



# PRIMUS

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Dear PRIMUS Owner:

What exactly is PRIMUS? Well, the name by itself is simply ancient Greek meaning "first."

We all know that brand names or catchy phrases seldom portray the true quality and performance of a product or service. However, every once in a while this rule is broken. The PRIMUS series of audio equipment is just such an exception. As you will see by its leading edge performance, its quality workmanship and flexible functionality, you have purchased truly the "first" and finest available.

Until recently, the PRIMUS concept simply was not possible. Certain crucial components just had not been invented yet. Once these obstacles were overcome though, a new generation of high benefit products became reality. For example: a new exclusive packaging design allows instant access to all electronics without having to remove the housing from your installation; a new concept in construction allowing emphasis to be placed on high quality, long life components instead of high cost labor (3 year parts and labor warranty); the incorporation of many user features that in the past were not economically feasible; and last, but certainly of prime concern, the highest performance technically possible.

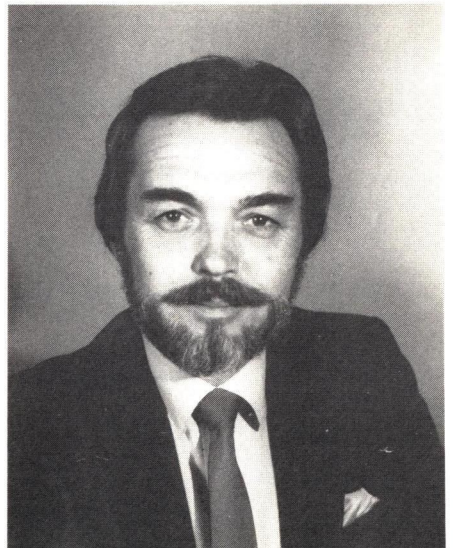
The product itself is only part of the PRIMUS System. The rest lies in our high stress placed on customer service, from the moment the order is placed and for as

long as you own the unit. Whether it be service or just advice there is a toll free number and the best people in the business at your service.

Thank you for your confidence in us and we all look forward to serving you in the future.

Sincerely,

Ray Kohfeld  
President



**PRIMUS P-8S/16M  
DISTRIBUTION  
AMPLIFIERS**

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PRIMUS P-8S/16M

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RAMKO RESEARCH

PRIMUS P-85/16M

## THE PRIMUS P-8S/16M AUDIO DISTRIBUTION AMPLIFIER

The PRIMUS P-8S/16M is a dual one-by-eight Audio Distribution Amplifier designed to provide broad expansion capabilities for either monaural or stereo audio/broadcast systems. Here is a versatile unit which can be used either as an eight-channel stereo DA, a dual one-by-eight mono DA, or as a 16-out mono DA, and can drive virtually any load which might be encountered, even 8-ohm headphones, without adversely affecting performance in any way. In addition, the P-8S/16M boasts operating specifications that surpass even the most demanding requirements, including the SMPTE Time Code.

Without modification, the P8S/16M; can accept a single stereo pair and provide up to eight balanced stereo outputs; can accept two separate monaural inputs to provide eight balanced outputs for each input; or can accept a single monaural input, and by paralleling inputs sixteen balanced outputs (or up to 32 unbalanced outputs) can be accomplished.

The P8S/16M unit may be ordered with individual push-button-selectable output metering and phones monitor. Also, the unit comes factory-equipped with screwdriver-adjustable trimmers (standard) or with optional front panel pots and knobs. The unit is packaged in a single case which may be used either as a tabletop/bracket mount unit or as a single rackmount. The only difference between these units is the front panel (faceplate).

The PRIMUS 8S/16M unit is available in four basic configurations. These configurations, together with their corresponding equipment part numbers are:

001-0249 - The basic tabletop/bracket-mount unit, without the meter/phones option and with screwdriver-adjustable front panel trimmers.

001-0249M - Incorporates the 003-0250 meter/head-phones option. Screwdriver-adjustable front panel trimmers.

001-0249P - The basic tabletop/bracket-mount unit but with front panel pots and knobs replacing the screwdriver-adjustable front panel trimmers

001-0249R1 - The basic unit (002-0249) equipped with a single rackmount faceplate panel and trimmers.

These options may be combined to form 4 other composite units; the 001-0249PM, the 001-0249PR1, the 001-0249R1M, and the 001-0249PR1M.

Each unit has dual-regulated power supplies and may be operated from either 117VAC or 234VAC by means of a selector switch located on the printed circuit board inside the unit.

## P-8S/16M OPERATING SPECIFICATIONS:

Gain	Selectable to +66dB. Variable from -60dB to +14dB standard from factory
Inputs	Balanced, gain-selectable; mic level thru +26dBm. Bridging high impedance
Outputs	Balanced 600 ohm, +25dBm max out
Distortion	.005% @ +8dBm out
Response	+0, -1dB; 10Hz-100kHz
Signal/Noise	-87dB reference 10Hz-80kHz @ +8dBm out. -95dB A weighted
Size	Tabletop/Bracket mount 17''W x 2''H x 7-1/2''D Available rack mount 19''W x 1-3/4''H x 7-1/2''D
Operating Power Requirements	117VAC/230VAC, 50/60Hz (Internal switch-selectable)

## FEATURES:

- \* Slide-out PCB module for easy servicing - no need to remove cabinet from installation
- \* 17''W x 2''H Tabletop/bracket or 19''W x 1-3/4''H rackmount
- \* Only minutes required for easy conversion from tabletop/bracket to rackmount
- \* Individual and isolated balanced outputs
- \* Independent, dual-regulated power supplies
- \* Optional push-button-select output metering and phones monitor
- \* Meter selectable for VU or Peak ballistics
- \* Individual recessed front-panel level controls
- \* Pot/knob option
- \* Response flat to 100kHz
- \* 3 year warranty

