Autonomous control unit

Description

Eaton’s Autonomous Control Unit (ACU-8421), part of the ALERiTY integrated MNS platform, is a supervised in-building emergency communications system that is integrated with the WAVES over IP Mass Notification System (MNS) for site-wide communications. This unit provides paging, background music, messaging and emergency voice communications with 24 VDC battery backup. The Individual Building System provides full control of building notification appliances such as loudspeakers and strobe lights.

The ACU-8421 includes a SAFEPATH (SP40S), IP Communicator (IPC-8020), an Ethernet communication network device, interface and cable. The ACU-8421 can be controlled and monitored through the WAVES over IP (WoIP) Integrated Base Station, which can send messages to one ACU-8421 or multiple ACUs. An Eaton-approved radio (RADIO-900M and RADIO-500G) can be added for wireless communications.

This single channel system is capable of delivering 40 watts of supervised high fidelity audio power and 2 amps of supervised 24 VDC synchronized strobe power. It comes standard with an on-board digital voice messaging system with 8 standard messages, a hand-held microphone, power supply/battery charger and numerous additional features. The ACU-8421 system is expandable to 5280 watts utilizing the SPB-80/4 (80 watts and 4 amps of strobe power), the SPB-160 (160 watts) or SPB-320 (320 watts) supervised audio power boosters. All models available in 115 VAC or 220 VAC.
Features

- Integrates with WoIP for a site-wide IP-based MNS
- Integrates with fire alarm systems
- Continuous Self Monitoring: BIT (Built-In Test) information from the WoIP ACU is transmitted to the WoIP Integrated Base Station

Background music

- Capable of broadcasting from a supplied background music (BGM) source
- Unique supervision method allows for full system supervision even during background music
- Line Level input for music source
- Frequency Response 100–15KHz

General paging

- Easily interfaces with most existing phone system page port, CO port and line level signals
- Automatically mutes BGM
- Frequency Response 275–6.5kHz
- Night ringer or security alert connection

Voice evacuation

- Supervised NAC speaker and strobe circuits
- Live microphone override
- 8 digitally pre-recorded voice messages
- Uses selectable pre-tones for messages

Strobe inputs and activation

- 2 Amps of 24 VDC supervised strobe power with built-in Wheelock sync protocol. Power limited.
- Strobe output is selectable for control of Wheelock sync protocol or non-sync operation
- Strobe terminals have pass-through capability for Wheelock sync or non-sync operation
- Messages can be dip switch selected to activate strobes
- MIC activation can be dip switch selected to activate strobes
- Auxiliary activation (Remote MIC) can be dip switch selected to activate strobes
- 24 VDC supervised and synchronized strobe power can be expanded to meet the requirements of the installation via connecting to optional Wheelock power boosters

Speaker output

- 40 watts of supervised audio power
- Speaker outputs: 25V or 70.7V power limited

System activation

- Contact closure message activation

Audio processing

- Volume and tone controls for general paging and BGM
- Connectivity of optional speaker splitter modules
- Dual-tone tone generator with Code 3 Tone and Slow Whoop for alerting of system trouble
- Night ringer/security alerting capability
- Audio power can be expanded by connecting to optional audio power boosters
  - SPB-80/4: 80-watt supervised audio power booster with 4 Amp of Synchronized Strobe Power
  - SPB-160: 160-watt supervised audio power booster

Live & pre-recorded message announcement

- Supplied with 8 pre-recorded emergency messages
- Capable of in-field recording of all messages via 1/8” line level audio input jack
- Preset audio levels for emergency messaging (prerecorded and live mic)—system reverts back to a preset level regardless of the volume set for BGM or general paging
- On board push-to-talk microphone
- Telephone paging input, disconnects BGM when in use
- Auxiliary input for remote microphone connection

Power supply & batteries

- 24 VDC, 33AH max rechargeable battery back-up power circuitry built-in
- Batteries can be housed in the enclosure. Up to two BAT-1212, 12 volt, 12 ampere hour batteries can fit in the enclosure. Actual battery size required will depend on speaker and/or strobe load. (Batteries are sold separately.)

Note: All CAUTIONS and WARNINGS are identified by the symbol ⚠. All warnings are printed in bold capital letters.

