

INSTRUCTION MANUAL



BYER INDUSTRIES PTY. LTD.
DORCAS STREET, SOUTH MELBOURNE. VICTORIA - AUSTRALIA

BYER "77" - INSTRUCTION MANUAL

ADDITIONAL OPERATING NOTES

Since printing this manual, modifications and additional features have been incorporated into the Byer "77", and the following additional notes on operation should be read in conjunction with the paragraphs referred to.

SECTION "B". Third paragraph on second page.

In addition to the V.U. meter's secondary function of indicating bias level, and cathode current of the various tubes, it will indicate A.C. line voltage and D.C. high tension voltage when the meter switch is moved to the appropriate position.

See Amendment below, referring to Section "E", paragraph (III) for further details.

SECTION "D". Paragraphs (III) and (V).

During rewinding or fast forward spooling it is not now necessary to push "STOP" button if a rapid change of direction is required. Thus shuttling between rewind and fast forward is permissible.

SECTION "D". Delete note at end of section:

When it is required to use the amplifier unit as an audio amplifier only, the amplifier should not be disconnected from the tape drive unit.

SECTION "E". Paragraph III. Add to table:-

Meter Switch Position	Signal Input	Function Switch Position	Gain Control	Meter Indication
D.C.	None	RECORD	OFF	75 \pm 20%
A.C.	Adjust mains input voltage selection switch (See Section "D") to position which brings meter pointer nearest to zero.			

ERRATUM:

SECTION "B". Paragraph five.

Amend "40 ohm Mike Input (-60 dbm average level)", to read -

"50 ohm Mike Input (-60 dbm average level)".

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SECTION "D" - (Paragraph 1)

It is IMPORTANT that the A.C. mains switch on the amplifier front panel be turned 'OFF' before moving input voltage selection switch.

REMOTE CONTROL:

All machines are now fitted with Remote Control facilities, the socket being located at the rear of the Control Box. This provides only for 'STOP' and 'START', not spooling.

EDIT SWITCH:

The 'Edit Switch' located at the rear of the Control Box is incorporated to facilitate editing, cueing and dubbing of tapes. With the switch in 'Edit' position, the capstan motor runs continuously, providing an instantaneous start.

Under normal conditions, however, the machine should always be operated with the switch in the normal (downward) position.

A.C. MAINS SWITCH:

The diagram of the amplifier shows the A.C. Mains switch as being 'ON' when in the upward position. This was correct for earlier models, but is now reversed and 'ON' is the DOWNWARD position of the switch.

D.C. FUSE:

Originally the D.C. fuse was located under the amplifier chassis in close proximity to the power transformer. This has been changed and both A.C. and D.C. fuses are now located on the front panel right-hand side.

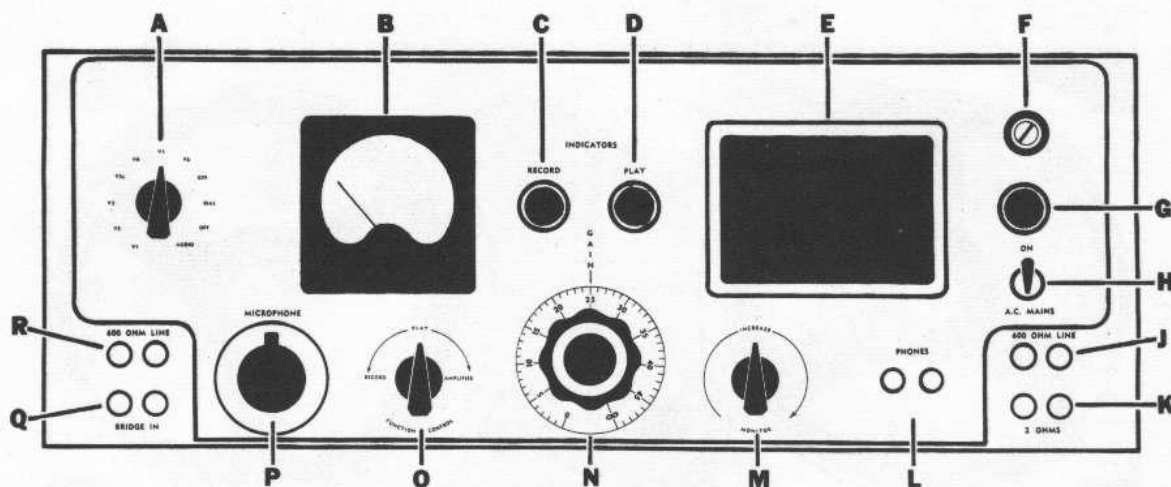
BYER "77"

