SPECIFICATIONS

1. PICTURE TUBE

Size : 19 inch (Flat Square Tube)
Deflection Angle : 90°
Neck Diameter : 29.1mm
Transmission : 46%
Dot Pitch : 0.26mm
Face Treatment : ARASC(Anti-Reflection & Anti-Static Coating), U-Coating

2. SIGNAL

2-1. Horizontal & Vertical Sync
1) Input Voltage Level : Low=0~1.2V, High=2.5~5.5V
2) Sync Polarity : Positive or Negative
3) Composite Sync Signal
4) SOG (Sync On Green)

2-2. Video Input Signal
1) Voltage Level : 0 ~ 0.7 Vp-p
a) Color 0, 0 : 0 Vp-p
b) Color 7, 0 : 0.467 Vp-p
c) Color 15, 0 : 0.7 Vp-p
2) Input Impedance : 75 Ω
3) Video Color : R, G, B Analog
4) Signal Format : Refer to the Timing Chart

2-3. Signal Connector
15-pin Attached Connector

2-4. Scanning Frequency
Horizontal : 30 ~ 96kHz
Vertical : 50 ~ 160Hz

3. POWER SUPPLY

3-1. Power Range
AC 100~240V (Free Voltage), 50/60Hz, 2.0A Max.
3-2. Power Consumption

MODE	H/V SYNC	POWER CONSUMPTION	LED COLOR
NORMAL (ON)	ON/ON	less than 130W (150W)	GREEN
STAND-BY	OFF/ON	less than 8W (30W)	ORANGE
SUSPEND	ON/OFF	less than 8W (30W)	
OFF	OFF/OFF	less than 3W (20W)	ORANGE

4. DISPLAY AREA

4-1. Active Video Area :
• Max Image Size - 365.8 x 274.3mm (14.40" x 10.80")
• Preset Image Size - 350x 262 mm (13.78" x 10.31")
4-2. Display Color : Full Colors
4-3. Display Resolution : 1600 x 1200 / 75Hz (Non-Interlace) *(With USB)
4-4. Video Bandwidth : 202 MHz

5. ENVIRONMENT

5-1. Operating Temperature: 15°C ~ 30°C (Ambient)
5-2. Relative Humidity : 8%~ 80% (Non-condensing)
5-3. Altitude : 5,000m

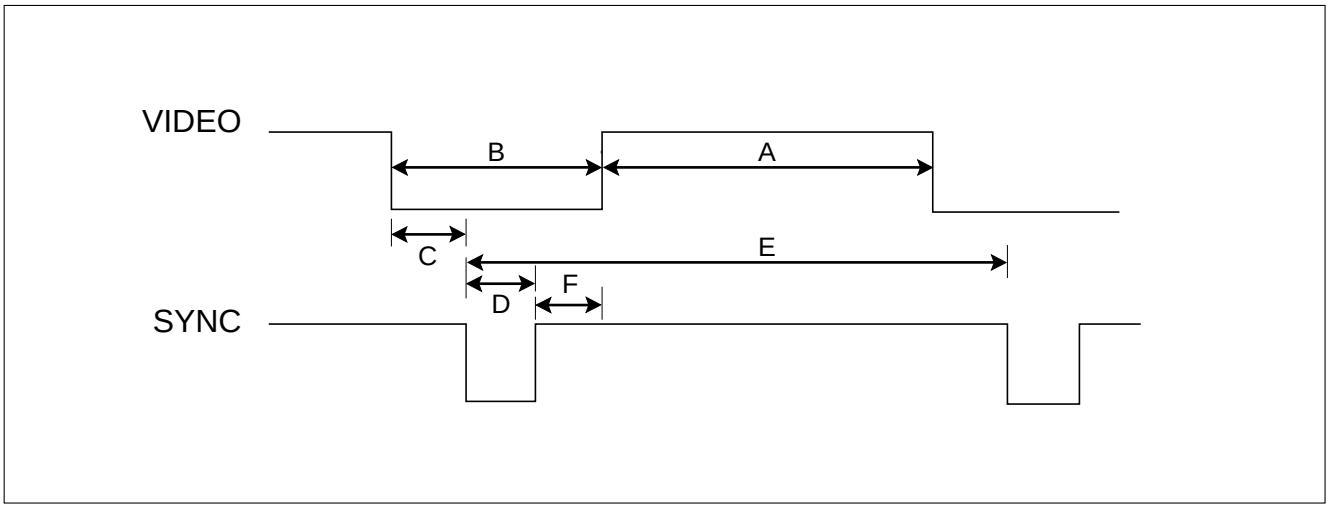
6. DIMENSIONS (with TILT/SWIVEL)

Width : 448.0mm (17.64 inch)
Depth : 476.0mm (18.74 inch)
Height : 465.0mm (18.31 inch)

