

MODEL

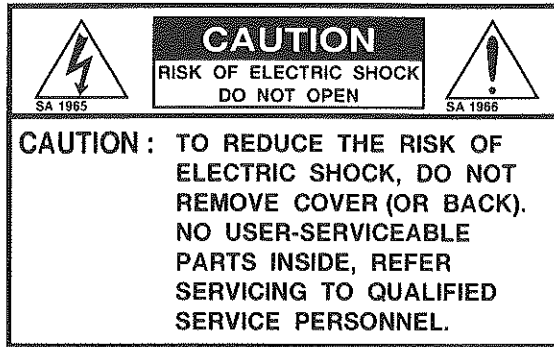
TM14-80RH/RP

TM20-80RH/RP

TM20-90RH/RP

COLOR MONITOR

INSTRUCTION MANUAL



The lightning flash with arrowhead within a triangle is intended to tell the user that parts inside the product may cause the risk of electric shock to persons.



The exclamation point within a triangle is intended to tell the user that important operating and servicing instructions are in the papers with the equipment.

WARNING : FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS (REFER TO SERVICE LITERATURE).

WARNING : TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR WATER.

INFORMATION TO USER FOR FCC

Warning

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications.

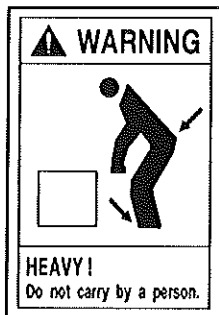
It has been tested with a class A computing device and found to comply with the limits for a Class A computing device in accordance with the specifications in subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

IMPORTANT SAFETY INSTRUCTION

1. General

1. Read all instructions provided.
2. Save these instructions for later use.
3. Follow all warnings and instructions marked on the television equipment.
4. Never push objects of any kind into this television monitor through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the television monitor.
5. Do not attempt to service this television monitor yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
6. Do not use attachments not recommended by the television equipment manufacturer as they may result in the risk of fire, electric shock, or injury to persons.
7. This television monitor has been adjusted to meet the respective broadcasting standard signals. So, it cannot be used with the signals of different broadcasting standards.
8. When keeping or transporting the unit for a long time, pack it in the supplied carton or equivalent.
9. This monitor is heavy.
When taking out of or putting it into a carton box, or setting, do not move or carry it by a person. You may drop it on your foot, or hurt your waist.



2. Power Supply

1. This television equipment should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home, consult your television dealer or local power company.
2. This television equipment is provided with a three-wire grounding type plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet.
Do not defeat the safety purpose of the grounding-type plug.
3. When connecting and disconnecting the power cable, be sure to hold the plug.
4. Do not allow anything to rest on the power cord. Do not locate this television equipment where the cord will be abused by persons walking on it.
5. For added protection for this television equipment during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet. This will prevent damage to the equipment due to lightning and power-line surges.
6. Do not overload wall outlets and extension cords as this can result in fire or electric shock.

3. Usage and Location

1. Do not use this television equipment near water - for example, near a bath tub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, or the like.
2. Do not place this television equipment on an unstable cart, stand, or table. The television equipment may fall, causing serious injury to a child or adult, and serious damage to the equipment. Use only with a cart or stand recommended by the manufacturer, or sold with the television equipment. Wall or shelf mounting should follow the manufacturer's instructions, and should use a mounting kit approved by the manufacturer. Television equipment and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the equipment and cart combination to overturn.



3. Slots and openings in the cabinet and the back or bottom are provided for ventilation, and to ensure reliable operation of the monitor and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the television equipment on a bed, sofa, rug, or other similar surface. (This television equipment should never be placed near or over a radiator or heat register.) This television equipment monitor should not be placed in a built-in installation such as a bookcase unless proper ventilation is provided.
4. Avoid operating or placing (keeping) in hot (+40 degrees Celsius or over) and cold (less than 0 degrees Celsius), excessively vibratory, or dusty place. And avoid operating or placing (keeping) in the places exposed to the direct sunlight. Otherwise the cabinet may deform or the phosphor of the CRT surface may deteriorate.
5. If an image of extremely high brightness is displayed on the screen for a long time, the CRT may cause burning.

4. Cleaning

1. Unplug this television equipment from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
2. Do not use thinner or benzene for cleaning. Otherwise, the cabinet may deform or the paint may peel away.

5. Repair

1. Unplug this television monitor from the wall outlet and refer servicing to qualified service personnel under the following conditions;
 - a. When the power cord or plug is damaged or frayed.
 - b. If liquid has been spilled into the television monitor.
 - c. If the television monitor has been exposed to rain or water.
 - d. If the television monitor does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the television monitor to normal operation.
 - e. If the television monitor has been dropped or the cabinet has been damaged.
 - f. When the monitor exhibits a distinct change in performance - this indicates a need for service.
2. When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or injury to persons.
3. Upon completion of any service or repairs to this monitor, ask the service technician to perform routine safety checks to determine that the television is in safe operating condition.
4. For repair service, contact **Ikegami's** authorized sales representative or **Ikegami** service desk directly.

Precautions for Operation

1. Never let this unit fall nor give it a strong shock.
Otherwise, it will be damaged.
2. Do not detach the cabinet unless otherwise necessary.
High-voltage parts are contained in the cabinet and they are very dangerous if you touch them. Only the qualified service engineers are allowed to adjust the inside of the cabinet.
3. This color monitor has been adjusted to the signals conforming to each broadcasting standard.
So, it cannot be used for signals of different broadcasting standards.
Be sure to operate the color monitor within the voltage range marked on its back.
4. If the cabinet or screen is stained, wipe with soft cloth.
At this time, avoid using benzine or thinner.
Otherwise, the paint may peel away.
5. Note that, if video signals with high luminance are monitored on the CRT for long, the CRT may suffer from sticking.
6. Avoid using and storing this unit in the following places;
 - Hot (+40 degrees Celsius or more) or cold (0 degrees Celsius or less) places.
Especially in a place where this unit is exposed to the direct rays of the sun, the cabinet may deform and the fluorescent screen of the CRT may be deteriorated.
 - Humid and dusty places.
 - Places where there is much vibration.
 - Places where strong magnetism is generated.
 - Places exposed to rain or water.
 - When storing this unit for long or transporting it, pack it up in the supplied carton or equivalent beforehand.
 - Even if no picture can be monitored by performing daily adjustment or something seems to be wrong with this unit, do not dismantle this unit by yourself.
In such a case, contact the service department of **Ikegami**.

Guarantee

Should this unit fail within one year after your acceptance, it will be repaired free of charge unless such a trouble is not caused by operator's mishandling or misuse.

However, the CRT and fuses are not covered by the warranty.

The specifications and appearance of this unit may be changed for further improvement without prior notice.

**TM14-80RH/RP
TM20-80RH/RP
TM20-90RH/RP**

INSTRUCTION MANUAL

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1. OUTLINE

1.1 General

This monitor is a color monitor for multi-format of NTSC/PAL-B. It complies with the use of both NTSC and PAL-B signals, and moreover it is useful in various locations such as a control room, an editing room, OB VAN, etc..

This monitor corresponds to various broadcasting formats and system needs. In addition, it is possible to input serial digital signals as well as analog component/composite signals.

This monitor employs a plug-in module method by which you can make system expansion easily by inserting optional modules without opening the cover. While this monitor makes system expansion and maintenance easy, it is suitable to professional use.

1.2 Features

(1) 3 Kinds of Remote Control Available

The monitor can be remote-controlled with three kinds of remote controllers (parallel, infrared, serial). Depending on the place of installation and type of operation, the remote controllers can be used.

In addition to the conventional parallel remote control, the monitor also contains a standard serial remote input interface which enables remote control with just one BNC coaxial cable. One serial remote controller SRC-301A (optional) can control up to 99 types of monitors (17/18/20/30/80/90/HTM series monitors) individually with them connected by the loop-through method.

The infrared wireless remote controller RCT-20A is also available as an option.

(2) Digital Control

Digital data are processed with 10-bit process. The data can be changed easily with the rotary encoder.

Using digital process provides the ability of remote control of image size, position and side pin correction.

(3) Memorization of 4 Types of Color Temperatures

This monitor can memorize three types of color temperatures besides factory-set color temperature. So, you can select optimum white balance setting speedily and easily in accordance with condition of input video or purpose of use.

(4) BFS (Beam Feedback System)

As the BFS circuit for detecting CRT cathode current is adopted, stable white balance can be obtained for a long period of time even when the CRT emission is changed.

(5) Built-in 3-Line Comb Filter (for NTSC)

This monitor has the 3-line comb filter circuit in the NTSC decoder module. It realizes wide band of frequency response with the digital delay driving method by 8fsc clocks when NTSC analog composite signals are input.

The Faroudja™ format 3-line comb filter used for Y/C separation reproduces high picture quality images with minimum cross color and cross luminance.

(6) Built-in Test Signals

This monitor is equipped with a variety of useful test signals for adjustments such as the cross hatch, flat field (50%), window (100%), character and staircase waveform with pluge. The format of the test signals can also be selected from 525/625 in the MENU setting.

(7) Built-in Markers

4:3, 13:9 and 14:9 markers can be displayed in 16:9 aspect mode.

In addition, 80%, 88%, 90%, 93%, 100% and other markers can be displayed in 4:3 and 16:9 aspect modes.

(8) Shadow

This monitor is equipped with the shadow function. The function darkens the outside of the 4:3 image area, while images are monitored in the 4:3 image area in 16:9 aspect mode. The contrast of the darkened area is 0% or 40% (selected in the MENU setting). Therefore, you can check 4:3 images immediately, while observing 16:9 images.

Using the remote control function makes the shadow ON/OFF switching quick.

(9) Degauss Timer

When this monitor is powered, the degauss function works automatically. The automatic degauss function is factory-set to work 4 seconds after this monitor is powered. You can set the time (from 0 to 4.5 seconds at the interval of 0.5 seconds) for the function to work.

When a system including a lot of monitors is powered, using this function can curb rush current to minimum.

(10) Structure Aimed at Maintenance and Extension

Modules for signal processing (including optional modules) employ plug-in module method by which you can easily insert them in and remove them out of this monitor from the rear side without removing the cover. So, easy maintenance can be made.

Besides the normal modules for YPbPr/RGB signals (the VIDEO PROC. module) and for analog composite signals (the DECODER module), you can install up to 3 optional modules.

(11) High-performance In-line Gun CRT

This monitor employs an in-line gun dot mask type CRT. The mask pitch is 0.31mm for TM14-80R, 0.43mm for TM20-80R and 0.28mm for TM20-90R.

The CRT shadow mask helps highly improve doming (a phenomenon that beams go out of targets by deformation of shadow mask due to heat) caused when brightness increases.

(12) Brightness Correction for Each Scanning Size

For CRT monitors, as changes from normal scan to under scan and from 4:3 to 16:9 cause image size to shrink, beam current density of electronic gun raises. Change from 4:3 to 16:9 raises brightness by about 40%. Therefore, it looks like picture image changes when aspect ratio changes.

But, this monitor makes brightness correction to always obtain stable brightness over 4 types of image size even if image size changes.

(13) High-performance High Voltage Regulation Circuit

This monitor employs a regulation circuit that controls high voltage by pulses for each scanning line in the high voltage circuit. That makes response speed high, image distortion minimum even if video with high light images is input, and image stability high.

(14) Auto Setup

You can easily adjust color temperature to the factory-set value by using the auto setup probe ASP-80 (optional (under development)) / ASP-15 (optional).

In addition, you can also adjust a lot of monitors so that they all have the same user's color temperature.

2. SPECIFICATIONS

2.1 Common Specifications

(1) General

1. Power

AC single phase, 50/60Hz
 100V areas : 100V-120V $\pm 10\%$
 200V areas : 200V-240V $\pm 10\%$
 Power consumption : about 160W

2. Ambient Temperature

0 to +40 degrees Celsius

3. Humidity

90% or less (no condensation)

4. Dimensions and Weight

- a) TM14-80R
 450 (W) x 265 (H) x 515 (D) mm, About 28kg
 b) TM20-80R
 450 (W) x 399 (H) x 515 (D) mm, About 38kg
 c) TM20-90R
 450 (W) x 399 (H) x 515 (D) mm, About 38kg

5. Accessory

Power cable, remote connector, operation manual

6. Operation

Continuity

7. X-ray Radiation

0.1mR/H or less
 (anywhere at 50mm away from the outside of this monitor)

(2) Video Signal System

1. Frequency Response

- a) NTSC (RGB/YPbPr input)
 60Hz to 10MHz +1/-3dB
 10MHz or over descending response
 b) PAL (RGB/YPbPr input)
 50Hz to 10MHz +1/-3dB
 10MHz or over descending response

2. Sag

$\pm 1\%$

3. Stability of Black Level

1% or less in change of APL 10% to 90%

4. Aperture

2T pulse overshoots are symmetrical with subcarrier trap ON.

5. Noise

Synchronous noise -46dB or more
 Ham noise -55dB or more
 Others -55dB or more

(3) Chrominance Signal System

1. Frequency Response

At the chroma signal test terminal
 a) NTSC 3.58MHz ± 1 MHz +1/-3dB
 b) PAL 4.43MHz ± 1 MHz +1/-3dB

2. Demodulation Axis

90 degrees ± 1 degree

3. Delay Compensation

Based on Pr, Pb signals, delay time of luminance signal is less than 0.02 μ sec.

4. Color Killer Operating Point

Automatically works when burst level is 5 ± 1 IRE.

5. Adjusters

Chroma level ± 6 dB or more
 Chroma phase ± 15 degrees

(4) Brightness and Contrast

1. CRT

- a) TM14-80R Dot trio pitch : 0.31mm
 b) TM20-80R Dot trio pitch : 0.43mm
 c) TM20-90R Dot trio pitch : 0.28mm

2. Horizontal Resolution

When luminance at the screen center is 120cd/m².

- a) TM14-80R 700 TV lines or more
 b) TM20-80R 700 TV lines or more
 c) TM20-90R 900 TV lines or more

3. Preset Contrast

120cd/m² at shipment (100% window signal input)

4. Maximum Brightness

- a) TM14-80R 240cd/m² or more
 b) TM20-80R 170cd/m² or more
 c) TM20-90R 170cd/m² or more
 (100% window signal input, brightness : PRESET, contrast : MAX)

(5) Deflection and Sync Systems

1. 16:9 Displaying Size

- a) TM14-80R W259 x H146 mm
 b) TM20-80R W400 x H225 mm
 c) TM20-90R W400 x H225 mm

2. Scanning

- a) NORMAL SCAN (4:3/16:9)
 b) UNDER SCAN (4:3/16:9)

3. Deflection Distortion

$\pm 0.5\%$ of screen height
 (deflection linearity and raster distortion)

4. Sync Stability

When input signals are under the following condition, this monitor works well.

Internal sync : ± 6 dB of the rated value for video input level

External sync : 0.3 to 8Vp-p for external sync input level

5. High Voltage

Generated voltage : 25kV ± 1 kV

High voltage fluctuation :

$\pm 1\%$ in a range of 0 to 450 μ A of beam current as reference of 150 μ A

6. Convergence

- | | |
|-------------|--|
| a) TM14-80R | Center : 0.2mm, In the 80% area of screen height : 0.3mm, Peripheral : 0.5mm |
| b) TM20-80R | Center : 0.2mm, In the 80% area of screen height : 0.3mm, Peripheral : 0.5mm |
| c) TM20-90R | Center : 0.15mm, In the 80% area of screen height : 0.3mm, Peripheral : 0.45mm |

(6) Functions**1. Marker**

a) Center marker

ON/OFF is set by the MENU.

b) Safe title

The following markers appear in accordance with the state of aspect (4:3/16:9).

Figure in the parentheses shows aspect ratio at which the marker appears.

Types :

- 80% + 100% (4:3/16:9)
- 88% + 100% (4:3/16:9)
- 90% + 100% (4:3/16:9)
- 93% + 100% (4:3/16:9)
- 5-partition cross hatch (4:3/16:9)
- 10-partition cross hatch (4:3/16:9)
- Cross (4:3/16:9)
- 100% area of 14:9 (16:9)
- 100% area of 13:9 (16:9)
- 4:3 marker (16:9)
- 4:3 marker + 80%(4:3) marker (16:9)

2. Shadow

This function darkens the outside of 4:3 area in 16:9 aspect mode.

Types :

- 4:3 marker + shadow
- 4:3 marker + 80%(4:3) marker + shadow
- shadow only

3. Auto Setup

The auto setup probe ASP-80 (optional (under development)) / ASP-15 (optional) makes automatic white balance adjustment.

4. Remote Control

a) Parallel remote control

Channel COMPOSITE/AUX/SDI, RGB/YPbPr, COLOR/MONO, SYNC INT/EXT, 4:3/16:9, 4:3 MARKER ON/OFF, 4:3 SHADOW ON/OFF, TALLY ON/OFF

b) Serial remote control

This monitor is equipped with input interface as normal equipment so that you can control most of functions using the optional remote controller SRC-301A.

c) Infrared remote controller

RCT-20A (optional)

5. Built-in Test Signal

Types are set by the MENU.

Types :

- Cross hatch
- 50% flat field
- 100% window
- Character
- Staircase waveform with pluge

6. Beam Feedback System (BFS)**7. MENU**

- Setting of RGB/YPbPr input (RGB/YPbPr)
- Display setting of the VITS signal (ON/OFF)
- Setting of TEST signal format (525i/625i)
- Setting of center-cross marker indication (ON/OFF)
- Setting of marker color (7 colors)
- Setting of remote ID number (1 to 99)
- Setting of DEGAUSS timer (0 to 9)
- % indication for each preset data
- Setting of password

(7) Memory**1. Used Memories**

ROM 64K byte programmable ROM

RAM 32K byte static RAM

2. Battery Backup

Memory retaining period 10 years or more

Used Battery Lithium battery (BR2330-1HF)

(8) Applications**1. Safety Standard**

In accordance with UL1950

2. Electric Wave Noise Standard

FCC Class-A

3. X-ray Radiation Standard

DHHS

2.2 Individual Specifications

(1) YPbPr/RGB Input Module

- Attached YPbPr/RGB 1-input module
- DC-801 dual component module
(for extension of YPbPr/RGB 1-input)

1. Input/Output Terminal

- a) YPbPr/RGB 1-input module (attached)
 YPbPr/RGB : BNC 1-input (loop-through)
 Sync : BNC 1-input (loop-through)
- b) DC-801
 YPbPr/RGB : BNC 1-input (loop-through)

2. Input Signal Format (YPbPr/RGB)

- 525i/59.94
- 625i/50

3. Input Level

- a) RGB input
- | | |
|--------------|----------|
| VS : 1.0Vp-p | positive |
| V : 0.7Vp-p | positive |
- When R, G and B signals have sync signal, when only G signal has sync signal, or when R, G and B signals do not have sync signal.

b) YPbPr input

Beta or MII (SMPTE, N10) as normal input signal

- Beta (525/60Hz)

Y signal	WHITE	: 714mVp-p
	SETUP	: 53.6mVp-p
	SYNC	: 286mVp-p
Pb, Pr signals		: 700mVp-p

(100/7.5/75/7.5 COLOR BAR)
- Beta (625/50Hz)

Y signal	WHITE	: 700mVp-p
	SETUP	: 0mVp-p
	SYNC	: 300mVp-p
Pb, Pr signals		: 700mVp-p

(100/0/75/0 COLOR BAR)
- MII

Y signal	WHITE	: 700mVp-p
	SETUP	: 0mVp-p
	SYNC	: 300mVp-p
Pb, Pr signals		: 525mVp-p

(100/0/75/0 COLOR BAR)

When input signals are not normal, make adjustment with the front panel.

4. Input Impedance

High-impedance bridge connection or 75Ω termination (75Ω termination plugs are optional.)

5. Return Loss

46dB or more (10MHz)

(2) SDI Input Module (optional)

- DK-801 (4:2:2 digital component module)
 - DK-802N (4fsc NTSC digital composite module)
 - DK-8012 (4:2:2/4fsc digital module)
- The above 3 modules cannot be installed at a time. NTSC decoder module (DE-801) is required when digital composite signal is input to DK-802N or DK-8012.

1. Input/Output Terminal

BNC 2-input (active loop-through)
 Setting in the module allows selected signal to be output.

2. Input Signal Format

- a) DK-801
 SDI 4:2:2 digital component signal
 (525i/59.94, 625i/50)
- b) DK-802N
 SDI 4fsc digital composite signal (NTSC)
- c) DK-8012
 2 formats selected automatically
- SDI 4:2:2 digital component signal
(525i/59.94, 625i/50)
 - SDI 4fsc digital composite signal (NTSC)

3. Input/Output Level

Rating 800mVp-p ±10%
 (The output level is rated in 75Ω termination)
 SCRAMBLED NRZI method

4. Transmission Speed

DK-801 : 270Mb/s
 DK-802N : 143Mb/s
 DK-8012 : 143Mb/s, 270Mb/s

5. Quantization Bit Number

10 bit

6. Input/Output Impedance

75Ω

7. Return Loss

15dB or more (270MHz)

(3) Decoder Module

1. Input/Output Terminal

BNC 3-input (loop-through)

2. Input Level

VS : 1.0Vp-p	positive
V : 0.7Vp-p	positive

3. Input Impedance

High-impedance bridge connection or 75Ω termination (75Ω termination plugs are optional.)

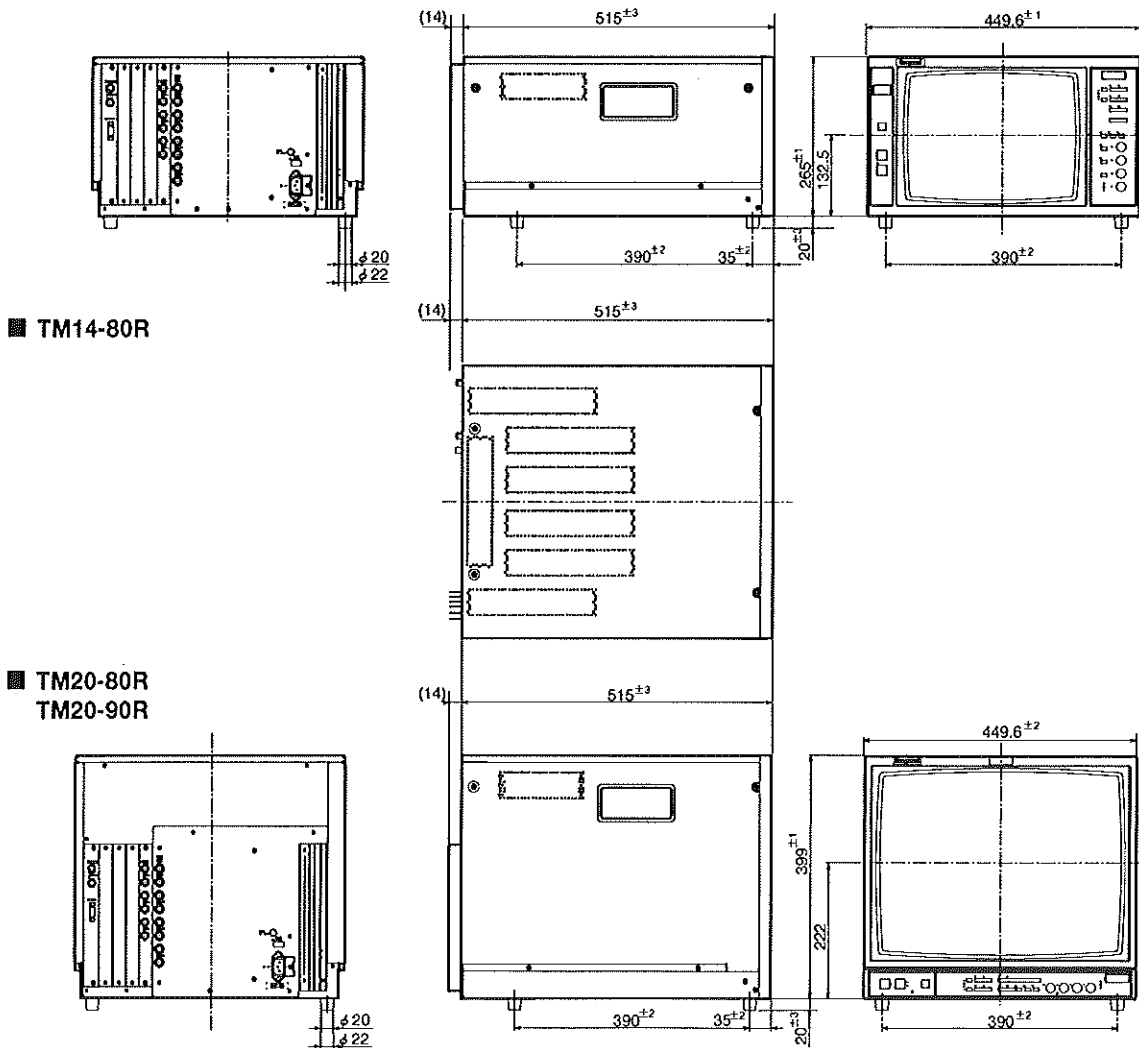
4. Return Loss

46dB or more (10MHz)

2.3 Option

- 1. **DK-801**
SDI 4:2:2 digital component 2-input module
- 2. **DK-802N**
SDI 4Fsc NTSC digital composite 2-input module
- 3. **DK-8012**
SDI 4:2:2 digital component / SDI 4Fsc NTSC digital composite 2-input module (DE-801 is necessary.)
- 4. **DE-801**
NTSC 3-line comb decoder module
- 5. **DE-802** (under development)
PAL comb decoder module
- 6. **DC-801** (made by order)
Dual component module (for expansion of YPbPr/RGB input)
- 7. **SRC-301A**
Serial remote controller
- 8. **RCT-20A**
Infrared remote controller
- 9. **EX-801**
Extender board for adjustment
- 10. **ASP-80** (under development)
Auto setup probe
- 11. **ASP-15**
Auto setup probe
- 12. **RS-1420S**
Rack mount adaptor for a 14-inch type monitor
- 13. **RS-2020S**
Rack mount adaptor for a 20-inch type monitor

2.4 External Appearance



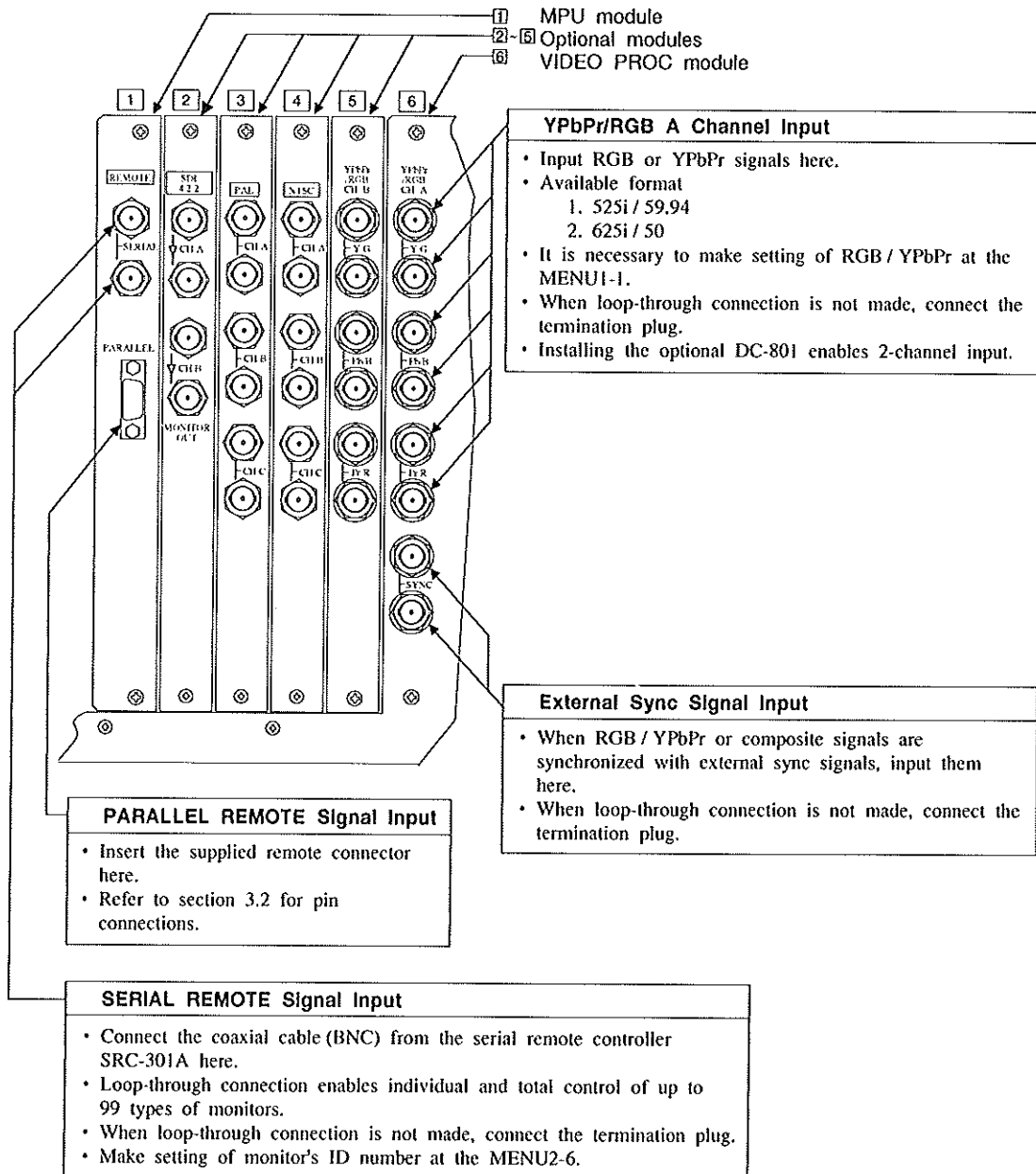
3. CONNECTION

⚠ CAUTION

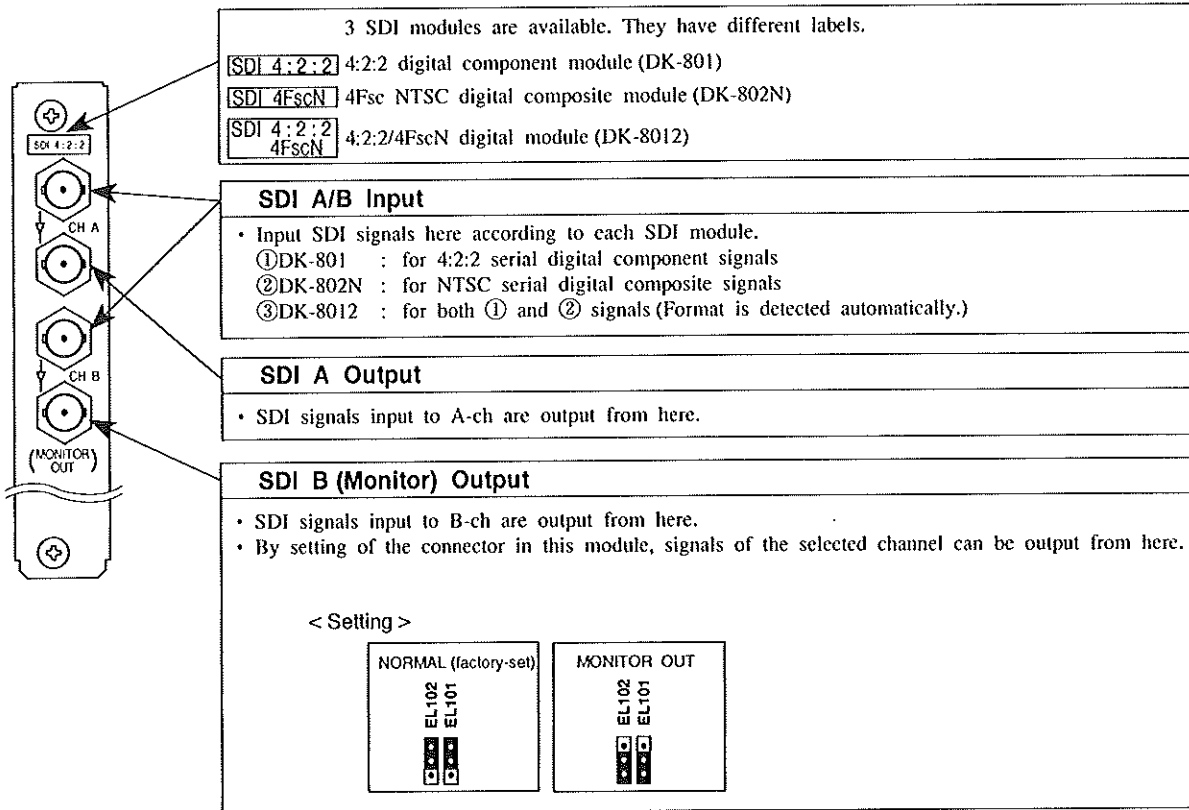
For safety, turn off power before connection.

3.1 Connection with External Equipment

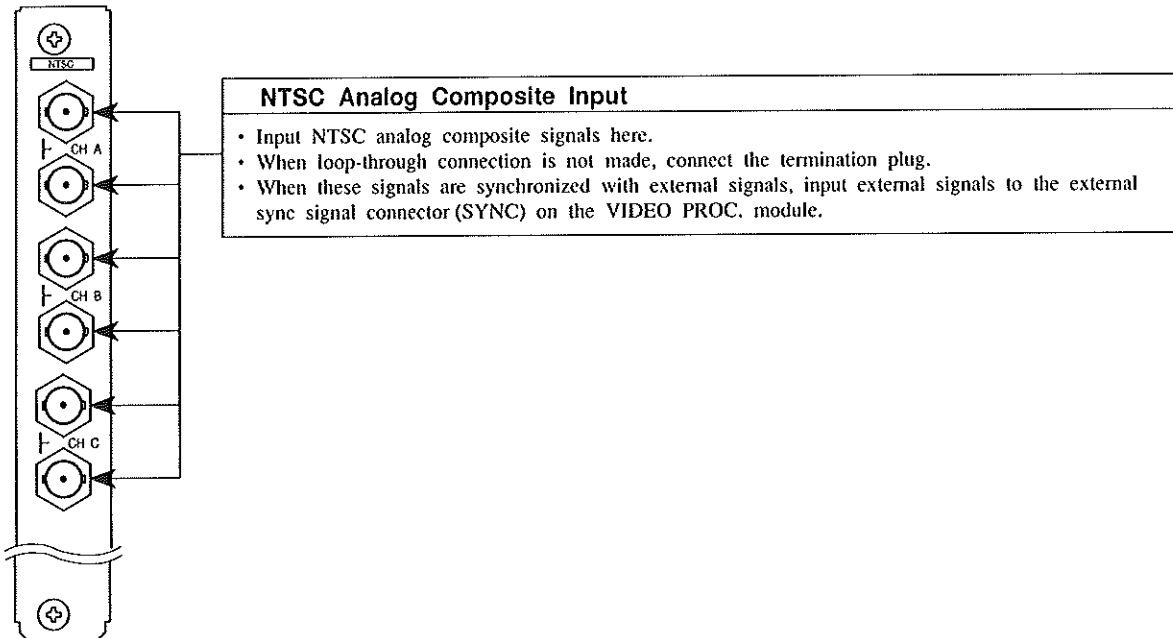
(1) Normal Module (MPU, VIDEO PROC.)



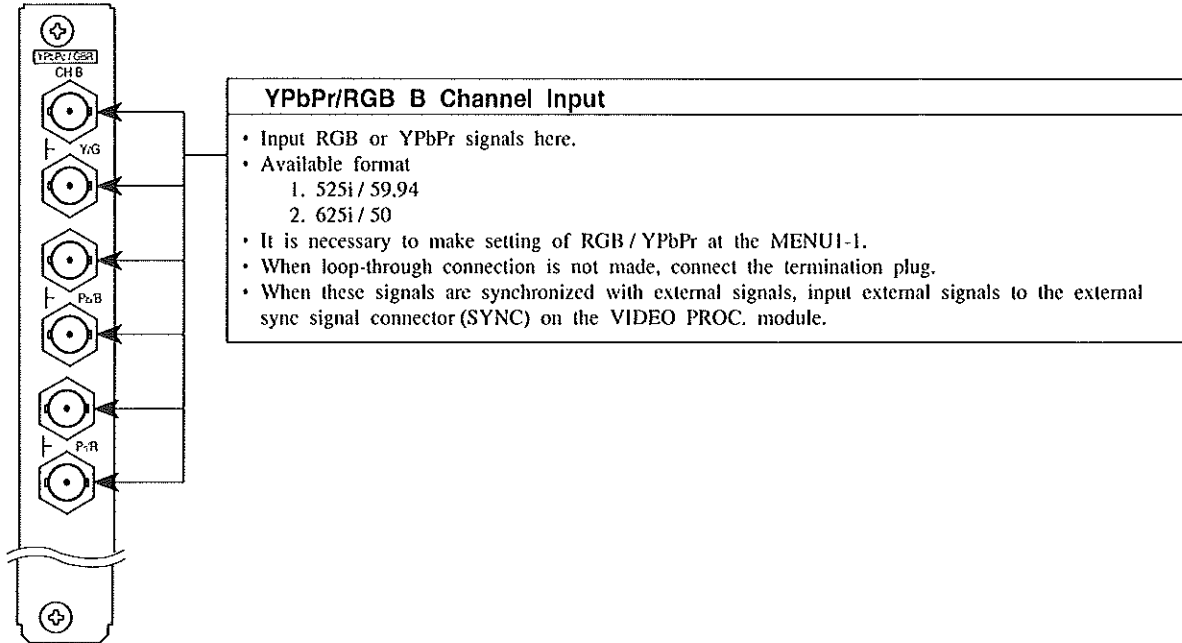
(2) SDI Input Module



(3) NTSC 3-Line Decoder Module (DE-801)

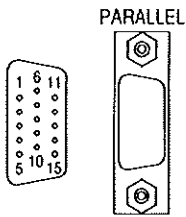


(4) Dual Component Module (DC-801)

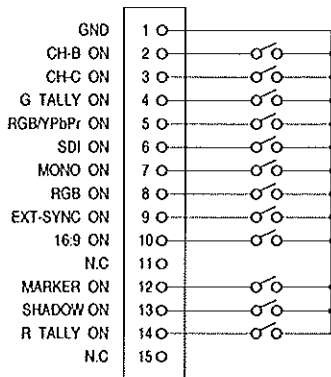


3.2 Parallel Remote Connection

[Connector]



[Wiring]

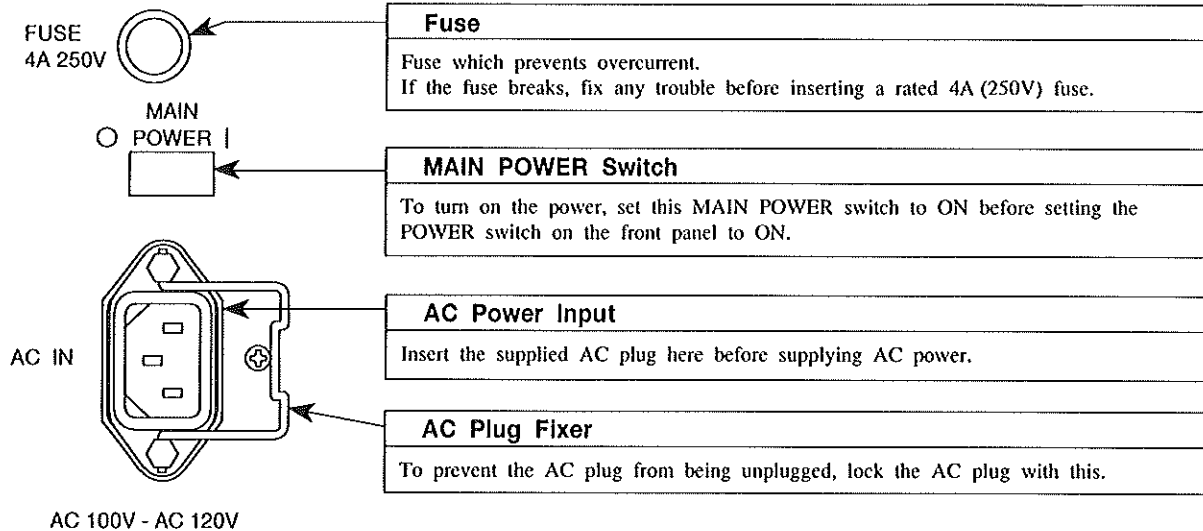


D-sub 15-pin (male) mini-plug

Pin Function

Pin No.	Name	Function
1	GND	Connecting to this enables remote control.
2	CH-B ON	Selects B-ch. A-ch is selected when both 2nd pin and 3rd pin are OPEN. (for composite, YPbPr/RGB, SDI)
3	CH-C ON	Selects C-ch. A-ch is selected when both 2nd pin and 3rd pin are OPEN. (for composite only)
4	G TALLY ON	Turns on G TALLY.
5	RGB/YPbPr ON	Selects RGB/YPbPr input signals. Use 2nd pin for A/B-ch selection.
6	SDI ON	Selects SDI input signals. Use 2nd pin for A/B-ch selection.
7	MONO ON	Sets COLOR/MONO to MONO.
8	RGB ON	Sets RGB/YPbPr to RGB.
9	EXT-SYNC ON	Makes analog input signals synchronized with external sync signal (EXT-SYNC).
10	16:9 ON	Sets the aspect (4:3/16:9) to 16:9.
11	N.C	Not connected.
12	MARKER ON	Displays 4:3 marker.
13	SHADOW ON	Displays shadow.
14	R TALLY ON	Turns on R TALLY.
15	N.C	Not connected.

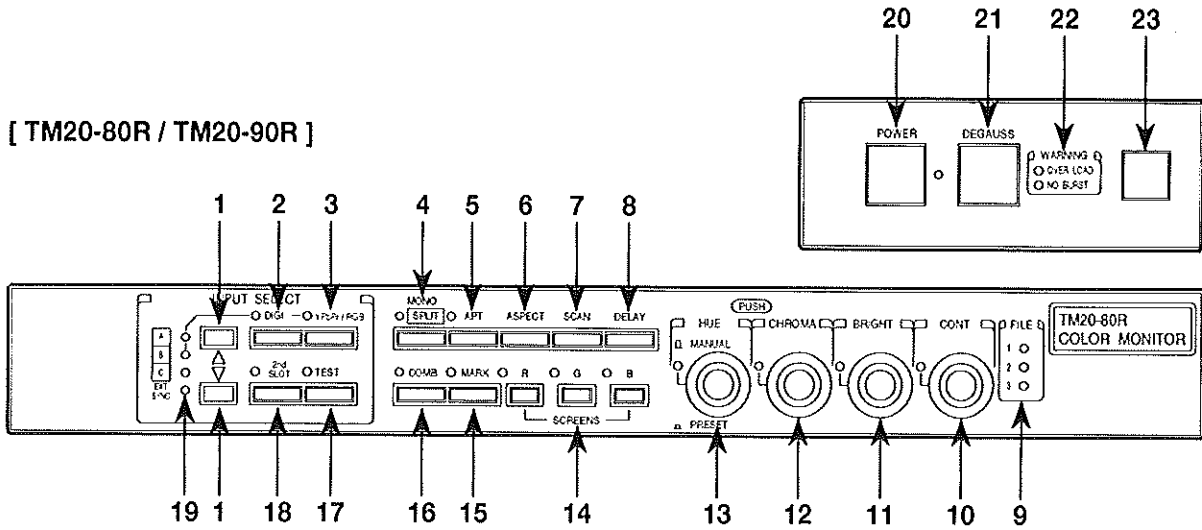
3.3 Connection to Power



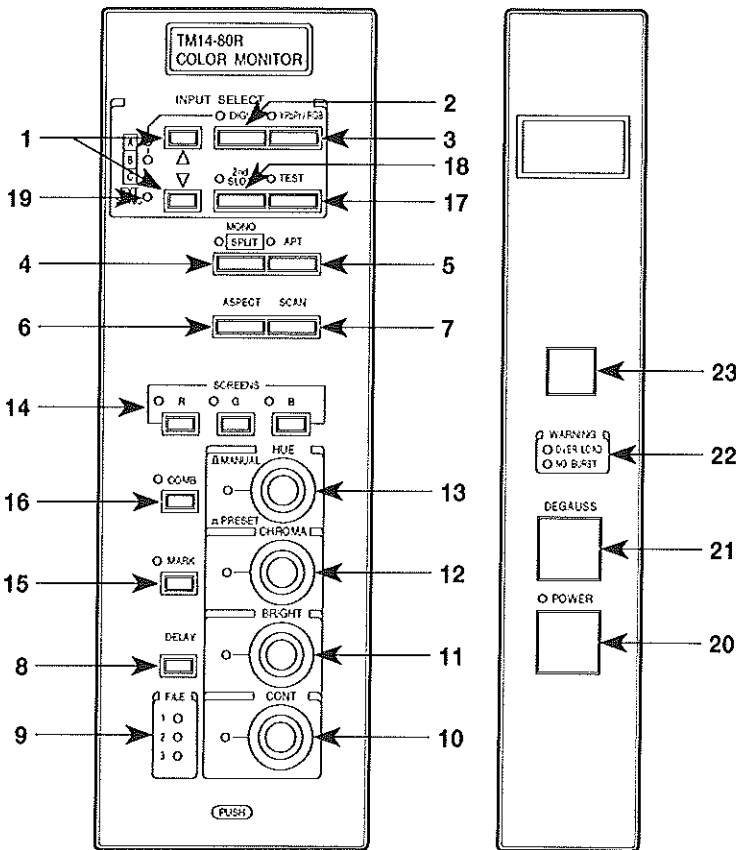
4. DAILY ADJUSTMENT

4.1 Names and Functions of Front Panel Section

[TM20-80R / TM20-90R]



[TM14-80R]



1. INPUT SELECT switch
2. DIGITAL switch
3. Y/PbPr/RGB switch
4. MONO (SPLIT) switch
5. APT switch
6. ASPECT switch
7. SCAN switch
8. DELAY switch
9. FILE LED
10. CONTRAST manual control
11. BRIGHTNESS manual control
12. CHROMA manual control
13. HUE manual control
14. SCREENS switch
15. MARKER switch
16. COMB switch
17. TEST switch
18. 2nd SLOT switch
19. EXT SYNC LED
20. POWER switch
21. DEGAUSS switch
22. WARNING LED
23. Infrared sensor

The following left-sided terms are used in this manual. They mean the right-sided signal formats.

- SDI : SDI for 525i, 625i

1. INPUT SELECT switch

Switches input signals.

When no optional module is installed, input signals are not switched.

As for the SYNC INT/EXT setting, while analog signals are input, you do not have to make setting of SYNC INT/EXT. Because the setting of SYNC INT/EXT is memorized for each channel (ch A, ch B, ch C, YPbPr/RGB ch A, YPbPr/RGB ch B) and is automatically switched.

As for the aspect ratio setting (4:3/16:9), you do not have to make setting of aspect ratio each time you switch channels, because the setting of aspect ratio is memorized for each channel (ch A, ch B, ch C, YPbPr/RGB ch A, YPbPr/RGB ch B, SDI ch A, SDI ch B) and is automatically switched once you make setting.

In addition, the settings of H.PHASE, CENT, SIZE, SIDE PIN and TRAPEZOID are also switched automatically.

2. DIGITAL switch

Turn this switch ON when selecting SDI input signals.

As for the aspect ratio setting (4:3/16:9), you do not have to make setting of aspect ratio each time you switch channels, because the setting of aspect ratio is memorized for each channel (ch A, ch B, ch C, YPbPr/RGB ch A, YPbPr/RGB ch B, SDI ch A, SDI ch B) and is automatically switched once you make setting.

3. YPbPr/RGB switch

Turn this switch ON when selecting YPbPr/RGB input signals.

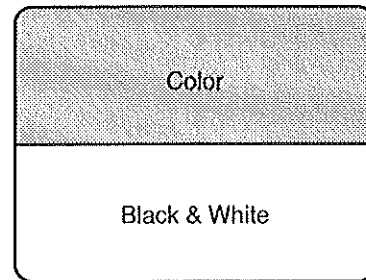
Make setting of YPbPr/RGB at the MENU1-1.

As for the SYNC INT/EXT setting, when selecting analog input signals, you do not have to make setting of SYNC INT/EXT each time you switch channels, because the setting of aspect ratio is memorized for each channel (ch A, ch B, ch C, YPbPr/RGB ch A, YPbPr/RGB ch B) and is automatically switched once you make setting.

As for the aspect ratio setting (4:3/16:9), you do not have to make setting of aspect ratio each time you switch channels, because the setting of aspect ratio is memorized for each channel (ch A, ch B, ch C, YPbPr/RGB ch A, YPbPr/RGB ch B, SDI ch A, SDI ch B) and is automatically switched once you make setting.

4. MONO (SPLIT) switch

Turn this switch ON to obtain black-and-white images. Moreover, pressing this switch for 2 or 3 seconds makes images get in the split mode (upper : color, lower : black-and-white).



[Wide-band MONO (for composite signals)]

With this switch ON, when the FORCED switch on the drawer panel is turned ON, the wide-band MONO state is set.

When analog or digital composite input signals are selected, their luminance signals are supposed to be processed with the COMB or TRAP filter in the usual MONO state, but with no filter in the wide-band MONO state and the frequency response is flat.

5. APT switch

Turn this switch ON to correct aperture.

This function works only for analog or digital composite input signals.

6. ASPECT switch

Press this switch to switch aspect ratio (4:3/16:9).

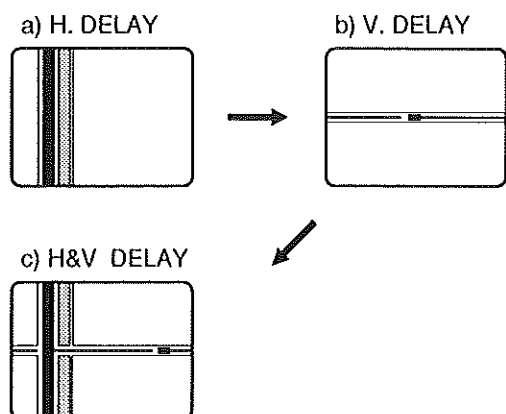
As for the aspect ratio setting (4:3/16:9), you do not have to make setting of aspect ratio each time you switch channels, because the setting of aspect ratio is memorized for each channel (ch A, ch B, ch C, YPbPr/RGB ch A, YPbPr/RGB ch B, SDI ch A, SDI ch B) and is automatically switched once you make setting.

