# Audio Amplifier (AA-120)

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* Indicates those sections where changes have occurred since the last printing.
Introduction

The 120 W Audio Amplifier (AA-120) is designed for use in emergency voice communications systems. It provides 120 W of audio power compatible with 25 VRMS speakers and supervised connection for 24 VDC secondary power input.

The AA-120 is used with the IFC-1010 and IFC-2020. It requires one tier of module space in the CAB series enclosure. A dress plate may be used to cover the amplifier in enclosures requiring cover plates.

The IFC-1010/2020 Control-By-Event selects speaker zones, or you may select them manually using the control switches on an ACM-16AT annunciator. For more information on speaker zone selection, refer to the IFC-1010/2020 Technical Manual (FAN 448).

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Installation Procedures

Mounting the AA-120

To mount the AA-120 to the CAB series backbox, refer to Figure 2 and complete the following steps:

1. Secure the AA-120 to the PEM (Personal Environmental Module) studs on the back panel using the two No. 8 nuts and lockwashers provided.

2. Make primary (AC) and secondary (24 V battery) power source connections to each AA-120. See Figure 3.

3. Provide an external means of charging the batteries.

Figure 2: AA-120 Mounting
Refer to Figures 3 and 4 for the terminals and connectors for the AA-120.

Note: The low-level input and high-level output connectors (P1, P2, P4, P5, and P6) are primarily used when the wiring to or from the AA-120 remains in the cabinet. For multiple-cabinet applications, use the terminals (P3 and P8). When using multiple AA-120s in several cabinets, mount the cabinets adjacent to each other and install all interconnecting wiring in conduit to ensure compliance with Underwriters Laboratories® (UL) Listing and installation standards for unsupervised wiring.

The AA-120 is capable of supervising its output wiring. If this option is selected, the high-level audio output circuit must be configured as a 4-wire or Style Z circuit, or a constant trouble indication will exist. To enable supervision, remove resistor R100. Refer to Figure 1 for resistor location.

**Figure 3: AA-120 Terminals**

**Figure 4: AA-120 Connectors**
Audio Amplifiers

Audio Amplifier (AA-120)

Figure 5: Employing a Backup Amplifier
The AA-120 Audio Amplifier is capable of backing up one or more amplifiers on a single channel. In the event of a primary system amplifier failure, the backup amplifier takes over automatically. Refer to Figures 5 and 9 for connection details.

To connect a Backup Amplifier, perform the following steps:

1. Connect the output labeled “25 Volt Out,” terminal (P6) on the backup amplifier, to “Backup In,” terminal (P4) of the first amplifier being backed up.

2. Connect “Backup Out,” terminal (P5) of the amplifier, to “Backup In,” terminal (P4) of the next amplifier in line to be backed up.

A single backup amplifier may be used to provide single channel backup of any combination of 25 VRMS AA-120 amplifiers and 70.7 VRMS AA-120 amplifiers with the T-70 option installed. Refer to the T-70 Transformer Installation section of this document for installation information for the T-70 option. The backup amplifier provides backup to any one amplifier in the group which fails. In the event of multiple amplifier failures, the failed amplifier wired closest to the backup amplifier is the only failed amplifier serviced by the backup amplifier.

If the backup amplifier is located in another cabinet away from the amplifiers it is backing up, and if it needs to be supervised, connect it to the 4-wire high-level return P8 (1, 2, and 3, shown by the dotted line in Figure 9) and cut R100 to enable supervision of the high-level audio output wiring.
The AA-120 fully supervises the following:
- main AC power
- battery power
- low level audio input
- audio input
- audio output wiring (optional)

A multi-position rotary switch allows you to adjust the gain of the audio output signal to compensate for low-level audio line losses. After correct adjustment, the AA-120 Audio Amplifier produces its maximum rated output power at 25 VRMS.

To properly adjust the audio gain, refer to Figures 6 and 7 and complete the following steps:

1. Install all amplifiers and associated circuitry.
2. Establish that no trouble LEDs are lit. If a trouble LED is lit, correct the problem before continuing.
3. Position the rotary switch using a small slotted screwdriver until the Normal Level LED is lit and the Incorrect Level LED is off. See Figure 7 for LED positions and descriptions.

**Figure 6: Audio Gain**
Normal Level LED - During normal (non-alarm) conditions, when this LED is on and the Incorrect Level LED is off, the AA-120 is adjusted properly and operating correctly.