7. WEIGHT (with TILT/SWIVEL)

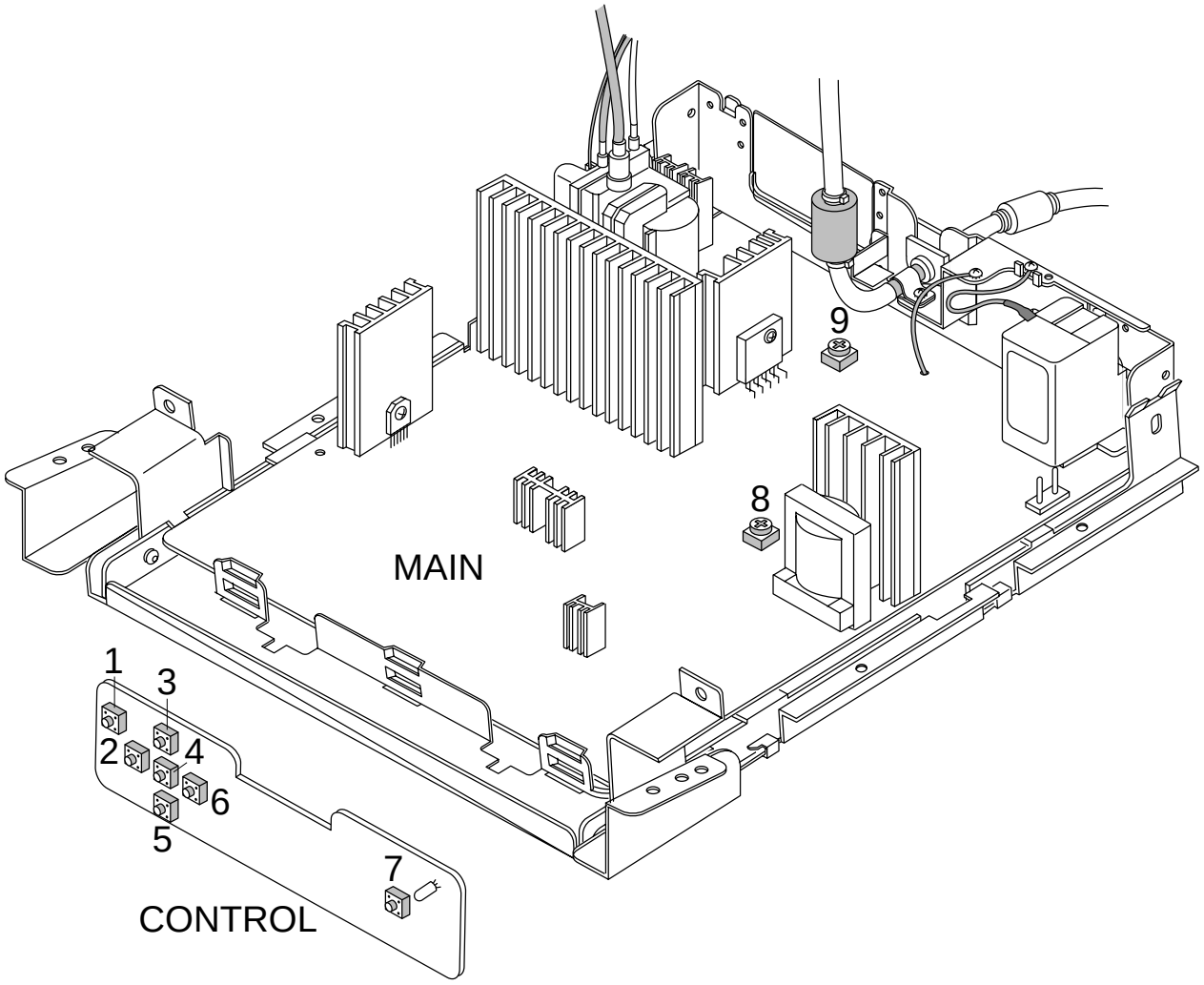
Net Weight : 21.5kg (47.41 lbs.)
Gross Weight : 25.0kg (55.12 lbs.)

