D Y N A T R O N

S P E C I A L I S T 1 2 0 0

T A P E R E C O R D E R

OPERATING AND INSTALLATION

INSTRUCTIONS

DYNATRON TAPE RECORDER SPECIALIST 1200

The Dynatron tape recorder 1200 possesses many features not included in other types of recording apparatus.
The 1200 is a precision-built instrument, quality controlled and tested through every stage of its production and if the instructions and recommendations are followed, there is no reason why the 1200 should not give the user many years of unfailing enjoyment.
To obtain full advantage of the facilities provided by the instrument, the user is recommended to read thoroughly this Handbook, although experienced tape recordists and sound engineers will find the abbreviated instructions quite adequate.

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Voltage Adjustments.

The 1200 is supplied to operate off A.C. mains only, 50 cycles, 200/250 volts. Before connecting the instrument to the electricity mains make sure that the supply is AC 50 cycles. Serieus damage can occur if it is connected to DC mains without a suitable convertor which is a separate unit. It is essential that the voltage adjustment plug is set to the appropriate voltage range of the AC supply being used. If the voltage is unknown then use the 240-250 volt range.
Earthing: It is recommended that the Green wire of the mains lead be connected to a good earth, otherwise unnecessary hum is likely to be present. If in doubt about a suitable earth, consult your Dealer.

A Brief description of the Dynatron Specialist 1200

Each 1200 comprises a tape deck, record amplifier, playback amplifier, power unit and self contained 10" x 6" Goodmans high flux loudspeaker, the whole being contained ina stout wooden case finished in durable leather cloth. The tape deck fitted to the 1200 incorporates many novel features which provide for extreme reliability, simple operations and particular ease of tape editing. Two speeds are provided - $7\frac{1}{2}$" and $3\frac{3}{4}$" per second and the replay characteristics at $7\frac{1}{2}$" per second are strictly to C.C.I.R. recommendations. This feature ensures that tapes recorded on the 1200 are to a recognised standard and can be replayed with fidelity on any 1200 or other machine of high quality. The deck is fitted with separate erase record and playback heads. In each case the finest quality will be obtained with recordings made at $7\frac{1}{2}$" per second. However, special compensation is provided when the speed is changed to $3\frac{3}{4}$" per second, thus providing exceptionally good record and playback characteristics at this speed. Use of the separate Bass and Treble tone controls will further compensate the playback frequency range. One advantage of having separate record and playback heads and amplifiers is that by the use of a switch, music or any incoming signal being recorded can be instantly compared with that which has been recorded on the tape. Further, it is possible to make useof the slight time delay caused by the physical spacing of the record and playback heads to introduce a controlled echo effect. The 1200 incorporates this echo facility together with an effective superimposing arrangement which, by manipulation of the Bias control, enables the user to fade in the additional signal at will, whilst monitoring the composite signal.

The Goodmans loudspeaker, which is built into the 1200, obviously cannot do full justice to the high quality recording and reproduction available from this instrument. Whilst being satisfactory for speech and for checking musical performances, full advantage can only be taken of the reproducing facilities of this instrument, by feeding the output to an independent high loudspeaker system. For monitoring purposes when recording from a microphone it is recommended that headphones be used to avoid accustic feedback problems. The use of high quality headphones having an extended frequency range is recommended, and it is then possible to monitor all programme material with fidelity.

Whilst the 1200 incorporates a 3 watt monophonic amplifier which will be of sufficient power and quality for the average room, very high quality at a greater volume range can be obtained by connecting it to a high fidelity amplifier of 10 or more watts with one or more loudspeakers. Even when connected in such a manner the monitoring facility is not impaired.

All input and output sockets are conveniently placed on the front panel of the instrument, but for those users who wish to include the 1200 in a permanent installation, duplicate sockets for input and output are fitted to the rear of the machine.

Recording can be made from four main sources;

a) Microphone
b) Radio
c) Records (Gramophone Pick-up)
d) Another Tape Recorder.

An inexpensive crystal microphone may be used for speech, but full justice to the instrument can really only be achieved by the use of a quality moving coil microphone. Inputs are provided for both high and low impedance microphones so that an external transformer is not necessarily required.

Recordings from radio etc. should never be made by placing a microphone in front of a loudspeaker, but the signal should be taken from either the tuner unit - preferably an FM/VHF tuner unit - or from a suitable socket on a high quality radio receiver. If you are in doubt how to make a connection from a commercial radio receiver, consult your Dealer.

It will only be possible to make first class radio recordings if an FM/VHF tuner unit or high quality radio is used.

Recordings of non copyright gramophone records are usually made by connecting the output of a gramophone pick-up either direct or through the pre-amplifier of a high fidelity amplifier, to the appropriate input of the 1200 or by taking a lead from the extension loudspeaker sockets of a radio-gramophone, which will be in parallel with the secondary side of the output transformer of that equipment. Alternatively some radio-gramophones have a socket outlet provided for this purpose. Here again recordings of the highest quality will only be made from the output of a high fidelity pre-amplifier, or direct from a suitable gramophone pick-up.

