

SPARTA RA-5
REMOTE AMPLIFIER
TECHNICAL MANUAL





MODEL RA-5

REMOTE AMPLIFIER / MIXER



PRODUCT GUIDE

The SPARTA RA-5 is a compact, transistorized amplifier/mixer incorporating the latest electronic and operational design concepts to meet a variety of special audio assignments. Primary in its representative applications is the outstanding ability to handle almost any remote broadcast assignment. The light weight, handy carrying case, internal battery power, and wide choice of audio source input accommodations gives the RA-5 the instant and always ready ability to cover those frequent impromptu and cramped-for-space remote broadcasts. The versatility and full-facility features of the RA-5 may also be applied in the console requirement for a small Radio-TV station production studio, closed circuit and ETV, Recording Studio or Public Address System Mixer.

The RA-5 is ruggedly constructed for extended mechanical and electrical life. The base, sides and rear panel of heavy gauge steel are finished in a brown Armorsol, baked enamel finish. The front control panel is of one-piece construction, finished in an attractive brushed anodized aluminum, which provides a pleasant contrast with the stylish black knobs and matching VU meter bezel. The shoulder-strap carrying case is of high impact, molded plastic with a shock absorbing inner lining. Room is provided for the optional AC power supply or accessories. Although miniature in size, the RA-5 reflects the same high quality and offers the same dependable performance that is characteristic of all SPARTA products. Careful consideration has been given to include more than adequate operational features in a unit of this size, and an attractive price range. A comparison review of these features will leave no doubt that the RA-5 represents a truly outstanding value.

If You Didn't Get This From My Site,
Then It Was Stolen From...

www.SteamPoweredRadio.Com

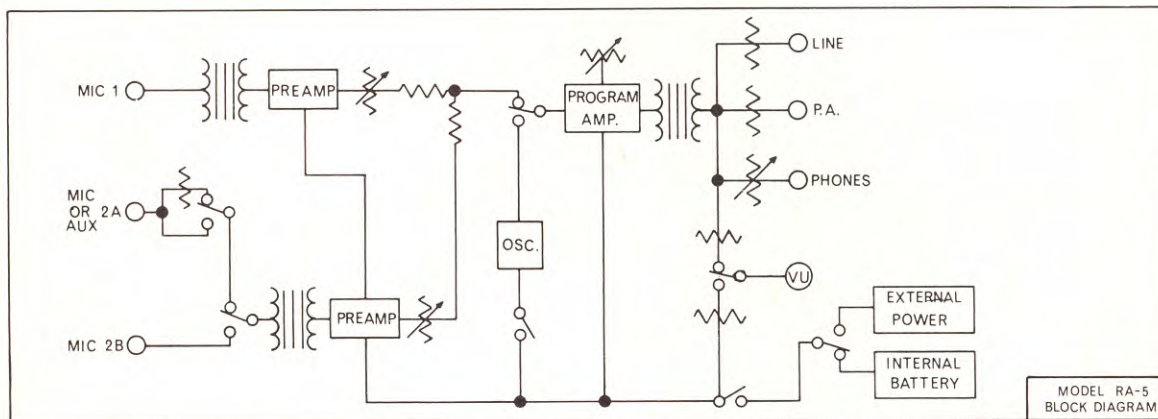
- BATTERY OR AC POWER
- ALL TRANSISTORIZED
- THREE INPUTS
- LINE TEST OSCILLATOR
- PUBLIC ADDRESS OUTPUT
- INPUTS AND OUTPUTS
BALANCED
- RUGGED CONSTRUCTION
- PROTECTIVE CARRYING CASE

TECHNICAL INFORMATION

Operation of the SPARTA RA-5 Amplifier/Mixer is illustrated by the console block diagram. A total of 3 inputs are provided. Mixer A connects directly to a preamplifier which, in turn, connects to the mixer buss. Mixer B is switched to either of two inputs, 2A or 2B. Input 2B can be used for a High or Low level input source. A slide switch on the rear panel designates the input level desired. Consequently, two microphones and one high level source such as tape machine, or three microphones can be accommodated by the RA-5.

The built-in 1000Hz oscillator is also controlled by the Mixer 2 selector switch on the front panel. In the Oscillator position, the input of the program amplifier is connected to the output of the oscillator. This handy feature provides a quick tone test or audio level check of remote line facilities.

A master program gain control and power On/Off switch is provided on the front panel. The adjacent VU meter also serves as a battery condition indicator. In the Battery Check position, the VU meter indicates the voltage of the internal batteries. A total of three program outputs are present: a 600 ohm balanced line, a headphone output with level control and a public address output. The headphone output is well isolated from the program circuit, so either low or high impedance phones may be used. The P.A. output is also an isolated circuit (10,000 ohm) and is designed to feed a P.A. or monitor amplifier. A Power source slide switch is located on the rear panel. Should a power failure occur when using the optional A/C regulated Power Supply (PS-3), instant change over to internal battery power may be made.



TYPICAL REMOTE BROADCAST ARRANGEMENT
Operators' microphone through Channel 1; SPARTA-MATIC® Tape Cartridge playback unit through Channel 2A and roving microphone through Channel 2B.



