

All Hazard Alert Broadcasting (AHAB) Radio

Introduction

The Washington State Emergency Management Division (EMD) in partnership with Federal Signal has designed and developed a system that provides both tone and voice alert and notification capability to state and local emergency management and federal authorities with the ability to activate alert and notification devices for any hazardous situation. These devices can be installed at high risk facilities or in areas that are high trafficked by both the public and public/private sector that are prone to natural and man-made hazards. The system can provide indoor alerting capabilities via newly installed speakers, or by interfacing into existing Public Address Systems. It is flexible and can be further enhanced with the addition of two-way status monitoring.

AHAB can be activated via NOAA Weather Radio (NWR) utilizing the EAS/SAME format, via local emergency management activation of the EAS system, or through other communication protocols, including Two-Tone Sequential, DTMF, or the Federal Signal Digital System. The primary activation system utilizes the NWR channel and EAS/SAME format. Additionally, local emergency managers have coordinated with NWS to utilize the same channel for local activation via EAS. We believe this joint effort between EMD, Federal Signal, and Federal officials is exemplary of the power of public/private partnerships to meet the needs of homeland security alert and notification requirements.

System Communications Overview

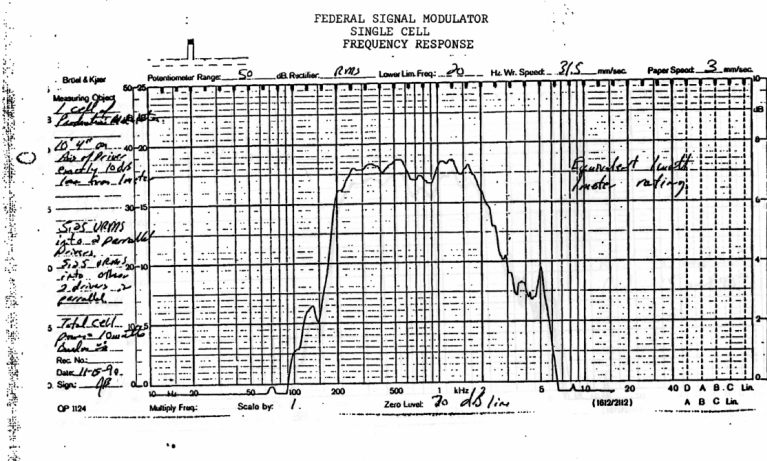
Local Emergency Managers may activate the EAS system via local EAS Encoders. The signal is transmitted over NWR frequency, which has wide distribution in the State of Washington. Each AHAB Radio Device has an EAS/SAME decoder interfaced into the speaker system and monitors the local NWR frequency for valid EAS messages. Once a valid message is received, the encoder activates the alert tone and then passes the alert audio over the speaker system. An intense blue light is activated at each location to further indicate that the area is under a homeland security situation. The light remains lit for the duration of the alert and notification (EAS messages require a defined time period for the event).

Furthermore, local emergency managers can monitor and control the AHAB Radio via a Graphic Users Interface on a local radio frequency. The system allows for direct activation for non-homeland security events, or in the event local officials determine the need to provide additional alerts or messages to select locations. Additionally, local officials can ensure the status of the system through regular status requests (polls) of each alert device, and through automatic change-in-status reports from the devices.

Modulator Electronic Siren

The Modulator Siren Series with the UltraVoice electronic siren controller are being used for AHAB Radio. These outdoor sirens use high power speakers for both voice and tone alerting.

The modulator siren produces 360°-coverage and the best voice reproduction of any omni-directional siren. Furthermore, the Modulator has the best frequency response of all omni-directional electronic sirens. As the chart indicates, the Modulator siren offers a flat frequency response from 400 to 1500Hz resulting in improved voice reproduction.



The Modulator Siren is available in 7 models ranging from 106 to 125dB output at 100ft (30m). Typically, the coverage area and installation costs will result in the use of larger sirens and Federal Signal recently proposed the MOD5020 and MOD4016 Siren. The MOD5020 utilizes 2000Watts to produce 120dB at 100ft and is rated to deliver a minimum of 70dB coverage at 3,100ft in every direction (for alert tones), while the MOD4016 is rated at 118dB at 100ft and provides coverage of 2,800ft from the install point. Federal Signal increases output of our amplifiers in voice mode (digital and live voice), and this fact combined with our flat frequency response across the range important for voice clarity means our voice reproduction is very consistent with our alert tones.

The aluminum center mast and modules of the Modulator provides strength and excellent lightning protection. The basic design of the Modulator allows easy replacement of drivers with no disassembly of the unit.

These models are used extensively throughout the USA and the world and especially throughout Hawaii for both Tsunami Warning and Civil Defense.

