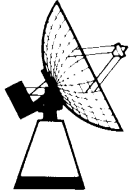


# NEC

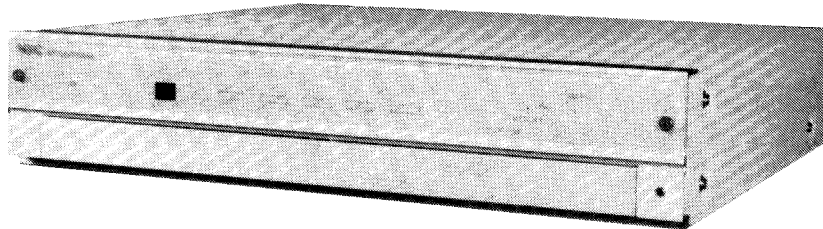
MODEL SI-5320

SYSTEM INTERFACE  
**SERVICE MANUAL**

PART NO. 399910660



**Better Service**  
**Better Reputation**  
**Better Profit**



**SAFETY CAUTION:**

Before servicing this chassis, it is important that the service technician read and follow the "Safety Precautions" and "Product Safety Notice" in this Service Manual.

**WARNING:**

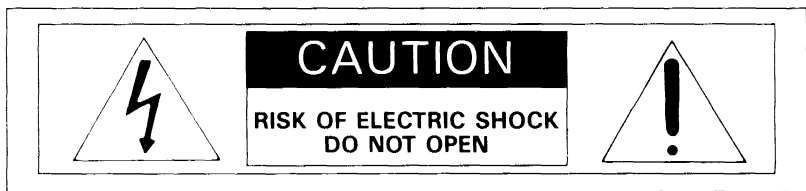
SHOCK HAZARD — Use an isolation transformer when servicing.

**NEC Corporation**

TOKYO, JAPAN

# CONTENTS

SAFETY PRECAUTIONS .....	3
SPECIFICATIONS .....	7
LOCATION OF CONTROLS .....	11
ACCESS TO PWBs FOR SERVICING .....	14
PARTS LOCATION DIAGRAMS .....	16
ADJUSTMENT PROCEDURE .....	22
BLOCK DIAGRAMS .....	27
CIRCUIT DESCRIPTIONS .....	33
TROUBLESHOOTING .....	38
PRINTED WIRING BOARDS .....	39
REPLACEMENT PARTS LIST .....	52
SCHEMATIC DIAGRAMS .....	61



**CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any part inside of this unit.



This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.



**ATTENTION:** POUR EVITER LES RISQUES D'ELECTROCUTION, NE PAS ENLEVER LE COUVERCLE (OU LE DOS). AUCUN DES ELEMENTS INTERNES NE DOIT ETRE REPARÉ PAR L'UTILISATEUR. NE CONFIER L'ENTRETIEN QU'À UN PERSONNEL QUALIFIÉ.



L'éclair fléché dans un triangle équilatéral est destiné à avertir l'utilisateur de la présence, dans l'appareil, d'une zone non-isolée soumise à une haute tension dont l'intensité est suffisante pour constituer un risque d'électrocution.



Le point d'exclamation dans un triangle équilatéral est destiné à attirer l'attention de l'utilisateur sur la présence d'informations de fonctionnement et d'entretien importantes dans la brochure accompagnant l'appareil.

# SAFETY PRECAUTIONS

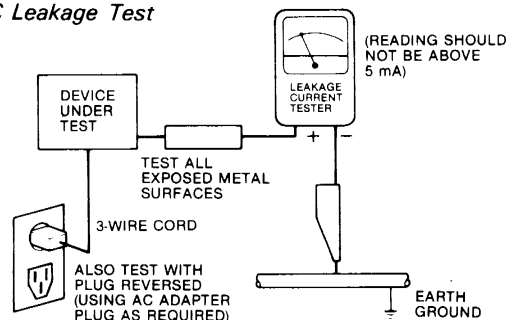
1. **Before returning an instrument to the customer**, always make a safety check of the entire instrument, including, but not limited to, the following items:

a. Be sure that no built-in protective devices are defective and/or have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including, but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning.**



b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

c. **Leakage Current Hot Check** — With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institutes (ANSI) *C101.1 Leakage Current for Appliances* and Underwriters Laboratories (UL) 478. With the instrument AC switch first in the ON position and then in the OFF position, measure from a known earth ground (metal waterpipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 5 milliamp. Reverse the instrument power cord plug in the outlet and repeat test. **ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER.**

AC Leakage Test



2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.
3. **Design Alteration Warning** — Do *not* alter or add to the mechanical or electrical design of this unit. Design alterations and additions, including, but not limited to, circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and will make you, the servicer, responsible for personal injury or property damage resulting therefrom.
4. **Hot Chassis Warning** — a. Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safely serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the *ground* side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground. b. Some TV receiver chassis normally have 85V AC (RMS), between chassis and earth ground regardless of the AC plug polarity. These chassis can be safely serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection. c. Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is *not isolated* from the AC power line. The two ground systems are electrically separated by insulating material that must not be defeated or altered.

5. Observe original lead dress. Take extra care to assure correct lead dress in the following areas:
  - a. near sharp edges,
  - b. near thermally hot parts — be sure that leads and components do not touch thermally hot parts,
  - c. the AC supply,
  - d. high voltage, and
  - e. antenna wiring.Always inspect in all areas for pinched, out-of-place, or frayed wiring. Do not change spacing between components, and between components and the printed-circuit board. Check AC power cord for damage.
6. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.
7. **PRODUCT SAFETY NOTICE** — Many TV electrical and mechanical parts have special safety-related characteristics some of which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified in this service data by shading with a  mark on schematics and by shading or a  mark in the parts list. Use of a substitute replacement part that does not have the same safety characteristics as the recommended replacement part in this service data parts list might create shock, fire, and/or other hazards.

# PRECAUTIONS DE SECURITE

1. **Avant de remettre un appareil à un client**, faire toujours d'abord un examen de sécurité de l'appareil en entier comprenant, mais ne s'y limitant pas les points cités ci-dessous:

a. Vérifier qu'aucun des dispositifs de protection ne soit défectueux ou n'ait été endommagé pendant les travaux.

(1) Les volets protecteurs sur ce châssis ont été montés pour protéger aussi bien le technicien que le client. Remplacer correctement tous les volets protecteurs manquants, aussi bien que ceux qui ont pu être enlevés pour la commodité des travaux.

(2) Quand vous remettez le châssis ou d'autres assemblages ensemble dans le coffret, vérifier qu'ont été remis à leur place tous les dispositifs de protection, comprenant mais ne s'y limitant point, les boutons de contrôle non-métalliques, les feuilles d'isolation, les couverture/volets de l'ajustement et du compartiment, et l'isolation des réseaux résistance/condensateur. **Ne pas travailler sur cet appareil ni permettre qu'y soit effectué un travail sans que tous les dispositifs de protection n'y soient correctement installés fonctionnants.**

b. Bien vérifier qu'il n'y ait aucune ouverture sur le coffret qui ne puisse permettre à un adulte ou à un enfant d'y faire pénétrer ses doigts et attraper une décharge électrique.

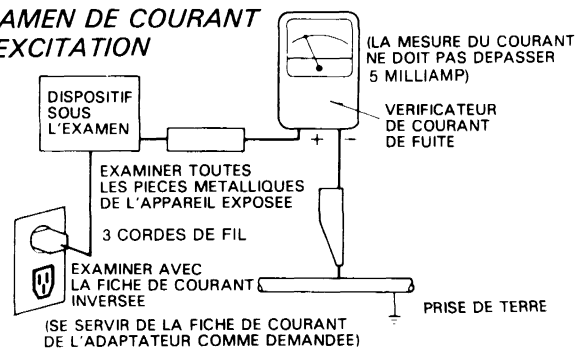
De telles ouvertures comprendraient sans pour autant s'y limiter (1) l'espace entre le tube à images et le coffret de l'appareil, (2) les espaces excessivement ouverts pour la ventilation et (3) la couverture arrière du coffret improprement fixée ou incorrectement protégée.

c. **Vérification de courant de fuite**

L'appareil ayant été complètement réassemblé, brancher-le à une prise de courant de 120V. (Ne pas se servir d'un transformateur d'isolation pendant ce test). Se servir d'un vérificateur de courant d'excitation ou d'un système de mesure conforme aux normes ANSI (American National Standards Institute) C101.1 Leakage Current for Appliances et U.L (Underwriters Laboratories) 478. Le bouton de l'appareil en position "Marche" et ensuite en position "Arrêt", mesurer à partir d'une prise de terre (métallique tuyauterie, conduite, etc...) à toutes les pièces métalliques de l'appareil exposées (antennes, poignet métalliques, coffret métallique, tête des vis, surfaces métalliques, traits de contrôle, etc.) surtout à toutes les pièces métalliques exposées qui peu-

vent reconduire le courant au châssis. En aucun cas, la mesure du courant ne doit dépasser 5 milliamp. Inverser la fiche de courant de l'appareil dans la prise et répéter le test. **Tout mesurage ne s'arrêtant pas aux limites spécifiées ici comporte un risque de décharge électrique dangereux, qui doit être éliminé, avant que l'appareil ne soit remis au client.**

## EXAMEN DE COURANT D'EXCITATION



2. **Lire et respecter** toutes les mises en garde et notes de sécurité à l'intérieur ou à l'extérieur du coffret du récepteur, sur le châssis du récepteur ou sur le tube à images.

3. **Mise en garde contre la modification du dessin**

Ne pas modifier ni ajouter à la pièce mécanique ou électrique du modèle. Des modifications ou additions, comportant, mais ne s'y limitant pas, des modifications des circuits et l'addition d'éléments tels que des auxiliaires audio et/ou des branchements pour la prise de vidéo, pourrait éprouver la sécurité de ce récepteur et créer un risque pour l'utilisateur. Tout changement ou addition accomplie annulera la garantie du fabricant et va rendre votre service d'entretien, responsable des dommages corporels ou de biens en résultant.

4. **Mise en garde contre le châssis sous tension**

a. Certains châssis de récepteur TV sont électriquement reliés à un conducteur du fil de courant et ainsi peuvent ne comporter aucun risque sans un transformateur d'isolation seulement si la prise de courant est branchée, de manière que le châssis est relié à la prise de terre de la source de courant. Pour s'assurer que la prise de courant est correctement insérée, relever les mesures avec un voltmètre de courant entre le châssis et un point de prise de terre bien connu. Si le voltage indiqué est supérieur à 1,0V, débrancher et re-insérer la prise de courant dans la polarité contraire et une fois de plus remesurer le voltage potentiel entre le châssis et la prise de terre.

- b. Certains châssis de récepteur ont habituellement 85V (RMS) entre le châssis et la prise de terre, en fonction de la polarité de la prise de courant. Ces châssis peuvent ne comporter aucun risque seulement avec un transformateur d'isolation inséré dans la ligne de puissance située entre le récepteur et la source d'électricité, cela pour la protection aussi bien du personnel que du matériel de vérification.
  - c. Certains châssis de téléviseurs ont un système secondaire de masse en addition avec le système principal de masse du châssis. Ce système secondaire de masse n'est pas isolé du courant électrique. Les deux systèmes sont électriquement séparés par du matériel d'isolation qu'on vérifiera bien qu'il ne soit ni altéré ni défectueux.
5. Vérifier la couverture originale en plomb. Accorder la plus grande attention à la couverture de plomb notamment aux endroits ci-dessous indiqués.
- a. près des bords aigus
  - b. près des parties très chaudes  
Vérifier que les composants et les plombs ne touchent pas les parties très chaudes telles que:
  - c. l'alimentation du courant
  - d. la haute tension
  - e. les fils de l'antenne
- Pousser l'inspection, à tous les endroits, à la recherche des cordes pincées, déplacées ou effilochées. Ne pas changer l'écartement entre composants, et entre composants et le tableau de circuit imprimé. Vérifier que le fil de conduite électrique est en bon état.

6. Les composants, parts (pièces) et/ou fils qui ont été trouvés surchauffés devraient être remplacés avec les composants, pièces et fils s'y reliant avec d'autres qui ont les mêmes spécifications que les originales. De plus, rechercher la cause du surchauffement et/ou des dommages et si nécessaire, prendre les mesures propres pour prévenir tout risque potentiel.

#### 7. Note sur la sûreté de l'appareil

Beaucoup de pièces de téléviseurs, qu'elles soient électriques ou mécaniques, ont des dispositions de sécurité qui ne sont pas toujours évidentes d'une simple inspection visuelle et la protection qu'elles donnent nécessairement ne pourront être pas obtenues par les remplaçants avec des composants aux voltages ou watts plus élevés.

Les pièces qui ont des caractéristiques particulières de sécurité sont identifiées avec un trait  $\Delta$  marqué sur les schémas et sont ombragés ou comportent un trait  $\Delta$  sur la liste des pièces. L'utilisation d'un produit substitutif qui n'aurait pas les mêmes caractéristiques comme il est recommandé dans ces données d'entretien pourrait provoquer une décharge électrique, un feu, et/ou d'autres dangers.

# SPECIFICATIONS

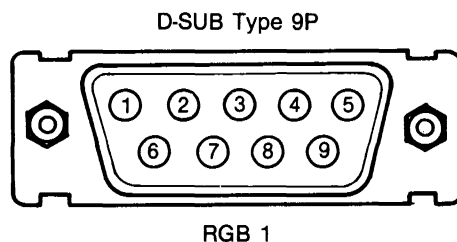
1. Input VIDEO 1 : NTSC, PAL, SECAM, NTSC 4.43 (BNC)  
1.0Vp-p 75Ω Positive with Loop thru
- VIDEO 2 : NTSC, PAL, SECAM, NTSC 4.43 (BNC)  
1.0Vp-p 75Ω Positive or (switchable)  
S-VIDEO Y; 1.0Vp-p 75Ω Positive  
C; 0.28Vp-p 75Ω (burst level)
- RGB 1 : CGA, EGA, PGA, VGA, 8514A Adapter refer to Table 1, 2  
on page 8.
- RGB 2, RGB 3 : R.G.B signal 0.7-1.5Vp-p 75Ω Positive (BNC)  
H.V sync. 0.7-4.0Vp-p 75Ω Negative or Positive  
G sync. 0.3-0.6Vp-p 75Ω Negative
- AUDIO : 0.4Vrms high impedance (Phono) STEREO  
2 Channels for VIDEO 1, VIDEO 2  
1 Channel for RGB (selectable)
2. Output : R.G.B signal  
0.7Vp-p 75Ω Positive (BNC)  
H.V sync. 1.0Vp-p 75Ω Negative (BNC)  
AUDIO 0.4Vrms 1KΩ (Phono) STEREO
3. Control : DIGITAL Control R.G.B GAIN  
Color, Tint, Sharpness  
INTENSITY (RGB 1, Digital input only)
- Remote Control : Color, Tint, Sharpness, R.G.B GAIN, POWER ON/OFF,  
Input signal select
- Serviceman Control : Brightness, Picture, Color, Tint, Sharpness,  
(Preset, VIDEO only)
4. Text color : Red, Green, Blue, Yellow, Cyan, Magenta, White  
(RGB 1, Digital input only)
5. Indicator : Power indicator  
Signal select indicators  
(VIDEO 1, VIDEO 2, RGB 1, RGB 2, RGB 3)  
Video system indicators  
(NTSC, PAL, SECAM, NTSC 4.43)  
Function indicators  
(R.G.B Gain, Color, Tint, Sharpness)  
Control level indicator
6. Power supply : AC120V, 60Hz
7. Power consumption : 30W
8. Safety and regulatory : UL 478  
FCC Class A
9. Dimension : 16-15/16x13-13/16x3-5/16 inch  
(W)x(D)x(H) 430x350x84mm
10. Weight : 13.3 lbs./6 Kg

Note: R. G. B inputs accept horizontal frequencies from 15kHz to 55kHz.

Specifications are subject to change without notice.

## 9 PIN RGB SIGNAL COMPOSITION

### Pin Assignments and Signal Levels for 9 Pin RGB



**TABLE 1 PIN ASSIGNMENT OF IBM GRAPHICS ADAPTER**

IBM ADAPTERS PIN- ASSIGNMENT	COLOR GRAPHICS TTL 16 COLORS	ENHANCED GRAPHICS TTL 16/64 COLORS	PROFESSIONAL GRAPHICS ANALOG	VIDEO GRAPHICS ANALOG
1	GROUND	GROUND	*RED	Δ RED
2	GROUND	SECONDARY RED	*GREEN	Δ GREEN
3	RED	PRIMARY RED	*BLUE	Δ BLUE
4	GREEN	PRIMARY GREEN	COMPOSITE SYNC.	HORIZONTAL SYNC.
5	BLUE	PRIMARY BLUE	MODE CONTROL	VERTICAL SYNC
6	INTENSITY	SECONDARY GREEN/ INTENSITY	RED GROUND	RED GROUND
7	NO CONNECTION	SECONDARY BLUE	GREEN GROUND	GREEN GROUND
8	HORIZONTAL SYNC.	HORIZONTAL SYNC.	BLUE GROUND	BLUE GROUND
9	VERTICAL SYNC.	VERTICAL SYNC.	GROUND	GROUND

**TABLE 2 PIN ASSIGNMENT OF OTHER COMPUTERS**

SIGNAL PIN- ASSIGNMENT	TTL			ANALOG		
	8 COLORS	16 COLORS	64 COLORS	SEPARATE SYNC.	COMPOSITE SYNC.	SYNC. ON GREEN
1	GROUND			Δ RED		
2	—		SECONDARY RED	Δ GREEN		GREEN ○H/V SYNC.
3	RED		PRIMARY RED	Δ BLUE		
4	GREEN		PRIMARY GREEN	H. SYNC.	H/V SYNC.	—
5	BLUE		PRIMARY BLUE	V. SYNC.	—	
6	—	INTENSITY	SECONDARY GREEN	GROUND		
7	—		SECONDARY BLUE			
8	H. SYNC./H/V SYNC.					
9	V. SYNC.					

“—” means GROUND or NO CONNECTION

#### SIGNAL LEVEL

All signal levels, except for those listed below, are TTL.

“\*” means 0.6 Vp-p (VIDEO)

“○” means 0.7 Vp-p (VIDEO), 0.3 Vp-p (SYNC.)

“Δ” means 0.7 Vp-p (VIDEO)



## SETTING DIP SWITCH

### 1. MANUAL/PRESET Switch Selection

Position	Description
MANUAL	The number of colors (8/16/64) which corresponds to the graphics adapter's output must be selected manually by the user. (refer to Table C)
PRESET	The multi-sync function automatically operates in the IBM mode and adjusts itself to the scanning frequency resolution and color requirements of the IBM compatible graphics adapter being used.

### 2. DIP SWITCH on the rear panel

- 1) Pin No. 1: Selects either PC, AT or PS-2 for RGB1.

Pin No. 1	IBM Select
ON	IBM PC, AT
OFF	IBM PS-2

TABLE A PC/PS-2 Selection

- 2) Pins No. 2, 3, 4: Select one of seven colors only when the TEXT button **(30)** is ON regardless of the colors of the software being used.

These switches are operative only in the TTL mode, RGB1.

TEXT COLOR	DIP SWITCH		
	No. 2	No. 3	No. 4
	R	G	B
RED	OFF	ON	ON
GREEN	ON	OFF	ON
BLUE	ON	ON	OFF
YELLOW	OFF	OFF	ON
CYAN	ON	OFF	OFF
MAGENTA	OFF	ON	OFF
WHITE	OFF	OFF	OFF

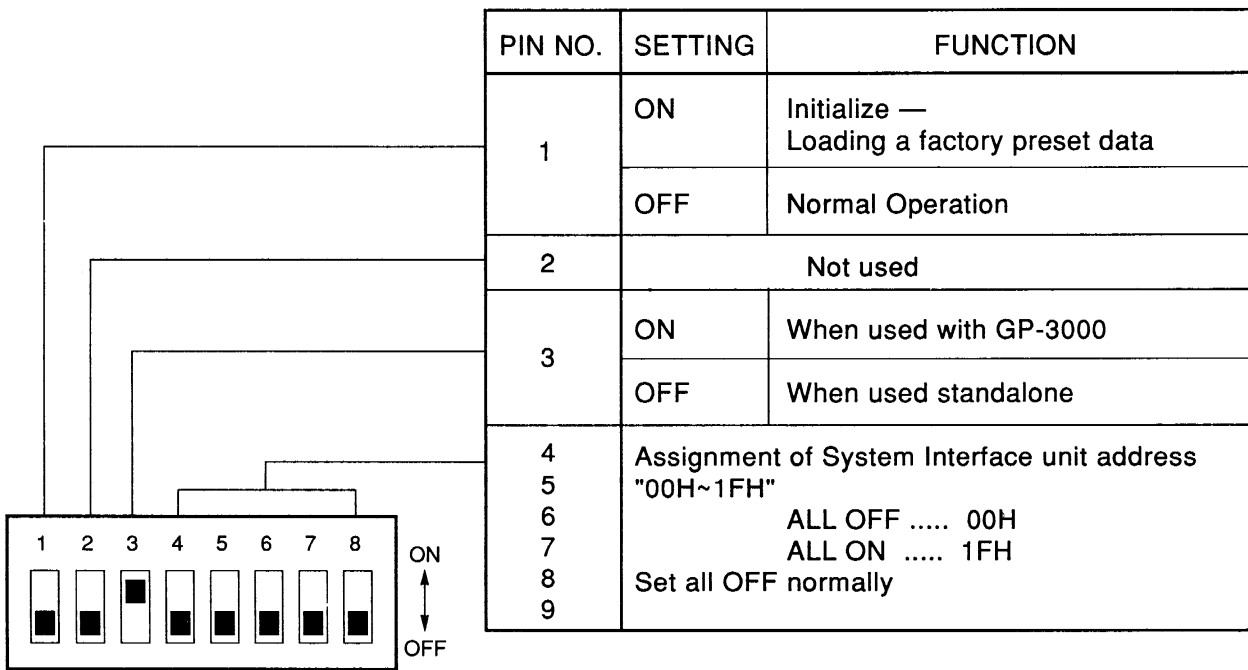
TABLE B Text Color Selection

- 3) Pins 5 and 6: Select the optimum color mode (8/16/64 colors) necessary for using non-IBM compatible graphic adapter with a combination of these switches. For the information on the number of colors and input signals the set requires, consult with its instructions. This switch selection is not used with analog graphics boards.

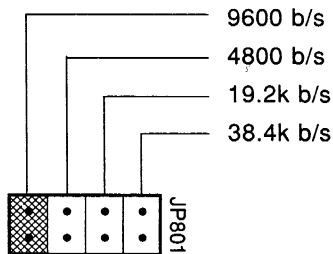
COLOR MODE	DIP SWITCH	
	No. 5	No. 6
8 colors	ON	OFF
16 colors	ON	ON
64 colors	OFF	ON
UNUSED	OFF	OFF

TABLE C Color Mode Selection

### 3. DIP SWITCH S801 on Control PWB



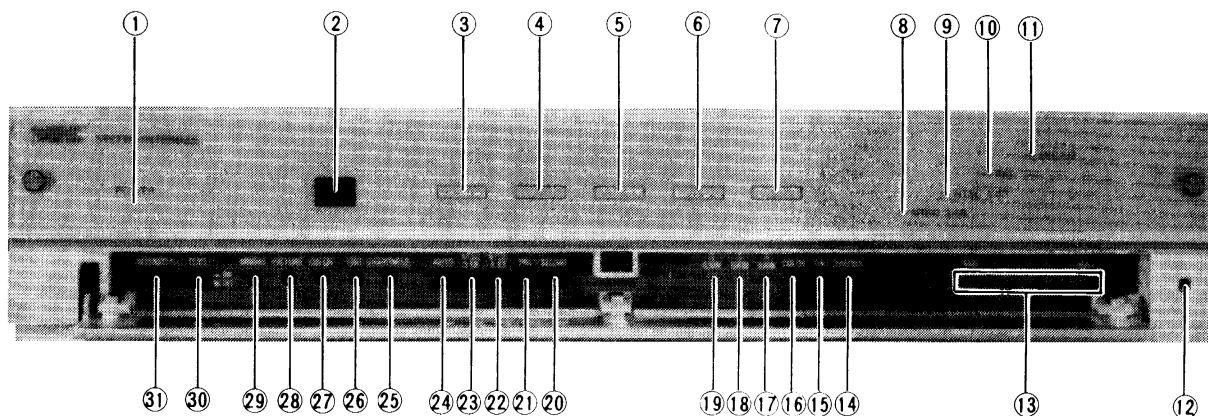
### 4. JP801 SETTING



JP801 switches the baud rate of the data transmission between SI-5320 and GP-3000. 9600b/s is factory preset mode.

# LOCATION OF CONTROLS

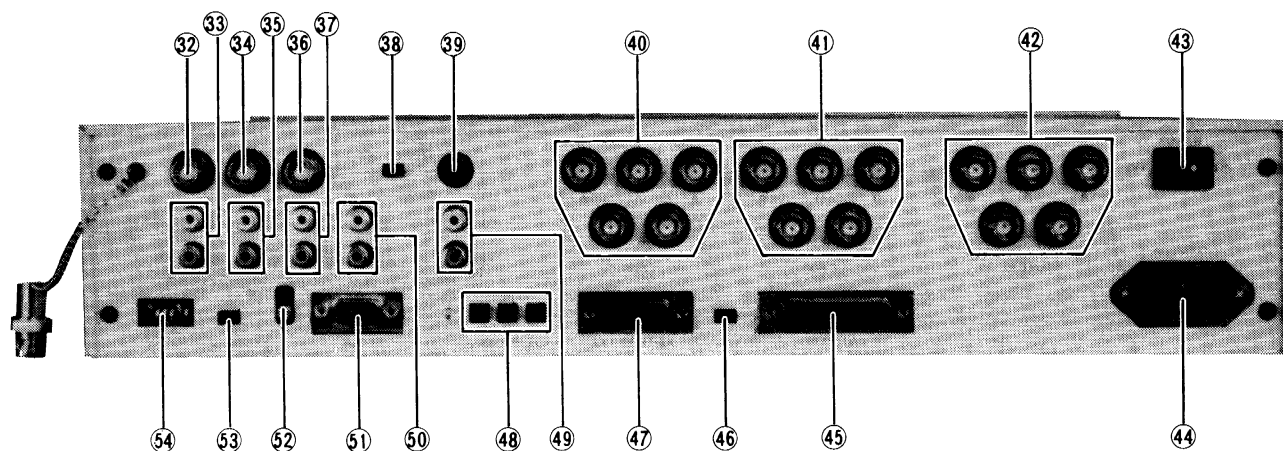
## • Front Panel



## • Front Panel

- |                          |                       |                      |
|--------------------------|-----------------------|----------------------|
| ① POWER indicator        | ⑪ SECAM indicator     | ⑳ PAL button         |
| ② INFRARED SENSOR window | ⑫ REMOTE CONTROL jack | ㉑ NTSC 4.43 button   |
| ③ VIDEO 1 indicator      | ⑬ MIN-MAX indicators  | ㉒ NTSC 3.58 button   |
| ④ VIDEO 2 indicator      | ⑭ SHARPNESS indicator | ㉓ AUTO button        |
| ⑤ RGB 1 indicator        | ⑮ TINT indicator      | ㉔ SHARPNESS control  |
| ⑥ RGB 2 indicator        | ⑯ COLOR indicator     | ㉕ TINT control       |
| ⑦ RGB 3 indicator        | ⑰ B GAIN indicator    | ㉖ COLOR control      |
| ⑧ NTSC 3.58 indicator    | ⑱ G GAIN indicator    | ㉗ PICTURE control    |
| ⑨ NTSC 4.43 indicator    | ㉒ R GAIN indicator    | ㉘ BRIGHTNESS control |
| ⑩ PAL indicator          | ㉓ SECAM button        | ㉙ TEXT ON/OFF button |
|                          |                       | ㉚ INTENSITY control  |

## • Rear Panel

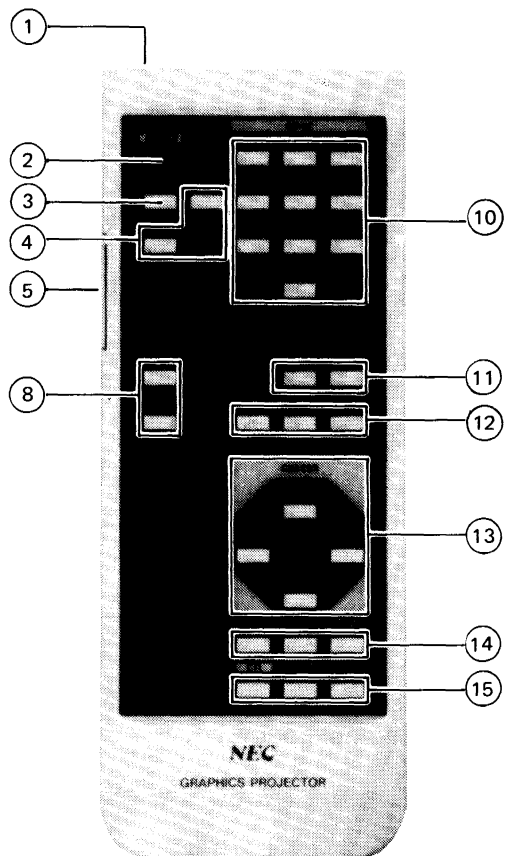


## • Rear Panel

- |                                      |  |
|--------------------------------------|--|
| ③② VIDEO 1 (OUT) terminal (BNC type) | ④④ AC input                                |
| ③③ VIDEO 1 AUDIO OUTPUT terminals    | ④⑤ REMOTE terminal                         |
| ③④ VIDEO 1 (IN) terminal (BNC type)  | ④⑥ EXT CONTROL/REMOTE switch               |
| ③⑤ VIDEO 1 AUDIO INPUT terminals     | ④⑦ EXT CONTROL terminal                    |
| ③⑥ VIDEO 2 terminal (BNC Type)       | ④⑧ AUDIO SELECT switches (RGB 1, 2 or 3)   |
| ③⑦ VIDEO 2 AUDIO INPUT terminals     | ④⑨ AUDIO OUT terminals                     |
| ③⑧ BNC/S-VIDEO switch                | ④⑩ RGB AUDIO IN terminals (RGB 1, 2 and 3) |
| ③⑨ VIDEO 2 terminal (S-VIDEO Type)   | ④⑪ RGB 1 terminal                          |
| ④⑩ RGB 2 terminal (BNC Type)         | ④⑫ ANALOG/TTL switch                       |
| ④⑪ RGB 3 terminals (BNC Type)        | ④⑬ MANUAL/PRESET switch                    |
| ④⑫ OUTPUT terminal (BNC Type)        | ④⑭ DIP switch                              |
| ④⑬ POWER switch                      |  |

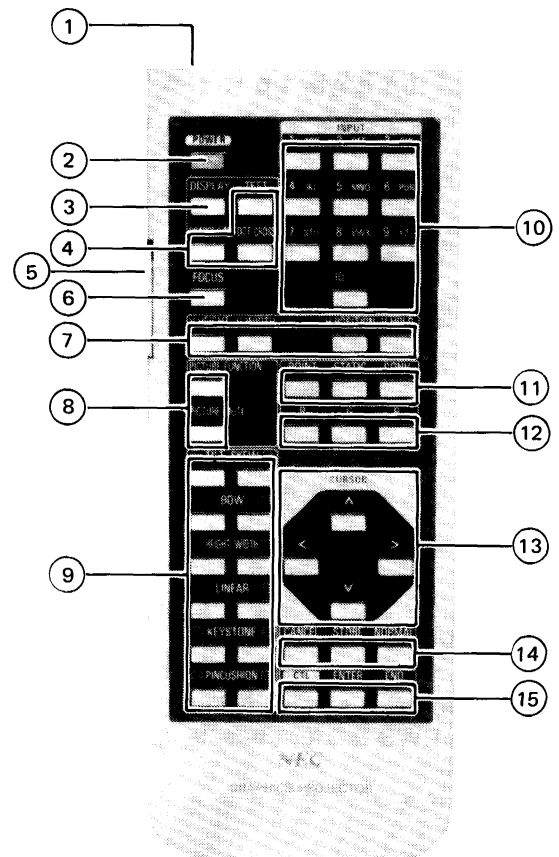
## REMOTE CONTROL FUNCTIONS

### USER REMOTE CONTROL



(UR-3020: 79609511)

### SET-UP REMOTE CONTROL



(IR-3040: 79609501)

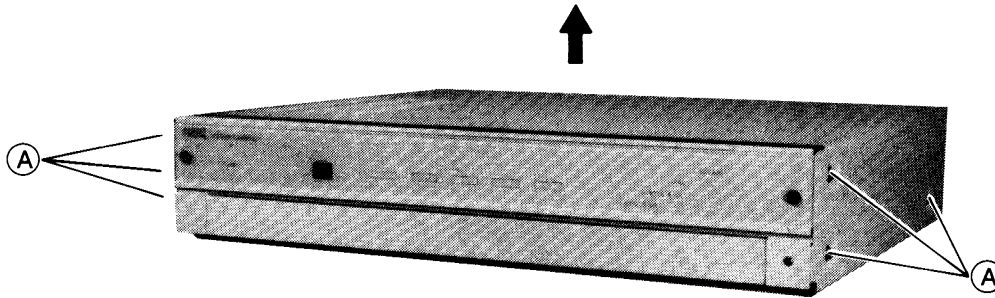
This remote control unit can be used as a wireless remote control unit by detaching the connected wire.