REAR PANEL VIEW
with optional PS-3 Power Supply

- MIXER:**.....2 Mixers, one selectable by rotor switch to either of 2 inputs or oscillator
- INPUTS:**.....3 inputs; 3 low level; or 2 low level and 1 high level
- AMPLIFIERS:**.....2 transistor preamplifiers.
1 transistor program amplifier
- OSCILLATOR:**.....1 transistor oscillator
- POWER SOURCE:**.....117 volts A.C., 50-60 Hz. using PS-3 power supply.
22 volts D.C., @ 15 ma. using battery power source
- INPUT IMPEDANCE:**.....Microphone: Factory connected for 150/250 ohm balanced microphones. Transformers can be reconnected for 50 ohm microphone
High Level: 600 ohm Balanced
- OUTPUT IMPEDANCE:**.....Line . . . 600 ohm balanced.
P.A. . . . 10,000 ohm balanced.
Headphone High or Low impedance
- INPUT LEVEL:**.....Low . . . -55db.
High . . . 0db.
- OUTPUT LEVEL:**.....Program . . . +4db, after 4db line pad
P.A. . . +8db
Oscillator at 0-VU, -4db after 4db line pad
- RESPONSE:**.....Overall program response at rated output is \pm 2db 30-20,000 Hz
- DISTORTION:**.....Less than 1% with +4db measured across program line
- HUM AND NOISE:**.....Greater than 60db below +4db program output level with -55db input level to preamplifier
- FINISH:**.....Base, side, rear panels—SPARTA Brown ARMORSOL, front panel—brushed anodized aluminum
- DIMENSIONS:**.....(Overall) 7 $\frac{1}{4}$ " wide; 7 $\frac{1}{2}$ " deep; 4 $\frac{1}{4}$ " high
- SHIPPING WEIGHT:**.....13 pounds



5851 FLORIN-PERKINS ROAD SACRAMENTO, CALIFORNIA 95828

A DIVISION OF COMPUTER EQUIPMENT CORPORATION

www.SteamPoweredRadio.Com

SPARTA RA-5
REMOTE AMPLIFIER
TECHNICAL MANUAL



INTRODUCTION

The SPARTA RA-5 is a compact, three input transistorized remote amplifier incorporating the latest electronic and operational design concepts. Solid state circuitry on etched glass epoxy boards provide an exceptionally neat amplifier layout and adds much to the convenience of service and adjustment. Outstanding features include: 3 inputs, 1 kc. oscillator, master gain control and power on/off switch, battery test, front panel headphone jack with level control, precision VU meter, and complete portability.

Representative applications are: Radio-TV station production studios, remote broadcasts, closed circuit and ETV, recording studios, mixer for P.A. line amplifier, and motion picture sound recording.

Outstanding in a remote amplifier of this type is the 1 kc. oscillator. The 1 kc. signal can be used for remote line and level checks.

A compact regulated power supply is external to the console for absolute freedom from hum. The SPARTA RA-5 REMOTE AMPLIFIER can also be operated from its internal batteries when commercial power is unavailable or unreliable.

The SPARTA RA-5 is ruggedly constructed for extended mechanical and electrical life. The 3-piece RA-5 base, sides and rear panel are finished in SPARTA Armorsol Brown, a durable baked enamel finish.

The front face panel is of one-piece construction, finished in attractive brushed anodized aluminum, which provides a pleasant contrast with the stylish black knobs and matching VU meter case.

RA-5 SPECIFICATIONS

| | |
|--------------------------|--|
| <u>Mixer:</u> | 2 mixers, one selectable by rotor switch to either of 2 inputs. |
| <u>Inputs:</u> | 3 inputs, 3 low level or 2 low level and 1 high level. |
| <u>Amplifiers:</u> | 2 transistor preamplifiers. 1 transistor program amplifier. |
| <u>Oscillator:</u> | 1 transistor oscillator. |
| <u>Power Source:</u> | 115 volts A.C., 50-60 cps. using PS-3 power supply. 22 volts D.C., @ 15 ma. using battery power source. |
| <u>Input Impedance:</u> | Microphone: Factory connected for 150/250 ohm balanced microphones. Transformers can be reconnected for 50 ohm microphone. High Level: 600 ohm Balanced |
| <u>Output Impedance:</u> | Line 600 ohm balanced. P.A. 10,000 ohm balanced Headphone. . High or Low impedance. |
| <u>Input Level:</u> | Low -55db. High. 0db. |
| <u>Output Level:</u> | Program +4db, after 4db line pad. P.A. +8db Oscillator at 0-VU, +4db after 4db line pad. |
| <u>Response:</u> | Overall program response at rated output is \pm 2db 30-20,000 cps. |
| <u>Distortion:</u> | Less than 1% with +4db measured across program line. |
| <u>Hum & Noise:</u> | Greater than 60db below +4db program output level with -55db input level to preamplifier |
| <u>Finish :</u> | Base, side, rear panels - SPARTA Armorsol Brown Front panel-brushed anodized aluminum. |

Standard Equipment:

The RA-5 is supplied with internal batteries.

Accessories:

A.C. supply 115 volts 50-60 cps.,
can be supplied as optional extra
at time of purchase or at a later date.