7. SCAN switch

Press this switch to switch scanning mode (normal/under).

8. DELAY switch

Press this switch to observe horizontal sync signals and vertical sync signals on the screen.

**9. FILE LED**

Press the FILE switch (FILE1 to FILE3) on the drawer panel to read out its file which contains various preset data.

When all LEDs are OFF, the reference (REFERENCE) file is set.

10. CONTRAST manual control

This knob is one with a MANUAL/PRESET switch and a MANUAL control for CONTRAST.

By pressing this knob, it will protrude. At this time, the manual value can be varied.

11. BRIGHTNESS manual control

This knob is one with a MANUAL/PRESET switch and a MANUAL control for BRIGHTNESS.

By pressing this knob, it will protrude. At this time, the manual value can be varied.

12. CHROMA manual control

This knob is one with a MANUAL/PRESET switch and a MANUAL control for CHROMA.

By pressing this knob, it will protrude. At this time, the manual value can be varied.

13. HUE manual control

This knob is one with a MANUAL/PRESET switch and a MANUAL control for HUE.

By pressing this knob, it will protrude. At this time, the manual value can be varied.

The HUE works only on analog and digital NTSC composite input signals.

14. SCREENS switch

Press one of these switches to make the respective color signals only output to the screen.

When all the switches are turned ON, all the LEDs are OFF.

15. MARKER switch

Press this switch to display each marker.

By pressing this switch continuously, the type of markers changes (see page 15), at last no marker appears. By pressing this switch for a few seconds, the marker can be closed.

In addition, this switch works as the 4:3 shadow switch (see page 15).

16. COMB switch

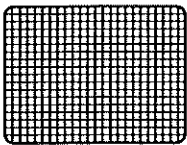
Turn this switch ON to use the 3-line comb filter circuit, and turn it OFF to use the trap filter circuit.

But, these two filter circuits work only when analog or digital composite input signals are selected.

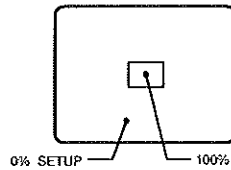
17. TEST switch

Turn this switch ON to use built-in TEST signals. Each time you press this switch, the TEST signals change, and at last normal images are displayed. The TEST signals are provided for 525i/60 and 625i/50 formats as standard features and the format setting is made at the MENU1-5. As for the aspect ratio setting (4:3/16:9), you do not have to make setting of aspect ratio each time you switch channels, because the setting of aspect ratio is memorized for each channel (ch A, ch B, ch C, YPbPr/RGB ch A, YPbPr/RGB ch B, SDI ch A, SDI ch B) and is automatically switched once you make setting.

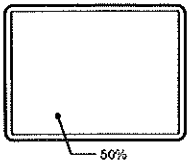
a) Cross hatch



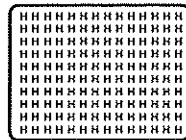
b) 100% window



c) 50% full white

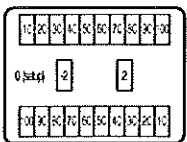


d) Character

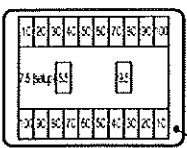


e) Staircase waveform with pluge

This is used for the white balance adjustment (section 4.4 (3)) and the brightness adjustment (section 4.4 (1)).



Use this TEST signal for the adjustments when the setup of input signals is 0%.



Use this TEST signal for the adjustments when the setup of input signals is 7.5%.

18. 2nd SLOT switch

Press this switch to select NTSC/PAL analog composite input signals. With both the NTSC 3-line decoder module and PAL decoder module installed, when this switch is ON, PAL input signal are selected for TM**-**RH, and NTSC input signals are selected for TM**-**RP.

19. EXT SYNC LED

This LED is ON when this monitor is synchronized with external sync signals (EXT SYNC). Make setting of SYNC INT/EXT with the EXT SYNC switch on the drawer panel.

20. POWER switch

This switch is used for turning power ON or OFF. To turn power ON, set the MAIN POWER switch on the rear panel to ON position before turning this switch ON. Usually leaving the MAIN POWER switch ON, turn this switch ON/OFF.

21. DEGAUSS switch

Press this switch to demagnetize the CRT. Demagnetizing is also performed automatically after this monitor is powered. Before you press this switch again, wait 2 to 3 minutes, as continual pressure of this switch is of no effect.

22. WARNING LED

[NO BURST LED]

This LED is ON when composite input signals are selected and when selected composite input signals have no burst (black-and-white signals) or the color killer circuit works only when composite input signals are selected.

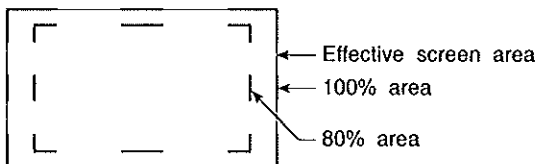
[OVER LOAD LED]

This LED is ON when the ABL circuit works (when luminance is too high). Lower luminance when it is ON, because using this monitor for a long time with it ON can deteriorate the CRT.

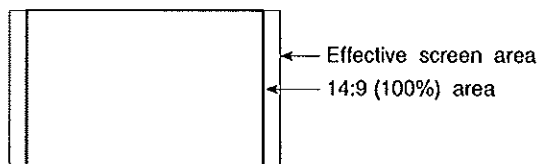
23. Infrared sensor

This is an infrared sensor for the wireless remote controller RCT-20A (optional).

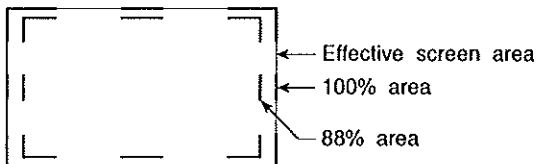
(1) 80% marker



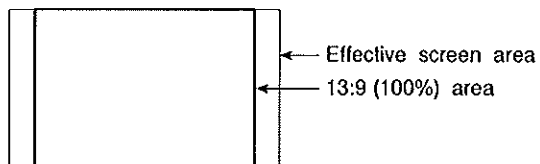
(8) 14:9 (100%) marker



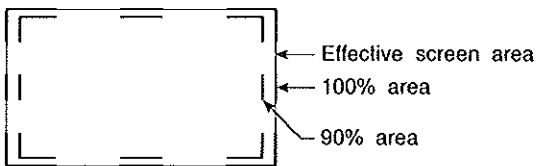
(2) 88% marker



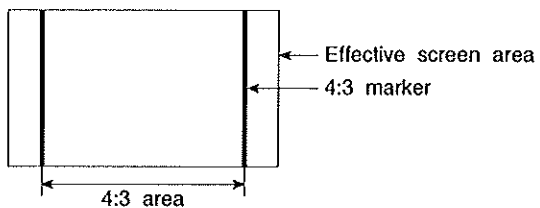
(9) 13:9 (100%) marker



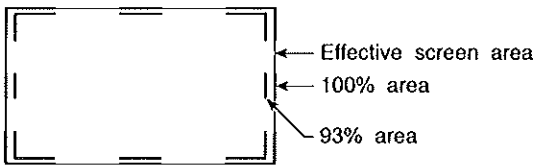
(3) 90% marker



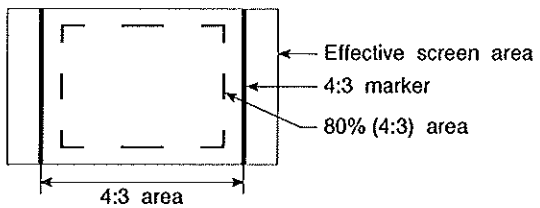
(10) 4:3 marker



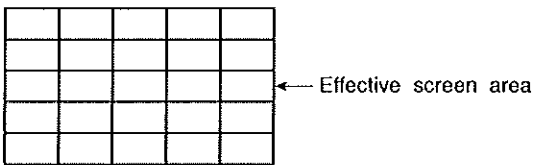
(4) 93% marker



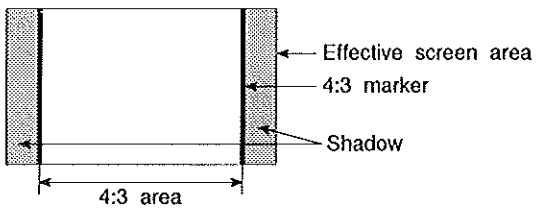
(11) 4:3 marker + 80% (4:3)



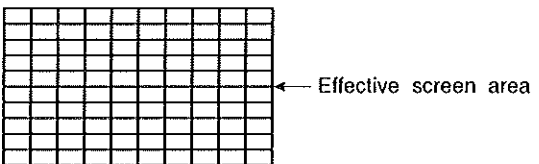
(5) 5-partition cross hatch



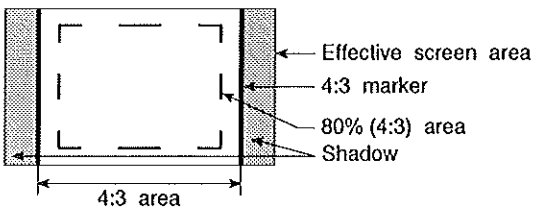
(12) 4:3 marker + shadow



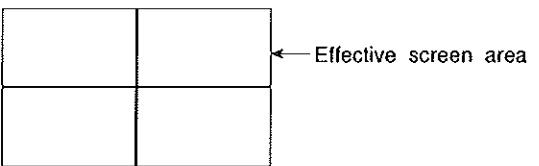
(6) 10-partition cross hatch



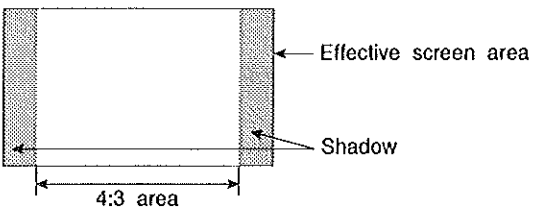
(13) 4:3 marker + 80% (4:3) + shadow



(7) Cross marker

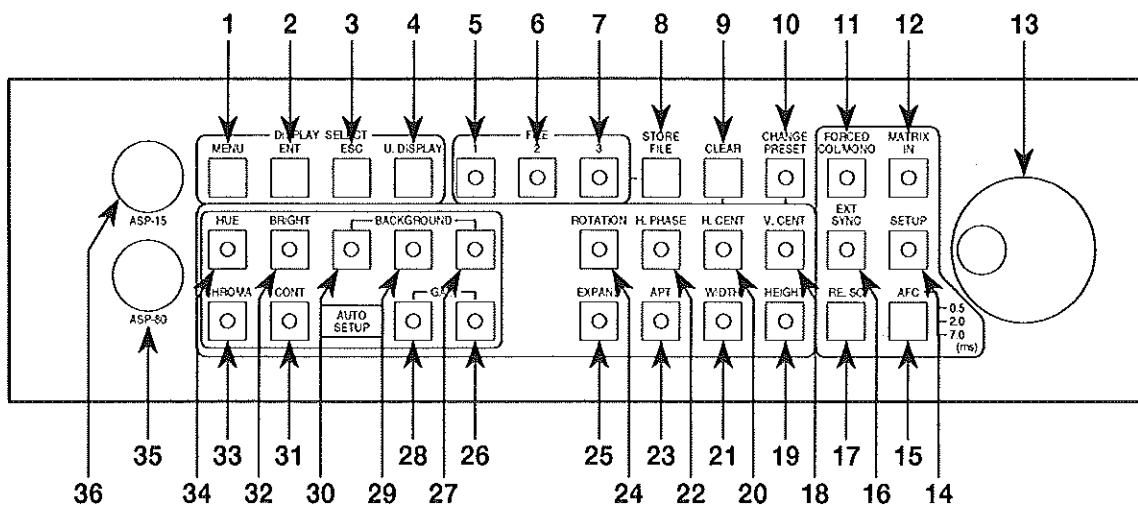


(14) 4:3 shadow

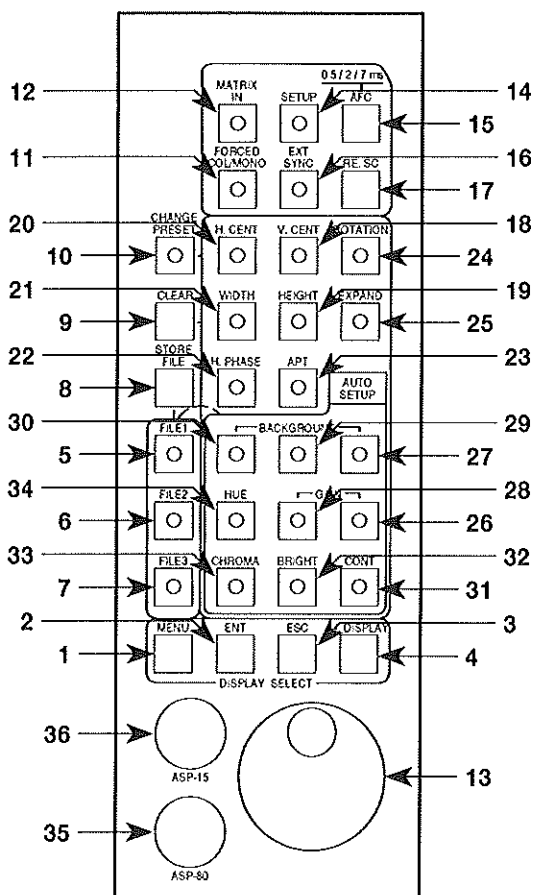


4.2 Names and Functions of Drawer Panel Section

[TM20-80R / TM20-90R]



[TM14-80R]



1. MENU switch
2. ENT switch
3. ESC switch
4. U. DISPLAY switch
5. FILE1 switch
6. FILE2 switch
7. FILE3 switch
8. STORE FILE switch
9. CLEAR switch
10. CHANGE PRESET switch
11. FORCED COL/MONO switch
12. MATRIX IN switch
13. Rotary encoder
14. SETUP switch
15. AFC switch
16. EXT SYNC switch
17. RE. SC switch
18. V. CENT switch
19. HEIGHT switch
20. H. CENT switch
21. WIDTH switch
22. H. PHASE switch
23. APT PRESET switch
24. ROTATION switch
25. EXPAND switch
26. B. GAIN switch
27. B. BACKGROUND switch
28. G. GAIN switch
29. G. BACKGROUND switch
30. R. BACKGROUND switch
31. CONT PRESET switch
32. BRIGHT PRESET switch
33. CHROMA PRESET switch
34. HUE PRESET switch
35. ASP-80 connector
36. ASP-15 connector

1. MENU switch

Press this switch to call out the MENU.

2. ENT switch

Press this switch to decide a result of MENU operation.

3. ESC switch

Press this switch to cancel a result of MENU operation.

4. U.DISPLAY switch

Press this switch to display the channel title.

Refer to section 4.5(4) f. on the setting.

5. FILE1 switch

Turn this switch ON when reading out data stored in the FILE1 or when storing data in the FILE1.

6. FILE2 switch

Turn this switch ON when reading out data stored in the FILE2 or when storing data in the FILE2.

7. FILE3 switch

Turn this switch ON when reading out data stored in the FILE3 or when storing data in the FILE3.

8. STORE FILE switch

- This switch is used for storing color temperature data in the FILE (FILE1 to FILE3).
- When this switch is pressed, the FILE1 to FILE3 switches blink. At this time, when one FILE switch corresponded to the desired FILE in which data are stored is pressed, the FILE switch lights up and the data are stored in the FILE.
- PRESET data which are stored in the FILEs are the following nine data (surrounded by the white line on the drawer panel).
HUE, CHROMA, BRIGHT, CONT, R/G/B BACKGROUND, G/B GAIN

9. CLEAR switch

- Press this switch not to store data and to restore previous data after changing PRESET data.
- You can adjust PRESET data temporarily without changing stored data in the memory.

10. CHANGE PRESET switch

- Press this switch to change or store PRESET data.
- Pressing this switch makes the LEDs of PRESET switches in the frame blink. At this time, pressing one of PRESET switches makes the LED of only the switch turned ON and allows you to change the PRESET data with the rotary encoder. When changing other PRESET data, press the PRESET switch and change the data with the rotary encoder.

When this CHANGE PRESET switch is pressed (at last), new PRESET data will be stored. When the CLEAR switch is pressed, new data will not be stored and previous data will be set.

- The FILE, FORMAT and SCAN modes have individual PRESET data as follows.

ROTATION and APT have only 1 type of data. But, HEIGHT and WIDTH have totally 8 types of data ; 2 types in each FORMAT and 4 types in each SCAN.

Therefore, while changing PRESET data, do not change SCAN size, ASPECT ratio and input channel.

PRESET data	FILE	FORMAT	SCAN	Amount
HUE	○	×	×	2
CHROMA	○	×	×	4
BRIGHTNESS	○	×	×	4
CONTRAST	○	×	×	4
G, B GAIN	○	×	×	4
R, G, B BKG	○	×	×	4
HEIGHT	×	○	○	8
WIDTH	×	○	○	8
H. CENT	×	○	×	2
V. CENT	×	○	×	2
H. PHASE	×	○	×	2
TRAPEZOID	×	○	×	2
SIDE PIN	×	○	×	2
ROTATION	×	×	×	1
APT	×	×	×	1

FILE : REFERENCE, FILE1, FILE2, FILE3

FORMAT : 525i, 625i

SCAN : 4:3 normal, 4:3 under, 16:9 normal, 16:9 under

- The LEDs of the PRESET switches do not blink nor light up.

APT PRESET switch :

When the APT switch on the front panel is OFF.

-> Turn the APT switch ON to change the APT PRESET data.

HUE PRESET switch :

When the HUE manual control on the front panel is ON.

-> Turn the HUE manual control OFF (PRESET).

When input signals other than NTSC composite input signals are selected.

CHROMA PRESET switch :

When the CHROMA manual control on the front panel is ON.

-> Turn the CHROMA manual control OFF (PRESET).

CONTRAST PRESET switch :

When the CONTRAST manual control on the front panel is ON.

-> Turn the CONTRAST manual control OFF (PRESET).

BRIGHTNESS PRESET switch :

When the BRIGHTNESS manual control on the front panel is ON.

-> Turn the BRIGHTNESS manual control OFF (PRESET).

11. FORCED COL/MONO switch

This switch functions as follows according to a combination with the MONO (SPLIT) switch on the front panel.

FORCED	MONO	Operation
OFF	OFF	< AUTO COLOR > The COLOR/MONO circuits of the decoder work according to whether or not composite signals have burst.
ON	OFF	< FORCED COLOR > The COLOR circuit is forced to work regardless of existence of burst.
OFF	ON	< NORMAL MONO > Normal MONO state is set. When composite input signals are selected, according to ON/OFF of the COMB switch the COMB or TRAP filter circuit works.
ON	ON	< WIDE BAND MONO > Unlike the above MONO state, the COMB and TRAP filter circuits do not work. The frequency response of luminance signals is full-flat.

12. MATRIX IN switch

Press this switch to change the matrix ratio of luminance and color difference signals.

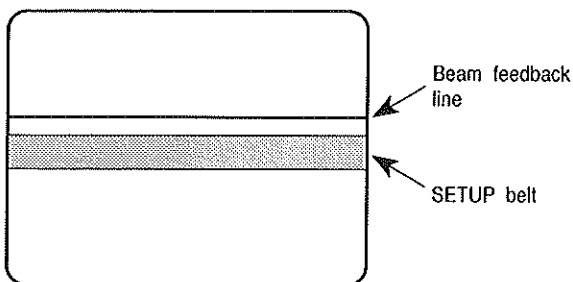
When the LED is OFF, the normal matrix ratio is set.
When ON, the matrix ratio close to that for general home television sets is set.

13. Rotary encoder

This switch is used for changing PRESET data and selecting MENU items on the drawer panel.

14. SETUP switch

Press this switch to switch OPERATE/SETUP.
When this switch is OFF (OPERATE), this monitor works normally. When this switch is ON (SETUP), vertical deflection is shrunk, so it is easy to make adjustment of white balance (R/G/B BACKGROUND).



15. AFC switch

Press this switch to select optimum time constant (0.5, 2, 7ms, which are displayed on the screen).

0.5ms : Select this when signals with unstable sync signals from a simple VCR or the like are input.

2ms : Select this normally.

7ms : Select this when camera line output signals or signals with stable sync signals from a broadcasting VCR or the like are input.

16. EXT SYNC switch

- Press this switch to switch SYNC INT/EXT. Turn it ON when selected input signals are synchronized with external sync signals.
- As for the SYNC INT/EXT setting, while analog signals are input, you do not have to make setting of SYNC INT/EXT. Because the setting of SYNC INT/EXT is memorized for each channel (ch A, ch B, ch C, YPbPr/RGB ch A, YPbPr/RGB ch B) and is automatically switched.

17. RE.SC switch

(Available only when NTSC composite input signals are selected.)

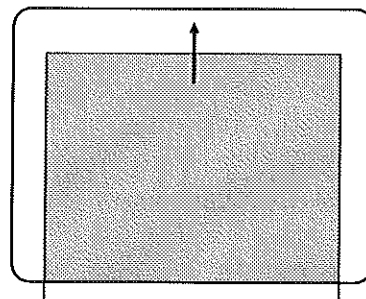
Press this switch to switch RESIDUAL SUBCARRIER ON/OFF for checking whether or not subcarrier leaks on input signals.

Observing the screen, press this switch. At this time, if the phase (HUE) changes, subcarrier is leaking into the feedback line area.

Releasing this switch automatically turns this switch OFF.

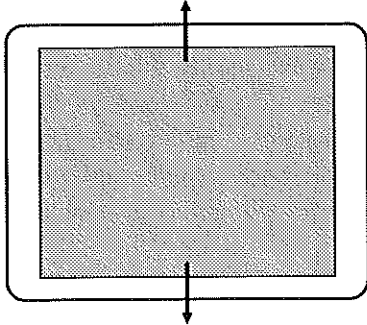
18. V.CENT switch

- Turn this switch ON to adjust the vertical position of the effective screen area with the rotary encoder.
- The setting of this switch is memorized for each input format (525i/625i) and is automatically switched.

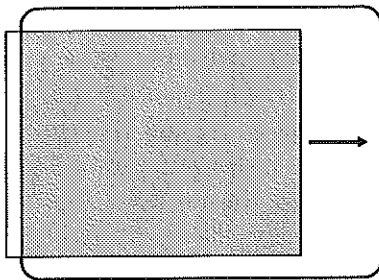


19. HEIGHT switch

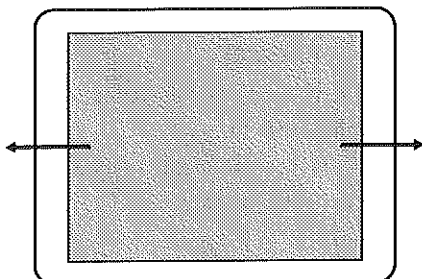
- Turn this switch ON to adjust the height of the effective screen area with the rotary encoder.
- The setting of this switch is memorized for each input format (525i/625i), scanning size (normal/under) and aspect ratio (4:3/16:9), and is automatically switched.

**20. H.CENT switch**

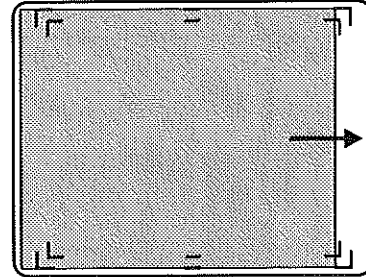
- Turn this switch ON to adjust the horizontal position of the effective screen area with the rotary encoder.
- The setting of this switch is memorized for each input format (525i/625i) and is automatically switched.

**21. WIDTH switch**

- Turn this switch ON to adjust the width of the effective screen area with the rotary encoder.
- The setting of this switch is memorized for each input format (525i/625i), scanning size (normal/under) and aspect ratio (4:3/16:9), and is automatically switched.

**22. H.PHASE switch**

- Turn this switch ON to adjust the horizontal phase of images with the rotary encoder.
Display the 100% marker and adjust so that images come into the marker frame.
- The setting of this switch is memorized for each input format (525i/625i) and is automatically switched.

**23. APT PRESET switch**

Turn this switch ON to adjust the APERTURE with the rotary encoder after turning ON the APT switch on the front panel.

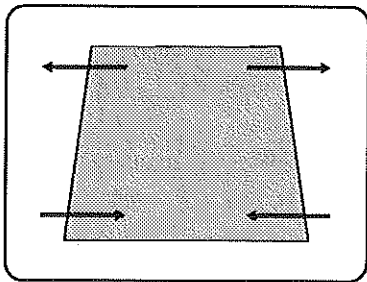
24. ROTATION switch

- This switch is used for correcting deviation of the purity caused by an effect of the terrestrial magnetism when this monitor is rotated.
- Select the 50% full white with the TEST switch and turn ON only the Rch SCREEN switch on the front panel to make the screen only red. Then, turn the ROTATION switch ON and adjust the rotary encoder so that the entire screen is even red. Next, check on the purity of green and blue.
- When using this monitor under circumstances such as an OB van where the monitor is rotated constantly, set the bit connector (EL561) on the DEF BOARD to OFF position so that this switch cannot function. The bit connector is set to ON position at shipment.

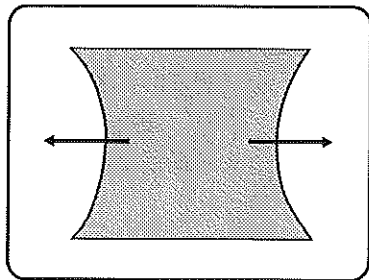
25. EXPAND switch

- Turn this switch ON to adjust the SIDE PIN and the TRAPEZOID with the rotary encoder.
Each time this switch is pressed, adjustment modes for the SIDE PIN and the TRAPEZOID will switch over.
- The setting of this switch is memorized for each input format (525i/625i) and is automatically switched.

• TRAPEZOID



• SIDE PIN

**26. B.GAIN switch**

- Turn this switch ON to adjust the high light white balance (blue component) with the rotary encoder.
- Refer to "4.4(3) Adjusting White Balance" on the adjustment.

27. B.GACKGROUND switch

- Turn this switch ON to adjust the low light white balance (blue component) with the rotary encoder.
- Refer to "4.4(3) Adjusting White Balance" on the adjustment.

28. G.GAIN switch

- Turn this switch ON to adjust the high light white balance (green component) with the rotary encoder.
- Refer to "4.4(3) Adjusting White Balance" on the adjustment.

29. G.GACKGROUND switch

- Turn this switch ON to adjust the low light white balance (green component) with the rotary encoder.
- Refer to "4.4(3) Adjusting White Balance" on the adjustment.

30. R.GACKGROUND switch

- Turn this switch ON to adjust the low light white balance (red component) with the rotary encoder.
- Refer to "4.4(3) Adjusting White Balance" on the adjustment.

31. CONT PRESET switch

- Turn this switch ON to adjust the CONTRAST PRESET data (value) with the rotary encoder.
This value means a CONTRAST value when the CONTRAST manual control on the front panel is OFF.
- Refer to "4.4(2) Adjusting Contrast" on the adjustment.

32. BRIGHT PRESET switch

- Turn this switch ON to adjust the BRIGHTNESS PRESET data (value) with the rotary encoder.
This value means a BRIGHTNESS value when the BRIGHTNESS manual control on the front panel is OFF.
- This switch does not function when the DELAY switch is functioning.
- Refer to "4.4(1) Adjusting Brightness" on the adjustment.

33. CHROMA PRESET switch

- Turn this switch ON to adjust the CHROMA PRESET data (value) with the rotary encoder.
This value means a CHROMA value when the CHROMA manual control on the front panel is OFF.
- Refer to "4.4(4) Adjusting Color Balance" on the adjustment.

34. HUE PRESET switch

- Turn this switch ON to adjust the HUE PRESET data (value) with the rotary encoder.
This value means a HUE value when the HUE manual control on the front panel is OFF.
- This switch functions only when analog or digital NTSC composite input signals are selected.
- Refer to "4.4(4) Adjusting Color Balance" on the adjustment.

35. ASP-80 connector

- This connector is used for connecting with the optional auto setup probe ASP-80 (under development).
- Using ASP-80 makes automatic adjustment of the white balance and the color balance.

36. ASP-15 connector

- This connector is used for connecting with the optional auto setup probe ASP-15.
- Using ASP-15 makes automatic adjustment of the white balance and the color balance.

4.3 Storage and Change to Memory

(1) Storage and Change of PRESET Data

< Example 1 > Change of H.PHASE, H.CENT, V.CENT, WIDTH, HEIGHT, TRAPEZOID, SIDE PIN

<p>1</p>		<p>Select the under scanning state with the SCAN switch and select the 10-partition cross hatch with the MARKER switch.</p>
<p>2</p>		<p>Press the CHANGE PRESET switch. Each PRESET switch will blink.</p>
<p>3</p>		<p>< Changing the phase > Press the H.PHASE switch and adjust the rotary encoder so that images come into the marker frame.</p>
<p>4</p>		<p>< Changing the center > Press the H.CENT switch and change the horizontal image position with the rotary encoder. Next, press the V.CENT switch and change the vertical image position with the rotary encoder.</p>
<p>5</p>		<p>< Changing the size > Press the WIDTH switch and change the image width with the rotary encoder. Next, press the HEIGHT switch and change the image height with the rotary encoder.</p>
<p>6</p>		<p>< Changing the TRAPEZOID > Press the EXPAND switch and change the TRAPEZOID with the rotary encoder.</p>
<p>7</p>		<p>< Changing the SIDE PIN > Press the EXPAND switch once more and change the SIDE PIN with the rotary encoder.</p>
<p>8</p>		<p>< Storing data > After completing changing data, press the CHANGE PRESET switch. New data will be stored.</p>
<p></p>		<p>< Clearing data > Before storing data, press the CLEAR switch. New data will be cleared and previous data will be restored.</p>

Note

PRESET data for HEIGHT, WIDTH, H. PHASE, H. CENT, V. CENT, TRAPEZOID and SIDE PIN are stored for each input signal format (525i/625i). Moreover, PRESET data for HEIGHT and WIDTH are also stored for each scanning size (under/normal) and each aspect ratio (4:3/16:9).

When switching of input signals (INPUT SELECT), scanning size (SCAN switch) or aspect ratio (ASPECT switch) is made, data changed until now will be cleared.

Therefore, store changed data before changing data in other modes (by selecting other input signals or other scanning size).

< Example 2 > Change of APT

<p>1</p>		<p>Turn the APT switch ON.</p>
<p>2</p>		<p>Press the CHANGE PRESET switch. Each PRESET switch will blink.</p>
<p>3</p>		<p>Press the APT PRESET switch and change aperture correction with the rotary encoder.</p>
<p>4</p>		<p>< Storing data > After completing changing data, press the CHANGE PRESET switch.</p> <p>< Clearing data > Before storing data, press the CLEAR switch.</p>

(2) Storage and Change of FILE Data

< Example > When copying the REFERENCE (FILE off) data into FILE3 and changing the color temperature

<p>1</p>		<p>< Storing FILE > Press the STORE FILE switch. The FILE1, FILE2 and FILE3 switches will blink.</p>
<p>2</p>		<p>Press the FILE3 switch. Current FILE data will be copied into the FILE3.</p>
<p>3</p>		<p>Press the CHANGE PRESET switch. Each PRESET switch will blink.</p>
<p>4</p>		<p>Press the R. BACKGROUND switch and change the data with the rotary encoder. Then, press other PRESET switch and change color temperature.</p>
<p>5</p>		<p>< Storing data > After completing changing data, press the CHANGE PRESET switch.</p> <p>< Clearing data > Before storing data, press the CLEAR switch.</p>

4.4 Adjustment

< To begin with >

- More accurate adjustment can be made by darkening environment around this monitor as much as possible.
- Read through section 4.3 on how to change PRESET data before making the following adjustment.

(1) Adjusting Brightness

a. About brightness

BRIGHTNESS is necessary to set proper black level. According to lighting conditions around the monitor, it is necessary to adjust BRIGHTNESS so that black level is not too high or too low.

b. Adjustment procedure

1. Input signal

Select the built-in staircase waveform with pluge with the TEST switch.

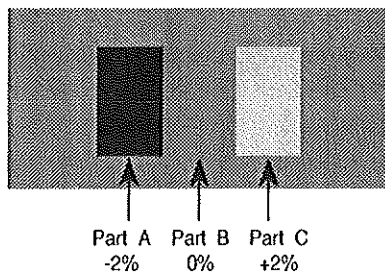


Fig. 4-4-1 Part of pluge

2. Adjustment of BRIGHTNESS

While looking at part of pluge at the screen center (the above figure), adjust BRIGHTNESS so that it is difficult to tell part A (-2%) from part B (0%).

At this time, check that part C (+2%) is slightly visible. If not, as black level is too low, adjust BRIGHTNESS so that part C (+2%) is slightly visible.

(2) Adjusting Contrast

a. About contrast

CONTRAST setting at shipment is adjusted to be optimum in video monitoring.

b. Precaution

Adjust CONTRAST PRESET to the value specified by the next item, if possible. Because keeping CONTRAST too high (the OVER LOAD LED lit) for a long time causes the CRT to be deteriorated.

c. Adjustment procedure

1. Input signal

Select the built-in 100% window with the TEST switch.

2. Adjustment of CONTRAST

Adjust CONTRAST so that luminance at the window is 120nit (cd/m²) with a measuring tool which can read luminance value.

(3) Adjusting White Balance

a. About white balance

4 files are provided for white balance data.

- REFERENCE (6500K)
- FILE1 (6500K)
- FILE2 (9300K)
- FILE3 (USER)

The white balance adjustment is made by using an analyzer or the optional ASP-80 (under development) / ASP-15 for automatic adjustment.

You can make setting of color temperatures for 4 files individually. But, if you are not used to adjustment of color temperature, make adjustment with FILE3 (USER).

b. Precaution

This monitor employs the beam feedback clamp method for long stability of black level, which clamps black level by detecting beam current. That is why 1 line appears at the upper part of the screen as shown in part A of fig. 4-4-2. If you lower BACKGROUND so that part B of fig. 4-4-2 is invisible, part A of fig. 4-4-2 disappears, beam current cannot be detected, and images disappears. Therefore, pay attention to adjustment of BACKGROUND.

c. Adjustment procedure 1 (by the eye)

1. Input signal

Input the color bar signal or select the built-in staircase waveform with pluge with the TEST switch.

2. Selection of file

Select a file to be changed about the white balance. Adjust BRIGHTNESS and CONTRAST before the white balance.

3. Setting before BACKGROUND adjustment

Turn ON the MONO (SPLIT) switch on the front panel to make images monochromatic when using the color bar signal. Then, turn ON the SETUP switch on the drawer panel to display as below.

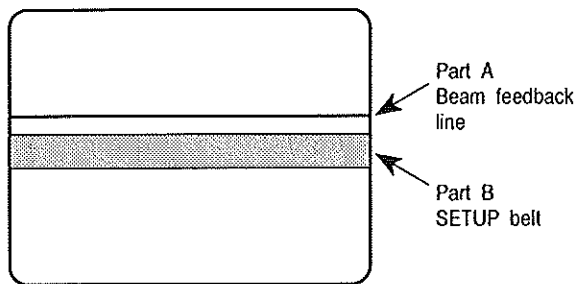


Fig. 4-4-2 State of SETUP "ON"

4. Initial adjustment for low light

Turn only the Rch SCREENS switch ON so that only red signals are monitored. Then, adjust R.BACKGROUND so that the red line of part B in the figure is slightly visible. Similarly, adjust G (green) and B (blue) BACKGROUNDS.

When even one of BACKGROUNDS cannot be adjusted, turn the SCREEN control slightly on the flyback transformer on the H.V OUT BOARD, and then adjust BACKGROUNDS again.

5. Adjustment for high light

Turn OFF the SETUP and SCREENS switches. While looking at high light part of staircase waveform, adjust G.GAIN and B.GAIN so that the desired color temperature is obtained.

6. Adjustment for low light

While looking at low light part of staircase waveform, adjust R, G and B BACKGROUNDS so that the desired color temperature is obtained.

7. Repeat steps 5 and 6 so that the desired color temperature is obtained at from low light part to high light part. Because steps 5 and 6 interferes each other.

d. Adjustment procedure 2 (by color analyzer)

When you adjust color temperature with a marketed color analyzer, adjust GAINS and BACKGROUNDS so that it reads chromaticity points as shown in the table below.

CIE chromaticity points (x, y)

Color temperature	x	y
6500K	0.313	0.329
9300K	0.283	0.297

1. Input signal

Select the built-in 100% window with the TEST switch.

2. Selection of file

Select a file to be changed about the white balance. Adjust BRIGHTNESS and CONTRAST before the white balance.

3. Adjustment of R.BACKGROUND

As red is reference in white balance adjustment, make setting of R.BACKGROUND as follows.

- Turn ON the SETUP switch on the drawer panel to display as fig. 4-4-2.
- Turn ON only the Rch SCREENS switch, and then adjust R.BACKGROUND so that the red line of part B is slightly visible.
- Turn the SETUP and SCREENS switches OFF. On and after, do not change R.BACKGROUND.

4. Setting of CONTRAST MANUAL

Set CONTRAST to MANUAL state, and then apply the probe of the color analyzer at the center of the window signal on the monitor screen.

At this time, in advance, adjust the CONTRAST manual control so that the color analyzer reads luminance of about 5nit (cd/m²) or about 1.5fL.

The MANUAL luminance value set here will change in adjustment of the white balance. Therefore, check it in adjustment of low light part, and set it again if it changes. But you do not have to care about change of ± 2 nit (± 0.5 fL).

5. Setting of chromaticity points (x, y) for high light

Set CONTRAST to PRESET state, and then set the chromaticity points (x, y) for high light with G and B GAINS as follows.

- Adjust B.GAIN so that the chromaticity point of x is the specified value.
- Adjust G.GAIN so that the chromaticity point of y is the specified value.
- Repeat adjustment of the chromaticity points (x, y) so that they are the specified values.

As the next low light chromaticity points adjustment described below causes some change of high light chromaticity points, after adjusting that for high light to a certain extent, adjust that for low light.

6. Setting of chromaticity points (x, y) for low light

Set CONTRAST to MANUAL state, and then set the chromaticity points (x, y) for low light with G and B BACKGROUNDS as follows.

- Adjust B.BACKGROUND so that the chromaticity point of x is the specified value.
- Adjust G.BACKGROUND so that the chromaticity point of y is the specified value.
- Repeat adjustment of the chromaticity points (x, y) so that they are the specified values.

As this low light chromaticity points adjustment causes some change of high light chromaticity points, after adjusting that for low light to a certain extent, adjust that for high light at step 5 again.

7. When the chromaticity points (x, y) for both low light and high light are the specified values, the adjustment is over.

(4) Adjusting Color Balance

a. About color balance

When component (YPbPr/RGB) signals or PAL composite signals are input, the color balance adjustment is made by only CHROMA. But, when NTSC composite signals are input, the color balance adjustment is made by HUE and CHROMA.

b. Adjustment procedure 1 (for NTSC composite signals)

1. Input signal

Input the SMPTE or NTSC 75% color bar signal.

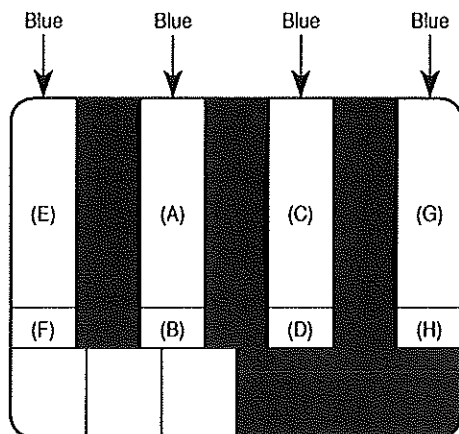


Fig. 4-4-3 NTSC 75% color bar

2. Initial setting

Turn only the Bch SCREENS switch ON so that only blue signals are monitored. Besides, as it is difficult to distinguish difference of luminances in brighter images, darken environment if possible and lower BRIGHTNESS (MANUAL state) so that blue parts are slightly visible. So, more accurate adjustment can be made.

3. Adjustment of HUE

Adjust HUE so that luminances from part A to D in Fig. 4-4-3 are all the same. If luminances do not become the same, after optimum result is obtained, adjust CHROMA at the next step.

4. Adjustment of CHROMA

Adjust CHROMA so that luminances from part E to H in Fig. 4-4-3 are the same. If luminances do not become the same, after optimum result is obtained, adjust HUE at step 3.

5. Repeat steps 3 and 4 so that luminances from part A to H are the same.

c. Adjustment procedure 2 (for component signals)

1. Input signal

Input the PAL 75% color bar signal.

2. Initial setting

Turn only the Bch SCREENS switch ON so that only blue signals are monitored. Besides, as it is difficult to distinguish difference of luminances in brighter images, darken environment if possible and lower BRIGHTNESS (MANUAL state) so that blue parts are slightly visible. So, more accurate adjustment can be made.

3. Adjustment of CHROMA

Adjust CHROMA so that luminances from part B to D in Fig. 4-4-4 are the same.

d. Adjustment procedure 3 (for component signals)

1. Input signal

Input the 100% color bar signal to the YPbPr input connectors.

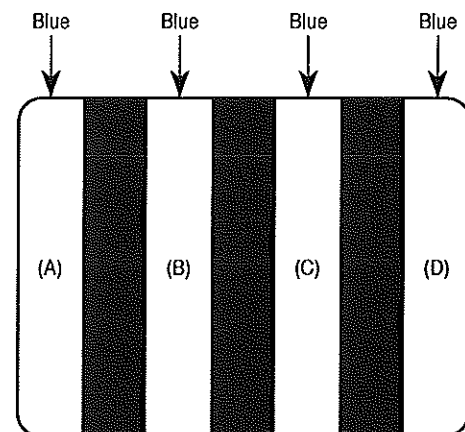


Fig. 4-4-4 100% color bar

2. Initial setting

Turn only the Bch SCREENS switch ON so that only blue signals are monitored. Besides, as it is difficult to distinguish difference of luminances in brighter images, darken environment if possible and lower BRIGHTNESS (MANUAL state) so that blue parts are slightly visible. So, more accurate adjustment can be made.

3. Adjustment of CHROMA

Adjust CHROMA so that luminances from part A to D in Fig. 4-4-4 are the same.

When inputting the 75% color bar signal (part A is 100% level white and parts B to D are 75% level), adjust CHROMA so that luminances from part B to D are the same.

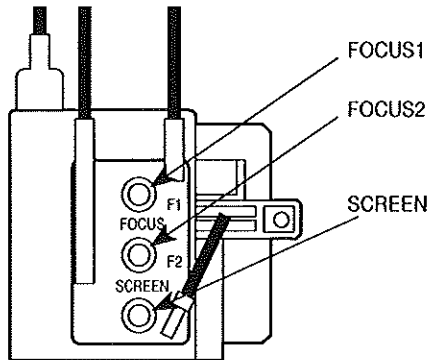
(5) Adjusting Focus**a. About focus**

Fig. 4-4-5 Flyback transformer

Focus adjustment for TM14-80R/TM20-80R is made by only FOCUS2 (static focus) in the above figure. But, focus adjustment for TM20-90R is made by FOCUS1 (dynamic focus) and FOCUS2 (static focus).

b. Precaution

Do not make adjustment except for service persons because the flyback transformer generates high voltage of 25kV and supplies it to the CRT. When adjusting, pay attention not to touch something other than adjusters.

c. Adjustment procedure**1. Initial setting**

Turn the power OFF, and then remove only the top cover of this monitor. Next, turn the power ON, and then keep the monitor powered for about 20 minutes.

2. Input signal

Input signals that display detail characters all over the screen or select the built-in character with the TEST switch.

3. Adjustment of focus

For TM14-80R/TM20-80R, adjust FOCUS2 in the figure so that focus is optimum. It is unnecessary to use FOCUS1 as it does not effect any change.

For TM20-90R, adjust FOCUS2 so that focus at the center is optimum and FOCUS1 so that focus at the outskirts is optimum. As FOCUS1 and FOCUS2 interferes each other, adjust them alternately so that focus on the entire screen is optimum.

(6) Adjusting Rotation**a. About rotation**

Deviation of the purity of the CRT can be caused by an effect of the terrestrial magnetism when this monitor is rotated. ROTATION is used for correcting deviation of the purity of the CRT.

Make this adjustment when putting this monitor to another place.

b. Adjustment procedure**1. Initial setting**

Press the DEGAUSS switch to demagnetize the CRT.

2. Input signal

Select the built-in 50% full white with the TEST switch.

3. Adjustment of ROTATION

Turn only the Rch SCREENS switch ON so that only red signals are monitored. Then, adjust ROTATION so that the purity is optimum.

Similarly, check on the purity of Gch and Bch.

(7) Adjusting Image Position**a. About image position**

To set images to the center of the screen, adjust 3 adjusters as described below. This monitor is designed to be able to store data for each input signal format.

- H.PHASE

This is used for adjusting the phase at which horizontal deflection of the CRT begins. Align the phase of images with that of the 100% marker.

- H.CENT

This is used for adjusting the position of horizontal deflection in the escutcheon (CRT front) frame. Set the marker to the center.

- V.CENT

This is used for adjusting the position of vertical deflection in the escutcheon (CRT front) frame. Set the marker to the center.

b. Precaution

As H.PHASE, H.CENT and V.CENT data are stored for each input signal format, while adjusting them, do not do the followings.

- Switching channel
- Changing input signal format
- Switching scanning size
- Switching aspect ratio

The above mentioned actions call out data for different format and clear new data being set until now. Therefore, while adjusting H.PHASE, H.CENT and V.CENT, do not do the above things until storing.

c. Adjustment procedure

The following is an adjustment procedure for one of signal formats. And, procedures for the other signal formats are also the same.

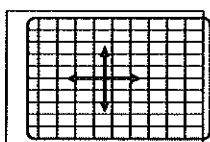
1. Input signal

Check that the format setting in the MENU1 is set to the desired format. Refer to section 4-5(3) for the format setting.

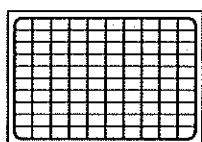
Input the monoscope signal or the like whose image can be displayed all over effective screen area.

2. Adjustment of H.CENT and V.CENT

- Set to NORMAL SCAN with the SCAN switch and display the 10-partition cross hatch with the MARKER switch.
- Adjust H.CENT (horizontal) and V.CENT (vertical) so that the marker comes to the screen center position.
- Store data temporarily with the CHANGE PRESET switch before setting to UNDER SCAN with the SCAN switch at the next step 3, as switching scanning size clears the data.



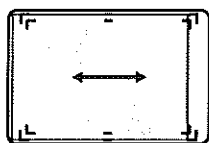
<NG>



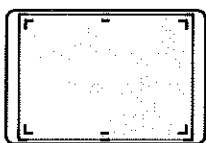
<OK>

3. Adjustment of H.PHASE

- Set to UNDER SCAN with the SCAN switch and display the 100% marker with the MARKER switch.
- Turn the H.PHASE switch ON and then adjust H.PHASE so that image outline is aligned with the 100% marker frame as shown below.



<NG>



<OK>

- 4. When inputting another format signal and adjusting at steps 2 and 3, after completing changing other types of data, store the data temporarily before switching to another format signal.**

(8) Adjusting Image Distortion

a. About image distortion

SIDE PIN and TRAPEZOID are provided for adjusting image distortion. The adjustment can be made with adjustment mode selected by the EXPAND switch.

These 2 preset data can be stored for each signal format like the preset data described in section (7).

b. Precaution

As SIDE PIN and TRAPEZOID data are stored for each input signal format like the preset data described in section (7), while adjusting them, do not do the followings.

- Switching channel
- Changing input signal format
- Switching scanning size
- Switching aspect ratio

The above mentioned actions call out data for different format and clear new data being set until now. Therefore, while adjusting SIDE PIN and TRAPEZOID, do not do the above things until storing.

c. Adjustment procedure

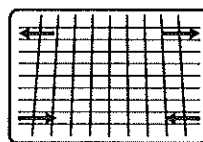
1. Input signal

Check that the format setting in the MENU1 is set to the desired format. Refer to section 4-5(3) for the format setting.

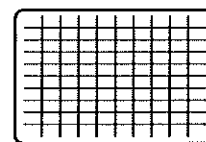
Select the built-in cross hatch with the TEST switch.

2. Adjustment of TRAPEZOID

Set to TRAPEZOID adjustment mode with the EXPAND switch, and then adjust TRAPEZOID as shown below.



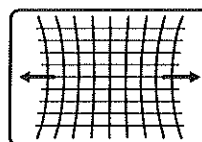
<NG>



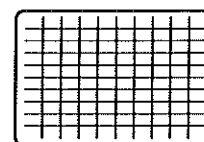
<OK>

3. Adjustment of SIDE PIN

Set to SIDE PIN adjustment mode with the EXPAND switch, and then adjust SIDE PIN as shown below.



<NG>



<OK>

- 4. When inputting another format signal and adjusting at steps 2 and 3, after completing changing other types of data, store the data temporarily before switching to another format signal.**

(9) Adjusting Image Size

a. About image size

Image size adjustment is made by HEIGHT and WIDTH. HEIGHT and WIDTH have 4 types of data as below for each signal format.

- SCAN switch
NORMAL SCAN, UNDER SCAN
- ASPECT switch
4:3 SCAN, 16:9 SCAN

b. Precaution

As HEIGHT and WIDTH data are stored for each input signal format, while adjusting them, do not do the followings.

- Switching channel
- Changing input signal format
- Switching scanning size
- Switching aspect ratio

The above mentioned actions call out data for different format and clear new data being set until now. Therefore, while adjusting HEIGHT and WIDTH, do not do the above things until storing.

The following is an adjustment procedure for one of signal formats. And, procedures for the other signal formats are also the same. In addition, before this adjustment, make adjustment in sections (7) and (8).

c. Adjustment procedure 1 (for UNDER SCAN)

For UNDER SCAN, adjust HEIGHT and WIDTH as below.

1. Input signal

Check that the format setting in the MENU1 is set to the desired format. Refer to section 4-5(3) for the format setting.

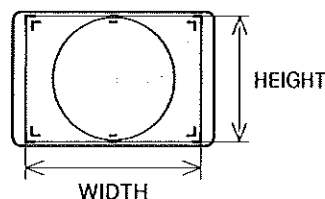
Input signals whose image can be displayed all over effective screen area and whose image contains a circle.

