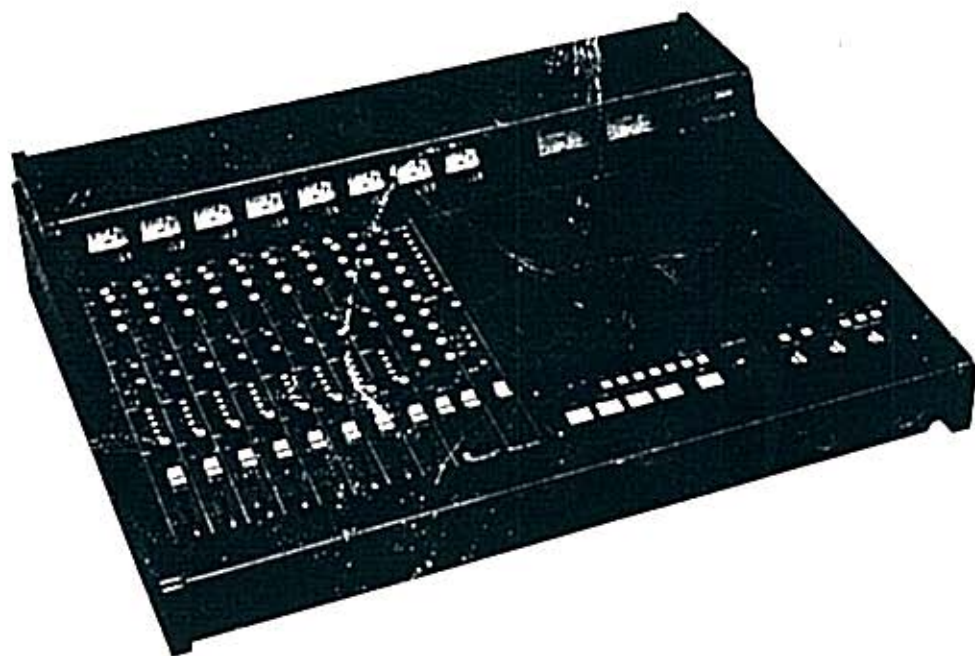


TASCAM

TEAC Professional Division

388

STUDIO 8



OPERATION/MAINTENANCE

5700070800

The guarantee provided for the Studio 8 has several restrictions. The Studio 8 will perform properly only if it is adjusted properly and we guarantee that such adjustment is possible. Set-up is not covered by Warranty. If your attempts at internal adjustments are unsuccessful, we will charge you for readjustments.

Recording is an art as well as a science. As a result, your finished product may be judged more by artistic criteria than technical performance. Art is the province of the artist and TASCAM can make no guarantee that the Studio 8, by itself, will assure the quality of your work.

Your skill as a technician and your abilities as an artist will be significant factors in the results you achieve.

Understanding what is going on inside your equipment will help improve your sound. Think of this manual as a reference book. You won't need to memorize it to get started, but try to find the time to read it thoroughly at least once. That way, you will be familiar with its contents, and if you need answers, you'll know where to find them.

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WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

This apparatus has a serial number located on the rear panel. Please record the model number and serial number and retain them for your records.
Model number _____
Serial number _____

<p>CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN</p>	<p>CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.</p>
	<p>The lightning flash with arrowhead symbol within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.</p>
	<p>The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.</p>

INTRODUCTION

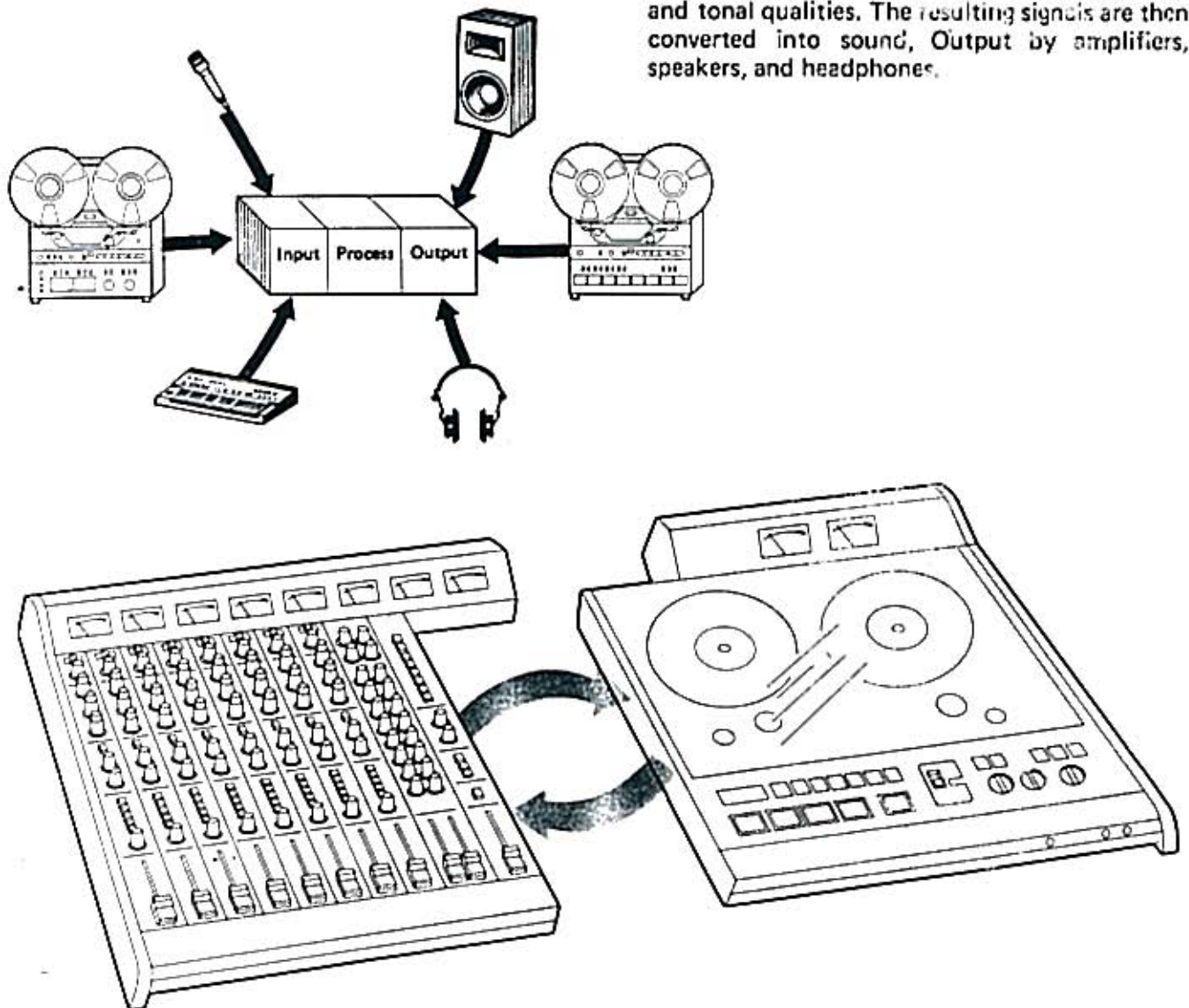
Your Studio 8 is a complete eight track production system. It contains a full function 8 x 8 x 2 mixer with 8 channel monitoring; combined with an eight track recorder/reproducer with full servo control, remote capability, and SMPTE/EBU/computer interface. It is an ideal "turn key" production facility for off-line audio for video, jingles, commercial radio and television spots, and music.

As a complete system, your Studio 8 virtually eliminates the time consuming and confusing "patching" normally associated with multi-track audio production. The most frequently used functions are engaged automatically and many complex operations are internally wired to reduce work by reducing the number of steps necessary to get things done.

THE MIXER

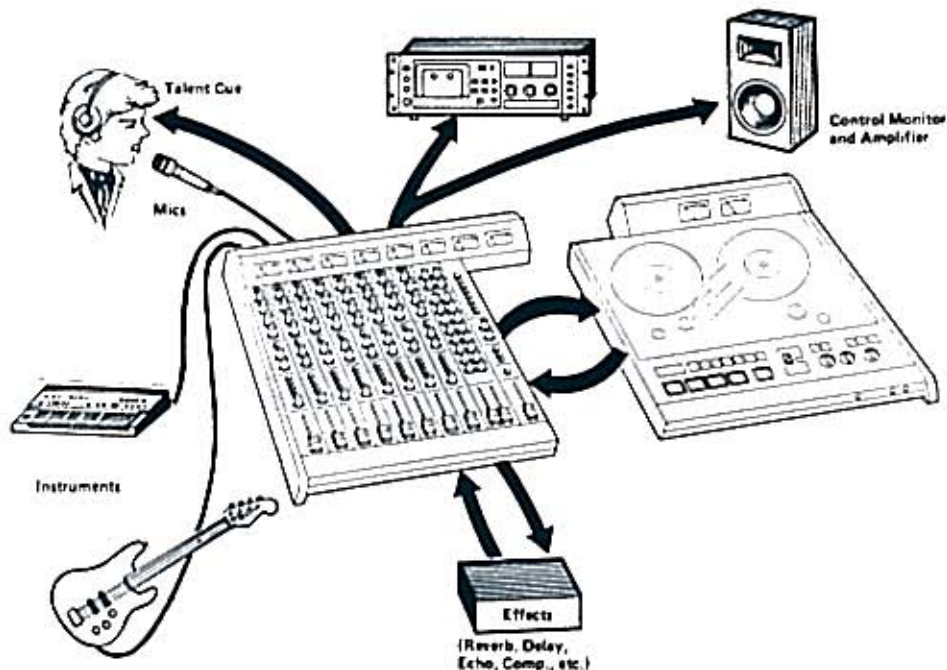
The Studio 8 mixer was designed to provide the maximum flexibility and performance. The tremendous number of features and controls available on your mixer can make it seem complicated and intimidating. But all mixers share some fundamental principles that are not difficult to understand. This understanding, particularly when combined with some experience, will ensure that your Studio 8 will be a powerful creative tool that is also easy to use.

Your mixer is a system, a group of individual elements working together as a unified whole. All audio systems have three things in common: Input, Process, and Output. In audio production systems, the Input consists of electrical signals from microphones, instruments, VTRs, turntables, tape recorders, etc. These signals are Processed electronically to balance their levels and tonal qualities. The resulting signals are then converted into sound, Output by amplifiers, speakers, and headphones.



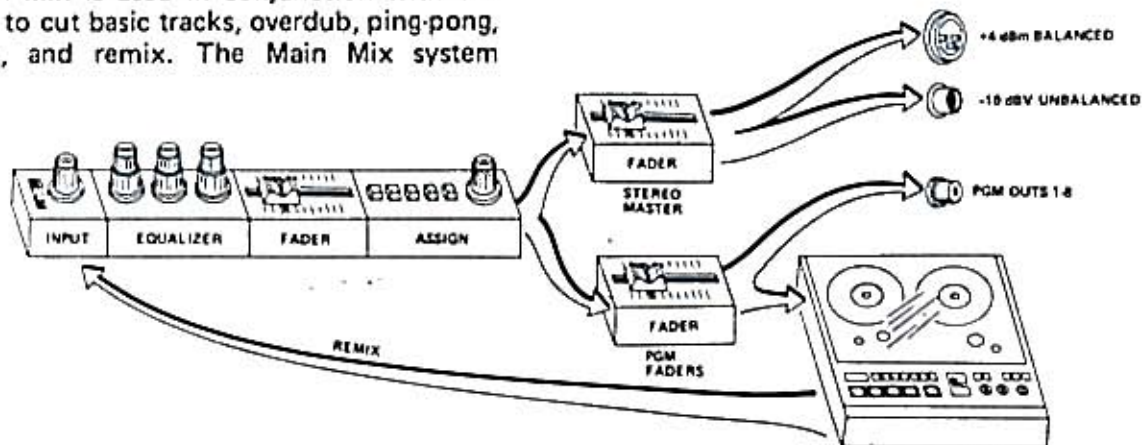
A mixer functions as a traffic control center for audio signals on the move. It takes multiple inputs, processes them for level and tone, and sends, or routes, them to multiple outputs. So the mixer controls "where" signals go to and come from, and "how much" signal goes there.

Large systems may be broken down into subsystems — each of which is a system in its own right. Your Studio 8 mixer is actually made up of several of these subsystems, known as submixers, each of which possesses the system requirements of Input, Process, and Output.

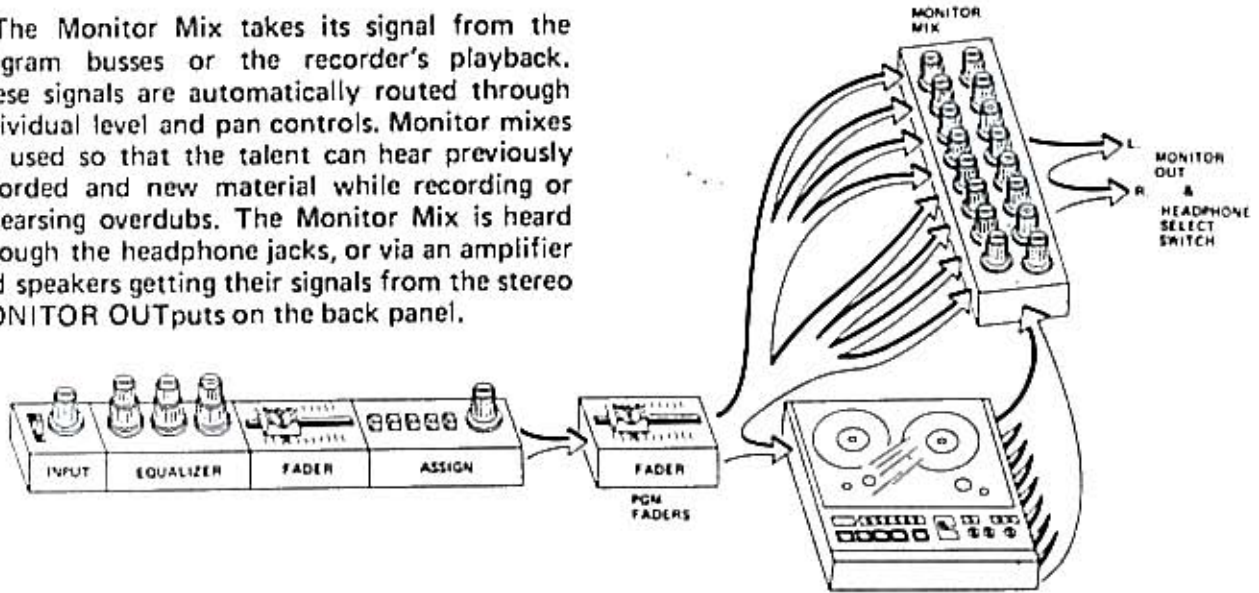


The largest of these is the Main Mix. It receives signals from multiple inputs and routes them through the input channels to the program busses, submixers, outputs, and the recorder. The Main Mix is used in conjunction with the recorder to cut basic tracks, overdub, ping-pong, punch-in, and remix. The Main Mix system

could also be used as a sound reinforcement mixer, or as an electronic music mixer.

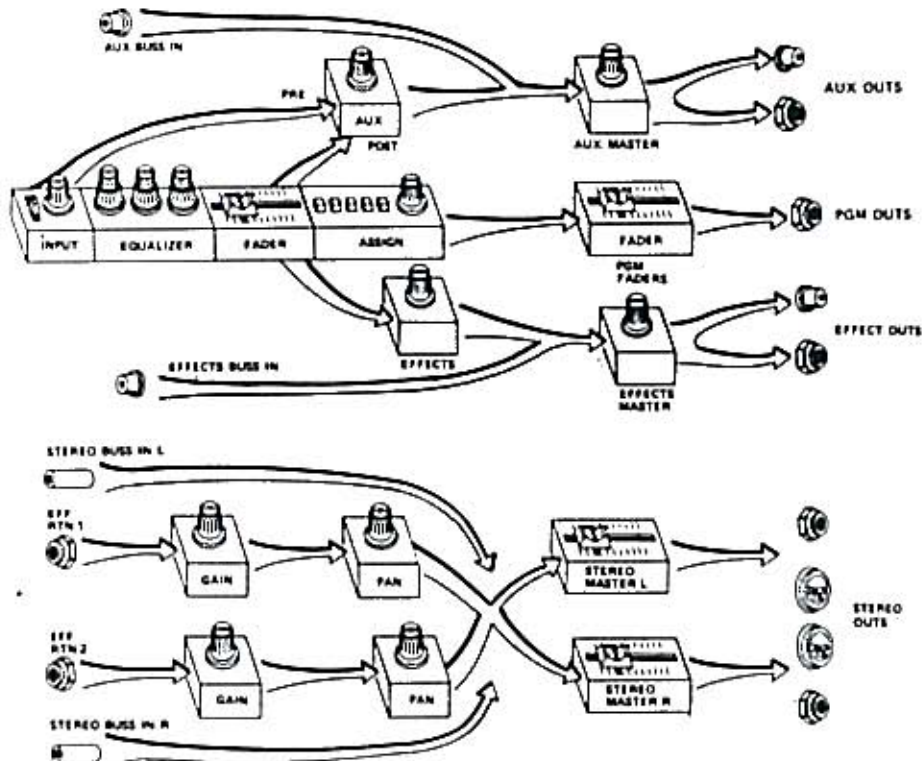


The Monitor Mix takes its signal from the program busses or the recorder's playback. These signals are automatically routed through individual level and pan controls. Monitor mixes are used so that the talent can hear previously recorded and new material while recording or rehearsing overdubs. The Monitor Mix is heard through the headphone jacks, or via an amplifier and speakers getting their signals from the stereo MONITOR OUTPUTS on the back panel.



The Effect and Auxiliary submixer signals come from the Main Mix system. Let's assume that you have a digital delay, reverb, or another signal processor that you want to use on some of your material. If you only want the processor's effect on one channel, you could plug your instrument or microphone into the processor and plug the output of the processor into the LINE INPUT of the mixer. You could also use the Studio 8's channel ACCESS jacks, connecting the processor to the appropriate input

channel. But suppose that you want to use the processor on more than one input channel simultaneously. Your Studio 8 is able to send signals of any combination of input channels to the EFFECT and AUXILIARY Output on the back panel. These outputs can then be connected to your signal processor, and the processor's output(s) can be connected to the EFFECT RTN (return), PGM BUSS INPUTS, or Stereo Buss Inputs.



THE RECORDER

A recorder's job is pretty easy to understand. It records. Of course, it also plays. Your Studio 8's recorder uses quarter-inch tape on seven inch reels to record, or play up to eight tracks of sound. Your Studio 8 has much in common with other reel-to-reel multitrack recorders. But it also differs in several important ways: sophisticated features combine the advantages of cassette and open reel recorders; and interface connections for SMPTE (Society of Motion Picture and Television Engineers) and EBU (European Broadcast Union) time code synchronizers and editing systems are provided.

The Studio 8 combines the flexibility of an open reel recorder with the convenience of a cassette recorder. Its "LOAD" feature insures that the tape, once it has been threaded, will never accidentally run off the reels, no matter what transport function is in use. Thus, the convenience and speed of the cassette is achieved while the flexibility and fidelity of the open reel is retained.

The Accessory interface jack on the back panel of the Studio 8 is the gateway to the world of synchronization and computer transport control. SMPTE/EBU time codes are used to synchronize multiple video/film and audio machines during the editing process. These codes are also being used by the manufactures of electronic musical instruments in conjunction with MIDI (Musical Instrument Digital Interface) to synchronize the operations of sequencers, computers, drum machines, signal processors, and synthesizers during multitrack recording. SMPTE/EBU controllers can be used to control the transport functions of your Studio 8. The optional TASCAM AQ-65 is a multifunction Auto Locator/Tape Transport Controller that also utilizes the Accessory jack.

The Studio 8 dbx system virtually eliminates unwanted tape noise. The dbx system can be turned off if you are working with, or auditioning, tapes using Dolby* or similar noise reduction systems. A separate dbx defeat switch is provided for track eight so that SMPTE/EBU and FSK (Frequency Shift Key) synchronizing codes can be recorded there. These codes and some older model drum machines can create tracking errors in the dbx system.

Your Studio 8 can be remotely controlled. If you are sitting in front of your instrument and not the Studio 8, the tape transport controls, Play, Stop, Fast Forward, Rewind, and Record can be located up to sixteen feet away from the recorder using the optional RC-71. Punch-in and Punch-out can be engaged using the optional RC-30P footpedal, which gives you an "extra hand" in the recording process.

The Pitch Control allows you to adjust the speed, and thereby the pitch, of the Studio 8 by as much as 15% plus or minus. This has a variety of uses from coping with a singer who thinks the world is a semi-tone sharp, to cutting a few seconds from your program. As an example, suppose your thirty second commercial runs 31.5 seconds. A pitch adjustment can be made to make the material fit the time constraints.

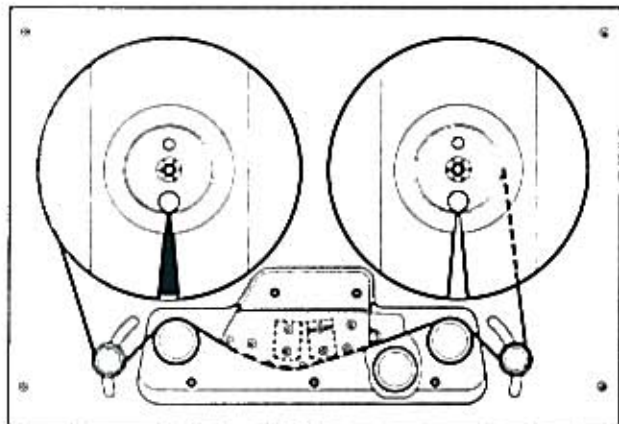
The Studio 8 Memory functions are not only convenient, they handle your tape very gently. The MEMORY and RTZ (Return To Zero) functions work with the recorder's tape transport to minimize the strain placed on your tape by fast forward, rewinds, and searches. You can also use the REPEAT, CUE, and RTZ functions to create a playback loop that will repeat until you turn it off.

*"Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

RECORDING THE BASIC TRACKS

SETUP

1. Lift the cover for the tape compartment. Thread a new tape onto the recorder as shown in the illustration below. Use only EIA center (small hub) 7 inch reels for both the supply and take-up reels. Tape must be the 1 mil variety, 1800 feet (549 meters) in length. Load Function will not work properly with tapes of different lengths or thickness.



2. With the power off, plug your instrument or microphone into the MIC or LINE INput of channel 1 in the Studio 8's mixer section.

3. Plug your stereo headphones into one of the two headphone jacks on the front panel of the Studio 8. Never plug mono headphones/earphones into either of these jacks. Never use "Y" cords to connect multiple headphones to either of these jacks. You will damage the circuits if you do.

4. Turn the power on. The switch is on the back panel.

5. Make sure the dbx is on. Its switches are on the top panel and its LEDs will show you its status.

6. Press the LOAD button on the top panel. The tape will run to a point past the leader. When it stops, press the RESET button.

7. Set the INPUT Selector Switch in channel 1 to the MIC position (left) if using the MIC Input. Set it to the LINE position (center) if using an instrument and the LINE Input.

NOTE: Instruments with low output levels such as electric guitars and basses should use a direct box to boost their signal to a sufficient level to use the line input.

8. Play your instrument or speak into your microphone watching the OL indicator light. Adjust the volume of your instrument or, if

using the MIC input, turn the TRIM up (clockwise) until the OL flashes; then, back off the TRIM, turn it counterclockwise slightly until the OL stops flashing.

9. Set your EQ controls to a 12 o'clock position. You will feel detents when the controls are in this position.

10. Adjust the Fader in channel 1 to the shaded area between 7 and 8.

11. Make sure the AUX PRE/POST selector switch is in the POST (up) position.

12. Adjust AUX and EFF rotary controls to their off positions, fully left (counterclockwise).

13. Press the ASSIGN switch marked 1-2 to the on position (down). Rotate the PAN control in channel 1 fully left (counterclockwise). Make sure the other ASSIGN switches are off (up).

14. Press the switch marked STEREO in the recorder section of the Studio 8. It's in the lower right hand corner of the top panel.

15. Adjust the ODD PGM MASTER Fader to the shaded area between 7 and 8. Press the number 1 switch in the REC FUNCTION section. The LED near the number 1 switch will start blinking.

16. Make sure the MON switch (PGM/CUE) is in the CUE position (up).

17. Make sure the METER switch (AUX-EFF/LR) is in the LR position (up).

18. The three position rotary switch next to the PITCH CONTROL in the recorder section should be in the FIXEd (center) position.

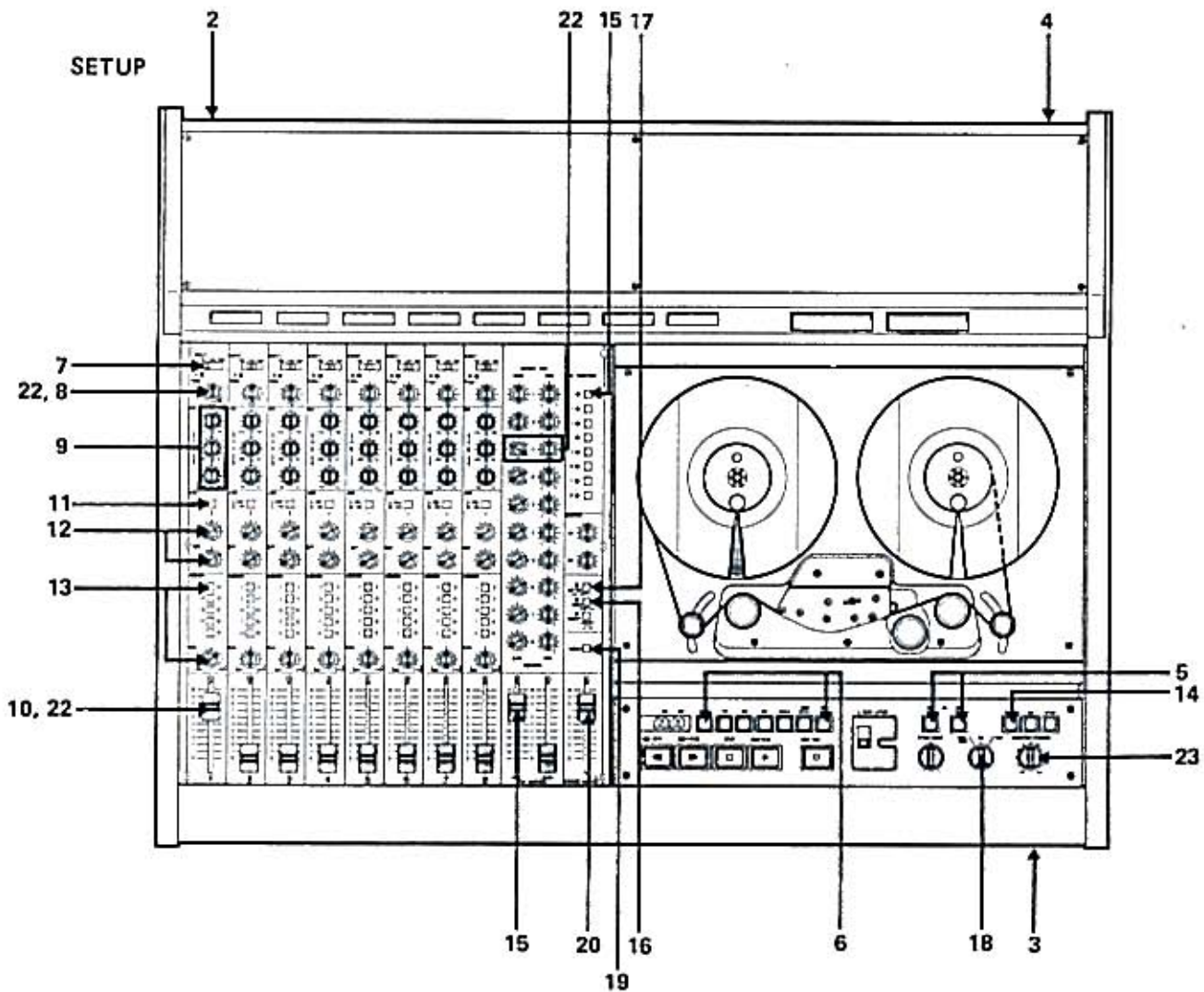
19. You may find it easier to work in mono, if so, press the MONO switch that is located above the STEREO MASTER Fader on the top panel.

20. Adjust the STEREO MASTER Fader to the shaded area between 7 and 8.

21. Put headphones on.

22. Adjust the MONITOR PAN control number 1 fully left (counterclockwise). Adjust the MONITOR GAIN control fully right (clockwise). Play your instrument or speak into the microphone and readjust the TRIM or the instrument volume until the TRK/PGM Meter number 1 registers a reading between -3 and 0. Use the Fader in channel 1 also, if necessary.

23. Adjust the MONITOR/PHONES control to a level that is comfortable.



INITIAL SETUP OF THE RECORDER SECTION

Switch	Setting	Indicator
PGM/CUE	CUE (up) position. (PGM – down – position during Ping-pong.)	LED off in CUE. (turns on in PGM.)
REC FUNCTION	On (down) position for the track(s) to be recorded.	LED(s) stay on showing Record mode.
INSERT	Off (up) position. (On – down – position during Punch-in.)	LED off in the up position. (turns on in the down position.)

RECORDING

1. Make sure that REC FUNCTION switch number 1 is down with its LED blinking. All other REC FUNCTION switches should be in the up position. Their LEDs will be off.

2. While playing your instrument or speaking into the microphone, make any EQ adjustments you feel are necessary. Refer to "Work Methods" for more information on EQ.

3. When your instrument or voice sounds the way you'd like, press REC and PLAY buttons in the recorder's transport section. The REC FUNCTION LED will stay on continuously and the red LED above the REC button will be on.

4. Play your instrument or, if using a microphone, slowly count to nineteen using only the

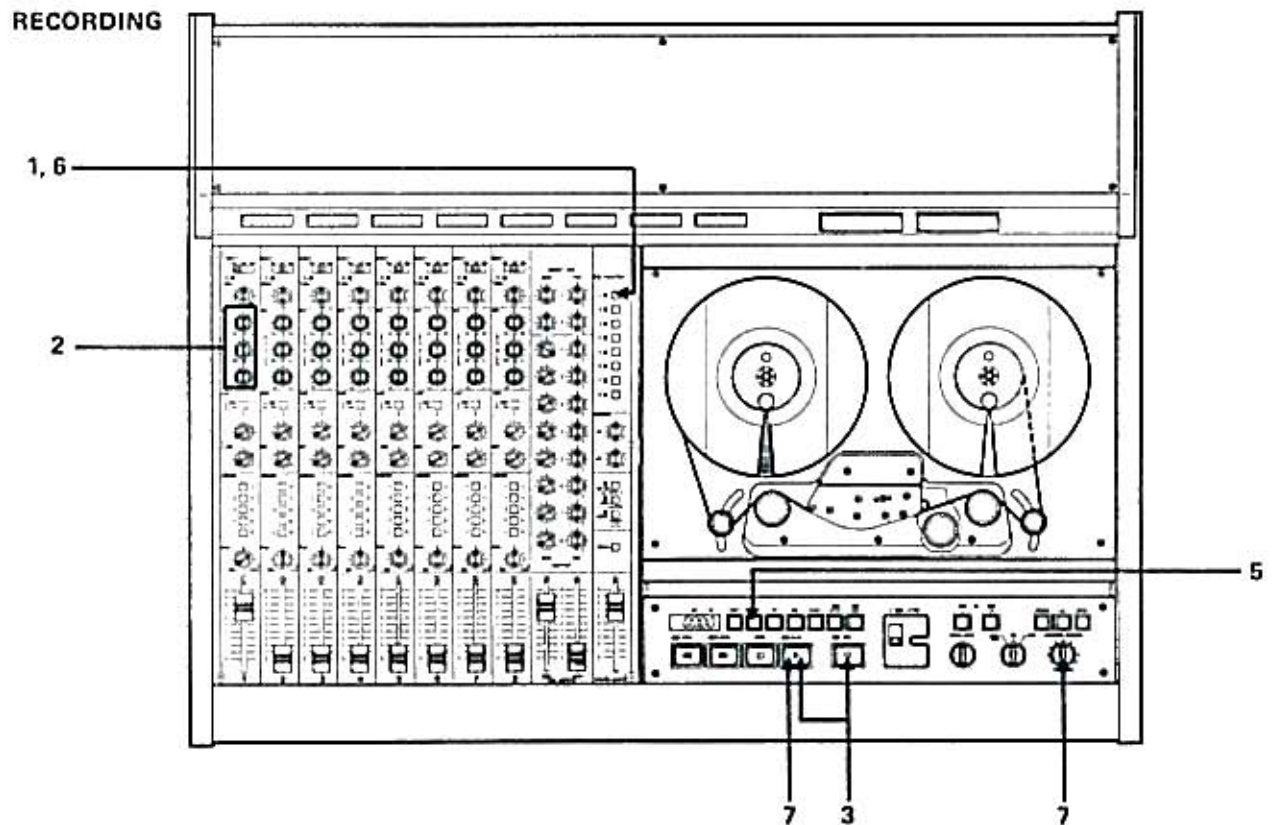
odd numbers, pausing for a full count between each number. You will need these pauses for the upcoming overdubbing.

5. When finished, press the RTZ button in the transport section. Since RESET has been pressed, in step 6 of setup, the tape will return to the zero position (00:00) and stop.

6. Press the number 1 REC FUNCTION switch, turning it off (up). Its LED will go out.

7. Press PLAY and listen to your track. Re-adjust MONITOR/PHONES level if necessary.

You've completed your first track. If you're not satisfied with the results, repeat the process. If your results are satisfactory, it's time to move on to overdubbing.



OVERDUBBING

You will use the same setup as you did for recording your basic track with the following changes:

1. Connect the new source, instrument or microphone to the appropriate channel 1 input. You can continue to use channel 1 because the

channel's ASSIGN switches make it possible to route any channel's signal to any track of the recorder.

2. Make sure ASSIGN switch 1-2 is still down (on) in channel 1. Adjust channel 1's PAN fully right, clockwise.

3. Press down REC FUNCTION 2. Its LED will blink. Make sure all other REC FUNCTION switches are off (up) with their LEDs off.

4. Press PLAY and listen to your first track through headphones. Make any necessary adjustments to MONITOR 1 GAIN and PAN controls. Adjust the MONITOR/PHONES level for comfort.

5. Raise the EVEN PGM MASTERS Fader to the shaded area between 7 and 8.

6. Play your instrument or speak into the microphone. If you counted on track 1, you will also count on track 2. The objective is to use only the even numbers to twenty, placing them in the pauses between the odd numbers used on track 1.

7. Adjust MONITOR GAIN 2 so that your instrument or voice and track 1 are at the proper balance in the headphones.

8. Adjust the channel Fader 1, while watching TRK/PGM Meter 2. It should read close to 0.

9. Rewind the tape by pressing the RTZ button. It should stop at 00:00.

10. Press REC and PLAY at the same time.

REC FUNCTION 2 LED will stop blinking and stay on continuously.

11. Play your instrument or count the even numbers to twenty. When finished, press STOP and RTZ.

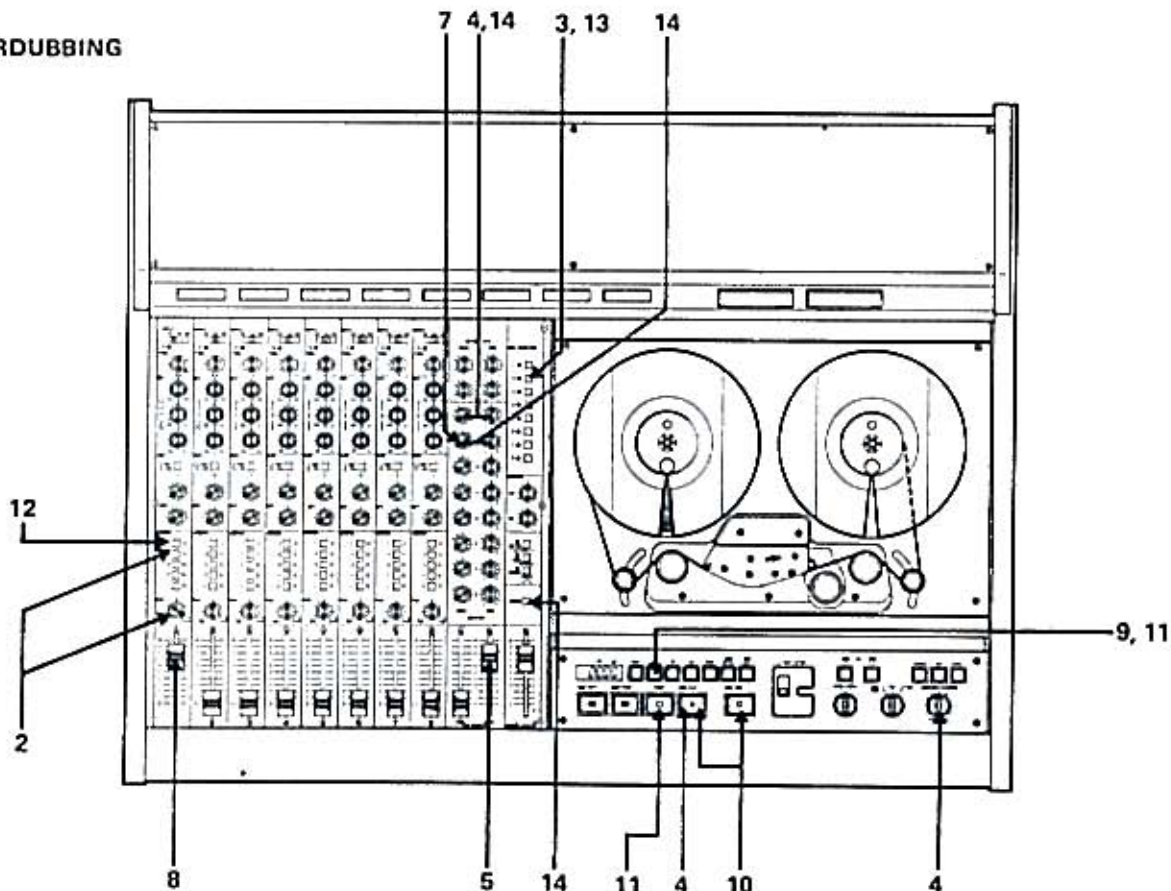
12. Press ASSIGN 1-2, turning it off (up).

13. Press REC FUNCTION 2 switch, turning it off (up). Its LED will go off.

14. You can now listen to both tracks. Press MONO, releasing the mono mode. Adjust MONITOR PAN for 1 and 2 to the desired location. Adjust MONITOR GAIN for 1 and 2 to the desired level.

Tracks 3 through 8 can be recorded using similar procedures as track 1 and 2. The differences, of course, are that the PGM ASSIGN switches and REC FUNCTION switches will correspond to the desired recorder tracks. PAN controls in any channels of the mixer will be rotated to match the ODD (3,5, and 7) or EVEN (4,6, and 8) tracks. MONITOR GAIN and PAN controls for playback will also change to be consistent with track locations.

OVERDUBBING



REMIX

When your multitrack master is finished, you will want to convert it to a stereo master. You will need another tape recorder for this process. A two track recorder whose quality is comparable to the Studio 8 is required (TASCAM models 22-2, 32, or equivalent). You don't want to step down in quality just because your stepping down in quantity (number of tracks).

1. Connect the XLR or RCA STEREO OUT-puts of your Studio 8 to the Line level inputs of your mastering recorder.

2. Set the INPUT Selector switches of your Studio 8 to the RMX (right) position.

3. Press the ASSIGN switches marked L-R in each of your channels.

4. Adjust the STEREO MASTER Fader to the 7 to 8 position.

5. The METER switch (AUX-EFF/LR) should be in the LR position (up), and the MONO switch in the up position.

6. Make sure all REC FUNCTION switches are off (up).

7. Press RTZ to rewind the tape.

8. PLAY the tape, adjusting the MONITOR/PHONES, channel Faders, and STEREO MASTER Fader for level. STEREO Meters should register between -3 and 0.

9. Adjust channel PAN controls as desired.

10. Press RTZ to rewind your tape. Put a fresh tape on your mastering deck. Run off fifteen seconds of tape to get past the leader on your mastering recorder. Reset the master's counter and press its zero return, if it has it.

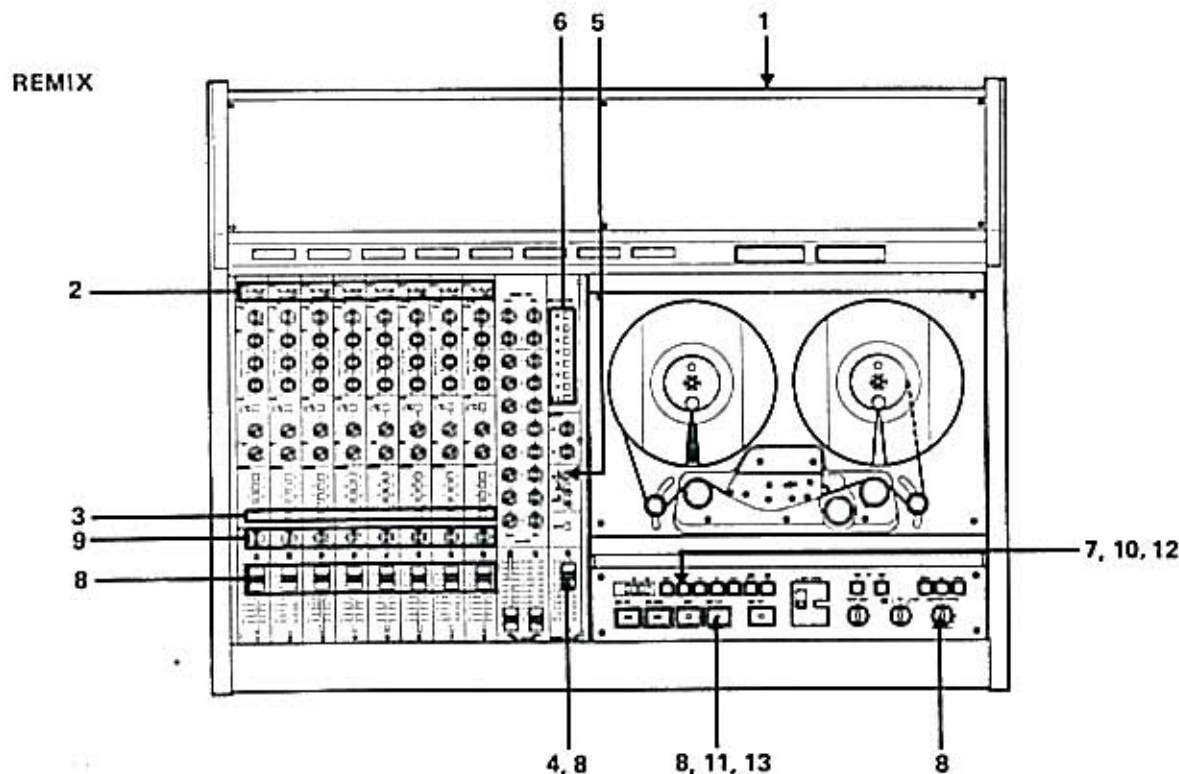
11. Play the tape on your Studio 8. Adjust the levels on your master, using its meters as a reference. The meters should register -3 to 0.

12. Press RTZ to rewind the Studio 8. Put the master deck into its record mode or record/pause mode. Record mode usually entails pressing the Record and Play buttons at the same time.

13. When the master is rolling (release pause if it's in record/pause mode), press PLAY on the Studio 8.

14. When finished, stop both recorders. Rewind and play the tape on the master. Listen to the results, if you're not satisfied, make notes of changes you'd like to make and repeat the Remix, making the desired changes.

While the Remix is progressing, you can monitor the proceedings using headphones, as in our example, or a speaker system. You can hear you mix through speakers by connecting the MONITOR OUTputs (L and R) to the auxiliary or tape inputs on your stereo receiver or amplifier.



PING-PONGING, COLLAPSING, or BOUNCING TRACKS

The recording capability of your Studio 8 is not limited to eight tracks. As you progress with your recording, you may reach a point where you need more than eight tracks. At this point, the recording technique variously called Ping-pong, Collapsing, or Bouncing can expand the capability of your recording equipment. The technique allows you to combine up to seven tracks onto the remaining blank track. You may even record additional new material while bouncing tracks.

For the sake of an example, we'll collapse material recorded on tracks 1 through 4 to track 8 of the Studio 8.

1. Set the MON switch (PGM/CUE) to the PGM setting (down).
2. Set the METER switch to the L/R position (up).
3. Press ASSIGN switch 7-8 in channels 1, 2, 3, and 4. Rotate the PAN control in each of these channels fully right, clockwise.
4. Set the INPUT Selector switch in channels 1 through 4 to the RMX position (right).
5. Press REC FUNCTION switch number 8. Its LED should flash. All other REC FUNCTION switches should be off.
6. Adjust the EVEN PGM MASTERS and STEREO MASTER Faders to the 7 to 8 position.
7. Press the RESET button and PLAY your

tape, watching the TRK 8 Meter. Levels should register between -3 and 0. Adjust channel Faders 1 - 4 so that their signal levels are balanced.

8. Make any EQ adjustments you feel are necessary in the individual channels. Make sure you don't boost the signal level too much with the EQ controls.

9. Adjust MONITOR GAIN number 8. All other MONITOR GAIN controls can be turned off (rotated fully counterclockwise).

10. Press the MONO button to the on position (down).

11. Press the RTZ button to rewind your tape to 00:00.

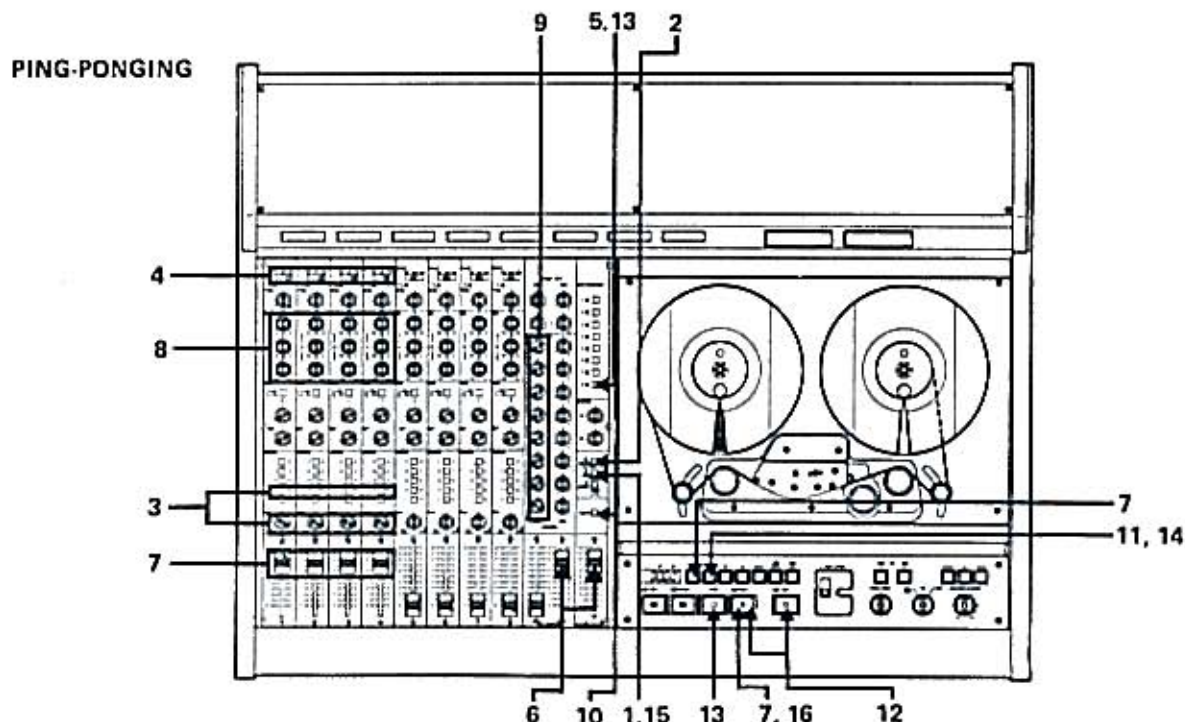
12. Press REC and PLAY. The tracks you have selected are now being ping-ponged to track 8.

13. When finished, STOP the recorder and turn off (up) the REC FUNCTION switch number 8.

14. Press the RTZ button to rewind to zero, 00:00.

15. Reset the MON switch (PGM/CUE) to the CUE position (up).

16. Play the tape and listen to the results of your track bounce. If you hear something that you don't like you can repeat the process. Make sure you have the results you want before you record new material on tracks 1 through 4. Recording new material there will erase the old.



It is possible to add new parts while ping-ponging. Any mixer channel that is not being used in the Remix input mode can be used to add a new part.

1. Set up the controls for the channel(s) that you want to use for the new material in the same way that you did for recording basic tracks. If you followed our example for ping-

ponging, you could use channels 5, 6, and 7 for new material. Route the new channels to program buss 8 by pressing ASSIGN 7-8 and rotating the PAN fully right in each channel.

2. Rehearse the new parts while listening to the previously recorded tracks. Use this rehearsal to set levels for the new material.

3. Perform the remainder of the Ping-ponging procedure.

PUNCH-IN AND INSERT EDITING

The artistic process doesn't end when the recording begins. Many times, a way to improve your program will become apparent as it is being recorded. Punch-in gives you a way to add those last minute ideas to your recording. Punch-in can also be used to correct a mistake that made its way onto the tape.

Punch-in erases old material and puts new material in its place. This change is permanent, so it's wise to rehearse your Pinch-in until you are confident that it can be performed correctly. We will give you the rehearsal procedure first.

1. PLAY the tape to within several seconds of the desired edit/punch-in point.

2. Press the RESET button.

3. Set the MON switch (PGM/CUE) to the CUE position (up).

4. Your new material will be coming from one of the Input channels of your mixer. Press

the appropriate ASSIGN switches and adjust Faders and PAN controls.

5. During this rehearsal, all REC FUNCTION switches should be off (up).

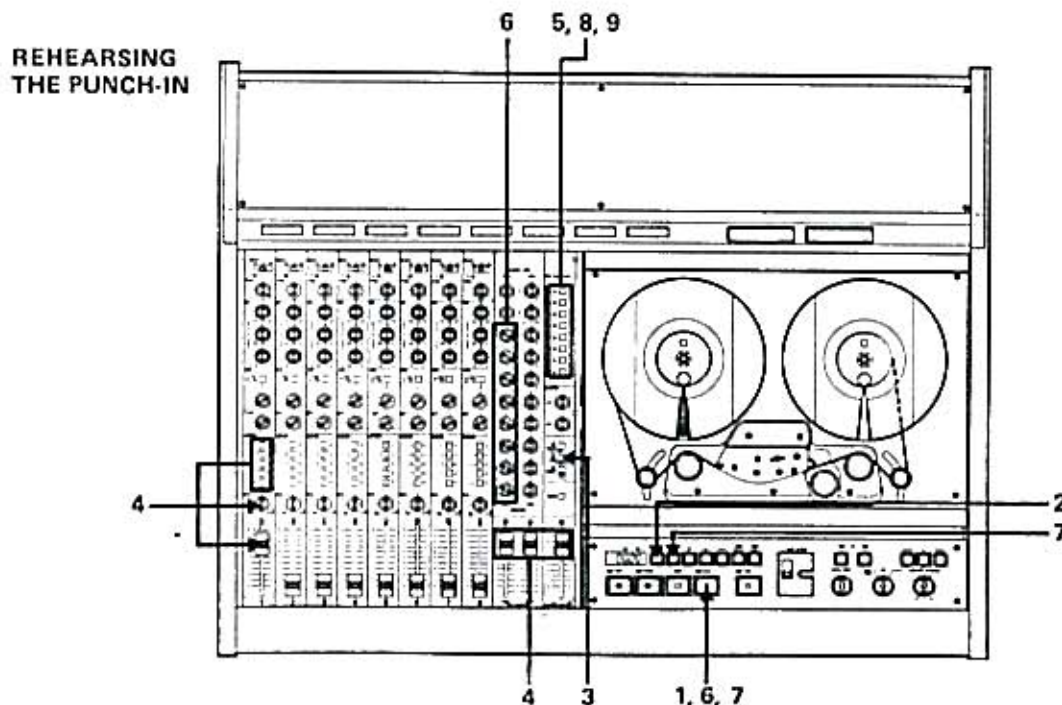
6. PLAY your tape. The reference tracks should be heard through your headphones via the MONITOR section. Adjust the levels of the tracks using the MONITOR GAIN controls.

7. Rewind the tape by pressing the RTZ button, and PLAY it again.

8. When you reach your edit point, press the REC FUNCTION switch for the track to be edited. You will now be able to hear the new material through your headphones.

9. When the point comes to punch-out, end the edit, press the REC FUNCTION switch again. This will return the MONITOR to the tape signal.

10. Repeat the process until you are comfortable with it.



THE ACTUAL PUNCH-IN

1. The INSERT switch should be in the on position (down). Its LED will be on. The MON switch (PGM/CUE) remains in the CUE position.

2. Press the appropriate REC FUNCTION switch.

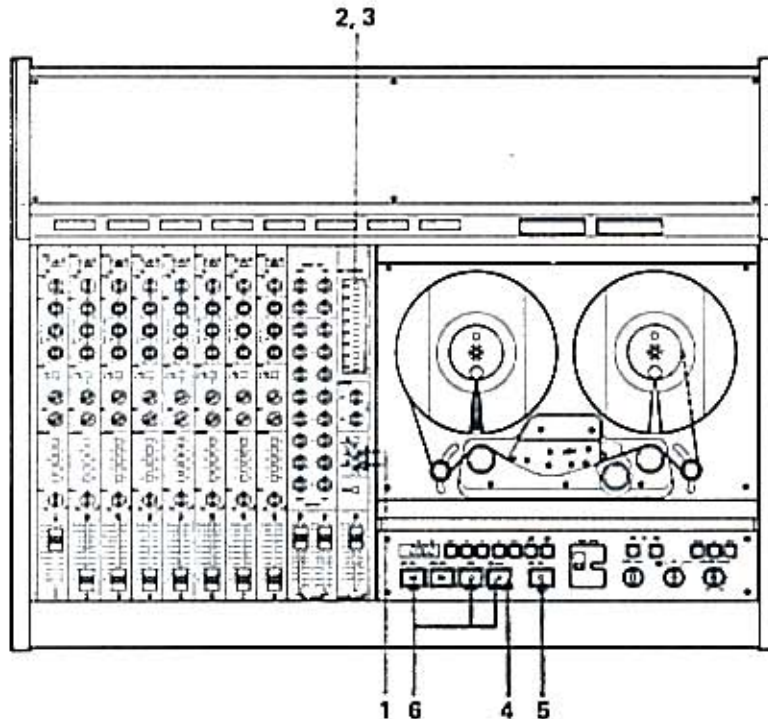
3. Make sure all other REC FUNCTION switches are off (up).

4. Press PLAY.

5. Just before you reach the edit point, press REC.

6. Perform the new material. When you reach the point that you'd like to end the edit, punch-out, press STOP, PLAY, or REW, turning off the record mode.

ACTUAL
PUNCH-IN



REMOTE PUNCH-IN/OUT USING THE RC-30P PEDAL

Rehearse in the same way as your did before. When you're ready to go...

1) Start the recorder rolling by pressing PLAY. The REC FUNCTION switch should be on, with its LED blinking.

2) When the Punch-in point arrives, step on

the RC-30P pedal. This will start the Recording process.

3) When the Punch-out point arrives, step on the RC-30P pedal again. This will stop the Recording process.

WORK METHODS

As we mentioned on the first page of this manual, recording is an art as well as a science. Art has a special and intangible quality that sets it apart. In order to create art, the artist must have the proper tools, and command of the techniques of those tools. Your Studio 8 is the tool. The command of the techniques will involve some practice and some thought on your part.

The following paragraphs are here to provide you with information, suggestions, and some perspectives regarding the recording process and your Studio 8. There are three fundamental notions upon which these suggestions are based: Planning, Apparent and Absolute Values, and Common Sense. We'll talk in some detail about Planning as well as Apparent and Absolute Values; we hope that you bring Common Sense to all your endeavors.

PLANNING

Planning is an obvious necessity when considering how many tracks your recording will require, when you intend to ping-pong, remix, etc. Track sheets are handy sketch pads that will aid you in the planning of your recording process.

RECORDING		DATE	REEL	OF				
CLIENT _____		IPS	TRACKS					
ARTIST _____		TAPES	<input type="checkbox"/> DEK					
PRODUCER _____			<input type="checkbox"/> TIME CODE					
ENGINEER _____	2/ENGINEER	<input type="checkbox"/> MASTER	<input type="checkbox"/> COPY					
TITLE _____	1	2	3	4	5	6	7	8
TITLE _____	1	2	3	4	5	6	7	8
TITLE _____	1	2	3	4	5	6	7	8

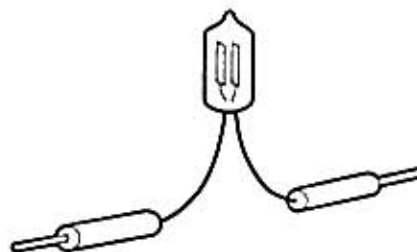
Plan your recording environment. You will need a room that is quiet and has sufficient electrical power. If there are appliances or air conditioners plugged into the same circuits as your Studio 8, they will probably cause hum, clicks, or other noises when their motors come on. Once you have your location picked out,

you will need to make it ready. You will find a lot more helpful material in the "Multitrack Primer" available from TASCAM.

The condition of the AC circuit that you intend to use with your Studio 8 is very important. Noise and other circuit problems can be both annoying and dangerous. There are a couple of inexpensive tools that you should have in your tool box: An AC Outlet Tester, AC Adapter/Ground Lifts, and an AC Neon Lamp Tester (better yet, a Volt/Ohm Meter).



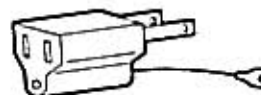
Outlet Tester



Neon Lamp Tester



Volt/Ohm Meter



AC Adapter

The AC Outlet Tester is very easy to use, just plug it into the outlet and its LEDs will signal whether or not the circuit is properly wired. If it isn't, do not under any circumstances use that outlet. Faulty wiring in an AC circuit is potentially hazardous.

AC Adapter/Ground Lifts are used when plugging three prong plugs into two prong outlets and when reversing two prong plugs in order to

reverse polarity. Your Studio 8 uses a two prong AC connector and will present no grounding problems by itself. These adapters are also useful as ground lifts. A ground lift is used in the event that a "ground loop" is created within the wiring of all the elements of your system. A ground loop will create a hum or buzz that will not go away no matter what remedy is used. Ground lifts should only be used as a last resort, since failure to have equipment properly grounded can create safety problems.

A Neon Lamp Tester, or Volt/Ohm Meter can be used to check the grounding of individual instruments and amplifiers. Guitar and bass amps are particularly vulnerable to grounding and shock problems when the guitarist or bassist is also using a microphone. Check the grounding by putting one of the tester or meter probes on the metal chassis of the amplifier, or the strings of the guitar or bass and touching the other probe of the microphone. If the lamp or meter registers the possibility of a shock, reverse the ground of the amplifier by using the amplifier's polarity switch or reversing its AC plug. If the amp has a three prong plug and doesn't provide a polarity switch, which is rare, use one of your AC Adapter/Ground Lifts to reverse the plug.

Should you be using Direct boxes? Microphones and magnetic pickups (the kind used on electric guitars and basses) have very low signal levels. As a result, they are very susceptible to the effects of radio frequency noise. Using cables that are over ten feet in length makes this problem more severe. Direct boxes can be used to improve the quality of your input signal. Remember, keep cables as short as possible to do the job. While electric guitars are usually "close miked" at the amplifier, electric basses often use direct boxes. Electronic instruments (synthesizers, drum machines, etc.), dependent upon their audio signal level, are usually plugged into the line-level inputs of a mixer. Plan to have the necessary equipment on hand for the session.

All your instruments should be properly adjusted. Does your guitar need new strings? Is the piano in tune? How about your microphones and their cables — do they all work properly? Your equipment needs to be in top condition when recording day rolls around.

Do you intend to use timing codes of some sort: SMPTE/EBU, FSK, or some other data code? These codes should be recorded first onto track 8 without dbx. dbx encoding and decoding can make some codes unreadable. The codes themselves also cause tracking errors in the dbx. Codes should not be put through your mixer system, record them directly from the PGM BUSS IN number 8. If code is recorded through the mixer while other material is being recorded, the code signals may "leak" onto the other busses. If they leak in this way, reduce their signal level, or record them separately. A metronome or "click" track may be recorded using dbx with other program material.

All your wiring should be neat. When cables that carry similar signals (input, output, effects, etc.) are grouped together, there is less danger of creating a noise source. Don't bundle any cables too tightly or bundle AC power cables with your audio cables. If you use cable ties to group your cables, make sure they are loosely grouped. It follows that cables that carry different kinds of signals should be kept away from one another. A neat arrangement of cables also keeps them from being damaged by equipment or talent. Damaged cables are the root of many problems during recording. Always have spare cables on hand.

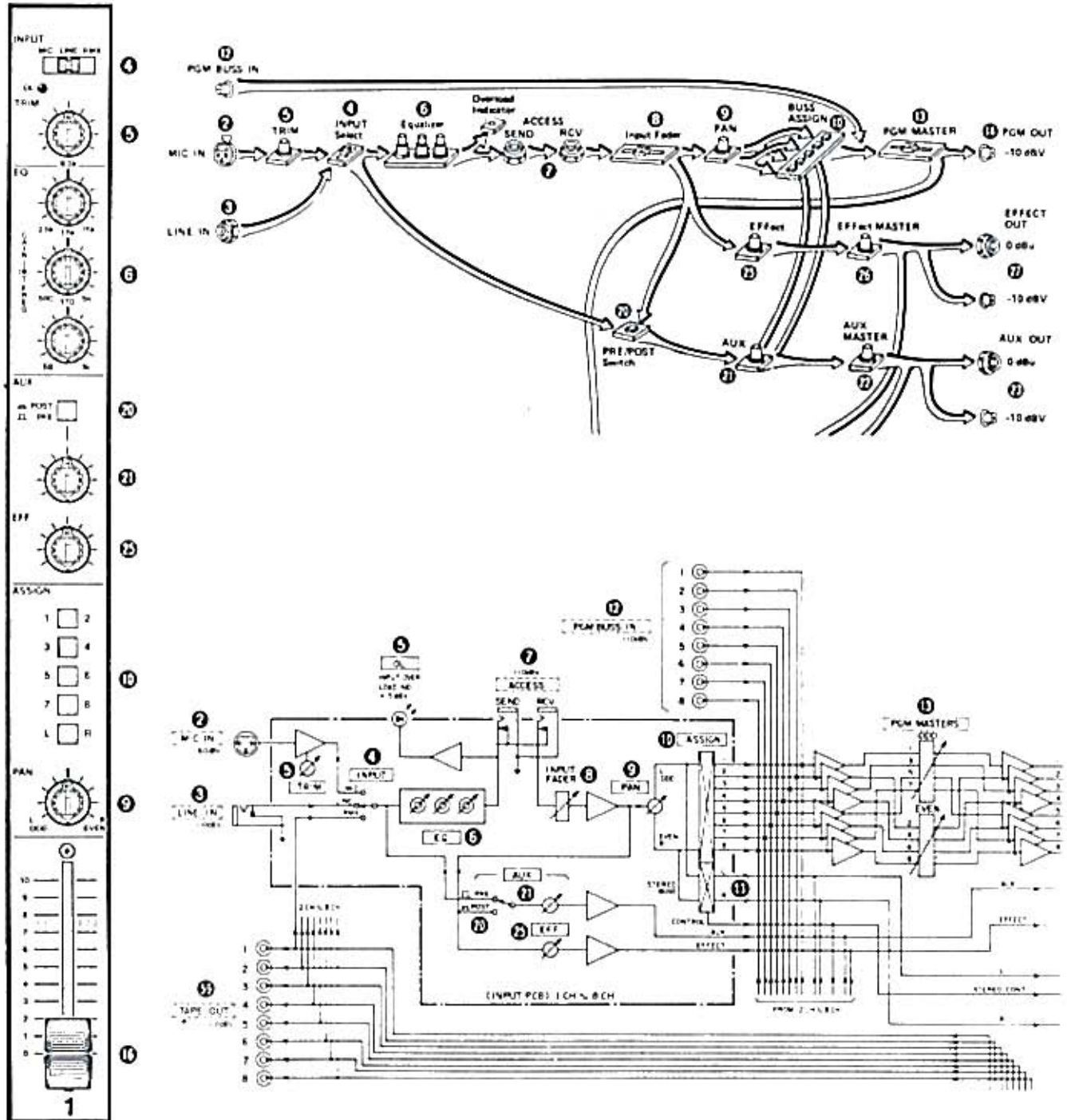
If you intend to use effects devices with your Studio 8, then a rack-mount cabinet is a wise investment. The "rack" should have metal rails, these help ground the chassis of the effects and/or power amps together, decreasing the potential for a noise problem related to grounding.

If you intend to use any optional equipment with your Studio 8 such as the AQ-65 Auto Locator or a SMPTE controller, be sure you understand their operation. The use of optional equipment often changes the operating procedures necessary to accomplish basic tasks. Plan ahead and learn how your equipment works during leisure time instead of under pressure during a session.

Understanding the inner workings and signal flow through your Studio 8 will help you maximize the features and functions of the unit, find problems quickly, and perhaps, come up with a new application. To help you in this

understanding, we have provided you with three types of illustrations: the first is a line drawing of the unit; the second is a pictogram that shows the features and controls placed in the proper sequence of signal flow; the third is a block diagram, which is similar to the pictogram using a different set of symbols to represent the

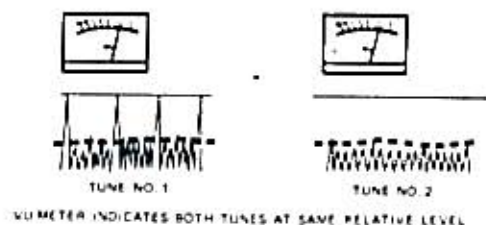
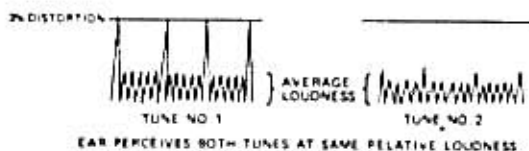
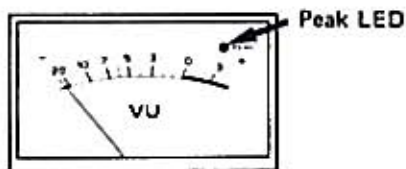
features and controls. Learning to read a block diagram can be a tremendous help in your future dealings with audio equipment. An experienced studio engineer can usually operate even the most sophisticated equipment with only a block diagram as a reference.



APPARENT AND ABSOLUTE VALUES

Your ear and your Studio 8 perceive the same program material in very different ways. The ear deals in apparent, subjective values, while your mixer and recorder in the Studio 8 deal in absolute, objective values. This difference leads to the fundamental rule: On the way in, to your recorder by way of the mixer, trust the machine's meters and OL indicators; On the way out, to the ear by way of loudspeakers/headphones, trust what you hear. Remember too, until your ears reach the level of perception achieved by experienced audio engineers, trust your meters and LEDs whenever in doubt.

The Meters of your Studio 8 show both the average program level with the needle of the meter and the peak program level and transients by means of peak LEDs built into the Meters. OL indicators in your mixer's channels also show signal levels that are too high. Percussive instruments and synthesizers are very difficult to mix and record properly. Believe your Meters and LEDs when you're recording these instruments. Their apparent loudness is not usually greater than other instruments, but their peak transient signal level, particularly at the beginning (attack) of a note, is much higher than the average program level. Keep your levels under control when you mix or record these instruments. If their levels reach your tape or amplifiers without being trimmed, they will cause your sound quality to go down.



HOW TO USE YOUR EQUALIZER

EQ controls are used to change the timbre of a signal in an individual channel of your mixer. There are three controls in your equalizer, each of which has two distinct functions: to cut or boost, and to determine a precise frequency to be affected. The term frequency roughly corresponds to the term pitch. The higher the frequency number, the higher the pitch. The human ear is an amazing instrument that can pickup an extremely broad range of sounds. The following is a very simple and subjective explanation of the characteristics of the various frequency ranges.

20 to 60 Hz: The lowest frequencies the ear can perceive exist here. Notes in this range are felt more than heard. Too much boost in this range will muddy the sound quality.

60 to 500 Hz: This is where the fundamental pitches of many instruments exist. This area is very sensitive to equalization. Too much cut in this area can make your music sound thin and lifeless. Too much boost will make the music sound a little dull and muffled.

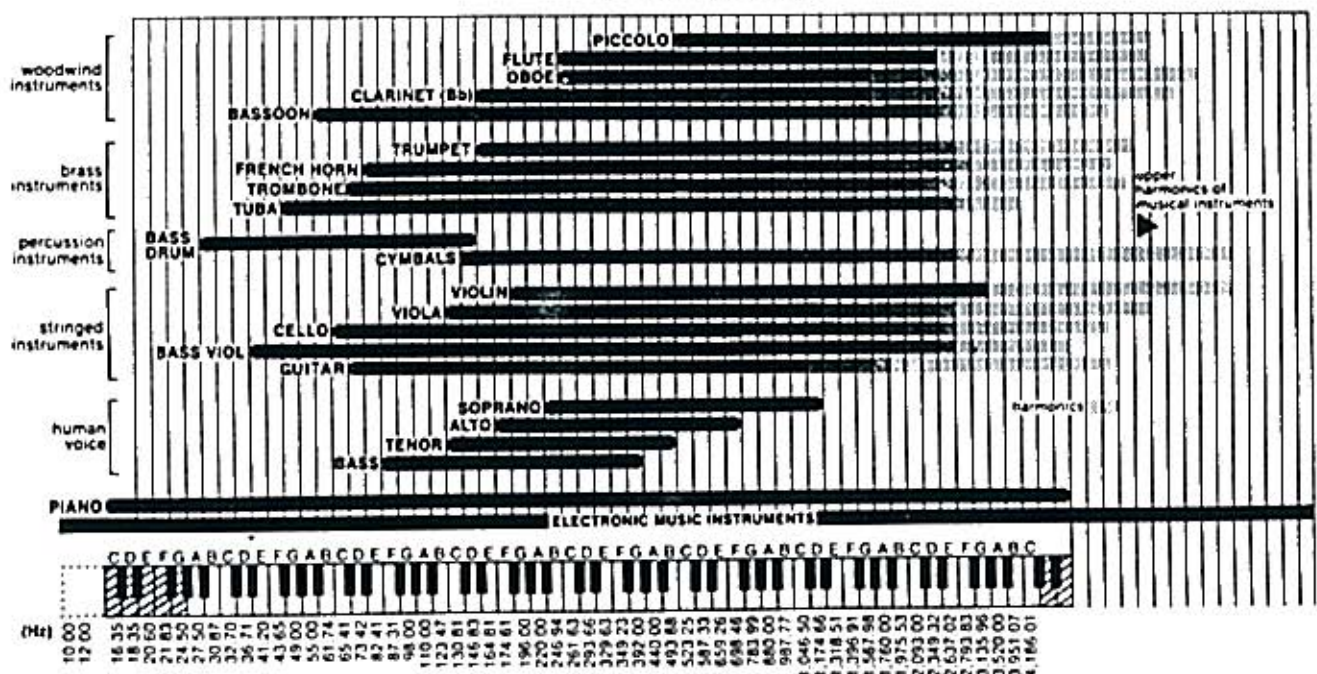
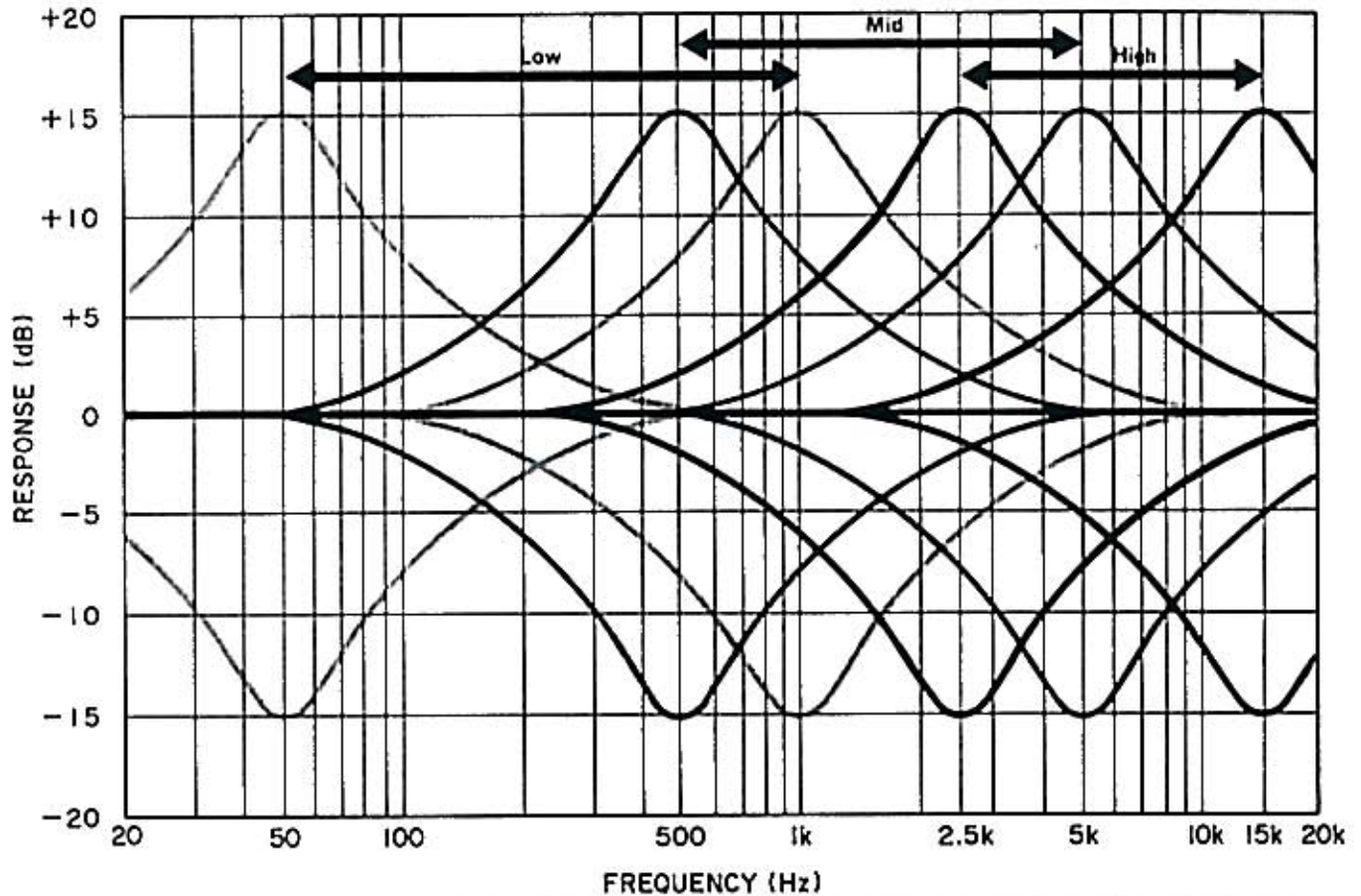
500 Hz to 2.5 kHz: This area is usually called the "mid-range." There is a lot going on in this range and too much boost can cause the music to become harsh or hard to listen to. The experience known as "listener fatigue" is usually caused by too much emphasis in this frequency range.

2.5 kHz to 6 kHz: This area contributes to the clarity and "presence" of the program. Material in this range is often perceived as being louder than its measurable signal level would suggest. A slight boost in the upper frequencies in this range (5 kHz) can make the music sound brighter. Be careful! Listener fatigue can happen here too.

6 kHz to 15 kHz: Brilliance, clarity, and the metallic sheen of bells and cross modulated synthesizer patches are found in this range. The ring of acoustic guitars and pianos can be accentuated in this area. Overtones, harmonics, are what you're working with, rather than fundamental pitches. The warning for this area has to do with noise. There is a lot of it up here and too much boost will bring out any noises present in your material.

The ability to favorably change one signal may result in an unfavorable alteration in another. Boosting the bass frequency range in order to emphasize a kick drum may adversely affect a cymbal using the same channel of the

mixer. EQ controls tend to be over used rather than under utilized. If the sound is acceptable as it comes into the mixer, then don't EQ it. And don't over adjust any control. Be careful, only make the adjustments that are absolutely



necessary. Less is definitely more when considering EQ.

The Studio 8 equalizer is a three band sweep-type. It offers the ability to select a precise frequency and cut or boost it by plus or minus 15 dB. The treble control covers frequencies from 2.5 kHz to 15 kHz. The mid-range control operates between 500 Hz and 5 kHz. The bass control is adjustable for frequencies from 50 Hz to 1 kHz. As you can see, there is some overlap in the frequency ranges.

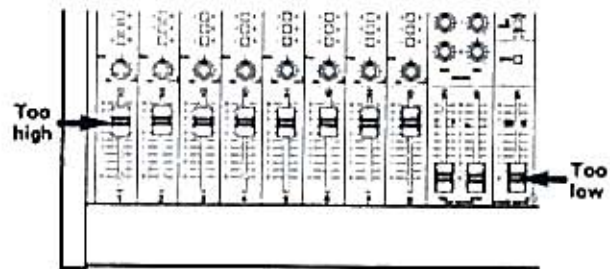
Your EQ controls work in an interactive way. The tone or timbre of the sound in a channel can be altered to bring about a similar change by using any of the three EQ controls. How so? Suppose you want to change the "balance" of the material by accentuating the bass. Before you reach for the 50 Hz to 1 kHz control and start boosting the bass, consider using either or both of the other two controls to "roll off" some of the mids and highs. These three controls epitomize the teamwork approach to problem solving. Always consider all three options when an EQ adjustment is necessary.

If you've decided that the signal definitely needs some EQ adjustment and you have looked at the frequency range chart and determined which of the three controls you wish to use, you now must determine the precise frequency within the control's range. To do this, turn the GAIN, the center (upper) of the two concentric knobs to an exaggerated position almost all the way up (clockwise). Then slowly sweep the frequency range by turning the outside (lower) portion of the concentric knob from its minimum (fully left) to its maximum (fully right) in a clockwise motion. As the control is turned, you will hear the change in the signal's content. When the desired frequency is isolated, reset the GAIN control for the necessary amount of boost or cut. Avoid making these changes during a recording. The sweeping action can create undesirable tonal effects.

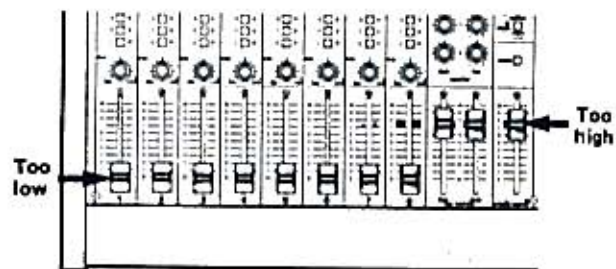
A WORD OF MIXING ADVICE

All finished tapes must be balanced for level. Do all the instruments and voices blend together in a way that is appealing? Are the bass and drums so loud that the singer is "lost in the mix"? Your signal levels will affect the entire recording and mastering process, including the EQ process. So make sure that your levels are properly adjusted when mixing for recording. You can't fix it if you can't find it.

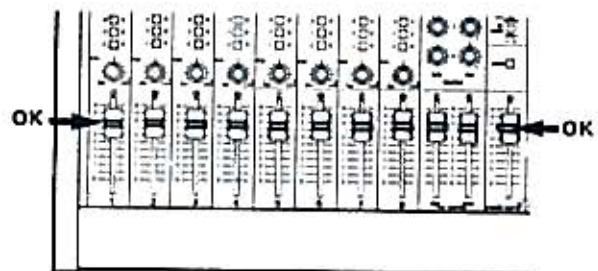
If your mixer's faders end up looking like this, then you're overloading your outputs. Pull down the input channel faders and raise the program master faders.



If this is the look that your mixer is projecting, then you're pushing the masters too hard. Your mix will not be distorted, but will have a lot of noise in it.



This picture is the reasonable compromise. It will give you the best results.



COMMON SENSE: CARE AND MAINTENANCE

Even though the heads used in your Studio 8 are constructed of very durable materials, they will show excessive wear much faster if they are not treated properly. If you follow the procedures listed here, you will get the most out of your Studio 8.

CLEANING

You need some head cleaner (TEAC HC Series/TZ-261), some cleaner for the rubber components (TEAC RC Series/TZ-261), and some cotton swabs. Cleaning procedures should be performed before each session, after each session, and whenever your waiting for the drummer to return from a break. Do it! You won't regret it.

Here's why:

1. Dirt or oxide build-up on the heads will force the tape away from the head gaps that do the recording and playing back. A very small distance is all that's required to produce a noticeable reduction in the record and playback quality. All the money you've spent, and all the engineering expertise expended by TASCAM on your Studio 8 can be wasted by a minuscule bit of dirt or oxide on the heads. Wipe it off with head cleaner.

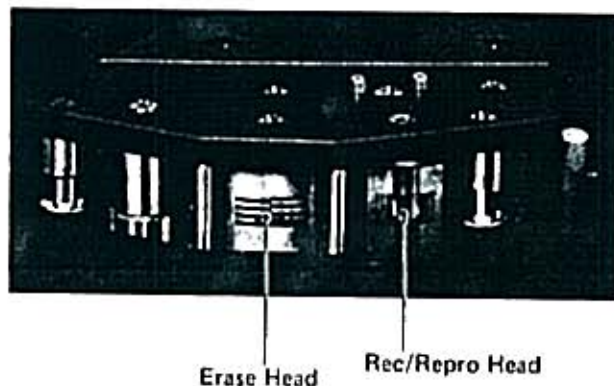
2. Tape and the oxide on tape act like very fine sandpaper. They slowly grind down the tape path on your recorder. If you don't clean off these abrasives regularly, the wear will be quicker and it will be uneven. Uneven wear on the heads can be compensated for, to a certain degree, by various adjustments. Eventually uneven wear will create notches that will cause your tape to "skew" and skip around on the tape head. This skew will cause the tape to wear unevenly, which will cause more uneven wear on the tape heads. . . A very nasty business. Eventually the only solution is the replacement of the tape heads and tape guides. This is very expensive, particularly when you add the cost of ruined tapes, sessions, and lost time. Being conscientious can more than double the life expectancy of your tape heads and guides.

Cleaning

As we mentioned, this should be done every chance you get. Using TEAC HC Series/TZ-261 and a cotton swab, clean the heads, capstan, and tape guides until the swab comes off clean. Wipe off any excess cleaning fluid with a dry swab.

Clean the pinch roller at least once each day the recorder is used. Use TEAC RC Series/TZ-261 rubber cleaner.

1. Open the tape compartment door.
2. Press PLAY, move tension arms so that capstan spins, and hold a cotton swab that has been lightly moistened with rubber cleaner capstan shaft. This will prevent the swab from becoming tangled in the mechanism.
3. Clean it until there is no visible residue coming off onto the swab.
4. Using a clean cotton swab, wipe off all the excess rubber cleaner from the pinch roller. Make certain that there is no foreign matter remaining on either the pinch roller or the capstan shaft.
5. Clean the capstan by lightly pressing a cotton swab moistened with head cleaning fluid onto the shaft. Clean thoroughly and wipe off excess fluid.



DEMAGNETIZING (DEGAUSSING)

A little magnetism rubs off onto the heads every time a tape passes over them. It takes a very small amount of the magnetism to have a noticeable effect on performance quality. Playing a tape ten times will deposit .2 Gauss on the heads. Gauss is the unit used to measure

magnetism. As little as .7 Gauss will cause erasure of the high frequencies on the tapes that pass by it. If you don't want your tapes erased, then demagnetize regularly with the TEAC E-3 Degausser.

Degaussing is always done with the Studio 8's power OFF. If you try it with the electronics on, the current pulses produced by the degausser will appear to the heads as an audio signal. These pulses are around 10,000 Gauss, and they will seriously damage the Studio 8's electronics and meters. Turn off your Studio 8 and turn on the degausser at least three feet away from the Studio 8.

If you are not using the TEAC E-3, be certain that your degausser has either a plastic tip cover or plastic tape covering the tip. Make sure that no metal ever touches the tape heads as it will scar them beyond repair.

Slowly move the demagnetizer into the tape path. Move the degausser up and down, touching lightly the heads and all the metal parts in the tape path. Slowly move it away again to at least a one-meter (three-foot) distance before turning it off.

Be sure to concentrate while you are degaussing. If you are not wide awake during this procedure, you can permanently damage the heads of your recorder. The demagnetizer will put a permanent magnetic charge onto the heads if it is turned off or on while near them. This charge cannot be removed. Your head is a goner. So perform these functions with the respect, attention to detail, and regularity they deserve and your Studio 8 will respond with the excellent performance both you and TASCAM expect.

CAUTION: Do NOT use paint thinner, benzine, alcohol, or other solvents that are not designed for the purpose at hand. These foreign substances will damage your Studio 8.

