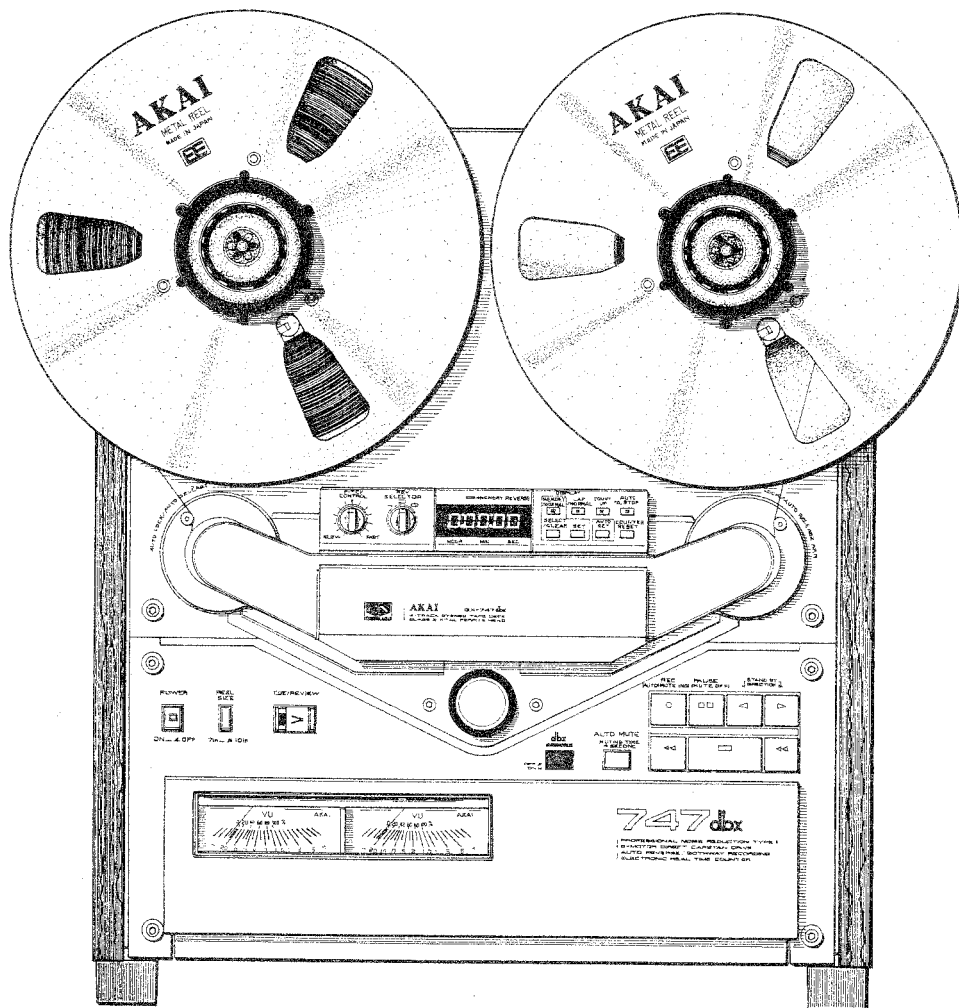
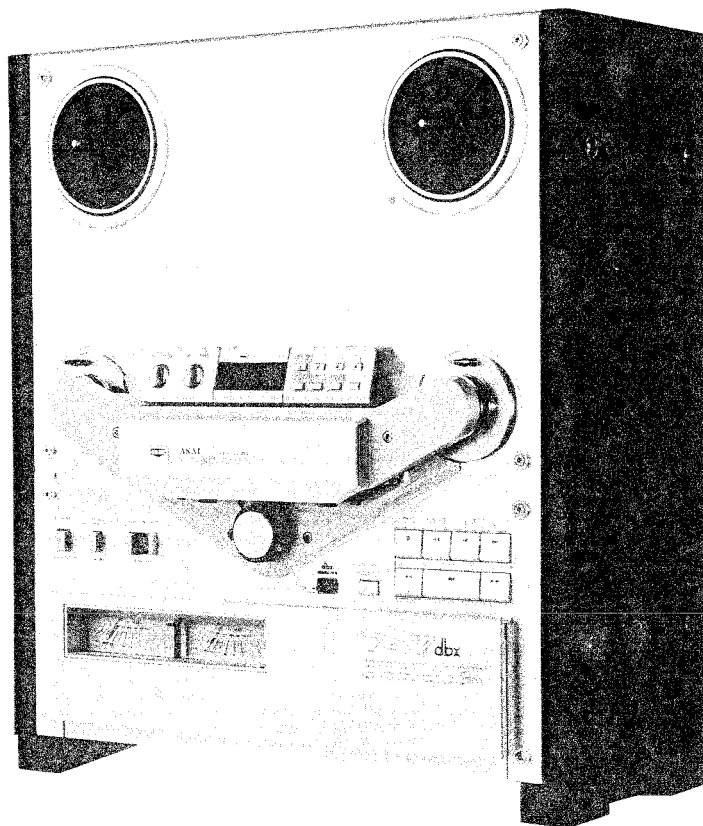


AKAI SERVICE MANUAL



STEREO TAPE DECK

MODEL **GX-747dbx**



STEREO TAPE DECK
MODEL **GX-747dbx**

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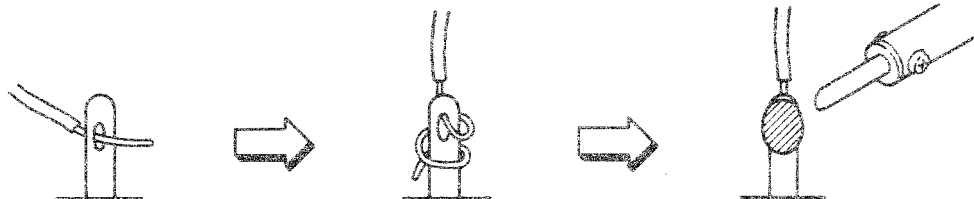
SAFETY INSTRUCTIONS

SAFETY CHECK AFTER SERVICING

Confirm the specified insulation resistance between power cord plug prongs and externally exposed parts of the set is greater than 10 Mohms, but for equipment with external antenna terminals (tuner, receiver, etc.) and is intended for **C** or **A**, specified insulation resistance should be more than 2.2 Mohms (ground terminals, microphone jacks, headphone jacks, line-in-out jacks etc.)

PRECAUTIONS DURING SERVICING

1. Parts identified by the Δ symbol parts are critical for safety.
Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements.
Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
 - 1) Wires covered with PVC tubing
 - 2) Double insulated wires
 - 3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
 - 1) Insulation Tape
 - 2) PVC tubing
 - 3) Spacers (Insulating Barriers)
 - 4) Insulation sheets for transistors
 - 5) Plastic screws for fixing microswitch (especially in turntable)
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

SECTION 1

SERVICE MANUAL

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For basic adjustments, measuring methods, and operating principles, refer to GENERAL TECHNICAL MANUAL.

I . SPECIFICATIONS

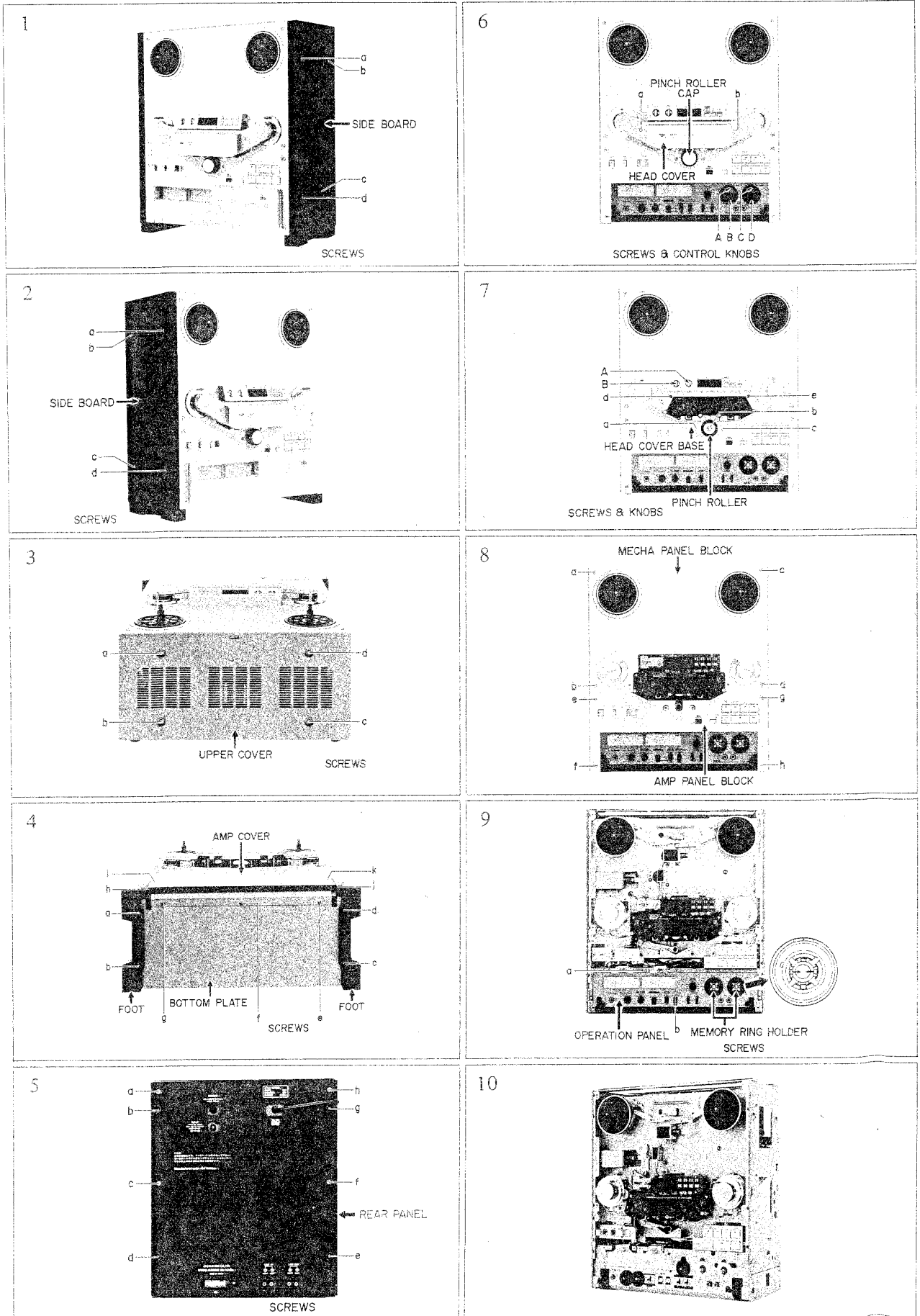
TRACK SYSTEM	4 Track 2 Channel Stereo System
REEL CAPACITY	Up to 10" reel
HEADS	GX head for Recording x 2 GX head for Playback x 2 Erase head x 2
MOTORS	AC Servo motor for capstan drive x 1 AC Eddy current motor for reel drive x 2
TAPE SPEED	19 cm/s \pm 0.8% (7-1/2 ips.) 9.5 cm/s \pm 1.0% (3-3/4 ips.)
WOW & FLUTTER	Less than 0.03% WRMS, 0.07% DIN 45500 at 19 cm/s Less than 0.04% WRMS, 0.09% DIN 45500 at 9.5 cm/s
TAPE WINDING TIME	75 sec. using 360 m (1,200 ft.) Tape
FREQUENCY RESPONSE	25 to 33,000 Hz \pm 3 dB at 19 cm/s 25 to 26,000 Hz \pm 3 dB (0 VU) 25 to 25,000 Hz \pm 3 dB at 9.5 cm/s 25 to 15,000 Hz \pm 3 dB (0 VU)
SIGNAL TO NOISE RATIO	Better than 65 dB at 19 cm/s DIN 45500
DYNAMIC RANGE	128 dB (dbx Switch "ON", 1,000 Hz Peak Recording level)
HARMONIC DISTORTION	Less than 0.4% at 19 cm/s
INPUT	MIC: 0.25 mV Required microphone impedance: 600 ohms Line: 70 mV
OUTPUT	Line: 410 mV at 0 VU Required load impedance: more than 20 kohms Phone: 1.3 mW
DIN	Input: 2 mV (input impedance 10 kohms) Output: 0.3 V Required load impedance: more than 20 khoms
POWER REQUIREMENTS	100 V, 50/60 Hz for Japan 110 V/120 V/220 V/240 V, 50/60 Hz switchable for the other countries.
POWER CONSUMPTION	JPN 80W U/T 140W
DIMENSIONS	440 (W) x 493 (H) x 256 (D) mm (17.3 x 19.4 x 10.1 inches)
WEIGHT	23.2 kg (51.0 lbs)

* For improvement purposes, specifications and design are subject to change without notice.

* "dbx" is Trademark of dbx Incorporated.

II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs. Reassemble in reverse order.



III. CONTROLS

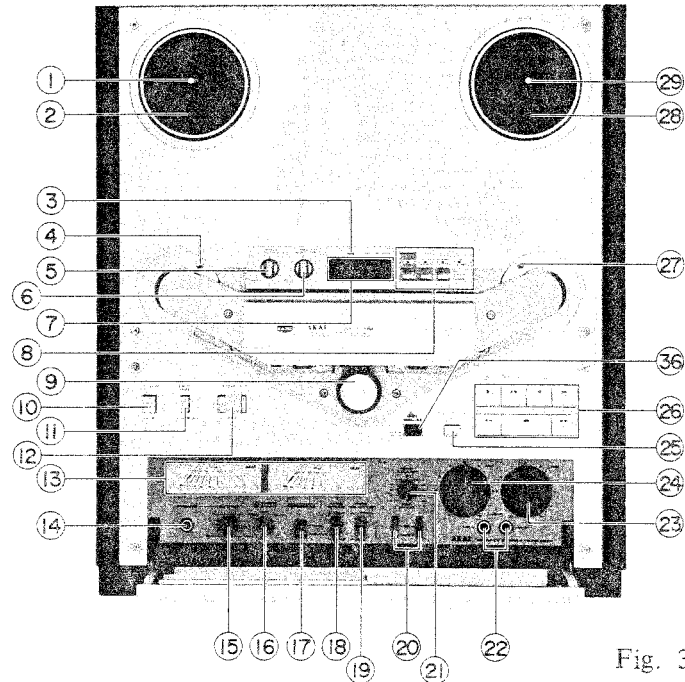


Fig. 3-1 Front View

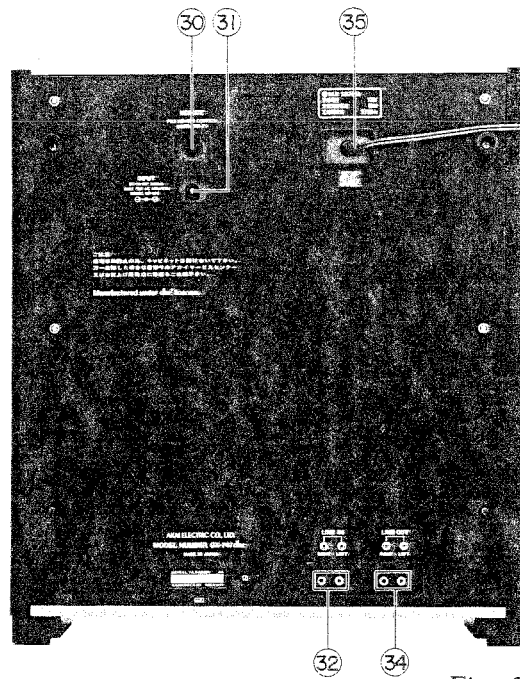


Fig. 3-2 Rear View

- | | |
|---|-------------------------------------|
| 1. BUILT-IN REEL RETAINER | 19. TAPE SELECTOR SWITCH |
| 2. SUPPLY REEL TABLE | 20. TRACK SELECTOR SWITCHES |
| 3. MEMORY REVERSE INDICATOR | 21. BIAS ADJUSTMENT VOLUME |
| 4. LEFT TENSION ARM (SENSING PIN) | 22. MICROPHONE JACKS |
| 5. PITCH CONTROL | 23. LINE INPUT CONTROLS |
| 6. REVERSE SELECTOR SWITCH | 24. MICROPHONE INPUT CONTROLS |
| 7. ELECTRONIC DIGITAL REAL TIME COUNTER | 25. AUTO MUTE BUTTON |
| 8. AUTO TIME COUNTER SYSTEM | 26. OPERATING BUTTONS |
| 9. PINCH ROLLER | 27. RIGHT TENSION ARM (SENSING PIN) |
| 10. POWER SWITCH | 28. TAKE-UP REEL TABLE |
| 11. REEL SIZE SELECTOR | 29. BUILT-IN REEL TABLE |
| 12. CUE/REVIEW LEVER | 30. REMOTE CONTROL JACK |
| 13. VU METERS | 31. AC ADAPTER JACK |
| 14. HEADPHONE JACK | 32. LINE IN JACKS |
| 15. OUTPUT LEVEL CONTROL | |
| 16. TIMER START SWITCH | 34. LINE OUT JACKS |
| 17. MONITOR SELECTOR | 35. POWER CORD |
| 18. TAPE SPEED SELECTOR | 36. dbx NOISE REDUCTION SWITCH |

IV. PRINCIPAL PARTS LOCATION

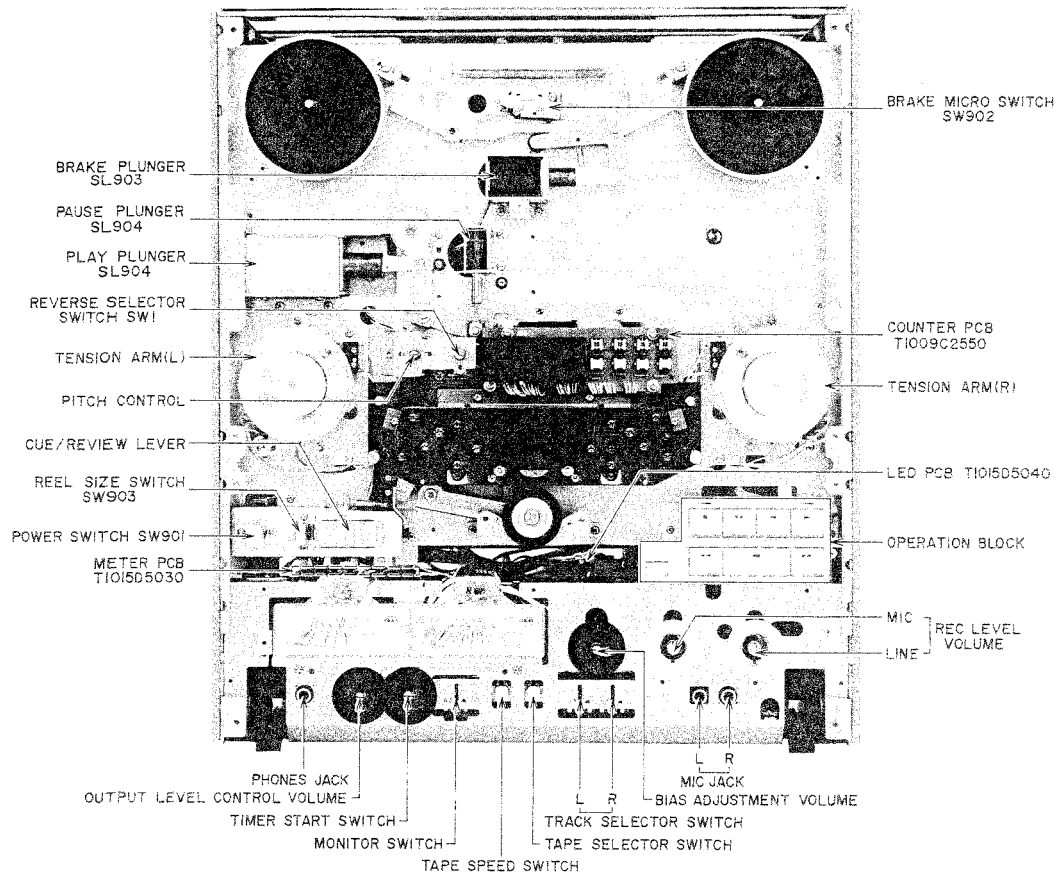


Fig. 4-1 Front View

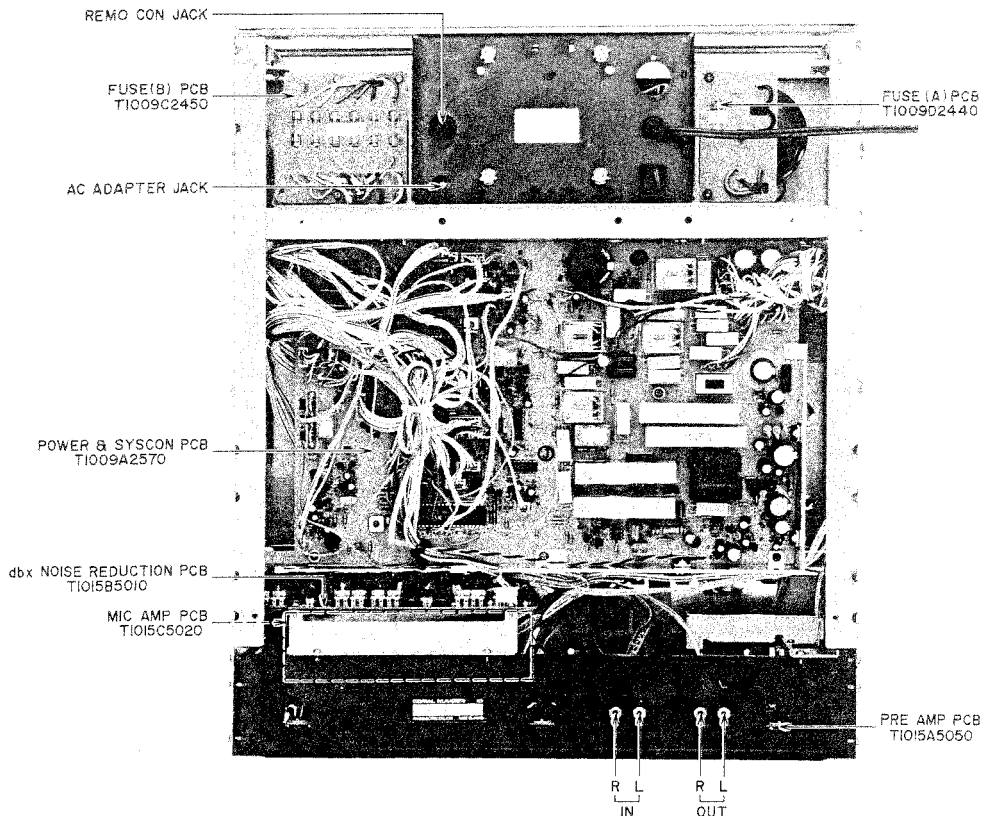


Fig. 4-2 Rear View

V. VOLTAGE AND CYCLE CONVERSION

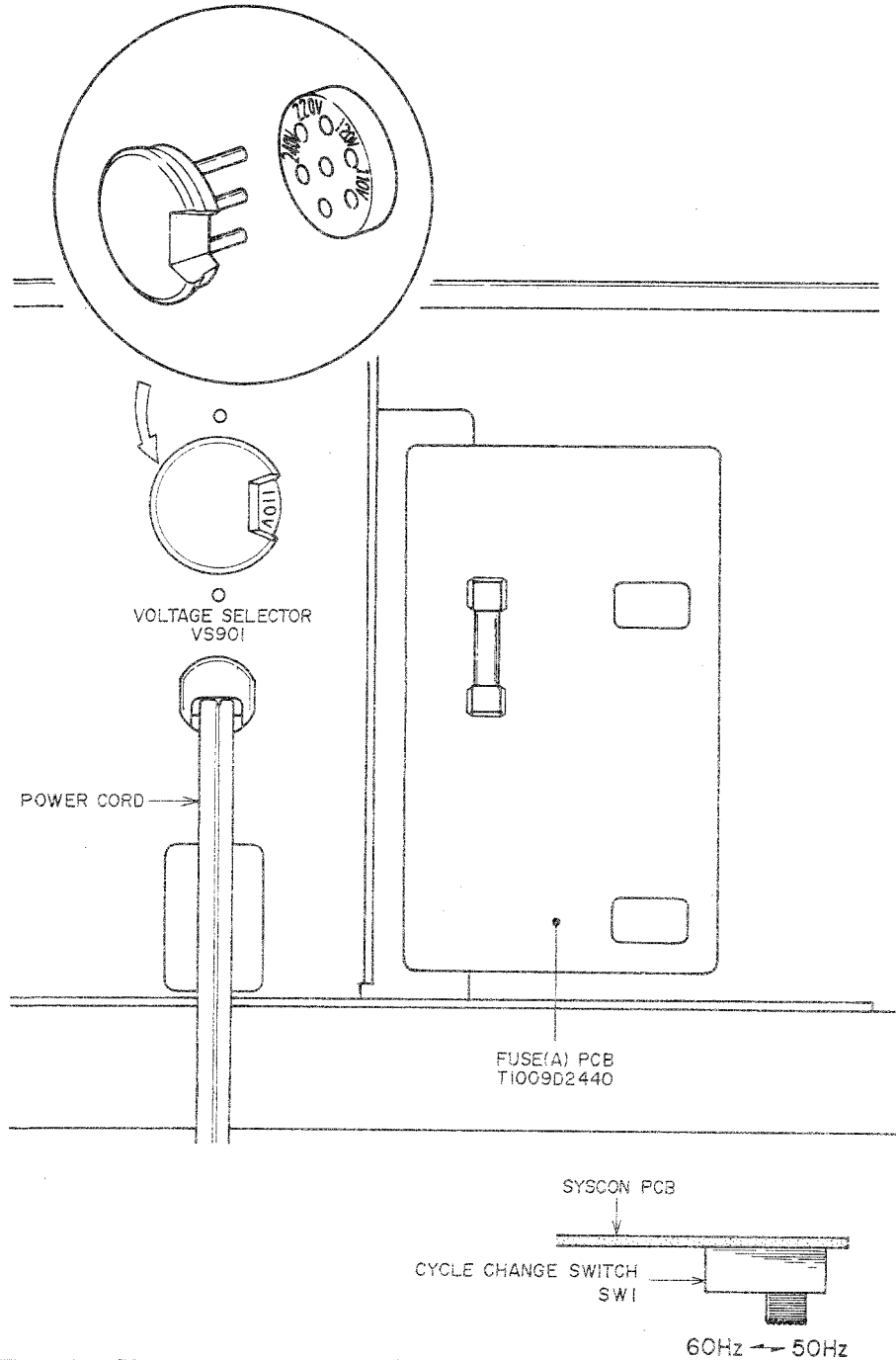


Fig. 5-1 Voltage Conversion (U/T Model) and Cycle Conversion (U/T, JPN Model)

1. VOLTAGE CONVERSION (Refer to Fig. 5-1)

U/T Model (110V/120V/220V/240V, 50/60 Hz)
Remove the back board and look for the voltage selector on the upper right portion of the machine. Change the position of voltage selector plugs so that the voltage to be used coincides with the voltage shown through the opening of voltage selector plug. Fuse change is not necessary.

2. CYCLE CONVERSION (Refer to Fig. 5-1)

Remove the back board and select the position of switch located in the recess at right portion of Syscon P.C Board to correspond to the frequency of power to be used. Move the switch to the right for 50 Hz and to the left for the 60 Hz.

VI. DESCRIPTION OF CIRCUIT OPERATION

GX-747 dbx is made by adding the dbx noise reduction system to GX-747. It is functionally identical to the GX-747 except for the dbx noise reduction system. The VU Meter is used for GX-747 dbx.

1. OUTLINE

The open deck has made a progress by increasing the performance of deck itself from 4 track 19 cm/sec. to 2 track 38 cm/sec. On the other hand, the cassette has tried to catch up with the performance of the open deck by rapidly improving the software, i. e., the recording tape.

But now for the open deck, too, a software, EE tape (extra efficiency tape) has been developed adding an advantage to the special features of the open deck such as long time recording and wide dynamic range. By using the EE tape, GX-747dbx 9.5 cm/sec. will have the same performance as that of the conventional 19 cm/sec., and the largest shortcoming of the open deck, i. e., troublesome tape loading has been eliminated by using the power lock system (tension arm is automatically locked by motor).

2. DETAILS AND FEATURES OF EE TAPE

- 1) "High range MOL" can be improved and "high linearity" can be obtained by using the cobalt addition type magnetic substance having high coercive force.
- 2) Playback equalizer of EE tape position

Tape Speed	Conventional Type	EE Position
38 cm/sec.	NAB 3,180 μ S + 50 μ S	NAB 3,180 μ S + 35 μ S
19 cm/sec.	NAB 3,180 μ S + 50 μ S	NAB 3,180 μ S + 35 μ S
9.5 cm/sec.	NAB 3,180 μ S + 90 μ S	NAB 3,180 μ S + 50 μ S
4.75 cm/sec.	NAB 3,180 μ S + 90 μ S	NAB 3,180 μ S + 70 μ S

- 3) The REC bias is set 30% or more larger than the conventional position.
- 4) Since the REC equalizer has high peaking frequency and less equalizing amount, the transient characteristic is improved.

Improvement in Record/Playback S/N ratio

Tape Speed (cm/s)	Tape Type	1 kHz Noise Level (dB)	10 kHz Noise Level (dB)
19	EE Tape	-74	-66
	Conventional Hi Fi Tape	-71	-63
9.5	EE Tape	-71	-66
	Conventional Hi Fi Tape	-71	-62

Fig. 6-1

Improvement in MOL (3% distortion level)

Tape Speed (cm/s)	Tape Type	1 kHz (VU)	10 kHz (VU)	15 kHz (VU)	20 kHz (VU)
19	EE Tape	+15	+10	+8	+5
	Conventional Hi Fi Tape	+15	+7	+3	+0.5
9.5	EE Tape	+14	+4	0	
	Conventional Hi Fi Tape	+13	+1	-6	

Fig. 6-2

10 kHz D Range Comparison

Tape Speed (cm/s)	Tape Type	10 kHz MOL Noise Level (dB)	10 kHz D Range (dB)
19	EE Tape	+10 ~ -66	76
	Conventional Hi Fi Tape	+ 6 ~ -63	70
9.5	EE Tape	+ 4 ~ -66	70
	Conventional Hi Fi Tape	+ 1 ~ -62	63

Fig. 6-3

F characteristics comparison of newly developed EE tape and conventional Hi Fi Tape

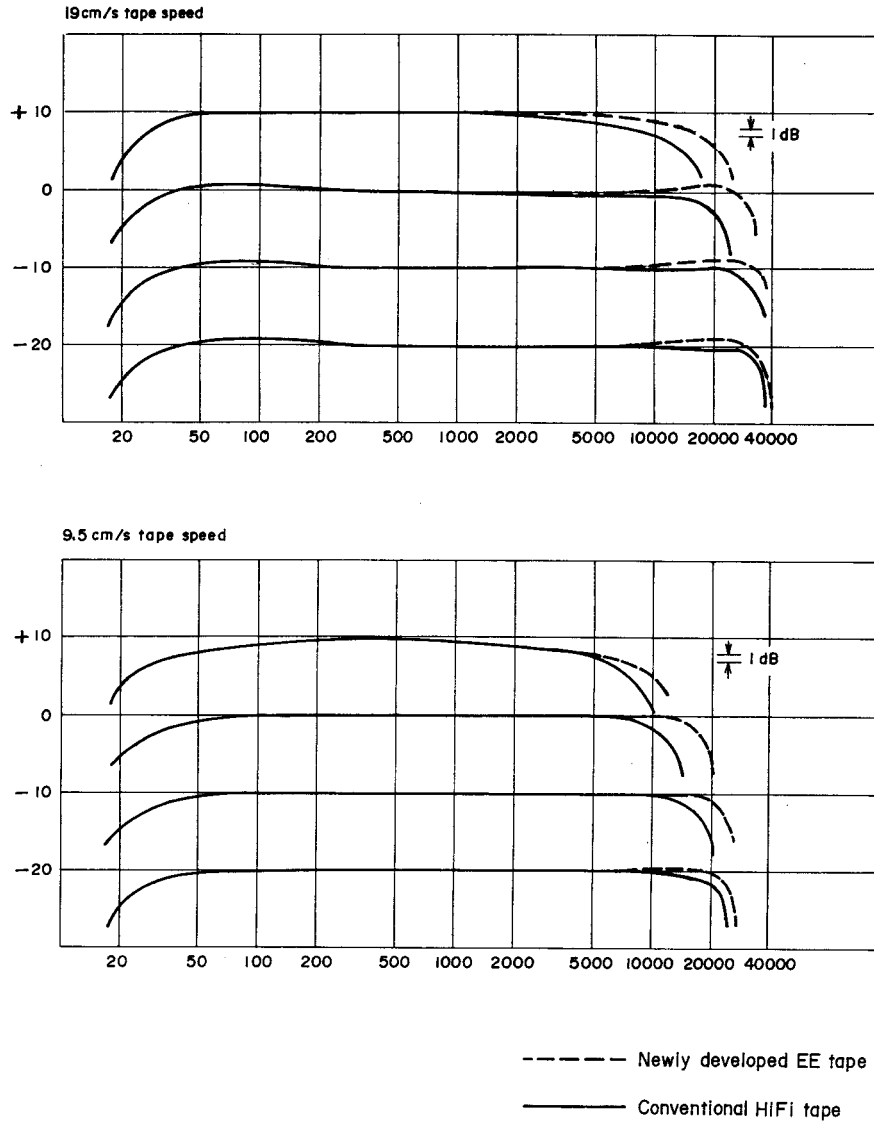


Fig. 6-4

S/N Ratio for Record/Playback

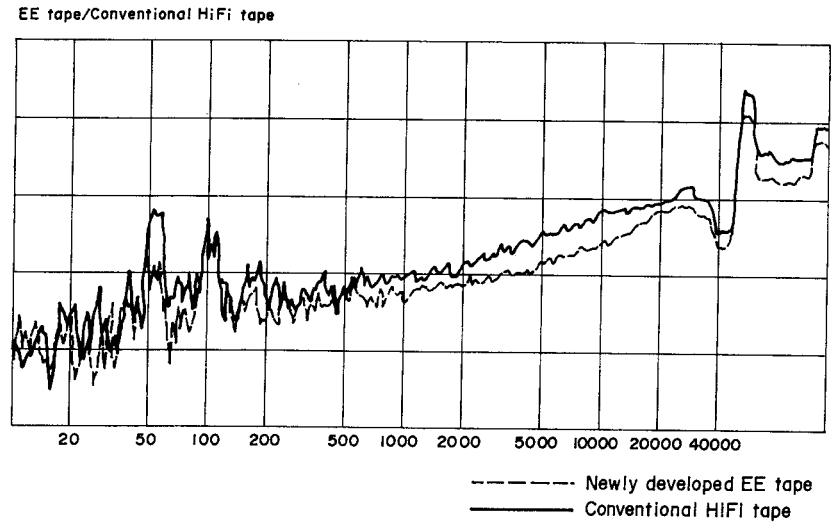


Fig. 6-5

3. dbx NOISE REDUCTION SYSTEM

The dynamic range of actual sounds of orchestra, rock band, etc. far exceeds 100 dB. On the other hand, the dynamic range of recording systems such as disk and tape has so far been limited to 50-70 dB due to the saturation level and noise characteristics. The dbx noise reduction system is one of the attempts to improve on the above drawback.

In this system, the dynamic range in decibels of the input signal is halved during recording, and doubled during playback after recording to return it to original range. The system makes it possible to record and playback signals whose dynamic range exceeds 100 dB through a tape deck whose dynamic range is the normal 50-60 dB. (Refer to Fig. 6-6)

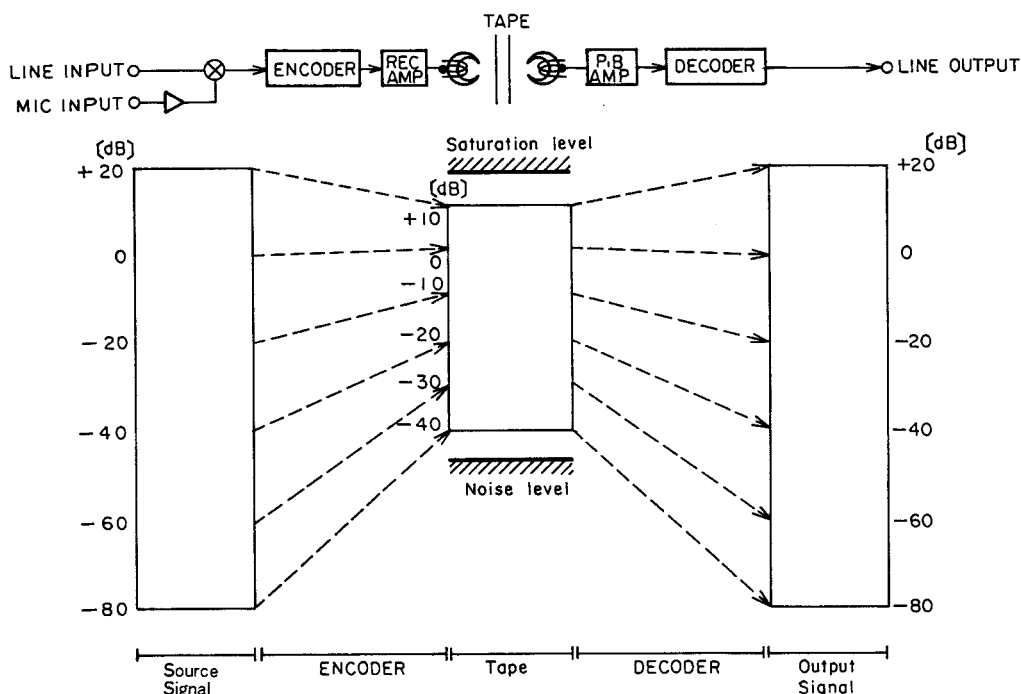


Fig. 6-6 Encode and Decode

The dbx system largely consists of the encoder and decoder. The basic operation of the encoder/decoder is as follows:

Encoder operation

As shown in Fig. 6-7, the input signal range in decibels is halved. For example, -60 dB input signal is changed to -30 dB, and $+20$ dB signal is reduced to $+10$ dB. After the encoder, the signal is sent to the recording amplifier, and recorded on the tape. That is, the 80 dB dynamic range of the original signal is reduced to 40 dB. In this case, when the user tries to record the original signal with the tape deck having 60 dB dynamic range, the 20 dB difference from the 80 dB signal range should have been sacrificed by the tape noise or saturation distortion, but thanks to the operation of the dbx encoder, the dynamic range of 40 dB thus obtained covers the 80 dB input range sufficiently.

