

Spotmaster 500

4100 N 24th St.
Quincy, Ill., 62301
1-217-224-9600



Super B

\$ 505 B

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



*Melvin Black
Service Manager*
Cliff Ratchiff

BROADCAST ELECTRONICS, INC.

8810 BROOKVILLE ROAD • SILVER SPRING, MARYLAND • AREA 301 JUNIPER 8-4983

When there is need to adjust
speed you must push in on
the adjustment screw very hard
when turning.

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

BROADCAST ELECTRONICS, INC.

SPOTMASTER MODELS 500 & 505 SUPER B

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:	Compact: 18 Lbs. Rack: 23 Lbs.
505:	Compact: 15 Lbs. Rack: 21 Lbs.
MOTOR:	Hysteresis Synchronous
OUTPUT LEVEL:	+4 dbm adjustable(plus 10db peak factor
OUTPUT IMPEDANCE:	Nominal 600 ohms (balanced)
FREQUENCY RESPONSE:	50 - 12000 cps \pm 2 db
	50 - 15000 cps \pm 3 db
SIGNAL TO NOISE RATIO:	55 db below 3% THD
HARMONIC DISTORTION:	Less than 2%
	(400 cps - 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 ohms) .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 - Play Switch *Recording Meter Selector Switch (program, control tone, bias) Start Switch Stop Switch Output Level
POWER REQUIREMENTS:	105-125 v ac, 60 cps, 50 watts (50 cps optional extra)
SPEED:	7 1/2 inches per second
PLAYING TIME:	1 second to 31 minutes

*Refers to Model 500 Super B Record/Play unit only



* * *

COPYRIGHT BY BROADCAST ELECTRONICS, INC. 1965

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

www.SteamPoweredRadio.Com

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 500 SUPER B (Recorder/Reproducer)

SPOTMASTER MODEL 505 SUPER B (Reproducer Only)

INSTALLATION & OPERATING INSTRUCTIONS

1. GENERAL

SPOTMASTER Models 500B and 505B 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 500B 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 500B recorder or 505B 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 nominal output impedance of the playback amplifier is 600 ohms 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 page B3.)

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

(B) The Model 500B 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. It is always advisable to connect the equipment to the system ground.

3. RECORDING PROCESS

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.)

Rotate the "Record-Playback" switch to record position. Feed program material into the recorder line input or connect a microphone to the microphone input and adjust the recording level by means of the recorder gain control and the VU meter. Never allow recording peaks to exceed zero VU.

Standard cartridge lengths are 20, 40, 70, 90, 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

INSTALLATION & OPERATING INSTRUCTIONS

RECORDING PROCESS (Cont.) -

a 70 second cartridge but a 70 second cartridge should not be used for two 35 second spots.

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 and the "ready" lamp. 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.

A 1000 cps cueing tone of the proper amplitude and duration is automatically recorded on the tape cueing track at the instant the start button is depressed. After the recording has been completed, allow the machine to run until it stops automatically at the beginning of the recording. The cartridge is then cued and ready for use.

"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.

When recording, the meter switch on the recorder should

INSTALLATION & OPERATING INSTRUCTIONS

RECORDING PROCESS (Cont.) -

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. A NOISY TAPE MAY RESULT.

The meter in the "T" position should read approximately "0" VU ± 3 db, and when the start button is depressed should decay to zero in .75 seconds. 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 adjusted 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.)

If you are making a series of spots on one cartridge, allow at least two seconds to elapse at the end of the first spot, then press the stop button to stop the tape. Another spot may then be started as described above.

If recorded 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

4. PLAYBACK PROCESS

Place a recorded cartridge in position and move the load lever to the "Play" position. The "ready" indicator lamp will then glow. (If using a Model 500B recorder as a playback machine, make certain the record/play switch is in the "Play" position.)

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 ready light reappears 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 power relay (K1). 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 located within the "start" and "stop" switches. 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, however, a few notes are in order:

(A) AC power is supplied to the motor and the 120 VDC power supply 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 activated by momentary pressure on the START button and holds down due to the existence of a constant hold voltage across the relay coil. If the STOP button is depressed or a 1000 cps tone appears at the input of the cueing amplifier, the hold voltage is reduced below the hold point and the relay drops out, 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.

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) instantly pulls down when the START button is depressed and stays down until the machine stops. The bias voltage is thereby removed from Q9 when C25 discharges through R42 and R43. Since Q9 is non-conducting when "bias" is removed, operating voltage is then applied to the cueing amplifier.

CIRCUIT DESCRIPTION

CONTROL CIRCUITRY (Cont.) -

The delayed application of voltage to the cue amplifier (approximately 3 seconds) is caused by the decay time of the above-mentioned RC circuit associated with Q9. As the bias voltage across this combination decays (after the START button is depressed), Q9 progresses to a non-conducting state. When this occurs, full operating voltage is then applied to the first two stages of the cue amplifier. 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 ohms or 600 ohms.

(E) The "record-play" switch (Model 500B), when in the "Record" position applies zener-regulated (D2, D4 and D5) power to the recording amplifier, the bias generator and the cue tone generator/s. The "record" indicator lamp is also energized. When in the "play" position, power is removed from the above components.

(F) The recording gain control (Model 500B) 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 Page 6.)