2. Adjustment of HEIGHT and WIDTH

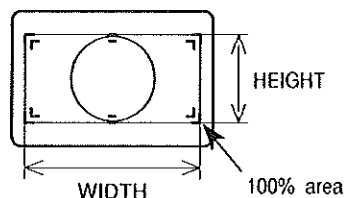
- Set to the desired aspect ratio with the ASPECT switch and set to UNDER SCAN with the SCAN switch.
- Display the 100% marker with the MARKER switch.
- Adjust WIDTH and HEIGHT so that the size of the 100% marker is as below.
- When adjusting other scanning size, before doing it, store the data temporarily with the CHANGE PRESET switch.

Size for UNDER SCAN

Model	ASPECT	HEIGHT	WIDTH
TM14-80R	4 : 3	202 mm	270 mm
	16 : 9	152 mm	270 mm
TM20-80/90R	4 : 3	285 mm	380 mm
	16 : 9	214 mm	380 mm



< Size for 4 : 3 (UNDER) >



< Size for 16 : 9 (UNDER) >

d. Adjustment procedure 2 (for NORMAL SCAN)

For NORMAL SCAN, adjust HEIGHT and WIDTH as below.

1. Input signal

Same as item c.

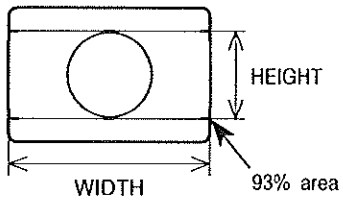
2. Adjustment of HEIGHT and WIDTH

- Set to the desired aspect ratio with the ASPECT switch and set to NORMAL SCAN with the SCAN switch.
- Select the 100%+93% marker with the MARKER switch.
- Adjust WIDTH so that the 93% marker size is as shown in the table below.
- Adjust HEIGHT so that the height of the circle is equal to the width of the circle. When using signals without a circle component, adjust HEIGHT so that the 93% marker size is as shown in the table below.
- When adjusting other scanning size, before doing it, store the data temporarily with the CHANGE PRESET switch.

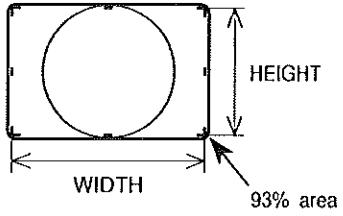
Size for NORMAL SCAN

Model	ASPECT	HEIGHT	WIDTH
TM14-80R	4 : 3	202 mm	270 mm
	16 : 9	152 mm	270 mm
TM20-80/90R	4 : 3	285 mm	380 mm
	16 : 9	214 mm	380 mm

This table shows 93% marker size.



< Size for 16 : 9 (NORMAL) >



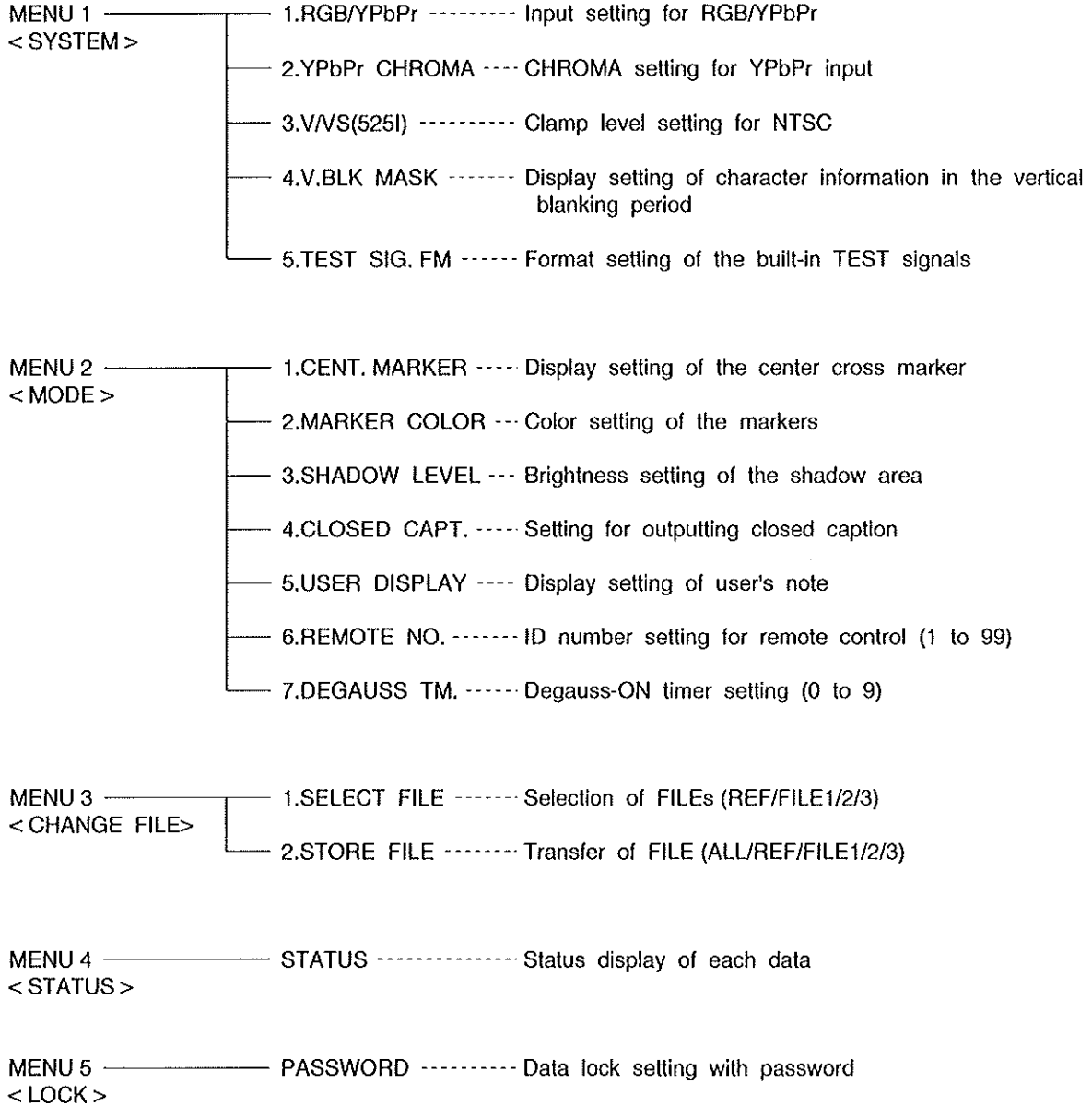
< Size for 4 : 3 (NORMAL) >

4.5 MENU Operation

(1) Contents of MENU

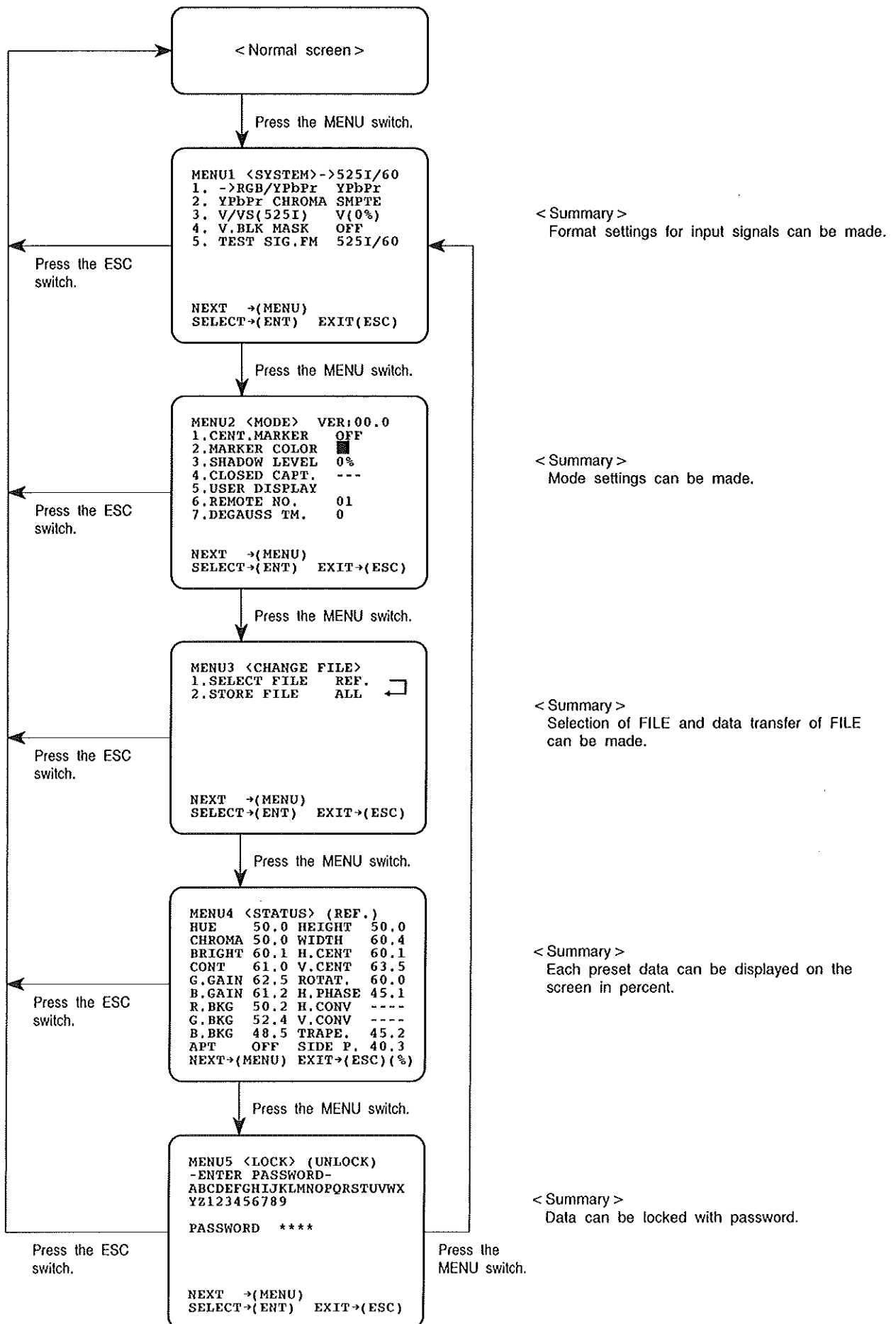
The following setting can be made in the MENU.

[Table of MENU]



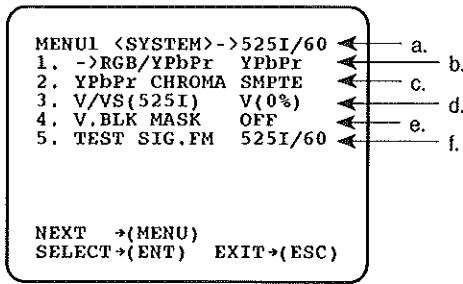
(2) Operation Flow of MENU

Pressing the MENU switch changes the MENU as follows.



(3) Explanation of MENU1

“/60” which means the vertical deflection frequency in the MENU implies “60Hz” and “59.94Hz”.



- a. Format display of selected signals
- b. Input setting for RGB/YPbPr
- c. CHROMA setting for YPbPr input
- d. Clamp level setting for NTSC
- e. Display setting of character information
- f. Format setting of the built-in TEST signals

a. Format display of selected signals

Selected signal format is displayed.

b. Input setting for RGB/YPbPr

Select “RGB” or “YPbPr” according to RGB/YPbPr input signals.

c. CHROMA setting for YPbPr input

Set the chroma level for YPbPr analog component signals by selecting “SMPTE” (MII/N10), “BETA” or “USER”. For “SMPTE” and “BETA”, the CHROMA PRESET data is set to become 50%. For “USER”, the chroma level can be set arbitrarily.

d. Clamp level setting for NTSC

Set the clamp level (black level) according to setup level of input signals.

Set clamp levels for each input channel according to setup level (0%/7.5%). So, that makes black levels for all channels even.

e. Display setting of character information

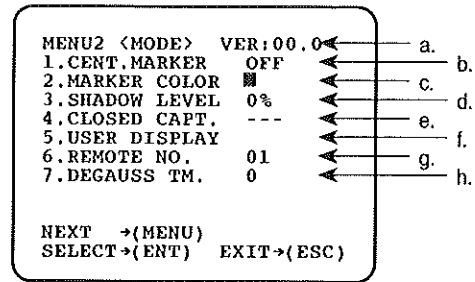
Set whether or not character information (VITS) mixed into vertical blanking period is displayed, for each channel.

When SDI signals or the built-in TEST signals are selected, this setting is “OFF”.

f. Format setting of the built-in TEST signals

Set the format (525i/60 or 625i/50) for the built-in TEST signals.

(4) Explanation of MENU2



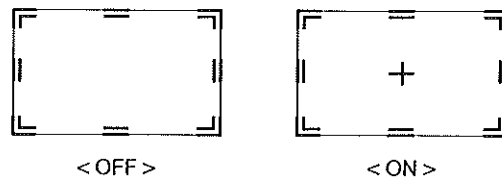
- a. Program version display
- b. Display setting of the center cross marker
- c. Color setting of the markers
- d. Brightness setting of the shadow area
- e. Setting for outputting closed caption
- f. Display setting of user's note
- g. ID number setting for remote control (1 to 99)
- h. Degauss-ON timer setting (0 to 9)

a. Program version display

The program version is displayed.

b. Display setting of the center cross marker

Set whether or not the marker's center cross is displayed. Setting to “ON” displays the center cross for all markers as shown in the figure below. This setting is set to “OFF” at shipment.



c. Color setting of the markers

Set the color of the markers. Select one among “white”, “red”, “green”, “blue”, “yellow”, “magenta” and “cyan”. This setting is set to “green” at shipment.

d. Brightness setting of the shadow area

Set the brightness of the shadow area.

e. Setting for outputting closed caption (for NTSC)

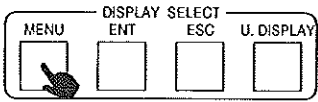
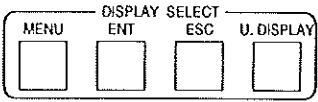
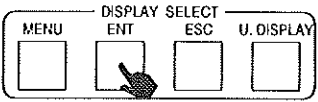
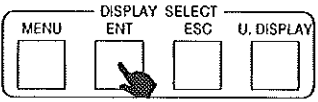

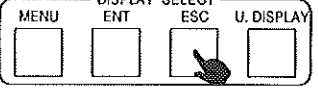
Set to “ON” to output character information (VITS) mixed into vertical blanking period.

But, it is necessary to install the optional capture card (under development) on the NTSC 3-line decoder module.

f. Display setting of user's note

Arbitrarily registered characters for each channel can be displayed. Up to 8 characters and its color can be set. The setting procedure is as follows.

Turn “ON” the U.DISPLAY switch on the drawer panel to display that.

1	 <p>Press the MENU switch.</p>	<pre> MENU (MODE) VER:00.0 1.CRT MODE OFF 2.HAZE COLOR # 3.SHADOW LEVEL ON 4.CLOSED CAPT. --- 5.USER DISPLAY 6.BKGT. RL 01 7.DEGAUSS TM. 0 </pre> <p>NEXT ←(MENU) SELECT ←(ENT) EXIT ←(ESC)</p>
2	 <p>Select "5. USER DISPLAY" by rotating the rotary encoder.</p>	
3	 <p>Press the ENT switch.</p>	
4	 <p>Select the desired character by rotating the rotary encoder and press the ENT switch to decide it. Decide 8 characters in the same way. With less than 8 characters, insert some spaces (blanks) to make totally 8 characters.</p>	
5	 <p>Press the ENT switch to decide the last 8th character and then press the ENT switch again to make characters blink. Next, select the desired color by rotating the rotary encoder and then press the ENT switch to decide it.</p>	
6	 <p>When any error appears on the screen during the setting, press the ESC switch to cancel the setting and then make setting again.</p>	

h. Degauss-ON timer setting (0 to 9)

Set the degauss timer, which starts the degauss (demagnetization) function after this monitor is powered. By setting monitors into groups 0 to 9, the rush current which flows when the power of each device of a system is turned on together can be minimized.

About timer starting time

When this setting is set to "0", the degauss function starts about 4 seconds after this monitor is powered. More 1 setting value means more 0.5 seconds later.

The table below shows degauss starting time.

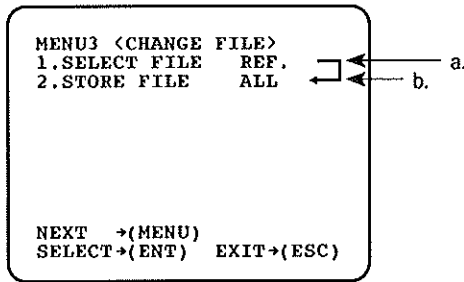
Setting	Starting time	Setting	Starting time
0	4.0 sec	5	6.5 sec
1	4.5 sec	6	7.0 sec
2	5.0 sec	7	7.5 sec
3	5.5 sec	8	8.0 sec
4	6.0 sec	9	8.5 sec

g. ID number setting for remote control (1 to 99)

Set monitor's identity number among 1 to 99 for remote control.

When performing remote control operation using the wireless remote controller (RCT-20A) or the serial remote controller (SRC-301A), you can remote-control monitors individually by assigning numbers (1 to 99) to the monitors.

(5) Explanation of MENU3



- a. Selection of FILE which transfers data
- b. Selection of FILE which receives data

a. Selection of FILE which transfers data

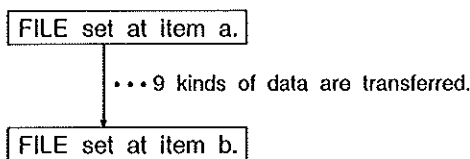
Select one among "REFERENCE", "FILE1", "FILE2" and "FILE3" whose data are to be transferred. These 4 files have the following 9 kinds of PRESET data.

- HUE
- CHROMA
- BRIGHTNESS
- CONTRAST
- G.GAIN
- B.GAIN
- R.BACKGROUND
- G.BACKGROUND
- B.BACKGROUND

In addition, this menu also functions in parallel with FILE1 to FILE3 switches on the drawer panel

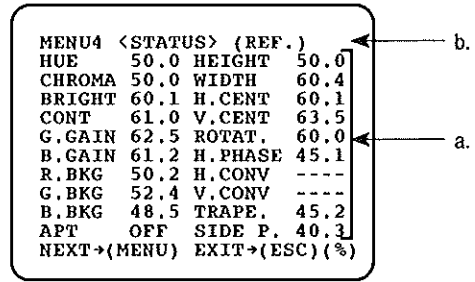
b. Selection of FILE which receives data

Select one among "ALL", "FILE1", "FILE2" and "FILE3" into which 9 kinds of data of FILE selected at item a. are to be transferred. For "ALL", these data are to be transferred into all of "REFERENCE", "FILE1", "FILE2" and "FILE3".



Transfer begins immediately after the ENT switch is pressed. As files are overwritten, pay attention to mistakenly not erasing precious data.

(6) Explanation of MENU4



- a. Status display of each data
- b. Selected FILE

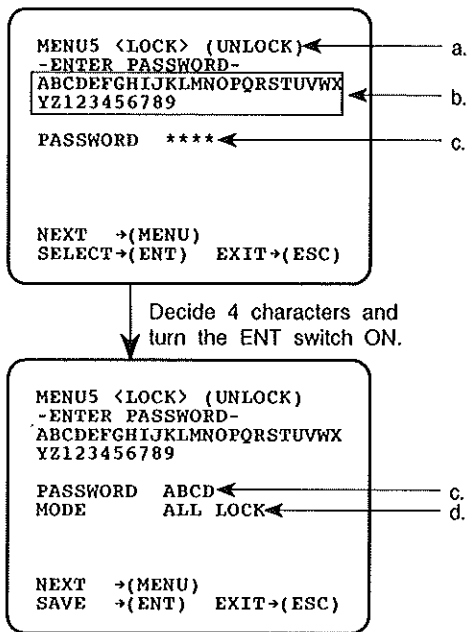
a. Status display of each data

PRESET data are displayed in percent (0 to 100% at the interval of 0.1%).

b. Selected FILE

Currently selected FILE is displayed here.

(7) Explanation of MENU5



- a. Display of set lock mode
- b. Selectable characters
- c. Password entry
- d. Selection of lock mode

a. Display of set lock mode

Currently set lock mode is displayed.

< Lock mode >

- UNLOCK
All PRESET data can be changed as LOCK is released.
- ALL LOCK
All PRESET data cannot be changed and FILEs cannot be switched.
- PRESET&FILE LOCK
All PRESET data cannot be changed, but FILEs can be switched.

b. Selectable characters

When setting the password at item c., select characters among these with the rotary encoder.

c. Password entry

When changing the lock mode, enter the 4-digit password here by selecting characters at item b..


Note

If you should forget your registered password, contact sales representative to ask the secret password.

d. Selection of lock mode

After finishing entering your password and then pressing the ENT switch, select the lock mode with the rotary encoder with lock mode blinking. When the ENT switch is pressed, selected mode will be set. When the ESC switch is pressed, previous mode will be set.

4.6 Message Display

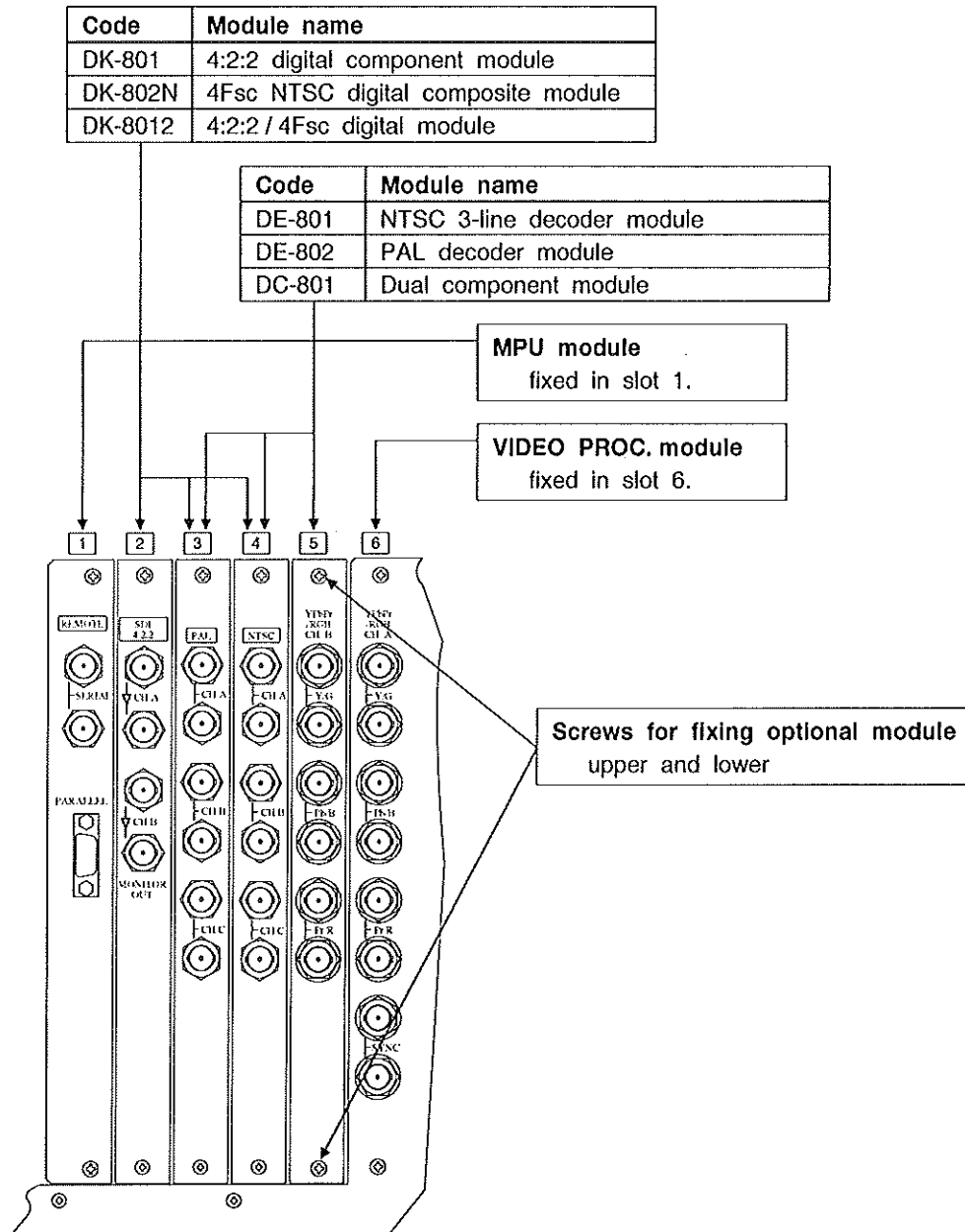
Message	Explanation
ALL LOCK	This appears if the CHANGE PRESET, STORE FILE, FILE1, FILE2 or FILE3 switch is pressed when the lock mode is set to "ALL LOCK" (see section 4.5(7)). Set the lock mode to "UNLOCK" before pressing.
PRESET&FILE LOCK	This appears if the CHANGE PRESET or STORE FILE switch is pressed when the lock mode is set to "PRESET&FILE LOCK" (see section 4.5(7)).
CHANGE PRESET -> ON	This appears if any PRESET switch is pressed when the CHANGE PRESET switch is "OFF". Turn the CHANGE PRESET switch "ON" before pressing.
CHANGE PRESET -> OFF	This appears if the STORE FILE, FILE1, FILE2 or FILE3 switch is pressed when the CHANGE PRESET switch is "ON". Turn the CHANGE PRESET switch "OFF" before pressing.
DELAY -> OFF	This appears if the BRIGHT PRESET switch is pressed when the DELAY switch is working (DELAY state). Return to normal state (DELAY off state) "OFF" before pressing.
APT -> ON	This appears if the APT PRESET switch is pressed when the APT switch is "OFF". Turn the APT switch "ON" before pressing.
STORE FILE -> OFF	This appears if the CHANGE PRESET switch is pressed when the FILE1, FILE2 and FILE3 switches blink. Press the STORE FILE switch to turn the FILE1, FILE2 and FILE3 switches OFF before pressing.
MANUAL -> PRESET	This appears if the PRESET switch is pressed when the manual control is "ON". Turn the manual control "OFF" before pressing.
MENU -> OFF	This appears if the CHANGE PRESET switch is pressed when the MENU is displayed. Close the MENU before pressing because any PRESET data cannot be changed when the MENU is displayed.
NO OPERATION	This appears if a wrong operation is performed or the function is not available. Operate correctly.
ENTER CORRECT PASSWORD	This appears if password is mistakenly input when the lock mode in the MENU5 is set. Input correctly.
	This appears if the voltage of the lithium battery on the MPU BOARD which holds data begins falling down. Replace with new one immediately by referring to the service (instruction) manual.

5. INSTALLATION OF OPTIONS

5.1 Installation of Optional Modules

< Note >

1. Do not insert optional modules into the unspecified slot.
2. Insert optional modules into slots 2 to 5.
3. The specified modules must be inserted into slots 1 and 6.
4. To install an optional module, remove the blank panel, then insert the module and fix the module by tightening the upper and lower screws. If the screws are loose, the module may get out of place or the connectors may get disconnected.

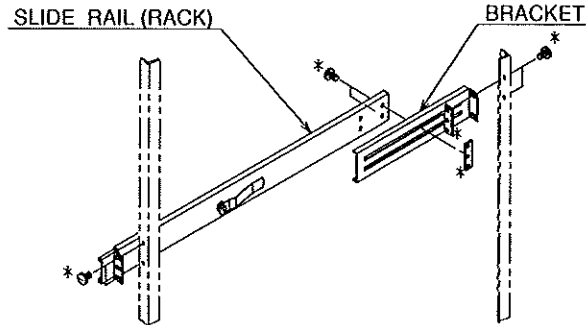


5.2 Installation of Optional Rack Mount

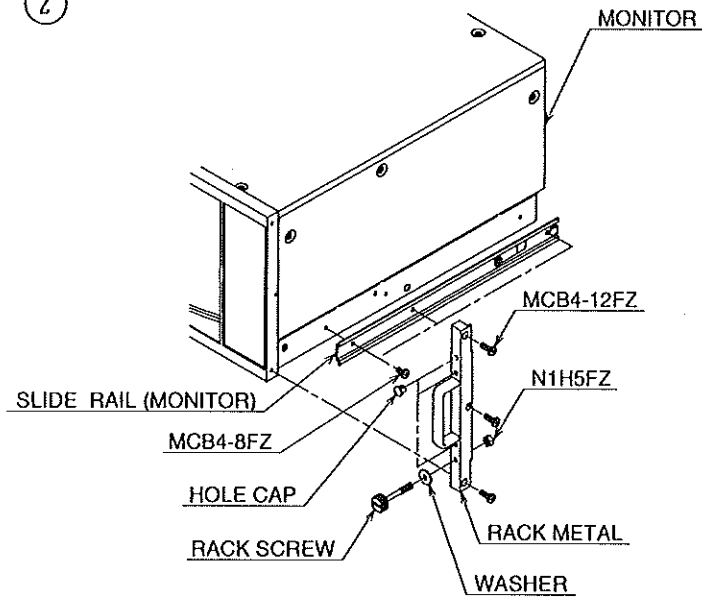
(1) RS-1420S

This is a rack mount adaptor for TM14-80R.

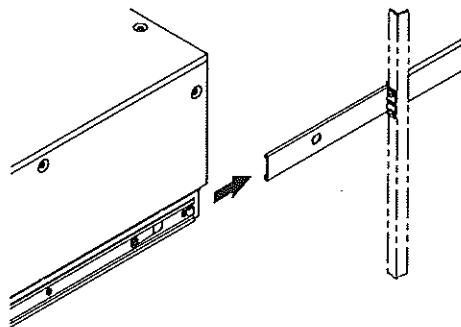
①



②

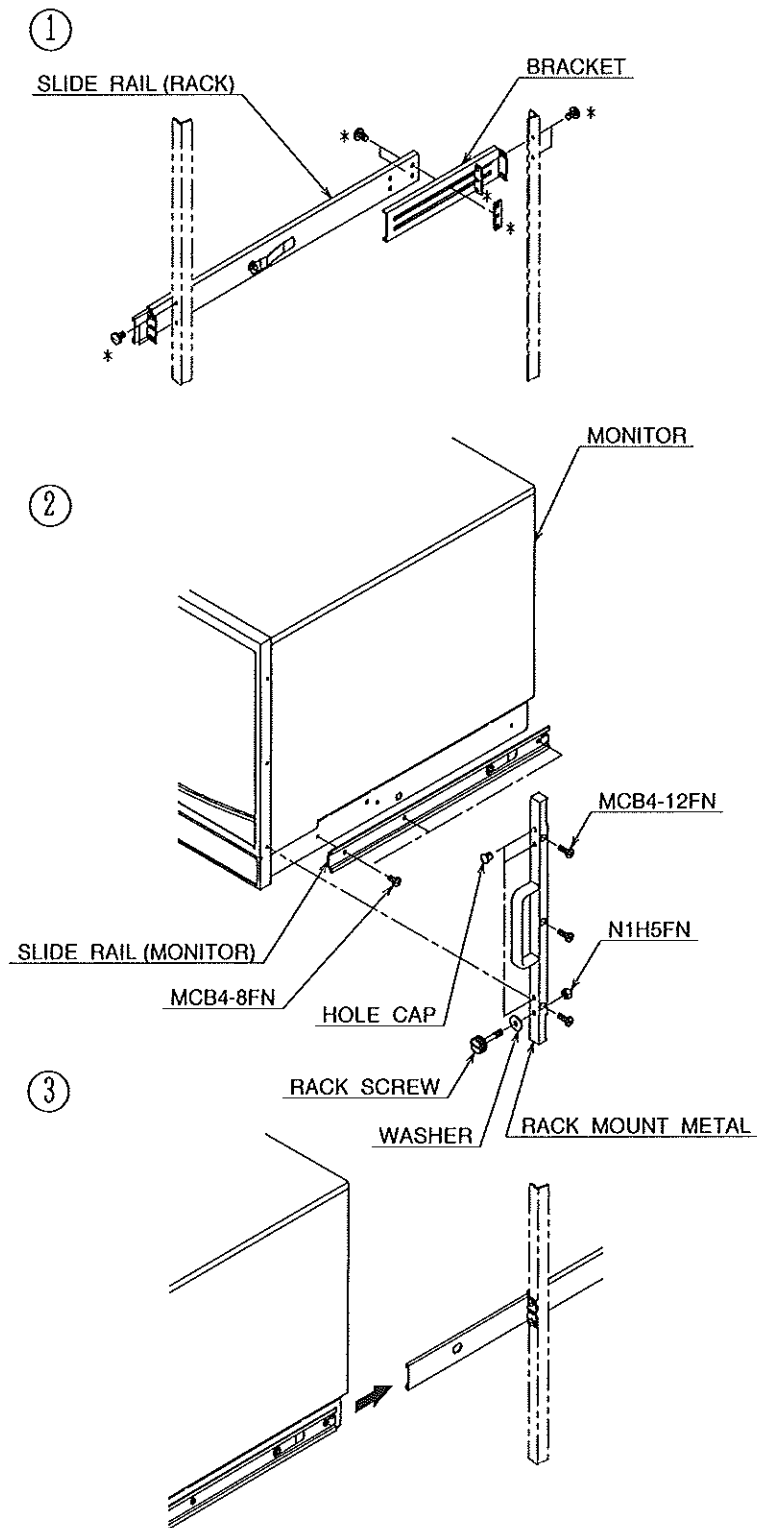


③



(2) RS-2020S

This is a rack mount adaptor for TM20-80R/TM20-90R.



6. MEMO

The following table is provided to be written PRESET data in.

It might help you restore data if you might have changed data mistakenly.

DATA	REF.	FILE1	FILE2	FILE3
HUE				
CHROMA				
BRIGHT				
CONT				
G. GAIN				
B. GAIN				
R. BKG				
G. BKG				
B. BKG				
APT				
ROTATION				

DATA		525i	625i	()	()
WIDTH	4:3 UNDER				
	4:3 NORMAL				
	16:9 UNDER				
	16:9 NORMAL				
HEIGHT	4:3 UNDER				
	4:3 NORMAL				
	16:9 UNDER				
	16:9 NORMAL				
H. PHASE					
H. CENT					
V. CENT					
TRAPEZOID					
SIDE PIN					

MAINTENANCE and ADJUSTMENT

When the specified performance can no longer be obtained with the adjusters on the front panel or when parts have been replaced due to a malfunction, perform adjustment of the

following parts.

When adjusting a board inserted into the slot section, use the EXTENDER BOARD (option).

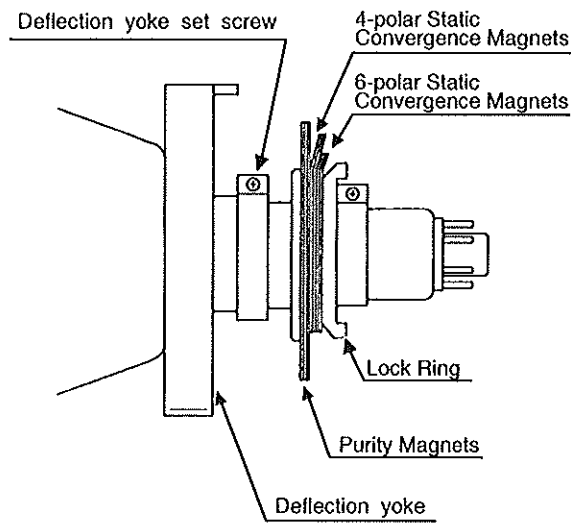
7. MAIN CHASSIS

(1) PURITY adjustment

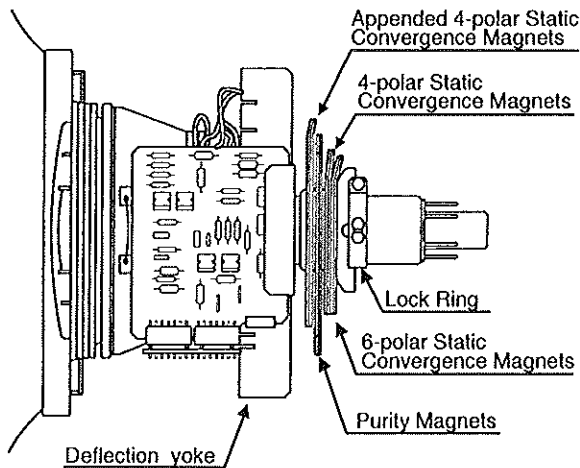
The purity is adjusted to optimum at shipment.

Normally, no adjustments are required.

However perform adjustments if necessary.



TM14-80, TM20-80



TM20-90

1. Select the flat field using the TEST switch.
2. Demagnetize the shadow mask using the DEGAUSS switch.
3. Set the screen to the green-only raster using the SCREENS switch.
4. Adjust the two purity magnets alternately, so that there are green vertical lines at the center of the screen.
5. While watching the screen, slide the deflection yoke forward so that the screen is an even green color.

6. Repeat for red-only and blue-only.

7. Adjust the purity to optimum using ROTATION.

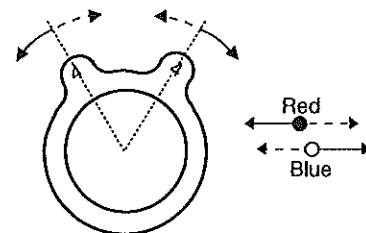
For details on adjustment procedure, refer to 4.4 (6) of this manual.

(2) CONVERGENCE adjustment

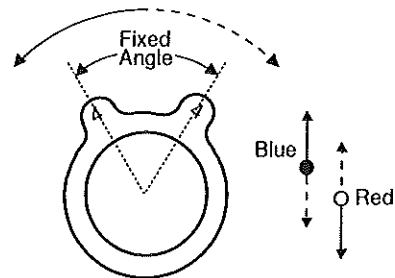
Before performing convergence adjustment, allow the monitor to warm up for at least 30 minutes. Select the cross hatch using the TEST switch.

1. Loosen the lock ring.
2. Set to the red and blue screens using the SCREENS switch.
3. Observe the crossed part at the center of the screen.

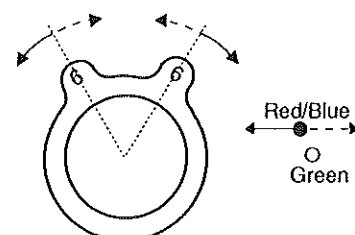
Adjust the angle of the two 4-polar magnets as shown in the figure below to adjust deviation of the red and blue vertical lines.



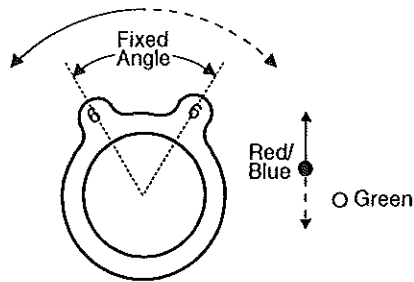
4. While keeping the angle at step 3, rotate the two magnets together and adjust the deviation of the horizontal lines.



5. Set all SCREEN switches to OFF to set the white screen.
6. Adjust the angle of the two 6-polar magnets to adjust the deviation of the red and blue vertical lines, and green vertical lines.



7. While keeping the angle at step 6, rotate the two magnets together and adjust the deviation of the horizontal lines.



8. Tighten the lock ring after completing of the center convergence.

(3) CRT replacement

The original replaceable CRT has a fixed deflection yoke. This is no need to readjust the purity and convergence.

(a) For TM14-80

1. Remove the four screws fixing the top cover, and remove the cover.
2. Remove the eight screws fixing the right cover and left cover, and remove these covers.
3. Remove the anode cap of the CRT.
4. Remove the CRT SOCKET BOARD from the CRT.
5. Remove the deflection yoke connector (CN901) on the DEF BOARD.
6. Pull out the front panel on the front right side, disconnect the connector and take it out.
7. Disconnect the connector between FRONT LEFT PANEL and DEF BOARD.
8. Remove the four screws fixing the escutcheon, and remove the CRT together with the escutcheon.
Make sure that the neck of the CRT does not touch the main unit at this time.
9. Place a soft cloth below the escutcheon to prevent it from scratches. Place the CRT on a stable surface with the escutcheon down.
10. Assemble in the reverse procedure of the above from step 9 backwards to step 1.

(b) For TM20-80/TM20-90

1. Remove the four screws fixing the top cover, and remove the cover.
2. Remove the eight screws fixing the right cover and left cover, and remove these covers.
3. Remove the anode cap of the CRT.
4. Remove the CRT SOCKET BOARD from the CRT.
5. Remove the deflection yoke connector (CN901) on the DEF BOARD.
6. Disconnect the connector at the top of the CRT.
(connected to the LED BOARD)
7. Disconnect the connector between FRONT PANEL and DEF BOARD, and remove the FRONT PANEL.
8. Remove the four screws fixing the escutcheon, and remove the CRT together with the escutcheon.

Make sure that the neck of the CRT does not touch the main unit at this time.

9. Place a soft cloth below the escutcheon to prevent it from scratches. Place the CRT on a stable surface with the escutcheon down.
10. Assemble in the reverse procedure of the above from step 9 backwards to step 1.

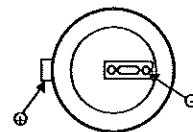
(c) Re-adjustment after replacing the CRT

1. Adjusting the center of the screen
Refer to 4.4 (7) of the this manual.
2. Adjusting the size of the screen
Refer to 4.4 (9) of the this manual.
3. Adjusting the focus
Refer to 4.4 (5) of the this manual.
4. Adjusting the white balance
Refer to 4.4 (3) of the this manual.
5. Adjusting the deflection linearity
Refer to 9.1 (3) of the this manual.
6. Adjusting the trapezoid distortion and side pin
Refer to 4.4 (8) of the this manual.
7. Adjusting the screen
Refer to 9.1 (3) of the this manual.

(4) BATTERY replacement

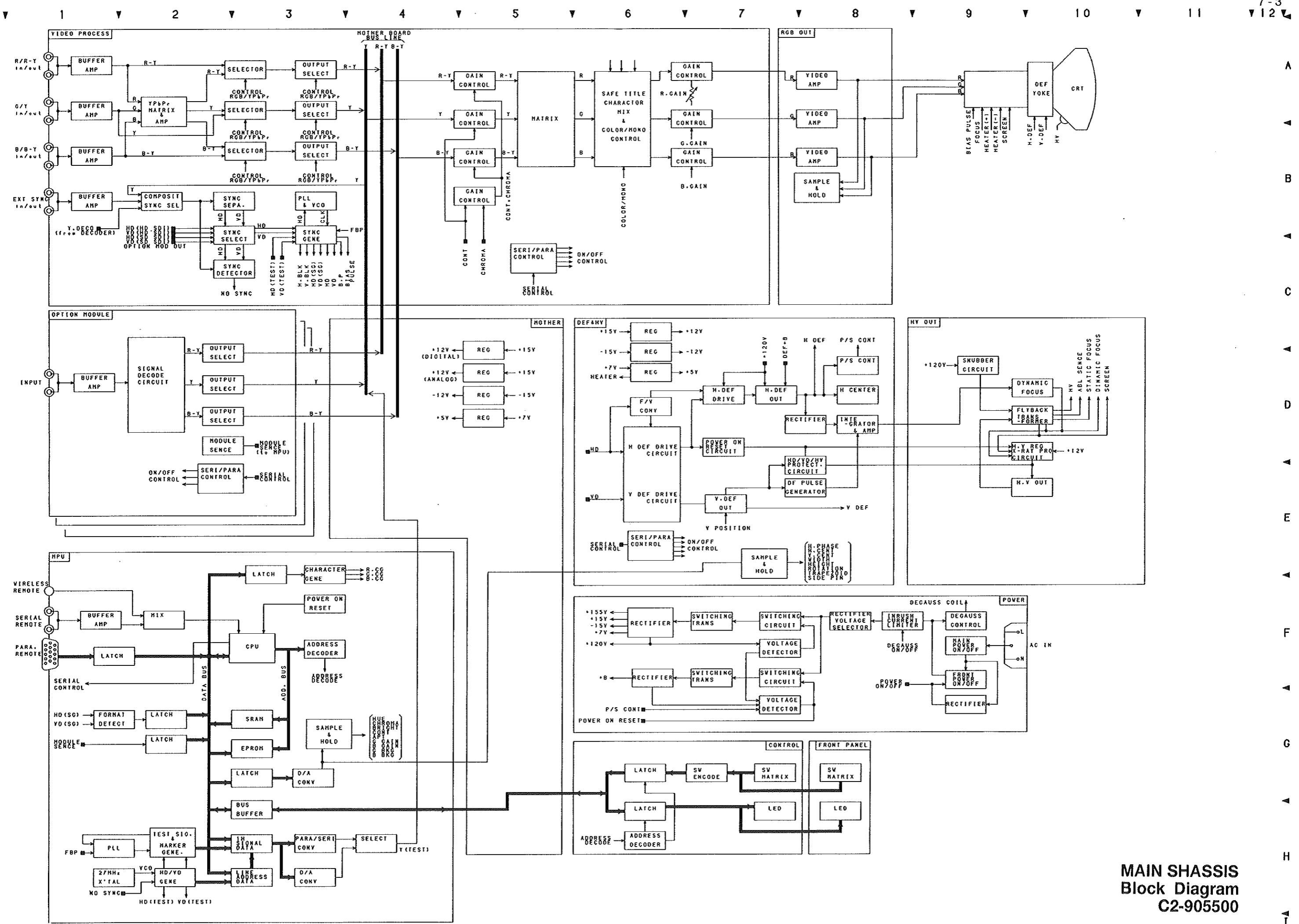
Before replacing the battery, note down the preset data. (Write them down at "Memo" on the section 6 of the this manual.)

1. Set the POWER switch to ON, wait for some time, and set it to OFF. (This charges the backup capacitor.)
2. Remove the MPU BOARD from the leftmost slot on the rear, and replace the battery.
This setting is held it exchange is able to complete within least four minutes after it turns OFF the POWER switch.
3. Insert the MPU BOARD back into its slot.
Set the POWER switch to ON, and check that the screen is normal.