Decoder operation

The encoded playback output signal of the tape deck which has passed through the playback amplifier from the PB head is sent to the decoder. The dynamic range in decibels is doubled according to the decode characteristic shown in Fig. 6-7. For

example, a -30 dB signal is changed to -60 dB, and the noise level is also lowered by 30 dB, which gives the so-called noise reduction effect. Similarly, a $+10$ dB signal is increased to $+20$ dB, so that the saturation characteristic on the tape has apparently been improved by 10 dB. The saturation ceiling level is increased, hence the dynamic range of the tape deck is effectively increased, and the original sound can be reproduced without its wide dynamic range being affected.

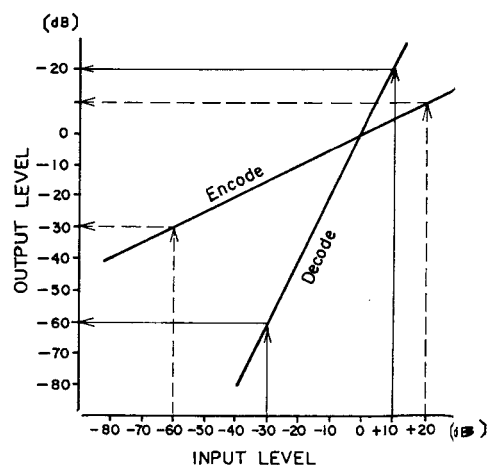


Fig. 6-7 Input/Output

4. EXPLANATION OF EACH OPERATING PRINCIPLES

Amplifier Block Diagrams

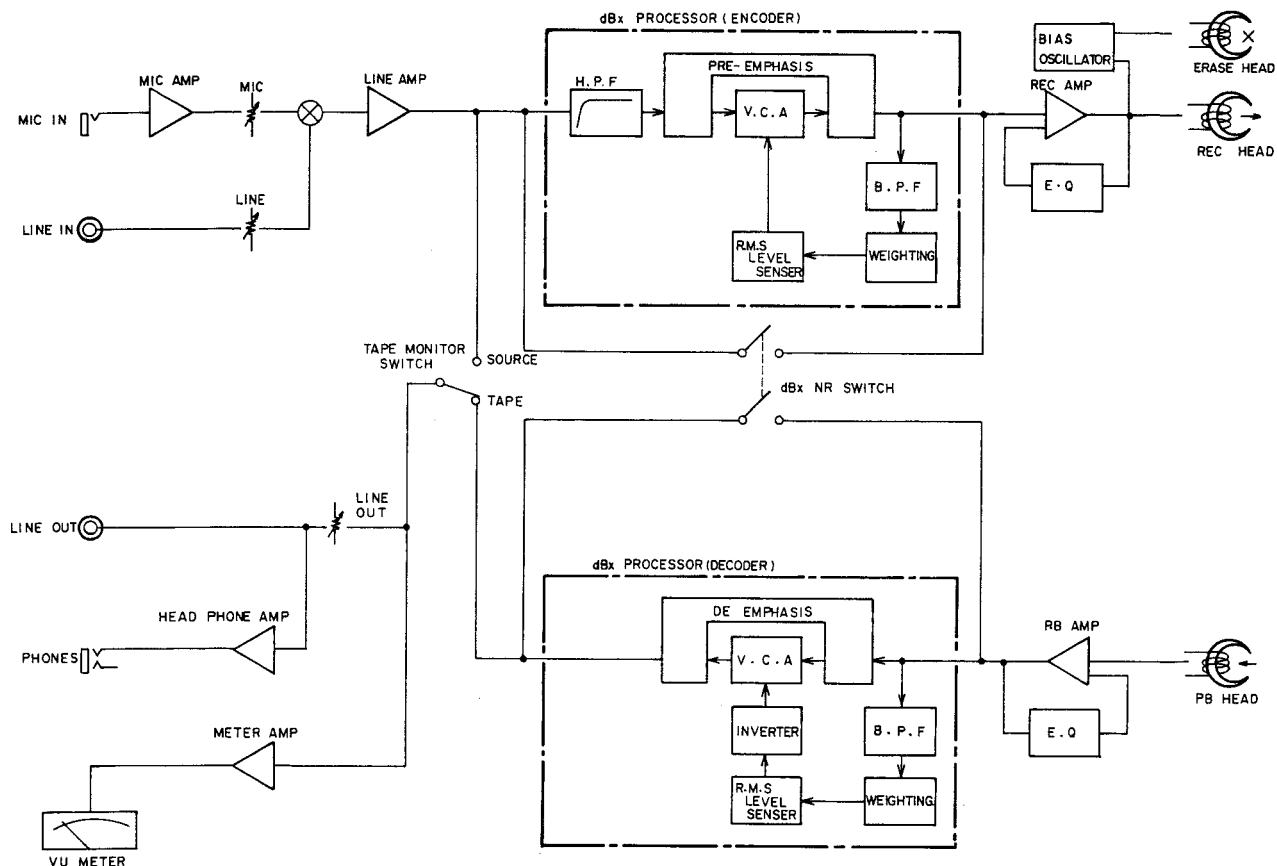


Fig. 6-8 Amplifier Block Diagram

4-1 dbx NOISE REDUCTION SYSTEM CIRCUIT

The main circuits composing this system provide the pre-emphasis, de-emphasis, VCA (Voltage Controlled Attenuator or Amplifier), RMS (Root Mean Square) action, level sensor, etc. (Refer to Fig. 6-8). Each circuit will be described below:

4-1-1 INPUT FILTER (HPF)

This filter, which is a high-pass filter (HPF) of about 20 Hz cutoff (f_{cut}) frequency and -12 dB/oct slope, is formed by a positive feedback active filter. Here, the filter is made into an active filter using a transistor to improve the shoulder characteristic of the filter and to act as a buffer to eliminate the effect of following circuits due to their impedance characteristics. (Refer to Figs. 6-9 and 6-10)

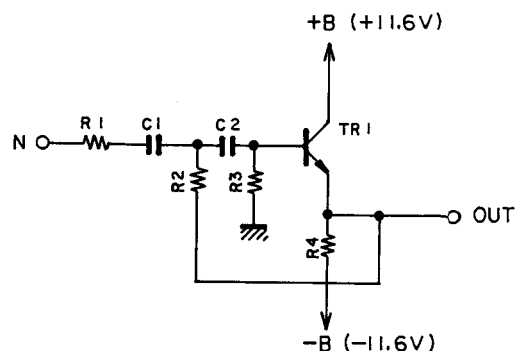


Fig. 6-9 INPUT Filter Circuit

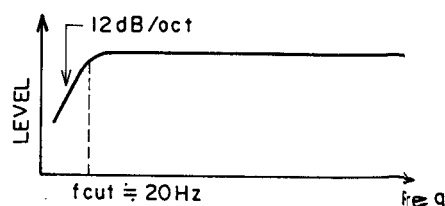


Fig. 6-10 Input Filter Characteristic

4-1-2 PRE-EMPHASIS CIRCUITS

(Refer to Figs. 6-11 and 6-12)

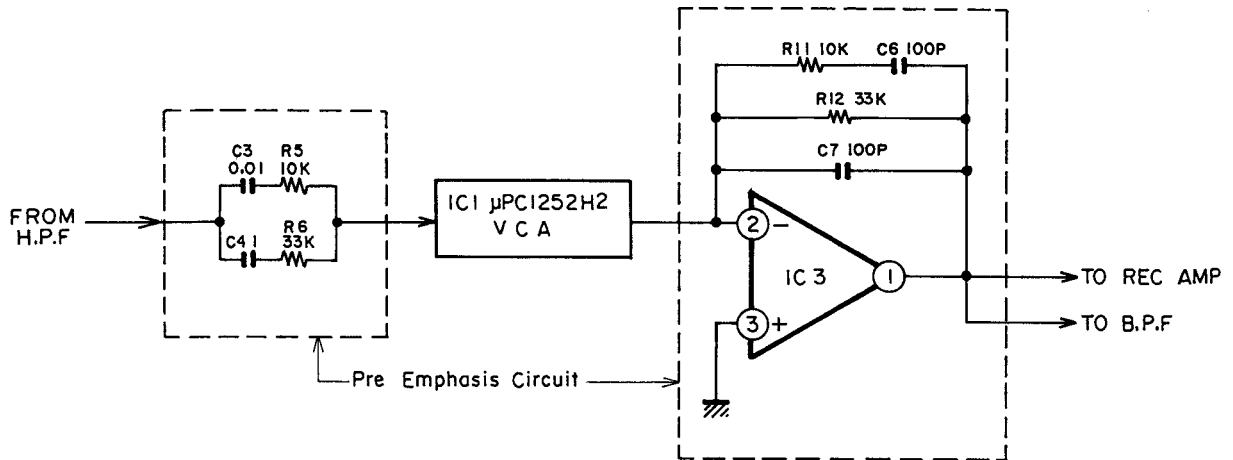


Fig. 6-11 Pre-emphasis Circuit

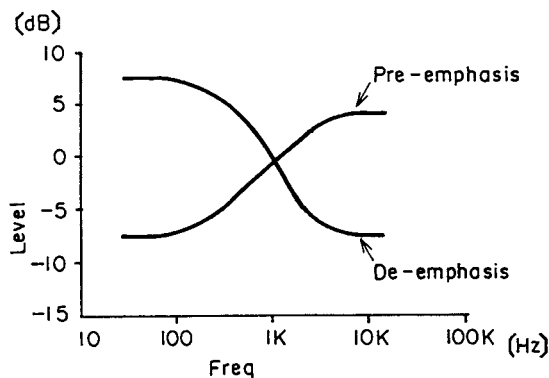


Fig. 6-12 Pre-emphasis and De-emphasis Characteristics

The primary role of this circuit is to play the same role as the equalizer used with the record or other recording media by pre-emphasis of the high frequency band to reduce high band noise, and to reduce the breathing phenomenon (Note 1).

During playback, the high frequency band is de-emphasized to return the signal to the original state. In Fig. 6-11, the time constant of the Low band is determined in the first stage, and the time constant of the high band and the emphasis value is determined in the last stage. C3 and C4 provide AC coupling to prevent the DC offset of the previous stage from being modulated by the change in the VCA gain. The first stage also serves to convert the input voltage to a current source, while the last stage converts the current to a voltage output. C7 is an oscillation preventing capacitor. (Refer to Fig. 6-11)

Note 1. It is generally well-known that noise (hiss noise) added by the tape recorder or tape deck has a high content of high frequency band components.

In the dbx system, compander gain changes according to the level of the intermediate and low frequency band components which are the main components in the input, but hiss noise also varies according to the gain change. As a result, hiss noise changes as the level of the main signal component changes, and "breathing" noise is heard. This is called the breathing phenomenon.

Of course intermediate and low frequency band noise changes similarly, but since intermediate/low band signal components are strong, this noise is masked by these strong signals, and it is not sensed by the ears. Hiss noise consisting of high frequency band components is not masked by the signal components and is therefore easily detected by ear.

4-1-3 DE-EMPHASIS CIRCUIT (Figs. 6-12 and 6-13)

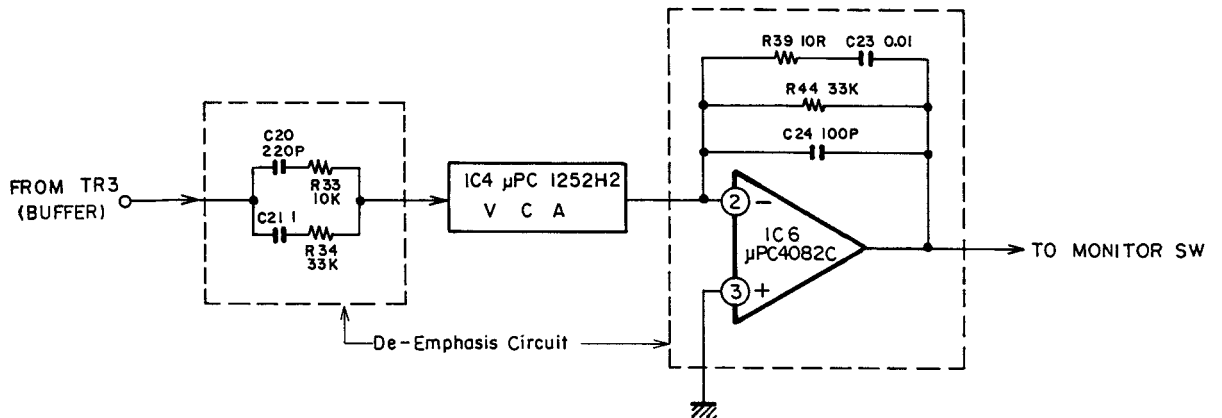


Fig. 6-13 De-emphasis Circuit

In contrast to the pre-emphasis circuit which pre-emphasizes the high frequency band during recording, this circuit de-emphasizes the high frequency band during playback to restore the signal to its original

state. The circuit configuration is the same as the pre-emphasis circuit, but has some differences in component values.

4-1-4 VCA (Voltage Controlled Amplifier (or Attenuator)) CIRCUIT (Refer to Figs. 6-14,6-15,6-16)

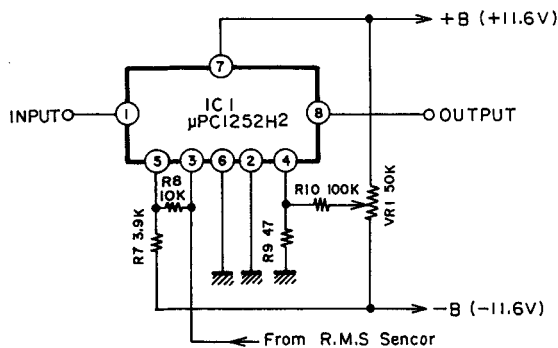


Fig. 6-14 Encoder

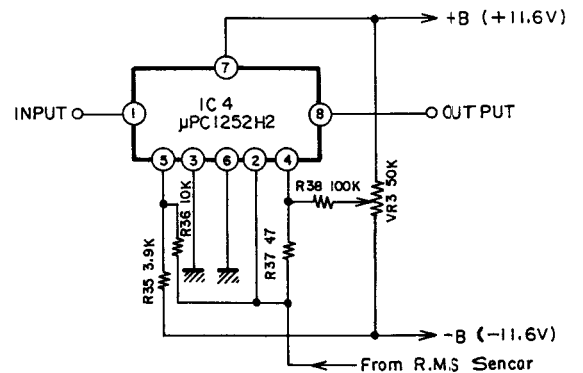


Fig. 6-15 Decoder

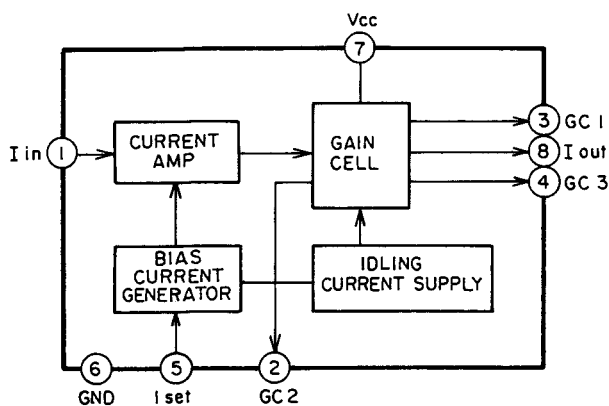


Fig. 6-16 IC μPC1252H2 Internal Block Diagram

IC1 and IC4 (μPC1252H2) are dbx VCA circuit ICs. Pin ① is a virtual ground, and accepts only an input signal current. Pin ⑧ is a high impedance current output.

Pin ⑤ is connected to negative power supply through the current setting internal bias circuit. The set current is nominally 2 mA. The range is compressed in the encode mode when the RMS sensor output is positive. In the decode mode, since the RMS sensor output is fed to Pin ② with Pin ③ being GND, the range is expanded when the RMS sensor output is positive, and it is compressed when the RMS sensor output is negative, which is just the opposite action to the encode mode.

The circuit consisting of R9(R37), R10(R38), and VR1 (VR3) can make symmetrical adjustment possible and minimize DC offset voltage which is multiplied by the circuit gain, and control the second order harmonic distortion. When a fast gain change is commanded, DC offset appears at the output. R8 (R36) are provided to reduce this. In the encoder (Fig. 6-14), it acts as a logarithmic amplifier, while it acts as an anti-logarithmic amplifier in the decoder (Fig. 6-15). Fig. 6-16 shows IC μPC1252H2 block diagram.

4-1-5 LEVEL SENSOR FILTER OR
BAND PASS FILTER (Figs. 6-17 and 6-18)

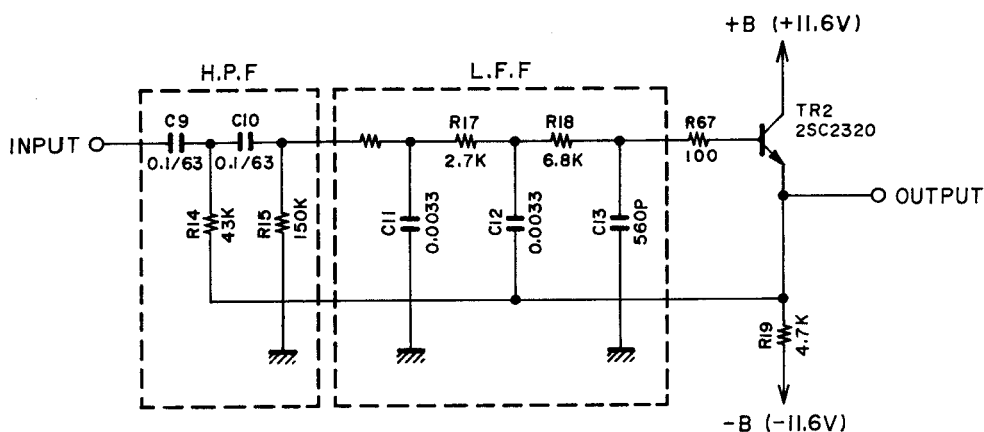


Fig. 6-17 Level Sensor Filter Circuit

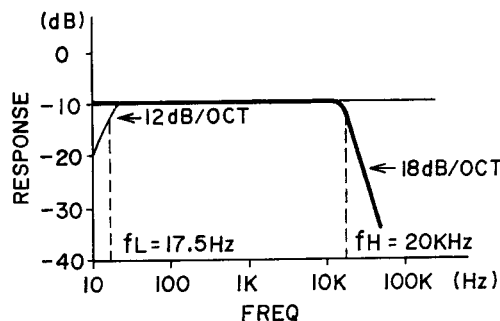


Fig. 6-18 Level Sensor Filter Characteristic

This filter circuit is a BPF (Band Pass Filter) in which the third order LPF (Low Pass Filter) and the second order HPF (High Pass Filter) are combined.

The purpose of this filter circuit is to prevent gain error occurrence by attenuating the characteristic of

the level sensor in the region where the frequency response of the tape deck is not flat. (Misoperation prevention).

As shown, in the GX-747 dbx, $f_L=17.5$ Hz and $f_H=20$ kHz.

4-1-6 WEIGHTING NETWORK (Figs. 6-19 and 6-20)

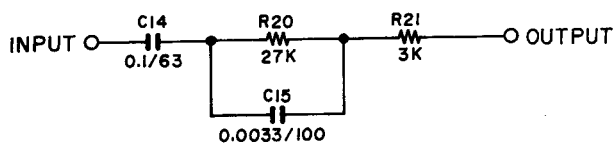


Fig. 6-19 Weighting Network Circuit

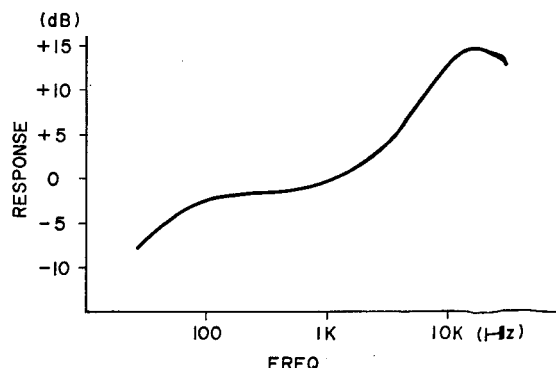


Fig. 6-20 Weighting Network Characteristic

If signals in which the high frequency band is emphasized by the pre-emphasis circuit, are directly recorded by the tape deck, the high frequency band saturation level of the tape might be exceeded. The weighting network prevents this by lowering the amplification of the VCA (Voltage Controlled Amplifier) by a corresponding amount in the case of

signals containing many high frequency band components. For this reason, a weighting network as shown in Fig. 6-19 which has the characteristic as shown in Fig. 6-20 is provided before the RMS sensor circuit. The weighting network raises the sensitivity of the level sensor for signals with a high content of high frequency band components, and lowers the amplification of the VCA.

4-1-7 RMS (ROOT MEAN SQUARE) LEVEL SENSOR
(Figs. 6-21 and 6-22)

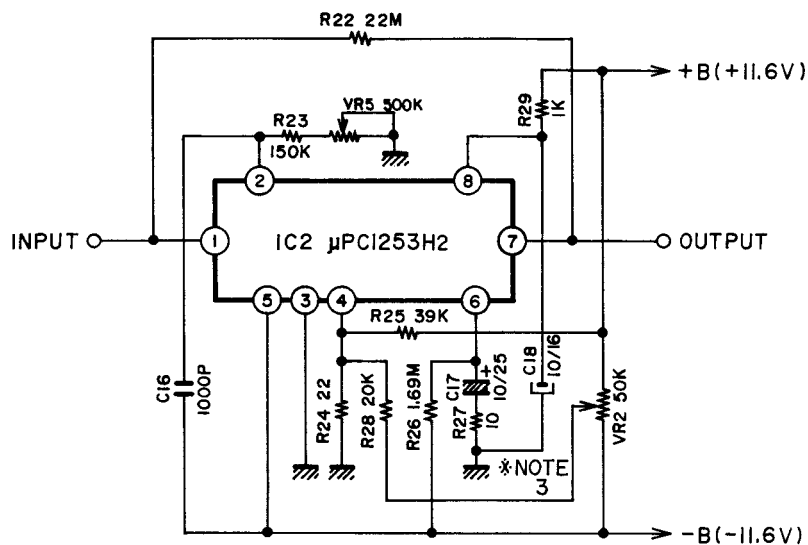


Fig. 6-21 RMS Level Sensor Circuit

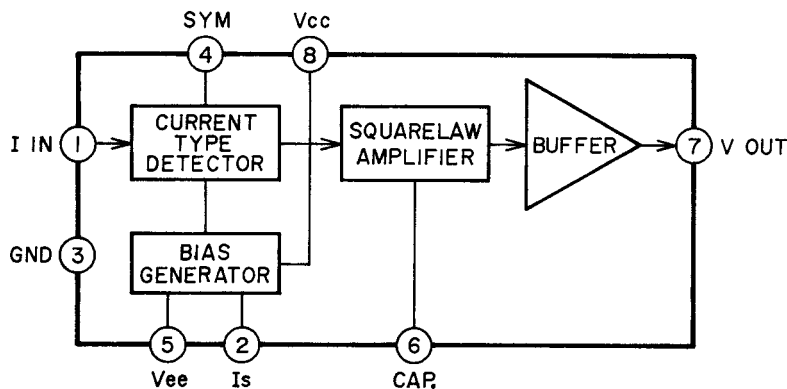


Fig. 6-22 IC μ PC1253H2 Block Diagram

The RMS level sensor circuit detects the effective value (RMS) of input signal current, and converts it to a DC voltage proportional to the logarithm of the detected level.

IC2 and IC5 (μ PC1253H2) are for the dbx RMS level sensor circuit.

Fig. 6-21 shows the RMS level sensor circuit. For pre-setting the control signal (0V at zero point level) for the input level, zero point level control is made possible by varying the operating current of IC by means of VR5. (Zero point level=410 mV=-5.5 dB ref 1mW 600 ohms (0.774 volts))

The attack time is 15 ms when there is a 10 dB level change (increase), 5 ms when there is a 20 dB change, and 3 ms when there is a 30 dB change. The decay

rate (Note 2) is 125 dB/sec as standard. Time constant is determined by the current (I_T) flowing through R26, and by C17.

In the GX-747 dbx, since $I_T=7.5 \mu A$, in the equation for obtaining the decay rate of 125 dB/sec, $C=10 \mu F$ from $I_T=0.75 C$.

C18 is a by-pass capacitor, and the charging current of C17 flows through C18. C16 is a capacitor provided to obtain stability and low distortion characteristics in the high frequency band. R25 serves as a level shift for bringing the control value to the center. VR2 is a volume control for symmetry adjustment.

R22 prevents any "thump" sound when there is no signal.

Note 2. Slope of the output voltage change after an abrupt large drop of the input signal level.

Note 3. GND is used for common, otherwise misoperation may result due to the large current flowing during the recovery time.

4-1-8 POWER SUPPLY CIRCUIT (For dbx NR Circuit)
(Refer to Figs. 6-23 and 6-24)

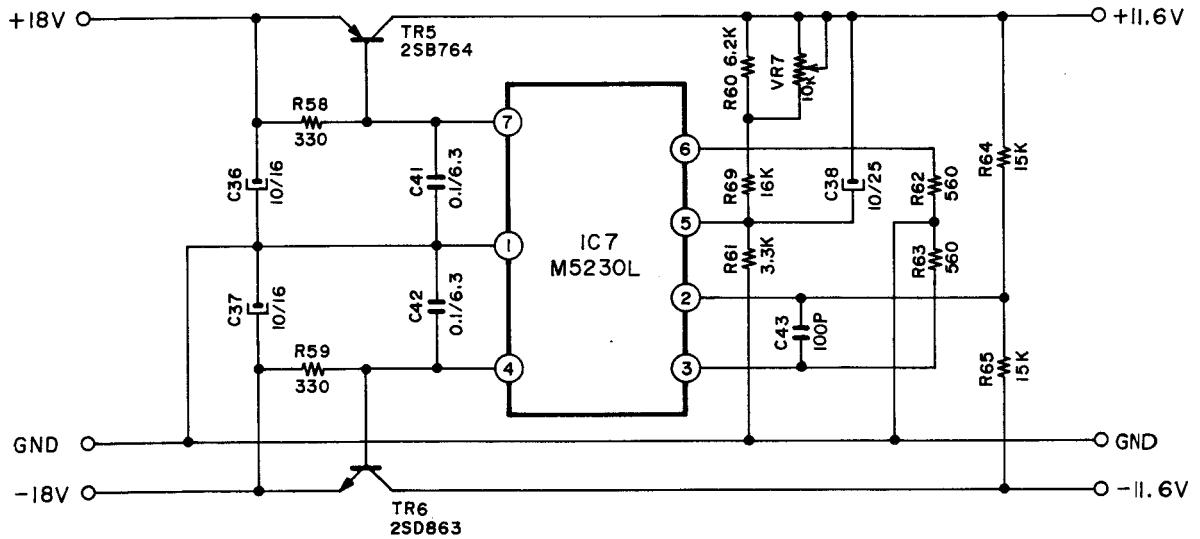


Fig. 6-23 Power Supply Circuit for dbx NR Circuit

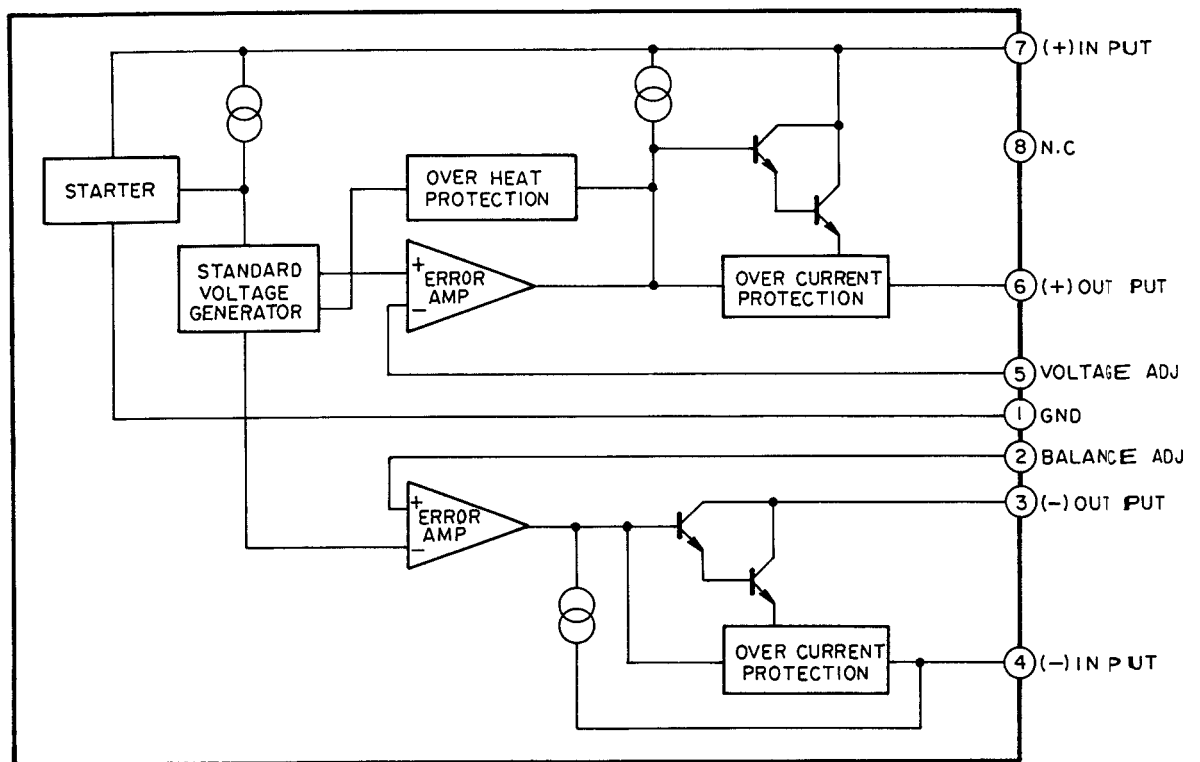


Fig. 6-24 IC M5230L Block Diagram

IC7 (M5230L) is an IC for the dual tracking regulator. The tracking regulator is a stabilized power supply in which a change in either the positive or negative output voltage due to the load (or otherwise), is followed by a similar change in the other voltage. When it is used for the DC amplifier, etc., any offset voltage due to supply voltage fluctuation can be prevented.

Figs. 6-23 and 6-24 show the power supply circuit and IC M5230L block diagram respectively. In the power supply circuit of Fig. 6-23, the output voltage is controlled by changing the reference voltage

applied to Pin ⑤ of IC (M5230L) through the resistor dividing circuit consisting of R61, R69, R60, and VR7. In addition, C38 sets the rise time constant of the output voltage, improves the ripple suppression ratio, and improves the output noise voltage.

R64 and R65 are resistors for balancing the positive and negative output voltages. Though the positive/negative output voltage ratio can be changed by changing this resistance ratio, the positive and negative output voltages are made identical by making R64 equal to R65.

4-2. SYSTEM CONTROL

The system control circuit using a microcomputer will carry out the following controls.

- ① Operational Control of tension arm lock
- ② Indication of real time counter
- ③ Operation control of function SW
- ④ Control of reel motor brake system
- ⑤ Flashing control of indication lamps

Since the LED indicator and the electronic counter indicator are operated by the timing of pulse, no tester can find the failure.

The failure can only be found by checking the waveform on the oscilloscope.

① IC1 (μ PD553C-152) Terminal Description

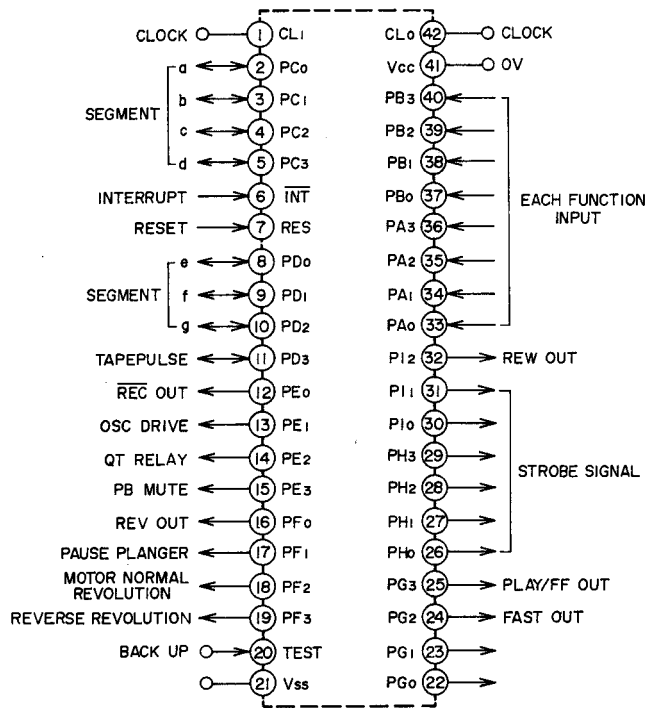


Fig. 6-25

② IC2 (μ PD553C-110) Terminal Description

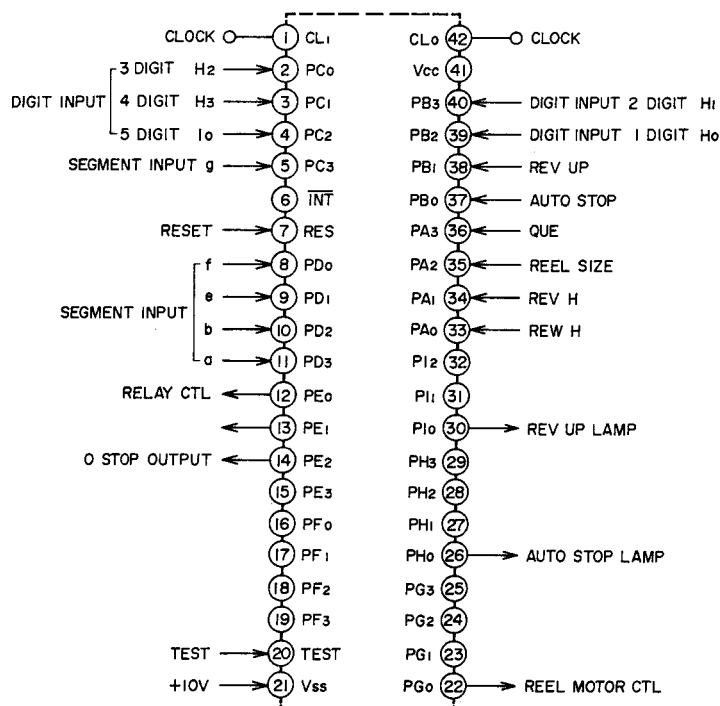


Fig. 6-26

4-2-1 FUNCTION MODE SELECTOR CIRCUIT

Selection of the function mode is controlled by the pulse timing using a microcomputer. For easier understanding, one input terminal (35) will be explained as an example. The terminal (35) receives four signals, i. e., the strobe signals from (26), (27), (28) and (29). Each pulse signal from (26), (27), (28) and (29) has a different timing. Assuming that the signals from these terminals are 1000, 0100, 0010 and 0001, signal 1000 of Terminal (26) will pass D84, and through the collector of TR85, it will enter the emitter of TR60. If FWD (SW3) button is pressed, the base of TR60 is earthed through R202, TR60 is energized, and Signal 1000 will be outputted into Terminal (35) of IC1 through D60.

If any input is made into (35), it is processed within the microcomputer depending on the signal and the signal is outputted from the respective terminal. If 1000 is inputted into (35), it is judged as FWD and the related signal is inputted to the output terminal. (See Fig. 6-27). Similarly, Signal 0100 from (27) passes the emitter and collector of TR86 and enters the Counter P.C Board. When the program SW (SW6) is pressed, Signal 0100 is inputted into IC1 (35). Signal 0010 from (28) passes the collector/emitter of TR87, and through D66 and the reverse selector SW (SW906), it is inputted into IC1 (35). Signal 0001 from (29) passes SR1 and SW906 and is inputted into (35).

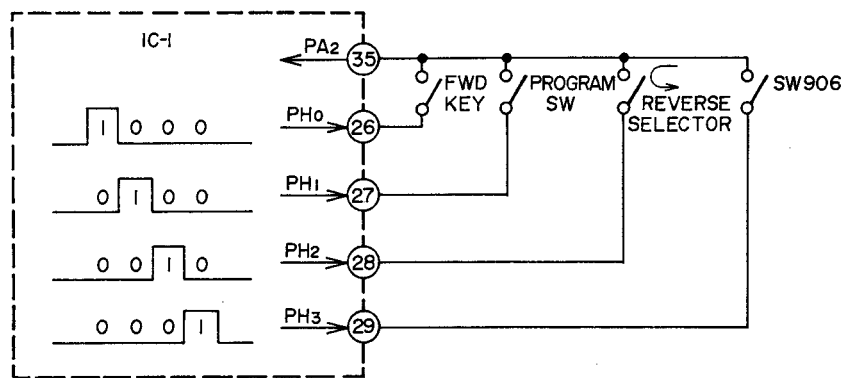


Fig. 6-27

Input to (35)	Judgement and Output by Microcomputer
1000	Output H to Terminals (12), (14), (24) and (25) of IC1 (FWD output order).
0100	Act as clear/program SW only when MEMORY AUTO REV SW is ON.
0010	Act once as a reverse equipment.
0001	(SW 906 is ON and tension arm is locked) When FWD, REV, FF or RWD key is pressed, process the other signals after making Terminal (18) H.

Fig. 6-28

Fig. 6-29 shows the truth table when the function switches are pressed.

