byer "5"

MAGNETIC TAPE RECORDER

Operating Instructions

Byer Industries
PROPRIETARY LIMITED

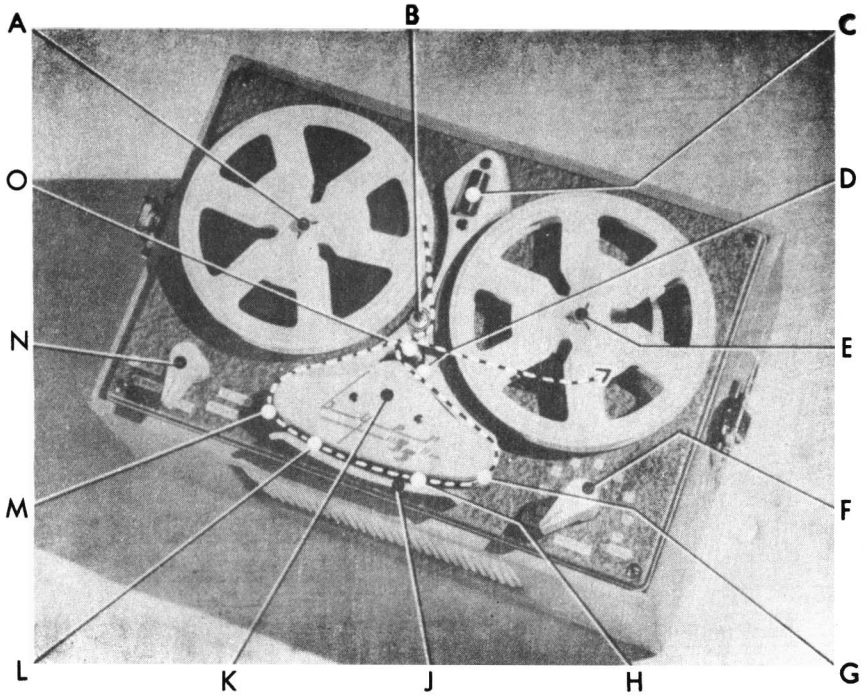

Fig. 1

(A) Supply Spindle.
(B) Tape Guide.
(C) Amplifier Pilot Light/Level Indicator.
(D) Pressure Roller.
(E) Takeup Spindle.
(F) Amplifier Switch/Volume Control.
(G) Secondary Roller.
(H) Record/Replay Head.
(J) Head Shield.
(K) Head Housing.
(L) Erase Head.
(M) Primary Roller.
(N) Selector Switch.
controls five functions:

- Fast Forward.
- Rewind.
- Stop.
- Replay.
- Record.

(O) Capstan.

SPECIFICATION.

NOTE. The Byer "55" has been produced for general domestic use. It has been designed to provide audio quality comparable with domestic radio receivers, and no performance claims are made beyond the limits of the published specifications.

MEDIUM:	Standard 1/4" magnetic tape.
PAYING TIME:	30 minutes.
REWIND TIME:	90 seconds.
TAPE CAPACITY:	600 feet.
SPOOL DIAMETER:	5"
RECORD/REPLAY HEAD TYPE:	High impedance - full track.
BIAS:	High frequency - full track.
ERASURE:	High frequency.
AMPLIFIER.	Three stages, single ended output.
VALVES:	Two 6AU6, One 6BJ5, One 6X4.
SPEAKER:	Rola 5B.
INPUT:	Low level, high impedance. Suitable for any high impedance microphone or pickup and radio through suitable pad.
OUTPUT:	2 ohms to external jack. On "record" phones may be used for monitoring. On "replay" output is fed to internal speaker or to external speaker, if used.
MOTOR:	BRS. Type M-39 synchronous.
A.C. LINE VOLTAGE:	200/240 volts.
POWER CONSUMPTION:	75 watts.
OVERALL DIMENSIONS (excluding carrycover)	12" x 7¾" x 8" high.
WEIGHT (including carrycover, mains lead, microphone and tape):	18 lbs.

