27

SERVICE MANUAL

Wollensak

MODEL 8080

8—TRACK CARTRIDGE RECORD/PLAY BACK DECK



Mincom Division 3M COMPANY

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SECTION I. GENERAL

1.1 SPECIFICATIONS

Frequency Response	30 - 15,000 Hz with Scotch® special high performance tape. 30 - 12,000 Hz with standard tape (low frequency is averaged).
Wow and Flutter	0.1% wtd rms
Signal to Noise Ratio	Dolby System off: ⩾ 50 db Dolby System on: ⩾ 60 db at 4 kHz ⩾ 59 db at 2.4 kHz ⩾ 56 db at 1.2 kHz ⩾ 53 db at 600 Hz
Distortion	Less than 1% at 1 kHz at 0 VU
Speed	3-3/4 ips, 9.5 cm per sec
Line Output	1 volt from a 0 VU tape level
Headphone Output	Stereo – either high or low impedance
Microphone Input	0.25 mv and will accept a low "Z" 500Ω microphone
Auxiliary Input	80 mv with 5 KΩ "Z"
Recording System	High frequency bias and erase
Track Width	1/4" standard 8-track format; 2/4 channel format
Size	19-3/4" x 5" x 10-1/4" (50.1 cm x 12.7cm x 26.0 cm)
Weight	17 lbs. (8 Kg)
Power Consumption	120V, 50/60 Hz, 15 watts
Safety	Underwriters Laboratories Commercial Approval

IMPORTANT NOTICE TO PURCHASER

The following is made in lieu of all warranties, express or implied:

Seller's and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Neither seller nor manufacturer shall be liable for any injury, loss or damage, direct or consequential, arising out of the use of or the inability to use the product. Before using, user shall determine the suitability of the product for his intended use, and user assumed all risk and liability whatsoever in connection therewith.

No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

1.2 EQUIPMENT DESCRIPTION

1.2.1 Introduction

Your Wollensak® 8080 8-Track Cartridge Recorder Deck adds new flexibility to any sound system. It provides high fidelity playback of 2- or 4-channel 8-track cartridges plus full fidelity 2-channel recording of 8-track cartridges for playback through the 8080 and any 8-track player, such as car tape players. In addition, the 8080 can record on 2 channels for stereo playback.

One of the most significant features of your 8080 is the built-in Dolby* System, a switchable electronic circuit that reduces the noise added on tape during the recording process to almost inaudible levels. Your new 8080 also has the unique feature of being able to listen to, or record FM Dolby.

Another outstanding feature is the new tape switch incorporated in this unit to allow the use of regular 8-track tapes or the new Scotch high performance tape.

Beautifully styled and with advanced engineering features, the 8080 is extremely simple to operate. Insert cartridge to turn on and begin playing or recording. Eject cartridge to stop playing/recording and turn unit off. Auto eject logic circuitry allows you to play/record one track and eject, or all tracks in sequence and eject, or to continue playing one track or all tracks in sequence. A locking PAUSE control allows you to preset recording levels without transporting tape, a helpful aid in instant cueing during recording. Rapid advancement of the tape to any point is possible with the FAST WIND control, and a Digital Time Counter keeps accurate track in minutes and seconds of the playing/recording time.

The 8080 will play 2-channel tapes through any stereo receiver/amplifier and will record 2-channel tapes from any sound source, including microphones for "live" recording. For 4-channel playback, connection must be made to a 4-channel receiver/amplifier (or two 2-channel stereo systems) and 4 speakers.

Designed for ease of operation and long, trouble-free performance, the Wollensak 8080 provides the fidelity of tape and the convenience of 8-track cartridges for both 2- and 4-channel sound.

*Manufactured under license from Dolby Laboratories, Inc. The word Dolby and the "Dolby-D" device are trademarks of Dolby Laboratories, Inc.

The terms Wollensak and Scotch are registered trademarks of the 3M Company, St. Paul, Minnesota 55101

1.2.2 Features

● SWITCHABLE DOLBY SYSTEM NOISE REDUCTION CIRCUIT ● NEW TAPE SWITCH ● FM DOLBY DECODED LISTENING AND RECORDING ● PLAYS 2- AND 4-CHANNEL 8-TRACK CARTRIDGES ● RECORDS 2-CHANNEL 8-TRACK CARTRIDGES ● AUTOMATIC ON/OFF ● AUTO EJECT AFTER PLAYING ONE TRACK OR ALL TRACKS ● RECORDS PRERECORDED DOLBY TAPES FOR PROPER NOISE REDUCTION ● TIME COUNTER ● IMPROVED FAST FORWARD ● PAUSE CONTROL ● DUAL ILLUMINATED VU METERS ● DUAL SLIDER RECORDING LEVEL CONTROLS ● PROGRAM INDICATOR LIGHTS ● HEADPHONE MONITORING ● PLAYS THROUGH ANY SOUND SYSTEM ● RECORDS FROM ANY SOUND SOURCE ● WALNUT CABINET ● AC OUTLET

1.2.3 Operating Controls (See Figure 1.1)

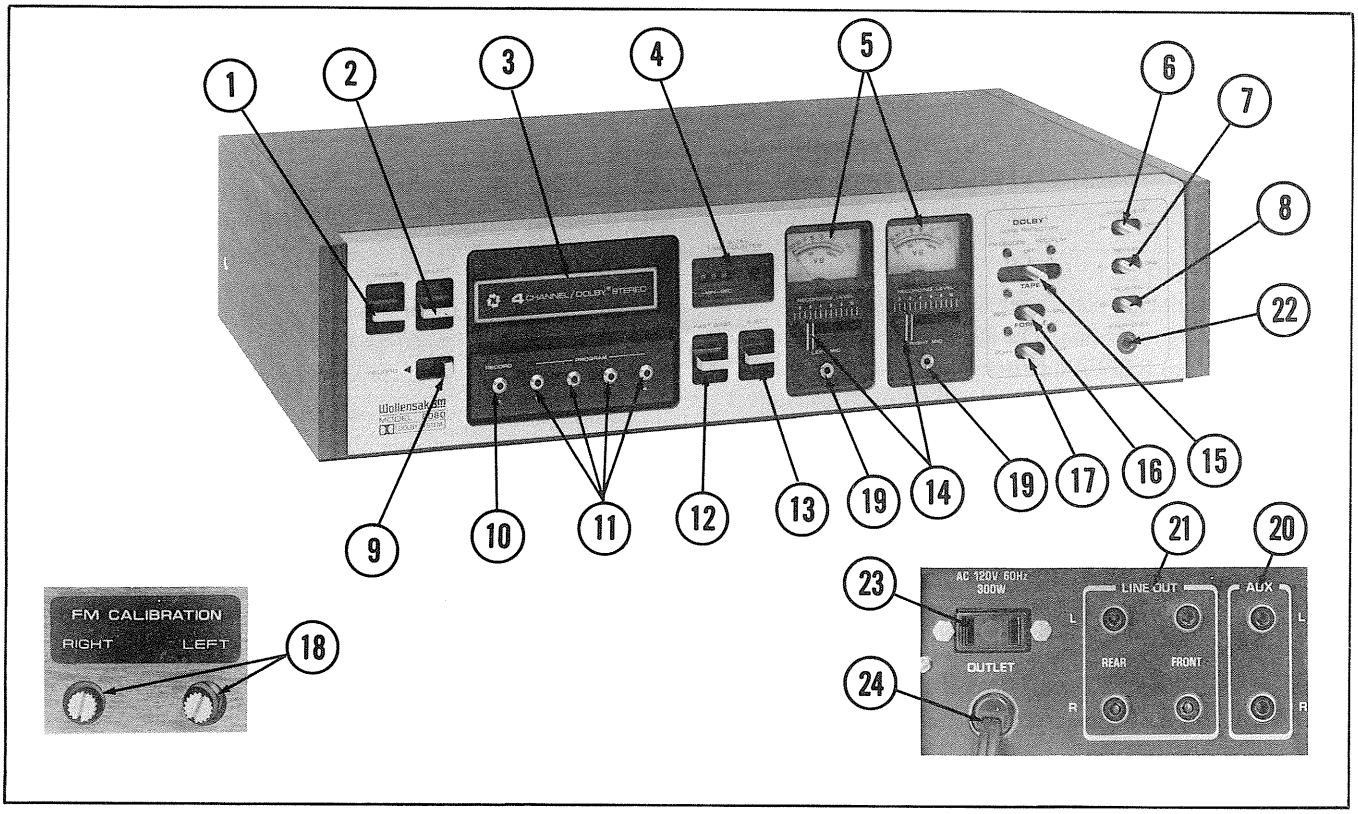
(1) *PAUSE CONTROL.* Momentarily stops tape during recording or playback without taking unit out of OPERATING mode. To operate, push lever down until it locks. To release, push up. PAUSE feature is useful in adjusting recording levels before starting tape, for instant cueing in play, and for accurate cueing at the start of a recording.

(2) *SELECT LEVER.* Push lever down to advance tape from track to track during playback. Track switching always operates in sequence: 1 to 2 to 3 to 4 to 1, etc. Lever is inoperative during recording unless PAUSE is pressed.

(3) *CARTRIDGE SLOT.* Standard 8-track cartridges are inserted here; hinged door retracts. Insert cartridge firmly all the way in, with detent on right side, until it "catches." Cartridge may be removed manually or by pressing EJECT lever.

(4) *TIME COUNTER AND RESET BUTTON.* Digital timer measures tape time in minutes and seconds during both PLAY/RECORD and FAST WIND operation. Reset to "000" at start of cartridge.

(5) *VU METERS.* Separate VU meters for each channel are specially calibrated to assure optimum recording level. For best results, adjust controls so that the meter needles just touch the red part of the scale (0 VU) on the loudest sounds being recorded. If the needles swing into the red area too often, the level is too high and the sound will be distorted. Too low a recording level may make it necessary to boost playback level to the point where noise and tape



hiss may become objectionable. However, a significant drop in tape noise will be noted if Dolby is on when low levels are recorded and on subsequent playback. Meters are always active, indicating relative recording levels or relative tape output during playback.

(6) *AUTO EJECT SWITCH.* During PLAY mode, controls automatic eject function interdependent with REPEAT switch. PLAY mode logic is:

a. AUTO EJECT ON – REPEAT ONE: Plays selected track, then ejects.

b. AUTO EJECT ON – REPEAT ALL: Plays tracks 1 through 4 in sequence, then ejects.

c. AUTO EJECT OFF – REPEAT ONE: Plays selected track only, replaying track continuously until cartridge is manually ejected.

d. AUTO EJECT OFF – REPEAT ALL: Plays all 4 tracks in sequence, replaying 1 through 4 in sequence continuously until cartridge is manually ejected.

In FAST WIND operation, if REPEAT switch is on ONE, cartridge will eject at end of track; if REPEAT switch is on ALL, cartridge will not eject until after the 4th track. If AUTO EJECT is OFF, FAST WIND will continue until lever is pushed up. In RECORD mode, the AUTO EJECT switch is inoperative and the setting of the REPEAT switch causes the cartridge to eject automatically after recording one or all tracks.

(7) *REPEAT SWITCH.* During PLAY mode, operates interdependently with AUTO EJECT switch to provide for continuous play of one or all tracks, or automatic ejection after one or all tracks. Play logic is the same as described in 1.2.3, 6, *Auto Eject Switch.* In RECORD mode, position of AUTO EJECT switch has no effect on operating logic. With REPEAT switch on ONE, the cartridge will record the selected track then eject. With REPEAT switch in ALL mode, the cartridge will record tracks 1 through 4 in sequence, then eject. However, in switching from track to track, there will be a track switch click and a very minute loss of signal.

(8) *FM LISTEN SWITCH.* To listen to FM Dolby radio broadcasts, the FM Dolby switch should be pushed to ON position. This turns unit on without necessity of inserting cartridge. Prior to recording, with switch in ON position, it will allow track switching regardless of EJECT switch position. Record levels can also be set when switch is on providing RECORD lever is held to the left while adjusting RECORD LEVEL controls.

(9) *RECORD LEVER.* Activates recording amplifiers, acting as a safety interlock to prevent accidental erasure of previously recorded tapes. To record, move lever to the left and hold while inserting cartridge. This starts recording except when PAUSE has previously been pressed. Lever will not latch into RECORD mode until a cartridge is inserted. RECORD lever turns unit on when DOLBY switch is in FM DECODE.

(10) *RECORD LIGHT.* Lights up when unit is in RECORD mode.

(11) *PROGRAM INDICATOR LIGHTS.* Automatically light up to indicate which set of tracks are being played or recorded.

(12) *FAST WIND LEVER.* Improved fast wind for rapidly advancing tape during play; lever will operate, but circuit is not active during recording. During FAST WIND, amplifiers are muted. When REPEAT switch is on ONE and AUTO EJECT switch is ON, the cartridge will automatically eject at end of track; if, however, REPEAT switch is on ALL, cartridge will not eject until after the 4th track; but, if AUTO EJECT switch is OFF, cartridge will continue fast winding until lever is pushed up. A 40-minute cartridge will fast wind in 3 minutes; an 80-minute cartridge will fast wind in 6 minutes.

(13) *EJECT LEVER.* Push down on lever to eject cartridge during recording or playback. If recording, unit automatically goes out of RECORD mode.

(14) *RECORDING LEVEL CONTROLS.* Separate sliding controls allow independent setting of each channel's recording level. Controls are not active during playback.

(15) *DOLBY SWITCH AND INDICATOR LIGHTS.* In the FM DECODE position, the Dolby decoding is switched in for listening to or recording Dolbyized FM broadcasts or other previously Dolbyized (encoded) program material. The FM LISTEN switch should also be switched to ON when listening to FM Dolby. The OFF position of the DOLBY switch turns off all Dolby. Recorder is now non-Dolby. When in the RECORD/PLAY position, Dolby encoding is supplied when in RECORD mode as well as proper decoding in PLAY mode. Dolby is utilized on the two *front* channels.

(16) *TAPE SELECTOR.* In the REGULAR position, the unit is equalized for standard tape (Scotch High Output-Low Noise). When using Scotch Low Noise Dynarange, a slight difference in output will be noted. If desired, this unit can be recalibrated for this tape by an authorized serviceman.

In the SPECIAL position, the unit is equalized for the new Scotch 8-track cartridge.

(17) *FORMAT SWITCH.* Set to 4 CHANNEL for playback of prerecorded discrete 4-channel tapes. Set to 2 CHANNEL for playback of 2-channel stereo cartridges.

(18) *FM DOLBY CALIBRATION ADJUST.* These controls are used to adjust the FM Dolby station to the proper levels as described under 1.9.3, *Listening to FM Dolby Broadcasts.*

1.2.4 Input/Output and Miscellaneous Connections (See Figure 1.1)

(19) *MICROPHONE INPUTS.* Front panel jacks for microphone connection. Microphone inputs have precedence over Auxiliary inputs and a plug in Microphone input disconnects Auxiliary input of corresponding channel. Jacks accept miniature phone plugs.

(20) *AUXILIARY INPUTS.* Jacks for receiving high-level signals to be recorded. Connect Left and Right Channel inputs to corresponding channel Tape outputs of stereo or 4-channel receiver, amplifier, tuner, etc. A microphone connected to front panel Microphone input jack automatically disconnects Auxiliary input jack of corresponding channel. Jacks accept standard pin plugs.

