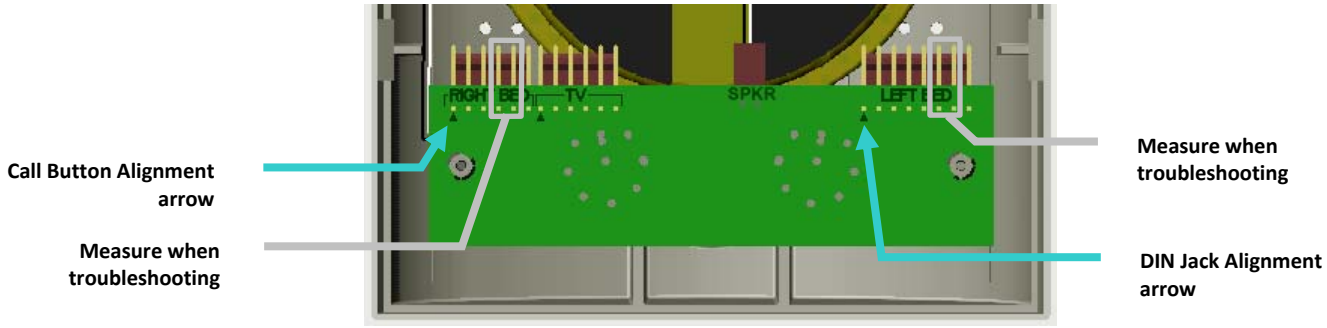


Figure 188: Staff Assist Bed Station troubleshooting, Alignment arrows.

Others Things You Should Know

- ✓ TV audio will only go through the pillow speaker.
- ✓ TV audio is not muted during communication.
- ✓ See page 26 for instructions on removing a Station.

R4KCB10/R4KCB12 Code, R4KPB11 Push-for-Help, R4KPB22 Dual Pushbutton, R4KRA1 Resident Assist, R4KCNCL Cancel, R4KSR1 Staff Registration, & R4KESR Emergency Staff Registration Stations

(Audio and Visual Only Network Compatible)

Making Connections

Connect the Push Button(s) Station to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216 or DCA214D) using a 6 conductor Station Connect cable as indicated:

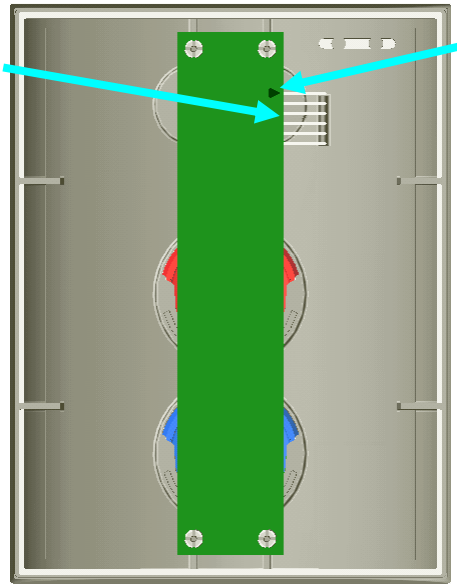


Figure 189: Push Button(s) Station, Rear View

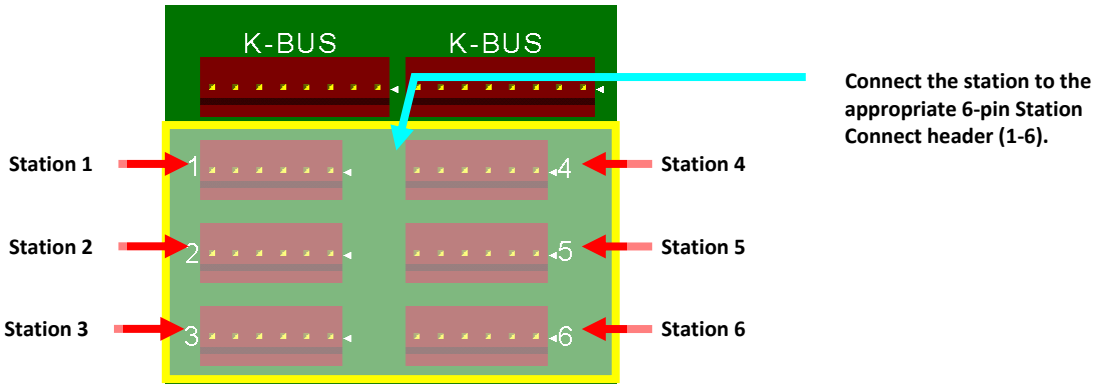


Figure 190: Corridor Light/Domeless Controller, PC Board

R4KCB12 and R4KPB22 Timer Connections

The R4KCB12 Code Station and R4KPB22 Dual Push Button Station provide an optically-isolated output rated at 10mA for interfacing to an elapsed timer as follows:

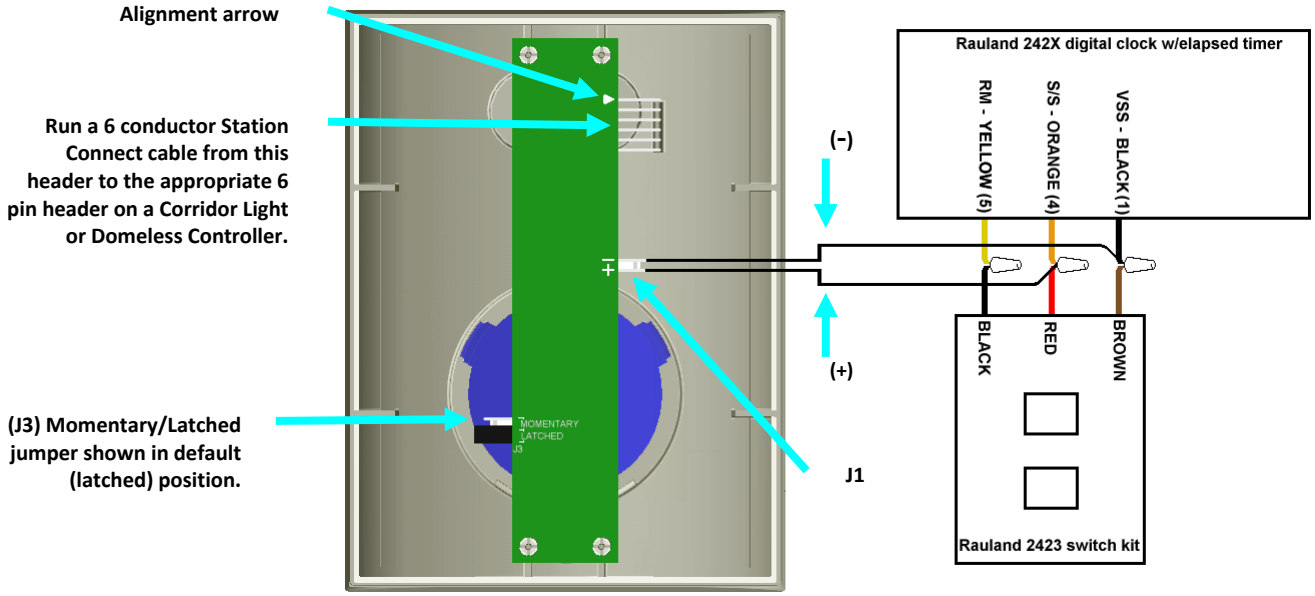


Figure 191: R4KCB12 elapsed timer connections (same for R4KPB22)

2423 Switch Kit	Clock	R4KCB12/R4KPB22
Black	RM – Yellow (5)	------
Red	S/S – Orange (4)	J1 (+)
Brown	VSS – Black (1)	J1 (-)

Table 37: R4KCB12/R4KPB22 elapsed timer wiring

If used with the recommended Rauland 2421 Digital Clock Timer/2423 Elapsed Timer Switch Kit combination, the J3 Jumper should be positioned in the latched position. This will not allow the clock to be reset until the call is cancelled. For other clocks, check manufacturer's recommendations regarding momentary or latched conditions.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Press the button to place a call.

2 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

➢ A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

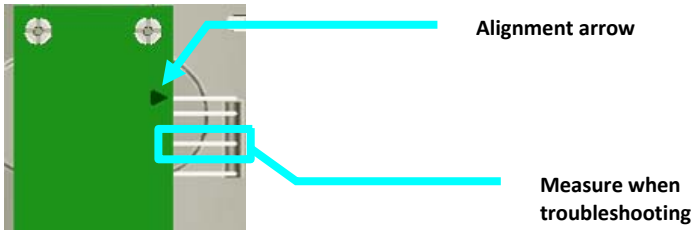


Figure 192: Push Button(s) Station Troubleshooting, Alignment arrow

Other Things You Should Know

✓ By default, the R4KCB12 is a supervised station. It will place a "fail" call at the console if disconnected, has wiring shorts, or malfunctions. You can block this automatic call for systems that do not require UL1069 Code supervision. For instructions, consult KI2015, the *Responder® 4000 Configuration Guide* (System Wide Options).

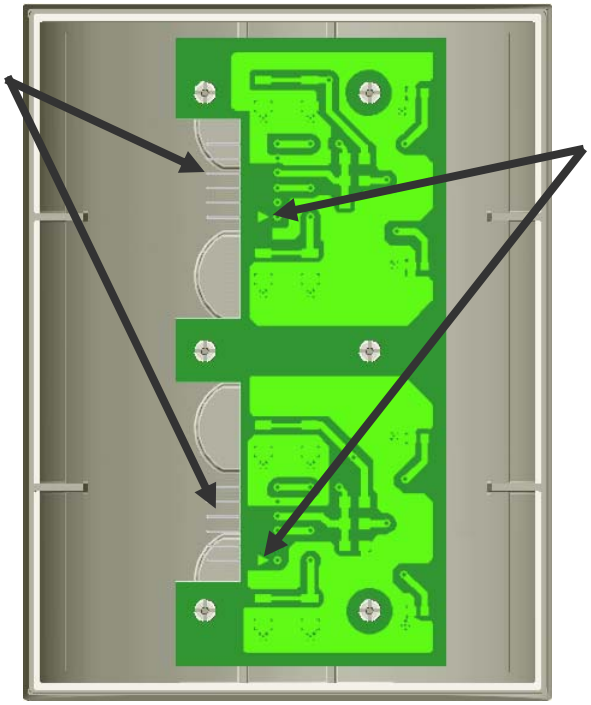
✓ See page 26 for instructions on removing a Station.

R4KPB44 Station
(Audio and Visual Only Network Compatible)

Making Connections

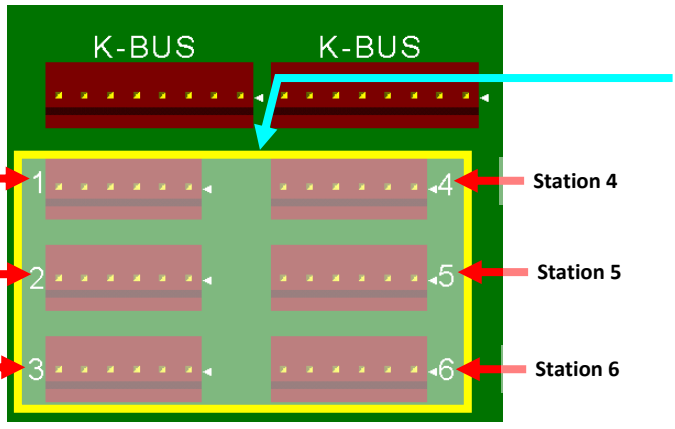
Connect the Push Button Station to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216 or DCA214D) using two 6 conductor Station Connect cables as indicated:

Run 6 conductor Station Connect cables from these headers to the appropriate 6 pin headers on a Corridor Light or Domeless Controller.



Alignment arrows

Figure 193: R4KPB44, Rear View



Connect the station to the appropriate 6-pin Station Connect headers (1-6).

Figure 194: Corridor Light/Domeless Controller, PC Board

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Press the buttons to light the corresponding corridor light color.

2 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cables from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

➢ A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

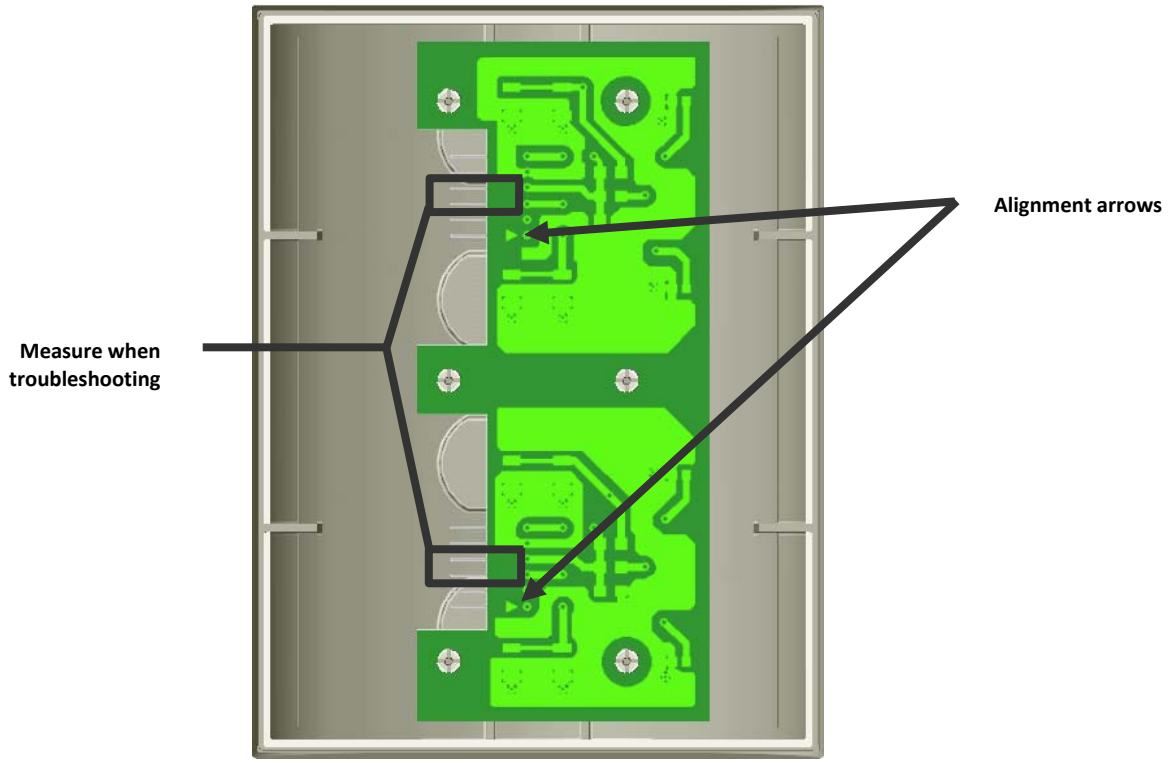


Figure 195: R4KPB44 Troubleshooting, Alignment arrow

Other Things You Should Know

✓ See page 26 for proper instructions on removing a Station.

R4KDY Duty Station
(Audio and Visual Only Network Compatible)

Making Connections

The Duty Station makes two connections to the DCA214D Domeless Duty Controller or CLA214D Duty Corridor Light.

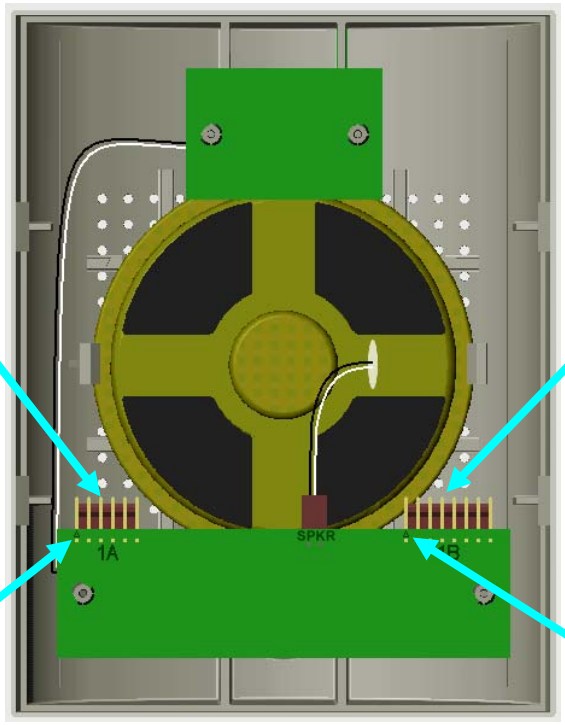


Figure 196: Duty Station

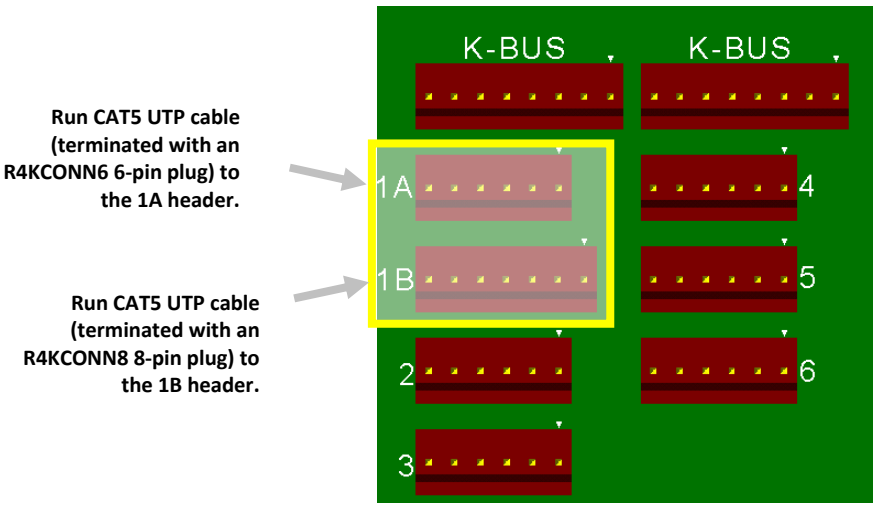


Figure 197: Duty Corridor Light connections

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Press the button to place a call.

2 Place a call from each accessory.

3 Verify the call assurance (red) LED is lit and an audio path has been established to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the 8 conductor station cable from the corridor light

3 Measure the resistance of the white/brown & green/white wires.

➢ A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

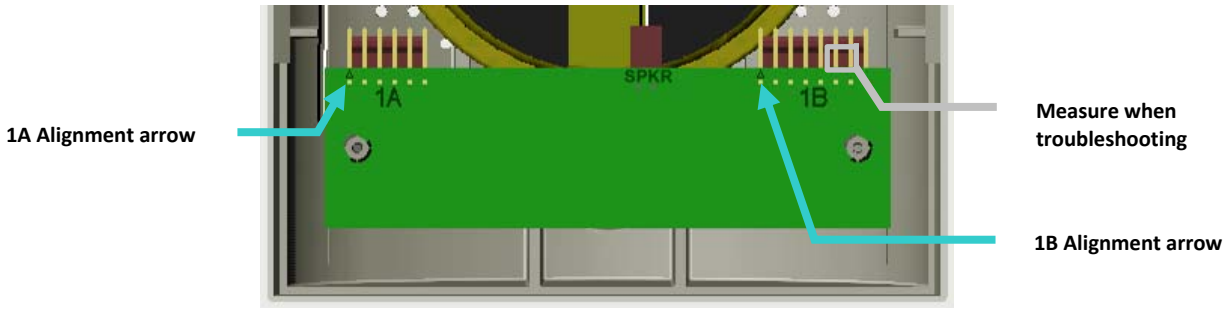


Figure 198: Duty station troubleshooting, Alignment arrow.

Others Things You Should Know

✓ The lights in the Duty Station are driven by the white, green, red and blue lights of the Duty Corridor Light. They **cannot** flash or light independent of the Corridor Light.

✓ See page 26 for instructions on removing a Station.

R4KPC10 Pullcord Station
(Audio and Visual Only Network Compatible)

Making Connections

Connect the Pullcord (shower) Station to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216 or DCA214D) using a 6 conductor Station Connect cable as indicated:

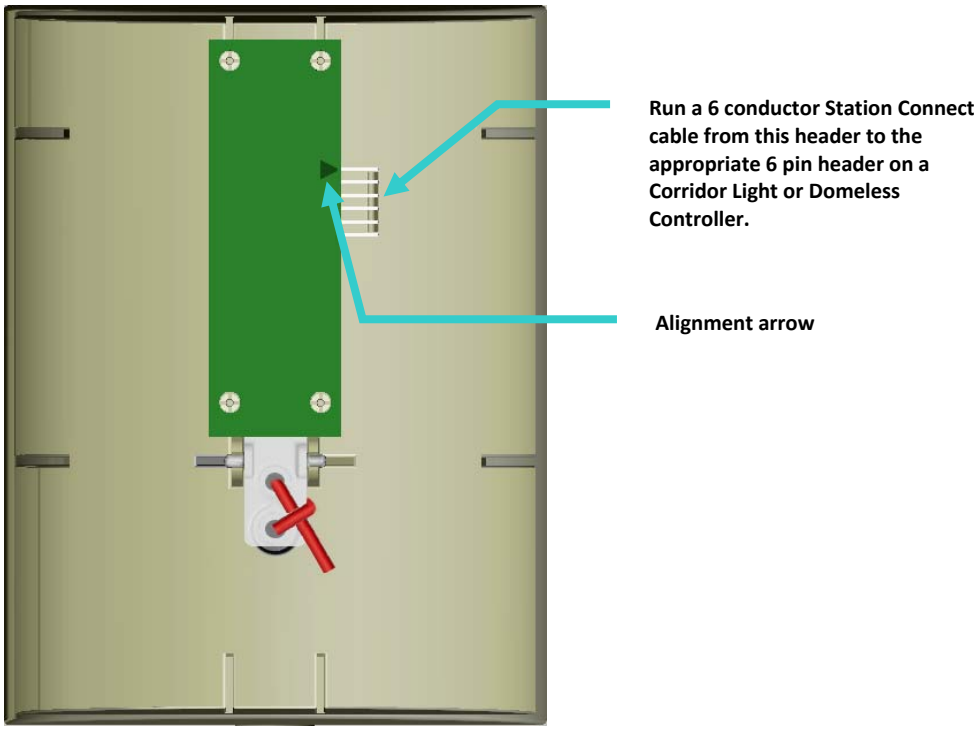


Figure 199: Pullcord Station, Rear View

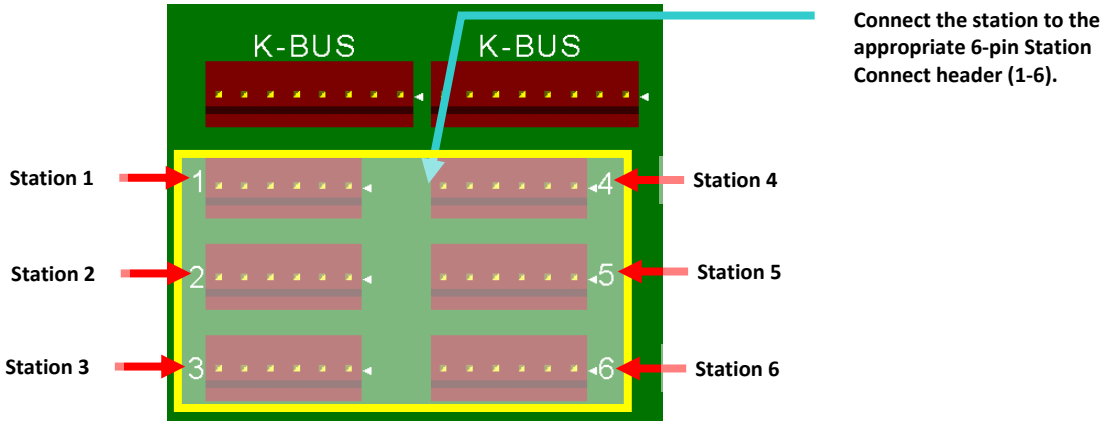


Figure 200: Corridor Light/Domeless Controller station connections

Mounting the Unit in a Shower Environment

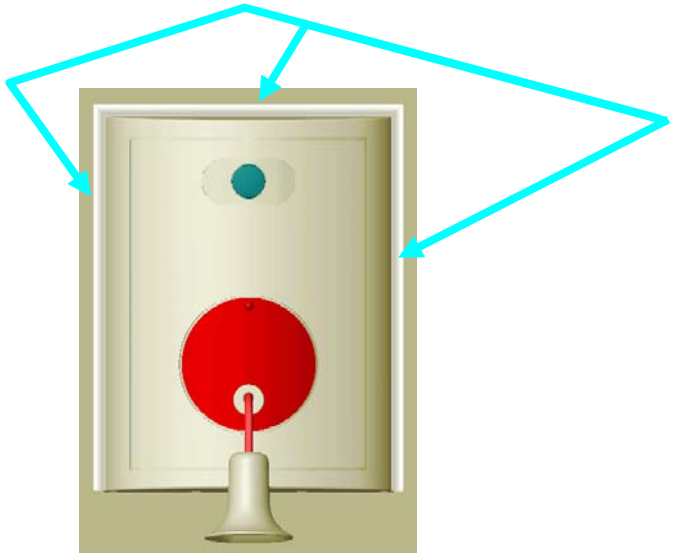
Mounting the Pullcord Station in a Shower Environment:

1 Attach the Station Base directly to a wall **or** to a single gang box using the provided screws.

2 Snap the Station to the Station Base.

3 Run a bead of caulk along the top and sides to splash-proof the station.

➢ Do **NOT** caulk the bottom! The bottom is left uncaulked in order to allow moisture to escape.



Although the Plate/Station combination is water-resistant, we recommend you run a bead of silicone caulk around the top and two sides of the station face. Do NOT caulk the bottom.

Figure 201: Pullcord Station with Caulking Call-outs (highlighted)

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Pull the cord to place a call.

2 Verify the call assurance (red) LED is lit when each call is placed.

Procedure 2

Set the meter to measure 10Kohms or higher.

1 Remove the station cable from the corridor light.

2 Measure the resistance of the white/green & orange/white wires.

➢ A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.

3 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

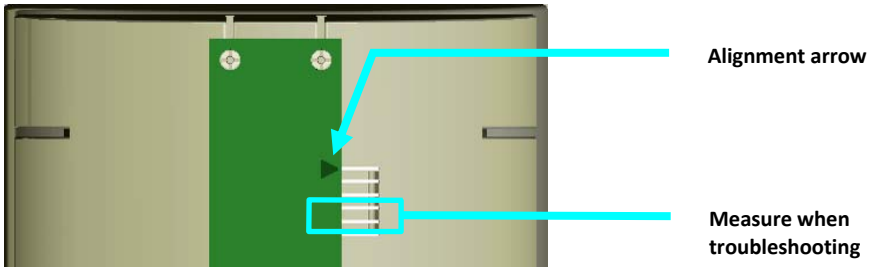


Figure 202: Pullcord Station Troubleshooting, Alignment arrow

Replacing the Cord

Should you need to replace the station's cord at any time, observe the following procedure:

Step 1 Pull the cord through the bottom hole 3-4 inches:

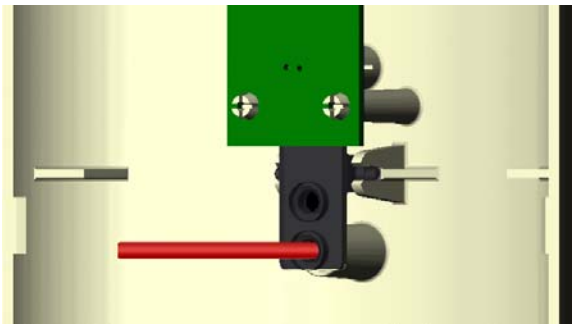


Figure 203: Step 1 (Insert New Cord)

Step 2 Run the cord to the right around the lever and through the hole in the center. Leave a small loop in the cord:

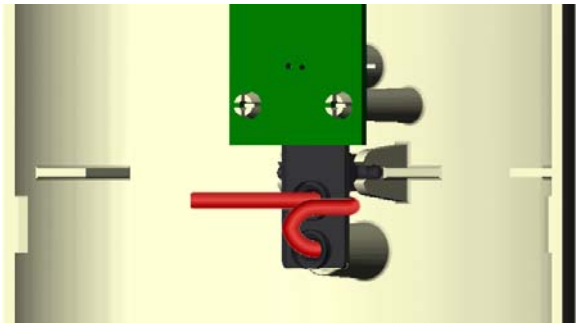


Figure 204: Step 2 (Run cord around back and through hole in the center)

Step 3 Run the cord under the small loop and cut the cord to 1 inch:

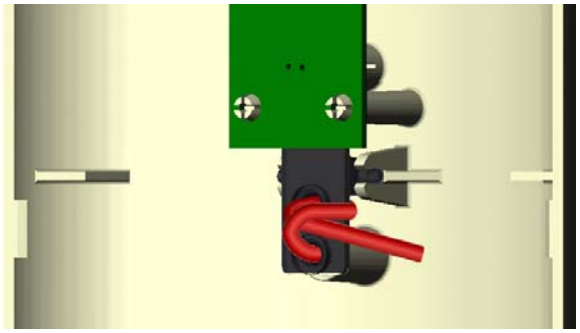


Figure 205: Step 3 (Finish the knot)

Step 4 Test the assembly by pulling the cord and listening for the switch to click. This will also tighten the small loop.

Adjusting the cord length/replacing the bell

In order to prevent the bell-end from falling off the cord, observe the following figure eight knot-tying procedure:

Step 1 Thread replacement cord through bell end.

Step 2 Loop the cord as shown above.

Step 3 Create the second loop.

Step 4 Pull the cord through the hole and tighten.

Step 5 Trim excess cord, and slide the bell over the knot to secure.

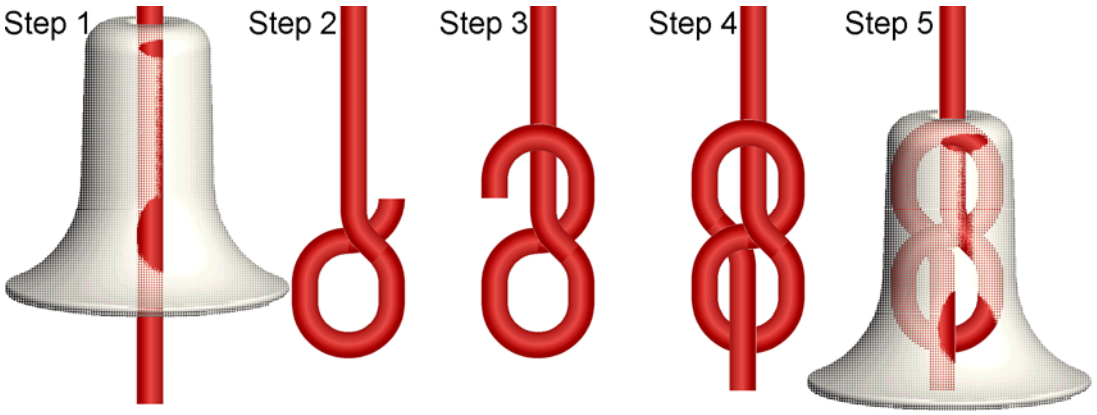
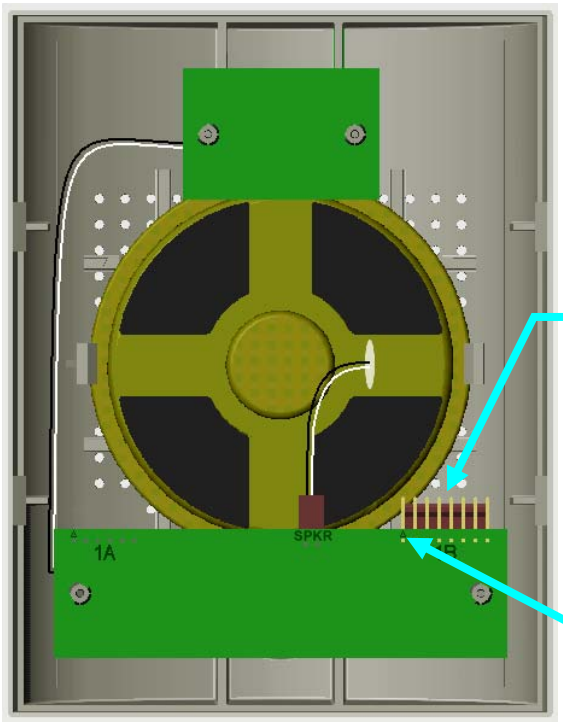


Figure 206: Figure eight knot

R4KSS Staff Station
(Audio/Visual Network Compatible)

Making Connections

Connect the Staff Station to any Audio Corridor Light (CLA222 or CLA244) or Audio Domeless Controller (DCA200, or DCA216) using an 8 conductor Station Connect cable as indicated:



Run an 8 conductor Station Connect cable from this header to the appropriate 8 pin header on an Audio Corridor Light or Domeless Controller.

Alignment arrow

Figure 207: Staff Station, Rear View

Run CAT5 UTP cable (terminated with an R4KCONN8 8-pin plug) to the Staff Station Audio Connect header.

Station 1

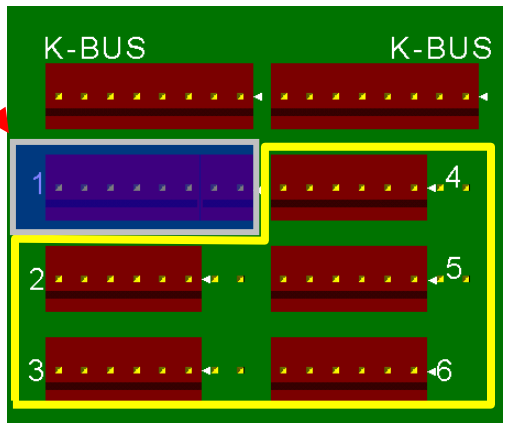


Figure 208: Staff station Corridor Light Connection

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Place a call.

2 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/brown & green/white wires.

➢ A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

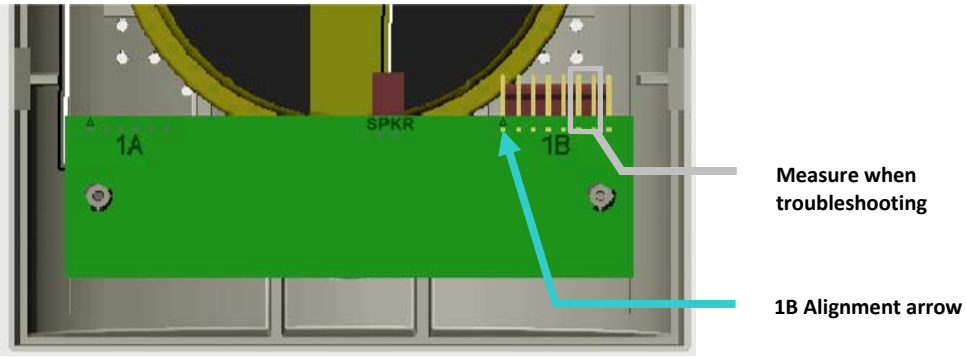


Figure 209: Staff Station Troubleshooting, Alignment arrow.

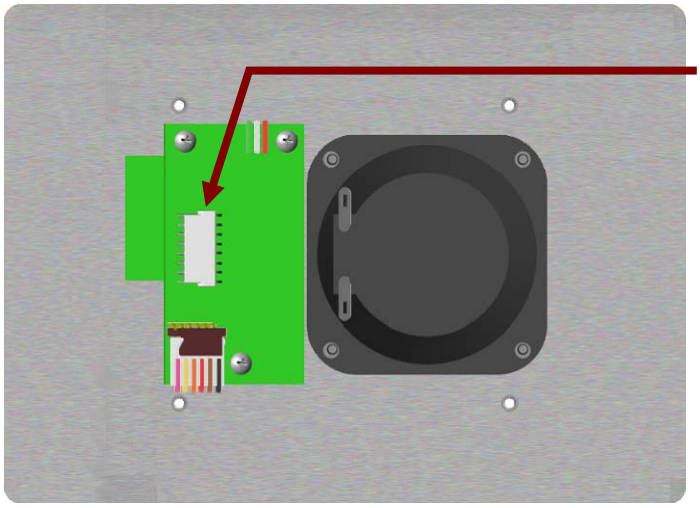
Others Things You Should Know

✓ See page 26 for instructions on removing a Station.

HSS400 High Security Bedside Station/ HSS401 High Security Staff Station
(Audio/Visual Network Compatible)

Making Connections

Connect the Bedside or Staff Station to any Audio Corridor Light (CLA222 or CLA244) or Audio Domeless Controller (DCA200, or DCA216) using an 8 conductor Station Connect cable as indicated:



Run an 8 conductor Station Connect cable from this header to the appropriate 8 pin header on an Audio Corridor Light or Domeless Controller.

Figure 210: High Security Bedside/Staff Station, Rear View

Run CAT5 UTP cable (terminated with an R4KCONN8 8-pin plug) to the Staff Station Audio Connect header.

Station 1

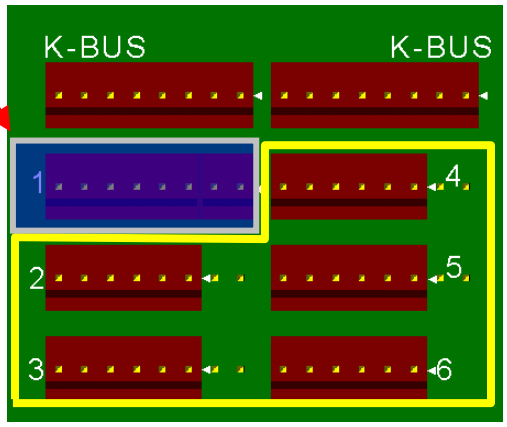


Figure 211: High Security station Corridor Light Connection

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Place a call.

2 Verify the call assurance (red) LED is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/brown & green/white wires.

- A properly wired and correctly functioning station (with no buttons pressed and call cord removed) will measure 27Kohms resistance across these wires.
- With the call cord plugged in (HSS400 only), the station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

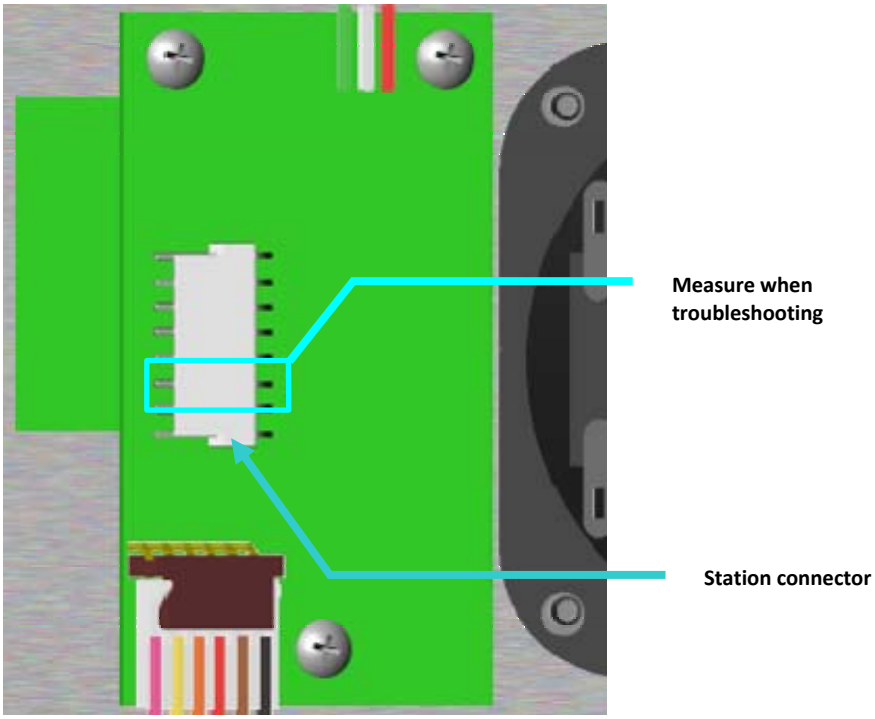


Figure 212: High Security Station Troubleshooting.

