FEDERAL SIGNAL
Safety and Security Systems

UltraVoice®

Model: UV
Electronic Siren Controller

Description, Specifications, Installation, Operation, and Service Manual

Limited Warranty

This product is subject to and covered by a limited warranty,
a copy of which can be found at www.fedsig.com/SSG-Warranty.
A copy of this limited warranty can also be obtained by written
request to Federal Signal Corporation, 2645 Federal Signal Drive,
University Park, IL 60484, email to info@fedsig.com or
call +1 708-534-3400.

This limited warranty is in lieu of all other warranties, express or
implied, contractual or statutory, including, but not limited to the
warranty of merchantability, warranty of fitness for a particular
purpose and any warranty against failure of its essential purpose.

Contents

Tables

Figures

Safety Messages

⚠ WARNING

It is important to follow all instructions shipped with this product. This device is to be installed by trained personnel who are thoroughly familiar with the country's electric codes and will follow these guidelines as well as local codes and ordinances, including any state or local noise-control ordinances.

Listed below are important safety instructions and precautions you should follow.

Important Notice

Federal Signal reserves the right to make changes to devices and specifications detailed in the manual at any time to improve reliability, function, or design. The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for any inaccuracies.

Publications

Federal Signal recommends the following publications from the Federal Emergency Management Agency for assistance with planning an outdoor warning system:

* The "Outdoor Warning Guide" (CPG 1-17)

* "Civil Preparedness, Principles of Warning" (CPG 1-14)

* FEMA-REP-1, Appendix 3 (Nuclear Plant Guideline)

* FEMA-REP-10 (Nuclear Plant Guideline)

Planning

* If suitable warning equipment is not selected, the installation site for the siren is not selected properly, or the siren is not installed properly, it may not produce the intended optimum audible warning. Follow Federal Emergency Management Agency (FEMA) recommendations.

* If sirens are not activated in a timely manner when an emergency condition exists, they cannot provide the intended audible warning. It is imperative that knowledgeable people, who are provided with the necessary information, be available at all times to authorize the activation of the sirens.

* When sirens are used out of doors, people indoors may not be able to hear the warning signals. Separate warning devices or procedures may be needed to warn people indoors effectively.

* The sound output of sirens can cause permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings, and restrict access to areas near sirens. Review and comply with any local or state noise control ordinances as well as OSHA noise exposure standards, regulations, and guidelines.

* Activating the sirens may not result in people taking the desired actions if those to be warned are not properly trained about the meaning of siren sounds. Siren users should follow FEMA recommendations and instruct those to be warned of corrective actions to be taken.

- After installation, service, or maintenance, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

- If future service and operating personnel do not have these instructions to refer to, the siren system may not provide the intended audible warning, and service personnel may be exposed to death, permanent hearing loss, or other bodily injuries. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees. Also give a copy to anyone who is going to service or repair the siren.

Installation and Service

- Electrocution or severe personal injury can occur when performing various installation and service functions such as making electrical connections, drilling holes, or lifting equipment. Therefore, only experienced and qualified electricians should install this product in compliance with national, state, and any other applicable codes, ordinances, and regulations. Perform all work under the direction of the installation or service crew safety foreman.

- The sound output of sirens is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings, and restrict access to areas near the sirens. Sirens may be operated from remote control points. Whenever possible, disconnect all siren power, including batteries, before working near the siren. Review and comply with any local or state noise control ordinances as well as OSHA noise exposure regulations and guidelines.

- After installation or service, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

- If future service and operating personnel do not have these instructions to refer to and are not properly trained, the system may not provide the intended audible warning, and service personnel may be exposed to hazards that could result in death, permanent hearing loss, or other bodily injuries. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to recruits and trainees. Also give a copy to anyone who is going to service or repair the siren.

Operation

Failure to understand the capabilities and limitations of your siren could result in permanent hearing loss, other serious injuries, or death to persons too close to the sirens when you activate them or to those you need to warn. Carefully read and thoroughly understand all safety notices in this manual and all operations-related items in all instruction manuals shipped with the equipment. Thoroughly discuss all contingency plans with those responsible for warning people in your community, company, or jurisdiction. A well-written contingency plan document is recommended.

Hazard Classification

Federal Signal uses signal words to identify the following:

⚠ **DANGER**

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ **WARNING**

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **CAUTION**

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Read and understand the information contained in this manual before attempting to install or service the siren.

Pay careful attention to notices located on the equipment.

General Description

Introduction

This manual describes the features, specifications, installation, operation, and maintenance of the UltraVoice (UV) controller. A UV controller is typically used with high-powered speaker arrays as an outdoor warning system commonly referred to as a giant voice system. The UV controller includes a control card, amplifiers, battery charger, and communication for interface to outdoor electronic sirens.

The UV controller provides activation and monitoring of outdoor electronic sirens. The UV controller can interface with various communications, including radio, landline, IP, satellite, and cellular services. Contact your local Federal Signal sales representative for more information.

Figure 1 UV Controller
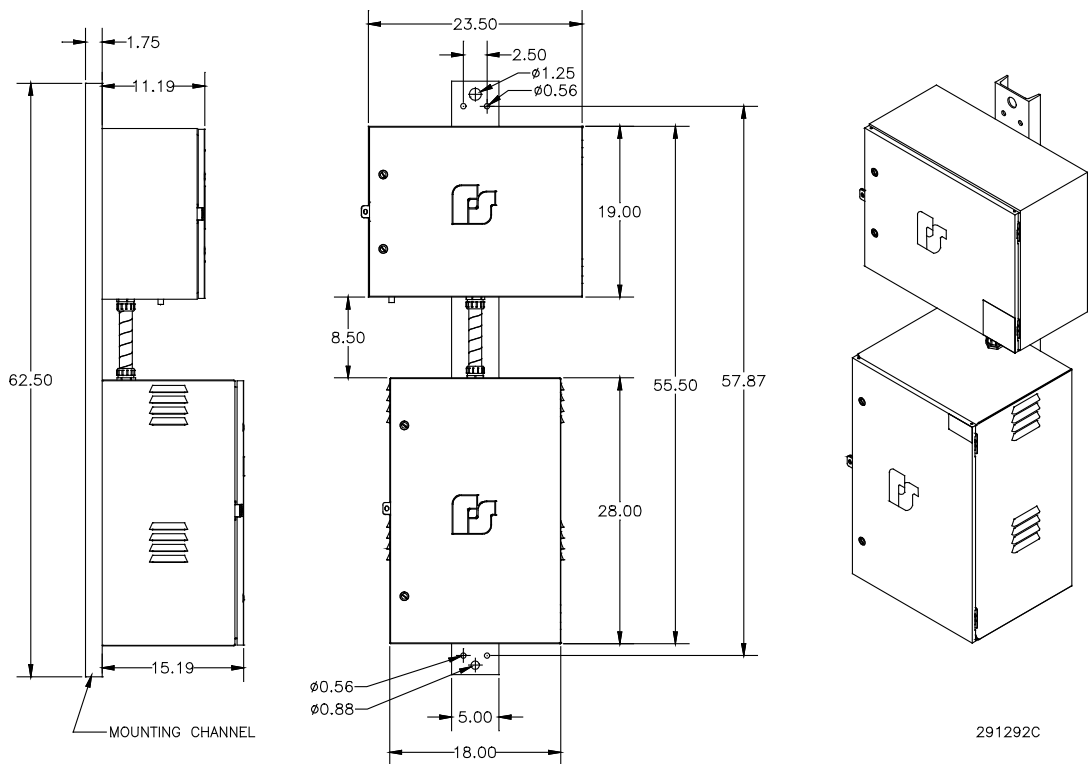
Overview

The UV controller contains the following components:

- Control Cabinet—Includes a card cage to mount a UV+ controller card, a UVARM (UltraVoice Audio Relay Module), and up to eight UV 400 amplifiers. The cabinet can mount radios, IP interface, or other communications equipment. A UV Control Cabinet comes standard with a UV+ control card.

- Battery Cabinet—Houses two or four batteries and a 24 Vdc charger. Optional battery heaters are available.

NOTE: Aluminum cabinet housing is standard, or optional 316 stainless steel is available.

Order the following separately:

- UV400 amplifier (1 to 8)

- UVARM (UltraVoice Audio Relay Module)

- Antenna system for radio communications

- Batteries

- DVSD—Digital voice microSD card to store voice and tone alerts

Features

The UV controller has the following features.

- Seven standard warning signals: wail, alternate wail, pulsed wail, steady, alternate steady, pulsed steady, and Westminster chime (auxiliary).

- Removable SD card for custom message generation. Store up to 4,093 voice or tone messages that total up to 17 hours of total recording time.

- Use local buttons (eight) for testing siren activation.

- Ability to interface with up to eight externally wired buttons for siren activation.

- Relay for local activation of strobes, LEDs, and legacy rotation siren designs.

- Siren activation verification through specialized Quiet Test.

- Ability to select or group amplifiers to create flexible zones.

- Volume control per message to optimize siren notification.

- Modular hot-swappable design to easily service cards without shutting off the power.

- Ability to stack multiple voice, tone, and relay functions to create complex siren notifications.

- Status system monitoring for system health and readiness.

- Flexible communications: radio (analog, P25, trunking, digital, broadband), satellites, cellular, landline, and IP.

- Flexible powering via 120 Vac or 230 Vac (nominal), or solar for battery charging, and 240 Vac (UVTR) for direct power with battery backup.

- Cellular and satellite communication options are available upon request. Contact your local Federal Signal sales representative for more information.

- Ability to mix various communication formats for high-system availability and redundancy.

- Secure communication with 128-bit or 256-bit encryption.

- Secure activation, programming, and status monitoring through the SS2000+ and Federal Signal Commander® Software.

- UVARM has the ability to send line level audio output to external equipment such as fire alarm panels or amplifiers, and relays for activation of strobes or LEDs.

- Power control ramps up siren or speaker volume for added safety, custom volume settings, and low power testing.

UV Controller Overview

The UV controller consists of two cabinets, which are bolted to a mounting channel for ease of shipping and installation. The Control Cabinet (NEMA 4X) houses a card cage for easy installation and maintenance of plug-in cards. The card cage has a capacity of ten cards consisting of the following:

- One controller position (UV+)

- One accessory position for optional audio and relay module card (UVARM)

- Eight amplifier positions (UV400)

Each UV400 amplifier provides 400 watts to drive any combination of speaker drivers up to 400 watts. Depending on the number of amplifier cards installed, eight power levels are available from 400 watts to 3200 watts.

Activation codes, command sequences, and operating parameters are uploaded from a computer through the RS232 port located on the front panel or over a communication channel with the Federal Signal Commander® Software. All information is stored in non-volatile memory that is immune to power and battery loss.

The control board, amplifiers, and optional equipment are all modularly constructed for easy removal. In most instances, field service is limited to replacing a slide-out module, which a non-technical person can perform with only a screwdriver.

The Battery Cabinet (NEMA 3R), the lower cabinet, houses rechargeable batteries. The cabinet houses two or four batteries depending on the number of amplifiers used and based on battery backup runtime and standby time. The lower and upper cabinets are interconnected by a conduit, which is sealed to prevent any harmful gases from entering the Control Cabinet. The AC charger or solar (regulator) maintains the charging of the batteries. The batteries provide power to the Control Cabinet. The batteries continue to provide power to the Control Cabinet in an AC power failure; typically, the standby minimum is seven days.

The UV400 amplifiers are ordered separately, and the number is based on the type of speaker array. Refer to the following tables to determine the number of amplifiers to order various siren combinations.

Ordering Controllers

Contact our Federal Signal Sales Engineers to design a system that meets your specific requirements.

Table 1 UV Controller Options

UV Model/Part Number	Description
UVTD	Siren control and battery cabinet, two-way, no radio
UVTD240	Siren control and battery cabinet, two-way, no radio, 240 Vac transformer
UVTD-316SS	Siren control and battery cabinet with 316SS, two-way, no radio
UVTDH	Siren control and battery cabinet, two-way, VHF (136-174)
UVTDU	Siren control and battery cabinet, two-way, UHF (403-470)
UVTD-IP	Siren control and battery cabinet IP-enabled, two-way (broadband radio and SmartMsg software sold separately)
UVTD-LL	Siren control and battery cabinet, two-way, landline

- Standard models are 120 Vac. For 240 Vac operation, use the UVTD240, which includes a 240 Vac to 120 Vac transformer. This is useful if 120 Vac heaters are required. If operation is required with 240 Vac with no heaters, the UV cabinet can accept 240 Vac, but the battery charger requires a switch to be set for 240 Vac operation.

- Contact factory for low-band two-way models

- Batteries and antenna are not included

- Stainless steel (S) control cabinets are also available

Directional Speaker Arrays (DSA)

Each UV400 amplifier is a 400-watt amplifier. Therefore, consult the following table to determine how many amplifiers are required to drive Directional Speaker Arrays (DSA) siren combinations. Use DSA speakers in 400-watt increments with UV400 amplifiers.

Table 2 DSA Power Rating Table

Model	Total Power
DSA2	200 W
DSA4	400 W
DSA6	600 W

For example:

If four DSA2 arrays are used with one UV controller:

4 x 200 watts = 800 watts or two UV400 amplifiers

When using DSA3 and DSA5, contact Technical Support for information regarding amplifier quantities.

Modulator Speaker Arrays

The Modulator® Electronic Siren Series consists of modules that use four 100-watt drivers. It also provides clear voice communication and offers warning signals (tone/voice) that are produced by the UV controller.

Table 3 UV400 Amplifier Selection Table

Quantity	Model Number	Total Power
One (1) UV400	MOD1004B	400 W
Two (2) UV400	MOD2008B	800 W
Three (3) UV400	MOD3012B	1200 W
Four (4) UV400	MOD4016B	1600 W
Five (5) UV400	MOD5020B	2000 W
Six (6) UV400	MOD6024B	2400 W
Eight (8) UV400	MOD8032B	3200 W

Ordering Accessories

Table 4 UV Accessories

Accessories/ Part Numbers	Description
DVSD	Digital voice microSD card: 4,093 voice or tone messages, 17 hours of total recording time
DVR	Digital voice recording fee per 16 messages
FSPWARE	Programming software (Two-tone and DTMF)
SFCD	Commander® Software System, 10, 25, 255, or 512 Site License
UV400	400-watt amplifier, required with UV controllers
TB-LL	Telco base, landline communication interface
ES-PROG-DTMF	Two-way DTMF programming

Options

Table 5 Options

Option	Description
UVARM	The UV supports an optional Audio and Relay Output Module (UVARM) that provides three audio outputs and four relay outputs to enable the UV to connect to existing PA systems or other auxiliary devices.
HTR4 (Battery Warmers)	In locations where temperatures may drop below freezing for extended periods, optional battery warmers are recommended to maintain battery efficiency.
PVS220W-24	The solar option allows the siren to operate in areas where power is not available. The PVS2110-24 model for the UV controller includes a solar regulator and solar panel kit.
Digital Voice Recording	When purchased, the Digital Voice option adds a microSD card capable of storing 17 hours or 4,093 pre-recorded messages.
UV25ST	The UV25ST allows the end-user the capability to reduce audio output from the 70 V_{rms} standard to the 25 V_{rms} standard. This option is beneficial when using the UV controller in an indoor warning application.

Option	Description
UVTD-IP	The UVTD-IP includes a network card that provides the capability to communicate over a network and provides audio decoding of digitized audio sent over the network.

Programming Methods

There are two methods of entering and reviewing the user programming information in a UV controller: Federal Signal Commander® Software and FSPWARE.

Federal Signal Commander Software (SFCDWARE)

SFCDWARE is computer software used to control, monitor, and configure the UV siren controller. The programming software communicates with the siren controller over the communication link. Refer to the Help menu provided with the software for operational details.

FSPWARE

FSPWARE is computer software for two-tone and DTMF-controlled systems. This software requires a direct connection between the UV controller and the computer's RS232 port through the use of a universal cable adaptor (included with FSPWARE) or a Universal Programmer (purchased through Federal Signal). Use FSPWARE for non-Commander® systems. Contact Technical Support for further information.

Status Monitoring

The UV controller provides monitoring of various system components and signals. The status of each of the following is communicated to Commander®. Status items monitored:

- Siren Type—Number of amplifiers

- Function State—Standby/Active

- Unit ID—Specific UV controller number

- Amplifier status*—Voltage and Current

- Audio A*—Pass/Fail

- Audio B*—Pass/Fail

- Master Current*—Pass/Fail

- Battery*—Battery voltage, Pass/Fail

- Charger—Pass/Fail

- AC Power—Pass/Fail

- Control Box Intrusion—Close/Open

- Battery Box Intrusion—Close/Open

- False Alarm/Local Activation*—Status of siren

- Rotation*—Pass/Fail for legacy rotating sirens

*Latched Items—remain set until the controller receives a Reset command or another function is run.

Status information is transmitted over the communications channel. Status reporting occurs when Federal Signal Commander® Software requests status or a report is received or any of the monitored circuits changes state.

Specifications

Table 6 Batteries (user supplied)

Battery Voltage at 72°F	27.2 Vdc nominal

Refer to the Federal Signal Website www.fedsig.com (document Battery Information | SYS5012) for currently recommended batteries. The use of batteries other than those specified may degrade the operation of this product and void the warranty. Batteries are user-supplied.

Table 7 Specifications

AC Power	108-132 Vac, 120 Vac nominal, 3.0 A nominal 216-264 Vac, 240 Vac nominal, 1.6 A nominal
Bulk Charge Current, I_{BULK}	5 A, +/- 10% at 25°C
Float Charge Voltage, V_{FLOAT}	Jumper Selectable from 26.4 to 27.6 V, +/- 0.75%
Trickle Charge Current, I_{TC}	2.0 A, +/- 20%
Input Voltage	120/240 Vac ±10%, 50/60 Hz single-phase (two separate models)
Input Current	7 A Max.
Battery Input Voltage	24 Volts (nominal)
Operating Voltage	24 Vdc
Standby Time	> 7 days
Continuous Signaling Time	30 min.
Control Module	
Signal Duration (auto reset)	3 min. max
Microphone Input Impedance	10 kΩ
Audio Distortion	10% THD max.
Sensor and Activation Contact Closure	(min) 500 ms < 2 kΩ
Amplifier Module	
Frequency Response	(300 to 3 kHz) ±3 dB (ref. 1 kHz)
Output Voltage (Tone and PA)	(to speaker drivers) 67 V_{rms} (nominal)
Input Impedance	(per amplifier) 100 kΩ
Enclosures	
Control Cabinet	Type 4X
Battery Cabinet	Type 3R
Operating temperature	-40° to 149°F (-40° to +65°C)
Humidity	0% to 98% non-condensing

NOTE: HTR2 or HTR4 battery heater option is required for a -40°C temperature rating.

Table 8 Relay Output (JP11)

Contact Rating	30 Vdc, 15 A

Table 9 600 ohm Balanced Line Port

Audio Input Level	0.10 to 2 V_{pp} to make 1 V_{pp} at TP10
Audio Output Level	0.25 to 2.0 V_{pp}

Table 10 Remote Activation, Sensor, and Direction Inputs

Number of Remote Activation Inputs	8
Number of Remote Sensor Inputs	4
Number of Direction Sense Inputs	4
Input Type	Optically Isolated activated by Dry Contact closure < 2 kΩ

Table 11 Audio Power Amplifier Modules Model (UV400)

Input voltage	24 Vdc nominal 28 Vdc maximum
Input current siren mode	At 24 Vdc with 1 kHz squarewave into 11 Ω: < 20 A
Input current voice mode	At 24 Vdc with 1 kHz tone set to 67 V_{rms} into 11 Ω: < 24 A
Standby current with amplifiers turned off	< 10 mA
Efficiency	> 90% (siren mode) > 80% (voice mode)
Output voltage into 11 Ω at 1 kHz and 24 Vdc nominal operating voltage	67 V_{rms} nominal at 400 W (siren mode) 67 V_{rms} nominal at 400 W (voice mode)
Duty Cycle, Continuous Signaling Times	Siren Mode 30 minutes Digital Voice or PA 30 minutes (depending on signal source)
Audio distortion	< 10% voice mode, below clipping
Frequency response	+/- 3 dB, 300 to 3000 Hz
Power low power mode	< 5 W per amplifier

Table 12 Signaling Formats

Number of codes	Up to 200 activation codes maximum
Functions allowed stacked under each code	Up to 20
Two-Tone Sequential or Single Tone Frequency range Tone timing Inter-tone Gap Tone Accuracy Tone Spacing	 282-3000 Hz First tone: 0.5 seconds minimum Second tone: 0.25 seconds minimum 8 seconds maximum for both 400 ms (maximum) +/- 1.5% 5.0% preferred, 3% minimum
Single Tone Frequency range Tone timing Tone Accuracy Tone Spacing	 282-3000 Hz 0.5-8 seconds maximum +/- 1.5% 5.0% preferred, 3% minimum
DTMF String length Mark/Space timing: Decoder Minimum Decoder Maximum Encoder Space between Stacked codes	All timings in milliseconds 3-12 standard DTMF characters 50 ms/50 ms (below 50/50 consult factory) 800 ms total mark/space timing per code 100 ms/100 ms mark/space timing minimum 1.25 seconds
AFSK Baud rate Modem type Mark frequency Space frequency Error checking	 1200 bps MSK (minimal shift key) 1200 Hz 1800 Hz 16 bit CRC
EAS	Supports standard EAS codes and wildcards
POCSAG Not applicable to the UVRI-B.	Supports Binary frequency shift keying 512 Baud numeric messages
Decode Sensitivity	18 dB SINAD for tone (except with CTCSS tones > 200 Hz and decode tones < 400 Hz) and 21 dB SINAD for MSK, EAS, POCSAG and DTMF with 50 ms/50 ms or greater timing
Two Way Formats	Federal Packet Digital and DTMF

Table 13 Physical

UV400 Amplifiers (height x width x depth)	10.5 x 2.0 x 8.5 in (26.7 x 5.1 x 21.6 cm) Weight 4.1 lb (1.9 kg)
Control Cabinet (height x width x depth)	19.0 x 23.5 x 11.2 in (48.3 x 59.7 x 28.4 cm)
Battery Cabinet (height x width x depth)	28.0 x 18.0 x 15.2 in (71.1 x 45.7 x 38.6 cm)
Net Weight	170 lb (77.1 kg)

Installation

⚠ **DANGER**

ELECTROCUTION HAZARD: Electrocution or severe personal injury can occur when making electrical connections, drilling holes, or lifting equipment. Therefore, experienced electricians in accordance with national and local electrical codes, acting under the direction of the installation crew safety foreman, should perform installation.