⚠ CAUTION

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

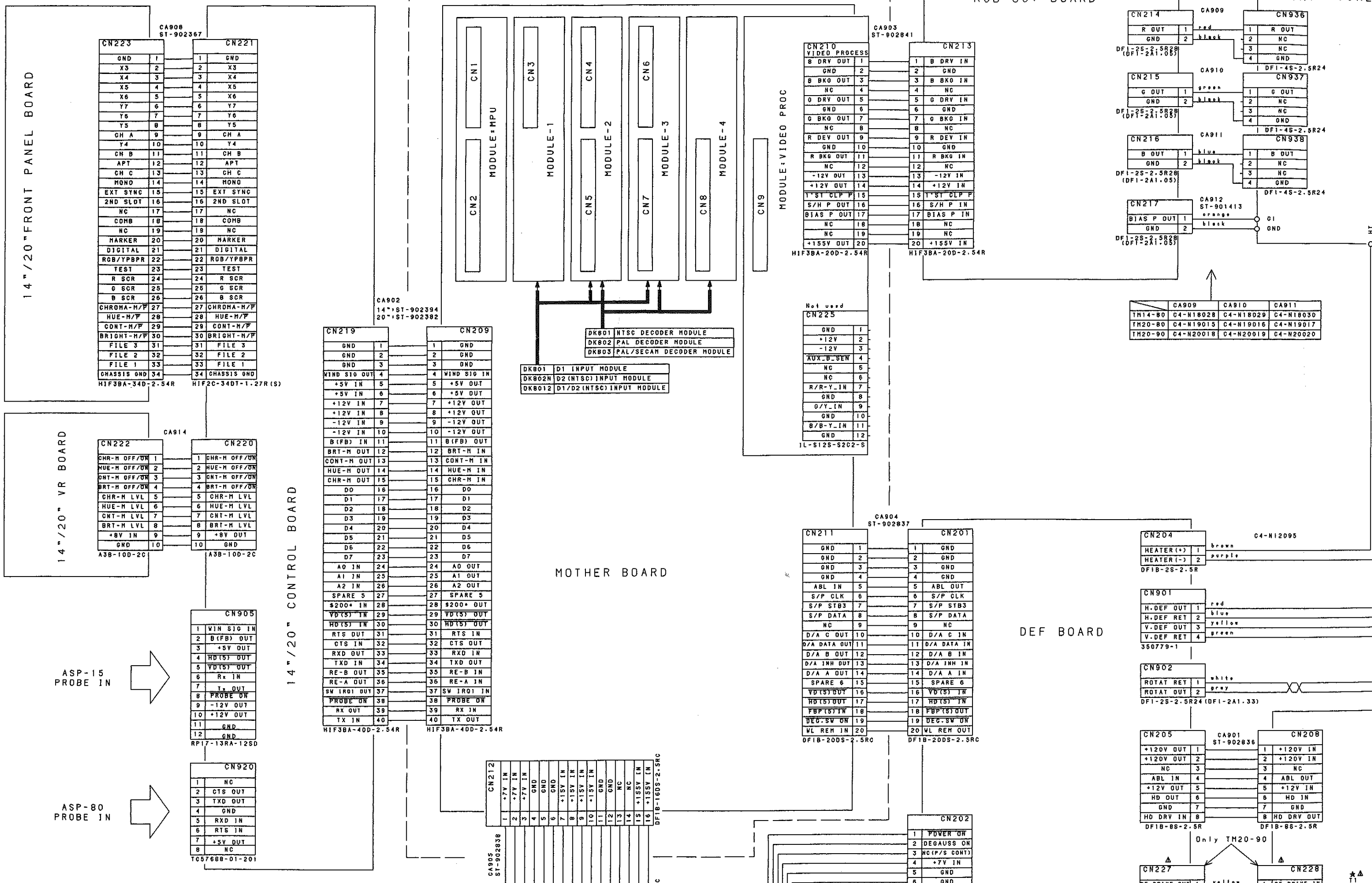


MAIN SHASSIS Block Diagram C2-905500

VIDEO UNIT

RGB OUT BOARD

CRT SOCKET



14" / 20" FRONT PANEL BOARD

CN223		CN221	
GND	1	1	GND
X3	2	2	X3
X4	3	3	X4
X5	4	4	X5
X6	5	5	X6
Y7	6	6	Y7
Y6	7	7	Y6
Y5	8	8	Y5
CH A	9	9	CH A
Y4	10	10	Y4
CH B	11	11	CH B
APT	12	12	APT
CH C	13	13	CH C
HONO	14	14	HONO
EXT SYNC	15	15	EXT SYNC
2ND SLOT	16	16	2ND SLOT
NC	17	17	NC
COMB	18	18	COMB
NC	19	19	NC
MARKER	20	20	MARKER
DIGITAL	21	21	DIGITAL
RGB/YBPR	22	22	RGB/YBPR
TEST	23	23	TEST
R SCR	24	24	R SCR
G SCR	25	25	G SCR
B SCR	26	26	B SCR
CHROMA-H/P	27	27	CHROMA-H/P
HUE-H/P	28	28	HUE-H/P
CONT-H/P	29	29	CONT-H/P
BRIGHT-H/P	30	30	BRIGHT-H/P
FILE 3	31	31	FILE 3
FILE 2	32	32	FILE 2
FILE 1	33	33	FILE 1
CHASSIS GND	34	34	CHASSIS GND

CN222		CN220	
CHR-H OFF/ON	1	1	CHR-H OFF/ON
HUE-M OFF/ON	2	2	HUE-M OFF/ON
ONT-M OFF/ON	3	3	ONT-M OFF/ON
BRT-M OFF/ON	4	4	BRT-M OFF/ON
CHR-M LVL	5	5	CHR-M LVL
HUE-M LVL	6	6	HUE-M LVL
ONT-M LVL	7	7	ONT-M LVL
BRT-M LVL	8	8	BRT-M LVL
+8V IN	9	9	+8V OUT
GND	10	10	GND

CN219		CN209	
GND	1	1	GND
GND	2	2	GND
GND	3	3	GND
WIND SIG OUT	4	4	WIND SIG IN
+5V IN	5	5	+5V OUT
+5V IN	6	6	+5V OUT
+12V IN	7	7	+12V OUT
+12V IN	8	8	+12V OUT
-12V IN	9	9	-12V OUT
-12V IN	10	10	-12V OUT
B(FB) IN	11	11	B(FB) OUT
BRT-M OUT	12	12	BRT-M IN
CONT-M OUT	13	13	CONT-M IN
HUE-M OUT	14	14	HUE-M IN
CHR-M OUT	15	15	CHR-M IN
D0	16	16	D0
D1	17	17	D1
D2	18	18	D2
D3	19	19	D3
D4	20	20	D4
D5	21	21	D5
D6	22	22	D6
D7	23	23	D7
A0 IN	24	24	A0 OUT
A1 IN	25	25	A1 OUT
A2 IN	26	26	A2 OUT
SPARE 5	27	27	SPARE 5
\$200* IN	28	28	\$200* OUT
VD(S) IN	29	29	VD(S) OUT
HD(S) IN	30	30	HD(S) OUT
RTS OUT	31	31	RTS IN
CTS IN	32	32	CTS OUT
RXD OUT	33	33	RXD IN
TXD IN	34	34	TXD OUT
RE-B OUT	35	35	RE-B IN
RE-A OUT	36	36	RE-A IN
SW I/O1 OUT	37	37	SW I/O1 IN
PROBE ON	38	38	PROBE ON
RX OUT	39	39	RX IN
TX IN	40	40	TX OUT

DK801	D1 INPUT MODULE
DK802	D2 (NTSC) INPUT MODULE
DK803	PAL/SECAM DECODER MODULE

CN225	
GND	1
+12V	2
-12V	3
AUX_B_SEN	4
NC	5
NC	6
R/R-Y_IN	7
GND	8
O/Y_IN	9
GND	10
B/B-Y_IN	11
GND	12

CN211		CN201	
GND	1	1	GND
GND	2	2	GND
GND	3	3	GND
GND	4	4	GND
ABL IN	5	5	ABL OUT
S/P CLK	6	6	S/P CLK
S/P STB3	7	7	S/P STB3
S/P DATA	8	8	S/P DATA
NC	9	9	NC
D/A C OUT	10	10	D/A C IN
D/A DATA OUT	11	11	D/A DATA IN
D/A B OUT	12	12	D/A B IN
D/A INH OUT	13	13	D/A INH IN
D/A A OUT	14	14	D/A A IN
SPARE 6	15	15	SPARE 6
VD(S) OUT	16	16	VD(S) IN
HD(S) OUT	17	17	HD(S) IN
FBP(S) IN	18	18	FBP(S) OUT
DEG. SW ON	19	19	DEG. SW ON
VL REM IN	20	20	VL REM OUT

CN214		CA909		CN936	
R OUT	1	red	1	R OUT	1
GND	2	black	2	NC	2
				NC	3
				GND	4

CN215		CA910		CN937	
G OUT	1	green	1	G OUT	1
GND	2	black	2	NC	2
				NC	3
				GND	4

CN216		CA911		CN938	
B OUT	1	blue	1	B OUT	1
GND	2	black	2	NC	2
				NC	3
				GND	4

CN217		CA912		G1	
BIAS P OUT	1	orange			
GND	2	black			

CA909	CA910	CA911
TM14-80	C4-N18028	C4-N18029
TM20-80	C4-N19015	C4-N19016
TM20-90	C4-N20018	C4-N20019

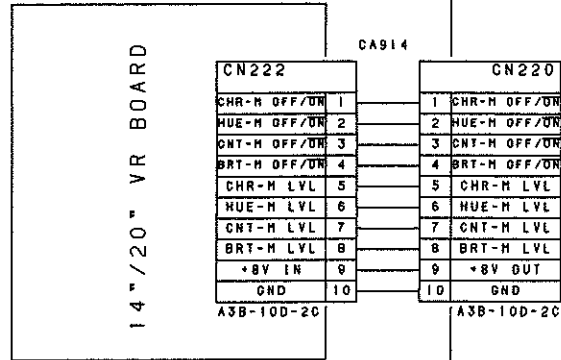
ASP-15 PROBE IN

ASP-80 PROBE IN

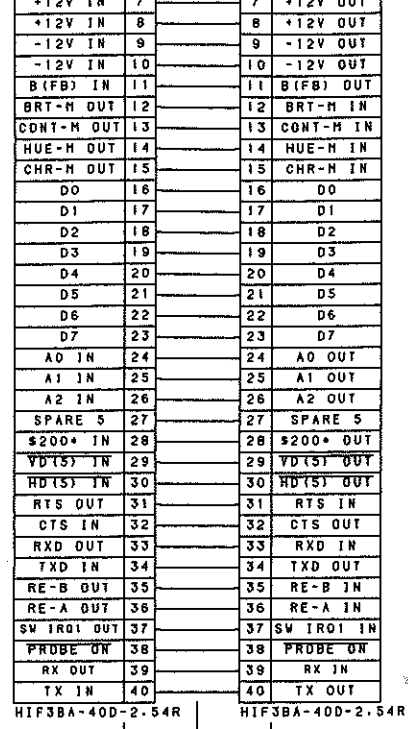
14" / 20" CONTROL BOARD

MOTHER BOARD

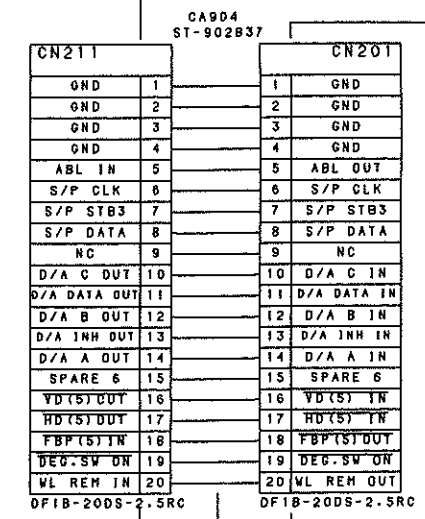
DEF BOARD



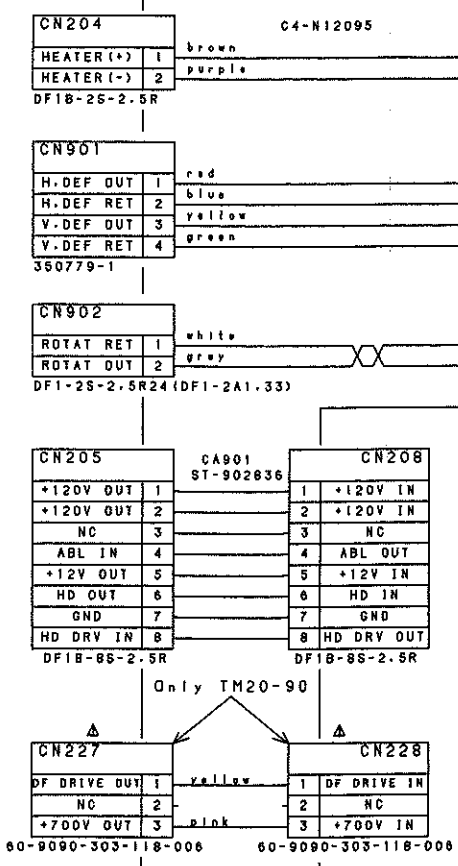
14" / 20" CONTROL BOARD



MOTHER BOARD

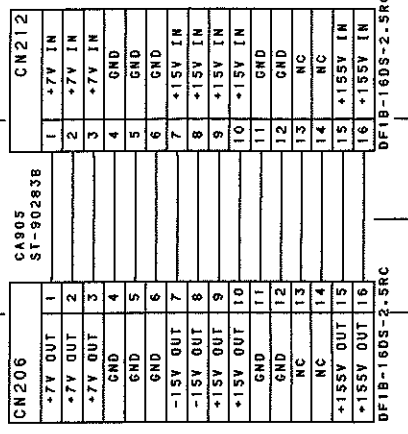
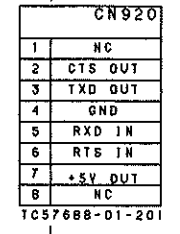
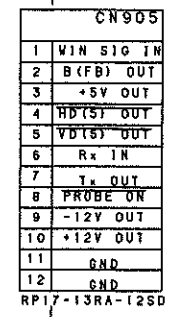


DEF BOARD

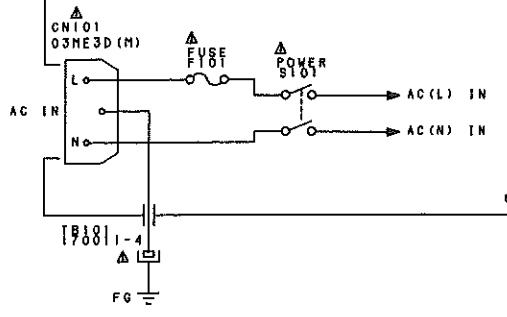
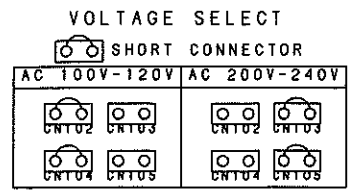
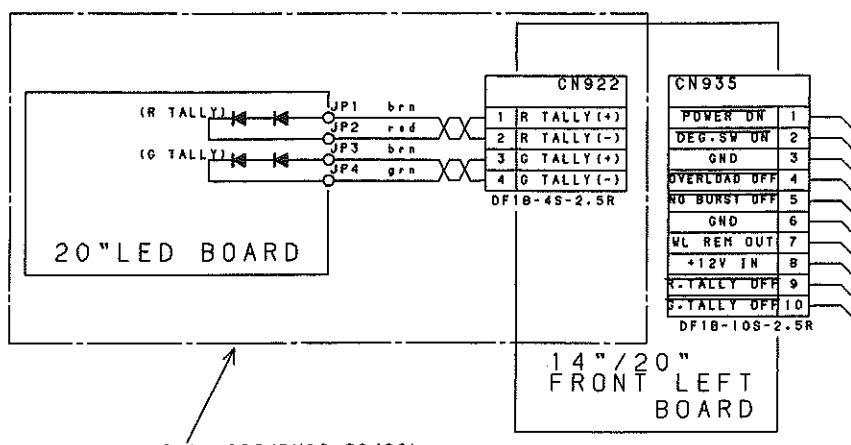
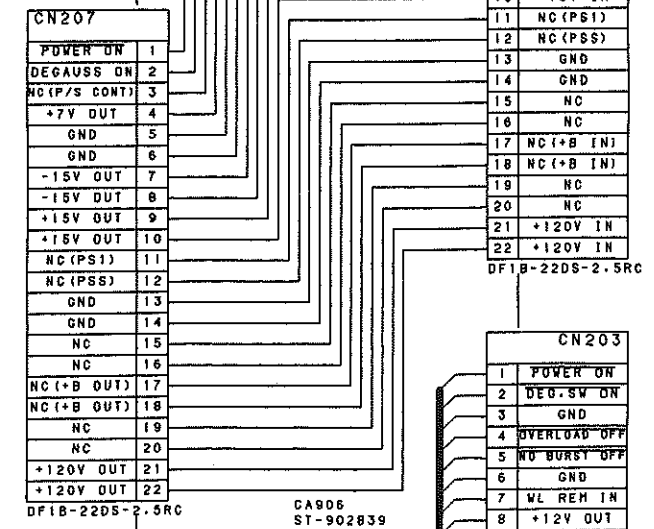


ASP-15 PROBE IN

ASP-80 PROBE IN

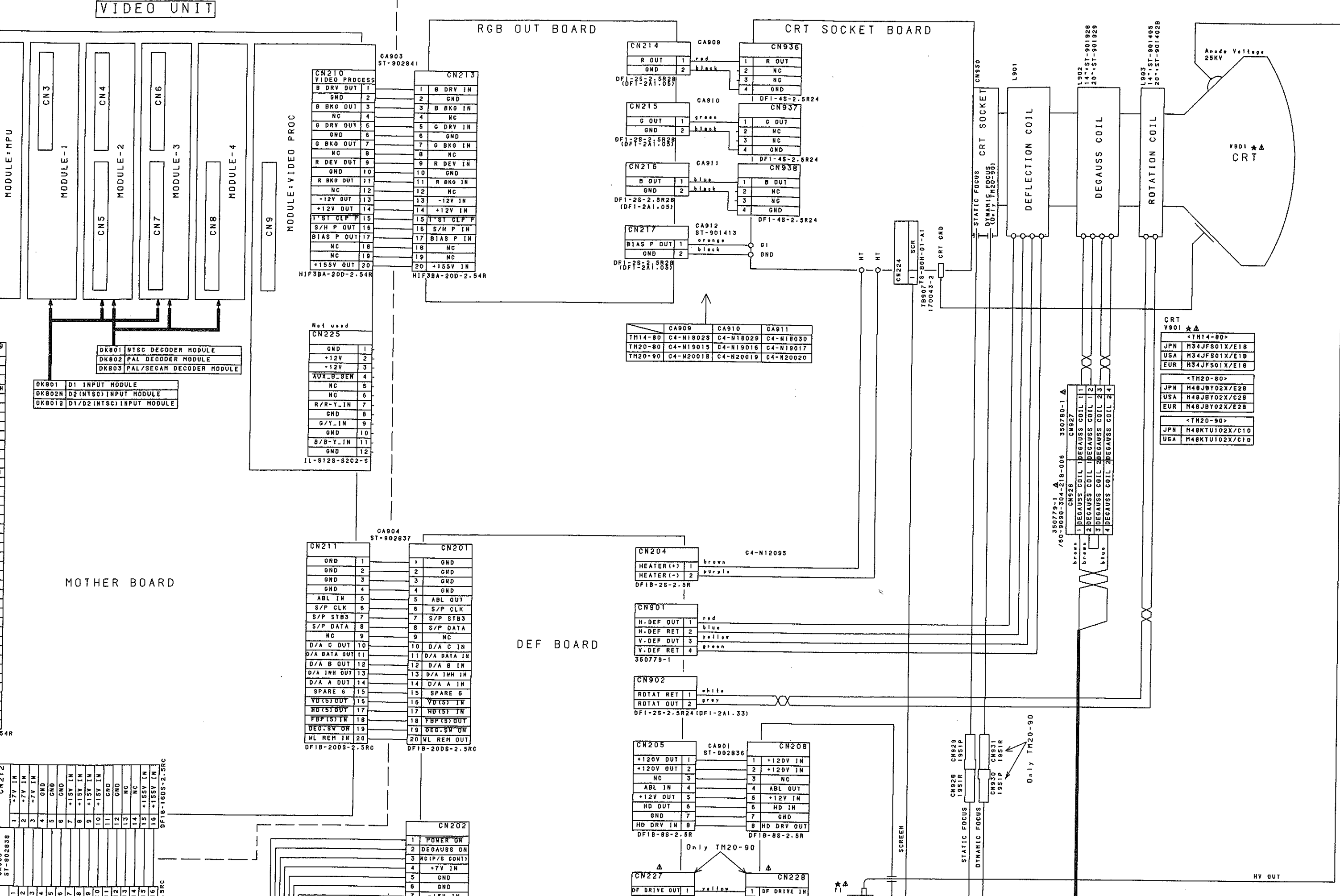


POWER BOARD



HV OUT BOARD

5 6 7 8 9 10 11 12 13 14 15 16



A
B
C
D
E
F
G
H

G/Y_IN	9
GND	10
B/B_Y_IN	11
GND	12
IL-ST25-S2C2-S	

JPN H48KTU102X/C10
USA H48KTU102X/C10

MOTHER BOARD

DEF BOARD

GND	4
GND	5
GND	6
+15V IN	7
+15V IN	8
+15V IN	9
+15V IN	10
GND	11
GND	12
NC	13
NC	14
+155V IN	15
+155V IN	16

CA904 ST-902837	
CN211	
GND	1
GND	2
GND	3
GND	4
ABL IN	5
S/P CLK	6
S/P STB3	7
S/P DATA	8
NC	9
D/A C OUT	10
D/A DATA OUT	11
D/A B OUT	12
D/A INH OUT	13
D/A A OUT	14
SPARE 6	15
VD(S) OUT	16
HD(S) OUT	17
FBP(S) IN	18
DEC-SW ON	19
WL REM IN	20
DFIB-200S-2.5RC	
CN201	
GND	1
GND	2
GND	3
GND	4
ABL OUT	5
S/P CLK	6
S/P STB3	7
S/P DATA	8
NC	9
D/A C IN	10
D/A DATA IN	11
D/A B IN	12
D/A INH IN	13
D/A A IN	14
SPARE 6	15
VD(S) IN	16
HD(S) IN	17
FBP(S) OUT	18
DEC-SW ON	19
WL REM OUT	20
DFIB-200S-2.5RC	

CA906 ST-902839	
CN207	
POWER ON	1
DEGAUSS ON	2
NC(P/S CONT)	3
+7V OUT	4
GND	5
GND	6
-15V OUT	7
-15V OUT	8
+15V OUT	9
+15V OUT	10
NC(P/S)	11
NC(P/S)	12
GND	13
GND	14
NC	15
NC(+B OUT)	17
NC(+B OUT)	18
NC	19
NC	20
+120V OUT	21
+120V OUT	22
DFIB-220S-2.5RC	

CA913 ST-902840	
CN921	
DEGAUSS COIL 1	1
DEGAUSS COIL 2	2

CA901 ST-902836	
CN202	
POWER ON	1
DEGAUSS ON	2
NC(P/S CONT)	3
+7V IN	4
GND	5
GND	6
-15V IN	7
-15V IN	8
+15V IN	9
+15V IN	10
NC(P/S)	11
NC(P/S)	12
GND	13
GND	14
NC	15
NC	16
NC(+B IN)	17
NC(+B IN)	18
NC	19
NC	20
+120V IN	21
+120V IN	22
DFIB-220S-2.5RC	

CA906 ST-902839	
CN203	
POWER ON	1
DEC-SW ON	2
GND	3
OVERLOAD OFF	4
NO BURST OFF	5
GND	6
WL REM IN	7
+12V OUT	8
TALLY OFF	9
NC	10
DFIB-10S-2.5R	

C4-N12095	
CN204	
HEATER(+)	1
HEATER(-)	2
DFIB-2S-2.5R	

350779-1	
CN901	
H.DEF OUT	1
H.DEF RET	2
V.DEF OUT	3
V.DEF RET	4

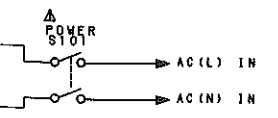
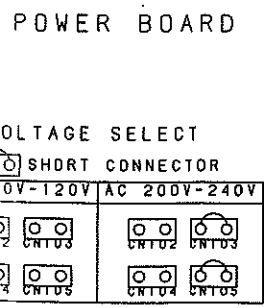
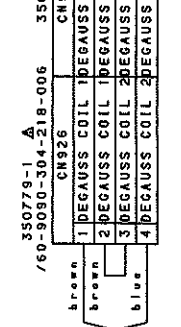
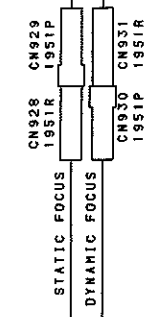
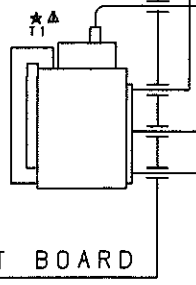
DFI-2S-2.5R24 (DFI-2A1.33)	
CN902	
ROTAT RET	1
ROTAT OUT	2

DFIB-8S-2.5R	
CN205	
+120V OUT	1
+120V OUT	2
NC	3
ABL IN	4
+12V OUT	5
HD OUT	6
GND	7
HD DRY IN	8

DFIB-8S-2.5R	
CN208	
+120V IN	1
+120V IN	2
NC	3
ABL OUT	4
+12V IN	5
HD IN	6
GND	7
HD DRY OUT	8

60-9090-303-118-006	
CN227	
DF DRIVE OUT	1
NC	2
+700V OUT	3

60-9090-303-118-006	
CN228	
DF DRIVE IN	1
NC	2
+700V IN	3



A
E
F
G
H
I
J
K
L

8. VIDEO SYSTEM

8.1 MOTHER BOARD

(1) Outline

This board function as interface for signal and control line between various boards.

(2) Adjustment procedure

Unless specified, the input signal should be the NTSC or PAL color bar (75%).

(a) VR1: +12V ADJ

1. Adjust the DC voltage at TP1 to $+12V \pm 0.01V$.

(b) VR2: +5V ADJ

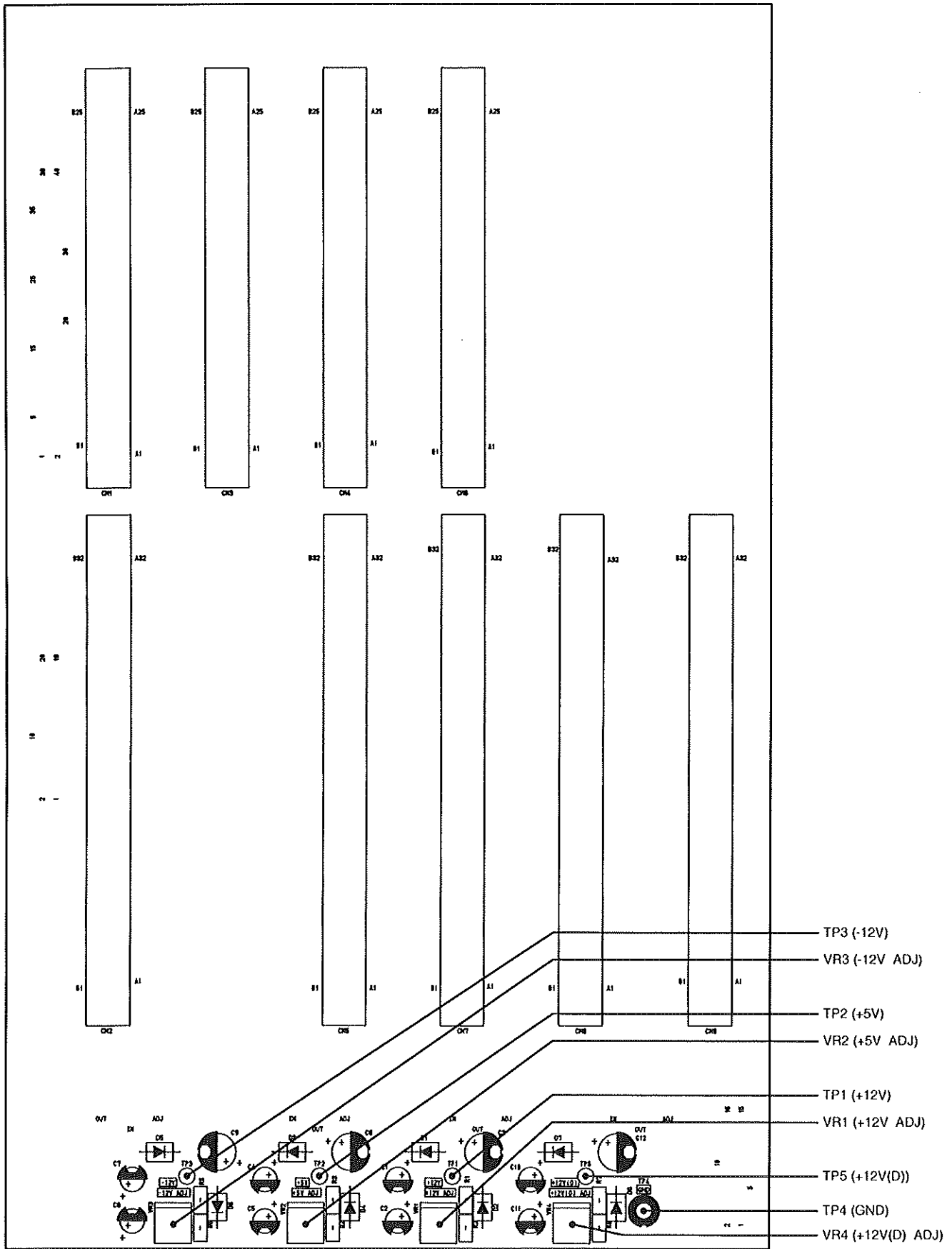
1. Adjust the DC voltage at TP2 $+5V \pm 0.01V$.

(c) VR3: -12V ADJ

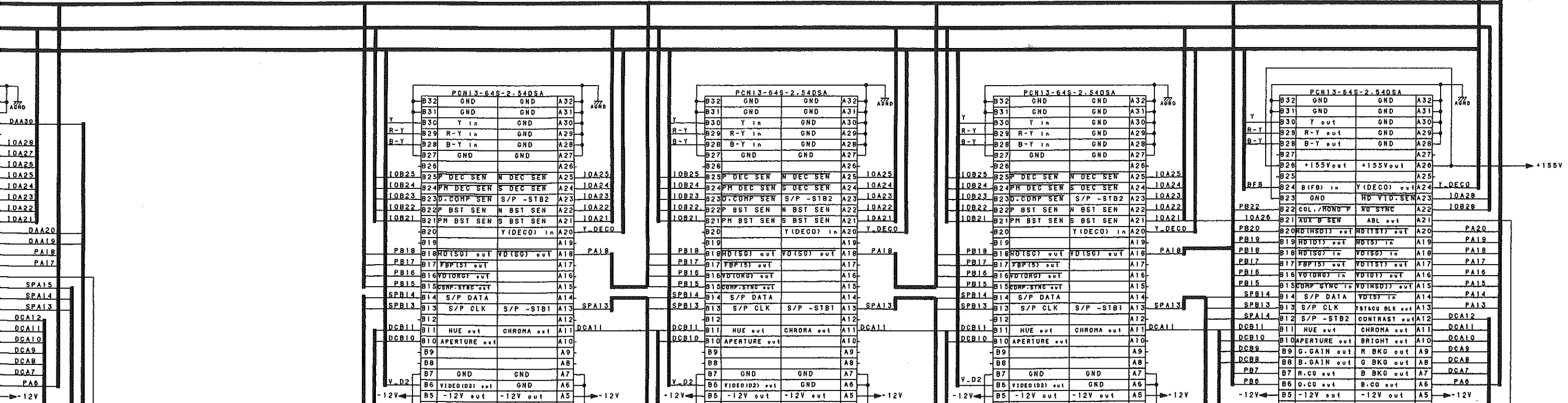
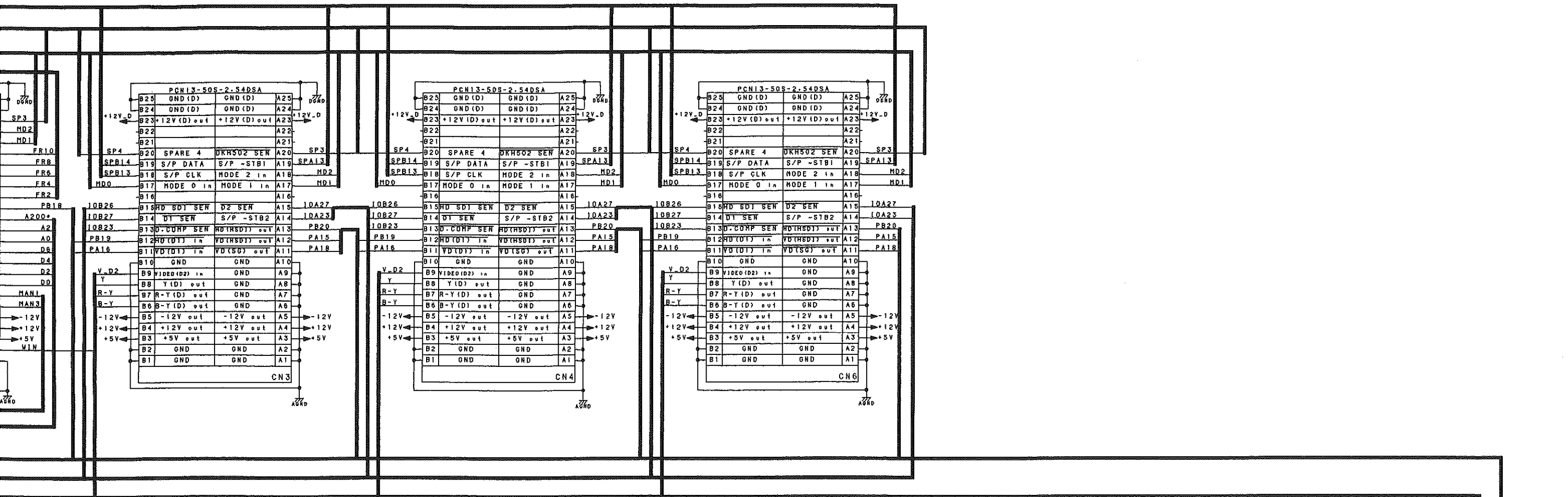
1. Adjust the DC voltage at TP3 $-12V \pm 0.01V$.

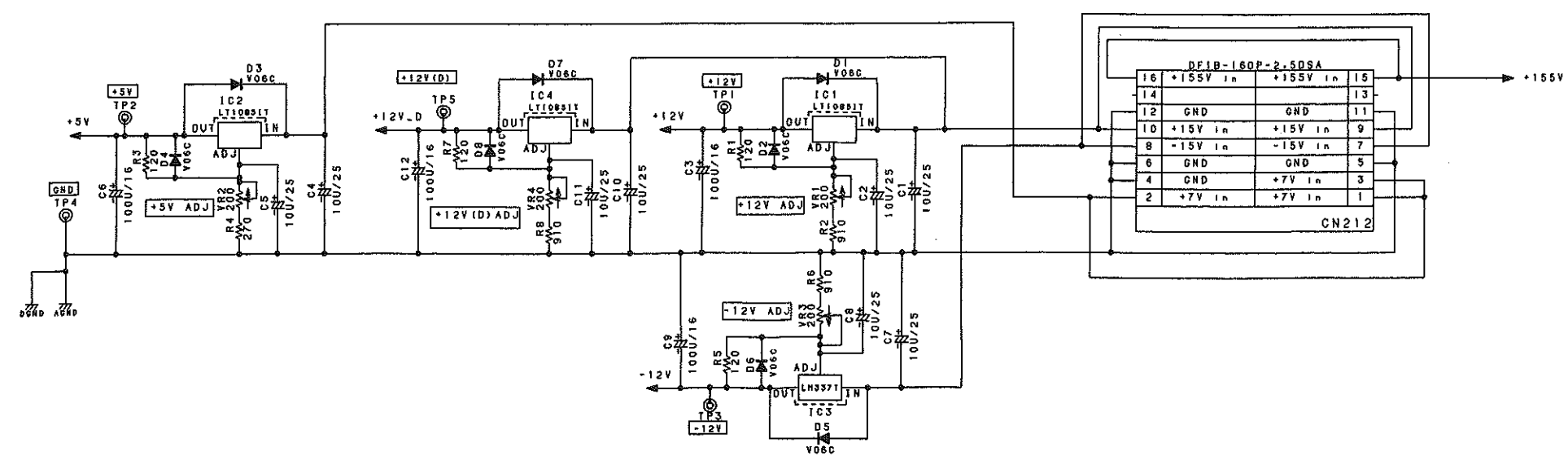
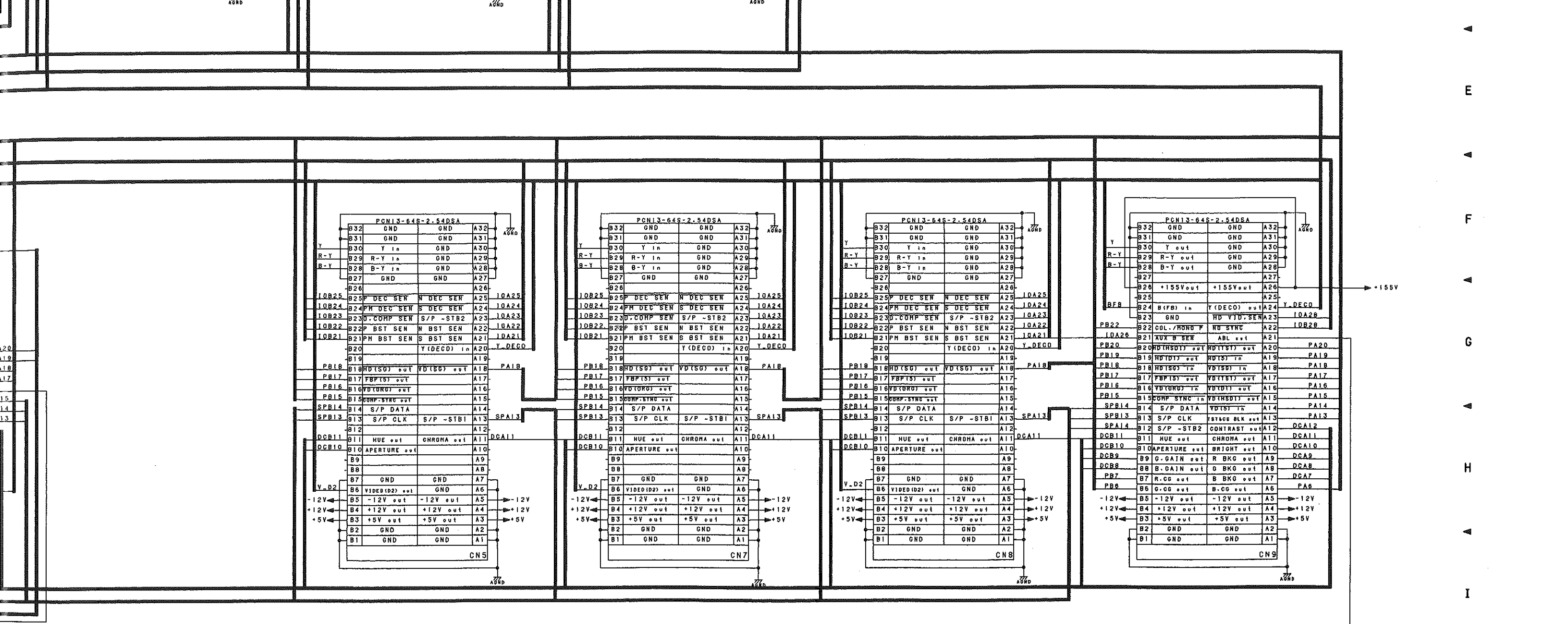
(d) VR4: +12V(D) ADJ

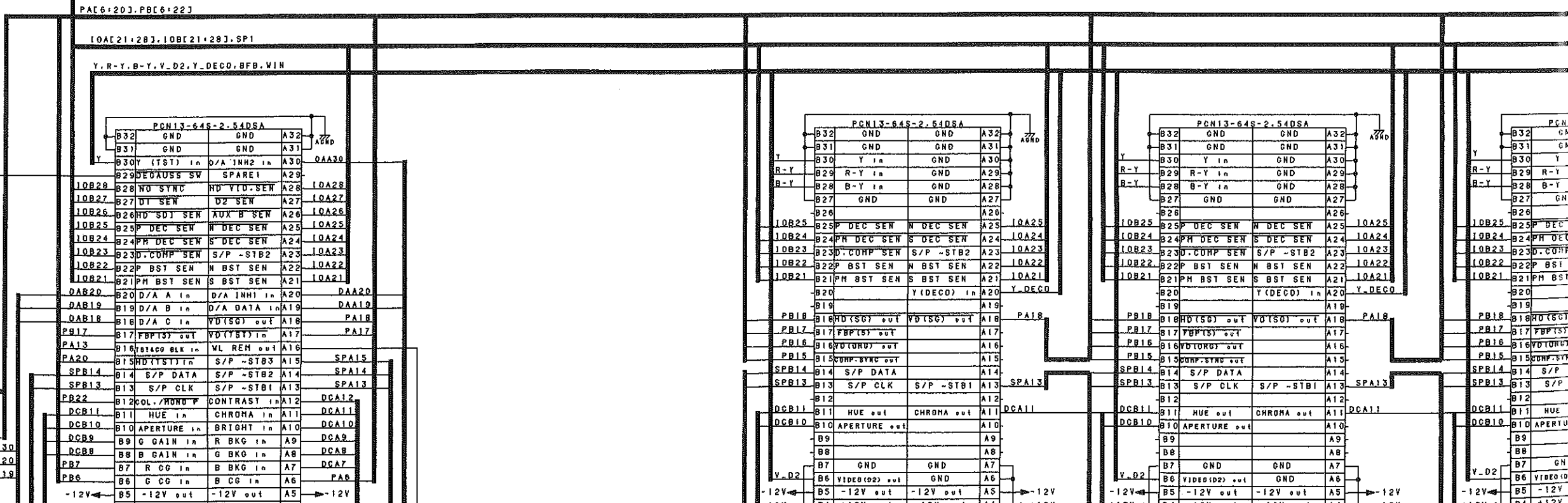
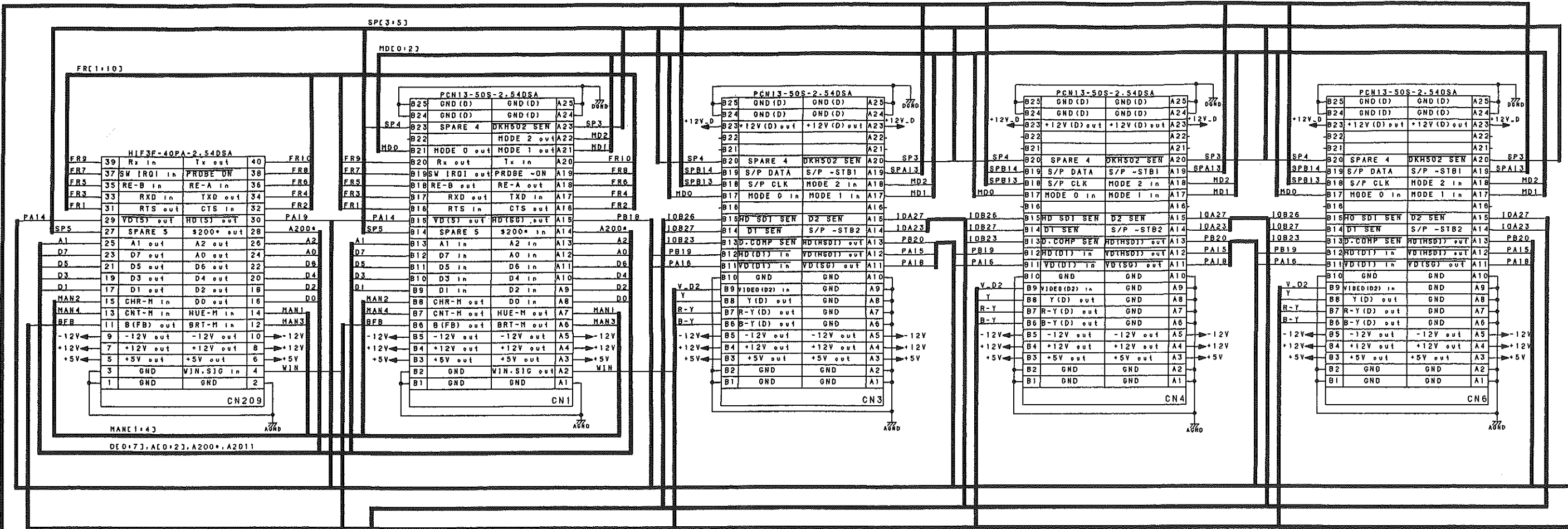
1. Adjust the DC voltage at TP5 $+12V \pm 0.01V$.



MOTHER BOARD Parts Location



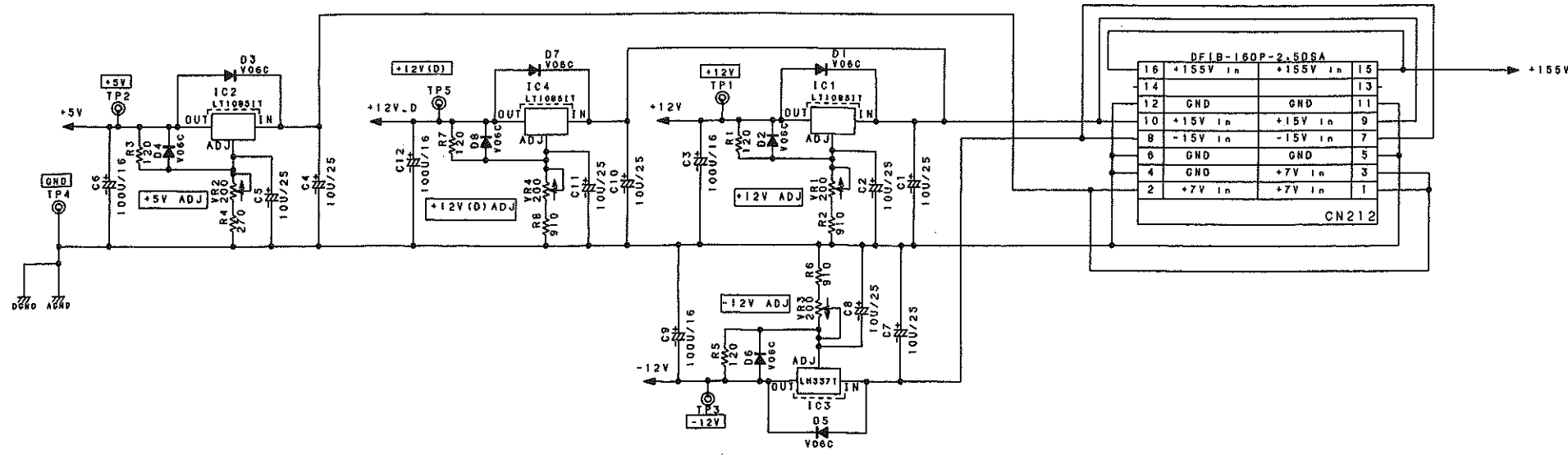
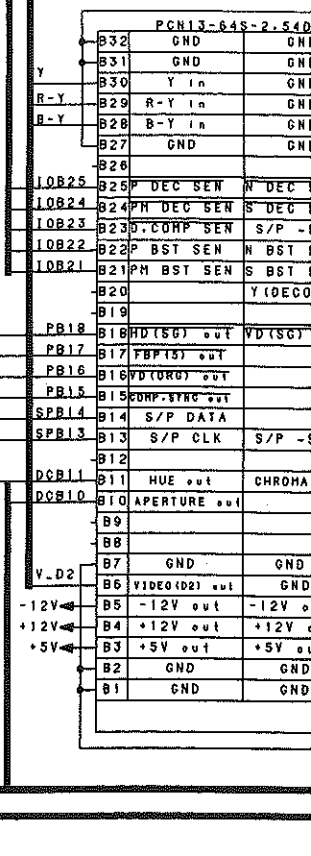
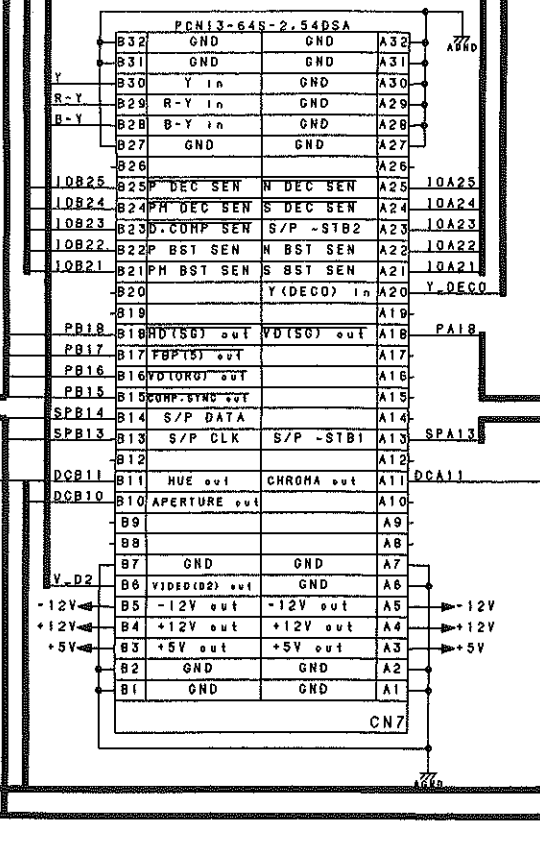
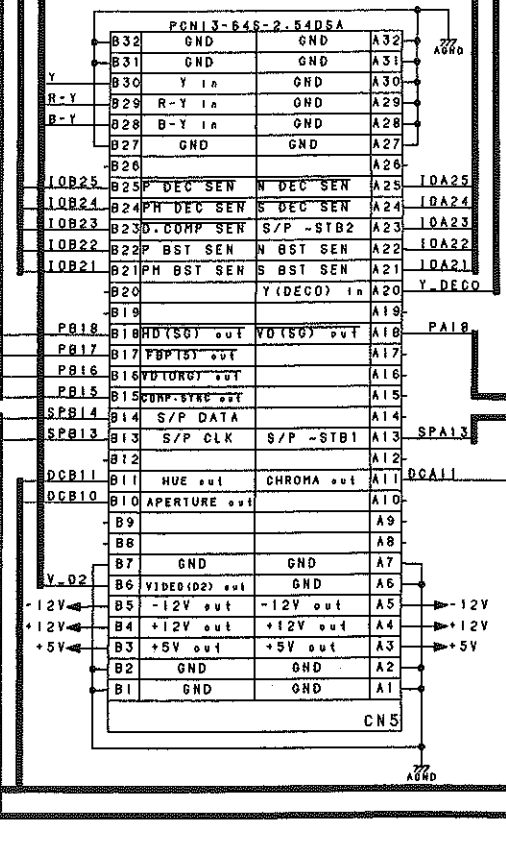
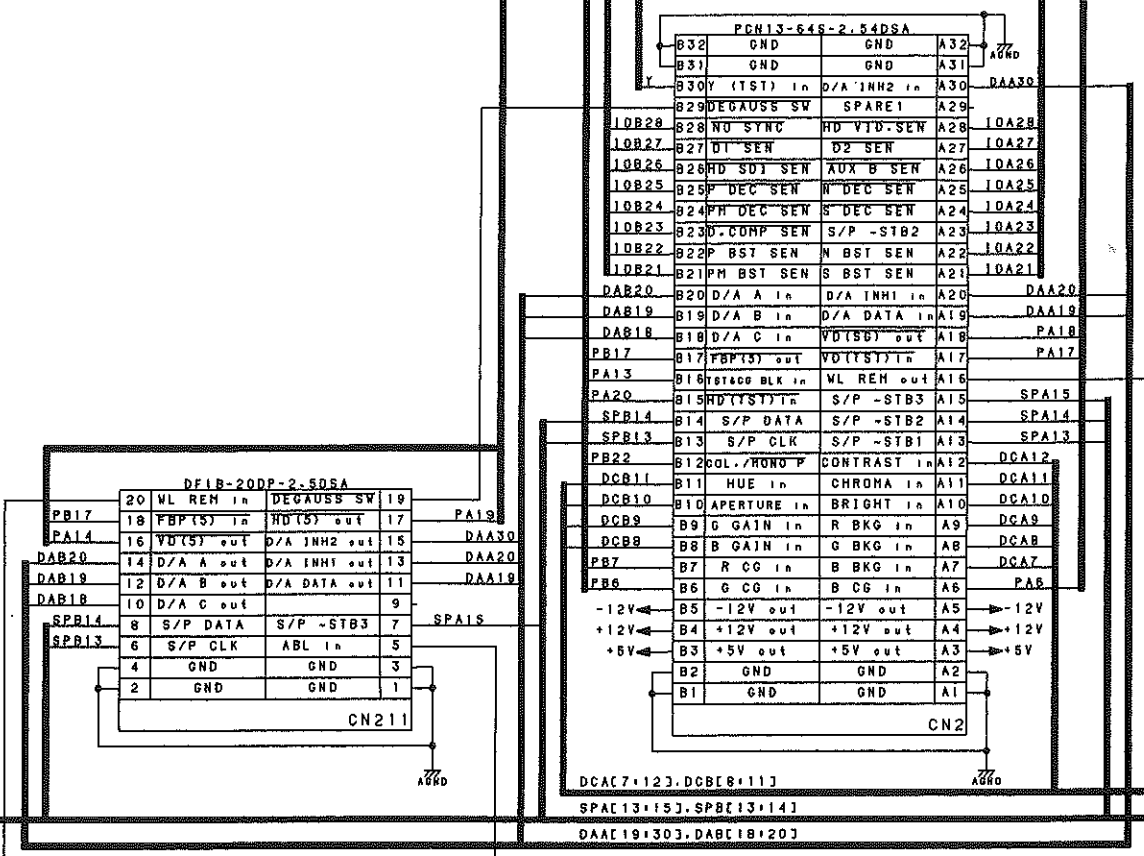




PAE6203.PBE6223

10AC21283.10B21283.SP1

Y.R-Y.B-Y.V.D2.Y-DECO.BFB.VIN



8.2 MPU BOARD

(1) Outline

This board performs all controls of the monitor by the MPU and DC control. It also generates various test signals and marker signals.

(2) Circuit Description

(a) MPU

The IC5 MPU (HD6303YF) is an 8-bit CMOS. Microprocessor comprising CPU, timer, RAM (256 bytes), SCI (serial communication interface) and I/O on a single chip.

The MPU operates by the program memorized in the external EPROM IC7 (64k bytes). Each data is memorized in the static RAM IC11 (32k bytes).

