



**MODEL 33B** Mk. II  
**MAGNETIC TAPE RE-PLAY UNIT**

**INSTRUCTION MANUAL**

## *Foreword . . .*

*The Professional Model 33B Mk. II Magnetic Tape Replay Unit has been designed to provide extremely flexible editing and cue-ing facilities. For this reason it is an invaluable piece of equipment for Broadcast Stations, Professional Recordists, and those engaged in the study of Tape Recorded scientific phenomena.*

*The Replay fidelity of the Model 33B Mk. II is equal to that of the best professional type recorders.*

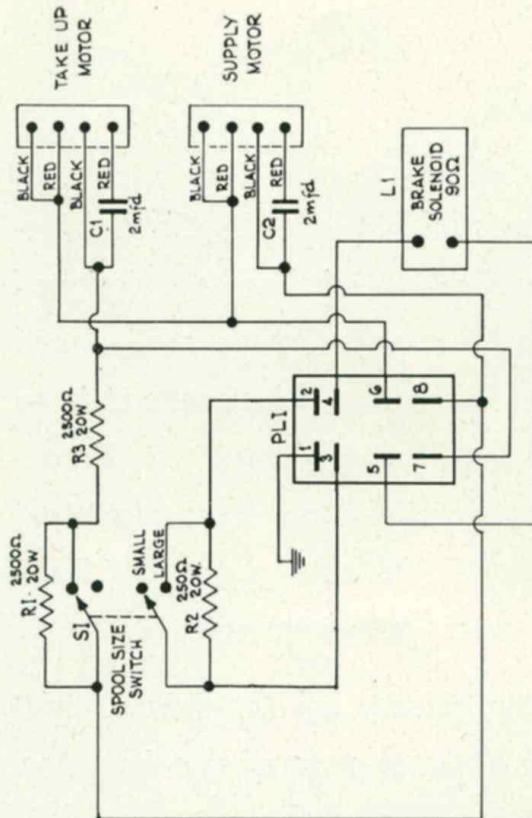
Magnetic Tape Recorder Division

**ROLA COMPANY (AUST.) PTY. LTD.**

The Boulevard, Richmond, E.1, Victoria - - - - - JB 3921



CHANGE RECORD

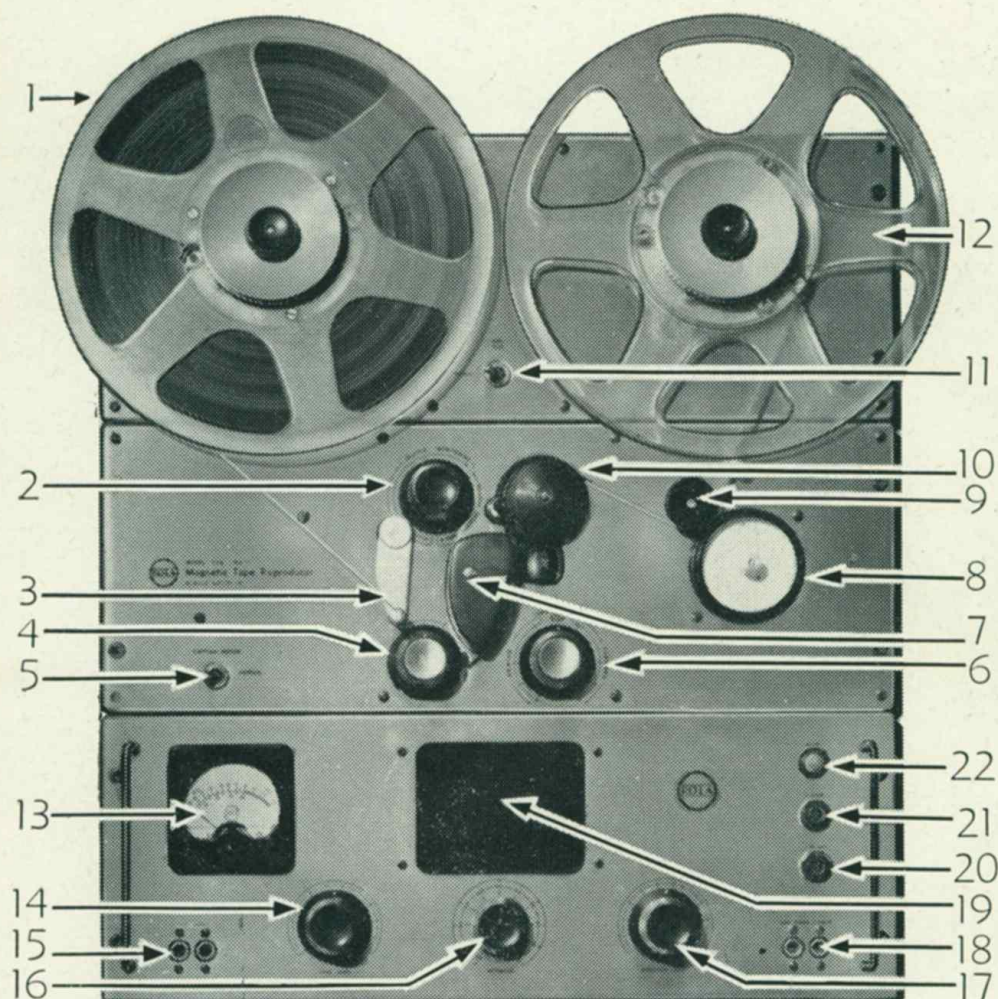


ALL DIMENSIONS IN INCHES.  
3RD ANGLE PROJECTION.  