⚠ **DANGER**

EXPLOSION HAZARD: Explosive gases and corrosive materials may be present. To prevent explosion or severe personal injury, installation technicians must be experienced with the safe installation of lead-acid type batteries.

⚠ **WARNING**

SOUND HAZARD: The output level of high-powered speakers is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan placement of siren and post warnings. To prevent excessive exposure to installers and service personnel, adequate measures must be taken to ensure that the sirens are not activated while they are within 150 feet of the speaker array or provide proper ear protection.

The Yagi and Omni Antennas Installation manual is available for download at the Federal Signal website.

ICM-UV Checklist

Before installing, commissioning, or performing maintenance, download the ICM checklist for the UV:

1. Go to www.fedsig.com.

2. Select Resources.

3. Click Resource Library.

4. Search for ICM-UV Checklist.

5. Click Download.

Recommendations on UV Controller Location

First, consider the mounting location of the UV controller. You can mount the UV controller indoors or outdoors. To avoid losses in speaker power, install the speaker array and UV controller without lengthening the 40-foot interconnecting cable supplied. If it is necessary to make a longer cable run, increase the wire size of the entire cable to 12 AWG or larger.

Install the UV controller out of the reach of vandals and apply any state or local noise control ordinance. The Control Cabinet and Battery Cabinet are both supplied with hasps for padlocking security. The UV controller requires a 120 Vac or 240 Vac 50 to 60 Hz power source (model dependent).

You can use several methods to activate the UV controller. Use the manual activation switches to activate the UV controller locally. Use landline controls through normally open contact switches. Make connections directly to the backplane motherboard terminal block. Activate the control through the optional radio receiver or an external 600-ohm audio source.

The Control and Battery Cabinets are shipped mounted on an aluminum channel with four mounting holes for 1/2-inch bolts. One 1-1/4 inch hole is a convenient lifting point. The total weight of the UV controller, not including user-provided batteries, is in the following table. Ensure that the mounting surface and fasteners can safely sustain the weight of the assembly. Add each UV400 amplifier to obtain the total weight.

Table 14 UV Weight

Model Number	Weight
UV	170 lb (Net weight, without user-provided batteries)
UV400	4.1 lb each

UV Controller Installation

Most siren installations are one of two types: Pole Mount or Flat Surface Mount. These two configurations make it possible to install a siren in almost any situation. If the installations in this manual are not suitable, modification of one of the configurations may be practical.

Many factors affect the propagation of sound over various types of terrain and changing weather conditions. Consult FEMA CPG 1-17 and CPG 1-14 and your local Federal Signal representative to place your outdoor warning equipment properly.

Pole Mounting

A typical pole-mounted siren installation is shown in "Figure 2 Typical Siren" on page 24. The siren is mounted on a Class 2 utility pole (ANSI type wooden pole or equivalent) with a minimum horizontal ground stress rating of 3,700 pounds (1682 kg). (Ensure that soil loads will conform to this size utility pole.)

NOTE:

- Certain soil conditions may require guying for the pole. Check with proper building authorities.

- The speaker array installation is covered in a separate set of instructions supplied with the array.

To install the UV controller to a wooden utility pole:

1. Uncrate the siren control. Remove the plastic bag attached to the conduit that is connected between the Control Cabinet and the Battery Cabinet.

2. Unlock the Control Cabinet and the Battery Cabinet. Inspect the Control Cabinet and Battery Cabinet for any damage. Report any damage immediately to the shipping company and file a claim. Inform Federal Signal of the damage.

3. Install the wooden utility pole following accepted standards and practices.

4. Install the speaker array on the pole following the instructions supplied with the array.

5. Mark the four mounting holes on the pole for the UV controller. Attach the cabinets to the pole at a height that is accessible to service personnel but discourages vandalism or as specified per contract.

6. Drill a 3/8-inch pilot hole at each of the locations. Drill each hole at least 3-1/2 inches (90 mm) deep.

7. Use a crane or mechanical hoist to lift the UV controller to the desired height along the pole. Attach the UV controller to the pole using four user-supplied 1/2-inch by 5-inch lag bolts. Slide a user-supplied 1/2-inch flat washer onto each bolt before threading the bolt into the pole.

8. Attach the UV controller to the pole using four user-supplied 1/2-inch by 5-inch lag bolts. Slide a user-supplied 1/2-inch flat washer onto each bolt before threading the bolt into the pole.

9. Mount a user-supplied fused disconnect switch on the pole beneath or beside the UV controller.

    See "Electrical Connections" on page 26.

Flat Surface Mounting

⚠ **WARNING**

SOUND HAZARD: Post notices at all roof access points indicating that a roof-mounted siren is installed and may cause hearing damage. When installing the siren on a flat roof, ensure that the loudspeakers clear parapets or other obstructions by at least ten feet.

The total weight of the UV controller is listed in the Specifications section. Make sure that the mounting surface and mounting method selected can safely sustain the weight of the assembly and user-provided batteries. The mounting method used must be able to withstand external mechanical stresses that may be applied to the assembly (such as applicable wind loads for the area). Consult building authorities in your area for recommendations regarding local ground conditions and wind loads.

To install the UV controller to a flat surface:

1. Install the speaker array on the roof, following the instructions supplied with the array.

2. Attach the template to the wall and mark the four mounting holes on the pole for the primary UV controller.

3. Drill a 3/8-inch pilot hole at each of the locations. Drill each hole at least 3-1/2 inches (90 mm) deep.

4. Use a lift to lift the UV controller to the desired height along the pole.

5. Attach the UV controller to the wall using four user-supplied 1/2-inch by 5-inch lag bolts. Slide a user-supplied 1/2-inch flat washer onto each bolt before threading the bolt into the pole.

6. Install a user-supplied, fused, disconnect switch. Use the proper type required by the authority having jurisdiction in your area.

7. If the speaker array is installed on the roof of the building, it may be desirable to install the UV controller inside the building, if practical.

Figure 2 Typical Siren

TYPICAL SIREN

MOD6024B

SPEAKER CABLE IN CONDUIT

RADIO ANTENNA (YAGI)

1-5/8 inch PIPE (1)

ANTENNA CABLE

TELEPHONE POLE

CONTROL CABINET

OPTIONAL AC TRANSFORMER
AND DC RECTIFIER

120 VAC SINGLE-PHASE METER BASE
WITH MAIN DISCONNECT
(Must meet local utility requirements)

BATTERY CABINET

GROUND WIRE 6 AWG MIN.

GROUND RODS (2 EACH) 8' MIN.

REFER
TO
SPEC

REFER
TO
SPEC

REFER
TO
SPEC

4'7.5"

REFER
TO SPEC

291164D

Figure 3 Flat Surface Mounting

CRANE LIFT

SEE DETAIL "A"

CONDUIT
(IF REQUIRED)

8 TO 10 FT.

WOOD OR STEEL
PLATFORM *

ROOF

ANCHOR LAG SCREWS
INTO PLATFORM AND
ROOF MEMBERS

SIREN
CONTROL

* A PROFESSIONAL/
STRUCTURAL ENGINEER
SHOULD REVIEW
MOUNTING LOCATIONS
AND METHODS PRIOR
TO INSTALLATION.

TO CONTROL
DEVICE

BATTERIES

SERVICE
DISCONNECT

TO POWER SOURCE

SEAL IF WIRING PASSES THROUGH WALL OR ROOF

18.00

9.00

2.39   3.49   6.23   3.49

2.39

3.49   9.00

6.23   18.00

4X 1.62

3.49

Ø23.25

20X Ø0.56

4X 4.94   4 x 45°

DETAIL "A"

90°

291170D

Electrical Connections

⚠ **WARNING**

SHOCK HAZARD: Install the siren electrical system in compliance with local electrical codes and NEC recommendations. Federal Signal also recommends that all user-installed conduit connections enter from the bottom of the cabinet. Disconnect all power and read all warnings at the beginning of this manual and on the batteries before making connections.

⚠ **CAUTION**

The UV controller must be solidly connected to an earth ground. If the siren is installed in a building, ground the system to a metallic object known to be grounded. For pole mount installations, drive a metal rod or bar at least 8 feet into the ground, as close as practical to the base of the pole. Use a separate, continuous 6 AWG or larger wire from the siren frame to ground and from the cabinet of each siren control system to ground.

NOTE: Seal and protect conduit connections to prevent water entry and corrosion in the Control Cabinet.

Power Connections

To connect the wires in the Control Cabinet:

1.   Route 1/2-inch conduit (steel preferred) between the user-supplied, fused disconnect switch and the conduit-fitting hole in the bottom right of the Control Cabinet enclosure. Use weatherproof switches, electrical boxes, and connectors to prevent water entry and corrosion.

2.   Route two user-supplied power wires and a ground wire through the conduit that was just installed between the Control Cabinet and the fuse disconnect box. Use wires no smaller than 14 AWG.

3.   Connect the ground wire to the green and yellow DIN mounted terminal block or the cabinet ground stud. Verify the appropriate siren model was purchased. 240 Vac models contain a step-down transformer pre-wired to the DIN rail located on the right side of the Control Cabinet.

4.   Connect the two AC power wires to the DIN-mounted terminal blocks labeled L1 and L2.

5.   Connect the power wires and the lightning protector to the AC disconnect box per instructions provided with the lightning protector and governing electrical codes.

Signal Connections

Refer to the following table for speaker wire connections. Module locations are 0 at the bottom, 1 next up, etc. See Figures 4 through 6 for AMP location on the backplane motherboard.

If the UV controller is going to replace an existing controller, re-wire the siren as shown in Appendix C, "Wiring Diagrams," before making the speaker connections. Improper installation can damage the drivers.

Table 15 Modulator Speaker Wiring (MOD1004B-MOD8032B)

Terminal Number	Wire Color	Module Location	Siren Model
JP21-1	White/Brown	1	1004,2008,3012,4016,5020,6024
JP21-2	Brown	1	1004,2008,3012,4016,5020,6024
JP22-1	White/Red	2	2008,3012,4016,5020,6024
JP22-2	Red	2	2008,3012,4016,5020,6024
JP23-1	White/Orange	3	3012,4016,5020,6024
JP23-2	Orange	3	3012,4016,5020,6024
JP24-1	White/Yellow	4	4016,5020,6024
JP24-2	Yellow	4	4016,5020,6024
JP25-1	White/Green	5	5020,6024
JP25-2	Green	5	5020,6024
JP26-1	White/Blue	6	6024
JP26-2	Blue	6	6024
JP27-1	White/Violet	7	8032
JP27-2	Violet	7	8032
JP28-1	White/Grey	8	8032
JP28-2	Grey	8	8032

NOTE: See Appendix C, "Wiring Diagrams," for drawing examples.

To mount the speaker wiring:

1. Mount a user-supplied junction box between the two Control Cabinets.

2. Run 1-inch flexible conduit from the junction box to the Control Cabinet's 1-inch conduit hole on the bottom of the top cabinet.

3. Wire the speaker cable into the Control Cabinet as shown in the tables.

Figures 4 through 6 illustrate the AMP location on the backplane motherboard.

Figure 4 UV Backplane Motherboard (AMP1 to AMP 4)
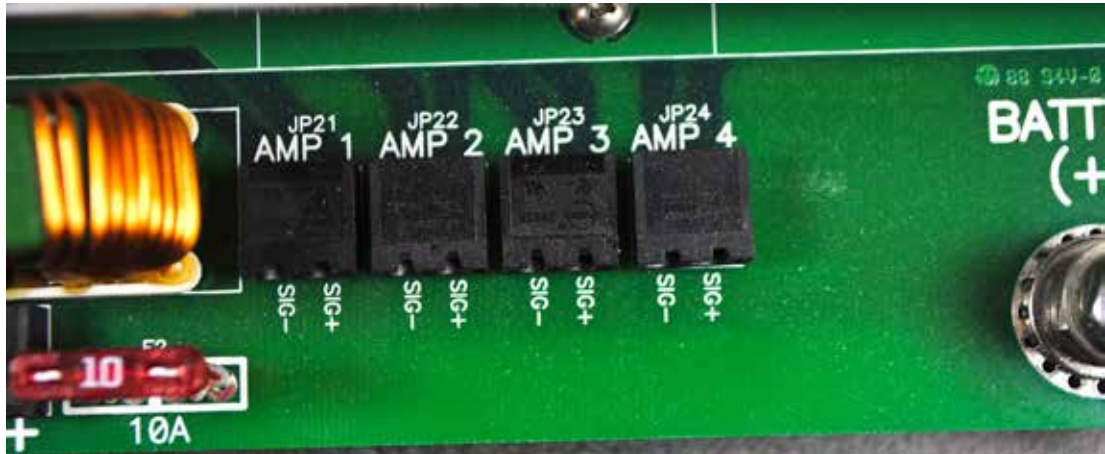
Figure 5 UV Backplane Motherboard (AMP 5)

Figure 6 UV Backplane Motherboard (AMP 6, AMP7, and AMP8)

Speaker Wiring for DSA Series Sirens

DSA speaker arrays range in size from 200 watts to 600 watts. The UV controller may drive multiple combinations of DSA speakers up to 3200 watts of power. Each UV amplifier is designed to drive an 11-ohm impedance, which corresponds to two series pairs of DSA speakers wired in parallel (400 watts).

Because you may use any combination of DSA arrays with a UV controller, all possible wiring diagrams are not shown in this manual. See Appendix C, "Wiring Diagrams," for drawing examples.

The controller's 400-watt amplifier outputs are labeled JP21 through JP28. Position two on these outputs connects to the solid-colored wires from the DSA array. Position one connects to the corresponding striped wire from the DSA array.

Table 16 Wiring example for four DSA6 speaker arrays

Terminal No.	Wire Color	Drivers	Array
JP21-1	White/Brown	A,B,C,D	DSA6 #1
JP21-2	Brown	A,B,C,D	DSA6 #1
JP22-1	White/Brown	A,B,C,D	DSA6 #2
JP22-2	Brown	A,B,C,D	DSA6 #2
JP23-1	White/Brown	A,B,C,D	DSA6 #3
JP23-2	Brown	A,B,C,D	DSA6 #3
JP24-1	White/Brown	A,B,C,D	DSA6 #4
JP24-2	Brown	A,B,C,D	DSA6 #4
JP25-1	White/Red	E,F	DSA6 #1&2
JP25-2	Red	E,F	DSA6 #1&2
JP26-1	White/Red	E,F	DSA6 #3&4
JP26-2	Red	E,F	DSA6 #3&4

Battery Hookup

⚠ DANGER

SHOCK HAZARD: When installing or removing batteries, take care to avoid shorting battery terminals to the metal Battery Cabinet. Failure to do so could result in serious personal injury or death. Batteries that are mis-wired can cause serious personal injury or death. Read and understand the following information before making actual connections.

The end user must obtain batteries to install in the lower cabinet(s) as listed in the Specifications section of this manual.

To wire batteries:

1. Remove the accessory kit from the Battery Cabinet.

2. Connect the wires as shown in the appropriate system wiring diagram for the model of UV purchased. See Appendix D, "Drawings."

3. Apply Battery Terminal Protector spray to battery terminals after wiring to prevent corrosion.

Figure 7 Battery Wiring Diagram
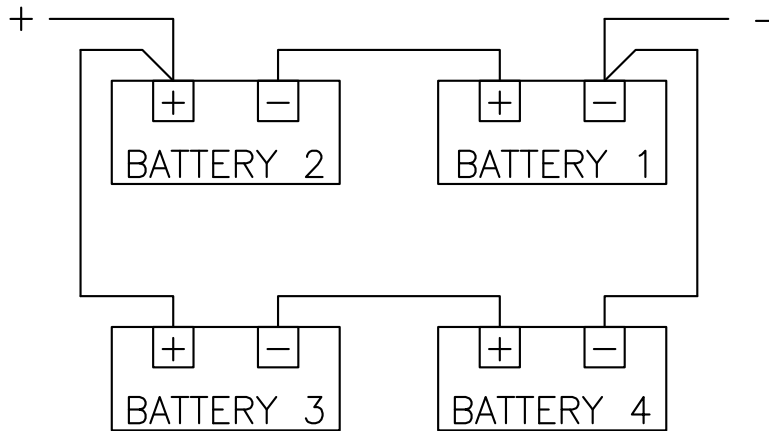
NOTE: Batteries are not required.

Model HTR4 (Battery Warmers)

⚠ **CAUTION**

VOLTAGE REQUIRED: Battery Warmers require 120 Vac.

In locations where temperatures may drop below freezing for extended periods, optional battery warmers are recommended to maintain battery efficiency. A thermostat provides on/off control of the warmers that senses the inside temperature of the Battery Cabinet. The battery warmer option is equipped with four battery warmers that are wrapped around each of the four batteries in the Battery Cabinet. The warmers are plugged into the cube taps, which plug into the thermostat cube, which is plugged into a 120 Vac outlet that is provided for in the Battery Cabinet. No other connection or mounting is required for this option.

Figure 8 HTR4 Wiring Diagram
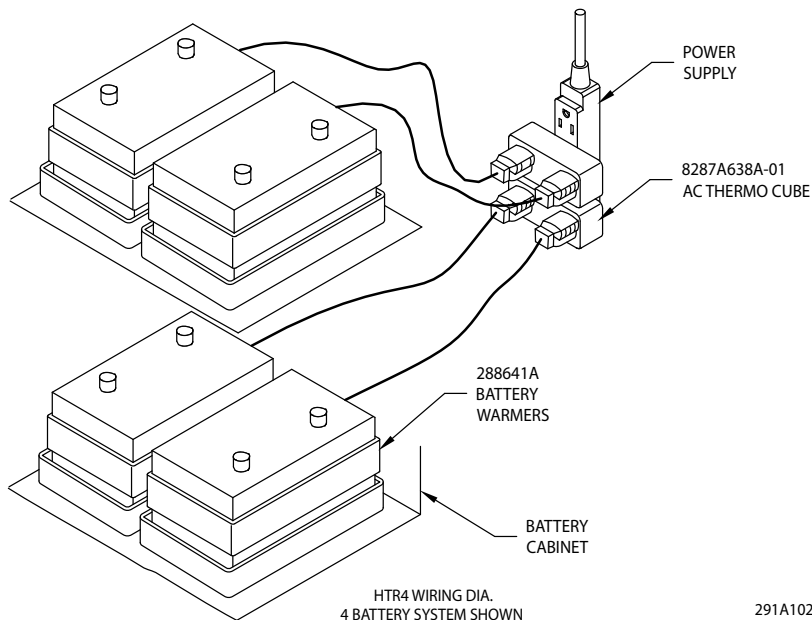
⚠ **DANGER**

ELECTROCUTION HAZARD: Electrocution or severe personal injury can occur when making electrical connections, drilling holes, or lifting equipment. Therefore, only experienced electricians should install this product in accordance with national and local electrical codes.

Solar Power (PVS220W-24)

The solar option allows the siren to operate in areas where power is not available. The PVS2110-24 model for the UV controller includes a solar regulator and solar panel kit. When installed, the batteries are charged by the battery charger through the photovoltaic charging system, instead of a battery charger, to provide operational power to the siren. The Solar Power Option Installation manual is available for download at the Federal Signal website.

Installation of Other Manufacturers' Radio Receivers

⚠ **CAUTION**

Improper installation of radio control equipment may cause the siren to malfunction or operate intermittently. Installation must only be performed by experienced radio technicians who have thoroughly read this manual.

- TUNING—Tune the radio receiver to the manufacturer's specifications.

- POWER—Determine the radio power requirements. The UV+ Controller provides +12 Vdc on the RADIO connector on the front panel.

Table 17 Radio Connector, 8 pin MOD jack

1	Receive Audio, 300 mV – 10 V_{pp}
2	Transmit Audio, 50 mV – 3 V_{pp}
3	Carrier Detect - active low
4	PTT
5	+12 Vdc
6	GND
7	+12 Vdc
8	GND

Do not use this voltage source for radios that draw more than 1.5 A of current in transmit. Use both grounds and both +12 Vdc connections for current handling. If a higher current output is required, purchase a 24 Vdc to 12 Vdc voltage converter. The UVT series models include this converter. Do not use one of the 12 Vdc batteries to run the radio equipment.

- RX AUDIO—Connect the UV+ Controller Receive Audio Input to the de-emphasized Audio Output of the radio. Use shielded audio grade cable and keep wire runs as short as possible. The Receive Audio level can vary from 300 mV to 3 V_{pp} unclipped.

- TX AUDIO—The Transmit Audio output is adjustable from 50 mV to 3 V_{pp}.

- C.D.—The carrier detect signal from the radio must pull to ground when active. The radio carrier detect signal is useful for controlling live PA announcements. When the C.D. signal is removed from the controller for over 5 seconds, the controller automatically cancels the PA function, which eliminates the need to broadcast the cancel tones over the speakers.

- PTT—The PTT output pulls to ground when active to key the radio.

Pre-operation Checkout and Testing

Before installing, commissioning, or performing maintenance, download the ICM checklist for the UV:

1. Go to www.fedsig.com.

2. Select Resources.

3. Click Resource Library.

4. Search for ICM-UV Checklist.

5. Click Download.

Amplifier and Speaker Pre-Operation Checkout (Non-Active Mode)

With an ohmmeter, measure the speaker terminal strips at the bottom of the backplane motherboard for each amplifier and measure the resistance at the output of that amplifier. The resistance is approximately 4.5 ohms. A different reading indicates a possible wiring error or faulty driver in the speaker array. Since the 400-watt speaker circuits are comprised of two sets of series wired speaker drivers connected in parallel, if one of the drivers in a circuit were to open, you measure approximately 9 ohms. If you are using 200-watt DSA speaker combinations, you measure a 10.8 ohms reading across the 200-watt load.

