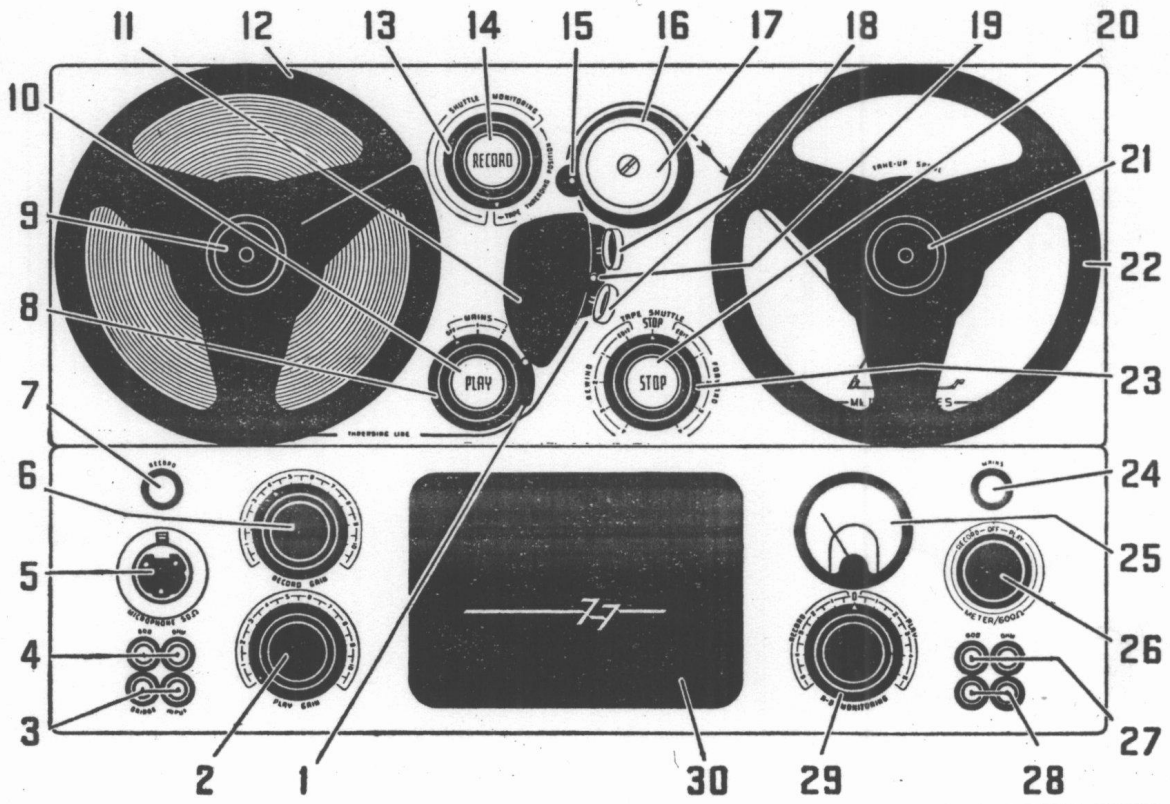
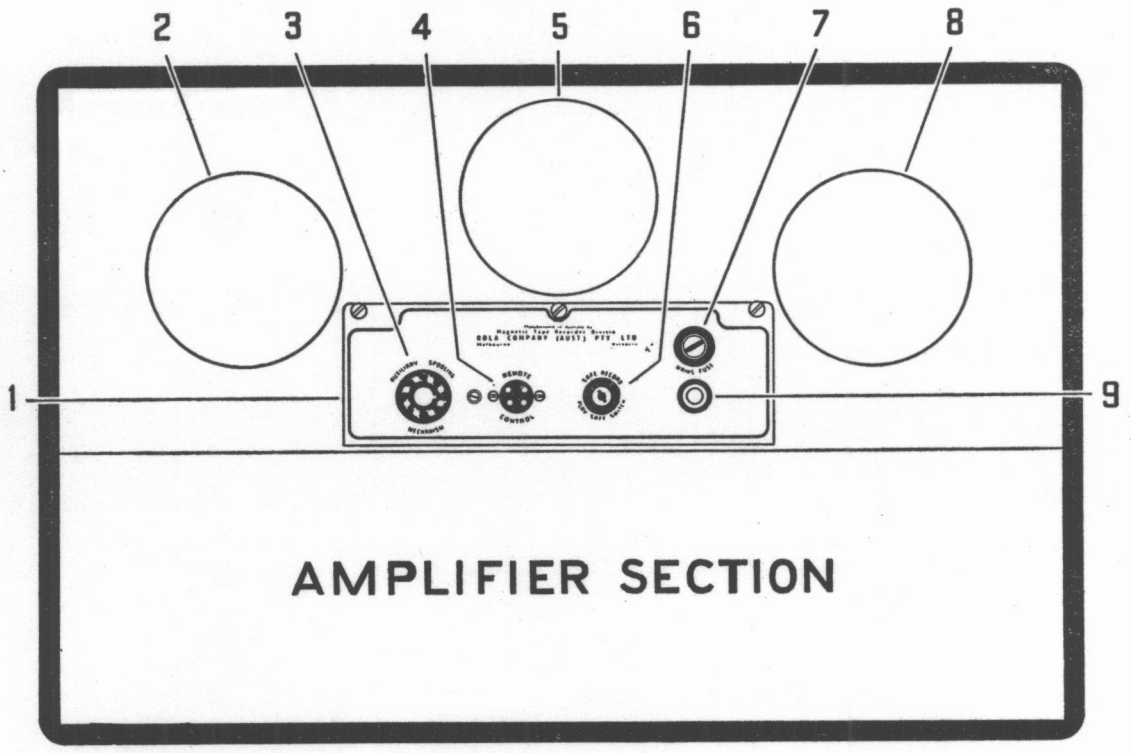
1. TAPE OVER-RUN SWITCH
2. PLAY GAIN
3. BALANCED BRIDGE INPUT
4. 600 OHMS ZERO LEVEL INPUT
5. MICROPHONE INPUT
6. RECORD GAIN
7. "RECORD" INDICATOR
8. MAINS SWITCH AND SPEED EQUALISER CHANGE
9. SPOOL CAP
10. "PLAY" PRESS BUTTON
11. TRIPLE HEAD ASSEMBLY
12. SUPPLY REEL
13. SHUTTLE MONITOR
14. "RECORD" PRESS BUTTON
15. CAPSTAN
16. PRESSURE ROLLER
17. COVER PLATE
18. HEAD SHIELDS
19. TAPE LIFT PIN
20. "STOP" PRESS BUTTON
21. SPOOL CAP