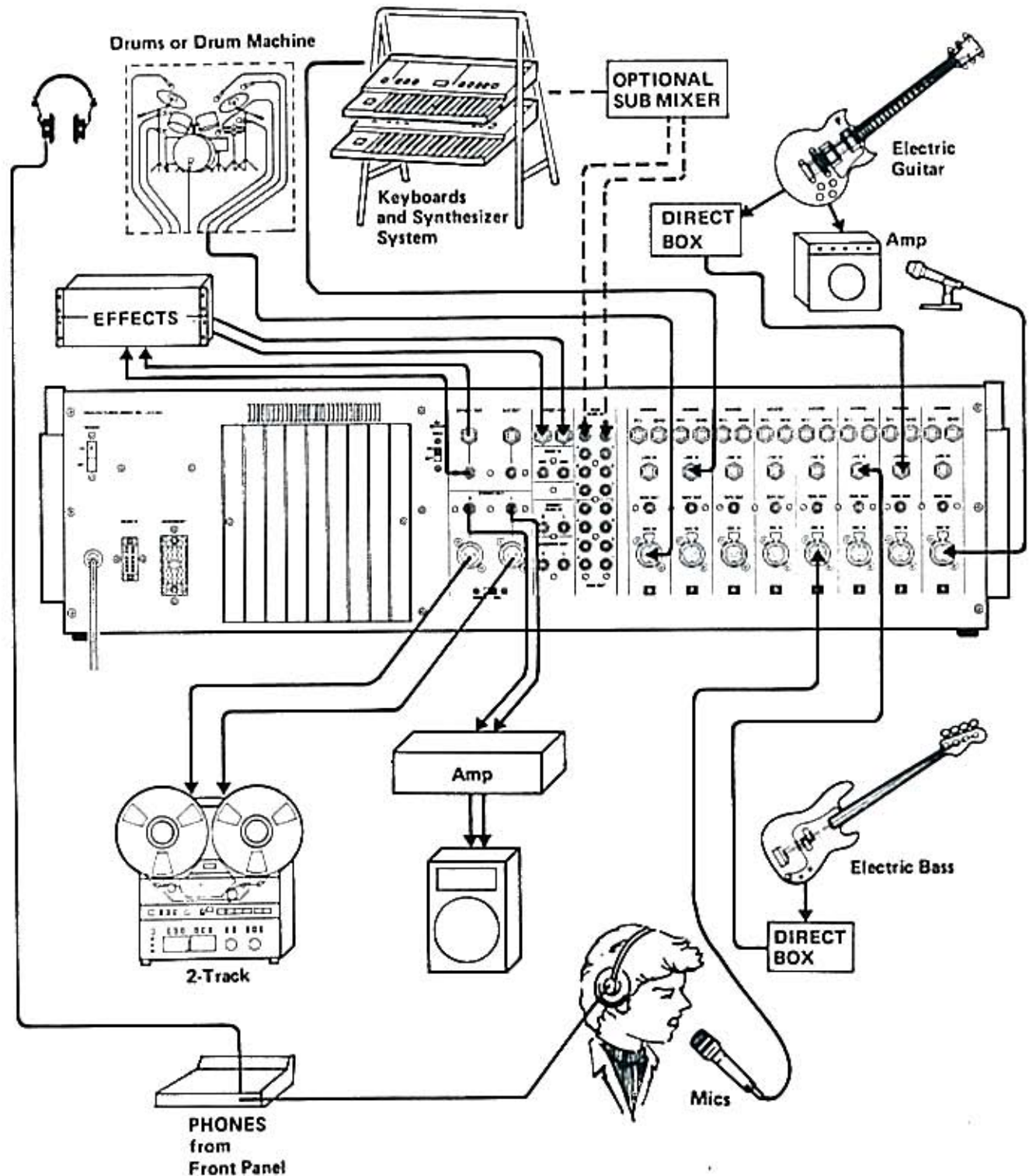
TAPE HANDLING AND STORAGE

Tapes should be stored in a dust-free environment that won't be subjected to extreme heat or cold. Your tapes are a magnetic storage medium and can be damaged by things that generate magnetism. Electric motors, the kind found in vacuum cleaners and other appliances, will damage tape if they get too close to it. The transformers in your power amps and instrument amplifiers can also cause this kind of damage. Make copies of your tapes so that if one is lost or damaged, you will have a spare. A phenomenon known as "print through" can occur if your tapes are wound onto their reels too tightly before they are stored. Never fast forward or rewind a tape for its entire length before storing it. Reel to reel tapes should be stored "tails out." If tapes are stored for a long time, a tails out (the end is the first thing to come off the reel) reel will insure that any print through will appear as "post echo," which is usually masked by the sound on tape.

APPLICATIONS

The following are intended only to serve as examples. They are not the only way to do things. As you become more familiar with your Studio 8, you will find alternate methods which

will better suit your needs. The basic recording setup was covered in detail in the operational chapters of this manual, so we will show the diagram without text.



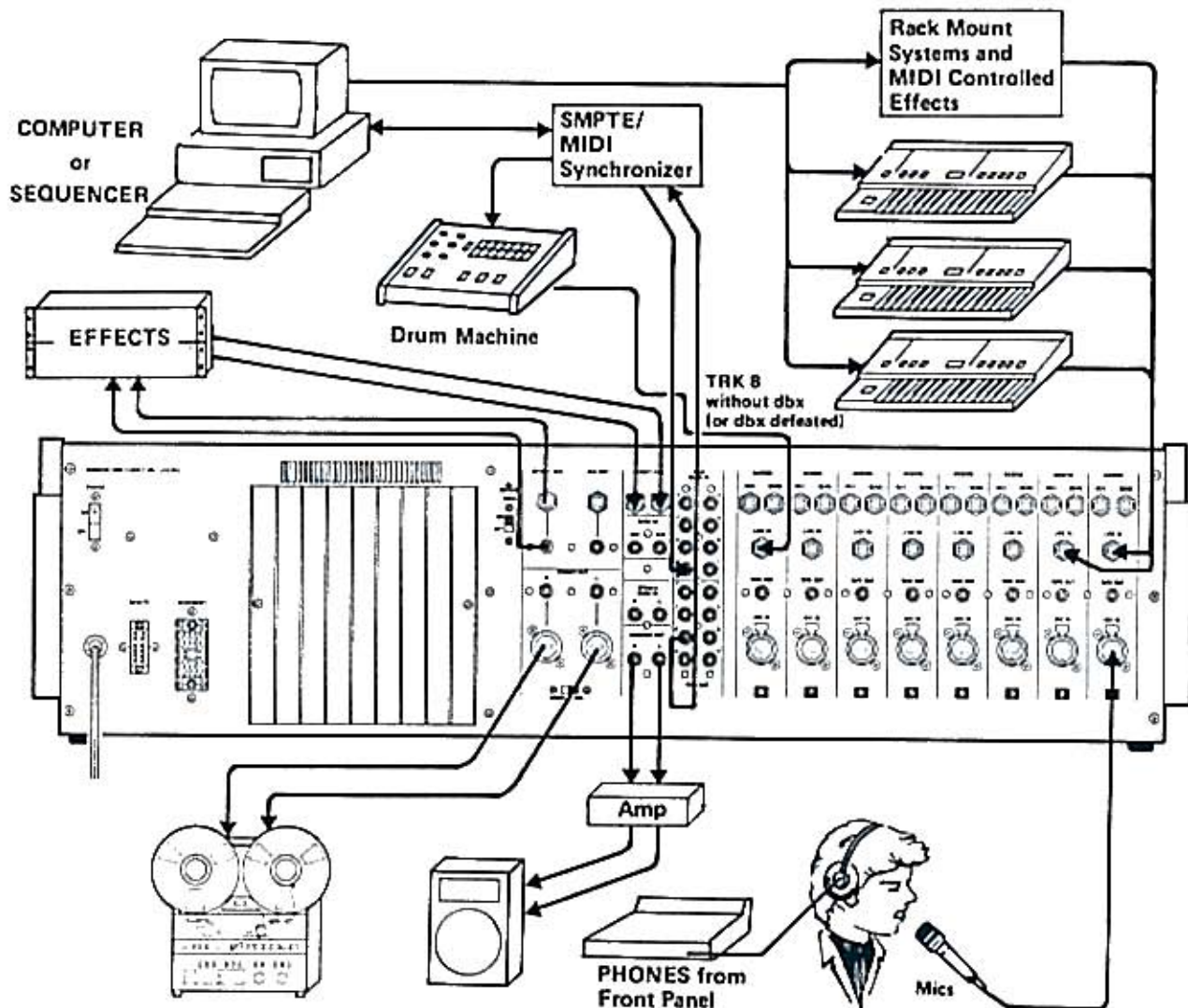
ELECTRONIC MUSIC STUDIO

When setting up a system of this type, the first thing to do is to put the speakers and amplifiers in their proper positions. Then wire each system. Make sure the Studio 8 faders are down and the power on all units is off. When all systems are wired and your mics and instruments are connected, begin turning on the system. Turn on electronic instruments first, followed by your Studio 8, then monitor and headphone amplifiers.

With the faders still down, set all EQ controls to their center, flat position. Set the channel input selectors to the appropriate positions, LINE on all synthesizer channels and MIC on any microphone channels. Press the appropriate ASSIGN and REC FUNCTION switches, and raise the PGM MASTERS and STEREO MASTER Faders to the shaded area between 7 and 8.

Play instruments and begin setting the channel levels by slowly raising the faders. If the levels of any of these channels is too high, as indicated by the meters or OL LEDs, and the channel fader must be kept below the 5 setting, then use the TRIM control or a less sensitive microphone, or turn down the volume controls on your instruments. Remember to watch your levels on percussive, cross modulated, highly resonant, and fast attack patches. Drum machine levels should also be watched closely.

Adjust any AUX or EFF mixes in the same way: first, adjusting the channel levels and Masters, watching any overload indicators on your effects or cue system equipment; then adjusting the EFFECT RTN GAIN controls. Any effects devices connected to the ACCESS



SEND/RCV jacks in the channels should be closely watched. Particularly distortion/overdrive units, since your channel OL indicator is located before the ACCESS point.

Setting the levels for the control room monitor speakers is a simple procedure. Set the STEREO MASTER Faders to the 7 to 8 position and adjust the Monitor Master control (MONITOR/PHONES) for a comfortable listening level

in the headphones or speakers. Begin raising the individual channel MONITOR GAIN controls and adjust them for a pleasing balance. Set MONITOR PAN controls as desired for stereo imaging and readjust the Monitor Master control for a comfortable volume level at the monitor speakers. Be aware that any "open" microphones in the room may cause feedback, a howling sound. Turn off or reposition any microphones that cause feedback.

VIDEO/FILM PRODUCTION

The Studio 8 fulfills all the audio needs of the video/film production or off-line sweetening facility. All popular brands and models of VCRs and VTRs will interface directly with the Studio 8. Plug-in compatibility with SMPTE/EBU controllers and synchronizers made by Adams Smith, Audio Kinetics, Timeline, Cypher, Convergence, ISC, Videomedia, and many others further enhances the Studio 8's capabilities in the video environment.

The Studio 8 motors are under servo control so that SMPTE controllers can tell the transport to go directly to cue points and the transport can respond with a high degree of accuracy. The ACCESSORY jack also outputs a tachometer signal whose frequency is interpreted by SMPTE/EBU controllers so that it knows the position of the tape even in fast-forward and high speed rewinds. A guard band is not necessary when recording time code on track 8 as long as time code levels are recorded at -7 to -10 VU.

Multitrack masters are easily created for video/film through conventional overdub and insert techniques or all eight Studio 8 tracks may be recorded simultaneously. Isolated feeds of the individual audio elements will later enable maximum creativity in mixdown, since each source is under independent control. High quality multitrack audio can be achieved on one machine without the necessity of transferring audio from mono or two-track master machines. The following are only two examples of track allocation using the Studio 8 in a video/film context.

TRACK

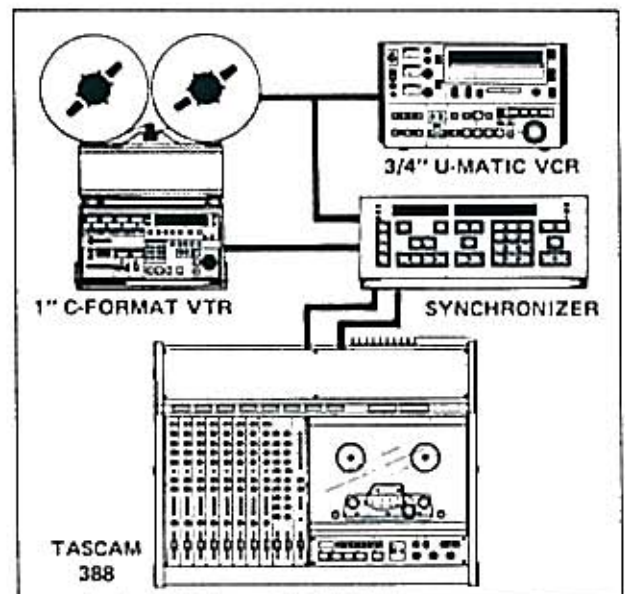
1. Guide (production) Track

2. Dialogue One
3. Dialogue Two
4. Dialogue Three
5. Ambience
6. Effects One
7. Effects Two
8. Time Code

Or a possible track layout for eventual multilingual release

TRACK

1. Narration - English
2. Music Left
3. Music Right
4. Effects
5. Ambience
6. Narration - Spanish
7. Narration - Japanese
8. Time Code



FEATURES AND CONTROLS

1 POWER

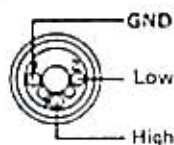
The POWER switch is on the back panel. The AC value of your Studio 8 should be checked for compatibility with your country's AC. See the Voltage Conversion section of this manual.

MAIN MIX SYSTEM

2 MIC IN Connectors

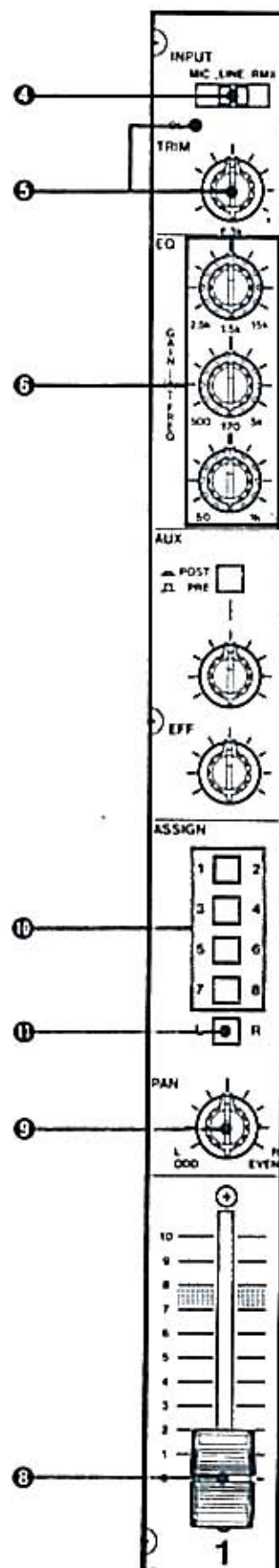
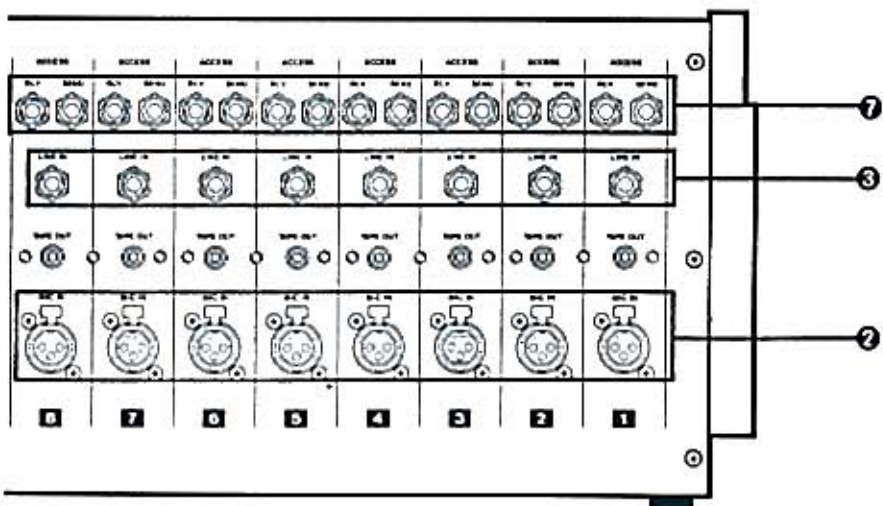
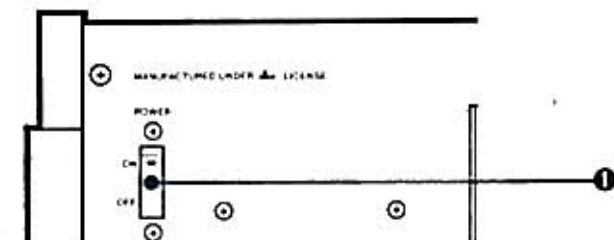
Located on the back panel, these XLR connectors accept balanced microphone or line signals. High impedance, unbalanced microphone signals may be connected here using a standard quarter-inch to XLR adapter/transformer.

Pin assignment is as follows: Pin 3 is high, pin 2 low and pin 1, shield.



3 LINE IN Connectors

Located on the back panel, these quarter-inch phone jacks accept unbalanced, line level signals. Electronic instruments and audio equipment producing line level signals can be connected here.



① INPUT Selector

These are found on the top panel, at the top of each channel of your Studio 8's mixer. The switch has three settings:

MIC: Allows the signal present at the MIC INput on the back panel to enter the mixer channel.

LINE: Allows the signal present at the LINE IN connector on the back panel to enter the mixer channel.

RMX: Allows the playback signal from the recorder to enter the mixer channel. Track one of the recorder goes to channel one of the mixer; track two to channel two, etc.

② TRIM and OL Indicator

The OL indicator lets you know that the signal is too hot. Use the TRIM to adjust the incoming MIC signal to a level that does not register, continuously, on the OL indicator. The OL is located after the EQ section so that if a signal is boosted to the point of overload by an EQ control it will register on the OL indicator.

③ EQualizer

The EQ system in your Studio 8 is a three-band sweep-type parametric system. It allows you to select the specific frequency range you wish to affect and the degree to which it will be affected, plus or minus 15 dB. The high frequency control has a range variable from 2.5 kHz to 15 kHz. The mid-range operates between 500 Hz to 5 kHz. The bass control has a range from 50 Hz to 1 kHz.

④ ACCESS SEND and ACCESS RCV

This access point allows you to add signal processing to an individual channel without affecting the signal in any other channel. ACCESS SEND may also be used as an extra send for a cue mix, or recorder send, since the mixer channel's signal also continues to flow through the rest of the mixer if the ACCESS RCV is not connected. Using ACCESS RCV routes all the channel's input signal into the effect loop.

⑤ Input Channel Fader

This linear, slide, fader varies the amount of signal going to the PAN control, the EFF submix, the ASSIGN switches, the STEREO MASTER Faders, and the AUX submix if it is switched to the POST position.

⑥ PAN

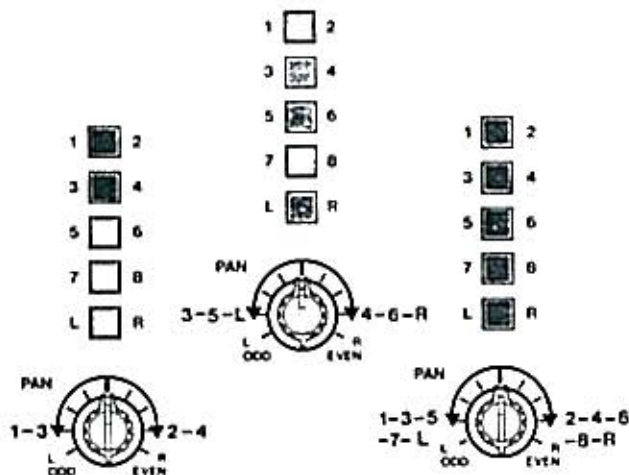
This control allows you to create stereo mixes by sending your channel's signal in continuously variable degrees to the left (ODD busses) or right (EVEN busses) sides of the mix.

⑦ ASSIGN Switches

These four switches are used to send (assign) a signal to any one, or any combination of all eight PGM Busses. The signal is also sent to the PGM MASTERS Faders, the PGM OUTputs, the inputs of the MONITOR submix, and the tracks of the recorder. These switches work in conjunction with your PAN controls, which decide how much signal goes to the left (ODD) or right (EVEN) busses.

⑧ L/R ASSIGN Switches

These are dual purpose switches. They send (assign) your channel's signal to the STEREO MASTER Fader and the Stereo Bus. This is the normal condition for Remix. They can also be used as a solo-in-place switch. By pressing down a L/R switch if the channel is assigned to one of the PGM Busses (1-8), the channel whose L/R switch is pressed will be the only signal present in the Stereo Bus, the PHONES, and the MONITOR OUT(s).



⑩ PGM BUSS IN

These connectors are on the back panel. You can connect the line-level outputs of another tape recorder, mixer, or effects devices with level controls at this point. These inputs are after the PAN, Channel Fader, EFF submix, AUX submix, and ASSIGN switches. Signals from these inputs are routed to the PGM MASTERS Faders, MONITOR submix, and PGM OUTputs. They will be recorded, along with any signals from the eight channels of your mixer by the Studio 8's recorder.

⑪ PGM MASTERS Faders

Located after the ASSIGN switches, the two PGM MASTERS Faders each adjust the level of four PGM Busses (ODD 1, 3, 5, and 7; EVEN 2, 4, 6, and 8). From this point the signal flows to the PGM OUTputs, MONITOR submix, and to the recorder.

⑫ PGM OUTputs

These RCA connectors are located on the back panel. Should you want to record on a different machine or use the Studio 8 as a submixer, these outputs supply the access. They provide a line-level signal.

⑬ STEREO BUSS IN

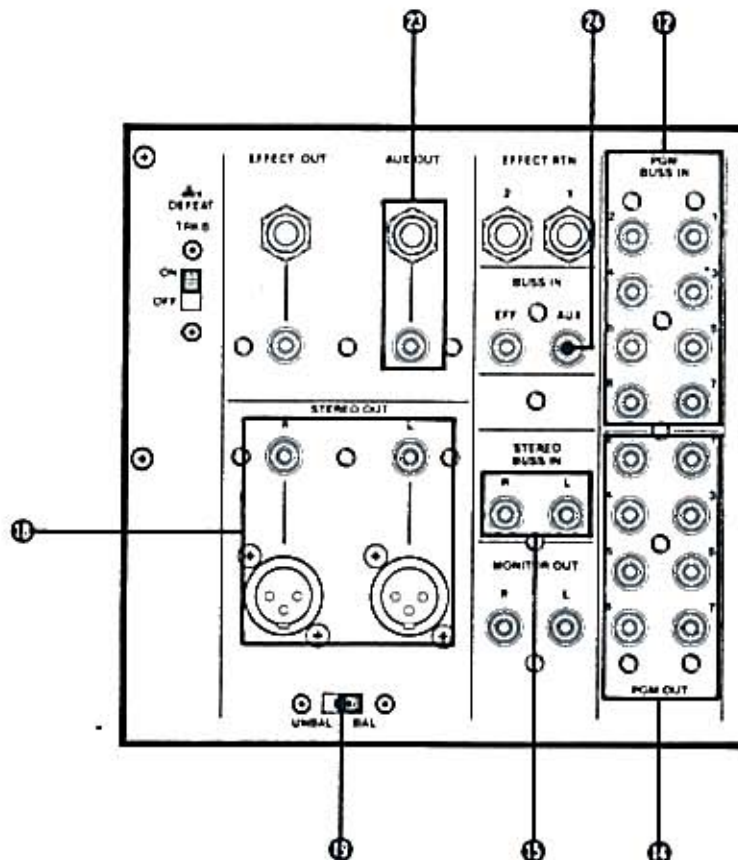
These RCA connectors allow input to the STEREO Buss system at a point prior to the STEREO MASTER Fader. They will accept a line level signal and can be utilized by recorders, submixers, or effects devices with level controls. Before signal from these inputs reaches the STEREO MASTER Fader, it is joined by signals from the EFF RTN inputs that have also passed through the EFF RTN GAIN and PAN controls.

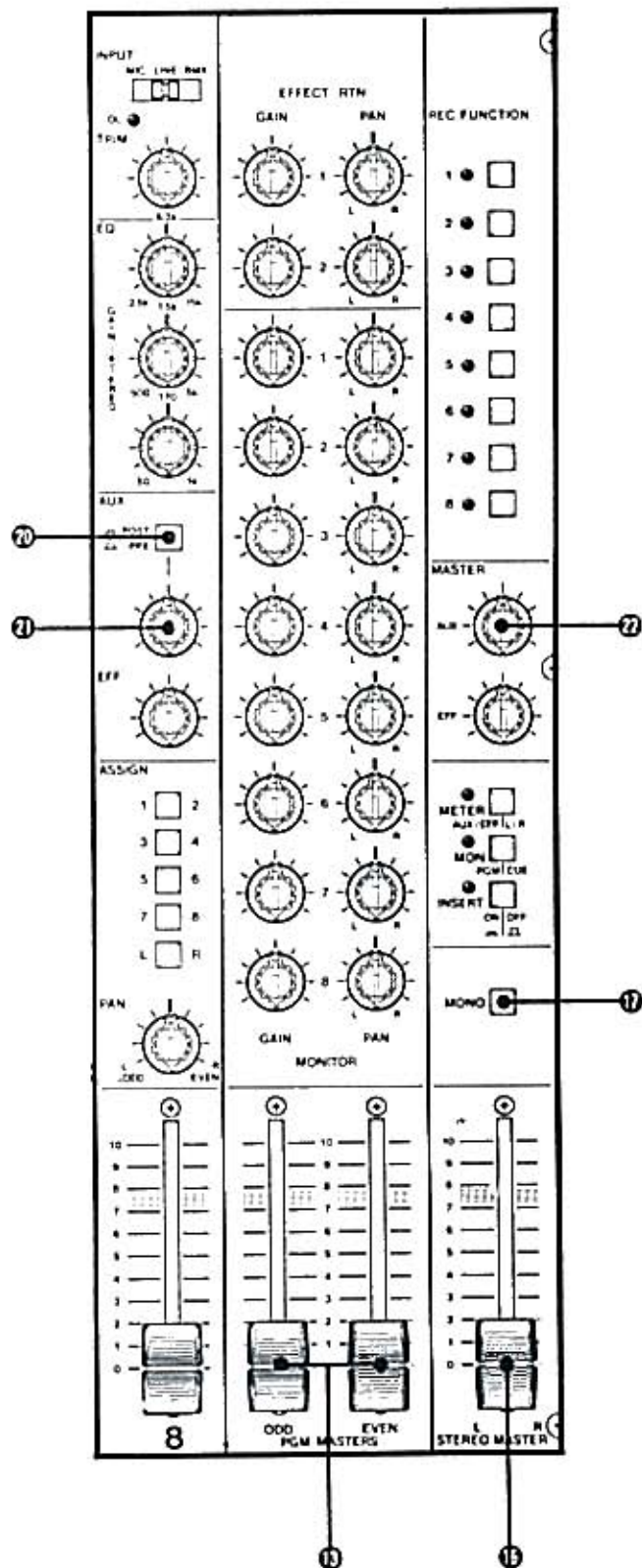
⑭ STEREO MASTER Fader

This linear, slide fader adjusts the level of both the right and left side of the Stereo Buss. It receives its signal from the L/R ASSIGN switch and sends the signal to the MONO switch and the STEREO OUTputs. When the Stereo Buss is used, the signal is automatically switched to the MONITOR/PHONES control.

⑮ MONO Switch

This switch combines the left and right sides of the Stereo Buss into a mono mix. It makes the same, combined signal available to both (L and R) STEREO OUTputs.





⑩ STEREO OUTPUTS

There are two pairs of these outputs on the back panel. The pair utilizing the XLR connectors provides a balanced +4 dBm signal. The other pair uses RCA connectors and provides an unbalanced -10 dBV signal.

⑪ BALANCED/UNBALANCED Switch

This switch located on the back panel affects only the XLR STEREO OUTPUTS. It allows the outputs to provide either a balanced or unbalanced line-level signal.

In the balanced position, pin 3 is high, pin 2 is low and pin 1, shield. In the unbalanced position, the pin out changes as follows: Pin 3 high, pin 2 and pin 1 shield.

AUX SUBMIX

⑫ PRE/POST Switch

This switch determines whether the AUX submix gets its signal from the input channel before (PRE) or after (POST) it passes through the EQ, ACCESS SEND/RCV, and Channel Fader.

⑬ AUX

This rotary control adjusts the level of the signal that will be passed along to the AUX MASTER control and the AUX OUT.

⑭ AUX MASTER

This rotary control adjusts the level of the summed AUX signals from all the input channels of your mixer. It determines the amount of the signal that will be present at the AUX OUT(s).

⑮ AUX OUT

There are two of these located on the back panel. The quarter-inch connector provides a 0 dBu signal. The RCA connector provides a line-level (-10 dBV) signal.

⑯ AUX BUSS IN

This input allows a line-level signal to enter the mixer. A signal entering here will then go to the AUX MASTER control. When using the Studio 8's mixer as the master in a stacked configuration, this input accepts the AUX sends from the submixer and allows the Studio 8's AUX MASTER to control the complete AUX system of both mixers.

EFFECT SUBMIX SYSTEM

② EFF

This rotary control determines the level of signal that will be admitted from the input channel into the Effect submix. The signal originates at a point in the channel after the Channel Fader and before the PAN control and is then routed to the EFF MASTER control.

③ EFF MASTER

This rotary control determines the level of the summed signal from all of the channel's EFF controls. The signal then goes to the EFF OUTPUTS on the back panel.

④ EFF OUT

There are two of these on the back panel. The quarter-inch jack provides a 0 dBu signal. The RCA connector provides a line-level (-10 dBV) signal. From here the signal goes to the effects/signal processors. It can be returned to the mixer at several points: EFF RTN (0 dBu), AUX BUSS IN (-10 dBV), PGM BUSS IN (-10 dBV), or STEREO BUSS IN (-10 dBV).

⑤ EFF RTN

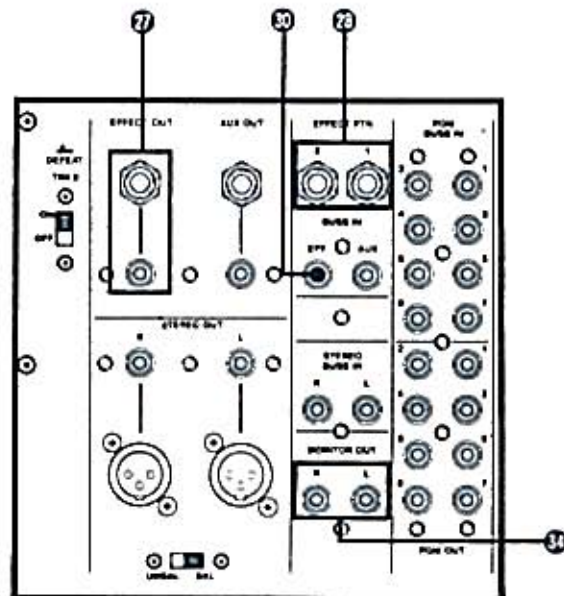
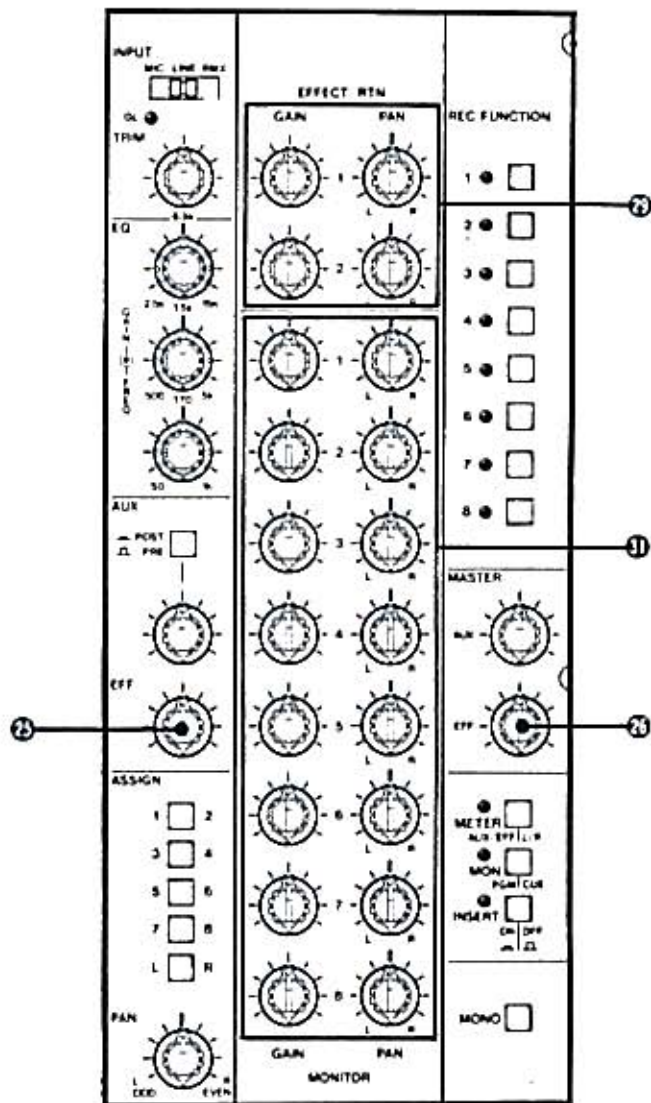
These are the normal points at which the Effect Mix signal is returned to the mixer from the signal processor(s). From these inputs, the signal is routed to the EFF RTN GAIN and PAN controls.

⑥ EFF RTN GAIN and PAN (1 and 2)

These controls determine the level (GAIN) and the left-to-right placement (PAN) of the returning Effect submix signal before it joins the Stereo Buss and is sent to the STEREO MASTER Fader.

⑩ EFF BUSS IN

This input is located before the EFF MASTER control in the signal flow sequence. It allows the effect outputs of a submixer used with the Studio 8 to enter, so that the EFF MASTER can control the total effect submix of both mixers. Do not return your effects loop signal that originated from the EFF OUT at this input, it will cause an audio ground loop (feedback).



MONITOR SUBMIX AND PHONES SECTION

① MONITOR GAIN and PAN

There are eight sets of these controls on the top panel, one for each PGM Buss or recorder Track. They control the level (GAIN) and left-to-right placement (PAN) of the signal that is then sent to the STEREO MASTER Fader, MONO switch, STEREO OUT(s), MONITOR OUT(s), PHONES jacks, and STEREO L/R Meters.

② MONITOR/PHONES Select Switches

There are three of these on the top panel near the recorder's transport controls. They are marked: STEREO, AUX, and EFF. They determine what signal will be heard in the headphones and be sent to the MONITOR OUT(s).

③ MONITOR/PHONES Level Control

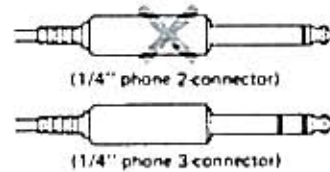
This rotary control determines the signal level (volume) that is sent to the PHONES Jacks and MONITOR OUT(s).

④ MONITOR OUT(s)

These RCA connectors provide a line-level signal and are normally used with a stereo amplifier/receiver and monitor loudspeakers.

⑤ PHONES Jack(s)

There are two of these located on the front panel of the Studio 8. These are stereo headphone jacks. NEVER! use mono headphones with these connectors.



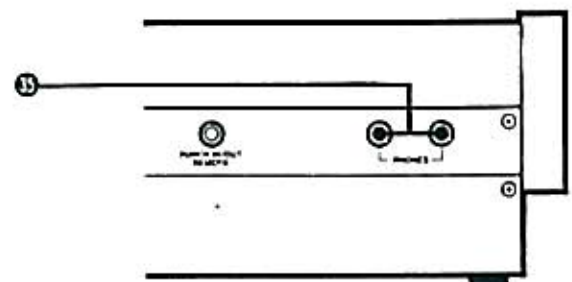
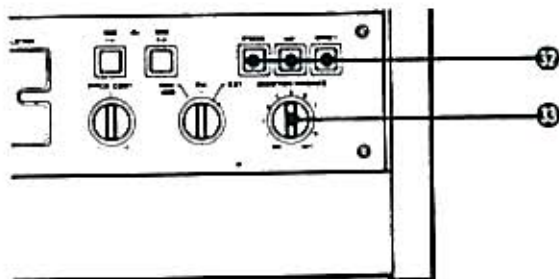
Monitor Source with MONITOR/PHONES Selector in STEREO*

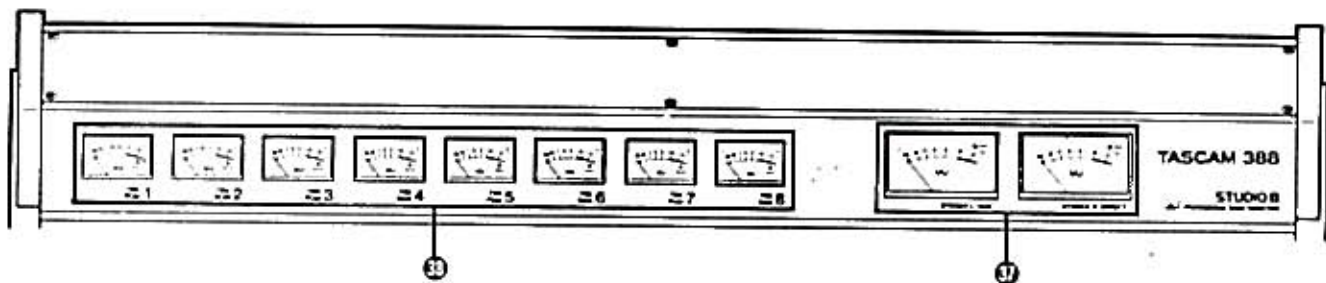
ASSIGN L/R Switch	CUE/PGM Switch	REC FUNCTION Switch	INSERT Switch	Transport Mode	Monitor Source	
Off (□)	PGM (▢)	—	—	—	PGM	
	CUE (▣)	On (▢)	On (▢)	PLAY	TAPE**	
				REC	PGM	
		Off (▣)	—	—	Other modes than PLAY and REC	(no sound)
					PGM	
	On (▢)	—	—	—	PLAY, REC	TAPE
Other modes than PLAY and REC					(no sound)	
On (▢)	—	—	—	—	L/R STEREO	
LED stays on in PGM position.		LED flashes with the transport REC off; and stays on with the REC on.	LED stays on in the down position.			

NOTES:

* Positions other than STEREO have nothing to do with the setting of the switches shown in the chart.

** does not include TAPE signal in RMX (Remix) mode (they pertain to "PGM").





METERS SECTION

33 METER Select Switch

This two position switch is located on the top panel above the STEREO MASTER Fader, MONO, and ACCESS SEND/RCV. It only affects the Stereo Meters; it switches them to either AUX/EFF or L/R (Stereo Buss).

34 STEREO L/AUX and STEREO R/EFF Meters

These Meters register both the average program level (with the needle) and the occurrence of peak or transient material (Peak indicator lights).

35 TRK/PGM Meters 1-8

These Meters register program level of the Program Busses or the Tracks of the recorder, on PLAY or during Remix. They have a switching logic so that they always display the appropriate signal. This switching also takes place during Insert Editing/Punch-in.

RECORDER/REPRODUCER

36 REW

Pressing this button rewinds the tape at high speed. If the LOAD function is engaged, the tape will not rewind off the reels. The tape will rewind to the Load position and stop. If a CUE position is in Memory and the STC is engaged, the tape will stop there.

37 F. FWD

Pressing this button winds the tape forward at high speed. If the LOAD function is engaged, the tape will stop before it winds off the reel. If a CUE position is in Memory and the STC is engaged, the tape will stop there.

38 STOP

Pressing the STOP button stops the tape's motion no matter what mode the transport is in.

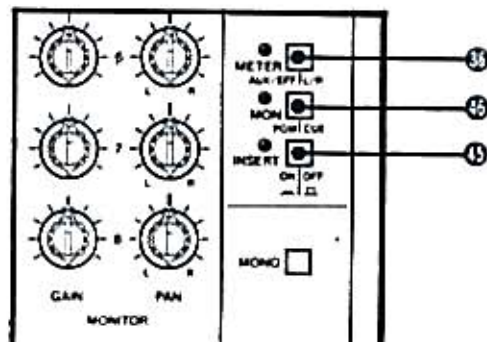
39 PLAY

Pressing this button starts the tape rolling forward at playback speed. Pressing this button in conjunction with REC and any number of REC FUNCTION switches puts the machine into Record mode.

40 REC

Because this is such an important function (Recording), the REC button, by itself, does nothing. It must be used in conjunction with the REC FUNCTION buttons. Its operation is also affected by the status of the INSERT switch. If a REC FUNCTION switch is on, and the Studio 8 is in Play mode, pressing the REC button will start the Recording process on the track(s) designated by the REC FUNCTION switches.

If no REC FUNCTION switches have been pressed, pressing REC and PLAY simultaneously will cause the tape to roll forward and the LED above the REC button will blink. This means the recorder is in the Record-ready mode, but no recording is taking place. Pressing a REC FUNCTION switch while the recorder is in Record-ready mode will start recording on the track designated. See the Punch-in procedure for more on this.



④ REC FUNCTION (1-8)

Pressing any of these eight switches makes the corresponding track of the recorder ready to record. If the transport is already in the Record-ready mode, recording will begin when the REC button is pressed.

A track cannot be recorded unless the REC FUNCTION switch designating it is on. A track is therefore, "safe" as long as its corresponding switch is off as illustrated in the chart.

Switch Setting			LED Condition			Track Status
REC	PLAY	REC FUNCTION	REC	PLAY	REC	
Off	Off	Up	-	-	-	Safe (No recording possible)
Off	On		-	On		
On	Off		-	-		
On	On		Blinks	On		
Off	Off	Down	-	-	Blinks	Record ready
Off	On		-	On		
On	Off		-	-		
On	On		On	On		

⑤ INSERT

This switch has no effect unless the MON PGM/CUE switch is in the CUE position with its LED off. Pressing INSERT to the on position allows the Studio B to automatically switch from tape to source signals during a punch-in and back to the tape signal at punch-out.

When a tape is played with the INSERT function on, only the tape signals will be heard, regardless of the REC FUNCTION settings. On the other hand, the off position of the INSERT lets you use the REC FUNCTION

switches to go between tape and input signals while playing a tape. This is useful for rehearsing punch-ins.

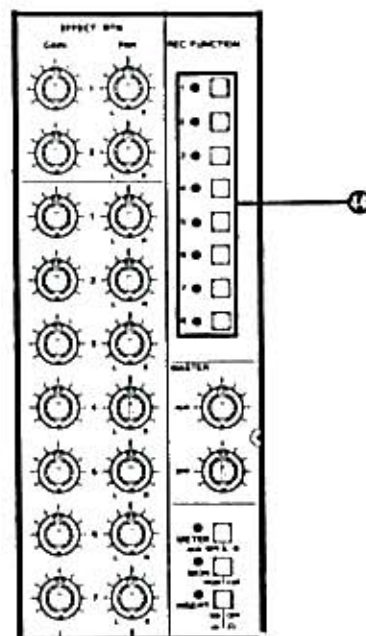
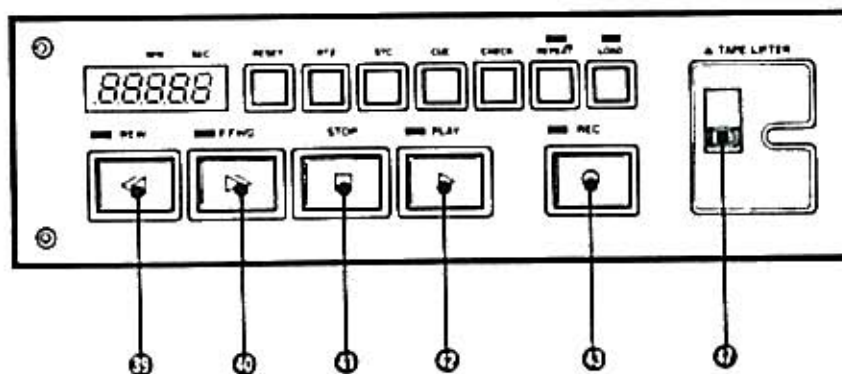
⑥ MON PGM/CUE

Pressing this switch to the PGM position causes the MONITOR mix to receive the signal present at the MIC, LINE, and PGM INPUTS, whether the recorder is in PLAY or REC. This switch takes priority over the INSERT switch. When in the PGM position you will not be able to monitor the Insert function. This is considered the normal position for Remix and when using the mixer independently.

When the MON PGM/CUE switch is in the CUE position, the INSERT switch becomes effective. This is considered the normal position for recording basic tracks and overdubbing. If any L/R switches are down, you will only be able to hear those channels in the stereo buss.

⑦ TAPE LIFTER

This lever retracts the tape lifters so that the tape will contact the heads during F.FWD or REW, allowing the monitoring of the sound on tape to find slate tones or specific program material. When using the TAPE LIFTER in this way, be cautious, a high frequency signal will be sent through your electronics when the recorder is in F.FWD or REW mode. Adjust your levels accordingly. Turn your levels down significantly before using the TAPE LIFTER function.



④ PITCH CONTROL

This knob allows you to adjust the speed of the Studio 8 by plus or minus 15% in either PLAY or REC. You can use this speed control to accommodate minor changes necessary in the length or relative pitch of your program material. If you're making a 30 second radio commercial and it runs a little long, you can speed it up enough to drop out the extra seconds. When tape runs faster than the speed at which it was recorded, the material on it will raise in pitch. This can sometimes be used in a creative way to save parts that are a little out-of-tune, or to create sound effects such as flanging. If you record with the PITCH CONTROL at its maximum or minimum settings, you will NOT have the ability to make further adjustment in that direction upon playback.

⑤ VARI/FIX/EXT

This three position switch controls the status of the PITCH CONTROL function. In the VARI position, the PITCH CONTROL knob will function and an LED will indicate that it is on. In the FIX position the PITCH CONTROL will be locked off, it will not function. In the EXT position, the transport speed of the recorder will be controlled by a device plugged into the ACCESSORY jack on the back panel. SMPTE Controllers and Synchronizers will normally be used with this function.

⑥ dbx 1-4 and dbx 5-8

These are the on/off switches for the dbx noise reduction system in your Studio 8. The

numbers correspond to the recorder's tracks. dbx 1-4 turns the system on or off for tracks 1-4, while dbx 5-8 performs the same function for tracks 5-8. You are given an additional switch found on the back panel that will defeat (turn off) the dbx for track 8.

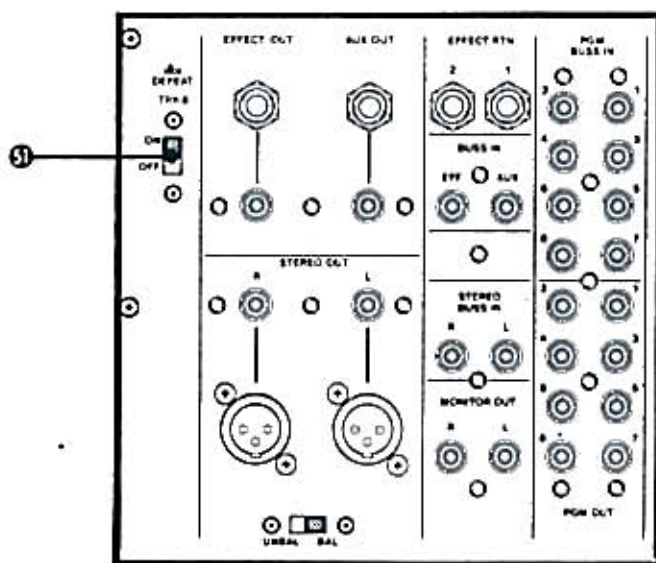
⑦ dbx DEFEAT TRK 8 (On the back panel)

This switch overrides dbx 5-8. It will turn off the dbx on track 8 (with the switch in the "ON" position) even if dbx 5-8 is on. This can be used to record FSK (Frequency Shift Key) or SMPTE time code data on track 8. It is also useful when recording some older model drum machines whose signal level is unpredictable and thereby, difficult for the dbx to handle effectively.

MEMORY, TRANSPORT CONTROLS

⑧ TRT Counter Display (MIN - SEC) and RESET

The Counter Display is a four digit florescent readout that indicates tape location in minutes and seconds (Tape Run Time). The counter measures linear tape footage, then computes the elapsed time based on 7 1/2 ips (15 cm/s) speed. Even if the tape is wound at high speed in either direction, the counter will indicate the correct location. The maximum time displayed by the counter is 59 minutes and 59 seconds. A minus sign (-) appears if the tape is located at a point before the Zero location. The RESET button will clear the display, causing it to read 00:00. RESET will NOT erase a CUE position that is in Memory.



Ⓢ RTZ (Return To Zero)

Pressing this button will cause the tape to roll (in either F.FWD or REW) to the Zero position (00:00) where it will stop. If PLAY has also been pressed, the tape will begin to PLAY when it reaches Zero. If REPEAT is also engaged, a playback loop will be created.

Ⓢ STC (Search To Cue)

Pressing this button will cause the tape to roll (in either F.FWD or REW) to the CUE position that has been entered in the Studio 8's Memory by using the CUE button. The tape will stop when it reaches the CUE point. If PLAY is also engaged, the tape will begin to PLAY when it reaches the CUE point. If STC is pressed and no CUE point has been entered into Memory, the tape will REWIND to the LOAD start point. If the LOAD function is not in use, the tape will run to the end of the tape.

Ⓢ CUE

This button is used to establish the CUE point in the Studio 8 Memory system. It can be used while the tape is stopped or rolling. RESET does NOT cancel CUE. A CUE point can be used to automate the punch-out process. If it is carefully placed at the desired punch-out point, the transport will stop, or REWIND if REPEAT is used. The Record Mode is turned off in the process.

Ⓢ CHECK

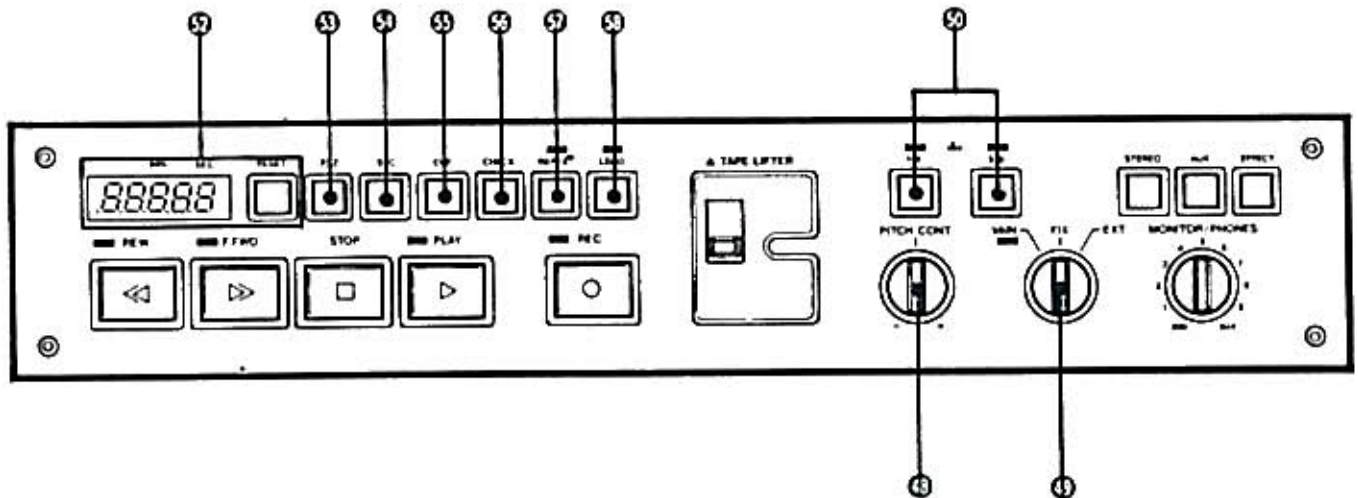
Pressing this button will display the CUE position in minutes and seconds on the Counter.

Ⓢ REPEAT

Pressing this button will cause the tape to Return To Zero when it reaches the CUE point and then PLAY again; repeating the program material continuously from Zero to CUE until the REPEAT function is turned off. This is very useful for rehearsing punch-ins or remixes. Pressing any transport control except PLAY and RTZ turns off the REPEAT function.

Ⓢ LOAD

This feature insures that your tape will never run off the reels at either end. When LOAD is engaged the tape will stop, no matter what transport mode it is in, before reaching either the beginning or end of the tape. The Memory calculates the tape length and the transport's relative position within that length. The basis for these calculations is forty minutes of playing time using 1800 feet (549 m) 7-inch reels of 1 mil. tape. If you use 5-inch reels, which is NOT recommended, or a nonstandard tape thickness, the LOAD function will not work properly. See the operations section of the manual ("Set Up") for more on this feature. Pressing LOAD a second time disengages the function (turns it off). We advise using the LOAD function whenever you are working with the Studio 8.



OTHER FUNCTIONS

⑧ TAPE OUT(s)

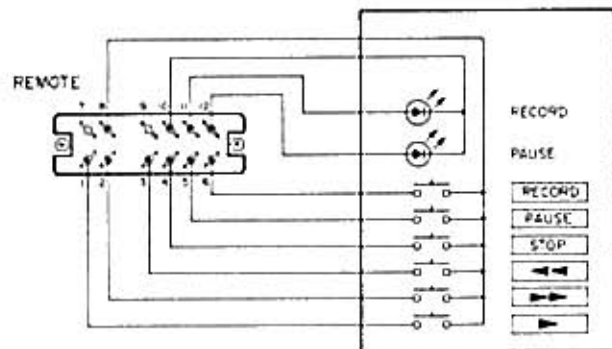
These outputs get their signals directly from the recorder/reproducer without going through either the RMX switch or MONITOR section of the Studio 8. These outputs are useful when you are using a different mixer or another tape recorder with the program material from the Studio 8's recorder/reproducer.

⑨ PUNCH IN/OUT REMOTE Connector

This jack is found on the front panel and is to be used with the RC-30P Remote Punch-in footpedal. See the Punch-in section of this manual for more on this.

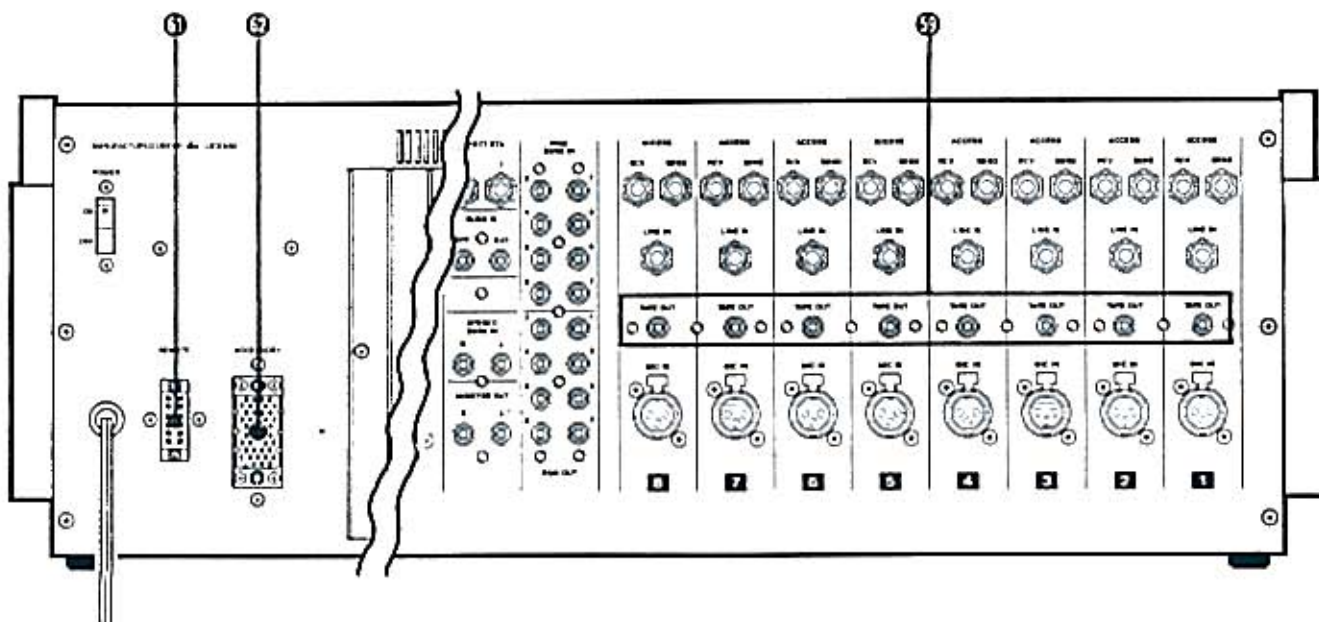
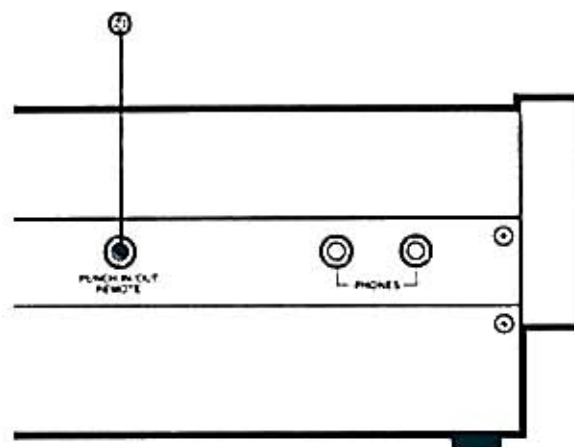
⑩ REMOTE Control Connector

This twelve-pin connector accepts the cable/connector from the RC-71 Remote Control Unit. It allows all transport functions, REW, F.FWD, STOP, PLAY, and REC, to be controlled from up to 5 meters (sixteen feet) away from the Studio 8.



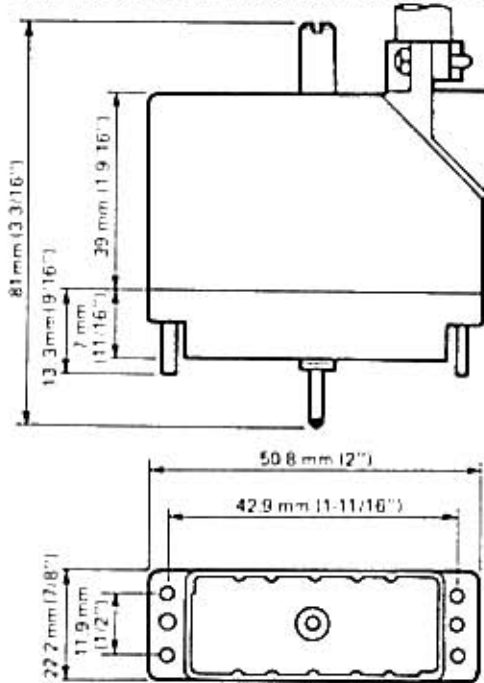
⑪ ACCESSORY Jack

This 38-pin connector will accept input from the TASCAM AQ-65 Auto Locator or a SMPTE/EBU Controller/Synchronizer. Controllers and Synchronizers made by Adams Smith, Audio Kinetics, Timeline, Cypher, Convergence, ISC, Videomedia, and others will work with the Studio 8 via the ACCESSORY connector. The AQ-65 Auto Locator, when used with the Studio 8, offers ten point memory, programmable duration pre-roll, two point repeat, and complete duplication of all transport control functions.



"ACCESSORY" Connector and Signals

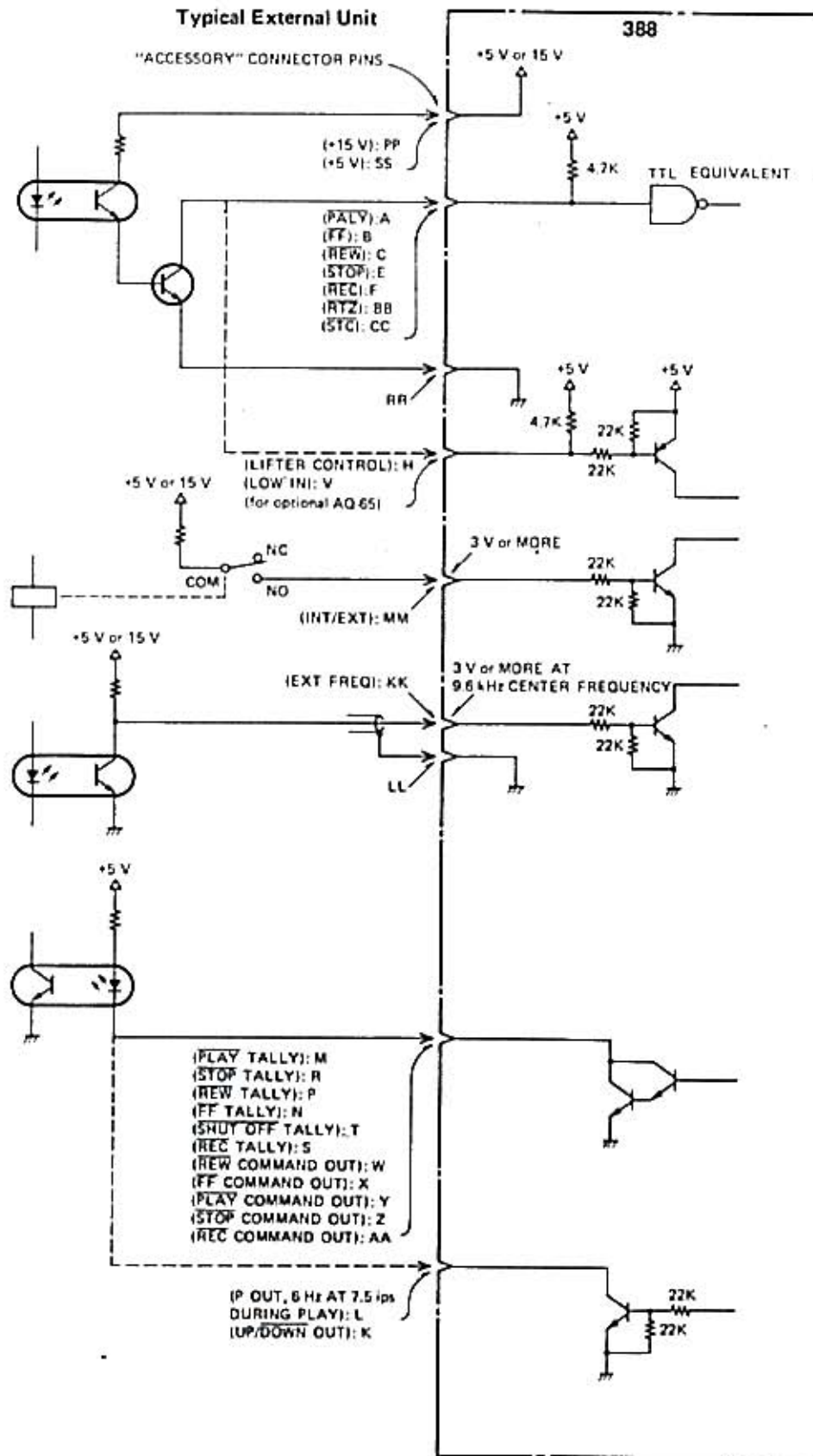
MALCO 354-38 pin plug (or ELCO 8016 Series)



Pin #	IN(put)-OUT(put) signals	Function
A	PLAY IN	Inputs PLAY signal at L level.
B	FF IN	Inputs FF signal at L level.
C	REW IN	Inputs REW signal at L level.
D	open terminal	
E	STOP IN	Inputs STOP signal at L level.
F	REC IN	Inputs REC signal at L level.
H	LIFTER CONT IN	Inputs LIFTER shift cancellation signal at L level.
J	open terminal	
K	UP/DOWN OUT	Outputs tape running control signal at H or L level.
L	CP OUT	Outputs open collector signal (6 Hz pulse at 7.5 cps)
M	PLAY TALLY OUT	Outputs open collector signal (Low level during PLAY mode.)
N	FF TALLY OUT	Outputs open collector signal (Low level during FF mode.)
P	REW TALLY OUT	Outputs open collector signal (Low level during REW mode.)
R	STOP TALLY OUT	Outputs open collector signal (Low level during STOP mode.)

Pin #	IN(put)-OUT(put) signals	Function
S	REC TALLY OUT	Outputs open collector signal (Low level during record mode)
T	SHUT-OFF TALLY OUT	Outputs open collector signal (Low level during tape stop)
U	open terminal	
V	LOW IN	Reduces tape speed to "Low" during fast winding.
W	REW COMMAND OUT	Outputs open collector signal (Low level when REW is pressed)
X	FF COMMAND OUT	Outputs open collector signal (Low level when F, FWD is pressed)
Y	PLAY COMMAND OUT	Outputs open collector signal (Low level when PLAY is pressed)
Z	STOP COMMAND OUT	Outputs open collector signal (Low level when STOP is pressed)
AA	REC COMMAND OUT	Outputs open collector signal (Low level when REC is pressed)
BB	RTZ IN	Inputs RTZ signal at L level
CC	STC IN	Inputs STC signal at L level
DD		
EE		
FF	open terminal	
HH		
JJ		
KK	EXT FREQ IN (HIGH)	Inputs speed control signal at input signal of 3.0 V or more and of 4.8 k to 19.2 kHz
LL	EXT FREQ GND	
MM	INT/EXT IN	Inputs internal/ external speed control select signal Internal: LOW level (0 V) External: HIGH level (3.0 V or more)
NN	open terminal	
PP	+15 V supply voltage OUT	Maximum: 50 mA
RR	0 V terminal	
SS	+5 V supply voltage OUT	Maximum: 50 mA
TT	Main unit GND	

"ACCESSORY" Connector Pins and External Signal Connections



ACCESSORIES

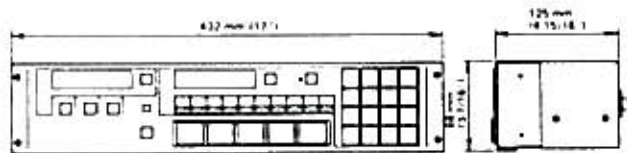
AQ-65 Auto Locator



The AQ-65 is a programmable multipoint locator that allows computer-precision transport control from a distance. It features among other capabilities: ten digit keys for writing cue times into memory, pre-roll (19 sec. max.), two-point repeat (between TAPE TIME and LOCATE TIME points) and a duplication of the Studio 8's transport control.

SPECIFICATIONS

Description	Auto locator
Function	
Transport:	PLAY, STOP, F. FWD, REW, spooling and RECORD (Spooling does not function with the Studio 8.)
Cue programming and location:	Ten-point (0 – 9) memory, cue point setting with ten digit keys
Counters:	RTZ, Return-To-Zero 2-Tape Time, Locate Time 5 digit, hour, minute and second read-out, with RESET button
Others	
Connecting Cable:	8 m, 34-core shielded, with 38 pin (MALCO 354 or ELCO 8016 Series)
Dimensions (W x H x D)	432 x 88 x 125 mm (17" x 3-7/16" x 4-15/16")
Weight	5 kg (11 lbs), including cable



RC-30P Remote Pedal



The RC-30P is a durable footswitch that connects to the PUNCH IN/OUT REMOTE jack on the front panel of the Studio 8. This permits "hands free" entry and exit from the record mode.

RC-71 Remote Control Unit



This unit makes remote control of the transport functions possible. It plugs into a multipin connector on the rear of the Studio 8.

E-3 Demagnetizer



The E-3 is essential for eliminating the residual magnetism that builds up on the heads, as well as other metal parts along the tape path. Demagnetization is part of regular recorder maintenance, and the TEAC E-3 is the right tool for the job.

E-2A Bulk Eraser



The E-2A allows you to erase cassettes, as well as 7" and 10" reels of tape, quickly and completely. It comes with a pilot light and integral circuit breaker to protect against overheating.

TASCAM Cables

Cable, because of its inherent capacitance and resistance, is an active component in an audio system. There are vast differences in cable design and performance that have significant effect on the sound quality you'll get from your equipment. TASCAM Professional Audio Cables are the best available.

Our cables feature very low capacitance (under 15 picofarads/foot) so they don't act as low-pass filters and roll off high frequencies. The capacitance is also consistent; it doesn't change when the cable is bent or compressed. You don't get noise or degraded results when the cable has been used a while. Our cable's long-term stability is provided by a special insulator that is as flexible as foam core dielectrics, but far more resistant to extreme cold or heat, and it doesn't let the center strands migrate. It also avoids the possibility of shearing the center conductor when the cable is crushed, so that cable does not suddenly fail.

Rather than loosely braided shield or spiral wrapped shield that can open up, we use bare copper braided shield with 97% coverage. This excludes electrostatic noise (buzz) and RFI (CB interference, etc.). We also use a 7-strand center conductor: 4 pure copper strands for minimum resistance and 3 copper weld stainless steel strands for strength. The multiple strands increase flexibility and strength while offering less resistance at ultra high-frequencies due to increased surface area for the "skin effect." This improves transient response.

The outer PVC insulating jacket resists abrasion, and is tightly fitted to the shield so it will not elongate. The connectors are special, too. Their nickel-plated brass center pins are a bit longer than most to establish good contact in all RCA jacks. The cadmium-plated steel outer shell includes a gentle ridge which burnishes the mating jack when the connector is twisted to ensure good contact. For maximum RF shielding, the braid is terminated inside the shell and 2-radian soldered, not just spot soldered, for maximum strength. The plugs are clad with an oval jacket of molded plastic to further increase strength and make the ends easier to handle. TASCAM cable is available in lengths from 6 inches to 20 feet, or in color-coded sets of 8 for fast channel or function identification. TASCAM cable is also available in 500 foot spools.

If TASCAM professional cables are not available in your area, please try to find the next best cables. It really does make a difference in system performance.

TZ-261 Cleaning Kit (Except U.S.)



HC Series Head Cleaner & RC Series Rubber Cleaner (U.S. Only)



Using the right chemicals is important because strong solvents can dissolve the binder that holds the head laminations together. Isopropyl alcohol can leave a residue and is not always adequate for cleaning desposits from modern tape formulations. Beware of rubbing alcohol; while it is isopropyl, it also contains oil and water that leave a heavy film on the heads. TEAC HC head cleaner is formulated to clean tape heads, tape guides, and capstans without leaving a film or damaging head integrity.

Since pinch rollers are made of special rubber compound, not metal, a different solvent is needed for cleaning them. Even a mild solvent like alcohol can cause drying and cracking of pinch rollers. TEAC RC rubber cleaner contains no alcohol. Its special solvents wipe off tape oxide, and other chemicals in RC actually rejuvenate the rubber. This increases its resiliency and enhances its ability to pull tape without slippage. HC and RC can be purchased with swabs in a tape recorder cleaning kit (part #TRC.).

M-1B Line Mixer



The M-1B is an 8-in, 2-out line mixer that provides you with an easy and practical way of creating an independent mix such as cue or monitor mixes. Rack mountable (19" EIA).

MX-80 Mixer



This is an 8-in, 2-out mic/line mixer useful as a fully functional, ingenious submixer for obtaining an extra mic or line mix. Versatility of your system will be considerably enhanced. Rack mountable (19" EIA).

MH-40B Headphone Amp



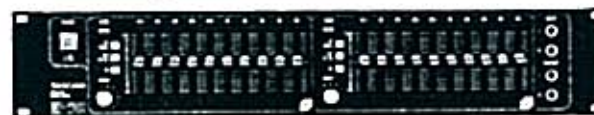
The MH-40B is a headphone distribution amplifier that can be used to feed four sets of studio cue headphones and can be mounted in a 19" EIA rack.

PE-40 Parametric EQ



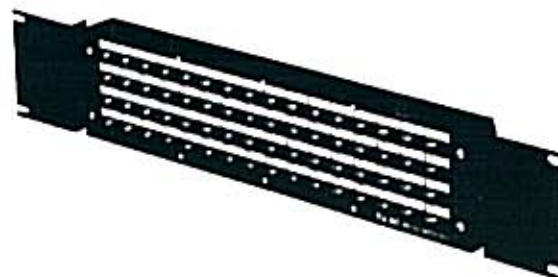
The PE-40 is a 4-channel, 4-band parametric equalizer providing precise control over the frequency characteristics of any line level program. Rack mountable (19" EIA).

GE-20B Graphic EQ



The GE-20B is a 2-channel, 10-band graphic equalizer offering an easy means of controlling the tonal balance between channels. Rack mountable (19" EIA).

PB-64 Patch Bay



When your system begins to expand beyond the basic, sorting out where things go can take much

time away from the recording process. This accessory will allow you to speed things up and get back to what you really want to do. Sixty-four RCA pins on a panel. So you can bring all those jacks to where you are. It will get you off the floor and back to recording. Connect all your inputs and outputs to the back, and you can reroute your signals with short jumpers quickly.

PB-32 Normalled Patch Bays



The PB-32 patch bay is today's simplest and most effective way to deal with the ever-increasing tangle of wires necessary for the recording and signal processing you want to do.

Instead of leaning over, walking around, or turning consoles, racks, recorders and other equipment, you can bring all those confusing cable ends to one single spot in your rack, or next to your mixer, and get them under control. You can label inputs and outputs on the PB-32, and won't have to guess anymore at what you might be plugging in. A few cords can save endless hours of searching around on the floor behind your console and, as the whole process of patching is made simpler, you'll probably find more flexibility in your recording setup.

The PB-32 comes in four versions. The PB-32P is equipped with 1/4" phone jacks only, the PB-32R with RCA jacks only, the PB-32H with 1/4" phone jacks on one side and RCA jacks on the other, and the PB-32W with 1/4" phone jacks for 6 channels and RCA jacks for the remaining 10 channels.

Model name	Type of jacks	Internal circuit connection	
		(FRONT)	(REAR)
PB-32P	1/4" phone jack (front and rear)	Upper	
		Lower	
PB-32R	RCA jack (front and rear)	Upper	
		Lower	
PB-32H	1/4" phone jack (front) RCA jack (rear)	Upper	
		Lower	
PB-32W	1/4" phone jack (leftmost 12 jacks, front and rear)	Leftmost 12 jacks (same as PB-32P)	
		Upper	
		Lower	
		Rightmost 20 jacks (same as PB-32R)	
	RCA jack (rightmost 20 jacks, front and rear)	Upper	
		Lower	

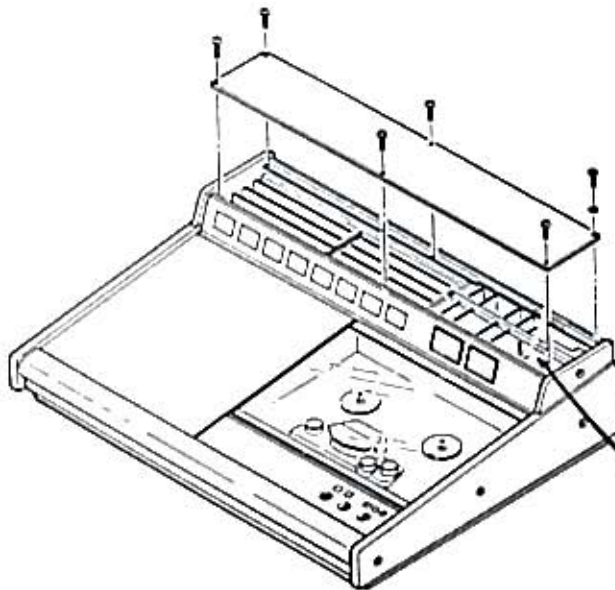
VOLTAGE CONVERSION

This unit is adjusted to operate on the electric voltage specified on the unit, power cord tag, or packing carton.

NOTE: This voltage conversion is not possible on models sold in the U.S.A., Canada, UK, Australia or Europe.

For general export units, if it is necessary to change the voltage requirements of the Studio 8 to match your area, use the following procedures. **ALWAYS DISCONNECT THE POWER LINE CORD BEFORE MAKING THESE CHANGES.**

1. Remove the top panel of the meter section and locate the voltage selector as shown in illustration.
2. Using a regular (slot blade) screwdriver, turn the selector so that the set mark indicates the numerals corresponding the voltage requirements of your area.



NOTE FOR U.K. CUSTOMERS

U.K. CUSTOMERS ONLY:

Due to the variety of plugs being used in the U.K., this unit is sold without an AC plug. Please request your dealer to install the correct plug to match the mains power outlet where your unit will be used as per these instructions.

IMPORTANT

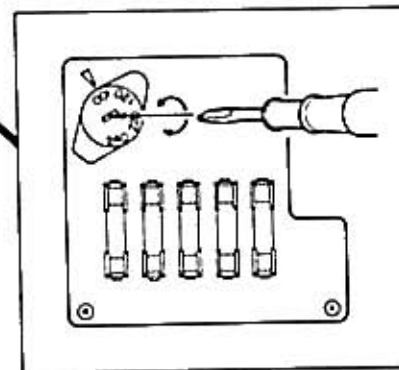
The wires in this mains lead are coloured in accordance with the following code:

BLUE: NEUTRAL
BROWN: LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured marking identifying the terminals in your plug, proceed as follows.

The wire which is coloured **BLUE** must be connected to the terminal which is marked with the letter **N** or coloured **BLACK**. The wire which is coloured **BROWN** must be connected to the terminal which is marked with the letter **L** or coloured **RED**.

This product is manufactured to comply with the radio interference of EEC directive "82/499/EEC."



SPECIFICATIONS

MECHANICAL CHARACTERISTICS

Tape	1/4 inch, 1 mil
Track Format	8-track, 8-channel
Reel Size (max.)	7"
Head Configuration	1 Erase, 1 Record/Reproduce
Motors	1 FG servo DC capstan motor 2 DC servo reel motors
Tape Speed ⁵⁾	7-1/2 ips (19 cm/s) ±1 % deviation
Pitch Control	±15 %
Fast Wind Time	Less than 100 seconds for 7" reel, 1,800 feet
Dimensions (WxHxD)	837 x 220 x 641 mm (32-15/16" x 8-11/16" x 25-4/16")
Weight (net)	38 kg (83.6 lbs)

ELECTRICAL CHARACTERISTICS

MIXER SECTION

MIC Input	XLR, balanced
Input Impedance	2.4 k ohms
Mic Impedance	Less than 600 ohms
Nominal Input Level	-60 dBV (1 mV)
Minimum Input Level	-70 dBV (0.3 mV)
Maximum Input Level	0 dBV (0.3 V)

LINE Input	1/4" phone, unbalanced
Input Impedance	50 k ohms
Nominal Input Level	-10 dBV (0.3 V)
Maximum Input Level	+14 dBV (5 V)

BUSS Input (PGM/STEREO/AUX/EFFECT)	RCA
Input Impedance	22 k ohms
Nominal Input Level	-10 dBV (0.3 V)
Maximum Input Level	+14 dBV (5 V)

EFFECT RETURN	1/4" phone
Input Impedance	22 k ohms
Nominal Input Level	0 dBu (0.775 V)
Maximum Input Level	+16 dBu (5 V)

ACCESS RCV	1/4" phone
Input Impedance	10 k ohms
Nominal Input Level	-10 dBV (0.3 V)
Maximum Input Level	+14 dBV (5 V)

PGM/MONITOR Output	RCA
Output Impedance	100 ohms
Nominal Load Impedance	10 k ohms
Minimum Load Impedance	2 k ohms
Nominal Output Level	-10 dBV (0.3 V)
Maximum Output Level	+14 dBV (5 V)

STEREO Output	XLR & RCA
XLR	
Output Impedance	100 ohms
Nominal Load Impedance	10 k ohms
Minimum Load Impedance	2 k ohms
Nominal Output Level	+4 dBm (1.2 V)

Maximum Output Level	+24 dBm (12 V)
RCA	
Output Impedance	100 ohms
Nominal Load Impedance	10 kohms
Minimum Load Impedance	2 k ohms
Nominal Output Level	-10 dBV (0.3 V)
Maximum Output Level	+14 dBV (5 V)
EFFECT/AUX Output	RCA & 1/4" phone
RCA	

Output Impedance	100 ohms
Nominal Load Impedance	10 k ohms
Minimum Load Impedance	2 k ohms
Nominal Output Level	-10 dBV (0.3 V)
Maximum Output Level	+14 dBV (5 V)
1/4"	
Output Impedance	100 ohms
Nominal Load Impedance	10 k ohms
Minimum Load Impedance	2 k ohms
Nominal Output Level	0 dBu (0.775 V)
Maximum Output Level	+22 dBu (10 V)

ACCESS SEND	1/4" phone
Output Impedance	100 ohms
Nominal Load Impedance	10 k ohms
Minimum Load Impedance	2 k ohms
Nominal Output Level	-10 dBV (0.3 V)
Maximum Output Level	+14 dBV (5 V)
HEADPHONES Output	1/4" stereophone
Nominal Load Impedance	8 ohms, stereophone
Maximum Output Power	100 mW + 100 mW, 8 ohms

Equalizer	
Type	3-band, peak/dip, sweepable
Frequencies	Low/Mid; 50 Hz to 1 kHz Mid; 500 Hz to 5 kHz Mid/High; 2.5 kHz to 15 kHz
Boost/Cut Range	±15 dB
Input Overload Indicator	Activates at 25 dB above nominal
Meter Peak Indicator	Activates at 18 dB above nominal

RECORDER SECTION

Tape Out	RCA
Output Impedance	100 ohms
Nominal Load Impedance	10 k ohms
Minimum Load Impedance	2 k ohms
Nominal Output Level	-10 dBV (0.3 V)
Maximum Output Level	+14 dBV (5 V)
Bias Frequency	100 kHz
Equalization	3,180 μs + 50 μs (NAB/DIN/IEC)
Record Level Calibration	250 nWb/m (0 VU reference)
Noise Reduction	8-Channel, dbx I, dual process
Power Consumption	120 W

Power Requirements	
USA/CANADA	120 V AC, 60 Hz
EUROPE	220 V AC, 50 Hz
UK/AUSTRALIA	240 V AC, 50 Hz
GENERAL EXPORT	100/120/220/240 V AC, 50/60 Hz

TYPICAL PERFORMANCE CHARACTERISTICS

MIXER SECTION

Frequency Response	
Line to PGM Out	20 Hz – 30 kHz $_{-2}^{+1}$ dB
Line to STEREO Out	20 Hz – 30 kHz $_{-2.5}^{+1}$ dB
Signal-to-Noise Ratio	IHF A WTD/UNWTD (20 – 20 kHz)
1 Mic to PGM Out	70 dB/68 dB
8 Mic to PGM Out	60 dB/58 dB
1 Line to PGM Out	80 dB/76 dB
8 Line to PGM Out	77 dB/73 dB
Total Harmonic Distortion	
1 Mic to PGM Out ¹⁾	0.03 %
1 Line to PGM Out ²⁾	0.03 %
Crosstalk ⁴⁾	-60 dB

RECORDER SECTION

Wow and Flutter ⁵⁾	0.05 % (NAB weighted) ±0.10 % peak (DIN/IEC/ ANSI weighted)
Frequency Response (Record/Reproduce) ⁶⁾	30 Hz – 16 kHz, ±3 dB

Signal-to-Noise Ratio ^{3), 6)}	IHF A WTD/UNWTD (20 – 20 kHz) 95 dB/90 dB with dbx 59 dB/56 dB without dbx
Total Harmonic Distortion ^{4), 6)}	0.5 %, 0 VU, with dbx 1.0 %, 0 VU, without dbx 3.0 %, 15 dB above 0 VU, with dbx
Adjacent Channel Crosstalk ^{4), 6)}	75 dB, 0 VU, with dbx 55 dB, 0 VU, without dbx
Erasure ^{3), 6)}	70 dB at 1 kHz

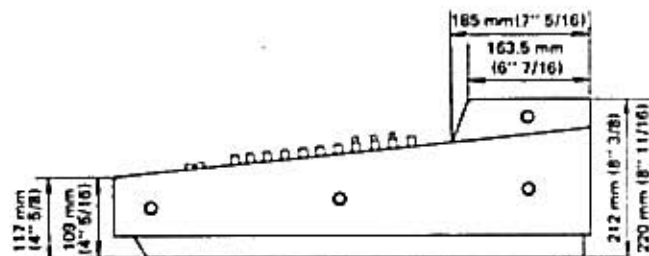
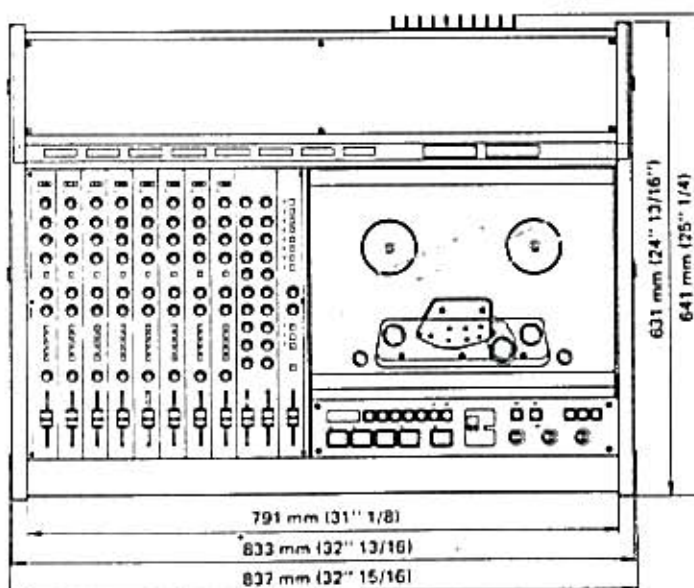
Test Conditions:

- (1) 50 dB above nominal input level, 1 kHz, with 30 kHz LPF.
- (2) Nominal input level, 1 kHz, with 30 kHz LPF.
- (3) Referenced to 3 % THD level.
- (4) 1 kHz.
- (5) TEAC Test Tape YTT-2003.
- (6) TEAC Test Tape YTT-8013.