(21) *LINE OUTPUTS.* Front and Rear Channel Line outputs: Jacks for feeding tape playback signals to external amplifier. For 2- and 4-channel playback, connect Left and Right Channel outputs to corresponding channel Tape Monitor or Auxiliary inputs of stereo or 4-channel receiver, amplifier or other sound system.

(22) *HEADPHONE OUTPUT.* Provides for listening in 2-channel stereo playback, monitoring during recording. Output is sufficient for any standard low or high impedance stereo headphone. Jacks accept standard 3-conductor phone plug.

(23) *ACCESSORY AC OUTLET.* Provides AC power for accessories. Outlet is always "live," whether unit is on or off.

(24) *AC POWER.* Unit has permanently attached AC line cord. Connect only to 110-120 volts, 60 Hz, AC current.

1.3 ACCESSORIES

Description	Part No.
1. Patch Cord – Black	A196-32

(1) PATCH CORD – BLACK. A 4 foot pin-to-pin black colored cable for recording from, or playback through, external amplifiers supplied with the unit.

1.4 OPTIONAL ACCESSORIES

Description	Part No.
1. Microphone	A-0560
2. Microphone Stand	A-0489
3. Patch Cord Set	A-0589

(1) MICROPHONE. Dynamic omni-directional microphone, 10K ohms impedance.

(2) MICROPHONE STAND. Used for supporting the microphone.

(3) PATCH CORD SET. One black and one red pin-to-pin cable for patching to or from an external source.

1.5 OPERATING INSTRUCTIONS

1.5.1 Preparation for Recording or Playback

1. Plug the AC cord into a 110-120 VAC, 60 Hz outlet.
2. Make sure that the amplifier VOLUME control to the speaker is turned down. Changing connections while the VOLUME control is turned up may cause sound shock that will result in damage to speakers.
3. To connect the 8080 to a stereo system or to another recorder for recording or playback, connect the patch cords supplied as follows:
   a. Connect two patch cords from the Left/Right Auxiliary input jacks of the 8080 to corresponding Left/Right output terminals (Tape, Play, Auxiliary Monitor, etc.) of the stereo system. When using another recorder, this connection allows recording to be made from that recorder.
   b. Connect two patch cords for stereo or four patch cords for quadraphonic from the Left/Right line out jacks of the 8080 to corresponding Left/Right input terminals (Tape Rec, Rec, etc.) of the stereo system.

NOTE

In either hookup, do not plug output of 8080 into Tape Head inputs of amplifier and be sure Left and Right Channels are connected to corresponding Channel inputs. Playback level is adjusted by VOLUME controls of sound system.

1.6 RECORDING

1.6.1 Microphone Recording

1. Insert microphone plugs firmly into the Microphone inputs on the front panel. Connections to rear panel Auxiliary inputs may remain. Microphone input automatically disconnects corresponding channel Auxiliary input.
2. Because of the variable conditions in microphone recording, the following suggestions for general application may be helpful in microphone placement as shown in Figure 1.2. Microphone should be placed a reasonable distance away, depending on the volume reaching the microphones. The distance apart is dictated by the span of the sound source.

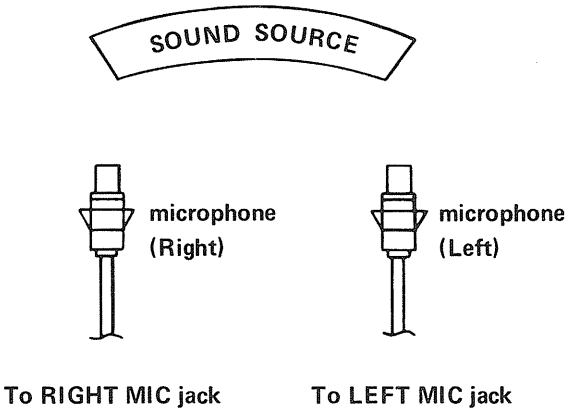


Figure 1.2. Microphone Placement

3. Check cartridge opening to determine if silver sensing tab is visible. If not, switch AUTO EJECT to ON, and REPEAT to ONE. Insert cartridge and push FAST WIND lever. Cartridge will eject at the beginning of the tape.
4. Press PAUSE lever, then insert cartridge. Set counter to "000."
5. Push AUTO EJECT switch to OFF, press SELECT lever to obtain track 1 or other desired track of the cartridge you wish to record on.

NOTE

SELECT lever will not operate unless a cartridge is inserted or when unit is in the RECORD mode.

6. To record one track, place REPEAT switch in ONE position. This will automatically eject cartridge and take unit out of RECORD mode. To record all 4 tracks consecutively, place REPEAT switch in ALL position. After recording all 4 tracks, cartridge will again automatically eject and go out of RECORD mode.

7. Put DOLBY switch in desired mode. When recording cartridges for playback on non-Dolby equipment, it may be desirable to record non-Dolby.

> **NOTE**
>
> When recording FM Dolby, switch must be in FM DECODE position to simultaneously listen to a decoded output signal. However, when playing back this recording, switch should be in REC/PLAY. Refer to paragraph 1.9.

8. TAPE switch should be in REGULAR position except when using the new Scotch high performance tape.

9. Press EJECT lever to release cartridge (PAUSE lever still pressed down). Next push RECORD lever and reinsert cartridge.

10. Adjust the RECORD LEVEL controls so that the highs of the sound source you wish to record peak at 0 VU.

11. After setting proper recording levels, begin taping by releasing PAUSE lever.

> **NOTE**
>
> Once recording has begun, be careful not to move the RECORD LEVEL controls; otherwise, the levels recorded will vary accordingly.

12. When recording is finished, the EJECT lever may be pressed to eject cartridge and disengage the RECORD mode. However, if cartridge is allowed to run to the end, the unit will automatically eject and shut off *unless FM LISTEN switch is on.* In this case, it will just eject the cartridge and *the recorder will remain on.*

13. If desired, you may monitor while recording through headphones connected to the Headphone output. It can also be used when recording FM Dolby.

1.6.2 Direct Input Recording

1. Connect the Model 8080 to the sound source being used as described in paragraph 1.5.1, 3.

2. When copying a prerecorded Dolby tape, the DOLBY switch should be on FM DECODE. Using a 400 Hz tone from a test tape or from the 400 Hz signal supplied on many Dolby tapes, adjust the output of the other recorder to read 0 VU on your 8080. Refer to paragraph 1.9.2, 4.

3. If the other recorder does not have an OUTPUT control, switch the 8080 DOLBY switch to OFF and adjust the 8080 RECORD LEVEL controls to read 0 VU.

4. Continue with your direct input recording preparation as described in paragraph 1.5.1, starting with step 3.

1.7 PLAYBACK

1. Connect patch cords to external sound system as described in paragraph 1.5.1, 3.

2. Put DOLBY switch in REC/PLAY if cartridge was recorded with Dolby. In playback, DOLBY REC/PLAY may also be switched in to reduce the noise on a particular cartridge.

3. Set AUTO EJECT and REPEAT switches for desired PLAY/EJECT operation. Switch AUTO EJECT to ON if you want cartridge to eject after playback. Switch to OFF if you want continuous playback. With AUTO EJECT on, switch REPEAT to ONE if you want to play only one track. Switch to ALL if you want to play all tracks in sequence.

4. Check cartridge opening to determine if silver sensing tab is visible. If not, switch AUTO EJECT to ON and REPEAT to ONE. Insert cartridge and push FAST WIND lever. Cartridge will eject at the beginning of the tape.

5. Press PAUSE lever; then insert cartridge. Press SELECT lever for desired track. Unit is now ready to play. Reset Digital Time Counter to "000" if desired. Push up on PAUSE lever.

6. To stop playback manually and turn off unit, push EJECT lever to eject cartridge. The cartridge can also be removed by hand.

7. For playing FM Dolby, refer to paragraph 1.9.3.

8. Stereo headphones may be connected to the Headphone output jack for private listening. Output jacks remain "live" and program can still be heard through sound system.

1.8 THE DOLBY SYSTEM

1.8.1 Introduction

- **Silence is an important part of music.** The notes of a score are only a part of the music a composer has written; the silence between the notes is the rest of it. Often, our enjoyment of music depends upon our ability to hear it against a background of silence. We expect this silence at a concert and we are disappointed when we do not have it.

- **Recorded music has always included noise.** Ever since the earliest days of music recording, home listeners have had to endure background noise. In recent years, scientists have learned that while such noise can never be completely removed, it is only noticed by the ear and brain of a listener under certain conditions. Research in both recording and psychology has led to the development of the Dolby System.

- **A circuit that listens to music.** The Dolby System is based on a patented circuit which is permanently "programmed" with information about the way in which the human ear and brain detect noise in the presence of music. When music is recorded through the circuit, the passages in which noise might be heard by a listener are anticipated and subtle adjustments automatically made during recording. When the recording is played, the same circuit reverses all of its earlier adjustments exactly, at the same time eliminating most of the noise introduced by the recording process.

- **The Dolby System is a standard professional instrument.** Because it reduces noise substantially without affecting the sound of the music, the Dolby System is used routinely by many recording companies and film studios. The best known recording companies each own hundreds of professional Dolby units. Now, a simplified version of the same system has been developed by Dolby Laboratories to reduce the noise of tape recordings to be played in the home. The new system is called the Dolby B System, and you can recognize prerecorded tapes which use it because they are marked with this symbol:  . Tape recorders such as the Wollensak 8080, receivers, and separate Dolby B System adapters which contain the special Dolby circuits, are marked with the words DOLBY or DOLBY SYSTEM. Both the "double D" symbol and the word "Dolby" are trademarks of Dolby Laboratories.

- **Q. Can Dolby System cartridges be played on a recorder without the special circuit?**

  A. Yes, and often with even better sound than ordinary cartridges. The brilliance heard on inexpensive players, such as those in cars, gives richer, clearer sound even though there is no noise reduction. On top hi-fi equipment, simply turning down the TREBLE control will give quite normal sound together with partial noise reduction as well.

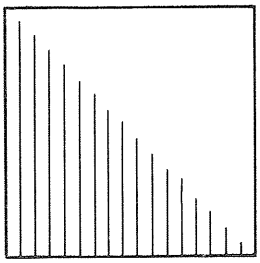
- **Q. How does the Dolby System work with the new kinds of tape, especially chromium dioxide tape?**

  A. To utilize the properties of the new tapes, recorders must be specially built for them; when that is done, treble response is improved, and some noise reduction – a fraction of that provided by the Dolby System – is also obtained. When the Dolby System is combined with facilities for using the new tape – as in the newest recorders like the Wollensak 8080 – the results are good enough to challenge the best recordings or broadcasts on professional equipment.

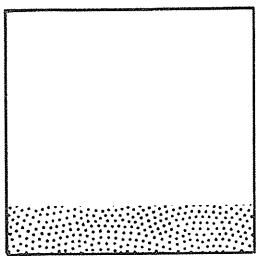
- **Q. Some noise reduction techniques work with any cartridge, even those not made by the Dolby System. How do they differ from the Dolby System?**

  A. Many of the sounds made by musical instruments are similar to noise; these sounds are cut out of the music by playback-only noise eliminators. Unlike the Dolby System, these devices hurt the music – the more noise they take out, the more musical sound is also chopped off. The Dolby System does not change the music at all, but at the same time it reduces noise very effectively.

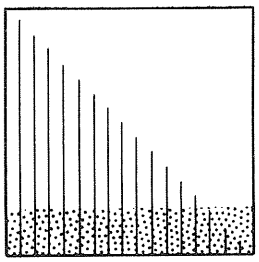
1.8.2 Making an Ordinary Recording



1. Music. Music is made of sounds of different loudness separated by intervals of silence. Loud and soft sounds are shown here as long and short lines. The music represented by this diagram starts loud and gradually becomes very quiet.

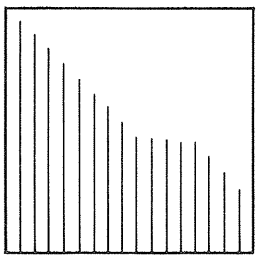


2. Noise. Any recording tape, even the best kind, makes a constant hissing noise when played. At the very slow speeds and narrow track widths used in tape cartridges, tape noise is much more noticeable than it is in professional tape recordings, although even there it is a problem.

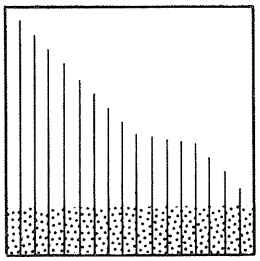


3. Music and Noise. When a tape recording is played, the noise of the tape conceals the quietest musical sounds and fills the silence when no sound should be heard at all. Only when the music is loud is the noise not usually heard; however, tape noise is so different from musical sounds that it sometimes can be heard even then.

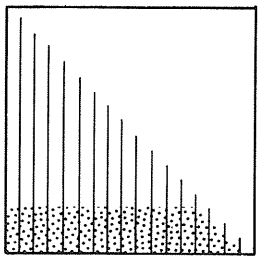
1.8.3 Making a Dolby System Recording



1. What the Dolby System does first. Before the recording is made, the Dolby System "listens" to the music to find the places where a listener might later be able to hear the noise of the tape. This happens mainly during the quietest parts of the music. When it finds such a place, the system automatically increases the volume of the higher frequencies so that the music is recorded louder than it would be normally.



2. The recording. In a Dolby System recording, the parts of the music which have been made louder stand out clearly from the noise. As a result, Dolby System recordings sound brilliant and unusually clear even when played back without the special Dolby System circuit.



3. What the Dolby System does during playback. When the tapes are played on a high-fidelity tape recorder equipped with the Dolby System circuit, the loudness of the higher frequencies is automatically reduced in all of the places at which it was increased during recording. This restores the music to its original fidelity again. At the same time, the noise which has been mixed with the music is reduced in loudness by the same amount – usually enough to make it inaudible.

1.9 DOLBY RECORDING

1.9.1 Listening To or Recording FM Dolby Broadcasts

The DOLBY switch on your 8080 allows you to *listen* to FM Dolby radio broadcasts through your sound system, providing proper Dolby playback circuitry that reduces the noise level of the FM signal. You may also *record* FM Dolby programs, as well as Dolby tapes for future playback, using the 8080 Dolby circuitry to provide correct encoding and decoding.

NOTE

Before playing or recording FM Dolby radio broadcasts, verify correct VU meter alignment as described in paragraph 1.9.2, 4.

1.9.2 Recording Dolby FM Broadcasts

1. Connect the Model 8080 to the sound source being used as described in paragraphs 1.5.1, 3.
2. Tune in desired FM Dolby radio station.
3. Put the DOLBY switch in FM DECODE, and FM LISTEN switch to the ON position.

CAUTION

DO NOT record a Dolby broadcast with DOLBY switch in REC/PLAY position, as you will be Dolbyizing a Dolby signal, creating distorted sound.

4. Adjust the VU meters by using the 400 Hz signal which is transmitted periodically throughout the day by most FM stations.

   As the signal is being broadcast, adjust the LEFT and RIGHT CALIBRATION controls located on the back of the unit, until both channel VU meters indicate "0."

5. Continue with recording procedure as described in paragraph 1.6.1 starting with step 3.

   When dubbing Dolby tapes from another recorder, this same procedure may be followed, thus providing you with a Dolby duplicate for playback through your 8080 Dolby circuitry. DOLBY switch should be in FM DECODE on your 8080 and the correct switching for non-Dolby on the other recorder.