PROFESSIONAL TAPE RECORDER

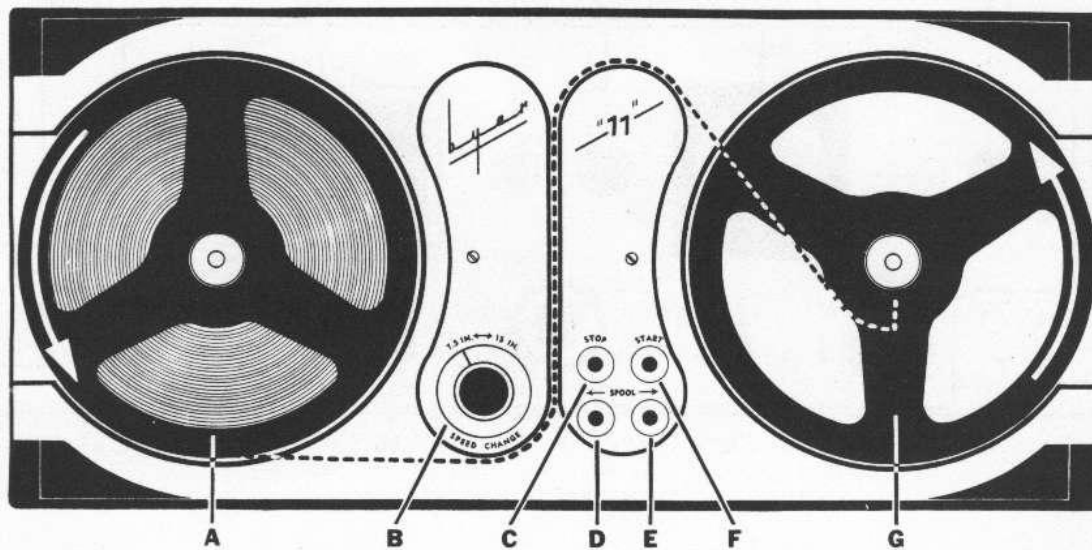
INSTRUCTION MANUAL

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- A - Meter Switch
- B - Meter
- C - "Record" Indicator Lamp
- D - "Play" Indicator Lamp
- E - Monitor Speaker
- F - Fuseholder
- G - Mains On Indicator Lamp
- H - Mains Switch
- J - 600-ohm Output
- K - 2-ohm Output
- L - Phones Jack
- M - Monitor Volume Control
- N - Gain Control
- O - Function Control
- P - 50-ohm Mike Input
- Q - 600-ohm Bridging Input
- R - 600-ohm Zero Input



- A - Supply Spool
- B - Speed Change Control
- C - "STOP" Button
- D - "SPOOL" (Rewind) Button
- E - "SPOOL" (Fast Forward) Button
- F - "START" Button
- G - Takeup Spool

SECTION "A"

BYER "77"

The Byer "77" is normally composed of two units contained in a single carrying case: the Tape Drive Unit and the Amplifier Unit. The two units are connected by cables for operation as a two speed tape recording and reproducing system, or, if desired, the amplifier unit may be used separately as an audio amplifier.

Three cables interconnect the tape drive unit and the amplifier unit.

- (i) Power and Control Cable.
- (ii) Replay Head Cable.
- (iii) Record and Erase Head Cable.

The 8-pin power and control cable plugs into the corresponding socket on the amplifier chassis and provides the tape drive unit with 230 volts A.C. for the three drive motors.

The 2-pin replay head cable connects the replay head to the input of the replay section of the amplifier. This plugs into the corresponding 2-pin socket on the amplifier chassis.

The 4-pin record and erase head cable connects

- (a) the record head to
 - (i) the recording section of the amplifier through the recording equalizer and
 - (ii) to the oscillator unit for bias supply
- (b) the erase head to the oscillator for erase supply.

This cable plugs into the corresponding 4-pin socket on the amplifier chassis.

Thus all power sources for the tape drive unit are derived from the amplifier unit.

The Byer "77" is normally connected for use on a power source of 200/250 volts A.C. (50 cycles) and requires the following amounts of power:-

At 240 Volts:

Motors running ("RECORD" position)	approx.	130 V.A.
" " ("PLAY" ")	"	130 V.A.
" " ("SPOOL" ")	"	113 V.A.
Amplifier only	"	56 V.A.

All parts used in the construction of the Byer "77" are either fabricated by the manufacturers or are the highest quality available from recognised electrical component manufacturers.

Tubes should be checked occasionally, and if a tube is suspected as a source of noise it should be replaced regardless of testing equipment indications.

Any other component replacements should be carried out by technically competent personnel.

Byer equipment is ruggedly constructed to withstand the requirements of studio and field use, and maintenance, therefore, will be of a minor nature. However, if either the tape drive unit or amplifier unit is damaged the recorder should be returned complete to the distributor from whom it was purchased for servicing.

In all communications referring to the equipment, the serial number and date of purchase should be stated.

GUARANTEE

The Byer "77" is guaranteed to be free from defects in material or labour (except components covered by other manufacturers' warranties) for a period of 90 days from date of purchase.

SECTION "B"

BYER "77" AMPLIFIER UNIT.

The Byer "77" amplifier is designed to provide the three separate functions of recording at two speeds (7½" and 15" per second) on the tape drive unit, reproducing recorded material at two speeds from the tape drive unit, and serving as a high quality audio amplifier.

The circuit variations necessary for the above functions are selectable through the Function Control.

The amplifier is housed in a P.V.C. fabric covered wooden carrying case, together with the tape drive unit, and is situated beneath the tape drive unit. The front of the carrying case is removable to give access to the various controls.

Four socket head screws in the corners of the front panel mount the unit in its portable carrying case. A hexagon key to fit mounting screws is supplied. This is secured by clips at rear of control housing. Location of the mounting holes conforms with P.M.G. Specification No. 724 to enable alternative rack mounting if required. Amplifier unit occupies four rack units.

