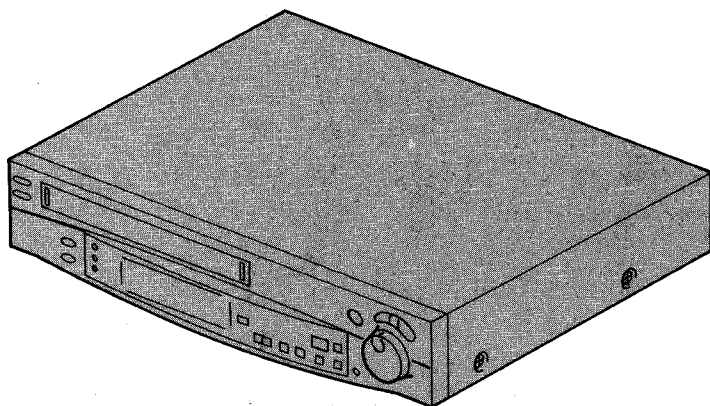


# Service Manual

Video Cassette Recorder

**Panasonic** **VHS** **HQ**  
PAL
**NV-SD20EE**
**K-MECHANISM**
SPECIFICATIONS \ **ТЕХНИЧЕСКИЕ ХАРАКТЕРИСТИКИ**DESCRIPTIONS \ **ОБЩЕЕ ОПИСАНИЕ**ADJUSTMENT PROCEDURES \ **ПРОЦЕДУРЫ НАСТРОЙКИ**MECHANICAL ADJUSTMENT PROCEDURES \ **МЕТОДИКА МЕХАНИЧЕСКОЙ НАСТРОЙКИ**ELECTRICAL ADJUSTMENT PROCEDURES \ **МЕТОДИКА ЭЛЕКТРИЧЕСКОЙ НАСТРОЙКИ**BLOCK DIAGRAMS \ **БЛОК - СХЕМЫ**SYSTEM CONTROL & SERVO BLOCK DIAGRAM \ **БЛОК - СХЕМА СИСТЕМЫ УПРАВЛЕНИЯ И СЕРВОПРИВОДА**LUMINANCE & CHROMINANCE BLOCK DIAGRAM \ **БЛОК - СХЕМА ОБРАБОТКИ ВИДЕОСИГНАЛА**SCHEMATIC DIAGRAMS \ **ПРИНЦИПИАЛЬНЫЕ СХЕМЫ**POWER SCHEMATIC DIAGRAM \ **ПРИНЦИПИАЛЬНАЯ СХЕМА БЛОКА ПИТАНИЯ**SUB SERVO SECTION IN MAIN SCHEMATIC DIAGRAM \ **ПРИНЦИПИАЛЬНАЯ СХЕМА ПОДСИСТЕМЫ СЕРВОПРИВОДА  
(ОСНОВНАЯ ПЛАТА)**SYSTEM CONTROL & SERVO SECTION IN MAIN SCHEMATIC DIAGRAM \ **ПРИНЦИПИАЛЬНАЯ СХЕМА СИСТЕМЫ  
УПРАВЛЕНИЯ И СЕРВОПРИВОДА**LUMINANCE & CHROMINANCE & AUDIO SECTION IN MAIN SCHEMATIC DIAGRAM \ **ПРИНЦИПИАЛЬНАЯ СХЕМА ОБРАБОТКИ  
ВИДЕО И АУДИОСИГНАЛА (ОСНОВНАЯ ПЛАТА)**LUMINANCE & CHROMINANCE PACK SCHEMATIC DIAGRAM \ **ПРИНЦИПИАЛЬНАЯ СХЕМА ОБРАБОТКИ ВИДЕОСИГНАЛА**INPUT/OUTPUT PACK SCHEMATIC DIAGRAM \ **ПРИНЦИПИАЛЬНАЯ СХЕМА МОДУЛЯ ВВОДА-ВЫВОДА СИГНАЛОВ**TIMER & OPERATION SCHEMATIC DIAGRAM \ **ПРИНЦИПИАЛЬНАЯ СХЕМА ТАЙМЕРА И КОНСОЛИ УПРАВЛЕНИЯ**HEAD AMP SCHEMATIC DIAGRAM \ **ПРИНЦИПИАЛЬНАЯ СХЕМА УСИЛИТЕЛЯ ВИДЕОГОЛОВОК**TV DEMODULATOR PACK SCHEMATIC DIAGRAM \ **ПРИНЦИПИАЛЬНАЯ СХЕМА ДЕМОДУЛЯТОРА**EXPLODED VIEWS & MECHANICAL PARTS LIST \ **СБОРОЧНЫЕ ЧЕРТЕЖИ И СПИСОК МЕХАНИЧЕСКИХ ЗАПАСНЫХ ЧАСТЕЙ**CHASSIS PARTS SECTION (1) \ **ШАССИ, СЕКЦИЯ 1**CHASSIS PARTS SECTION (2) \ **ШАССИ, СЕКЦИЯ 2**CASING PARTS SECTION \ **КОРПУС**PACKING PARTS SECTION \ **УПАКОВОЧНЫЕ МАТЕРИАЛЫ**ELECTRICAL REPLACEMENT PARTS LIST \ **СПИСОК ЭЛЕКТРИЧЕСКИХ ЗАПАСНЫХ ЧАСТЕЙ**
**Panasonic**

## SPECIFICATIONS

| ITEM             | SPECIFICATION                                                                                                                                                                                                       | ITEM                 | SPECIFICATION                                                                                                                                                                                |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| POWER            | SOURCE: 110~240V AC 50/60 Hz                                                                                                                                                                                        | AUDIO                | HEAD: 1 Stationary head (Normal Audio)                                                                                                                                                       |
|                  | CONSUMPTION: 21 watts                                                                                                                                                                                               |                      | INPUT: AUDIO IN Connector (Phono type)<br>More than -10dBV (316mV),<br>More than 50k $\Omega$<br>MICROPHONE JACK -70dBV                                                                      |
| RECORDING SYSTEM | 2 rotary heads, helical scanning system                                                                                                                                                                             |                      | OUTPUT: AUDIO OUT Connector (Phono type)<br>-6dBV (500mV), Less than 1k $\Omega$                                                                                                             |
|                  | PAL                                                                                                                                                                                                                 |                      |                                                                                                                                                                                              |
| TV TUNER SYSTEM  | VHF I: CH1~CH5 (SECAM D, K1)<br>CHE2~CHS3 (PAL B/SECAM B)<br>VHF III: CH6~CH12 (SECAM D, K1)<br>CHM1~CHU10 (PAL B/SECAM B)<br>CH4~CH13 (PAL I)<br>UHF: CH21~CH69<br>(PAL G, I/SECAM G, K)<br>75 $\Omega$ terminated | TAPE SPEED           | SP: 23.39 mm/s<br>LP: 11.695 mm/s<br>Record/Playback Time:<br>SP: 4 hours with 240 min. type tape<br>LP: 8 hours with 240 min. type tape<br>FF/REW Time:<br>2.5 min. with 180 min. type tape |
| RF OUT SYSTEM    | UHF: CH38 $\pm\frac{1}{2}$ (PAL G, I/SECAM G, K)<br>73 $\pm$ 3dB $\mu$ , 75 $\Omega$ terminated                                                                                                                     | DIMENSIONS           | 380(W) $\times$ 89(H) $\times$ 357(D) mm                                                                                                                                                     |
| VIDEO            | HEADS: 4 rotary heads<br>1 pair for recording and playback<br>(L-R heads)<br>1 pair for trick play (L'-R' heads)                                                                                                    | WEIGHT               | 4.6 kg                                                                                                                                                                                       |
|                  | INPUT: VIDEO IN Connector (Phono type)<br>1.0V <sub>p-p</sub> , 75 $\Omega$ unbalanced                                                                                                                              | STANDARD ACCESSORIES | 1 pc. DIN-RF Cable<br>1 pc. Programme Sheet<br>1 pc. AC Mains Lead<br>1 pc. Infra-res Remote Controller                                                                                      |
|                  | OUTPUT: VIDEO OUT Connector (Phono type)<br>1.0V <sub>p-p</sub> , 75 $\Omega$ unbalanced                                                                                                                            |                      |                                                                                                                                                                                              |

Weight and dimensions shown are approximate.  
Specifications are subject to change without notice.

# SECTION 1

## GENERAL DESCRIPTIONS

### 1-1. TECHNICAL INFORMATION

#### INITIALIZATION OF CHANNEL MEMORY IC (IC7504/M6M80021P)

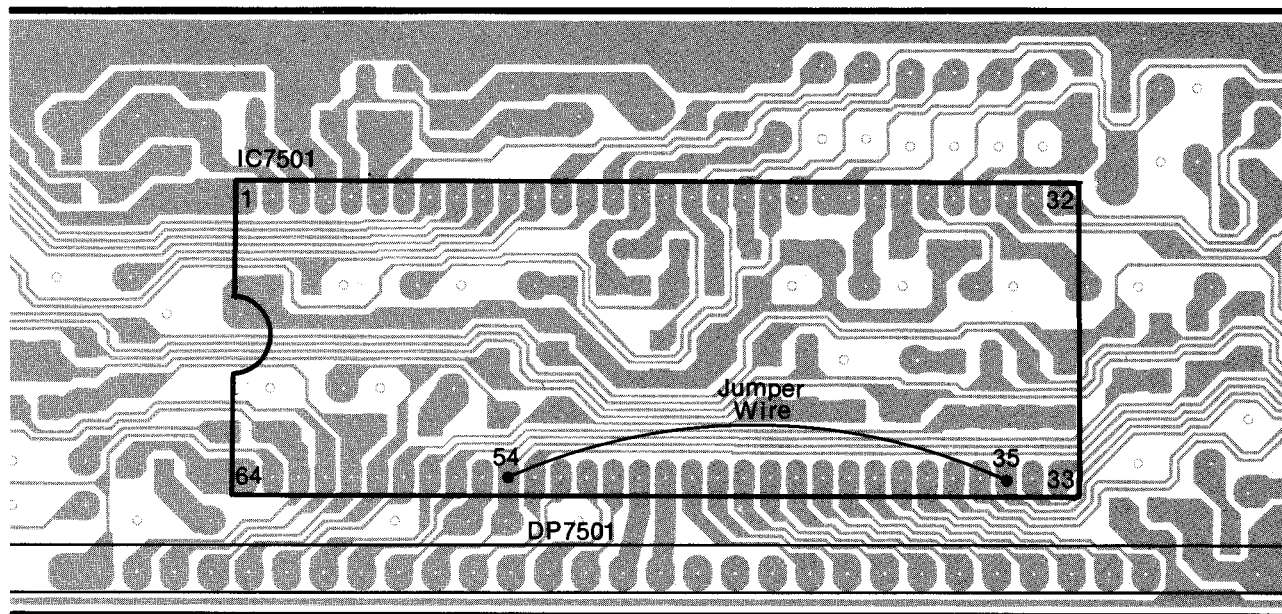
When replacing the channel memory IC (IC7504/  
M6M80021P), the memory IC should be initialized to  
original specifications.

#### Note:

- 1) This should be performed before tuner preset.
- 2) During initialization or after initialization within 1 second, do not disconnect the power source.
- 3) "INITIALIZATION" erases the "SKIP CH" and makes the POSITION CH and DISPLAY CH the same.

#### Method:

- 1) Press the CH UP/DOWN Button so that the Channel indicator indicates "3".
- 2) Connect a jumper wire between Pin 54 and Pin 35 of IC7501 for more than 1 second.
- 3) Channel indication should change from "3" to "1".



### 1-1-2. ASSEMBLY OF CAPSTAN STATOR UNIT

When replacing the CAPSTAN STATOR UNIT, the CENTRE FIXING TOOL (VFK0851) must be used to fix the centre of CAPSTAN STATOR UNIT.

Method:

- 1) Place the CAPSTAN STATOR UNIT into position.
- 2) Loosely tighten the 3 screws.
- 3) Insert the CENTRE FIXING TOOL (VFK0851) as shown in Fig.T2.
- 4) Tighten the 3 screws.

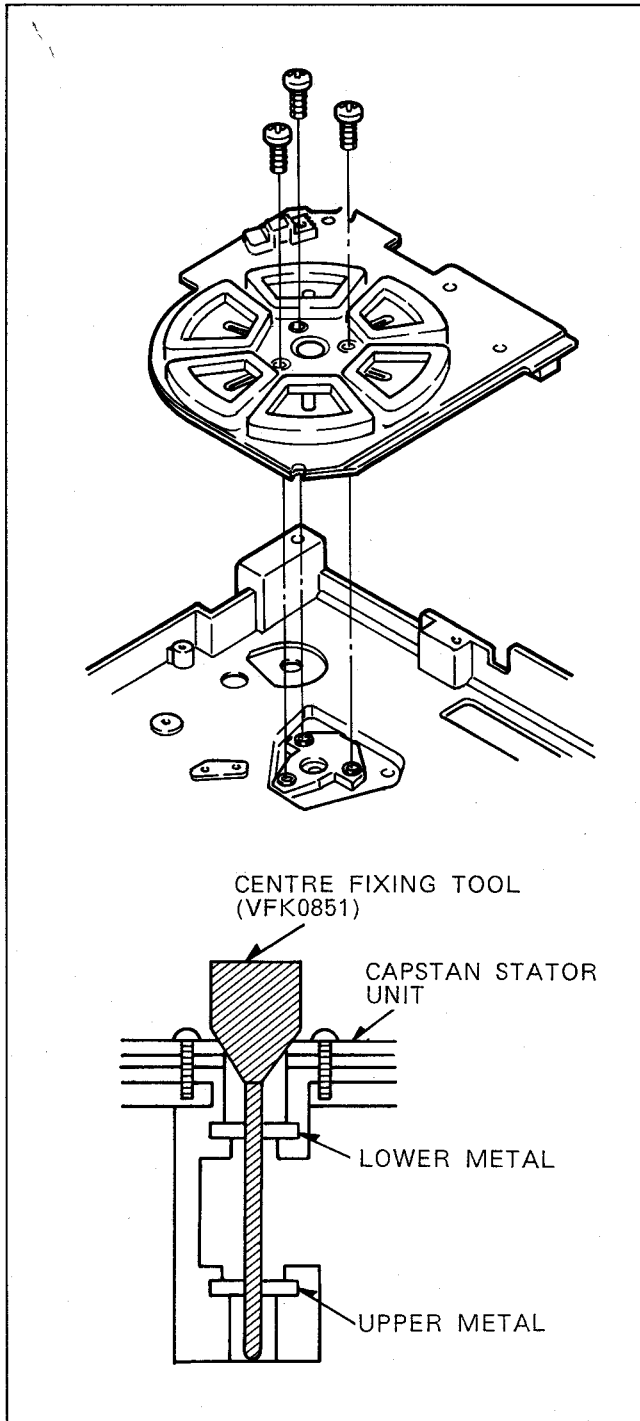


Fig. T2

### 1-1-3. EJECT OPERATION

The main cam gear rotates in the direction of the arrow. The projection (B) of the carriage connection gear engages with the recession (A) of the main cam gear. The carriage connection gear rotates in the direction of the arrow to perform the Eject operation.

<NOTE>

If the Eject operation is performed without the cassette carriage installed while repairing or making the mechanical phase alignment, the main cam gear will not engage with the carriage connection gear will not rotate.

For performing the Eject operation with the cassette carriage not installed, it is necessary to rotate to the carriage connection gear by hand in the direction of the arrow.

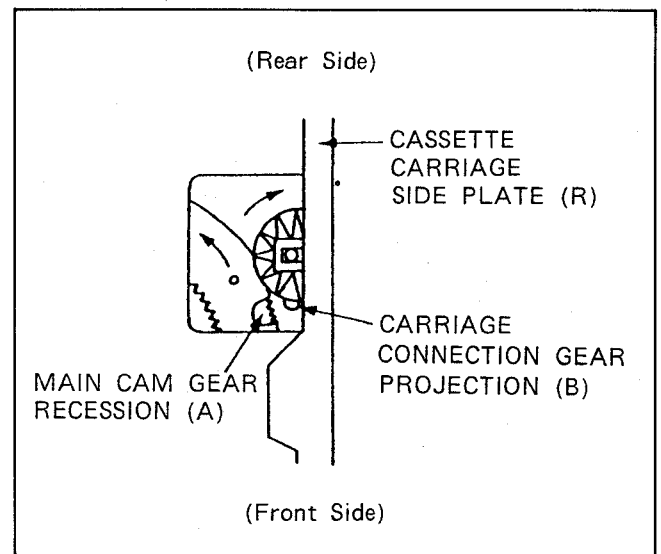


Fig. T3 Top View of Eject Operation

### 1-1-4. SERVICE INFORMATION DISPLAY

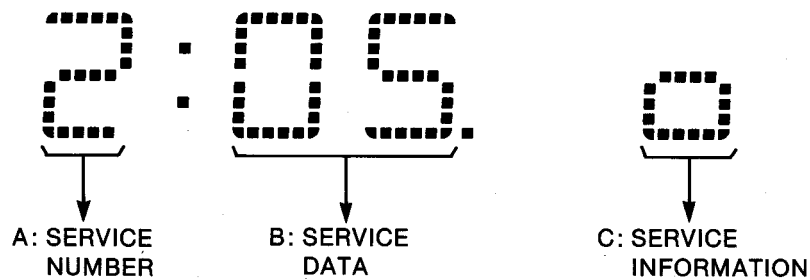
This unit can display service informations detected by the microprocessor IC6001 on the Front Indication Panel, which will help speed up troubleshooting and servicing.

Method:

- 1) Press the "EJECT" button while turning the "SHUTTLE RING" clockwise.
- 2) The counter of multi function display indicates microprocessor data approximately 1 minutes as shown in Fig.T4.

Note:

- 1) This mode can be entered even when the power is OFF.
- 2) It can also display the data when a jumper wire is connected between TP6001 and TPGND.
- 3) Press the "EJECT" button while turning the "SHUTTLE RING" clockwise to increase the service number.



| A: SERVICE NUMBER | B: SERVICE DATA | CONTENTS                                | REMARKS                                                                                                 |
|-------------------|-----------------|-----------------------------------------|---------------------------------------------------------------------------------------------------------|
| 1                 | *0              | can not detect Take-up and Supply Photo |                                                                                                         |
|                   | *1              | detect Take-up Photo                    |                                                                                                         |
|                   | *2              | detect Supply Photo                     |                                                                                                         |
|                   | *3              | detect Take-up and Supply Photo         |                                                                                                         |
| 2                 | 00              | EJECT                                   |                                                                                                         |
|                   | 01              | CASSETTE DOWN                           |                                                                                                         |
|                   | 02              | REVIEW                                  |                                                                                                         |
|                   | 04              | PLAY/STOP/CUE                           |                                                                                                         |
|                   | 06              | FF/REW                                  |                                                                                                         |
|                   | 07              | During moving of each mode              |                                                                                                         |
| 5                 | 8*              | CAPSTAN MOTOR ON                        | In case of the indication (8/9/U/A/-/□/□/□) or no indication, CAP MOTOR is turned on.                   |
|                   | *7              | CAPSTAN MOTOR ROTATING DIRECTION        | In case of the indication (0/1/2/3/4/5/6/7), CAP MOTOR is rotated in forward direction.                 |
|                   | *8              | CAPSTAN MOTOR ROTATING DIRECTION        | In case of the indication (8/9/U/A/-/□/□/□) or no indication, CAP MOTOR is rotated in REVERS direction. |
| 6                 | 1*              |                                         | In case of the indication (1/3/5/7/9/A/□) or no indication, CYL MOTOR is turned on.                     |

NOTE: “\*”; No meaning

#### C: SERVICE INFORMATION

0: Normal

1: Cylinder lock (STOP)

2: Reel lock (STOP)

3: Mechanism lock during moving next position except NO. 4 or NO. 6 of service information.  
(In this case, loading motor can be expected to break down.)

4: Mechanism lock during unloading

5: Less pulse of reels during unloading (In this case, capstan can be expected to break down.)

6: Mechanism lock during front loading (Cassette IN)

7: Serial data (IC6001—IC7501) can not be transmitted.

Fig. T4

## 2-3. MECHANICAL ADJUSTMENT PROCEDURES

### 2-3-1. TENSION POST POSITION ADJUSTMENT

(Equipment Required)  
Hex Wrench (VFK0326)

1. Disconnect the AC plug.
2. Remove the TOP PLATE and CASSETTE HOLDER.
3. Turn the LOADING MOTOR until the loading completes.
4. Adjust the hole of TENSION BAND FASTENER by hex wrench so that the left edge of IMPEDANCE ROLLER and TENSION ARM UNIT as shown in Fig.M1.

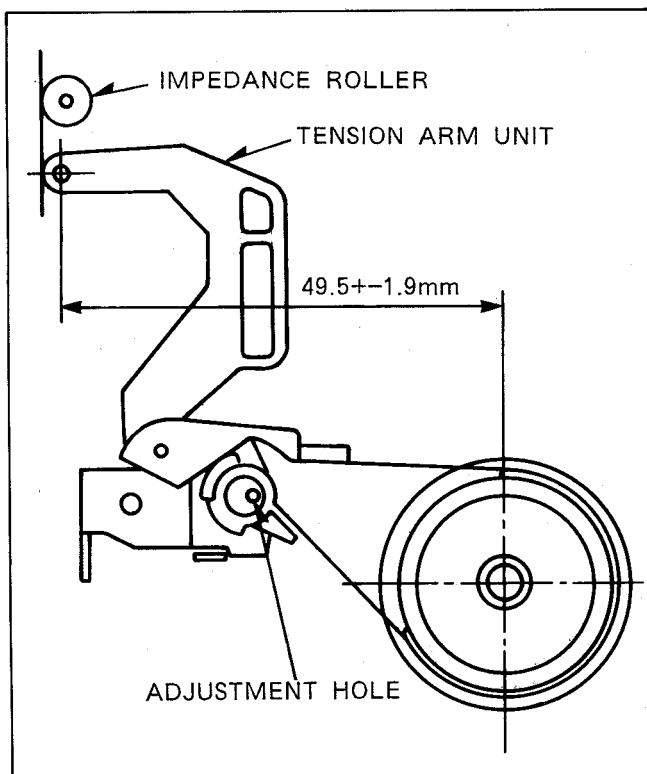


Fig. M1

### 2-3-2. BACK TENSION ADJUSTMENT

(Equipment Required)  
Back Tension Meter (VFK0132)  
VHS Cassette Tape (180 minutes tape:PAL)  
(120 minutes tape:NTSC)

(Specification)  
22.5-27.5g

1. Playback the cassette tape from the beginning and wait until the tape movement get the stabilization.  
(for approx. 10~20 seconds)
2. Insert the Back tension Meter into the path of a tape, and measure the back tension to be within specification as shown in Fig.M2.

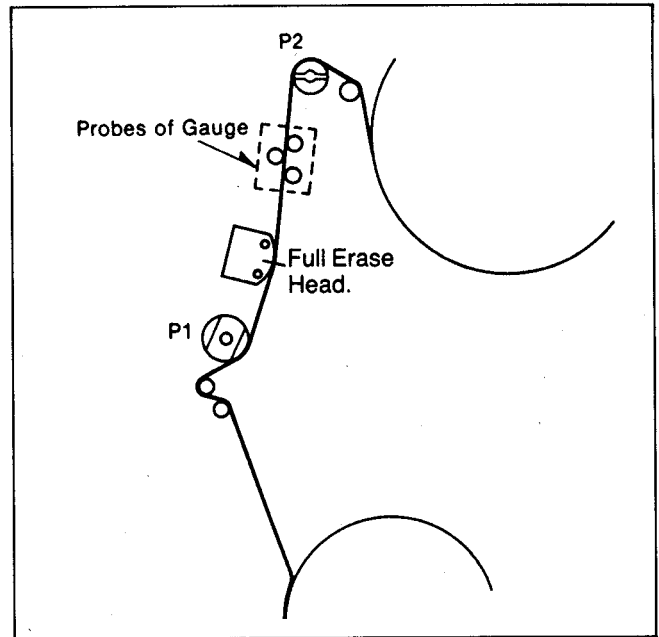


Fig. M2

3. If it is out of specification, change the spring notch as shown in Fig.M3.

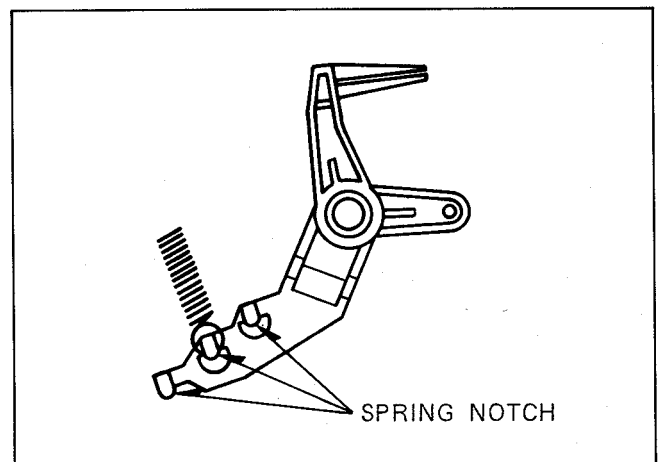


Fig. M3

### 2-3-3. P2 AND P3 POSTS ADJUSTMENT (PREADJUSTMENT)

(Equipment Required)  
Post Adjustment Screwdriver (VFK0329)

1. Remove the TOP PLATE and CASSETTE HOLDER.
2. Turn the LOADING MOTOR until the unloading completes.
3. Loosen the fixing screw of P2 and P3 POSTS.
4. Rotate the P2 and P3 POSTS clockwise to the end.
5. Rotate the P2 and P3 POSTS twice counterclockwise.

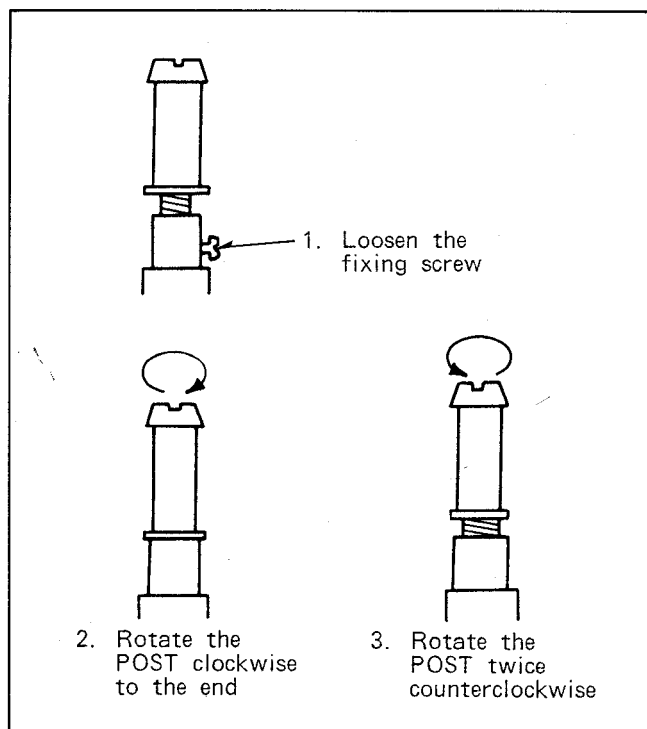


Fig. M4

6. Install the TOP PLATE and CASSETTE HOLDER.
7. Playback the cassette tape and make sure that the edges of the tape are not curling at the bottom or top end of the P1, P2, P3 and P4 POSTS as shown in Fig.M5.

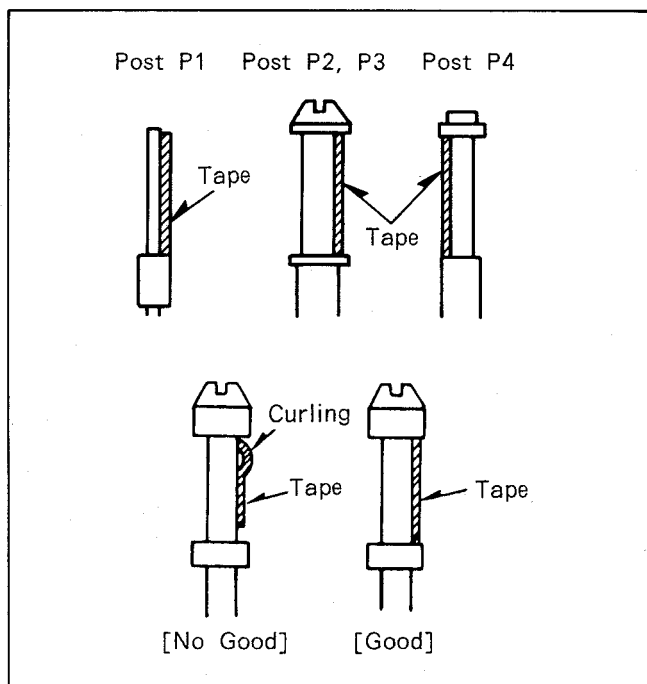


Fig. M5

8. If curling appears, readjusts the P2 and P3 POSTS.

#### 2-3-4. TAPE INTERCHANGEABILITY ADJUSTMENT

Proceed the following procedures for Tape Interchangeability Adjustment to do it correctly and smoothly.

- (1) Adjustment of P2 and P3 Posts.
- (2) Height Adjustment of A/C Head (1).
- (3) Height Adjustment of A/C Head (2).
- (4) Fine-Adjustment of A/C Head
- (5) Horizontal Position Adjustment of A/C Head.

If the Tape Interchangeability Adjustment is not perfect, repeat the above procedures from (1) to (5).

#### CAUTIONS:

To make a Adjustment Mode for Tape Interchangeability, connect a Cut Jumper Wire as shown in Fig.M6.  
(Auto Tracking is turned off.)

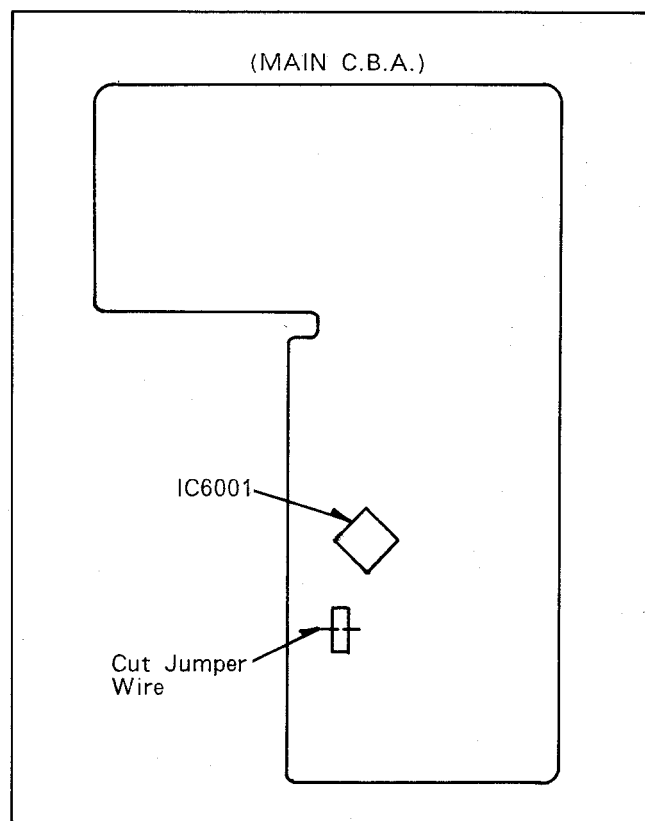


Fig. M6

(1) Adjustment of P2 and P3 Posts

(Equipment Required)  
Alignment Tape(PAL/SECAM:VFJ8125H3F,  
NTSC:VFM8080HQFP)  
Post Adjustment Screwdriver (VFK0329)

1. Set the tracking control into the fix position. (by pressing the tracking (+) and (-) button simultaneously on the Remote Controller)  
And connect the oscilloscope to the output of the Head Amp as shown in Fig.M7.

Note:

To get a stable waveform of the Head Amp output on the oscilloscope, use the head switching pulse as a triggering signal as shown in Fig.M7.

