

RE-301

SERVICE NOTES

SECOND EDITION

1. SPECIFICATIONS

1-1. INPUT

| | Impedance | Sensitivity* |
|-------|--------------|-------------------|
| -50dB | 3K Ω | 3.2 (2.8) mVrms |
| -35dB | 56K Ω | 17.8 (12.5) mVrms |
| -20dB | 56K Ω | 100 (58) mVrms |

*With 1KHz sine wave input, to obtain 0 VU, slightly over which Peak Level Lamp lights up. Figures in parenthesis indicate sensitivity for Serial No. Up to 621849.

1-2. OUTPUT

| | Level | Impedance (Approx.) | |
|----------|---------|---------------------------------|---------------------------|
| | | Connected to both A and B Jacks | Connected to A Jack alone |
| H: -15dB | 88mVrms | 5K Ω | 2.5K Ω |
| M: -25dB | 27mVrms | 1.5K Ω | 0.75K Ω |
| L: -35dB | 9mVrms | 0.5K Ω | 0.25K Ω |

*Input: 1KHz sine wave, 3.2mVrms, with Input Level switch at -50dB.
 Setting: All effects - off, Direct signal - on
 Output: No load, from A Jack

1-3. TONE CONTROL

| Input | 3.2mVrms sine wave, Input Level at -50dB | | | |
|--------|--|-----|--------|-----|
| | 600Hz | | 6KHz | |
| BASS | MAX | MIN | CENTER | |
| TREBLE | CENTER | | MAX | MIN |
| Output | 240mV | 7mV | 150mV | 7mV |
| | No load, from A Jack | | | |

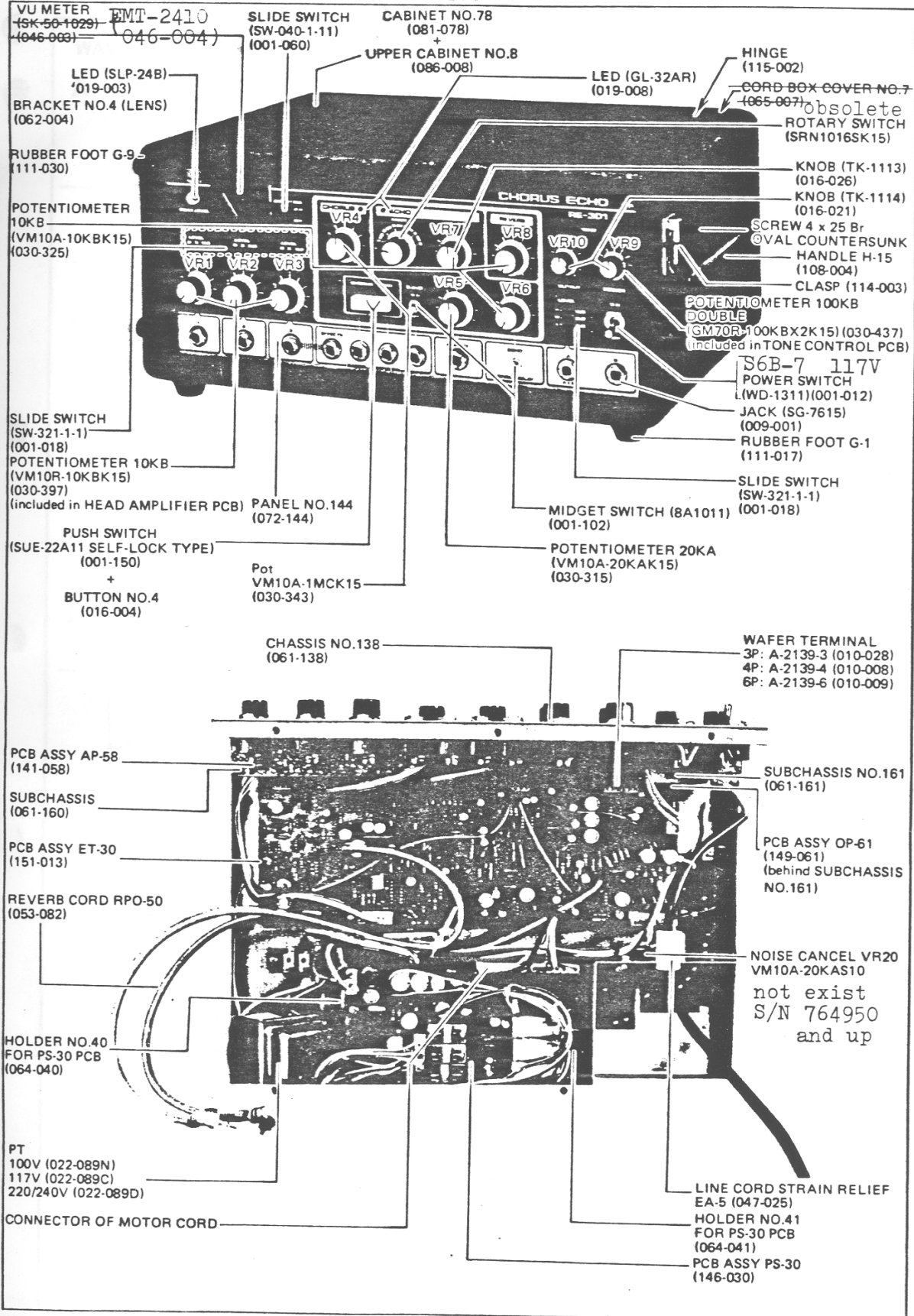
1-4. DELAY TIME

| | Repeat Rate | Mode 1 PH-1 | Mode 2 PH-2 | Mode 3 PH-3 | Sound on Sound PH-4 |
|--------|-------------|----------------|----------------|----------------|------------------------|
| ECHO | Max. | 40ms | 80ms | 210ms | 10s |
| | Center | 60ms | 120ms | 320ms | 15s |
| | Min. | 130ms | 260ms | 720ms | 35s |
| CHORUS | Intensity | Delay Time | | | |
| | Min. | 2ms | | | |
| | Max. | 12ms | | | |

