



**MAGNETIC TAPE REPLAY UNIT  
MODEL 33B**

**Mk. II Series**

**SERVICE AND MAINTENANCE  
MANUAL**

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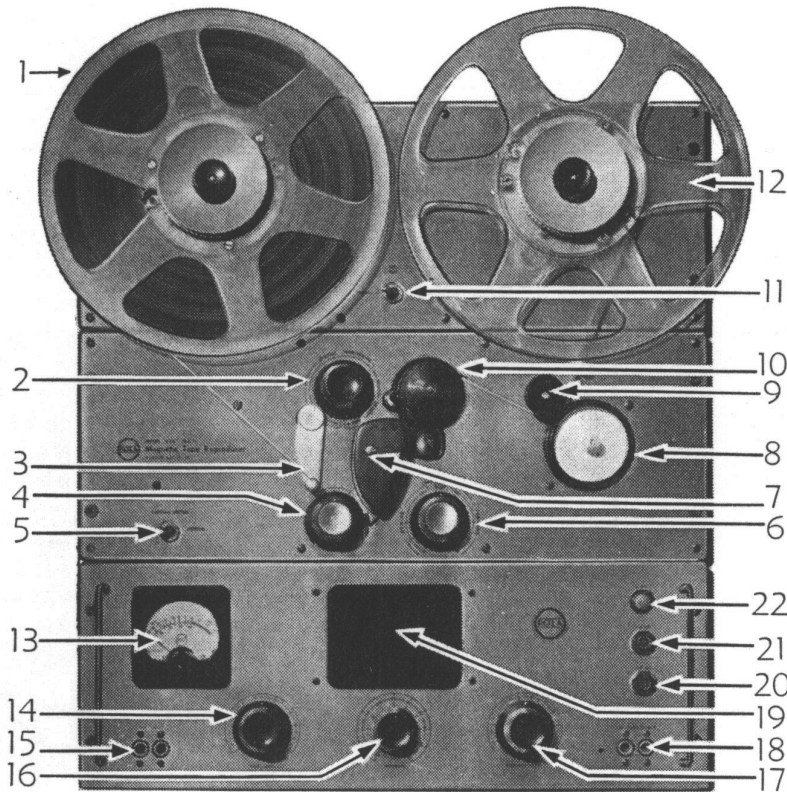
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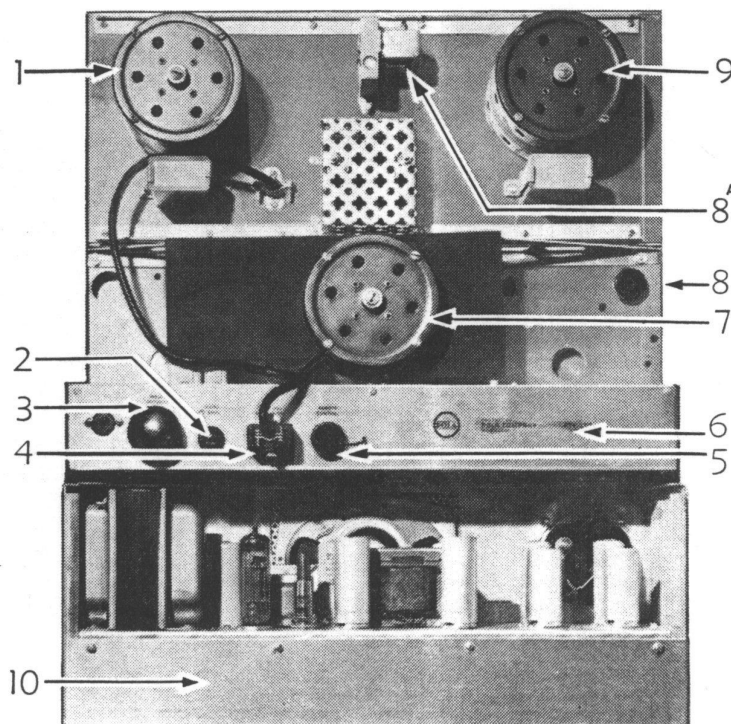
## MODEL 33B MK. II REPLAY UNIT

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 SERIES

### SECTION 1 — GENERAL DESCRIPTION OF TAPE TRANSPORT MECHANISM

The Model 33B Mk. II Tape Transport Mechanism consists of two units —

- (1) Transport Deck.
- (2) Spooling Mechanism.

