BRENELL MINI 8 - OWNERS MANUAL

CONTENTS:

1. INSTALLATION

1.1 The Brenell Mini 8 tape recorder is supplied as two separate units - the tape deck with its associated record/replay electronics and the Power Supply Unit (PSU). The PSU is provided separately so that it may be positioned well away from the tape recorder to minimise magnetic induction from the transformers and bias/erase oscillator that are in the unit.

1.2 Supplied with the tape recorder is a three-core mains cable terminated with three-pole plug. This cable is color coded:

- brown - live
- blue - neutral
- green and yellow - earth

and a suitable three-pin plug should be attatched to this cable. If a fused plug is used a fuse of 5 amp (240V.) or 10 amp (110V.) rating should be fitted. Before connecting mains to the PSU the input voltage selector should be set to the available voltage by placing the plug in the appropriate position.

1.3 A second cable is also provided to connect the PSU to the tape recorder. This is terminated with a 15 way plug and socket - the plug is inserted in the PSU and the socket in the tape recorder. Models after serial number 000254 have separate mains and signal cables to conform to EEC regulations.

1.4 When the power cable is connected to the PSU the RED indicator on the front of the PSU will light and power will be available to the tape recorder. On later models the PSU indicator will light only when the tape recorder is switched on.

1.5 The tape recorder itself is best positioned as far away as possible from the PSU (a two metre cable is normally provided). It can be mounted either vertically or horizontally but in either case adequate space should be provided at the rear of the recorder to allow for ventilation.

2. INPUT AND OUTPUT

2.1 The tape recorder is provided with eight (8), single pole jacks ($\frac{1}{4}$ inch) and eight (8), single pole output jacks on the rear panel. These correspond, from top to bottom, to channels one to eight on the tape.

INPUT:

2.2 The input sockets have an impedance of 10K ohm and can accept unbalanced inputs up to 10K ohms impedance. The input sensitivity can be adjusted (by means of the line level control) from -10dBm to +20dBm to produce the optimum record level.

OUTPUT:

2.3 The output sockets have an impedance of less than 100 Ohms and can be used with balanced or unbalanced loads, 600 ohms or greater. Output level is adjustable (by means of the line-out level control) up to +10dBm for 0VU.

Three possible signals are available at the output dependent upon the position of the monitor switch. These are:

- line - the input signal
- sync - during replay the sync signal from the record head. In record the input signal
- replay - the signal from the replay head

3. CONTROLS AND INDICATORS

TAPE DECK

3.1 Reel Carrier

This will accept up to 10½ inch NAB reels of tape which are retained by a threaded centre piece hub. Reel adjusting shims are provided to compensate for differing reel thicknesses. Each shim is 0.7 mm (.028 inch) thick.

3.2 Tape Tension Arm

Maintains steady tape tension and operates auto-stop mechanism.

3.3 Head Assembly

Removeable cover protecting the three heads which are, from left to right:

- erase (8 track)
- record, and sync replay
- replay

A manually operated replay head shield is provided. This should always be used during mixdown operations to minimise hum induction.

3.4 Pinch Roller

A rubber pinch wheel holds the tape against the capstan, when the PLAY mode is selected.

3.5 Capstan

3.6 Motion Sensing Roller

The tape is in contact with this roller at all times. It detects the direction and rate of movement of the tape and feeds this to the logic elements that control the deck operation. It also provides a real time output at 15 i.p.s. for the tape counter (half real time at 7½ i.p.s.)

3.7 Power

Power supply switch, and indicator, for both the deck and record/replay electronics.

3.8 Speed Selector

Tape speed selector switch HI-15 inches/second (38 cm/s) to LO 7½ inches/second (19 cm/s). Speed should preferably only be changed when the capstan has stopped as undue stress may be placed on the capstan drive belts.

3.9 Deck Mode Selector Switches

Five coloured push-buttons are used to select the operating mode of the deck, they are from left to right:

REWIND	(BLUE)	- tape fast rewind
WIND	(BLUE)	- tape fast wind
PLAY	(GREEN)	- for tape replay or in conjunction with REC pushbutton for recording
STOP	(YELLOW)	- stops tape movement
REC	(RED)	- used with PLAY pushbutton to select record mode.

SECTION 3 CONTROLS AND INDICATORS

When the deck is in the record mode the red indicator adjacent to the mode selector pushbuttons will light.