The Controls and Facilities of the Dynatron Specialist 1200

On the Tape Deck

1. Mains on/off Knob switches the AC mains to the tape deck and amplifiers.
2. Neon Lamp indicates when the machine has reached operational condition. When this lamp shows colour the machine is ready to be started.
3. Function Lever. This decides the actual movement of the tape, whether to be fast wound in the forward or reverse direction or to be moved from left to right at 3¾" or 7½" per second for the record or playback function. In the latter two functions the lever is locked on by means of a selfcontained solenoid. It will only lock in when the neon lamp is alight and can only be released by pressing the OFF button or otherwise switching off the current. An automatic switch is incorporated which is triggered by the metal foil inserts to be found on many tapes and which will stop the machine automatically when they reach the left hand end of the tape guide channel.
4. Starting Brake. Used to steady the supply reel at the instant of starting. The tape transport mechanism has been designed to start very rapidly from rest and with large reels of tape some slight irregularity in the tape travel can occur within the first second of starting. In use the brake is applied only when the function lever is moved to the record orplay position and then released. It should not be operated at any other time.
5. Off Button. To switch off and stop the tape transport mechanism when recording or playing a tape. This does not operate in the fast wind conditions.
6. Speed Selector Knob. Provides two speeds for the tape transport mechanism. In the central position the deck motors are 'off' but the amplifiers are available for the reproduction of records or radio programmes without recording them.
7. Fast wind knob. This controls the direction and speed for fast winding on or winding back. It is not operative until the function lever is in the Fast Wind position. Rotation of the knob clockwise moves the tape back, and anti-clockwise moves the tape forward. The tape is slowed or stopped by rotating the knob in the opposite direction to the tape travel. When the desired position is found the function lever is returned manually to the 'Off' position. Do not return the function lever to the off position until the tape is stationary. The variable speed wind facility gives complete control over the tape and may be 'inched' to any predetermined point for editing or cueing purposes. Further, the speed of wind is veryhigh when required and the absence of harsh reel brakes prevents the stretching or even breaking of the tape which can occur when high speed winding is stopped rapidly with mechanical brakes.
8. Tape Position Indicator. A useful indicator for re-locating previously cued sections of tape. It may be manually set at any reading by rotation of the knurled knob in the centre of the clock face.

On the Amplifier Panel.

9. Record/Playback Switch. A four button press switch of special construction is used for this function. The record, Super-Impose, and Playback conditions are clearly marked and indicated by 3 coloured lamps, Red, Amber and Green respectively. When the Record of Superimposition function is selected, it is necessary also to press down the WHITE button marked 'Interlock'. Unless this 'Interlock' button is used the Red and Amber lights will not show and the Erase and Bias current is not produced; further the level meter will not function. By this method an effective safety factor is introduced to avoid the accidental erasure of a recording. Asan added safety measure, Fast Wind is only available when the PLAY button is pressed which action immediately cancells the previously selected function.

10. Playback Volume Control. To adjust the volume level for playing back a tape or listening to an incoming signal whilst recording. It does not control the volume being fed to an external amplifier if one is connected. The adjustment of this control whilst recording will not effect the volume of signal recorded on the tape.

11. Tone Controls. By adjusting these controls you are able to lift and cut the treble and bass response of the playback amplifier. Although these controls do not effect the quality of the signal being recorded on the tape, they may be used with good effect whilst monitoring a recording or using the amplifier for radio or gramophone reproduction.

12. Bias Control. This control has been incorporated into the 1200 to enable super-imposition to be carried out smoothly and with considerable ease. When set to minimum i.e. Zero, no bias current is fed to the record head and the recording signal is also attenuated. It is therefore possible to operate the machine with the superimpose function selected, the bias control set to zero and to listen to the tape being replayed via the monitor facility. The tape is then quite unaffected during this provess. When the correct point on the tape for the super-imposition is reached, the bias control is swung smoothly to maximum and immediately the original recording is reduced in level and the additional material is faded into overlay the original. At the end of the super-imposed section the Bias control is returned smoothly to zero and the second signal fades and the original programme returns to normal level. By this means no switch clicks or other extraneous noises are impressed on the tape.

13. Input Level Mixers. These three controls are part of an electronic mixing circuit which allows mixing of three independent signals without any interaction between them. These input mixer controls are marked A,B, and C, and the inputs which they serve are clearly marked, and are as follows:-

1. Mixer Input A will accept a radio, gramophone, or similar signal
2. Mixer Input B will accept either as A or a high impedance microphone or similar low level signal.
3. Mixer Input C will accept either a low or high impedance microphone or similar low level signal.

14. Echo Switch. Operating in conjunction with the mixer input A, this switch allows a controlled echo effect to be added to the recording as it is being made. When this device is in use mixer knob A is set to give the effect required whilst listening through the monitoring facility. It is possible to add echo to a previously recorded signal by use of the super-imposition function.

15. Tape/Input Switch. Used for comparing incoming signals with the signals recorded on the tape. When a tape is played back the switch must be in the 'Tape' position. If the amplifier is being used to reproduce without recording a disc or radio tuner broadcast, the switch should be inthe 'Input' position.

16. Balance Control. Used in conjunction with the Tape/Input switch to accurately balance the volume of the incoming signal with the volume of the recorded signal. Access for adjustment by screwdriver through a hole in the amplifier panel.

