



RATH® Analog AOR Systems Installation

Instructor: Jerry Last

Title: Technical Services Superintendent

Subject: Installation of Analog AOR
Systems

- ▶ Level: Installer and Above
- ▶ Objectives: Properly install and troubleshoot RATH® SmartRescue and Command Center Systems



Objectives and Target

- ▶ Identify equipment, wiring, and programming requirements to ensure successful implementation of both styles of Emergency Communication Systems. Including but not limited to:

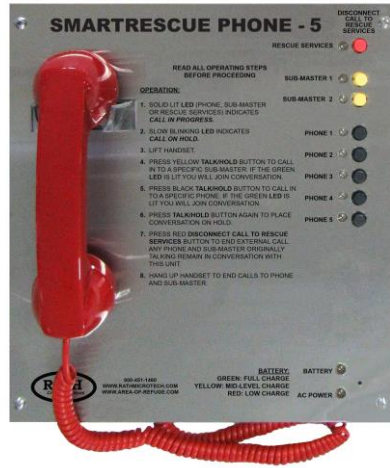
- Equipment
- Tools needed
- Wiring requirements
- Base programming (as applicable)
- Endpoint programming
- Basic troubleshooting techniques

Tool Recommendations for Emergency Communication Systems



- ▶ Multi-meter
- ▶ Analog phone or telephone test set
- ▶ 110 Punch Tool
- ▶ Phillips Head Jeweler's screwdriver
- ▶ Wire Cutter
- ▶ Wire Stripper
- ▶ Tone generator and inductive amp

Main Systems



SmartRescue



Command Center



SmartRescue



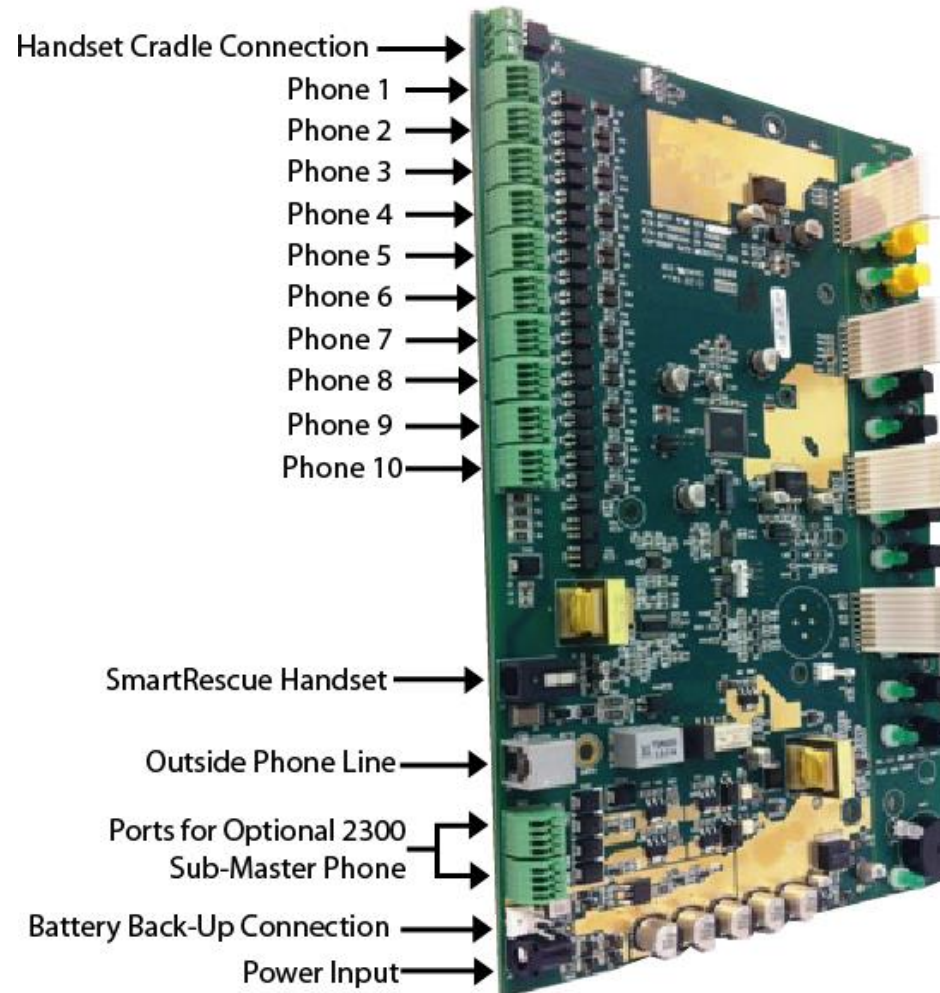
- ▶ Available in 5 or 10 Base Station
- ▶ MUST HAVE:
 - ▶ 2100 Series (SmartPhone) call stations
 - ▶ Communications Connection (Either a Loop-Start Central Office Line, an Analog Station Port from a telephone system)
 - ▶ Power Source
 - ▶ Internal Battery (Supplied) Connected
 - ▶ Endpoints (Properly Wired and programmed)
- ▶ Optional:
 - ▶ Additional Sub-Masters (alternate control points) may be added (up to 2)



SmartRescue

Hardware Installation- Base Station

- ▶ Install back-box and plan which conduit knockouts are needed for analog communications line, station cabling and power runs
- ▶ Mount SmartRescue to the box using suitable mounting screws and tools
- ▶ Test Analog communications by placing a call in and out on the provided line, then to destination number
- ▶ Connect Analog Phone line to provided connector on SmartRescue circuit board

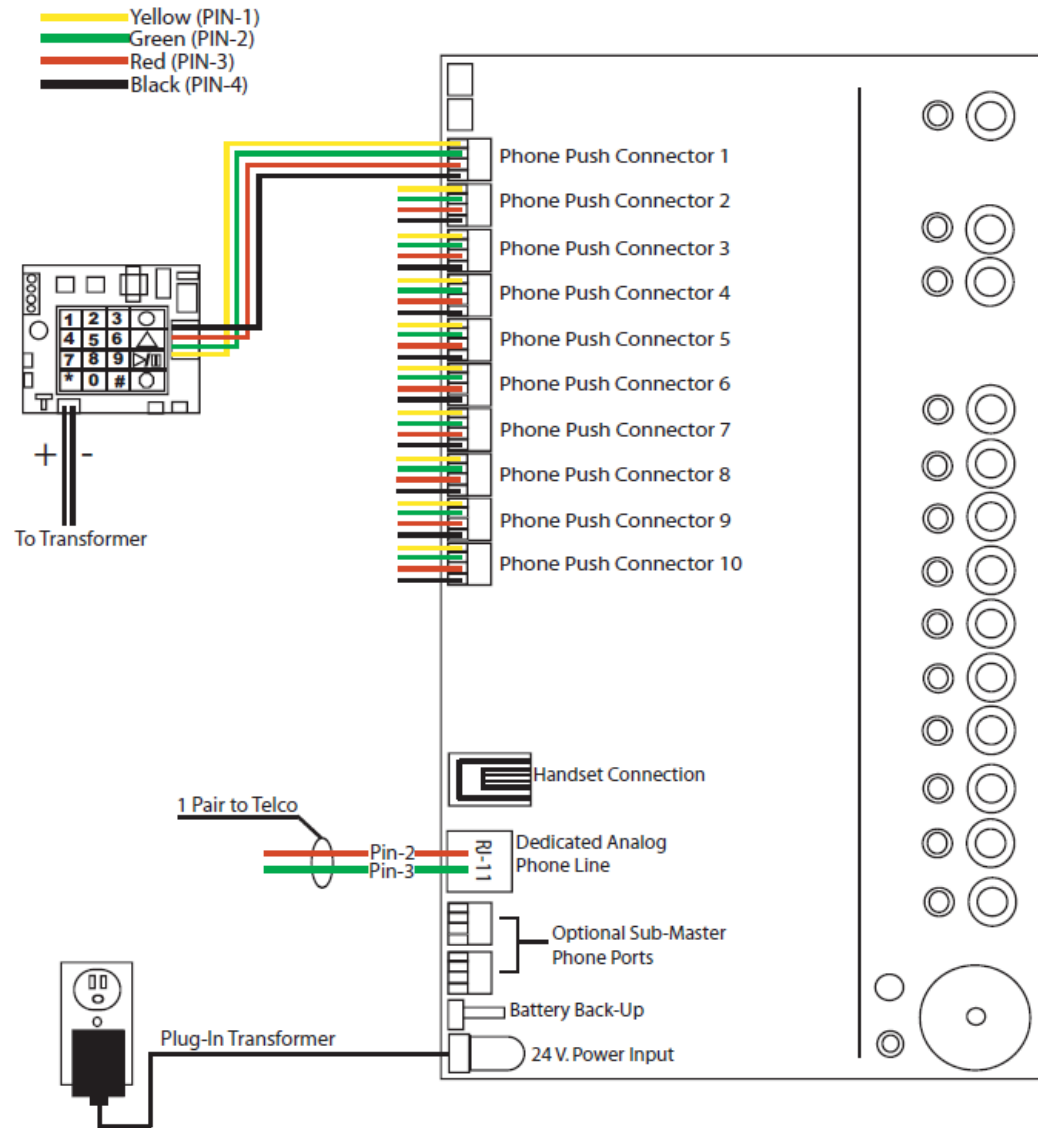


Station Connections to Base Station

- ▶ Take 4-Wire Cabling, strip 1/8” insulation, and insert into the push connectors
- ▶ Terminate all 4 conductors in proper order, to connect wires to endpoints