Function SW Terminal	FF	FWD	STOP	REV	REW	PAUSE	REC	REC MUTE	REC PAUSE
12	H	H	H	H	H	H	L	H	H
13	L	L	L	L	L	L	H	H	H
14	H	H	L	H	H	L	H	L	L
15	H	L	H	L	H	L	L	L	L
16	L	L	L	H	L	L	L	L	L
17	L	H	L	H	L	H	H	H	H
24	H	L	L	L	H	L	L	L	L
25	H	H	L	H	L	L	H	H	L

Note: H of Terminal (14):

H of other Terminals:

Fig. 6-29

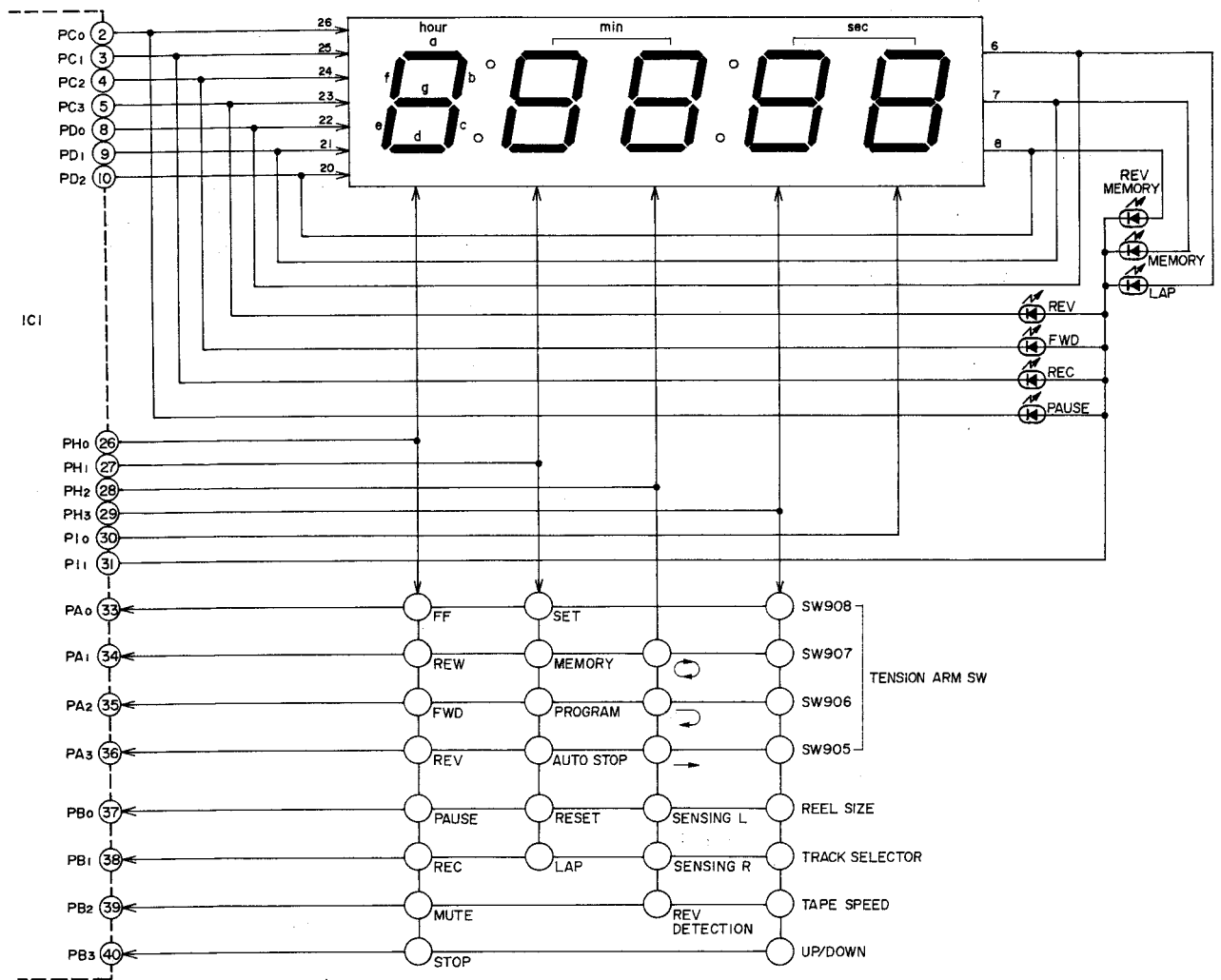


Fig. 6-30

Description of mode switches in Fig. 6-31

Mode	Description of switches
FF	Operation P.C Board SW1 Remocon TR58
RWD	Operation P.C Board SW2 Remocon TR59
FWD	Operation P.C Board SW3 Remocon TR60
REV	Operation P.C Board SW4 Remocon TR61
Pause	Operation P.C Board SW5 Remocon TR62
REC	Operation P.C Board SW6 Remocon TR63
Mute	Operation P.C Board SW7 Remocon TR64
Stop	Operation P.C Board SW8 Remocon TR65
Set	Counter P.C Board SW5
Memory	Counter P.C Board SW1
Program	Counter P.C Board SW6
Automatic Stop	Counter P.C Board SW7
Reset	Counter P.C Board SW8
Lap	Counter P.C Board SW2
Permanent REV	SW P.C Board SW1
One Time REV	SW P.C Board SW1

MON REV	SW P.C Board SW1 →
Sensing L	Sensing Pole L
Sensing R	Sensing Pole R
REV detection	RL6
SW908	Take up side tension arm, detection of shut-off position
SW907	Take up side tension arm, detection of arm lock position
SW906	Supply side tension arm, shut-off position
SW905	Supply side tension arm, arm lock position
Reel size	SW903
Track selector	Pre Amp SW3
Tape Speed	Tape Speed SW
UP/DOWN	Counter P.C Board SW3

Fig. 6-31

4-2-2 TENSION ARM LOCKING SYSTEM

(Refer to Figs. 6-32 to 6-35)

The tension arm position is detected by means of the microswitch. At the time of shut-off, the tension arm is placed in locked position by the release motor. If any function key (FWD, REV,

FF or RWD) is pressed when the tension arm is in the lock position, the release motor starts and after the arm comes to its middle position (i. e., the tape is loaded), such outputs as listed in Fig. 6-29 will be issued from the terminals of IC1.

Truth table of BA6109 (IC 5, 6)

IN (5) Pin	IN (6) Pin	V Out 1 (2) Pin	V Out 2 (10) Pin
H	H	L	L
L	H	L	H
H	L	H	L
L	L	Open	Open

Fig. 6-32

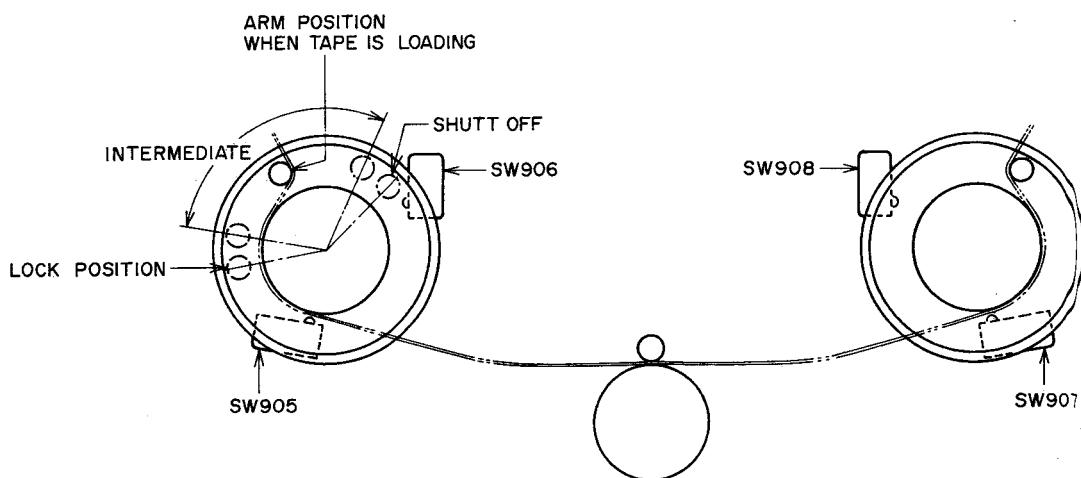


Fig. 6-33

SW positions in accordance with the tension arm positions

Position of tension arm	SW905	SW906	SW907	SW908
Lock	off	ON	off	ON
Middle	ON	off	ON	off
Shut-off	off	off	off	off

Fig. 6-34

Truth table of IC1 Pins (18) and (19) in accordance with tension arm positions

(18) Pin	(19) Pin	
L	L	Lock
H	L	↓ Play key is pressed
L	L	Middle
L	H	↓ Shut-off
L	L	Lock

Fig. 6-35

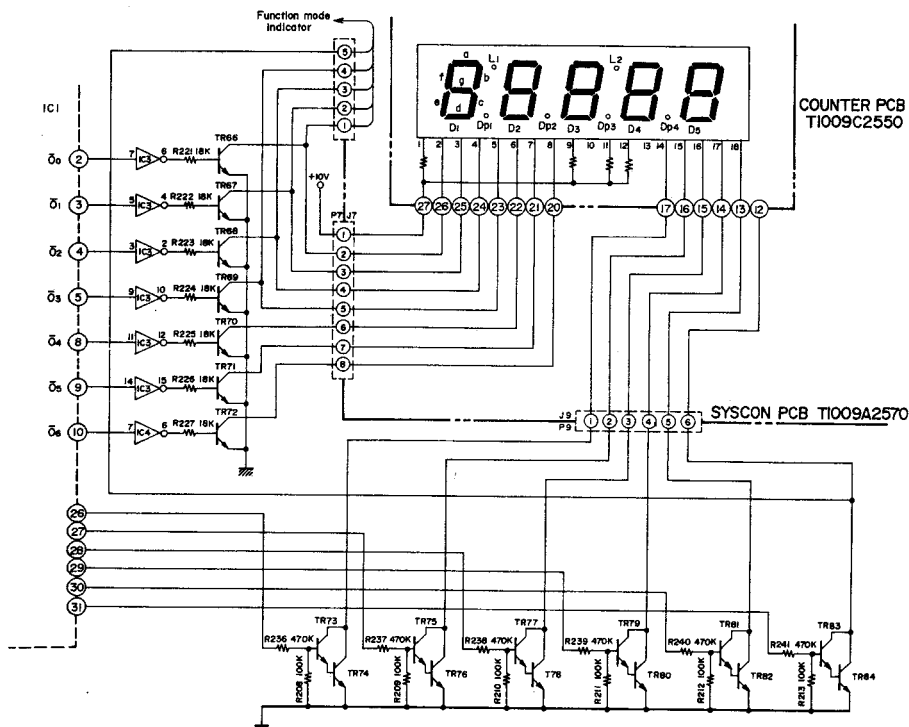


Fig. 6-36

4-2-3 FUNCTION MODE INDICATOR CIRCUIT AND COUNTER CIRCUIT

● Function Mode Indicator Circuit

The function mode indicator lighting is also controlled by the operation timing of the control signal from the microcomputer.

Here we will explain about the situation in Fig. 6-37. (FWD PLAY/PAUSE) as one example. Hereinafter FWD PLAY is just written as PLAY. Under PLAY/PAUSE, PAUSE of the function mode indicator is always lit and PLAY is flashing. Firstly, refer to the vertical row of the function mode indicators of O0 - O3 in Fig. 6-37. You will note that PAUSE IND has "H" level, PLAY IND has "L/H" flashing and others have "L" level.

The signals of (O0 - O3) and IC (31) enter IC3 and IC4 and TR83 in Fig. 6-36. In this way the digits of the function mode ind. and PLAY/PAUSE IND. are inputted. When these two digits are synchronized, the indicator is lit.

● Counter Indicator Circuit

The counter indicators are also lit by the pulse from the microcomputer, and it is not that all the indicators are always lit.

Because of the afterimage, it appears to our eyes that all the digits are lit despite the fact that they are lit in sequence as shown in Fig. 6-38. This system is called dynamic lighting system.

Fig. 6-37 shows the timing chart. By means of the waveforms of IC (26) - (30) coming from the microcomputer, the lighting position of LED of each digit is moved in sequence. Take the example of the first digit.

The first digit can only be lit when the waveform of IC (30) is "H" level. Depending on the condition of O0 - O6 at the time of "H" level, each segment is lit and the figure is indicated. Since the segments of the LED indicators are cathode common, each segment is lit when O0 - O6 are at "H" level. If we see the condi-

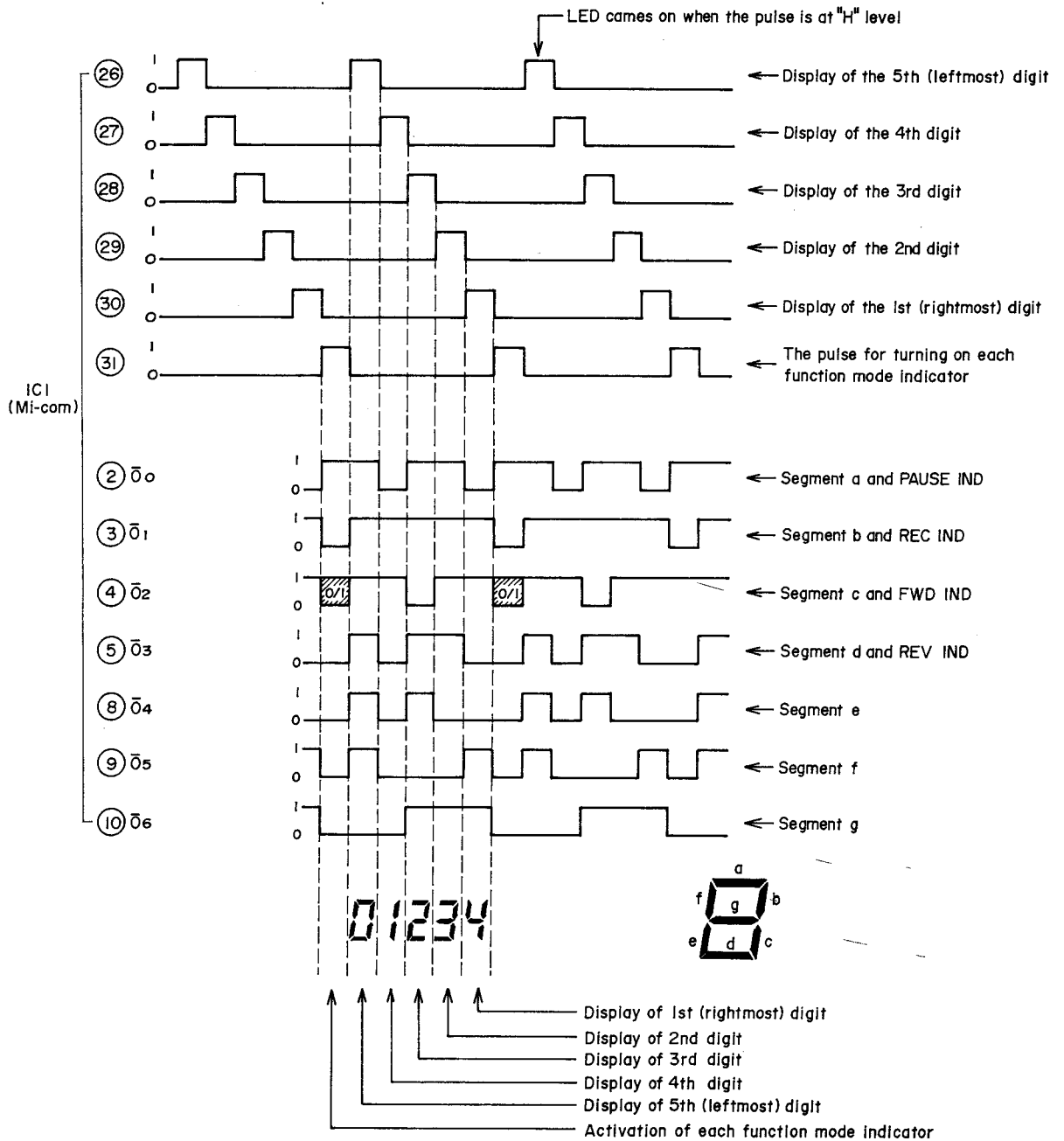


Fig. 6-37

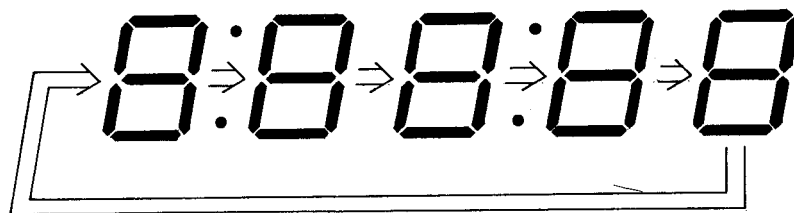


Fig. 6-38

tion of $\bar{O}_0 - \bar{O}_6$ of the first digit indication in Fig. 23, b, c, f, and g segments are lit and a, d and e segments are dark. In this condition, the indicator indicates 4. Similarly if we look at the 2nd - 5th digits, 01234 is indicated in the condition of Fig. 6-37.

4-2-4 MICROCOMPUTER RESETTING CIRCUIT

(Refer to Fig. 6-39)

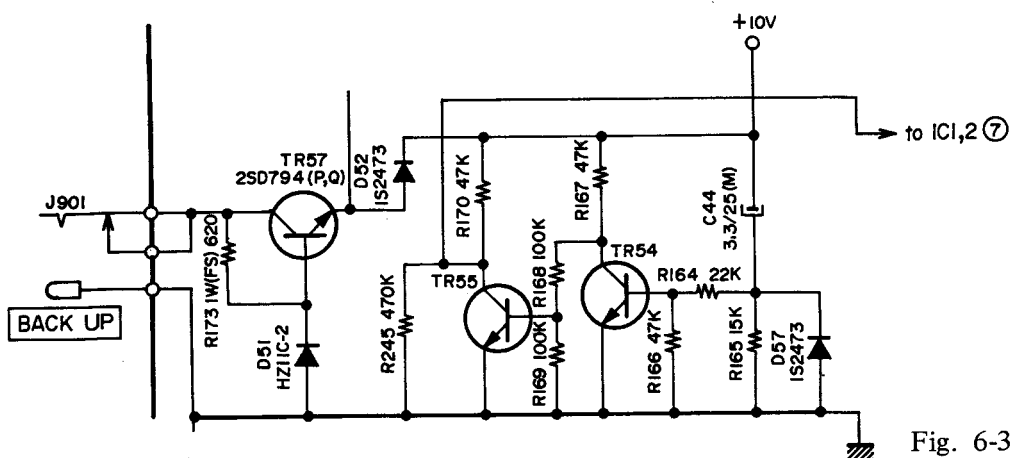


Fig. 6-39

A reset circuit is provided in order to eliminate the memory of the electronic counter and 0 Stop when power is supplied.

When power is turned on, the voltage (+10V) is supplied to the base of TR54 through C44 and R164 to turn TR54 ON, i. e., the collector of TR54 will be "L" to turn TR55 OFF

through R168 which means the collector of TR55 will be "H". Then "H" is supplied to Terminal 7 of IC1 and 2, and when Terminal 7 becomes "H", the microcomputer is reset. When the charging to C44 is completed, TR54 is turned OFF, TR55 ON and Terminal 7 "L".

4-2-5 TIMER STARTING CIRCUIT

(Refer to Fig. 6-40)

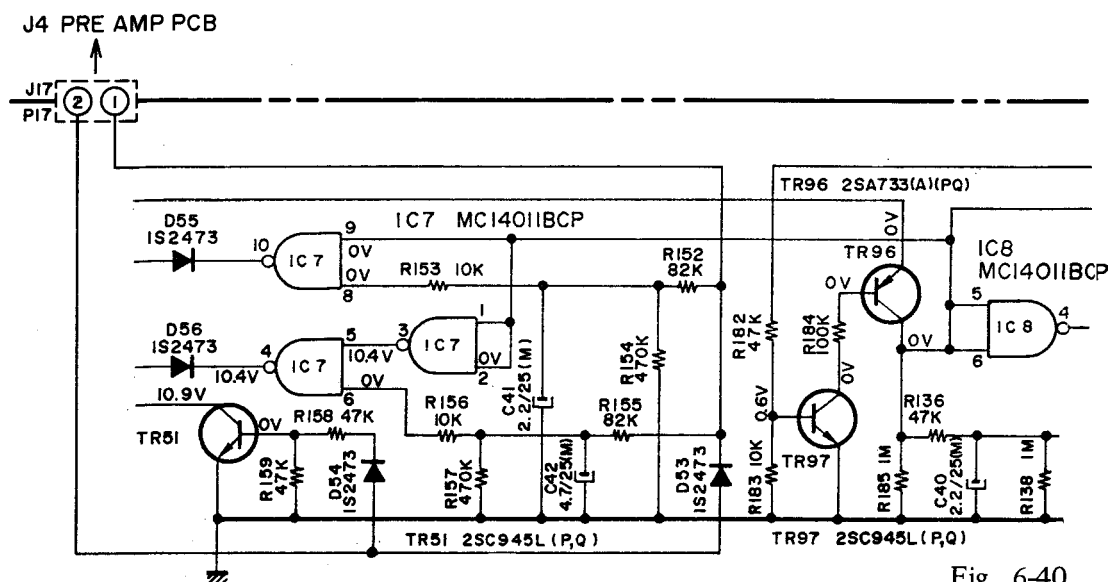


Fig. 6-40

When TIMER REC:

When power is switched ON, the base of TR51 is turned "H" through C49 and R88 of the Pre Amplifier P.C Board and through D54 and R158 of J17 (2) of the Syscon P.C Board. The collector becomes "L" to turn TR63 ON through R205. The "H" from J17 (2) makes IC7 (6) "H" through D53, R155 and R156, and at the same time, "H" is supplied to IC7 (8) through D53, R152 and R153. Depending on the condition of the collector of TR96, the output to IC7 (10) or IC7 (4) is determined

and the direction of FWD or REV is determined. If the collector of TR96 is "L", IC7 (3) becomes "H".

Therefore, "H" goes into IC7 (5) and (6), the IC7 (4) becomes "L".

TR60 is energized through D56, i. e., FWD REC.

When TIMER PB:

Same as for REC TIMER START, but due to the lack of input in TR51, FWD or REV PB is achieved instead of REC.

6-2-6 REVERSE HOLDING CIRCUIT

(Refer to Fig. 6-41)

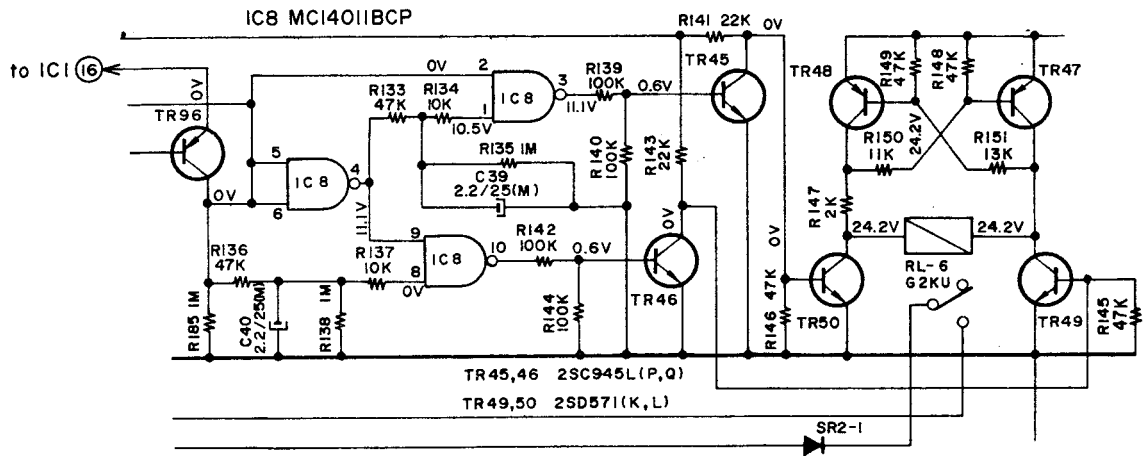


Fig. 6-41

Suppose the REV key is pressed when the machine is in FWD mode. IC1 (16) becomes "H", and "H" is supplied to the emitter of TR96. Because the base of TR96 is always "L", the "H" of the emitter of TR96 will go to the collector of TR96. IC8 (5) and (6) become "H", IC8 (4) "L", and the "H" of TR96 collector is supplied to IC8 (8) through R136 and R137, and therefore, "H" to IC8 (10). This "H" is supplied to the base of TR46 through R142 to make the collector of TR46 "L". Consequently the base of TR49 is "L" and the collector of TR49 "H". Since IC8 (4) is "H" in FWD mode, C39 is charged. Therefore, IC8 (1) is kept at "H" until C39 is dis-

charged even if IC8 (4) becomes "L". Because IC8 (1) and (2) become "H", IC8 (3) "L". The base of TR45 becomes "L" through R139 and the collector "H", and TR50 is energized. "L" of the collector of TR50 turns TR47 ON through R147 and R150. Therefore, current runs to RL6 and TR50 through TR47, and RL6 is working. The RL6 relay worked remains in that position even when the power is turned OFF, and when the reverse voltage is applied, it is reset. When the TR6 is worked, the output from IC1 (28) is taken into IC1 (39) through the switch of RL6 and the direction is decided for REV mode by the microcomputer.

4-2-7 BRAKE CONTROL SYSTEM OF REEL MOTOR (Refer to Figs. 6-42 to 6-46)

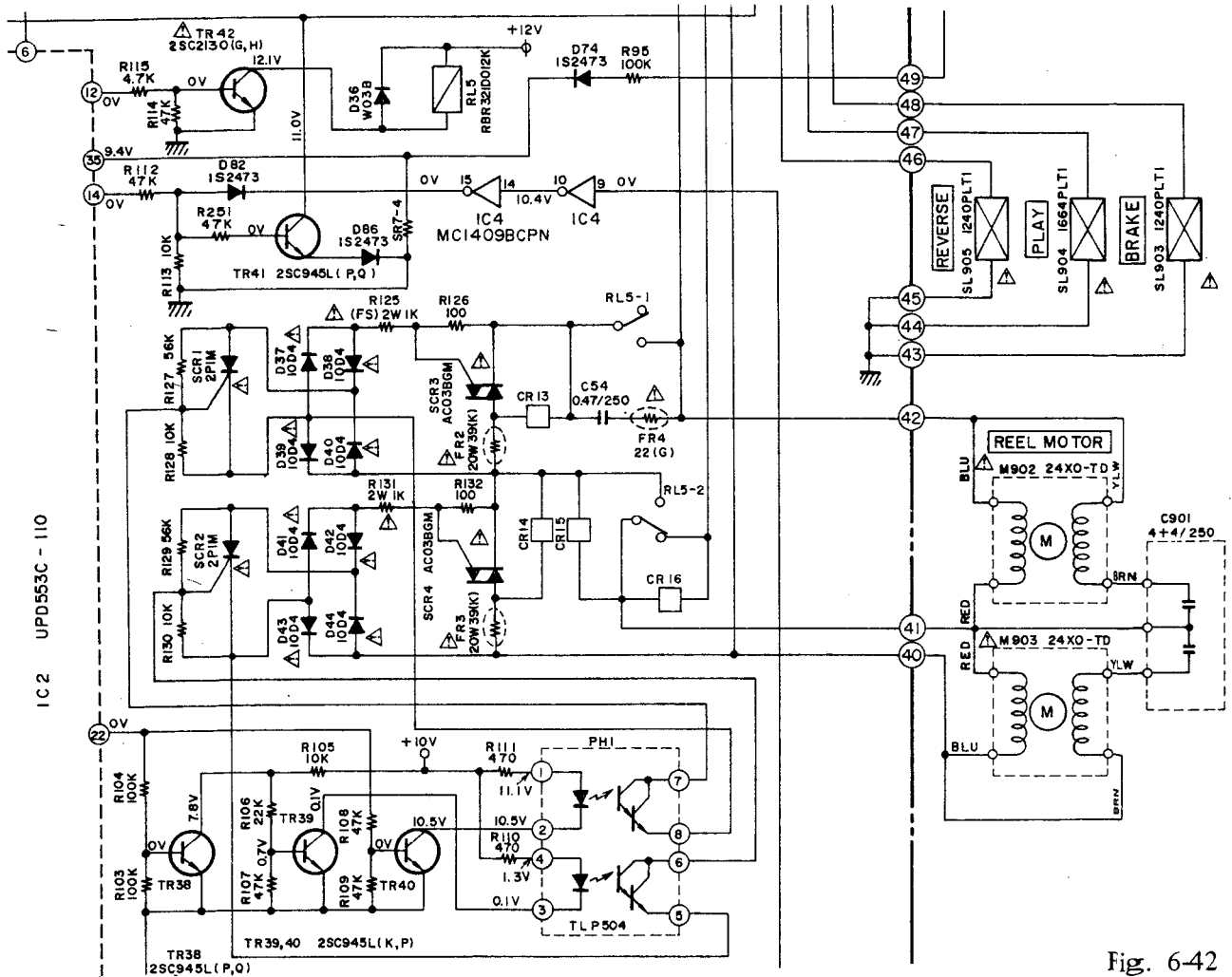


Fig. 6-42

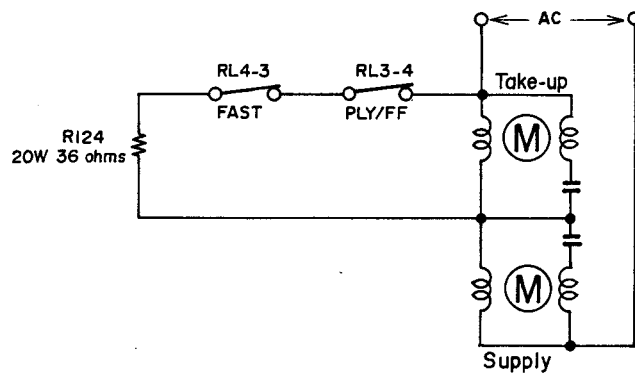


Fig. 6-43

In the mode (Reel Size 7", 0 Stop SW ON), RWD SW is turned ON from a certain counter number, for example, 0:05:00.

Fig. 6-43 shows how the take up reel motor and the supply reel motor work. Since R124 36 ohms is connected in parallel to the take up reel motor, the torque of the supply reel motor is increased, and the tape is wound by the supply reel motor. If the counter indicates 0:00:50 from this position, "H" signal is issued from IC2 (12) (relay control). "H" enters the base of TR42 through R115 to

turn TR42 ON and RL5 ON. Fig. 6-44 shows the condition when RL5 is ON. R124 36 ohms so far attached is disconnected from the take up reel motor. Suppose the signal of IC2 (22) (reel motor control) is in "L". TR40 is OFF via R108, and TR38 is turned OFF via R104. TR38 collector will be "H". The base of TR49 will be "H" through R106 to turn TR39 ON, i. e., the switch of PH1-2 is ON. Therefore, PH1-1 will be ON when PH1-2 is OFF or vice versa.

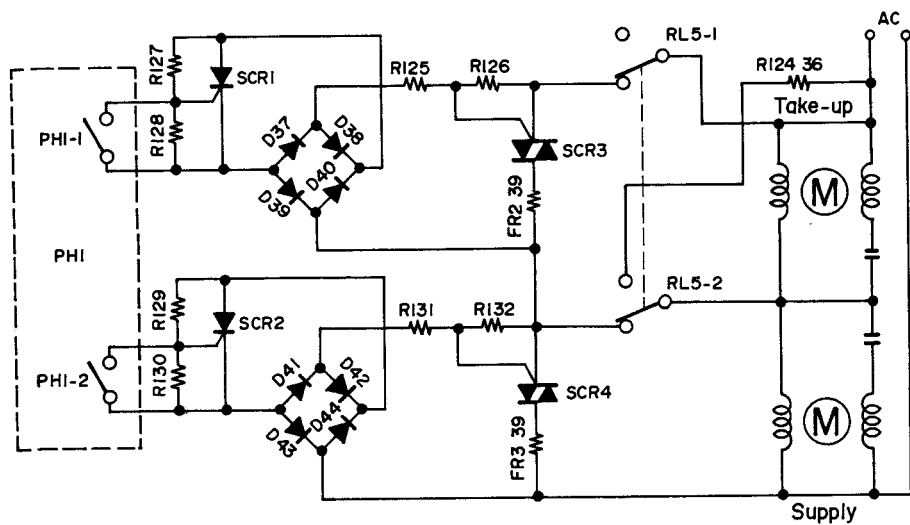


Fig. 6-44

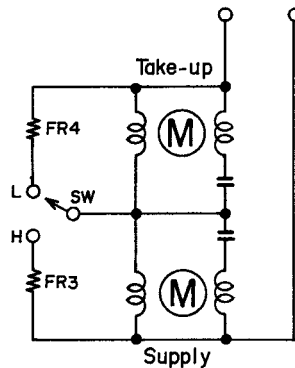


Fig. 6-45

Counter 10" 3:20
Indication 7" 0:50

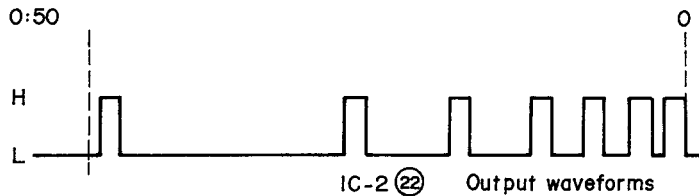


Fig. 6-46

When the switch of PH1-2 is ON, the gate of SCR2 becomes "L" and SCR2 is turned OFF. When SCR2 is OFF, no current will run to R132 and there will be no potential difference between the gate and the anode of SCR4 (triode AC switch), and therefore it will be OFF. On the other hand, since PH1-1 is OFF, SCR1 will be ON and SCR3 ON. This means that FR2 39 ohms, instead of R124 36 ohms, is connected in parallel to the take up reel motor and the RWD mode is maintained. Now, the signal of IC2 (22) is considered. IC2 (6) (interrupt) receives the signal (input to real time counter) from the Detector P.C Board. The counter starts counting the input signal of (6) every 25 msec from 0:00:50. This data is com-

pared with the data written in IC2 and when the reel motor is running at a speed faster than the data, "H" signal is issued to (22).

The switch in Fig. 6-45 goes to H side, the mode similar to FF is achieved and apparently the brake is applied.

Such waveform as shown in Fig. 6-46 appears at IC2 (22).

In such a way, the brake is applied on the motor to ensure that the motor stops at 0:00:00 of the counter. In the case of reel size 10", the microcomputer start working at the counter indication of 0:03:20. With the 0 Stop when the COUNT UP SW is ON, IC2 (22) usually becomes "H", and the negative pulse is issued.

VII. MECHANISM ADJUSTMENT

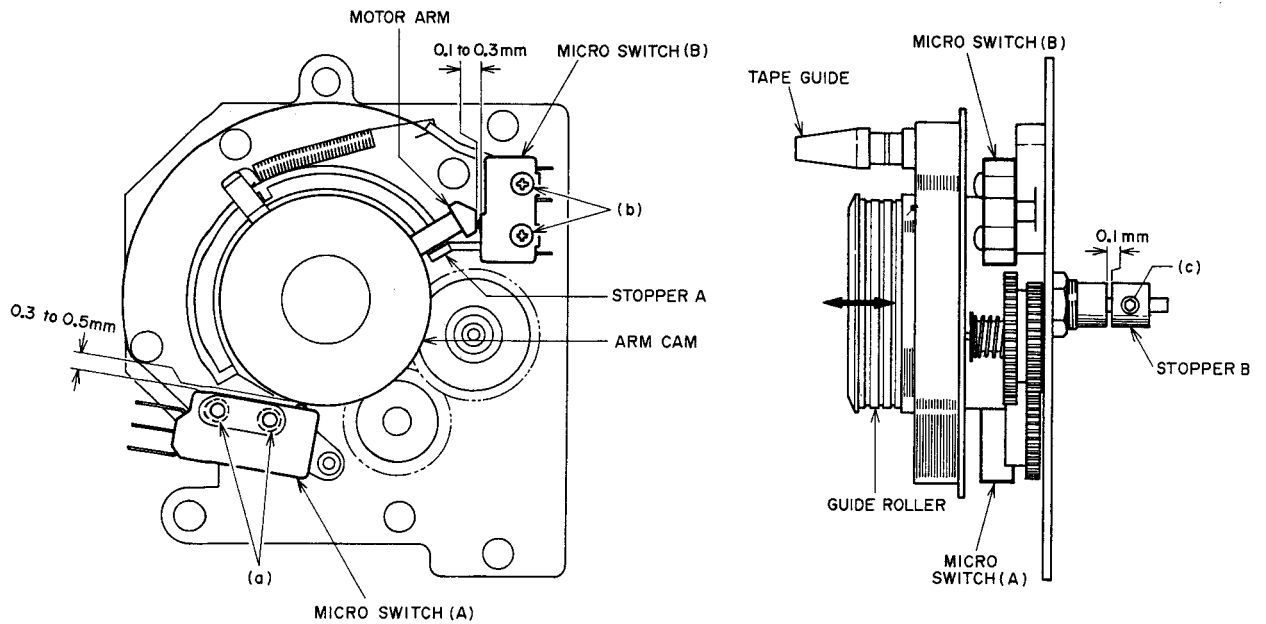


Fig. 7-1 Roller Block

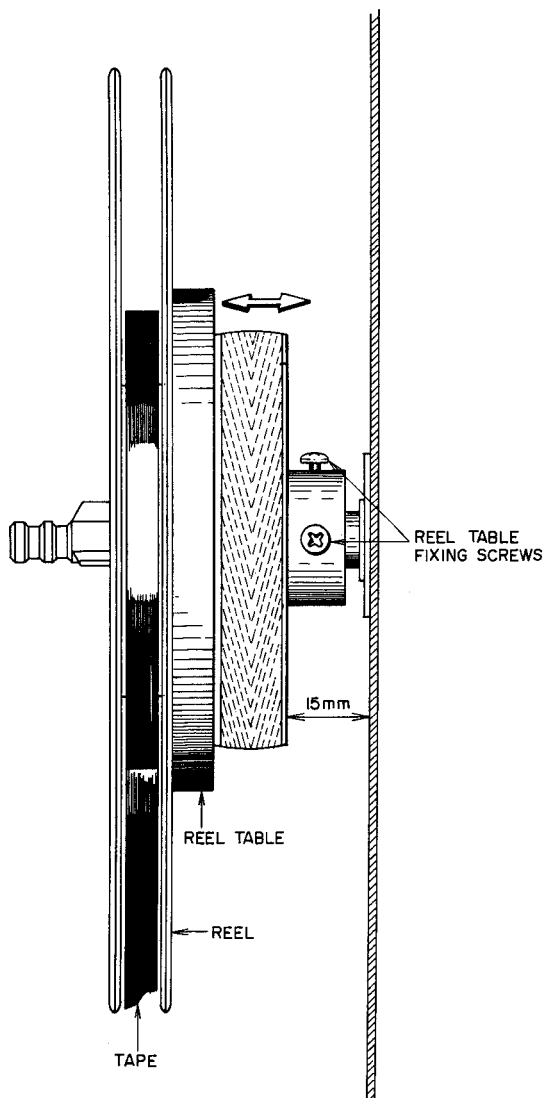


Fig. 7-2

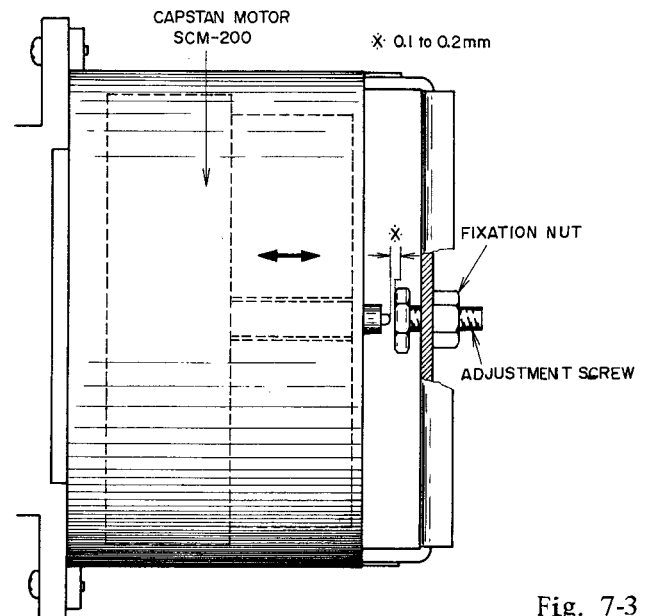


Fig. 7-3

1. GUIDE ROLLER LOOSE PLAY

ADJUSTMENT (Refer to Fig. 7-1)

Adjust the stopper B (roller pulley on the right) screw (c) so that the loose play gap is approximately 0.1 mm when the guide roller is moved as indicated by arrow mark in Fig. 7-1.