⚠ WARNING

SOUND HAZARD: The output sound level of a siren is capable of causing permanent hearing damage at short distances; sound levels may exceed 150 dB. Therefore, always wear adequate hearing protection when performing tests or maintenance on the siren.

Supply power to the siren to charge the batteries for a period of 24 hours prior to operation of the siren in order to ensure full charge of the batteries. (Alternatively, charge the batteries externally before installation following the battery manufacturer's recommendations.) The typical battery voltage is 27.2 Vdc when fully charged at room temperature. (See "Specifications" on page 18 for details.)

Testing Battery Charge

After charging the batteries, test siren operation:

1. Disconnect all amplifier terminal strip connectors from the bottom of the backplane motherboard.

2. Press one of the manual activation switches to start one of the pre-programmed functions. The signal A LED and signal B LED light on the control, indicating that the

tone is being generated from the control module and the amplifier power and output LEDs are lit.

3. Momentarily insert the terminal strip connectors sequentially for each amplifier. You hear the siren tone from the speaker array for the duration of the time that the connector is installed. (Amplifier output points on the connector read 67 Vac$_{rms}$ nominally; this level reads higher when you remove the speakers.)

4. Cancel the signal tone or wait for it to time out (typically 3 minutes). You can insert all of the terminal strip connectors and activate any or all signals for full-volume siren testing.

Initial Checkout

The siren is now ready to operate as a stand-alone device with control from the front panel. To remotely control this siren through a landline, terminal blocks are located at the bottom of the backplane motherboard labeled REMOTE ACTIVATION INPUTS (JP14). A momentary, dry contact closure between COM and any other JP14 terminal activates the associated function.

The SIG OUTPUT LED indicates that the amplifier output signal level is sufficient for siren signal operation. The audio LED is on when the amplifier is transmitting.

Final Testing

Refer to the factory data sheet and unit programming data sheet that were shipped with the controller.

- If the controller is using two-way communication, calibrate the Quiet Test function by pressing switches 2 and 3 on the front panel at the same time.

- Test all siren signals at this time by momentarily pressing the appropriate switch on the control module front panel or, if possible, by radio activation. If included, test the optional radio interface at this time. Test and verify the proper operation of all functions over the radio system. If there is two-way radio communication, then check the Central UV controller base station reports for failures.

- After the installation is complete and the siren is operating properly, padlock the Control Cabinet and Battery Cabinet to discourage vandalism.

- A factory test data sheet and unit programming data sheet were shipped with the controller. Keep these data sheets for future reference.

Operations

The modular UV controller contains a card cage with ten plug-in cards consisting of the following:

- One controller card slot (UV+)

- One optional accessory slot (UVARM)

- Eight amplifier slots (UV400)

You can vary the number of amplifier cards from one for a 400-watt system up to a maximum of eight for a 3200-watt system. All siren control, audio generation, and remote communication functions are handled by the UV+ controller card. The backplane motherboard contains connectors and terminal blocks for the interconnection of the other system components. Power for the UV Controller and siren is supplied by two or four deep cycle marine batteries. AC and solar battery charger options are available.

UV Controller Front Panel Indicators

Figure 9 UV+ Controller Front Panel Indicators
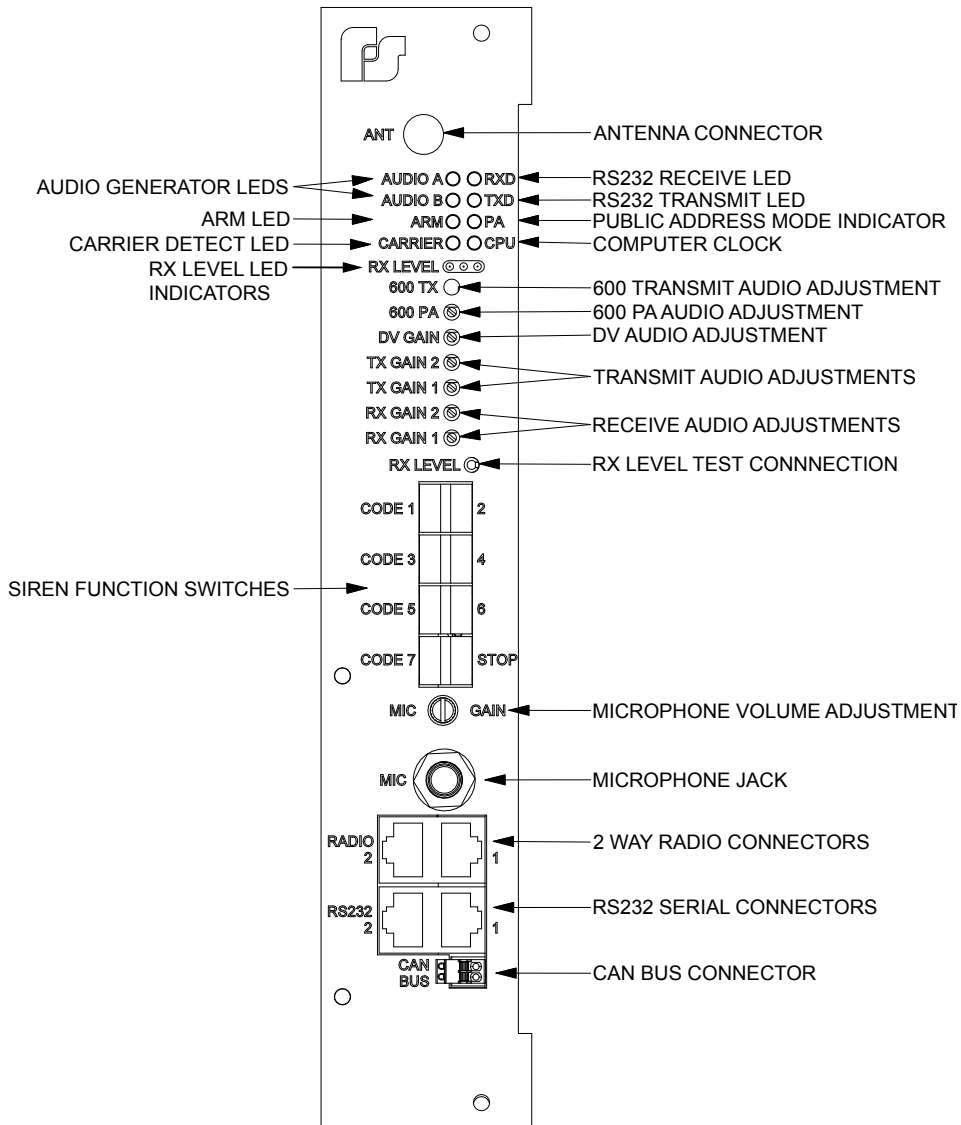
The following table provides the descriptions of the front panel indicators. See Figure 9 on page 34.

Table 18 Front Panel of UV+ Controller Card

Labels	Activate with a hold time > 0.50 seconds
ANT	Antenna connector when used with a one-way radio receiver
AUDIO A	Audio present on channel A
AUDIO B	Audio present on channel B
ARM	Unit Armed indicator
CARRIER	Radio frequency (RF) carrier indicator ON with carrier present
RXD	Receive serial data and receipt of radio channel modulation
TXD	Transmit serial data and DTMF and digital
PA	Public Address mode indicator
CPU	Microprocessor heartbeat
RX LEVEL	Three-stage LED bar graph

The following table provides the descriptions of the front panel controls. See Figure 9 on page 34.

Table 19 Front Panel Controls for UV+ Controller Card

600 TX	600 Ω audio transformer Transmit (TX) level adjustment.
600 PA	600 Ω audio transformer Public Address (PA) level adjustment.
DV GAIN	Volume adjustment for Digital Voice option. Internal Digital Voice level sufficient to drive TP5 or TP6 into clipping.
TX GAINs	Transmitted audio adjustable from 50 mV to 1 V_{pp}
RX GAINs	Received audio adjustable from 300 mV to 3.00 V_{pp}
RX LEVEL	Test point for the meter probes.
MIC GAIN	Mic level adjustment.
CAN BUS	Input for Controller Area Network (CAN) BUS.

UV400 Amplifier Front Panel Indicators

Figure 10 UV400 Amplifier Front Panel Indicators
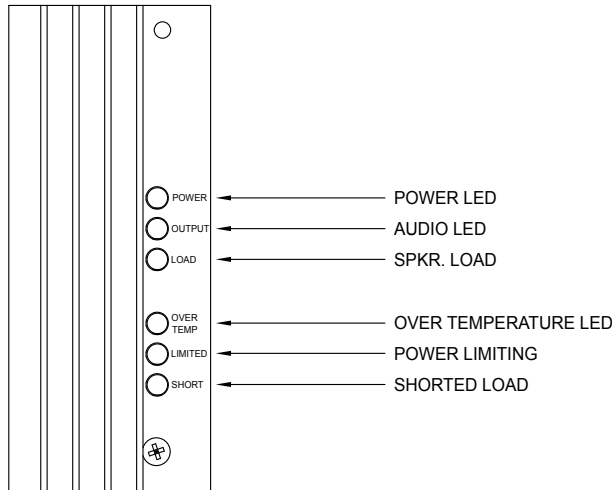
The following table provides the description of the UV400 amplifier front panel indicators.

Table 20 Front Panel Indicators for Model UV400 Amplifier

POWER	Power LED is only on during activation.
OUTPUT	Audio LED is on when the amplifier is transmitting.
LOAD	Speaker load is on during activation with speaker load
OVER TEMP	Over Temperature LED is on when the amplifier reaches an over-temperature condition. Call Technical Support if the light remains on.
LIMITED	Power Limiting is on or flashing during activation when overdriving the amplifier.
SHORT	Shorted Load is on when load appears shorted.

Basic UV+ Controller Programming

The following information is the minimum required configuration of the UV+ Controller. FSPWARE or Commander® is required.

Unit Type

The Unit Type is set to the type of siren this unit is controlling and is usually determined by the number of cells in the speaker array. When setting up the unit type, the user selects from a menu with the following choices.

Table 21 Unit Type Selection Table

Unit type	Quantity	Siren Type	Total Power
UV - 1	One (1) UV400	MOD1004B	400 W
UV - 2	Two (2) UV400	MOD2008B	800 W
UV - 3	Three (3) UV400	MOD3012B	1200 W
UV - 4	Four (4) UV400	MOD4016B	1600 W
UV - 5	Five (5) UV400	MOD5020B	2000 W
UV - 6	Six (6) UV400	MOD6024B	2400 W
UV - 8	Eight (8) UV400	MOD8032B	3200 W

Activation Formats

For Two-Tone activated units, the Two-Tone Timing parameters configure the time duration of the activation tone codes. The three parameters, A-Time, B-Time, and S-Time, set the time duration for the A-tone, B-tone, and Single-Tone respectively.

NOTE: The Two-Tone timing parameters are minimum values only. The actual tone times may be longer than the specified times.

- Single tone, two-tone, DTMF, MSK, EAS, and POCSAG decoders for remote siren control

- DTMF or MSK encoders for remote status monitoring

User Programs

The UV controller has the capacity to store up to fifty user programs. Each user program contains twenty stacked function items.

Assigning more than one function to each activation code or user program allows you to run a sequence of functions without sending additional activation commands.

Activation Functions

Table 22 Activation Functions

Function	Definition
Arm	Arms the siren.
Disarm	Disarms the siren.
Wail	Sound Wail siren tone.
Pulsed Wail	Sound Pulsed Wail siren tone.
Alternate Wail	Sound Alternate Wail siren tone.
Steady	Sound Steady siren tone.
Pulsed Steady	Sound Pulsed Steady siren tone.
Alternate Steady	Sound Alternate Steady siren tone.
Auxiliary (Chime)	Sound Auxiliary siren tone. The Auxiliary tone is normally set for Westminster Chimes.
Digital Voice (1-250 DV messages)	Enter the desired digital voice number to run and click OK. If voice number is not between 1 and 250, an error message box appears.
Dynamic Voice	Plays a sequence of digital voice messages specified at the time of activation. This function is only applicable for sirens equipped with a special vocabulary chip.
Public Address	Broadcast live radio PA. PA remains active until carrier has dropped for ten seconds or until 4-1/2 minutes has elapsed, whichever occurs first.
Play Recorded PA	Play message previously recorded during the "RECORD PA" function. For EAS activation, the message repeats continuously for the duration of time encoded in the TTTT field. For non-EAS activation, the "PLAY RECORDED PA" function plays once without repeats.
Quiet Test	Performs a self-test of the siren's amplifiers and speakers by sounding a 20 kHz tone.
Cancel	Terminates active function.
Report	Send unit status to base.
Master Reset	Terminates active function and clears latched status.
Plus Phase	All functions between "PLUS PHASE" and "MINUS PHASE" repeat for the duration of time encoded in the EAS activation frame (EAS activations only).
Minus Phase	All functions between "PLUS PHASE" and "MINUS PHASE" repeat for the duration of time encoded in the EAS activation frame (EAS activations only).
Phase Off	Turn off the minus and plus phases and return the siren to omni-directional mode.

Function	Definition
Low Power/ High Power	Causes the siren to operate at a greatly reduced volume level. Upon activation of a user program, the siren defaults to High (normal) volume level. This command must follow an ARM command. Reduced volume mode remains in effect for all subsequent functions in a user program that follow the Low Power function or until a High Power function occurs or an ARM command is sent. The Low Power function is one watt per amplifier.
Power	The Power function controls the volume level. You can adjust the volume from 0 to -20 dB in 1 dB steps. Reduced volume mode remains in effect for all subsequent functions in a user program that follow the Power function, or until another Power function occurs, or an ARM command is sent. **NOTE**: Each 3 dB reduction results in half the power output.
Delay	Causes the siren to pause (wait) for 2 to 500 seconds before starting the next function of the user program currently running. When selecting the delay function, the user is prompted to enter the desired delay time in seconds. A default delay of 4 seconds is present between functions without adding a delay.
Amp/Audio Zone	Allows you to control which amplifiers are to operate. The Amp/Audio Zone function allows you flexibility in building alerting or other zone-dependent systems. You can divide each UV controller into eight different zones. When selecting the Zone Control function, you are prompted to enable or disable each of eight possible zones corresponding to each amplifier in the siren. Upon activation of a user program, the siren defaults to all zones enabled. The ZONE command must follow an ARM command. Zoning remains in effect for all subsequent functions in a user program that follows the zone function or until another ZONE or ARM function occurs.
Record PA	Records a live PA message for later playback using the "PLAY RECORDED PA" function. A recording is terminated by the reception of the EAS-SAME End of Message command or two minutes, whichever occurs first.
Zone A (rotating sirens only)	Position siren head in the A direction.
Zone B (rotating sirens only)	Position siren head in the B direction.
Zone C (rotating sirens only)	Position siren head in the C direction.
Zone D (rotating sirens only)	Position siren head in the D direction.
Relay Functions	All relay functions require the optional UVARM (UltraVoice Audio Relay Module).
Repeat Start	Repeat all functions between Repeat Start and Repeat End *n* times.
Repeat End	Repeat all functions between Repeat Start and Repeat End *n* times.

UVARM Option

The UV supports an optional Audio and Relay Output Module (UVARM) that provides three audio outputs and four relay outputs to enable the UV to connect to existing PA systems or other auxiliary devices. The outputs consist of a balanced 33 ohm, a balanced 600 ohm, a selectable 600 ohm balanced or single-ended line level output, and four SPDT relay outputs. The level of each audio output is independently adjustable. Each audio and relay output is individually addressable, allowing each output to be activated at different times.

Figure 11 UVARM Front Panel Indicators
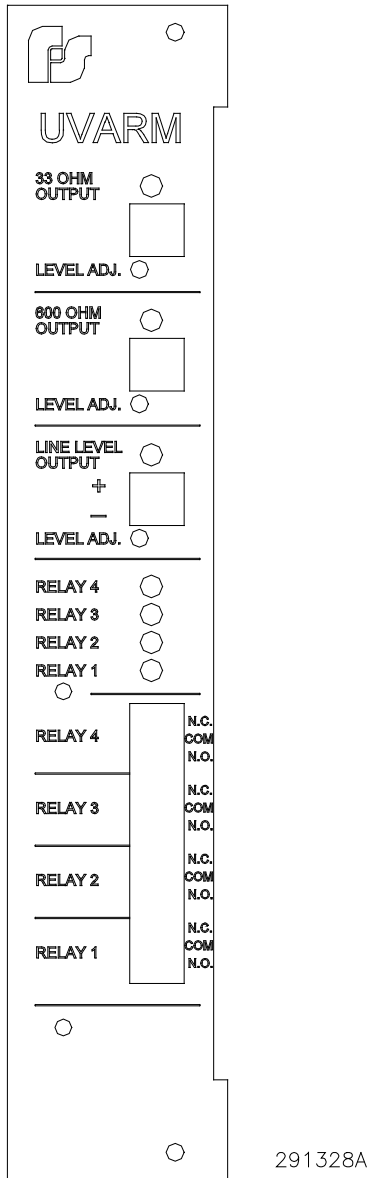
Specifications for UVARM

Table 23 Audio and Relay Output Card Option

Input voltage	13.5 V to 30 V
Input current	200 mA maximum
Balanced 33 ohm output	Adjustable from 0.2 V_{rms} to 1.9 V_{rms}
Balanced 600 ohm output	Adjustable from 0.2 to 3 V_{rms} or -12 dB to +11 dB, surge protected
Single-ended or balanced Line-level/600 ohm output	Adjustable from 0.2 V_{rms} to 3 V_{rms}
Relay outputs	4 SPDT
Contact rating	20 A at 30 Vdc with NO and NC contacts

Table 24 Connectors for the UVARM

Wire Size	All front panel connectors 22 to 14 AWG
P1	Back plane 48 pin EPT male card edge connector
JP1	33 Ω audio output 1 and 2 balanced output
JP3	600 Ω audio output 1 and 2 balanced output
JP7	600 Ω/line level audio output 1 and 2 balanced output or 1 - signal 2 - ground
JP6	Two-pin shorting jumper Shorted makes JP7 unbalanced output Open makes JP7 balanced output
JP2	Three-pin shorting jumper Short pins 1 and 2 to select channel A audio for JP1 output Short pins 2 and 3 to select channel B audio for JP1 output
JP4	Three-pin shorting jumper Short pins 1 and 2 to select channel A audio for JP3 output Short pins 2 and 3 to select channel B audio for JP3 output
JP5	Three-pin shorting jumper Short pins 1 and 2 to select channel A audio for JP7 output Short pins 2 and 3 to select channel B audio for JP7 output

JP8	Relay Outputs 1 - Relay #1, N.O. 2 - Relay #1, COM 3 - Relay #1, N.C. 4 - Relay #2, N.O. 5 - Relay #2, COM 6 - Relay #2, N.C. 7 - Relay #3, N.O. 8 - Relay #3, COM 9 - Relay #3, N.C. 10 - Relay #4, N.O. 11 - Relay #4, COM 12 - Relay #4, N.C.

Table 25 Indicators for the UVARM

LED D18	Power
LED D1	33 Ω output active
LED D3	600 Ω output active
LED D5	Line level output active
LED D11	Relay #1 energized
LED D10	Relay #2 energized
LED D9	Relay #3 energized
LED D8	Relay #4 energized

Battery Charger

In the Battery Cabinet is a 24 Vdc charger that monitors battery conditions, temperature, and varies charge rates. See the Battery section under Specifications for the required quantity of batteries. The two or four batteries are wired to provide the 24 Vdc required for controller operation.

The following table describes the wire connections on the charger.

Table 26 Wire Connections on Charger

Wire	Connection
Black AC plug	Connects to AC power strip in cabinet.
Black temperature sense	Connects to any battery.
White sensor wire	Connects to JP20 on the motherboard in the Control Cabinet
Black wire/Red wire	Black wire connects to Battery 1 (negative). Red wire connects to 200 A fuse.

Battery Charger Status

Charger Status is indicated by the LEDs on the front of the charger.

Figure 12 LEDs on charger

Table 27 LEDs description

LED	Description
CURRENT	The green LED indicates the charge current is being delivered to the battery. LED intensity increases with charge current.
TRICKLE	The yellow LED indicates the battery voltage is below 20 V and that the charger is trickle charging at a low current level.
BULK	The yellow LED indicates the battery voltage has dropped below 90% of the float voltage setting, and the charger is charging at a high current level.
READY	The green LED indicates the battery has reached the float voltage. The charger is float charging at the float voltage setting.
FAULT	The red LED indicates a charger fault. The charger may be delivering abnormally low current, have a blown fuse, or not producing the correct output voltage.

NOTES:

- Battery Voltage is temperature compensated when the temperature is above 86°F (30°C).

- The battery charger described is model Q860000236, which replaces model 120816C. For information regarding updating to the new charger see https://www.fedsig.com/product/uv-siren-controller under Product manuals.

UV25ST Option

The UV25ST allows the end user the capability to reduce audio output from the 70 V_{rms} standard to the 25 V_{rms} standard. This option is beneficial when using the UV controller in an indoor warning application.

The UV25ST has a similar form and fit as the UV400 amplifier. In an indoor application, the UV+ can accommodate up to four UV400 amplifiers and four UV25ST. For every UV400 amplifier used, purchase a corresponding UV25ST.

The UV25ST plugs into the unused amplifier slots following the UV400 amplifiers.

UVTD-IP Option

The UVTD-IP includes a network card that provides the capability to communicate over a network and provides audio decoding of digitized audio sent over the network.