COLOUR & FINISH:	Top Panel:	Bronze enamel and ivory lacquer.
	Case:	Beige leathercloth.
	Speaker grille:	Anodised aluminium.
	Carrycover:	Tan P.V.C. waterproof leathercloth, with white piping.

The manufacturers reserve the right to change specifications without notice.

Wholly designed and produced in Australia
by
BYER INDUSTRIES PTY. LTD.
Dorcas Street,
South Melbourne, Victoria,
AUSTRALIA.

While the foregoing is based on general practice, there are few absolute rules of microphone technique. Individual voices, instruments, orchestras, acoustics and recording conditions are so varied that it is advisable that a trial and error method be adopted whenever new conditions are encountered. Best results will be obtained by rehearsing the artists, during which the correct setting of the volume control and the timing can be determined accurately.

OPERATING INSTRUCTIONS

Before attempting to operate, read these instructions carefully and check mains supply voltage against specification plate on carrying case.

The Byer "55" is a high quality sound recording and replay instrument designed for portable use from A.C. mains supply, or from a Carpack ~~6 or~~ 12 volt battery unit. The salient features are:-

Recordings are made magnetically on plastic based tape coated with iron oxide.

Byer magnetic tape, supplied in reels of 600 ft. gives a playing time of 30 minutes.

The tape does not require processing in any way, and after recording it is ready for immediate replay.

Recordings can be made over an already recorded tape, the previous signal being automatically erased.

Recordings may be stored indefinitely without deterioration.

All functions, including record, replay, fast rewind and forward, are controlled from one rotary switch.

A built-in speaker and outlet for extension speaker or 'phones provide facilities for high quality replay or headphone monitoring.

Single track heads enable editing of recorded material to delete unwanted sounds.

THREADING

1. Load 5" reel of tape (with emulsion side facing out) on supply spindle, so that tape issues in a clockwise direction. Ensure that locating indents in spool hub register with takeup shaft driving splines.

2. Place empty spool on takeup spindle and ensure that locating indents in spool hub register with takeup shaft driving splines.

3. Feed end of tape across to hub of takeup spool so that it winds on in an anti-clockwise direction. Rotate takeup spool two or three times to make sure tape is gripped.

4. Hold takeup spool stationary and pull tape down to form a "U" so that it lies in front of head housing (between head housing and head shield).

5. Now slip tape lying between supply spool and primary roller over tape guide and slip tape lying between secondary roller and takeup spool over capstan to form threaded path shown in Fig. 1. Note. Threading may be carried out quite casually. Slack tape will be taken up when selector switch is turned to "play" or "record".

RECORDING.

1. Connect mains plug to earthed A.C. supply.

2. Load tape as outlined above.

3. Switch on amplifier by turning volume control in a clockwise direction. Pilot light will glow when amplifier is ready for operation.

4. Insert microphone plug into jack marked "input" on left side of cabinet.

5. Move selector switch to "record".

6. Adjust volume control so that level indicator does not flash when speaking into the microphone. Optimum recording level is correctly adjusted when peak signals just fail to flash the level indicator. The setting of the volume control during recording determines to a great extent the quality of the resultant recording. Setting the control too low will require high boost on replay and setting the control too high may introduce distortion.

7. At the conclusion of a recording return selector switch to "stop".

IMPORTANT.

At all times other than whilst actually operating the recorder the selector switch should be left in the "stop" position.

REWINDING.

1. Move selector switch to "rewind". Tape will wind back rapidly to desired position.

2. Return selector switch to "stop" on completion.

REPLAYING.

Move selector switch to "replay" and adjust volume control to required level.

FAST FORWARD.

When the selector switch is moved to "fast forward" the tape is transported rapidly in a forward direction and enables any particular point to be reached for recording or replaying with the minimum spooling delay.

With instrumental accompaniment, the essential problem is to obtain a pleasing balance between the volume of the singer's voice and the musical accompaniment, i.e. the accompaniment should be so placed that the vocal passages are not overwhelmed. The correct position of the microphone can be determined only by trial and error.