\* \* \* \* \* CAUTION \* \* \* \* \*

THE 8S/16M UNIT WILL BE SHIPPED FROM THE FACTORY WITH THE INPUT POWER SELECTOR SWITCH IN THE 117VAC POSITION UNLESS OTHERWISE SPECIFIED. IF THE UNIT IS TO BE OPERATED FROM A 234VAC POWER SOURCE THIS SWITCH MUST BE MOVED TO THE PROPER POSITION. WHEN INSTALLING THE UNIT FOR THE FIRST TIME TO A 234VAC SOURCE, OR WHEN REINSTALLING THE UNIT, IT IS RECOMMENDED THAT THE SETTING OF THIS SWITCH BE VERIFIED TO AVOID POSSIBLE DAMAGE TO THE UNIT WHICH MIGHT BE CAUSED BY AN OVER-VOLTAGE CONDITION.

\* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \* \*

## INSTALLATION

All of the system interface connectors, the AC power cord, and a grounding stud are located on the rear panel (see figure 1). Connection of this stud to an external earth-type ground is recommended to assure proper operation of the unit and maximum efficiency of the noise shielding.

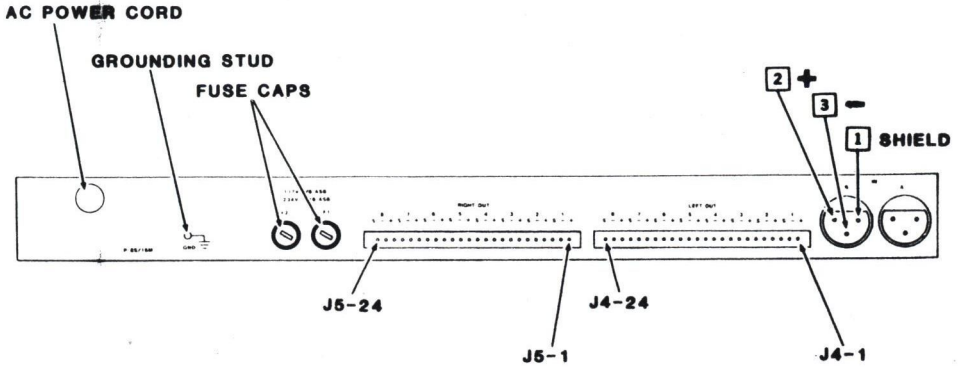


FIGURE 1 - REAR PANEL CONNECTORS

1. WIRING THE INPUT CONNECTORS

The A and B Input connectors are wired as shown in figure 1. The connectors may be interconnected in parallel to permit 16 balanced monaural outputs (32 unbalanced monaural outputs) from a single monaural input. Inputs may be operated either balanced or unbalanced.

BALANCED	UNBALANCED	PIN
SHIELD	SHIELD	1
(+)	(+)	2
(-)	GROUND	3

2. WIRING THE AUDIO OUTPUT CONNECTORS

To install wires to the output connector(s), (see figure 2) place a wire across the back of the connector terminal to be wired and press the wire firmly into both of the terminal clips using the wiring tool (RAMKO P/N 012-0593) included in the BS/16M installation kit (which is furnished with the unit). Then wrap a service loop of wire back across the terminal.

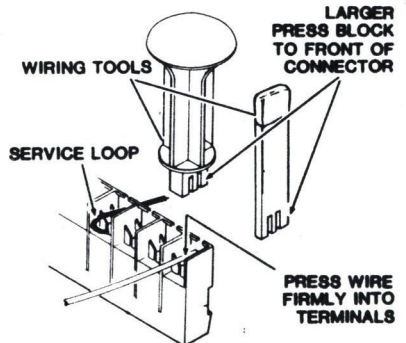


FIGURE 2 - CONNECTOR WIRING

Three-, six-, nine or 12-pin connector sockets may be used in wiring the 8S/16M audio output connectors. The installation kit is made up of four 12-pin connectors (RAMKO P/N 009-0168) which are wired as follows:

OUTPUT	(+)	(-)	SHIELD
1	1	2	3
2	4	5	6
3	7	8	9
4	10	11	12
5	13	14	15
6	16	17	18
7	19	20	21
8	22	23	24
9	25	26	27
10	28	29	30
11	31	32	33
12	34	35	36
13	37	38	39
14	40	41	42
15	43	44	45
16	46	47	48

The output connectors may be wired to allow eight balanced stereo outputs or 16 balanced monaural outputs. In wiring for Stereo applications, the output pairs should be connected as follows:

## STEREO PAIRS

## OUTPUT PIN GROUPS

1	1(L) and 9(R)
2	2(L) and 10(R)
3	3(L) and 11(R)
4	4(L) and 12(R)
5	5(L) and 13(R)
6	6(L) and 14(R)
7	7(L) and 15(R)
8	8(L) and 16(R)

NOTE: Any or all of the outputs may be connected in either balanced or unbalanced configurations.

## FOR UNBALANCED OUTPUTS:

- Using the POSITIVE (+) outputs, only the POSITIVE (+) output terminal and the ground terminal are used. The NEGATIVE (-) output terminal is left unconnected (free floating) (See figure 3.)
- Using the NEGATIVE (-) outputs, only the NEGATIVE (-) output terminal and the ground terminal are used. The POSITIVE (+) output terminal is left unconnected (free floating). These outputs will be 180 degrees out of phase with the input signal.