2. MICRO SWITCH POSITION ADJUSTMENT (Refer to Fig. 7-1)

1) Micro Switch (A) Position Adjustment

Adjust the screw (a) so that the gap between the arm cam and the micro switch is approximately 0.3 to 0.5 mm. Check that the micro switch works and that the arm lock smoothly disengages.

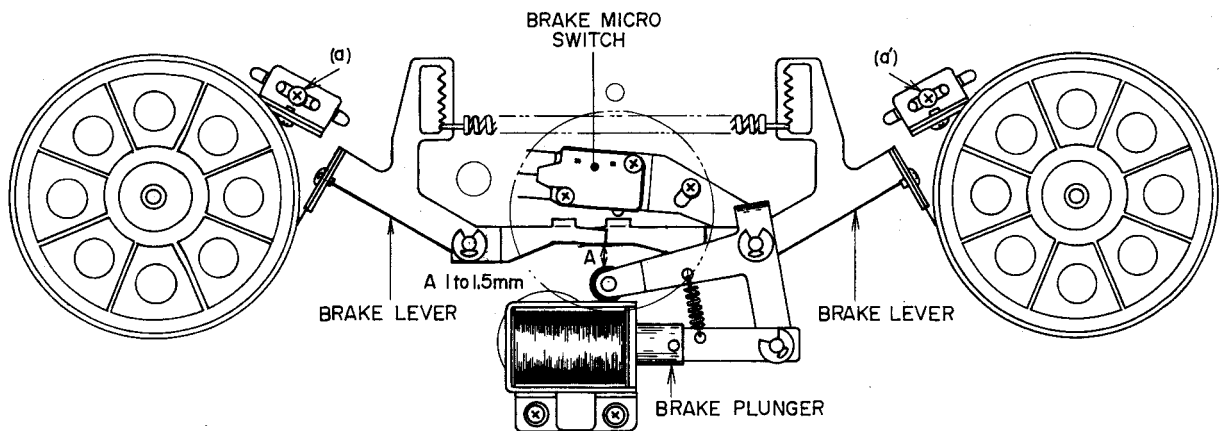


Fig. 7-4

2) Micro Switch (B) Position Adjustment

Rotate the arm cam, press the motor arm against the stopper A and then adjust so that the gap between the micro switch and the end of the motor arm is 0.1 to 0.3 mm.

NOTE: Steps 1 and 2 also apply to the right guide roller.

3. REEL TABLE HEIGHT ADJUSTMENT

(Refer to Fig. 7-2)

- 1) Temporarily screw in the fixing screws leaving a gap of 15 mm between the reel table and the chassis board.
- 2) Run the tape and adjust the height of the reel table so that the tape is taken up in the center of the reel. Tighten fixing screws. Adjust the height of the right reel table at fast forward, of the left reel table at rewind.

4. CAPSTAN SHAFT LOOSE PLAY

ADJUSTMENT (Refer to Fig. 7-3)

Adjust by turning Adjustment Screw to obtain a 0.1 to 0.2 mm degree of loose play when the capstan shaft is moved as indicated by the arrow mark.

Tighten fixation nut to maintain optimum adjusted condition.

5. BRAKE BAND POSITION ADJUSTMENT AND BRAKE TENSION ADJUSTMENT

(Refer to Figs. 7-4 to 6)

- 1) Adjust the screws (a) and (a') so that the gap A between the brake lever and the rubber is 1 to 1.5 mm.
- 2) Work the brake plunger to check that the brake band is not slanted.
- 3) With the machine stopped, adjust the position of the spring so that a brake tension of 550 ~ 600 g is obtained on each brake.
- 4) By working the brake plunger with a finger, adjust the position of the micro switch screw (c) so that the gap between the brake lever and the micro switch body is 0.2 to 0.3 mm.

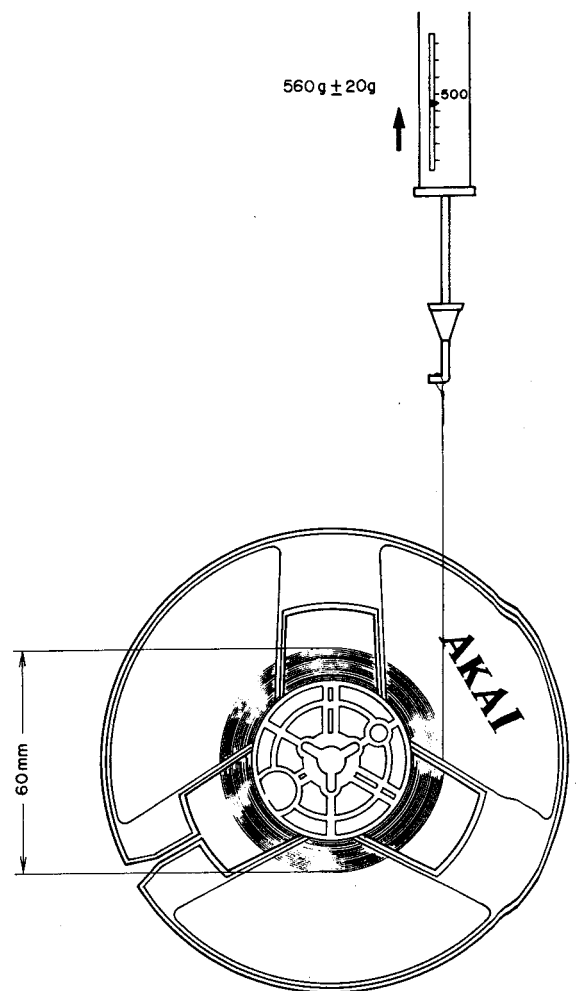


Fig. 7-5

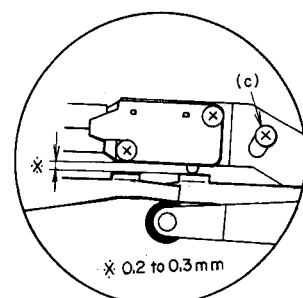


Fig. 7-6

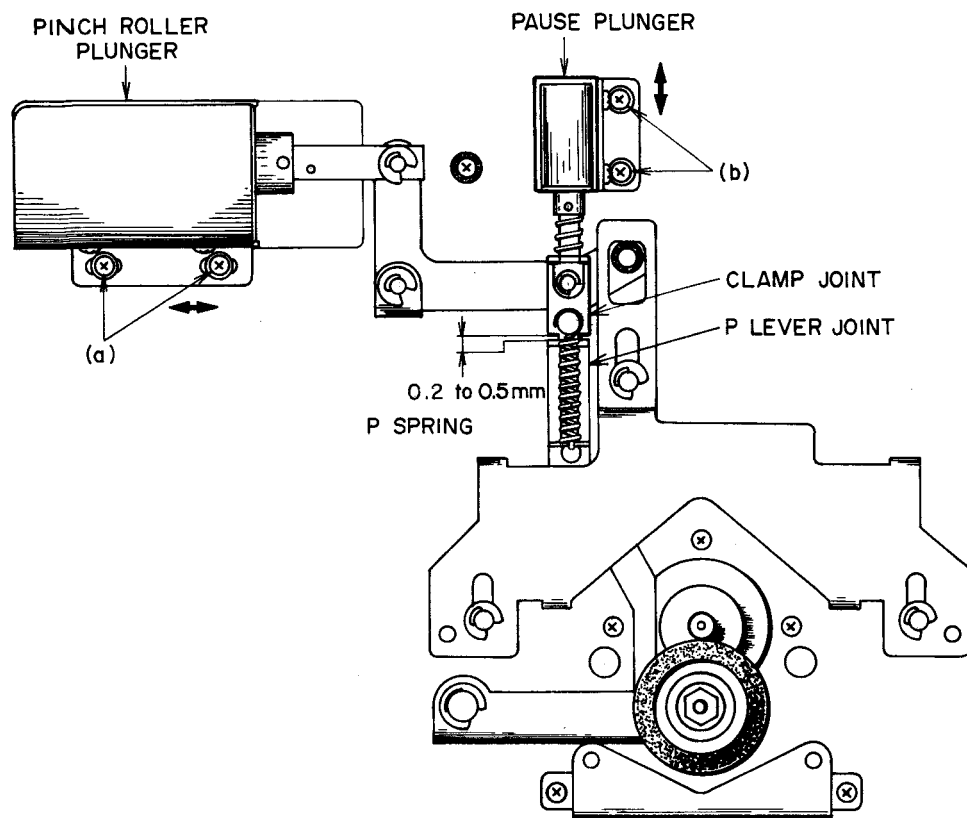


Fig. 7-7

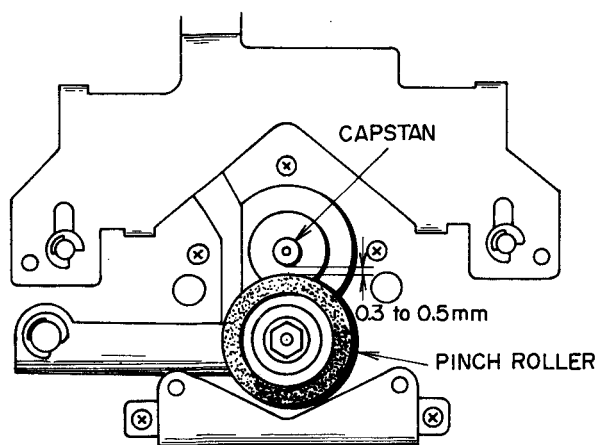


Fig. 7-8

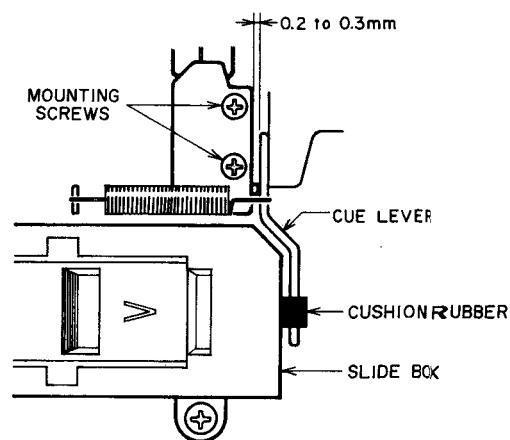


Fig. 7-9

6. PINCH ROLLER POSITION ADJUSTMENT (Refer to Fig. 7-7)

At the play mode, the gap between the clamp joint and the P lever joint should be 0.3 to 0.5 mm. Adjust the pinch roller plunger position with screws (a).

7. PAUSE PLUNGER POSITION ADJUSTMENT (Refer to Figs. 7-7, 7-8)

At the pause mode, the gap between the capstan and the pinch roller should be 0.2 to 0.5 mm. Adjust the pause plunger position with screws (b).

8. PINCH ROLLER PRESSURE ADJUSTMENT

Connect a 2 kg spring gauge to the pinch roller fixing screws. Pull down the pinch roller and then let it slowly move back. Check that the spring gauge reads 1.2 kg \pm 200 g at the moment the pinch roller touches the capstan and starts rolling.

It reads otherwise, replace the P spring (See Fig. 7-7).

9. CUE MICRO SWITCH POSITION ADJUSTMENT

By means of micro switch mounting screws, adjust the distance 'C' between the lever and the micro switch so as to be 0.2 to 0.3 mm with the cushion rubber in touch with the slide box. (See Fig. 7-9)

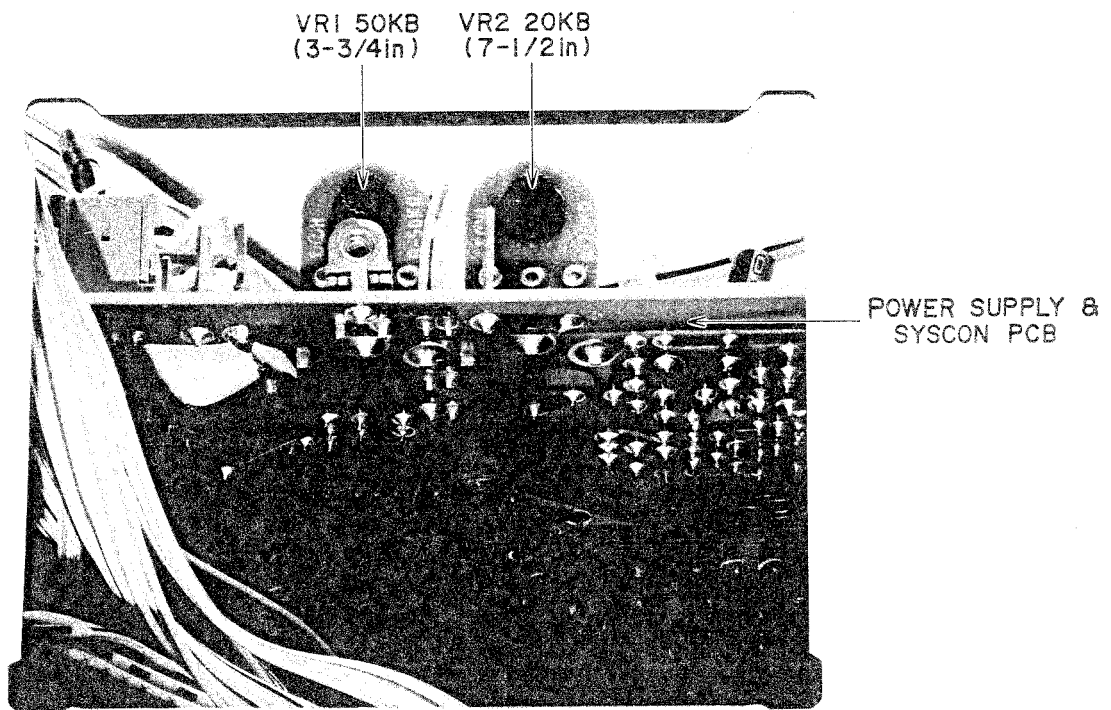


Fig. 7-10

10. TAPE SPEED ADJUSTMENT

(Refer to Fig. 7-10)

Set the Tape Speed Switch to 7-1/2 ips. and playback the 1,000 Hz, 7-1/2 Test Tape. Connect a frequency counter to LINE OUT and adjust VR2 20 kB until the counter reads, 1,000 Hz \pm 0.8%. Next, set the Tape Speed Switch to 3-3/4 ips. and adjust VR1 50 kB until the frequency counter reads 500 Hz \pm 1.0%.

VIII. HEAD ADJUSTMENT

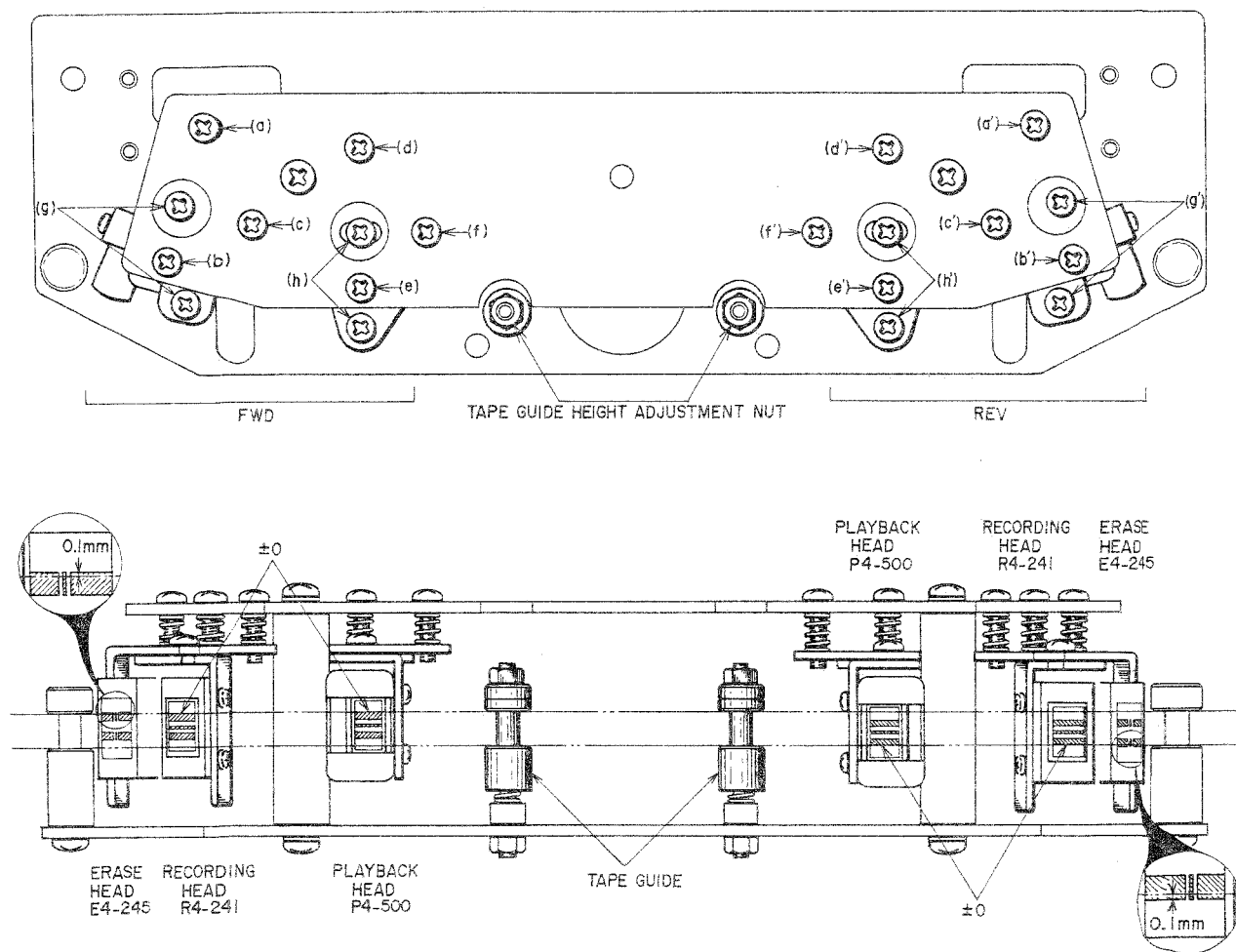


Fig. 8-1

STEP	ADJUSTMENT ITEM	TEST TAPE SUPPLY SIGNAL	MODE	ADJUSTMENT POINT	REMARKS
1	Tape Guide Height	Optional	FWD	Tape Guide Height Adjustment Nut	1) Adjust so that tape travels smoothly and does not twist. 2) Do not thread tape over tension arm.
2	FWD Recording Head Height	Optional	FWD	(a) (b)	Upper edges of Left Ch. head core and tape are the same height.
3	FWD Erase Head Height Confirmation	Optional	FWD		Upper edge of Left Ch. head core is 0.1 mm higher than upper edge of tape
4	FWD Playback Head Height	Optional	FWD	(d) (e)	Upper edges of Left Ch. head core and tape are the same height.
5	FWD Playback Head Azimuth Alignment	8,000 Hz 3-3/4 ips Test Tape	FWD	(f)	Maximum output, both channels.
6	FWD Playback Head Angle Alignment	8,000 Hz 3-3/4 ips Test Tape	FWD	(h)	Adjust head gap surface so that there is no change in output level when tension is applied to the supply reel side.
7	FWD Recording Head Azimuth Alignment	Maxell UD 15,000 Hz -20 dBm	REC	(c)	Maximum output, both channels. See NOTE 6.
8	FWD Recording Head Angle Alignment	Maxell UD 15,000 Hz -20 dBm	REC	(g)	Adjust head gap surface so that there is no change in output level when tension is applied to the supply reel side.

Fig. 8-2

- NOTES: 1. As perfect head adjustments are vital to tape deck performance, be sure that these adjustments are carried out properly.
2. Be careful not to use a magnetized driver or other magnetized tools in the vicinity of the heads.
3. Use only new tape as level variation is likely to occur when using old tape.

4. Demagnetize heads with head demagnetizer before and after head adjustment.
5. Set tape speed to 7-1/2 ips.
6. Set Tape Selector Switch to NORMAL Position.
7. Adjustments outlined in Fig. 8-2 are only for FWD side heads. However, adjustments for REV side heads are exactly the same.

IX. ELECTRICAL ADJUSTMENT

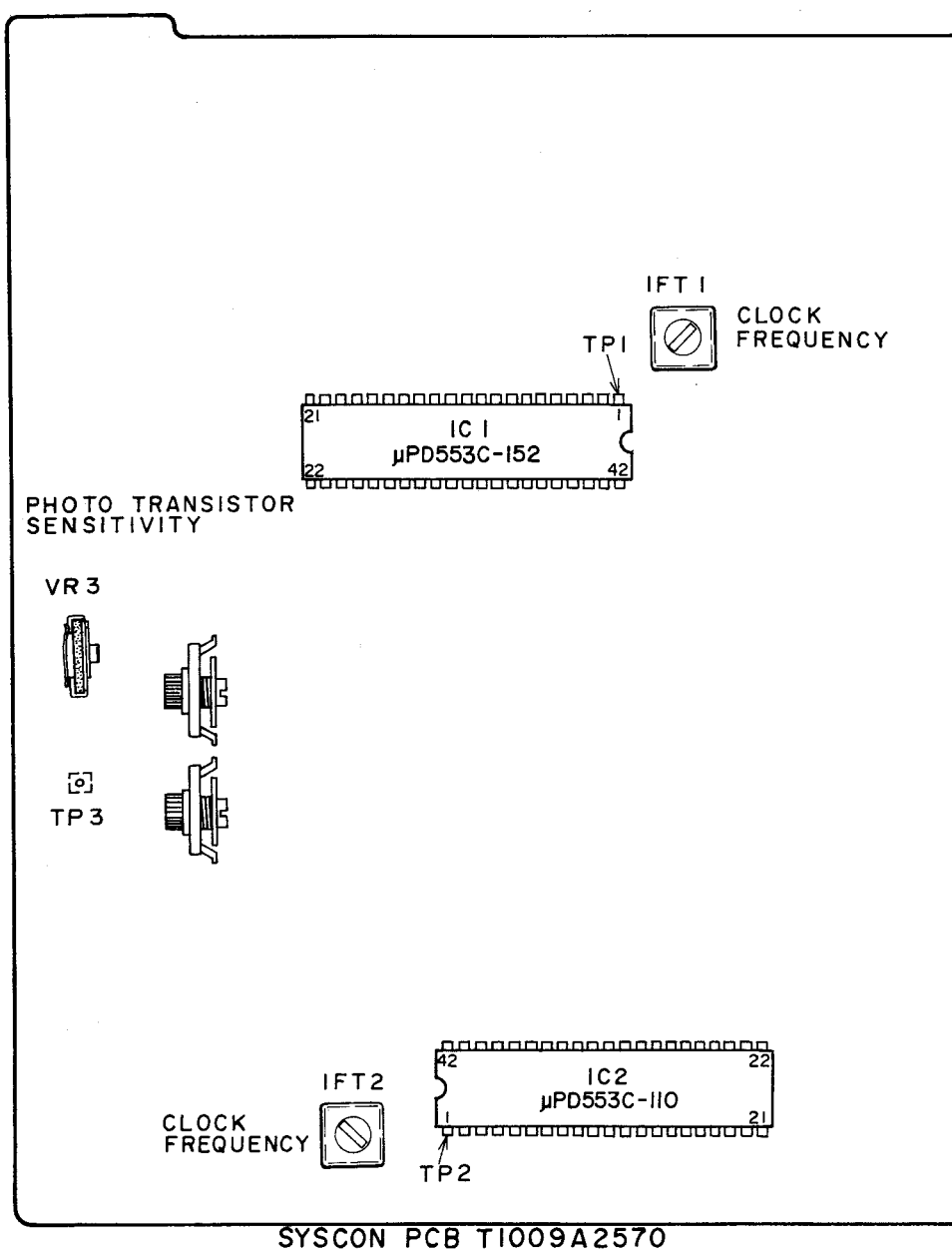


Fig. 9-1 Syscon P.C Board T1009A2570

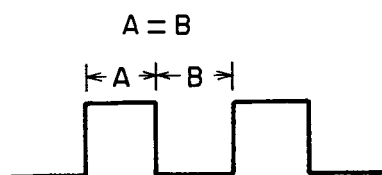


Fig. 9-2

1. CLOCK FREQUENCY ADJUSTMENT

(Refer to Fig. 9-1)

Connect the frequency counter between TP1 (IC1 Pin ①) and GND, and adjust with IFT1 so that the indicating values will be from 390 to 400 kHz.

Also for the IC2, make the same adjustment with IFT2.

2. PHOTO TRANSISTOR SENSITIVITY

(Refer to Figs. 9-1, 9-2)

Connect the oscilloscope between TP3 and GND. For the reel size 10", adjust with VR3 so that the ON and OFF widths of the pulse will be equal ($A=B$) as shown in Fig. 9-2 when the rotation is stabilized in FF or REW mode.

3. PRE-AMPLIFIER P.C BOARD ADJUSTMENT

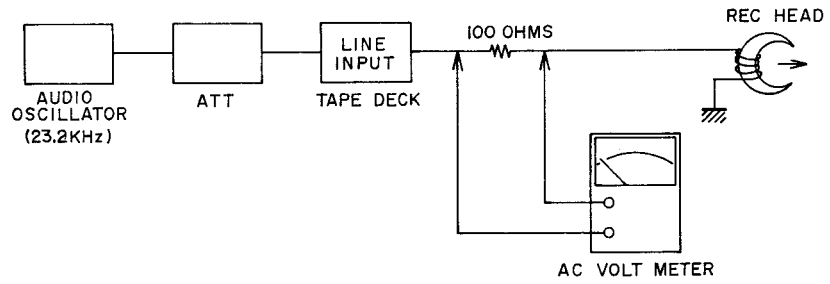


Fig. 9-3 Rec Peaking Adjustment Instrument Connection (Step 3)

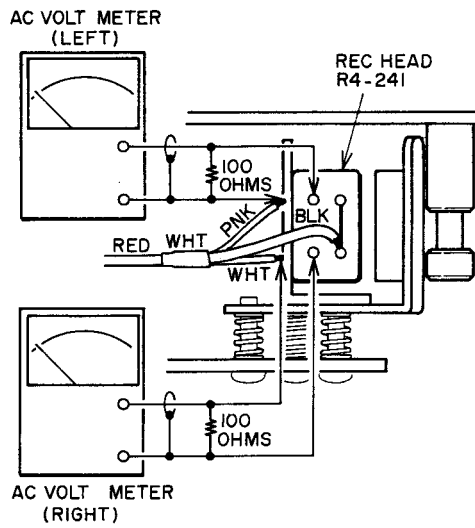


Fig. 9-4 Rec Peaking Adjustment (Step 3)

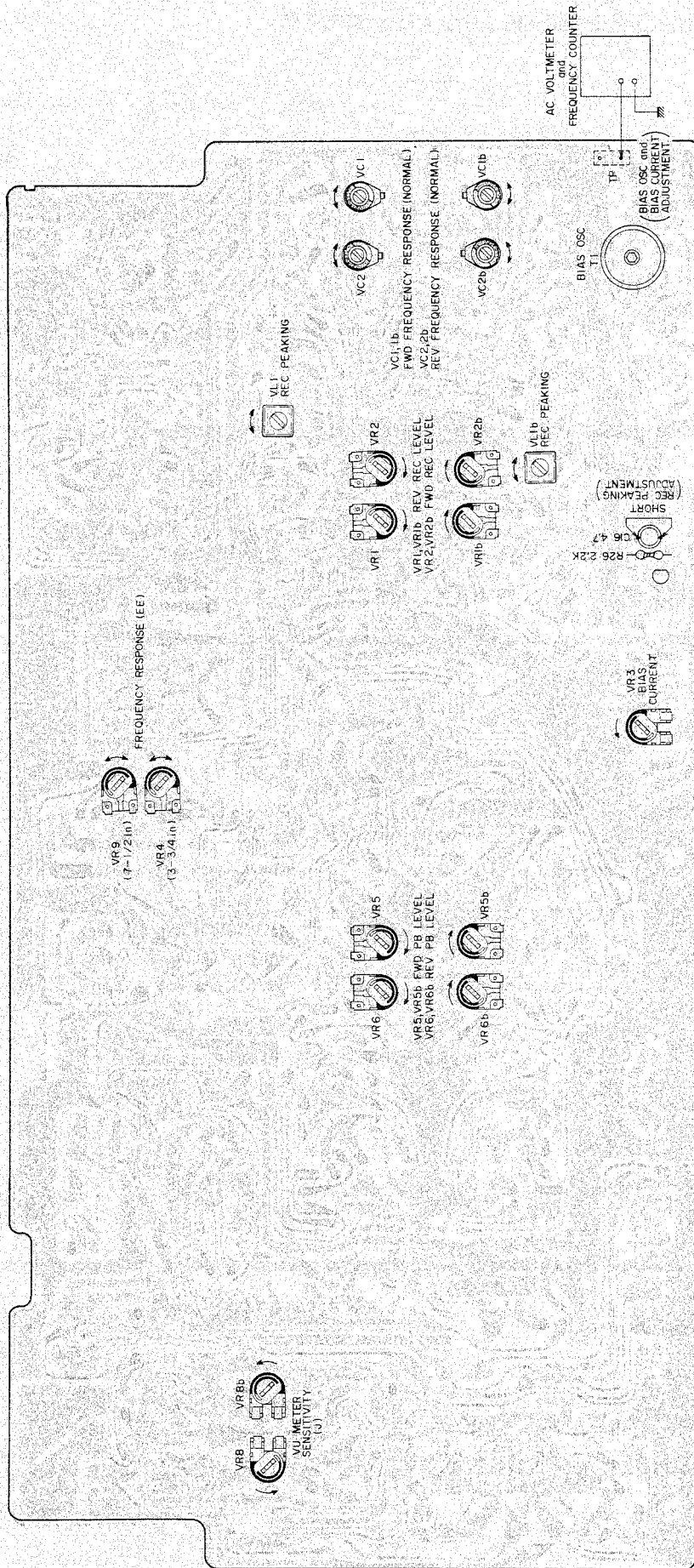


Fig. 9-5 Pre Amp P.C Board T1015A5050

STEP	ADJUSTMENT ITEM	TEST TAPE SUPPLY SIGNAL	MODE	ADJUSTMENT POINT	RESULT	REMARKS
1	FWD Playback Level	700 Hz 7-1/2 ips. 0 VU Test Tape	FWD	VR5 50 kB	-5.5±0.5 dBm (410 mV)	
2	REV Playback Level	700 Hz 7-1/2 ips. 0 VU Test Tape	REV	VR6 50 kB	-5.5±0.5 dBm (410 mV)	
3	REC Peaking	23.2 kHz from an Oscillator	REC	VL1 1 mH	Maximum AC Voltmeter indication	Set TAPE SELECTOR to "NORMAL" Tape Speed 3-3/4 ips. See NOTE 6, 7, 9 and Figs. 9-3, 9-4, 9-5.
4	BIAS OSC		REC	T1	100 ± 0.5 kHz	Set TAPE SELECTOR to "NORMAL" Tape Speed 7-1/2 ips. Connect a Frequency Counter between TP and GND. Fig. 9-5.
5	BIAS Current		REC	VR3 20 kB	140±2 mV	Set TAPE SELECTOR to "NORMAL" Tape Speed 7-1/2 ips. Connect a AC Volt- meter between TP and GND Fig. 9-5.
6	FWD Recording Level	NORMAL Blank Tape 1,000 Hz -5.5 dBm Recording	FWD/ REC	VR2 20 kB	-5.5±0.5 dBm (410 mV)	
7	REV Recording Level	NORMAL Blank Tape 1,000 Hz -5.5 dBm Recording	REV/ REC	VR1 20 kB	-5.5±0.5 dBm (410 mV)	
8	Bias leak	No signal input Mic and Line Volume are MAX.	REC	FL1 (Mic Amp PCB)	Minimum	
9	NORMAL Position FWD Frequency Response	NORMAL Blank Tape 1.5 kHz, 15 kHz -25.5 dBm Recording	FWD/ REC	VC1	1.5 kHz, 15 kHz flat	Tape Speed 3-3/4 ips. Recheck Recording Level. See NOTE 10.
10	NORMAL Position REV Frequency Response	NORMAL Blank Tape 1.5 kHz, 15 kHz -25.5 dBm Recording	REV/ REC	VC2	1.5 kHz, 15 kHz flat	Tape Speed 3-3/4 ips. Recheck Recording Level. See NOTE 10.
11	EE Position Frequency Response (3-3/4 ips)	EE Blank Tape 1.5 kHz, 20 kHz -25.5 dBm Recording	FWD, REV/ REC	VR4 10 kB	1.5 kHz, 20 kHz flat	Tape Speed 3-3/4 ips. Recheck Recording Level. See NOTE 10.
12	EE Position Frequency Response (7-1/2 ips)	EE Blank Tape 1.5 kHz, 25 kHz -25.5 dBm Recording	FWD, REV/ REC	VR9 30 kB	1.5 kHz, 25 kHz flat	Tape Speed 7-1/2 ips. Recheck Recording Level. See NOTE 10.
13	FWD Distortion Confirmation	1,000 Hz -5.5 dBm Recording	FWD/ REC		NORMAL: EE : See NOTE 8.	Less than 0.5% Less than 0.4%
14	REC Distortion Confirmation	1,000 Hz -5.5 dBm Recording	REV/ REC		NORMAL: EE : See NOTE 8.	Less than 0.5% Less than 0.4%

STEP	ADJUSTMENT ITEM	TEST TAPE SUPPLY SIGNAL	MODE	ADJUSTMENT POINT	RESULT	REMARKS
15	VU Meter Sensitivity	1,000 Hz -5.5 dBm from an Oscillator	STOP	VR8 1 kB	0 VU indication	Set MONITOR Switch to "SOURCE"

- NOTES:
1. Output Level Control should be at maximum.
 2. Except for Steps 3, 8, 9 and 10, set Tape Speed to 7-1/2 ips.
 3. Except for Steps 10 to 12 and 13, set Tape Selector Switch to NORMAL Position.
 4. Set Bias Adjustment Volume to center position.
 5. Use the following open measuring tapes:
 NORMAL Tape: Maxell UD
 EE Tape : Maxell XLII
 TDK SA
 6. Stop Recording bias oscillator while making Rec Peaking adjustment (Refer to Fig. 9-4).

7. When 23.2 kHz indicates the peak, check and ensure that the AC Voltmeter show 16 dB of increase when 15 kHz of input is fed rather than when 1 kHz is fed.
8. If it does not comply with the specifications repeat Steps 6 to 10 and 11, and re-adjust.
9. Unless the core is moved intentionally this adjustment is not necessary.
10. Since the deviation is doubled if the dbx noise reduction system is actuated, when the frequency response is maladjusted and does not agree with the reference level, perform adjustments more exactly than so far been done.

4. dbx NR PC BOARD ADJUSTMENT

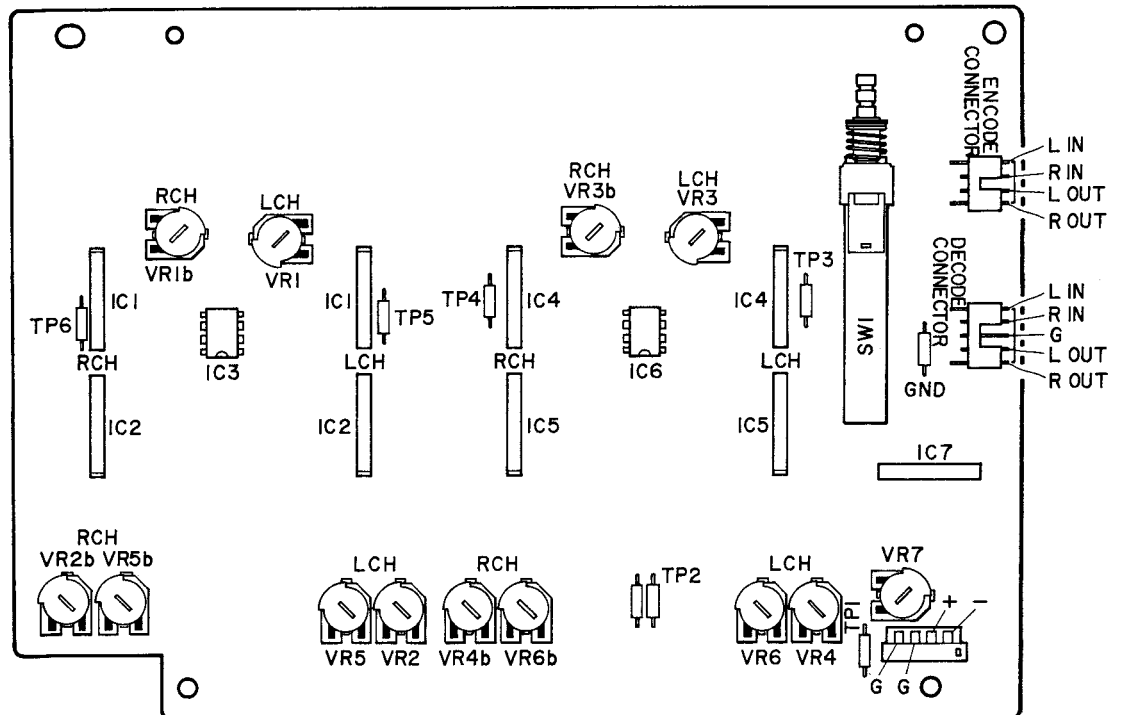
NOTICES

1. Adjustment of the dbx NR is not required except when a part is replaced or an adjustable VR is turned by mistake.
2. Since an error will be caused in the zero point level and detected time constant, when the dbx NR power supply voltage is not normal, be sure to adjust accurately.
3. Be specially cautious for the replacement of R22, R49 (22 M ohms), C17, and C33 (tantalum

capacitor 10/25V).

