

TECHNICAL MANUAL

FOR

BRIDGING SPEAKER PANEL

MODEL BSP-7 SERIES

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SECTION 1

GENERAL INFORMATION

1-1. GENERAL.

Bridging Speaker Panels BSP-7/1, BSP-7/2, BSP-7/3 and BSP-7/4 are compact, rack-mount assemblies providing one, two, three and four audio monitor channels respectively. For each channel there is a loudspeaker, volume control, DC-controlled squelch circuit, and squelch indicating lamp. The monitoring facilities may be used with receivers which have audio output impedances between 600 and 10K ohms. The squelch facilities may be used with receivers which provide a suitable DC output such as automatic gain control. All operator controls and indicators are front panel mounted. When BSP-7/() is referenced in the text, it is understood to include all models of the BSP-7 series.

1-2. EXTERNAL POWER SUPPLY DESCRIPTION.

A 12 VDC Power Supply AP10007 is available as an option for each Model BSP-7-(). It is supplied for operation from a power source of 110 VAC 50/60 Hz but it may be changed easily for a source of 230 VAC 50/60 Hz. The Power Supply is voltage-regulated and it is entirely solid-state, including the "ON" indicator (light emitting diode).

1-3. REFERENCE DATA FOR BSP-7-().

a. Audio Amplifier (Figures quoted for each channel)

Power Requirements:	+12 VDC 45 ma - no signal 200 ma - full output
Input Impedance:	80K ohms
Sensitivity (for full output):	50 mV
Output Power:	0.5 Watt
Loudspeaker Impedance	3 ohms

b. Squelch Circuit

Squelch Threshold	0 to +5 VDC
Squelch Input Impedance: ("AGC" Input)	2K to 10K ohms (dependent on squelch level)

1-4. PHYSICAL DESCRIPTION.

Type of Mounting: Standard 19-inch Rack

Size: 19" wide, 5" deep, 5" high

Weight: 6 lbs maximum

Front Panel Controls/Indicators: For each Channel:
 Audio Volume Control
 Squelch Threshold Control
 Squelch Indicator Lamp
 3" Loudspeaker

Rear Panel Connectors: Barrier Terminal Block

Rear Panel Connections: +12 VDC
 Audio Input
 Squelch Input
 AC/DC Ground

1-5. SEMICONDUCTOR COMPLEMENT.

Table 1-1 lists the semiconductors, integrated circuits, and Light Indicators found in each channel assembly. Model BSP-7/2 contains 2 of each component, BSP-7/3 contains 3 of each, etc.

TABLE 1-1. SEMICONDUCTOR COMPLEMENT

Assembly	Reference Designation	Type No.	Description
A10699-5	C1	1N3018A	Diode, Zener
	Q2		
	thru	2N3904	Transistor
	Q5		
	Q1	2N3906	Transistor
AX10049	U1	NW-CA3020	Integrated Circuit
	DS1	TS10009	Light Indicator

SECTION 2

INSTALLATION

2-1. INITIAL INSPECTION.

Each BSP is calibrated at the factory prior to shipment. Upon receipt of the unit, inspect it for possible damage and the packing material for parts which may have been shipped as loose items.

With respect to damage to the equipment for which the carrier is liable, The Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

2-2. INSTALLATION.

Each BSP is designed for installation in a standard 19 inch relay rack. The assembly is secured to the rack by mounting holes provided on the front panel.

2-3. POWER REQUIREMENTS.

Bridging Speaker Panel BSP-7/() requires a + 12-volt dc, 1.0 ampere, 10-watt regulated power source. TMC model AP10007 regulated power supply, which operates from 115 VAC or 230 VAC primary source, is available, or an equivalent power supply or source can be used.

2-4. INITIAL CHECKOUT.

Before installing the Bridging Speaker Amplifier in a remote location from the receiver(s), it should be checked out with the associated receivers on a local basis.

Connect a pair of wires from the 600 ohm output of each receiver to each Input and Ground of the BSP-7-(); i.e., to Terminals 4 and 6 of TBl. (See figure 4-2).

If it is intended that the audio monitoring be done at a considerable distance from the receivers, consideration should be given to the use of "un-balanced lines" with suitable line transformers.