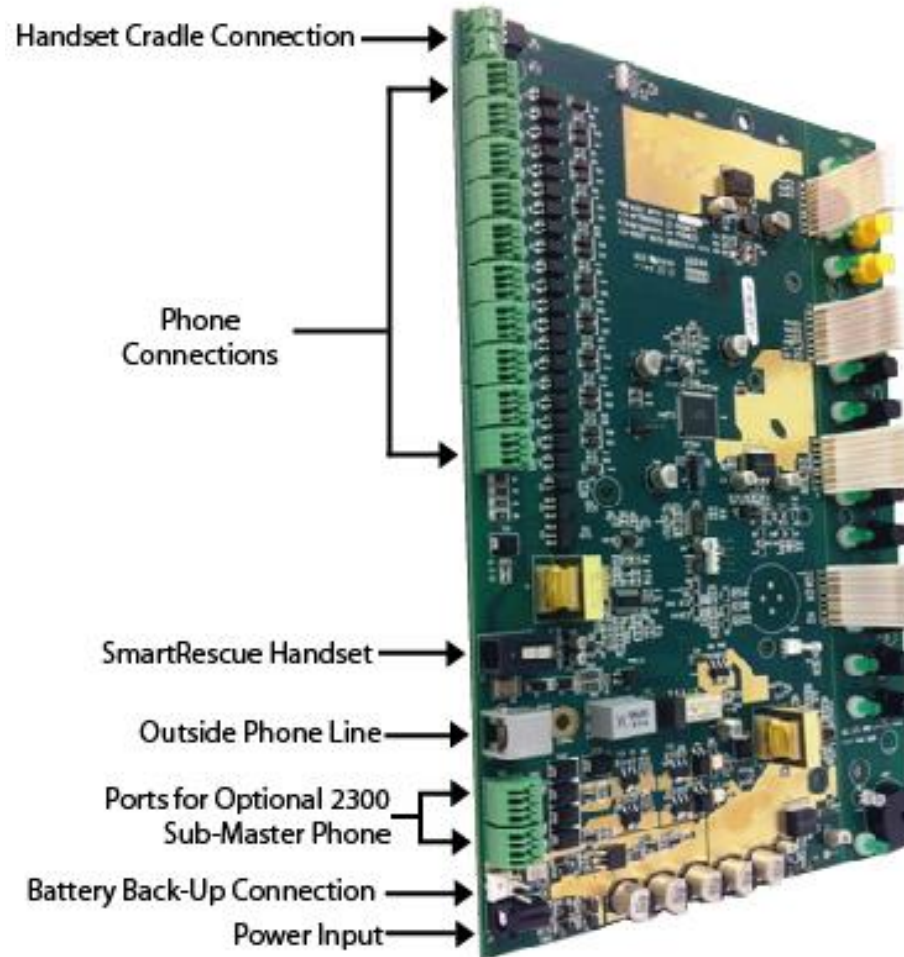


General Wiring Diagram



Sub-Masters with SmartRescue

- ▶ Up to 2 Sub-Masters can be installed on the SmartRescue
- ▶ The Sub-Master can communicate with all endpoints connected (individually or collectively) as well as any conversation occurring with SmartRescue



Pre-Installation Requirements

- ▶ Install a standard 4 pin (2-pair) wall jack in the desired location
- ▶ Twisted, shielded, solid conductor 24 or 22-gauge, 4 conductor wire between a standard 4 conductor wall jack and SmartRescue
- ▶ Hang the Sub-Master on the wall jack

Power Options - Base Station

- ▶ Direct wire to a 120VAC Power Source or 24VDC from the RATH® 2500-PWR24U



Plug-In Transformer



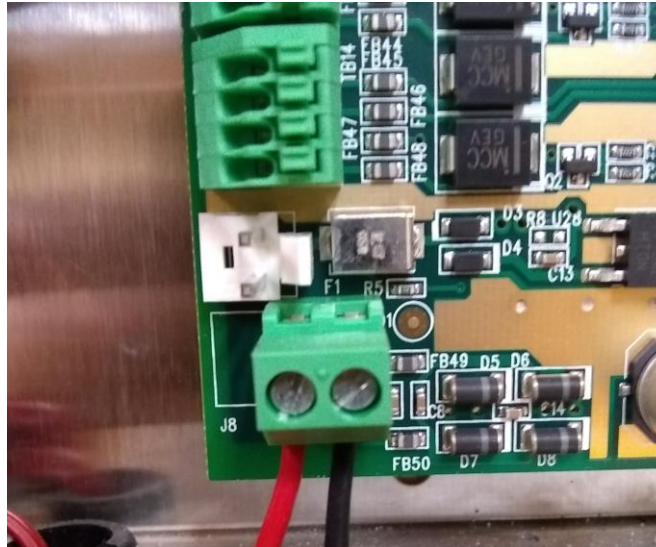
2500-PWR24U 24VDC
Power Supply



Hard Wired Transformer

Base Station 120VAC Power Connection

- ▶ Connect the Hot Wire of the 120VAC to the “L” screw on the power supply
- ▶ Connect the Neutral Wire of the 120VAC to the “N” screw
- ▶ Connect the Ground Wire of the 120VAC to the “Ground” screw
- ▶ Check DCV across the -V screw and the +V screw, and adjust potentiometer to 24VDC
- ▶ Connect leads of the DC power input connection to the + and -V output terminals on the transformer
- ▶ Reinstall the Front Cover



Power/Battery Indicator

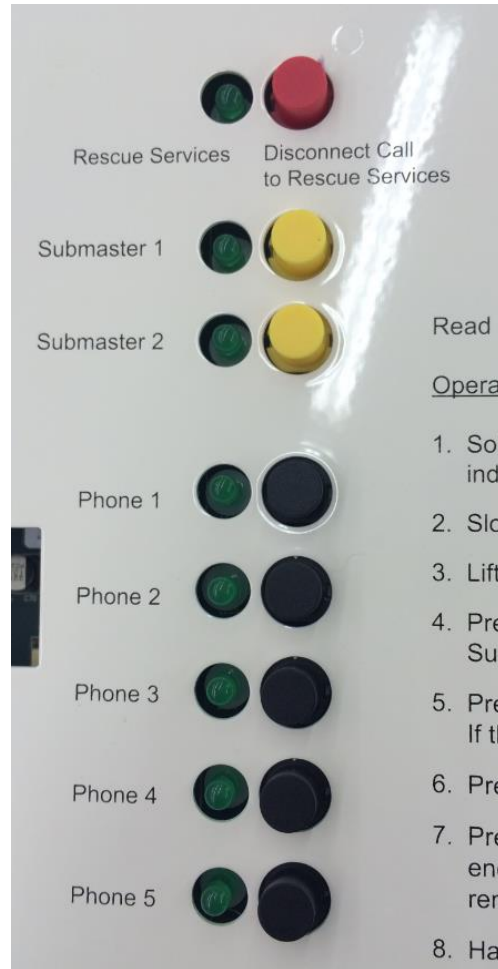


- ▶ When proper power is applied and included battery connected, the AC Power LED should be on and the battery should be illuminated in one of the following:
 - ▶ Red- Low Level Charge
 - ▶ Yellow- Mid Level Charge
 - ▶ Green- Full Charge

- ▶ Connected Call stations will function according to Base Programming. When a call is initiated:
 - Calls go to the Base and then call an outside Emergency Number
 - Calls go directly an outside number only (This is the default)
- ▶ If you would like the call to go the base first, you must program the base accordingly, if not, you may skip this step and proceed in programming the Endpoints