(H) Essential circuitry for remotely controlling either the START or STOP functions 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.

(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 mounted on the relay board by means of five screws under which are plated contacts that carry the necessary connections through to the associated circuitry on the relay printed circuit board. To remove the amplifier for service it is only necessary to remove the retaining screws. All connections are automatically remade

CIRCUIT DESCRIPTION

CUE TONE AMPLIFIER (Primary)(Cont.)

when the amplifier is replaced. The sensitivity of the amplifier may be adjusted, if necessary, by means of variable resistor R31. Factory adjustment is for .3 mv sensitivity at 1000 cps with the input terminated into 600 ohms. A tap (Terminal J) at the output of the second stage (Q6) is provided as a signal source for Cue-Trip 1 and Cue-Trip 2 amplifiers, if used.

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 connected across the power relay coil (K1). When the cue reproduce head senses the presence of a 1000 cps 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, the voltage applied across the relay coil is reduced below the hold-in voltage of K1 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 fixed audio frequency equalization conforming to standards of the National Association of Broadcasters. Equalization is accomplished

CIRCUIT DESCRIPTION

PLAYBACK AMPLIFIER (Cont.)

by means of selective feed back circuitry (R16, R16A and C6) and bypass condenser C7. C6A is selected as a trimmer for C6.

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 1 KC to 15 KC to the extent of approximately 5 decibels.

The amplifier is secured in position by means of five screws under which are plated contacts which carry the necessary connections to the associated circuitry on the relay printed circuit board. To remove the amplifier for service it is only necessary to remove the retaining screws. All connections are automatically remade when the amplifier is replaced.

(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 C53 and R78, low frequency network C54 and R81, and high frequency bypass condenser C55 and variable resistor R89.

CIRCUIT DESCRIPTION

RECORDING UNIT (Cont.) -

Any necessary adjustment to the amplifier record curve can usually be made by adjusting variable resistor R89. Reducing the value of this resistor increases the high frequency record current and vice versa. 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 R84 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 cps.

Power is supplied by the regulated power supply through the "record/play" switch when in the record position.

(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 condenser C67 will provide an approximate 5 db change in bias current. Larger changes can be made by changing the value of plug-in resistor R95. 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.^{1/}

A 27 volt zener diode (D4) regulates the voltage supplied to the bias generator.

(C) The primary cue tone (1000 cps) recorded on the tape is supplied by a Wein bridge oscillator and emitter follower combination utilizing two transistors (Q17 and Q18) and associated components arranged on a plug-in board. Power is supplied through a set of back contacts on the power relay (K1). When the start button is depressed, voltage to Q17 is interrupted but it continues to oscillate for approximately one-half second due to the time constant of C70 and associated resistive elements. A one-half second tone is thereby recorded on the cue track of

-
- 1/(A) A Simpson Model 260 (50 VAC position) or Precision Model 120 (60 VAC position) VOM will indicate a bias voltage of approximately 12 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 12 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 3-1/2 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 a reduction of high frequency recording level. Conversely, a reduction in recording bias will result in an increase in high frequency recording level.

CIRCUIT DESCRIPTION

RECORDING UNIT (Cont.) -

the tape. The tone level, which is in conformance with NAB Standards (Section 2.15), is determined by the adjustment of variable resistor R111 and may be visually monitored by turning the meter switch to the "T" position.^{2/} (Also see Page 6.)

Recording bias is supplied to the cue record head through C68 on the bias generator board.^{3/}

Depressing the start switch thus starts tape motion as well as automatically applying the correct length 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.)

Other features of the recording unit will become apparent upon examination of the circuit diagram.

(6) ALTERNATE MOTOR WIRING

SPOTMASTER units are factory wired so that power is applied to the motor only when the load lever is in the "play"

^{2/} The program playback amplifier may be conveniently used to measure the level of the recorded cue tone from the tape by plugging the cue reproduce head into the program amplifier and comparing the cue tone level from the cue track with a 1000 cps signal recorded on the program track. The two levels should be the same, ± 3 db. (See Annex C, Table 2 of NAB Standards.)