Connect the Negative output of a 12-volt dc power supply, AP10007 or equivalent, to terminal 6 of TBl on the BSP-7-() for each channel to be used. Similarly, connect the positive output of the power supply to terminal 1 of TBl on the BSP-7-() for each channel to be used.

Squelch action may be introduced by connecting suitable equipment to BSP-7-(), TBl, Terminal 2. Technical requirements are given in Paragraph 1-3 (b), "Squelch Circuit". Connect the positive AGC output from the receiver to TBl, terminal 2, and connect TBl, terminal 3 to the receiver squelch input.

Ensure that the 12-volt power supply has been wired and fused correctly for the source of power to be used. For safety, ensure that the "ground" pin of the primary power cord connects to a permanent ground.

Complete the interconnections, as given in Paragraph 2-4, "Initial Check-out". For critical applications, consult the information given in Paragraph 1-3, "Reference Data".

SECTION 3

OPERATION

3-1. POWER TURN-ON.

Connect the Bridging Speaker Panel and associated receiver(s) to their primary source(s) of power. Set power switches on all units to ON.

3-2. OPERATION.

Adjust the VOLUME control for each BSP channel for desired loudness level.

If "Squelch" input has been provided for in the installation, adjust the "SQUELCH" Controls on the front panel of the BSP-7/() so that background noise is normally eliminated between communications. The squelch monitor lamp lights when the squelch amplifier is activated.

SECTION 4

PRINCIPLES OF OPERATION

4-1. INTRODUCTION.

The BSP comprises one or more assemblies, each assembly consisting of: an amplifier; a volume control; a squelch control; a squelch indicator; and a loudspeaker. The following description is for one assembly only.

4-2. CIRCUIT DESCRIPTION.

+12Vdc power is applied, via terminal 1 of terminal board TB1 on the circuit board A10699-5, to Integrated Circuit U1, transistors Q1 thru Q5 (see figure 4-1), and squelch monitor lamp DS1 (see figure 4-2).

Audio input signals are applied, via terminal TB1-4, to pin 10, the base of the input transistor in the integrated circuit U1 (see figure 4-1). The signals are amplified by the integrated circuit, with a gain of 75 db, and applied by the push-pull power amplifier output circuit to Output Transformer T1. The secondary impedance of the output transformer matches the 3.2-ohm impedance of the loudspeaker. The gain of the input transistor, an emitter-follower used as a low-power amplifier, is controlled by the VOLUME control, mounted on the front panel of the BSP and connected to terminals 6 and 10 of TB1.

A positive squelch reference level, set by the SQUELCH control on the front panel, is applied to the emitter of transistor amplifier Q1 to establish the squelch threshold. When very low RF levels cause the AGC input to the base of Q1 to go less positive, amplifier transistor Q1 conducts less, Q2 conducts more, and causes the first audio amplifier in integrated circuit U1 to cut off and disable the audio signal. At the same time amplifier Q5 produces a squelch output voltage, which is routed to the squelch input circuit of the associated receiver, via terminal TB1-3 of the circuit board. Whenever a squelch output occurs, transistor driver Q3 and amplifier Q4 produce a ground signal which lights the squelch monitor lamp on the front panel of the BSP.