3. Both POSITIVE and NEGATIVE outputs may be utilized simultaneously in the manner described above, which provides a capacity of 32 unbalanced outputs - 16 in phase and 16 out of phase with the input signal.

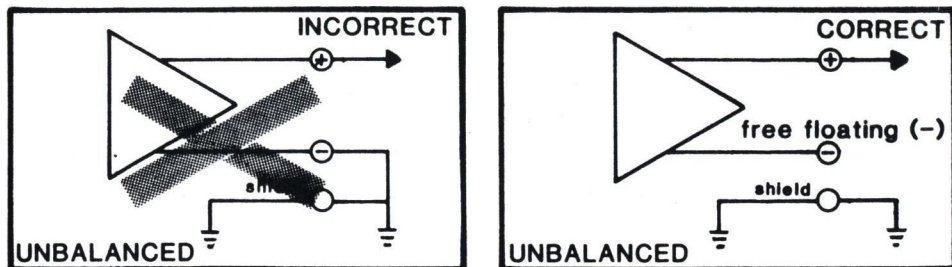


FIGURE 3 - WIRING POSITIVE (+) UNBALANCED OUTPUTS (IN PHASE)

It is not necessary to remove the top cover of the unit case to gain access to the PCB module and to the above described components. To gain access to the interior of the unit, simply remove two screws from the back panel and slide the module out of the back of the case. (See figure 4.)

When reinstalling the module into the case, exercise care to assure that the front panel power indicator LED slides cleanly into the opening on the front panel.

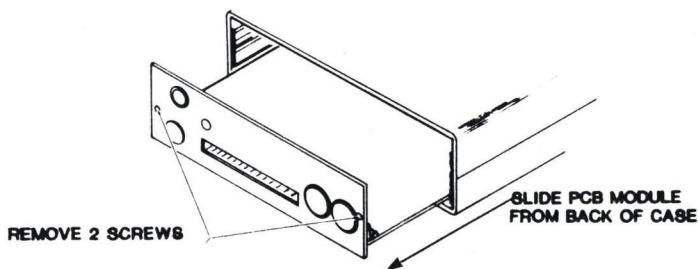


FIGURE 4 - REMOVING PCB MODULE FROM CASE

## USER SELECTIONS

Several user-selectable features have been incorporated into the 8S/16M unit. (See figure 7 for component location.)

- |                        |                     |   |
|------------------------|---------------------|---|
| 1. Power Source Select | Switch              | Allows selection of power source of 117VAC or 234VAC  |
| 2. Input Gain Select   | Change of Resistors | Allows for matching of input line signals to various operating levels (Refer to table 1 for resistance values for specific dBm gains) |

TABLE 1  
INPUT GAIN LEVEL SELECT RESISTOR SELECTION GUIDE

To produce 2VRMS output (+8dBm) with the level controls centered, use the following values for gain select resistors. Output is terminated into a 600-ohm load. Refer to figure 5 for resistor socket location(s).

(Input level for +8dBm Output) POTS	TRIMMERS	MAX GAIN (Ctrl full CW)	RESISTOR VALUE
-38dBm ( )	-52dBm ( )	+66dB	240 ohms
-32dBm ( )	-46dBm ( )	+60dB	510 ohms
-26dBm (.043v)	-40dBm (.0077v)	+54dB	1K
-20dBm (.077v)	-34dBm (.0137v)	+48dB	2K
-10dBm (.249v)	-24dBm (.043v)	+38dB	6.8K
0dBm (.774v)	-14dBm (.154v)	+28dB	24K
+ 8dBm (1.94v)	- 6dBm (.388v)	+20dB	100K
+14dBm (3.88v)	0dBm (.774v)	+14dB	----

NOTES: 1. With no gain select resistors, and CMR adjusted, the input signal will be amplified +14dB (-6dBm in for +8dBm out) with the level controls at the full clockwise position.

2. Common Mode Rejection (CMR) trimmers should be adjusted for minimum each time gain select resistors are changed.

TO ADJUST COMMON MODE REJECTION short the (+) and (-) input terminals of the input to be adjusted. Next, with respect to ground, feed a 100Hz signal (at about 2 volts) into the input. Then, while monitoring any of the outputs associated with that input, adjust the CMR trimmer (R2 or R13) for a null or minimum signal out. (Refer to figure 7 for trimmer location.)

OPERATIONS

All of the controls and indicators necessary to operate and monitor the 8S/16M unit are located on the front panel and are clearly marked for easy identification (see figure 5).

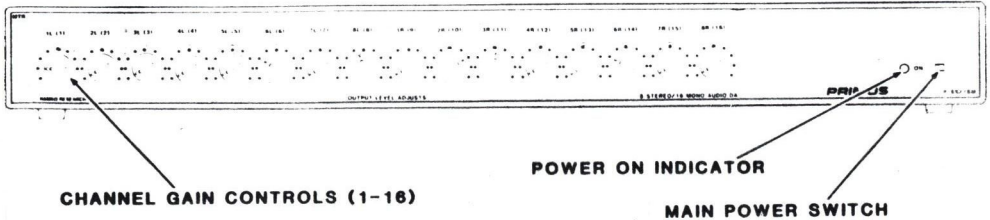


FIGURE 5  
FRONT PANEL CONTROLS AND INDICATORS (BASIC UNIT)

The meters and switches option allows push-button switch-selectable monitoring of one output for each input side [left (A) or right (B)]. Individual outputs are selected by pressing the switch/indicator for that desired output. Outputs selected by pressing switch/indicators 1-8 are displayed on the left meter; outputs selected by pressing switch/indicators 9-16 are displayed on the right meter (see figure 5A). At the same time, the selected output signal is also available at the monitor headphone jack.