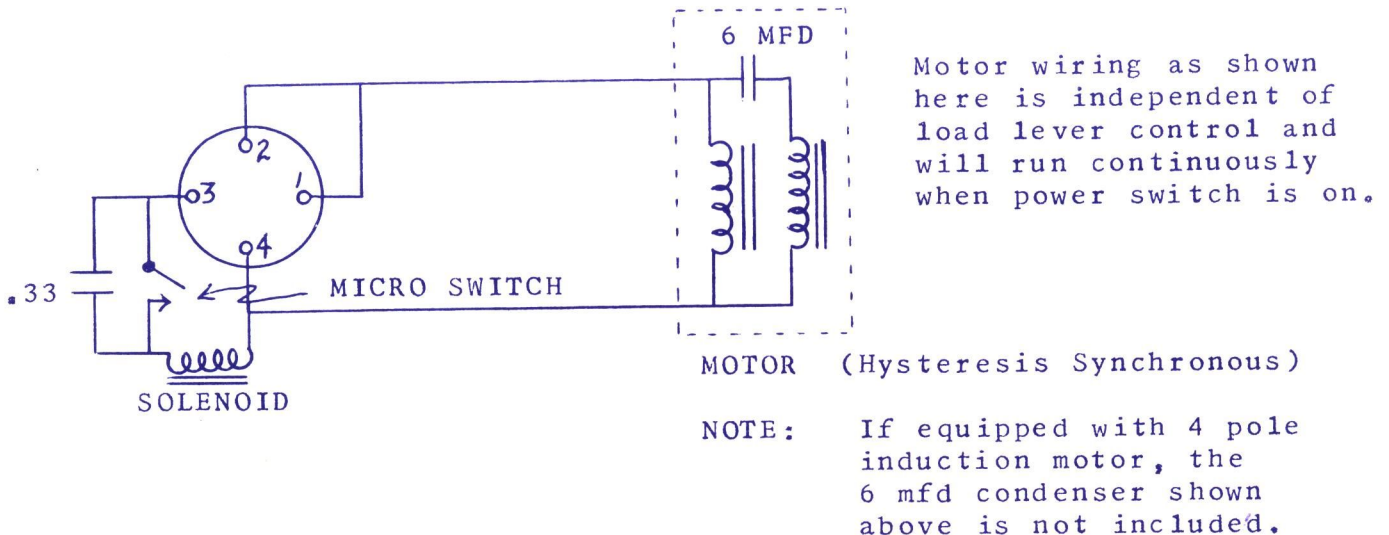
^{3/} See Footnote 1, Page B8.

CIRCUIT DESCRIPTION

ALTERNATE MOTOR WIRING (Cont.) -

position, and removed when the load lever is in the "release" position. Approximately 2 seconds is required for the motor to reach full speed after the load lever is placed in the "play" position. This is usually not objectionable since a cartridge is normally loaded well ahead of scheduled playback time. If desired, however, the wiring may be changed so that the motor is controlled only by the "on-off" power switch, thereby eliminating the 2 second lag. If wired in this manner, the motor will run as long as the switch is in the "On" position. See wiring change diagram below.

ALTERNATE MOTOR WIRING



INSTALLATION AND MAINTENANCE NOTES, (Series B)

- (1) Avoid installing equipment in overheated areas. Provide good ventilation. SPOTMASTER amplifiers are heat compensated to 135°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 plugs. Correct polarization will help to reduce residual noise to a minimum.
- (4) A good connection to ground is essential, especially when operating in 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.
- (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) Both record and reproduce heads are properly aligned before leaving the factory, but after considerable use it may be desirable to re-align the heads in the field. This is indicated by a loss in high frequency response which cannot be restored by cleaning of the heads.

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

The program reproduce head should be aligned first, making use of a SPOTMASTER alignment cartridge. Start the tape in motion and adjust the head so as to obtain maximum high frequency tone output as observed on a suitable meter connected to the output of the playback amplifier. To align the record head, turn the record/play switch to record, feed a 15kc signal into the line input of the recording amplifier, adjust recording gain to a meter reading of -10 VU, place an unrecorded cartridge on the tape deck, start the tape in motion and adjust the record head so as to produce maximum output from the playback amplifier.

- (8) Enclosed plug-in type relays are used in the equipment and are easily removed for repair or replacement.

(9) REMOVAL OF AMPLIFIERS:

Both the cueing amplifier and the playback amplifier are easily removed for servicing, if necessary, by removing the mounting screws. No wiring or solder connections need be removed. All connections are made by plated contacts under the screw heads.

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

* (10) 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.

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 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 and Super B models and is located on the back side of the panel beneath the lever slot. 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.

(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 and is secured by a locking nut. 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 ± 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, the lamp in the "Stop" button will not light when the load lever is moved to the "Play" position, and 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 lamp will then indicate "ready" and the machine 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.

TABLE OF TYPICAL VOLTAGES
SPOTMASTER MODELS 500 & 505 SUPER B

		Emitter	Base	Collector
<u>PROGRAM AMPLIFIER</u>				
Q1	2N2613	.14	.24	1.6
Q2	2N2613	.41	.55	4.0
Q3	2N217	.55	.64	7.3
Q4	40329	13.0	13.5	22.0
<u>CUE AMPLIFIER</u>				
Q5	2N2613	0	.16	1.0
Q6	2N2613	0	.15	1.0
Q7	2N2613	0	.17	3.1
Q8	2N217	0	.02	9.5
<u>DELAY CIRCUIT</u>				
Q9	40329	0	.3	.05 (Stop Mode)
		0	.01	16.0 (Run Mode)
<u>MICROPHONE PREAMPLIFIER</u>				
Q10	2N2613	0	.16	1.15
<u>RECORD AMPLIFIER</u>				
Q11	2N2613	.75	.85	5.2
Q12	2N2613	2.1	2.2	15.5
Q13	2N2613	9.0	8.5	28.0
Q14	2N2613	.85	.9	10.5
<u>BIAS OSCILLATOR</u>				
Q15	40329	.32	+14.8	17.4
Q16	40329	.34	+14.8	17.4
<u>1 kc TONE OSCILLATOR</u>				
Q17	2N2613	1.9	2.3	14.0 (Stop Mode)
<u>CUE HEAD DRIVER</u>				
Q18	2N2613	10.0	9.5	21.0 (Stop Mode)