#### 1.1 TRANSPORT DECK

The Transport Deck is fitted with a single phase synchronous Capstan Motor with inbuilt flywheel providing a smooth, direct, wow-free drive without mechanical linkages.

The rotor and flywheel are dynamically balanced to better than 20 milligram /inch.

The two-speed motor winding allows the Capstan Motor to be electrically switched for operation at either 7½ or 15 ips.

The Capstan itself is formed by grinding the motor shaft (which has previously been hard chromed) to the required size, with the motor in the normal running condition. The diameter of the shaft is held to 0.0001" and the ovality is better than 0.00002".

To allow the Capstan Motor to run for long periods without over-heating, a Heat Dissipator has been fitted to the motor.

The Head Block consists of a full track Play Head with multi-mumetal shielding around the head and over the tape path when the unit is in the Play mode.

The Compliance Arm, mounted below the Shuttle Monitoring control, takes up any tape "bounce" which may occur when the Play mode is commenced.

A Tape Metering Scale is provided on which tape footage and playing time is indicated in minutes and seconds. The pointer is readily adjusted to the zero mark for any position of the tape.

A Solenoid carries an arm on which is mounted the Pressure Roller and the Tape Lift Arm. When the machine is in a condition ready for Shuttling, the solenoid is de-energised and the Tape Lift Arm holds the tape away from the Play Head and opens the Play Head Shield.

A cross arm set in the Pressure Roller Arm operates a set of contacts, and also runs on the Shuttle Monitor control.

A 3 Amp Mains fuse is located at the rear of the Transport Deck.

#### 1.2 SPOOLING MECHANISM

The Spooling Mechanism mounts directly above the Transport Deck and is powered by two, heavy-duty, capacitor-start induction motors. These motors ensure adequate take-up and hold-back torque when Playing or Shuttling 3", 5" or 7" cine spools or 10½" NAB spools.

The Spool Size Switch adjusts torque for the size of spools used.

The Spool Retaining Knobs used with all spools have a normal right-hand thread with a broad pitch to allow quick secure and release.

Adaptor plates and NAB adaptor hubs are provided for use with NAB spools.

Power to the Spooling Mechanism is provided via a lead which plugs into the Spooling Mechanism socket at the rear of the Transport Deck.

The large precision-ground brake drums are moulded on to the spooling motor extension shaft. Brake shoes, with a braking area of 1½ square inches, align automatically and are servo-assisted in opposite directions. This provides more powerful braking to whichever spool is unwinding tape and eliminates any possibility of "tape throwing" during Shuttling. The brakes are held "ON" by spring tension and are released by a common solenoid which takes up two connecting tie-rods.

This solenoid and the Pressure Roller Solenoid in the Transport Deck is operated from a full-wave bridge rectifier circuit, using selenium rectifiers and a 200 µF condenser. This power supply provides a no-load potential of approximately 40 volts peak which drops to 30 volts when both solenoids are energised. The resulting initial surge current through the solenoids ensures their reliable operation.

The 28-volt supply required for the rectifier is obtained from a special winding on the amplifier power transformer through pins 5 and 6 of the amplifier power source socket at the rear of the Control Deck.

## SECTION 2 — GENERAL DESCRIPTION OF THE AMPLIFIER

### 2.1 GENERAL

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 AC 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 jacks disconnects the rear socket.

Equalisation is in accord with CCIR standards at both 15 and 7½ ips operation.

### 2.2 CIRCUITRY

The amplifier consists of an EF86 pre-amplifier stage (V1), followed by a second stage, EF86 (V2), with a feed-back loop to give the necessary replay equalisation. The equalisation is changed by relay RL1, 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.

Volume level to the internal monitor speaker is variable by means of the Monitor Level control.

The DC 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 HT for the amplifier is derived from the selenium rectifier RE2 through the filter network, L1, C22 and C23. Access to the 3 AMPS MAINS fuse and the 250 mA DC fuse is provided on the front panel of the amplifier.

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

NOTE:—Correct cathode currents and HT and AC Mains voltages are indicated when the meter reads ZERO on the VU scale.

## SECTION 3 — GENERAL DESCRIPTION OF CIRCUIT OPERATION

### 3.1 PLAY MODE

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 1,000 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 an alternative 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 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.

### 3.2 TAPE SHUTTling

When the Tape Shuttle control is turned to the EDIT position the spooling motors have equal torque in opposite directions and remain static, keeping the tape under tension. This condition allows the tape to be "rocked" over the heads for editing, cueing, etc.

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 release the brakes. The pressure roller solenoid remains de-energised.