When an output is selected, an orange indicator is displayed in the plastic pushbutton head. To release (deselect) an output, simply press the pushbutton again to disengage the mechanical switch latch.

Selection/monitoring of an output signal does not effect the back-panel output signal(s) in any way.

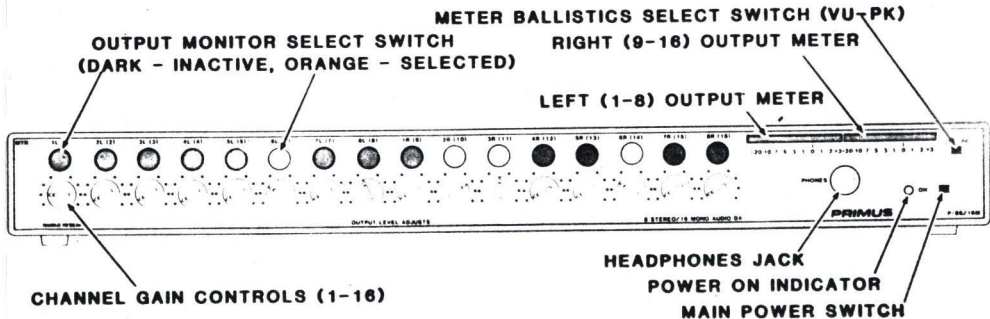
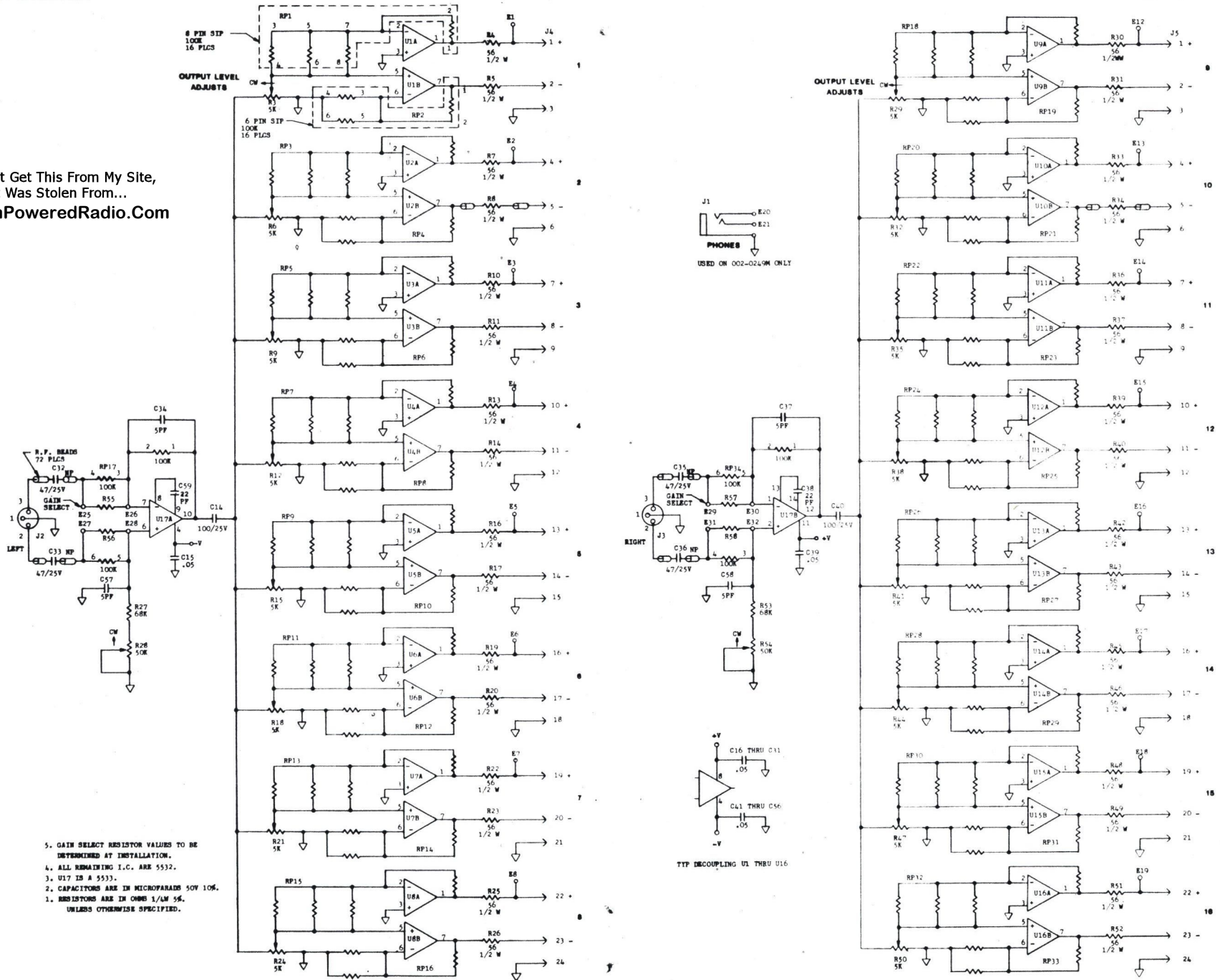