POWER SUPPLY

E_1	E_2	E_3	* E_4	E_{ac} (T1 secondary)
37 vdc	28 vdc	22 vdc	120 vdc	30 vac

*Measure E_4 voltage across C33

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

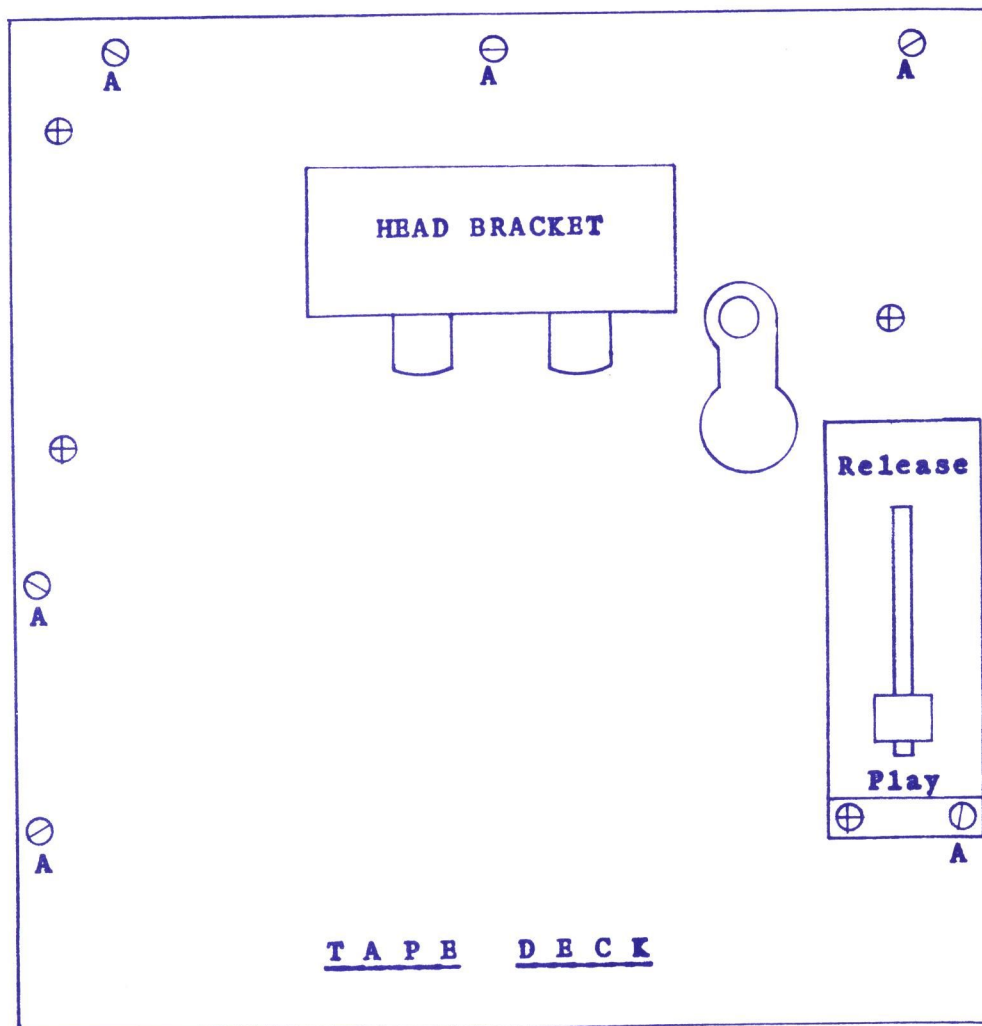
Measurements made using 20,000 ohm per volt meter with SPOTMASTER equipment in "Run" mode unless otherwise noted.

AC input to transformer (T1 primary) = 115 vac

INSTRUCTIONS FOR REMOVAL OF TAPE DECK

SPOTMASTER COMPACT MODELS

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



BROADCAST ELECTRONICS, INC.
SILVER SPRING, MD.

P A R T S L I S T

SPOTMASTER, Series 500 Super B

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

Schematic Ref. No.	Description	Stock No.
	PROGRAM AMPLIFIER	PA31B
R1	Resistor 15K ohm	
R2	" 180K "	
R3	" 68K "	
R4	" 100 "	
R5	" 4.7K "	
R6	" 47K "	
R7	" 10K "	
R8	" 100 "	
R9	" 3.3K "	
R10	" 150K "	
R11	" 10K "	
R12	" 100 "	
R13	" 33K "	
R14	" 180K "	
R15	" 680 "	
R16	" 680 "	
**R16A	" 1.5K " Pot.	
C1A	Capacitor 25 @ 25v	
C1	" 5 @ 50v	
C2	" 25 @ 25v	RB8B
C3	" 25 @ 25v	RB8B
C4	" 25 @ 25v	RB8B
C5	" 25 @ 25v	RB8B
C6	" .047 @ 100v	
**C6A	" .01	
C7	Capacitor .15 @ 100v	
C8	" 500 mmf ceramic	
Q1	Transistor 2N2613	2N2613
Q2	" 2N2613	2N2613
Q3	" 2N217	2N217
Q4	" 40329	40329

	CUE AMP & 1KC FILTER AMP.	TA31B
R20	Resistor 47 ohm	
R21	" 15K "	
R22	" 220K "	
R23	" 100K "	
R24	" 10K "	
R25	" 100K "	
R26	" 100K "	
R27	" 22K "	
**R31	" 22K " Pot.	