Others Things You Should Know

✓ To comply with IEC 60601-1, the station's faceplate must be properly grounded to the building's earth ground.

HSS433 High Security Push Button Station
(Audio/Visual Network Compatible)

Making Connections

Connect the Push Button Station to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216 or DCA214D) using a 6 conductor Station Connect cable as indicated:

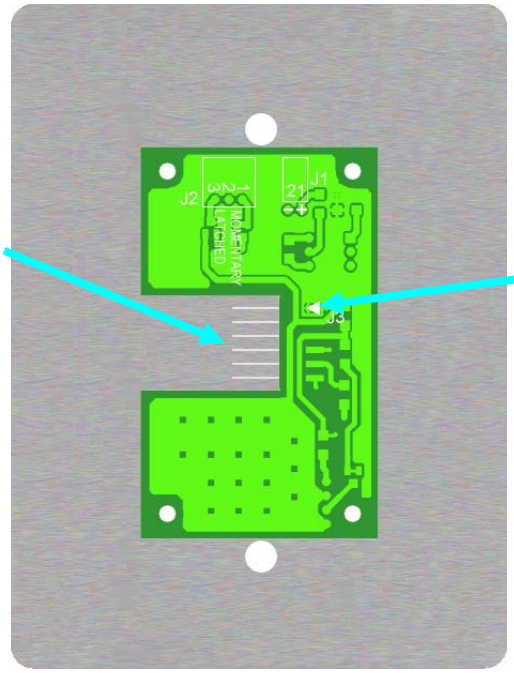


Figure 213: HSS433, Rear View

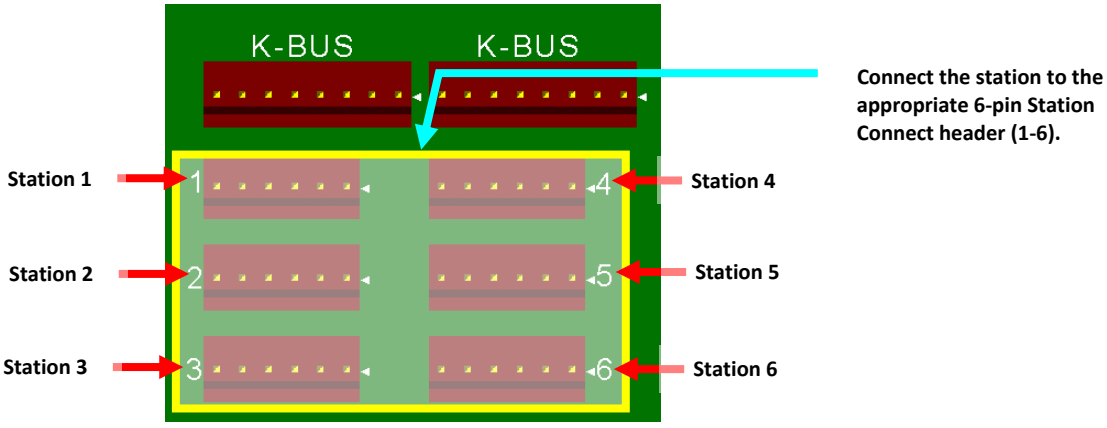


Figure 214: Corridor Light/Domeless Controller, PC Board

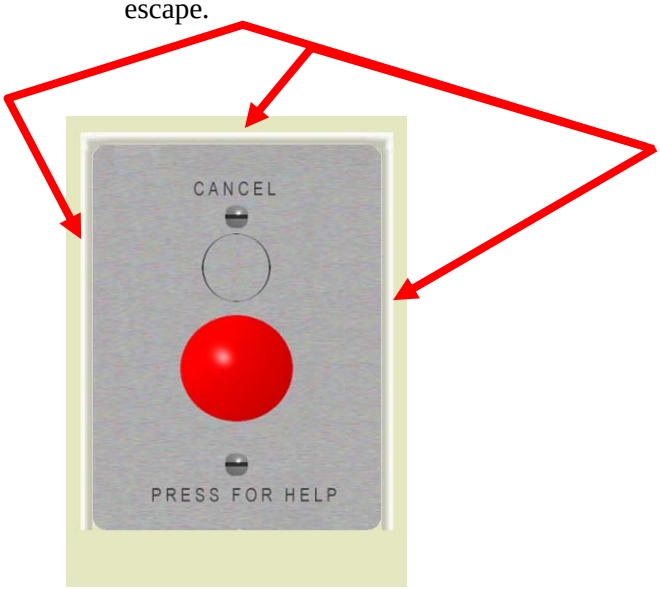
Mounting the Unit in a Shower Environment

Mounting the HSS433 in a Shower Environment:

1 Attach the HSS433 directly to a wall **or** to a single gang box using the provided screws.

2 Run a bead of caulk along the top and sides to splash-proof the station.

➢ Do **NOT** caulk the bottom! The bottom is left uncaulked in order to allow moisture to escape.



Although the Plate/Station combination is water-resistant, we recommend you run a bead of silicone caulk around the top and two sides of the station face. Do NOT caulk the bottom.

Figure 215: High Security Push Button Station with Caulking Call-outs (highlighted)

Others Things You Should Know

✓ To comply with IEC 60601-1, the station's faceplate must be properly grounded to the building's earth ground.

HSS433 Timer Connections

The HSS433 Push Button Station provides an optically-isolated output rated at 10mA for interfacing to an elapsed timer as follows:

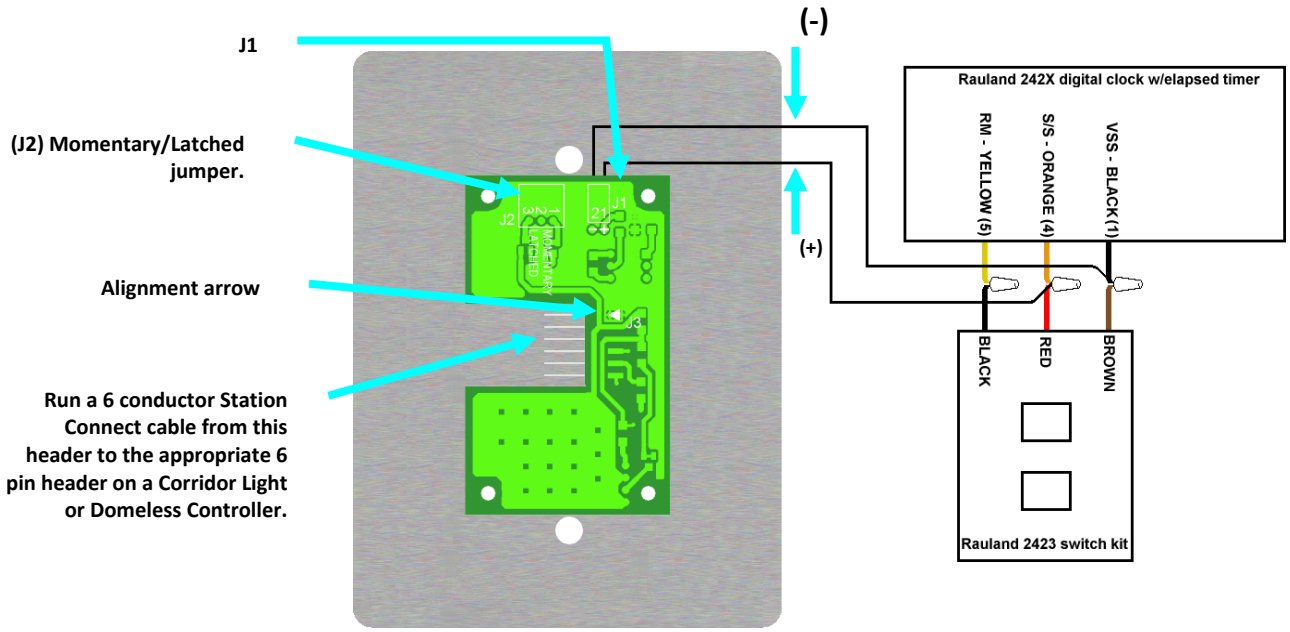


Figure 216: HSS433 elapsed timer connections

2423 Switch Kit	Clock	HSS433
Black	RM – Yellow (5)	------
Red	S/S – Orange (4)	J1 (+)
Brown	VSS – Black (1)	J1 (-)

Table 38: HSS433 elapsed timer wiring

If used with the recommended Rauland 2421 Digital Clock Timer/2423 Elapsed Timer Switch Kit combination, the J2 Jumper should be positioned in the latched position. This will not allow the clock to be reset until the call is cancelled. For other clocks, check manufacturer's recommendations regarding momentary or latched conditions.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Press the button to place a call.

2 Verify the proper corridor light is lit.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

➢ A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

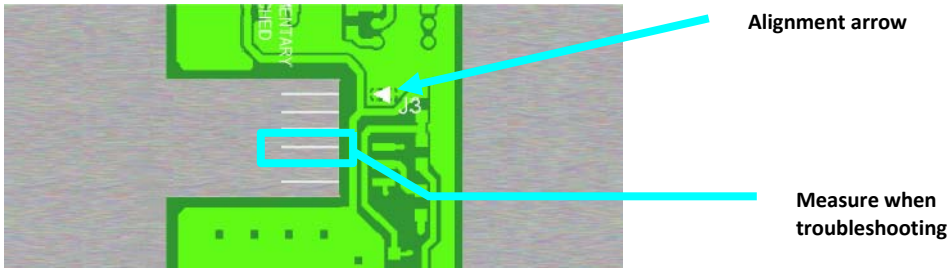


Figure 217: HSS433 Troubleshooting, Alignment arrow

R4KMST Marquee Speaker Station
(Audio/Visual Network Compatible)

Making Connections

Connect the Marquee Speaker Station to either of the two available MST Station Connect ports on the R4KMQC Marquee Controller:

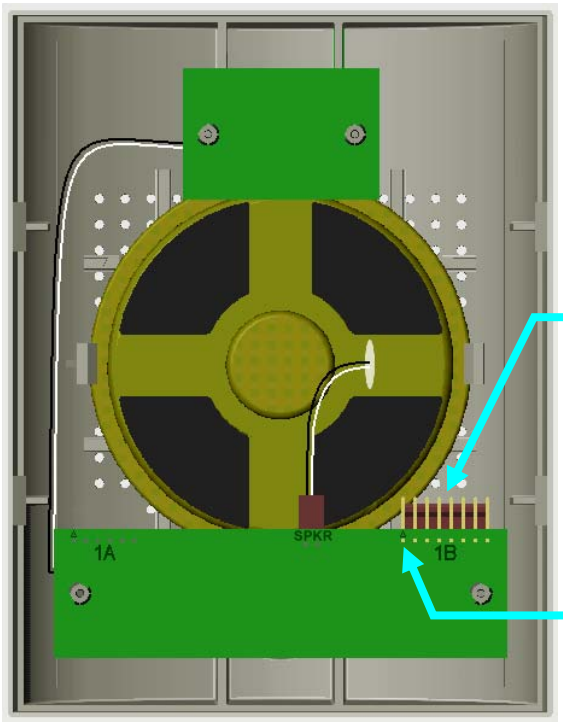


Figure 218: Marquee Speaker Station, Rear View

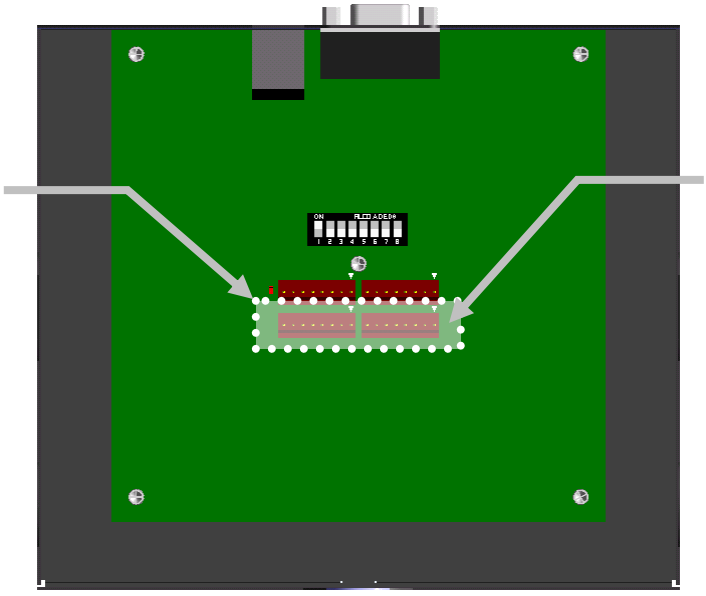


Figure 219: R4KMQC Marquee Controller MST Station Connect Ports

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the unit, you can use the following procedures to initialize and test it:

Procedure 1

1 Place a call from a station that is covered by the Marquee in question.

➢ A tone should sound at the R4KMST Station.

2 Press the upper Button.

➢ The tone should mute.

3 Toggle the volume with the lower button.

➢ The tone should alternate between low and high volumes.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/brown & green/white wires.

➢ A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

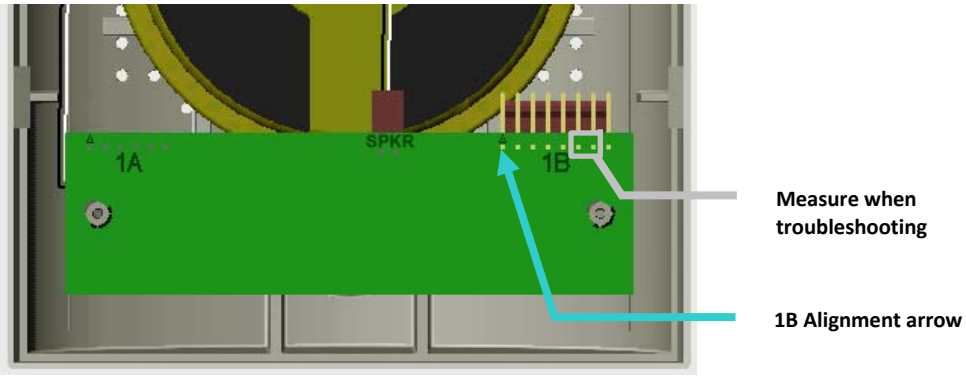


Figure 220: R4KMST Troubleshooting, Alignment arrow

Other things You Should Know

- ✓ Take care not to plug the station directly on to the K-Bus—which could damage the speaker.
- ✓ See page 22 for proper instructions on removing a Station

R4KSPK SLIM Speaker Station
(Audio/Visual Network Compatible)

Mounting to a Back Box

The R4KSPK SLIM Speaker Station has provisions for mounting to a three-gang back box. It has four through holes for the leftside and middle mounting screws; and two friction slots for the rightside mounting screws. For convenience, the backside of the SLIM Speaker Station contains four mounting screws that are press-fit into molded slots in its plastic and are used for installation. Note: Mount the SLIM Speaker Station to the back box before making the connections to the SLIM-style Call Station. In that way, the SLIM-style Call Station that will be mounted on the SLIM Speaker Station will not be hanging from the cables and interfering while the SLIM Speaker Station is being mounted.

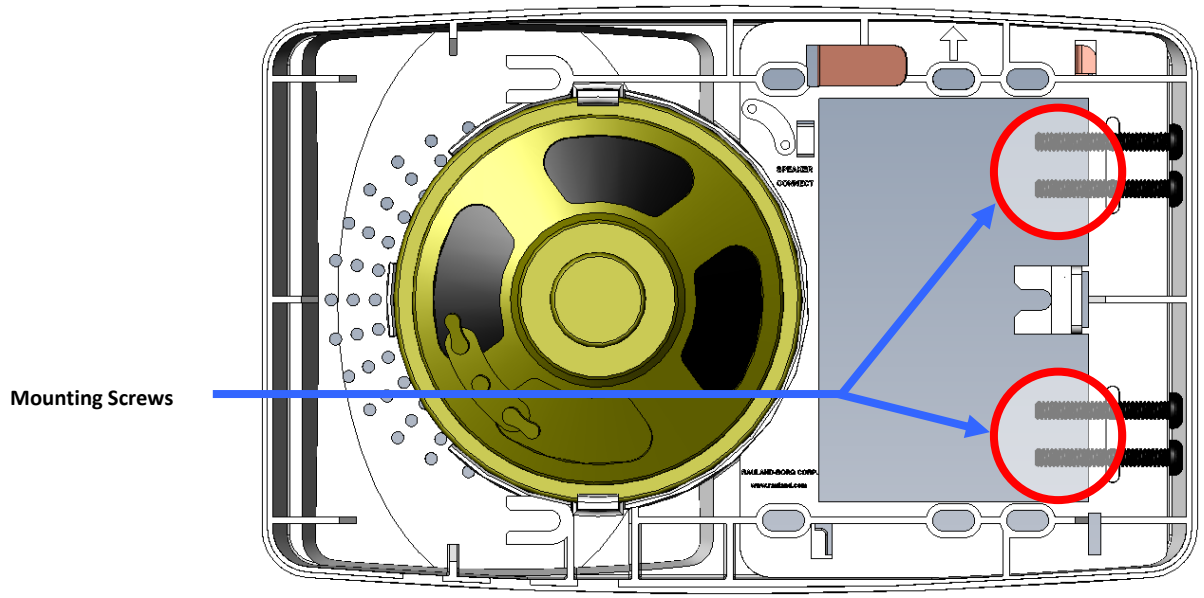


Figure 221: R4KSPK SLIM Speaker Station Rear View

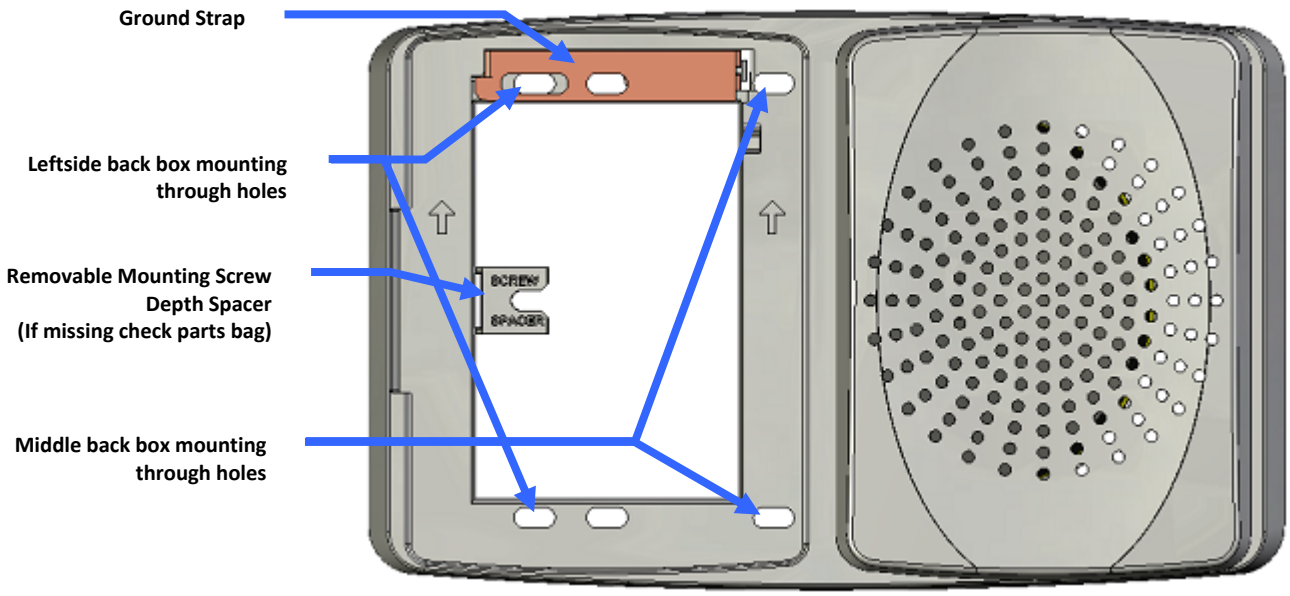


Figure 222: R4KSPK SLIM Speaker Station Front View

Procedure

1. Remove the plastic mounting screw depth spacer (by bending it back-and-forth) and the screws from the SLIM Speaker Station.
2. Install the two rightside screws in the back box mounting holes.
3. Slide and hold the Mounting Screw Depth Spacer under each rightside screw, one at a time, and tighten each screw so that the Mounting Screw Depth Spacer is held snug but can also be slid out from under each screwhead. This will set the rightside screws for the correct depth to mount the SLIM Speaker Station.

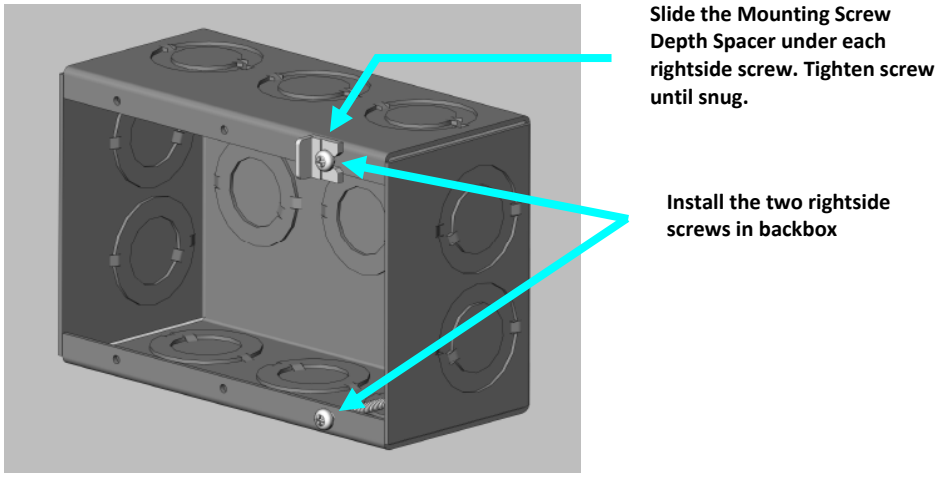


Figure 223: Rightside mounting screw installation in backbox.

4. Slide the SLIM Speaker Station onto the installed rightside screws so that they go into the two friction slots on its rear and snap into place; revealing the four other back box mounting holes through the SLIM Speaker Station through holes.
5. Connect the speaker and call-in cables to the SLIM-style Call Station – See the section *Making Connections* for the SLIM-style Call Station for information.

6. Place the base plate of the SLIM-style Call Station that will be used over the opening in the SLIM Speaker Station – align the back box mounting holes in the SLIM-style Call Station base plate through holes.
7. Install and tighten the remaining four leftside and middle screws for the SLIM-style Call Station base plate through the SLIM Speaker Station through holes. Do not over tighten the mounting screws – over tightening the screws may cause the plastic to deform.
8. Place the face plate of the SLIM-style Call Station over its base plate and press firmly on it at each of the four corners so that all four of the snap tabs engage and the two parts snap together.
9. Refer to the individual section of the manual for the SLIM-style Call Station for information to initialize and test it.

Making Connections

All of the SLIM-style Call Stations can be mounted to the SLIM Speaker Station. Connect the 2-conductor speaker cable to the speaker connection header that is labeled 'SPKR' on the SLIM-style station. – see the section *Making Connections* for the SLIM-style Call Station for information. The SLIM Speaker Station ground strap provides conduit ground connection to the SLIM-style Call Station when it is installed.

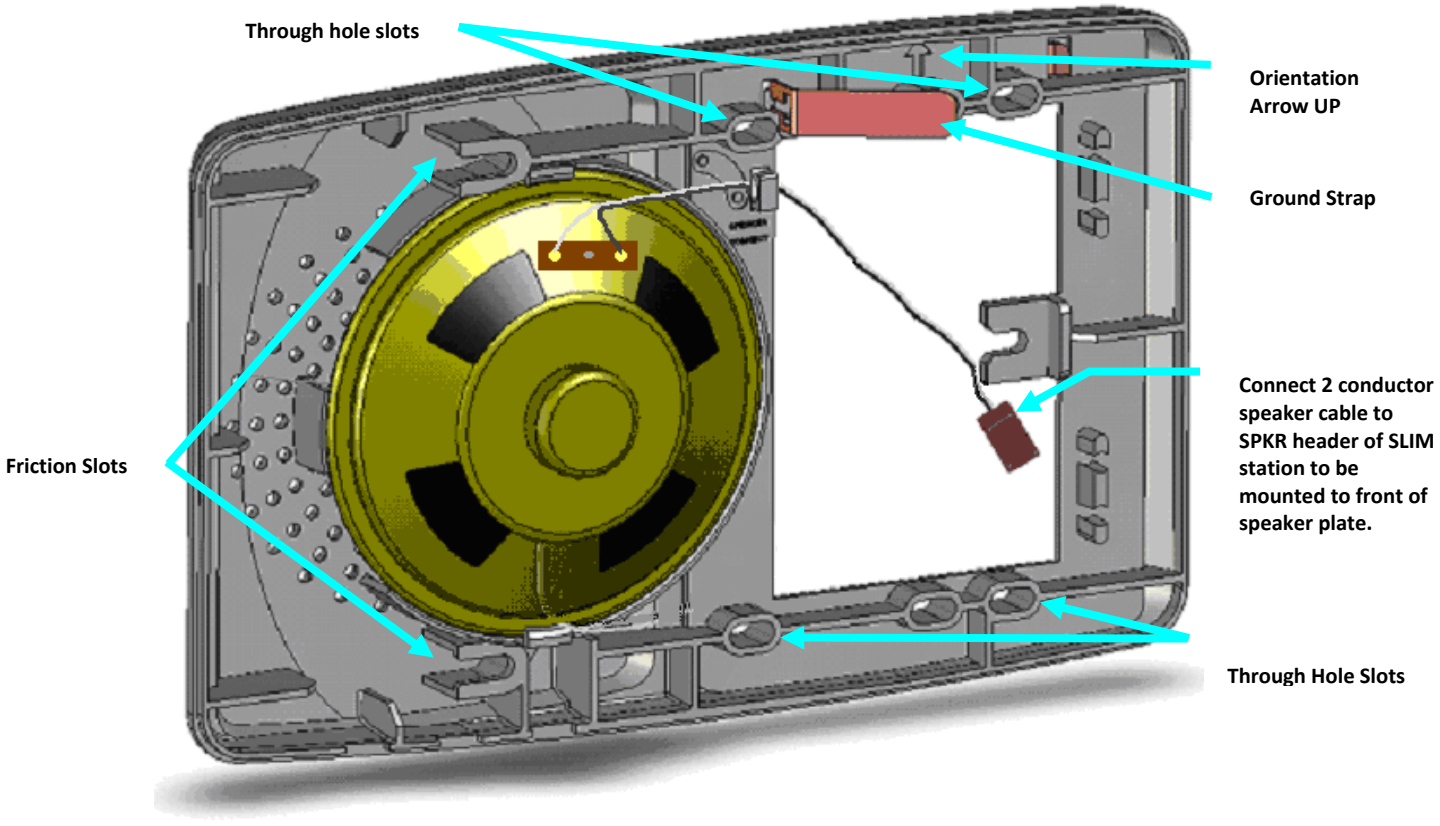


Figure 224: R4KSPK SLIM Speaker Station, Rear View

Other Things You Should Know

- ✓ Important Note: If a SLIM-style Call Station needs to be removed after it is installed on a SLIM Speaker Station, only the snap tabs on the left side that hold its face plate are accessible with the Station Removal Tool – interference from the SLIM Speaker Station plastic molding prevents the snap tabs on the right from being accessible with the Station Removal Tool.
- ✓ To remove a SLIM-style Call Station, access its left side snap tabs through the recess on the left side of the SLIM Speaker Station. Pull and twist with the Station Removal Tool to open both of the left side snap tabs one at a time. When both left side snap tabs are open, the SLIM-style Call Station face plate will easily detach from its base plate.
- ✓ If a SLIM Speaker Station mounting needs to be oriented with the speaker on the left side, the ground strap can be removed and re-installed on the other side of the SLIM-style Call Station opening; so that it also will provide conduit ground connection to the SLIM-style Call Station when it is installed.

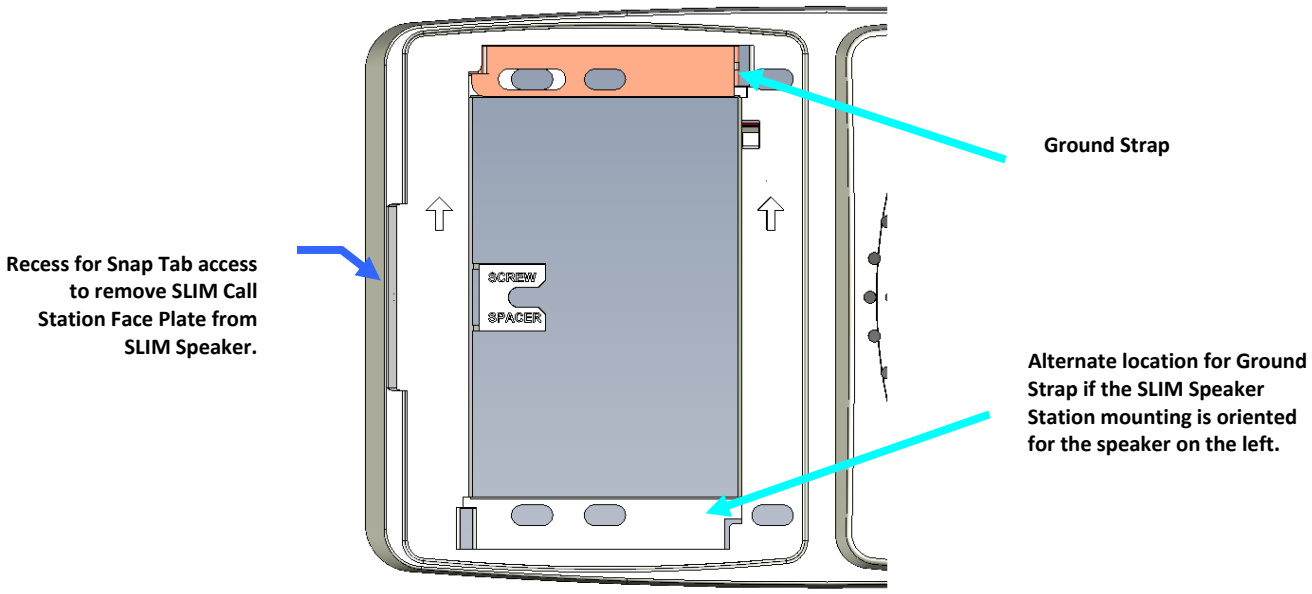


Figure 225: R4KSPK SLIM Speaker Station Front View, Snap Tab Access

R4K17V Enhanced Single Bed Station
(Audio/Visual Network Compatible)

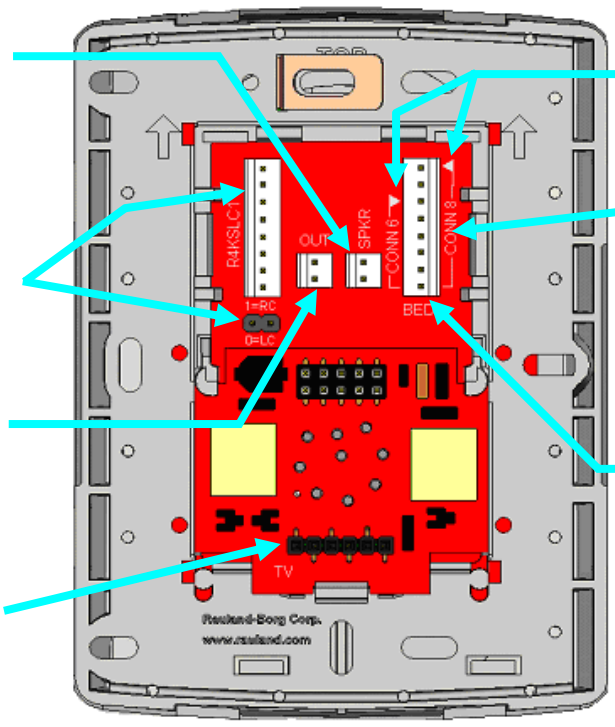
Making Connections/Interconnect

The Enhanced Single Bed Station makes one of two alternate required connections and two optional connections.

Required Connection

Connect the Enhanced Single Bed Station to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216, or DCA214D) using a 6 conductor Station Connect cable for the pillow speaker Call Buttons as indicated for visual-only operation; or an 8 conductor Station Connect cable for the pillow speaker Call Buttons with audio operation in the station as indicated if the R4K17V is mounted to the optional R4KSPK SLIM Speaker Station:

Note: The optional R4KSPK SLIM Speaker Station also requires connection of its 2 conductor speaker cable to the station as indicated:



Optional: Connect 2 conductor speaker cable from the R4KSPK to this header for audio operation in the station

Optional: Remove the 2 pin shorting jumper block from the two-pin header and use the eight pin header to connect to an R4KSLC1 Single Lighting Controller.

Optional: Use the two pin connector to connect to a radio stepper or a single low voltage controller.

Optional: Use an R4KTVA pigtail to connect an optional TV to the station.

Alignment arrows

Required/Alternate: Run an 8 conductor Station Connect cable from this header to the appropriate header on a Corridor Light or Domeless Controller.

Required/Alternate: Run a 6 conductor Station Connect cable from this header to the appropriate header on a Corridor Light or Domeless Controller.

Figure 226: Enhanced Single Bed Station, Rear view

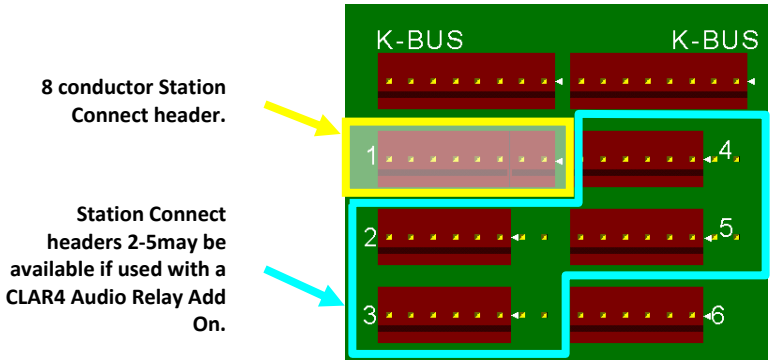


Figure 227: Audio Corridor Light/Domeless Controller, PC Board

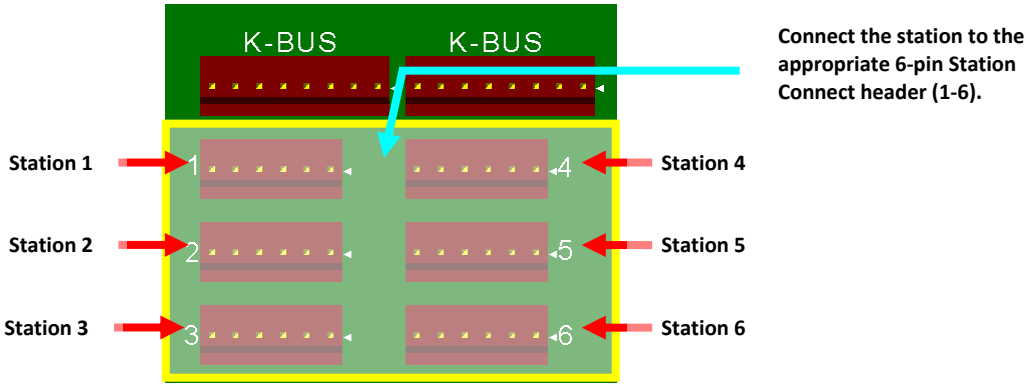


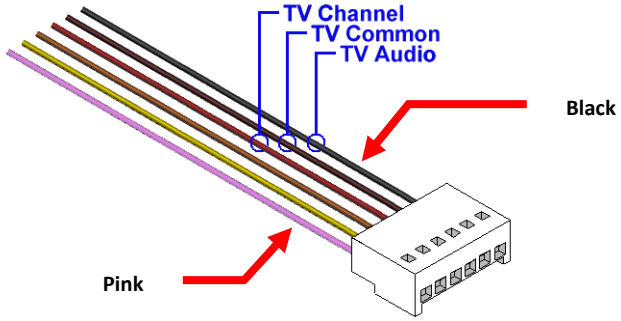
Figure 228: Corridor Light/Domeless Controller, PC Board

Special Connection Precaution

If a SLIM-Style station is used on a CLAR4 module Port 1, the monitor LED may incorrectly turn on when there is an active audio call on one of the other ports. To prevent this from happening, do not use Port 1 on a CLAR4 module if other unused ports are available on it. Alternately, cut the white with green stripe wire that connects to the station connector pin 4.

Optional TV Connection

You can connect an optional TV to the station using the R4KTVA pigtail connection. The TV connection should be made as follows:



Wire	Cable Connection
Black	TV Audio
Brown	TV Common
Red	TV Channel
Orange	----------
Yellow	----------
Pink	----------

Figure 229: R4KTVA pigtail

Optional Radio Stepper Connections

The RS1010 will only work with the NCESVA pillow speaker. Do not attempt to use it with any other pillow speaker.

You can connect an optional RS1010 Radio Stepper to the station using the two pin "OUTPUT" connector and an R4KTVA. Before connecting the Home In wire of the RS1010, measure the voltage between the TV Common and TV Channel wires. It should measure at least 12VDC. If TV Channel measures less than 12VDC, connect the Home In wire to the 24VDC of the RS1010. The 24VDC power supply is required to power the RS1010. The R4KPR400 can not be used to power the RS1010. The Radio Stepper connection should be made as follows:

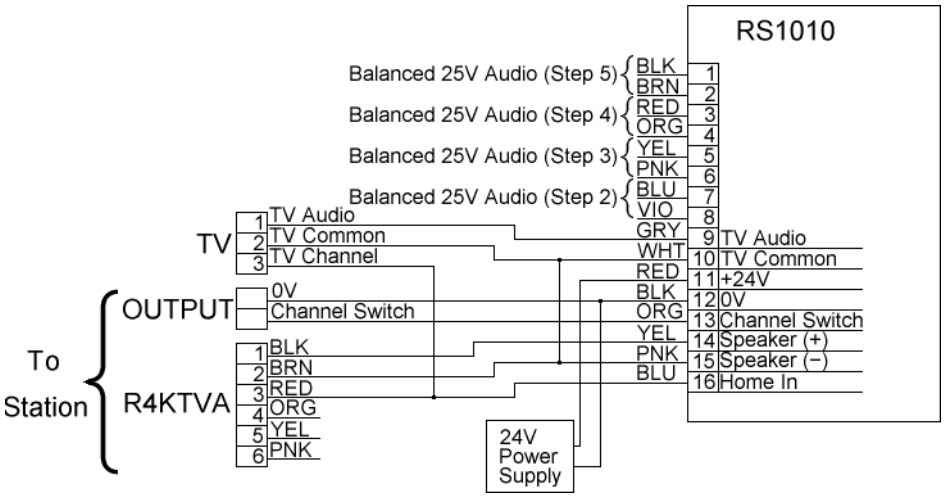


Figure 230: R4K17V connection to RS1010 Radio Stepper

Optional Lighting Controller Connections

You can connect an optional single lighting controller to the station using the two pin "OUTPUT" connector. In this case the RS1010 Radio Stepper can not be used. The Lighting Controller connection should be made as follows:

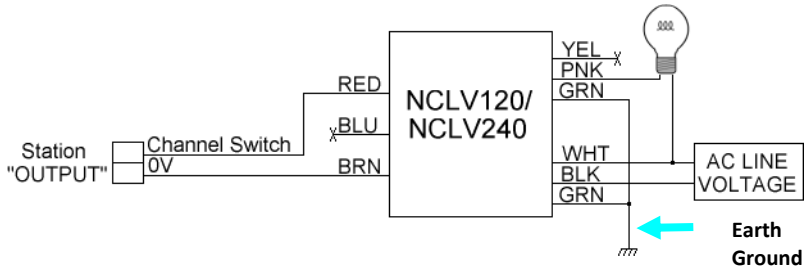


Figure 231: Single NCLV120/NCLV240 connections

As a second option for lighting control, an optional R4KSLC1 Single Lighting Controller Module can be connected to the station using the eight pin "R4KSLC1" connector. **You must remove the 2 pin shorting jumper block from the two-pin header on the R4K17V pc board to make this connector active.** This allows for the control of multiple lights in the room/bed area.