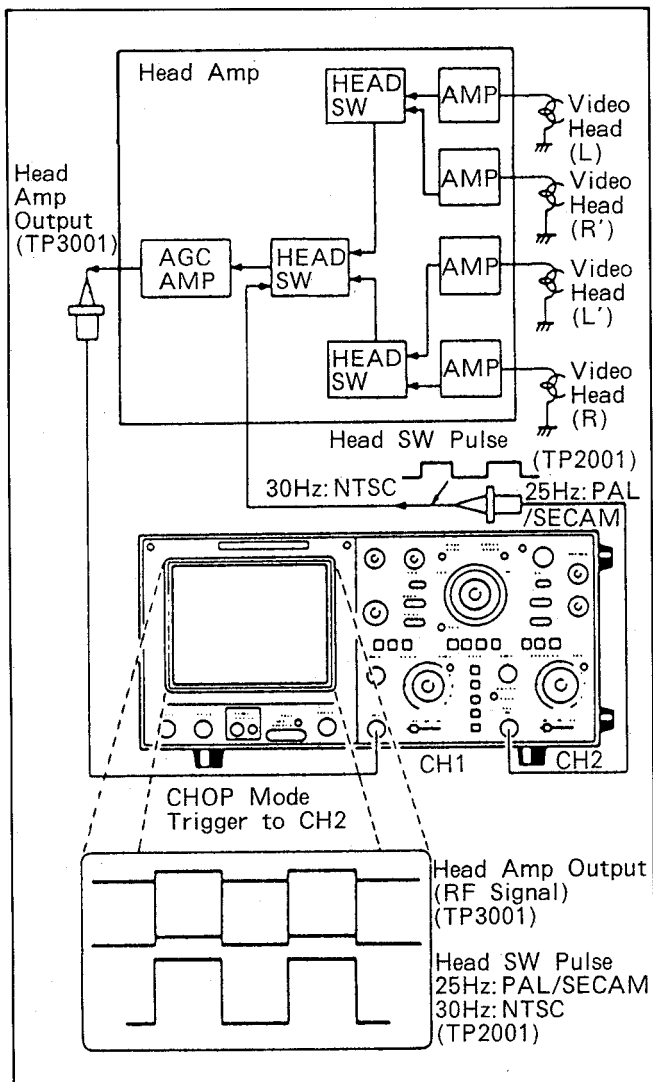


Fig. M7 Connect of Oscilloscope

2. Playback the alignment tape.
3. If the RF envelope appears like example "A" or "B" in Fig.M8 then adjustment of the tape guide post (P2:Entrance) is necessary.
4. Adjust the tape guide post (P2) with the post adjustment screwdriver so that the RF envelope waveform at the entrance portion becomes flat as shown in Fig.M8-"C".

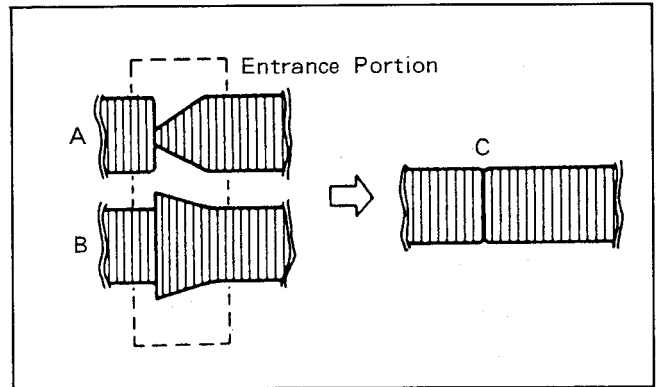


Fig. M8

5. If the RF envelope appears like example "D" or "E" in Fig.M9, then adjustment of the tape guide post (P3:Exit) is necessary.
6. Adjust the tape guide post (P3) in the same manner as the P2 post so that the exit portion becomes flat as shown in Fig.M9-"F".

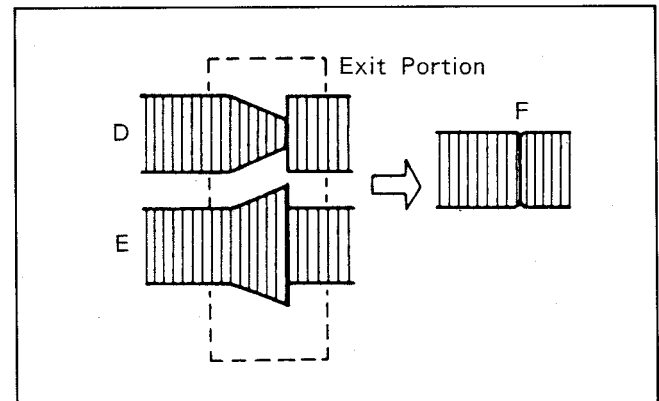


Fig. M9

7. Turn the Tracking VR fully clockwise and counter clockwise. (Keep pressing + button or - button on the Remote Controller) The output envelope should vary nearly parallel with other condition as shown in Fig.M10.
8. Set the tracking control into centre fix position and adjust for maximum RF envelope. If the RF envelope does not meet these specifications,  
 $V1/V > 0.7$ ,  $V2/V > 0.8$  (Refer to Fig.M12)  
then repeat steps 1-8 again.

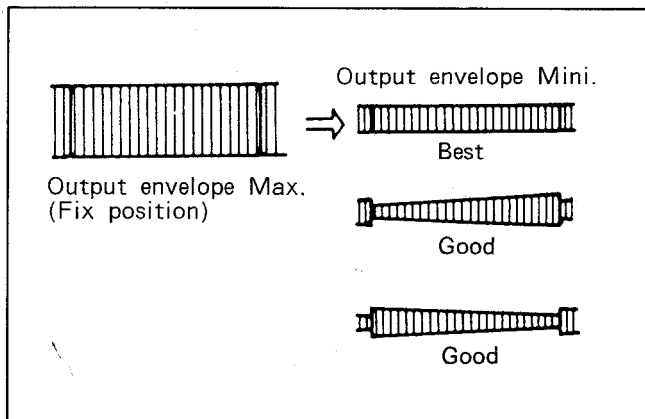


Fig. M10

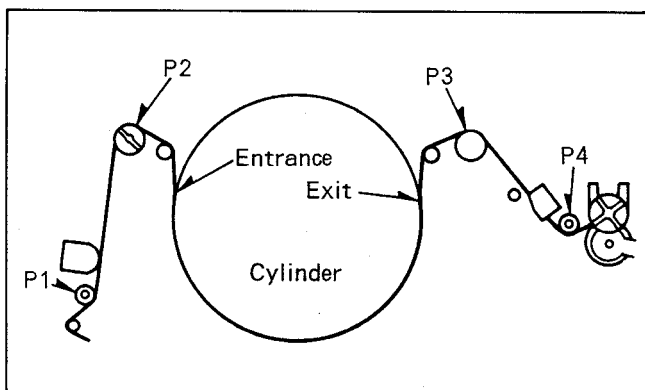


Fig. M11 Loading of Posts

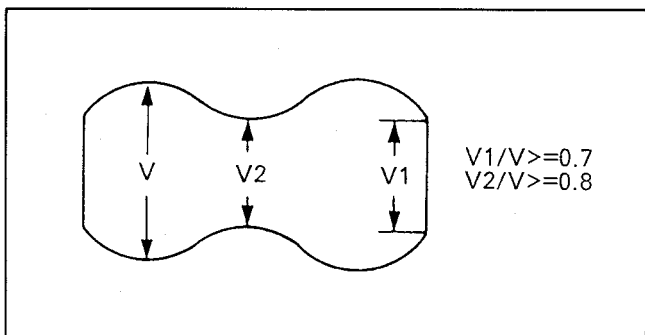


Fig. M12 Spec. of Envelope Figure

## (2) Height Adjustment of A/C Head (1)

- 1) Install the A/C HEAD on the A/C HEAD BASE (E) by 3 screws (A), (B) and (C) with springs.
- 2) Tighten the screw (A) until it touches chassis and then rotate the SCREW(A) counterclockwise for approx. 1.5 times.
- 3) Rotate the 2 screws (B) and (C) until A/C HEAD BASE (D) and (E) is separate.

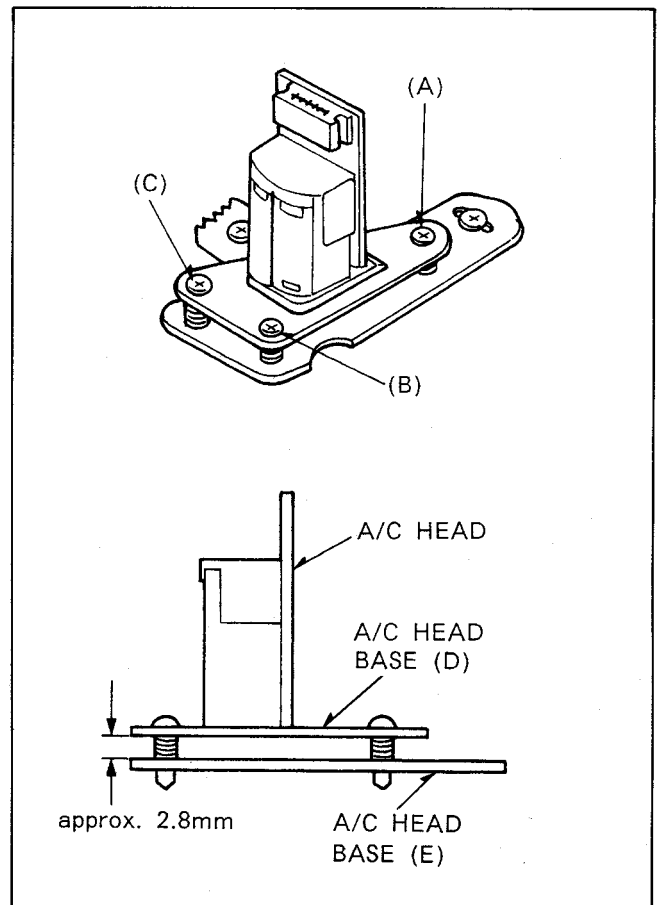


Fig. M13

### (3) Height Adjustment of A/C Head (2)

- 1) Playback the alignment tape.
- 2) Rotate the screw (A) or (B) until the wrinkle appears on the lower edge of tape at P4 post.
- 3) Rotate the screw (A) or (B) until the wrinkle just disappears on the lower edge of tape at P4 post.
- 4) Connect the oscilloscope to audio output terminal.
- 5) Rotate the screw (C) until audio signal is maximized.

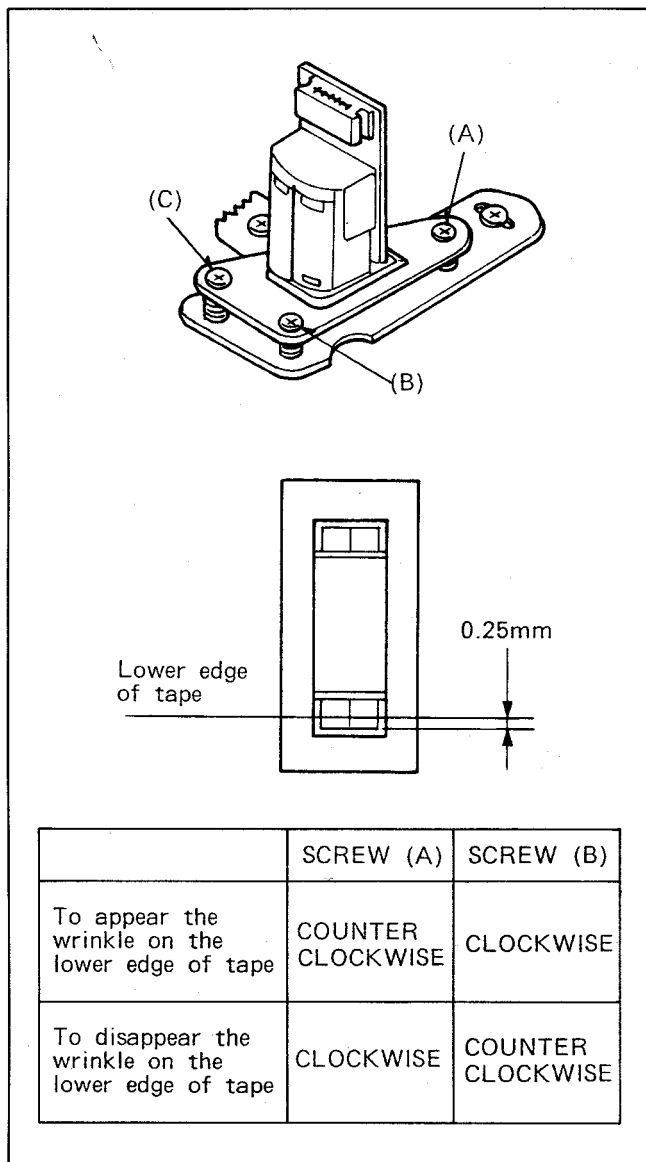


Fig. M14

### (4) Fine-Adjustment of A/C HEAD

<When moving the A/C HEAD up>

- 1) Rotate the screw (A) counterclockwise until the wrinkle appears on the lower edge of tape at P4 post.
- 2) Rotate the screw (B) counterclockwise until the wrinkle just disappears on the lower edge of tape at P4 post.
- 3) Rotate the screw (C) counterclockwise until the audio signal is maximized.

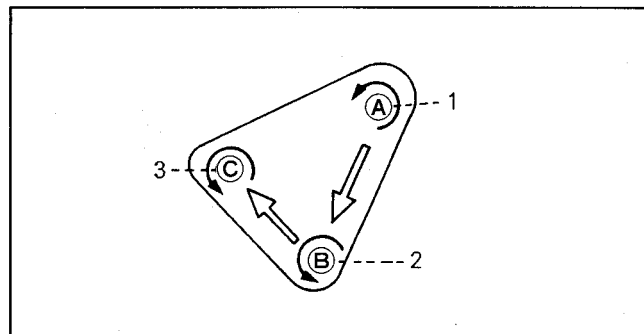


Fig. M15

<When moving the A/C HEAD down>

- 1) Rotate the screw (B) clockwise until the wrinkle appears on the lower edge of tape at P4 post.
- 2) Rotate the screw (A) clockwise until the wrinkle just disappears on the lower edge of tape at P4 post.
- 3) Rotate the screw (C) clockwise until the audio signal is maximized.

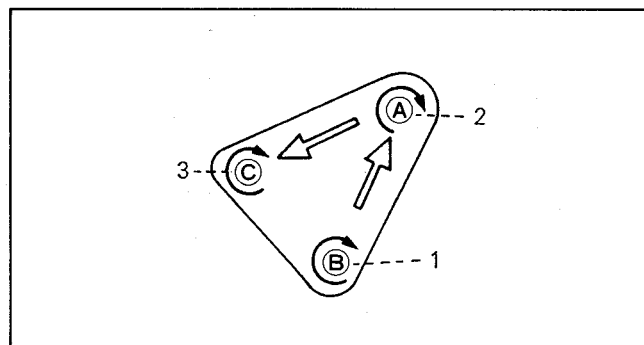


Fig. M16

(5) Horizontal Position Adjustment of A/C HEAD

- 1) Set the tracking control into the centre fix position. (by pressing the tracking (+) and (-) button simultaneously on the Remote Controller)
- 2) Connect the oscilloscope to the output of the Head Amp as shown in Fig.M7.
- 3) Playback the alignment tape.
- 4) Loosen the 2 screws (F) and (G).
- 5) Adjust the A/C HEAD BASE (E) until the RF envelope waveform is maximized.

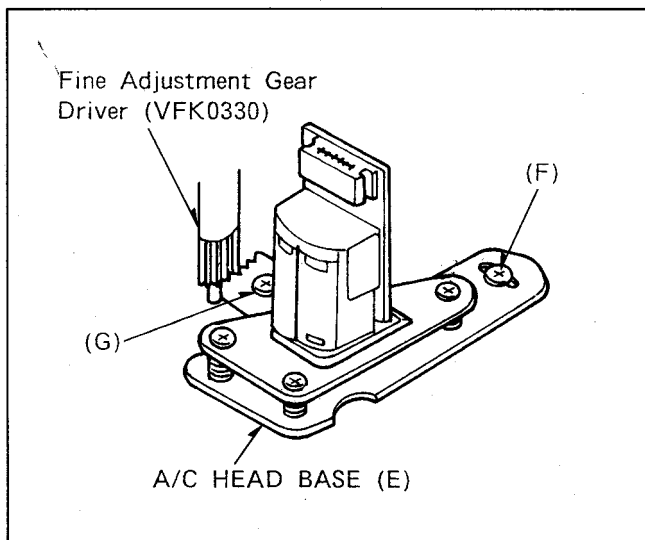


Fig. M17

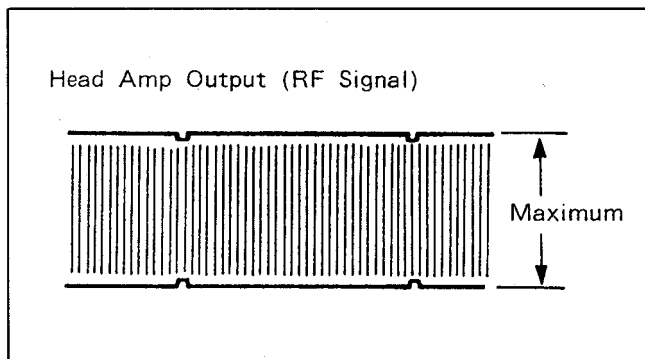
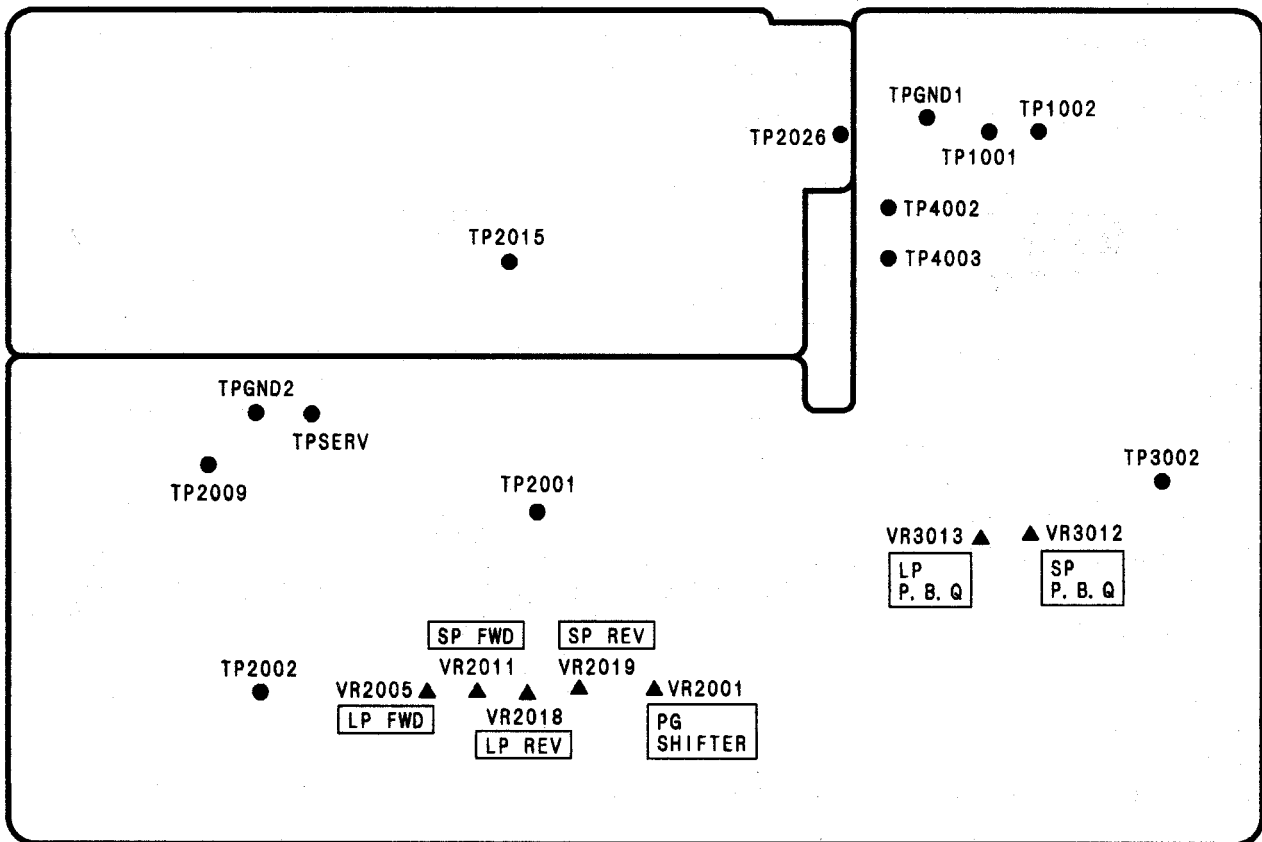


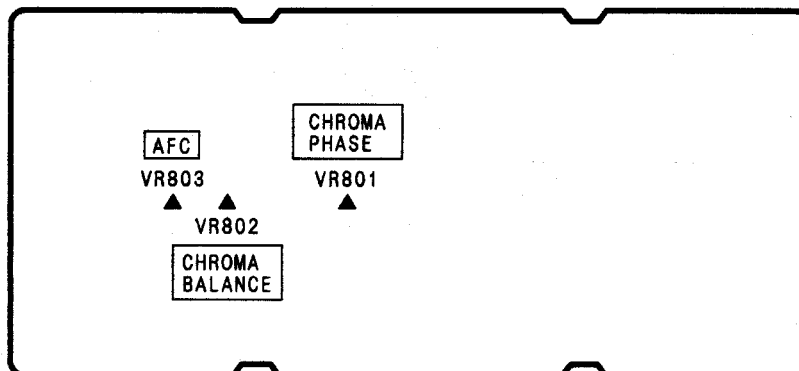
Fig. M18

# LOCATION OF TEST POINTS & CONTROLS

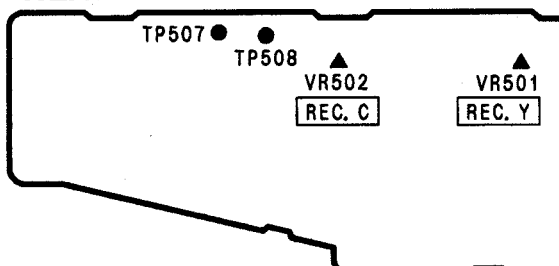
## MAIN C.B.A.



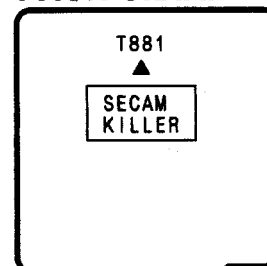
## LUMINANCE & CHROMINANCE PACK C.B.A.



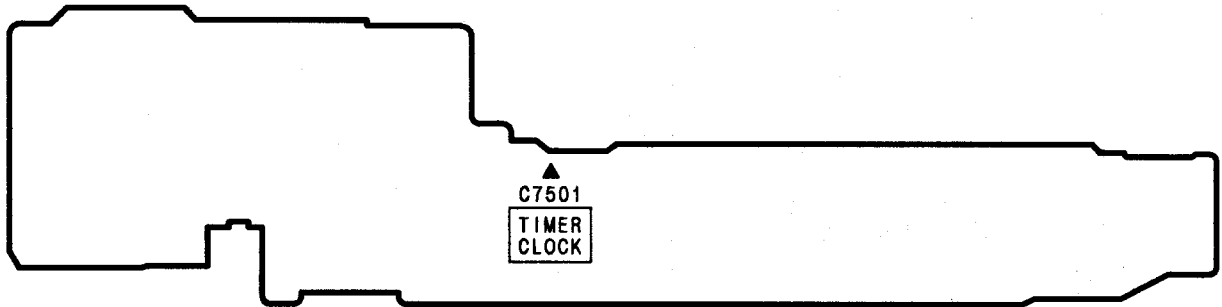
## HEAD AMP C.B.A.



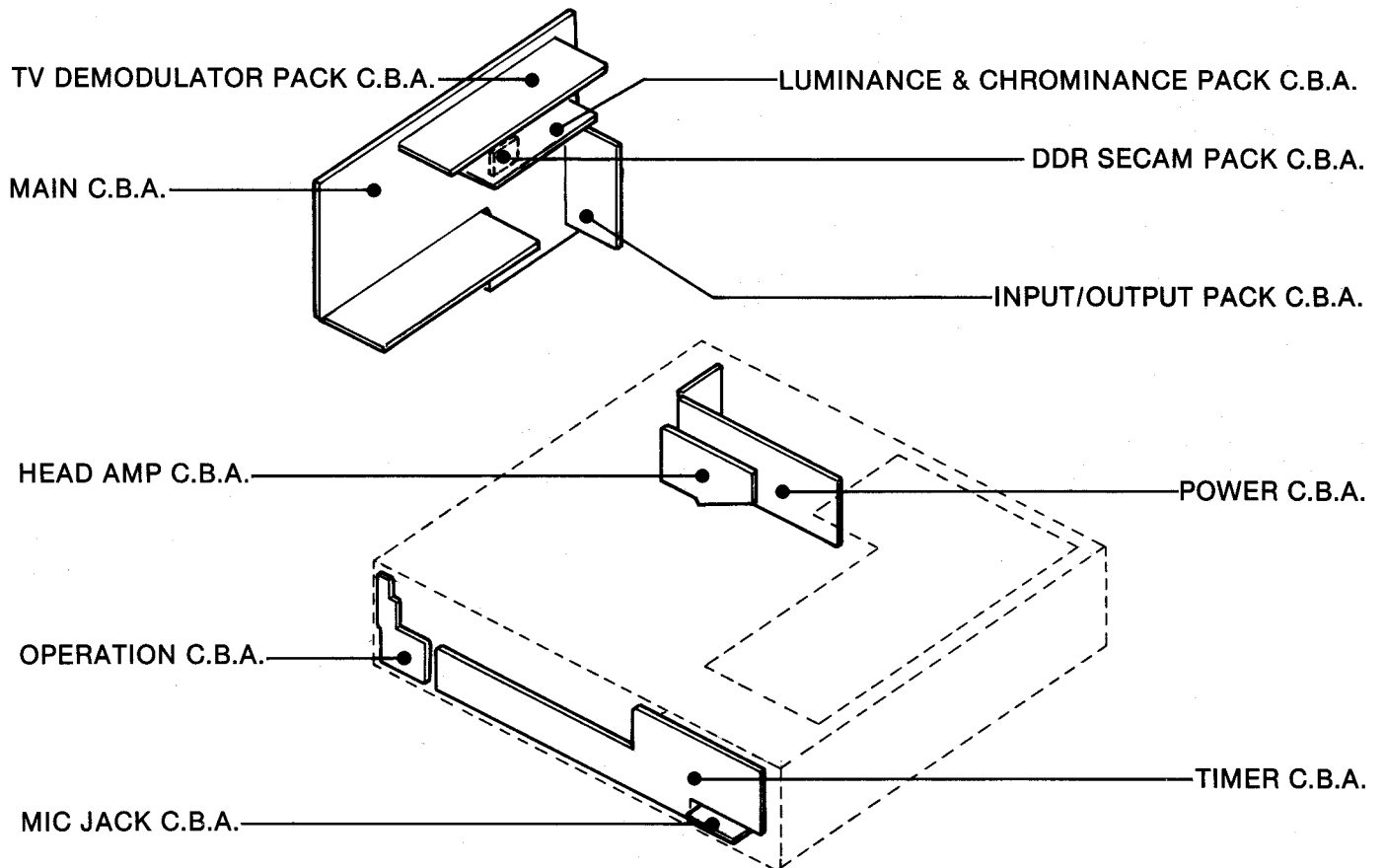
## DDR SECAM PACK C.B.A.



## TIMER C.B.A.



## CIRCUIT BOARD LAYOUT



## 2-6. ELECTRICAL ADJUSTMENT PROCEDURES

This section provides complete adjustment procedures required for electric circuits of VHS Video Cassette Recorders.

### 2-6-1. TEST EQUIPMENT

To perform electrical adjustments following equipment is required.

1. Dual-Trace Oscilloscope. (More than 35 MHz)  
Voltage Range: 0.005-5V/div  
Frequency Range: DC-35MHz  
Probes: 10:1
2. Frequency Counter.  
Frequency Range: 0-10MHz  
Probes: 1:1
3. Universal Counter.
4. Vacuum Tube Volt Meter. (V.T.V.M.)
5. Video Sweep Generator.
6. Sine Wave Generator.
7. Video Pattern Generator.
8. VHS Alignment Tape. (VFJ8125H3F)
9. VHS Blank Tape.
10. Monitor.
11. Plastic Tip Driver.

### 2-6-2. PREPARATION

During adjustment, set each selector as follows: when no indication in the procedure.

NOISE FILTER/EDIT SW.....OFF  
TEST SIGNAL SW (REAR).....OFF  
TAPE SPEED.....SP

### 2-6-3. HOW TO READ ADJUSTMENT PROCEDURES

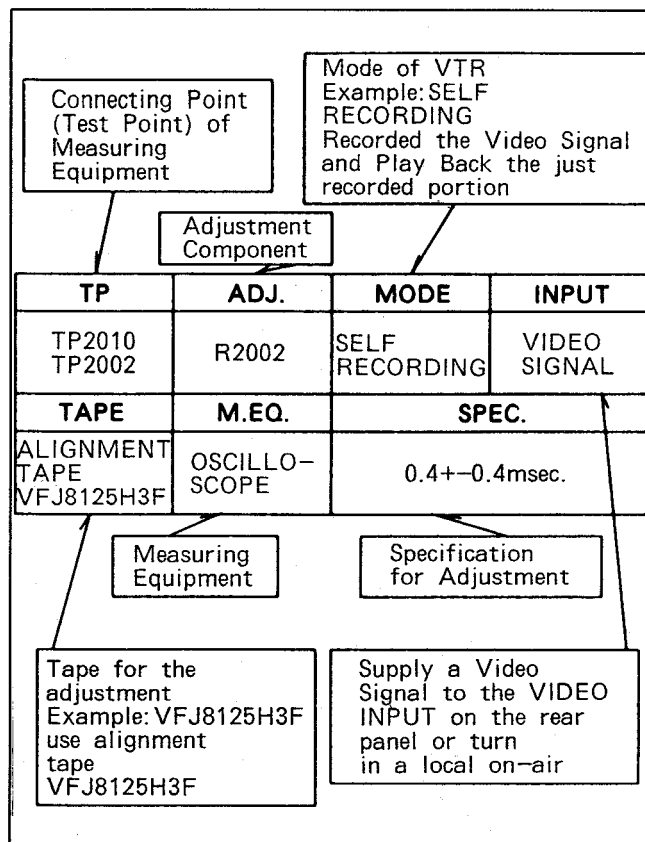


Fig. E1

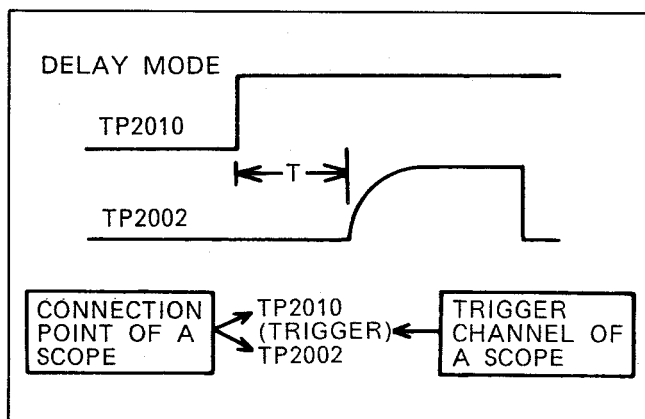


Fig. E2

## SERVO SECTION

### 2-6-4. PG SHIFTER ADJUSTMENT

| TP                               | ADJ.              | MODE         | INPUT |
|----------------------------------|-------------------|--------------|-------|
| TP2001<br>TP3002                 | VR2001            | PLAYBACK     |       |
| TAPE                             | M. EQ.            | SPEC.        |       |
| ALIGNMENT<br>TAPE,<br>VFJ8125H3F | OSCILLO-<br>SCOPE | 7.0+/-0.5(H) |       |

1. Connect the oscilloscope to TP2001(H.SW) and TP3002(V.OUT)
2. Playback the alignment tape.
3. Adjust VR2001 so that phase difference between falling edge of Head SW pulse and V-Sync is 7.0+/-0.5(H).

