



## ES-217

### 1 X 4 AUDIO DISTRIBUTION AMPLIFIER OPERATION AND MAINTENANCE MANUAL

The ES-217 is a 4 output audio distribution amplifier. It is housed in a metal box measuring 4.7" x 3.7" x 2.2". The balanced inputs and outputs are made via the externally mounted terminal blocks.

The ES-217 is a transformerless design, which takes a single balanced or unbalanced input and creates four exact copies; each is a totally isolated and balanced output whose level is individually adjustable. If unbalanced outputs are desired, up to eight separate and isolated feeds can be made. The output levels are set via the four screwdriver adjustable pots on the unit's cover. An input attenuator is also provided, which is internally adjustable. This control has been set to maximum attenuation (-6 db), which will accommodate a house level of +8db. This provides a maximum overall gain of 12 db. When using lower input levels, it may be desirable to reduce the attenuation setting. This is accomplished by removing the four cover screws and pulling the cover, along with the PC board, off of the box. The attenuator pot (R7) shaft may then be adjusted.

An unbalanced input connection may be made by connecting the "hot" lead to the "+" input and the shield to the "-" input, jumpering the "-" input to the ground terminal. An unbalanced output may be taken from between one of the output terminals and ground. If option BNC is ordered, the "-" input is jumpered to ground and the outputs are taken from the "+" outputs.

### SPECIFICATIONS

<b>GAIN:</b>	+18 db maximum
<b>INPUT:</b>	Balanced or unbalanced; 2K Ohms (input attenuator at max. attenuation) 25K Ohms (input attenuator at min. attenuation)
<b>OUTPUT:</b>	600 Ohms balanced or unbalanced
<b>OUTPUT LEVEL:</b>	+21 dbm maximum
<b>RESPONSE:</b>	20 – 20,000 Hz, +/- 0.2 db
<b>HUM AND NOISE:</b>	-90 db typical under +18 dbm output
<b>DISTORTION:</b>	Less than 0.2% at +18 dbm output
<b>POWER REQUIRED:</b>	117 VAC, 60 Hz, 3 watts

### OPTIONS

- BNC:** When this option is specified, BNCs are used for the inputs and outputs. The BNC option is typically ordered for an audio time code distribution application.
- J:** When this option is specified, input voltage is 220 VAC, 50/60Hz.
- UL:** When this option is specified, the unit is supplied with a "UL" Approved Wall Mount Power Supply.
- XLR:** When this option is specified, the unit is housed in a metal box measuring 7.4" x 4.7" x 2.2". The balanced inputs and outputs are accessible via the six XLR connectors with pin configurations as pin 3 (hot), pin 2 (-), and pin 1 (ground).

### CIRCUIT DESCRIPTION

The input signal first encounters the variable input attenuator network (R7-R10), which can provide a maximum attenuation of 6 db. This is followed by an RF filter network (C13-C16, L1, L2), which assures proper operation in high RF environments. The signal is then amplified by op-amp Z1. This stage also converts the balanced input to unbalanced form and drives the four output level pots (R27-R30). Each pot divides the signal down to the desired level and directs it to its own active output stage. Each of the output stages (Z2-Z5) is composed of two op-amps driven in parallel, one being a unity gain inverter and the other a unity gain follower. The output is taken from across the op-amp outputs, providing a balanced output.

## POWER SUPPLY

The power supply is a simple, center tapped transformer, bridge rectifier / filter combination. This supply delivers a dual output voltage of + and - 15 volts DC with respect to ground. Power supply regulation is not required in this application. A 1/4 amp fuse is accessible on the front panel.

## SAFETY INSTRUCTIONS

Please review the following safety precautions. If this is the first time using this unit, then read this manual before installing or using the unit. If the unit is not functioning properly, please contact the **ESE** factory or system installer. Failure to follow these safety instructions could result in injury to you or damage to the unit.

*Be careful with electricity:*

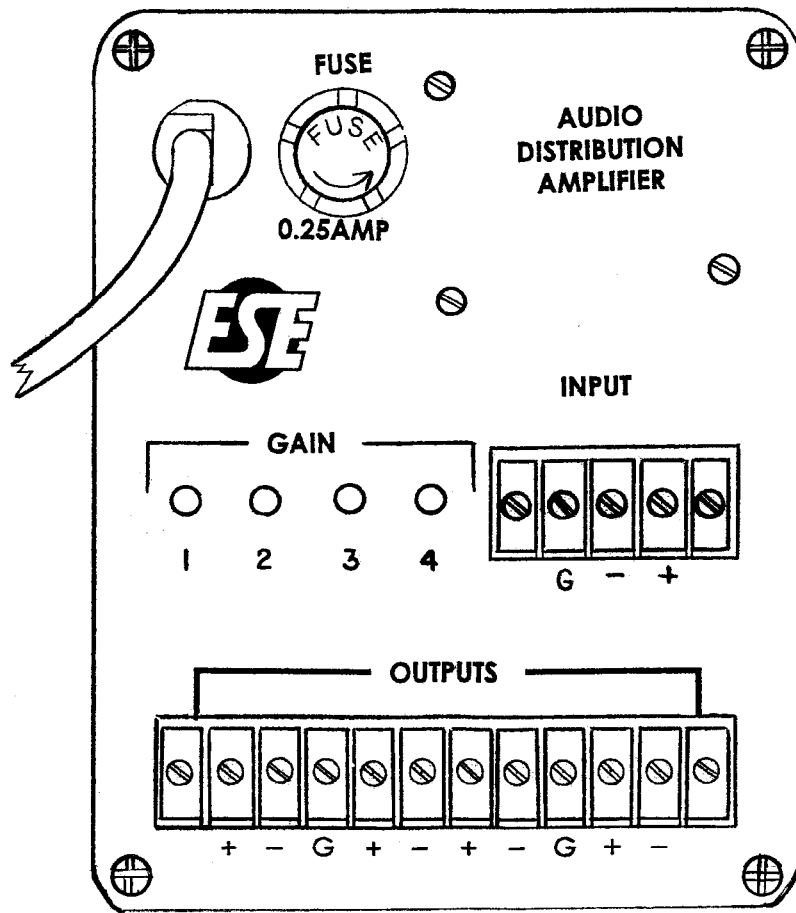
- **Power outlet:** To prevent electric shock, be sure the electrical plug used on the unit's power cord matches the electrical outlet used to supply power to the unit. Only connect the power cord to a power source that operates between 110 – 120 VAC, 50/60 Hz. If option J is ordered, only connect the power cord to a power source that operates at 220 VAC, 50/60 Hz. If option UL is ordered, only connect the wall wart adapter to a power source that operates at 120 VAC, 60 Hz. If option J/UL is ordered, only connect the line cord of the adapter to a power source that operates at 230 VAC, 50 Hz.
- **Power cord:** Be sure the power cord is routed so that it will not be stepped on or pinched by heavy items.
- **Power overloading:** Avoid overloading electrical outlets or extension cords which otherwise could result in electric shock or fire.
- **Lightning:** For protection from lightning or when the unit is left unattended for a long period, disconnect it from the power source.
- **Protect other equipment:** Unplug the unit before connecting any other equipment. Connect all equipment to the unit before plugging in any power cords to the power source.