The TAPE SHUTTLE control now supplies the spooling motor (toward which it has been turned) with power, through a series resistance. Through further series resistances power is applied to the opposing spooling motor to provide hold-back tension whilst shuttling. This condition conversely applies when the control is turned in the opposite direction.

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.

### 3.3 CAPSTAN MOTOR EDIT SWITCH

The capstan motor EDIT switch, S3, is located on the front panel of the Transport Deck and when switched to EDIT allows the capstan motor to operate continuously instead of coming progressively to operating speed after the PLAY button is pressed.

### 3.4 REMOTE CONTROL

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

*Play Mode* — bridge pins 1 and 4 of remote socket with Press Switch.

*Stop Mode* — remove "short" between pins 1 and 2 of remote socket with Press Button.



## SECTION 4 — SERVICE AND MAINTENANCE.

### 4.1 REMOVAL OF FRONT PANEL

Access to the front of the tape transport mechanism is gained by removing the 16 retaining screws, in each of the two panels, and lifting the front panels clear. These panels form part of the structural strength of the assemblies and the screws should always be tightened securely when replaced.

*Caution:—Points carrying mains supply potentials are exposed when the front panel is removed. Care should be taken in handling the unit if it is connected to the supply mains.*

With the front panel removed, the undermentioned components are accessible for inspection and adjustment:—

- (i) Brake Drums, Brake Shoes and Tie Rods.
- (ii) Pressure Roller Solenoid contacts on left-hand side.
- (iii) Tape Shuttle contacts (operated by a cam on the knob of the right-hand lower control).
- (iv) Pressure Roller Arm, Tape Lift Arm and Head Shield opening mechanism. For further access the pressure roller may be removed by removing the retaining screw in the centre and withdrawing the roller.

**NOTE:—**Carefully note the location of shim washers, if any, so that they may be replaced in proper sequence.

The two bakelite mouldings which surround the pressure roller mounting stud and the head shield arm may also be removed if greater accessibility is desired.

Servicing the front face of the tape transport consists, in the main, of contact cleaning and adjustment, brake setting and pressure roller tensioning.

### 4.2 BRAKE SERVICING

Inefficient braking is usually evidenced by a prolonged period of tape travel after shuttling. In more serious instances, the tape may even "throw a loop" and become entangled round the spool. This fault could result from oil on brake drums and brake shoes or the displacement of the spooling motor.

To cure the fault, lift the brake shoe away from the panel where it may be detached from its return spring and removed.

The brake drum may now be removed by loosening the set screw which locks it to the motor shaft. A 5/32" hexagonal spanner is used for this purpose and the screw should be slackened off a few turns to ensure complete clearance from its recess in the shaft.

If it is found that the brake drum cannot be withdrawn easily, two screwdrivers may be used gently as levers against the chassis, using an even pressure 180 degrees apart. Failure to observe this 180 degrees placement could result in a bent motor shaft.

With the brake drum removed, it will be seen that the felt seal on the motor shaft has become oil saturated. It should be replaced with a new seal.

Clean all oil from the chassis, brake drum and brake shoe with Carbon-tetrachloride or similar cleaning fluid. Methylated spirits has been found successful. Acetone or Lacquer thinners should be avoided as they could possibly react on the adhesive which secures the brake lining to the shoe.

An excessive amount of oil on the brake shoe may necessitate the replacement of the part.

On re-fitting, the brake drum must be re-set with the front face .805" from the chassis (with motor shaft end play taken up on the ball at rear of the motor).

A smear of light grease should be applied to the brake shoe bearing post, the hole which engages the tie rod, and in the case of the right-hand shoe, a light touch of grease on the boss which operates the contacts.

### 4.3 BRAKE ADJUSTMENT

By turning the shuttle control to either EDIT position the brakes will be released. Clearance between the heel of the shoe and the brake drum should be approximately .015". Adjustment is made by twisting the cranked section situated half-way along the brake tie rod. Clockwise twisting increases, and anti-clockwise twisting decreases, the gap between shoe and drum.

When the brakes are operating correctly the differential braking action is quite obvious if the spools are turned by hand.

### 4.4 UNRELIABLE OR NON-RELEASE OF BRAKES

Apart from electrical faults, this trouble is usually due to the brake actuating solenoid being mechanically overloaded. Causes of this are:—

- (i) Brake shoes opening too far (i.e., more than .015").
- (ii) Excessive friction in the solenoid bearings or in the linkages.