Incorrect Level LED - During normal (non-alarm) conditions, this LED indicates that the AA-120 is out of adjustment. When this LED is on and the Normal Level LED is off, the audio level has been adjusted too low. When both this LED and the Normal Level LED are on, the audio level has been adjusted too high.

Battery Trouble LED - The battery has fallen below a sufficient level.

Brownout LED - The AC power source has fallen below a sufficient level. During a complete loss of AC power, no LEDs light on the AA-120.

Speaker Trouble LED - An open circuit condition in the 4-wire high level output.*  **

Input Trouble LED - Loss of the low level audio input signal or ampere failure.**

Amplifier Trouble LED - Loss of the low level audio input signal or ampere failure.**

*This LED is functional only if R100 is cut, enabling supervision of the output circuit. See High Level Audio Output Wiring Supervision in this document.

**The amplifier does not indicate a trouble condition until 40 seconds after these faults have occurred.

Figure 7: AA-120 Status LEDs

Note: During complete loss of primary (AC) power, when the AA-120 operates on secondary (battery) power, no LEDs will light. This conserves secondary power.
The AA-120 may be used as a standalone amplifier and tone generator. To enable the tone generator and disable the input supervision, remove resistor R107. The amplifier cannot provide voice or tone messages from the AMG-1 or AMG-E in this configuration. It simply serves as a tone generator by using its built-in tone generator. Refer to Figure 1 for resistor location.

The AA-120 has a built-in backup tone generator. Use SW1, located in the lower right-hand corner of the AA-120 circuit board, to select High/Low or Slow/Whoop as the default backup tone (Figure 8). The backup tone starts automatically if the AA-120 loses its low-level audio input. Refer to Figure 1 for switch location.

**Operating the AA-120 as a Standalone Amplifier**

**Selecting the AA-120 Default Backup Tone**

![Figure 8: SW1 Backup Tone Switch](image)
The T-70 is a step-up transformer that converts a standard 25 VRMS 120 W audio signal into a standard 70.7 VRMS 100 W audio signal available on Terminals 7 and 8 of P8.

As of 1995, the T-70 Transformer is no longer available. Use the AA-100 when a 70.7 VRMS Speaker output is needed.

The backup amplifier in the 70.7 VRMS audio systems does not require a T-70 transformer. However, when using the T-70 option, all speakers must be rated for use at 70.7 VRMS.

1. Connect the output labeled “25 Volt Out,” terminal (P6) on the backup amplifier, to “Backup In,” terminal (P4) of the amplifier being backed up.

2. Connect “Backup Out,” terminal (P5) of the amplifier, to “Backup In,” terminal (P4) of the next amplifier in line to be backed up.

A single backup amplifier may be used to provide single channel backup of any combination of 25 VRMS AA-120 amplifiers and 70.7 VRMS AA-120 amplifiers with the T-70 option installed. This backup amplifier provides backup to any one amplifier in the group that fails. In the event of multiple amplifier failures, the failed amplifier wired closest to the backup amplifier is the only failed amplifier serviced by the backup amplifier.

If the backup amplifier is located in another cabinet away from the amplifiers that it is backing up, and if it needs to be supervised, connect it to audio return terminal P8 (1, 2, and 3, shown by the dotted line in Figure 9) and cut R100 to enable supervision of the high-level audio output wiring.

Note: Audio amplifier output supervision is not available when the T-70 is used. Therefore, do not remove resistor R100 from the AA-120 top board, nor connect field wiring to screws 2 and 3 of P8. The AA-120 with the T-70 option must be located in the same cabinet as the modules providing speaker circuit supervision (i.e., the same cabinet as the XPC-8 card).
Figure 9: Amplifier Connections for P4 and P5

T-70 Transformer Installation

Complete the following steps to install the T-70 transformer. Refer to Figure 10.

1. Disconnect all power sources.
2. Disconnect P3 and P8 from the AA-120 amplifier.
3. Remove the upper board of the amplifier from the chassis by removing six screws (two from the top and four from the sides).
4. Attach the T-70 transformer to the studs provided on the chassis using the hardware included.
5. Re-attach the upper board to the chassis.
6. Connect the transformer module to connector P7 on the upper board of the amplifier.
7. Re-connect P3 and P8 to the upper board.

Note: The AA-120 chassis amplifier may have to be removed from the cabinet in order to install the T-70 option.
Figure 10: T-70 Transformer Installation