Tapes of different brands may require the resetting of this control. It does not effect the quality of the recording and should be adjusted finally when the Input Level control is set at the desired position and the Playback volume control is likewise set at a listening level.

17. Meter Zero Adjustment. This control is adjusted by a small screwdriver through a hole in the amplifier panel. The input mixer controls are turned to zero and machine switched to Record. When the meter needle has reached its steady position, the Zero control should be rotated to place the needle over the '0' position.

18. Input Level Meter. Calibrated 0-10, the final three segments being coloured red. The meter is not 'live' until the amplifier is switched to the Record position and the Interlock button pressed. In this position the needle swings over to the left hand side of the scale and is then zero adjusted. The mixer input controls are adjusted as required so that on loud passages of music or speech the needle just comes up to the red segment of the scale but not into it.

19. Input Sockets. These sockets have been mentioned in a previous section but further information may be of assistance. The Radio sockets are for the connection of a screened jack lead from a pick-up, a radio tuner, the pre-amplifier of a high fidelity system or from another tape recorder. They may also be used for making a recording by connecting a twisted flex lead and jack plug from the external speaker terminals of a radio receiver or gramophone. It is not necessary to remove the input jack plug when playing back a recording but when recording using the microphone in Input B the jack, if in the adjacent Radio socket, should be removed.

For the convenience of those who wish to make a permanent installation of the 1200 a radio input jack is fitted to the rear of the instrument and is coloured Red. When this socket is in use mixer control 'A' is used for level setting. However, when a jack is inserted into the front panel Socket A, the rear socket is inoperative, so that the versatility of the instrument is not impaired.

The microphone sockets provide for high or low impedance matching. The low impedance socket on mixer C will accept any impedance up to about 100 ohms. It is not possible to use simultaneously both sockets associated with Mixer C.

20. Output Sockets. The "Hi-fi" socket on the amplifier panel provides an output from the head pre-amplifier and equaliser stage ahead of the actual L.F. output stage so that by connection of a screened jack lead a signal may be fed to the pre-amplifier of an external high fidelity amplifier system. The Playback volume control does not effect the level or quality of this signal, but may be used to control the volume of the monitoring signal which is still available if required. The Hi-fi socket is duplicated on the rear panel on the machine and is coloured white. If this rear mounted Socket is in use in a permanent installation, the front panel socket may still be used and the rear socket is automatically disconnected.

Also located at the rear of the machine is a socket which provides a high fidelity output of 3 watts undistorted across 15 ohms for feeding an external 15ohm loudspeaker. The insertion of a jack plug into this socket silences the internal loudspeaker. This socket is coded Black.

On the front panel there is an outlet for headphone connection for monitoring purposes. Any impedance headphone is suitable and there is adequate volume available When this socket is in use the internal or external loudspeaker is silenced.

A 15 ohm external loudspeaker may be connected to this socket if more convenient than the rear mounted outlet.

Abbreviated Instructions on the use of the Dynatron 1200 Tape Recorder.

Having switched on the instrument, press down the 'Record' button followed by the White 'Interlock' button. With the input Mixer controls set at zero, adjust the Record level Meter to zero through the aperture provided. Plug in the desired input signal, rotate the appropriate Mixer Control until the Level Meter needle moves across the scale. Move the Tape/Input switch to 'Input' and adjust Mixer Control so that the meter needle moves up to, but does not enter the red segment on peak passages of signal. Turn 'Bias' control to maximum.

When satisfactorily adjusted start recording by moving the starting brake lever to the left to check the supply reel, move the Function lever to On Play/Record position, and release the starting brake. Compare input signal with recorded signal by flicking left to right the Tape/Input switch. Disparity in the actual volume of these signals can be overcome by adjusting Balance control through aperture provided. When the recording is completed or the take-up reel is full, switch off machine manually by depressing the 'Off' button, or allow the instrument switch itself off automatically at the end of tape on the metal tape foil fitted to most brands of tape.

It is not necessary to wind past the heads the metal foil fitted at the commencement of the tape unless a full reel smaller than 7" is being used.

To wind on or play back, switch amplifier to 'Playback', move function lever to Wind, and rotate fast wind knob in the required direction. Sound is available whilst winding if the Playback Volume control is turned near to maximum.

How to make a Recording.

The current to the tape deck and amplifiers is switched on by moving the mains Off/On knob to the 'On' position. About one minute should be allowed to elapse before the instrument is started as this time is required for the valves to warm up. The desired tape speed may be selected by adjusting the Speed selector Knob to $7\frac{1}{2}$" or $3\frac{3}{4}$" per second. The finest quality will be obtained with recording made $7\frac{1}{2}$" i.p.s but the amplifiers of the 1200 are specially compensated when $3\frac{3}{4}$" per second speed

is used, providing exceptionally good quality recording which may be further compensated by using the tone controls to adjust the playback frequency range, either whilst listening to the tape when recording, or playing back a tape.

It must be remembered that with all high quality instruments, and the 1200 is no exception, a certain amount of time must be taken for the motors to warm up and 'free'. It is recommended, therefore, that if a serious recording session is being undertaken the machine should be warmed up for ten minutes by playing a tape through for this period. It may then be assumed that the motors are in synchronism.