The operating mode may be changed at any time simply by pressing the appropriate pushbutton, it is unnecessary to select STOP before going from, for instance, PLAY to REWIND, the deck logic will automatically bring the tape to rest and immediately commence rewinding. Pushbutton can be pressed at any time and in any order, the last to be operated being the mode selected, without any fear of damaging the tape or mechanism. (The last command is always obeyed by the logic with the exception of record which has a safety interlock)

Channel Units

NOTE: Only the normal user operated controls are described here. Each unit has a number of labelled preset controls accessible through the front panel but these are intended for alignment purposes only. Their operation is detailed in the Appendices. Alignment should only be attempted by a competent engineer after reading the relevant Appendix.

3.10 Record

Selects the record mode (ON) for the channel. If operated when the deck is not in the record mode the red REC indicator immediately above will flash indicating standby. When the deck is also in the record mode the indicator will be on continuously, indicating that recording is taking place on that particular channel. Both the deck and the channel must be in Record before a recording (or erasure) can take place.

3.11 Line-in-Level

A rotary control for varying the level of line input

3.12 Line-out-Level

A rotary control for varying the level of all the line outputs

3.13 Line-out-Selector

A three position switch for selecting the line-output, from top to bottom these are:

sync - a synchronised output is available from the record head
line - the line-input is available at the line-output
replay - signal from the replay head

Note that a sync output is available only if the channel is in the sync mode (RECORD switch OFF) otherwise the sync position provides a line output.

3.14 Eight (8) standard VU meters give a visual indication of input level, sync replay level or replay level. Both sync and replay readings are before the main output level control hence giving an accurate indication of the level actually being picked up from the tape. The meter circuits are switched automatically by the line, sync, replay selectors.

4 LOADING AND UNLOADING THE TAPE

4.1 Remove the reel retainers from both reel carriers by unscrewing anti-clockwise.

4.2 Place a full reel of tape on the left hand carrier and an empty reel on the right hand carrier. Only 10½ inch (260 mm.) NAB spools should be on this machine.

Note: reel adjusting shims are provided to allow for reels of differing thickness. These are rings of metal 0.7 mm. thick that can be removed by twisting to open the cut in them, they will then clear the Key in the hub.

4.3 Replace both reel retainers. If the machine is operating vertically one reel should be fitted and locked before the other reel is placed on its hub.

4.4 Lower replay hum shield

4.5 Pass the tape (see Fig. A.1)

- over the tension arm (2)
- across the face of heads and between the mu-metal shield and the replay head (3)
- between the pinch roller and the capstan
- around the motion-sensing roller
- onto the take up reel and wind the tape two or three times around the hub and rotate the reel until the tape is tensioned.

  Lift the head shield to cover the replay head.

4.6 To UNLOAD the tape it is only necessary to press the [rewind] or [wind] button (3.9), all of the tape will wind onto the left or right hand reel, releasing pressure on the tension arm (2) and operating the auto-stop. Unscrew the reel retainer and remove the tape.

n.b. To avoid ambiguity the following symbols have been designated:


Channel function


Deck function

5. PLAYBACK

To replay a tape that has been recorded:

5.1 Load a tape as described in section 4.

5.2 Select the track(s) to be replayed by:

- setting the (record) switch(es) to OFF
- the (line out) switch to replay

5.3 Start the tape by pressing the PLAY pushbutton

5.4 The replay signal will be available at the appropriate channel Jack(s) and the level can be adjusted by means of the appropriate output level control. The output level controls should normally be adjusted to give the required calibration reading on the meters of the mixing console in use. This can be done by recording a reference signal as described in the Appendices.

6. RECORDING

6.1 Load a tape as described in section 4.

6.2 Apply the signal(s) to be recorded at the appropriate input jacks on the rear panel

6.3 Adjust the line-in level control such that the modulation peaks of the input signal do not exceed the OVU level (i.e. enter the red area)

Note: Correct setting of the record level is essential to produce best possible recording. Too low a level will mean that the residual noise of the tape and amplifier will become apparent and too high a level, caused by continuous over-modulation or extreme transient peaks, will cause distortion. Noise and distortion are both to a large extent dependent upon the type of tape used and itwill be found that certain tapes have a low noise level and can be under driven more than others (see fig. 6a). Experimentation with the level control whilst monitoring the recorded signal will help to determine the limits. It is especially important if recorded material is to be transferred from tape to tape (or track to track) that the maximum possible recording level be achieved, before distortion, to minimise the additive effects of noise, i.e. keep the noise well below the wanted signal level.

