

# Spotmaster

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500C/505C



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**BROADCAST ELECTRONICS, INC.**

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# BROADCAST ELECTRONICS, INC.

— A FILMWAYS COMPANY —

8810 BROOKVILLE RD. • SILVER SPRING, MD. 20910 • PHONE 301-588-4983

## I N S T R U C T I O N   M A N U A L   S U P P L E M E N T

### INSTALLATION & MAINTENANCE NOTES FOR RACK MOUNTED MODELS

1. Rack mounted models are equipped with chassis slides for direct mounting to your rack. Slight adjustment of the slides is possible (up or down, to compensate for variations in the rack opening) by loosening the chassis slide mounting screws and adjusting as desired. Due to the wide variation in rack depth in various installations, no provision has been made for securing the rear of the chassis slides. If the rack frame is sufficiently rigid this is generally not necessary but, if desired, the rear section of the chassis slides may be held secure by installing a metal strap between the rear of the chassis slide and a suitable location on the rack frame.

2. When properly installed, the SPOTMASTER may be pulled forward on the chassis slides for head and capstan cleaning and other routine maintenance. Note that it is necessary to depress the small tab on the side of each slide to return the unit to a flush position in the rack.

The entire unit may be removed from the rack for other servicing procedures by removing connecting plugs and sliding out until free.

- R Mi -

*Spotmaster*

## INSTALLATION & MAINTENANCE NOTES FOR RACK MOUNTED MODELS

3. The tape transport deck may be removed, if necessary, as follows:

- (A) Unplug head leads at rear of head bracket.
- (B) Remove clips from microswitch on underside of tape deck.
- (C) Unplug motor plug from socket on relay board.
- (D) Remove screws marked "A" on chassis layout diagram; do not remove unmarked screws.
- (E) Place load lever in READY position and remove lever knob.
- (F) Deck may now be lifted and removed from chassis.

4. Access to the underside of printed circuit boards, if necessary, is gained by removing mounting screws located on the underside of the chassis. Boards may then be lifted and turned for inspection. DISCONNECT THE POWER CORD BEFORE SERVICING.

5. Ignore references in the General Instructions to mounting of compact models or to microphone input connections, since rack mounted recorders are normally supplied with a bridging type line level input to the recorder.

6. Two adjustable load lever stops are provided to limit the travel of the load lever. These are located at each end and below the load lever plate on the inside of the tape deck compartment. Both stops are factory adjusted, but if further adjustment should

## INSTALLATION & MAINTENANCE NOTES FOR RACK MOUNTED MODELS

### 6. (Cont.) -

ever be necessary the procedure below should be followed.

Stop #1 which limits the maximum lever travel in the RELEASE position is relatively non-critical and should be adjusted so that the lever barely misses striking the top of the lever slot on the front panel.

Stop #2 which limits the maximum lever travel when in the READY position should be adjusted as follows:

- (A) Loosen STOP mounting screw.
- (B) Move load lever to READY position.
- (C) Energize solenoid by pressing START button.
- (D) Move load lever slightly toward RELEASE position until it stops.
- (E) Move STOP against load lever and tighten mounting screw.
- (F) De-energize solenoid by depressing STOP button.

When this is done, the solenoid swing arm should release and clear the solenoid from 1/8" to 3/16" when the load lever is resting against the stop.



B R O A D C A S T   E L E C T R O N I C S , I N C .



SPOTMASTER MODELS 500C & 505C

SPECIFICATIONS

SIZE - Compact:	10-1/4" W, 12-3/4" L, 6-5/8" H
Rack:	19" W, 14-1/2" D, 7" H
WEIGHT - 500:	<u>Compact</u> : 18 Lbs. <u>Rack</u> : 23 Lbs.
505:	<u>Compact</u> : 15 Lbs. <u>Rack</u> : 21 Lbs.
MOTOR:	Hysteresis Synchronous
OUTPUT LEVEL:	+4 dbm adjustable (plus 10db peak factor)
OUTPUT LOAD IMPEDANCE:	Nominal 600 $\Omega$ (Transformer Output)
FREQUENCY RESPONSE:	50 - 12000 Hz $\pm$ 2 db
	50 - 15000 Hz $\pm$ 3 db
SIGNAL TO NOISE RATIO:	55 db below 3% THD
HARMONIC DISTORTION:	Less than 2%
	(400 Hz - Normal recording level)
WOW AND FLUTTER:	Less Than .2 of 1%
STOP TIME:	1/10 second or better
START TIME:	1/25 second or better
*LINE INPUT:	.2 volts (bridging)
*MICROPHONE INPUT:	(150 $\Omega$ ) .5 millivolts
(Compact only)	
*MONITORING:	Independent record and reproduce systems permit monitoring of either the recording or reproducing amplifier while recording.
CONTROLS:	*Gain, On - Off
	*Record - Momentary Push Button Switch
	*Recording Meter Selector Switch
	(program, control tone, bias)
	Start Switch
	Stop Switch
	Output Level
POWER REQUIREMENTS:	105-125 v ac, 60 Hz, 50 watts
	(50 Hz optional extra)
SPEED:	7½ inches per second
PLAYING TIME:	1 second to 31 minutes

\* Refers to Model 500C Record/Play unit only

\* \* \*

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B R O A D C A S T   E L E C T R O N I C S , I N C .

SPOTMASTER MODEL 500C (Recorder/Reproducer)

SPOTMASTER MODEL 505C (Reproducer Only)

INSTALLATION & OPERATING INSTRUCTIONS

1.    GENERAL

SPOTMASTER Models 500C and 505C recording and/or reproducing units are professional grade tape cartridge machines for use in radio stations, TV stations, recording studios and similar operations. Ease of installation, operation and maintenance is a feature of the equipment. The recording amplifier of the 500C is designed to accept audio input levels between -15 and +20 dbm. Compact models are equipped with a microphone preamplifier for use with a standard broadcast type dynamic microphone and will accommodate input levels as low as -65 dbm.

The output circuitry of the reproducing amplifier in each model is designed to work into line key inputs of standard broadcast type consoles. The output level is adjustable by means of a variable control located on the rear panel of the equipment.

The equipment is designed to accept standard NAB tape cartridges, types A, B and C, available in tape lengths from 20 seconds to 31 minutes in playing time, thereby making possible the use of as little as 1 second or as much as 31 minutes of



## INSTALLATION & OPERATING INSTRUCTIONS

### GENERAL (Cont.) -

program or spot material on a single cartridge. SPOTMASTER cartridge racks are recommended for cartridge storage.

### 2. INSTALLATION

(A) Either the Model 500C recorder or 505C reproducer may be used as a playback unit and installed in a control room or studio within convenient access of the operator but, if desired, may be installed at a remote location and operated by means of a remote control unit (BE-101 or BE-102). Units may be placed side by side on any available table top, control desk, or on an inclined shelf constructed over the turntables. The output of one or all machines may be connected to a single console line input, but connection of each unit to a separate line input key is recommended where possible. This increases flexibility and provides greater control over individual units. Standard broadcast installation procedures should be followed. Use shielded connecting cables, avoid high hum and magnetic fields, avoid high temperatures, avoid dusty locations, etc. Do not install directly over a console or other heat generating equipment due to the possible adverse effect of excessive heat on the transistorized amplifiers.

The playback amplifier output is available from two standard (headphone type) jacks connected in multiple and located on the rear panel of the unit. The mating plug should be a

## INSTALLATION & OPERATING INSTRUCTIONS

### INSTALLATION (Cont.) -

Switchcraft type 40 or equal. The playback amplifier is designed to operate into a 600  $\Omega$  load but because of the output stage design, the unit may be connected to much higher load impedances without adverse effect on program quality. The secondary of the output transformer may be reconnected for operation into 150 ohm loads, if desired. (See schematic diagram.) To connect the playback amplifier to the console, install a two conductor line between the output jack and a line input of the console.

If machines are connected in multiple, balance the output of the group by means of the variable output level control on the rear panel of each machine. When connecting machines in multiple to a single console input, a 560 ohm isolating resistor should be installed in series with the output of each machine to prevent the loading effect of other machines in the group, if the output controls are to be operated fully open. (See B3, sect. 2D)

NOTE: The playback amplifier output jack is insulated above ground. External ground connections should be made to the case ground terminal.

(B) The Model 500C is designed for use both as a recorder and a reproducer. When used as a recorder, it is only necessary to connect a suitable program source (approximately -10 dbm) to the record amplifier line input jack (Switchcraft type 40 or equal mating plug) and follow the recording procedure outlined in Section 3. On compact models a low impedance dynamic microphone



## INSTALLATION & OPERATING INSTRUCTIONS

### INSTALLATION (Cont.)

may be connected to the microphone preamplifier (Cannon XL connector), if desired. If the microphone input is used, be certain to remove the phone plug from the line input jack since this disconnects the microphone preamplifier.

### 3. RECORDING PROCESS (Model 500C & 500C-R)

#### CAUTION:

Before recording, make certain that the cartridge is thoroughly erased by means of a bulk type degausser. Erase both sides of the cartridge, then tip up and erase exposed tape on the open end of cartridge. (NAB Standards, Section 2.55, require that no erase function be provided as a machine capability.)

(A) The model 500C recorder is equipped with record pre-set and record release circuitry which automatically switches back to the playback mode each time the machine is stopped. To switch from playback to the record mode it is only necessary to momentarily depress the RECORD button. This energizes the record/play relay (K2) which in turn activates the recording circuitry. Program material may be fed to the recording amplifier either through the line input jack (located on the rear panel) or by means of a microphone connected to the microphone input. (Microphone preamplifiers are provided as standard equipment on all compact models and as optional equipment on rack mounted models.) The input level to the recording amplifier is adjustable by means of the gain control located on the front panel. Program peaks as read on the VU meter should reach but not exceed zero VU.

## INSTALLATION & OPERATING INSTRUCTIONS

### RECORDING PROCESS (cont.)

Load the proper length cartridge in the machine and move the load lever to the "Play" or "Ready" position. This action rotates the pressure roller into position and energizes the motor. Momentary pressure on the "start" button sets the tape in motion. "Tightness" of cueing will depend upon how quickly program material is started after the start button is depressed. It is recommended that at least one-fourth second be allowed between the start of tape motion and the beginning of program material. (See note 3, page 6, NAB Cartridge Standard)

When a recording has been completed, allow the machine to run until it stops automatically. This cues the tape to the beginning of the program and at the same moment switches the equipment back to the playback mode which is indicated by the play lamp. A guard ring is provided to protect the RECORD button from accidental activation.

If, for any reason, it is desired to return the equipment to the playback mode, when in the record mode, it is only necessary to momentarily depress the STOP button.

If multiple spots are to be recorded on a single cartridge it is necessary to stop the machine at the end of each spot and reactivate the record circuitry by momentarily depressing the record button before proceeding with the next recording.

If program material is to be edited or changed it is recommended that this be done on reel to reel equipment and then transferred to the cartridge.



## INSTALLATION & OPERATING INSTRUCTIONS

### RECORDING PROCESS (Cont.)

(B) Standard cartridge lengths are 20, 40, 70, 100, 140 seconds, and  $3\frac{1}{2}$ ,  $5\frac{1}{2}$ ,  $8\frac{1}{2}$ ,  $10\frac{1}{2}$ ,  $12\frac{1}{2}$ , 16 and 31 minutes. Check the length of the recording to be made and allow two seconds minimum dead tape after the recording is finished. For instance, a 70 second cartridge should be used when recording a 60 second spot. Additionally, three 20 second spots may be recorded on a 70 second cartridge but a 70 second cartridge should not be used for two 35 second spots.

When in the record mode a 1000 Hz cueing tone of the proper amplitude and duration is automatically recorded on the tape cueing track at the instant the start button is depressed.

"Off the tape" monitoring facilities while recording are provided. To check recording quality during the recording process, a suitable amplifier-speaker combination or headphones may be connected to the playback amplifier output jack.

(C) When recording, the meter switch on the recorder should be kept in the "P" or program position, which indicates program recording level. A thirty day check of the "T" tone voltage and "B" bias voltage by rotating the switch to these positions is advisable. DO NOT CHANGE THE METER SWITCH WHILE RECORDING.