The **2 pin shorting jumper block** should only be removed when adding a lighting control module. After the 2 pin shorting jumper block is removed, the station will not respond to any pillow speaker or call cord button presses without having connection to the lighting control module.

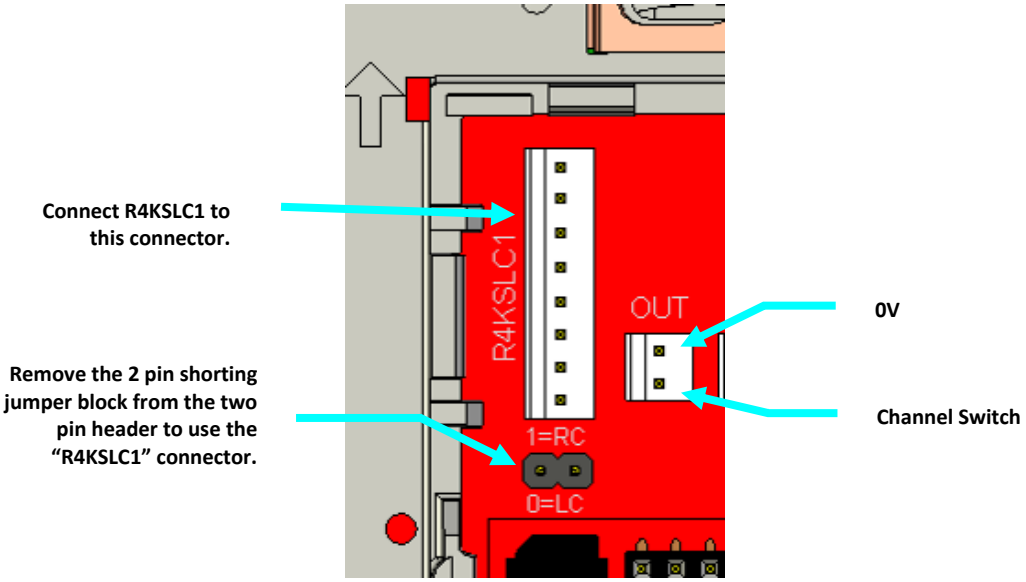


Figure 232: Rear view of R4K17V

The R4KSLC1 Single Lighting Controller Module connection should be made as follows:

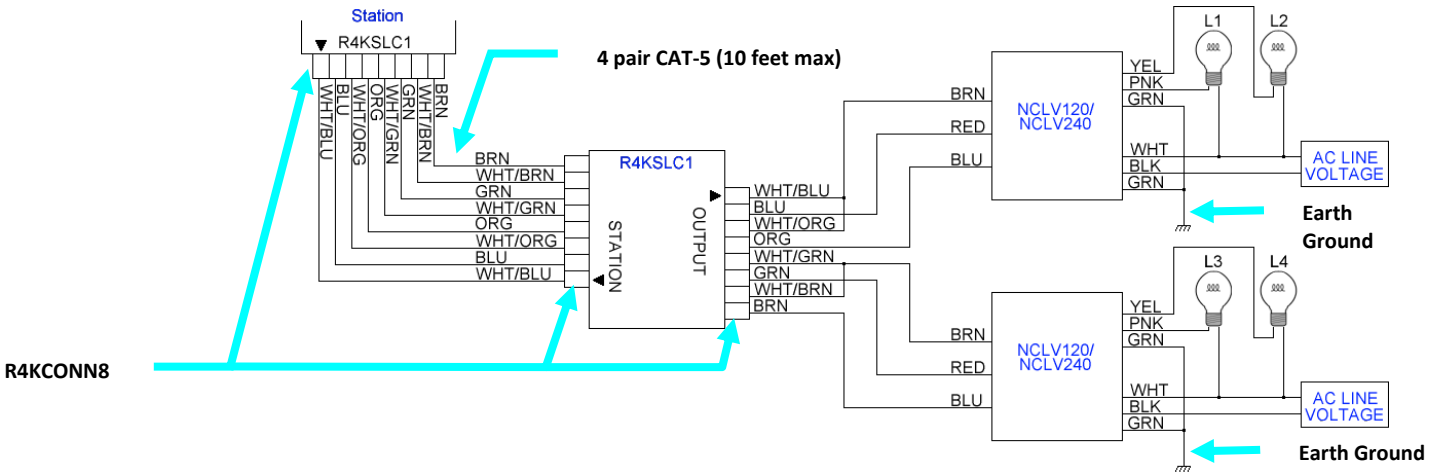


Figure 233: R4KSLC1 to NCLV120/NCLV240 connection

The R4KSLC1 will fit in a quad electrical box and must be within 10 feet of the R4K17V.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the station, you can use the following procedures to initialize and test it:

Procedure 1

1 Connect a pillow speaker or CCDIN to the DIN jack.

2 Place a call.

3 Verify the call assurance (red) LED is lit and verify that an audio path has been established to the console by conducting a 2-way conversation exchange through the station to the console

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

- A properly wired and correctly functioning bed station (with no buttons pressed and DIN call cord removed) will measure 27Kohms resistance across these wires.
- With the DIN call cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

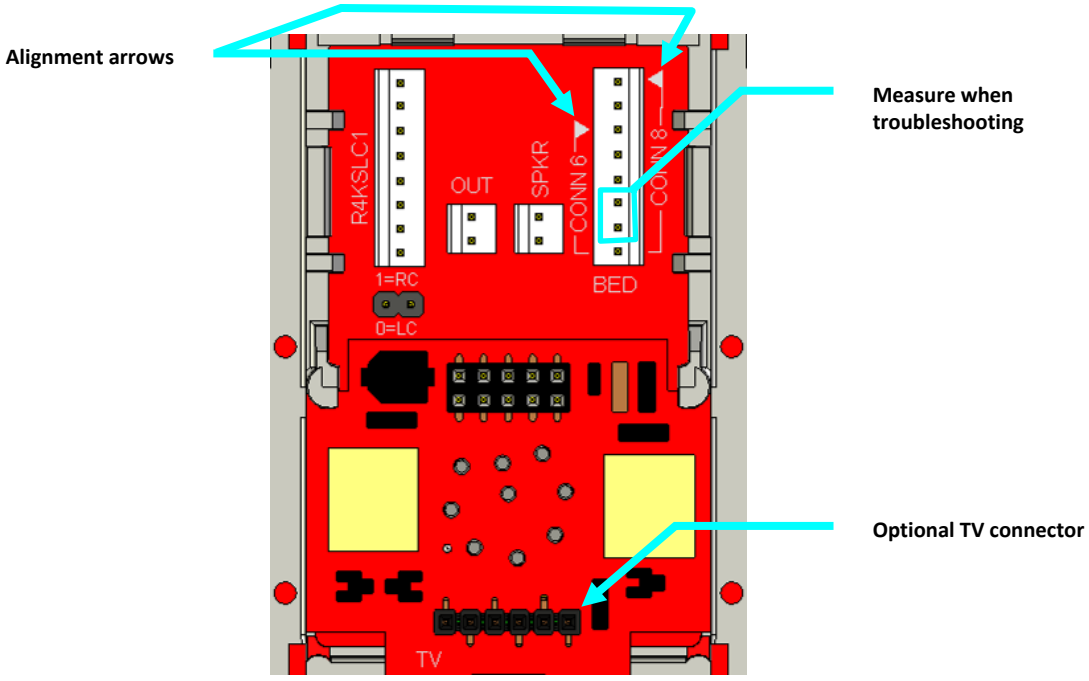


Figure 234: Enhanced Single Bed Station troubleshooting, Alignment arrows.

Others Things You Should Know

- ✓ TV audio will only sound through the pillow speaker.
- ✓ Nurse call audio will be muted at the station speaker and transferred to the pillow speaker.
- ✓ The R4K17V is a supervision-ready station. For the appropriate configuration programming settings, it will place a “fail” call at the console if disconnected or has wiring shorts. You can block this automatic call for systems that do not require UL1069 Code supervision. For instructions, consult KI-2105, the *Responder® 4000 Configuration Guide* (System Wide Options).
- ✓ See the section *SLIM-Style Stations General Installation Information* for instructions about mounting a station.

R4K15V SLIM ¼" Jack & Button Station
(Audio/Visual Network Compatible)

Making Connections

Connect the SLIM ¼" Jack & Button Station to either any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216, or DCA214D) using two 6 conductor Station Connect cables (one each) for the Station Buttons and/or the Call Cord as indicated for visual-only operation; or a 6 conductor Station Connect cable for the Station Buttons and an 8 conductor Station Connect cable for the Call Cord with audio operation as indicated if the R4K15V is mounted to the optional R4KSPK SLIM Speaker Station. Note: The R4K15V station must be connected to two sequentially adjacent Station Connect headers; which must be on the same Corridor Light or Domeless Controller. Additionally, the BED Station Connect cable must be connected to the lower numbered Station Connect header and the BUTTON Station Connect cable must be connected to the higher numbered Station Connect header:

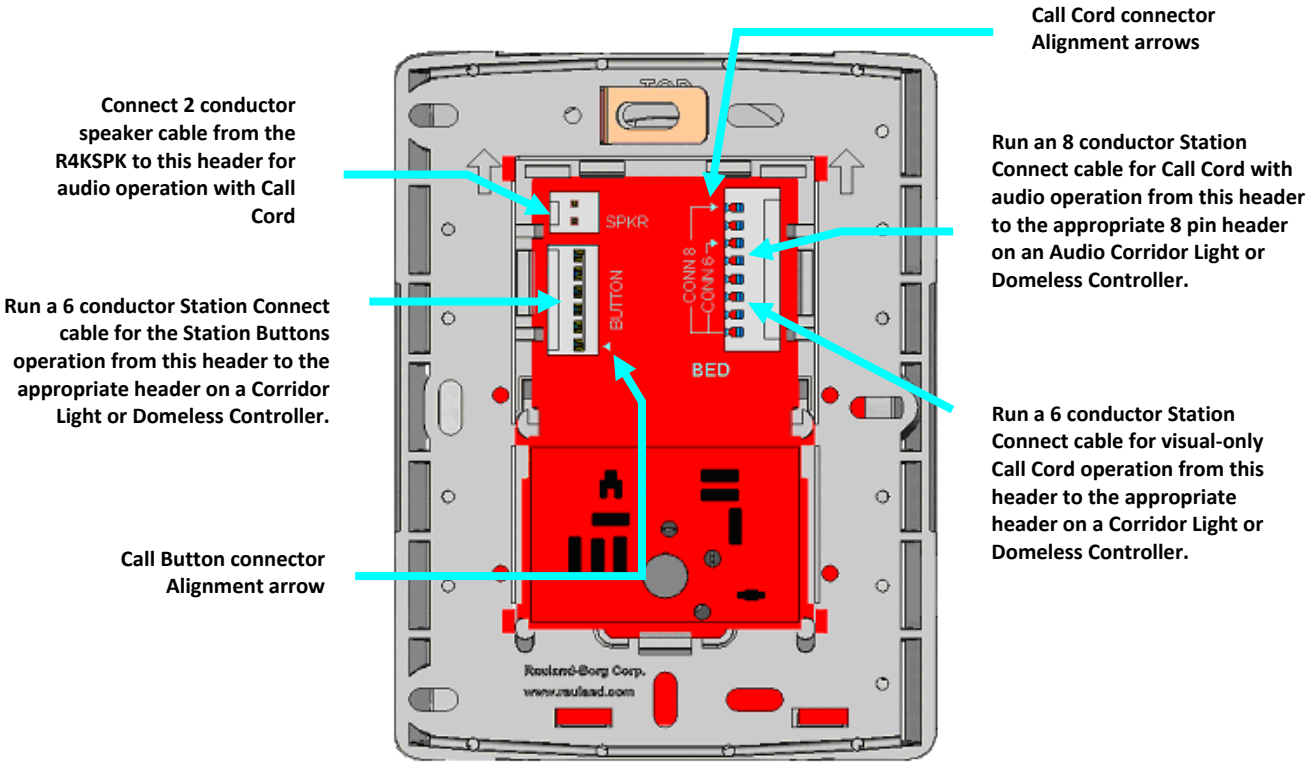
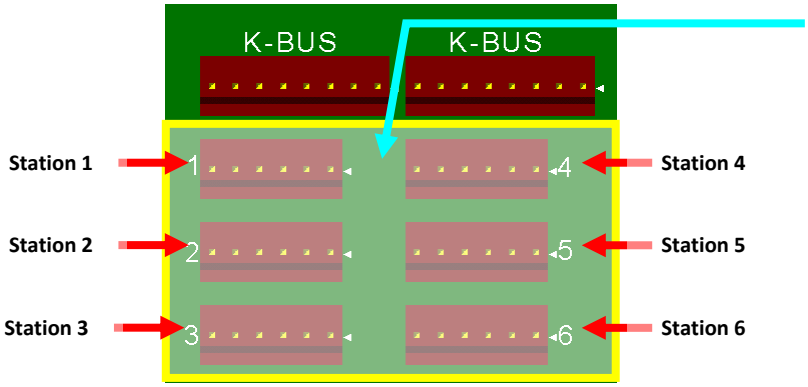


Figure 235: SLIM ¼" Jack & Button Station, Rear View



Connect the station to two sequentially adjacent 6-pin Station Connect headers (1-6). Connect the BED Station Connect cable to the lower numbered Station Connect header; Connect the BUTTON Station Connect cable to the upper numbered Station Connect header.

Figure 236: Corridor Light/Domeless Controller, PC Board

Connect the station to sequentially adjacent 8-pin and 6-pin Station Connect headers for visual and audio operation.

Station Connect headers 3-5 may also be available if used with a CLAR4 Audio Relay Add On.

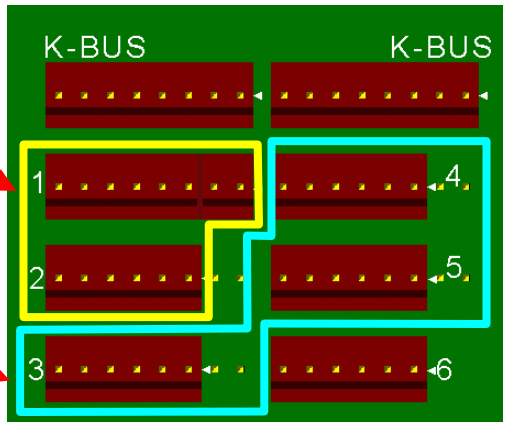


Figure 237: Audio Corridor Light/Domeless Controller, PC Board

Special Connection Precaution

If a SLIM-Style station is used on a CLAR4 module Port 1, the monitor LED may incorrectly turn on when there is an active audio call on one of the other ports. To prevent this from happening, do not use Port 1 on a CLAR4 module if other unused ports are available on it. Alternately if Port 1 is used, cut the white with green stripe wire that connects to the station connector pin 4.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the station, you can use the following procedures to initialize and test it:

Procedure 1

1 Place a call from the station Call Button.

2 Verify the call button's call assurance (red) LED is lit.

3 Connect a Call Cord to the ¼ inch jack.

4 Place a call.

5 Verify the call cord's call assurance (red) LED is lit; and if mounted to the optional R4KSPK SLIM Speaker Station verify that the monitor LED changes from red to

amber color and an audio path has been established to the console by conducting a 2-way conversation exchange through the station to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cables from the corridor light.

3 Measure the resistance of the white/green & orange/white wires for the station Call Button and Call Cord.

- A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.
- With the call cord plugged in, the white/green & orange/white wires for the station Call Cord will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

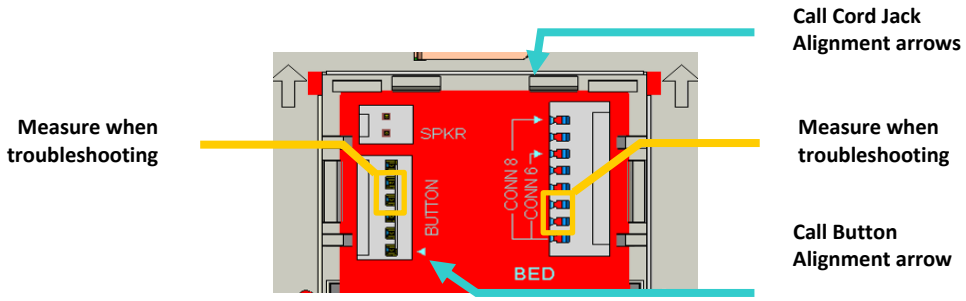


Figure 238: SLIM ¼" Jack & Button Station troubleshooting, Alignment arrows.

Others Things You Should Know

- ✓ The R4K15V is a supervision-ready station. For the appropriate configuration programming settings, it will place a "fail" call at the console if disconnected or has wiring shorts. You can block this automatic call for systems that do not require UL1069 Code supervision. For instructions, consult KI-2105, the *Responder® 4000 Configuration Guide* (System Wide Options).
- ✓ See the section *SLIM-Style Stations General Installation Information* for instructions about mounting a station.

R4K2JACK SLIM Dual ¼" Jack Station
(Audio and Visual Only Network Compatible)

Making Connections

Connect the SLIM Dual ¼" Jack Station to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216, or DCA214D) using either two 6 conductor Station Connect cables, one each for Left and Right Beds, or one 6 conductor Station Connect cable for the right bed and one 8 conductor Station Connect cable for the left bed as indicated if the R4K2JACK is mounted to the optional R4KSPK SLIM Speaker Station. Calls for both beds will share the station speaker for audio operation if the R4K2JACK is mounted to the optional R4KSPK SLIM Speaker Station. Note: The R4K2JACK station must be connected to two sequentially adjacent Station Connect headers; which must be on the same Corridor Light or Domeless Controller. Additionally, the LEFT BED Station Connect cable must be connected to the lower numbered Station Connect header and the RIGHT BED Station Connect cable must be connected to the higher numbered Station Connect header:

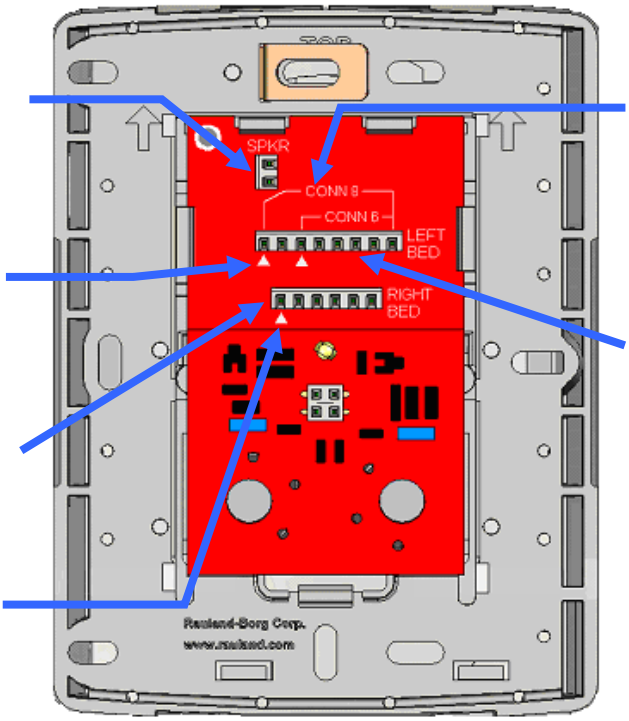
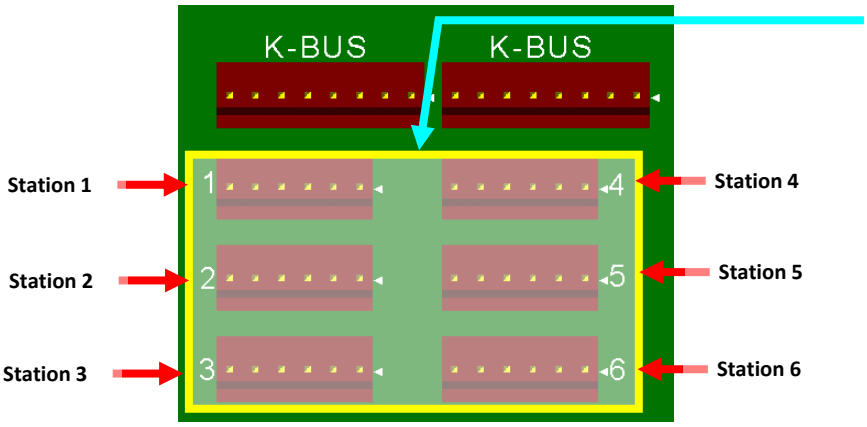


Figure 239: SLIM Dual ¼" Jack Station, Rear View

The LEFT BED and RIGHT BED connectors are not interchangeable. They must be connected to the proper corridor light ports for which they are programmed to connect in order to cancel calls properly from the station.



Connect the station to two sequentially adjacent 6-pin Station Connect headers (1-6). Connect the LEFT BED Station Connect cable to the lower numbered Station Connect header; connect the RIGHT BED Station Connect cable to the upper numbered Station Connect header.

Figure 240: Corridor Light/Domeless Controller, PC Board

Connect the station to sequentially adjacent 8-pin and 6-pin Station Connect headers for visual and audio operation.

Station Connect headers 3-5 may also be available if used with a CLAR4 Audio Relay Add On.

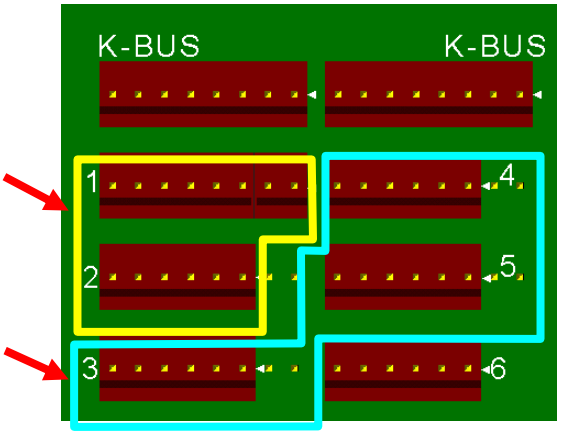


Figure 241: Audio Corridor Light/Domeless Controller, PC Board

Special Connection Precaution

If a SLIM-Style station is used on a CLAR4 module Port 1, the monitor LED may incorrectly turn on when there is an active audio call on one of the other ports. To prevent this from happening, do not use Port 1 on a CLAR4 module if other unused ports are available on it. Alternately if Port 1 is used, cut the white with green stripe wire that connects to the station connector pin 4.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the station, you can use the following procedures to initialize and test it:

Procedure 1 speakers

1 Connect call cords to each of the ¼ inch jacks.

2 Place a call from each call cord.

3 Verify the call assurance (red) LED for each call cord is lit; and if mounted to the optional R4KSPK SLIM Speaker Station verify that the monitor LED changes from red to amber color and an audio path has been established to the console by conducting a 2-way conversation exchange through the station to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cables from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

- A properly wired and correctly functioning bed station (with no buttons pressed and Call Cord removed) will measure 27Kohms resistance across these wires.
- With the Call Cord plugged in, the bed station will measure 13Kohms.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

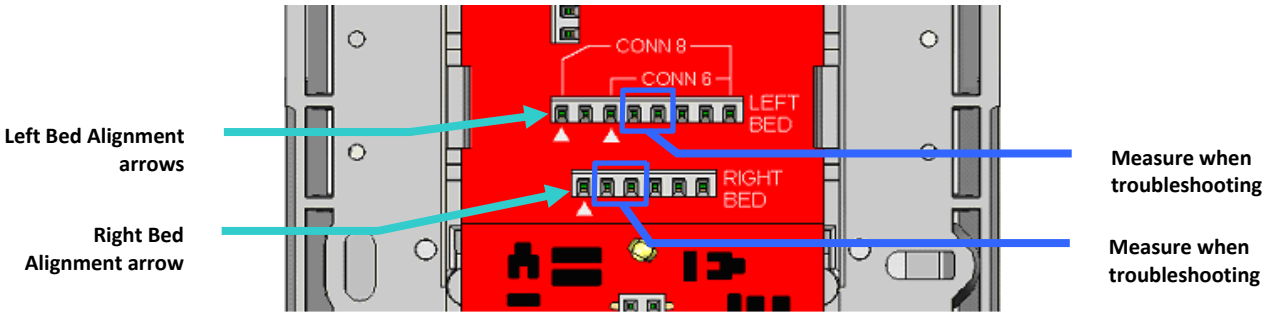


Figure 242: SLIM Dual ¼" Jack Station troubleshooting, Alignment arrows

Others Things You Should Know

- ✓ The R4K2JACK is a supervision-ready station. For the appropriate configuration programming settings, it will place a "fail" call at the console if disconnected or has wiring shorts. You can block this automatic call for systems that do not require UL1069 Code supervision. For instructions, consult KI-2105, the *Responder® 4000 Configuration Guide* (System Wide Options).
- ✓ See the section *SLIM-Style Stations General Installation Information* for instructions about mounting a station.

R4KCB13 SLIM Code Station, R4KPB12 SLIM Push-for-Help Station, R4KPB23 SLIM Staff Assist Code Station, R4KSAR SLIM Push-for-Help/Staff Registration or Check-In Station

(Audio and Visual Only Network Compatible)

Making Connections

Connect the R4KCB13, R4KPB12, R4KPB23 and R4KSAR Stations to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216 or DCA214D) using a 6 conductor Station Connect cable as indicated for visual-only operation; or an 8 conductor Station Connect cable for visual with audio operation as indicated if the Station is mounted to the optional R4KSPK SLIM Speaker Station:

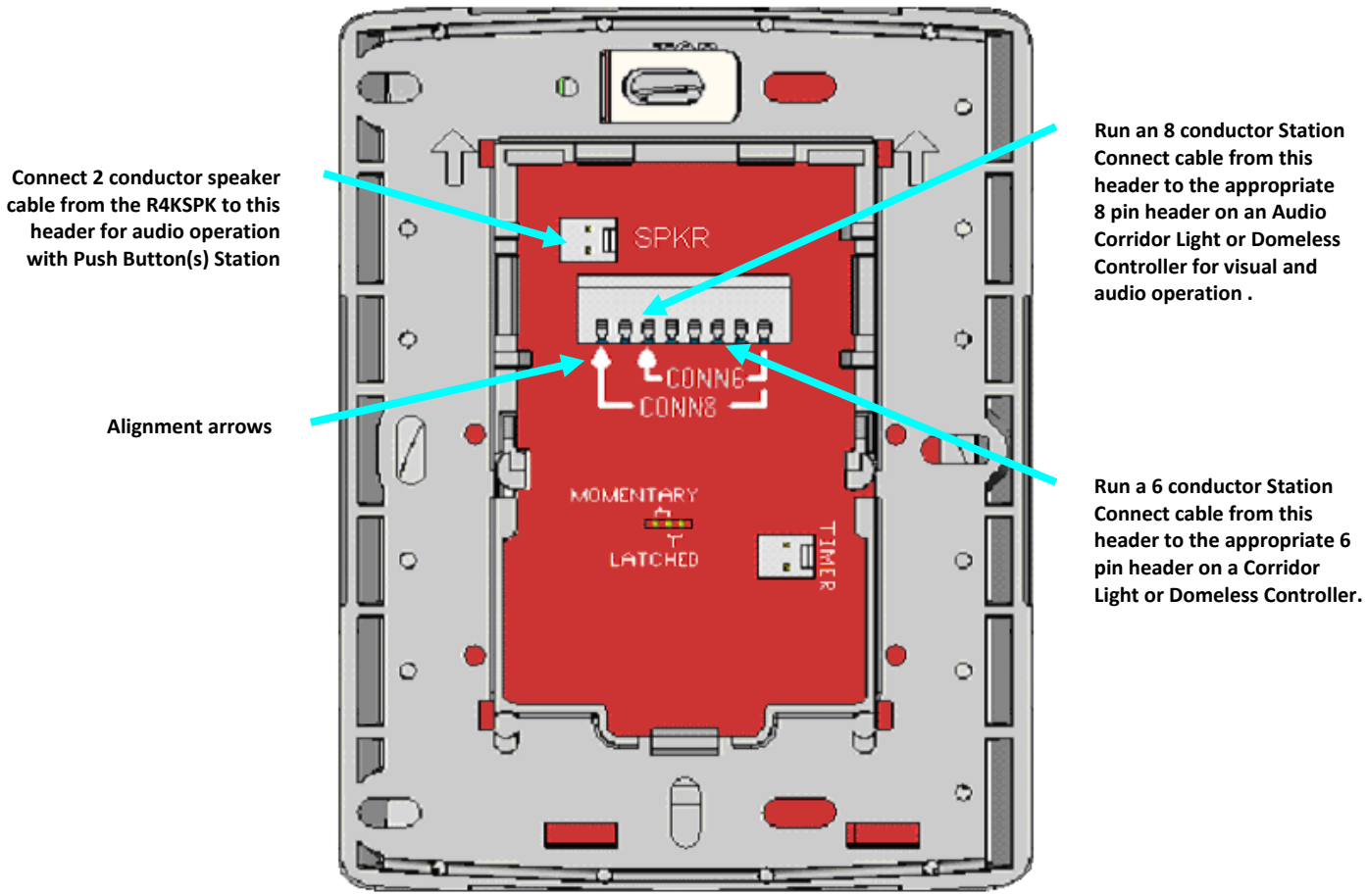


Figure 243: R4KCB13, R4KPB12, R4KPB23 and R4KSAR Stations, Rear View

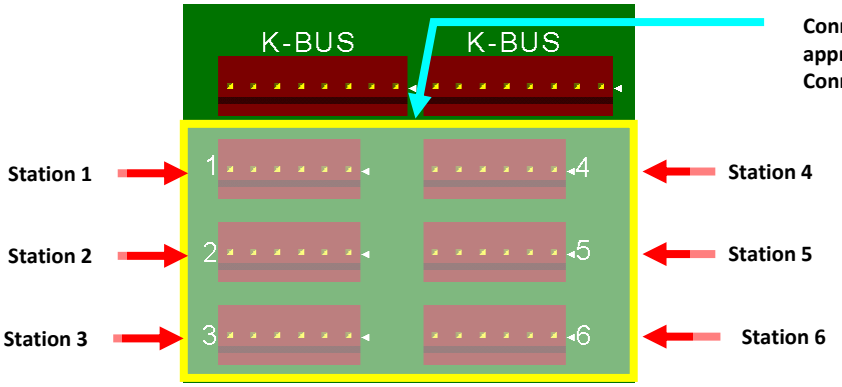


Figure 244: Corridor Light/Domeless Controller, PC Board

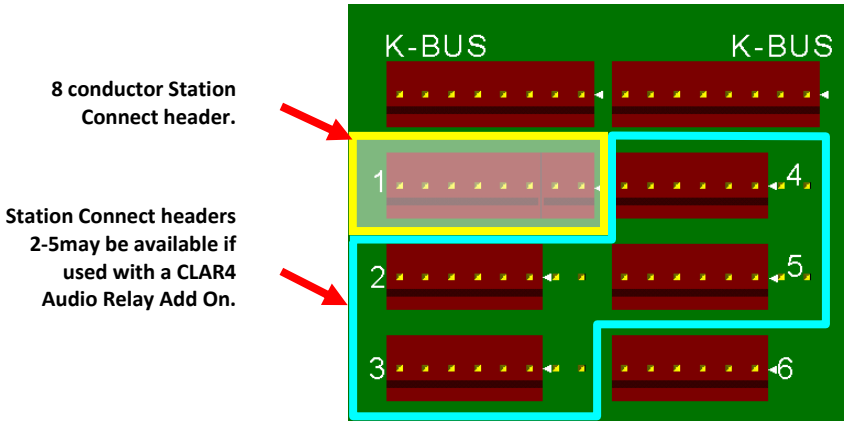


Figure 245: Audio Corridor Light/Domeless Controller, PC Board

Special Connection Precaution

If a SLIM-Style station is used on a CLAR4 module Port 1, the monitor LED may incorrectly turn on when there is an active audio call on one of the other ports. To prevent this from happening, do not use Port 1 on a CLAR4 module if other unused ports are available on it. Alternately if Port 1 is used, cut the white with green stripe wire that connects to the station connector pin 4.

R4KCB13 and R4KPB23 Timer Connections

The R4KCB13 SLIM Code Station and R4KPB23 SLIM Staff Assist Code Station provide an optically-isolated output rated at 10mA for interfacing to an elapsed timer as follows:

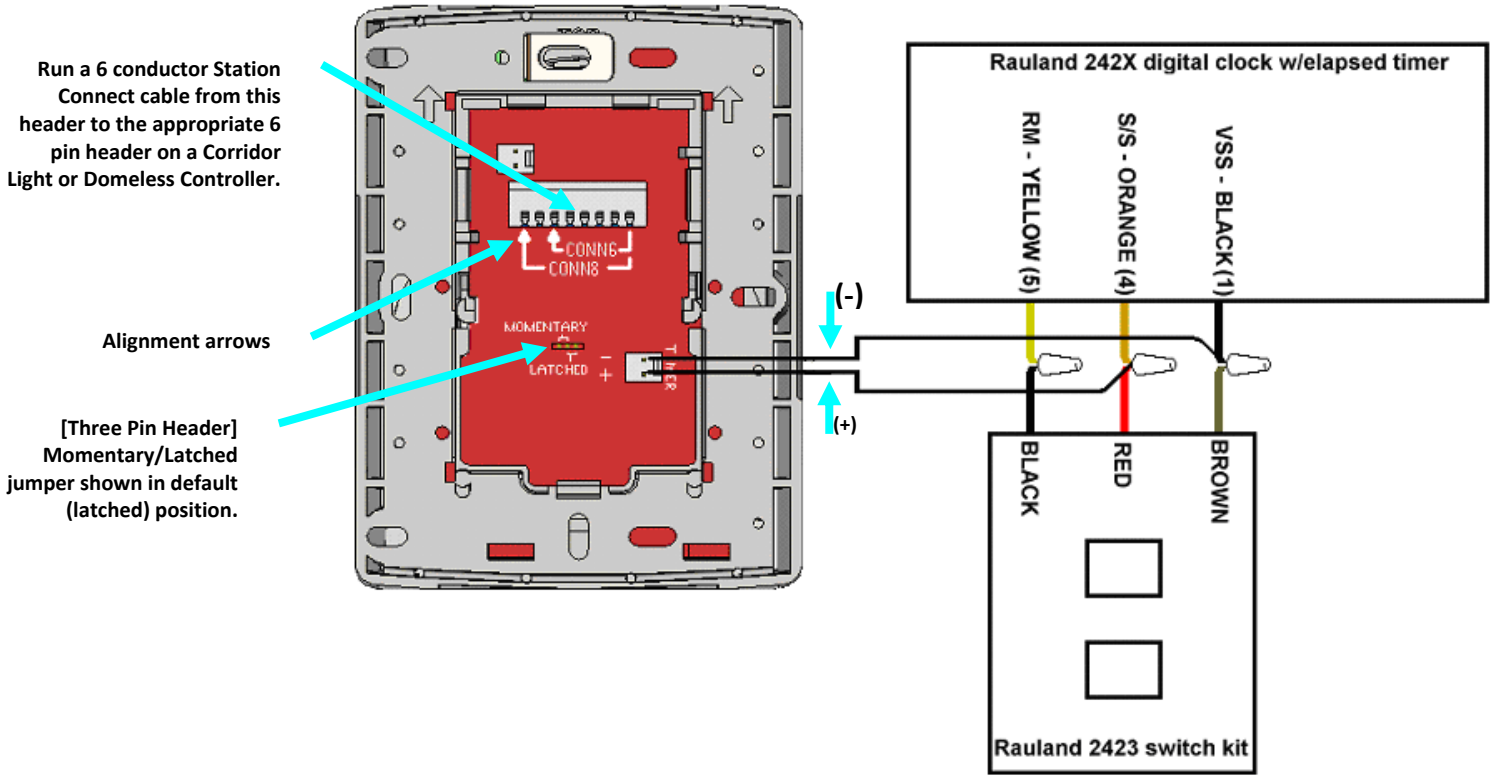


Figure 246: R4KCB13 and R4KPB23 elapsed timer wiring

2423 Switch Kit	Clock	R4KCB13/R4KPB23
Black	RM – Yellow (5)	------
Red	S/S – Orange (4)	J1 (+)
Brown	VSS – Black (1)	J1 (-)

Table 37: R4KCB13/R4KPB23 elapsed timer connections

If used with the recommended Rauland 2421 Digital Clock Timer/2423 Elapsed Timer Switch Kit combination, the J3 Jumper should be positioned in the latched position. This will not allow the clock to be reset until the call is cancelled. For other clocks, check manufacturer's recommendations regarding momentary or latched conditions.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the station, you can use the following procedures to initialize and test it:

Procedure 1

1 Press the button to place a call.

2 Verify the call assurance (red) LED is lit; and if mounted to the optional R4KSPK SLIM Speaker Station verify that the monitor LED changes from red to amber color and an audio path has been established to the console by conducting a 2-way conversation exchange through the station to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the station cable from the corridor light.

3 Measure the resistance of the white/green & orange/white wires.

➢ A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.

4 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

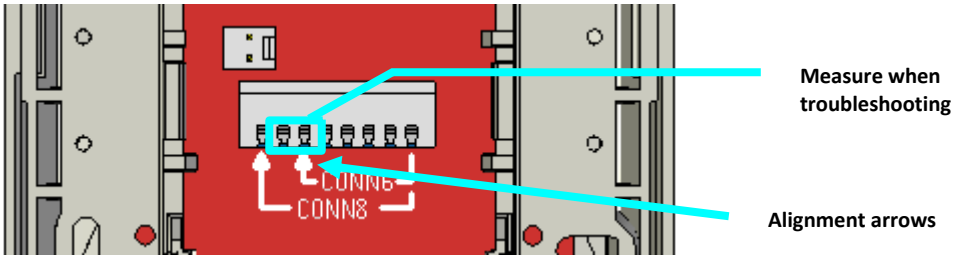


Figure 247: R4KCB13, R4KPB12, R4KPB23 and R4KSAR Stations Troubleshooting, Alignment arrow

Other Things You Should Know

✓ The R4KCB13/R4KPB12/R4KPB23/R4KSAR are supervision-ready stations. For the appropriate configuration programming settings, they will place a “fail” call at the console if disconnected or has wiring shorts. You can block this automatic call for systems that do not require UL1069 Code supervision. For instructions, consult KI-2105, the *Responder® 4000 Configuration Guide* (System Wide Options).

✓ See the section *SLIM-Style Stations General Installation Information* for instructions about mounting a station.

R4KDTY2 SLIM Duty Station
(Audio and Visual Only Network Compatible)

Installation Provision

The R4KDTY2 SLIM Duty Station comes with an R4KSPK SLIM Speaker Station; which should be installed together. The R4KSPK SLIM Speaker Station must be installed before connections are made to the R4KDTY2 SLIM Duty Station and mounting it. Refer to the section for the R4KSPK SLIM Speaker Station for installation information.