Use of a tape other than that originally specified will require realignment as per Appendix O A

6.4 Set the channel (record) switch(s) to ON - red lamp(s) on channel(s) will flash indicating standby.

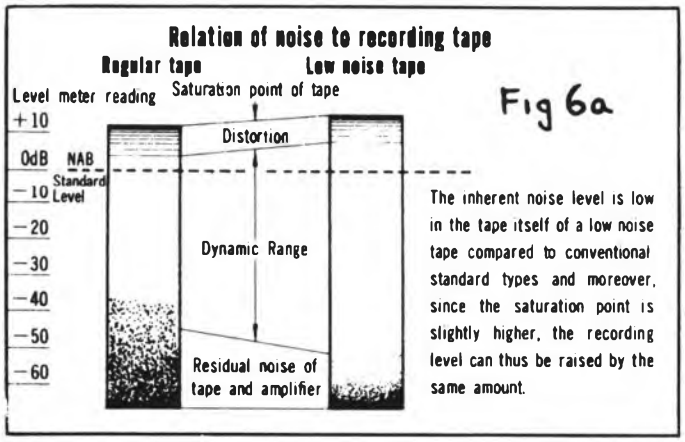

Fig 6a

6.5 Start the recorder by pressing (PLAY) START and RECORD simultaneously. The red lamp on the tape deck will light to indicate that the machine is recording, the red lamp(s) on the selected channel(s) will stay continuously illuminated.

6.6 The input signal can be monitored with the (line-out) switch in the line position. The recorded (tape) signal can be monitored at any time with the line out switch in the Replay position. Adjustment of the line-out (level) control does not affect the level of the signal recorded or the reading on the VU meters.

When switching from line to replay it will be apparent that there is a delay of approximately 0.15 sec. between the two signals due to the spacing of the tape heads (45 mm.).

6.7 Recording can be stopped at any time by pressing the [stop] button on the tape deck - the record lamp on any selected channels will then flash (standby mode).

N.B. Once a channel has been satisfactorily recorded it is essential to switch the channel (record) switch to the off position, otherwise accidental erasure may take place.

6.8 An alternative method of starting a recording is to start the tape deck in the record mode ([START] and [RECORD] pressed simultaneously) but without the recording channel being switched ON.

6.9 When it is desired to start recording, select (RECORD ON) on the appropriate channel(s).

N.B. Even though the deck is in the record mode, tracks will not be recorded or erased until the record switch on the selected channels is switched ON.

This method of starting recording avoids any possibility of excessive wow and flutter during tape start-up.

This technique is generally referred to as 'dropping in' and is essential for overdubbing. A 'ramp' bias switch on avoids the possibility of an audible click being recorded onto tape.

6.10 Similarly recording may be terminated by switching the channel record switch to off (dropping out) or by stopping the tape.

N.B. Once a channel has been satisfactorily recorded it is essential to switch the channel record switch to the off position otherwise accidental erasure may take place.

7. Remote Control and Vari-speed

7.1 Remote Counter

All Motion Sensing, Logic Mini 8's are now supplied with a digital tape counter which is driven by a photo-electric sensor mounted on the motion sensing roller.

The counter gives a Real-Time indication in minutes and hundredths of minutes at 15 ips and half Real-Time indication at 7½ ips. The unit is connected to the Mini 8 via the multi-pin socket at the rear of the machine.

A zero setting button is provided for track cuing.

7.2 Remote Control Unit

The multipin socket at the rear of the machine is capable of interfacing all deck and channel functions and a remote control unit is now available. When this unit is used the tape counter should be connected to the remote control unit via the multipin connector provided.

7.3 A remote drive socket is provided at the rear of the Mini 8 for the purpose of variable speed capstan drive.

The wiring from the capstan motor may be connected to this socket in order to feed a 240V. signal at varying frequency which will vary the speed of the capstan itself.

A separate data sheet on Varyspeed will be available shortly.

8. FAULT FINDING & BASIC MAINTENANCE

8.1 Basic Maintenance

All bearings on Mini 8 are lubricated for life and require no oiling or adjustment. The only maintenance that should be attempted by the user is that normally associated with keeping the tape path clean and demagnetised.