- |   |                               |   |                                |
|---|-------------------------------|---|--------------------------------|
| ① | REMOTE CONTROL JACK           | ⑩ | INPUT 1~10 keys                |
| ② | POWER                         | ⑪ | CONVERGENCE SELECT             |
| ③ | DISPLAY                       | ⑫ | CRT SELECT                     |
| ④ | TEST                          | ⑬ | CURSOR                         |
| ⑤ | BACK LIGHT SWITCH             |   | ^/>: INCREASE                  |
| ⑥ | FOCUS                         |   | v/<: DECREASE                  |
| ⑦ | ALIGNMENT CONTROL             | ⑭ | ADJUSTMENT CANCEL/STORE/NORMAL |
| ⑧ | PICTURE FUNCTION/PICTURE MUTE | ⑮ | CONTROL                        |
| ⑨ | DYNAMIC CONVERGENCE           |   |                                |

# ACCESS TO PWBs FOR SERVICING

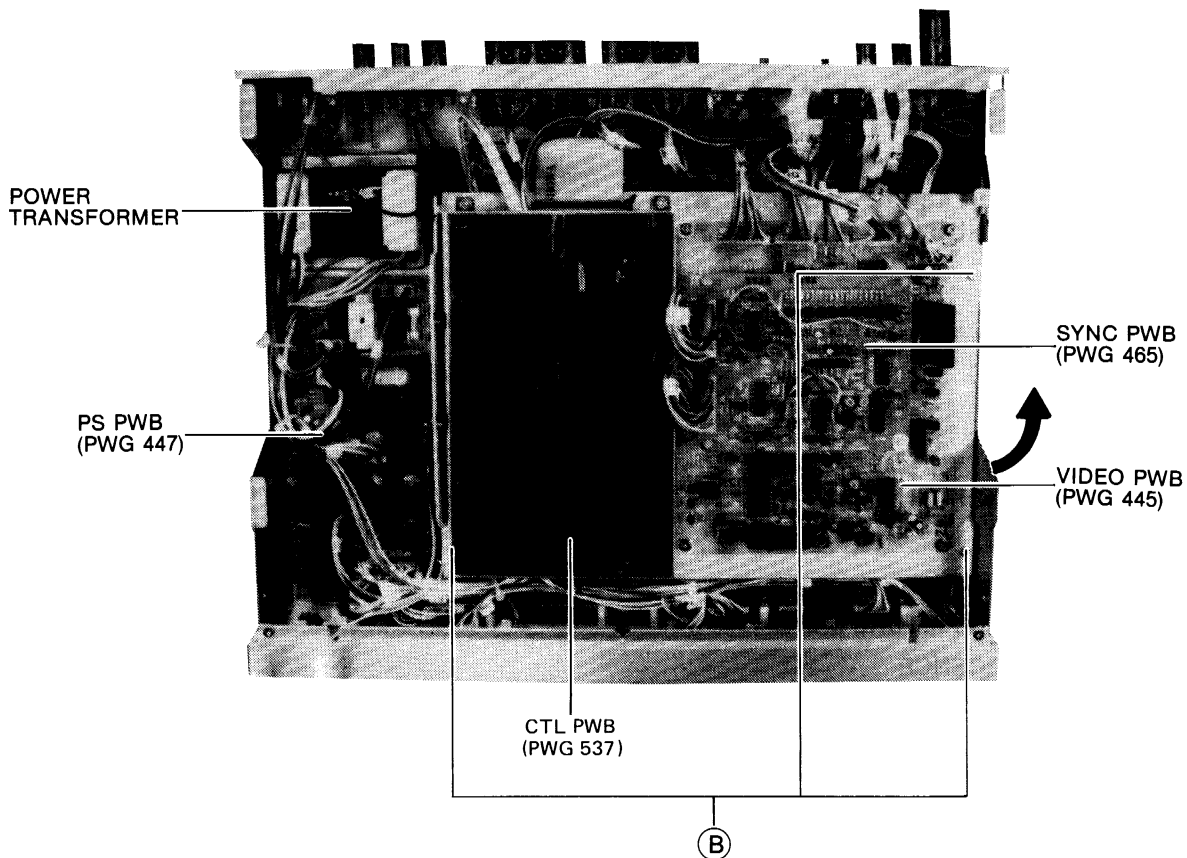
## (1) Cover Removal

- ① Remove the 6 screws (A) at the sides of the unit as shown in the diagram below.
- ② Lift the top cover up to remove.

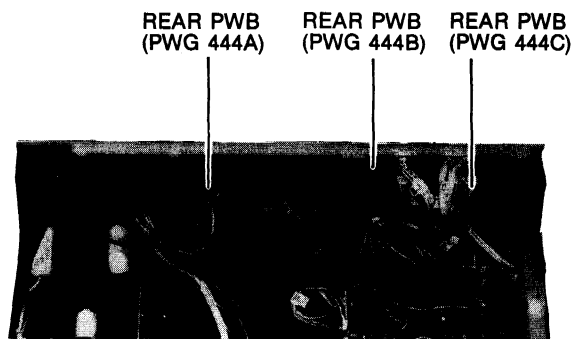
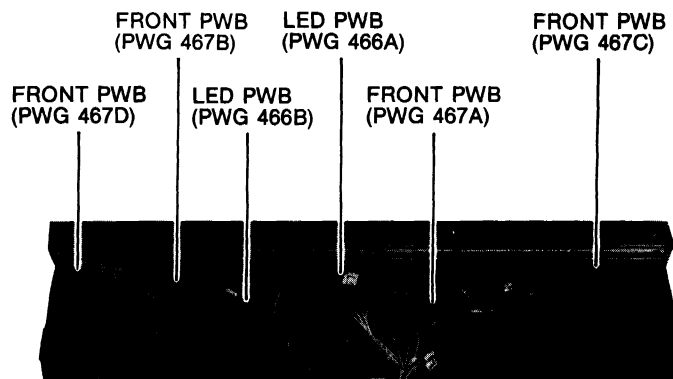
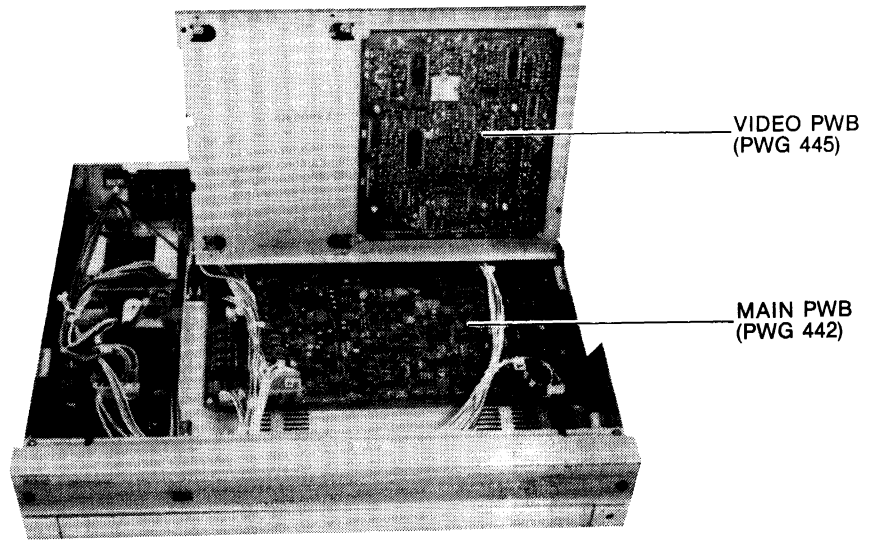


## (2) PWB Layout 1.

- ① Remove the 3 screws (B) on the PWB holder chassis.
- ② Lift the PWB holder chassis up for servicing the MAIN PWB. (see next page.)

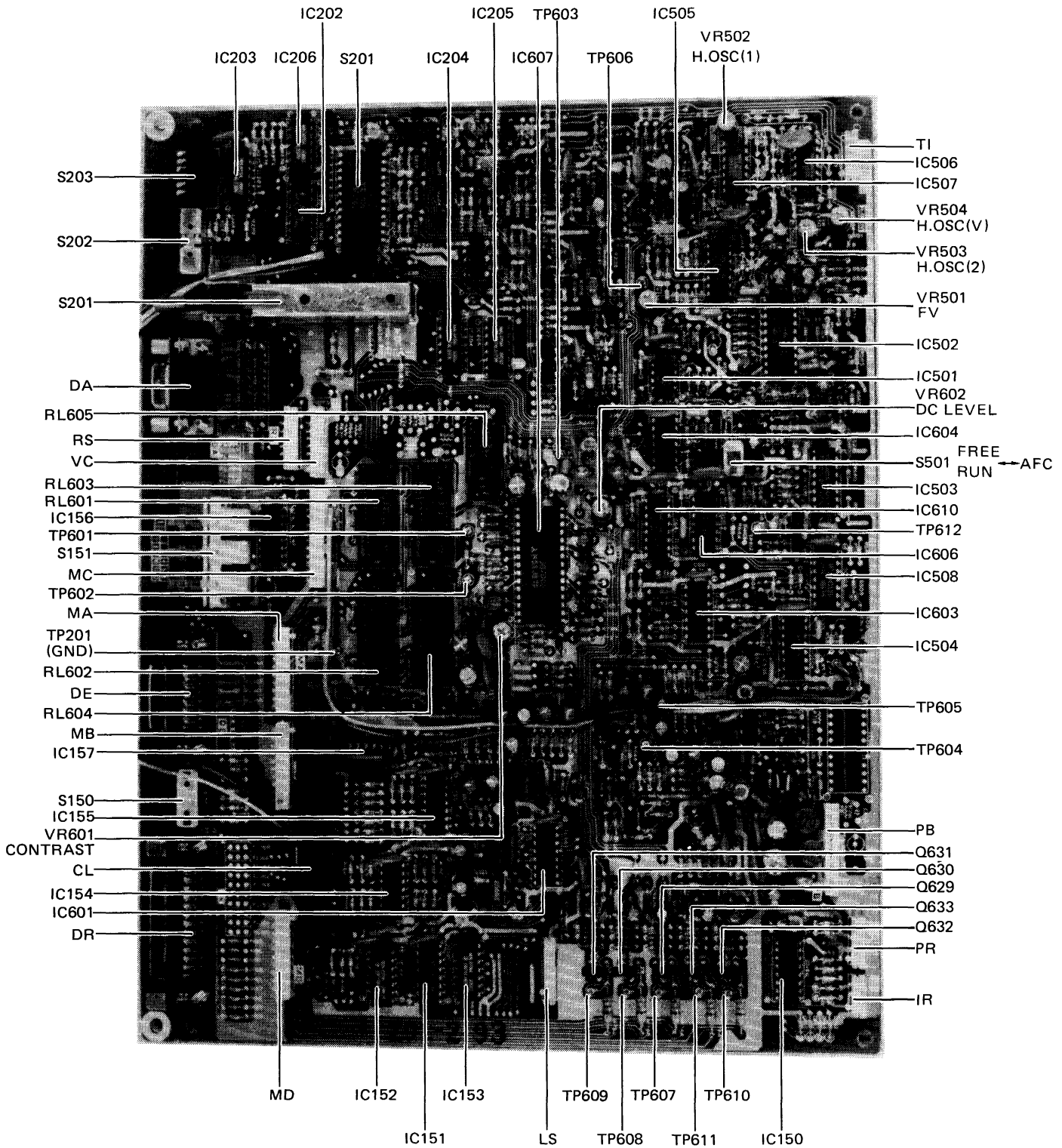


**(3) PWB Layout 2.**



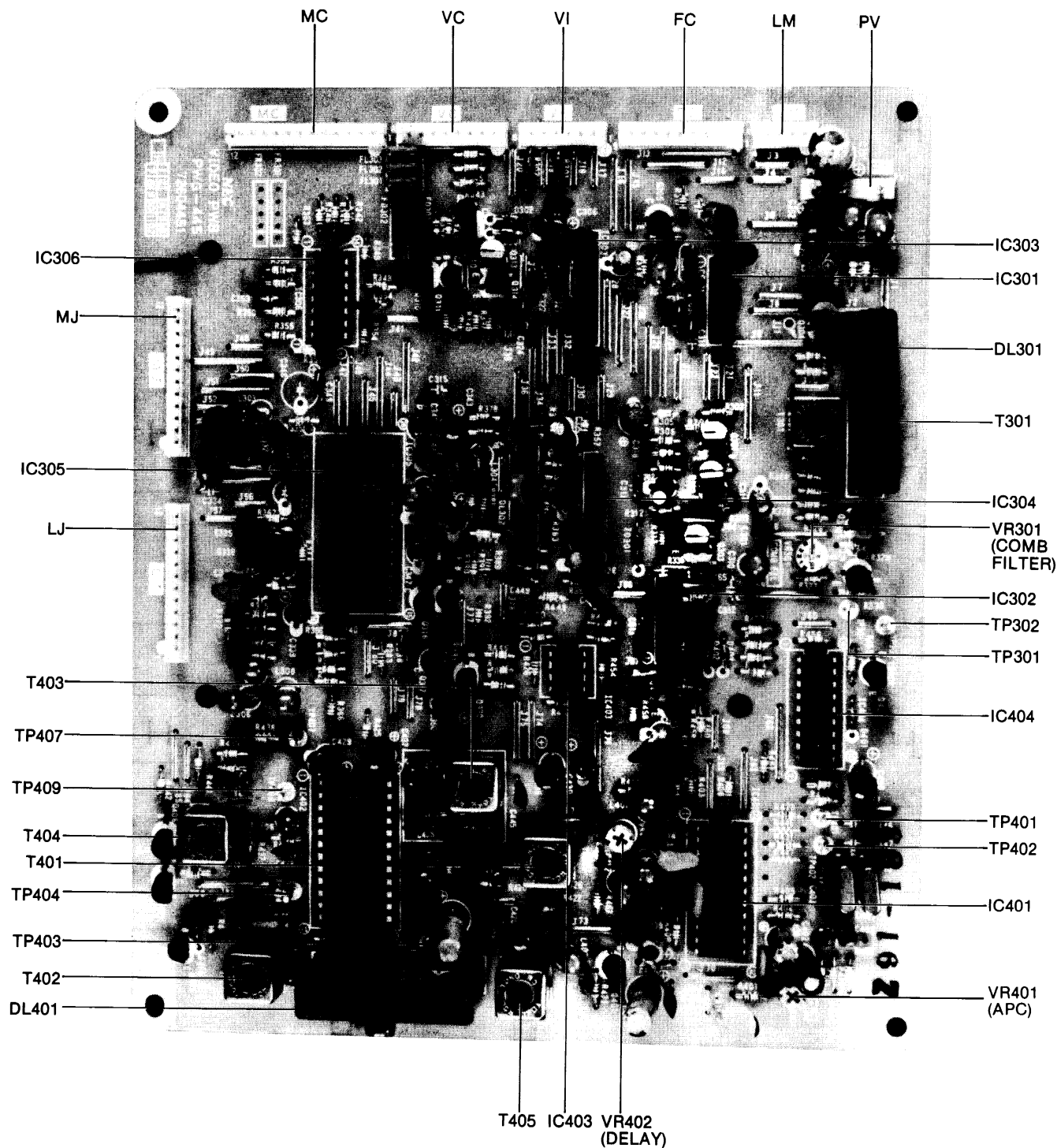
# PARTS LOCATION DIAGRAMS

## MAIN PWB (PWG 442)

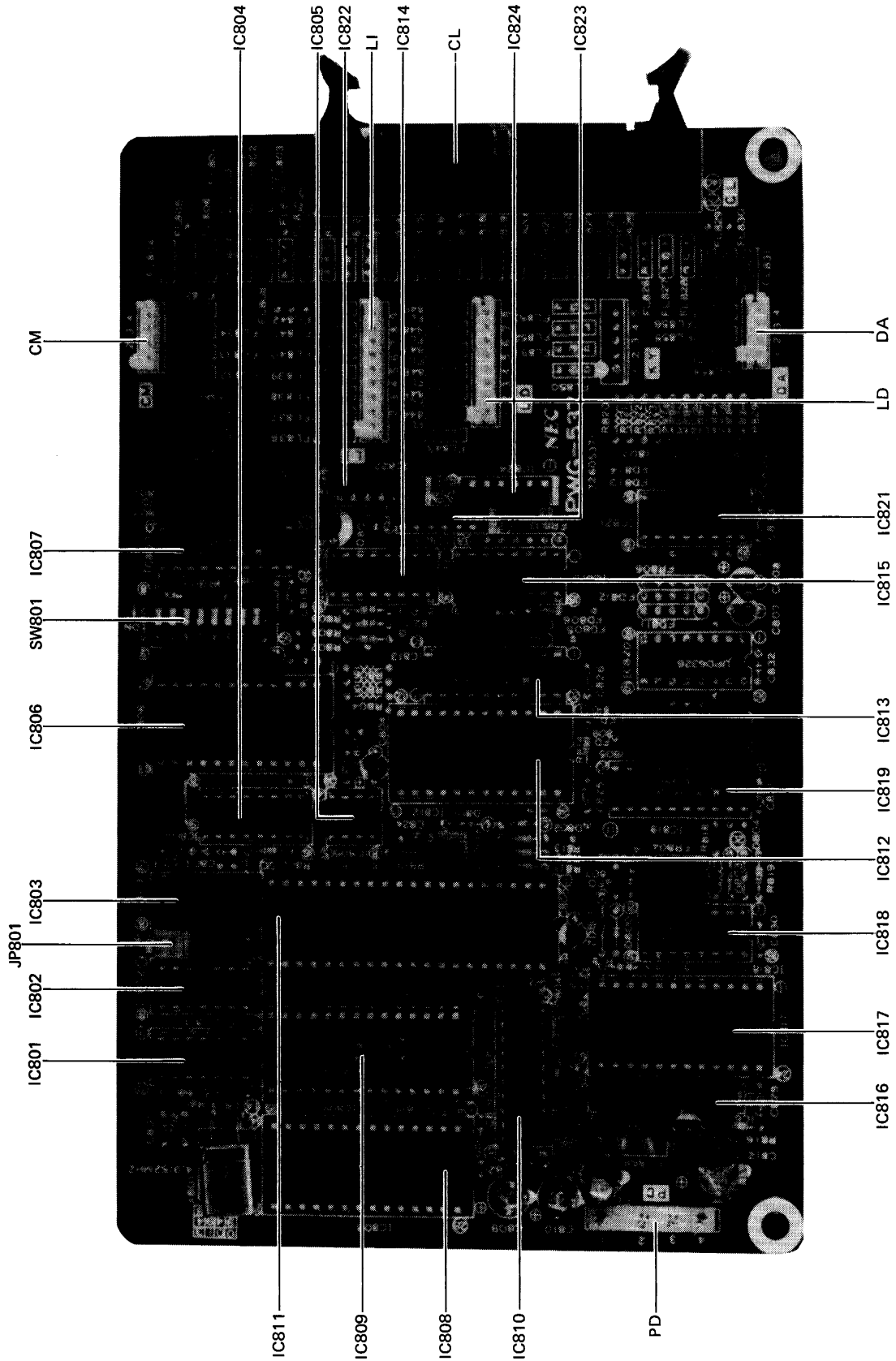




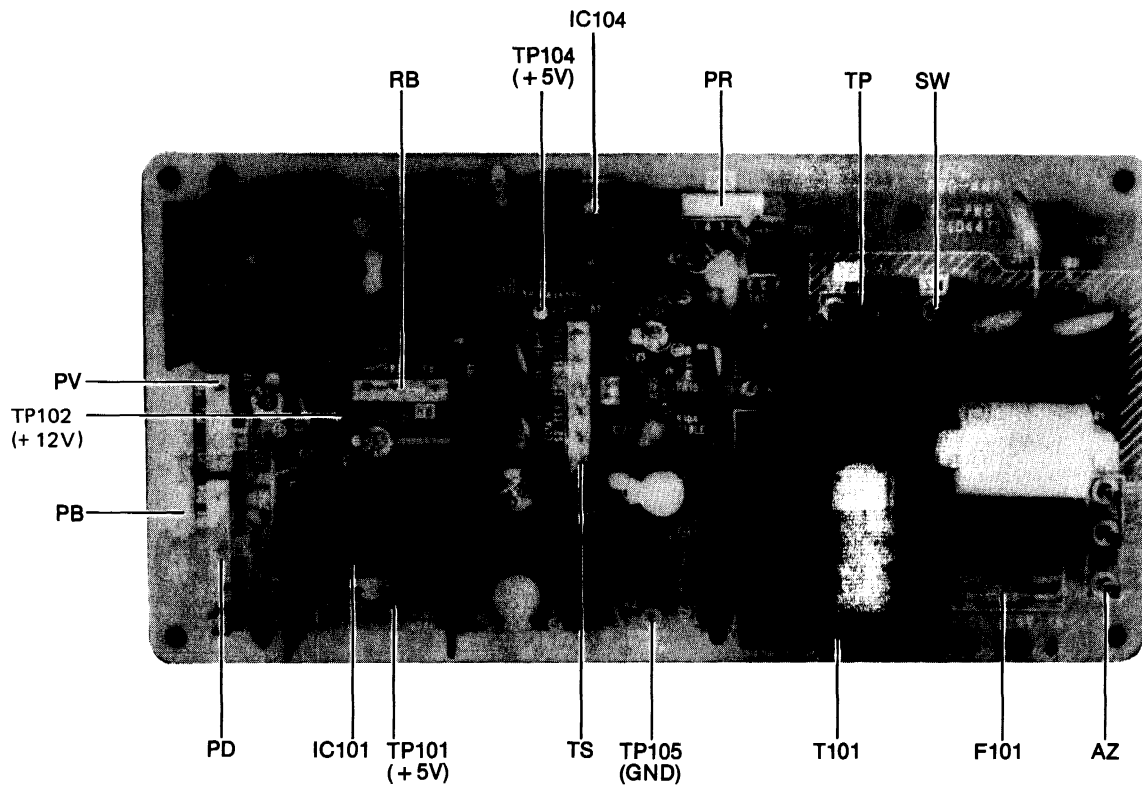
# VIDEO PWB (PWG 445)



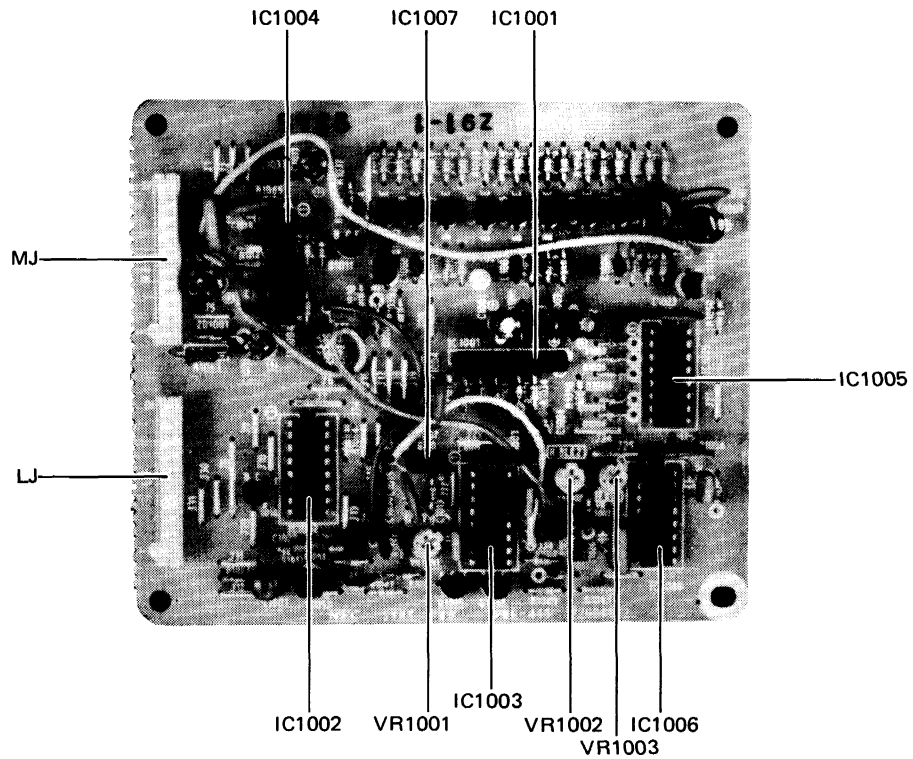
# CONTROL PWB (PWG 537)



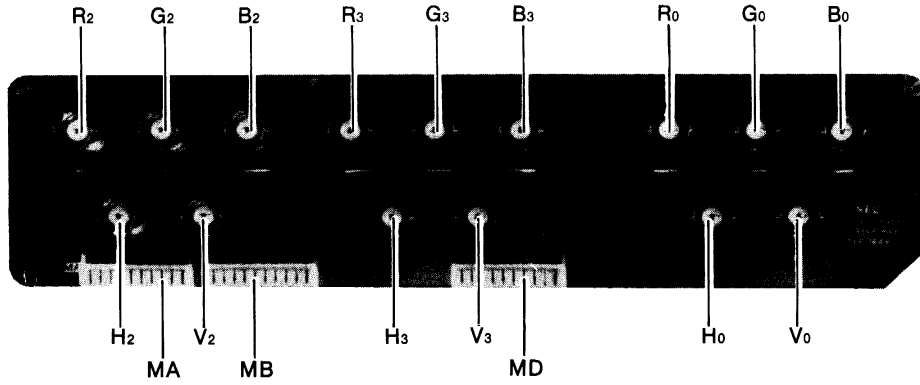
### PS PWB (PWG 447)



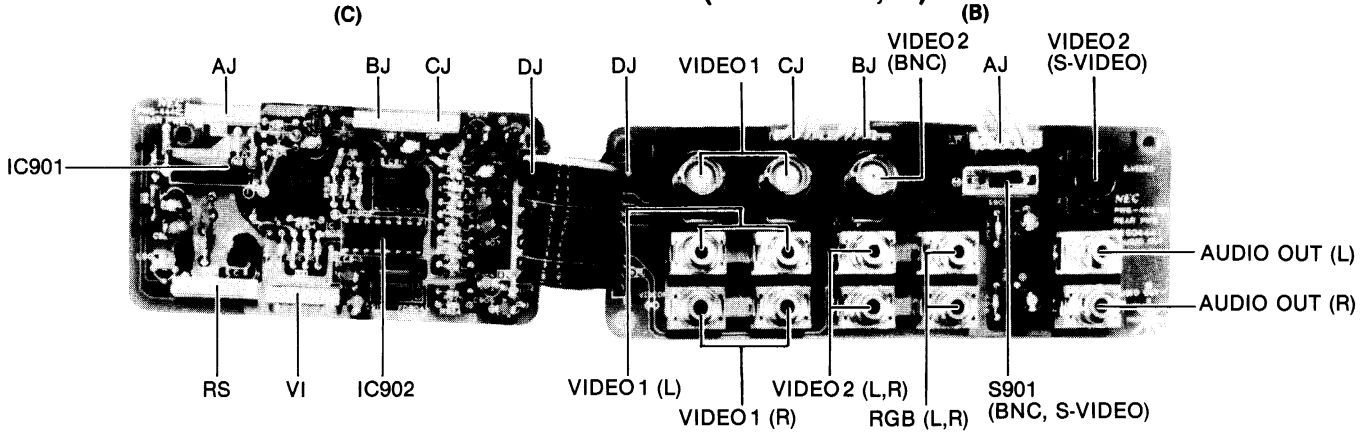
### SYNC PWB (PWG 465)