TIMING CHART



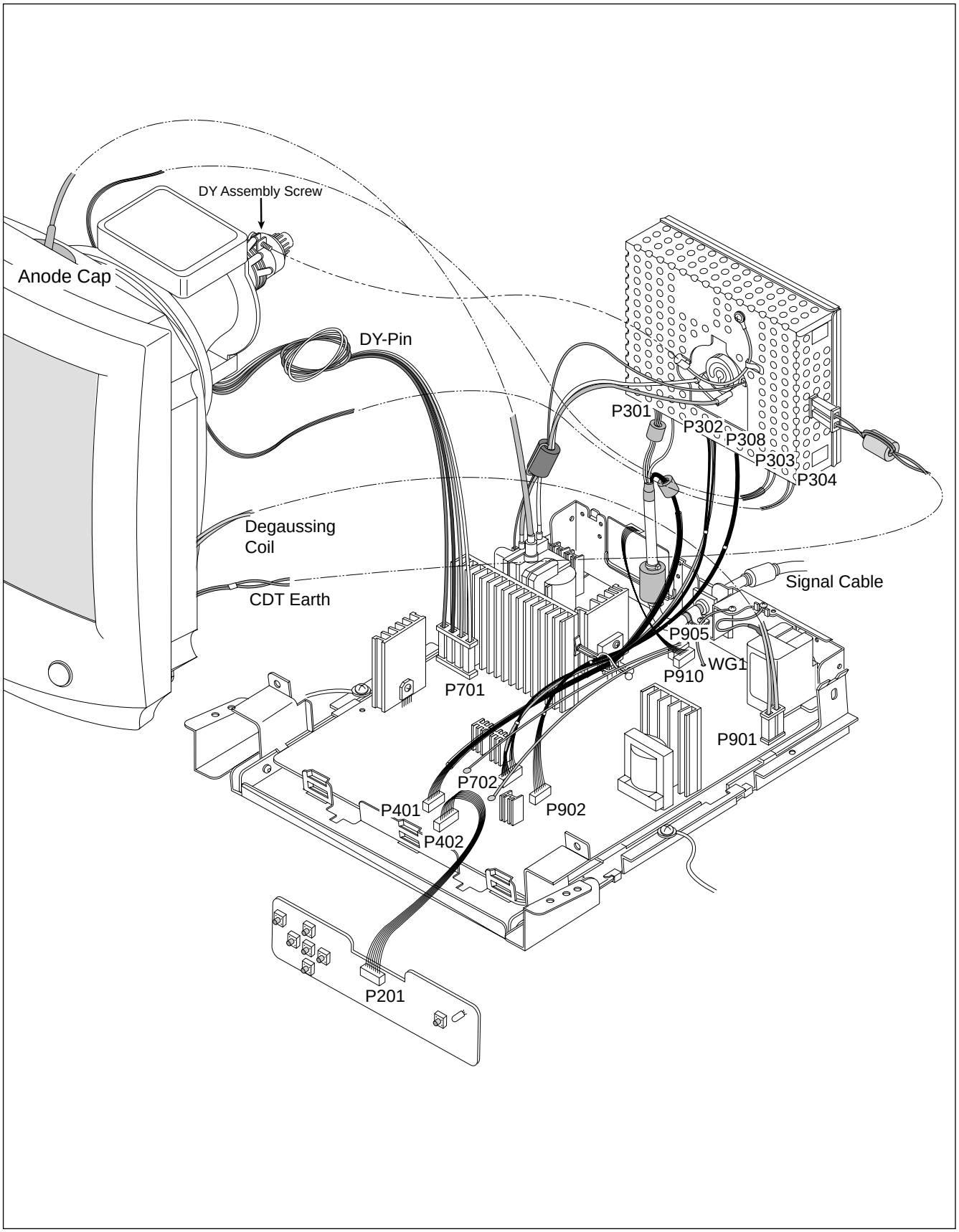
MODE			MARK	FACTORY PRESET MODE					
				MODE 1	MODE 2	MODE 3	MODE 4	MODE 5	MODE 6
				VESA					SOG CHECK
HORIZONTAL	Sync Polarity			–	+	+	+	+	SOG
	Frequency	kHz		43.269	53.674	68.677	91.146	93.750	68.677
	Total Period	µs	E	23.112	18.631	14.561	10.971	10.666	14.561
	Video Active Time	µs	A	17.778	14.222	10.836	8.127	7.901	10.836
	Blanking Time	µs	B	5.334	4.409	3.725	2.844	2.765	3.725
	Front Porch	µs	C	1.556	0.569	0.508	0.406	0.316	0.508
	Sync Duration	µs	D	1.556	1.138	1.016	1.016	0.948	1.016
	Back Porch	µs	F	2.222	2.702	2.201	1.422	1.501	2.201
VERTICAL	Sync Polarity			–	+	+	+	+	SOG
	Frequency	Hz		85.008	85.061	84.997	85.024	75.000	84.997
	Total Period	ms	E	11.763	11.756	11.765	11.762	13.333	11.765
	Video Active Time	ms	A	11.093	11.178	11.183	11.235	12.800	11.183
	Blanking Time	ms	B	0.670	0.578	0.582	0.527	0.533	0.582
	Front Porch	ms	C	0.023	0.019	0.015	0.011	0.011	0.015
	Sync Duration	ms	D	0.069	0.056	0.044	0.033	0.032	0.044
	Back Porch	ms	F	0.578	0.503	0.523	0.483	0.490	0.523
Resolution				**640 X 480 85Hz**	**800 X 600 85Hz**	**1024 X 768 85Hz**	**1280 X 1024 85Hz**	**1600 X 1200 75Hz**	**1024 X 768 85Hz**
Recall				Yes	Yes	Yes	Yes	Yes	No

CONTROL LOCATIONS



No.	Ref. No.	Control Function	No.	Ref. No.	Control Function
1	SW201	OSD BUTTON	6	SW206	OSD SELECT/ADJUSTMENT (RIGHT)
2	SW202	OSD SELECT/ADJUSTMENT (LEFT)	7	SW207	POWER BUTTON
3	SW203	OSD SELECT/ADJUSTMENT (UP)	8	VR901	B^+ ADJUSTMENT
4	SW204	SET BUTTON	9	VR701	HIGH-VOLTAGE ADJUSTMENT
5	SW205	OSD SELECT/ADJUSTMENT (DOWN)			