NOTES- UNLESS OTHERWISE STATED  
FINISH-

UNSPECIFIED TOLERANCES		DRAWN		C.A.		PART No.		MATERIAL		SPEC.		NEXT ASSY.	
DECIMALS	± .005	CHECK'D				20160		ROLA CO. (AUST.) PTY. LTD. MAGNETIC RECORDER					DIVISION
FRACTIONS	± 1/16												
ANGLES	± 1°	APPROV'D											
SCALE-				SIZE		E		SPOOLING MECHANISM		C.D. 33B - 1		DRG. No.	
								'33B' MK II				ISSUE	

# MODEL 33B MK. II REPLAY UNIT

FRONT VIEW OF AUXILIARY SPOOLING MECHANISM,  
TRANSPORT DECK AND PRE-AMPLIFIER



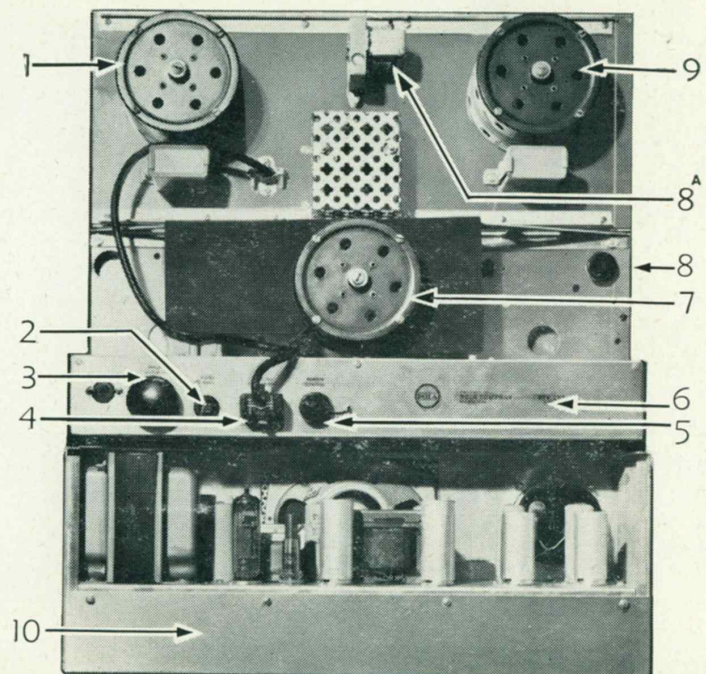
- 1 Supply Spool
- 2 SHUTTLE MONITORING CONTROL
- 3 Compliance Arm
- 4 On-Off Switch, Speed Selector and Press Button PLAY
- 5 Capstan Motor EDIT Switch
- 6 TAPE SHUTTLE Spooling Control and Press Button STOP
- 7 Play-back Head
- 8 Tape Metering Scale
- 9 Tape Metering Roller