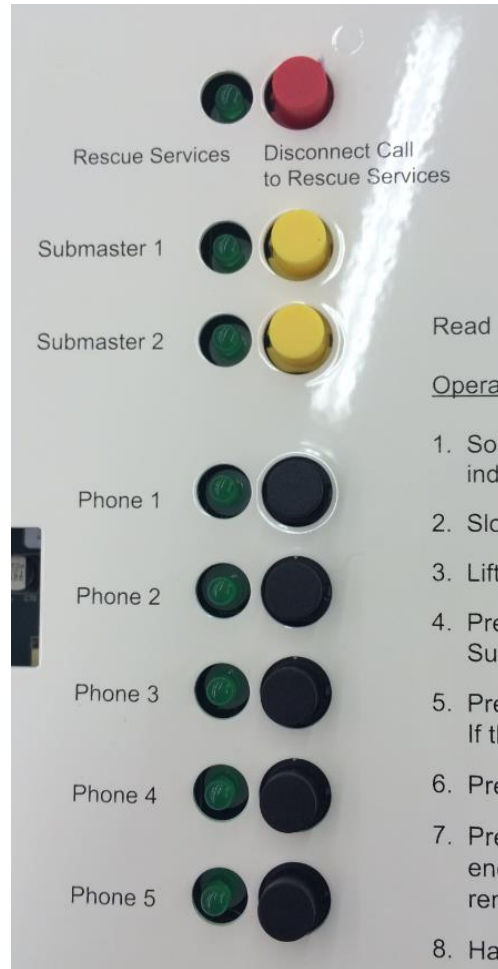
Programming the Base Station

Programming the Base Station



- ▶ For Endpoints to call the Base Station first then call outside:
 - Leave Handset on hook
 - Hold Down the Red Disconnect and Sub Master 1 Button for 5 seconds (a high pitch tone will be heard)
 - Release the Buttons (a confirmation tone is heard)
 - Press the Phone 2 button, the Red Disconnect Button, then the Phone 1 button (a confirmation tone is heard)
 - Press the Sub-Master 2, then the Sub-Master 1 button (System will restart)

Programming the Base Station (cont.)



- ▶ To Restore Default (Call Outside Number)
 - ▶ Leave Handset on hook
 - ▶ Hold Down the Red Disconnect and Sub Master 1 Button for 5 seconds (a high pitch tone will be heard)
 - ▶ Release the Buttons (a confirmation tone is heard)
 - ▶ Press the Phone 2 button, the Red Disconnect Button, the Sub-Master 2 button, then the Phone 5 button (Confirmation tone will be heard)
 - ▶ Press the Sub-Master 2, then the Sub-Master 1 button (System will reset)



Hardware Installation- Endpoints

Follow recommended installation for type of endpoint installed with system

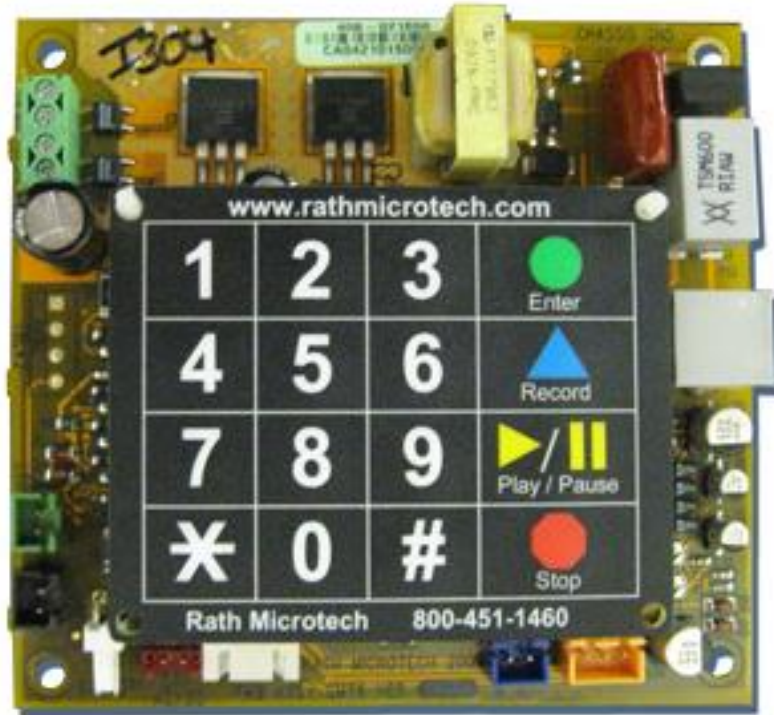
- ▶ Follow best practices for connecting endpoints
- ▶ Landing feeder cables on the provided jack
- ▶ Crimp an RJ-11 end on feeder
- ▶ Make a solid conductor Pig-Tail line cord to splice via conventional means

Call Station Wiring

- ▶ Cut the end off of the provided phone cable and direct splice the wires to feeder cable
- ▶ Scotch lock or use “dolphin” connectors directly on line cords

DO NOT

Programming Endpoints



- ▶ Endpoints will either call Base Station first, then call outside numbers or call outside numbers first depending on Base programming.
- ▶ Programming will be performed at each endpoint connected to the SmartRescue.
- ▶ Program *THE SAME* number into memory slots 1 and 2. This accommodates either Base programming option.



System Operation

- ▶ To Initiate a Call to a Endpoint from the SmartRescue
 - Lift Handset on the SmartRescue
 - Press the black button corresponding to desired phone
 - The Green LED will illuminate next to the button and 2-Way Communication will occur.
 - The station's black button is a Call/Hold/Resume toggle button.
 - Hanging up the handset disconnects all calls whether on hold or active.

System Operation



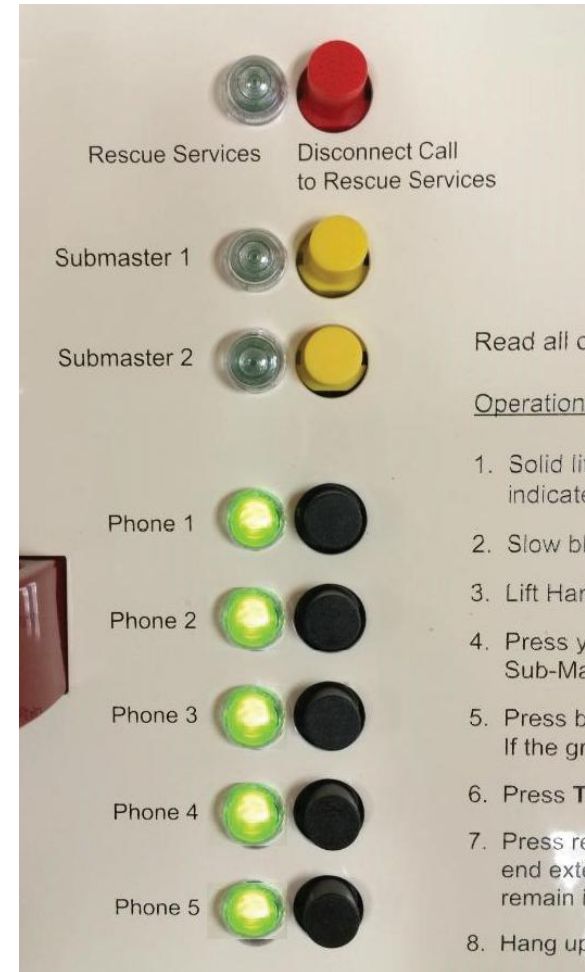
- ▶ To Call the SmartRescue from an Endpoint
 - ▶ Press Call button on Endpoint
 - ▶ If system is programmed for calls to go to Base first, an audible alert is heard at the SmartRescue Base Station
 - ▶ Lift Handset on the SmartRescue for 2-Way Communication
 - ▶ Green LED next to button of calling station will be illuminated
 - ▶ Call can be put on hold or disconnected

System Operation

- ▶ Endpoints call SmartRescue, then an Outside Number
 - ▶ Press Call Button on front of Endpoint
 - ▶ If settings and wiring correct, an audible alarm will come from the SmartRescue, indicating a call
 - ▶ If call is not answered within 6 rings, the Endpoint will hang-up and dial the 2nd programmed number and the Base begins a 90 second timer to allow all calls during that time to directly access the phone line to dial out
 - ▶ When the call is answered by the outside party, 2-way communication with the endpoint will begin
 - ▶ At any time the handset can be lifted at the SmartRescue to join the conversation between the endpoint and the outside number
 - ▶ To disconnect the outside number from the call, press the Red Disconnect button on the SmartRescue. This will drop communication with the outside line but continue communication between the base and endpoint until the handset is hung up.