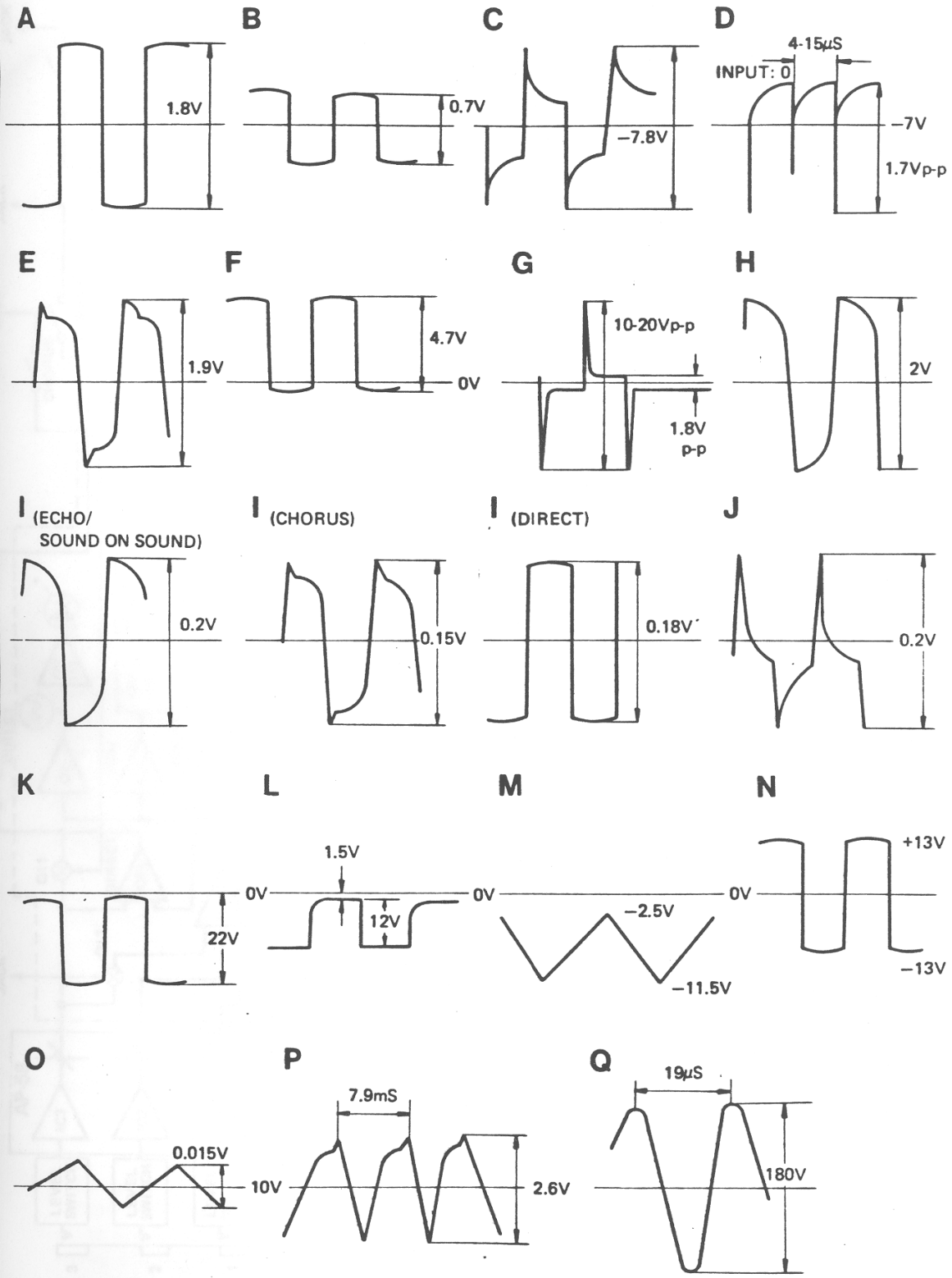
1-5. OTHERS

- Power consumption 22W
- Dimensions 415(W) x 190(H) x 300(D)mm
- Weight 10kg

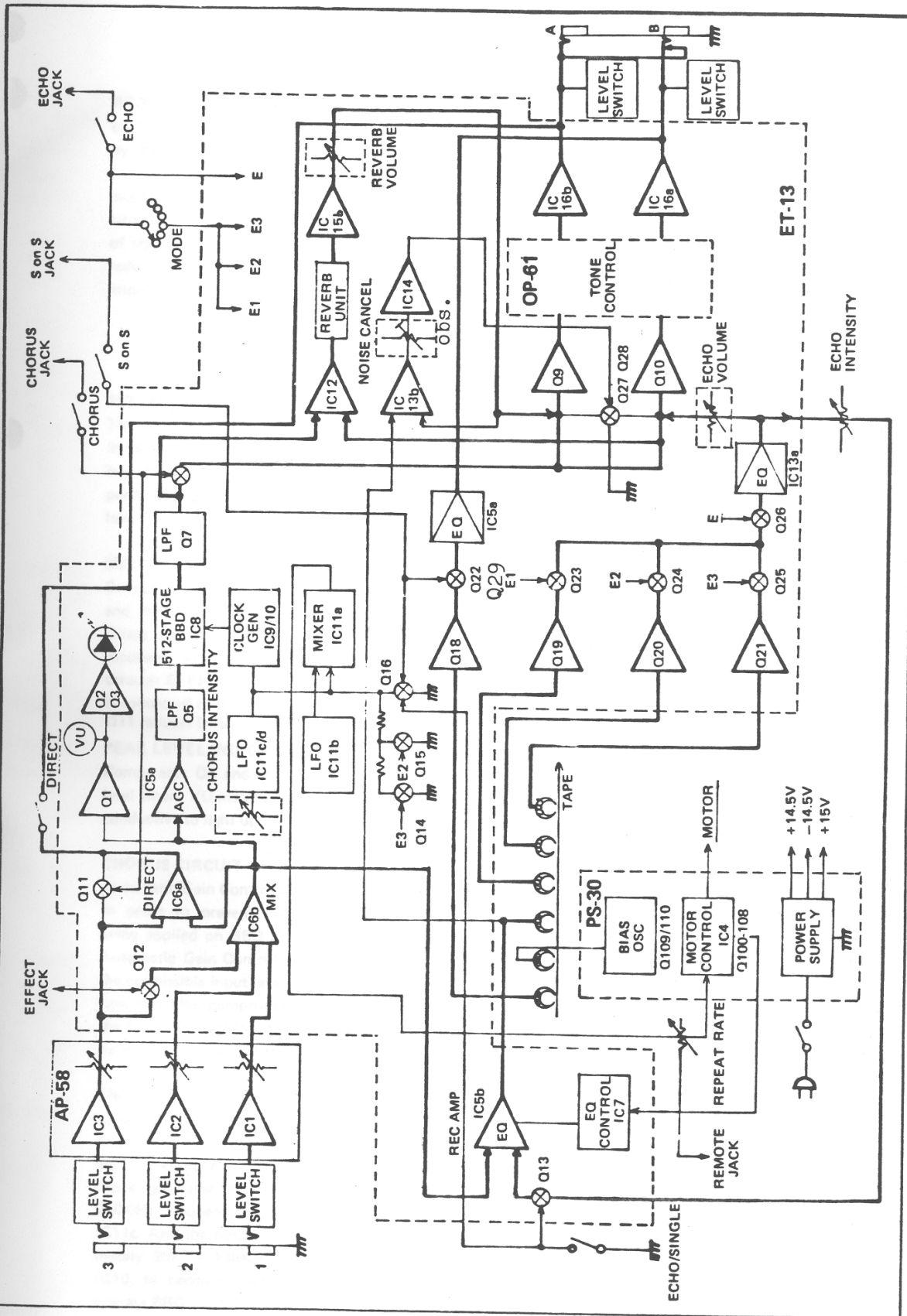
2. DISASSEMBLY AND UNIT LOCATION



WAVEFORM CHART WITH 3.8mV (approx. 9mVp-p), 1KHz SQUARE WAVE INPUT



4. BLOCK DIAGRAM



5. CIRCUIT DESCRIPTION

RE-301 produces (1) Direct sound, (2) Echo and Sound on Sound sounds by tape mechanism, (3) Chorus sound by BBD and (4) Reverb sound by spring. The unit comprises circuits to produce the above sounds and auxiliary circuits like motor circuit and power supply circuit. Most of the control of these circuits and switching of signals are processed by DC voltage, which serves to reduce the number of signal wiring, resulting in great improvement in signal-to-noise ratio and hum level.

1ST PREAMPLIFIER (AP-58)

The input signal is attenuated by changing the feedback in IC1, IC2 and IC3 and also by changing the input impedance. At -20dB and -35dB input level switch positions, impedance is high and at -50dB , impedance is low.

MIXER & DIRECT SOUND AMPLIFIER (IC6)

Output signal from AP-58 is mixed by Mixer IC6b and the mixed signal is amplified by IC6a to become Direct sound signal. The mixed signal is also fed to successive effect circuits. When EFFECT is cancelled through EFFECTS CANCEL REMOTE jack, Input No.3 is connected to Direct Sound Amplifier IC6a alone. Q11 reduces Direct Level when Chorus is ON.

PEAK LEVEL INDICATOR

Comparator Q2 and Q3 operates with sine wave of the level where VU meter indication exceeds 0, making LED conductive to light up.

CHORUS CIRCUIT

Automatic Gain Control & Low-Pass Filter

In order to prevent excessive amplitude signal from being applied on BBD (IC8) that may cause distortion, Automatic Gain Control IC5a controls the signal below the permissible input level of BBD.

Low-pass filter comprises Q5 and C & R's, and attenuates the frequencies of input signal which may cause beating by interference with clock frequency.

BBD CLOCK GENERATOR

Clock leakage in the output signal of BBD IC8 is decreased by VR13 and subsequent low-pass filter comprising Q7 and C & R's.

Clock generator IC9a, 9c and 9d generates $45\text{K} - 250\text{KHz}$ frequency, while being modulated by LFO IC11c. And the output is frequency-divided to approximately $20\text{K} - 130\text{KHz}$, by the subsequent Flip Flop IC10, to become clock pulses of opposite polarity to operate BBD.

ECHO CIRCUIT

Recording Amplifier & Equalizer

In order to improve signal-to-noise ratio, higher frequency is pre-emphasized in recording amplifier IC5b.

On the other hand, recording frequency response changes in accordance with the change in tape speed. To compensate for this change, the capacitance of IC7 which demonstrates capacitor character is changed by the voltage that is proportional to motor speed, causing change in equalizer curve.

Playback equalization (de-emphasis) is made by IC13a.

But equalization for sound-on-sound playback is made exclusively by IC15a.

MOTOR DRIVE

Motor drive circuit comprises Q100 - 108 and IC4b on PS-30. Output voltage from IC11a on ET-13 is changed by Repeat Rate control VR5. This voltage is compared by IC4b with the voltage proportional to motor speed. The difference is applied on Q108 to control the power applied on the motor.

In order to obtain natural echo effect through adequate motor revolution, LFO outputs are mixed by IC11a and added on the control voltage. The voltage differs for each of playback head. At Chorus effect, outputs from two LFO's are added to IC11a.

IC4a produces DC voltage that is proportional to motor speed and it is applied to the recording equalizer control circuit mentioned above.

NOISE CANCEL CIRCUIT

Q27 and Q28 conduct when input signal is very low and any noise that is generated in the preceding circuits are grounded.

With signal exceeding the noise level, the minus voltage from IC14 is cut off to pass the signal.

6 MAIN BOARD ET-13 (151-013) Serial No. up to 764799

NOTE:
For Serial No. 611400 and higher, Non-Polar Capacitors (formerly Electrolytic) are used for: C2, 4, 22, 41, 43, 44, 54, 59, 64, 65, 68, 69, 70, 73, 80.

PARTS attached on foil side:

R166
R167

C82

C92

C93

C86

C87

C88

C89

C85

C81

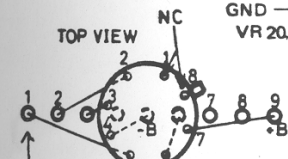
C90

C91

VR15
P1 level
VR16
P2 level
VR17 P3

WAFER TERMINAL A-2461-4C (010-030)

VR7, No.3
VR 6
VR8, No.3
GND
VR 20, No.1



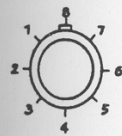
BA662

pins connection

CA3080A
BA662

see page 9

IC7: CA3080A

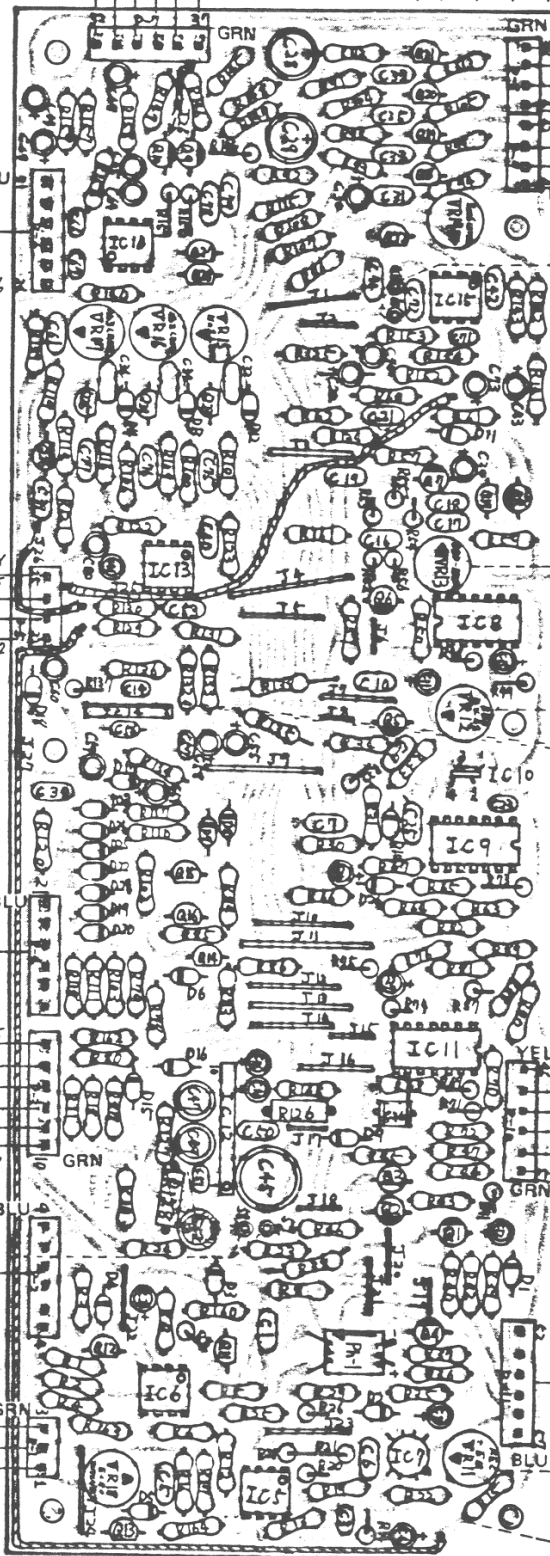


TOP VIEW

REVERB UNLT INPUT
AP-58

SW4, No.2
GND
VR6, No.2
A2461-3C (010-035)

J6
J5
GND
SW4, CT
VR8, No.2
VR7, No.2



GRN
22
PH3
GND
PH2
GND
PH1
GND
PH4
GND
45

REVERB UNIT OUTPUT

CLOCK BALANCE

BBD BIAS ADJ

Can be replaced by ET-13A.
When VR-20 is left effective, R132 on ET-13A should be the same as is on ET-13 (in value, in connection).

J4
VR4, No.3
VR4, No.2
LED1
GND
VU METER (+)

PS-30

REC-EQ ADJ

BIAS TRAP CHECK POINT

6-1 MAIN BOARD ET-13 A (151-013A)

MAY 30 1979

Can replace ET-13 see note below.

IC8: MN3004 IC9: CD4001UBE



TOP VIEW

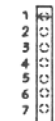


TOP VIEW

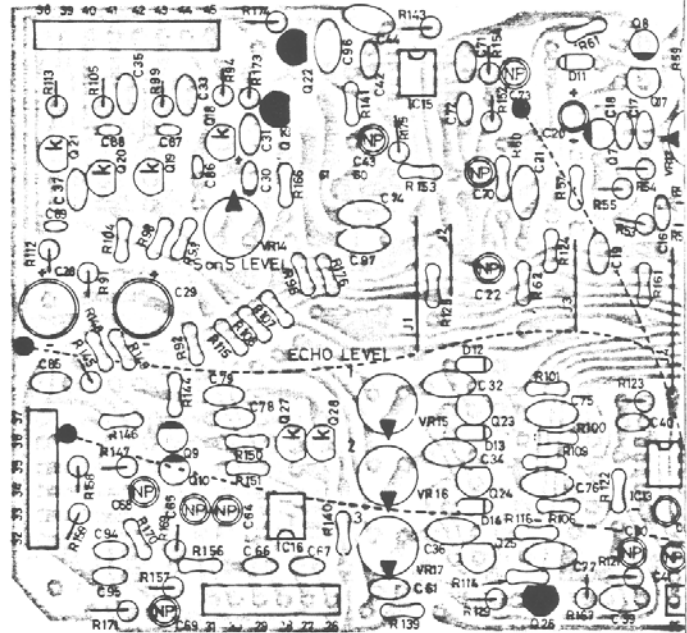
IC12: TA7200P IC14: TA7136P



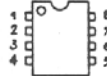
TOP VIEW



TOP VIEW



IC'S
IC5, 6, 13, 15, 16:
JRC4558D (NJM)
μPC4558C (NEC)