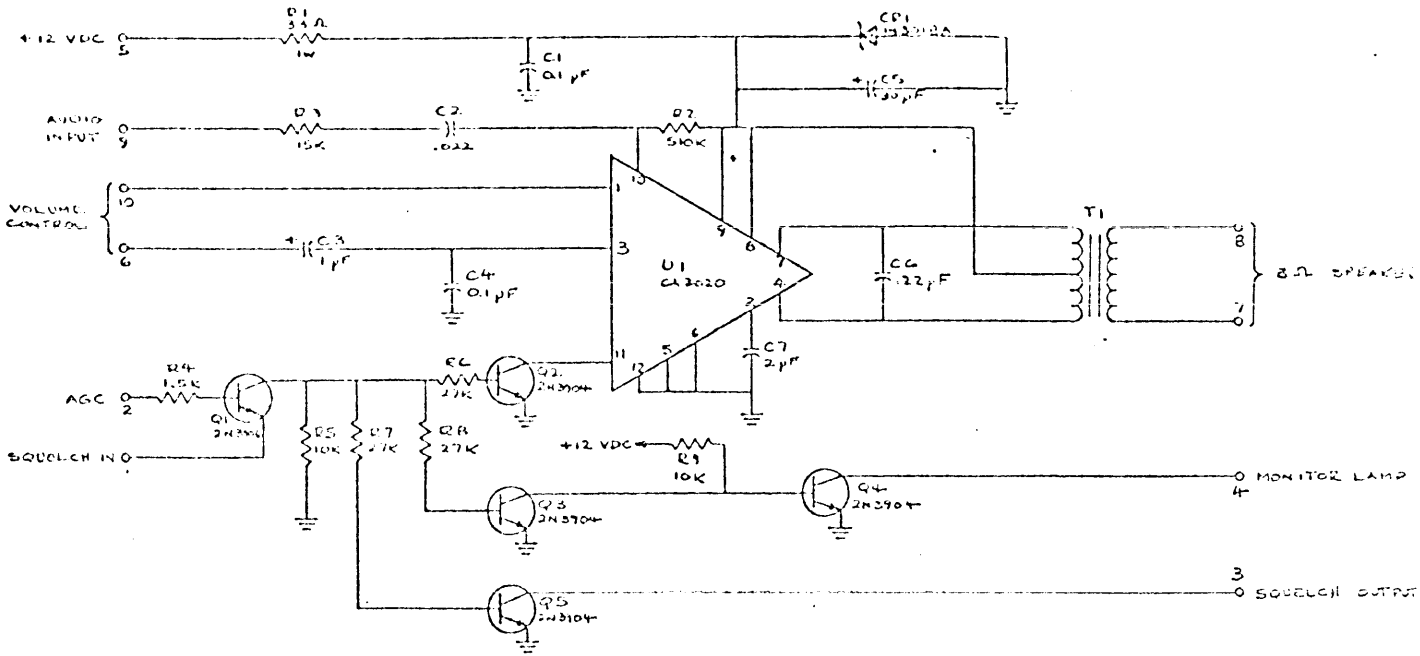


FIGURE 4-1
AF Monitor Board A10699-5 - Schematic

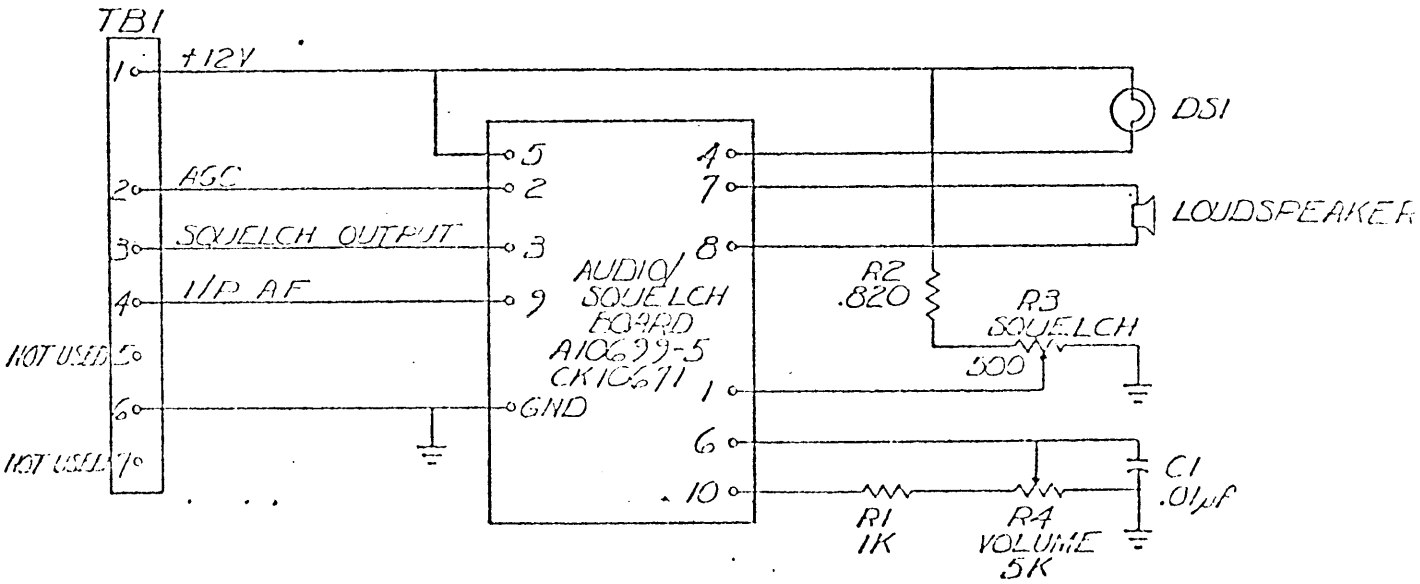


FIGURE 4-2
Bridging Speaker Amplifier BSP-7/() - Schematic
Main Chassis - A10049

SECTION 5

MAINTENANCE

5-1. PREVENTIVE MAINTENANCE.

At regular intervals, ensure that each channel of the Bridging Speaker Amplifier is operating normally. If this is not apparent owing to a lack of communications traffic, arrange for a test transmission or other test signal.

As required, clean any build-up of dust or dirt to obviate overheating of components. A vacuum cleaner or compressed air hose may be used but care must be taken not to damage the loudspeaker cones in the BSP-7/(). Ensure that spare fuses are on hand.

5-2. CORRECTIVE MAINTENANCE.

Schematic diagrams are included in this Manual as an aid to fault-finding. In addition, an "X-ray" view of AF Monitor Board A10699-5 is given in Figure 6-1 which relates the Component Locations to the etched circuits on the reverse side of the Board.

If it is necessary to replace an electronic component, observe the following precautions.

- (a) Always replace a component with its exact replacement. Components should be placed in the same position as the one being replaced.
- (b) Do not use a soldering iron with a power rating in excess of 100 watts for work on printed circuit boards or on delicate components. When soldering heat-sensitive components such as semiconductor devices, use a heat sink such as a pair of needle nose pliers.
- (c) When soldering components on etched circuit boards, do not apply excessive heat which might lift the circuit from the board.
- (d) After soldering, check each joint for "cold" or loose solder.