Making Connections

The SLIM Duty Station makes two connections to the DCA214D Domeless Duty Controller or CLA214D Duty Corridor Light.

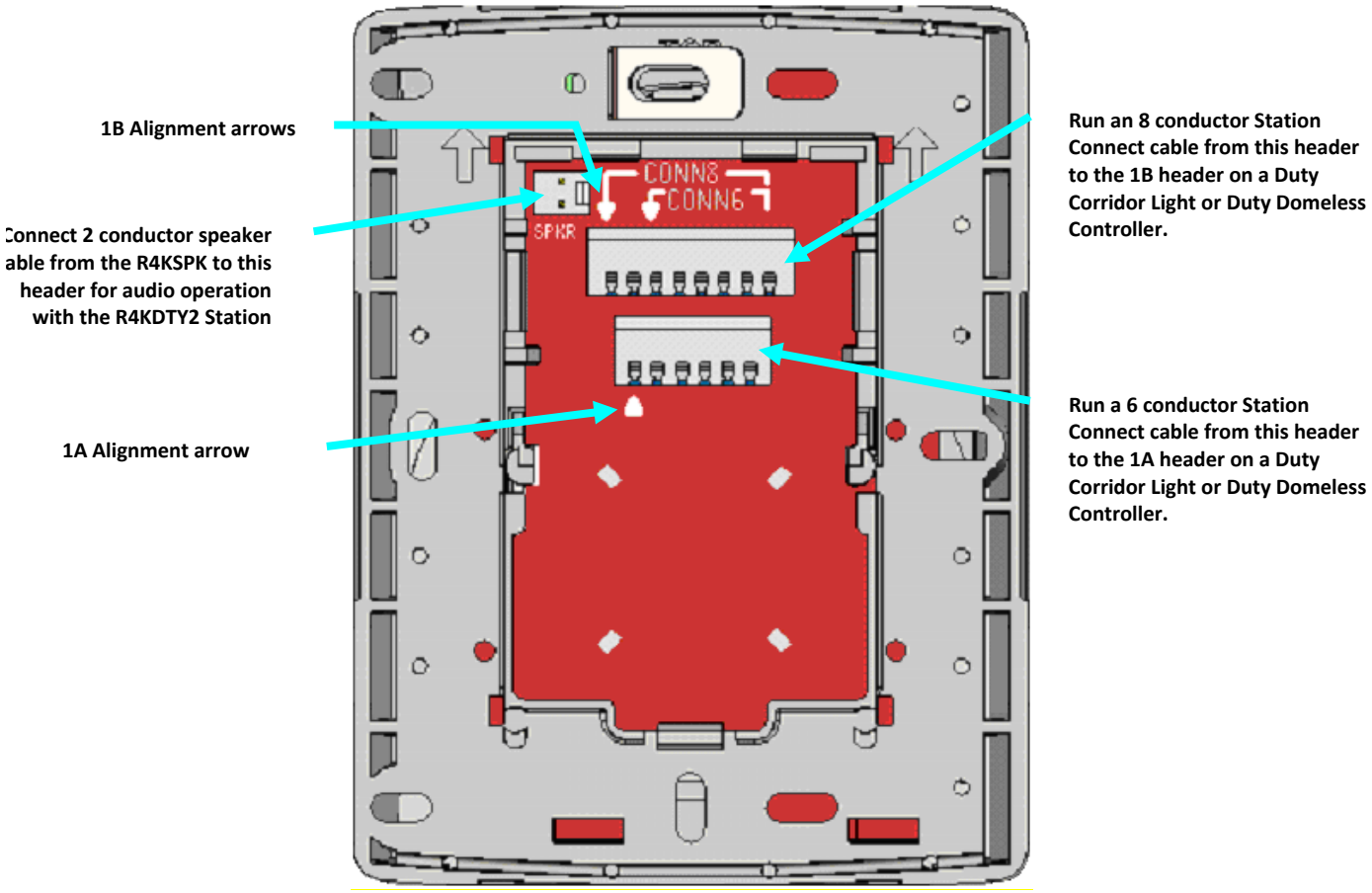


Figure 248: SLIM Duty Station, Rear View

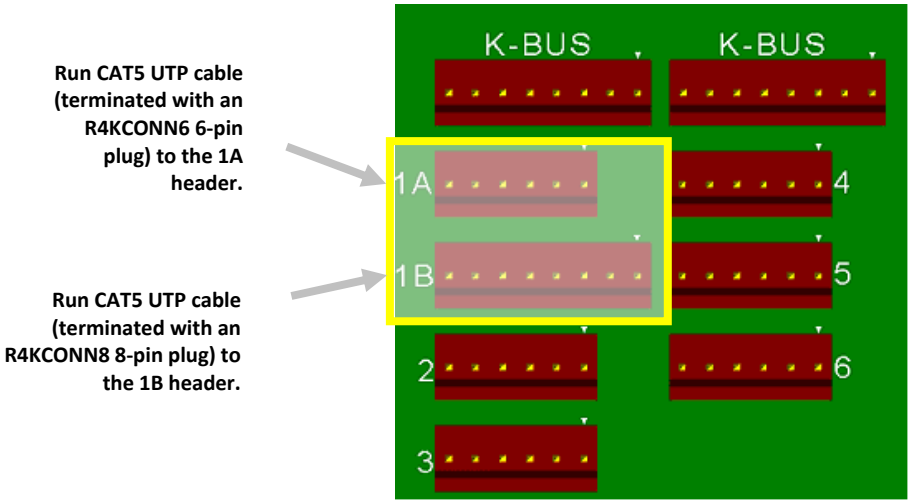


Figure 249: Duty Corridor Light connections

Special Connection Precaution

If other SLIM-Style, visual-only stations are used on CLA214D or DCA214D modules Ports 2 through 6, the monitor LED on those stations may incorrectly turn on when there is an active audio call on the R4KDTY2 station on Port 1A/1B. To prevent this from happening, cut the white with green stripe wire that connects to pin 4 of the SLIM-Style, visual-only stations on Ports 2 through 6.

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the station, you can use the following procedures to initialize and test it:

Procedure 1

1 Press the button to place a call.

2 Verify the call assurance (red) LED is lit and that the monitor LED changes from red to amber color and an audio path has been established to the console by conducting a 2-way conversation exchange through the station to the console.

Procedure 2

1 Set the meter to measure 10Kohms or higher.

2 Remove the 8 conductor station cable from the corridor light.

3 Measure the resistance of the white/brown & green/white wires.

- A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.
- If the measurement is not correct, measure the resistance of the corresponding pins at the station.

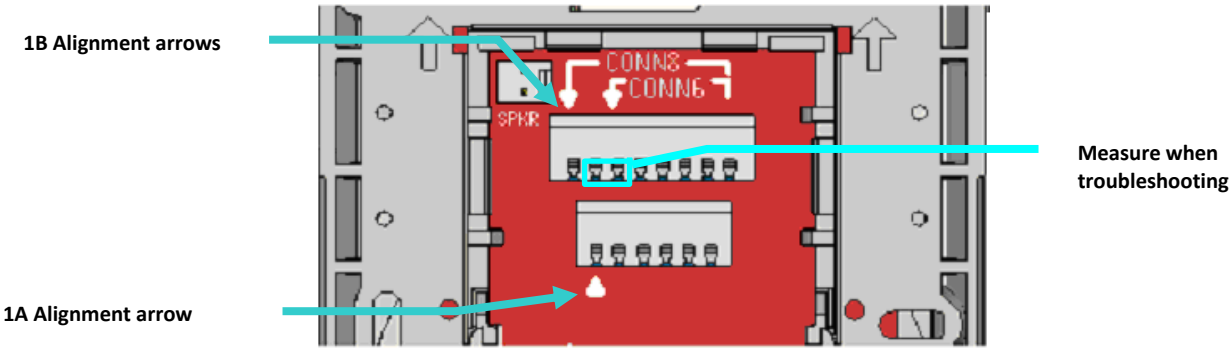


Figure 250: SLIM Duty station troubleshooting, Alignment arrow.

Others Things You Should Know

- ✓ The lights in the SLIM Duty Station are driven by the white, green, red and blue lights of the Duty Corridor Light. They **cannot** flash or light independent of the Corridor Light.
- ✓ The R4KDTY2 is a supervision-ready station. For the appropriate configuration programming settings, it will place a “fail” call at the console if disconnected or has wiring shorts. You can block this automatic call for systems that do not require UL1069 Code supervision. For instructions, consult KI-2105, the *Responder® 4000 Configuration Guide* (System Wide Options).
- ✓ See the section *SLIM-Style Stations General Installation Information* for instructions about mounting a station.

R4KPC11 SLIM Pull Cord Station
(Audio and Visual Only Network Compatible)

Making Connections

Connect the SLIM Pull Cord Station to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216 or DCA214D) using a 6 conductor Station Connect cable as indicated for visual-only operation; or an 8 conductor Station Connect cable for the pull cord with audio operation as indicated if the R4KPC11 is mounted to the optional R4KSPK SLIM Speaker Station:

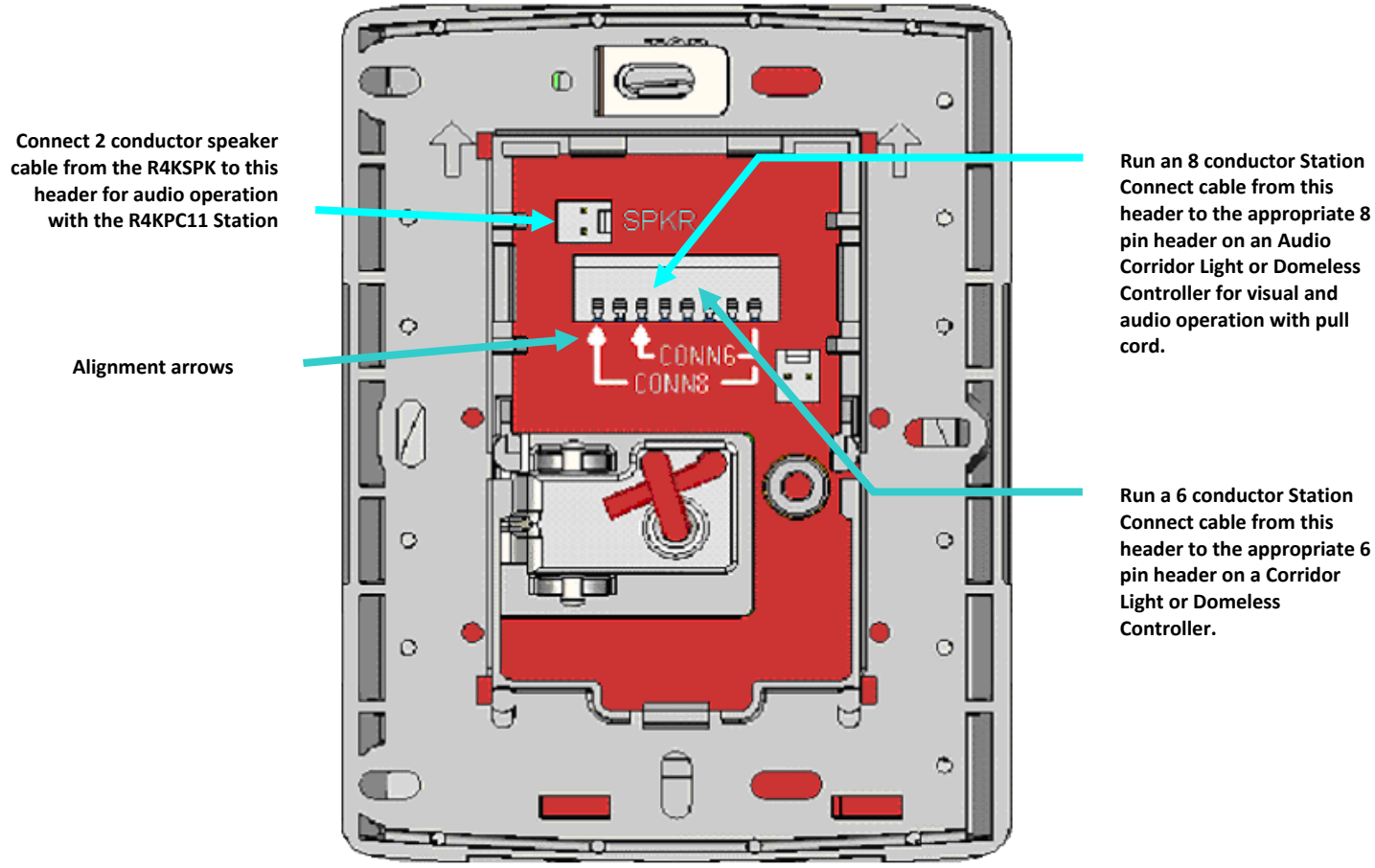


Figure 251: SLIM Pull Cord Station, Rear View

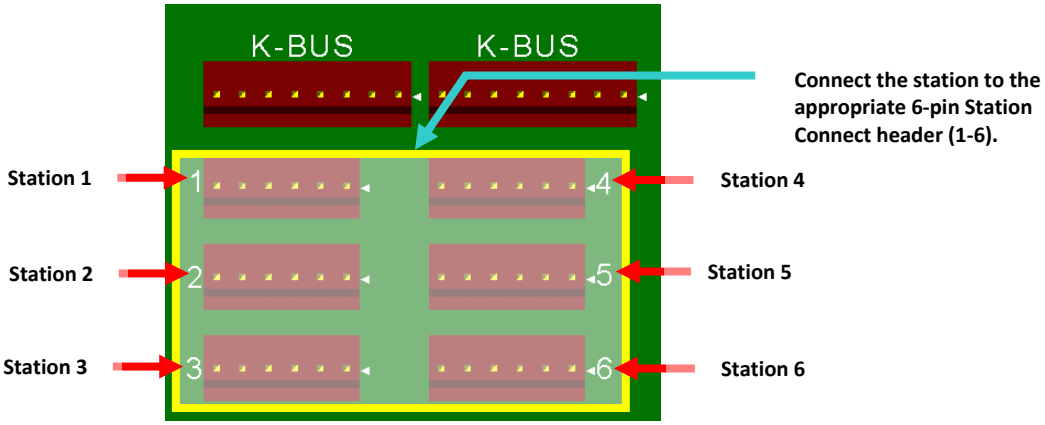


Figure 252: Corridor Light/Domeless Controller station connections

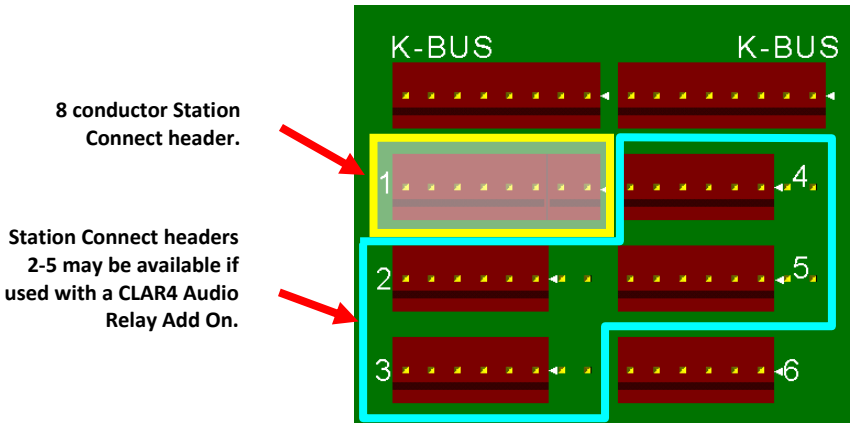


Figure 253: Audio Corridor Light/Domeless Controller, PC Board

Special Connection Precaution

If a SLIM-Style station is used on a CLAR4 module Port 1, the monitor LED may incorrectly turn on when there is an active audio call on one of the other ports. To prevent this from happening, do not use Port 1 on a CLAR4 module if other unused ports are available on it. Alternately if Port 1 is used, cut the white with green stripe wire that connects to the station connector pin 4.

Mounting the Station in a Shower Environment

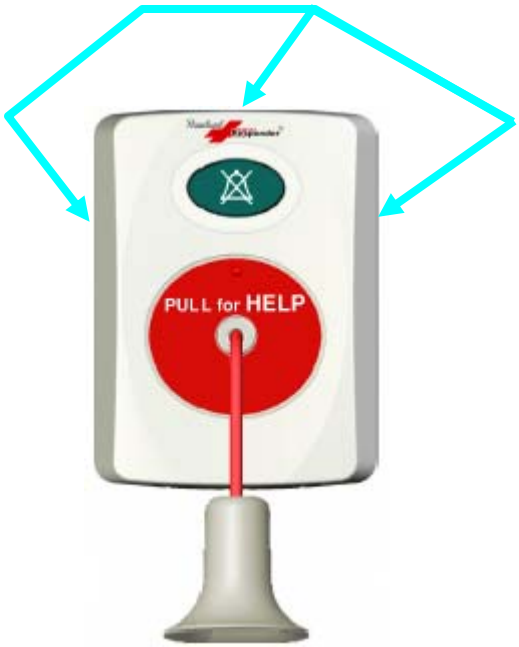
Mounting the SLIM Pull Cord Station in a Shower Environment:

1 Attach the Station Base directly to a wall **or** to a single gang box using the provided screws.

2 Snap the front Station Face Plate to the Station Base.

3 Run a bead of caulk along the top and sides to splash-proof the station.

➢ Note: Do **NOT** caulk the bottom of the station! The bottom is to remain uncaulked in order to allow moisture to escape.



Although the Plate/Station combination is water-resistant, we recommend you run a bead of silicone caulk around the top and two sides of the station face. Do NOT caulk the bottom.

Figure 254: SLIM Pull Cord Station with Caulking Call-Outs (highlighted)

Getting it Ready & Confirming it Works

Once you've made the appropriate connections and mounted the station, you can use the following procedures to initialize and test it:

Procedure 1

1 Pull the cord to place a call.

2 Verify the call assurance (red) LED is lit when each call is placed; and if mounted to the optional R4KSPK SLIM Speaker Station verify that the monitor LED changes from red to amber color and an audio path has been established to the console by conducting a 2-way conversation exchange through the station to the console.

Procedure 2

Set the meter to measure 10Kohms or higher.

1 Remove the station cable from the corridor light.

2 Measure the resistance of the white/green & orange/white wires.

- A properly wired and correctly functioning station (with no buttons pressed) will measure 27Kohms resistance across these wires.

3 If the measurement is not correct, measure the resistance of the corresponding pins at the station.

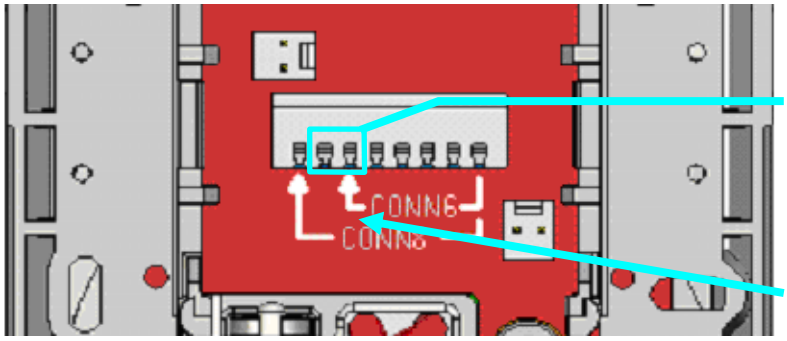


Figure 255: SLIM Pull Cord Station Troubleshooting, Alignment arrows

Replacing the Cord

Should you need to replace the station's cord at any time, observe the following procedure:

Step 1 Pull the cord through the bottom hole 3-4 inches:

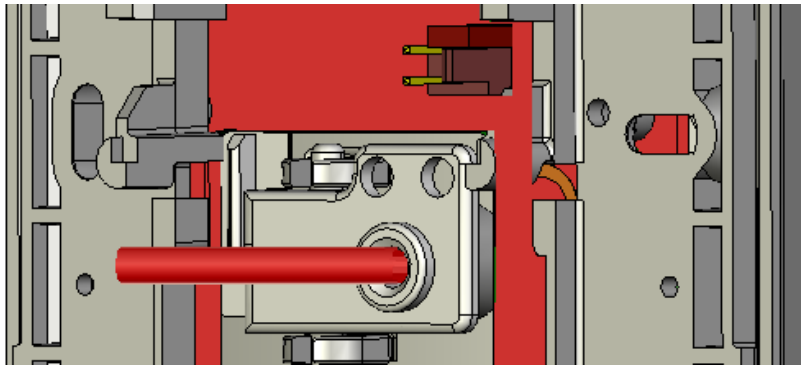


Figure 256: Step 1 (Insert New Cord)

Step 2 Run the cord to the up and around the lever and through the left hole. Leave a small loop in the cord:

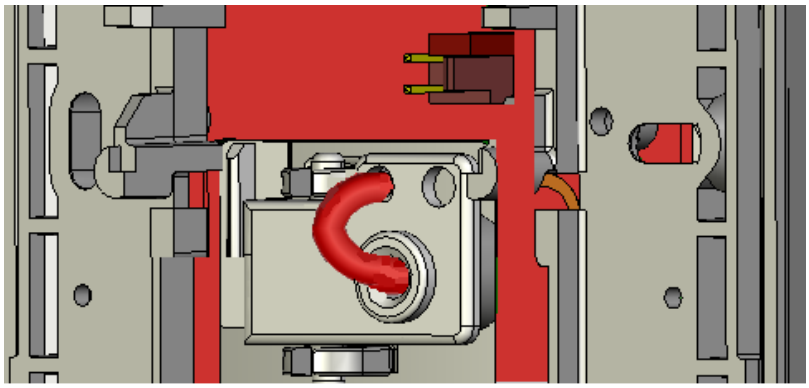


Figure 257: Step 2 (Run cord around back and through hole on the left)

Step 3 Run the cord back through the hole on the right then under the small loop and cut the cord to 1 inch:

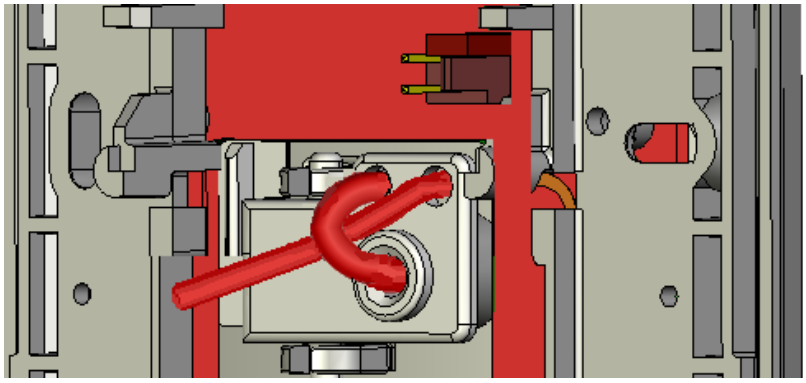


Figure 258: Step 3 (Finish the knot)

Step 4 Test the assembly by pulling the cord and listening for the switch to click. This will also tighten the small loop.

Adjusting the cord length/replacing the bell

In order to prevent the bell-end from falling off the cord, observe the following figure-eight knot-tying procedure:

Step 1 Thread replacement cord through bell end.

Step 2 Loop the cord as shown above.

Step 3 Create the second loop.

Step 4 Pull the cord through the hole and tighten.

Step 5 Trim excess cord, and slide the bell over the knot to secure.

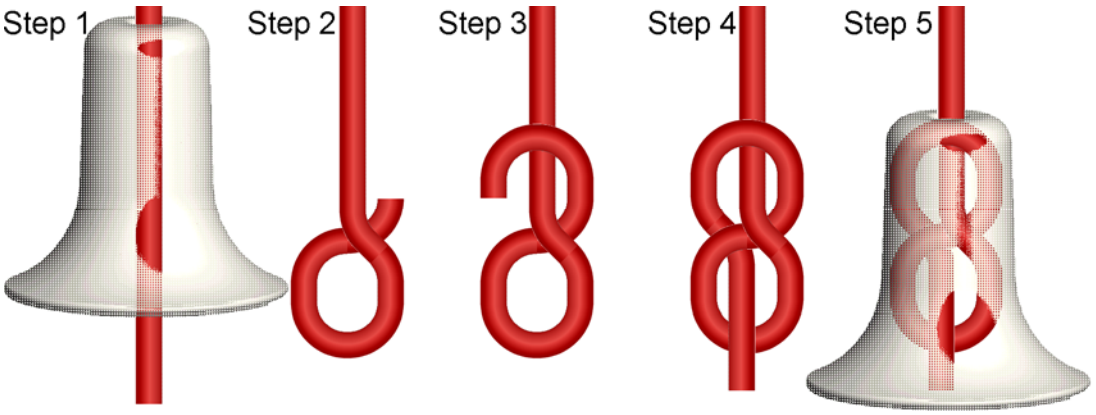


Figure 259: Figure eight knot

Others Things You Should Know

✓ The R4KPC11 is a supervision-ready station. For the appropriate configuration programming settings, it will place a “fail” call at the console if disconnected or has wiring shorts. You can block this automatic call for systems that do not require UL1069 Code supervision. For instructions, consult KI-2105, the *Responder® 4000*

Configuration Guide (System Wide Options).

✓ See the section *SLIM-Style Stations General Installation Information* for instructions about mounting a station.

12

Accessories

In this chapter you'll find installation tear sheets for the following Accessories:

- ✓ Feature Bed Interface
- ✓ Dry Contact Interface
- ✓ Remote Station Disable Switch
- ✓ CCDIN Call Cord
- ✓ R4KSTR Strain Relief Kit
- ✓ R4KGRD Station Guard
- ✓ R4KDSB Station Bracket
- ✓ Pillow Speaker(s)
- ✓ R4KCSC Clear Station Cover
- ✓ R4KSLC1 Single Lighting Controller
- ✓ R4KDLC2 Dual Lighting Controller
- ✓ R4KTVR1 Digital TV Relay Isolation Module
- ✓ R4KFAM Fire/Auxiliary Isolation Module

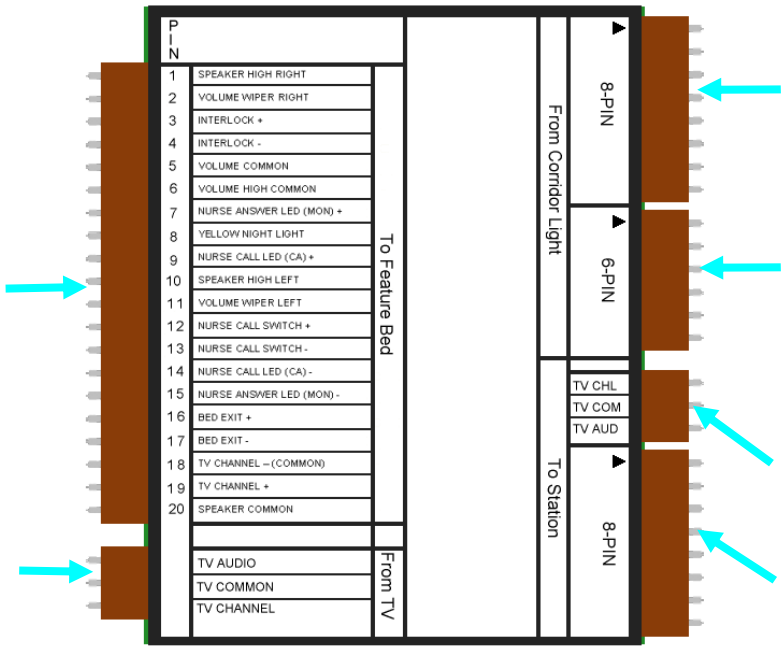
R4KFB1 Feature Bed Interface
(Audio/Visual Network)

Making Connections

The Feature Bed Interface makes four types of connections: 1) to the Corridor Light/Room Controller, 2) to a feature bed, 3) to a TV and 4) to a bed station.

Corridor Light/Room Controller Connection

Connect the Feature Bed Interface to an Audio Corridor Light (CLA222, or CLA244) or Audio Room Controller (DCA200, or DCA216) using an 8 conductor Station Connect cable and 6 conductor Station Connect cable as indicated:



Connect the 20 pin pigtail cable from this header to the feature bed.

Use a 3 pin pigtail cable to connect an optional TV to the Feature Bed Interface.

Run an 8 conductor Station Connect cable from this header to the appropriate 8 pin header on an Audio Corridor Light or Domeless Controller.

Run a 6 conductor Station Connect cable from this header to the appropriate 6 pin header on an Audio Corridor Light or Domeless Controller.

Use a 3 pin pigtail cable to connect an optional TV to the station.

Run an 8 conductor Station Connect cable from this header to the 8 pin header on a bed station.

Figure 260: R4KFB1 connections

Feature Bed Connection

Connect the Feature Bed Interface to a feature bed 37-pin connector as indicated:

R4KFB1 Wire number	R4KFB1 pigtail Wire color	Feature Bed Wire number	Function
1	Black	4	SPEAKER HIGH RIGHT
2	Brown	5	VOLUME WIPER RIGHT
3	Red	10	INTERLOCK +
4	Orange	11	INTERLOCK -
5	Yellow	14	VOLUME COMMON
6	Pink	15	VOLUME HIGH COMMON
7	Blue	16	NURSE ANSWER LED (MON) +
8	Violet	18	YELLOW NIGHT LIGHT
9	Gray	19	NURSE CALL LED (CA) +
10	White	22	SPEAKER HIGH LEFT
11	White/Black	23	VOLUME WIPER LEFT
12	White/Brown	25	NURSE CALL SWITCH +
13	White/Red	26	NURSE CALL SWITCH -
14	White/Orange	28	NURSE CALL LED (CA) -
15	White/Yellow	29	NURSE ANSWER LED (MON) -
16	White/Pink	30	BED EXIT +
17	White/Blue	31	BED EXIT -
18	White/Violet	33	TV CHANNEL – (COMMON)
19	White/Gray	34	TV CHANNEL +
20	White/Green	35	SPEAKER COMMON

Figure 261: R4KFB1 to feature bed wiring

TV Connection

Connect a TV to a feature bed and a feature bed to a bed station TV connection as indicated:

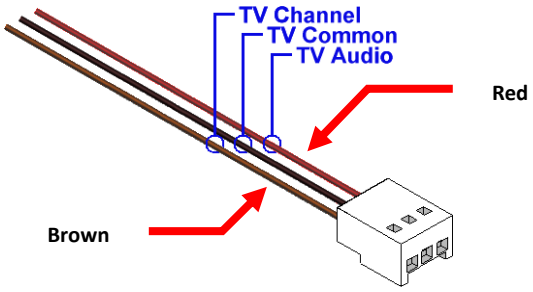


Figure 262: Feature bed TV connections

Bed Station Connection

Connect the Feature Bed Interface to a bed station (R4K12A, R4K13VA, R4K17V, or R4K23VA) using an 8 conductor Station Connect cable and 3 conductor TV connection. An R4K23VA with two feature beds will require two R4KFB1s and a CLAR4.

Getting it Ready & Confirming it Works

1 Place a call from the feature bed.

2 Verify the call assurance LED is lit and an audio path has been established to the console.

3 Place a call from the bed station.

4 Verify the call assurance LED is lit and an audio path has been established to the console.

5 Verify TV audio is operating through the bed rails and/or pillow speaker.

Others Things You Should Know

- ✓ Each corridor light is limited to 6 speakers. Be careful not to exceed this limit when using a CLAR4 and a feature bed.
- ✓ The R4KFB1 must connect to an R4K12A, R4K13VA, R4K17V or R4K23VA.
- ✓ The R4KFB1 will **not** work with the R4K22A.
- ✓ One R4KFB1 is required for each feature bed. The R4KFB1 can **not** be paralleled to multiple beds.
- ✓ TV audio will go through the pillow speaker(s) and bed rails.
- ✓ The R4KFB1 mutes all TV audio during communication.
- ✓ With a CLAR4 added to the CL, the R4KFB1 can be moved to connection point 2 and 3, or 3 and 4, or 4 and 5, or 5 and 6. Note the use of “and” and "or" in the list. An R4KFB1 always uses a pair of sequential connection points.
- ✓ Two R4KFB1s on a single corridor light/domeless controller must connect to points 2 and 3, and 4 and 5. However 2 R4K12A/FB1 pairs are not allowed due to the 6 speaker limit.
- ✓ Visual patient stations can not be used with R4KFB1s (as the station in the connection). They can be used as a separate entity on a CL if required.

Dry Contact Interface
(Audio and Visual Only Network Compatible)

Risk of Electrical Shock Hazard: For IEC 60601-1 certified systems, dry contacts can only be connected to an isolated low voltage circuit of an IEC 60601-1 certified medical device. All combinations of equipment must be installed in accordance with Situation 1b of Table BBB.201 in the Standard for Medical Electrical Systems, IEC 60601-1-1.

Making Connections

You can connect devices that provide a **normally open** dry contact directly to a Corridor Light/Domeless Controller.

Dry Contact Connection

Both Unsupervised and Supervised contacts are possible.

Unsupervised Contact

Connect the Dry Contact Interface to the 6 conductor Station Connect cable as illustrated:

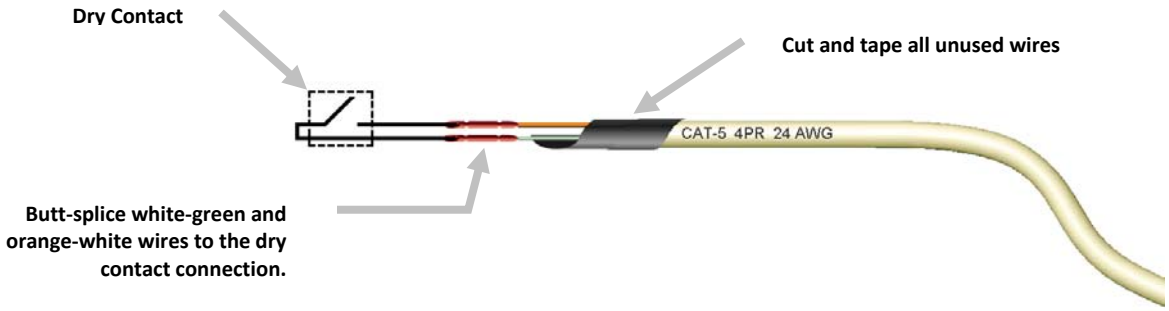


Figure 263: Dry Contact (Use only the white/green & orange/white wires)

Supervised contact

Supervision of the contact requires two resistors. Connect the Dry Contact Interface to the resistors and 6 conductor Station Connect cable as illustrated:

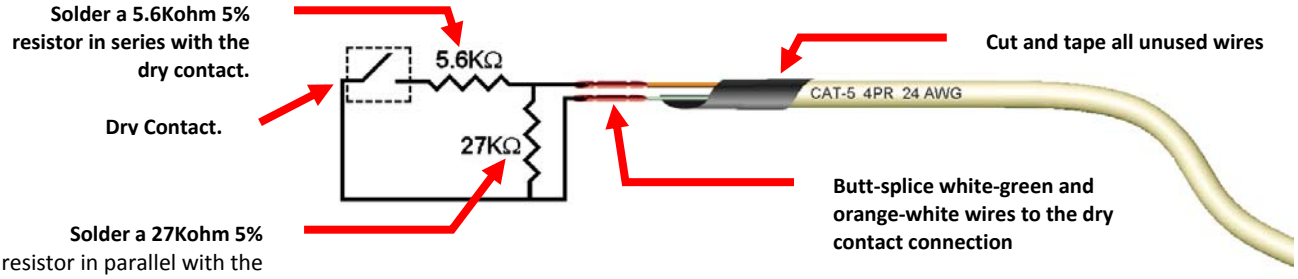


Figure 264: Dry Contact (Use only the white/green & orange/white wires)

Supervised contact with key switch

A locking key switch can also easily be added to enable/disable the dry contact. Shown below is the supervised dry contact with locking key switch.

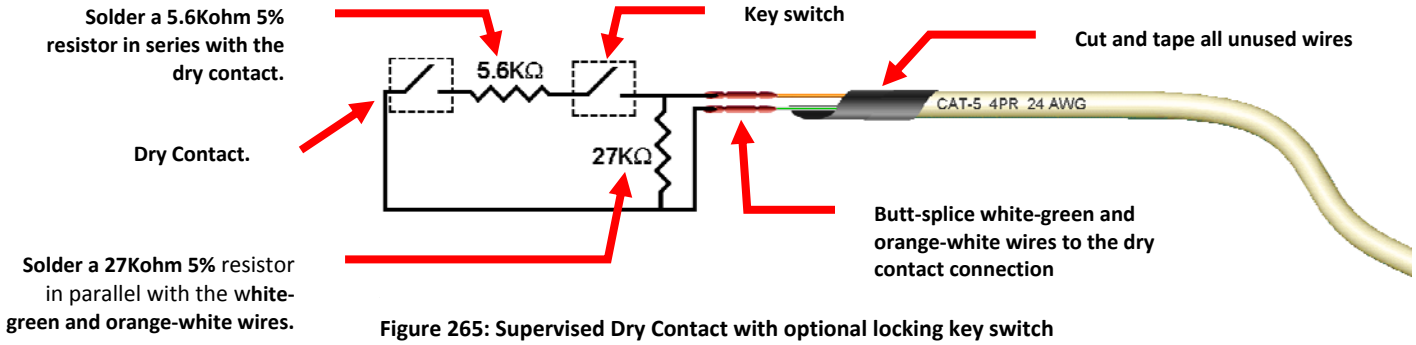


Figure 265: Supervised Dry Contact with optional locking key switch

There must be a primary fire-alarm system that works independently from the Responder® 4000. The dry contact to Fire-Alarm interface provided here can only serve as a supplementary warning. **Underwriters Laboratory does not list Responder® 4000 as a primary alarm system**. The dry contact inputs should **only be used for redundant annunciation of high priority calls, such as "Fire Alarms."**

Corridor Light Connection

Connect the Dry Contact Interface to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, DCA216 or DCA214D) using a 6 conductor Station Connect cable as illustrated:

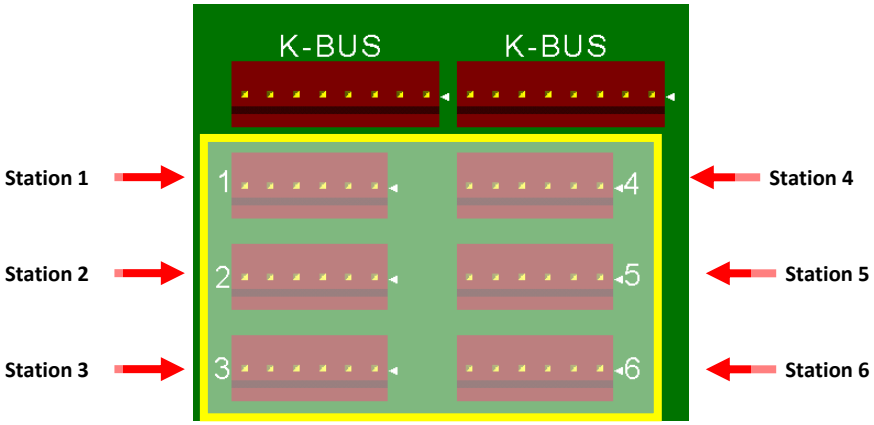


Figure 266: Dry Contact

Others Things You Should Know

- ✓ Normally closed dry contacts will not work properly with this system.
- ✓ Dry contacts usually require an R4KCNCL cancel station to cancel the call. The system can also be configured to allow other stations within the room to cancel dry contact calls via the Room Wide cancel.

Remote Station Disable Switch
(Audio and Visual Only Network Compatible)

Making Connections

If it is sometimes required to disconnect a station temporarily, an SPST switch (e.g. Key Switch) can be inserted between **some** stations and a Corridor Light/Domeless Controller.