Since the values of R22 and R49 are as high as 22 Mohms, be cautious about dirt, flux, frost, etc. When C17 and C33 of small dielectric strength are used, misoperation can sometimes occur due to a change in leakage current.

4. In R.M.S symmetry adjustment (step 2), Observe the signals at the testpoints (TP 3 to TP 6) by referring to Fig. 9-8. Due to the signals at those testpoints are very low level.



VR1 ENCODER V.C.A SYMMETRY
 VR2 ENCODER R.M.S SYMMETRY
 VR3 DECODER V.C.A SYMMETRY
 VR4 DECODER R.M.S SYMMETRY
 VR5 ENCODER ZERO POINT
 VR6 DECODER ZERO POINT
 VR7 POWER SUPPLY

* VR1b to VR6b IS INDICATE RIGHT CHANNEL

* EACH TEST POINT IS USING JUMPER RESISTER

Fig. 9-6 dbx Noise Reduction P.C. Board Adjustment point & Test point

STEP	ADJUSTMENT ITEM	INPUT SIGNAL	TEST POINT	ADJUSTMENT POINT	RESULT	REMARKS
1	Power Supply		TP1 TP2	VR7 10KB	Adjust so that TP-1 output voltage becomes $\pm 11.6 \pm 0.1V$. At this time, make sure that TP-2 voltage is within $-11.6 \pm 0.4V$.	See Note 2.

STEP	ADJUSTMENT ITEM	INPUT SIGNAL	TEST POINT	ADJUSTMENT POINT	RESULT	REMARKS
2	R.M.S Symmetry	100 Hz -5.5 dBm (410 mV) from an oscillator	TP-5 (L) TP-6 (R) (ENCODER) TP-3 (L) TP-4 (R) (DECODER)	VR2 50kB (ENCODER) VR 450kB (DECODER)	Observe TP3 to TP6 with an oscilloscope, and adjust with VR2 and VR4 (50 KB) so that the peak value of the waveform becomes constant at 200 Hz.	Refer to Fig. 9-7. See Note 4. Fig. 9-8
3	V.C.A Symmetry	1000 Hz, -5.5 dBm (410 mV) from an oscillator	Each ENCODER/DECODER Output Terminal	VR1 50 kB (ENCODER) VR3 50 kB (DECODER)	Adjust VR1 (encoder) and VR3 (decoder) so that the distortion at each terminal is minimized (below 0.1%).	
4	ZERO Point	1000 Hz, -5.5 dBm (410 mV) from an oscillator	Each ENCODER/DECODER Output Terminal	VR5 500 kB (ENCODER) VR6 500 kB (DECODER)	Adjust VR5 (encoder) and VR6 (decoder) so that the output level of each output terminal corresponds to the input at -5.5 dBm (410 mV).	
5	Confirmation of ENCODER and DECODER Operation	1000 Hz, -5.5 dBm ±10 dB from an oscillator	Each ENCODER/DECODER Output Terminal	Confirmation	Make sure that during encode and decode, compression and expansion are made in the proportion of 2 to 1, when the input signal level is changed by ±10 dB. (See Fig. 9-8)	Refer to Fig. 9-8.

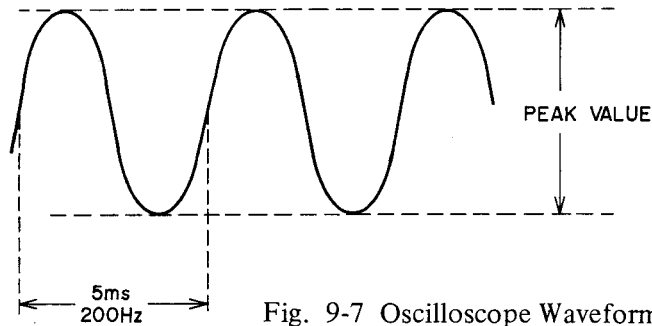


Fig. 9-7 Oscilloscope Waveform

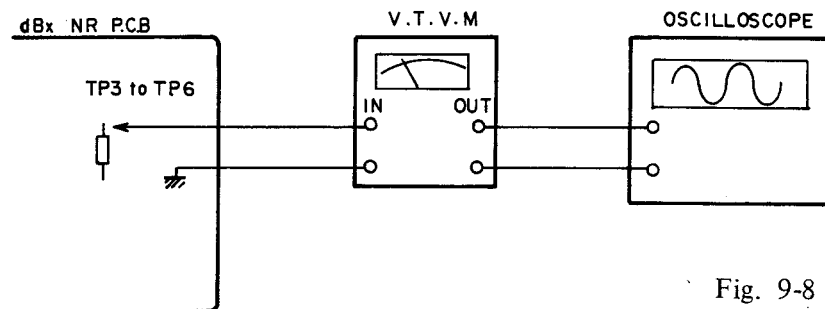


Fig. 9-8

INPUT LEVELS	ENCODER OUTPUT LEVEL	DECODER OUTPUT LEVEL
-15.5 dBm	-10.5 dBm	-25.5 dBm
-5.5 dBm	-5.5 dBm	-5.5 dBm
+4.5 dBm	-0.5 dBm	+14.5 dBm

* Tolerance of each output is ±3 dB.

Fig. 9-9

X. DC RESISTANCE OF VARIOUS COILS

PART	DESIGNATION	DC RESISTANCE
Main Motor	SCM-200	Between BLU-RED: 110 ohms Between YLW-BRN: 170 ohms Pick-up Coil: 665 ohms
Reel Motor	24X0-TD	Between BLU-RED: 30 ohms Between YLW-BRN: 157 ohms
Pinch Roller Plunger	1664PLT1	600 ohms \pm 10%
Brake Plunger REV Plunger	1240PLT1	600 ohms \pm 10%
Pause Plunger	0730FLT	600 ohms \pm 10%
Relay	MY4-02-US-L	650 ohms \pm 15%
Relay	BR211	1,280 ohms \pm 10%
Relay	G2KU	1,000 ohms \pm 10%
Relay	321D012	230 ohms \pm 15%
Erase Head	E4-245	3.1 ohms
Recording Head	R4-241	5.9 ohms
Playback Head	P4-500	407 ohms \pm 5%

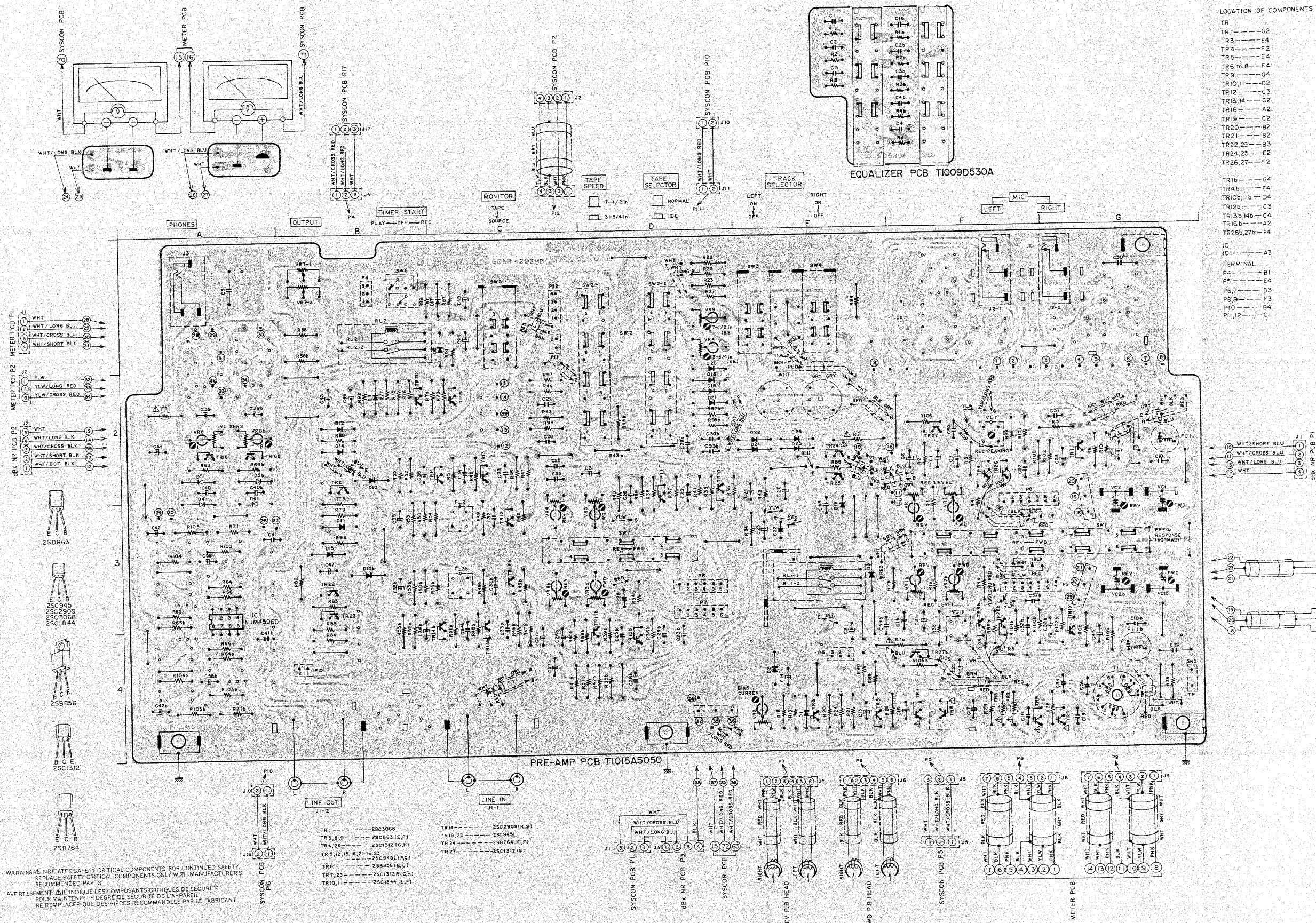
XI. CLASSIFICATION OF VARIOUS P.C BOARDS

1. P.C BOARD TITLES AND IDENTIFICATION NUMBERS

P.C BOARD TITLE	P.C BOARD NUMBER	REMARKS
Syscon P.C Board	T1009A2570	
Pre Amp P.C Board	T1015A5050	
Meter P.C Board	T1015D5030	
Mic Amp P.C Board	T1015C5020	
dbx NR P.C Board	T1015B5010	
Operation P.C Board	T1009C2390	
Fuse (A) P.C Board	T1009D2440	
Fuse (B) P.C Board	T1009C2450	
Counter P.C Board	T1009C2550	
LED P.C Board	T1015D5040	
Equalizer P.C Board	T1009D530A	
Bias, Adjustment P.C Board	T1009D530B	
Remocon P.C Board	T1009D2420	
Switch P.C Board	T1009D2500	
Detector (A) P.C Board	T1009D2540	
Detector (B) P.C Board	T1009D2520	

2. COMPOSITION OF VARIOUS P.C BOARDS

1) Pre Amp P.C Board T1015A5050, Equalizer P.C Board T1009D530A and Bias Adjust P.C Board T1009D530B



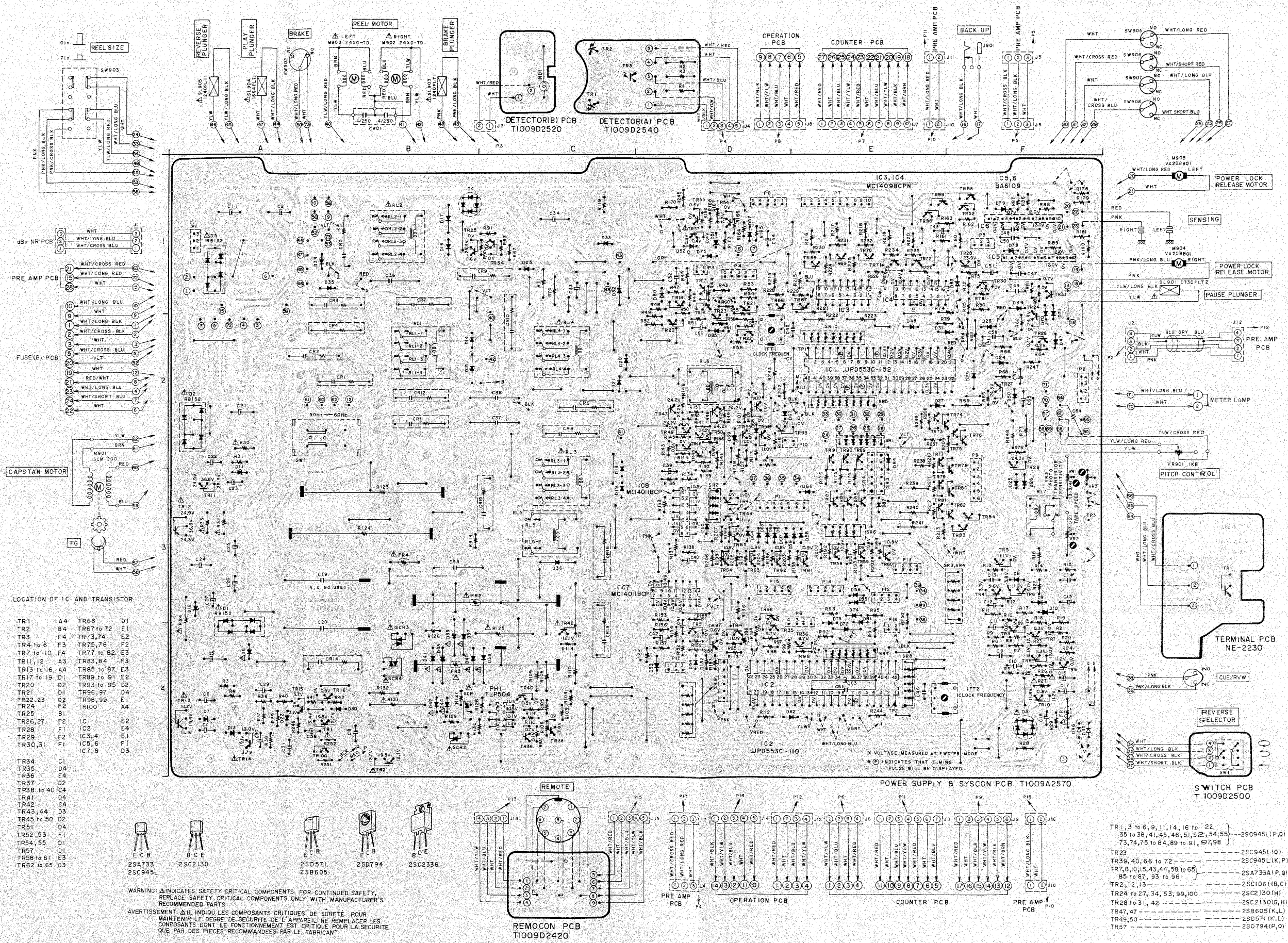
- LOCATION OF COMPONENTS
- TR 1 --- G2
 - TR 3 --- E4
 - TR 4 --- F2
 - TR 5 --- E4
 - TR 6, 10 --- F4
 - TR 9 --- G4
 - TR 10, 11 --- D2
 - TR 12 --- C3
 - TR 13, 14 --- C2
 - TR 16 --- A2
 - TR 19 --- C2
 - TR 20 --- B2
 - TR 21 --- B2
 - TR 22, 23 --- B3
 - TR 24, 25 --- E2
 - TR 26, 27 --- F2

 - TR 15 --- G4
 - TR 4b --- F4
 - TR 10b, 11b --- D4
 - TR 12b --- C3
 - TR 13b, 14b --- C4
 - TR 16b --- A2
 - TR 26b, 27b --- F4
- IC 1 --- A3
- TERMINAL
- P4 --- B1
 - P5 --- E4
 - P6, 7 --- D3
 - P8, 9 --- F3
 - P10 --- B4
 - PH1, 2 --- C1

WARNING: INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

AVERTISSEMENT: Δ INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

- TR 1 --- 25C3088
- TR 3, 9, 9 --- 25C862 (E, F)
- TR 4, 26 --- 25C1312 (G, H)
- TR 5, 12, 13, 16, 21, 16, 23 --- 25C945 (L, P, Q)
- TR 6 --- 25B856 (E, F)
- TR 7, 23 --- 25C1312 (R, K)
- TR 10, 11 --- 25C144 (E, F)
- TR 14 --- 25C2809 (R, S)
- TR 19, 20 --- 25C945L
- TR 24 --- 25B764 (E, F)
- TR 27 --- 25C1312 (E)



LOCATION OF IC AND TRANSISTOR

TR1	A4	TR66	D1
TR2	B4	TR67 to 72	E1
TR3	F4	TR73,74	E2
TR4 to 6	F3	TR75,76	F2
TR7 to 10	F4	TR77 to 82	E3
TR11, 12	A3	TR83,84	F3
TR13 to 16	A4	TR85 to 87	E3
TR17 to 19	D1	TR88 to 91	E2
TR20	D2	TR93 to 95	D2
TR21	D1	TR96,97	D4
TR22,23	D2	TR98,99	E1
TR24	F2	TR100	A4
TR25	B1		
TR26,27	F2	C1	E2
TR28	F1	IC2	E4
TR29	F2	IC3,4	E1
TR30,31	F1	IC5,6	F1
		IC7,8	D3
TR34	C1		
TR35	D4		
TR36	E4		
TR37	D2		
TR38 to 40	C4		
TR41	D4		
TR42	C4		
TR43,44	D3		
TR45 to 50	D2		
TR51	D4		
TR52,53	F1		
TR54,55	D1		
TR57	D1		
TR58 to 61	E3		
TR62 to 65	D3		

- | | | | | |
|---------|---------|--------|--------|---------|
| | | | | |
| 2SA733 | 2SC2130 | 2SD571 | 2SD794 | 2SC2336 |
| 2SC945L | | 2SB605 | | |

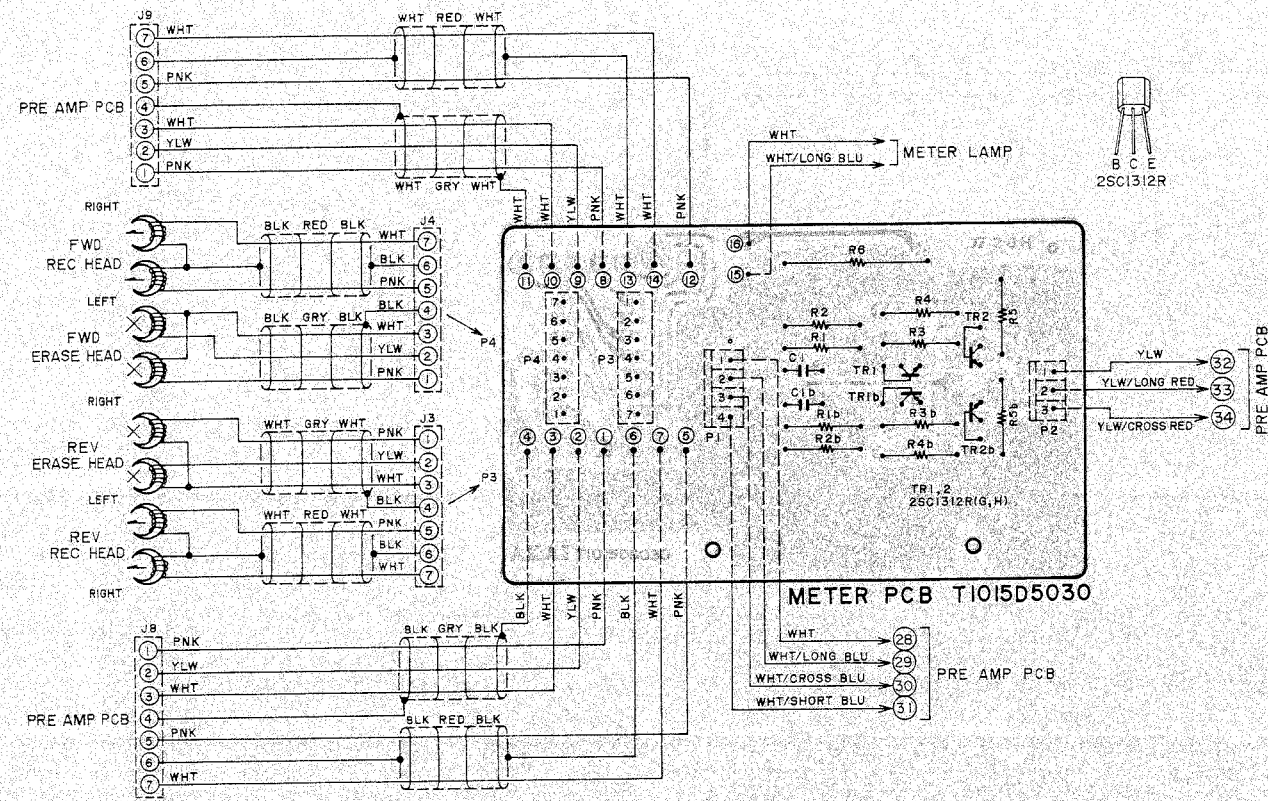
WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

AVERTISSEMENT: Δ IL INDIQUÉ LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRÉ DE SÛRETÉ DE L'APPAREIL, NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SÛRETÉ QUE PAR DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

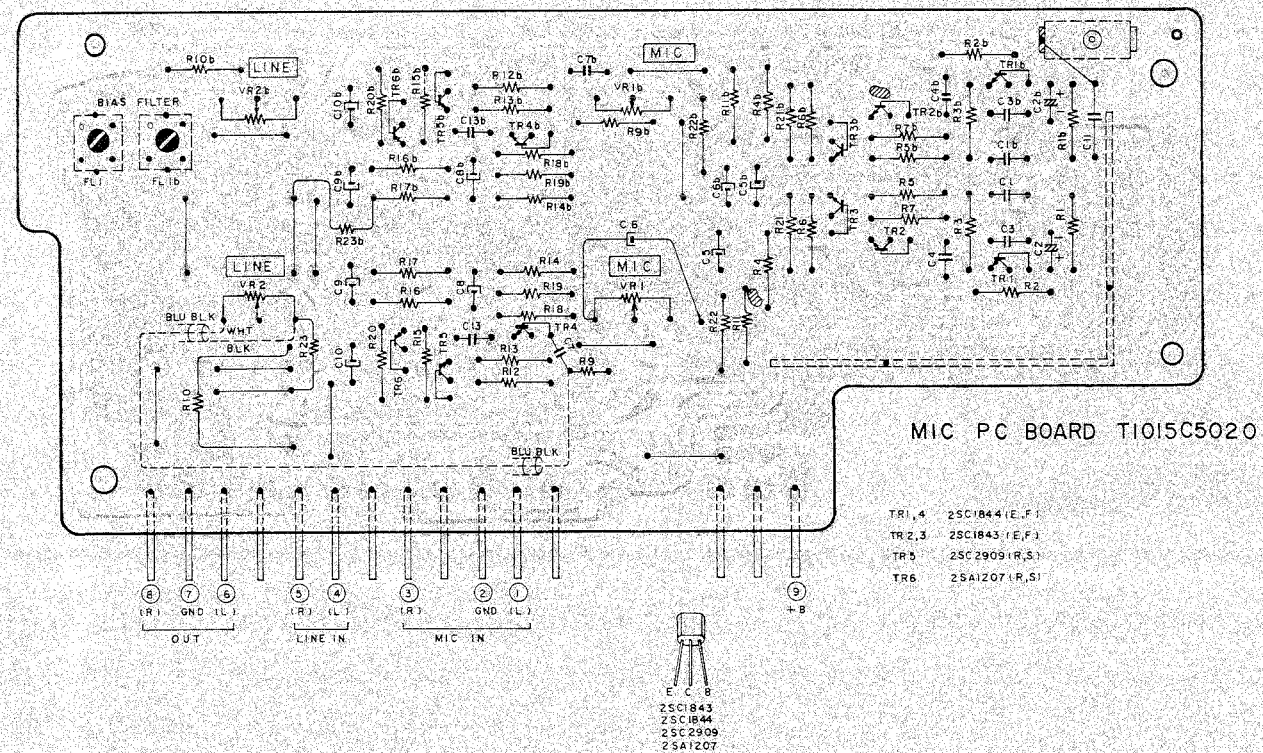
REMOCON PCB T1009D2420

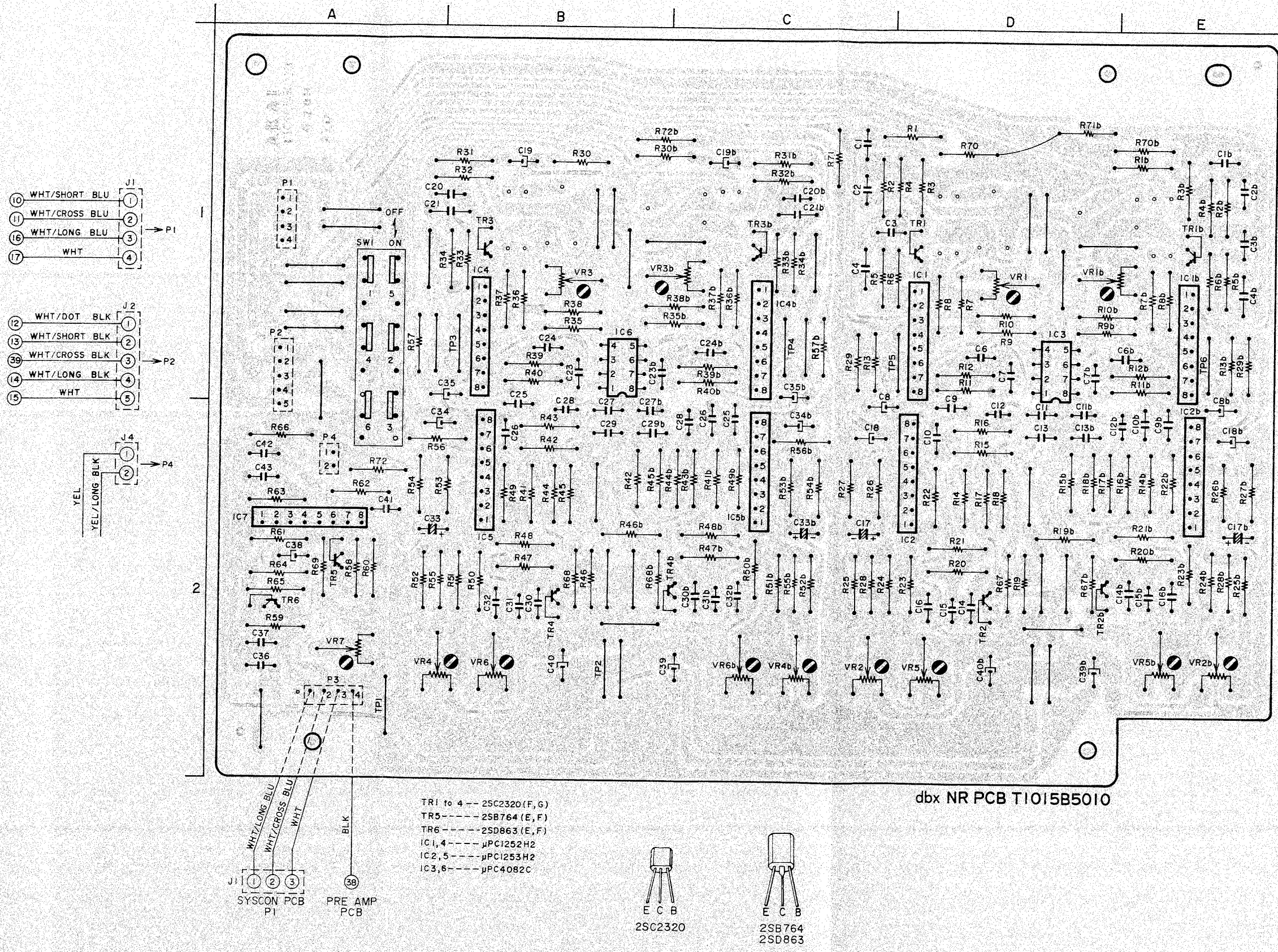
- | | |
|-------------------------------|--------------|
| TR1,3 to 6,9,11,14,16 to 22 | 2SC945L(P,Q) |
| 35 to 38,41,45,46,51,52,54,55 | 2SC945L(K,P) |
| 73,74,75 to 84,89 to 91,97,98 | 2SA733A(P,Q) |
| TR23 | 2SC945L(Q) |
| TR39,40,66 to 72 | 2SC945L(K,P) |
| TR7,8,10,15,43,44,59 to 68 | 2SA733A(P,Q) |
| 85 to 87,93 to 96 | 2SC1061(B,C) |
| TR2,12,13 | 2SC2130(H) |
| TR24 to 27,34,53,99,100 | 2SC2130(G,H) |
| TR28 to 31,42 | 2SC2130(K,L) |
| TR47,47 | 2SB605(K,L) |
| TR49,50 | 2SD571(K,L) |
| TR57 | 2SD794(P,Q) |

3) Meter P.C Board T1015D5030



4) Mic P.C Board T1015C5020

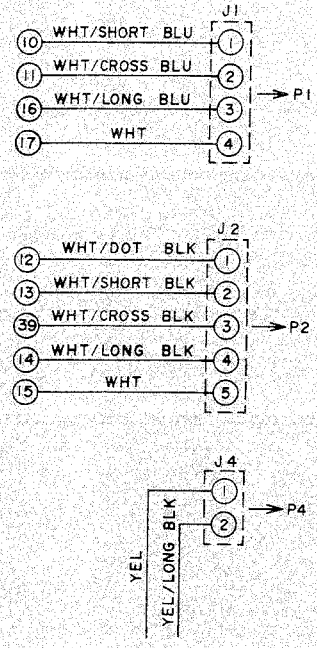
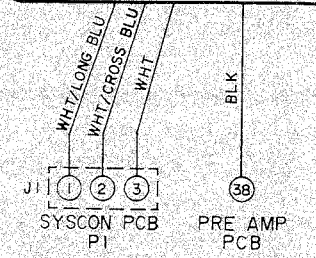
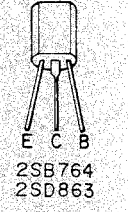
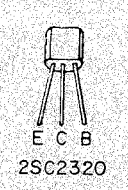




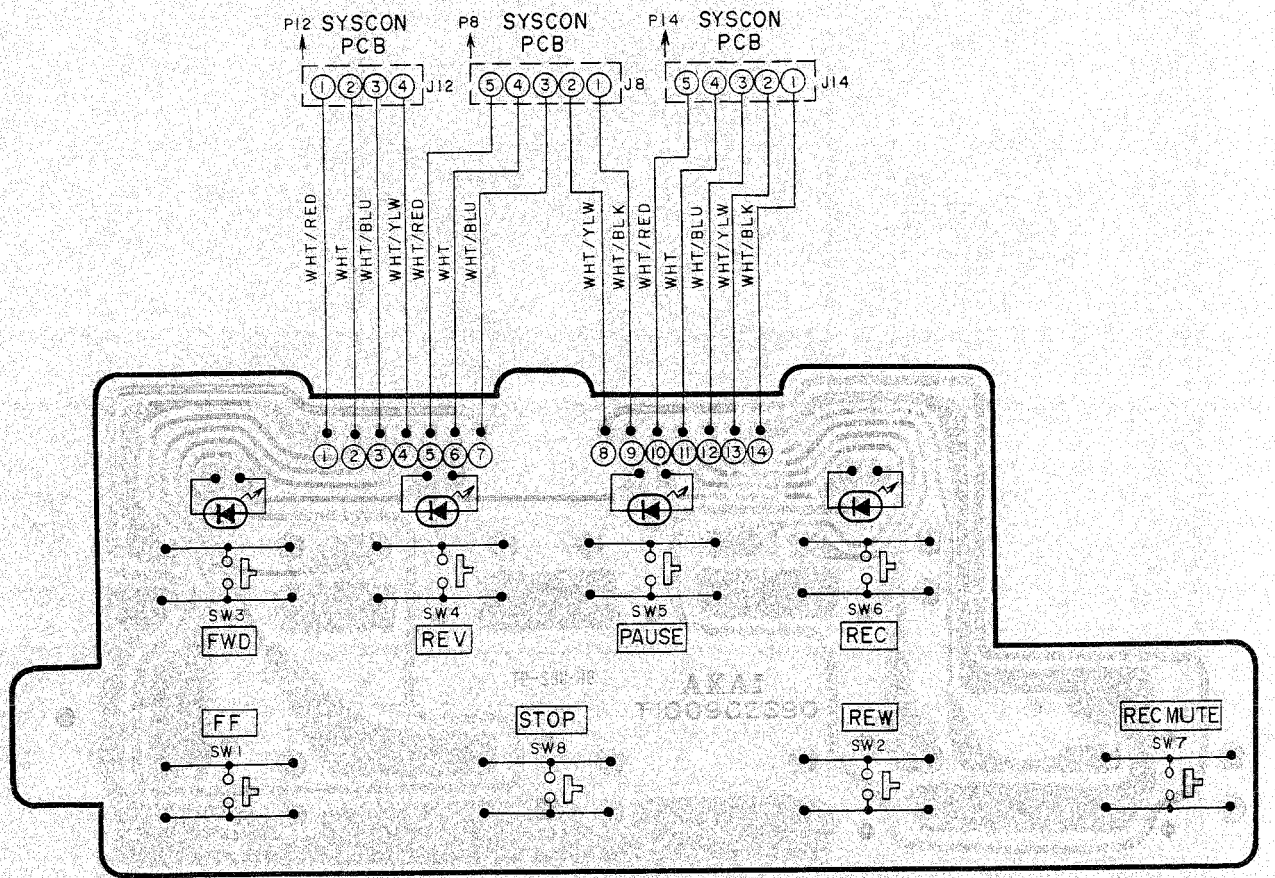
LOCATION OF COMPONENTS

- TR1.....D1
- TR1b....E1
- TR2.....D2
- TR2b....D2
- TR3.....B1
- TR3b....C1
- TR4.....B2
- TR4b....C2
- TR5,6...A2
- IC1.....D1
- IC1b....E1
- IC2.....D2
- IC2b....E2
- IC3.....D1
- IC4.....E1
- IC4b....C1
- IC5.....B2
- IC6.....B1

- TR1 to 4 --- 2SC2320 (F, G)
- TR5 --- 2SB764 (E, F)
- TR6 --- 2SD863 (E, F)
- IC 1, 4 --- μPC1252H2
- IC 2, 5 --- μPC1253H2
- IC 3, 6 --- μPC4082C

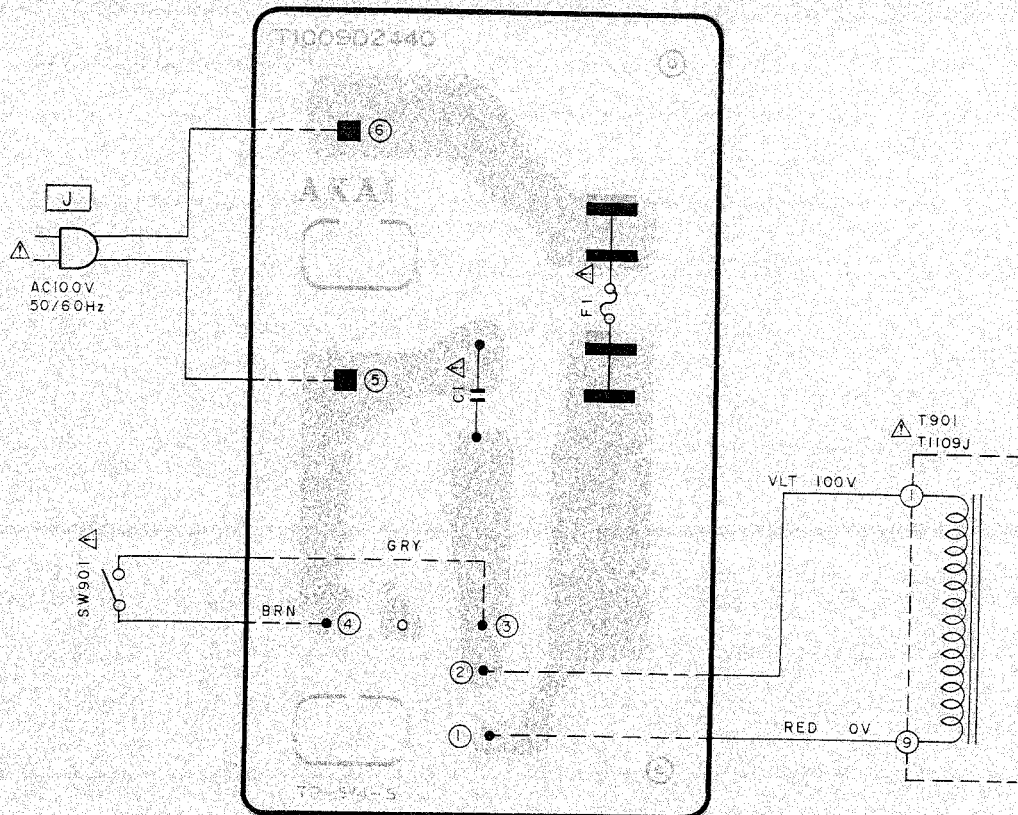
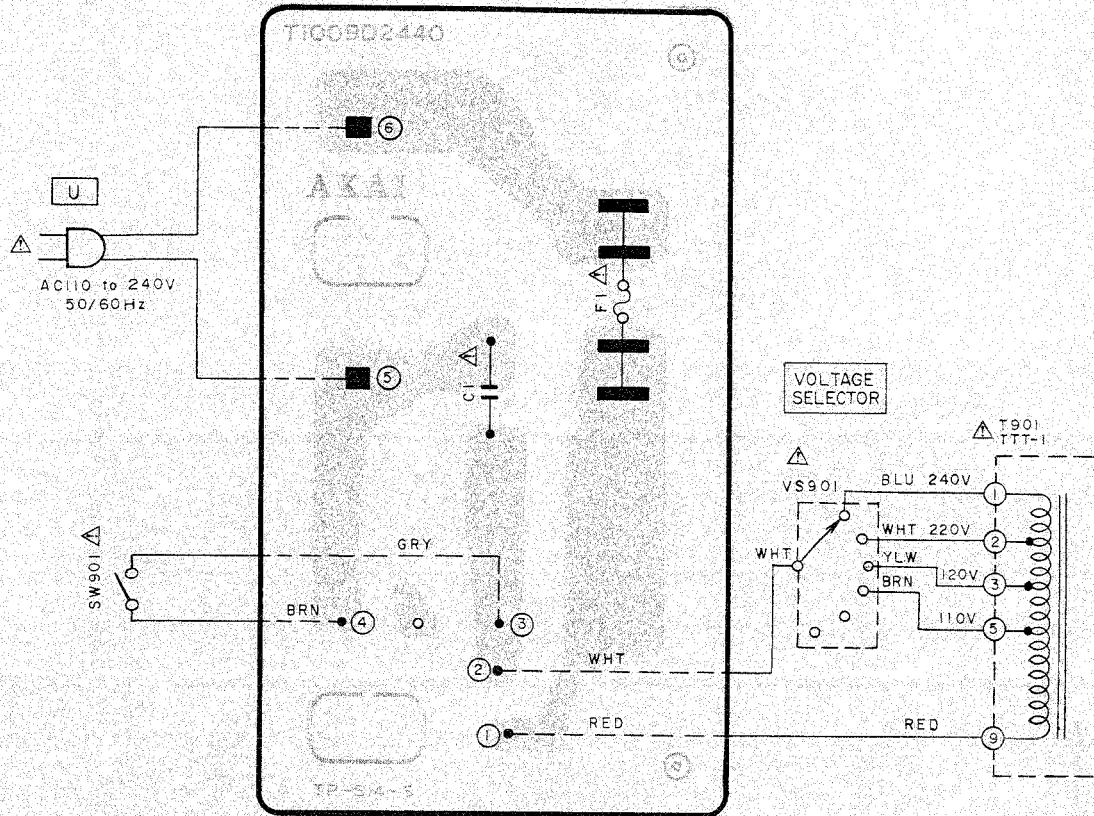