8.2 Cleaning

The use of a proprietary head cleaning fluid is recommended at regular intervals depending upon the degree of useage. Never use any hard or metallic tools for cleaning the tape heads or guides as they will induce stray magnetism and possibly scratch the highly polished surfaces. Only soft cloths or cotton tipped cleaning stocks should be used.

8.3 De-Magnetising

At frequent intervals the tape path - that is the tape guides, the heads, the tape lifters, the capstan and motion sensing roller, should be demagnetised.

In no circumstances should the machine be demagnetised while it is switched on.

8.4 Fault Finding

In the main fault finding and repair are tasks better left to a competent servoce engineer. There are, however, a number of simple checks that can be carried out by the user.

8.5 Preliminary Checks

In view of the number of connectors associated with the recorder it is wise to check those first. No power at the recorder may indicate that the power supply unit connectors are not properly inserted or that a fuse has failed (see 8.8).

8.6 Failure of a single channel module to replay or record, if there is no indication on the appropriate VU meter, could be due to an input or output cable or jack and this can be checked by substitution - otherwise a single channel failure may be temporarily overcome as described in 8.9.

8.7 If the machine operates but fails to record on any channel it is possible that the bias/erase oscillator, which is in the power supply unit, is not connected.

8.8 Fuses

The machine is protected by three fuses mounted on the PSU front panel. Disconnect the mains cable before removing a fuse holder.

Replacement Values:

Main fuse 2.5 A (240V.) or 5 A (110V.) 20 mm anti surge

Deck power 2.5 A (240V.) or 5 A (110V.) 20 mm anti surge

Electronics 40V. rail 5 A semi delay protection 20 mm anti surge

8.9 Record or Replay failure of an individual channel

Each individual channel module carries the all the record (with the exclusion of the master bias/erase oscillator) electronics and all the replay electronics. If a single channel fails an unused channel can be substituted.

To remove a channel: Undo the two screws (one top and one bottom) on the channel module, insert a screwdriver under the top edge of the module and gently ease it out - the first half inch or so of movement will be stiff until the edge connectors is released.

To replace a channel: Engage the top and bottom edges of the channel module in the guides and gently slide it home into the connector. Replace the two screws. Channel alignment should be checked as per Appendices A,B,C.

MECHANICAL FAULT FINDING:

1. Lack of capstan drive, all other functions O.K. - check that the two drive belts are intact.

2. Excessive wow and flutter - one drive belt broken.

3. Slipage or running slow pinch roller pressure too low or broken drive belt.

4. Relay Failure. All deck relays 430-600 ohm 4 pole change-over. Channel record-on relay miniature, low profile 24V. D.C. 2 pole change-over. Line, sync, replay relay - ITT (MZ) Available only through Brenell or ITT.

All other mechanical problems should be referred to the Brenell factory or to an appointed Agent.

For belt change procedure see appendix D.

1. ADJUSTING THE REPLAY GAIN AND SYNC GAIN

1.1 Load the calibration tape

1.2 The first section of the tape carries a 100Hz reference level with an effective tape flux of 320nWb/meter (32 m Maxwell). This lasts for approximately 30 seconds.

1.3 Set channel one to REPLAY

1.4 Start the tape

1.5 If required, adjust REP LEVEL (Replay level) to indicate 0dB on the VU Meter.

1.6 Switch the channel to SYNC

1.7 If required, adjust SYNC level to indicate 0dB on the VU meter

1.8 Repeat 1.2 to 1.7 above for every channel

2. RECORD HEAD AZIMUTH ADJUSTMENT

2.1 The azimuth alignment section on the calibration tape is in two parts - an 8 sec. 1000Hz signal, followed by a 60 sec. 10,000Hz signal recorded 10dB below the reference level. It is the second (10kHz) signal that is used for azimuth alignment.

2.2Connect an AC millivoltmeter to the output of channel one.

2.3 Set the channel to SYNC

2.4 Start the tape recorder at the beginning of the 10kHz alignment section.

2.5 Turn the record head azimuth screw (see fig. A1) slowly first clockwise a half turn. If the reading on the voltmeter falls, stop or turn the screw in the opposite direction until a maximum is reached.