The meter in the "T" position should read approximately "0" VU  $\pm$  3 db, and when the start button is depressed should decay to zero in approximately 1/2 second. The meter in the "B" or bias position should read approximately "0" VU. (Both of the above meter indications are approximate as the actual voltages are ad-

## INSTALLATION & OPERATING INSTRUCTIONS

### RECORDING PROCESS (Cont.)

justed for optimum performance of each individual machine during final test operations. For this reason, it is wise to make a note of the meter reading in both the tone and bias positions for comparison purposes on later check dates.)

#### 4. PLAYBACK PROCESS

Place a recorded cartridge in position and move the load lever to the "Play" position. (If using a Model 500C recorder as a playback machine, make certain the PLAY indicator lamp is glowing. This indicates that the equipment is in the playback mode.)

Momentary pressure on the "start" button will start tape travel across the heads resulting in reproduction of the recorded material through the playback amplifier. The tape may be stopped at any point for a live insert, if desired, by depressing the "stop" button.

Do not remove the cartridge from the machine, however, until the spot has ended and the start light goes out which indicates that the spot is cued and ready for re-use.

#### 5. REMOTE CONTROL

To use the SPOTMASTER Type 101 or 102 remote control unit, insert the remote control plug in the receptacle on the rear panel of the playback unit.

One, two or three machines may then be controlled from a remote point. Machines stop automatically when the tape cartridge is re-cued.



## CIRCUIT DESCRIPTION

### (1) POWER SUPPLY

Two DC power supplies furnish power for the operation of the equipment as follows: One is a 37 VDC triple zener regulated, solid state, bridge rectifier supply which furnishes power to the recording amplifier, the playback amplifier, the bias generator, the cue tone generator/s, the cueing amplifier/s, and the relays. The silicon bridge type rectifier (CR1) and filter components for this supply are located on the relay board.

The second is a 120 VDC supply furnishing power for the tape transport solenoid and the neon signal lamps. The silicon rectifier (CR2) and filter for this unit are located on the relay board.

### (2) CONTROL CIRCUITRY

The manner of operation of the control circuitry will become apparent to the experienced technician upon examination of the diagrams, but the following notes will be helpful.

(A) AC power is supplied to the motor when the load lever is moved to the play position, thereby actuating a micro switch associated with it.

## CIRCUIT DESCRIPTION

### CONTROL CIRCUITRY(Cont.)

(B) Power is supplied to the tape transport solenoid through a set of contacts on the "power" relay (K1). This relay is energized by momentary pressure on the START button and remains energized due to the existence of a constant 9 volt hold voltage across the relay coil. If the STOP button is depressed or a 1000 Hz tone appears at the input of the cueing amplifier, the hold voltage is reduced below the relay drop out point and the relay returns to normal, thereby releasing the tape transport solenoid and stopping tape travel.

(C) The automatic delay control circuitry (Q9) delays application of voltage to the cue tone amplifier/s until the primary cue tone, recorded on the tape, has travelled past the cueing head after the START button is depressed. Delay time is approximately 3 seconds.

The silicon transistor (Q9) in the delay control circuit receives bias voltage through a set of back contacts on K1 relay when this relay is in the relaxed position (machine not running). Q9 draws maximum current in this mode with the result that no voltage is supplied for the operation of the cueing amplifier. The relay (K1) is instantly energized when the START button is depressed and remains so until the machine stops. The bias voltage is thereby removed from Q9 when C40 discharges through R35 and R36. The discharge time is approximately 3 seconds. Since Q9 is non-conducting when "bias" is removed, operating voltage is then applied to the cueing amplifier.



## CIRCUIT DESCRIPTION

### CONTROL CIRCUITRY (Cont.)

Diode D1 prevents reverse current flow from C25 thereby maintaining the same time constant in both the record and play modes.

(D) The output level control located on the rear panel provides a means of adjusting the output level of the playback amplifier. If operating the equipment into loads less than the output impedance of the output transformer, the control should not be advanced more than three-quarters open unless an isolating resistor is installed in series with one of the connecting output leads. The resistor should be equal to the transformer secondary impedance, i.e., 150  $\Omega$  or 600  $\Omega$ . (See schematic for output transformer connections.

(E) The momentary push button RECORD switch (S4) energizes relay K2 which applies zener-regulated (DZ1, DZ3, and DZ4) voltage to the recording amplifier, bias oscillator and cue tone oscillator. The associated indicator lamps are energized through a separate set of contacts on the same relay. Zener diode DZ2 serves to stabilize the holding voltage for relays K1 and K2. Diodes D2 and D3 are blocking diodes to prevent interaction between the energizing voltages applied to K1 and K2.

(F) The recording gain control (Model 500C provides a means for adjusting the audio input to the recording amplifier.

## CIRCUIT DESCRIPTION

### CONTROL CIRCUITRY (Cont.)

The AC power switch is ganged with the recorder gain control.

(G) The meter selector switch, when in the "P" position connects the VU meter so as to indicate program recording level. When in the "T" position it indicates the momentary cue tone recording level (and Cue-Trip tone recording levels), and when in the "B" position it indicates the recording bias level. (See Section 3C)

(H) Essential circuitry for remotely controlling either the START, STOP, or RECORD PRESET is available at the "remote socket" on the rear panel (see circuit diagram). A momentary connection across socket terminals 2 and 3 starts tape travel. A momentary connection across socket terminals 2 and 7 stops it. A momentary connection across socket terminals 1 and 3 switches the equipment to the record mode.

#### (3) CUE TONE AMPLIFIER (Primary)\*

The cue tone amplifier is a modular, 4- stage transistorized amplifier (Q5, Q6, Q7 and Q8) driven by the cue reproduce head and receives power from the zener regulated power supply (see Section 2 (C), Control Circuitry). The amplifier is of modular plug-in construction and mounts on the relay board.

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\*Circuit descriptions of optional secondary and tertiary cueing equipment will be found in the Series C Cue-Trip Supplement issued when the equipment is ordered.



## CIRCUIT DESCRIPTION

### CUE TONE AMPLIFIER (Primary) (Cont.)

The sensitivity of the amplifier may be adjusted, if necessary, by means of variable resistor R28. Factory adjustment is for .3 mv sensitivity at 1000 Hz with the input terminated into 600  $\Omega$ . No field adjustment should be necessary under normal operating conditions.

The manner of operation of the tone amplifier and the automatic stop circuitry is as follows: The output transistor (Q8) of the cueing amplifier is in parallel with the run relay coil (K1). When the cue reproduce head senses the presence of a 1000 Hz cueing tone, previously recorded on the tape, the signal is amplified and causes maximum current to flow in the output transistor (Q8). Since both the transistor and the relay (K1) receive power through a common resistor (R40), the voltage applied across K1 relay coil is reduced below the hold-in voltage and the relay drops out, thereby instantly stopping the tape.

### (4) PLAYBACK AMPLIFIER

The playback portion of the equipment consists of a modular, 4-stage transistorized (Q1, Q2, Q3, and Q4) program amplifier driven by the program reproduce head which is connected directly to the input. Power is supplied from a zener-regulated source. It is designed for high quality reproduction and utilizes audio frequency equalization conforming to standards of the

## CIRCUIT DESCRIPTION

### PLAYBACK AMPLIFIER (Cont.)

National Association of Broadcasters. Equalization is accomplished by means of selective feed back circuitry (R16, R16A, C10 and C10A). C10A is selected as a trimmer for C10. The amplifier response curve when combined with the response curve of the reproduce head provides the necessary NAB reproduce curve response. IT IS IMPORTANT, THEREFORE, THAT ONLY SPOTMASTER-APPROVED REPRODUCE HEADS BE USED FOR REPLACEMENT. If necessary, the amplifier high frequency response may be adjusted by means of variable resistor R16A which is effective within the band from 5 kHz to 15 kHz to the extent of approximately 5 decibels at 15 kHz.

The amplifier is a plug-in modular device and is mounted on the relay board.

### (5) RECORDING UNIT

(A) The recording amplifier is a four-stage (Q11, Q12, Q13, and Q14) plug-in unit utilizing NAB equalization. Equalization is accomplished by means of high frequency network C72 and C75, low frequency network C75 and R79, and high frequency bypass condenser C77 and variable resistor R84. Any necessary adjustment to the amplifier record curve can usually be made by adjusting variable resistor R84. Reducing the value of this resistor increases the high frequency record current and vice versa.



## CIRCUIT DESCRIPTION

### RECORDING UNIT (Cont.)

The amplifier is designed for line level audio input voltages and the input level is adjustable by means of a variable control (P2) located on the front panel. The output of the amplifier is connected to the program record head through a plug-in head lead at the head bracket. The output level is factory adjusted by means of variable resistor R85 to produce the proper record current for the NAB Standard Reference Level (8 db below 3% THD) when the recording VU meter indicates 0 VU at 400 Hz. C78 and L2 form a parallel tuned network serving as a bias trap.

Power is supplied by the regulated power supply through relay K2 when in the record mode.

(B) The bias generator utilizes two silicon transistors (Q15 and Q16) and a bias transformer (T3) arranged as a push-pull oscillator on a plug-in etched circuit board. Bias is adjustable and is properly adjusted at the factory but if readjustment should become necessary in the field, variable resistor R113 will provide an approximate 5 db change in bias current. The bias voltage should indicate approximately "0" VU on the

## CIRCUIT DESCRIPTION

### RECORDING UNIT (cont.)

VU meter with the meter selector switch in the "B" position.<sup>1/</sup>  
A 27 volt zener diode DZ3 regulates the voltage supplied to the bias generator. A balance control R116 is provided to equalize the current through Q15 and Q16. If necessary, adjust for equal voltages across R117 and R118. Variable resistor R113 adjusts bias current to the program record head and R115 adjusts current to the cue record head. Variable resistor R114 is provided to adjust the indication of the VU meter to zero VU when the meter selector switch is in the "B" position.

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- <sup>1/</sup> (A) A Simpson Model 260 (50 VAC position) or Precision Model 120 (60 VAC position) VOM will indicate a bias voltage of approximately 20 volts across the program record head when in the record mode. It should be recognized that this does not represent a true indication of the high frequency bias voltage. The 20 volt reading is relative but the method provides a practical means of checking or adjusting bias in the field when more adequate instrumentation is not available. Bias at the tone head when measured in the same manner should be approximately 5 volts.
- (B) Recording bias voltage has a definite effect on high frequency response and to a lesser degree on recording level. An increase in bias level will result in reduction of high frequency recording level. Conversely, a reduction in recording bias will result in an increase in high frequency recording level.

Precise adjustment of bias record current is made by observing the output of the playback amplifier while recording a 400 Hz tone and adjusting R113 for maximum 400 Hz signal. It will be noted that as the bias current is increased, the 400 Hz output level will reach a peak over a broad curve and then gradually fall off as the bias current is further increased. Correct adjustment is at peak output of the 400 Hz signal.



## CIRCUIT DESCRIPTION

### RECORDING UNIT (cont.)

(C) The primary cue tone recorded on the tape is supplied by a 1000 Hz oscillator and amplifier combination utilizing two transistors (Q17 and Q18), and associated components arranged on a plug-in board. Power is supplied to the two transistors from a regulated 27V source. The Q17 oscillator stage begins oscillation when the record button is depressed. When the start button is depressed, voltage across the timing network (C81 and R89) is interrupted and begins to decay, but Q17 continues to oscillate for approximately one half second due to the time constant of the network. When the voltage across the network equals that at the collector of Q17, D7 begins to conduct and stops oscillation. A one half second tone is thereby recorded on the cue track of the tape. The tone duration may be changed, if desired, by changing the value of R89 in the timing network. The tone level, which is in conformance with NAB Standards (Section 2.15) is determined by the adjustment of variable resistor R99 and may be visually monitored by turning the meter switch to the "T" position.<sup>2/</sup>

(Also see section 3C)

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<sup>2/</sup> The program playback amplifier may be conveniently used to measure the level of the recorded cue tone from the tape by plugging the program amplifier head lead into the cue reproduce head and comparing the cue tone level from the cue track with a 1000 Hz signal recorded on the program track. The two levels should be the same,  $\pm 3$  db. (See Annex C, Table 2 of NAB Standards)

## CIRCUIT DESCRIPTION

### RECORDING UNIT (cont.)

Recording bias is supplied to the cue record head through R115 on the bias generator board.<sup>3/</sup>

Depressing the start switch thus starts tape motion as well as automatically applying the correct duration and amplitude of primary cue tone to the tape cue track. (See Cue-Trip supplement for description of optional secondary and tertiary control tones if used.)