1.9.3 Listening to FM Dolby Broadcasts

1. Connect the Auxiliary inputs of the 8080 to the output terminals (Tape, Monitor, Auxiliary, etc.) of the stereo FM receiver/tuner you are using.

2. Connect the line out jacks of the 8080 to an auxiliary sound system.

3. Tune in the desired FM Dolby radio station.

4. Put the DOLBY switch in FM DECODE. In this position the encoded FM signal is decoded and the motor is off.

5. Put the FM LISTEN switch in ON position. This switch turns the unit on without necessity of inserting a cartridge.

6. Adjust the VU meters as described in paragraph 1.9.2, 4.

You can now listen to an FM Dolby broadcast with correct playback decoding which will provide a greatly reduced noise level.

1.10 SOUND IDEAS

1.10.1 Optimum Recording Levels

Musical energy content can vary widely at different frequencies. Thus, it is not always desirable to set your recording levels at the same point for all recordings. For the majority of recording, 0 VU on your 8080 meters can be considered the maximum permissible level. However, on certain types of music encompassing extremely wide dynamic ranges, it is best to use a maximum level significantly less than 0 VU to prevent overloading of the tape. Here are some tips to help you determine proper levels:

- A cassette tape overloaded at low and/or midrange frequencies produces a "gargly" sound, as if the tape had "dropouts" or bad flutter.

- A cassette tape overloaded at high frequencies will produce a much duller sound than the original material being recorded. Either case of distortion caused by overload can be solved by lowering the overall recording level.

- The best way to prevent overload is to make a short trial recording of the loudest passages to be recorded, setting your level so that the peak sounds just hit 0 VU.

- If you cannot make a trial recording, and are not sure of the peak levels in the material to be recorded, it is always preferable to underrecord. The substantial hiss reduction afforded by the Dolby System allows you to do this with a minimum sacrifice in signal-to-noise ratio.

1.10.2 8-Track Cartridge Recording

8-track stereo and 4-channel cartridges offer the ideal combination of tape fidelity and convenience of use. Housed in a sturdy, protective plastic case is a continuous reel of tape. The tape is recorded at 3-3/4 inches per second and, depending upon length, the tape provides 40 to 80 minutes of 2-channel stereo playback, or 20 to 40 minutes of 4-channel playback. Each pair of stereo tracks thus provide either 10 or 20 minutes of continuous sound, while 4-channel tapes provide one-half that time. There is no rewinding or threading required, as the tape is spliced at one point to form the continuous loop. A special sensing tape at the splice point provides for automatic switching from track to track, in sequence. This allows for continuous play of the entire cartridge, with only a momentary interruption as the tracks switch, as the end of one track is the beginning of the next. As no rewinding is required, you can set your 8080 to continuously repeat the 4 tracks in sequence until you eject the cartridge.

All 8-track stereo cartridges are recorded at the same speed and in the same track arrangement (see Figure 1.3) so they may be played on any 8-track player. Thus any blank 8-track 2-channel cartridges recorded on your 8080 will play on any other 8-track 2-channel unit, such as car tape players, automatically without any adjustment.

In 4-channel (see Figure 1.3), the 2 front channels have the same arrangement as in 2-channel stereo; the front Left/Right outputs relate to the main left and right speakers and are derived from tracks 1 and 5 on the tape. The 2 secondary channels are the rear Left/Right outputs, and are derived from tracks 3 and 7 on the tape; the corresponding speakers may be located in the rear left and right corners of the room, or at the left and right sides.

1.10.3 Monitoring

Recording may be monitored through stereo headphones connected to the Stereo Phono output on the front panel. This monitors only the 2 front stereo channels.

1.10.4 Automatic Erasure

Whenever recorder is in the RECORD mode, any signal previously recorded on the tape is automatically erased at the point of the tape at which the new recording is made.

1.10.5 Tape Storage

When not in use, tape cartridges should be stored in the box supplied, thus protecting the tape from dust, dirt and damage. As there is practically no wear on magnetic tape, your cartridges may be played hundreds of times without loss of quality or fidelity. For optimum results and longevity, tapes should be stored at normal room temperatures, avoiding extremes of heat, cold and humidity.

1.10.6 Tape Protection

With Wollensak's superior design, heads never require demagnetization. They cannot retain permanent magnetism, which would tend to spoil previously recorded tapes.

1.11 SERVICE

The recorder you have purchased, has been carefully engineered and manufactured under Wollensak rigid quality standards, and will give you satisfactory and dependable operation. All moving mechanical levers have been factory pre-lubricated. All electrical circuits use solid state components which have extremely long life and reliability. However, like all electro-mechanical equipment it may occasionally require adjustments or maintenance. Should you ever need technical assistance, contact your Authorized Wollensak Warranty Station or Self-Servicing Audio-Visual Dealer.

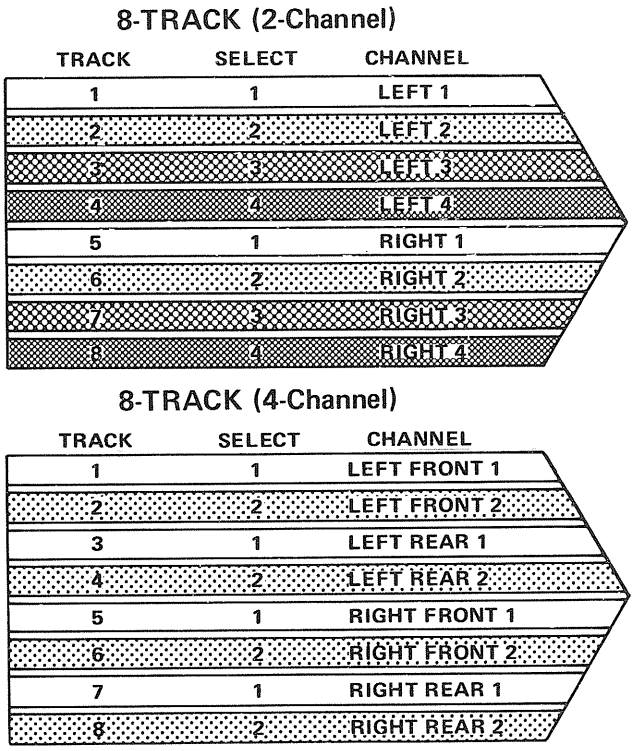


Figure 1.3. Track Location

SECTION II. PRELIMINARY SERVICE

2.1 ROUTINE CLEANING AND OPERATION

2.1.1 Purpose

Accumulation of tape oxide residue and other foreign material can cause wow and flutter, impaired erasure, reduced volume, and loss of high frequency response. These deposits are found on the tape head, capstan and tape guides. Perform the cleaning procedures outlined below after every 10 hours of operation, or as determined after frequent visual inspection.

2.1.2 Cleaning Procedures

1. Tape head – Use a soft, clean cloth or a cotton swab to remove most of the residue from the head. To soften hardened residue, use a cloth or swab moistened with alcohol or tape head cleaning solution.

CAUTION

1. Do not saturate the cloth or swab; dampening is sufficient. Use only tape head cleaning solution or methyl alcohol. Other volatile solvents can damage the tape head by dissolving the insulating compounds surrounding the head pole piece.
2. Do not touch the head with any magnetized, metallic, or abrasive material. The highly polished pole pieces and delicate tape head can be easily damaged by these materials.
3. Use a room with adequate ventilation when cleaning with volatile liquids.

2. Capstan – Move it by hand while cleaning it with a cotton swab or cloth dampened with methyl alcohol.

3. Chassis Mechanism – Use only a soft, clean cloth dampened in a cleaning solution to remove grease from belts, rollers, flywheel rims, and other drive parts. To clean sliding bars and lever, it is helpful to use a brush saturated with cleaning solution after the surfaces have been wiped with a cloth. Make sure the surfaces are dry after cleaning is completed. Lubricate the parts which normally require lubrication.

2.2 LUBRICATION

2.2.1 Preparation

Your Wollensak Model 8080 tape recorder is factory lubricated. Additional lubrication is not necessary more often than every 6 months, or before 500 hours of operation. Before applying additional lubrication, remove excess grease that has moved away from the point of lubrication. This grease picks up dirt and grit, causing excessive wear or binding when not removed.

CAUTION

Use oil and grease sparingly – do not over lubricate. The motor is factory lubricated and designed to operate in excess of 500 hours without lubrication.

2.2.2 Procedure

1. Disassemble the recorder (refer to paragraph 2.4.1). Lubrication is applied as follows:

   a. Apply grease to slide assembly, lever assembly and sliding contact area of other parts.

2.3 PRELIMINARY TESTS

2.3.1 Introduction

1. Verify that recorder is not operating correctly by attempting to operate equipment as described in Section I.

2. Check the power line cord for defects.

3. See that accessory equipment, such as the microphone and connecting cables are not defective.

2.3.2 Preliminary Test Procedures

1. Insert a prerecorded cartridge of known quality into the machine.

2. Play the prerecorded tape.

   a. How is the reproduction quality?

b. Are there any mechanical noises from the tape mechanism?

c. Inspect the tape and tape path.

1) Is the tape moving smoothly over the head at a constant speed?

2) Is there abnormal slack in the tape?

3. Remove the prerecorded cartridge and insert a cartridge of blank tape to make a microphone recording. Use a microphone known to be good. Play the recording when finished.

a. Is the reproduction quality and volume satisfactory?

b. Are any indications of a previous recording heard?

c. If the tape recorder produces a tape which plays satisfactorily, make a recording using the customer's (if available) microphone.

1) While recording, test the microphone cord for intermittent conductors by running the fingers of one hand down the cord, squeezing and rotating the cord all the way down to the plug.

2) Wiggle the microphone plug in its socket when the end is reached.

d. Play back the recording. If scratchy noises are heard, the microphone cable is defective and should be replaced. If the noise occurs at the end of the recording when the microphone plug was handled, check the plug for cold solder joints.

4. Refer to Sections III and IV of the manual to correct any faults observed.

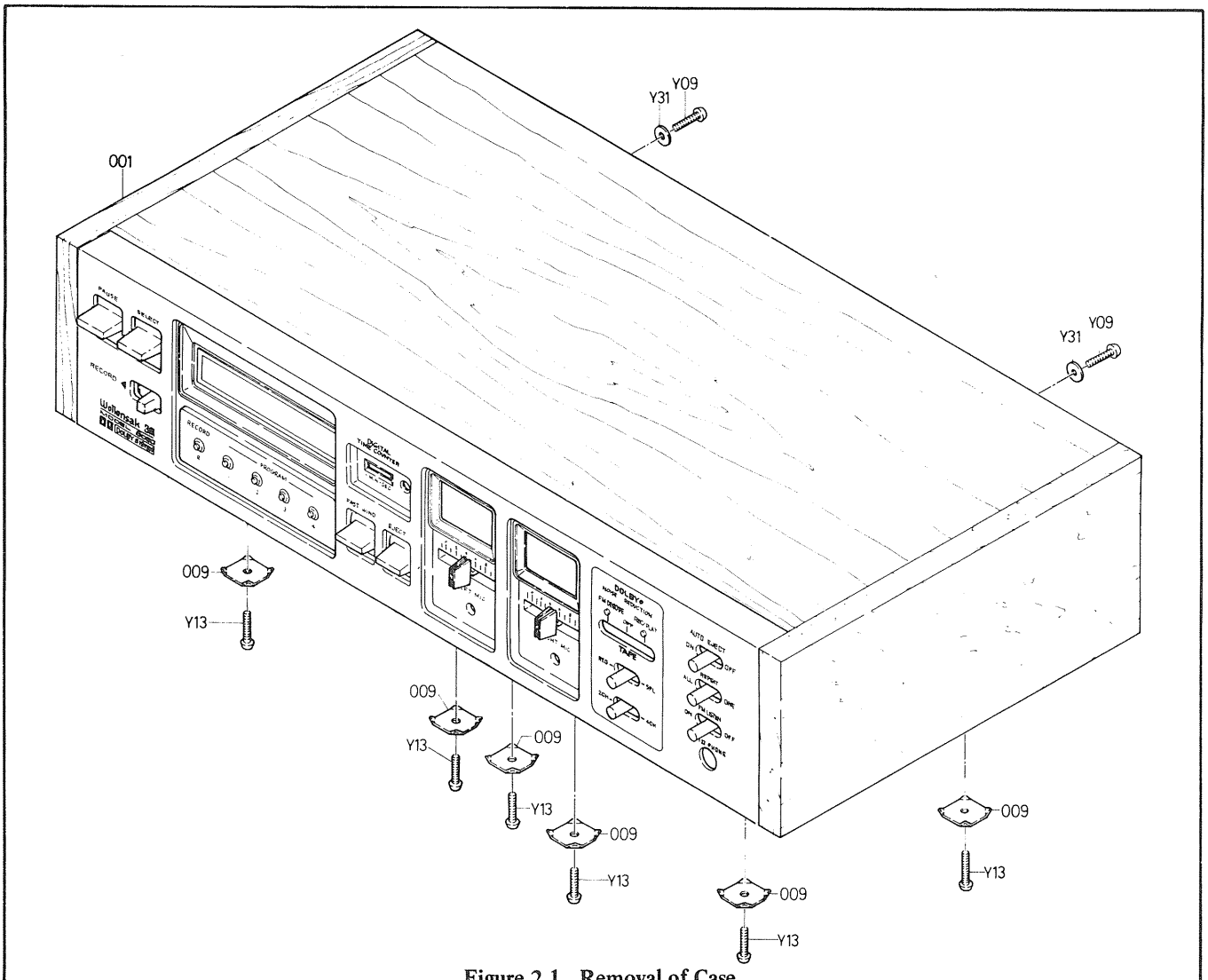


Figure 2.1. Removal of Case

2.4 DISASSEMBLY INSTRUCTIONS

2.4.1 Removal of the Cabinet (See Figure 2.1)

1. Pull out the cartridge from the cartridge slot.
2. Place the recorder in the OFF mode.
3. Turn the recorder upside down on a soft cloth.
4. Remove the 6 screws (Y13) from the bottom of cabinet.
5. Place the recorder in the upright position.
6. Remove the 2 screws (Y09) from the rear of cabinet.
7. Pull out the chassis (201) from cabinet (001).

2.4.2 Removal of the Chassis from Mechanism (See Figure 3.3)

1. Follow disassembly sequence as described in paragraph 2.4.1.
2. Remove the screw (Y17) that secures the motor shield (180). Remove the shield.
3. Remove the 4 screws (Y17) from the corners of the chassis (201).
4. Disconnect individual wires as required. Remove no more than necessary. Record each wire disconnected both by terminal and color to facilitate reassembly.
5. Lift off the chassis with care.

2.4.3 Partial Removal of the Amplifier Printed Circuit Board for Testing and Component Replacement (See Figure 3.3)

1. Follow disassembly sequence as described in paragraph 2.4.1.
2. Remove 4 screws (Y06) retaining printed circuit board (123).
3. Disconnect individual wires as required from the printed circuit board. Disconnect no more than required to permit reaching the component desired. Record each wire disconnected by terminal and color to facilitate reassembly.

2.4.4 Partial Removal of Dolby Board (See Figure 3.3)

1. Follow disassembly sequence as described in paragraph 2.4.1.
2. Remove screw (Y17) securing the Dolby board (152) to the Dolby chassis bracket (184).
3. Remove the two screws (Y17) and Dolby board bracket (183).