Sub-Master Operation

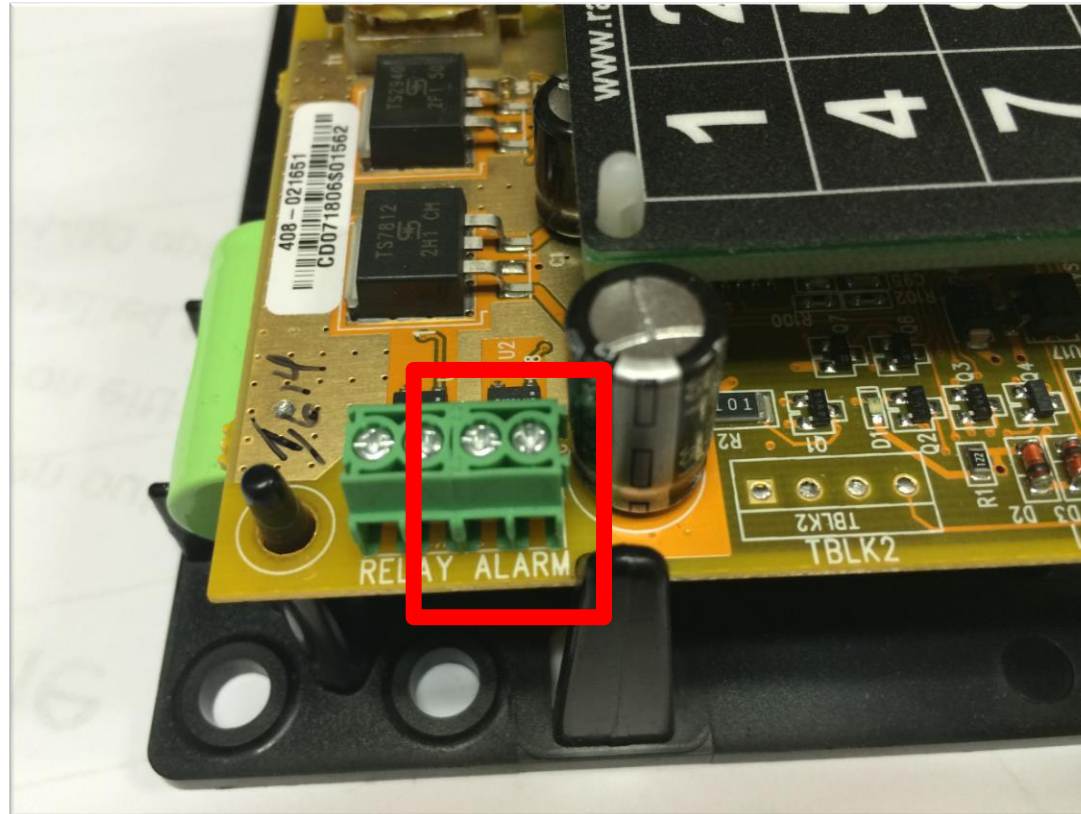
- ▶ There is no additional programming needed for the Sub-Master phone
- ▶ Lift handset on Sub-Master Phone
- ▶ Press “*, 0” to talk into all endpoints connected to SmartRescue
- ▶ To talk to individual endpoints select one of the following:
 - Phone 1: “*, 1”
 - Phone 2: “*, 2”
 - Phone 3: “*, 3”
 - Phone 4: “*, 4”
 - Phone 5: “*, 5”
 - Phone 6: “#, 1”
 - Phone 7: “#, 2”
 - Phone 8: “#, 3”
 - Phone 9: “#, 4”
 - Phone 10: “#, 5”
- ▶ Hang up the handset to disconnect all calls



- ▶ Required in some areas
- ▶ Must have additional wire pair to endpoints
- ▶ Endpoint can provide either normally open or closed contact
- ▶ Connection to additional device for notification required
- ▶ ***DO NOT APPLY VOLTAGE TO ALARM CONTACTS***

System Supervision

Line Monitor Contact Output



- ▶ Endpoint will not call out or, may be able to call from SmartRescue to endpoint, but not from the endpoint to SmartRescue or LED on front of endpoint, will come on, then go off, and not call out
 - If 4 wires not running all the way through or compromised in some way
 - No outside phone line connected, or is not active
- ▶ Call not stopping at SmartRescue, and calling out right away
 - SmartRescue not programmed properly, or not programmed at all
 - Call placed before timer reset.
- ▶ Lights on front of SmartRescue blinking and beeping coming from buzzer periodically
 - Endpoints have built in line check, where they are checking for dial tone and voltage, this is a part of code requirements in some states

Troubleshooting

Recap and Question Time

- ▶ Two sizes of SmartRescue
- ▶ Units can be programmed to call Base, then out or outside only
- ▶ Up to two Sub-Masters may be installed on either size system
- ▶ All prerequisites MUST be properly installed for system to function
- ▶ Call RATH® Tech Support at 1-800-451-1460 option 3 for assistance



Command Center



Command Center Overview

- ▶ Typically used for applications requiring greater than 10 endpoints
- ▶ Used with either RATH® 2400 (2100 Series Endpoints can be added as needed)
- ▶ Station Supervisor available for use with 2400 series Endpoints
- ▶ Must have 110/120VAC Power Source
- ▶ Optional add on Sub-Master Stations

Hardware Overview



Distribution Modules



- ▶ The Command Center is comprised of two components, the Base Station and the Distribution Module
- ▶ The Base Station is the main control point
- ▶ The Distribution Module is the head end

Hardware Overview

- ▶ **Base Station Phone:** Install the provided stand on the back of the Base Station Phone for desk mount application or install cabinet on wall
- ▶ **Distribution Module:** Mount in an appropriate location. (Telco or network wiring closet preferred)



12-36 Zone System



56-116 Zone System



Hardware Installation- Endpoints

Follow recommended installation for type of endpoints installed with system

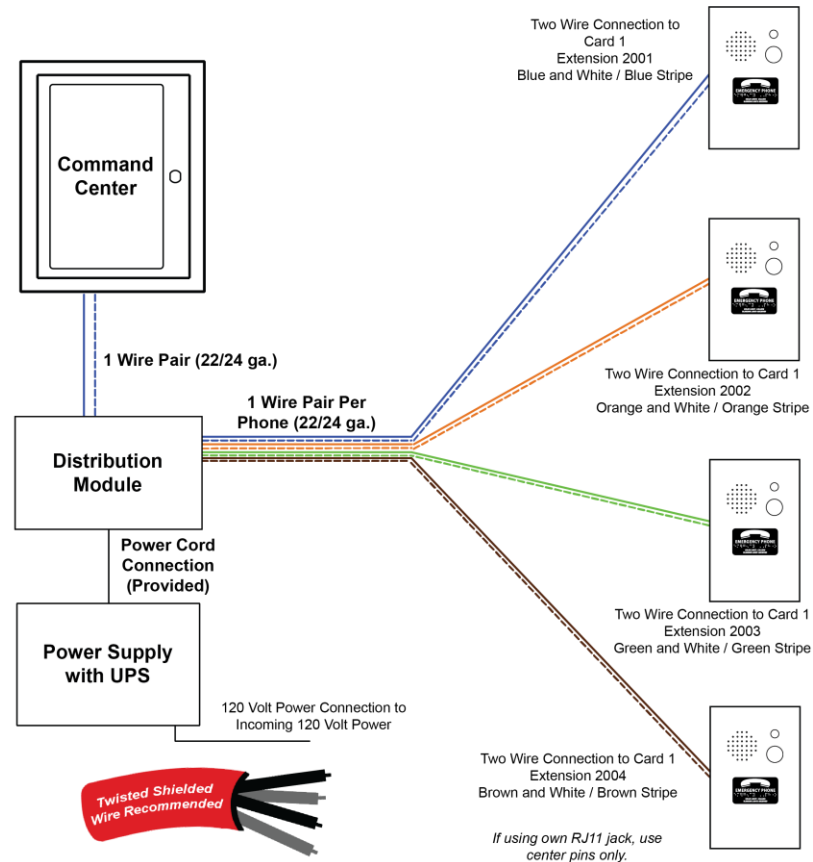
- ▶ Cut the end off of the provided phone cable and direct splice the wires to feeder cable
- ▶ Scotch lock or use “dolphin” connectors directly on line cords

DO NOT

- ▶ Follow best practices for connecting endpoints
- ▶ Landing feeder cables on a jack
- ▶ Crimp an RJ-11 end on feeder
- ▶ Make a solid conductor Pig-Tail line cord to splice via conventional means

DO

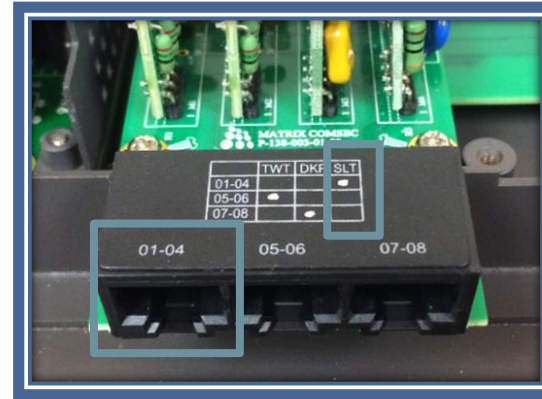
Pre-Installation Requirements



- ▶ 110/120VAC Power
- ▶ Twisted, shielded, solid conductor 24 or 22 gauge, single pair cabling between Distribution Module and Devices
- ▶ Analog Telephone Line (POTS, PBX, or Central Office)-Optional