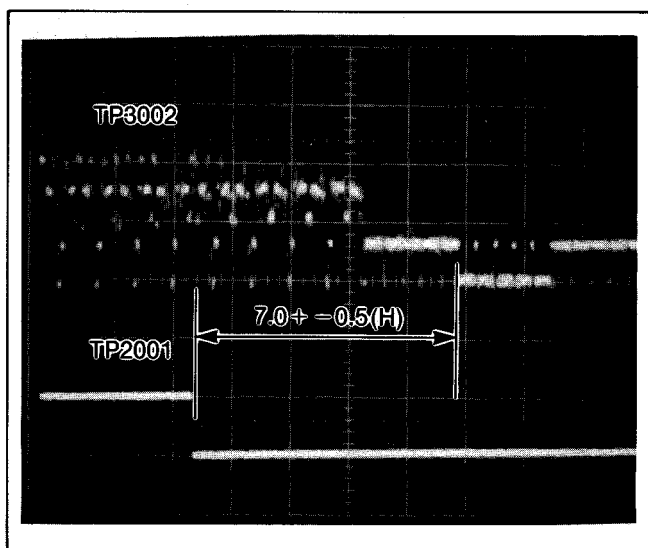


Fig. E3

### 2-6-5. SLOW TRACKING ADJUSTMENT

| TP                | ADJ.                     | MODE                           | INPUT         |
|-------------------|--------------------------|--------------------------------|---------------|
| MONITOR<br>SCREEN | VR2011(SP)<br>VR2006(LP) | SP (SELF<br>RECORDED)<br>STILL | COLOUR<br>BAR |
| TAPE              | M. EQ.                   | SPEC.                          |               |
| BLANK<br>TAPE     | MONITOR<br>TV            | A=B<br>(A+B)/V<1/6             |               |

1. Connect a cut jumper wire as shown in Fig.E4.
2. Record the colour bar in SP(LP) mode for a few minutes and playback the just recorded portion.
3. Place the unit in SLOW mode by pressing search button on Remote Controller Unit.
4. Adjust VR2011(SP)(VR2006(LP)) until noise bar on the monitor screen is minimized. (Detail specifications are shown in Fig.E5)
5. Disconnect a jumper wire.

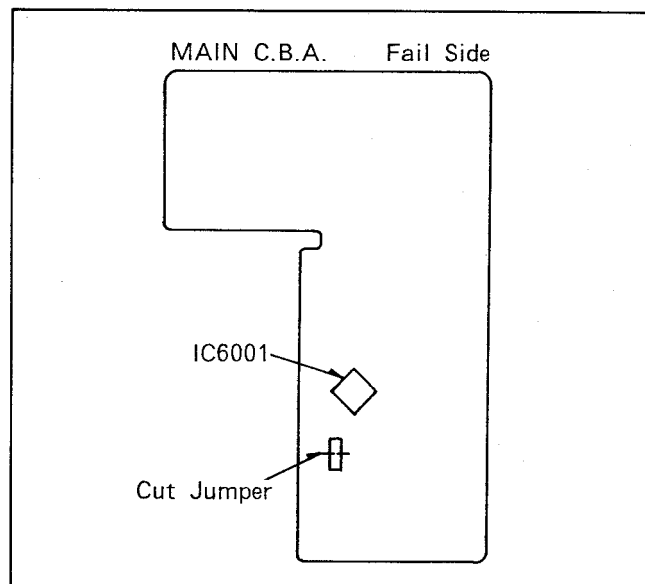


Fig. E4

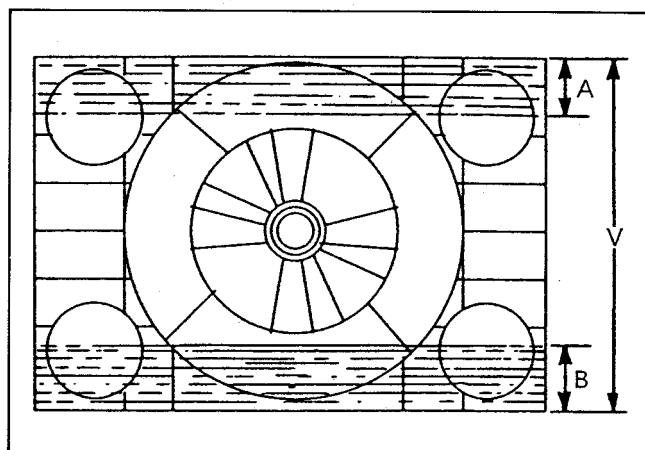


Fig. E5

## 2-6-6. REVERSE SLOW TRACKING ADJUSTMENT

| TP             | ADJ.                     | MODE                                                           | INPUT      |
|----------------|--------------------------|----------------------------------------------------------------|------------|
| MONITOR SCREEN | VR2019(SP)<br>VR2018(LP) | REVERSE SLOW                                                   | COLOUR BAR |
| TAPE           | M. EQ.                   | SPEC.                                                          |            |
| BLANK TAPE     | MONITOR TV               | SP: $A=B$<br>$(A+B)/V \leq 1/6$<br>LP: $A=0$<br>$B/V \leq 1/3$ |            |

1. Connect a cut jumper wire as shown in Fig.E4.
2. Record the colour bar in SP(LP) mode for a few minutes and playback the just recorded portion.
3. Place the unit in SLOW mode by pressing search button on Remote Controller Unit.
4. Adjust VR2019(SP)(VR2018(LP)) until noise bar on the monitor screen is minimized. (Detail specifications are shown in Fig.E5)
5. Disconnect a jumper wire.

## LUMINANCE & CHROMINANCE SECTION

### 2-6-7. ARTIFICIAL NTSC AFC FREE RUN ADJUSTMENT

| TP               | ADJ.                                    | MODE                | INPUT                                |
|------------------|-----------------------------------------|---------------------|--------------------------------------|
| PIN (9) of IC802 | VR803                                   | STOP                | SINEWAVE<br>8KHz<br>-10dB<br>(316mV) |
| TAPE             | M. EQ.                                  | SPEC.               |                                      |
|                  | FREQUENCY COUNTER<br>SINEWAVE GENERATOR | 15735 $\pm$ 100(Hz) |                                      |

Note:

Supply +5V DC to Pin 27 of IC802.

1. Supply a sinewave (8KHz/-10dB) to Line In. (Video In)
2. Connect the frequency counter to Pin 9 of IC802.
3. Turn VR803 to maximum frequency.
4. Adjust VR803 so the frequency is 15735 $\pm$ 100(Hz).

## 2-6-8. RECORDING CURRENT ADJUSTMENT

| TP                       | ADJ.                 | MODE                                          | INPUT      |
|--------------------------|----------------------|-----------------------------------------------|------------|
| TP507(HOT)<br>TP508(GND) | VR501(Y)<br>VR502(C) | SP RECORDING                                  | COLOUR BAR |
| TAPE                     | M. EQ.               | SPEC.                                         |            |
| BLANK TAPE               | OSCILLOSCOPE         | Y: 130 $\pm$ 5(mVp-p)<br>C: 32 $\pm$ 2(mVp-p) |            |

1. Record the colour bar.
2. Connect the oscilloscope to TP507(HOT) and TP508(GND).
3. Adjust VR501 so the amplitude of sync tip portion is 130 $\pm$ 5mVp-p.
4. Supply +5V DC to PP3001-6 to reduce luminance component.
5. Adjust VR502 until the amplitude of Cyan is 32 $\pm$ 2mVp-p.

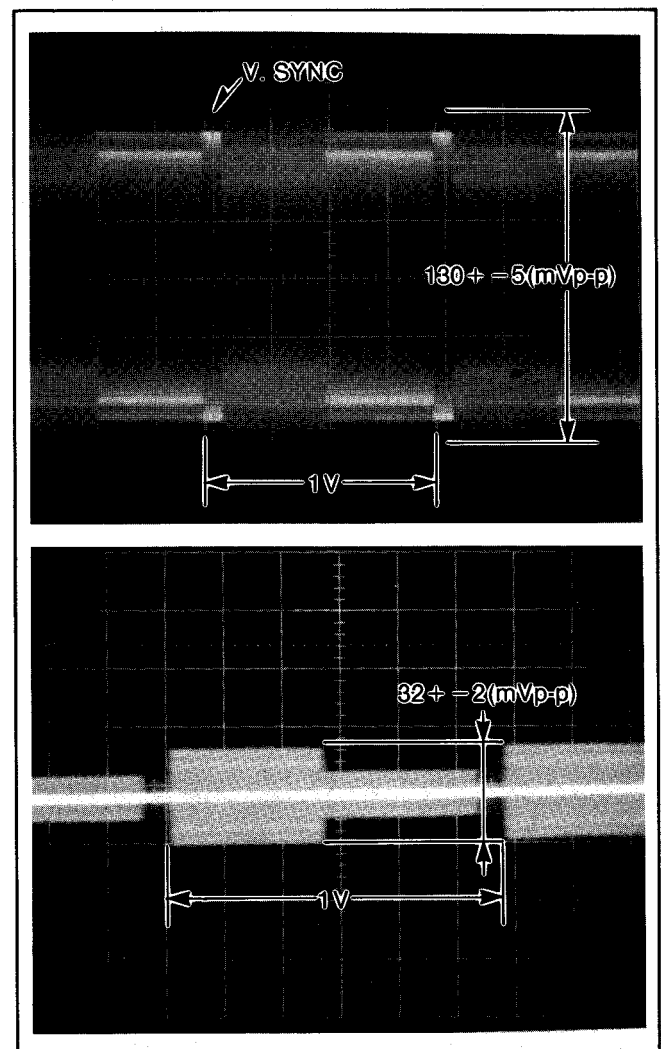


Fig. E6

2-6-9. VIDEO FREQUENCY RESPONSE  
ADJUSTMENT

| TP            | ADJ.                                             | MODE                                                       | INPUT                    |
|---------------|--------------------------------------------------|------------------------------------------------------------|--------------------------|
| TP3002        | VR3012(SP)<br>VR3013(LP)                         | (SELF<br>RECORDED)<br>PLAYBACK<br>(SP/LP)                  | VIDEO<br>SWEEP<br>SIGNAL |
| TAPE          | M. EQ.                                           | SPEC.                                                      |                          |
| BLANK<br>TAPE | OSCILLO-<br>SCOPE<br>VIDEO<br>SWEEP<br>GENERATOR | SP: 0+-1(dB)<br>(90 - 110%)<br>LP: 0+-1(dB)<br>(90 - 110%) |                          |

Note:  
 (1) Set the Video Sweep Signal as shown in Fig.E7.

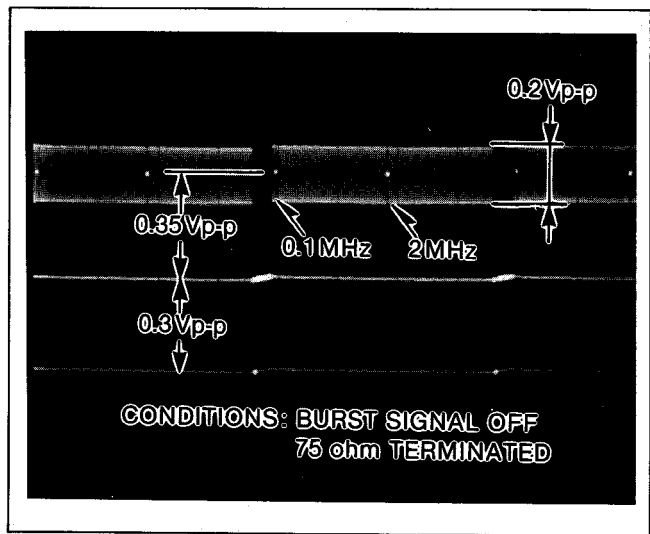


Fig. E7

1. Record the Video Sweep Signal in SP/(LP) mode for a few minutes and playback the just recorded signal.
2. Connect the oscilloscope to TP3002.
3. Adjust VR3012(SP)(VR3013(LP)) until the frequency response level is 0+-1dB at 2MHz portion by comparing with 0.1MHz portion.

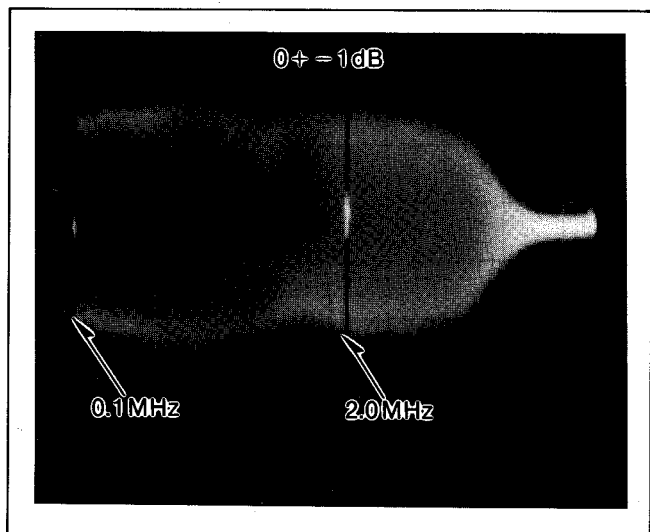


Fig. E8

2-6-10. SECAM KILLER ADJUSTMENT

| TP            | ADJ.              | MODE                                                     | INPUT                  |
|---------------|-------------------|----------------------------------------------------------|------------------------|
| IC881-11      | T881              | SP<br>RECORDING                                          | SECAM<br>COLOUR<br>BAR |
| TAPE          | M. EQ.            | SPEC.                                                    |                        |
| BLANK<br>TAPE | OSCILLO-<br>SCOPE | MAXIMIZE<br>AMPLITUDE<br>("A" PORTION:<br>NEGATIVE PEAK) |                        |

1. Record SECAM color bar.
2. Adjust T881 until the amplitude of the signal at the Pin 11 of IC881 is maximum.  
 (To make "A" portion negative peak)

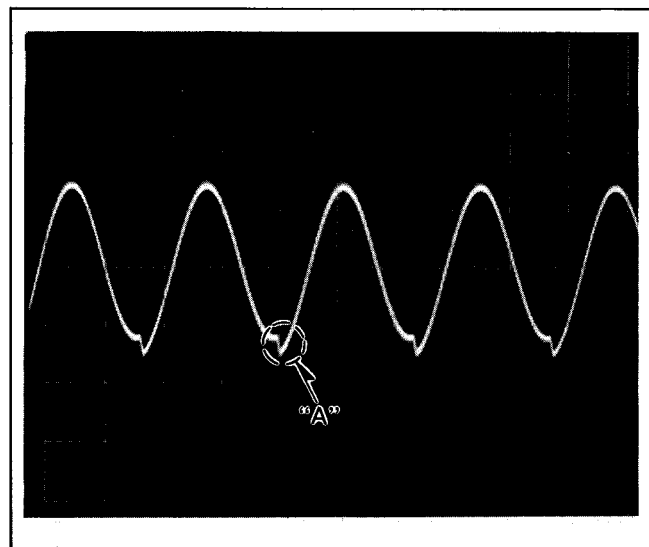


Fig. E9

## 2-6-11. CHROMINANCE RECURSIVE ADJUSTMENT

| TP            | ADJ.              | MODE               | INPUT         |
|---------------|-------------------|--------------------|---------------|
| IC301-17      | VR801<br>VR802    | SELF<br>REC&PB     | COLOUR<br>BAR |
| TAPE          | M. EQ.            | SPEC.              |               |
| BLANK<br>TAPE | OSCILLO-<br>SCOPE | MINIMIZE AMPLITUDE |               |

1. Record the color bar and play back the just recorded portion.
2. Adjust VR801 and VR802 until the amplitude of the signal at the Pin 17 of IC301 is minimum.

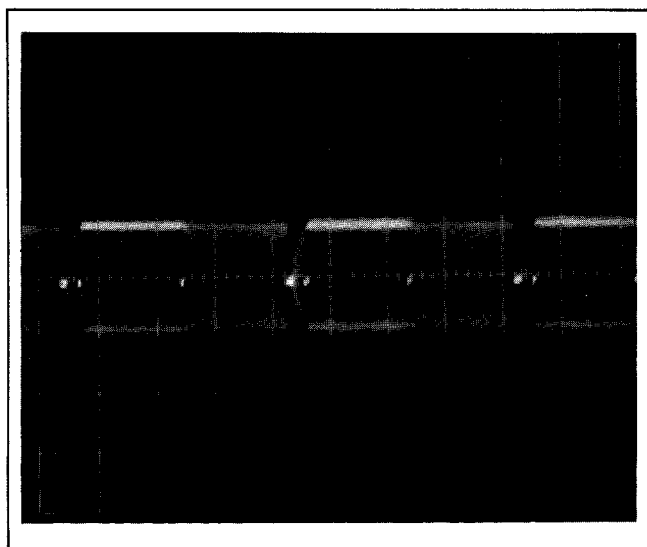


Fig. E10 Before adjustment.

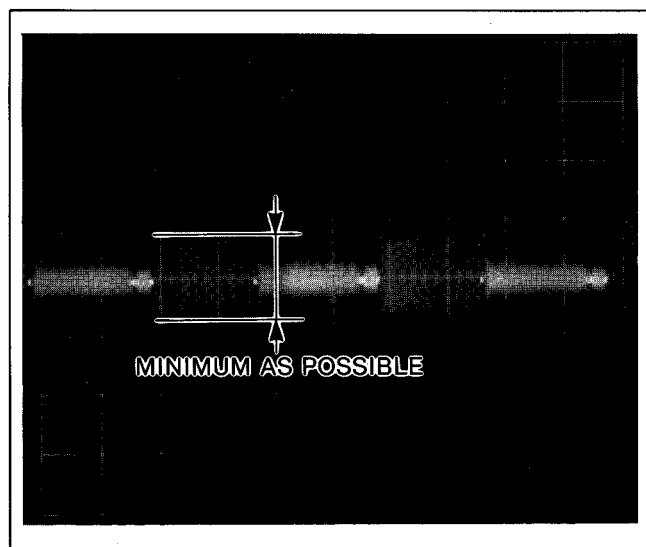


Fig. E11 After adjustment.

## AUDIO SECTION

### 2-6-12. BIAS CURRENT ADJUSTMENT

| TP                                 | ADJ.     | MODE             | INPUT |
|------------------------------------|----------|------------------|-------|
| TP4002<br>(HOT)<br>TP4003<br>(GND) | VR4002   | RECORDING        |       |
| TAPE                               | M. EQ.   | SPEC.            |       |
| BLANK<br>TAPE                      | V.T.V.M. | 2.9+/-0.1(mVrms) |       |

Note:

Connect the Audio input and GND.

1. Place the unit in SP recording mode.
2. Connect the V.T.V.M. to TP4002(HOT) and TP4003(GND).
3. Adjust VR4002 so reading of V.T.V.M. is 2.9+/-0.1(mVrms).

## TIMER SECTION

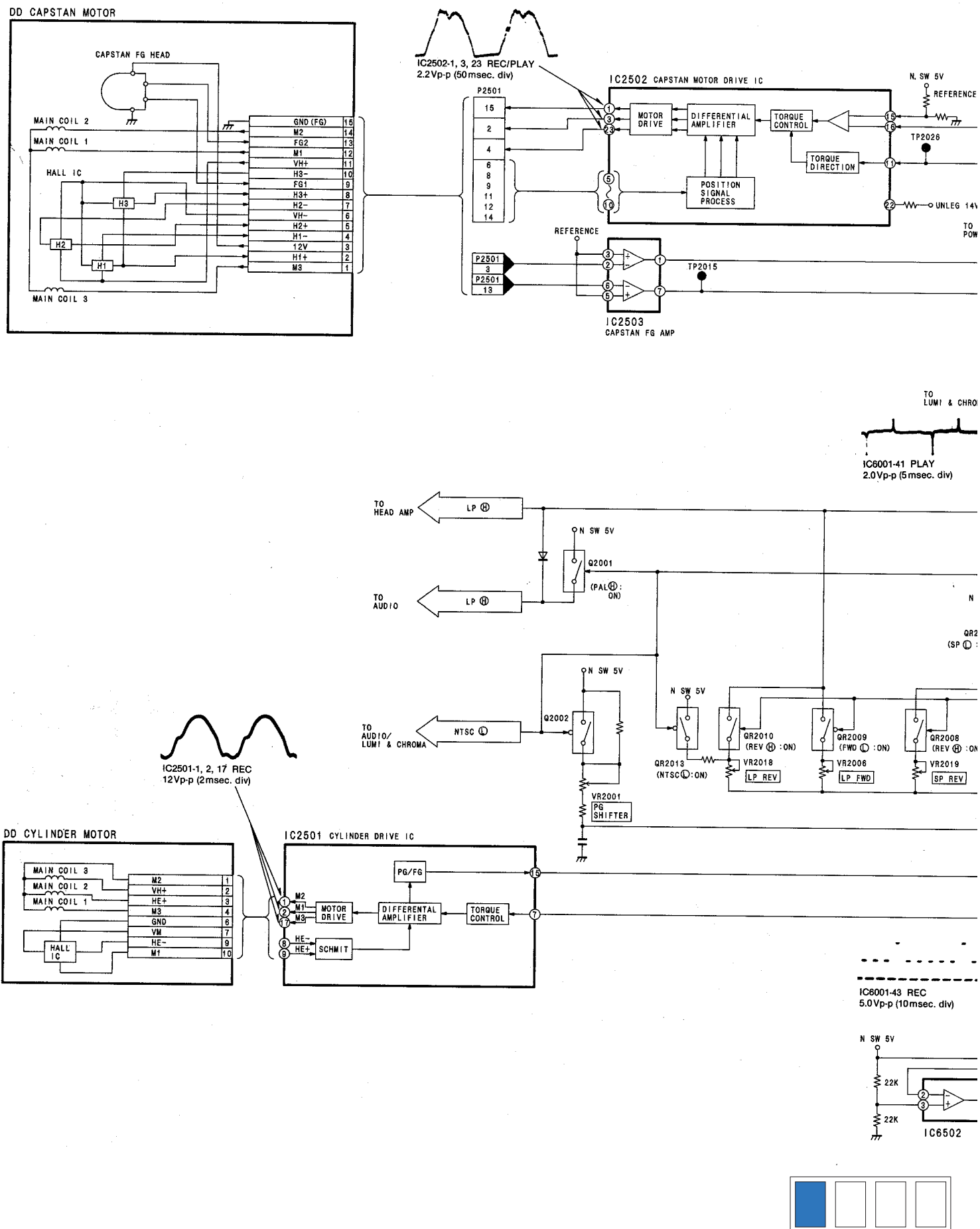
### 2-6-13. TIMER REFERENCE CLOCK ADJUSTMENT

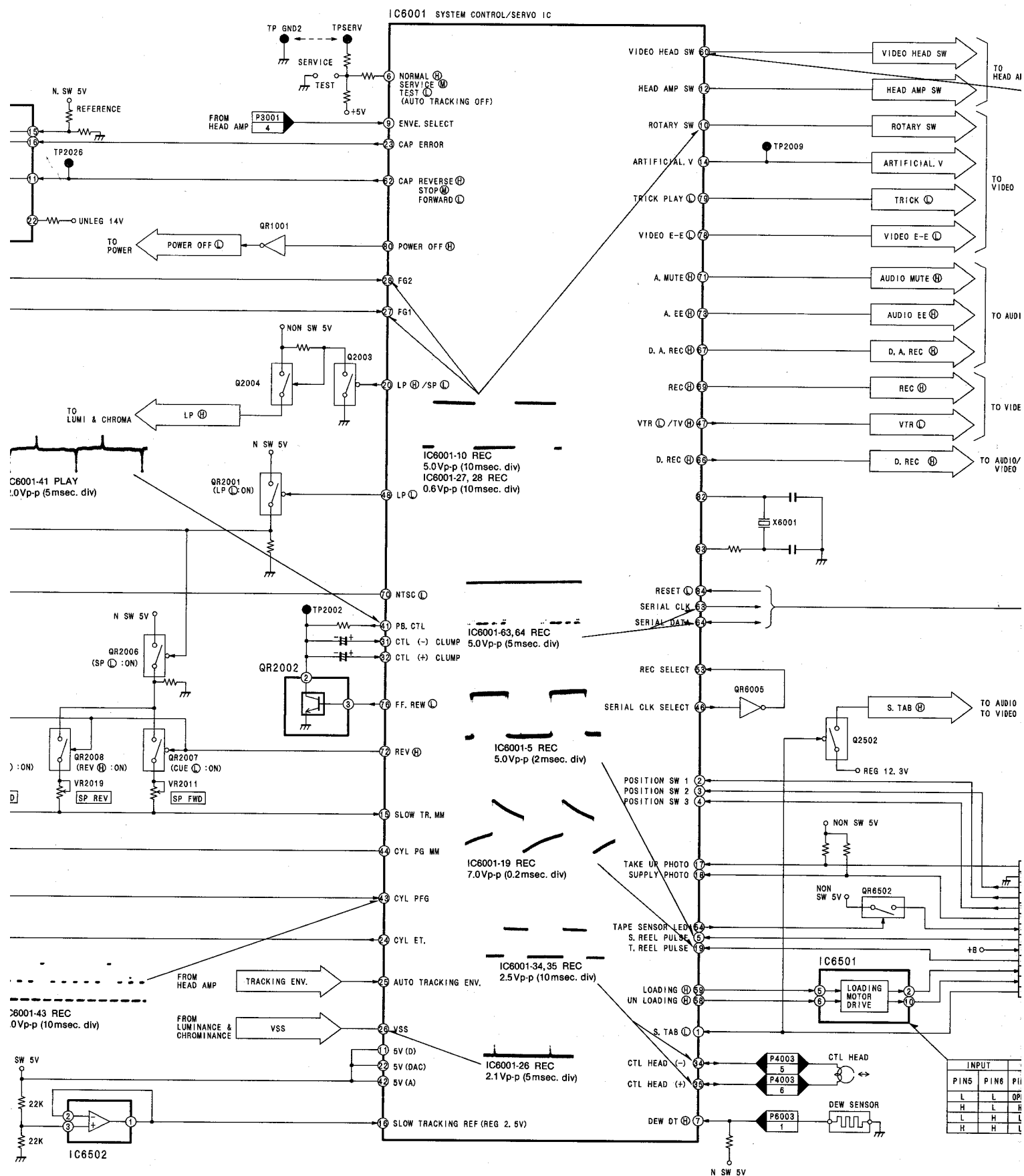
| TP        | ADJ.                 | MODE               | INPUT |
|-----------|----------------------|--------------------|-------|
| TP7501-28 | C7501                | STOP               |       |
| TAPE      | M. EQ.               | SPEC.              |       |
|           | UNIVERSAL<br>COUNTER | 7812.5+/-0.015(us) |       |

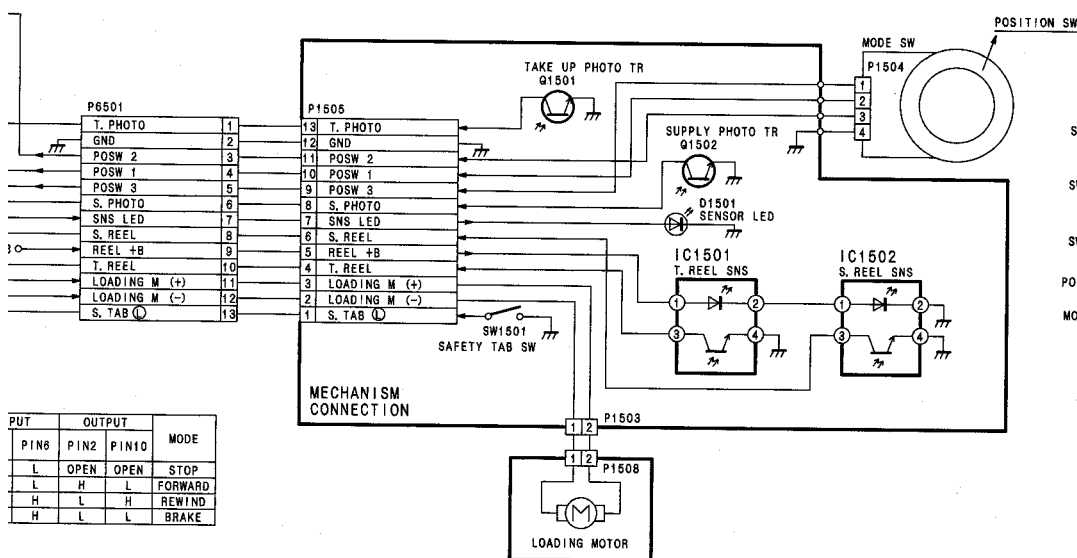
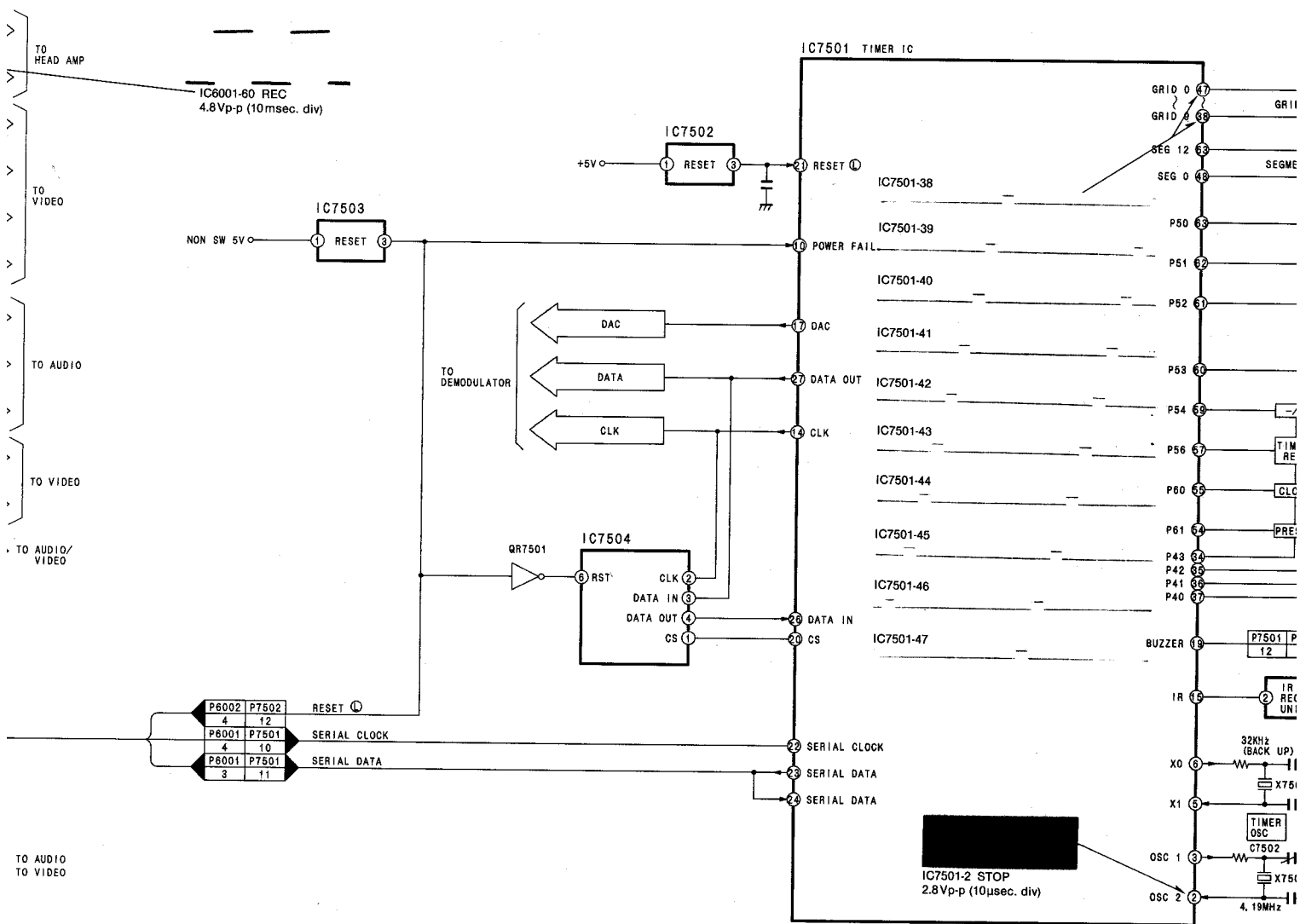
1. Connect the universal counter to TP7501-28.
2. Adjust C7501 so the reading of universal counter is 7812.5+/-0.015us.