- 10 Pressure Roller
- 11 REEL SIZE Switch
- 12 Take-up Spool
- 13 VU Meter
- 14 LINE LEVEL Control
- 15 TEST INPUT Jacks
- 16 METERING Switch
- 17 MONITOR LEVEL Control
- 18 600 OHM OUTPUT Test Jacks
- 19 Monitor Speaker
- 20 250 mA Amplifier DC Fuse
- 21 3 AMPS Amplifier AC Mains Fuse
- 22 Mains Indicator Bezel



## REAR VIEW OF MODEL 33B MK.II REPLAY UNIT

- 1 Take-up Spooling Motor
- 2 MAINS 3 AMPS Fuse
- 3 REPLAY AMPLIFIER  
Power Take Off
- 4 SPOOLING MECHANISM  
Power Take Off
- 5 REMOTE CONTROL  
Socket
- 6 Control Box
- 7 Capstan Motor
- 8 Head Output to Amplifier
- 8A Brake Operating Solenoid
- 9 Supply Spooling Motor
- 10 Amplifier Chassis





## **MODEL 33B MK. II**

### **MAGNETIC TAPE REPLAY MACHINE**

#### **GENERAL DESCRIPTION**

The Model 33B Mk. II Magnetic Tape Replay Machine is comprised of three units —

- (a) A special Mark II Series Tape Transport Mechanism.
- (b) A Spooling Mechanism.
- (c) A Replay Amplifier.

#### **TAPE TRANSPORT:**

The tape transport has been designed on similar lines to the Mk. II series transport used in the "77" recorder. Since the 33B Mk. II is a replay unit, no Erase or Record heads are provided, and the RECORD press button has been eliminated. The normal spooling motors are also deleted. A compliance arm has been fitted as a necessary addition for the use of 10½" NAB spools. Located approximately beneath the take-up spool is the tape metering scale on which tape footage and playing time in minutes is indicated. The pointer is readily adjusted to the zero mark for any position of the tape and this facilitates easy reading in playing and spooling.

Fast FORWARD or REWIND is accomplished by means of a TAPE SHUTTLE control which provides for variable speed spooling whilst editing, cue-ing or any aural scanning of the tape is facilitated by the use of the SHUTTLE MONITORING control. The STOP press button stops the machine from the PLAY function only.

#### **SPOOLING MECHANISM:**

This unit mounts directly above the Tape Transport and permits the use of 10½" Spools. Connection to the tape transport is by means of the socket marked SPOOLING MECHANISM on the control box on the rear of the tape transport.



Heavy-duty spooling motors are provided to ensure adequate take-up and hold-back tensions when using the larger spools. The SPOOL SIZE switch is located at the bottom centre of the spooling mechanism panel.

Adaptor plates and NAB spool adaptor hubs are also provided for use with NAB Spools, the normal spool retaining knob locking the complete assembly in place.

#### **AMPLIFIER:**

The Model 33B Mk. II amplifier has been designed to give a maximum power output of +21 dbm. into 600 ohm load from the 1 kc track of the E.M.I. SRT 13 test tape. Normal operating level is +8 dbm to a 600 ohm line.

The amplifier is provided with a line level control, a VU meter and monitoring facilities. In addition, test jacks are provided for both input and output and a METERING switch is fitted so that circuit voltages and the a.c. mains voltage may be read on the VU meter.

Signal output is taken from the amplifier via an Amphenol PC2F two-pin connector located at the rear left of the chassis. The output is also available from the 600 OHMS OUTPUT jacks on the right hand side of the front panel. Plugging into these packs disconnects the rear socket.

Equalisation is in accord with CCIR standards at both 15 and 7.5 ips operation.

The amplifier consists of an EF86 pre-amplifier stage (V1) followed by a second stage EF86 (V2) with a feedback loop to give the necessary replay equalisation. The equalisation is changed by relay RLI, operated by the tape speed switch in the tape transport so that the change of equalisation with speed is accomplished automatically.

Means are provided to adjust the equalisation to compensate for head wear. Trimmer CT1 adjusts the high frequency response at the low speed, and trimmer CT2 adjusts the high frequency response at the high speed. In addition, trimmer CT3 is provided to allow a slight adjustment in the middle frequency region on the high operating speed. The output of the second stage EF86 (V2) is connected to the LINE LEVEL control and, through a series resistor, to the MONITOR LEVEL control. The main amplifier consists of one half of a 12AX7 (V3) as an amplifier stage, followed by the other half of the same valve (V4) as a phase splitter. This is connected to the output stage, which is a 12AU7 (V5) with the two sections in push-pull. The output to line from the output transformer is fed through a resistor network which raises the output impedance of the amplifier to the required 600 ohms.