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<sup>3/</sup> See Footnote 1, page B8.

## INSTALLATION AND MAINTENANCE NOTES, (Series B)

- (1) Avoid installing equipment in overheated areas. Provide good ventilation. SPOTMASTER amplifiers are heat compensated to 140°F, but many transistors are temperamental at higher temperatures. Therefore, do not install equipment over a console or other heat generating devices.
- (2) SPOTMASTERS are designed for long, trouble-free operation, but good maintenance procedures should be followed. Keep component parts clean and in good adjustment. For best results, clean heads, pressure roller and capstan drive shaft each day with BE Type 903 cleaning fluid or equivalent.
- (3) As in much electronic equipment, the minimum noise output may be affected by the polarity of the AC power plug. Correct polarization will help to reduce residual noise to a minimum.
- (4) A good connection to ground is essential, especially when operating a high magnetic fields.
- (5) Any change in the characteristics of transistors will usually be evidenced by low gain and/or increased distortion. If it is ever necessary to change a transistor, be certain to follow recommended practices as to soldering. Transistors and diodes are heat sensitive and can be damaged during installation by the application of too much heat during the soldering process.



## INSTALLATION AND MAINTENANCE NOTES, (Series B)(Cont.)

- (6) Optimum high frequency response is quite often more dependent upon the tape and cartridge than upon the machine. Warped cartridges, improperly fitting pressure pads, worn tape or cartridges not complying with NAB Standards are major contributors to high frequency loss. Cartridges and tape should be examined frequently for the above and other faults.
- (7) Enclosed plug-in type relays are used in the equipment and are easily removed for repair or replacement.

### (8) REMOVAL OF AMPLIFIERS:

Both the cueing amplifier and the playback amplifier are plug-in modules and are easily removed for servicing, if necessary.

The recording amplifier, the bias generator and the 1000Hz cue generator are plug-in modules held in place by a single screw from the bottom of the case to each module.

### (9) LUBRICATION:

Sintered bronze bearings are used in the motor, the capstan and the flywheel, and under ideal conditions further lubrication should not be necessary. Depending upon environment and conditions of use, however, it may be desirable to disassemble, clean and relubricate the bearings in these parts on an annual basis.

Occasional lubrication at points in the assembly may be necessary where sliding parts come together. "Lubriplate" or similar lubricant is recommended.

## INSTALLATION AND MAINTENANCE NOTES, (Series B)(Cont.)

### (10) HEAD ADJUSTMENT

The alignment of a new head or realignment of the existing head/s requires two adjustments - tracking and azimuth. On combination record/reproduce equipment, the reproduce head must be adjusted first followed by the adjustment of the record head. Materials and tools required are:

- (1) A .050" hex key
- (2) A SPOTMASTER 10 kHz alignment cartridge
- (3) A tracking cartridge  
(This cartridge may be fabricated from a standard type A 70 second cartridge with the cover and pressure pads removed so that the tape travel path across the head may be easily observed. The wire guide usually found in such cartridges should be taped in place at each end to prevent its accidental movement during operation.)
- (4) A means of measuring the output level of the program amplifier.
- (5) A 10 kHz signal source

### REPRODUCE HEAD ADJUSTMENT PROCEDURE:

- (1) Refer to Fig. 1 for location of the tracking and azimuth adjusting screws.
- (2) A coarse adjustment of head tracking should be made by measurement. With the .050" hex key, rotate the tracking screw for a spacing of 5/16" between the deck surface and the lower edge of the head pole pieces (see Fig. 1).
- (3) The fine adjustment makes use of the tracking cartridge described in item (3) under "Materials Required". Place the cartridge on the deck and set the tape in motion. Hold cartridge firmly against deck surface with finger pressure. Observe the tape travel path across the head. Adjust the tracking screw so that the top and bottom pole pieces are equidistant from the top and bottom edges of the tape. The ideal tracking adjustment is shown in Fig. 1.

The lower edge of the tape guides, located on the head bracket, should be flush against the deck surface.

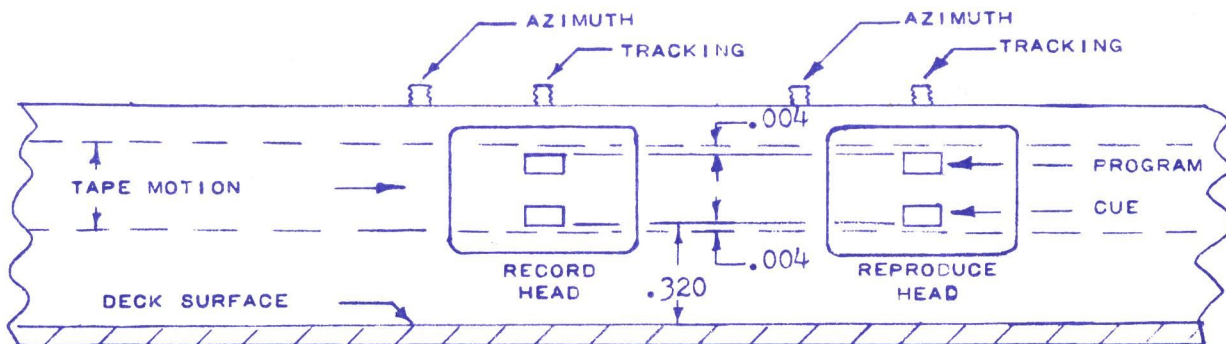


FIG. 1

- (4) Remove tracking cartridge and place azimuth alignment cartridge on the deck. Set tape in motion and while observing the output level of the playback amplifier adjust the azimuth screw for maximum output at the tape alignment frequency.
- (5) Repeat steps (3) and (4) for final adjustment.

RECORD HEAD ADJUSTMENT PROCEDURE:

- (1) After the reproduce head has been adjusted, proceed with alignment of the record head. See Fig. 1 for location of tracking and azimuth adjusting screws.
- (2) Follow tracking adjustment instructions (2) and (3) under REPRODUCE HEAD ADJUSTMENT PROCEDURE
- (3) Remove tracking cartridge and place unrecorded cartridge on deck, turn RECORD/PLAY switch to RECORD, feed a 15 kc signal into the line input of the record amplifier, adjust recording gain to a meter reading of -10 VU, start the tape in motion and adjust the azimuth adjustment screw for maximum output from the playback amplifier.
- (4) Repeat procedure for final adjustment.
- (5) See note 1B, page B-8 for record bias adjustment.

HEAD PENETRATION:

The head bracket, on which the head is mounted, is adjustable, forward or backward, to provide for proper penetration of the head into the cartridge and to permit compensation for various types of pressure pads in common use. The bracket is factory-adjusted for use with Fidelipac cartridges equipped with teflon-coated foam pads, but may be changed for use with other type pads, if necessary. Generally, the factory adjustment is adequate for most cartridges in common use at this time. (See NAB Cartridge Tape Recording and Reproducing Standards, Chart B, Fig. 2.)



## MECHANICAL ADJUSTMENTS

All of the adjustments described below are made before your SPOTMASTER equipment leaves the factory, but the following notes are furnished in the event field readjustment should become necessary.

### (1) LOAD LEVER STOP ADJUSTMENT

An adjustable load lever stop is provided under the lever cover plate to limit the travel of the load lever when in the "Ready" or "Play" position. Its purpose is to prevent engagement of the pressure roller and the capstan when a cartridge is in position ready for playback but before the "Start" button is depressed. If necessary, the adjustment should be made by energizing the solenoid (push "Start" button) then move the stop firmly against the load lever and tighten the mounting screw. When the Stop button is pressed and the solenoid is de-energized the pressure roller should clear the capstan approximately 1/16 inch and the swing arm should clear the solenoid approximately 3/16 inch. (A similar stop is provided on rack mounted Series 500A, 500B and 500C models and is located on the back side of the panel beneath the lever. The adjustment procedure is as described above.)

### (2) PRESSURE ROLLER ADJUSTMENT:

If necessary, the adjustment of pinch roller pressure is easily made from the rear of the tape deck by inserting a screw driver through a small hole found near the rear center of the tape deck. Turning clockwise increases pinch roller pressure. Too tight an adjustment may cause slow tape speed and perhaps tape creepage through the cartridge when the machine is idling. Too tight an adjustment may also keep the capstan solenoid from seating properly, resulting in solenoid "drop-out" a few seconds after the "Start" button is depressed. Too loose an adjustment will cause tape slippage. Correct adjustment is generally achieved when pressure roller adjustment is advanced three-quarters to one full turn beyond the point where the pressure roller "just touches" the capstan. When properly adjusted approximately 1½ to 2 lbs. pull will be exerted on a short length of non-lubricated 1 mil mylar tape attached to a tension scale. (See Section 1.30 of NAB Cartridge Tape Standards.)

CAUTION: Clean pinch roller and capstan thoroughly before making adjustment.

IMPORTANT: Tighten solenoid swing arm retaining screw (under side of deck) before adjusting pinch roller.

NOTE: Refer to illustrated adjustment procedure on following page (D1a).



## P R E S S U R E      R O L L E R      A D J U S T M E N T

Due to normal wear of the roller diameter, the pressure of the roller may decrease after a period of time. Excessive wear and roller misalignment will result in erratic tape motion, causing flutter or wow.

### **Pressure Adjustment Procedure**

To adjust for proper pressure of the roller against the capstan . . .

1. Remove the "Play/Release" control cover and the control arm knob.
2. Move the control arm to the "PLAY" position.
3. Hold the swing arm platen firmly into place against the rubber cushion of the solenoid (using thumb and forefinger).

4. Release pressure of the roller by turning (counterclockwise) with Pressure Adjustment Screw on the rear edge of the chassis . . . Gradually bring the roller into engagement with the capstan (using the light gap between as a gauge) until the light gap just disappears.

5. Turn the Adjustment Screw one (1) full clockwise turn.

Do not overadjust for faulty cartridge operation. This is not a speed adjustment.

### **Parallel Adjustment Procedure**

At the factory, the pressure roller is adjusted parallel to the capstan with a special gage device. Normally this adjustment need never be changed. If it is known for certain that readjustment is necessary, use the following procedure.

First, follow Steps 1, 2, and 3 of the Pressure Adjustment Procedure.

4. Instead of completely closing the light gap as in the preceding Step 4, leave a narrow gap for reference.

5. Loosen the two screws which hold the solenoid to the solenoid bracket. (The clearance provided in the screw holes will allow radial movement of the solenoid.)

6. Move the solenoid and the swing arm, as a single unit, just enough to position the roller shaft parallel to the capstan.

7. Tighten the solenoid anchor screws.

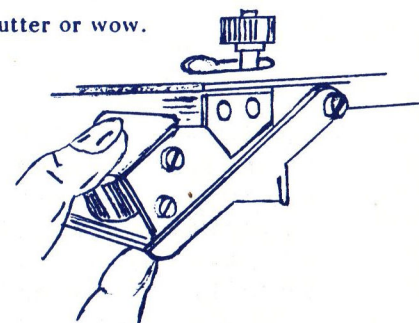
8. Using the Pressure Adjustment Screw, still holding the swing arm engaged with the cushion, move the pressure roller into engagement with the capstan until the light gap just disappears.

9. Continue to turn the screw one (1) full clockwise turn.

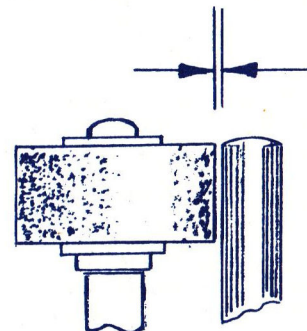
**NECESSARY FINAL CHECK** — After all adjustments have been completed and before replacing control cover . . . move the control arm to the "PLAY" position.

The pressure roller should be completely clear of the capstan. A gap of approximately 1/32 inch should be evident between the lower edge of the pressure roller and the capstan.

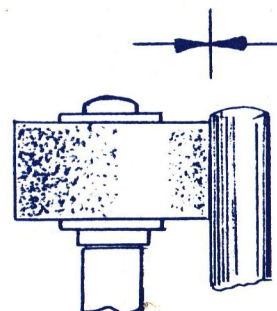
To adjust the clearance, loosen the single screw which anchors the phenolic bearing strip to the panel . . . and move the phenolic strip toward the capstan to increase the clearance, or away to decrease.