⚠ WARNING

PLEASE READ THESE SPECIFICATIONS AND ASSOCIATED INSTALLATION INSTRUCTIONS CAREFULLY BEFORE USING, SPECIFYING OR APPLYING THIS PRODUCT. FAILURE TO COMPLY WITH ANY OF THESE INSTRUCTIONS, CAUTIONS OR WARNINGS COULD RESULT IN IMPROPER APPLICATION, INSTALLATION AND/OR OPERATION OF THESE PRODUCTS IN AN EMERGENCY SITUATION, WHICH COULD RESULT IN PROPERTY DAMAGE, AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.

Benefits & Advantages

- One system multi-function facility communications system
- Background Music (BGM) system, with patent-pending supervision during BGM operation
- Supervised emergency/fire voice evacuation system
- Interfaces with telephone system for general paging requirements
- Built-in power for visual notification appliances (e.g., strobes)
- Expandable for larger system requirements (with optional equipment)

Approvals & compliance

- SP40S: UL 864, UL 1711, ULC-S527, California State Fire Marshal (CSFM), New York City (MEA), FCC Part 15/ICES
- IPC-8020: TÜV certification—UL/CSA/EN 60950-1, FCC Part 15/ICES

Applications

- Multi-use applications: The system can function as an evacuation system, an emergency messaging system, a paging system, an employee notification system and a background music system per NFPA 72 (2002), section 6.8.4 Combination Systems.
- Integrates with fire alarm systems and provides a signal for temporary deactivation of fire-alarm audible notification devices. The fire alarm system appliances are reactivated after the mass notification voice messages are delivered.
- Economic OSHA applications: The system is OSHA 1910.165 compliant and therefore it does not require reliability inspections every two months or the required spare parts inventory
Table 1. Inputs: Audio & Activation

<table>
<thead>
<tr>
<th>Priority Ordered Inputs</th>
<th>Priority Level</th>
<th>Type of Input</th>
</tr>
</thead>
<tbody>
<tr>
<td>On Board Microphone</td>
<td>1</td>
<td>Push to Talk (PTT) Microphone</td>
</tr>
<tr>
<td>Auxiliary</td>
<td>2</td>
<td>Remote Microphone or Remote Microphone Expander</td>
</tr>
<tr>
<td>Digital Message Input 1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Digital Message Input 2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Digital Message Input 3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Digital Message Input 4</td>
<td>6</td>
<td>Contact Closure activation</td>
</tr>
<tr>
<td>Digital Message Input 5</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Digital Message Input 6</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Digital Message Input 7</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Digital Message Input 8</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Night Ringer Input</td>
<td>11</td>
<td>Contact Closure input</td>
</tr>
<tr>
<td>Telephone Paging Input</td>
<td>12</td>
<td>Page port input</td>
</tr>
<tr>
<td>Background Music Input</td>
<td>13</td>
<td>Line Level Input, 600 ohm, input voltage must be less than 2.5 V peak to peak or 0.3 volts RMS</td>
</tr>
</tbody>
</table>

Table 2. Inputs: Audio/Technical Specifications

- Switch mode, Class D amplifier (40 Watts)
- 25V or 70.7V power limited
- Frequency Response
  - Voice: 275 Hz – 6.5 kHz
  - BGM: 100 Hz – 15 kHz
  - Meets UL Voice Evacuation Requirements of 800–2800 Hz
- Signal-to-Noise Ratio: Better than 65 dB
- Dynamic Range: Better than 65 dB
- Total Harmonic Distortion: Less than 2%
- Stand by Current Draw: 130 mA
- Alarm Current Draw: 4.7 amps

Table 3. SP40S Mechanical

- Dimensions: 21” H x 16” W x 6” D (wall mount)
- Weight: 36 lbs. (without batteries)
- Finish: Red or black exterior enclosure
- Door Lock: Wheelock Key-lock

© For information on the IPC-8020, please refer to the IPC2 Spec Sheet
Table 4. Order Information