**Remedy (i)** — See para. 4.3.

**Remedy (ii)** — Clean and lubricate the relevant moving parts.

### 4.5 ADJUSTMENT OF CONTACTS

Should adjustment become necessary, the use of a contact adjusting tool is advised.

Dirty and pitted contacts may be cleaned by the use of a small square of very fine wet and dry emery paper folded double and inserted between the two contact faces. Gentle finger pressure of the contacts on to the emery surface will facilitate the removal of all pitting and dirt.

Contact "Banks" may be re-positioned by loosening the two screws securing the contact mounting bracket to the chassis, and re-tightening in the new position.

A definite amount of contact pressure is vital for reliable operation. This pressure is best defined as

that which will produce a positive wiping action between the contact surfaces in either the "make" or "break" actions.

#### 4.6 MALADJUSTMENT OF PRESSURE ROLLER AND ASSOCIATED MOVEMENTS

The tension of the pressure roller against the capstan is most important and irregularities may result from a number of causes. In most cases of maladjustment the effect is partial loss of control of the tape motion by the capstan — particularly at the beginning and/or end of a reel — with the audible evidence in the form of a random wow.

Pressure roller tension can be readily checked in the following manner, by means of a suspendable-type spring balance with a full-scale reading of approximately 8 lbs.

- (i) With a reel of tape almost fully spooled on to the take-up spool (approximately 30 to 40 turns should remain on the supply reel), remove the pressure roller cover disc and replace the pressure roller retaining screw.

**NOTE:** It will be necessary to fit a 3/16" washer under the screw when the cover disc is not present — otherwise the pressure roller will run off the spindle over the retaining screw head.

- (ii) Loop a short length of cord over the end of the screw and attach the spring balance.
- (iii) Pull on the spring balance so that the cord lies directly over the centre of, and as close as possible to, the timing indicator.
- (iv) Start the machine in PLAY operation.
- (v) A reading of 5 to 5½ lbs. should be reached before the pressure roller tension is reduced to the point where the tape motion becomes irregular.

#### 4.7 LOW PRESSURE ROLLER TENSION

If the pressure roller tension is too low, check the following causes:—

- (a) Pressure Roller Solenoid.
  - (i) Looseness of the screw and spacer securing the solenoid frame to the chassis panel.
  - (ii) Looseness of the screws securing the armature spring plate.
  - (iii) Fouling of the magnet face by foreign matter, magnetic or otherwise, preventing the armature spring plate from seating properly.
- (b) Pressure Roller and Capstan.
  - (i) Presence of oil, tape debris or any foreign matter on the capstan and/or pressure roller.
  - (ii) Deep groove or wear on the pressure roller surface which reduces "pinch" and renders the roller unfit for use with thin, L.P. tapes.
- (c) "Bottoming" of the tape lift arm within its recess in the head block when the pressure roller solenoid is energised.

#### 4.8 REMEDIAL MEASURES

The following is the action to be taken, respectively, should any of the faults listed in para. 4.7 be present.

- (a)
  - (i) Fully tighten the screw and spacer, at the same time turning the solenoid frame fully anti-clockwise against the securing screw.
  - (ii) Remove the spring plate assembly from its mounting spindle and tighten or replace the screws.
  - (iii) Clean the magnet face of foreign matter.
- (b)
  - (i) Clean the pressure roller and/or capstan with a dust-free cloth moistened with Carbon-tetrachloride.
  - (ii) Fit a new pressure roller and check for correct tension. (New rollers can sometimes cause excessive tension.)
- (c) When the pressure roller solenoid is energised and the pressure roller is engaged against the capstan, the tape lift arm should be evenly positioned in its recess in the head block, and must be clear of the bottom of the recess and of the tape. Should the arm foul the bottom or sides of the recess, gently bend the arm until correct positioning is achieved.

In extreme cases of a bent tape lift arm, it may be necessary to loosen the pressure roller mounting stud and move the tape lift arm in or out of its mounting hole. Unless absolutely necessary, it is recommended that this should be left locked, and adjustment be concentrated on the tape lift arm.

At the point where the tape is in contact with the tape lift arm, an angle of approximately 90 degrees between the chassis and the tape lift arm will ensure correct layering of the tape on the spool. If, when spooling, the tape does not "layer" in the same place as when the pressure roller is engaged, a slight alteration to the angle of the tape lift arm, at the point where the tape makes contact, will remedy the fault. (Bending the top of the arm away from the head block will cause the tape to "layer" closer to the panel, and vice versa.)