22. TAKE-UP SPOOL
23. TAPE SHUTTLE CONTROL
24. "MAINS" INDICATOR
25. VU METER
26. METER/600 OHMS LINE SWITCH
27. 600 OHMS ZERO LEVEL OUTPUT
28. EXTERNAL SPEAKER OUTPUT
29. A.B. MONITOR CONTROL
30. MONITOR SPEAKER

1. CONTROL BOX
2. TAKE-UP MOTOR
3. AUXILIARY SPOOLING MECHANISM SOCKET
4. REMOTE CONTROL SOCKET
5. CAPSTAN MOTOR
6. PLAY-SAFE SWITCH
7. MAINS FUSE
8. SUPPLY MOTOR
9. RECORD BIAS ADJUSTMENT SCREW



MODEL "77"

PROFESSIONAL PORTABLE MAGNETIC TAPE RECORDER

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INTRODUCTION

The purpose of this booklet is to give the necessary information required for the successful operation of the Rola "77" Magnetic Tape Recorder.

To the professional recordist or to those experienced in the use of recording equipment, some of the instructions will appear superfluous, but the layman operator will find the contents helpful until such time as he becomes conversant with the instrument.

The Model "77" is normally composed of two units contained in a single carrying case — the Tape Transport Mechanism and the Amplifier. The two units are interconnected by flexible leads for operation as a complete tape recording and reproducing system.

GENERAL DESCRIPTION

HEAD ASSEMBLY:

The Rola "77" is fitted with three separate heads mounted in a single head block assembly, i.e., Erase, Record and Play.

For optimum results, correct **Azimuth Setting** or **Head Gap Alignment** is essential in both the RECORD and the PLAY heads, but as this adjustment has been carefully made to international standards during manufacture, the **SETTING SHOULD NOT BE ALTERED** unless absolutely necessary, and then only the PLAY Head should be adjusted.

Head Demagnetiser: After a period of time, the PLAY Head may, under certain conditions, become magnetised. This condition is indicated by a surface noise similar to needle scratch in disc playing equipment, and to remedy the defect an inexpensive "Head Demagnetiser" is available as an accessory.

Should it become necessary to alter the Azimuth Setting of the PLAY Head to compensate for tapes recorded on machines with an incorrect Azimuth Setting, this adjustment can be carried out with the "Azimuth Adjusting Tool," which is available as an accessory.

CONTROL PANEL:

The Control Panel at the rear of the Tape Transport Mechanism mounts the following facilities:—

A.C. Mains Fuse: This fuse can be removed for renewal or inspection by unscrewing the solid bakelite cap in an anti-clockwise direction and withdrawing the glass fuse container.

Play/Safe Switch: This switch is fitted as a safety device for protection against accidental erasure of tape. When the key is switched to the SAFE position and, if necessary, removed, the machine will operate only as a PLAY unit and **WILL NOT RECORD OR ERASE.**

Remote Control Socket: The machine may be operated remotely by means of the "START/STOP REMOTE CONTROL MECHANISM" available as an accessory.

A further control — REWIND REMOTE CONTROL MECHANISM — is also available, but to permit its use, minor modifications to the machine become necessary. This unit incorporates three press buttons — one to start, one to stop and one to rewind.

Auxiliary Spooling Mechanism Socket: To enable the Model "77" to be used with 10½ in. NAB Spools, a separate accessory — AUXILIARY SPOOLING MECHANISM — is available. This is a fully motorised unit which mounts above the Tape Transport Panel and plugs directly into the appropriate socket on the Control Box, thus transferring the power from the normal spooling motors to the heavy duty motors fitted to this deck.

SPOOLS:

The use of 7 in. NARTB Type Spools is strongly recommended. This spool, made in Australia exclusively by "Rola," has been developed by professional users as the most satisfactory for all purposes, and minimises the effects of varying tension ratios between a full and an empty spool. Its design follows very closely the external and hub diameters of the NAB professional spool.

OPERATING INSTRUCTIONS

Before attempting to operate, read these instructions carefully and check the mains supply voltage against the specification plate on rear panel of Tape Transport.

PREPARING FOR OPERATION:

1. With the recorder in an upright position, release the fasteners and open REAR cover to full extent, ensuring that the stays are in the locked position.
2. Tilt back the recorder until the rear cover supports the machine.
3. Remove the front cover.
4. Plug the mains lead into the A.C. mains supply and switch on at power point. Switch the MAINS switch to position 1 (Low Speed Operation) or position 2 (High Speed Operation). When the MAINS switch is set at positions 1 or 2 the bezel lamp marked MAINS on the amplifier panel should glow.
5. Load reel of tape on to SUPPLY REEL spindle (left), and thread tape as indicated by THREADING LINE, ensuring that the tape is wound on to both spools with the oxide coating (dull surface) to the inside.
6. Power to the Tape Transport is controlled by the MAINS and SPEED CHANGE switch on the front panel.
   The MAINS switch turned to position No. 1 selects the lower speed and to position No. 2, the higher speed.
   Equalisation is automatically switched with capstan motor speed.