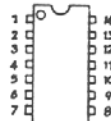


TOP VIEW

IC10: DN819 IC11: μPC324C



TOP VIEW



TOP VIEW

Circuit impro

Serial No. 764800

PCB Assy chang
inter
taken
- ref

S.on. S. add,-
chang
chang

OUTPUT add,-
IC7 chang
3080
inter
of pi

2SC100GR repla
inter

Serial No.764950 -

NOISE CANCEL Varia
VR

S/N No.805700 -
R168(

⊗: Q18 - 21, Q27, Q28

2SK68A-K

●: Q26, Q22, Q29

2SK30A-Y

○: Q1, Q2, Q4 -10

2SC732TM-GR

○: Q3

2SA733-P or Q

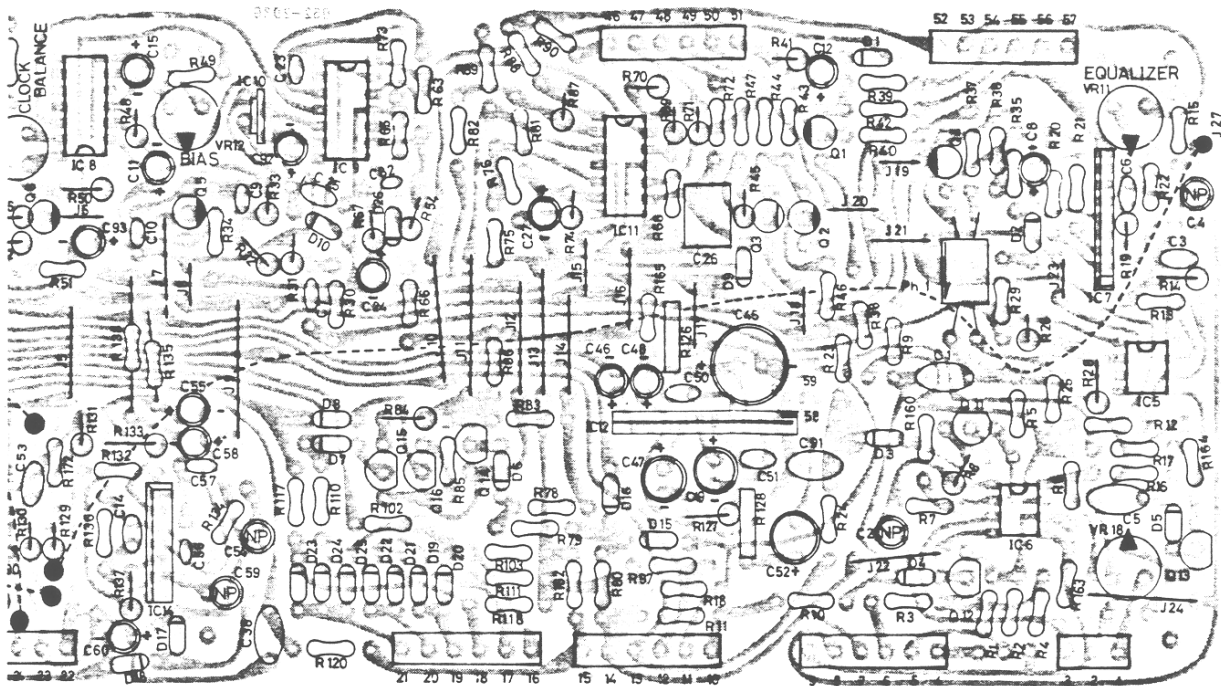
○: Q11 - 17, Q23 - 25

2SK68A-K or L, M, N

⊢: Diode

1S1588

Serial No.764800and higher



vements and Component changes

e,- ET-13 to ET-13A
changeable, but care should be
if NOISE CANCEL,VR20 is needed
er to below.

FET switch Q29, 2SK30A-Y
e,- Q22, 2SK68 to 2SK30A-Y
e,-EQ circuit (RC constant)

LPF

e,- 3080A to BA662
is not in production
changeable with proper connection
ns.

ce,- by 2SC732TM-GR
changeable

805699

ble to Fix resistor
20 to R168, 18k-ohm

bs.) to R132(1k to 2.2k)

LEVEL METER

S/N No. 785450 -

change,- BK-560(SK-50) to EMT-2410
compatible

IC CD4001BE

change,- to CD4001UBE or TC4001UBP
CD4001BE with internal buffer for
output gate

CD4001UBE without buffer

Using CD4001BE in CLOCK GENERATOR
may result in no oscillation.

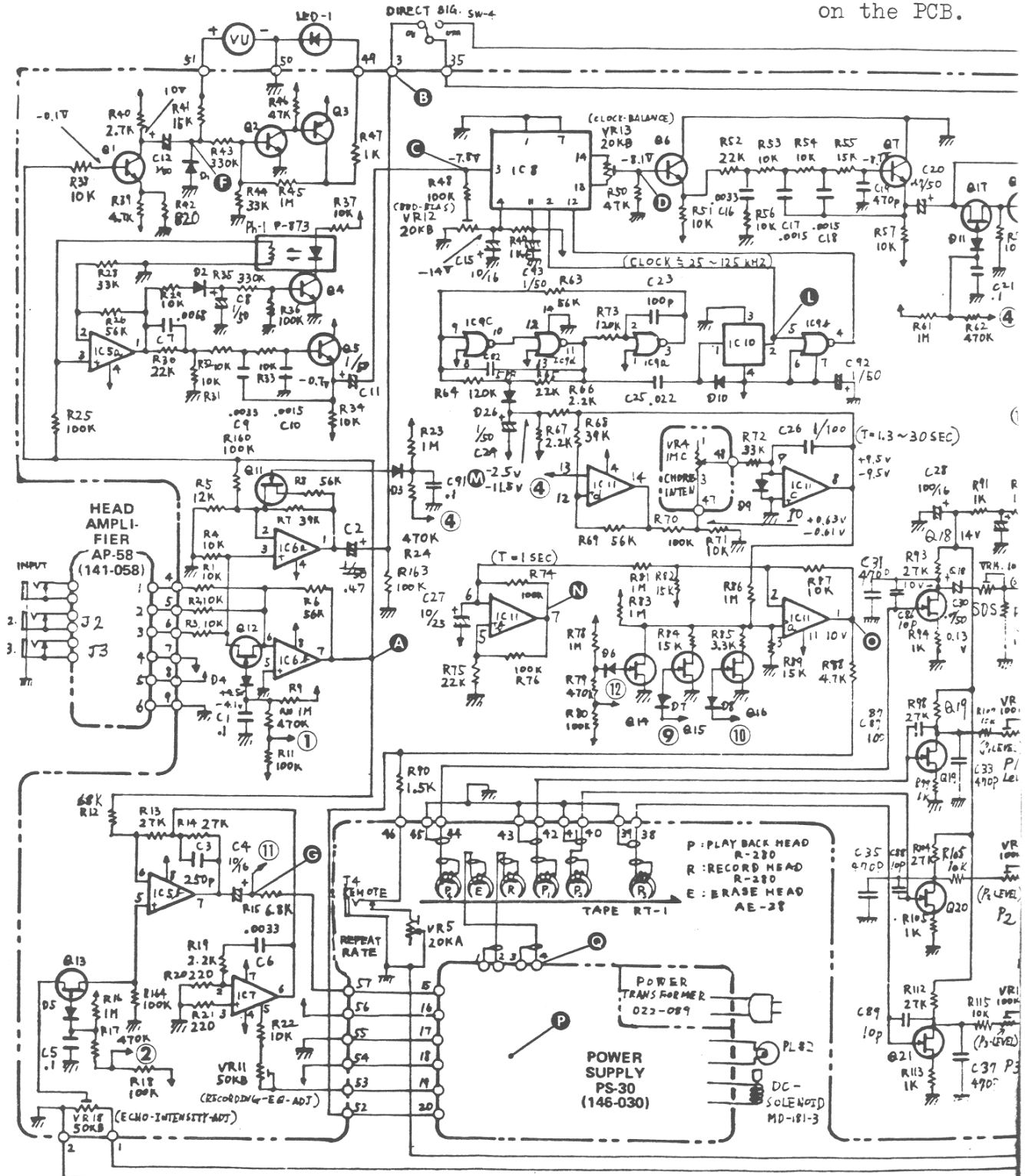
NOTE: To replace ET-13 with ET-13A,
R132 (2.2K) should be changed
to 1k with one end connected
to pin 22 if VR-20 left
effective.

JUN 30 1977 RE-301

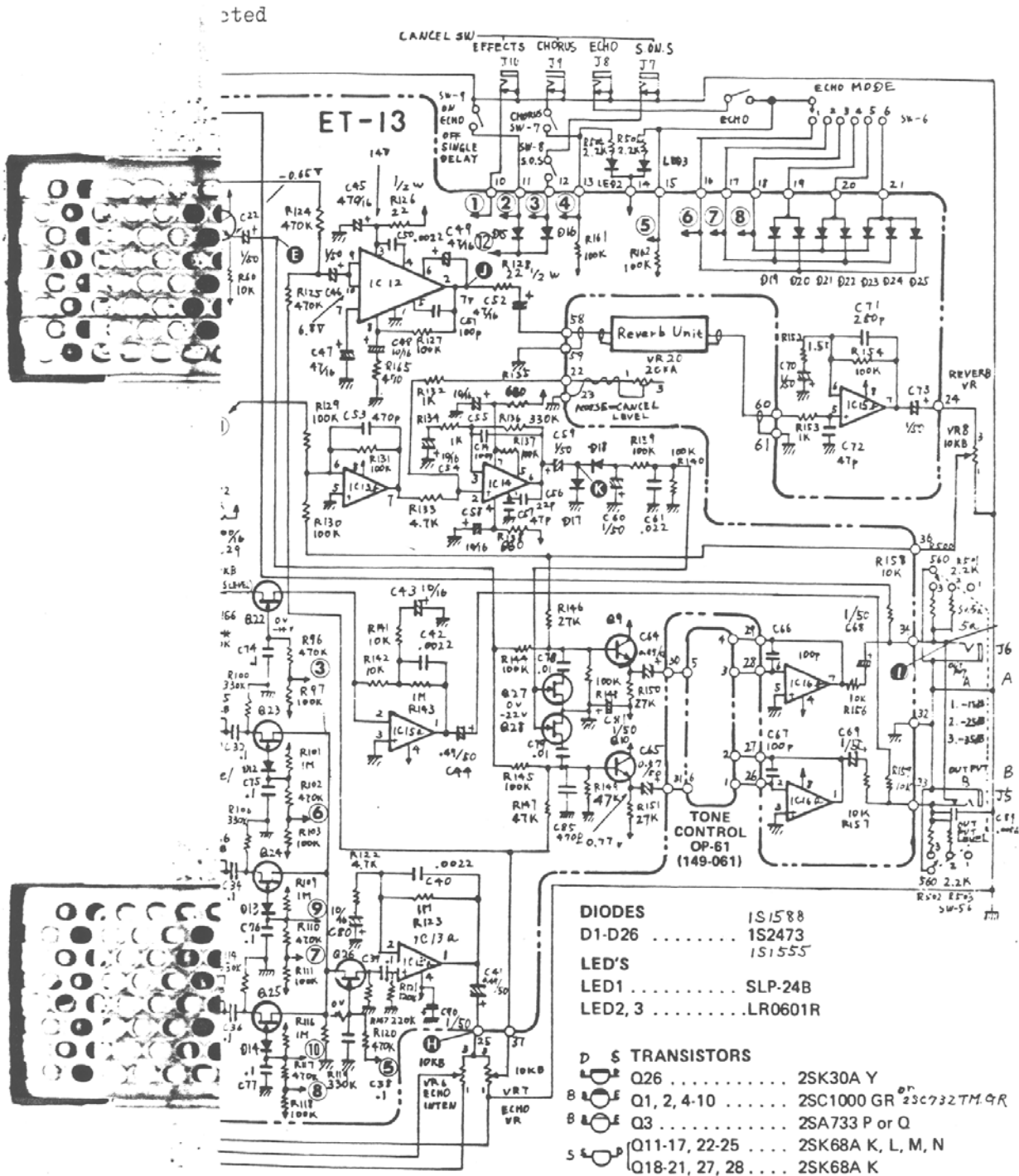
Stenciled letters indicate waveform check point.

- see page 3 -

Encircled figures of the same number are interconne on the PCB.