SECTION 6

PARTS LISTS

6-1. GENERAL.

The following lists give the parts complement for one channel of the BSP-7(). The total quantity of each part in the Bridging Speaker Amplifier is derived by multiplying by the number of channels in the particular BSP. Figure 6-1 shows the location of each part on the AF Monitor Board assembly A10699-5.

Reference symbols designated in the Parts List have been assigned to identify each electrical part in the equipment, and correspond to the reference symbols (designations) marked adjacent to each part, on the circuit board, chassis, or panel, and on the schematics and drawings. The letters of a reference designation indicate the kind of part (generic group), such as resistor, capacitor, transistor, etc. The number differentiates between parts of the same generic group, as R1, R2, R3. Reference designations for sockets for any plug-in device include the reference designation of the device preceded by an X; for example, the socket for fuse F101 is designated XF101. To expedite delivery when ordering a replacement part, specify the reference designation, TMC part number, and the name and model number of the equipment.

BRIDGING SPEAKER AMPLIFIER BSP7/()
AX10049

REFERENCE DESIGNATION	DESCRIPTION	TMC PART NUMBER
C1	Capacitor, ceramic, .01 uf	CC131-32
DS1	Light, indicator	TS10009
LS1	Loudspeaker, permanent magnet	LS106
R1	Resistor, fixed, composition, 1 K ohms, 1/2 watt	RC20GF102J
R2	Resistor, fixed, composition, 820 ohms, 1/2 watt	RC20GF821J
R3	Resistor, variable, composition, 500 ohms	RV4ATSA501B
R4	Resistor, variable, composition, 5 K ohms	RV4NAYSA502D
TB1	Terminal strip, barrier lug type	TM100-7