Feedback is applied around the amplifier from the tertiary

winding on the output transformer to the cathode of the first half of the 12AX7 (V3).

The monitor amplifier consists of a single 6BM8. The triode section (V6) functions as an amplifier to drive the pentode section (V7). This is coupled to a Rola Model 5-4F loudspeaker. Feedback is applied from the secondary of the speaker transformer to the cathode of the triode section.

The d.c. supply for the heaters of the first two stages (V1 and V2) is provided by means of the selenium rectifier RE1, and filter network C20, C21, R35, and R42. The main H.T. for the amplifier is derived from the selenium rectifier RE2.

The METERING switch, SW1, is arranged so that the cathode voltages of each valve and the H.T. supply and A.C. Mains voltages are indicated simply by turning this switch.

*Note:—Correct cathode currents and H.T. and A.C. Mains voltages are indicated when the meter reads ZERO on the VU scale.*

### RELAY OPERATION:

Pressing the PLAY button energises relay RL1 which then operates the pressure roller solenoid via the Tape Shuttle Control contacts and RL1/2 and the brake solenoid via RL1/2 and pin number 5 of the 8 pin socket, SO2. The take-up motor is supplied with power through a 1000 ohm resistor (shunted by 125 ohms via RL2/1) and from pin number 7 of the 8-pin socket, SO2, through RL1/1 which on closing also completes the circuit to the supply motor through the 2,000 ohm resistor, R2.

On releasing the PLAY button a nalternative holding circuit is set up for RL1 via pins 1 and 2 of the REMOTE CONTROL socket, SO3, relay RL2, the STOP button, the pressure roller solenoid contacts (made when the pressure roller solenoid operates), and RL1/2 to ground.

RL2 is operated by the coil current of RL1 and, in so doing, opens RL2/1 and reduces the torque of the take-up motor.

So long as the PLAY button is held in, the take-up motor operates with a high torque to prevent looping of the tape during starting. The PLAY button should only be released after stable tape motion has been attained (approximately  $\frac{1}{2}$  second).

Operating the STOP button opens RL1 which releases the pressure roller and brake solenoids, bringing the machine to a halt. These operations may be performed with external (remote) circuitry as shown on the circuit drawing.



### **TAPE SHUTTLE:**

When the TAPE SHUTTLE control knob is rotated from the STOP position, power is applied to the two spooling motors, through combinations of R1 and R2, to give various spooling speeds, the mains now being connected to the spooling motors via the Tape Shuttle Control contacts. The brake solenoid is also connected, via these contacts, to remove the brakes. The pressure roller solenoid remains de-energised.

Returning the TAPE SHUTTLE control knob to STOP de-energises the brake solenoid, thus allowing the brakes to come on, and at the same time removes power from the spooling motors, thus bringing the tape to rest.

### **REMOTE CONTROL:**

It is possible to start and stop the machine remotely. To facilitate this, a four-pin teletron socket, SO3, has been provided in the control box. To use this facility the shorting plug should be withdrawn and the remote control unit plugged in.

### **CAPSTAN MOTOR EDIT SWITCH:**

This is located on the lower left hand front panel of the transport mechanism and when switched to the EDIT position allows the capstan motor to operate continuously instead of coming progressively to operating speed after the PLAY button is pressed.

## **OPERATING INSTRUCTIONS**

### **TAPE THREADING:**

In normal operation both spools rotate anti-clockwise and the tape leaves the supply reel from the left-hand side of the reel. The tape first passes over the compliance arm and under the guide roller, then over the Play head and between the capstan and the pressure roller. From the pressure roller the tape passes under the drive wheel of the Tape Metering mechanism, over the guide post and on to the right-hand side of the take-up spool.

Note:—When threading tape on to the machine, rotate the SHUTTLE MONITOR control to the TAPE THREADING position which in turn moves the pressure roller away from the capstan and the head shield away from the head. This is not essential, but simplifies tape threading.