# SECTION 3 BLOCK DIAGRAMS

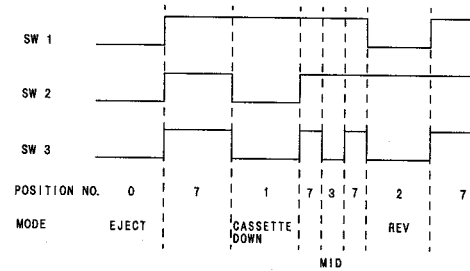
## 3-1. SYSTEM CONTROL & SERVO BLOCK DIAGRAM



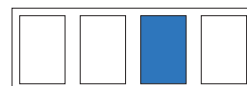


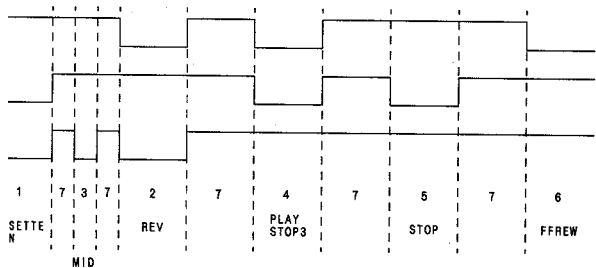
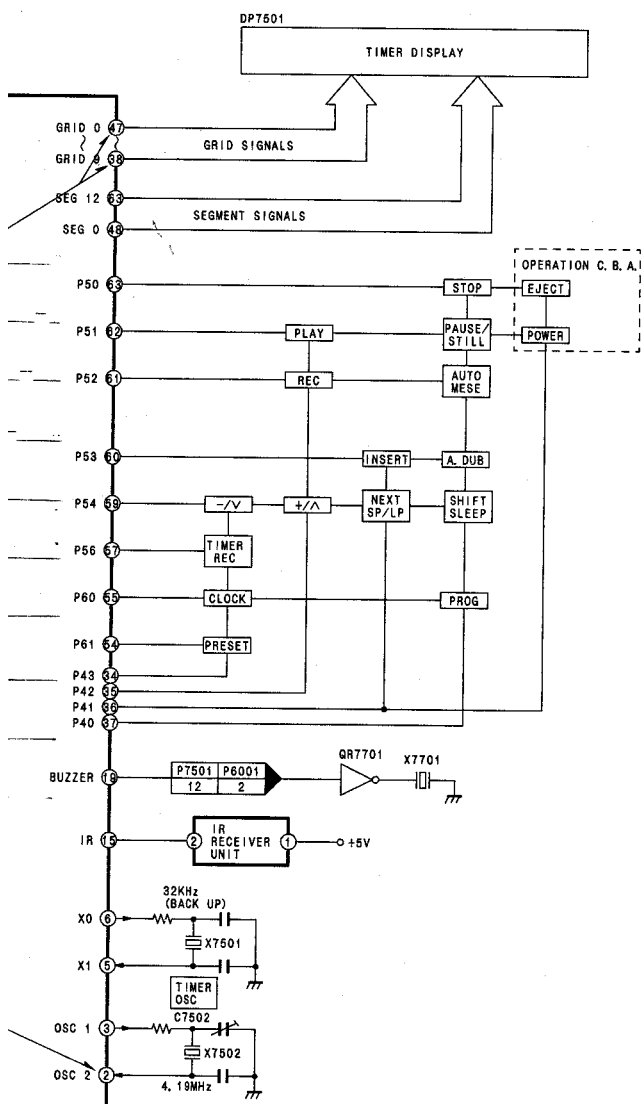


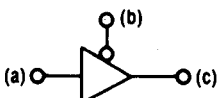
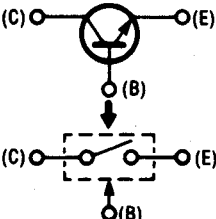
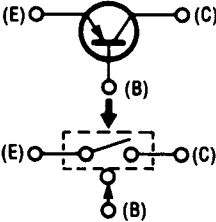
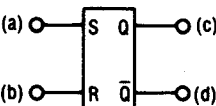
<TIMING CHART>

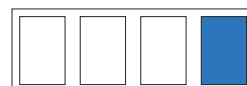


| PUT  | OUTPUT | MODE  |
|------|--------|-------|
| PIN6 | PIN2   | PIN10 |
| L    | OPEN   | OPEN  |
| L    | H      | L     |
| H    | L      | H     |
| H    | L      | L     |

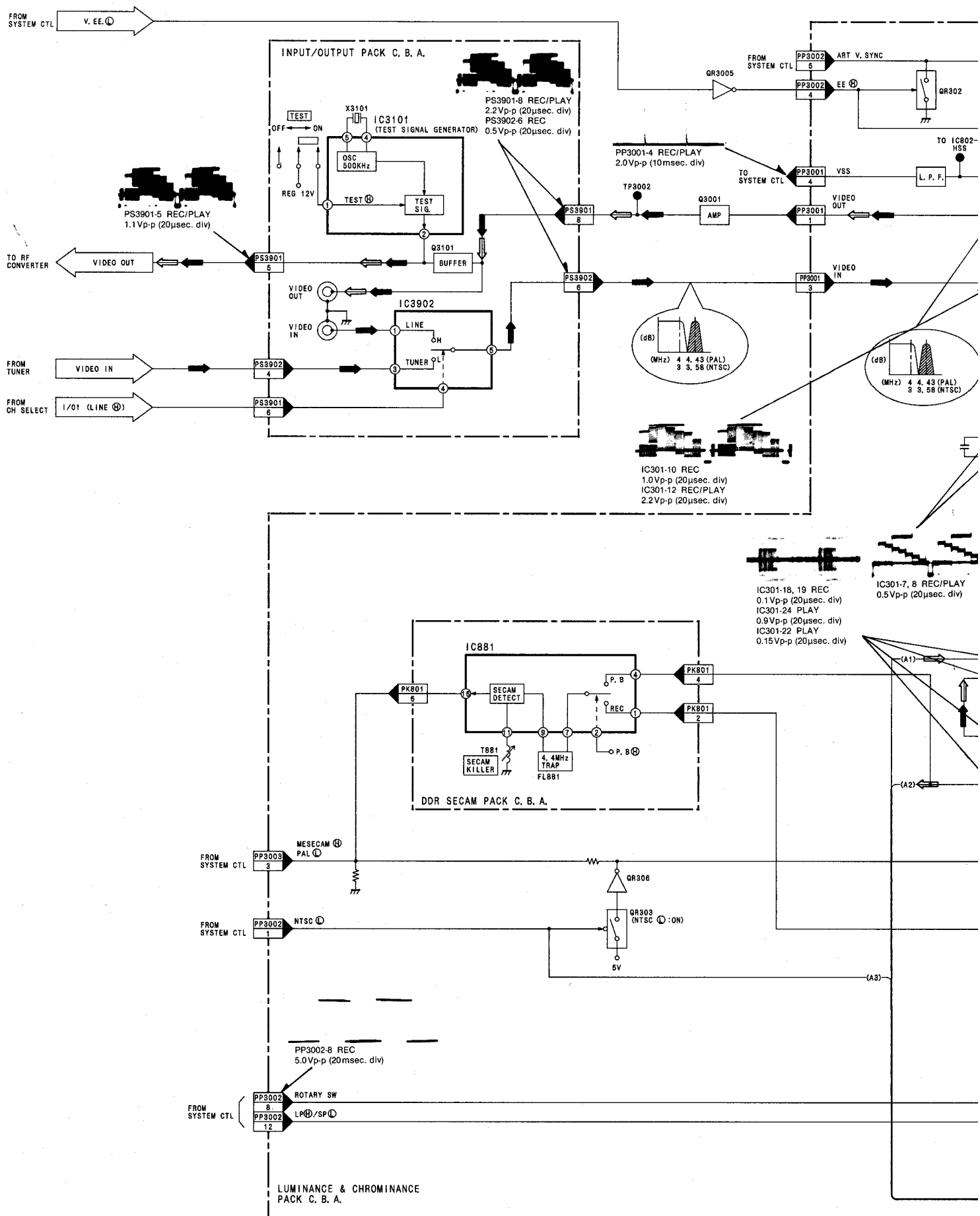


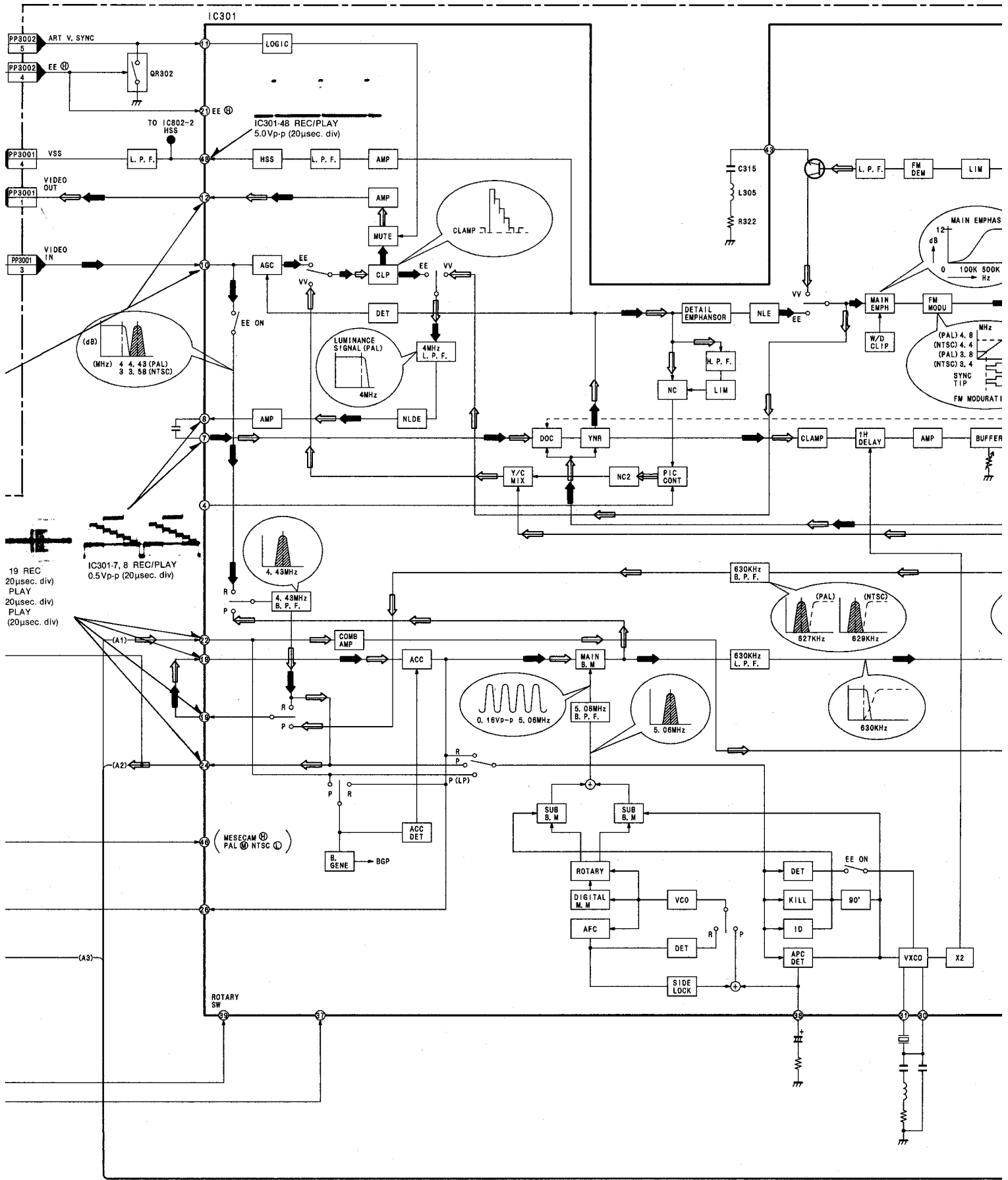


| SYMBOL                                                                                                            | TRUTH VALUE TABLE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                                                                       |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------|-----|-----|-----|---------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|---|---|-----|---|---|---|
| <b>INVERTER</b><br>             | <table><tr><td>IN</td><td>(a)</td><td>H</td><td>L</td></tr><tr><td>OUT</td><td>(b)</td><td>L</td><td>H</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                    | IN        | (a)                                                                                   | H                                                                                     | L         | OUT                                                                                   | (b) | L   | H   |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| IN                                                                                                                | (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | H         | L                                                                                     |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| OUT                                                                                                               | (b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         | H                                                                                     |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| <b>COMPARTOR</b><br>            | <table><tr><td>IN</td><td>(a)</td><td>(a) &gt; (b)</td><td>(a) &lt; (b)</td></tr><tr><td></td><td>(b)</td><td></td><td></td></tr><tr><td>OUT</td><td>(c)</td><td>H</td><td>L</td></tr></table>                                                                                                                                                                                                                                                                                                                              | IN        | (a)                                                                                   | (a) > (b)                                                                             | (a) < (b) |                                                                                       | (b) |     |     | OUT                                                                                   | (c) | H   | L   |     |     |   |   |     |   |   |   |
| IN                                                                                                                | (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | (a) > (b) | (a) < (b)                                                                             |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
|                                                                                                                   | (b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                       |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| OUT                                                                                                               | (c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | H         | L                                                                                     |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| <b>AND CIRCUIT</b><br>          | <table><tr><td>IN</td><td>(a)</td><td>L</td><td>L</td><td>H</td><td>H</td></tr><tr><td></td><td>(b)</td><td>L</td><td>H</td><td>L</td><td>H</td></tr><tr><td>OUT</td><td>(c)</td><td>L</td><td>L</td><td>L</td><td>H</td></tr></table>                                                                                                                                                                                                                                                                                      | IN        | (a)                                                                                   | L                                                                                     | L         | H                                                                                     | H   |     | (b) | L                                                                                     | H   | L   | H   | OUT | (c) | L | L | L   | H |   |   |
| IN                                                                                                                | (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         | L                                                                                     | H                                                                                     | H         |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
|                                                                                                                   | (b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         | H                                                                                     | L                                                                                     | H         |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| OUT                                                                                                               | (c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         | L                                                                                     | L                                                                                     | H         |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| <b>OR CIRCUIT</b><br>           | <table><tr><td>IN</td><td>(a)</td><td>L</td><td>L</td><td>H</td><td>H</td></tr><tr><td></td><td>(b)</td><td>L</td><td>H</td><td>L</td><td>H</td></tr><tr><td>OUT</td><td>(c)</td><td>L</td><td>H</td><td>H</td><td>H</td></tr></table>                                                                                                                                                                                                                                                                                      | IN        | (a)                                                                                   | L                                                                                     | L         | H                                                                                     | H   |     | (b) | L                                                                                     | H   | L   | H   | OUT | (c) | L | H | H   | H |   |   |
| IN                                                                                                                | (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         | L                                                                                     | H                                                                                     | H         |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
|                                                                                                                   | (b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         | H                                                                                     | L                                                                                     | H         |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| OUT                                                                                                               | (c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         | H                                                                                     | H                                                                                     | H         |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| <b>THREE STATES BUFFER</b><br> | <table><tr><td>IN</td><td>(a)</td><td>H</td><td>L</td><td>H or L</td></tr><tr><td></td><td>(b)</td><td>L</td><td>L</td><td>H</td></tr><tr><td>OUT</td><td>(c)</td><td>H</td><td>L</td><td>※</td></tr></table> <p>※ High Impedance</p>                                                                                                                                                                                                                                                                                       | IN        | (a)                                                                                   | H                                                                                     | L         | H or L                                                                                |     | (b) | L   | L                                                                                     | H   | OUT | (c) | H   | L   | ※ |   |     |   |   |   |
| IN                                                                                                                | (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | H         | L                                                                                     | H or L                                                                                |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
|                                                                                                                   | (b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         | L                                                                                     | H                                                                                     |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| OUT                                                                                                               | (c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | H         | L                                                                                     | ※                                                                                     |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| <b>TR. SW (NPN TYPE)</b><br>  | <table><tr><td>BASE</td><td>H</td><td>L</td></tr><tr><td>TR. SW</td><td>ON</td><td>OFF</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                    | BASE      | H                                                                                     | L                                                                                     | TR. SW    | ON                                                                                    | OFF |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| BASE                                                                                                              | H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | L         |                                                                                       |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| TR. SW                                                                                                            | ON                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OFF       |                                                                                       |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| <b>TR. SW (PNP TYPE)</b><br>  | <table><tr><td>BASE</td><td>H</td><td>L</td></tr><tr><td>TR. SW</td><td>OFF</td><td>ON</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                    | BASE      | H                                                                                     | L                                                                                     | TR. SW    | OFF                                                                                   | ON  |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| BASE                                                                                                              | H                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | L         |                                                                                       |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| TR. SW                                                                                                            | OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ON        |                                                                                       |                                                                                       |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| <b>R-S TYPE FLIP-FLOP</b><br> | <table><tr><td>IN</td><td>(a)</td><td>L</td><td>L</td><td></td></tr><tr><td></td><td>(b)</td><td>L</td><td></td><td>L</td></tr><tr><td>OUT</td><td>(c)</td><td>※</td><td>L</td><td>H</td></tr><tr><td></td><td>(d)</td><td>◆</td><td>H</td><td>L</td></tr></table> <p>※ Initial condition is maintained.<br/>◆ Initial condition is reversed.</p> | IN        | (a)                                                                                   | L                                                                                     | L         |  |     | (b) | L   |  | L   | OUT | (c) | ※   | L   | H |   | (d) | ◆ | H | L |
| IN                                                                                                                | (a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         | L                                                                                     |  |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
|                                                                                                                   | (b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | L         |  | L                                                                                     |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
| OUT                                                                                                               | (c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ※         | L                                                                                     | H                                                                                     |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |
|                                                                                                                   | (d)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ◆         | H                                                                                     | L                                                                                     |           |                                                                                       |     |     |     |                                                                                       |     |     |     |     |     |   |   |     |   |   |   |

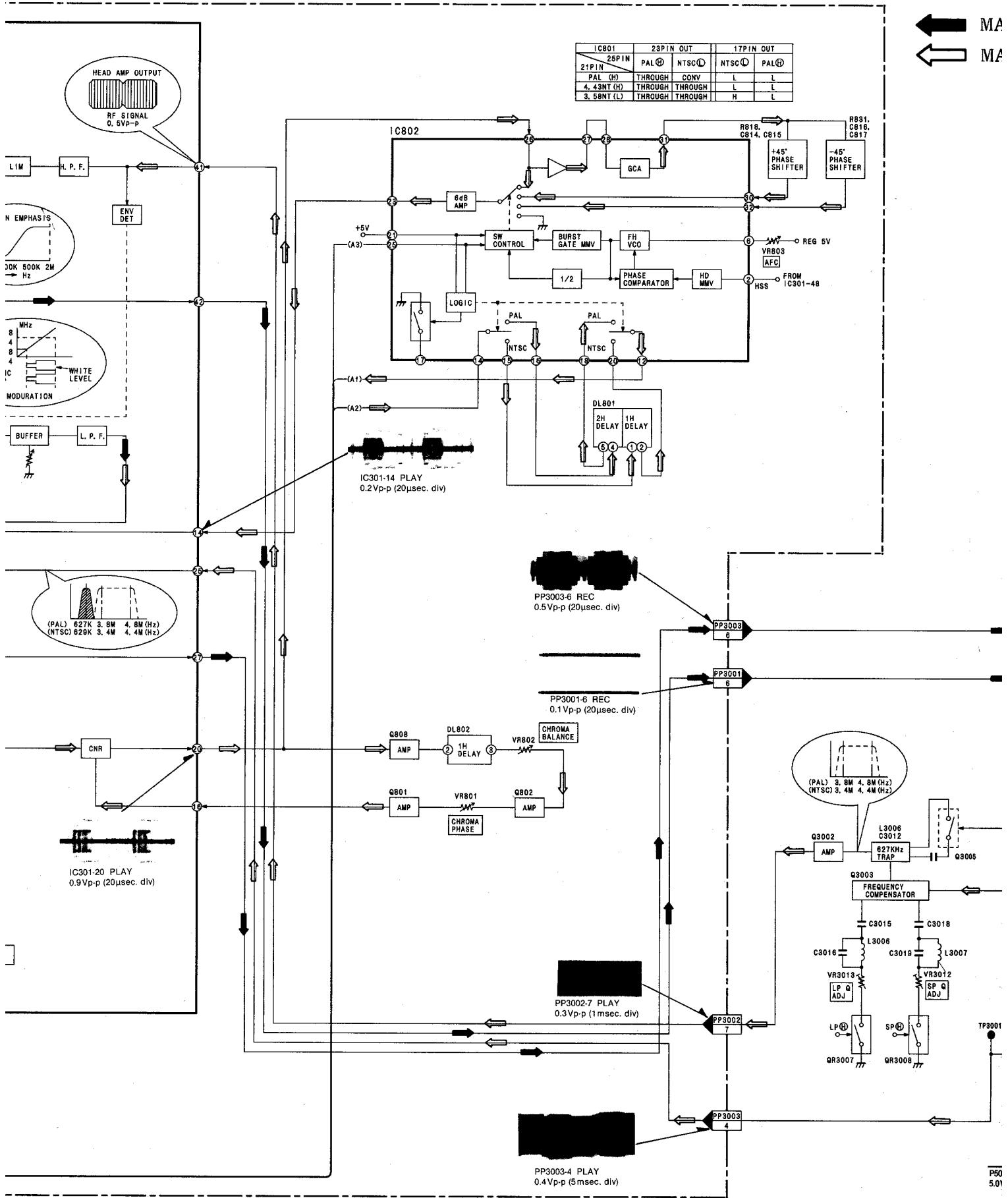


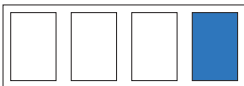
## 3-2. LUMINANCE & CHROMINANCE BLOCK DIAGRAM





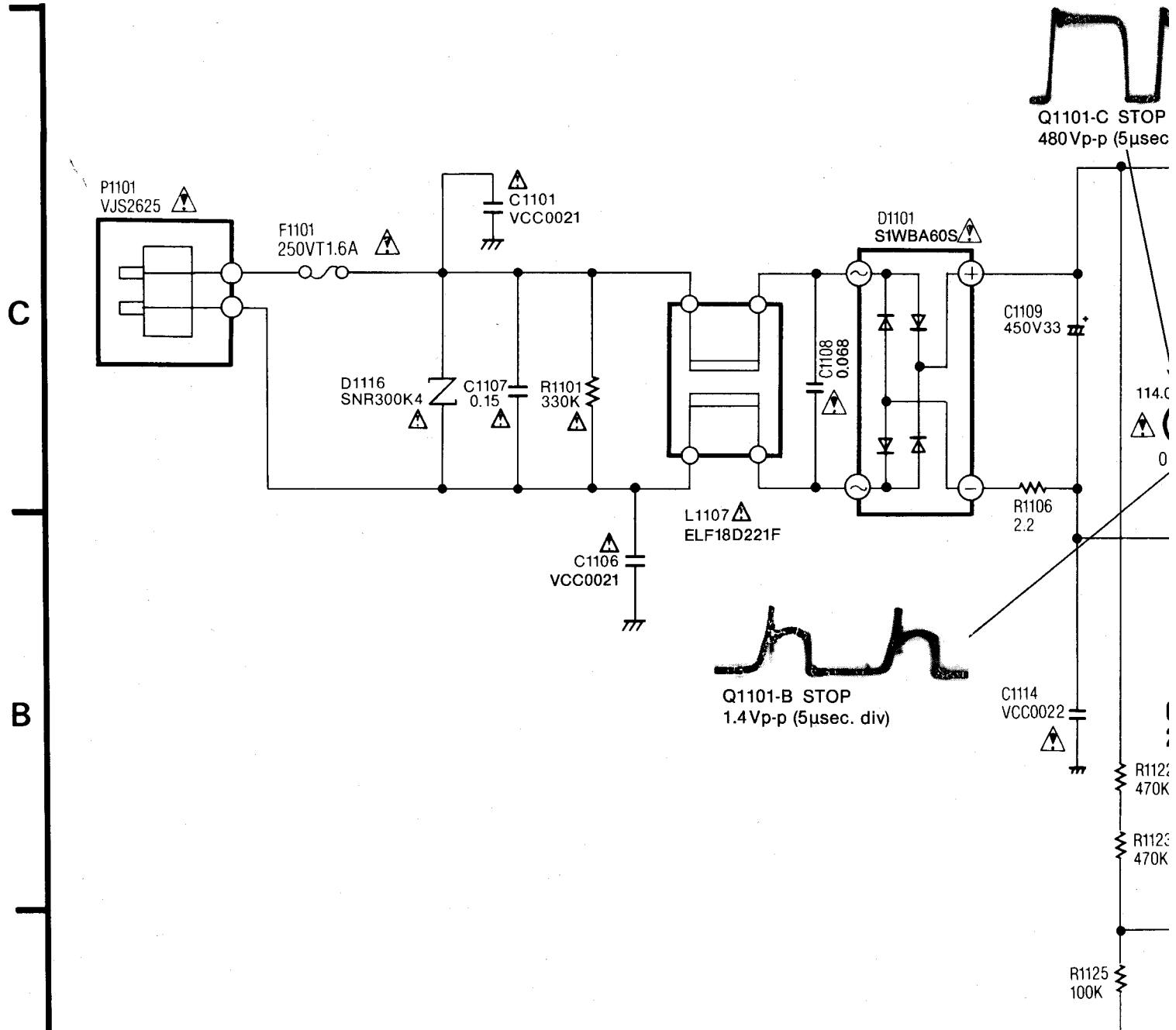
MA  
MA





# SECTION 4 SCHEMATIC DIAGRAMS

## 4-1. POWER SCHEMATIC DIAGRAM



NOTE 1. WHEN MEASURE THE VOLTAGE OR WAVEFORM ON THE POWER TRANSFORMER CIRCUIT, SET THE GND TERMINAL OF MEASURING POINT AS FOLLOWS.

PRIMARY SIDE ..... T1101-B2

SECONDARY SIDE .... TP GND OF MAIN C.B.A.

NOTE 2. THE DC VOLTAGE INDICATED IN PRIMARY SIDE IS SHOWN THE VOLTAGE WHEN INPUT AC IS 240V.