Hardware Installation for 12-36 Zone System

- ▶ Each Circuit Card has 3 RJ-45 style connectors
- ▶ NOTE:(From left to right) the port counts on each connector are 4-2-2, for 8 ports per card
- ▶ Connect provided “pig-tailed” cables to card RJ-45 ports and extend wire pairs to desired device
 - ▶ If 4 ports, use all 4 pair from the provided cable
Blue, Orange, Green, Brown
 - ▶ If 2 ports use only the Blue and Orange pairs

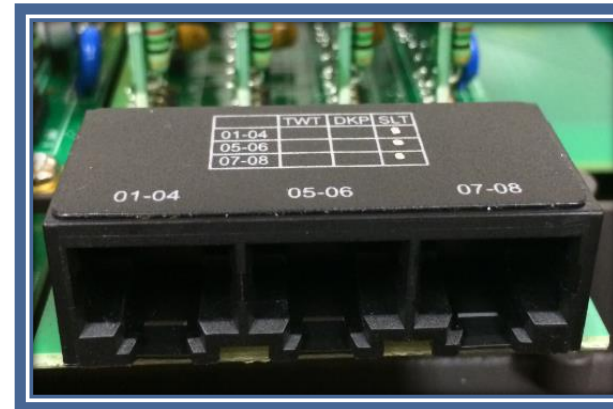
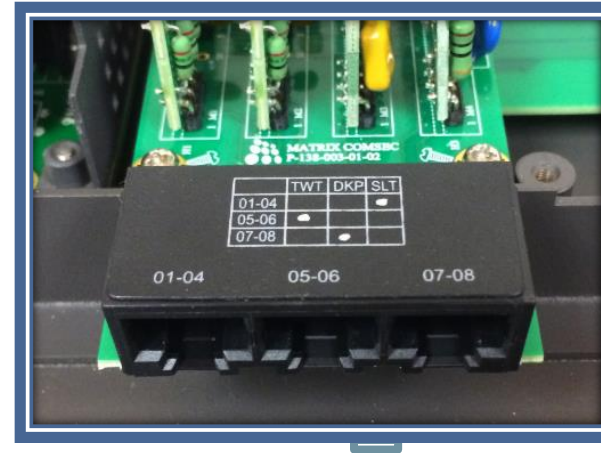


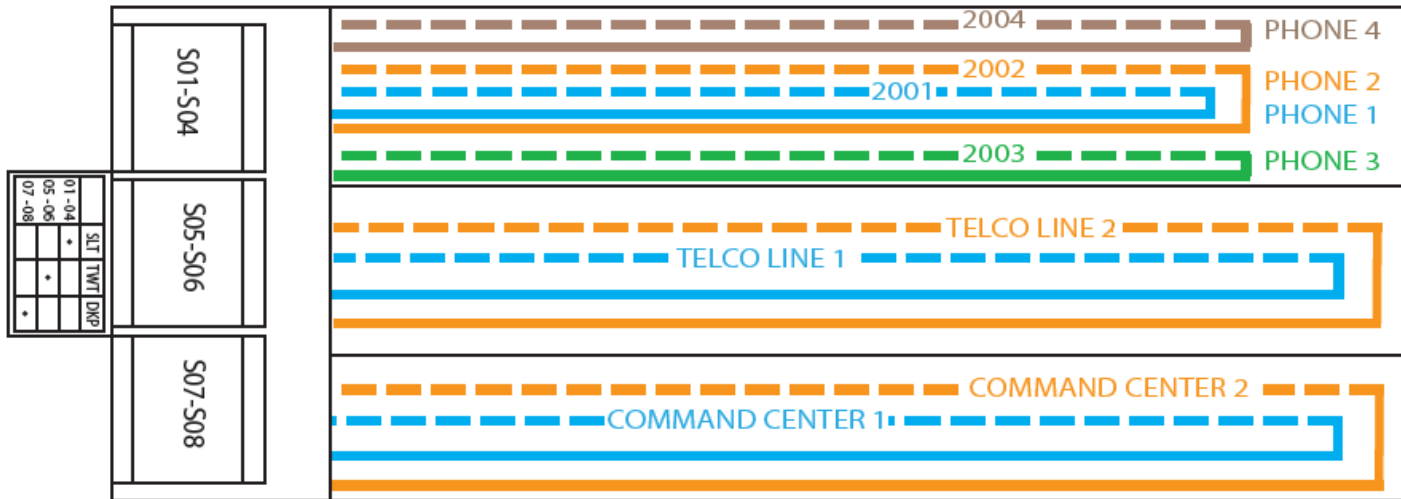
If making replacement cables, use T-568A pin out

*Specific port identification and wiring specifications will be discussed in 2 slides

Hardware Installation for 12-36 Zone System

- ▶ Connecting Base Station to Distribution Module:
 - Identify DKP Port top of the first card (closest to power supply)
- ▶ Maximum Wire Run Length is: 1000' to Command Center
- ▶ Connecting Endpoints to Distribution Module:
 - Locate table on top of circuit cards and identify “SLT” Ports
- ▶ Maximum Wire Run Length is: 4000' to Endpoint
- ▶ The Command Center does not need an outside phone line, unless there is a requirement for the system to call an outside party
 - If connecting outside line, locate the “TWT” port on the first card and connect phone line to the blue, blue-white pair

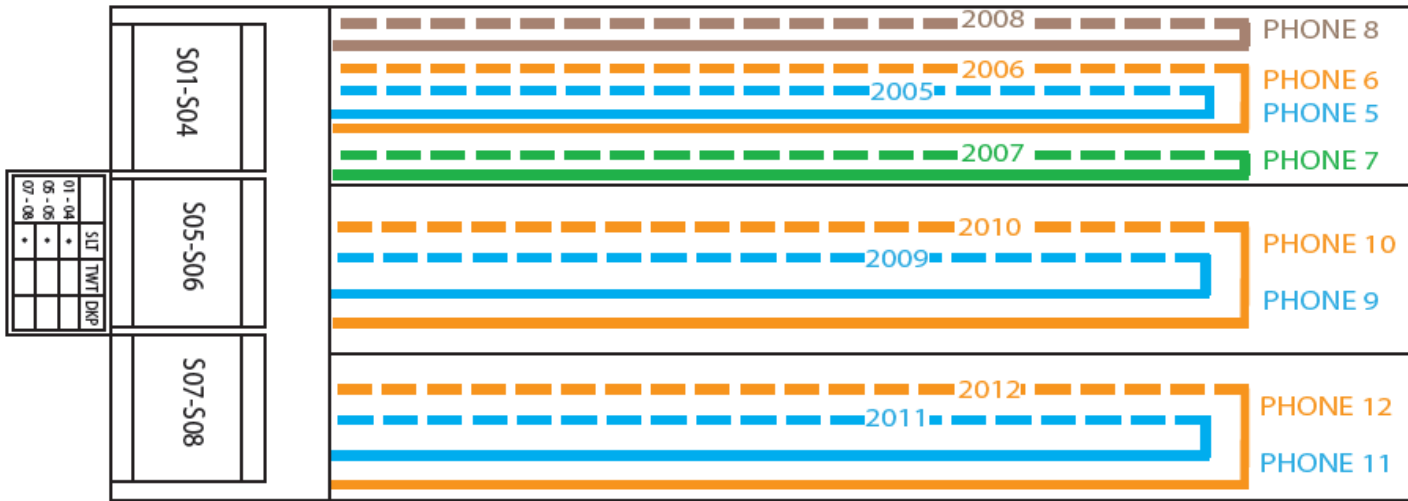




01-04	*	SIT	TWT	DNP
05-06	*			
07-08	*			

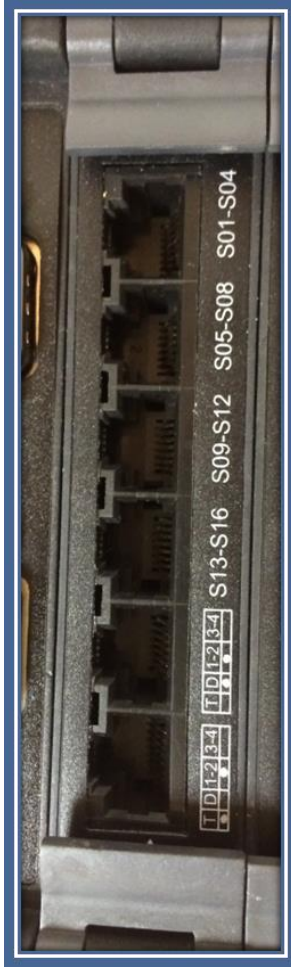
Note: Do not use the green and brown pairs