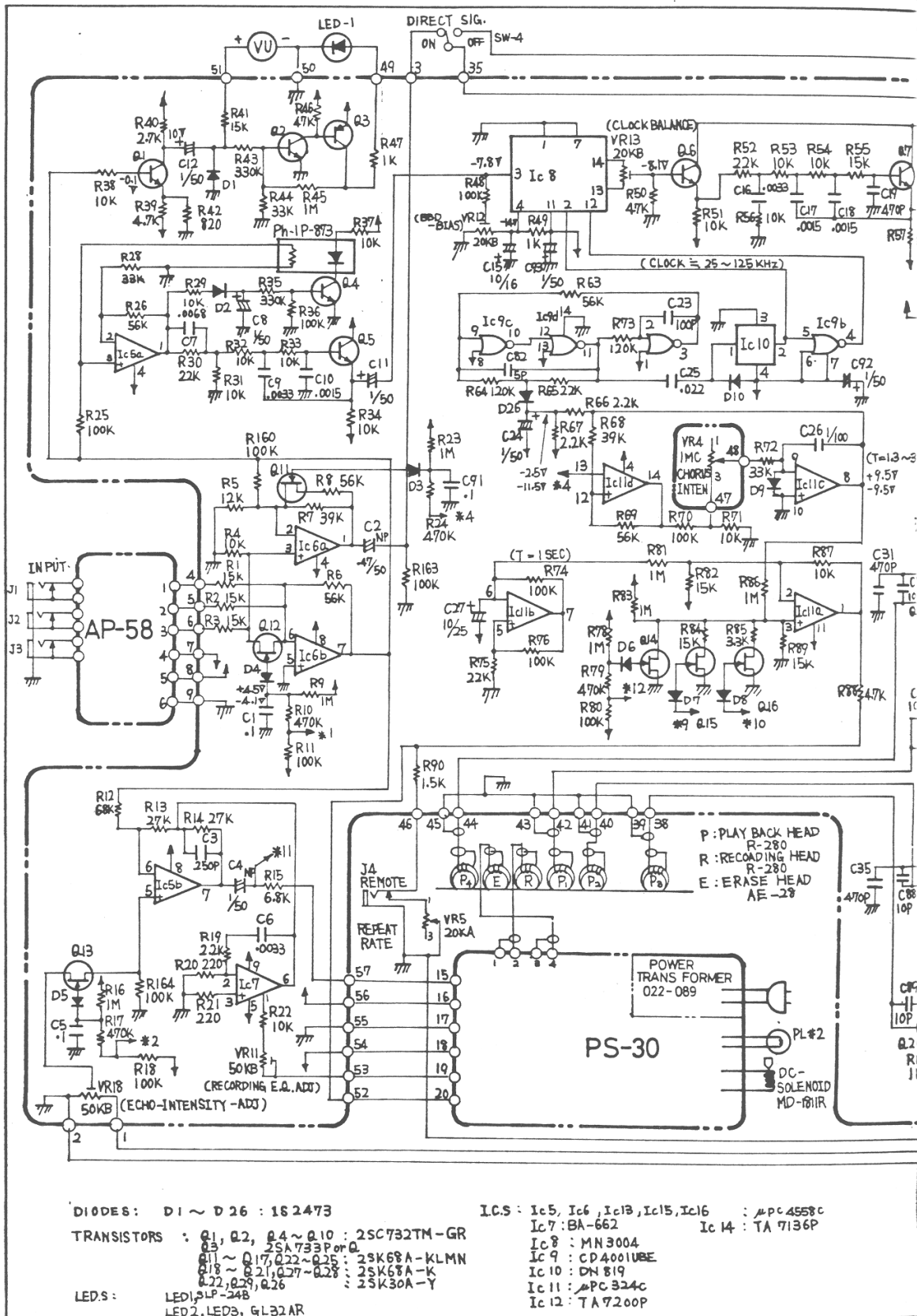
7 CIRCUIT DIAGRAM Serial No. up to 764799

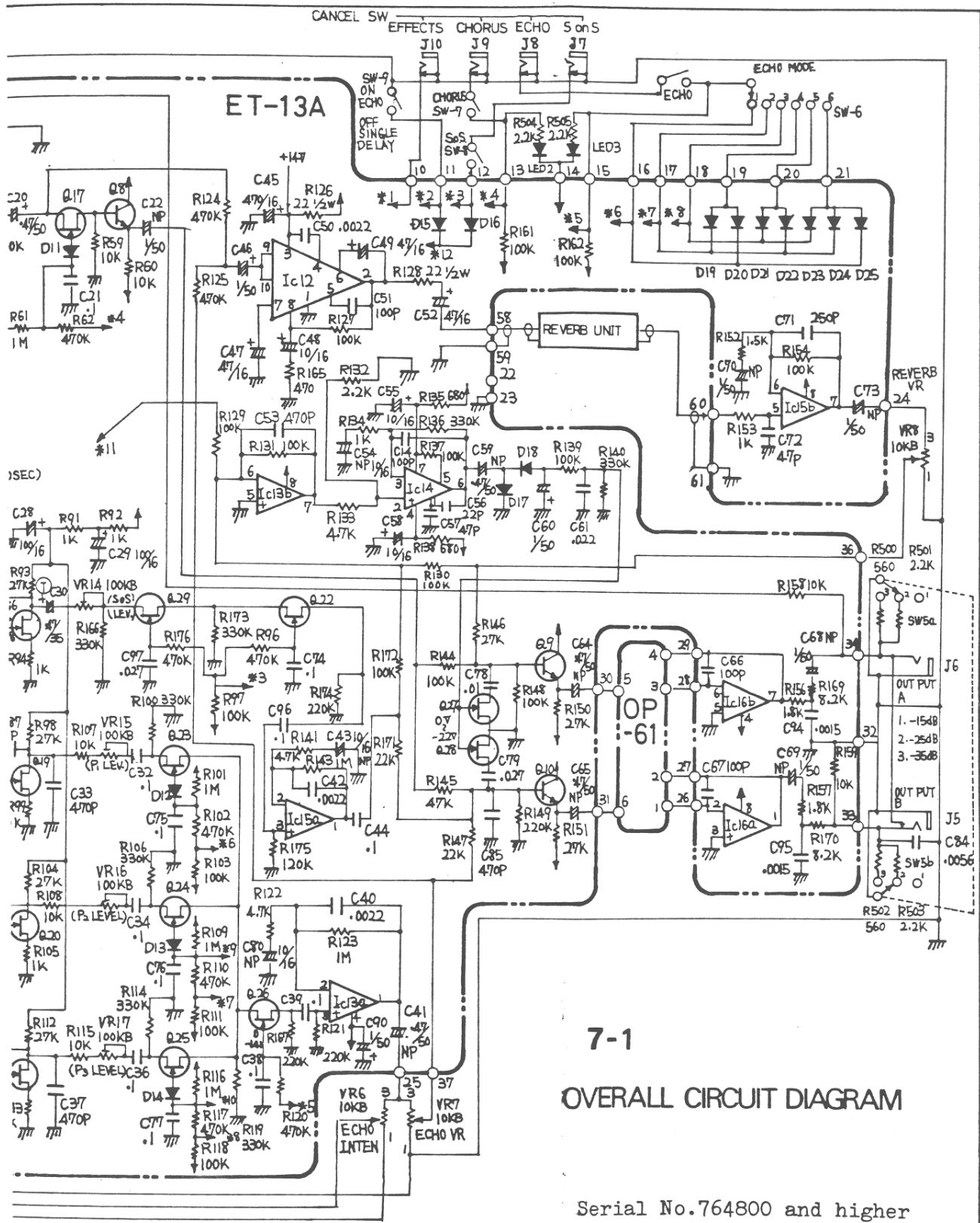


- DIODES**
 D1-D26 1S1588
 1S2473
 1S1555
- LED'S**
 LED1 SLP-24B
 LED2, 3 LR0601R

- D S TRANSISTORS**
 Q26 2SK30A Y
 Q1, 2, 4-10 2SC1000 GR 2SC7327M 4R
 Q3 2SA733 P or Q
 Q11-17, 22-25 2SK68A K, L, M, N
 Q18-21, 27, 28 2SK68A K

TOP VIEW



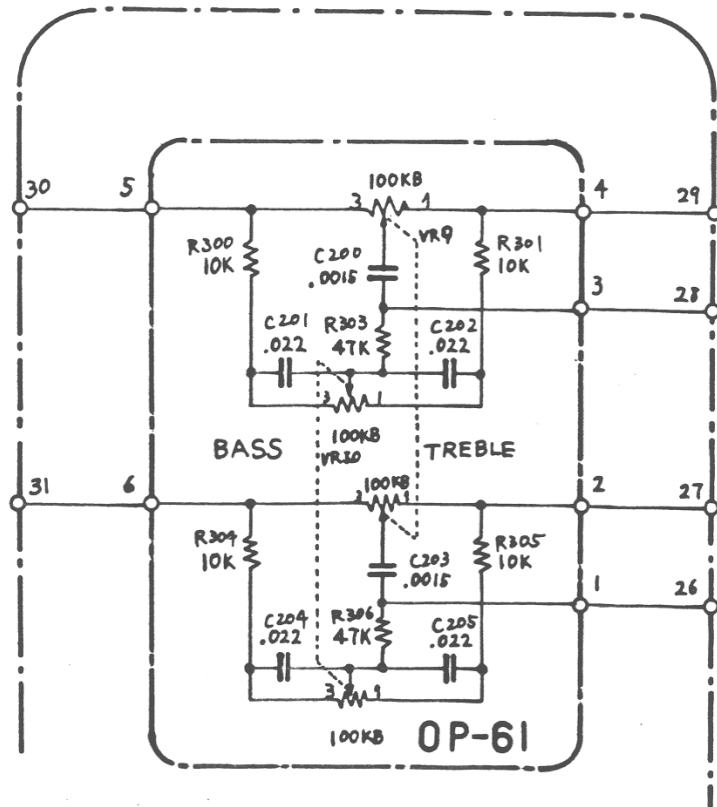
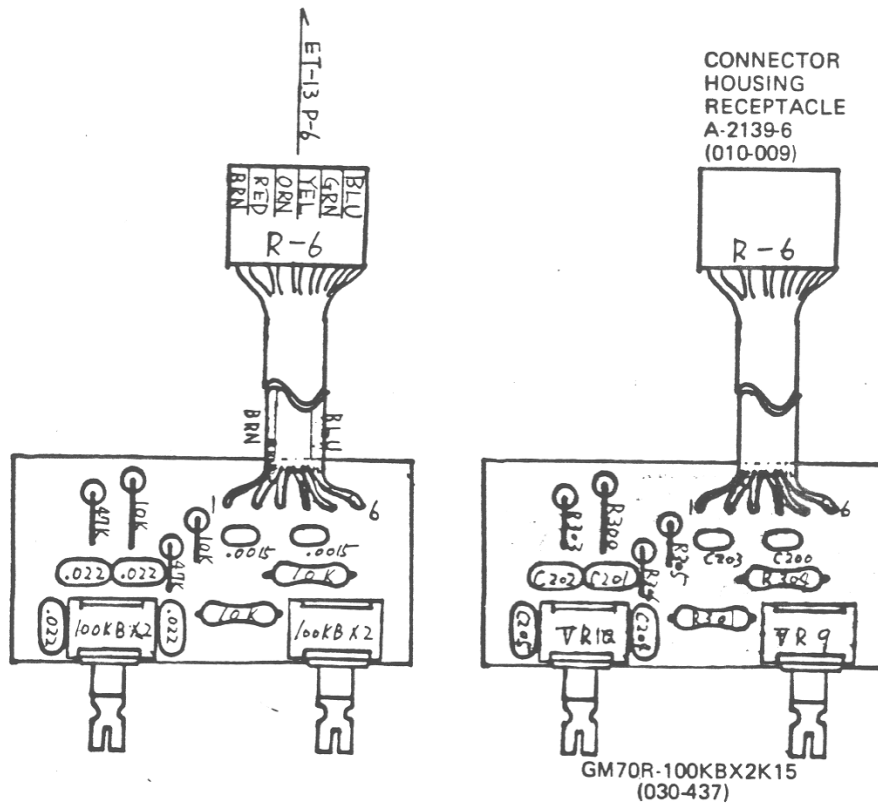