DESCRIPTION OF OPERATION

Operation of the SPARTA RA-5 REMOTE AMPLIFIER is illustrated by the console block diagram. A total of 3 inputs are provided. Mixer A connects directly to a preamplifier which in turn connects to the mixer buss. Mixer B is switched to either of 2 inputs, 2A or 2B. From the switch the input signal passes through a preamplifier to the mixer buss which feeds the program line amplifier.

A master program gain control and power switch is provided on the front panel.

The 1 kc. oscillator is controlled by the mixer 2 selector switch on the front panel. In the oscillator position, the input of the program amplifier is connected to the output of the oscillator.

A total of three program outputs are present: a 600 ohm balanced line, a headphone output with level control and a public address output. The P.A. output is isolated across the program amplifier output transformer.

In order for the VU meter to indicate correctly, the line output should always be connected to a 600 ohm resistive load. Properly loaded, the VU meter will indicate 0-VU with +4db. at the line output.

The VU meter also serves as a battery check meter. In the Batt. CHK. position, the VU meter indicates the battery voltage. When the meter indication is below 0-VU, the batteries are below correct operating potential and should be replaced.

USING THE SPARTA RA-5 REMOTE AMPLIFIER

The previous section dealt with the operation of the RA-5 REMOTE AMPLIFIER; presented here is information regarding the various controls and ways of using the amplifier.

Facilities:

The RA-5 has two mixing channels and a total of three inputs plus a 1 kc oscillator. One input for channel one, two inputs for channel two which connects to the input selector switch. The two mixers or channel gain controls are located horizontally across the center of the front panel. The input selector switch for channel two is of the rotor type and appears between the control for each channel. This switch also controls the 1 kc. oscillator.

In the 1 kc. oscillator position the inputs are disconnected and the output of the oscillator is fed to the input of the program amplifier.

Selecting Mixer 2 Inputs:

The selector switch has three positions. Designations above the switch indicate the channel number (2A-2B) and identify the 1 kc. oscillator. The input connectors on the amplifier's rear panel are given the same designations that appear above the switch.

To select a given input for channel two, the selector switch must be set so that the switch knob is toward the desired input designation. It then follows that input 2A cannot be used while input 2B is "on

the air", etc. Input 2B can be used as a High or Low level input.

A slide switch on the rear panel controls the input level.

Master Gain Setting:

The master gain control is in the upper right area of the front panel. It will normally be set slightly above mid-range, in order to provide adequate operating range for the mixers. A suggested way of determining the correct position for the master gain control is to set the selector switch to OSC. position, increase the master gain control to produce a 0-VU reading. The power off/on switch is at the counter-clockwise position of the master gain control.

Headphone:

The headphone jack and gain control are located on the bottom lip of the front panel. The headphone output is well isolated from the program circuit, so either low or high impedance phones can be used.

Since the headphone output is across the program line output, it is possible to monitor studio audio or talkback fed down the line during remote broadcast setup. The remote announcer or engineer can call or reply to the studio through the remote amplifier.

P.A. Output:

This output is well isolated from the program circuit and is designed to drive the input of a P.A. or monitor amplifier.

Battery Operation:

The battery should supply 22 volts. An Eveready No. 425P or equivalent, is suggested.

Current drain of the RA-5 is as follows:

| | |
|---------------------------------|--------|
| Idling current. | 10 ma. |
| Operating current | 12 ma. |
| Max. operating current. | 15 ma. |

Note: Operating current measurements taken with sine-wave input to amplifier and +4dbm measured output across 600 ohm load.

Battery Connections:

(For External Battery)

Connect the battery to a Cinch-Jones S304-CCT connector as follows:

| | |
|-----------------------|-----------------------|
| Pin 1 | Positive battery post |
| Pin 2 | Negative battery post |
| Pin 3 and 4 | Jumper together |

Connectors:

The various input and output connectors are located on the rear panel. Audio inputs are grouped at the right, audio output are at the left and power connector at the lower left. The Program Line Output, P.A. Output, Ground, and Mike Inputs are positioned toward the top of the rear panel for convenient access.

Connector Types:

Mike

| | |
|-------------------------|--|
| Low level (2) | Cannon XLR-3-31C |
| High or Low (1) | Phone Plug, such as Switchcraft 260 |

P.A. (1) Phone Plug, such as Switchcraft 260

Headphone (1) . Phone Plug, such as Switchcraft 240

Line (1) Dual Banana Plug, 2 tip plug or direct wire connection

Ground (1) . . . Single Banana Plug, tip plug or direct wire connection

Fuses:

The RA-5 is fused in three circuits, providing ample protection to console and power supply components.

The a.c. fuse and d.c. fuse are located on one end of the power supply box. An additional d.c. fuse is provided on the RA-5 bottom cover which serves to protect the RA-5 in internal battery mode.

IMPORTANT: When replacing fuses, care should be taken to insure that only fuses of identical ratings are used. A fuse should never be replaced by one of a higher current rating as transistors and other circuit components may be damaged by overloads that are not sufficient to blow the fuse.

Microphone Impedance:

As normally supplied, the microphone input transformers in the RA-5 are connected for 150/250 ohm microphones. To use with 50 ohm microphones, unsolder the blue lead connected to the input connector and solder the black lead in its place.