Note: The AC millivoltmeter is only used to show when the output is at a maximum the absolute value of the output is of no interest. Therefore the output level control on the channel unit and the range setting on the millivoltmeter should be chosed such that the variation in output is readily apparent (e.g. a mid-point setting)

2.6 Azimuth alignment, having been carried out on channel one for the record head, will be correct for all channels.

3. REPLAY HEAD AZIMUTH ALIGNMENT

3.1 The 10kHz azimuth alignment section of the calibration is used as above.

3.2 Connect an AC millivoltmeter to the output of channel one

3.3 Set the channel to REPLAY

3.4 Start the tape recorder at the beginning of the 10kHz alignment section.

3.5 Turn the replay head azimuth alignment screw (see fig. A.1) slowly first clockwise, no more than half turn. If the reading on the millivoltmeter falls, stop and turn the screw in the opposit direction. The millivoltmeter will rise to a maximum and then fall. Turn the screw back until the maximum is reached.

4. SETTING THE RECORD HEAD ROTATION

4.1 Exactly the same procedure as in section 3 - setting the record head azimuth alignment is to be followed except that the record head rotation adjustment screws are to be used.

5. SETTING THE REPLAY HEAD ROTATION

5.1 Exactly the same procedure as in section 4. Setting the replay head azimuth alignment is to be followed except that the replay head rotation adjustment screws are to be used.

6. REPLAY FREQUENCY RESPONSE TOP ADJUSTMENT

6.1 Provision is made, on each channel unit, for the adjustment of the frequency response at the top end of the bandwidth. This adjustment is only effective above 6kHz and gives a variation of ± 1.5dB up to 14kHz.

6.2 The frequency response section of the calibration tape has a number of frequencies recorded on it between 31.5Hz and 18kHz. All of these frequencies can be used to check that the frequency response of the replay section lies within the NAB specification, but the 10kHz frequency is used as the standard for aligning the top end of the frequency response.

6.3 Set the calibration tape to the beginning of the frequency response section.

6.4 Connect an AC millivoltmeter to the output of channel one.

6.5 Start the calibration tape and use the first signal on the tape (a 1kHz reference signal) to set the output level control on the channel unit to indicate 0dB on the millivoltmeter.

6.6 The next signal on the tape is 31.5Hz, note any variation in output level from the 0dB reference for this and subsequent frequencies. They should all be within ± 2dB of this level.

6.7 Should the deviation from the reference be in excess of ± 2dB above 6.3kHz the replay top should be adjusted to bring the level within this range. This should normally be carried out on the 10kHz frequency signal.

6.8 If subsequent replays of frequency response section of the calibration tape (there are two repeats) indicate that although adjustment has brought the variation within ±2dB at 10kHz but is greater at other frequencies, then replay top should be adjusted at the frequency showing the highest variation. This may result in the variation at 10kHz being, say, 1.5dB rather than the 0.5dB that was achieved when the adjustment was carried out at 10kHz, the overall variation however at all frequencies will still be within ± 2dB.

6.9 Repeat 6.3 to 6.8 above for all remaining channels.

This concludes the alignment of the replay section of the tape recorder and the calibration tape should now be removed. The remaining alignment procedures are carried out with the tape normally used on the tape recorder.

7. RECORD BIAS ADJUSTMENT

7.1 Mount a reel of blank tape on the recorder

7.2 Connect an audio signal generator to the input of channel one

7.3 Set the generator to a frequency of 1kHz at a level of approximately 0dBm.

7.4 Set the line-in level control, with the monitor switch set to INPUT to give an indicated record level, on the VU meter, of -10dB.

7.5 Connect an AC millivoltmeter to the output of channel one

7.6 Start the deck in RECORD mode and switch the channel unit to RECORD ON and the monitor switch to REPLAY

7.7 Adjust the output level control to provide any convenient level on the millivoltmeter (e.g. -10dBm)

ADJUSTING THE RECORD BIAS

7.8 Set the audio signal generator to 10kHz at -10dBm

7.9 Turn the BIAS adjustment fully anti-clockwise and then slowly turn it clockwise. The output (observed on the millivoltmeter) will rise to a maximum and slowly start to fall.

Note the maximum value and continue increasing the bias until the output level has dropped by the correct amount for the particular tape used -

e.g.	BASF SPR 50	3.5dB below maximum
	Scotch 206	3.0dB below maximum

7.10 Repeat 7.2 to 7.9 for remaining channels.

8. RECORD/REPLAY TOP FREQUENCY ADJUSTMENT

8.1 Set the input signal as in sections 7.2 to 7.7 of the record bias adjustment.

8.2 Sweep the audio signal generator from 30Hz to 20kHz in steps of, say 100Hz up to 500 or 1kHz thereafter. Check that the response is within $\pm$2dB of the 1kHz reference set over the full range. Variation greater than $\pm$2dB can only be rectified at the top end of the bandwidth, above 6kHz. As with the replay top adjustment the control will vary the level by up to $\pm$1.5dB. Adjustment is best carried out at frequencies between 15kHz and 20kHz.