2.4.5 Removal of Flywheel (See Figure 3.4)

1. Follow disassembly sequence as described in paragraph 2.4.1.
2. Remove counter belt (243).
3. Loosen set screw (Y02) and remove the pulley bearing (244).
4. Place the unit on its side (power transformer up) and remove the two screws (Y06) and two screws (Y17) securing the flywheel bracket (219) to the chassis.
5. Remove both the flywheel bracket (219) and drive belt (215).
6. Remove the "E" ring (Y41) from the flywheel shaft, located inside the flywheel bearing assembly (207).
7. Remove flywheel.

2.4.6 Removal of Drive Belt

1. Follow the procedure as outlined in paragraph 2.4.5, steps 1, 4 and 5.

NOTE

When the rubber belt is replaced, care should be taken not to permit oil or grease to stick to the belt. If a little grease or oil is put on the belt, use a soft clean cloth or cotton swab to remove the residue from the belt.

2.4.7 Removal of the Motor (See Figure 3.4)

1. Follow disassembly sequence as described in paragraph 2.4.1.

2. Slip the drive belt (215) off the motor pulley (224).

3. Place the unit on its side (power transformer down) and remove the two motor mounting screws (223). The resistor grounding screw must also be removed from the motor mounting bracket (221).

4. Remove screw (Y17) and the motor shield (180) from the rear sub-chassis (102). See Figure 3.3.

5. Pull the motor (247) straight out away from the motor mounting bracket, being careful not to hook the motor pulley on the bracket.

SECTION III. TAPE TRANSPORT MECHANISM

3.1 DESCRIPTION

3.1.1 Play Operation

Inserting the cartridge will cause the slide assembly (255) and brake lever (211) to move forward simultaneously, switching on SW18 and SW6-B. The record lock slide (140) and slide assembly (255) switch on the SW6-A and SW12. This action will retrack the shaft of the eject solenoid (250) and eject slide plate (272) locking the slide assembly (255) at cartridge inserted position. Energy from the motor (247) transmitted to flywheel (218) through main belt (215).

3.1.2 Fast Wind Operation

When FAST WIND button (146) is depressed, FAST WIND switch S120 is activated. The motor is controlled without the electrical governor.

3.1.3 Eject Operation

When EJECT button is depressed, manual eject S133 is activated. This operates the eject solenoid (250) by pulling the plunger into itself and cam (part of 201) is turned clockwise. Eject slide plate (272) unlocks the slide assembly (255). The cartridge is ejected by spring coil (256). (Refer to Figure 3.1.)

3.1.4 Program Changing Operation

When SELECT button (146) is pressed down, PROGRAM SELECTING switch S134 is activated. Track changing solenoid (251) pulls and releases the cam actuating assembly (236). By this action, the cam assembly (241) is rotated clockwise 90^{o} changing the head height.

3.1.5 Pause Operation

When the PAUSE button is pressed down and locked, switch S123 is opened, thereby disconnecting the motor circuit.

3.1.6 Record Operation

When the RECORD knob (145) is fully moved to the left, S102 and S202 are placed in the RECORD position by RECORD lever (113) and record/play changing slide assembly (114). By inserting a cartridge while holding the RECORD lever (113) fully to the left, record/play changing slide assembly (114) is locked in recording position.

3.2 MECHANICAL TROUBLESHOOTING AND REPAIR

3.2.1 Unit has Wow

1. Inspect flywheel bracket (219) position in relation to the flywheel (218). Some endshake should be present.
2. Inspect the main belt (215) on the motor.
3. Check the belt (215), capstan (218), pulley (224) for any oil on them.
4. When all of the above have been checked out, replace the motor (247).

3.2.2 Slow Forward

1. Check the belt (215) for any oil or grease on it.
2. Check the motor control circuit board (284).

3.2.3 Excessive Current Drain

This fault is usually caused by a binding flywheel or defective motor. How to check:

1. Check endshake between the flywheel and capstan assembly and the flywheel bearing bracket.
2. Does it turn easily? If not, lubricate it.
3. Check the motor for excessive current drain.

				AUTO EJECT SWITCH	
				ON	OFF
2 CHANNEL	REPEAT SWITCH	ONE	PLAY & F. WIND	1 → EJECT	1 → 1 → 1 → 1
			RECORD	1 → EJECT	
		ALL	PLAY & F. WIND	1 → 4 → EJECT	1 → 4 → 1 → 4
			RECORD	1 → 4 EJECT	
4 CHANNEL	REPEAT SWITCH	ONE	PLAY & F. WIND	1 → EJECT	1 → 1 → 1 → 1
			RECORD	1 → EJECT	
		ALL	PLAY & F. WIND	1 → 2 → EJECT	1 → 2 → 1 → 2
			RECORD	1 → 2 → 3 → 4 → EJECT	

Figure 3.1. Repeat and Auto Eject Switch Positions

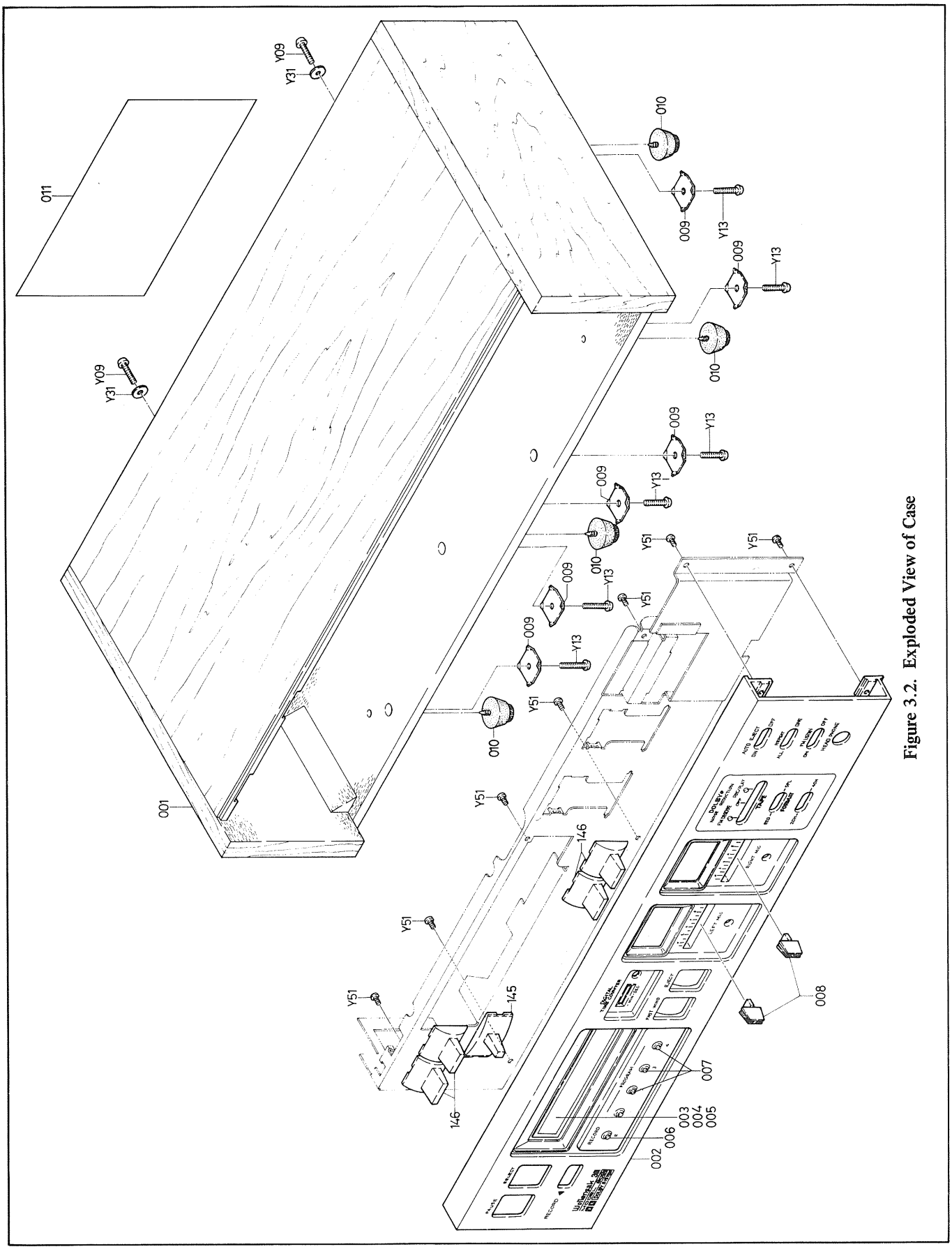


Figure 3.2. Exploded View of Case

Figure 3.2. Parts List

INDEX NUMBER	PART NUMBER	DESCRIPTION
001	81-48010322-5	Cabinet Assembly
002	81-48010358-9	Panel Assembly, Front
003	81-48010138-5	Leg Assembly, Rubber
004	81-48120121-8	Nameplate, Model and Serial
005	81-48030320-5	Lid Assembly, Cartridge
006	81-48120040-0	Bezel, Track and Record Lamp
007	81-48150046-0	Red Jewel, Record and Switch Lamp
008	81-48010112-0	Knob Assembly, Volume
009	81-48030089-6	Washer, Square
010	81-48150047-8	Green Jewel, Track Lamp
011	81-48120150-7	Rating Plate
012	81-48130077-0	Spring, Cartridge Lid
013	81-48120043-4	Label, Caution
145	81-48010111-2	Knob Assembly, Record
146	81-48010110-4	Knob Assembly, Function
Y07	81-49713008-8	Screw, Pan Head, 3 x 8 mm
Y09	81-49713012-0	Screw, Pan Head, 3 x 12 mm
Y13	81-49714016-0	Screw, Pan Head, 4 x 16 mm
Y31	81-49133130-2	Washer, 3.3 x 13 x 1 mm

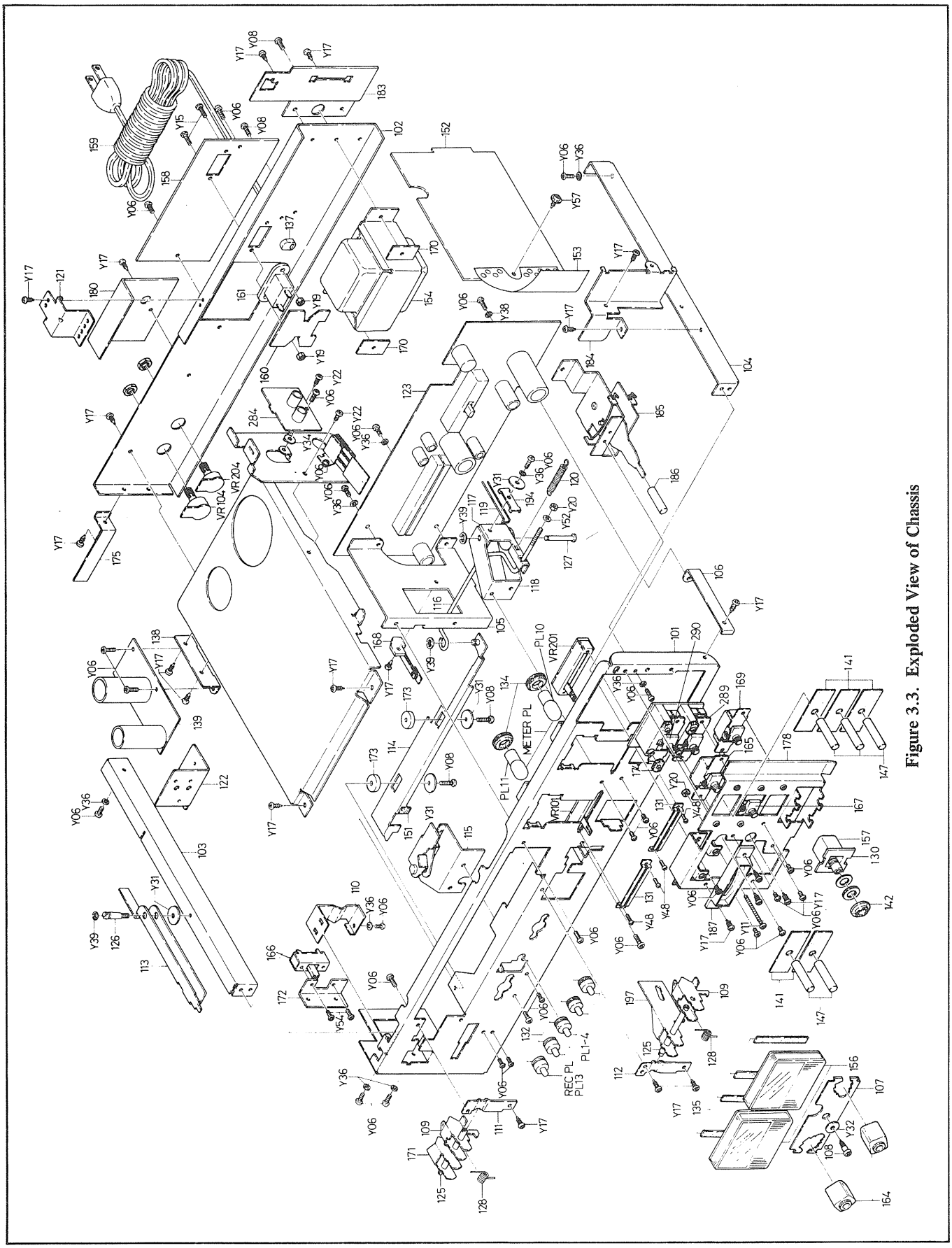


Figure 3.3. Exploded View of Chassis

Figure 3.3. Parts List		
INDEX NUMBER	PART NUMBER	DESCRIPTION
101	81-48030261-1	Chassis, Front
102	81-48030246-2	Sub-Chassis, Rear
104	81-48030247-0	Reinforcement, Side
105	81-48030248-8	Bracket, Amplifier
106	81-48030262-9	Bracket, Amplifier Support
107	81-48030309-8	Bracket, Microphone Socket
108	81-49790039-9	Special Screw, Microphone Socket
109	81-48030088-8	Lever, Pause and Eject
110	81-48130187-7	Plate Spring, Pause
111	81-48030316-3	Bracket, Select and Pause Shaft
112	81-48030100-3	Bracket, Fast Forward and Select Lever
113	81-48030091-2	Lever, Record
114	81-48010304-5	Slide Assembly, Record/Play Changing
115	81-48010305-2	Bracket Assembly, Slide Assembly
116	81-48040081-1	Rod, Record/Play
117	81-48030264-5	Lever, Record
118	81-48030093-8	Bracket, Record/Play Lever
119	81-48130188-5	Spring Wire, Record/Play Switch
120	81-48130079-6	Spring, Record Lever
121	81-48030311-4	Bracket, Rear Amp PC Board
122	81-48030312-2	Heat Sink
123	81-48230062-1	Amplifier Board, Complete
125	81-48040039-9	Shaft, Eject and Fast Forward Lever
126	81-48040043-1	Shaft, Record Lever
127	81-48040046-4	Shaft, Record/Play Lever
128	81-48130075-4	Spring, Eject and Select Lever
130	81-48150051-0	Bracket, Headphone Jack
131	81-48030102-9	Guide, Record Lever Control
132	81-46180003-9	Cushion, Track Lamp
134	81-46180004-7	Cushion, Meter Lamp
135	81-48090095-0	Felt Pad, Meter
137	81-46180005-4	Relief, Strain
138	81-48030095-3	Bracket, Eject Board Support
139	81-48230068-8	Eject Board, Complete
140	81-45030249-6	Slide, Record Lock
141	81-48090027-3	Veil, Switch Cover
142	81-46180006-2	Grommet, Headphone Jack
145	81-48010111-2	Lever Knob Assembly, Record
146	81-48010110-4	Lever Knob Assembly
147	81-48040040-7	Knob, Switch
151	81-48150050-2	Cushion, Record/Play Slide
152	81-48230067-0	PC Board, Dolby
153	81-48230065-4	PC Board, Flexible
154	81-46130016-2	Transformer, Power
155	81-46123031-0	CR Pack
156	81-46164012-0	Meter, VU
157	81-46174016-9	Socket, Headphone
158	81-48010325-8	Jack Plate with Jacks
159	81-46195002-4	Cord, Power
160	81-48230053-0	Foil Board, AC Outlet
161	81-46174044-1	Socket, AC Outlet