1 kc Oscillator:

The oscillator is of the phase shift type. Output from Q9 feeds the calibration control R42. The calibration is set for +4dbm line output at 0-VU indication.

PS3 Power Supply:

The power supply is regulated, providing -22 volts for operation of the entire RA-5 REMOTE AMPLIFIER. The regulator is a shunt type. Zener diode D2 provides a bias reference voltage for the -22 volt regulation. The power supply is protected by a.c. fuse F1 and d.c. fuse F2.

PARTS LIST RA-5 CONTROL CHASSIS

Switches

| | |
|--------|--------------------------|
| S1, S5 | D.P.D.T. slide |
| S2, | 4 pole 3 position rotary |
| S3 | D.P.S.T. part of R4 |
| S4 | 2 pole 2 position rotary |

Resistors

| | |
|--------------------|---------------------|
| R1, R2 | 68k 1/2w |
| R3 | 160 ohm 1/2 w |
| R4 | 5 k pot. C2 taper |
| R5, R6 | 25 k pot. C2 taper |
| R7, R8 | 27 k 1/2 w |
| R9, R10, R12 | 4.7 k 1/2 w |
| R11 | 100 k pot. C2 taper |
| R13, R14, R15, R16 | 62 ohm 1/2 w |
| R17 | 1.2 k 1/2 w |
| R18, R20 | 3.3 k 1/2 w |
| R19 | 600 ohm 1/2 w |
| R21 | 18 k 1/2 w |

Capacitor

| | |
|----|----------------|
| C1 | 100 mfd 30 vdc |
|----|----------------|

Transformers

| | |
|--------|----------------------------|
| T1, T2 | Input MP-12 |
| T3 | Output 150/600 ohm-150/600 |

Diode

| | |
|----|-------------------|
| D1 | 18 v 1 watt zener |
|----|-------------------|

Fuse

| | |
|----|------------|
| F1 | 1/8 A 3 AG |
|----|------------|

Batteries

| | |
|--------|------------------|
| B1, B2 | No. 425P 22 volt |
|--------|------------------|

PARTS LIST RA-5 CIRCUIT BOARD

Resistors

| | | |
|-------------------------|---------------|-------|
| R1, R6, R12, R17 | 100 k | 1/2 w |
| R2, R13, | 15 k | 1/2 w |
| R3, R11, R14, R22, R27 | 3.3 k | 1/2 w |
| R4, R9, R15, R20, R29 | 100 ohm | 1/2 w |
| R5, R16, R38, R40, R42 | 10 k | 1/2 w |
| R7, R18, R24 | 68 k | 1/2 w |
| R8, R19 | 8.2 k | 1/2 w |
| R10, R21, R25, R28, R36 | 4.7 k | 1/2 w |
| R23 | 22 k | 1/2 w |
| R26, R39 | 1 k | 1/2 w |
| R30 | 62 ohm | 1/2 w |
| R31 | 120 k | 1/2 w |
| R32 | 2.7 k | 1/2 w |
| R33 | 39 ohm | 1/2 w |
| R34 | 47 ohm | 1/2 w |
| R35 | 6.8 k | 1/2 w |
| R37 | 270 k | 1/2 w |
| R41 | 220 k | 1/2 w |
| R42 | 10 k trim pot | |

Capacitors

| | | |
|----------------------|----------|---------|
| C1, C7 | 10 mfd | 5 vdc |
| C2, C6, C8, C12, C15 | | |
| C16, C18 | 50 mfd | 25 vdc |
| C3, C4, C9, C10, C14 | 100 mfd | 6 vdc |
| C5, C11 | 10 mfd | 25 vdc |
| C13 | 50 mfd | 15 vdc |
| C17 | .005 mfd | 200 vdc |
| C19, C20, C21, C23 | .01 mfd | 200 vdc |
| C22 | 5 mfd | 25 vdc |