SAFETY INTERLOCK SYSTEM:

The following are points to be watched when operating the machine:—

YOU CANNOT:

(a) Record with PLAY-SAFE Key in Safe;
(b) Record or Play unless TAPE SHUTTLE is set to STOP.
(c) Maintain operation unless the tape is threaded.

In addition, the movement of the TAPE SHUTTLE control whilst the machine is running will automatically stop the operation.

FAST FORWARD AND REWIND:

Fast Forward and Rewind operations are accomplished by means of the TAPE SHUTTLE.

Turned to the right for FAST FORWARD and to the left for FAST REWIND, the speed of these operations is progressively vari-

able in Positions 1, 2, 3 or 4, in either direction. However, to overcome spool inertia it is desirable to turn the 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, and at this speed 1,200 ft. of tape can be transferred from one spool to the other in 50 seconds.

The EDIT position is explained in the Paragraph headed "SHUTTLE MONITORING."

Because of the safety interlocking system the TAPE SHUTTLE control must be set to STOP before the record or play functions can be operated. It must be remembered also that the movement of this control during record or play will automatically stop the machine.

TAPE OVER-RUN SWITCH:

Situated immediately beneath the head block assembly is a safety device which, unless held closed by the pressure of tape passing over it, will not allow the machine to maintain operation. Therefore, should no tape be threaded on the machine or, in shuttling, should the tape over-run and all be wound in error from either spool, or should the tape between the capstan and the supply reel be interfered with in any way, the tape over-run switch will automatically stop the machine.

SHUTTLE MONITORING:

This control is used in conjunction with the TAPE SHUTTLE; turning the 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 either direction.

NOTE.—After locating the position required, return the SHUTTLE MONITOR control to the TAPE THREADING POSITION, as constant shuttling with the tape in contact with the PLAY and RECORD heads will cause them to wear at an excessive rate.

TAPE THREADING:

When threading (loading) a tape on to the machine, rotate the SHUTTLE MONITOR control to the TAPE THREADING position to move the pressure roller away from the capstan and the head shield away from the PLAY head, as well as to bring the tape lift pin from its recess in the head block. Although this is not absolutely essential for the threading of the tape, it is recommended in order to simplify this operation.

As mentioned earlier it is necessary for the tape, when threaded, to hold the over-run switch OPEN. It is therefore important that when threading, the tape passes over the TOP of the switch actuating arm, and to facilitate threading at this point a small solenoid is incorporated which will hold the arm in its "down" position whilst threading is effected. It will remain down until such time as the machine is operated, after which the switch is held open by tape tension on the actuating arm.

Thus with Shuttle Monitor control at "Tape Threading Position" and the Over-Run switch fully open, it will be observed that there is a clear tape path round the guide roller, over the TOP of the over-run switch, round the Triple head assembly between the Tape Lift Pin and the Head Shields, between Capstan and Pressure Roller, around the last named and across on to the Take-up spool.

This method of loading has been termed "Wrap-Round Tape Threading," and is noted for its simplicity.

V.U. METER:

Visual indication for level control is by means of a V.U. Meter. Correct audio level is obtained by operating the appropriate GAIN CONTROL until the pointer deflects to the zero marking on the scale on "peaks" or loud passages only. An **occasional** movement into the red section of the scale is not harmful, but consistent deflection in this manner should be avoided.

RECORDING:

1. Move speed change control to required tape speed. This control is a three-position switch, the extreme left position being, as marked, OFF, Position 1 permitting 7½ in. per second operation and Position 2 15 in. per second operation.

2. Apply a suitable signal to the amplifier by connecting:—

(a) A low impedance microphone (50 ohms) equipped with the appropriate input connector to the microphone input socket.

(b) A zero level unterminated 600 ohm line into the upper twin jacks of the inputs section.

(c) A zero level terminated 600 ohms source into the lower twin jacks of the inputs section.