AF MONITOR BOARD
A10699-5

REFERENCE DESIGNATION	DESCRIPTION	TMC PART NUMBER
C1	Capacitor, ceramic, 0.1 uf	CC131-39
C2	Capacitor, ceramic, .022 uf	CC131-34
C3	Capacitor, fixed, electrolytic 1 uf, 15 WVDC	CE105-1-15
C4	Same as C1	
C5	Capacitor, fixed, electrolytic, 30 uf 15 WVDC	CE105-30-15
C6	Capacitor, ceramic, .22 uf	CC131-50
C7	Capacitor, fixed, electrolytic, 2 uf, 15 WVDC	CE105-2-15
CRL	Diode, Zener	1N3018A
Q1	Transistor	2N3906
Q2	Transistor	2N3904
Q3	Same as Q2	
Q4	Same as Q2	
Q5	Same as Q2	
R1	Resistor, fixed, composition, 33 ohms, 1 watt	RC32GF330J
R2	Resistor, fixed, composition, 510 K ohms 1/2 watt	RC20GF514J
R3	Resistor, fixed, composition, 15 K ohms, 1/2 watt	RC20GF153J
R4	Resistor, fixed composition, 1.5 K ohms, 1/2 watt	RC20GF152J
R5	Resistor, fixed, composition, 10 K ohms, 1/2 watt	RC20 GF103J
R6	Resistor, fixed, composition, 27 K ohms, 1/2 watt	RC20GF273J
R7	Same as R6	
R8	Same as R6	
R9	Same as R5	
T1	Transformer, audio	TF10047
U1	Integrated Circuit	NW*CA3020