Transistors

| | |
|--------------------|--------|
| Q1, Q2, Q3, Q4, Q5 | 2N2614 |
| Q6, Q7 | 2N217 |
| Q8 | 2N647 |
| Q9 | 2N2613 |

PARTS LIST P S-3

Transformer

T1 F94X

Diodes

D1 FW-200
D2 22V 1 watt zener

Resistors

R1 3.3 k 1/2 w
R2 680 ohm 1 w

Capacitor

C1 250 mfd 50 vdc

Fuses

F1 1/8A 3 AG
F2 1/8A 3 AG

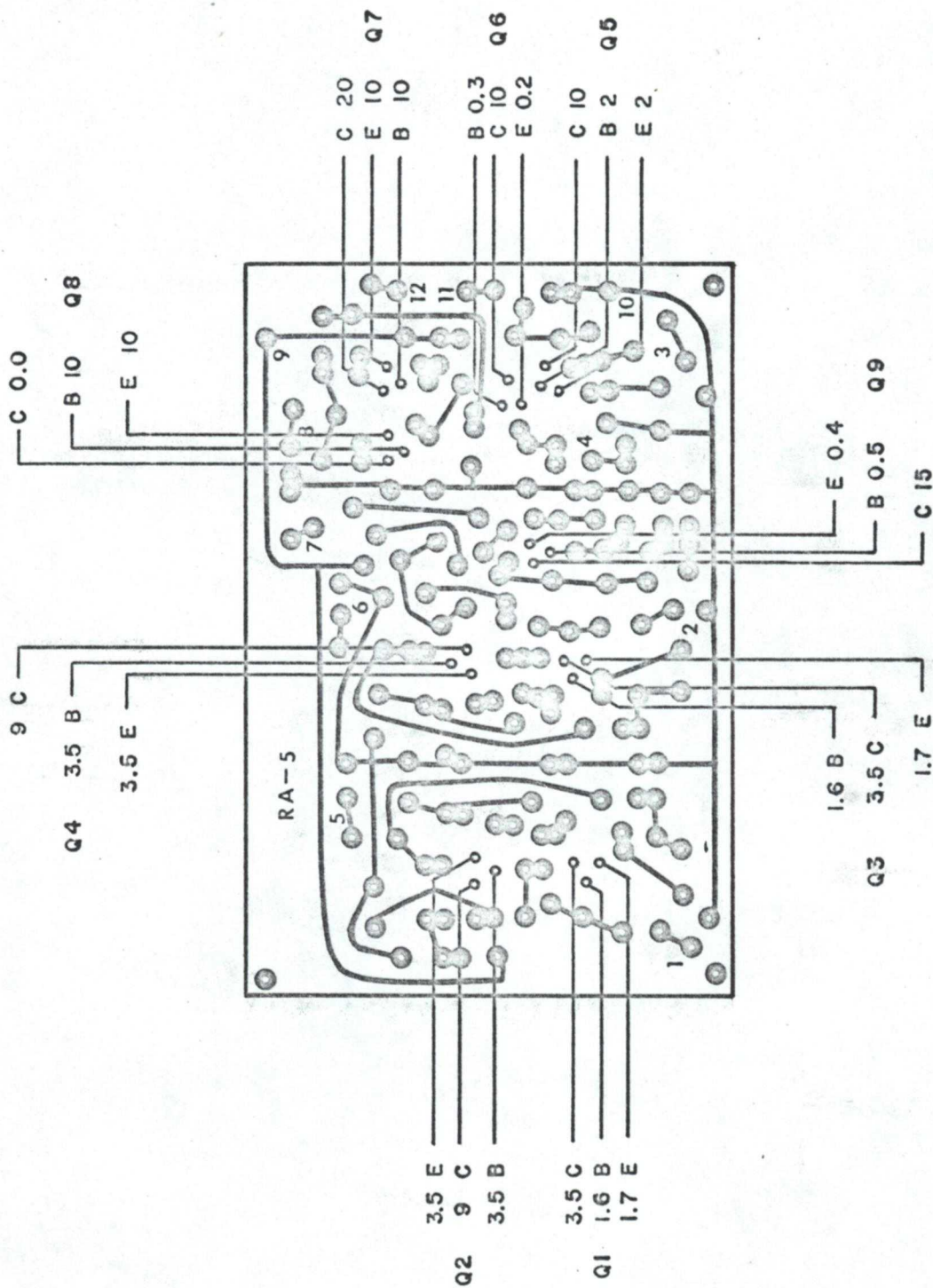
Light

L1 NE-2

WARRANTY

SPARTA ELECTRONIC CORPORATION warrants to the purchaser of SPARTA Electronic Products that any part thereof, which proves to be defective within six months from the date of shipment, will be repaired or replaced free of charge if returned to the factory postpaid. All returns must be specifically authorized by the factory prior to shipment.

This warranty is expressly in lieu of all other warranties express or implied and does not apply to damage resulting from shipment, misuse, unauthorized modifications, or any other cause or condition except normal usage.