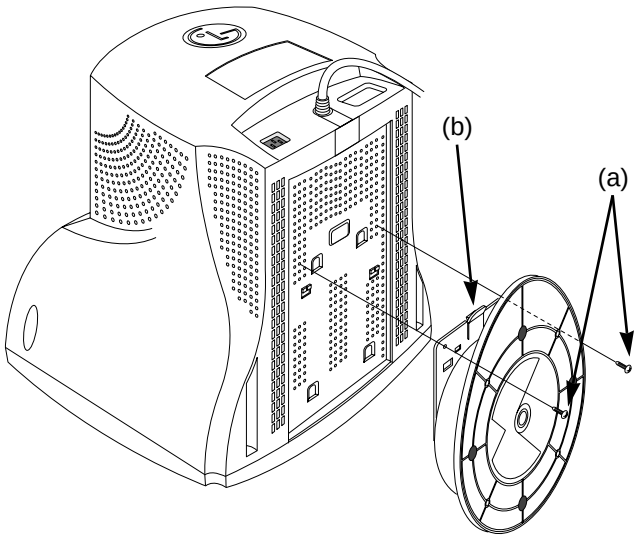
WIRING DIAGRAM



DISASSEMBLY

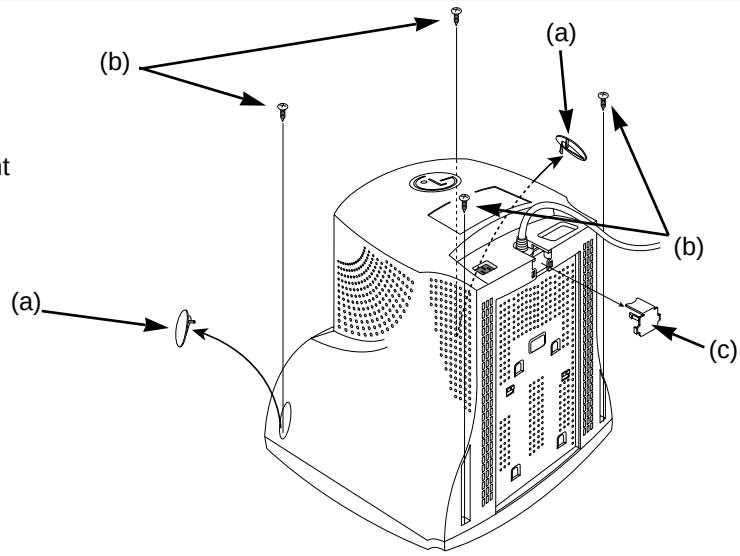
1. TILT/SWIVEL REMOVAL

1) Set the monitor face downward.
2) Remove two screws (a).
3) Pressing the latch (b), carefully remove the Tilt/Swivel by pulling it upward.



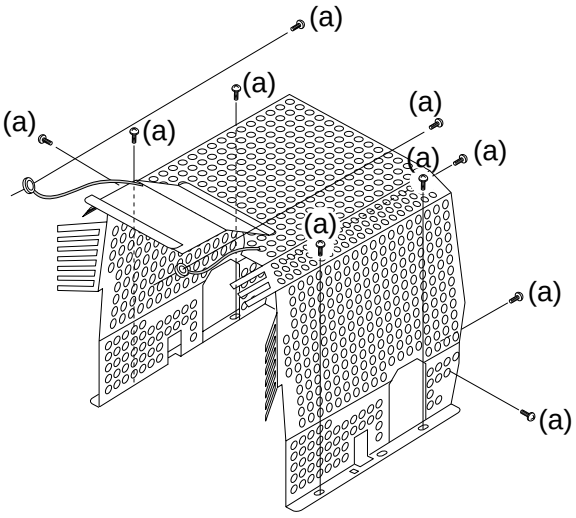
2. BACK COVER REMOVAL

1) Remove two screw caps (a).
2) Remove four screws (b).
3) Remove Cable Cap (c).
4) Slide the Back Cover away from the Front Cabinet of the monitor.