6) Operation P.C Board T1009C2390



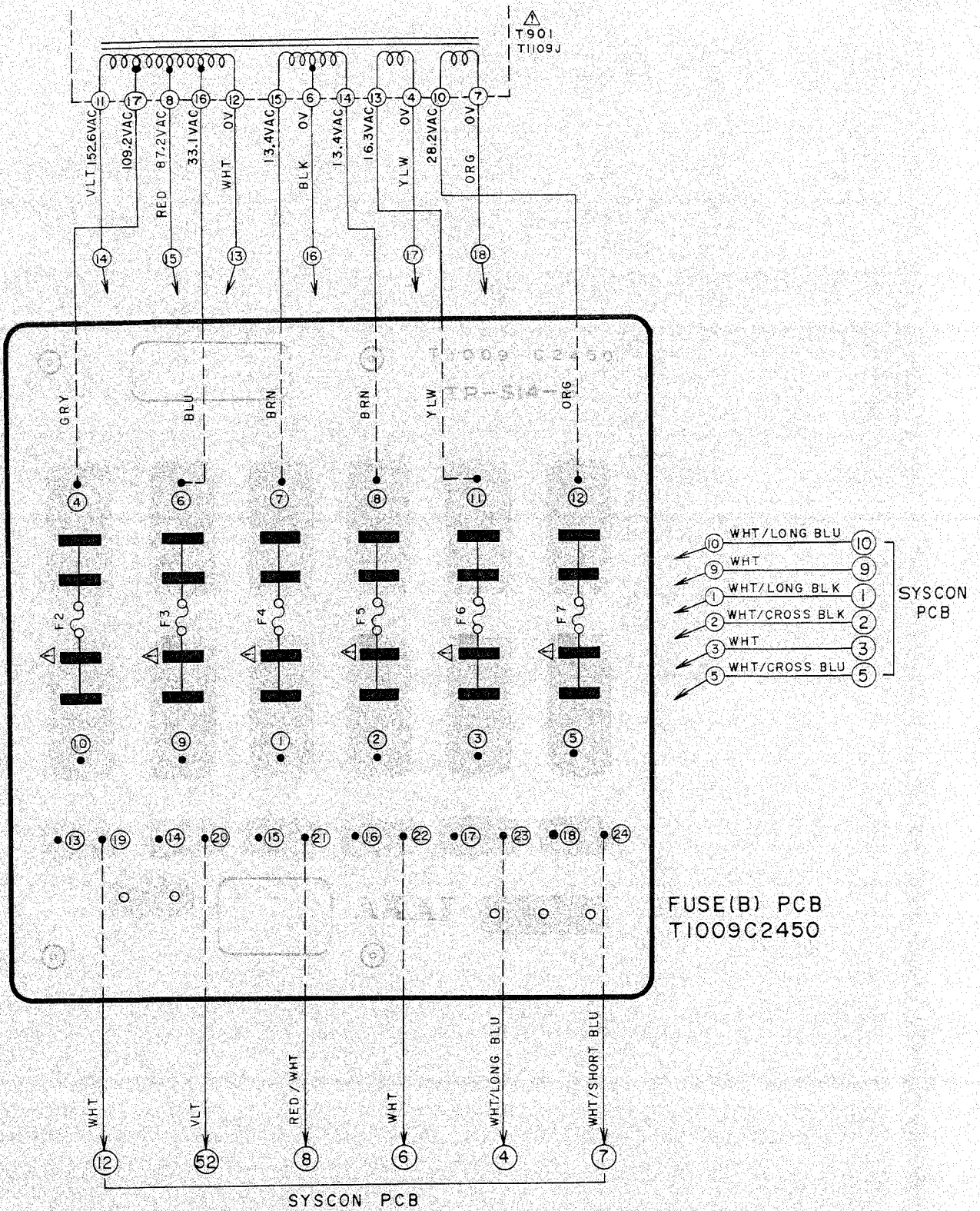
OPERATION P.C B T1009C2390

7) Fuse (A) P.C Board T1009D2440



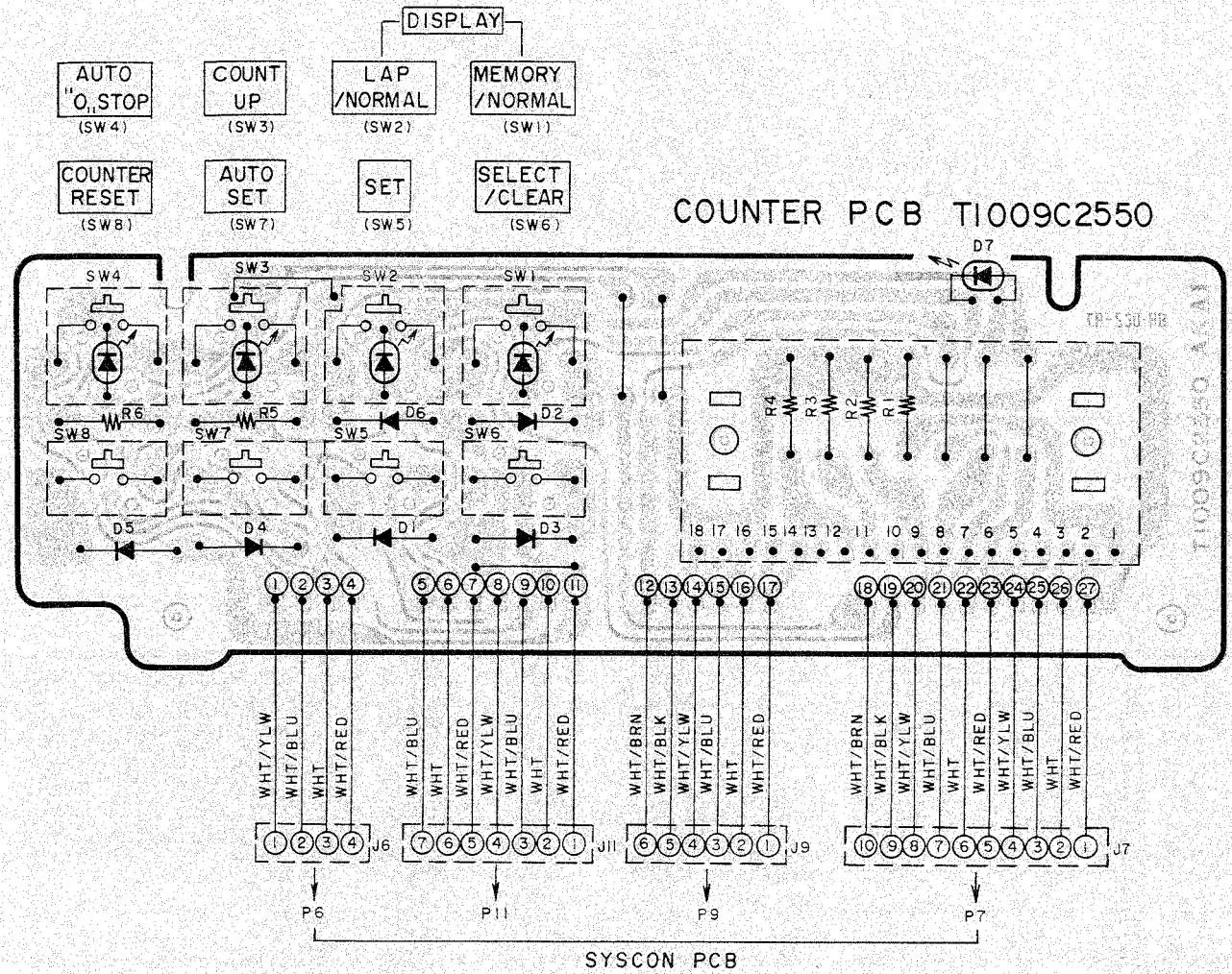
WARNING: ⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
 AVERTISSEMENT: ⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SURETE. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL, NE REMPLACEZ PAS LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE, POUR LA SECURITE, QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

8) Fuse (B) P.C Board T1009C2450



WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
 AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRÉ DE SÛRETÉ DE L'APPAREIL, NE REMPLACEZ LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SÛRETÉ QUE PAR DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

9) Counter P.C Board T1009C2550



SECTION 2

PARTS LIST

TABLE OF CONTENTS

RECOMMENDED SPARE PARTS 57

1. HEAD BLOCK 58

2. MOTOR BLOCK 59

3. REEL TABLE BLOCK 59

4. ROLLER TABLE (L/R) BLOCK 60

5. POWER BLOCK 62

6. MECHA BLOCK 63

7. SYS. CON P.C BOARD BLOCK 64

8. PRE AMP P.C BOARD BLOCK 65

9. NR P.C BOARD BLOCK 65

10. MIC P.C BOARD BLOCK 65

11. COUNTER P.C BOARD BLOCK 65

12. METER P.C BOARD BLOCK 65

13. LED P.C BOARD BLOCK 65

14. BIAS P.C BOARD BLOCK 65

15. ASSEMBLY BLOCK 66

16. FINALLY ASSEMBLY BLOCK 67

INDEX 68

Resistor and Capacitor which is not listed in this parts list, please refer to
COMMON LIST FOR SERVICE PARTS.

ATTENTION

1. When placing an order for parts, be sure to list the parts no., model no., and description. There are instances in which if any of this information is omitted, parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because parts number and parts unit supply in the Preliminary Parts List may be partially changed, please use this parts list for all future reference.

HOW TO USE THIS PARTS LIST

1. This Parts List shows the parts that are considered necessary for repairs. Other parts, such as resistors and capacitors, are shown in the "Common List for Service Parts". Select and order such parts from the "Common List for Service Parts".
2. The Recommended Spare Parts shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not be supplied in principle.
4. How to read list
 - a) Mechanism Block
 - b) P.C Board Block

2. HEAD BASE BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
2-1x	BH-T2023A320A	HEAD BASE BLOCK GX-F66R
2-2	HP-H2206A010A	HEAD R/P PR4-8FU C
2-3	ZS-477876	PAN20x03STL CMT
2-4	ZS-536488	BID20x08STL CMT
2-5	ZG-402895	CS ANGLE ADJUST SPRING

SP (Service Parts) Classification
 A small "x" indicates the inability to show that particular part in the Photo or Illustration.
 This number corresponds with the individual parts index number in that figure
 This number corresponds with the Figure Number

6. SYS. CON. P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
6-1	BA-T2034A070A	PC SYS CON BLK GX-F44R
6-IC1	EI-324536	IC HD14049BP
6-IC2	EI-336801	IC MB8841-564M
6-IC3	EI-331661	IC SN7405N
6-IC4	EI-336725	IC M54527P
6-TR1to4	ET-200985	TR 2SC2603 F,G
6-TR5to28	ET-554657	TR 2SA733A P,Q
6-D1	ED-318292	D SILICON H 1S2473T-77 T26
6-D2to4	ED-308952	D GERMA V 1K34A-LR F07
6-D5to10	ED-318292	D SILICON H 1S2473T-77 T26
6-X1	EI-318384	OSC X'TAL NC-18C 3.579545MHZ

SP (Service Parts) Classification
 This reference numbers corresponds with symbol numbers of Schematic Diagrams.

5. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List. It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index.

WARNING

△ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURE'S RECOMMENDED PARTS

AVERTISSEMENT

△ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT

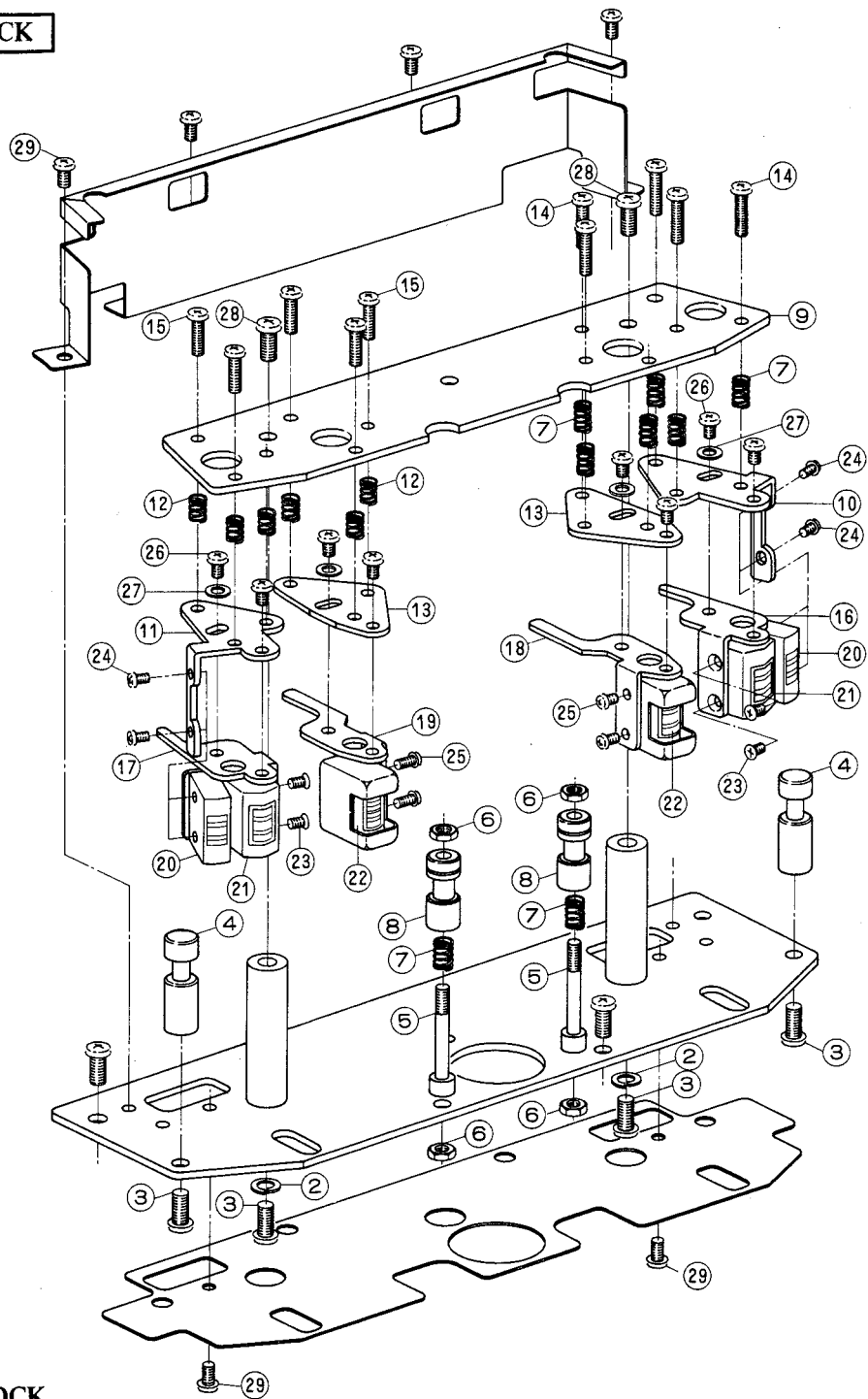
RECOMMENDED SPARE PARTS

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

REF. NO.	PARTS NO.	DESCRIPTION
1	BH-T1009A320A	HEAD BLK GX-747
2	BM-M1101A010A	△MOTOR SCM-200
3	BM-319631	△MOTOR VA208801
4	BM-M1202A010A	△MOTOR 24XO-TD
5	BT-330329	△TRANS POWER TTT-1
6	BT-344145	△TRANS POWER T1109J
7	BZ-T1009A140A	ROLLER TABLE (L) BLK GX-747
8	BZ-T1009A140B	ROLLER TABLE (L) BLK GX-747-BL
9	BZ-T1009A220A	ROLLER TABLE (R) BLK GX-747
10	BZ-T1009A220B	ROLLER TABLE (R) BLK GX-747-BL
11	ED-313566	△D SILICON GP-25G 400/2.5A
12	ED-330987	△D SILICON RB152 200/1.5A
13	ED-326168	△D SILICON 1D4B1 200/1.5A
14	ED-324669	△D SILICON 10D4-FA-2 F12 400/1.0A
15	ED-324668	△D THYRISTOR AC03BGML 200V 3A
16	ED-324667	△D THYRISTOR 2P1M 100V 2A
17	ED-330361	D COMP 03-0034
18	ED-308953	D GERMA H 1K34A-LH S12
19	ED-322982	D GERMA V 1S188FM-1-LR F07
20	ED-330996	D LED GL-5HY5 YLW
21	ED-330997	D LED GL-5PR5 RED
22	ED-322247	D LED SLP-151D RED
23	ED-337414	D LED SLP-235B GRN
24	ED-330995	D LED SLP-260C GRN
25	ED-316143	D SILICON H 1S2473HS F10
26	ED-560913	D SILICON V 1S2473VE
27	ED-323979	D SILICON W03B F12 100/1.0A
28	ED-306109	D SILICON W03B 100/1.0A
29	ED-494583	D SILICON 10D05 50/1.0A
30	ED-224550	D SILICON 10D4 400/1.0A
31	ED-330988	D ZENER H HZ11 C2
32	ED-324526	D ZENER H HZ12 C1
33	ED-313623	D ZENER H HZ22 3
34	ED-329051	D ZENER H HZ24 3
35	ED-302269	D ZENER H HZ5 A2
36	ED-302295	D ZENER H HZ7 C3
37	ED-331185	D ZENER V HZ12 C2
38	EF-691007	△FUSE SEMKO T 250V 3.15A (U)
39	EF-327103	△FUSE TSC A 250V 0.50A (U)
40	EF-309388	△FUSE TSC A 250V 0.80A (U,J)
41	EF-306949	△FUSE TSC A 250V 1.25A (U,J)
42	EF-311839	△FUSE TSC A 250V 1.6A (U,J)
43	EI-330352	IC BA6109
44	EI-257602	IC MC14011BCP
45	EI-696363	IC MC14049BCP
46	EI-336994	IC M5230L
47	EI-344144	IC μPC1252H2
48	EI-337360	IC μPC4082C
49	EI-330985	IC μPD553C-110
50	EI-330984	IC μPD553C-152
51	EJ-324276	DIN J TCS4680-01-111 P 8P
52	EL-324540	PL H LEAD 12V 55mA
53	EM-330992	IND LE SL-1574W CHARACTER (IN1)
54	EM-330374	METER VU D64A24L 0.260mA (ME1,2)
55	EM-330600	METER VU D64A27L 0.260mA (BL)
56	EP-330363	△SOLENOID 0730FLT2 29V (SL901)
57	EP-315918	△SOLENOID 1240PLTI
58	EP-316121	△SOLENOID 1664PLTI (SL904)
59	EP-308973	RELAY LEAD LAB2NS 2NO 24V
60	EP-308949	RELAY POWER FBR211BD024-M 1TR 24V
61	EP-324672	RELAY POWER FBR321D012-K 2TR 12V
62	EP-300132	RELAY POWER MY4-02-US-L 4TR 24V
63	EP-330351	RELAY SIGNAL G2KU 1TR 24V
64	ER-308955	△R CT P 20W 360K
65	ER-315356	△R CT P 20W 551K
66	ER-326169	△R FUSE ERD2FC S10 1/4W 22R0G
67	ER-328520	△R FUSE ERD2FC S10 1/4W 1000G
68	ER-326167	△R FUSE 20W 390K
69	ES-330888	△SW PUSH ESB-70240R 01-1 J (J)
70	ES-330887	△SW PUSH ESB-70411S 01-1ESB (U)
71	ES-319464	SW LEVER 00420460 2-04-02S
72	ES-319448	SW LEVER 00420461 2-04-02N
73	ES-573478	SW MICRO K3 UC
74	ES-319156	SW MICRO SS-1-E4 UC
75	ES-326720	SW MICRO VV-S-01

REF. NO.	PARTS NO.	DESCRIPTION
76	ES-330993	SW PUSH SUE-12 2-04-02N
77	ES-330372	SW PUSH SUE24 2-THROW
78	ES-344143	SW PUSH SUL192A 2-06-02N
79	ES-306714	SW ROTARY SRU1023N 1-02-03N
80	ES-301436	SW SLIDE CL206E 2-06-02S
81	ES-301435	SW SLIDE CL210E 2-10-02S
82	ES-309094	SW SLIDE SL13-6-6-2-2 2-02-02N
83	ES-315362	SW TACT AKC8S
84	ES-323367	SW TACT KEC10001
85	ES-319624	SW TACT KEC11903
86	ET-318237	△TR 2SB764 E,F
87	ET-200399	△TR 2SB856 B,C
88	ET-375603	△TR 2SC1061 B,C
89	ET-517263	△TR 2SC1312R G,H
90	ET-308937	△TR 2SC2130 G,H
91	ET-308947	△TR 2SC2336B Q,R
92	ET-639437	△TR 2SC945L Q,P
93	ET-307349	△TR 2SD794 P,Q
94	ET-328440	△TR 2SD863-V8 E,F
95	ET-324539	TR PHOTO PT-410C C
96	ET-338244	TR 2SA1207 R,S
97	ET-554657	TR 2SA733A P,Q
98	ET-666415	TR 2SB605 K,L
99	ET-318237	TR 2SB764 E,F
100	ET-517263	TR 2SC1312R G,H
101	ET-337258	TR 2SC1843 E,F
102	ET-308954	TR 2SC1844 E,F
103	ET-311336	TR 2SC2130 H
104	ET-330270	TR 2SC2320 F,G
105	ET-338181	TR 2SC2909 R,S
106	ET-346113	TR 2SC3068
107	ET-391768	TR 2SC458LG C,D
108	ET-635220	TR 2SC945L K,P
109	ET-399846	TR 2SC945L Q
110	ET-639437	TR 2SC945L Q,P
111	ET-666404	TR 2SD571 K,L
112	ET-328440	TR 2SD863-V8 E,F
113	EV-319625	VR ROTARY 16L10×0QB1 02 (VR901)
114	EV-319494	VR ROTARY 16P11×0UA5 03 A503
115	EV-319316	VR ROTARY 16P20×2AB1 03
116	EV-331189	VR ROTARY 16P20×2B35 02
117	EZ-324787	PHOTO SENSOR TLP504
118	HE-H1305A010A	HEAD E E4-245 O
119	HP-H1005A010A	HEAD PB P4-500 O
120	HR-H1101A010A	HEAD REC R4-241 O
121	MB-330938	DETECTION BELT
122	MB-331022	ROLLER BELT
123	MB-331021	TENSION ARM BELT
124	MP-B424023	PINCH ROLLER PART KD
125	MT-T1003A340A	BRAKE CLOTH ASSY GX-2 15D

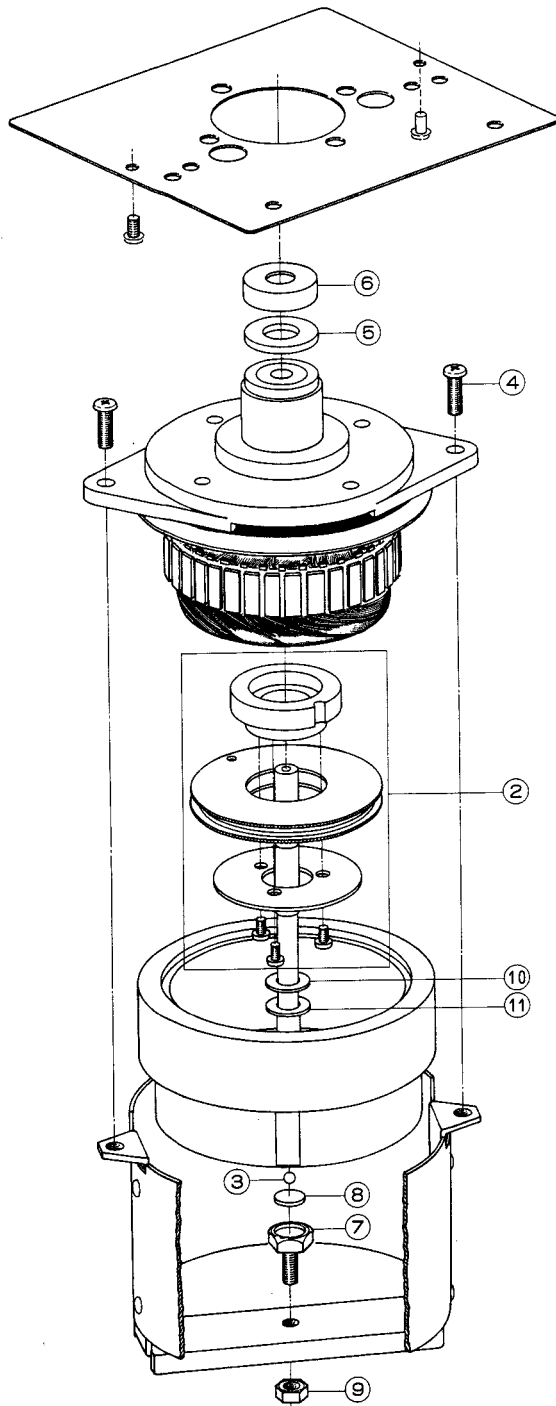
HEAD BLOCK



1. HEAD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1-1x	BH-T1009A320A	HEAD BLK GX-747	1-16	HA-309409	ER HEAD ANGLE (A)
1-2	ZW-273914	SW40	1-17	HA-309410	ER HEAD ANGLE (B)
1-3	ZS-413201	PAN40×08STL CMT	1-18	HA-330924A	PB HEAD ANGLE (R)
1-4	HZ-528581	TAPE GUIDE (A)	1-19	HA-330924B	PB HEAD ANGLE (L)
1-5	MH-578957	TAPE GUIDE PROP	1-20	HE-H1305A010A	HEAD E E4-245 O
1-6	ZW-265522	N30BRS NI3 2	1-21	HR-H1101A010A	HEAD REC R4-241 O
1-7	ZG-466312	ANGLE ADJUST SPRING (E)	1-22	HR-H1005A010A	HEAD PB P4-500 O
1-8	HZ-301777	TAPE GUIDE (C)	1-23	ZS-524812	CTS20×04STL CMT
1-9	HZ-308681	HEAD SUB CHASSIS	1-24	ZS-460440	PAN20×04STL CMT
1-10	HB-331113A	ER HEAD BASE (A)	1-25	ZS-608095	PAN20×05STL CMT
1-11	HB-331113B	ER HEAD BASE (B)	1-26	ZS-608477	PAN30×04STL BNI
1-12	ZG-540584	ANGLE ADJUST SPRING (G)	1-27	ZW-309055	PW30×060X050STL BNI
1-13	HZ-308685	PB HEAD BASE	1-28	ZS-201778	PAN40×08STL BNI
1-14	ZS-608501	PAN30×12STL BNI	1-29	ZS-422076	PAN30×05STL CMT
1-15	ZS-417407	PAN30×10STL BNI			

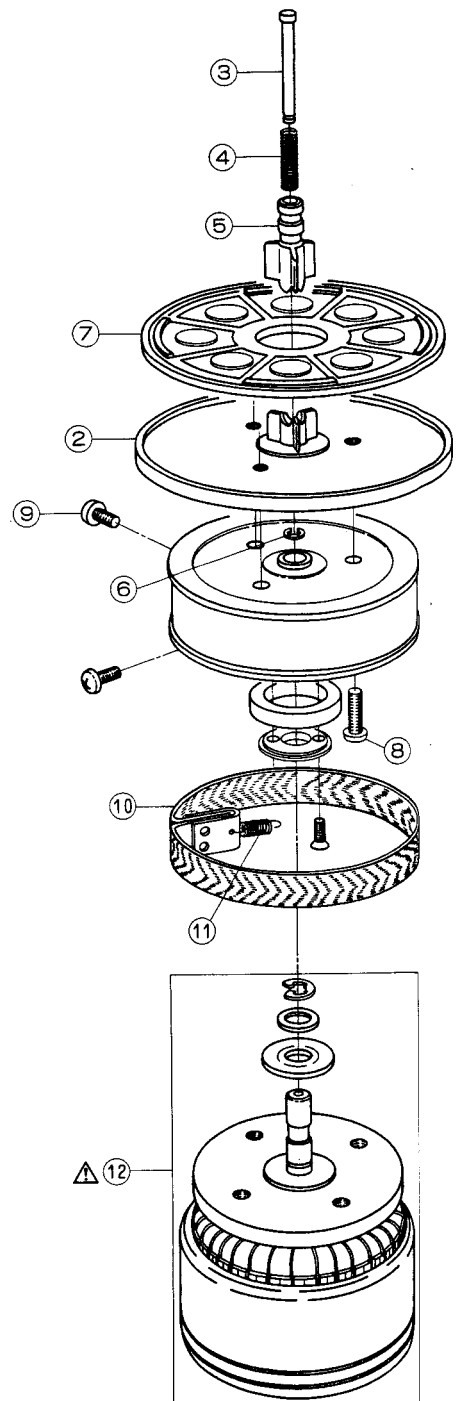
MOTOR BLOCK



2. MOTOR BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
2-1x	BM-M1101A010A	△ MOTOR SCM-200
2-2	BZ-M1101A040A	DETECTION GEAR BLK SCM-200
2-3	MV-368886	BALL 300STL
2-4	ZS-413201	PAN40×08STL CMT
2-5	ZW-597622	FELT WASHER
2-6	SK-597633	CAP
2-7	MZ-585900	SHAFT SUPPORT
2-8	MZ-597690	BALL HOLDER
2-9	ZW-413278	N50STL CMT 1
2-10	ZW-597543	THRUST WASHER
2-11	ZW-605698	THRUST WASHER (B)

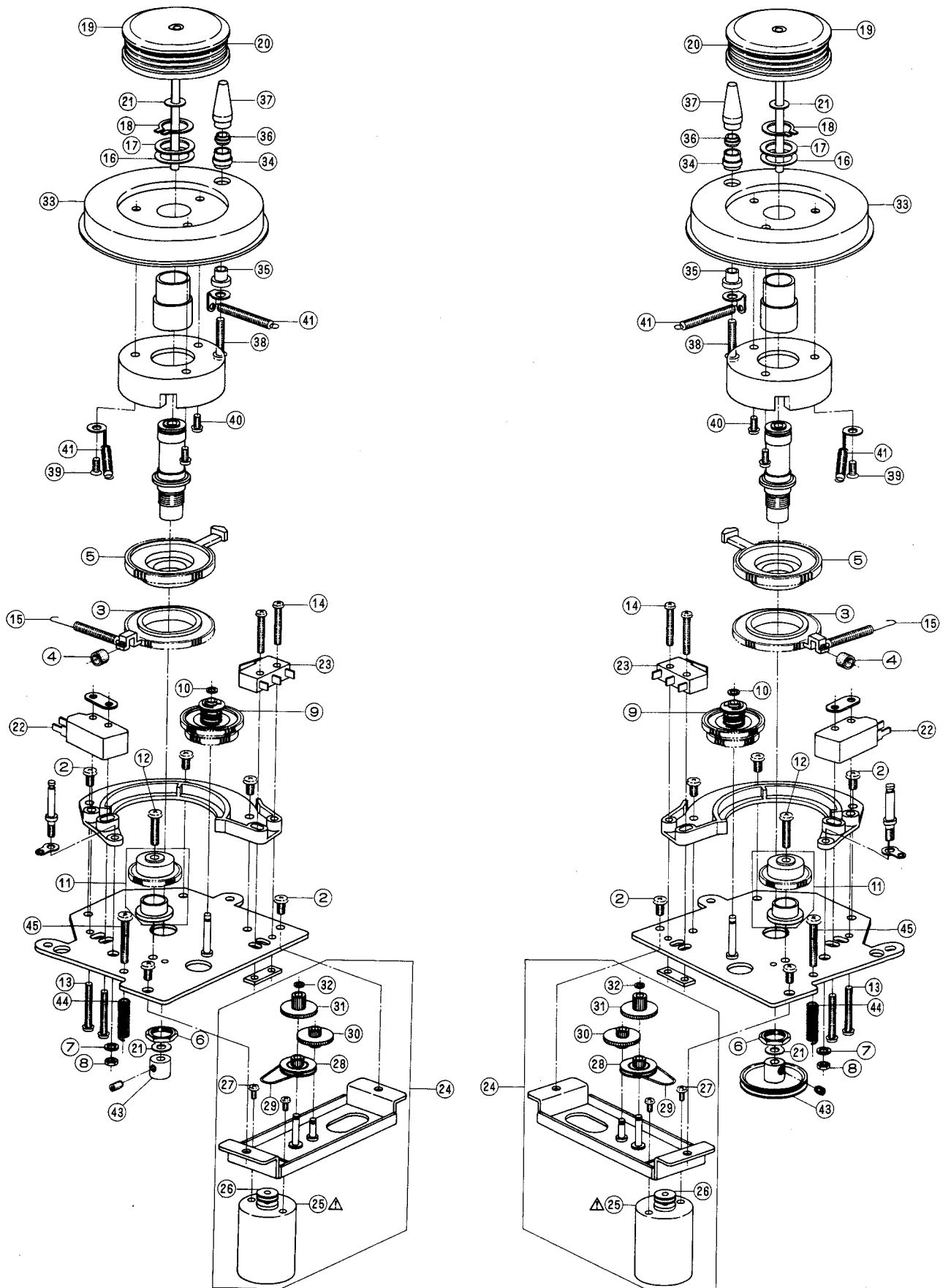
REEL TABLE BLOCK



3. REEL TABLE BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
3-1x	BR-T1005A110B	REEL TABLE BLK TE (TAKE-UP)
3-2	MT-534666	REEL TABLE
3-3	MS-342000	REEL SHAFT
3-4	ZG-540617	CLAMPER SPRING
3-5	MT-534677	REEL CLAMPER
3-6	ZW-270088	RING E 190SUP CMT
3-7	MT-534688	REEL TABLE RUBBER
3-8	ZS-419670	PAN30×12STL CMT
3-9	ZS-424056	PAN40×10STL CMT
3-10	MT-T1003A340A	BRAKE CLOTH ASSY C _X -215D
3-11	ZG-317496	FELT TENSION SPRING
3-12	BM-M1202A010A	△ MOTOR 24XO-TD

ROLLER TABLE (L/R) BLOCK



4. ROLLER TABLE (L/R) BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
4-1x	BZ-T1009A140A	ROLLER TABLE (L) BLK GX-747
4-1x	BZ-T1009A140B	ROLLER TABLE (L) BLK GX-747-BL
4-2	ZS-422076	PAN30×05STL CMT
4-3	ML-331001	DAMPER ARM
4-4	SZ-332462	CUSHION ARM
4-5	ML-331000	MOTOR ARM
4-6	ZW-318099	NUT M9
4-7	ZW-321513	PW26×080×100NYL
4-8	ZW-618884	N20STL CMT 1
4-9	BZ-T1009A150A	CLUTCH BLK GX-747
4-10	ZW-321437	PUSH WASHER
4-11	BZ-T1009A160A	DAMPER BLK GX-747
4-12	ZS-419670	PAN30×12STL CMT
4-13	ZS-319473	BID26×18STL CMT
4-14	ZS-670004	PAN23×16STL CMT
4-15	ZG-567685	AZIMUTH SPRING (1)
4-16	ZW-313873	PW105×140×050NYL
4-17	ZW-313872	PW105×140×013PSL
4-18	ZW-307294	RING C.930SUP PKR
4-19	MR-308713	COUNTER ROLLER
4-20	MB-331022	ROLLER BELT
4-21	ZW-308928	PW24×070×020TFL

MICRO SW (L/R) BLOCK

4-22	ES-326720	SW MICRO VV-S-01 (SW905)
4-23	ES-319156	SW MICRO SS-1-E-4 UC (SW906)

GEAR BASE BLOCK

4-24	BZ-T1009A190A	GEAR BASE BLK GX-747(1)
4-25	BM-319631	△ MOTOR VA208B01
4-26	MR-331010	MOTOR PULLEY
4-27	ZS-477876	PAN20×03STL CMT
4-28	MZ-331006	GEAR (A)
4-29	MB-331021	TENSION ARM BELT
4-30	MZ-331008	GEAR (B)
4-31	MZ-331009	GEAR (C)
4-32	ZW-331851	WASHER PUSH 1.6×3.2×0.25 PSL

