**SECTION 27 51 29**

**EMERGENCY COMMUNICATIONS SYSTEMS**

**PART 1 GENERAL**

**1.01 SUMMARY**

1. Equipment and materials used shall be standard components that are manufactured and available for purchase as standard replacement parts as long as the product is commercially available from the manufacturer.

**1.02 QUALITY ASSURANCE**

1. All command unit installation, configuration, setup, programming, and related work shall be performed by electronic technicians thoroughly trained by the manufacturer in the installation and service of the equipment provided.
2. All equipment shall be warrantied against any defects in material and workmanship under normal use for a period of sixty (60) months beginning on the earlier of (1) sale to an end customer, or (2) six (6) months after the equipment leaves the manufacturer’s facility.

**1.03 CERTIFICATIONS AND STANDARDS**

1. The command unit shall be designed to meet the following standards:
   1. NFPA 72: National Fire Alarm and Signaling Code (2022), §24.10
   2. International Building Code (IBC) (2021), §1009.8
   3. Accessibility
      1. ADA Accessibility Guidelines (ADAAG) (2010), Ch. 7
      2. ANSI ICC A117.1 (2017): Accessible and Usable Buildings and Facilities, Ch. 7
   4. Safety
      1. UL 62368-1

**PART 2 PRODUCTS**

**2.01 GENERAL**

1. The command unit shall:
   1. Be an indoor-rated emergency communications system device comprised of an operating panel with dedicated buttons and LEDs for each analog call station and sub-command unit, a handset with volume control, a keyed reset switch, and a battery backup.
   2. Have an available configuration where all operable components are secured behind a door for use by authorized personnel.
   3. Provide analog call stations with the ability to establish communication with either an attendant at the local command unit handset, at up to two (2) sub-command units (i.e. secondary and tertiary on-premise answering points), or through a PSTN connection.
   4. Support and provide power to each analog call station for either up to five (5) or up to ten (10) units as an area of refuge (or area of rescue assistance) station used for emergency communications.
   5. Be half duplex in operation.
   6. Be programmable from either:
      1. A touch-tone telephone or a sub-command unit connected locally;
      2. Or a remote location if a connection to the public switched telephone network (PSTN) is made available.
   7. Provide an audible indicator for the following fault conditions:
      1. Open faults and short faults that occur on an analog call station conductive pathway.
      2. PSTN connection fault.
      3. System ground fault.
      4. Low or disconnected battery backup.
      5. Loss in primary power.
   8. Provide a visual indicator for the following fault conditions:
      1. Open faults and short faults that occur on each individual analog call station conductive pathway.
      2. PSTN connection fault.
      3. System ground fault.
      4. Low or disconnected battery backup.
      5. Loss in primary power.
   9. Provide a relay output for the following fault conditions:
      1. Any open fault or short fault that occurs on an analog call station conductive pathway.
      2. System ground fault.
      3. Low or disconnected battery backup.
      4. Loss in primary power.
   10. Provide the following audible and visual indicators for operation of the system.
       1. Audible indicators for:
          1. Receiving an inbound call from an analog call station.
          2. Receiving an inbound call from a sub-command unit.
       2. Visual indicators for:
          1. Line status of the PSTN connection.
          2. Activation and call status for each individual analog call station.
          3. Activation and call status for each individual sub-command unit.
          4. Powered on status for the command unit.
   11. Provide a relay output for any analog call station activation.