FIGURE 5A  
CONTROLS AND INDICATORS INCLUDING METERS/SWITCHES OPTION

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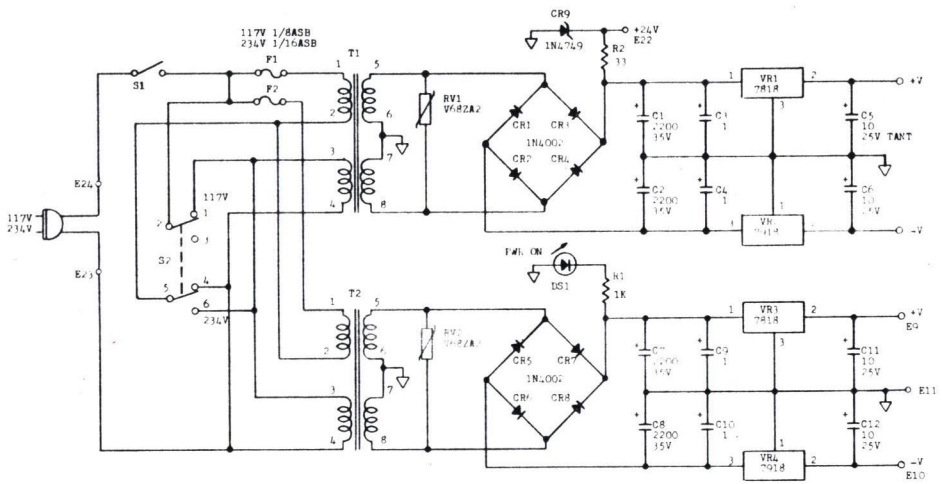


5. GAIN SELECT RESISTOR VALUES TO BE DETERMINED AT INSTALLATION.
4. ALL REMAINING I.C. ARE 5532.
3. U17 IS A 5533.
2. CAPACITORS ARE IN MICROFARADS 50V 10%. UNLESS OTHERWISE SPECIFIED.
1. RESISTORS ARE IN OHMS 1/LW 5%. UNLESS OTHERWISE SPECIFIED.

FIGURE 6-A

SCHEMATIC DIAGRAM, BS/16M AUDIO DISTRIBUTION AMPLIFIER

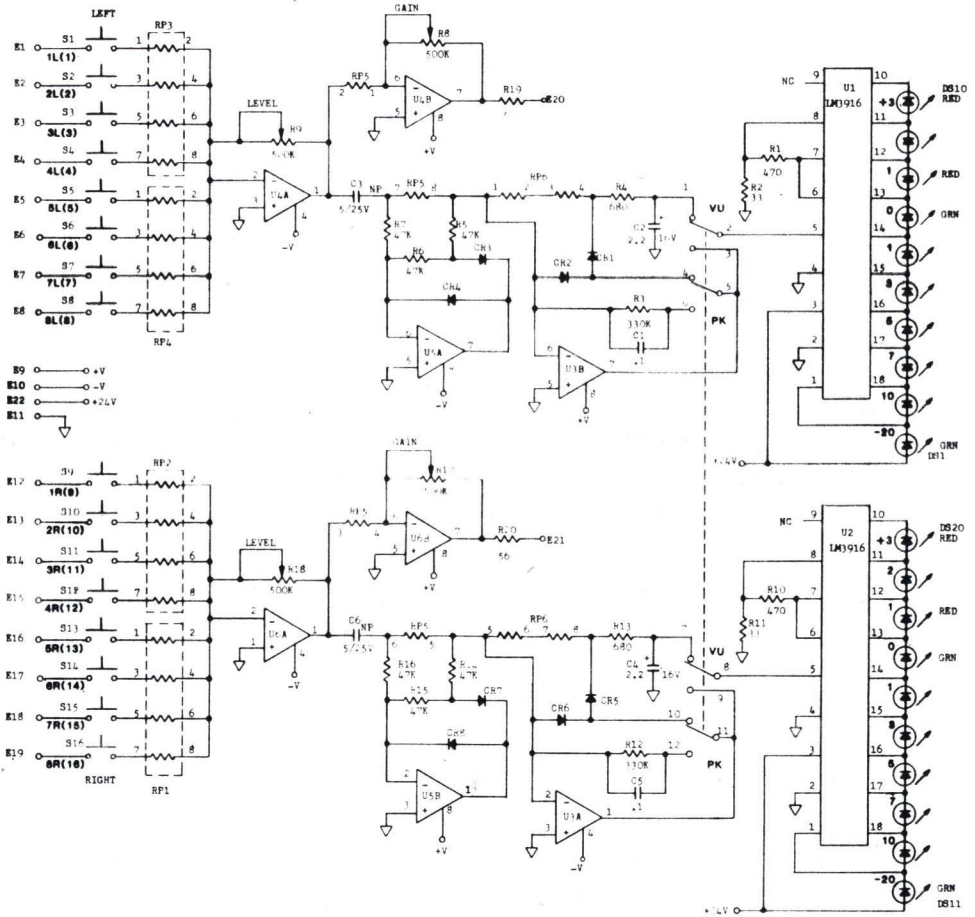
FIGURE 6-B  
SCHEMATIC DIAGRAM, 8S/16M POWER SUPPLY



3. TRANSFORMERS ARE SIGNAL 40-300.
2. CAPACITORS ARE IN MICROFARADS 50V 10%.
1. ALL RESISTORS ARE IN OHMS 1/4 W.  
UNLESS OTHERWISE SPECIFIED.