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Order Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACU-8421</td>
<td>Same</td>
<td>Multi-Function Supervised Paging, Messaging, Background Music delivery and Emergency Voice Evacuation System with 24 VDC battery backup circuitry. Includes SP40S, IPC-8020*, interface and cable. Single channel system with 40 watts of supervised audio power and 2 amps of supervised 24 VDC synchronized strobe power and 8 standard messages. (Batteries not included, 2 required) Red Enclosure.</td>
</tr>
<tr>
<td>BAT-1212</td>
<td>7390</td>
<td>12 volt, 12-ampere hour battery</td>
</tr>
<tr>
<td>SP40S-PMK</td>
<td>9936</td>
<td>SP40S 8 Message Programmed Message Kit</td>
</tr>
<tr>
<td>AM-SP40S-SMK</td>
<td>9937</td>
<td>SP40S After Market 8 Message Standard Message Kit</td>
</tr>
<tr>
<td>AM-SP40S-PMK</td>
<td>9938</td>
<td>SP40S After Market 8 Message Programmed Message Kit</td>
</tr>
<tr>
<td>AM-SP40S-NBT</td>
<td>9939</td>
<td>SP40S After Market Narrow Band Signal Tone Kit</td>
</tr>
<tr>
<td>SP-COA</td>
<td>9908</td>
<td>C.O. Port Adapter for the SP40S – Recommended 24 VDC Power Supply is Wheelock RPS-2406 (Order Code 3770)</td>
</tr>
<tr>
<td>BATC-R</td>
<td>5414</td>
<td>Battery Cabinet, Red</td>
</tr>
<tr>
<td>BATC-B</td>
<td>5413</td>
<td>Battery Cabinet, Black</td>
</tr>
<tr>
<td>BAT-1224</td>
<td>7391</td>
<td>12 Volt, 24 Ampere Battery Cell</td>
</tr>
</tbody>
</table>

Table 5. Message Capabilities

<table>
<thead>
<tr>
<th>Message and Priority #</th>
<th>Type of Message</th>
<th>Voice Type</th>
<th>Message Script</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fire (Do not use elevators)</td>
<td>Male</td>
<td>Three (3) rounds of code 3 horn (followed by): “May I have your attention please! A fire emergency has been reported in the building. While this is being verified, please leave the building by the nearest exit. Do not use the elevators.”</td>
</tr>
<tr>
<td>2</td>
<td>Fire (Do not use elevators)</td>
<td>Female</td>
<td>Three (3) rounds of code 3 horn (followed by): “May I have your attention please! A fire emergency has been reported in the building. While this is being verified, please leave the building by the nearest exit. Do not use the elevators.”</td>
</tr>
<tr>
<td>3</td>
<td>Male</td>
<td>Male</td>
<td>Three (3) rounds of code 3 horn (followed by): “May I have your attention please! A fire emergency has been reported in the building. While this is being verified, please leave the building by the nearest exit.”</td>
</tr>
<tr>
<td>4</td>
<td>Emergency</td>
<td>Female</td>
<td>Three (3) rounds of code 3 horn (followed by): “May I have your attention please! An emergency has been reported in the building. While this is being verified, please leave the building by the nearest exit.”</td>
</tr>
<tr>
<td>5</td>
<td>Emergency</td>
<td>Male</td>
<td>Three (3) rounds of code 3 horn (followed by): “May I have your attention please! An emergency has been reported in the building. While this is being verified, please leave the building and report to the designated assembly area for your group.”</td>
</tr>
<tr>
<td>6</td>
<td>Weather</td>
<td>Male</td>
<td>Five (5) seconds of 1kHz tone (followed by): “May I have your attention please! The National Weather Service has issued a severe weather warning for our area.”</td>
</tr>
<tr>
<td>7</td>
<td>All Clear</td>
<td>Male</td>
<td>Five (5) seconds of 1kHz tone (followed by): “May I have your attention please! The building emergency has ended. An all clear has been given. Please resume normal activities.”</td>
</tr>
<tr>
<td>8</td>
<td>Test</td>
<td>Male</td>
<td>Five (5) seconds of 1kHz tone (followed by): “May I have your attention please! This is a test of the Wheelock evacuation system, repeat, this is only a test.”</td>
</tr>
</tbody>
</table>

- Each message can be selected to have a code 3 pre-alert tone, a 1kHz continuous pre-alert tone, or no pre-alert tone
- Post-tones are also selectable and match the pre-tones for individual messages
- Any of the 8 messages are field programmable to record your own custom message
  - Each message length is 30 seconds
  - A 1/8” line level audio input jack is supplied for message recording
  - A two-step recording procedure is required to ensure and verify that the standard message will be permanently erased
- Factory programmed messages are available for custom messages
  - Contact customer service for additional information
  - Form is required and can be downloaded from www.eaton.com/massnotification

Note: For telephone paging, the SP40S can connect directly into the page port of the local phone system. If a page port is inaccessible, the SP-COA (C.O. Port Adapter for the SP40S) may be used to connect the SP40S to an unused C.O. port or stand-alone telephone.