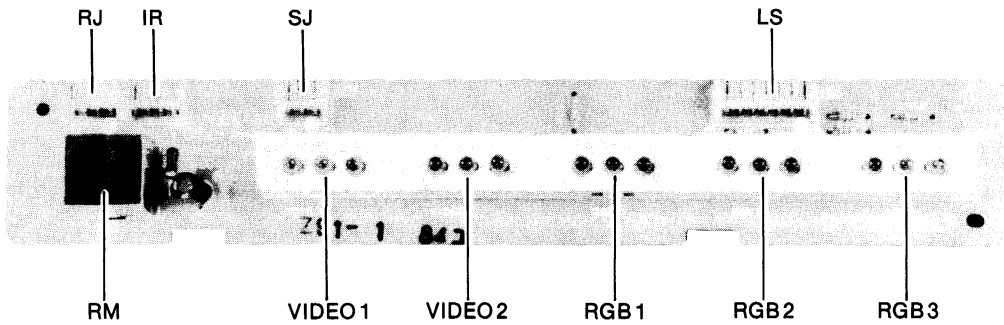
**REAR PWB (PWG 444A)**



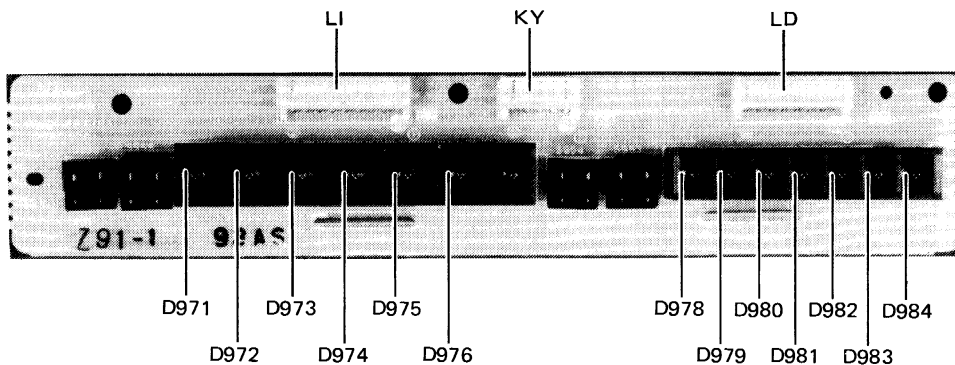
**REAR PWB (PWG 444B, C)**



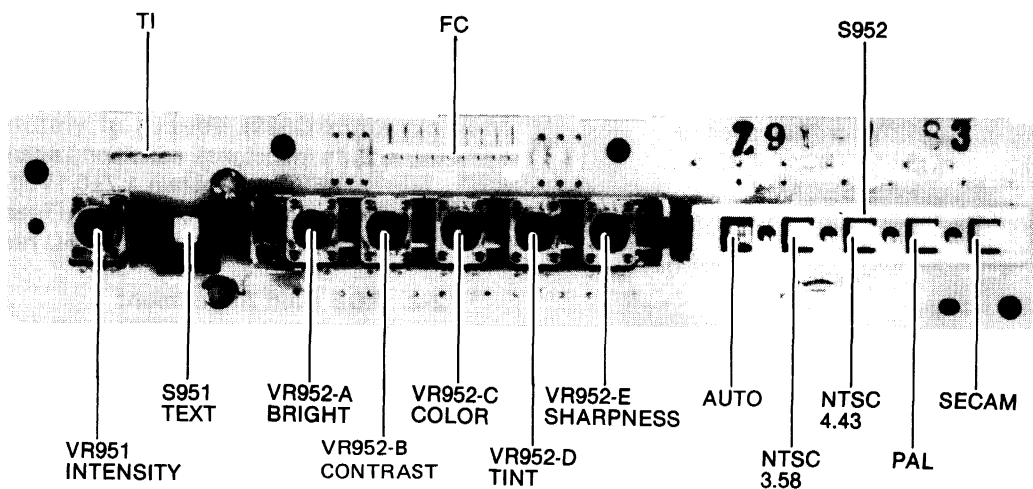
**LED PWB (PWG 466A)**



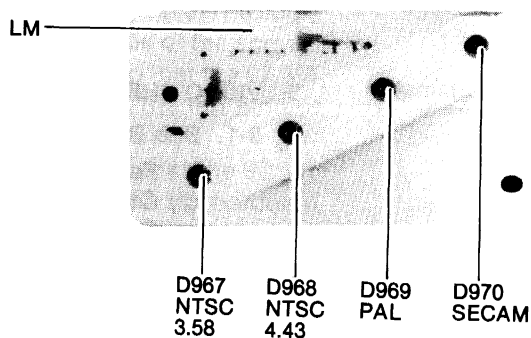
**LED PWB (PWG 466B)**



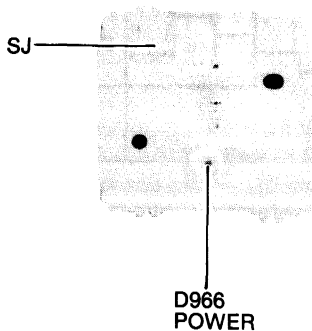
**FRONT PWB (PWG 467A)**



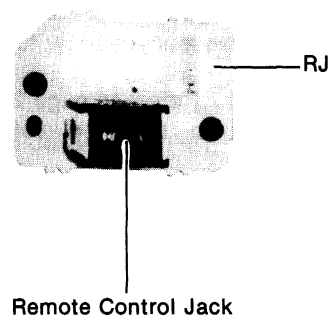
**FRONT PWB (PWG 467B)**



**FRONT PWB (PWG 467C)**



**FRONT PWB (PWG 467D)**



# ADJUSTMENT PROCEDURE

## STANDARD ADJUSTMENT CONDITION

- Power Supply: AC120V, 60Hz
- Input signal:
  - Video : 1.0Vp-p 75Ω, positive  
(1), (2) 3.58NTSC, 4.43NTSC, PAL, SECAM
  - IBM Interface: [VIDEO]
    - Analog 0.7Vp-p, 75Ω positive  
(SYNC ON GREEN)  
Video 0.7Vp-p  
Sync. 0.3Vp-p
    - TTL level  
[SYNC]  
TTL level  
Negative/Positive  
Separate/Composite
- RGB (2), (3): [VIDEO]
  - 0.7Vp-p, 75Ω, positive  
(SYNC ON GREEN)  
Video 0.7Vp-p  
Sync. 0.3Vp-p  
[SYNC]  
0.7~4.0Vp-p 75Ω  
Negative/Positive  
Separate/Composite
- Loop Out terminal (VIDEO (1)) must be terminated with a 75Ω resistor.

## SERVICE ADJUSTMENTS

### 1. HORIZONTAL OSCILLATION FREQUENCY ADJUSTMENT

**Note:** Use a digital voltmeter with an input resistance of more than 10MΩ.

- Set service switch S501 into "FREE RUN" position.
- Select VIDEO 1 mode using the remote control unit.
- Connect a frequency counter to TP613 (IC610 of pin 10).
- Adjust VR504 (H. OSC (V)) to obtain  $15.7 \pm 0.1$  kHz reading on the counter.
- Select RGB 2 mode.
- Connect the frequency counter to TP606 (pin ① of IC501).
- Feed in Signal 7 (refers to page 26), and adjust VR501 (F/V) so that the voltmeter reads  $3.00 \pm 0.01$  Vdc.
- Connect the frequency counter to TP613.
- Adjust VR502 (H. OSC(1)) to obtain  $15.0 \pm 0.1$  kHz.
- Reset S501 to "AFC" position.

### 2. GAIN CONTROL ADJUSTMENT

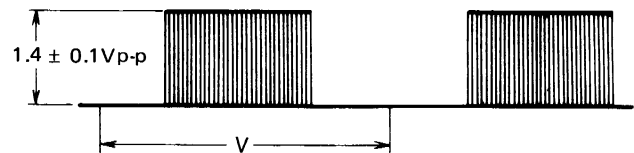
#### 2-1. DC Level Adjustment

- Connect a digital voltmeter to TP607 (emitter of Q629).
- In no signal condition, adjust VR602 (DC LEVEL) to obtain  $1.7 \pm 0.1$  Vdc.

**Note:** The rear panel OUTPUT terminals④ must be terminated with 75Ω resistors.

#### 2-2. RGB Gain Adjustment

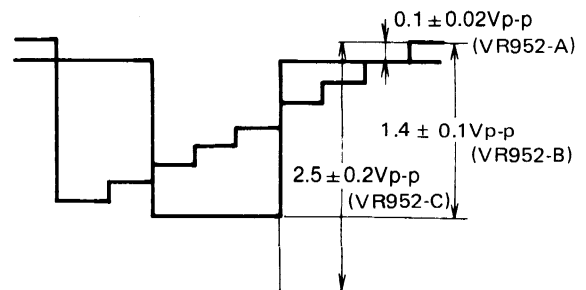
- Feed in a 0.7Vp-p crosshatch pattern signal (Signal 1, refer to page 26) to RGB2 terminal (BNC Connector).
- Connect an oscilloscope to TP607 (emitter of Q629).
- Adjust VR601 (CONTRAST) to obtain an amplitude of  $1.4 \pm 0.1$  Vp-p.



### 3. VIDEO CHROMA CIRCUIT ADJUSTMENT

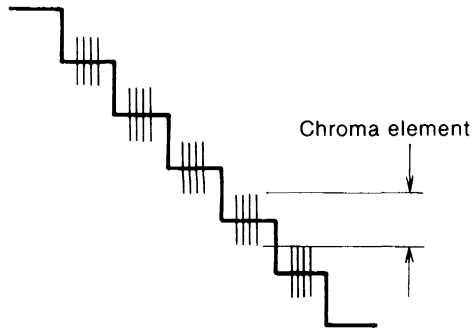
#### 3-1. Sub Bright, Sub Picture Adjustment.

- Feed in a NTSC color bar signal.
- Connect an oscilloscope to the emitter of Q1010 on the SYNC PWB.
- Adjust VR952-A (SUB. BRIGHTNESS) and VR952-B (SUB. PICTURE), VR952-C (SUB. SHARPNESS) on the FRONT PWB (PWG 467A) alternately to obtain the waveform of Y signal illustrated below.



### 3-2. Comb Filter Adjustment

- (1) Feed in an NTSC color bar signal.
- (2) Connect an oscilloscope to TP301 (collector of Q307) and ground on the VIDEO PWB.
- (3) Adjust both T301 and VR301 alternately to reduce the chroma element in the video signal to a minimum.

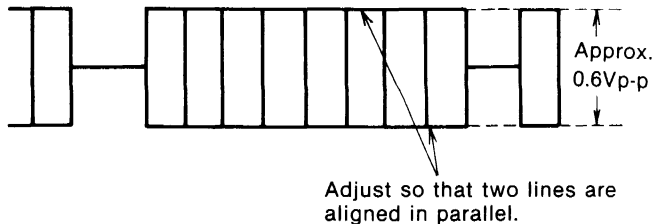


### 3-3. Blanking Adjustment

- (1) Feed in a color bar pattern signal.
- (2) Adjust VR1001 (H. BLK1) on the SYNC. PWB so that 97.5% indication of the scale is aligned with the right side of the screen.
- (3) Adjust VR1002 (H. BLK2) so that the 97.5% indication is aligned with the left side of the screen.
- (4) Adjust VR1003 (V. BLK) so that the 97.5% indication is aligned with the top border of the screen.

### 3-4. Bell Filter and System Identification Adjustment.

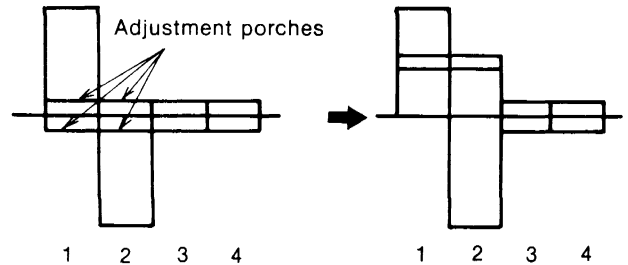
- (1) Feed in a SECAM color bar signal.
- (2) Connect an oscilloscope to TP403 (pin 14 of IC402) on the VIDEO PWB.
- (3) Rotate T401 to adjust chroma level so that the waveform is obtained as shown below.



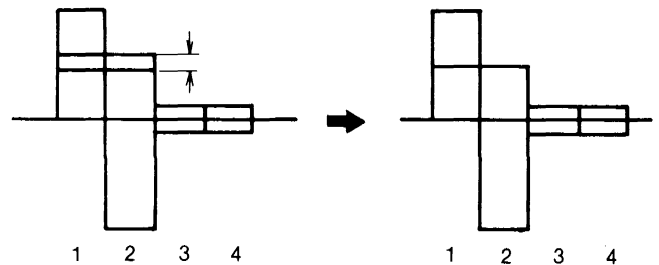
- (4) Connect a digital voltmeter to TP404 (pin 10 of IC402).
- (5) Rotate T402 to read a minimum DC level (approx. 3V) on the voltmeter.

### 3-5. PAL Matrix Adjustment

- (1) Feed in a PAL "DEM" signal (Philips model PM5518).
- (2) Connect an oscilloscope to pin 22 of IC401 (R - Y output).
- (3) Adjust VR402 (DELAY) to align the first and second porch of two lines into one line.

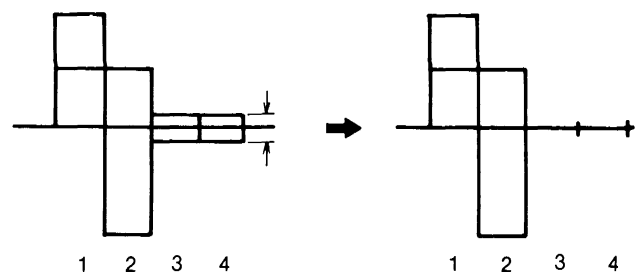


- (4) Rotate T405 so that the first and second porch of two lines are aligned into one line.



### 3-6. APC (Automatic Phase Control) Adjustment

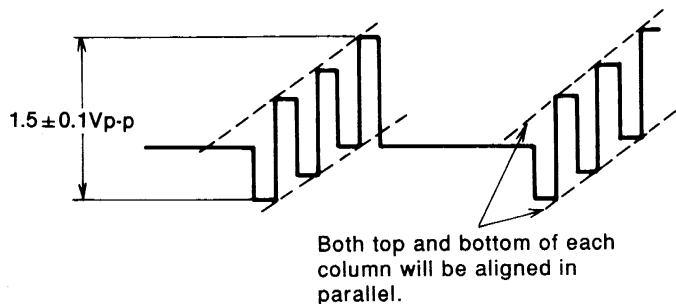
Continuous alignment of the above item. Adjust VR401 (APC) so that the third and fourth porch of two lines into one line.



### 3-7. Sub-Color, Sub-Tint, Sub-Sharpness Adjustment

- (1) Feed in a NTSC color bar signal.
- (2) Set the COLOR and TINT CONTROL on the remote control unit to the initialized level. (i.e., turn on the main power with dipswitch ② of SW8502 in short position.)

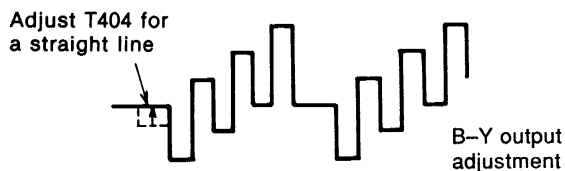
- (3) Connect an oscilloscope to TP409 (pin ③ of IC402) on the VIDEO PWB.
- (4) Adjust VR952-C (SUB. COLOR) and VR952-D (SUB. TINT) on the FRONT PWB so that the waveform below is observed.



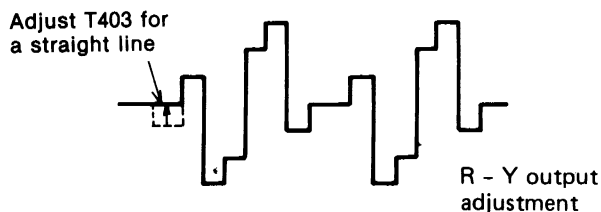
- (5) VR952-E (SUB. SHARPNESS) is set to its mechanical center position.

### 3-8. SECAM Color Difference Adjustment

- (1) Feed in a SECAM color bar signal.
- (2) Connect an oscilloscope to TP409 (pin ③ of IC402) on the VIDEO PWB.
- (3) Rotate T404 to obtain the waveform in the illustration below.



- (4) Connect the oscilloscope to TP407 (pin ① of IC402) on the VIDEO PWB.
- (5) Rotate T403 so the waveform below is observed.



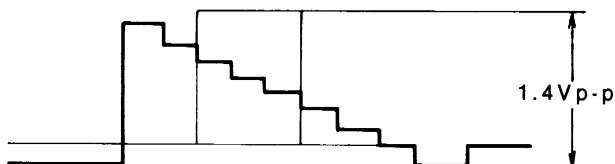
## 4. HORIZONTAL PHASE, HORIZONTAL WIDTH, VERTICAL HEIGHT, VERTICAL HOLD ADJUSTMENTS

**Note:** Adjustment procedure for RGB output level, Horizontal Width, Vertical Height and Vertical Hold should be performed according to the following steps.

1. Select a desired function mode by pressing SELECT key.
2. Adjust to the optimum by the Up/Down buttons.  
(The values you input in this item become the initialized value for the function.)

### 4-1. VIDEO Adjustment (Field frequency 60Hz)

- (1) Feed in a 1Vp-p NTSC color bar signal.
- (2) Set the COLOR control on the remote control unit to minimum.
- (3) Connect an oscilloscope to the following TPs and adjust their corresponding gain controls on the front panel to obtain the waveform shown below.
  - TP607 (Q629 emitter) — R Gain control
  - TP608 (Q630 emitter) — G Gain control
  - TP609 (Q631 emitter) — B Gain control

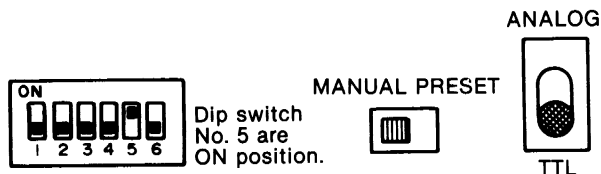


### 4-2. VIDEO Adjustment (Field Frequency 50Hz)

- (1) Feed in a 1Vp-p PAL color bar signal.
- (2) Set the COLOR control to a minimum.
- (3) Perform the same alignment of 4-1 (3).

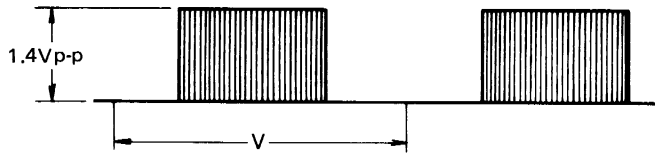
### 4-3. IBM CGA Mode Adjustment

- (1) Feed in signal 1 (refer to a signal table on page 26) to RGB1 input terminal (TTL mode).
- (2) Set the rear panel switches as shown below.





- (3) Feed in a crosshatch pattern signal.  
Connect an oscilloscope to TPs and adjust their corresponding gain controls to obtain the waveform shown below.  
TP607 (Q629 emitter) — R Gain control  
TP608 (Q630 emitter) — G Gain control  
TP609 (Q631 emitter) — B Gain control

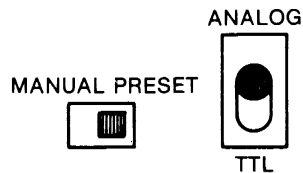


#### 4-4. IBM EGA Mode Adjustment

- (1) Feed in signal 2 (refer to signal table on page 26) to RGB1 input terminal.
- (2) Set to the TTL mode.
- (3) Connect the oscilloscope to TPs and adjust their corresponding gain controls to obtain 1.4Vp-p and the same waveform in 4-3 adjustment.  
TP607 (Q629 emitter) — R Gain control  
TP608 (Q630 emitter) — G Gain control  
TP609 (Q631 emitter) — B Gain control

#### 4-5. IBM PGA 480 Line Mode Adjustment

- (1) Set the rear panel switches to the positions below.



- (2) Feed in signal 4 (refer to signal table on page 26) to RGB1 (D SUB 9 pins) input terminal.
- (3) Leave pin number 5 of the RGB 1 open.
- (4) Connect the oscilloscope to TPs and adjust their corresponding gain controls to obtain 1.4Vp-p and the same waveform in 4-3 adjustment.  
TP607 (Q629 emitter) — R Gain control  
TP608 (Q630 emitter) — G Gain control  
TP609 (Q631 emitter) — B Gain control

#### 4-6. IBM PGA 400 Line Mode Adjustment

- (1) Apply signal 3 (refer to signal table on page 26) to RGB1 (D SUB 9 pins) input terminal.
- (2) Connect pin number 5 of the RGB1 to ground.
- (3) Connect the oscilloscope to TPs and adjust their corresponding gain controls to obtain 1.4Vp-p and the same waveform in 4-3 adjustment.  
TP607 (Q629 emitter) — R Gain control  
TP608 (Q630 emitter) — G Gain control  
TP609 (Q631 emitter) — B Gain control

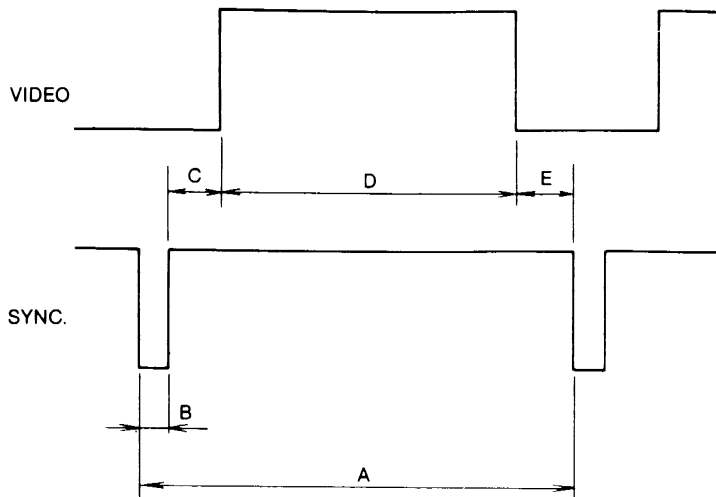
#### 4-7. RGB 2 Input Mode Adjustment

- (1) Feed in signal 5 (refer to signal table on page 26) to RGB2 (BNC connector) input terminal.
- (2) Connect the oscilloscope to TPs and adjust their corresponding gain controls to obtain 1.4Vp-p and the same waveform in 4-3 adjustment.  
TP607 (Q629 emitter) — R Gain control  
TP608 (Q630 emitter) — G Gain control  
TP609 (Q631 emitter) — B Gain control

#### 4-8. RGB 3 Input Mode Adjustment

- (1) Feed in signal 6 (refer to signal table on page 26) to RGB3 (BNC connector) input terminal.
- (2) Connect the oscilloscope to TPs and adjust their corresponding gain controls to obtain 1.4Vp-p and the same waveform in 4-3 adjustment.  
TP607 (Q629 emitter) — R Gain control  
TP608 (Q630 emitter) — G Gain control  
TP609 (Q631 emitter) — B Gain control

## TIMING CHART



## ADJUSTMENT SIGNALS

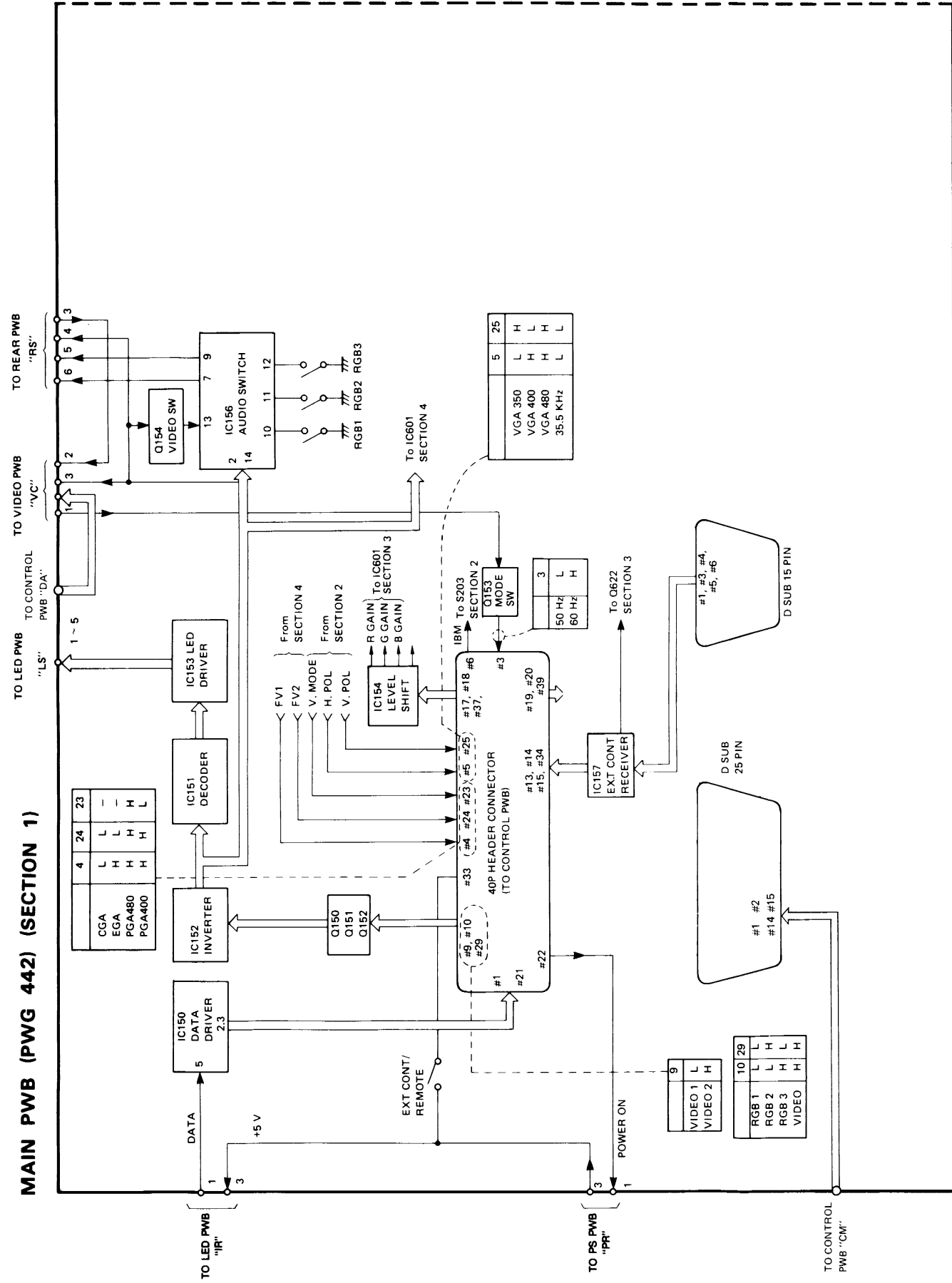
Signal 1	} RGB 1	} IBM CGA IBM EGA IBM PGA 400 line mode IBM PGA 480 line mode
Signal 2		
Signal 3		
Signal 4		
Signal 5	RGB 2	IDC-1000
Signal 6	RGB 3	MAC II
Signal 7	15kHz	60Hz
Signal 8	25kHz	60Hz
Signal 9	35kHz	60Hz
Signal 10	45kHz	60Hz
Signal 11	55kHz	60Hz
Signal 12	15kHz	38Hz
Signal 13	15kHz	70Hz
Signal 14	15kHz	100Hz

## SIGNAL TABLE

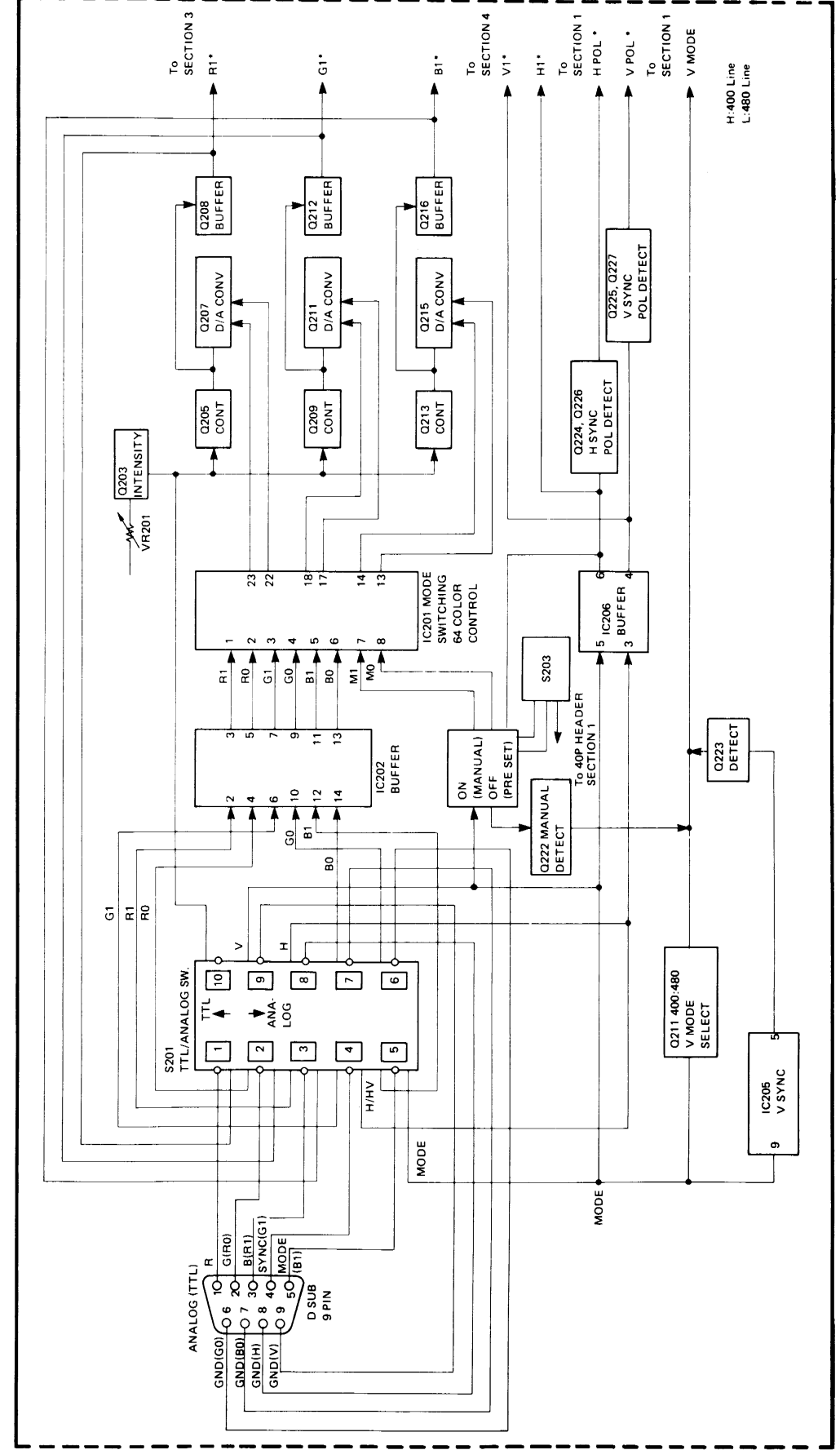
		A	B	C	D	E
Signal 1	H $\mu$ s	63	4.2	7.2	45	6.6
	Vms	16.4	0.075	1.525	12.6	2.2
Signal 2	H $\mu$ s	45.5	4.9	1.6	39	0
	Vms	16.68	0.6	0.08	16	0
Signal 3	H $\mu$ s	33	4.5	2.8	25.6	0.1
	Vms	16.6	0.07	2.12	13.05	1.36
Signal 4	H $\mu$ s	33	4.5	2.8	25.6	0.1
	Vms	16.6	0.07	0.83	15.67	0.03
Signal 5	H $\mu$ s	31.78	2.76	1.60	26.29	1.13
	Vms	16.67	0.64	0.77	15.14	0.12
Signal 6	H $\mu$ s	28.57	2.12	3.17	21.16	2.12
	Vms	15.00	0.09	1.11	13.71	0.09
Signal 7	H $\mu$ s	66.7	9.1	5.7	51.7	0.2
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 8	H $\mu$ s	40.0	5.5	3.4	31.0	0.1
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 9	H $\mu$ s	28.6	3.9	2.4	22.2	0.1
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 10	H $\mu$ s	22.2	3.0	1.9	17.2	0.1
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 11	H $\mu$ s	18.2	2.5	1.6	14.1	0
	Vms	16.7	0.07	3.33	10.95	2.35
Signal 12	H $\mu$ s	66.7	9.1	5.7	51.7	0.2
	Vms	26.3	0.11	5.2	17.2	3.8
Signal 13	H $\mu$ s	66.7	9.1	5.7	51.7	0.2
	Vms	14.3	0.06	2.9	9.4	1.9
Signal 14	H $\mu$ s	66.7	9.1	5.7	51.7	0.2
	Vms	10.0	0.05	2.0	6.6	1.3