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FIGURE 6-C  
SCHEMATIC DIAGRAM, 003-0250 METER/HEADPHONES OPTION



- 5. U1 & U5 ARE 5532.
  - 4. U4 & U6 ARE 4558.
  - 3. DIODES ARE 1N4148.
  - 2. CAPACITORS ARE IN MICROFARADS 50V 10%.
  - 1. RESISTORS ARE IN OHMS 100K 1/4W 5%.
- UNLESS OTHERWISE SPECIFIED.

FIGURE 7  
PARTS REFERENCE - COMPONENT LOCATOR

The following parts reference tables present all of the components which are considered replaceable under normal field conditions. Electrical components are listed by reference designator index, mechanical parts are listed by an index number which also appears on the face of the drawing.

The PRIMUS 85/16M unit is available in four basic configurations. These configurations, together with their corresponding equipment part numbers are:

001-0249 - The basic tabletop/bracket-mount unit, without the meter/phones option and with screwdriver-adjustable front panel trimmers. (See figure 7-A.)

001-0249M - Incorporates the 003-0250 meter/head-phones option. (See figure 7-B) Screwdriver-adjustable front panel trimmers.

001-0249P - The basic tabletop/bracket-mount unit but with front panel pots and knobs replacing the screwdriver-adjustable front panel trimmers

001-0249R1 - The basic unit (002-0249) equipped with a single rackmount faceplate panel and trimmers.

These options may be combined to form 4 other composite units; the 001-0249PM, the 001-0249PR1, the 001-0249R1M, and the 001-0249PR1M.

Unless otherwise specified, all components listed on the following tables apply to all units. In such cases as a component has limited usage, the basic application(s) will be listed and it is to be assumed that the component is also used in the composite of that configuration. Thus a component noted "Used on 001-0249P" can also be understood to be used on 001-0249PM, 001-0249PR1, and 001-0249PR1M.

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TABLE 7-A  
COMPONENT LOCATOR, 003-0249 CIRCUIT CARD

Component Identifier	Part Number	Description or Specification
C1, C2, C7, C8	008-0093	2200ufd, -10+30%, 35V, Axial
C3, C4, C9, C10	008-0057	1ufd, -10+30%, 50V, Electrolytic
C5, C6, C11, C12	008-0062	10ufd, 20%, 25V, Tantalum
C13	NOT USED	
C14, C40	008-0105	100ufd, 25V, Nonpolar
C15-C31, C39, C41-C56	008-0045	.05ufd, -20+80%, 50V, Disk
C32, C33, C35, C36	008-0067	47ufd, 20%, 16&25V, Nonpolar
C34, C37, C57, C58	008-0001	5pfd, 10%, 50V, Disk
C38, C59	008-0005	22pfd, 10%, 50V, Disk
CR1-CR8	005-0002	1N4002 Diode
CR9	005-0109	1N4749 Zener Diode (Used on 001-0249M configurations)
DS1	018-0001	LED, MV50104 Red
F1, F2	013-0002	1/8A SB
J1	009-0162	AJ339-1 Phones jack (Used on 001-0249M configurations)
J2, J3	009-0156	PCF3-1, Right angle
R1	007-0084	1k ohms, 1/4W, 5%
R2	007-0048	33 ohms, 1/4W, 5% (Used on 001-0249M configurations)
R3, R6, R9, R12, R15, R18, R21, R24, R29, R32, R35, R38, R41, R44, R47, R50	015-0014	Trimmer, 5k ohms (PT15Y) (Used on basic configurations)
	015-0001	Pot, 5k ohms (Allen-Bradley) (Used on 001-0249P configurations)
	020-0013PB	Knob, 1/4", Primus Brown, K500A (Used with 015-0001)
R4, R5, R7, R8, R10, R11, R13, R14, R16, R17, R19, R20, R22, R23, R25, R26, R30, R31, R33, R34, R36, R37, R39, R40, R42, R43, R45, R46, R48, R49, R51, R52	007-0252	56 ohms, 1/2W, 5%
R27, R53	007-0128	68k ohms, 1/4W, 5%
R28, R54	015-0033	Trimmer, 50k ohms (12PT10V)
R55-R58	xxx-xxxx	Gain Select Resistors (See TABLE 1 for resistance selection guide)



TABLE 7-A  
COMPONENT LOCATOR, 003-0249 CIRCUIT CARD  
(continued)

Component Identifier	Part Number	Value or Specification
RP1, RP3, RP5, RP7, RP9, RP11, RP13, RP15, RP18, RP20, RP22, RP24, RP26, RP28, RP30, RP32 ...	007-0464	8-pin SIP, 100k ohms, 1/4W, 5% resistor
RP2, RP4, RP6, RP8, RP10, RP12, RP14, RP16, RP17, RP19, RP21, RP23, RP25, RP27, RP29, RP31, RP33, RP34 .....	007-0463	6-pin SIP, 100k ohms, 1/4W, 5% resistor
RV1, RV2 .....	005-0037	V68ZA2 Varistor
S1 .....	014-0040	SPST PC MT Switch, black
S2 .....	014-0042	Right angle slide switch
T1, T2 .....	010-0023	Transformer, signal, LP40-30
U1-U16 .....	005-0105	Integrated circuit, NE5532
U17 .....	005-0054	Integrated circuit, NE5533
VR1, VR3 .....	005-0058	Regulator, +18V, 7818C
VR2, VR4 .....	005-0059	Regulator, -18V, 7918