A "stop" has been incorporated to limit the return travel of the pressure roller arm. Fitted to one leg of the pressure roller surround, this stop prevents the tape lift arm from being bent by pressure against the front cover panel in the event of any excess movement of the pressure roller arm.

If the pressure roller tension needs to be varied further after the abovementioned remedies have been carried out, the adjustment can be made by loosening or tightening the two 1/8" self-locking nuts on the armature face. For this a 1/4" A.F. or similar size "Spintite" is used. Be sure that both screws are adjusted evenly to maintain armature alignment.

#### 4.9 PRESSURE ROLLER CLEANING

Drive of tape through the machine can be affected by a dirty or greasy pressure roller surface. A brush is useful for removal of dust particles, but oil, grease or wax must be removed with the aid of a



## Section 4 — MODEL 33B

cleaning fluid, preferably Carbon-tetrachloride. This should be applied sparingly, using a moistened cloth. After cleaning, the correct drive surface is obtained by applying a fine film of powdered graphite evenly over the pressure roller driving surface.

### 4.10 PRESSURE ROLLER LUBRICATION

The pressure roller and guide roller are both fitted with self-lubricating bearings and require no attention in this respect.

### 4.11 THE MOTORS

Normally the three motors of the tape transport mechanism require no attention — the bearings are of phosphor-bronze with an oil pad reservoir. However, should unforeseen circumstances necessitate the removal of a motor from the transport, the following sequences should be observed:—

### 4.12 CAPSTAN MOTOR REMOVAL

- (i) Disconnect the unit from mains supply.
- (ii) Disconnect the "head" outlet cables and Power Supply cable at the rear of tape transport.
- (iii) Remove the transport deck from the case or rack by slackening the four socket head screws (two at each end on the front of the deck) and lifting the unit out of the case or rack.
- (iv) Place the transport upside down on a bench or table with the rear of unit facing operator.
- (v) Loosen the three screws securing the control box lid, and open the lid to full extent.
- (vi) Disconnect the leads from the terminal strip, carefully noting the colour coding of leads for re-assembly.
- (vii) Slacken the four studs on the rear-end bell of capstan motor until free of thread in chassis panel.
- (viii) Note the position of the motor leads in relation to the deck as they provide an indication of the motor location, and ensure that the motor is positioned for minimum inductive noise.
- (ix) Support the motor with both hands and ease it out gently. Careful handling is necessary to avoid possible damage to the capstan.

NOTE: If motor is to be forwarded for repair, fit four 5/32" Whitworth nuts to the motor studs to hold the end-bells in place during transit.

### 4.13 CAPSTAN MOTOR RE-FITTING

In re-fitting the capstan motor, the foregoing procedure is reversed. The utmost care should be taken that the capstan does not at any time foul the capstan shield. It is also important that the weight of the motor should not be taken by the motor shaft or capstan.

### 4.14 SPOOLING MOTORS REMOVAL

- (i) Remove the front cover panel as described in para. 4.1.

- (ii) From the front of the unit, disconnect the two leads to the condenser and the two leads to terminal panel. (Note and code tag the leads for re-assembly.)
- (iii) Remove the brake shoe and brake drum as described in para. 4.2.
- (iv) Slacken the four securing studs on the rear end-bell of the motor until the motor is free.

NOTE: The four aluminium posts surrounding the brake drum serve also as securing nuts for the studs holding the motor to the chassis, and may drop free.

When replacing, it is important that the small diameter post be placed at the lower position, toward the centre of the machine. (This forms the brake shoe pivot.)

### 4.15 SPOOLING MOTORS — RE-FITTING

Re-fitting is a reversal of the foregoing procedure, but the remarks relating to Brake Servicing and Adjustment, Para. 4.2, should be noted.

### 4.16 HEAD ASSEMBLY

The Head Assembly is attached to the 1/8" aluminium chassis by a 5/32" Whitworth screw through the body of the head block moulding, which has a spigot to prevent rotation.

### 4.17 HEAD BLOCK REMOVAL

- (i) Disconnect the twin-shielded lead from the "Head Outlet" socket.
- (ii) Free the shielded lead from under the holding clip.
- (iii) Unscrew the 5/32" screw holding the head block to the chassis and lift the head block clear.

### 4.18 CLEANING OF HEAD

Dust and ferrous powder is best removed by a denture, or similar stiff-bristle, brush. Where caked accumulations occur, they are usually caused by the particles adhering to smears of adhesive from cellulose tape. For this reason it is not good policy to use other than a correct splicing tape when making joints.