Wheelock products must be used within their published specifications and must be PROPERLY specified, applied, installed, operated, maintained and operationally tested in accordance with their installation instructions at the time of installation and at least twice a year or more often and in accordance with local, state and federal codes, regulations and laws. Specification, application, installation, operation, maintenance and testing must be performed by qualified personnel for proper operation in accordance with all of the latest National Fire Protection Association (NFPA), Underwriters' Laboratories (UL), National Electrical Code (NEC), Occupational Safety and Health Administration (OSHA), local, state, county, province, district, federal and other applicable building and fire standards, guidelines, regulations, laws and codes including, but not limited to, all appendices and amendments and the requirements of the local authority having jurisdiction (AHJ).
Architects and engineers specifications

ACU-8421 In-Building Emergency Communications System

The ACU-8421 or equivalent system shall be a multi-purpose NFPA compliant, supervised, general-purpose audio, and fire/emergency communications system. The system shall include a SAFEPATH® (SP40S), IP Communicator (IPC-8020*), interface, and cable or equivalent and shall be controlled and monitored by a base-wide WAVES over IP (WoIP) Mass Notification System (MNS) for an integrated site-wide MNS.

The system shall be a single channel voice evacuation system incorporating supervision during the broadcasting of background music and general paging. The system shall be capable of delivering 40 watts of supervised audio power and 2 amps of supervised 24 VDC synchronized strobe power. Minimum supervised audio power shall be 40 watts, expandable to 5280 watts, depending on system configuration and with additional modules and power boosters. Supervised 24 VDC synchronized strobe power shall be 2 amps, expandable to the requirements of the installation. The system shall be capable of operating from a 120 VAC power source. E models shall be capable of operating from a 240 VAC power source. All models shall have a 24 VDC battery backup. Standard on-board system features shall include: digital voice messaging, a hand-held push-to-talk microphone with override priority, and a power supply/battery charger. The system shall be capable of interfacing with telephone systems for general paging announcements and will have night ringer capabilities. Form C contacts shall be provided for system alarm and trouble conditions.

The system shall have 8 message contacts with contact closure activation. Background music input voltage shall be capable of handling less than 2.5 V peak to peak or less than 0.3 volts. The system shall have thirteen priority ordered inputs, including: On Board Microphone, Auxiliary Input (Line Level), 8 Digital Messages, Night Ringer Input, Telephone Paging Input, and Background Music Input. The system shall have preset audio levels for emergency messaging (prerecorded and live mic). The system shall revert back to a preset level regardless of the volume set for background music (BGM) or general paging. Background music inputs can be an AM/FM tuner, cassette, CD, MP3, or any other remote source. The system shall be supplied with 8 pre-recorded messages and be capable of in-field recording of customer unique messages. The system shall have a dual-tone tone generator with Code-3 Tone and Slow Whoop. When the system is on battery power, telephone page, night ring and background music shall be disengaged.

The panel shall have power-limited circuitry with an internal battery charger and power supply. The power supply/charger section shall be able to charge 24 VDC batteries with a maximum capacity of 33 amp hours. Up to two 12 VDC, 12 AH batteries may be housed in the enclosure. Batteries larger than 12 Ah shall be housed in a separate enclosure such as the Wheelock BATC or equivalent. Batteries shall be supplied separately.

The system shall have power limited circuitry and class B wiring. Wiring terminal blocks will be removable and accept #22–#12 AWG wire. Audio output voltage shall be selectable for 25V or 70.7V. The voice (live microphone or recorded message) frequency response shall be 275 Hz–6.5 kHz, background music frequency response shall be 100 Hz–15 kHz. Stand by current draw shall be 140mA. Alarm current draw shall be 4.7 amps. The signal to noise ratio shall be better than 65 dB, dynamic range shall be better than 65 dB, total harmonic distortion shall be less than 2%.

The system shall be wall mountable, enclosed in a steel locking enclosure. The required batteries for 40-watt systems shall fit inside the enclosure. The 40 watt system shall weigh no more than 36 lbs (without batteries) and the SP40S dimensions shall not exceed 21” H x 16” W x 6” D, and the IPC-8020 dimensions shall not exceed 17” H x 15” W x 5.5” D in. The system shall be OSHA 1910.165, and ADA compliant.

*For A&E specifications for the IPC-8020, please refer to the IPC2 Spec Sheet.

Note: Due to continuous development of our products, specifications and offerings are subject to change without notice in accordance with Cooper Notification, Inc. dba Eaton standard terms and conditions.