SPST Switch Connections

Supervised stations with SPST switch

An SPST switch can easily be added to momentarily disable push button, pull cord or staff stations. Shown below are the connections required for a supervised station with an SPST switch. The switch and resistor can be located in a remote back-box separate from the station.

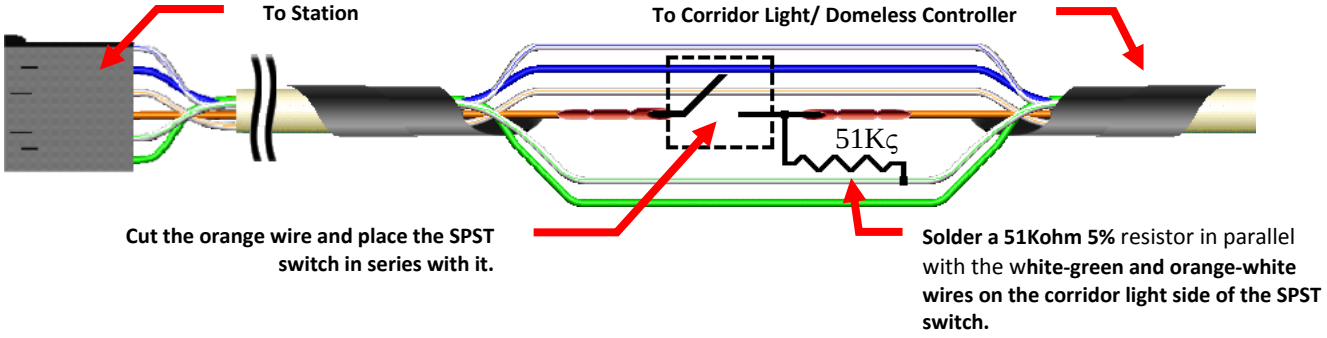


Figure 267: Supervised push button/pull cord station with SPST switch

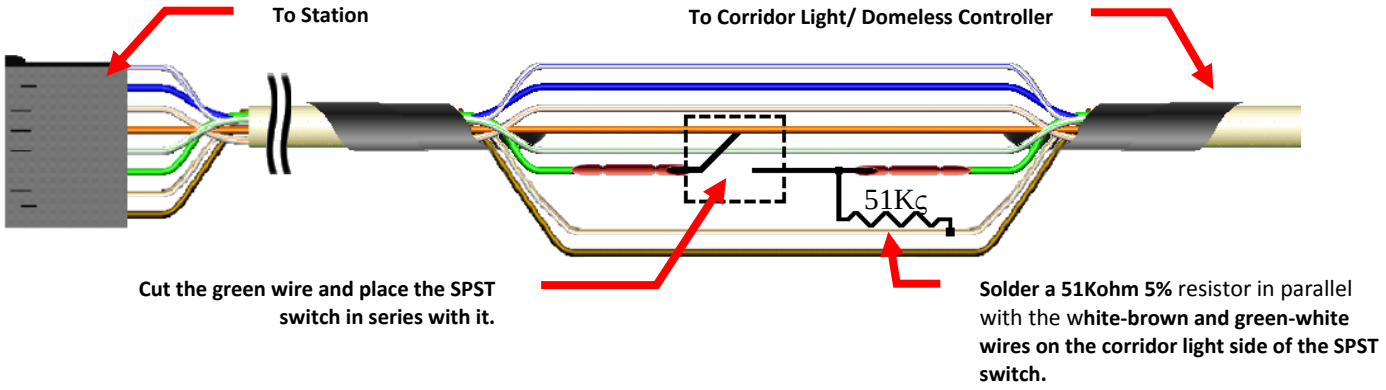


Figure 268: Supervised staff station with SPST switch

- ✓ Only the R4KPB11, R4KPB22, R4KPB44, R4KESR, R4KRA1, R4KCNCL, R4KSR1, R4KPC10, R4KSS, R4KPB12, R4KSAR, R4KPC11, HSS401 and HSS433 will work with this configuration.
- ✓ The R4KCB10, R4KCB12, R4K11V, R4K12A, R4K21V, R4K22A, R4K16LV, R4K25LV, R4K13VA, R4K23VA, R4K14SA, R4KDY, R4K17V, R4K15V, R4K2JACK, R4KCB13, R4KPB23, R4KDTY2 and HSS400 will **NOT** work with this configuration. UL-1069 requires code station supervision; therefore this cannot be used with the R4KCB10 or R4KCB12.

Corridor Light Connection

Connect the station/switch to any Corridor Light (CLV122, CLV144, CLA222, CLA244) or Domeless Controller (DCV100, DCV116, DCA200, DCA216 or DCA214D) using a 6 or 8 conductor Station Connect cable as required by the station.

Others Things You Should Know

- ✓ Adding the 51K ohm resistor will disable station supervision even with the switch closed.
- ✓ All Code, Bed and Duty Stations (R4KCB10, R4KCB12, R4K11V, R4K12A, R4K21V, R4K22A, R4K16LV, R4K25LV, R4K13VA, R4K23VA, R4K14SA, R4KDY R4K17V, R4K15V, R4K2JACK, R4KCB13, R4KPB23, R4KDTY2 and HSS400) can **NOT** be used with this configuration.
- ✓ UL-1069 requires code station supervision; therefore this cannot be used with the R4KCB10, R4KCB12, R4KCB13, or R4KPB23.
- ✓ The wiring for the Staff Station (R4KSS) requires the switch to be connected in series with the green wire and the resistor to go between the white/brown and green wires.
- ✓ The 51Kohm resistor should always be located on the corridor light side of the switch to prevent “trouble” messages at the console.

R4KFAM Fire/Auxiliary Isolation Module
(Audio/Visual Network)

Making Connections

The Fire/Auxiliary Isolation Module makes two connections: 1) to a Fire Alarm or other device that requires isolation and 2) to a Corridor Light/Domeless Controller.

There must be a primary fire-alarm system that works independently from the Responder® 4000. The R4KFAM to Fire-Alarm interface provided here can only serve as a supplementary warning. **Underwriters Laboratory does not list Responder® 4000 as a primary alarm system**. The R4KFAM inputs should **only be used for redundant annunciation of high priority calls, such as "Fire Alarms."**

Underwriters Laboratory lists Model NC4JACK with Responder 4000 when used with Model R4KFAM used in Supervision Mode (wire the 27 kOhm supervision resistor across the dry contact on the ¼" Plug side of the NC4JACK). Also, the NC4JACK may only connect to a device providing a normally open dry contact relay.

Contact Connection

The contact connection to the fire alarm or auxiliary unit can be supervised or unsupervised:

Supervised contact (typical)

The R4KFAM unit itself is always supervised by parts internal to the R4KFAM. To provide **supervision of the connection** to the fire alarm or auxiliary unit, use the **included 27Kohm resistor**. For proper supervision of the contact, be sure to connect the 27Kohm resistor as close the contact as possible. Connect the 27Kohm resistor in parallel with the contact and connect to the R4KFAM as illustrated:

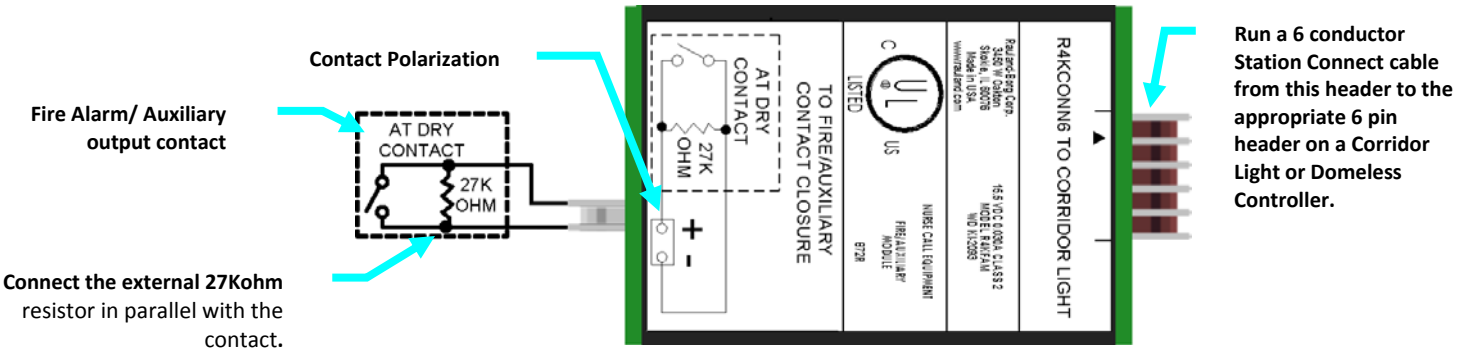
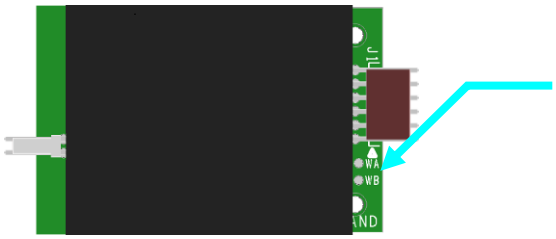


Figure 269: Supervised contact connections of the R4KFAM

Unsupervised contact

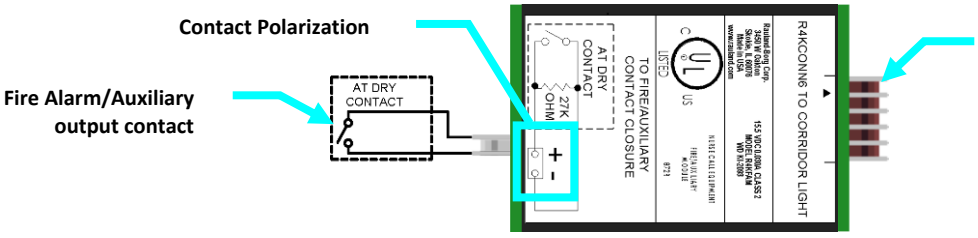
In order to disable supervision of the connection between the R4KFAM and the fire alarm or auxiliary unit, you **must** first solder a wire between the WA and WB pads on the board. The 27Kohm resistor is not needed for fire alarm or auxiliary unit connections that do not need supervision.



Solder a wire between the WA and WB pads to disable supervision of the connection between the R4KFAM and the fire alarm or auxiliary unit.

Figure 270: Back-side view of R4KFAM, showing WA and WB pads

Connect the R4KFAM to the 6 conductor Station Connect cable and contact as illustrated:



Run a 6 conductor Station Connect cable from this header to the appropriate 6 pin header on a Corridor Light or Domeless Controller.

Figure 271: Unsupervised contact connections of the R4KFAM

Programming as an R4KSPCL

The R4KFAM can be programmed as the interface to activate “Special” mode. See KI-2105 Configuration Guide for instructions on programming the R4KFAM as an R4KSPCL.

Contact Polarization

The R4KFAM uses a solid state opto-isolator to sense a contact closure on the auxiliary device. Be sure to pay attention to the polarity when wiring these contacts to auxiliary devices that do not provide “dry” contacts.

Corridor Light Connection

Connect the Fire/Auxiliary Isolation Module to any Corridor Light (CLV122, CLV144, CLA222, CLA244 or CLA214D) or Domeless Controller (DCV100, DCV116, DCA200, or DCA216, DCA214D) using a 6 conductor Station Connect cable as illustrated:

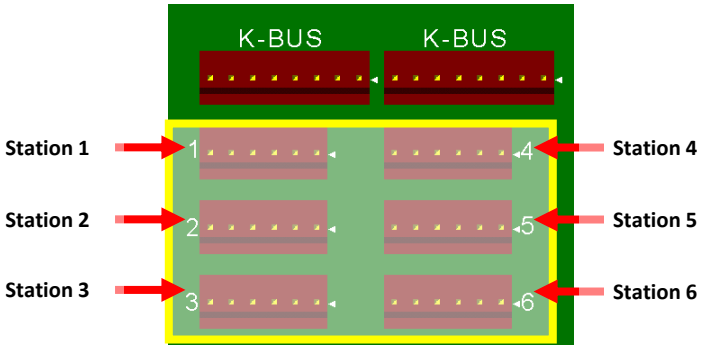


Figure 272: The Fire/Auxiliary Isolation Module corridor light connection points

NC4JACK ¼" Plug Connection

Connection of Model NC4JACK to up to four (4) R4KFAM Fire/Auxiliary Isolation Modules is shown in the table below. Connect jack inputs to a normally open dry contact rated for at least 2mA @ 5Volts DC:

Wire Color	NC4JACK Right side Jacks 1 and 2		Wire Color	R4KFAM "1" & "2"	
Orange	Jack #1 J5	Pin1 SLV	Black	Pin 1 +	R4KFAM #1 Input
Yellow		Pin 2 TIP	Brown	Pin 2 -	
Pink	Jack #2 J5	Pin 3 TIP	Brown	Pin 2 -	R4KFAM #2 Input
Blue		Pin 4 SLV	Black	Pin 1 +	
Wire Color	**NC4JACK Left side Jacks 3 and 4**		**Wire Color**	**R4KFAM "3" & "4"**	
Orange	Jack #3 J6	Pin1 SLV	Black	Pin 1 +	R4KFAM #3 Input
Yellow		Pin 2 TIP	Brown	Pin 2 -	
Pink	Jack #4 J6	Pin 3 TIP	Brown	Pin 2 -	R4KFAM #4 Input
Blue		Pin 4 SLV	Black	Pin 1 +	

Table 43: NC4JACK to R4KFAM Wiring

Others Things You Should Know

- ✓ The Fire/Auxiliary Isolation Module usually require an R4KCNCL cancel station to cancel the call. The system can also be configured to allow other stations within the room to cancel all calls within the room via the Room Wide cancel option.
- ✓ Normally closed dry contacts will not work properly with this system.

Entertainment Speakers
(Audio/Visual Network Compatible)

Making Connections

Connect the Entertainment Speaker to the DIN connector on the front of the R4K11V, R4K12A, R4K13VA, R4K21V, R4K22A, R4K23VA, R4K14SA, R4K17V.

Compatible Models

You can use the following Entertainment Speakers with the RESPONDER® 4000 Audio/Visual Network

- ✓ NCESTV (See KI-2057)
- ✓ NCDSTV (See KI-2077)

Figure 273: Responder® 4000 Compatible Entertainment Speaker

Confirming it Works

Once you've made the appropriate connections, prepare the unit as follows:

1 Connect the pillow speaker to the bed station DIN jack.
2 Place a call.
3 Verify the call assurance (red) LED is lit.

Others Things You Should Know

- ✓ TV audio will only go through the pillow speaker and will not be muted if used with the R4K12A, R4K12AHZ, R4K14SA or R4K22A.
- ✓ Using pillow speakers not mentioned in the compatible model list will interfere with normal nurse call operation.

CCDIN DIN Type Call Cord
(Audio and Visual Only Network Compatible)

Making Connections

Connect the Call Cord to any Responder® 4000 Bed Station (R4K11V, R4K12A, R4K12AHZ, R4K13VA, R4K13VAHZ, R4K14SA, R4K21V, R4K22A, R4K23VA, R4K17V).

Figure 274: CCDIN DIN Type Call Cord

Confirming it Works

Once you've made the appropriate connections, use the following procedure to make sure it works:

1 Connect the CCDIN to the bed station DIN jack

2 Press the Call Cord button.

➢ The Call Assurance LED should light.

R4KCSC Clear Station Cover
(Audio or Visual Only Network Compatible)

Attach the R4KCSC metal bracket to the backside of the station base as follows:

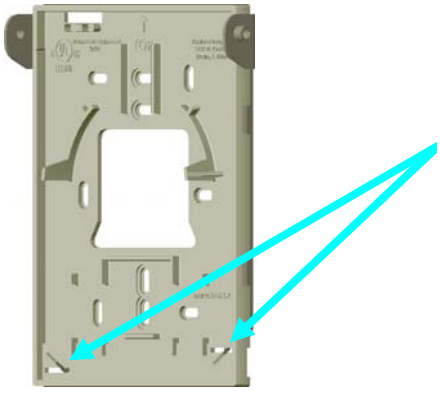


Figure 275: Attach the bracket to the base

1 Plug the station connector to the station and snap it to the base.

Figure 276: Attached Base

2 Snap the cover to the swivel supports on the bracket.

Figure 277: Attach the cover (shown in the resting position)

Confirming it Works

Once you've installed the cover, open and close it a few times to make sure it drops freely to the closed position.

Others Things You Should Know

- ✓ This cover is designed to work with the R4KCB12, R4KCB10, R4KPB11, R4KPB22, R4KRA1, R4KSR1, R4KCNCL and R4KESR.

R4KSTR Strain Relief Kit
R4KGRD Station Guard
R4KDSB Station Bracket
(Audio or Visual Only Network Compatible)

Attach the R4KSTR, R4KGRD or R4KDSB metal bracket to the station as follows:

1 Attach the base to the metal bracket and twist the tabs to lock it in place. Screw the base/bracket to a back box using as many screws as possible.

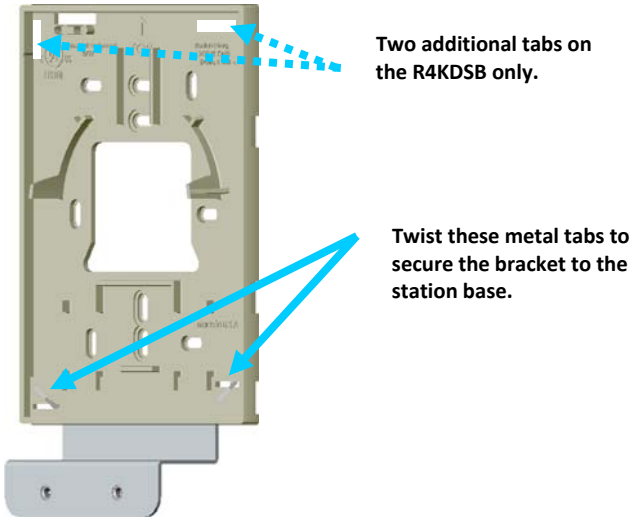


Figure 278: Attach the bracket to the base

2 Plug the station connector(s) to the station and snap it to the base. Plug in the pillow speaker(s)/call cord(s).

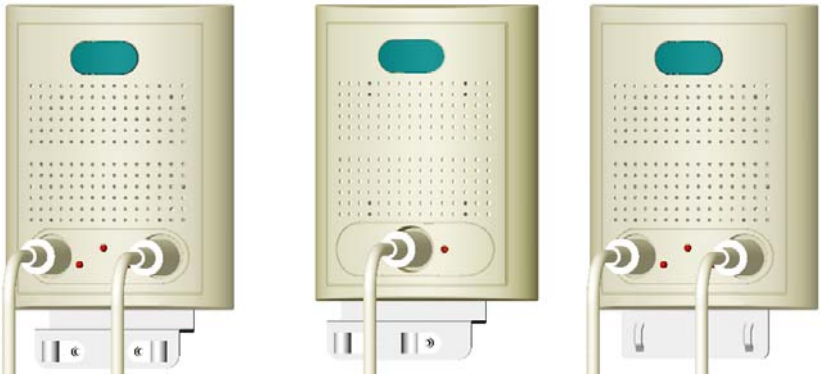


Figure 279: Attached Station and cords

3 a) For the R4KSTR or R4KGRD: Wrap the strain relief(s) around the cord(s) then screw the cord retainer(s) to the bracket. Be sure to leave at least 3 inches slack in the cord(s).

b) For the R4KDSB: Wrap the cable tie(s) through the slot(s) and around the cord(s) to secure the cord(s) to the bracket. Be sure to leave at least 3 inches slack in the cord(s).

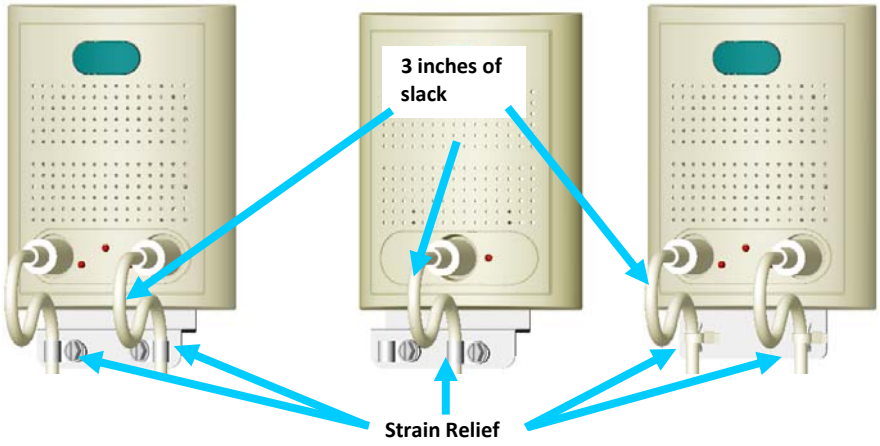


Figure 280: Screw the cord retainers to the bracket.

4 (R4KGRD only) Attach the metal "facemask" to the plate using the 4 screws included with the unit.

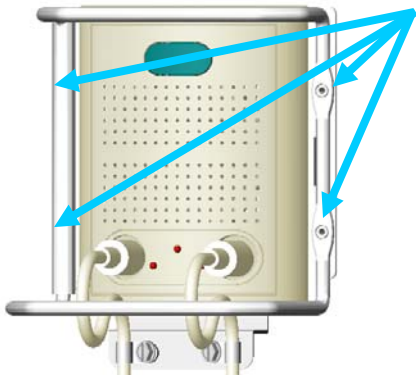


Figure 281: Attach the bracket to the base

Confirming it Works

Once you've installed the strain relief, test the station as normal. Make sure the screws are tight enough to prevent the cord from slipping.

Others Things You Should Know

- ✓ This strain relief and guard are designed to work with the R4K11V, R4K12A, R4K21V, R4K22A, R4K13VA, R4K23VA, R4K14SA.
- ✓ Screw the station base/bracket to the wall using as many screws as possible. This will provide make the backplate more rigid.

R4KSLC1 Single Lighting Control Module
(Audio/Visual Network)

Making Connections

The Single Lighting Control Module makes two connections: 1) to a bed station and 2) to a low voltage lighting controller (i.e. NCLV120, NCLV240).

Bed Station Connection

You **must** cut the "LC" trace (on the R4K17V remove the "LC" jumper) on the bed station board to enable the "R4KSLC1" connector.

The "LC" trace should only be cut when adding a lighting control module. Once cut the station will not respond to any pillow speaker or call cord button presses without the lighting control module. A wire can be soldered across the trace if it is inadvertently cut.

Connect the bed station (R4K16LV, R4K13VA, or R4K17V) "R4KSLC1" connector to the Single Lighting Control Module "STATION" using an 8 conductor Station Connect cable:

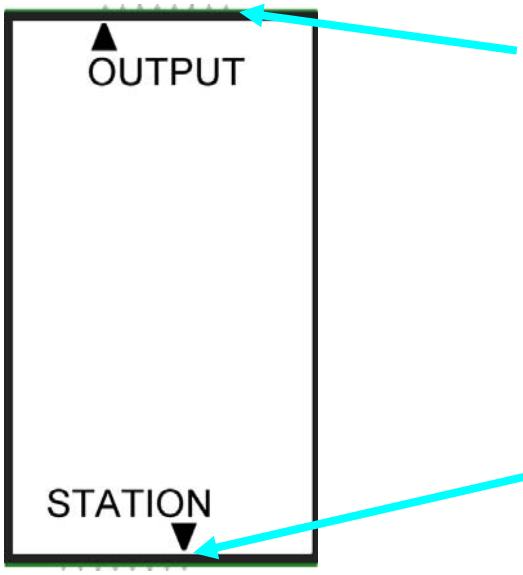


Figure 282: R4KSLC1 connections

Low Voltage Lighting Controller Connection

Connect the low voltage lighting controller to the R4KSLC1 as indicated:

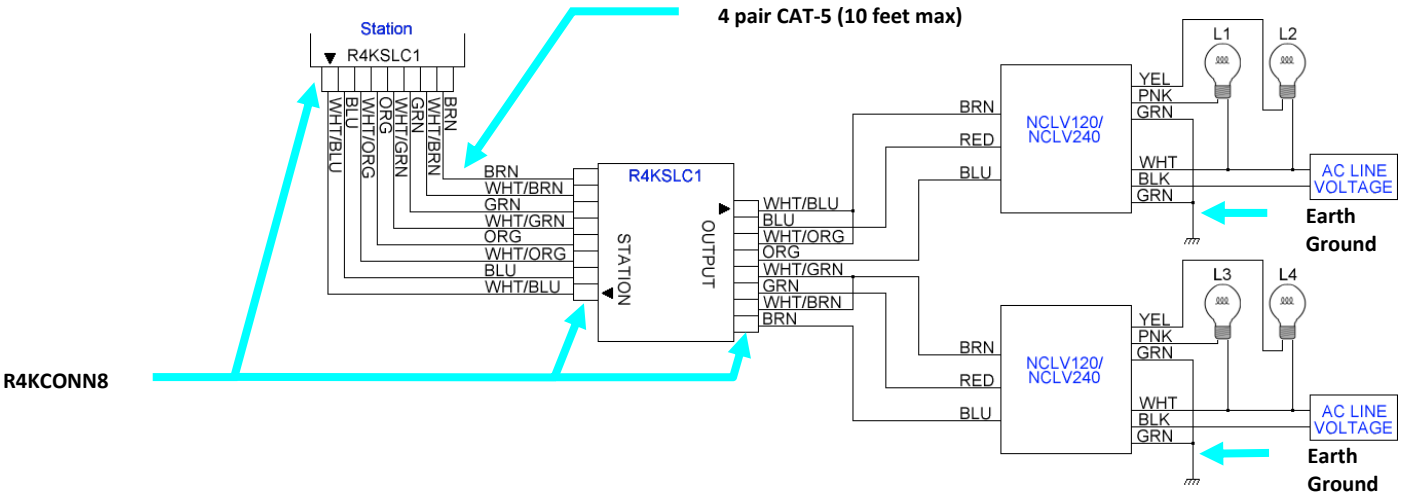


Figure 283: R4KSLC1 to NCLV120/NCLV240 low voltage lighting controller connection

The R4KSLC1 will fit in a quad electrical box and must be within 10 feet of the station.

Getting it Ready & Confirming it Works

1 Place a call from the Pillow Speaker.
2 Verify the call assurance LED is lit on the station.
3 Light each light using the pillow speaker.
4 If the lights don't light, verify the "LC" trace is cut.

Others Things You Should Know

- ✓ The R4KSLC1 Module provides the isolation for low voltage lighting controllers. No additional relays are required.
- ✓ The R4KSLC1 will fit in a quad electrical box and must be within 10 feet of the station.
- ✓ The "LC" trace on the bed station board must be cut to enable the R4KSLC1 connector.
- ✓ The R4KSLC1 will only work with these pillow speakers:
- ✓ NCESSL1
- ✓ NCESDL2
- ✓ NCESPL4
- ✓ NCDSSL1##
- ✓ NCDSDL2##

R4KDLC2 Dual Lighting Control Module
(Audio/Visual Network)

Making Connections

The Dual Lighting Control Module makes two connections: 1) to a bed station and 2) to low voltage lighting controllers (i.e. NCLV120, NCLV240).

Bed Station Connection

You **must** cut the "R. LC" and "L. LC" traces on the bed station board to enable the "R4KDLC2" connector.

The "LC" traces should only be cut when adding a lighting control module. Once cut the station will not respond to any pillow speaker or call cord button presses without the lighting control module. A wire can be soldered across the trace if it is inadvertently cut.

Connect the bed station (R4K25LV or R4K23VA) "R4KDLC2" connector to the Dual Lighting Control Module "STATION" using an 8 conductor Station Connect cable:

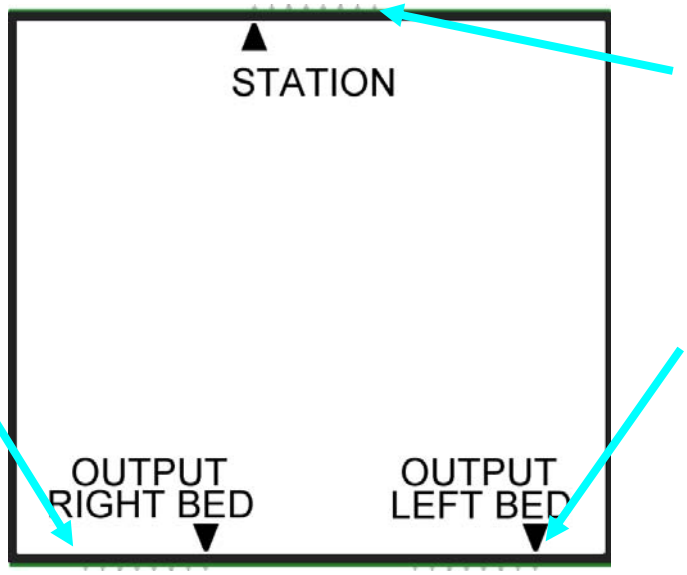


Figure 284: R4KDLC2 connections

Low Voltage Lighting Controller Connection

The R4KDLC2 Dual Lighting Controller Module connection should be made as follows:

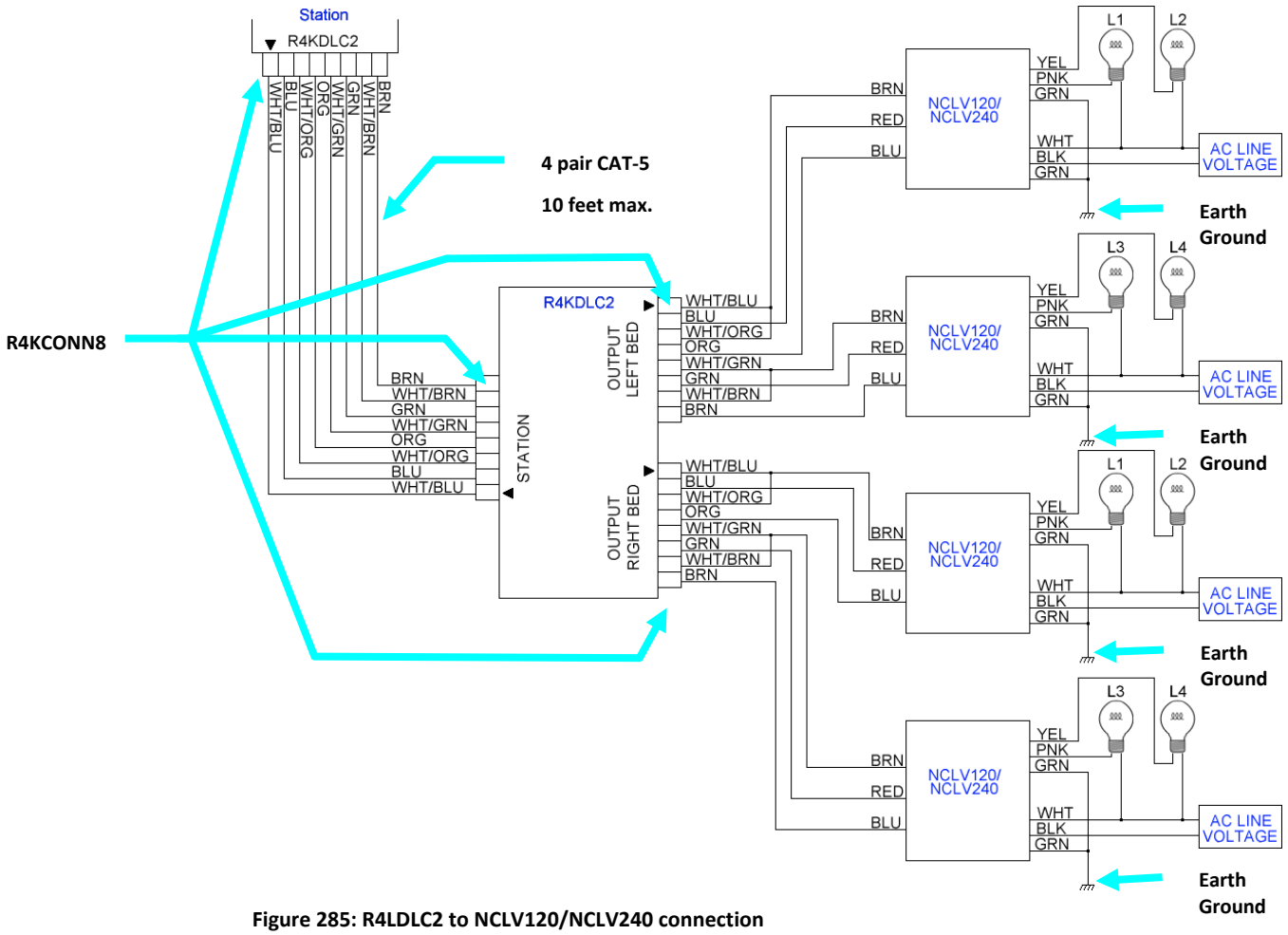


Figure 285: R4LDLC2 to NCLV120/NCLV240 connection

The R4KDLC2 will fit in a quad electrical box and must be within 10 feet of the station.

Getting it Ready & Confirming it Works

1 Place a call from the Pillow Speaker.
2 Verify the call assurance LED is lit on the station.
3 Light each light using the pillow speakers.
4 If the lights don't light, verify the "R. LC" and "L. LC" traces are cut.

Others Things You Should Know

- ✓ The R4KDLC2 Module provides the isolation for low voltage lighting controllers. No additional relays are required.
- ✓ The R4KDLC2 will fit in a quad electrical box and must be within 10 feet of the station.
- ✓ The "R. LC" and "L. LC" traces on the bed station board must be cut to enable the "R4KDLC2" connector.
- ✓ The R4KDLC2 will only work with these pillow speakers:

- ✓ NCESSL1
- ✓ NCESDL2
- ✓ NCESPL4
- ✓ NCDSSL1##
- ✓ NCDSDL2##

R4KTVR1 Digital TV Isolation Module
(Audio/Visual Network)

Making Connections

The Digital TV Isolation Module makes three connections: 1) to a TV 2) to Bed Station and 3) to a Corridor Light/Domeless Controller.

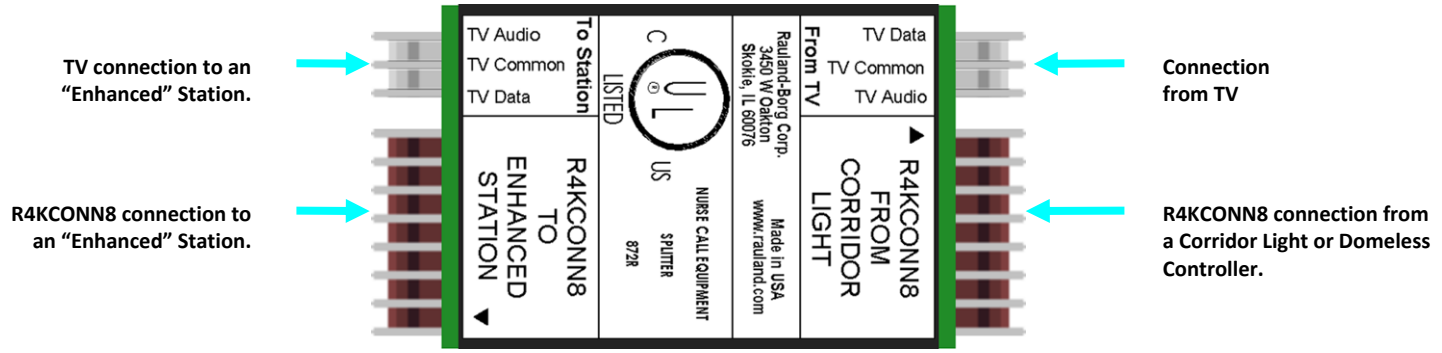


Figure 286: R4KTVR1 connections

TV Connection

Connect the TV Data (Channel), Common and Audio wires to the "From TV" connector of the R4KTVR1 using one of the provided, 3-pin pigtails.

Reversing the "From TV" and "To Station" connections will allow cross-talk between the TV audio and nurse call audio.

Bed Station Connection

Connect the Digital TV Isolation Module to an "Enhanced" bed station (R4K16LV, R4K13VA, R4K17V, R4K25LV or R4K23VA) using an 8 conductor Station Connect cable and 3 conductor TV connection. An R4K25LV or R4K23VA with two TVs will require two Digital TV Isolation Modules.

Corridor Light Connection

Connect the Corridor Light/Domeless Controller cable to the "R4KCONN8 FROM CORRIDOR LIGHT" connector of the R4KTVR1. Connect the Station cable to the "R4KCONN8 TO STATION" connector of the R4KTVR1.

Getting it Ready & Confirming it Works

1. Change the TV audio to the loudest setting.
2. Place a call from the Pillow Speaker.
3. Answer the call from an R4K4020 console.
4. Verify the TV audio is muted at the R4K4020 during communication.

Others Things You Should Know

- ✓ Reversing the “From TV” and “To Station” connections will allow cross-talk between the TV audio and nurse call audio.
- ✓ An R4K25LV or R4K23VA with two TVs will require two Digital TV Isolation Modules.

A

Appendix A: Component Summary

The Component Summary provides information regarding:

- ✓ Component Number/Name
- ✓ Part Description
- ✓ Component Uses
- ✓ System Type
- ✓ System Capacity
- ✓ Recommended Installation Location
- ✓ Device Connection Information

Check Appendix B: Location Summary for more specific information regarding mounting location.