The front panel contains the following items, reading from left to right (excluding the input and output panels in the left and right hand bottom corners of the main panel):

- Meter Switch
- 40 ohm Mike Input (-60 dbm average level)
- Meter
- Function Control
- Record Indicator Lamp
- Gain Control
- Play Indicator Lamp
- Monitor Volume Control
- Monitor Speaker
- Phones Jack
- Mains Fuse (3 amp)
- Mains Switch
- Mains on Indicator Lamp

Input Jacks (in bottom left hand corner)
(top pair) 600 ohms zero level (balanced)
(bottom pair) 600 ohms bridging input (balanced)

Output Jacks (in bottom right hand corner)

(top pair) 600 ohms balanced (+ 21 dbm peak level)

(bottom pair) 2 ohms (one side earthed)

The rear panel of the carrying case is hinged to allow withdrawal of the mains lead, to gain access to the tape drive unit, and to check interconnections between the two units. This compartment allows sufficient space to store a small microphone.

The rear edge of the amplifier chassis carries three sockets (viewed from rear of chassis and reading from left to right):-

Power and Control Cable Socket.

Record and Erase Head Cable Socket.

Replay Head Cable Socket.

A V.U. Meter is provided to read the audio levels during record and play and its operation for these functions is dependent upon the meter switch being turned to "AUDIO". The meter also performs the functions of a bias level indicator and a cathode current indicator for the various tubes. The meter may be switched off when its indications are not required.

Other features of the amplifier include a built-in monitor loudspeaker with a separate volume control for selection of speaker monitoring level during both record and play.

A phones jack is connected to the output of the replay preamplifier for headphone monitoring of the recorded signal whilst recording. On "play" the preamplifier is connected also to the final stages of the main amplifier to feed line, 2 ohm extension speaker and phones outlets. The gain control selects the required level for line and extension speaker output. No volume control is provided for headphone monitoring.

The maximum gain which can be realised from the amplifier input to the 600 ohm output termination is 91 db. The maximum output at the 2 ohm termination is 400 milliwatts. The undistorted power output to line is + 21 dbm. The frequency response is essentially flat from 40 - 15,000 cycles per second.

BYER "77" TAPE DRIVE UNIT

1. DESCRIPTION.

The Byer "77" Tape Drive Unit is a recording mechanism designed for use in combination with the Amplifier Unit described in Section "B". It consists of a three motor tape transport mechanism incorporating the following:-

- Supply and Takeup Spindles.
- Spoon Retaining Caps.
- Erase Head.
- Record Head.
- Replay Head.
- Capstan.
- Pressure Roller.
- Primary Tape Guide Roller.
- Recording Equalizers.
- Speed Change Control.
- Four push buttons controlling:

- Start
- Stop
- Spool (Fast Forward)
- Spool (Rewind)

Power for all three motors is supplied by the amplifier unit through the power and control cable.

Both spooling motors incorporate automatic servo and self adjusting brakes actuated by built-in solenoids. Braking is automatically applied on pushing the "STOP" button.

The two-speed capstan motor assembly is designed for 7½" and 15" per second tape speed, as selected by the Speed Change Control. This motor is equipped with a built-in flywheel, and is directly coupled to the capstan without intermediate idlers. An integral solenoid actuates the pressure roller and tape contact guide to transport the tape over the heads.

Four socket head screws in the corners of the front panel mount the unit in its portable carrying case. Location of the mounting holes conforms with P.M.G. Specification No. 724, to enable alternative rack mounting if required. The Tape Drive Unit occupies FIVE rack units.

Normal forward motion for either "RECORD" or "PLAY" (as selected by the amplifier function control) is brought into operation by the "START" button. This supplies power to the capstan motor and energises the pressure roller and tape contact guide solenoid to bring the tape into contact with the three heads and the capstan. It also supplies sufficient power to the takeup motor for normal forward spooling. In addition, the rewind motor is partially energised in a reverse direction to provide supply spool hold-back for optimum tape tension.

Fast forward spooling is actuated by the right hand "SPOOL" button. This applies full power to the takeup motor only. During this operation the rewind motor is allowed to rotate freely and the pressure roller and tape contact guide solenoid is not energised, thus allowing free, rapid movement of the tape in a forward direction.

Fast rewind spooling is actuated by the left hand "SPOOL" button. This applies full power to the rewind motor only. During this operation the takeup motor is allowed to rotate freely and the pressure roller and tape contact guide again remain in a neutral position.

The "STOP" button cancels any prior selected operation described above by disconnecting power from capstan motor and both spooling motors and applying braking to supply and takeup spindles.

The speed change control determines the operating speed of the capstan motor. The control is directly coupled to the recording equalizers to provide the correct pre-emphasis for the tape speed selected. Moving the control to the left selects the lower tape speed and its appropriate equalization. Moving the control to the right selects the higher tape speed and its appropriate equalization.

IMPORTANT. Turn mains switch "OFF"
when selecting tape speed.

The Byer "77" is primarily intended to use high coercivity recording tape.

SECTION "D"

BYER "77"

PROFESSIONAL TAPE RECORDER

OPERATING INSTRUCTIONS

CAUTION: The standard model is designed to operate over the range 200/250 volts A.C. (50 cycles) only. A toggle switch marked "210" and "240" is located through an aperture in the amplifier grille (adjacent to mains cable grip) and this should be moved to the appropriate position for the line voltage existing. The marked positions cover the following range:

<u>"210"</u>	<u>"240"</u>
200-220 volts	230-250 volts

Do not connect to any power source before determining that it is correct for the voltage selected.

WARNING: Disconnect A.C. power before touching any inside portion of either tape drive unit or amplifier unit.