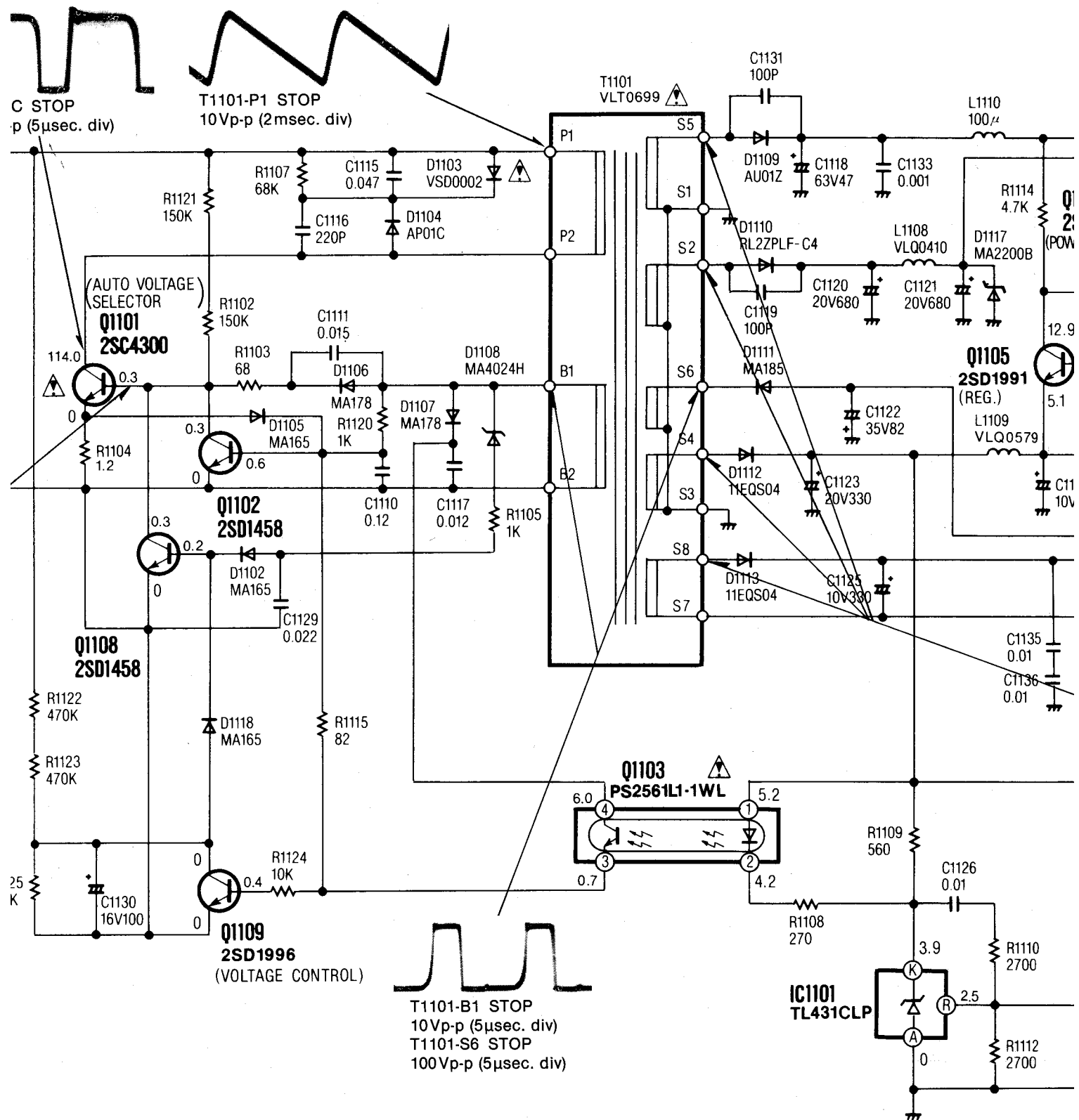
NOTE: THE MEASUREMENT MODE OF THE C

1

2

3



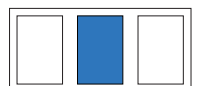


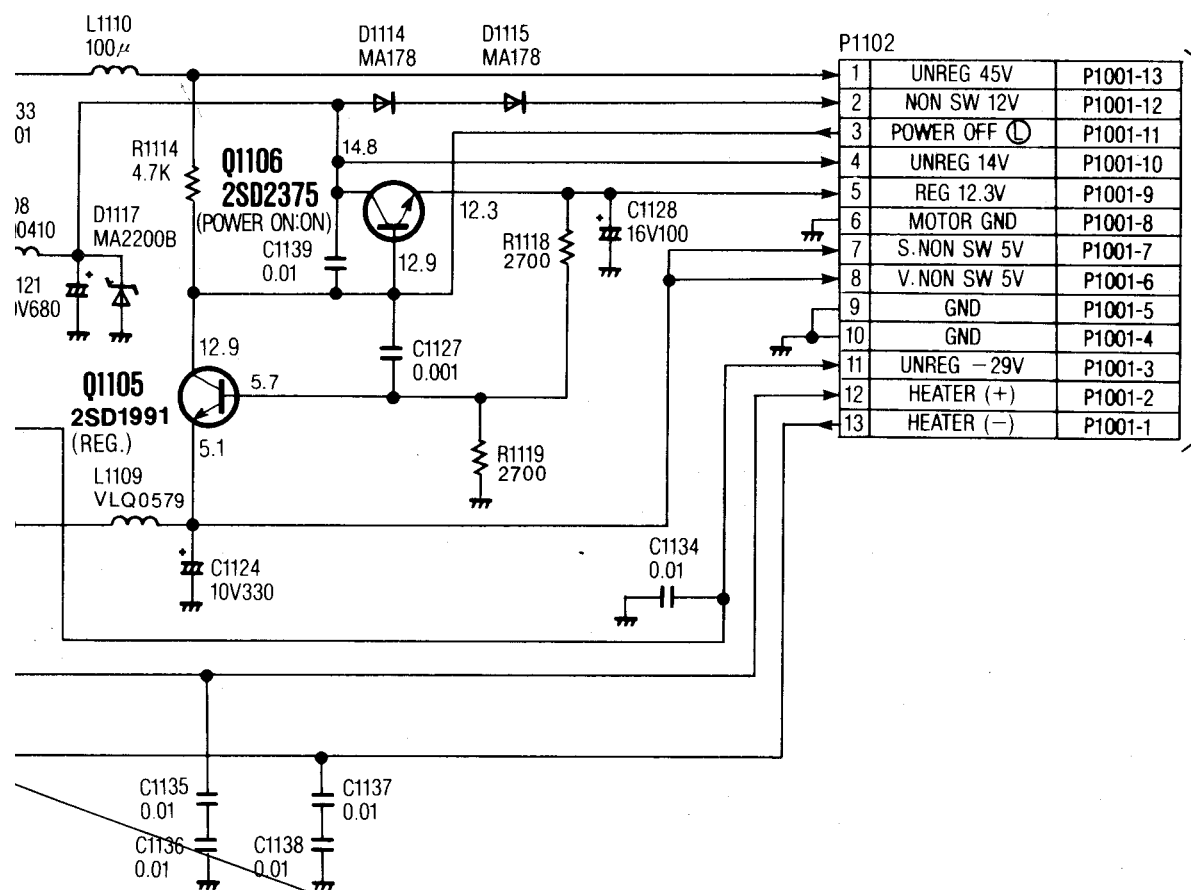
OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

4

5

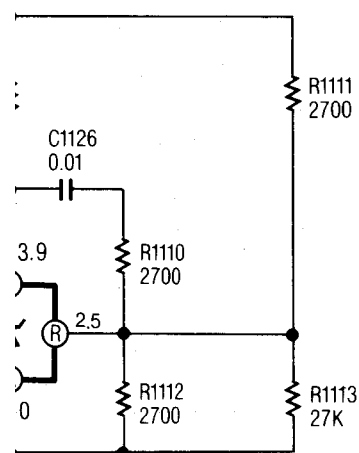
6





TO LUMINANCE/  
CHROMINANCE & AUDIO  
SECTION P1001  
(Page: 4-13/F-18)

|    |             |          |
|----|-------------|----------|
| 1  | UNREG 45V   | P1001-13 |
| 2  | NON SW 12V  | P1001-12 |
| 3  | POWER OFF   | P1001-11 |
| 4  | UNREG 14V   | P1001-10 |
| 5  | REG 12.3V   | P1001-9  |
| 6  | MOTOR GND   | P1001-8  |
| 7  | S.NON SW 5V | P1001-7  |
| 8  | V.NON SW 5V | P1001-6  |
| 9  | GND         | P1001-5  |
| 10 | GND         | P1001-4  |
| 11 | UNREG -29V  | P1001-3  |
| 12 | HEATER (+)  | P1001-2  |
| 13 | HEATER (-)  | P1001-1  |



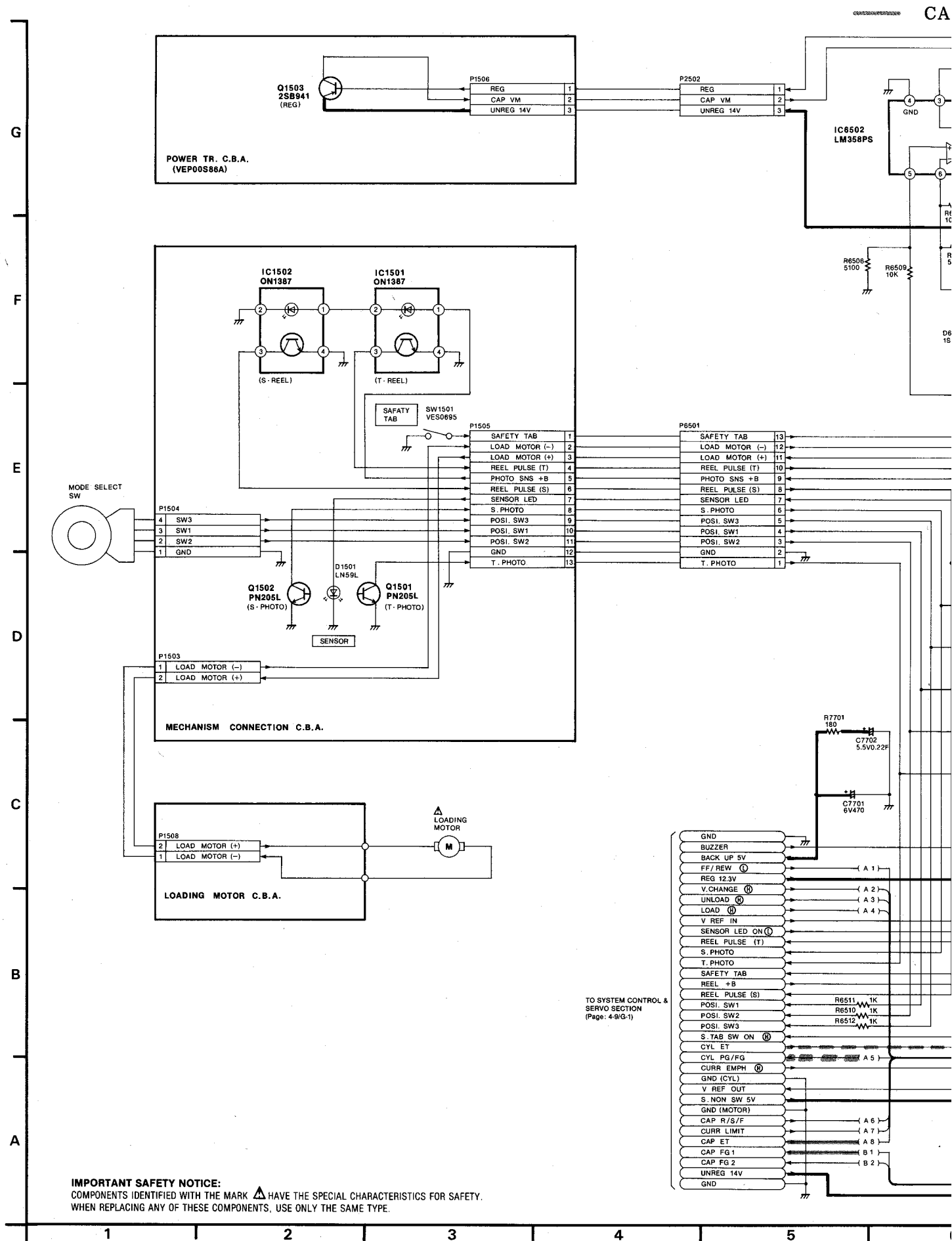
T1101-S2 STOP  
50Vp-p (5μsec. div)  
T1101-S4 STOP  
20Vp-p (5μsec. div)  
T1101-S5 STOP  
125Vp-p (5μsec. div)  
T1101-S8 STOP  
25Vp-p (5μsec. div)

**IMPORTANT SAFETY NOTICE:**  
COMPONENTS IDENTIFIED BY THE SIGN HAVE SPECIAL CHARACTERISTICS  
IMPORTANT FOR SAFETY WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY  
THE SPECIFIED PARTS.

NOTE: DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR  
ORDERING. WHEN YOU ORDER A PART, PLEASE REFER TO PARTS LIST.

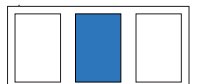
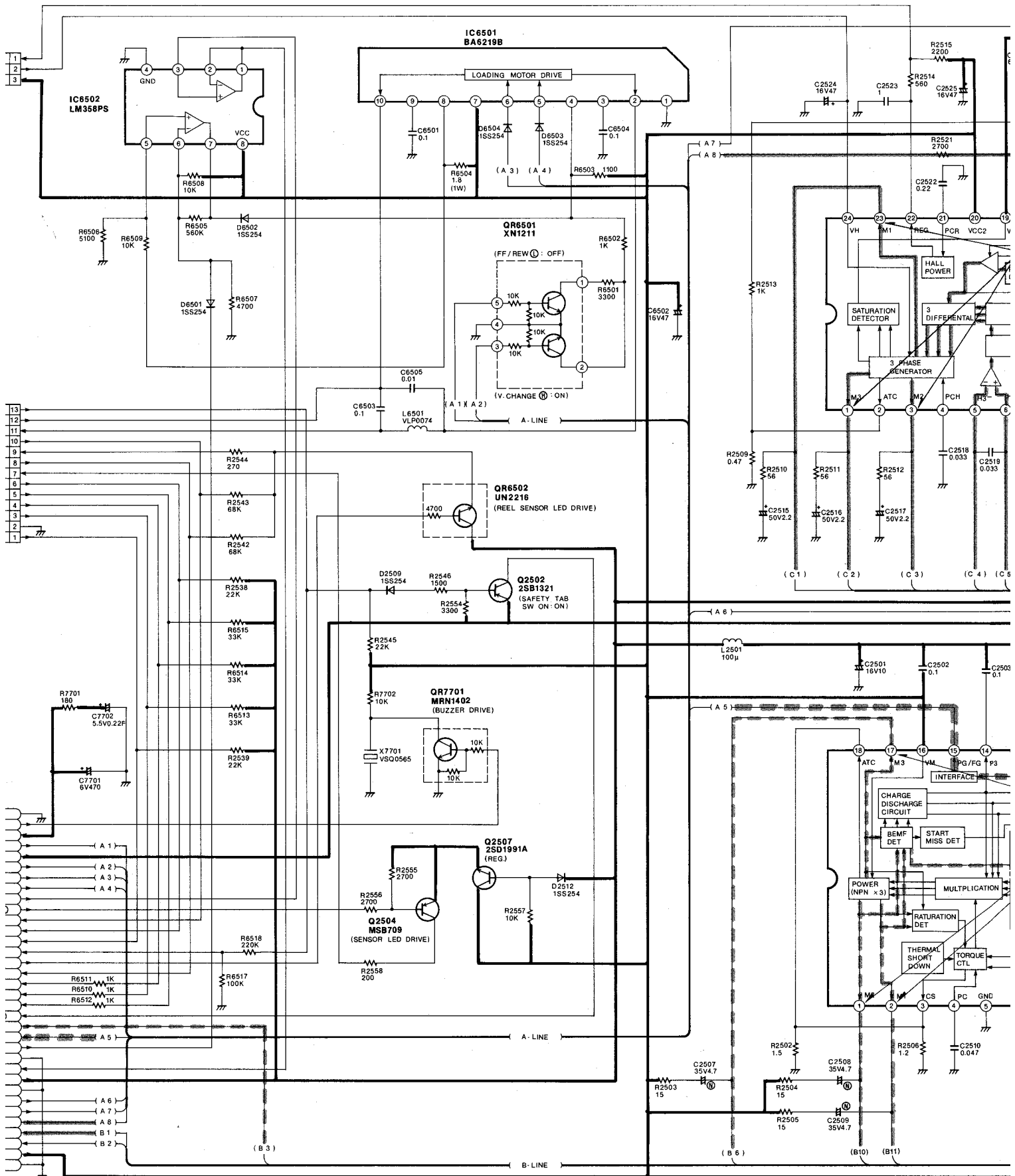


## 4-2. SUB SERVO SECTION IN MAIN SCHEMATIC DIAGRAM

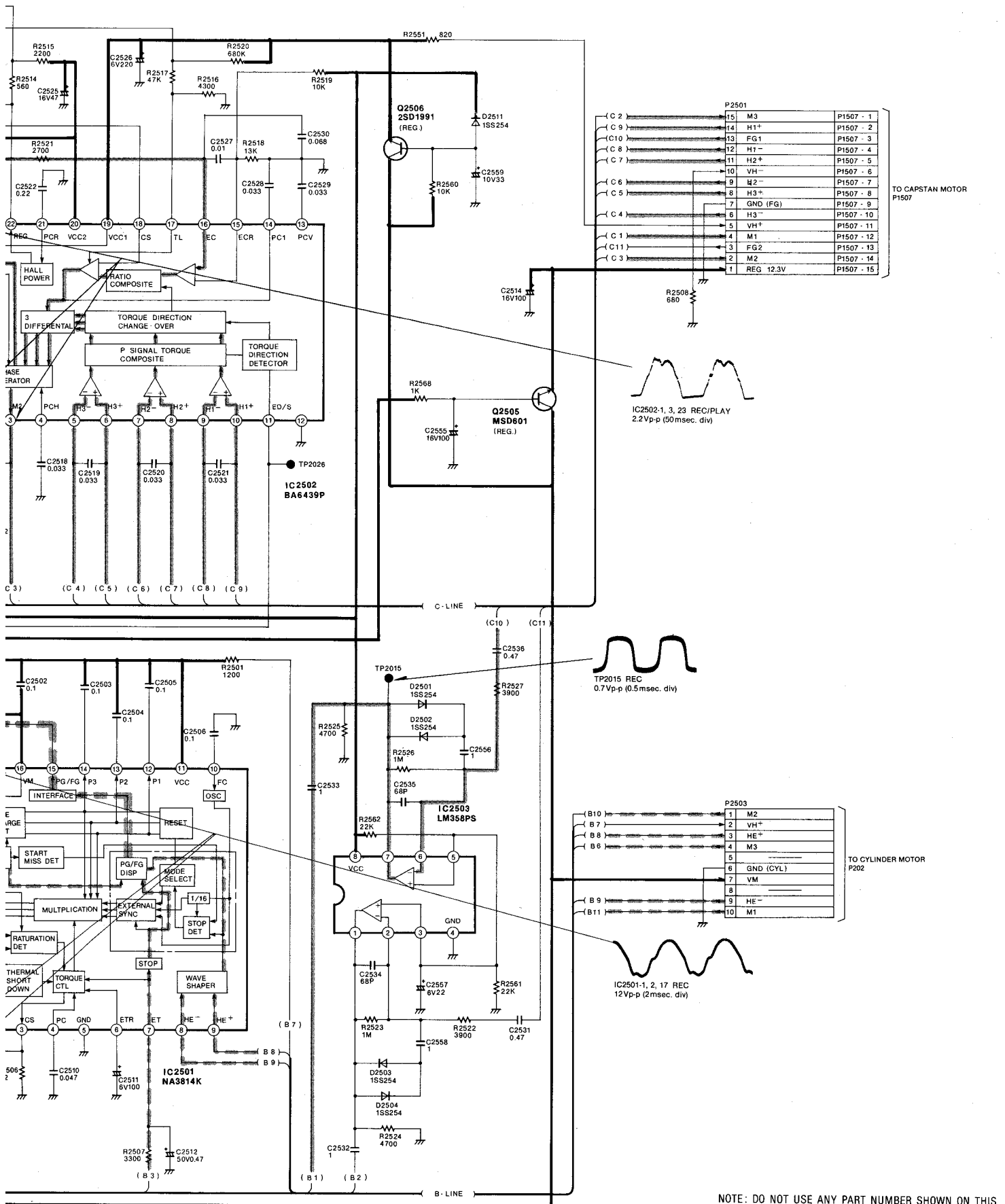


## CAPSTAN SERVO SPEED LOOP

## CYLINDER SERVO SPEED LOOP



# LOOP CYLINDER SERVO PHASE LOOP



NOTE: DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING. WHEN YOU ORDER A PART, PLEASE REFER TO PARTS LIST.

11

12

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16





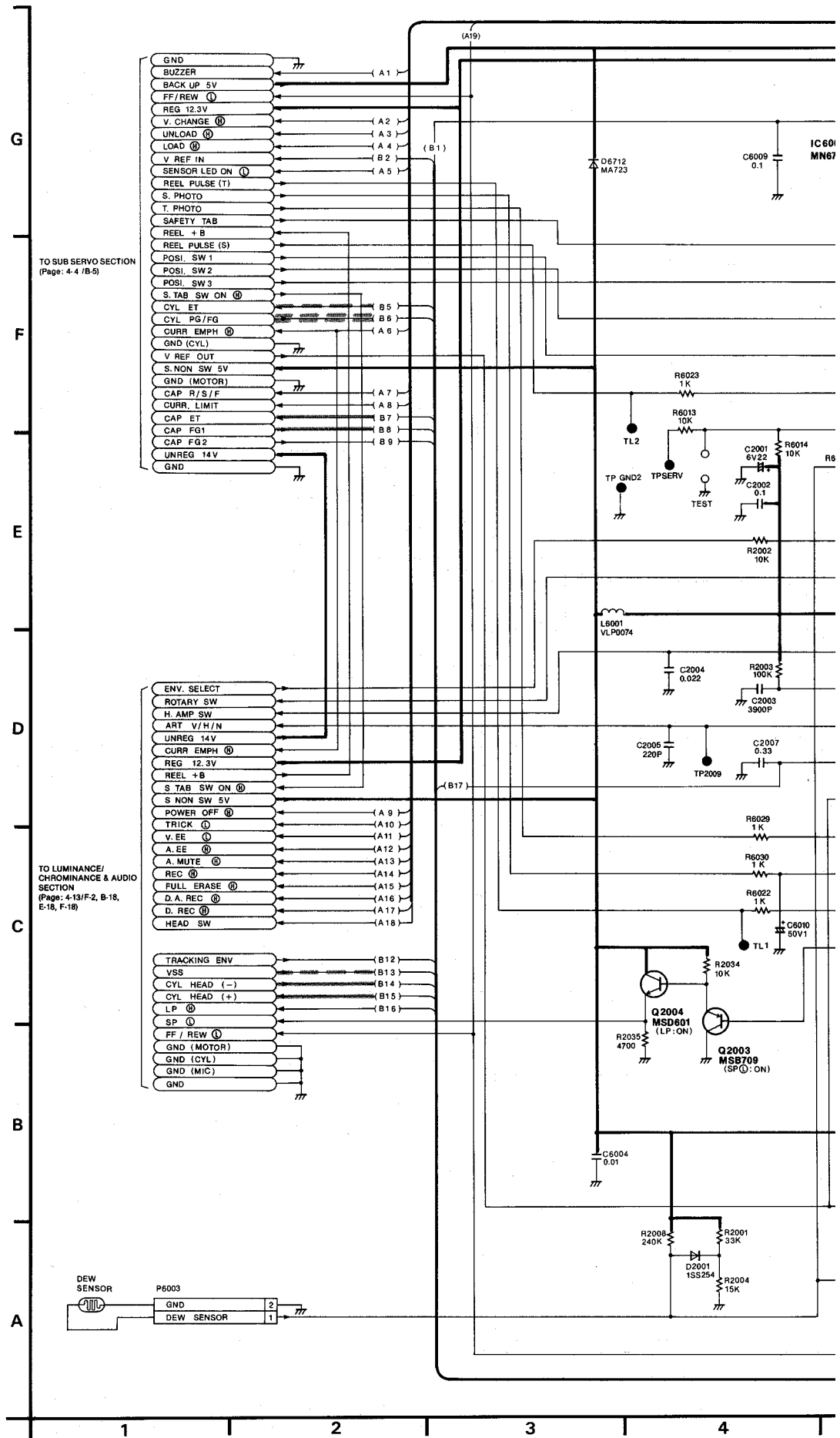
## SYSTEM CONTROL & SERVO ICs DC VOLTAGE CHART (SP MODE)

| REF. NO. | IC6001 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| MODE     | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  |
| STOP     | 0.4    | 4.9 | 0   | 4.9 | 0.1 | 2.7 | 0   | 0   | 0.4 | 5.1 | 5.1 | 0   | 0   | 0   | 0   | 2.5 | 4.8 | 5.0 | 5.0 | 0   |
| PLAY     | 0.1    | 4.9 | 0   | 0   | 0.1 | 5.1 | 0   | 0   | 4.0 | 1.5 | 5.1 | 0   | 0   | 0   | 0   | 2.5 | 4.8 | 5.0 | 5.0 | 0   |
| REC      | 0.6    | 5.0 | 0   | 0   | 4.8 | 5.1 | 0   | 0   | 4.6 | 5.0 | 5.1 | 0   | 0   | 0   | 0   | 2.5 | 5.0 | 5.0 | 5.0 | 0   |
| F.F      | 0      | 5.0 | 4.9 | 0   | 2.4 | 5.1 | 0   | 0   | 3.0 | 5.1 | 5.1 | 0   | 0   | 0   | 0   | 2.5 | 4.9 | 4.9 | 1.6 | 0   |
| REW      | 0      | 5.1 | 5.1 | 0   | 1.6 | 5.1 | 0   | 0   | 2.6 | 5.1 | 5.1 | 0   | 0   | 0   | 0   | 2.5 | 4.7 | 4.9 | 1.7 | 0   |
| REF. NO. | IC6001 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| MODE     | 21     | 22  | 23  | 24  | 25  | 26  | 27  | 28  | 29  | 30  | 31  | 32  | 33  | 34  | 35  | 36  | 37  | 38  | 39  | 40  |
| STOP     | 5.0    | 5.1 | 0.2 | 2.5 | 0.3 | 2.2 | 2.0 | 2.5 | 0   | 2.5 | 2.4 | 2.0 | 5.0 | 0   | 2.0 | 2.0 | 2.0 | 2.5 | 2.2 | 2.5 |
| PLAY     | 5.1    | 5.1 | 2.6 | 2.4 | 3.8 | 2.5 | 2.5 | 2.5 | 0   | 2.5 | 2.7 | 2.4 | 5.0 | 0   | 0   | 0   | 2.5 | 2.5 | 0   | 2.8 |
| REC      | 0      | 5.1 | 2.7 | 2.5 | 0.4 | 2.5 | 2.5 | 2.5 | 0   | 2.5 | 2.4 | 2.7 | 5.0 | 3.5 | 3.7 | 0   | 2.5 | 2.5 | 0   | 2.5 |
| F.F      | 5.1    | 5.1 | 2.2 | 2.5 | 2.7 | 2.5 | 2.5 | 2.5 | 0   | 2.5 | 2.5 | 2.6 | 5.0 | 0   | 0   | 0   | 2.5 | 1.6 | 0   | 2.9 |
| REW      | 5.1    | 5.1 | 2.3 | 2.4 | 2.1 | 2.8 | 2.1 | 2.3 | 0   | 2.5 | 2.5 | 2.6 | 5.0 | 2.6 | 2.6 | 2.0 | 2.5 | 1.8 | 0   | 2.9 |
| REF. NO. | IC6001 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| MODE     | 41     | 42  | 43  | 44  | 45  | 46  | 47  | 48  | 49  | 50  | 51  | 52  | 53  | 54  | 55  | 56  | 57  | 58  | 59  | 60  |
| STOP     | 2.5    | 5.1 | 1.4 | 3.6 | 0   | 4.3 | 0   | 5.1 | 0   | 0   | 0   | 5.0 | 1.4 | 5.1 | 5.0 | 5.1 | 0   | 0   | 0   | 0.3 |
| PLAY     | 2.4    | 5.1 | 0.8 | 3.8 | 3.8 | 4.5 | 0   | 5.1 | 0   | 0   | 0   | 0   | 1.3 | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| REC      | 2.5    | 5.1 | 0.8 | 3.8 | 0   | 4.6 | 0   | 0   | 0   | 0   | 0   | 5.1 | 1.3 | 0.1 | 5.1 | 0   | 0   | 0   | 0   | 5.1 |
| F.F      | 2.5    | 5.1 | 1.5 | 3.7 | 0   | 4.3 | 0   | 5.1 | 0   | 0   | 0   | 5.1 | 1.3 | 0.1 | 0   | 5.1 | 0   | 0   | 0   | 5.1 |
| REW      | 2.5    | 5.1 | 1.1 | 3.7 | 0   | 4.4 | 0   | 5.1 | 0   | 0   | 0   | 4.9 | 1.0 | 0.1 | 0   | 5.1 | 0   | 0   | 0   | 5.0 |
| REF. NO. | IC6001 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| MODE     | 61     | 62  | 63  | 64  | 65  | 66  | 67  | 68  | 69  | 70  | 71  | 72  | 73  | 74  | 75  | 76  | 77  | 78  | 79  | 80  |
| STOP     | 5.1    | 2.1 | 4.6 | 4.0 | 0   | 0   | 0   | 0   | 0.3 | 5.1 | 0   | 5.1 | 5.1 | 0   | 0.1 | 5.0 | 0   | 0   | 5.1 | 0   |
| PLAY     | 5.1    | 0   | 4.9 | 4.5 | 0   | 0   | 0   | 0   | 0.3 | 5.1 | 0   | 0   | 0   | 0   | 0.1 | 5.0 | 0   | 5.1 | 5.1 | 0   |
| REC      | 5.1    | 0   | 4.6 | 4.4 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 0   | 0   | 5.1 | 0   | 0.1 | 5.0 | 0   | 0   | 5.1 | 0   |
| F.F      | 5.1    | 0   | 4.6 | 4.6 | 0   | 0   | 0   | 0   | 0.3 | 5.1 | 0   | 0   | 5.1 | 0   | 0.1 | 0   | 0   | 0   | 5.1 | 0   |
| REW      | 5.1    | 5.1 | 4.6 | 4.6 | 0   | 0   | 0   | 0   | 0.3 | 5.1 | 0   | 5.1 | 5.1 | 0   | 0.1 | 0   | 0   | 0   | 5.1 | 0   |
| REF. NO. | IC6001 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| MODE     | 81     | 82  | 83  | 84  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| STOP     | 0      | 2.6 | 2.6 | 3.9 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| PLAY     | 0      | 2.6 | 2.6 | 4.1 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| REC      | 0      | 2.6 | 2.6 | 4.3 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| F.F      | 0      | 2.6 | 2.6 | 4.1 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| REW      | 0      | 2.6 | 2.6 | 3.9 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| REF. NO. | IC6710 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| MODE     | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  | 14  | 15  | 16  | 17  | 18  | 19  | 20  |
| STOP     | 0      | 3.9 | 5.0 | 5.0 | 5.1 | 5.1 | 0   | 0   | 0.1 | 0   | 0.1 | 2.2 | 0   | 0.2 | 0   | 5.1 | 0.1 | 0.1 | 4.8 | 5.1 |
| PLAY     | 0      | 3.9 | 4.9 | 5.0 | 5.1 | 5.1 | 0   | 0   | 0.1 | 0   | 0.1 | 2.2 | 0   | 0.2 | 0   | 5.1 | 0.1 | 0.1 | 4.8 | 5.1 |
| REC      | 0      | 4.1 | 5.0 | 5.0 | 5.1 | 5.1 | 0   | 0   | 0.1 | 0   | 0.1 | 2.2 | 0   | 0.2 | 0   | 5.1 | 0.1 | 0.1 | 4.8 | 5.1 |
| F.F      | 0      | 3.9 | 5.0 | 5.0 | 5.1 | 5.1 | 0   | 0   | 0.1 | 0   | 0.1 | 2.2 | 0   | 0.2 | 0   | 5.0 | 0.1 | 0.1 | 4.8 | 4.8 |
| REW      | 0      | 3.9 | 5.0 | 5.0 | 5.1 | 5.1 | 0   | 0   | 0.1 | 0   | 0.1 | 2.2 | 0   | 0.2 | 0   | 5.1 | 0   | 0.1 | 4.8 | 5.1 |