Stations									
Part Identifier	Common Name	System Compatibility	DIN Connection	Call Assurance LED's	Monitor LED's	Cancel Button	Backlight	Speaker	Notes/Other Considerations
HSS400	High Security Station ¼" Jack	Audio Only		1	1	✓		1	Vandal-proof stainless steel face; ¼" jack for call cord; 1 cancel button; 1 call assurance LED, 1 monitor LED
HSS401	High Security Station w/Switch	Audio Only		1	1	✓		1	Vandal-proof stainless steel face; 1 call button; 1 cancel button; 1 call assurance LED, 1 monitor LED
HSS433	High Security Pushbutton Station	Both				✓			Vandal-proof stainless steel face; 1 large, red, call button; 1 cancel button;
R4K11V	Single Bed Station	Both	✓	1		✓			Fits single gang box (U.S. and Foreign), TV connection for TV audio over pillow speaker
R4K12A	Single Bed Station	Audio Only	✓	1	1	✓		✓	Fits single gang box (U.S. and Foreign), TV connection for TV audio over pillow speaker (not broken during Nurse Call)
R4K12AHZ	Single Bed Horizontal Station	Audio Only	✓	1	1	✓		✓	Faceplate icons rotated 90 degrees for horizontal mounting; Fits single gang box (U.S. and Foreign), TV connection for TV audio over pillow speaker (not broken during Nurse Call)
R4K13VA	Single Bed Enhanced Audio Station	Audio Only	✓	1	1	✓		✓	Fits single gang box (U.S. and Foreign), TV and nurse call audio over pillow speaker (TV audio broken during Nurse Call), Wall speaker muted when pillow speaker is plugged in the DIN jack; provides interface for lighting controls
R4K13VAHZ	Single Bed Horizontal Enhanced Audio Station	Audio Only	✓	1	1	✓		✓	Faceplate icons rotated 90 degrees for horizontal mounting; Fits single gang box (U.S. and Foreign), TV and nurse call audio over pillow speaker (TV audio broken during Nurse Call), Wall speaker muted when pillow speaker is plugged in the DIN jack; provides interface for lighting controls
R4K14SA	Staff Assist Bed Station	Audio Only	✓	2	1	✓		✓	Fits single gang box (U.S. and Foreign), TV connection for TV audio over pillow speaker (not broken during Nurse Call)
R4K16LV	Single Bed Enhanced Visual	Both	✓	1		✓			Fits single gang box (U.S. and Foreign), TV connection for TV audio over pillow speaker; provides interface for lighting controls
R4K21V	Dual Bed Station	Both	✓	2		✓			Fits single gang box (U.S. and Foreign), TV connection for TV audio over pillow speaker
R4K22A	Dual Bed Station	Audio Only	✓	2	1	✓		✓	Fits single gang box (U.S. and Foreign), TV connection for TV audio over pillow speaker (not broken during Nurse Call)
R4K23VA	Dual Bed Enhanced Audio Station	Audio Only	✓	2	1	✓		✓	Fits single gang box (U.S. and Foreign), TV connection for TV audio over pillow speakers (broken during Nurse Call), Wall speaker muted when both pillow speaker are plugged in the DIN jacks; provides interface for lighting controls
R4K25LV	Dual Bed Enhanced Visual Station	Both	✓	2		✓			Fits single gang box (U.S. and Foreign), TV connection for TV audio over pillow speaker; provides interface for lighting controls
R4KCB10	Code Station	Both		1		✓	✓		Fits single gang box (U.S. and Foreign)
R4KCB12	Code Station	Both		1		✓	✓		Fits single gang box (U.S. and Foreign)
R4KCNCL	Cancel Station	Both		1		✓			Fits single gang box (U.S. and Foreign)
R4KDY	Duty Station	Both			1	✓		✓	Fits single gang box (U.S. and Foreign);4 LEDs (White, green, red, blue); requires Duty Corridor Light (CLA214D)

R4KESR	Emergency Staff Registration Station	Both		2		✓	✓		Fits single gang box (U.S. and Foreign)
R4KFAM	Fire/Auxiliary Module	Both							Provides an isolated, supervised call input; Fits in a single gang box (U.S. and Foreign)
R4KFB1	Feature Bed Interface	Both							Fits three gang box (U.S. and Foreign), provides connection to feature bed, TV and 1 single bed station; mutes entertainment audio during Nurse Call.
R4KMST	Marquee Speaker	Both		1				✓	Fits single gang box (U.S. and Foreign), volume toggle button, “current call mute” button
R4KPB11	Push-for-Help Station	Both		1		✓	✓		Fits single gang box (U.S. and Foreign)
R4KPB22	Dual Pushbutton Station	Both		2		✓	✓		Fits single gang box (U.S. and Foreign)
R4KPB44	Four Button Station	Both		4					Fits single gang box (U.S. and Foreign)
R4KPC10	Pullcord Station	Both		1		✓			Fits single gang box (U.S. and Foreign)
R4KRA1	Resident Assist Station	Both		2		✓	✓		Fits single gang box (U.S. and Foreign)
R4KSR1	Staff Registration Station	Both		1					Fits single gang box (U.S. and Foreign)
R4KSS	Staff Station	Audio Only		1	1	✓		✓	Fits single gang box (U.S. and Foreign)

Station-Related Accessories			
Part Identifier	**Common Name**	**System Compatibility**	**Notes/Other Considerations**
CCDIN	Call Cord	Both	8-pin round DIN-ended, single button Call Cord
R4CONN6	Station connectors	Both	100 6-pin (Station Connect) connectors.
R4CONN8	Station and K-Bus connectors	Both	100 8-pin (Station and K-Bus Connect) connectors.
R4KCRIMP	Station/K-Bus Connector Crimp Tool	Both	Required crimp tool for station and K-Bus connect cables and for Corridor Light removal.
R4CSC	Clear Station Cover	Both	Station cover, protects against accidental calls; fits single and dual button stations.
R4KDLC2	Dual Lighting Controller	Both	Interface between a pillow speaker with lighting controls and lights; for use with R4K23VA and R4K25LV
R4KDSB	Station Bracket and Strain Relief	Both	Metal mounting plate for stiffening backplate. Includes Strain relief for call cords.
R4KGRD	Station Guard and Strain Relief	Both	Metal “facemask” and mounting plate for protecting station. Includes Strain relief for call cords.
R4KKBS	K-Bus ”Y” Splitter	Both	Three way K-Bus splitter
R4KKBSP	K-Bus Splitter with Power	Both	K-Bus splitter with local power input; used in remote areas with local power supply.
R4KSLC1	Single Lighting Controller	Both	Interface between a pillow speaker with lighting controls and lights; for use with R4K13VA, R4K13VAHZ and R4K16LV
R4KSTR	Strain Relief Plate	Both	Provide strain relief for pillow speaker(s)/call cord(s)

Corridor Lights & Domeless Controllers[†]								
Part Identifier	Common Name	System Compatibility	Lamps[❖]	Total Connection Points	LED Points	Audio Points	Accepts CLAR4	Notes/Other Considerations
Visual Only Network								
DCV100	6 Port Visual Room Controller	Visual	0	6	12	0	No	Does **not** accept any Audio stations; out-of-view, blackbox installation.
DCV116	16 Port Visual Room Controller	Visual	0	16	32	0	No	Does **not** accept any Audio stations; out-of-view, blackbox installation.
CLV122	2 “Bulb” Visual Corridor Light	Visual	2	6	12	0	No	Does **not** accept any Audio stations; White and red “lamps” ; fits single gang box (U.S. and Foreign)
CLV144	4 “Bulb” Visual Corridor Light	Visual	4	6	12	0	No	Does **not** accept any Audio stations; White, green, red, and blue “lamps” ; fits single gang box (U.S. and Foreign)
R4KCAL	Call Assurance Light	Both	1	NA	NA	NA	NA	Connects inline with bed stations and single push button stations; fits single gang box
R4KOUT4R	Relay Output Module	Visual	NA	NA	NA	NA	NA	Attaches to DCV100; Provides 4 dry contact outputs
Audio/Visual Network								
DCA200	6 Port Audio/Visual Room Controller	Audio	0	6	12	1	Yes	Provides one audio point (expandable to 4 with CLAR4); out-of-view, blackbox installation.
DCA216	16 Port Audio/Visual Room Controller	Audio	0	16	32	1	Yes	Provides one audio point (expandable to 4 with CLAR4); out-of-view, blackbox installation.
CLA222	2 “Bulb” Audio/Visual Corridor Light	Audio	2	6	12	1	Yes	Provides one audio point(expandable to 4 with CLAR4); White and red “lamps” ; fits single gang box (U.S. and Foreign)
CLA244	4 “Bulb” Audio/Visual Corridor Light	Audio	4	6	12	1	Yes	Provides one audio point(expandable to 4 with CLAR4); White, green, red, and blue “lamps” ; fits single gang box (U.S. and Foreign)
CLA214D	Duty Corridor Light	Both	4	6	12	1	No	Provides one audio point to R4KDY; generates call tones; White, green, red, and blue “lamps” ; fits single gang box (U.S. and Foreign)
DCA214D	Duty Domeless Controller	Both	0	6	12	1	No	Provides one audio point to R4KDY; generates call tones; out-of-view, blackbox installation.
CLAR4	Audio Corridor Light Add-On	Audio	NA	4	0	4	NA	Adds 3 audio points (4 total) to Audio/Visual Corridor Lights or Domeless Controllers; fits single gang box (U.S. and Foreign)
R4KOUT4S	Solid State Output Module	Audio	NA	NA	NA	NA	NA	Attaches to DCA200; Provides 4 solid-state outputs

[†] The system supports a maximum of 150 total Corridor Lights/Controllers per K-Bus (in any combination)

[❖] Although they are commonly referred to as “lamps,” LEDs have replaced bulbs in all system Corridor Lights.

Network and Control (Head-end) Equipment						
Part Identifier	**Description**	**Uses/ Comments**	**System Type**	**System Capacity**	**Recommended Installation**	**Connects to...**
R4KBK400	Rechargeable Battery Back-Up	Provides 10 minutes of back-up system power Status LED	Both	1 per R4KPR400	Component Cabinet	R4KPR400
R4KKBS	K-Bus Y Splitter	Pass-Through termination for 3 K-Bus segments	Both	As Needed	Wherever Possible	K-Bus
R4KKBSP	K-Bus Splitter with Power	Pass-Through termination for 2 K-Bus segments or Consoles Power Supply Terminal (for localizing power to remote devices)	Both	As Needed	Wherever Possible	K-Bus or Consoles
R4KNIM	Network Interface Module	Main board Supports 1 K-Bus Port Provides 1 X-Bus Port	Both	1 per K-Bus 25 Total	Component Cabinet	X-Bus, K-Bus, Power Supply,
R4KPA25	25W Paging Amp	Single Channel	Audio Only	20 per K-Bus	Component Cabinet	Console R4KTMB, K-Bus R4KTMB
R4KPIP	Peripheral Interface Port	Pocket Paging interconnect Configuration PC interconnect Includes R4KSPA	Both	3 per R4KNIM	Component Cabinet	X-Bus, Pocket paging terminal, Configuration PC
R4KPLI	Phone Line Interface	Phone interface Interfaces with 2 independent K-Buses	Audio Only	1 per 2 R4KNIMs	Component Cabinet	K-Buses, Phones
R4KPR400	Power Supply	3.5A, 15.5V Auto-Resettable Fuses	Both	As Needed	Component Cabinet	Network and Control Boards
R4KRSPIP	Reporting Software PIP	Reporting Software interconnect Includes R4KSPA	Both	1 per System	Component Cabinet	X-Bus, Reporting Software PC.
R4KSPA	Serial Port Adapter	Configuration interface (R4KNIM) DB9 Port (only one can be active at any time)	Both	1 per R4KNIM	Component Cabinet	K-Bus, Configuration PC
R4KTMB	K-Bus Termination Board	Pass-Through termination for 12 K-Bus segments or Consoles Power Supply Terminals (optional supplementary power)	Both	As Needed	Wherever Possible	K-Bus or Consoles
R4KXBA	X-Bus Adapter	Interface to Responder® IV Provides 2 X-Bus Ports	Both	1 per System	Component Cabinet	X-Bus, Power Supply

Consoles/Annunciators*						
Part Identifier	Description	Uses/ Comments	System Type	System Capacity	Recommended Installation	Connects to...
R4K4020	LCD Console	20 character x 4 line LCD Display 4 Line Keys 3 Soft Keys Standard dial-pad Telephone handset	Audio Only	10 Uniquely Addressed per K-Bus	Countertop or Wall	K-Bus
R4KANN	Annunciator Panel	36 Annunciator Points 2 Room Status Lamps (Red/Green) per Point Requires R4KNIM Adjustable night and day tones	Both	20 Uniquely Addressed per K-Bus[1]	Countertop or Wall	K-Bus
R4KMQC	Marquee Controller	Interfaces to Scrolling Dot Matrix/LED Display Controls max of 4 Marquees (parallel connection) R232 or RS485 marquee Interface R4KMST interface Creates Tones for R4KMST	Both	30 Uniquely Addressed per K-Bus	Wherever Possible	K-Bus
R4K40V	R4K4020 Violet Keypad	Violet Color R4K4020 keypad	Audio Only	NA	NA	R4K4020
R4K40C	R4K4020 Coral Keypad	Coral Color R4K4020 keypad	Audio Only	NA	NA	R4K4020
R4K40T	R4K4020 Teal Keypad	Teal Color R4K4020 keypad (System standard color)	Audio Only	NA	NA	R4K4020
R4K40G	R4K4020 Green Keypad	Green Color R4K4020 keypad	Audio Only	NA	NA	R4K4020
R4K60V	R4KANN Violet Color Kit	Violet Color R4KANN keypad and overlay	Both	NA	NA	R4KANN
R4K60C	R4KANN Coral Color Kit	Coral Color R4KANN keypad and overlay	Both	NA	NA	R4KANN
R4K60T	R4KANN Teal Color Kit	Teal Color R4KANN keypad and overlay (System standard color)	Both	NA	NA	R4KANN
R4K60G	R4KANN Green Color Kit	Green Color R4KANN keypad and overlay	Both	NA	NA	R4KANN

* There is a system limit of 20 consoles per K-Bus. Consoles can be grouped to form a cluster. There is a maximum of 18 consoles per cluster and 10 clusters per K-Bus.

[1] A maximum of 17 R4KANN Annunciator Panels can be grouped and associated with any given R4K4020 LCD Console.

Consoles/Annunciators✠						
Part Identifier	Description	Uses/ Comments	System Type	System Capacity	Recommended Installation	Connects to...
R4KWM11	R4K4020 Wall-Mount Kit	Wall-Mount for LCD Consoles	Audio Only	NA	Wall	R4K4020
R4KWM22	Annunciator Panel Wall-Mount Kit	Wall-Mount for Annunciator Panels	Both	NA	Wall	R4KANN
R4KDM22	Desk-Mount Kit	Desk-Mount for R4K4020 or R4KANN	Both	NA	Countertop	R4KWM11 or R4KWM22

Analog Entertainment/Pillow Speakers						
Part Identifier	Description	Uses/ Comments	System Type	System Capacity	Recommended Installation	Connects to...
NCESTV	Entertainment Speaker	Analog TV controls Nurse call controls	Both	1 per DIN	Station	R4K11V, R4K12A, R4K12AHZ, R4K13VA, R4K13VAHZ, R4K14SA, R4K16LV, R4K21V, R4K22A, R4K23VA, R4K25LV
NCESVA	Entertainment Speaker w/Radio	Analog TV controls Nurse call controls Radio channel stepper controls	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV
NCESSL1	Pillow Speaker TV & 1 light	Analog TV controls Nurse call controls 1 light control	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV
NCESDL2	Pillow Speaker TV & 2 lights	Analog TV controls Nurse call controls 2 light controls	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV
NCESPL4	Pillow Speaker TV & 2 lights on/off	Analog TV controls Nurse call controls 2 light controls (toggle on/off)	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV

Note: Pillow Speakers are not to be used in IEC 60601-1 certified systems.

Digital Entertainment/Pillow Speakers						
Part Identifier	Description	Uses/ Comments	System Type	System Capacity	Recommended Installation	Connects to...
NCDSTVPH	Digital Entertainment Speaker Phillips TV	Phillips Digital TV controls Nurse call controls	Both	1 per DIN	Station	R4K11V, R4K12A, R4K12AHZ, R4K13VA, R4K13VAHZ, R4K14SA, R4K16LV, R4K21V, R4K22A, R4K23VA, R4K25LV
NCDSTVRC	Digital Entertainment Speaker RCA TV	RCA Digital TV controls Nurse call controls	Both	1 per DIN	Station	R4K11V, R4K12A, R4K12AHZ, R4K13VA, R4K13VAHZ, R4K14SA, R4K16LV, R4K21V, R4K22A, R4K23VA, R4K25LV
NCDSTVZN	Digital Entertainment Speaker Zenith TV	Zenith Digital TV controls Nurse call controls	Both	1 per DIN	Station	R4K11V, R4K12A, R4K12AHZ, R4K13VA, R4K13VAHZ, R4K14SA, R4K16LV, R4K21V, R4K22A, R4K23VA, R4K25LV
NCDSSL1PH	Digital Entertainment Speaker Phillips TV , 1 light control	Phillips Digital TV controls Nurse call controls 1 light control	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV
NCDSSL1RC	Digital Entertainment Speaker RCA TV, 1 light control	RCA Digital TV controls Nurse call controls 1 light control	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV
NCDSSL1ZN	Digital Entertainment Speaker Zenith TV, 1 light control	Zenith Digital TV controls Nurse call controls 1 light control	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV
NCDSDL2PH	Digital Entertainment Speaker Phillips TV, 2 light controls	Phillips Digital TV controls Nurse call controls 2 light controls	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV
NCDSDL2RC	Digital Entertainment Speaker RCA TV, 2 light controls	RCA Digital TV controls Nurse call controls 2 light controls	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV
NCDSDL2ZN	Digital Entertainment Speaker Zenith TV, 2 light controls	Zenith Digital TV controls Nurse call controls 2 light controls	Both	1 per DIN	Station	R4K13VA, R4K13VAHZ, R4K16LV, R4K23VA, R4K25LV

Note: Pillow Speakers are not to be used in IEC 60601-1 certified systems**.**

B

Appendix B: Location Summary

The Location Summary provides information regarding:

- ✓ Component Number/Name
- ✓ Mounting Location
- ✓ Finished Dimensions

Check Appendix A: Component Summary for more specific information regarding most other installation issues.

Part Identifiers		Location	Finished Dimensions
Network and Control Equipment			
R4KBK400	Rechargeable Battery Back-Up	Telecom Closet	2.00" x 11.50" x 3.75"
R4KKBS	K-Bus Y Splitter	As needed	0.44” x 1.60” x 2.40”
R4KKBSP	K-Bus Splitter with Power	As needed	0.44” x 1.60” x 2.40”
R4KMQC	Marquee Controller	Mounted wherever necessary	2.00” x 6.00” x 6.50”
R4KNIM	Network Interface Module	Telecom Closet	7.75" x 11.50" x 1.13"
R4KPA25	25W Paging Amp	Telecom Closet	2.00" x 11.50" x 3.75"
R4KPIP	Peripheral Interface Port	Telecom Closet	5.50" x 11.50" x 2.50"
R4KPLI	Phone Line Interface	Telecom Closet	7.75" x 11.50" x 2.39"
R4KPR400	Main Power Supply	Telecom Closet	4.00" x 11.50" x 3.25"
R4KRSPIP	Reporting Software PIP	Telecom Closet	5.50" x 11.50" x 2.50"
R4KSPA	Serial Port Adapter	Telecom Closet	4.38" x 3.75" x 1.50"
R4KTMB	K-Bus Termination Board	As needed	1.06” x 3.88” x 4.50”
R4KXBA	X-Bus Adapter	Telecom Closet	5.50" x 11.50" x 1.13"
Stations			
HSS400	High Security Station ¼” Jack	Headwall, 46” above finished floor	2.50” x 5.50” x 7.50”
HSS401	High Security Station w/Switch	Headwall, 46” above finished floor	2.50” x 5.50” x 7.50”
HSS433	High Security Push Button Station	Headwall, 46” above finished floor	2.25” x 3.50” x 5.50”
R4K11V	Single Bed Visual Station	Headwall, 46” above finished floor	1.25” x 4.25” x 5.50”
R4K12A	Single Bed (w/ speaker)	Headwall, 46” above finished floor	1.25” x 4.25” x 5.50”
R4K12AHZ	Horizontal Single Bed (w/ speaker)	Headwall, 46” above finished floor	1.25” x 5.50” x 4.25”
R4K13VA	Single Bed Enhanced Audio (w/ speaker)	Headwall, 46” above finished floor	1.25” x 4.25” x 5.50”
R4K13VAHZ	Horizontal Single Bed Enhanced (w/ speaker)	Headwall, 46” above finished floor	1.25” x 5.50” x 4.25”
R4K14SA	Staff Assist Bed Station	Headwall, 46” above finished floor	1.25” x 4.25” x 5.50”
R4K16LV	Single Bed Enhanced Visual	Headwall, 46” above finished floor	1.25” x 4.25” x 5.50”
R4K21V	Dual Bed Visual Station	Headwall, 46” above finished floor	1.25” x 4.25” x 5.50”
R4K22A	Dual Bed Station (w/ speaker)	Headwall, 46” above finished floor	1.25” x 4.25” x 5.50”
R4K23VA	Dual Bed Enhanced Audio Station (w/ speaker)	Headwall, 46” above finished floor	1.25” x 4.25” x 5.50”
R4K25LV	Dual Bed Enhanced Visual	Headwall, 46” above finished floor	1.25” x 4.25” x 5.50”
R4KCB10	Code Station	46” above finished floor	1.25” x 4.25” x 5.50”
R4KCB12	Code Station	46” above finished floor	1.25” x 4.25” x 5.50”
R4KCNCL	Cancel Station	46” above finished floor	1.25” x 4.25” x 5.50”
R4KDLC2	Dual Lighting Controller	Behind station	3.00” x 3.32” x 0.41”
R4KDY	Duty Station (w/ speaker)	46” above finished floor	1.25” x 4.25” x 5.50”
R4KESR	Emergency Staff Registration Station	46” above finished floor	1.25” x 4.25” x 5.50”
R4KFAM	Fire Auxiliary Module	Headwall	1.70" x 2.96” x 0.44”
R4KFB1	Feature Bed Interface	Headwall	0.50” x 2.75” x 3.50”
R4KMST	Marquee Speaker	46” above finished floor	1.25” x 4.25” x 5.50”
R4KPB11	Push-for-Help Station	46” above finished floor	1.25” x 4.25” x 5.50”
R4KPB22	Dual Pushbutton Station	46” above finished floor	1.25” x 4.25” x 5.50”
R4KPB44	Four Button Station	46” above finished floor	1.25” x 4.25” x 5.50”
R4KPC10	Pullcord Station	46” above finished floor	1.50” x 4.25” x 5.50”
R4KRA1	Residence Assist Station	46” above finished floor	1.25” x 4.25” x 5.50”
R4KSLC1	Single Lighting Controller	Behind station	3.00” x 1.90” x 0.41”
R4KSR1	Staff Registration Station	46” above finished floor	1.25” x 4.25” x 5.50”
R4KSS	Staff Station (w/ speaker)	46” above finished floor	1.25” x 4.25” x 5.50”
R4KTVR1	Digital TV Isolation Module	Behind station	2.53" x 1.55” x 0.47”

Table 39: Component Mounting Summary

Part Identifiers		Location	Finished Dimensions
Corridor Lights and Domeless Controllers			
CLV122	R4K 2 Bulb Visual Corridor Light	Above entrance door, 80” above finished floor	3.88” x 4.25” x 5.50”
CLV144	R4K 4 Bulb Visual Corridor Light	Above entrance door, 80” above finished floor	3.88” x 4.25” x 5.50”
DCV100	R4K Six Station Visual Domeless Controller	Above ceiling	3.00” x 4.38” x 5.50”
DCV116	R4K Sixteen Station Visual Domeless Controller	Above ceiling	3.00” x 5.06” x 8.00”
R4KOUT4R	R4K Visual Output Controller	Plugs on to DCV100 PC board	3.00” x 4.38” x 5.50”
CLA222	R4K 2 Bulb Audio Corridor Light	Above entrance door, 80” above finished floor	3.88” x 4.25” x 5.50”
CLA244	R4K 4 Bulb Audio Corridor Light	Above entrance door, 80” above finished floor	3.88” x 4.25” x 5.50”
DCA200	R4K Six Station Audio Domeless Controller	Above ceiling	3.00” x 4.38” x 5.50”
DCA216	R4K Sixteen Station Audio Domeless Controller	Above ceiling	3.00” x 5.06” x 8.00”
R4KOUT4S	R4K Audio Output Controller	Plugs on to DCA200 PC board	3.00” x 4.38” x 5.50”
CLA214D	R4K Duty Corridor Light	80” above finished floor	3.88” x 4.25” x 5.50”
DCA214D	R4K Duty Domeless Controller	Above ceiling	3.88” x 4.25” x 5.50”
R4KCAL	R4K Call Assurance Light	Anywhere convenient	2.50” x 4.50” x 1.75”
CLAR4	R4K Audio Corridor Light Add-On	Plugs on to CL or Domeless Controller PC board	1.00” x 2.00” x 2.38”
Consoles and Annunciators			
R4K4020	LCD Console	Either on surface or wall-mounted using R4KWM11	1.38” x 7.44” x 8.75”
R4KANN	Annunciator Panel	Either on surface or wall-mounted using R4KWM22	2.75” x 8.75” x 10.06”

Table 40: Component Mounting Summary

C

Appendix C: Power Calculation Utility

In order to assist you in planning your Responder® 4000 installation, we have developed the Power Calculation utility. The Excel-based utility helps you to determine the number of device that can be powered by a single R4KPR400 Power Supply based on component selection, configuration, and layout variables. In addition, the utility also provides a power supply estimator and cost estimates. Please keep in mind that the entire workbook including all tabs accounts for a complete Responder® 4000 system with multiple R4KNIM's and multiple R4KPR400's. Certain, very large, configurations will require multiple instances of the workbook to account for all devices of the Nurse Call System.

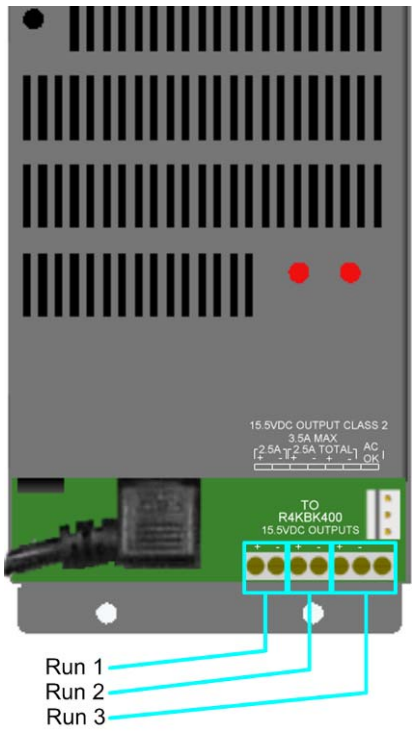


Figure 287: R4KPR400 Power Supply (Power Runs)

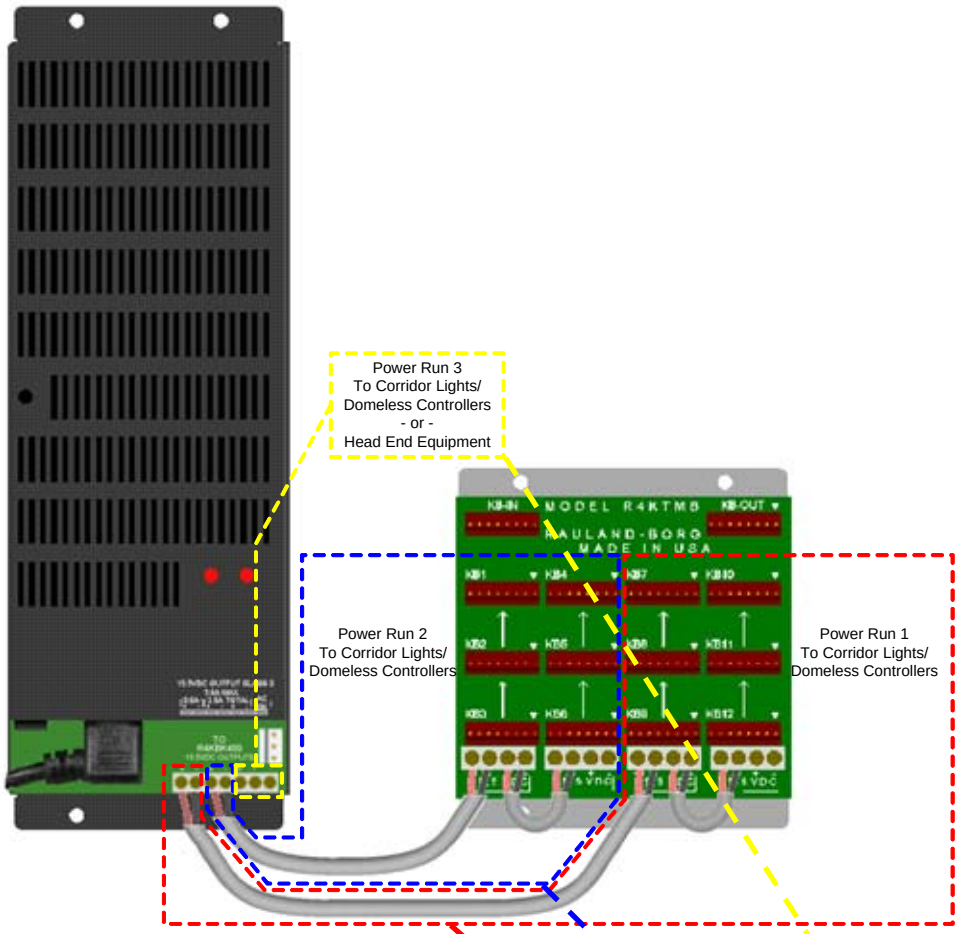


Figure 288: Example: Single Power supply

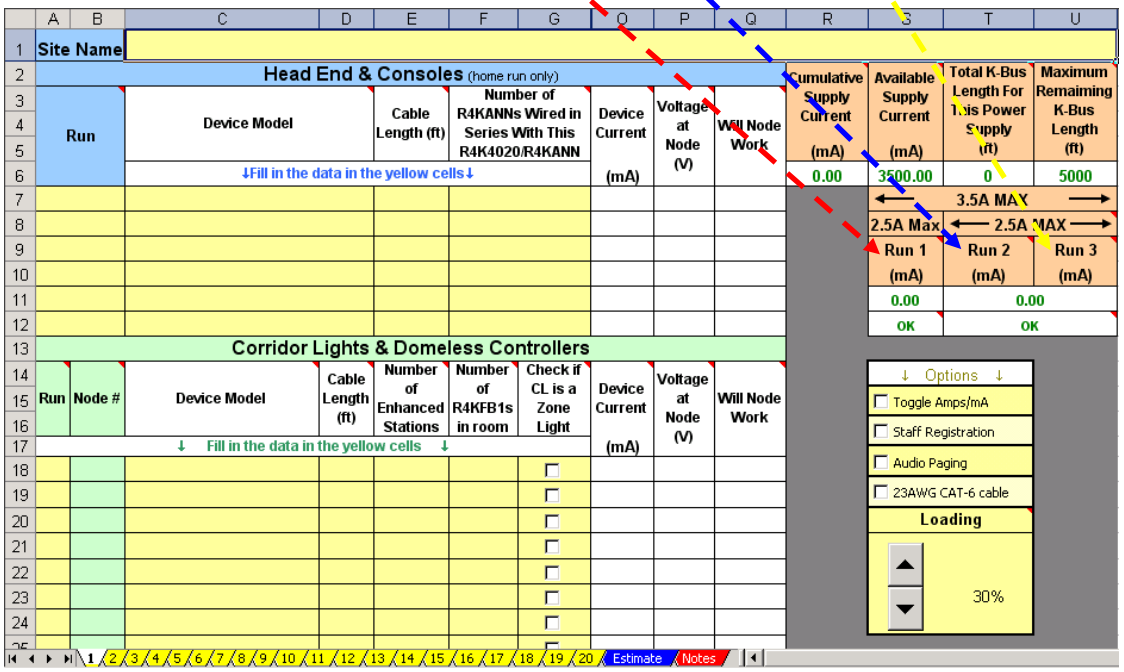


Figure 289: Power Calculation Utility (Single Power Supply View)

Accessing and Launching the Utility

The utility can be found on the R4KWARE CD. Use Windows Explorer to locate the file. Assuming Excel is installed on the computer, save the utility to the "\Program Files\Rauland-Borg\HC\R4KV#-##/ folder.

1 Double click on the file name to launch the utility.

2 Enter the Site Name at the top of sheet 1.

3 Save the file (File | Save As), using a memorable name associated with the location facility, e.g. "MemorialHospital_ConfigV1_02_11MAR03.xls".

Many of the cells in the utility are write-protected. Do **NOT** disable that protection. The yellow cells are accessible in all worksheet.

Using the Power Calculation Options

(fill in the yellow cells)

1 Click on the appropriate checkbox to indicate whether you prefer Amps or mA, plan to install **any** Staff Registration Stations, use Audio Paging on these runs are using 23AWG CAT-6 K-Bus wire.

2 Establish the appropriate Loading percentage (20-40% recommended). Loading refers to the maximum percentage of simultaneous calls estimated at the busiest point.

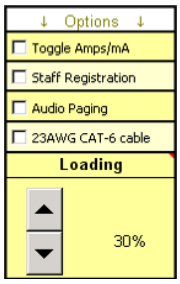


Figure 290: Power Calculation Options

Driving a system beyond the planned loading factor may result in system malfunction.

Head End & Consoles

(fill in the yellow cells)

1 Select a Device Model.

2 Fill in the Cable Length.
3 If the Device is an R4K4020 or R4KANN, fill in the number (if any) of R4KANNs in series with the device.
4 Repeat as necessary.

Corridor Lights and Domeless Controllers

(fill in the yellow cells)

1 Select a Device Model.
2 Fill in the Cable Length.
3 If any Enhanced Stations (R4K15LV, R4K13VA, R4K26LV, or R4K23VA) are going to be attached to the device, fill in the quantity.
4 If any R4KFB1s are going to be attached to the device, fill in the quantity.
5 Check the Zone Light box if the device will be used as a zone light.
6 Repeat as necessary.
7 Change the start of a new power run in the Run column to 2 or 3 if needed.

The R4KFB1 and "Enhanced Stations" listed above run at a higher current level than the assumed standard station. These must be accounted for in the power calculation.

Multiple Power Supplies

Use the tabs at the bottom to access other worksheets/power supplies.

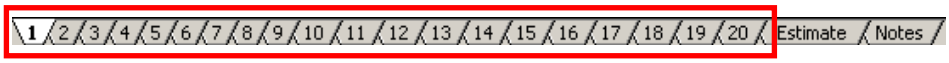


Figure 291: Power Calculation Tabs (separate power supplies)

Using the Copy/Paste Functions

Should you find that you are creating duplicate runs, you may use Excel to copy and paste any data in the yellow columns. You may only copy/paste between fields sharing the same size of range (rows are horizontal; columns are vertical). That is, you may copy Device Model and Cable Length data from one row and paste that information in other rows; you may **not** copy Device Model cells into the cable length cells.

Copying/Pasting Data

1 Select the data fields to copy (either use the mouse to highlight the appropriate cell range or click in the first cell of the range, hold the shift key down, and then click in the last cell within the range):

	Corridor Lights & Domeless Controllers									
	Run	Node #	Device Model	Cable Length (ft)	Number of Enhanced Stations	Number of R4KFB1s in room	Check if CL is a zone light	Device Current (Amps)	Voltage at Node (V)	Will Node Work
	↓ Fill in the data in the yellow cells ↓									
18	1	1	CLA244	10			☐	0.046	15.49	Yes
19							☐			

Figure 292: Device Model and Cable Length highlighted for copying

2 Click Edit | Copy to put the data on the clipboard.

3 Highlight the appropriate rows to paste.

	Corridor Lights & Domeless Controllers									
	Run	Node #	Device Model	Cable Length (ft)	Number of Enhanced Stations	Number of R4KFB1s in room	Check if CL is a zone light	Device Current (Amps)	Voltage at Node (V)	Will Node Work
	↓ Fill in the data in the yellow cells ↓									
18	1	1	CLA244	10			☐	0.046	15.49	Yes
19							☐			
20							☐			
21							☐			
22							☐			
23							☐			
24							☐			
25							☐			

Figure 293: Device Model and Cable Length highlighted for pasting

5 Click Edit | Paste to put the data in the spreadsheet:

	Corridor Lights & Domeless Controllers									
	Run	Node #	Device Model	Cable Length (ft)	Number of Enhanced Stations	Number of R4KFB1s in room	Check if CL is a zone light	Device Current (Amps)	Voltage at Node (V)	Will Node Work
	↓ Fill in the data in the yellow cells ↓									
18	1	1	CLA244	10			☐	0.046	15.49	Yes
19	1	2	CLA244	10			☐	0.046	15.48	Yes
20	1	3	CLA244	10			☐	0.046	15.46	Yes
21	1	4	CLA244	10			☐	0.046	15.45	Yes
22	1	5	CLA244	10			☐	0.046	15.44	Yes
23	1	6	CLA244	10			☐	0.046	15.43	Yes
24	1	7	CLA244	10			☐	0.046	15.42	Yes
25	1	8	CLA244	10			☐	0.046	15.41	Yes

Figure 294: Data Pasted

Other Utility Definitions

In order to use the utility, you'll need to be familiar with the following definitions and processes:

Node

No entry is required. A "Node" is (1) a Head End device or Console wired direct to a single terminal of a power supply, or (2) a Corridor Light or Domeless Controller wired in series with other nodes on a single run. The spreadsheet automatically enters a sequential Node number (#) beginning with one (1) in this field. Entering a 2 or 3 in the Corridor Light Run column will indicate the start of a new run and reset the node to one (1).

Device Model

Choose from any of the available devices in the drop down menu. Choose the appropriate model ending suffix (i.e. “w/CLAR4” if you plan to install a CLAR4 add-on board).

Cable Length

Enter the length to the first device, in feet, between the Power Supply and the Node (whether or not you use a R4KTMB Termination Board). For each sequential Node (Corridor Lights and Domeless Controllers only), enter the length between Nodes.

Number of R4KANNs Wired in Series with This R4K4020/R4KANN

The R4KANN has input and output connections allowing you to wire up to 4 of them in series with another console.

Device Current

No entry is required. The spreadsheet automatically enters a number based on the nodes and options you have selected for that device.

Voltage at Node

No entry is required. The spreadsheet automatically tracks and calculates available voltage at each of the Device entries. Each device requires a minimum of 11 volts to operate correctly. (Use another run to accommodate those nodes that cause voltage to dip below 11V.) This voltage can be verified by measuring the voltage at the device with a digital volt meter.

Will Node Work

No entry is required. The spreadsheet will automatically calculate all applicable variables and will give an indication whether or not this device will work. "No" means the device is below the 11V limit. "Over Limit" means the power supply is over its 3.5A total limit for the sum of all runs.

Number of Enhanced Stations in room

If any Enhanced Stations (R4K15LV, R4K13VA, R4K26LV, or R4K23VA) are going to be attached to the device, fill in the quantity. The limits for these stations are:

R4K15LV – 6 per Corridor Light/Domeless Controller or 16 on a 16 point Domeless Controller.

R4K13VA – 1 per Audio Corridor Light/Domeless Controller or 4 when used in combination with a CLAR4.

R4K26LV – 3 per Corridor Light/Domeless Controller or 8 on a 16 point Domeless Controller.

R4K23VA – 2 per Audio Corridor Light/Domeless Controller (requires a CLAR4).

Number of R4KFB1s in room

There is a limit of (2) R4KFB1s per room and can only be attached to Audio Corridor Lights (CLA###) or Audio Domeless Controllers (DCA###). The R4K12A, R4K13VA and R4K23VA are the only stations that can be associated with an R4KFB1.

Check if CL is a Zone Light

Check this box if you are calculating Power Requirements for a Light that will be used as a "Zone Light".

Cumulative Supply Current

No entry is required. The spreadsheet automatically tracks and calculates all devices current draw. This is the total draw from all devices on this power supply.

Available Supply Current

No entry is required. The spreadsheet automatically tracks and calculates all devices current draw. This is the total current remaining from this power supply.

Total K-Bus Length for This Power Supply

No entry is required. The spreadsheet automatically tracks and calculates all cable lengths on **all** power supplies/worksheets. The total cumulative K-Bus length (all runs) cannot exceed 5000 feet. Use another R4KNIM (connected together by the X-Bus) if total cable length exceeds the 5000 foot K-Bus limitation.

Maximum Remaining K-Bus Length

No entry is required. The spreadsheet will automatically calculate remaining or deficit cable length (in feet). Total cable length (all runs, all worksheet pages combined) **cannot** exceed 5000 feet.

Run 1, Run 2, Head End/Run 3

No entry is required. The spreadsheet will automatically calculate Run current from the data entered in the worksheet. It also gives status as:

OK = Run is properly configured.

Page Limit = Run not within 400 feet or more than 16 nodes.

Over 2.5A = Beyond power supply run limit of 2.5A.

Over Limit = Beyond total power supply 3.5A limit.

Staff Registration

Use this check box to indicate if you plan to install one or more Staff Registration stations on any run.

Audio Paging

Use this check box to indicate if you plan to use Audio Paging on any run.