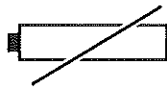
Even when the power is turned OFF, this RAM preserves data by the lithium battery (BT1).

(b) I/O

The I/O control between the modules MPU, FRONT PANEL and CONTROL is performed with latching the data bus by the address decoder (IC13, IC15, IC16, IC17 and IC97).

(c) RAM backup circuit

The 32k bytes static RAM (IC11) memorizing all digital control data should preserve data for about 10 years using the lithium battery (BT1).



IC12 detects the voltage of the battery used, and displays a message on the screen when the voltage falls below 2.4V.

(d) Display generator and marker color control

The character generator (IC25) operating by the HD and VD is controlled by the data from the CPU, and outputs character signals and background signals of R, G, and B. The marker level is controlled according to the DC level of VR1. The analog switch (IC29) is used to switch between the character signal and marker level.

(e) D/A, S/H circuits

The low 8-bit and upper 8-bit data are sent to the RAM in two parts. The 16-bit data latched (IC36, IC37) is input to the D/A converter (IC38).

The data is sent continuously, and the analog multiplexers (IC41, IC42) work as a circuit to divide the data. By Capacitor (C83 to 92) for this IC and hold the sample & hold circuit are being composed.

(f) TEST, marker signal generator circuit

IC64 and IC65 are ICs for PLD. IC64 operates as a circuit generating test signals, free-run HD and VD signals from the crystal (27MHz: X1) clock. IC65 operates as a circuit generating HD signals to be provided to the PLL (IC56).

And also controls the ROM (IC74, IC75) storing the data of the TEST signal and marker signal.

The EPROM IC75 memorizes data on the pattern of one line (64 bytes) in each address. The address control memorizes the memo address data (vertical data).

For the marker signals and some test signals (CROSS HATCH, CHARACTER), the data (8 bits) output from IC75 is serial-parallel converted by IC76.

Other test signals are analog-converted by IC78.

(3) Adjustment procedure

(a) EL2 :Elbit

S1 :Dip switch

The initial setting of the type different peculiar flag relation of the monitor.

1. The position of EL2 is set as follows for each type of monitor.

HTM :HTM1550R/2050R

CS :HTM1550CS

8090 :80/90 SIERIES

2. The position of S1 is set as follows for each type of monitor.

PH-H :JPN phosphor = ON

EBU phoshor = OFF

PH-C :C phosphor = ON

EBU phosphor = OFF

CONV :To activate STATIC CONV = ON

TYPE-1 :TYPE-1 (720P compatible) = ON

FT :Adjustment mode = ON

(Setting at shipment :OFF)

(b) VR1 :MK LVL

VR6 :TEST-S LVL

VR7 :DA LVL

1. VR1 is used to adjust the contrast level of the marker. Normally set to the center.
2. Set MARKER to OFF, and internal TEST signals to ON, and select the CROSS HATCH signal. Adjust VR6 so that the level of TP24 becomes $1.0 \pm 0.01V_{p-p}$.
3. Select the WINDOW signal in the test signal of inclusion. Adjust VR7 so that the level of TP24 becomes $1.28 \pm 0.01V_{p-p}$.

(c) VR2 : 4 : 3 U-CONT

VR3 :16 : 9 N-CONT

VR4 :16 : 9 U-CONT

1. Input the WINDOW (100%) signal, and adjust the CONTRAST Manual Control so that the 4:3 NOR-SCAN becomes 120 cd/m^2 .
2. Adjust VR2 so that the 4:3 UNDER-SCAN becomes 120 cd/m^2 .
3. Adjust VR3 so that the 16:9 NOR-SCAN becomes 120 cd/m^2 .

8-6 8. VIDEO SYSTEM

4. Adjust VR4 so that the 16:9 UNDER-SCAN becomes 120 cd/m².

*For TM20-80/TM20-90, adjust all the above values to 100 cd/m².

(d) L7

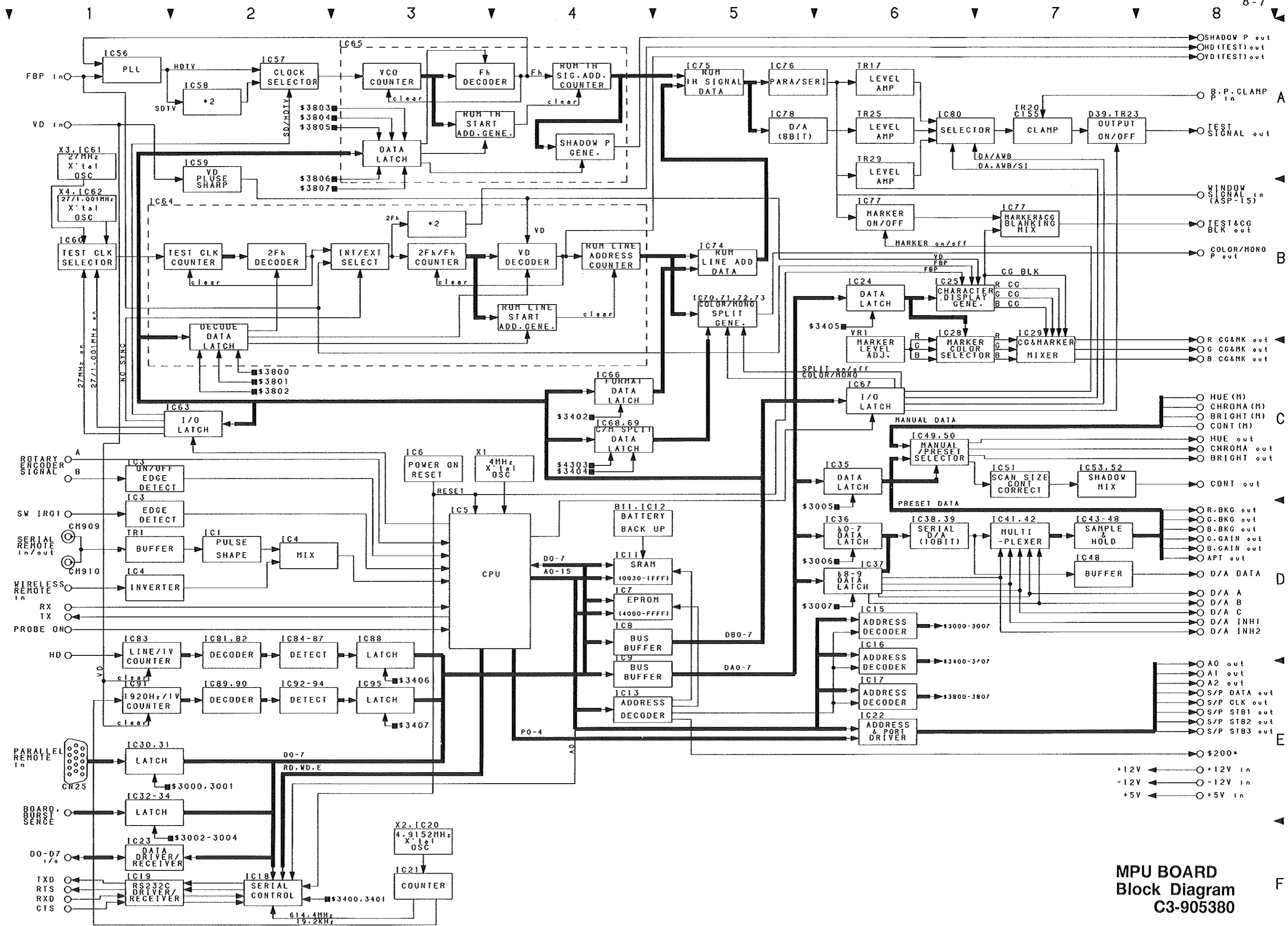
Adjust the screen display range of the character.

1. Set the MENU screen to STATUS and then set SHADOW.

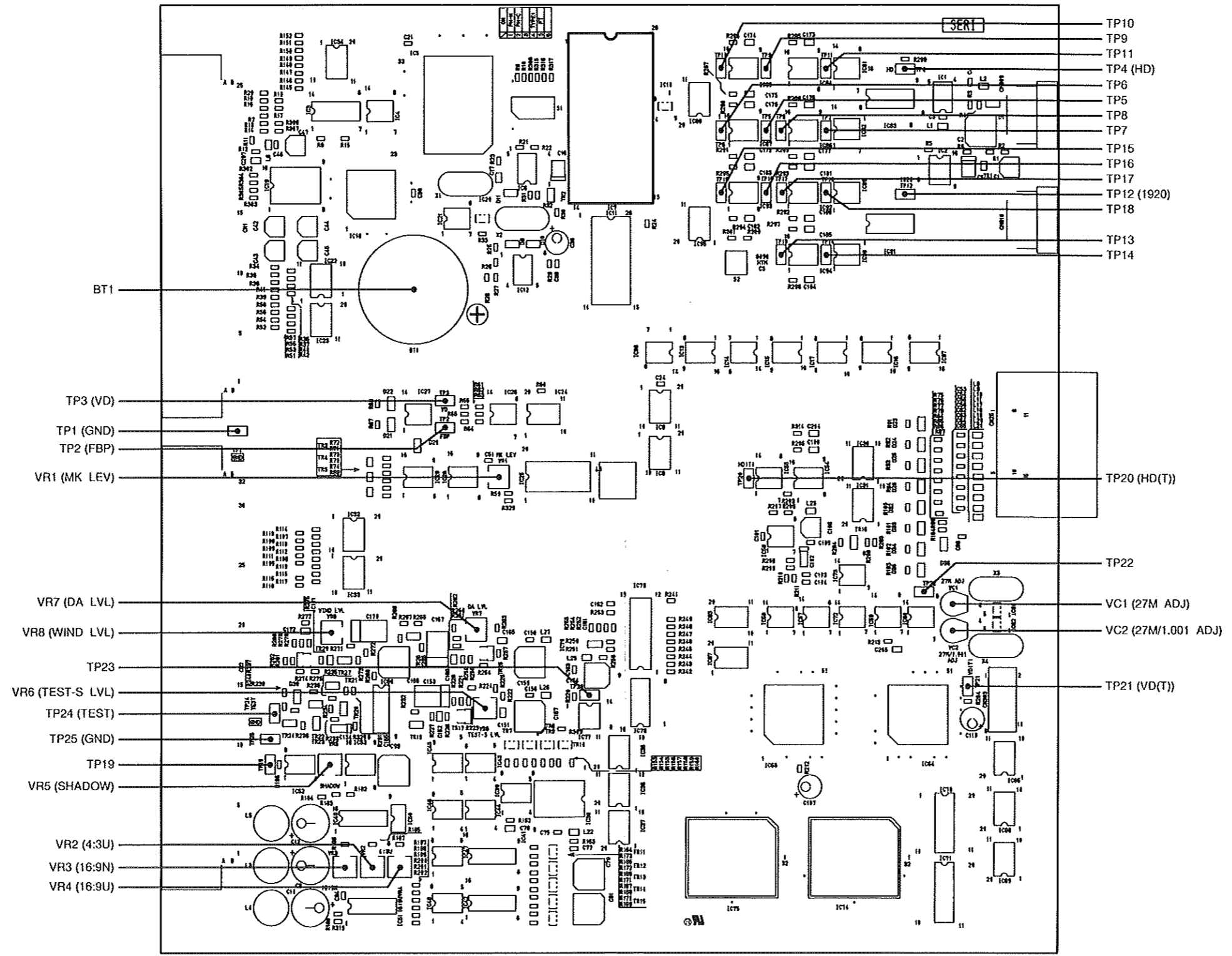
Adjust L7 so that the characters displayed are not in the SHADOW.

(e) VR8 :WIND LV

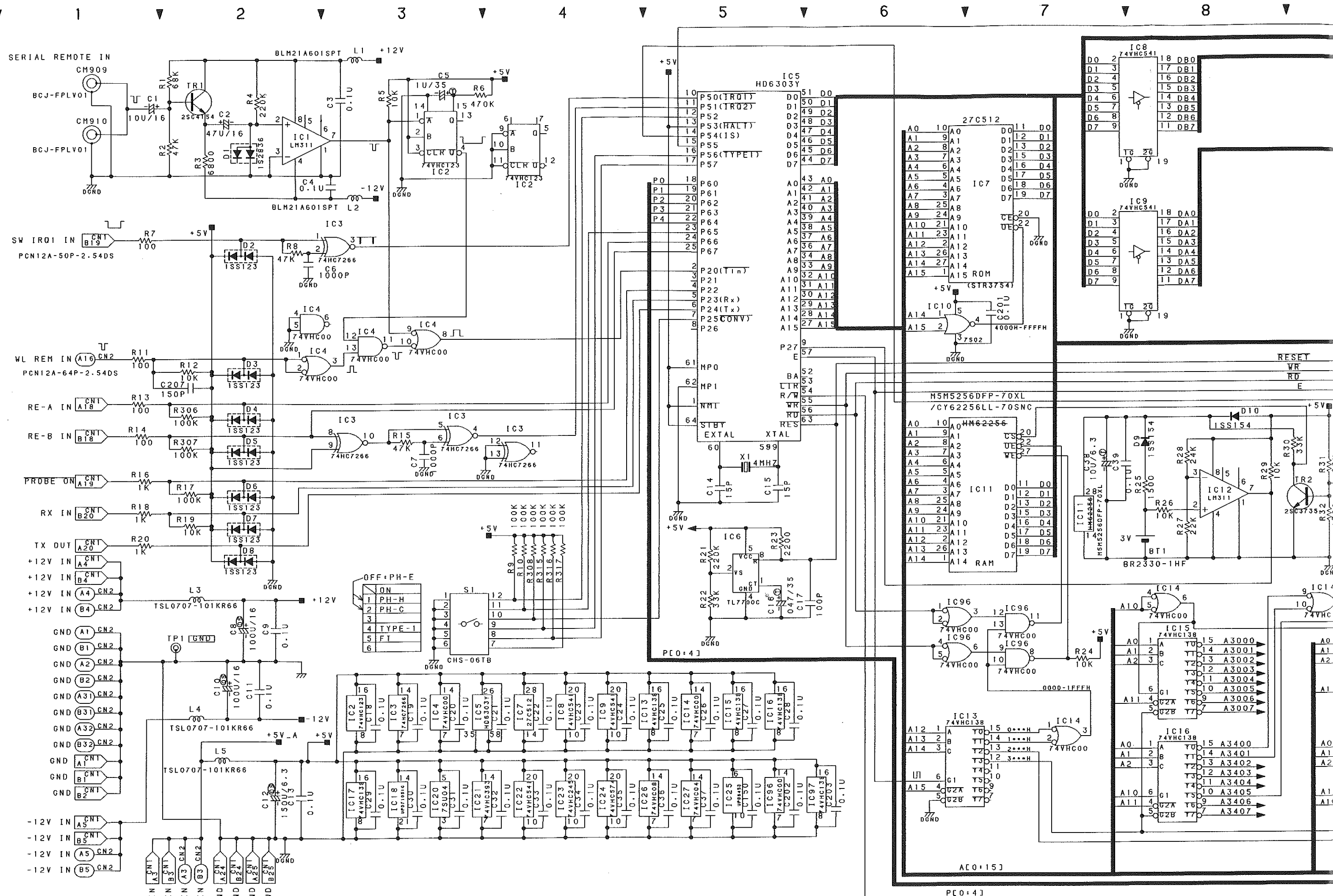
No adjustment is required.

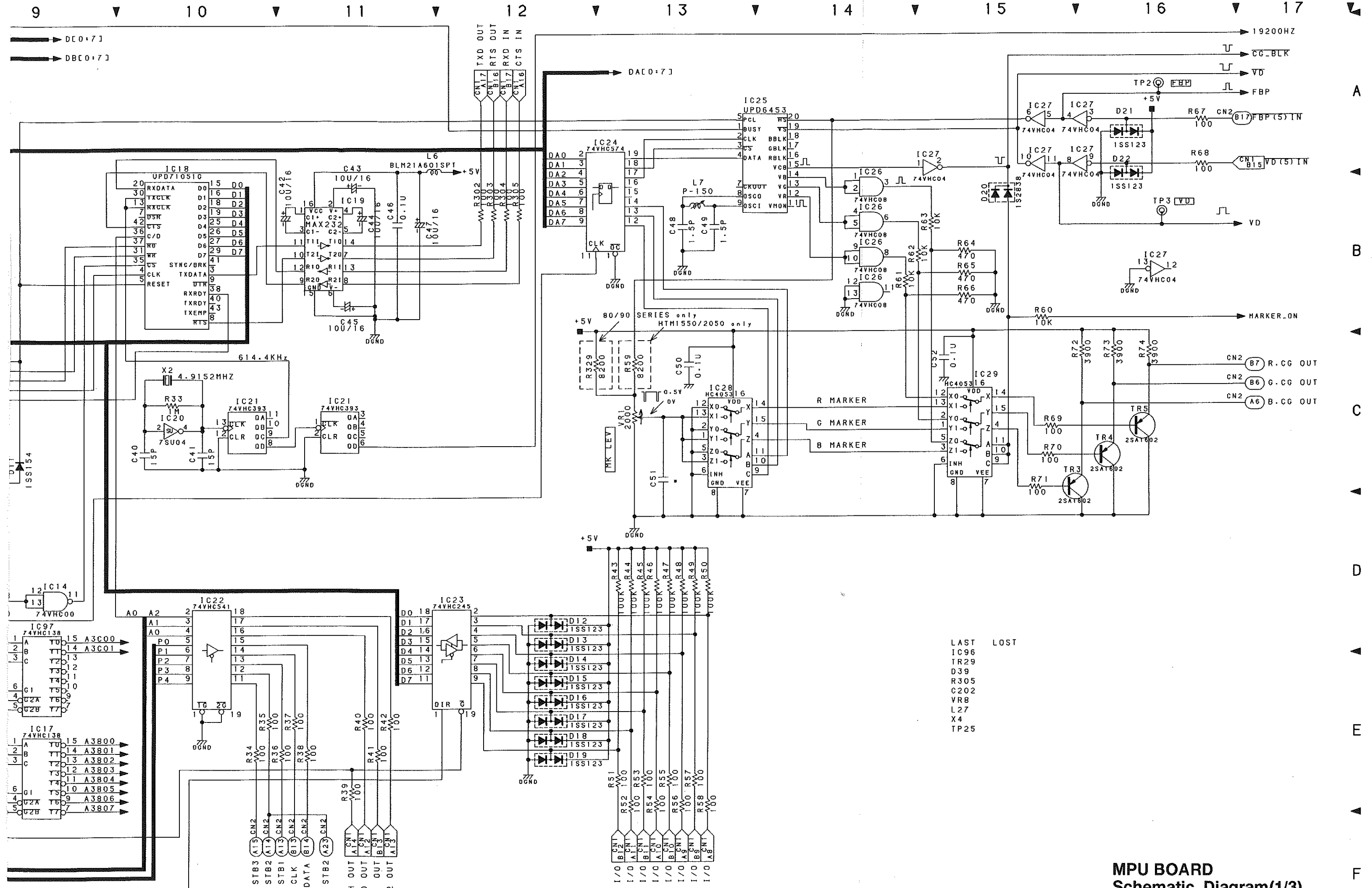


MPU BOARD
Block Diagram
C3-905380



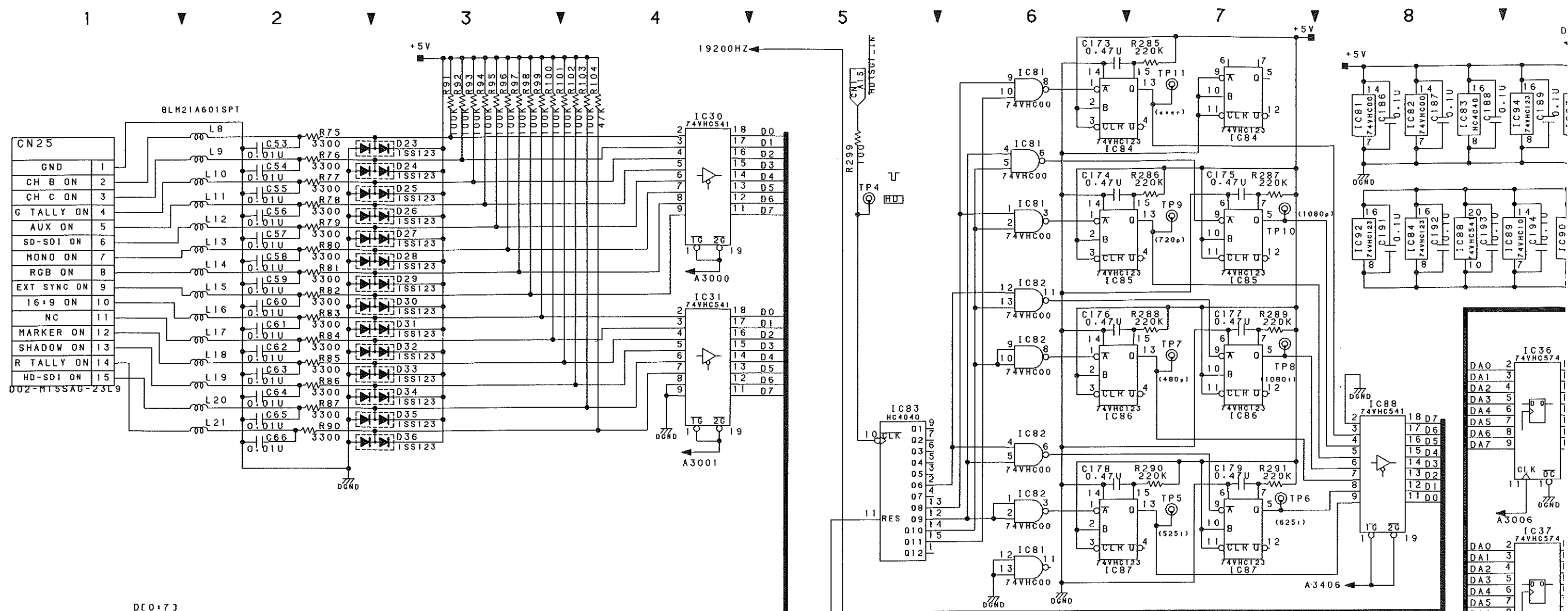
**MPU BOARD
Parts Location**



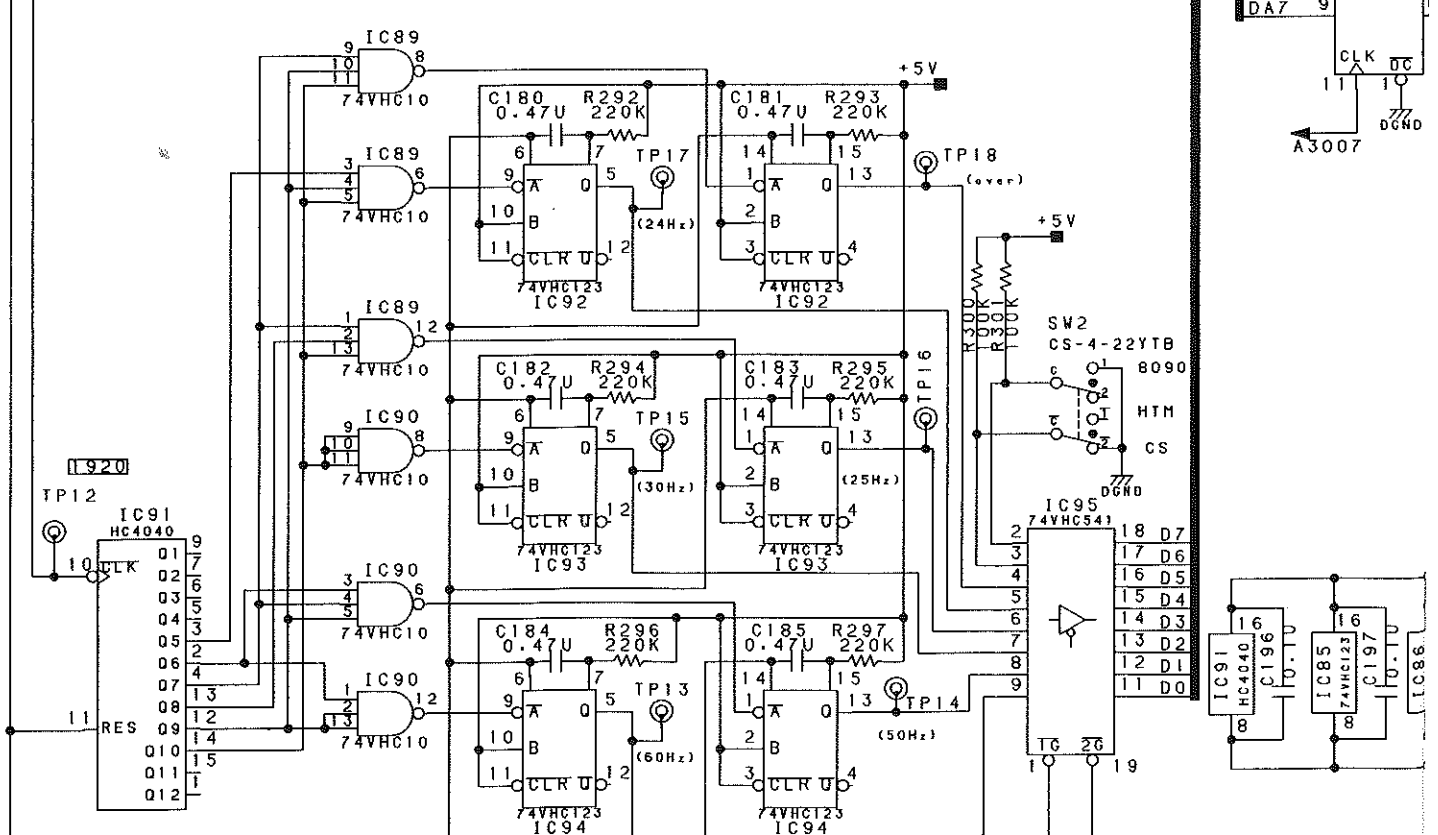
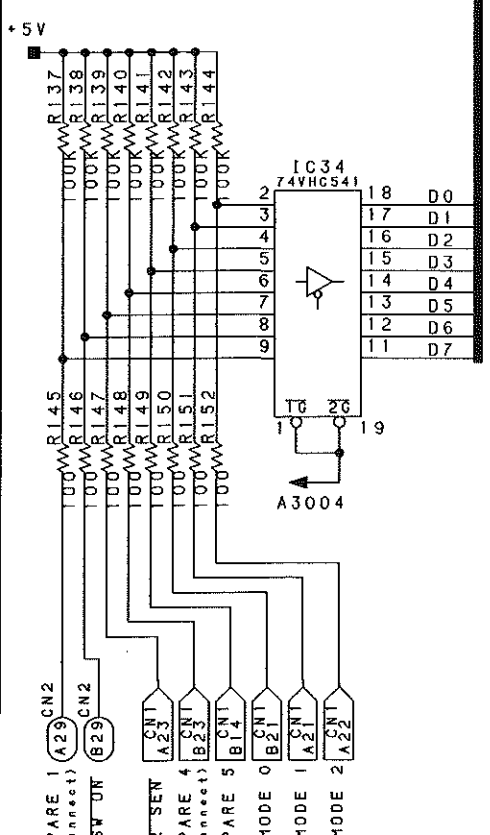
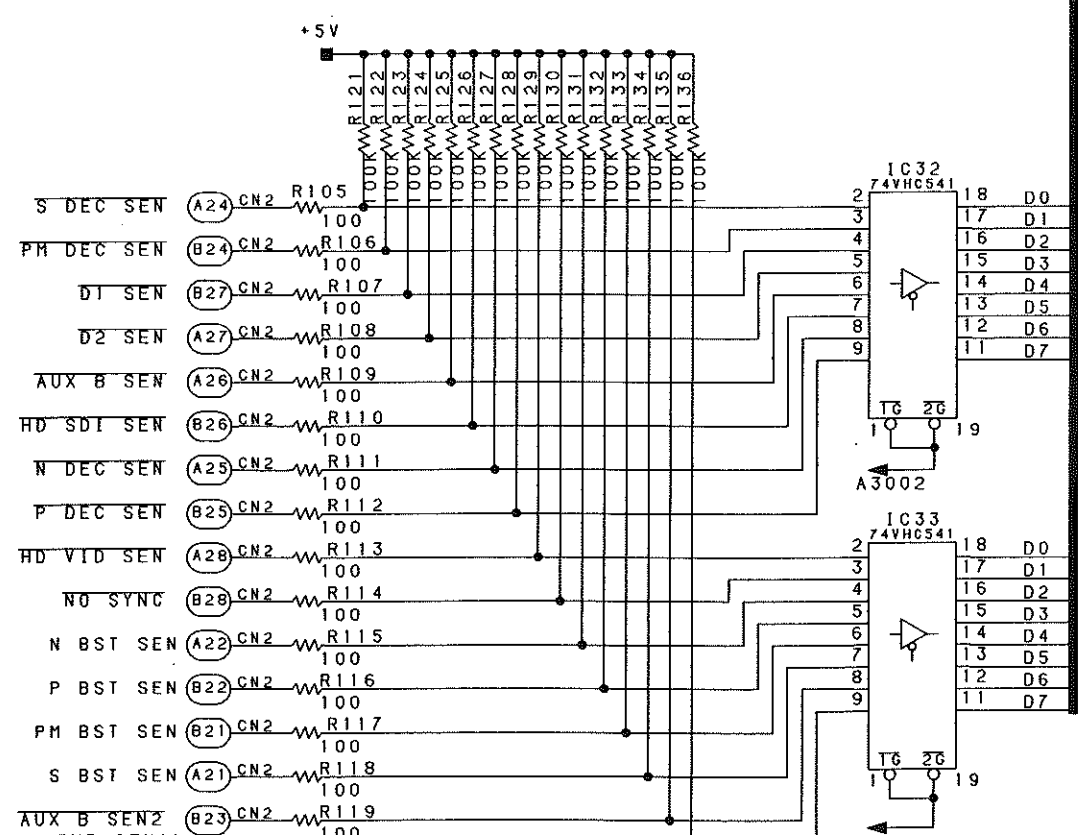


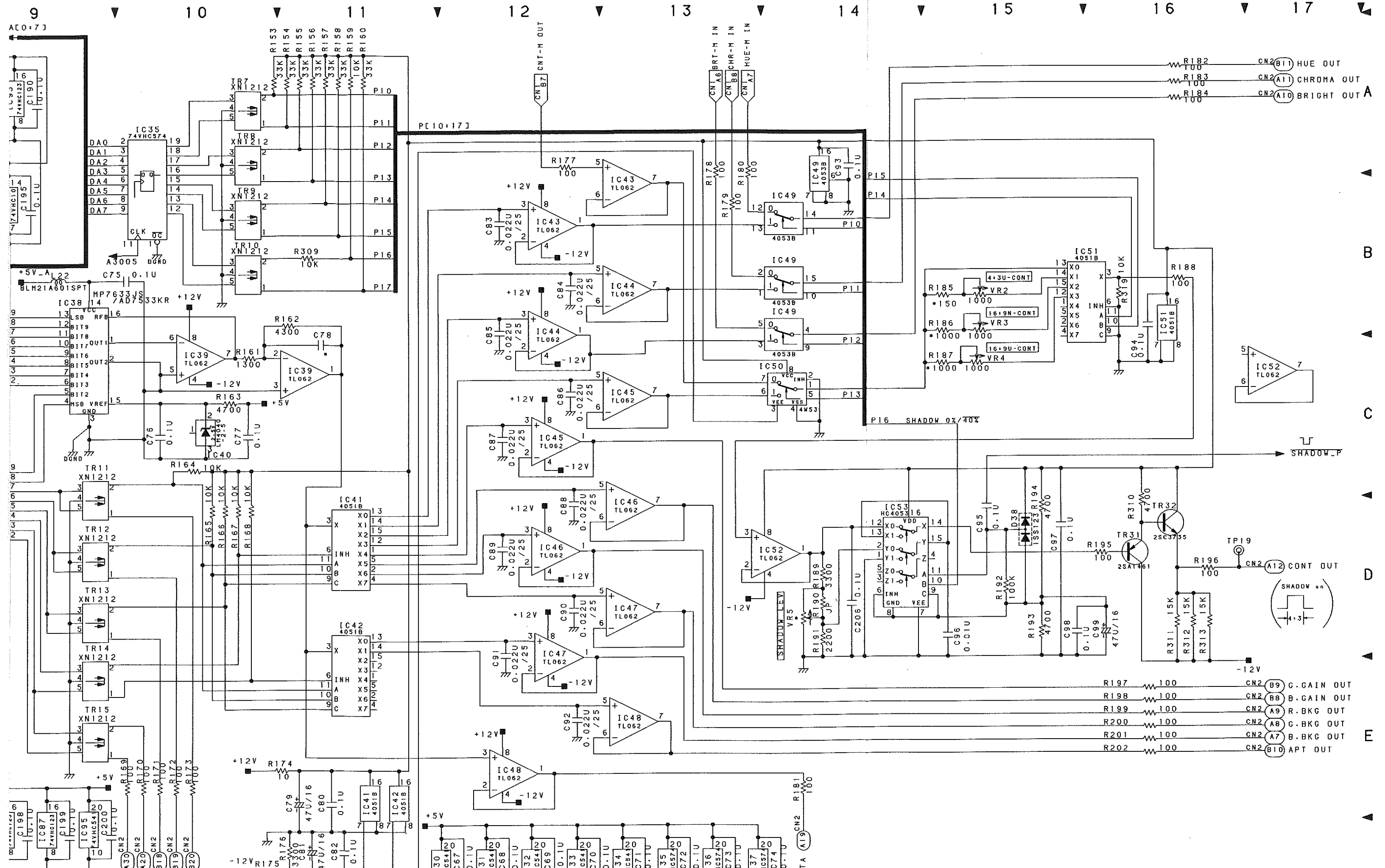
- LAST LOST
- IC96
 - TR29
 - D39
 - R305
 - C202
 - VR8
 - L27
 - X4
 - TP25

MPU BOARD
Schematic Diagram(1/3)



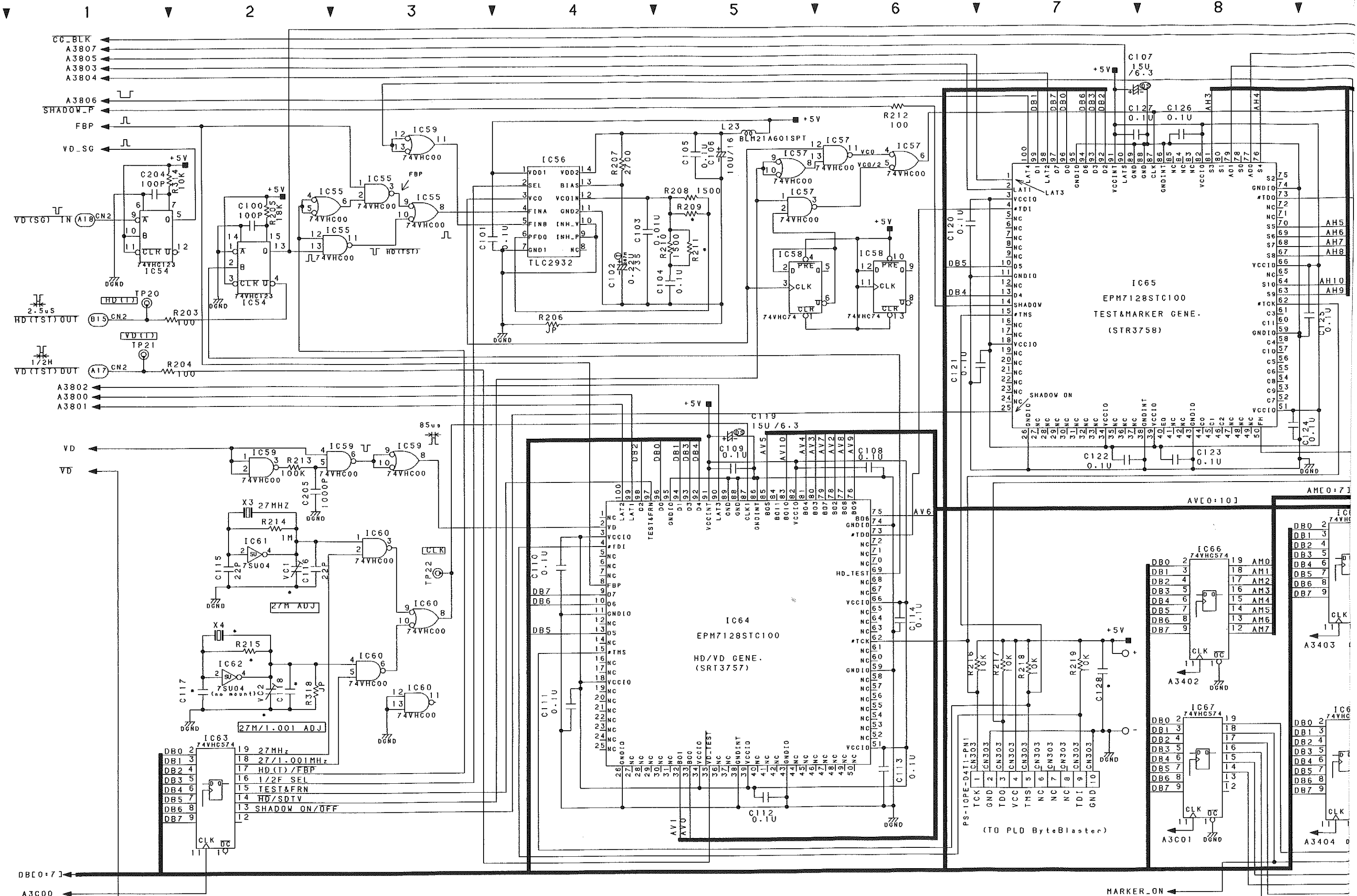
DC073





MPU BOARD Schematic Diagram(2/3)

A
B
C
D
E
F



1 2 3 4 5 6 7 8

CG_BLK
A3807
A3805
A3803
A3804

A3806
SHADOW_P
FBP
VD_SG

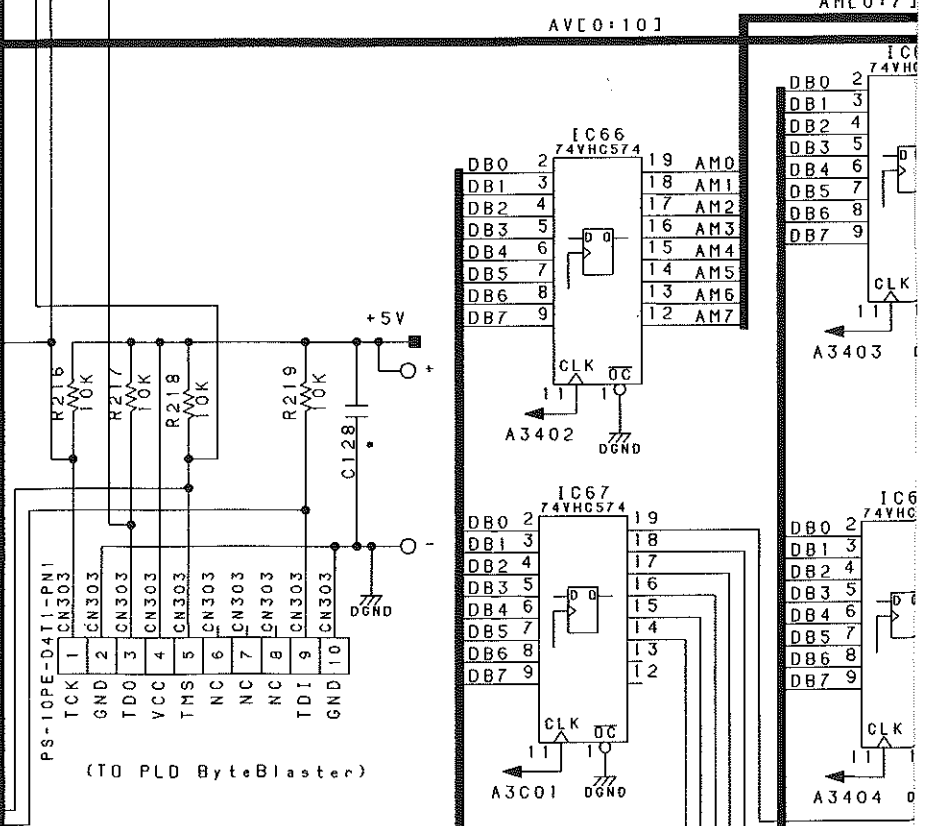
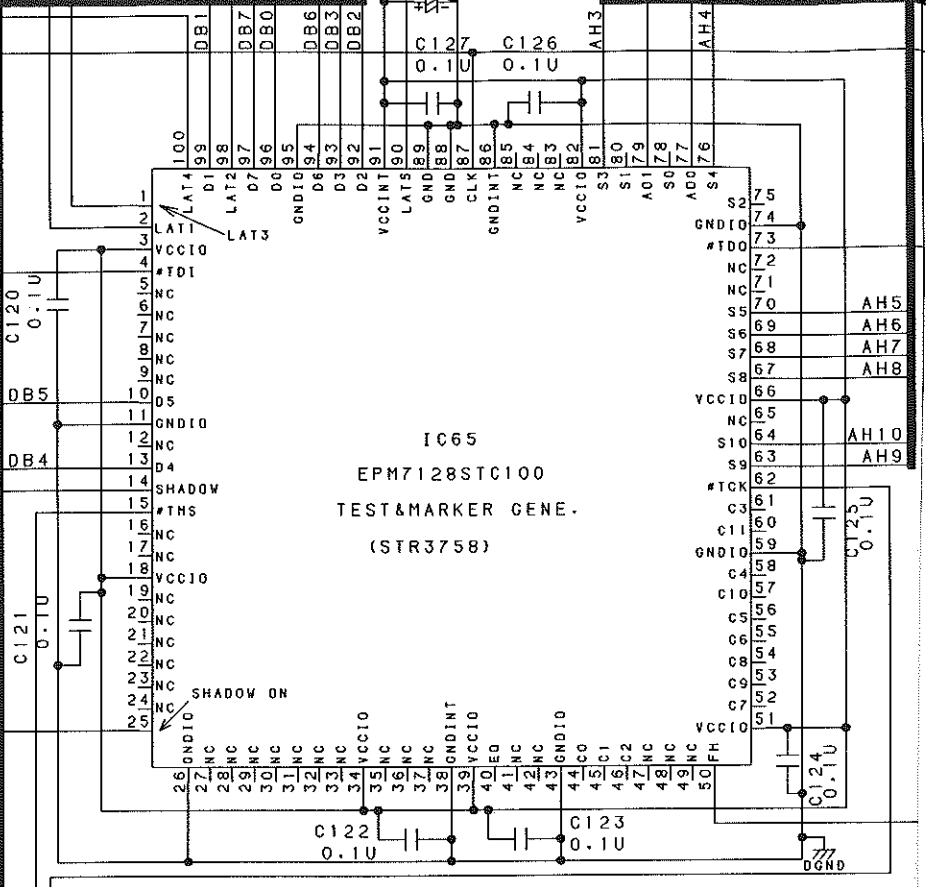
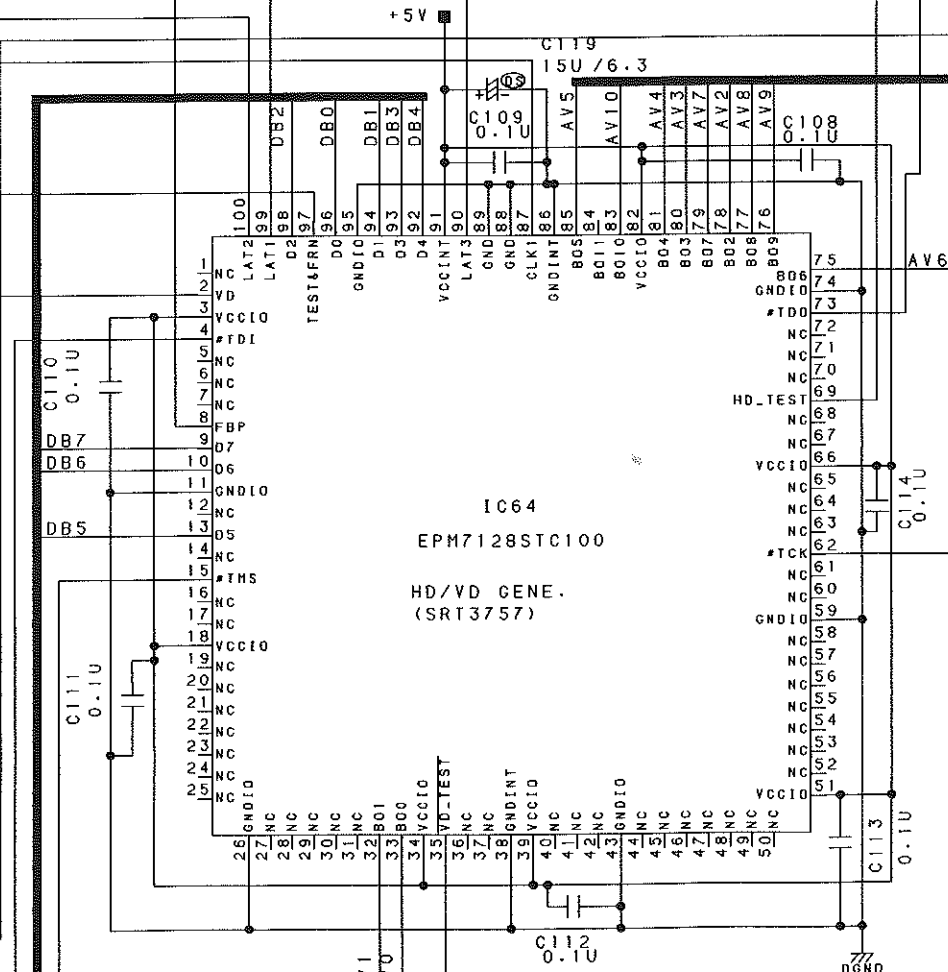
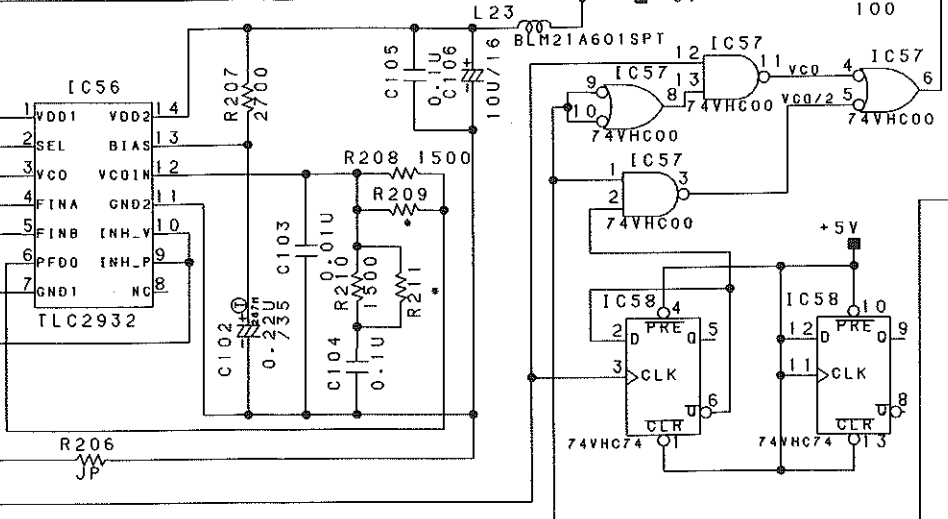
VD(SG) IN (A18) CN2
HD(TST) OUT (B15) CN2
VD(TST) OUT (A17) CN2

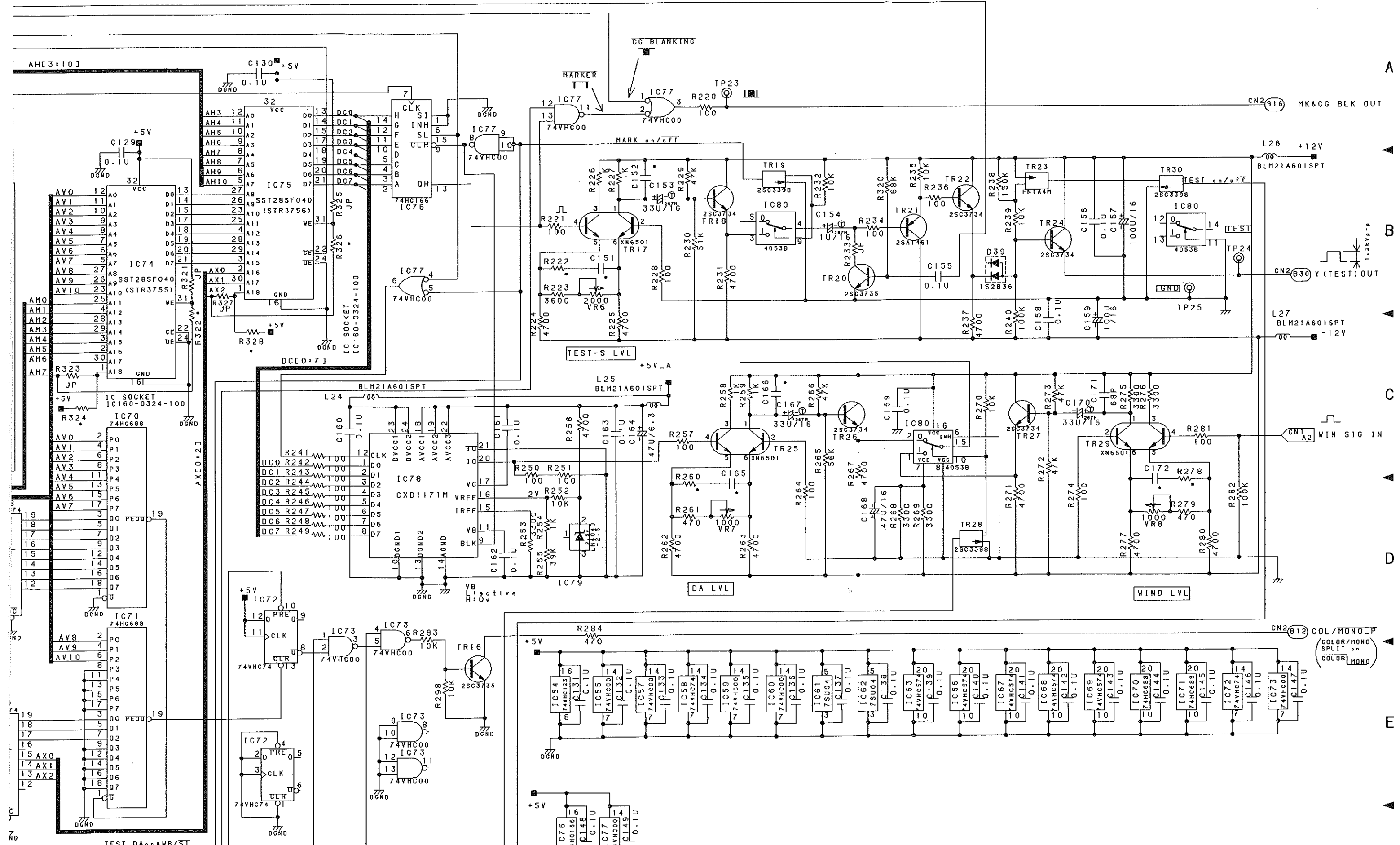
A3802
A3800
A3801

VD
VD

DBC0:71
A3C00

MARKER_ON





A
B
C
D
E
F

MPU BOARD Schematic Diagram(3/3)

011 205270 4

8.3 VIDEO PROCESS BOARD

(1) Outline

This board performs input processing of the analog component signal (RGB/YpbPr) and supplies to each module various pulses generated by the PLD. The YPbPr signal sent from each module by way of the YPbPr bus line is subjected to chroma and contrast control, converted to an RGB signal, and supplied to the RGB OUT BOARD.