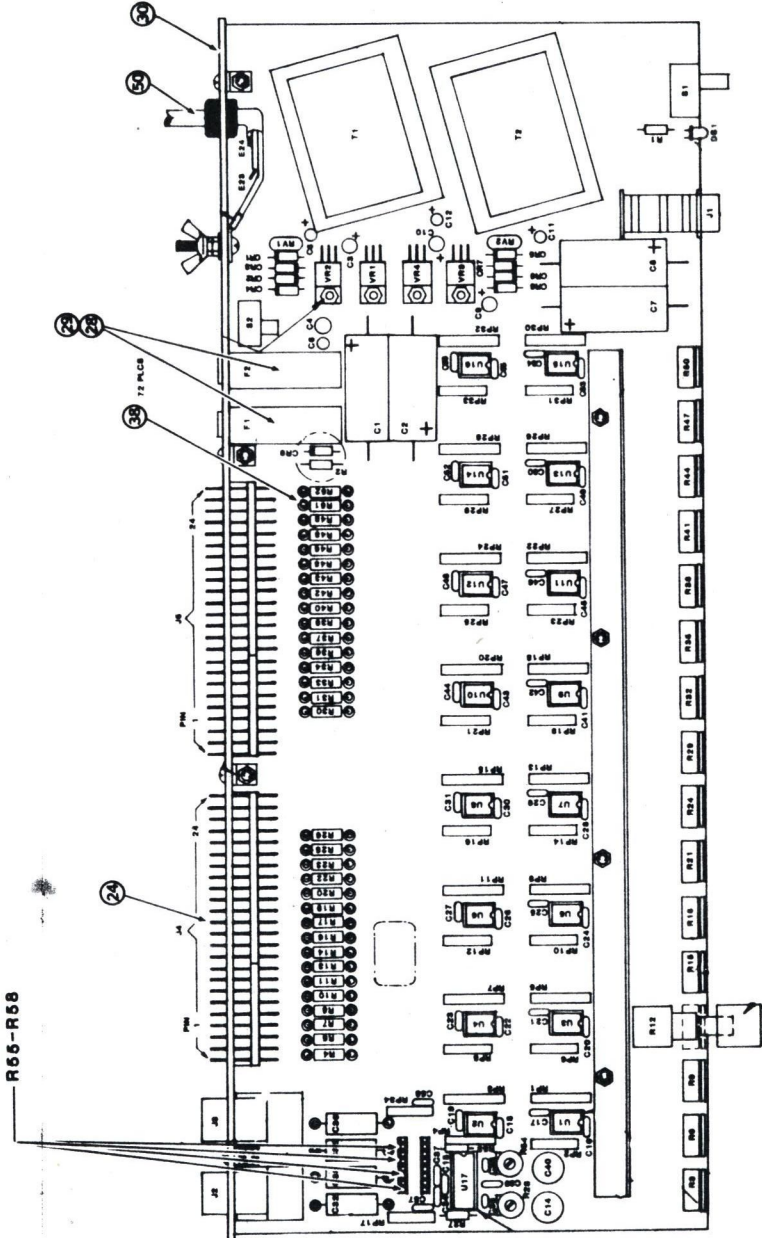
## MECHANICAL PARTS

24 .....	009-0140	Connector, 9-pin right angle
28 .....	011-0005	Fuse holder
29 .....	011-0006	Fuse Carrier
30 .....	012-0478A	Screened rear panel assembly
38 .....	022-0001	Ferrite Bead, 5701812572
50 .....	025-0002	3-prong line cord

## NON-ILLUSTRATED MECHANICAL PARTS

012-0588A	Screened front panel (Used on 001-0249 tabletop/ bracket mount units)
012-0589A	Screened front panel (Used on 001-0249R1 rackmount units)
012-0476A	Screened front panel (Used on 001-0249M tabletop/ bracket mount units)
012-0477A	Screened front panel (Used on 001-0249R1M rackmount units)
003-4124	Housing assembly

FIGURE 7-A  
COMPONENT LOCATOR DRAWING, 003-0249 CIRCUIT CARD



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ORIGINAL RELEASE

TABLE 7-B  
COMPONENT LOCATOR, 003-0250 CIRCUIT CARD

Component Identifier	Part Number	Value or Specification
C1, C5 .....	008-0047	.1ufd, -20+80%, 50V, Disk
1C2, C4 .....	008-0058	2.2ufd, -10+30%, 16V, Electrolytic
C3, C6 .....	008-0061	5ufd, 25V, Nonpolar
CR1-CR8 .....	005-0003	1N4148 Diode
DS1-DS7, DS11-DS17 ...	018-0010	LED, LL231G (Green)
DS8-DS10, DS18-DS20 ..	018-0007	LED, LL201 (Red)
R1, R10 .....	007-0076	470 ohms, 1/4W, 5%
R2, R11 .....	007-0048	33 ohms, 1/4W, 5%
R3, R12 .....	007-0144	330k ohms, 1/4W, 5%
R4, R13 .....	007-0080	680 ohms, 1/4W, 5%
R5-R7, R14-R16 .....	007-0124	47k ohms, 1/4W, 5%
R8, R9, R17, R18 .....	015-0035	Trimmer, 500k ohms
R19, R20 .....	007-0252	56 ohms, 1/4W, 5%
RP1-RP6 .....	007-0464	8-pin SIP, 100k ohms, 1/4W, 5%, resistor
S1-S16 .....	014-0041	Shadow push-button switch
S17 .....	014-0030	Slide switch, MSS4200
U1, U2 .....	005-0108	Integrated circuit, LED Display, LM3916
U3, U5 .....	005-0030	Integrated circuit, 4558
U4, U6 .....	005-0105	Integrated circuit, NE5532