7-1
OVERALL CIRCUIT DIAGRAM

Serial No.764800 and higher

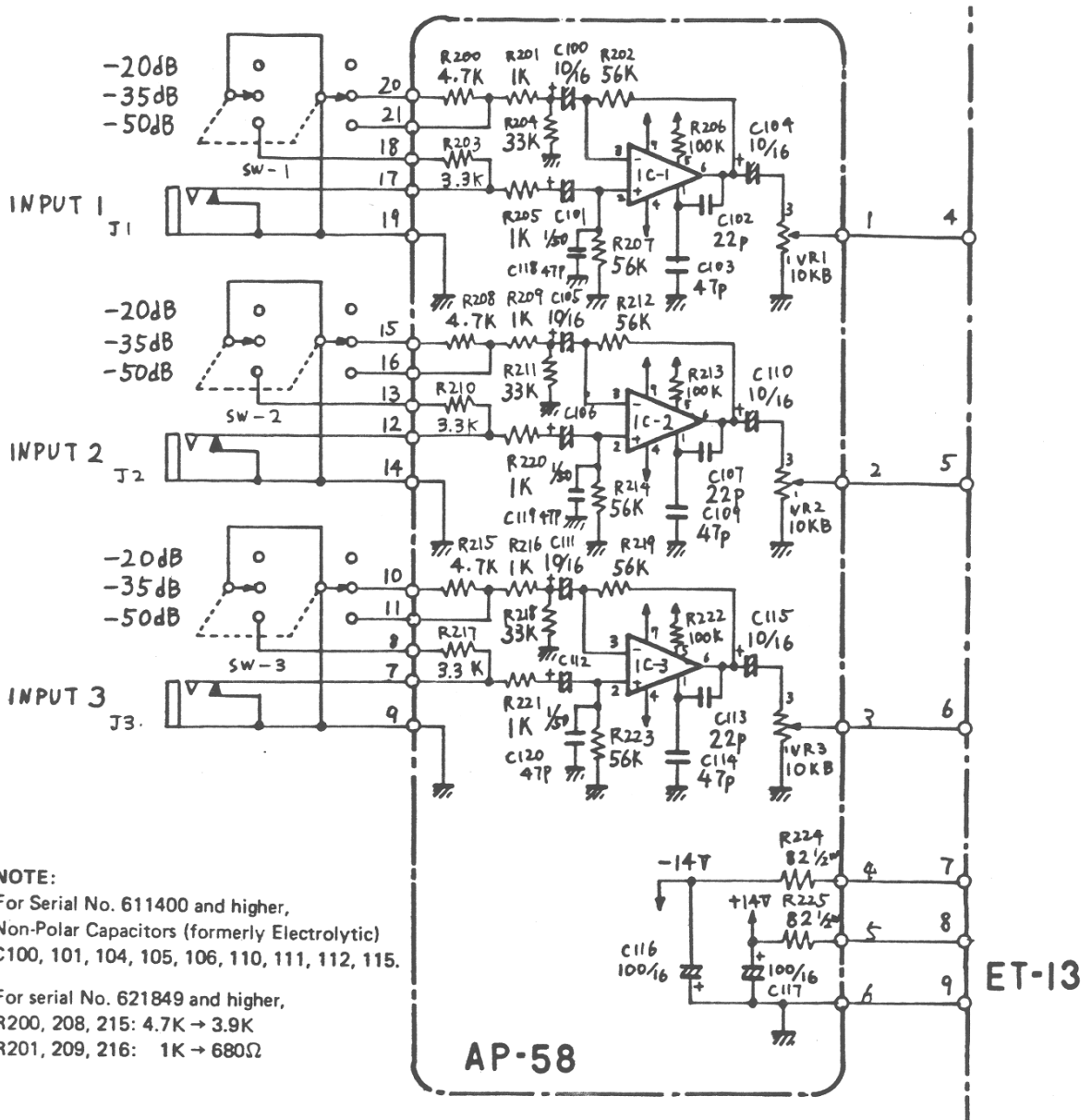
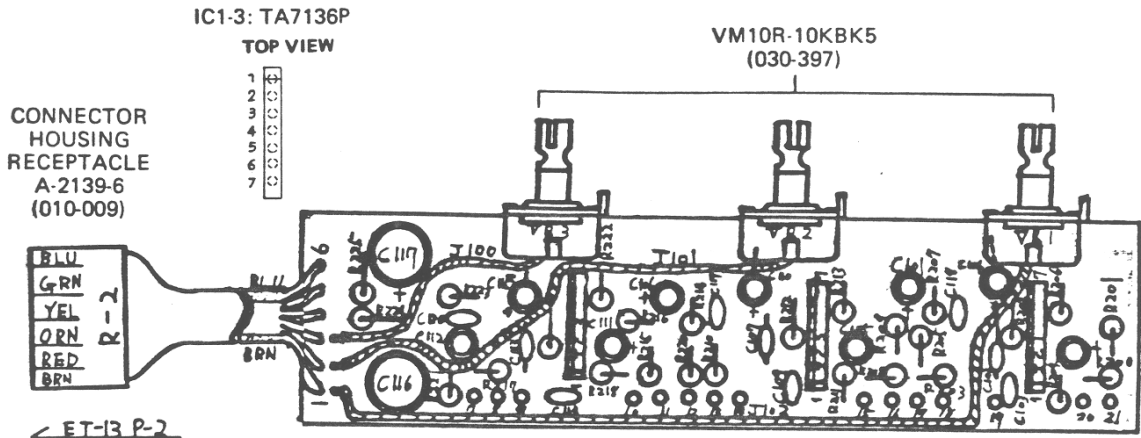
Figures of the same number marked with "*" are interconnected on the PCB.

8. TONE CONTROL OP-61 (149-061)

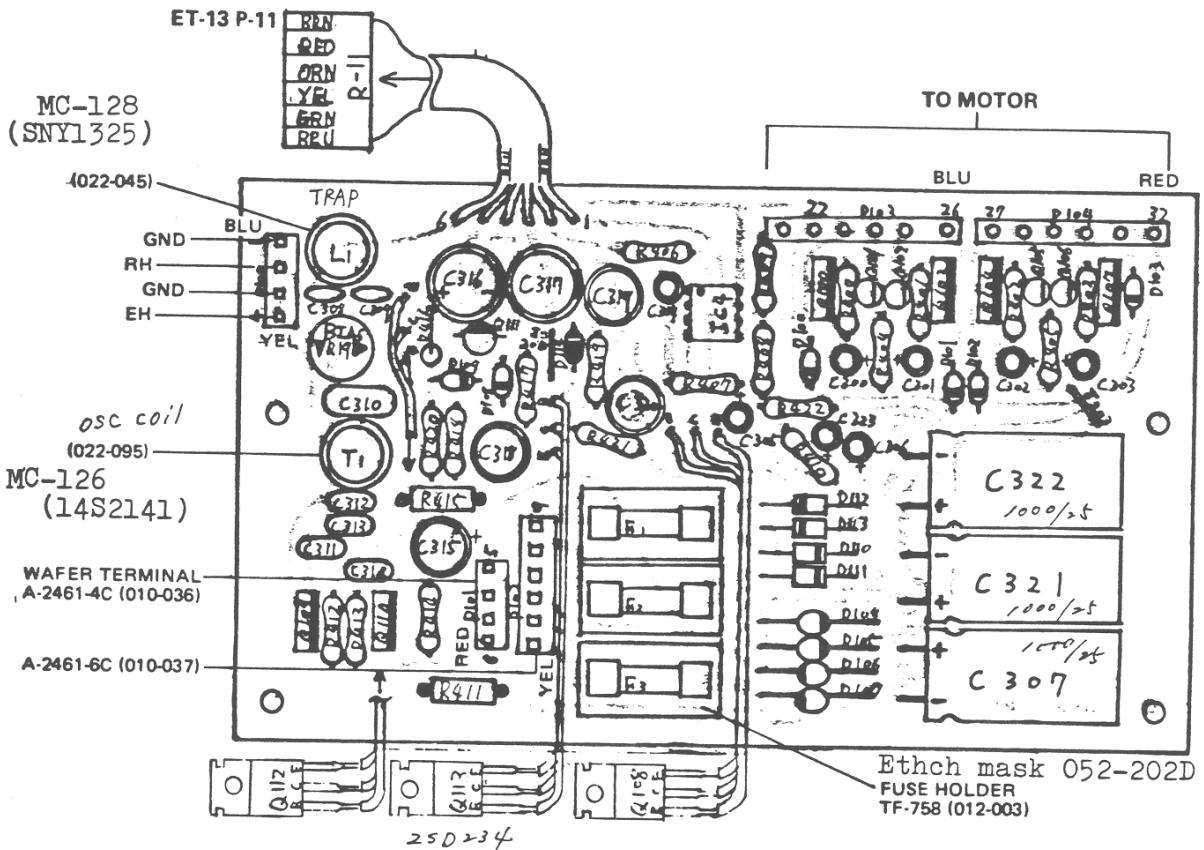


ET-13

9. HEAD AMPLIFIER AP-58 (141-058)



10. POWER SUPPLY PS-30 (146-030)



Serial No. 764800 and higher

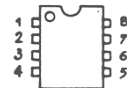
Etch mask 052-202G (compatible, slight shift of pattern)

AC LINE VOLTAGE - FUSE RATING

| | 100-120V | | 220-240V (DNS) | | 220-240V | |
|----|----------|---------|----------------|-----------|----------|---------|
| F1 | 1.0A SGA | 008-026 | 400mAT | Ⓢ 008-062 | 1.0A SGA | 008-026 |
| F2 | 1.0A SGA | 008-026 | 400mAT | Ⓢ 008-062 | 1.0A SGA | 008-026 |
| F3 | 2.0A SGA | 008-028 | 1.6AT | Ⓢ 008-069 | 2.0A SGA | 008-028 |
| F4 | 1.0A SGA | 008-026 | 400mAT | Ⓢ 008-062 | 0.5A SGA | 008-024 |

IC

IC4 JRC4558D (NJM)
 μPC4558C (NEC)