12-36 Zone Card Wiring Overview



Note: Do not use the green and brown pairs

12-36 Zone Card Wiring Overview



Hardware Installation for 56 - 116 Zone System

- ▶ Each Circuit Card has 20 ports across 6 RJ-45 style connectors
- ▶ NOTE:(From top to bottom) the port counts are 4-4-4-4-2-2
- ▶ Connect provided “pig-tailed” cables to ports and connect wiring to desired device
 - ▶ If 4 ports, use all 4 pair from the provided cable. Blue, Orange, Green, Brown
 - ▶ If 2 ports Use only the Blue and Orange pairs

If making replacement cables, use T-568A pin out

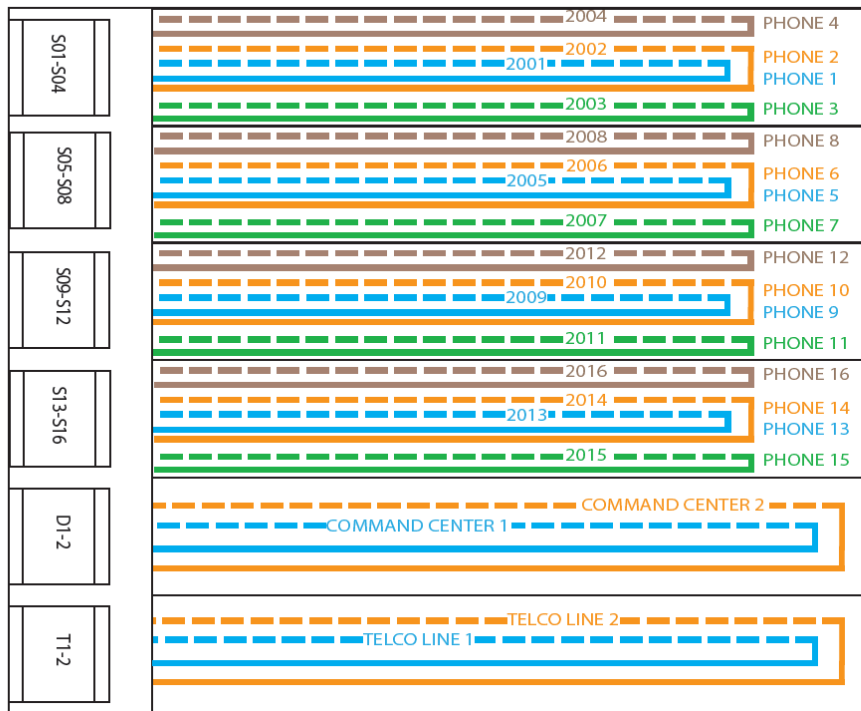
Hardware Installation for 56-116 Zone System



- ▶ Connecting Base Station to Distribution Module:
 - Identify DKP Port (card closest to power supply) with the dot in the D and 1-2
- ▶ Connecting endpoints to Distribution Module:
 - Locate “SLT” ports on cards, they will be labeled with Sxx-Sxx
- ▶ The Command Center does not need an outside phone line, unless there is a requirement for the system to call an outside party
 - If an outside phone line is required, on the first card beginning from left, locate the port labeled “T,D, 1-2,3-4” that has the white dot under the “T”. This is outside line connection.

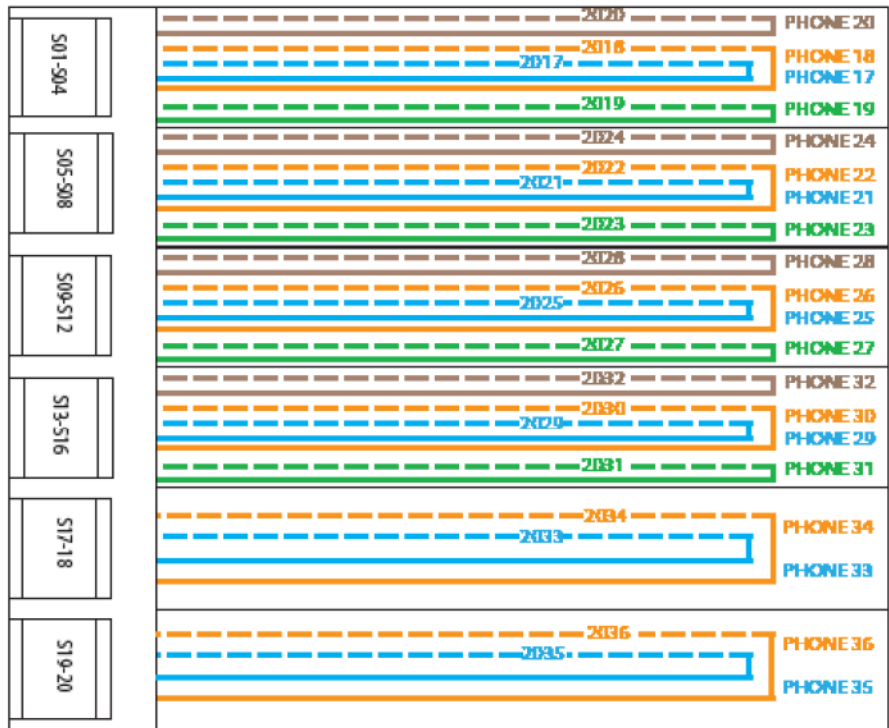
If making replacement cables, use T-568A pin out

Card 1 Example



Note: Do not use the green and brown pairs

56-116 Zone Card Wiring Overview



Note: Do not use the green and brown pairs

56-116 Zone Card Wiring Overview

Programming Date/Time Display

The Base Station phone has the date and time displayed on the screen. After powering on the system, if the correct information is displayed, proceed in programming the endpoints. If the information is incorrect, perform the following:

▶ Program Time Zone:

- Enter Programming
 - Lift Handset, Dial 1, #, 9, 1
 - Enter Passcode: 7, 2, 8, 4
- Dial 1, 0, 0, 2
- Enter Correct Time Zone Code:
 - Eastern: 1, 1, 1
 - Central: 1, 1, 2
 - Mountain: 1, 1, 3
 - Pacific: 1, 1, 4
- Touch Check Mark Button under display

▶ Dial 0, 0 and touch check mark button again

- Dial 0, 0 and touch check mark

▶ Program Month, Day, and Year

- Enter Programming
 - Lift Handset, Dial 1, #, 9, 1
 - Enter Passcode: 7, 2, 8, 4
- Dial 1, 0, 0, 1 (Month-Day- Year)- [Ex: 02152011 (Feb. 15, 2011)]
- Touch Check Mark Under Display

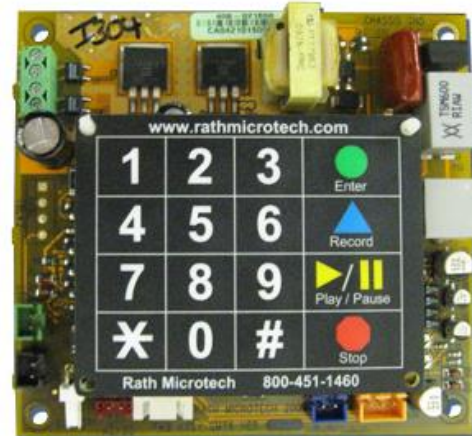
▶ Dial 0, 0 and touch check mark

▶ Program Time:

- Enter Programming
 - Lift Handset, Dial 1, #, 9, 1
 - Enter Passcode: 7, 2, 8, 4
- Dial 1, 0, 0, 3 (Hours- Min- Sec) [Ex: 143000 (2:30 p.m.)]
- Touch Check Mark

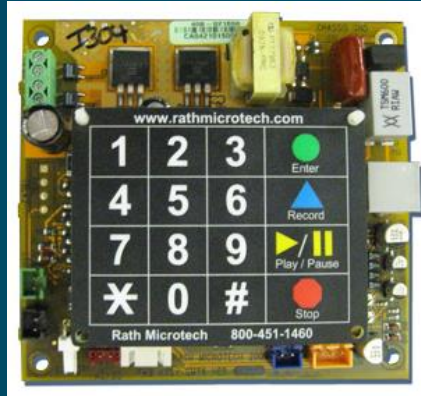
Programming Endpoints

- ▶ Endpoints call to call sequencer, program 3931 in memory slot 1
- ▶ First attempt is to Command Center
- ▶ If no answer, call is forwarded to outside number
 - ▶ Number is programmed at Command Center
 - ▶ Dial 1, 3, 4, 9, outside number, #, *
- ▶ Subsequent unanswered calls go back to sequencer if line is unavailable



Programming Endpoints (continued)

- ▶ Program location specific message
 - ▶ *Note - With 2400 sets only use the continuous play until interrupted by called Party (7*3)
 - ▶ Message must end with the phrase “For 2-way communications press the # key 4 times after the beep”



OPERATING INSTRUCTIONS

- INDICATOR STATUS**
1. RED LED LIGHT - INCOMING CALL OR CONNECTED TO OUTSIDE PARTY
 2. BLUE LED LIGHT - ACTIVE CALL
 3. BLUE LED FLASHING - CALL ON HOLD

ANSWERING CALL AT COMMAND CENTER

1. LIFT HANDSET TO ANSWER FIRST INCOMING CALL
2. IF MULTIPLE CALLS, PRESS RED LED LIGHT OF NEXT DESIRED CALL (THIS WILL PLACE THE ORIGINAL CALL ON HOLD)

DISCONNECT CALLS

1. SELECT THE DESIRED FLASHING BLUE LED AND PRESS *, #
2. EACH CALL MUST BE DISCONNECTED INDIVIDUALLY
(NOTE: IF YOU HANG UP HANDSET BEFORE DISCONNECTING EACH CALL, LEDS WILL REMAIN LIT. LIFT HANDSET, PRESS LIT LED, 5, THEN *, # TO DISCONNECT, HANG UP HANDSET. REPEAT FOR EACH LIT LED.)