## SYSTEM CONTROL & SERVO TRANSISTORS DC VOLTAGE CHART (SP MODE)

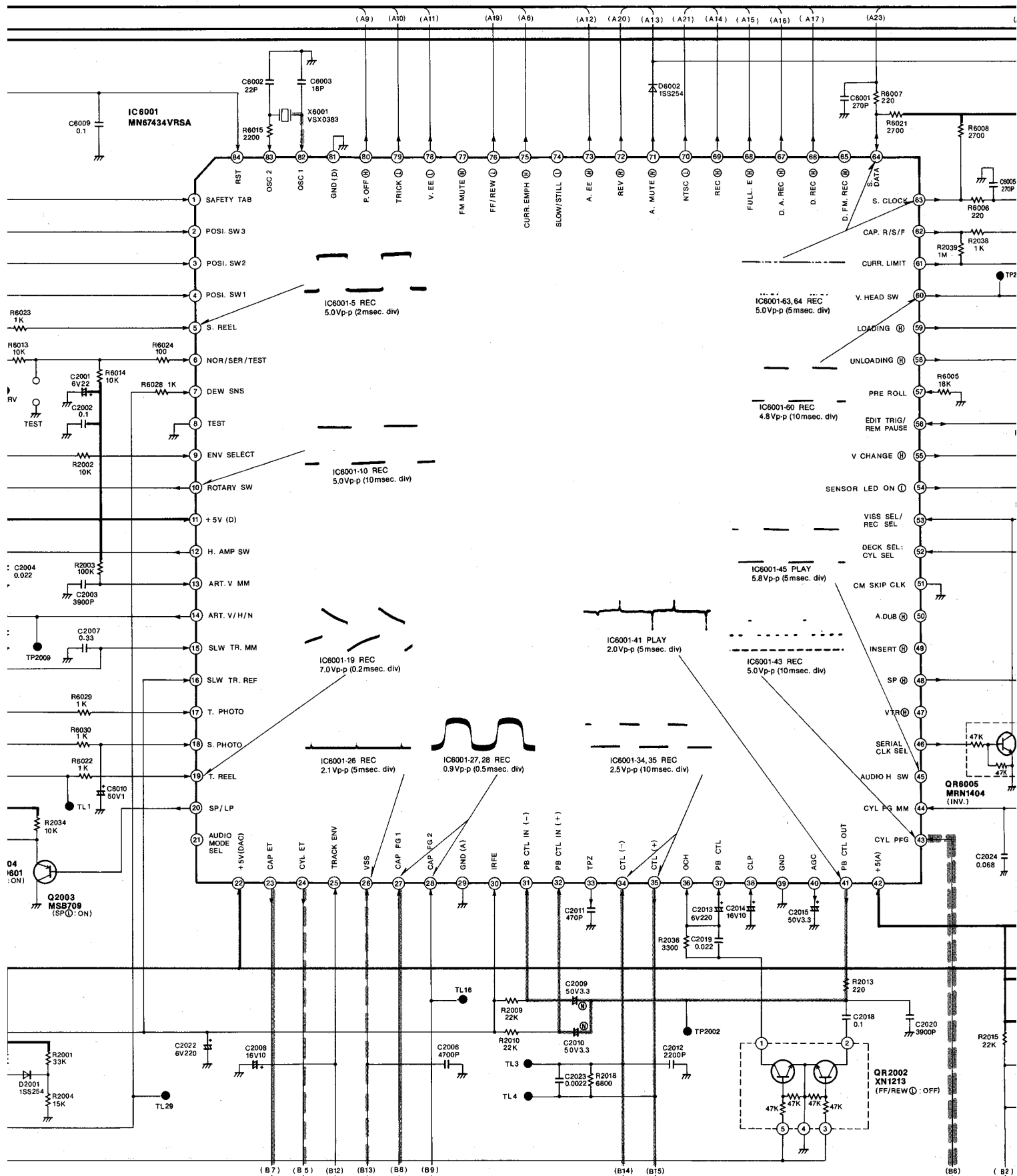
| REF. NO. | Q2001  |      |     | Q2002  |     |     | Q2003  |     |        | Q2004  |     |        |        |     |        |     |     |     |
|----------|--------|------|-----|--------|-----|-----|--------|-----|--------|--------|-----|--------|--------|-----|--------|-----|-----|-----|
| MODE     | E      | C    | B   | E      | C   | B   | E      | C   | B      | E      | C   | B      |        |     |        |     |     |     |
| STOP     | 2.9    | 5.1  | 3.4 | 5.1    | 4.8 | 5.1 | 0.6    | 0   | 0      | 0.3    | 5.1 | 0.6    |        |     |        |     |     |     |
| PLAY     | 2.9    | 5.1  | 3.4 | 5.1    | 4.7 | 5.1 | 0.6    | 0   | 0      | 0.3    | 5.1 | 0.6    |        |     |        |     |     |     |
| REC      | 2.9    | 5.1  | 3.3 | 5.1    | 4.7 | 5.1 | 0.6    | 0   | 0      | 0.3    | 5.1 | 0.6    |        |     |        |     |     |     |
| F.F      | 2.9    | 5.1  | 3.4 | 5.1    | 4.6 | 5.0 | 0.6    | 0   | 0      | 0.3    | 5.1 | 0.6    |        |     |        |     |     |     |
| REW      | 2.9    | 5.1  | 3.5 | 5.1    | 4.8 | 5.1 | 0.6    | 0   | 0      | 0.3    | 5.1 | 0.6    |        |     |        |     |     |     |
| REF. NO. | QR2001 |      |     | QR2002 |     |     |        |     | QR2006 |        |     | QR2007 |        |     | QR2008 |     |     |     |
| MODE     | E      | C    | B   | 1      | 2   | 3   | 4      | 5   |        | E      | C   | B      | E      | C   | B      | E   | C   | B   |
| STOP     | 5.1    | 0.3  | 5.1 | 0      | 0   | 5.0 | 1.8    | 5.0 |        | 5.1    | 5.1 | 0.3    | 5.1    | 0   | 5.1    | 0   | 5.1 | 5.1 |
| PLAY     | 5.1    | 0.2  | 5.1 | 0      | 0   | 5.0 | 0      | 5.0 |        | 0      | 5.1 | 0.2    | 5.1    | 5.1 | 0      | 0.3 | 5.1 | 0   |
| REC      | 5.1    | 0.2  | 5.1 | 0      | 0   | 5.0 | 0      | 5.0 |        | 5.1    | 5.1 | 0.2    | 5.1    | 5.1 | 0      | 0.2 | 5.1 | 0   |
| F.F      | 5.1    | 0.2  | 5.1 | 0      | 2.0 | 0   | 0      | 0   |        | 4.3    | 5.1 | 0.2    | 5.1    | 5.0 | 0      | 0.3 | 5.1 | 0   |
| REW      | 5.1    | 0.3  | 5.1 | 0      | 1.2 | 0   | 0      | 0   |        | 5.1    | 5.1 | 0.3    | 5.1    | 3.0 | 5.1    | 4.5 | 5.1 | 5.1 |
| REF. NO. | QR2009 |      |     | QR2010 |     |     | QR2013 |     |        | QR6005 |     |        | QR6710 |     |        |     |     |     |
| MODE     | E      | C    | B   | E      | C   | B   | E      | C   | B      | E      | C   | B      | E      | C   | B      |     |     |     |
| STOP     | 0.3    | -0.2 | 5.1 | 0.4    | 0.3 | 5.1 | 5.1    | 0   | 5.1    | 0      | 1.1 | 4.1    | 5.1    | 0.3 | 5.0    |     |     |     |
| PLAY     | 0.2    | -0.3 | 0   | -0.1   | 0.2 | 0   | 5.1    | 0   | 5.1    | 0      | 1.1 | 4.1    | 5.1    | 0.3 | 4.9    |     |     |     |
| REC      | 0.2    | -0.2 | 0   | -0.1   | 0.2 | 0   | 5.1    | 0   | 5.1    | 0      | 1.4 | 3.7    | 5.1    | 0.3 | 5.1    |     |     |     |
| F.F      | 0.2    | -3.7 | 0   | -0.1   | 0.2 | 0   | 5.1    | 0   | 5.1    | 0      | 1.4 | 3.5    | 5.1    | 0.3 | 4.9    |     |     |     |
| REW      | 0.4    | -1.0 | 5.1 | 0.4    | 0.4 | 5.1 | 5.1    | 0   | 5.1    | 0      | 1.4 | 3.7    | 5.1    | 0.3 | 4.9    |     |     |     |

### 4-3. SYSTEM CONTROL & SERVO SECTION IN MAIN S



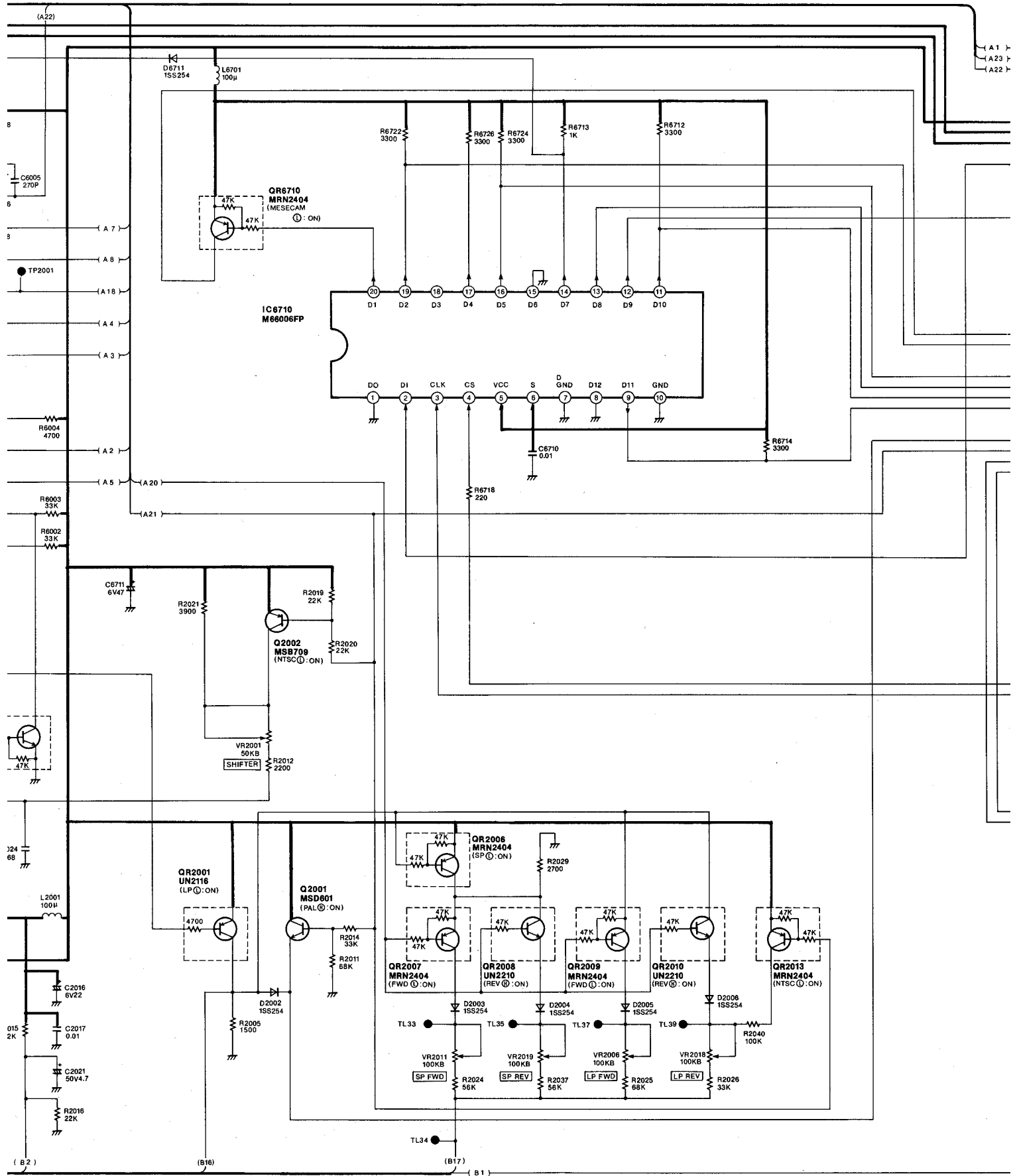
# IN MAIN SCHEMATIC DIAGRAM

## CAPSTAN SERVO SPEED LOOP



## CAPSTAN SERVO PHASE LOOP

## CYLINDER SERVO SPEED LOOP



10

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12

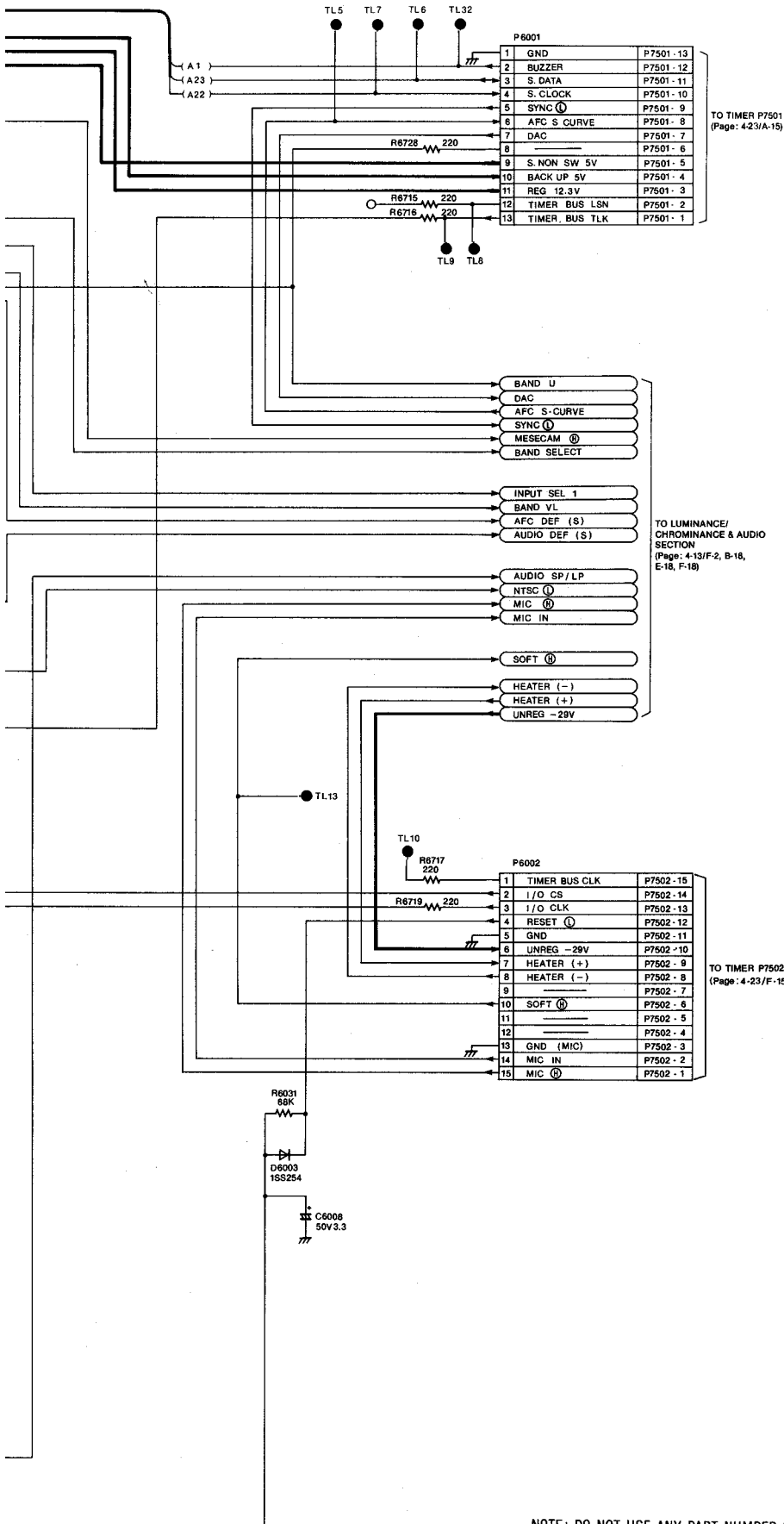
13

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15

LOOP

# CYLINDER SERVO PHASE LOOP



NOTE: DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING. WHEN YOU ORDER A PART, PLEASE REFER TO PARTS LIST.

15

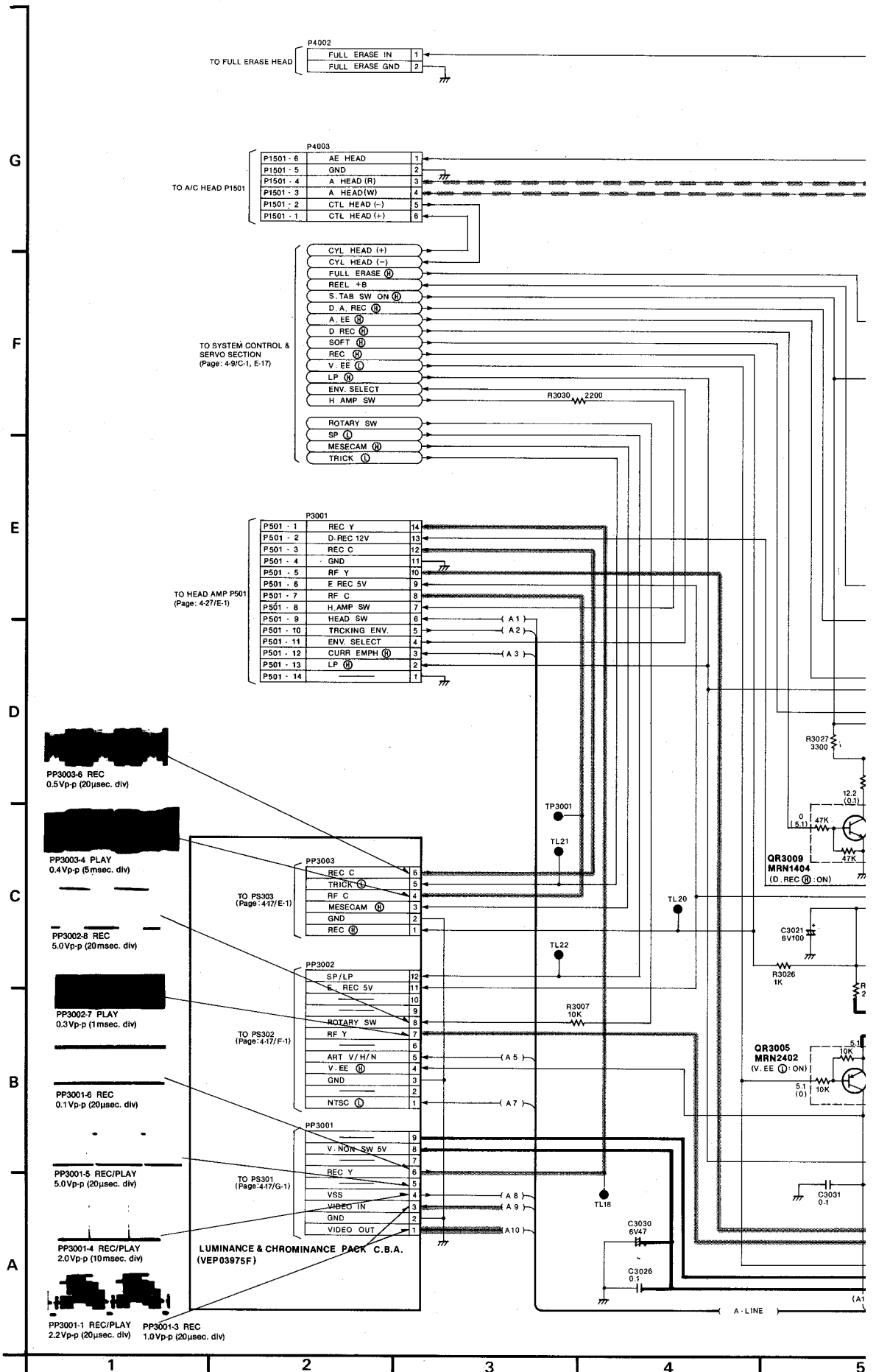
16

17

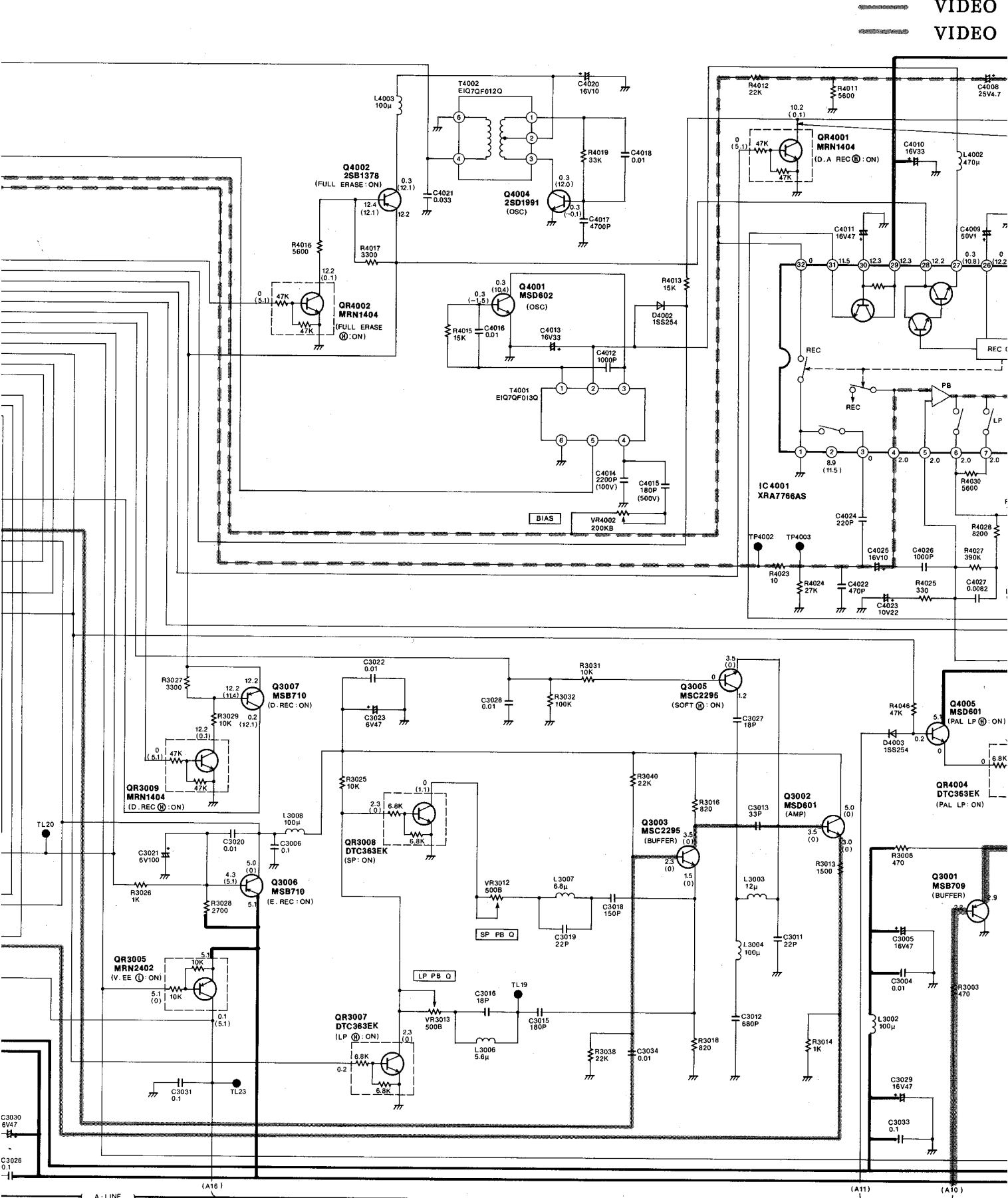
18



## 4-4. LUMINANCE/CHROMINANCE & AUDIO SECTION IN M

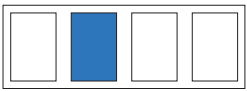


O SECTION IN MAIN SCHEMATIC DIAGRAM



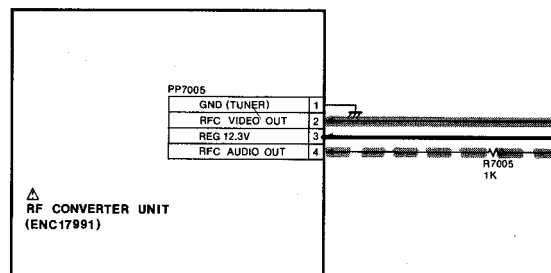
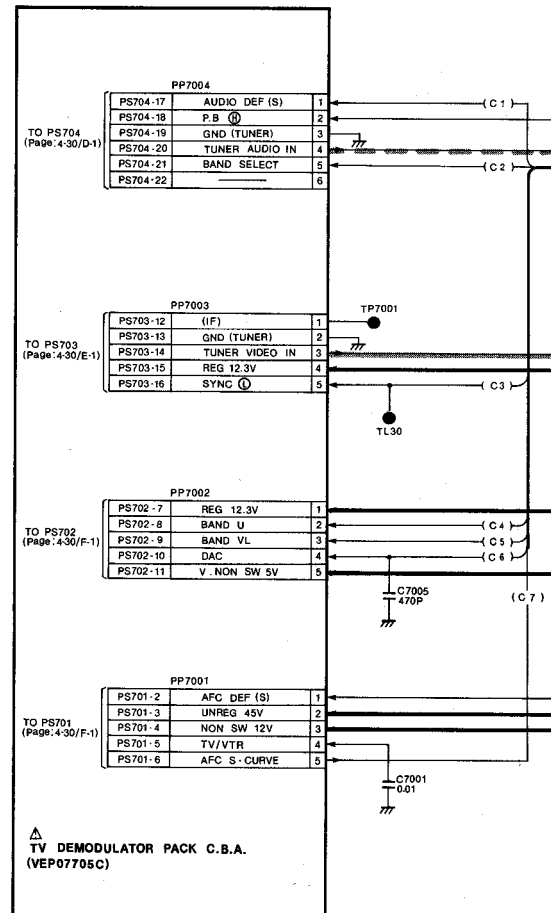
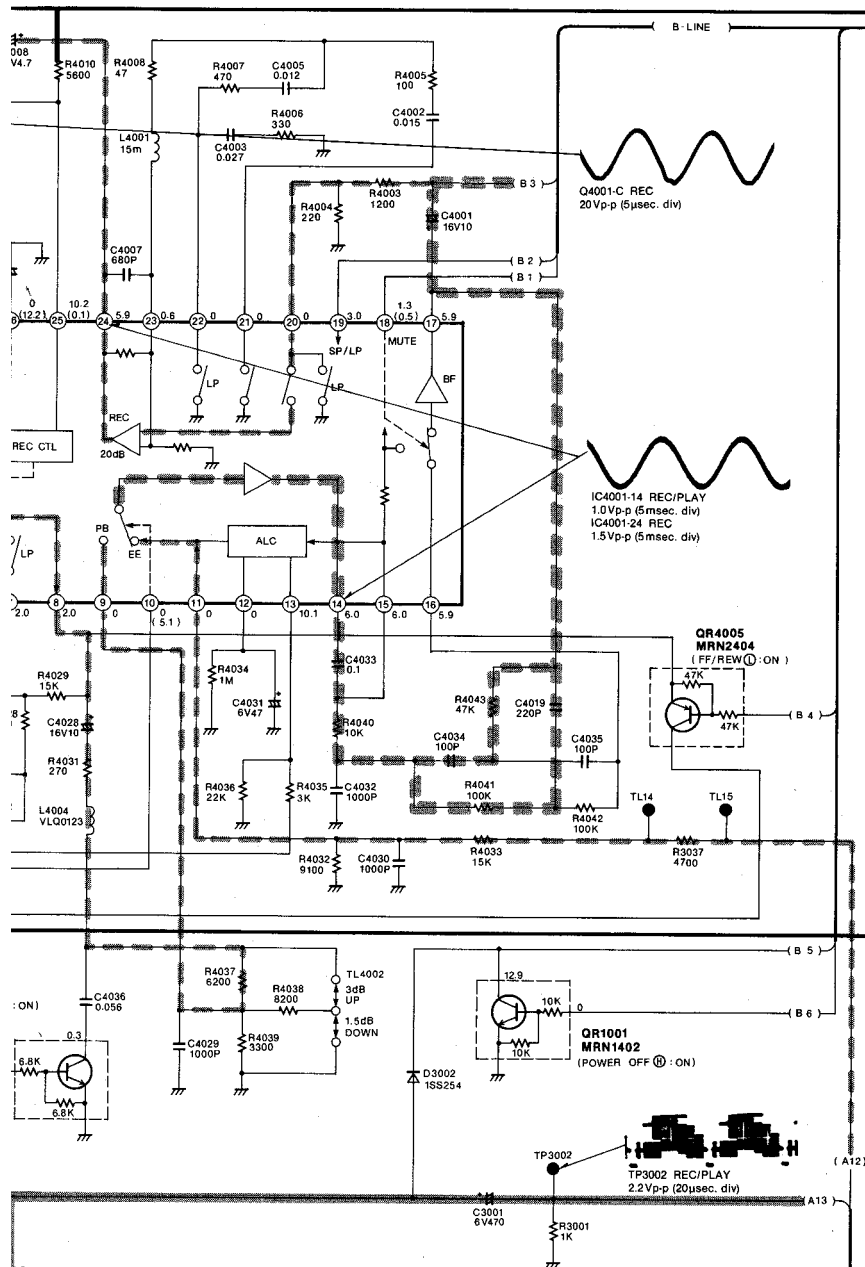
**IMPORTANT SAFETY NOTICE:**  
COMPONENTS IDENTIFIED WITH THE MARK  HAVE THE SPECIAL CHARACTERISTICS FOR SAFETY.  
WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY THE SAME TYPE.

NOTE: THE MEASUREMENT MO  
WITH PAL COLOUR SIGN



▷ MAIN SIGNAL PATH IN REC MODE  
▷ MAIN SIGNAL PATH IN PLAYBACK MODE

▷ AUDIO MAIN SIGNAL PATH IN REC  
▷ AUDIO MAIN SIGNAL PATH IN PL



MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE SIGNAL. (SP MODE)

THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL. (SP MODE)