8.3 Repeat the above procedure for remaining channels.

9. ADJUSTING THE RECORD LEVEL

9.1 Connect an audio signal generator to the input of channel one

9.2 Set the generator to a frequency of 1kHz at an output level of approximately 0dBm.

9.3 Set the line in level control, with the monitor switch set to INPUT, to give a level of 0dB on the VU meter.

9.4 Start the deck in the RECORD mode and switch the channel unit to record on.

9.5 Change the monitor switch from line in to replay, if the VU meter indicates other than 0dB adjust the RECORD level control to bring the meter back to 0dB.

9.6 Return the monitor switch to line in. There should be no perceptible movement of VU meter needle, if there is, repeat 9.5.

9.7 Repeat 9.1 to 9.6 for the remaining channels.

APPENDIX A. ALIGNMENT

A 1 INTRODUCTION

A1.1 The alignment procedure is intended to bring the tape recorder to within the NAB specification (Ref A). It comprises the following procedures:

1. Adjusting the REPLAY gain
   Adjusting the SYNC gain
2. Adjusting the RECORD head azimuth
3. Adjusting the REPLAY head azimuth
4. Adjusting the RECORD head rotation
5. Adjusting the REPLAY head rotation
6. Adjusting the REPLAY top frequency response
7. Adjusting the RECORD bias
8. Adjusting the RECORD top frequency response
9. Adjusting the RECORD level

The first seven of these can only be carried out if a calibration tape is available (BASF Calibration Tape 15, or equivalent - see Appendix B). This will align the replay section of the tape recorder according to the NAB specification.

A1.2 The remaining adjustments, using the tape normally used on the tape recorder, effectively align the record section to the previously aligned replay section.

A1.3 It must be stressed that the tape recorder is fully aligned during manufacture and it is extremely unlikely that the majority of these adjustments will be necessary during normal use of this machine - the mechanical adjustment of the head assemblies (azimuth and rotation) is only required if they have been subject to mechanical shock or excessive wear. The adjustment likely to be made most frequently is the RECORD BIAS adjustment if a different recording tape is used. Apart from this only periodic checks on the gains and frequency responses are required.

A 2 PREPARATION

A2.1 Prior to attempting any of the alignment procedures, ensure:

a. that the correct test equipment is available - an AC Millivoltmeter scaled in dB (e.g. Levell TM3B) and an Audio Signal Generator (e.g. Levell 200DM)

b. That you are thoroughly familiar with the alignment procedure

c. That the correct calibration tape is available

d. That the heads, tape guides, capstan and any tools to be used on or near the heads are demagnetised prior to mounting the calibration tape. In professional recording studios it is standard practice to demagnetise heads and guides daily, before a session starts.

A2.2 If it is intended to carry out adjustments to the heads, the head cover (3.3) has first to be removed. It is secured by two (4BA) Allen screws. Figure A1 shows the relevant head adjustment screws and the meaning of the terms azimuth and rotation.

A2.3 If the calibration tape is to be used it is advisable to monitor the announcements and tones with headphones or speaker to ensure the correct section is being used. One of the channels not being aligned can be used for this purpose. The layout of the calibration tape is described in Appendix B.

A2.4 The calibration tape is intended for use at a speed of 15 inches/sec. (381 mm/sec) only.

A2.5 Before loading the calibration tape ensures that RECORD is OFF on all channel units. (It is a wise precaution to place a piece of adhesive tape across each switch to avoid inadvertent erasure of the calibration tape)

APPENDIX B — BASF CALIBRATION TAPE NO. 15

The Calibration Tape 15 is used for adjusting magnetic sound equipment at 15 ips tape seppd. The equalization in the frequency response section corresponds to 50 + 3,180 us.

The tape consists of 3 sections. The recordings are made across the full tape width, and the magnetization vector is parallel to the tape edges. Deviations hereof are smaller than ± 3 minutes. Tolerances mentioned below refer to full track playback.

1. Reference Level Section

When playing back this section, the reference level is determined. The recorded wavelength corresponds to a frequency of 1,000 Hz ± 0.3%. The effective tape flux in magnetic short circuit (see DIN 45 200) is 32 mMaxwell ±5%, for 1 mm of tape width. The harmonic distortion of the recorded signal is less than 2%

The duration of the signal is approximately 30 s.