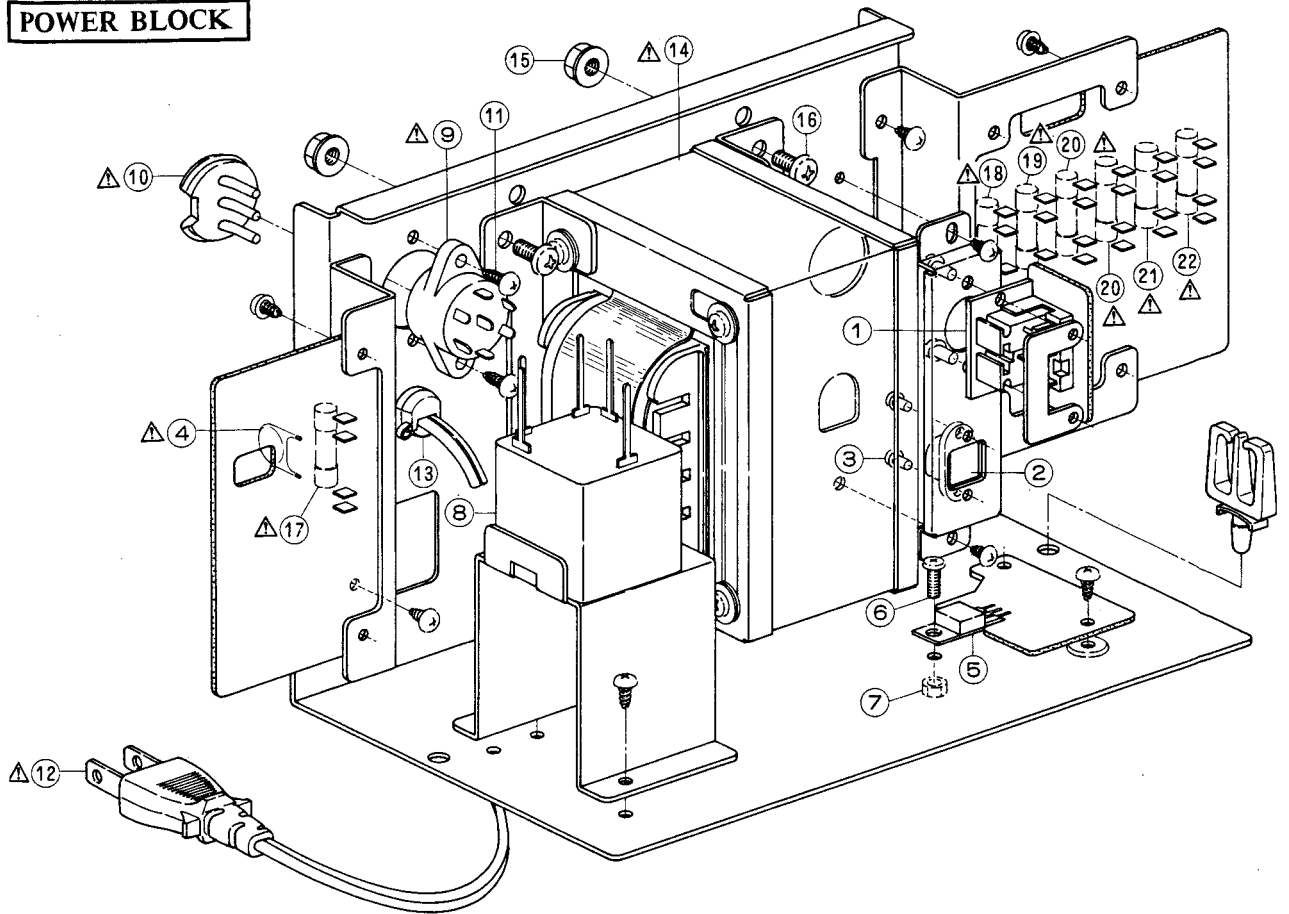
TENSION WHEEL (L/R) BLOCK

4-33	MI-308707	TENSION WHEEL
4-33x	MI-315558	TENSION WHEEL (BL)
4-34	HZ-308710	TAPE GUIDE (B)
4-35	EZ-308712	INSULATOR BUSH
4-36	MZ-535072	INSULATOR BUSH (A)
4-37	HZ-331013	TAPE GUIDE
4-38	ZS-422965	PAN30×15STL CMT
4-39	ZS-572242	CTS26×06STL CMT
4-40	ZS-479474	PAN26×05STL CMT
4-41	ZG-312399	SP T1-3.2/0.2-31.5 T1-049

ROLLER TABLE (R) BLOCK

4-42x	BZ-T1009A220A	ROLLER TABLE (R) BLK GX-747
4-42x	BZ-T1009A220B	ROLLER TABLE (R) BLK GX-747-BL
4-43	MR-331011	ROLLER PULLEY
4-44	ZG-331019	SP ROLLER BASE
4-45	ZS-608253	PAN30×20STL CMT

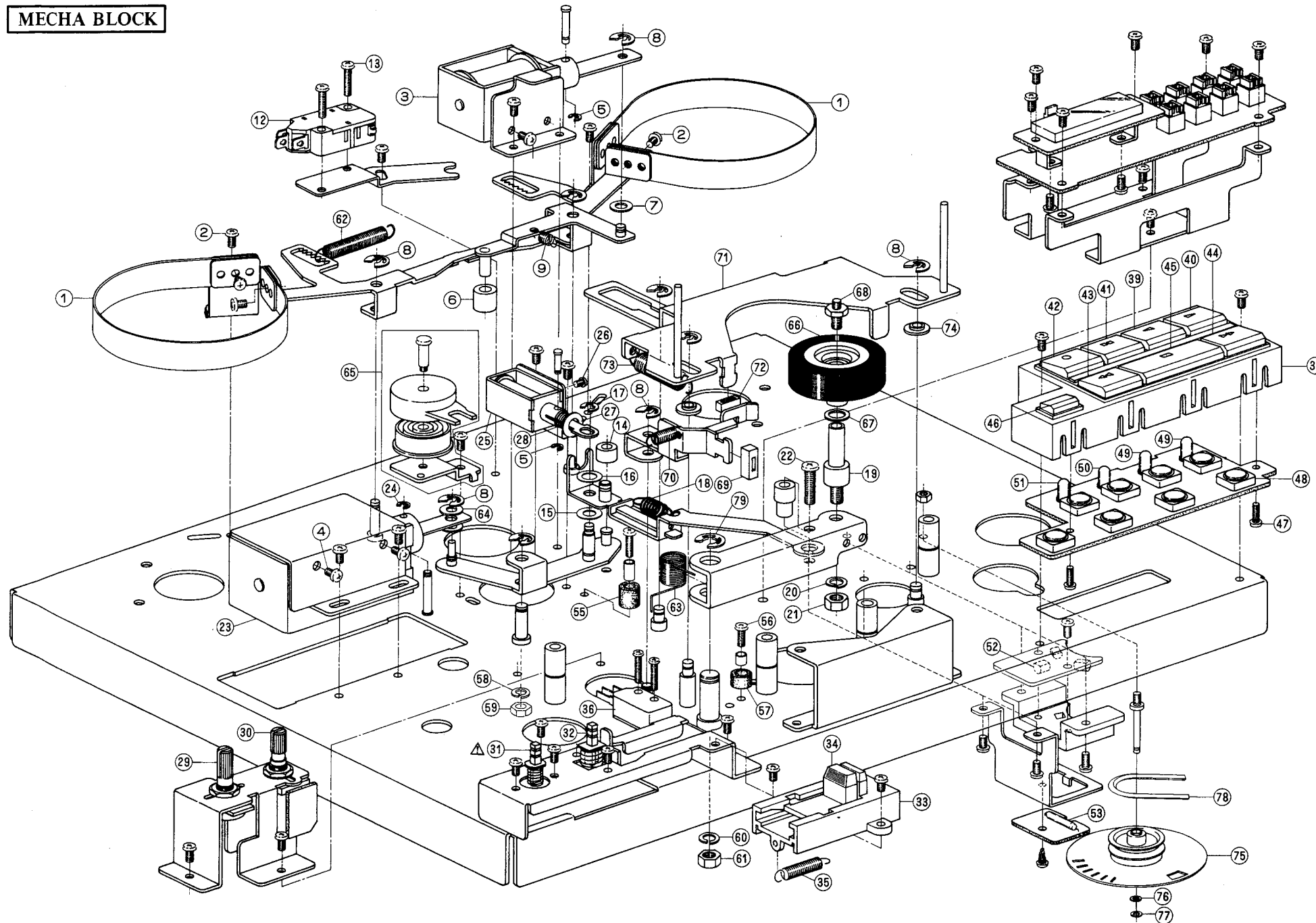
POWER BLOCK



5. POWER BLOCK

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
REMOTE CONTROL P.C BOARD BLOCK					
5-1	EJ-324276	DIN J TCS4680-01-111 P 8P	5-17x	EF-326639	△ FUSE TSC A 250V 3.15A (J)(F1)
			5-18	EF-306949	△ FUSE TSC A 250V 1.25A (J,J) (F2)
SOCKET BASE BLOCK					
5-2	EJ-310203	PLUG CONNECTOR EC0630-020 2P (P902)	5-19	EF-309388	△ FUSE TSC A 250V 0.80A (U,J)(F3)
5-3	ZS-322839	PAN23x05BRS BNI	5-20	EF-327103	△ FUSE TSC A 250V 0.50A (U,J) (F4,5)
			5-21	EF-306949	△ FUSE TSC A 250V 1.25A (U,J)(F6)
			5-22	EF-311839	△ FUSE TSC A 250V 1.6A (U,J)(F7)
FUSE P.C BOARD BLOCK					
5-4	EC-320548	△ C CE V F 103Z 250AC(U,J)(C1)			
POWER BLOCK					
5-5	ET-308947	△ TR 2SC2336B Q,R (TR1)			
5-6	ZS-421806	PAN30x08STL CMT			
5-7	ZW-516993	N30STL CMT 1			
5-8	EC-316065	C MMY V HFV SPECIAL 250AC (C901)			
5-9	EJ-262732	△ SOCKET SELECTOR S-17223 U 7P (U)(VS1)			
5-10	EJ-249467	△ PLUG VOLTAGE SELECTOR S-17207 3P (U)(P901)			
5-11	ZS-463353	T2BR30x08STL BNI			
5-12	EW-374894	△ AC CORD 2 CORES VM-0129A J (U)			
5-12x	EW-524845	△ AC CORD 2 CORES VM1165B (J)			
5-13	SZ-631945	STRAIN RELIEF SR-4N-4			
5-14	BT-330329	△ TRANS POWER TTT-1 (J)(T901)			
5-14x	BT-344145	△ TRANS POWER T1109J (J)(T901)			
5-15	ZW-413267	N FRANGE 40STL CMT			
5-16	ZS-435273	BID40x10STL CMT			
5-17	EF-691007	△ FUSE SEMKO T 250V 3.15A (U) (F1)			

MECHA BLOCK



6. MECHA BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
BRAKE LEVER BLOCK		
6-1	MT-314987	BRAKE BAND
6-2	ZS-417216	PAN30x04STL CMT
BRAKE PLUNGER BLOCK		
6-3	EP-315918	SOLENOID 1240PLTI (SL903)
6-4	ZS-422076	PAN30x05STL CMT
6-5	ZW-270088	RING E 190SUP CMT
6-6	MZ-397181	LEVER CUSHION
6-7	ZW-420682	PW42x090x050NYL
6-8	ZW-290283	RING U 285SUP CMT
6-9	ZG-580522	CLUTCH LEVER SPRING
6-10x	ZW-616004	PW31x080x100STL CMT
6-11x	ZS-323728	BID30x05STL CMT
SW PLATE BLOCK		
6-12	ES-573478	SW MICRO K3 UC

REF. NO.	PARTS NO.	DESCRIPTION
6-13	ZS-419670	PAN30x12STL CMT
P PLUNGER BLOCK		
6-14	MB-428343	KD STOPPER RUBBER
6-15	ZW-405865	PW51x103x050NYL
6-16	ZW-260043	PW61x100x020NYL
6-17	ZW-270123	RING E400SUP CMT
6-18	ZG-308728	P SPRING
6-19	MS-527591	PINCH ROLLER SHAFT
6-20	ZW-274026	SW50
6-21	ZW-413278	N50STL CMT 1
6-22	ZS-444262	BID40x18STL CMT
PR PLUNGER BLOCK		
6-23	EP-316121	SOLENOID 1664PLTI (SL904)
6-24	ZW-357164	RING E230SUP CMT

REF. NO.	PARTS NO.	DESCRIPTION
PAUSE PLUNGER BLOCK		
6-25	EP-330363	SOLENOID 0730FLT2 29V (SL901)
6-26	ZS-592378	PAN26x03STL CMT
6-27	ZW-313593	PW51x103x050PBR
6-28	ZG-308734	JOINT SPRING
VOLUME BLOCK		
6-29	EV-319625	VR ROTARY 16L10x0QB102 (VR901)
ROTARY SELECTOR BLOCK		
6-30	ES-306714	SW ROTARY SRU1023N 1-02-03N (SW1)
POWER SW BLOCK		
6-31	ES-330887	SW PUSH ESB-70411S 01-1ESB (U)(SW901)

REF. NO.	PARTS NO.	DESCRIPTION
6-31x	ES-330888	SW PUSH ESB-70240R 01-1J (J)(SW901)
REEL SIZE SW BLOCK		
6-32	ES-330993	SW PUSH SUE-12 2-04-02N (SW903)
SLIDE BOX BLOCK		
6-33	SZ-331037A	SLIDE BOX
6-33x	TC-331037B	SLIDE BOX (BL)
6-34	TC-331038A	CUE SLIDE
6-34x	TC-331038B	CUE SLIDE (BL)
6-35	ZG-331565	SP T2-5.0/0.32-28.0 T2-144
MICRO SW BLOCK		
6-36	ES-326720	SW MICRO VV-S-01 (SW904)
OPERATION BLOCK		
6-37	SE-331024A	OPERATE ESCUTCHEON
6-37x	SE-331024B	OPERATE ESCUTCHEON (BL)
6-38x	SB-331025	OPERATE BUTTON
6-39	SB-B603905	OPERATION KEY (A) PART
6-39x	SB-B603901	OPERATION KEY (A)-BL PART
6-40	SB-B603906	OPERATION KEY (B) PART
6-40x	SB-B603902	OPERATION KEY (B)-BL PART
6-41	SB-B603907	OPERATION KEY (C) PART
6-41x	SB-B603903	OPERATION KEY (C)-BL PART
6-42	SB-B603908	OPERATION KEY (F) PART
6-42x	SB-B603904	OPERATION KEY (F)-BL PART
6-43	SB-331026D	OPERATION KEY (D)
6-43x	SB-331026K	OPERATION KEY (D)-BL
6-44	SB-331026E	OPERATION KEY (E)
6-44x	SB-331026L	OPERATION KEY (E)-BL
6-45	SB-331027A	OPERATION KEY (G)
6-45x	SB-331027B	OPERATION KEY (G)-BL
6-46	SB-331028A	OPERATION KEY (H)
6-46x	SB-331028B	OPERATION KEY (H)-BL
6-47	ZS-602190	T2BR26x06STL CMT
OPERATION P.C BOARD BLOCK		
6-48	ES-315362	SW TACT AKC8S (SW1to8)
6-49	ED-330995	D LED SLP-260C GRN (D1,2)
6-50	ED-330996	D LED GL-5HY5 YLW (D3)
6-51	ED-330997	D LED GL-5PR5 RED (D4)
DETECTION (A) P.C BOARD BLOCK		
6-52	ET-324539	TR PHOTO PT-410C C (TR1to3)
DETECTION (B) P.C BOARD BLOCK		
6-53	EL-324540	PL H LEAD 12V 55mA (IN1)
MECHA BLOCK		
6-54x	SA-312529	RUBBER FOOT (A-2) PART (P)
6-55	MB-606712	KJ STOPPER RUBBER
6-56	ZS-419670	PAN30x12STL CMT
6-57	MB-428343	KD STOPPER RUBBER
6-58	ZW-273914	SW40
6-59	ZW-413188	N40STL CMT 1
6-60	ZW-274026	SW50
6-61	ZW-413278	N50STL CMT 1
6-62	ZG-313078	SP T1-6.3/0.5-50.0 T1-190
6-63	ZG-301340	PINCH ROLLER SPRING
6-64	ZW-420682	PW42x090x050NYL
6-65	BZ-T1009A080A	PR DAMPER BLK GX-747
6-66	MP-B424023	PINCH ROLLER PART KD
6-67	ZW-376391	PW61x100x013PSL
6-68	ZS-527681	PINCH ROLLER SET SCREW
6-69	MB-668801	TE STOPPER RUBBER (B)
6-70	ZG-313028	SP T1-5.0/0.32-20.0 T1-141
6-71	ML-B330939	SHIFTER SLIDE PART
6-72	VT-422673	BRAKE RUBBER BUSH
6-73	ZG-317114	TENSION LEVER SPRING
6-74	ZW-580173	GUIDE WASHER
6-75	MR-330945	DETECTION PULLEY
6-76	ZW-305546	PW21x040x025PSL
6-77	ZW-321437	PUSH WASHER
6-78	MB-330938	DETECTION BELT
6-79	ZW-270156	RING E 600S UP CMT

7. SYS. CON P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
7-1	BA-T1009A430E	PC SYS CON BLK GX-747dbx	7-SCR3,4	ED-324668	△D THYRISTOR AC03BGML 200V 3A
7-IC1	EI-330984	IC μPD553C-152	7-SR1	ED-330361	D COMP 03-0034
7-IC2	EI-330985	IC μPD553C-110	7-SR2	ED-330362	D COMP 03-0035
7-IC3,4	EI-696363	IC MC14049BCP	7-SR3,4	ER-330356	COMP R 01-0031
7-IC5,6	EI-330352	IC BA6109	7-SR5	ER-330355	COMP R 01-0291
7-IC7,8	EI-257602	IC MC14011BCP	7-SR6	ER-330357	COMP R 01-0292
7-TR1	ET-639437	△ TR 2SC945L Q,P	7-SR7	ER-330358	COMP R 01-0293
7-TR2	ET-375603	△ TR 2SC1061 B,C	7-SR8	ER-330359	COMP R 01-0294
7-TR3to6	ET-639437	TR 2SC945L Q,P	7-SR9	ER-330360	COMP R 01-0295
7-TR7,8	ET-554657	TR 2SA733A P,Q	7-SR10	ER-330354	COMP R 01-0290
7-TR9	ET-639437	TR 2SC945L Q,P	7-SW1	ES-309094	SW SLIDE SL13-6-6-2-2 2-02-02N
7-TR10	ET-554657	TR 2SA733A P,Q	7-VR1	EV-330980	R S-FIX V V18K3-2 (4US) T3P 503
7-TR11	ET-639437	TR 2SC945L Q,P	7-VR2	EV-330981	R S-FIX V V18K3-2 (4US) T3P 203
7-TR12	ET-375603	△ TR 2SC1061 B,C	7-VR3	EV-341258	R S-FIX V V8K1-1 3P 304
7-TR13	ET-402682	△ TR 2SC1061 C	7-RL1to4	EP-300132	RELAY POWER MY4-02-US-L 4TR 24V
7-TR14	ET-639437	△ TR 2SC945L Q,P	7-RL5	EP-324672	RELAY POWER FBR321D012-K 2TR 12V
7-TR15	ET-554657	TR 2SA733A P,Q	7-RL6	EP-330351	RELAY SIGNAL G2KU 1TR 24V
7-TR16to22	ET-639437	TR 2SC945L Q,P	7-RL7	EP-308949	RELAY POWER FBR211BD024-M 1TR 24V
7-TR23	ET-399846	TR 2SC945L Q	7-CR1to16	ER-300820	SPARK QUENCHER CRU 104C+121R 125AC
7-TR24to27	ET-311336	TR 2SC2130 H	7-PH1	EZ-324787	PHOTO SENSOR TLP504
7-TR28to31	ET-308937	TR 2SC2130 G,H	7-IFT1,2	EO-330353	COIL IFT 12A1295 400KHz
7-TR34	ET-311336	TR 2SC2130 H	7-R26	ER-330680	△ R CB H FS RDS 1/4W 331J
7-TR35to38	ET-639437	TR 2SC945L Q,P	7-R27	ER-330677	△ R CB H FS RDS 1/4W 181J
7-TR39,40	ET-635220	TR 2SC945L K,P	7-R30	ER-331187	△ R OMF H FS 1W 272J
7-TR41	ET-639437	TR 2SC945L Q,P	7-R32,33	ER-201798	△ R OMF H FS 2W 820J
7-TR42	ET-308937	△ TR 2SC2130 G,H	7-R34	ER-336841	△ R OMF H S15 FS 1W 332J
7-TR43,44	ET-554657	TR 2SA733A P,Q	7-R123	ER-315356	△ R CT P 20W 551K
7-TR45,46	ET-639437	TR 2SC945L Q,P	7-R124	ER-308955	△ R CT P 20W 360K
7-TR47,48	ET-666415	TR 2SB605 K,L	7-R125	ER-324670	△ R OMF H S20 FS 2W 102J
7-TR49,50	ET-666404	TR 2SD571 K,L	7-R131	ER-324670	△ R OMF H S20 FS 2W 102J
7-TR51,52	ET-639437	TR 2SC945L Q,P	7-R173	ER-330979	△ R OMF H FS 1W 621J
7-TR53	ET-311336	TR 2SC2130 H	7-R214to220	ER-303342	△ R OMF H FS 1W 331J
7-TR54,55	ET-639437	TR 2SC945L Q,P	7-FR1	ER-328520	△ R FUSE ERD2FC S10 1/4W 1000G
7-TR57	ET-307349	△ TR 2SD794 P,Q	7-FR2,3	ER-326167	△ R FUSE 20W 390K
7-TR58to65	ET-554657	TR 2SA733A P,Q	7-FR4	ER-326169	△ R FUSE ERD2FC S10 1/4W 22R0G
7-TR66to72	ET-635220	TR 2SC945L K,P	7-C1,2	EC-316188	C EC V CUT SM 102M 25DC
7-TR73to84	ET-639437	TR 2SC945L Q,P	7-C5	EC-324662	C EC V CUT SM 222M 25DC
7-TR85to87	ET-554657	TR 2SA733A P,Q	7-C18	EC-316189	C EC V F05 SM 1R0M 100DC
7-TR89to91	ET-639437	TR 2SC945L Q,P	7-C19	EC-316192	C COMP V ECW-R 155J 180AC
7-TR93to96	ET-554657	TR 2SA733A P,Q	7-C20	EC-342928	C COMP V ECW-R 355J 180AC
7-TR97,98	ET-639437	TR 2SC945L Q,P	7-C34	EC-331243	C EC V S10 TSL 471 160DC
7-TR99,100	ET-311336	TR 2SC2130 H	7-C36to38	EC-316194	C MMY V CUT CF921 474K 250DC
7-D1,2	ED-330987	△D SILICON RB152 200/1.5A	7-C54	EC-316194	C MMY V CUT CF921 474K 250DC
7-D3,4	ED-326168	△D SILICON 1D4B1 200/1.5A	7-C64	EC-326583	C MMY V CUT CF921 473K 400DC
7-D5	ED-330987	△D SILICON RB152 200/1.5A			
7-D6	ED-313566	△D SILICON GP-25G 400/2.5A			
7-D7	ED-324526	D ZENER H HZ12 C1			
7-D8to10	ED-560913	D SILICON V 1S2473VE			
7-D11	ED-329051	D ZENER H HZ24 3			
7-D12	ED-330988	D ZENER H HZ11 C2			
7-D13	ED-331185	D ZENER V HZ12 C2			
7-D14to27	ED-560913	D SILICON V 1S2473VE			
7-D28,29	ED-494583	D SILICON 10D05 50/1.0A			
7-D30,31	ED-560913	D SILICON V 1S2473VE			
7-D32to35	ED-224550	D SILICON 10D4 400/1.0A			
7-D36	ED-323979	D SILICON W03B F12 100/1.0A			
7-D37to41	ED-324669	△D SILICON 10D4-FA-2 F12 400/1.0A			
7-D42	ED-224550	△D SILICON 10D4 400/1.0A			
7-D43	ED-324669	△D SILICON 10D4-FA-2 F12 400/1.0A			
7-D44	ED-224550	△D SILICON 10D4 400/1.0A			
7-D45,46	ED-322982	D GERMA V 1S188FM-1-LR F07			
7-D47to50	ED-560913	D SILICON V 1S2473VE			
7-D51	ED-330988	D ZENER H HZ11 C2			
7-D52to69	ED-560913	D SILICON V 1S2473VE			
7-D70,71	ED-306109	D SILICON W03B 100/1.0A			
7-D72to75	ED-560913	D SILICON V 1S2473VE			
7-D78,79	ED-302295	D ZENER H HZ7 C3			
7-D80	ED-308952	D GERMA V 1K34A-LR F07			
7-D81to86	ED-560913	D SILICON V 1S2473VE			
7-D87	ED-302269	D ZENER H HZ5 A2			
7-SCR1,2	ED-324667	△D THYRISTOR 2P1M 100V 2A			

8. PRE AMP P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
8-1	BA-T1015A060A	PC PRE AMP BLK GX-747dbx
8-IC1	EI-307644	IC NJM4556D
8-TR1	ET-346113	TR 2SC3068
8-TR3	ET-328440	△ TR 2SD863-V8 E,F
8-TR4	ET-517263	TR 2SC1312R G,H
8-TR5	ET-639437	△ TR 2SC945L Q,P
8-TR6	ET-200399	△ TR 2SB856 B,C
8-TR7	ET-517263	△ TR 2SC1312R G,H
8-TR8,9	ET-328440	△ TR 2SD863-V8 E,F
8-TR10,11	ET-308954	TR 2SC1844 E,F
8-TR12	ET-639437	TR 2SC945L Q,P
8-TR13	ET-391768	TR 2SC458LG C,D
8-TR14	ET-338181	TR 2SC2909 R,S
8-TR16	ET-639437	TR 2SC945L Q,P
8-TR19 to 23	ET-639437	TR 2SC945L Q,P
8-TR24	ET-318237	△ TR 2SB764 E,F
8-TR25	ET-517263	△ TR 2SC1312R G,H
8-TR26,27	ET-517263	TR 2SC1312R G,H
8-D1 to 3	ED-301911	D SILICON H DS448
8-D4,5	ED-308953	D GERMA H 1K34A-LH S12
8-D8 to 12	ED-301911	D SILICON H DS448
8-D14,15	ED-301911	D SILICON H DS448
8-D16	ED-313623	D ZENER H HZ22 3
8-D17 to 25	ED-301911	D SILICON H DS448
8-J1	EJ-308986	PIN J 1784P1782 P 4P
8-J2	EJ-331184	PHONE J HLJ0345-100 2x2P
8-J3	EJ-330545	PHONE J 3P HLJ0315-020 6.3
8-SW1	ES-301435	SW SLIDE CL210E 2-10-02S
8-SW2	ES-330372	SW PUSH SUE24 2-THROW
8-SW3,4	ES-319464	SW LEVER 00420460 2-04-02S
8-SW5	ES-319448	SW LEVER 00420461 2-04-02N
8-SW6	ES-306714	SW ROTARY SRU1023N 1-02-03N
8-SW7	ES-301436	SW SLIDE CL206E 2-06-02S
8-VR1 to 3	EV-336849	R S-FIX H KVSF807U 3P 203
8-VR4	EV-336853	R S-FIX H KVSF807U 3P 103
8-VR5,6	EV-341225	R S-FIX H KVSF807U 3P 503
8-VR7	EV-319316	VR ROTARY 16P20x2A B103
8-VR8	EV-336852	R S-FIX H KVSF807U 3P 102
8-VR9	EV-336843	R S-FIX H KVSF807U 3P 303
8-VC1,2	EC-330991	C S-FIX H ECR-BC090M11 8.0-90
8-VL1	EO-319495	COIL VARI I GYD-102 1mH
8-L1,2	EO-330990	COIL FIX 2 0358-042 510μH
8-T1	EO-331190	COIL OSC 1 2330-065 100KHz
8-FL1	EO-315758	COIL TUN 1 100S-431 100KHz
8-FL2	EO-319447	COIL TUN1 GYD-100K 100 KHz
8-RL1,2	EP-308973	RELAY LEAD LAB2NS 2NO 24V
8-FR1	ER-308898	△ R FUSE FR25SJ 1/4W 101J
8-F2,3	ER-331188	△ R FUSE ERD2FC S10 1/4W 8R2J
8-R7	ER-331562	R OMF H S15 FS 1W 471J
8-C20	EC-325380	C PP V F10 PFH 332J 630DC
8-C28	EC-341409	C COMP V AWS 6801G 50DC

9. NR P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
9-1	BA-T1015A010A	PC NR BLK GX-747dbx
9-IC1	EI-344144	IC μPC1252H2
9-IC2	EI-344148	IC μPC1253H2
9-IC3	EI-337360	IC μPC4082C
9-IC4	EI-344144	IC μPC1252H2
9-IC5	EI-344148	IC μPC1253H2
9-IC6	EI-337360	IC μPC4082C
9-IC7	EI-336994	IC M5230L
9-TR1 to 4	ET-330270	TR 2SC2320 F,G
9-TR5	ET-318237	TR 2SB764 E,F
9-TR6	ET-328440	TR 2SD863-V8 E,F
9-SW1	ES-344143	SW PUSH SUL192A 2-06-02N
9-VR1 to 4	EV-330531	R S-FIX H TM8KV2-1S 3P 0.50W 503
9-VR5,6	EV-341239	R S-FIX H TM8KV2-1S 3P 0.50W 504
9-VR7	EV-341235	R S-FIX H TM8KV2-1S 3P 0.50W 103
9-R2	ER-338325	R MF H 1/4W 4302F
9-R3	ER-323487	R MF H F10 1/4W 1503F
9-R5	ER-310326	R MF H 1/4W 1002F
9-R6	ER-330272	R MF H F10 1/4W 3302F
9-R11	ER-310326	R MF H 1/4W 1002F
9-R12	ER-330272	R MF H F10 1/4W 3302F
9-R14	ER-338325	R MF H 1/4W 4302F
9-R15	ER-323487	R MF H F10 1/4W 1503F
9-R16	ER-318316	R MF H F10 1/4W 2201F
9-R17	ER-302353	R MF H F10 1/4W 2701F
9-R18	ER-318337	R MF H F10 1/4W 6801F
9-R20	ER-329282	R MF H F10 1/4W 2702F
9-R21	ER-314603	R MF H 1/4W 3001F
9-R22	ER-346169	R SD 1/4W 226J
9-R26	ER-346158	R MF H T26 1/4W 1694F
9-R33	ER-310326	R MF H 1/4W 1002F
9-R34	ER-330272	R MF H F10 1/4W 3302F
9-R39	ER-310326	R MF H 1/4W 1002F
9-R40	ER-330259	R MF H T26 1/4W 3302F
9-R41	ER-338325	R MF H 1/4W 4302F
9-R42	ER-319986	R MF H T26 1/4W 1503F
9-R43	ER-318316	R MF H F10 1/4W 2201F
9-R44	ER-302353	R MF H F10 1/4W 2701F
9-R45	ER-318337	R MF H F10 1/4W 6801F
9-R47	ER-329282	R MF H F10 1/4W 2702F
9-R48	ER-307651	R MF H F10 1/4W 3301F
9-R49	RR-346169	R SD 1/4W 226J
9-R53	ER-346158	R MF H T26 1/4W 1694F
9-R60	ER-309809	R MF V 1/4W 6201F
9-R61	ER-311773	R MF H 1/4W 3301F
9-R64	ER-341399	R MF H 1/4W 1502F
9-R65	ER-341399	R MF H 1/4W 1502F
9-R66	ER-304948	△ R CB H FS RDS 1/2W 821J
9-R69	ER-314672	R MF V 1/4W 1602F
9-C3	EC-344134	C COMP V AWS 1002G 50DC
9-C8	EC-337002	C EC V F05 NP NXA 100M 16DC
9-C11,12	EC-343879	C PP V F03 FPS 3301G 100DC
9-C15	EC-343879	C PP V F03 FPS 3301G 100DC
9-C17	EC-346114	C TT V DN 100J 25DC
9-C19	EC-337261	C EC V F05 NP NXA 1R0M 50DC
9-C23	EC-344134	C COMP V AWS 1002G 50DC
9-C27,28	EC-343879	C PP V F03 FPS 3301G 100DC
9-C31	EC-343879	C PP V F03 FPS 3301G 100DC
9-C33	EC-346114	C TT V DN 100J 25DC

10. MIC P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
10-1	BA-T1015A050A	PC MIC BLK GX-747dbx
10-TR1	ET-308954	TR 2SC1844 E,F
10-TR2,3	ET-337258	TR 2SC1843 E,F
10-TR4	ET-308954	TR 2SC1844 E,F
10-TR5	ET-338181	TR 2SC2909 R,S
10-TR6	ET-338244	TR 2SA1207 R,S
10-VR1,2	EV-319494	VR ROTARY 16P11x0U A503 A503
10-C1	EC-343863	C PP V F03 FPS 5600G 100DC
10-C2	EC-346170	C TT V DN 100K 16DC
10-C3	EC-343857	C PP V F03 FPS 3300G 100DC

11. COUNTER P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
11-D1 to 6	ED-316143	D SILICON H 1S2473HS F10
11-D7	ED-322247	D LED SLP-151D RED
11-SW1 to 4	ES-319624	SW TACT KEC11903
11-SW5 to 8	ES-323367	SW TACT KEC10001
11-IN1	EM-330992	IND LE SL-1574W CHARACTER

12. METER P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
12-TR1,2	ET-517263	TR 2SC1312R G,H
12-R6	ER-281338	△ R OMF H FS 2W 100J

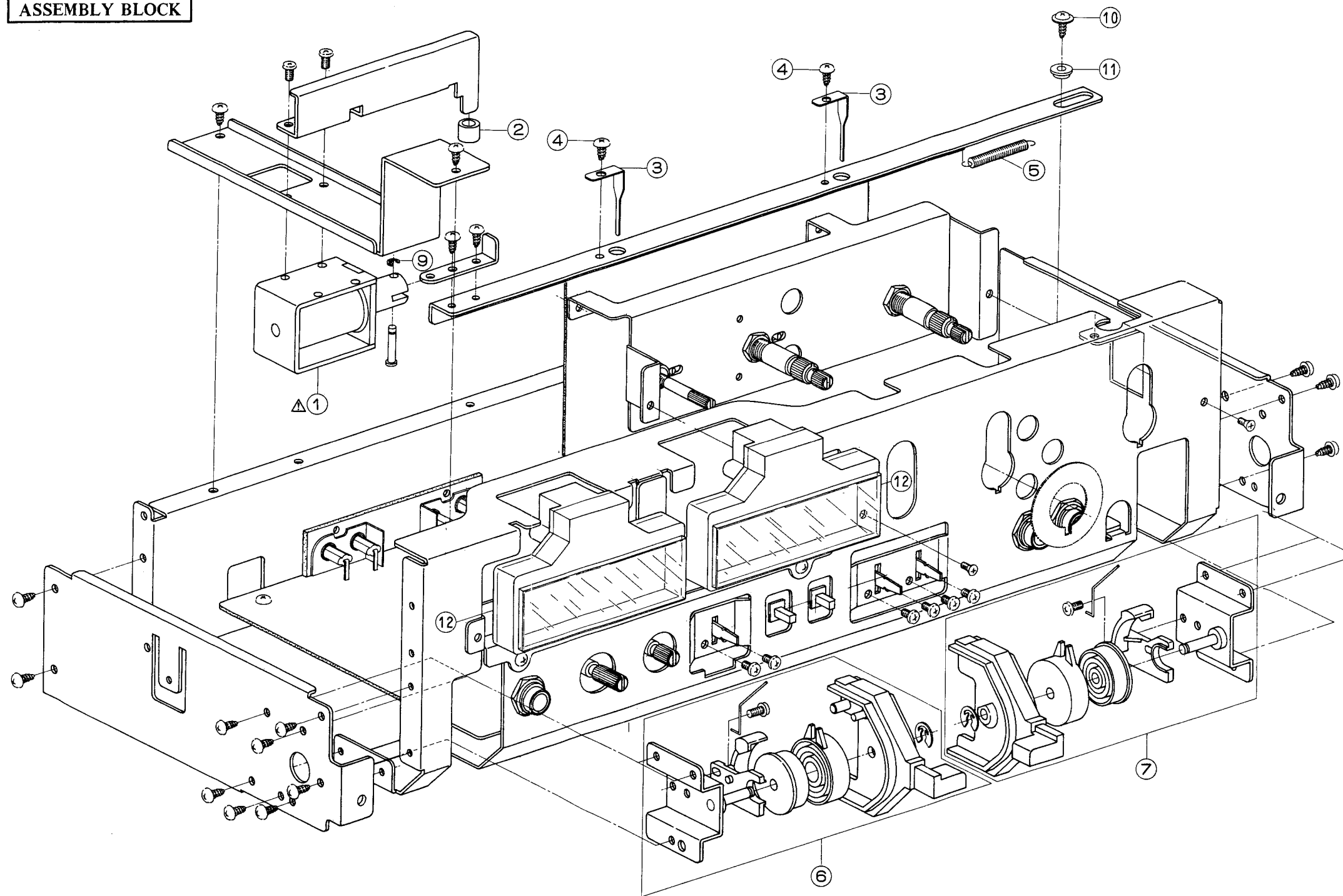
13. LED P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
13-D1	ED-337414	D LED SLP-235B GRN

14. BIAS P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
14-VR1	EV-331189	VR ROTARY 16P20x2B B502

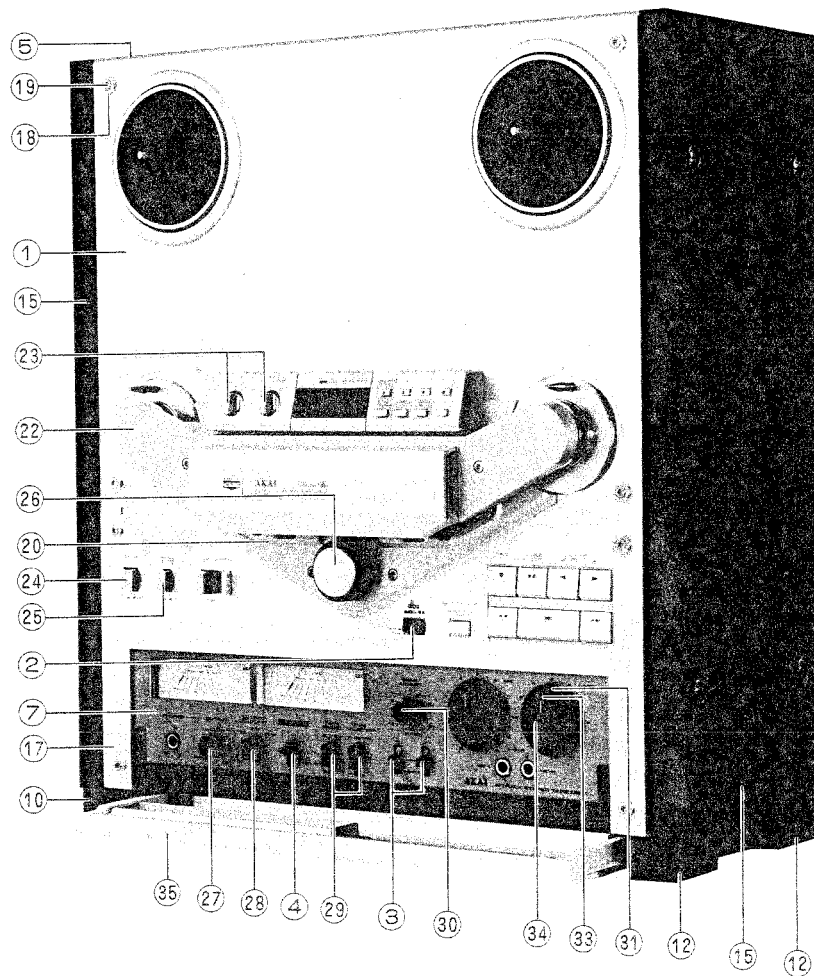
ASSEMBLY BLOCK



15. ASSEMBLY BLOCK

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
REVERSE PLUNGER BLOCK			ASSEMBLY BLOCK		
15-1	EP-315918	△ SOLENOID 1240PLTI (SL905)	15-6	BZ-T1009A450A	HINGE BASE (L) BLK GX-747
15-2	MB-606712	KJ STOPPER RUBBER	15-7	BZ-T1009A460A	HINGE BASE (R) BLK GX-747
REVERSE ARM BLOCK			15-8x	ZW-263946	RV NYL40×050
15-3	ZG-331069	SP REVERSE	15-9	ZW-270088	RING E 190SUP CMT
15-4	ZS-325495	T2BR30×06STL CMT	15-10	ZS-331566	PAN30×08STL CMT CUP
15-5	ZG-313004	SP T1-4.0/0.4-35.5 T1-118	15-11	ZW-625241	GRADUATED WASHER
			15-12	EM-330374	METER VU D64A24L
					0.260mA (ME1,2)
			15-12x	EM-330600	METER VU D64A27L
					0.260mA (BL) (ME1,2)