**2.02 HARDWARE**

1. The command unit enclosure shall:
   1. Be constructed of 16 Ga. cold-rolled steel (CRS).
   2. Be powder coated red or black.
   3. Measure approximately:
      1. 13.30 in. W x 18.00 in. H x 6.90 in. D for the configuration without a door.
      2. 14.60 in. W x 19.30 in. H x 7.60 in. D for the configuration with a door.
   4. Have mounting holes on the rear and two sides of the enclosure.
   5. Have multiple 0.5 in., 0.75 in., 1.0 in., and 1.25 in. conduit knockouts for wiring access.
   6. Have a faceplate that shall:
      1. Provide a means for internal component servicing.
      2. Be held in place by six (6) 10-24 screws.
2. The command unit enclosure with a door shall:
   1. Have a door with a keyed latch.
   2. Have a door with an acrylic window so that the operating panel light-emitting diodes (LEDs) are visible.
3. The command unit shall weigh approximately:
   1. 25 lbs. for the configuration without a door.
   2. 35 lbs. for the configuration with a door.
4. The command unit shall have an operating panel to provide a visual indication on the status of individual analog call stations. The operating panel shall:
   1. Have one (1) LED for each analog call station to indicate activation status—for a total of either five (5) or ten (10) LEDs.
   2. Have one (1) LED for each analog call station to indicate fault status in the event an open fault or a short fault occurs on an analog call station conductive pathway—for a total of either five (5) or ten (10) LEDs.
   3. Have one (1) LED to indicate an activation status on the PSTN connection.
   4. Have one (1) LED to indicate a fault status on the PSTN connection.
   5. Have one (1) LED for each sub-command unit to indicate activation status—for a total of two (2) LEDs.
   6. Have one (1) LED to indicate a system ground fault.
   7. Have one (1) LED to indicate whether the battery backup is in a fully charged state or in a state of being charged.
   8. Have one (1) LED to indicate a low or disconnected battery backup.
   9. Have one (1) LED to indicate a normal status for primary power input.
   10. Have one (1) LED to indicate a fault status for primary power input.
5. The local command unit handset shall:
   1. Have a handset with a coiled cord.
   2. Have a built-in volume control.