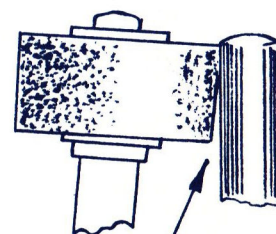
HOLD PLATEN AGAINST CUSHION



NARROW LIGHT GAP



LIGHT GAP COMPLETELY CLOSED



ROLLER SHAFT NOT PARALLEL

## MECHANICAL ADJUSTMENTS (Cont.) -

### (3) HEAD BRACKET ADJUSTMENT:

The head bracket is adjustable by loosening the two retaining screws under the cover. The head bracket may then be moved forward or backward as desired. The best adjustment is obtained when the head penetration into the cartridge is approximately 9/32" when measuring from the leading edge of the cartridge to the FACE of the head. Correct adjustment is important in order to prevent excessive head wear, loss of high frequencies and variations in frequency response during reproduction.

### (4) STRIKING ANGLE OF PINCH ROLLER:

The striking angle of the pinch roller, as related to the capstan, is determined by the position of the solenoid. The correct adjustment of the solenoid is made at the factory but if for any reason it is necessary to change it, the solenoid may be moved slightly up or down as required by loosening the two mounting screws on the side. Correct adjustment is obtained when, with the swing arm held firmly against the face of the solenoid, the pressure roller strikes the capstan squarely. If the solenoid is readjusted, it may then be necessary to readjust the roller pressure as well as the load lever stop, as described in Items No. 1 and No. 2 above. After the solenoid mounting screws have been re-tightened, make certain that the swing arm face plate meets the face of the solenoid squarely so as to provide the necessary holding power.

### (5) FLY WHEEL THRUST BEARING:

The thrust bearing at the bottom of the fly wheel should be adjusted to provide for minimum friction to the fly wheel. the adjusting screw is located at bottom center of the fly wheel shaft. Allow approximately 1/64" end play. Adjustment of the horizontal alignment of the bottom thrust bearing is possible by loosening the two nuts holding the thrust bearing mounting plate in place and moving the plate from side to side as required. When the two adjustments have been properly made, the fly wheel should spin freely.



### OPERATING NOTES

- (1) Be certain that each operator is properly instructed in the operation of the equipment. Seeming equipment failure is sometimes due to operating errors.
- (2) Before recording, be certain each cartridge is bulk erased. In conformance with NAB Standards, SPOTMASTER playback and recording units are not equipped with erase heads. Erase the cartridge top and bottom, and then tip up on the tape end. Check cartridge pressure pads for proper seating against the heads. Check for free movement of the cartridge rotor release spring.
- (3) Be careful that correct levels are maintained during the recording process. If all recordings are made at the same recording level, comparatively few adjustments are necessary in the playback process. Never allow recording peaks to exceed "0" VU.
- (4) When inserting a cartridge in the unit, always move the load lever firmly against the stop.
- (5) On playback, always let the cartridge run after the announcement ends until it automatically stops. It will then be cued and ready for re-use.
- (6) Store cartridges at normal room temperature for best results.
- (7) Clean heads, capstan drive shaft and rubber pressure roller daily with BE Type 903 Cleaning Fluid. This is extremely important. Lubricated tape is used in all cartridges and some of the lubricant is naturally deposited on these parts during the playing process.
- (8) It is comparatively easy to check whether or not you have recorded a stop tone on the tape. Connect the playback head lead to the tone head and start the tape. The tone, if properly recorded, will then be heard through the playback amplifier and should produce a signal equivalent to program level  $\pm 3$  db.

OPERATING NOTES (Cont.) -

- (9) When recording a short spot, for example, one 20 seconds in length, three identical spots may be recorded on a 70 second cartridge. This reduces cue-up time to a minimum. Similarly, six 10 second station breaks can be placed on a 70 second cartridge.
- (10) IMPORTANT: If the "Start" button is accidentally depressed before placing a cartridge in position, and the load lever is moved to the "Play" position, the machine will not start when the "Start" button is depressed the second time. This condition can be immediately corrected by depressing the "Stop" button. The machine then can be started by depressing the "Start" button.
- (11) A good practice to follow when recording new or rewound cartridges is to first run the tape until the splice travels two or three inches past the head assembly. The tape should be stopped at this point. Recording can then proceed in the usual manner.
- If this is done, the possibility of recording over the splice will be eliminated. Recording over the splice quite often produces a slight "bump" or drop out during the playback process.
- (12) Occasionally, tape will become misaligned across the face of the cartridge due to handling, and when recorded the stop cue track may not be properly positioned on the tape. To avoid this, it is good practice, prior to making a recording, to place the cartridge in position and with the Record/Play switch in the "Play" position run the tape for a few seconds to allow it to align itself in the correct tape travel path across the heads. The Record/Play switch may then be placed in the "Record" position and the normal recording process followed. If this is done, you can then be certain that the recorded stop cue will track properly.
- (13) Easy identification of cartridges is possible by the application of SPOTMASTER Tape-Tags. Do not use cellophane tape.



# P A R T S   L I S T

## SPOTMASTER, Series 500C

Parts listed below are common to both the  
Model 500C Recorder/Reproducer and the 500C Reproducer

Schematic Ref. No.	Description	Stock No.
	<u>PROGRAM AMPLIFIER</u>	<u>PAM-4</u>
R1	Resistor 15K ohm	
R2	" 270K "	
R3	" 68K "	
R4	" 100 "	
R5	" 4.7K "	
R6	" 47K "	
R7	" 10K "	
R8	" 100 "	
R9	" 2.7K "	
R10	" 56K "	
R11	" 10K "	
R12	" 47 "	
R13	" 33K "	
R14	" 180K "	
R15	" 68 "	
R16	" 68 "	
**R16A	" 2.2K " Pot	
R17	" 1K "	
C1	Capacitor 5 @ 50v	
C2	" 100 @ 40v	
C3	" 220pf @ 100v	
C4	" 32 @ 40v	
C5	" 32 @ 40v	
C6	" .005 @ 1v	
C7	" 32 @ 40v	
C7A	" .001 @ 500v	
C8	" .02 @ 100v	
C9	" 32 @ 40v	
C10	" .047 @ 200v	
C10A	" .02 @ 100v	
C11	" .47 @ 3v	
C12	" 750pf @ 100V	
Q1	Transistor 2N4248	210-4248
Q2	" 2N4248	"
Q3	" 2N4248	"
Q4	" 2N3644	210-3644

	<u>1kHz CUE &amp; FILTER AMP</u>	<u>TAM-1K6C</u>
R21	Resistor 10K ohm	
R22	" 220K "	
R23	" 100K "	
R24	" 12K "	
R25	" 100K "	

Schematic Ref. No.	Description	Stock No.
R26	Resistor 100K ohm	
R27	" 22K "	
**R28	" 100K " Pot	
R29	" 3.3K "	
R30	" 220K "	
R31	" 100K "	
R32	" 10K "	
L1	Choke, 100mh ferrite	364-1662
C21	Capacitor 10 @ 16v	
C22	" 1 @ 40v	
C23	" 1 @ 40v	
C24	" .01 @ 100v	
C25	" .002 @ 100v	
C26	" .15 @ 100v	
C27	" .1 @ 100v	
C28	" .1 @ 100v	
C29	" .15 @ 100v	
C30	" 1 @ 40v	
C31	" .1 @ 100v	
Q5	Transistor 2N4248	210-4248
Q6	" 2N4248	"
Q7	" 2N4248	"
Q8	" 2N3644	210-3644

The following part is used only in the  
Model 505C Reproducer

	<u>POWER SUPPLY &amp; RELAY BOARD</u>	<u>RB-9</u>
R34	Resistor 10K ohm	
R35	" 10K "	
R36	" 3.3K "	
R37	" 1.5K "	
R38	" 470 "	
R40	" 10K "	
R41	" 22K "	
R44	" 33K "	
R46	" 3.3 " 2W	
R47	" 150 " 2W	
R48	" 100 " 2W	
R49	" 100 " 2W	
R50	" 220 " 2W	
C40	Capacitor 100 @ 40v	
C41	" 32 @ 64v	
C42	" .02 @ 100v	

\*\* May vary in listed value to compensate for recording and/or play characteristics  
All resistors  $\frac{1}{2}$  watt and capacitors in microfarads unless otherwise noted



# P A R T S   L I S T

SPOTMASTER, Series 500C

Parts listed below are common to both the  
Model 500C Recorder/Reproducer and the 505C Reproducer

Schematic Ref. No.	Description	Stock No.	Schematic Ref. No.	Description	Stock No.
	<u>POWER SUPPLY &amp; RELAY BOARD</u> (Cont.)		*S1	Power Switch (Ganged w/P2 on 500C)	344-1561
C45	Capacitor 500 @ 50v		S2	Start Switch	343-0011
C46	" 500 @ 50v		S3	Stop Switch	343-0010
C47	" 500 @ 50v		*S4	Record Pre-set Switch	343-0101
C48	" 30 @ 150v		*S5	Meter Switch	344-0215
C49	" Not Used		*	VU Meter	319-0033
C52**	" 5 @ 64v		*	Record/Play Light	324-0101
K1	Relay T154-X-562	271-0154	T1	Power Transformer (117vac/50-60Hz)	(B34-118) 376-0118
K2	" (Optional)	"	T1	Power Transformer (220-240vac/50Hz)	(B34-119) 376-0119
Q9	Transistor 2N3644	210-3644	T2	Output Transformer (500/600 ohm)	370-0026
CR1	Bridge Rectifier NSS3060	239-0001		<u>ALH Indicator Lamp</u>	343-0011
CR2	Diode 1N2071	203-2071		<u>TAPE DECK</u>	
D1	" 1N4005	203-4005	C50	Capacitor .33 @ 400v	
DZ1	Zener Diode TZ27B	200-0027	C51	(See page P5, Ref. 82)	
D5	Diode 1N4005	203-4005			
	<u>CHASSIS/PANEL</u>				
*R65	Resistor 4.7K ohm		K4	Solenoid (Complete mechanical parts list appears on page P5)	289-0140
*R87	" 10K "		DM2RB	Record Head, 2-track	252-0003
*R88	" 3.3K "		DMLB	Reproduce Head, "	252-0001
P1	Pot 2.5K ohm		M51	Micro switch	346-3300
*P2	Pot/Switch 100K ohm	190-1063			
F1	Fuse, 3AG $\frac{1}{2}$				
C50	Capacitor .33 @ 400v (Rack Model Only)				
*C65	Capacitor 10 @ 16v				

Parts listed below are used only in the Model 500C Recorder/Reproducer

Schematic Ref. No.	Description	Stock No.	Schematic Ref. No.	Description	Stock No.
	<u>MICROPHONE PRE-AMP</u>	MP1B	C61	Capacitor 32 @ 40v	
R61	Resistor 1.5K ohm		C62	" .005 @ 100v	
R62	" 12K "		C63	" 32 @ 40v	
R63	" 100K "		C64	" 32 @ 40v	
R64	" 4.7K "		Q10	Transistor 2N4248	210-4248

\*Not used in 505C

\*\*Operational only on Cue Trip I option

All resistors  $\frac{1}{2}$  watt and capacitors in microfarads unless otherwise noted

# P A R T S   L I S T

SPOTMASTER, Series 500C

Parts listed below are common to both the  
Model 500C Recorder/Reproducer and the 505C Reproducer

Schematic Ref. No.	Description	Stock No.
	<u>RECORDING AMPLIFIER</u>	RA-6S
R66	Resistor 4.7K ohm	
R67	" 6.8K "	
R68	" 100K "	
R69	" 15K "	
R70	" 470 "	
R71	" 3.3K "	
R72	" 33K "	
R73	" 22K "	
R74	" 470 "	
R75	" 82K "	
R76	" 220K "	
R77	" 100K "	
R78	" 4.7K "	
R79	" 6.8K "	
R80	" 15K "	
R81	" 100K "	
R82	" 10K "	
R83	" 470 "	
R84	" 2.2K " Pot	
R85	" 22K " "	
R86	" 1.2K "	
C66	Capacitor 32 @ 40v	
C67	" 5 @ 64v	
C68	" 32 @ 40v	
C69	" 32 @ 40v	
C70	" 32 @ 40v	
C71	" .02 @ 100v	
C72	" 220pf @ 100v	
C73	" 1 @ 50v	
C74	" .02 @ 100v	
C75	" .22 @ 100v	
C76	" 1 @ 40v	
C77	" .047 @ 200v	
C78	" 220pf @ 100v	
C79	" .002 @ 100v	
C80	" 750pf @ 100v	
C81	" .01 @ 100v	
C82	" .022 @ 100v	
C83	" .047 @ 100v	
Q11	Transistor 2N4248	210-4248
Q12	" 2N4248	"
Q13	" 2N4248	"
Q14	" 2N4248	"
L2	Coil	