On the left-hand side place a reel of recording tape (Note: the 1200 will accept reels up to 8¼" in diameter). An empty reel - preferably of the same size should be placed on the right hand spindle. Both reels should be locked on the motor spindles by lightly screwing down the hub knobs provided. A couple of feet or so of tape are then wirhdrawn from the left reel and the end is introduced into the slot on the empty reel. Then the tape in both hands on either side of the head cover and lay the tapes across the front of the heads and inside the tape guide pillars. Finally, the tape is fed over the capstan so that it lies between the capstan and pinch wheel. It may be found convenient to do this first, that is to say hold the tape so that a loop is offered forward and away from the user, the loop is then dropped over the capstan spindle and the tape then laid across the front of the recording head. The tape may then be tautened by taking up the slack with the right hand reel.

Remember that the tape should be so loaded that the left-hand reel rotates in an anticlockwise motion and the shiny side of the tape is away from the heads and towards the user.

If at any time it is required to withdraw the tape before the reel has been completely recorded or rewound, this can be done easily by gripping the tape in the same way and then lifting it upwards.

Having loaded the tape and the signal to be recorded connected to the appropriate Input socket, a level can be determined by pressing down the Record button followed by the White 'Interlock' button when the Red indicator light will be illuminated. At the same time it is important to check that the Bias Control is at maximum i.e. '10'. The mixer control associated with the input socket in use should then be turned to zero and the needle of the level meter checked to lie in the extreme left hand position: if it is not, the meter control should be adjusted.

If a microphone is being used in the same room, the Playback Volume Control should always be set to a minimum, otherwise acoustic feed back will occur and a howl will be set up. If a source other than a microphone is being used the Playback Volume Control may be adjusted to a comfortable level. The appropriate mixer control is then adjusted so that the signal moves the pointer of the Record Level Meter, but does not allow it to come into the red sections of the extreme right, which indicate that section of the meter in which a signal could overload the recording tape and cause distortion.

Care should be taken that the signal fed in is not too low - that is, the meter should, on peaks, come close up to the division before the red segments- as otherwise the signals will have been recorded at too low a level and tape hiss will be heard.

Having established that the level is correct, the Tape/Input Switch should be placed in the 'Input' position.

When it is desired to start recording, the Starting Brake Lever should be held over to the left and the Function lever should be drawn across the slot until it is felt to engage with, and be held by the electrical solenoid beneath the deck. Then the starting brake should be immediately released.

Having moved the Function lever, tape travel will commence.

If a smaller reel than 7" is being used, when starting the tape drive hold the Function lever in engagement manually until the metallic foil has passed the heads and then it will be found that the lever holds itself in. Another method is simply to draw the recording tape manually past the heads until the metal foil is wound on to the right reel.

The signal is now being recorded on the tape and this may be checked by moving the Tape/Input switch on the amplifier panel to the 'Tape' position on the left. By moving this switch to the left and to the right it will be possible to check the quality going into the recorder and the actual quality of the siganl being recorded on the tape, assuming of course that the Playback Volume control is turned up to a listening level.

If when placing the tape Input switch in the Tape position nothing is heard, this will indicate (if the signal is heard when the switch is in the 'Input'

position) that the tape has been incorrectly placed across the heads or the Bias control is not at maximum.

If the quality is very poor at $7\frac{1}{2}$ i.p.s. in comparison with the signal when the Tape Input switch is in the 'Input' position, this probably indicates that inferior quality tape is being used, or alternatively, the tape has been loaded the wrong way round, i.e. with the shiny side inside instead of on the outside.

The volume of the production of the recording or the input signal can be adjusted by means of the Playback Volume Control. Generally, the Input mixer controls should not be adjusted during the recording session unless it is found that the peak level meter indicator is moving into the red segments when the appropriate control should be very slightly reduced to avoid distortion.

If when the Tape/Input switch is moved to the left and to the right to make comparisons of signals it is thought that the signal on the tape is slightly unbalanced with the input signal, as often happens with different brands of tape, it may be adjusted by means of a screwdriver and the Balance control.

If it is required to make a recording without the playback signal being heard at the time of recording, the playback volume control should be returned to zero.

To stop recording the 'OFF' button is depressed, which brings the tapedrive mechanism to an instantaneous stop.

Recordings will be made on two tracks and this when one track has been completed the reel on the right-hand side should be unlocked and transposed to the left-hand side by turning the reel 180° and vice versa for the other reel. Recording on the other track may now be commenced.

Automatic Stop.

An automatic stop is provided which automatically switches off the equipment at the end of the tape, being actuated by the metal foil strip now spliced into most brands of recording tape. However, metallic strips may be affixed to any recording tape and which will stop the equipment at the point where they are placed.

Recording with a Microphone.

The amplifier switch is, of course, placed in the 'Record' position: the Tape/Input switch can be placed in the 'Tape' position but the Playback Volume Control must be turned to a minimum otherwise acoustic feed back will occur. When it is desired to check back a recording, the tape is rewound and then played again. At the same time the Playback Volume Control should be turned to a satisfactory level. It is not necessary as is the case with many other makes of recorder, to withdraw the microphone plug from the instrument panel.