## WARNING!

TO REDUCE THE RISK OF ELECTRICAL SHOCK, UNPLUG THE UNIT BEFORE REMOVING THE COVER  
REFER SERVICING TO QUALIFIED PERSONNEL

*Also follow these precautions:*

- **Ventilation:** Do not block any ventilation holes on the unit or place any heavy object on top of it. Blocking the airflow could damage the unit. Arrange components so that air can flow freely around the unit. Ensure that there is adequate ventilation to the unit wherever it is placed. Put the unit in a properly ventilated area, away from direct sunlight or any source of heat.
- **Overheating:** Avoid stacking the unit on top of a hot component.
- **Risk of Fire:** Do not place the unit on top of any easily combustible material, such as paper, carpet or fabric.
- **Proper Connections:** Be sure all cables and equipment are connected to the unit as described in this manual.
- **Object Entry:** To avoid electric shock, never stick anything in the holes on the enclosure or remove the cover.
- **Water Exposure:** To reduce the risk of fire or electric shock, do not expose the unit to rain or any other source of moisture.
- **Keep the unit out of the reach of children or it may fall, causing personal injury or damage to the unit.**
- **Always disconnect the power cord from the power outlet when you are not using the unit.** This reduces your risk of electric shocks or fire.
- **Always turn off the unit, disconnect it from the power outlet, and unplug all other cables from before moving the unit.** This reduces your risk of electric shocks or fire.



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PARTS LIST

QTY	DESIGNATION	DESCRIPTION	PART NUMBER
1	Z1	INTEGRATED CIRCUIT	TL071
4	Z2-Z5	INTEGRATED CIRCUIT	NE5532
4	D1-D4	DIODE	1N4003
1	C7	CERAMIC CAPACITOR	10 PF 50V
2	C9;C10	CERAMIC CAPACITOR	47 PF 50V
4	C13-C16	CERAMIC CAPACITOR	200 PF 50V
8	C19-C26	CERAMIC CAPACITOR	470 PF 50V
2	C5;C6	CERAMIC CAPACITOR	.1 UF 50V
2	C11;C12	ELECTROLYTIC CAPACITOR	10 UF 25V NP
2	C17;C18	ELECTROLYTIC CAPACITOR	100 UF 25V
4	C1-C4	ELECTROLYTIC CAPACITOR	470 UF 16V
2	R1;R2	RESISTOR	18 OHM 10% 1/4W
8	R19-R26	RESISTOR	68 OHM 10% 1/4W
2	R9;R10	RESISTOR	510 OHM 10% 1/4W
1	R8	RESISTOR	1K OHM 10% 1/4W
2	R3;R5	RESISTOR	22K OHM 10% 1/4W
8	R11-R18	RESISTOR	100K OHM 10% 1/4W
2	R4;R6	RESISTOR	120K OHM 10% 1/4W
4	R27-R30	POTENTIOMETER	PT10V 10K
1	R7	POTENTIOMETER	PT10HW 50K
2	L1;L2	RF CHOKE	470 UH
1	T1	TRANSFORMER	P8394
1		3 TERMINAL BLOCK	RDI 3PCV-03-004
1		10 TERMINAL BLOCK	RDI 3PCV-10-004
1		FUSE HOLDER	HTA
1		FUSE	AGC 1/4 AMP FB
1		LINE CORD	3 WIRE 6'
1		LINE CORD BUSHING	SR-5N-4
2		WIRE CAPS	71B
1		CASE & HARDWARE	ES-217
1		PC BOARD	ES-217

NOTE: THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS A DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

IF COMPONENT REMOVAL IS REQUIRED, WE RECOMMEND REMOVING ALL SOLDER USING A 35W OR SMALLER SOLDERING IRON AND 'SOLDER WICK' TO PREVENT DAMAGE TO THE PRINTED CIRCUIT BOARD.

ALL INFORMATION CONTAINED IN THIS MANUAL IS SUBJECT TO CHANGE WITHOUT NOTICE.

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## REVISION HISTORY

- Revision 1.0 (1/27/88): First version.
- Revision 1.1 (11/17/10): The safety instructions were added.
- Revision 1.2 (6/30/14): Option BNC was added.