2. Azimuth Alignment Section

This section serves the purpose of aligning the gap of the playback head. Furthermore it is used for approximate determination of the frequency response.

Two signals are recorded on this section. The first one whose wavelength corresponds to a frequency of 1,000 Hz lies 10dB below the reference level. Its duration is approximately 8 s.

The second signal whose wavelength corresponds to a frequency of 10,000 Hz ±5%, also lies 10dB below the reference level, taking into consideration the tape flux diagram. The duration of the signal is approximately 60 s.

The gap of the playback head is aligned by adjusting the gap position during playback of the 10,000 Hz signal until the output voltage reaches a maximum. Simultaneously the variations of the level are reduced to a minimum.

The equalization of the playback amplifier is correct, when the playback level of both the 1,000 Hz signal and the 10,000 Hz signal meet.

3. Frequency Response Section

This section is used for determining and adjusting, point by point, the frequency response of the playback amplifier. The following frequencies are recorded on the frequency response section: 1,000 - 31.5 - 40 - 63 - 125 - 250 - 500 - 1,000 - 2,000 - 4,000 - 6,300 - 8,000 - 10,000 - 12,500 - 14,000 - 16,000 - 18,000 - 1,000 Hz.

The duration of each signal is about 8 s and is identified by a preceding announcement. Deviations from the nominal frequencies are less than ±3%. The deviations from the level according to the time constant curve for the frequency range from 31.5 Hz up to 4,000 Hz are less than ± 0.5 dB and less than ± 1dB for the frequency range from 6,300 Hz up to 18,000 Hz.

The level of the 1,000 Hz signal lies approximately 20dB below the reference level. The frequency response of the tape flux corresponds to the impedance of a parallel combination of resistance and capacitor with a time constant of 50 us and a series combination of resistance and capacitor with a time constant of 3,180 us.

Each frequency starting from 4,000 Hz up to 18,000 Hz is repeated twice.

Appendix C

Mini 8 Logic Pinch Solenoid - 'Lock On' Adjustment

Single Solenoid Type

The purpose of this adjustment is to ensure that the pinch solenoid plunger 'Locks On' to achieve correct pressure between pinch wheel and capstan shaft, thus obtaining constant tape driving speed.

This adjustment will only affect the pinch plunger locking position, it will not alter the final pinch operating pressure.

Adjustment Procedure

1. Remove left hand wooden side panel

2. Remove back panel and disconnect fan leads

3. Ensure that pinch wheel carrier (diag: D1 SH-2) is correctly located on its drive pin. That is, make sure that the two 'Allen Screws' are tightened on to the 'Flat' of the drive pin squarely.

4. Go to rear of machine and push pinch solenoid plunger (Diag: G SH-1) slowly into the solenoid, until the pinch wheel touches the capstan shaft.

The plunger, if adjustment is correct, should not yet have reached the end of its travel by approximately 1.5 mm.

The last 1.5 mm. of plunger travel is the amount of movement required to tension the pinch pressure spring prior to 'Lock On' of the plunger. (Hereafter referred to as 'Spring Tension Travel')

If the 'Spring Tension Travel' of the plunger exceeds 1.5 mm, it will not achieve 'Lock On' and therefore the final pinch pressure will be 'Low' causing tape 'Slip' and erratic tape path.

5. If 'Spring Tension Travel' is excessive (i.e. if pinch operates but plunger does not 'Lock On') adjust as follows:-

5a. Loosen 2BA locknut on plunger

5b. Turn plunger 'Clockwise' (screw into solenoid) half a turn, and tighten lock nut.

Test Procedure After Adjustment

Insulate mains leads to fan

Switch on machine

Hold pinch carrier in 'Off' position firmly by hand

Push 'Play' button (still holding carrier firmly) and slowly allow the pinch wheel to move towards the capstan shaft.

If correct adjustment has been achieved, 'Lock On' will be heard as the pinch wheel contacts with the capstan shaft.

If 'Lock On' is not achieved, then repeat adjustment as in 5a and 5b a half turn at a time until correct. Finally, thread tape onto the machine and select fast forward mode.

Check that pinch wheel just clears the tape (see Diag: SH-2) if tape touches pinch wheel, then adjust 'Buffer Bracket' (Diag: SH-1)