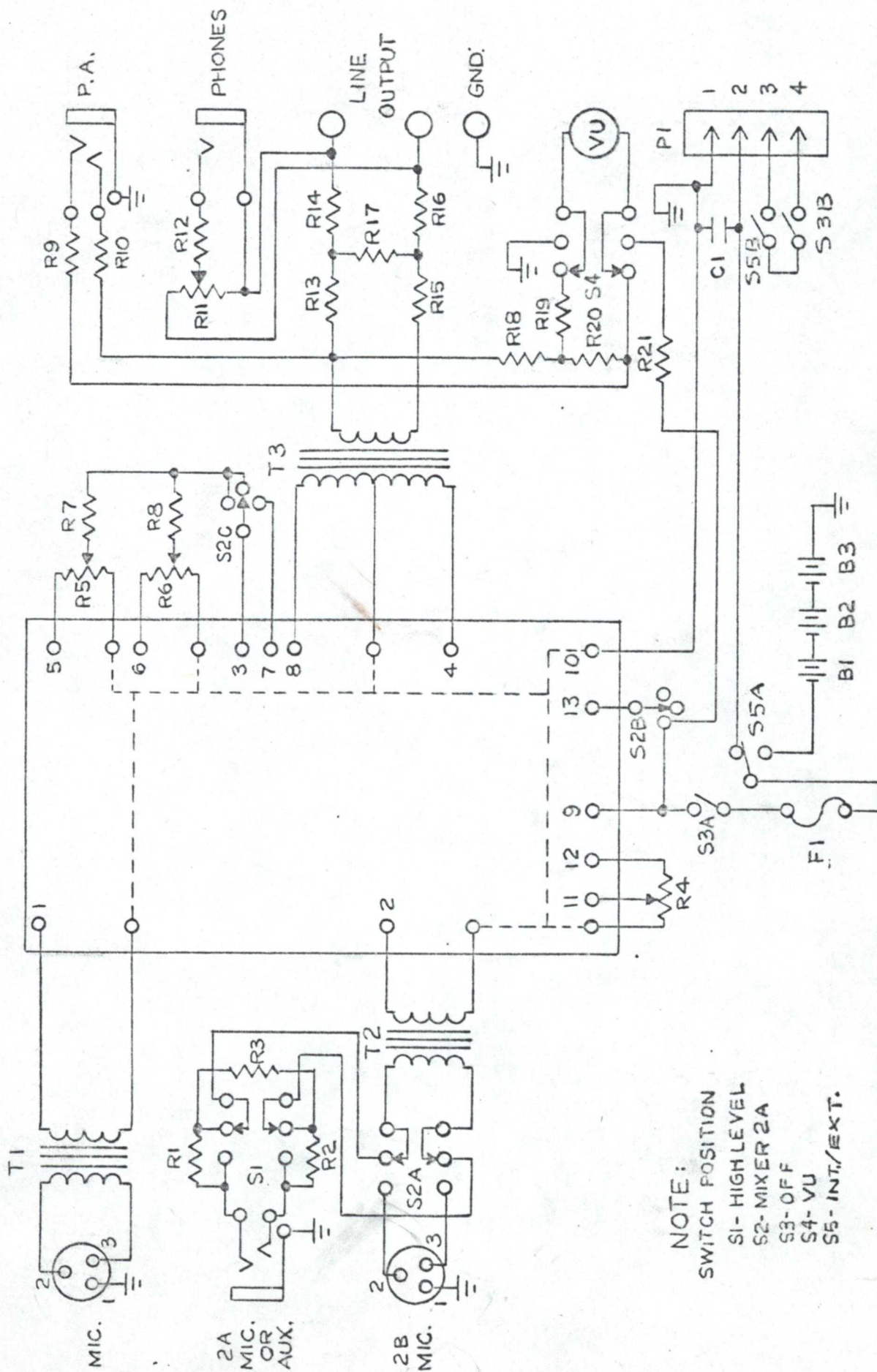


VOLTAGES ARE NEGATIVE,
MEASURED WITH 20,000 OHM VOLTMETER.