The converter is configured with its own fixed IP address and port number. When packets of data are received over the Ethernet port that are addressed to the board's IP and port number, they are converted to serial data and sent out over the serial port. Likewise, any data coming into the serial port is converted to TCP/IP data packets and sent out over the Ethernet port to the server's IP address. The unit also contains a digital to analog converter. This allows specially configured incoming data packets to be converted to audio, which are then filtered and sent out over a 600-ohm audio port.

Ethernet Board Specifications

Table 28 Electrical Ethernet Board Specifications

Input Voltage	10.5 to 95 Vdc
Current Draw	< 150 mA
Serial Port Protocol	RS232C, N, 8, 1 baud rate configurable
Ethernet Port Protocol	IEEE 802.3, 10 Base-T connection
600 ohm Audio Output Port	
Protection	MOV and Transorb surge protection
Impedance	600 Ω
Audio Output Level	Adjustable from 0.30 to 3.00 V_{pp} (-17 dB to +2.7 dB) into 600 Ω

NOTE: To use the 600-ohm input for activation receive audio, place a jumper across pins 2 and 3 at JP8. JP8 is located on the main controller card. Refer to "600-ohm Adjustment Procedure for Activation Audio," in the Maintenance section.

See the SE2000 Manual for connections and specifications.

Figure 13 Serial to Ethernet Board
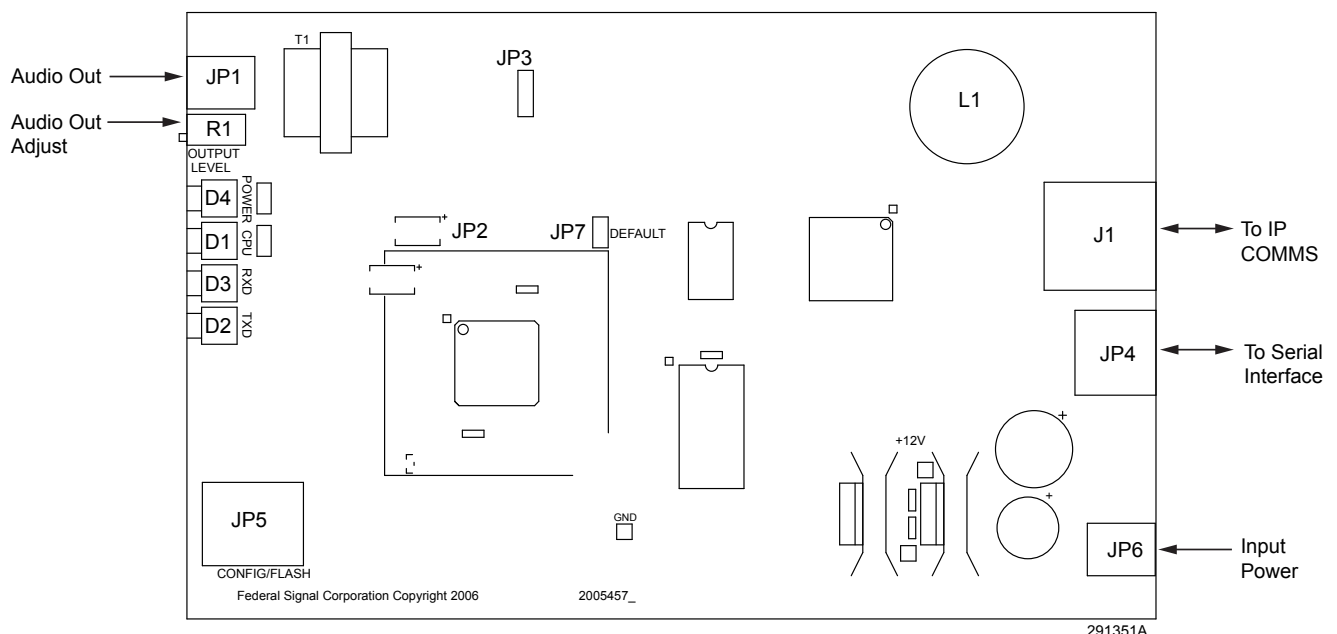
Network Information

Protocols Supported

- TCP/IP

- UDP (optional)

- XML (optional)

- XMPP (optional)

IP Ports Used

16887 (SmartMsg TCP/IP)

80 (HTTP)

3100 (optional UDP Serial Over IP)

3101 (optional UDP Voice Over IP)

IP Address

User selectable

TOS/DSCP (Type of Service)

User selectable

Table 29 Bandwidth Requirements

Voice Over IP	150 K baud per connection
Siren Activation	50 bytes per connection
Siren Poll Response	74 bytes per connection

UV+ Controller Card

The following table provides settings and interface inputs and outputs for the UV+ controller card. See Figure 14 on page 47.

Table 30 UV+ Controller Card Setting I/O

J1	Pins 9 and 10, P1#1 Baud Rate Selection Jumper ON=9600 Baud, OFF=1200 Baud
J2	Front Panel Microphone jack
JP1	microSD holder on PCB
JP2	Special option jumper that requires special firmware
JP3	Connector pins for one-way radio receiver
JP4	Options Connector for SINAD
JP6	600 Ω Input Configuration Jumper Pins: Use shorting plug between pins 2 and 3 — 600 Ω audio in to receiver decoders Use shorting plug between pins 1 and 2 — Audio from 600 Ω to go to amplifiers when 600 Ω PTT is closed
JP7	600 Ω Output Configuration Jumper Pins: Use shorting plug between pins 1 and 2 — Output siren audio Use shorting plug between pins 2 and 3 — Output radio transmit audio
JP8	CTCSS Connector Pins
JP9	Transceiver #1 VOX selection Use shorting plug for VOX Carrier Detect
JP10	Dual receiver priority jumper Jumper EXT side to give external receiver first priority Jumper INT/EXT2 side to give on-board receiver or external receiver second priority Jumper neither side, first carrier detect has priority
JP11	Jumpered when SINAD option is used
JP12	Short to force Carrier Detect of External transceiver 1
JP13	Front Panel External Transceiver (radio) Connector Ports #1 and #2
JP14	Equalizer setting for public address or digital voice. Setting is normal or treble.
JP20	Input for Controller Area Network (CAN) BUS.
P1	Front Panel RS232 Ports #1 and #2 • Use P1 #1 to control and monitor data at 1200 or 9600 baud. Baud rate is selected by J1, 9-10. ON=9600 Baud, OFF=1200 Baud • Use P1 #2 with the 9600 baud scrolling message display option.
R125	600 TX: 600 Ω audio transformer Transmit (TX) level adjustment.
R123	600 PA: 600 Ω audio transformer Public Address (PA) level adjustment.
R57	DV GAIN: Volume adjustment for Digital Voice option. Internal Digital Voice level sufficient to drive TP5 or TP6 into clipping.
R128	TX GAIN 2: Transmitted audio adjustable from 50 mV to 1 V_{pp}
R106	TX GAIN 1: Transmitted audio adjustable from 50 mV to 1 V_{pp}
R182	RX GAIN 2: Received audio adjustable from 300 mV to 3.00 V_{pp}
R105	RX GAIN 1: Received audio adjustable from 300 mV to 3.00 V_{pp}

Figure 14 UV+ Controller Card

JP11

JP14

JP1

S1

JP3

J1

JP2

JP4

R125
R123
R57
R128
R106
R182
R105

JP7

JP6

MIC

J2

JP10

JP13

P1

JP20

JP5

F1

JP12

JP9

JP8
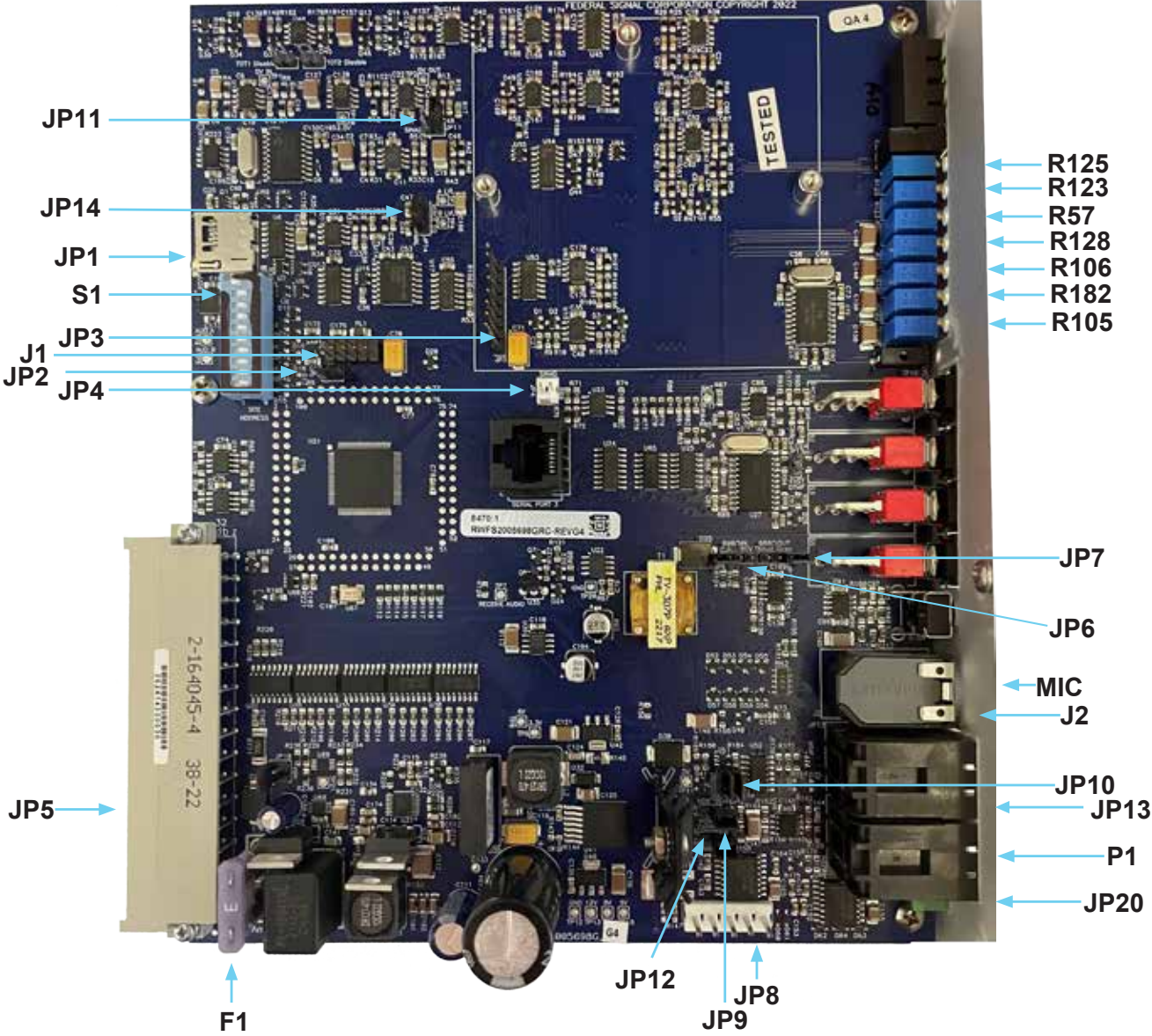
Manual Activation

Use the manual activation switches to activate siren functions. Switches are located on the front panel of the UV+ controller card. In addition, activating switches simultaneously can operate specific testing and calibration features. See Table 31.

Figure 15 UV+ Controller Card Switches

Table 31 Manual Activation Switches on UV+ Controller Card

Function Switch	Function
CODE 1	Activates function 1
CODE 2	Activates function 2
CODE 3	Activates function 3
CODE 4	Activates function 4
CODE 5	Activates function 5
CODE 6	Activates function 6
CODE 7	Activates function 7
STOP	Reset
CODE 1 and CODE 6	Loads default speaker calibration values and transmits DTMF characters (production testing)
CODE 2 and CODE 3	Calibrate speaker load and Xmit DTMF Quiet Test
CODE 5 and CODE 7	Transmits 1200 Hz tone for radio deviation adjustment

NOTE: At any time during a sounding function, push the RESET button to halt all output immediately.

Local Public Address

With the optional microphone (part number MNC-MC), the operator has the ability to locally give a Public Address (PA) message. You can enter the PA mode by plugging the MNC-MC into the microphone receptacle labeled MIC on the UV+ controller card front panel. The PA LED is lit anytime the press-to-talk button on the microphone is pressed. Rotating sirens start rotating to the next zone when PTT is released.

NOTE:

- The microphone volume adjustment knob, labeled MIC GAIN, is located on the UV+ controller card front panel.

- Local PA overrides ALL siren functions activated either remotely or locally.

Relay Output (JP11)

The relay output is terminal block JP11, which is located at the bottom of the backplane motherboard. Relay JP11 closes whenever a siren function is running. In PA mode, the relay is open while the MIC PTT button is pushed and closes when the MIC PTT button is released to enable rotating sirens to change position. Siren rotates to the next zone. The relay is not closed during the remote Quiet Test. See Figure 16.

Figure 16 UV Controller Backplane Motherboard I/O
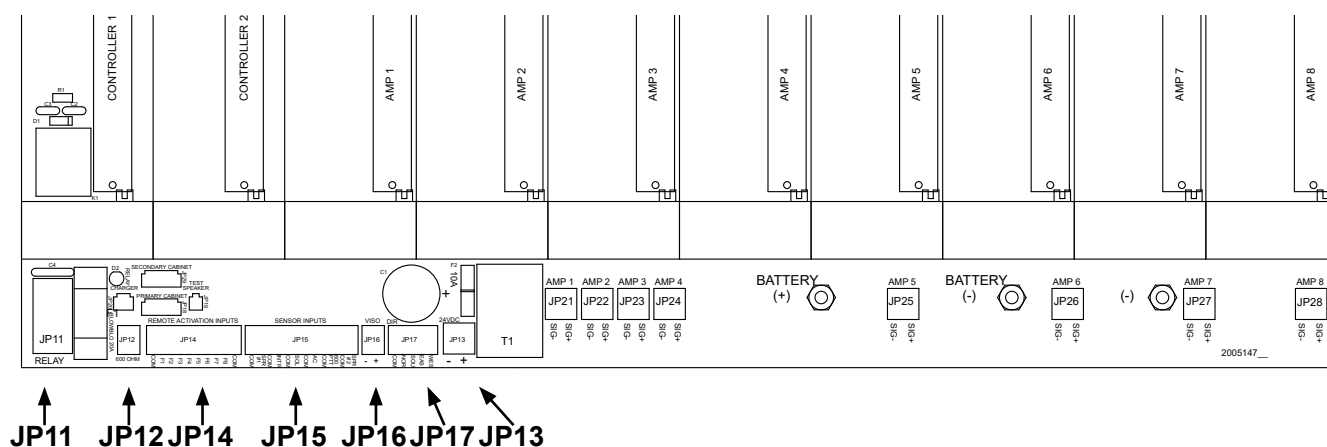
600 ohm Input (JP12)

The 600-ohm input is at JP12 on the backplane motherboard. See Figure 16. Use JP12 for audio input for activation from a radio receiver or from an external voice storage unit. To use the 600-ohm input for activation receive audio, on the UV+ controller card, place a jumper across JP6 pins 2 and 3. See "Figure 14 UV+ Controller Card" on page 47.

To use the 600 ohm input for audio from an external voice storage unit, the UV+ controller card requires a jumper across JP6 pins 1 and 2. See "Figure 14 UV+ Controller Card" on page 47. When used in this mode, use UV+ controller R123 (see Figure 14) to control the volume level. To activate audio mode, place a jumper across JP15 pins 10 and 11 (PTT: Push To Talk, on the backplane motherboard). See Figure 16 and Figure 17. For best results, use a well-filtered audio source. For the audio cable, use a shielded audio grade cable and keep the length as short as possible. Keep away from sources of electrical noise.

24 Vdc Supply (JP13)

Use this output to power external equipment at 24 Vdc maximum 10 A. See "Figure 18 UV Backplane Motherboard (JP15, JP16, JP17, and JP13)" on page 52.

Remote Activation (JP14)

Terminal block JP14 at the bottom of the backplane motherboard is the Remote Activation Inputs. See Figure 17. Optionally, you can operate the UV controller by wired relays or buttons. Use terminal block JP14 for external interface equipment.

You can activate functions 1 through 7 by providing momentary, dry contact closure between COM and the desired JP14 terminal. Shorting F1 to COM activates whatever is programmed for code #1, shorting F2 to COM activates whatever is programmed for code #2, and so on. A half-second momentary contact duration is required.

To terminate an activated signal before it runs for the full duration, do the following: provide a momentary contact closure between JP14 COM and F8 (RESET).

NOTE: No matter how F8 is programmed, F8 is a master reset or a stop switch.

Table 32 Remote Activation Connections (JP14)

JP14 Terminal	Function
1 COM	Common
2 F1	F1 Activates functions 1
3 F2	F2 Activates functions 2
4 F3	F3 Activates functions 3
5 F4	F4 Activates functions 4
6 F5	F5 Activates functions 5
7 F6	F6 Activates functions 6
8 F7	F7 Activates functions 7
9 F8	F8 Activates functions 8
10 COM	Common (Reset)

Figure 17 UV Backplane Motherboard (JP12, JP14, and JP15)

JP12   JP14   Charger JP20   JP15
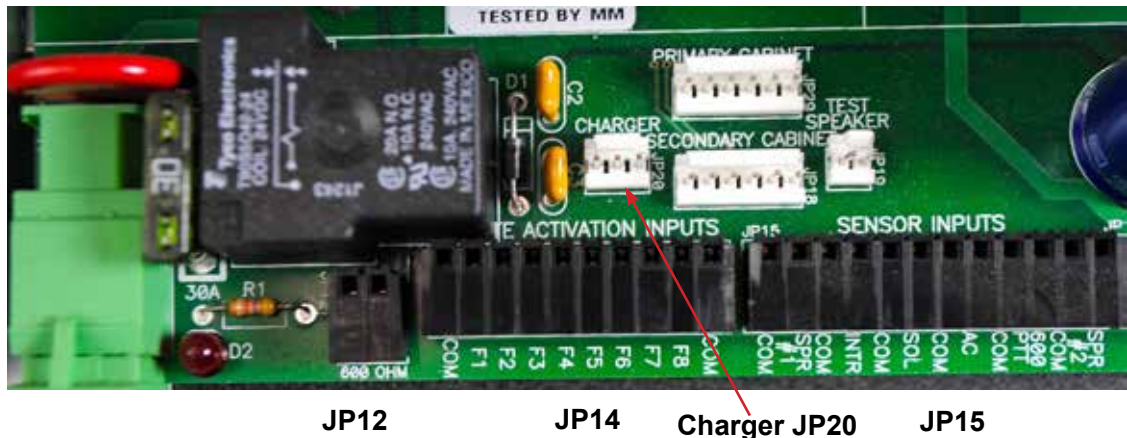
Charger Sense (JP20)

The charger sense (JP20) input is located on the backplane motherboard. It connects from the charger. Greater than 3 Vdc is a pass on JP20 pin 2. See Figure 17.

Sensor Inputs (JP15)

Terminal block JP15 is located at the bottom of the backplane motherboard. Use sensor inputs to detect and notify conditions occurring at an RTU location. See "Figure 17 UV Backplane Motherboard (JP12, JP14, and JP15)" on page 50.

Table 33 Sensor Connections

JP15 Terminal	Function
1 COM	Common
2 SPR #1	Spare #1
3 COM	Common
4 INTR	Intrusion
5 COM	Common
6 SOL	Solar
7 COM	Common
8 AC	AC Power
9 COM	Common
10 600 PTT	600 PTT
11 COM	Common
12 SPR #2	Spare #2

Spare 1 and 2 (JP15: pins 1 and 2)

Use for user-defined application.

Intrusion (JP15: pins 3 and 4)

Alerts the controller when one of the unit's doors has been opened. Low is intrusion pass.

Solar (JP15: pins 5 and 6)

Use to sense operation of a solar power system.

Jumper JP15: pins 5 and 6 when using solar. This jumper enables solar mode, which causes the system not to report a failure during low-light conditions or at nighttime. This is done by locking in a power pass until a master reset. For solar panel testing during the day, initiate a master reset, wait 15 seconds, and then poll.

AC Power/Solar (JP15: pins 7 and 8)

Jumper JP15 pins 7 and 8 when using solar only. If using AC, 7 and 8 are connected to the AC power sensor.

600 ohm PTT (JP15: pins 9 and 10)

Shorting pins 9 and 10 puts the UV+ controller card in local PA mode.

User-Defined Application (JP15: pins 11 and 12)

Use spare JP15: pins 11 and 12 for user-defined application.

+5 Vdc Supply (JP16)

The UV+ backplane motherboard can supply +5 Vdc for external use up to 150 mA. See Figure 18.

Table 34 External Sensors

JP16 Terminal	Function
1 (-)	Isolated Supply (ground)
2 (+)	Isolated Supply (+5 V)

Rotation Sensor (JP17)

Terminal block JP17 at the bottom of the backplane motherboard is for Rotation Sensor Inputs. See Figure 18. Activate these by a short to common. Only use these inputs with a rotating electronic siren. When a zone function is run, the speaker array rotates until the corresponding direction sensor input detects that the array is facing the proper direction. A rotation time-out timer stops the siren from rotating after 20 seconds if the sensor is not connected.