Figure 3.3. Parts List (Cont.)		
INDEX NUMBER	PART NUMBER	DESCRIPTION
164	81-46174008-2	Jack, Microphone
165	81-46141028-4	Slide Switch, Auto Eject
166	81-46141095-3	Slide Switch, Pause
167	81-46141028-4	Slide Switch, Repeat
168	81-46141073-0	Spring Switch, Manual Eject
169	81-46141018-5	Lever Switch, FM Listen
170	81-48030263-7	Plate Nut, Power Transformer
171	81-48010346-4	Lever, Pause
172	81-48030289-2	Bracket, Pause Switch
173	81-48040085-2	Ring, Slide
174	81-46180010-4	Grommet, Lamp Switch
175	81-48030290-0	Bracket, Switch
178	81-48030313-0	Bracket Assembly, Slide Switches
180	81-48090109-9	Fixer, Motor Lead
183	81-48030314-8	Bracket, PC Board, Dolby
184	81-48030292-6	Bracket, PC, Dolby
185	81-48030315-5	Lever, Knob Assembly Dolby
186	81-48040099-3	Knob, Dolby Select
187	81-48030317-1	Cover, Dolby Switch Lever
194	81-48030318-9	Fixer, Spring
196	81-48030319-7	Bracket, Pilot Lamp Dolby
197	81-48030259-5	Lever, Forward
284	81-48230047-2	Motor Governor Board, Complete
289	81-46141081-3	Lever Switch, Format
290	81-46141017-7	Lever Switch, Tape
291	81-46141082-1	Spring Switch, Pack S128
292	81-46141078-9	Spring Switch, Select
Y06	81-49713006-2	Screw, Pan Head, 3 x 6 mm
Y07	81-49713008-8	Screw, Pan Head, 3 x 8 mm
Y08	81-49713010-4	Screw, Pan Head, 3 x 10 mm
Y11	81-49713035-1	Screw, Pan Head, 3 x 35 mm
Y17	81-49733006-8	Screw, Self-Tap, 3 x 6 mm
Y20	81-49913000-3	Hex Nut, 3 mm
Y25	81-49130065-3	Washer, 3 x 6 x 0.5 mm
Y31	81-49133130-2	Washer, 3.3 x 13 x 1 mm
Y34	81-49333105-2	Fiber Washer, 3.3 x 10 x 0.5 mm
Y36	81-49613000-6	Spring Washer, 3 mm
Y39	81-49933000-9	"E" Ring, 3 mm
Y40	81-49934000-8	"E" Ring, 4 mm
Y48	81-49712004-8	Screw, Pan Head, 2 x 4 mm

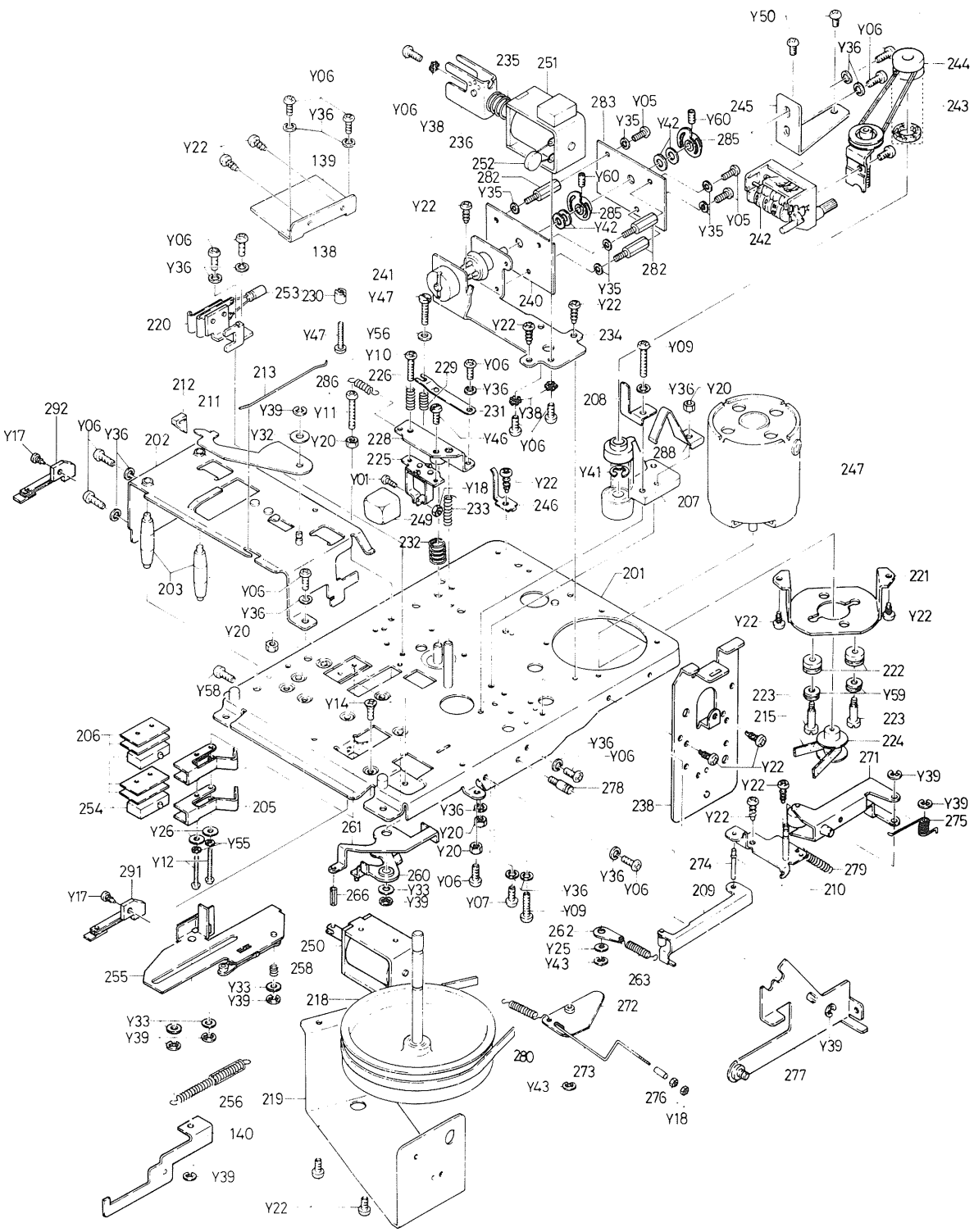


Figure 3.4. Exploded View of Tape Transport

Figure 3.4. Parts List		
INDEX NUMBER	PART NUMBER	DESCRIPTION
138	81-48030095-3	Bracket, Power Supply Board
139	81-48230068-8	Eject Board, Complete
140	81-48030249-6	Slide, Record Lock
201	81-48010326-6	Chassis, Main
202	81-48010308-6	Sub-Chassis
203	81-48150052-8	Roller, Sub-Chassis
205	81-48130183-6	Plate Spring, Switch
206	81-46182001-1	Insulator, Microswitch
207	81-48010327-4	Bearing Assembly, Flywheel
208	81-48030101-1	Bracket, Tape Guide
209	81-48010320-9	Roller Assembly, Pressure
210	81-48010127-8	Bracket Assembly, Lever
211	81-48030096-1	Lever, Cartridge Holding
212	81-48300023-8	Rubber Shoe, Cartridge Holding Lever
213	81-48130080-4	Spring Wire, Cartridge Lever
215	81-48300074-1	Belt, Drive
218	81-48010312-8	Flywheel Assembly
219	81-48010311-0	Bracket Assembly, Flywheel
220	81-46141025-0	Tape Guide Assembly, S135
221	81-48030250-4	Bracket, Motor
222	81-46180003-9	Mount, Rubber Motor
223	81-49790040-7	Screw, Motor
224	81-48040100-9	Pulley Assembly, Motor
225	81-48010119-5	Mount Assembly, Head
226	81-48130085-3	Spring, Head Azimuth
228	81-48010120-3	Bracket Assembly, Head Mount
229	81-48130085-3	Spring, Head Height
230	81-48040047-2	Stud, Nut
231	81-48130083-8	Plate Spring, Head Height
232	81-48130086-1	Spring, Head Mount
233	81-48130087-9	Spring, Head Mount
234	81-48030104-5	Bracket, Cam Solenoid
235	81-48130081-2	Spring, Solenoid Plunger
236	81-48010128-6	Bracket Assembly, Solenoid Actuating
238	81-48030251-2	Bracket, Motor Governor Board
240	81-48230051-4	Cam Switch Board, Track, S131 and S132
241	81-48010350-6	Cam Assembly, Track Changing
242	81-48090097-6	Counter, Tape
243	81-48300075-8	Belt, Counter
244	81-48010317-5	Pulley Assembly, Counter
245	81-48030253-8	Bracket, Tape Counter
246	81-48130082-0	Plate Spring, Cam
247	81-48090096-8	Motor, DC
249	81-46161026-3	Head, Record/Play
250	81-46134002-8	Solenoid, Eject
251	81-46134001-0	Solenoid, Channel Select
252	81-46123011-2	Diode, FR2
253	81-46114020-4	Capacitor, .1 μfd, 50V, Mylar
254	81-46141026-8	Microswitch, Cartridge Interlock
255	81-48010316-7	Slide Assembly, Eject
256	81-48130088-7	Spring, Eject

Figure 3.4. Parts List (Cont.)		
INDEX NUMBER	PART NUMBER	DESCRIPTION
258	81-48130089-5	Spring, Stop Lever
260	81-48010319-1	Cam Assembly, Eject
261	81-48030252-0	Lever, Eject
262	81-48090101-8	Lug, Spring
263	81-48130185-1	Spring, Pressure Roller Assembly
266	81-49950015-5	Spring Pin, 3 x 1 mm
271	81-48010133-6	Lever Assembly, Fast Wind
272	81-48010309-4	Plate Assembly, Eject Slide
273	81-48090099-2	Rod, Pressure Roller
274	81-48040048-0	Shaft, Roller Assembly
275	81-48130092-9	Spring, Roller Assembly
276	81-48040083-7	Spacer, Rod
277	81-48010314-4	Lever Assembly, Fast Wind Lock
278	81-48040084-5	Shaft, Eject and Fast Wind
279	81-48130189-3	Spring, Fast Wind Lever
280	81-48130186-9	Spring, Plate Assembly
282	81-49790041-5	Screw, PC Board Mounting
283	81-48230052-2	Cam Switch Board Format and Mode
285	81-48010135-1	Wiper Assembly, Cam
286	81-48130094-5	Spring, Head Assembly
288	81-48130195-0	Spring, Plate Eject
292	81-46141078-9	Spring Switch, Select, SW6
293	81-46141080-5	Spring Switch, Fast Wind, SW3
Y01	81-49712006-3	Screw, Pan Head, 2 x 6 mm
Y04	81-49712018-8	Screw, Pan Head, 2 x 18 mm
Y05	81-49712606-0	Screw, Pan Head, 2.6 x 6 mm
Y06	81-49713006-2	Screw, Pan Head, 3 x 6 mm
Y07, Y46	81-49713008-8	Screw, Pan Head, 3 x 8 mm
Y09	81-49713012-0	Screw, Pan Head, 3 x 12 mm
Y10	81-49713014-6	Screw, Pan Head, 3 x 14 mm
Y11	81-49713035-1	Screw, Pan Head, 3 x 35 mm
Y17	81-49733006-8	Screw, Self-Tap, 3 x 6 mm
Y18	81-49912000-4	Hex Nut, 2 mm
Y20	81-49913000-3	Hex Nut, 3 mm
Y22	81-49790014-2	Screw, Self-Tap, Binder Head, 3 x 6 mm
Y25	81-49130065-3	Washer, 3 x 6 x 0.5 mm
Y26	81-49130085-1	Washer, 3 x 8 x 0.5 mm
Y33	81-49140108-9	Washer, 4 x 10 x 0.8 mm
Y34	81-49612300-1	Spring Washer, 2.3 mm
Y35	81-49612600-4	Spring Washer, 2.6 mm
Y36	81-49613000-6	Spring Washer, 3 mm
Y38	81-49633000-2	Washer, Ext. Tooth, 3 mm
Y39	81-49933000-9	"E" Ring, 3 mm
Y41	81-49935000-7	"E" Ring, 5 mm
Y42	81-49241065-9	Washer, 4.1 x 6.5 x 0.5 mm
Y43	81-49932000-0	"E" Ring, 2 mm
Y45	81-49733010-0	Screw, Self-Tap, 3 x 10 mm
Y47	81-49713016-1	Screw, Pan Head, 3 x 16 mm
Y50	81-49713004-7	Screw, Pan Head, 3 x 4 mm

4.1 DOLBY SYSTEM

4.1.1 Dolby Noise Reduction System

One of the major noise factors with a tape recorder is tape hiss. This noise is derived from the magnetic characteristics and sliding properties of the magnetic surface of the tape. The noise comprises high and medium frequencies, and is generated through the magnetic head during recording and playback. Generally, the hiss noise is suppressed by a low-pass filter included in the reproduction circuit or by means of a tone control circuit. These methods, however, deteriorate the frequency response in the higher frequency range. The Dolby Noise Reduction System has been developed to minimize the hiss noise without any adverse effect on the frequency response and transient characteristic (see Figure 4.1).

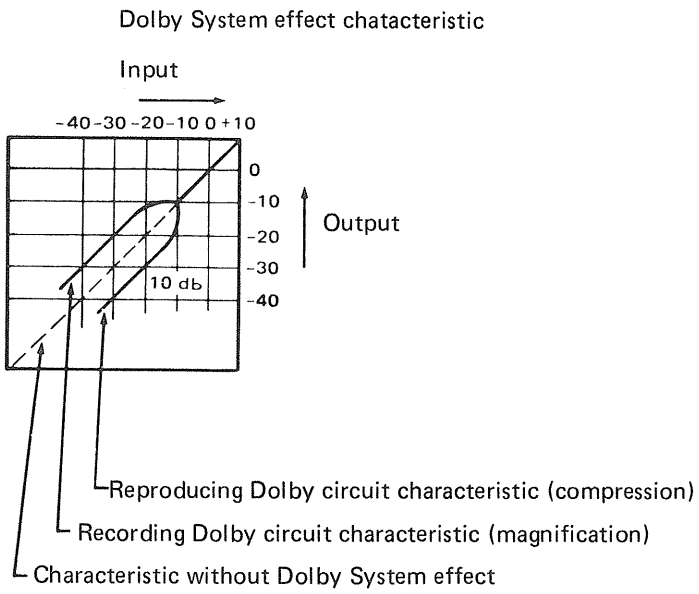


Figure 4.1. Dolby Noise Reduction System

4.1.2 Principles of the Dolby System

When reproduced music comprises strong sound (fortissimo), tape hiss is not noticeable by the listener because the noise level is far below that of the music signal and is masked by the reproduced music. However, when reproduced music is of weak sound (pianissimo), the level of music signal is near that of tape hiss, resulting in the noise irritating the listener (see Figure 4.2). This effect of noise has been found to be reducible by increasing the recording level at the time of recording pianissimo while the level of tape hiss is left unchanged, and by lowering the level of pianissimo reproduction as much as was increased during the recording. The Dolby System is devised to conduct the above process automatically in both recording and playback, with no adverse effect on music. Thus, unlike other systems, the Dolby System does not apply constant magnification and compression to all signals of a certain level, but varies the magnification and compression effect according to the level of input signal. In addition, the Dolby System applies the effect to the sound of medium and high frequencies with which noise is most noticeable.