FINALY ASSEMBLY BLOCK



16. FINALY ASSEMBLY BLOCK

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
	MECHA PANEL BLOCK				
16-1	BD-T1009A540A	MECHA PANEL BLK GX-747	16-19x	ZS-306435	PANEL SCREW (C)
16-1x	BD-T1009A540B	MECHA PANEL BLK GX-747-BL	16-20	SC-B331082A	HEAD COVER BASE PART
	FINALY ASSEMBLY BLOCK		16-20x	SC-B331082B	HEAD COVER BASE (BL) PART
16-2	SK-B604516	JOINT KNOB PART	16-21x	ZS-422965	PAN30x15STL CMT
16-3	SK-328684	KNOB LEVER (C)	16-22	SC-B604510	HEAD COVER PART
16-4	ML-328683	KNOB LEVER (B)	16-22x	SC-B604511	HEAD COVER (BL) PART
16-5	SP-304933A	UPPER COVER	16-23	SK-331109A	KNOB (B)
16-5x	SP-304933B	UPPER COVER (BL)	16-23x	SK-331109B	KNOB (B)-BL
16-6x	ZS-331181	BT BID30x08STL NI3	16-24	SB-331137A	POWER BUTTON
16-6x	ZS-331182	BT BID30x08STL BNI	16-24x	SK-331137B	POWER BUTTON (BL)
16-7	SP-B604505	OPERATION PANEL (C) PART	16-25	SB-315834	BUTTON (C)
16-7x	SP-B604507	OPERATION PANEL (C-BL) PART	16-25x	SK-B601365	PINCH ROLLER CAP (E) PART
16-8x	SP-331076A	BOTTOM PLATE	16-26	SK-B601364	PINCH ROLLER CAP (D) PART
16-8x	SP-331076B	BOTTOM PLATE (BL)	16-26x	SK-B601365	PINCH ROLLER CAP (E) PART
16-9x	ZS-447761	T2BR30x06STL BNI	16-27	SK-331108A	KNOB (A-1)
16-10	SA-B331097	FOOT (L) PART	16-28	SK-331109B	KNOB (B)-BL
16-11x	ZS-435273	BID40x10STL CMT	16-29	SB-315835	BUTTON (C-BL)
16-12	SA-B331098	FOOT (R) PART	16-30	SK-331108B	KNOB (A-2)
16-13x	ZS-435273	BID40x10STL CMT	16-31	SK-B603210	MEMORY RING PART
16-14x	ZS-447761	T2BR30x06STL BNI	16-32x	TC-331104	MEMORY RING RETAINER
16-15	SP-305022	SIDE PLATE (B)	16-33	SK-331100	DOUBLE KNOB (LOWER)
16-16x	ZS-318423	SCREW (B), W/SPOT FACING WASHER	16-34	SK-B331101	DOUBLE KNOB (UPPER) PART
16-17	BD-B604508	AMP PANEL (B) PART	16-35	BC-B604514	AMP COVER (B) PART
16-17x	BD-B604509	AMP PANEL (B-BL) PART	16-35x	BC-B604515	AMP COVER (B-BL) PART
16-18	TC-331106A	PANEL WASHER	16-36x	ZS-200417	CTS30x06STL NI3
16-18x	ZW-331106B	PANEL WASHER (BL)	16-37x	ZS-559056	CTS30x06STL BNI
16-19	ZS-613901	PANEL SCREW	16-38x	SP-331078P	BACK BOARD GX-747 (U)
			16-38x	SP-331078Q	BACK BOARD GX-747 (J)
			16-39x	ZS-331568	T2BR30x10STL CMT (Ø80)

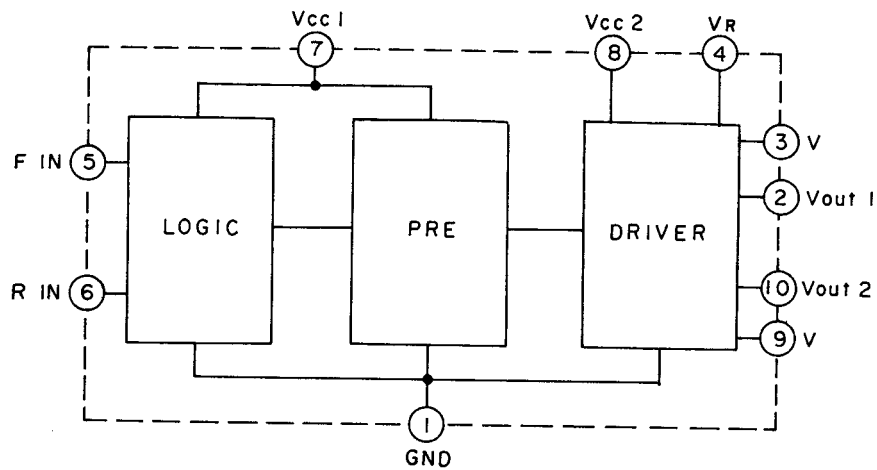
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SP-B604505	16-7	ZS-608477	1-26						
SP-B604507	16-7x	ZS-608501	1-14						
SP-304933A	16-5	ZS-613901	16-19						
SP-304933B	16-5x	ZS-670004	4-14						
SP-305022	16-15	ZW-260043	6-16						
SP-331076A	16-8x	ZW-263946	15-8x						
SP-331076B	16-8x	ZW-265522	1-6						
SP-331078P	16-38x	ZW-270088	3-6						
SP-331078Q	16-38x	ZW-270088	6-5						
SZ-331037A	6-33	ZW-270088	15-9						
SZ-332462	4-4	ZW-270123	6-17						
SZ-631945	5-13	ZW-270156	6-79						
TC-331037B	6-33x	ZW-273914	1-2						
TC-331038A	6-34	ZW-273914	6-58						
TC-331038B	6-34x	ZW-274026	6-20						
TC-331104	16-32x	ZW-274026	6-60						
TC-331106A	16-18	ZW-290283	6-8						
VT-422673	6-72	ZW-305546	6-76						
ZG-301340	6-63	ZW-307294	4-18						
ZG-308728	6-18	ZW-308928	4-21						
ZG-308734	6-28	ZW-309055	1-27						
ZG-312399	4-41	ZW-313593	6-27						
ZG-313004	15-5	ZW-313872	4-17						
ZG-313028	6-70	ZW-313873	4-16						
ZG-313078	6-62	ZW-318099	4-6						
ZG-317114	6-73	ZW-321437	4-10						
ZG-317496	3-11	ZW-321437	6-77						
ZG-331019	4-44	ZW-321513	4-7						
ZG-331069	15-3	ZW-331106B	16-18x						
ZG-331565	6-35	ZW-331851	4-32						
ZG-466312	1-7	ZW-357164	6-24						
ZG-540584	1-12	ZW-376391	6-67						
ZG-540617	3-4	ZW-405865	6-15						
ZG-567685	4-15	ZW-413188	6-59						
ZG-580522	6-9	ZW-413267	5-15						
ZS-200417	16-36x	ZW-413278	2-9						
ZS-201778	1-28	ZW-413278	6-21						
ZS-306435	16-19x	ZW-413278	6-61						
ZS-318423	16-16x	ZW-420682	6-7						
ZS-319473	4-13	ZW-420682	6-64						
ZS-322839	5-3	ZW-516993	5-7						
ZS-323728	6-11x	ZW-580173	6-74						
ZS-325495	15-4	ZW-597543	2-10						
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ZS-331182	16-6x	ZW-605698	2-11						
ZS-331566	15-10	ZW-616004	6-10x						
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ZS-413201	1-3	ZW-625241	15-11						
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ZS-419670	6-56								
ZS-421806	5-6								
ZS-422076	1-29								
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ZS-435273	5-16								
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ZS-444262	6-22								
ZS-447761	16-9x								
ZS-447761	16-14x								
ZS-460440	1-24								
ZS-463353	5-11								
ZS-477876	4-27								
ZS-479474	4-40								
ZS-524812	1-23								
ZS-527681	6-68								
ZS-559056	16-37x								
ZS-572242	4-39								
ZS-592378	6-26								
ZS-602190	6-47								
ZS-608095	1-25								
ZS-608253	4-45								

SECTION 3

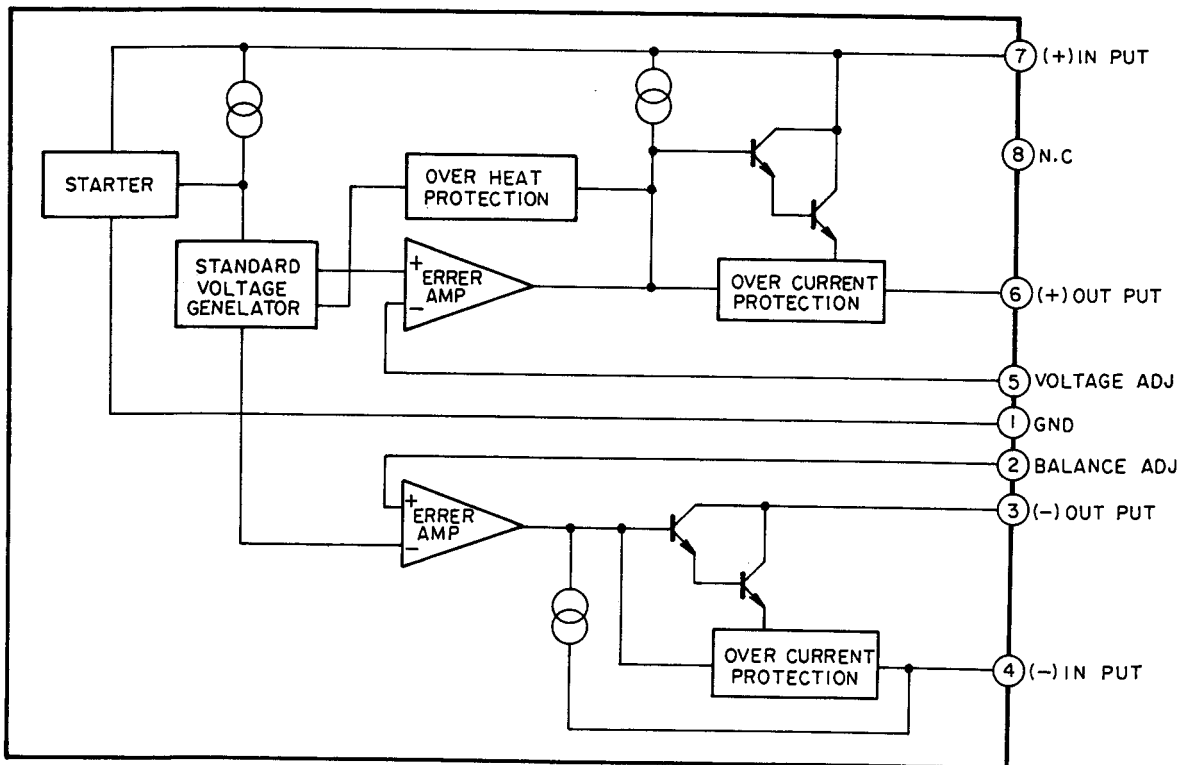
SCHEMATIC DIAGRAM

1. SCHEMATIC DIAGRAM OF IC's	70
2. GX-747 dbx No. 2-1 1621824B SYSCON SCHEMATIC DIAGRAM	73
3. GX-747 dbx No. 2-2 821120A AMP SCHEMATIC DIAGRAM	74

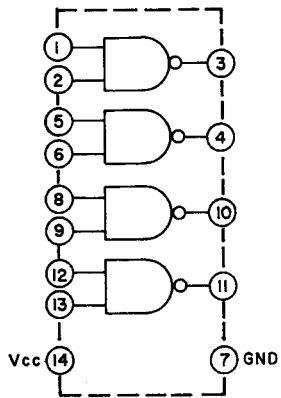
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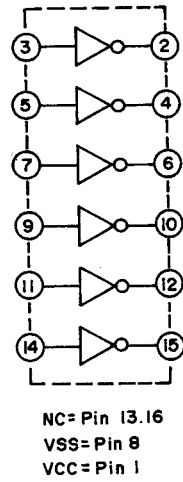
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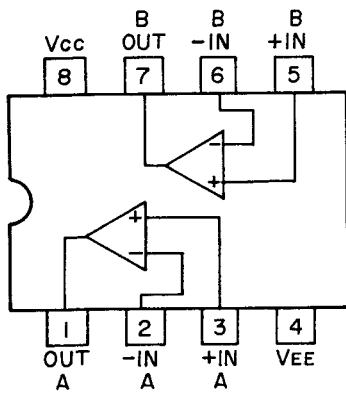


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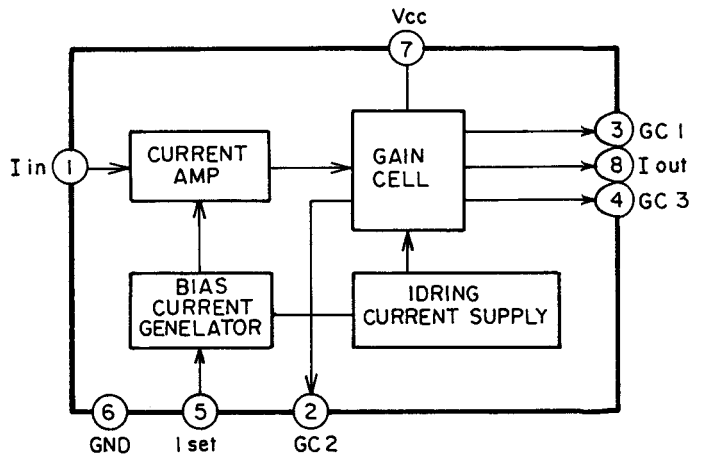


NC= Pin 13,16
VSS= Pin 8
VCC= Pin 1

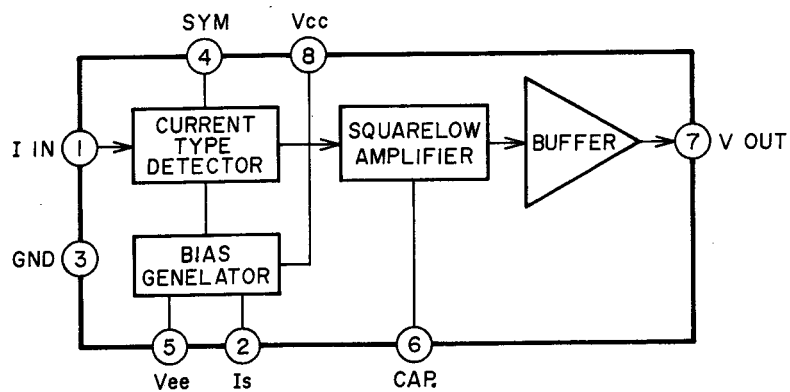
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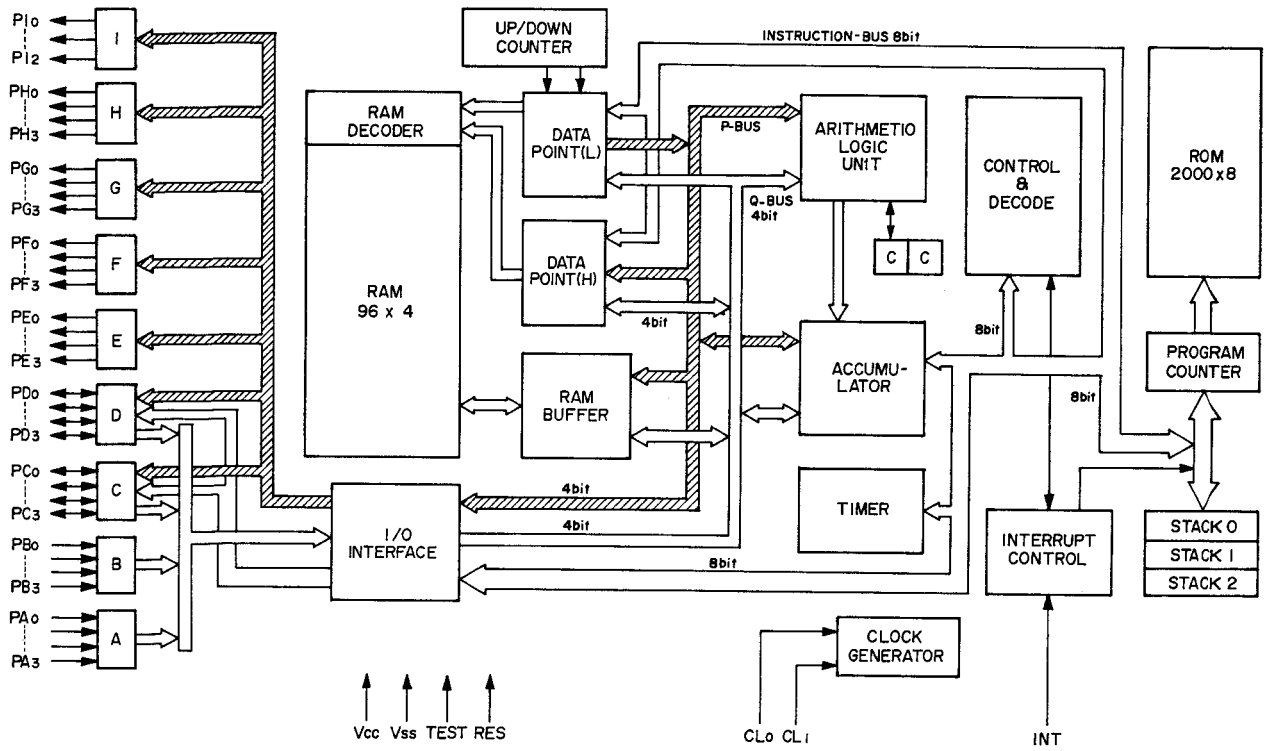


μ PC1252H2



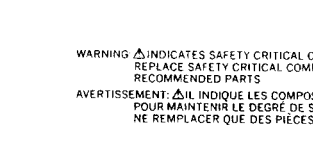
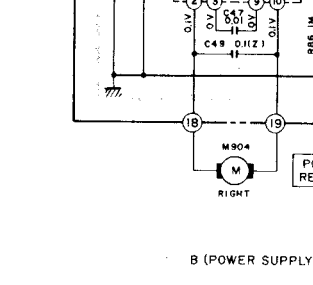
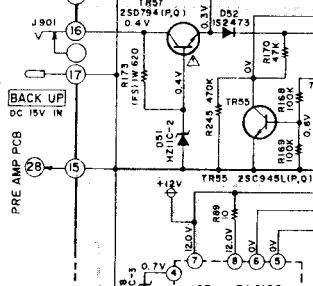
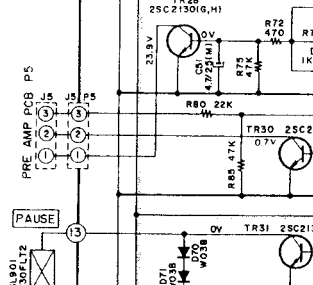
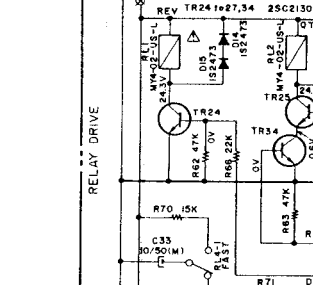
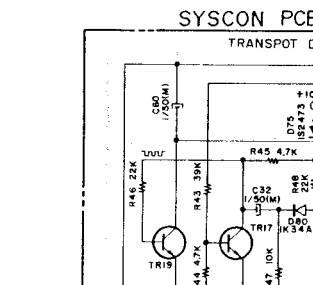
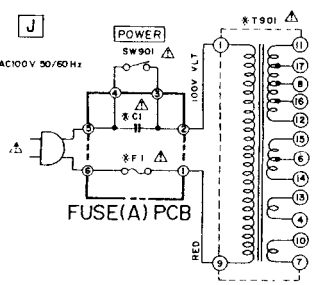
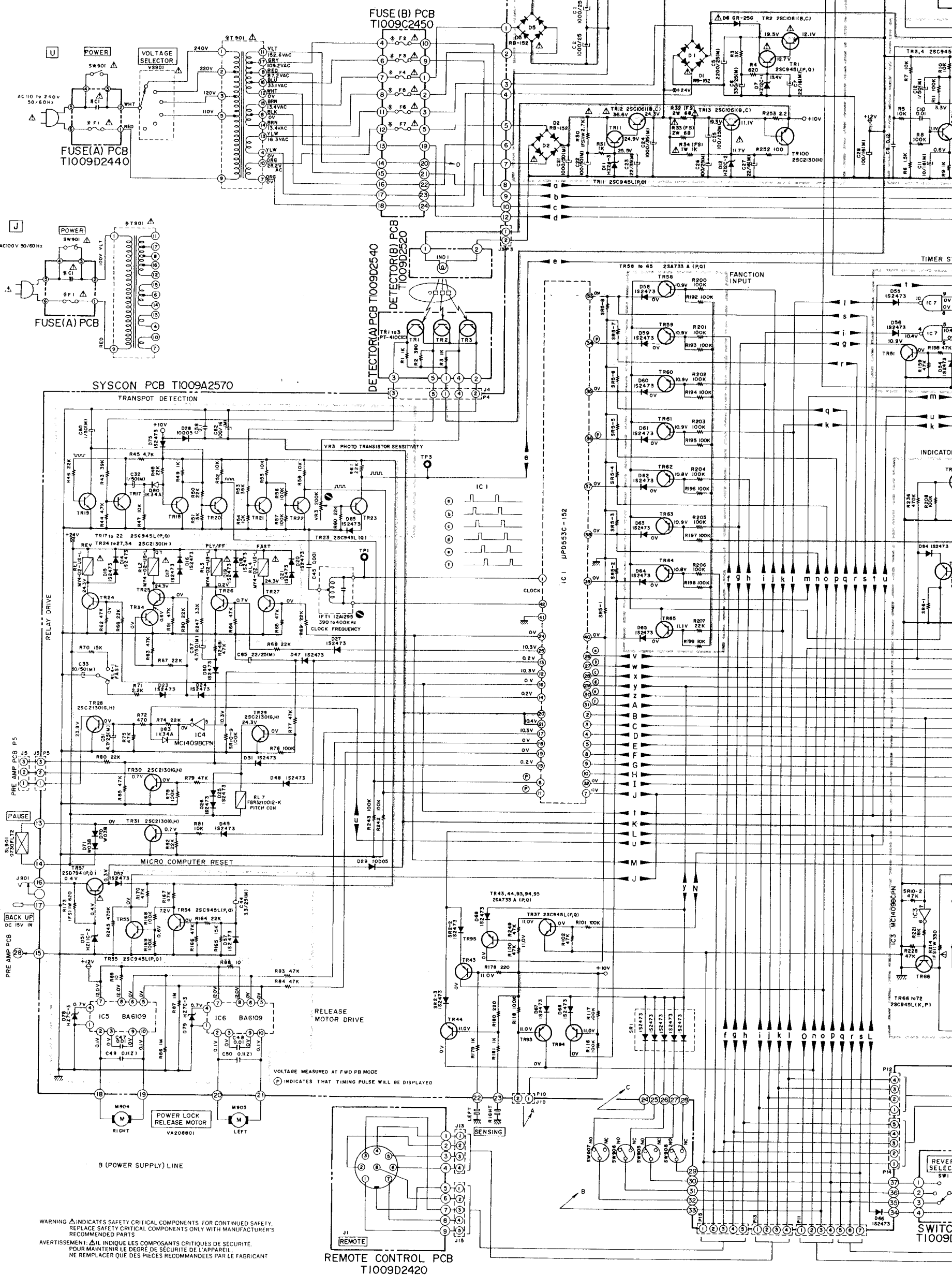
μ PC1253H2





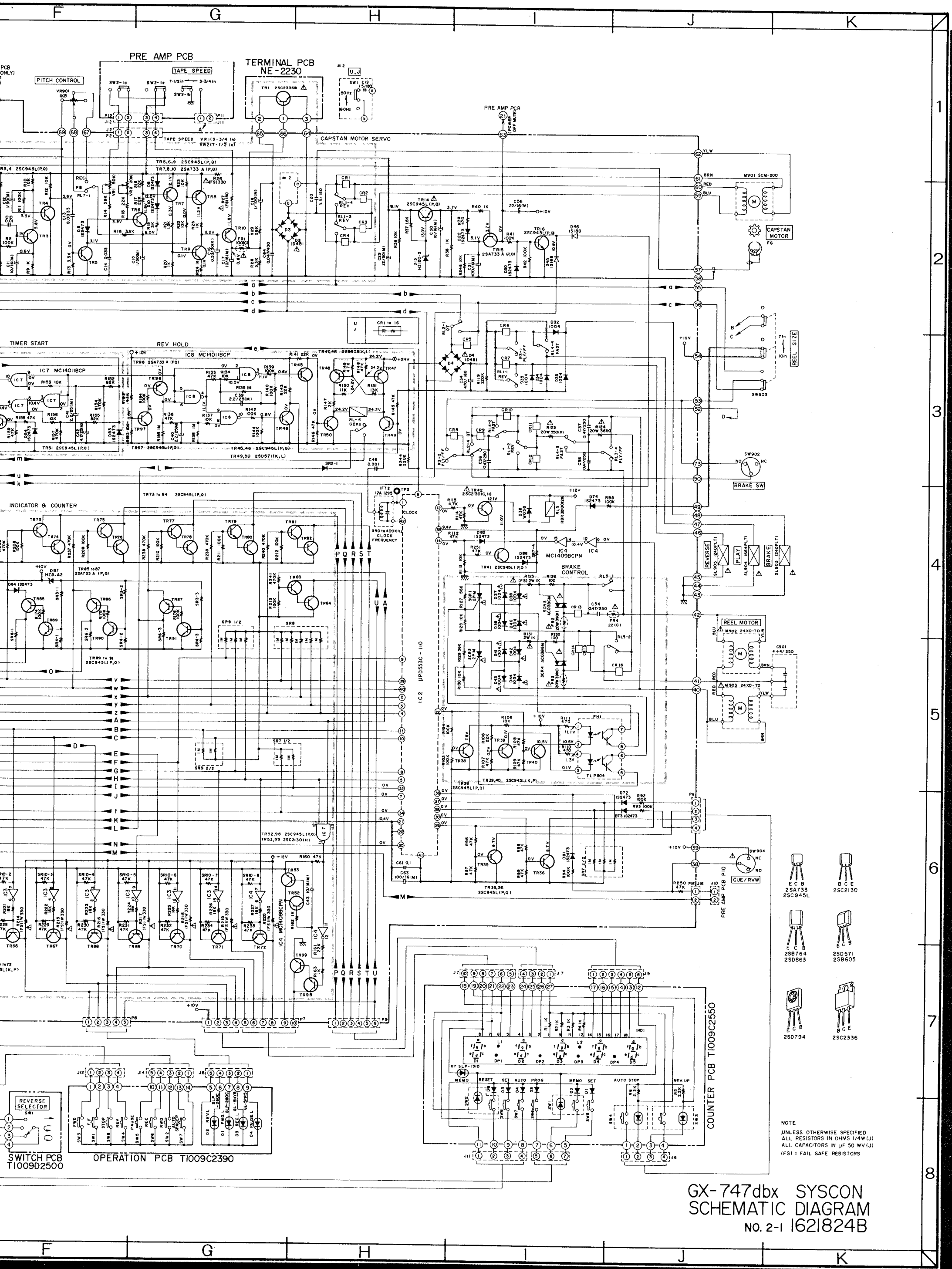
GX-747 dbx

F1	F2	F3	F4	F5	F6	F7	C1	T 901
3.15A 250V	1.25A 250V	800mA 250V	1A 250V	1A 250V	1.25A 250V	1.6A 250V	0.01 250AC(2)	TTY-1
3.15A 250V	1.25A 250V	800mA 250V	1A 250V	1A 250V	1.25A 250V	1.6A 250V	0.01 250AC(2)	TI109J



WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY. REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

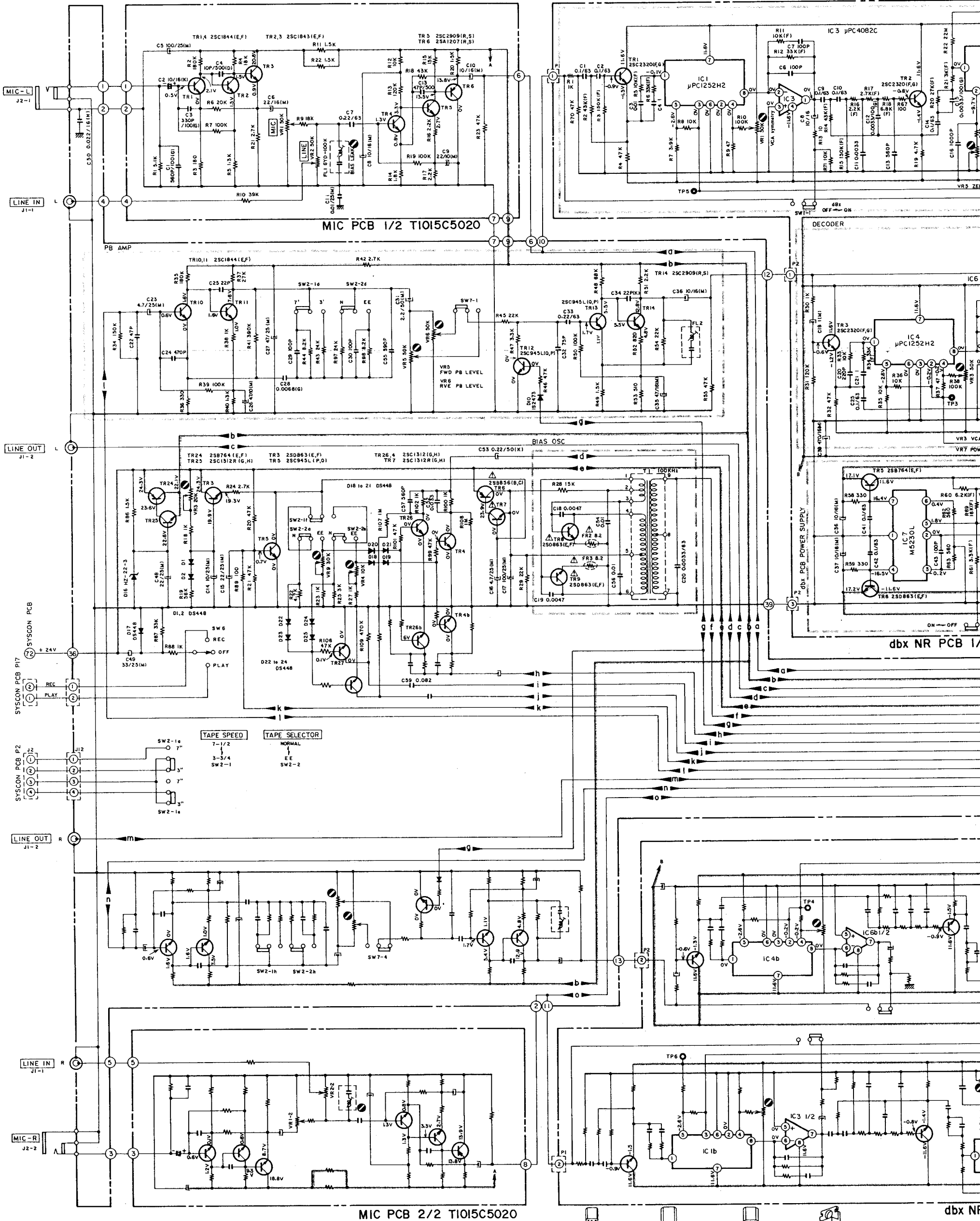
AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.



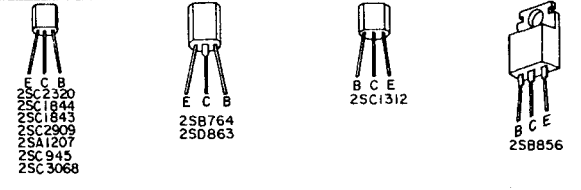
GX-747dbx SYSCON
SCHEMATIC DIAGRAM
NO. 2-1 1621824B

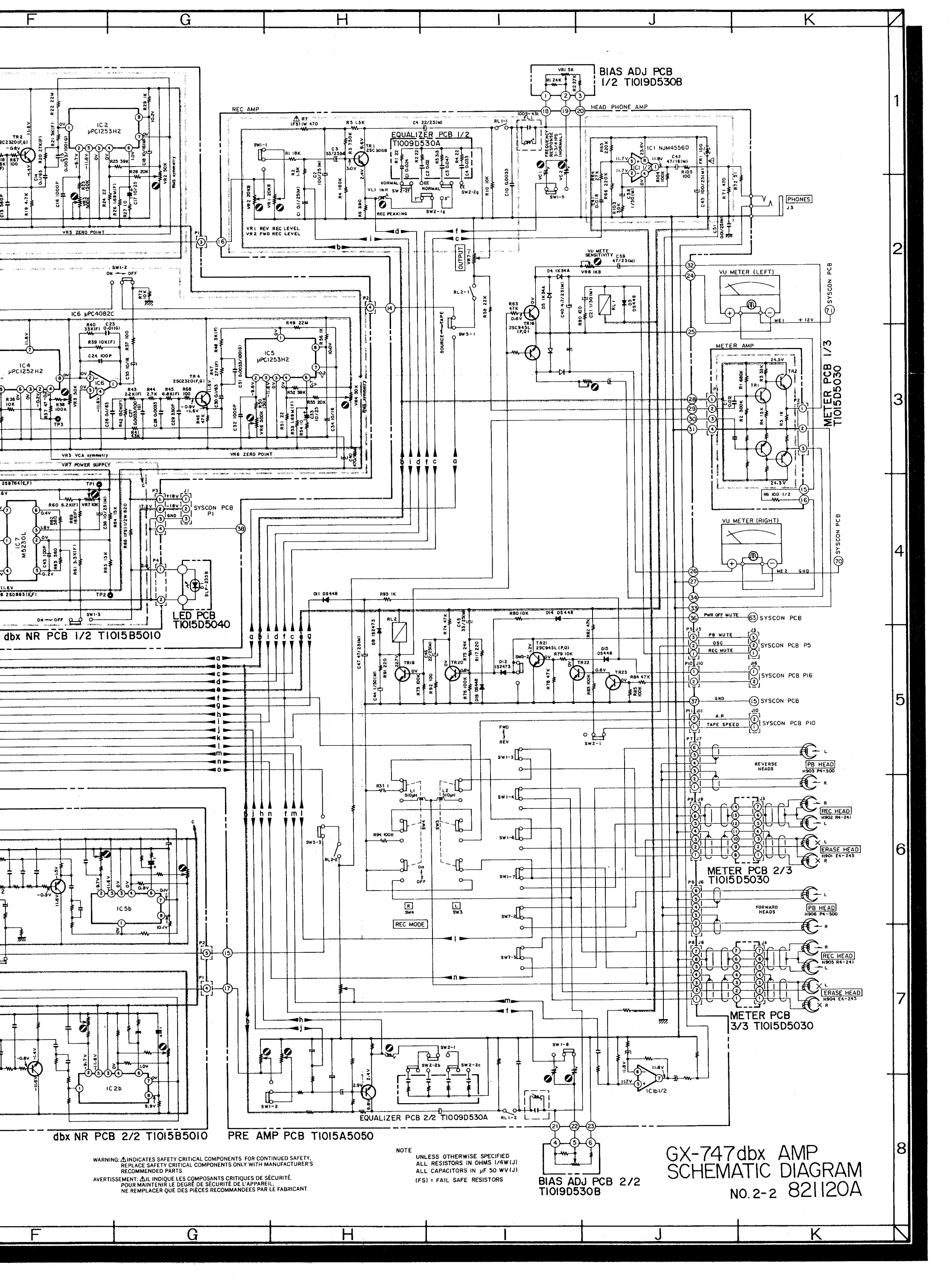
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W (J)
ALL CAPACITORS IN μ F 50 WV (J)
(FS) = FAIL SAFE RESISTORS

GX-747dbx



B (POWER SUPPLY) LINE





WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY. REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.
 AVERTISSEMENT: Δ IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT

NOTE
 UNLESS OTHERWISE SPECIFIED
 ALL RESISTORS IN OHMS 1/4W(J)
 ALL CAPACITORS IN µF 50 WV(J)
 (FS) = FAIL SAFE RESISTORS

GX-747 dbx AMP
 SCHEMATIC DIAGRAM
 NO. 2-2 821120A

BIAS ADJ PCB 2/2
 T1019D530B

ABBREVIATIONS USED IN GX-747 dbx SERVICE MANUAL

Abbreviation	Explanation
BPF	Band Pass Filter
D (range)	Dynamic (Range)
EE (tape)	Extra Efficiency (Tape)
EQ	EQualizer
FF	Fast Forward
f _H	High cut-off frequency
f _L	Low cut-off frequency
FWD	ForWarD
GND	GrouND
H	High
HPF	High Pass Filter
L	Low
LED	Light Emitting Diode
LPF	Low Pass Filter
M	Motor
MOL	Maximum Output Level
NAB	National Association of Broadcasters
NR	Noise Reduction
Oct	Octave e.g. 12 dB/oct
PLY	PLaY
REMOCON	REMOte CONtrol
REV	REVerse
REW	REWind
RMS	Root Mean Square
RWD	ReWinD
SYSCON	SYStem CONtrol
TP	Test Point
VCA	Voltage Controlled Attenuator or Amplifier
VR	Variable Resistor