Other Things to Know

- ✓ Each power supply provides a maximum of 3.5 Amps (total draw across all runs/terminals combined)
- ✓ Each power terminal pair/run provides a maximum of 2.5 Amps (2500mA).
- ✓ Each worksheet (tabs 1-20) allows you to calculate power requirements for a single Power Supply.
- ✓ A single K-Bus can never exceed a total of 5000 feet (the sum of all runs). All worksheets are linked and the K-Bus cable length will subtract accordingly.
- ✓ Each R4KNIM provides only one K-Bus.
- ✓ If the **Cumulative Supply Current** goes above 3.5A on any worksheet, all Runs on that worksheet will display "**Over Limit**". You must use another Power Supply and another worksheet.
- ✓ If any **Run** current goes above 2.5A, it will display "**Over 2.5A**". You must use another power run or power supply.
- ✓ If **Audio Paging** is checked and a run is over 400 feet or has more than 16 nodes it will display "**Page Limit**". You must shorten the Run length, use another power run, or use another power supply.
- ✓ If the **Voltage at Node** is below 11V it will display "**No**" in the **Will Run Work** column. All nodes require at least 11V to operate properly.

Using the Estimate Function

The Estimate function provides (1) the ability to estimate the number of power supplies for a site and (2) summary information regarding the cost of all R4K parts (stations, corridor lights, consoles and head end equipment)

1 Click on the Estimate tab:

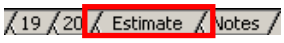


Figure 295: Power Calculation Estimate Tab

2 Adjust the **Loading** to the maximum percentage of calls you believe the system will have. This is defaulted to 30%. We recommend values between 20% and 40%.

3 Enter the proper numbers for each device in the **Number Per System** column.

➢ This will give you the minimum number of power supplies required.

4 Enter a dollar amount for each device in the **Enter Cost** column. Be sure to enter an amount for the power supplies in the cell where the arrow is pointing.

5 Enter any other costs (i.e. labor or cable) in the cells below the power supplies costs. Review the totals for system design cost limits.

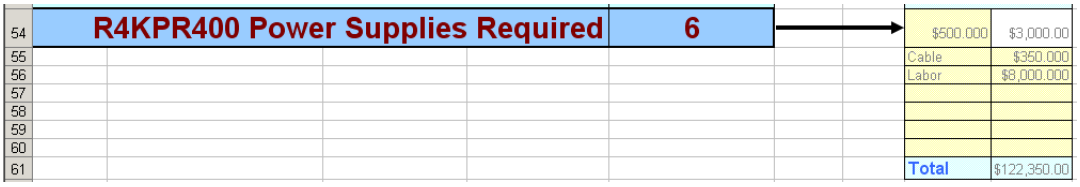


Figure 296: Power Calculation Estimate worksheet

Other Things to Know

- ✓ The Estimate function does not necessarily apply to a really small system (under 10 stations).
- ✓ The Estimate function is really intended to start at the 15 - 20 nodes and up systems to prevent errors and short-cuts that get installations in trouble. The power supplies should not be run to the limits from the beginning, and the loading estimates should be considered carefully - since this is to a large extent a guess on the designer's part and can vary the power supply requirements substantially.
- ✓ The Estimate function should ensure that distribution across power supplies is evenly distributed using R4KTMB's and R4KKBS as required.

Power Draw Reference

Unit	Power Draw Reference
Stations	
HSS400 High Security Bed Station	0.010A
HSS401 High Security Staff Station	0.008A
HSS433 High Security Push Button Station	0.015A
R4K11V Single Bed Visual Station	0.002A
R4K12A Single Bed Audio Station	0.005A
R4K12AHZ Horizontal Single Bed Audio Station	0.005A
R4K13VA Single Bed Enhanced Audio Station	0.025A
R4K13VAHZ Horiz. Single Bed Enhanced Audio Stn	0.025A
R4K14SA Staff Assist Bed Station	0.007A
R4K16LV Single Bed Enhanced Visual Station	0.015A
R4K21V Dual Bed Visual Station	0.004A
R4K22A Dual Bed Audio Station	0.007A
R4K23VA Dual Bed Enhanced Audio Station	0.030A
R4K25LV Dual Bed Enhanced Visual Station	0.020A
R4KCB10 Code Station	0.007A
R4KCB12 Code Station w/Timer	0.017A
R4KCNCL Cancel Station	0.002A
R4KDLC2 Dual Lighting Controller	0.023A
R4KDY Duty Station	0.012A
R4KESR Emergency Staff Reg. Station	0.007A
R4KFAM Fire/Auxiliary module	0.030A
R4KFB1 Feature Bed Interface	0.075A
R4KMST Marquee Speaker	0.005A
R4KPB11 Push For Help Station	0.004A
R4KPB22 Dual Push Button Station	0.017A
R4KPB44 Four Button Station	0.014A
R4KPC10 Pull Cord Station	0.002A
R4KRA1 Residence Assist Station	0.007A
R4KSLC1 Single Lighting Controller	0.013A
R4KSR1 Staff Registration Station	0.002A
R4KSS Staff Station	0.005A
R4KTVR1 Digital TV Isolation Module	0.015A
Corridor Light/Domeless Controllers	
DCV100 6 Point Visual Domeless Controller	0.012A
R4KOUT4R Visual Output Controller	0.032A
DCV116 16 Point Domeless Controller	0.012A
CLV122 2 Bulb Visual Corridor Light	0.012A + 0.025 per bulb
CLV144 4 Bulb Visual Corridor Light	0.012A + 0.025 per bulb
DCA200 6 Point Audio Domeless Controller	0.038A
R4KOUT4S Audio Output Controller	0.021A
DCA216 6 Point Audio Domeless Controller	0.038A
CLA214D Duty Corridor Light	0.058A + 0.025 per bulb
DCA214D Duty Domeless Controller	0.058A
CLA222 2 Bulb Audio Corridor Light	0.038A + 0.025 per bulb
CLA244 4 Bulb Audio Corridor Light	0.038A + 0.025 per bulb
R4KCAL Call Assurance Light	0.005A
CLAR4 Corridor Light Audio Relay Add-on	0.032A

Network and Control Equipment & Consoles	
R4K4020 LCD Console	0.375A
R4KANN Annunciator Panel	0.375A
R4KMQC Marquee Controller	0.300A
R4KNIM Network Interface Module	0.500A
R4KPA25 25W Paging Amp	2.500A
R4KPIP Peripheral Interface Port	0.400A
R4KRSPIP Reporting Software PIP	0.400A
R4KSPA Serial Port Adapter	0.200A
R4KPLI Phone Line Interface	1.000A
R4KXBA X-Bus Adapter	0.500A

Table 41: Power Draw/Requirements

D

Appendix D: Electromagnetic Compatability

Medical electrical equipment needs special precautions regarding electromagnetic compatibility (EMC) and needs to be installed and put into service according to the EMC information provided in this user manual.

Portable and mobile radio frequency (RF) communications equipment can affect medical electrical equipment.

Guidance and Manufacturer's Declaration—Electromagnetic Emissions		
The Responder 4000 System is intended for use in the electromagnetic environments specified below. The customer or the user of the Responder 4000 System should assure it is used in such an environment.		
Emissions Test	**Compliance**	**Guidance**
RF Emissions CISPR 11	Group 1	The Responder 4000 System uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions CISPR 11	Class A	The Responder 4000 System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic Emissions IEC 61000-3-2	N/A	
Voltage Fluctuations/ Flicker Emissions IEC 61000-3-3	N/A	

Guidance and Manufacturer's Declaration—Electromagnetic Immunity			
The Responder 4000 System is intended for use in the electromagnetic environments specified below. The customer or the user of the Responder 4000 System should assure it is used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Guidance**
Electrostatic Discharge IEC 61000- 4-2	± 6 kV Contact ± 8 kV Air	± 6 kV Contact ± 8 kV Air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical Fast Transient/ Burst IEC 61000-4-4	± 2 kV on power Supply Lines ± 1 kV on Input/Output Lines	± 2 kV on Power Supply Lines ± 1 kV on Input/Output Lines	Mains power quality should be that of a typical commercial or hospital environment
Surge IEC 61000-4-5	± 1 kV Differential Mode ± 2 kV Common Mode	± 1 kV Differential Mode ± 2 kV Common Mode	Mains power quality should be that of a typical commercial or hospital environment
Voltage Dips, Short Interrupts, & Variations on Power Supply Lines IEC 61000-4-11	< 5% UT (95% dip in UT for 0.5 cycles) < 40% UT (60% dip in UT for 5 cycles) < 70% UT (30% dip in UT for 25 cycles)	< 5% UT (95% dip in UT for 0.5 cycles) < 40% UT (60% dip in UT for 5 cycles) < 70% UT (30% dip in UT for 25 cycles)	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Responder 4000 System requires continued operation during mains interruptions, it is recommended that the Responder 4000 System be powered from an uninterruptible power supply or a battery.
Power Frequency Magnetic Fields IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
Note: UT is the a.c. mains voltage prior to application of the test level			

Guidance and Manufacturer's Declaration—Electromagnetic Immunity			
The Responder 4000 System is intended for use in the electromagnetic environments specified below. The customer or the user of the Responder 4000 System should assure it is used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Guidance**
			Portable and mobile RF communications equipment should be used no closer to any part of the Responder 4000 System, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 Mhz	3 Vrms	Recommended separation distance: $d = 1{,}2\sqrt{P}$
Radiated RF IEC 61000-4-3	3 Vrms 80 MHz to 2.5 GHz	3 V/m	$d = 1{,}2\sqrt{P}$ 80 MHz to 800 MHz $d = 2{,}3\sqrt{P}$ 800 MHz to 2.5 GHz
			Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Filed strengths from fixed RF transmitters, as determined by an electromagnetic site survey[a], should be less than the compliance level in each frequency range[b]. Interference may occur in the vicinity of equipment marked with the following symbol: 
Note 1: at 80 MHz and 800 MHz, the higher frequency range applies. **Note 2:** these guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
[a] Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Responder 4000 System is used exceeds the applicable RF compliance level above, the Responder 4000 System should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Responder 4000 System. [b] Over the frequency range 150 kHz to 80 MHz, field strengths should be less than [V1] V/m.			

Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the Responder 4000 System

The Responder 4000 System is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Responder 4000 System can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Responder 4000 System as recommended below, according to the maximum output power of the communications equipment.

Rated Maximum Output Power of Transmitter	Separation Distance According to Frequency of Transmitter (m)		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
	$d = 1{,}2\sqrt{P}$	$d = 1{,}2\sqrt{P}$	$d = 2{,}3\sqrt{P}$
0.01	0,12	0,12	0,23
0.1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: at 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: these guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

E

Appendix E: K-Bus Address Worksheet

Use the K-Bus Address Worksheet to assign correct K-Bus Addresses throughout your installation. Make copies of the original, if necessary, to accommodate multiple installations:

K-Bus Address Worksheet				
R4KNIM ADDRESS (0-63):				
Physical Location (Room Number)	**Corridor Light/ Domeless Controller Model**	**K-Bus Address (1-150)**	**R4KTMB Port (KB1-KB12)**	**Notes**

Table 42: K-Bus Address Worksheet

F

Appendix F: Decimal/Binary Conversion

Review the following example/discussion should you not know how to convert decimal K-Bus entries to actual binary (Dipswitch) settings:

Decimal/Binary Conversion

In order to convert any X-Bus or K-Bus Configurator entry from decimal to actual (On/Off) Dipswitch setting, use the following process. (In the example given below, an entry of 135 is converted from decimal to Dipswitch setting.)

Step 1

Number = 135. Can I subtract 128 from the number? Yes, enter 1 under 128, subtract 128 from 135 and place the result (7) in the next row.

Switch	1	2	3	4	5	6	7	8
	1	2	4	8	16	32	64	128
								1

Step 2

Number = 7. Can I subtract 64 from the number? No, enter 0 under 64, place 7 in the next row.

Switch	1	2	3	4	5	6	7	8
	1	2	4	8	16	32	64	128
							0	1

Step 3

Number = 7. Can I subtract 32 from the number? No, enter 0 under 32, place 7 in the next row.

Switch	1	2	3	4	5	6	7	8
	1	2	4	8	16	32	64	128
						0	0	1

Step 4

Number = 7. Can I subtract 16 from the number? No, enter 0 under 16, place 7 in the next row.

Switch	1	2	3	4	5	6	7	8
	1	2	4	8	16	32	64	128
					0	0	0	1

Step 5

Number = 7. Can I subtract 8 from the number? No, enter 0 under 8, place 7 in the next row.

Switch	1	2	3	4	5	6	7	8
	1	2	4	8	16	32	64	128
				0	0	0	0	1

Step 6

Number = 7. Can I subtract 4 from the number? Yes, enter 1 under 4. Subtract 4 from 7 and place the result (3) in the next row.

Switch	1	2	3	4	5	6	7	8
	1	2	4	8	16	32	64	128
			1	0	0	0	0	1

Step 7

Number = 3. Can I subtract 2 from the number? Yes, enter 1 under 2. Subtract 2 from 3 and place the result (1) in the next row.

Switch	1	2	3	4	5	6	7	8
	1	2	4	8	16	32	64	128
		1	1	0	0	0	0	1

Step 8

Number = 1. Can I subtract 1 from the number? Yes, enter 1 under 1. Subtract 1 from 1.

Switch	1	2	3	4	5	6	7	8
	1	2	4	8	16	32	64	128
	1	1	1	0	0	0	0	1

Step 9

Number = 1. Can I subtract 1 from the number? Yes, enter 1 under 1. Subtract 1 from 1.

Final Switch Settings (135 “Decimal” Entry)

Switch	1	2	3	4	5	6	7	8
ON				■	■	■	■	
OFF	■	■	■					■

G

Appendix G: Console/Panel Wall-Mount Installation

In the following appendix, you'll find information regarding how to wall-mount either the R4K4020 LCD Console or R4KANN Annunciator Panel with or without the R4KWM11 and/or R4KWM22 Wall-Mount Bracket kits. (They are called "kits" because they include 1) a product-specific metal mounting bracket, 2) an integrated R4KRECP board, and 3) necessary mounting hardware.)

Preparing to Mount the Console(s)/Panel(s)

In order to mount Consoles/Panels, you must:

1 Determine whether you are going to mount a single Console or Panel or whether you are going to create a Multiple Console Cluster—comprised of two or more Panels and possibly a single R4K4020.

(Should you be creating a Multiple Console Cluster, you'll need to designate a "primary" Console. Since it will distribute K-Bus signal and Power, the primary Panel must always be mounted using a single or dual gang box. Further, an LCD Console cannot be the primary Console because it must be physically mounted to the left of any other Panels in the Cluster and only provides a single knockout for wiring, available on the unit's right side.)

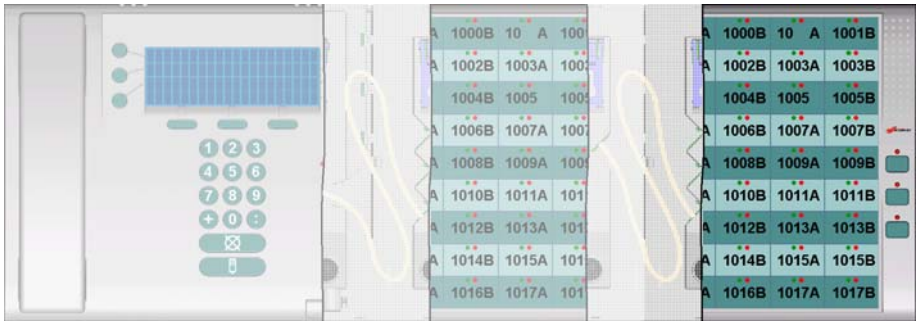


Figure 297: Multiple Console Cluster (LCD Console at far left)

2 Make sure there is enough unobstructed wall area for correctly positioned and installed Console(s)/Panel(s).

3 Determine whether you are going bracket or surface-mount the Consoles/Panels and/or use an electrical box.

4 Have the proper tools and supplies available.

Tools & Supplies

It's likely you'll need the following tools in order to mount the Consoles/Panels:

- ✓ Electrical Tape*
- ✓ Flathead and Phillips screwdrivers
- ✓ Tin snips (or equivalent)
- ✓ Standard Wire Cutter (for the K-bus to the R4KRECP)
- ✓ Standard Wire Stripper (for the K-bus to the R4KRECP)
- ✓ R4KCRIMP K-Bus Connector Crimp Tool (for the K-bus to the R4KRECP)
- ✓ R4KCONN8 K-Bus Connector Kit (for the K-bus to the R4KRECP)
- ✓ CAT 5 UTP Cable (for the K-bus to the R4KRECP)
- ✓ 2 #4-40 screws (WA140, Supplied with Each Mounting kit)

*Apply electrical tape, as necessary, to protect cabling from jagged metal edges.

Mounting a Single LCD Console

You can mount the LCD Console either using a single/dual gang electrical box or directly to the wall. Should you connect it to an electrical box, you'll need the R4KWM11 Wall-Mount Bracket kit.

LCD Console Electrical Box Mount

Observe the following instructions when mounting the LCD Console using the R4KWM11 Bracket Kit and an electrical box:

Step 1: Securing the Kit & Making Connection

a Locate or install a single or two gang electrical box.

- ➢ The K-Bus cable (and optional power pair) should already be available in the box. (You'll need at least 12" of strain relief to work comfortably.)

b Plug the 8-pin K-Bus Connector (and power pair, if used) into the integrated R4KRECP Console Receptacle.

- ➢ **Note**: Be sure to observe power cable polarity if you are using an additional power feed. (You'll find polarity markers [+/-] on the integrated R4KRECP board.)

c Plug one end of the supplied Patch Cable (VP1023) into the modular jack on the wall mount unit terminal board.

d Guide the protruding Console Receptacle into the electrical box:

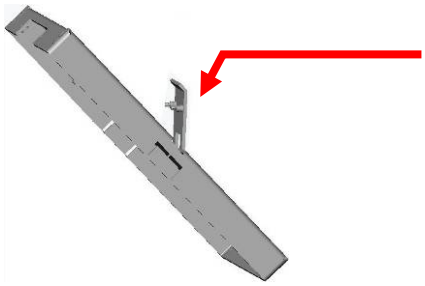


Figure 298: Protruding Console Receptacle

e Center the kit on the electrical box, aligning all mounting holes.

f Screw the mounting bracket to the electrical box.

g Plug the other end of the patch cable into the console unit modular jack.

Step 2: Completing the Connection & Hanging the Console

Once you've mounted the wall bracket…

a Feed the handset cord through the opening on the left side of the R4KWM11, and plug it into the handset jack on the back of the R4K4020.

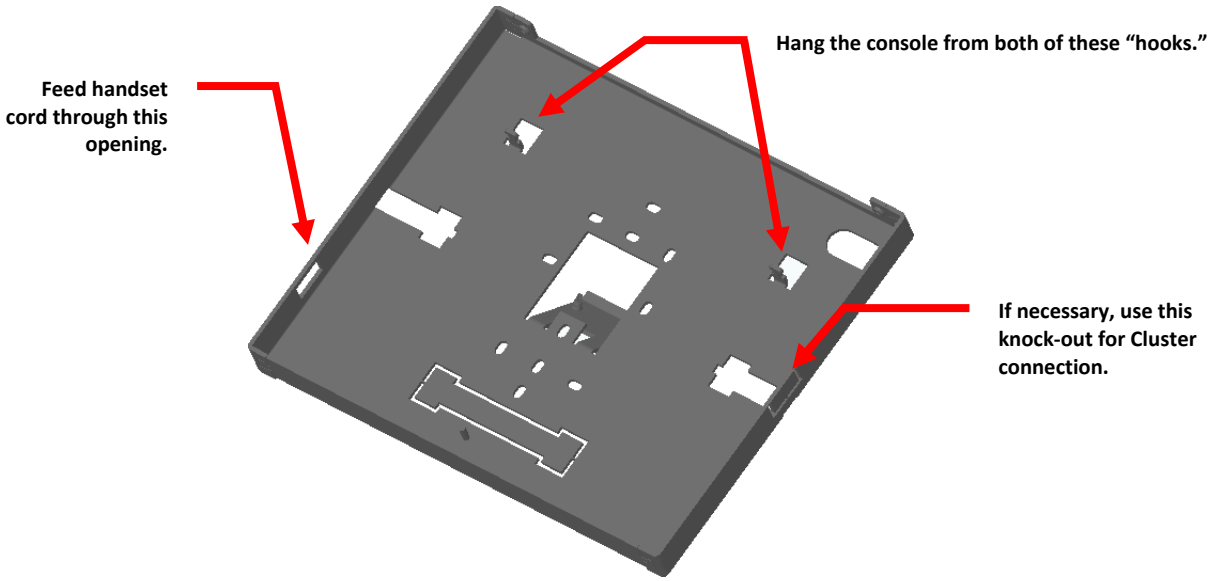


Figure 299: R4KWM11 LCD Console Mounting Bracket

b Slide the slot (bottom center of console back) over the hooks on the wall mount unit.

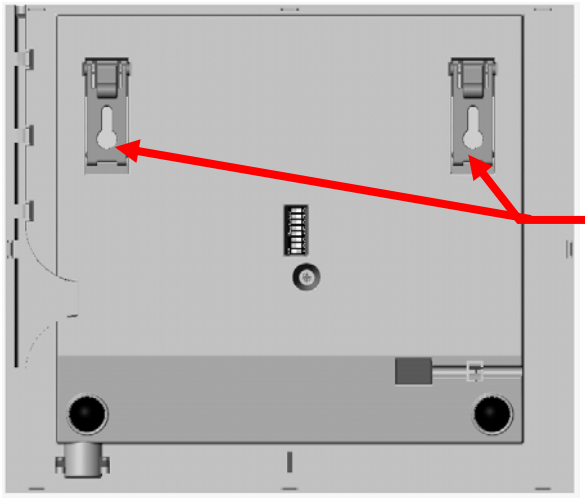


Figure 300: R4K4020 LCD Console (Rear)

c Insert the console into the metal frame, making sure the Patch Cord is not in the way.

Figure 301: Console mounted in R4KWM11

d Secure the console with the metal retention bar by using the 2 supplied #4-40 screws (WA140):

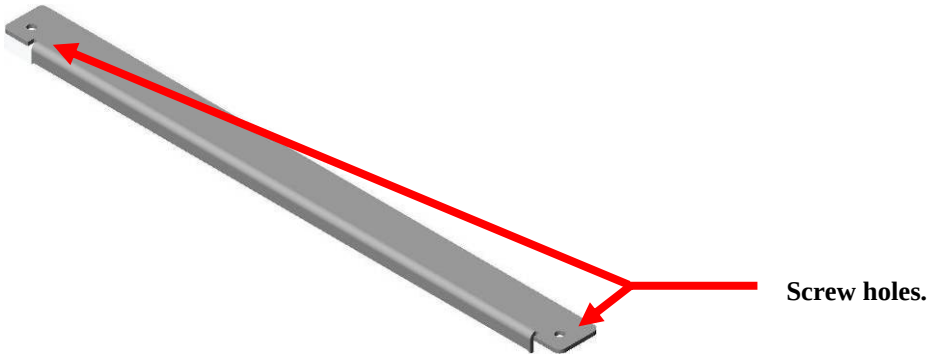


Figure 302: WM11 Retention Bar (AB4228)

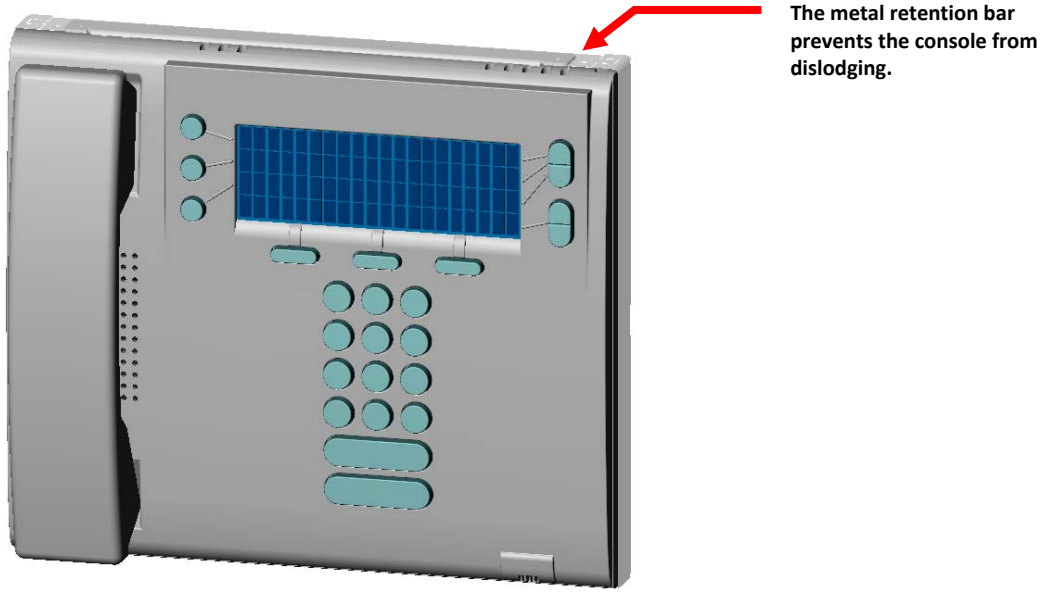


Figure 303: Console wall mounted complete

e Orient the handset keeper to hold the handset in the cradle:

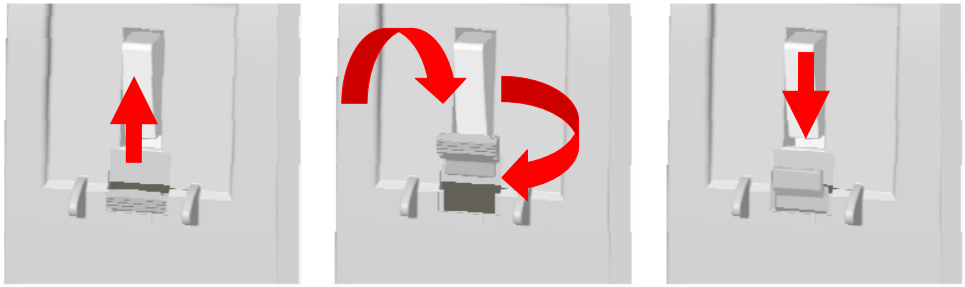


Figure 304: Handset Keeper

f Carefully slide handset keeper upward and out of the slot, remembering its orientation.

g Rotate the keeper front to back and flip it over top to bottom, so that the small tab is up and to the front.

h Carefully slide the keeper back into the slots.

i The handset should catch on the keep when placed in the handset cradle.

j Verify that unit will power up and operate normally.

LCD Console Direct Wall Mount (No Box)

Here's what you'll have to do if you plan to screw-mount the LCD directly to the wall:

1 Locate and print a copy or copies of either or both the R4K4020 Wall-Mount Installation templates (below).

2 Drill a pilot hole for each screw and, if necessary, insert anchors capable of holding 2.25 pounds.

3 Drive two #8 pan or hexhead screws for each Consoles/Panels into the wall or anchors.

4 Hang Console, making sure the Patch Cord is not in the way.

Mounting a Single R4KANN

You can mount the R4KANN Panel either using a single/dual gang electrical box or directly to the wall.

R4KANN Panel Electrical Box Mount

Observe the following instructions when mounting the R4KANN Panel using the R4KWM22 Kit and an electrical box:

Step 1: Securing the Kit & Making Connection

a Locate the single or two gang electrical box.

- The K-Bus cable (and optional power pair) should already be available in the box. (You'll need at least 12" of strain relief to work comfortably.)

b Plug the 8-pin K-Bus Connector (and power pair, if used) into the integrated R4KRECP Console Receptacle.

- **Note**: Be sure to observe power cable polarity if you are using an additional power feed. (You'll find polarity markers [+/-] on the integrated R4KRECP board.)

c Plug one end of the supplied Patch Cable (VP1023) into the modular jack on the wall mount unit terminal board.

d Guide protruding Console Receptacle into the electrical box.

e Center the kit on the electrical box, aligning all mounting holes.

f Screw the mounting bracket to the electrical box.

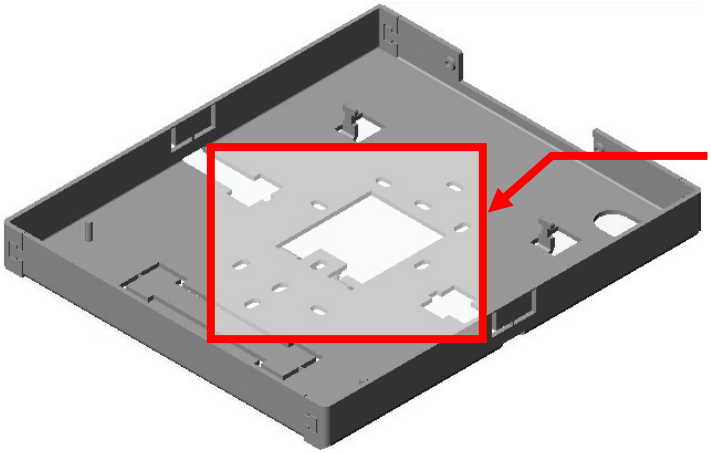


Figure 305: R4KWM22 R4KANN Mounting Bracket

g Plug the other end of the patch cable into the console unit modular jack

Step 2: Completing the Connection & Hanging the Panel

Once you've attached the mounting bracket to the box…

a Slide the eyelets over the hooks on the bracket.

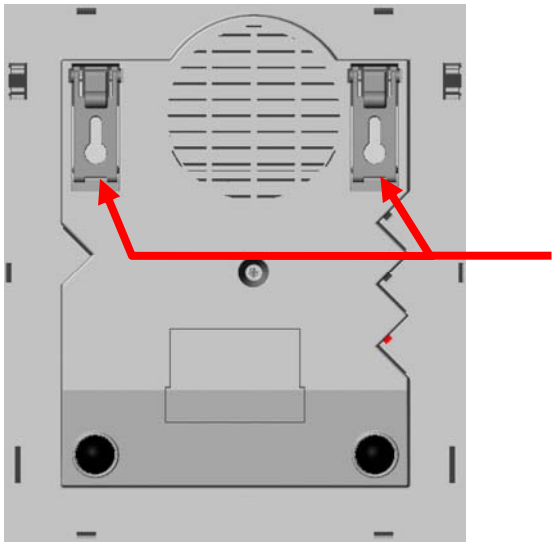


Figure 306: R4KANN Annunciator Panel (Rear)

b Insert the Panel into the metal frame, making sure the Patch Cord is not in the way.

c Secure the console with the metal retention bar, using the 2 supplied #4-40 screws (WA140):

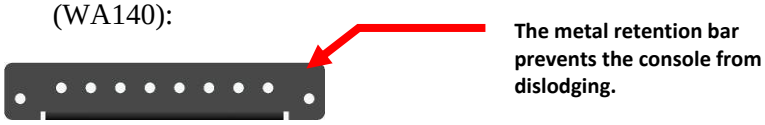


Figure 307: R4KWM22 Retention Bar (AB4184)

d Verify that unit will power up and operate normally.

R4KANN Panel Direct Wall Mount (No Box)

Here's what you'll have to do if you plan to screw-mount the R4KANN directly to the wall:

1 Locate and print a copy or copies of the R4KANN Wall-Mount Installation template (below).

2 Drill a pilot hole for each screw and, if necessary, insert anchors capable of holding 0.9 pounds.

3 Drive two #8 pan or hex head screws for each Panel into the wall or anchors.

4 Hang Panel, making sure the Patch Cord is not in the way.

Mounting Multiple Consoles/Panel (Cluster)

A multiple console cluster allows you to daisy chain up to 18 Consoles/Panels. Such clustering requires proper Console/Panel to Console/Panel alignment and spacing. For your convenience, a spacer is provided.

Observe the following instructions when attempting to align/space Consoles/Panels:

a Box-mount the first bracket.

- The rightmost mounted Panel must serve as the "primary" Panel, as it will distribute K-Bus signal and Power to all others in the Cluster.(An LCD Console cannot serve as the primary Console, as it must be physically mounted to the left of any other Panels in the Cluster.)
- Do **not** hang the Consoles/Panels until you've laid out the entire Cluster.

b Locate the "dog bone-shaped" spacer at the bottom of the second Wall-Mount unit:

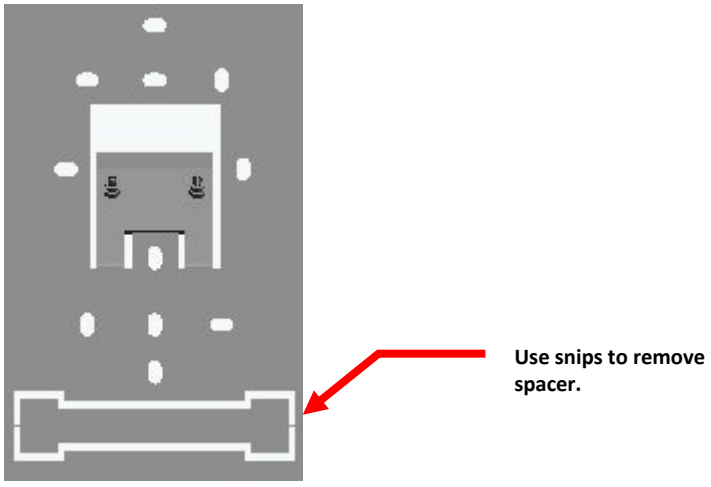


Figure 308: Dog Bone Spacer

c Use snips or equivalent tool to remove the spacer.

d Place and temporarily tape the spacer into the alignment knock-out of the already installed Wall-Mount unit:

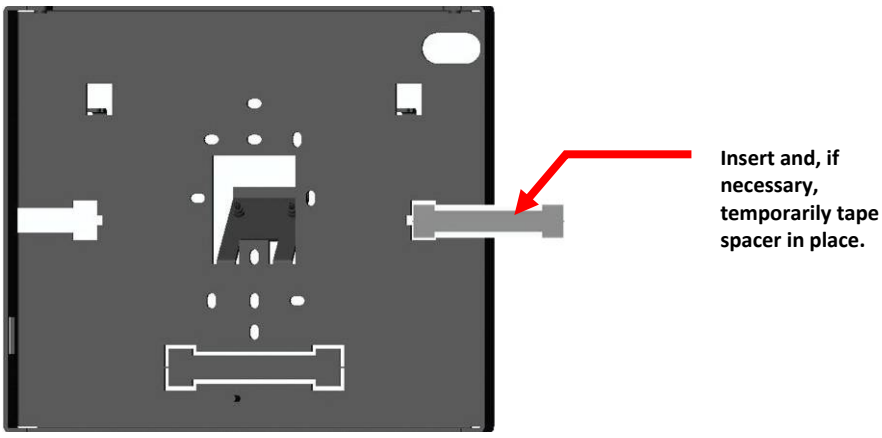


Figure 309: Spacer Temporarily Taped In Place

e Use the spacer to line up the second Wall-Mount:

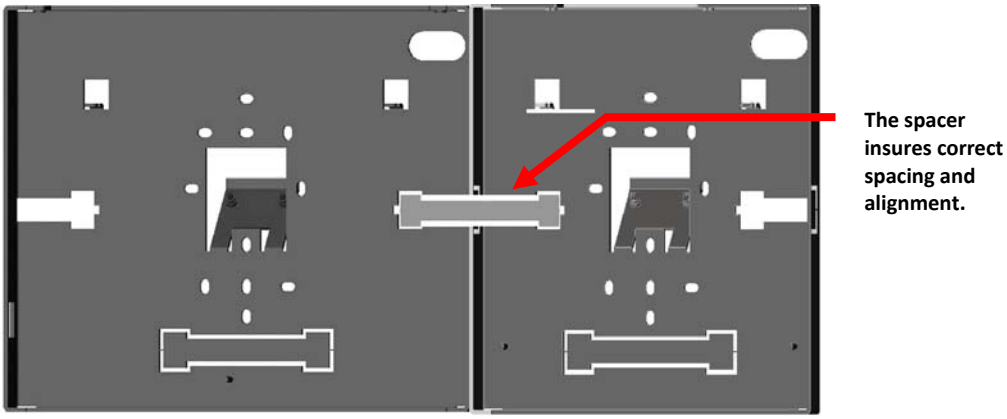
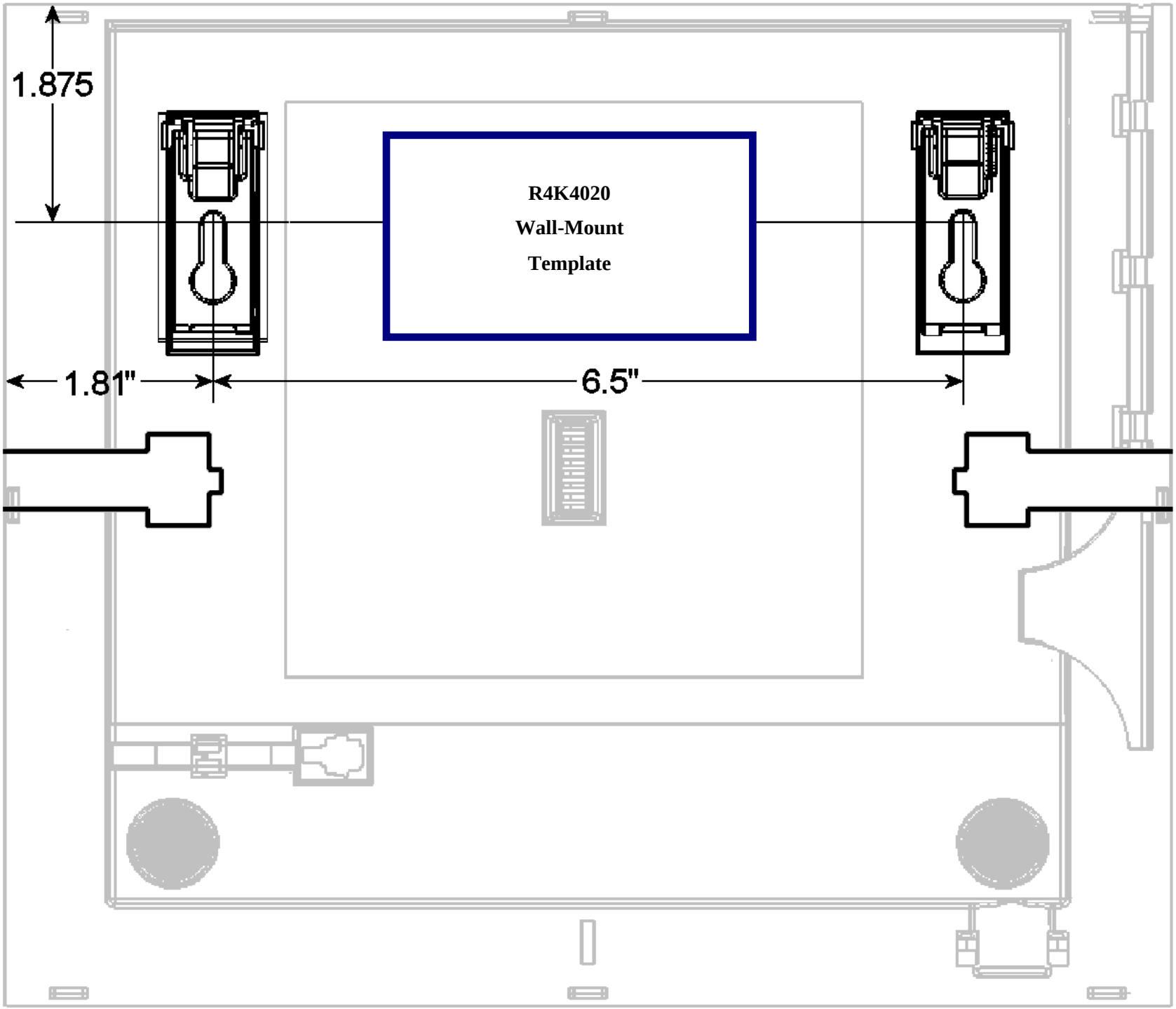


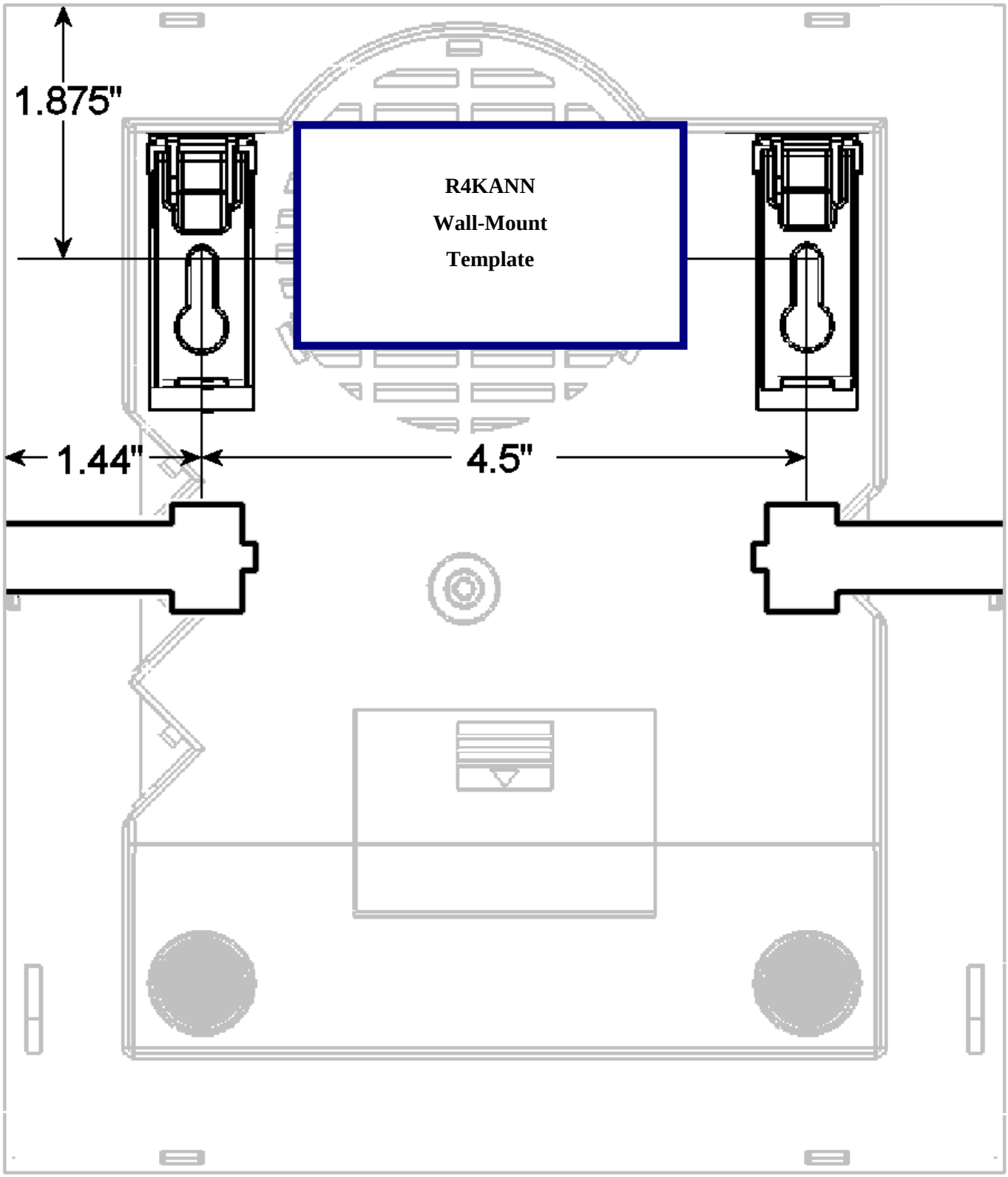
Figure 310: Properly Spaced/Aligned Wall-Mounts

f Mount the second unit either to the wall or to an electrical box.

g Repeat as necessary for all units.

h Complete the connection and hang the Consoles/Panels (see above for details on connecting and hanging Consoles/Panels).