I. PREPARING FOR OPERATION.

1. Remove hinged front cover of carrying case and set up the complete unit on a flat, firm surface, as free as possible from vibration. The Byer "77" may be operated in
 - (a) a vertical position with the rear cover open
 - or
 - (b) in an inclined position by securing the rear cover with the hinge stays and tilting the complete unit back on to the rear cover.
2. Withdraw mains lead from rear compartment and connect to power source.
3. Move mains switch to "ON" position. The mains indicator lamp will glow to signify that power is being supplied to the unit.

4. Remove bayonet type spool retaining cap from the takeup spindle and place an empty spool on the spindle. The spool will snap into position if slight pressure is applied near its centre, provided the spool register pins coincide with the slots radiating from the centre hole of a standard R.M.A. type "7" spool. Do not apply pressure further out than one inch from the spool centre hole or the spool sides may become warped.
5. Place a loaded reel of tape on the supply spindle. The reel should be oriented so that the tape will unwind as the reel rotates anti-clockwise. Tape should come off the bottom of the reel with the coated or dull side inwards. Replace both spool retaining caps.
6. Turn the supply reel anti-clockwise by hand so that approximately 18 inches of tape or leader unwinds.
7. Drop tape into threading slot to form path shown by dotted line in illustration of tape drive unit, i.e. under primary tape guide roller, through slot and over pressure roller. Threading through the slot is best carried out by grasping approximately 8" of tape between the thumb and forefinger of each hand. Hold the tape vertically with right hand uppermost so that tape is both taut and perfectly flat. Now slip tape into threading slot, maintaining tautness. Use bottom of left head cover as guide for left hand alignment, and top of right cover for right hand alignment. Ensure that tape is fed well down into slot.
8. Insert end of tape in slot inside takeup spool.
9. Rotate takeup spool anti-clockwise by hand until there are at least two full turns of tape on the spool. If recording tape is preceded by a leader, sufficient turns should be taken up until end of leader is beyond the pressure roller.
10. Rotate full supply reel to remove slack tape.

II. RECORDING.

1. Move speed change control to required tape speed. This control is a three position switch. Move control fully left for 7½" per second and fully right for 15" per second. Midway position is neutral.

IMPORTANT. Speed change control must not be operated whilst capstan motor is running. Push "STOP" button before changing speed.

2. Connect a suitable signal to the amplifier by plugging:-

- (a) a low impedance microphone (approximately 50 ohms) equipped with an appropriate plug (ABAC Type P3MS) into mike input socket,

OR

- (b) a zero level unterminated 600 ohm line into the upper twin jacks of input panel.

OR

- (c) a zero level terminated 600 ohm line into the lower twin jacks of input panel.

3. Turn function control to "RECORD". The record indicator lamp will glow to signify setting of function control.

NOTE: A safety measure is provided by the function control to guard against faulty handling and tape drive unit will stop if function control is moved to "REPLAY" or "AMPLIFIER" whilst recording. Accidental erasure whilst replaying is similarly guarded against.

4. Turn meter switch to "AUDIO" and adjust recording level with gain control. Turning the control clockwise increases amplifier gain. The V.U. meter pointer will follow the programme material in proportion to the magnitude of applied signal modulation. Recording level should be adjusted so that average level does not give a scale reading above zero position, although an occasional peak reading in excess of zero is permissible.

5. (a) Adjust monitor volume control to required level for speaker monitoring of incoming signal

AND/OR

- (b) Connect headset to phones jack for monitoring from replay head.

NOTE: No volume control is provided for headphone monitoring.

6. Push "START" button to commence recording.
7. At conclusion of recording fade out and push "STOP" button.

III. REWINDING.

1. Push left hand "SPOOL" button.

NOTE: This control does not actuate pressure roller solenoid. Therefore tape clears heads during "REWIND" and "FAST FORWARD" operations.

2. Push "STOP" button at conclusion.

IV. REPLAYING.

1. Move function control to "PLAY". The play indicator lamp will glow to signify setting of function control.

NOTE: Tape drive unit will stop if function control is moved to "RECORD" or "AMPLIFIER" whilst replaying.

2. Connect a suitable load to the amplifier by plugging:-

- (a) a 600 ohm line into the upper twin jacks of the output panel

AND/OR

- (b) an extension speaker of 2 ohms impedance into the lower twin jacks of the output panel.

3. Adjust gain control to required replay level.

NOTE: Meter switch should be moved to an "OFF" position if replay is required through extension speaker only.

4. (a) Adjust monitor volume control to required level for speaker monitoring of replay signal

OR

- (b) Turn monitor volume control fully anti-clockwise if speaker indications are not required.

OR

- (c) Connect headset to phones jack for monitoring of replay signal.

No volume control is provided for headphone monitoring.

NOTE: Speaker and phones monitoring may be carried out simultaneously if required.

- 5. Push "START" button to commence replaying.
- 6. At conclusion push "STOP" button.

V. FAST FORWARD.

- 1. Push right hand "SPOOL" button.
- 2. When desired spooling point is reached push "STOP" button.

VI. AUDIO AMPLIFIER.

- 1. Move function control to "AMPLIFIER" position.
- 2. Connect a suitable input. (See Section "D").
- 3. Connect suitable load(s) to the jacks of the output panel. (See Section "D").
- 4. Adjust gain control to required level.

NOTE: The amplifier unit may be used physically apart from the tape drive unit as an audio amplifier, but it is not necessary to disconnect the units for this function. However, when the two units are disconnected the amplifier should be operated with the function control set on "AMPLIFIER" only.

BYER "77"

PROFESSIONAL TAPE RECORDER

MAINTENANCE.