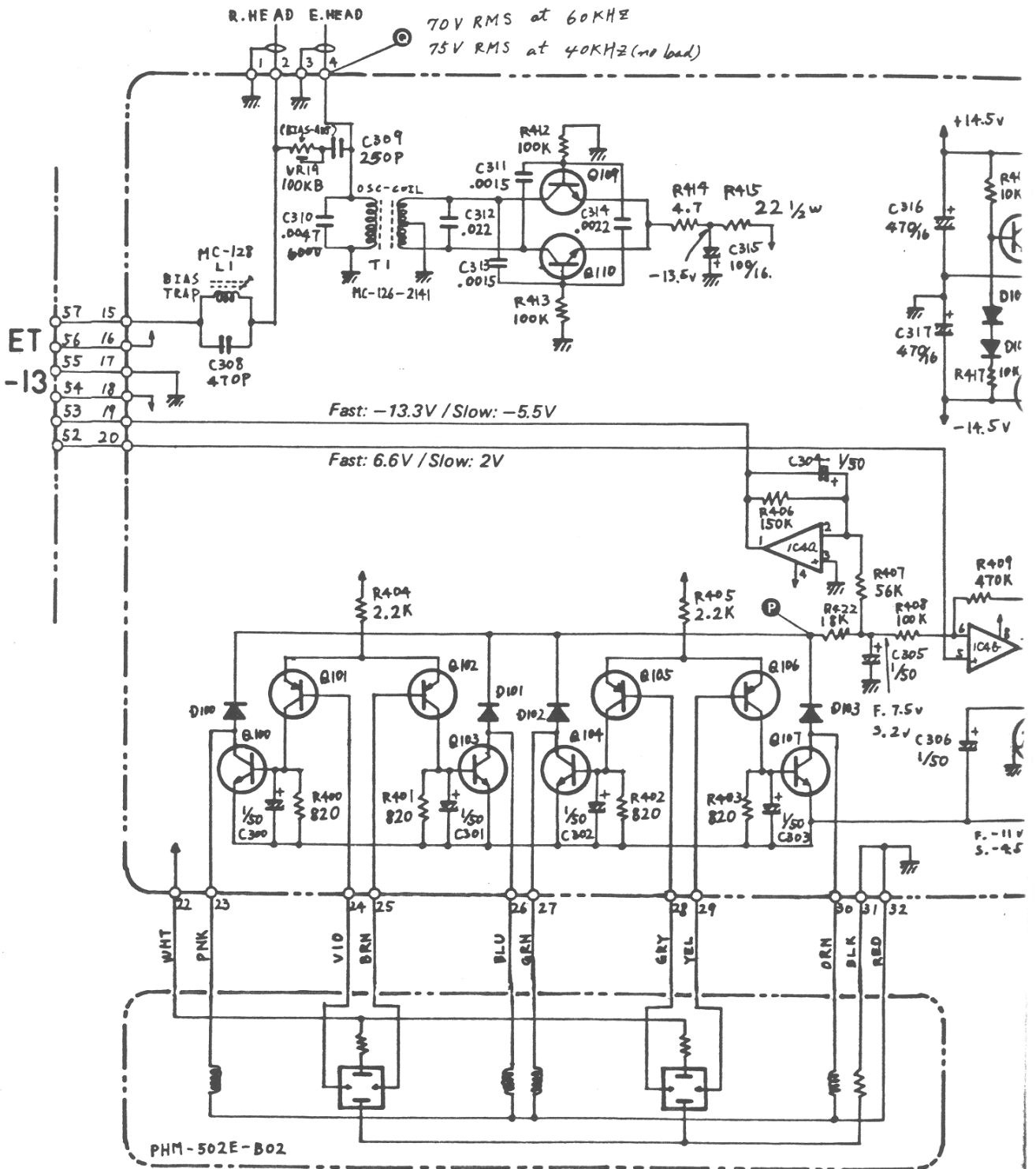


DIODES

- Ⓢ D100-103, 108, 109 1S2473
- D104-107 GM-3Z
- D110-113 1N4003
- D114 05Z-15

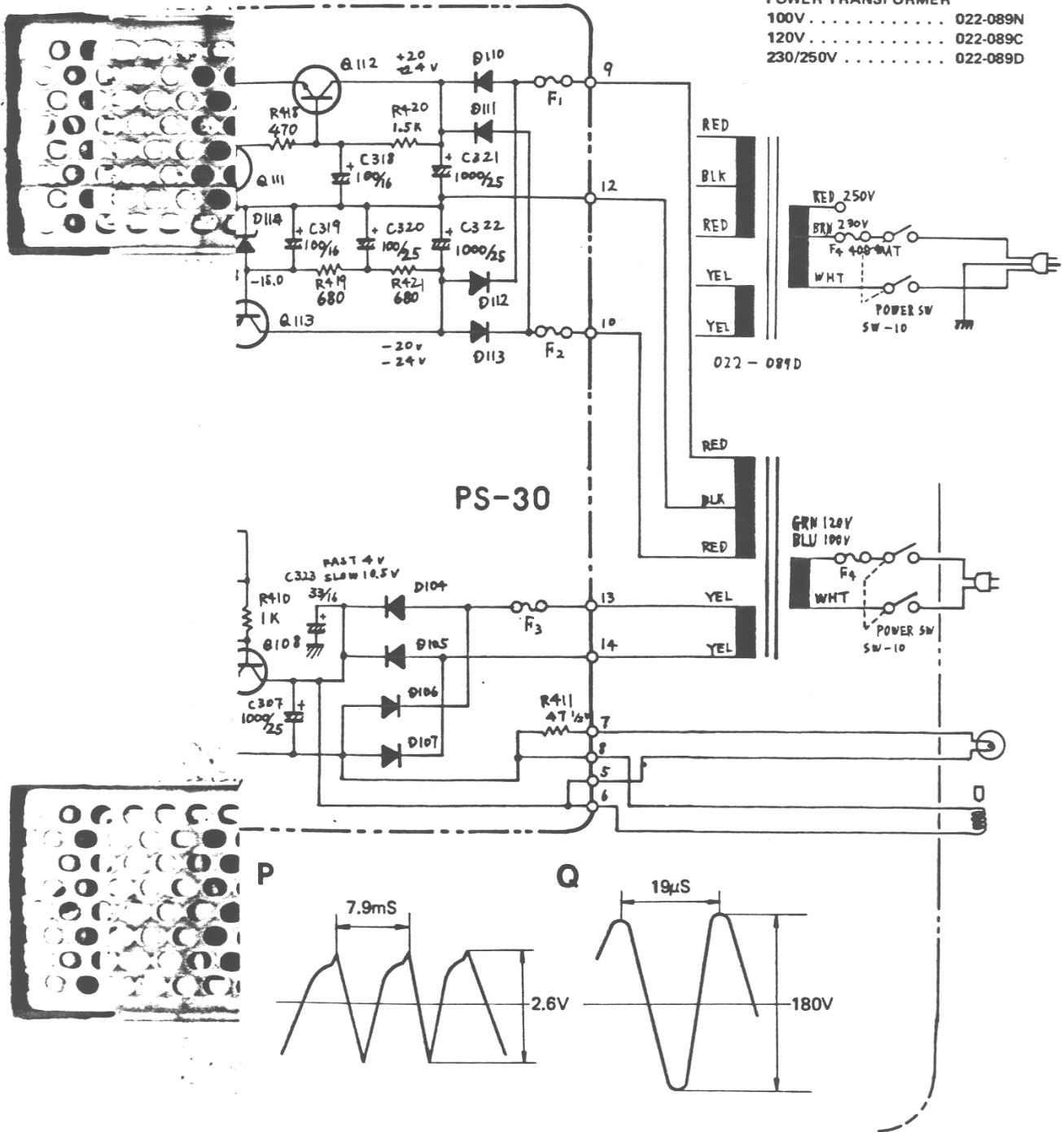
TRANSISTORS

- 110 Q100, 103, 104, 107, 109. 2SD571 L
- Q101, 102, 105, 106 2SA733 P or Q
- Q108, 112 2SD234 O
- Q113 2SB434 O
- Q111 2SC1000 GR

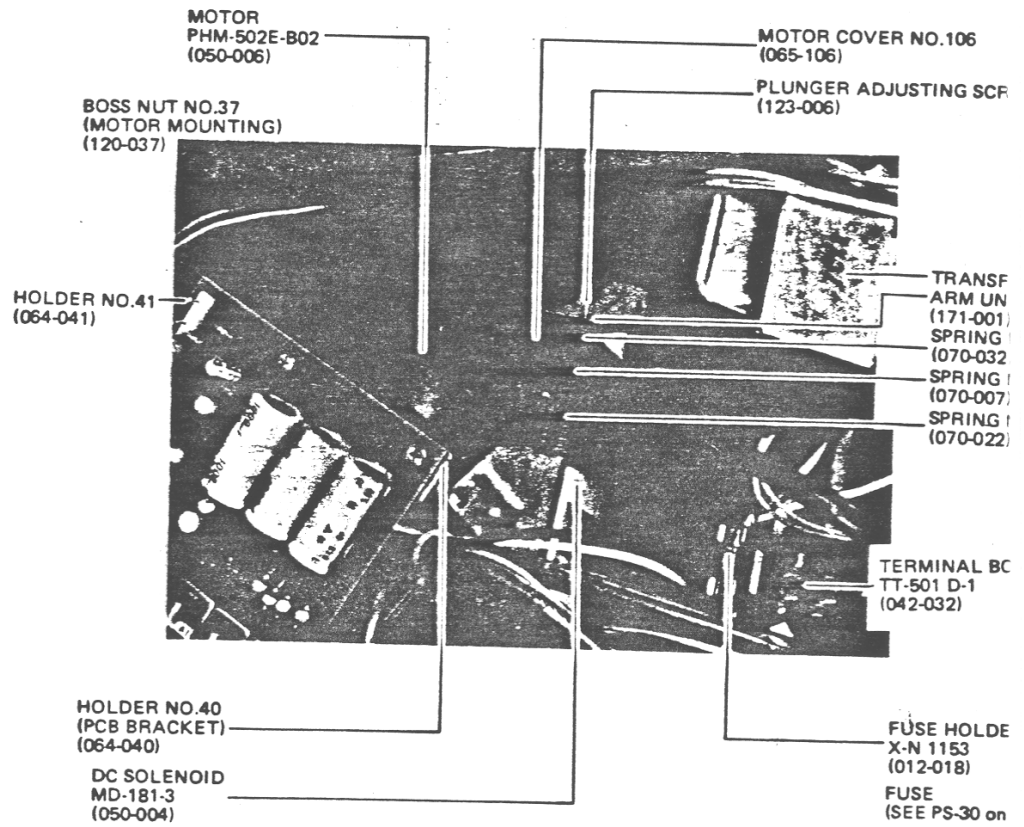
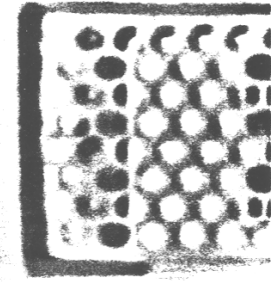
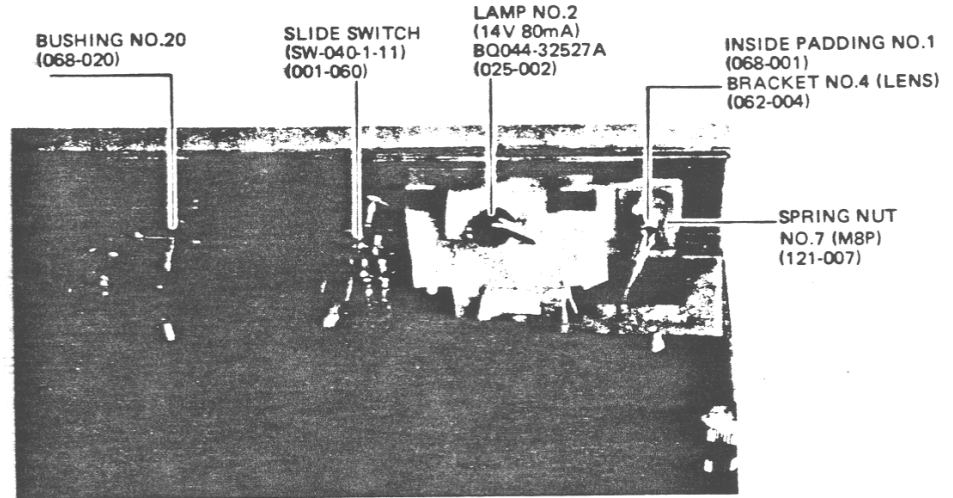
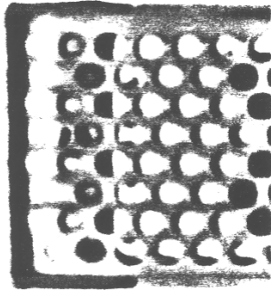


CIRCUIT DIAGRAM / POWER SUPPLY

POWER TRANSFORMER
 100V 022-089N
 120V 022-089C
 230/250V 022-089D



PARTS ILLUSTRATED



PARTS LIST

(MAY 30, 1979 2nd) RE-301

| PARTS NO. | PARTS NAME AND DESCRIPTION | PARTS NO. | PARTS NAME AND DESCRIPTION |
|--------------------|--|-----------|--|
| | CABINET ASS'Y (includes the following) | | SWITCHES |
| 081-078 | Cabinet & Cover | 001-254 | Rotary SRN 1016S-k15 |
| 108-004 | Carrying Handle H-15 | 001-012 | Power WD-1311 (S6B-7 for 117V) |
| 065-001 | Cover, cord box | 001-102 | Midget BA-1011 |
| 114-003 | Clasp | 001-018 | Slide SW-321-1-1 |
| 115-002 | Hinge obs. | 001-060 | Slide SW-040-1-11 |
| 111-017 | Rubber Foot G-1 | 001-150 | Push SUE-22A11 |
| 111-030 | Rubber Foot G-9 | 009-001 | Jack SG-7615 No.5 |
| 064-012 | Angle H-12 | 046-003 | VU Meter SK-50 → BK560 → EMT2410 |
| 065-112 | Ventilation Grille | 025-002 | Lamp BQ044 (14V, 80mA) interchangeable |
| 131-023A | Vinyl Cover 替 23A | 040-001 | Reverb Unit Z-3F |
| 130-056 | Carton No.156 | 010-028 | Connector 3-pin A-2139-3 |
| 057-004 | Cleaner Set | 010-008 | Connector 4-pin A-2139-4 |
| 057-006 | Tape RT-1L (4.5m) | 010-009 | Connector 6-pin A-2139-6 |
| 053-013 | Connection Cord LI-10 | 010-035 | Wafer Terminal 3-pin A-2461-3C |
| 061-138 | Chassis, main | 010-036 | Wafer Terminal 4-pin A-2461-4C |
| 061-160 | Chassis, input | 010-037 | Wafer Terminal 6-pin A-2461-6C |
| 061-161 | Chassis, tone | 022-095 | OSC Coil MC-126-2141 |
| 065-019 | Cover No.19 | 022-045 | Trap Coil MC-128 |
| 073-024 | Spacer No.24, (See photo, page 20.) | 022-089N | Power Transformer (100V) |
| 063-013 | Plate No.13 | 022-089C | Power Transformer (117V) |
| 065-114 | Head Cover | 022-089D | Power Transformer (220/240V) |
| 067-005 | Guide Post, tape | 012-003 | Fuse Holder TF-758 (sec.) |
| 064-025 | Guide, tape | 012-018 | Fuse Holder X-N 1153 (prim.) |
| 064-127 | Platform, head | 042-032 | Terminal TT-501D-1 2P |
| 070-005 | Spring No.5 | 047-025 | Line Cord Strain Relief EA-5 |
| 049-003 | Record Head R-280MR | | TRANSISTORS |
| 049-004 | Playback Head R-280MP | 017-010 | 2SD-234 (O) |
| 049-001 | Erase Head AE-28 | 017-022 | 2SB-434 (O) |
| <i># NO.4</i> | 065-118 | 017-072 | 2SD-571 (L) |
| | 112-001 | 017-003 | 2SC-1000 (GR) or 2SC732TM-GR |
| | 068-006 | 017-012 | 2SA-733 (P) or (Q) |
| | 101-001 | | FET's |
| | 050-006 | 017-081 | 2SK-68A (K) (L/M/N) |
| | 065-106 | 017-014 | 2SK30A (Y) |
| | 120-037 | | DIODES |
| | 069-009 | 018-014 | 1S-2473 (1S-1555) |
| <i>RMER</i> | 171-001 | 018-064 | GM-3Z |
| <i>AU-1</i> | 050-004 | 018-022 | 1N-4003 |
| <i>J.32A</i> | 070-007 | 018-024 | Zener 05Z-15 (500mW, 15V) |
| | 070-022 | 019-003 | LED SLP-24B |
| <i>J.7</i> | 070-032 | 019-008 | LED GL-32AR |
| | 123-006 | 019-011 | Photocoupler P873A (RE) or (WHT) |
| <i>J.22</i> | 064-040 | | IC's |
| | 064-041 | 020-028 | TA-7200P |
| | 016-004 | 020-071 | JRC (NJM) 4558D |
| | 016-026 | 020-015 | CA3080A or 020-160 BA662 |
| | 016-021 | 020-027 | TA7136P |
| <i>.RD 2P</i> | 062-004 | 020-067 | CD4001UBE or 020-194 TC4001UBP |
| | 068-001 | 020-069 | μPC324C |
| | 121-007 | 020-063 | MN3004 |
| | 068-020 | 020-039 | DN819 |
| | 064-033 | | PCB |
| | | 151-013 | ET-13 Assembly |
| | | 052-203C | ET-13 less parts |
| | | 141-058 | AP-58 Assembly |
| | | 052-200B | AP-58 less parts |
| | | 149-061 | OP-61 Assembly |
| | | 052-201B | OP-61 less parts |
| | | 146-030 | PS-30 Assembly |
| | | 052-202D | PS-30 less parts -- 202G |

age 10.)