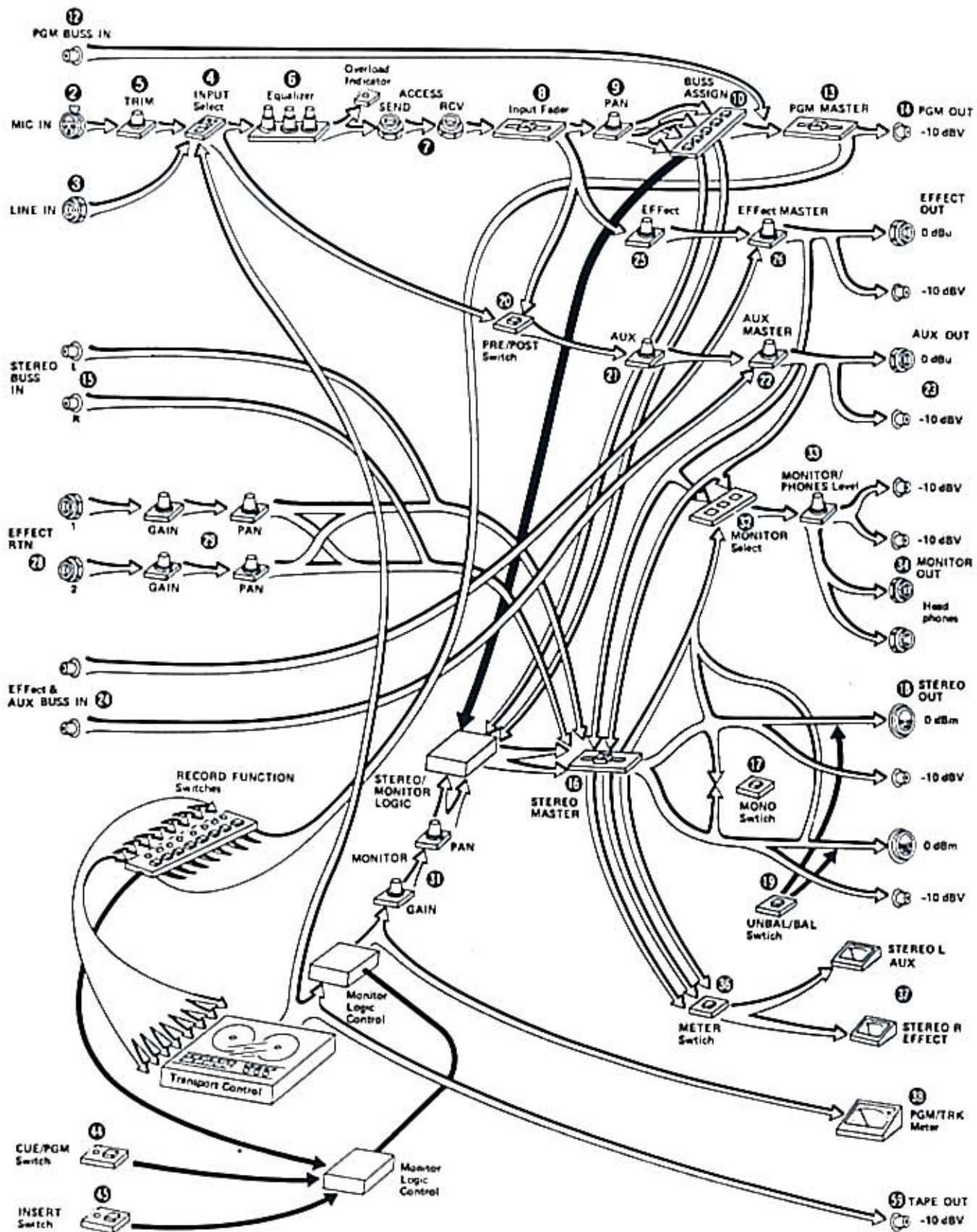
In these specifications, 0 dBV is referenced to 1.0 Volt rms; 0 dBu/0 dBm is referenced to 0.775 Volt. Actual voltage levels are also given in parenthesis. Changes in Specifications and features may be made without notice or obligation.

*dbx is a registered trademark of dbx Incorporated.

EXTERNAL DIMENSIONS



PICTOGRAM



MAINTENANCE

INSTRUCTIONS FOR SERVICE PERSONNEL

BEFORE RETURNING APPLIANCE TO THE CUSTOMER, MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT.

NOTES

- ★ All resistors are 1/4 watts, 5 %, unless marked otherwise. Resistor values are in ohms (K=1,000-ohms, M=1,000,000 ohms).
- ★ Capacitor values are in microfarads, UF (PF = picofarads).
- ★ Δ Parts marked with this sign are safety critical components. They must always be replaced with identical components – refer to the TEAC Parts List and ensure exact replacement.
- ★ 0 dB is referenced to 1 V in this manual unless otherwise specified.
- ★ PC boards shown viewed from component side.
- ★ Because of the improvements made to the recent production models, some parts of the circuit diagram may no longer confirm to the actual circuitry.



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1. CHECKS AND ADJUSTMENTS

I-1. ESSENTIAL TEST EQUIPMENT REQUIRED

Wow & Flutter Meter	Meguro Denpa Sokki K.K., Model MK-668C (JAPAN), or Mincom Division, 3M Co, Model 8155 (U.S.A)
Audio Oscillator	Hewlett Packard, Model 204C or equivalent
Digital Frequency Counter	Range: 0 Hz ~ 1 MHz; sensitivity; 0.1 Vrms; imp.: > 1 M Ω , < 25 pF
Band-Pass-Filter	1 kHz narrow band pass type
AF Level Meter	Range: -80 dB ~ +40 dB; imp.: > 1 M Ω , < 25 pF (example-HP 400GL)
Distortion Meter	General purpose (400 Hz, 1 kHz)
Oscilloscope	General purpose
Attenuator	General purpose
Function Generator	TEAC FG-1
Tools	Tape tension gauge: TENTELO Model T-2-H20-1 (preferred) or Tension analyzer Spring scale: 0 ~ 8 lbs (0 ~ 4 kg) 0 ~ 2.2 lbs (0 ~ 1 kg) Hex head Allen wrenches, Plastic alignment tool
Cleaning Fluid	TEAC TZ-261 or equivalent TEAC Spindle Oil TZ-255 or equivalent
Head Demagnetizer	TEAC E-3 or equivalent
Test Tapes	Tape Speed/Wow-Flutter Test Tape TEAC YTT-2003 (for tape speed 7-1/2 ips) Reproduce Alignment Test Tape TEAC YTT-1003 (for tape speed 7-1/2ips, NAB Equalization 3180 + 50 μ sec.) Reference fluxivity is 185 nWb/m; reference output level is 2.6 dB lower compared with 250 nWb/m fluxivity. Calibration level under "Reproduce Calibration" refers 0 VU as 250 nWb/m.
Extension Cards	Blank Test Tape (Recording) TEAC YTT-8013 For Rec/Play Amp PCB Ass'y and DBX PCB Ass'y TEAC Part number 52001773-00 For Bias PCB Ass'y and Power Supply PCB Ass'y TEAC Part number 52001774-00 For Input PCB Ass'y P701 ~ P708 (P104) and Buss B Ass'y P709 (P101) TEAC Part number 5200193700 For Input PCB Ass'y P901 ~ P908 (P105), Buss A PCB Ass'y P909 (P102), Buss B PCB Ass'y P910 (P102) and Monitor PCB Ass'y P911 (P115) TEAC Part number 5200193900

1-2. REMOVAL OF THE MAIN PARTS

1-2-1. Top Panel of the Deck Section

1. See the illustration and remove the dust cover.
2. Remove the control panel.
3. Remove the left and right escutcheons.
4. Remove the pinch roller cap and pinch roller.
5. Remove the housing base.
6. Remove the left and right tension rollers.
7. Now the top panel can be removed.

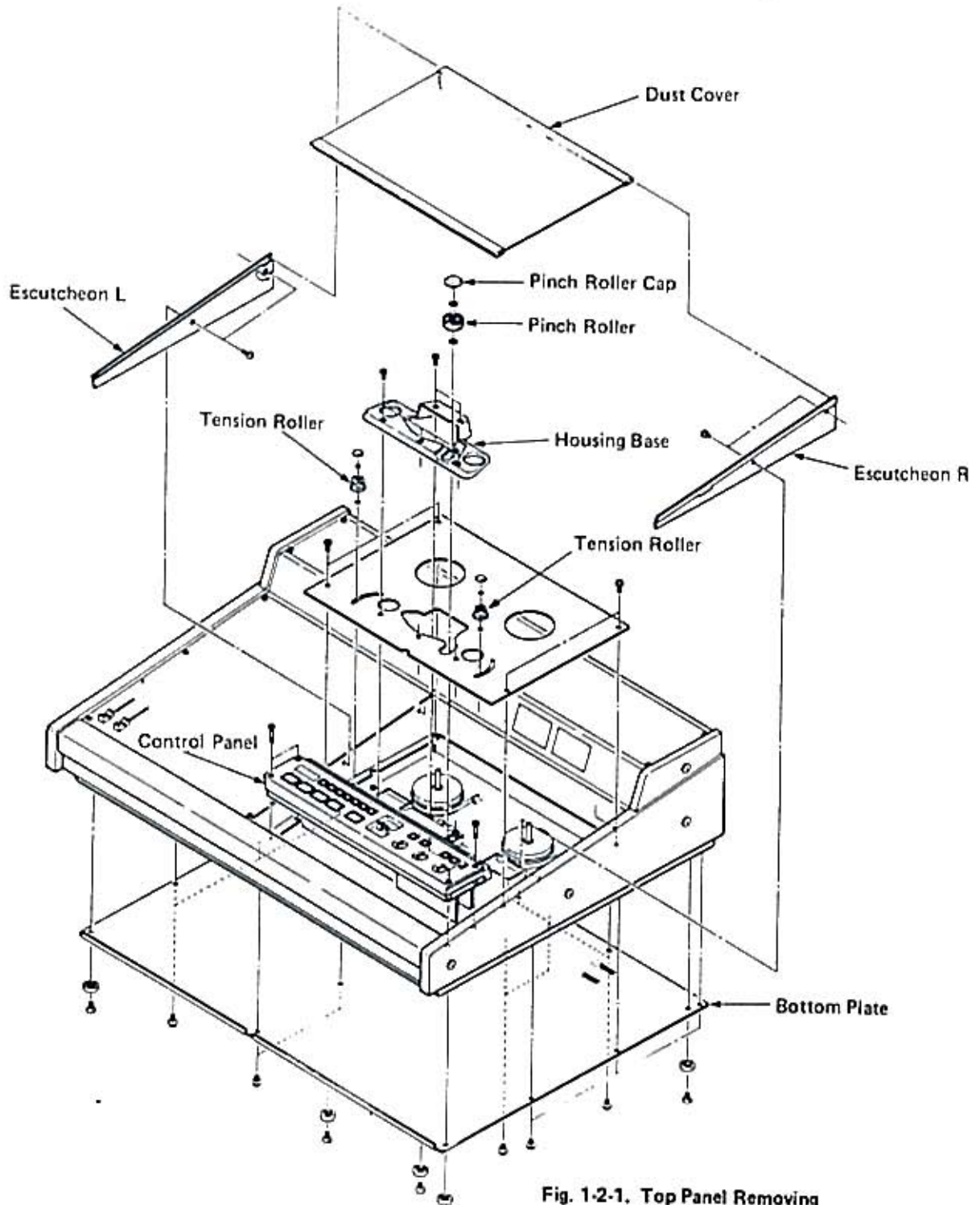


Fig. 1-2-1. Top Panel Removing

1-2-2. Reel Motor

1. After removing the top panel and bottom plate, remove the reel table assembly as shown in Fig. 1-2-2, and remove the four screws holding the reel motor.
2. Finally, undo the wire running to the MECHA JOINT PCB with the use of a soldering iron.

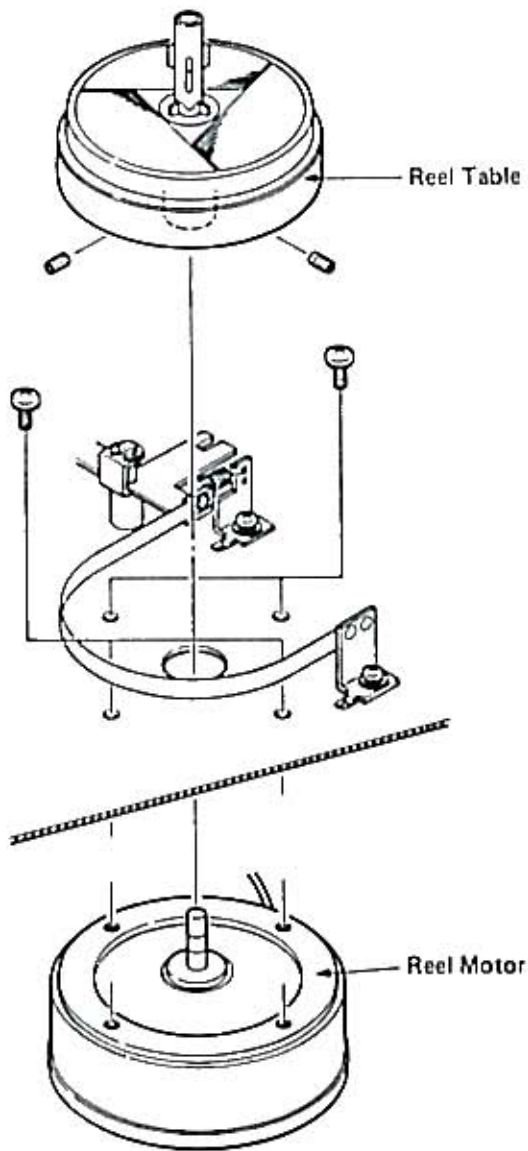


Fig. 1-2-2. Reel Motor Removing

1-2-3. Capstan Motor

1. Remove the Motor Pulley from the Capstan Motor.
2. Remove the four screws (a) from the Motor Bracket.
3. Remove the four screws (b) holding the Reel Motor.
4. Unsolder the wire from the MECHA JOINT PCB.

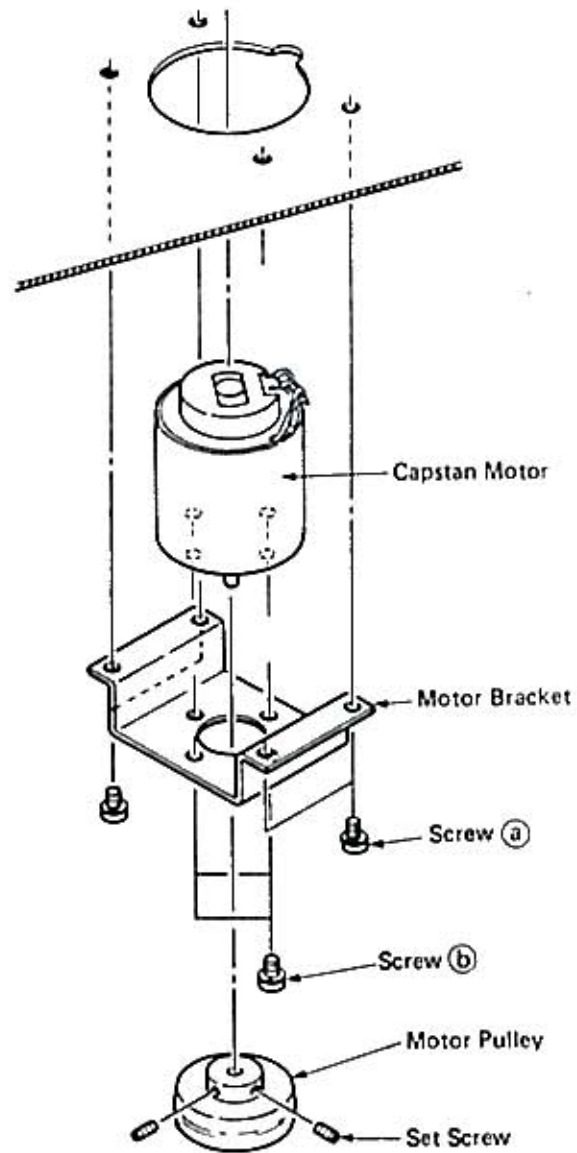


Fig. 1-2-3. Capstan Motor Removing

1-3. MECHANICAL ADJUSTMENT

1-3-1. Capstan Thrust Clearance

1. There must be a clearance of 0.1 to 0.3 mm between the capstan shaft and the thrust plate. Check to see that the clearance is within this range. If not, loosen the two screws on the flywheel, adjust the clearance, and retighten the screws.

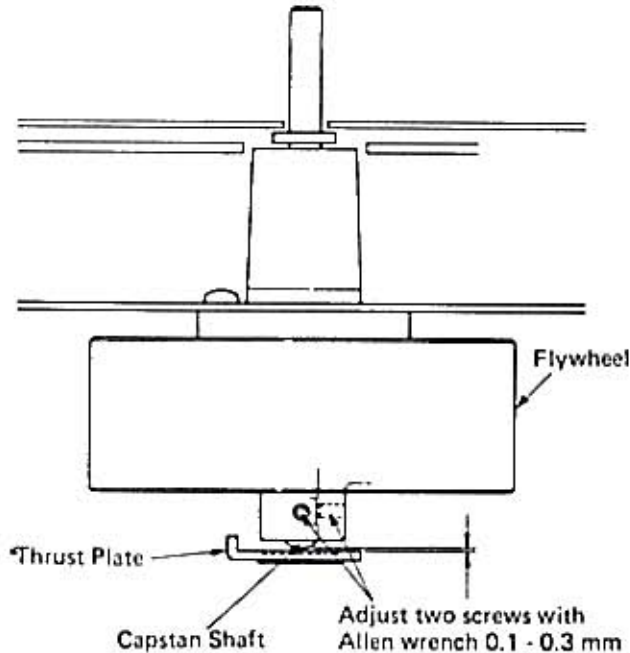


Fig. 1-3-1

1-3-2. Brake Mechanism

Note: Be sure that the power is turned off prior to making any adjustments to the brakes.

1. Screw (A) for the left brake (as viewed from the front) must be adjusted so that lever (C) is parallel to brake solenoid. Screw (A) for the right brake must be adjusted so that there is a clearance (a) of 0.5 mm between lever (C) and lever (F). See Fig. 1-3-2.
2. When there is contact at (a), position the solenoid housing so that the gap at (f) (the distance between the plunger and solenoid washer) is 3 mm.

1-3-3. Brake Torque

Note: Before making any brake adjustments or measurements, make sure that power is off.

1. Mount an empty 7" reel onto either reel table and attach a spring scale to the reel with a string. See Fig. 1-3-3.
2. Smoothly pull the scale away from the reel under test and note the torque value when the reading on the scale is steady. The proper torque values are given in the chart on the next page.

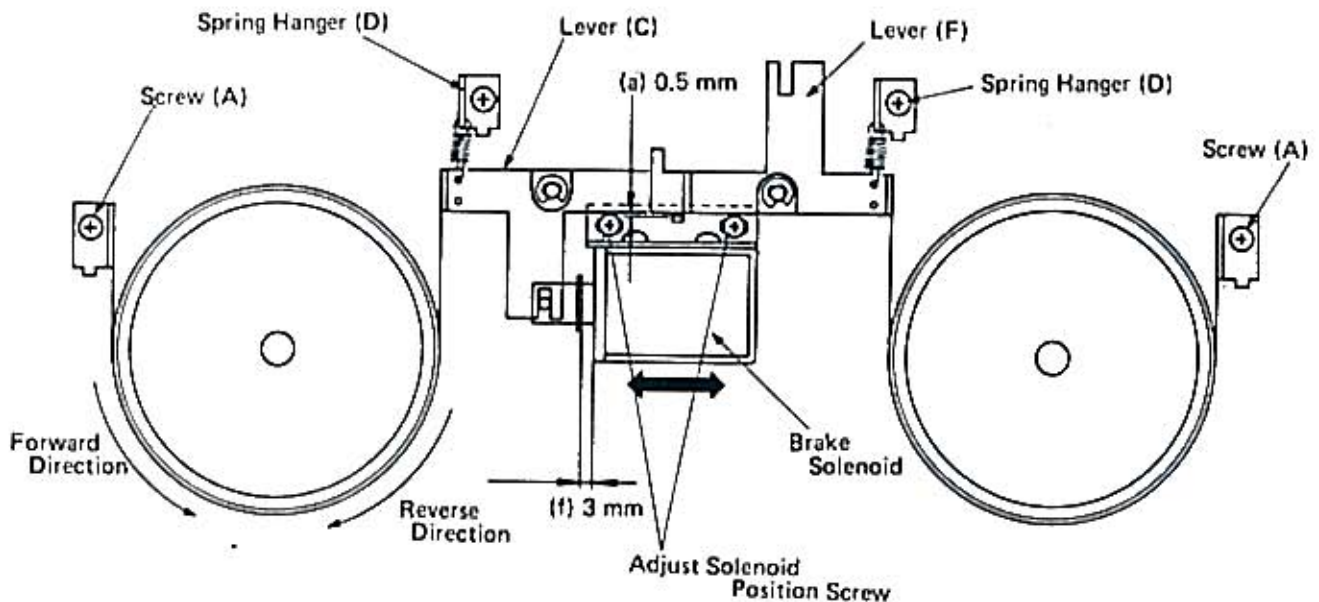


Fig. 1-3-2

3. Follow steps 1 and 2 for each measuring condition; i.e., (A) through (D) in Fig. 1-3-3.

1. If the forward-direction torque is not correct, change the hooking position of the spring hanger (reference (D) in Fig. 1-3-2) for the corresponding brake requiring adjustment. If, after the forward-direction torque has been properly adjusted, the reverse-direction torque is not correct, or the forward-direction torque is still not correct, replace the brake felt pad with a new one after cleaning the inner side of the brake band with a cleaning alcohol, and also check that the brake mechanism is properly aligned as explained in Section 1-3-2, "Brake Mechanism". If necessary, replace the entire reel table.

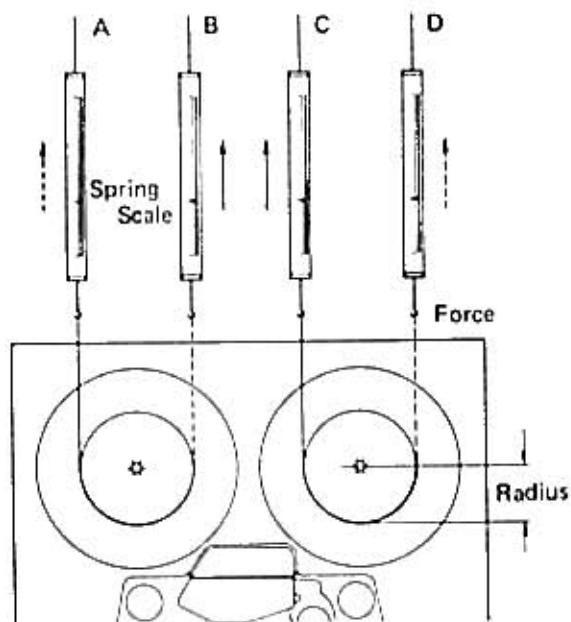


Fig. 1-3-3

Forward direction (B) (C)	1,000 – 1,500 g-cm (13.9 – 20.9 oz-inch)
Reverse direction (A) (D) (Reference values)	500 – 700 g-cm (6.9 – 9.7 oz-inch)
Left/Right deviation	500 g-cm (6.95 oz-inch)

Torque calculating formulas:

1. Torque (in g-cm or oz-inch)
= Force or Weight (in g or oz) x Radius
(in cm or inch)

2. Conversion of g-cm to oz-inch:
g-cm x 0.0139 = oz-inch

1-3-4. Pinch Roller Pressure

Note: Pinch roller pressure is supplied by the pinch roller spring arm and it is most important that the solenoid plunger be fully bottomed before taking pressure measurement.

1. Hold the right tension arm up with a rubber band, string, etc.
2. Place the deck in the reproduce mode without threading the tape.
3. Attach a spring scale to the pinch roller as shown in Fig. 1-3-4.
4. Pull the pinch roller away from the capstan shaft until the pinch roller just stops rotating. The scale should then be read 1.3 kg to 1.7 kg (2.9 lbs to 3.74 lbs).
5. If you get a reading other than what should be indicated, make the necessary adjustments through the adjust screws.

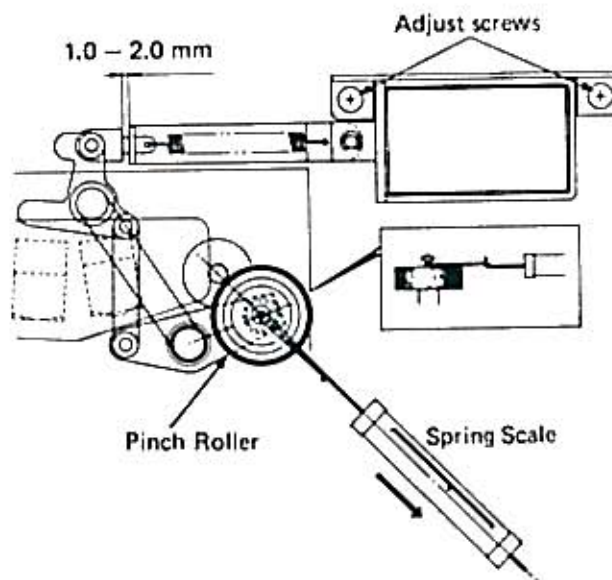


Fig. 1-3-4

1-3-5. Reel Table Height Adjustment

Reel height adjustment is required only if a reel motor has been replaced or if tape rubs excessively against the reel flanges.

Adjustment is accomplished by loosening the reel set screws and moving the reel table on the motor shaft as shown in Fig. 1-3-5.

Remove the top panel of the unit for access to the set screws (2) in the reel motor shaft. Reel table should be adjusted using standard NAB 7" reels. With a tape loaded on the machine, position the reel table height for smooth tape travel. Be sure to tighten the set screws after adjustment is made.

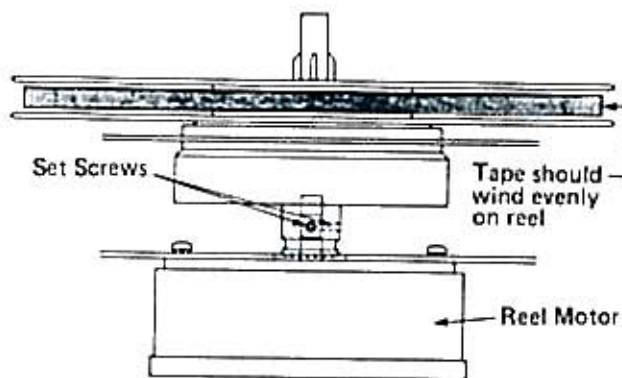


Fig. 1-3-5

1-3-6. Head Alignment

There is no need for head height and tilt adjustments because the record/reproduce head of the 388 is a semi-fixed type (erase head fully-fixed).

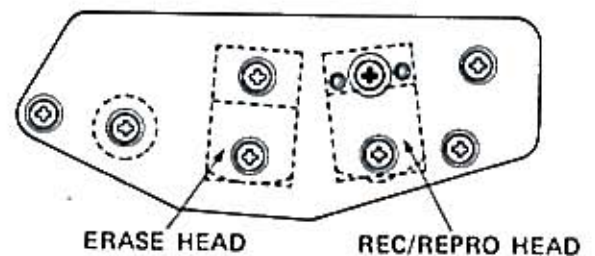
Head Mounting (Record/Reproduce Head)

1. Refer to Fig. 1-3-6.
2. Mount head to head base using mounting screw and mount tangency adjustment screw.
3. Mount azimuth adjustment screws.

Head Azimuth Adjustment

1. Connect the TAPE OUT jack for TRK 2 of the deck to the vertical input terminals of an oscilloscope.
2. Connect the TAPE OUT jack for TRK 7 of the deck to the horizontal input terminals of the oscilloscope.
3. Connect an AF level meter to the TAPE OUT jack(s).
4. Load the reproduce alignment test tape (YTT-1003/400 Hz) to reproduce.

5. Slightly loosen the mounting screws which hold record/reproduce head in place and adjust the tangency using adjustment screw, for maximum output. When the maximum output is attained, retighten both mounting screws.
6. Reproduce the 10-kHz signal on the test tape. A picture showing phase relations between both channels will be obtained on the oscilloscope as shown in Fig. 1-3-7.
7. Adjust the repro head azimuth screw until the scope display shows less than 90 degree out of phase at 10 kHz with the AF level meter showing approximately maximum value for both channels.



- ⊕ TANGENCY ADJ. SCREW
- AZIMUTH ADJ. SCREWS
- ⊙ FIXED SCREW

Fig. 1-3-6

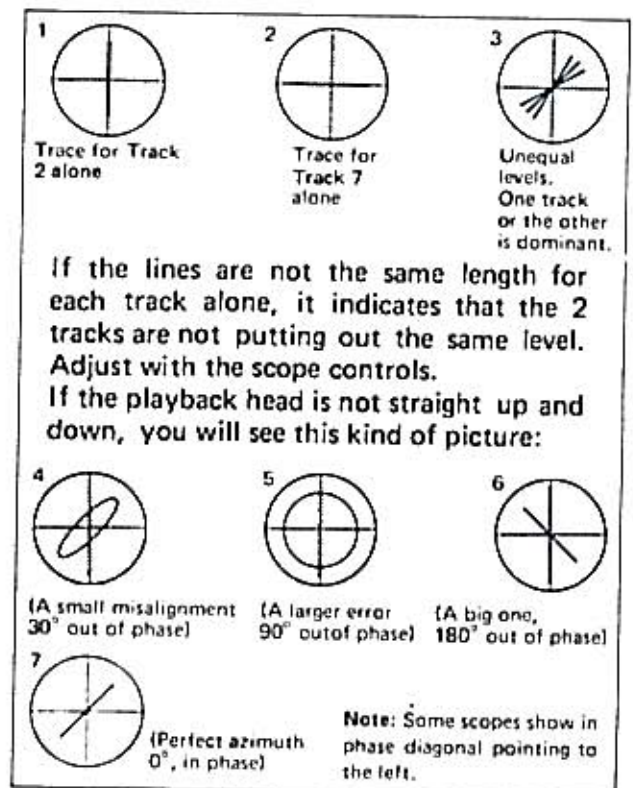


Fig. 1-3-7

1-3-7. Tape Tension

NOTES

1. Since these settings are precisely factory adjusted, in general they should not be re-adjusted. If it is specifically required, a special meter is needed.

Tentelo meter; Model T2-H20-1 or T2-H15-UM.

2. For the reels mounted on both left and right reel tables, use the same size ones.

3. Before all the following adjustments (A-1 ~ C-3), perform next instructions in order to activate the relevant circuit.

a. Thread the tape to lift up both tension/shut-off arms.

b. Set the POWER switch to ON.

c. Leave the deck as it is for 5 to 10 minutes.

A. IN PLAY MODE

1. Place a reel loading TEAC YTT-8013 test tape on the left reel table and an empty reel on the right reel table, then thread the tape.

2. Let the tape run in fast forward mode until both reels have nearly the same tape winding diameter.

3. During play, measure tape tension at points A and B.

4. Adjust R112 (for left tension arm) and R212 (for right tension arm) so that the top center of the tension rollers aligns with the forward outer edge of the inertia and footage rollers as shown in Fig. 1-3-8.

5. Adjust R103 (for back tension at point B) and R203 (for take-up tension at point A) so that the specified tape tension of $40\text{ g} \pm 5\text{ g}$ ($1.2\text{ oz} \sim 1.6\text{ oz}$) for back tension and $50\text{ g} \pm 5\text{ g}$ ($1.6\text{ oz} \sim 2.0\text{ oz}$) for take-up tension are obtained.

B. IN FAST FORWARD MODE

1. Load TEAC YTT-8013 test tape on the left reel table and an empty reel on the right reel table, then thread the tape.

2. Stop the left reel by hand and set the deck in fast forward mode.

3. Adjust R105 to obtain a 80 g to 90 g (2.8 oz ~ 3.2 oz) value at point A (Obtain a 80 g or 2.8 oz value as far as possible).

C. IN REWIND MODE

1. Load TEAC YTT-8013 test tape on the right reel table and the empty reel on the left reel table, then thread the tape.

2. Stop the right reel by hand and set the deck in the rewind mode.

3. Adjust R206 to obtain a 80 g to 90 g (2.8 oz ~ 3.2 oz) value at point B (Obtain a 80 g or 2.8 oz as far as possible).

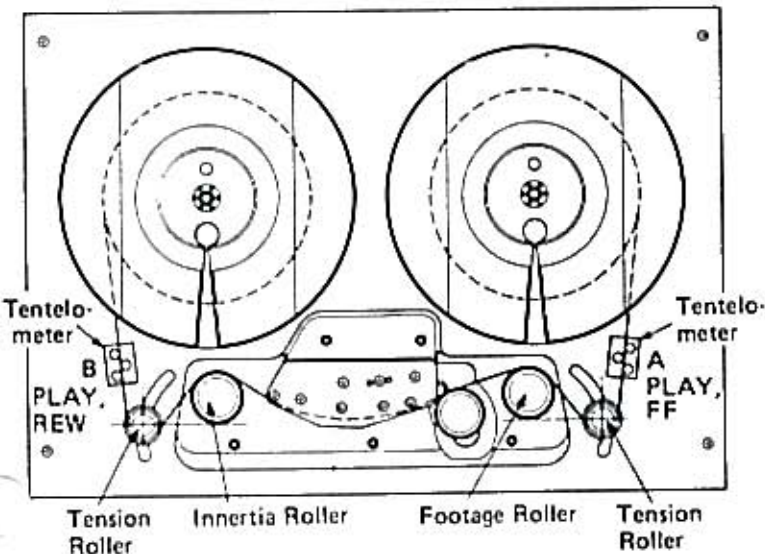


Fig. 1-3-8

Reel Servo Adjustment

REF. NO.	FUNCTION
R112	Tension Arm Position (Left)
R105	F. F Tape Tension
R150	Fast Winding Speed
R212	Tension Arm Position (Right)
R206	Rewind Tape Tension
R103	Play Tape Tension (Back Tension)
R203	Play Tape Tension (Take-up)

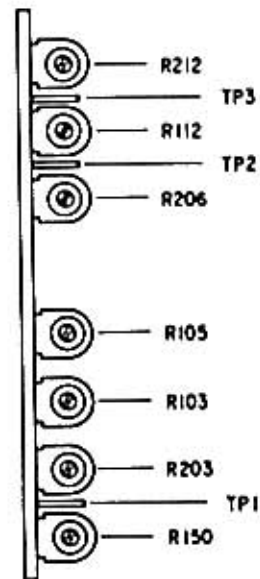


Fig. 1-3-9

1-3-8. Fast Winding Speed

1. Connect oscilloscope between TP1 test point on the REEL SERVO PCB and ground.
2. Thread TEAC YTT-8013 test tape. In this case, use of 7-inch reel is permitted provided both left and right reels are the same size.
3. During fast forward or rewind mode, adjust R150 (see Fig. 1-3-9) so that wavelength displayed on the oscilloscope becomes 2.5 msec. (Fig. 1-3-10). Adjustment should be satisfied at any tape winding position.
4. Check that almost equal value of fast winding speed is obtained between fast forward and rewind modes.

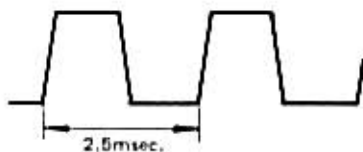


Fig. 1-3-10

1-3-9. Wow-And-Flutter Check (Reproduce Method)

1. Connect a Wow-and-Flutter to the deck as shown in Fig. 1-3-11. These meters will measure the ANSI peak value or the NAB rms value depending on the switch selection on the meter.
2. Playback the TEAC YTT-1003 test tape.
3. If the peak or rms weighted value is to be read, set the Wow-and-Flutter Meter for the "Weighted" readings and also make sure that the meter is properly calibrated.
4. As the measured results may vary with respect to the location on the tape at which the measurement is taken, at least two locations – at the beginning and near the end of the tape – should be checked. There may also be slight differences in absolute values measured according to the brand of the meter being used.

Values should be as shown:

DIN/IEC/ANSI (peak value)	NAB (rms value)
Weighted	Weighted
±0.10 %	0.05 %

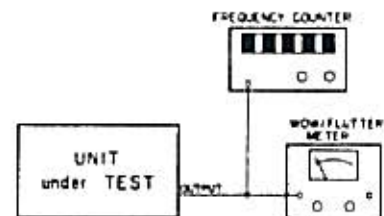


Fig. 1-3-11

1-3-10. Tape Speed

1. Connect a digital frequency counter to any one of the TAPE OUT jacks.
2. Set the speed knob to FIX.
3. Reproduce the middle of the TEAC test tape YTT-2003 (3,000 Hz) and adjust the FIX speed trimmer R815 on the CAP SERVO PCB until the frequency counter indicates a reading of 3,000 Hz.
4. Playing the tape at both the beginning and the end, check that the tape speed does not vary any more than the limits prescribed in the specifications, so that there is never a total deviation of more than 15 Hz between the beginning and end.
5. Set the Speed Knob to EXT.

6. Apply a +5 V (H) signal to MM terminal of the ACCESSORY connector and apply 9.6 kHz rectangular pulses to KK terminal.
7. Play the middle of the tape and adjust the EXT speed trimmer R807 on the CAP SERVO PCB for a reading of 3,000 Hz.

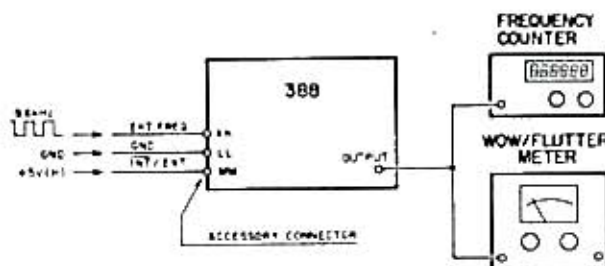


Fig. 1-3-12

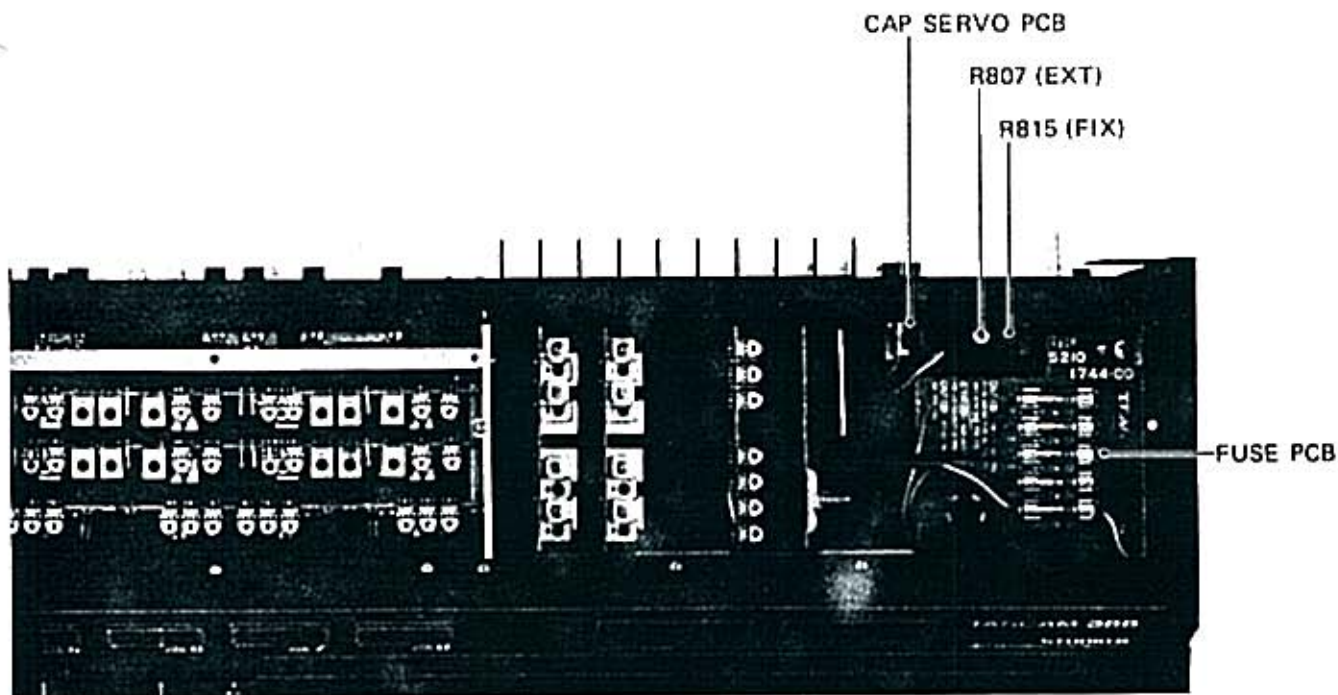
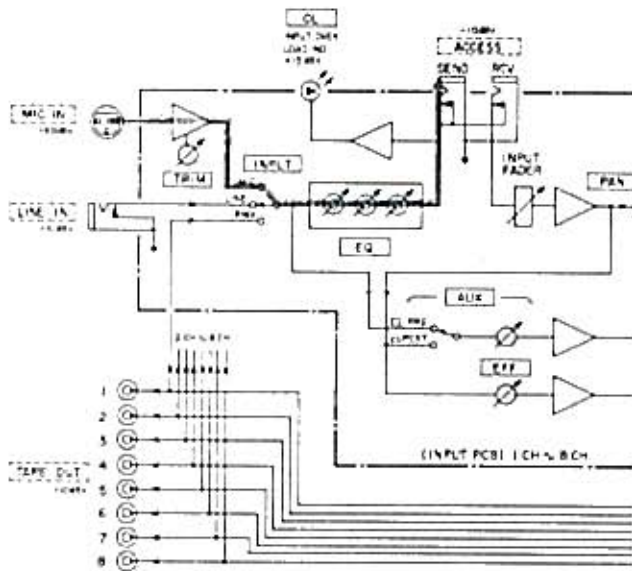


Fig. 1-3-13

1-4. MIXER SECTION CHECK AND ADJUSTMENT

1-4-1. MIC IN → ACCESS SEND

1. Plug an AC voltmeter into the ACCESS SEND jack.
2. Set the INPUT switch to MIC and the EQ knobs to center position.
3. Apply a 1 kHz, -60 dB (1 mV) signal to the MIC IN XLR connector on the back panel.
4. Adjust the MIC TRIM for a -10 dBV (0.3 V) reading on the voltmeter.
5. Check all remaining channels in the same manner.



1-4-2. LINE IN → ACCESS SEND

1. Apply a 1 kHz, -10 dBV (0.3 V) signal to the LINE IN jack.
2. Measure the level at ACCESS SEND jack. It should be -10 dBV (0.3 V).
3. Check that the OverLoad LED lights at 25 dB \pm 1 dB (5 V to 6.3 V) above nominal level of -10 dB V (0.3 V) at ASSESS SEND.
4. Confirm that the output signal is not distorted.

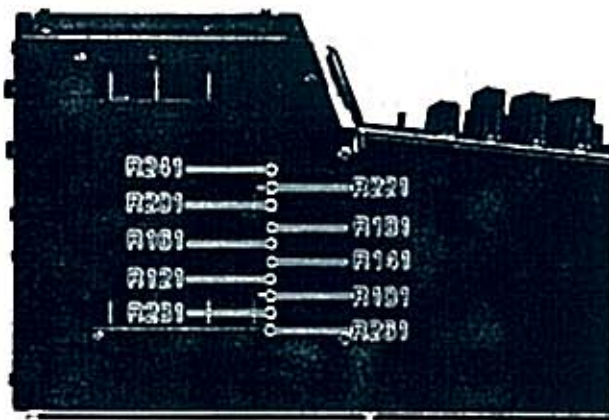
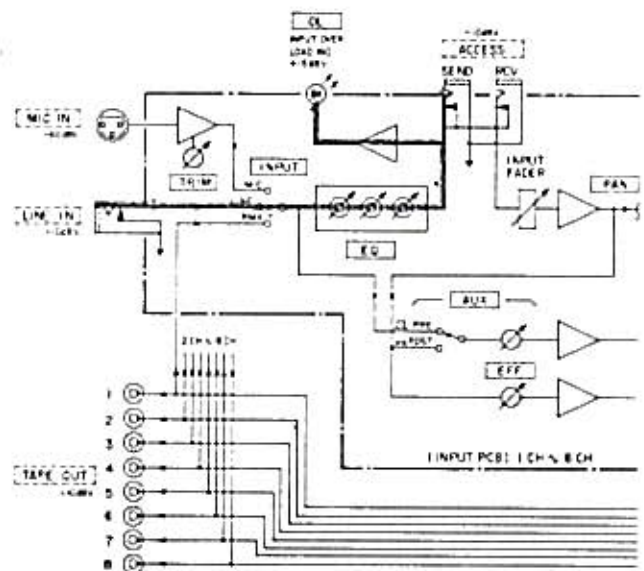


Fig. 1-4-1 Meter Adjustment

REF. NO.	FUNCTION
R101	TRK/PGM 1
R121	TRK/PGM 2
R141	TRK/PGM 3
R161	TRK/PGM 4
R181	TRK/PGM 5
R201	TRK/PGM 6
R221	TRK/PGM 7
R241	TRK/PGM 8
R261	STEREO L/AUX
R281	STEREO R/EFFECT

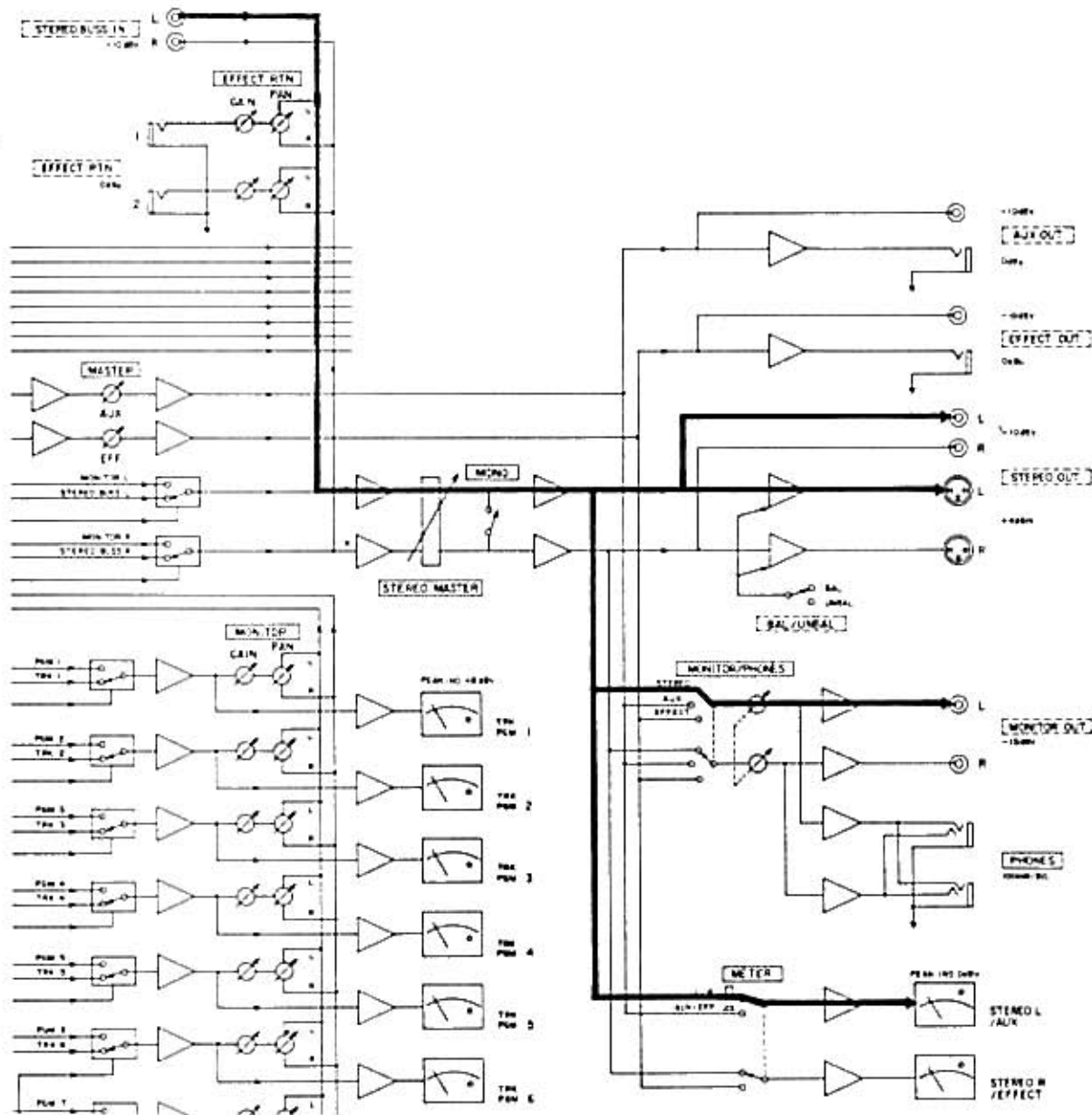
**1-4-3. STEREO BUSS IN → STEREO OUT
MONITOR OUT**

1. Plug an AC voltmeter into the STEREO OUT L (R) jack.
2. Apply a 1 kHz, -10 dBV (0.3 V) signal to the STEREO BUSS IN L(R) jack.
3. Set the METER switch to L/R.
4. Set the MONITOR/PHONES switch to STEREO.
5. Adjust the STEREO MASTER fader for a -10 dBV (0.3 V) reading at the STEREO OUT RCA jacks (at XLR connectors: +4 dB).
6. STEREO MASTER fader should then be in the shaded area between 7 and 8.

7. Adjust the MONITOR/PHONES knob for a -10 dBV reading at the MONITOR OUT jack.
8. Confirm that the STEREO VU meters indicate 0 VU. If the VU meters do not indicate 0 VU, adjust the calibrating pots, R261 for L channel and R281 for R channel, on the METER AMP PCB. (Fig. 1-4-1, page 1-12)

1-4-4. EFFECT RTN → STEREO OUT

1. Apply a 1 kHz, 0 dBu (0.775 V) signal to the EFFECT RTN 1/4" phone jack.
2. Turn the EFFECT RTN PAN knob fully left and adjust the GAIN knob for a -10 dBV (0.3 V) reading at the STEREO OUT.
3. Turn the PAN fully right and check the level at STEREO OUT R.





1-4-9. Frequency Response

Set the input and output levels to nominal as in previous paragraphs and connect an oscillator to the input jack and a wide range (more than 100 kHz) level meter to the output jack.

Frequency response ranges are as follows:

MIC IN → PGM OUT 20 Hz – 30 kHz $\begin{matrix} +1 \\ -2 \end{matrix}$ dB

Other Inputs → Other Outputs
20 Hz – 30 kHz $\begin{matrix} +1 \\ -2.5 \end{matrix}$ dB

1-4-10. T.H.D.

T.H.D. is also measured with the input and output levels set to nominal as previously described. Connect a low distortion oscillator to the input jack, and a 30-kHz L.P.F. and a distortion meter to the output jack. Set the oscillator output to 1 kHz and read the distortion meter.

Specs are as follows:

1 MIC IN → PGM OUT 0.03 % or less

1 LINE IN → PGM OUT 0.03 % or less

1-4-11. S/N Ratio

S/N ratio should be measured with the input and output levels set to nominal as previously described and a 150-ohm dummy load connected to the MIC IN connector.

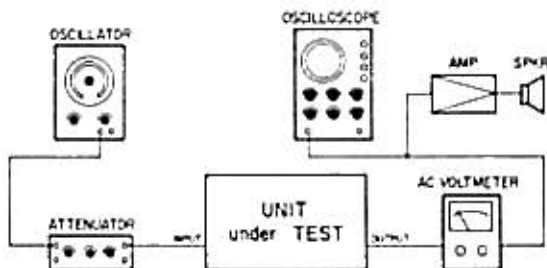
Specs are given in the table below.

	IHF-A	DIN
1 MIC TO 1 PGM OUT	70 dB	68 dB
8 Σ MIC TO 1 PGM OUT (150 Ω SOURCE)	60 dB	58 dB
1 LINE TO 1 PGM OUT	80 dB	76 dB
8 Σ LINE TO 1 PGM OUT	77 dB	73 dB

1-5. RECORDER/REPRODUCER SECTION ADJUSTMENT

1-5-1. Reproduce Level

- 1) Connect a level meter to the TAPE OUT "1" jack on the rear panel.
- 2) Reproduce a TEAC test tape YTT-1003, 400 Hz and adjust the trim pot R128 for -12.6 dB (230 mV) reading on the level meter. (If you use Reference Fluxivity 250 nWb/m tape, adjust the trim for -10 dB reading.)
- 3) Connect the level meter to the remaining channel outputs (2 to 8) and proceed to the adjustment in the same manner by adjusting.
R128: for channel 1, 2, 5, 6
R228: for channel 3, 4, 7, 8



1-5-1. Reproduce Level Calibration

1-5-2. Reproduce Frequency Response

- 1) Connect a level meter to the TAPE OUT "1" jack on the rear panel.
- 2) Reproduce a test tape YTT-1003 and reads the output level; it should be within the following limits.
- 3) If the output level is out of the limits, adjust the trim pot R124.
- 4) For the remaining channels (2 to 8), also proceed the check and adjustment in the same manner.
R124: channel 1, 2, 5, 6
R224: channel 3, 4, 7, 8

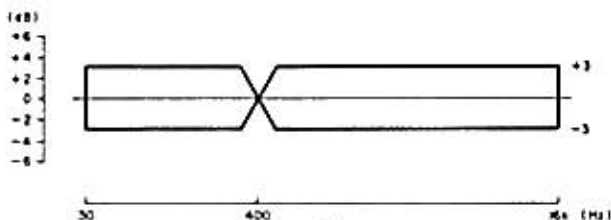


Fig. 1-5-2. Reproduce Frequency Response

1-5-3. Bias Tuning and Bias Trap Adjustments

These adjustments have been made at the factory and realignment will not be necessary except for the following circumstances:

- When the REC/REPRO head, ERASE head and/or Bias amplifier is replaced.
- When the MASTER BIAS unit is replaced.

Use the following procedures to adjust.

A. BIAS TUNING

1. Place all channel REC FUNCTION switches to ON and set the tape deck into the RECORD mode.
2. Connect a DC volt-meter between TP01 (TP02, TP03, TP04) and TP11 (TP12, TP13, TP14) by using an insulate screwdriver, adjust L101 (L201, L301, L401) on the BIAS PCB (1) and BIAS PCB (2) to obtain a minimum reading on the DC meter. Be sure to use a non-conductive screwdriver (i.e. wood, plastic, etc.).

CAUTION: Do not try to obtain maximum reading on the DC volt-meter, which would occasion an extreme amount of Bias Amp output load.

B. BIAS TRAP

1. Connect an "AC" level meter between TP1 and ground on the REC/PLAY AMP PCB.
2. Place all the REC FUNCTION switches to ON and set the deck into the RECORD mode.
3. Adjust L104/L204 to obtain a minimum reading on the level meter.

1-5-4. Recording Bias Adjustment

- 1) Connect AC Voltmeter between TP 2 and TPG on the REC/PLAY AMP PCB.
- 2) Adjust trim pots on the BIAS PCB for a 150 mV reading on the AC Voltmeter.

Trim pots to be adjusted:

- | | |
|-------|--------------|
| C103: | channel 1, 5 |
| C203: | channel 2, 6 |
| C303: | channel 3, 7 |
| C403: | channel 4, 8 |

1-5-5. Recording Level

This alignment should be performed after completion of the bias adjustment.

- 1) Connect test equipment as shown in Fig. 1-5-1. Connect an AF signal generator to PGM BUSS IN jacks.

Connect level meters to both TAPE OUT and PGM OUT jacks.

(If two meters are not available, use one meter alternately.)

- 2) Load the deck with a blank test tape YTT-8013.
- 3) Adjust the signal generator to provide 400 Hz, -10 dBV (0.3 V) reference input.
- 4) Record reference input signal of 400 Hz, -10 dBV (0.3 V) and then playback the tape just recorded; the playback output level at the TAPE OUT jack should be -10 dBV (0.3 V). If not, adjust the trim pot on the REC PLAY PCB for the channel to be adjusted.

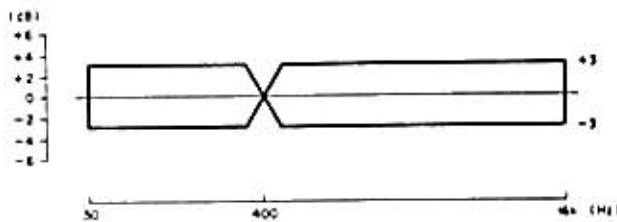
Trim pots to be adjusted:

R143: Channel 1, 2, 5, 6

R243: Channel 3, 4, 7, 8

1-5-6. Overall Frequency Response

- 1) Adjust the test set-up as mentioned under "1-5-5 Recording Level" (Items 1 through 5).
- 2) Decrease the input signal level by 10 dB from the reference level or set it to -20 dB (0.1 V).
- 3) Vary the input signal frequency over a range of 30 Hz to 16 kHz and record the frequencies, and then reproduce the signals just recorded. Measure the reproduced output levels at the proper test frequencies, and make sure that the frequency response is within the specified limit shown.
- 4) If the specified frequency response cannot be obtained by adjusting the REC EQ coil L103 and/or L203, readjust the Bias Level Setting within its specified range by referring to "1-5-4. Recording Bias Adjustment". If the bias level is readjusted, the recording level adjustment will be upset, so repeat the recording level adjustment again as described in "1-5-5. Recording Level Adjustment".



1-5-7. Overall S/N Ratio

- 1) Set and adjust the test set-up as mentioned under "1-5-6. Overall Frequency Response".
- 2) Record the reference input signal, and then remove the input plug and continue the recording with no signal applied.
- 3) Reproduce both the reference signal and no signal just recorded and read the level difference between the outputs.
- 4) The difference (S/N) should be higher than 50 dB for each channel, when measured through a 20 Hz to 20 kHz filter.
- 5) If the S/N is out of the limit:
 - * Erase record/reproduce head and tape path with a tape eraser.
 - * Check for normal erasing ratio.
 - * Readjust the bias traps.
 - * Recheck the S/N by using another test tape.

1-5-8. Overall Distortion

- 1) Set and adjust the test setup as mentioned under "1-5-6. Overall Frequency Response".
- 2) Vary the signal frequency of the reference input signal to 1 kHz, and record and reproduce the frequency.
- 3) Measure the distortion; it should be less than 1%.
- 4) If not:
 - * Readjust the bias voltage.
 - * Try to erase the erase head and record/reproduce head or replace the head(s).

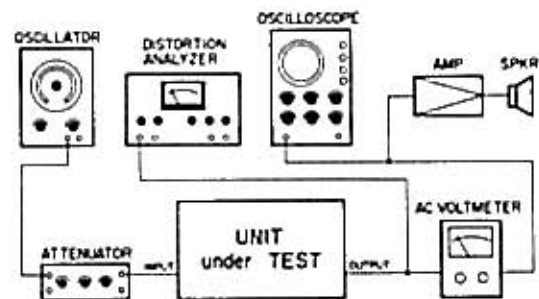


Fig. 1-5-3. Distortion Measurement Set-Up

1-5-9. Erasing Ratio

- 1) Connect test equipment as shown in Fig. 1-5-1, and adjust the controls and switches as mentioned under "1-5-6. Overall Frequency Response".
- 2) Adjust the signal generator to provide 1 kHz, 0 dB (1 V) and record it. Playback the signal just recorded and read and note the output level.
- 3) Rewind the tape up to the beginning of the tape just recorded. Remove the plug from the PGM BUSS IN jack and then record no signal on the tape just recorded with 1 kHz signal.
- 4) Rewind the tape just recorded with no signal and reproduce it. Read the output level with the level meter sensitivity increased.
- 5) Compare the output levels obtained in the steps 2 and 4; the level difference should be higher than 70 dB for each channel.
- 6) If not:
 - *Clean the tape transport path.
 - *Check the tape transport mechanism.

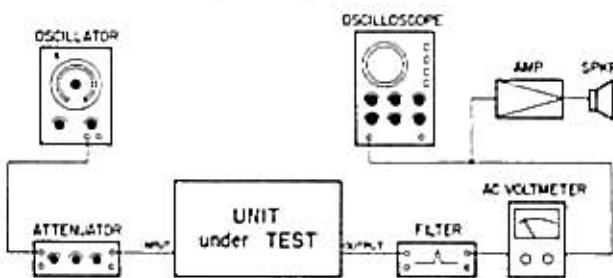


Fig. 1-5-5. Erase Ratio Test Set-Up

1-5-10. Crosstalk Between Channels

- 1) Set and adjust the test equipment as mentioned under "1-5-6. Overall Frequency Response".
- 2) Record the reference signal of 1 kHz, -10 dB (0.3 V) on the channel 1. Rewind the tape just recorded and reproduce it. Measure the leakage output levels to the adjacent channels through a 1 kHz filter, and measure ratio(s) against the reference level.
- 3) The ratio should be higher than 55 dB for each channel.

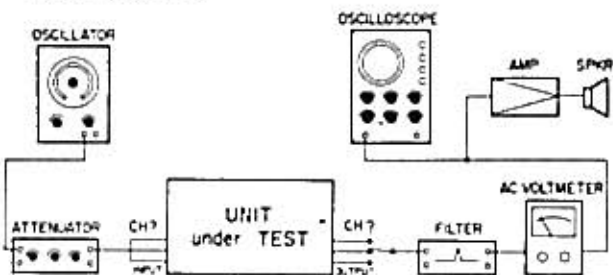


Fig. 1-5-6. Crosstalk Measurement Set-Up

1-5-11. Sync Crosstalk

This refers to the crosstalk between adjacent tracks when a SYNC recording is made. In other words, it refers to the degree of leakage into an adjacent track of a bias signal from a recording track.

Measurement setting is made in the same manner as mentioned under "1-5-6. Overall Frequency Response".

Crosstalk between Track #1 and #2

- 1) Place the TRK#1 REC FUNCTION switch in the "ON" position.
- 2) Apply 15 kHz, -10 dB (0.3 V) reference signal to PGM BUSS IN jacks. Set the deck to RECORD mode.
- 3) Check how much of the signal applied to the track #1 leaks into the track #2, and read the level difference against the reference level.
- 4) Adjust R507 (Odd Track to Even Track) or R508 (Even Track to Odd Track) for minimum reading.
- 5) Use the same method for measuring crosstalk between other adjacent tracks. Adjust R607 and/or R608.

Crosstalk between Track #1 and #3

Put track #1 into record mode and, while watching the level at TAPE OUT #3, adjust R101 so that leakage into track #3 becomes minimum. Repeat adjustment for the remaining tracks by referring to the table below.

RECORD Track	REPRO. Track (TAPE OUT channel)	Adj. Pot
1	3	R101
2	4	R102
3	5	R203
4	6	R204
5	7	R205
6	8	R206
7	5	R207
8	6	R208
3	1	R103
4	2	R104
5	3	R105
6	4	R106

1-6-2 DBX Adjustment Connection

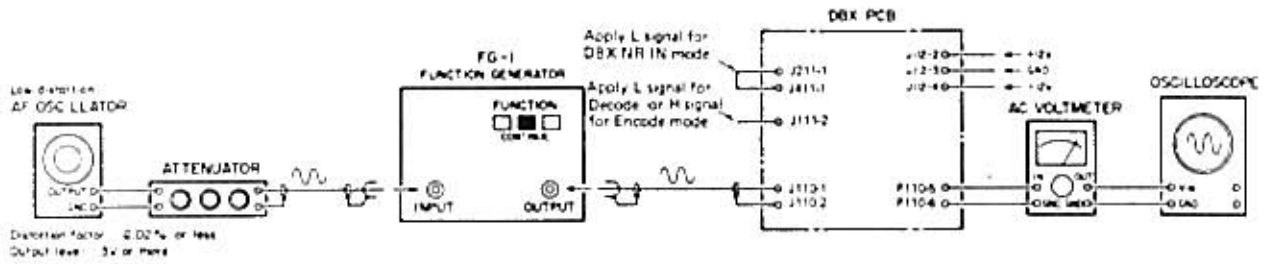


Fig. 1-6-2 RMS Symmetry Adj. & Level Adj.

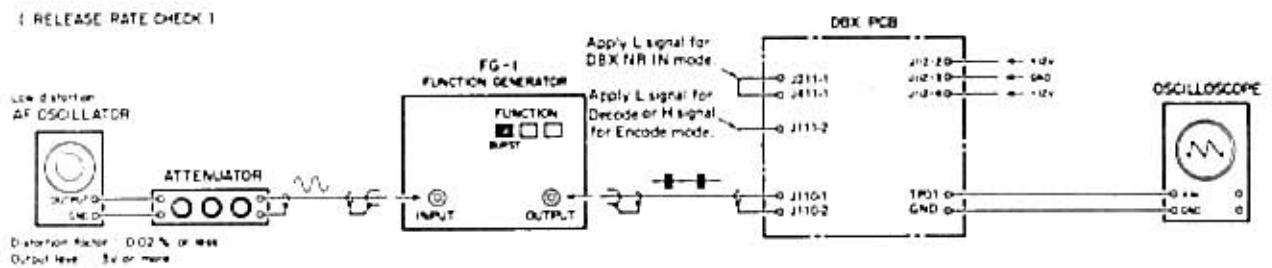


Fig. 1-6-3 Release Rate Check

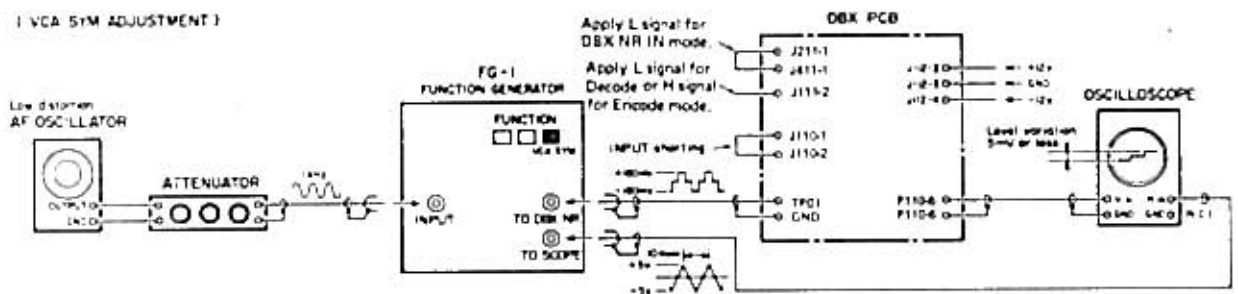


Fig. 1-6-4 VCA Symmetry Adj.

1-6-3 VCA Symmetry Adjustment Waveform

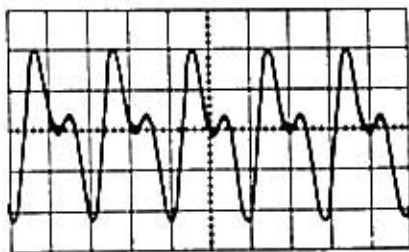


Fig. 1-6-5 RMS Symmetry Adjustment (Incorrect)

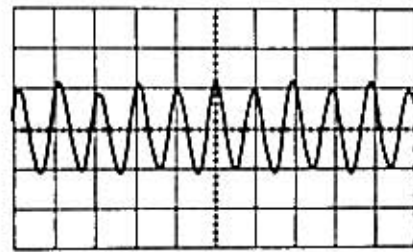


Fig. 1-6-6 RMS Symmetry Adjustment (Correct)

1-6-4. Decoder

Apply Low signal to J111-2 to activate DBX Decode mode.

A. RMS Symmetry Adjustment (Connection: Fig. 1-6-2)

1. Apply a 100 Hz, 300 mV signal to J110-1 terminal.
2. Adjust R135 to obtain a clean 200 Hz sine-wave on TP01 (see Figs. 1-6-5 & 1-6-6).

B. VCA Symmetry Adjustment (Connection: Fig. 1-6-4)

1. Apply a staircase wave signal to TP01, and a triangle wave signal to the horizontal input terminal on the oscilloscope.
2. Shortcircuit between J110-1 and J110-2.
3. Adjust R118 for a relatively straight horizontal line display on the oscilloscope. (Level deviation: 5 mV or less)

C. Decoding Level (Connection: Fig. 1-6-2)

1. Apply a 1 kHz, 300 mV signal to J110-1 terminal.
2. Adjust R107 for a 300 mV reading at J110-5 terminal.

D. Frequency Response (Connection: Fig. 1-6-2)

1. Vary the signal frequency to 50 Hz (300 mV) and then to 10 kHz (300 mV).
2. Read the output level at the J110-5 terminal for each frequency. The output level should be within the following limits with reference to level at 1 kHz.

50 Hz: +5 dB \pm 1 dB (447 mV to 602 mV)
 10 kHz: +9.4 dB \pm 1 dB (793 mV to 997 mV)

E. Release Rate Check (Connection: Fig. 1-6-3)

1. Apply a 1 kHz tone burst wave signal with 8 cycles on and 128 cycles off.
2. Confirm that release rate is less than 750 mV \pm 10 %.

F. Decode Effect Check (Connection: Fig. 1-6-2)

1. Apply a 1 kHz, -20 dB signal to J110-1 terminal.

2. Confirm that the level at J110-5 terminal is -300 dB \pm 0.5 dB (i.e., -20 dB against -10 dB (300 mV) reference level).
3. Apply a 1 kHz, 0 dB signal to J110-1 terminal.
4. Confirm that the level at J110-5 terminal is +10 dB \pm 0.5 dB (i.e., +20 dB against -10 dB (300 mV) reference level).

G. Other Channels

Repeat procedures for channels 2 through 8 using the following adjustment points and input/output terminals.

Channel	Decode mode L signal	Input	Output	Test Point	Adjustment Point		
					RMS	VCA	Level
ch1/ch5	J111-2	J110-1	J110-5	TP01	R135	R118	R107
ch2/ch6	J211-2	J210-1	J210-5	TP02	R235	R218	R207
ch3/ch7	J311-2	J310-1	J310-5	TP03	R335	R318	R307
ch4/ch8	J411-2	J410-1	J410-5	TP04	R435	R438	R407

1-6-5. Encoder

Apply High signal to J111-2 to activate DBX Encode mode.

A. RMS Symmetry Adjustment (Connection: Fig. 1-6-2)

1. Apply a 100 Hz, 300 mV signal to J111-3 terminal.
2. Check for clean 200 Hz sinewave at TP01 (see Fig.s 1-6-5 & 1-6-6).

B. VCA Symmetry Adjustment (Connection: Fig. 1-6-4)

1. Apply a staircase wave signal to TP01, and a triangle wave signal to the horizontal input terminal on the oscilloscope.
2. Shortcircuit between J111-3 and J111-4.
3. Confirm that J110-5 supplies a relatively straight horizontal line on the oscilloscope (level deviation: 10 mV or less).

C. Encoding Level (Connection: Fig. 1-6-2)

1. Apply a 1 kHz, 300 mV signal to J111-3 terminal.
2. Adjust R108 for a -10 dB reading at J110-3 terminal.

D. Frequency Response (Connection: Fig. 1-6-2)

1. Vary the signal frequency to 50 Hz (300 mV) and then to 10 kHz (300 mV).
2. Read the output level at the J110-5 terminal for each frequency. The output level should be within the following limits with reference to level at 1 kHz.

50 Hz : -2.5 dB \pm 1 dB (213 mV to 240 mV)
 10 kHz: -4.8 dB \pm 1 dB (166 mV to 186 mV)

E. Release Rate Check (Conenction: Fig. 1-6-3)

1. Apply a 1 kHz tone burst wave signal with 8 cycles on and 128 cycles off.
2. Confirm that release rate is less than 750 mV \pm 10 %.

F. Encode Effect Check (Connection: Fig. 1-6-2)

1. Apply a 1 kHz, -70 dB signal to J111-3 terminal.
2. Confirm that the level at J110-3 terminal is -40 dB \pm 0.5 dB (i.e., -30 dB against -10 dB (300 mV) reference level)
3. Apply a 1 kHz, +10 dB signal to J111-3 terminal.
4. Confirm that the level at J110-3 terminal is 0 dB \pm 1 dB (i.e., +10 dB against -10 dB reference level).

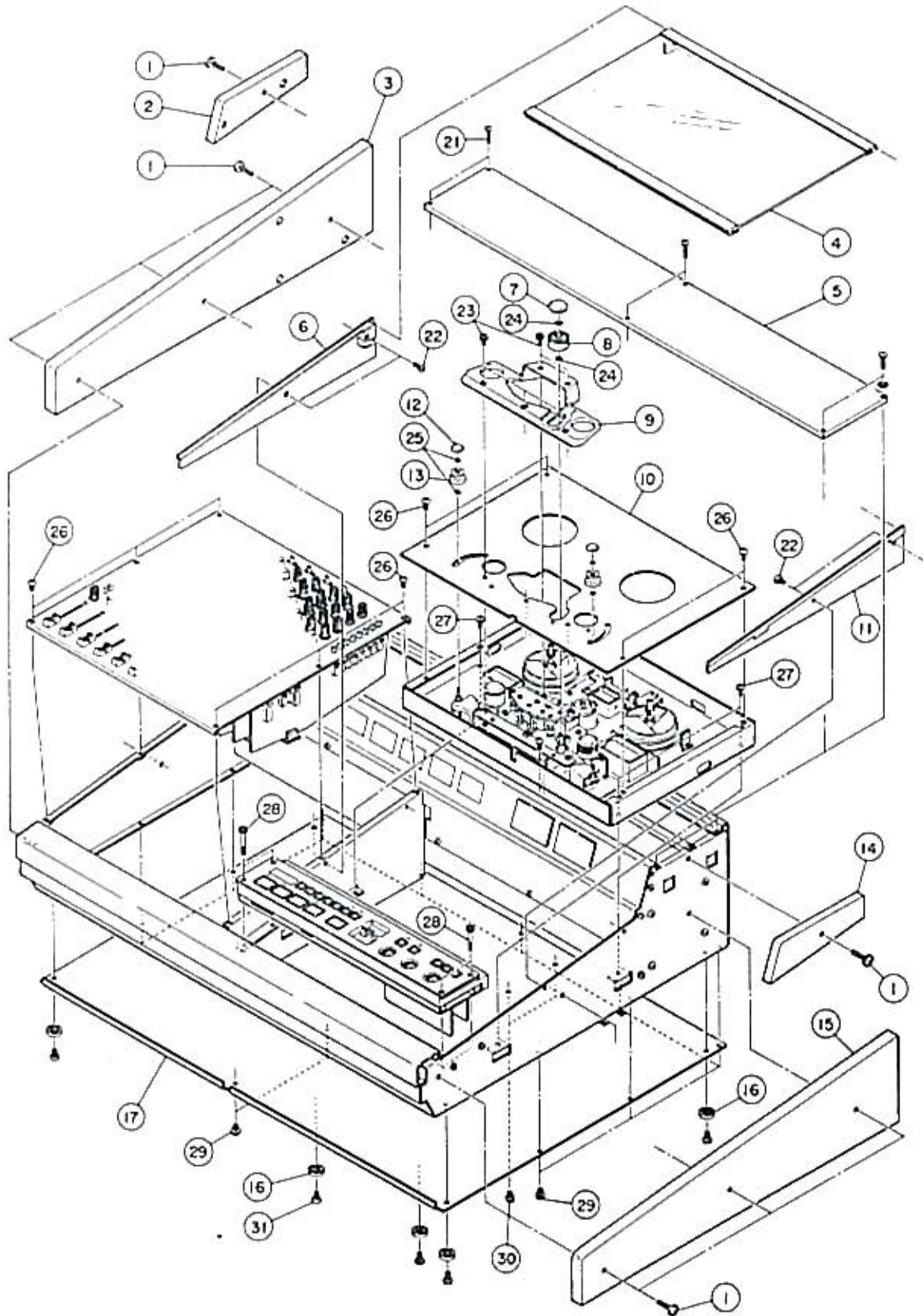
G. Other Channels

Repeat procedures for channels 2 through 8 using the following adjustment points and input/output terminals.

Channel	Decode mode H signal	Input	Output	Test Point	Adjustment Point		
					RMS	VCA	Level
ch1/ch5	J111-2	J111-3	J110-3	TP01	-	-	R108
ch2/ch6	J211-2	J213-3	J210-3	TP02	-	-	R208
ch3/ch7	J311-2	J311-3	J310-3	TP03	-	-	R308
ch4/ch8	J411-2	J411-3	J410-3	TP04	-	-	R408

2. MECHANICS – EXPLODED VIEWS AND PARTS LISTS

2-1. EXPLODED VIEW-1



EXPLODED VIEW-1

PARTS MARKED WITH *REQUIRE LONGER DELIVERY TIME.