For a piano accompaniment, the microphone should be fitted to a floor stand and never placed on the piano, otherwise vibrations will be transmitted through the base of the microphone and will cause unpleasant distortion in the recording.

Choirs should be arranged in an arc around the microphone; the weaker voices in front, stronger ones in the rear. The sopranos, tenors, baritones, basses etc., should be placed in the conventional manner, but, if the group is large, it is advisable to bring closer to the microphone a singer or two from each section of the choir, so that the lyrics are more easily understandable. In this case, the best position of the microphone will generally be found to be slightly above the level of the singer's heads.

RECORDING INSTRUMENTALISTS.

The position of the microphone for obtaining best results when recording instrumentalists will depend greatly upon the acoustics of the room or studio, and on the type of instruments being played.

For recording a piano in a room where the acoustics are poor, the microphone should be placed at a distance of approximately 4 to 6 feet away. In an acoustically treated room, placing the microphone at a greater distance may produce a better recording.

When recording solos of other instruments, the characteristics of the instruments should be considered before deciding on the position of the microphone. Obviously, the strings will be placed nearer to the microphone than the brass; the exact positioning, however, can only be obtained by trial and error during rehearsal. In the case of the brass, it may be found advisable to turn the instrument slightly away from the microphone to avoid distortion.

In recording an orchestra, the problems of balance become complex. The correct position of the microphone, which may be suspended, is best solved by making trial recordings. The orchestra should be arranged in a series of arcs, within the "live" area of the microphone, the string section being placed nearest the microphone, the woodwind and bass strings in a second arc behind the strings, while the third arc is generally composed of the brass and percussion instruments and the piano.

For dance bands, it is best to place the microphone from between 10 and 20 feet from the band. The positioning of the band in a series of arcs should follow the same arrangement as for other orchestras, with the saxophone section taking the place of the string section of the large orchestra.

APPENDIX.

RECORDING TECHNIQUE

No attempt is being made here to cover the complete science of recording; reference to published books on the subject should enable the user to appreciate the problems encountered in the production of high quality recordings.

The first consideration when using a microphone for recording is its position.

For recordings made in halls, classrooms, or rooms where excessive reverberation or echo is encountered, improved results can be obtained by covering the floor with rugs and the walls with drapings, but "over-damping" should be avoided. In order to reduce reverberation in the immediate vicinity of the microphone, it is advisable to place the microphone on soft material (i.e. rubber mat, felt pad etc.)

Where reverberation cannot easily be damped, it is best for the microphone to be placed near to the artist so that the volume of direct sound is as great as possible in comparisen with the reverberation.

RECORDING SPEECH.

The microphone should be placed between 8 and 18 inches away depending upon the strength of the speaker's voice, and about 3 to 6 inches below the speaker's mouth. Normally, the speaker should talk directly into the microphone, but in the case of a voice with excessive sibilance (tendency to whistle) he should speak obliquely into the microphone until this characteristic is reduced to a minimum. With persons inexperienced in the use of a microphone, there is a tendency to over-emphasize, both in pronunciation and volume. It will be noticed that a good radio announcer delivers speech smoothly and with little change in volume. A certain amount of practice in order to obtain a good microphone technique is essential for results to be as natural as possible. When several persons, they should be grouped together as evenly as possible in an arc around the microphone.

RECORDING SINGERS.

In recording singing the position of the microphone, as in recording speech, depends upon the singer's type of voice; also due consideration should be given to the level of the accompanying music (if any) in order that a clear recording of the singer's voice is obtained.

Intimate effects can sometimes be obtained by a singer with a crooning type of voice singing at a distance of 4 to 5 inches away from the microphone; "colour" should be obtained by change of vocal expression rather than by loudness.

A singer with a powerful operatic voice should be placed about 2 or 3 feet from the microphone, and if commanding extreme volume and range, should turn away from the microphone during loud passages, rather than the operator attempting to compensate by use of the volume control.

EXTENSION SPEAKER.