# BLOCK DIAGRAMS

**MAIN PWB (PWG 442) (SECTION 1)**

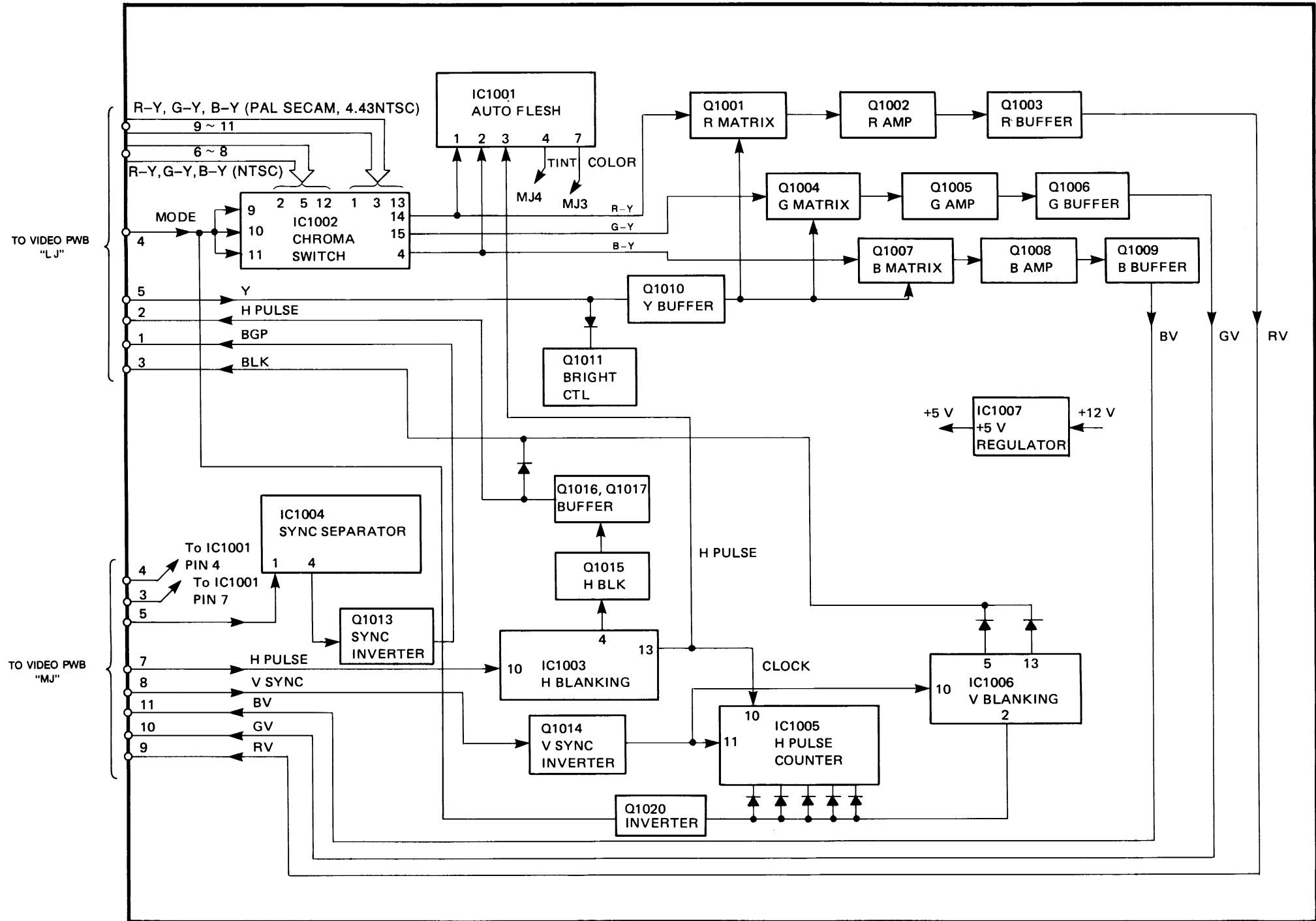


**MAIN PWB (PWG 442) (SECTION 2)**





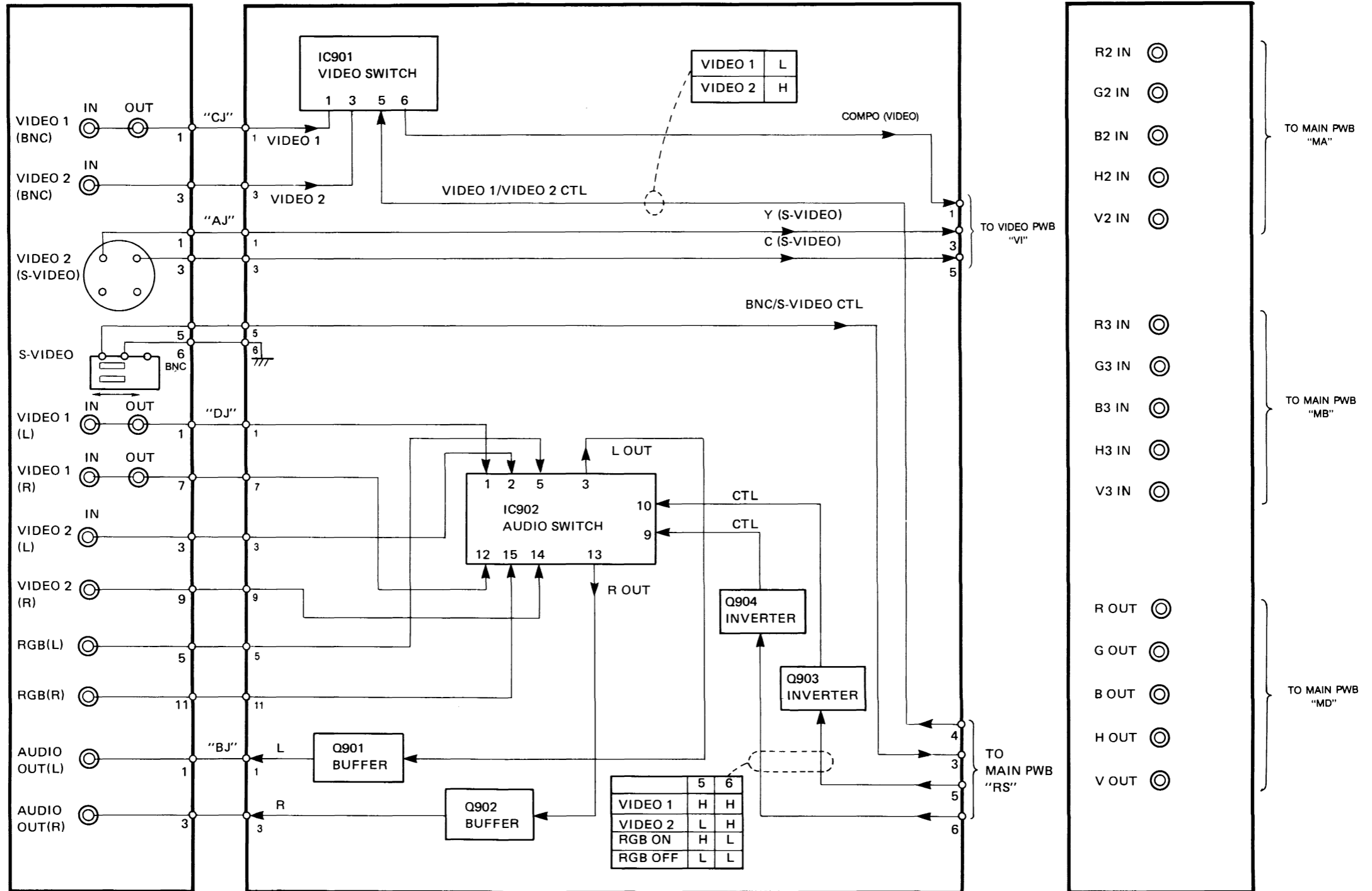
SYNC PWB (PWG 465)



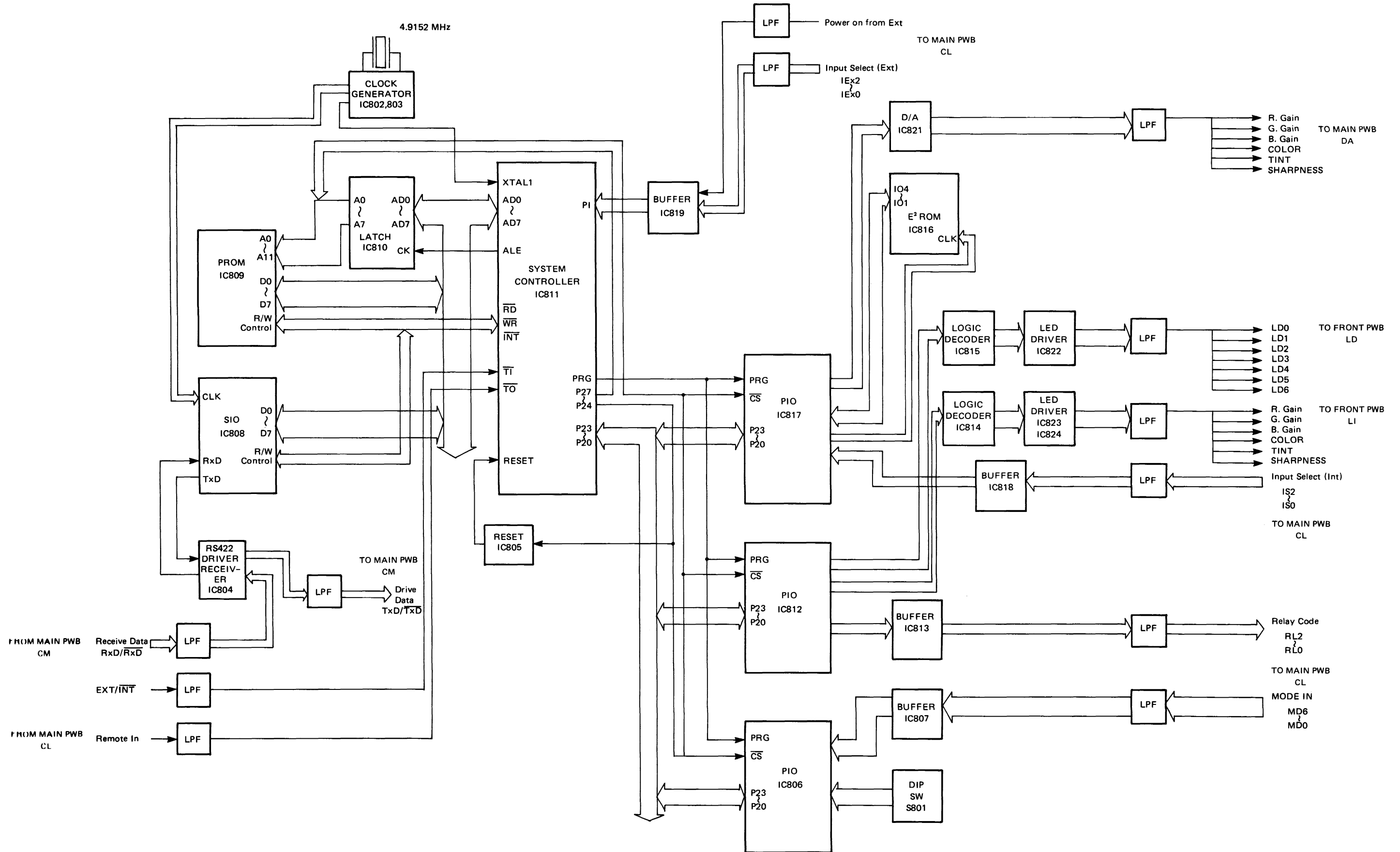
**REAR PWB  
(PWG 444B)**

**REAR PWB (PWG 444C)**

**REAR PWB  
(PWG 444A)**



**CONTROL PWB (PWG 537)**



# CIRCUIT DESCRIPTIONS

## MAIN PWB

### 1. RGB Input Section

The R.G.B. signals input from the RGB1 input section, REAR PWB, and VIDEO PWB are switched in RL601 to RL605 and go to IC607 pins ③, ⑦, and ⑪.

Switching Transistor Condition

MODE	Q604	Base	Q601	Base
	Q605		Q602 Q603	
RGB1	0	(V)	0	(V)
RGB2	0		5	
RGB3	5		0	
VIDEO	5		5	

IC154 shifts the level of the voltage D/A converted in CONTROL PWB and outputs it to IC607 pins ④, ⑧ and ⑫. (R.G.B. sub contrast control terminals)

This voltage controls the output level of each R.G.B. signal. Thereafter the controlled R.G.B signals are output to pins ⑲, ⑳, ㉑ respectively.

If the external control is connected, the output is cut when the Q622 is turned on and the voltage at IC607 pin ⑭ becomes 0 V.

The R.G.B signals from IC607 go to REAR PWB through buffers Q629, Q630, and Q631 and connector MD pins ①, ③, and ⑤.

### 2. Synchronizing Signal Processing System

The H and V sync signals from the RGB input section, REAR PWB, and VIDEO PWB are input to IC601.

Input terminal at each mode

MODE	IC601 Pin number	
	H	V
RGB1	⑫	①
RGB2	⑭	⑤
RGB3	⑮	②
VIDEO	⑪	—

The condition of pins ⑨ and ⑩ (High/Low) of IC601 determine the mode of output signal as follows;

MODE	IC601 Pin number	
	⑨	⑩
RGB1	0	0
RGB2	0	5 V
RGB3	5 V	0
VIDEO	5 V	5 V

The selected H-SYNC signal passes through buffers Q606 and Q607 and the signal is limited to 1.4 Vp-p by the limiter constructed of D608 and D609. Then the signal is input to IC603 pins ⑨ and ⑪. It is inverted and amplified in IC603 and divided into two signals. These two signals are output to IC606 pins ⑨ and ⑩ from IC603 pins ⑧ and ⑩.

The positive and negative portions of the SYNC signal are unified into negative portion in IC606 and output through pin ⑧ of IC606.

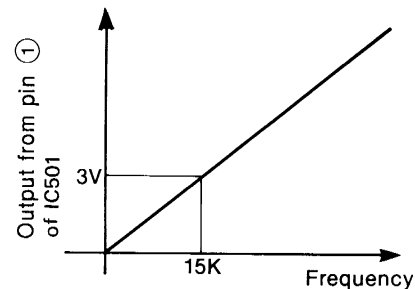
The V-SYNC signal is processed in the same way and output through pin ⑥ from IC606.

### H-synchronization Circuit

When the H-SYNC signal is output to IC606 pin ⑧, it is detected in Q610. At the same time, the voltages at IC508 pin ① and at IC508 pin ⑬ become 0 V and 5 V respectively, and the signal output to IC606 pin ⑥ is fed out through pin ③ of IC508.

When the "sync on green signal" is input, lack of H sync signal at pin ⑥ of IC606 induces the voltages 5 V and 0 V at pins ① and ⑬ of IC508 respectively.

The separated H-sync signal from the "sync on green signal" in Q611 and Q612 is flowed into pin ⑫ of IC508 and output from pin ⑪. When the signal is input, the H sync signal output from pin ③ or ⑪ of IC508 is differentiated and input to pin ⑥ of IC501. It is F/V (frequency-to-voltage) converted in IC501 and output from pin ①.



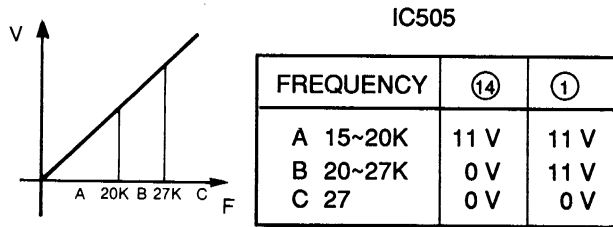
F/V Relation

### Video Horizontal Synchronization

The composite signal input from "MC" connector pin ① is amplified at Q615 and Q616 and input to IC604 pin ⑤ through the buffer of Q635. This signal is output from IC604 (VIDEO RGB Sync SW) pin ④ and input to IC502 pin ① through the buffer of Q505. This IC synchronizes and separates the signal and oscillates horizontally. The horizontal sync signal is output from IC503 pin ⑦ and input to IC601 pin ⑪.



The F/V converted voltage from IC501 pin ① passes through the comparator of IC505, is inverted in Q503 and Q504, and goes to connector CL pins ⑳ and ㉑.



These signals are used for detecting CGA, EGA, and PGA in RGB mode.

### V-synchronization Circuit

#### a) Separate SYNC

The V sync signal which is output from IC606 pin ⑥ is inverted in IC603 and is inverted again in Q508. It is then output through the driver IC508 and buffer Q633 to REAR PWB.

#### b) H/V MIX SYNC

H/V MIX SYNC signal passes through IC604 and the buffer Q506 and is input to IC502 pin ㉒. The 10Vp-p V sync signal which is separated and inverted is obtained at IC502 pin ㉑. This signal is double-integrated, inverted in Q507, and output through driver IC508 and buffer Q633 to REAR PWB.

### Video Vertical Synchronization

The composite signal passed through the buffer of Q635 is input to IC604 pin ②. This signal is output from IC604 pin ⑮ and input to IC502 pin ㉒ through the buffer of Q506. This signal is synchronized and separated at IC502 and output from IC502 pin ㉑. The vertical sync signal is detected at Q507 through the integration circuit. This signal is output through IC508 and Q633.

### 3. Control Section

#### Power Rise

The signal input through connector IR pin ① on the FRONT PWB from the remote control is converted to the balanced transmission signal in IC150.

### 4. IBM Interface

#### Detecting the sync polarity

The sync signals input from D SUB 9 PIN connector are input to IC206 pins ③ (H sync) and ⑤ (V sync) through switch S201. Only detecting the horizontal sync polarity is described here, because the polarity of the vertical sync is detected in the same way.

The sync signal output from IC206 pin ④ is inverted and amplified in Q225. It then passes through the low pass filter and the pulse components are eliminated. According to the sync polarities the voltage at collector of Q227 are as follows:

	Collector of Q227
Positive polarity	0 V
Negative polarity	5 V

This signal is output to the CONTROL PWB through connector CL pin ⑤. The signal is used for mode detection while in the IBM VGA mode.

#### Detecting V mode

While in IBM PGA mode, the V. MODE signal is input through pin ⑤ of D SUB 9 PIN connector as follows;

	D SUB 9 PIN Pin 5
400 LINE	L
480 LINE	H

This signal is inverted in Q221 and transmitted to CONTROL PWB through connector CL pin ㉓.

If the PRESET/MANUAL switch is set to MANUAL, or if the V-SYNC signal is input to pin ⑤ of D SUB 9 PIN connector, the signal is forcedly fixed to the 480-line mode in Q222, Q223, and IC205 to avoid malfunctions.

## SYNC PWB

The following signals are selected in IC1002:

- The NTSC 3.58 signal input from VIDEO PWB through connector LJ pins ⑥, ⑦, and ⑧.
- The NTSC 4.43 signal, the PAL signal and the SECAM signal input from connector LJ pins ⑨, ⑩, and ⑪.

The voltages at control terminals of IC1002 such as pins ⑨, ⑩, and ⑪ become low level in NTSC 3.58 mode and the color difference signals of NTSC 3.58 signal fed in pins ②, ⑤ and ⑫ are then output from pins ⑭ (R-Y), ⑮ (G-Y), ④ (B-Y) respectively. In other receiving mode, the voltages at pins ⑨, ⑩ and ⑪ become high level and the color difference signals fed in pins ①, ③ and ⑬ are output from the output terminals.

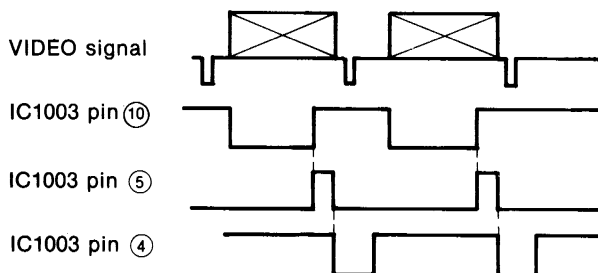
The color difference signals selected in the IC1002 are processed in the RGB matrix circuits.

RGB matrix circuits (for R-Y, B-Y, and G-Y) operate in the same way.

The following is a description of the G matrix circuits. The G-Y signal and Y signal are matrixed in Q1004, and inverted and amplified in Q1005. The signal goes through buffer Q1006 and are output from connector MJ pin ⑩.

### H. blanking

The H-pulse signal is input from connector MJ pin ⑦ and goes to IC1003. The mono-/multi-vibrator in IC1003 generates the blanking pulse from H-pulse signal.



H. Blanking Timing Chart

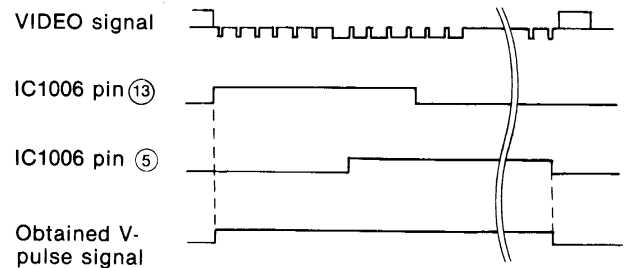
The signal at IC1003 pin ④ is reversed in Q1015. The reversed signal passes through buffers Q1016 and Q1017 and goes to VIDEO PWB through connector LJ pin ②.

### V. blanking

The H-PULSE signal from IC1003 pin ⑬ is input to IC1005 pin ⑩. The V-SYNC signal is input to IC1005 pin ⑪ after being inverted in Q1014. IC1005 functions as a counter of H-pulses. If NTSC signal is input, it sets IC1006 pin ② to 5V at every 252 pulses. If PAL or SECAM signal is input, it sets to IC1006 pin ② to 2V at every 307 pulses. A V-pulse per 1ms is output from IC1006 pin ⑬.

The inverted V-SYNC signal in Q1014 is input to IC1006 pin ⑩ and the pulse of 1.6 ms is output from pin ⑤ of IC1006.

The V-pulse signal is obtained by ORing the two V-pulses above.



V. Blanking Timing Chart

### VIDEO sync separation circuit

The Y signal is input to IC1004 pin ① from connector MJ pin ⑤. The sync pulse is sync-separated and output from IC1004 pin ④. It is differentiated to be a burst gate pulse and goes to VIDEO PWB through connector LJ pin ①.

## VIDEO PWB

### 1. Luminance Signal

The VIDEO signals fed into through the connector VI are input to pins of IC303, VIDEO SW IC as described below.

- a) When the NTSC signal is input, the VIDEO signal passes through the comb filter which consists of Q306 and Q307 and is divided into luminance and chroma signals. The luminance signal then goes to pin ① of IC303.
- b) When the NTSC4.43, the PAL, or the SECAM signals are input, the VIDEO signal goes to pin ③ of IC303 through the 4.43 MHz trap.
- c) When the S-VIDEO signal is input, the VIDEO signal goes to pin ⑥ of IC303.

The luminance signal selected at IC303 is input to IC304 pin ⑦. IC304 is an IC for correcting the black level. IC304 imposes the black level correction signal on the luminance signal and outputs it from IC304 pin ⑤. DL302 delays the phase of the luminance signal by 300 ns and the signal goes to IC305 pin ⑭.

The sharpness of the luminance signal input to IC305 pin ⑰ is controlled and output from IC305 pins ⑳ and ㉑. The signals go to IC305 pin ㉒.

The brightness and contrast of the signal are controlled by the voltage from VR952A, and VR952B on the FRONT PWB. The signal is output from IC305 pin ⑲. It goes through the buffer (Q318) to connector LJ pin ⑤ and to white suppressor circuit (Q319, Q320).

This circuit will reduce the contrast at white peak.

### 2. Chroma Signals

#### 1) NTSC

The signal input from connector VI of the rear panel is selected at IC302.

- a) When the composite video signal is input, this signal passes through the comb filter which consists of Q306 and Q307 and is divided into luminance and chroma signals. The chroma signal then goes to pin ③ of IC302.
- b) When the S-VIDEO signal is input, this signal goes through IC301 and then is amplified by Q301, Q302, and Q303 to pin ① of IC302.

The signal output from IC302 pin ⑥ goes through the chroma band pass filter to IC305 pin ②. It passes through the color control circuit and goes out from IC305 pin ⑥. The signal is applied H and V blanking signals in Q317. The signal is then input to IC305 pin ⑭. IC305 demodulates and matrixes this signal to obtain G-Y, R-Y, and B-Y signals, which are output from IC305 pins ⑮, ⑯, and ⑰. These signals then go to connector LJ pins ⑦, ⑧, and ⑨, respectively.

#### 2) NTSC4.43

The chroma signal which passed through IC301 and is amplified by Q301, Q302, and Q303 goes to IC401 pin ⑦. This signal is amplified again and goes out from IC401 pin ⑤. It returns to IC401 pin ③ and is demodulated. B-Y and R-Y signals are obtained and output from IC401 pins ㉑ and ㉒, respectively.

The B-Y and R-Y signals input from IC402 pins ④ and ㉑ go to the matrix circuit where the G-Y signal is generated. The R-Y, G-Y and B-Y signals therefore, go to connector LJ pins ⑨, ⑩, and ⑪ from IC402 pins ①, ②, and ③ respectively.

IC403 adjusts the DC level so that the same color and tint characteristics as that in IC305 is obtained.

#### 3) PAL

The chroma signal output from IC401 pin ⑤ is divided to IC401 pin ③ through VR402 and into IC402 pin ⑮. The signal input to IC402 pin ⑮ is amplified and goes out from IC402 pin ⑰. DL401 delays this signal by 1H. The signal returns to IC401 pin ①. IC401 matrixes and demodulates signals from pin ③ and pin ① (1H-delayed signal) and obtains the R-Y and the B-Y signals. The B-Y and the R-Y signals are output from IC401 pins ㉑ and ㉒. The B-Y and R-Y signals from IC401 pins ㉑ and ㉒ enter IC402 pins ④ and ㉑. As same as in NTSC4.43 the color of the signals is controlled in IC402 and the signals go to the matrix circuit where the G-Y signal is generated. Thereafter the R-Y, G-Y, and B-Y signals are output to connector LJ pins ⑨, ⑩, and ⑪ from IC402 respectively.

#### 4) SECAM

The signal selected in IC301 and amplified by Q301, Q302, and Q303 goes to the bell filter through buffer Q401. The chroma signal filtered by bell filter goes to IC402 pin ⑭. The IDENT circuit identifies the R-Y and B-Y signals input every 1H alternately.

Those signals are amplified and output from IC402 pin ⑰. One is input to IC402 pin ⑱ through L408, R427 and C434; the other is delayed by 1H in the delay line DL401 and input to IC402 pin ⑨. Thus, the R-Y and B-Y signals are divided. These signals are amplified and matrixed and the G-Y signal is generated. The R-Y, B-Y, and G-Y signals are output to connector LJ pins ⑨, ⑩, and ⑪ respectively.

IC404 detects the chroma components and vertical frequency and switches the mode among NTSC, NTSC4.43, PAL, and SECAM.

### 3. Supplementary Explanations

How to detect NTSC 3.58, NTSC 4.43, PAL, and SECAM:  
The mode can be switched by changing the voltage at IC404 pin ⑪, as follows:

		IC404 11 pin
AUTO		10.8~12 V
MANUAL	NTSC 3.58	8.9 ~9.8 V
	NTSC 4.43	6.7 ~7.9 V
	PAL	4.7 ~5.6 V
	SECAM	0 ~3.7 V

#### I. AUTO mode

- The H-PULSE and V-SYNC signals are input to IC404 pins ⑧ and ⑨, respectively.
- The counter in IC404 counts the pulses of the H-PULSE during the V-SYNC period.
- The voltage of 10 V appears at IC404 pin ①, when the V frequency is 50 Hz. The voltage of 0 V is obtained, when the V frequency is 60 Hz.
- The search pulses, 0 V to 10 V, are output at IC404 pin ② every V period/16.

(a) When the NTSC 3.58 signal is input:

- The following pulses are input to IC401 pin ⑲:



- When the voltage at pin ⑲ is 4 V, the color killer does not function and the voltage at IC401 pin ⑬ exceeds 9.5 V. This voltage is applied to IC404 pin ⑩.
  - When the voltage at IC404 pin ⑩ exceeds 9.5 V, the voltage at IC404 pin ② is held and the voltage at IC404 pin ⑥ goes low. The NTSC 3.58 indicator on the front panel lights.
- (b) When the NTSC 4.43 signal is input:  
The search pulses, described item (a) above, are input to IC401 pin ⑲. When the voltage at the pin is 0 V, the voltage at IC404 pin ⑩ exceeds 9.5 V and the NTSC 4.43 mode is selected, and the voltage at IC404 pin ⑥ goes high. The NTSC 4.43 indicator lights.
- (c) When the PAL signal is input:
- The voltage at IC401 pin ⑲ exceeds 8 V because the V frequency is 50 Hz. By this voltage, IC401 enters the PAL mode.
  - When the voltage of IC404 pin ⑩ exceeds 9.5 V, the voltage of IC404 pin ② is held.
  - The voltage at IC404 pin ⑦ goes low. The PAL indicator lights.

(d) When the SECAM signal is input:

- The voltage at IC402 pin ⑧ becomes 0 V when SECAM IDENT signal is detected in IC402.
- IC404 is set to the SECAM signal reception mode. The voltage at IC404 pin ⑦ goes high. The SECAM indicator lights.

#### II. MANUAL mode

When NTSC 3.58, NTSC 4.43, PAL or SECAM switch is pressed, the voltages at IC401 pin ⑲ and IC402 pin ⑧ are output as follows:

	IC401 pin ⑲	IC402 pin ⑧
NTSC 3.58	4 V	1.1~4.7 V
NTSC 4.43	0 V	1.1~4.7 V
PAL	8 V or more	1.1~4.7 V
SECAM	8 V or more	0 V

The most suitable receiving condition is set up in every system selected.

#### CONTROL PWB

This circuit controls the following functions;

- Controls the power ON/OFF.
- Transfers a video input.
- Controls D/A conversion output of R.G.B GAIN, COLOR, TINT, and SHARPNESS.
- Decodes the signals transferred from the remote control unit.
- Illuminates the LED indicators.

The CPU of projector (GP-3000) commands the items ① ~ ③.