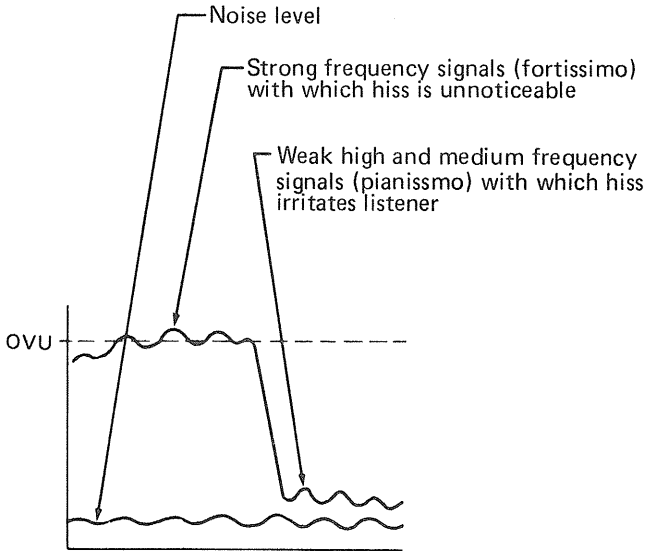


Figure 4.2. Signal and Noise Levels

4.1.3 Effect of the Dolby System

The upper curve in Figure 4.3 shows the recording/playback overall noise level due to tape hiss and tape equipment noise without music or input signal. As the curve shows, noise is spread over a wide frequency range. If music is recorded and reproduced by the tape and tape equipment having this overall noise level, higher frequency noise and tape hiss will be heard distinct from the reproduced music, although they are scarcely noticeable, provided that the music chiefly comprises low and medium frequencies, since the noise and hiss are masked by the music sound. The main component of higher frequency sound is harmonics of musical instruments which are low in level; therefore, the masking effect is not so effective. The lower curve in Figure 4.3 shows the recording/playback overall noise level with the Dolby System effect applied. As seen from this curve in comparison with the upper curve, the noise level in the higher frequency range is largely decreased, as much as 5 db at 1 kHz and about 10 db at 4 kHz and higher frequencies with respect to the signal-to-noise ratio. This improvement virtually widens the dynamic range of the tape equipment, permitting more natural hi-fi sound to be recorded and reproduced.

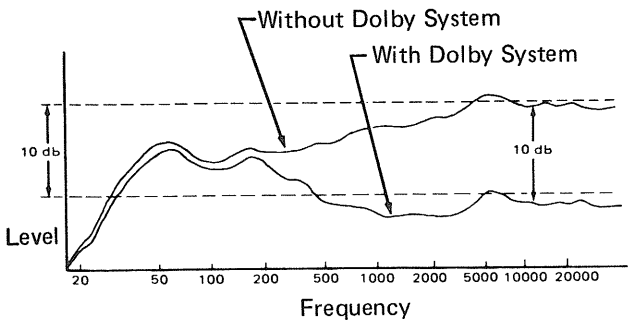


Figure 4.3. Noise Characteristics

4.1.4 Recording With the Dolby System

Lower frequency signals are not passed through the Dolby System effect circuit, but are supplied straight from the pre-amplifier to the recording compensating circuit for recording. Medium and high frequency signals pass the high-pass filter into the Dolby System effect circuit. If the medium and high frequency signals have a high level, a voltage is produced after the rectifier. This voltage decreases the amplification degree of the amplifier by means of the FET used variable-gain control. With the decreased degree of amplification, the amplifier has a smaller output, which in turn makes lower the ratio of the output to be added to the straight signal. Addition of the medium and high frequency signals in no way increases the level to higher than original. When the level of medium and high signals is low, a low voltage is produced after the rectifier. This low voltage causes the amplifier to have an increased degree of amplification, resulting in a larger output of the amplifier. The signal amplified at the increased degree of amplification joins the straight signal in the summing circuit. The resultant frequency response is emphasized at medium and high frequencies. The extent of emphasis is greater for the smaller input signal (see Figure 4.4).

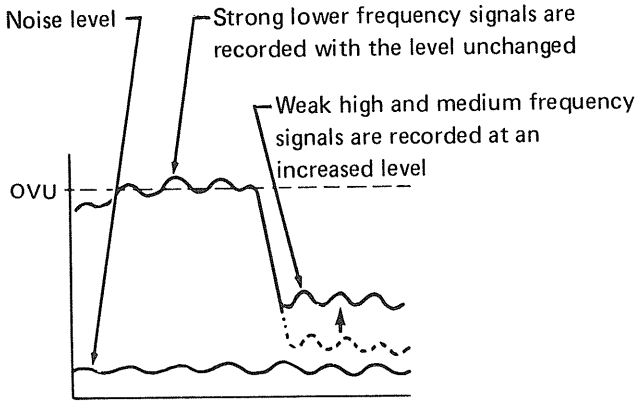


Figure 4.4. Recording With Dolby

4.1.5 Playback of Dolby Recordings

The playback process is exactly the reverse of the recording process. That is, the degree of amplification is decreased more for the smaller input signal. This is to subtract the portion of signal which was added at the time of recording. In practice, this process can be done simply by inverting the phase of the signal to be supplied to the summing circuit (see Figure 4.5).

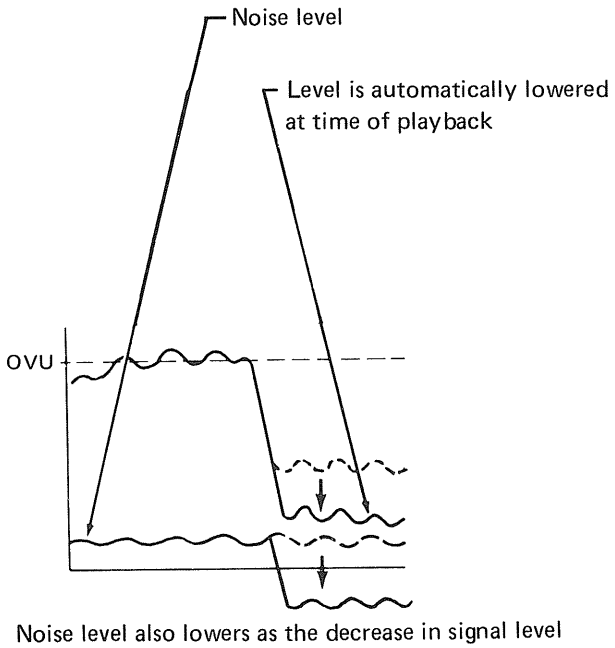


Figure 4.5. Dolby Playback

4.1.6 Availability of Dolby Level Calibration Tapes

The operation of the Dolby B-type noise reduction circuit in consumer tape equipment depends on a defined relationship between a voltage in the noise reduction circuitry and a standard flux level referred to as Dolby Level. This relationship is established by the adjustment of calibration controls on the equipment together with the use of an appropriate Dolby Level calibration tape.

The following is a list of where the appropriate calibration 8-track cartridges may be obtained:

Marantz Co.
P.O. Box 99
Sun Valley, CA 91352

4.2 CIRCUIT DESCRIPTION

4.2.1 Amplifier

The amplifier is a conventional Record/Playback stereo circuit with a discrete component Dolby Noise Reduction System. Four-channel playback capabilities are provided by two additional head preamplifiers.

Q101, 201	First Preamplifier
Q102, 202	Second Preamplifier
Q103, 203	Record Head Driver
Q104, 204	Power Stage for Headphone
Q401	Third Preamplifier
Q402	Fourth Preamplifier
Q451	Left Rear Line Driver
Q452	Right Rear Line Driver
Q301	Fast Wind Sound Muting
Q302, 303	Bias Oscillator
Q304	Track Change Solenoid Driver
Q305	Voltage Regulator Stage

The remaining solid state devices form the Dolby Noise Reduction processing circuitry.

4.3 ELECTRICAL TROUBLESHOOTING

4.3.1 Dead in Record or Playback

Note all playback checks apply to Left and Right Rear Channels. Check for the following conditions:

1. When a cartridge is inserted, the meter lamps should light. If they do not, check the power supply circuit.

2. If the meter lamps are lit and the motor is energized, check for proper connection of the head wires to both the amplifier and the record/play head.

3. Inspect the amplifier printed circuit boards for both open and delaminated foils. Check for cold solder joints and broken wire connections.

4. Upon verification of the points as stated in steps 1 through 3 and the unit still fails to operate, using a DC VTVM check for correct operating voltages as indicated on the schematic diagram. Start at the output stage and work toward the input stage.

5. Check line out for Left and Right Rear Channels. Repeat steps 3 and 4 if output is not present.

4.3.2 Playback is Present, But Record is Distorted

Check the following:

1. Microphone and audio cables.

2. RECORD/PLAY SLIDE switches (S102 and S202) for poor or dirty contacts.

3. Check for proper bias voltage as described in paragraph 4.4.4.

4. Open or cold solder joints on the amplifier boards as described in paragraph 4.3.1, 3.

5. Correct record/play head azimuth. Refer to paragraph 4.4.1.

4.3.3 Noisy Playback, Weak or High Frequencies Missing

1. At the record/play head, check for the following:

   a. Cold solder joints.

   b. Grounded leads.

   c. Open or intermittent record/play head.

   d. Oxide buildup on the face of the head.

   e. Condition of the face of the head. The record/play head should be smooth, with no scratches or pits.

2. RECORD/PLAY SLIDE switches (S102 and S202) for poor or dirty contacts.

3. Verify the azimuth as described in paragraph 4.4.1.

4.4 ELECTRICAL TEST AND ADJUSTMENTS

4.4.1 Head Azimuth and Height Adjustment (See Figure 3.4)

1. Follow disassembly sequence as described in paragraph 2.4.1.

2. Connect a VTVM to the line output jacks.

3. To adjust head height:

   a. Insert a head height alignment cartridge.

   b. Adjust the head height screw (Y10) for a maximum indication on the VTVM for both Channels left and right.

4. To adjust head azimuth:

   a. Insert a head azimuth alignment cartridge.

   b. Adjust head azimuth screw (Y07) for a maximum indication on the VTVM for both Channels left and right.

4.4.2 VU Meter Adjust

1. Follow disassembly sequence as described in paragraph 2.4.1.

2. Connect a signal oscillator to the Auxiliary input jacks. Adjust the oscillator to a setting of 1 kHz, 0 db.

3. Using a VTVM, connect the probe to the emitter of Q104 (Left Channel) or Q204 (Right Channel).

4. Put the recorder in the RECORD mode. Adjust the RECORD LEVEL controls to a nominal indication of 980 mv on the VTVM.

5. Adjust the Meter Variable Resistor SVR103 (Left Front Channel) or SVR203 (Right Front Channel) until you obtain a 0 VU level indication on the meters.

4.4.3 Amplifier Gain Adjust

1. Follow disassembly sequence as described in paragraph 2.4.1.

2. Connect a VTVM to the line output jacks.

3. Disconnect the head lead wires from the record/play head, and reconnect them to a signal oscillator. Adjust the oscillator to a setting of 1 kHz, -60 db.

4. Put the recorder in the PLAY mode.

5. Adjust the Play Gain Variable Resistor SVR101 (Left Front Channel) or SVR201 (Right Front Channel) until a 1V indication is obtained on the VTVM.

> **NOTE**
>
> There are no gain adjustments for the Left or Right Rear Channels.

4.4.4 Bias Check

1. Follow disassembly sequence as described in paragraph 2.4.1.

2. Connect the probe of a VTVM in parallel with C303 and the erase head lead wire.

3. Put the unit in RECORD mode.

4. The correct bias voltage indication on the VTVM must be 70 VAC.

5. If the bias voltage is not correct, the head may require replacement or circuit components have failed.

> **NOTE**
>
> The following procedures apply only to the Left and Right Front Channels. The Rear Channels have playback capabilities only.

4.4.5 Record Sensitivity Adjust

1. Follow disassembly sequence as described in paragraph 2.4.1.

> **NOTE**
>
> Before proceeding further, verify that the VU meters are properly aligned. Refer to paragraph 4.4.2.

2. Connect a signal generator to the Auxiliary Line input jacks. Adjust the generator to a setting of 1 kHz, 0 db.

3. Insert a blank cartridge. Put the unit in RECORD mode, and adjust the record level controls until both meters indicate 0 VU.

4. Record a short passage on the tape.

5. Put the recorder in PLAYBACK mode, and play back the passage you just recorded.

6. Both channels should play back at ±1 db from 0 VU. If not, adjust the Record Gain Variable Resistor SVR102 (Left Channel) and SVR202 (Right Channel). Repeat steps 4-6, if necessary, until correct setting is obtained.

4.4.6 FM Dolby Trap Adjustment

1. Follow disassembly sequence as described in paragraph 2.4.1.

2. Connect a signal oscillator to the Auxiliary Line input. Adjust the oscillator to a setting of 19 kHz, -20 db.

3. Using a VTVM, connect the probe in parallel with C155 and L152 (Left Channel) or C255 and L252 (Right Channel).

4. Put the recorder in PLAY mode, and the DOLBY switch in FM DECODE position.

5. Adjust the coil (L152 or L252) until a minimum voltage indication is obtained on the VTVM.

4.4.7 Dolby Calibration

1. Follow disassembly sequence as described in paragraph 2.4.1.

2. Connect a signal oscillator to the Auxiliary Line input. Adjust the oscillator to a setting of 5 kHz, -18 db.

3. Put the recorder in the RECORD mode with the DOLBY switch in the OFF position.

4. Short TP254 (Left Channel) or TP154 (Right Channel) to ground. See Figure 4.9 Component Side.

5. Connect the probe of a VTVM to TP153 or TP253. Adjust SVR151 or SVR251 to allow maximum voltage.

6. Remove the VTVM probe from TP153 or TP253 and reconnect the probe to TP152 or TP252. Adjust the RECORD LEVEL controls until a voltage of 17.5 mv is indicated on the VTVM.

7. Put the DOLBY switch in the RECORD/PLAY position. Adjust SVR152 or SVR252 for a gain of 10 db (at TP152 or TP252) from the DOLBY OFF mode.