### **FAST FORWARD AND REWIND:**

Fast forward and rewind operations are accomplished by means of the TAPE SHUTTLE control.

When turned to the right for fast FORWARD or to the left for fast REWIND, the speed of each operation is progressively variable in positions 1, 2, 3, 4, in either direction. However, to overcome spool inertia it is desirable to turn the TAPE SHUTTLE control to the full FORWARD or REWIND position before selecting the desired shuttling speed.

In position 4, full speed shuttling in either direction is selected without any slowing down of the tape motion. At this speed 1,200 feet of tape can be transferred from one spool to the other in 50 seconds and 2,400 feet of tape in less than 75 seconds.

### **SHUTTLE MONITORING:**

This control is used in conjunction with the TAPE SHUTTLE. Turning the SHUTTLE MONITORING control anti-clockwise brings the tape closer to the Play head and if used in this position during fast FORWARD and REWIND it is possible to search aurally for any given spot on the tape.

Having arrived at the approximate position on the tape, set the TAPE SHUTTLE to EDIT and then position the tape manually by rotating either spool in the required direction.

Note:—After locating the position required, return the SHUTTLE MONITORING control to the TAPE THREADING position, as constant shuttling with the tape in contact with the Play head will cause the latter to wear at a greater than normal rate, and may make it necessary for the head to be demagnetised more frequently than usual.

### **TO PLAY A TAPE:**

When a 7" or smaller spool size is to be used, the NAB spool adaptor plates and spool retaining hubs should be removed.

Thread the tape in the manner described under Tape Threading, check to make sure that the REEL SIZE switch is in the correct position for the spools being used, then press the PLAY button.

When the 10½" NAB spool size is to be used, place the adaptor plates on each spooling motor shaft, making sure that the holes in each plate sit snugly over the locating pins at the base of the spool shaft.

Place the spool on the adaptor plate so that one of the recesses in the spool hub locates in the drive pin at the outer diameter of the adaptor plate, fit the NAB adaptor hub, and lock it in place with the normal spool retaining knob.



By setting the metering switch to VU, the VU meter will read the level being fed to the 600 ohm line output, and this can be set as required by means of the LINE LEVEL control. To monitor this signal on the internal monitor speaker, set the level of the monitor speaker by means of the MONITOR LEVEL control.



**MODEL 33B MK. II**  
**MAGNETIC TAPE REPLAY MACHINE**

**SPECIFICATIONS:**

**OPERATING METHOD:**

Press button start and stop. Rotary Tape Shuttle control.

**TAPE SPEEDS:**

7.5 and 15 ips. (Other speeds can be supplied to order.)

**SPOOL SIZES:**

10½ in. NAB, 7 in. and 5 in. (as specified B.S.S. 1568:1953).

**TAPE DRIVE:**

Three Motor. Capstan directly driven by synchronous dual-speed balanced-drive motor with integral flywheel. Hold-back and take-up by separate constant-torque induction motors.

**STARTING AND STOPPING TIME:**

Virtually instantaneous. Edit switch provided.

**TIMING ACCURACY:**

Better than 0.25%.

**REWIND AND FAST FORWARD TIME:**

Better than 50 seconds for 1,200 ft. spool of tape.

Better than 75 seconds for 2,400 ft. spool of tape.

**FLUTTER AND WOW:**

At 15"/Sec. Total Flutter and Wow less than 0.1%  
r.m.s.

Total Wow less than 0.06% r.m.s.

At 7.5"/Sec. Total Flutter and Wow less than 0.15%  
r.m.s.

Total Wow less than 0.1% r.m.s.

(Measured on Gaumont Kalee Wow and Flutter meter type 564.)



**FREQUENCY RESPONSE:**

Within the limits specified in British Standard Specification 1968:1953 (N.A.B. Standard machines to order).

**OUTPUT IMPEDANCE:**

600 Ohms. Balanced.

**POWER CAPABILITIES:**

Plus 21 dbm. output with a total harmonic distortion of less than 1%.

**SENSITIVITY:**

Sufficient to provide an output of plus 21 dbm, when replaying the 1 kc tone band of E.M.I. Test Tape SRT13.

**SIGNAL TO NOISE RATIO:**

The unweighted noise output, when playing non-magnetic leader tape is more than 50 db below the output from the 1 kc tone band on E.M.I. test tape SRT13, with the line level control set to give an output of plus 8 dbm. from this tone band.