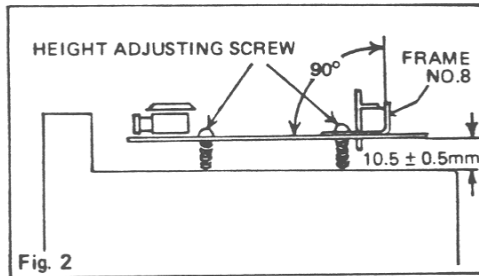
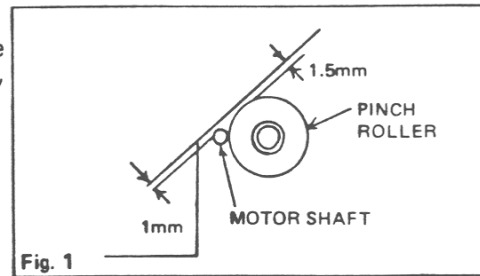


ADJUSTMENT AND CHECKING

1. MECHANICAL ADJUSTMENT

1-1. TAPE CHASSIS POSITION

Adjust the tape chassis position so that the clearance from the motor shaft is 1mm. See Fig.1. Secure it by tightening 2 screws at the rear section of the chassis.

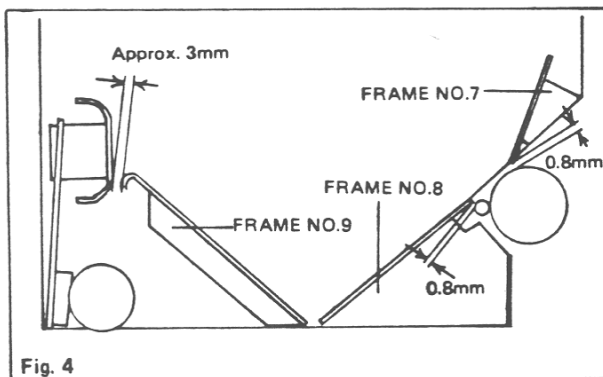
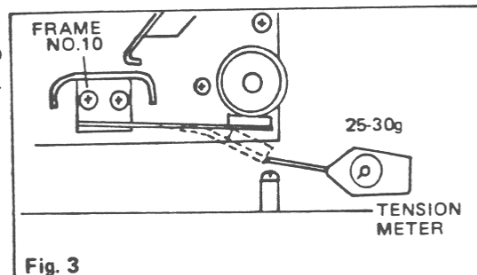


1-2. TAPE CHASSIS HEIGHT (TEMPORARY)

Adjust the tape chassis height so that it is $10.5 \pm 0.5\text{mm}$ above the main chassis. See Fig.2. (Make sure that Frame No.8 is not deformed.)

1-3. LEAF SPRING PRESSURE

Adjust position of Frame No.10 so that the tension to separate the leaf spring from the bearing roller is 25 – 30g. See Fig.3.



1-4. POSITION OF FRAMES NOS. 7, 8 AND 9

Secure the frames as illustrated in Fig.4.

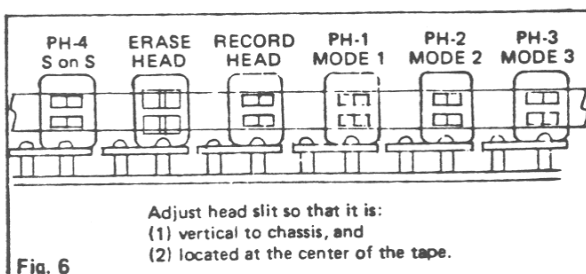
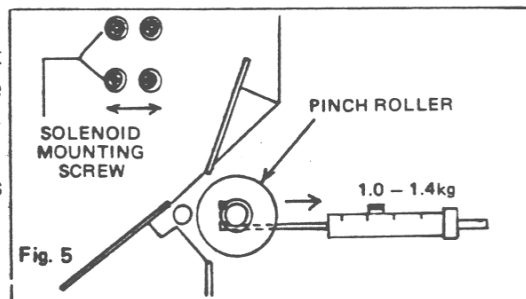
CAUTION:

Make adjustment of position of Frames Nos. 7 and 8 accurately with the pinch roller in contact with the motor shaft.

1-5. PINCH ROLLER PRESSURE

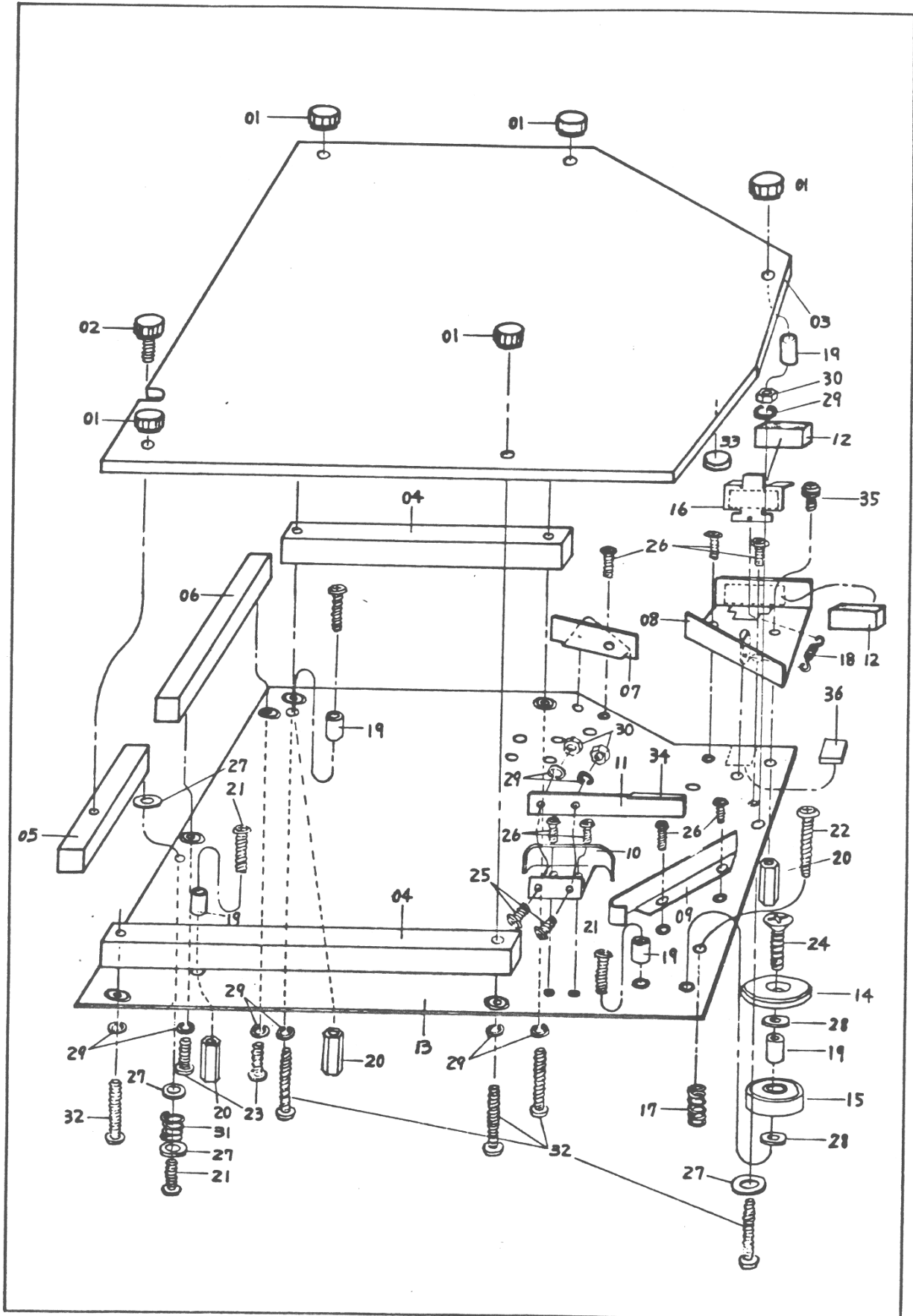
Plug in the power cord and turn switch on. Adjust the solenoid position so that the tension to separate the pinch roller from the motor shaft is 1.0 – 1.4kg, using a spring balance. See Fig.5.

CAUTION: Make sure that pinch roller surface is perfectly parallel with the motor shaft.



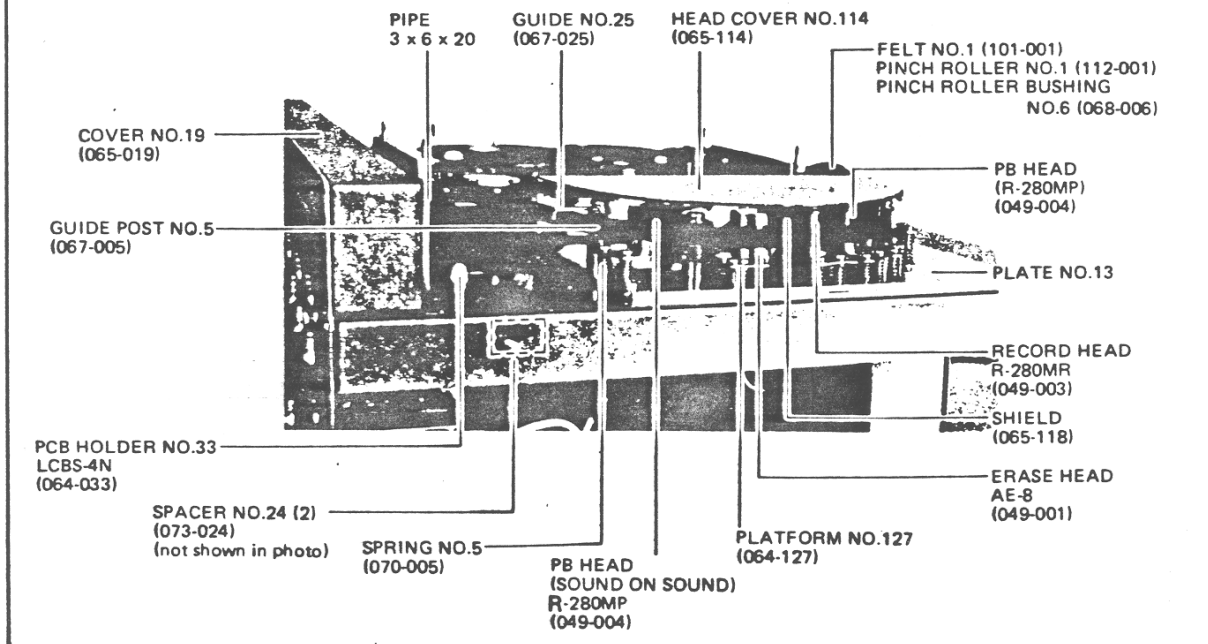
1-6. TAPE PACK HEIGHT (FINAL)

- Thread the tape and run it.
- Consulting Fig.6, visually adjust the head alignment. (This alignment must be made first, otherwise tape cannot run stably.) Then proceed to electrical adjustment.