1. LUBRICATION.

Most bearings throughout the tape drive unit are either oilite bronze, which retain oil over long periods of time, or are sealed ball races which have been lubricant packed on assembly, and therefore require no attention. The following summarizes the attention required:-

- | | | | |
|-----|-----------------|---|-----------------------------------|
| (a) | Rewind Motor |) | Special anti-friction bearings. |
| | |) | Two or three drops of Shell G.960 |
| (b) | Capstan Motor |) | in front and rear bearing oilers |
| | |) | after every 500 operating hours. |
| (c) | Takeup Motor |) | |
| (d) | Idler Bearing |) | Sealed bearings, lubricant packed |
| | |) | on assembly. No user maintenance. |
| (e) | Pressure Roller |) | |
| | Bearing. |) | |
| (f) | Tape Contact | | Silicone packed bearing. No |
| | Guide Arm. | | attention. |

CAUTION: DO NOT over lubricate. Excess oil may penetrate beyond the bearings and impair operation. Clean off excess oil with cleaning fluid applied to a clean cloth.

Special care must be taken to avoid oil getting on to heads, capstan and rubber pressure roller. Remove excess with cleaning fluid as above.

- | | | |
|-----|---------------|--|
| (g) | Push buttons. | No lubricant required. |
| (h) | Brakes. | Self adjusting. No attention required. |

II. HEADS.

- (a) Cleaning. Since the majority of recording tape is of the coated variety, it is reasonable to expect a small quantity of coating to adhere to the heads - the amount of deposit being governed to a large extent by the brand of tape used. Tape tension has been pre-determined and is sufficiently high to prevent an accumulation of coating at the gaps, but should this occur it may be removed with a dental brush.
- (b) Wear. Byer "77" heads have been designed for exceptionally long life and preliminary tests have justified a life expectancy in excess of 500 hours under normal conditions of use.

A worn record or replay head (not to be confused with a head requiring removal of coating deposit) is characterised by a loss in high frequency response.

Replacement heads are available through the distributor from whom the equipment was purchased.

- (c) Alignment. The heads of all tape drive units are aligned with a standard alignment tape on final test and should not require further adjustment. Should it become necessary to adjust alignment when replacing a worn head, proceed as follows:-
- (i) Remove head cover.
 - (ii) Load a standard alignment tape and adjust replay head azimuth for maximum signal on V.U. meter.
 - (iii) Remove alignment tape and replace with a length of recording tape.
 - (iv) Record a signal of say 7,000 cycles and whilst recording adjust record head azimuth for maximum signal received by replay head through headset connected to phones jack.

NOTE: Standard alignment tapes are available through Byer "77" distributors.

- (d) Adjustment. Record and replay heads are adjustable for azimuth only. Height is pre-set on assembly, and requires no further attention. Azimuth adjustment screws (one to each head) are located in head mounting bracket between record and replay heads. See diagram enclosed at Section "F".

III. METERING.

Occasionally a check should be made to ascertain that amplifier gain, cathode currents of the various stages, and A.C. bias level are correct. The following readings should be obtained with tape drive motors running without tape.

Meter Switch Position	Signal Input	Function Switch Position	Gain Control.	Meter Indication.
V1	None	RECORD	OFF	70 \pm 20%
V2	"	"	"	70 "
V3	"	"	"	80 "
V3a	"	"	"	80 "
V4	"	"	"	95 "
V5	"	"	"	70 "
V6	"	"	"	70 "
BIAS	"	"	"	80 "
AUDIO	- 91 dbm.	AMPLIFIER	MAX	OVU \pm 1.5 db

IV. CAPSTAN MOTOR.

IMPORTANT: Capstan motor end thrust should not be altered unless absolutely essential. If necessary to dismantle motor, great care should be taken in reassembly to locate ball and thrust washer centrally on rotor shaft before replacing thrust adjusting screw. This should be carried out with unit placed down on front panel with capstan motor uppermost. Failure to observe these conditions may result in damage to end of shaft.

CIRCUIT LEGEND

"77" AMPLIFIER TYPE A-41+C

RESISTORS

R-1	470K	1 watt
R-2	2.2K	1 watt
R-3	100K	1 watt
R-4	100K	1 watt
R-5	270 ohm	1 watt
R-6	270 Ohm	1 watt
R-7	6.8K	1 watt
R-8	50 ohm	1 watt
R-9	6.8K	1 watt
R-10	1 meg	1 watt
R-11	220K	1 watt
R-12	120K	1 watt
R-13	470K	1 watt
R-14	47K	1 watt
R-15	1.2K	1 watt
R-16	560 ohm	1 watt
R-17	27K	1 watt
R-18	220K	1 watt
R-19	680 ohm	1 watt
R-20	1.5K	1 watt
R-21	1 meg	1 watt
R-22	470K	1 watt
R-23	100K	1 watt
R-24	47K	1 watt
R-25	500K	Trimax Att.
R-26	220K	1 watt
R-27	220K	1 watt
R-28	2.2K	1 watt
R-29	220K	1 watt
R-30	15K	20 watt