ULTRAVOICEä CONTROLLER

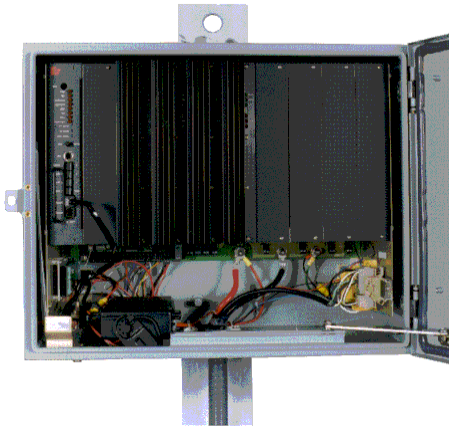
The UltraVoice Control Unit, with digital two-way control and status monitoring, controls the Modulator sirens. The controller can also serve as the indoor control and amplification system for use with distributed loudspeakers. The UltraVoice™ Controller is completely self-contained, single board microprocessor-based monitoring and control unit. It has the capacity to store siren activation functions uploaded from the Central Controller Unit (CCU). It also collects siren status and diagnostic information for report back to the CCU. All programmable parameters are stored in non-volatile memory and are not battery-dependent.

The AHAB Radio System includes an integrated radio receiver and EAS decoder for alert and notification utilizing the NWR channel and EAS/SAME protocol. This PC board includes two independently controlled relays, one which is programmed to control the solid blue warning duration light installed on the outside of the cabinet. Up to six valid EAS codes and three specific location codes can be programmed into the EAS decoder. The decoder utilizes a high quality Federal signal radio receiver. The receiver exceeds the EIA-603 specifications for Adjacent Channel Selectivity, Intermodulation Rejection, and Spurious Response & Image Rejection. For each of these specifications, the receiver exceeds 75dB. In addition, the Informer sensitivity is less than 20dB SINAD, where many products only meet 35dB SINAD.

Each RTU can communicate status and alarm data to one or more CCUs. All data is transmitted in a digital format as a stream of characters using Medium Shift Keying (MSK), serially organized and transmitted at a rate of 1200 bits per second. In the system network, the RTU and SS2000D work as a complex data communication pair. Data protection techniques and handshaking is included to insure that messages are not corrupted and are received correctly. If an alarm condition is reported by the RTU, the CCU can be programmed to initiate an alarm and even place a series of telephone calls until it reaches and reports to key support personnel. Status alarms from any RTU are handled the same way so that maintenance action can be taken at once. This means that alarms can be set up to report as they happen, enabling action to be taken before extensive downtime occurs. Any RTU in the system may act as a communication repeater, allowing wide area coverage capabilities without the necessity of expensive, high power transmitters or large antenna arrays.



The UltraVoice RTU's are rack mounted in a common back plane used to interface the UV400 audio amplifiers and mounted in a common polished aluminum NEMA 4X weather proof cabinet with separate NEMA 4X- vented (3R equivalent) battery compartment. All of the Federal Warning Systems RTU's support and use Motorola CDM750 radios (or customer specified transceiver) to communicate with the Central Controllers(s). The antenna system is a high quality 3dB omni-directional ½ wave DC grounded base station antenna with white fiberglass radome and low loss ½" coaxial cable (flooded braid jacket) with weather sealed N Male connectors.



The UltraVoice siren controllers (RTU) use extremely efficient pulse width modulated (PWM) amplifiers to provide the highest reliability and efficiency in a small modular weatherproof enclosure. Powered from two or four standard 12VDC marine batteries, the sirens can operate continuously for over 30 minutes in tone and voice. These systems can be powered by AC mains, solar panels, or wind generators to maintain battery charge. Each controller can house up to eight (8) 400-watt amplifiers for a total of 3200 watts per RTU. Each amplifier monitors voltage, current, power and speaker load, and is individually controllable to allow for zoning. Amplifiers are rack mounted and hot swappable which eliminates wiring and simplifies maintenance.

The UltraVoice siren controllers can operate completely independent from the communications network enabling local operation in case of an emergency or complete wire-line interruptions. Up to 16 voice messages and seven tones can be stored locally in the siren.

The system allows operators to activate each UltraVoice siren controller independently, in groups or as an entire system. The controllers can be programmed to automatically report changes in status or polled for current status at any time. It is equipped with quiet test diagnostics that allow the system to test all major system components without producing an audible signal. The UltraVoice controllers also allow for multiple activation sequences to be programmed from the central control points or locally at the site using a laptop computer and SFCDWARE software. These sequences can be arranged so that a single encrypted digital coded function can set up a sequence of events such as: Wail; Message 1; Wail; Message 2; Steady; Message 1; etc.) This can be valuable when utilizing voice messages stored within the UltraVoice RTU. In addition, the UltraVoice can be programmed with up to seven different alert tones, which can be customized to meet specific requirements.