SPARTA ELECTRONIC CORP

RA-5 VOLTAGE MEASUREMENTS

| DRAWN | CHECKED | DATE | NUMBER |
|-------|---------|---------|--------|
| SMU | | 10-8-60 | AVA 1 |

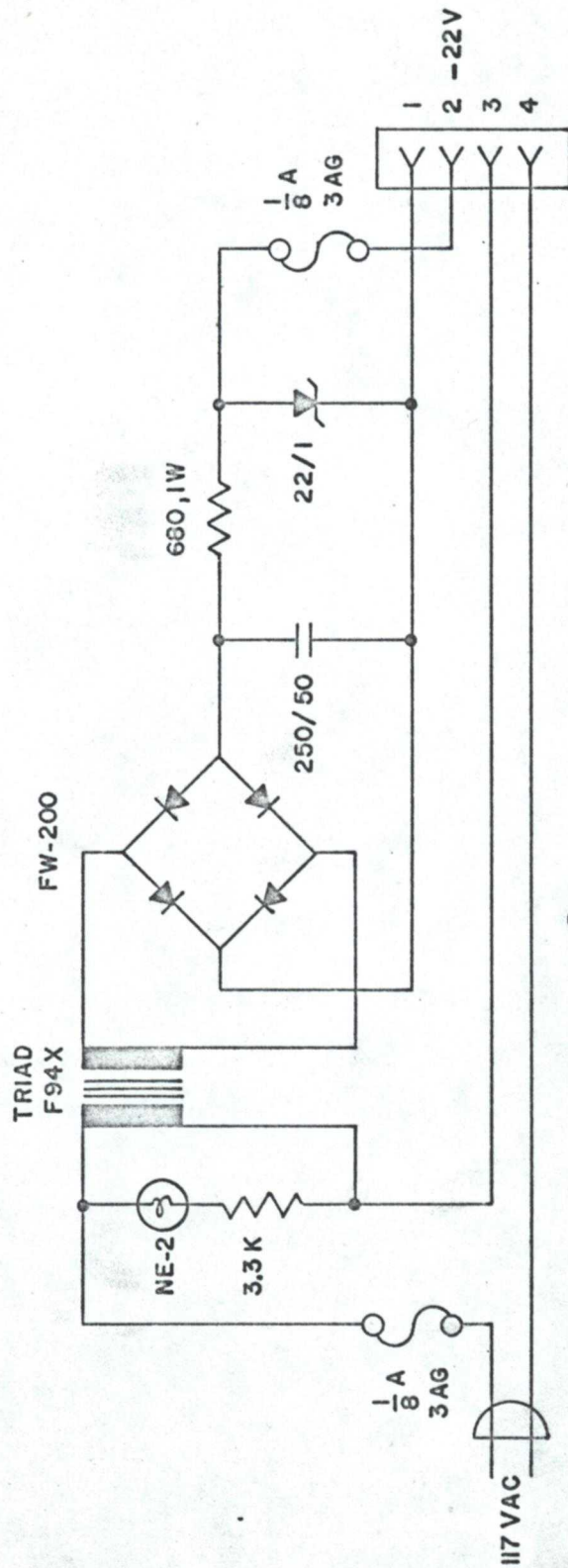


NOTE:
 SWITCH POSITION
 S1- HIGH LEVEL
 S2- MIC/AUX
 S3- OFF
 S4- VU
 S5- INT./EXT.

SPARTA ELECTRONIC CORP.

RA-5 CONTROL CHASSIS 10-20-67

If You Didn't Get This From My Site,
 Then It Was Stolen From...
www.SteamPoweredRadio.Com



SPARTA ELECTRONIC CORP

PS-3 POWER SUPPLY

If You Didn't Get This From My Site,
Then It Was Stolen From...

www.SteamPoweredRadio.Com

DRAWN

CHECKED

DATE

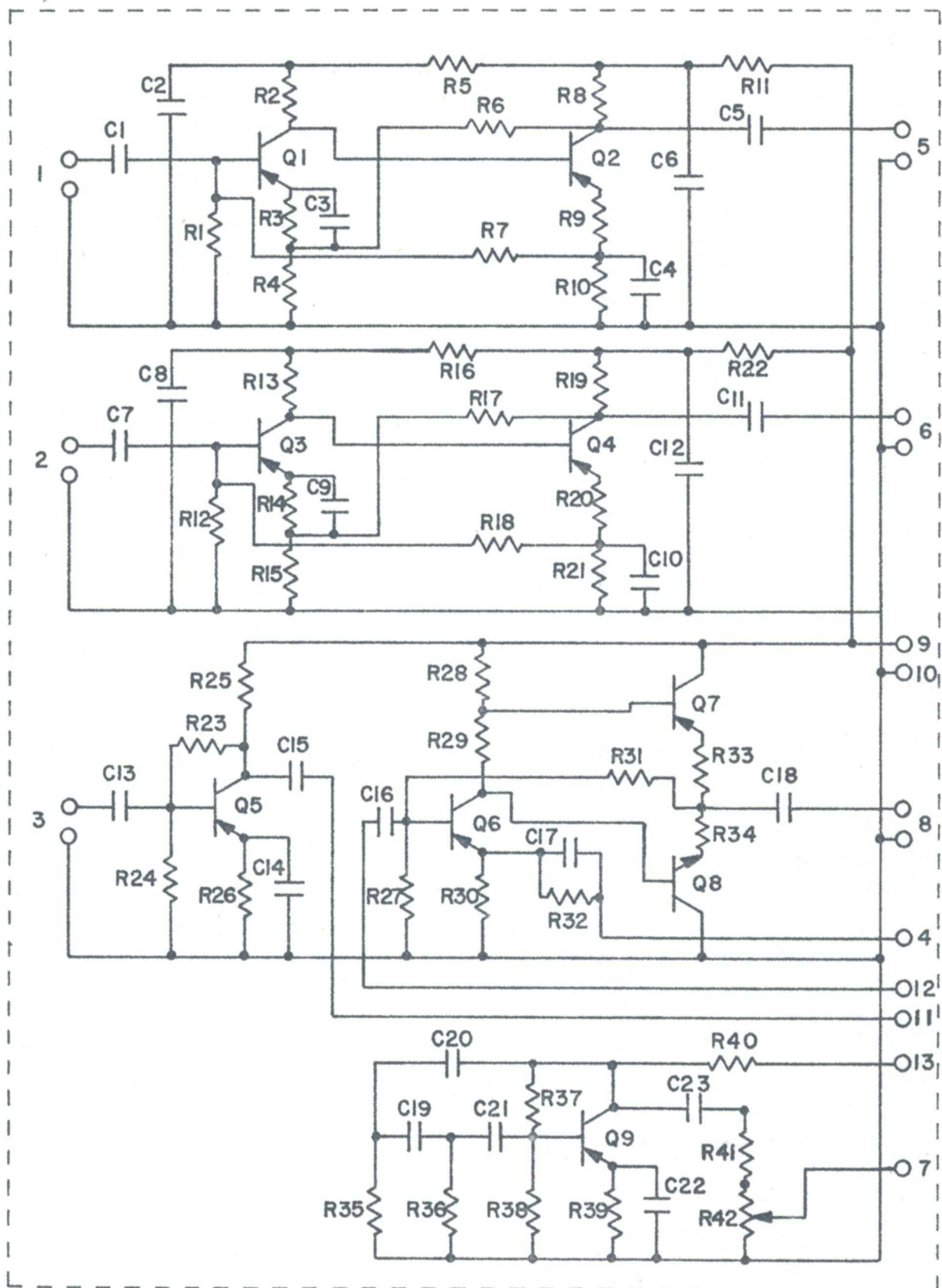
NUMBER

ASA 67

10-7-68

RKO

SMU



SPARTA ELECTRONIC CORP.