RESISTORS

R-31	1 meg.	1 watt
R-32	50 ohm	Potentiometer W.W.
R-33	27K	1 watt
R-34	33K	1 watt (adjusted) in factory)
R-35	1.5 meg	1 watt
R-36	4000 ohm	20 watt Divider
R-37	470K	1 watt
R-38	390 ohm	1 watt
R-39	1.2K	1 watt
R-40	470K	1 watt
R-41	27K	1 watt
R-42	47 ohm	1 watt
R-43	27K	1 watt
R-44	10K	Meter Shunt
R-45	5.6K	1 watt
R-46	30 ohm	Potentiometer
R-47	220 ohm	1 watt
R-48	220 ohm	1 watt
R-49	56K	1 watt
R-50	68K	1 watt
R-51	470K	1 watt
R-52	220K	1 watt
R-53	4.7K	1 watt
R-54	5.6K	1 watt
R-55	50 ohm	1 watt
R-56	5 ohm	1 watt
R-57	2.5 ohm	1 watt
R-58	330 ohm	1 watt

CAPACITORS

C-1	25	ufd	40 V.P.	Electrolytic
C-2	.1	ufd	200 V	Paper
C-3	.1	ufd	400 V.D.C.W.	Paper
C-4	24	ufd	525 V.P.	Electrolytic
C-5	.01 ufd	.02 ufd	400 V.D.C.W.	Paper (Adjusted at factory)
C-6	.0015	ufd		Mica
C-7	25	ufd	40 V.P.	Electrolytic
C-8				
C-9	25	ufd	40 V.P.	Electrolytic
C-10	.1	ufd	400 V.D.C.W.	Paper
C-11	.02	ufd	400 V.D.C.W.	Paper
C-12	24	ufd	525 V.P.	Electrolytic
C-13	.1	ufd	400 V.D.C.W.	Paper
C-14	.1	ufd	400 V.D.C.W.	Paper
C-15	.1	ufd	400 V.D.C.W.	Paper
C-16	24	ufd	600 V.P.	Electrolytic
C-17	24	ufd	525 V.P.	Electrolytic
C-18	.1	ufd	400 V.D.C.W.	Paper
C-19	.002	ufd		Mica
C-20	.0025	ufd		Mica
C-21	.002	ufd		Mica
C-22	.1	ufd	400 V.D.C.W.	Paper
C-23	.5	ufd	200 V.D.C.W.	Paper
C-24	25	ufd	40 V.P.	Electrolytic
C-25	.01	ufd	200 V.D.C.W.	Paper
C-26	24	ufd	600 V.P.	Electrolytic

TRANSFORMERS

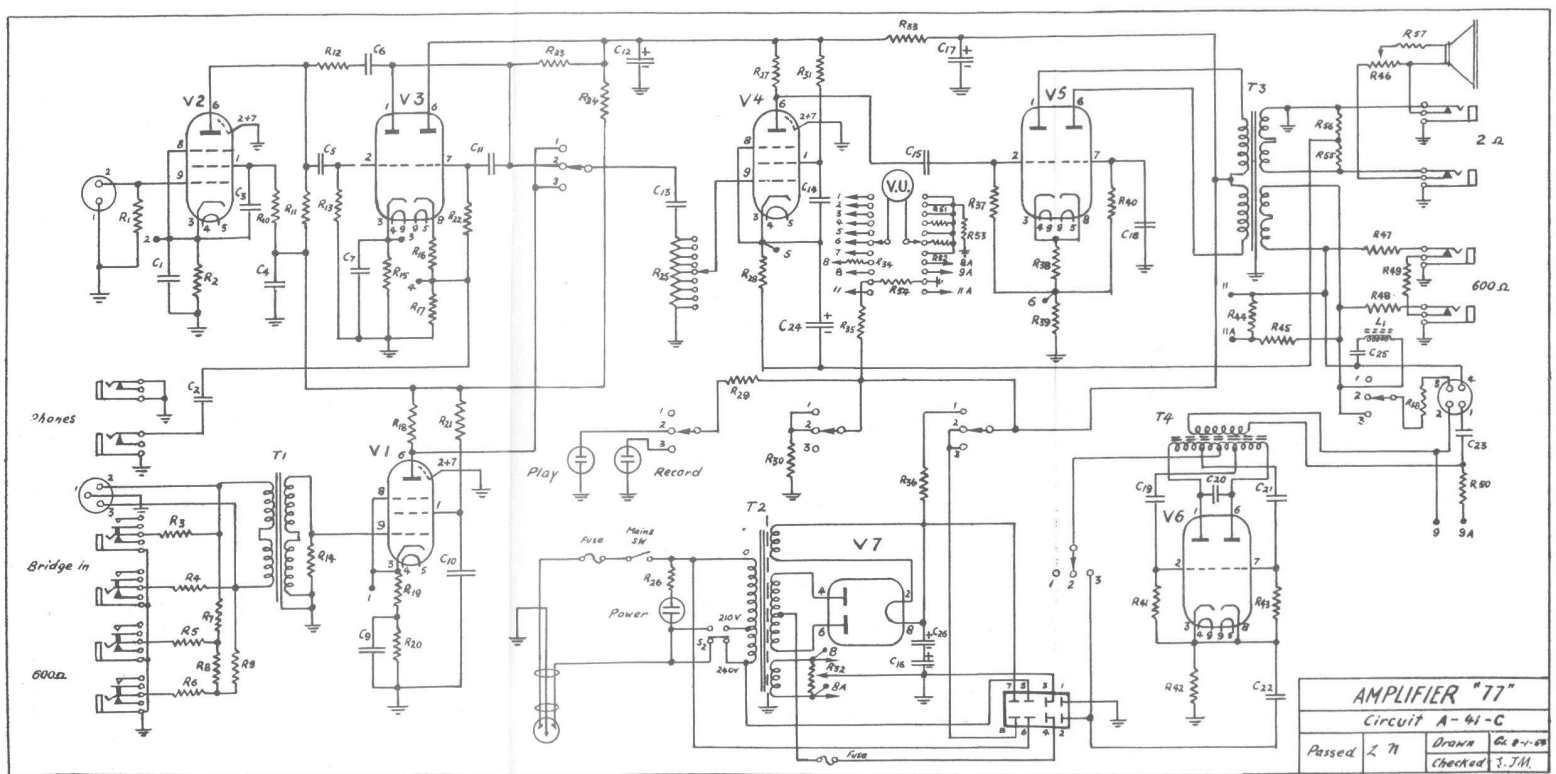
T-1	Input	30-30,000 ohm	MS1114
T-2	Power	TP-2267	
T-3	Output	TA-1232	
T-4	Oscillator	R-351	