Table 35 Rotation Sensor Connections

JP17 Terminal	Function
1 COM	Common
2 NOR	North
3 SOU	South
4 EAS	East
5 WES	West

Figure 18 UV Backplane Motherboard (JP15, JP16, JP17, and JP13)
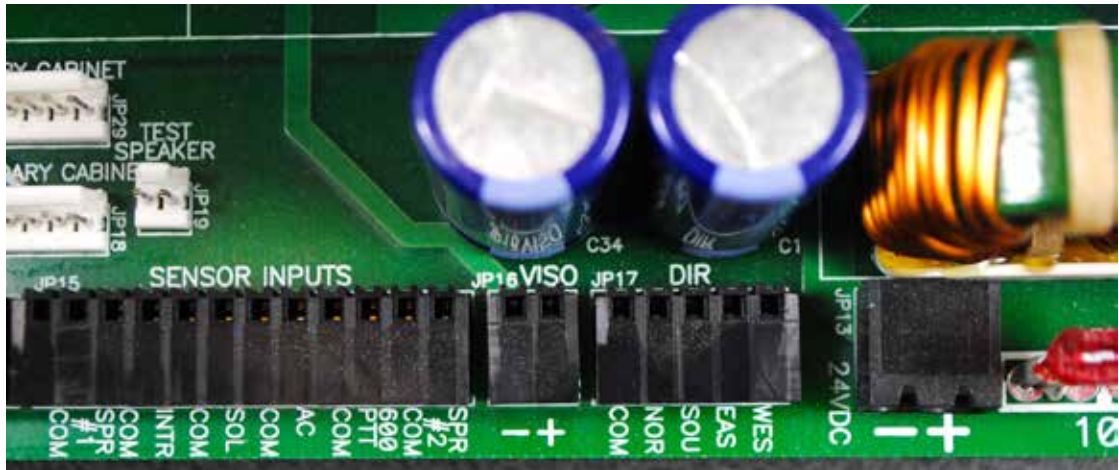
Site Address Switch (S1)

For digital systems only: For the siren to report back with its identity, define the site address by setting DIP switches located on the board. The DIP switches have values of 1, 2, 4, 8, 16, 32, 64, 128, 256, and 512. Add appropriate DIP switch values to define the site number address.

Example

To define the board for Site #1, toggle the first DIP switch to the left. All other DIP switches are to the right. For Site #2, toggle the second DIP switch to the left. For Site #3, toggle the first and second DIP switch to the left. For Site #4, toggle the third DIP switch to the left. For Site #5, toggle the first and third DIP switch to the left. Continue this method to define other site number addresses.

Figure 19 Setting the Switch Number Example
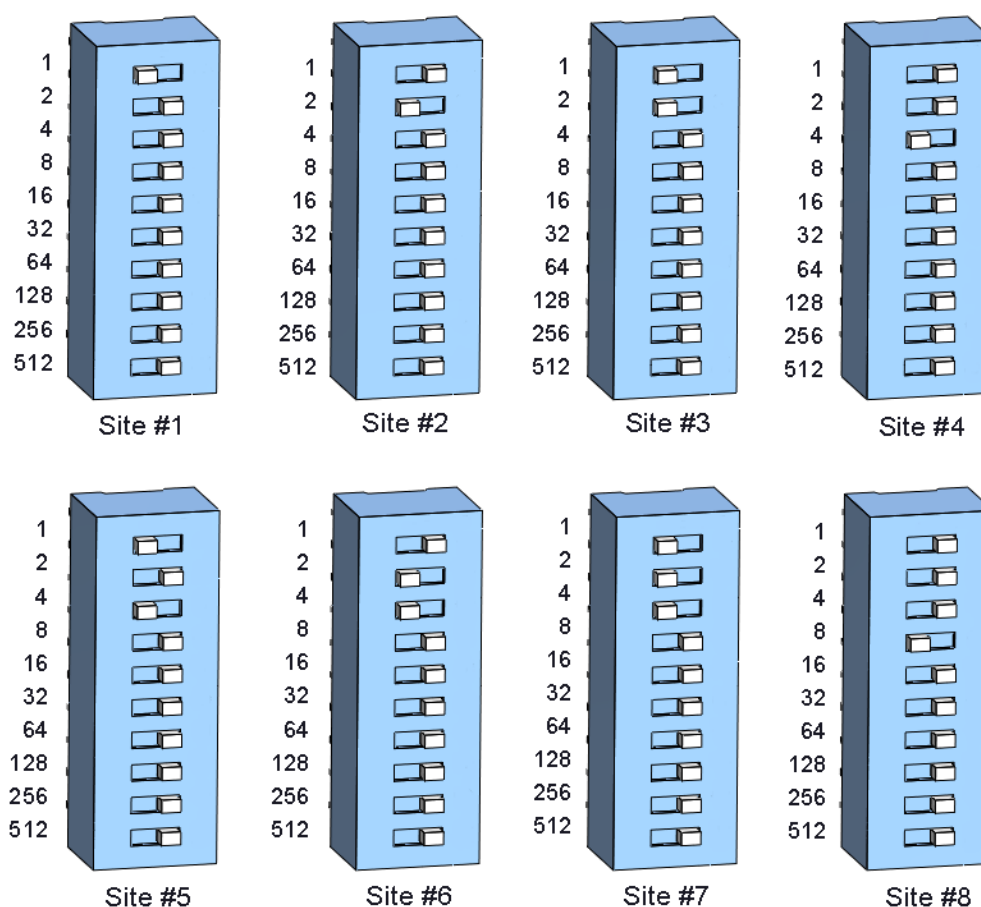
Switch number	1	2	3	4	5	6	7	8	9	10
Binary number	1	2	4	8	16	32	64	128	256	512

Example: Switch numbers 1, 2, and 3 are binary numbers 1, 2, and 4.

Add 1 + 2 + 4 = 7; 7 is the unit address

NOTES:

- Programming details are in the software manual.

- Set the site address to one to program UV+ controller card with firmware (HEX code).

- To program a non-digital unit using FSPWARE Software, set the site address to one. When programming is completed, change the DIP switch setting to the actual site address.

- The site address is stored at power-up of the controller. If the site address is changed, the power (battery and AC) must be turned off and then on.

Radio Control

You can activate the siren by a radio signal when the optional radio receiver is incorporated into the UV controller. Activation by radio control has the advantage that control lines are not required between the siren control site and the siren location. A suitable receiver in the UV controller can control voice and tone signals. Federal Signal offers a full line of radios which cover the VHF bands and UHF bands.

Federal Signal receivers for one-way communications (receive only) are connected to a sealed female PL259 (SO239) cabinet-mounted bulkhead connector. The antenna cable connection is made to the female PL259 (SO239) connector outside the cabinet. Protect this connection from moisture. Mount the antenna facing the activating radio antenna per instructions provided with the antenna. See the Maintenance section for the radio adjustment procedure.

Federal Signal transceivers for two-way communications are connected to a sealed female N-Type cabinet-mounted polyphaser connector. The antenna cable connection is made to the female N-Type cabinet-mounted polyphaser connector outside the cabinet. Protect this connection from moisture. Mount the antenna facing the activating radio antenna per instructions provided with the antenna. See the Maintenance section for the radio adjustment procedure.

Two-Way Sensor Package

The two-way sensor package uses a variety of sensors in the UV controller, which, when equipped with a two-way radio, allow the remote units to communicate their status back to the base station. This reduces station downtime by quickly alerting operating personnel to potential problems at remote units.

The package itself consist of sensors to provide information on the following conditions:

- AC Power

- Battery Voltage (built in)

- Charger Operation (built in)

- Activation Current (built in)

- Signal A (built in)

- Signal B (built in)

- Quiet Test (amplifiers and drivers built in)

- Intrusion

- Local activation/False Alarm

- Amplifier Condition

- Rotation (Rotating sirens only)

All sensors are optically coupled to provide protection in electrical interface conditions. Consult Federal Signal for further information.

Local Quiet Test

The Local Quiet test allows performing Quiet Tests on the siren control and siren speaker array. Quiet Test uses a 20 kHz tone to inaudibly test the tone generators, amplifiers, and speaker drivers. To perform this test, program the Quiet Test under one of the activation codes. If it is one of the first seven codes, then you can activate it manually through the switches on the front panel or with the remote activation inputs. Normally once the Quiet Test is programmed under one of the activation codes, the code is activated over the radio channel, the panel switches, or with a local laptop computer running SFCDWARE.

Operation

Obtain the results of a Quiet Test remotely using the SS2000+ printout or the SFCDWARE control and status monitoring software. You can also obtain the status locally at the siren site with a portable computer running SFCDWARE. The actual amplifier voltage and current are monitored with Quiet Test providing a true indication of each amplifier and load performance.

Perform calibration of the Quiet Test by pressing switches 2 and 3 on the front panel at the same time. Prior to performing a calibration, the speakers must be known good, as per the Maintenance section.

Finding Faults

The siren automatically resets when running a Quiet Test. Reset prior to a Quiet Test is not required. After a test, poll the siren from the SS2000+. The SS2000+ printout indicates the present siren status.

When using SFCDWARE, the controller automatically updates the Quiet Test status each time a new Quiet Test is run. Obtain the status from the status detail screen and from the Reports menu.

Digital Voice Recording

When purchased, the Digital Voice option adds a microSD card that is capable of storing up to 4,093 voice or tone messages that total up to 17 hours of total recording time.

File Format

The digital voice message format is 8000 samples per second, 8 bit, mono. Save these messages with a DV#.wav naming format, or the messages are not recognized. This naming format results in messages DV1.wav through DV4093.wav.

Voice Levels Within Files

Voice sections of a recording should be "Normalized" so that the peaks are at the limits. After Normalization, increase the gain by 4 dB to deliver full nominal output power at the peaks and about 3.5 dB down on average during a word.

Tone Levels Within Files

Tone signals in the recording (such as siren sounds, horn sounds, and music) should be at no more than 36% of the maximum level (-9 dB) to prevent them from overdriving the amplifiers and overpowering the drivers. These can be normalized to set them at the maximum level and then reduced to 36% or -9 dB. Voice maximum level is +4 dB.

These levels assume that the UV attenuation is not programmed and the DV GAIN on the UV+ Controller is turned fully up. See "Figure 9 UV+ Controller Front Panel Indicators" on page 34. This delivers -1.8 dB compared to the square wave siren tones or about 54 V_{rms}. For UVRI-Bs, this delivers -2 dB compared to the square wave siren tones.

Filtering Files

You need to filter the files to reduce content below 300 Hz. This prevents low-frequency tones in a recording from saturating the output transformer and the speaker drivers.

NOTICE

SPEAKER DAMAGE: The speaker drivers can not reproduce these frequencies and can be damaged by them.

Checking/Setting UV+ Controller DV Levels

These levels assume that the UV attenuation is not programmed and the DV GAIN on the UV+ Controller is turned fully up.

To check the UV+ Controller DV levels, with the speakers unplugged from the amplifiers:

1. Turn the DV GAIN pot fully (25 turns) counterclockwise.

2. Play the stored tone function (-9 dB).

3. Monitor the amplifier's output level.

4. Turn up the DV GAIN pot until 69 V_{rms} is reached.

   NOTE: It is important to start by turning the DV GAIN pot down to a low level and work your way up to prevent overdriving the amplifiers.

Alternatively, with the speakers plugged into the amplifiers:

1. Turn the DV GAIN pot fully (25 turns) counterclockwise.

2. Play the stored tone function.

3. Monitor the amplifier's output level.

4. Turn up the DV GAIN pot until 54 V_{rms} is reached.

   NOTE: It is important to start by turning the DV GAIN pot down to a low level and work your way up to prevent overdriving the amplifiers and speakers.

These methods leave the tone 0.4 to 1.8 dB low, depending on frequency, but limit the current to a safe level.

Converting the Files

To convert the files:

1. Adjust the amplitude to ensure that the peaks are at or slightly into the limits. If converting from 16 bit to 8 bit, ensure that dithering is disabled.

2. To program activation codes with Digital Voice Messages under them, follow the instructions in the programming software. It is possible to assign codes to the functions DIG VOICE 1 through DIG VOICE 4093. As in all sounding functions, the unit must first receive the ARM command followed by one of the DIG VOICE commands to activate the stored message. The Digital Voice Volume is adjustable through a potentiometer located on the controller front panel, called DV Gain.

Maintenance

⚠ WARNING

Service or maintenance should be performed by qualified personnel familiar with the siren, associated controls, and power sources being used and in conjunction with the authorities having jurisdiction.

Before servicing or maintaining, ensure that remote activation cannot occur and disconnect power to the siren and its controls.

⚠ WARNING

SOUND HAZARD: The sound output of sirens is capable of causing permanent hearing damage at short distances. Therefore, always wear hearing protection when performing tests or maintenance on the siren and avoid excessive exposure.

To prevent the siren from sounding, always turn off the power to the siren at the ac disconnect switch and remove any DC power being supplied by the Battery Box before inspecting or maintaining the siren.

UV Controller Preventive Maintenance

Test the siren for proper operation at least once a month. A daily test at noon, curfew, or other selected time is preferred. This not only enhances the usefulness of the siren and verifies that it remains ready for use in an emergency but also instills public confidence in the reliability of the warning system.

In order to minimize the possibility of siren failure, annual inspection and maintenance are recommended. Additionally, see "Amplifier and Speaker Pre-Operation Checkout (Non-Active Mode)" on page 32.

Driver Replacement and Inspection

Each amplifier drives four 100-watt speakers. To measure the resistance of a given speaker:

1. With an ohmmeter, measure the outputs on the terminal strip (JP21-JP28) (at the bottom of the backplane motherboard).

2. Observe the DC resistance of the speakers. The normal DC resistance of a speaker set of four drivers is approximately 4.5 ohms. A DC resistance measurement of less than 3.5 ohms indicates that one or both of the speakers is probably shorted. A reading of approximately 9 ohms or more indicates that at least one of the speakers in the set is open; a reading of infinity indicates that both speaker sets are open.

3. If resistance is abnormal, perform resistance checks on each speaker individually at the speaker array. Refer to the signal connections section for speaker locations. Each driver is 4.5 ohms.

4. To replace a defective driver, remove the four hex head 1/4-inch mounting bolts that are holding the inspection plate. Make sure the flat washers and split washers are not misplaced. Note the color and location of the wires going to the driver. Remove the driver by turning it counterclockwise. Make sure that the male threads are lightly greased, and then install the new driver. Reconnect the wires as previously noted. Reinstall the inspection plate. Repeat the resistance check above.

5. Test the siren to verify the driver was properly installed.

Checking the Signal

To check the signal operation:

1. When checking for proper control module output, unplug the terminal strip connectors to the speakers (at the bottom of the backplane motherboard) to eliminate output from the speaker array.

2. Activate each of the signals and observe the signal indicators on the control module and the amplifiers.

3. If desired, you can connect an oscilloscope or digital multi-meter (DMM) to the amplifier module output terminal strip to observe the amplifier output. This output is at least 67 V_{rms} during a signal. To limit sound output, plug in one amplifier terminal strip connector at a time during this test.

4. Plug all of the amplifier terminal strip connectors to enable amplifier outputs.

Checking the Battery

To check the battery:

1. The voltage of a fully charged set of batteries is approximately 27.2 Vdc, and the charger current is less than 2 A. The charger is set for 27.2 +/- 0.1 Vdc at room temperature.

2. Load test the batteries per the manufacturer's specifications.

3. Some batteries are equipped with a built-in hydrometer. When the hydrometer's eye is green, the battery is charged. If the eye is dark, the battery needs to be charged. If the eye is light in color, the battery is low on fluid and needs to be inspected for leaks. Maintain or replace the battery as recommended by its manufacturer; obey local or state laws governing the disposal of lead-acid batteries.

4. Check the battery terminals for corrosion. Clean and grease connectors and terminals if necessary.

Checking the Charger

To check the charger:

1. Turn off the AC power to the Control Cabinet.

2. Measure the overall battery voltage between Battery 1 (negative) and Battery 2 (positive). The battery voltage should be 25 to 27 Vdc (nominal).

3. Turn on the AC power to the Control Cabinet.

4. Measure the overall charger voltage between Battery 1 (negative) and Battery 2 (positive). Ensure the voltage is rising up to 27 Vdc (nominal).

NOTE: If your GUEST charger is not working, you may need to replace it. Call Federal Signal for the Battery Charger Retrofit Kit Q860000236 for UV Cabinet (manual number 25500365).

Adjusting Two-Way Radio Receiver

This procedure is completed at the factory. Only complete this procedure if radio re-alignment is required or the radio is installed in the field.

Qualifications

Radio shop and/or a properly trained radio technician.

Equipment Required

1. Service Monitor

2. Oscilloscope

Setup

Connect the Unit Under Test (UUT) to the service monitor.

Adjusting the receive audio

To adjust the receive audio:

1. Using a service monitor, modulate the correct RF signal into the receiver with a 1 kHz tone

    -   If bandwidth is 12.5 kHz (typical), then modulate at a 1.5 kHz deviation. If using a private line, add 0.375 kHz private line deviation to the signal.

    -   If bandwidth is 25 kHz, then modulate at a 3 kHz deviation. If using a private line, add 0.75 kHz private line deviation to the signal.

2. Adjust the level at TP16 (UV+ controller card) for 1 V_{pp} using the REC gain adjustment R105 (UV+ controller card front panel). See "Figure 14 UV+ Controller Card" on page 47.

Adjusting the transmit deviation

To adjust the transmit deviation:

1. Simultaneously flip switches 5 and 7 on the UV+ controller board. This causes the controller to transmit a calibration tone for approximately 8 seconds.

2. Measure the deviation level using a radio service monitor set to the correct RF.

3. Adjust the TX level (UV+ controller card front panel) for the following deviation level on the radio service monitor.

    *   If bandwidth is 12.5 kHz (typical), then adjust for a 1.5 kHz deviation. If using a private line, add 0.375 kHz private line deviation to the signal.

    *   If bandwidth is 25 kHz, then adjust for a 3 kHz deviation. If using a private line, add 0.75 kHz private line deviation to the signal.

4. If this step fails to solve the issue, then check base station deviation levels as per the base station documentation and manual. Also if used, check the repeater.

Recommended Cables for Radio

The Federal Signal part number, communication control cable, and power cable are on the Recommended Cables for Radio sheet (SYS5060).

To download the Recommended Cables for Radio sheet:

1. Go to www.fedsig.com.

2. Search for SYS5060.

600-ohm Adjustment Procedure for Activation Audio

To use the 600-ohm input for activation receive audio, at JP6, place a jumper across pins 2 and 3. JP6 is located internally on the main controller card.

1. RX adjustment

    Transmit a tone from the base station.

    *   Ensure that the base station TX level was previously adjusted properly.

    *   Ensure that the tone is not clipped by viewing the waveform with an oscilloscope.

    *   Verify that the nominal base station TX level is 1 V_{pp}

    Adjust the level at TP16 (UV+ controller card) for 1 V_{pp}

    *   Use the REC gain adjustment R105 (UV+ controller card front panel).

    *   Ensure that the tone is not clipped by viewing the waveform with an oscilloscope.

2. TX adjustment (If one-way communication, then skip this step)

    *   Simultaneously press buttons 5 and 7 on the UV+ controller card. This causes the controller to transmit for approximately 8 seconds.

    *   Determine the proper siren TX level required: the nominal UV TX level is 1 V_{pp}. The TX levels for all of the siren controllers must be the same. Once you adjust one siren's TX level, adjust all other sirens to the same level. Measure at the base station.

- Adjust the TX level (UV+ controller card front panel) for the correct level determined above.

- Ensure that the tone is not clipped or distorted by viewing the waveform with an oscilloscope.

600-ohm Adjustment Procedure for External Audio Source Input

To use the 600-ohm input for the external audio, at JP6, place a jumper across pins 1 and 2. JP6 is located internally on the main controller card.

Audio source adjustment for external audio source.

- Transmit a tone from the external audio source.

- Ensure that the tone is not clipped or distorted by viewing waveform with an oscilloscope.

- Verify that the nominal external audio source level is 1 V_{pp}.

- If required, adjust the external audio source.

Audio source adjustment for UV controller.

- Transmit a tone from the external audio source.

- Contact closure at JP15 pins 10 and 11 (PTT: Push To Talk) is required to activate the audio mode.

- Adjust the level using the external audio gain adjustment R123. (R123 is located on the UV+ controller card. See "Figure 14 UV+ Controller Card" on page 47.)

NOTE: The preferred method of setting this level is to use a dB meter or by ear.

- Activate the siren through an external audio source.

- Set for the same level as the standard siren sounds.

- Ensure that the sound is not distorted.

Table 36 Troubleshooting

Problem	Action
No Radio Decode	• Unit was not armed before sending a DTMF function code, or the unit is not programmed to recognize that particular code sequence or signal is not being received properly. • Verify programming is correct. Check the received audio signal quality at the RX test pin on the front of the control card.
No Two-tone decode	Decoder is not programmed. Check radio connections if external. (See the wiring diagram.) Check for proper C/D polarity setting. Ensure that the radio is working properly by using a service monitor to inject a strong, clean signal. Check transmitter deviation.
Low output from speaker array	Check the battery voltage. Check speaker impedance. (See the Maintenance section.) Also check signal indicators on amplifiers during a function. If indicators are off, remove the amplifier for service.

Problem	Action
Function stops before normal timeout	Batteries may require further charging. Check battery voltage under load. Check charger output.
Local PA feeds back	Lower PA volume using knob above MIC connector.
Local PA has little or no output	Hold MIC close to mouth. Increase PA volume using knob above MIC connector.
Batteries not holding charge	Check that charger fuses are intact and check charger output. Load test batteries.
EOWS*612 does not rotate	Check that the rotation relay on the backplane motherboard is operating (indicated by LED D2). Also check fuses F1 and F2 on the backplane motherboard.
Radio PA takes too long to timeout	Check radio for proper operation of squelch. CD LED should light while carrier is present.
Landline activation inputs do not function	Verify minimum 0.5-second contact closure is applied to JP14 on the backplane motherboard.

Getting Technical Support and Service

For Technical Support, contact:

Federal Signal Technical Support
Phone: 800-524-3021 or 708-534-4790
Email: techsupport@fedsig.com
www.fedsig.com

For Customer Support, contact:

Federal Signal Customer Support
Phone: 800-548-7229 or 708-534-3400 extension 367511
Email: customersupport@fedsig.com
www.fedsig.com

Appendix A Stainless Steel Care and Maintenance

Type 316 Stainless Steel is a durable material with strong anti-corrosion properties. With proper care and maintenance, it maintains an optimal appearance over a long service life. Exposure to high-saline environments, chlorides, abrasive chemicals, or carbon steel diminishes its anti-corrosion properties and increase the risk of damage.