Accumulations not readily removable by brushing can usually be cleared by the use of Acetone, lacquer thinners, or similar solvents, on a piece of clean rag or absorbent cotton. Solvents of this nature should be used very sparingly and NEVER in the vicinity of a naked flame or spark of any nature.

### 4.19 HEAD BLOCK REPLACEMENT

Before fitting, make sure that the tape track is clean and that the head is locked in line. Screw the head block down, making sure that the locating spigot is properly seated in its receiving hole in the 1/8" base plate or chassis.

Connect the leads, check operation and adjust the azimuth setting of the "Replay" head. (See Section 5.)

## SECTION 5 — AZIMUTH ADJUSTMENT

The Replay Head is locked into the head block with a 5/64" socket-head locking screw at the rear of the head. This screw must be slackened slightly before turning the head with the Azimuth Adjusting Tool.

### 5.1 EQUIPMENT REQUIRED

- (i) Standard Azimuth Alignment Tape.
- (ii) Azimuth Adjusting Tool.
- (iii) 5/64" hexagon key.

### 5.2 ADJUSTMENT PROCEDURE

- (i) Load the Azimuth Alignment tape on to the machine and press the PLAY button.
- (ii) Slacken the head locking screw slightly.
- (iii) Insert the Azimuth Alignment tool into the holes provided on the head, and turn the head slightly in either direction to achieve maximum output meter reading from the 10 kc tone on the tape.
- (iv) When maximum reading has been obtained, re-tighten the locking screw, being careful not to alter the Azimuth setting whilst so doing. Observe the meter reading as a check of this.
- (v) Re-wind Alignment tape and remove from machine.

## SECTION 6 — ELECTRONIC MAINTENANCE

### 6.1 GENERAL

Electronic maintenance should consist of a periodic check of voltages as indicated on the circuit diagrams, and other routine checks of valves, etc., as normally applied to all electronic units.

All faults in the electronic assembly will be found to be of a conventional nature, and should be treated as such, subject to a performance check of the circuit or circuits involved with the faulty component.

### 6.2 FAULTS

Faults in the electrical system of the Tape Transport will be normally confined to —

- (i) Dirty or poorly-operating contacts.
- (ii) Faulty motor windings.
- (iii) Defective motor condensers.

### 6.3 SERVICE PROCEDURE

Service in these instances will consist of:—

- (i) Cleaning and/or correctly setting operating pressures as dealt with in Section 4, Para. 4.5.
- (ii) Replacement of faulty parts.