VALVES

V-1	6F86	V-5	12AU7
V-2	6F86	V-6	12AU7
V-3	12AT7	V-7	5Y3
V-4	6F86		

INDUCTORS

L-1	1.1 MH	Iron Core
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CIRCUIT LEGEND

"77" TAPE-TRANSPORT A-41-A/4E

RESISTORS.

R-1	470 ohm	1 Watt	W.W.
R-2	10K ohm	20 "	W.W.
R-3	2K ohm	20 "	W.W.
R-4	500 ohm	20 "	W.W.
R-5	Deleted		
R-6	Deleted		
R-7	100 ohm	$\frac{1}{2}$ "	
R-8	1.5K ohm	5 "	W.W.
R-9	75 ohm	$\frac{1}{2}$ "	
R-10	600 ohm	$\frac{1}{2}$ "	
R-11	600 ohm	$\frac{1}{2}$ "	
R-12	4.7K ohm	$\frac{1}{2}$ "	
R-13	600 ohm	$\frac{1}{2}$ "	

CAPACITORS.

C-1	0.1 uf	400 V	Paper
C-2	0.1 uf	400 V	"
C-3	1.25 uf	600 V	Duconola
C-4	1.25 uf	600 V	"
C-5	2 uf	400 V A.C.	Duconal
C-6	0.05 uf	400 V	Paper
C-7	0.05 uf	400 V	"
C-8	0.05 uf	400 V	"
C-9	0.05 uf	400 V	"
C-10	0.01 uf	200 V	"
C-11	0.015 uf	200 V	"
C-12	0.05 uf	200 V	"
C-13	0.025 uf	200 V	"

INDUCTORS.

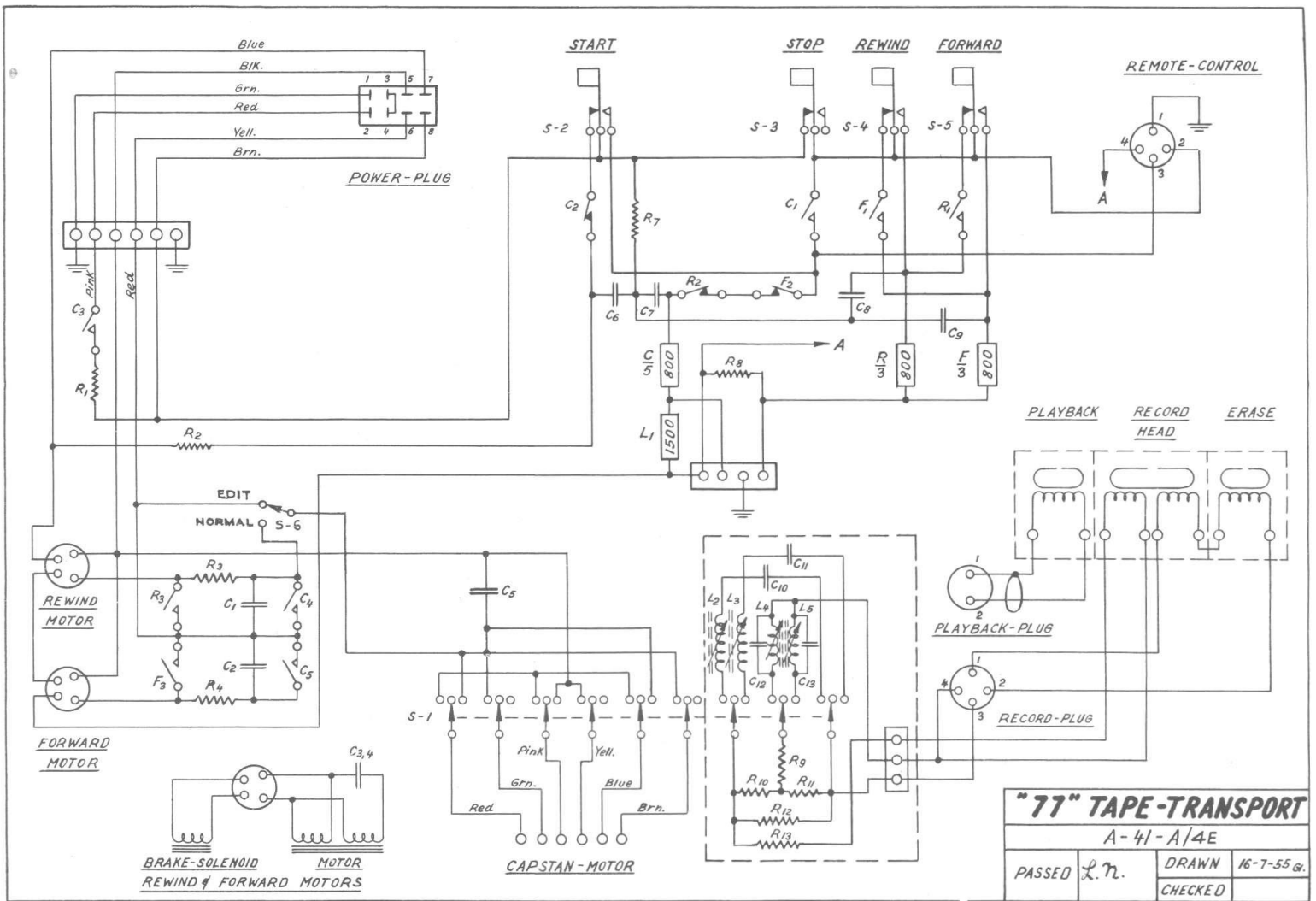
L-1	Capstan Solenoid
L-2	.0112H
L-3	.0266H
L-4	.00225H
L-5	.0057H