Schematic Ref. No.	Description	Stock No.
R32	Resistor 3.3K ohm	
R33	" 220K "	
R34	" 100K "	
R35	" 3.3K "	
R36	" 22 "	
L1	Choke, 100 mh ferrite	L1-100
C11	Capacitor 10 @ 6v	
C12	" 1 @ 50v	
C13	" 1 @ 50v	
C17	" .005 ceramic	
C18	" .22 @ 100v	
C19	" .1 @ 100v	
C20	" .1 @ 100v	
C21	" .01 ceramic	
C22	" .15 @ 100v	
C23	" 1.0 @ 50v	
C24	" .1 @ 100v	
Q5	Transistor 2N2613	2N2613
Q6	" 2N2613	2N2613
Q7	" 2N2613	2N2613
Q8	<i>CV 2N3644</i> 2N217	2N217

	POWER SUPPLY & RELAY BOARD	RB31B
R40	Resistor 330 ohm	
R41	" 10K "	
R42	" 10K "	
R43	" 3.3K "	
R44	" 2.2K "	
R45	" 4.7K "	
R50	" 100 "2W(500B)	
R50	" 220 "2W(505B)	
R51	" 220 "2W	
R52	" 3.3 "2W	
R53	" 330 "2W	
R54	" 100 "2W	
R55	" 22K "	
R56	" 33K "	
Q9	Transistor 2N3638	2N3638
K1	Relay DPDT, T154X-562	RB4B
T1	Transformer, Power type B34-118	B34-118
C25	Capacitor 100 @ 25v	
C26	" 25 @ 25v	RB8B

*Items starred not used in 505B.

**May vary in listed value to compensate for recording and/or play characteristics.

All resistors 1/2 watt and capacitors in microfarads unless otherwise noted.

P A R T S L I S T

SPOTMASTER, Series 500 Super B

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

Schematic Ref. No.	Description	Stock No.
	POWER SUPPLY & RELAY BOARD (Cont.)-	RB31B
C30	Capacitor 500 @ 50v	RB11B
C31	" 500 @ 50v	RB11B
C32	" 500 @ 50v	RB11B
C33	" 30 @ 150v	RB10B
C34	" .02 Ceramic	
CR1	Bridge Rectifier NSS3059	NSS3059
CR2	Diode 1N4369, 600v, .6A	1N4369
D1	Diode SRL692, 100v, .6A	SRL692
D2	Zener diode ZA27A	ZA27A
D3	Diode 1N4369, 600v, .6A	1N4369
	CASE (Compact)	PlB
	Front Panel (500B)	FP1B
	Front Panel (505B)	FP2B
*R57	Resistor 2.2K ohm	
*R58	" 47K "	
*R64	" 4.7K "	
*R86	" 3.3K "	
*R87	" 10K "	
-P1	Potentiometer 2.5K ohm	
*P2	Pot./sw., 100K ohm	SW6B
F1	Fuse, 3AG 1/2	
*C45	Capacitor, 10 @ 6v	
*C59	" .001 ceramic	
*S1	Rec/Play switch	SW1B

Schematic Ref. No.	Description	Stock No.
	CASE (Compact)(Cont.)-	PlB
S2	Start switch	SW21B
S3	Stop switch	SW21B
S4	Power switch (ganged with P2 on 500B)	SW4B
		SW6B
*S5	Meter switch	SW5B
*PL1	Record light assy.	PL1B
*M1	VU Meter(API)	MLB
*M1	VU Meter(Honeywell)	MS2
T2	Output transformer	
	TAPE DECK	
C91	Capacitor .33 @ 400v	
C92	" (115v, 60 cps operation) 6 mfd	D16B
C92	" (120v, 50 cps operation) 8 mfd	D165B
C92	" (220v, 50 cps operation) 2.5 mfd	D1652B
K2	Solenoid	D8B
	Motor, 115v, 60 cps	D17B
	Motor, 120/220v, 50 cps	D175B
DM2RB	Record head, twin track	DM2RB
DMLB	Reproduce head, twin track	DMLB
S6	Micro switch	D9B

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

Schematic Ref. No.	Description	Stock No.
	MICROPHONE PREAMPLIFIER	MP1B
R60	Resistor 1.5K ohm	
R61	" 12K "	
R62	" 100K "	
R63	" 100K "	

Schematic Ref. No.	Description	Stock No.
	MICROPHONE PREAMP. (Cont.)-	MP1B
C40	Capacitor 25 @ 25 vdc	RB8B
C41	" 25 @ 25 vdc	RB8B
C42	" 25 @ 25 vdc	RB8B
Q10	Transistor 2N2613	2N2613

*Items starred not used in 505B.
**May vary in listed value to compensate for recording and/or play characteristics.
All resistors 1/2 watt and capacitors in microfarads unless otherwise noted.