Schematic Ref. No.	Description	Stock No.
	<u>BIAS OSCILLATOR</u>	B07-MSD
R111	Resistor 220 ohm	
R112	" 330 "	
R113	" 100K " Pot	
R113A	" 22K "	
R114	" 100K " Pot	
R114A	" 15K "	
R115	" 100K " Pot	
R115A	" 47K "	
R116A	" 27K "	
R116B	" 27K "	
R117	" 22 "	
R118	" 22 "	
R119	" 2.7K "	
R120	" 2.7K "	
C101	Capacitor 220pf/100v	
C102	" .01 @ 100v	
C103	" .01 @ 100v	
C104	" .047 @ 100v	
C105	" 100 @ 40v	
C106	" .22 @ 100v	
C107	" .22 @ 100v	
C108	" .01 @ 200v	
C109	" 500pf @ 100v	
C110	" 220pf @ 100v	
Q15	Transistor 2N3644	210-3644
Q16	" 2N3644	"
DZ3	Zener Diode TZ27B	200-0027
T3	Bias Xfmr T70-T2	372-0270
J	Jumper	

	<u>TONE OSCILLATOR &amp; CUE HEAD DRIVER</u>	C07-1KD
R88	Resistor 2.7K ohm	
R89	" 12K "	
R90	" 4.7K "	
R91	" 330 "	
R92	" 2.2K " Pot	
R93	" 27K "	
R94	" 27K "	
R95	" 220K "	
R96	" 22K "	
R97	" 4.7K "	

All resistors  $\frac{1}{2}$  watt and capacitors in microfarads unless otherwise noted



# P A R T S   L I S T

SPOTMASTER, Series 500C

Parts listed below are contained only in the  
Model 500C Recorder/Reproducer

Schematic Ref. No.	Description	Stock No.
	<u>TONE OSCILLATOR &amp; CUE</u> <u>HEAD DRIVER (Cont.)</u>	C07-1KD
R98	Resistor 1K ohm	
R99	" 100K " Pot	
R100	" 2.2K "	
R101	" 22K "	
R102	" 15K "	
R103	" 6.8K "	
R104	" 100K "	
R105	" 15K "	
R106	" 470 "	
R107	" 22K " Pot	
R108	" 6.8K "	
R121	" 3.3K "	
R122	" 22K "	
C81	Capacitor 100 @ 40v	
C82,83	" .022 @ 100v	
C84	" .01 @ 100v	
C85	" 1 @ 40v	
C86	" 10 @ 16v	
C87	" .047 @ 100v	
C88,89	" 1 @ 40v	
C90	" .047 @ 100v	
C90A	" .001 @ 100v	
C91	" .001 @ 100v	
C92	" 1 @ 40v	
C93	" 100 @ 40v	
C94	" 50pf @ 100v	
Q17,18	Transistor 2N3644	210-3644
D6,7	Diode 1N4005	203-4005

	<u>RELAY BOARD-PRESET</u>	RB-9 (Preset)
R34	Resistor 10K ohm	
R35	" 10K "	
R36	" 3.3K "	
R37	" 1.5K "	
R38	" 470 "	
R39	" 470 "	
R40	" 4.7K "	

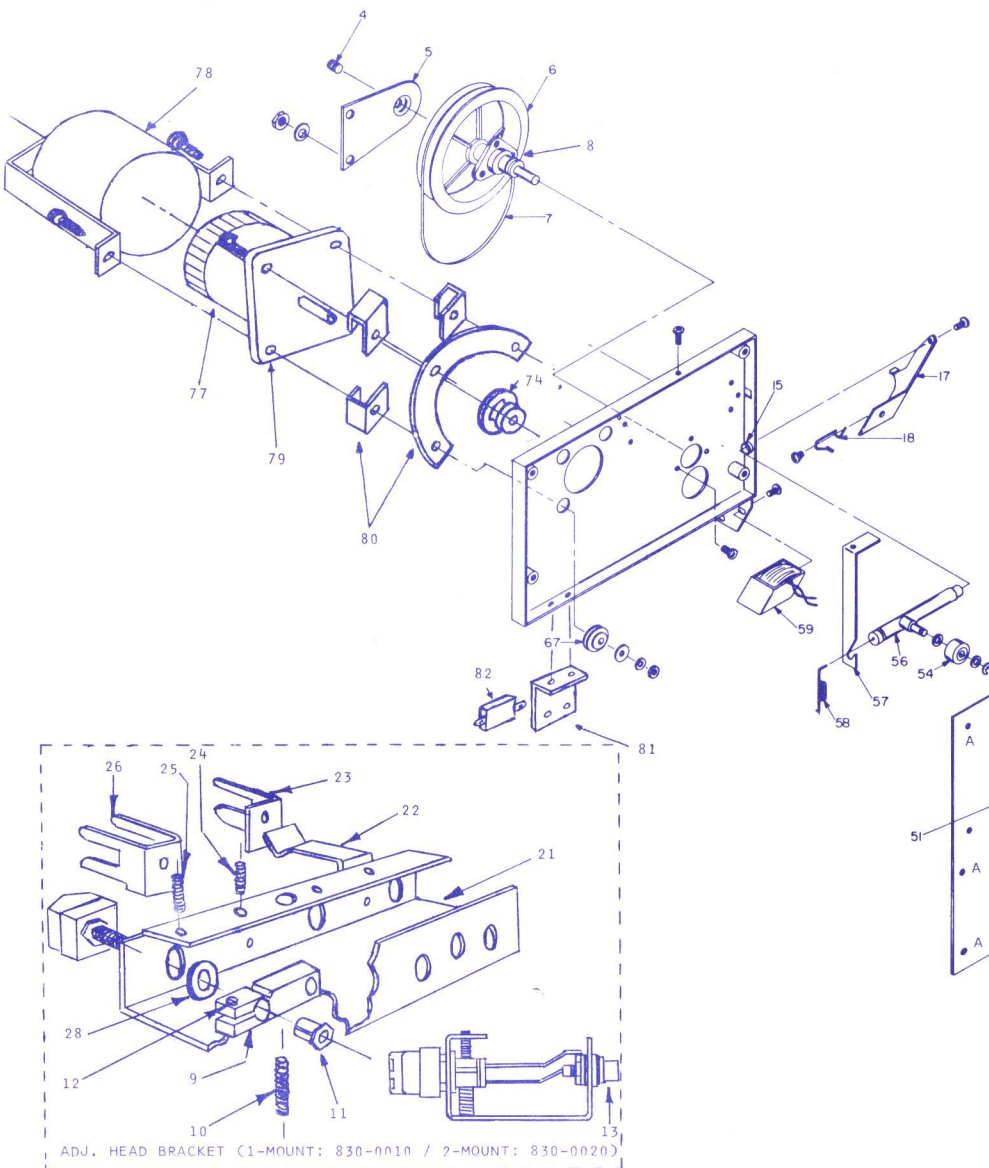
Schematic Ref. No.	Description	Stock No.
	<u>RELAY BOARD-PRESET</u>	RB-9
R41	Resistor 22K ohm	
R42	" 33K "	
R43	" 33K "	
R44	" 33K "	
R45	" 1K "	
R46	" 3.3 " 2W	
R47	" 150 " 2W	
R48	" 100 " 2W	
R49	" 100 " 2W	
R50	" 220 " 2W	
R65	" 4.7K "	
R87	" 10K "	
R88	" 3.3K "	
J	Jumper	
C40	Capacitor 100 @ 40v	
C41	" 32 @ 64v	
C42	" .02 @ 100v	
C43	" .02 @ 100v	
C44	" .02 @ 100v	
C45	" 500 @ 50v	
C46	" 500 @ 50v	
C47	" 500 @ 50v	
C48	" 30 @ 150v	
C49	" 500 @ 50v	
C52**	" 5 @ 64v	
K1	Relay T154-X-562	271-0154
K2	" T154-X-562	"
Q9	Transistor 2N3644	210-3644
CR1	Bridge Rectifier NSS3060	239-0001
CR2	Diode 1N4005	203-4005
D1	" 1N4005	"
D2	" 1N4005	"
D3	" 1N4005	"
D5	" 1N4005	"
DZ1	Zener Diode TZ27B	200-0027
DZ2	" " TZ9.1A	200-0009

\*\* Operational only on Cue Trip I Option

All resistors  $\frac{1}{2}$  watt and capacitors in microfarads unless otherwise noted  
Component values in equipment may sometimes differ from those shown on parts list



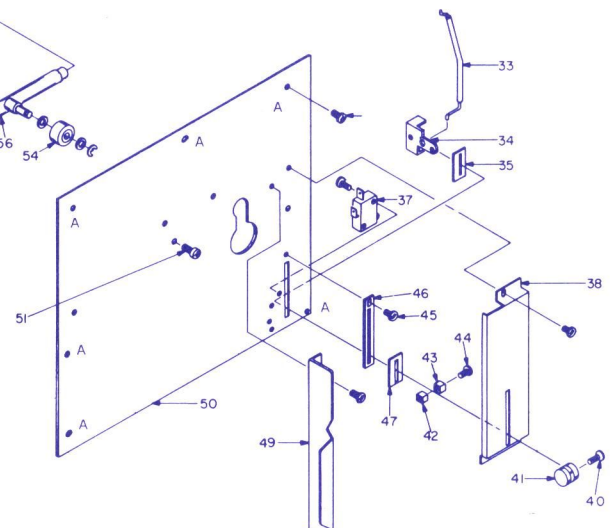
# SPOTMASTER COMPACT MECHANICAL VIEW AND PARTS LIST



## DECK REMOVAL INSTRUCTIONS

- (1) Remove head lead plugs.
- (2) Remove only screws marked "A".
- (3) Lift deck and remove motor plug from relay board.
- (4) Remove deck from case.

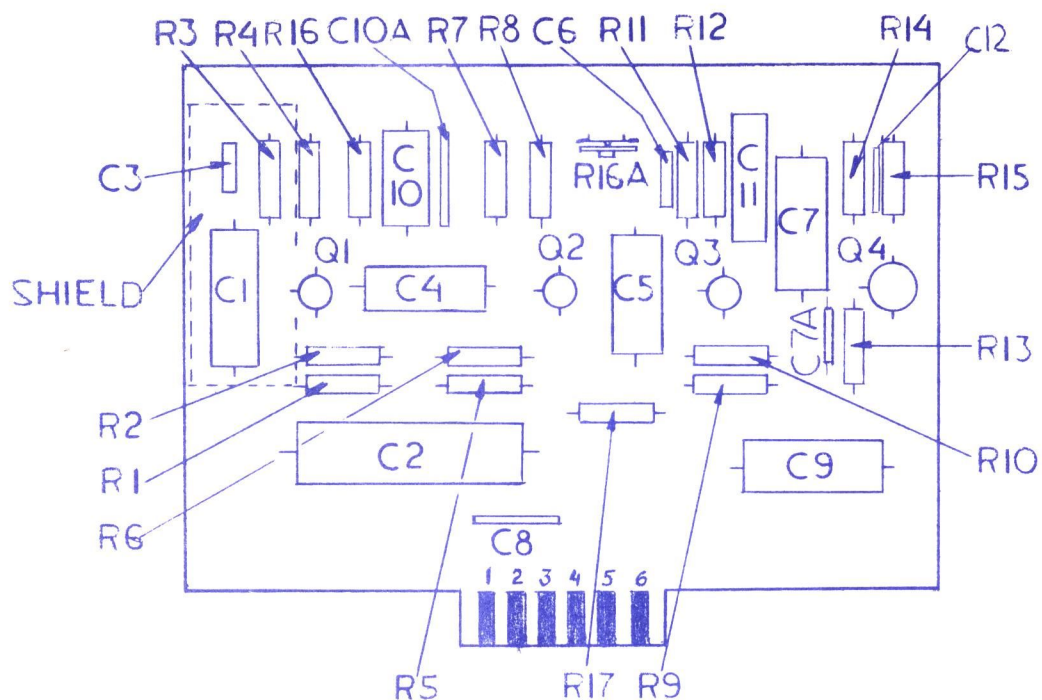
*Caution: Always replace and secure deck screws if equipment is to be shipped for service.*