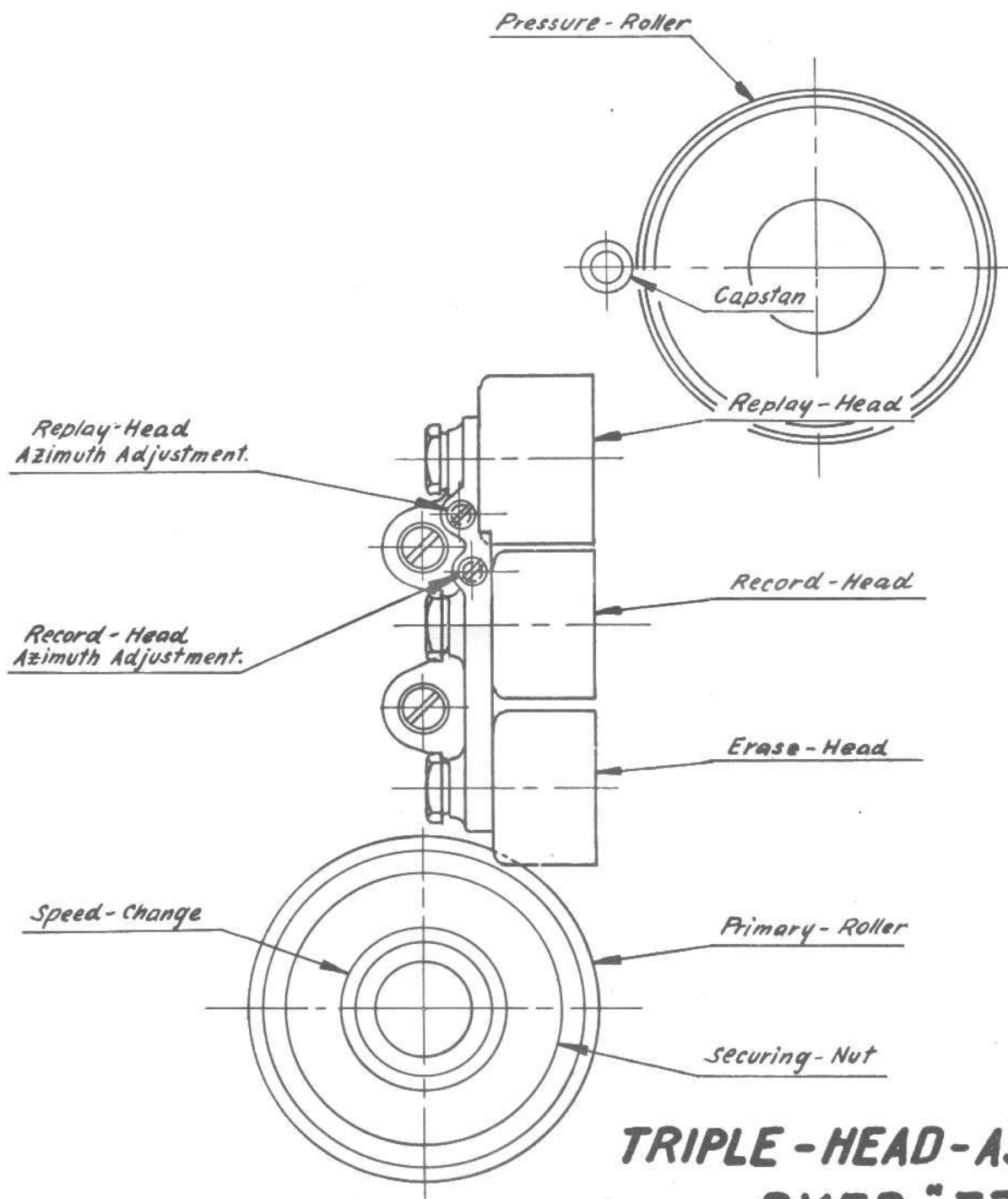
RELAYS.

F	Type S	Forward Operation
R	Type S	Rewind Operation
C	Type S	Capstan Operation

SWITCHES.

S-1	Rotary Wafer	Motor Speed and Equaliser Change
S-2	Micro Switch	Start
S-3	Micro Switch	Stop
S-4	Micro Switch	Rewind Spooling
S-5	Micro Switch	Fast Forward Spooling
S-6	Toggle Switch	Edit





**TRIPLE-HEAD-ASSY.
BYER "77"**