**MONITORING:**

A Rola 5/4F loudspeaker with a separate integral amplifier and monitoring level control is provided.

**METERING:**

A 3" VU meter of approved design is fitted. A rotary switch allows this meter to be used for measuring all valve cathode currents, H.T. and mains voltages and level to line.

**TEST JACKS:**

Input and output test jacks are provided.

**MAINS SUPPLY:**

230/240 Volts 50 Cycle. (Standard machine.)

**POWER CONSUMPTION:**

135 watts.

**WEIGHT:**

46½ lbs.

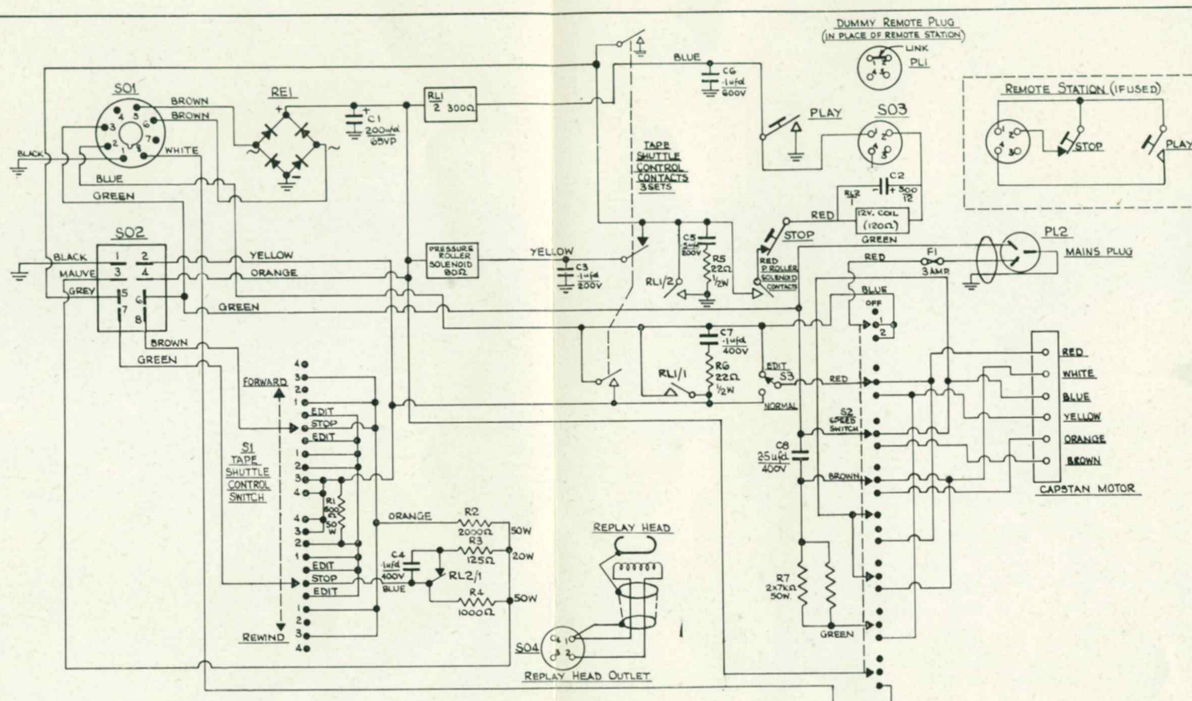
**SIZE:**

Transport 19" x 7", Amplifier 19" x 7", Spooling mechanism 19" x 7".

**TIMING DEVICE:**

Calibrated in Minutes and Feet.