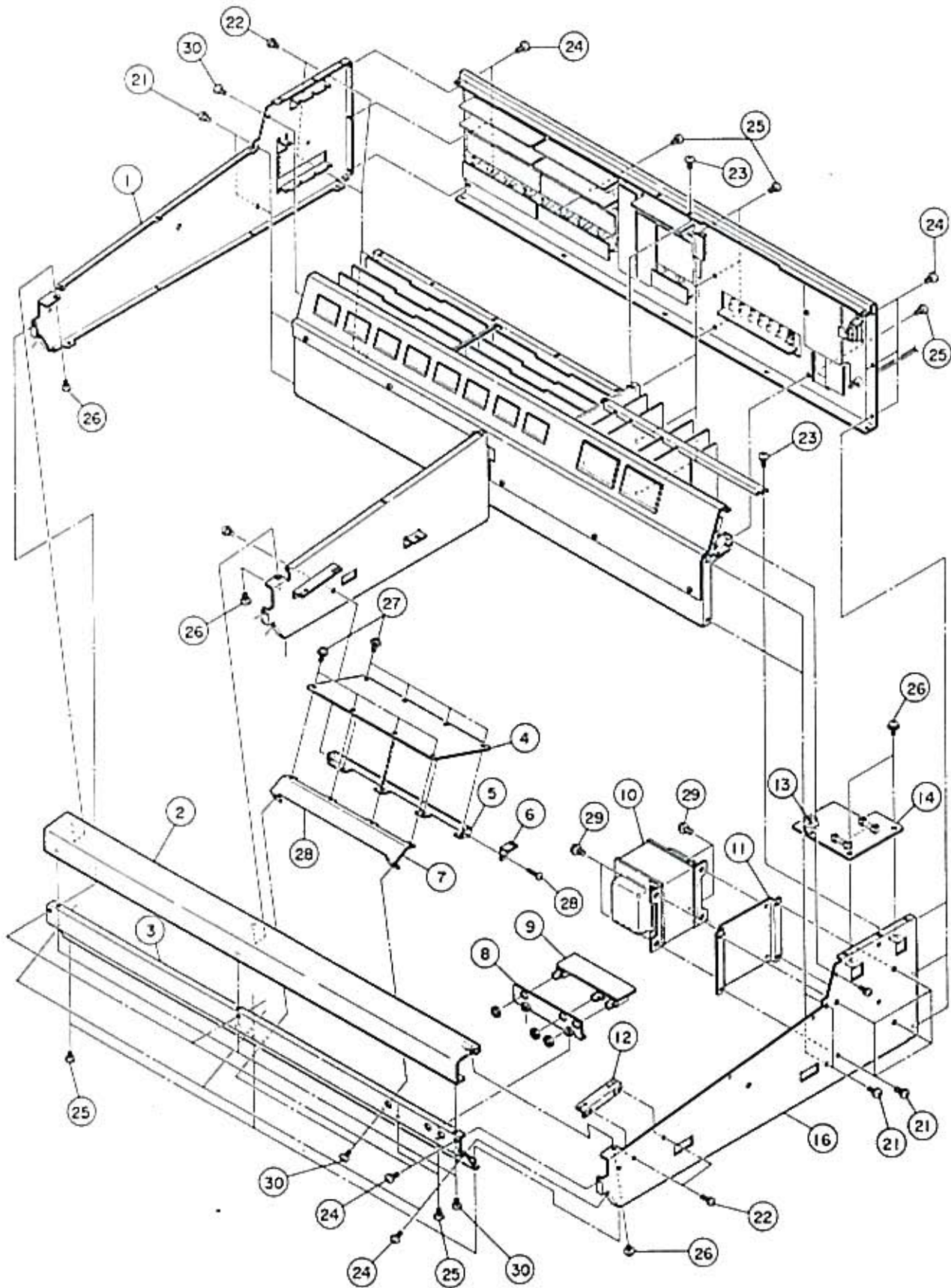
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
1- 1	*5504549000	SCREW C	
1- 2	*5800711200	SIDE BOARD,SL	
1- 3	*5800711000	SIDE BOARD,L	
1- 4	*5800705801	COVER ASS'Y,DUST	
1- 5	*5800708201	PCB COVER ASSY	
1- 6	*5800705600	SIDE SASH,L	
1- 7	5800700400	CAP,PF ROLLER	
1- 8	5014175100	PINCH ROLLER	
1- 9	*5800701300	BASE,HOUSING	
1-10	*5800701001	PANEL,TAPE TRANSPORT	
1-11	*5800705700	SIDE SASH,R	
1-12	5800700800	CAP,T ROLLER	
1-13	5800700600	ROLLER ASS'Y TENSION	
1-14	*5800711300	SIDE BOARD,SR	
1-15	*5800711100	SIDE BOARD,R	
1-16	*5800708000	FOOT	
1-17	*5800707901	COVER,BOTTOM	
1-21	*5780023015	SCREW,BIND;M3X15(BLK NI)	
1-22	*5780023008	SCREW,BIND M3X8 NI B	
1-23	*5781713008	SCREW,CAP;M3X8 (BLK NI)	
1-24	*5785315000	WASHER,POLY;5X8X0.5T	
1-25	*5785313000	WASHER,POLY.; 3X6X0.5T	
1-26	*5780423006	SCREW,TRUSS;M3X6 (BLK NI)	
1-27	*5780134008	SCREW,PAN SEMS A;M4X8	
1-28	*5781703035	SCREW,CAP;M3X35 (NI)	
1-29	*5780144008	SCREW,PAN SEMS B;M4X8	
1-30	*5780143006	SCREW,PAN SEMS B;M3X6	
1-31	*5780104006	SCREW,PAN;M4X6	

INCLUDED ACCESSORIES

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
	*5700070700	388 OWNER'S MANUAL [J]	
	*5700070800	388 OWNER'S MANUAL [ALL EXCEPT J]	
	*5085008300	REEL, 7 INCH	

[J]:JAPAN [US]:U.S.A. [C]:CANADA
[GE]:GENERAL EXPORT [E]:EUROPE
[UK]:U.K. [A]:AUSTRALIA

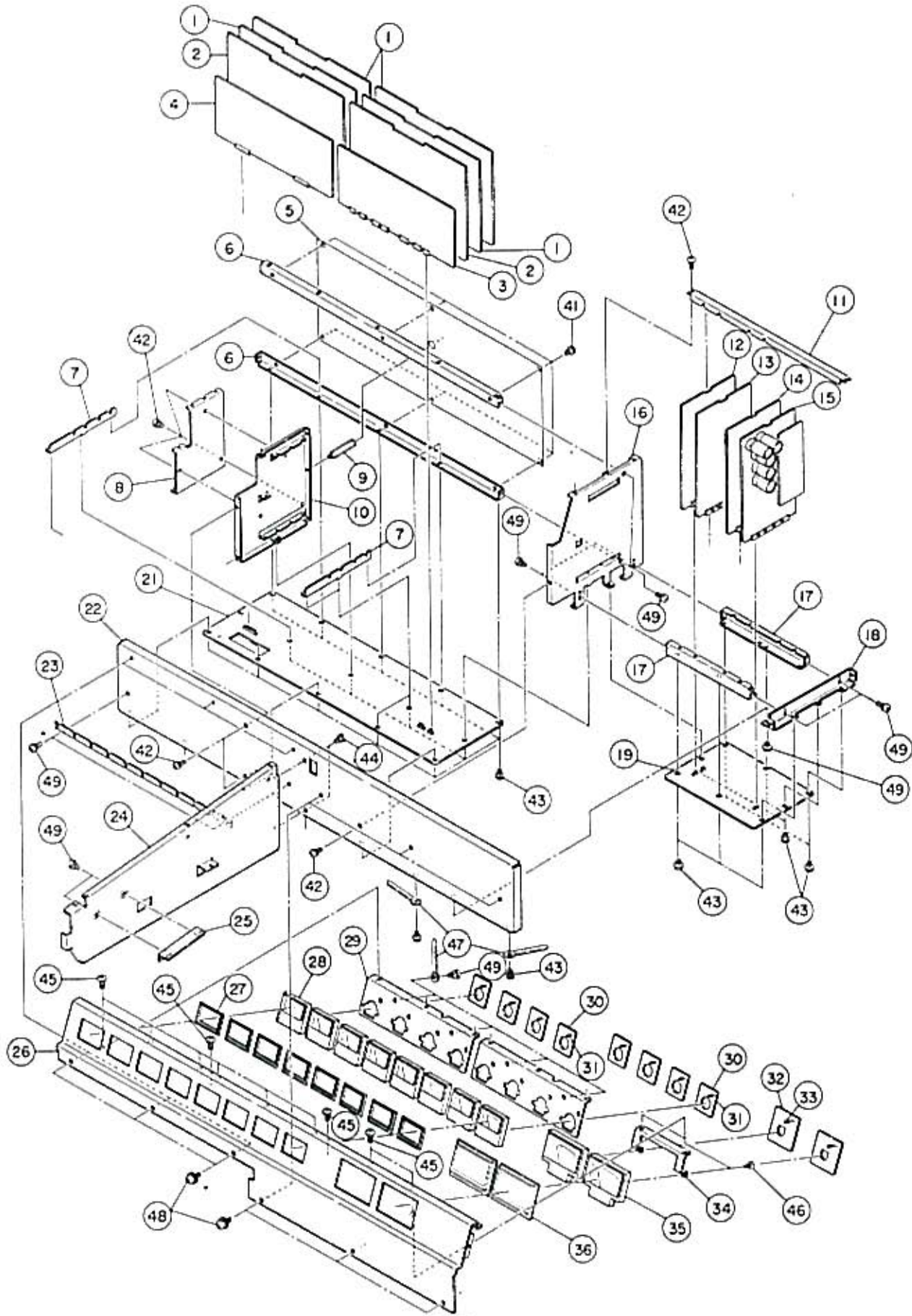
2-2. EXPLODED VIEW-2



REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
2- 1	*5800707200	FRAME,SIDE;L	
2- 2	*5800707600	PAD ASSY	
2- 3	*5800708100	COVER,FRONT	
2- 4	*5200175000	CONTROL PCB ASSY	
2- 5	*5800704100	BRACKET,CONTROL PCB;B	
2- 6	*5800704000	BRACKET,CONTROL;A	
2- 7	*5800704200	BRACKET,CONTROL PCB;C	
2- 8	*5800703900	BRACKET,JACK	
2- 9	*5200176700	PHONE JACK PCB ASSY	
2-10	△ 5320036500	TRANSFORMER;[US,C]	
	△ 5320036400	TRANSFORMER;[J]	
	△ 5320036600	TRANSFORMER;[GE]	
	△ 5320036700	TRANSFORMER;[E,UK,A]	
2-11	*5800705100	BRACKET,TRANSFORMER	
2-12	*5800703200	BRACKET,CONTROL CHASSIS	
2-13	△ *5302101700	SW.,VOLTAGE SELECT FS907G [GE]	
2-14	*5200174500	FUSE PCB ASSY(2) [E,UK,A]	
	*5200185400	FUSE PCB ASSY(1) [GE]	
	*5200174400	FUSE PCB ASSY(1)-A [J,US,C]	
2-15	Vacant		
2-16	*5800707300	FRAME,SIDE;R	
2-21	*5780134008	SCREW,PAN SEMS A;M4X8	
2-22	*5780133006	SCREW,PAN SEMS A;M3X6	
2-23	*5783003006	SCREW,PAN TAP;M3X6	
2-24	*5780024008	SCREW,BIND; M4X8 (BLK NI)	
2-25	*5780023006	SCREW,BIND;M3X6(BLK NI)	
2-26	*5780143006	SCREW,PAN SEMS B;M3X6	
2-27	*5783073006	SCREW,WASHER TAP;M3X6	
2-28	*5780133008	SCREW,PAN SEMS A;M3X8	
2-29	*5780144008	SCREW,PAN SEMS B;M4X8	
2-30	*5780003006	SCREW,BIND;M3x6	

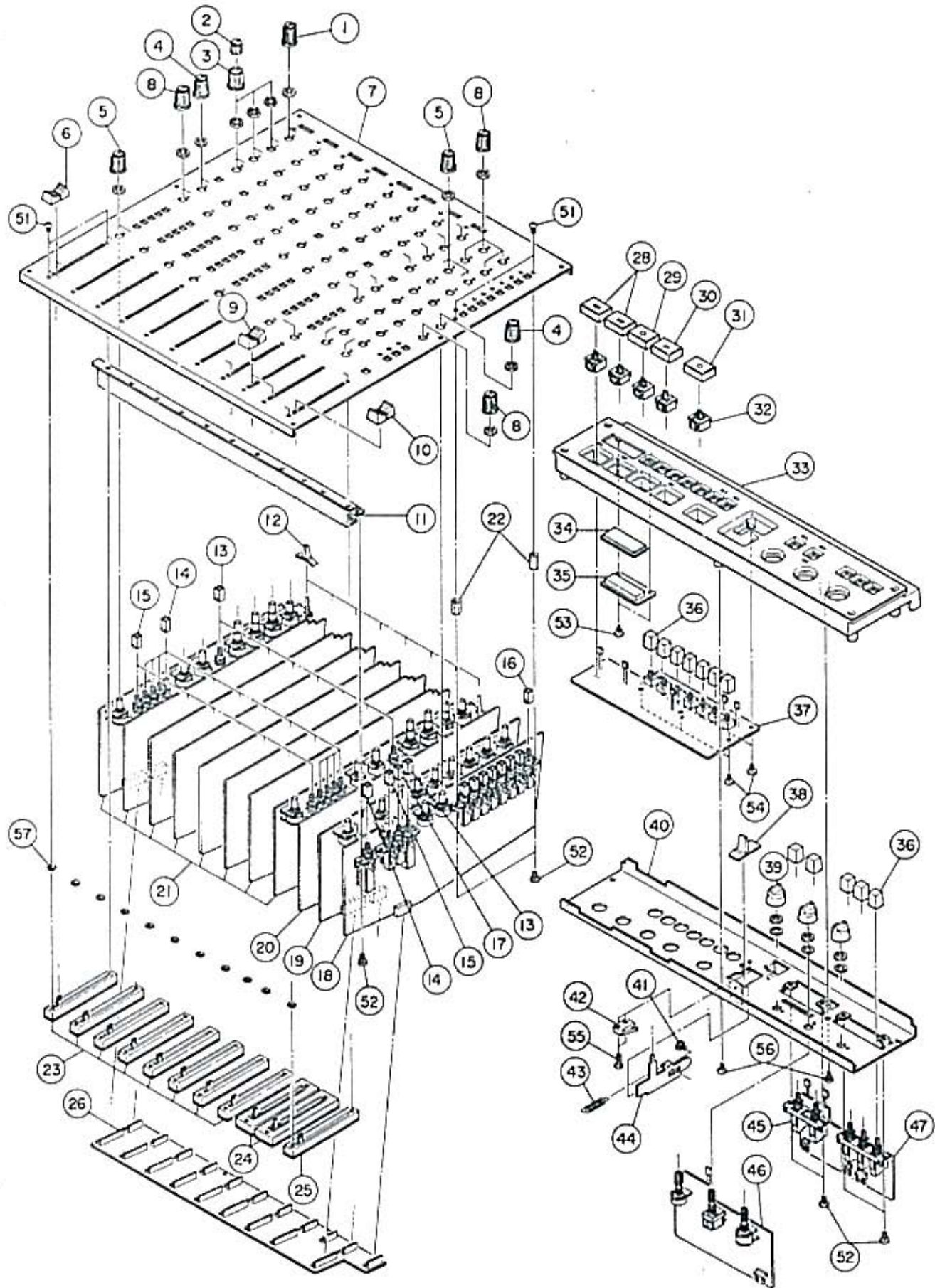
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 [GE]:GENERAL EXPORT [E]:EUROPE
 [UK]:U.K. [A]:AUSTRALIA

2-3. EXPLODED VIEW-3



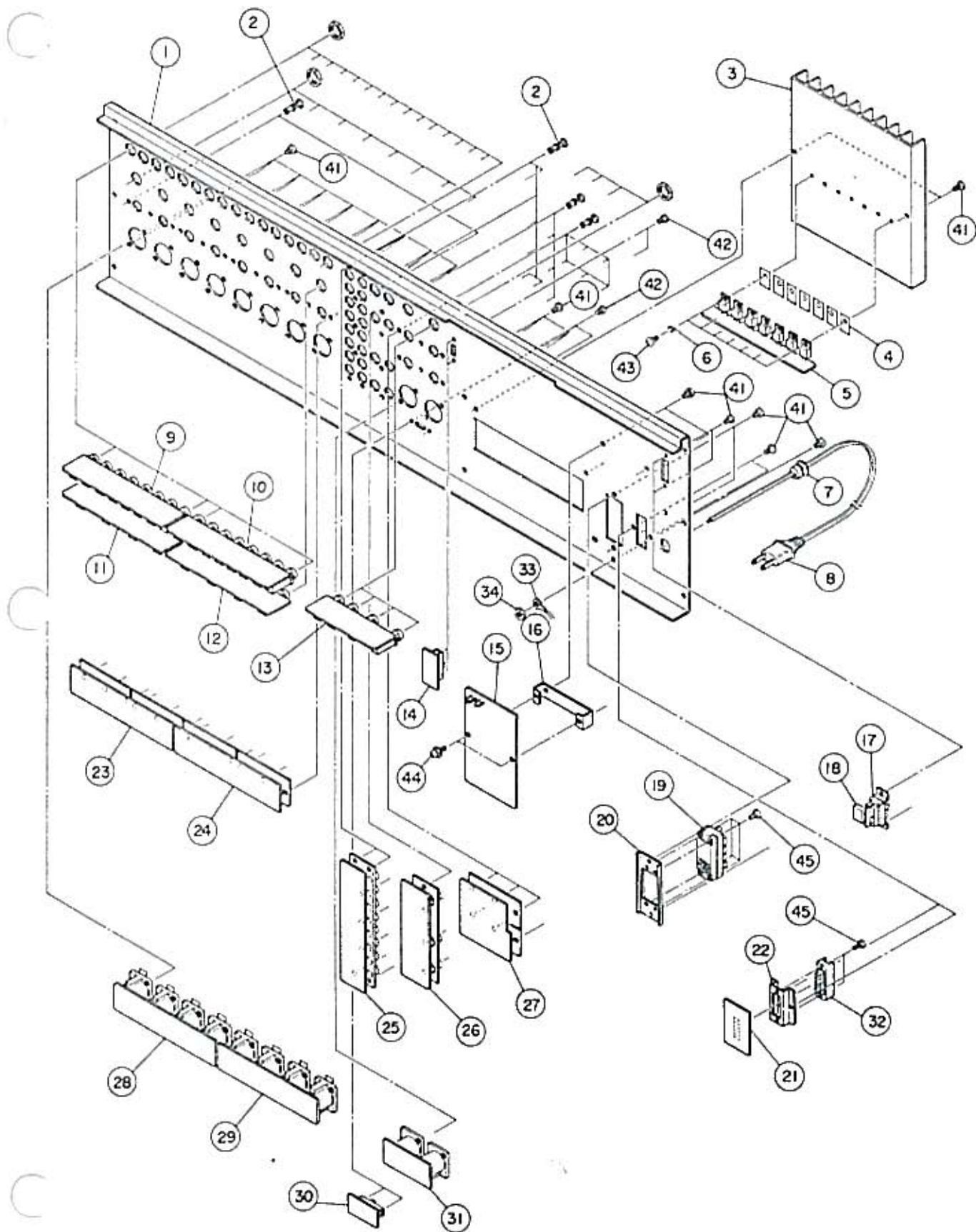
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
3- 1	*5200176900	R/P PCB ASSY	
3- 2	*5200177000	DBX PCB ASSY	
3- 3	*5200174300	BAL.AMP PCB ASSY	
3- 4	*5200174200	METER AMP PCB ASSY	
3- 5	*5800704800	COVER,PCB	
3- 6	*5800704400	BRACKET,MOTHER PCB;A	
3- 7	*5800704700	PLATE,PCB GUIDE	
3- 8	*5800704600	BRACKET,PCB;B	
3- 9	*5800703000	STUD,REAR	
3-10	*5800704500	BRACKET,PCB;A	
3-11	*5800705400	BRACKET,PCB HOLDER;A	
3-12	*5200177100	BIAS PCB ASSY(1)	
3-13	*5200180400	BIAS PCB ASSY(2)	
3-14	*5200174000	REEL SERVO PCB ASSY	
3-15	*5200173900	PWR SPLY PCB ASSY	
3-16	*5800704301	BRACKET,PCB HOLDER	
3-17	*5800705200	BRACKET,MOTHER PCB;B	
3-18	*5800705300	BRACKET,MOTHER PCB;C	
3-19	*5200174100	MOTHER PCB ASSY(2)	
3-20	Vacant		
3-21	*5200177500	MOTHER PCB ASSY(1)	
3-22	*5800707500	FRAME,JOINT	
3-23	*5800702500	HOLDER,PCB;M	
3-24	*5800707400	FRAME,SIDE;M	
3-25	*5800703200	BRACKET,CONTROL CHASSIS	
3-26	*5800708700	COVER ASS'Y METER	
3-27	*5800287500	ESCUTCHEON,VU	
3-28	5296005000	METER,VU	
3-29	*5800704900	BRACKET,METER;S	
3-30	*5210093700	PCB,METER	
3-31	5225011400	LED,SLP144B	
3-32	*5210111600	METER PCB	
3-33	5225012900	LED,SLC-26UR5	
3-34	*5800705000	BRACKET,METER;L	
3-35	5296006600	METER,VU	
3-36	*5800566200	ESCUTCHEON ASY,METER	
3-41	*5783073006	SCREW,WASHER TAP;M3X6	
3-42	*5783003006	SCREW,PAN TAP;M3X6	
3-43	*5783073006	SCREW,WASHER TAP;M3X6	
3-44	*5780134008	SCREW,PAN SEMS A,M4X8	
3-45	*5780103006	SCREW,PAN;M3X6	
3-46	*5781013006	SCREW,PAN TAP;M3X6	
3-47	*5786713000	CLIP,HARNESS	
3-48	*5780143006	SCREW,PAN SEMS B;M3x6	
3-49	*5780133006	SCREW,PAN SEMS A;M3x6	

2-4. EXPLODED VIEW-4



REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
4- 1	5800611400	KNOB ASSY, B	
4- 2	5800662300	KNOB ASSY, C 2 SHAFT	
4- 3	5800645801	KNOB, B	
4- 4	5800611700	KNOB ASSY, E	
4- 5	5800611300	KNOB ASSY, A	
4- 6	5800724700	KNOB, FADER; N(ORG)	
4- 7	*5800702201	PANEL ASS'Y, MIXER	
4- 8	5800611600	KNOB ASSY, D	
4- 9	5800677200	KNOB, FADER H(ORG)	
4-10	5800677300	KNOB, FADER J(ORG)	
4-11	*5800702600	BRACKET, FADER	
4-12	5800702800	KNOB, LEVER	
4-13	5800429600	BUTTON, PUSH E(GRN)	
4-14	5800429200	BUTTON, PUSH A	
4-15	5800429400	BUTTON, PUSH C(YEL)	
4-16	5800429300	BUTTON, PUSH B	
4-17	5800429500	BUTTON, PUSH D(BLU)	
4-18	*5200173800	MONITOR PCB ASSY	
4-19	*5200173600	BUSS PCB ASSY(B)	
4-20	*5200173400	BUSS PCB ASSY(A)	
4-21	*5200173200	INPUT PCB ASSY	
4-22	*5800762300	SHAFT, SUPPORT; SW	
4-23	5284009700	SLIDE VR 10KA S6011	
4-24	5284009900	SLIDE VR 10KAX4 S6041	
4-25	5284009800	SLIDE VR 10KAX2 S6023	
4-26	*5200174800	M. BUSS PCB ASSY	
4-27	Vacant		
4-28	5800475501	BUTTON, OPERATION; A	
4-29	5800475901	BUTTON, OPERATION; B	
4-30	5800476001	BUTTON, OPERATION; C	
4-31	5800476101	BUTTON, OPERATION; D	
4-32	5300033900	SW., PUSH 1-1	
4-33	*5800703400	PANEL, CONTROL	
4-34	*5800474900	LENS, COUNTER	
4-35	*5200176500	COUNTER PCB ASSY	
4-36	5800703500	BUTTON(A)	
4-37	*5200175800	OPERATION PCB ASSY	
4-38	5800288100	KNOB, CUE	
4-39	5800475100	SPEED MODE KNOB	
4-40	*5800703600	CHASSIS, CONTROL	
4-41	*5581056000	SHAFT, A	
4-42	5301455500	SW., MICRO SS5GL13-F	
4-43	*5800703800	SPRING, CUE	
4-44	*5800703700	LEVER, CUE	
4-45	*5200176600	DBX SW PCB ASSY	
4-46	*5200175200	PHONE AMP PCB ASSY	
4-47	*5200176800	MONITOR SW PCB ASSY	
4-51	*5780423006	SCREW, TRUSS; M3X6(BLK NI)	
4-52	*5780133006	SCREW, PAN SEMS A; M3X6	
4-53	*5781012006	SCREW, PAN TAP; M2X6	
4-54	*5781013006	SCREW, PAN TAP; M3X6	
4-55	*5780102010	SCREW, PAN; M2X10	
4-56	*5781014008	SCREW, PAN TAP; M4X8	
4-57	*5785123000	WASHER, LOCK; M3	

2-5. EXPLODED VIEW-5



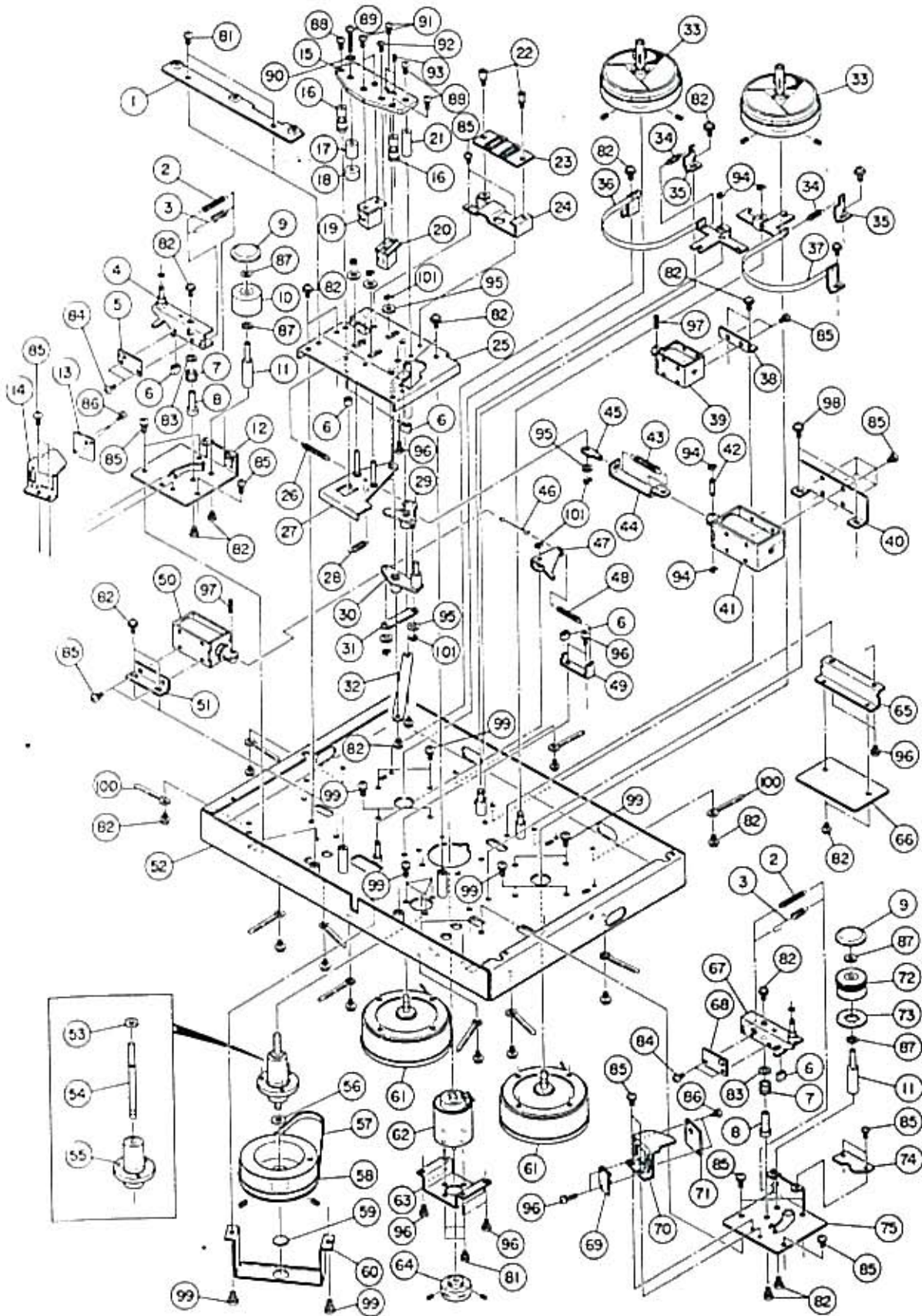
EXPLODED VIEW-5

PARTS MARKED WITH *REQUIRE LONGER DELIVERY TIME.

REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
5- 1	*5800702901	PANEL, REAR	
5- 2	*5534878000	RIVET, PUSH	
5- 3	*5800703100	HEATSINK	
5- 4	*5033291000	PLATE, INSULATOR	
5- 5	*5200175500	TR PCB ASSY	
5- 6	*5033295000	TUBE, INSULATOR	
5- 7	△*5534663000	STRAIN RELIEF 6W-1	[C]
	△*5534660000	BUSHING, CORD; 4N-4	[J, GE, E, A]
	△*5317001700	BUSHING, CORD; 4N-5	[US, UK]
5- 8	△*5350008300	CORD, AC ASS	[A]
	△*5128047000	CORD, AC	[UK]
	△*5350010800	CORD, AC UL SPT-1	[GE]
	△*5350008200	CORD, AC EUR	[E]
	△*5350012200	CORD, AC CSA	[C]
	△*5350010700	CORD, AC UL SPT-2	[US]
	△*5128027000	CORD, AC	[J]
5- 9	*5200171600	I/O PCB ASSY(1)	
5-10	*5200171700	I/O PCB ASSY(2)	
5-11	*5200171800	I/O PCB ASSY(3)	
5-12	*5200171900	I/O PCB ASSY(4)	
5-13	*5200172600	I/O PCB ASSY(11)	
5-14	*5200172900	DEFEAT SW PCB ASSY	
5-15	*5200175100	CAP SERVO PCB ASSY	
5-16	*5800705500	HOLDER, SERVO PCB	
5-17	△ 5300025100	SW., POWER SDE3S CLASS2	[E, UK, A]
	△ 5300025000	SW., POWER SDE3S TV3 M-15B	[US, C, GE]
	△ 5300024900	SW., POWER SDE3S M-15B	[J]
5-18	△*5292002500	CR, 0.01MF+1200HM 300VAC	[J, GE]
	△*5292002600	CR, 0.033MF+1200HM 125V	[C]
	△*5052910000	CR., 0.033+1200HM TCA	[US]
	△*5267702500	C., 4700PF 250VAC	[E, UK, A]
5-19	5334012900	SOCKET, CONNECTOR 36P	
5-20	*5800194101	BRACKET, CONNECTOR; C	
5-21	*5210175400	REMOTE PCB	
5-22	*5554099100	BRACKET, CONN	
5-23	*5200172000	I/O PCB ASSY(5)	
5-24	*5200172100	I/O PCB ASSY(6)	
5-25	*5200172400	I/O PCB ASSY(9)	
5-26	*5200172500	I/O PCB ASSY(10)	
5-27	*5200172700	I/O PCB ASSY(12)	
5-28	*5200172200	I/O PCB ASSY(7)	
5-29	*5200172300	I/O PCB ASSY(8)	
5-30	*5200173000	BALANCE SW PCB ASSY	
5-31	*5200172800	I/O PCB ASSY(13)	
5-32	5334010100	CONNECTOR SOCKET, 12P	
5-33	*5786705100	LUG, GND; SRA-21T-3	
5-34	*5781813000	NUT, M3	
5-41	*5780023006	SCREW, BIND; M3X6 (BLK NI)	
5-42	*5780022604	SCREW, BIND; M2.6X4 (BLK NI)	
5-43	*5780023006	SCREW, BIND M3X6 (BLK NI)	
5-44	*5780143006	SCREW, PAN SEMS B; M3X6	
5-45	*5780102608	SCREW, PAN; M2.6X8	

[J]: JAPAN [US]: U.S.A. [C]: CANADA
 [GE]: GENERAL EXPORT [E]: EUROPE
 [UK]: U.K. [A]: AUSTRALIA

2-6. EXPLODED VIEW-6

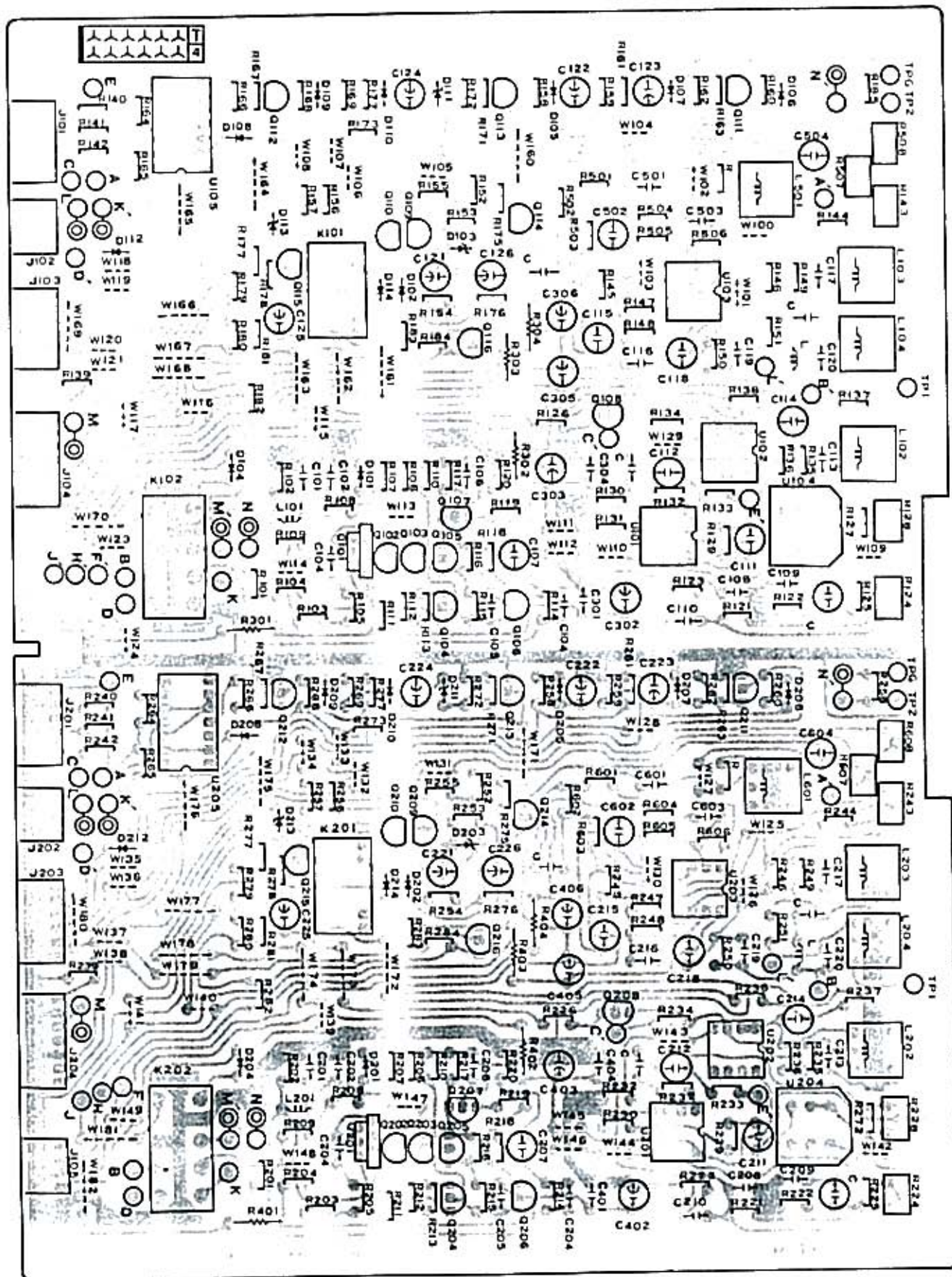


REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
6- 1	*5800701200	BRACKET,PANEL	
6- 2	*5800701800	SPRING,TA RETURN	
6- 3	*5800700900	SPRING,TA	
6- 4	*5800699201	ARM ASS'Y,TENSION;L	
6- 5	5200176200	LED PCB ASSY(L)	
6- 6	*5534850000	CUSHION,STOPPER	
6- 7	*5800701700	SPRING,ARM	
6- 8	*5800699100	SHAFT,TA	
6- 9	5800700400	CAP,PF ROLLER	
6-10	5800700000	ROLLER ASS'Y,2	
6-11	*5800699900	SHAFT,ROLLER	
6-12	*5800698900	BASE PLATE,TA;L	
6-13	5200176000	SENSOR PCB ASSY(L)	
6-14	*5800699700	BRACKET,SENSOR;L	
6-15	*5800698300	PLATE,HEAD BASE	
6-16	5800698600	GUIDE,TAPE	
6-17	*5800698400	GUIDE,A	
6-18	*5800698500	GUIDE,B	
6-19	5378306100	HEAD,ERASE(1/4" 8CH)	
6-20	5378306000	HEAD,REC/PLAY(1/4" 8CH)	
6-21	*5800698700	STUD,HEAD BASE	
6-22	*5800701600	STUD,PCB	
6-23	*5200177200	PCB ASS'Y,HEAD CONNECT	
6-24	*5800698800	BRACKET,HEAD PCB	
6-25	*5800695400	PLATE ASS'Y,CAPSTAN BASE	
6-26	*5800702000	SPRING,PINCH ROLLER	
6-27	*5800695800	PLATE ASS'Y,LIFTER BASE	
6-28	*5800702100	SPRING,LIFTER	
6-29	*5800696800	ARM ASS'Y,LINK	
6-30	*5800696300	ARM ASS'Y,PINCH ROLLER	
6-31	*5800697000	PLATE,JOINT	
6-32	*5800697100	PLATE,ARM	
6-33	5600018100	TABLE ASSY,REEL	
6-34	*5524291000	SPRING,BRAKE	
6-35	*5555929000	HOOK,SPRING	
6-36	5800694800	BAND ASS'Y,BRAKE;L	
6-37	5800695100	BAND ASS'Y,BRAKE;R	
6-38	*5800695300	BRACKET,BRAKE SOLENOID	
6-39	5313003100	SOLENOID,BRAKE	
6-40	*5800694400	BRACKET,BRAKE SOLENOID	
6-41	5313003000	SOLENOID,PINCH ROLLER	
6-42	*5545022000	PIN,SOLENOID	
6-43	*5800697401	SPRING,PRESSURE	
6-44	*5800697300	PLATE,PRESSURE BASE	
6-45	*5800697200	PLATE,SLIDE	
6-46	*5800694500	ROD,JOINT	
6-47	*5800694600	ARM,CUE RETURN	
6-48	*5800701900	SPRING,CUE RETURN	
6-49	*5800694700	PLATE,CUE STOPPER	
6-50	5313003200	SOLENOID,LIFTER	
6-51	*5800171000	BRACKET,SOLENOID	
6-52	*5800693900	SHASSIS ASS'Y, MECHANISM	
6-53	*5012390000	STOPPER,OIL	
6-54	5800698000	SHAFT,CAPSTAN	
6-55	5800697800	HOLDER ASSY,METAL	

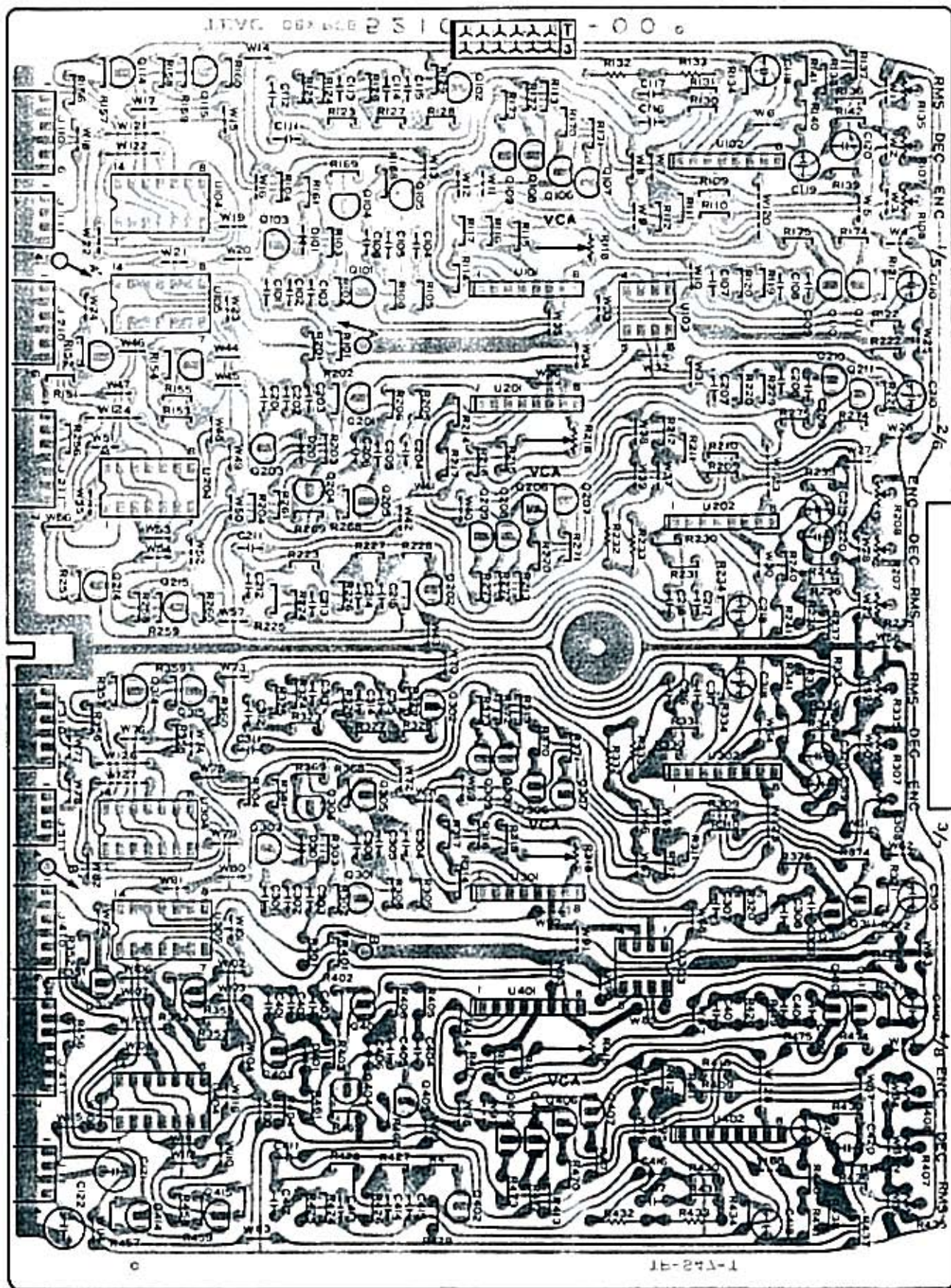
REF. NO.	PARTS NO.	DESCRIPTION	REMARKS
6-56	*5800397300	WASHER, THRUST	
6-57	5800698200	BELT, CAPSTAN	
6-58	*5800397200	FLYWHEEL	
6-59	5800697600	PLATE, CAPSTAN BEARING	
6-60	*5800697500	BRACKET, CAPSTAN THRUST	
6-61	5370005700	MOTOR, REEL; DC	
6-62	5370005900	MOTOR, CAPSTAN; DC	
6-63	*5800698100	BRACKET, MOTER	
6-64	5800701100	PULLEY, MOTER	
6-65	*5800701500	BRACKET, CONTROL JOINT PCB	
6-66	*5200175600	PCB ASS'Y, MECHANISM JOINT	
6-67	*5800699501	ARM ASS'Y TENSION; R	
6-68	5200176300	LED PCB ASSY(R)	
6-69	5200175900	SHUT OFF PCB ASSY	
6-70	*5800699800	BRACKET, SENSOR; R	
6-71	5200176100	SENSOR PCB ASSY(R)	
6-72	5800700200	ROLLER ASS'Y, FOOTAGE	
6-73	5800700500	DISK, TC	
6-74	*5200176400	PCB ASS'Y, P.G.	
6-75	*5800699000	BASE PLATE, TA; R	
6-81	*5780003004	SCREW, BIND; M3X4	
6-82	*5780143008	SCREW, PAN SEMS B; M3X8	
6-83	*5785305100	WASHER, POLY.; 5.2X16X0.25T	
6-84	*5780002604	SCREW, BIND; M2.6X4	
6-85	*5780133006	SCREW, PAN SEMS A; M3X6	
6-86	*5780002003	SCREW, BIND; M2X3	
6-87	*5785315000	WASHER, POLY.; 5X8X0.5T	
6-88	*5780023008	SCREW, BIND M3X8 NI B	
6-89	*5780023025	SCREW, BIND; M3X25(BLK NI)	
6-90	*5785103000	WASHER, SPRING; 3	
6-91	*5780023006	SCREW, BIND, M3X6(BLK NI)	
6-92	*5780223006	SCREW, FLAT; M3X6(BLK NI)	
6-93	*5782063006	SCREW, HEX; M3X6(FLAT)(BLK NI)	
6-94	*5786011500	E RING E-3	
6-95	*5785024200	WASHER, FLAT; 4X12X0.8T	
6-96	*5780133008	SCREW, PAN SEMS A; M3X8	
6-97	*5786303012	PIN, SPRING; 3X12	
6-98	*5780144008	SCREW, PAN SEMS B; M4X8	
6-99	*5780134008	SCREW, PAN SEMS A; M4X8	
6-100	*5786713000	CLIP, HARNESS	
6-101	*5786011500	E RING, E-3	

3. PC BOARDS AND PARTS LIST

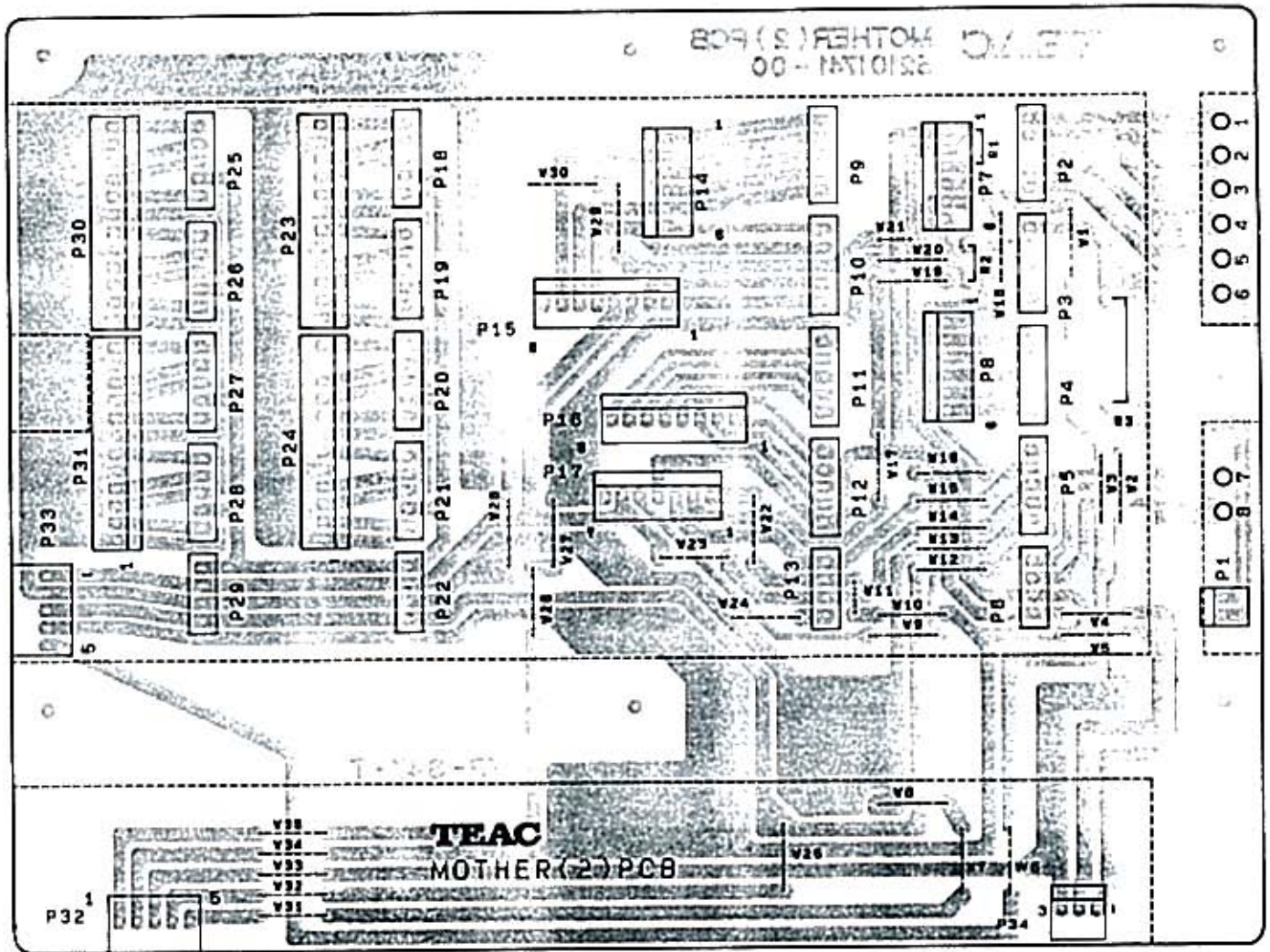
3-1. REC/PLAY AMP PCB ASSY



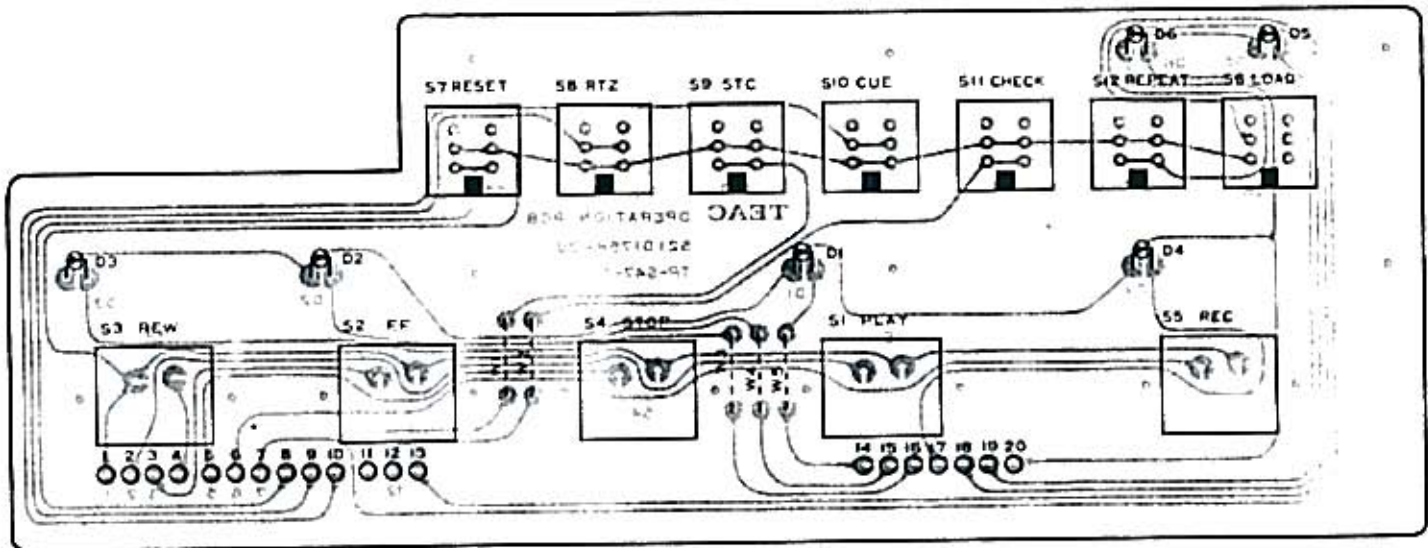
3-2. DBX PCB ASSY



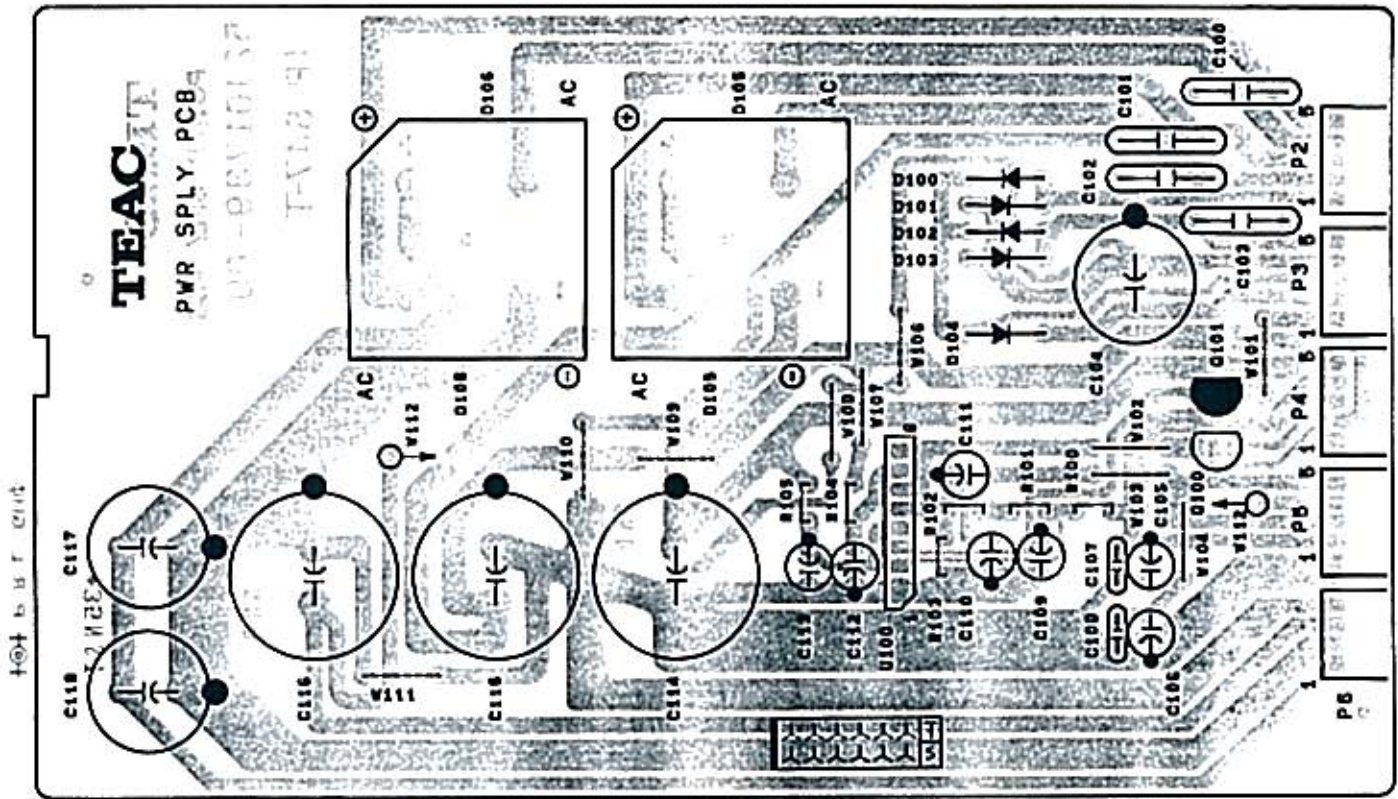
3-22. MOTHER PCB ASSY (2)



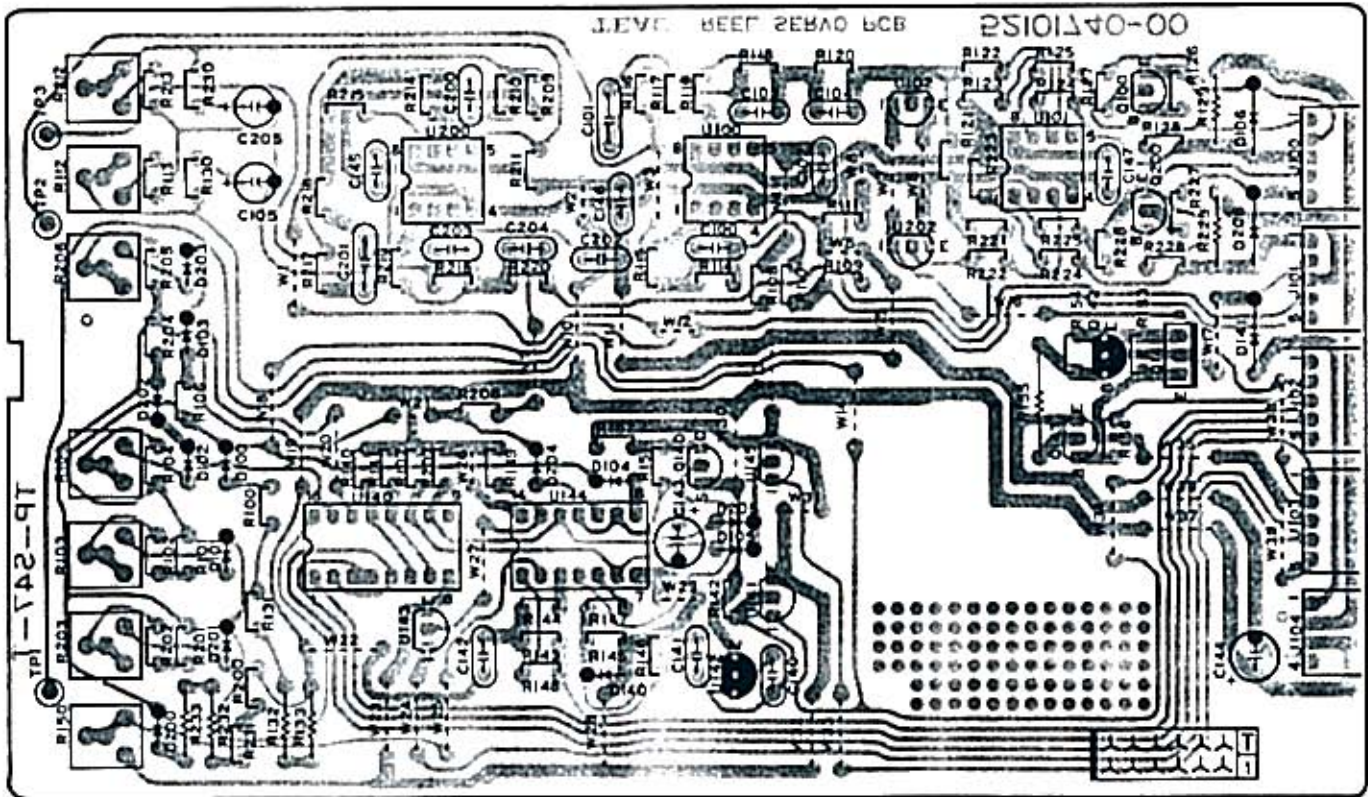
3-23. OPERATION PCB ASSY



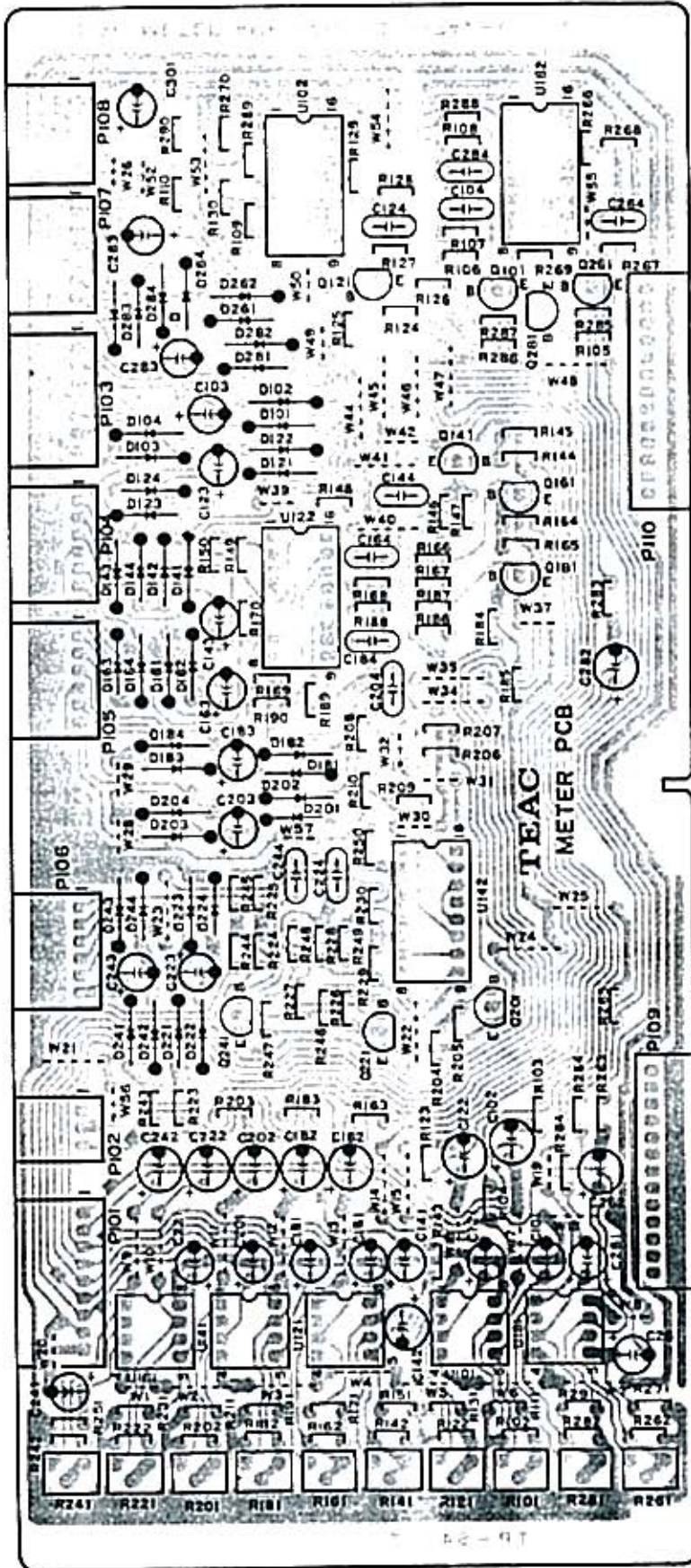
3-24. PWR SPLY PCB ASSY



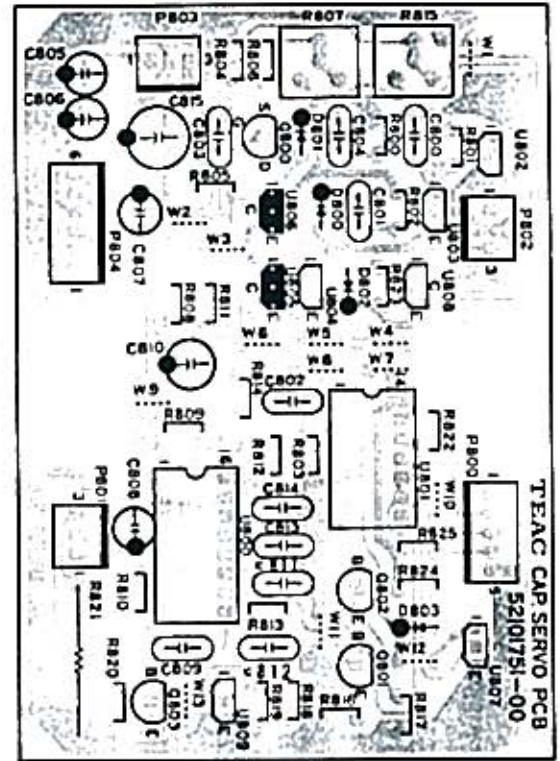
3-25. REEL SERVO PCB ASSY



3-26. METER AMP PCB ASSY

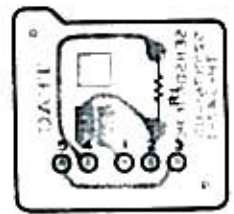
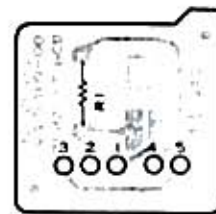


3-27. CAP SERVO PCB ASSY



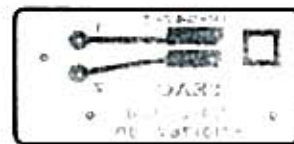
3-28. SENSOR PCB ASSY (L)

3-29. SENSOR PCB ASSY (R)



3-30. LED PCB ASSY (L)

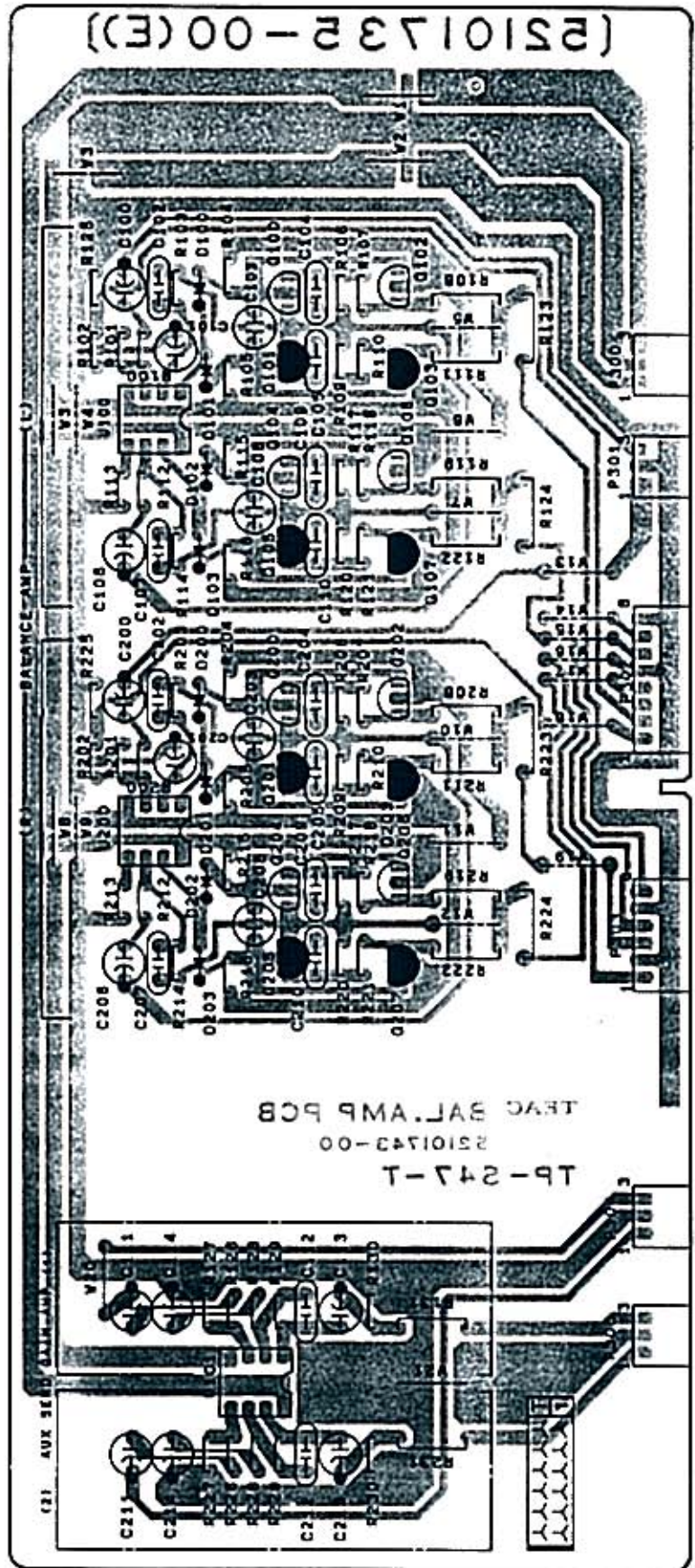
3-31. LED PCB ASSY (R)



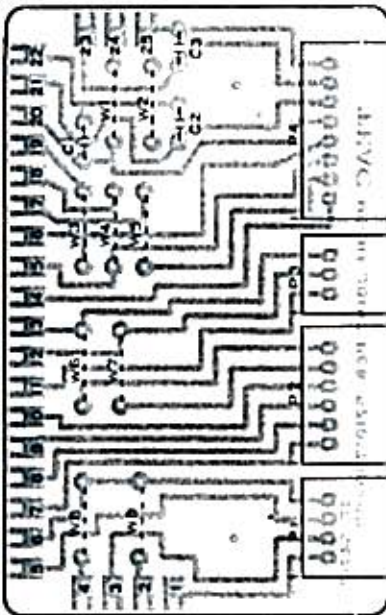
3-32. PHONE JACK PCB ASSY



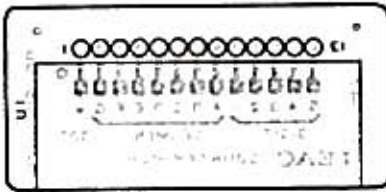
3-34. BAL. PCB ASSY



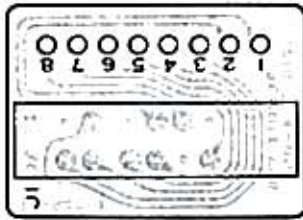
3-33. MECHANISM JOINT PCB ASSY



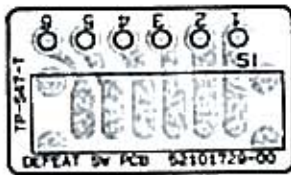
3-35. COUNTER PCB ASSY



3-36. REMOTE PCB ASSY



3-37. DEFEAT SW PCB ASSY



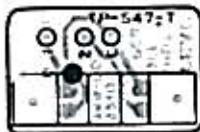
3-38. P.G PCB ASSY



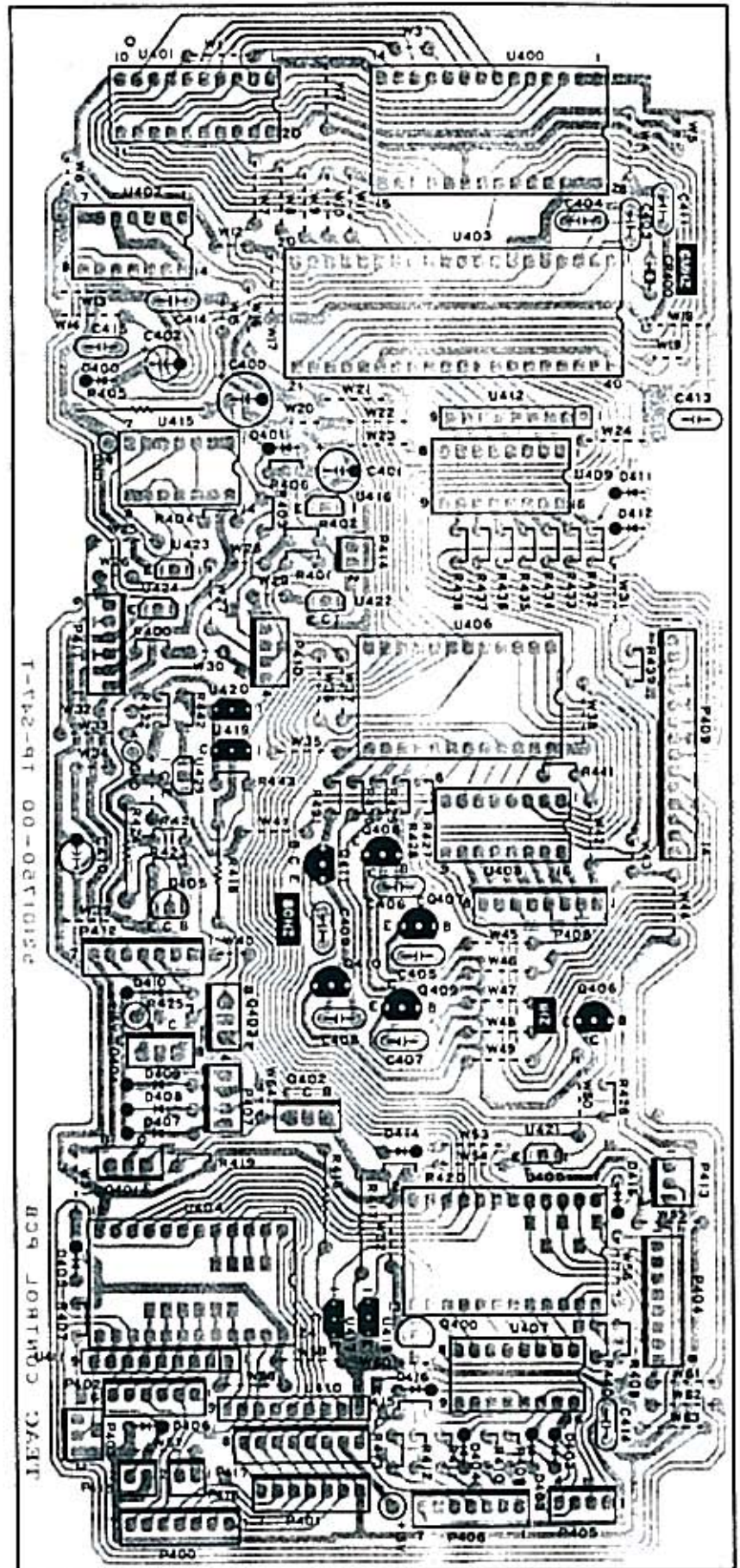
3-39. BALANCE SW PCB ASSY



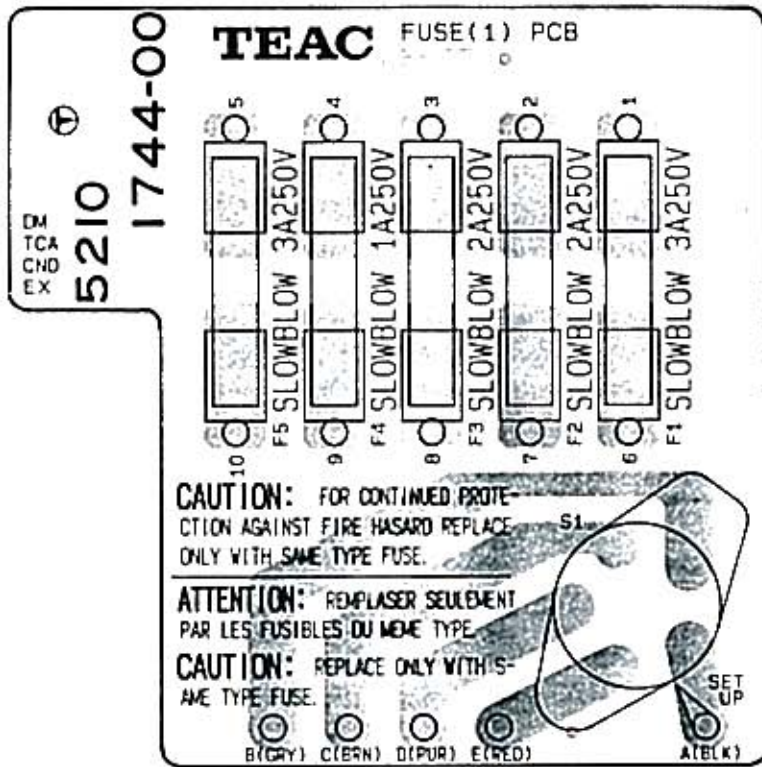
3-40. SHUT OFF PCB ASSY



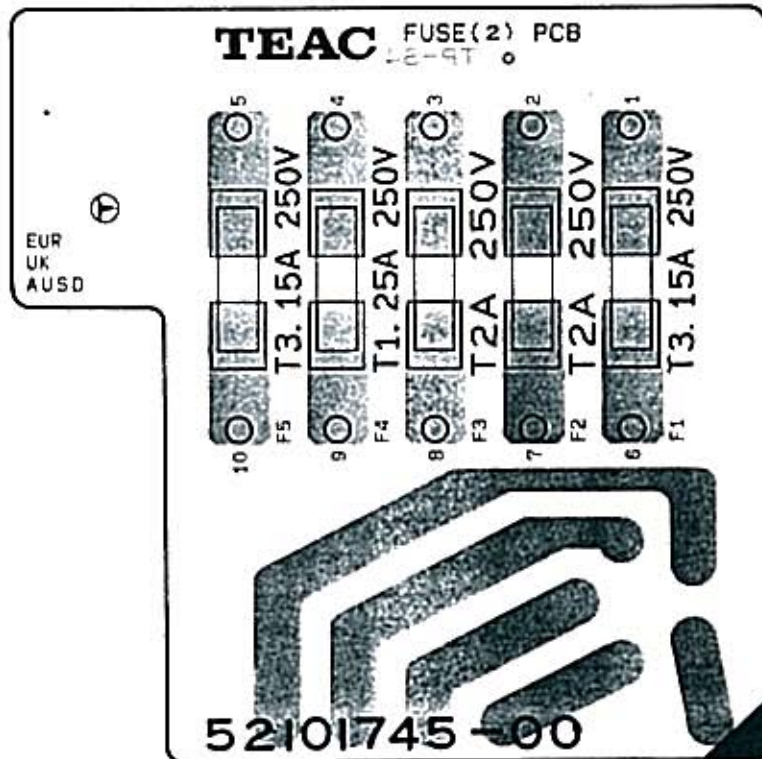
3-41. CONTROL PCB ASSY



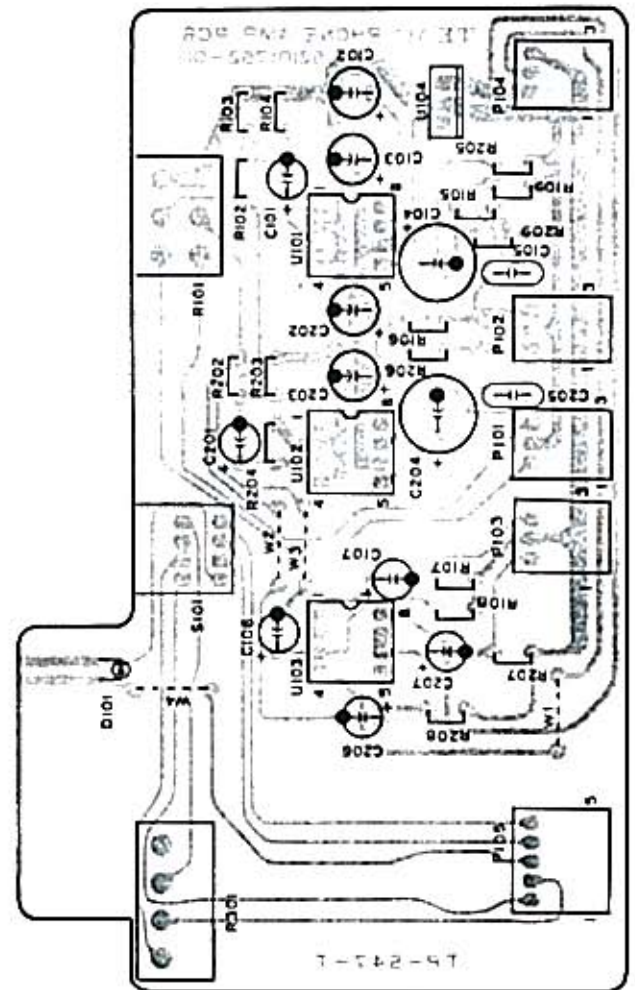
3-47. FUSE PCB ASSY (1)



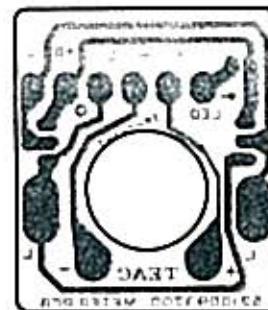
3-48. FUSE PCB ASSY (2)



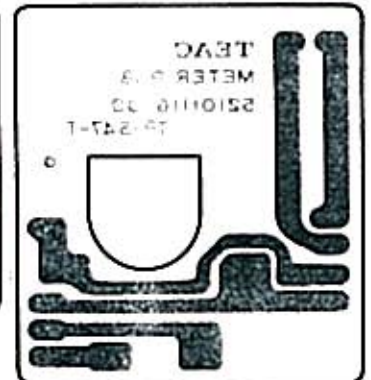
3-49. PHONE AMP PCB ASSY



METER PCB



METER PCB



REC/PLAY PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176900	REC/PLAY PCB ASSY
	*5210176900	REC/PLAY PCB
C101 C201	5263107620	C.,POLY. 20PF 100V J VT
C102 C202	5263101320	C.,POLY. 0.0022UF 100V J
C103 C203	5263106620	C.,POLY. 330PF 100V J VT
C104 C204	5263100920	C.,POLY. 0.0015UF/100V
C105 C205	5172204000	C.,CERAMIC 22PF/50V T
C106 C206	5172204000	C.,CERAMIC 22PF/50V T
C107 C207	5260065850	C.,ELEC. 2.2UF 50V M SMBP
C108 C208	5263106420	C.,POLY. 270PF 100V J VT
C109 C209	5263103120	C.,POLY. 0.012UF 100V J
C110 C210	5260165952	C.,ELEC. 100UF/10V M USM
C111 C211	5260066550	C.,ELEC. 4.7UF 35V M SMBP
C112 C212	5260066550	C.,ELEC. 4.7UF 35V M SMBP
C113 C213	5263107620	C.,POLY. 820PF 100V J VT
C114 C214	5260065650	C.,ELEC. 1.0UF50V M SMBP
C115 C215	5260066550	C.,ELEC. 4.7UF 35V M SMBP
C116 C216	5263168123	C.,METAL 0.15UF/50V J VT
C117 C217	5263103320	C.,POLY. 0.015UF 100V J
C118 C218	5260067050	C.,ELEC. 10UF 16V
C119 C219	5263101520	C.,POLY. 0.0027UF 100V
C120 C220	5263107620	C.,POLY. 820PF 100V J VT
C121 C221	5260162650	C.,ELEC. 10UF25V M SM VT
C122 C222	5260162550	C.,ELEC.10UF 16V
C123 C223	5171912000	C.,ELEC. 0.22UF 50V M
C124 C224	5260163452	C.,ELEC. 22UF 25V
C125 C225	5260065650	C.,ELEC. 1.0UF50V M SMBP
C126 C226	5260066550	C.,ELEC. 4.7UF 35V M SMBP
C127 C227	5260066550	C.,ELEC. 4.7UF 35V M SMBP
C301 C401	5173435000	C.,CERAMIC 0.047UF 50V Z
C302 C402	5173054800	C.,ELEC.220UF 16V USM F
C303 C403	5173054800	C.,ELEC.220UF 16V USM F
C304 C404	5173435000	C.,CERAMIC 0.047UF 50V Z
C305 C405	5260165252	C.,ELEC.47UF/25V M USM VT
C306 C406	5260165252	C.,ELEC.47UF/25V M USM VT
C501 C601	5263102920	C.,POLY. 0.010UF 100V J
C503 C603	5263167023	C.,METAL 0.018UF/50V J VT
C504 C604	5260066550	C.,ELEC. 4.7UF 35V M SMBP
C505 C605	5263101520	C.,POLYPRO 0.0027UF
D101 D201	5224015020	DIODE,1S5133T-77
D102 D202	5224015020	DIODE,1S5133T-77
D103 D203	5224540901	DIODE,ZENER RD6.2E2 FR
D104 D204	5224015020	DIODE,1S5133T-77
D105 D205	5224015020	DIODE,1S5133T-77
D106 D206	5224015020	DIODE,1S5133T-77
D107 D207	5224015020	DIODE,1S5133T-77
D108 D208	5224015020	DIODE,1S5133T-77
D109 D209	5224015020	DIODE,1S5133T-77
D110 D210	5224015020	DIODE,1S5133T-77
D111 D211	5224539301	DIODE,ZENER RD3.6E2 FR
D112 D212	5224015020	DIODE,1S5133T-77
D113 D213	5224540901	DIODE,ZENER RD6.2E2 FR
D114 D214	5224015020	DIODE,1S5133T-77
J101 J201	5122377000	CONNECTOR,SOCKET 3024-06A
J102 J202	5122375000	CONNECTOR,SOCKET 3024-04A
J103 J203	5122377000	CONNECTOR,SOCKET 3024-06A
J104 J204	5122378000	CONNECTOR,SOCKET 3024-07A
J105	5122375000	CONNECTOR,SOCKET 3024-04A
K101 K201	5290009800	RELAY,RPIA24 DC24V
K102 K202	5290010400	RELAY,MR62-24S 24V
L101 L201	5286021100*	COIL,CHOKE 1200UH M VR
L102 L202	5160044000	COIL,TRAP.3MH
L103 L203	5286023900	COIL,REC EQ
L104 L204	5160044000	COIL,TRAP.3MH
L501 L601	5056665000	COIL,CHOKE 23MH

REF. NO.	PARTS NO.	DESCRIPTION
Q101 Q201	5232008600	FET,2SK389BL
Q102 Q202	5230779520	SI.TR.25C1815GR 0.4 80
Q103 Q203	5145149000	SI.TR.25A-970GR 0.3 100
Q104 Q204	5145149000	SI.TR.25A-970GR 0.3 100
Q105 Q205	5230779520	SI.TR.25C1815GR 0.4 80
Q106 Q206	5230779520	SI.TR.25C1815GR 0.4 80
Q107 Q207	5145150000	SI.TR.25A-1015GR 0.4 80
Q108 Q208	5145185000	SI.TR.25D-655E 0.5 250
Q109 Q209	5230779720	SI.TR.25C945A KA 0.25 250
Q110 Q210	5230779720	SI.TR.25C945A KA 0.25 250
Q111 Q211	5230779720	SI.TR.25C945A KA 0.25 250
Q112 Q212	5230779720	SI.TR.25C945A KA 0.25 250
Q113 Q213	5230779720	SI.TR.25C945A KA 0.25 250
Q114 Q214	5145185000	SI.TR.25D-655E 0.5 250
Q115 Q215	5230779720	SI.TR.25C945A KA 0.25 250
Q116 Q216	5145149000	SI.TR.25A-970GR 0.3 100
R101 R201	5240023420	R.,CARBON 10 OHM
R102 R202	5240030820	R.,CARBON R20 12K J FT
R103 R203	5240028220	R.,CARBON R20 1.0K J FT
R104 R204	5240028220	R.,CARBON R20 1.0K J FT
R105 R205	5240025420	R.,CARBON R20 68 J FT
R106 R206	5240027020	R.,CARBON R20 330 J FT
R107 R207	5240027020	R.,CARBON R20 330 J FT
R108 R208	5240028620	R.,CARBON R20 1.5K J FT
R109 R209	5240026020	R.,CARBON R20 120 J FT
R110 R210	5240030420	R.,CARBON R20 8.2K J FT
R111 R211	5240028020	R.,CARBON R20 820 J FT
R112 R212	5240025420	R.,CARBON R20 68 J FT
R113 R213	5240025420	R.,CARBON R20 68 J FT
R114 R214	5240028620	R.,CARBON R20 1.5K J FT
R115 R215	5240029220	R.,CARBON R20 2.7K J FT
R116 R216	5240028820	R.,CARBON R20 1.8K J FT
R117 R217	5240030420	R.,CARBON R20 8.2K J FT
R118 R218	5240024620	R.,CARBON R20 33 J FT
R119 R219	5240024620	R.,CARBON R20 33 J FT
R120 R220	5240030620	R.,CARBON R20 10K J FT
R121 R221	5240031820	R.,CARBON R20 33K J FT
R122 R222	5240033920	R.,CARBON R20 240K J FT
R123 R223	5240028020	R.,CARBON R20 820 J FT
R124 R224	5150154000	R.,TRIMMER 10KB
R125 R225	5240029420	R.,CARBON R20 3.3K J FT
R126 R226	5240029820	R.,CARBON R20 4.7K J FT
R127 R227	5240031020	R.,CARBON R20 15K J FT
R128 R228	5150154000	R.,TRIMMER 10KB
R129 R229	5240028220	R.,CARBON R20 1.0K J FT
R130 R230	5240033020	R.,CARBON R20 100K J FT
R131 R231	5240027620	R.,CARBON R20 560 J FT
R132 R232	5240030820	R.,CARBON R20 12K J FT
R133 R233	5240028220	R.,CARBON R20 1.0K J FT
R134 R234	5240028220	R.,CARBON R20 1.0K J FT
R135 R235	5240029820	R.,CARBON R20 4.7K J FT
R136 R236	5240030620	R.,CARBON R20 10K J FT
R137 R237	5240033020	R.,CARBON R20 100K J FT
R138 R238	5240025220	R.,CARBON R20 56 J FT
R139 R239	5240032220	R.,CARBON R20 47K J FT
R140 R240	5240031820	R.,CARBON R20 33K J FT
R141 R241	5240031220	R.,CARBON R20 18K J FT
R142 R242	5240032220	R.,CARBON R20 47K J FT
R143 R243	5150156000	VR,50KB
R144 R244	5240028220	R.,CARBON R20 1.0K J FT
R145 R245	5240033020	R.,CARBON R20 100K J FT
R146 R246	5240028420	R.,CARBON R20 1.2K J FT
R147 R247	5240031420	R.,CARBON R20 22K J FT
R148 R248	5240033020	R.,CARBON R20 100K J FT
R149 R249	5240026620	R.,CARBON R20 220 J FT

DBX PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
R150 R250	5240028620	R., CARBON R20 1.5K J FT
R151 R251	5240033020	R., CARBON R20 100K J FT
R152 R252	5240031820	R., CARBON R20 33K J FT
R153 R253	5240026620	R., CARBON R20 220 J FT
R154 R254	5240029820	R., CARBON R20 4.7K J FT
R155 R255	5240031620	R., CARBON R20 27K J FT
R156 R256	5240031020	R., CARBON R20 15K J FT
R157 R257	5240030020	R., CARBON R20 5.6K J FT
R158 R258	5240032020	R., CARBON R20 39K J FT
R159 R259	5240032220	R., CARBON R20 47K J FT
R160 R260	5240026620	R., CARBON R20 220 J FT
R161 R261	5240026620	R., CARBON R20 220 J FT
R162 R262	5240030620	R., CARBON R20 20K J FT
R163 R263	5240032220	R., CARBON R20 47K J FT
R164 R264	5240031020	R., CARBON R20 15K J FT
R165 R265	5240031620	R., CARBON R20 27K J FT
R166 R266	5240031620	R., CARBON R20 27K J FT
R167 R267	5240029820	R., CARBON R20 4.7K J FT
R168 R268	5240030420	R., CARBON R20 8.2K J FT
R169 R269	5240031220	R., CARBON R20 18K J FT
R170 R270	5240030620	R., CARBON R20 10K J FT
R171 R271	5240028220	R., CARBON R20 1.0K J FT
R172 R272	5240033020	R., CARBON R20 100K J FT
R173 R273	5240030620	R., CARBON R20 10K J FT
R174 R274	5181516000	R., CARBON R25 27K J
R175 R275	5240029820	R., CARBON R20 4.7K J FT
R176 R276	5240032220	R., CARBON R20 47K J FT
R177 R277	5240030620	R., CARBON R20 10K J FT
R178 R278	5240032220	R., CARBON R20 47K J FT
R179 R279	5240031620	R., CARBON R20 27K J FT
R180 R280	5240032220	R., CARBON R20 47K J FT
R181 R281	5240029020	R., CARBON R20 2.2K J FT
R182 R282	5240029420	R., CARBON R20 3.3K J FT
R183 R283	5240031420	R., CARBON R20 22K J FT
R184 R284	5240032220	C., CARBON R20 47K J FT
R185 R285	5240025820	R., CARBON R20 100 J FT
R301 R401	△ 5183578000	R., INCOMBUSTIBLE 1/4W 100
R302 R402	△ 5183578000	R., INCOMBUSTIBLE 1/4W 100
R303 R403	△ 5183586000	R., INCOMBUSTIBLE 220 F25
R304 R404	△ 5183586000	R., INCOMBUSTIBLE 220 F25
R501 R601	5240034020	R., CARBON R20 270K J FT
R502 R602	5240032220	R., CARBON R20 47K J FT
R503 R603	5240030620	R., CARBON R20 10K J FT
R504 R604	5240025820	R., CARBON R20 100 J FT
R505 R605	5240032220	R., CARBON R20 47K J FT
R506 R606	5240032220	R., CARBON R20 47K J FT
R507 R607	5150157000	R. TRIMMER 100KB, TT14R
R508 R608	5150157000	R. TRIMMER 100KB, TT14R
R509 R609	5240025820	R., CARBON R20 100 J FT
R510 R610	5240028620	R., CARBON R20 1.5K J FT
U101 U201	5220416700	IC, NJM2043DD
U102 U202	5220416700	IC, NJM2043DD
U103 U203	5147064000	IC, NJM4559DD
U104 U204	5220019000	IC, TC4001BP
U105 U205	5292803300	FILTER, LOWPASS 19KHZ