When it is desired to continue recording, the Playback Volume Control is turned down to the zero position and the Record/Playback Switch is placed again in the 'Record' position.

It is good practice when making recordings from a microphone, to glance occasionally at the Input Level Meter as the movement of this pointer will confirm that a recording is being made on the tape at a satisfactory level. Alternatively, a pair of headphones may be connected to the monitor socket at the front of the instrument.

Unless headphones are used, it is not practicable to hear the recording at the same time as it is made from a microphone in the same room, due to acoustic feed back, and thus the meter or headphones should be the means of checking the recording.

It is essential that screened jack plugs used for the screened lead from the microphone. In every case the braiding - this is, the screening, is connected to the longer section - this is, the outside of the plug. The centre conductor should thus be connected to the terminal which is connected to the tip of the plug.

Recording from a Pick-up.

Recordings of non-copyright gramophone records can be made by connecting to the Radio Socket the output from a suitable pick-up, pre-amplifier (to which a pick-up is connected) or a lead in parallel with the output of a radio-gramophone,

The 1200 amplifier may also be used for the reproduction of gramophone records without making recordings of them, as referred to in an earlier paragraph. Tests have shown that most crystal pick-ups may be connected direct to the Radio Socket through a screened lead and plug and good results obtained.

However, many brands of pick-ups other than crystal may be found to have insufficient output to feed the Radio Socket without an additional pre-amplifier of which several suitable brands are available. Alternatively, a connection to the Microphone Socket may be satisfactory.

It may be appreciated that when listening to, or recording, gramophone records the type of turntable equipment as well as the pick-up will have an important effect on quality. If possible a transcription type motor should be used.

The manufacturers of pick-ups and motors will be glad to answer technical queries in regard to the operation of their equipment with the 1200.

Superimposition.

When it is desired to superimpose or overlay other material onto an original recording, such as a speech commentary or sound effects, the facilities offered by the 1200 make this process convenient and effective.

The amplifier should be switched to E. Imp. and the white interlock button depressed. This enables the machine to function in the record mode without the erasing circuit in operation. The Bias control is turned anticlockwise to zero, the Tape/Input switch to Tape and the machine started. The previously recorded signal may now be heard by adjustment of the playback volume control. The superimposing signal which may be set by use of the mixer control as in normal recording - but none of this signal will yet appear on the tape. When the correct point on the tape for superimposition is reached the Bias control is rotated smoothly to its maximum clockwise position and immediately the original signal will fade down to a lower level and the new material will fade in to full volume. At the end of the superimposition signal the Bias control is turned smoothly back to zero when the original signal will return to its original volume level. It will be found that the quality of the original recording is slightly reduced during the superimposition period, but since the new material is of greater importance, this effect is not detrimental to the composite recording.

Adding an Echo.

For special effects and for adding what is sometimes called 'space' to a recording, a controlled amount of artificial reverberation may be introduced when recording any programme material. It will be found most satisfactory at a tape of $7\frac{1}{2}$" per second, but for some special effects the slower speed may prove more effective.

To use this device, it is only necessary to move the small slide switch on the front panel and to adjust mixer Control A to about 7 with the Tape/Input switch in the Tape position the effect can be judged and the mixer control A set as required. When recording speech the amount of reverberation required will be quite small, whilst musical programmes can tolerate a much higher level of echo.

When this effect is in use the radio socket adjacent to the 'Echo' switch should not be used.

If necessary for a special effect, an echo may be added to a previously recorded signal by using the superimpose function. Set the instrument for super-imposition as detailed above, move the 'echo' switch to 'ON' and adjust Mixer input 'A' to required level previously determined from a trial on an old recording. Start the machine, and at the required place bring up the Bias control to maximum for the function of the echo effect, and then return to zero.

Some Notes on Microphones.

As mentioned earlier in this manual, an inexpensive crystal microphone can be used for speech recording but for first recordings a moving coil or ribbon microphone should be considered. Many of these microphones use low impedance devices although some have matching transformers built in to them and these latter may be connected by screened jack plugs to either of the higher impedance sockets on the amplifier panel of the 1200. However, should a long cable be necessary between the microphone and the 1200 a low impedance is preferred and connections should be made where estraneous sounds will be picked up by a microphone having an omnidirectional characteristic, it is often advisable to employ a microphone with a cardiod type characteristic. This type of microphone exhibits quite marked directional properties and can be located so that the unwanted sounds are much reduced in volume. Much literature exists on microphones, their relative merits, and uses, and manufacturers of these components will be pleased to offer guidance. However, some examples of suitable microphones are listed at the end of this booklet.

To rewind and Playback a Tape.

If it is desired to rewind the tape, it is necessary first of all to Switch to the 'Playback' position when the Green light will be illuminated.

The function lever is then moved through the slot and into the right-hand slot to the 'Wind' position. The Fast Wind Knob is then rotated in a clockwise direction until the tape begins to rewind. To stop the tape, rotate the Fast Wind knob in the opposite direction and when the tape is stationary, return the Function Lever to the 'Off' position.

It should be explained here that it is always necessary to switch to the 'Playback' position when rewinding in order to switch off the current on the erase head which would otherwise erase completely and automatically all of the recorded signal as the tape passed the head.