1.875
R4K4020
Wall-Mount
Template
1.81"
6.5"


1.875"
R4KANN
Wall-Mount
Template
1.44"
4.5"

H

Appendix H: Station & Corridor Light Backplate Templates

For your convenience, we've included Station and Corridor light backplate templates to assist you in mounting these devices.

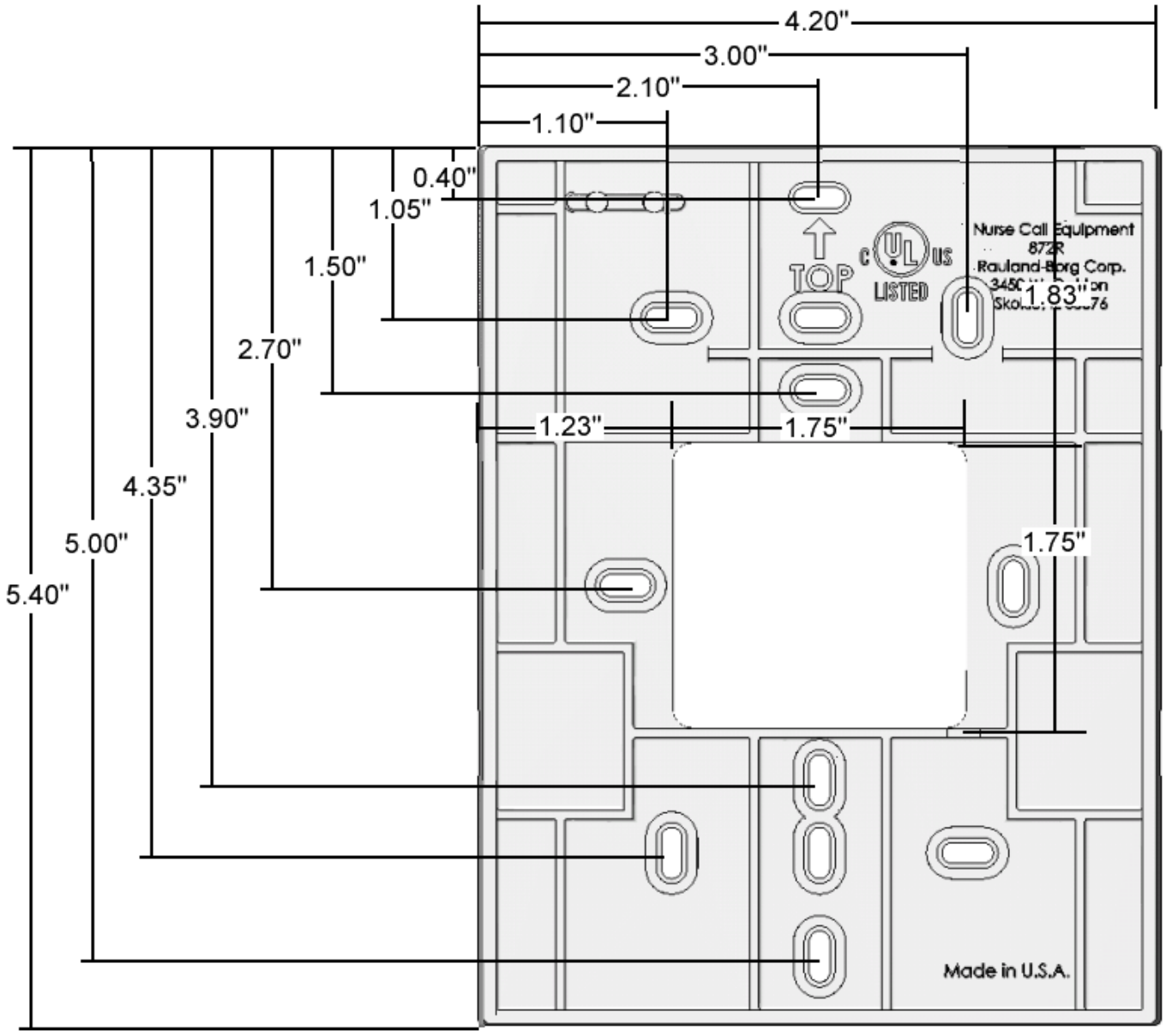


Figure 311: Responder® 4000 corridor light base mounting template

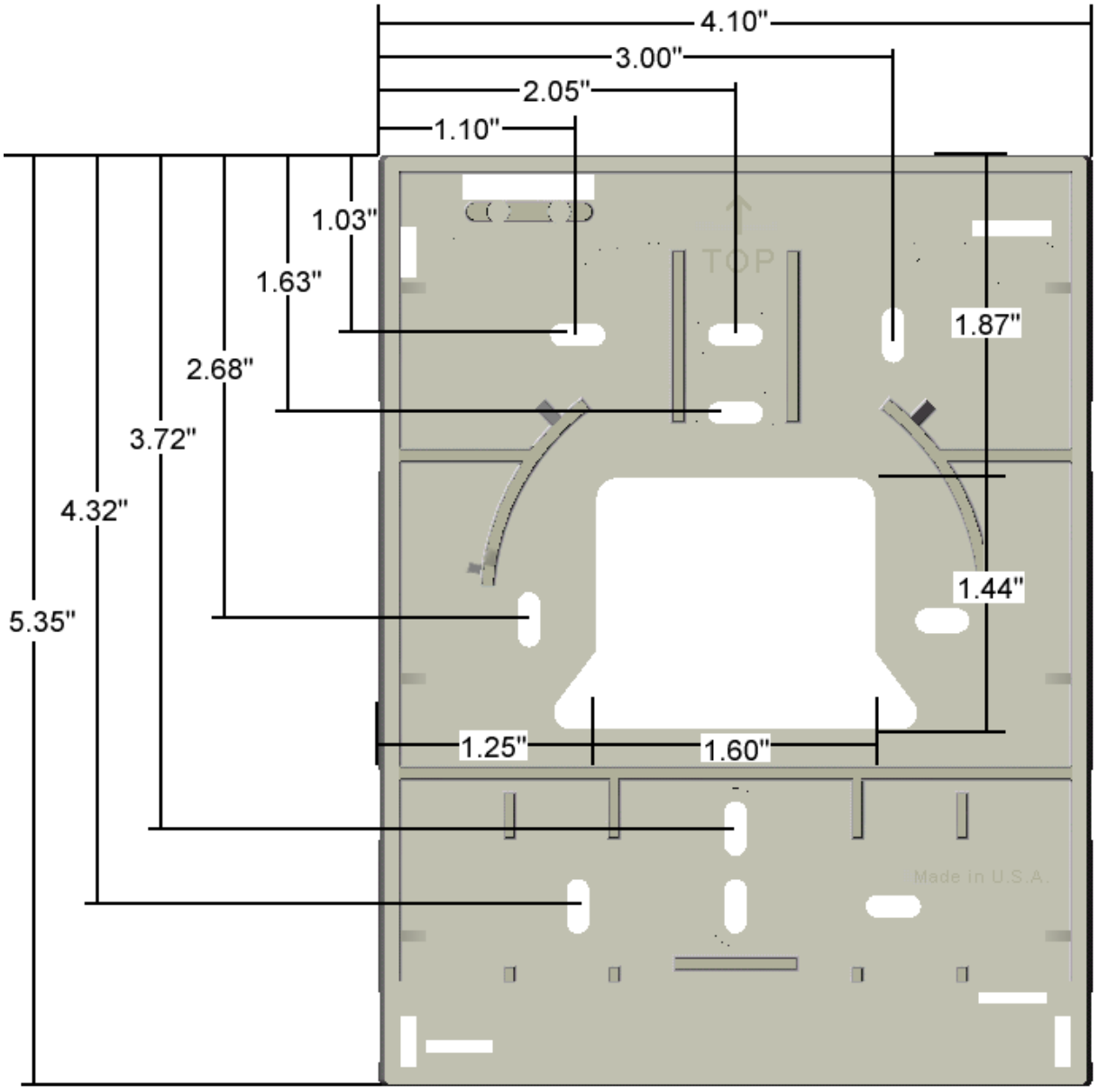


Figure 312: Responder® 4000 station base mounting template

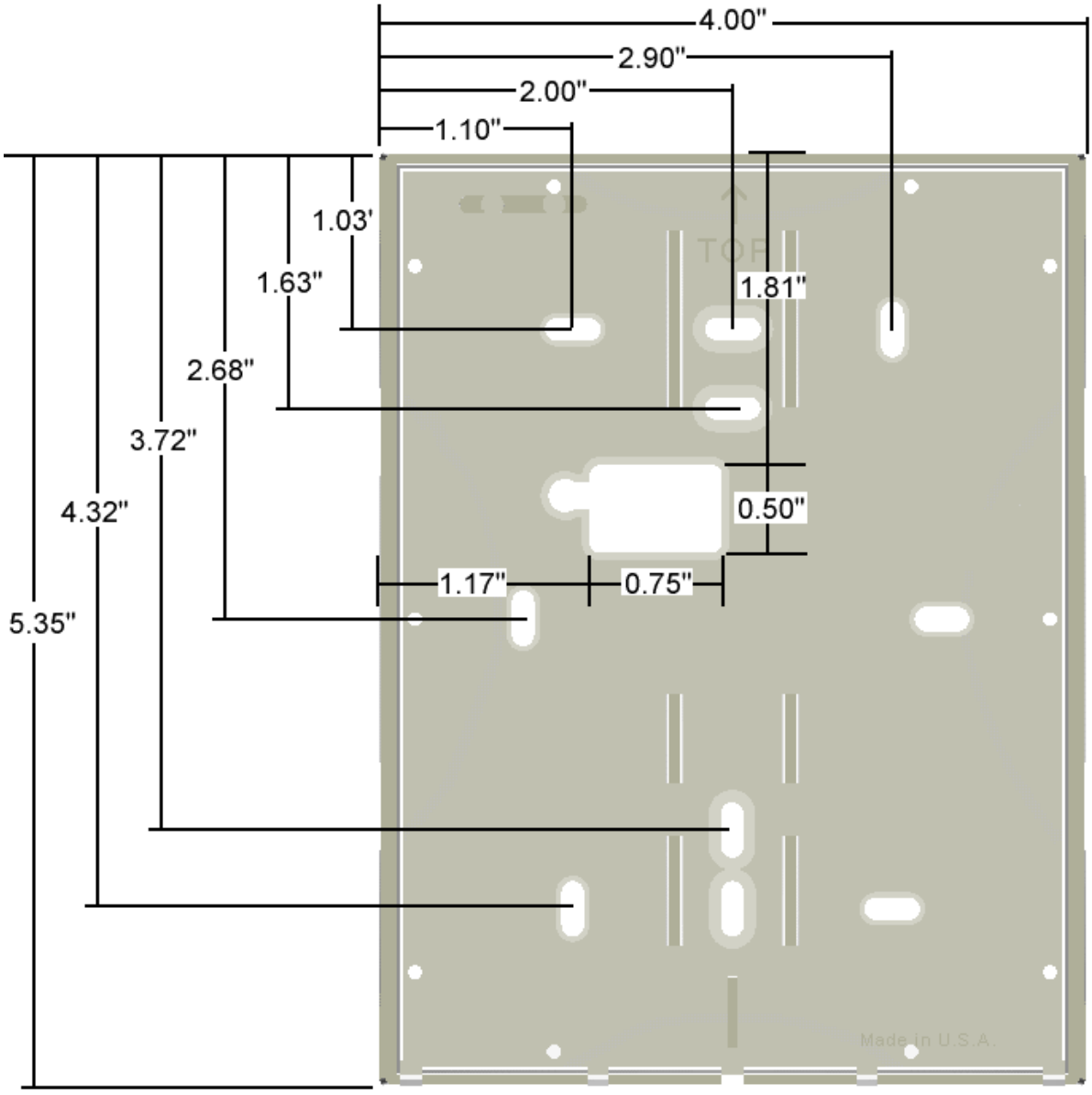


Figure 313: R4KPC10 base mounting template

Appendix I: Installation Quick Guides

For your convenience, we've included Quick Guides to assist you in the following operations:

- ✓ Installing and maintaining the R4KPC10 Pullcord Station
- ✓ Replacing the R4K4020 LCD Console Keypad
- ✓ Replacing the R4KANN Annunciator Panel Keypad
- ✓ Installing the R4KCSC Clear Plastic Cover

R4KPC10 Pullcord Installation/Maintenance Summary

Step 1: Mount the Station Base

a Attach the Station Base directly to a wall **or** to a single gang box using the provided screws.

Step 2: Mount the Station

a Snap the Station to the Station Base.

b Run a bead of caulk along the top and sides to splash proof the station. Do **NOT** caulk the bottom! The bottom is left uncaulked in order to allow moisture to escape.

Run a bead of caulk only around the top and sides of the mounted Station.

Figure 314: Step 1 (Insert New Cord)

Step 3: Adjust Cord/Replace Bell

a In order to prevent the bell-end from falling off the cord, observe the following figure eight knot-tying procedure:

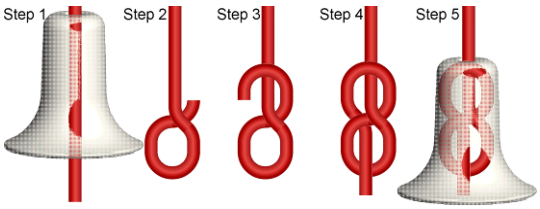


Figure 315: Knot-Tying Procedure

- ✓ Thread replacement cord through bell end.
- ✓ Loop the cord as shown above.
- ✓ Create the second loop.
- ✓ Pull the cord through the hole and tighten.
- ✓ Trim excess cord, and slide the bell over the knot to secure.

R4K4020 LCD Console Keypad Replacement Summary

Step 1: Attach Supplied ESD Wrist Strap

a Place wrist strap around one wrist.

b Connect strap to a known, good earth ground.

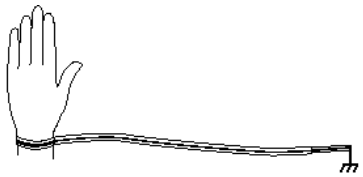


Figure 316: ESD wrist strap

Step 2: Remove R4K4020 Cover

a Flip console.

b Remove mounting screw.

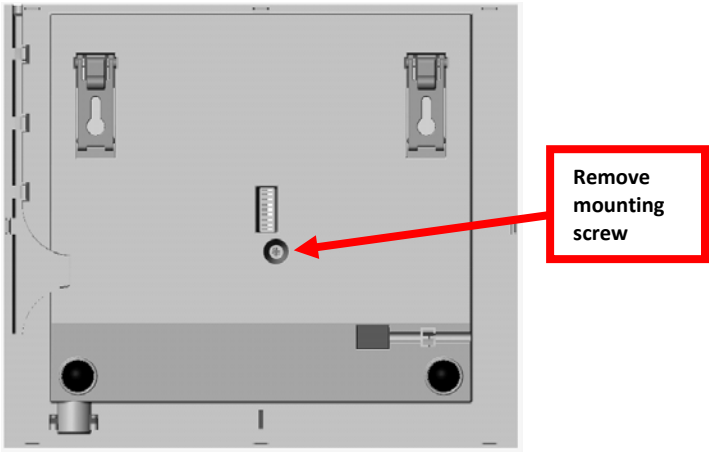


Figure 317: Mounting Screw

c Gently unsnap console cover, using only your fingers.

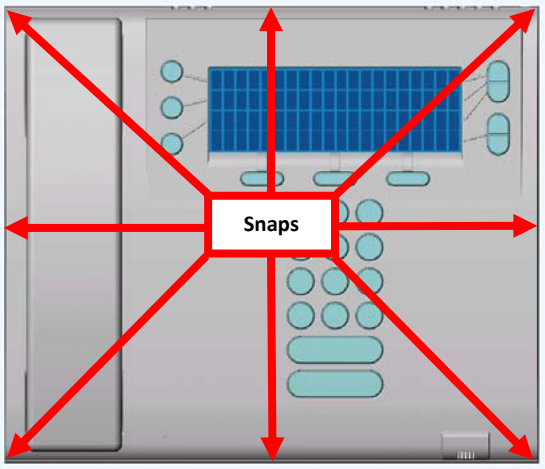


Figure 318: Cover Snaps

Step 3: Replace Keypad

a Remove old keypad.

b Use circuit board guide holes to align new keypad:

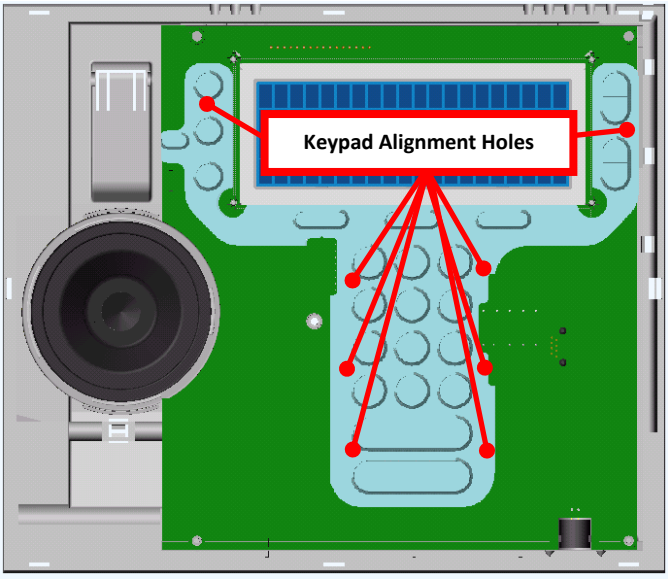


Figure 319: Keypad Alignment

Step 4: Replace the Cover

a Flip console over, making sure hookswitch spring remains in place.

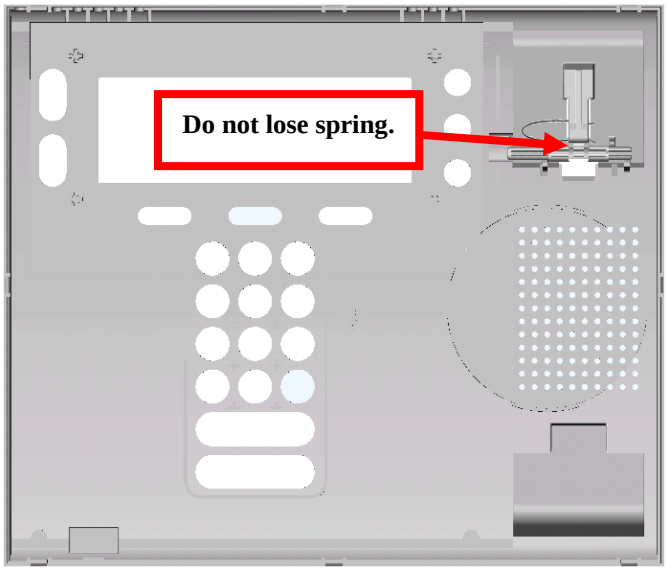


Figure 320: Hookswitch Spring

b Replace cover.

c Replace screw.

R4KANN Keypad Replacement Summary

Step 1: Attach Supplied ESD Wrist Strap

a Place wrist strap around one wrist.

b Connect strap to a known, good earth ground.

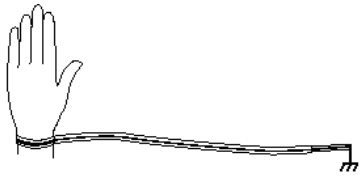


Figure 321: ESD wrist strap

Step 2: Remove R4KANN Cover

a Flip console over.

b Remove mounting screw.

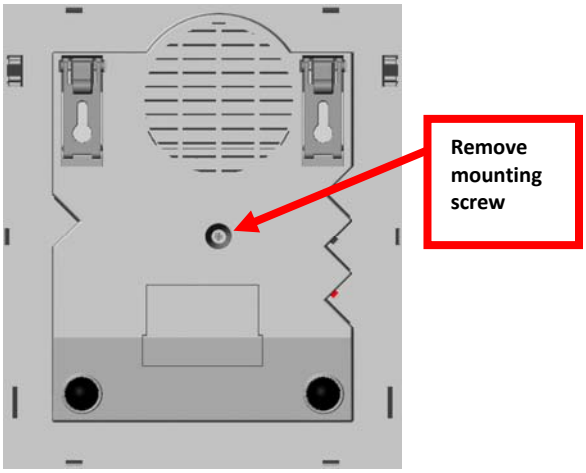


Figure 322 Mounting Screw

c Gently unsnap console cover, using only your fingers.

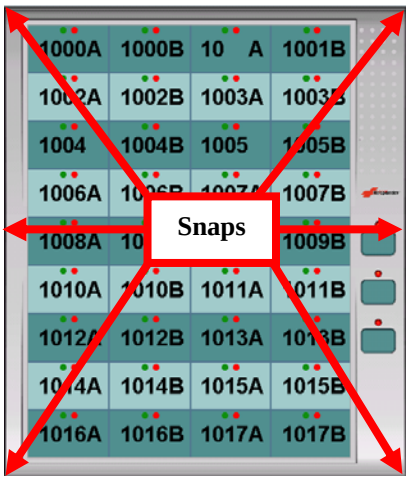


Figure 323: Cover Snaps

Step 3: Replace Keypad

a Remove old keypad.

b Use circuit board guide holes to align new keypad:

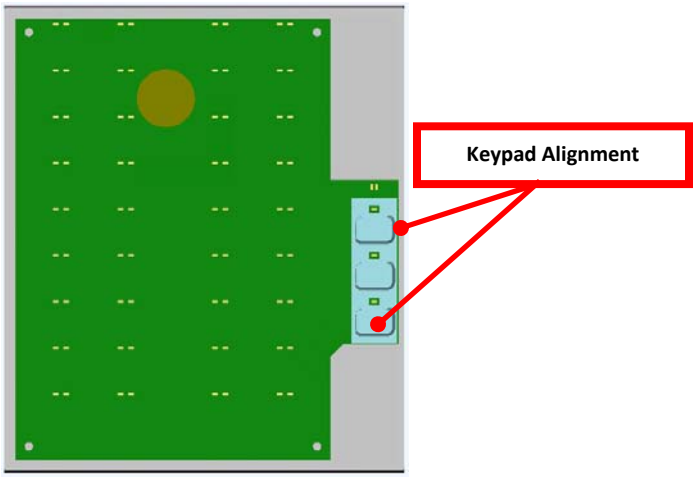


Figure 324: Keypad Alignment

Step 4: Replace Cover

a Flip console over.

b Replace cover.

c Replace screw.

Step 5: Remove Overlay

a Remove the old overlay using a sharp flat object.

Step 6: Replace Overlay

a Remove the original overlay using a sharp flat object.

b Align the new overlay using the clear LED holes as guide.

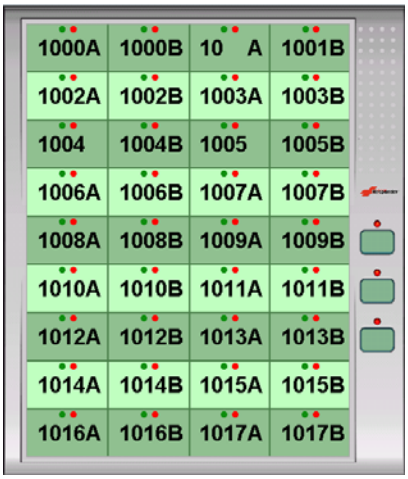


Figure 325: New Overlay in Place

Clear Station Cover Installation Summary

Step 1: Secure R4KCSC Bracket to Station Base

a Attach the R4KCSC metal bracket to the backside of the station base.

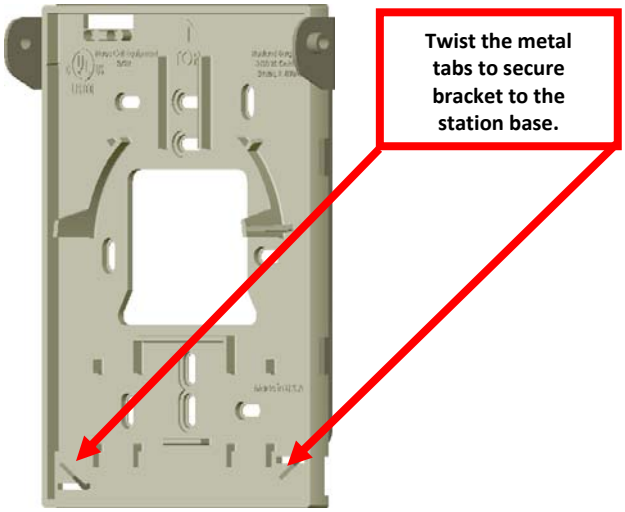


Figure 326: Step 1 Attach Bracket to Base

b Screw the bracket/base to the wall.

Step 2: Connect the Station

a Plug the station connector to the station.

b Snap station to base.

Figure 327: Step 2 Attach Station to Base

Step 3: Attach Cover

a Snap the cover to the swivel supports on the bracket.

b Open and close the cover a few times to make sure it drops freely to its resting position.

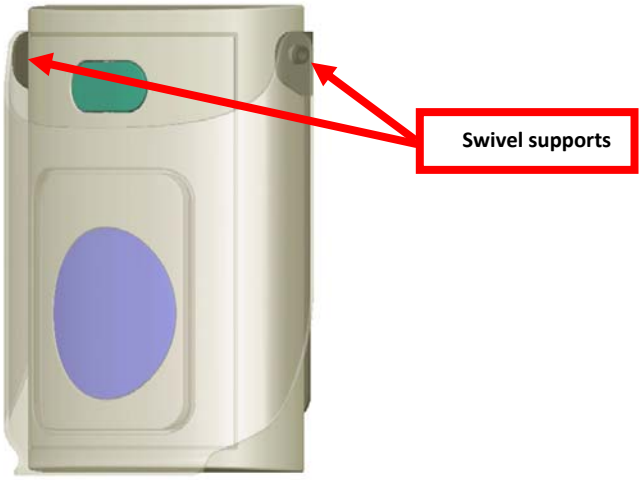


Figure 328: Step 3 Cover Shown in Resting Position

J

Appendix J: R4K4020 Display Cover Installation

For your convenience, we've included a Quick Guide to assist you in installing the R4K4020 LCD Console display cover. UL 1069 requires the cover to be attached when the console is operating in a horizontal position (on a desktop, for example). The cover is designed to protect the LCD display from falling objects.

R4K4020 Display Cover Installation Summary

Follow these steps to install the protective Display Cover:

Step 1: Remove tape cover

a Remove protective backing to expose one side of the double sided tape:

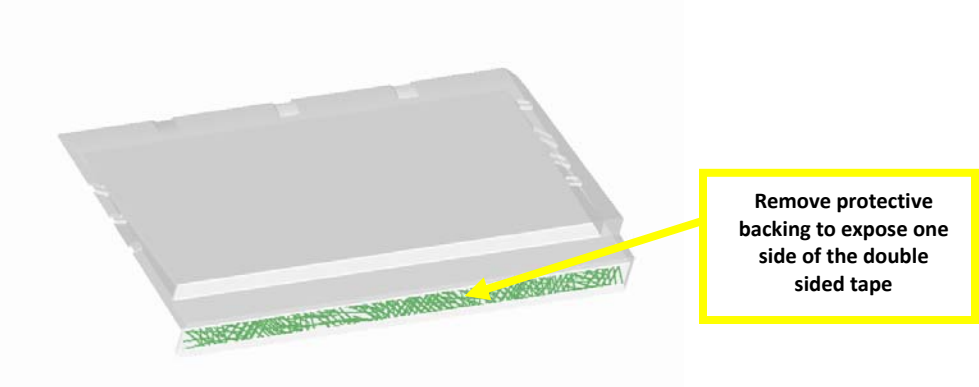


Figure 329: Double-sided Tape

Step 2: Attach Cover to Console

a Line up the cover using the menu option lines as guides.

b Slide the cover (from the back side) parallel to the console face.

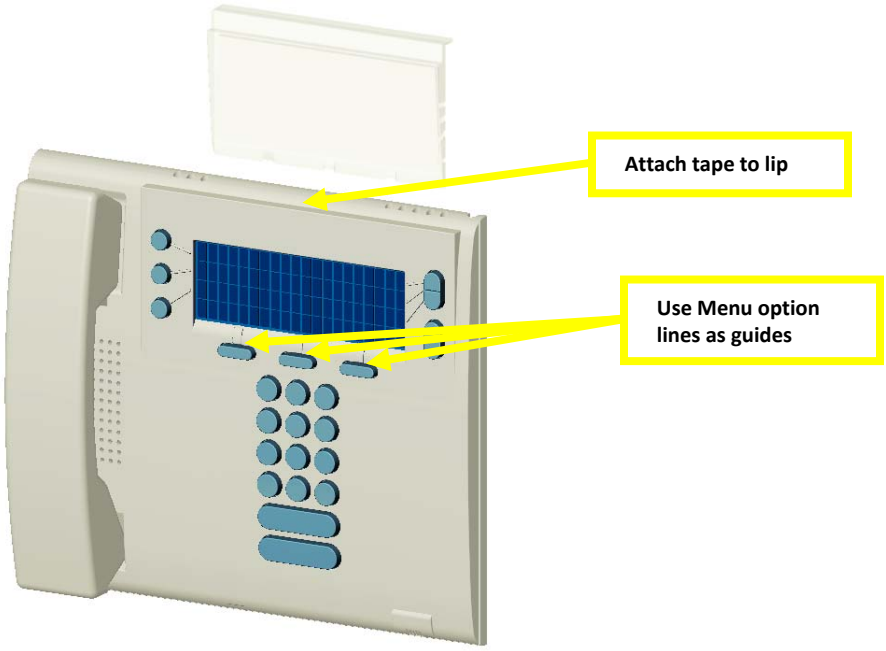


Figure 330: Cover Alignment

Step 3: Verify alignment

a Verify proper alignment.

b Press the cover along the back edge at the lip to insure good contact.

c Allow the tape adhesive to cure for 24 hours before using console.

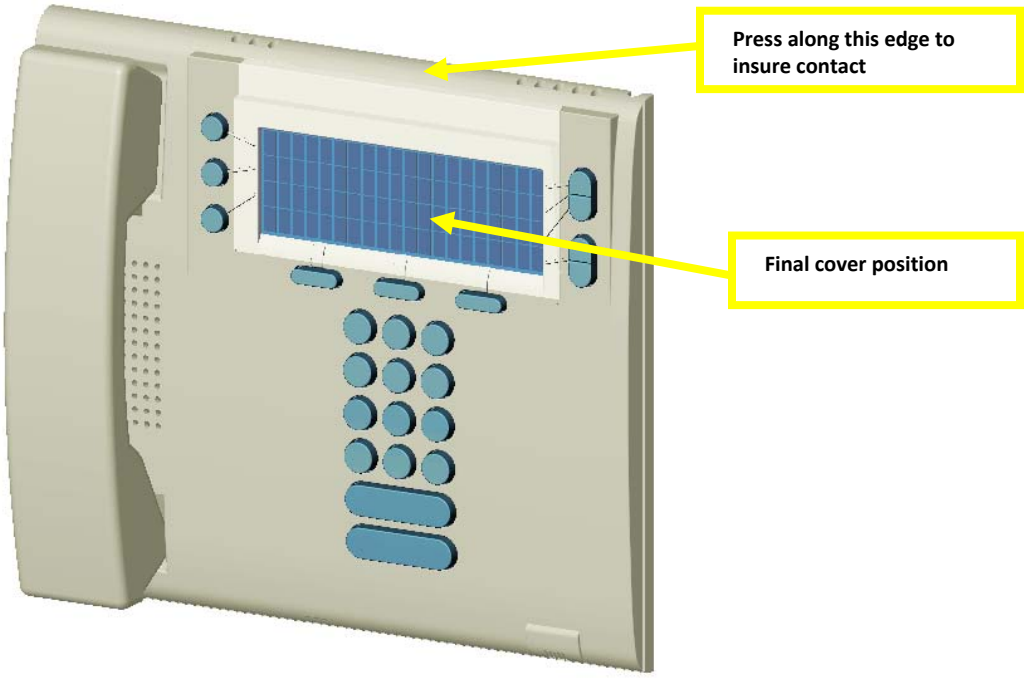


Figure 331: Step 3: Cover shown in final position over LCD display window

K

Appendix K: R4KPIP/R4KRSPIP Ferrite Bead Installation Guide

For your convenience, we've included a Quick Guide to assist you in installing the R4KPIP/R4KRSPIP Ferrite Bead. In order comply with Part 15 of the FCC Rules, the installation of the R4KPIP/R4KRSPIP and the serial data equipment attached to it must meet the following requirements:

1 The ferrite bead (included with the R4KPIP/R4KRSPIP) must be installed on the serial cable where it connects to the R4KSPA portion of the R4KPIP/R4KRSPIP assembly.

2 The serial data equipment (Personal Computer, Pager Base Station, etc.) must provide a connection to Earth Ground for the metal shell of its serial connector.

Installing the Bead

1 Plug a 9-pin serial cable into the appropriate connector (DCE or DTE) on the R4KSPA and tighten its screw terminals to lock it in place.

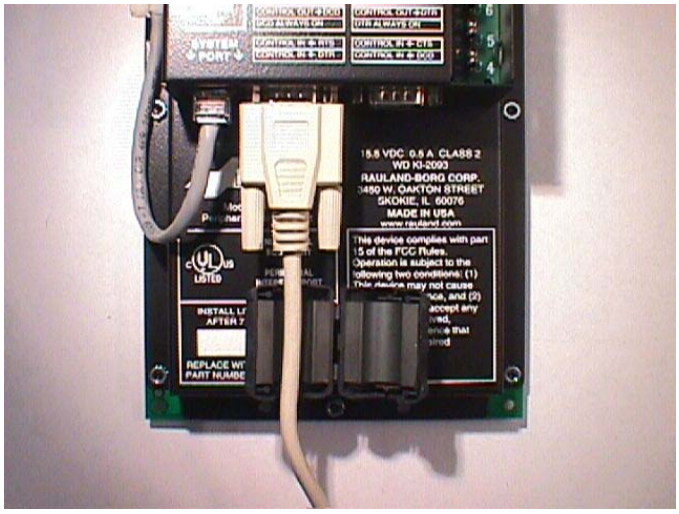


Figure 332: Ferrite bead located near connector

2 Keeping the ferrite bead open, place it underneath the cable as close to the R4KSPA as possible. (Figure 332)

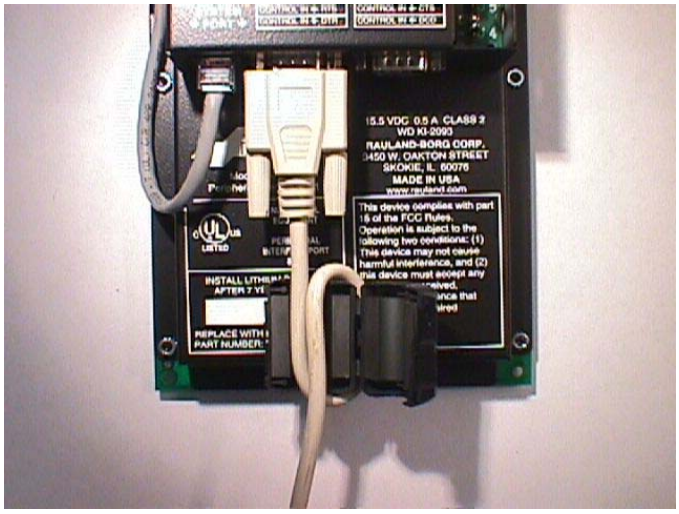


Figure 333: Cable looped once through bead

3 Wrap one turn of the cable around the bead. (Figure 333)

Figure 334: Bead is closed and locked in place

4 Close the two halves of the bead and gently squeeze them together until the bead snaps together and locks in place. (Figure 334)