REF No.	DESCRIPTION	STOCK No.
4	NYLON THRUST BEARING ONLY	420-1337
465	FLYWHEEL THRUST BEARING ASSEMBLY	443-4481
6	CAPSTAN 7 FLYWHEEL ASSEMBLY	444-0335
7	MOTOR BELT	405-0438
8	UPPER CAPSTAN BEARING ONLY	444-0334
9,10,11,12,24,25	HEAD MOUNT KIT #129	449-0129
9	ADJUSTMENT LEVER	
13	PHONO JACK	417-0135
15	NYLON ROLLER SHAFT BUSHING	406-0778
17	SWING ARM	459-0108*
18	SOLENOID RELEASE SPRING	436-0135
21	HEAD BRACKET	470-4460
22	CARTRIDGE CLIP	459-0002
23	TAPE GUIDE LEFT	452-2101
26	TAPE GUIDE DOUBLE	452-0103
33	CONTROL LINKAGE ARM	429-0664*
34,42,43,44,46,47,35	CONTROL ARM ASSEMBLY	459-0109*
35	BEARING BLOCK PLATE, LOWER	459-4059*
37	MICRO SWITCH	346-3300
38	LOAD LEVER COVER	459-2055*
41,40	LOAD LEVER KNOB ASSEMBLY	481-0615

REF No.	DESCRIPTION	STOCK No.
46	LOAD LEVER GUIDE PLATE	459-0136*
47	BEARING BLOCK PLATE, UPPER	459-4060*
49	CARTRIDGE GUIDE	459-0105*
50	TAPE DECK PLATE, LAMINATED STAINLESS	490-0105*
51	CARTRIDGE STOP SCREW	420-0112
54	PRESSURE ROLLER	404-0001
56	ROLLER SHAFT ASSEMBLY	446-0107
57	ROLLER SHAFT SUPPORT BRACKET	453-0110
58	ROLLER POSITION SPRING	432-0616
59	SOLENOID	289-0140
67	MOTOR SHOCK MOUNT	389-9034
74	MOTOR PULLEY, 60HZ, 7.5IPS	389-0100
74	MOTOR PULLEY, 50HZ, 7.5IPS	389-0200
77	HURST SYNCHRONOUS MOTOR, 115VAC/60HZ	384-1112
77	PAPST SYNCHRONOUS MOTOR, 115VAC/60HZ	384-1052
77	PAPST SYNCHRONOUS MOTOR, 125-220VAC/50HZ	384-1053
77	PAPST SYNCHRONOUS MOTOR, 240VAC/50HZ	384-1054
78	MOTOR SHIELD (USED ONLY WITH 384-1112)	389-9000
79	MOTOR MOUNTING PLATE (USED ONLY WITH 384-1112)	453-0001
80,67	MOTOR MOUNTING KIT (USED WITH ALL MOTORS)	389-9156
81	CAPACITOR MOUNTING BRACKET (FOR 029-0274)	453-0002
82	MOTOR START CAPACITOR 2MFD(FOR 384-1112)	029-0274
82	MOTOR START CAPACITOR 6MFD(FOR 384-1052)	029-6064
82	MOTOR START CAPACITOR 8MFD(FOR 384-1053@125V)	029-8064
82	MOTOR START CAPACITOR 2.5MFD(FOR 384-1053@220V)	029-2564
82	MOTOR START CAPACITOR 2MFD(FOR 384-1054)	029-2064

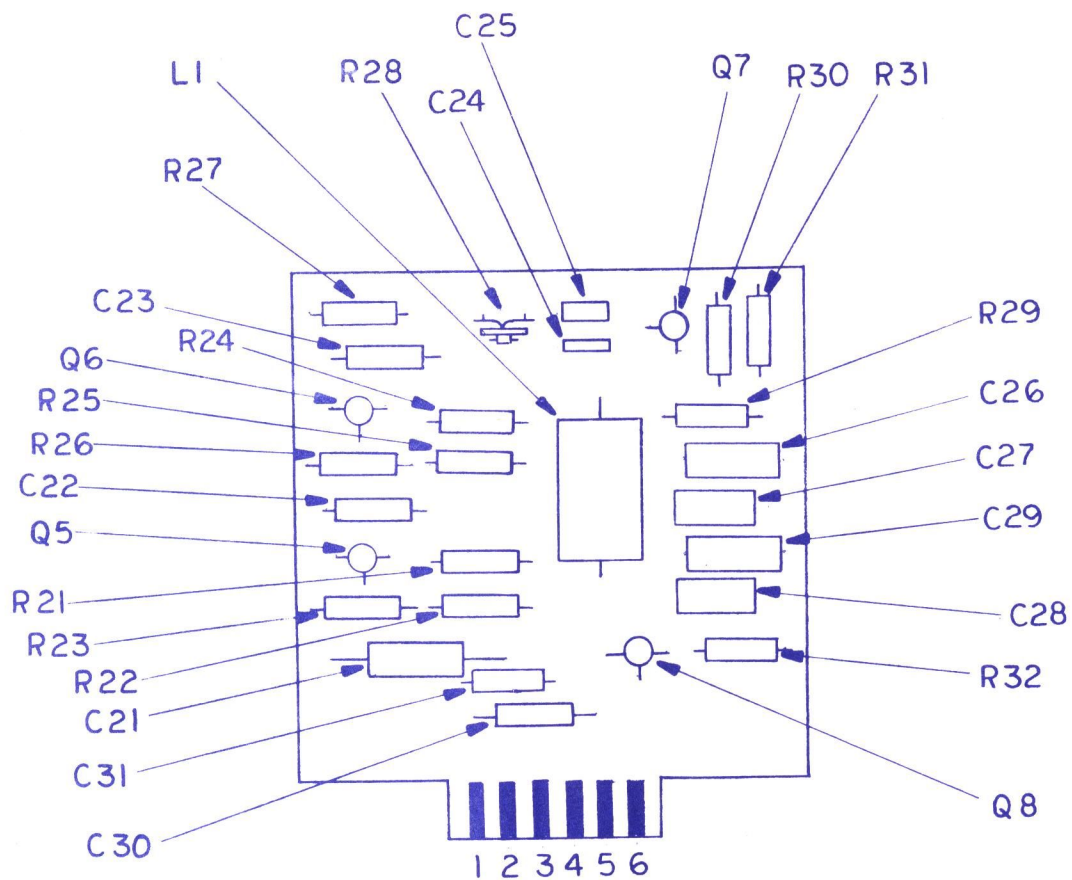
\*These parts do not appear in rack-mounted units which use a modified compact deck employing the other parts listed above as well as special parts unique to rack units.



PAM - 4  
PROGRAM AMPLIFIER

PARTS LAYOUT  
PROGRAM AMPL. PAM - 4

BROADCAST ELECTRONICS  
SILVER SPRING, MARYLAND  
68 C 20 A

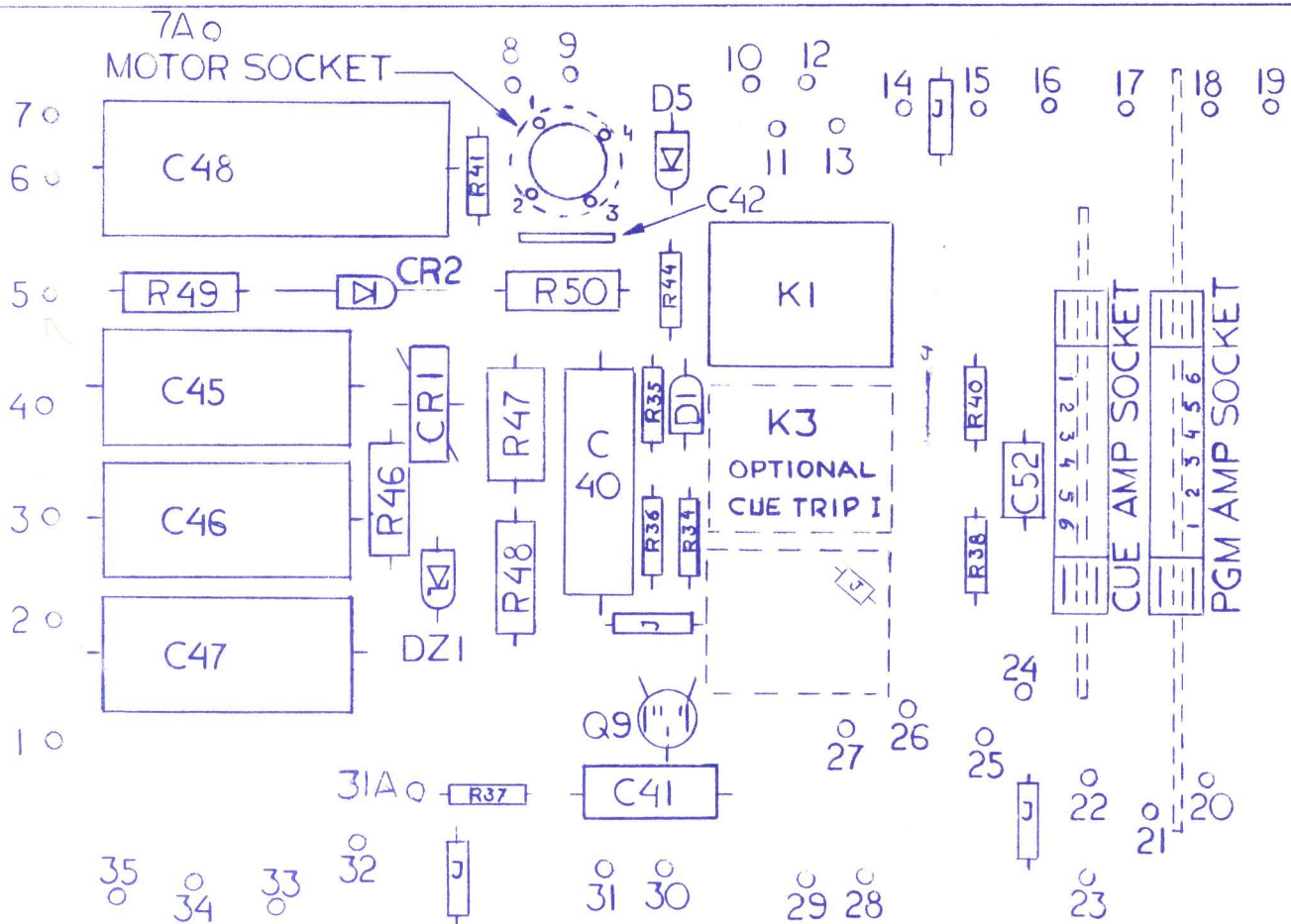


# TAM-1K6C 1000 HZ CUE AMPLIFIER

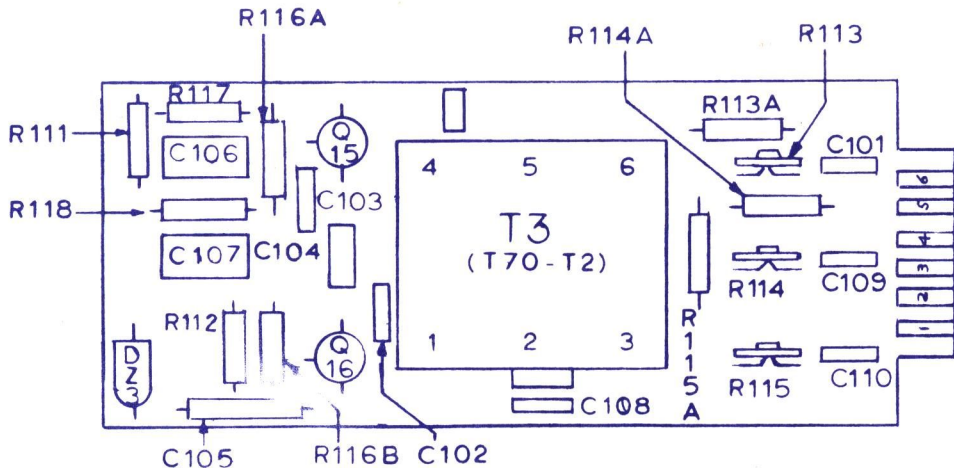
<p>PARTS LAYOUT TAM-1K6C CUE AMP.</p>
<p>BROADCAST ELECTRONICS SILVER SPRING, MD.</p>
<p>69 F 20 A</p>