The data transmission between the projector (GP-3000) and the System Interface is done by a 9600 bps serial data bus. It is switchable whether to use the System Interface linked up with the projector or to use it alone by changing JP801 connection. (i.e., transferring the program of the micro computer.) See page 10.

# TROUBLESHOOTING

## 1. No POWER on (When the POWER SW of Remote Controller is pressed while the PJ is being connected)

Is there 5 V at TP104 on PS PWB?

- NO: Defective PS PWB
- YES: Is there a 3.4 V input at pin ② of D SUB 25 PIN?
  - NO: Check the data projector.
  - YES: Is there a 3.4 V output at pin ⑮ of D SUB 25 PIN?
    - NO: Defective CONTROL PWB
    - YES: Are voltages at TP101, TP102, and TP103 of PS PWB as follows?
 

TP101	5 V
TP102	12 V
TP103	-12 V

      - NO: Defective PS PWB, T102, IC101, IC102 or IC103
      - YES: Check connectors PB, PD, and PV.

## 2. No Remote Control Function

Is there a signal at IR1 on FRONT PWB when the button of the remote controller is pressed?

- NO: Defective FRONT PWB or remote controller
- YES: Is there an output signal at IC150 pins ①, ②, ③, and ④ on MAIN PWB?
  - NO: Defective MAIN PWB
  - YES: Check the data projector.

## 3. No Picture (Video)

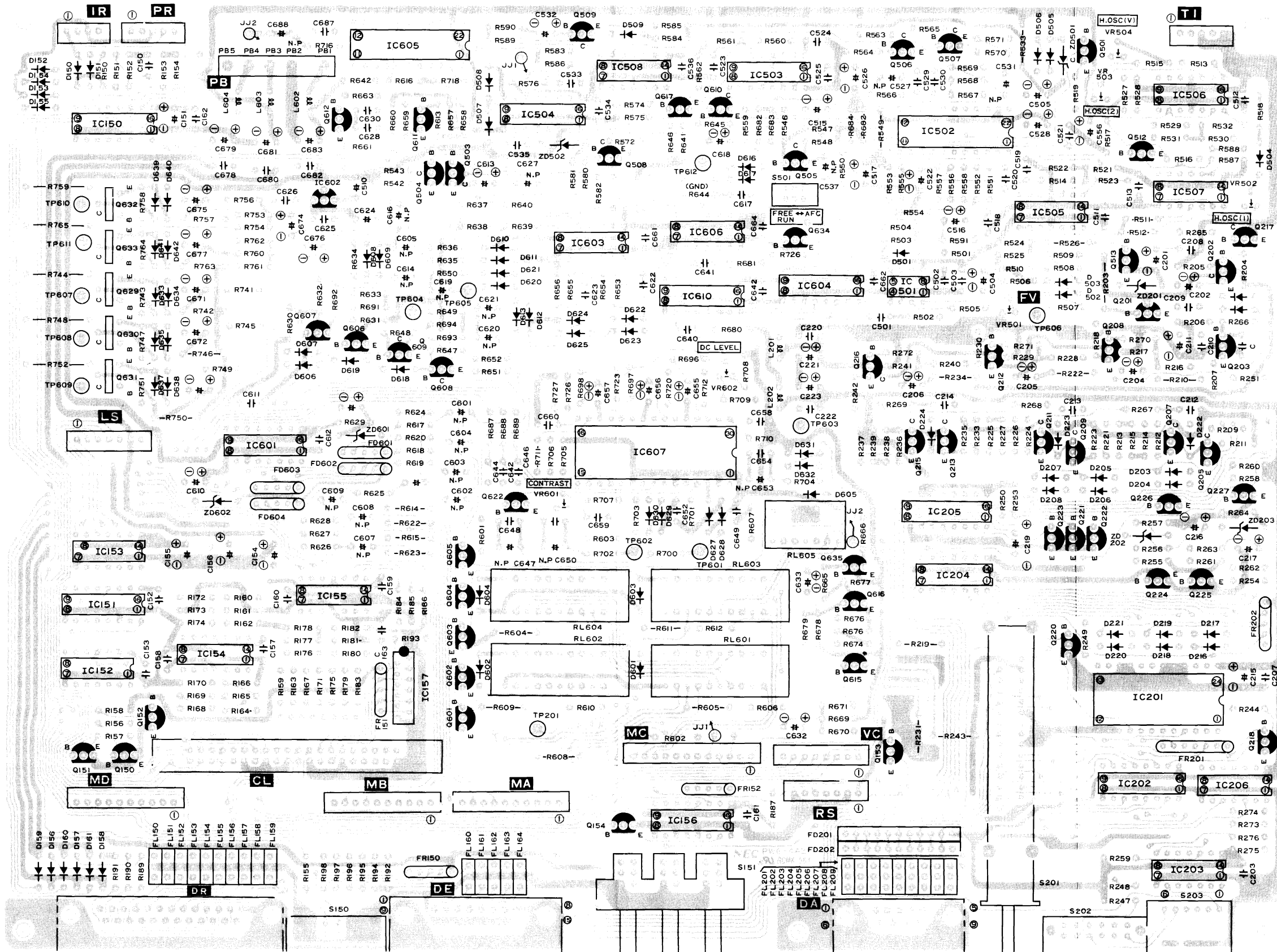
Is there a signal at VI1 or VI3 on VIDEO PWB?

- NO: Defective REAR(B), (C) PWB
- YES: Is there a signal of 0.7 V<sub>p-p</sub> at TP601, TP602, and TP603 on MAIN PWB?
  - NO: Defective VIDEO PWB or SYNC PWB
  - YES: Is there a signal of 1.4 V<sub>p-p</sub> at TP607, TP608, and TP609 on MAIN PWB?
    - NO: Is there approx. 4.4 V at IC607 pins ④, ⑧, and ⑫ ?
      - NO: Defective CONTROL PWB
      - YES: Defective MAIN PWB
    - YES: Is there a signal of 0.7 V<sub>p-p</sub> at the BNC connectors RO, GO, and BO on REAR PWB?
      - NO: Defective MAIN PWB
      - YES: Check the data projector.

# PRINTED WIRING BOARDS

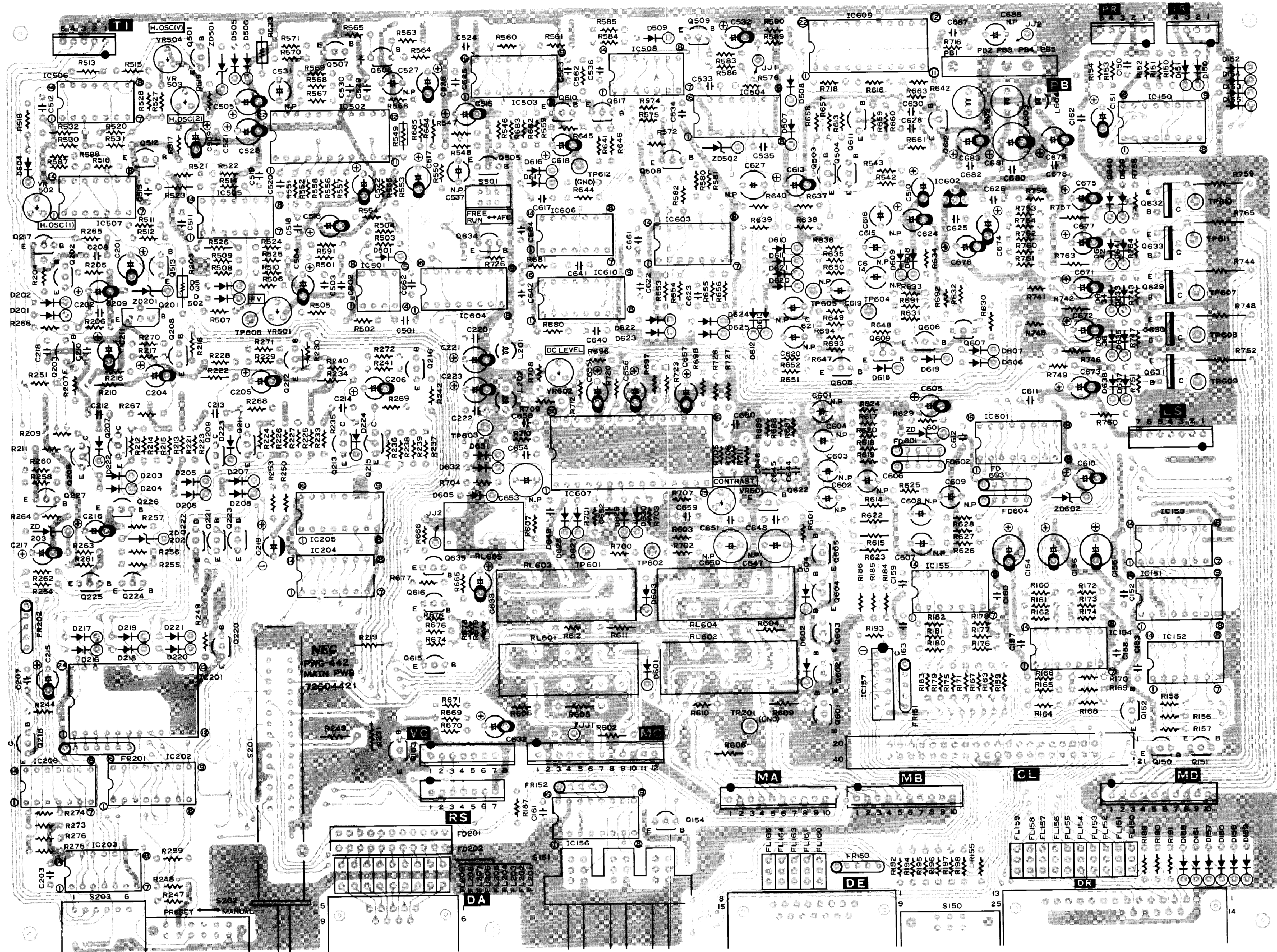
## MAIN PWB (PWG 442)

—Solder Side—



# MAIN PWB (PWG 442)

—Component Side—

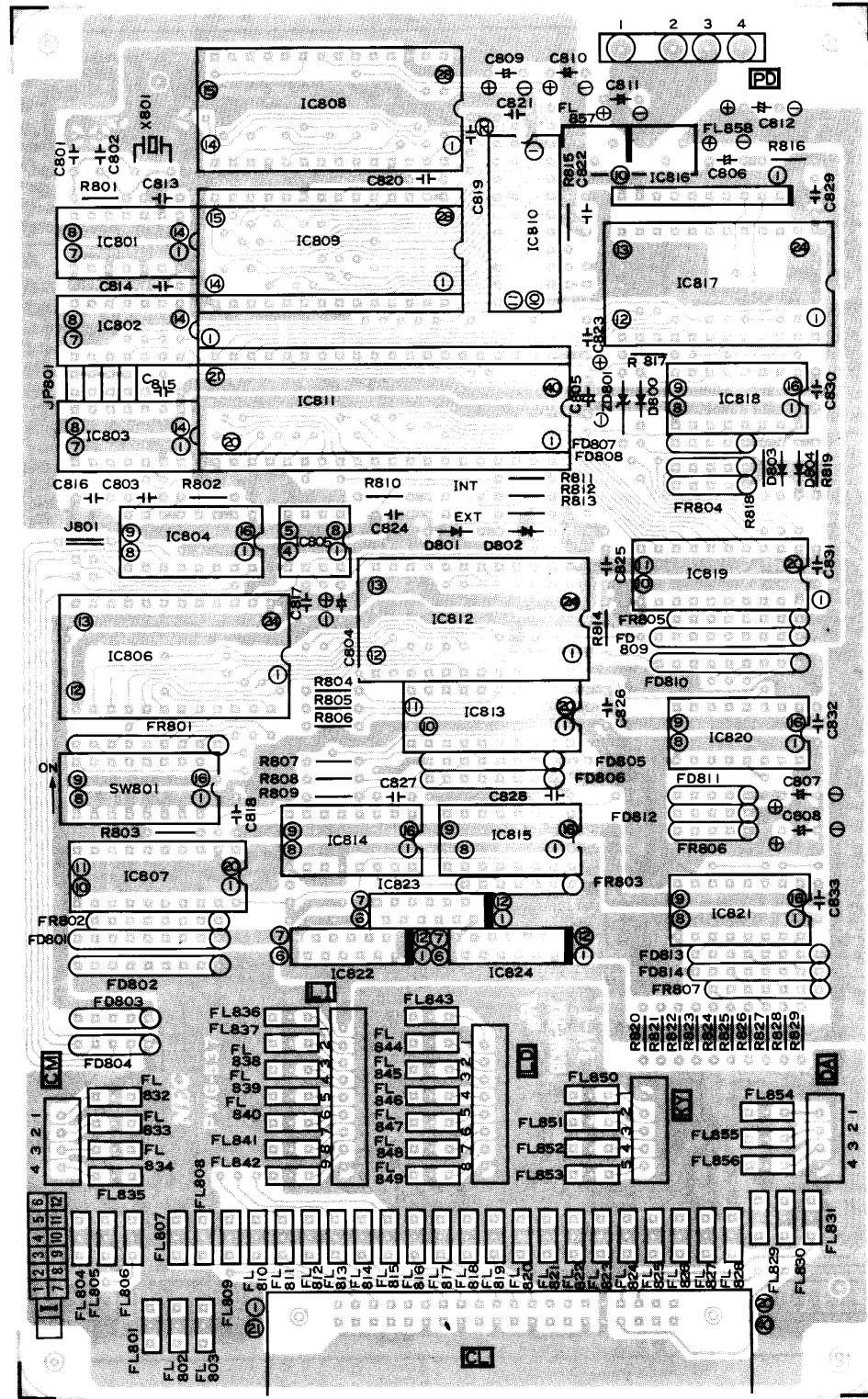






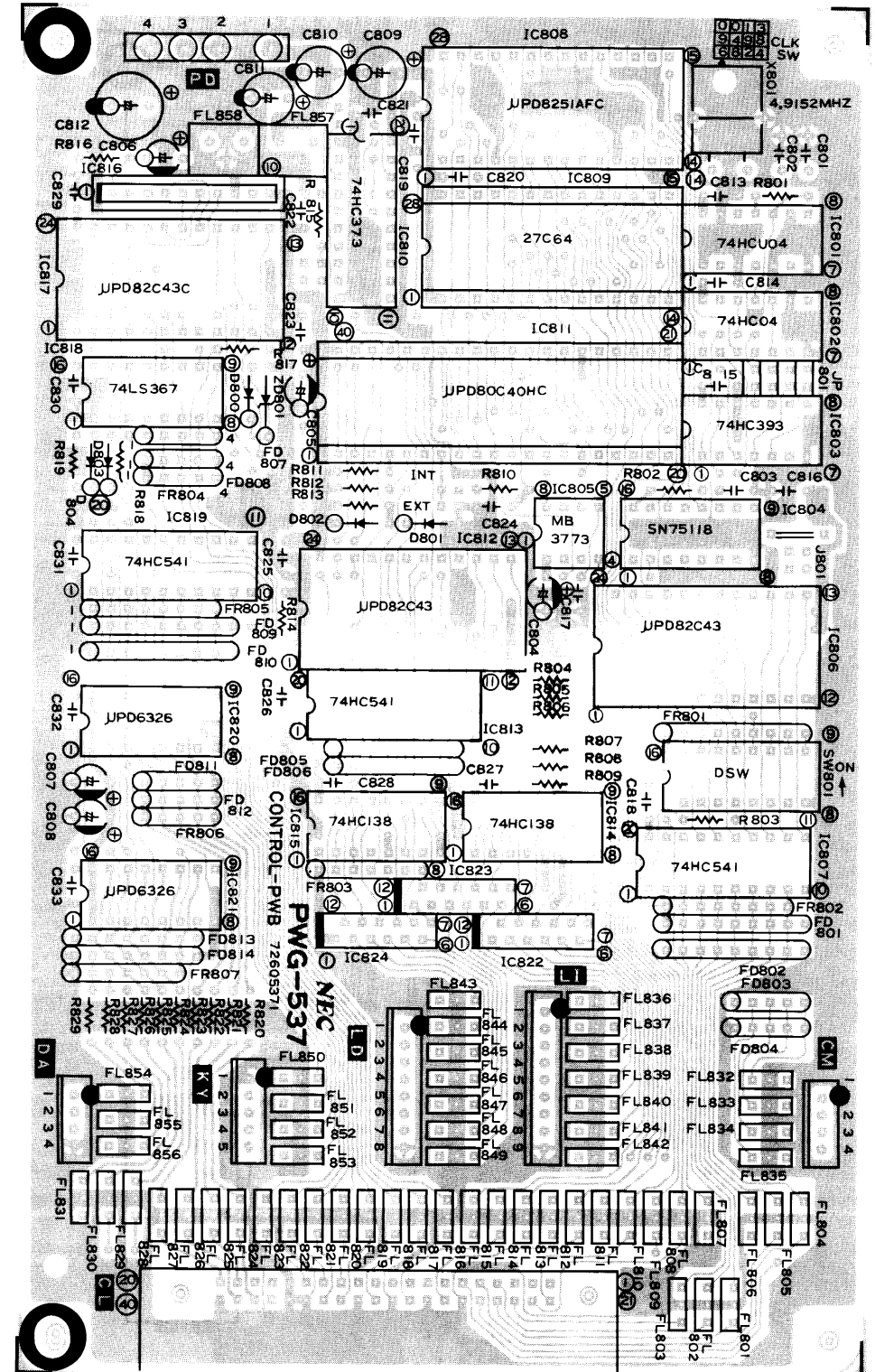
CONTROL PWB (PWG 537)

—Solder Side—



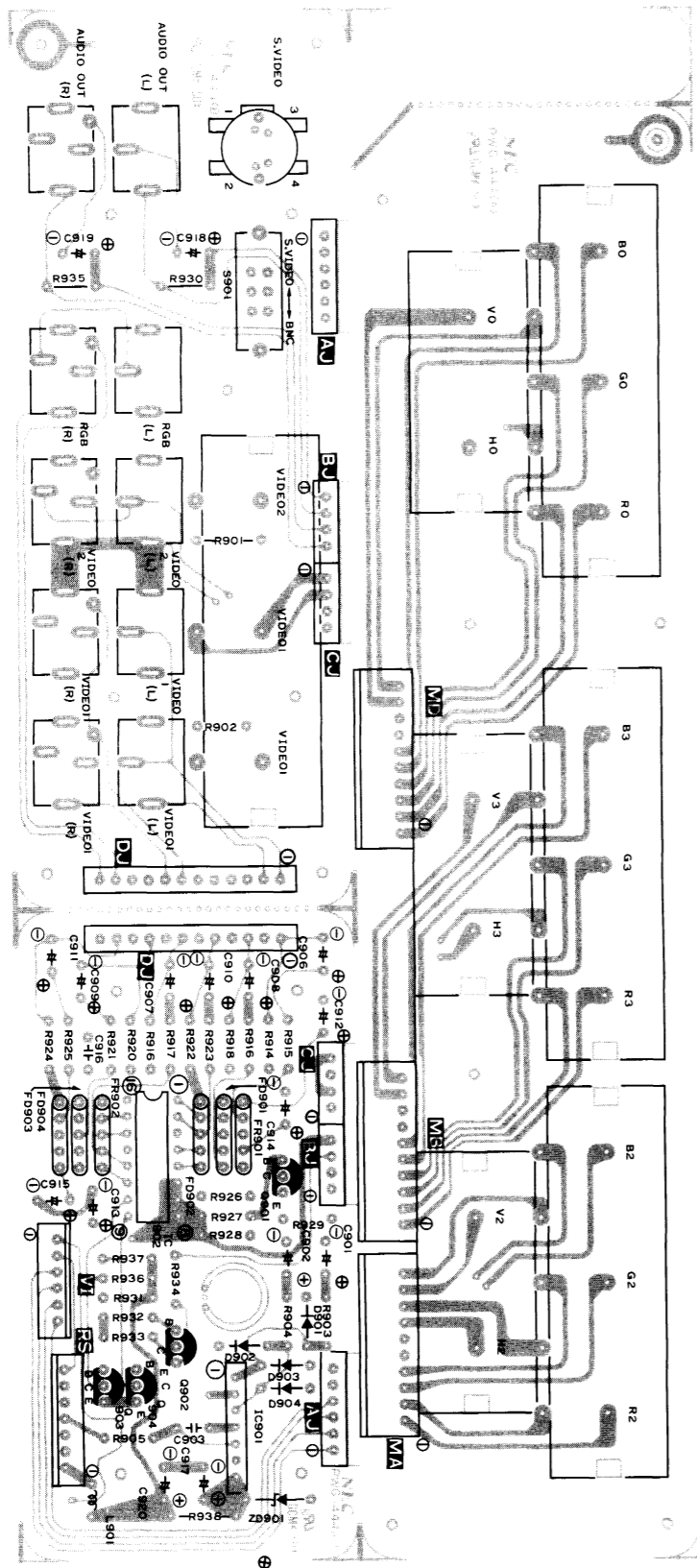
CONTROL PWB (PWG 537)

—Component Side—



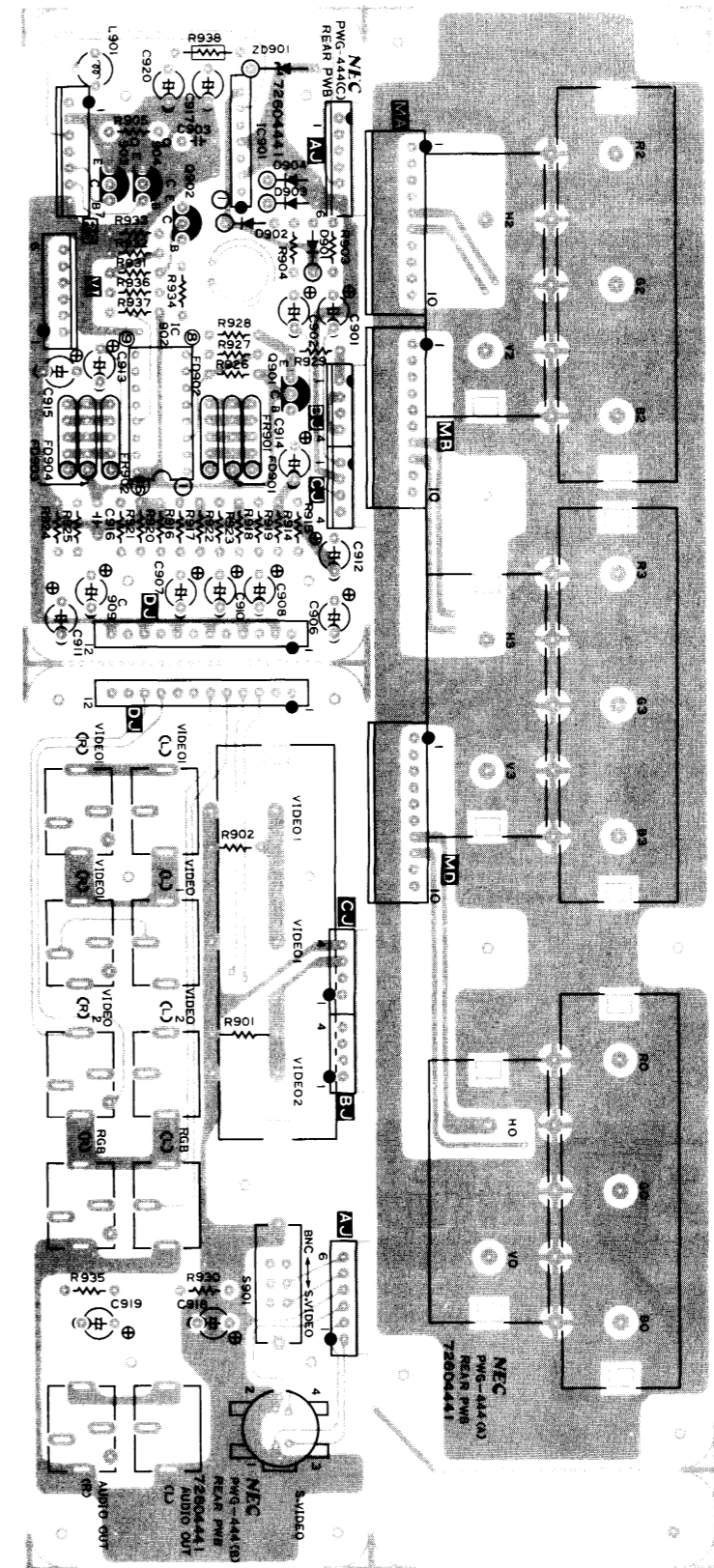
REAR PWB (PWG 444A, B, C)

—Solder Side—



REAR PWB (PWG 444A, B, C)

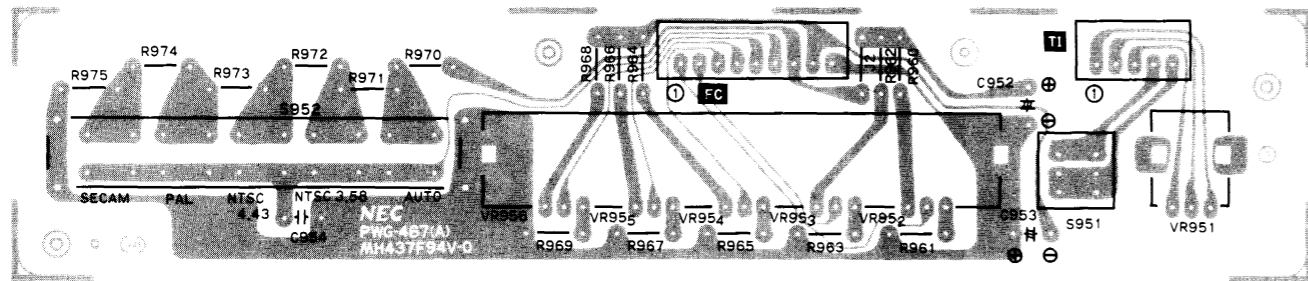
—Component Side—



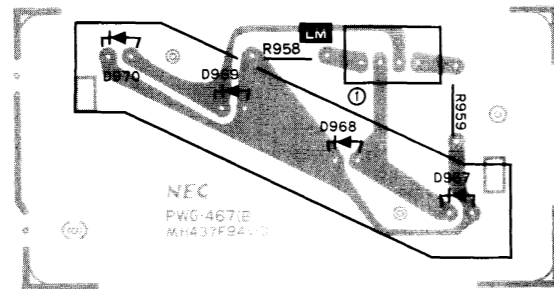
FRONT PWB (PWG 467A, B, C, D)

—Solder Side—

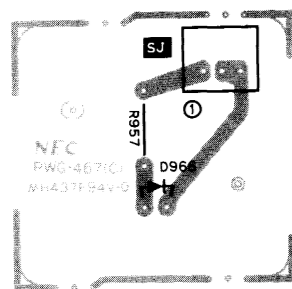
(A)



(B)



(C)





# REPLACEMENT PARTS LIST

**Notes:**

1. Parts orders must contain model name, parts number and description.
2. When you place an order for spare parts, please refer to the respective service manual and mention the right parts number on your P.O. Sheets.

3. Standard resistors, capacitors and coils which are normally available from local electronics suppliers are not stocked in our warehouse.
4. The components identified by a  $\Delta$  mark or with the symbol Nos. shaded are critical for safety. Replace only with parts number specified.