REF. NO.	PARTS NO.	DESCRIPTION
	*5200177000	DBX PCB ASSY
	*5210177000	DBX PCB
C101 C201	5260162750	C., ELEC. 10UF 35V M SM VT
C102 C202	5263168023	C., METALIZED 0.12UF 50V J
C103 C203	5263168023	C., METALIZED 0.12UF 50V J
C104 C204	5263169113	C., METALIZED 1.0UF 50V J
C105 C205	5263106120	C., POLY. 200PF 100V J VT
C106 C206	5263102920	C., POLY. 0.010UF 100V J VT
C107 C207	5263105420	C., POLY. 100PF 100V J VT
C108 C208	5263105420	C., POLY. 100PF 100V J VT
C109 C209	5263102920	C., POLY. 0.010UF 100V J VT
C110 C210	5260162750	C., ELEC. 10UF 35V M SM VT
C111 C211	5263167723	C., METALIZED 0.068UF 50V
C112 C212	5263167723	C., METALIZED 0.068UF 50V
C113 C213	5263101720	C., POLY. 0.0033UF 100V J
C114 C214	5263101720	C., POLY. 0.0033UF 100V J
C115 C215	5263107220	C., POLY. 560PF 100V J
C116 C216	5263168023	C., METALIZED 0.12UF 50V J
C117 C217	5263101720	C., POLY. 0.0033UF 100V J
C118 C218	5260160750	C., ELEC. 1UF50V SM T-N
C119 C219	5260227050	C., ELEC. 10UF 35V K LL VT
C120 C220	5260162550	C., ELEC. 10UF 16V M SM VT
C121	5260165252	C., ELEC. 47UF 25V M USM
C122	5260165252	C., ELEC. 47UF/25V M USM VT
C123 C223	5260161550	C., ELEC. 3.3UF 35V
C301 C401	5260162750	C., ELEC. 10UF 35V M SM VT
C302 C402	5263168023	C., METALIZED 0.12UF 50V J
C303 C403	5263168023	C., METALIZED 0.12UF 50V J
C304 C404	5263169113	C., METALIZED 1.0UF 50V J
C305 C405	5263106120	C., POLY. 200PF 100V J VT
C306 C406	5263102920	C., POLY. 0.010UF 100V J VT
C307 C407	5263105420	C., POLY. 100PF 100V J VT
C308 C408	5263105420	C., POLY. 100PF 100V J VT
C309 C409	5263102920	C., POLY. 0.010UF 100V J VT
C310 C410	5260162750	C., ELEC. 10UF 35V M SM VT
C311 C411	5263167723	C., METALIZED 0.068UF 50V
C312 C412	5263167723	C., METALIZED 0.068UF 50V
C313 C413	5263101720	C., POLY. 0.0033UF 100V J
C314 C414	5263101720	C., POLY. 0.0033UF 100V J
C315 C415	5263107220	C., POLY. 560PF 100V J
C316 C416	5263168023	C., METALIZED 0.12UF 50V J
C317 C417	5263101720	C., POLY. 0.0033UF 100V J
C318 C418	5260160750	C., ELEC. 1UF50V SM T-N
C319 C419	5260227050	C., ELEC. 10UF 35V K LL VT
C320 C420	5260162550	C., ELEC. 10UF 16V M SM VT
C323 C423	5260161550	C., ELEC. 3.3UF 35V
D101 D201	5224015020	DIODE, 1SS133T-77
D301 D401	5224015020	DIODE, 1SS133T-77
J110	5122377000	CONNECTOR, SOCKET 3024-06A
J111	5122375000	CONNECTOR, SOCKET 3024-04A
J112	5122375000	CONNECTOR, SOCKET 3024-04A
J210	5122377000	CONNECTOR, SOCKET 3024-06A
J211	5122378000	CONNECTOR, SOCKET 3024-07A
J310	5122377000	CONNECTOR, SOCKET 3024-06A
J311	5122375000	CONNECTOR, SOCKET 3024-04A
J410	5122377000	CONNECTOR, SOCKET 3024-06A
J411	5122378000	CONNECTOR, SOCKET 3024-07A
Q101 Q201	5230778320	SI. TR. 2SC2320F 0.3 200
Q102 Q202	5230778320	SI. TR. 2SC2320F 0.3 200
Q103 Q203	5232007300	FET, 2SK-364V
Q104 Q204	5230775000	SI. TR. 2SC2878-B 0.4 30
Q105 Q205	5230775000	SI. TR. 2SC2878-B 0.4 30
Q106 Q206	5230775000	SI. TR. 2SC2878-B 0.4 30
Q107 Q207	5230775000	SI. TR. 2SC2878-B 0.4 30
Q108 Q208	5230775000	SI. TR. 2SC2878-B 0.4 30

REF. NO.	PARTS NO.	DESCRIPTION
Q109 Q209	5230775000	SI,TR.25C2878-B 0.4 30
Q110 Q210	5230775000	SI,TR.25C2878-B 0.4 30
Q111 Q211	5230775000	SI,TR.25C2878-B 0.4 30
Q112	5230016620	SI,TR.25A999F 0.3 200
Q113	5230016620	SI,TR.25A999F 0.3 200
Q114 Q214	5230016620	SI,TR.25A999F 0.3 200
Q115 Q215	5230016620	SI,TR.25A999F 0.3 200
Q301 Q401	5230778320	SI,TR.25C2320F 0.3 200
Q302 Q402	5230778320	SI,TR.25C2320F 0.3 200
Q303 Q403	5232007300	FET,25K-364V
Q304 Q404	5230775000	SI,TR.25C2878-B 0.4 30
Q305 Q405	5230775000	SI,TR.25C2878-B 0.4 30
Q306 Q406	5230775000	SI,TR.25C2878-B 0.4 30
Q307 Q407	5230775000	SI,TR.25C2878-B 0.4 30
Q308 Q408	5230775000	SI,TR.25C2878-B 0.4 30
Q309 Q409	5230775000	SI,TR.25C2878-B 0.4 30
Q310 Q410	5230775000	SI,TR.25C2878-B 0.4 30
Q311 Q411	5230775000	SI,TR.25C2878-B 0.4 30
Q312	5230016620	SI,TR.25A999F 0.3 200
Q313	5230016620	SI,TR.25A999F 0.3 200
Q314 Q414	5230016620	SI,TR.25A999F 0.3 200
Q315 Q415	5230016620	SI,TR.25A999F 0.3 200
R101 R201	5240033220	R.,CARBON R20 120K J FT
R102 R202	5240025820	R.,CARBON R20 100 J FT
R103 R203	5240031920	R.,CARBON R20 36K J FT
R104 R204	5240030020	R.,CARBON R20 5.6K J FT
R105 R205	5240031820	R.,CARBON R20 33K J FT
R106 R206	5240030620	R.,CARBON R20 10K J FT
R107 R207	5150156000	VR,50KB
R108 R208	5150156000	VR,50K2
R109 R209	5240030820	R.,CARBON R20 12K J FT
R110 R210	5240030820	R.,CARBON R20 12K J FT
R111 R211	5240024220	R.,CARBON R20 22 J FT
R112 R212	5240024220	R.,CARBON R20 22 J FT
R113 R213	5240024220	R.,CARBON R20 22 J FT
R114 R214	5240024420	R.,CARBON R20 27 J FT
R115 R215	5240029620	R.,CARBON R20 3.9K J FT
R116 R216	5240030620	R.,CARBON R20 10K J FT
R117 R217	5240032420	R.,CARBON R20 56K J FT
R118 R218	5150094000	R.TRIMMER 50KB,TT14R A400
R119 R219	5240030620	R.,CARBON R20 10K J FT
R120 R220	5240031820	R.,CARBON R20 33K J FT
R121 R221	5240025820	R.,CARBON R20 100 J FT
R122 R222	5240033020	R.,CARBON R20 100K J FT
R123 R223	5240032520	R.,CARBON R20 62K J FT
R124 R224	5240033820	R.,CARBON R20 220K J FT
R125 R225	5240029020	R.,CARBON R20 2.2K J FT
R126 R226	5240029220	R.,CARBON R20 2.7K J FT
R127 R227	5240030220	R.,CARBON R20 6.8K J FT
R128 R228	5240025820	R.,CARBON R20 100 J FT
R129 R229	5240029820	R.,CARBON R20 4.7K J FT
R130 R230	5240031520	R.,CARBON R20 24K J FT
R131 R231	5240029220	R.,CARBON R20 2.7K J FT
R132 R232	5181568000	R.,CARBON R25 10M J FT
R133 R233	5181568000	R.,CARBON R25 10M J FT
R134 R234	5240034620	R.,CARBON R20 470K J FT
R135 R235	5150094000	R.TRIMMER 50KB,TT14R A400
R136 R236	5240031420	R.,CARBON R20 22K J FT
R137 R237	5240032020	R.,CARBON R20 39K J FT
R138 R238	5240024220	R.,CARBON R20 22 J FT
R139 R239	5240023420	R.,CARBON R20 10 J FT
R140 R240	5240035420	R.,CARBON R20 1.0M J FT
R141 R241	5240035120	R.,CARBON R20 750K J FT
R142 R242	5240028220	R.,CARBON R20 1.0K J FT
R143 R243	5240173000	R.,CARBON R25 100K J

REF. NO.	PARTS NO.	DESCRIPTION
R144 R244	5240173000	R.,CARBON R25 100K J
R151	5240032220	R.,CARBON R20 47K J FT
R152	5240030620	R.,CARBON R20 10K J FT
R153	5240029820	R.,CARBON R20 4.7K J FT
R154	5240033020	R.,CARBON R20 100K J FT
R155	5240029820	R.,CARBON R20 4.7K J FT
R156 R256	5240032220	R.,CARBON R20 47K J FT
R157 R257	5240030620	R.,CARBON R20 10K J FT
R158 R258	5240029820	R.,CARBON R20 4.7K J FT
R159 R259	5240033020	R.,CARBON R20 100K J FT
R160 R260	5240029820	R.,CARBON R20 4.7K J FT
R161 R261	5240033220	R.,CARBON R20 120K J FT
R168 R268	5240032220	R.,CARBON R20 47K J FT
R169 R269	5240032220	R.,CARBON R20 47K J FT
R170 R270	5240032220	R.,CARBON R20 47K J FT
R171 R271	5240032220	R.,CARBON R20 47K J FT
R172 R272	5240033020	R.,CARBON R20 100K J FT
R173 R273	5240033020	R.,CARBON R20 100K J FT
R174 R274	5240032220	R.,CARBON R20 47K J FT
R175 R275	5240032220	R.,CARBON R20 47K J FT
R301 R401	5240033220	R.,CARBON R20 120K
R302 R402	5240025820	R.,CARBON R20 100 J FT
R303 R403	5240031920	R.,CARBON R20 36K J FT
R304 R404	5240030020	R.,CARBON R20 5.6K J FT
R305 R405	5240031820	R.,CARBON R20 33K J FT
R306 R406	5240030620	R.,CARBON R20 10K J FT
R307 R407	5150156000	VR,50KB
R308 R408	5150156000	VR,50KB
R309 R409	5240030820	R.,CARBON R20 12K J FT
R310 R410	5240030820	R.,CARBON R20 12K J FT
R311 R411	5240024220	R.,CARBON R20 22 J FT
R312 R412	5240024220	R.,CARBON R20 22 J FT
R313 R413	5240024220	R.,CARBON R20 22 J FT
R314 R414	5240024420	R.,CARBON R20 27 J FT
R315 R415	5240029620	R.,CARBON R20 3.9K J FT
R316 R416	5240030620	R.,CARBON R20 10K J FT
R317 R417	5240032420	R.,CARBON R20 56K J FT
R318 R418	5150094000	R.TRIMMER 50KB,TT14R A400
R319 R419	5240030620	R.,CARBON R20 10K J FT
R320 R420	5240031820	R.,CARBON R20 33K J FT
R321 R421	5240025820	R.,CARBON R20 100 J FT
R322 R422	5240033020	R.,CARBON R20 100K J FT
R323 R423	5240032520	R.,CARBON R20 62K J FT
R324 R424	5240033820	R.,CARBON R20 220K J FT
R325 R425	5240029020	R.,CARBON R20 2.2K J FT
R326 R426	5240029220	R.,CARBON R20 2.7K J FT
R327 R427	5240030220	R.,CARBON R20 6.8K J FT
R328 R428	5240025820	R.,CARBON R20 100 J FT
R329 R429	5240029820	R.,CARBON R20 4.7K J FT
R330 R430	5240031520	R.,CARBON R20 24K J FT
R331 R431	5240029220	R.,CARBON R20 2.7K J FT
R332 R432	5181568000	R.,CARBON R25 10M J FT
R333 R433	5181568000	R.,CARBON R25 10M J FT
R334 R434	5240034620	R.,CARBON R20 470K J FT
R335 R435	5150094000	R.TRIMMER 50KB,TT14R A400
R336 R436	5240031420	R.,CARBON R20 22K J FT
R337 R437	5240032020	R.,CARBON R20 39K J FT
R338 R438	5240024220	R.,CARBON R20 22 J FT
R339 R439	5240023420	R.,CARBON R20 10 J FT
R340 R440	5240035420	R.,CARBON R20 1.0M J FT
R342 R442	5240035120	R.,CARBON R20 750K J FT
R342 R442	5240028220	R.,CARBON R20 1.0K J FT
R343 R443	5240173000	R.,CARBON R25 100K J
R344 R444	5240173000	R.,CARBON R25 100K J
R351	5240032220	R.,CARBON R20 47K J FT

REF. NO.	PARTS NO.	DESCRIPTION
R352	5240030620	R.,CARBON R20 10K J FT
R353	5240029820	R.,CARBON R20 4.7K J FT
R354	5240033020	R.,CARBON R20 100K J FT
R355	5240029820	R.,CARBON R20 4.7K J FT
R356 R456	5240032220	R.,CARBON R20 47K J FT
R357 R457	5240030620	R.,CARBON R20 10K J FT
R358 R458	5240029820	R.,CARBON R20 4.7K J FT
R359 R459	5240033020	R.,CARBON R20 100K J FT
R360 R460	5240029820	R.,CARBON R20 4.7K J FT
R361 R461	5240033220	R.,CARBON R20 120K J FT
R368 R468	5240032220	R.,CARBON R20 47K J FT
R369 R469	5240032220	R.,CARBON R20 47K J FT
R370 R470	5240032220	R.,CARBON R20 47K J FT
R371 R471	5240032220	R.,CARBON R20 47K J FT
R372 R472	5240033020	R.,CARBON R20 100K J FT
R373 R473	5240033020	R.,CARBON R20 100K J FT
R374 R474	5240032220	R.,CARBON R20 47K J FT
R375 R475	5240032220	R.,CARBON R20 47K J FT
U101 U201	5220414501	IC,UPC1252H2,
U102 U202	5220414601	IC,UPC1253H2,
U103 U303	5220418800	IC,M5218P
U104 U204	5220036200	IC,LC4966,
U105 U305	5220036200	IC,LC4966,
U301 U401	5220414501	IC,UPC1252H2,
U302 U402	5220414601	IC,UPC1253H2,
U304 U404	5220036200	IC,LC4966,

MONITOR PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200173800	MONITOR PCB ASSY
	*5210173800	MONITOR PCB
C101 C102	5260162750	C.,ELEC. 10UF 35V M SM VT
C103	5260162550	C.,ELEC. 10MF 16V
C110 C210	5260163552	C.,ELEC. 22MF/35V M USM V
C111 C211	5260163552	C.,ELEC. 22MF/35V M USM V
C112 C212	5260163552	C.,ELEC. 22MF/35V M USM V
C113 C213	5260163552	C.,ELEC. 22MF/35V M USM V
C114 C214	5260163552	C.,ELEC. 22MF/35V M USM V
C115 C215	5260163552	C.,ELEC. 22MF/35V M USM V
C116 C216	5260163552	C.,ELEC. 22MF/35V M USM V
C117 C217	5260163552	C.,ELEC. 22MF/35V M USM V
C118 C218	5260163552	C.,ELEC. 22MF/35V M USM V
C119 C219	5172204000	C.,CERAMIC 22PF/50V T
C120 C220	5172204000	C.,CERAMIC 22PF/50V T
C121 C221	5172204000	C.,CERAMIC 22PF/50V T
C122 C222	5172204000	C.,CERAMIC 22PF/50V T
C123 C223	5172204000	C.,CERAMIC 22PF/50V T
C124 C224	5260163552	C.,ELEC. 22MF/35V M USM V
D101-D108	5224015020	DIODE,1SS133T-77
D109-D116	5224015020	DIODE,1SS133T-77
D117-D124	5224015020	DIODE,1SS133T-77
D125-D135	5225005400	LED,SLP135B (RED)
P101-D111	5122373000	CONNECTOR, SOCKET 3024-2AH
P112	5122455000	CONNECTOR, PLUG 5046-04A R
P113	5122147000	CONNECTOR, PLUG 5046-04A W
P114	5122146000	CONNECTOR, PLUG 3P 40-4
P115	5336164800	CONNECTOR SOCKET 1L-D-08S
P116	5122147000	CONNECTOR, PLUG 5046-04A W
P117	5122146000	CONNECTOR, PLUG 3P 40-4
P118	5122151000	CONNECTOR, PLUG 5046-08A W
P119	5122146000	CONNECTOR, PLUG 3P 40-4
P120	5122454000	CONNECTOR, PLUG 5046-03A R
P121	5122459000	CONNECTOR, PLUG 5046-08A R
P122	5122151000	CONNECTOR, PLUG 5046-08A W

REF. NO.	PARTS NO.	DESCRIPTION
P123	5122455000	CONNECTOR, PLUG 5046-04A R
P124	5336174300	CONNECTOR, PLUG 5046-03A Y
P125	5122456000	CONNECTOR, PLUG 5046-05A R
P126	5122205000	CONNECTOR, PLUG 5046-05A R
R101 R201	5282014600	151UVR 16, 10KA
R110 R210	5240031420	R.,CARBON R10 22K
R111 R211	5240031420	R.,CARBON R10 22K
R113 R213	5240032220	R.,CARBON R20 47K J FT
R114 R214	5240033220	R.,CARBON R10 120K
R116 R216	5240025820	R.,CARBON R20 100 J FT
R117 R217	5240033020	R.,CARBON R20 100K J FT
R121 R221	5240031420	R.,CARBON R10 22K
R124 R224	5240033020	R.,CARBON R20 100K J FT
R125 R225	5240029820	R.,CARBON R20 4.7K J FT
R126 R226	5240030720	R.,CARBON R20 11K J FT
R127 R227	5240030720	R.,CARBON R20 11K J FT
R128 R228	5240031420	R.,CARBON R10 22K
R129 R229	5240033020	R.,CARBON R20 100K J FT
R130 R230	5240031020	R.,CARBON R10 15K
R131 R231	5240030620	R.,CARBON R10 10K
R132 R232	5240033020	R.,CARBON R20 100K J FT
R133 R233	5240025820	R.,CARBON R20 100 J FT
R301	5240030620	R.,CARBON R10 10K
R302	5240027020	R.,CARBON R20 330 J FT
R303	5240027020	R.,CARBON R20 330 J FT
R304	5240027020	R.,CARBON R20 330 J FT
R305-R312	5240027020	R.,CARBON R20 330 J FT
R313-R320	5240032220	R.,CARBON R20 47K J FT
R321	5240032220	R.,CARBON R20 47K J FT
S101-S108	5300041300	PUSH SW 8 GANG SUE81
S109-S111	5300041100	PUSH SW 3 GANG SUE31
S112	5300041000	PUSH SW 4-2 SUE12
U101 U201	5220407000	IC,TLO72CP
U102 U202	5220407000	IC,TLO72CP
U103	5220407000	IC,TLO72CP
U301 U302	6048932000	IC,MC14011BCP
U303 U304	5232251620	SI.TR.25A1346 0.3 200

INPUT PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200173200	INPUT PCB ASSY
	*5210173200	INPUT PCB
C101 C102	5260163652	C.,ELEC. 22UF 50V M USM
C103 C104	5172212000	C.,CERAMIC 100PF/50V T
C105 C106	5260166052	C.,ELEC. 100MF/16V M USM
C107 C108	5172208000	C.,CERAMIC 47PF/50V T
C109	5263100520	C.,POLY., 0.0010UF 100V J
C110	5263105420	C.,POLY., 100PF 100V J VT
C111	5260072710	C.,ELEC. 470UF 16V M SMBP
C112	5263105420	C.,POLY. 100PF 100V J VT
C113	5260165252	C.,ELEC.47MF/25V M USM VT
C114	5172200000	C.,CERAMIC 10PF/50V T
C115 C116	5260165252	C.,ELEC.47MF/25V M USM VT
C117	5263101320	C.,POLY. 0.0022UF 100V J
C118	5260162750	C.,ELEC. 10UF 35V M SM VT
C119	5263104620	C.,POLY. 0.051UF 100V J
C120	5263167023	C.,METAL 0.018UF/50V J VT
C121	5263102120	C.,POLY. 0.0047UF 100V J
C122	5263101120	C.,POLY. 0.0018UF 100V J
C123 C124	5260162650	C.,ELEC. 10MF25V M SM VT

REF. NO.	PARTS NO.	DESCRIPTION
C125	5263167923	C.,METAL 0.1MF/50V J VT
C126 C127	5260162750	C.,ELEC. 10UF 35V M SM VT
C133	5173433000	C.,CERAMIC 0.010UF 50V Z
C135	5173433000	C.,CERAMIC 0.010UF 50V Z
C136	5260162550	C.,ELEC.10MF 16V
C137	5263107720	C.,POLY. 910PF 100V J VT
C138	5263106620	C.,POLY. 330PF 100V J VT
C139	5172200000	C.,CERAMIC 10PF/50V T
C140 C141	5172200000	C.,CERAMIC 10PF/50V T
C142 C143	5172200000	C.,CERAMIC 10PF/50V T
D101	5224015020	DIODE,1SS133T-77
D102	5225005400	LED,SLP135B (RED)
L101	5286021100	COIL,CHOKE 1200UH M VR
P101	5122150000	CONNECTOR,PLUG 5046-07A
P102	5122147000	CONNECTOR,PLUG 5046-04A W
P103	5122146000	CONNECTOR,PLUG 3P 40-4
P104	5336165100	CONNECTOR SOCKET IL-D-11S
P105	5336164800	CONNECTOR SOCKET IL-D-08S
P106	5122373000	CONNECTOR,SOCKET 3024-2AH
Q101 Q102	5145119000	SI.TR.25C-1844F 0.25 100
Q103 Q104	5230779520	SI.TR.25C1815GR 0.4 80
Q105	5230779520	SI.TR.25C1815GR 0.4 80
R102	5282014500	1S1UVR 16, 20KRD
R103 R104	5283505500	2S3UVR 16,100KEX2,10KB
R105	5283505500	2S3UVR 16,100KEX2,10KB
R107	5282410800	1S1UVR 16, 5KA,C
R108 R109	5282014600	1S1UVR 16, 10KA
R111	5240029120	R.,CARBON R20 2.4K
R117 R118	5240030620	R.,CARBON R10 10K
R119 R120	5240023420	R.,CARBON 10 OHM
R121 R122	△ 5183566000	R.,INCOMB.R25 1/4W 33 J
R123 R124	5240029820	R.,CARBON R20 4.7K J FT
R125 R126	5240028620	R.,CARBON R20 1.5K J FT
R127	5240028620	R.,CARBON R20 1.5K J FT
R128	5240029920	R.,CARBON R20 5.1K J FT
R129	5240025820	R.,CARBON R20 100 J FT
R130	5240031920	R.,CARBON R20 36K J FT
R131	Vacant	
R132	5240025220	R.,CARBON R20 56 J FT
R133	5240031920	R.,CARBON R20 36K J FT
R134	5240033020	R.,CARBON R20 100K J FT
R135	5240031420	R.,CARBON R20 22K J FT
R136	5240031420	R.,CARBON R10 22K
R137	5240030620	R.,CARBON R10 10K
R138	5240033020	R.,CARBON R20 100K J FT
R139	5240025820	R.,CARBON R20 100 J FT
R140	5240033020	R.,CARBON R20 100K J FT
R141	5240033020	R.,CARBON R20 100K J FT
R142	5240028220	R.,CARBON R20 1.0K J FT
R143	5240033020	R.,CARBON R20 100K J FT
R144 R145	5240030620	R.,CARBON R10 10K
R146 R147	5240029920	R.,CARBON R20 5.1K J FT
R148 R149	5240030620	R.,CARBON R10 10K
R150 R151	5240030720	R.,CARBON R20 11K J FT
R152	5240032220	R.,CARBON R20 47K J FT
R153	5240025820	R.,CARBON R20 100 J FT
R154	5240033020	R.,CARBON R20 100K J FT
R155	5240030420	R.,CARBON R20 8.2K J FT
R156	5240032220	R.,CARBON R20 47K J FT
R157	5240026220	R.,CARBON R20 150 J FT
R158	5240033020	R.,CARBON R20 100K J FT
R159	5240035420	R.,CARBON R20 1.0M J FT
R160	5240027020	R.,CARBON R20 330 J FT
R161	5240025820	R.,CARBON R20 100 J FT
R162	5240033020	R.,CARBON R20 100K J FT

REF. NO.	PARTS NO.	DESCRIPTION
R163	5240030620	R.,CARBON R10 10K
R164	5240031020	R.,CARBON R10 15K
R165	5240033020	R.,CARBON R20 100K J FT
R166 R167	5240031420	R.,CARBON R10 22K
R168 R169	5240031420	R.,CARBON R10 22K
R170 R171	5240031420	R.,CARBON R10 22K
R172 R173	5240031420	R.,CARBON R10 22K
R179 R184	5240031420	R.,CARBON R10 22K
R185 R186	5240031420	R.,CARBON R10 22K
R187 R188	5240030620	R.,CARBON R10 10K
R189 R190	5240030620	R.,CARBON R10 10K
R191 R192	5240031320	R.,CARBON R20 20K J FT
R193	5240030620	R.,CARBON R10 10K
S101	5300514200	LEVER SW SLK2N8C
S102	5300040900	PUSH SW 2-2 N SUE12
S103-S107	5300041200	PUSH SW 5 GANG SUE50
U101	5220407000	IC,TL072CP
U102	5220407000	IC,TL072CP
U103	5220407000	IC,TL072CP
U105	6048945000	IC,MCL4049UBCP
U106	5220407000	IC,TL072CP

BUSS A PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200173400	BUSS A PCB ASSY
	*5210173400	BUSS A PCB
C105 C205	5260164452	C.,ELEC. 33UF 35V M USM
C106 C206	5260163452	C.,ELEC. 22MF 25V
C305 C405	5260164452	C.,ELEC. 33UF 35V M USM
C306 C406	5260163452	C.,ELEC. 22MF 25V
C505 C605	5260164452	C.,ELEC. 33UF 35V M USM
C506 C606	5260163452	C.,ELEC. 22MF 25V
C705 C805	5260164452	C.,ELEC. 33UF 35V M USM
C706 C806	5260163452	C.,ELEC. 22MF 25V
C901 C902	5260162650	C.,ELEC. 10MF25V M SM VT
C903 C904	5260162650	C.,ELEC. 10MF25V M SM VT
P101	5336174900	CONNECTOR PLUG, 5046-09A
P102	5336164800	CONNECTOR SOCKET,IL-D-08S
P103	5122460000	CONNECTOR,5046-09A-RE
P104	5122151000	CONNECTOR,PLUG 5046-08A W
P108	5122152000	CONNECTOR,PLUG 9P 40-4
P109	5122147000	CONNECTOR,PLUG 5046-04A W
P110	5122146000	CONNECTOR,PLUG 3P 40-4
R109 R209	5240033020	R.,CARBON R20 100K J FT
R110 R210	5240033020	R.,CARBON R20 100K J FT
R120 R220	5240030620	R.,CARBON R10 10K
R121 R221	5240030620	R.,CARBON R10 10K
R130 R230	5282014600	1S1UVR 16, 10KA
R309 R409	5240033020	R.,CARBON R20 100K J FT
R310 R410	5240033020	R.,CARBON R20 100K J FT
R320 R420	5240030620	R.,CARBON R10 10K
R321 R421	5240030620	R.,CARBON R10 10K
R330 R430	5282014600	1S1UVR 16, 10KA
R509 R609	5240033020	R.,CARBON R20 100K J FT
R510 R610	5240033020	R.,CARBON R20 100K J FT
R520 R620	5240030620	R.,CARBON R10 10K
R521 R621	5240030620	R.,CARBON R10 10K
R530 R630	5282014600	1S1UVR 16, 10KA
R709 R809	5240033020	R.,CARBON R20 100K J FT

REF. NO.	PARTS NO.	DESCRIPTION
R710 R810	5240033020	R.,CARBON R20 100K J FT
R720 R820	5240030620	R.,CARBON R10 10K
R721 R821	5240030620	R.,CARBON R10 10K
R730 R830	5282014600	1S1UVR 16, 10KA
R903 R904	5282014600	1S1UVR 16, 10KA
U109 U110	5220036200	IC,LC4966,
U111 U112	5220036200	IC,LC4966,
U113 U114	5220407000	IC,TL072CP
U115 U116	5220407000	IC,TL072CP
U120	5232252020	SI.TR.25C3400
U121	5232251620	SI.TR.25A1346 0.3 200
U122	5232252020	SI.TR.25C3400
U123	5232251620	SI.TR.25A1346 0.3 200
U124	5232252020	SI.TR.25C3400
U125	5232251620	SI.TR.25A1346 0.3 200
U126	5232252020	SI.TR.25C3400
U127	5232251620	SI.TR.25A1346 0.3 200
U128	5232252020	SI.TR.25C3400
U129	5232251620	SI.TR.25A1346 0.3 200
U130	5232252020	SI.TR.25C3400
U131	5232251620	SI.TR.25A1346 0.3 200
U132	5232252020	SI.TR.25C3400
U133	5232251620	SI.TR.25A1346 0.3 200
U134	5232252020	SI.TR.25C3400
U135	5232251620	SI.TR.25A1346 0.3 200

BUSS B PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200173600	BUSS B PCB ASSY
	*5210173600	BUSS B PCB
C101 C102	5260162650	C.,ELEC. 10UF25V M SM VT
C104 C105	5260065650	C.,ELEC. 1.0UF50V M SHBP
C301 C321	5260164452	C.,ELEC. 33UF 35V M USM
C302 C322	5260163552	C.,ELEC. 22UF/35V M USM V
C303 C323	5260164452	C.,ELEC. 33UF 35V M USM
C304 C324	5260163552	C.,ELEC. 22UF/35V M USM V
C305 C325	5172204000	C.,CERAMIC 22PF/50V T
C306 C326	5172204000	C.,CERAMIC 22PF/50V T
C341 C361	5260164452	C.,ELEC. 33UF 35V M USM
C342 C362	5260163552	C.,ELEC. 22UF/35V M USM V
C343 C363	5260164452	C.,ELEC. 33UF 35V M USM
C344 C364	5260163552	C.,ELEC. 22UF/35V M USM V
C345 C365	5172204000	C.,CERAMIC 22PF/50V T
C346 C366	5172204000	C.,CERAMIC 22PF/50V T
C381 C401	5260164452	C.,ELEC. 33UF 35V M USM
C382 C402	5260163552	C.,ELEC. 22UF/35V M USM V
C383 C403	5260164452	C.,ELEC. 33UF 35V M USM
C384 C404	5260163552	C.,ELEC. 22UF/35V M USM V
C385 C405	5172204000	C.,CERAMIC 22PF/50V T
C386 C406	5172204000	C.,CERAMIC 22PF/50V T
C421 C441	5260164452	C.,ELEC. 33UF 35V M USM
C422 C442	5260163552	C.,ELEC. 22UF/35V M USM V
C423 C443	5260164452	C.,ELEC. 33UF 35V M USM
C424 C444	5260163552	C.,ELEC. 22UF/35V M USM V
C425 C445	5172204000	C.,CERAMIC 22PF/50V T
C426 C446	5172204000	C.,CERAMIC 22PF/50V T
D102 D103	5224015020	DIODE,1S5133T-77
P101	5336165100	CONNECTOR SOCKET IL-D-115
P102	5336164800	CONNECTOR SOCKET IL-D-085
P103	5122459000	CONNECTOR,PLUG 5046-08A R
P104	5122147000	CONNECTOR,PLUG 5046-04A W
P105	5122460000	CONNECTOR,5046-09A-RE
P106	5122146000	CONNECTOR,PLUG 3P 40-4

REF. NO.	PARTS NO.	DESCRIPTION
P108	5122454000	CONNECTOR,PLUG 5046-03A R
P109	5122152000	CONNECTOR,PLUG 9P 40-4
P111	5122155000	CONNECTOR,PLUG 5046-12A W
P112	5122463000	CONNECTOR PLUG 5046-12A R
Q101 Q102	5232008400	FET.,2SK381D
Q103 Q104	5232008400	FET.,2SK381D
Q105	5230779520	SI.TR.25C1815GR 0.4 80
R101 R201	5240031420	R.,CARBON R10 22K
R102 R202	5240031420	R.,CARBON R10 22K
R103 R203	5240031420	R.,CARBON R10 22K
R104 R204	5240031420	R.,CARBON R10 22K
R105 R205	5240031420	R.,CARBON R10 22K
R106 R206	5240031420	R.,CARBON R10 22K
R107 R207	5240031420	R.,CARBON R10 22K
R108 R208	5240031420	R.,CARBON R10 22K
R111 R211	5240031420	R.,CARBON R10 22K
R112 R212	5240031420	R.,CARBON R10 22K
R121 R221	5240031420	R.,CARBON R10 22K
R151 R152	5282410800	1S2UVR 16, 5KA,C
R153 R154	5282410800	1S2UVR 16, 5KA,C
R155 R156	5282410800	1S2UVR 16, 5KA,C
R157 R158	5282410800	1S2UVR 16, 5KA,C
R159 R160	5282410800	1S2UVR 16, 5KA,C
R251	5240031220	R.,CARBON R20 18K J FT
R253	5240033020	R.,CARBON R20 100K J FT
R255	5240034220	R.,CARBON R20 330K J FT
R256	5240031420	R.,CARBON R10 22K
R257	5240028220	R.,CARBON R20 1.0K J FT
R258	5240028220	R.,CARBON R20 1.0K J FT
R259	5240031220	R.,CARBON R20 18K J FT
R260	5240028620	R.,CARBON R20 1.5K J FT
R261 R262	5240033020	R.,CARBON R20 100K J FT
R263 R264	5181568000	R.,CARBON R25 10M J FT
R265 R266	5181568000	R.,CARBON R25 10M J FT
R301 R321	5240031420	R.,CARBON R10 22K
R302 R322	5240031420	R.,CARBON R10 22K
R304 R324	5240032220	R.,CARBON R20 47K J FT
R305 R325	5240033220	R.,CARBON R10 120K
R307 R327	5240033020	R.,CARBON R20 100K J FT
R308 R328	5240025820	R.,CARBON R20 100 J FT
R309 R329	5240031420	R.,CARBON R10 22K
R341 R361	5240031420	R.,CARBON R10 22K
R342 R362	5240031420	R.,CARBON R10 22K
R344 R364	5240032220	R.,CARBON R20 47K J FT
R345 R365	5240033220	R.,CARBON R10 120K
R347 R367	5240033020	R.,CARBON R20 100K J FT
R348 R368	5240025820	R.,CARBON R20 100 J FT
R349 R369	5240031420	R.,CARBON R10 22K
R381 R401	5240031420	R.,CARBON R10 22K
R382 R402	5240031420	R.,CARBON R10 22K
R384 R404	5240032220	R.,CARBON R20 47K J FT
R385 R405	5240033220	R.,CARBON R10 120K
R387 R407	5240033020	R.,CARBON R20 100K J FT
R388 R408	5240025820	R.,CARBON R20 100 J FT
R389 R409	5240031420	R.,CARBON R10 22K
R421 R441	5240031420	R.,CARBON R10 22K
R422 R442	5240031420	R.,CARBON R10 22K
R424 R444	5240032220	R.,CARBON R20 47K J FT
R425 R445	5240033220	R.,CARBON R10 120K
R427 R447	5240033020	R.,CARBON R20 100K J FT
R428 R448	5240025820	R.,CARBON R20 100 J FT
R429 R449	5240031420	R.,CARBON R10 22K
U101	5232251620	SI.TR.25A1346 0.3 200
U102	5232251620	SI.TR.25A1346 0.3 200
U104	6048937000	IC,HC14049B

REF. NO.	PARTS NO.	DESCRIPTION
U301 U321	5220407000	IC,TL072CP
U341 U361	5220407000	IC,TL072CP
U381 U401	5220407000	IC,TL072CP
U421 U441	5220407000	IC,TL072CP

I/O PCB ASSY(1)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200171600	I/O PCB ASSY(1)
	*5210171600	I/O PCB (1)
J1 - J8	5330010500	JACK,YKB21-5011 SINGLE
C1 - C4	5173433000	C.,CERAMIC 0.010UF 50V Z

I/O PCB ASSY(2)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200171700	I/O PCB ASSY(2)
	*5210171700	I/O PCB (2)
J1 - J8	5330010500	JACK,YKB21-5011 SINGLE
C1 - C4	5173433000	C.,CERAMIC 0.010UF 50V Z

I/O PCB ASSY(3)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200171800	I/O PCB ASSY(3)
	*5210171800	I/O PCB (3)
J1 - J4	5330010600	JACK,YKB21-5013 SINGLE
C1 - C4	5173433000	C.,CERAMIC 0.010UF 50V Z

I/O PCB ASSY(4)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200171900	I/O PCB ASSY(4)
	*5210171900	I/O PCB (4)
J1 - J4	5330010600	JACK,YKB21-5013 SINGLE
C1 - C4	5173433000	C.,CERAMIC 0.010UF 50V Z

I/O PCB ASSY(5)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172000	I/O PCB ASSY(5)
	*5210172000	I/O PCB (5)
P1 P2	5330509700	PIN JACK, 2P

I/O PCB ASSY(6)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172100	I/O PCB ASSY(6)
	*5210172100	I/O PCB (6)
P1 P2	5330509700	PIN JACK, 2P

I/O PCB ASSY(7)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172200	I/O PCB ASSY(7)
	*5210172200	I/O PCB (7)
J1 - P4	5334041800	CONNECTOR,CANNON;XLB3-31

I/O PCB ASSY(8)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172300	I/O PCB ASSY(8)
	*5210172300	I/O PCB (8)
J1 - P4	5334041800	CONNECTOR,CANNON;XLB3-31

I/O PCB ASSY(9)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172400	I/O PCB ASSY(9)
	*5210172400	I/O PCB (9)
P1	5330509900	PIN JACK, 16P

I/O PCB ASSY(10)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172500	I/O PCB ASSY(10)
	*5210172500	I/O PCB (10)
P1	5330509800	PIN JACK, 6P

I/O PCB ASSY(11)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172600	I/O PCB ASSY(11)
	*5210172600	I/O PCB (11)
J1 - J4	5330010600	JACK,YKB21-5013 SINGLE

I/O PCB ASSY(12)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172700	I/O PCB ASSY(12)
	*5210172700	I/O PCB (12)
P1 P2	5330509700	PIN JACK, 2P

I/O PCB ASSY(13)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172800	I/O PCB ASSY(13)
	*5210172800	I/O PCB (13)
J1 J2	5334041900	CONNECTOR SOCKET, XLB3-31

MOTHER PCB ASSY(1)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200177500	MOTHER PCB ASSY(1)
	*5210177500	MOTHER PCB(1)
C101	5260165252	C.,ELEC.47MF/25V M USM VT
C102	5260165252	C.,ELEC.47MF/25V M USM VT
D101	5224013210	DIODE,DS135D FA4 FF
P101	5122358000	CONNECTOR,M 6P
P102	5122356000	CONNECTOR,M 4P
P103	5122358000	CONNECTOR,M 6P
P104	5122359000	CONNECTOR,M 7P
P105	5122356000	CONNECTOR,M 4P
P110	5122358000	CONNECTOR,M 6P
P111	5122356000	CONNECTOR,M 4P
P112	5122356000	CONNECTOR,M 4P
P113	5336126200	CONNECTOR PLUG,8263-0212
P114	5336126600	CONNECTOR PLUG,8263-0612
P115	5336126800	CONNECTOR PLUG,8263-0812
P116	5336126600	CONNECTOR PLUG,8263-0612
P117	5336126400	CONNECTOR PLUG,8263-0412
P118	5336126500	CONNECTOR PLUG,8263-0512
P119	5336126200	CONNECTOR PLUG,8263-0212
P120	5336126800	CONNECTOR PLUG,8263-0812
P121	5336135400	CONNECTOR PLUG,8263-0412
P122	5336127200	CONNECTOR PLUG 8263-1212
P123	5122363000	CONNECTOR,M 11P
P124	5122363000	CONNECTOR,M 11P
P140	5336126400	CONNECTOR PLUG,8263-0412
P141	5336126300	CONNECTOR PLUG,8263-0312
P142	5336135800	CONNECTOR PLUG,8263-0812
P143	5336137600	CONNECTOR PLUG,8263-0612
P144	5336137400	CONNECTOR PLUG,8263-0412
P145	5336135300	CONNECTOR PLUG,8263-0312
P146	5336137300	CONNECTOR PLUG,8263-0312
P201	5122358000	CONNECTOR,M 6P
P202	5122356000	CONNECTOR,M 4P
P203	5122358000	CONNECTOR,M 6P
P204	5122359000	CONNECTOR,M 7P
P210	5122358000	CONNECTOR,M 6P
P211	5122359000	CONNECTOR,M 7P
P213	5336135200	CONNECTOR PLUG,8263-0212
P214	5336135600	CONNECTOR PLUG,8263-0612
P215	5336135800	CONNECTOR PLUG,8263-0812
P216	5336135600	CONNECTOR PLUG,8263-0612
P217	5336135400	CONNECTOR PLUG,8263-0412
P300	5122355000	CONNECTOR,M 3P
P301	5122355000	CONNECTOR,M 3P
P302	5122360000	CONNECTOR,M 8P
P303	5122358000	CONNECTOR,M 6P
P304	5122355000	CONNECTOR,M 3P
P305	5122355000	CONNECTOR,M 3P
P310	5122358000	CONNECTOR,M 6P
P311	5122356000	CONNECTOR,M 4P
P313	5336137200	CONNECTOR PLUG,8263-0212
P314	5336137600	CONNECTOR PLUG,8263-0612
P315	5336137800	CONNECTOR PLUG,8263-0812
P316	5336137600	CONNECTOR PLUG,8263-0612
P317	5336137400	CONNECTOR PLUG,8263-0412
P410	5122358000	CONNECTOR,M 6P
P411	5122359000	CONNECTOR,M 7P
P413	5336145200	CONNECTOR PLUG,8263-0212
P414	5336145600	CONNECTOR PLUG,8263-0612
P415	5336145800	CONNECTOR PLUG,8263-0812
P416	5336145600	CONNECTOR PLUG,8263-0612
P417	5336145400	CONNECTOR PLUG,8263-0412
U101	5220413000	IC,NJM78M12A.
U102	5220420400	IC,NJM79M12A

M.BUSS PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200174800	M.BUSS PCB ASSY
	*5210174800	M.BUSS PCB
P701-P709	5336167100	CONNECTOR PLUG, IL-11P
P901-P911	5336166800	CONNECTOR PLUG, IL-08P

MOTHER PCB ASSY(2)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200174100	MOTHER PCB ASSY(2)
	*5210174100	MOTHER PCB(2)
P1	5122126000	CONNECTOR,PLUG 3P W
P11 P12	5122357000	CONNECTOR,M 5P
P13	5122356000	CONNECTOR,M 4P
P14	5122187000	CONNECTOR,PLUG 6P B
P15	5122132000	CONNECTOR,PLUG 8P 40-4
P16	5122305000	CONNECTOR,PLUG 5045-08A R
P17	5122131000	CONNECTOR,PLUG 5045-07A W
P18 P19	5122357000	CONNECTOR,M 5P
P2	5122357000	CONNECTOR,M 5P
P20 P21	5122357000	CONNECTOR,M 5P
P22	5122356000	CONNECTOR,M 4P
P23	5122193000	CONNECTOR,PLUG 12P B
P24	5334029700	CONNECTOR PLUG 5045-12
P25 P26	5122357000	CONNECTOR,M 5P
P27 P28	5122357000	CONNECTOR,M 5P
P29	5122356000	CONNECTOR,M 4P
P30	5122136000	CONNECTOR,PLUG 12P W
P31	5122309000	CONNECTOR,PLUG 5045-12A R
P32	5122456000	CONNECTOR,PLUG 5046-05A R
P33	5122148000	CONNECTOR,PLUG 5P 40-4
P34	5122127000	CONNECTOR,PLUG 3P 40-4
P4 P5	5122357000	CONNECTOR,M 5P
P6	5122356000	CONNECTOR,M 4P
P7	5122130000	CONNECTOR,PLUG 6P W
P8	5122303000	CONNECTOR,PLUG 5045-06A R
P9 P10	5122357000	CONNECTOR,M 5P
R1 R2	5240032220	R.,CARBON R20 47K J FT
R3	5184565000	R.,CARBON 2W 4.7 J FR

OPERATION PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200175800	OPERATION PCB ASSY
	*5210175800	OPERATION PCB
D1 D2	5225007100	LED,GL-9NG2 GRN X-3R
D3	5225007100	LED,GL-9NG2 GRN X-3R
D4 D5	5225007900	LED,GL-9PR2 RED V-50
D6	5225007900	LED,GL-9PR2 RED V-50
S10 S11	5300028100	SW.,PUSH SPH122A 2-2
S12	5300028100	SW.,PUSH SPH122A 2-2
S6 S7	5300028100	SW.,PUSH SPH122A 2-2
S8 S9	5300028100	SW.,PUSH SPH122A 2-2

PWR SPLY PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200173900	PWR SPLY PCB ASSY
	*5210173900	PWR SPLY PCB
C100 C101	△ 5267010300	C., CERAMIC 0.01MF 500V P
C102 C103	△ 5267010300	C., CERAMIC 0.01MF 500V P
C104	△ 5173088000	C., ELEC. 2200UF 16V (SM)
C105 C106	5260162550	C., ELEC. 10MF 16V
C107 C108	5263166723	C., METALIZED 0.010UF 50V
C109 C110	5260162050	C., ELEC. 4.7MF 35V M SM
C112 C113	5260165352	C., ELEC. 47UF 35V M USM
C114 C115	△ 5260272710	C., ELEC. 4700UF 25V M SME
C116	△ 5260272710	C., ELEC. 4700UF 25V M SME
C117 C118	△ 5260271810	C., ELEC. 2200UF 50V M SME
C119 C120	△ 5172212000	C., CERAMIC 100PF 50V
D100 D101	△ 5224013200	DIODE, DS135D FR
D102 D103	△ 5224013200	DIODE, DS135D FR
D104	△ 5224013200	DIODE, DS135D FR
D105 D106	△ 5228008000	SILICON STACK, DBA60C
P2 P3	5122376000	CONNECTOR, SOCKET 3024-05A
P4 P5	5122376000	CONNECTOR, SOCKET 3024-05A
P6	5122375000	CONNECTOR, SOCKET 3024-04A
Q100	5230779520	SI. TR. 2SC1815GR 0.4 80
Q101	5145150000	SI. TR. 2SA-1015GR 0.4 80
R100 R101	5184960000	R., CARBON R25 15 K G FT
R102	5184965000	R., CARBON R25 24 K G FT
R103	5184944000	R., CARBON R25 3.3K G FT
R104 R105	5240027620	R., CARBON R20 560 J FT
U100	5220425800	IC, MS2301A,

REEL SARVO PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200174000	REEL SERVO PCB ASSY
	*5210174000	REEL SERVO PCB
C100 C200	5263107220	C., POLY. 560PF 100V J VT
C101 C201	5263168523	C., METAL 0.33UF 50V J VT
C102 C202	5263167923	C., METAL 0.1MF/50V J VT
C103 C203	5263167623	C., METAL 0.056UF 50V J VT
C104 C204	5263167923	C., METAL 0.1MF/50V J VT
C105 C205	5260165952	C., ELEC. 100MF/10V M USM
C140 C141	5263107220	C., POLY. 560PF 100V J VT
C142	5263167323	C., METAL 0.033UF 50V J VT
C143	5260160550	C., ELEC. 0.47MF 50V M SM
D100 D200	5224015020	DIODE, 1SS133T-77
D101 D201	5224015020	DIODE, 1SS133T-77
D102 D202	5224015020	DIODE, 1SS133T-77
D103 D203	5224015020	DIODE, 1SS133T-77
D104 D204	5224015020	DIODE, 1SS133T-77
D105 D205	5224015020	DIODE, 1SS133T-77
D106 D206	5224013200	DIODE, DS135D FR
D140	5224015020	DIODE, 1SS133T-77
J100 J101	5122376000	CONNECTOR, SOCKET 3024-05A
J102 J103	5122376000	CONNECTOR, SOCKET 3024-05A
J104	5122375000	CONNECTOR, SOCKET 3024-04A
Q100 Q200	5230778320	SI. TR. 2SC2320F 0.3 200
Q140	5232008400	FET., 2SK381D
Q141	5145129000	SI. TR. 2SB-507 30 8
Q142	5145150000	SI. TR. 2SA-1015GR 0.4 80
Q143	5230778320	SI. TR. 2SC2320F 0.3 200
R100 R200	5240031820	R., CARBON R20 33K J FT
R101 R201	5240032020	R., CARBON R20 39K J FT
R202	5240029620	R., CARBON R20 3.9K J FT

REF. NO.	PARTS NO.	DESCRIPTION
R103 R203	5150154000	R., TRIMMER 10KB
R104 R205	5240032020	R., CARBON R20 39K J FT
R105 R206	5150155000	R., TRIMMER 20KB
R106 R204	5240030620	R., CARBON R10 10K
R107 R207	5240031420	R., CARBON R10 22K
R108 R208	5240033020	R., CARBON R20 100K J FT
R109 R209	5240029820	R., CARBON R20 4.7K J FT
R110 R210	5240033020	R., CARBON R20 100K J FT
R111 R211	5240030620	R., CARBON R10 10K
R112 R212	5150154000	R., TRIMMER 10KB
R113 R213	5240029820	R., CARBON R10 4.7K
R114 R214	5240033020	R., CARBON R20 100K J FT
R115 R215	5240028220	R., CARBON R20 1.0K J FT
R116 R216	5240030620	R., CARBON R10 10K
R117 R217	5240033020	R., CARBON R20 100K J FT
R118 R218	5240033020	R., CARBON R20 100K J FT
R119 R219	5240028220	R., CARBON R20 1.0K J FT
R120 R220	5240033820	R., CARBON R10 220K
R121 R221	5240033820	R., CARBON R10 220K
R122 R222	5240031420	R., CARBON R10 22K
R123 R223	5240032220	R., CARBON R20 47K J FT
R124 R224	5240030620	R., CARBON R10 10K
R125 R225	5240031420	R., CARBON R10 22K
R126 R226	5240030620	R., CARBON R10 10K
R127 R227	5240024220	R., CARBON R20 22 J FT
R128 R228	5240030620	R., CARBON R10 10K
R129 R229	△ 5185190000	R., METAL PLATE 0.22 2W
R130 R230	5240034220	R., CARBON R20 330K J FT
R131 R231	5240029420	R., CARBON R20 3.3K J FT
R132 R232	5241426602	R., METAL FILM LT 1/8 5.1K
R133 R233	5241426602	R., METAL FILM LT 1/8 5.1K
R140 R141	5240031420	R., CARBON R10 22K
R142	5240031420	R., CARBON R10 22K
R143	5240025820	R., CARBON R20 100 J FT
R144	5240027020	R., CARBON R20 330 J FT
R145	5240033820	R., CARBON R10 220K
R146	5240034620	R., CARBON R10 470K J FT
R147	5240032020	R., CARBON R20 39K J FT
R148	5240032620	R., CARBON R20 68K J FT
R149	5240031420	R., CARBON R10 22K
R150	5150156000	VR, 50KB
R151	5240027820	R., CARBON R20 680 J FT
R152	5240029020	R., CARBON R10 2.2K
R153 R154	5240029420	R., CARBON R20 3.3K J FT
R155	5241206600	R., INCOMB. 4.7K/1W J FR
R156	5240031420	R., CARBON R10 22K
TP1 TP2	5544750000	PIN, COMBINATION
TP3	5544750000	PIN, COMBINATION
U100 U200	5220419500	IC, LA6358,
U101	5220419500	IC, LA6358,
U102 U202	5232252020	SI. TR. 2SC3400
U140	5232250900	TR., ARRAY BA6251
U141	5232252020	SI. TR. 2SC3400
U142	5232251620	SI. TR. 2SA1346 0.3 200
U143	5232252020	SI. TR. 2SC3400
U144	6048968000	IC, MC14066BCP 85-16
U145	5232252020	SI. TR. 2SC3400

METER AMP PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
	*5200174200	METER AMP PCB ASSY	R108 R128	5240033020	R., CARBON R20 100K J FT
	*5210174200	METER AMP PCB	R109 R129	5240035420	R., CARBON R20 1.0M J FT
C101 C121	5260162750	C., ELEC. 10UF 35V M SM VT	R110 R130	5240027020	R., CARBON R20 330 J FT
C102 C122	5260163552	C., ELEC. 22MF/35V M USM V	R111 R131	5240033020	R., CARBON R20 100K J FT
C103 C123	5260162650	C., ELEC. 10MF25V M SM VT	R141 R161	5150153000	R., TRIMMER 5KB
C104 C124	5263167923	C., METAL 0.1MF/50V J VT	R142 R162	5240027820	R., CARBON R20 680 J FT
C141 C161	5260162750	C., ELEC. 10UF 35V M SM VT	R143 R163	5240030220	R., CARBON R20 6.8K J FT
C142 C162	5260163552	C., ELEC. 22MF/35V M USM V	R144 R164	5240033020	R., CARBON R20 100K J FT
C143 C163	5260162650	C., ELEC. 10MF25V M SM VT	R145 R165	5240031520	R., CARBON R20 24K J FT
C144 C164	5263167923	C., METAL 0.1MF/50V J VT	R146 R166	5240032220	R., CARBON R20 47K J FT
C181 C201	5260162750	C., ELEC. 10UF 35V M SM VT	R147 R167	5240026220	R., CARBON R20 150 J FT
C182 C202	5260163552	C., ELEC. 22MF/35V M USM V	R148 R168	5240033020	R., CARBON R20 100K J FT
C183 C203	5260162650	C., ELEC. 10MF25V M SM VT	R149 R169	5240035420	R., CARBON R20 1.0M J FT
C184 C204	5263167923	C., METAL 0.1MF/50V J VT	R150 R170	5240027020	R., CARBON R20 330 J FT
C221 C241	5260162750	C., ELEC. 10UF 35V M SM VT	R151 R171	5240033020	R., CARBON R20 100K J FT
C222 C242	5260163552	C., ELEC. 22MF/35V M USM V	R181 R201	5150153000	R., TRIMMER 5KB
C223 C243	5260162650	C., ELEC. 10MF25V M SM VT	R182 R202	5240027820	R., CARBON R20 680 J FT
C224 C244	5263167923	C., METAL 0.1MF/50V J VT	R183 R203	5240030220	R., CARBON R20 6.8K J FT
C261 C281	5260162750	C., ELEC. 10UF 35V M SM VT	R184 R204	5240033020	R., CARBON R20 100K J FT
C262 C282	5260163552	C., ELEC. 22MF/35V M USM V	R185 R205	5240031520	R., CARBON R20 24K J FT
C263 C283	5260162650	C., ELEC. 10MF25V M SM VT	R186 R206	5240032220	R., CARBON R20 47K J FT
C264 C284	5263167923	C., METAL 0.1MF/50V J VT	R187 R207	5240026220	R., CARBON R20 150 J FT
C301	5260162550	C., ELEC. 10MF 16V	R188 R208	5240033020	R., CARBON R20 100K J FT
C302 C303	5260163452	C., ELEC. 22MF 25V	R189 R209	5240035420	R., CARBON R20 1.0M J FT
D101 D102	5224015400	DIODE, 1K60	R190 R210	5240027020	R., CARBON R20 330 J FT
D103 D104	5224015400	DIODE, 1K60	R191 R211	5240033020	R., CARBON R20 100K J FT
D121 D122	5224015400	DIODE, 1K60	R221 R241	5150153000	R., TRIMMER 5KB
D123 D124	5224015400	DIODE, 1K60	R222 R242	5240027820	R., CARBON R20 680 J FT
D141 D142	5224015400	DIODE, 1K60	R223 R243	5240030220	R., CARBON R20 6.8K J FT
D143 D144	5224015400	DIODE, 1K60	R224 R244	5240033020	R., CARBON R20 100K J FT
D161 D162	5224015400	DIODE, 1K60	R225 R245	5240031520	R., CARBON R20 24K J FT
D163 D164	5224015400	DIODE, 1K60	R226 R246	5240032220	R., CARBON R20 47K J FT
D181 D182	5224015400	DIODE, 1K60	R227 R247	5240026220	R., CARBON R20 150 J FT
D183 D184	5224015400	DIODE, 1K60	R228 R248	5240033020	R., CARBON R20 100K J FT
D201 D202	5224015400	DIODE, 1K60	R229 R249	5240035420	R., CARBON R20 1.0M J FT
D203 D204	5224015400	DIODE, 1K60	R230 R250	5240027020	R., CARBON R20 330 J FT
D221 D222	5224015400	DIODE, 1K60	R231 R251	5240033020	R., CARBON R20 100K J FT
D223 D224	5224015400	DIODE, 1K60	R261 R281	5150153000	R., TRIMMER 5KB
D241 D242	5224015400	DIODE, 1K60	R262 R282	5240027420	R., CARBON R20 470 J FT
D243 D244	5224015400	DIODE, 1K60	R263 R283	5240030220	R., CARBON R20 6.8K J FT
D261 D262	5224015400	DIODE, 1K60	R264 R284	5240033020	R., CARBON R20 100K J FT
D263 D264	5224015400	DIODE, 1K60	R265 R285	5240031520	R., CARBON R20 24K J FT
D281 D282	5224015400	DIODE, 1K60	R266 R286	5240032220	R., CARBON R20 47K J FT
D283 D284	5224015400	DIODE, 1K60	R267 R287	5240026220	R., CARBON R20 150 J FT
P101	5122152000	CONNECTOR, PLUG 9P	R268 R288	5240033020	R., CARBON R20 100K J FT
P102	5122146000	CONNECTOR, PLUG 3P	R269 R289	5240035420	R., CARBON R20 1.0M J FT
P103	5122150000	CONNECTOR, PLUG 5046-07A	R270 R290	5240027020	R., CARBON R20 330 J FT
P104	5122457000	CONNECTOR, PLUG 5046-06A R	R271 R291	5240033020	R., CARBON R20 100K J FT
P105	5122206000	CONNECTOR, PLUG 5046-06A B	U101 U121	5220406700	IC, RC4558P, TI
P106	5122149000	CONNECTOR, PLUG 5046-06A W	U102 U122	6048945000	IC, MC14049UBCP
P107	5336174600	CONNECTOR PLUG 5046-06A	U141 U161	5220406700	IC, RC4558P, TI
P108	5122148000	CONNECTOR, PLUG 5P	U142 U162	6048945000	IC, MC14049UBCP
P109 P110	5122382000	CONNECTOR, SOCKET 3024-11A	U181	5220406700	IC, RC4558P, TI
Q101 Q121	5230779520	SI. TR. 25C1815GR 0.4 80			
Q141 Q161	5230779520	SI. TR. 25C1815GR 0.4 80			
Q181 Q201	5230779520	SI. TR. 25C1815GR 0.4 80			
Q221 Q241	5230779520	SI. TR. 25C1815GR 0.4 80			
Q261 Q281	5230779520	SI. TR. 25C1815GR 0.4 80			
R101 R121	5150153000	R., TRIMMER 5KB			
R102 R122	5240027820	R., CARBON R20 680 J FT			
R103 R123	5240030220	R., CARBON R20 6.8K J FT			
R104 R124	5240033020	R., CARBON R20 100K J FT			
R105 R125	5240031520	R., CARBON R20 24K J FT			
R106 R126	5240032220	R., CARBON R20 47K J FT			
R107 R127	5240026220	R., CARBON R20 150 J FT			

CAP SERVO PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200175100	CAP SERVO PCB ASSY
	*5210175100	CAP SERVO PCB
C800	5263106220	C.,POLY. 220PF 100V J VT
C801	5172200000	C.,CERAMIC 10PF/50V T
C802	5263166723	C.,POLY. 0.010UF 50V J VT
C803	5263100520	C.,POLY. 0.0010UF 100V J
C804	5172200000	C.,CERAMIC 10PF/50V T
C805 C806	5260162050	C.,ELEC. 4.7MF 35V M SM
C807	5260161150	C.,ELEC.2.2MF 50V
C808	5260160550	C.,ELEC. 0.47MF 50V M SM
C809	5263166723	C.,METAL 0.010UF 50V J VT
C810	5260163552	C.,ELEC. 22MF/35V M USM V
C811	5263100520	C.,POLY. 0.0010UF 100V J
C812	5263167723	C.,METAL 0.068UF 50V J VT
C813	5171864000	C.,MYLAR 0.022UF 50V J VT
C814	5263100520	C.,POLY. 0.0010UF 100V J
D800 D801	5224015020	DIODE,1S5133T-77
D802 D803	5224015020	DIODE,1S5133T-77
P800	5122129000	CONNECTOR,PLUG 5045-05A W
P801	5122127000	CONNECTOR,PLUG 3P 40-4
P802	5122300000	CONNECTOR,PLUG 5045-03A R
P803	5122184000	CONNECTOR PLUG 5045-03A
P804	5122130000	CONNECTOR,PLUG 6P W
Q800	5232008400	FET.,2SK381D
Q801 Q802	5230778320	SI.TR.2SC2320F 0.3 200
Q803	5230778320	SI.TR.2SC2320F 0.3 200
R800	5240029820	R.,CARBON R20 4.7K J FT
R801	5240032220	R.,CARBON R20 47K J FT
R802	5240029820	R.,CARBON R20 4.7K J FT
R803	5240030120	R.,CARBON R20 6.2K J FT
R804	5240029820	R.,CARBON R20 4.7K J FT
R805	5240032220	R.,CARBON R20 47K J FT
R806	5240030620	R.,CARBON R20 10K J FT
R807	5130154000	R.,TRIMMER 10KB
R808	5240028220	R.,CARBON R20 1.0K J FT
R809	5240032220	R.,CARBON R20 47K J FT
R810	5240033020	R.,CARBON R20 100K J FT
R811	5240027020	R.,CARBON R20 330 J FT
R812	5240032220	R.,CARBON R20 47K J FT
R813	5240034220	R.,CARBON R20 330K J FT
R814	5240031220	R.,METAL OXIDE 22K J FT
R815	5280132002	R.,TRIMMER 5KB
R816	5241011300	R.,METAL OXIDE 20K J FT
R817	5240030820	R.,CARBON R20 12K J FT
R818	5240028220	R.,CARBON R20 1.0K J FT
R819	5241011400	R.,METAL OXIDE 22K F XR
R820	5240031420	R.,CARBON R20 22K
R821	△ 5052747000	R.,METAL OXIDE 3.3,2W
R822 R823	5240029820	R.,CARBON R20 4.7K J FT
R824	5240029820	R.,CARBON R20 4.7K J FT
R825	5240028420	R.,CARBON R20 1.2K J FT
R826	5240031420	R.,CARBON R20 22K
U800	5220426600	IC,UPC1043C
U801	6048968000	IC,HC14066BCP
U802 U803	5232252020	SI.TR.2SC3400
U804	5232252020	SI.TR.2SC3400
U805 U806	5232251620	SI.TR.2SA1346 0.3 200
U807 U808	5232252020	SI.TR.2SC3400
U809	5232252020	SI.TR.2SC3400

SENSOR PCB ASSY(L)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176000	SENSOR PCB ASSY(L)
	*5210176000	SENSOR PCB(L)
Q1	5228010100	PHOTO TRANSISTOR, PT-430F
R1	5181476000	C,CARBON R25 560 J FT

SENSOR PCB ASSY(R)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176100	SENSOR PCB ASSY(R)
	*5210176100	SENSOR PCB(R)
Q1	5228010100	PHOTO TRANSISTOR, PT-430F
R1	5181476000	C,CARBON R25 560 J FT

LED PCB ASSY(L)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176200	LED PCB ASSY(L)
	*5210176200	LED PCB(L)
D1	5225014300	LED GL-410

LED PCB ASSY(R)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176300	LED PCB ASSY(R)
	*5210176300	LED PCB(R)
D1	5225014300	LED GL-410

PHONE JACK PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176700	PHONE JACK PCB ASSY
	*5210176700	PHONE JACK PCB
J101 J102	5330010100	JACK,PHONE 3P
J103	5330010600	JACK,YKB21-5013 SINGLE

MECHANISM JOINT PCB ASS'Y

REF. NO.	PARTS NO.	DESCRIPTION
	*5200175600	PCB ASS'Y,MECHANISM JOINT
	*5210175600	PCB,MECHANISM JOINT
C100 C101	5173433000	CERAMIC 0.010UF 50V
C102	5173433000	CERAMIC 0.010UF 50V
P1	5122147000	CONNECTOR,PLUG 5046-04A W
P2	5122149000	CONNECTOR,PLUG 5046-06A W
P3	5122146000	CONNECTOR,PLUG 3P 40-4
P4	5122151000	CONNECTOR,PLUG 5046-08A W

BAL.PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200174300	BAL.AMP PCB ASSY
	*5210174300	BAL.AMP PCB
C100 C200	5260162550	C.,ELEC.10MF 16V
C101 C201	5260162550	C.,ELEC.10MF 16V
C102 C202	5172200000	C.,CERAMIC 10PF/50V T
C103 C203	5260067050	C.,ELEC. 10MF 16V
C104 C204	5172204000	C.,CERAMIC 22PF/50V T
C105 C205	5172204000	C.,CERAMIC 22PF/50V T
C106 C206	5260162550	C.,ELEC.10MF 16V
C107 C207	5172200000	C.,CERAMIC 10PF/50V T
C108 C208	5260067050	C.,ELEC. 10MF 16V
C109 C209	5172204000	C.,CERAMIC 22PF/50V T
C110 C210	5172204000	C.,CERAMIC 22PF/50V T
C111 C211	5260162550	C.,ELEC.10MF 16V
C112 C212	5172200000	C.,CERAMIC 10PF/50V T
C113 C213	5260162550	C.,ELEC.10MF 16V
C114 C214	5260162550	C.,ELEC.10MF 16V
C300 C301	5260165352	C.,ELEC.47MF 35V
C304 C305	5173433000	C.,CERAMIC 0.01MF 50V
D100-J103	5224015000	DIODE,1SS133
D200-J203	5224015000	DIODE,1SS133
P300	5122374000	CONNECTOR,SOCKET 3024-03A
P301	5122374000	CONNECTOR,SOCKET 3024-03A
P302	5122379000	CONNECTOR,SOCKET 3024-08A
P303	5122377000	CONNECTOR,SOCKET 3024-06A
P304	5122374000	CONNECTOR,SOCKET 3024-03A
P305	5122374000	CONNECTOR,SOCKET 3024-03A
Q100 Q200	5230779720	SI.TR.25C945A KA 0.25 250
Q101 Q201	5230017920	SI.TR.25A733A 0.25 180
Q102 Q202	5230773800	SI.TR.25C2655-Y 0.9 100
Q103 Q203	5230014000	SI.TR.25A1020-Y 0.9 100
Q104 Q204	5230779720	SI.TR.25C945A KA 0.25 250
Q105 Q205	5230017920	SI.TR.25A733A 0.25 180
Q106 Q206	5230773800	SI.TR.25C2655-Y 0.9 100
Q107 Q207	5230014000	SI.TR.25A1020-Y 0.9 100
R100 R200	5240028220	R.,CARBON R20 1.0K J FT
R101 R201	5240031420	R.,CARBON R20 22K J FT
R102 R202	5240031120	R.,CARBON R20 16K J FT
R103 R203	5240032220	R.,CARBON R20 47K J FT
R104 R204	5240031020	R.,CARBON R20 15K J FT
R105 R205	5240031020	R.,CARBON R20 15K J FT
R106 R206	5240029820	R.,CARBON R20 4.7K J FT
R107 R207	5240028220	R.,CARBON R20 1.0K J FT
R108 R208	△ 5183546000	R.,CARBON F25 4.7 NONFLAM
R109 R209	5240029820	R.,CARBON R20 4.7K J FT
R110 R210	5240028220	R.,CARBON R20 1.0K J FT
R111 R211	△ 5183546000	R.,CARBON R25 4.7 NONFLAM
R112 R212	5240030620	R.,CARBON R20 10K J FT
R113 R213	5240030620	R.,CARBON R20 10K J FT
R114 R214	5240030620	R.,CARBON R20 10K J FT
R115 R215	5240031020	R.,CARBON R20 15K J FT
R116 R216	5240031020	R.,CARBON R20 15K J FT
R117 R217	5240029820	R.,CARBON R20 4.7K J FT
R118 R218	5240028220	R.,CARBON R20 1.0K J FT
R119 R219	△ 5183546000	R.,CARBON F25 4.7 NONFLAM
R120 R220	5240029820	R.,CARBON R20 4.7K J FT
R121 R221	5240028220	R.,CARBON R20 1.0K J FT
R122 R222	△ 5183546000	R.,CARBON F25 4.7 NONFLAM
R123 R223	△ 5183554000	R.,CARBON R25 10 NONFLAM
R124 R224	△ 5183554000	R.,CARBON R25 10 NONFLAM

REF. NO.	PARTS NO.	DESCRIPTION
R125 R225	5240031820	R.,CARBON R20 33K J FT
R126 R226	5240031020	R.,CARBON R20 15K J FT
R127 R227	5240032020	R.,CARBON R20 39K J FT
R128 R228	5240031020	R.,CARBON R20 15K J FT
R129 R229	5240032020	R.,CARBON R20 39K J FT
R130 R230	5240032220	R.,CARBON R20 47K J FT
R131 R231	△ 5183578000	R.,INCOMBUSTIBLE 1/4W 100
U100 U200	5220416600	IC,NJM2041D-D
U101	5220426900	IC,H5220P

COUNTER PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176500	COUNTER PCB ASSY
	*5210176500	COUNTER PCB
U1	5225013000	LED,GL-3E508A

REMOTE PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200175400	REMOTE PCB ASSY
	*5210175400	REMOTE PCB
J1	5334010100	SOCKET,12P CONN

DEFEAT SW PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200172900	DEFEAT SW PCB ASSY
	*5210172900	DEFEAT SW PCB
S1	5300909300	SW.,SLIDE 4-2 N

P.G PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176400	P.G PCB ASSY
	*5210176400	P.G PCB
U1 U2	5228010200	PHOTO INTERRUPT.GP2504(B)

BALANCE SW PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200173000	BALANCE SW PCB ASSY
	*5210173000	BALANCE SW PCB
S1	5300909300	SW.,SLIDE 4-2 N

SHUT OFF PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200175900	SHUT OFF PCB ASSY
	*5210175900	SHUT OFF PCB
U1	5228009600	SPI-208,PHOTO TR

CONTROL PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200175000	CONTROL PCB ASSY
	*5210175000	CONTROL PCB
C400	5260166052	C.,ELEC. 100MF/16V M USM
C401	5260166752	C.,ELEC. 220UF6.3V M USM
C402	5260162050	C.,ELEC. 4.7MF 35V M SM
C403 C404	5172200000	C.,CERAMIC 10PF/50V T
C410	5260166052	C.,ELEC. 100MF/16V M USM
C411 C412	5173433000	C.,CERAMIC 0.010UF 50V Z
C413 C414	5173433000	C.,CERAMIC 0.010UF 50V Z
C415	5263100520	C.,POLYST. 0.0010UF 100V
D400 D401	5224015020	DIODE,1SS133T-77
D402 D403	5224015020	DIODE,1SS133T-77
D404 D405	5224015020	DIODE,1SS133T-77
D406	5224015020	DIODE,1SS133T-77
D407 D408	5224013200	DIODE,DS135D FR
D409 D410	5224013200	DIODE,DS135D FR
D411 D412	5224015020	DIODE,1SS133T-77
D414	5224015020	DIODE,1SS133T-77
D415 D416	5224015020	DIODE,1SS133T-77
P400	5122131000	CONNECTOR,PLUG 5045-07A W
P401	5122304000	CONNECTOR,PLUG 5045-07A R
P402	5122130000	CONNECTOR,PLUG 6P W
P403	5122127000	CONNECTOR,PLUG 3P
P404	5122132000	CONNECTOR,PLUG 8P
P405	5122128000	CONNECTOR,PLUG 4P
P406	5122188000	CONNECTOR,PLUG 5045-07A B
P407	5122301000	CONNECTOR,PLUG 5045-04A R
P408	5122305000	CONNECTOR,PLUG 5045-08A R
P409	5122138000	CONNECTOR,PLUG 5045-14A W
P410	5122185000	CONNECTOR,PLUG 4P B
P411	5122303000	CONNECTOR,PLUG 5045-06A R
P412	5336107700	CONNECTOR,PLUG 5045-07A Y
P413	5122300000	CONNECTOR,PLUG 5045-03A R
P414	5122126000	CONNECTOR,PLUG 3P W
P415	5122299000	CONNECTOR,PLUG 5045-02A R
P416	5122183000	CONNECTOR,PLUG 5045-02F B
P417	5122189000	CONNECTOR,PLUG 5045-08A B
Q400	5230778320	SI.TR.25C2320F 0.3 200
Q401 Q402	5231755400	SI.TR.25D794-Q 10 60
Q403	5231755400	SI.TR.25D794-Q 10 60
Q404	5145129000	SI.TR.25B-507 30 8
Q405	5230778320	SI.TR.25C2320F 0.3 200
Q406 Q407	5230016620	SI.TR.25A999F 0.3 200
Q408 Q409	5230016620	SI.TR.25A999F 0.3 200
Q410 Q411	5230016620	SI.TR.25A999F 0.3 200
R400	5240028420	R.,CARBON R20 1.2K J FT
R401 R402	5240032220	R.,CARBON R20 47K J FT
R403	5240033020	R.,CARBON R20 100K J FT
R404	5240035220	R.,CARBON R20 820K J FT
R405	5241241600	R.,CARBON;2W 47 NONFLAMBS
R406	5240031420	R.,CARBON R10 22K
R407	5240026620	R.,CARBON R20 220 J FT
R408	5240028220	R.,CARBON R20 1.0K J FT
R409 R410	5240025020	R.,CARBON R20 47 J FT
R411	5240025020	R.,CARBON R20 47 J FT
R412 R413	5240027020	R.,CARBON R20 330 J FT
R415	5240027020	R.,CARBON R20 330 J FT
R416 R417	5180062000	R.,CARBON R50 150 J FR
R418	5180062000	R.,CARBON R50 150 J FR
R419 R420	5240031420	R.,CARBON R10 22K
R421	5240031420	R.,CARBON R10 22K
R422	5240028220	R.,CARBON R20 1.0K J FT
R423	5240031420	R.,CARBON R10 22K
R424	5185790000	R.,FILM 1W 1K RSX1
R425	5240029420	C.,CARBON R20 3.3K J FT

REF. NO.	PARTS NO.	DESCRIPTION
R426 R427	5240028220	C.,CARBON R20 1.0K J FT
R428 R429	5240028220	C.,CARBON R20 1.0K J FT
R430 R431	5240028220	C.,CARBON R20 1.0K J FT
R432 R433	5240026220	C.,CARBON R20 150 J FT
R434 R435	5240026220	C.,CARBON R20 150 J FT
R436 R437	5240026220	C.,CARBON R20 150 J FT
R438 R439	5240026220	C.,CARBON R20 150 J FT
R440	5240029820	C.,CARBON R20 4.7K J FT
R441 R442	5240029820	R.,CARBON R20 4.7K J FT
R443	5240029820	R.,CARBON R20 4.7K J FT
U400	5220805900	LSI M5L2764K
U401	5220038300	IC,M74L5373P
U402	6048934000	IC,MC140138CP
U403	5220805700	IC,M5L8039P-6
U404 U405	5220806200	LSI M5L8243P
U406	5220806200	LSI M5L8243P
U407 U408	6048105000	TR. ARRAY,M54519P
U409	5232250900	TR.,ARRAY BA6251
U410 U411	5242110600	RESISTOR ARRAY,4.7KX8
U412	5242110600	RESISTOR ARRAY,4.7KX8
U415	6048932000	IC,MC140118CP
U416	5232252020	SI.TR.25C3400
U417 U418	5232251620	SI.TR.25A1346 0.3 200
U419 U420	5232251620	SI.TR.25A1346 0.3 200
U421 U422	5232252020	SI.TR.25C3400
U423 U424	5232252020	SI.TR.25C3400
U425	5232252020	SI.TR.25C3400
Y400	5347001300	OSC,CERAMIC KRB-6.0M

MONITOR SW PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176800	MONITOR SW PCB ASSY
	*5210176800	MONITOR SW PCB
P101	5122146000	CONNECTOR,PLUG 3P
P102	5122148000	CONNECTOR,PLUG 5P
S101-J103	5300041400	PUSH SW 3GANG 2-2 SUN33

DBX SW PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200176600	DBX SW PCB ASSY
	*5210176600	DBX SW PCB
D101 D102	5225007100	LED,GL-9NG2 GRN
P101	5122147000	CONNECTOR,PLUG 5046-04A W
R101 R102	5240027420	R.,CARBON 470 J FT
S101 S102	5300040800	PUSH SW 2-2 SUN212A

HEAD CONNECT PCB ASS'Y

REF. NO.	PARTS NO.	DESCRIPTION
	*5200177200	PCB ASS'Y, HEAD CONNECT
	*5210177200	HEAD CONNECT PCB
J001 J002	5332015300	IC SOCKET,16P

BIAS PCB ASSY(1) & BIAS PCB ASSY(2)

REF. NO.	PARTS NO.	DESCRIPTION
	*5200177100	BIAS PCB ASSY(1)
	*5200180400	BIAS PCB ASSY(2)
	*5210177101	BIAS PCB
C101 C201	5260162750	C.,ELEC. 10UF35V M SM VT
C102 C202	5260160750	C.,ELEC. 1UF50V SM T-N
C103 C203	5267205900	C.,TRIMMER 180PF
C104 C204	5260161550	C.,ELEC. 3.3UF 50V
C105 C205	5260162050	C.,ELEC. 4.7UF 35V
C106 C206	5263104120	C.,POLYPRO.0.033UF
C301 C401	5260162750	C.,ELEC. 10UF35V M SM VT
C302 C402	5260160750	C.,ELEC. 1UF50V SM T-N
C303 C403	5267205900	C.,TRIMMER 180PF
C304 C404	5260161550	C.,ELEC. 3.3UF 50V
C305 C405	5260162050	C.,ELEC. 4.7UF 35V
C306 C406	5263104120	C.,POLYPRO.0.033UF
C504	5260161550	C.,ELEC. 3.3UF 50V [BIAS (1) PCB ASSY]
D101 D201	5224015020	DIODE,1SS133T-77
D102 D202	5224015020	DIODE,1SS133T-77
D103 D203	5224015020	DIODE,1SS133T-77
D104 D204	5224544401	DIODE,ZENER RD18EB3 FR
D301 D401	5224015020	DIODE,1SS133T-77
D302 D402	5224015020	DIODE,1SS133T-77
D303 D403	5224015020	DIODE,1SS133T-77
D304 D404	5224544401	DIODE,ZENER RD18EB3 FR
J101	5122376000	CONNECTOR,SOCKET 3024-05A
J201	5122376000	CONNECTOR,SOCKET 3024-05A
J301	5122376000	CONNECTOR,SOCKET 3024-05A
J401	5122376000	CONNECTOR,SOCKET 3024-05A
J501	5122375000	CONNECTOR,SOCKET 3024-04A
L101 L201	5286024700	COIL,CHOKE 1.8MH
L102 L202	5286011500	COIL,CHOKE 200UH
L301 L401	5286024700	COIL,CHOKE 1.8MH
L302 L402	5286011500	COIL,CHOKE 200UH
Q101 Q201	5230779720	SI.TR.25C945A KA 0.25 250
Q102 Q202	5042625000	SI.TR.25C-13185 0.4 200
Q301 Q401	5230779720	SI.TR.25C945A KA 0.25 250
Q302 Q402	5042625000	SI.TR.25C-13185 0.4 200
R101 R201	5240030620	R.,CARBON R10 10K
R102 R202	5240026620	R.,CARBON R20 220 J FT
R103 R203	5240030820	R.,CARBON R20 12K J FT
R104 R204	5240030620	R.,CARBON R10 10K
R105 R205	5240030620	R.,CARBON R10 10K
R106 R206	5240027620	R.,CARBON R20 560 J FT
R107 R207	5240033020	R.,CARBON R20 100K J FT
R108 R208	5183552000	R.,CARBON F25 8.2 NONFLAM
R135 R235	5240029820	R.,CARBON R20 4.7K J FT
R170 R270	5240030620	R.,CARBON R10 10K
R301 R401	5240030620	R.,CARBON R10 10K
R302 R402	5240026620	R.,CARBON R20 220 J FT
R303 R403	5240030820	R.,CARBON R20 12K J FT
R304 R404	5240030620	R.,CARBON R10 10K
R305 R405	5240030620	R.,CARBON R10 10K
R306 R406	5240027620	R.,CARBON R20 560 J FT
R307 R407	5240033020	R.,CARBON R20 100K J FT
R308 R408	5183552000	R.,CARBON R25 8.2 NONFLAM
TP01 TP11	5544750000	PIN,COMBINATION
TP02 TP12	5544750000	PIN,COMBINATION
TP03 TP13	5544750000	PIN,COMBINATION
TP04 TP14	5544750000	PIN,COMBINATION
U101 U201	5292204401	BIAS AMP MODULE
U301 U401	5292204401	BIAS AMP MODULE
U501	5292204300	BIAS OSC MODULE [BIAS PCB (1) only]

TR PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200175500	TR PCB ASSY
	*5210175500	TR PCB
C1 C2	5260162150	C.,ELEC.4.7MF 50V
C3 C4	5260162150	C.,ELEC.4.7MF 50V
Q2	△ 5145129000	SI.TR.25B-507 30 8
Q1	△ 5145188000	SI.TR.25D-313E 30 8
Q3 Q4	△ 5145188000	SI.TR.25D-313E 30 8
Q5	△ 5145188000	SI.TR.25D-313E 30 8
U1	△ 5220424800	IC, L7805
U2	△ 5220425700	IC, L7824

FUSE PCB ASSY(1) [J,US,C,GE]

REF. NO.	PARTS NO.	DESCRIPTION
	*5200174400	FUSE PCB ASSY(1)-A [J,US,C]
	*5200185400	FUSE PCB ASSY(1) [GE]
	*5210174400	FUSE PCB(1)
	5041237000	HOLDER,FUSE PCB
	△ 5302101700	SW.,VOLUME SELECT FS907G [GE only]
F1	△ 5307021400	FUSE,T3A250V UL
F2 F3	△ 5307021000	FUSE,T2A250V UL
F4	△ 5307020400	FUSE,T1A250V UL
F5	△ 5307021400	FUSE,T3A250V UL

FUSE PCB ASSY(2) [EUR,UK,A]

REF. NO.	PARTS NO.	DESCRIPTION
	*5200174500	FUSE PCB ASSY(2)
	*5210174500	FUSE PCB(2)
	5142087000	HOLDER,FUSE;PCB
F1 F3	△ 5142191000	FUSE,3.15A-250V T;MINI
F2	△ 5142189000	FUSE,2A-250V OLVIS (T)
F4	△ 5142187000	FUSE,1.25A-250V (T)
F5	△ 5142191000	FUSE,3.15A-250V T;MINI

VR AMP PCB ASSY

REF. NO.	PARTS NO.	DESCRIPTION
	*5200186100	VR AMP PCB ASSY
	*5210186100	VR AMP PCB
R101-R106	5260162550	R.,TRIMMER 470K(B)
R203-R208	5260162550	R.,TRIMMER 470K(B)

PHONE AMP PCB ASSY

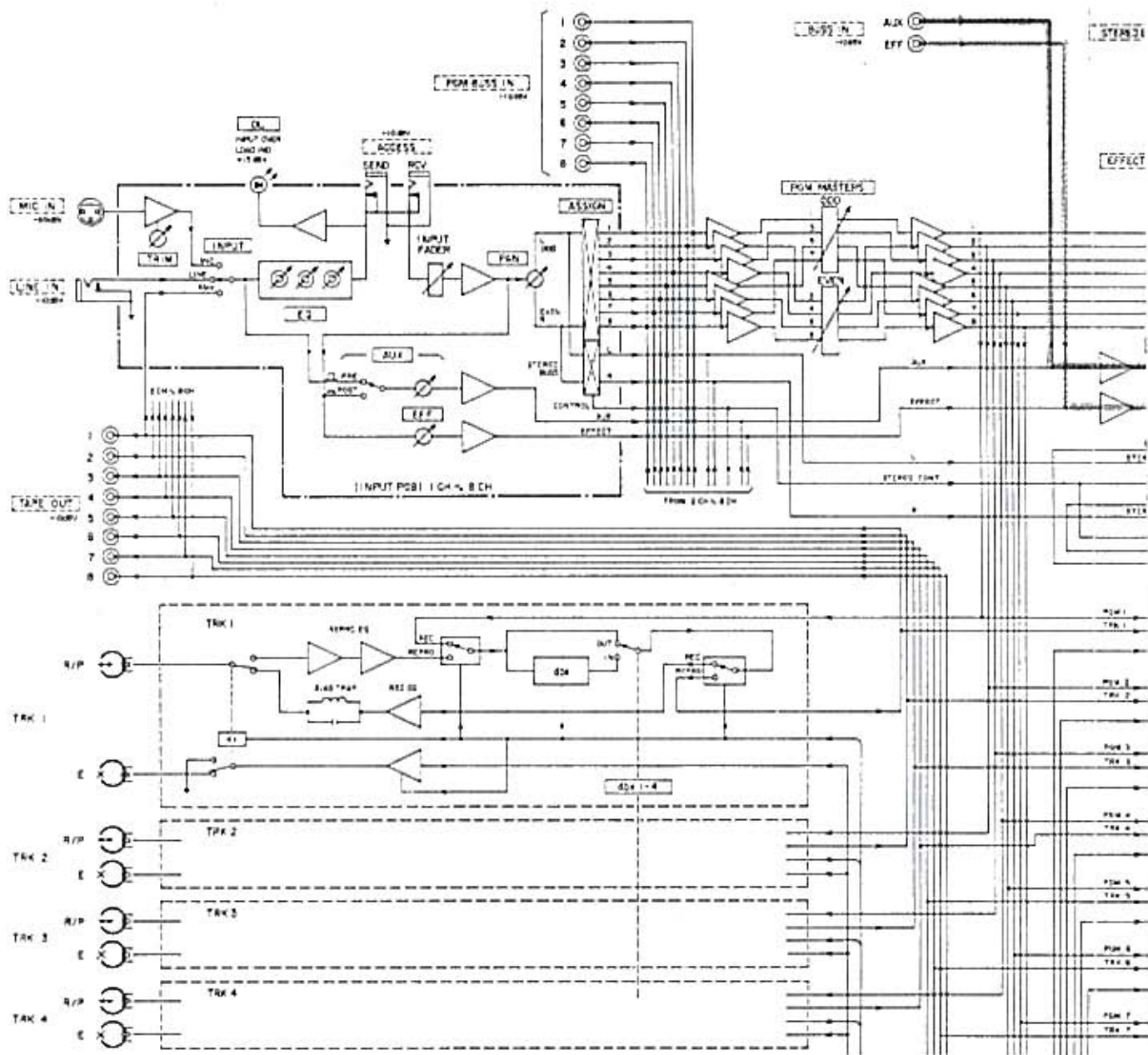
REF. NO.	PARTS NO.	DESCRIPTION
	*5200175200	PHONE AMP PCB ASSY
	*5210175200	PHONE AMP PCB
C101 C201	5260162550	C.,ELEC.10UF 16V
C102 C202	5260166052	C.,ELEC. 100UF/16V M USM
C103 C203	5260166052	C.,ELEC. 100UF/16V M USM
C104 C204	5173070000	C.,ELEC.SM 470UF/6.3V
C105 C105	5263167523	C.,METALIZED; 0.047UF 50V
C106 C206	5260163452	C.,ELEC. 22UF 25V
C107 C207	5260163452	C.,ELEC. 22UF 25V
C110	5172970000	C.,ELEC. 1000UF 16V
D101	5225007900	LED,GL-9PR2 RED V-50
P101	5122203000	CONNECTOR,PLUG 5046-03A B
P102	5122146000	CONNECTOR,PLUG 3P 40-4
P103	5122454000	CONNECTOR,PLUG 5046-03A R
P104	5336174300	CONNECTOR PLUG 5046-03A Y
P105	5122148000	CONNECTOR,PLUG 5P 40-4
R101	5282411100	1S2UVR 16, 10KX2
R102 R202	5240032420	R.,CARBON R20 56K J FT
R103 R203	5240031420	R.,CARBON R10 22K
R104 R204	5240033020	R.,CARBON R20 100K J FT
R105 R205	5240028220	R.,CARBON R20 1.0K J FT
R106 R206	5240021020	R.,CARBON R20 1.0 J FT
R107 R207	5240032220	R.,CARBON R20 47K J FT
R108 R208	5240033020	R.,CARBON R20 100K J FT
R109 R209	5240023420	R.,CARBON R20 10 J FT
R110 R210	5240025800	R.,CARBON R20 100 J FT
R120	△5183566000	R.,CARBON F25 33 NONFLAM
R301	5282015200	1S1UVR 16, 20KB
S101	5301205300	ROTARY SW 2-3 SRU1023
U101 U102	6048649000	IC,NJM386D
U103	5220406700	IC,RC455BP,TI
U104	5220411000	IC,NJM78M06A,

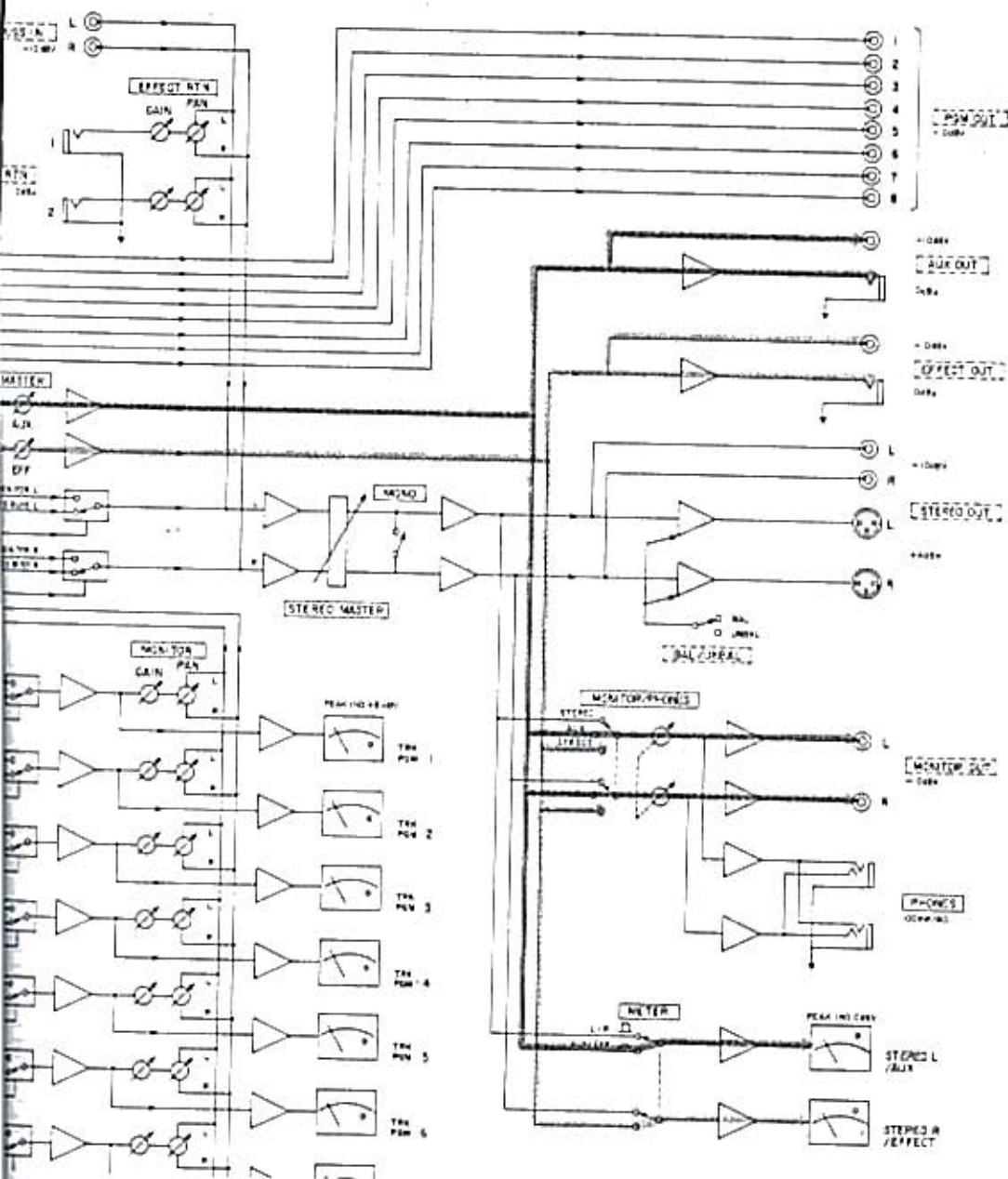
**1-4-5. BUSS IN AUX → AUX OUT
BUSS IN EFF → EFFECT OUT**

1. Apply a 1 kHz, -10 dBV (0.3 V) signal to the BUSS IN AUX (EFF) jack.
2. Set the METER switch to AUX/EFF.
3. Set the MONITOR/PHONES switch to AUX (EFF).
4. Adjust the MASTER AUX (EFF) knob for a

-10 dBV (0.3 V) reading at the AUX OUT (EFF OUT).