P A R T S L I S T

SPOTMASTER, Series 500 Super B

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

Schematic Ref. No.	Description	Stock No.
	RECORDING AMPLIFIER	RA21B
R65	Resistor 6.8K ohm	
R66	" 68K "	
R67	" 15K "	
R68	" 390 "	
R69	" 3.3K "	
R70	" 220K "	
R71	" 200K "	
R72	" 4.7K "	
R73	" 12K "	
R74	" 470 "	
R75	" 220K "	
R76	" 100K "	
R77	" 4.7K "	
R78	" 47K "	
R79	" 15K "	
R80	" 100K "	
R81	" 6.8K "	
R82	" 10K "	
R83	" 680 "	
** R84	" 15K " Pot.	
** R85	" 2.7K "	
** R89	" 1.5K " Pot.	
C46	Capacitor 25 @ 25 vdc	RB8B
C47	" 5 @ 50 vdc	
C48	" 25 @ 25 vdc	RB8B
C49	" 750 mmf, ceramic	
C50	" 25 @ 25v	
C51	" .01, ceramic	
C52	" 1.0 @ 50v	
C53	" 750 mmf, ceramic	
C54	" .47, disc	
C55	" .047	
C56	" 5.0 @ 50v	
C57	" 750 mmf, ceramic	
C58	" 220 mmf, ceramic	
C59	" .02	
C60	" 25 @ 25v	RB8B
L2	Choke, 10 mh, ferrite	L2-10
Q11	Transistor 2N2613	2N2613
Q12	" 2N2613	2N2613
Q13	" 2N2613	2N2613
Q14	" 2N2613	2N2613

Schematic Ref. No.	Description	Stock No.
	BIAS OSCILLATOR	BO21B
R90	Resistor 330 ohm	
R90A	" 180 "	
R91	" 22K "	
R92	" 22K "	
R93	" 22 "	
R94	" 22 "	
**R95	" 27K "	
R96	" 47K "	
T3	Bias Transformer, T60-T2	BO3B
Q15	Transistor 40329	40329
Q16	" 40329	40329
C61	Capacitor 25 @ 25v	RB8B
C62	" .01, ceramic	
C63	" .01, ceramic	
C64	" .47 @ 100v	
C65	" .47 @ 100v	
C66	" .047 @ 100v	
C67	Bias Adj. Capacitor, Arco PC4211	BO4B
C68	Capacitor 50 mmf, ceramic	
D4	Zener Diode ZA27A	ZA27A

	1KC TONE OSCILLATOR & CUE HEAD DRIVER	CO21B
R100	Resistor 1.2K ohm	
R101	" 2.2K "	
R102	" 220K "	
R103	" 22K "	
R104	" 390 "	
R105	" 15K "	
R106	" 15K "	
R107	" 3.3K "	
** R108	" 15K " Pot.	
R110	" 100K "	
** R111	" 15K " Pot.	
R112	" 10K "	
R113	" 2200 "	
R114	" 100K "	
R115	" 2200 "	
R116	" 6.8K "	
R117	" 1.5K "	

*Items starred not used in 505B.

**May vary in listed value to compensate for recording and/or play characteristics.

All resistors 1/2 watt and capacitors in microfarads unless otherwise noted.