⚠ CAUTION

Improper care of stainless steel diminishes its anti-corrosion properties and may result in surface damage.

- Use only stainless steel components (that is, washers, bolts, etc.) and tools when installing stainless steel products.

- Never use carbon steel or galvanized fasteners to install stainless steel products.

- Do not use cleaning products containing chlorides (that is, hydrochloric acid) or other abrasive chemicals.

- When power washing nearby surfaces, wrap stainless steel to prevent contact with concrete detergents.

- If chloride solutions or concrete detergents contact stainless steel, immediately rinse away with water.

- Always wear clean gloves when handling stainless steel products.

- Do not use abrasive brushes or scouring pads to wipe stainless steel.

- Unless otherwise specified, apply all cleaners and polishers with a soft, lint-free cloth or soft nylon brush. For heavier rust deposits, a nylon scouring pad may be required; however, buffing with nylon pads may alter stainless steel finishes. To minimize alteration, use only "ultra-fine" nylon pads and rub with the grain. Avoid excessive scrubbing.

- Do not clean stainless steel in direct sunlight or excessive temperatures.

- Do not weld, cut, drill, or grind carbon steel near stainless steel. Resulting particles will contaminate and rust stainless steel.

- Stainless steel care and maintenance may require the use of harmful chemicals. Follow all use and safety instructions provided with cleaning or polishing agents. Ensure personal protective equipment is worn in accordance with occupational health and safety guidelines stipulated by your local governing authority.

Cleaning

Routine cleaning with soap and water is usually sufficient to maintain the corrosion resistance and appearance of 316 Stainless Steel. Use a soft nylon brush to remove any accumulated dirt. Wash with mild soap or detergent, then rinse in clean water and wipe dry with a soft cloth.

Iron or Carbon Steel Contamination

Passivated stainless steel surfaces can be compromised by contact with iron or carbon steel products. This can result from exposure to nearby welding, cutting, drilling, or grinding of carbon steel. Grit from iron or carbon steel will quickly rust in the presence of moisture. If left unattended, contaminates may compromise passivation, leading to stainless steel rust. To remove contaminants from stainless steel surfaces, use a soft cloth to apply a solution of Oxalic Acid. Leave solution on surface for a few minutes to dissolve contaminating particles. Once clean, thoroughly rinse away all residual solution with clean water.

Corrosion

Type 316 Stainless Steel does not corrode with proper care. If signs of corrosion appear, clean immediately.

- Minor—Use an all-purpose lubricant, such as WD-40, to wipe affected stainless steel. Domestic stainless steel cleaners containing calcium carbonate or citric acid, such as Citisurf 77 Plus, can also be used. Rinse thoroughly with clean water. If rust remains, treat as moderate. If rust returns in a short time, treat for iron or carbon steel contamination.

- Moderate—Use E-NOX CLEAN or another phosphoric acid based stainless steel cleaner. Spread the cleaner evenly over the surface, wait 30-60 minutes, and then neutralize the acid with an alkaline cleaner like UNO S F. Thoroughly rinse away all residue with clean water. If rust remains, the stainless steel may need to be treated for severe corrosion or be replaced. If rust returns in a short time, treat for iron or carbon steel contamination.

- Severe—Due to the highly corrosive nature of severe rust treatments and the inherent risks to personnel and surrounding environments, a professional service provider is recommended. Severe rust is treated with a pickling bath, typically containing highly corrosive hydrofluoric acid. Once treated, stainless steel can be passivized with mild nitric acid.

Mortar and Cement Spatter

If mortar or cement comes into contact with stainless steel, remove it immediately. Use E-NOX CLEAN or another phosphoric acid based stainless steel cleaner. Spread the cleaner evenly over the surface, wait 30-60 minutes, and then neutralize the acid with an alkaline cleaner like UNO S F. Thoroughly rinse away all residue with clean water.

Graffiti Removal

Remove graffiti from stainless steel with a biodegradable graffiti-cleaning spray or wipe. Avoid using knives or hard scraping tools to remove graffiti, as these may damage stainless steel surfaces.

Oil and Grease Marks

Remove oil or grease from stainless steel with hydrocarbon solvents such as methylated spirit (Bartoline is a common brand), isopropyl alcohol (that is, rubbing alcohol) or acetone. Apply solvent several times with a clean, non-scratching cloth until all oil or grease is removed.

Heavily Neglected or Tarnished Surfaces

Use domestic metal polish to improve the appearance of tarnished stainless steel. Chrome polishes for automotive parts are suitable for stainless steel and are widely available. Treat entire stainless-steel surface to avoid discolored patches.

Heavily Damaged Products

To avoid progression of damage, identify and address problems as early as possible. Heavy damage includes structural compromises such as visible dents, cracks, breaks, and rust that can undermine the integrity of a product. Heavily damaged products should be removed from service until a repair or replacement can be made. To prevent worsening of damage, remove any significant rust as soon as possible.

NOTICE

This content is provided for informational purposes only. Any mention of a specific product is not a guarantee of quality or effectiveness. Federal Signal is not responsible for any improper use or handling of hazardous chemicals.

Appendix B Wiring Diagrams

Figure 20 DSA Retrofit Wiring for UV Controllers

Figure 21 Original DSA Wiring for UV Controllers not using retrofit kit

ORIGINAL DSA WIRING FOR ULTRAVOICE CONTROLLERS NOT USING THE RETROFIT KIT

NOTE: IMPROPER INSTALLATION WILL RESULT IN DAMAGE TO THE DRIVERS. IN THE ORIGINAL OBSOLETE DSA CONFIGURATIONS, DRIVERS ARE IN A PARALLEL RESISTIVE CONFIGURATION. EACH SET OF PARALLEL CONFIGURATION DRIVERS CAN HANDLE HALF OF THE AMP OUTPUT VOLTAGE. THEREFORE EACH SET OF PARALLEL CONFIGURATION DRIVERS CAN BE PUT IN SERIES, WITH ANOTHER SET OF PARALLEL CONFIGURATION DRIVERS, UP TO 4 DRIVERS PER AMPLIFIER.

* ODD NUMBER DSA REQUIRES ANOTHER ODD NUMBER DSA TO ACHIEVE THE EXTRA REQUIRED DRIVER.
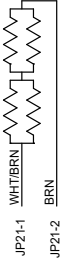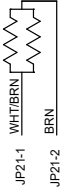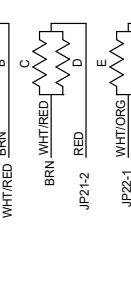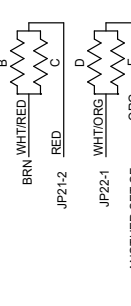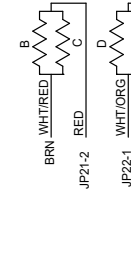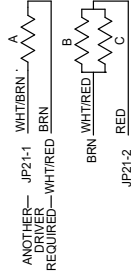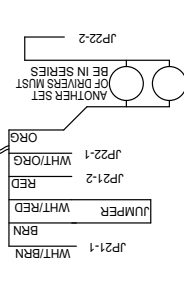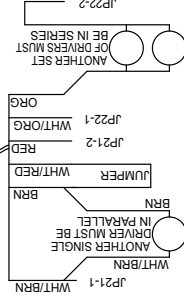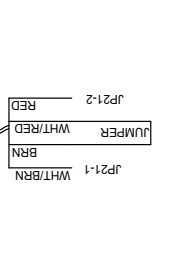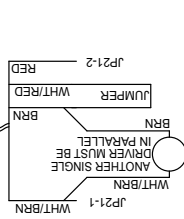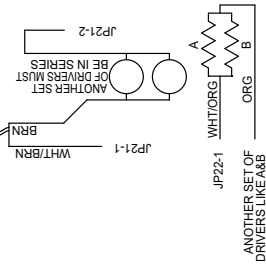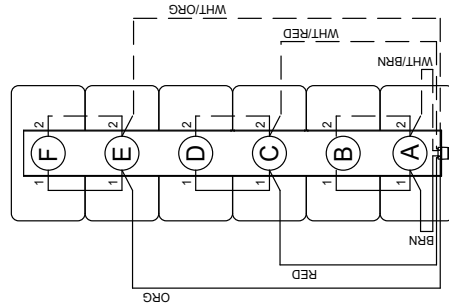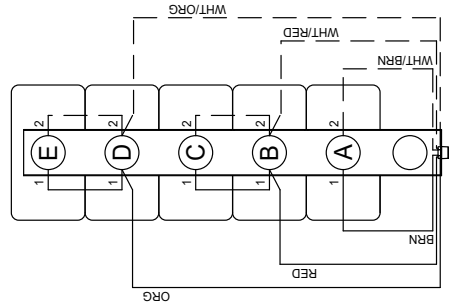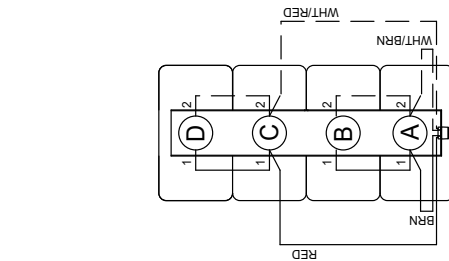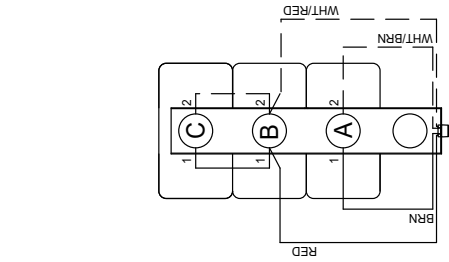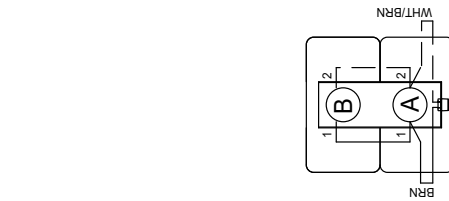
Figure 22 Modulator Speaker Array Retrofit Wiring

MODULATOR SPEAKER ARRAY RETROFIT WIRING FOR PRE-2002 MC & MCP CONTROLLERS TO ULTRAVOICE CONTROLLERS - MOD-UV-KIT (RETROFIT KIT)

291283C
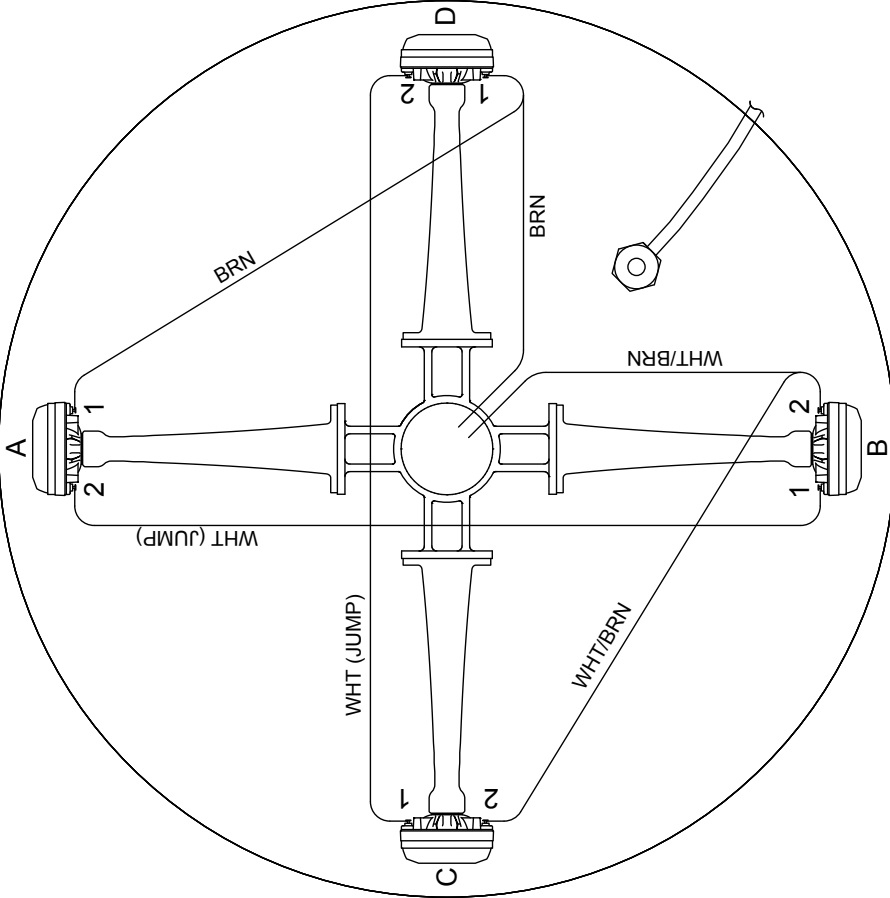
TOP VIEW MODULE 1
DRIVER ORIENTATION

ACTIVE MODULE	DRIVER-TERMINAL	WIRE COLOR
1 CUT RED & WHT/RED	A - 1 / A - 2	BROWN / WHT(JUMP)
	B - 1 / B - 2	WHT(JUMP) / WHT/BRN
	C - 1 / C - 2	WHT(JUMP) / WHT/BRN
	D - 1 / D - 2	BROWN / WHT(JUMP)
2 CUT YEL & WHT/YEL	E - 1 / E - 2	ORG / WHT(JUMP)
	F - 1 / F - 2	WHT(JUMP) / WHT/ORG
	G - 1 / G - 2	WHT(JUMP) / WHT/ORG
	H - 1 / H - 2	ORG / WHT(JUMP)
3 CUT BLU & WHT/BLU	I - 1 / I - 2	GRN / WHT(JUMP)
	J - 1 / J - 2	WHT(JUMP) / WHT/GRN
	K - 1 / K - 2	WHT(JUMP) / WHT/GRN
	L - 1 / L - 2	GRN / WHT(JUMP)
4 CUT GRY & WHT/GRY	M - 1 / M - 2	VIO / WHT(JUMP)
	N - 1 / N - 2	WHT(JUMP) / WHT/VIO
	O - 1 / O - 2	WHT(JUMP) / WHT/VIO
	P - 1 / P - 2	VIO / WHT(JUMP)
5 CUT WHT & BLK/WHT	Q - 1 / Q - 2	TAN / WHT(JUMP)
	R - 1 / R - 2	WHT(JUMP) / WHT/TAN
	S - 1 / S - 2	WHT(JUMP) / WHT/TAN
	T - 1 / T - 2	TAN / WHT(JUMP)
6 CUT PINK & WHT/PINK	U - 1 / U - 2	BLK / WHT(JUMP)
	V - 1 / V - 2	WHT(JUMP) / WHT/BLK
	W - 1 / W - 2	WHT(JUMP) / WHT/BLK
	X - 1 / X - 2	BLK / WHT(JUMP)

NOTE: EACH ACTIVE MODULE REQUIRES TWO WHITE JUMPERS (#T300214-09-009)

Figure 23 Modulator Speaker Array Retrofit Wiring

MODULATOR SPEAKER ARRAY RETROFIT WIRING FOR PRE-2002 MC & MCP CONTROLLERS TO ULTRAVOICE CONTROLLERS (**WITHOUT** USING MOD-UV-KIT)

291324B

MODEL	WIRES EXTENDING FROM MODULATOR	
MOD1004	WHITE/BROWN	TO JP21-1 (MOTHERBOARD)
	BROWN	JUMPER
	WHITE/RED	
	RED	TO JP21-2 (MOTHERBOARD)
MOD2008	WHITE/ORANGE	TO JP22-1 (MOTHERBOARD)
	ORANGE	JUMPER
	WHITE/YELLOW	
	YELLOW	TO JP22-2 (MOTHERBOARD)
MOD3012	WHITE/GREEN	TO JP23-1 (MOTHERBOARD)
	GREEN	JUMPER
	WHITE/BLUE	
	BLUE	TO JP23-2 (MOTHERBOARD)
MOD4016	WHITE/VIOLET	TO JP24-1 (MOTHERBOARD)
	VIOLET	JUMPER
	WHITE/GRAY	
	GRAY	TO JP24-2 (MOTHERBOARD)
MOD5020	BLACK/WHITE	TO JP25-1 (MOTHERBOARD)
	WHITE	JUMPER
	WHITE/TAN	
	TAN	TO JP25-2 (MOTHERBOARD)
MOD6024	WHITE/BLACK	TO JP26-1 (MOTHERBOARD)
	BLACK	JUMPER
	WHITE/PINK	
	PINK	TO JP26-2 (MOTHERBOARD)

Appendix C Drawings

Figure 24 UV Controller Two-way Radio Wiring Diagram

Figure 25 UVTD-IP Broadband Wiring Diagram
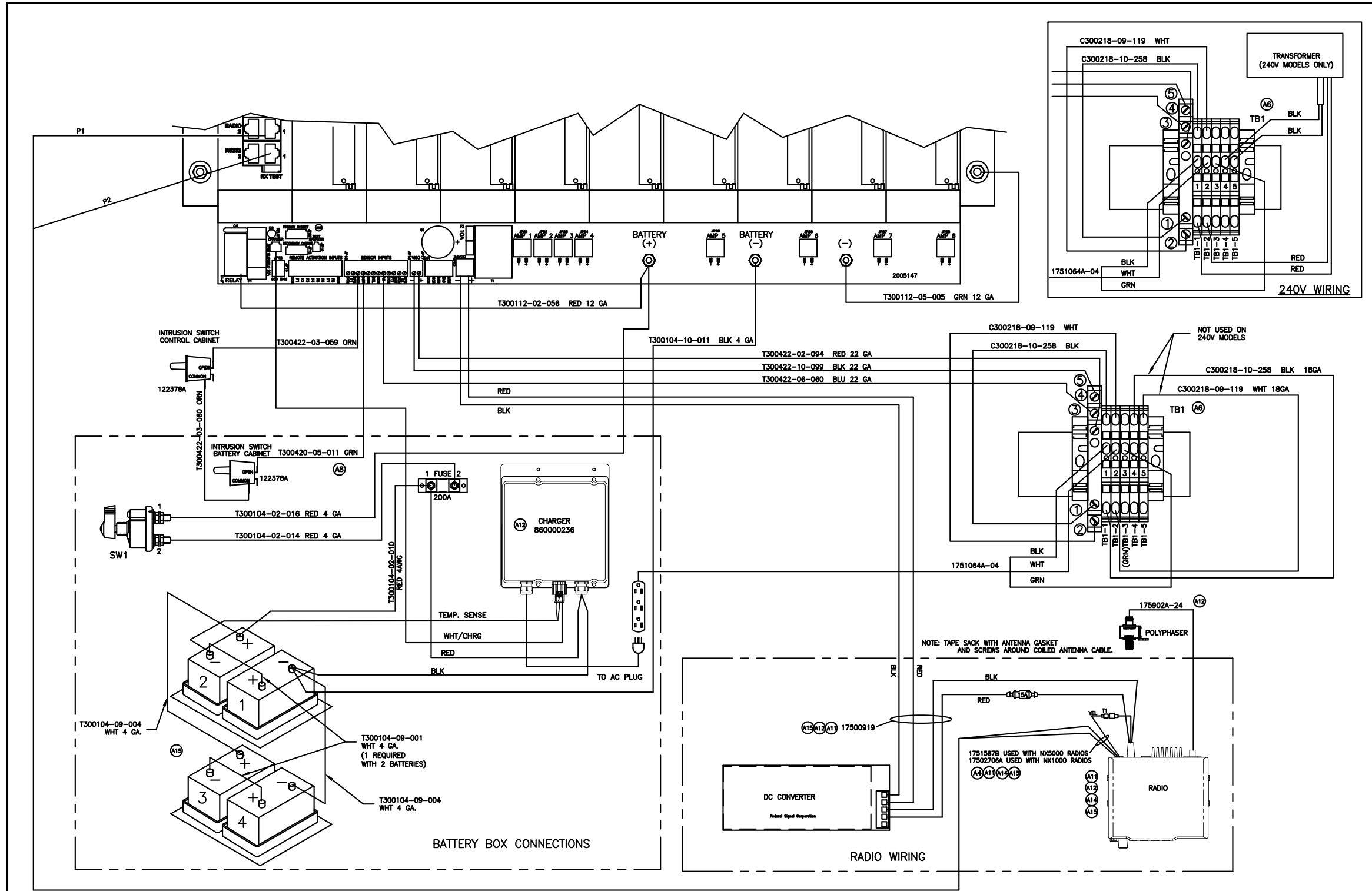
NOTES:
1. BATTERY CONNECTIONS ARE MADE DURING SIREN INSTALLATION.
2. WHEN USING ONLY TWO BATTERIES, DO NOT USE (3) WHITE 4 AWG WIRES (T300104-09-004).
3. LENGTH OF WIRES IN BATTERY CABINET (MEASURED FROM CONDUIT END TO TERMINAL START ±0.5").
   T300422-03-060, ORANGE, 36"
   T300420-05-011, GREEN, 36"
   T300104-02-016, RED, 13"
   T300104-10-011, BLACK, 10.5"
   1751064A-04, 10" TO END OF PLUG
   1461309A, 13.5"

BATTERY BOX CONNECTIONS

REV.	CHANGE	DATE	BY
A4	SEE ECR #10686	02/15/19	PJB
A3	SEE ECR #6443	10/7/16	MJF
A2	SEE ECR #443	2/13/13	BWH
A1	SEE ECR# 11-8608	12/16/11	VT
A	REL TO PROD. ECO #07-4108	8/7/07	MAF

Tolerances Unless Otherwise Specified
Angles ----- ±0.5°
x.xx ----- ±.015
x.xxx ----- ±.005

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FINISH: N/A
REMOVE BURRS, SHARP CORNERS AND EDGES
MATERIAL: N/A
UNIT OF MEASURE: RF
DRAWN BY MAF   CHKD. BY RC
DATE 5/22/07   DATE 8/3/07
SCALE AT C SIZE: NONE
DO NOT SCALE DRAWING