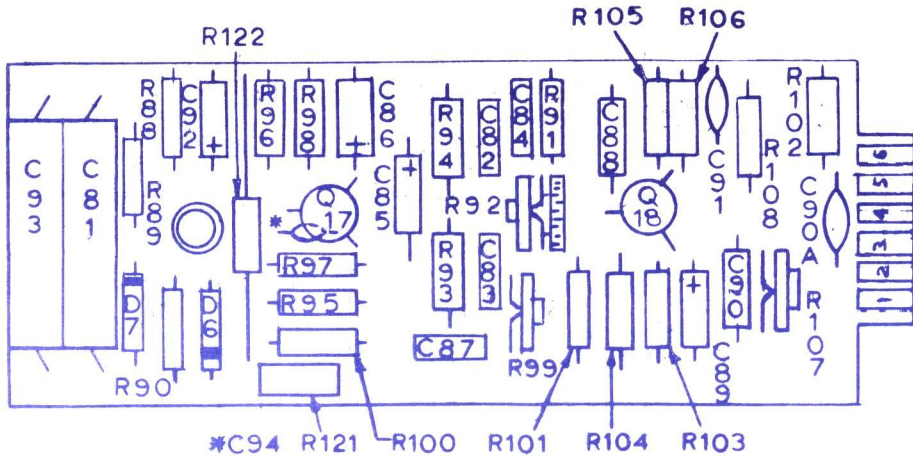




PARTS LAYOUT  
 POWER SUPPLY & RELAY BOARD  
 505 C  
 BROADCAST ELECTRONICS  
 SILVER SPRING, MARYLAND  
 68 C 23 A

BO-7MSD  
BIAS OSC.

C07-1K-D  
1KHZ. OSC.



## OSCILLATORS

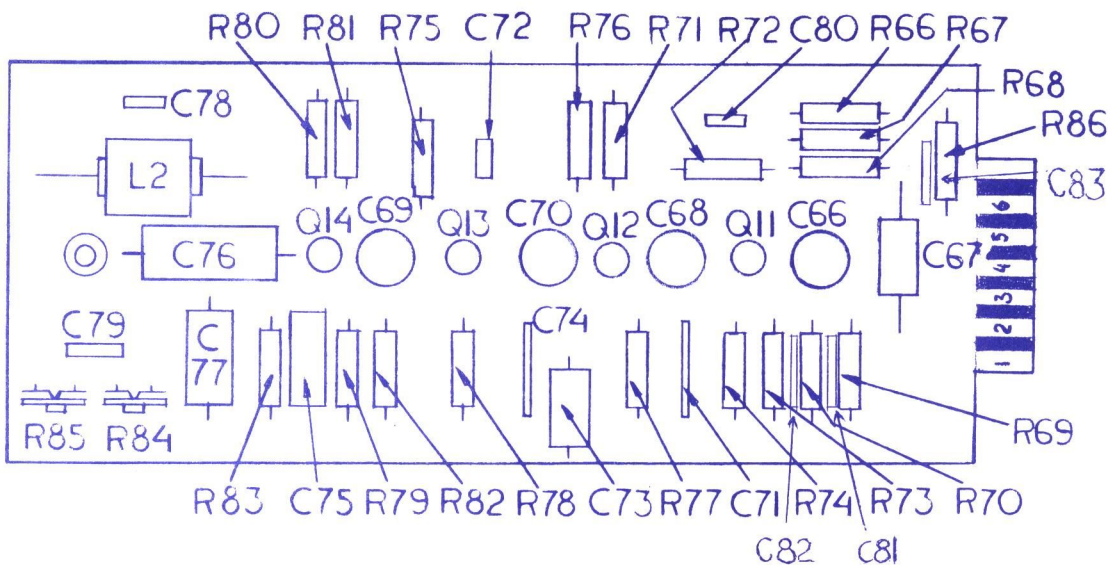
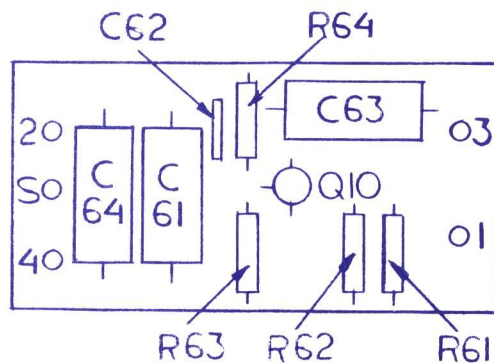
### PARTS LAYOUT

**BROADCAST ELECTRONICS**  
SILVER SPRING, MARYLAND

70K10



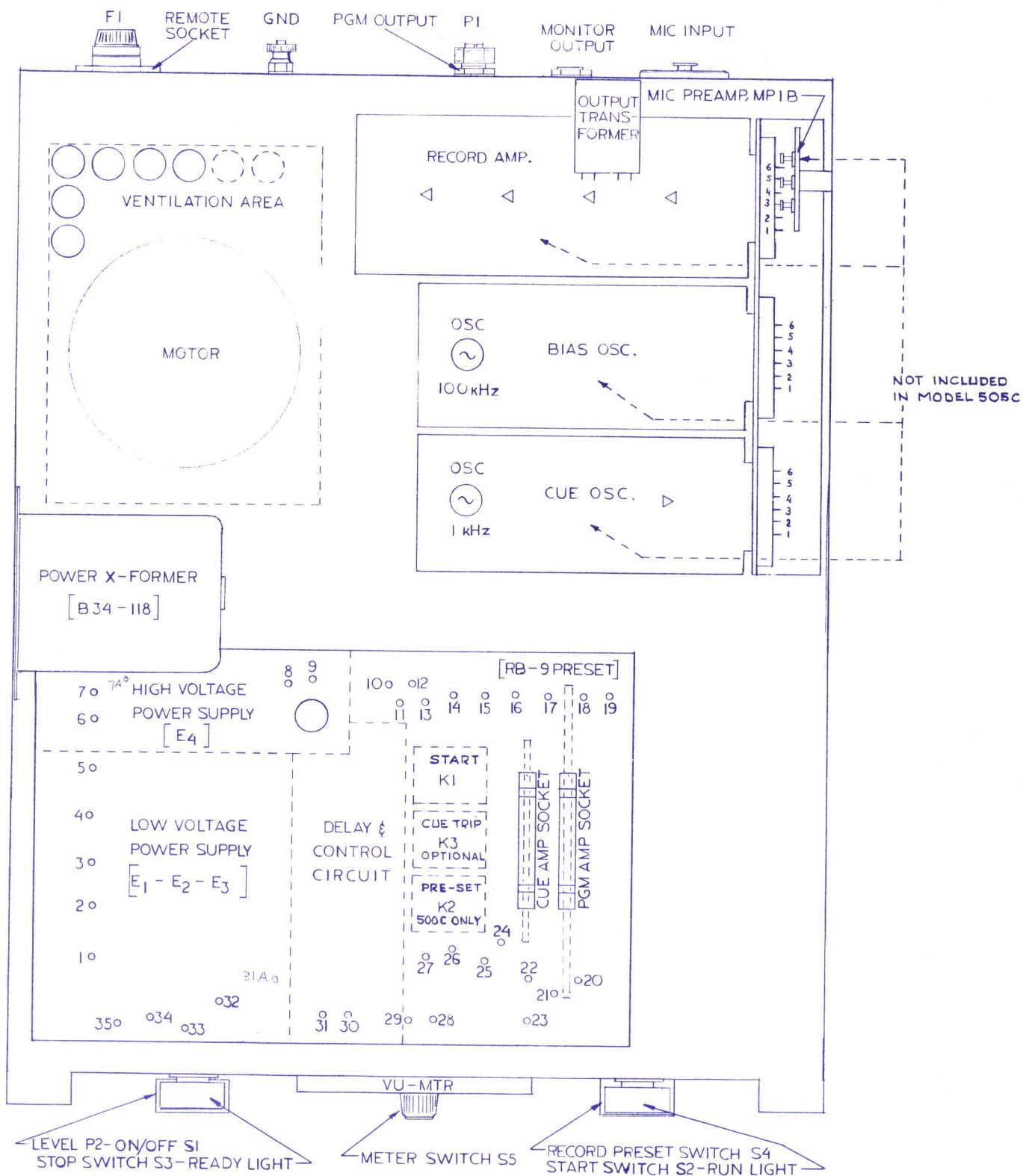
MP-I-B  
MIC.PRE AMP

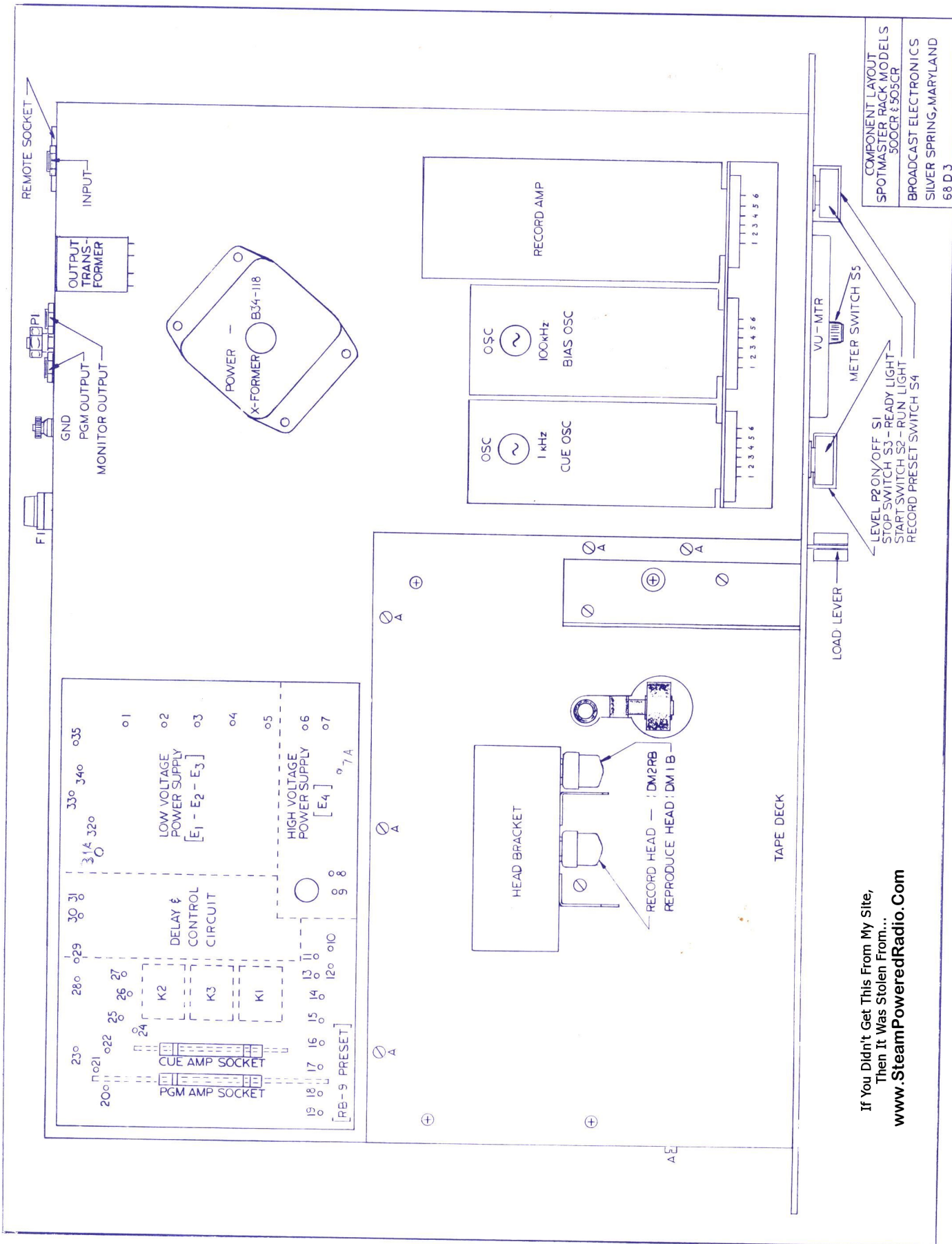


RA-6S, RECORD AMP.