(2) Circuit description

(a) RGB/YPbPr input processing circuit

The RGB/YPbPr signal received from the BNC is amplified nearly twofold by the differential amplifier (Rch: TR11, TR12, TR13).

When an RGB signal is inputted, the RGB signal is converted by the resistor matrix to a YPbPr signal and fed to the analog switch IC101 (RGB/YPbPr selector switch). TR123 turns on and, the signal flows to the YPbPr bus line only when the RGB/YPbPr input is selected.

(b) Pulse sync separation circuit

A sync separation is achieved by IC902 into three pulse: composite SYNC, VD and back porch clamp. Different signals are applied to this IC, depending on which setting, SYNC INT or EXT, is selected. When the setting is INT (internal sync), the Y signal from the bus line is applied to the IC. When the setting is EXT (external sync), the sync signal from the BNC is fed to the IC.

When INT SYNC is selected, TR904 turns on and the composite sync signal from the pin 1 of IC902 is applied to the delay circuit, which consists of C906, C907 and IC903, where it is corrected so that it has the same phase as in the case of EXT SYNC. The signal is then output from the pin 3 of IC903. Either the composite sync or HD from the D1 signal is selected by analog switch IC904. The equalizing pulse is removed by the equalizing pulse eliminating circuit comprising IC905 and applied, as a horizontal sync signal, to the pin 100 of IC909 for pulse processing.

When the D1 signal is selected by analog switch IC906, vertical sync signal VD from the pin 3 of IC902 is switched by VD sent from the D1 module and the signal is applied to the pin 13 of IC909.

(c) Pulse generator circuit

The pulses required for the modules are generated in circuits such as the counter circuit of IC909 by the use of a 13.5MHz clock from the pin 3 of IC910 which is created by the PLL circuit (which consists of the counter circuit of IC909 and PLL-specific IC IC910) with reference to the HD pulse.

The G1 BIAS pulse which is applied to G1 of the CRT

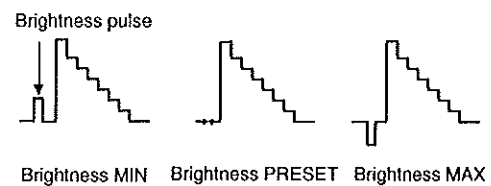
is prepared by clamping at D912 the HV blanking pulse from IC909 in the negative direction, and the pulse for beam feedback detection is created by clamping the same pulse at D913 in the positive direction.

(d) Contrast/chroma control circuit

The Y signal output from each circuit is gain-controlled by IC301 in accordance with contrast level, and the R-Y and B-Y signals at IC201 and IC401, respectively in accordance to the level attained by multiplying the chroma and contrast levels at IC501.

(e) Brightness addition circuit

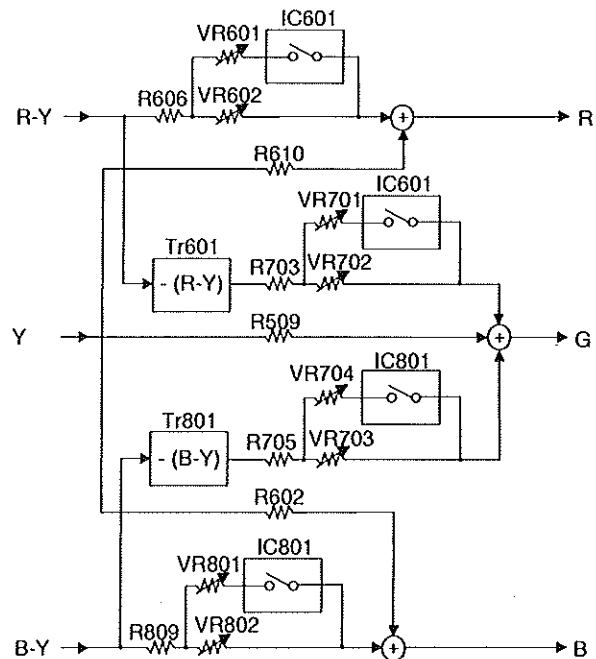
With the contrast-controlled Y signal clamped at GND by Tr306, a brightness pulse is added by analog switch IC203 (2/3) to the SYNC part.



(f) RGB matrix circuit

The R-Y and B-Y signals are fed to the Y signal matrix to form R and B signals, respectively. The G signal is generated from the resistance matrix for each of the Y, -(R-Y) and -(B-Y) signals.

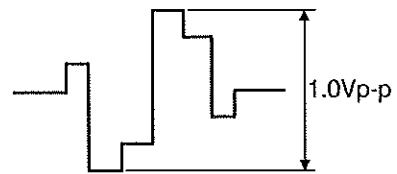
When the MATRIX IN switch is set to ON, analog switches IC601 and IC801 turn on to change the matrix ratio to such a ratio that emphasis is placed on red.



(g) Gain control circuit

The brightness pulse part of the separated R, G and B signals is clamped by Tr606, Tr703 and Tr807, and mixed by analog switch IC602 with a character and MARKER signals.

After that, the signals are gain-controlled at IC603, IC701 and IC802 in accordance with their gain level and supplied to the RGB OUT BOARD.



(3) Adjustment procedure

Before starting the adjustment, set up the following conditions.

1. Apply a YPbPr 75% color bar signal (Y: 0.7Vp-p, Pb, Pr: 0.525Vp-p) to AUX INPUT.
2. With the menu screen displayed, set the RGB/YPbPr setting to "YPbPr" and set the YPbPr CHROMA setting to "SMPTE".
(For the menu setting procedure, see section 4.5 of the Instruction Manual.)
3. Set the YPbPr/RGB switch on the front panel to ON and select the YPbPr/RGB signal.
4. Set CHROMA to "PRESET" (50%).

(a) VR501 (CHROMA LEVEL)

1. Set VR501 at the middle point (initial setting).

(b) VR502(OFFSET)

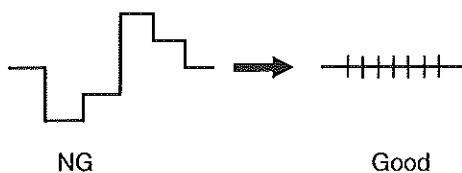
VR504(CONT OS)
VR503(CHROMA OS)

1. Set CHROMA and CONT switches on the front panel.
2. Connect the probe to TP501.
3. Set CHROMA and CONTRAST to MIN.
4. Adjust VR502 so that the DC voltage becomes 0V.
5. Set CHROMA and CONTRAST to MIN.
6. Adjust VR504 so that the DC voltage becomes 0V.
7. Set CHROMA to MIN and CONTRAST to MAX.
8. Adjust VR503 so that the DC voltage becomes 0V.
9. Repeat steps 3. to 8. above.

(c) VR201(R-Y OFFSET)

VR202(R-Y GAIN)

1. Connect the probe to TP203.
2. Set CHROMA switches on the front panel to the MANUAL mode and set it to MIN.
3. Adjust VR201 to eliminate the signal component as shown in the figure below.

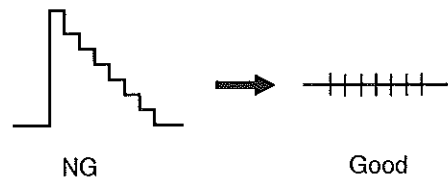


4. Set CHROMA to "PRESET," and set CONTRAST to the MANUAL mode and then set it to MAX.
5. Adjust VR202 so that the level becomes 1.0Vp-p.

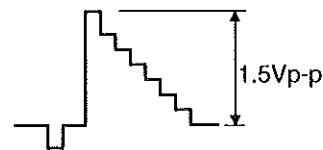
(d) VR301(Y OFFSET)

VR302(Y GAIN)

1. Connect the probe to TP304.
2. Set CONT to the MANUAL mode and set it to MIN.
3. Adjust VR301 to eliminate the signal component as shown in the figure below.



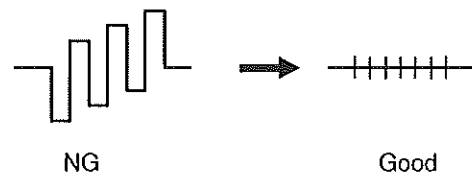
4. Set CONTRAST to MAX.
5. Adjust VR302 so that the level becomes 1.5Vp-p.



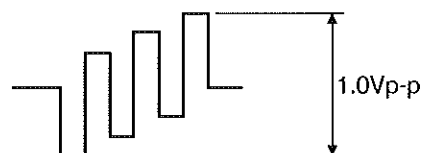
(e) VR401(B-Y OFFSET)

VR402(B-Y GAIN)

1. Connect the probe to TP403.
2. Set CHROMA to the MANUAL mode and then set it to MIN.
3. Adjust VR401 to eliminate the signal component as shown in the figure below.



4. Set CHROMA to "PRESET" and set CONTRAST to the "MANUAL" mode and set it to MAX.
5. Adjust VR402 so that the level becomes 1.0Vp-p.

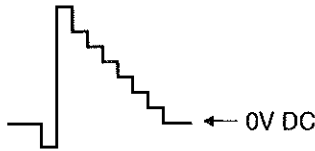


(f) VR203(R-Y DC)

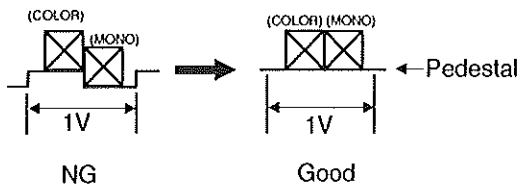
VR304(Y DC)

VR403(B-Y DC)

1. Set CONT and CHROMA to "PRESET."
2. Connect the probe to TP304.
3. Adjust VR304 so that the DC voltage at the pedestal becomes 0V.



4. Connect the probe to TP203.
5. Press the MONO switch for 2 seconds to get the "SPLIT" state.
6. Adjust VR203 so that the pedestal levels at the COLOR and MONO parts become the same.

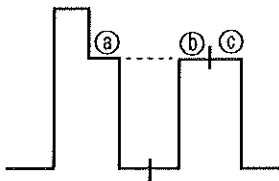


To make a more accurate adjustment, turn the entire screen red by using the SCREENS switch, apply a burst-added white signal, and then adjust VR203 so that the brightness on the upper COLOR part of the screen becomes the same as that on the lower MONO part.

7. Connect the probe to TP403.
8. Adjust VR403 in the same manner as in step 6.

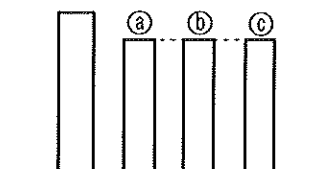
(g) VR602(R.BAL)

1. Connect the probe to TP601.
2. Adjust VR602 so that the levels at (a), (b) and (c) become the same in the figure below.



(h) VR802(B.BAL)

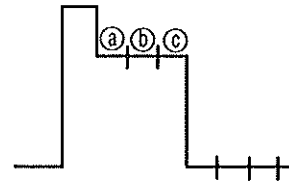
1. Connect the probe to TP801.
2. Adjust VR802 so that the levels at (a), (b) and (c) become the same in the figure below.



(i) VR702(GR.BAL)

VR703(GB.BAL)

1. Connect the probe to TP701.
2. Adjust VR702 and VR703 so that the levels at (a), (b) and (c) become the same in the figure below.



(j) VR604(RC SET)

VR705(GC SET)

VR803(BC SET)

1. Connect the probe to TP602.
2. Adjust VR604 so that the DC voltage at the pedestal becomes 1.7V.
3. Adjust VR705 at TP702 and VR803 at TP802 in similar manner.

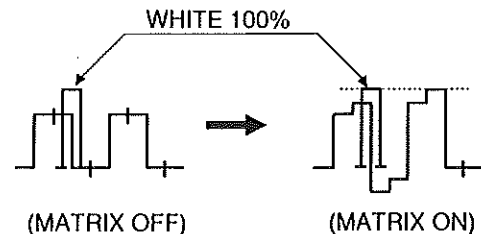
(k) VR601(MTX R BAL)

VR701(MTX GR BAL)

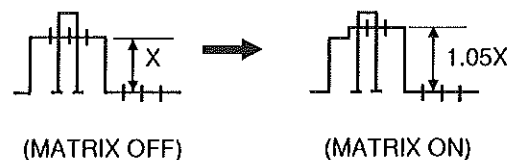
VR801(MTX B BAL)

VR704(MTX GB BAL)

1. Connect the probe to TP601.
2. Adjust VR601 so that a waveform such as shown in the figure below can be obtained when the MATRIX IN switch is set to ON.



3. Connect the probe to TP701.
4. Adjust VR701 and VR704 so that a waveform such as shown in the figure below can be obtained when the MATRIX IN switch is set to ON.



5. Connect the probe to TP801.
6. Adjust VR801 so that a waveform such as shown in the figure below can be obtained when the MATRIX IN switch is set to ON.

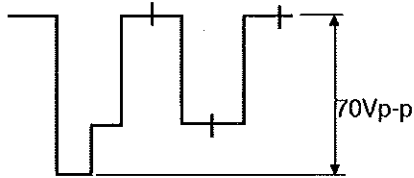


(l) VR305(VS BRT)

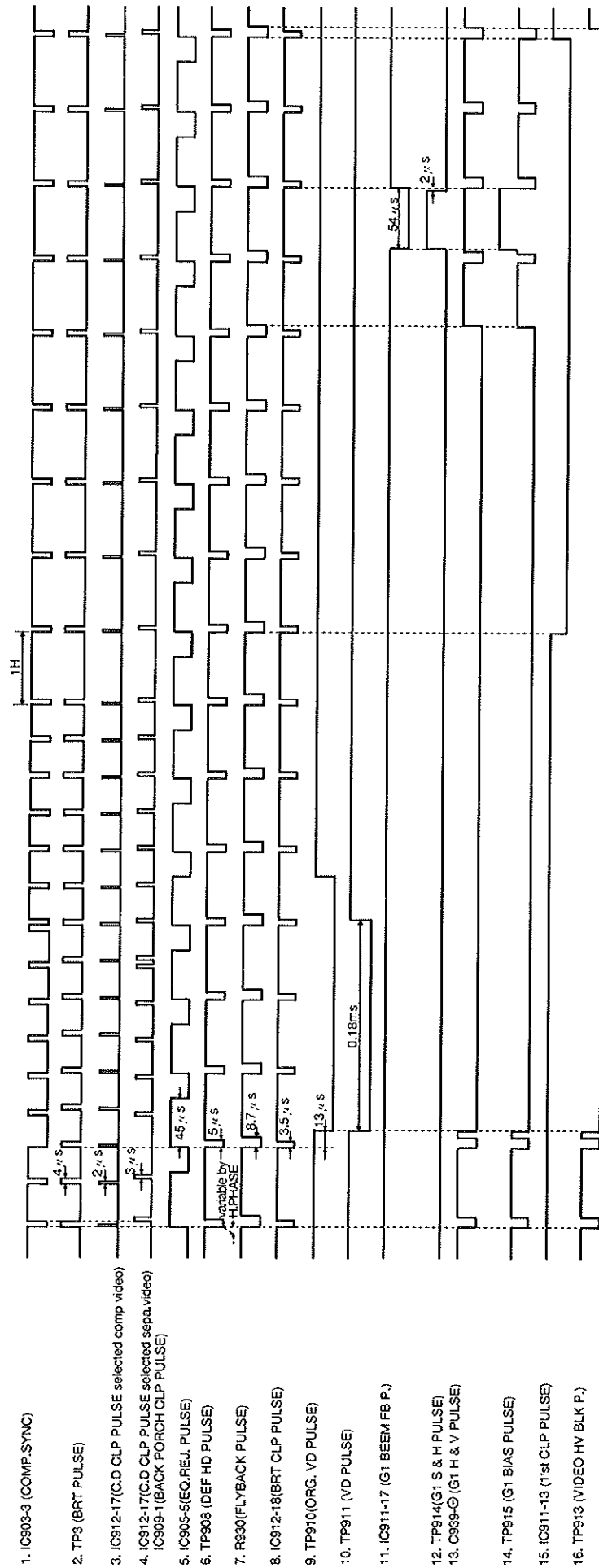
1. Connect the probe to TP305.
2. With the MENU screen displayed, set the V/VS setting to the "V" mode.
(For the menu setting procedure, see section 4.5 of the Instruction Manual.)
3. Set the brightness pulse to the pedestal line with the BRIGHTNESS manual control on the front panel.
4. Set the V/VS setting to the "VS" mode.
5. Adjust VR305 so that the brightness pulse comes at the setup position.

(n) VR603(R.GAIN)

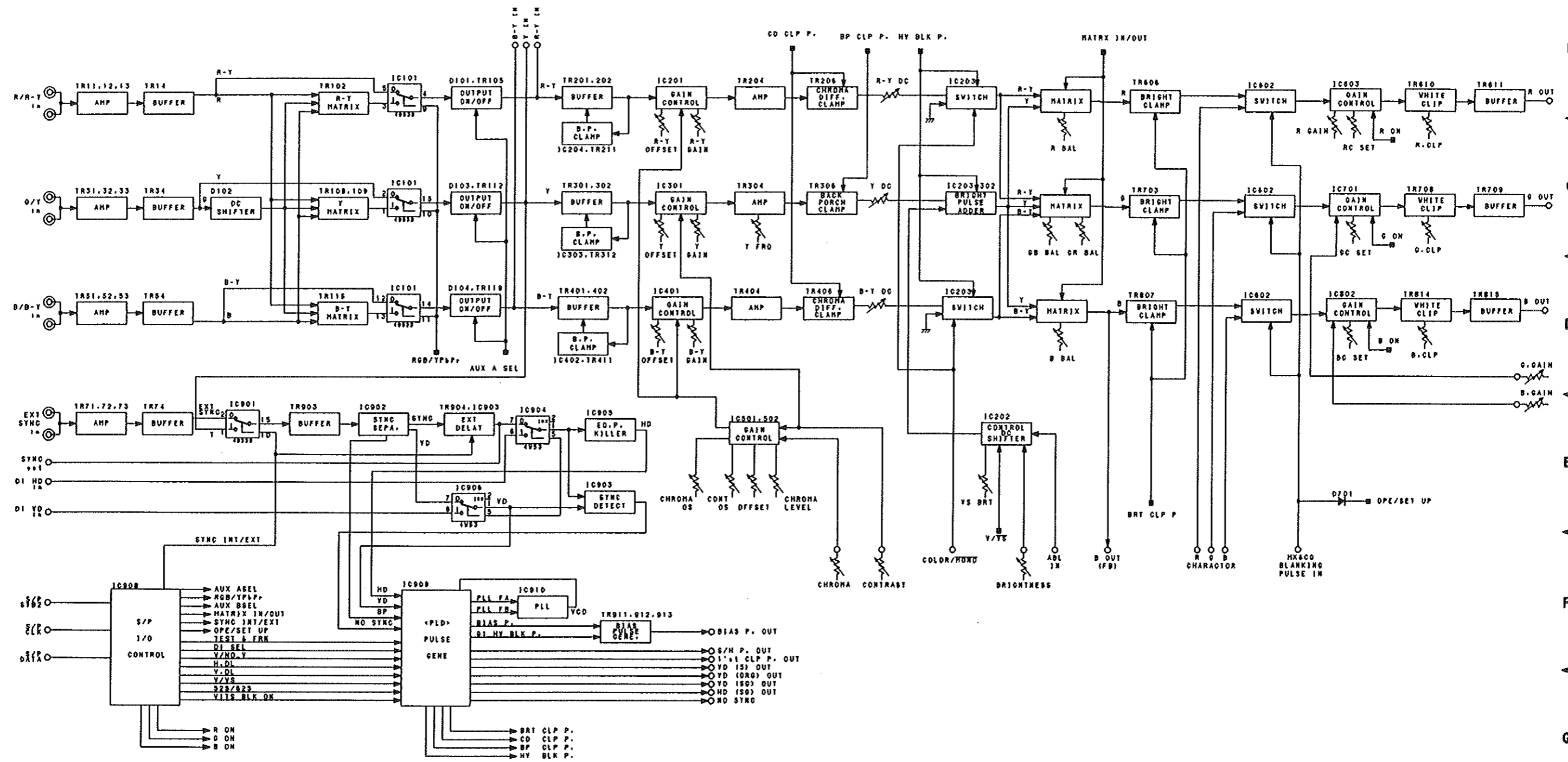
1. Connect the probe to TP101 on the RGB OUT BOARD.
2. Set CHROMA to "PRESET," and set CONT to the MANUAL mode and set it to MAX.
3. Adjust VR603 so that the signal level becomes 70Vp-p.



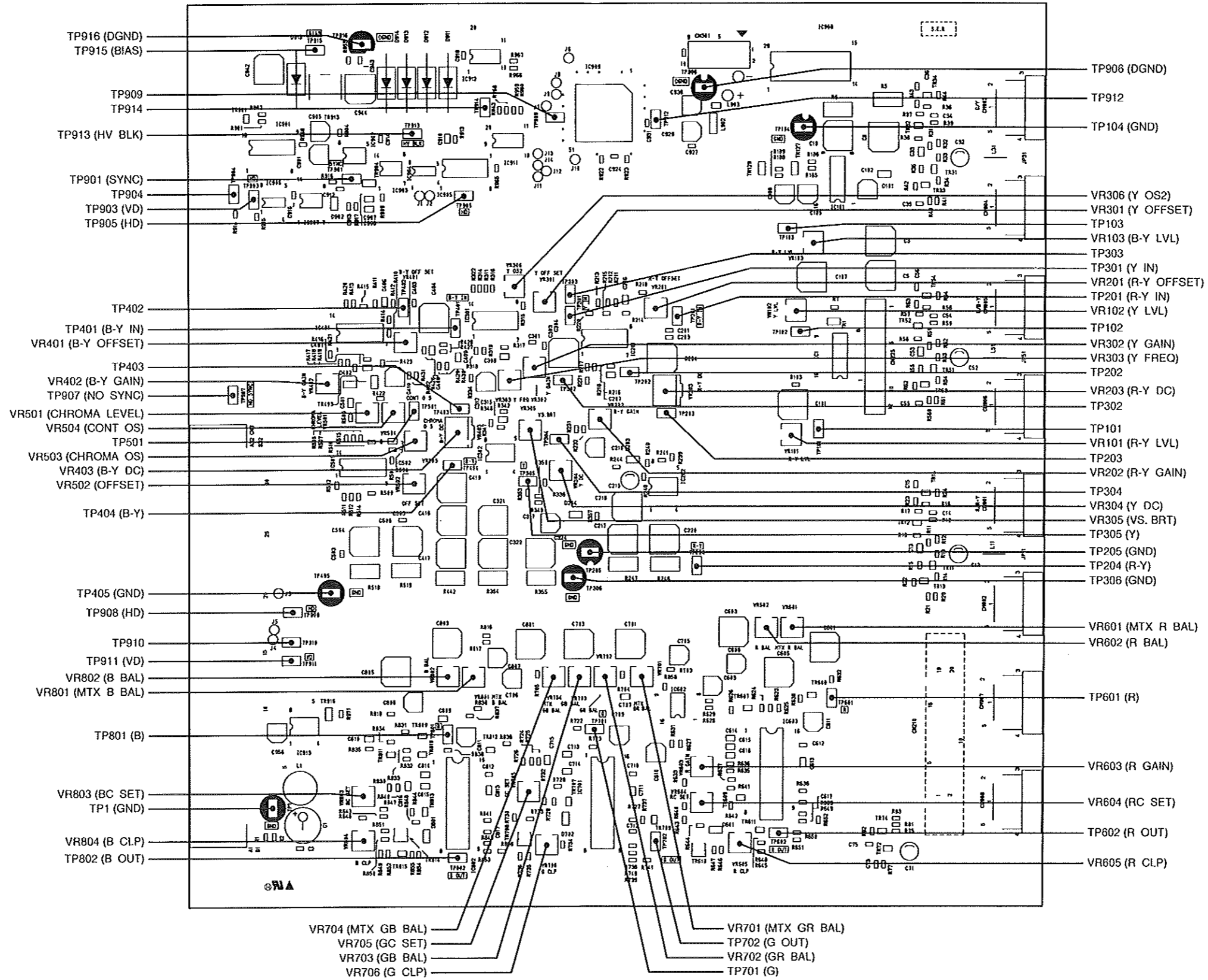
■ Timing chart



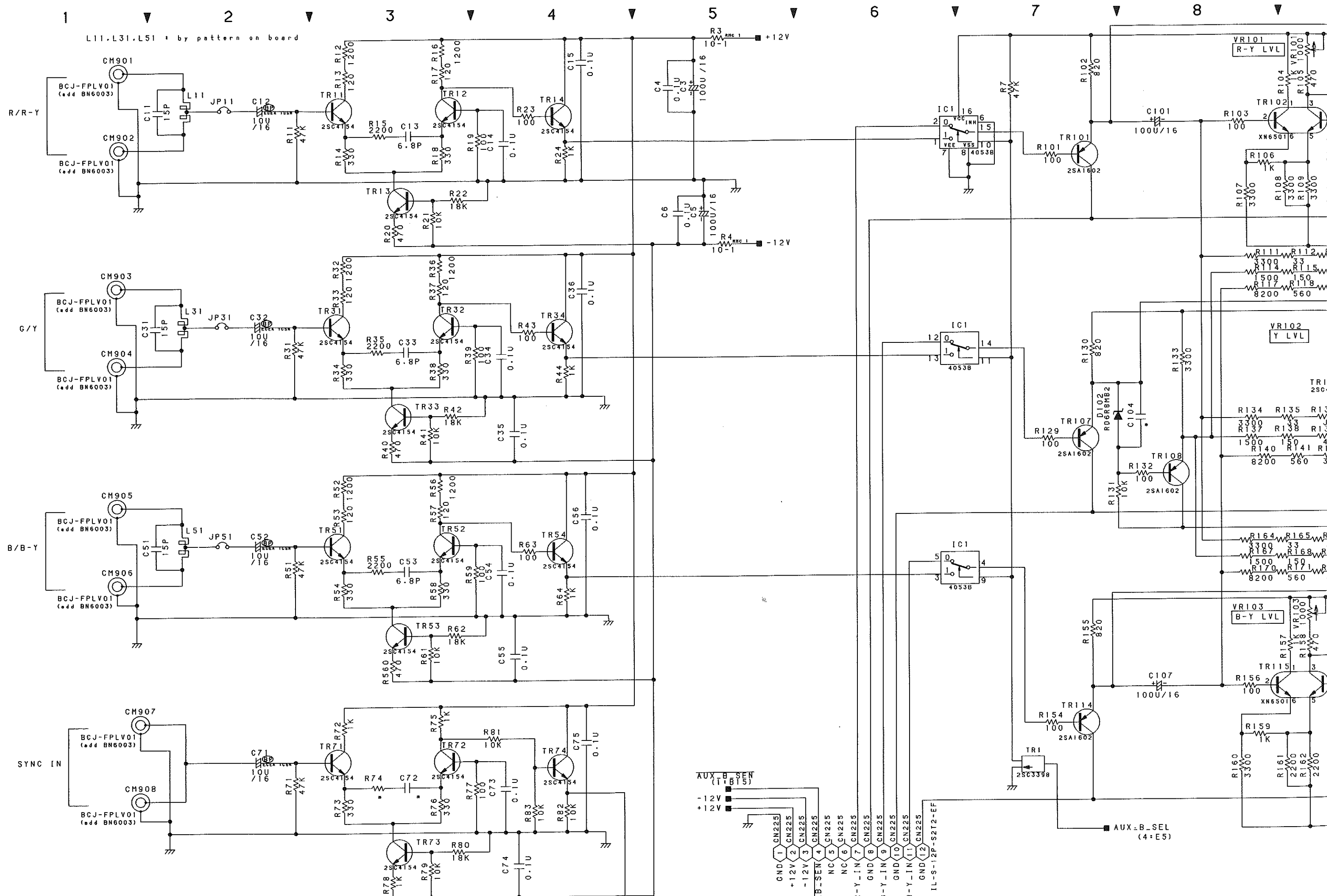
1 2 3 4 5 6 7 8 9 10 11 12

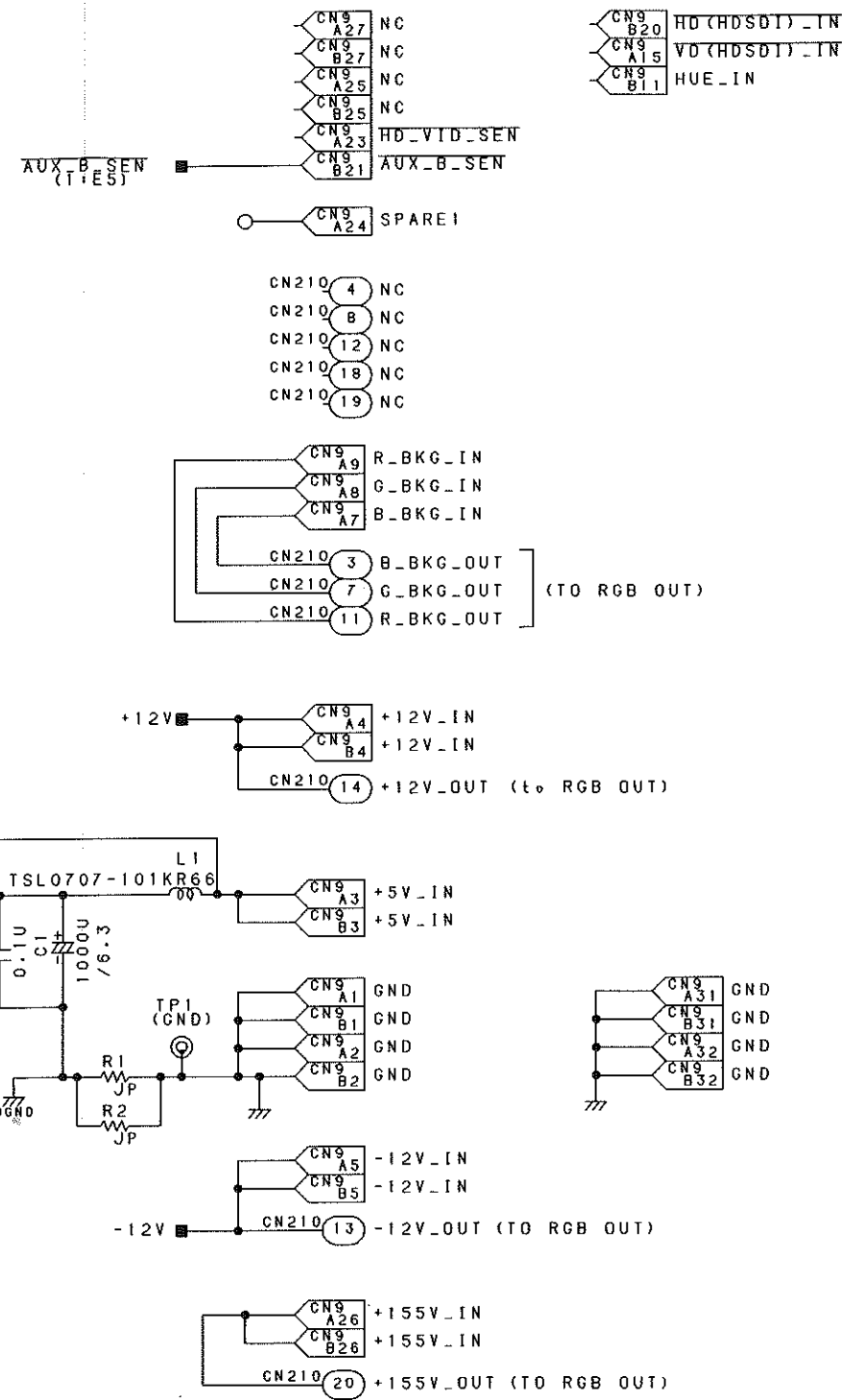
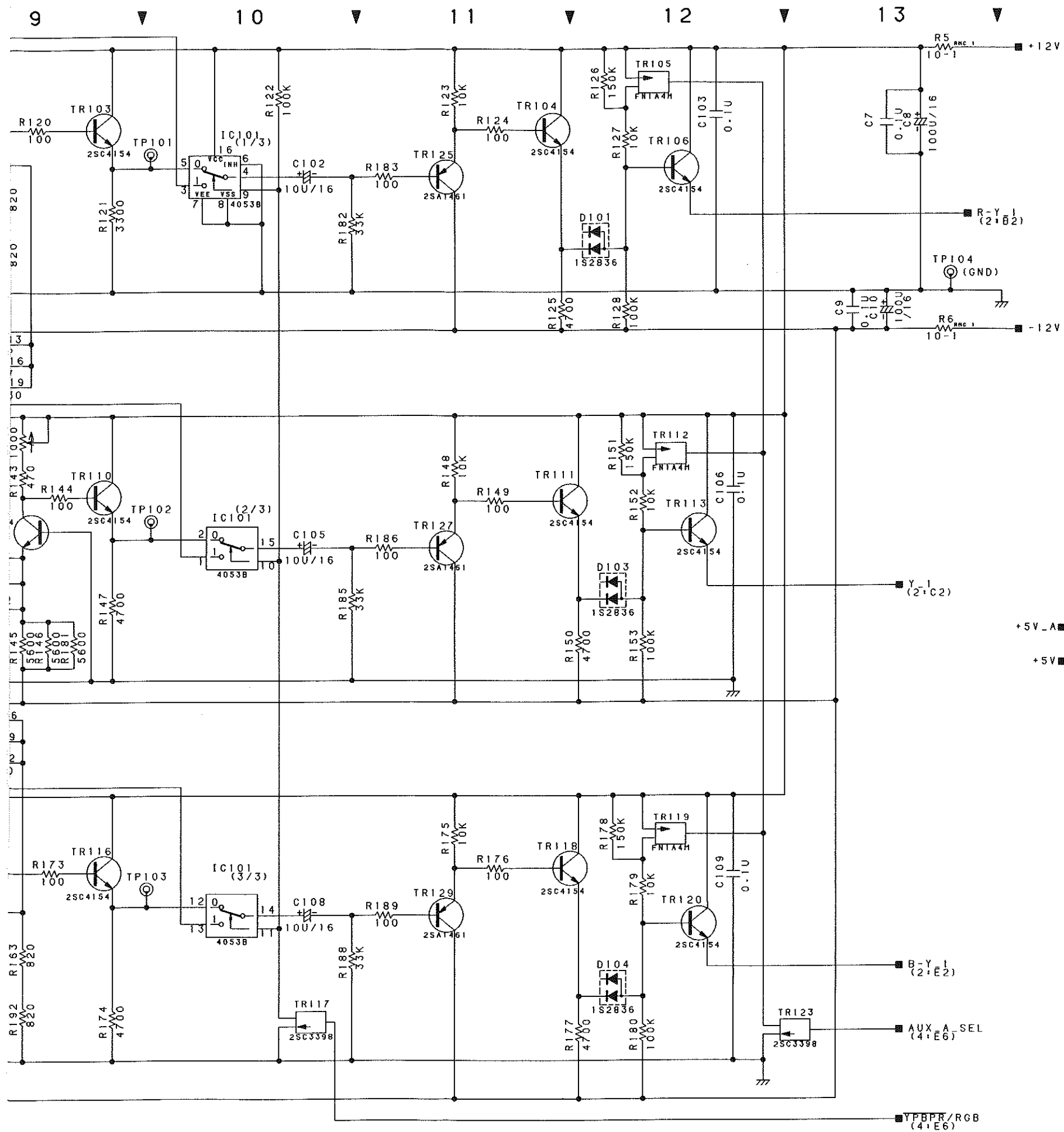


VIDEO PROCESS BOARD
Block Diagram
C3-905514



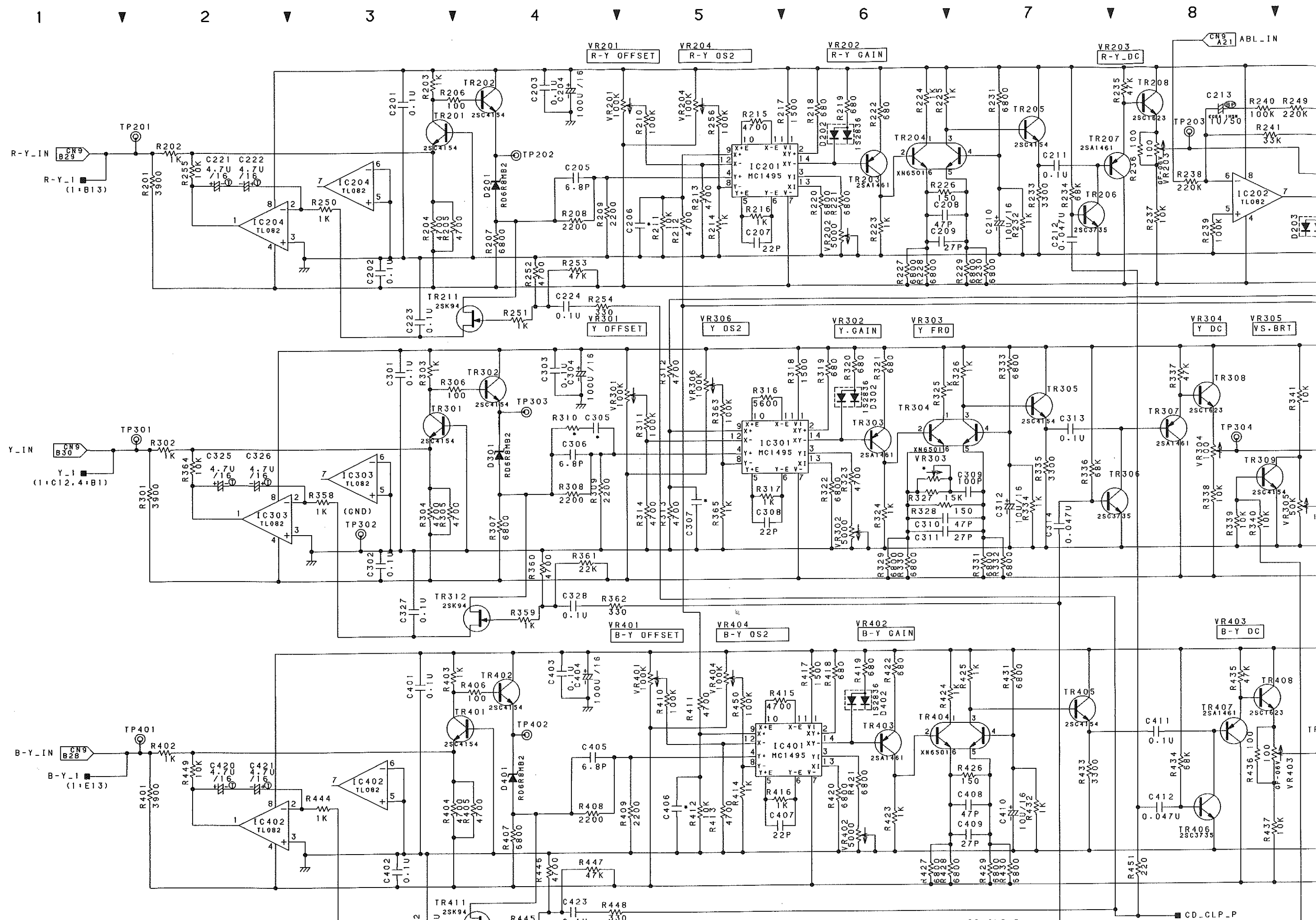
VIDEO PROCESS BOARD
Parts Location



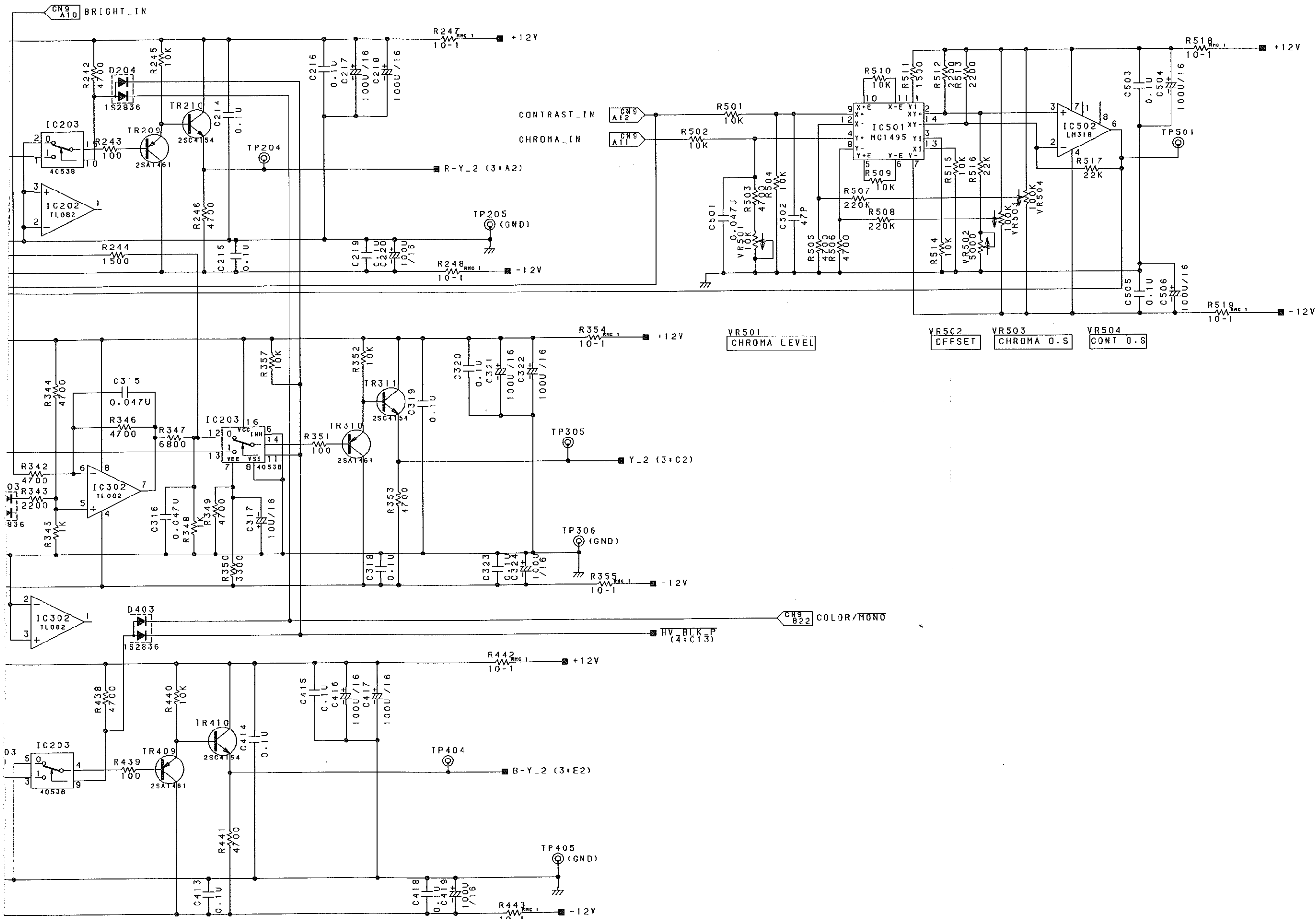


CN9: PCN12A-64P-2.54DS
 CN210: HIF3-20PA-2.54DSA

VIDEO PROCESS BOARD
 Schematic Diagram(1/4)