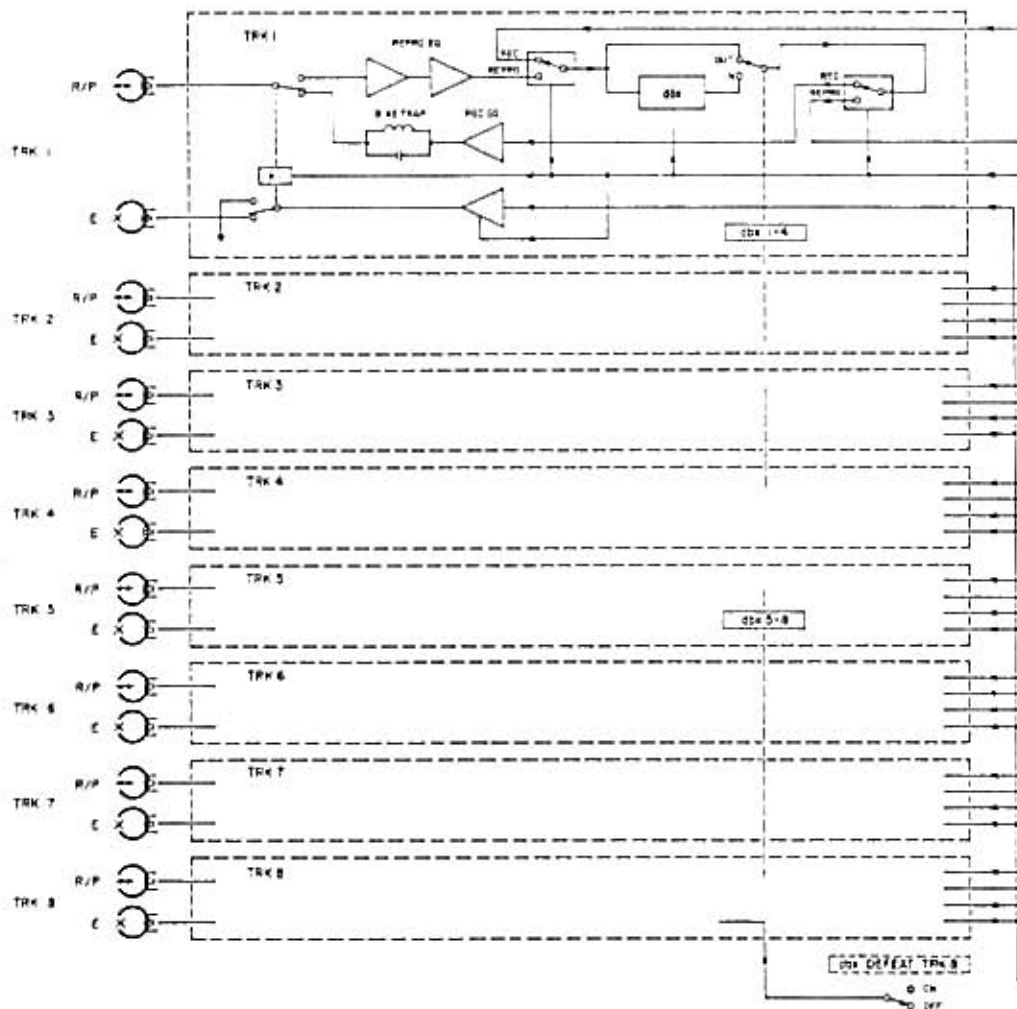
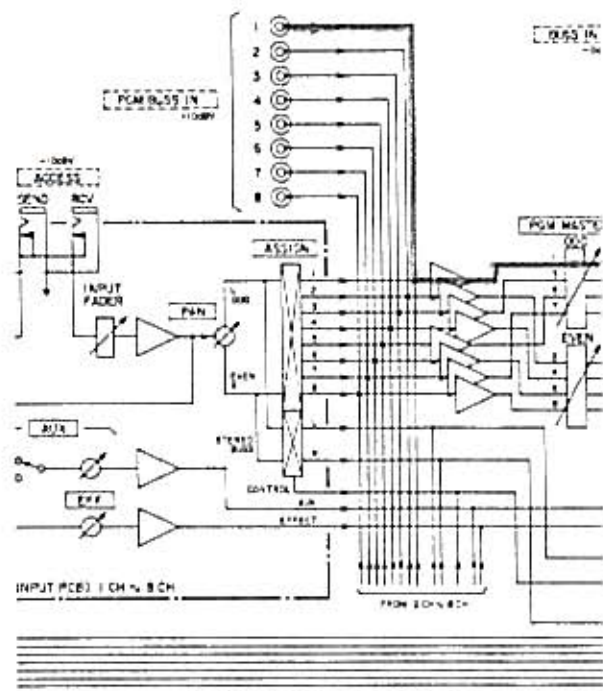
5. Confirm that the AUX (EFFECT) VU meter indicates 0 VU and check the level at MONITOR OUT.

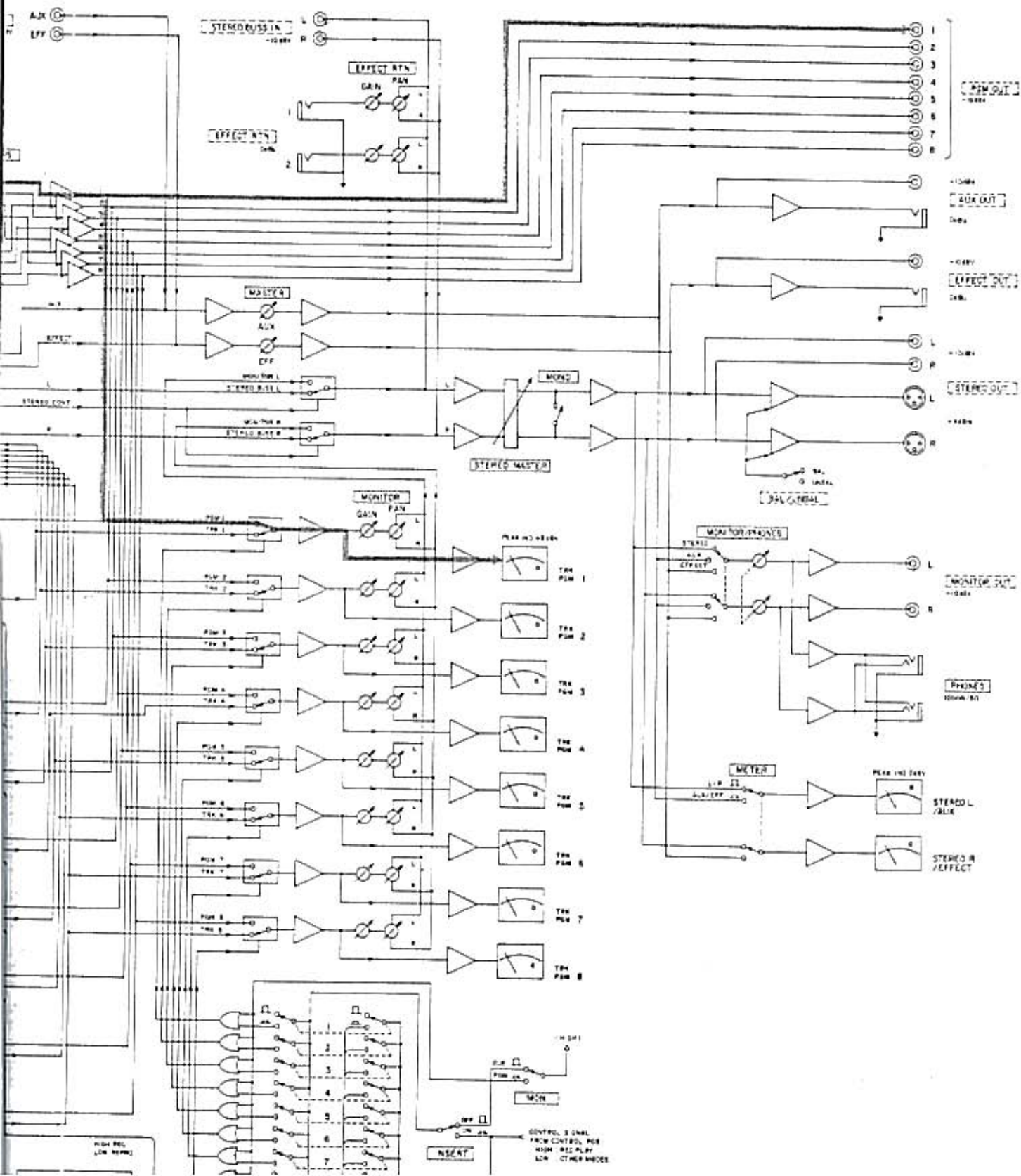




1-4-6. PGM BUSS IN → PGM OUT

1. Depress the REC FUNCTION switches to ON.
2. Apply a 1 kHz, -10 dBV (0.3 V) signal to PGM BUSS IN jack.
3. Adjust the PGM MASTER fader for a -10 dBV (0.3 V) reading at the PGM OUT.
4. PGM MASTER fader should then be in the shaded area between 7 and 8.
5. Confirm that the PGM VU meters indicate 0 VU. If the VU meters not indicate 0 VU, adjust calibrating pot R101 for PGM 1.
6. Connect the level meter to the remaining channel outputs (PGM 2 to 8) and proceed to adjustment in the same manner, by adjusting: (Fig. 1-4-1, on page 1-12)
 R121: for PGM 2, R141: for PGM 3
 R161: for PGM 4, R181: for PGM 5
 R201: for PGM 6, R221: for PGM 7
 R241: for PGM 8,
7. The PEAK level LED should light up at 18 dB \pm 1 dB (2.2 V to 2.8 V) above nominal level of -10 dBV (0.3 V) at STEREO BUSS IN.

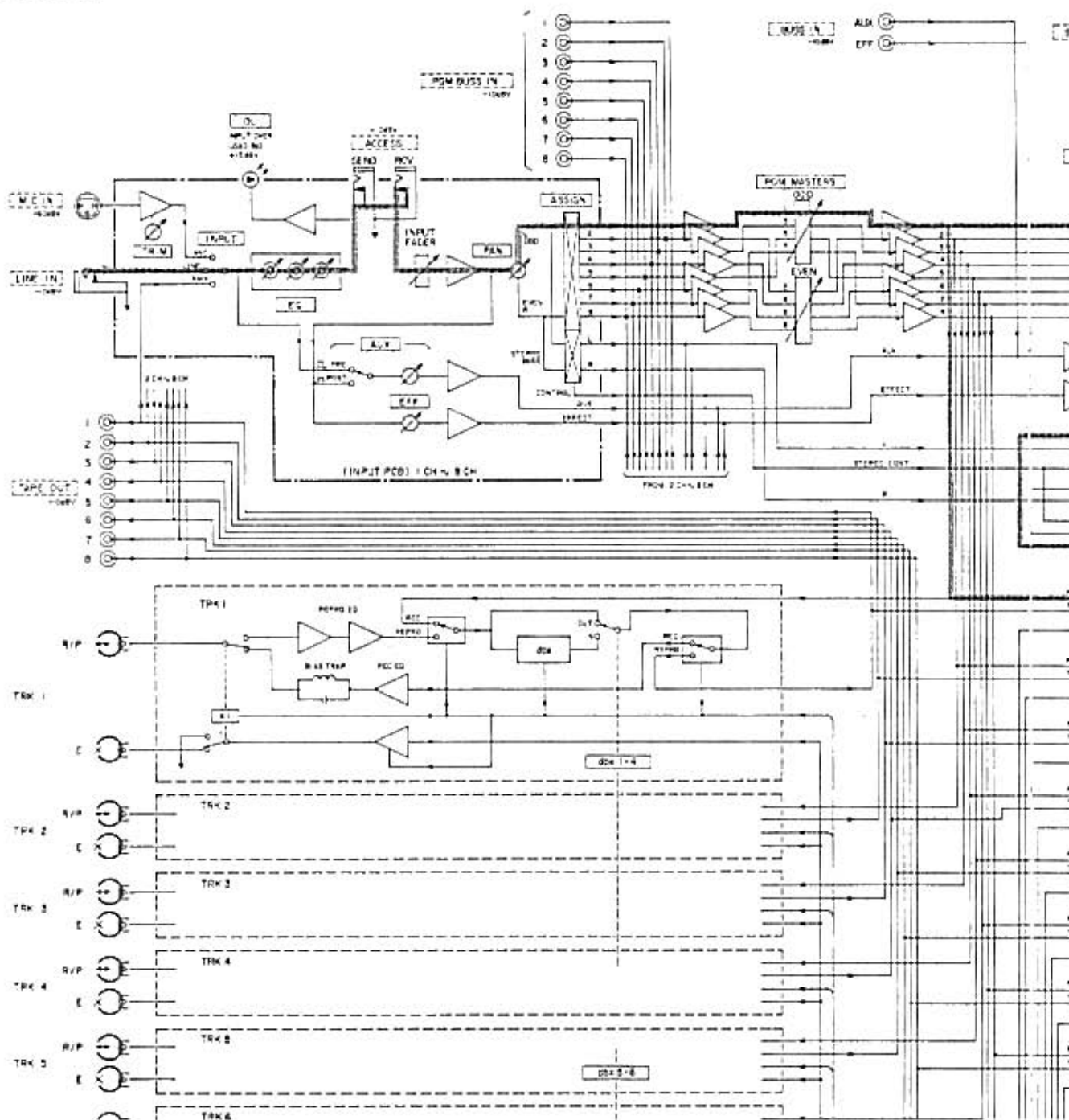


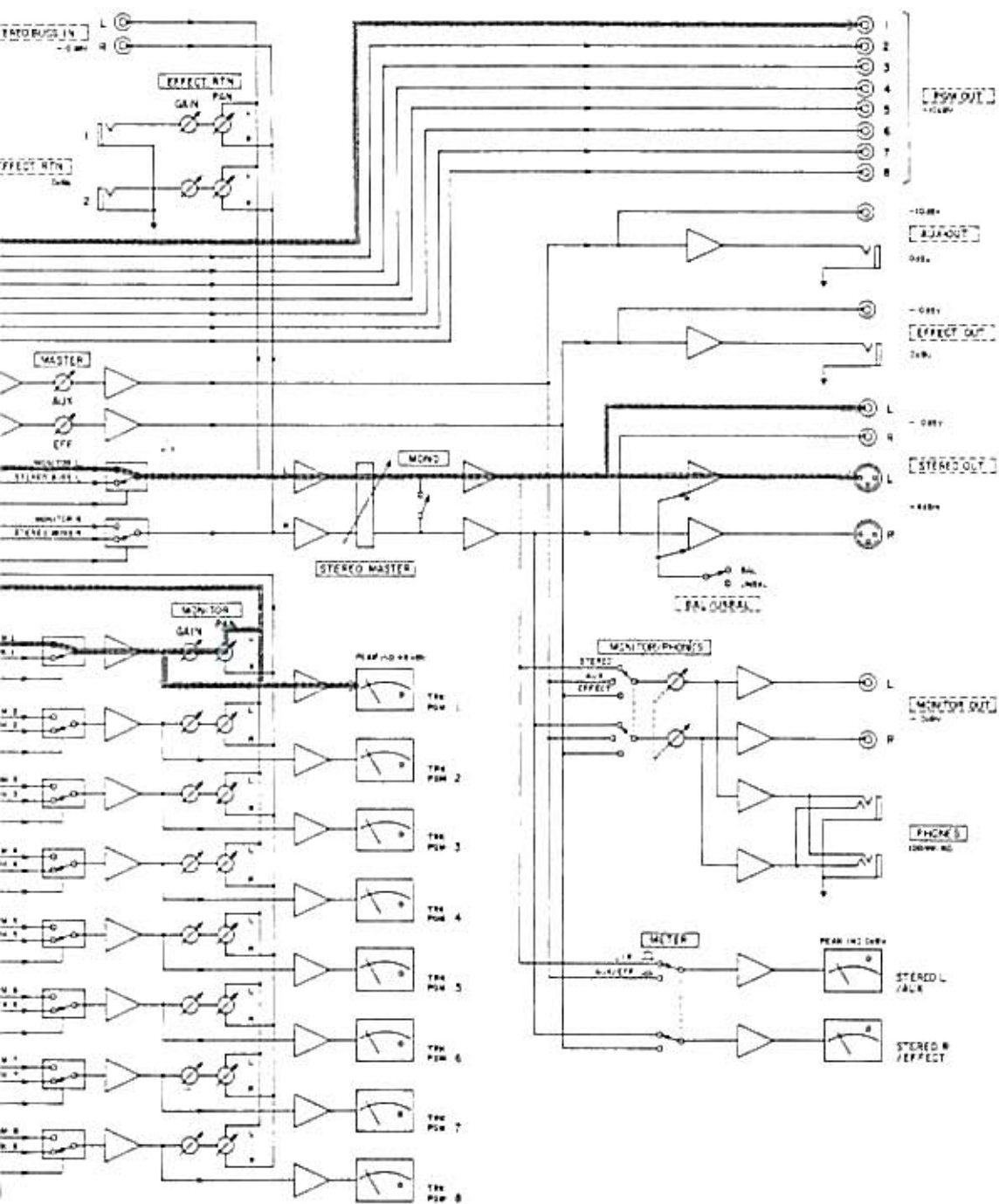


1-4-7. LINE IN → PGM OUT

1. With a 1 kHz, -10 dBV (0.3 V) signal connected to the LINE IN jack, set the INPUT switch to LINE.
2. Set the input PAN to position L/ODD (fully CCW).
3. Depress the ASSIGN 1 and L switches to on.
4. Adjust the Input Fader for a -10 dBV (0.3 V) reading at PGM OUT 1 and STEREO OUT jacks.
5. Input Fader should then be in the shaded area between 7 and 8.

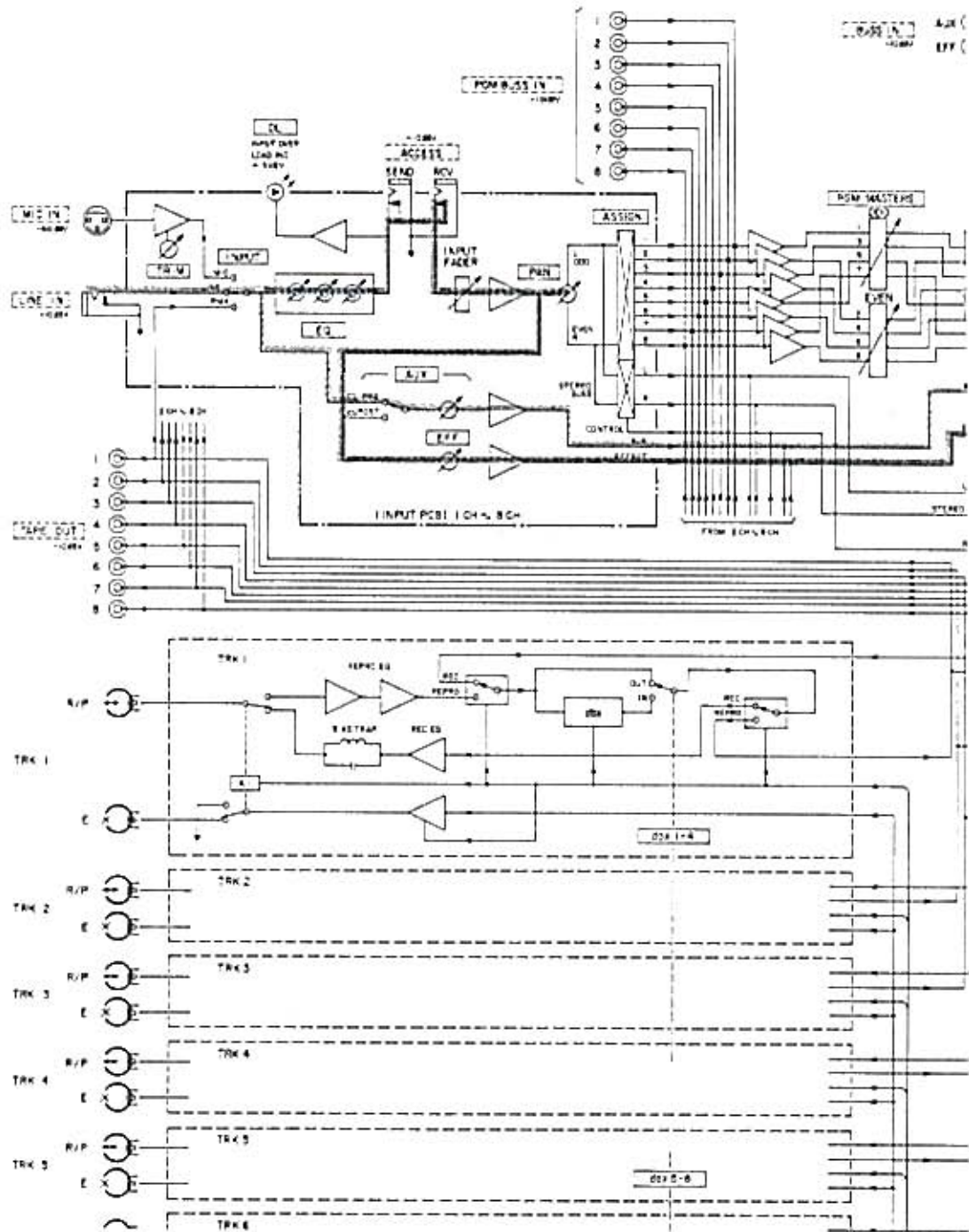
6. Confirm that the VU meters indicate 0 VU.
7. The remaining channels 2 to 8 should also be checked in the same manner, with the PAN knob turned fully CW for assignment to EVEN PGM busses.
8. Set the PAN knob to the center position. Output level at each ASSIGNED PGM busses should be -12.5 dB ± 1 dB.

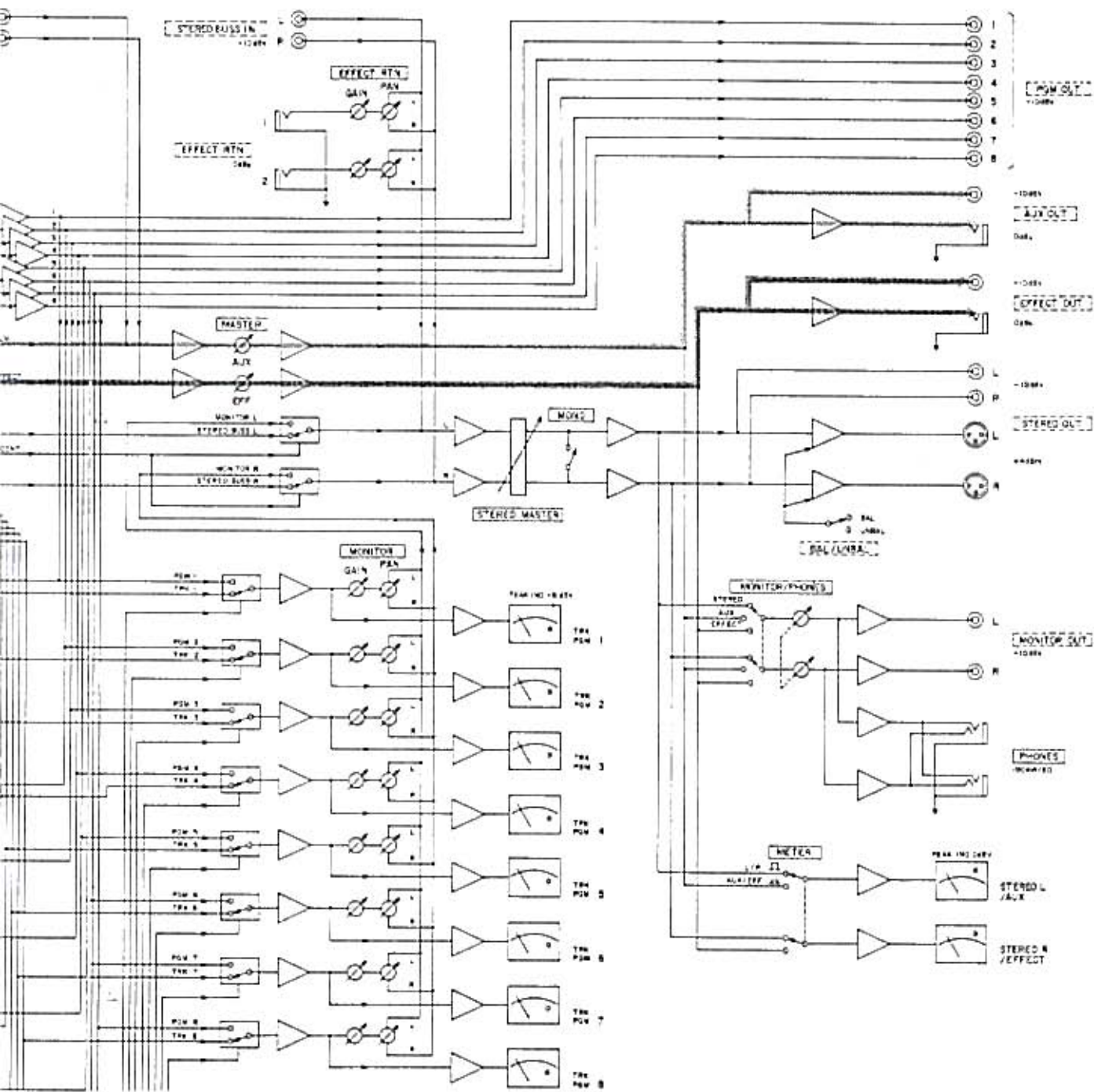




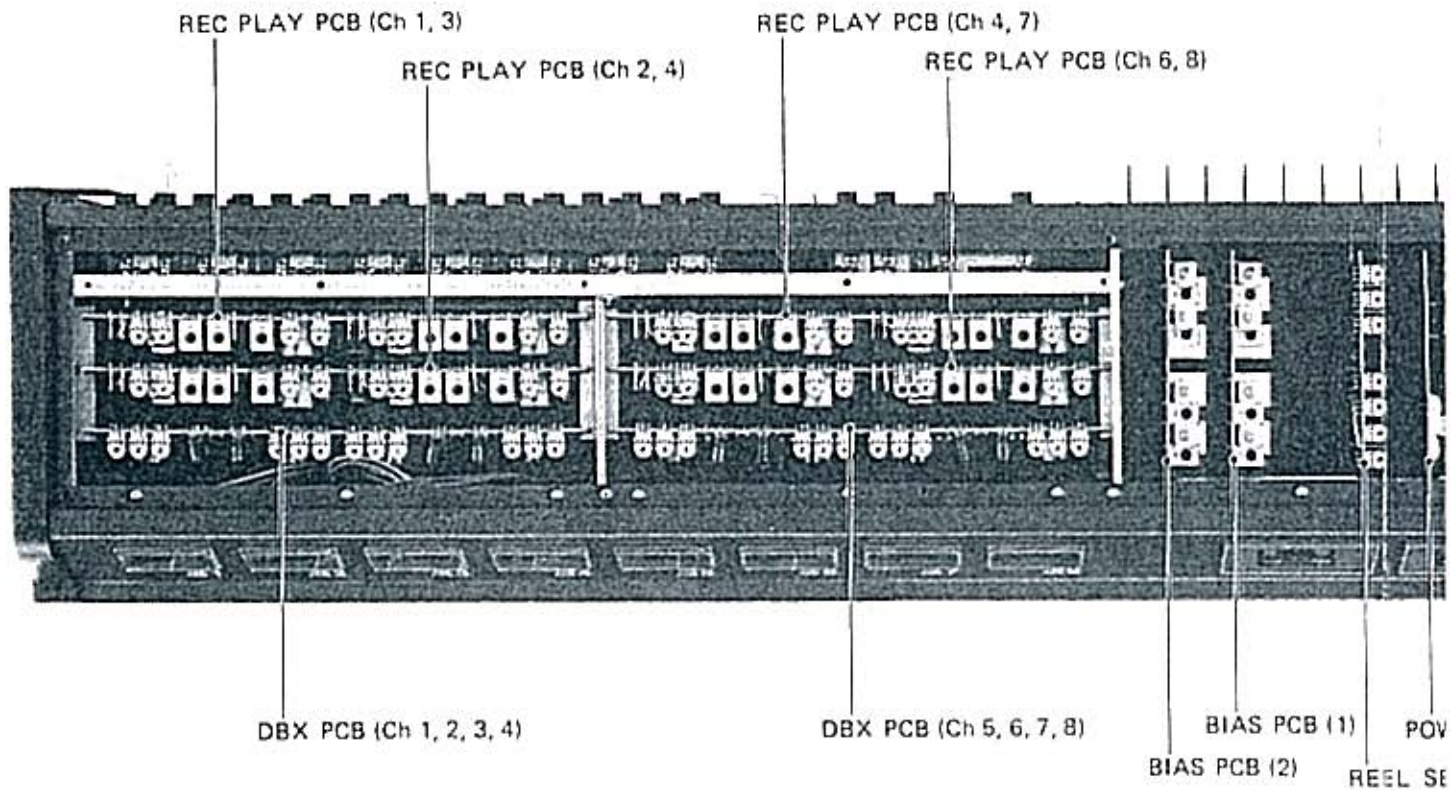
1-4-8. LINE IN → AUX OUT
EFFECT OUT

1. Apply a 1 kHz, -10 dBV (0.3 V) signal to the LINE IN jack.
2. Set the INPUT switch to LINE and the AUX switch to PRE.
3. Adjust the AUX and EFF knobs for a -10 dBV (0.3 V) at the AUX OUT and EFFECT OUT jacks.

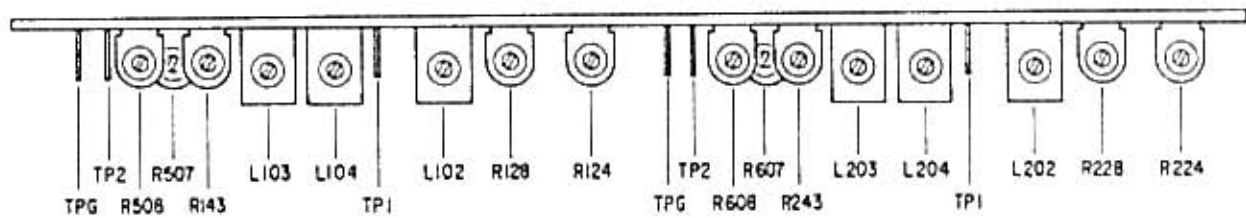




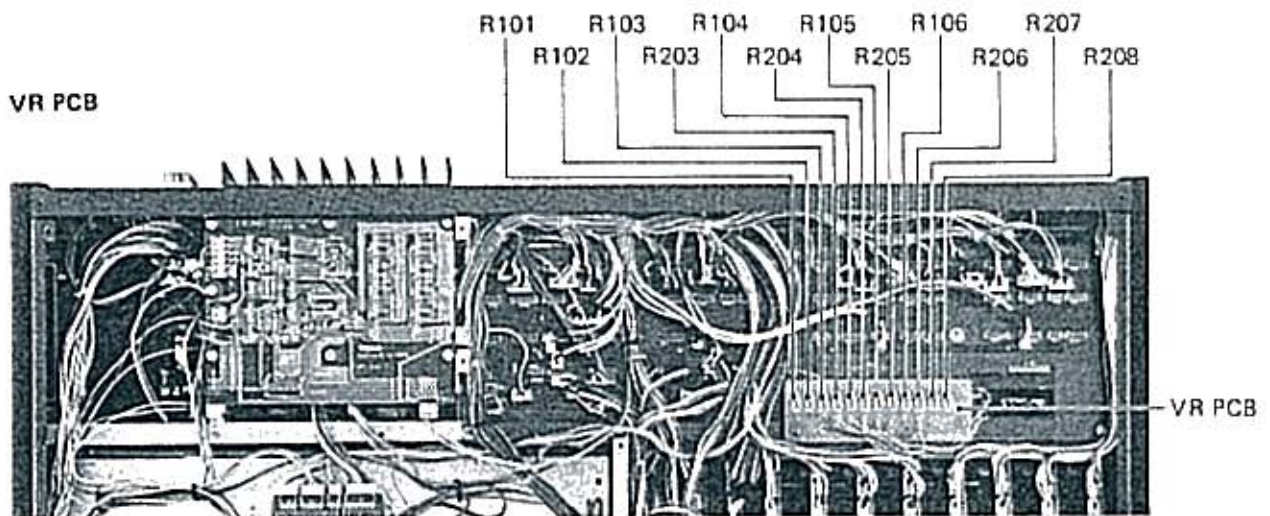
1-5-12. Location of Electrical Adjustment

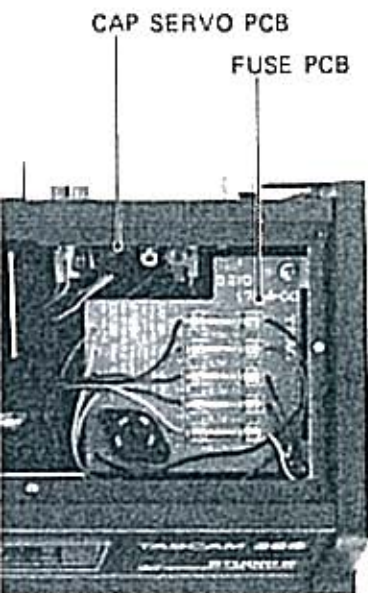


REC PLAY PCB

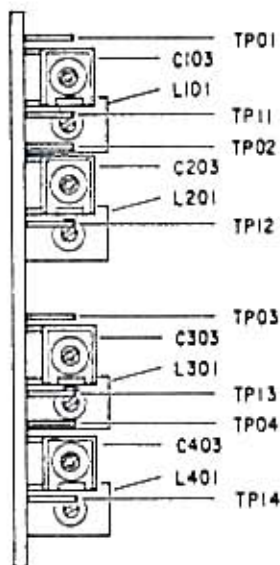


VR PCB

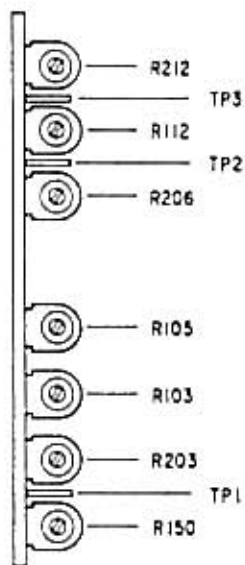




BIAS PCB (1) & (2)



REEL SERVO PCB



POWER SUPPLY PCB

REEL SERVO PCB

REC PLAY PCB

REF. NO.	FUNCTION
R124/R224	Reproduce EQ
R128/R228	Reproduce Level
R143/R243	Recording Level
R507/R607	Crosstalk (Odd to Even)
R508/R608	Crosstalk (Even to Odd)
L102/L202	Bias Trap (Tape Out)
L103/L203	Record EQ
L104/L204	Bias Trap

BIAS PCB

REF. NO.	FUNCTION
C103/C203/C303/C403	Recording Bias
L101/C201/C301/C401	Bias Tuning

REEL SERVO PCB

REF. NO.	FUNCTION
R112	Tension Arm Position (Left)
R105	F.F. Tape Tension
R150	Fast Winding Speed
R212	Tension Arm Position (Right)
R206	Rewind Tape Tension
R103	Play Tape Tension (Back Tension)
R203	Play Tape Tension (Take-up)

DBX PCB (for Adjustment Location see page 1-29)

REF. NO.	FUNCTION
R107/R207/R307/R408	Decoding Level
R108/R208/R308/R408	Encoding Level
R118/R218/R318/R418	VCA Symmetry
R135/R235/R335/R435	RMS Symmetry

CAP SERVO PCB (for Adjustment Location see page 1-9)

REF. NO.	FUNCTION
R807	Tape Speed (EXT)
R815	Tape Speed (FIX)

1-5-13. Service Chart

ADJUST STEP	WHAT IS IT CALLED	SIGNAL SOURCE AND AMOUNT	WHAT TEST GEAR TO USE	WHAT IS THE RECORDER DOING?	POINT TO ADJUST	WHAT READING TO ADJUST FOR
1	Reproduce Head Alignment	TEAC YTT-1003 Playback Alignment Test Tape	VTVM and Oscilloscope with vertical and horizontal inputs connected to TAPE OUT tracks 2 and 7.	Reproduce mode.	Repro head azimuth adjusting screw.	Adjust for maximum output and for output of tracks 2 and 7 less than 90° out of phase (at 10 kHz)
2*	Reproduce Level	400 Hz signal on TEAC YTT-1003 playback Alignment Test Tape	VTVM connected to TAPE OUT jack	Same as above	Trim pot R128/R228	-12.6 dB (0.23 V) on VTVM
3*	REPRO EQ	16 kHz signal on the tape.	Same as above	Same as above	Trim pot R124/R224	Same as above
4*	LINE INPUT Level	400 Hz signal at -10 dB from oscillator connected to LINE IN jack	Same as above	Record mode.	Input Fader	Adjust to read 0 VU on VU meters or -10 dB at PGM OUT.
5*	Bias Trap Adjustment	No input signal	VTVM connected to Bias Trap test point TP-1, negative lead to ground, positive lead to test point.	Record mode, no input signal	Inductor L104	Adjust inductor for minimum output at Trap test point TP-1.
6*	Bias Level Adjustment.	Same as above	VTVM connected between TP2 & TP G.	Same as above	Trim capacitor C103/C203/C303/C403	While recording adjust trim pot until VTVM indicates 150 mV.
7*	Record Level	400 Hz signal at -10 dB (0 VU on VU meters) connected to LINE IN jack	VTVM connected to TAPE OUT jack or use VU meters	Record mode.	Trim pot R143/R243	Set to -10 dB (0.3 V) at TAPE OUT jacks or 0 VU on VU meters
8*	Record/Reproduce Frequency Response.	30 Hz to 16 kHz signal at -20 dB connected to input terminals	Same as above	Same as above	Inductor L103	Same as above
9*	Overall Signal-to-Noise Ratio	No input signal	VTVM connected to TAPE OUT jack	Same as above		Check for 50 dB or better

REPEAT STEP MARKED WITH AN ASTERISK FOR EACH CHANNEL. THE ADJUSTMENT NUMBERS ARE THE SAME BUT THE CIRCUIT BOARD LOCATION, INPUT/OUTPUT TERMINAL NUMBERS, VU METERS, ETC., WILL BE DIFFERENT DEPENDING ON THE CHANNEL.

1-6. DBX PCB ADJUSTMENT

NOTES:

- *This section adjustment is not usually needed unless an adjuster(s) have been changed or a component(s) on the DBX PC board have sustained damage, since the DBX PC board has been precisely adjusted in the factory.
- *Turn the deck OFF to prevent accidental damage when removing or replacing DBX PC board.

1. Apply +12 V to J112-2 and -12 V to J112-4 on the DBX PCB.
2. Apply Low signal to J211-1 and J411-1 to turn DBX on.
3. Set all trim pots to the center position.

Adjustment Point

REF. NO.	FUNCTION
R 107/R207/R307/R408	Decoding Level
R 108/R208/R308/R408	Encoding Level
R 118/R218/R318/R418	VCA Symmetry
R 135/R235/R335/R435	RMS Symmetry

1-6-1. Location of the DBX PCB Adjustments

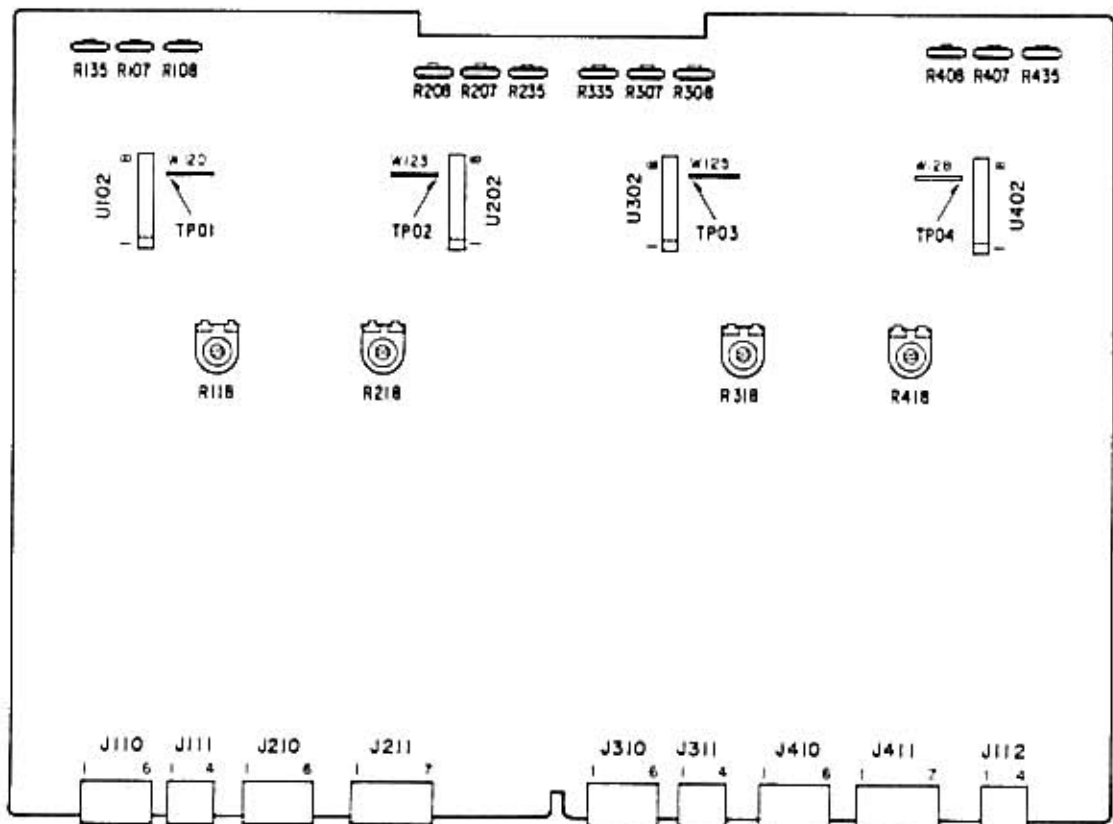
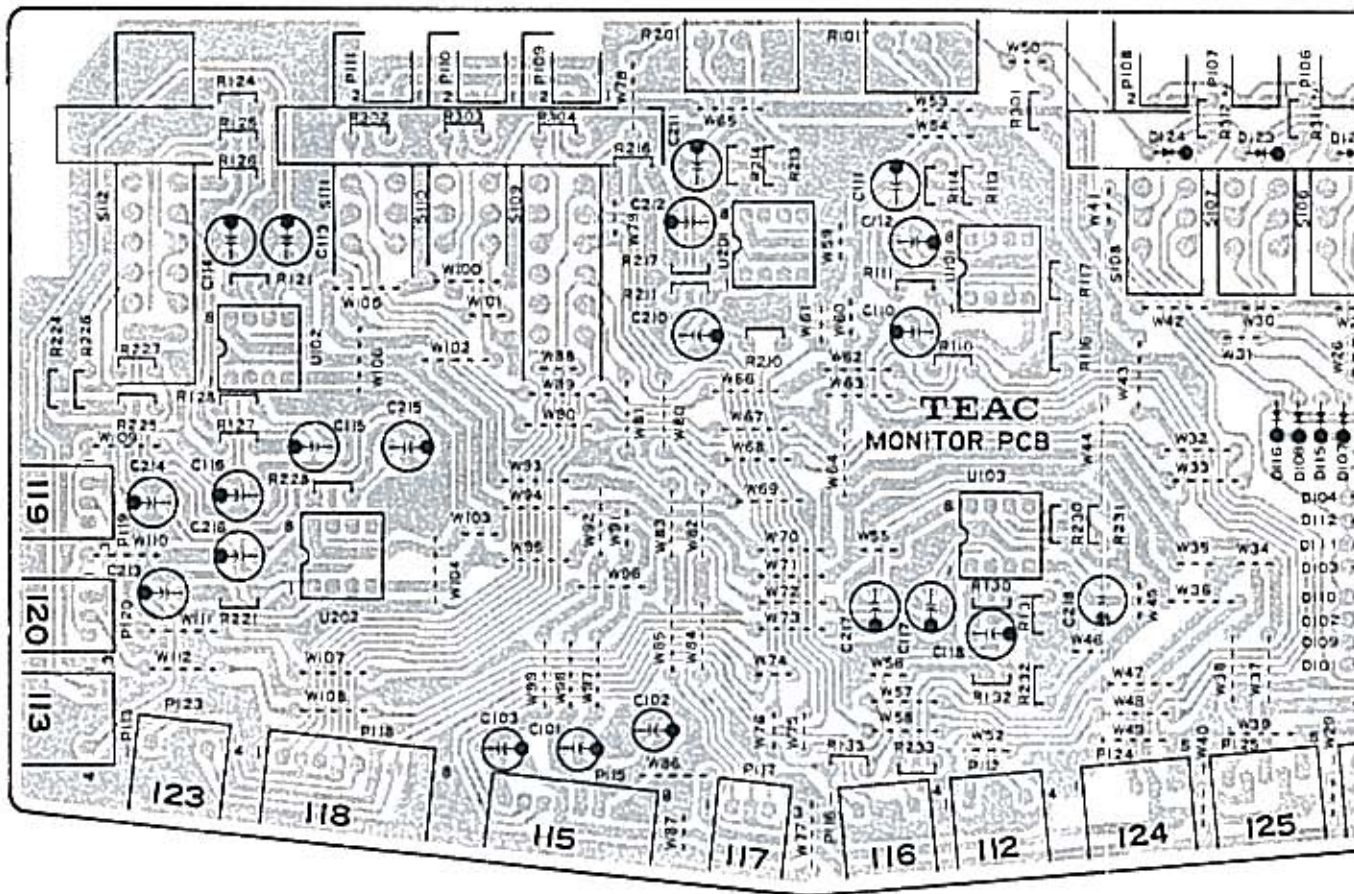
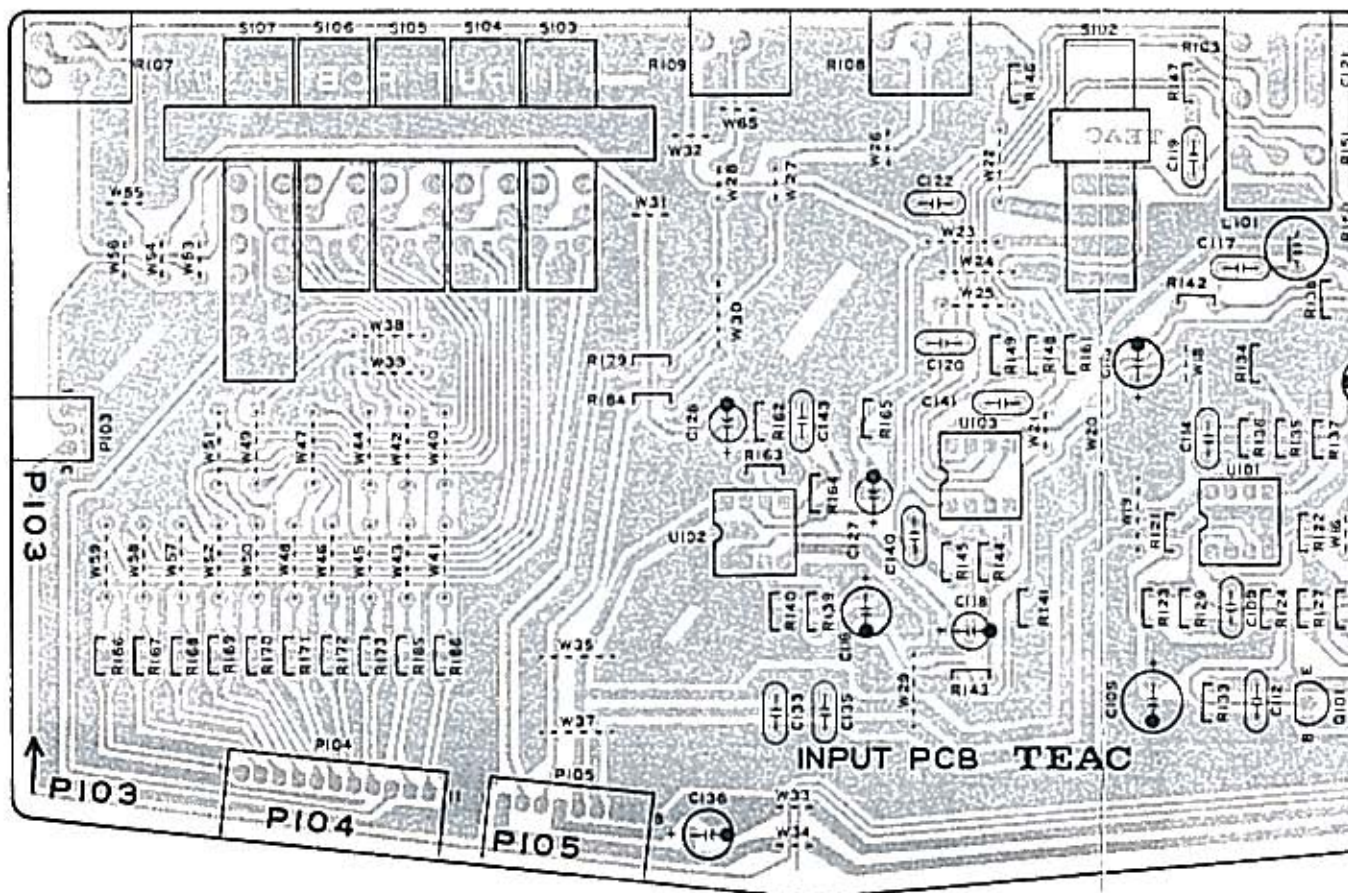


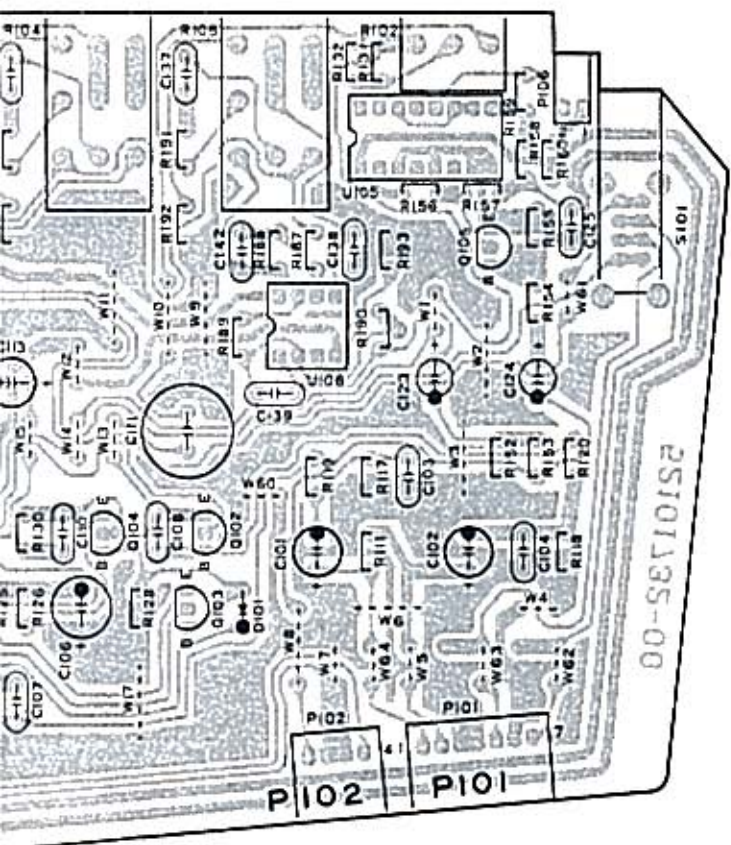
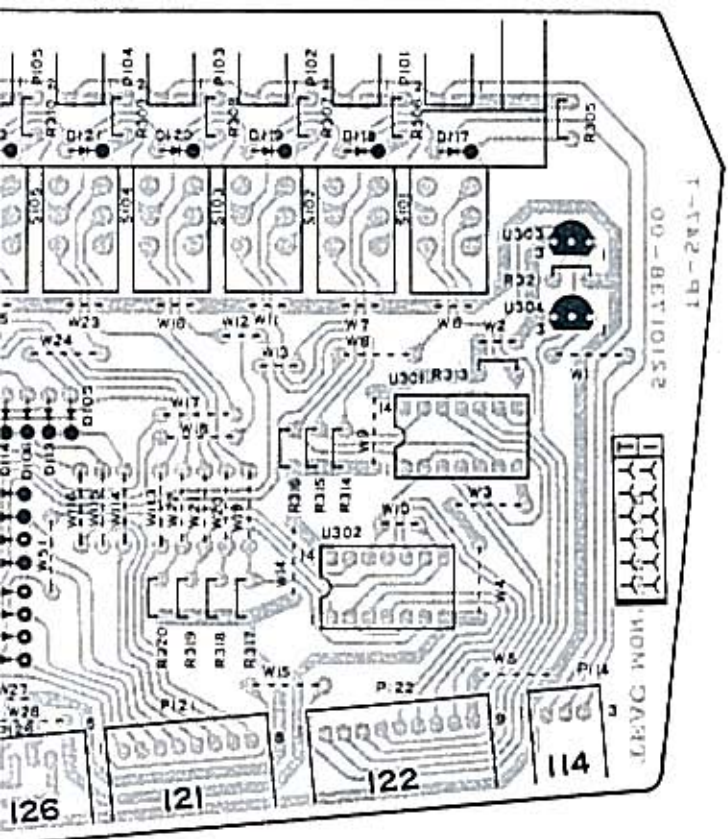
Fig. 1-6-1 DBX PCB Adjustment Point

3-3. MONITOR PCB ASSY

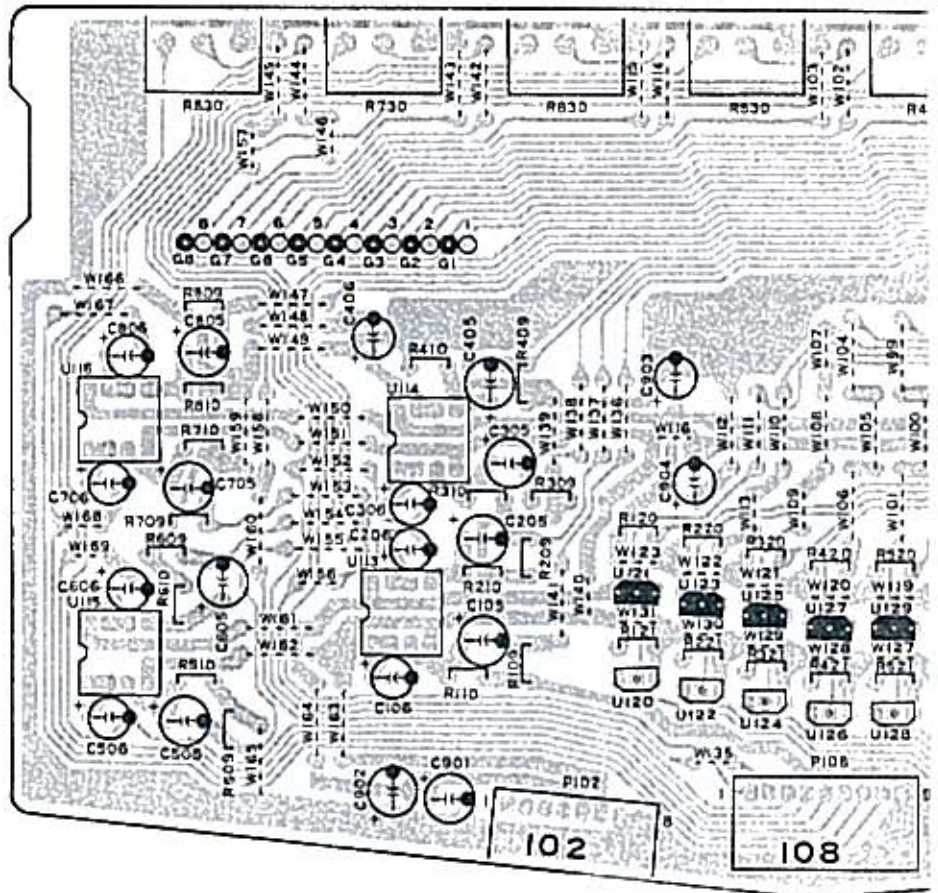


3-4. INPUT PCB ASSY

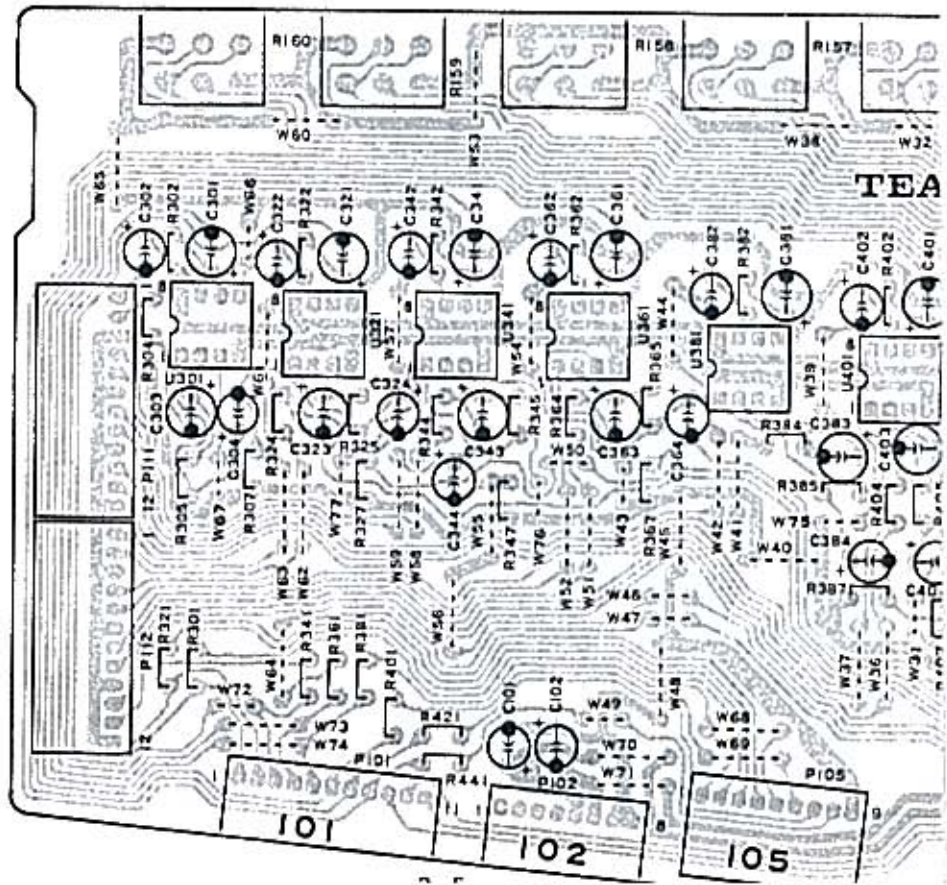


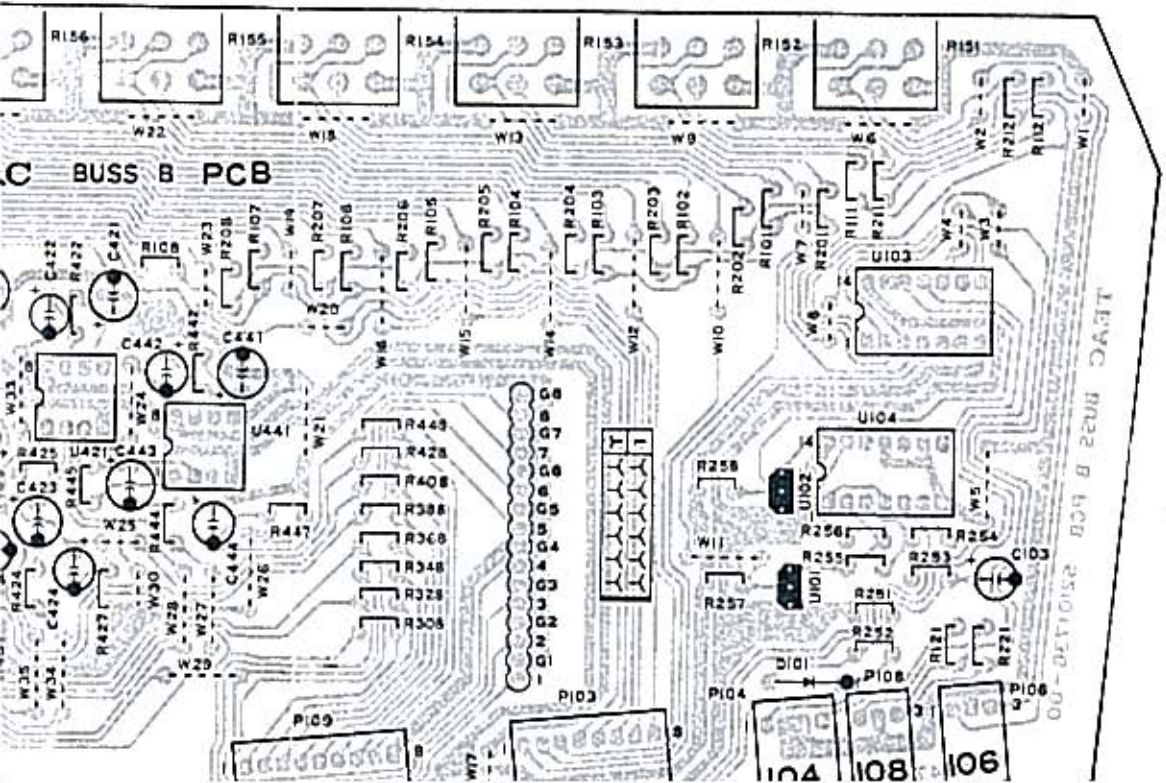
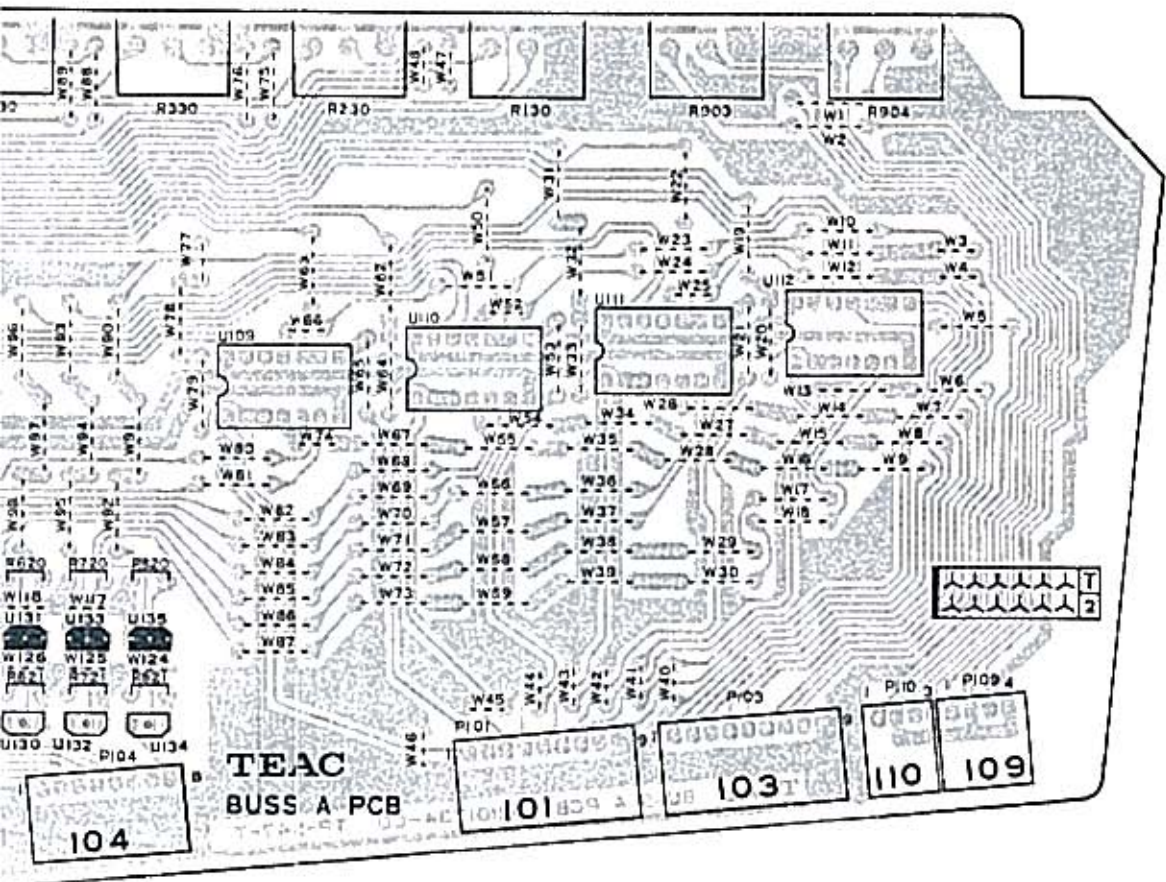


3-5. BUSS PCB ASSY (A)

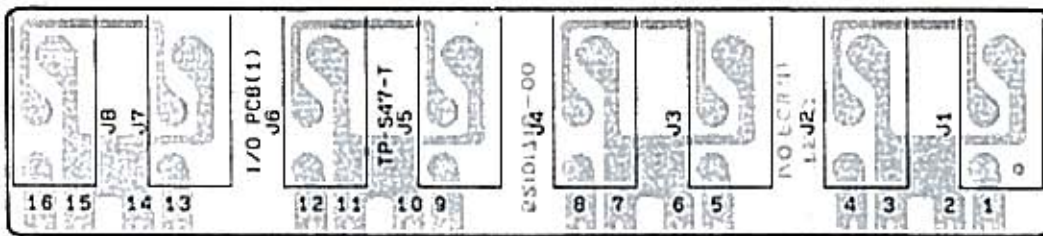


3-6. BUSS PCB ASSY (B)

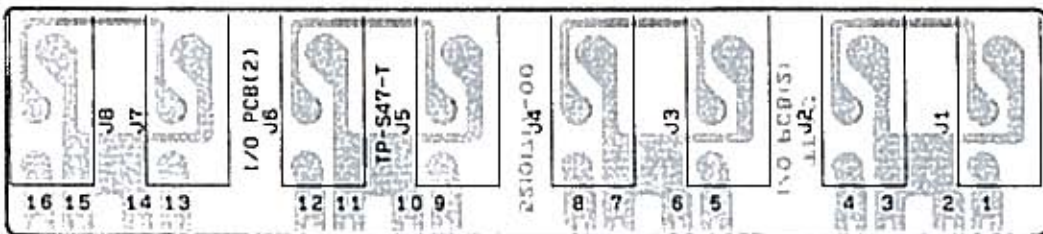




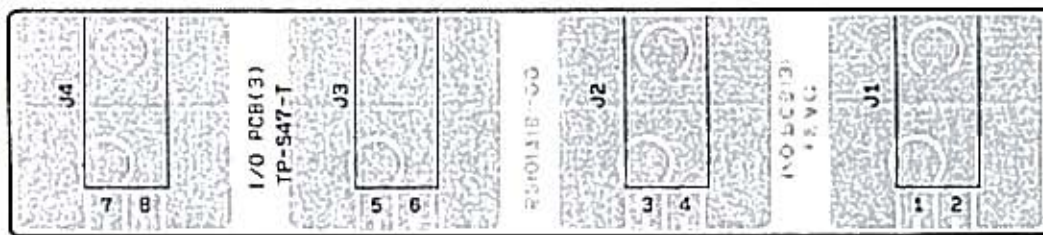
3-7. I/O PCB ASSY (1)



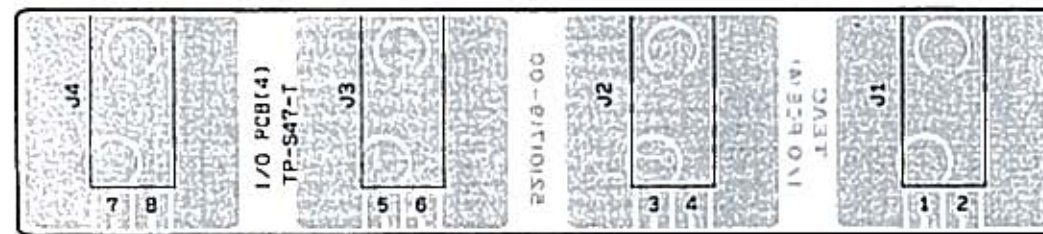
3-8. I/O PCB ASSY (2)



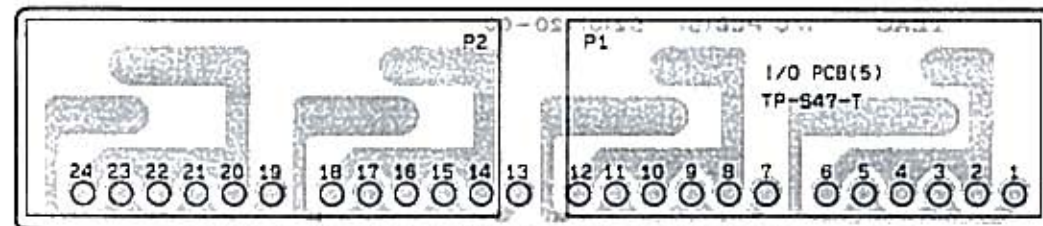
3-9. I/O PCB ASSY (3)



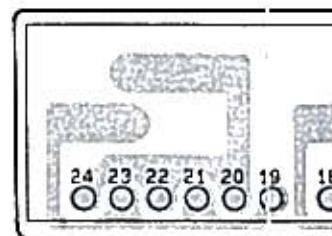
3-10. I/O PCB ASSY (4)



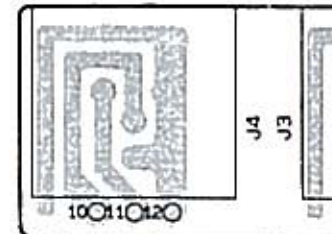
3-11. I/O PCB ASSY (5)



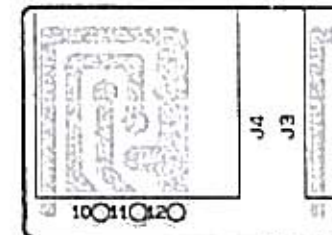
3-12. I/O PCB ASSY (6)



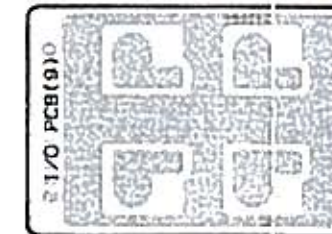
3-13. I/O PCB ASSY (7)



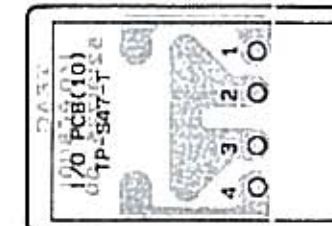
3-14. I/O PCB ASSY (8)



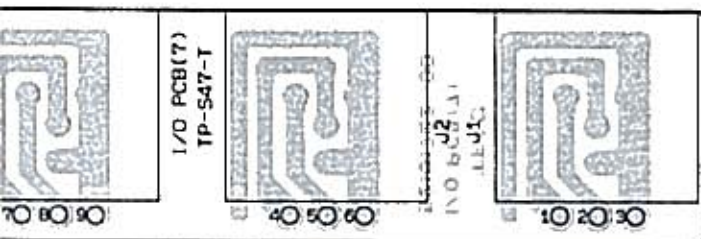
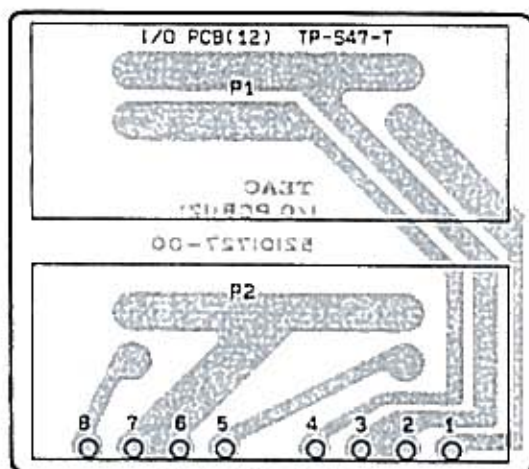
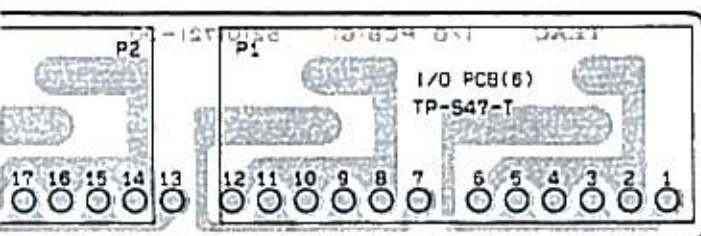
3-15. I/O PCB ASSY (9)



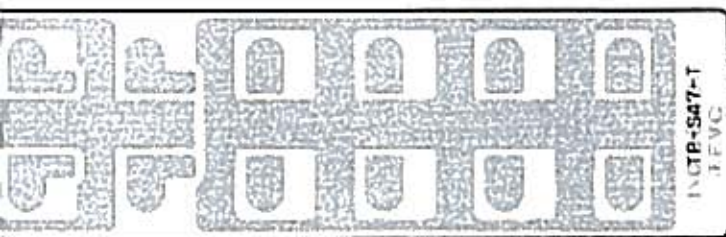
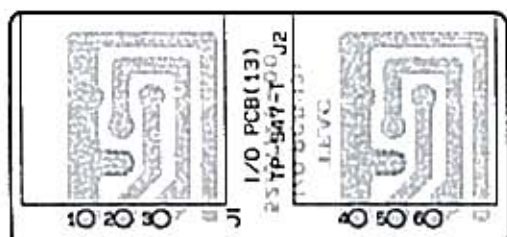
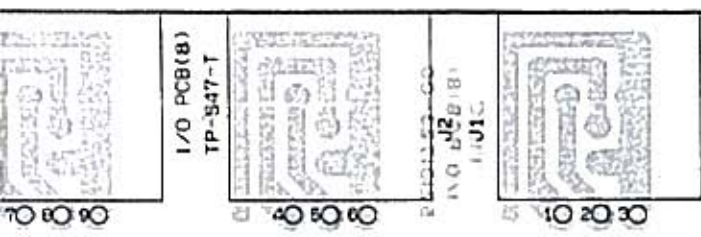
3-16. I/O PCB ASSY (10)



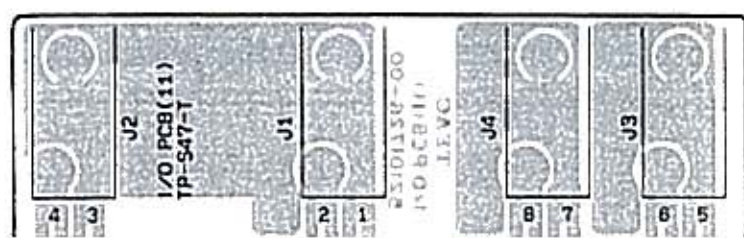
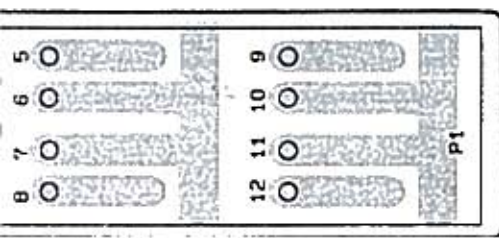
3-18. I/O PCB ASSY (12)



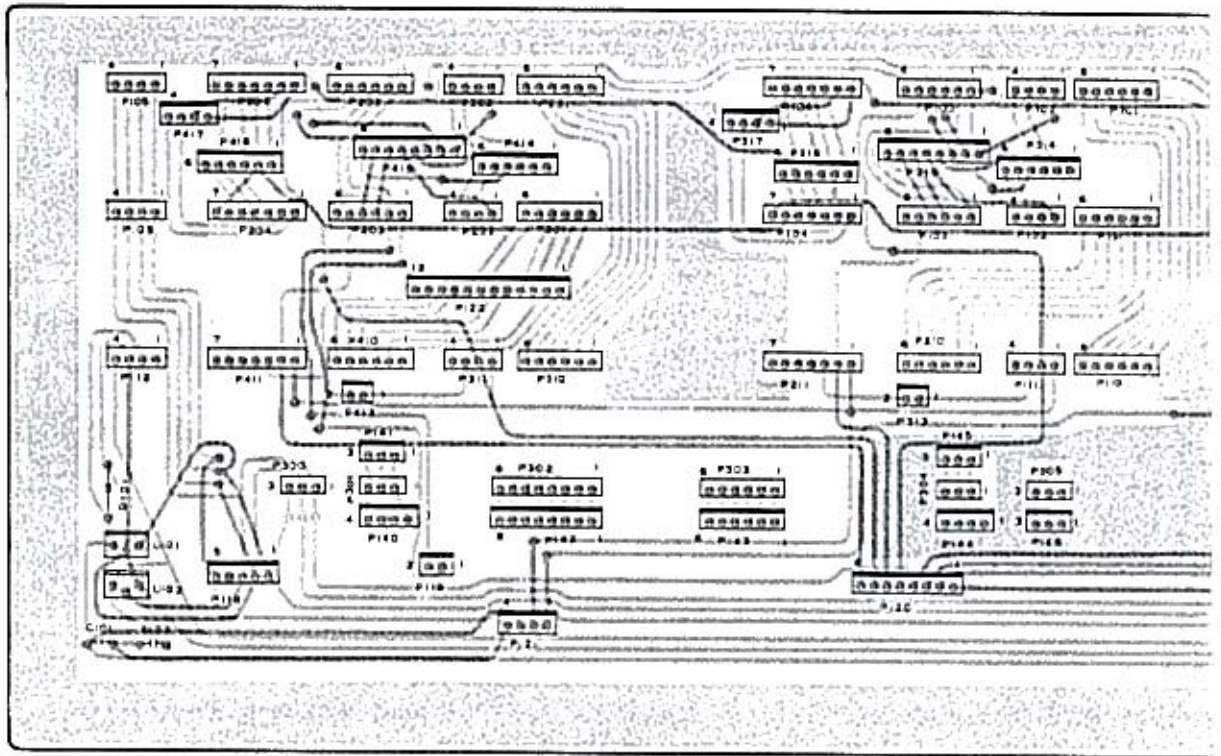
3-19. I/O PCB ASSY (13)



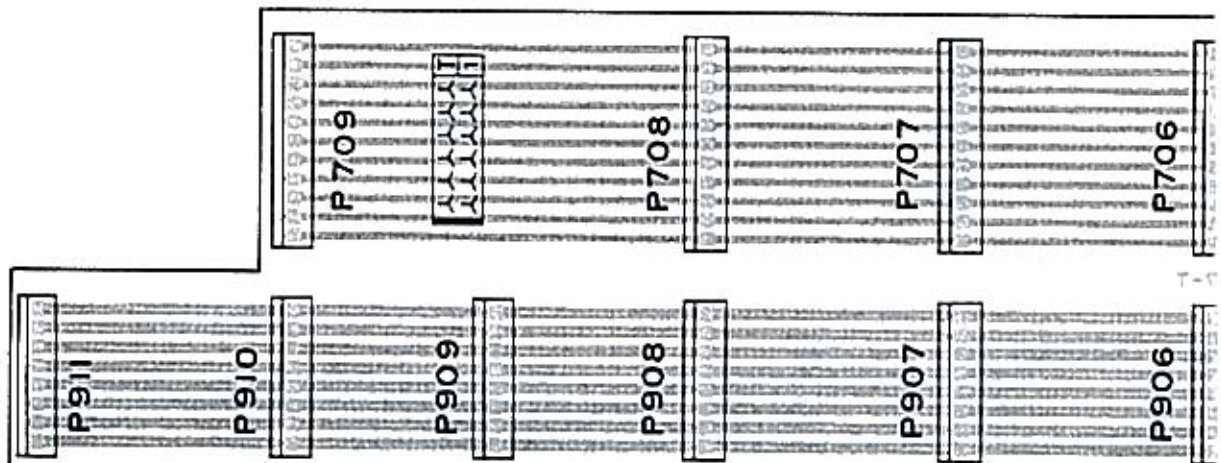
3-17. I/O PCB ASSY (11)