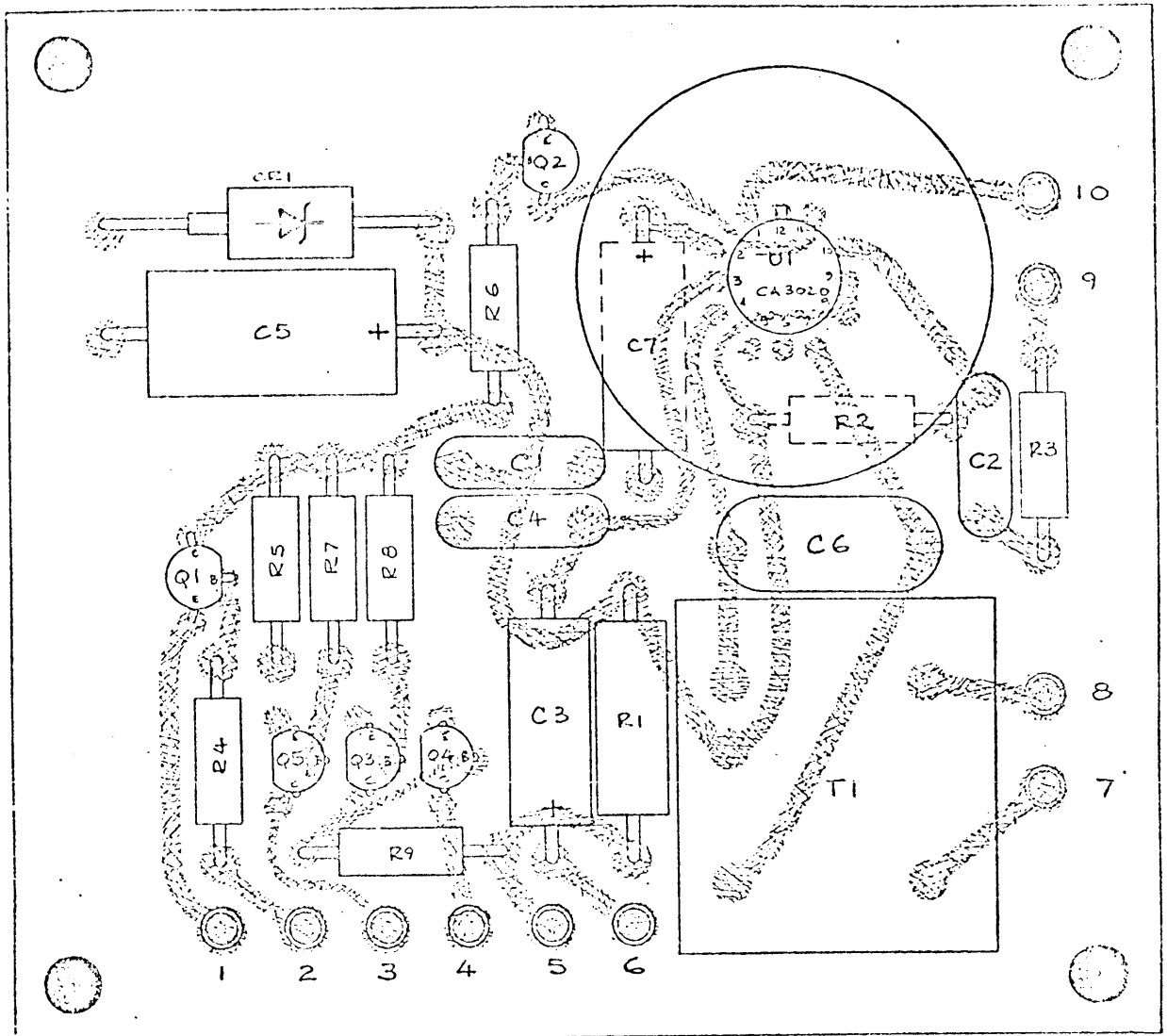


FIGURE 6-1

AF Monitor Board A10699-5 - Component Locations

This Figure shows component locations as seen from the "component-side" of the board. Also shown are the connections on the reverse side of the board, as seen from the component-side. (Not shown are the connections which exist on the component-side of the board.)

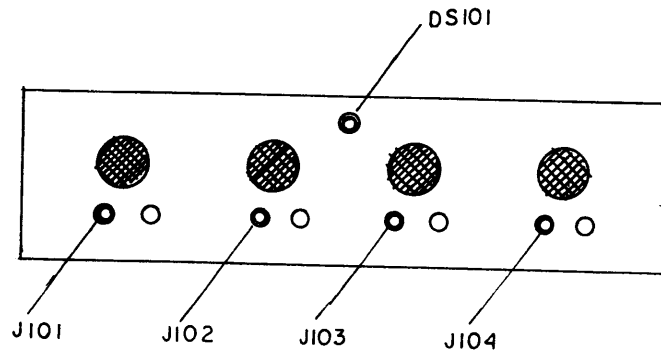
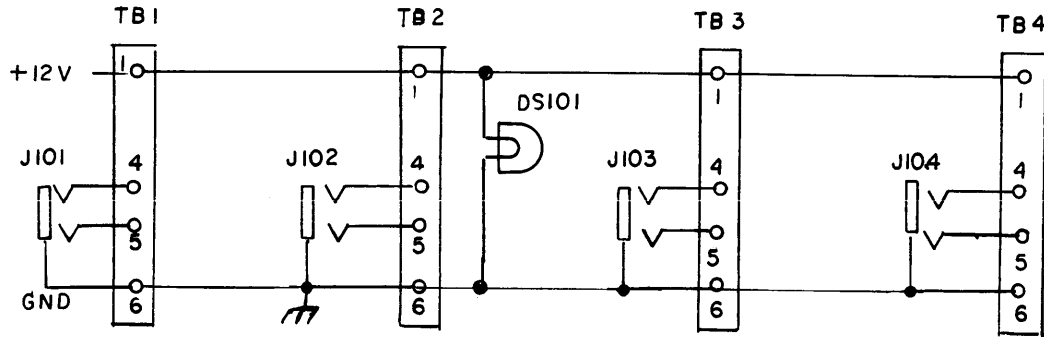
NOTICE