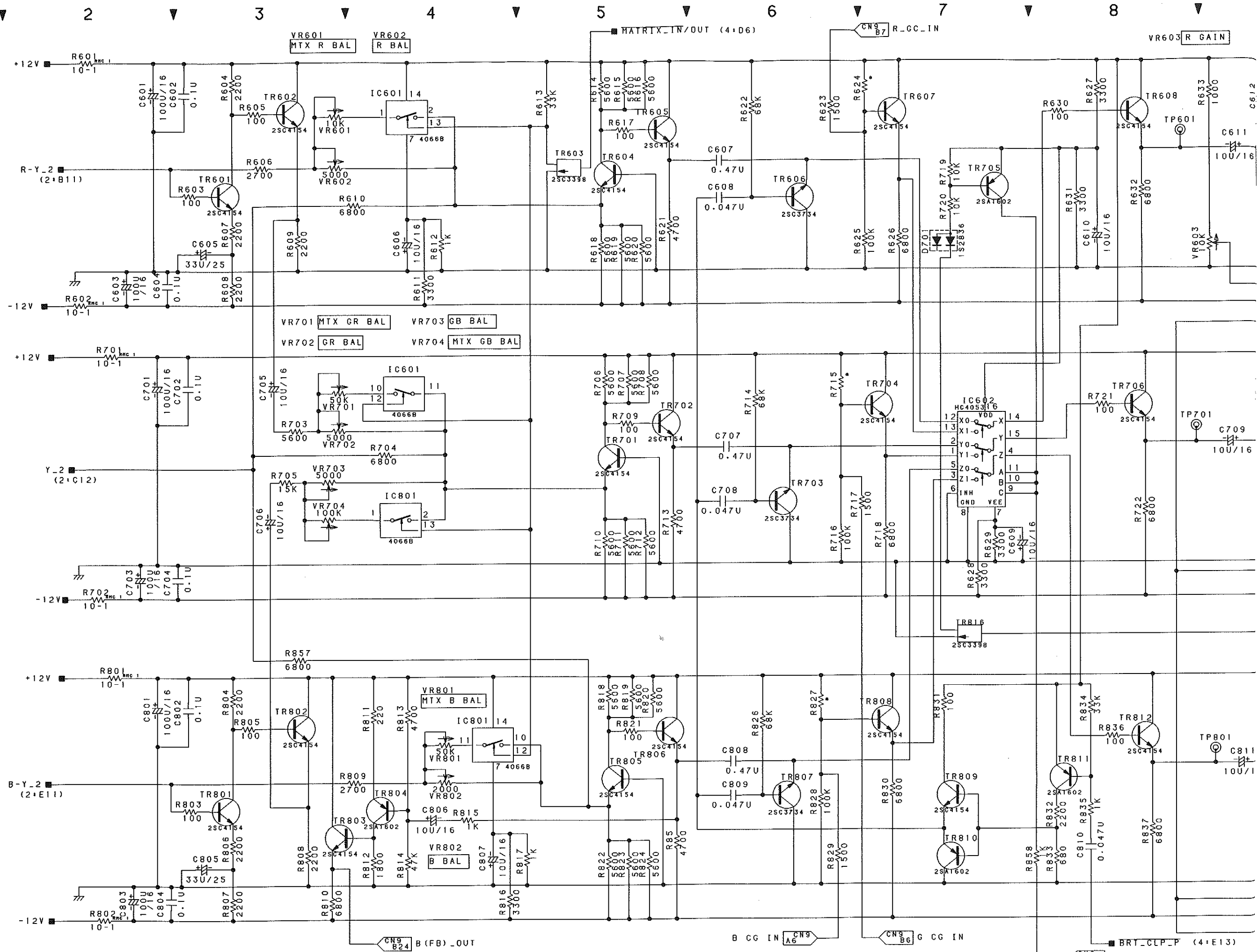


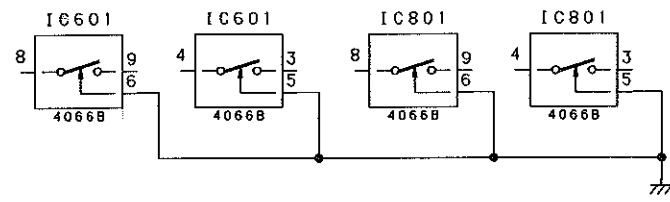
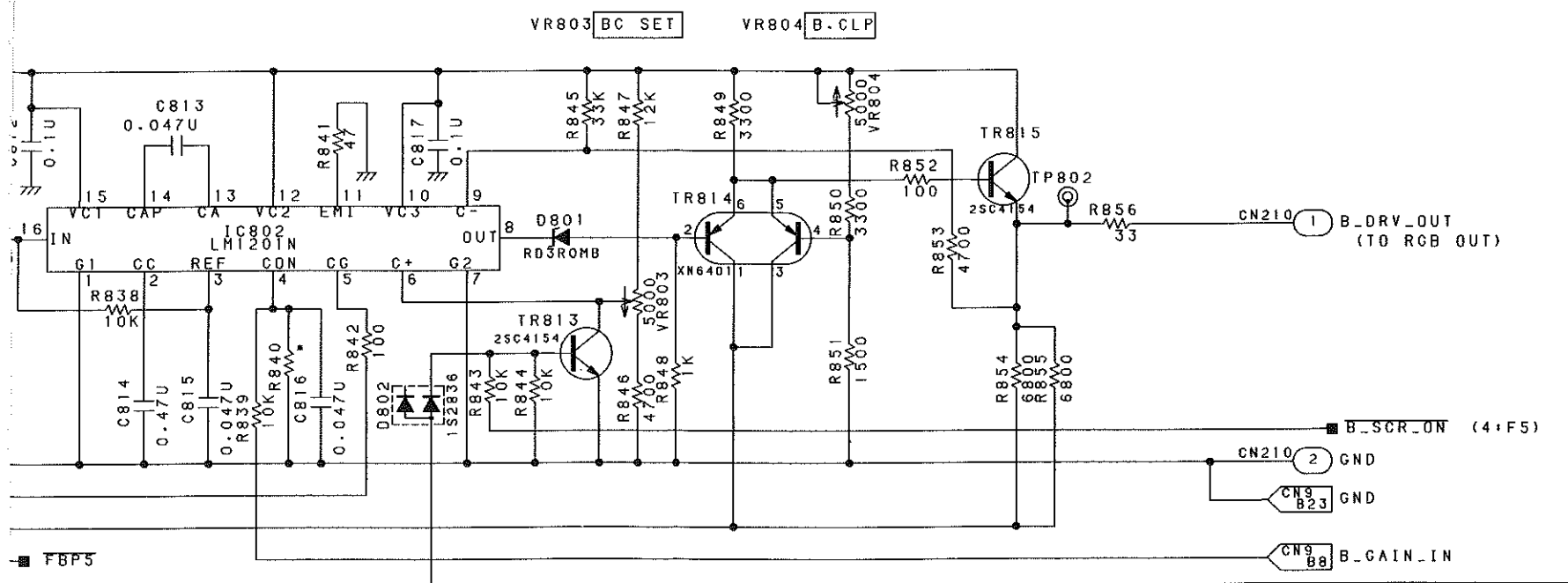
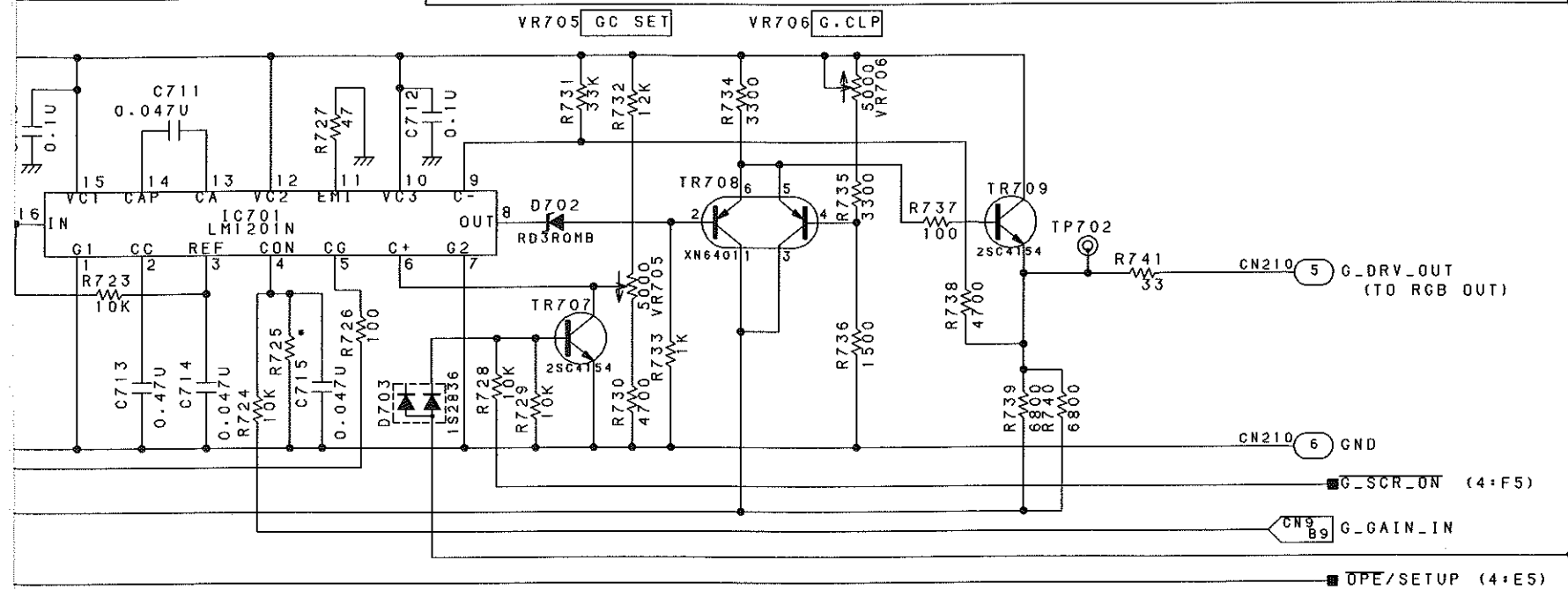
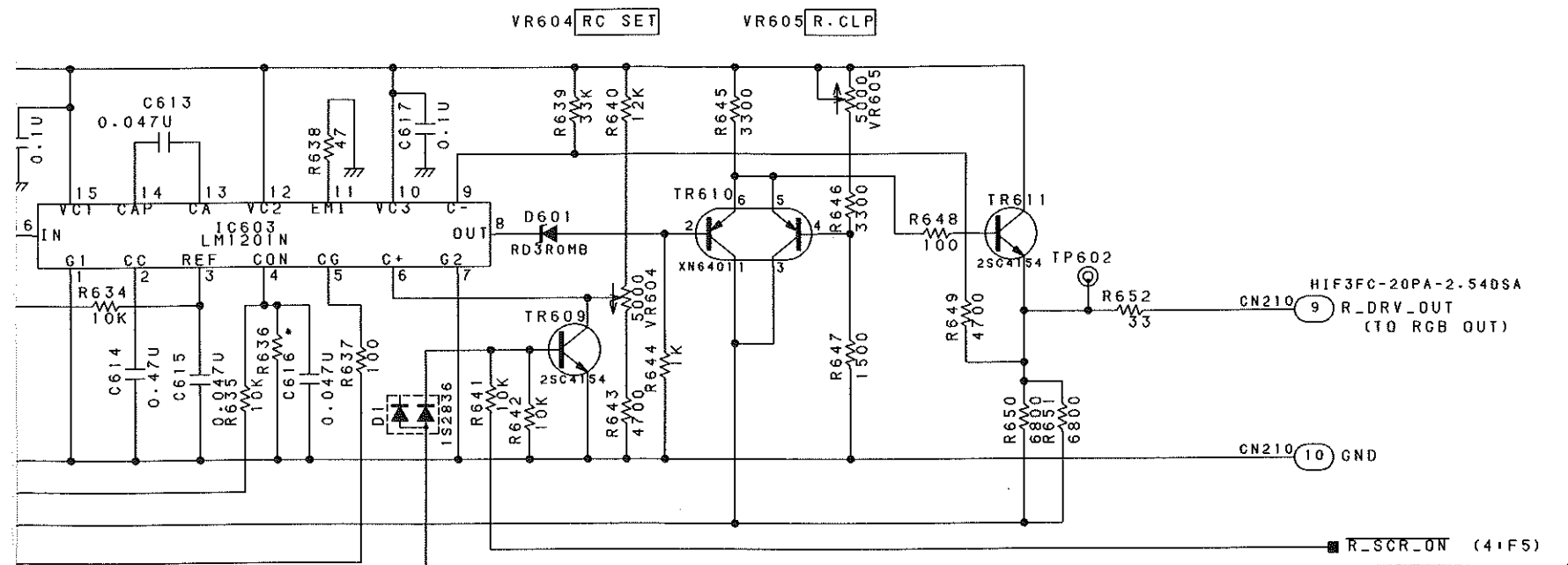
9 10 11 12 13 14 15 16 17



A
B
C
D
E
F

VIDEO PROCESS BOARD Schematic Diagram(2/4)





VIDEO PROCESS BOARD Schematic Diagram(3/4)

1 2 3 4 5 6 7 8

*1 parts contents

MONITOR TYPE	R201	R202
HTM1550	1000	2200
HTM2050	1500	2700

CN201 (TO MOTHER BOARD)
DF1B-20DP-2.5DSA

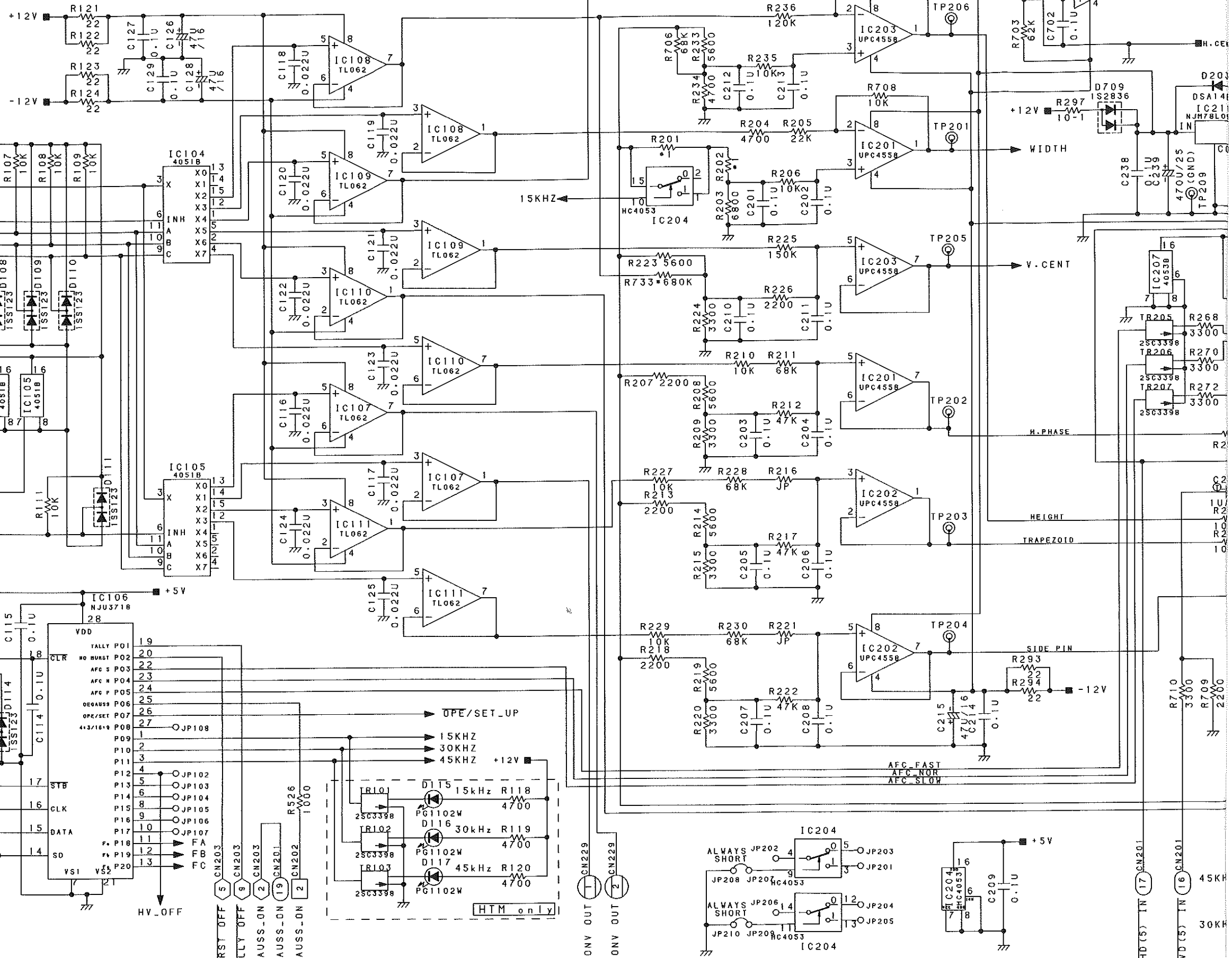
- D/A_DATA (11) CN201
- D/A_INH-1 (13) CN201
- D/A_A (14) CN201
- D/A_B (12) CN201
- D/A_C (10) CN201

- +12V
- 12V
- D/A_INH-2 (15) CN201

- GND (1) CN201
- GND (2) CN201
- GND (3) CN201
- GND (4) CN201

- POWER ON (1) CN202
- POWER ON (1) CN203

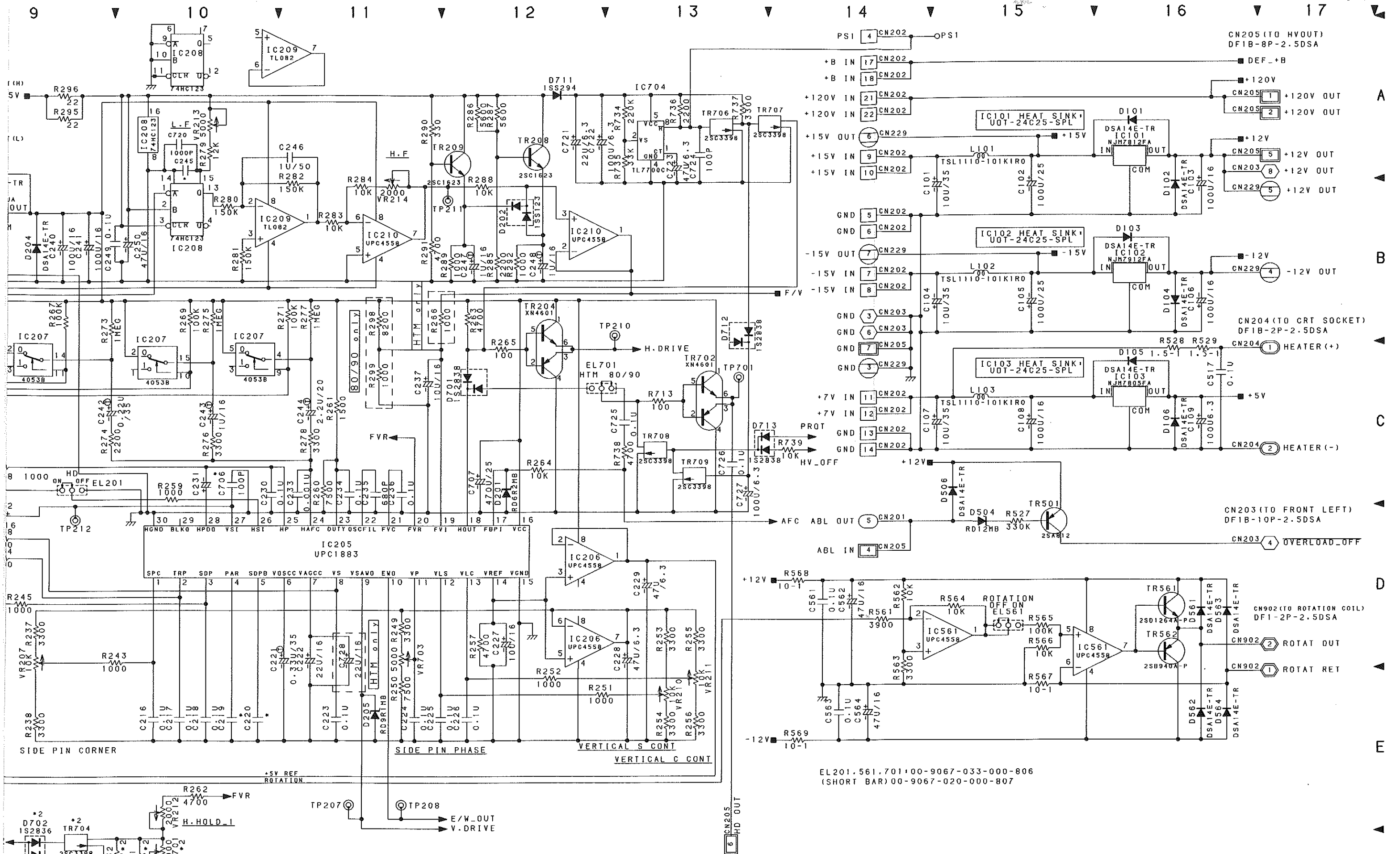
- S/P_STB3 (7) CN201
- S/P_CLK (6) CN201
- S/P_DATA (8) CN201
- WL REM OUT (20) CN201
- WL REM IN (7) CN203



HTM only

.CONV OUT (1) CN229
.CONV OUT (2) CN229

HD (5) IN (17) CN201
VD (5) IN (16) CN201

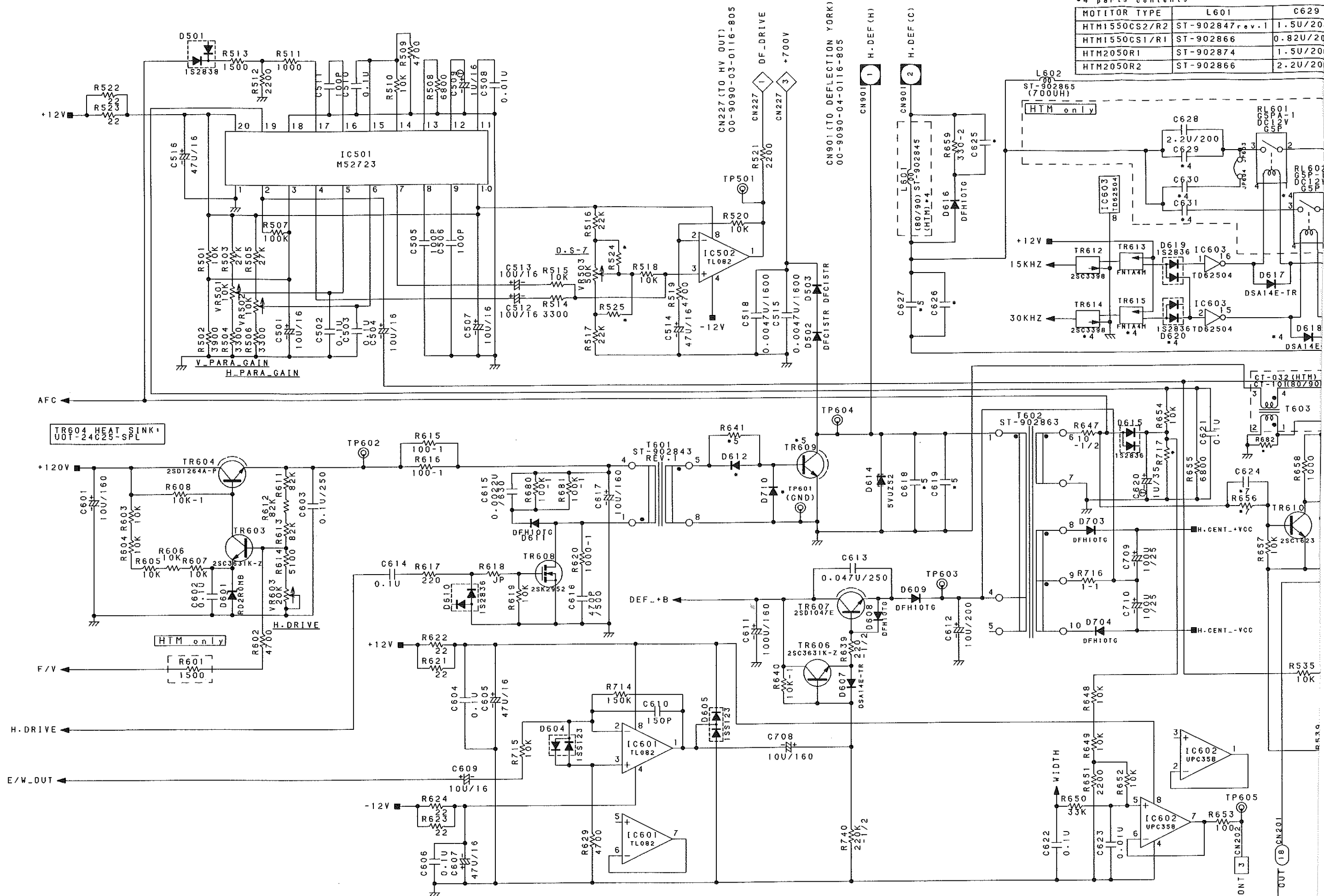


* 2 parts contents

MONITOR TYPE	VR701	VR702	TR704	TR705	D702	D708	R731	R732
HTM1550CS1/R1.HTM2050R1	30KHZ ADJ	15KHZ ADJ	USED	USED	USED	USED	NOT USED	NOT USED
HTM1550CS2/R2.HTM2050R2	NOT USED	15KHZ ADJ	NOT USED	USED	NOT USED	USED	NOT USED	USED
80/90 SERIES	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	USED	NOT USED

DEF BOARD Schematic Diagram(1/2)

EL201, 561, 701, 100-9067-033-000-806
(SHORT BAR) 00-9067-020-000-807



*4 parts contents

MOTOR TYPE	L601	C629
HTM1550CS2/R2	ST-902847 rev.1	1.5U/200
HTM1550CS1/R1	ST-902866	0.82U/200
HTM2050R1	ST-902874	1.5U/200
HTM2050R2	ST-902866	2.2U/200

TR604 HEAT SINK:
UOT-24C25-SPL

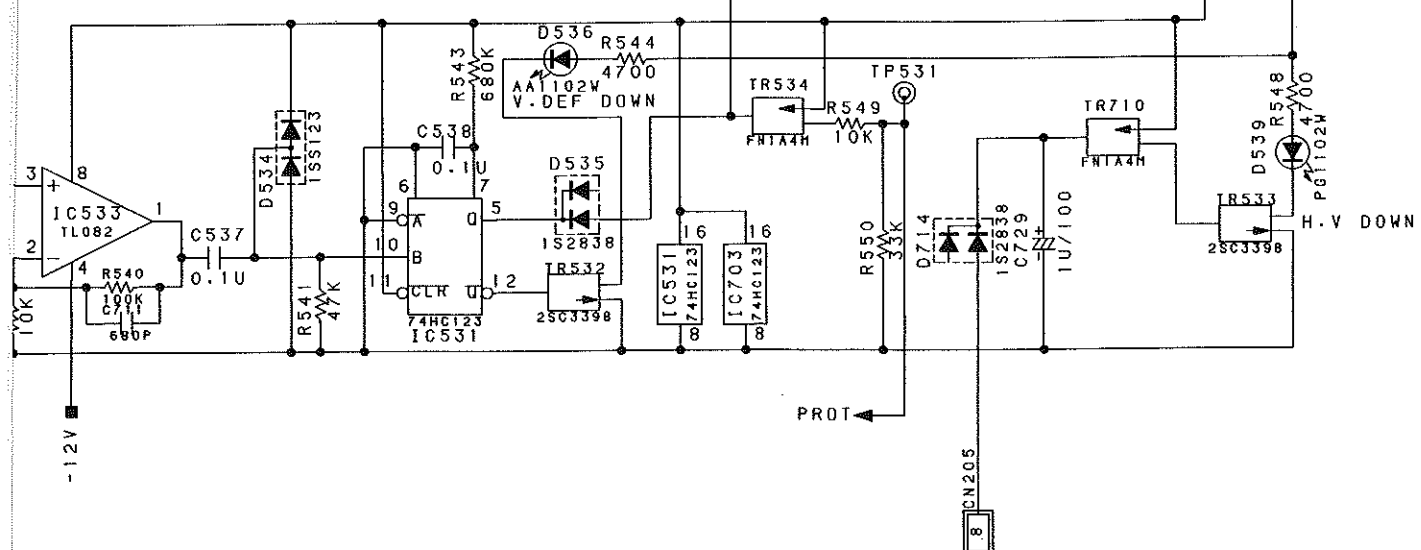
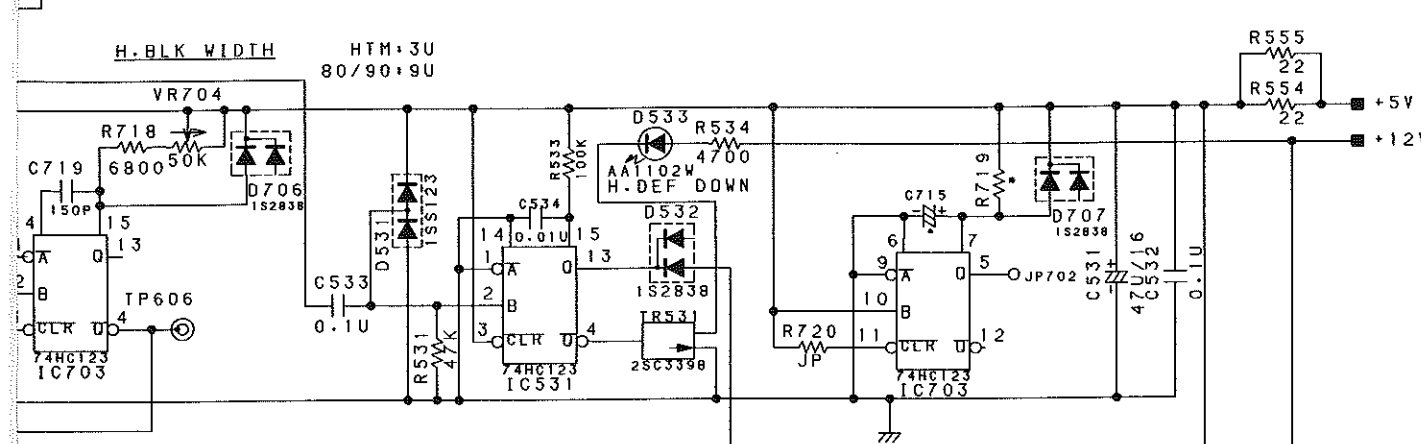
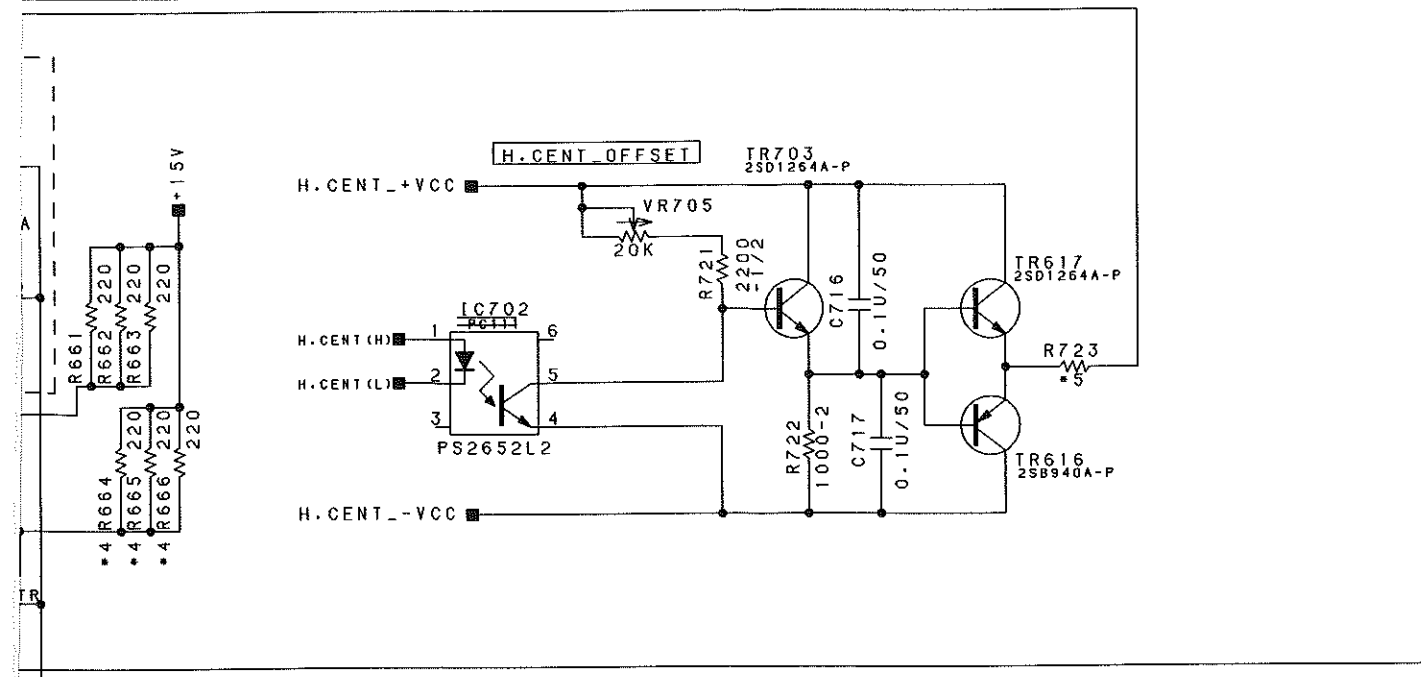
HTM only

HTM only

18 CN201

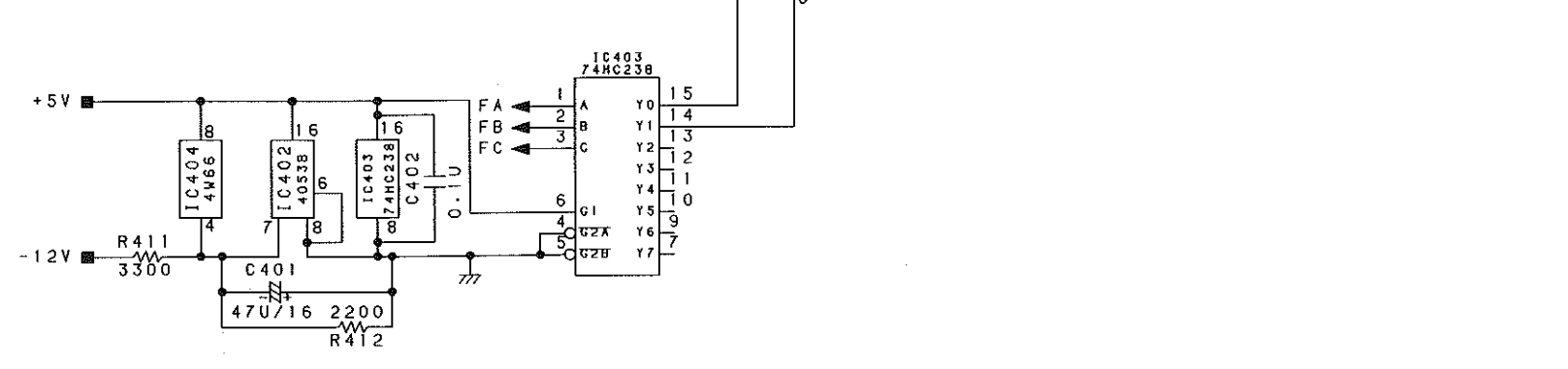
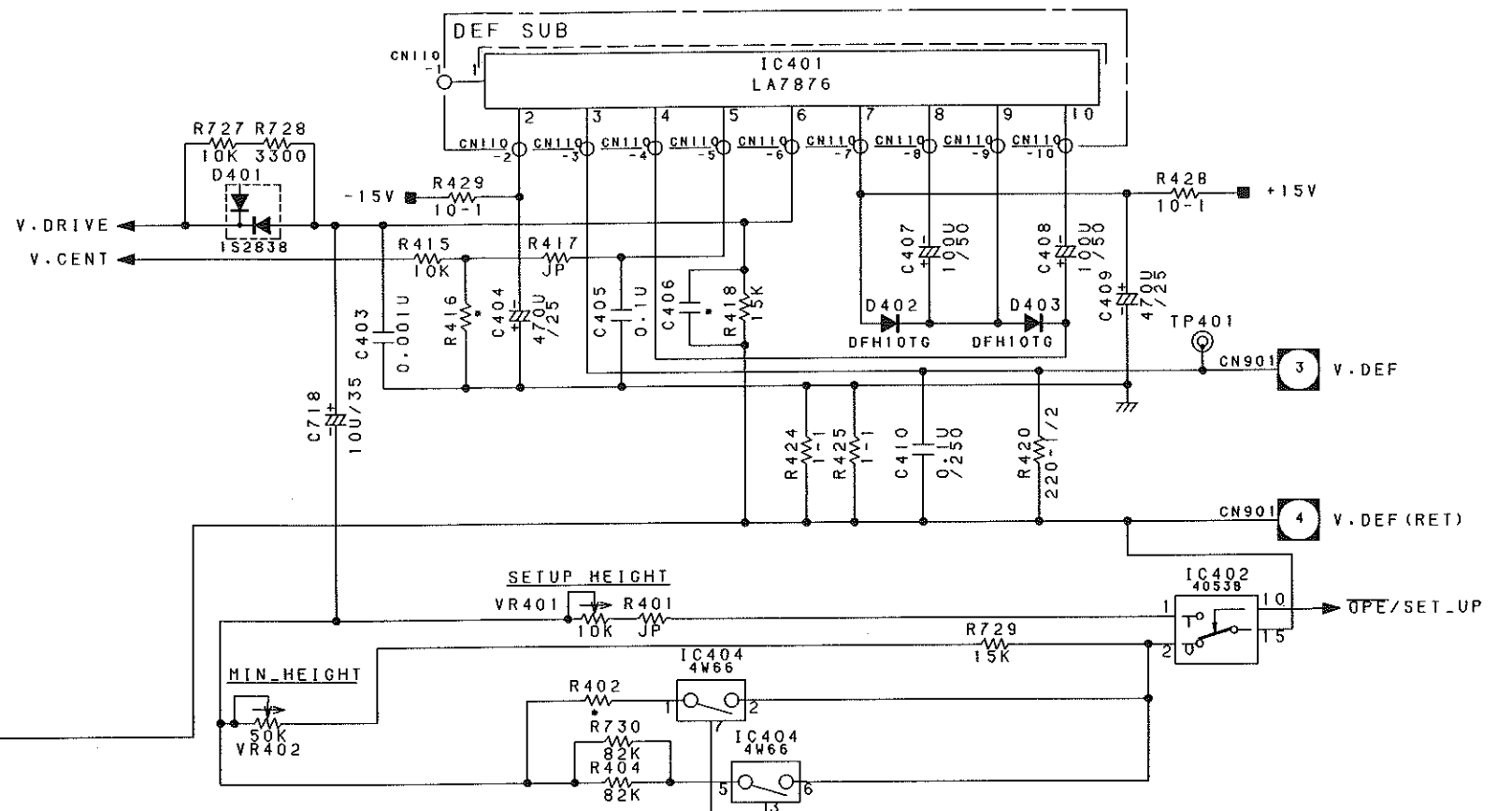
9 10 11 12 13 14 15 16 17

	C630	C631	TR614	TR615	D620	D618	RL602	R664	R665	R666
V	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED
0V	2.2U/200V	NOT USED	USED	USED	USED	USED	USED	USED	USED	USED
V	3.3U/200V	2.2U/200V	USED	USED	USED	USED	USED	USED	USED	USED
V	NOT USED	3.3U/200V	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED	NOT USED



*7 parts contents

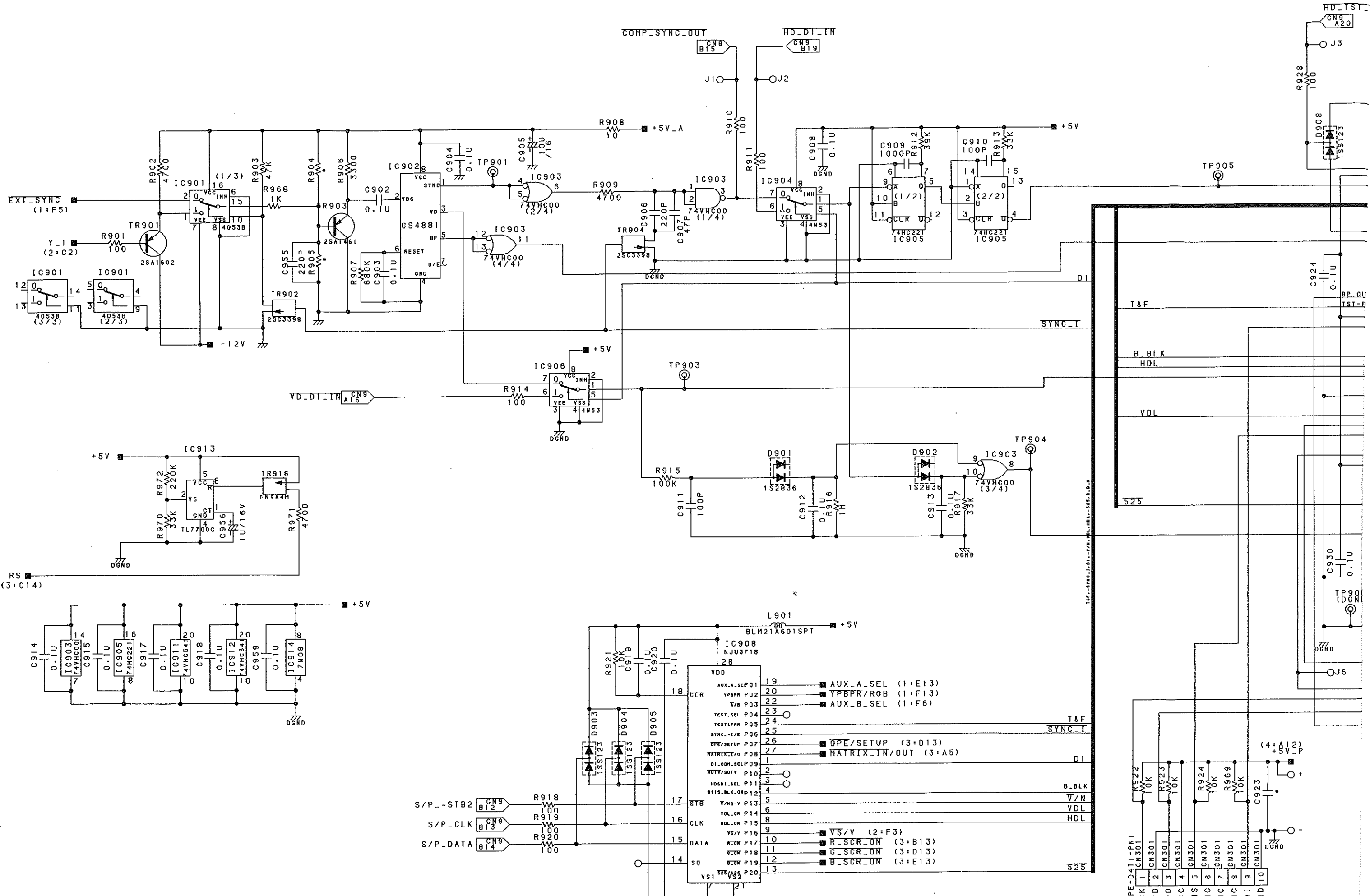
MONITOR TYPE	R656	C624
HTM1550CS1/R1, HTM2050R1	2200	NOT USED
HTM1550CS2/R2, HTM2050R2	2200	NOT USED
80/90 SERIES	47K	47P

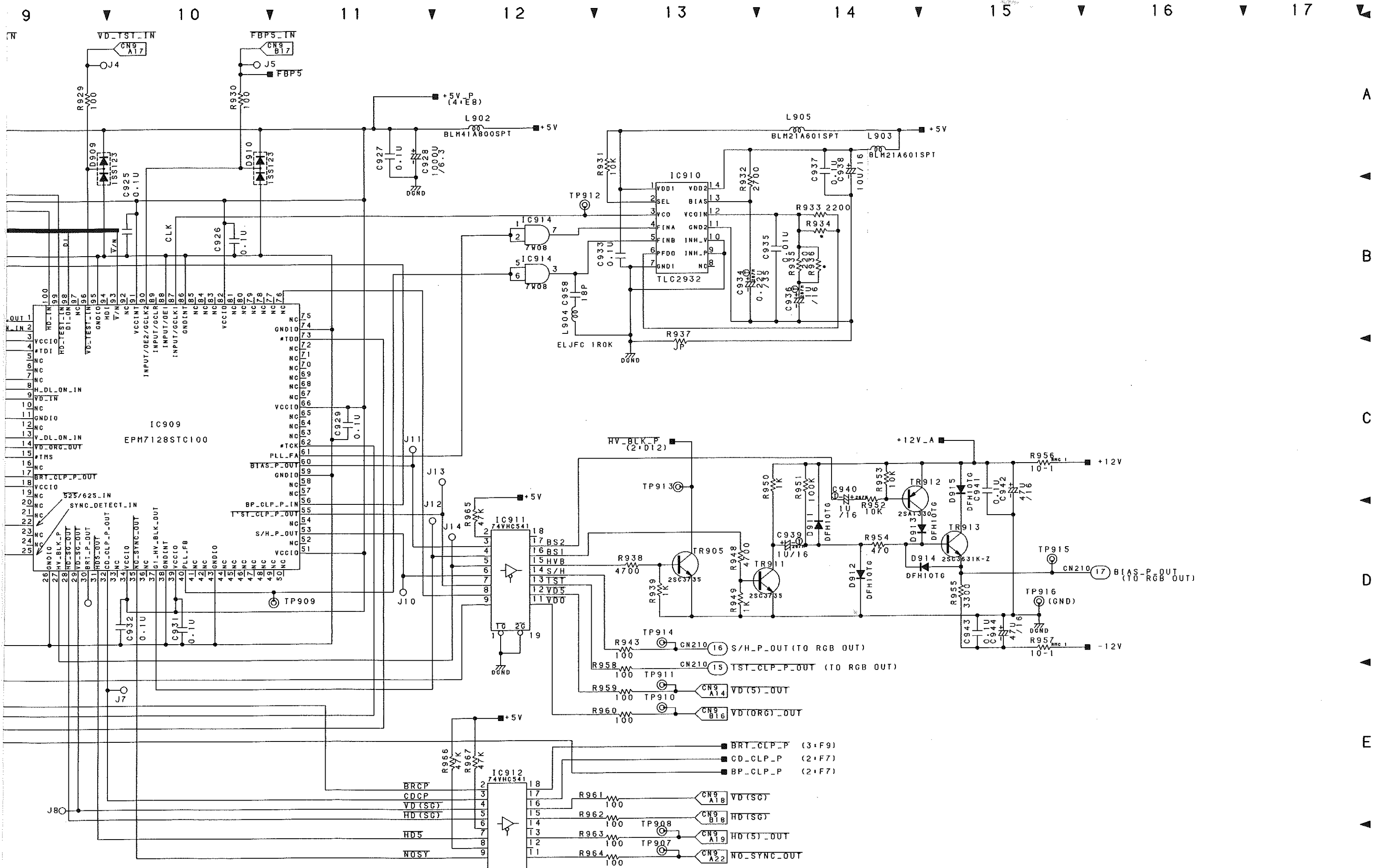


*5 parts contents

MONITOR TYPE	C618	C619	TR609	C627	R641	R723
HTM1550CS2/R2	0.0015U/1800VHP	0.0015U/1800VHP	2SC5150	0.82U/200V	1-3W	10-2W
HTM1550CS1/R1	0.0015U/2000VDC	0.0022U/2000VDC	2SC5144	0.82U/200V	0.47-3W	10-2W
HTM2050R1	0.0033U/2000VDC	0.0033U/2000VDC	2SC5144	1.5U/200V	0.47-3W	10-2W
HTM2050R2	0.0022U/2000VDC	0.0022U/2000VDC	2SC5144	1.5U/200V	0.47-3W	10-2W
80/90SERIES	0.0022U/2000VDC	0.0033U/2000VDC	2SC5144	1.5U/200V	0.47-3W	33-2W

DEF BOARD Schematic Diagram(2/2)





VIDEO PROCESS BOARD Schematic Diagram(4/4)

8.4 DECODER (N) BOARD

(1) Outline

The DE-801 DECODER (N) BOARD is an NTSC type "3-line Comb Filter Board"

(2) Feature

- The digital delay is driven by clock 8fsc(28.6MHz), resulting in the wide band width of video.
- As *V. logic circuit is mounted on this board, it serves to reduce cross luminance of image, even if it lacks vertical correlation, so that natural image can be reproduced.

*: Licensed by Faroudja Laboratories.

(3) Explanation of each circuit

(a) 3-line comb filter circuit

Either the video signal supplied from the INTERFACE BOARD or D2 signal is selected with analog switch IC1 and output to pin 4 of IC1.

And it is separated into luminance (Y) signal and chroma (C) signal by 3-line comb filter circuit.

In the normal mode, the video signal is separated into 3 signals;

Original video signal (0H without delay), 1H-delayed signal and 2H-delayed signal come through digital delay circuit consisting of digital line memories IC107, 110, 111, 112 and etc.

Then, the basic 3-line comb output signal is picked up from TR201 to 209 circuits based on 1H-delayed signal. And the signal picked up from the V logic circuits consisting of TR210 to 225, IC201 and IC202 is added to these 3-line comb output signals at TR226 and 227 to correct incomplete portion, thereby reproducing chroma waveform.

In the process of reproducing the luminance signal, 1H delayed signal is inverted and amplified through TR232, 233 and 234.

And its phase is corrected to match with the above mentioned chroma waveform in the Y delay circuit consisting of DL203, TR235, DL204 and TR236.

Then, the chroma waveform that is inverted and amplified through TR242 and 228 is subtracted from the 1H-delayed signal in TR237, so that luminance signal is reproduced.

In the trap mode, the V logic circuit is turned off and the 3-line comb filter circuit serves as a band pass filter.

And the luminance signal reproducing circuit outputs a video signal as it is.

(b) Chroma signal demodulating circuit

Either the chroma signal separated by 3-line comb filter circuit or the one from Y/C signal is selected with IC204 and input to IC401 and IC402.

The 3.58MHz sine wave supplied from the subcarrier

oscillator is added to the ICs to demodulate R-Y signal and B-Y signal.

The phase equalizer consisting of TR405, VR404, L406, C418, TR408, VR406, L409 and C427 corrects the phase of these demodulated R-Y and B-Y signals.

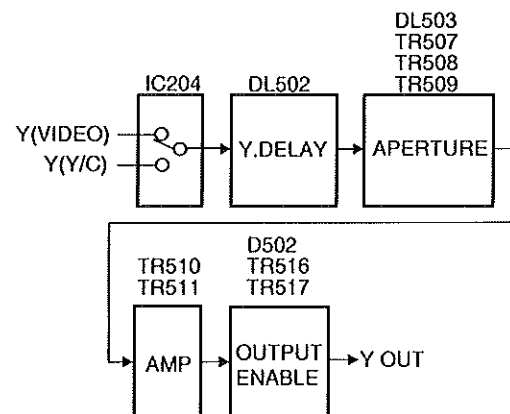
R-Y and B-Y signal are given to (D503,504, TR 521,522,527 and TR528) VIDEO PROC BOARD through the enable circuit.

(c) Y signal processing circuit

Either the Y signal separated by 3-line comb filter circuit or the one from Y/C signal is selected with IC204 and input to Y DELAY (DL502) so that its phase meets with the demodulated chroma signal.

Coming through the 3.58MHz trap circuit consisting of TR505, L502, C503, C537 and R515 (passing through when COMB is selected) and the aperture circuit consisting of TR507 to 509 and DL503, this signal is adjusted for Y signal level by differential amplifier (TR510 and TR511).

The back porch of Y signal is clamped at TR513 and this signal is supplied to the VIDEO PROC BOARD through the output enable circuit (D502, TR516 and TR517).



(d) Color hold circuit

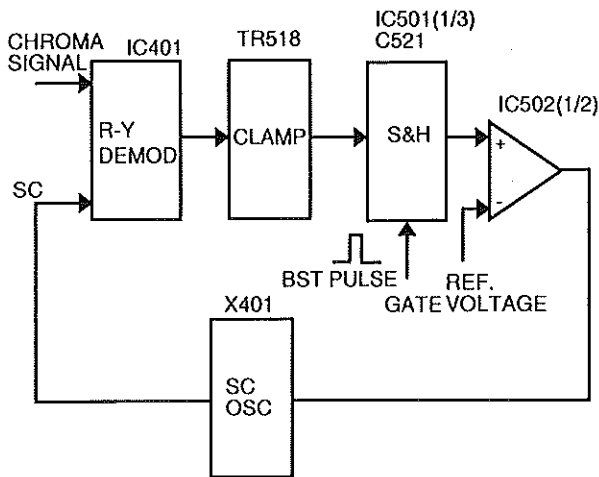
The portion of SYNC signal (without the chroma component) on the demodulated R-Y signal is clamped at TR518.

Then, its burst portion is picked up in the sample & hold circuit consisting of IC501 and C521, and its DC voltage is compared with the reference voltage applied to pin 2 of IC205.

The result is used to control the subcarrier oscillator, thereby stabilizing the oscillating frequency and phase.

The burst phase is orthogonal to the R-Y axis in this process, so if hue is not changed and while the reference voltage is zero, the color hold is properly adjusted.

On the other hand, changing reference voltage at IC502 (2/2) and IC503 control hue.

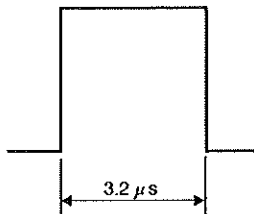


(4) Adjustment procedure

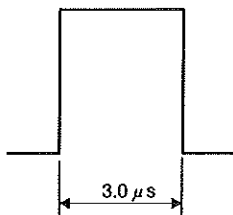
Adjust the preset level of hue and chroma to 50% by drawer panel.

**(a) VR407 :CL PHASE
VR408 :CL WIDTH**

1. Input the color bar signal.
2. Connect the oscilloscope probe to TP403.
3. Adjust VR407 so that its pulse width is 3.2µs.



4. Connect the probe to TP404.
5. Adjust VR408 so that its pulse width is 3.0µs.



(b) L401

1. Input the color bar signal.
2. Connect the probe to TP401.
3. Adjust L401 so that its 3.58MHz reference oscillating level is maximized (0.5Vp-p to 0.6Vp-p).

(c) VR108 :AD_LO

1. Input the color bar signal.
2. Connect the probe to TP103.
3. Disconnect the 75Ω termination of the input signal.
4. Adjust VR108 so that its waveform is not saturate vertically.

**(d) VR102 :0H_LVL
VR104 :1H_PHASE**

**VR106 :1H_LVL
VR105 :2H_PHASE
VR107 :2H_LVL**

1. Input the color bar signal.
2. Connect the probe to TP103 and TP102 and select the ADD mode on the oscilloscope.
3. Adjust VR102, VR104 and VR106 so that their carrier leak is minimized.
4. Connect the probe to TP103 and TP104 and select the ADD mode on the oscilloscope.
5. Adjust VR105 and VR107 so that their carrier leak is minimized.

(e) VR110 :0H DC

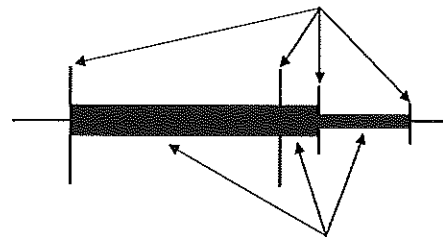
1. Input the color bar signal.
2. Connect the probe to TP200.
3. Turn "OFF" the COMB switch.
4. Adjust VR110 so that it comes to the same level as DC level when COMB switch is turned "ON".