NAME
WIRING DIA,BROADBAND UVTD-IP

DRAWING NUMBER
259242A

72

Figure 26 UV Controller Two-Way Radio Receiver Final Assembly

Assembly notes on drawing:
- REPLACE BLANK W/UVARM OPTION WHEN USED
- ADHERE TO INSIDE OF DOOR
- INSTALL USING 100-110 IN-LBS TORQUE
- ASSEMBLE W/HANDLE IN UPWARD POSITION
- SEAL FITTINGS WITH RTV
- SECTION A-A, SECTION B-B, SECTION C-C, SECTION J-J, SECTION D-D, SECTION E-E
- ** NOT SHOWN ON DWG.
- *** INCLUDED BUT NOT INSTALLED

REFERENCE AND WIRING - ALL MODELS

QTY	PART #	DESCRIPTION
REF	259024A	WIRING DIA.,2-WAY,UV
REF	82261026A	DIM. OUTLINE,ULTRAVOICE
REF	8500811B	TEST PROC,FINAL ASSY,UV
REF	8500813C	PRODUCT SPEC,ULTRAVOICE
REF	8500833B	FINAL TEST DATA,UV
REF	8500858A	INSPECTION SHEET,FINAL
REF	8600124B	SOLAR ASSY,ULTRAVOICE
1	17500919	CABLE,POWER, UV TO KENWOOD
1	1751064A-04	CABLE,AC,W/FERRULES
1	175902A-24	CABLE,ANT,RG8X,N MALE/UHF
2	C300218-09-119	C-WIRE,5'(3/8NT:3/8NT)
2	C300218-10-258	C-WIRE,5'(3/8NT:3/8NT)
1	T300104-02-010	WIRE,TERM,4AWG,RED,14"
1	T300104-02-014	WIRE,TERM,4GA.,RED,20"
1	T300104-02-016	WIRE,TERM,4GA.,RED,30"
2	T300104-09-001	T-WIRE 13'(1/2"NT:1/2"NT)
3	T300104-09-004	T-WIRE,30'(1/2"NT:1/2"NT)
1	T300104-10-011	WIRE,TERM,4AWG,BLK,28"
1	T300112-02-056	WIRE,TERM,12GA,RED,21"
1	T300112-05-005	WIRE,TERM,12GA,GRN,5"
1	T300420-05-011	T-WIRE,69'(5/16NT:1/4NT)
1	T300422-02-094	T WIRE,28'(1/4NT:5/16NT)
1	T300422-03-059	WIRE,TERM,22GA,ORN,18"
1	T300422-03-060	WIRE,TERM,22GA,ORN,70"
1	T300422-06-060	T WIRE,28'(1/4NT:5/16NT)
1	T300422-10-099	T WIRE,28'(1/4NT:5/16NT)

ITEMS INCLUDED BUT NOT INSTALLED

QTY	PART #	DESCRIPTION
1	255354Q	MANUAL,ULTRAVOICE
1	8549A178A	ACCESSORY KIT,DESICCANT
1	8549A193A	LIGHTNING PROTECTOR AC

AMPLIFIER TABLE

NO. OF UV400	1	2	3	4	5	6	7	8
8600113A	8	7	6	5	4	3	2	1

Parts List (Models: UVTD, UVTDH, UVDU, UVTD240, UVTDS, UVTDHS, UVTDUS, UVTDS-240, UVTDH-FP, UVTDU-FP)

ITEM #	PART #	DESCRIPTION
1	86000236	CHARGER,BATT.,UV,24VDC
2	122323A-01	SWITCH,DISCONNECT,PLATED
3	122323A-02	FACE PLATE,DISCONNECT SWI
4	122378A	SWITCH,MOMENTARY
5	148A147A	FUSE,200A,BUSS #JJN-200
6	1612393B	LABEL,DIN RAIL,UV,120V
	1612393B-01	LABEL,DIN RAIL,UV,240V
7	1612875A-05	LABEL ELEC RATINGS 120VAC
8	1612590A-01	LABEL,UV MODEL,SERIAL NO.
9	1612590A-09	LABEL,UV MODEL,UVTD
	1612590A-10	LABEL,UV MODEL,UVTDH
	1612590A-11	LABEL,UV MODEL,UVTDU
	1612590A-12	LABEL,UV MODEL,UVTD240
	1612590A-27	LABEL,UV MODEL,UVTDS
	1612590A-28	LABEL,UV MODEL,UVTDHS
	1612590A-29	LABEL,UV MODEL,UVTDUS
	1612590A-30	LABEL,UV MODEL,UVTDS-240
	1612590A-33	LABEL,UV MODEL,UVTDH-FP
	1612590A-34	LABEL,UV MODEL,UVTDU-FP
10	161693A	DECAL,LABEL,FS LOGO
11	161767A	LABEL,BATTERY WARNING
12	161A509A	DECAL,LABEL,WARNING,CNTL UNIT
13	161A510A	DECAL,LABEL,WARNING,BATT BOX
14	161B511A	LABEL,DANGER,BATT.SHELF
15	170322A-316SS	CABINET,CONTROL,316SS
	170345D	CABINET,CONTROL,ALUMINUM
16	170329A-316SS	CABINET,BATTERY,316SS
	170346D	CABINET,BATTERY,ALUMINUM
17	2005147G	PCBA,UV MOTHERBOARD
18	2005173F	PCBA,DC TO DC CONVERTER
19	2005698E	PCBA,UV+ CONTROLLER
20	229218A	BRKT,T BLOCK,END,DIN MT.
21	229282A	TERM.BLOCK, 3POS, BRANCH
22	229288A	BLOCK,TERM,GROUND
23	230286A	SPACER,.25 HEX,6-32X.375
24	231194A	PLUG,HOLE,SS,1.38"
26	284454B	INPUT MODULE, 120V AC/DC
27	286891A-03	RF LHTG PRO,125-1000 MHZ
28	288810A-04	DIN RAIL,ALUM,UNCOATED,4"
29	19902693A-01	RADIO,KENWOOD NX1700
	19902693A-02	RADIO,KENWOOD NX1800
	19902326A-01	RADIO,KENWOOD NX5700K-SPFS,W/FP
	19902163A-03	RADIO,KENWOOD NX5800K2-SPFS,W/FP
31	7000A419-06	SCR,6-32,SS,MACH,PAN HD.
32	7002A009-16	BOLT,HEX HD SS 3/8-16
34	7011246A-08	SCR,#10 TYP B,PAN TORX,STL
35	7011A1S2-06	SCR,THD FORM,PAN,PHIL,#8,
36	7058050A	NUT,KEPS,1/4-20,SS
37	7058065A	NUT HEX EXT KEPS 3/8-16
38	7058A033	NUT,MAC HEX EX KEP,STL,5/
39	7058A047	NUT,MACH SCR HEX KEPS 10-
40	7058A063	NUT HEX 3/8-16
41	7072A035	WASH,FLT,SS,.406X 1IN X.0
43	7074A046	LKWASH,SPLIT SS 3/8 SCR
45	81481875B	LABEL,NAMEPLATE,U.L.
46	8402A066A	FUSE BLOCK ASSEMBLY
47	8402A068A	FITTING,1"CONDUIT,CARLON
48	8581025A	1" COND. LIQUI-TITE, 7.5"
49	8600100B	RAIL UV CAGE
50	8600100B-01	RAIL ASSY MTHRBRD UV CAGE
51	8600100B-02	RAIL ASSY FRNT TOP UV CAGE
52	8600100B-03	RAIL ASSY FRNT BOT UV CAGE
53	8600101C-01	END PLATE ASSY UV CAGE
54	8600106C-W	CHANNEL,MTG CHANNEL,WHITE
	8600106C	CHANNEL,ALUM,MTG CHANNEL,
55	8600108A	CARDGUIDE,NYLON,6"
56	8600113A	FACEPLATE,BLANK
57	8600116B	BRACKET,MTG,SWITCH,DISCON
58	8600118D	BRKT,INTR.SWTCHCNTL,BOXAL
58a	8600118B-1	BRKT,INTRUSION SWITCH,UVIC
58b	8600118B-2	BRKT,INTRUSION SWITCH,SS CNTL
59	7000A427-04	SCR,MACH,PAN PHIL 6-32,31
	78000914A	PACKAGING, FOAM, UV CABINET
61	860000349A-01	BRKT ASSY, UV CAGE, SUPPORT,AL
	860000351A-01	BRKT ASSY, UV CAGE, SUPPORT,SS
62	77701225A-01	BRKT ASSY,RADIO,NX-5000
63	77701229A	BRKT2,RADIO,NX-5000
64	7000508A-08	SCR,MACH,PAN HD,PHIL,M4
65	8600112A-01	BRACKET ASSY,PWR SUPPLY
66	7058055A	NUT,EL STOP,THIN,1/4-20,
67	7000486A-18	SCR,MACH,PAN,PHIL,M4,SS
68	230317A	SPACER,1/2"ROUND ALUMINUM,7/16" LG
101	120833A	XFMR,PWR,TORROID
101	7002080A-72	SCREW,HEX,SS 3/8-1604 1/2
102	7072253A	WASHER,3/8,NEOPRENE
103	7075066A	LKWASH,INT.TOOTH,3/8 SS
**	150A109	TIE, CABLE, MOUNT
**	150A130A	TIE, CABLE, 4.29"L, WHT
**	150A146A	CABLE TIE, 8"L, BLK, UV STABIL
**	1612354A-08	LABEL,SHIPPING,UVTD
	1612354A-09	LABEL,SHIPPING,UVTDH
	1612354A-10	LABEL,SHIPPING,UVTDU
	1612354A-11	LABEL,SHIPPING,UVTD240
	1612354A-25	LABEL,SHIPPING,UVTDS
	1612354A-26	LABEL,SHIPPING,UVTDHS
	1612354A-27	LABEL,SHIPPING,UVTDUS
	1612354A-28	LABEL,SHIPPING,UVTDS-240
	1612354A-31	LABEL,SHIPPING,UVTDH-FP
	1612354A-32	LABEL,SHIPPING,UVTDU-FP
**	R70-08-03	ADHESIVE, RTV 6708
**	8402A070A-01	TRAY,BATT.,LARGE
**	1751587B	CABLE,RADIO,KENWOOD-UV
**	17502706A	CABLE,RADIO,NX1000-UV

Revision Block

REV	CHANGE	DATE	BY
B10	SEE ECR #17729	09/22/22	NJ
B9	SEE ECR #13757	7/1/20	MAF
B8	SEE ECR #13507	6/1/20	MAF
B7	SEE ECR #13145	3/2/20	MAF
B6	SEE ECR #12829	2/3/20	MAF
B5	SEE ECR #9210	2/23/18	MAF
B4	SEE ECR #8756	11/28/17	AEO
B3	SEE ECR #8615	11/8/17	MAF

Title Block

Tolerances Unless Otherwise Specified
Angles ±0.5°
X.XX ±0.015
X.XXX ±0.005

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FINISH: N/A
REMOVE BURRS, SHARP CORNERS AND EDGES
MATERIAL: N/A

DRAWN BY: MAF DATE: 10/23/01
CHKD. BY: MJF DATE: 10/24/01
MEASURE: RF
SCALE AT D SIZE: NONE

NAME: FINAL ASSY,ULTRAVOICE,2 WAY
DRAWING NUMBER: 8600111
SHEET 1 OF 2

TO UV25ST

ATTACH CLAMP
#150164A TO
MOTHERBOARD
USING EXISTING
MOTHERBOARD
SCREW

WIRE TIE

WIRE ASSY.
1461511

TO MOTHERBOARD

WHEN USING UV25ST OPTION,
AMPS ARE GROUPED TOGETHER WITH
UV25ST'S GROUPED TO THE RIGHT OF THEM.
CONNECT THE AMPLIFIER OUTPUT TO THE
UV25ST USING THE 1461511A WIRE SET.

FS-SINAD OPTION

SINAD BOARD
LOCATION

SINAD BOARD CONNECTION TO
UV CONTROLLER BOARD 2005141

FS-SINAD OPTION		
QTY.	PART NO.	DESCRIPTION
1	2005186C	SINAD BOARD
2	7000444A-05	SCR, MACH, PHIL HD., 4-40, S.S.
2	7075080A	LKWASHER, INT. TOOTH, #4, S.S.
2	8552A125A	WASHER, FLAT, TEFLON

UV400 AMPLIFIER

TRANSFORMER - 240V MODELS

ASSEMBLE TO CABINET PRIOR
TO CAGE INSTALLATION

CAGE ASSEMBLY

Tolerances Unless
Otherwise Specified
Angles ------- ±0.5°
X.XX ------- ±0.015
X.XXX ------- ±0.005

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FINISH: N/A

REMOVE BURRS, SHARP CORNERS AND EDGES

MATERIAL: N/A

MATERIAL DESCRIBED AND INFORMATION CONVEYED IS
PROPRIETARY TO FEDERAL SIGNAL CORPORATION, IS
OR MAY BE THE SUBJECT OF PATENT APPLICATIONS,
AND MAY OR MAYNOT BE COPIED, DIVULGED TO OTHERS,
OR USED FOR MANUFACTURING WITHOUT CONSENT.

UNIT OF MEASURE	DRAWN BY: MAF	CHKD. BY: MJF	SCALE AT D SIZE
RF	DATE: 10/23/01	DATE: 10/24/01	NONE

NAME: FINAL ASSEMBLY, ULTRAVOICE,2-WAY

DRAWING NUMBER: 8600111

SHEET 2 OF 2

REV	CHANGE	DATE	BY
**	SEE SHEET 1	*	*

Figure 28 Broadband UVTD-IP Final Assembly

ITEM NO.	QTY	PART NO.	DESCRIPTION
1	1	860000236	CHARGER,24V,10A
2	1	122323A-01	SWITCH,DISCONNECT
3	1	122323A-02	FACE PLATE,DISCONNECT SWITCH
4	2	122378A	SWITCH, INTRUSION, SPDT
5	1	148A147A	FUSE, 200A
6	1	16123393B	LABEL,DIN RAIL,UV,120V
7	1	1612590A-01	LABEL,UV MODELS,SERIAL NUMBER
8	1	1612590A-22	LABEL,UV MODELS,UVTD-IP
9	1	1612875A-XX	LABEL,UL ELEC RATINGS (See dwg. 1612875A)
10	1	161693A	LABEL,FS LOGO
11	1	161A509A	LABEL, WARNING, CNTRL
12	1	161B511A	LABEL,DANGER,BATTERY SHELF
13	1	170345D	CABINET,CONTROL,ALUMINUM
14	1	170346D	CABINET,BATTERY,ALUMINUM
15	1	2005147	PCBA, UV MOTHERBOARD
16	1	2005457	PCBA, SERIAL TO ETHERNET CONVERTER
17	2	229218A	BRKT,T,BLOCK END
18	4	229282A	TERM BLOCK,1-POLE,35MM DIN
19	1	229288A	GROUND TERM. BLOCK, 3-POS, 35MM DIN
20	1	231194	MISC MECH, PLUG, HOLE, 1.38" DIA.
21			
22	1	288454B	MISC ELEC, INPUT MODULE, AC/DC
23	1	288810A-06	DIN RAIL ALUM UNCOATED 6" LENGTH
24	34	7000A419-06	SCREW, MACH., PAN HD, 6-32 X 3/8
25	11	7002A009-16	BOLT,HEX HD,SS,3/8-16 X 1
26	16	7011246A-08	SCREW,TORX, #10,TYPE B, BLK
27	2	7011A152-06	#8 SHT.MTL.SCREW,S.S.
28	5	7058050A	NUT,MACH SCR,KEPS,1/4-20
29			
30	6	7058065A	NUT,KEPS,3/8-16,SS
31	1	7058A033	NUT,MACH SCR,KEPS,5/16-18
32	8	7058A047	NUT,MACH SCR,KEPS,10-32
33	5	7059A063	NUT, 3/8-16
34	10	7072035	WASHER,FLAT, FOR 3/8 SCREW
35	9	7074A046	LKWSHR, SPLT, SS, 3/8
36	4	7075A011	WASHER, INT TTH, #6
37	1	814651875B	LABEL,SIREN CONTROLLER,U.L.
38	1	8402A066A	FUSE BLOCK ASSEMBLY
39	2	8402A068A	FITTING,1" CONDUIT,CARLON
40	1	8581025A	1" COND,LIQUI-TITE,7.5"
41	1	8600106C	CHANNEL,MTG,CABINET
42	20	8600108	CARD GUIDE,NYLON,6"
43			
44	4	8600100B	RAIL,ULTRA VOICE,CAGE
45	2	8600100B-01	RAIL ASSY,ULTRA V CAGE,MOTHERBOARD
46	1	8600100B-02	RAIL ASSY,CAGE,FRONT,TOP
47	1	8600100B-03	RAIL ASSY,CAGE,FRONT,BOTTOM
48	2	8600101C-01	END PLATE,ASSY,ULTRAVOICE CAGE
49	8	8600113A	FACEPLATE,BLANK
50	1	8600116A	BRACKET,MTG,SWITCH,DISCONNECT
51	2	8600118C	BRACKET,INTRUSION SWITCH
52	1	8605123A-01	PLATE ASSY, BROADBAND, UVTD-IP
53	1	231208A	PLUG,HOLE,0.88" DIA.
**	10	150A109	CLAMP,CABLE TIE WRAP
**	9	150A130A	TIE CABLE,MOUNT
**	6	150A146A	TIE WRAP,UV STABILIZED
**	1	1612354A-21	LABEL,SHIPPING,UVTD-IP MODEL
**	4	8402A070A-01	TRAY,BATTERY,LARGE
**	.05OZ	R70-08-03	ADHESIVE,RTV 6708,SIL
*	1	1461243A	WIRE LEAD,POWER SUPPLY
*	1	1461309A	WIRE LEAD,CHARGER SENSE
*	1	1751064A-04	CABLE,AC,W/FERRULES
*	1	1751186B-03	CABLE,MODULAR,6 COND,1 TO 6,3 FT.
*	1	1751415A	CABLE,2 COND,SHIELD,W/FERRULES & RING TERM

ITEM NO.	QTY	PART NO.	DESCRIPTION
*	2	C300218-09-119	C-WIRE,WHT,5"
*	2	C300218-10-258	C-WIRE,BLK,5"
*	1	C300422-02-168	C-WIRE,RED,15"
*	1	C300422-10-165	C-WIRE,BLK,15"
*	1	T300104-02-010	T-WIRE,RED,14"
*	1	T300104-02-014	T-WIRE,RED,20"
*	1	T300104-02-016	T-WIRE,RED,30"
*	2	T300104-09-001	T-WIRE,WHT,13"
*	3	T300104-09-004	T-WIRE,WHT,30"
*	1	T300104-10-011	T-WIRE,BLK,28"
*	1	T300112-02-056	T-WIRE,RED,21"
*	1	T300112-05-005	T-WIRE,GRN,5"
*	1	T300420-05-011	T-WIRE,GRN,69"
*	1	T300422-02-094	T-WIRE,RED,28"
*	1	T300422-03-059	T-WIRE,ORN,18"
*	1	T300422-03-060	T-WIRE,ORN,70"
*	1	T300422-06-060	T-WIRE,BLU,28"
*	1	T300422-10-099	T-WIRE,BLK,28"
**	1	8549A178A	ACCESSORY KIT,DESICCANT
**	1	8549A193A	LIGHTNING PROTECTOR
**	1	255354Q	MANUAL,ULTRAVOICE
**	0	8500858	INSPECTION SHEET,FINAL
**	REF	82261026	DIM. OUTLINE,ULTRAVOICE
**	REF	8500811	TEST PROC.,FINAL ASSY,UV
**	REF	85001698	PRODUCT SPEC,ULTRAVOICE
**	REF	8500833	FINAL TEST DATA,UV
**	REF	259242	WIRING DIA,BROADBAND,UVTD-IP
**	1	255373	MANUAL,SE2000,2005457,SERIAL TO ETHERNET
**	REF	85001342	TEST DATA SHEET,SE2000,2005457
54	1	2005698	PCBA, UV CONTROLLER
55	1	860500295	KIT, PCBA COVER
56	1	860000349A-01	BRKT ASSY, UV CAGE, SUPPORT, AL
57	1	78000914A	PACKAGING, FOAM, UV CABINET