1. This unit has the following modifications making it a special or BSP-7(4)-3S.

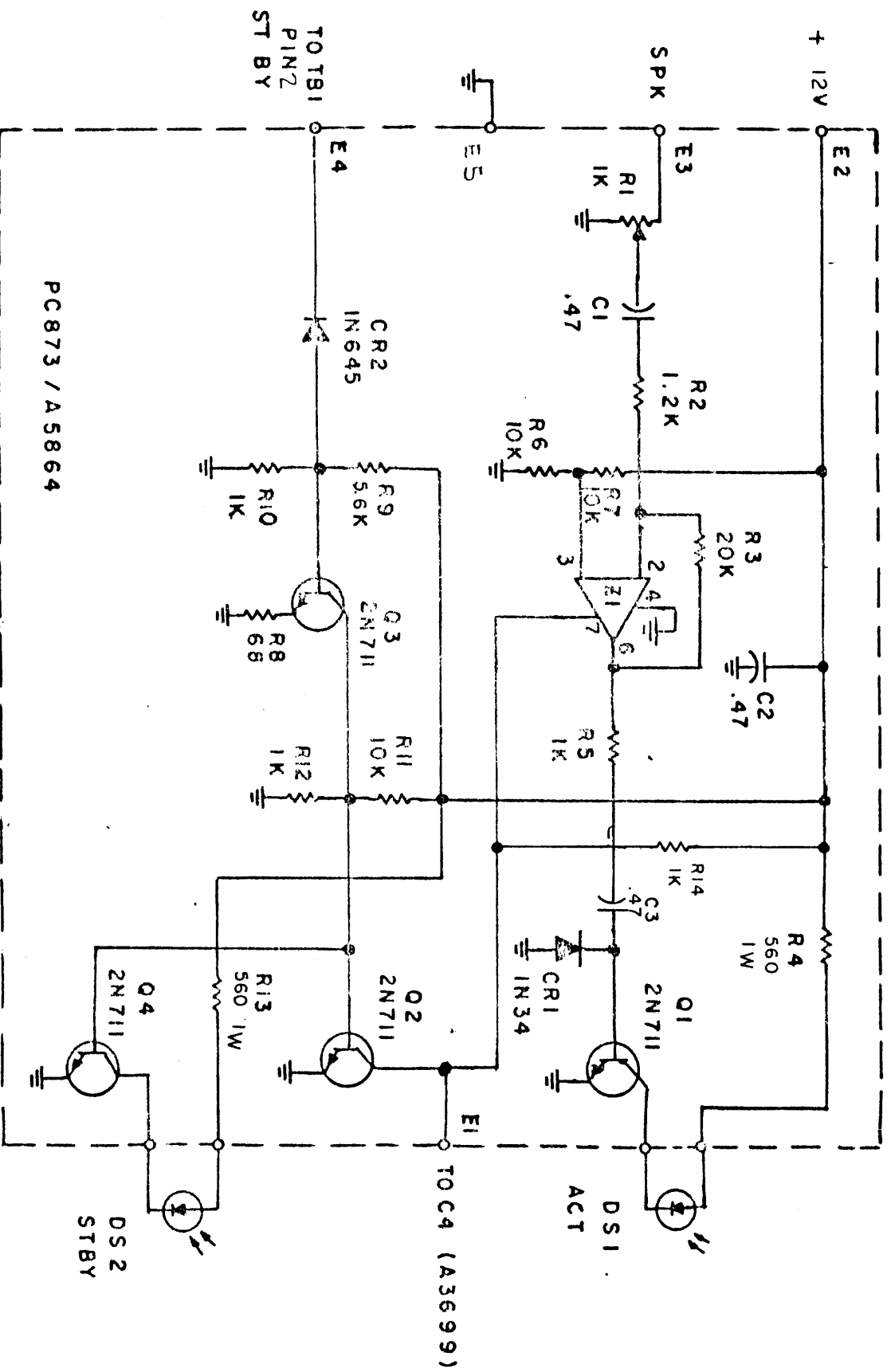
All other components and mechanical configurations are identical to TMC standard BSP-7 Series.

The modifications are as follows:

1. The addition of an audio input jack on the front panel.
2. The addition of a power indicator on the front panel.



REVISIONS							
EMM NO	DRAFT	CHD	ZONE	LTR	DESCRIPTION	DATE	APPROVED
1					SCHEMATIC DIAGRAM	8 17 55	



NOTE: ON PC873/A5864 USED ON
 ALL CAPACITORS FOR IN USE IN THIS
 BSS-75 ADD 214,1K

REQ'D ITEM	PART NUMBER	DESCRIPTION	SYM.
LIST OF MATERIAL			
THE TECHNICAL MATERIEL CORP. MAMARONECK, NEW YORK			
SCHEMATIC DIAGRAM			
SIZE	CODE IDENT. NO.	DWG NO.	ISSUE
B	82679	CK 23000	1
SCALE			SHEET OF
			1