SYMBOL	PARTS NO	DESCRIPTION
*** ICS	***	
IC1001	37011091	IC LAT690 (AUTO FLESH)
IC1002	37051378	MOS UPD4053BC (MPX)
IC1003	37053122	MOS UPD74HC123AC
IC1004	37009025	IC TA7357P (SYN-SEPARATE)
IC1005	37053102	MOS SN74HC4040N (COUNTER)
IC1006	37053122	MOS UPD74HC123AC
IC1007	37005053	IC UPC78L05
$\Delta$ IC101	37011026	IC UPC7805H (REG)
$\Delta$ IC102	37005034	IC SI-3122V (REG)
$\Delta$ IC103	37005045	IC UPC7912H
$\Delta$ IC104	37011026	IC UPC7805H (REG)
IC150	37056351	IC SN75116N (LINE RECEIV)
IC151	37053040	MOS MC74HC139N (DECODER)
IC152	37053027	MOS SN74HC04N (INVERTER)
IC153	37052179	IC SN74LS07N
IC154	37903028	IC UPC451
IC155	37903028	IC UPC451
IC156	37053211	MOS SN74HC153N
IC157	37011022	IC TA78
IC201	37056233	IC PCD-016M1
IC202	37051096	IC SN74LS367AN (BUFF)
IC203	37051081	IC SN74LS32N (OR)
IC204	37052179	IC SN74LS07N
IC205	37051179	IC SN74LS123N (MONO MLT)
IC206	37052179	IC SN74LS07N
IC301	37011041	IC TA7347P (VIDEO SW)
IC302	37011041	IC TA7347P (VIDEO SW)
IC303	37011036	IC TA7348P (VIDEO SW)
IC304	37011086	IC CX20125 (BLK CONT.)
IC305	37003023	IC HA11431 (CHR)
IC306	37903028	IC UPC451
IC401	37003033	IC AN5625 (PAL)
IC402	37003034	IC AN5635 (SECAM)
IC403	37011068	IC UPC4558C (OP AMP)
IC404	37011107	IC AN5641 (SYSTEM DETECT)
IC501	37056218	IC IR9331
IC502	37009016	IC UPC1377C (HORI)
IC503	37056213	MOS TC4538BP

SYMBOL	PARTS NO	DESCRIPTION
IC504	37053122	MOS UPD74HC123AC
IC505	37903028	IC UPC451
IC506	37903028	IC UPC451
IC507	37051036	MOS UPD4066BC
IC508	37053139	MOS MC74HC125N (BUFFER)
IC601	37053002	MOS UPD4052BC (MPX)
$\Delta$ IC602	37005074	IC NJM79L05A
IC603	37051044	MOS UPD4069UBC (INV)
IC604	37051378	MOS UPD4053BC (MPX)
IC606	37053078	MOS SN74HC86N
IC607	37056245	IC M51387P
IC610	37053122	MOS UPD74HC123AC
IC801	37053014	MOS TC74HC004P (INVERTER)
IC802	37053086	MOS TC74HC04AP
IC803	37053081	MOS SN74HC793N
IC804	37056638	IC SN75118N (TRNSCEJVERS)
IC805	37011114	IC MB3773 (RESET-DIP)
IC806	37056637	MOS UPD82C43C (I/O)
IC807	37053143	MOS MC74HC541N (DRIVE)
IC808	37056097	MOS UPD8251AFC
IC809	37054738	MOS NMC27C64Q200 (EPROM)
IC810	37053136	MOS SN74HC373N
IC811	37056636	MOS UPD80C40HC (CPU)
IC812	37056637	MOS UPD82C43C (I/O)
IC813	37053143	MOS MC74HC541N (DRIVE)
IC814	37053088	MOS TC74HC138P (DECODER)
IC815	37053088	MOS TC74HC138P (DECODER)
IC816	37058167	MOS CXK1006L (EAROM)
IC817	37056637	MOS UPD82C43C (I/O)
IC818	37051096	IC SN74LS367AN (BUFF)
IC819	37053143	MOS MC74HC541N (DRIVE)
IC821	37058114	MOS UPD6326C (D/A)
IC901	37011041	IC TA7347P (VIDEO SW)
IC902	37053002	MOS UPD4052BC (MPX)

SYMBOL	PARTS NO	DESCRIPTION
*** TRANSISTORS	***	
IC822	35170110	DIGITAL ALLIAY DT5A114E
IC823	35170110	DIGITAL ALLIAY DT5A114E
IC824	35170110	DIGITAL ALLIAY DT5A114E
Q1001	350D7216	TR 2SC945-T P
Q1002	350K3516	TR 2SA733/2SA733A-T P
Q1003	350D7216	TR 2SC945-T P
Q1004	350D7216	TR 2SC945-T P
Q1005	350K3516	TR 2SA733/2SA733A-T P
Q1006	350D7216	TR 2SC945-T P
Q1007	350D7216	TR 2SC945-T P
Q1008	350K3516	TR 2SA733/2SA733A-T P
Q1009	350D7216	TR 2SC945-T P
Q101	35065911	TR, 2SD471 K
Q1010	350K3516	TR 2SA733/2SA733A-T P
Q1011	350D7216	TR 2SC945-T P
Q1013	350D7216	TR 2SC945-T P
Q1014	351G0501	TR, AA1A4M-T
Q1015	350D7216	TR 2SC945-T P
Q1016	350D7216	TR 2SC945-T P
Q1017	350K3516	TR 2SA733/2SA733A-T P
Q1018	351G0501	TR, AA1A4M-T
Q102	35065911	TR, 2SD471 K
Q1020	351G0501	TR, AA1A4M-T
Q150	351G0501	TR, AA1A4M-T
Q151	351G0501	TR, AA1A4M-T
Q152	351G0501	TR, AA1A4M-T
Q153	351G0501	TR, AA1A4M-T
Q154	351G0501	TR, AA1A4M-T
Q155	35003516	TR, 2SA733/733A P
Q201	35065911	TR, 2SD471 K
Q202	350D7216	TR 2SC945-T P
Q203	350K3516	TR 2SA733/2SA733A-T P
Q205	350H5017	TR, 2SC3811-TA Q
Q207	350H5017	TR, 2SC3811-TA Q
Q208	350D7216	TR 2SC945-T P
Q209	350H5017	TR, 2SC3811-TA Q
Q211	350H5017	TR, 2SC3811-TA Q
Q212	350D7216	TR 2SC945-T P

SYMBOL	PARTS NO	DESCRIPTION
Q213	350H5017	TR, 2SC3811-TA Q
Q215	350H5017	TR, 2SC3811-TA Q
Q216	350D7216	TR 2SC945-T P
Q217	351G0501	TR, AA1A4M-T
Q218	351G0501	TR, AA1A4M-T
Q220	351G0501	TR, AA1A4M-T
Q221	351G0501	TR, AA1A4M-T
Q222	351G0501	TR, AA1A4M-T
Q223	351G0501	TR, AA1A4M-T
Q224	350D7216	TR 2SC945-T P
Q225	350D7216	TR 2SC945-T P
Q226	350D7216	TR 2SC945-T P
Q227	350D7216	TR 2SC945-T P
Q301	350D7216	TR 2SC945-T P
Q302	350D7216	TR 2SC945-T P
Q303	350D7216	TR 2SC945-T P
Q304	350D7216	TR 2SC945-T P
Q305	350D7216	TR 2SC945-T P
Q306	350D7216	TR 2SC945-T P
Q307	350D7216	TR 2SC945-T P
Q310	351G0501	TR, AA1A4M-T
Q311	351G0501	TR, AA1A4M-T
Q312	351G0501	TR, AA1A4M-T
Q313	351G0501	TR, AA1A4M-T
Q314	351G0501	TR, AA1A4M-T
Q317	350D7216	TR 2SC945-T P
Q318	350K3516	TR 2SA733/2SA733A-T P
Q319	350D7216	TR 2SC945-T P
Q320	350K3516	TR 2SA733/2SA733A-T P
Q401	350D7216	TR 2SC945-T P
Q402	350D7216	TR 2SC945-T P
Q403	351G0501	TR, AA1A4M-T
Q404	351G0501	TR, AA1A4M-T
Q405	351G0501	TR, AA1A4M-T
Q406	351G0501	TR, AA1A4M-T
Q407	351G0501	TR, AA1A4M-T
Q501	350K3516	TR 2SA733/2SA733A-T P
Q503	351G0501	TR, AA1A4M-T
Q504	351G0501	TR, AA1A4M-T

SYMBOL	PARTS NO	DESCRIPTION
Q505	350D7216	TR 2SC945-T P
Q506	350D7216	TR 2SC945-T P
Q507	350D7216	TR 2SC945-T P
Q508	350D7216	TR 2SC945-T P
Q509	350K3516	TR 2SA733/2SA733A-T P
Q512	351G0501	TR,AA1A4M-T
Q513	351G0501	TR,AA1A4M-T
Q601	351G0501	TR,AA1A4M-T
Q602	351G0501	TR,AA1A4M-T
Q603	351G0501	TR,AA1A4M-T
Q604	351G0501	TR,AA1A4M-T
Q605	351G0501	TR,AA1A4M-T
Q606	350D7216	TR 2SC945-T P
Q607	350K3516	TR 2SA733/2SA733A-T P
Q608	350D7216	TR 2SC945-T P
Q609	350K3516	TR 2SA733/2SA733A-T P
Q610	350D7216	TR 2SC945-T P
Q611	350D7216	TR 2SC945-T P
Q612	350D7216	TR 2SC945-T P
Q615	350D7216	TR 2SC945-T P
Q616	350D7216	TR 2SC945-T P
Q617	351G0501	TR,AA1A4M-T
Q622	351G0501	TR,AA1A4M-T
Q629	35083304	TR,2SC3597 D
Q630	35083304	TR,2SC3597 D
Q631	35083304	TR,2SC3597 D
Q632	35056311	TR,2SC2688 K
Q633	35056311	TR,2SC2688 K
Q634	350D7216	TR 2SC945-T P
Q635	350D7216	TR 2SC945-T P
Q642	350D7216	TR 2SC945-T P
Q901	350D7216	TR 2SC945-T P
Q902	350D7216	TR 2SC945-T P
Q903	351G0501	TR,AA1A4M-T
Q904	351G0501	TR,AA1A4M-T
Q961	35170501	TR,AA1A4M

SYMBOL	PARTS NO	DESCRIPTION
*** DIODES ***		
D1001	360K1027	DIODE 1SS132
D1002	360K1027	DIODE 1SS132
D1003	360K1027	DIODE 1SS132
D1009	360K1027	DIODE 1SS132
ΔE101	36108011	DIODE,RB-151 BRIDGE
D1010	360K1027	DIODE 1SS132
D1011	360K1027	DIODE 1SS132
ΔD102	36108068	D,NETWORK RBV401
ΔD103	36108011	DIODE,RB-151 BRIDGE
ΔD104	36108011	DIODE,RB-151 BRIDGE
D105	36001027	DIODE 1SS132
D150	360K1027	DIODE 1SS132
D151	360K1027	DIODE 1SS132
D152	360K1027	DIODE 1SS132
D153	360K1027	DIODE 1SS132
D154	360K1027	DIODE 1SS132
D155	360K1027	DIODE 1SS132
D156	360K1027	DIODE 1SS132
D157	360K1027	DIODE 1SS132
D158	360K1027	DIODE 1SS132
D159	360K1027	DIODE 1SS132
D160	360K1027	DIODE 1SS132
D161	360K1027	DIODE 1SS132
D162	36001027	DIODE 1SS132
D201	360K1027	DIODE 1SS132
D202	360K1027	DIODE 1SS132
D203	360K1027	DIODE 1SS132
D204	360K1027	DIODE 1SS132
D205	360K1027	DIODE 1SS132
D206	360K1027	DIODE 1SS132
D207	360K1027	DIODE 1SS132
D208	350K1027	DIODE 1SS132
D216	360K1027	DIODE 1SS132
D217	360K1027	DIODE 1SS132
D218	360K1027	DIODE 1SS132
D219	360K1027	DIODE 1SS132
D220	360K1027	DIODE 1SS132
D221	360K1027	DIODE 1SS132

SYMBOL	PARTS NO	DESCRIPTION
D222	360K1027	DIODE 1SS132
D223	360K1027	DIODE 1SS132
D224	360K1027	DIODE 1SS132
D301	360K1027	DIODE 1SS132
D302	360K1027	DIODE 1SS132
D303	360K1027	DIODE 1SS132
D304	360K1027	DIODE 1SS132
D305	360K1027	DIODE 1SS132
D306	360K1027	DIODE 1SS132
D401	360K1027	DIODE 1SS132
D402	360K1027	DIODE 1SS132
D403	360K1027	DIODE 1SS132
D404	360K1027	DIODE 1SS132
D501	360K1027	DIODE 1SS132
D502	360K1027	DIODE 1SS132
D503	360K1027	DIODE 1SS132
D504	360K1027	DIODE 1SS132
D505	360K1027	DIODE 1SS132
D506	360K1027	DIODE 1SS132
D507	360K1027	DIODE 1SS132
D508	360K1027	DIODE 1SS132
D509	360K1027	DIODE 1SS132
D601	360K1027	DIODE 1SS132
D602	360K1027	DIODE 1SS132
D603	360K1027	DIODE 1SS132
D604	360K1027	DIODE 1SS132
D605	360K1027	DIODE 1SS132
D606	360K1027	DIODE 1SS132
D607	360K1027	DIODE 1SS132
D608	360K1027	DIODE 1SS132
D609	360K1027	DIODE 1SS132
D610	360K1027	DIODE 1SS132
D611	360K1027	DIODE 1SS132
D612	360K1027	DIODE 1SS132
D613	360K1027	DIODE 1SS132
D616	360K1027	DIODE 1SS132
D617	360K1027	DIODE 1SS132
D618	360K1027	DIODE 1SS132
D619	360K1027	DIODE 1SS132

SYMBOL	PARTS NO	DESCRIPTION
D620	360K1027	DIODE 1SS132
D621	360K1027	DIODE 1SS132
D622	360K1027	DIODE 1SS132
D623	360K1027	DIODE 1SS132
D624	360K1027	DIODE 1SS132
D625	360K1027	DIODE 1SS132
D627	360K1027	DIODE 1SS132
D628	360K1027	DIODE 1SS132
D629	360K1027	DIODE 1SS132
D630	360K1027	DIODE 1SS132
D631	360K1027	DIODE 1SS132
D632	360K1027	DIODE 1SS132
D633	360K1027	DIODE 1SS132
D634	360K1027	DIODE 1SS132
D635	360K1027	DIODE 1SS132
D636	360K1027	DIODE 1SS132
D637	360K1027	DIODE 1SS132
D638	360K1027	DIODE 1SS132
D639	360K1027	DIODE 1SS132
D640	360K1027	DIODE 1SS132
D641	360K1027	DIODE 1SS132
D642	360K1027	DIODE 1SS132
D643	360K1027	DIODE 1SS132
D644	360K1027	DIODE 1SS132
D801	360K1027	DIODE 1SS132
D802	360K1027	DIODE 1SS132
D803	360K1027	DIODE 1SS132
D804	360K1027	DIODE 1SS132
D901	360K1027	DIODE 1SS132
D902	360K1027	DIODE 1SS132
D903	360K1027	DIODE 1SS132
D904	360K1027	DIODE 1SS132
D905	36001027	DIODE 1SS132
D951	36801160	LED SLH34MC/STUV
D952	36801160	LED SLH34MC/STUV
D953	36801160	LED SLH34MC/STUV
D954	36801160	LED SLH34MC/STUV
D955	36801160	LED SLH34MC/STUV
D956	36801160	LED SLH34MC/STUV

SYMBOL	PARTS NO	DESCRIPTION
D957	36801160	LED SLH34MC/STUV
D958	36801160	LED SLH34MC/STUV
D959	36801160	LED SLH34MC/STUV
D960	36801160	LED SLH34MC/STUV
D961	36801160	LED SLH34MC/STUV
D962	36801160	LED SLH34MC/STUV
D963	36801160	LED SLH34MC/STUV
D964	36801160	LED SLH34MC/STUV
D965	36801160	LED SLH34MC/STUV
D966	36801163	DIODE, LIGHT-E PRG5241KST
D967	36801160	LED SLH34MC/STUV
D968	36801160	LED SLH34MC/STUV
D969	36801160	LED SLH34MC/STUV
D970	36801160	LED SLH34MC/STUV
D971	36801160	LED SLH34MC/STUV
D972	36801160	LED SLH34MC/STUV
D973	36801160	LED SLH34MC/STUV
D974	36801160	LED SLH34MC/STUV
D975	36801160	LED SLH34MC/STUV
D976	36801160	LED SLH34MC/STUV
D978	36801160	LED SLH34MC/STUV
D979	36801160	LED SLH34MC/STUV
D980	36801160	LED SLH34MC/STUV
D981	36801160	LED SLH34MC/STUV
D982	36801160	LED SLH34MC/STUV
D983	36801160	LED SLH34MC/STUV
D984	36801160	LED SLH34MC/STUV
D985	36107522	RECTIFIER, SI ERA15-02
D986	36107522	RECTIFIER, SI ERA15-02
FD1001	36108036	DIODE ARRAY 1S2473*6 A
FD1002	36108054	DIODE ARRAY 1S2473*7A
FD201	36108093	DIODE ARRAY 1S2473*9K
FD202	36108092	DIODE ARRAY 1S2473*9A
FD301	36108030	DIODE ARRAY DAN401
FD302	36108031	DIODE ARRAY DAP401
FD601	36108030	DIODE ARRAY DAN401
FD602	36108031	DIODE ARRAY DAP401
FD603	36108030	DIODE ARRAY DAN401
FD604	36108031	DIODE ARRAY DAP401
FD801	36108204	DIODE ARRAY DAN803

SYMBOL	PARTS NO	DESCRIPTION
FD802	36108203	DIODE ARRAY DAP803
FD803	36108030	DIODE ARRAY DAN401
FD804	36108031	DIODE ARRAY DAP401
FD805	36108099	DIODE, ARRAY 1S2473+RD5.1E
FD806	36108100	DIODE, ARRAY 1S2473+RD10K
FD809	36108204	DIODE ARRAY DAN803
FD810	36108203	DIODE ARRAY DAP803
FD813	36108035	DIODE ARRAY 1S2473*6 K(O)
FD814	36108036	DIODE ARRAY 1S2473*6 A
FD901	36108030	DIODE ARRAY DAN401
FD902	36108031	DIODE ARRAY DAP401
FD903	36108030	DIODE ARRAY DAN401
FD904	36108031	DIODE ARRAY DAP401
ZD1001	360K3037	DIODE RD9.1EB-T4
ZD101	36003119	DIODE, RD6.2EB(1)
ZD201	360K3037	DIODE RD9.1EB-T4
ZD202	360K3100	DIODE RD5.1EB (2) -T4
ZD203	360K3100	DIODE RD5.1EB (2) -T4
ZD301	360K3096	DIODE RD9.1EB(1) -T4
ZD302	36003114	DIODE, RD8.2EB(1)
ZD401	360K3106	DIODE RD6.2EB(3) -T4
ZD501	360K3037	DIODE RD9.1EB-T4
ZD502	360K3077	DIODE RD5.1EB-T4
ZD601	360K3090	DIODE RD3.9EB-T4
ZD602	360K3090	DIODE RD3.9EB-T4
ZD603	360K3077	DIODE RD5.1EB-T4
ZD801	360K3077	DIODE RD5.1EB-T4
ZD901	360K3037	DIODE RD9.1EB-T4

\*\*\* TRANSFORMERS \*\*\*

ΔT101	45015117	PT9.5V0.3A UL CSA
ΔT102	45080105	TRANS, POWER 9.5V 0.4A

\*\*\* VARIABLE RESISTORS \*\*\*

VR1001	41071011	R, VARIABLE 47K
VR1002	41071011	R, VARIABLE 47K
VR1003	41071014	R, VARIABLE B15K
VR301	41071004	R, VARIABLE B330H
VR401	41071013	R, VARIABLE B10K
VR402	41071009	R VARIABLE 2.2K

SYMBOL	PARTS NO	DESCRIPTION
VR501	41071010	R, VARIABLE B3.3K
VR502	41071007	R, VARIABLE B1.0K
VR503	41071007	R, VARIABLE B1.0K
VR504	41071013	R, VARIABLE B10K
VR601	41071013	R, VARIABLE B10K
VR602	41071007	R, VARIABLE B1.0K
VR951	41011362	R, VARIABLE B10K-V
VR952	41014481	R, VARIABLE (2XB44-B)

\*\*\* RELAYS & SWITCHES \*\*\*

ΔRL101	65299016	SWITCH, SEE-SAW
RL601	65602044	RELAY G5R-1112P DC6V
RL602	65699014	RELAY G5Y-254P
RL603	65699014	RELAY G5Y-254P
RL604	65699014	RELAY G5Y-254P
RL605	65699013	RELAY G5Y-154P
S150	65113253	SWITCH, SLIDE
S151	65314151	PUSH SWITCH
S201	65169901	LEVER SWITCH, SLIDE
S202	65163001	SWITCH, SLIDE
S203	66098206	SWITCH, LEVER 6P
S501	65113506	SWITCH, SLIDE
S801	65161018	SWITCH, 8P-DIP (DTS-8H)
S901	65113255	SWITCH, SLIDE
S951	65399032	SWITCH, PUSH BUTTON
S952	65314490	PUSH SWITCH

\*\*\* COILS & FILTERS \*\*\*

DL301	61062078	POWER LINE FILTER
DL302	61511055	DELAY LINE EN645B35G
DL401	61511035	DELAY LINE 0.3US
FL160	61511008	DELAY LINE 1H, EN64511X
	616K6720	NOISE FILTER
FL161	61606620	NOISE FILTER 50V 0.022UF
FL162	616K6720	NOISE FILTER
FL163	61606620	NOISE FILTER 50V 0.022UF
FL164	616K6720	NOISE FILTER
FL201	61606801	NOISE FILTER 2R2-101 (ZJSC)
FL202	61606801	NOISE FILTER 2R2-101 (ZJSC)

SYMBOL	PARTS NO	DESCRIPTION
FL203	61606801	NOISE FILTER 2R2-101 (ZJSC)
FL204	61606801	NOISE FILTER 2R2-101 (ZJSC)
FL205	61606801	NOISE FILTER 2R2-101 (ZJSC)
FL206	61606801	NOISE FILTER 2R2-101 (ZJSC)
FL207	61606801	NOISE FILTER 2R2-101 (ZJSC)
FL208	61606801	NOISE FILTER 2R2-101 (ZJSC)
FL209	61606801	NOISE FILTER 2R2-101 (ZJSC)
FL301	616K6720	NOISE FILTER
FL302	616K6720	NOISE FILTER
FL303	616K6720	NOISE FILTER
FL801	616K6720	NOISE FILTER
FL802	616K6720	NOISE FILTER
FL803	616K6720	NOISE FILTER
FL804	616K6720	NOISE FILTER
FL805	616K6720	NOISE FILTER
FL806	616K6720	NOISE FILTER
FL807	616K6720	NOISE FILTER
FL808	616K6720	NOISE FILTER
FL810	616K6720	NOISE FILTER
FL814	616K6720	NOISE FILTER
FL815	616K6720	NOISE FILTER
FL816	616K6720	NOISE FILTER
FL820	616K6720	NOISE FILTER
FL821	616K6720	NOISE FILTER
FL822	616K6720	NOISE FILTER
FL823	616K6720	NOISE FILTER
FL824	616K6720	NOISE FILTER
FL829	616K6720	NOISE FILTER
FL830	616K6720	NOISE FILTER
FL831	616K6720	NOISE FILTER
FL832	616K6720	NOISE FILTER
FL833	616K6720	NOISE FILTER
FL834	616K6720	NOISE FILTER
FL835	616K6720	NOISE FILTER
FL836	616K6720	NOISE FILTER
FL837	616K6720	NOISE FILTER
FL838	616K6720	NOISE FILTER
FL839	616K6720	NOISE FILTER
FL840	616K6720	NOISE FILTER
FL841	616K6720	NOISE FILTER

SYMBOL	PARTS NO	DESCRIPTION
FL842	616K6720	NOISE FILTER
FL843	616K6720	NOISE FILTER
FL844	616K6720	NOISE FILTER
FL845	616K6720	NOISE FILTER
FL846	616K6720	NOISE FILTER
FL847	616K6720	NOISE FILTER
FL848	616K6720	NOISE FILTER
FL849	616K6720	NOISE FILTER
FL854	616K6720	NOISE FILTER
FL855	616K6720	NOISE FILTER
FL856	616K6720	NOISE FILTER
FL857	61606023	NOISE FILTER DSS-223S
FL858	61606023	NOISE FILTER DSS-223S
FL901	616K6824	NOISE FILTER
FL902	616K6824	NOISE FILTER
FL903	616K6824	NOISE FILTER
FL904	616K6824	NOISE FILTER
FL905	616K6824	NOISE FILTER
FL906	616K6824	NOISE FILTER
FL907	616K6824	NOISE FILTER
FL908	616K6824	NOISE FILTER
FL909	616K6824	NOISE FILTER
FL910	616K6824	NOISE FILTER
L1001	61064055	COIL,FILTER 4700UH
ΔL101	61062012	COIL,LINE FILTER
L201	610E1714	COIL,FILTER 5.6UH
L202	610E1714	COIL,FILTER 5.6UH
L301	610E1723	COIL,FILTER 33UHA,T (S)
L303	610E1719	COIL,FILTER 15UH
L304	610E1728	COIL,FILTER 82UHA,T (S)
L305	610E1730	COIL,FILTER 120UH
L306	610E1721	COIL,FILTER 22UHA,T (S)
L307	610E1721	COIL,FILTER 22UHA,T (S)
L308	610E1721	COIL,FILTER 22UHA,T (S)
L309	610E1725	COIL,FILTER 47UHA,T (S)
L310	610E1725	COIL,FILTER 47UHA,T (S)
L311	610E1724	COIL,FILTER 39UH
L401	610E1718	COIL,FILTER 12UH
L402	610E1724	COIL,FILTER 39UH
L403	610E1713	COIL,FILTER 4.7UH

SYMBOL	PARTS NO	DESCRIPTION
L404	610E1716	COIL,FILTER 8.2UHA,T (S)
L405	610E1719	COIL,FILTER 15UH
L406	610E1719	COIL,FILTER 15UH
L407	610E1723	COIL,FILTER 33UHA,T (S)
L408	610E1717	COIL,FILTER 10UHA,T (S)
L602	61055010	COIL,FILTER 47UH
L603	61055010	COIL,FILTER 47UH
L604	610E1725	COIL,FILTER 47UHA,T (S)
T301	60565017	COIL,D.L MATCHING
T401	60518011	TRANS,FILTER 4.28MHZ
T402	60518010	COIL 4.32MHZ
T403	60518010	COIL 4.32MHZ
T404	60518010	COIL 4.32MHZ
T405	60565019	COIL,D.L MATCHING

\*\*\* PWB ASSYS \*\*\*

93R68C01	CONTROL PWB ASSY
94R68F01	MAIN PWB ASSY
94R68L01	LED PWB ASSY
94Z91B01	PS PWB ASSY
94Z91K01	FRONT PWB ASSY
94Z91R01	REAR PWB ASSY
94Z91S01	SYNC PWB ASSY
94Z91V01	VIDEO PWB ASSY

\*\*\* ELECTRICAL PARTS & MISCELLANEOUS PARTS \*\*\*

FH101	73499106	CONNECTING CABLE 40P(L95)
FR150	71205037	HOLDER,FUSE
FR151	39030009	R,NETWORK 4*10K 5% 1/8W
FR152	39030058	R,BLOCK 4*5.6K 5% 1/8W
	39030009	R,NETWORK 4*10K 5% 1/8W
FR201	39030066	R,NETWORK 6*10K 5% 1/8W
FR202	39030009	R,NETWORK 4*10K 5% 1/8W
FR801	39030012	R,NETWORK 3*10K 5% 1/8W
FR802	39030019	R,NETWORK 7*10K 5% 1/8W
FR805	39030019	R,NETWORK 7*10K 5% 1/8W
FR807	39030060	R,NETWORK 6*1K 5% 1/8W
FR901	39030040	R,NETWORK 4*100K 5% 1/8W
FR902	39030040	R,NETWORK 4*100K 5% 1/8W
FR951	39031001	R,NETWORK 1/8W 7X330H,J
FR952	39031001	R,NETWORK 1/8W 7X330H,J

SYMBOL	PARTS NO	DESCRIPTION
ΔF101	66653011	FUSE 125V 1A-UC
P-EJ	70505027	JACK,HEADPHONE
SK809	70102148	IC SOCKET 28P
SK811	70102149	IC SOCKET 40P
X301	64003021	X TAL 3.58M(KSS)
X401	64003026	X TAL 4.43M(KSS)
X402	64003021	X TAL 3.58M(KSS)
X801	64099029	X,TAL 4.9152MHZ

\*\*\* PRINTED & PACKING MATERIALS \*\*\*

12504421	BRACKET R (RACK)
12504431	BRACKET L (RACK)
12801381	FILLER R
12801391	FILLER L
12801401	FILLER T
12801411	FILLER B
12801421	BAG,PROTECTION
12802231	CARTON BOX
24806961	BAG,POLYETHYLENE (270*370)
70810722	LINE CORD UC-3 L3.0
73499177	BNC CABLE 5P
73499203	D-SUB 9PIN CABLE
73499206	D-SUB 9-15PIN CABLE
73499218	D-SUB CABLE 15-25P (16M)
78401271	INSTRUCTION BOOK
79609501	IR-3040
79609511	UR-3020

\*\*\* RESISTORS \*\*\*

ΔR104	40177109	R,CARBON 2.2H 5% 1/4W
ΔR105	40175161	R,CARBON 330H 5% 1/4W
ΔR106	40023253	R,SOLID 2.2M 5% 1/2W
ΔR203	40371161	R,METAL 330H 5% 1W
ΔR742	40175125	R,CARBON 10H 5% 1/4W
ΔR746	40175125	R,CARBON 10H 5% 1/4W
ΔR750	40175125	R,CARBON 10H 5% 1/4W
ΔR757	40175125	R,CARBON 10H 5% 1/4W
ΔR763	40175125	R,CARBON 10H 5% 1/4W
ΔR956	40177149	R,CARBON 100H 5% 1/4W

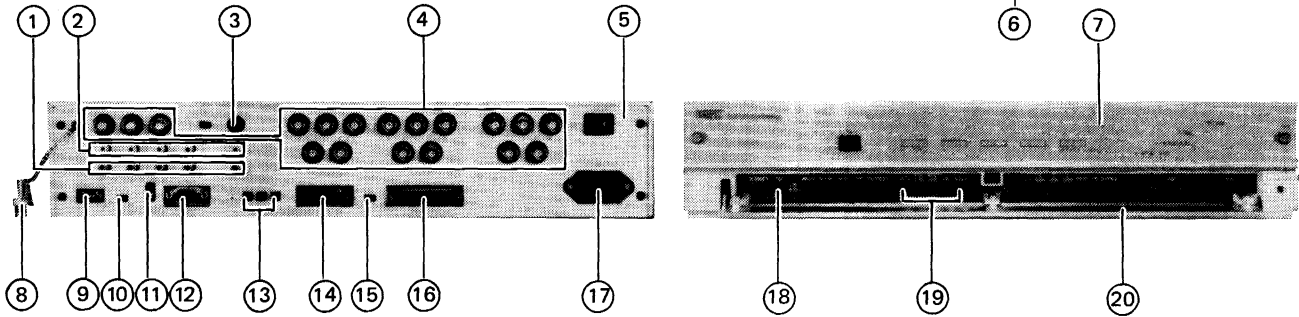
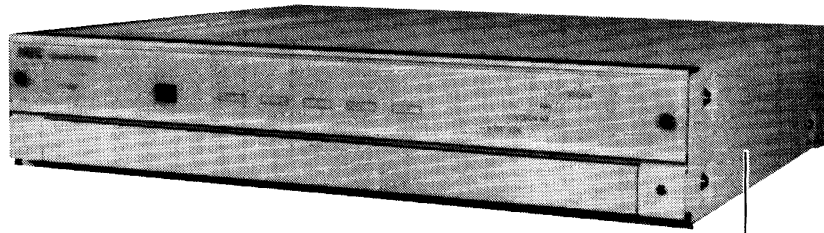
SYMBOL	PARTS NO	DESCRIPTION
--------	----------	-------------

\*\*\* CAPACITORS \*\*\*

ΔC119	42899025	C,METAL FILM 125V 0.1UF
ΔC120	42899025	C,METAL FILM 125V 0.1UF
ΔC121	42099029	C,CERAMIC 125V 4700PF
ΔC122	42099029	C,CERAMIC 125V 4700PF
ΔC123	42099029	C,CERAMIC 125V 4700PF