CALLING A LOCATION

1. PICK UP HANDSET AND PRESS DESIRED LOCATION KEY (BLUE LED WILL LIGHT)

JOINING AN EXISTING CONVERSATION BETWEEN LOCATION AND OUTSIDE PARTY

1. PICK UP HANDSET, PRESS RED LED, THEN 5
2. YOU WILL BE IN A THREE WAY CONVERSATION WITH THE OUTSIDE PARTY AND LOCATION

CALL THE LAST LOCATION THAT DIALED OUT

1. PICK UP HANDSET AND DIAL 1092

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Rev 3
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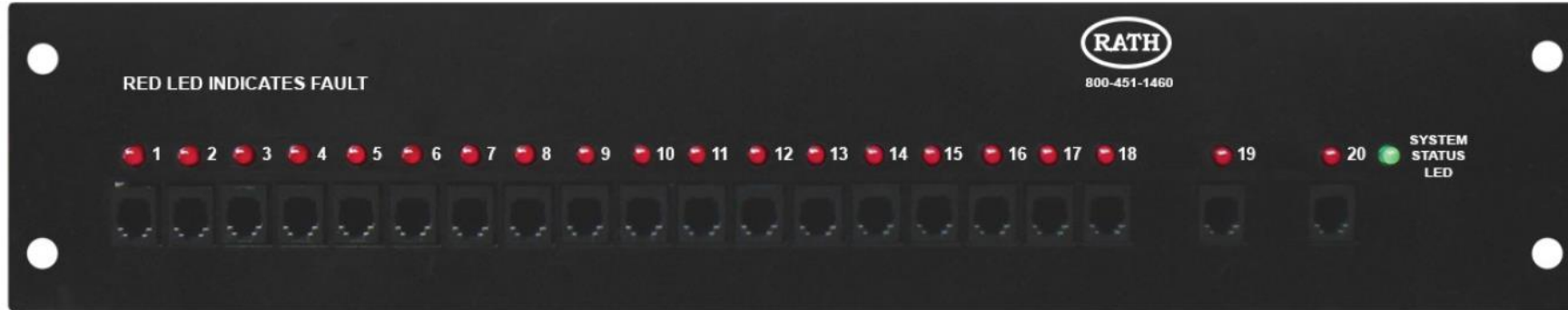
Base Station Operation

- ▶ Required in most areas
- ▶ NO additional wire pair to endpoints
- ▶ Supervisor can provide either normally open or closed contact
- ▶ Monitors phone line and endpoints (Base not required)
- ▶ Connection to additional device for notification required