It should also be emphasised here that the 1200, unlike many other tape recorders, provides for the sound or recorded signal to be heard whilst the tape is being rewound or wound on.

The volume of this sound is adjustable through the normal Playback Volume Control and after a little practice it will be found very easy to pick out significant points of a recorded tape whilst running the tape at a relatively high speed.

It will be seen that this has a tremendous advantage when editing tapes, which is dealt with in a later paragraph.

To Play back a previously recorded tape it is necessary to select the correct speed and then Switch to the 'Playback' position and ensure that the Tape/Input is in the 'tape' position. The tape deck mechanism should then be started by moving the function lever to the 'ON' Play/Record position. The Playback Volume Control and Tone Controls may then be adjusted accordingly.

Tape Editing.

If full advantage is to be made of the particular case of tape editing with the 1200 it is recommended that the user obtains a Bib Recording Tape Splicer, listed on the Accessories page. These splicers may be conveniently fitted to the deck by removing the two 4 BA chromium plated screws. The Bib splicer, after it has been taken off its wood base board, can be screwed to the mounting plate with the two 6 BA screws provided.

Full instructions and helpful hints on tape editing are packed in the splicer carton. It will be obvious to the user that if tapes are to be subsequently edited it is always best to have the same brands of tape joined together as there is sometimes a slight difference in the level of different brands of tape.

Hum

The high quality record and playback amplifiers of the 1200 ensure that no hum should be discernible if recordings are being made and played back correctly. If hum is present on the tape it is due to elementary precautions not being undertaken regarding connection of the appropriate input to the TRP2.

Generally it will be possible to determine whether hum has been introduced by recording or reproducing by listening to a tape that is known to be hum-free. Alternatively, if hum is due to reproduction, that is, incorrect connection of the instrument to another high fidelity amplifier, it will become evident whether or not the tape is running.

Trouble with hum is sometimes experienced due to earth loops. If the 1200 is being used as a self contained instrument, - that is, it is not being connected to a radio, tuner unit, radio-gramophone, or high fidelity amplifier, it should if possible be earthed: that is, the green mains lead should be connected to the earth socket of the three pin plug. If, on the other hand, the 1200 is being used in conjunction with a high fidelity amplifier or tuner unit, it may be preferable not to earth this green lead if the other units are already earthed. This may avoid hum due to earth loops in the various equipments.

The lead used from an F.M. tuner unit should also be screened and a screened plug should be used in the same way as described for the microphone. Connection of the output socket of the 1200 to an external high fidelity amplifier should also be made through screened plugs and leads.

HOW TO INSTALL INTO FURNITURE

The most important recommendation to make in this connection is to ensure that adequate ventilation is provided.

Having three motors and separate record and playback amplifiers with their associated valves, means that the 1200, unlike many other recorders, has to be provided with adequate heat dispersal arrangements from these additional sources. Ensure, therefore, that matching holes or slots, identical to those in the base plate of the recorder, are drilled in the bottom of the drawer or piece of furniture into which it is intended to install the receiver.

The instrument is removed from its case by withdrawing the securing screws each side, the recorder may then be inserted into the furniture or fitment, having first drilled and cut holes or apertures for the input and output sockets and loudspeaker.

If it is intended subsequently to fit a lid or totally enclose the recorder and possibly use it like this, adequate ventilation above the deck must again be provided to take away the generated heat.

See full detailsof dimensions under 'Technical Specifications'.

QUERIES, ANSWERS AND REMEDIES.

1. Q. Tape will not drive but amplifiers are switched on.
   A. Speed Selector Knob is in central position.
   R. Move speed Selector Knob to desired speed.

2. Q. Function Lever will not hole in when moved to 'Play' function.
   A. Mains Off/On knob is in 'Off' position, or recorder has not had time to warm up.
   R. Switch on and allow a full minute to elapse before moving Function lever. Neon lamp will indicate when instrument is ready for operation.

3. Q. Speed of motors appears too sluggish. Quality of recording and reproduction is below standard.
   A. Mains voltage plug is incorrectly adjusted or mains voltage reaching instrument is below stated figure.
   R. Adjust voltage plug. If mains voltage is much below standard rating, use an external 150 watt mains auto-transformer.

4. Q. No signal is heard from recorded tape.
   A. Playback Volume Control is not adjusted correctly, Tape/Input switch is set at 'Input' position.
   R. Place switch in 'Tape' position.

5. Q. Tape does not drive in 'Record' or 'Playback' position.
   A. Tape has not been correctly aligned between capstan Spindle and pinch wheel.
   R. Take tape out and refit correctly between capstan spindle and pinch wheel.

6. Q. When undertaking recording, signal is heard when Tape/Input is switched to 'Input' but nothing is heard at 'Tape' position.
   A. Tape has been rewound wrongly or is placed across heads with shinny side inwards.
   Or. Bias control is not at maximum. Or. Interlock button is not down.
   R. Rewind tape so that side is outwards and reload tape correctly.
   2. Check Bias Control.
   3. Check interlock button and Red and Amber lamp.