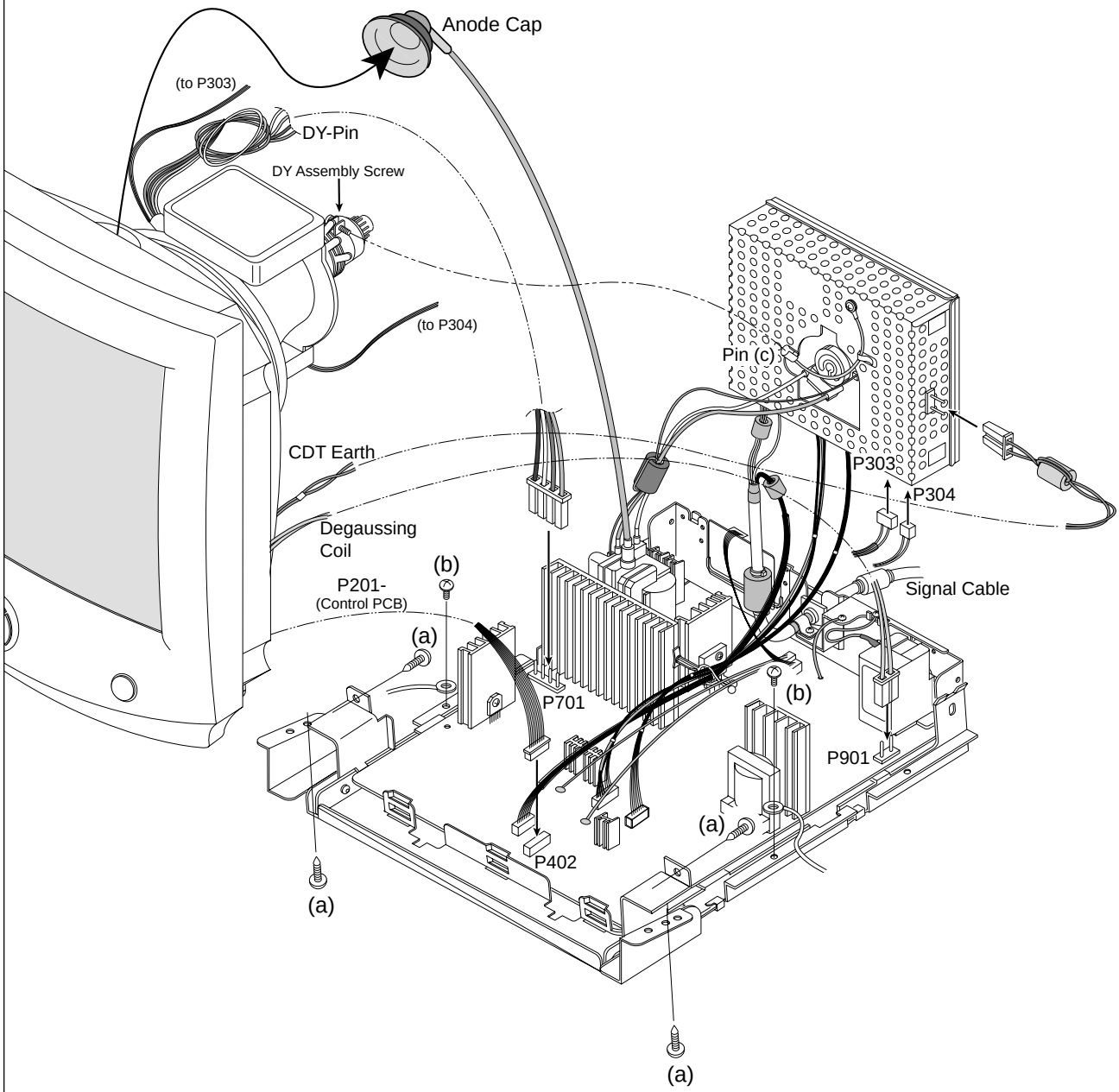
3. TOP SHIELD REMOVAL

1) Remove ten screws (a).



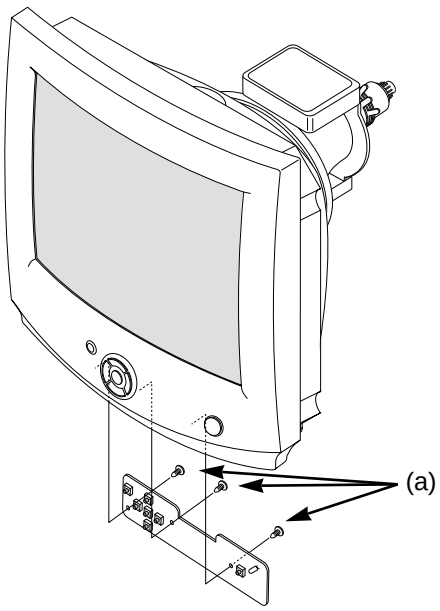
4. TOTAL CHASSIS ASSEMBLY REMOVAL

1) Disconnect P901 (Degaussing pin), P701 (DY pin) and P402 from the Main PCB.
2) Disconnect CDT Earth Pin, P303, P304 from the Video PCB, P910 from the USB PCB.
3) Disconnect Pin (c) from the DY Assembly screw.
4) Carefully separate the CDT Board Assembly from the CDT neck.
5) Discharge the remaining static electricity by shorting between the Anode Cap and the CDT ground.
6) Disconnect the Anode Cap from the CDT.
7) Remove four screws (a).
8) Remove two screws (b).
8) Remove the Front Cabinet and the Total Chassis Assembly from the Main Bracket.