• LINE

10

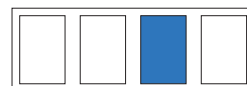
11

12

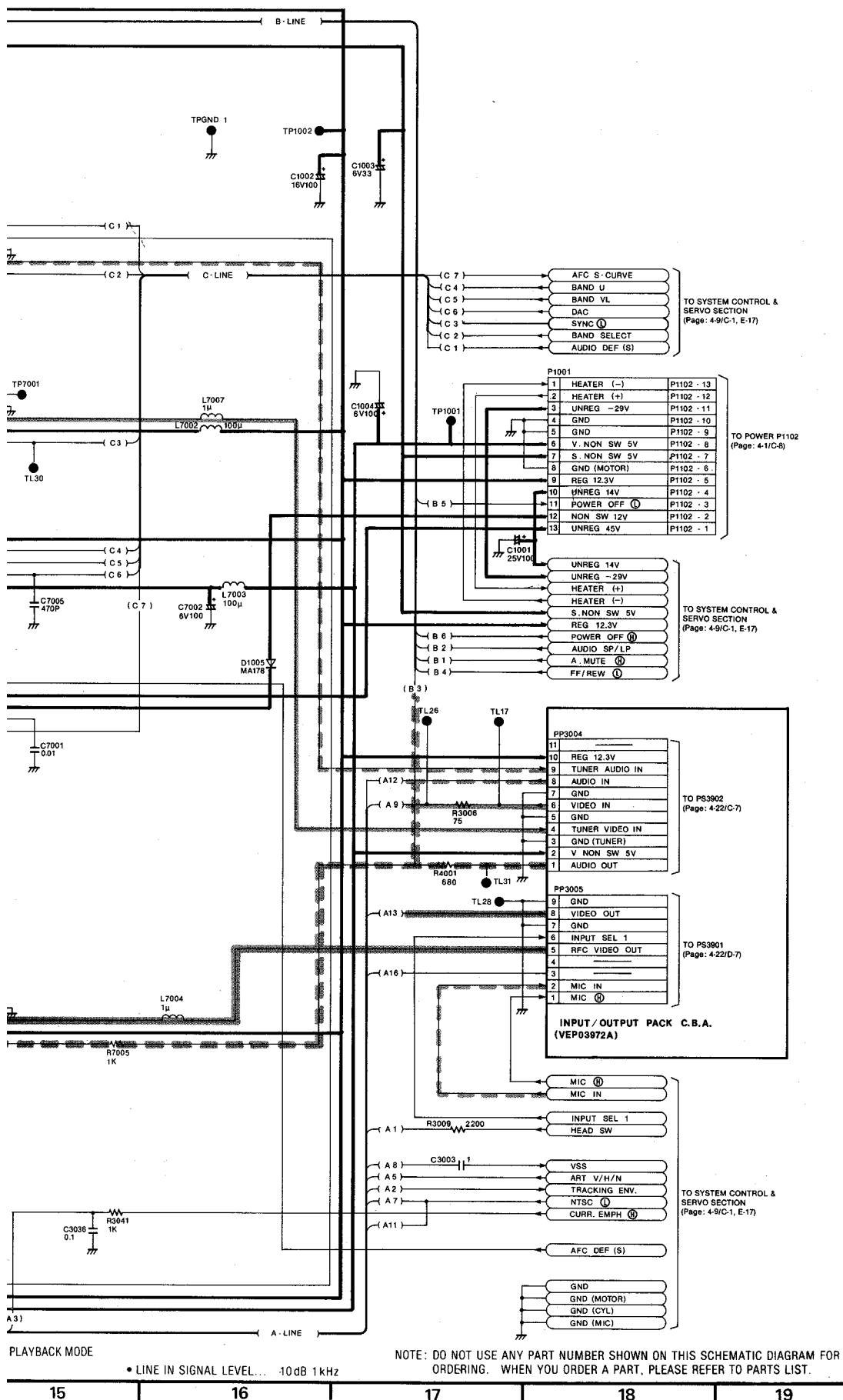
13

14

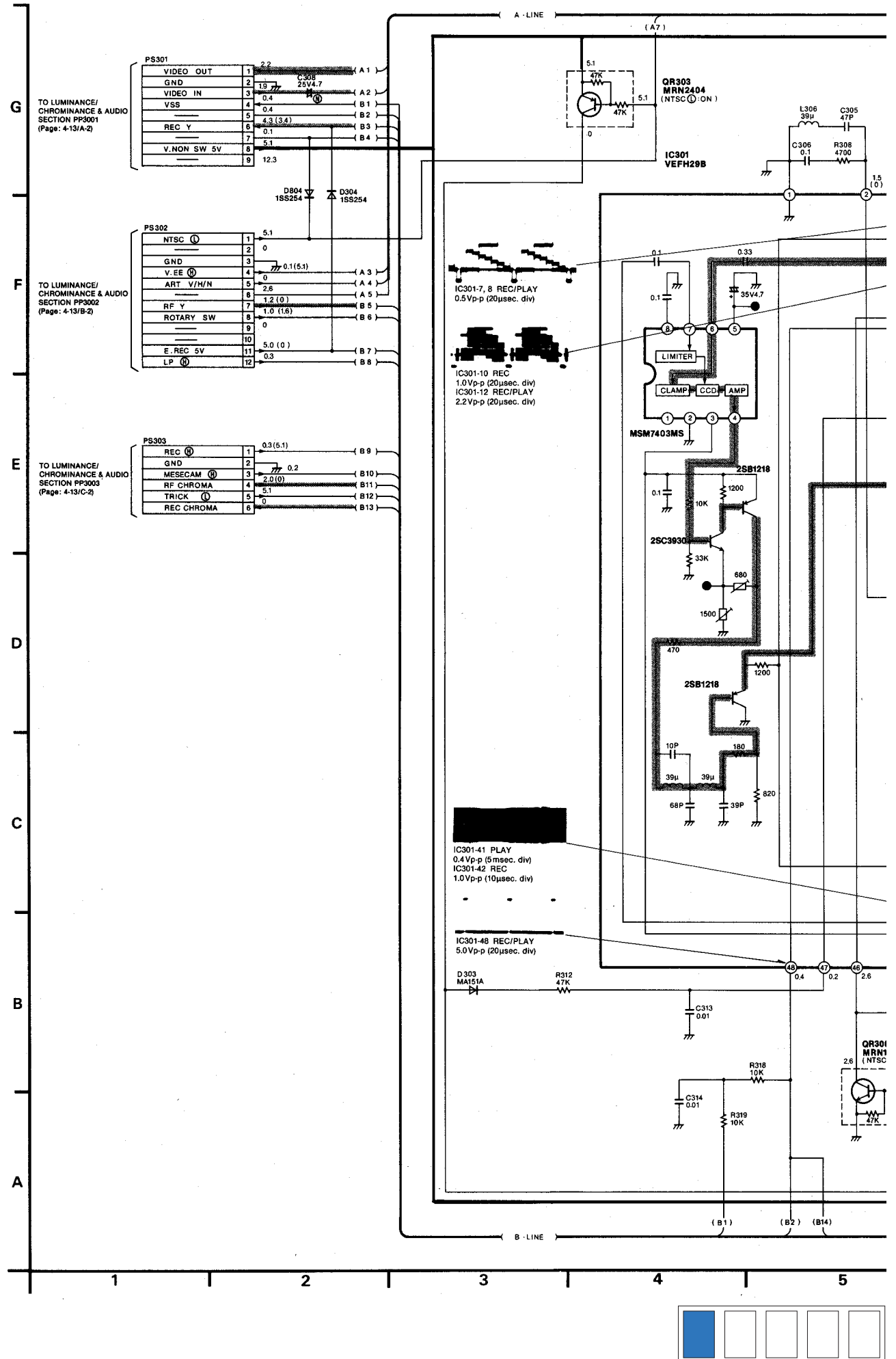
15



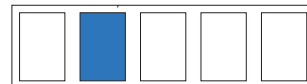
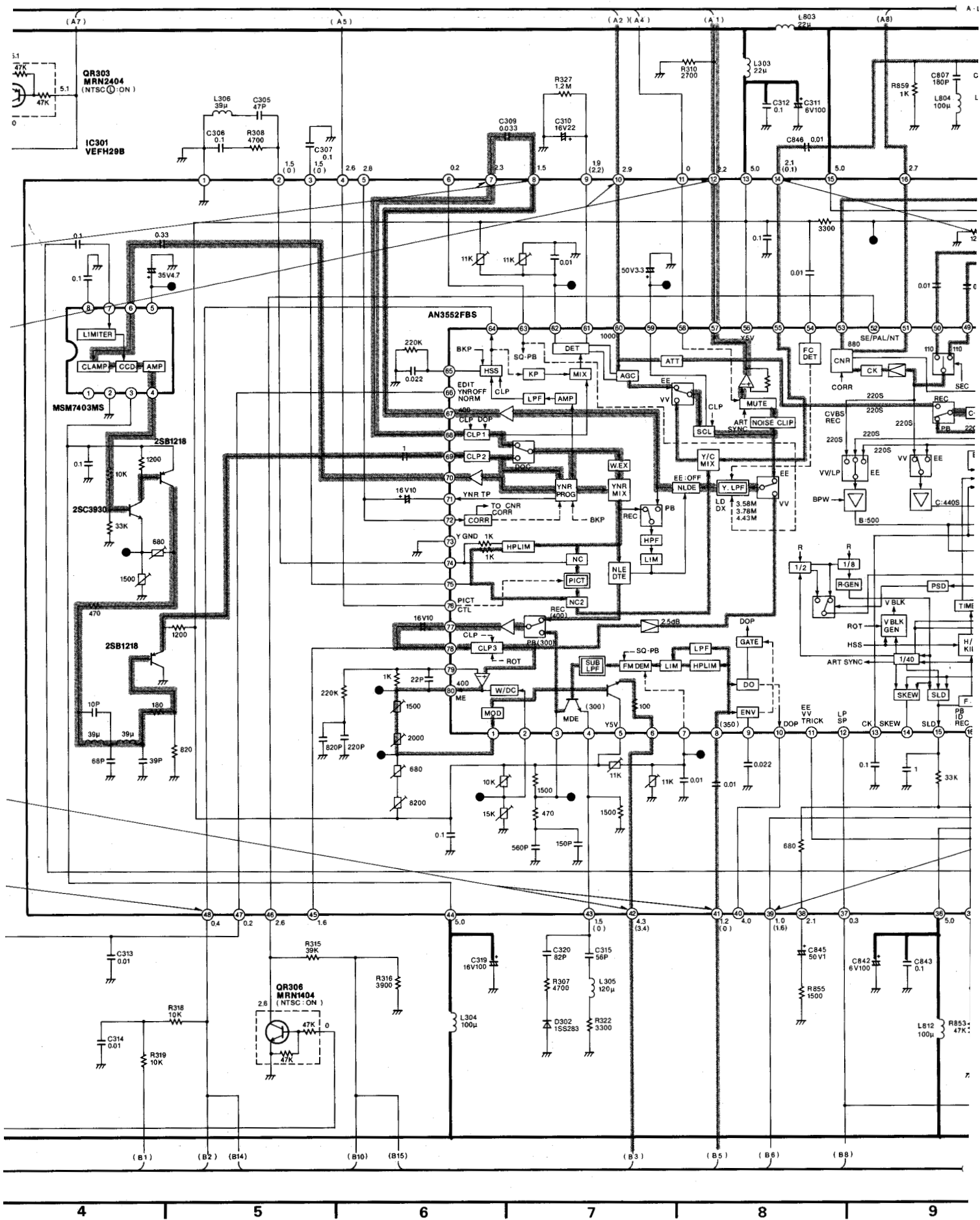
# PATH IN REC MODE PATH IN PLAYBACK MODE



# 4-5. LUMINANCE & CHROMINANCE PACK SCHEMATIC DIAGRAM

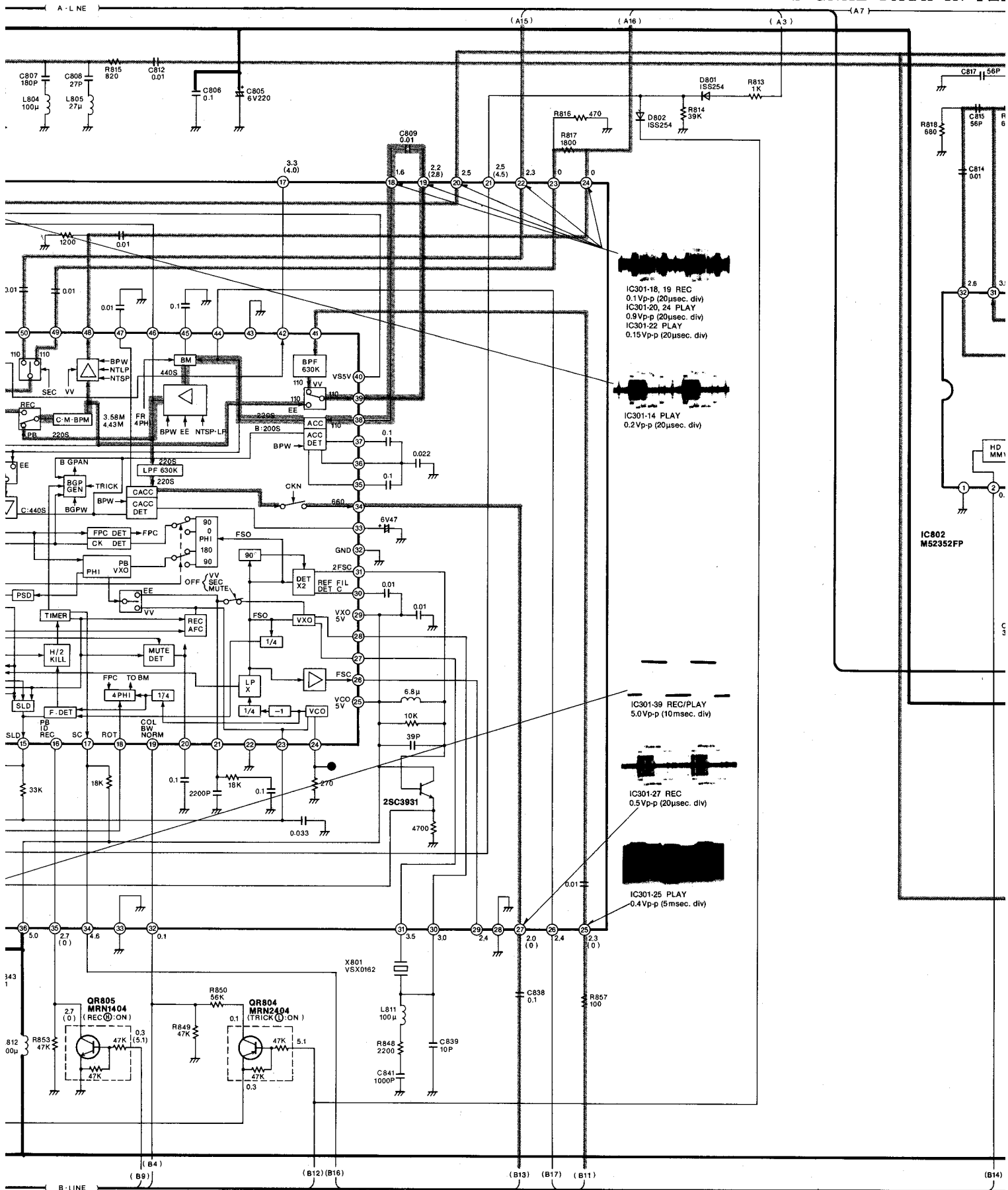


## SCHEMATIC DIAGRAM

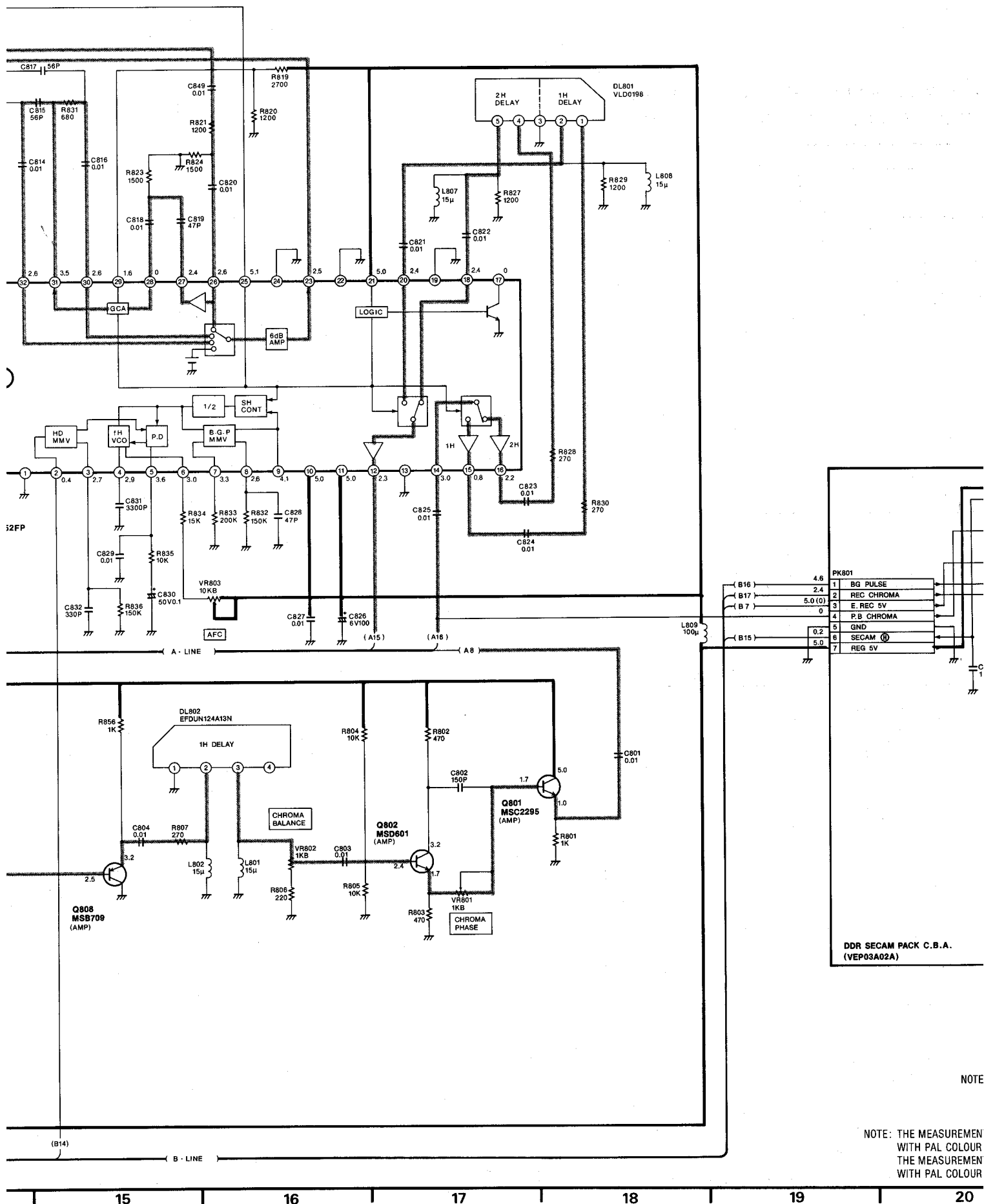


# MAIN SIGNAL PATH IN REC MODE

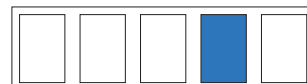
# MAIN SIGNAL PATH IN PL

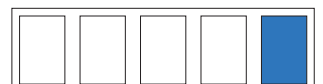
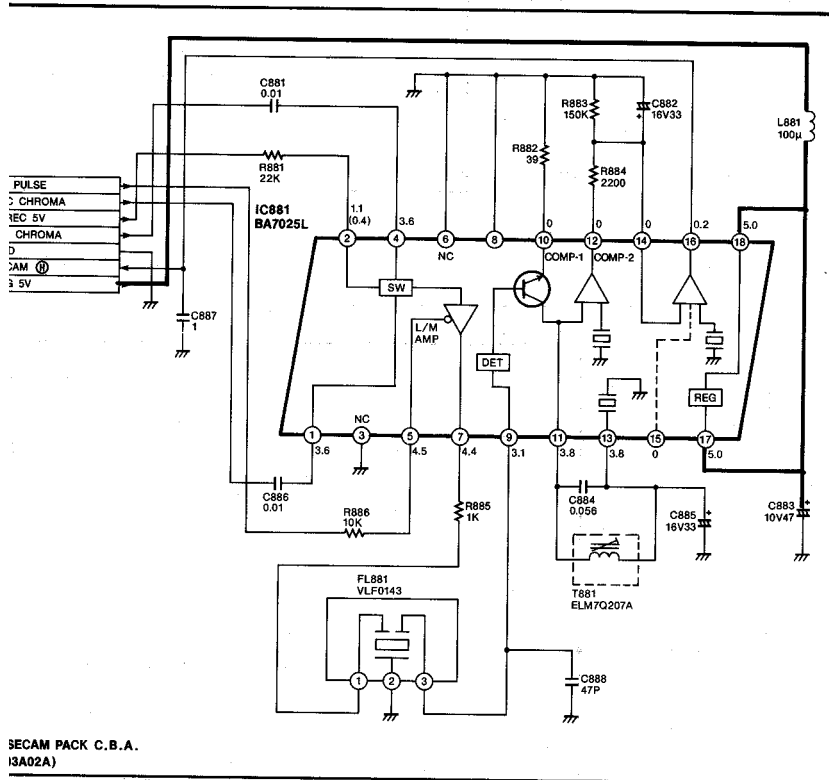


# IN PLAYBACK MODE

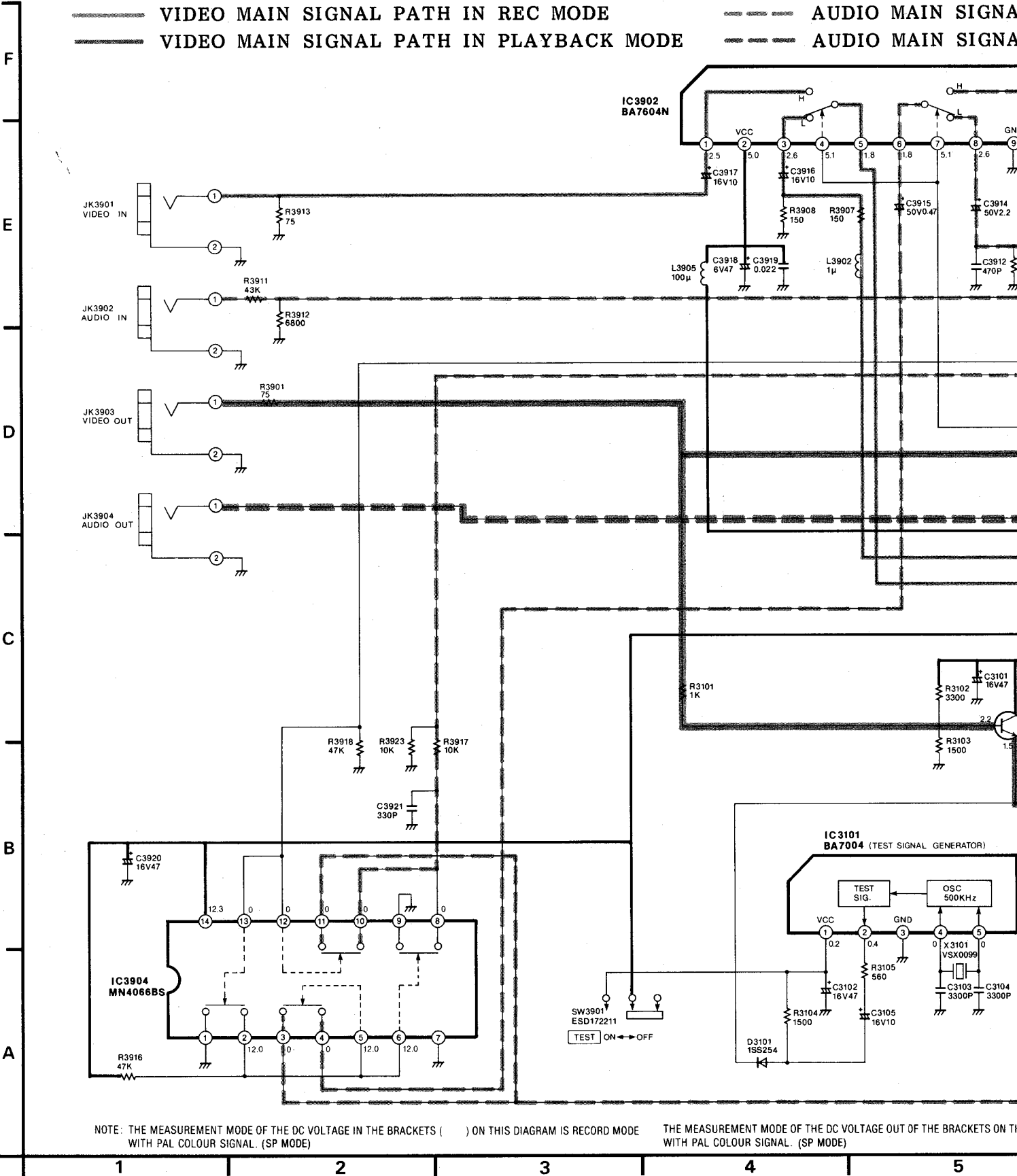


NOTE

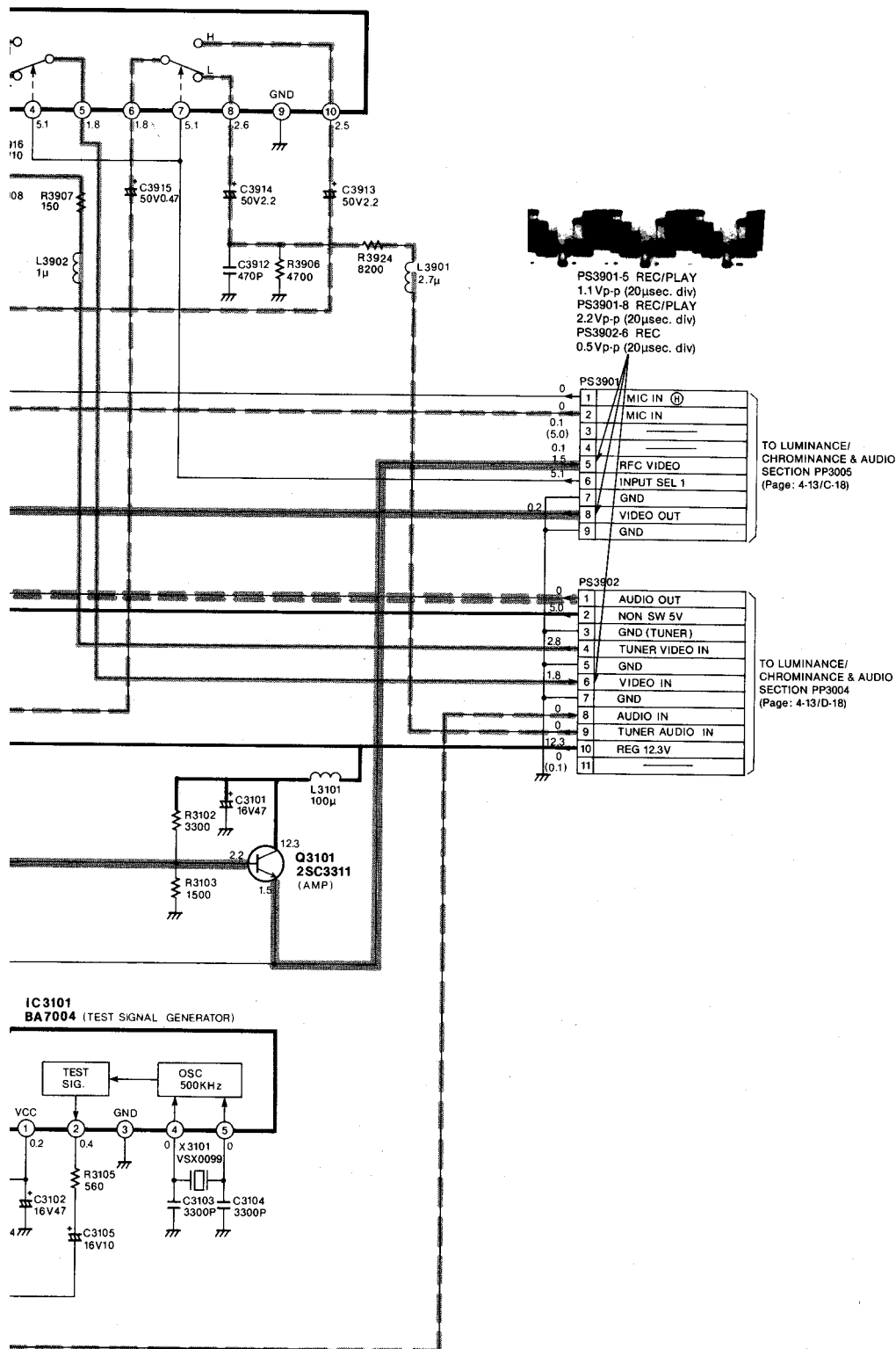




4.6. INPUT/OUTPUT PACK SCHEMATIC DIAGRAM



# AUDIO MAIN SIGNAL PATH IN REC MODE AUDIO MAIN SIGNAL PATH IN PLAYBACK MODE



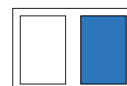
NOTE: DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING. WHEN YOU ORDER A PART, PLEASE REFER TO PARTS LIST.

IF DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE

5

6

7



DP7501 VSL0271B

4G 5G 9G

VTR CATV SP SLP A.DUB INSERT REMAINWRITE MESECAMPDCVPS

REC R ON S AP COUNT OFF DAP

SU MO TU WE TH FR SA PROG

188 7G 6G 4G 3G 2G 1G 0G

F- F- S15 S14 S13 S12 S11 S10 S9 S8 S7 S6 S5 S4 S3 S2 S1 S0 0G 1G 2G 3G 4G 5G 6G 7G 8G 9G F+ F+

R7548 680 R7502 100K D7501 MA3220 C7505 50V10

R7504 100

IC7501 MN187164VTSV

IC7501-2 STOP 2.8Vp-p (10μsec. div)

IC7502-5 STOP 2.0Vp-p (10μsec. div)

IC7502-6 STOP 5.0Vp-p (10μsec. div)

VPP P50 P51 P52 P53 P54 P55 P56 P57 P60 P61 P62 P63 P64 P65 P66 P67 P70 P71 P80 P81 P82 P83 P84 P85 P86 P87 P40 P41

OSC 1 OSC 2 VSS X1 X0 CURVE LED2 LED1

S- KEY KEY

VDD 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

C7604 6P X7501 VXS0484 X7502 VSX0094

TIMER CLOCK

C7501 30P C7506 33P C7507 22P

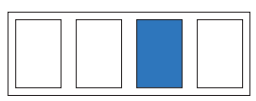
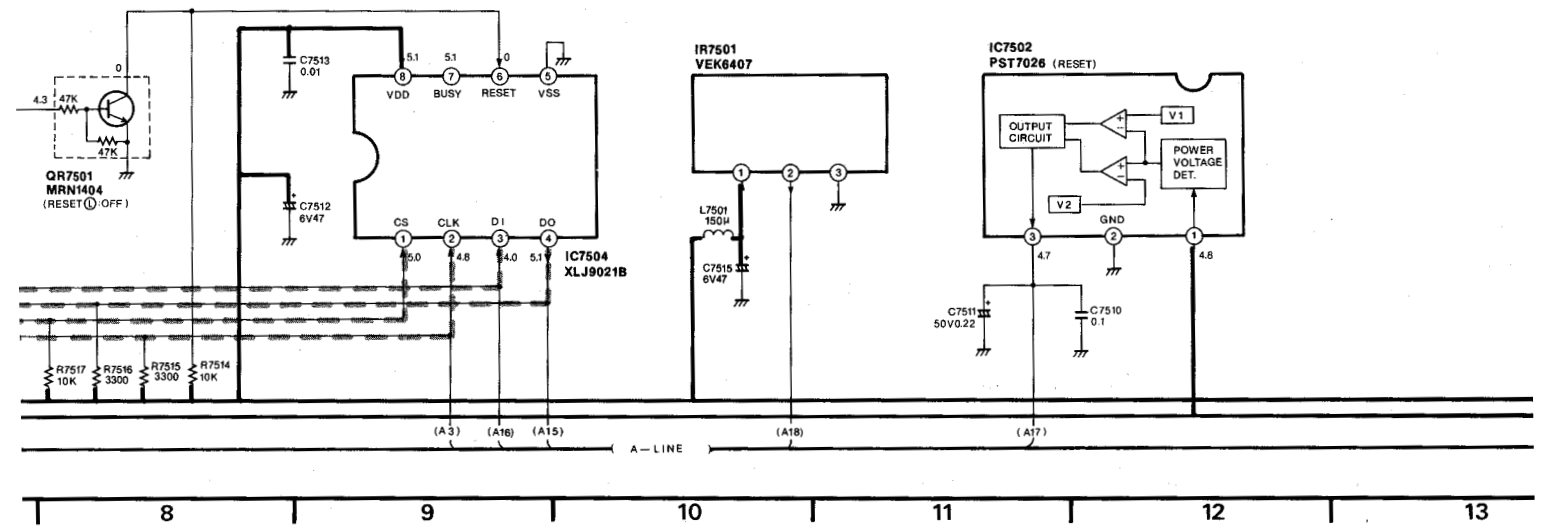
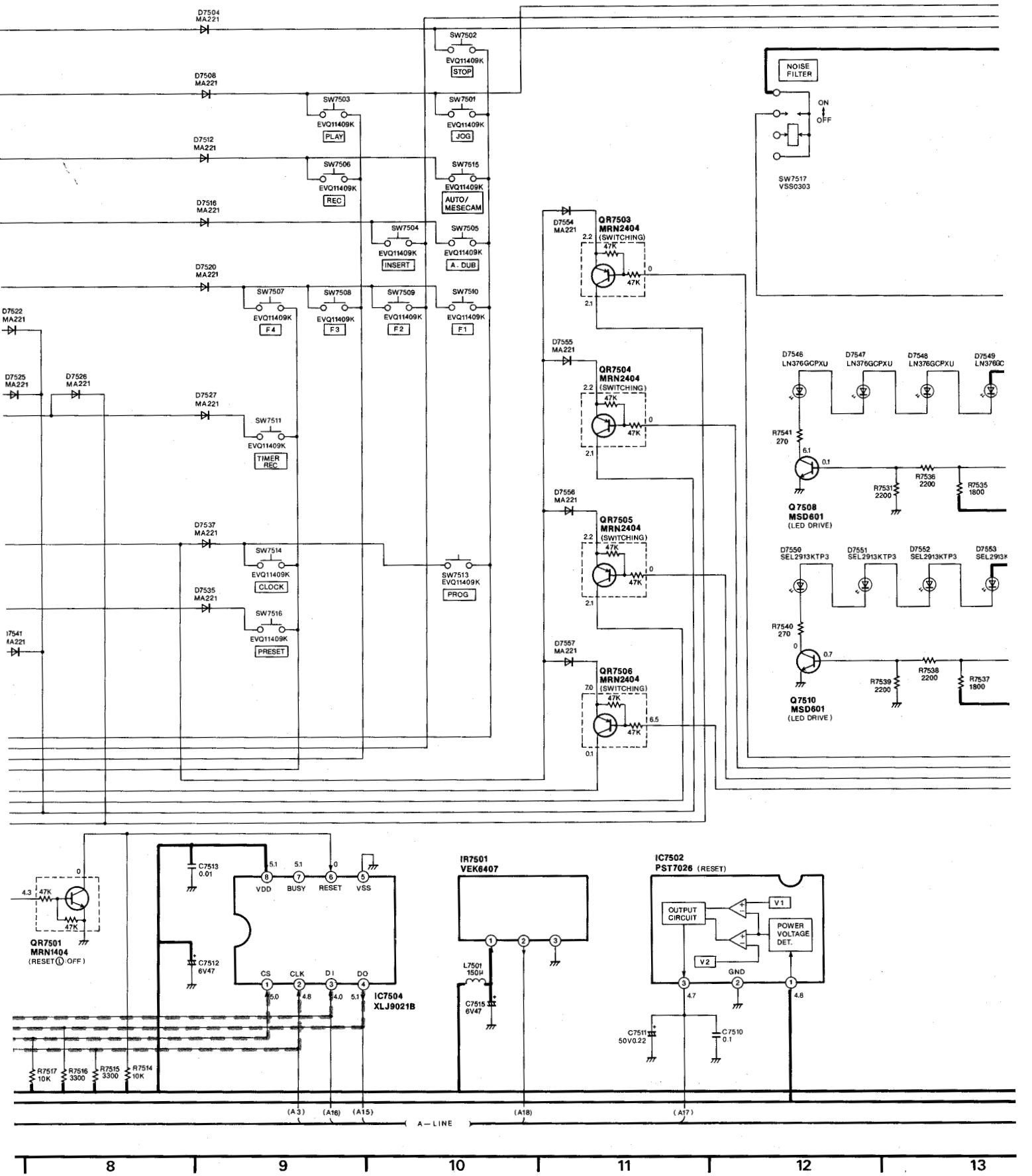
C7503 0.1 C7509 0.1