# APPEARANCE PARTS LOCATION



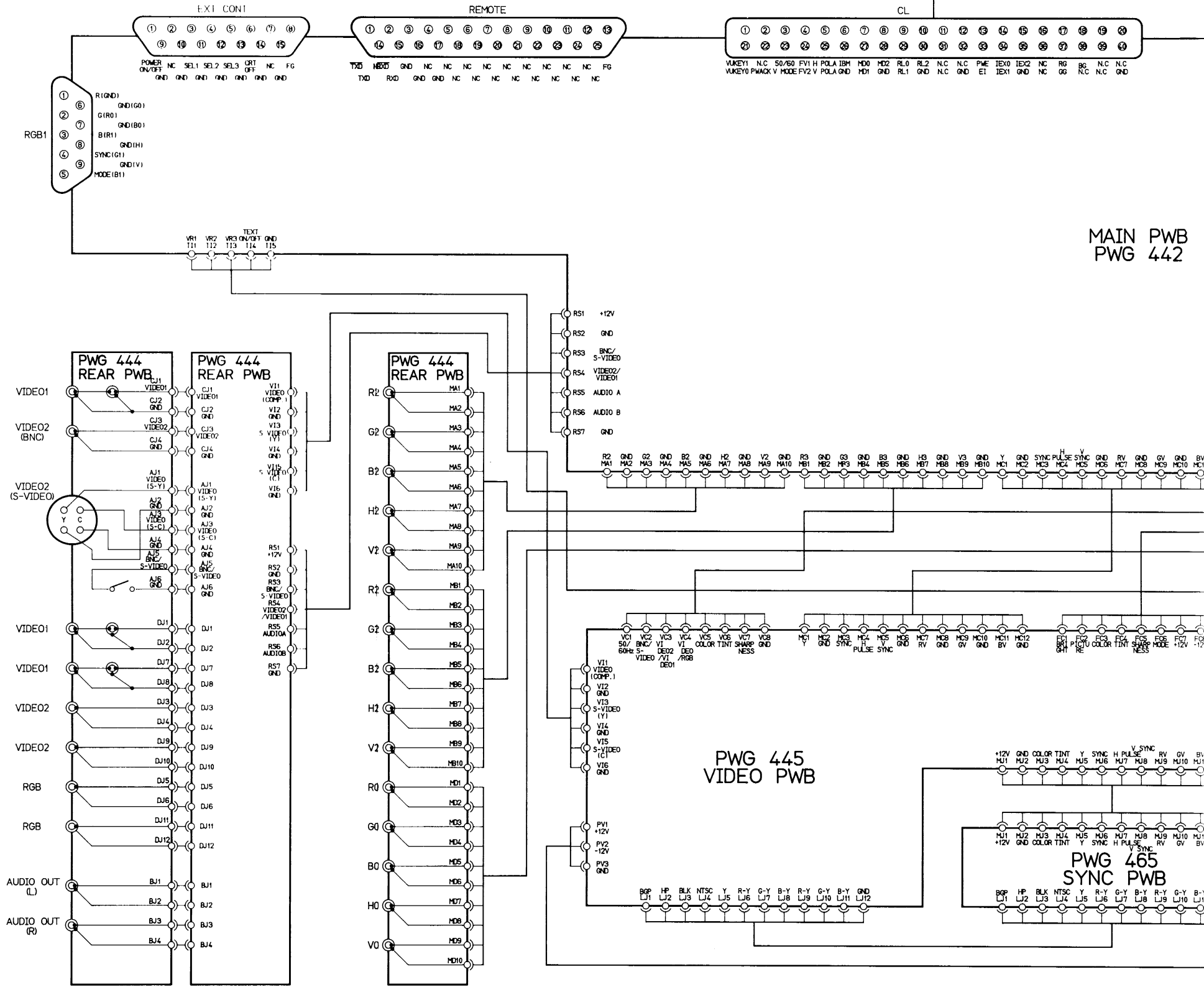
SYMBOL	PARTS NO.	DESCRIPTION	Q'TY
①	70051124	PIN JACK (SW)	5
②	70051121	PIN JACK	5
③	70057008	DIN SOCKET 4P	1
④	70599090	BNC RECEPTACLE	18
⑤	12351901	REAR PANEL ASSY	1
⑥	12351911	CABINET ASSY	1
⑦	12702071	FRONT PANEL ASSY	1
⑧	70599106	CONNECTOR, BNC CABLE	1
⑨	66098206	LEVER SWITCH 6P (DPS-6-E)	1
⑩	65163001	SWITCH SLIDE (4-2 L-9 NS)	1
⑪	65169901	LEVER SWITCH, SLIDE (10-2)	1
⑫	70056195	D-SUB SOCKET 9PL	1
⑬	24468541	PUSH BUTTON B	3
⑭	70056194	D-SUB SOCKET 15PL	1
⑮	65113253	SWITCH, SLIDE	1
⑯	70056189	D-SUB SOCKET	1
⑰	61062078	POWER LINE FILTER	1
⑱	12450591	PUSH BUTTON	1
⑲	12450621	PUSH BUTTON	5
⑳	12702091	DOOR ASSY	1

**SCHEMATIC DIAGRAMS**

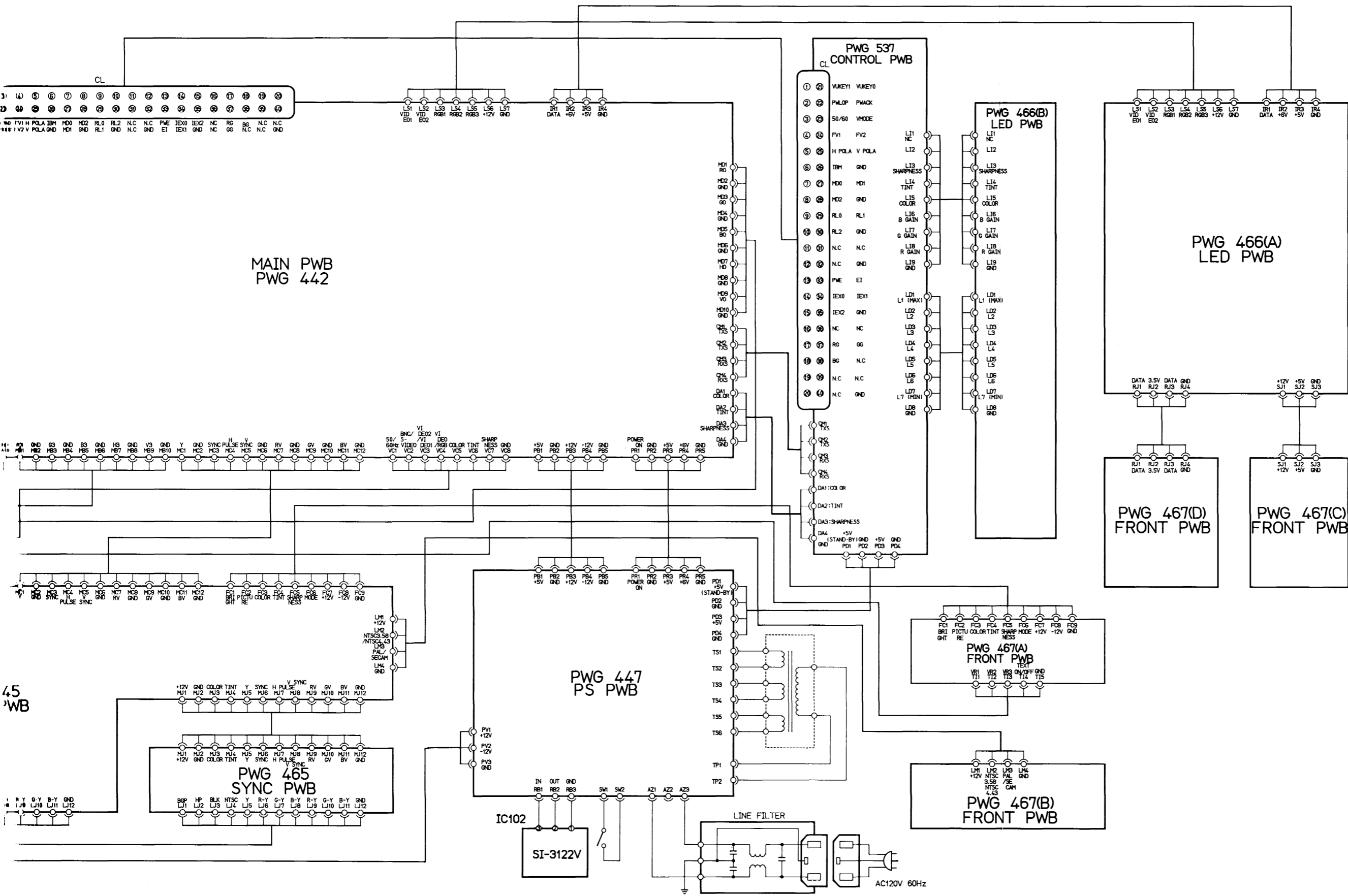
1. CONNECTION .....	2
2. MAIN PWB (PWG 442).....	5
3. VIDEO PWB (PWG 445) .....	13
4. CONTROL PWB (PWG 537).....	17
5. REAR PWB (PWG 444A, B, C) .....	19
6. SYNC PWB (PWG 465).....	21
7. FRONT PWB (PWG 467A, B, C, D) .....	23
LED PWB (PWG 466A, B)	
8. PS PWB (PWG 447) .....	25



# CONNECTION DIAGRAM



MAIN PWB  
PWG 442



MAIN PWB  
PWG 442

PWG 537  
CONTROL PWB

PWG 466(B)  
LED PWB

PWG 466(A)  
LED PWB

PWG 467(D)  
FRONT PWB

PWG 467(C)  
FRONT PWB

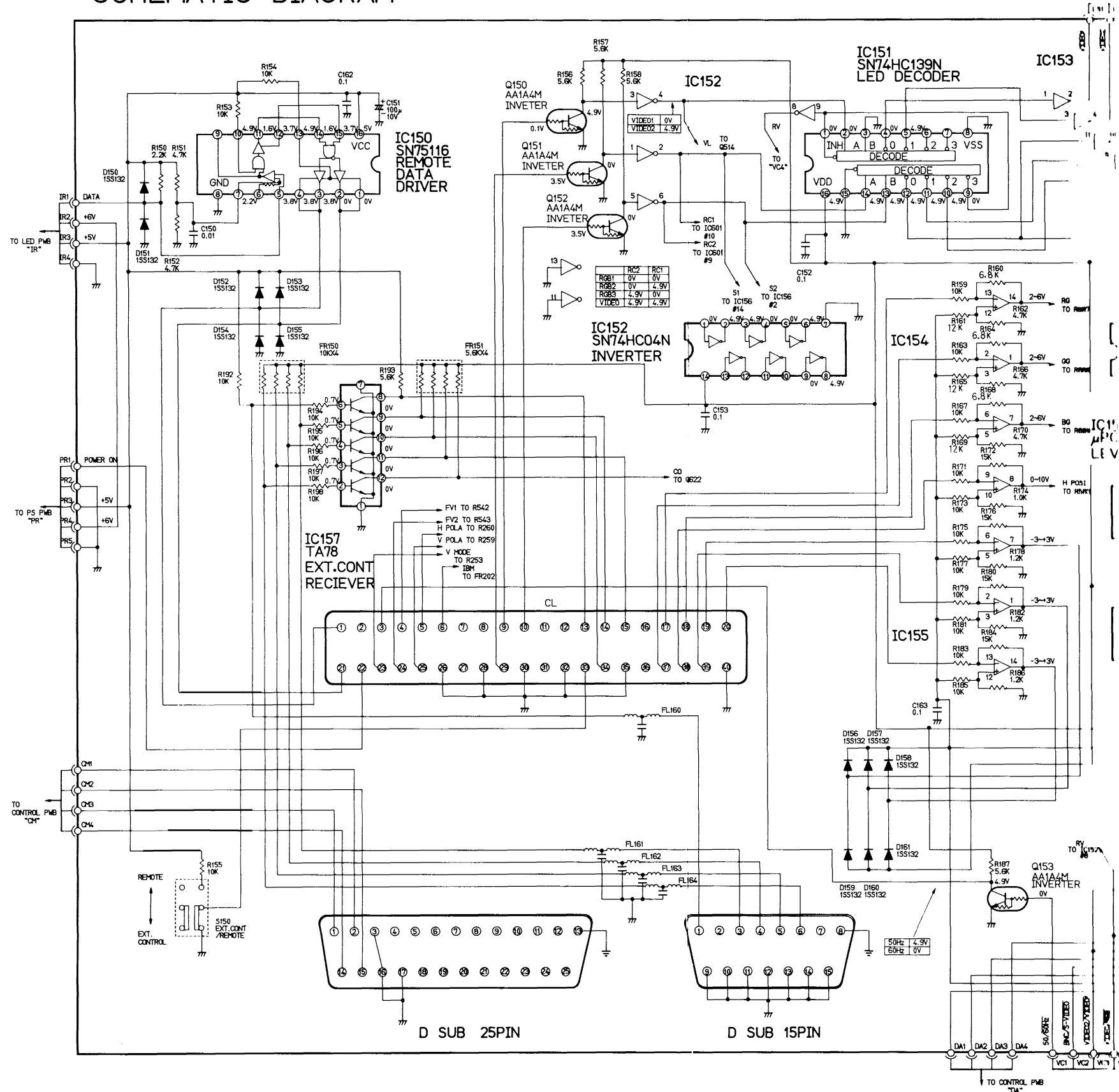
PWG 467(A)  
FRONT PWB

PWG 467(B)  
FRONT PWB

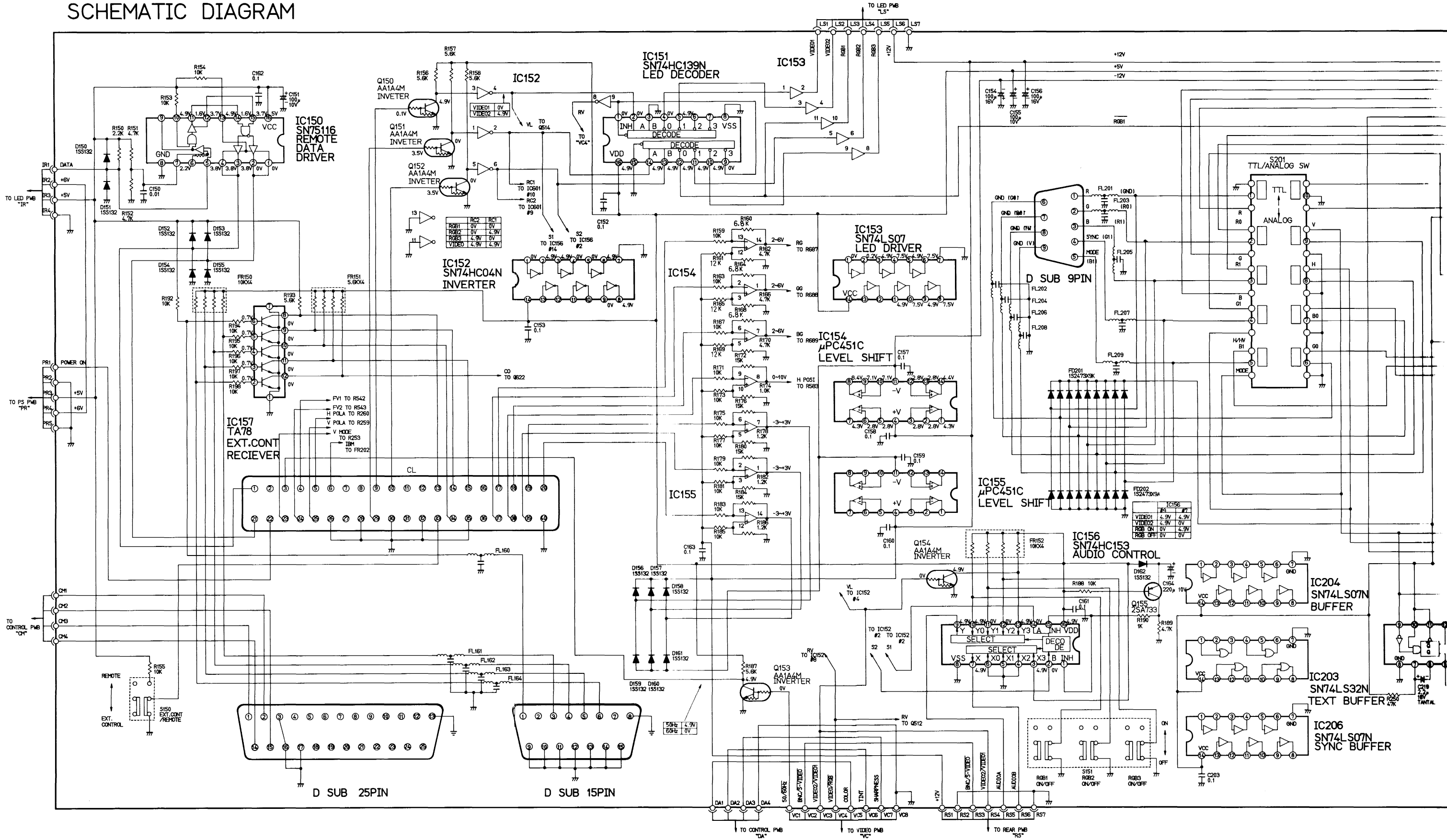
PWG 447  
PS PWB

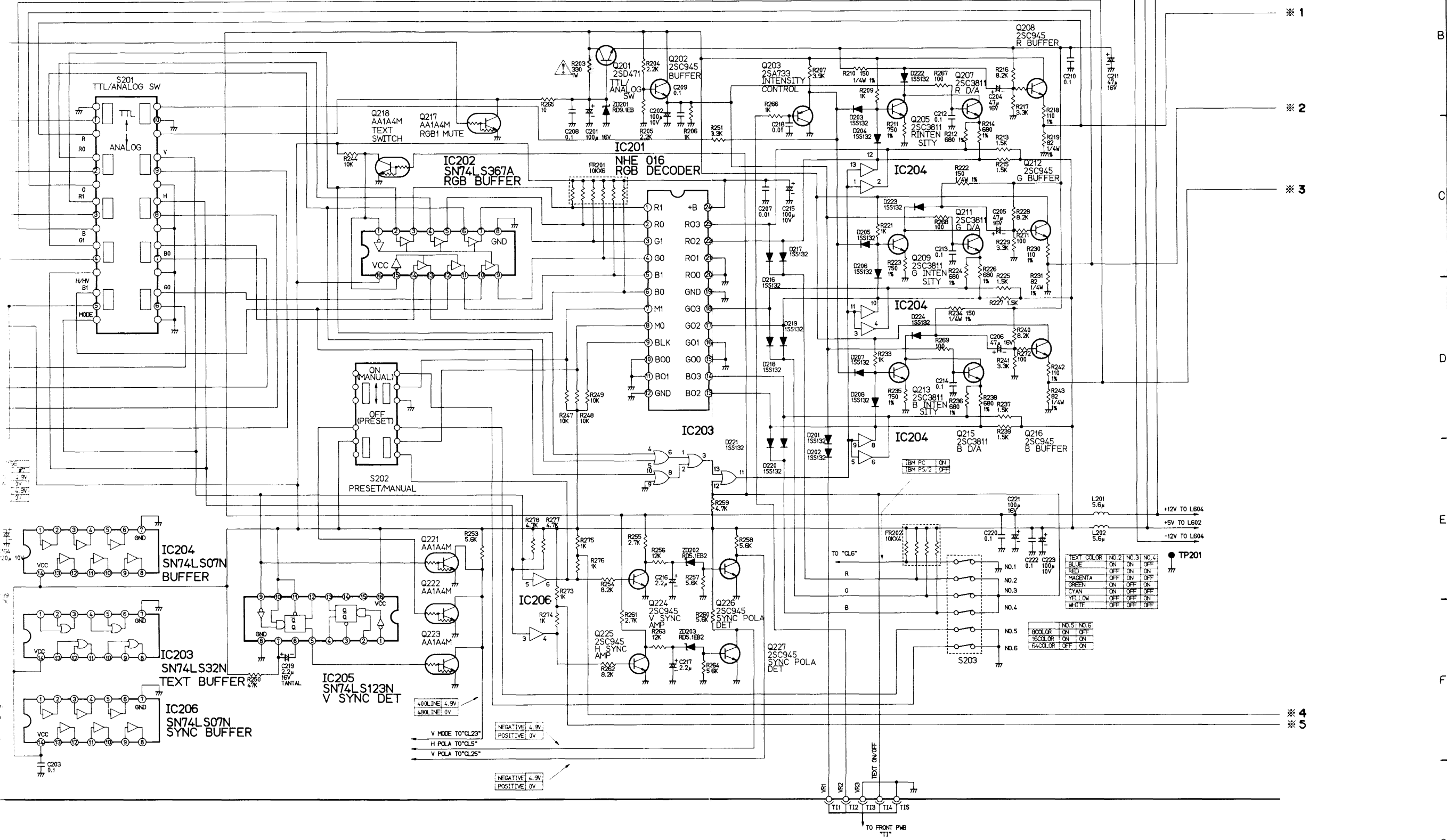
PWG 465  
SYNC PWB

# MAIN PWB SCHEMATIC DIAGRAM



# MAIN PWB SCHEMATIC DIAGRAM

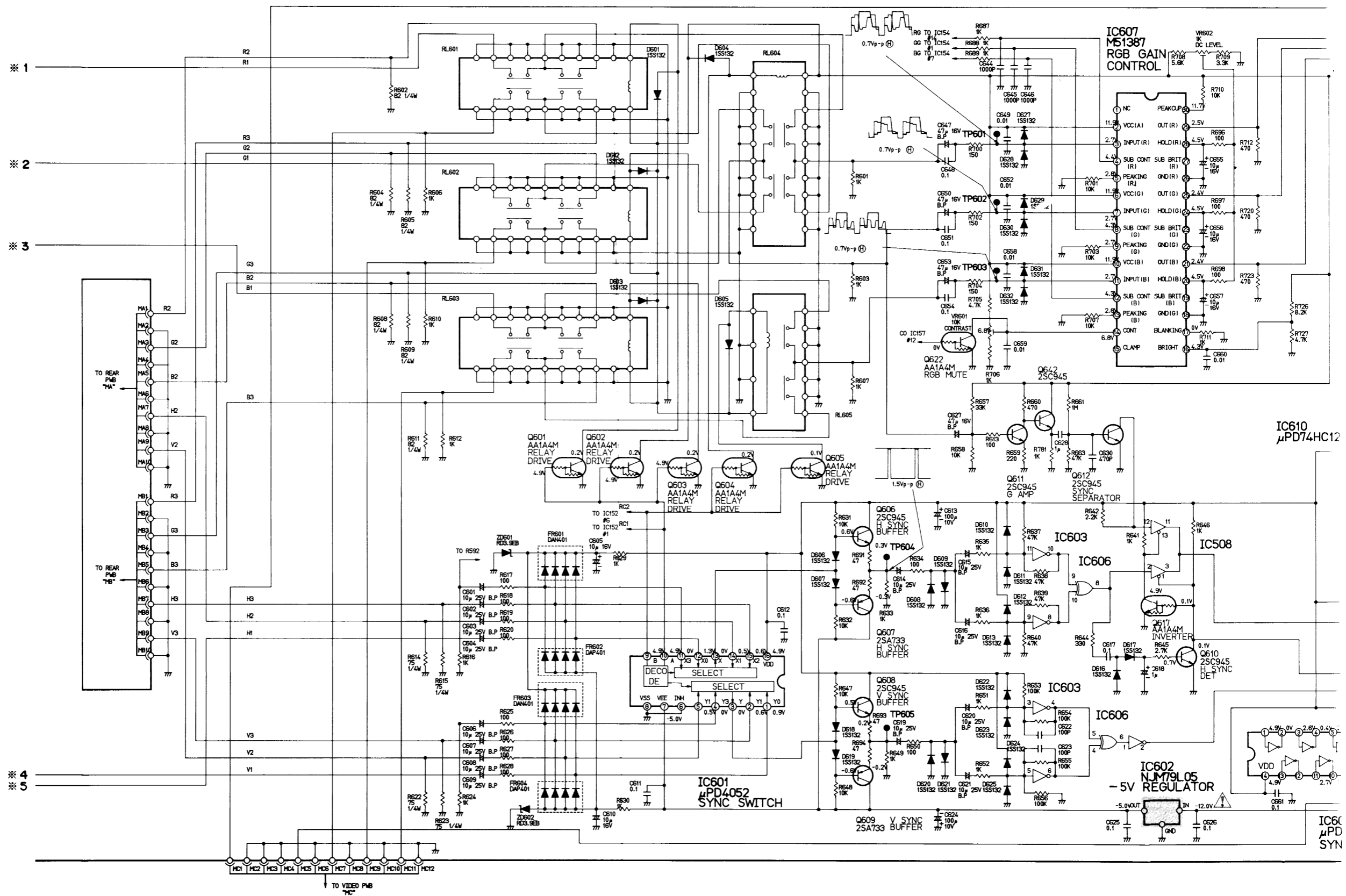


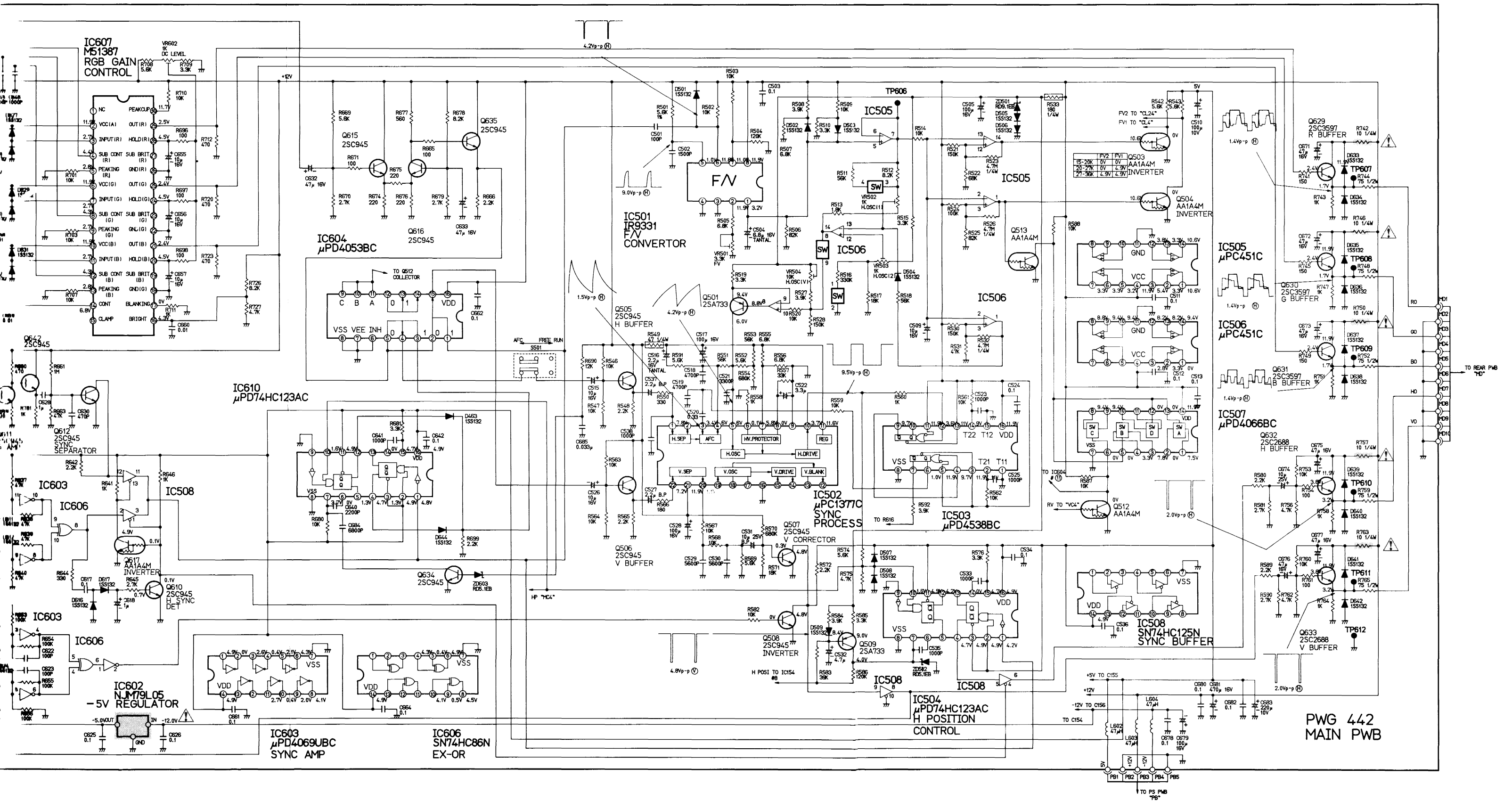


TEXT COLOR	NO.2	NO.3	NO.4
BLUE	ON	ON	OFF
RED	OFF	ON	OFF
MAGENTA	OFF	ON	OFF
GREEN	ON	OFF	ON
CYAN	ON	OFF	OFF
YELLOW	OFF	OFF	ON
WHITE	OFF	OFF	OFF

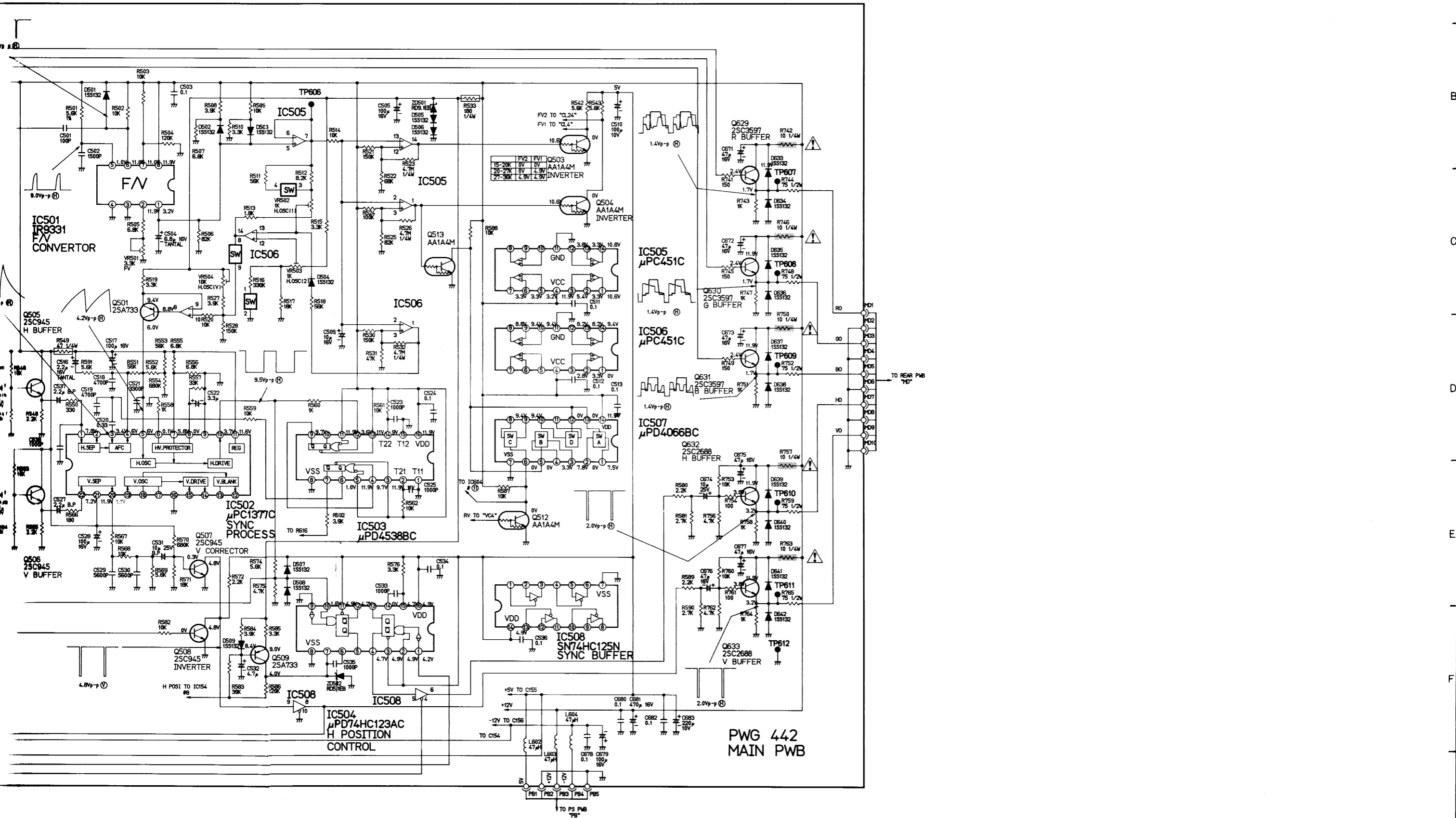
SCOLOR	NO.5	NO.6
SCOLOR	ON	OFF
SCOLOR	ON	ON
SCOLOR	OFF	OFF