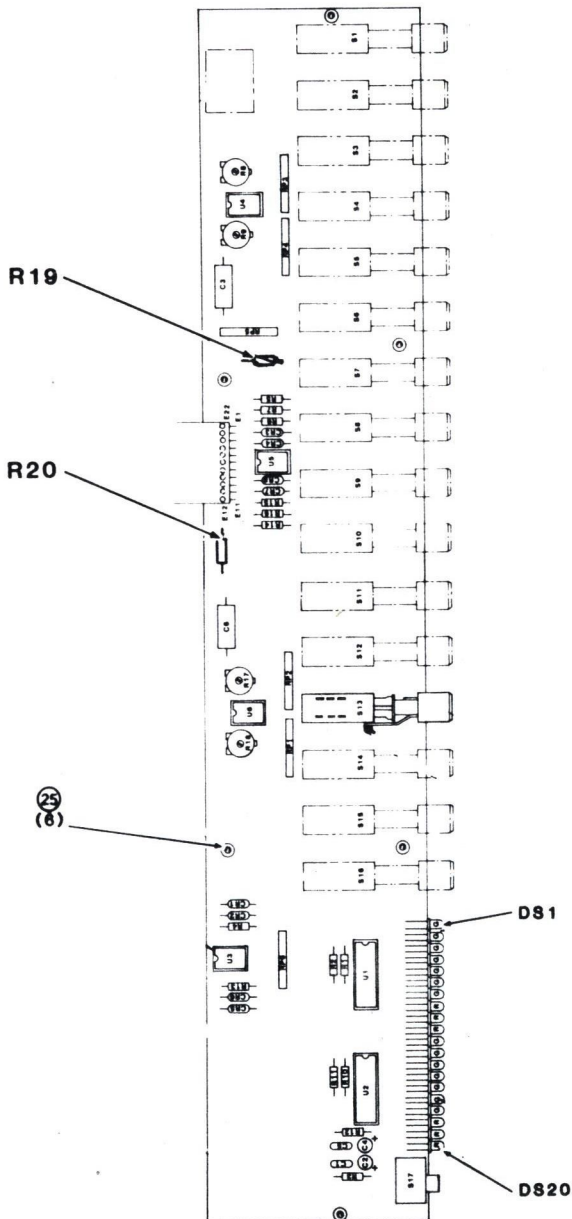
## MECHANICAL PARTS

25 .....	024-0095	Spacer, Nylon, 3/16x3/4x4-40
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FIGURE 7-B  
COMPONENT LOCATOR DRAWING, 003-0250 CIRCUIT CARD





## ▶ LIMITED WARRANTY ◀

**WARRANTY:** All equipment designed and manufactured by RAMKO RESEARCH is warrantied against defects in workmanship and material that develop under normal use within a period of 3 years (4 years on the DC-38 series consoles) from the date of original shipment, and is also warrantied to meet any specifications represented in writing by RAMKO so long as the purchaser is not in default under his contract purchase and subject to the following additional conditions and limitations. \*

1. The sole responsibility of RAMKO RESEARCH INC. for any equipment not conforming to this warranty shall be, at its option:

A. To repair or replace such equipment or otherwise cause it to meet the represented specifications either at the purchaser's installation or upon the return thereof f.o.b. Rancho Cordova,

B. To accept the return thereof, f.o.b. Rancho Cordova, Calif., credit the purchaser's account for the unpaid portion, if any, of the purchase price theretofore paid; or

C. To demonstrate that the equipment has no defect in workmanship or material and that it meets represented specifications, in which event all expenses reasonably incurred by RAMKO in so demonstrating, including but not limited to costs of travel to and from the purchaser's installation and subsistence, shall be paid by purchaser to RAMKO.

2. In case of any equipment thought to be defective, the purchaser shall promptly notify RAMKO giving full particulars as to the defects. RAMKO will give instructions respecting the shipment of the equipment, or such other manner as it elects to service this warranty as above provided.

3. This warranty extends only to the original purchaser and is not assignable or transferable, does not extend to any equipment which has been subjected to abuse, misuse, physical damage, alteration, operation under improper conditions or improper

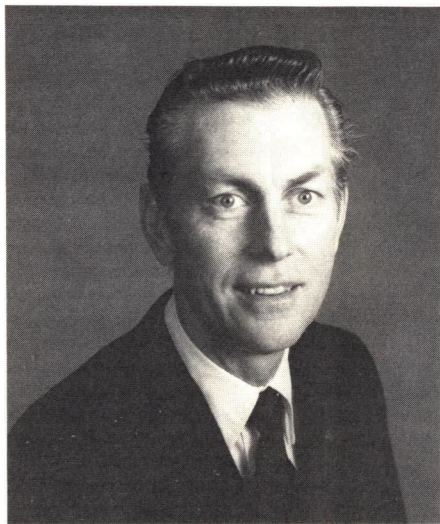
installation, use or maintenance, and does not extend to equipment not manufactured by RAMKO, and such equipment is subject to only such adjustments as are available from the manufacturer thereof.

4. No other warranties, express or implied, shall be applicable to any equipment sold by RAMKO and no representative or any other person is authorized to assume for it any liability or obligation with respect to the condition or performance of any equipment sold by it, except as provided in this warranty. This warranty provides for the sole right and remedy of the purchaser and RAMKO shall in no event have any liability for consequential damage or for loss, damage or expense directly or indirectly arising from the use of equipment purchased from RAMKO RESEARCH.

**NOTE:** Freight charges on All Equipment sent to the Factory for Warranty Service are the Responsibility of the Purchaser.

RAMKO RESEARCH will return the equipment Freight Prepaid.

\* **Special warranty exists for cart machines**



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