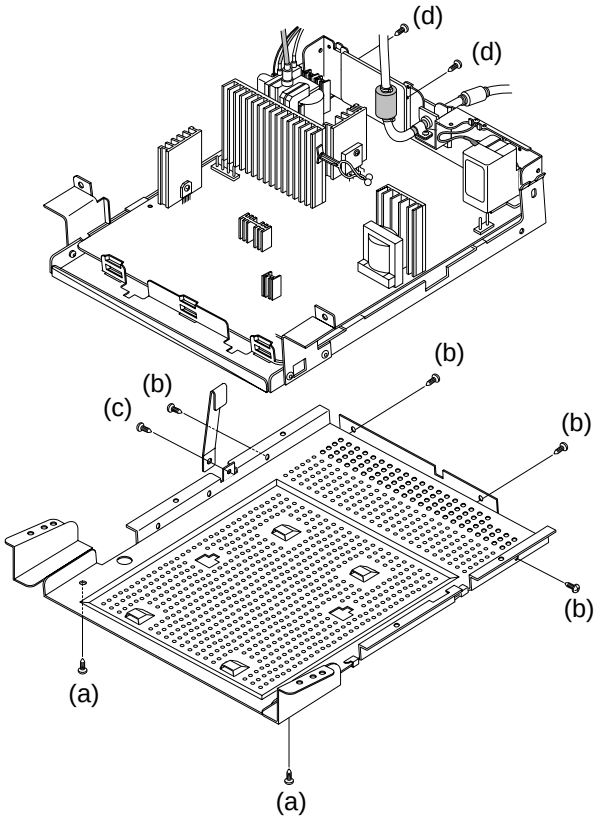
5. CONTROL PCB ASSEMBLY REMOVAL

1) Remove three screws (a).
2) Remove the Control PCB Assembly from the Front Cabinet.

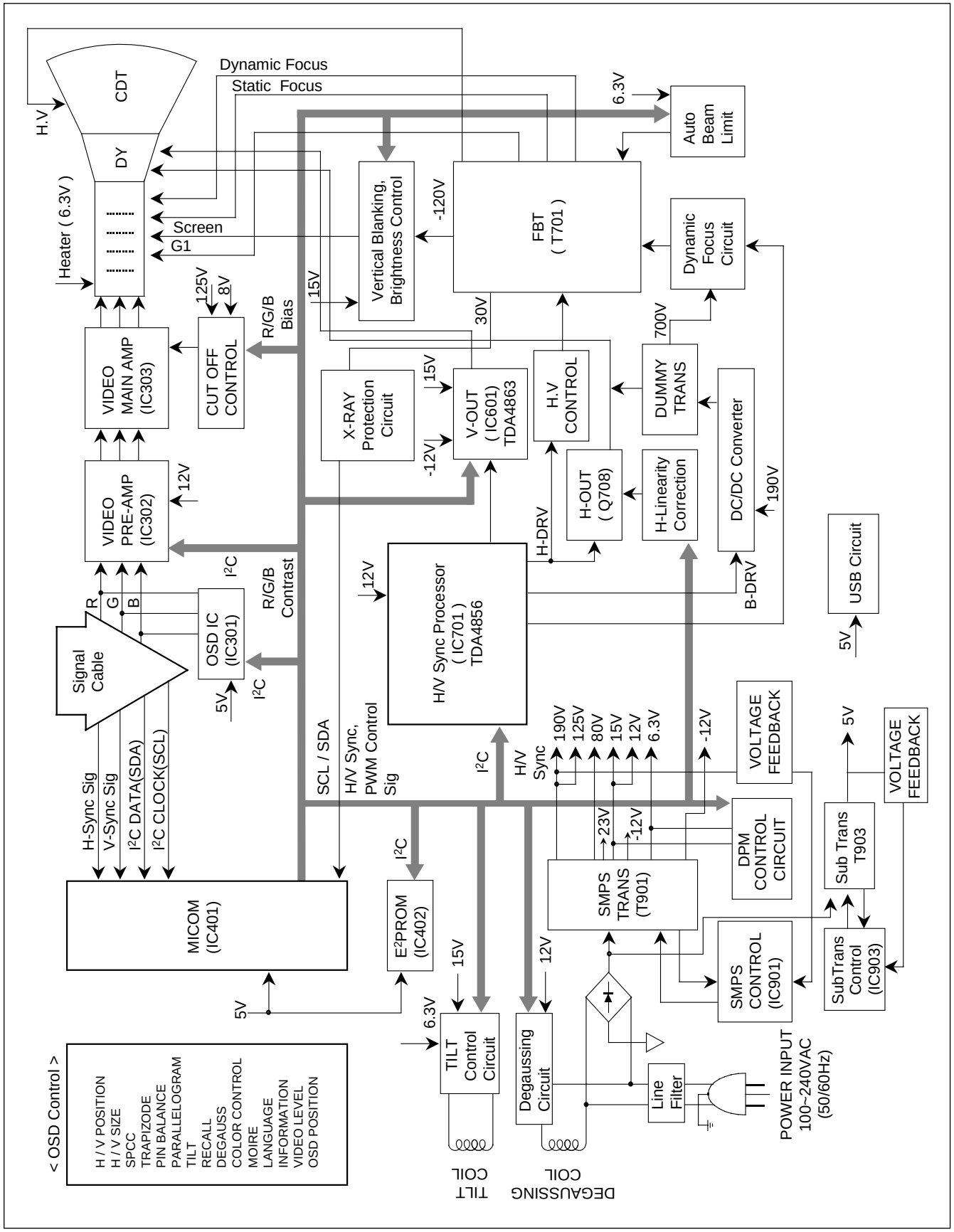


6. BOTTOM BRACKET REMOVAL

1) Remove two screws (a).
2) Remove four screws (b).
3) Remove screw (c) and Metal Fix.
4) Remove two screws (d).
5) Remove the Bottom Bracket.