R7513 220K R7544 22K R7545 22K R7500 3300 R7549 220 R7501 1K R7516 3300

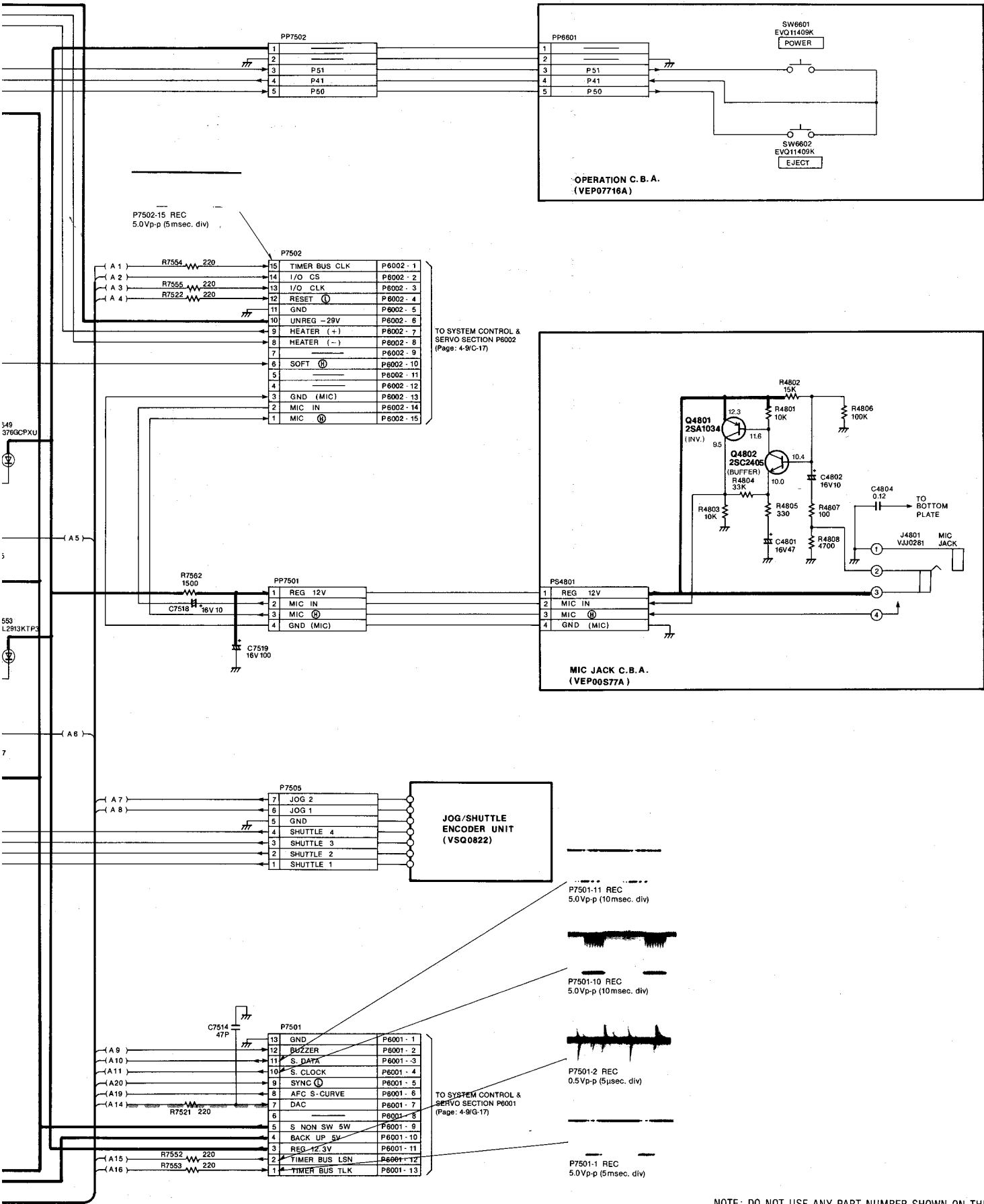
EPROM CS RESET SYS S-CLK S-DATA TMR CLK TMR LSN TMR TLK 128Hz TEST

(A19) (A5) (A6) (A7) (A8) (A20) (A18) (A14) (A2) (A9) (A17) (A11) (A10) (A1)

## SEGMENT

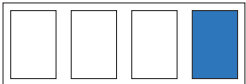


ROL SIGNAL

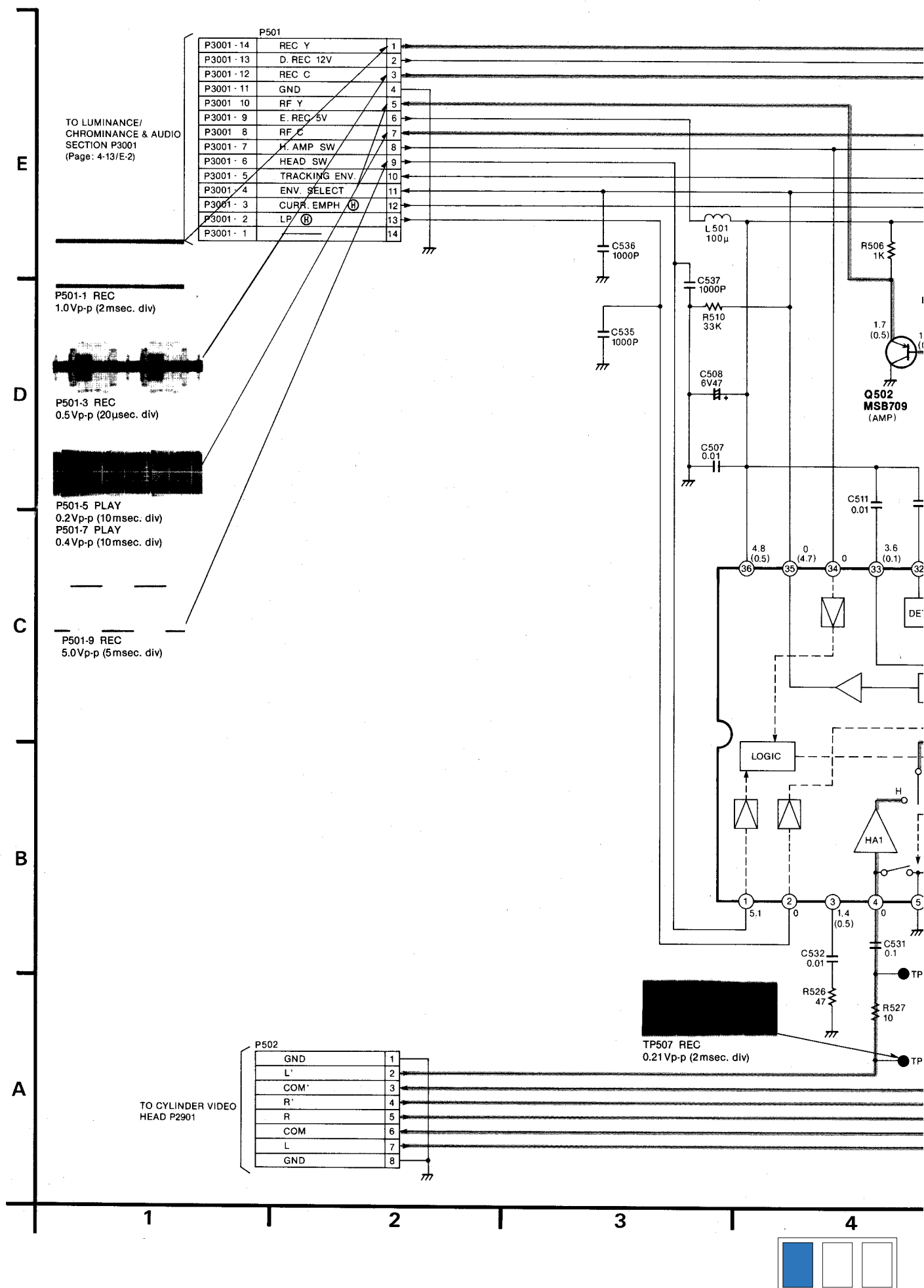


NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE ON THIS DIAGRAM IS STOP MODE.

NOTE: DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING. WHEN YOU ORDER A PART, PLEASE REFER TO PARTS LIST.

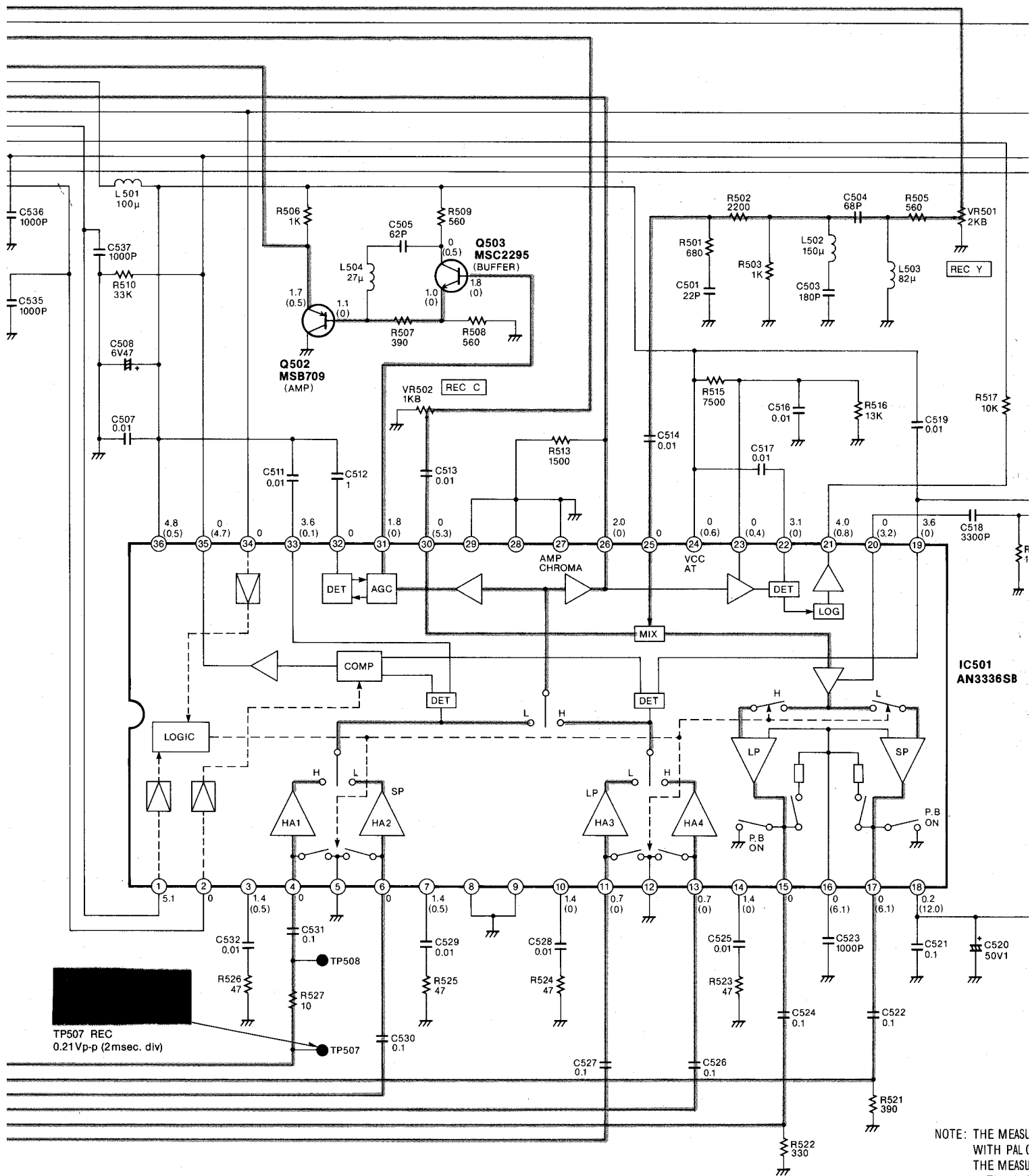


# 4-8. HEAD AMP SCHEMATIC DIAGRAM



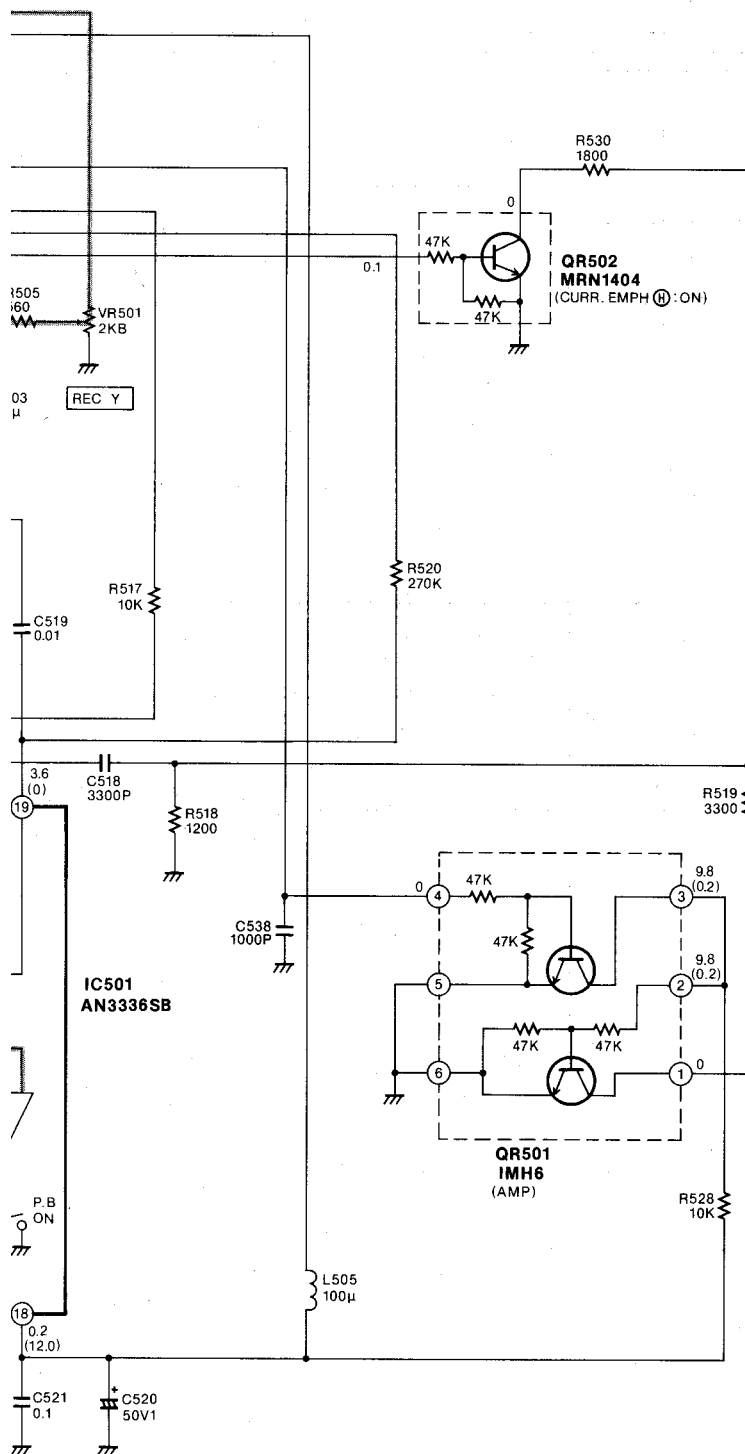
# VIDEO MAIN SIGNAL PATH IN REC MODE

# VIDEO MAIN SIGNAL PATH IN PLAYBACK



REC MODE

PLAYBACK MODE



NOTE: DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING. WHEN YOU ORDER A PART, PLEASE REFER TO PARTS LIST.

NOTE: THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ( ) ON THIS DIAGRAM IS RECORD MODE WITH PAL COLOUR SIGNAL. (SP MODE)  
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS PLAYBACK MODE WITH PAL COLOUR SIGNAL. (SP MODE)

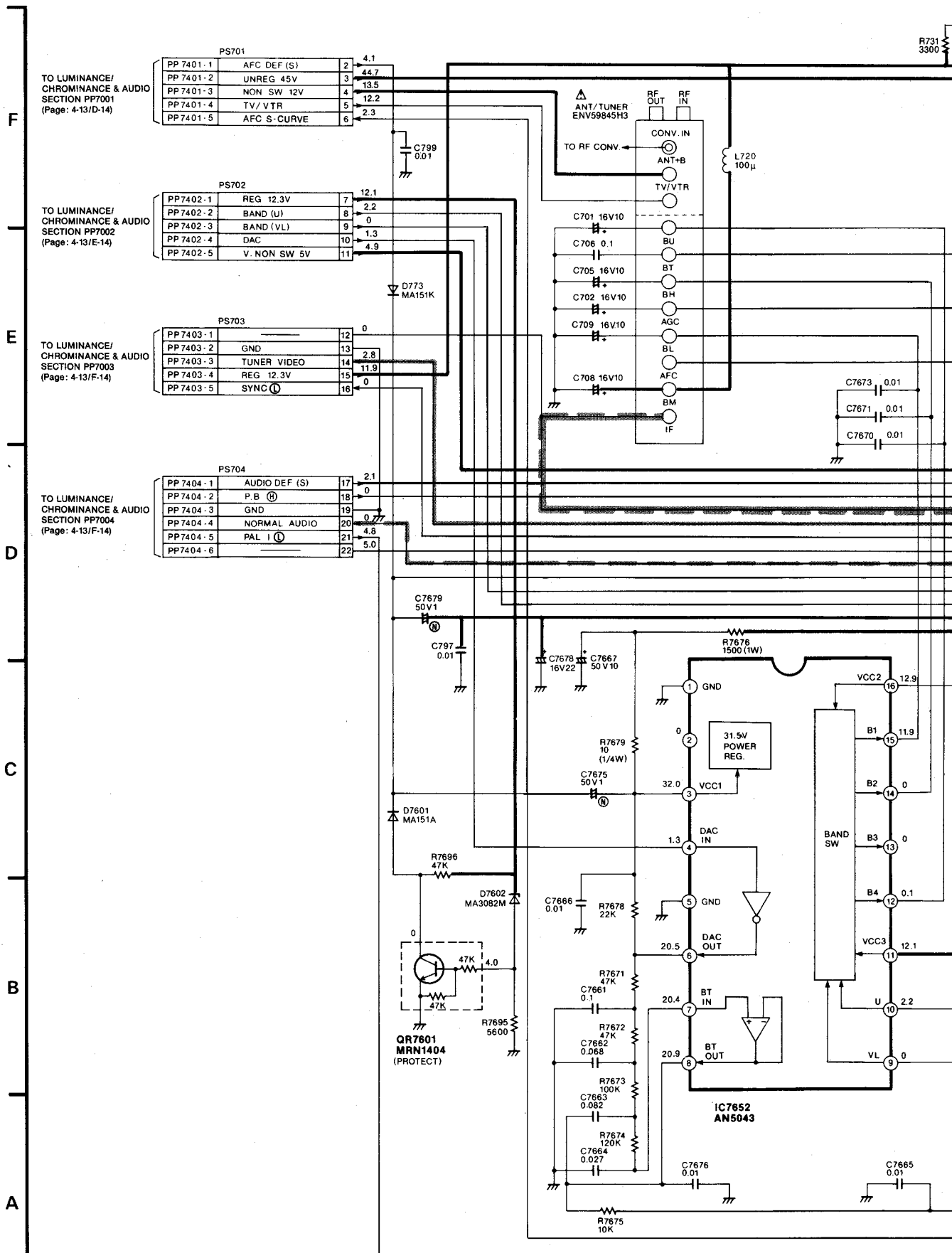
7

8

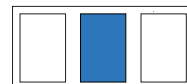
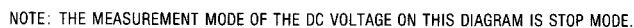
9



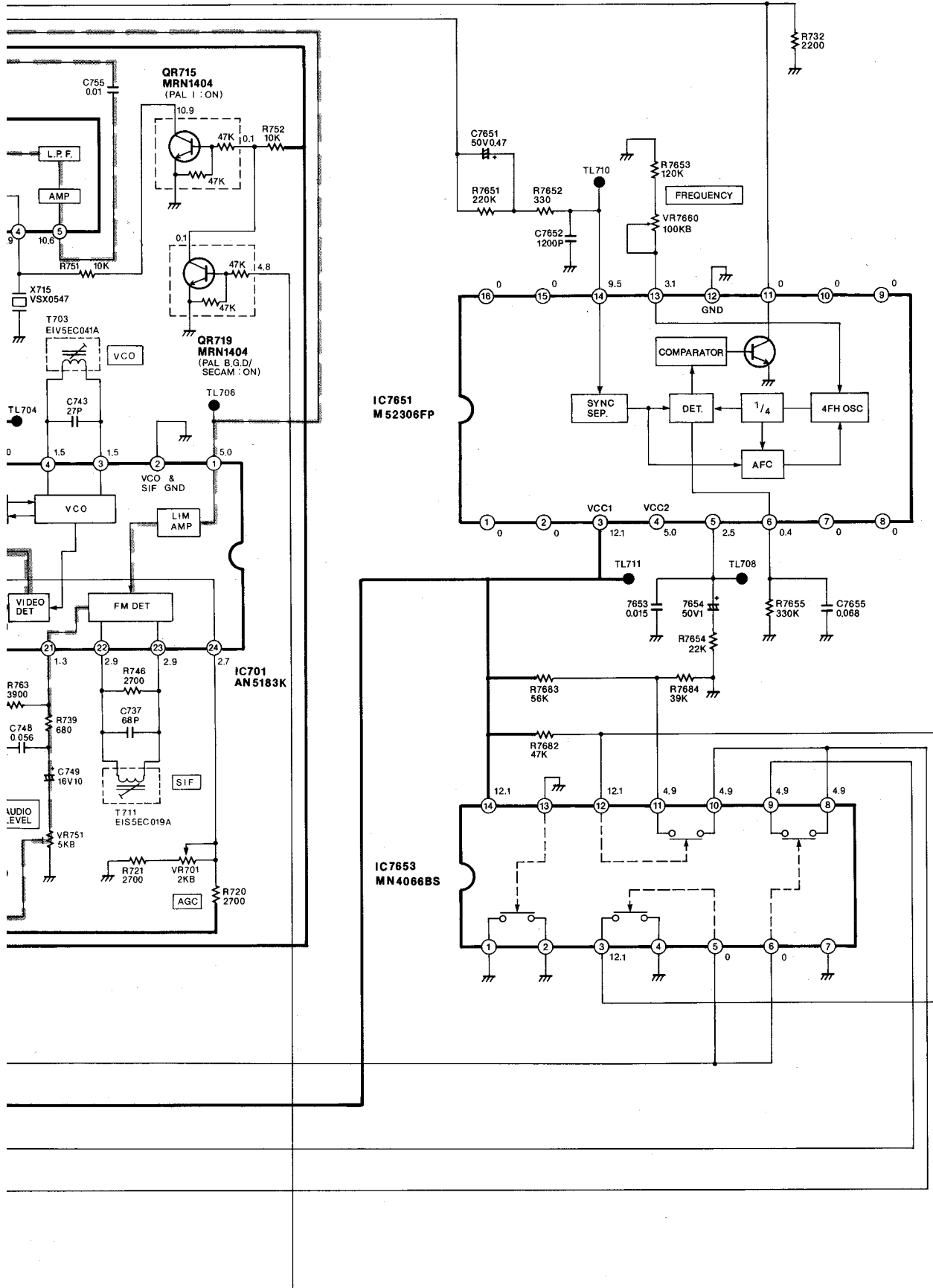
# 4.9. TV DEMODULATOR PACK SCHEMATIC DIAGRAM



AUDI



# AUDIO SIGNAL PATH



NOTE: DO NOT USE ANY PART NUMBER SHOWN ON THIS SCHEMATIC DIAGRAM FOR ORDERING. WHEN YOU ORDER A PART, PLEASE REFER TO PARTS LIST.

FOP MODE.

9

10

11

12

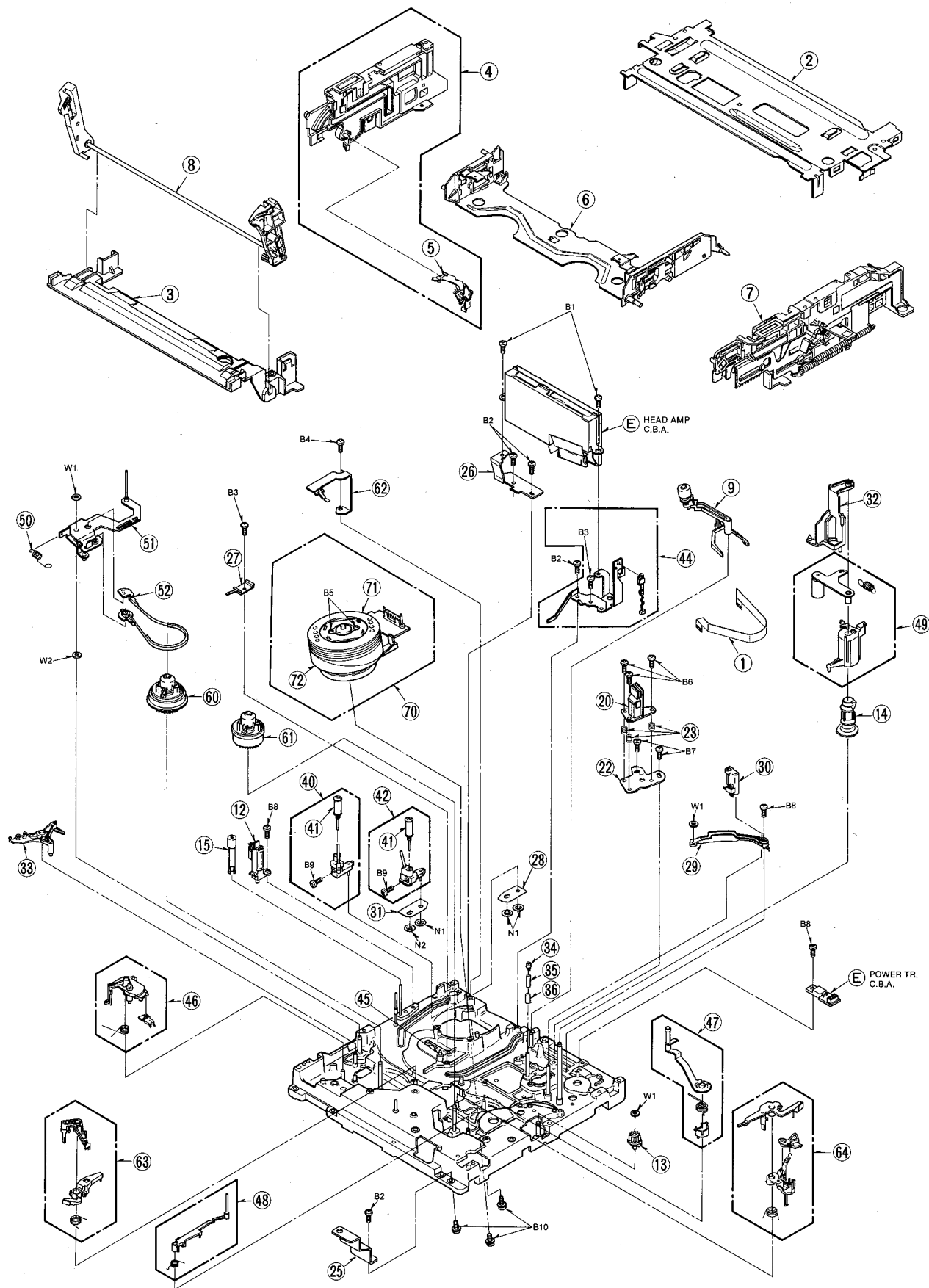


## SECTION 5

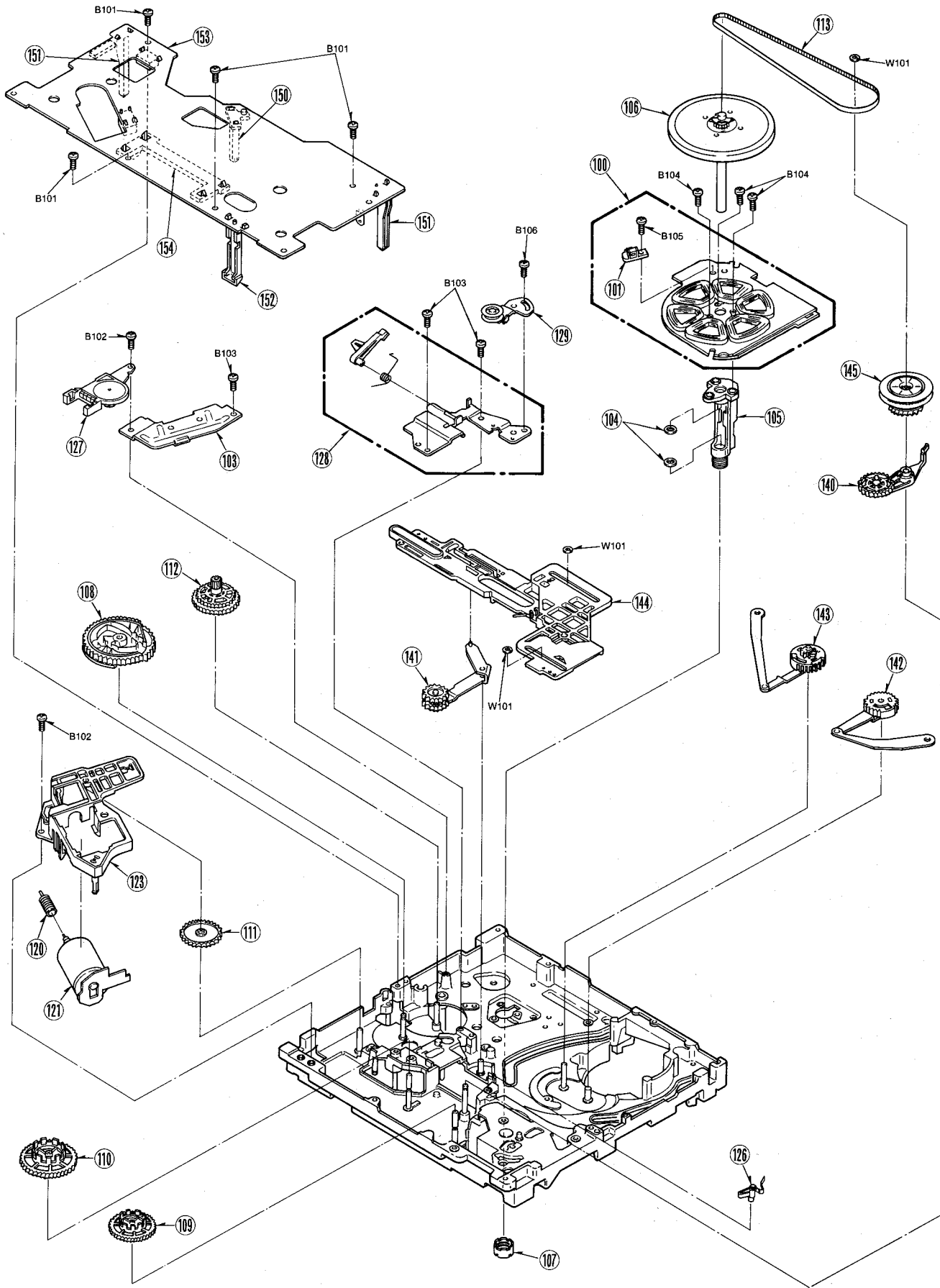
### EXPLODED VIEWS & PARTS LIST

#### 5-1. EXPLODED VIEW & MECHANICAL REPLACEMENT PARTS LIST

##### ❶ CHASSIS PARTS SECTION (1)



## 2 CHASSIS PARTS SECTION (2)



### ③ CASING PARTS SECTION