8. Remove the short from TP154 or TP254. Adjust SVR151 or SVR252 for a drop of 2 db at TP152 or TP252.

9. Reinsert the jumper from TP154 or TP254 to ground. Voltage indication should now return to that as stated in step 7.

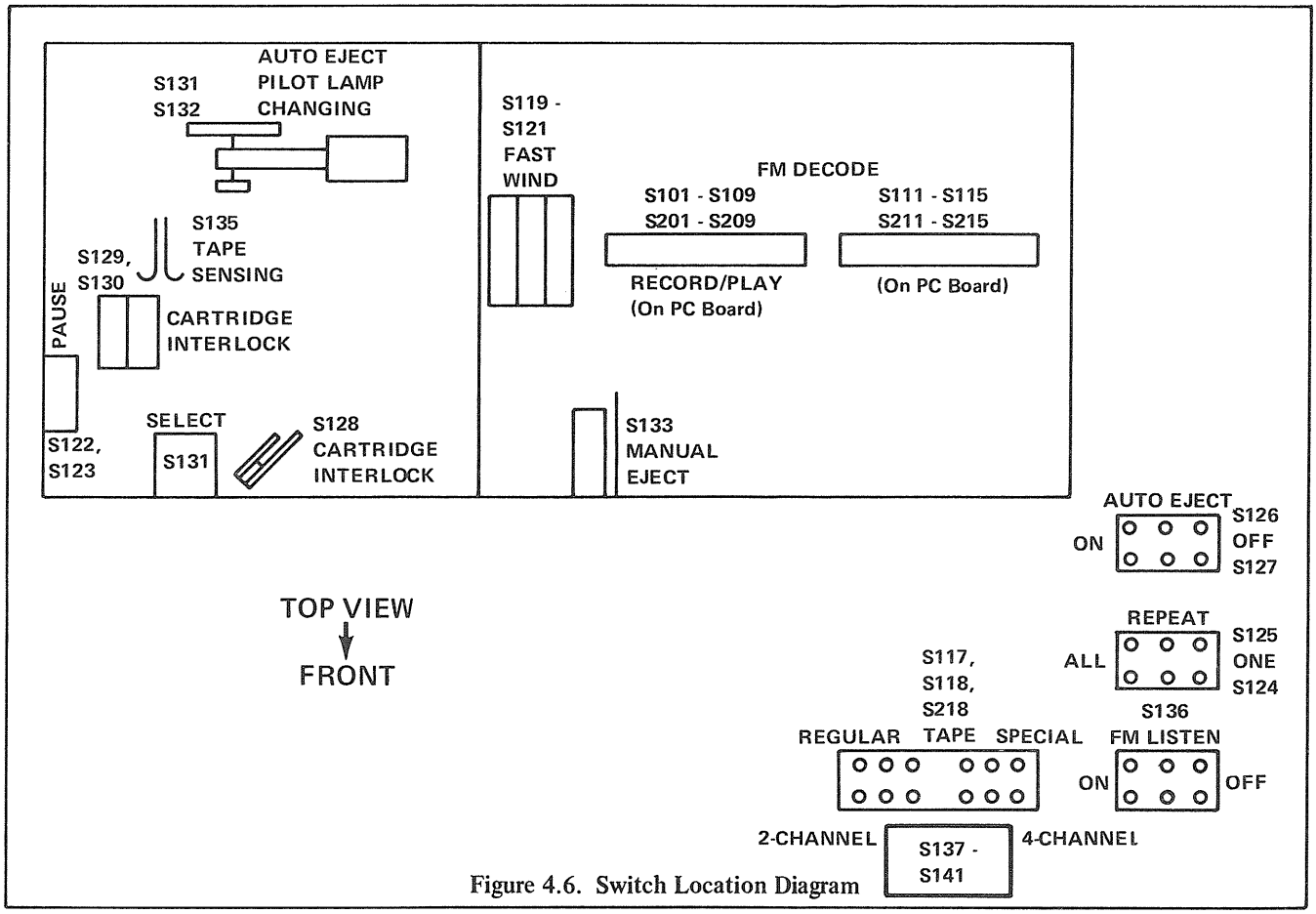


Figure 4.6. Switch Location Diagram

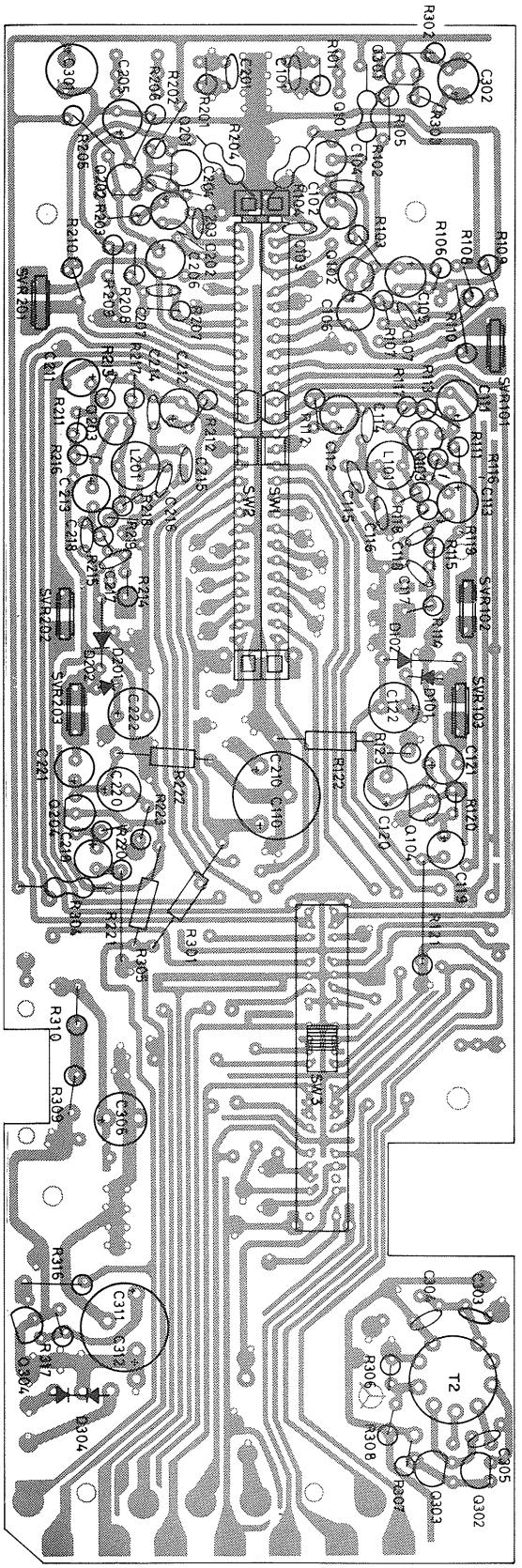


Figure 4.7. Amplifier Board (Component Side)

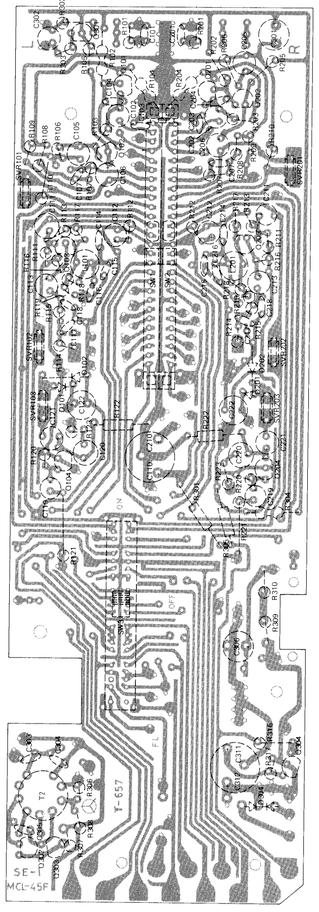


Figure 4.7. Amplifier Board (Foil Side)

Figure 4.7. Parts List

All Resistors are 10%, 1/4 Watt Carbon Unless Noted.

INDEX NUMBER	PART NUMBER	DESCRIPTION
R101, 201	N/A	39K Ohm
R102, 202, 303	N/A	47K Ohm
R103, 203	N/A	220K Ohm
R104, 204, 121, 221	N/A	220 Ohm
R105, 205, 119, 219	N/A	6.8K Ohm
R106, 206	N/A	1.2K Ohm
R107, 207	N/A	330K Ohm
R108, 208, 113, 213	N/A	22K Ohm
R109, 209	N/A	33K Ohm
R110, 210, 116, 216	N/A	5.6K Ohm
R111, 211	N/A	150K Ohm
R112, 212, 306	N/A	10K Ohm
R114, 214, 302	N/A	10 Ohm
R115, 215	N/A	18K Ohm
R117, 217	N/A	1K Ohm
R308	N/A	2.2K Ohm
R120, 220	N/A	100K Ohm
R122, 222	N/A	680 Ohm, 1/2 Watt, 10%
R123, 223	N/A	390 Ohm
R124, 224, 321	N/A	2.7K Ohm
R301	N/A	470 Ohm, 1/2 Watt, 10%
R304	N/A	1.5K Ohm
R305	N/A	390 Ohm, 1/2 Watt, 10%
R307	N/A	22 Ohm, 1 Watt, 10%
R309, 310	N/A	56 Ohm, 2 Watt, 10%
R320	N/A	22 Ohm, 1/2 Watt, 10%
C102, 202, 106, 206, 111, 211, 119, 219, 121, 221	81-46116030-1	2.2 μf, 25V, Electrolytic
C103, 203	81-46114087-3	820 pf, 50V, Ceramic
C101, 201	81-46110041-4	150 pf, 50V, Ceramic
C104, 204	81-46110043-0	100 pf, 50V, Ceramic
C107, 207	81-46114017-4	0.0047 μf, 50V, Mylar
C110, 210	81-46116043-4	220 + 220 μf, 25V, Electrolytic
C112, 212	81-46116100-4	0.1 μf, 16V, Electrolytic
C113, 213	81-46116079-8	1 μf, 25V, Electrolytic
C114, 214	81-46114085-7	0.027 μf, 50V, Mylar
C115, 215, 108, 208, 123, 223, 303	81-46114004-8	0.0068 μf, 50V, Mylar
C116, 216	81-46114036-0	0.01 μf, 50V, Mylar
C117, 217, 118, 218	81-46114056-8	0.0015 μf, 50V, Ceramic
C105, 205	81-46116101-2	33 μf, 6.3V, Electrolytic
C120, 220		33 μf, 16V, Electrolytic
C122, 222	81-46116006-1	100 μf, 6.3V, Electrolytic
C124, 224	81-46110023-2	330 pf, 50V, Ceramic
C125, 225	81-46114001-4	0.001 μf, 50V, Ceramic
C301	81-46116057-4	220 μf, 16V, Electrolytic
C302	81-46116053-3	4.7 μf, 25V, Electrolytic
C304	81-46114003-0	0.0022 μf, 50V, Ceramic

Figure 4.7. Parts List (Cont.)

INDEX NUMBER	PART NUMBER	DESCRIPTION
C305	81-46114046-9	0.022 μf, 50V, Mylar
C306	81-46116072-3	100 μf, 35V, Electrolytic
C312, 313	81-46116088-9	220 + 470 μf, 35V, Electrolytic
D101, 201, 102, 202	81-46123001-3	Diode, 1S188
D306	81-46123034-4	Diode, DS131
L101, 201	81-46133020-1	Coil, 3.9 mH
L102, 202	81-46133041-7	Coil, 15 mH
Q101, 201	81-46125053-2	Transistor, 2SC644S
Q102, 202, 103, 203, 104, 204, 301	81-46125059-9	Transistor, 2SC945Q, R
Q302, 303, 305	81-46125055-7	Transistor, 2SC1318Q, R
SVR101, 201	81-46140080-6	Variable Resistor, Play Gain Adjust, 10K Ohm
SVR102, 202	81-46140081-4	Variable Resistor, Record Gain Adjust, 50K Ohm
SVR103, 203	81-46140013-7	Variable Resistor, Meter Adjust, 2K Ohm
S101-109, 201-209	81-461410946	Switch, Record/Play
S111-115, 211-215	81-46141099-5	Switch, Dolby
OSC. Coil	81-46132029-3	Transformer, Oscillator

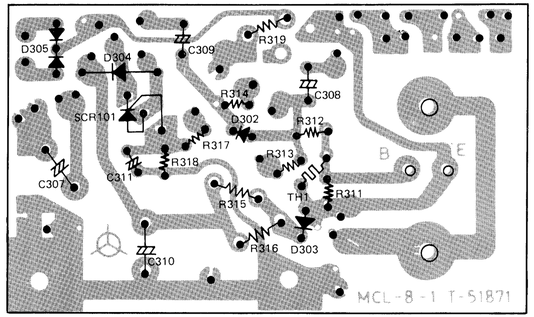


Figure 4.8. Ejector Board Component Layout

Figure 4.8. Parts List		
All Resistors are 10%, 1/4 Watt Carbon Unless Noted.		
INDEX NUMBER	PART NUMBER	DESCRIPTION
R311, 314	N/A	47 Ohm, 1/2 Watt, 10%
R312	N/A	220 Ohm, 1/2 Watt, 10%
R313	N/A	10 Ohm, 1/2 Watt, 10%
R315, 316	N/A	220 Ohm, 3 Watt, 10%
R317	N/A	1.8K Ohm
R318	N/A	1K Ohm
R319	N/A	56 Ohm, 3 Watt, 10%
C307	81-46116037-6	1000 μf, 25V, Electrolytic
C308, 309	81-46116072-3	100 μf, 35V, Electrolytic
C310	81-46116039-2	1000 μf, 35V, Electrolytic
C311	81-46116079-8	1 μf, 25V, Electrolytic
D302, 303, 304	81-46123043-5	Diode, 1N4001
D305	81-46123035-1	Diode, DS17
SCR101	81-46123046-8	SCR, 2P1M
Q304	81-46125060-7	2SB481
TH1	81-46143004-3	SDT-04

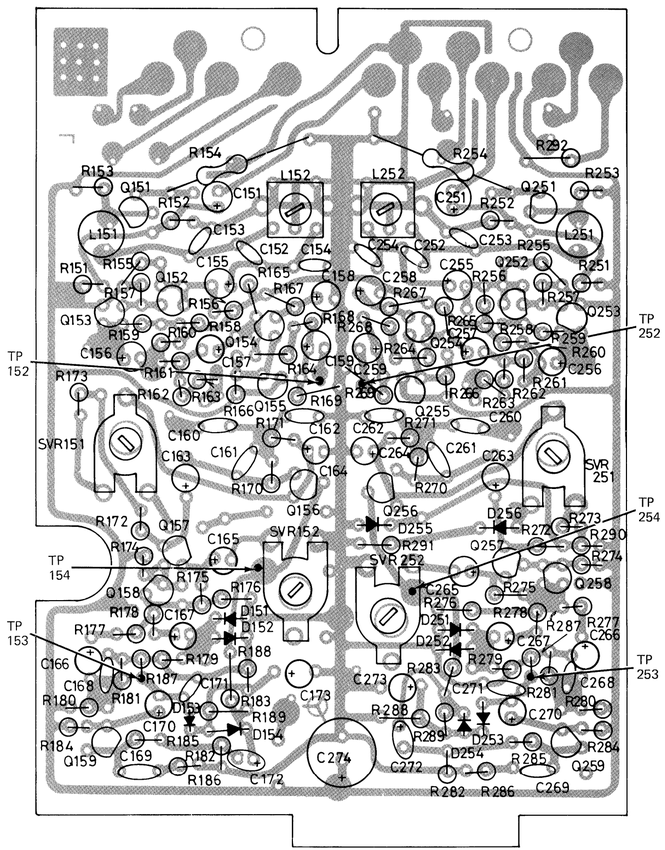


Figure 4.9. Dolby Board (Component Side)

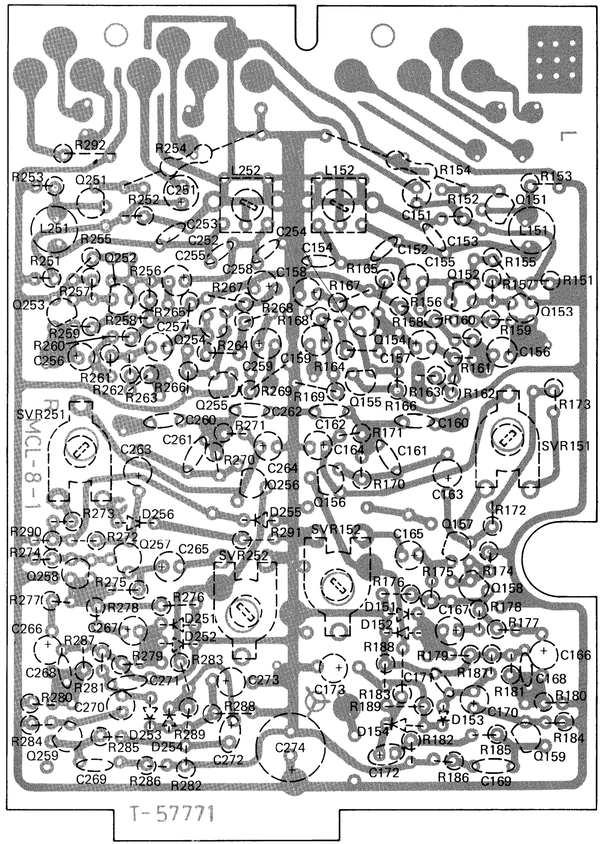


Figure 4.9. Dolby Board (Foil Side)

Figure 4.9. Parts List

All Resistors are 10%, 1/4 Watt Carbon Unless Noted.