For greater volume on replay an 8" or 12" extension speaker of 2 ohms impedance may be plugged directly into the jack marked "output" on left side of the cabinet. This disconnects the internal speaker.

NOTE.

An extension speaker should not be connected to the output socket whilst recording. If the operator requires to monitor input signals, headphones may be plugged into the output jack for this purpose.

ERASING.

Whenever tape is run through with selector switch on "record", previous signals are being erased. Be sure, therefore, to operate selector switch with due care, in order to obviate accidental erasure.

To erase a recorded tape without recording a new signal, disconnect the microphone and adjust volume control to minimum setting (but not "off"). Now allow tape to run through with selector switch turned to "record".

MAINTENANCE.

The Byer "55" has been carefully designed and mounted to provide maximum protection for the various components. It should be remembered that whilst normal handling may entail slight knocks which will not affect operation, a tape recorder is a delicate electronic instrument and should be treated as such.

After prolonged use small particles of tape coating material may be deposited on to the capstan and pressure roller. If this is allowed to accumulate, it may result in tape slippage. Therefore, it is advisable to inspect the capstan and pressure roller periodically and to remove any deposit with a small quantity of cleaning fluid applied to a soft cloth. This procedure may also be applied to the primary roller, erase head, record/replay head and secondary roller if any deposit of tape coating material is observed.

The Byer "55" is equipped with oilite bearings throughout. These have been fully lubricated during assembly, and no regular lubrication is therefore necessary.

If the urge to lubricate becomes too strong to resist, care should be taken against over-oiling. No more than one drop of Shell G. 960 should be applied to any bearing surface, and particular care must be exercised against applying oil to the felt clutch, rubber drive tyre, and takeup drive belt.

NOTE.

Disconnect mains supply before

removing recorder mechanism from

carrying case.

TAPE BREAKAGE.

In the event of tape breakage, lay one tape on top of the other, so that ends overlap approximately ½-inch. Cut through tape ends with scissors at an angle of 45°. Remove loose pieces and butt join ends with cellulose tape applied to shiny side of recording tape. Trim with scissors, and, if necessary, dust splice with talc if it appears to be tacky. A correctly made splice will not affect operation in any way and should be inaudible on replay.

EDITING.

Single track recording offered by the Byer "55" facilitates editing. Unwanted sounds and pauses may be cut out with scissors and tape rejoined as outlined above.

RADIO & PICKUP RECORDING.

Input jack is matched for high impedance crystal microphone supplied.
High impedance pickup, or radio tuner, may be plugged into input jack through suitable pad limiting input to approximately 1 millivolt.

PUBLIC ADDRESS.

The Byer "55" may be used as a small public address system as follows :-

1. Remove both tape spools.
2. Connect microphone to input socket.
3. Connect 2 ohm extension speaker to output socket.
4. Move selector switch to "record".
5. Adjust volume to desired level.

ACCESSORIES.

* For optimum quality recording insist on Byer recording tape - available in 600 ft. packs. If unobtainable locally write to Byer Industries Pty. Ltd. for the name of your nearest stockist.

Carpack Vibrator Unit for operating Byer "55" from 6 or 12 volt battery. May be installed in any car equipped with 6 or 12 volt lighting system.

Continuous Loop Mechanism. For applications requiring repetition of announcements etc.
Tape magazine holds 100 feet.
Maximum playing time 5 minutes.

* The manufacturers wish to stress the importance of using the brand of tape recommended in these instructional notes. A large variety of recording tapes are at present available through retail suppliers, and, to the layman, may appear to be identical to the tape supplied with the recorder. It is an acknowledged fact, however, that electrical and physical characteristics differ widely between brands, and the selection of a brand of tape unsuited to the electrical design of the recorder may have an adverse effect on recording quality and sensitivity.

REPAIR SERVICE.

In the event of damage return the recorder (freight paid) in the carton supplied to Byer Industries Pty. Ltd., Dorcas Street, South Melbourne, Victoria. A minimum charge of 22/6d to cover dismantling, inspection and reassembly, will be made for all repairs carried out by the manufacturers.