The state-of-the-art siren controller uses non-volatile re-programmable FLASH memory for the siren's operating system. User configuration data is stored in non-volatile E² memory. Both memory types can be reprogrammed in the field over the built-in serial

port without changing any IC chips. All user configuration data can also be updated with over-the-air programming from the Federal Commander Digital System computer.

With four (4) or Eight (8) minutes of digitally stored messaging, complete amplifier monitoring of both voltage and current, and the ability to stack multiple functions under one activation code, UltraVoice is the premier electronic siren controller.

Fiberglass Omni-directional VHF Antenna

Features & Benefits

- Collinear Designs - High Performance
- High Density Fiberglass - Very Durable
- Special UV Treated - Stands Up to the Sun
- 100% Tested on a Network Analyzer
- Durable Gold Anodized Sleeve and Cap
- N Female Industry Standard Connector



Antenex® Gold Fiberglass Base Station

antennas are collinear designs enclosed in a high density fiberglass, which is covered with a protective ultraviolet inhibiting coating. The radiating elements are made from high efficiency copper and are carefully phased to provide maximum gain in the horizontal plane. The mounting sleeves are tuned to eliminate RF currents from the transmission line resulting in a “cold” sleeve allowing great freedom in mounting. This high quality and well-focused beam provides the highest gain and best efficiency. Every FG fiberglass base antenna is tested on a network analyzer before shipping to assure the best VSWR performance.

INFORMER TONE-ALERT RADIO

Federal Signal can also provide the Informer Tone-Alert Radio (TAR) for Indoor Alert and Notification. The Informer is a high-end radio receiver, which can decode Single Tone, Two-Tone Sequential, DTMF and either the Federal Commander Digital protocol or EAS/SAME. The compact TAR provides four distinct 85dBA at 10ft. alert tones and comes standard with a 6V, 1.2amp hour battery that provides a minimum of 18 hours of operation in stand-by mode and 1½ hours in full alert mode without AC power. The Informer is UL Listed and includes a UL Listed wall transformer, which can be plugged into a 120V standard wall outlet. The Informer also has a standard BNC antenna connector and comes with a rubber duck antenna that has proven effective for most installations.



Optionally, the Informer can include two independent relays and a 600-ohm audio output (IO models) for controlling remote devices or porting audio from the speaker into external amplified speakers or PA systems.

The Informer is programmed from an easy-to-use software package and can include up to six different activation functions. Each relay can be controlled independently and operate in a separate fashion from the speaker. Furthermore, the Informer can be connected to an independent, but complementary ADA approved Strobe device (model IS2) with its own battery back-up option for providing visual alert as part of the Informer activation.



A US Coastguard approved blue strobe is used on systems that border water ways.

Federal Signal's Starfire® strobe warning. Through precise timing of the strobe flash, the double flash unit produces 1,200 effective candlepower; the single flash unit produces 1,000 effective candlepower. Starfire models are available in 12-24VDC, 120VAC (50/60Hz) and 240VAC (50/60Hz). All units are less than nine inches high and six inches in diameter, but powerfully effective. Starfire strobe warning lights contain their own strobe power supply in the base of the light. The strobe flash tube is mounted in an eight-pin octal socket base. The fresnel dome stands up to impact and abuse and is available in amber, blue, clear, green and red. The base of the light is made of corrosion-resistant anodized aluminum. Each Starfire model comes with a standard 1/2-inch pipe mount. An optional magnetic mount or surface mount can be ordered. The Model 131DST warns of hazardous conditions, mark dangerous areas. The strobe light is driven by the Informer series receivers providing a visual extension of the warning signal for the hearing-impaired and in areas for high ambient noise. The strobe light is UL Listed as "Visual

Signaling Equipment for Hearing Impaired” (UL1971) and compliant with ADA requirements when properly installed. The unit is completely self-contained and easily wall mounted. Power is supplied by a UL-Listed 30VDC wall transformer for operating the strobe and charging the battery back-up system. The batteries provide voltage to run the strobe for more than 1½ hours of operation. The strobe is controlled from a contact closure supplied by the Informer TAR or any other controlling device with a relay output. The flash rate is adjustable from 50 to 80 flashes per minute. (UL rating is based on 60 flashes per minute).

The fully NOAA/EAS integrated system provides multiple activation and control points including fixed and mobile sentry activation interfaces. A modified version of Federal Commander Digital System software is also used to provide full status monitoring of each base. The battery-operated UltraVoice™ controller offers more than 30 minutes of continuous run-time for voice or alerting functions, and the system even offers two-way communication between facilities.