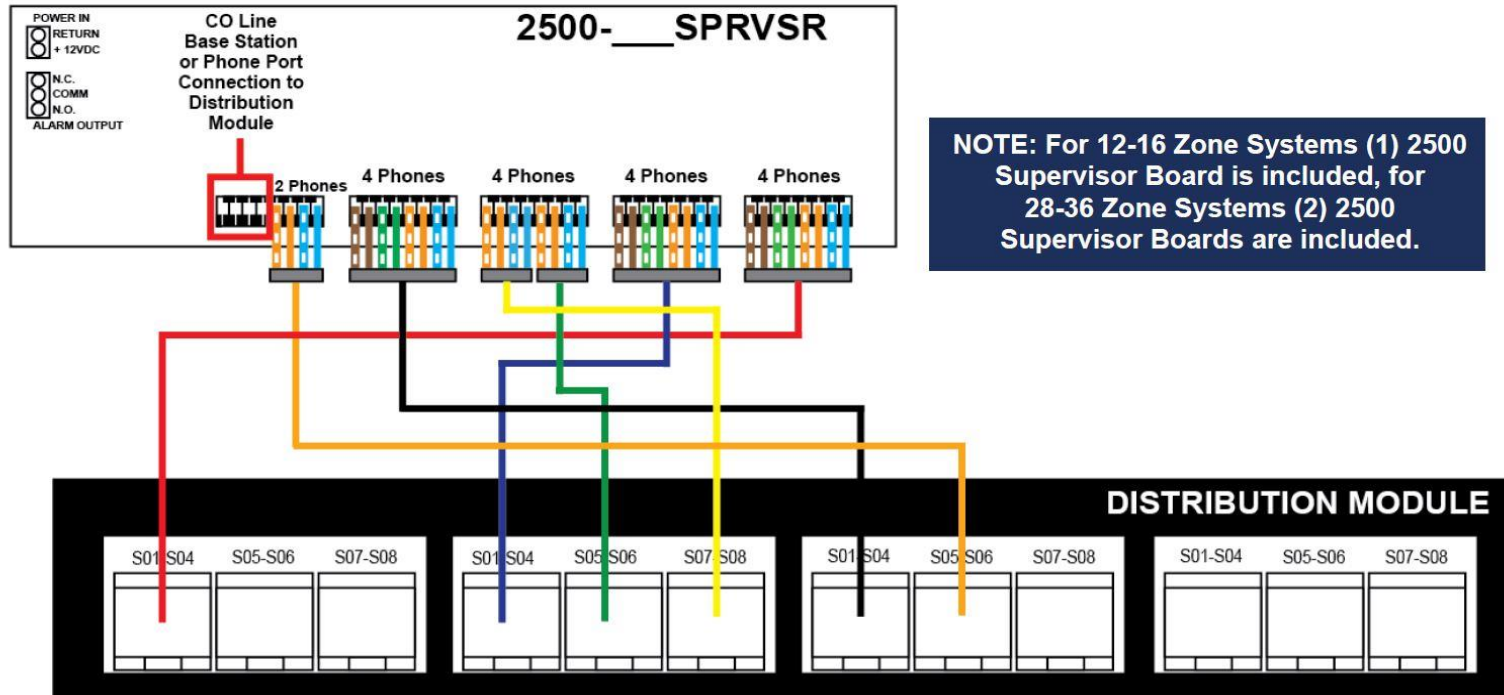
System Supervision

AOR Supervisor



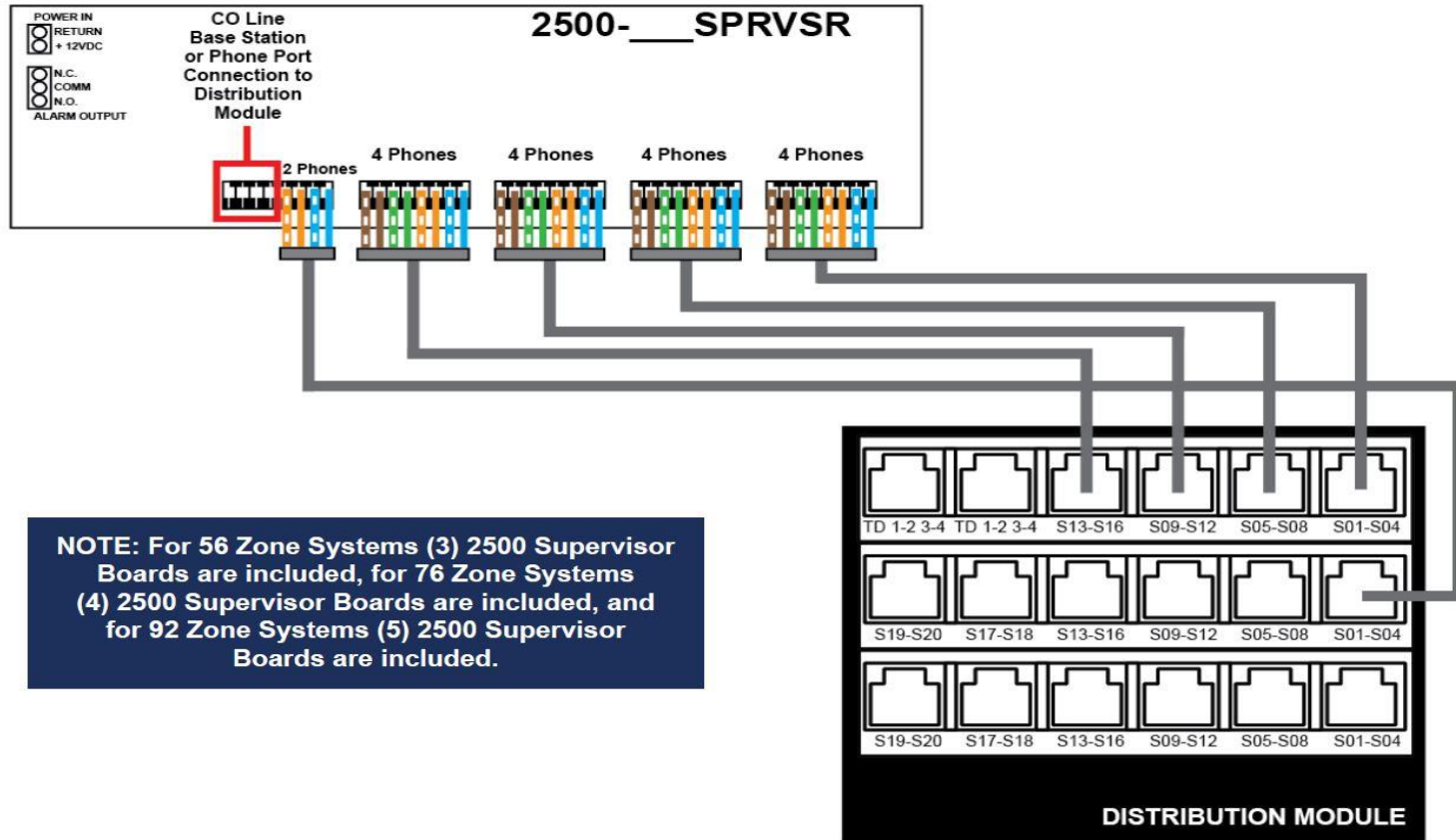
Supervisor Board Connections

Wiring For 12-36 Zone System:

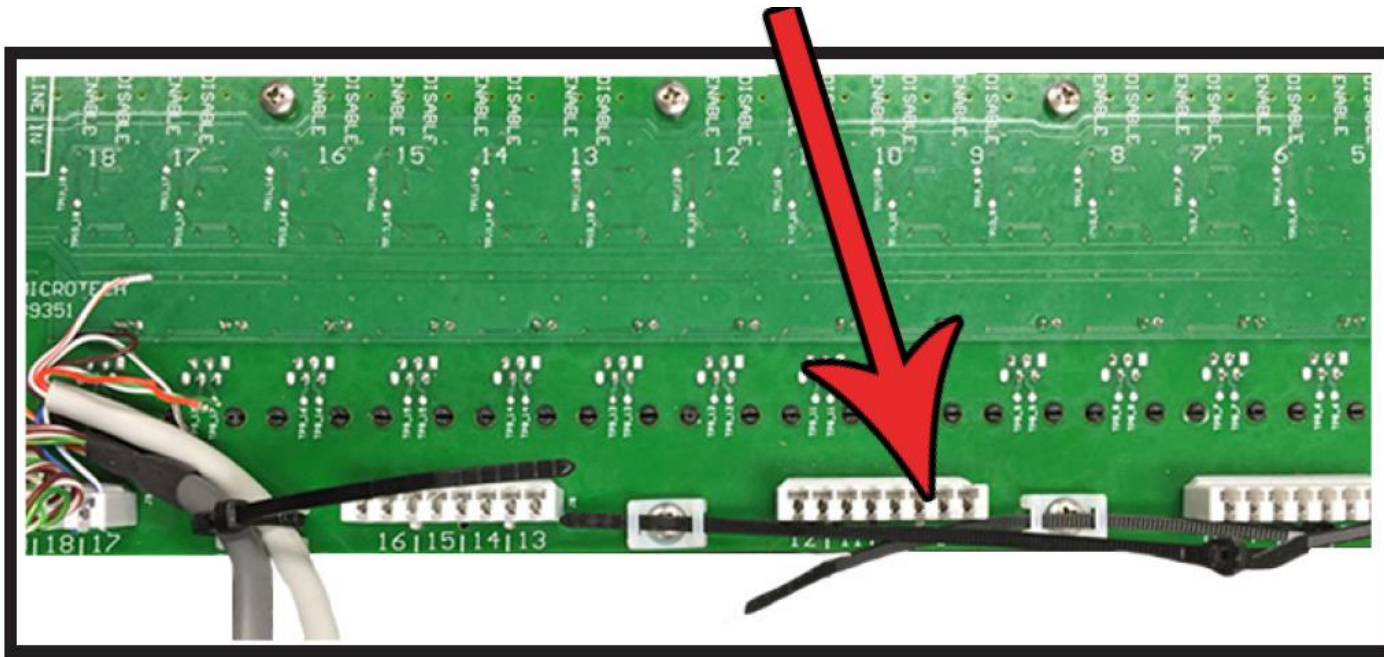


Supervisor Board Connections

Wiring For 56-92 Zone System:

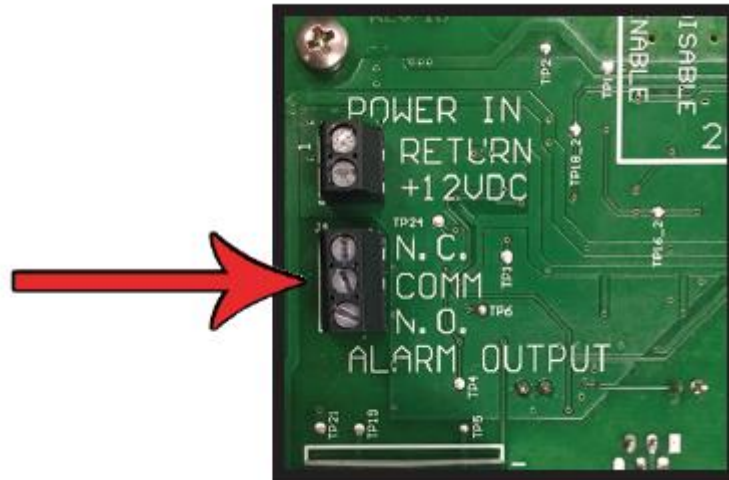


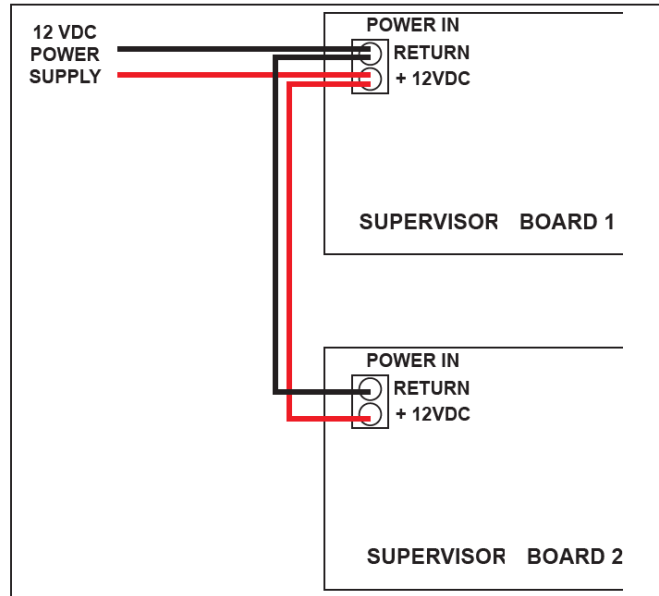
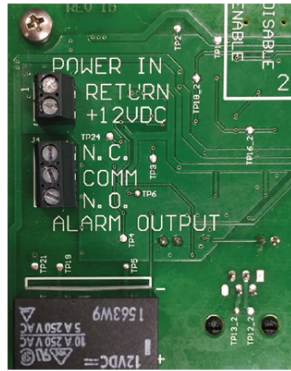
NOTE: For 56 Zone Systems (3) 2500 Supervisor Boards are included, for 76 Zone Systems (4) 2500 Supervisor Boards are included, and for 92 Zone Systems (5) 2500 Supervisor Boards are included.



Wiring Connections

Alert Device Connection






Power Connection

- ▶ Command Center Distribution Module has 2 sizes depending on number of endpoints
- ▶ Follow wiring diagram(s) for proper connections
- ▶ Can use either 2100 or 2400 series endpoints
- ▶ Can be equipped with multiple Sub-Masters
- ▶ Supervision of all connections done with 2400 endpoints via Supervisor Board

Questions/Recap:



This is to Certify that



*Has completed the prescribed course for Certified Emergency
Communication Systems Installer –Analog
During the Year of 2020*

Jerry Last
Jerry Last, TCI

CERTIFIED

A gold, circular seal with a scalloped edge, positioned below the word "CERTIFIED".

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