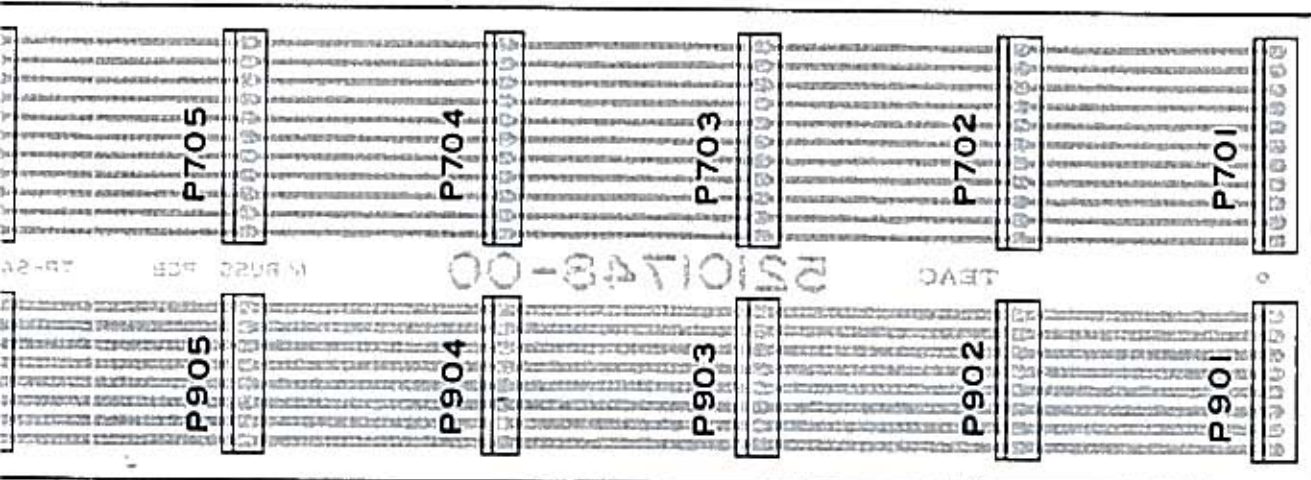
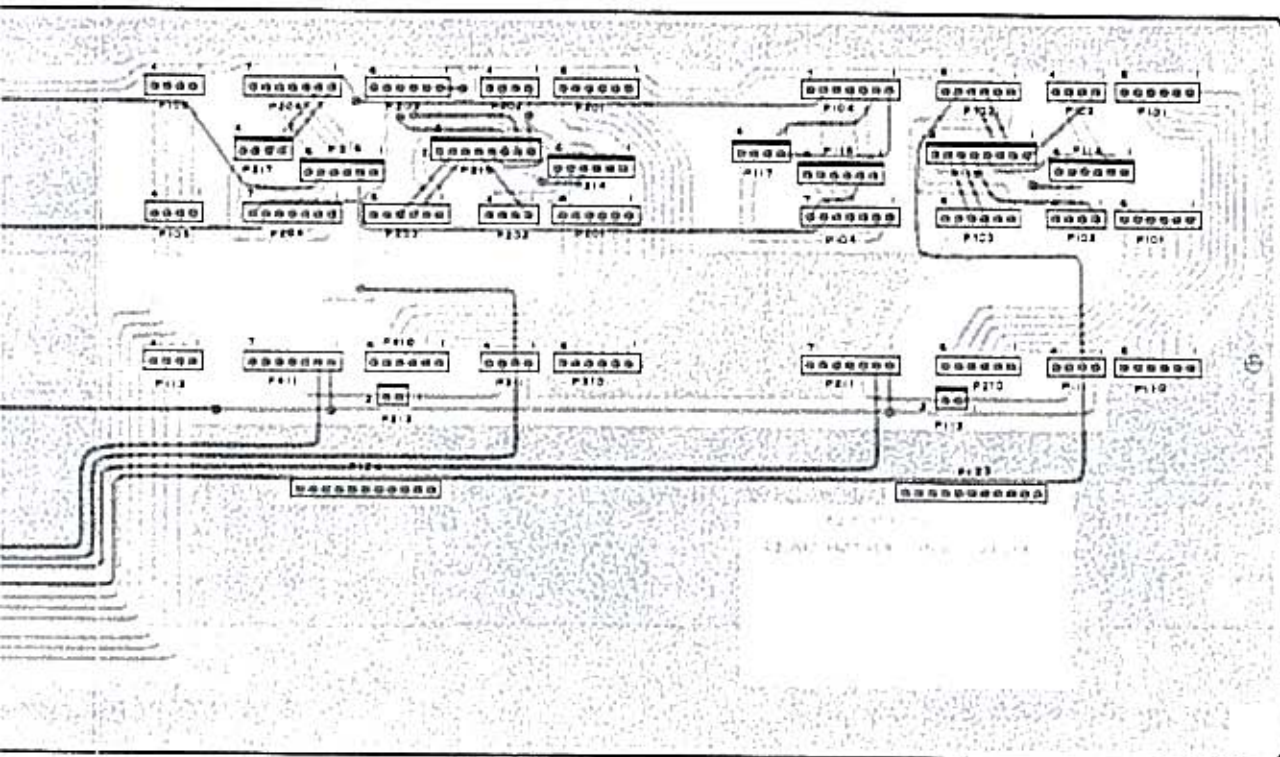


3-20. MOTHER PCB ASSY (1)



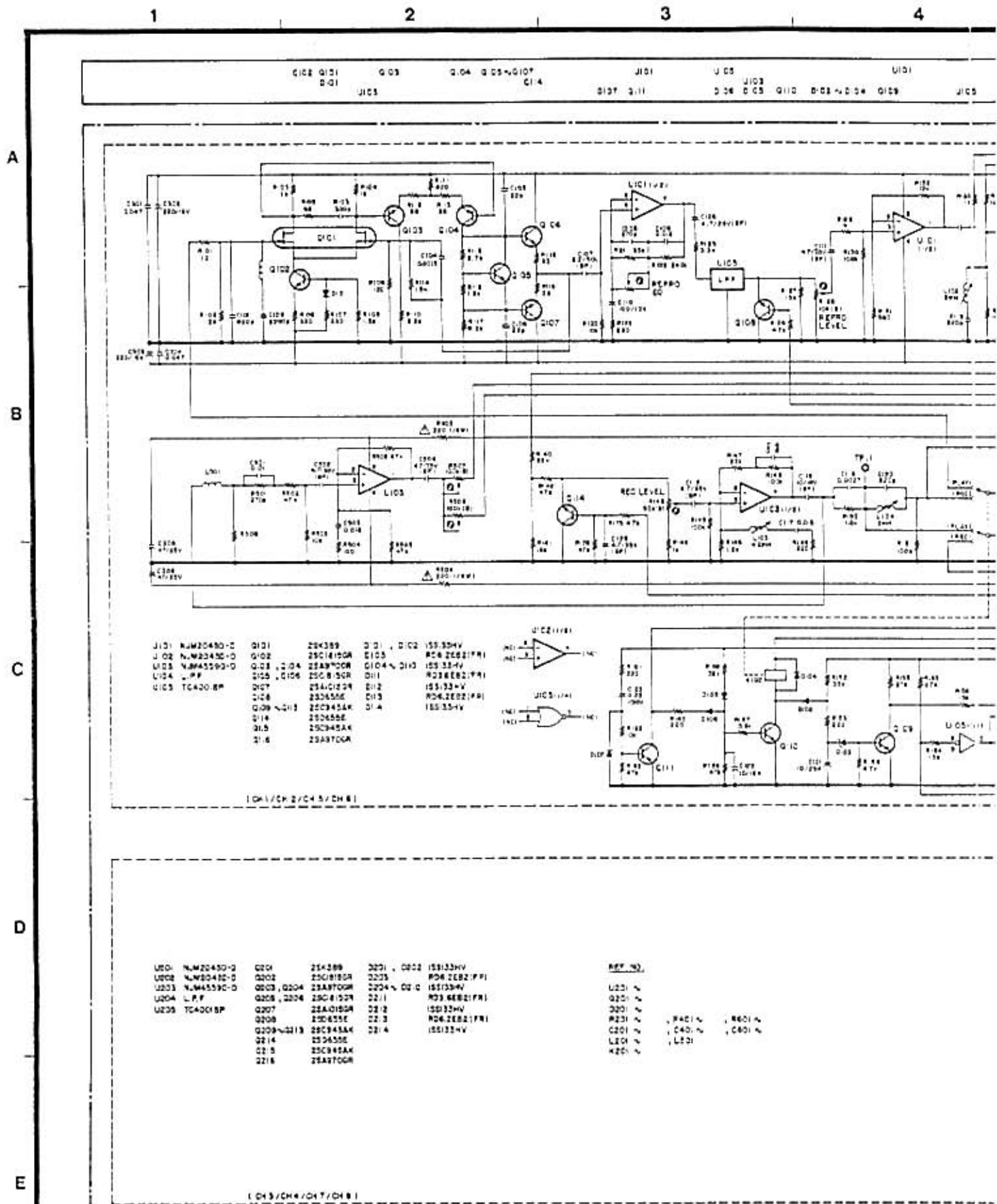
3-21. M BUSS PCB ASSY

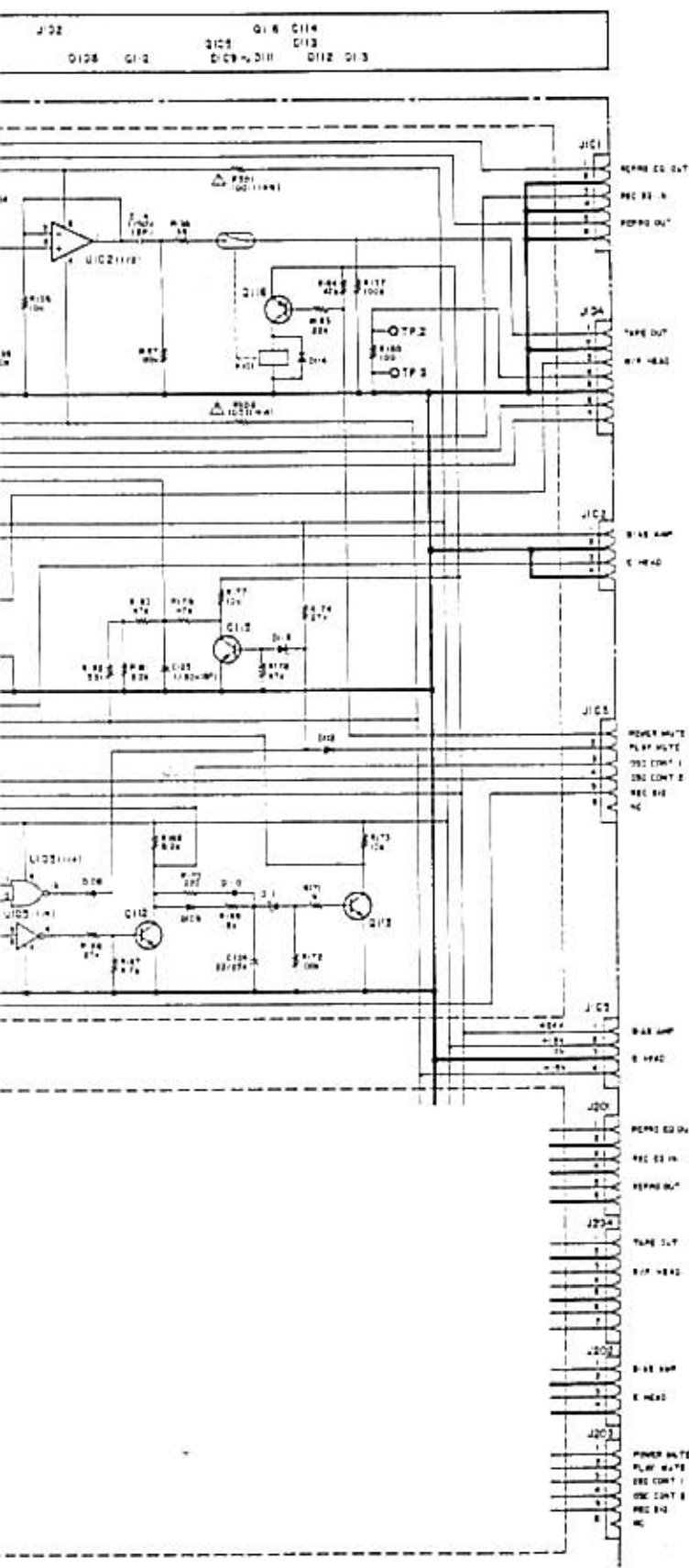




4. SCHEMATIC DIAGRAMS

4-1. Rec/Play PCB Ass'y





To MOTHER (1) PCB Assy
(Page 4 of 7)

4-2. DBX PCB Ass'y

1

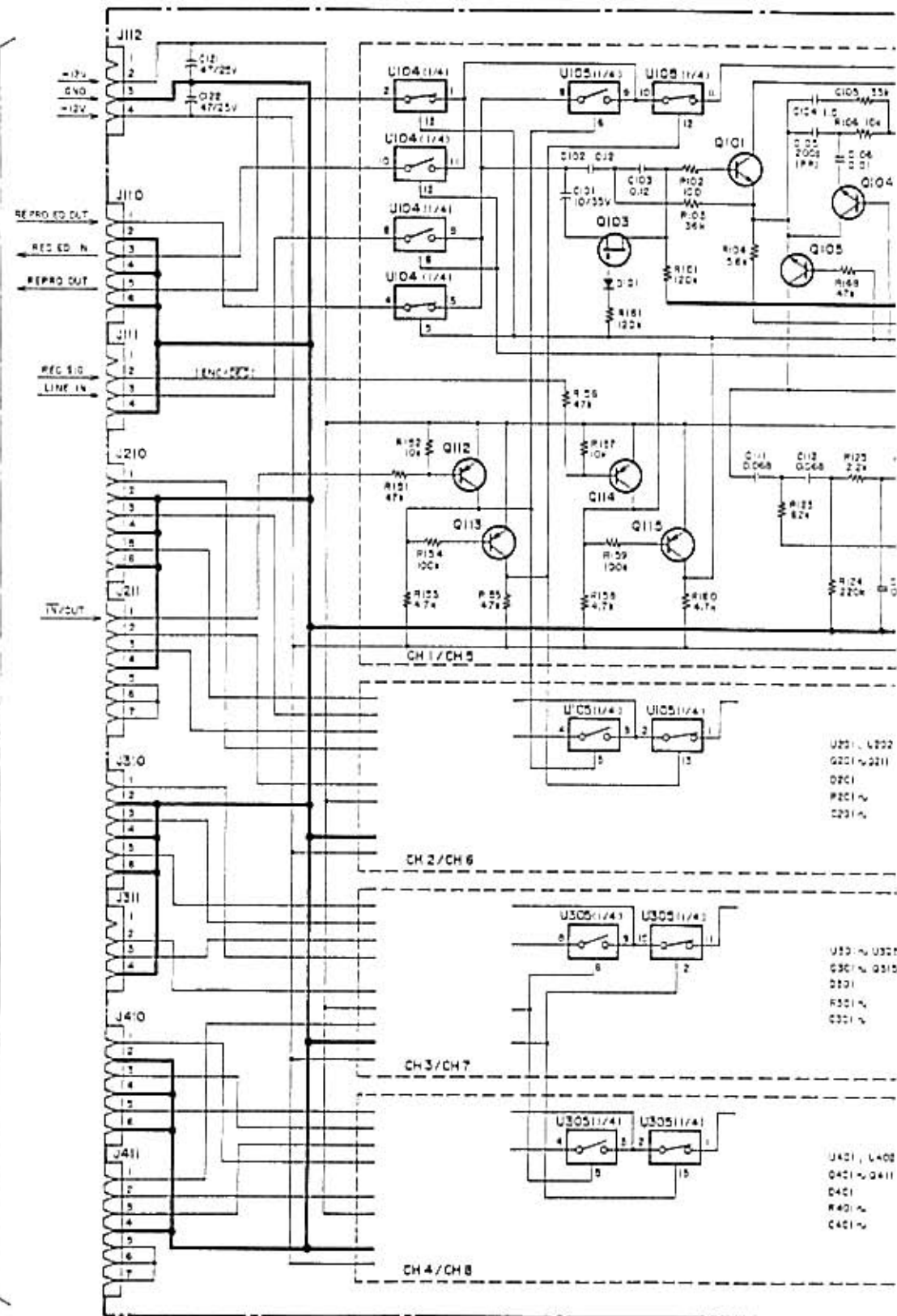
2

3

A
B
C
D
E

U104 Q112 Q113 U105 Q103 Q114 Q115 U105 Q101 Q105 Q104
Q103 U105

To MOTHER (3 PCB Ass'y (Page 4-7))



U201 ~ U202
Q201 ~ Q211
D201
R201 ~
C201 ~

U301 ~ U302
Q301 ~ Q310
D301
R301 ~
C301 ~

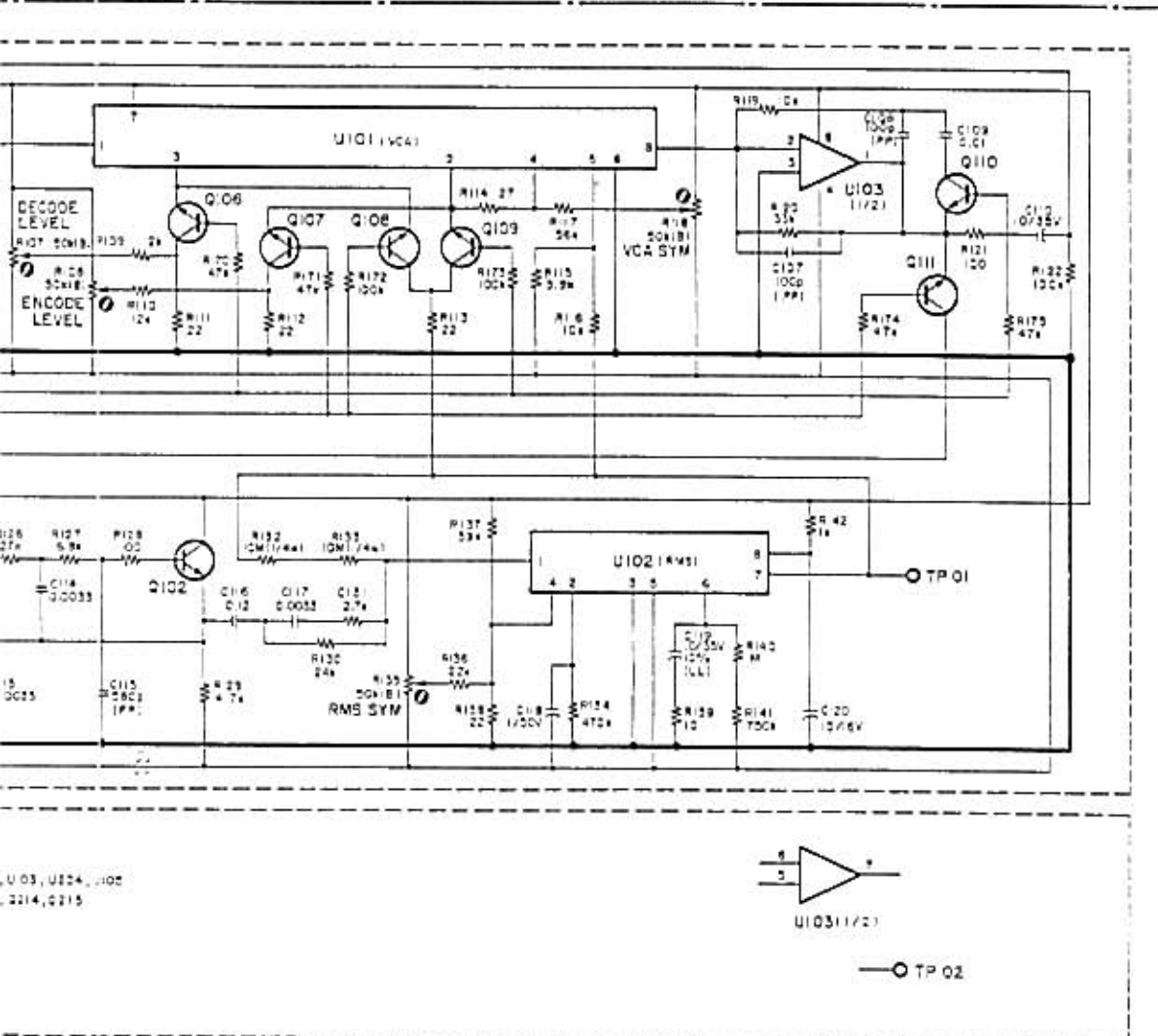
U401 ~ U402
Q401 ~ Q411
D401
R401 ~
C401 ~

Q106 Q107 Q108 U101 Q109 Q110

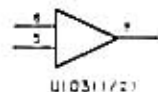
U102

U103
U103

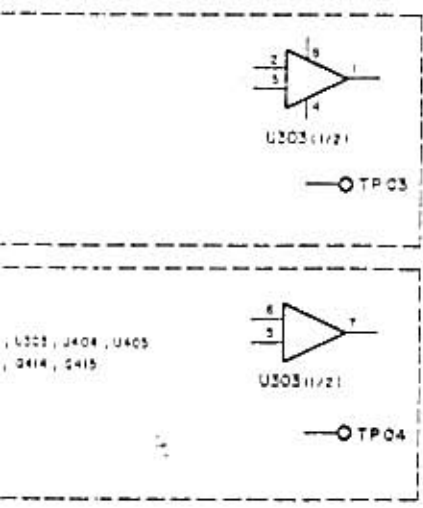
Q111 Q110



U103, U104, U102
Q114, Q115



TP 02



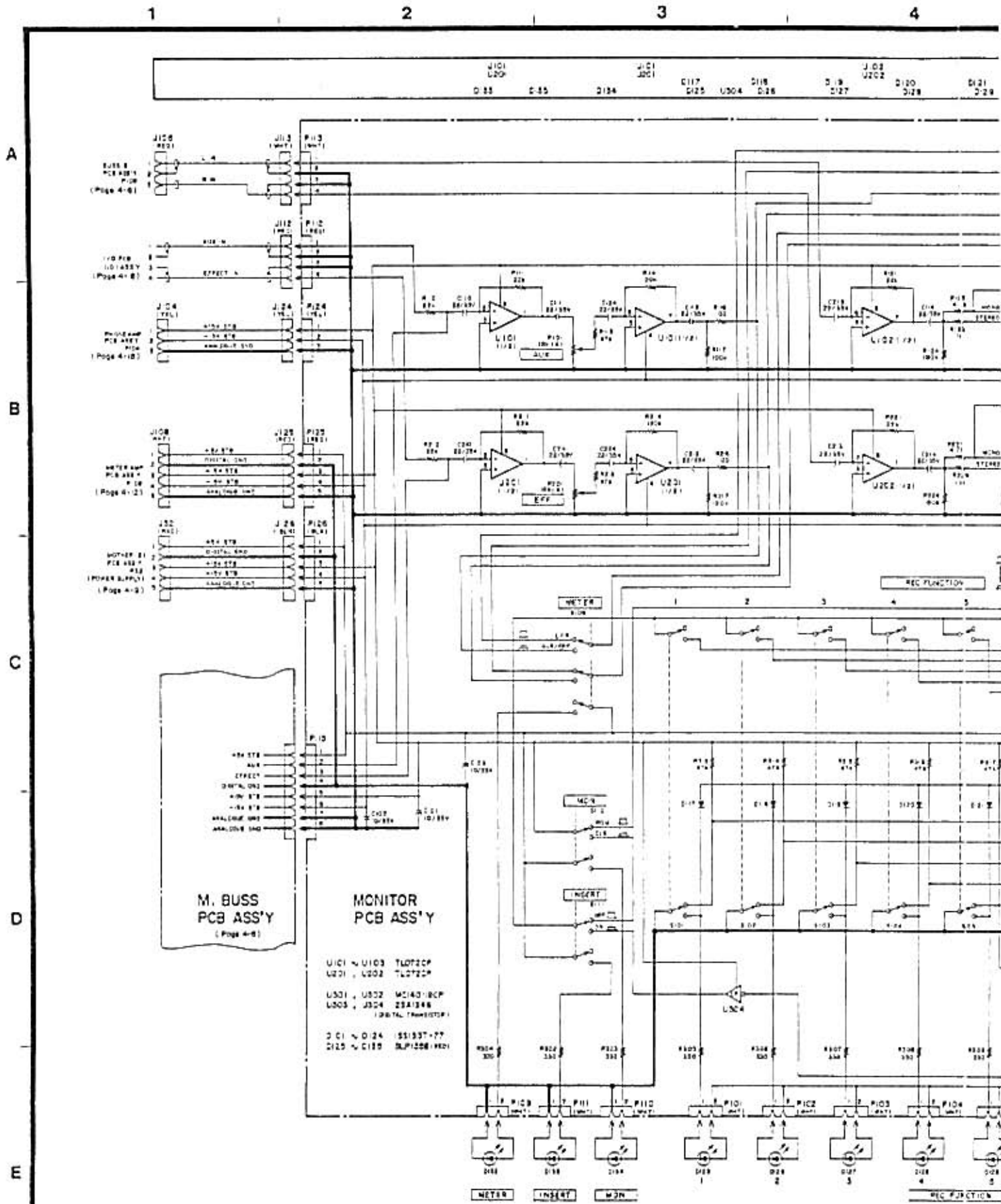
U203, U204, U205
Q114, Q115

CH 1 / CH 5	CH 2 / CH 6	CH 3 / CH 7	CH 4 / CH 8	
U101	U201	U301	U401	μPC1252H2
U102	U202	U302	U402	μPC1253H2
U103		U303		M521BP
U104	U204	U304	U404	LC4966
U105		U305		LC4966
Q101, Q102	Q201, Q202	Q301, Q302	Q401, Q402	2SC2320F
Q103	Q203	Q303	Q403	2SK364V
Q104, Q111	Q204, Q211	Q304, Q311	Q404, Q411	2SC2676B
Q112, Q113		Q312, Q313		2SA999F
Q114, Q115	Q214, Q215	Q314, Q315	Q414, Q415	2SA999F
D101	D201	D301	D401	1SS133HV

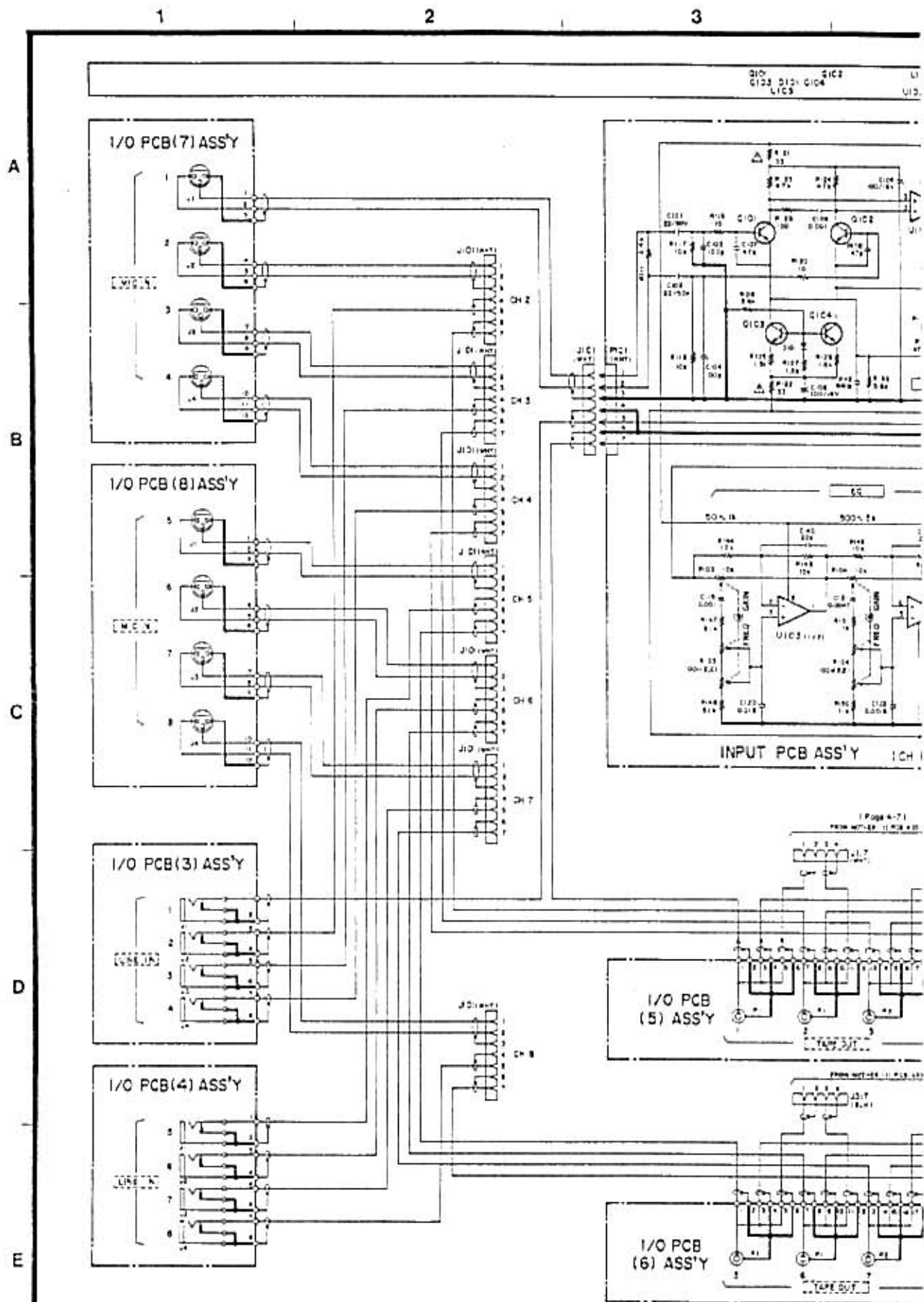
NOTE : ANALOGUE SWITCHES ARE S40NN DECODE MODE.

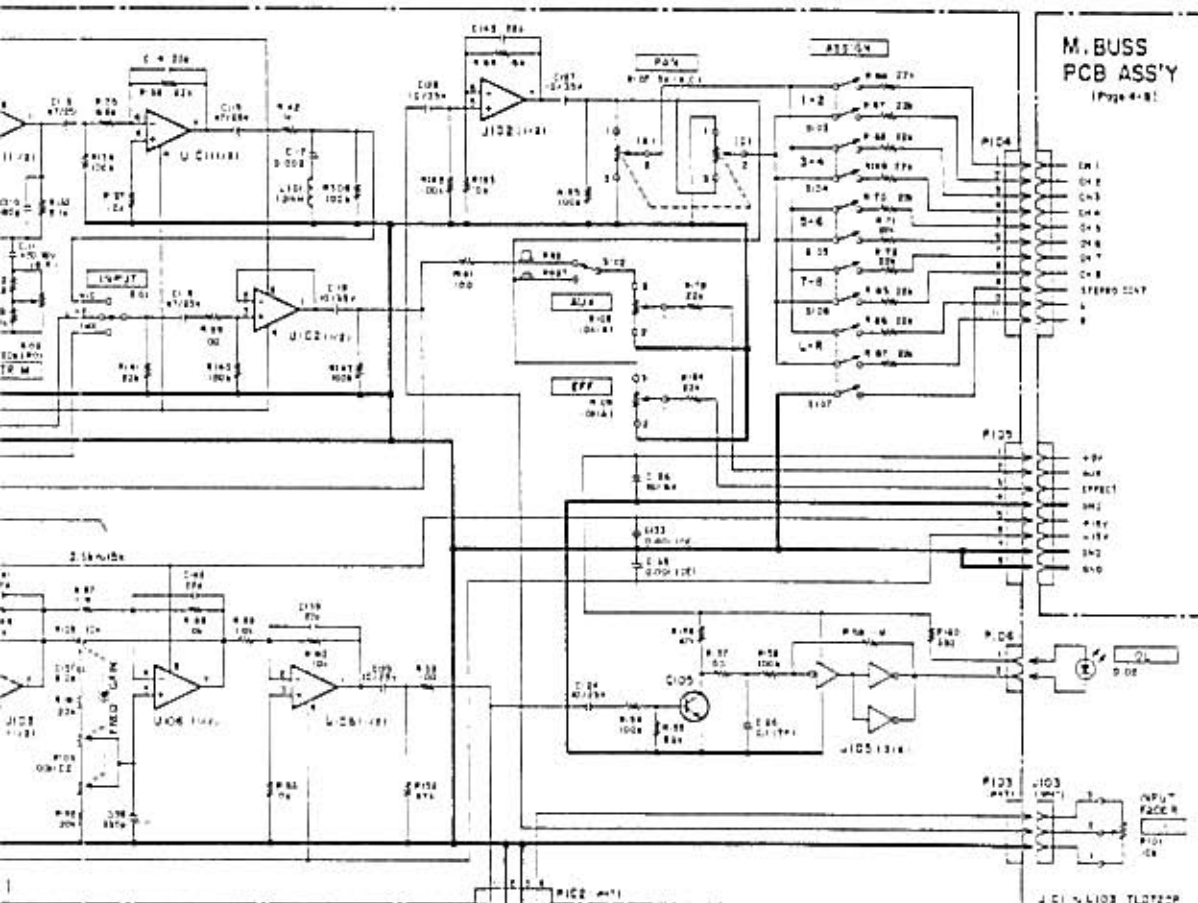
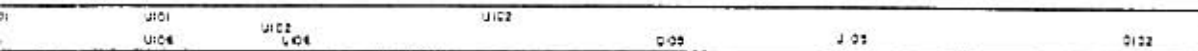
DBX PCB ASS'Y

4-3. Monitor PCB Ass'y



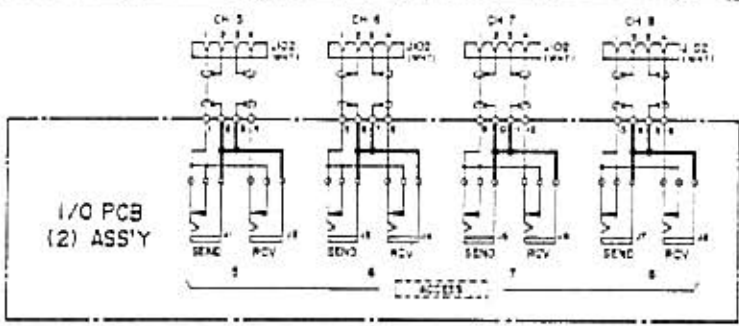
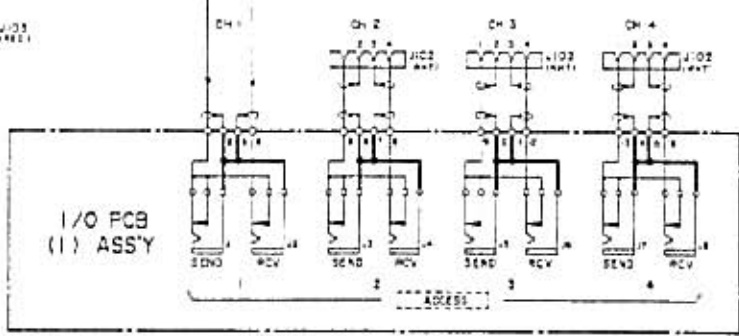
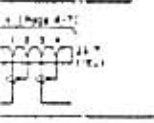
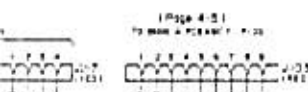
4-4. Mixer Input Section



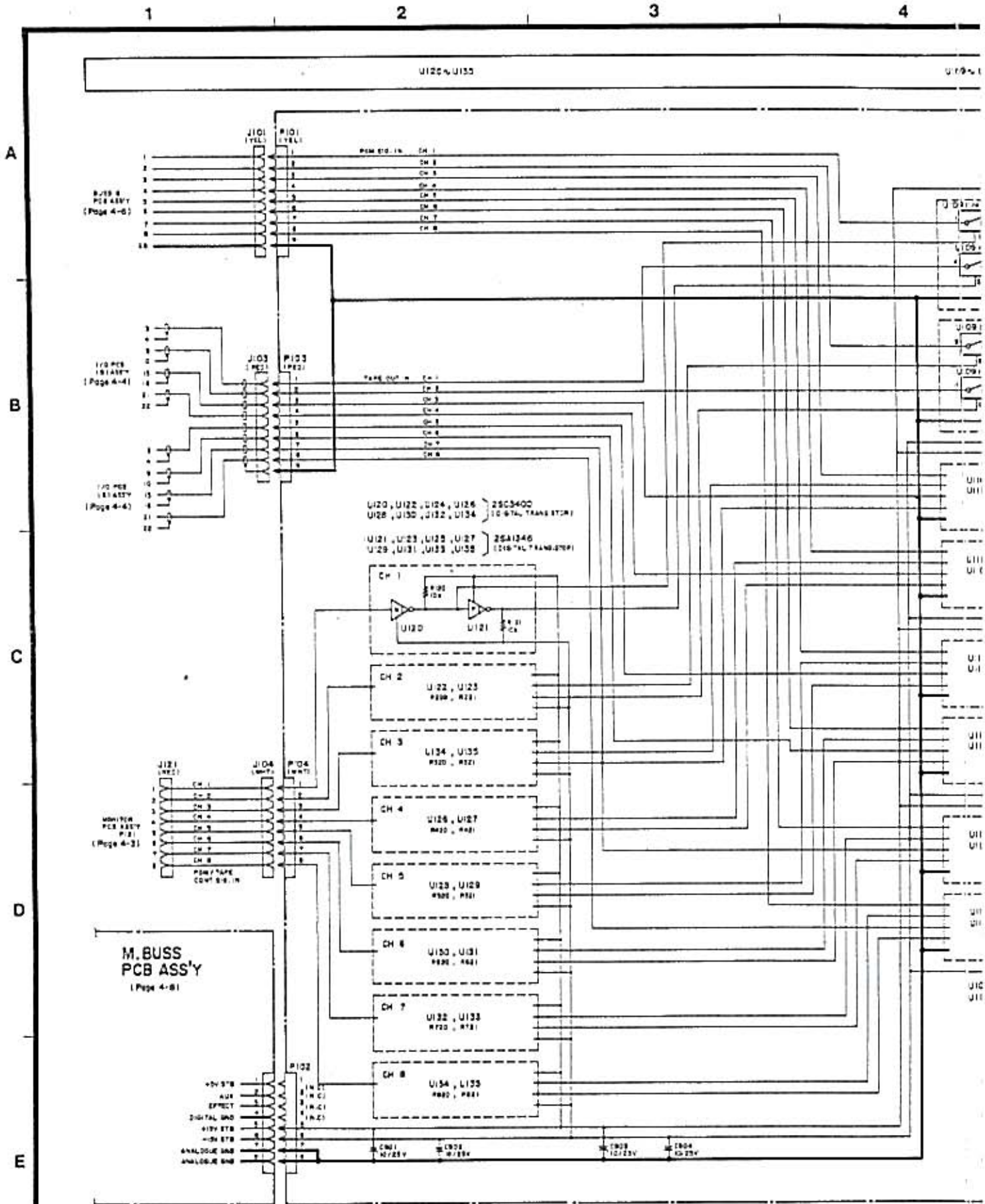


**M. BUSS
PCB ASS'Y**
(Page 4-8)

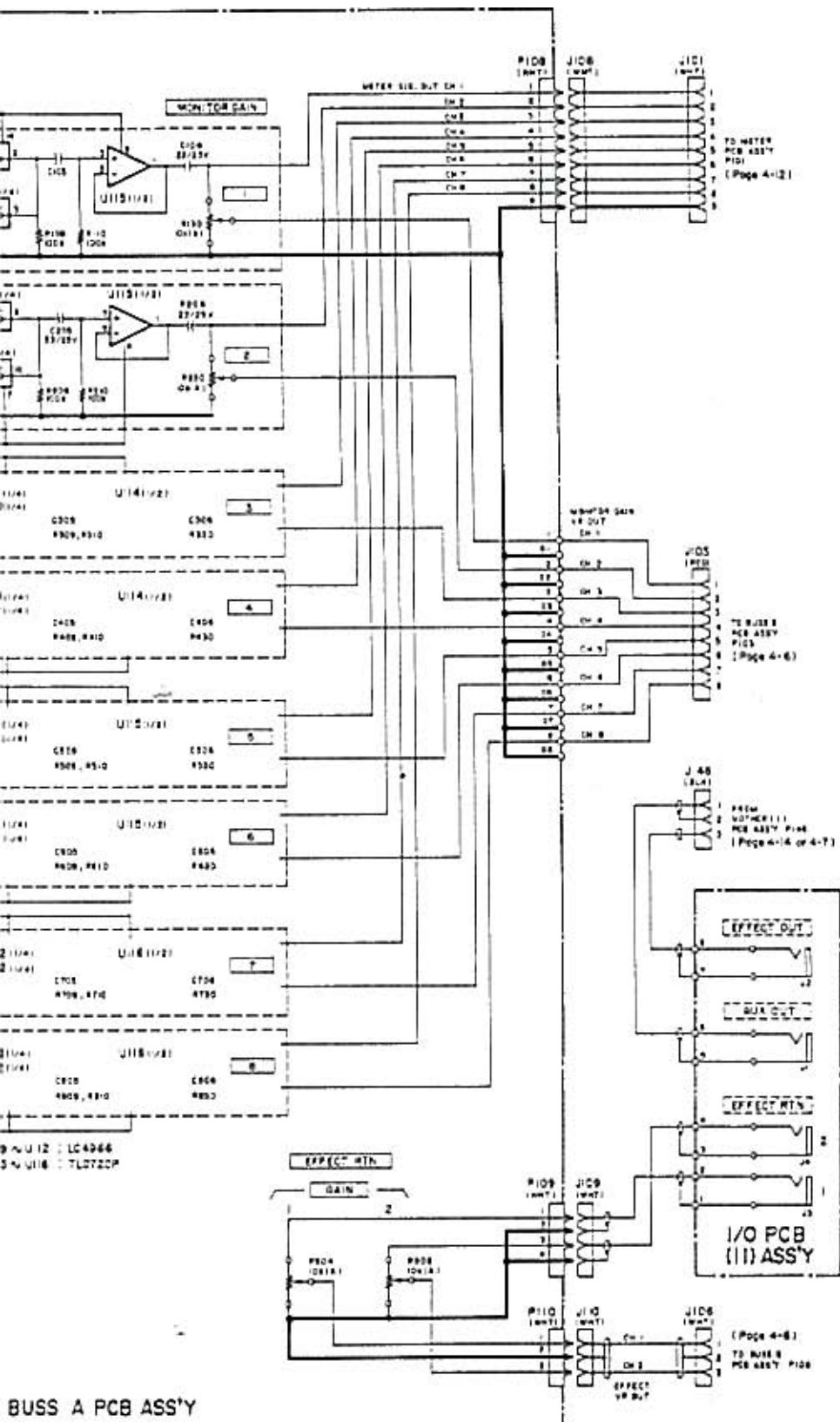
- J 01 N 4103 TL072CP
- J 05 MC 4049UP
- UIC8 TL072CP
- Q 01, Q 02 2SC1844P
- Q 03 N 3105 2SC850P
- S 01 15318T-17
- S 02 SLP 350 401



4-5. Buss A PCB



112 U13~U16



TO MASTER PCB ASS'Y P101 (Page 4-12)

TO BUS 8 PCB ASS'Y P103 (Page 4-6)

TO BUS 8 PCB ASS'Y P104 (Page 4-14 or 4-17)

I/O PCB (II) ASS'Y

TO BUS 8 PCB ASS'Y P106 (Page 4-8)

4-6. Buss B Ass'y

1

2

3

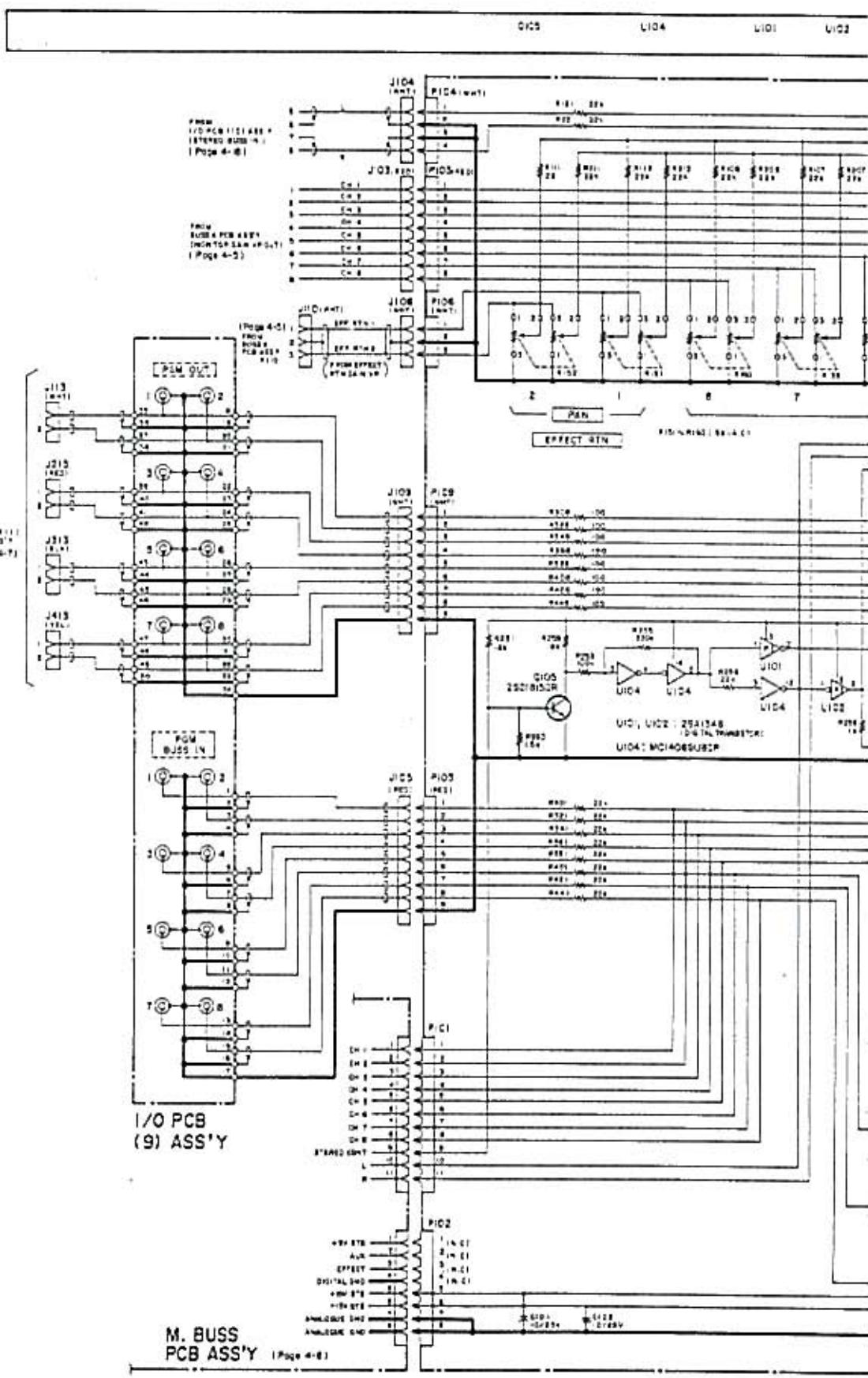
A

B

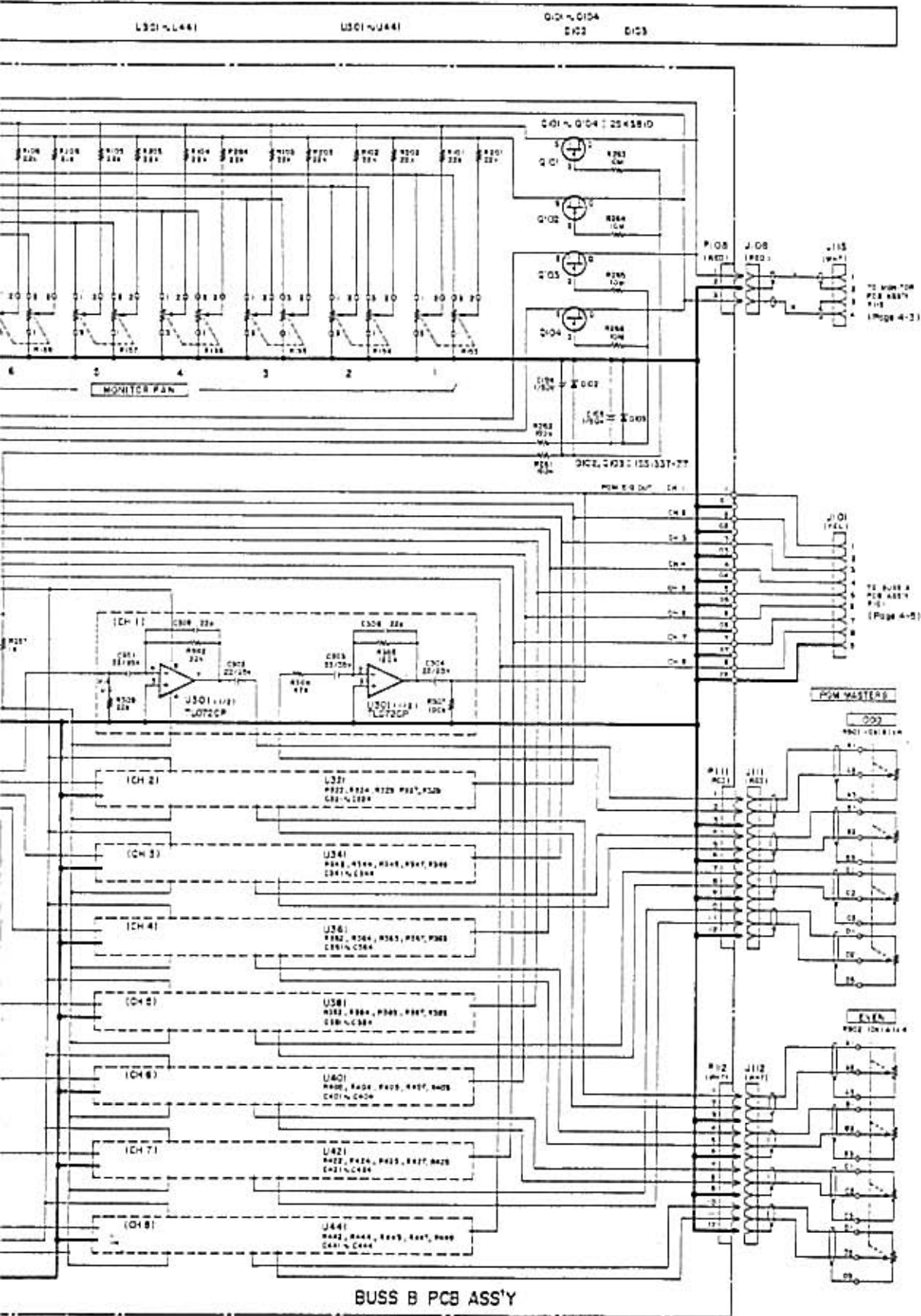
C

D

E



M. BUSS PCB ASS'Y (Page 4-6)



4-7. Mother (1) PCB Ass'y

1

2

3

4

A

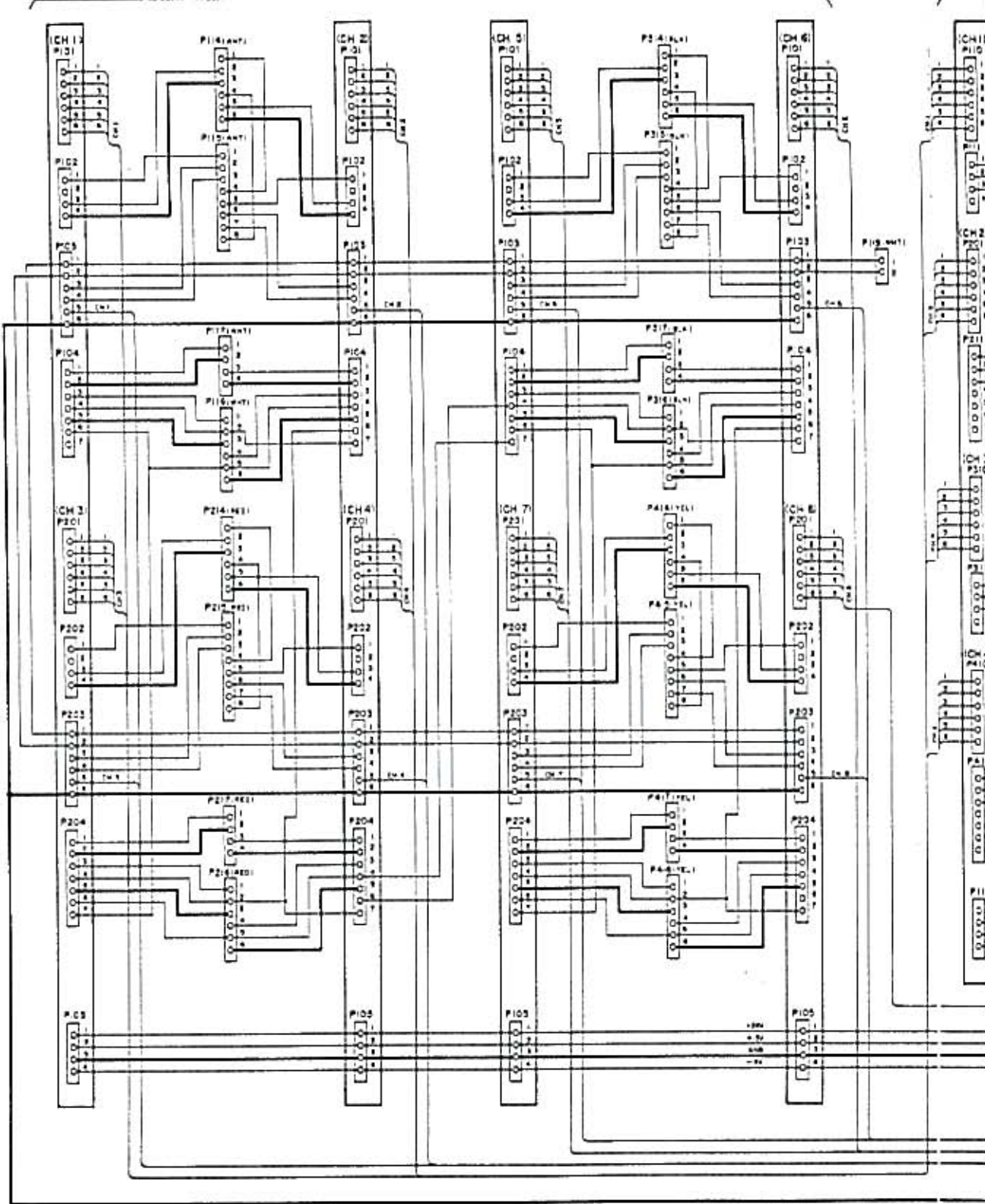
B

C

D

E

REC PLAY AMP PCB ASS'Y (Page 4-1)



MOTHER (1) PCB ASS'Y

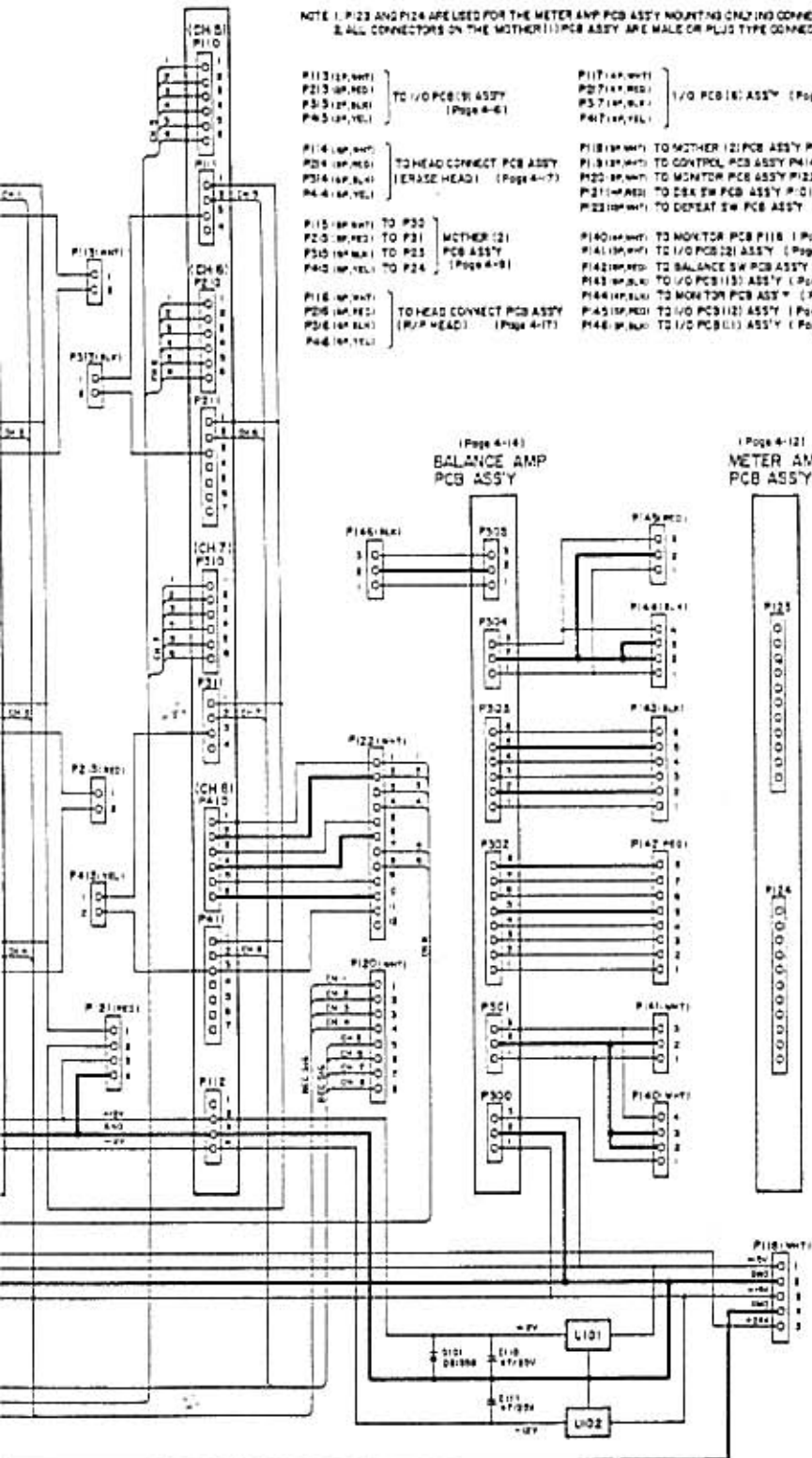
DEX PCB ASS'Y (Page 4-2)

NOTE 1: P123 AND P124 ARE USED FOR THE METER AMP PCB ASSY MOUNTING CONNECTIONS.
2: ALL CONNECTORS ON THE MOTHERBOARD PCB ASSY ARE MALE OR PLUG TYPE CONNECTORS.

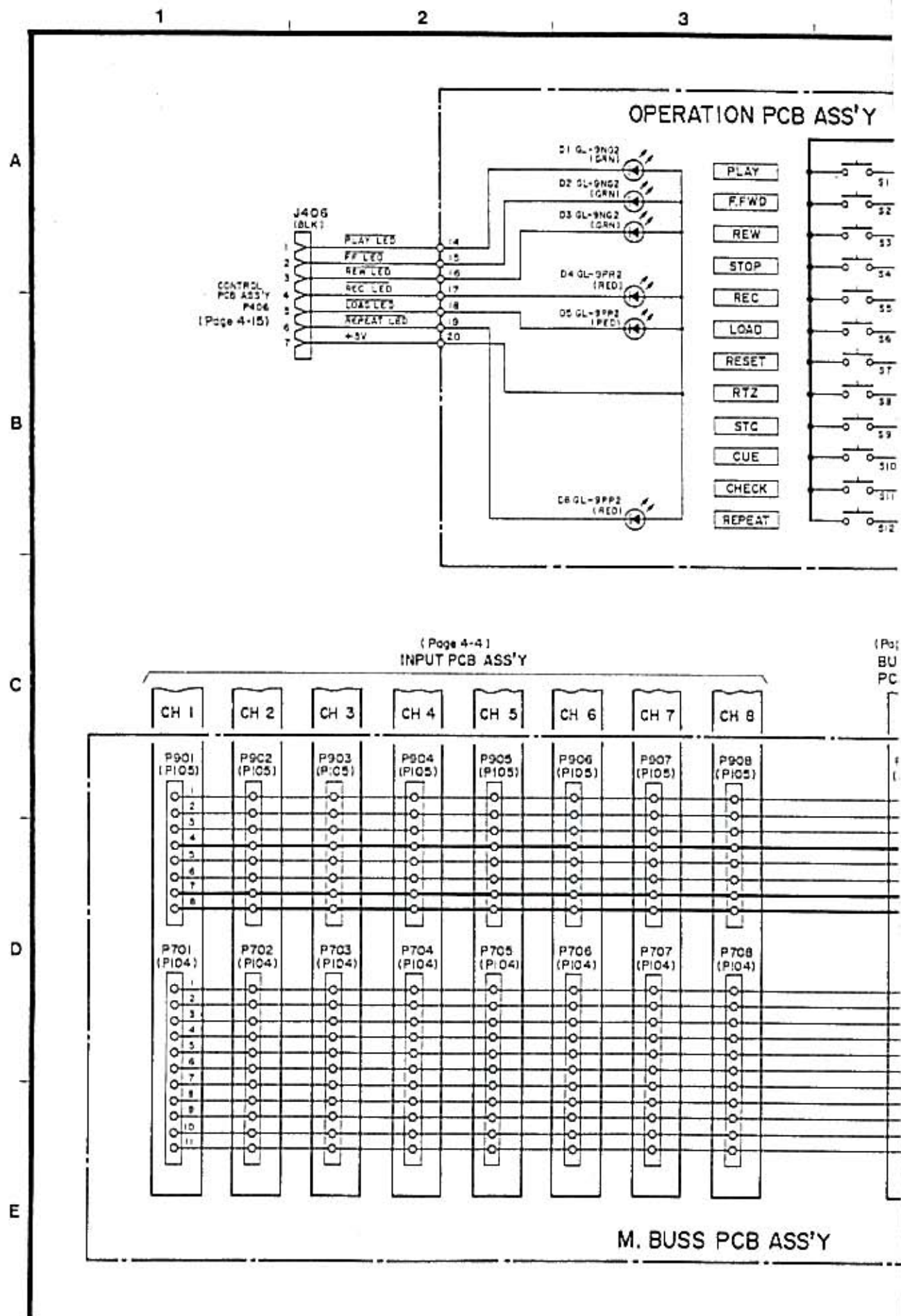
P113 (wht)	} TO I/O PCB (9) ASSY (Page 4-6)	P117 (wht)	} I/O PCB (8) ASSY (Page 4-4)
P213 (wht)		P217 (wht)	
P313 (wht)		P317 (wht)	
P413 (wht)		P417 (wht)	
P114 (wht)	} TO HEAD CONNECT PCB ASSY (ERASE HEAD) (Page 4-7)	P118 (wht)	TO MOTHER (2) PCB ASSY P33 (Page 4-8)
P214 (wht)		P119 (wht)	TO CONTROL PCB ASSY P416 (Page 4-5)
P314 (wht)		P211 (wht)	TO MONITOR PCB ASSY P122 (Page 4-3)
P414 (wht)		P212 (wht)	TO DSK SW PCB ASSY P101 (Page 4-18)
P115 (wht)	} MOTHER (2) PCB ASSY	P140 (wht)	TO MONITOR PCB P118 (Page 4-5)
P215 (wht)		P141 (wht)	TO I/O PCB (2) ASSY (Page 4-14)
P315 (wht)		P142 (wht)	TO BALANCE SW PCB ASSY (Page 4-4)
P415 (wht)		P143 (wht)	TO I/O PCB (13) ASSY (Page 4-4)
P116 (wht)	} TO HEAD CONNECT PCB ASSY (R/P HEAD) (Page 4-17)	P144 (wht)	TO MONITOR PCB ASSY (Page 4-5)
P216 (wht)		P145 (wht)	TO I/O PCB (12) ASSY (Page 4-4)
P316 (wht)		P146 (wht)	TO I/O PCB (11) ASSY (Page 4-5)
P416 (wht)			

(Page 4-14)
BALANCE AMP
PCB ASS'Y

(Page 4-12)
METER AMP
PCB ASS'Y



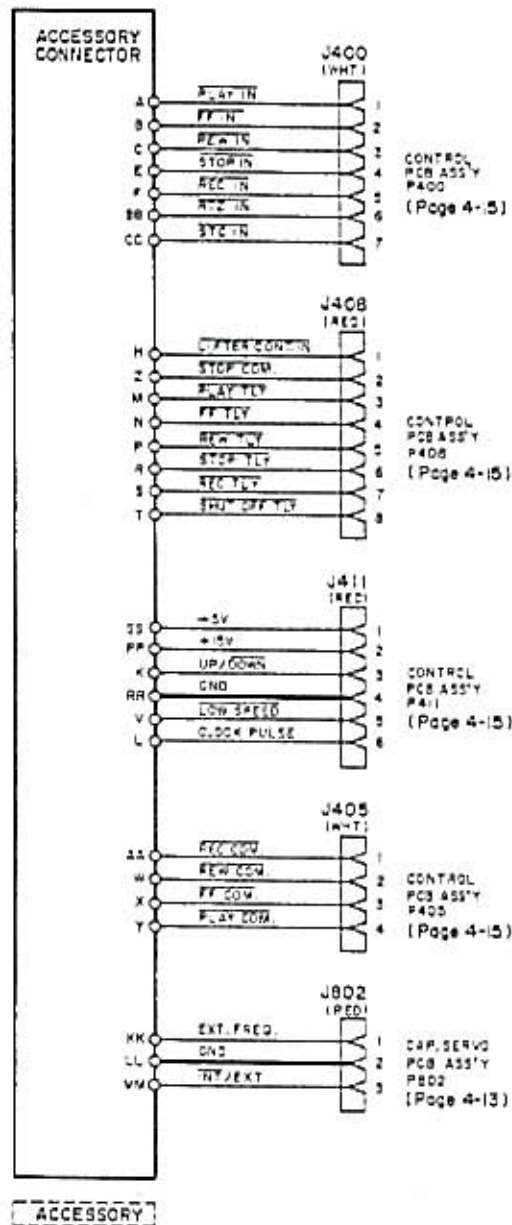
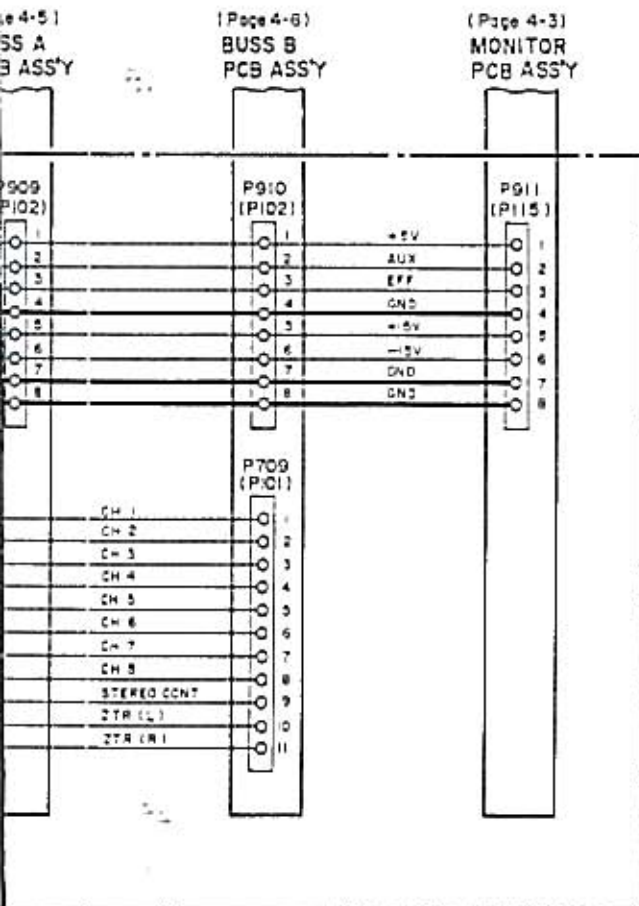
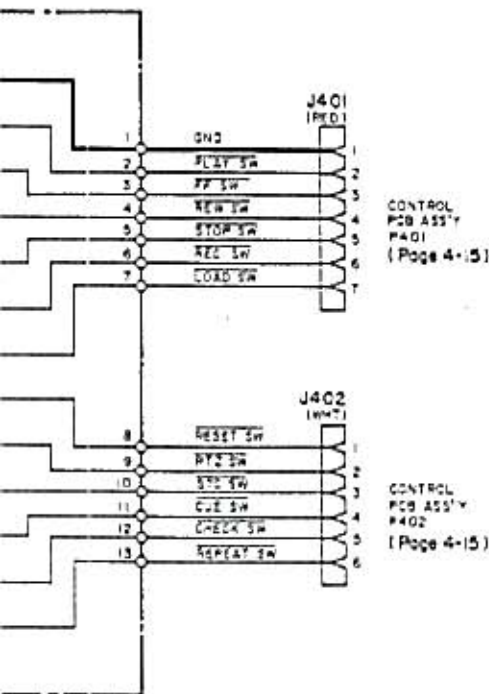
4-8. M Buss PCB Ass'y Operation PCB Ass'y Accessory Connector



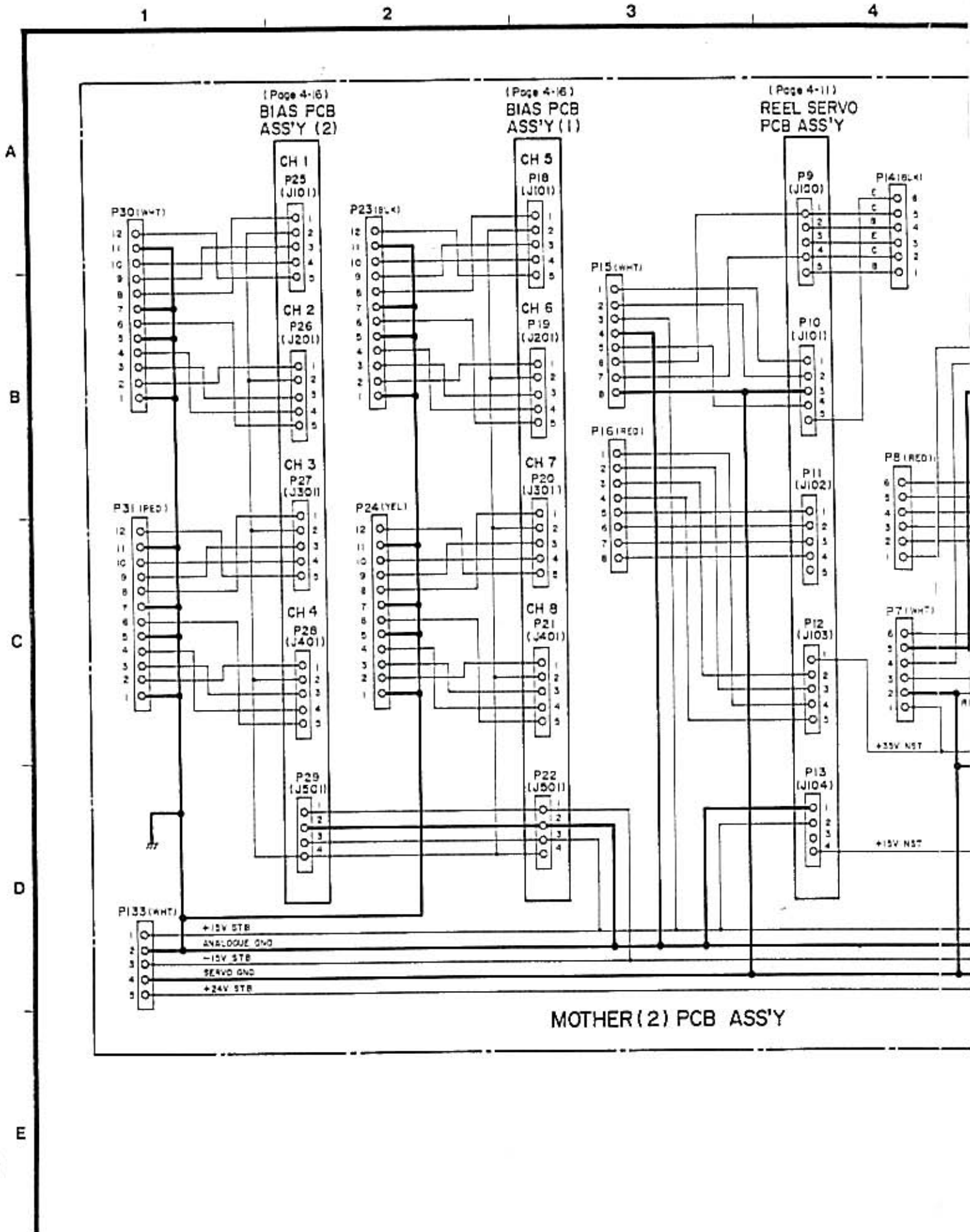
(Page 4-4)
INPUT PCB ASS'Y

(Pa)
BU
PC

M. BUSS PCB ASS'Y

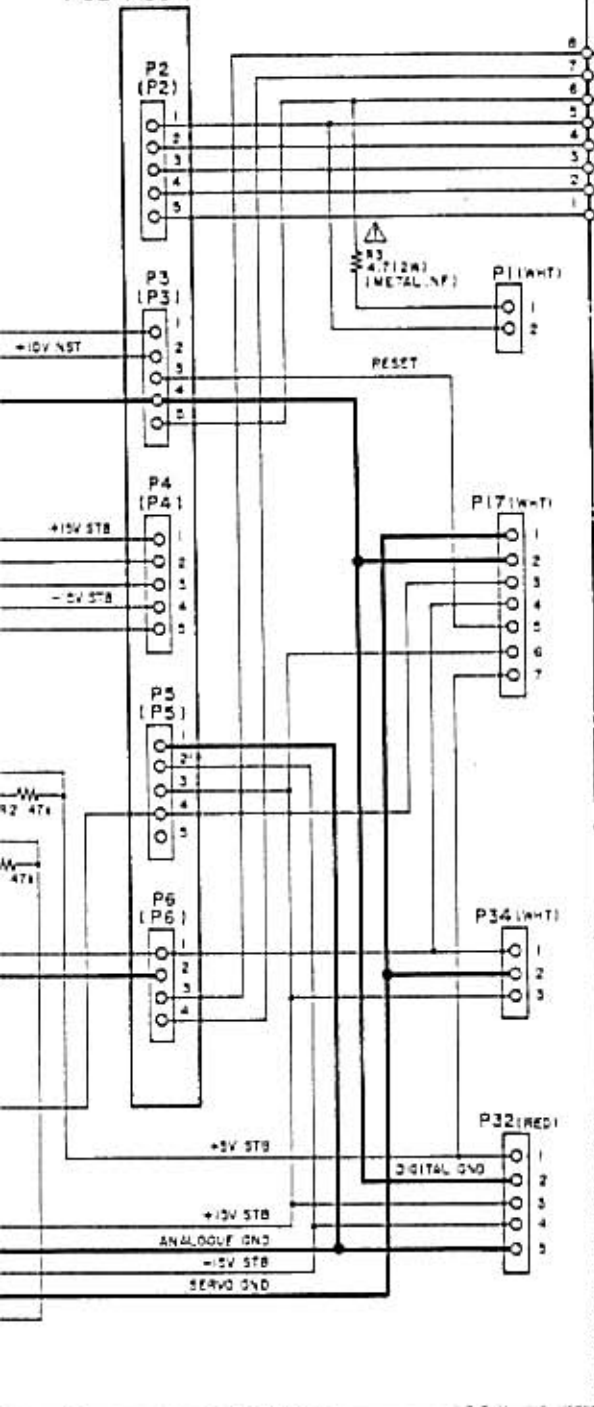


4-9. Mother (2) PCB Ass'y



MOTHER (2) PCB ASS'Y

(Page 4-10)
POWER SUPPLY
PCB ASS'Y



FROM
FUSE (1/2/3) PCB ASS'Y
(Page 4-10)

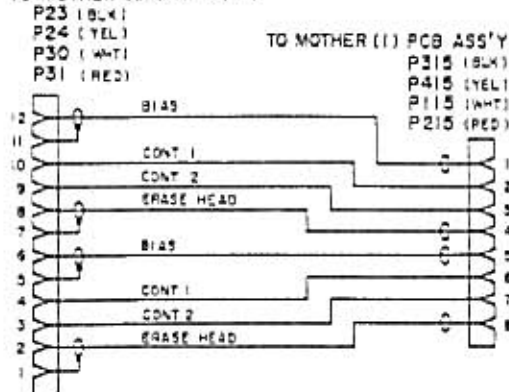
FROM
POWER TRANSFORMER
(Page 4-10)

P1, P7, P8, P14~P17, P23, P24, P30~P34: MALE
P2~P6, P9~P13, P18~P29: CONNECTOR PLUG

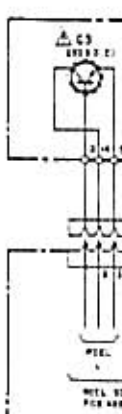
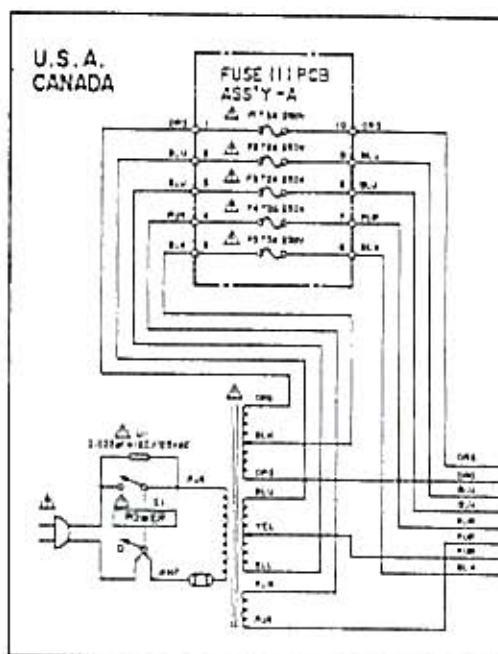
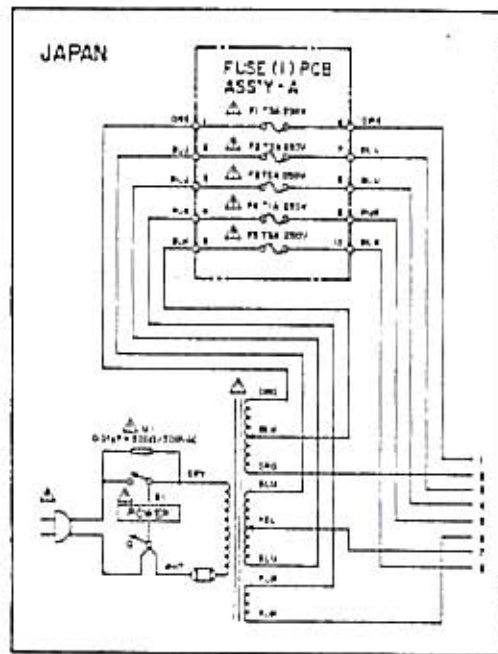
P2~P6: POWER SUPPLY PCB ASS'Y
J100~J104: REEL SERVO PCB ASS'Y
J101~J501: BIAS PCB ASS'Y (1/2)

P1 (SP, WHT) TO METER PCB ASS'Y (MONITOR #/ALK2) (Page 4-12)
P7 (SP, WHT) }
P8 (SP, RED) } TO TR PCB ASS'Y (Page 4-10)
P14 (SP, BLK) }
P15 (SP, WHT) TO MECHA JOINT PCB ASS'Y P4 (WHT) (Page 4-17)
P16 (SP, RED) TO P404 (WHT) } CONTROL
P17 (TP, WHT) TO P414 (YEL) } PCB ASS'Y (Page 4-15)
P23 (1/2P, RED) TO P315 (BLK) } MOTHER (1)
P24 (1/2P, YEL) TO P415 (YEL) } PCB ASS'Y (Page 4-7)
P30 (1/2P, WHT) TO P115 (WHT)
P31 (1/2P, RED) TO P215 (RED)
P32 (1/2P, RED) TO MONITOR PCB ASS'Y P126 (BLK) (Page 4-3)
P33 (1/2P, WHT) TO MOTHER (1) PCB ASS'Y P118 (WHT) (Page 4-7)
P34 (1/2P, WHT) TO CAP. SERVO PCB ASS'Y P803 (BLK) (Page 4-13)

TO MOTHER (2) PCB ASS'Y

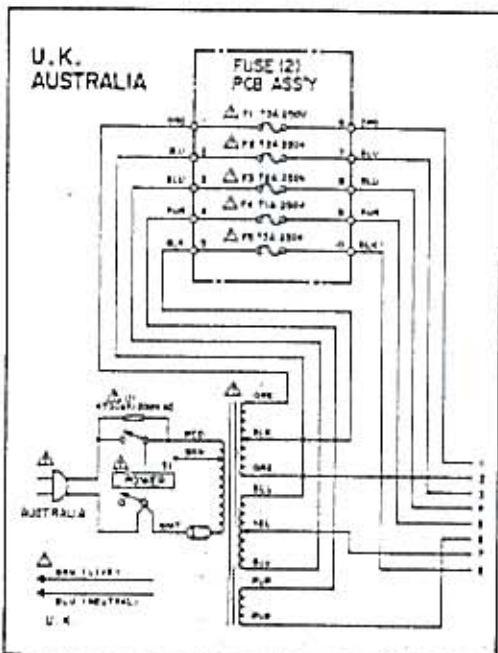
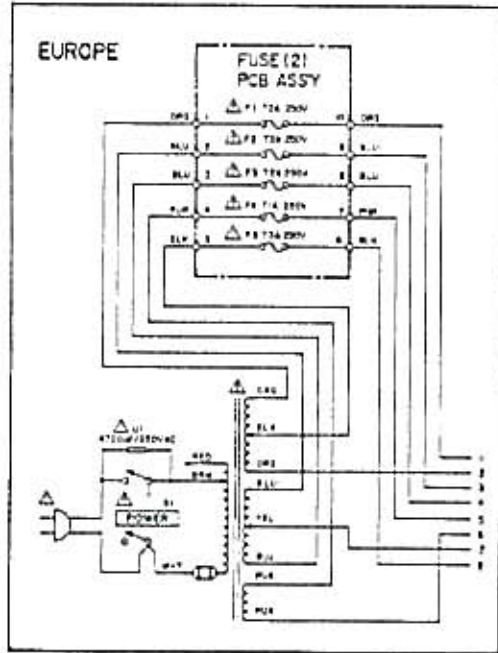


A



B

C



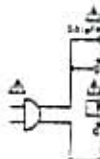
D

W07-00121 PCB ASSY POWER SUPPLY TABLE (REFERENCE)

	R/P AMP	DBX	METER AMP	BALANCE AMP	MIXER SECTION	CONTROL	PHONE AMP	RET. SERVO	BIAS (1)	BIAS (2)	CAPSTAN SERVO	MECHA SECTION	METER LAMP
DIGITAL SYSTEM	+5V STB												
	DIGITAL GND												
ANALOGUE SYSTEM	+15V STB												
	-5V STB												
	ANALOGUE GND												
SERVO SYSTEM	+35V NST												
	+15V NST												
	+24V STB												
	SERVO GND												
AC	AC 5V												
	RESET												