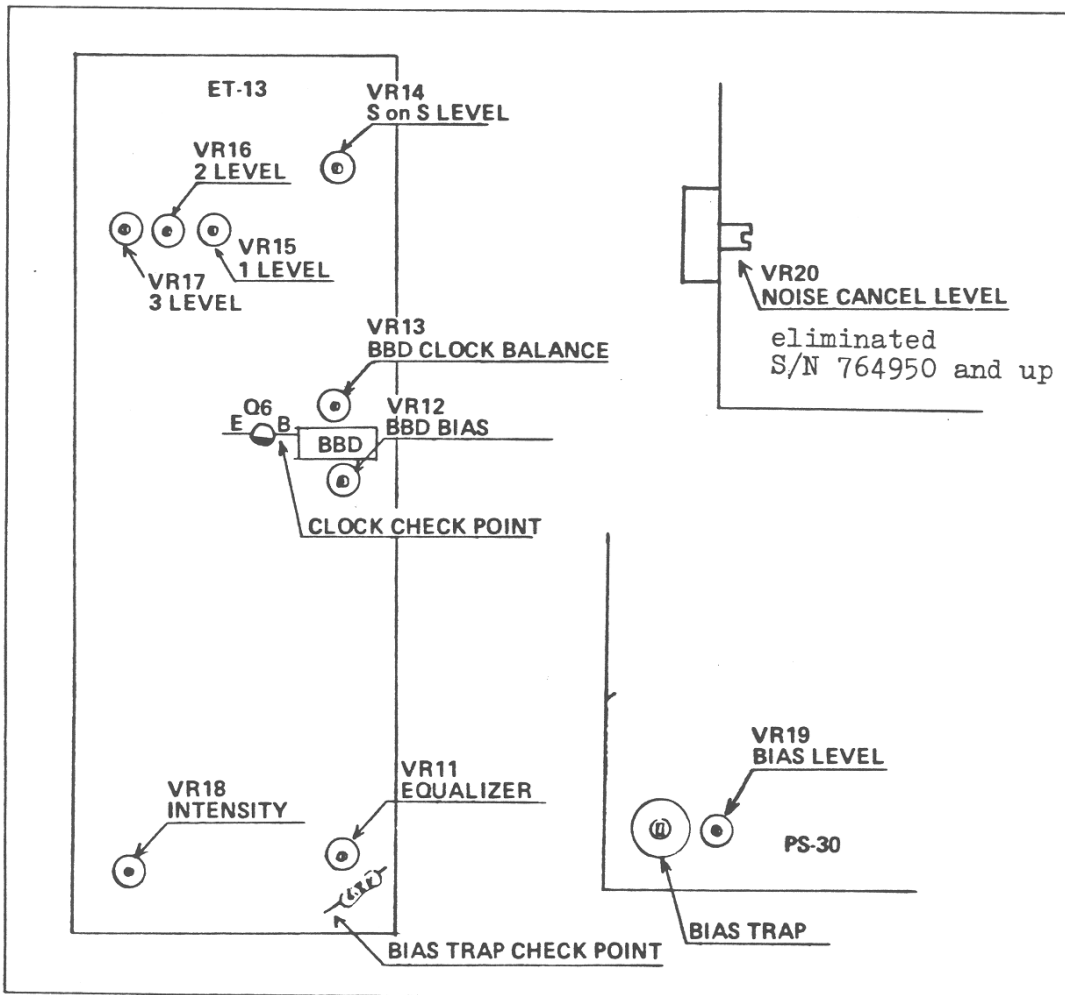


| NO. | PARTS NO. | PARTS NAME AND DESCRIPTION |
|-----|-----------|--|
| 01 | 120-036 | Nut, Decoration, M3 |
| 02 | 123-004 | Screw, Decoration, M3 |
| 03 | 092-004 | Top cover No.4, pack (acrylic) |
| 04 | 079-004 | Frame No.4 |
| 05 | 079-005 | Frame No.5 |
| 06 | 079-006 | Frame No.6 |
| 07 | 079-007 | Frame No.7 |
| 08 | 079-008 | Frame No.8 |
| 09 | 079-009 | Frame No.9 |
| 10 | 079-010 | Frame No.10 |
| 11 | 070-033 | Leaf spring No.33 |
| 12 | 101-017 | Felt No.17 |
| 13 | 061-063A | Chassis No.63A |
| 14 | 065-113 | Cover, Bearing |
| 15 | 113-004 | Bearing |
| 16 | 063-011 | Plate No.11 |
| 17 | 070-017 | Spring No.17, Support for chassis |
| 18 | 070-018 | Spring No.18 |
| 19 | * | Collar (plastic), M3 x 6mm |
| 20 | 120-001 | Sleeve Nut No.1, 10mm |
| 21 | * | Screw, B.H. M3 x 12mm, Nickel |
| 22 | * | Screw, B.H. M3 x 15mm, Chrome |
| 23 | * | Screw, B.H. M3 x 6mm, |
| 24 | * | Screw, O.H. M3 x 15mm, Nickel |
| 25 | * | Screw, B.H. M3 x 6mm, |
| 26 | * | Screw, T.H. M2.6 x 4mm, Nickel |
| 27 | * | Plain washer M3 x 8 x 0.5mm |
| 28 | 121-035 | Plain washer No.35, M3 x 8 x 0.3mm Phosphor bronze |
| 29 | * | Spring washer M3 |
| 30 | * | Nut, Hex M3 |
| 31 | 070-005 | Spring No.5 |
| 32 | * | Screw, B.H. M3 x 18mm |
| 33 | 101-008 | Felt Chip No.8 |
| 34 | 101-026 | Felt No.26 |
| 35 | * | Screw, SEMS M3 x 8mm, Chrome (wire spring washer) |
| 36 | 107-004 | Cushion No.4 |

* R-280MR
can be used for
R-280MP



2. ELECTRICAL ADJUSTMENT



SETTING OF SWITCHES AND CONTROLS ON FRONT PANEL FOR ADJUSTMENT

| | ECHO | CHORUS | SOUND ON SOUND | REVERB | DIRECT |
|--------------------------|--------------|--------------|----------------|--------|--------|
| Input Level Switch | -50dB | -50dB | -50dB | -50dB | -50dB |
| Input Volume | Max. | Max. | Max. | Max. | Max. |
| Output Level Switch | -15dB | -15dB | -15dB | -15dB | -15dB |
| Echo Switch | ON | OFF | OFF | OFF | OFF |
| Echo Mode Switch | as specified | - | - | - | - |
| Echo Volume | Max. | - | - | - | - |
| Repeat Rate | as specified | - | as specified | - | - |
| Chorus Switch | OFF | ON | OFF | OFF | OFF |
| Chorus Intensity | - | as specified | - | - | - |
| Direct Signal Switch | OFF | OFF | OFF | OFF | ON |
| Reverb Volume | Min. | Min. | Min. | Max. | Min. |
| Sound on Sound Switch | OFF | OFF | ON | OFF | OFF |
| Echo/Single Delay Switch | Single Delay | - | - | - | - |
| Tone Controls | Center | Center | - | - | - |

*Switches or controls marked - may be set to any position.
 **When Direct Signal Switch is set to OFF with other controls at DIRECT setting, the output should be 0.
 ***For adjustment, output should be taken through Output Jack A.

INSTRUMENTS: Audio Generator
AC VTVM, 2 units
Oscilloscope

2-1. TRAP COIL ADJUSTMENT

Note: This adjustment is necessary only when repairing the unit which may cause the change in oscillation frequency.

The core is subject to breakage unless driver that fits closely is used.

Setting: Input – 0

Single Delay Switch – Single Delay

Measuring point:

BIAS-TRAP CHECK POINT on ET-13 Main Board

Measuring method:

Adjust trap coil on PS-30 to obtain minimum leakage of bias voltage. It should be not over than 20mVrms on AC VTVM.

2-2. HEAD AZIMUTH

Setting: Input – 1KHz square wave, 3.8mV

Set to obtain Echo

Repeat Rate – Center

Measuring point:

Output Jack, with Oscilloscope and AC VTVM

Measuring method:

- a) Adjust each head so that it is vertical to the chassis and the head gap is positioned at the center of the tape.
- b) Fine adjust so that level from each head is maximum and treble is produced best.
- c) The alignment should be made in the order of Recording Head, Playback Head 1, 2, and 3, and Sound on Sound Head.

2-3. BIAS CURRENT ADJUSTMENT

Setting: The same as above, 9-2-2.

Echo mode – 1

Measuring point:

The same as above, 9-2-2.

Measuring method:

Adjust bias potentiometer VR19 on PS-30 to obtain maximum output.

2-4. DIRECT OUTPUT LEVEL

Setting: Input – 1KHz sine wave, 3.2mV

Set to obtain only Direct sound.

Measuring point:

Output Jack, with Oscilloscope and AC VTVM

Measuring method:

Make sure the output level is 89mV, for each of Input Jacks 1, 2 and 3.

2-5. ECHO OUTPUT LEVEL

Setting: Input – 1KHz sine wave, 3.2mV
 Set to obtain Echo sound.
 Repeat rate – Center

Measuring point:

Output Jack, with Oscilloscope and AC VTVM.

Measuring method:

Adjust VR15 to obtain the same output level as Direct output level with Echo Mode Switch at 1; VR16 with the switch at 2; and VR17 with the switch at 3.

2-6. SOUND ON SOUND OUTPUT LEVEL

Setting: Input – 1KHz sine wave, 3.2mV
 Set to obtain Sound on Sound sound
 Repeat Rate – Center

Measuring point:

Output Jack, with Oscilloscope and AC VTVM

Measuring method:

Adjust VR14 to obtain the same output level as Direct output level.

2-7. EQUALIZER

Setting: Input – 1KHz, square wave, 3.8mV
 Set to obtain Echo sound.
 Mode Selector – 1
 Tone control – BASS, Center
 TREBLE, 1 graduation up from Center

Measuring point:

Output Jack, with Oscilloscope

Measuring method:

Adjust equalizer potentiometer VR11 so that the higher frequency response with Repeat Rate at Center equals that with Repeat Rate at Minimum. Turning VR11 counterclockwise lifts higher frequency response.

2-8. INTENSITY

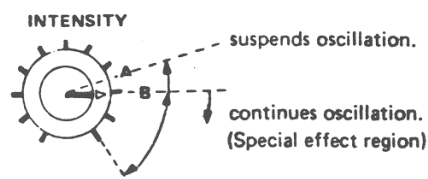
Setting: Input – 0
 Set to obtain Echo sound.
 Single Delay Switch – Echo
 Mode Selector – 1

Measuring point:

Output Jack, with Oscilloscope and AC VTVM, and also connect to an amplifier/speaker.

Measuring method:

Adjust Intensity Potentiometer VR18 so that oscillation occurs with Intensity Control on Panel at Point A and the level is the same as Direct output level.



2-9. BBD BIAS OF CHORUS CIRCUIT

Setting: Input – 1KHz square wave, over 3.8mV

Set to obtain Chorus sound

Chorus Intensity – Maximum

Measuring point:

Output Jack, with Oscilloscope and AC VTVM

Measuring method:

Adjust BBD Bias Potentiometer VR12 so that output waveform is clipped neither at top nor bottom, that the level is 65mV and also that the waveform swings horizontally.

2-10. BBD CLOCK BALANCE

Setting: Input – 0

Set to obtain Chorus sound.

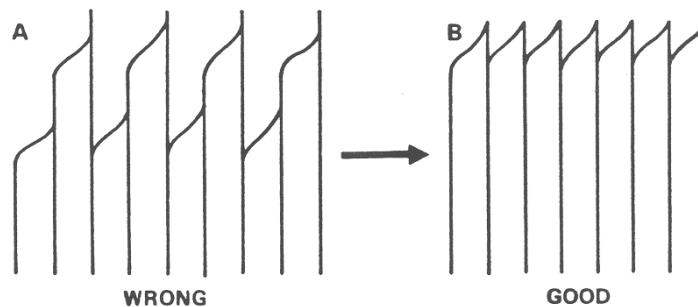
Chorus Intensity – Maximum

Measuring point:

Base of Transistor Q6, Oscilloscope

Measuring method:

Adjust Balance Potentiometer VR13 to obtain waveform of Fig.B, in the illustration below.

**2-11. REVERB OUTPUT LEVEL**

Setting: Input – 1KHz sine wave, 3.2mV

Set to obtain Reverb sound alone.

Reverb Volume (VR8) – Maximum

Measuring point:

Output Jack, with Oscilloscope and AC VTVM

Measuring method:

Make sure that output waveform is not clipped and the level is approximately 80mV.

2-12. NOISE CANCEL CIRCUIT (needless serial no. 764950 and higher)

Setting: Input – 0

Set to obtain Echo sound.

Measuring point:

Output Jack, connect to an amplifier/speaker with gain set at maximum.

Measuring method:

Adjust Noise Cancel Potentiometer VR20 so that noise at spliced part of tape is not heard.