**2.03 FUNCTIONALITY**

1. Local Command Unit Handset
   1. Receive calls from one (1) of the five (5) or ten (10) analog call stations.
   2. When an incoming call has been received, the command unit shall audibly ring.
   3. Originate calls selectively to one (1) of the five (5) or ten (10) analog call stations.
2. Sub-Command Unit
   1. Serve as a secondary or tertiary on-premise answering point.
   2. Receive calls from one (1) of the five (5) or ten (10) analog call stations.
   3. When an incoming call has been received, the sub-command unit shall audibly ring.
   4. Originate calls selectively to one (1) of the five (5) or ten (10) analog call stations.
3. Call Routing
   1. The command unit shall be configurable with one of the following call routing procedures:
      1. Only route calls to the local command unit handset;
      2. Only route calls through a PSTN connection;
      3. Simultaneously call the local command unit handset and the sub-command unit(s)—the first attendant to answer the call on-premise establishes two-way communication with the analog call station.
      4. Route calls to the local command unit handset as primary, PSTN connection as secondary—the command unit will continue routing the call in round robin fashion until the call is answered or the call conversation timer expires;
      5. Route calls to the PSTN connection as primary, local command unit handset as secondary—the command unit will continue routing the call in round robin fashion until the call is answered or the call conversation timer expires;
      6. Route calls to some combination of local command unit handset, sub-command unit, and PSTN connection in round robin fashion until the call is answered or the call conversation timer expires.
   2. The command unit shall be capable of queueing calls on a “first in, first out” (FIFO) basis.
      1. When a call is in session, subsequent calls shall be placed into a FIFO queue.
      2. When a call is completed, the next call in queue shall be, as configured during installation, automatically placed to an attendant at the local command unit handset, at a sub-command unit, or through a PSTN connection.
   3. When the attendant terminates a call, the analog call station shall automatically return to an on-hook condition.
   4. Automatic Call Merging
      1. The command unit can be configured so that any inbound phone call through the PSTN connection can automatically join a call in progress with an analog call station, local command unit handset, and/or sub-command unit.
      2. The local command unit handset shall automatically join a call in progress when taken off-hook.
      3. Either sub-command unit shall automatically join a call in progress when taken off-hook.
   5. All-Call to Analog Call Stations
      1. The command unit shall allow a one-way audio page to be sent to every analog call station via an inbound call through a PSTN connection.
      2. The command unit shall allow a one-way audio page to be sent to every analog call station through a sub-command unit.
      3. The all-call shall only be initiated when a DTMF command is issued by the attendant at a sub-command unit or a call through a PSTN connection.
4. Push Buttons (Operating Panel)
   1. Analog Call Stations Push Buttons
      1. The operating panel shall provide a dedicated push button for each analog call station.
      2. Each analog call station push button will service as a hold/talk button—pressing the respective button will place an active call on hold and a subsequent press will reengage the call for two-way communication.
      3. Each analog call station push button shall also allow dialing from the command unit into any available analog call station.
   2. PSTN Disconnect Push Button
      1. The operating panel shall provide a PSTN disconnect push button.
      2. The PSTN disconnect push button shall allow the PSTN connection to be disconnected once emergency services have arrived on-site, established communication with the attendant through the PSTN connection, and assumed control of the on-premise situation.
   3. Sub-Command Unit Push Button
      1. The operating panel shall provide a dedicated push button for each sub-command unit.
      2. Each sub-command unit push button shall allow dialing from the command unit into any available sub-command unit.
5. Visual Indicators (Operating Panel)
6. Analog Call Station Status LEDs
   1. When an analog call station has been activated but is not connected to an attendant at the local command unit handset, at a sub-command unit, or through a PSTN connection, the respective analog call station status LED shall flash.
   2. When an analog call station has been activated and the call has been answered by an attendant at the local command unit handset, at a sub-command unit, or through a PSTN connection, the respective analog call station status LED shall be solidly illuminated.
   3. Queued calls shall be indicated through the respective flashing analog call station status LED.
   4. Calls on hold shall be indicated through the respective flashing analog call station status LED.
7. PSTN Connection Status LEDs
   1. When there is a call connection attempt or an active call through the PSTN connection, the PSTN connection status LED shall be solidly illuminated.
8. Sub-Command Unit Status LEDs
   1. When a sub-command unit has placed a call but is not active in a call, the respective sub-command unit status LED shall flash.
   2. When a sub-command unit is active in a call, the respective sub-command unit status LED shall be solidly illuminated.
9. Battery Backup Status LED
   1. When the battery backup is fully charged, the battery backup status LED shall be solidly illuminated.
   2. When the battery backup is in the process of being charged, the battery backup status LED shall flash.
10. Primary Power Input Status LED
    1. When the command unit is powered, the primary power input status LED shall be solidly illuminated.
    2. When there is a loss in primary power, the primary power input status LED shall disengage.
11. Fault LEDs
    1. When an open fault or short fault occurs on an analog call station conductive pathway, the respective fault LED(s) shall flash.
    2. When the PSTN connection has an open or a short, its dedicated fault LED shall flash.
    3. When a system ground fault occurs, its dedicated fault LED shall flash.
    4. When the battery backup is disconnected or is low on voltage, its dedicated fault LED shall flash.
    5. When there is a loss in primary power, its dedicated fault LED shall flash.
12. Audible Indicator (Analog Call Station Prerecorded Voice Message)
13. An attendant at the local command unit handset, at a sub-command unit, or through a PSTN connection shall be capable of receiving a prerecorded voice message from the analog call station.
14. This prerecorded voice message shall notify the attendant of the analog call station location by playing at the beginning of the phone conversation.
15. Audible Fault Indicator
    1. The command unit shall emit a steady tone when one of the following faults occur:
       1. Open faults and short faults that occur on an analog call station conductive pathway.
       2. PSTN connection fault.
       3. System ground fault.
       4. Low or disconnected battery backup.
       5. Loss in primary power.
16. Fault Reset Key Switch
    1. The command unit shall have a fault reset key switch that can only be used by authorized personnel through a key.
    2. The fault reset key switch can be used to:
       1. Temporarily silence the audible fault indicator for 23 hours or until the next timed supervisory test occurs. If the fault remains during the next timed supervisory test, the audible fault indicator will be provided again.

Any LED fault indicators will remain in their trouble condition until the faults have been fully corrected.

An audible double beep will also be heard when the fault reset key switch is toggled to silence the audible fault indicator.

* + 1. Deactivate the audible fault indicator when all faults have been corrected.
    2. Deactivate fault LEDs when all have been corrected.