INDEX NUMBER	PART NUMBER	DESCRIPTION
R151, 251, 188, 288, 189, 289	N/A	270K Ohm
R152, 252, 181, 281	N/A	47K Ohm
R153, 253, 171, 271	N/A	3.3K Ohm
R154, 254	N/A	470 Ohm
R155, 255	N/A	56K Ohm
R156, 256	N/A	6.8K Ohm
R157, 257, 290	N/A	2.2K Ohm
R158, 258	N/A	100 Ohm
R159, 259	N/A	750 Ohm
R160, 260, 179, 279	N/A	33K Ohm
R161, 261, 168, 268	N/A	150K Ohm
R162, 262, 165, 265	N/A	27K Ohm
R163, 263	N/A	68K Ohm
R164, 264	N/A	18K Ohm
R166, 266	N/A	22K Ohm
R167, 267	N/A	1.5K Ohm
R169, 269, 184, 284	N/A	2.7K Ohm
R170, 270	N/A	39K Ohm
R172, 272	N/A	680K Ohm
R173, 273	N/A	12K Ohm
R174, 274, 187, 287	N/A	15K Ohm
R175, 275, 177, 277, 178, 278	N/A	8.2K Ohm
R176, 276	N/A	10K Ohm
R180, 280	N/A	120K Ohm
R182, 282	N/A	33 Ohm
R183, 283	N/A	220K Ohm
R185, 285	N/A	1K Ohm
R186, 286	N/A	47 Ohm
R291	N/A	680 Ohm
R292	N/A	330 Ohm, 1 Watt, 10%
C151, 251, 155, 255, 156, 256, 157, 257, 164, 264, 167, 267, 170, 270	81-46116015-2	10 μf, 16V, Electrolytic
C152, 252	81-46114085-7	0.0027 μf, 50V, Mylar
C153, 253	81-46114084-0	0.0039 μf, 50V, Ceramic
C154, 254	81-46114003-0	0.0022 μf, 50V, Ceramic
C158, 258	81-46116005-3	33 μf, 6.3V, Electrolytic
C159, 259	81-46116004-6	4.7 μf, 16V, Electrolytic
C160, 260	81-46110080-2	3000 pf, 50V, Styrol
C161, 261	81-46110076-0	4700 pf, 50V, Styrol
C162, 262	81-46114082-4	0.03 μf, 50V, Mylar
C163, 263, 166, 266, 173, 273	81-46116100-4	0.1 μf, 16V, Electrolytic
C165, 265	81-46116048-3	47 μf, 6.3V, Electrolytic
C168, 268, 171, 271	81-46114001-4	0.001 μf, 50V, Ceramic
C169, 269	81-46114062-6	0.1 μf, 50V, Mylar

Figure 4.9. Parts List (Cont.)

INDEX NUMBER	PART NUMBER	DESCRIPTION
C172, 272	81-46116101-2	0.33 μf, 16V, Electrolytic
C175	81-46110007-5	15 pf, 50V, Ceramic
C274	81-46116016-0	470 μf, 16V, Electrolytic
D151, 251, 152, 252, 154, 254	81-46123038-5	Diode, DS442
D153, 253, 256	81-46123001-3	Diode, 1S188
D255	81-46123044-3	Zener Diode, WZ081
L151, 251	81-46133045-8	Choke Coil, 36 mH
L152, 252	81-46133046-6	Choke Coil, 23 mH
Q151, 251, 152, 252, 154, 254, 155, 255, 157, 257, 159, 259	81-46125063-1	Transistor, 2SC945
Q153, 253, 158, 258	81-46125071-4	Transistor, 2SA628
Q156, 256	81-46125065-6	Fet, 2SK30
SVR151, 251	81-46140082-2	Variable Resistor, Law Adjust, 5K Ohm
SVR152, 252	81-46140070-7	Variable Resistor, Dolby Gain, 1K Ohm

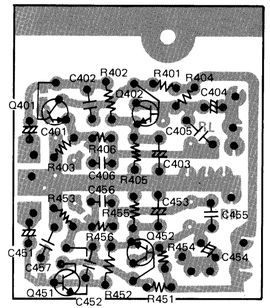


Figure 4.10. Motor Governor Board

Figure 4.10. Parts List

All Resistors are 10%, 1/4 Watt Carbon Unless Noted.

INDEX NUMBER	PART NUMBER	DESCRIPTION
R401, 451	N/A	47K Ohm
R402, 452	N/A	100K Ohm
R403, 453	N/A	2.2 Ohm
R404, 454	N/A	10K Ohm
R405, 455	N/A	1.2K Ohm
R406, 456	N/A	5.6K Ohm
C401, 404, 451, 454	81-46116030-1	2.2 μf, 25V, Electrolytic
C402, 452	81-46110021-6	47 pf, 50V, 20%, Ceramic
C403, 453	81-46116005-3	33 μf, 6.3V, Electrolytic
C405, 455	81-46114046-9	0.022 μf, 50V, 20%, Mylar
C406, 456	81-46114033-7	0.001 μf, 50V, 20%, Ceramic
C457	81-46114086-5	0.0015 μf, 50V, 20%, Ceramic
Q401, 451	81-46125053-2	2SC644 Transistor
Q402, 452	81-46125058-1	2SC945 Transistor

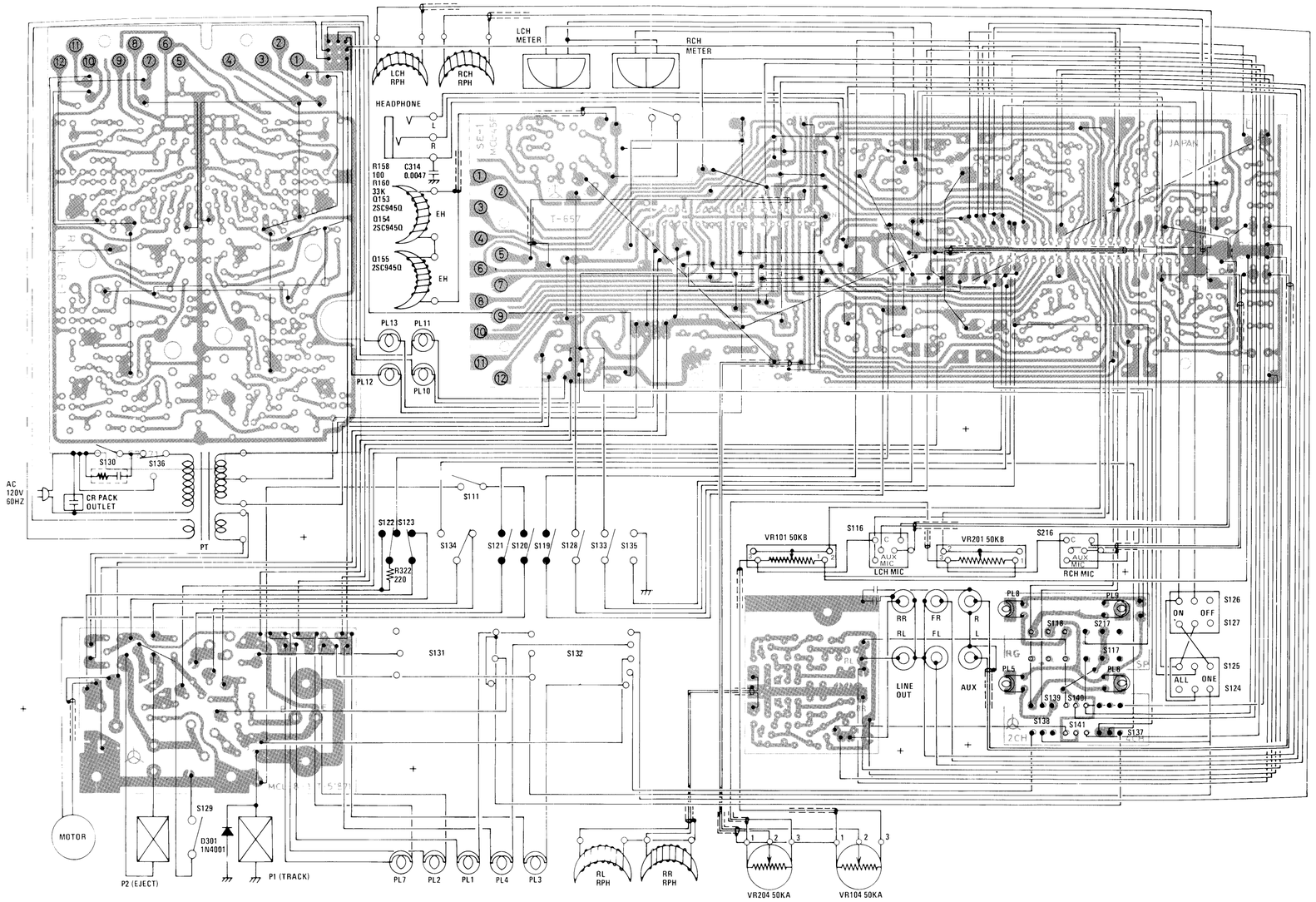


Figure 4.11. Wiring Diagram

Figure 4.11. Parts List

INDEX NUMBER	PART NUMBER	DESCRIPTION
S116, 216		Switch, Mic Active, Part of Mic Jack
PL5, 6, 7, 12	81-46121013-0	Pilot Lamp Without Leads
PL1-4, 8, 9, 13	81-46121010-6	Pilot Lamp With Leads
PL10, 11	81-46121011-4	Pilot Lamp, VU
VR101, 201	81-46140079-8	Record Level, 50K
VR104, 204	81-46140068-1	FM Calibration, 50K
VR104, 204	81-46123031-0	CR Module
S110, 210	81-46141100-3	Push Switch, Record/Play

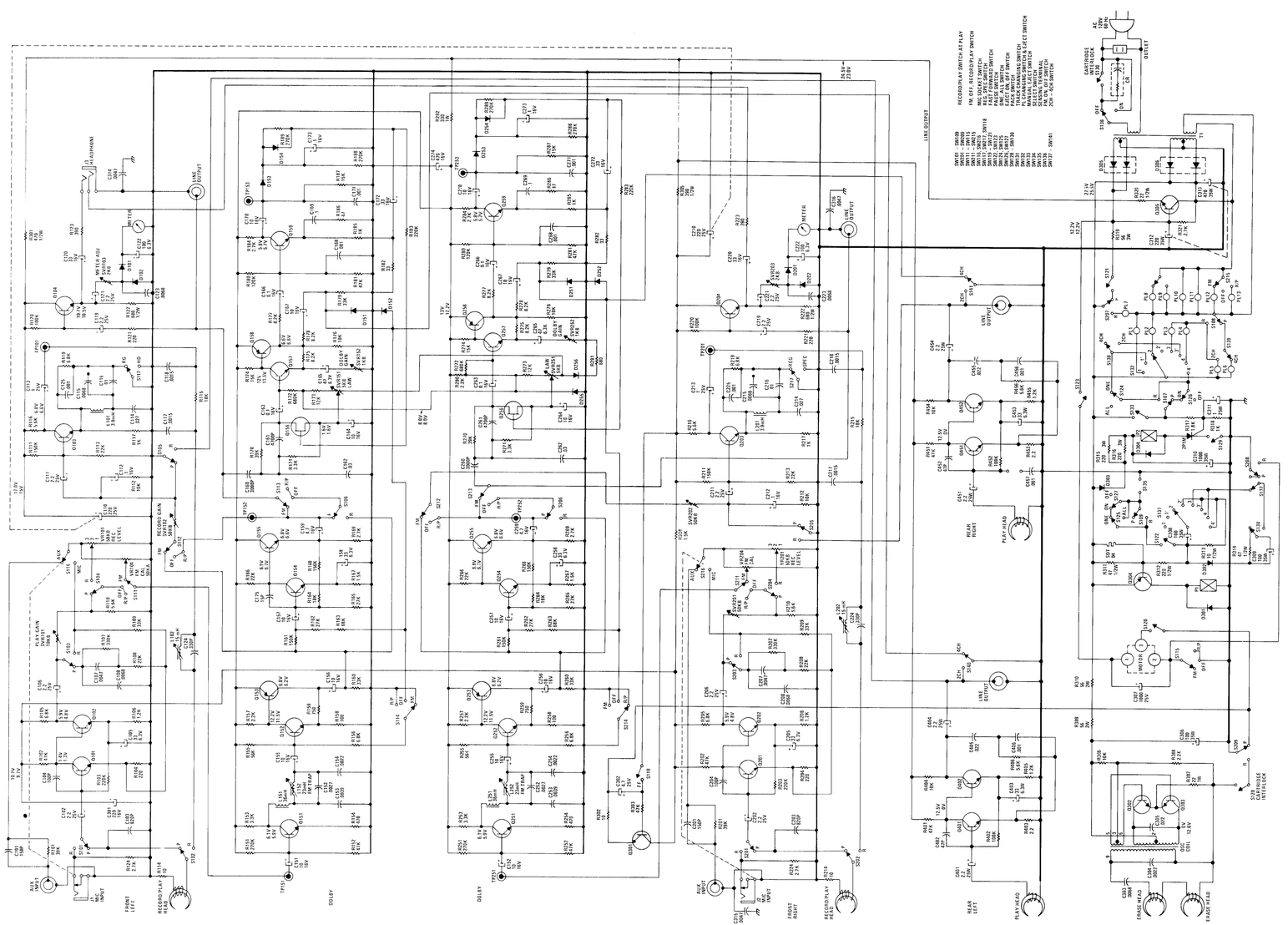


Figure 4.12. Schematic Diagram – Model 8080