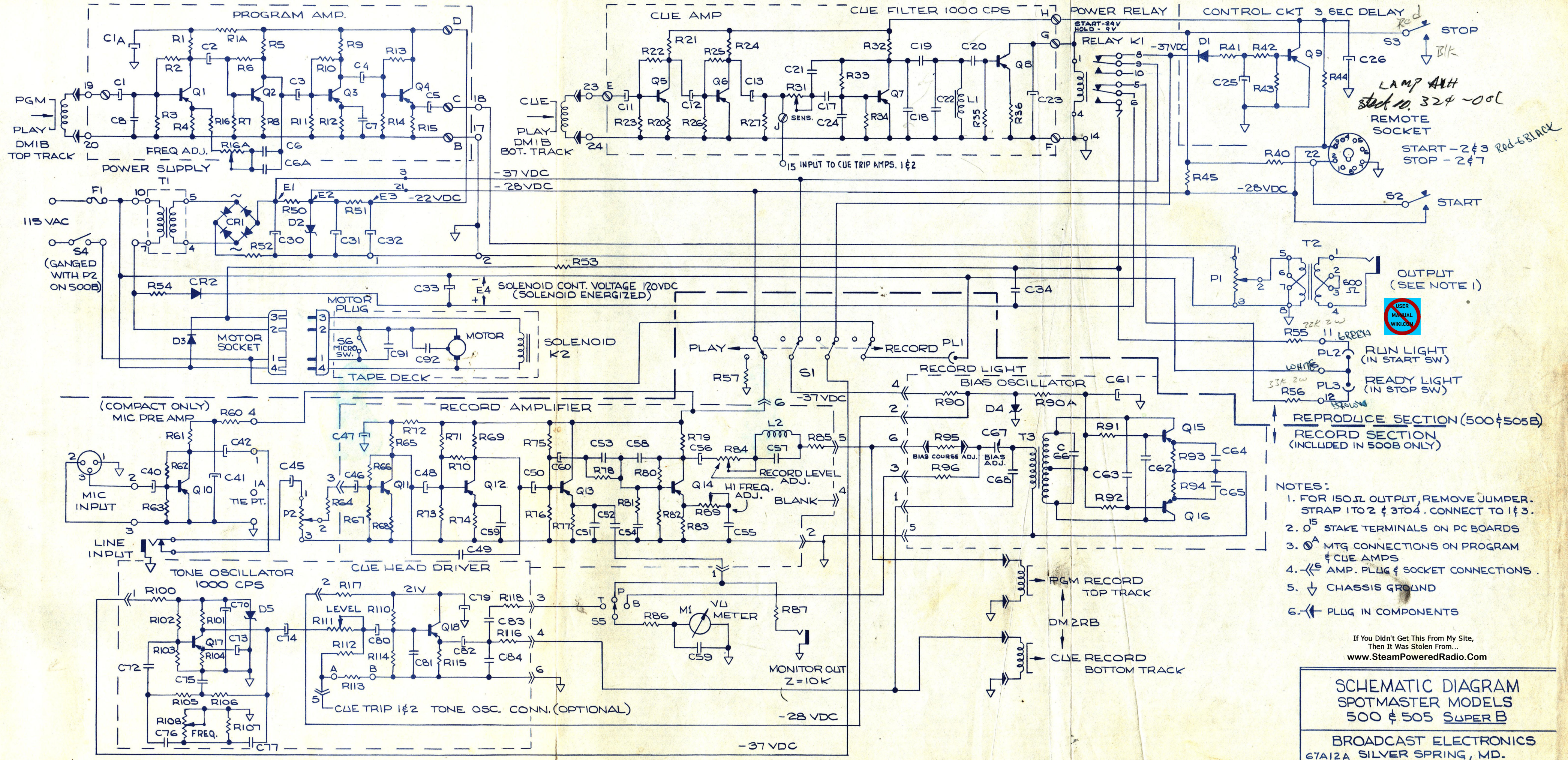
SPOTMASTER, Series 500 Super B

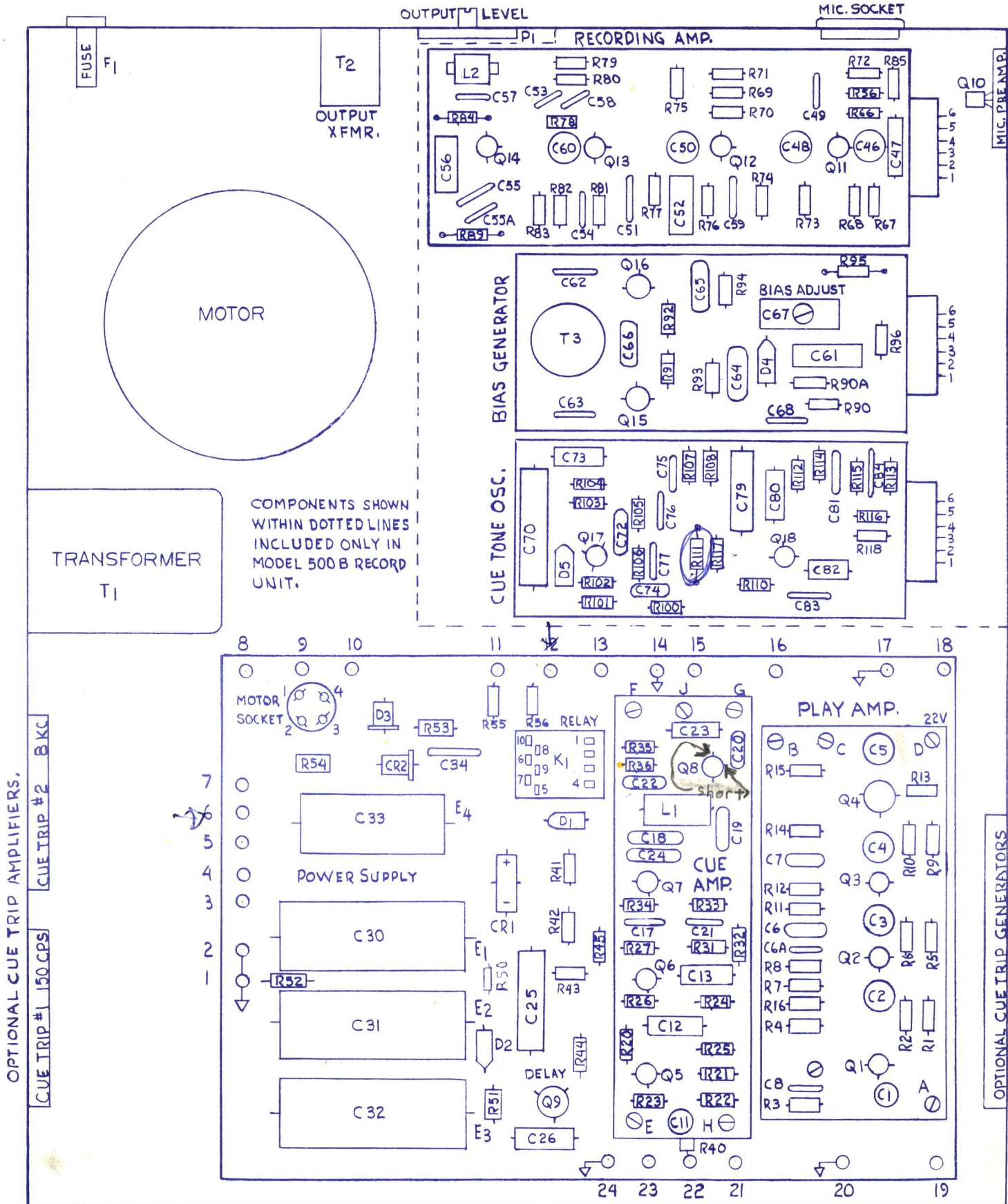
Schematic Ref. No.	Description	Stock No.
	<u>1KC TONE OSCILLATOR & CUE HEAD DRIVER (Cont.)</u>	<u>-C021B</u>
R118	Resistor 22K ohm	
Q17	Transistor 2N2613	2N2613
Q18	" 2N2613	2N2613
C70	Capacitor 100 @ 25v	
C72	" .22 @ 100v	
C73	" 50 @ 12v	
C74	" .047 @ 100v	
C75	" .02, ceramic	
C76	" .02, ceramic	
C77	" .02, ceramic	
C79	" 5 @ 50v	
C80	" 1 @ 50v	
C81	" .005, ceramic	
C82	" 1 @ 50v	
C83	" .02, ceramic	
C84	" .005, disc	
D5	Zener Diode ZA27A	ZA27A