# SECTION 7—TROUBLE-SHOOTING CHART

## MODEL 33B MK. II SERIES

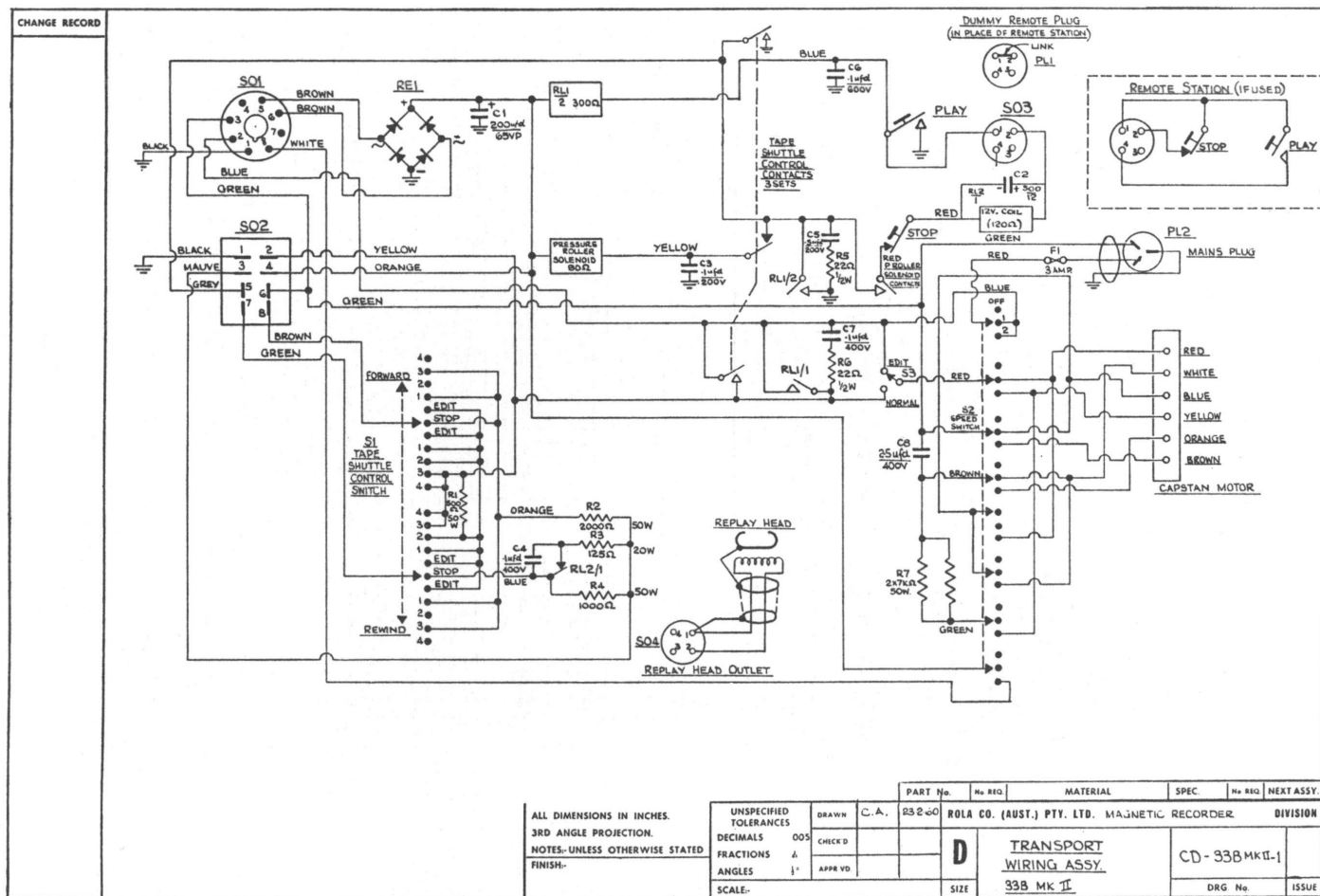
TROUBLE	POSSIBLE FAULT	REMEDY
*Wow on beginning or end of tape.	(i) Low pressure roller tension.	Adjust as described in Section 4, Para. 4.6, under heading "Mal-adjustment of pressure roller and associated movements".
	(ii) Binding in supply motor.	Check bearings and securing screws.
	(iii) Brake shoe not clearing brake drum on supply motor.	See Section 4, Para. 4.2, "Brake servicing".
	(iv) Oil on capstan.	Clean with industrial solvent.
General Wow.	(i) As stated above.	As stated above.
	(ii) Dirty or worn pressure roller.	Clean or replace as necessary.
	(iii) Worn and binding timing roller.	Clean or replace as necessary.
†High Flutter.	Generally faulty capstan motor.	Return to factory for repair.
NON-OPERATION		
(a) Complete failure of unit.	Blown fuse on rear of control box.	Replace fuse—if replacement fuse also blows, check for shorts under front cover panel and inside the control box at rear.
(b) Amplifier only operating.	(i) Dirty or maladjusted contacts.	See Section 4, Para. 4.5, "Adjustment of contacts".
	(ii) Faulty solenoid coil.	Replace with new unit.
	(iii) Faulty 200 $\mu$ F condenser.	Replace with new unit.
	(iv) Play button permanently open.	Check contact adjustment.
(c) Deck only operating.	(i) Blown fuse amplifier.	Replace fuse—if replacement fails, check for shorts in amplifier high-tension circuits.
	(ii) Faulty valves.	Replace and check circuit voltages.
(d) Deck operates when play button pressed but will not hold in.	(i) Permanently open stop button.	Check contacts adjustment.
	(ii) Open circuit coil RL2.	Replace with new unit.
	(iii) Dirty contacts RL1/2, or pressure roller solenoid.	See Section 4, Para. 4.5, "Adjustment of contacts".

\*"Wow"—The term applied undesired frequency deviations occurring at frequencies below 10 to 20 cps.

†Flutter—Same as described under "Wow", but above 20 cps.