BLOCK DIAGRAM



DESCRIPTION OF BLOCK DIAGRAM

1. Line Filter & Associated Circuit.

This is used for suppressing noise of power input line flowing into the monitor and/or some noise generated in this monitor flowing out through the power input line. That is to say, this circuit prevents interference between the monitor and other electric appliances.

2. Degauss Circuit & Coil.

The degauss circuit consists of the degaussing coil, the PTC (Positive Temperature Coefficient) thermistor (TH901), and the relay (RL901). This circuit eliminates abnormal color of the screen automatically by degaussing the slot mask in the CDT when turn on the power switch.
When you need to degauss while using the monitor, select DEGAUSS on the OSD menu.

3. SMPS (Switching Mode Power Supply).

This circuit works with power of 110-240Vac (50/60Hz).

The operation procedure is as follows:

1) AC input voltage is rectified and smoothed by the bridge diode (D901) and the capacitor (C907).
2) The rectified voltage (DC voltage) is applied to the primary coil of the transformer (T901).
3) The control IC (IC901) generates switching pulse to turn on and off the primary coil of the transformer (T901) repeatedly.
4) Depending on the turn ratio of the transformer, the secondary voltages appear at the secondary coil of the transformer (T901).
5) These secondary voltages are rectified by each diode (D906, D907, D908, D909, D910, D911, D912, D913) and operate the other circuits. (Deflection, Video Amplifier, etc.)

4. Display Power Management Circuit.

This circuit control power consumption of the monitor by detecting H and V sync signal. There are stand-by and suspend mode. When no horizontal or vertical sync signal input, the circuit consists of Q930 and Q907 becomes stand-by and suspend mode. It's power consumption is below 8W. When no horizontal and vertical sync signal input, it's power consumption is below 3W.

5. X-ray Protection.

This circuit detects the rectified DC voltage comes from the FBT pin 4. If the high voltage of the FBT reaches up to about 30kV (abnormal state), Micom(IC401) detects. It stops B^+ voltage supplied to the FBT (T701), and high voltage is not be generated, (In the normal state, the high voltage is about 26kV.)

6. Micom(Microprocessor) Circuit.

The operating procedure of Micom (Microprocessor) and its associated circuit is as follows:

1) H and V sync signal is supplied from Signal Cable to the Micom (IC401).
2) The Micom (IC401) distinguishes polarity and frequency of H and V sync.
3) The Micom controls each OSD function signals. (H-size, H-position, V-size, etc.)
4) The controlled data of each mode is stored in IC402. User can adjust screen condition by each OSD function. The data of the adjust screen condition is stored automatically.

7. Horizontal and Vertical Synchronous Processor.

This circuit generates the horizontal drive pulse and the vertical drive pulse by taking sync-signal from Signal Cable. This circuit consists of the TDA4856(IC701) and the associated circuit.

8. Oscillating Circuit for D/D Converter.

This circuit generates the pulse wave which has the horizontal period by taking the output of the TDA4856 (IC701).

9. D/D (DC to DC) Converter.

This circuit supplies DC voltage to the horizontal deflection output circuit by decreasing DC 190V which is the secondary voltage of the SMPS in accordance with the input horizontal sync signal.

10. Side-Pincushion Correcting Cirucit.

This circuit improves the Side-pincushion of the screen by mixing east-west wave to the output of the horizontal deflection D/D converter which is used for the supply voltage source (B^+) of the deflection circuit.

11. D/D Drive & Convert Circuit.

This circuit is used for supplying B^+ voltage to horizontal deflection output transistor (Q709). This circuit makes to add side-pincushion correcting signal to B^+ voltage.

12. Horizontal Deflection Output Circuit.

This circuit makes the horizontal deflection by supplying the saw-tooth current to the horizontal deflection yoke.

13. High Voltage Output & FBT (Flyback Transformer).

The high voltage output circuit is used for generating pulse wave to the primary coil of the FBT (Flyback Transformer (T701)). A boosted voltage (about 26kV) appears at the secondary of the FBT and it is supplied to the anode of the CDT.
And there are another output voltages such as the dynamic focus voltage.

14. H-Linearity Correction Circuit.

This circuit corrects the horizontal linearity for each horizontal sync frequency.

15. Vertical Output Circuit.

This circuit takes the vertical wave from the TDA4856 (IC701) and performs the vertical deflection by supplying the saw-tooth wave current from the TDA4863A (IC601) to the vertical deflection yoke.

17. Dynamic Focus Output Circuit.

This circuit takes H and V parabola wave from the TDA4856 (IC701), and amplifies these waves to offer to the FBT (T701).

18. H & V Blanking and Brightness Control.

This circuit eliminates the retrace line by supplying a negative pulse to the G1 of the CDT. The brightness control circuit is used to control of the screen brightness by changing the DC level of G1.

19. Image Rotation (Tilt) Circuit.

This circuit corrects the tilt of the screen by supplying the image rotation signal to the tilt coil which is attached to the CDT near the deflection.

20. Static Convergence Control Circuit.

This circuit corrects the convergence of the screen by supplying the convergence signal to the 4H (STC) coil which is attached to the CDT near the deflection.