3. Press "Record" button; the record indicator will glow and the tape transport mechanism will operate.

4. Adjust recording level with the RECORD GAIN control. The V.U. Meter, switched to the record channel by means of the Meter/600 ohm switch, will indicate the programme material in proportion to the magnitude of applied signal modulation. With the meter/600 ohms switch in this position the 600 ohm line output is bridged across the Record channel. Recording level should be adjusted so that average peaks will indicate Zero V.U. on the meter scale.

5. Adjust A-B monitoring control to required monitor listening level, selecting either the input signal or, alternatively, that from the replay channel. This latter signal is taken from the replay head and reproduces material recorded on the tape. Direct comparison between input signal and recorded signal can be achieved by oscillating the monitor control to either side of the central position.

Headphones (with single jack) inserted in one of the monitor sockets will automatically mute the monitor speaker. Alternatively, a standard P.M.G. type twin jack may be used.

PLAYING:

Assuming the machine to be made ready for operation and the speed change control set to the required tape speed, press the "PLAY" button and the transport mechanism will operate. The meter/600 ohms switch should be positioned on the play channel and the PLAY GAIN control adjusted for required play level. The "A-B MONITORING" control may be adjusted for required monitoring level of replay signal. This latter function is quite independent of the play gain control setting.

Headphones or an external Monitor Speaker can be inserted in the external speaker socket/s for monitoring purposes.

In the Model "77" it is possible to switch from PLAY to RECORD and vice versa merely by pressing either button and without any pause in tape motion. As there are no clicks or electrical noises recorded on to the tape, unlimited scope is available for editing and word or sentence "drop in."

EDITING:

On the Rola "77" editing is rendered extremely simple by the controls provided for this purpose. The TAPE SHUTTLE and SHUTTLE MONITOR controls permit rapid location of any desired position on the tape which, once selected, can be marked on the tape (over the PLAY head) by means of a "Chinagraph" or similar pencil, after gently pulling down the head shield.

It should be borne in mind that tape recorded with double tracks cannot be cut successfully, as the cuts made from one track will also affect the other track.

Unwanted sounds and passages may be cut out with scissors and the tape rejoined as outlined in the following paragraph headed "Splicing."

SPLICING:

To re-join tape cut in editing, lay one end of the tape on top of the other to give an over-lap of approximately ½ in., ensuring that the oxide coating on both ends is facing in the same direction. Cut through the tape ends with scissors at an angle of 45°. Remove

loose pieces and butt join the ends with special Splicing Tape applied to the shiny (uncoated) side of the recording tape, trimming off the surplus splicing tape with scissors.

ERASING:

Erasure is effected automatically whilst recording. A recorded tape or any portion of it may be erased without a new signal being recorded by running it through the machine in the RECORD function with the RECORD GAIN CONTROL set to its minimum.

BIAS ADJUSTMENT:

The Bias control is initially set at the factory to suit the majority of generally available high-quality tapes. However, it may be re-adjusted to obtain peak performance from any particular type of tape it is desired to use.

The adjustment procedure is as follows:—

Set the panel meter switch to "RECORD" and feed a 400 c.p.s. signal from an oscillator to the input of the "Record" amplifier. Adjust the "Record Gain" control to give a reading of -7 VU on the panel meter.

Start the machine recording at a speed of 7½ i.p.s. on the selected tape. Switch the VU meter to "PLAY" and turn the bias control to its maximum anti-clockwise position. Next, slowly turn the bias control clockwise until peak output is indicated on the VU meter. The setting which gives peak output is the correct one for the particular tape being used.

ROLA

MODEL "77"

PROFESSIONAL PORTABLE MAGNETIC TAPE RECORDER

SPECIFICATIONS:

OPERATING METHOD:

Press Button—electro mechanical interlock.

TAPE SPEEDS:

7½ in. and 15 in. per second.