QTY / UNIT	MODEL USED ON	ASSY NO.
1	BSS-75	
APPLICATION		
CODE		

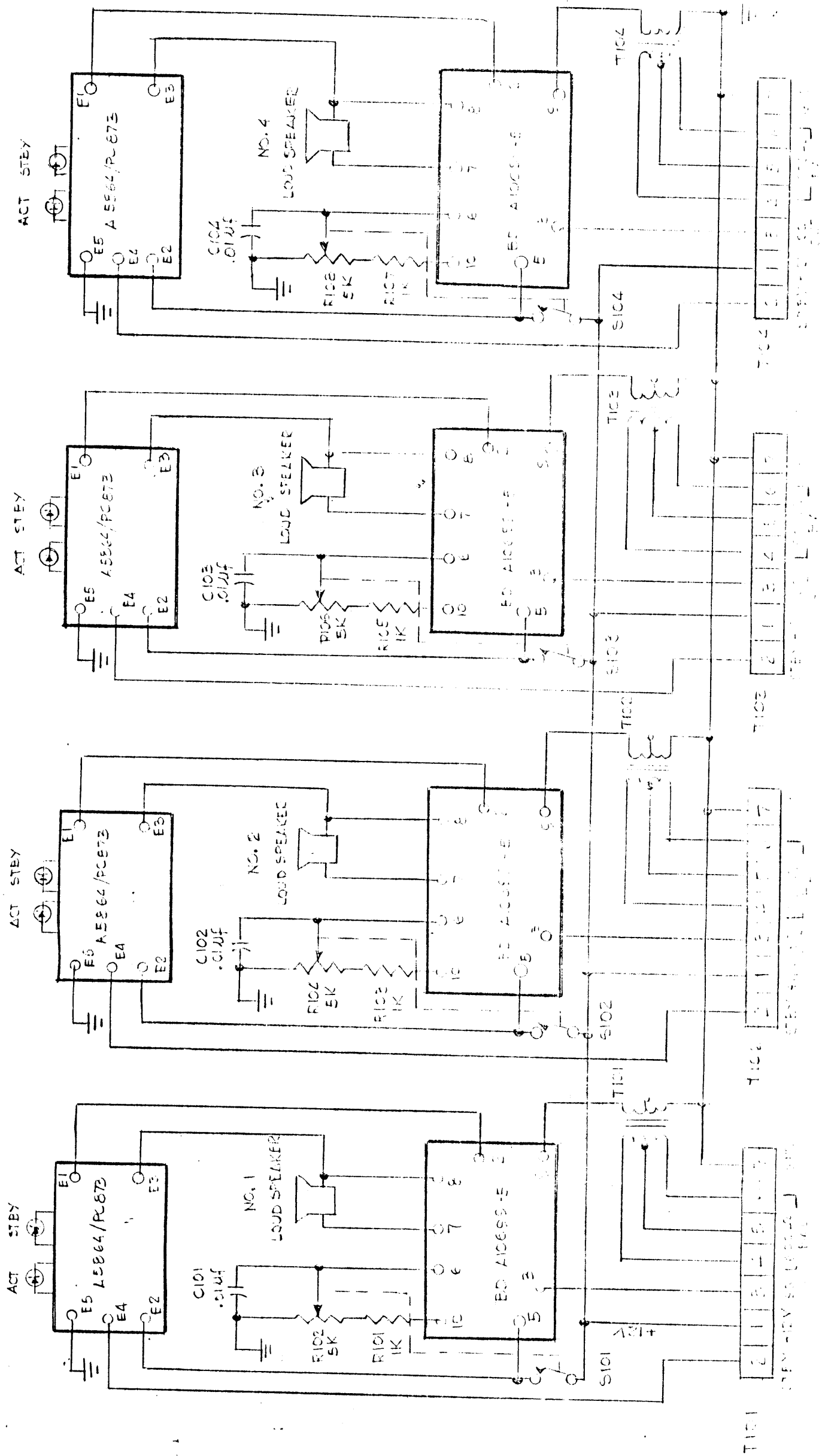
DECIMALS	FRACTIONAL
X ± .05 TOLS.	1/64 ANGLES
XX ± .01	OF .37
XXX ± .005	

FINAL APPROVAL	MECH. DES.	DATE
218		

ELECT. DES.	DATE

FINISH MATERIAL

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ACT STEP 1

ACT STEP 2

ACT STEP 3

ACT STEP 4

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ED AUGUST-E

ED AUGUST-E

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ED AUGUST-E

NO. 1
LOUD SPEAKER

NO. 2
LOUD SPEAKER

NO. 3
LOUD SPEAKER

NO. 4
LOUD SPEAKER

C101 .01uF

C102 .01uF

C103 .01uF

C104 .01uF

R101 1K

R102 5K

R103 1K

R104 1K

S101

S102

S103

S104

T101

T102

T103

T104

12V

12V

12V

12V

STEP 1

STEP 2

STEP 3

STEP 4

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