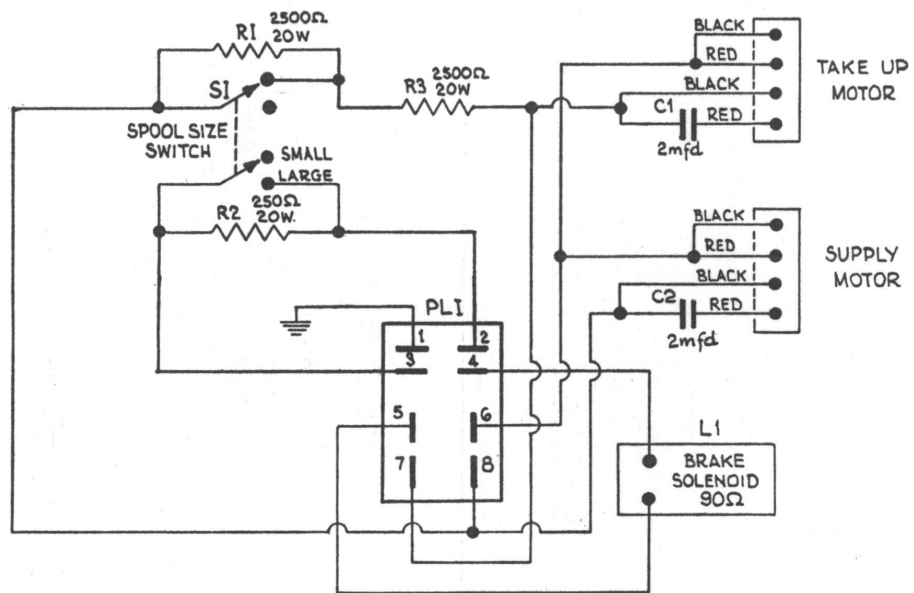
TROUBLE	POSSIBLE FAULT	REMEDY
Pressure roller tension on capstan inadequate.	(i) Tape lift arm fouling in recess in head block. (ii) Slackness in mechanical linkages (a) Solenoid frame has rotated slightly. (b) Armature fixing screws loosened. (iii) Capstan motor bearing housing(s) has slackened, allowing capstan to move sideways. (iv) Dirty pressure roller or capstan. (v) Worn pressure roller.	Straighten tape lift arm until clearance is obtained.  Re-position and lock in place.  Tighten screws and lock them.  Return motor to factory for repair.  Clean with Carbon-tetrachloride.  Replace with new unit.
Does not play L.P. tapes.	(i) Worn pressure roller. (ii) Excessive take-up torque.	Replace with new unit.  Check RL2 for correct operation.
Capstan motor runs though not switched to edit.	Faulty spark quench condenser C7.	Replace with new unit.
On replacement of transport front panel, timing indicator does not operate.	Indicator escutcheon not correctly centred, and glass fouling pointer.	Loosen panel screws, carefully centre escutcheon and re-tighten screws.
Faulty frequency response.	(i) Equalizer relay contacts. (ii) Faulty equalizer relay coil.	See Section 4, Para. 4.5, "Adjustment of contacts".  Replace with new unit.

## Section 7 — MODEL 33B





Section 7 — MODEL 33B



ALL DIMENSIONS IN INCHES.

3<sup>rd</sup> ANGLE PROJECTION.

NOTES:- UNLESS OTHERWISE STATED

FINISH:-

PART No.		No. REQ.	MATERIAL	SPEC.	No. REQ.	NEXT ASSY.
20-1-60			ROLA CO. (AUST.) PTY. LTD. MAGNETIC RECORDER			DIVISION
E			SPOOLING MECHANISM.			
SIZE			'33B' MK II			
SCALE:-					DRG. No.	ISSUE
UNSPECIFIED TOLERANCES		DRAWN	C.A.			
DECIMALS	± .005	CHECK'D				
FRACTIONS	± 1/24	APPR'VD.				
ANGLES	± 1°					

PL1  
RELAY HEAD  
PLUG

J1  
TEST INPUT

J2  
TEST INPUT

PL2  
POWER PLUG

PL3  
PLUG SUPPLY

TEST OUTPUT

TEST LINE  
OUT PUT

NOTE  
COMPONENTS MARKED \* MAY BE  
ADJUSTED IN FINAL ASSY

ALL DIMENSIONS IN INCHES  
1st ANGLE PROJECTION  
NOTES-UNLESS OTHERWISE STATED  
FINISH:

UNSPECIFIED TOLERANCES  
DECIMALS - .000  
FRACTIONS - 32  
ANGLES - 1°  
SCALE -

DRAWN  
CHECKED  
APPROVED

PART No. 15-240  
MATERIAL  
SPEC  
QTY  
TEST AS

ROLL CO. (AUST.) PVT. LTD. MAGNETIC RECORDER DIVISION

AMPLIFIER  
-SIGNAL-  
338 VARI-2

CD-338V-2

DWG No.