(f) VR208 :0H1H

**VR204 :0H2H
VR201 :COMB D**

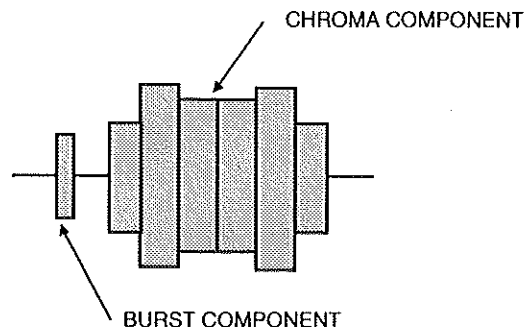
1. Input the color bar signal.
2. Connect the probe to TP206.
3. Viewing at V rate, check the vertical line on border portion of color bar.
4. Adjust VR208 so that level of ② portion is minimized.
5. Connect the probe TP203.
6. Viewing at V rate, check the vertical line on border portion of color bar.
7. Adjust VR204 so that level of ② portion is minimized.

① Check the vertical line



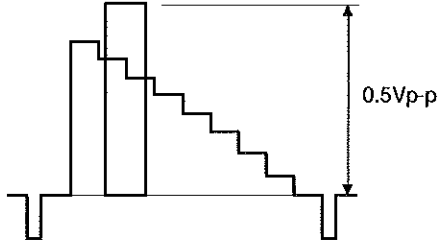
② This signal component is minimized.

8. Connect the probe to TP201.
9. Viewing at H rate, adjust VR201 so that other signal than burst and chroma components is zeroed.



(g) VR209 :Y.P LEVEL
VR109 :TRAP LVL1
VR101 :MONO LEVEL

1. Input the color bar signal.
2. Connect the probe to TP212.
3. Turn "ON" the COMB switch.
4. Adjust VR209 so that its Y level is 0.5Vp-p.



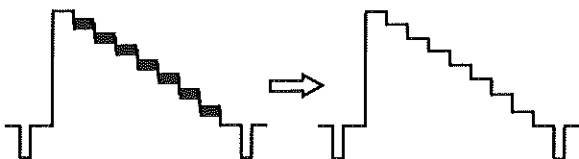
5. Turn "OFF" the COMB switch.
6. Adjust VR109 so that it comes to the same level as Y level when "COMB" switch is turned "ON".
7. Input signals of the same level, one with burst and the other without burst.
8. When the above input signals are switched, adjust VR101 so that the signals are the same level.

(h) VR210 :Y.VL.PHASE
VR211 :Y.VL.LVL

1. Input the color bar signal.
2. Connect the probe to TP212.
3. Reduce subcarrier by adjusting VR210 and VR211.

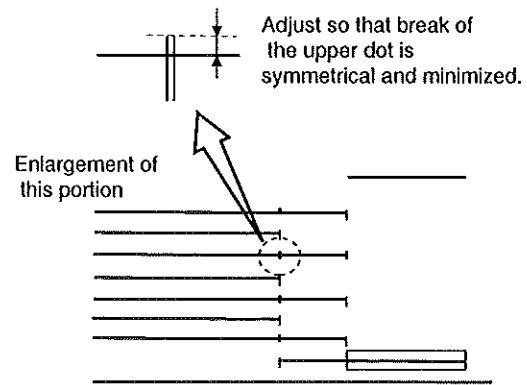
(i) L201
L202
L203
VR202 :PHASE EQ
VR203 :C LVL

1. Input the color bar signal.
2. Connect the probe to TP212.
3. Adjust L201, L202, L203, VR202 and VR203 so that its carrier leak is minimized.



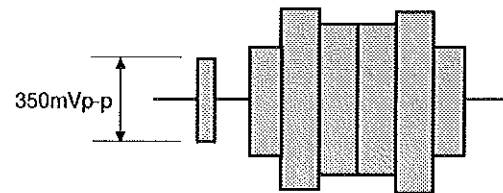
(j) VR212 :C VL PHASE 1
VR205 :C VL PHASE 2
VR206 :C VL LVL
VC201

1. Input the color bar signal.
2. Connect the probe to TP212.
3. Viewing at V rate, adjust VR212, VR205, VR206 and VC201 so that the switched portion of color bar has a minimum chroma component.



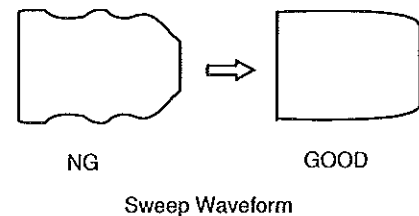
(k) VR214 :CHR LVL

1. Input the color bar signal.
2. Connect the probe to TP402.
3. Adjust VR214 so that its burst level is 350 mVp-p. If VR214 is varied at this time, a carrier leak will occur. Therefore, adjust to minimize the carrier leak.

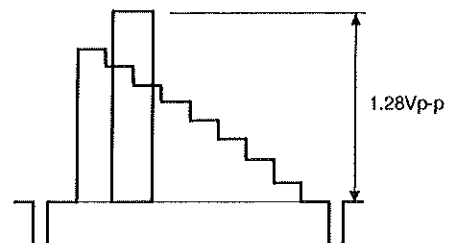


(l) VR501 :MATCH
VR502 :Y.LEVEL
VR503 :APT.OFFSET

1. Input the sweep signal.
2. Connect the probe to TP502.
3. Adjust VR501 so that its waveform is flat.



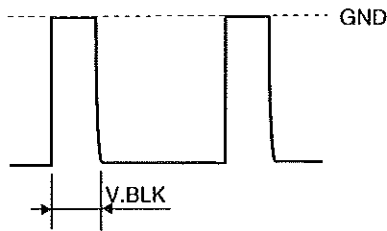
4. Input the color bar signal.
5. Turn "ON" the FORCED COLOR switch of the drawer panel.
6. Adjust VR2 so that its Y level is 1.28Vp-p.



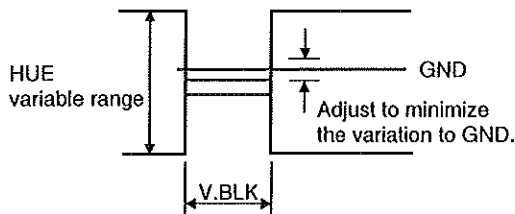
7. Input the sweep signal.
8. Set the aperture level at 20% by means of the APT switch on the drawer panel.
9. Adjust VR503 so that the aperture starts working at this time.

(m) VR504 :HUE HIGH
VR505 :HUE LOW
VR506 :HUE OFFSET

1. Input the color bar signal.
2. Press the HUE Manual Control to protrude it.
3. Connect the probe to pin 7 of IC504.
4. Adjust HUE manual level so that its peak level becomes GND.
5. Connect the probe to TP507.
6. Adjust VR506 so that V.blanking time becomes GND.
If color hold comes off at this time, adjust VR509 (COLOR HOLD).



7. Connect the probe to pin 12 of IC503.
8. Adjust VR505 so that its output becomes GND.
9. Connect the probe to TP504.
10. Adjust VR504 so that V.blanking time becomes GND.
11. Adjust VR505 so that, when the hue is varied from MIN to MAX, variation in the level of V blanking time to GND is minimized.



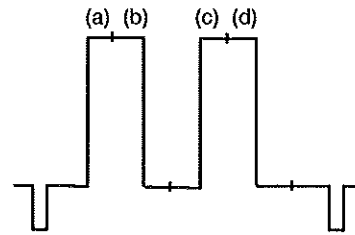
(n) VR509 :COLOR HOLD

1. Turn "ON" the FORCED COLOR switch and the EXT SYNC switch on the drawer panel.
2. Connect the probe to TP602 of VIDEO PROC BOARD inserted into slot No.5.
3. Adjust VR509 so that, when the color bar signal is attenuated up to -50dB, the color hold does not come off.

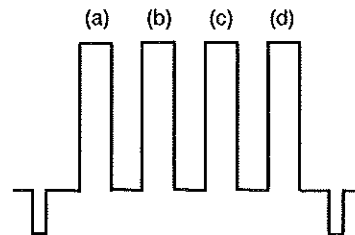
(o) VR403 :R-Y LEVEL
VR405 :B-Y LEVEL
VR507 :SUB HUE
VR508 :TRAP HUE
VR213 :TRAP LVL2
L402

1. Input the color bar signal.
2. Connect the probe to TP402 of VIDEO PROC BOARD.
3. Set the hue preset level at 50% by means of HUE preset switch on the drawer panel.

4. Turn "ON" the COMB switch.
5. Adjust VR403, VR507 so that "a" to "d" in the figure below have the same level.



6. Connect the probe to TP602 of VIDEO PROC BOARD.
7. Adjust VR405, L402 so that "a" to "d" in the figure below have the same level.



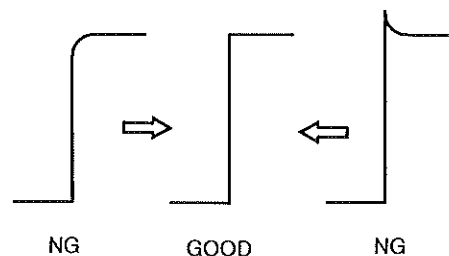
8. Adjust the offset of hue with COMB switch turned "OFF" (difference in level at "(b)" and "(c)" in the above figure) by means of VR508 and adjust the offset of chroma (difference in level at "(a)" and "(d)" in the above figure) by means of VR213.

(p) VR510 :COLOR KILLER

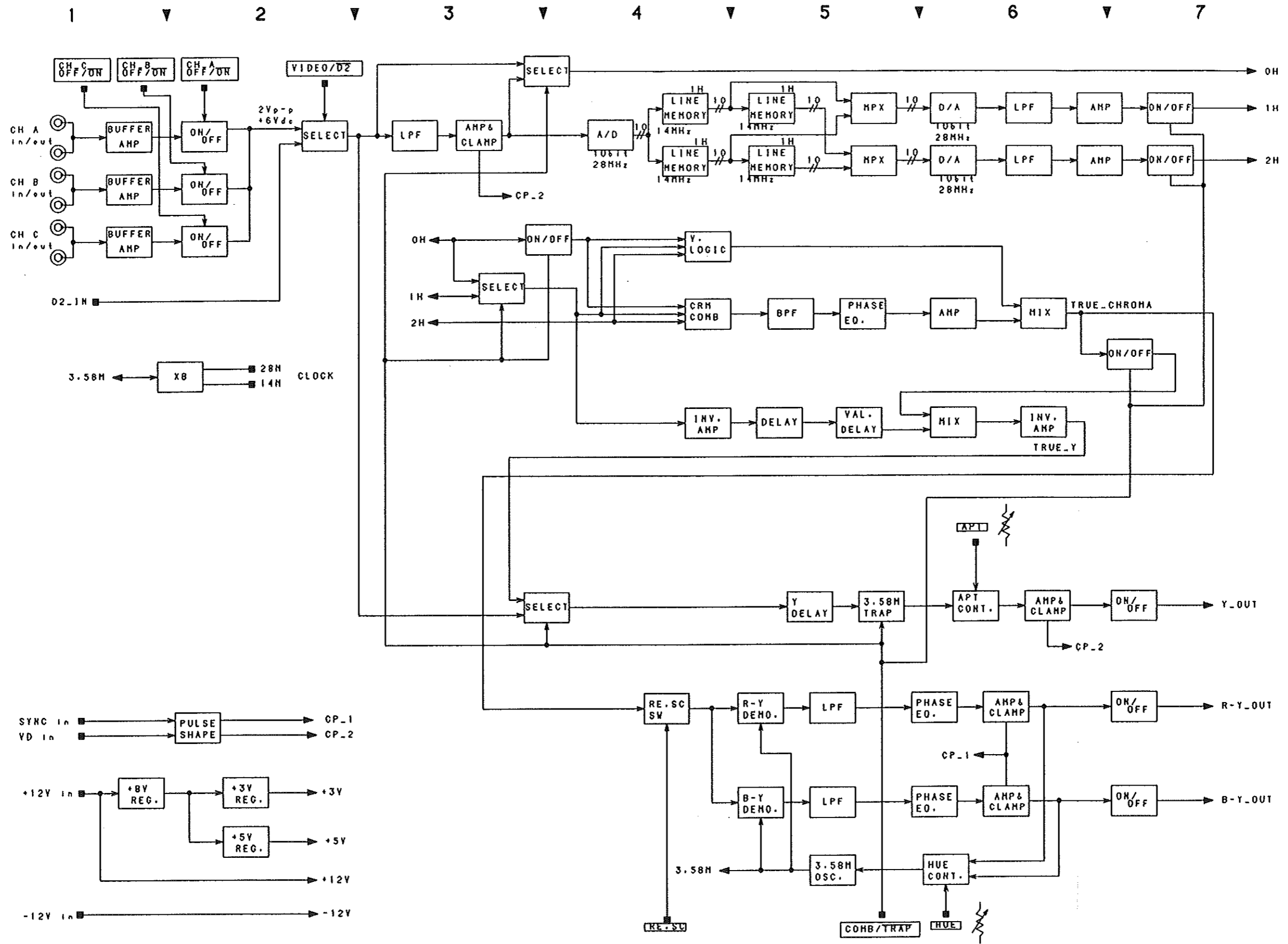
1. Turn "OFF" the FORCED COLOR switch on the drawer panel.
2. Connect the probe to TP602 of VIDEO PROC BOARD.
3. Adjust VR510 so that, when the color bar signal is attenuated to -18dB by means of the attenuation and input, the color killer is activated.

(q) VR404 :R PHASE EQ
VR406 :B PHASE EQ

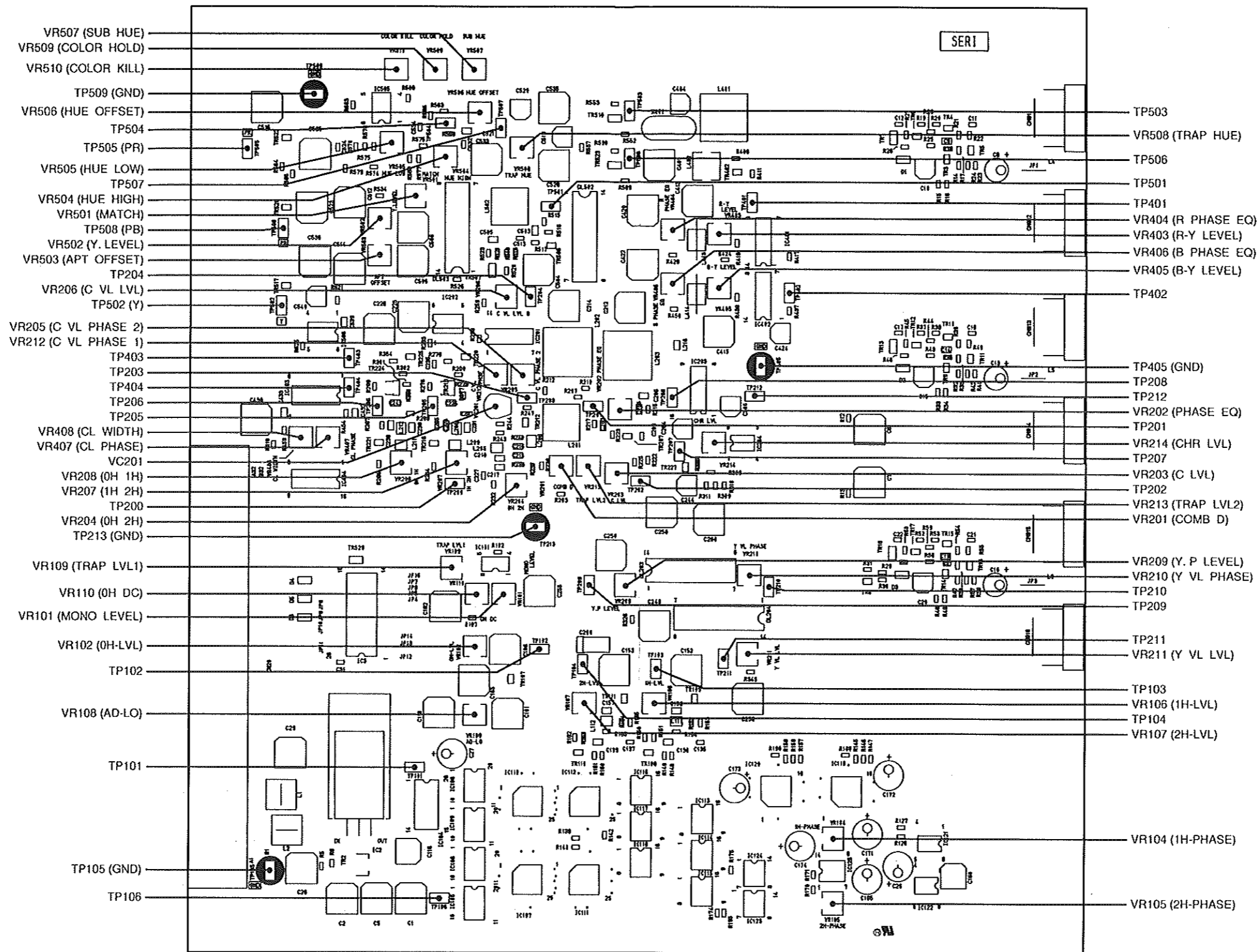
1. Input the color bar signal.
2. Connect the probe to TP402 of VIDEO PROC BOARD.
3. Adjust VR404 so that the leading edge of switched portion of its output waveform has optimum characteristics.



4. Connect the probe to TP602 of VIDEO PROC BOARD.
5. Adjust VR406 so that the leading edge of switched portion of its output waveform has optimum characteristics.



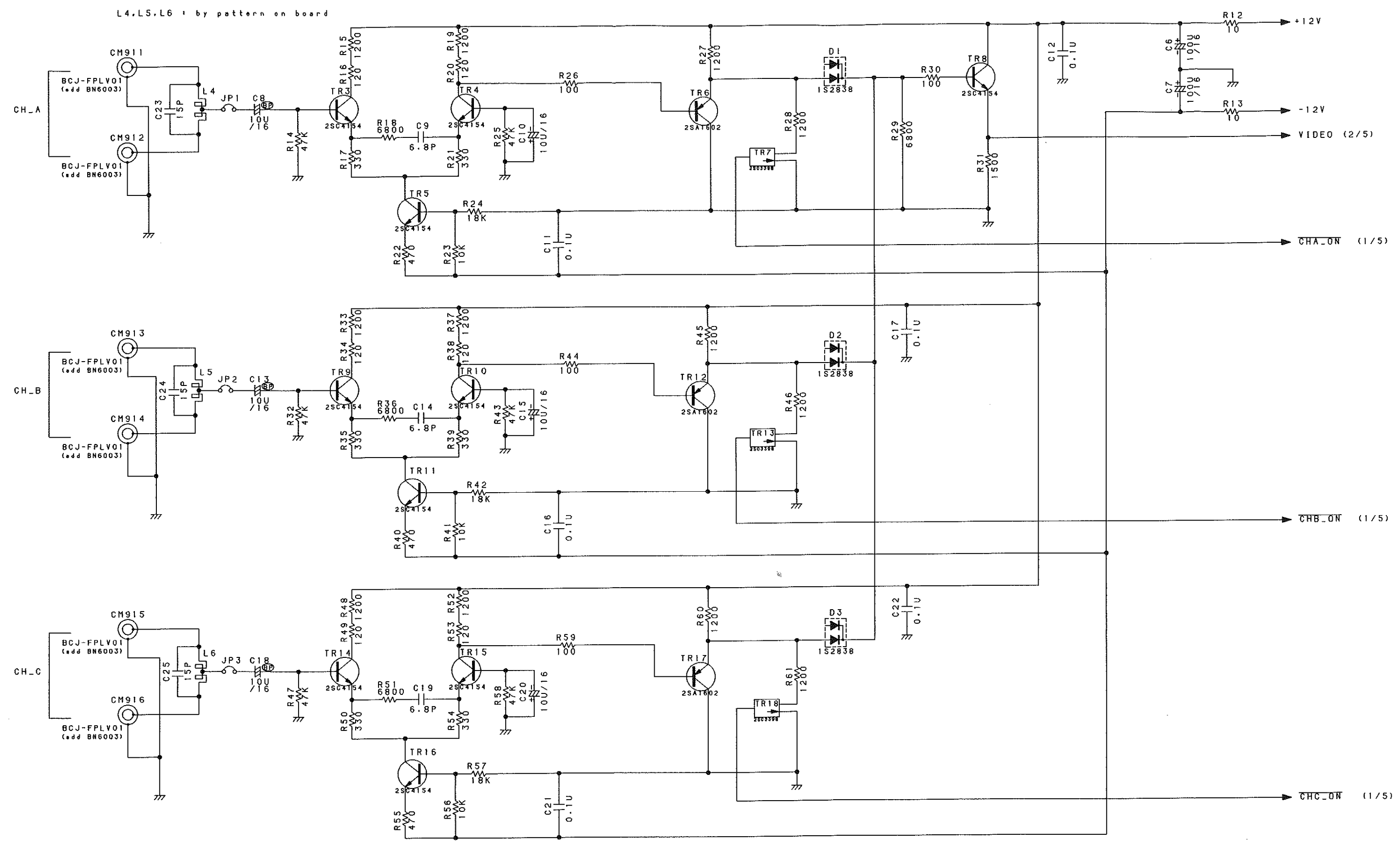
DECODER (N) BOARD
 Block Diagram
 C3-905340

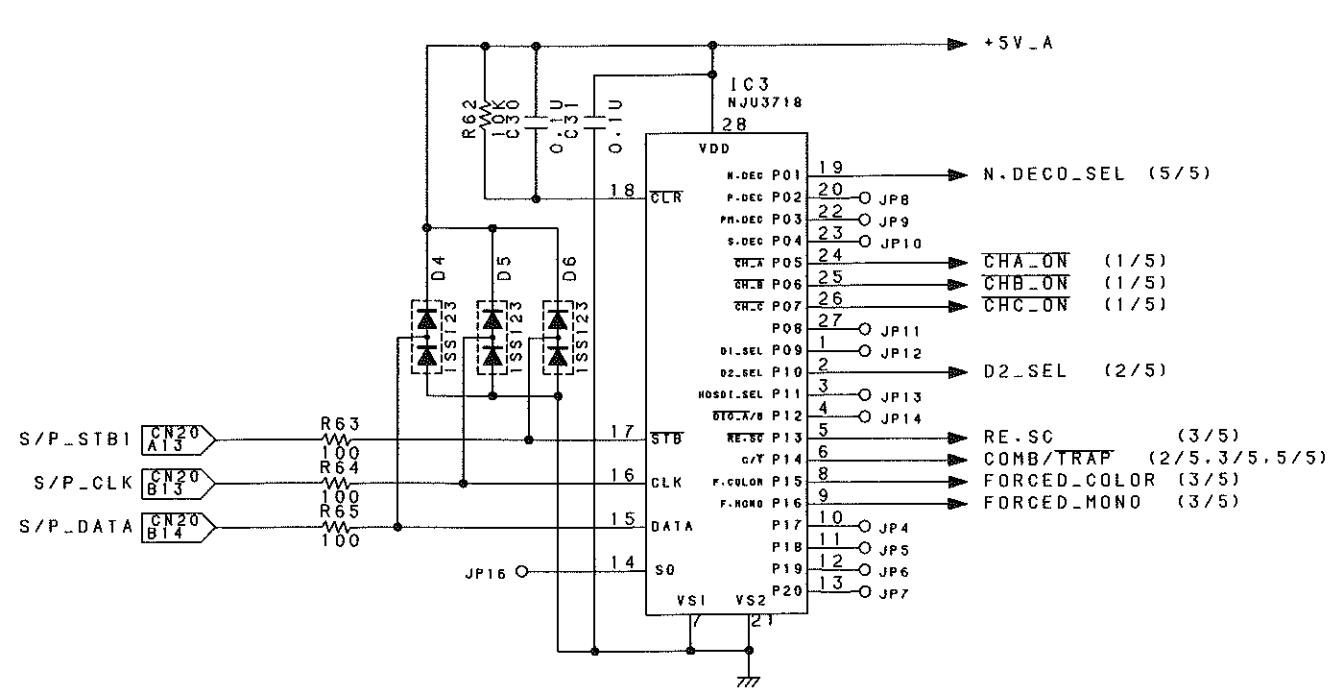


- VR507 (SUB HUE)
- VR509 (COLOR HOLD)
- VR510 (COLOR KILL)
- TP509 (GND)
- VR508 (HUE OFFSET)
- TP504
- TP505 (PR)
- VR505 (HUE LOW)
- TP507
- VR504 (HUE HIGH)
- VR501 (MATCH)
- TP508 (PB)
- VR502 (Y. LEVEL)
- VR503 (APT OFFSET)
- TP204
- VR206 (C VL LVL)
- TP502 (Y)
- VR205 (C VL PHASE 2)
- VR212 (C VL PHASE 1)
- TP403
- TP203
- TP404
- TP206
- TP205
- VR408 (CL WIDTH)
- VR407 (CL PHASE)
- VC201
- VR208 (0H 1H)
- VR207 (1H 2H)
- TP200
- VR204 (0H 2H)
- TP213 (GND)
- VR109 (TRAP LVL1)
- VR110 (0H DC)
- VR101 (MONO LEVEL)
- VR102 (0H-LVL)
- TP102
- VR108 (AD-LO)
- TP101
- TP105 (GND)
- TP106

- TP503
- VR508 (TRAP HUE)
- TP506
- TP501
- TP401
- VR404 (R PHASE EQ)
- VR403 (R-Y LEVEL)
- VR406 (B PHASE EQ)
- VR405 (B-Y LEVEL)
- TP402
- TP405 (GND)
- TP208
- TP212
- VR202 (PHASE EQ)
- TP201
- VR214 (CHR LVL)
- TP207
- VR203 (C LVL)
- TP202
- VR213 (TRAP LVL2)
- VR201 (COMB D)
- VR209 (Y. P LEVEL)
- VR210 (Y VL PHASE)
- TP210
- TP209
- TP211
- VR211 (Y VL LVL)
- TP103
- VR106 (1H-LVL)
- TP104
- VR107 (2H-LVL)
- VR104 (1H-PHASE)
- VR105 (2H-PHASE)

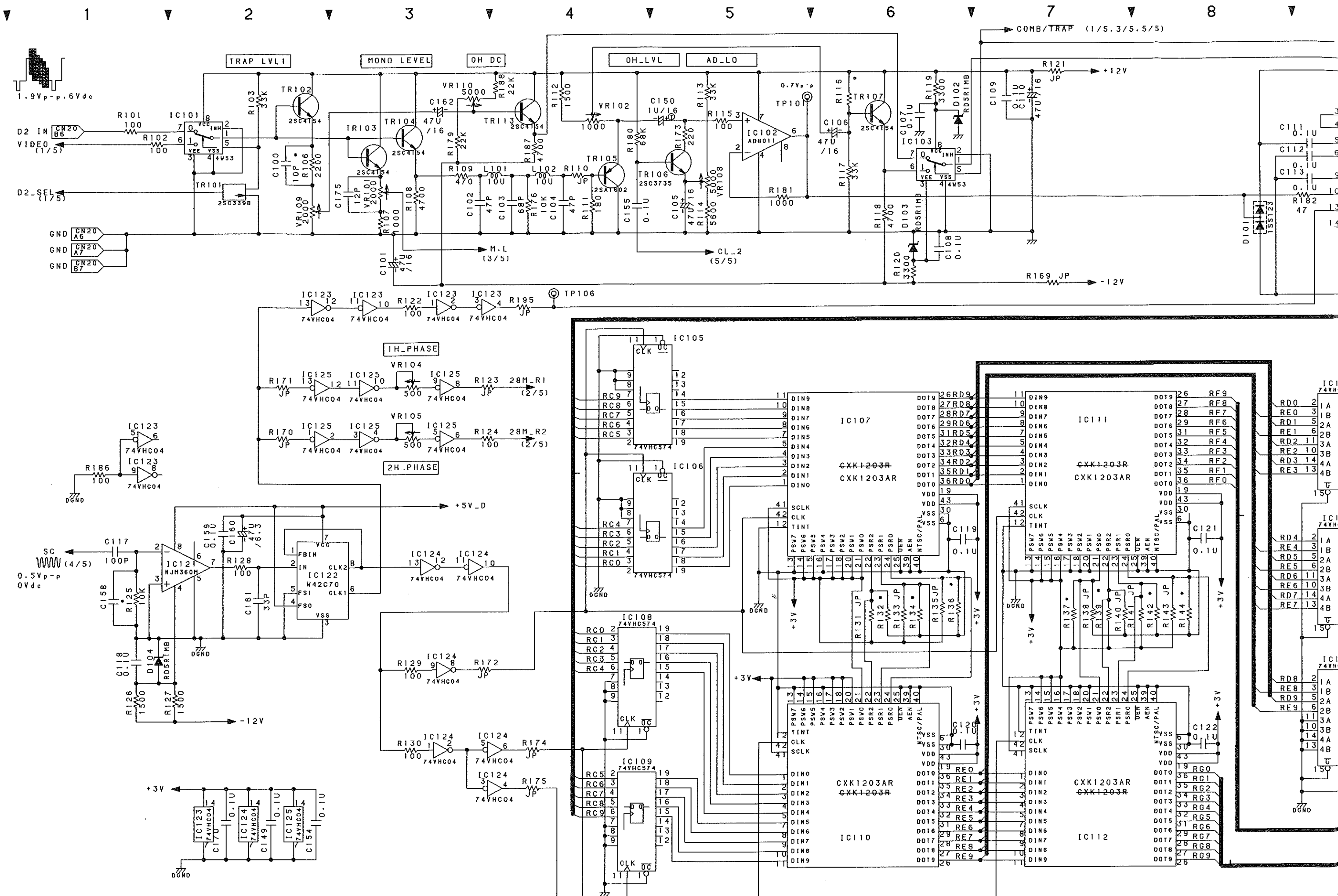
DECODER(N) BOARD
Parts Location

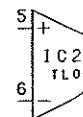
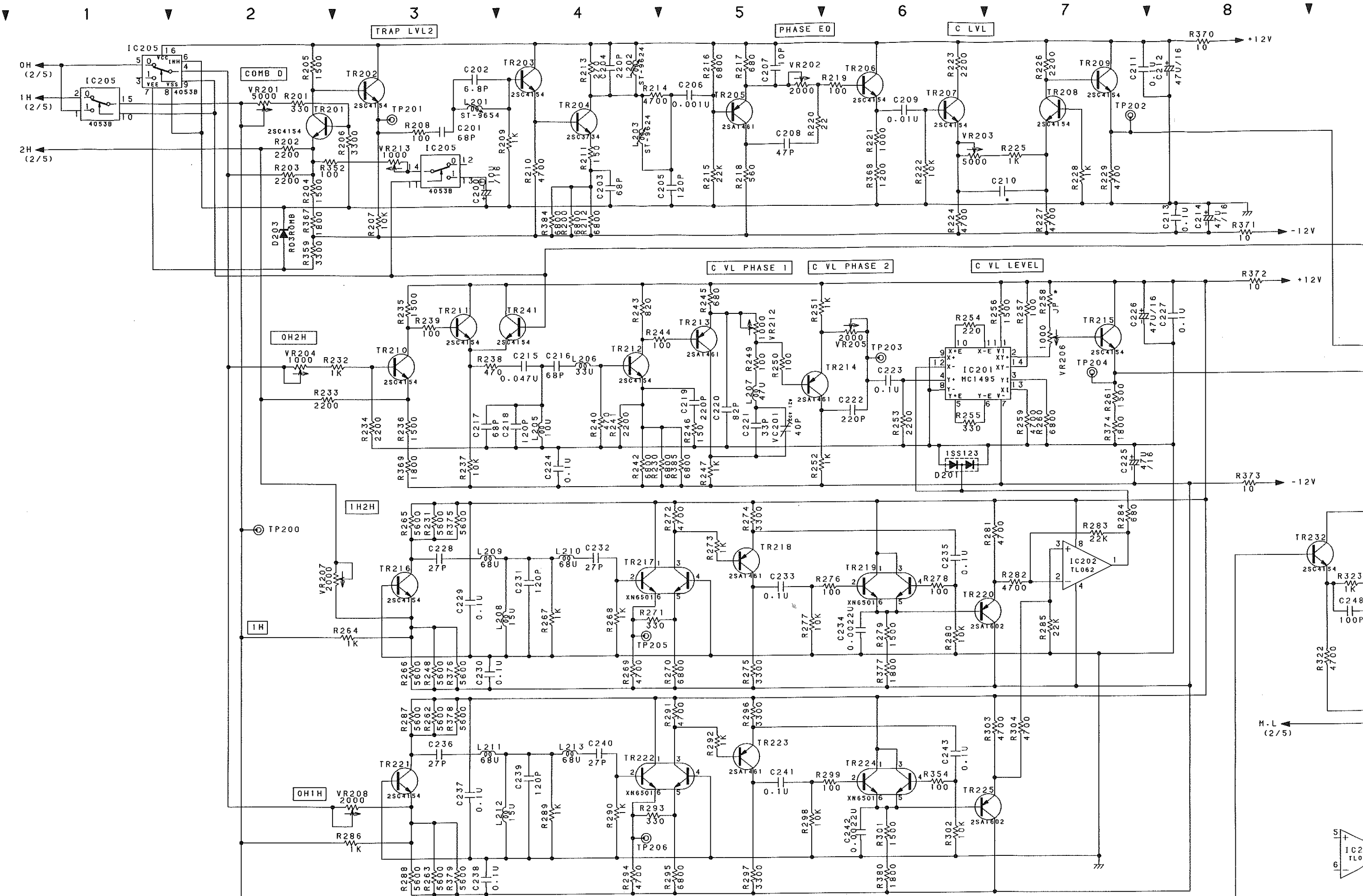




DE-801(NTSC)
 DECODER(N) BOARD
 Schematic Diagram(1/5)

A
 B
 C
 D
 E
 F





M.L
(2/5)

A

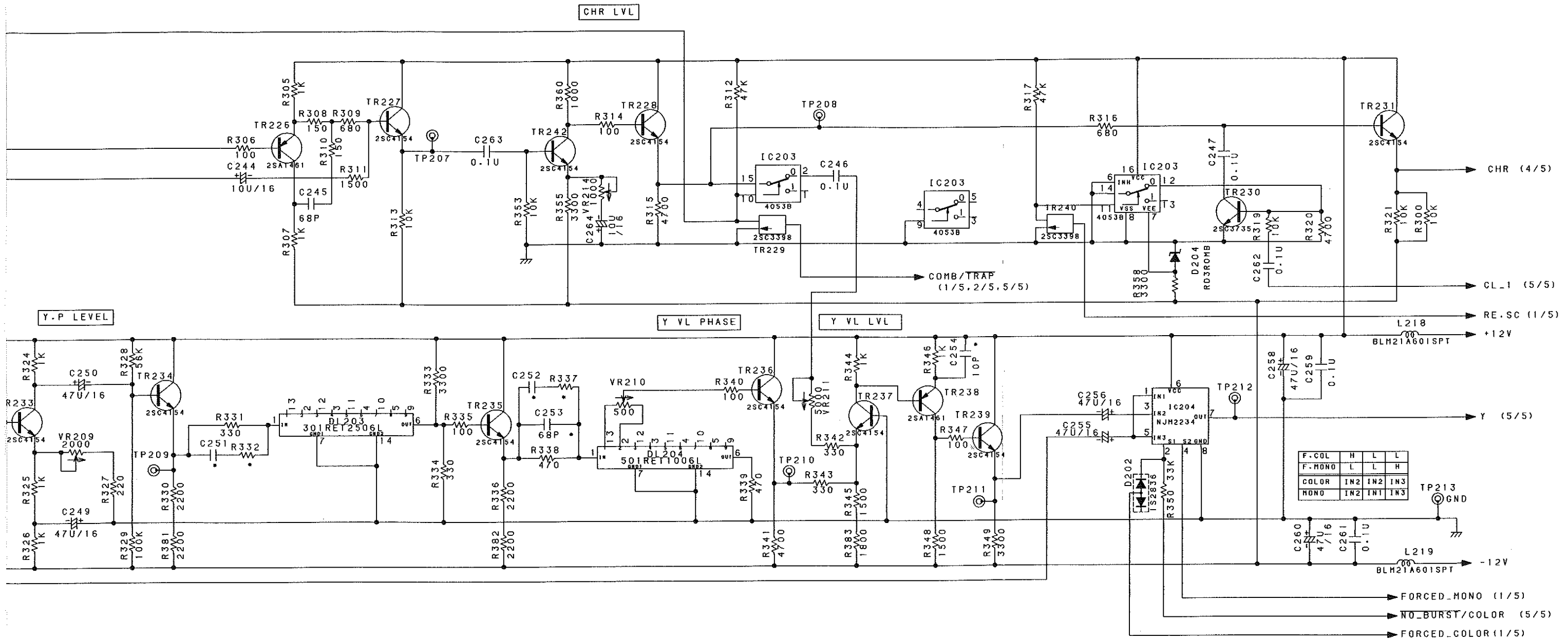
B

C

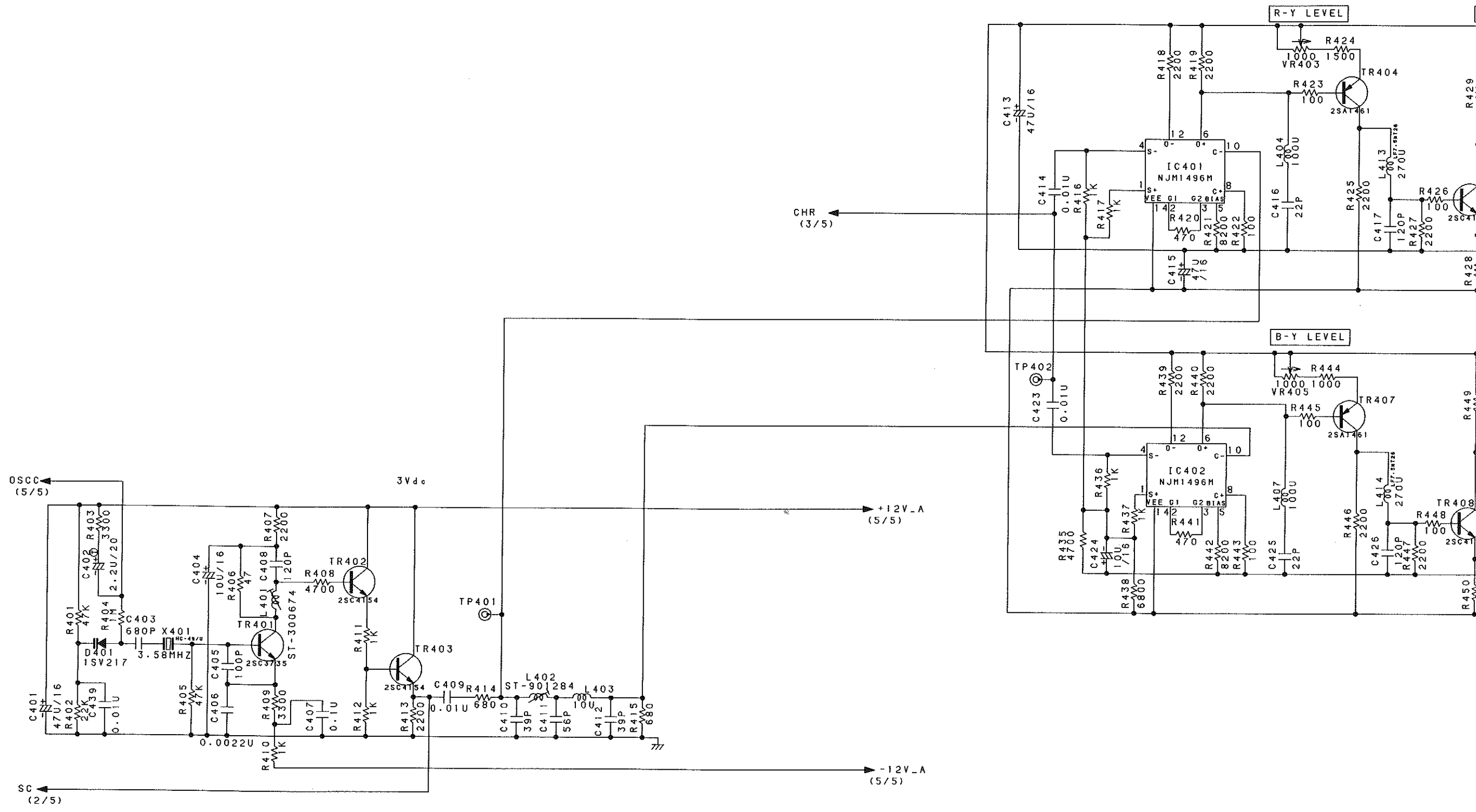
D

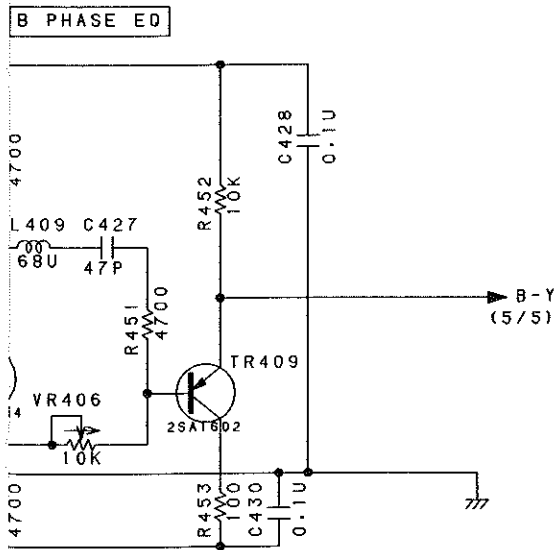
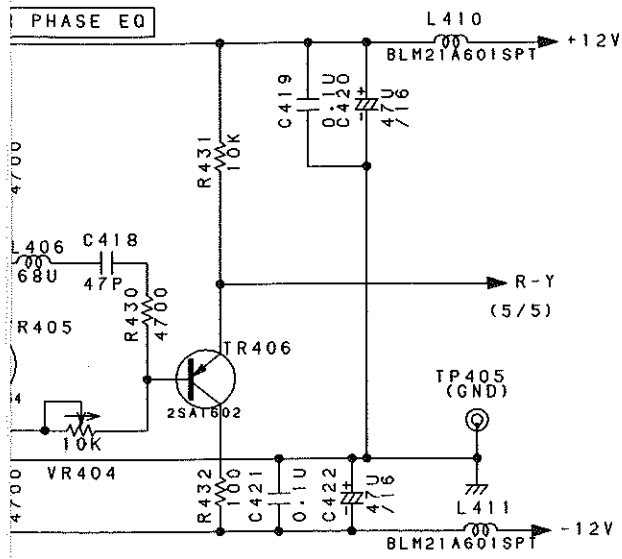
E

F

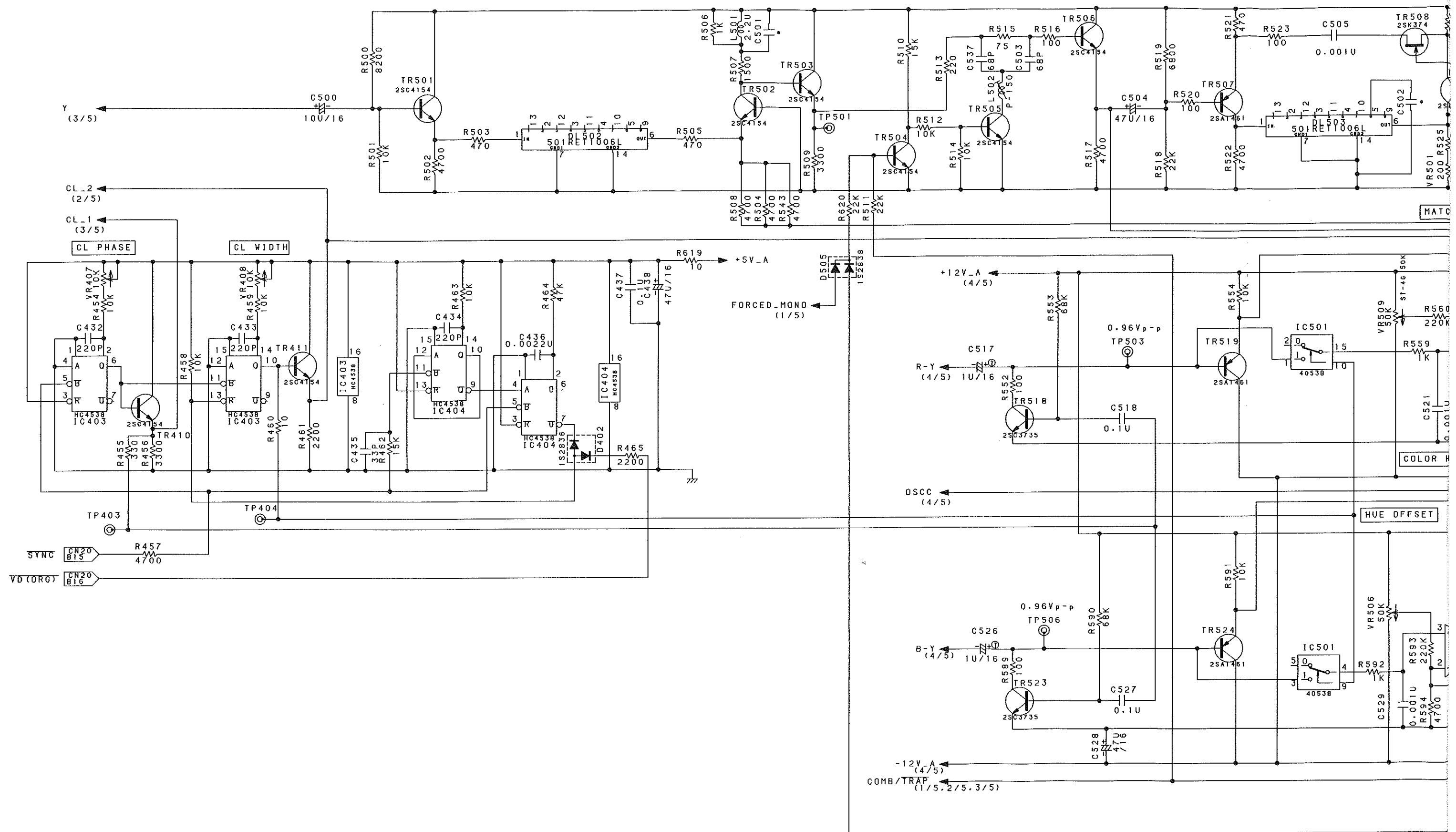


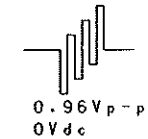
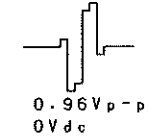
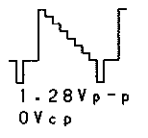
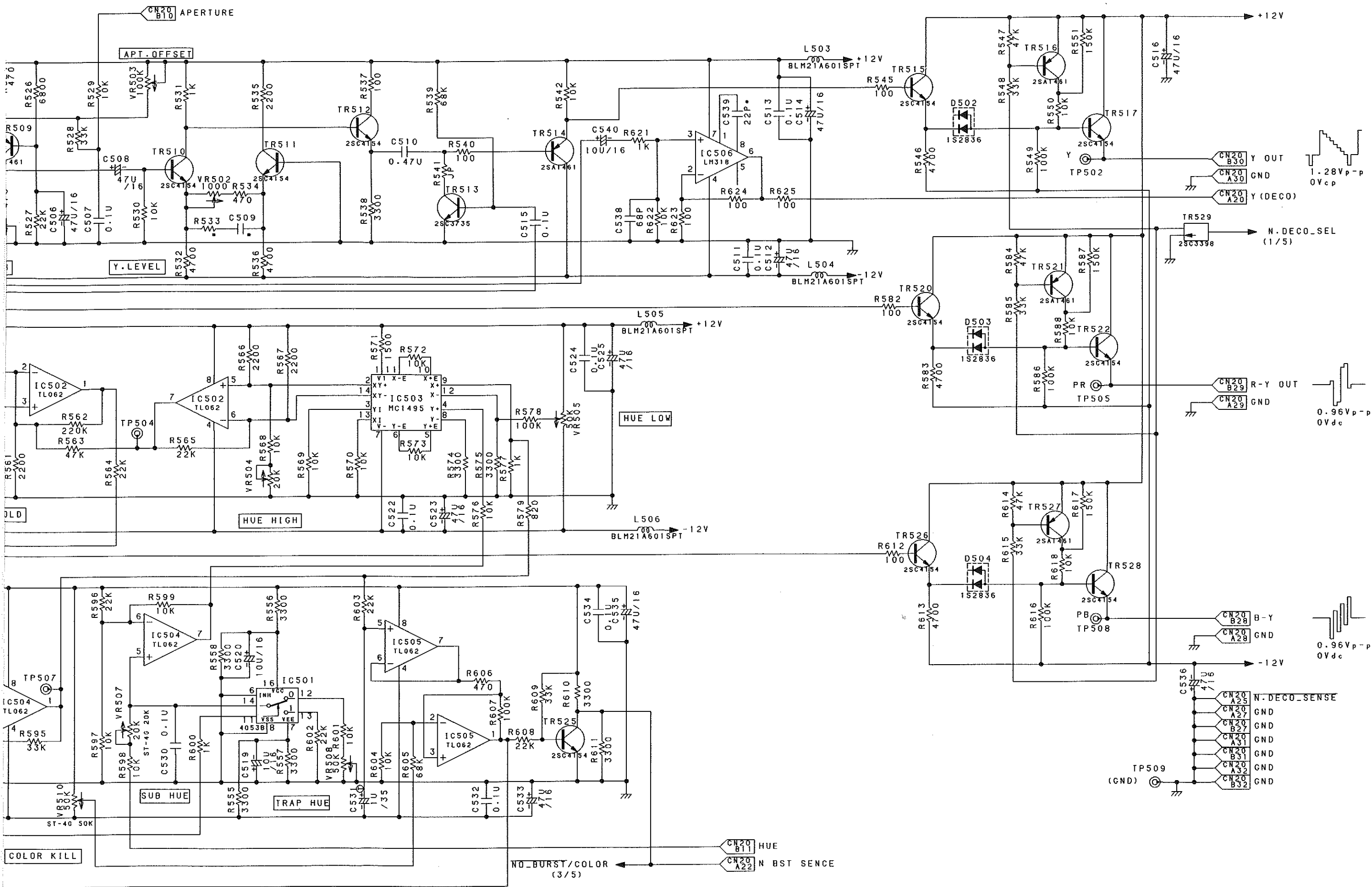
DE-801(NTSC)
 DECODER(N) BOARD
 Schematic Diagram(3/5)





A
B
C
D
E
F





DE-801(NTSC) DECODER(N) BOARD Schematic Diagram(5/5)