7. Q. When Recording there is excessive hum present.
   A. 1. Instrument not properly earthed.
   2. Input leads are insufficiently screened.
   3. Screened Jack Plugs are incorrectly connected.
   R. 1. Ensure mains lead is connected to a good earth.
   2. Screened leads must be used with screened plugs for inputs from microphone, VHF tuner, gramophone pick-up.
   3. Screened Lead must be connected to the centre section of plug.

8. Q. When instrument is operating, an acoustic buzzing sound is heard from deck.
   A. Probably due to reel vibrating on reel carrier splines due to hub locking knob not being fitted or not being screwed down.
   R. Fit and screw down lightly the hub locking knob.

9. Q. When playing 8½" reel the speed is uneven or reels stop.
   A. Probably due to reel with bent flange touching deck.
   R. Straighten bent reel flange.
   (NOTE: Some 8¼" reels (not of our manufacture) are made of soft aluminium and can become bent easily.

10. Q. When recording or playing back tape a momentary cessation of signal is heard.
    A. Assuming that when recording the input signal is constant, this is due to 'drop' out, i.e. missing oxide or lump of oxide in the tape.
    (NOTE: It is always advisable to make important library recordings on a good brand of tape that has already been used several times. This ensures that the tape surface has been well polished and reduces the possibility of 'drop outs').

11. Q. Passage of tape from take-off reel through heads and on to take-up reel appears to be jerky.
A. Due to tape being oversize or new and adhering to previous layer.
R. If oversize return tape to manufacturer. If new tape is being used then fast wind tape through deck before recording. (NOTE: Professional recording studios usually wind tape at least once on to another reel before using for recording to remedy slight adhersion of one layer to another which may occur whilst tape is in store).

12. Q. As reel revolves acoustic scraping noise is heard.
A. Tape end is protruding through reel hub and bearing on deck plate.
R. Wind off and tuck end of tape correctly into reel hub.

CLEANING OF TAPE GUIDES, HEADS, ETC.

It will be appreciated that magnetic recording tape comprises very fine oxide which is bound on to a plastic tape.

The new TRP 2's have been very carefully designed to ensure that, unlike many other recorders, the capstan does not bear on the oxide side of the tape.

It is of course, inevitable that the oxide side (dull side) must pass across the tape guides, the tape heads and between the capstan and the pinchwheel or pressure roller.

The design of the tape path on the 1200 deck is such that the tape should not wander up and down during the travel and thus the limits of movement on this machine have been very carefully controlled.

Consequently, mistracking of tape due to:-

(a) Oversize tape or bad joins (Particularly between paper metallic strip sections at beginning and end of reels of tape and the coloured leaders); or:
Old tape where the tape has been used on recorders where the edges have rubbed on the reels;

may give rise to a high degree of flutter because of buckling and distortion of the tapeedges. In view of the above comments we make the following special recommendations:-

Cleaning of Surfaces.

If dirt has accumulated then it may be necessary to use lighter fuel or petroleum ether. (On no account should carbon tetrachloride or any commercial cleaning agent be allowed to come in contact with the heads or with the plastic head and deck covers as damage or discolouration may result). The lighter fuel or petroleum ether should be applied on a soft damp cloth or on the sides of a thick pipe cleaner which may be bent to the proper angle.

Oxide can also be deposited from the back of the tape on the capstan, particularly if the instrument is used in a damp atmosphere. It is important that if this oxide is deposited on the capstan it should be removed regularly by the same method as used for the heads. On no account should any metallic object be placed near to the heads, guides or capstan.

Cleaning the Pinchwheel.

Use lighter fuel or petroleum ether. Do not use commercial cleaning agents.

Use of Tape.

It is recommended that new tape be used wherever possible, i.e. tape which has not been used on any other recorder. When using a new reel of tape for the first time, it is always advisable to rewind the tape once to remove the tendency for adjacent layers to stick together which will occur if the tape has been in stock for some time.

Tape Rubbing Against Reel Flanges.

The deck has been designed to accomodate plastic reels up to 8¼" diameter and one brand of 8¼" metal reel which is made to the same limits as the plastic reel. However another brand of 8¼" metal reel has a much narrower non-standard distance between the flanges. The use of such reels on the 1200 may involve the tape rubbing against the flanges and if this should occur flutter may be introduced. It is sometimes possible to use such reels on the 1200 by making cardboard shims which can be placed between the reel and the hub so as to bring the centre of the reel to the same standard as normal reels.

Removal of Head Cover.

The head cover, which is of plastic, is a one-piece unit which covers the heads, pinchwheel and side motors.

Normally there should be no need for this head cover to be removed by the user but for certain servicing procedures it would be removed by the Service Engineer.

If extremely old tape of a brittle nature was being used and a break occured it is possible that tape may be wound round the pinchwheel and may be difficult to remove without taking off the head cover. Consequently, the following information is given so that in case of necessity the user may remove the head cover, but he is strongly recommended not to do so unless it is essential. However, it is a comparatively simple operation and the following procedure should be observed:-

The recorder should be disconnected from the mains supply.

The reels of tape and spare reel should be removed from the tape deck. If one reel is still connected to the tape which is wound round the pinchwheel there is no need to break the tape and the reel may be removed after unwinding the tape a few turns.