*May vary in listed value to compensate for recording and/or play characteristics.

All resistors 1/2 watt and capacitors in microfarads unless otherwise noted.

- P4 -





COMPONENT LAYOUT
SPOTMASTER MODELS 500B & 505B (COMPACT)

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

BROADCAST ELECTRONICS
SILVER SPRING, MD. 65G19

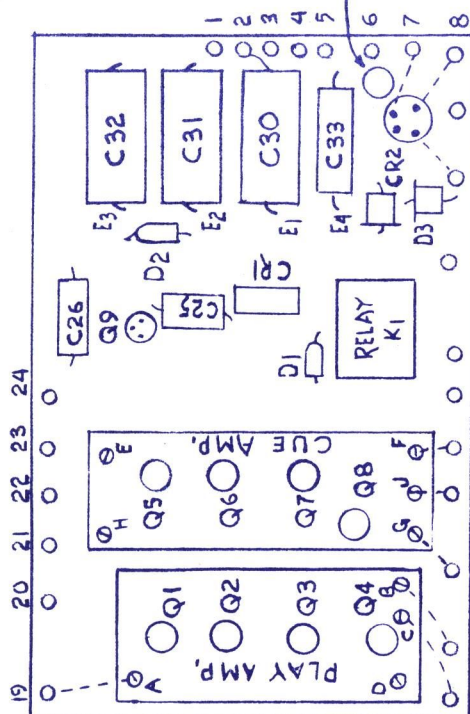
OPTIONAL CUE TRIP AMPLIFIERS
#1 150CPS

OPTIONAL CUE TRIP AMPLIFIERS
#2 BKC

FUSE
F1

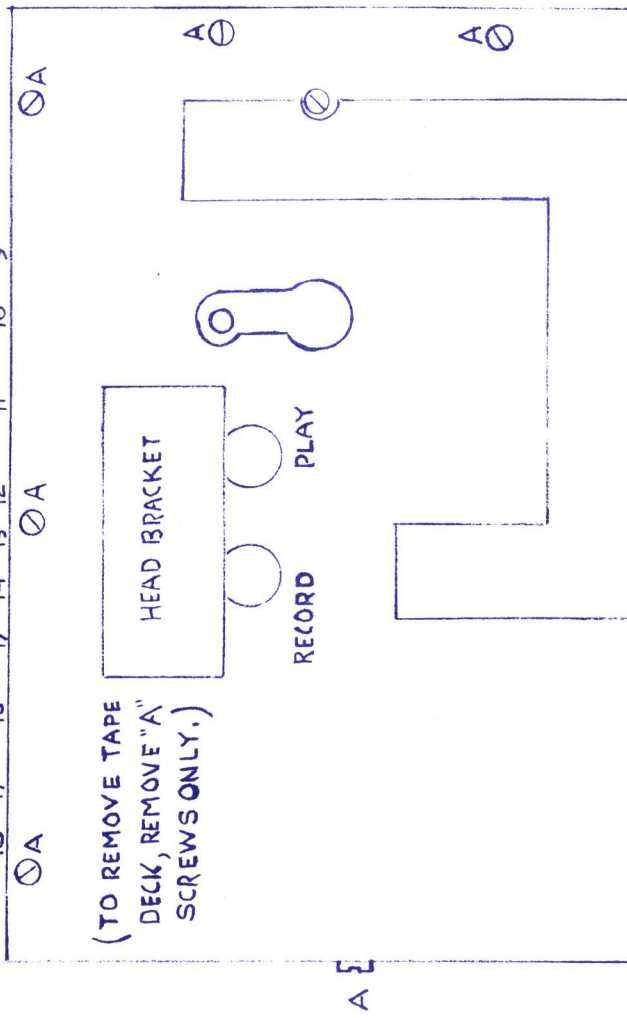
OUTPUT
LEVEL
P1

REMOTE
SOCKET
T2
XFMR



OPTIONAL MIC. PRE-AMP.

(RECORD SECTION INCLUDED IN 500B ONLY.)



OPTIONAL CUE TRIP GEN.

(CHASSIS LAYOUT SPOTMASTER 500B & 505B, RACK MOUNT

(FOR PARTS PLACEMENT)
DETAIL, SEE FIG. 2.

BROADCAST ELECTRONICS, INC.
SILVER SPRING, MD.

Fig. 3

65G19