RA-5 CIRCUIT BOARD

SPARTA ELECTRONIC CORPORATION

Dear Customer,

Careful attention to Quality Control is another important element in our daily effort to provide you with excellence of product and service. At SPARTA each piece of equipment and sub-assembly receives numerous inspections and tests in the process of production. The final results must measure within our exacting requirements before it is shipped to you. Listed below are just a few of the major check points and tests this particular piece of equipment has received before being prepared for shipment. Should you note any discrepancy in the appearance or operation of your SPARTA Product or if you have any general comments as to how we might be of greater service, your suggestions will be greatly appreciated.

RA-5

CUSTOMER _____

SERIAL NO. 257

DATE 4-16-69

CHECKOUT/CALIBRATION EWP

MECH/PHYSICAL INSP. ✓

OSC. CALIBRATION W/ MASTER 3/4 OPEN ✓

OUTPUT LEVEL + 4dbm

CURRENT LEVEL 14 ma

CHANNEL #1

DISTORTION .4%

S/N - 67db

CHANNEL #2 (Low Level)

2A - DISTORTION .7%

S/N - 66db

2B - DISTORTION .6%

S/N - 66db

2A - DISTORTION (HIGH LEVEL) .7%

RESPONSE

CHANNEL

(1KHz reference)

| | #1 | #2 |
|--------|------|------|
| 1 KHz | 0db | 0db |
| 30 Hz | -.7 | -.7 |
| 100 Hz | -.4 | -.4 |
| 500 Hz | -.2 | -.2 |
| 2 KHz | +1.2 | +1.1 |
| 5 KHz | -.3 | -.4 |
| 10 KHz | -1.2 | -1.2 |
| 15 KHz | -2.0 | -1.9 |

HEAD PHONES ✓

BATTERY CHECK ✓

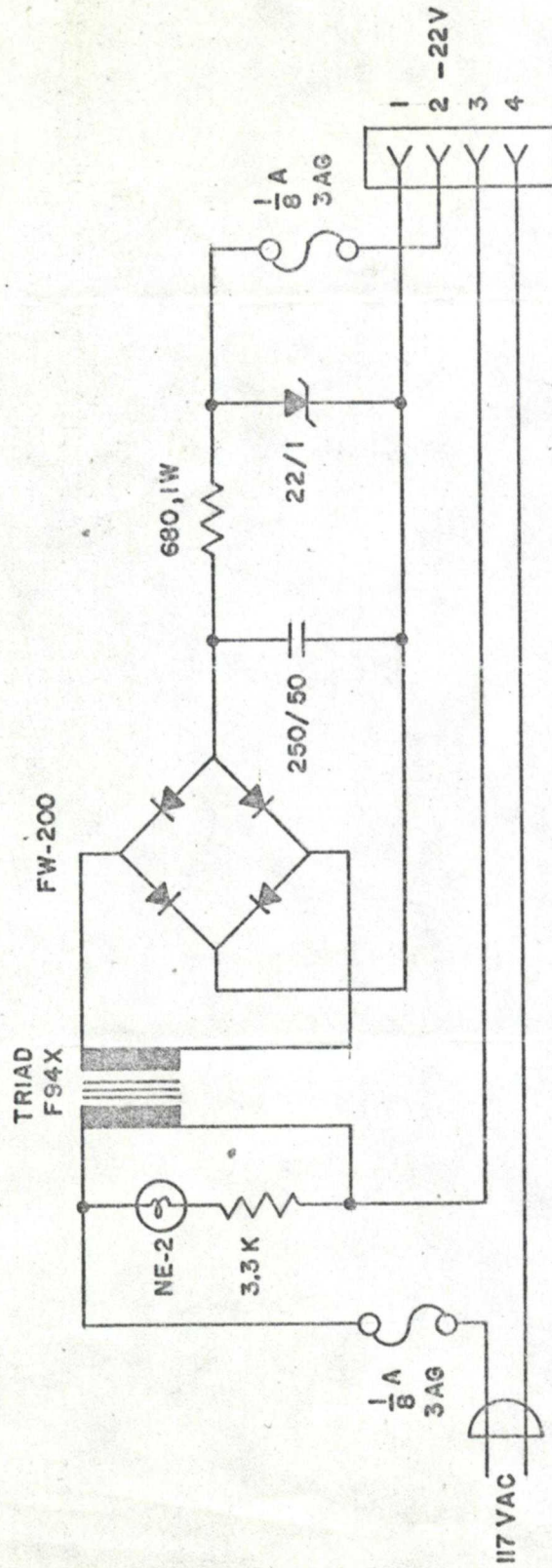
P.A. OUTPUT ✓

FINAL INSP. _____

PAINT/SCRATCHES _____

POLISHING _____

MANUAL _____



S-53

SPARTA ELECTRONIC CORP

PS-3 POWER SUPPLY

| DRAWN | CHECKED | DATE | NUMBER |
|-------|---------|---------|--------|
| SMU | RKO | 10-7-68 | ASA 67 |

If You Didn't Get This From My Site,
Then It Was Stolen From...

www.SteamPoweredRadio.Com