E

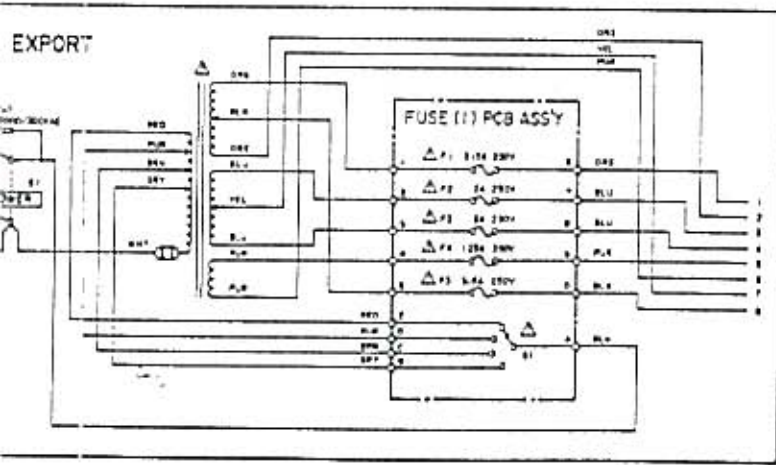
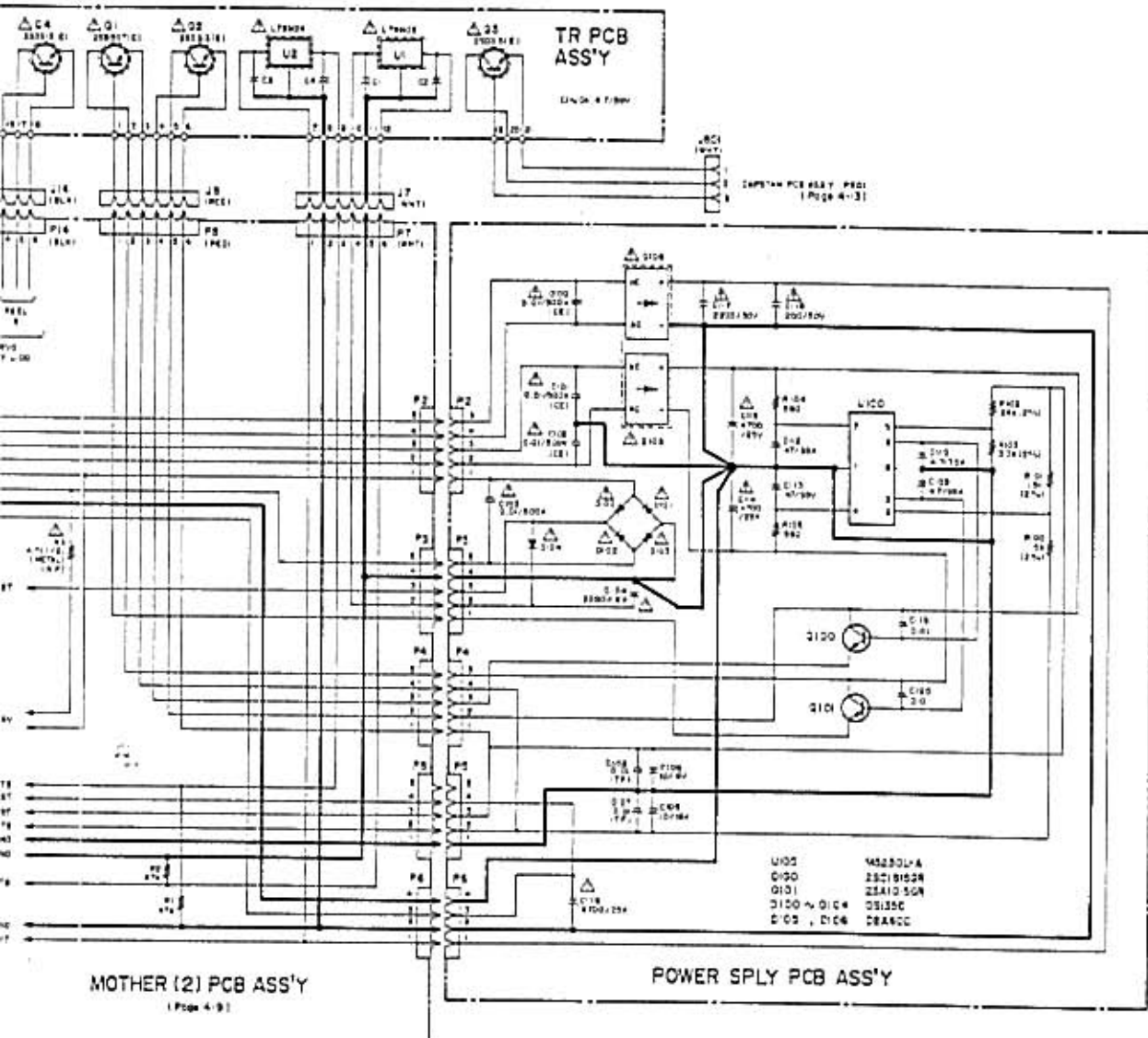
GENERAL



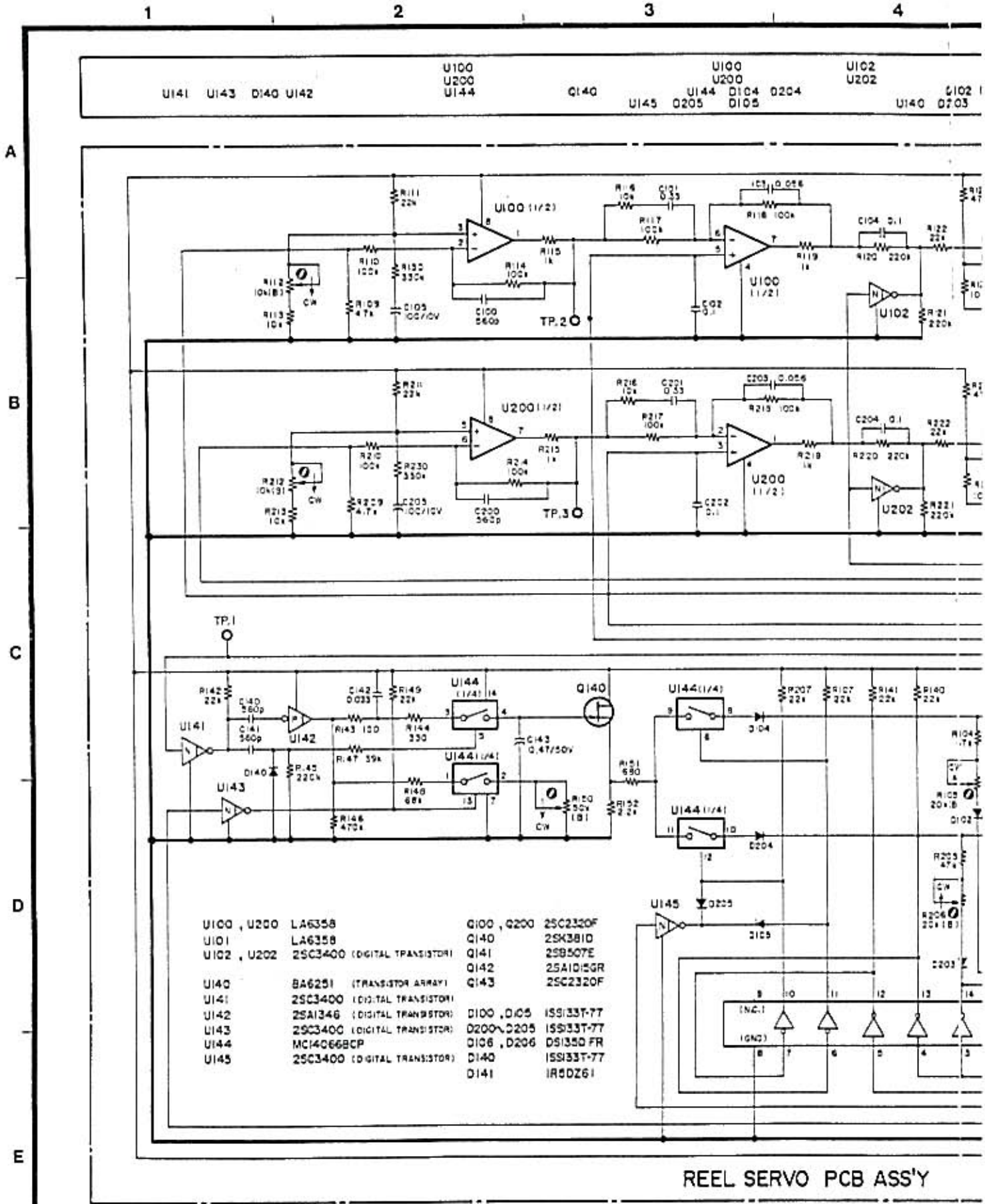
100V
115V
120V
240V
250V

100V
115V
120V
240V
250V

C4	Q1	Q2	L2	U1	Q3	D14	D15	D16	D17	D18	D19	D20	D21	D22	D23	D24	D25	D26	D27	D28	D29	D30	D31	D32	D33	D34	D35	D36	D37	D38	D39	D40	D41	D42	D43	D44	D45	D46	D47	D48	D49	D50	D51	D52	D53	D54	D55	D56	D57	D58	D59	D60	D61	D62	D63	D64	D65	D66	D67	D68	D69	D70	D71	D72	D73	D74	D75	D76	D77	D78	D79	D80	D81	D82	D83	D84	D85	D86	D87	D88	D89	D90	D91	D92	D93	D94	D95	D96	D97	D98	D99	D100
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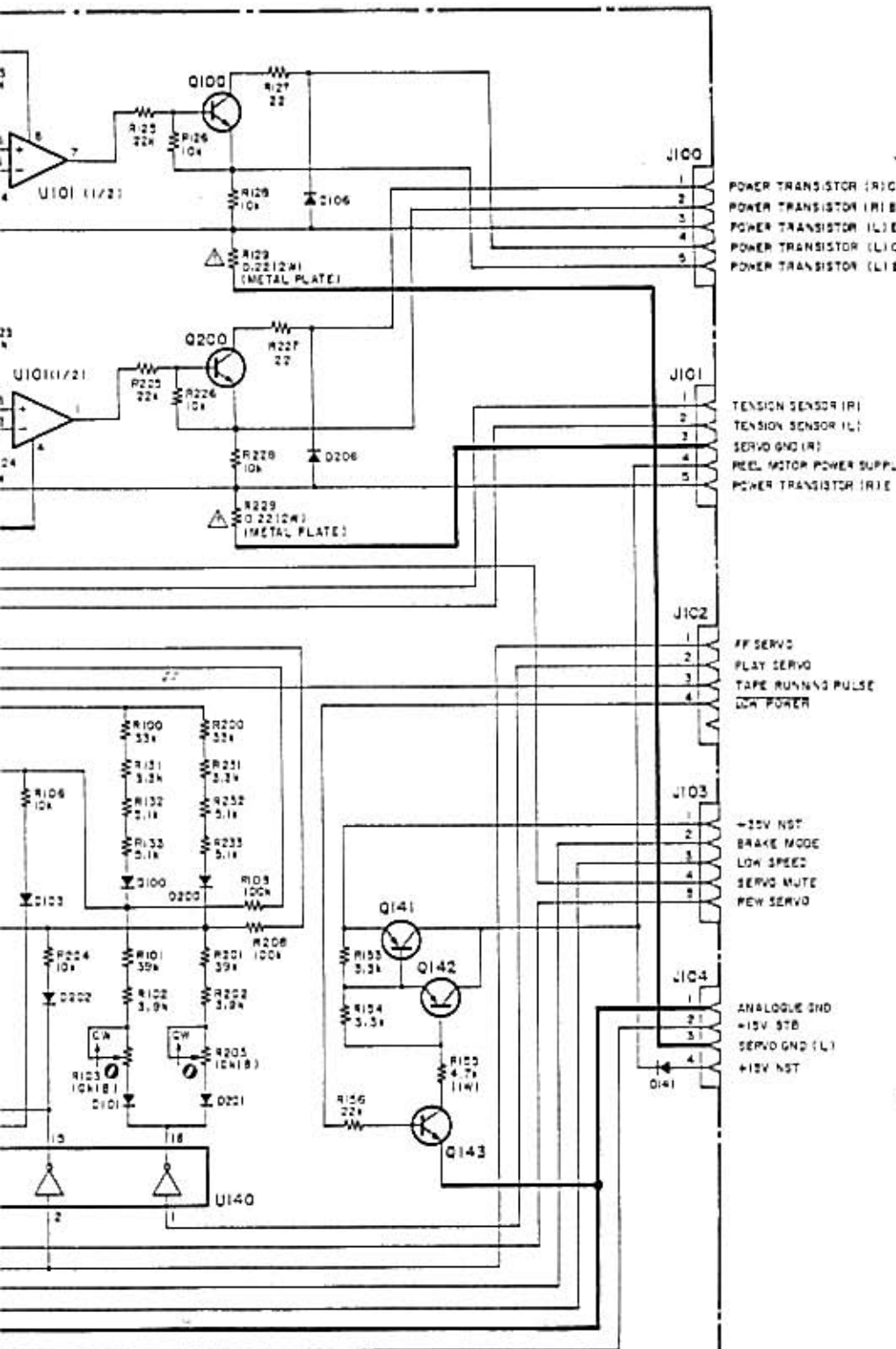
4-11. Reel Servo PCB Ass'y



U100, U200	LA6358	Q100, Q200	25C2320F
U101	LA6358	Q140	25K3810
U102, U202	25C3400 (DIGITAL TRANSISTOR)	Q141	25B507E
U140	BA6251 (TRANSISTOR ARRAY)	Q142	25A1015GR
U141	25C3400 (DIGITAL TRANSISTOR)	Q143	25C2320F
U142	25A1346 (DIGITAL TRANSISTOR)	D100, D105	15S133T-77
U143	25C3400 (DIGITAL TRANSISTOR)	D200, D205	15S133T-77
U144	MC14066BCP	D106, D206	DS1350 FR
U145	25C3400 (DIGITAL TRANSISTOR)	D140	15S133T-77
		D141	1R80Z61

REEL SERVO PCB ASS'Y

U101	Q100	D106		
U101	Q200	D206		
Q103	D100	D200	Q141	
D202	D101	D201	Q142 Q143	Q141

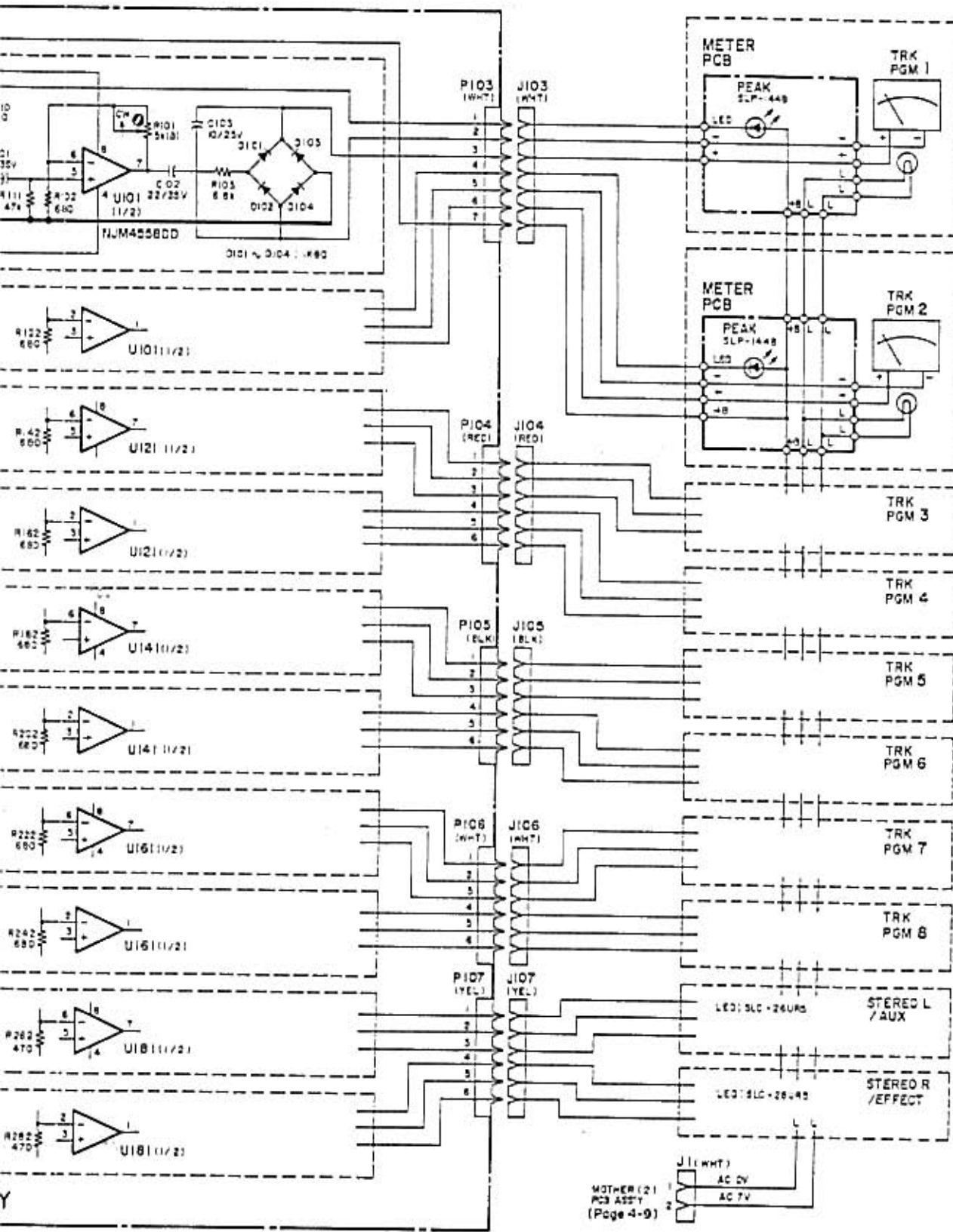


To
MOTHER (2)
PCB ASS'Y
(Page 4-9)

- J100
 - 1 POWER TRANSISTOR (R1C)
 - 2 POWER TRANSISTOR (R1B)
 - 3 POWER TRANSISTOR (L1E)
 - 4 POWER TRANSISTOR (L1C)
 - 5 POWER TRANSISTOR (L1B)
- J101
 - 1 TENSION SENSOR (R1)
 - 2 TENSION SENSOR (L1)
 - 3 SERVO GND (R1)
 - 4 REEL MOTOR POWER SUPPLY
 - 5 POWER TRANSISTOR (R1E)
- J102
 - 1 FF SERVO
 - 2 PLAY SERVO
 - 3 TAPE RUNNING PULSE
 - 4 LOW POWER
- J103
 - 1 +12V NST
 - 2 BRAKE MODE
 - 3 LOW SPEED
 - 4 SERVO MUTE
 - 5 REV SERVO
- J104
 - 1 ANALOGUE GND
 - 2 +15V STB
 - 3 SERVO GND (L1)
 - 4 +12V NST

U101

D101 ~ D104



METER PCB

TRK PGM 1

METER PCB

TRK PGM 2

TRK PGM 3

TRK PGM 4

TRK PGM 5

TRK PGM 6

TRK PGM 7

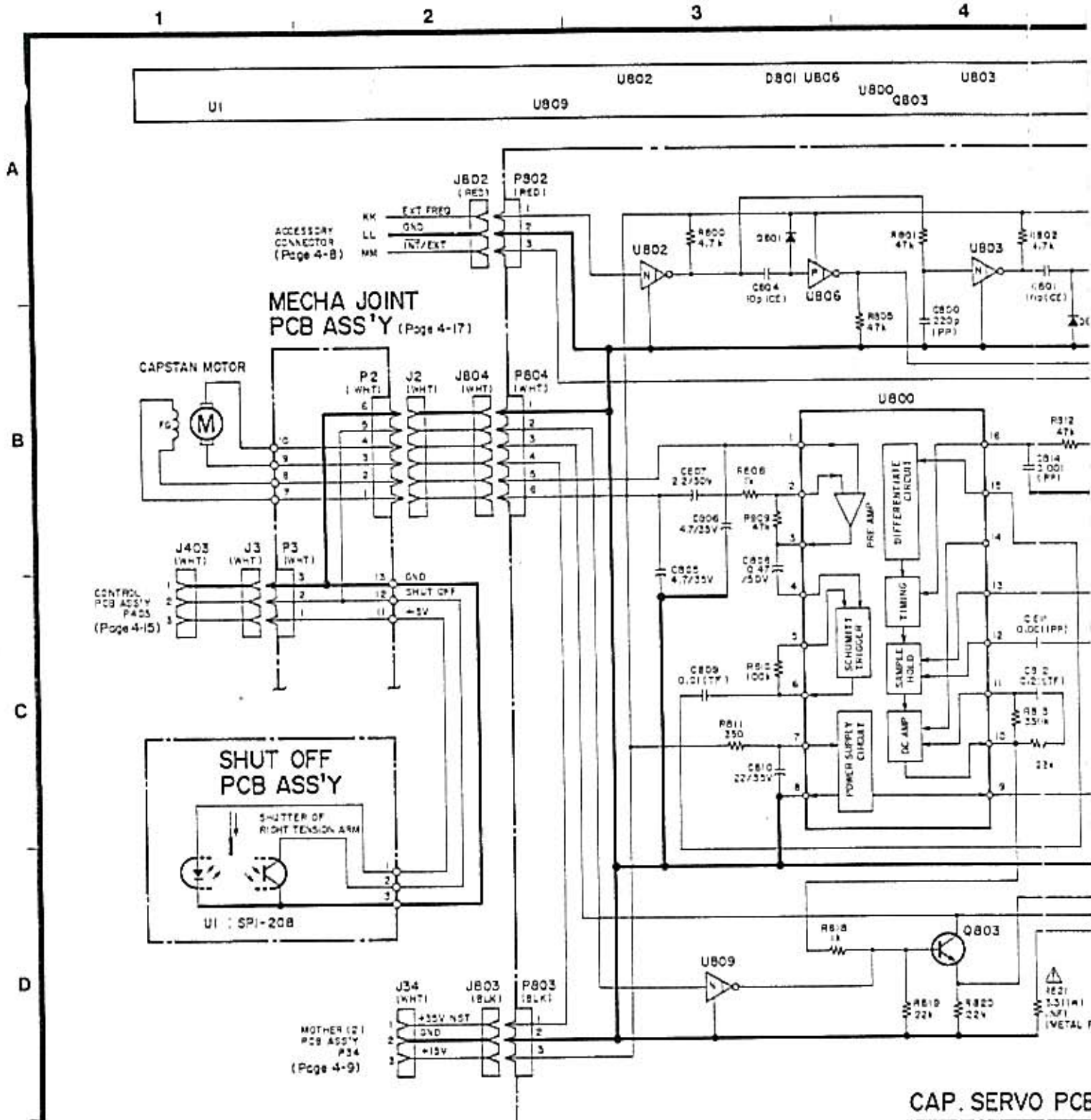
TRK PGM 8

STEREO L / AUX

STEREO R / EFFECT

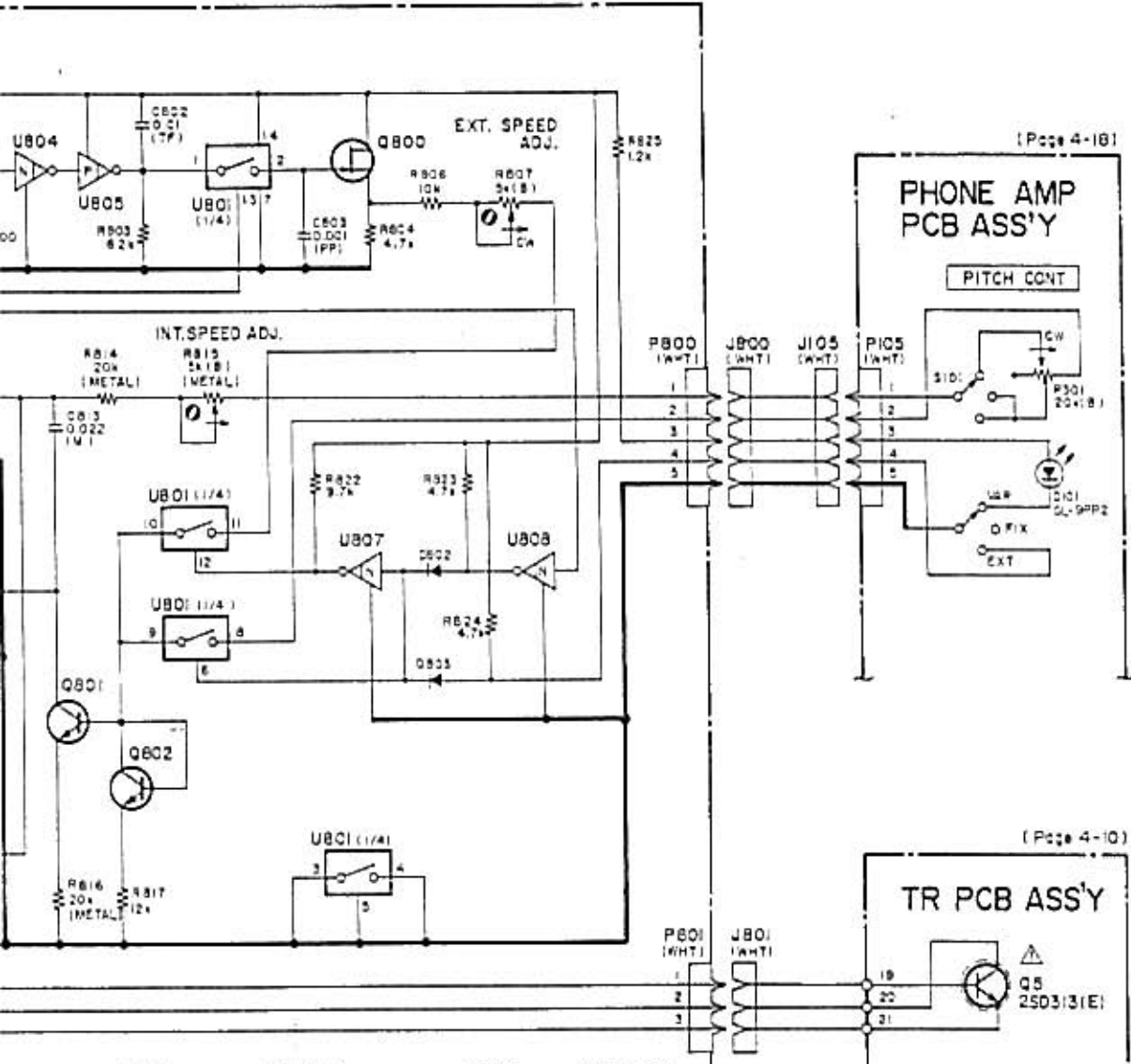
MOTHER (2) PCB ASSY (Page 4-9)

4-13. Cap. Servo PCB Ass'y



CAP. SERVO PCB ASS'Y

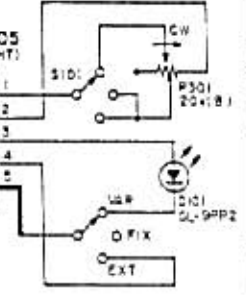
UB04	UB05	UB01	Q800	DB02	UB08		
QB01	QB02	UB01	UB07	DB03			
			UB01			C5	D101



(Page 4-18)

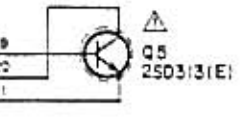
PHONE AMP PCB ASS'Y

PITCH CONT



(Page 4-10)

TR PCB ASS'Y



UB00	μPC1043C	Q800	25K381(D)
UB01	MC14066B	QB01 ~ QB03	25C2320 (F)
UB02 ~ UB04	25C3400		
UB05, UB06	25A1346	DB00 ~ DB03	ISS133T-77
UB07 ~ UB09	25C3400		

DIGITAL TRANS STOP

ASS'Y

4-14. Balance Amp PCB Ass'y

4-

1

2

3

A

A

B

B

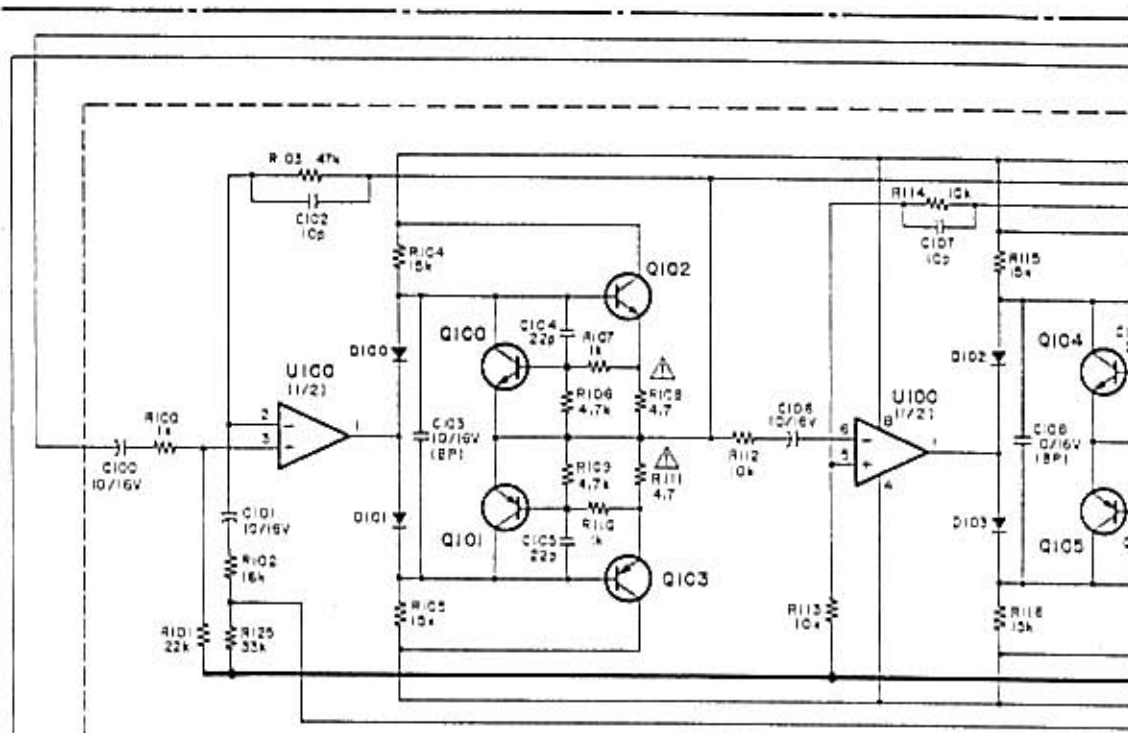
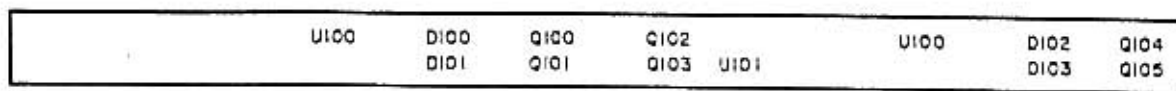
C

C

D

D

E

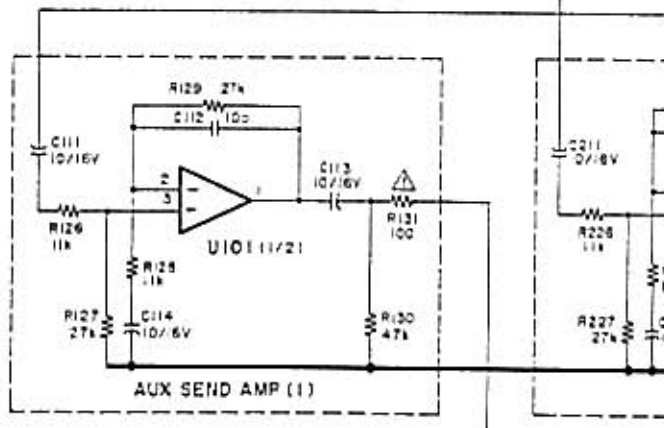


BALANCE AMP (L)

BALANCE AMP (R)

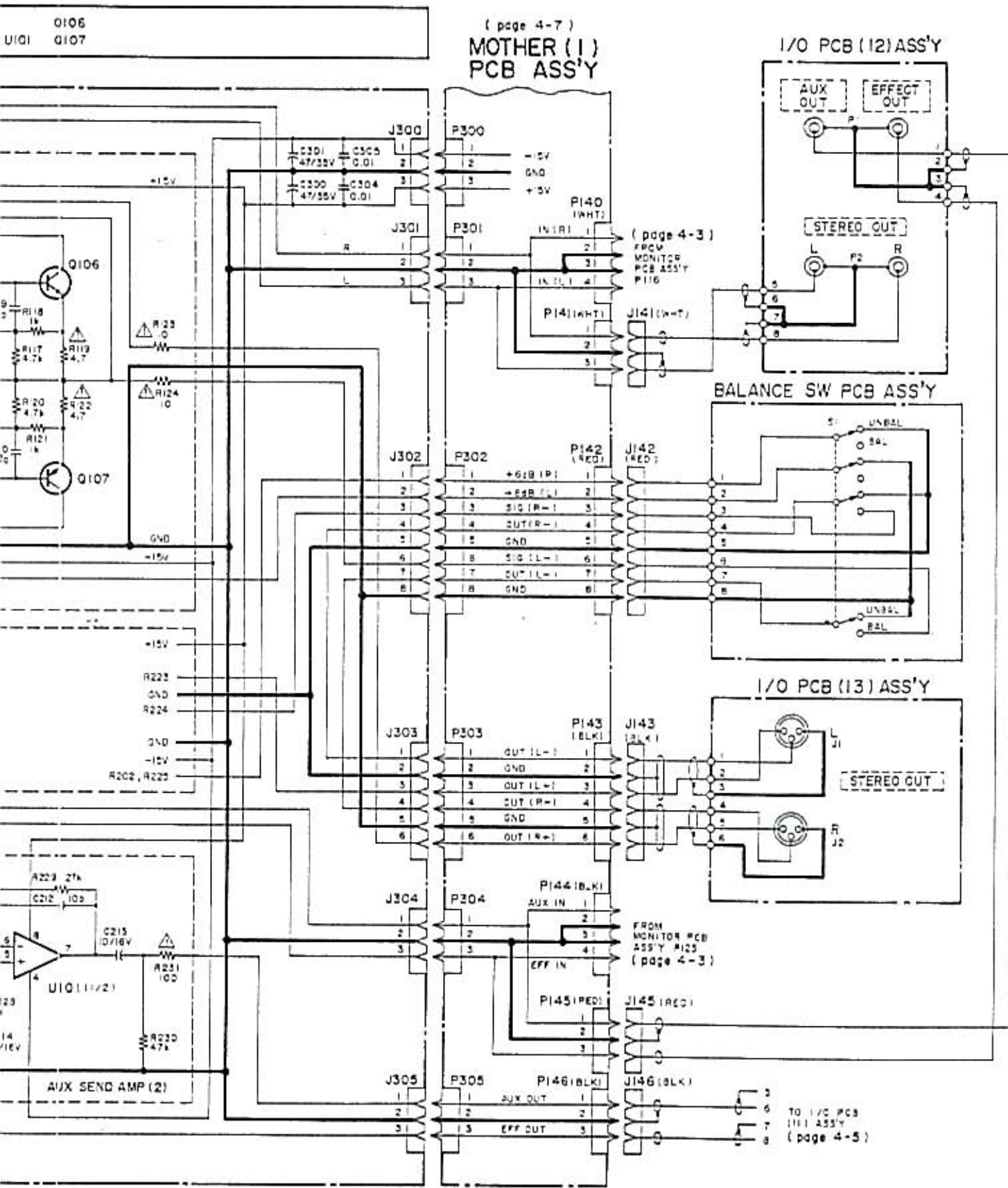
- U200
- Q200 ~ Q207
- R200 ~ R229
- C200 ~ C210

- U100, U200 : NJM204BP
- U101 : TL072CP
- Q100, Q104, Q200, Q204 : 2SC945AK
- Q101, Q105, Q201, Q205 : 2SA733K
- Q102, Q106, Q202, Q206 : 2SC2655 (Y)
- Q103, Q107, Q203, Q207 : 2SA1020 (Y)
- D100 ~ D103 : 1SS133T-77
- D200 ~ D203 : 1SS133T-77



AUX SEND AMP (1)

BALANCE AMP PCB ASS'Y



4-15. Control PCB Ass'y

1

2

3

4

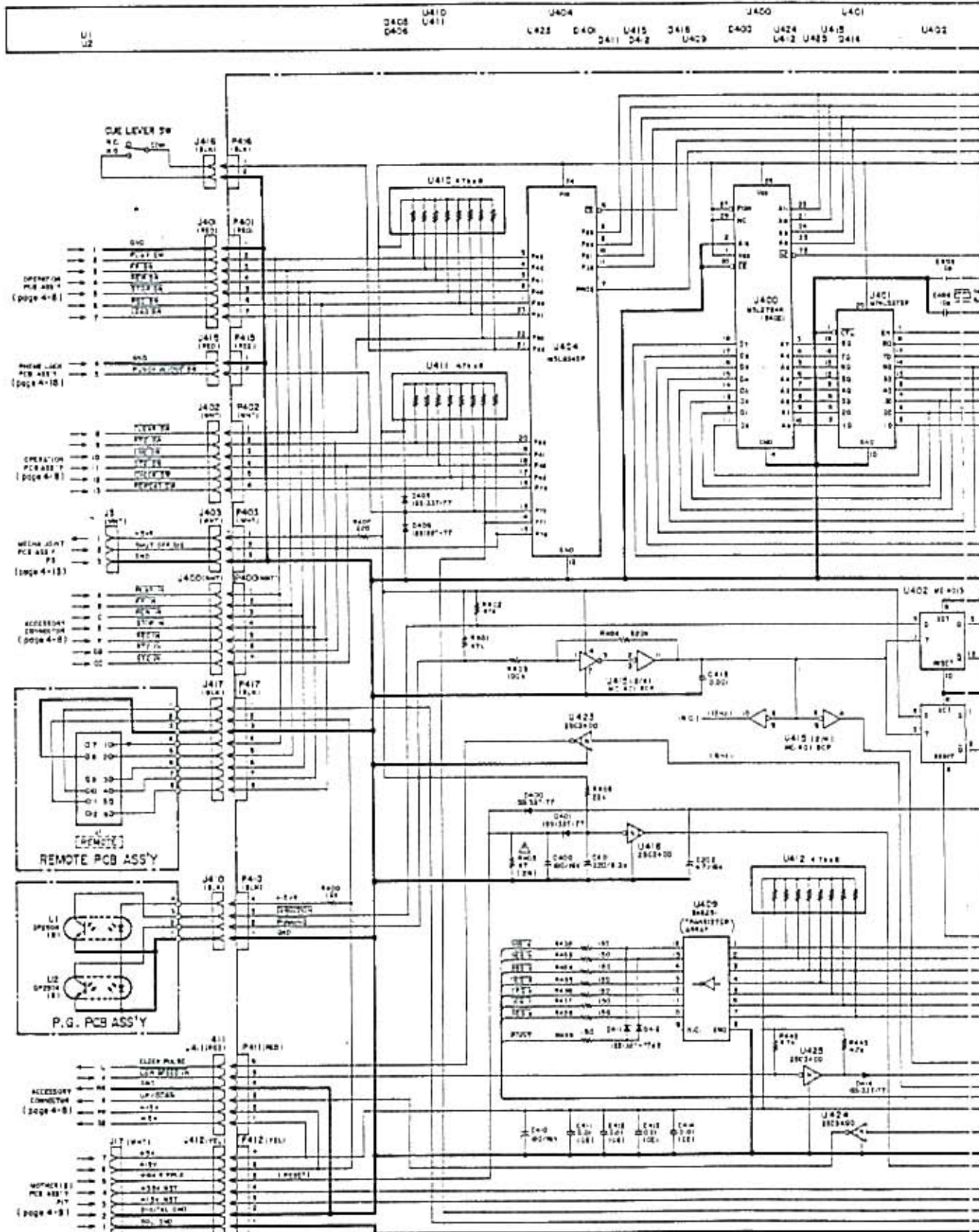
A

B

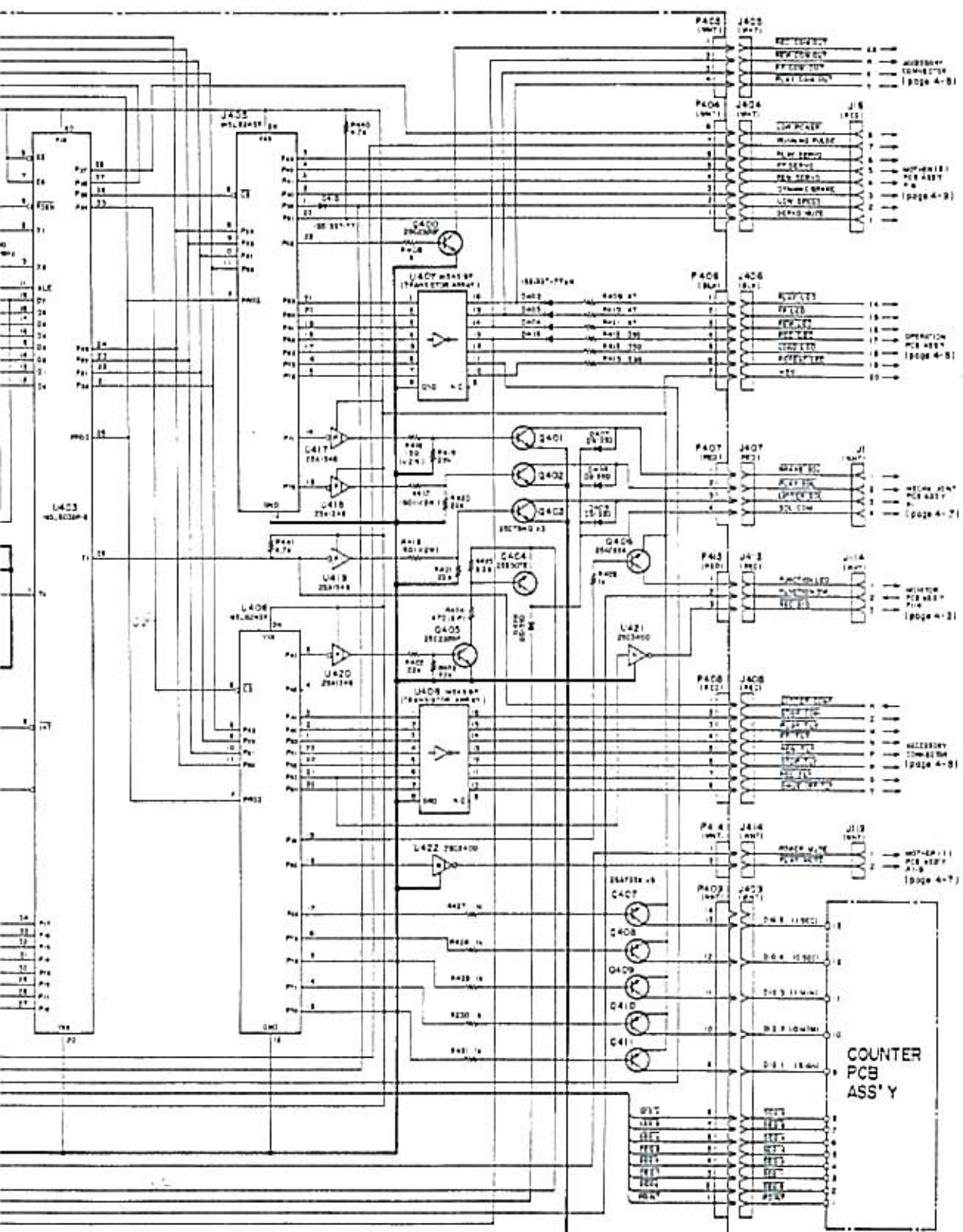
C

D

E

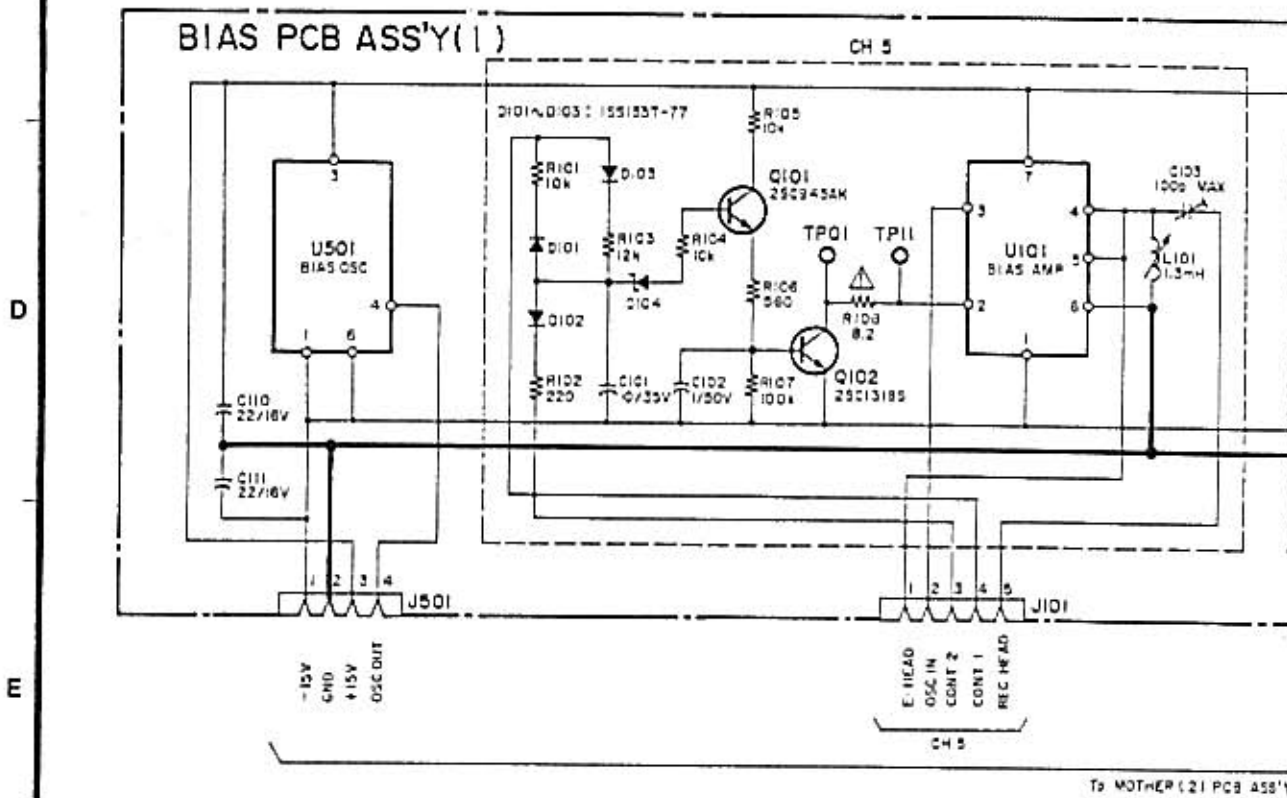
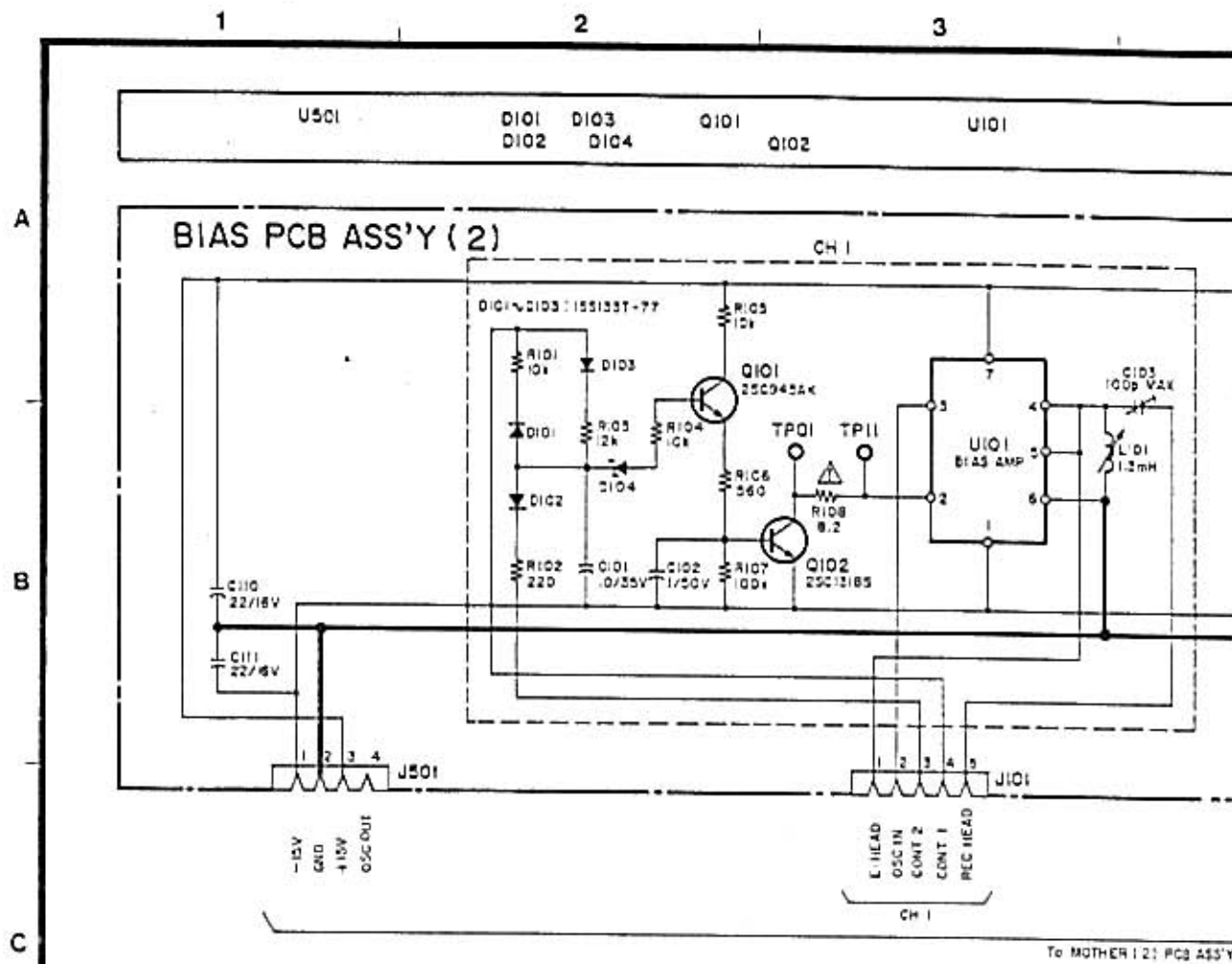


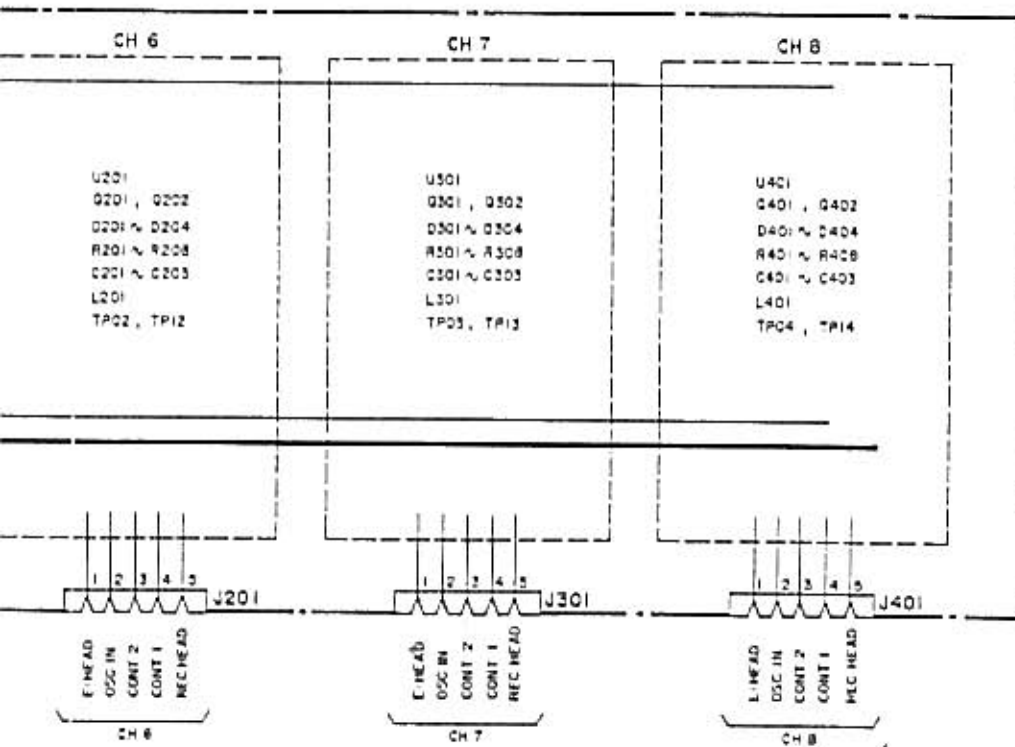
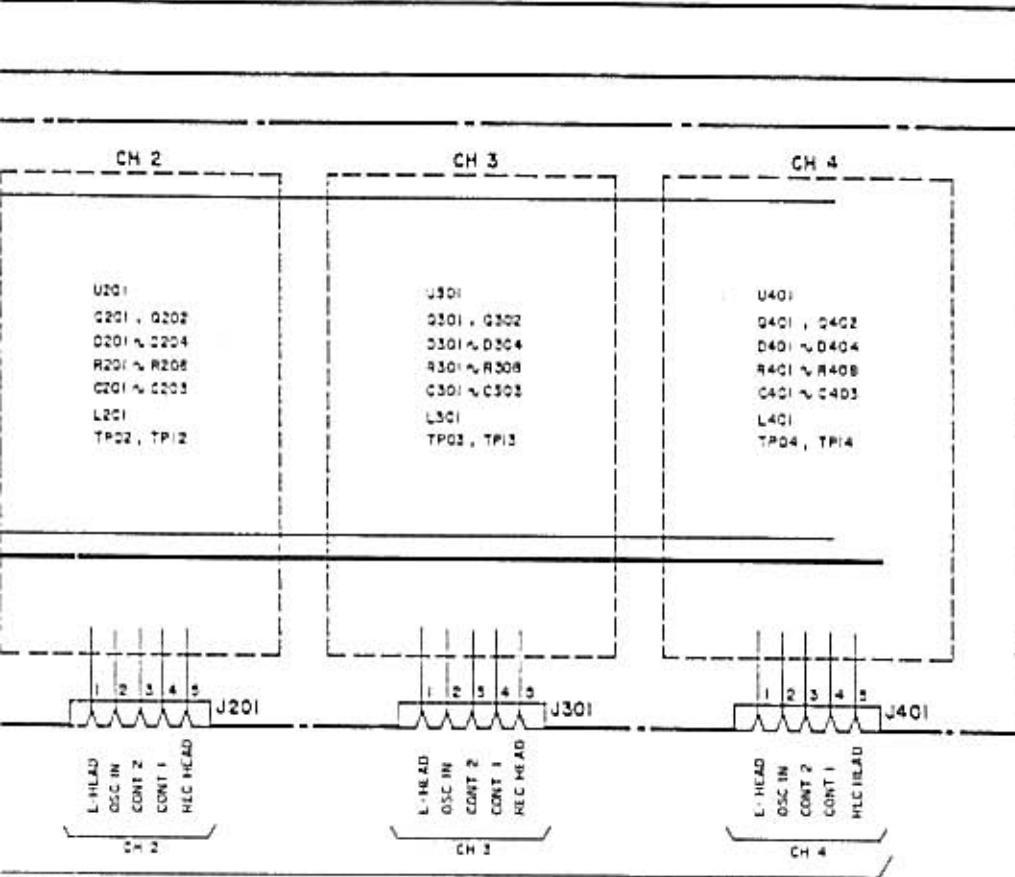
U403	U405	Q413	Q400	Q402, Q404	Q406
	U407	Q418	Q403	Q405, Q409	Q412
U408	U417, U420	Q422	Q404, Q404	Q410	Q407, Q411



COUNTER PCB ASS'Y

4-16. Bias PCB Ass'y





4-17. Head Ass'y/Mecha. Joint PCB Ass'y

1 2 3 4

A

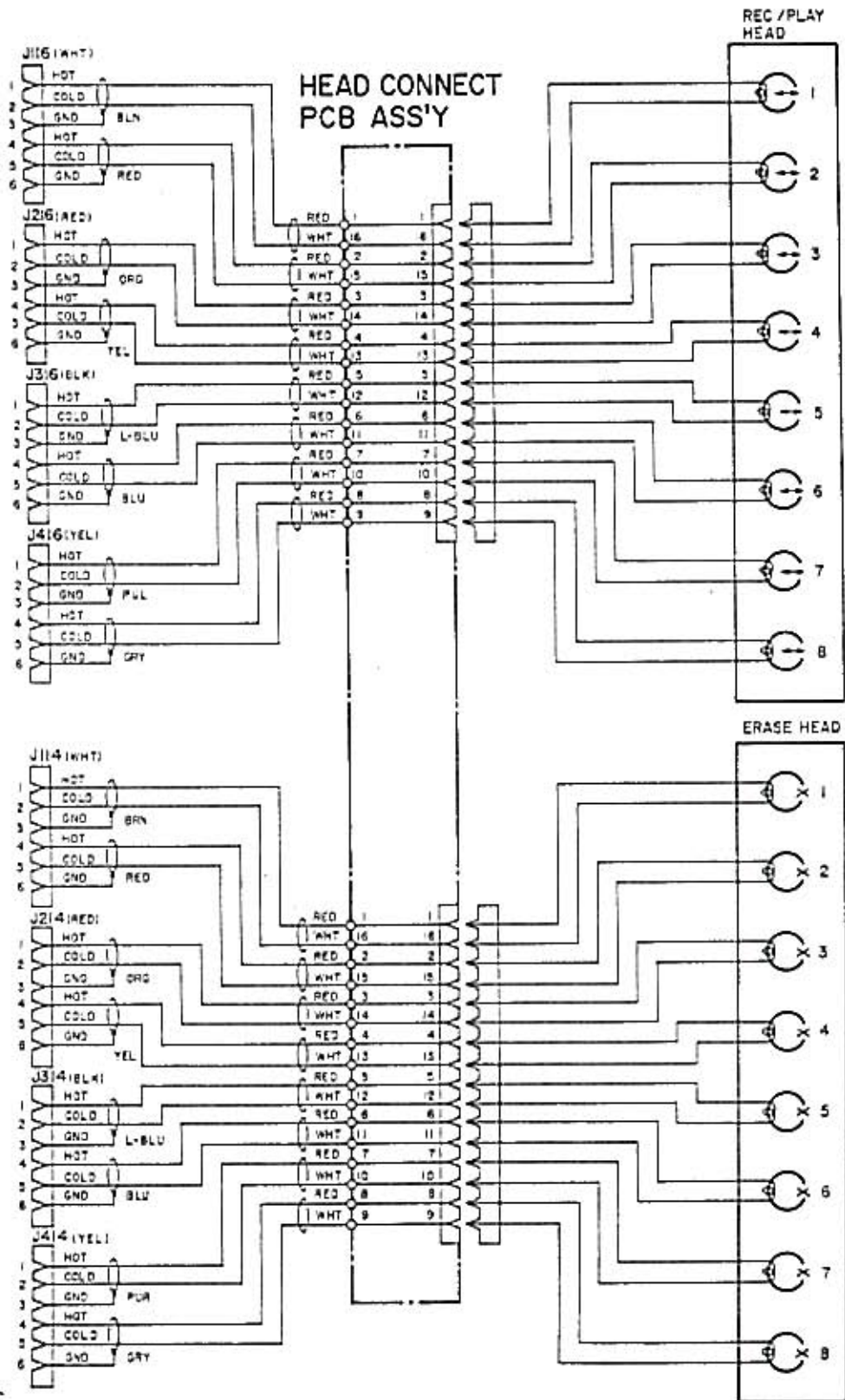
B

C

D

E

MOTHER (1) PCB ASS'Y (page 4-7)



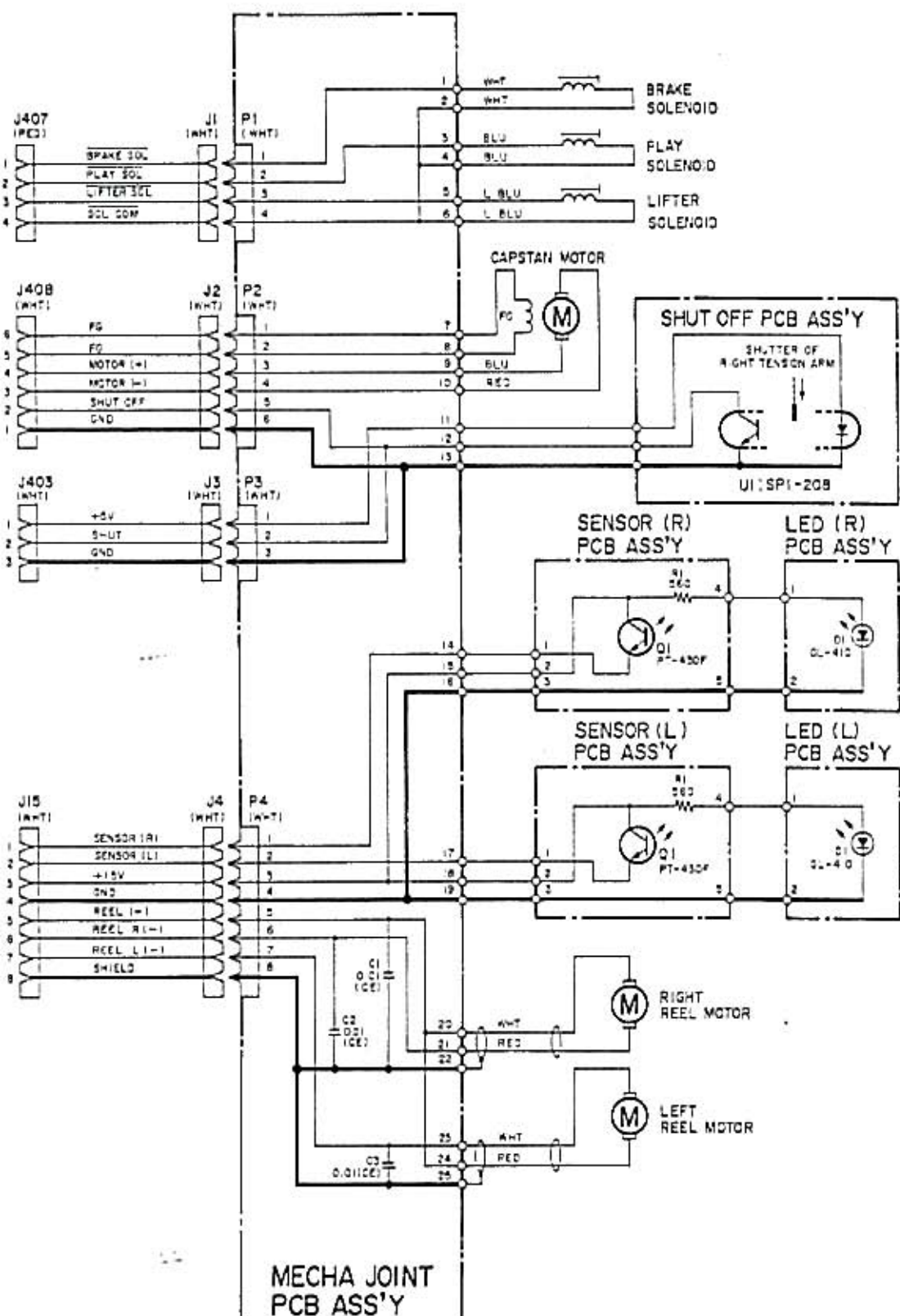
CONTROL PCB ASS'Y 1407 (page 4-15)

CAPD/RVD PCB ASS'Y 1804 (page 4-13)

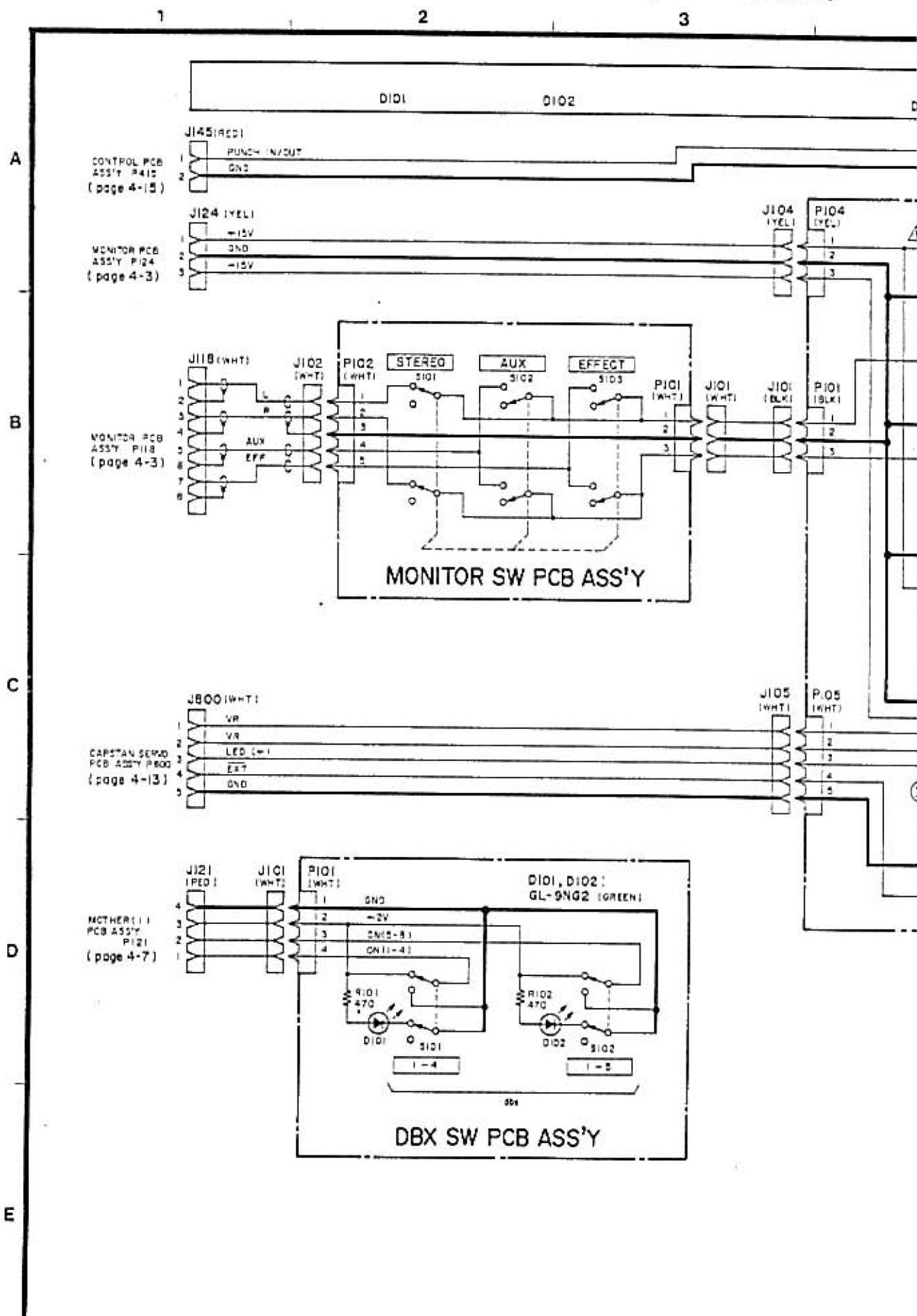
CONTROL PCB ASS'Y 1403 (page 4-15)

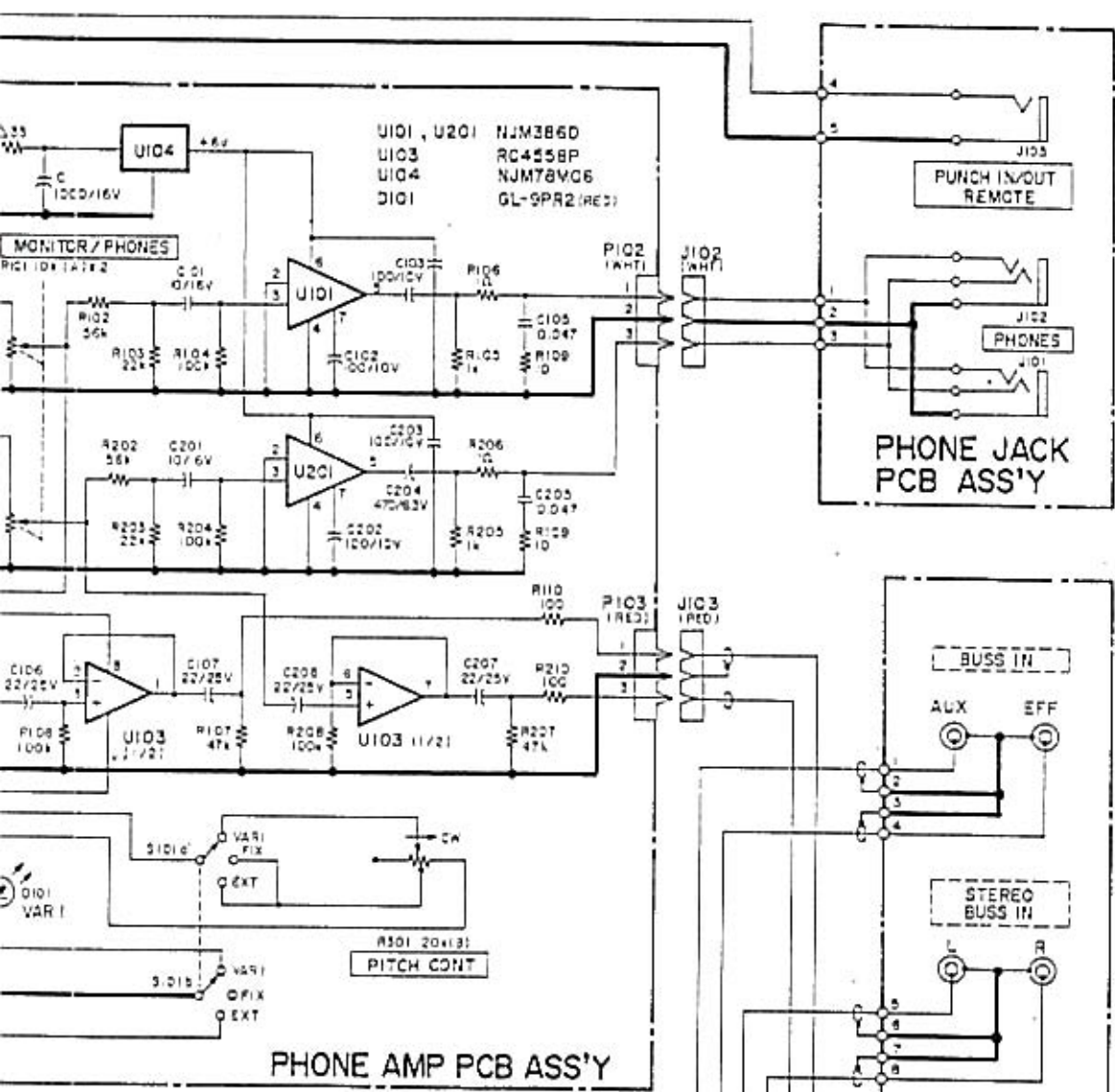
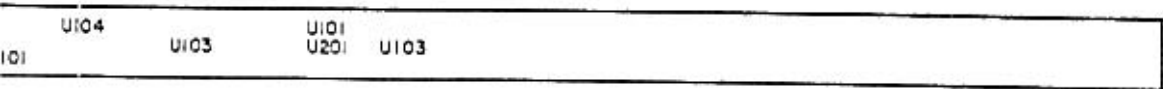
MOTHER (2) PCB ASS'Y P15 (page 4-9)

Q1	U1	O1
Q1		O1



4-18. Monitor SW PCB Ass'y/DBX SW PCB Ass'y/Phone Amp PCB Ass'y/I/O PCB (IO) Ass'y





MONITOR PCB
 ASS'Y P12
 (page 4-3)

BASS B PCB
 ASS'Y P.04
 (page 4-6)

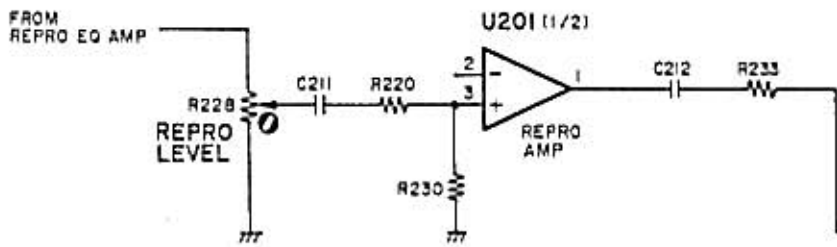
1

2

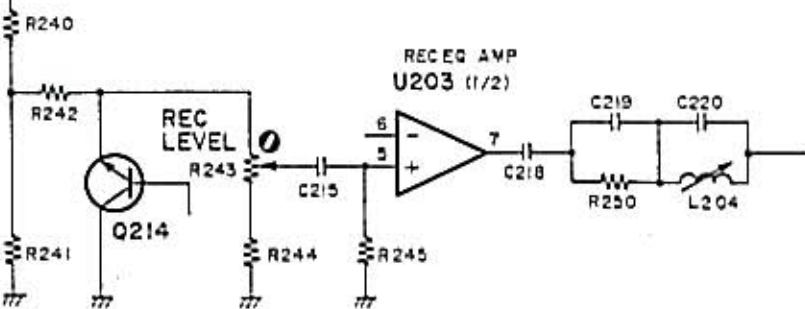
3

4

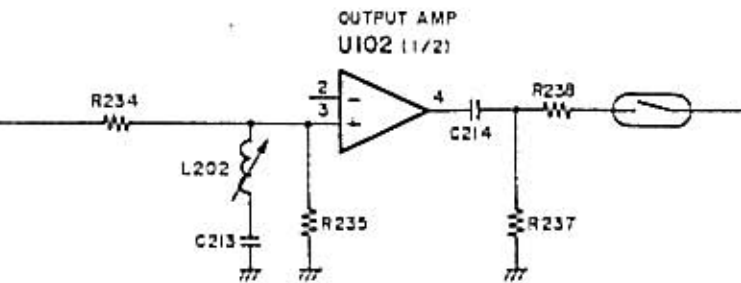
A



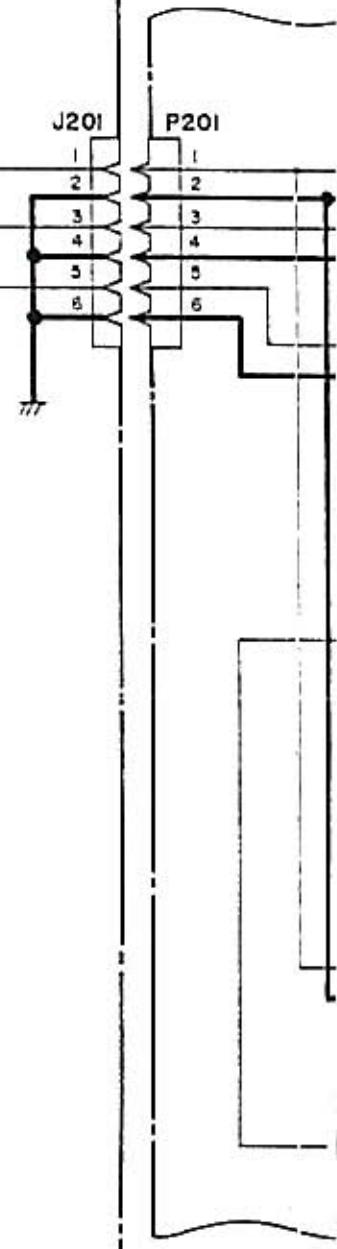
B



C



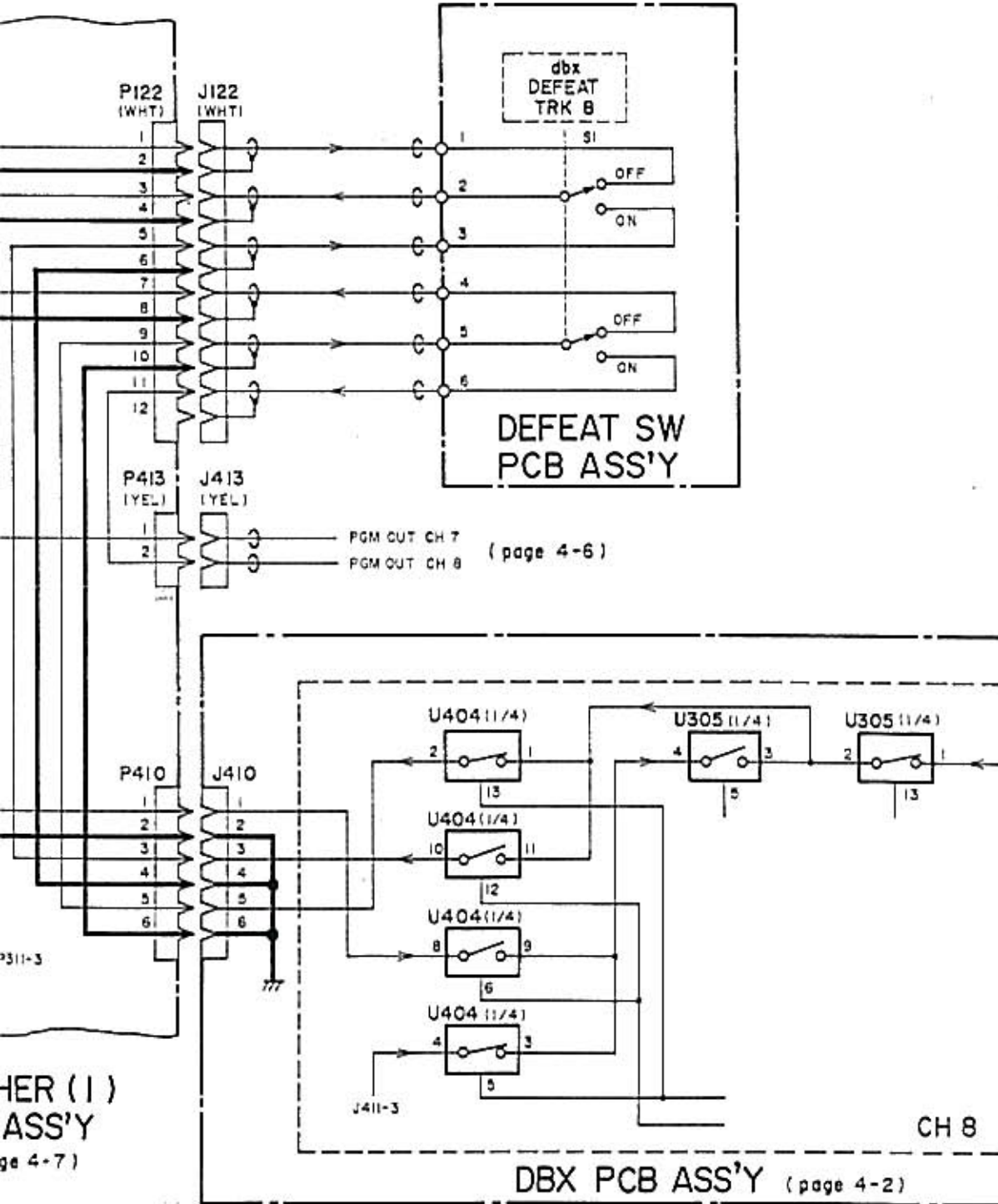
CH 8



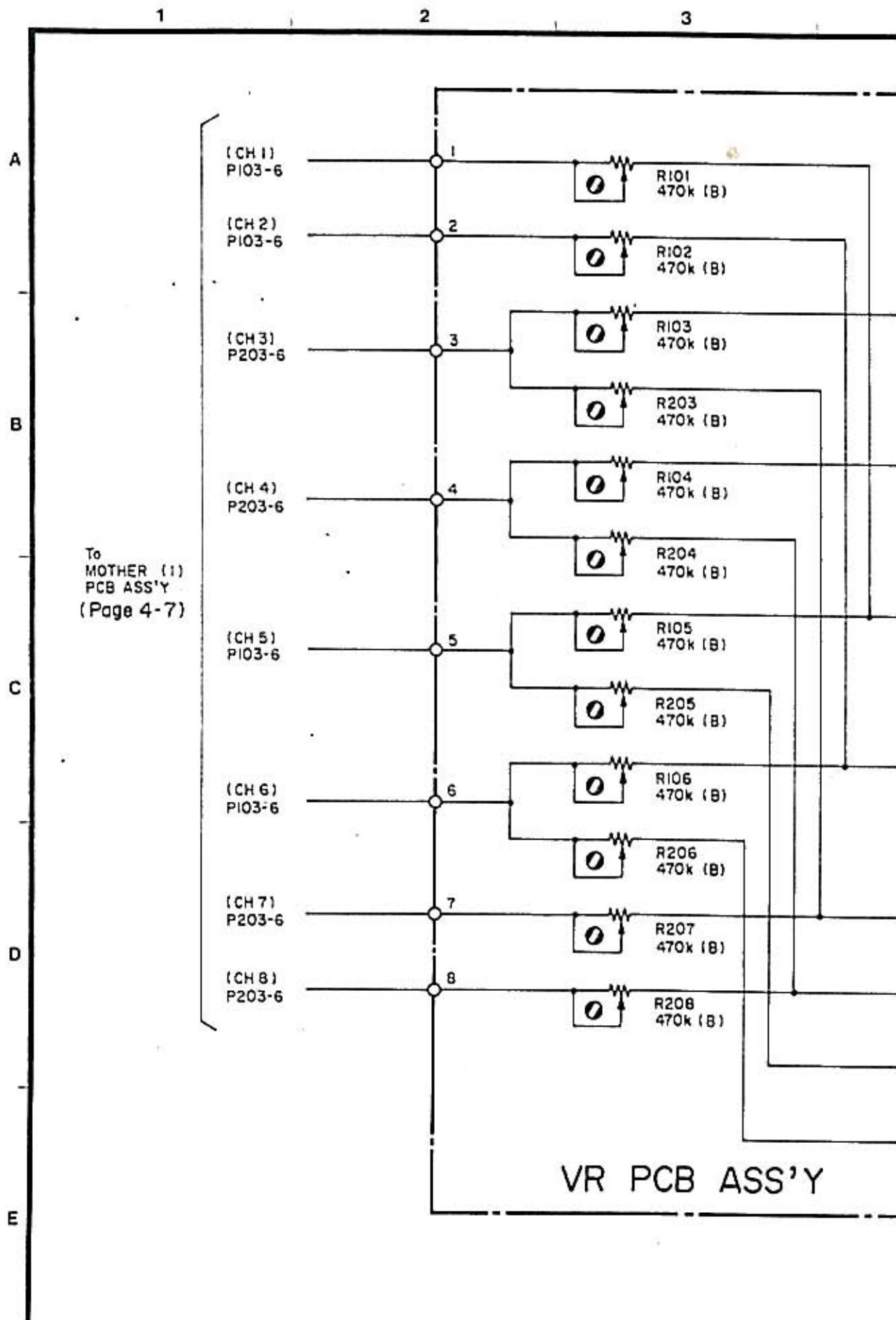
REC PLAY AMP PCB ASS'Y (page 4 - 1)

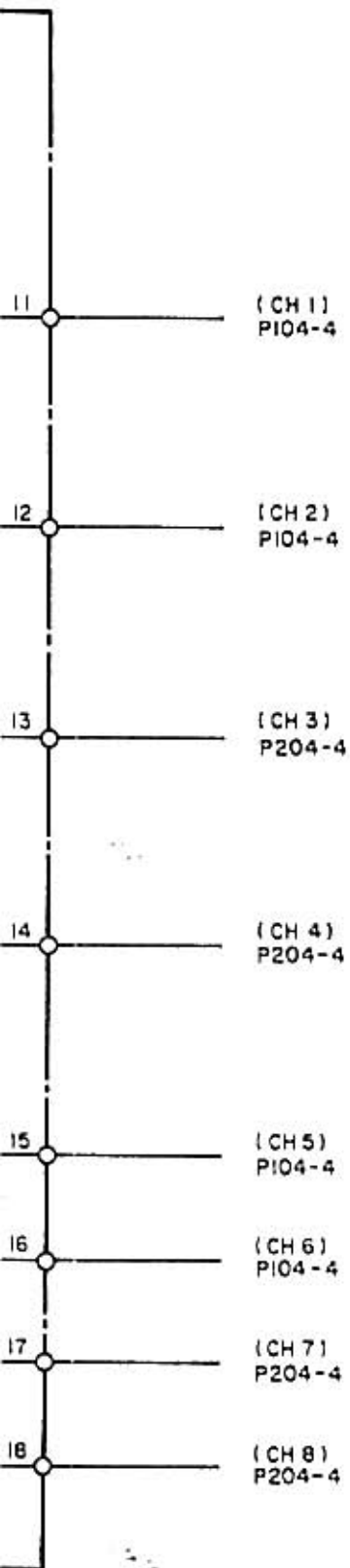
MOTI
PCB
(po

E



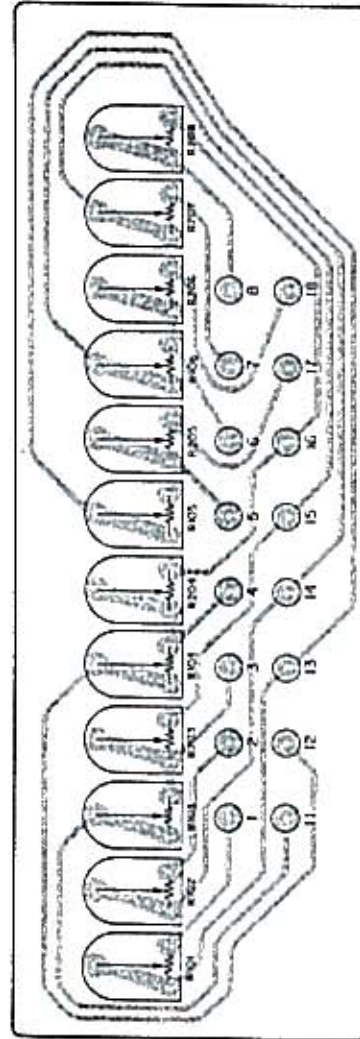
4-20. VR PCB Ass'y





To
 MOTHER (1)
 PCB ASS'Y
 (Page 4-7)

VR PCB



Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß der/die/das

**MAGNETTONBANDGERÄT MIT
MISCHPULT TASCAM 388**

(Gerät, Typ, Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

AMTSBLATT 163/1984, VFG 1045/1984

(Amtsblattnummer)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

TEAC CORPORATION

Name des Herstellers/Importeurs

TASCAM

TEAC Professional Division

388

TEAC CORPORATION

MAIN OFFICE: 3-7-3 NAKACHO MUSASHINO TOKYO PHONE (0422) 53-1111
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