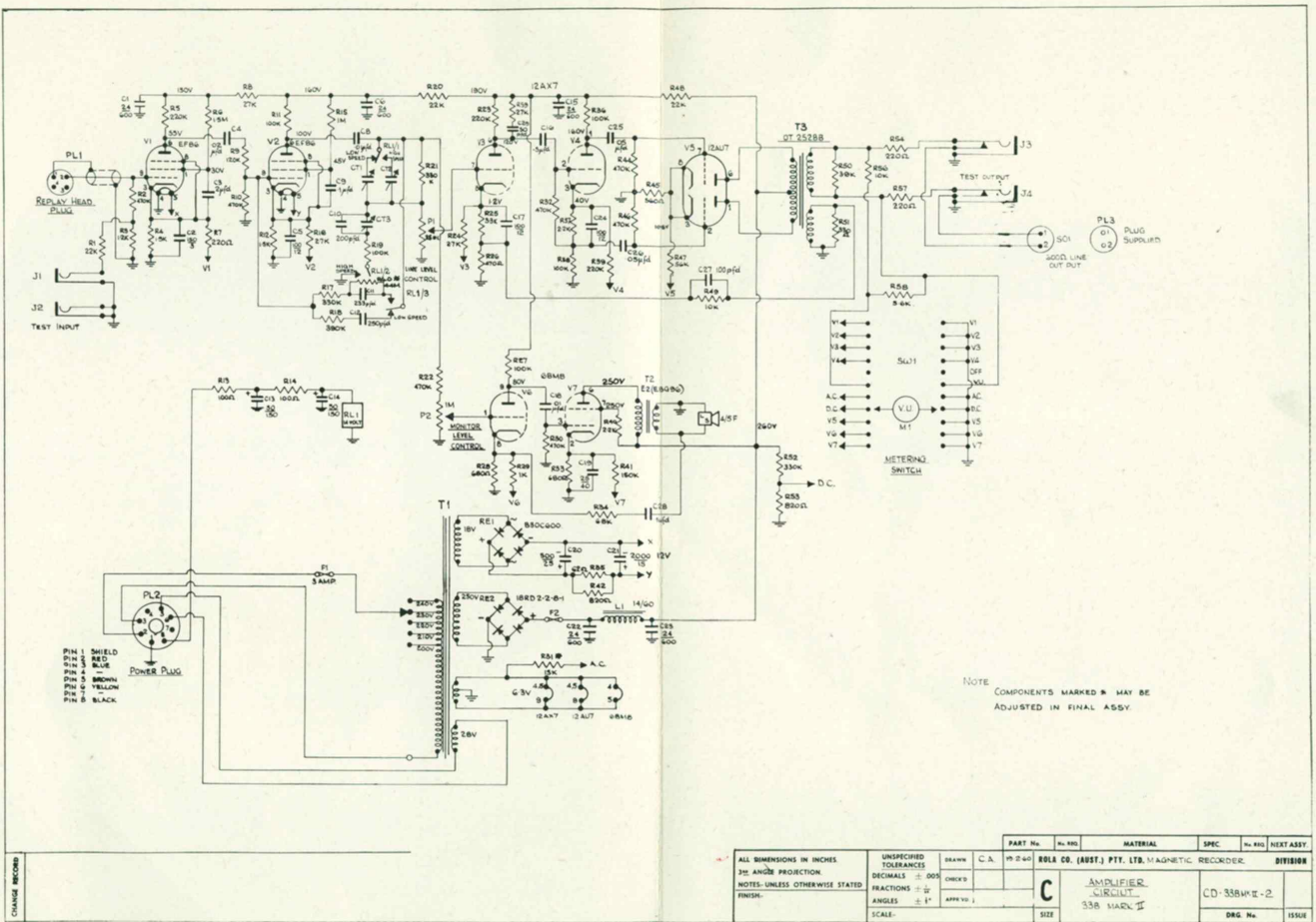
## CHANGE RECORD



ALL DIMENSIONS IN INCHES.  
3RD ANGLE PROJECTION.  
NOTES:- UNLESS OTHERWISE STATED  
FINISH:-

			PART No.	No. REQ.	MATERIAL	SPEC.	No. REQ.	NEXT ASSY.
UNSPECIFIED TOLERANCES			DRAWN	C. A.	03-20-62	ROLA CO. (AUST.) PTY. LTD. MAGNETIC RECORDER		
DECIMALS ± .005	CHECK'D	<i>1.1</i>	<i>2.2</i>	<i>3.3</i>	D	CD-33B MK II-1		
FRACTIONS ± 1/16	APPROV'D	<i>2.4</i>	<i>2.3</i>	<i>2.4</i>		<u>TRANSPORT</u> <u>WIRING ASSY</u> 33B MK II		
ANGLES ± 1°						DRG. No. _____ ISSUE _____		
SCALE: 1" = 1"			SIZE					





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