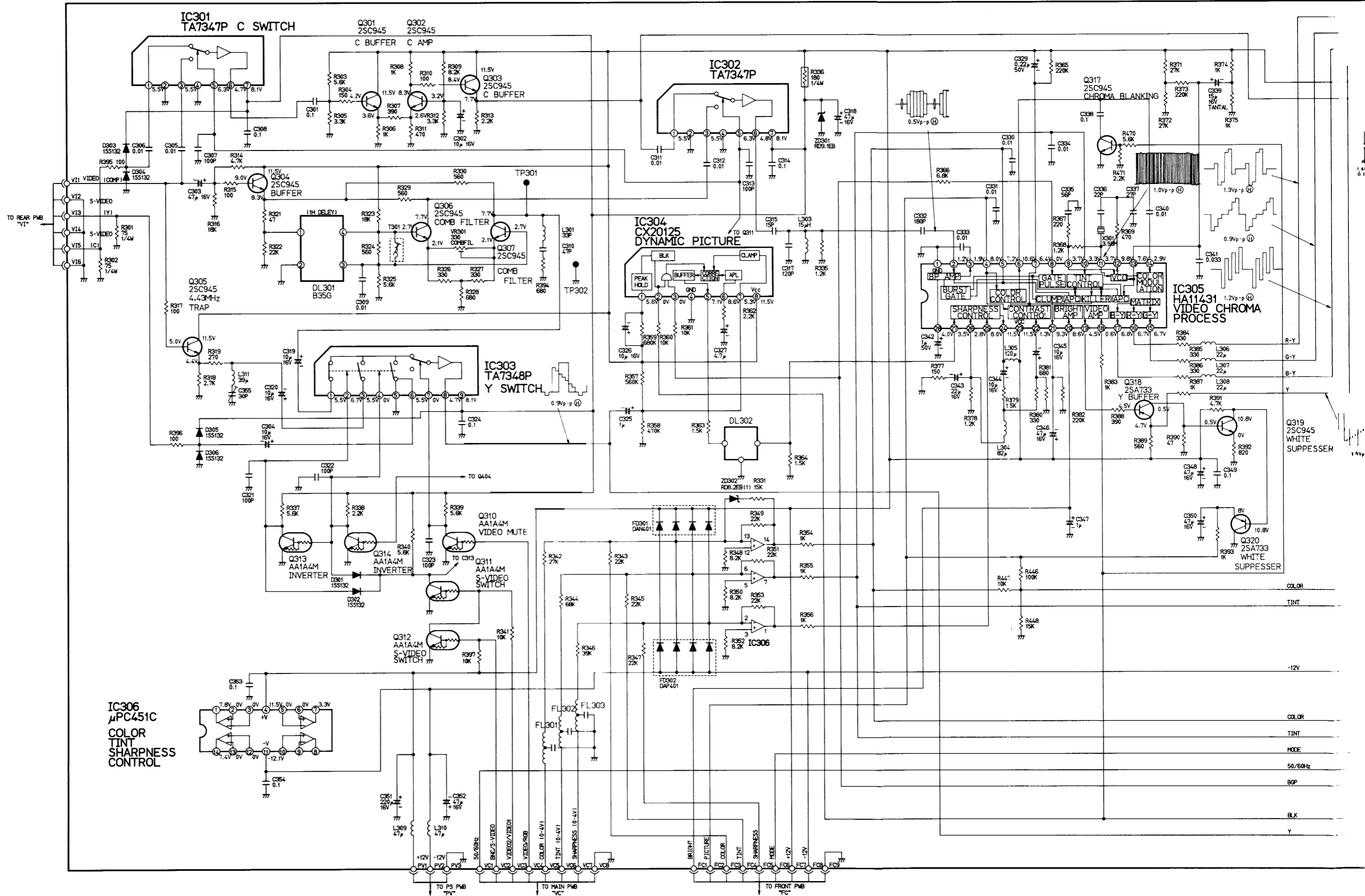


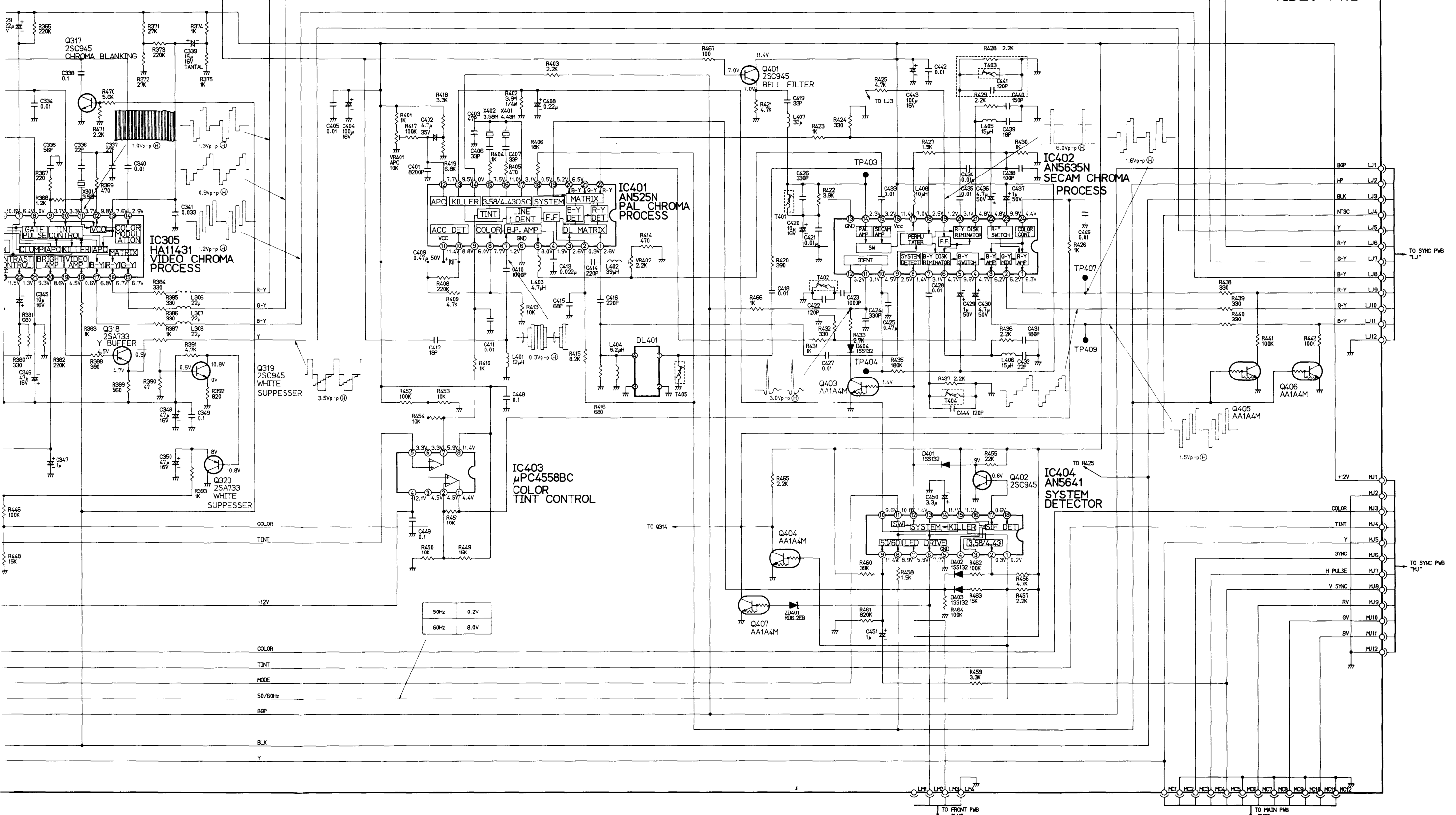
PWG 442  
MAIN PWB



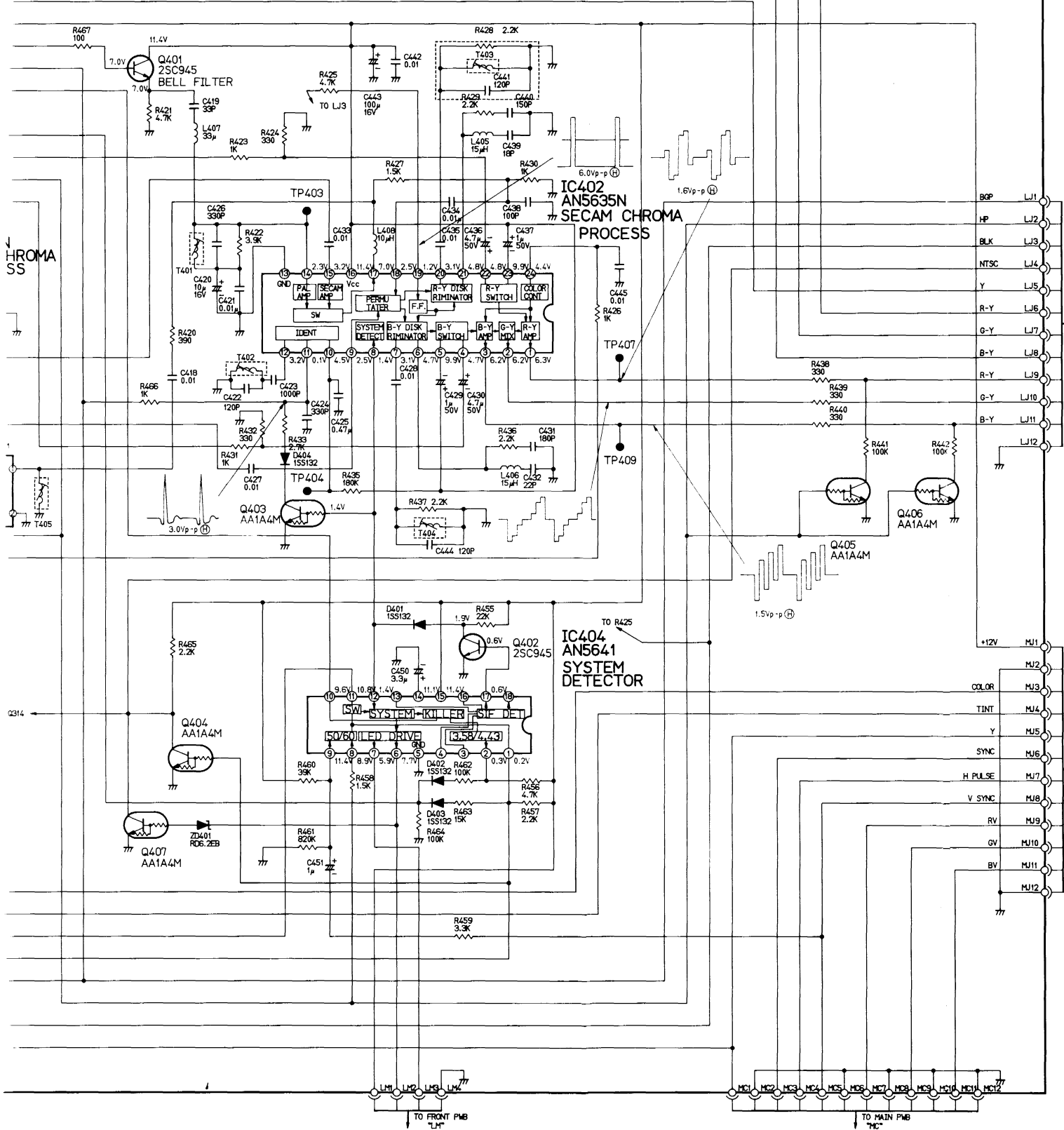
PWG 442  
MAIN PWB

# VIDEO PWB SCHEMATIC DIAGRAM



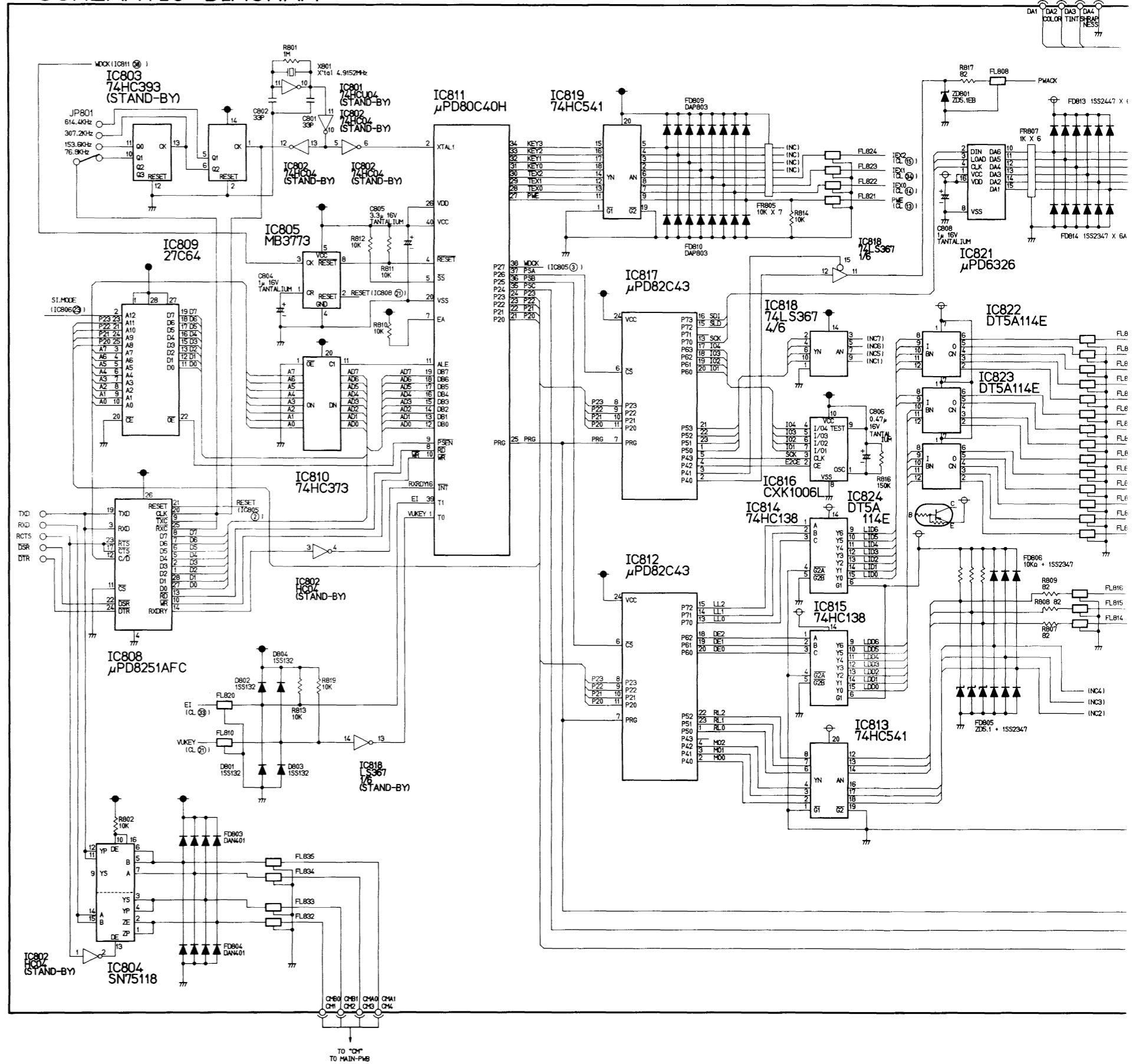


PWG 445  
VIDEO PWB

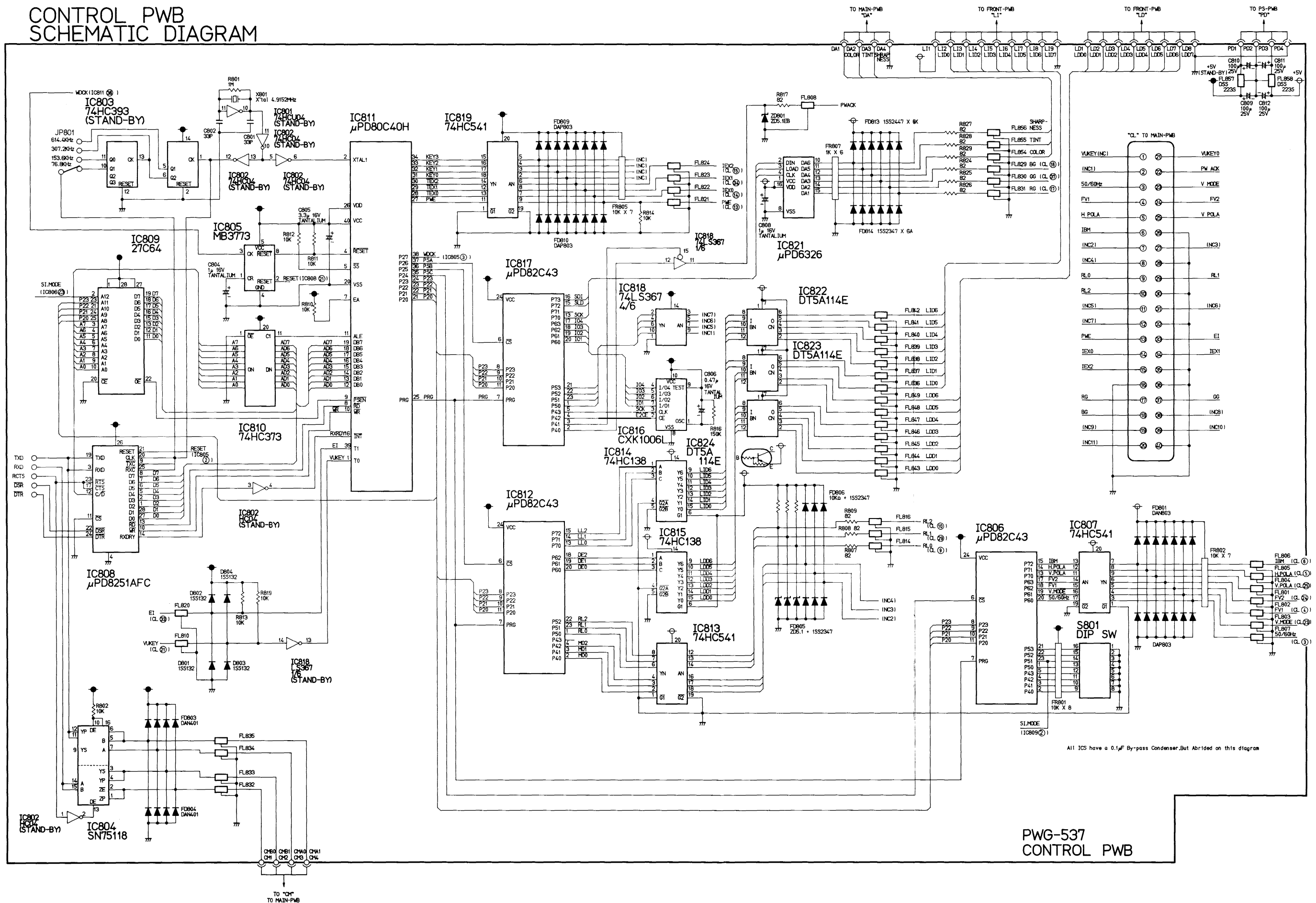


B  
C  
D  
E  
F  
G

# CONTROL PWB SCHEMATIC DIAGRAM



# CONTROL PWB SCHEMATIC DIAGRAM

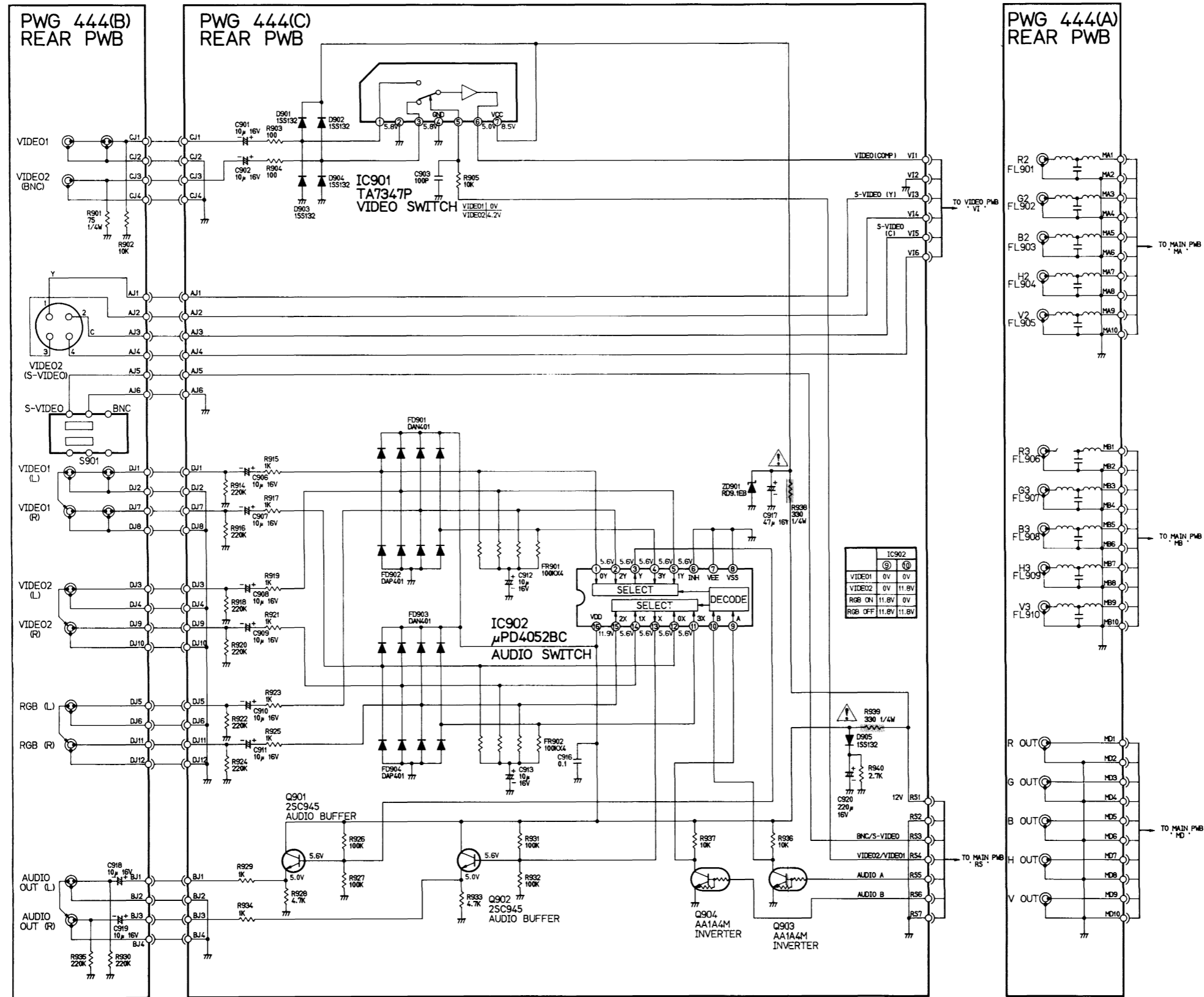


PWG-537  
CONTROL PWB

All ICs have a 0.1 $\mu$ F By-pass Condenser, But Abridged on this diagram

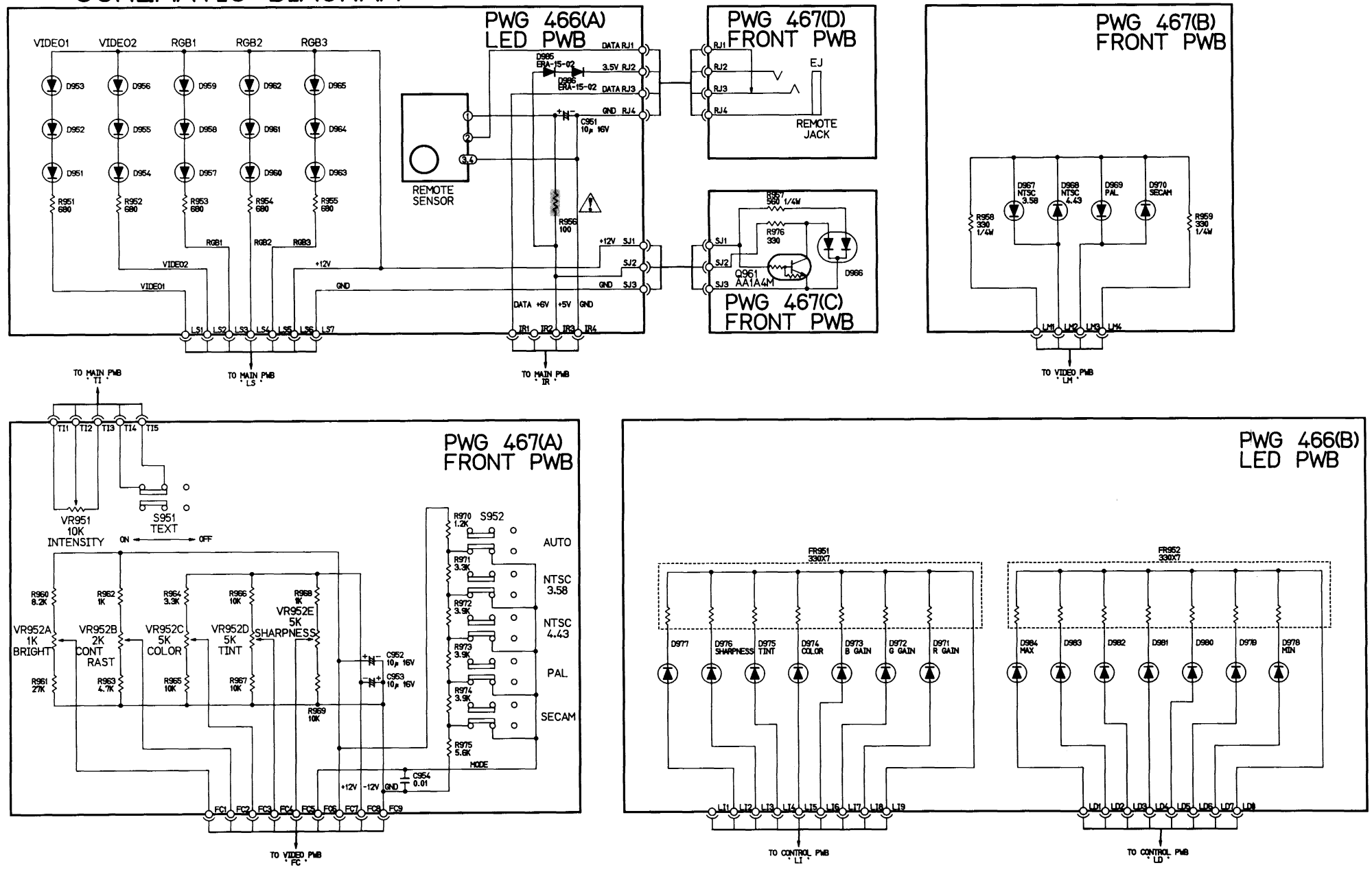


REAR PWB  
SCHEMATIC DIAGRAM





# FRONT PWB. LED PWB SCHEMATIC DIAGRAM



466(B)  
PWB

0978  
40N

B

C

D

E

F

G

19

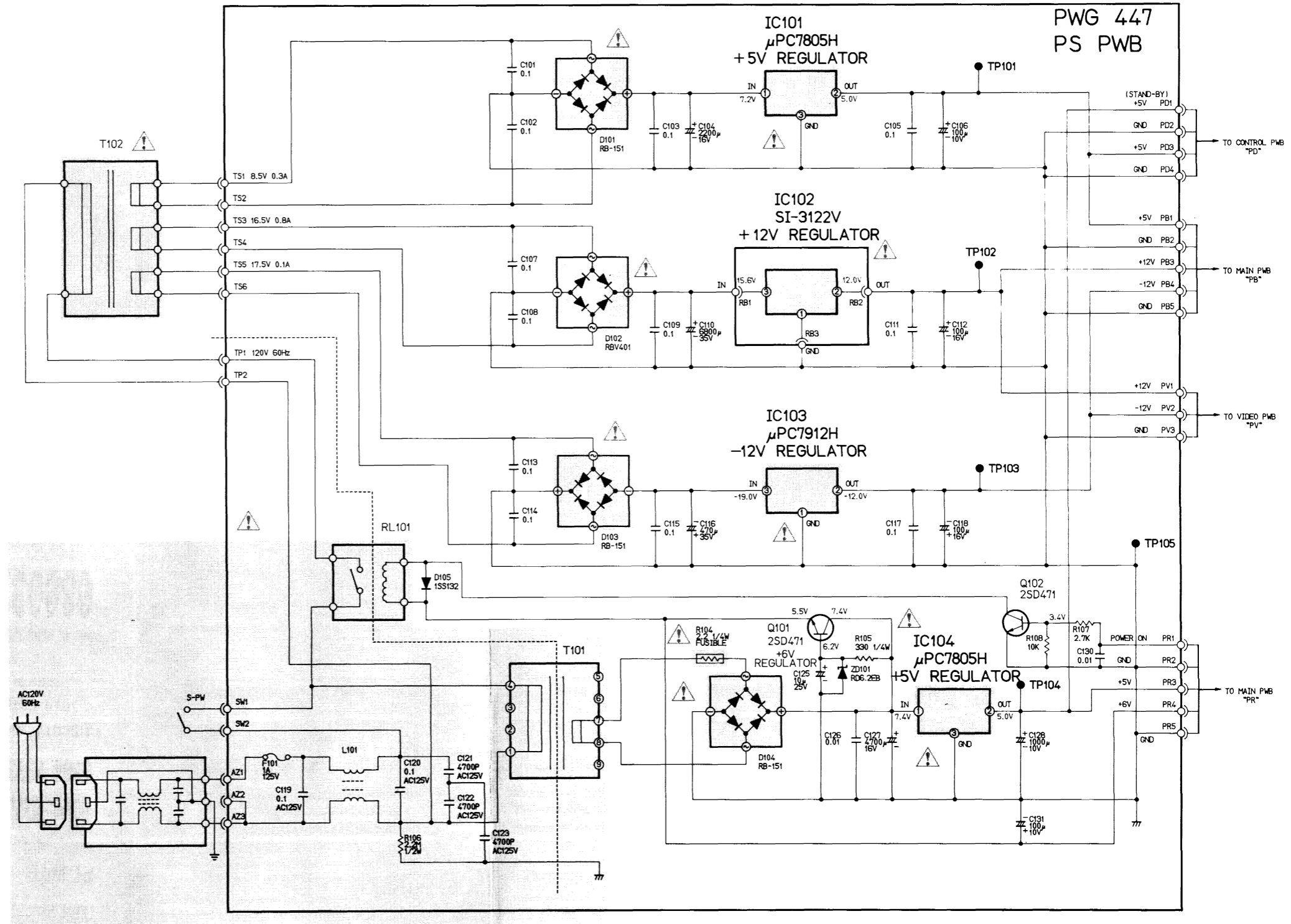
20

21

22

23

# PS PWB SCHEMATIC DIAGRAM



**NEC**

**C&C** Computers and Communications