LABELS ON INSIDE OF CABINET DOOR

SECTION A-A
SECTION B-B
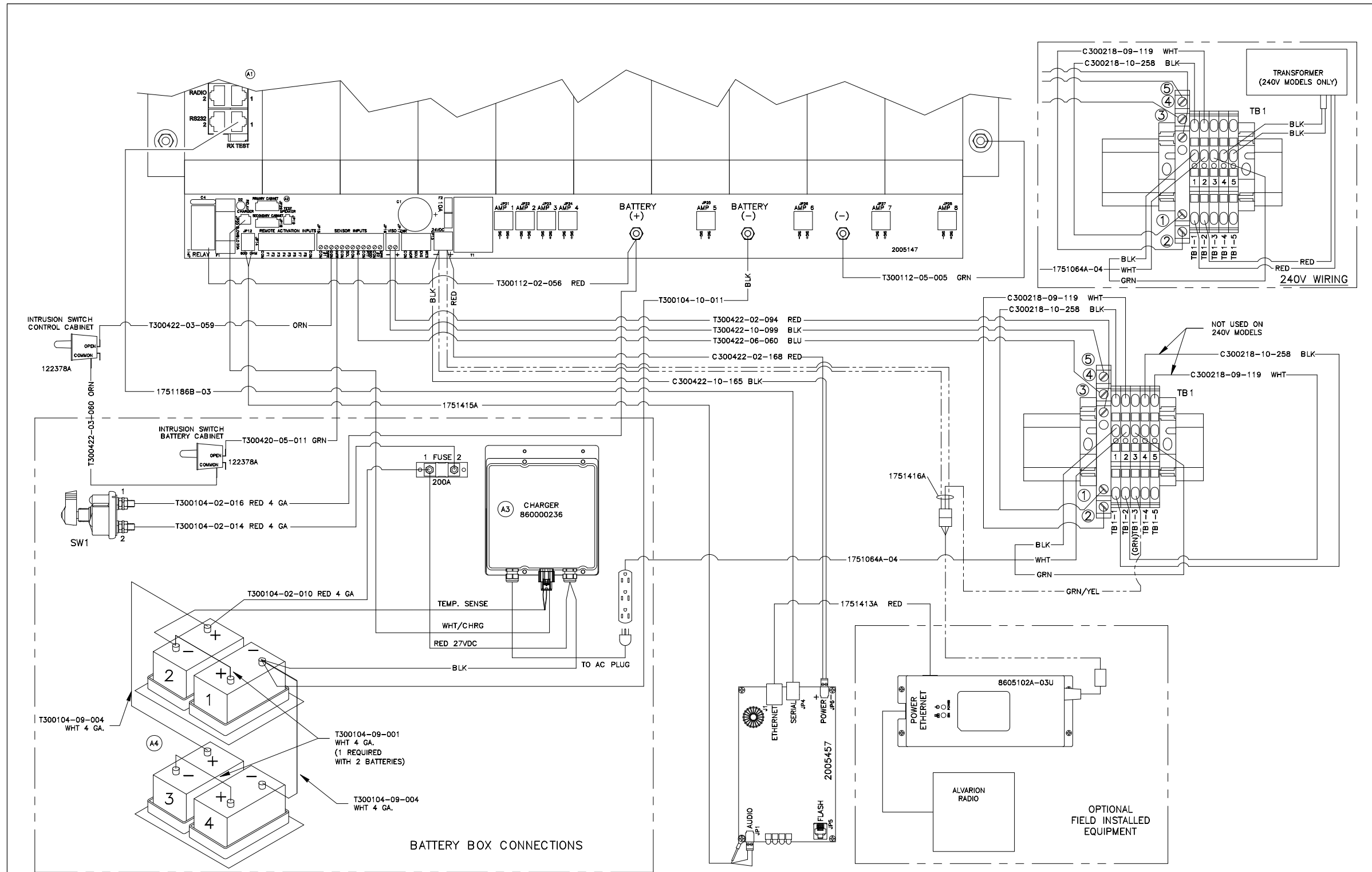SECTION C-C
SECTION D-D

* SEE WIRING DIAGRAM
** ITEM NOT SHOWN

Tolerances Unless Otherwise Specified
Angles ——— ±0.5°
X.XX ——— ± 0.015
X.XXX ——— ±0.005

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Federal Signal Corporation
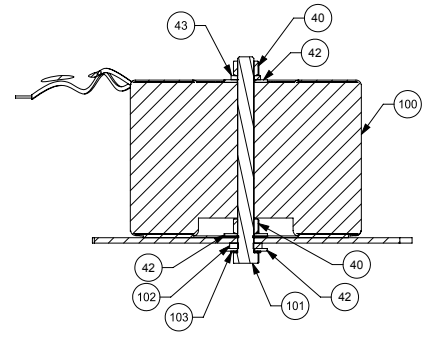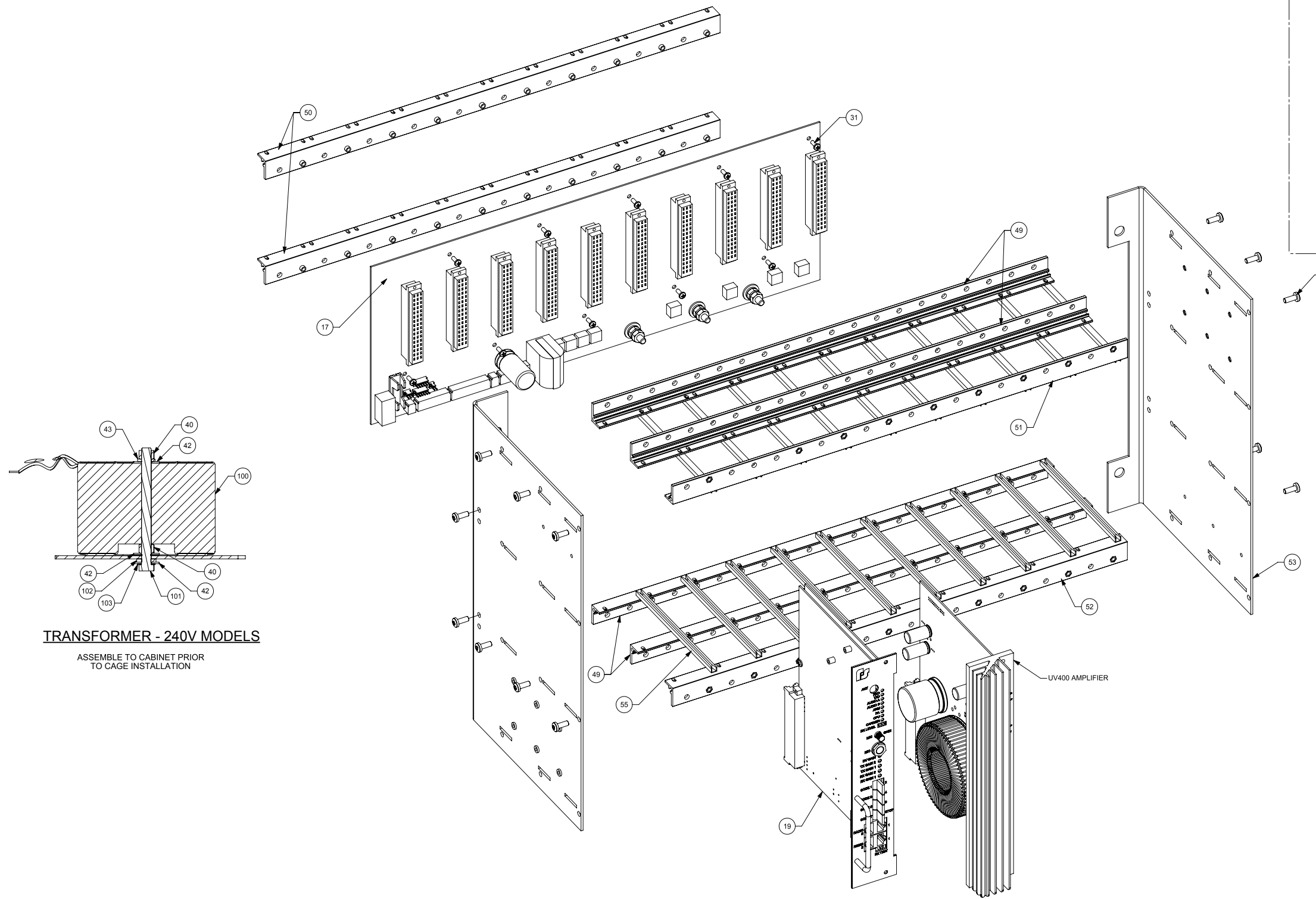2645 FEDERAL SIGNAL DRIVE - UNIVERSITY PARK,IL 60466

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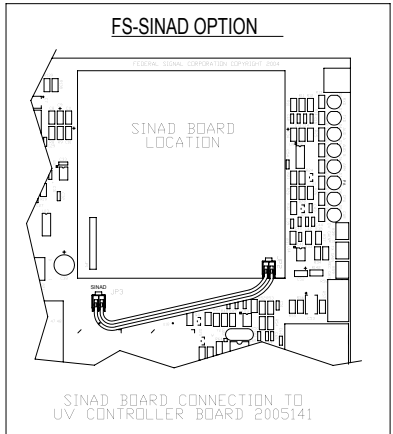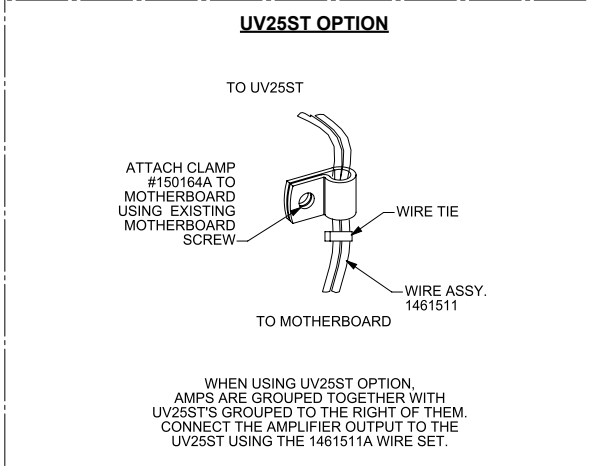
FINISH: N/A
REMOVE BURRS, SHARP CORNERS AND EDGES
MATERIAL: N/A
UNIT OF MEASURE: RF
DRAWN BY: MAF DATE: 6/4/07
CHKD. BY: SC DATE: 8/6/08
SCALE AT D SIZE: NONE

NAME: FINAL ASSY,BROADBAND, UVTD-IP
DRAWING NUMBER: 8605119A
SHEET 1 OF 2

REV	CHANGE	DATE	BY
A15	SEE ECR #8756	11/28/17	AEO
A14	SEE ECR #7380	4/11/17	MAF
A13	SEE ECR #6735	12/07/16	MAF
A12	SEE ECO #6443	10/13/16	KM
A11	SEE ECO #3132	2/20/15	BWH
A10	SEE ECR #1136	9/19/13	MAF
A9	SEE ECR #12-9371	8/20/12	VT
A8	SEE ECR# 11-8608	12/28/11	VT

Figure 29 Broadband UVTD-IP Final Assembly (continued)
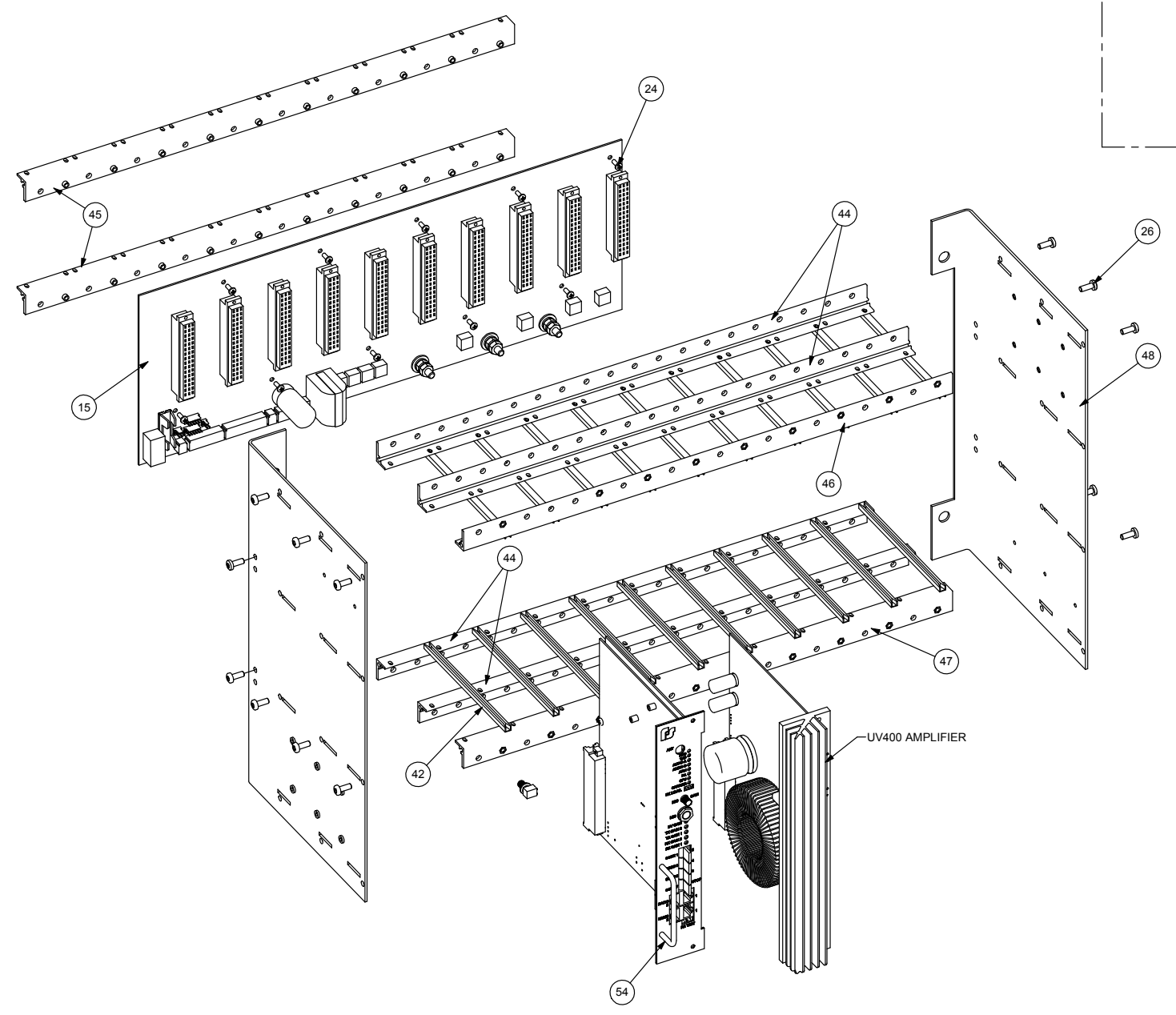
240V OPTION

ITEM	QTY	PART NO.	DESCRIPTION
100	1	120833A	TRANSFORMER,PWR,TOROID
101	1	7002080A-72	SCREW,3/8-16 X 4 1/2
102	1	7075066A	LKWSHR, INT TOOTH 3/8 SCREW
103	1	7072253A	WASHER,3/8,NEOPRENE
104	2	7059A063	NUT, 3/8-16
105	3	7072A035	FLT. WASHER,SS,3/8
106	1	7074A046	LKWSHR,SPLIT,SS,3/8
REF	0	8600117A	TEMPLATE,CNTL CAB,XFRMR HOLE

UV25ST OPTION

TO UV25ST

ATTACH CLAMP
#150164A TO
MOTHERBOARD
USING EXISTING
MOTHERBOARD
SCREW

WIRE TIE

WIRE ASSY.
1461511A

TO MOTHERBOARD

WHEN USING UV25ST OPTION,
AMPS ARE GROUPED TOGETHER WITH
UV25ST'S GROUPED TO THE RIGHT OF THEM.
CONNECT THE AMPLIFIER OUTPUT TO THE
UV25ST USING THE 1461511A WIRE SET.

UV400 AMPLIFIER

OPTIONAL IP PARTS

OPTIONAL SWITCH
8605102A-31

APPROX
2.4"

(2)229218A

SECTION F-F

(2)7058A047

(4)7000A428-06

OPTIONAL
BRACKET
8605129A-01

OPTIONAL
POWER SUPPLY
8605102A-03U
& 1751416A

SECTION G-G

RADIO

OPTIONAL
POWER SUPPLY
8605102A-03U
(REQUIRES CABLES
1751413A & 1751416A)

(4)7000419A-06

SECTION H-H

WITH OPTIONS

WITH OPTIONS & CDM750 RADIO

Tolerances Unless
Otherwise Specified
Angles ------- ±0.5°
X.XX ------- ±0.015
X.XXX ------- ±0.005

FINISH:
N/A
REMOVE BURRS, SHARP CORNERS AND EDGES
MATERIAL:
N/A

DRAWN BY MAF   CHKD. BY: SC
DATE: 6/4/07   DATE: 8/6/07

SCALE AT D SIZE
NONE

NAME:
FINAL ASSY,BROADBAND,
UVTD-IP

DRAWING NUMBER:
8605119A

SHEET 2 OF 2

** REV | SEE SHEET 1 CHANGE | DATE | BY

Figure 30 Transformer Rectifier Wiring to Control Cabinet

NOTE:
FIELD WIRING SHOWN FOR 60Hz.
FOR 50Hz, CHANGE WIRING FROM TAP 2 TO TAP3
AND FROM TAP 4 TO TAP 5.
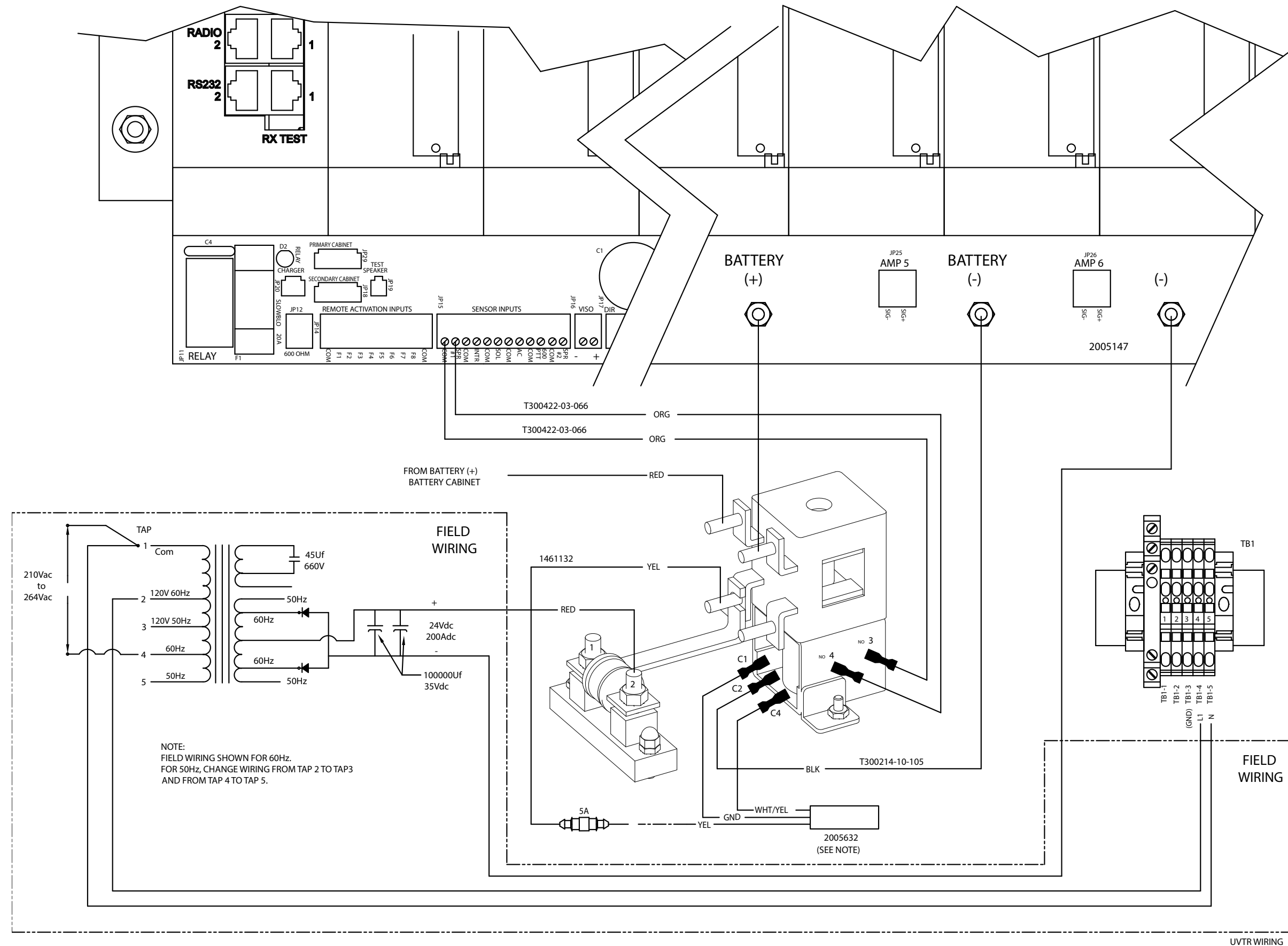
NOTE: Place 2005632A between fuse and contactor after connections are made.

Figure 31 UVTR Transformer

11.50
1.75
10.50 15.35

(A1)

⌀ 1.25
2.66
6X ⌀ .56

⚠ DANGER
HIGH VOLTAGE – HAZARD OF ELECTROCUTION, BURNS OR BURNS

33.00
29.00
27.00

2X ACCESS PLATES

5.00
⌀ .31 GND.   .88

1.00

SPECIFICATIONS:
SEE UVTR LABEL BELOW

DRAWING NUMBER: 120892A

FEDERAL SIGNAL CORPORATION
MODEL #UVTR
DRY TYPE TRANSFORMER
CLASS AA

5.5 KVA	Single phase	50/60HZ	C rise 120C	Weight 230 LBS.

50 HZ OPERATION	60 HZ OPERATION
CONNECT 210-264VAC LINE TO: 1 & 5	CONNECT 210-264VAC LINE TO: 1 & 4
CONNECT 120VAC, 700VA LOAD TO: 1 & 3	CONNECT 120VAC, 700VA LOAD TO: 1 & 2
CONNECT 45UF CAP TO: 6 & 8	CONNECT 45UF CAP TO: 6 & 7
CONNECT 50HZ LEADS TO DIODES	CONNECT 60HZ LEADS TO DIODES

*ISOLATE UNUSED SECONDARY LEADS

1 Com
120V tap
5.8A 700Va max.
2 120V 60Hz
3 120V 50Hz
Input
210-264V
4 60HZ
5 50HZ

6 45uf 660V
7
8
50Hz
60Hz
60Hz
50Hz 100000UF 35VDC

24Vdc 200Adc

Tolerances Unless Otherwise Specified	
Angles -------	±0.5°
X.XX ----------	±0.015
X.XXX ---------	±0.005

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FINISH:
N/A
REMOVE BURRS, SHARP CORNERS AND EDGES

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MATERIAL:
5052-H32 ALUMINUM HOUSING

UNIT OF MEASURE	DRAWN BY: MJF	CHKD. BY: SC	SCALE AT A SIZE:
PC	DATE: 3/4/09	DATE: 4/8/09	NONE

NAME:
TRANSFORMER, UVTR

DRAWING NUMBER:
120892A

REV	CHANGE	DATE	BY
A1	SEE ECR #09-5300	8/21/09	MAF
A	RELEASED ECR #09-4671	4/9/09	MJF