The chromium-plated screws securing the plastic head cover should now be undone and withdrawn. NOTE: this refers only to the screws securing the plastic head cover and does not apply to the screws holding the front plastic cover on which the three deck control knobs and the function lever are mounted.

When all screws have been withdrawn it will be found easy to lift the complete head cover up and clear of the deck. There is no need to touch the tape position indicator as only the rim of the clock is affixed to the plastic head cover whilst the dial and mechanism remains in situ.

The head cover should be placed carefully on one side and the necessary attention given to the mechanism to withdraw the tape which may be wound round the pinchwheel. If necessary, the pinchwheel may be rotated byhand to withdraw the tape.

Technical Specification of Dynatron Tape Recorder Specialist 1200

As the Dynatron 1200 is a professional quality instrument, the specifications are accurately measured and do not include any exaggerated claims.

Specifications stated are the minimum performance of a studio or user could be expected to achieve over an extended period.

Power Supplies: Operates off 200-250 volts AC 50 Cycles.

Power Consumption: Appox. 100 watts with motors running.

Voltage Selector: By fused 2 amp selector plug at rear.

Dimensions: $20\frac{1}{8}$" long x $18\frac{1}{4}$" deep x $10\frac{3}{8}$" high overall.

Tape Deck:

Construction Complete tape transport mechanism mounted on cast aluminium frame.

Motors: Direct drive synchronous capstan motor, two Garrard side motors.

Tape Speed: $7\frac{1}{2}$ and $3\frac{3}{4}$ inches per second.

Tape Width: $\frac{1}{4}$ inch.

Tape Speed control: Switched two speed capstan motor.

Number of Tracks: Two.

Track Width: 0.1 inch.

Spool Size: Up to $8\frac{1}{4}$ inch.

Wow and Flutter: At $7\frac{1}{2}$ i.p.s. better than 0.2% R.M.S. Total.

Tuning Accuracy: 0.8%

Long Term Speed Stability: 0.2%

Starting and Stopping: Tape accelerates to full play speed in 1/10th second. Stops in less than 1 second.

Tape Loading: Visible placing across heads.

Megnetic Heads: Type E 1 erase, R 1 Record, P 1 Playback.

Tape Wind: Controlled by single knob electrical wind with mechanical 'Park' position. Less than 48 seconds for 1200 ft. in either direction.

Playing Time: At 7½ i.p.s.
8¼" reel, Double play, 3600 ft. 1 hour 36 mins per track.
7" reel long play. 1800 ft. 48 mins. per track.
7" reel Standard, 1200 ft. 32 mins. per track.
Recordings at 3¾ i.p.s. are of course, double the above time.

Tape Position Indicator: Clock type.

Controls: 3 position function lever.
Main ON - OFF
Push Button OFF
Motor Speed 7½" - Off - 3¾"
Wind on - Wind back.

Splicer: Provision for mounting Bib Tape Slicer.

Tape Inching Control: Facility incorporated in Wind On/Wind back control: sound available whilst inching if required.

Auto Stop Switch: Operates on metal foil at end of tape. Instantaneous stop.

Amplifiers: Separate Record and Playback amplifiers providing continuous monitoring from the tape with provision for instant comparison between input signal and recorded signal.

Controls: Amplifier function press button switch with mechanical and electrical safety interlock on Record and Superimpose. 3 channel input mixer controls with calibration. Brass Cut/Boost with calibration for C.C.I.R response. Treble Cut/Boost with calibration for C.C.I.R. response. Playback Volume with calibration. Bias/Signal level with calibration. Tape/Input switch. Echo effect switch.

Frequency Response: At 7½ i.p.s. to C.C.I.R. specification.
Response 7½ i.p.s. ± 2 db 50 - 10,000 c/s
± 3 db 30 - 13,000 c/s
Response at 3¾ i.p.s ± 2db 45 - 7,500 c/s

Record Characteristics: ± 2 db within the above range referred to 4— c/s.

Signal Noise Ratio: Approx - 50 db (unweighted including hum)

Input Sensitivities: Mic. High: not more than 6mV for peak recording level.
Mic: Low: not more than 0.1 mV for peak recording level.
Radio: note more than 0.25v for peak recording level.

Output Voltages: From pre-amplifier 'Hi-fi' socket
150mV R.M.S. medium impedance.
From L.F. Amplifier: 3 watts across 15 ohm.

Erase and Bias Frequency: 63 Kc/s approx.

Tape Speed Equalising: Automatic for 7½, & 3¾ i.p.s.

Record Level Meter: Moter indicator, edgewise reading with coloured and calibrated scale..

Inputs Sockets: High gain for high or low impedance microphones low gain for Radio (2)

Microphone Impedance: 2 inputs for high impedance microphone, 1 input for low impedance microphone (up to 60 ohms)

Output Sockets: Head pre-amplifier. External speaker 15 ohm. Headphone Monitor.

Socket Position: All on front panel. Duplicated sockets low gain.
input, pre-amplifier output, & external speaker at rear.

Valves: 1-EF 86, 3-ECC 83, 1-ECC 82, 1-6BR8, 1-EL84, 1-EF91, 1-EZ80.

Monitor Speaker: Special 10" x 7" high quality elliptical high flux, low field (by Goodmans Industries).