PARTS LAYOUT  
AMPLIFIERS, MP-I-B & RA-6S

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SILVER SPRING, MARYLAND  
68 C 25 A





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COMPONENT LAYOUT  
SPOTMASTER RACK MODELS  
500CR & 505CR  
BROADCAST ELECTRONICS  
SILVER SPRING, MARYLAND  
68 D 3



TABLE OF TYPICAL VOLTAGES  
SPOTMASTER MODELS 500C & 505C

<u>PROGRAM AMPLIFIER</u>		<u>Emitter</u>	<u>Base</u>	<u>Collector</u>
Q1	2N4248	- .1	- .65	- 5.5
Q2	2N4248	- .32	- .94	- 6.5
Q3	2N4248	- .40	- 1.0	- 7.2
Q4	2N3644	-16.5	-17.0	-24.0
<u>CUE TONE AMPLIFIER 1000Hz</u>				
Q5	2N4248	0	- .62	- 5.0
Q6	2N4248	0	- .66	- 2.7
Q7	2N4248	0	- .64	- 1.5
Q8	2N3644	0	- .06	- 9.0
<u>DELAY CIRCUIT-RUN MODE</u>				
Q9	2N3644	0	0	-32.0
<u>DELAY CIRCUIT-STOP MODE</u>				
Q9	2N3644	0	- .75	- .04
<u>RECORD AMPLIFIER (500C)</u>				
Q11	2N4248	- .6	- 1.2	-10
Q12	2N4248	- 2.2	- 2.9	- 9.0
Q13	2N4248	- 2.4	- 6.0	-27.0
Q14	2N4248	- .04	- 1.0	-12.5
<u>CUE TONE OSCILLATOR &amp; CUE HEAD DRIVER (500C)</u>				
Q17	2N3644	- 1.5	- 1.3	-17.0
Q18	2N3644	- 1.0	- 1.5	-14.0
<u>BIAS OSCILLATOR (500C)</u>				
Q15	2N3644	- .34	+ .6	-20.0
Q16	2N3644	- .35	+ .59	-20.0

POWER SUPPLY

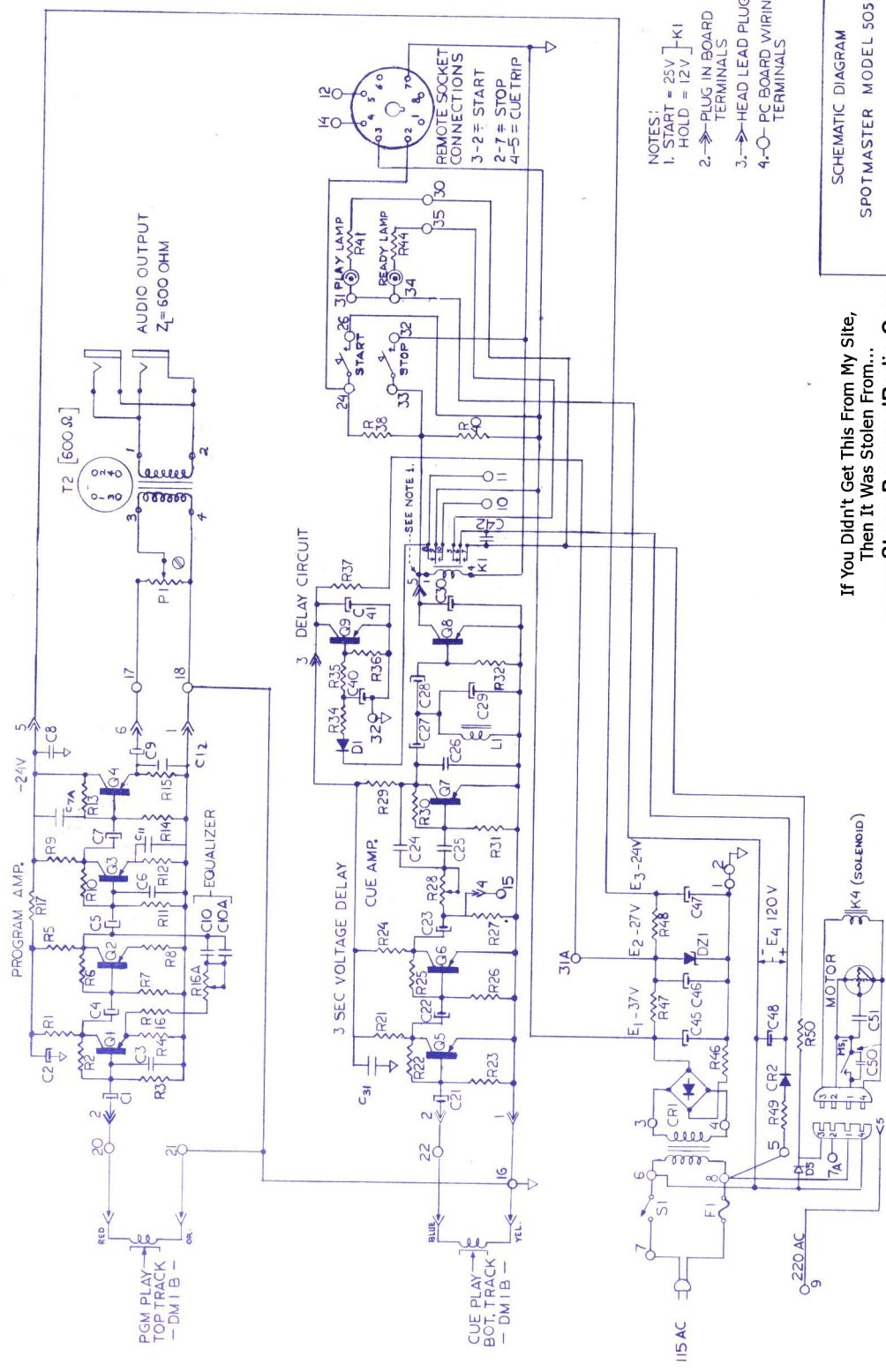
<u>E<sub>1</sub></u>	<u>E<sub>2</sub></u>	<u>E<sub>3</sub></u>	<u>*E<sub>4</sub></u>	<u>E<sub>ac</sub> (T<sub>1</sub> secondary)</u>
-37 vdc	-27 vdc	-24 vdc	+120vdc	32 vac

\* Measure E<sub>4</sub> across C48, solenoid energized

All DC voltages negative with respect to chassis ground unless otherwise noted.

Measurements made using 20,000Ω per volt with SPOTMASTER equipment in RUN mode unless otherwise noted.

AC input to transformer (T<sub>1</sub> primary) = 115 vac



- NOTES:
1. START = 25V -K1 HOLD = 12V -K1
  2. PLUG IN BOARD TERMINALS
  3. HEAD LEAD PLUG
  4. PC BOARD WIRING TERMINALS

SCHEMATIC DIAGRAM  
SPOTMASTER MODEL 505C

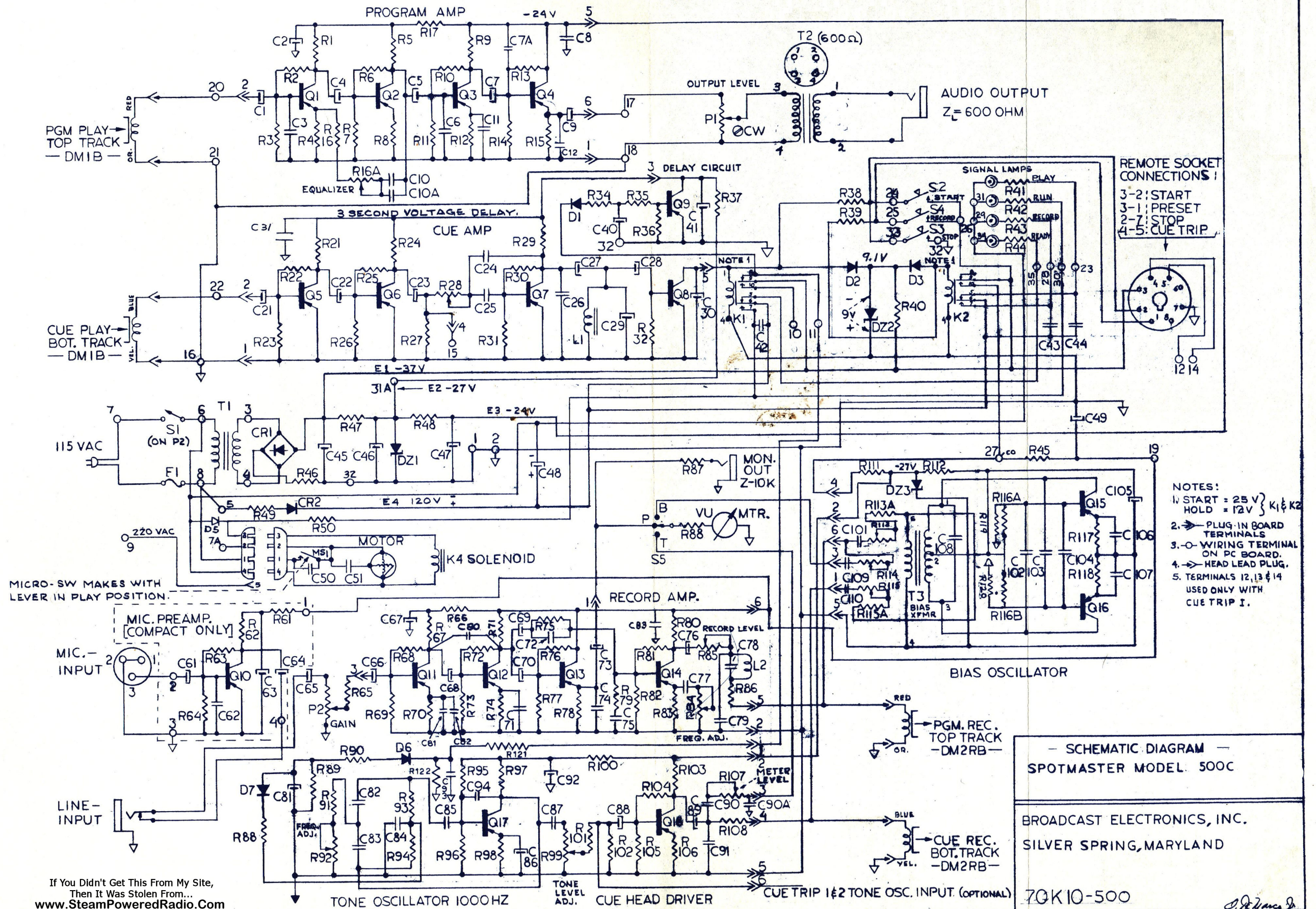
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70K10-505

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RELAY BOARD GND TERMINALS = 1, 2, 16, 18, 21 & 32.  
NO CONNECTION TERMINALS 19, 23, 25, 27, 28, 29.  
TERMINALS 12, 13 & 14 USED ONLY WITH OPTIONAL CUE TRIP 1.

MICRO-SW MAKES WITH  
LEVER IN PLAY POSITION







## *Broadcast Electronics, Inc.*

No effort has been spared in the manufacture of SPOTMASTER equipment to assure long and reliable service. This unit has been thoroughly tested and inspected, and carefully packed to assure its safe arrival at the destination. The following guarantee applies.

Broadcast Electronics, Inc., hereinafter referred to as Seller, agrees to repair or replace, without charge, any equipment which is defective as to design, workmanship or material, and which is returned to Seller at its factory, transportation prepaid, provided

- (a) Notice of the claimed defect is given Seller within one(1) year from date of delivery and goods are returned in accordance with Seller's instructions.
- (b) Parts not manufactured by Seller or from Seller's design are subject to only such adjustments as Seller may obtain from the supplier thereof.
- (c) Equipment shall not be deemed to be defective if, due to misuse, exposure or excessive impurities or moisture in the atmosphere it shall fail to operate in a normal or proper manner.

The guarantee of these paragraphs is void if equipment is altered by others than Seller or its authorized service center.

No other warranties, expressed or implied, shall be applicable.

BROADCAST ELECTRONICS, Inc.  
8810 Brookville Road  
Silver Spring, Maryland 20910