SPOOL SIZE:

NARTB 7 in. O.D. by 2¾ in. Hub (10½ in. NAB with auxiliary spooling mechanism fitted).

TAPE DRIVE:

Three Motors — Capstan directly driven by synchronous dual speed drive motor with integral fly wheel. Take-up and rewind by separate high torque induction motors.

TIMING ACCURACY:

± 0.1% (± 1.8 seconds in 30 minutes).

STARTING AND STOPPING TIME:

Instantaneous.

FAST FORWARD AND REWIND TIME:

50 seconds for 1,200 ft. reel.

FLUTTER AND WOW:

Better than 0.2% at 7½ in. per second.
0.15% at 15 in. per second.

BIAS FREQUENCY:

55 Kc.

HEADS:

Separate Erase, Record and Play Heads.

DISTORTION:

Record — Less than 1% (from 600 ohm input).
Play — Less than 1% (for zero level out — i.e., + 8 dbm).
All measurements at 1,000 c.p.s.

FREQUENCY RESPONSE:

At 7½ in. per second:
40 to 10,000 cps. ± 2 db.
30 to 14,000 cps. ± 4 db.

At 15 in. per second:
40 to 15,000 cps. ± 2 db.
30 to 18,000 cps. ± 4 db.

SIGNAL TO NOISE RATIO:

Not less than 52 db below 2% T.H.D. level.

INPUTS:

Balanced 600 ohms.
Balanced Bridge In.
50 ohm Microphone.

OUTPUTS:

Balanced 600 ohms.
Unbalanced 3.5 ohms (for monitor purposes only).

METERING:

V.U. Meter.

POWER OUTPUT:

To 600 ohms line — greater than plus 18 dbm at less than 1% distortion.
To Monitor Speaker — 2 Watts at 2.5% distortion.

POWER REQUIREMENTS:

210 to 250 Volts A.C. 50 cycle.

POWER CONSUMPTION:

150 Watts.

WEIGHT:

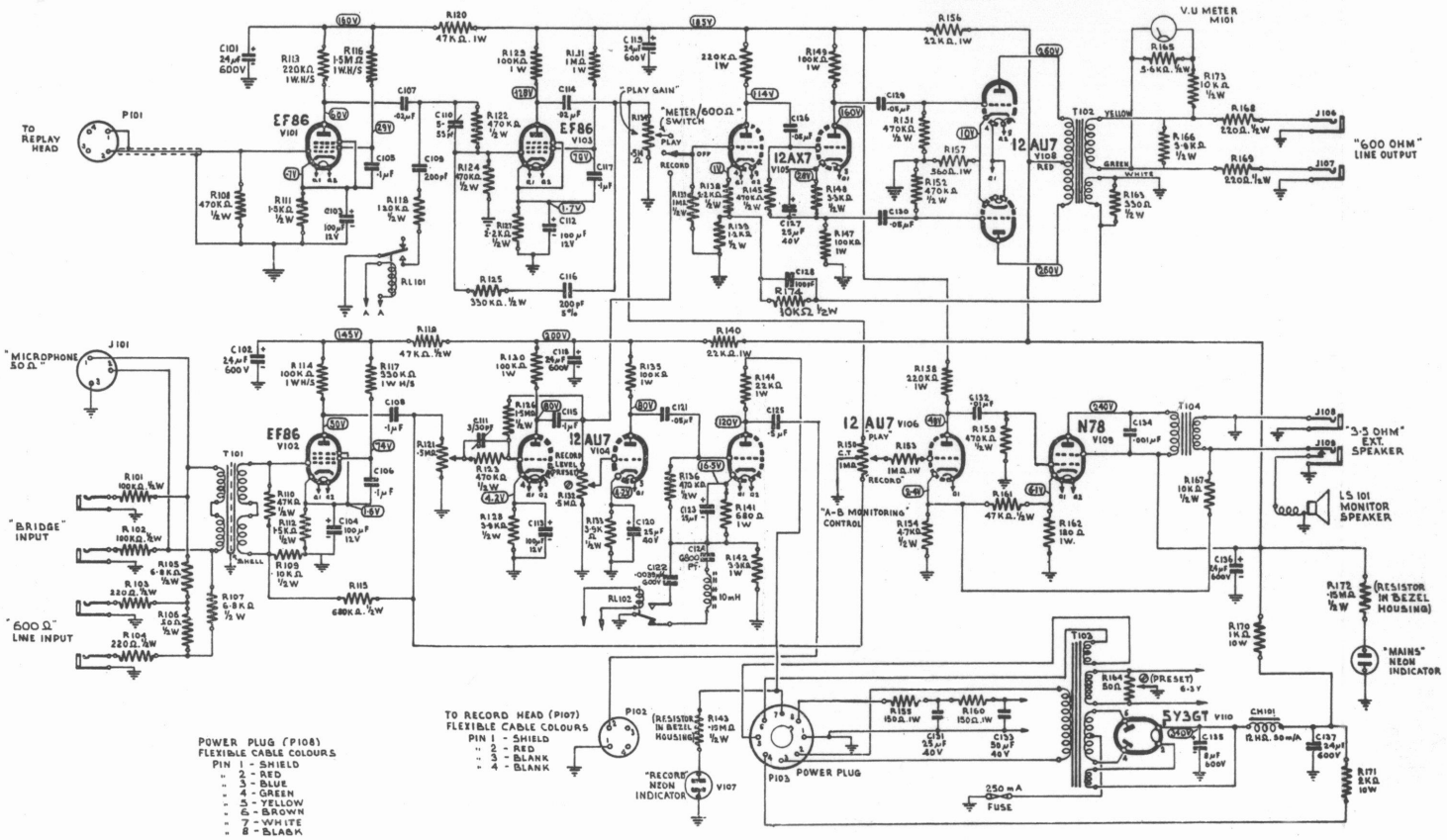
47 lbs.