**2.04 INTERFACES**

1. Analog Call Station Interface
   1. The command unit shall be equipped with five (5) or ten (10) analog call station ports in order to support up to five (5) or ten (10) analog call stations.
   2. Each analog call station interface port shall provide power to one (1) analog call station through one (1) twisted, shielded pair.
   3. The command unit shall be equipped with a terminal block for the analog call station interface.
2. Sub-Command Unit Interfaces
   1. The command unit shall be equipped with two (2) sub-command unit ports in order to support up to two (2) sub-command units.
   2. The sub-command unit ports shall interface through a terminal block.
3. Public Switched Telephone Network (PSTN) Interface
   1. The command unit shall be equipped with one (1) PSTN port.
   2. The PSTN port shall interface through a terminal block.
4. Relay Output Interfaces
   1. The command unit shall be equipped with five (5) relay output ports—each port is dedicated to indicate:
      1. Call station active – this relay output (normally open, NO) will provide a contact closure when any call station is activated.
      2. Power fault – this relay output (normally open, NO) will provide a contact closure when there is a loss in 24VDC power.
      3. Battery fault – this relay output (normally open, NO) will provide a contact closure when the backup battery is disconnected or providing a low voltage output.
      4. Ground fault – this relay output (normally open, NO) will provide a contact closure when a system ground fault is present.
      5. Phone fault – this relay output (normally open, NO) will provide a contact closure when a short or open is present on any call station interface or PSTN connection.
   2. The relay output ports shall interface through a terminal block.
5. Battery Backup Interface
   1. The command unit shall be equipped with one (1) battery backup port.
   2. The battery backup port shall interface through a terminal block.
6. Primary Power Input Interface
   1. The command unit shall be equipped with one (1) 24VDC input port.
   2. The primary power input port shall interface through a terminal block.

**2.05 POWER REQUIREMENTS**

1. The command unit shall be powered by one of the following power sources:
   1. Model HON-AOR-PSU-5-10, an external Class 2 power supply with an input of 115VAC, 3.5A and an output of 24VDC, 2.5A;
   2. Or an external, regulated power supply providing an output of 24VDC, 2.5A.
2. The command unit shall have a built-in battery backup.
   1. In the event of a power source failure, the built-in battery backup shall provide the entire system with up to twenty-four (24) hours of standby time followed by up to four (4) hours of full system operation.

**2.06**

**ENVIRONMENTAL**

1. The command unit shall:
   1. Operate in a temperature range of +32°F (0°C) to +120°F (+49°C).
   2. Operate in a humidity range up to 95% RH (non-condensing).

**2.07 MANUFACTURED UNITS**

1. The command unit shall be one of the following models:
   1. HON-AOR-5, 5-Station Area of Refuge Command Unit, black enclosure;
   2. HON-AOR-5-R, 5-Station Area of Refuge Command Unit, red enclosure;
   3. HON-AOR-5-DKL, 5-Station Area of Refuge Command Unit with Door and Keyed Latch, black enclosure;
   4. HON-AOR-5-DKL-R, 5-Station Area of Refuge Command Unit with Door and Keyed Latch, red enclosure;
   5. HON-AOR-10, 10-Station Area of Refuge Command Unit, black enclosure;
   6. HON-AOR-10-R, 10-Station Area of Refuge Command Unit, red enclosure;
   7. HON-AOR-10-DKL, 10-Station Area of Refuge Command Unit with Door and Keyed Latch, black enclosure;
   8. Or HON-AOR-10-DKL-R, 10-Station Area of Refuge Command Unit with Door and Keyed Latch, red enclosure.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

1. The installer shall carefully follow instructions in documentation provided by the manufacturer to ensure all steps have been taken to provide a reliable, easy-to-operate system.
2. All equipment shall be tested and configured in accordance with instructions provided by the manufacturer prior to installation.
3. The command unit shall support surface mounting.
4. The command unit shall be capable of supporting flush mounting through one of the following available trim ring models:
5. HON-AOR-TR10, flush mount trim ring for 5- or 10-Station Area of Refuge Command Units without door and in black;
6. HON-AOR-TR10-R, flush mount trim ring for 5- or 10-Station Area of Refuge Command Units without door and in red;
7. HON-AOR-TR10-D, flush mount trim ring for 5- or 10-Station Area of Refuge Command Units with door and in black;
8. Or HON-AOR-TR10-D-R, flush mount trim ring for 5- or 10-Station Area of Refuge Command Units with door and in red.

**END OF SECTION**