DIMENSIONS:

Panel Size — Tape Transport 19 in. x 7 in. Amplifier 19 in. x 5¼ in.
Case (Overall) — 20¼ in. x 14 in. x 7½ in.

Magnetic Tape Recorder Division
ROLA COMPANY (AUST.) PTY. LTD.
The Boulevard, Richmond, E.1, Victoria, Australia. JB 3921

CIRCUIT DIAGRAMS

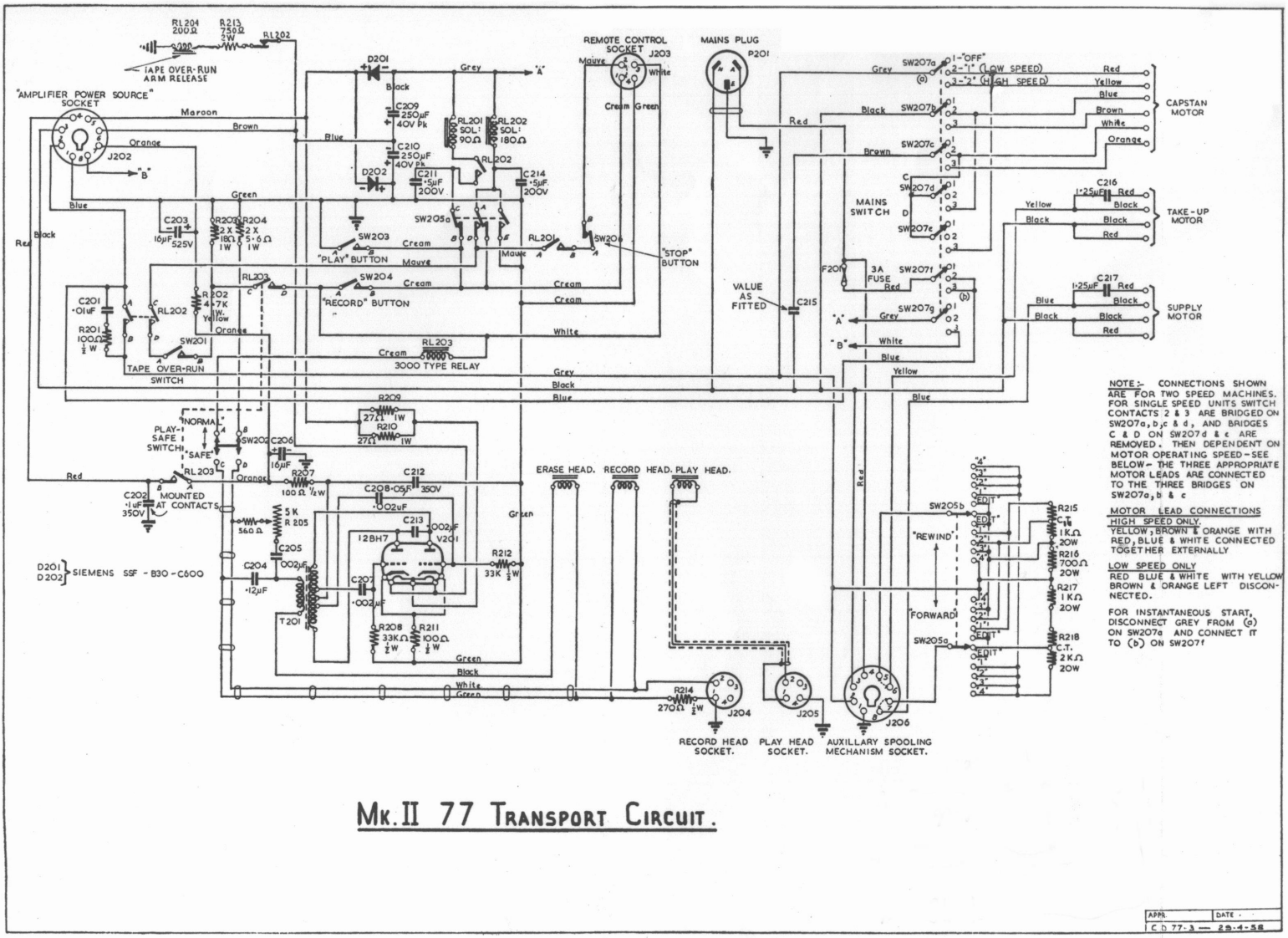


MODIFICATION "A".

INDEX	VALUES
R173	10KΩ WAS 11 KΩ
C124	6800 PFD WAS 0·0039 MFD.
C122	0·0039 MFD. WAS 6800 PFD.

"77" AMPLIFIER CIRCUIT.

APPR. A.H. DATE 5-6-58
C.D. 77-4 — 2-5-58



NOTE:- CONNECTIONS SHOWN ARE FOR TWO SPEED MACHINES. FOR SINGLE SPEED UNITS SWITCH CONTACTS 2 & 3 ARE BRIDGED ON SW207a, b, c & d, AND BRIDGES C & D ON SW207d & e ARE REMOVED. THEN DEPENDENT ON MOTOR OPERATING SPEED - SEE BELOW - THE THREE APPROPRIATE MOTOR LEADS ARE CONNECTED TO THE THREE BRIDGES ON SW207a, b & c

MOTOR LEAD CONNECTIONS

HIGH SPEED ONLY.
YELLOW, BROWN & ORANGE WITH RED, BLUE & WHITE CONNECTED TOGETHER EXTERNALLY

LOW SPEED ONLY
RED BLUE & WHITE WITH YELLOW BROWN & ORANGE LEFT DISCONNECTED.

FOR INSTANTANEOUS START, DISCONNECT GREY FROM (a) ON SW207a AND CONNECT IT TO (b) ON SW207f

MK. II 77 TRANSPORT CIRCUIT.

APPR.	DATE
ICD 77-3 —	29-4-58