21. Moiré Reduction Circuit

This circuit reduce interference between the periodical display pattern and the CDT's slot (or dot).
The positions of every other one dot video signal beams (red, green, and blue beam) are shifted finely, thus reducing interference.

22. OSD Circuit.

This circuit is used for performing the OSD (On-Screen- Display) function.
When a user selects the OSD Select/Adjustment control, the adjustment status displays on the screen.

23. Video Pre-Amp Circuit.

This circuit amplifies the analog video signal from 0-0.7V to 0-4V. This circuit is operated by taking the clamp, R, G, B drives, and contrast signals from the Micom (IC401).

24. Video Output Amp Circuit.

This circuit amplifies the video signal which comes from the video pre-amp circuit and amplified video signal is applied to the CDT cathode.

ADJUSTMENT

GENERAL INFORMATION

All adjustment are thoroughly checked and corrected when the monitor leaves the factory, but sometimes several adjustments may be required.
Adjustment should be following procedure and after warming up for a minimum of 30 minutes.

- Alignment appliances and tools.
  - IBM compatible PC.
  - Programmable Signal Generator.
    (eg. VG-819 made by Astrodesign Co.)
  - EPROM or EEPROM with saved each mode data.
  - Alignment Adaptor and Software.
  - Digital Voltmeter.
  - White Balance Meter.
  - Luminance Meter.
  - High-voltage Meter.

AUTOMATIC AND MANUAL DEGAUSSING

The degaussing coil is mounted around the CDT so that automatic degaussing when turn on the monitor. But a monitor is moved or faced in a different direction, become poor color purity cause of CDT magnetized, then press (DEGAUSSING) on the OSD menu.

ADJUSTMENT PROCEDURE & METHOD

- Install the cable for adjustment such as Figure 1and run the alignment program on the DOS for IBM compatible PC.
- Set external Brightness and Contrast volume to max position.

1. Adjustment for B^+ Voltage.

1) Display cross hatch pattern at Mode 4.
2) Adjust C913 (+) voltage to 190V ± 0.5V with **VR901**.

2. Adjustment for High-Voltage.

1) Display cross hatch pattern at Mode 4.
2) Adjust CDT Anode voltage to 26kV ± 0.2kV with **VR701**.

3. Adjustment for Factory Mode (Preset Mode).

1) Display cross hatch pattern at Mode 4.
2) Run alignment program for CB995CU on the IBM compatible PC.
3) EEPROM → ALL CLEAR → Y(Yes) command.
4) COMMAND → PRESET START → Y(Yes) command.
5) DIST. ADJ. → BALANCE command.
6) Adjust tilt as arrow keys to be the best condition.
7) Adjust balance of side-pincushion as arrow keys to be the best condition.
8) Adjust parallelogram as arrow keys to be the best condition.
9) DIST. ADJ. → FOS1. ADJ command.
10) Adjust H-POSITION as arrow keys to center of the screen.
11) Adjust H-SIZE as arrow keys to 350 ± 2mm.
12) Adjust V-POSITION as arrow keys to center of the screen.
13) Adjust V-SIZE as arrow keys to 262 ± 2mm.
14) DIST. ADJ. → FOS2. ADJ command.
15) Adjust SIDE-PIN (Side-Pincushion) as arrow keys to be the best condition.
16) Adjust TRAPEZOID as arrow keys to be the best condition.
19) Display from Mode 2 to Mode 5 and repeat above from number 9) to 16).
21) COMMAND → PRESET EXIT → Y (Yes) command.

5. Adjustment for White Balance and Luminance.

1) Set the White Balance Meter.
2) Press the (DEGAUSSING) on the OSD menu for demagnetization of the CDT.
3) Display color 0,0 pattern at Mode 4.
4) COLOR ADJ. → LUMINANCE command of the alignment program.
5) Set OSD Brightness and Contrast data to max data.
6) COLOR ADJ. → BIAS ADJ. command of the alignment program.
7) Check whether blue color or not at R-BIAS and G-BIAS to min position and B-BIAS to 130 (decimal) position. If it's not blue color, the monitor must repair.
8) Adjust Screen control on the FBT to 0.1 ± 0.02FL of the raster luminance.
9) Adjust R-BIAS and G-BIAS command to x=0.283 ± 0.006 and y=0.298 ± 0.006 on the White Balance Meter with PC arrow keys.
10) Adjust SUB-Brightness command to 0.40 ± 0.05FL of the raster luminance.
11) Display color 15,0 box pattern(70x70mm) at mode 4.
12) Set Brightness and Contrast to max.
13) DRIVE ADJ command.
14) Set B-DRIVE to 150(decimal) at DRIVE of the alignment program.
15) Adjust R-DRIVE and G-DRIVE command to white balance x=0.283 ± 0.003 and y=0.298 ± 0.003 on the White Balance Meter with PC arrow keys.

16) Adjust SUB-CONTRAST command to 47 ± 1FL of the color 15,0 box pattern (70x70mm) luminance at Mode 8.
17) Display color 15,0 full white patten at Mode 4.
18) COLOR ADJ. → LUMINANCE → ABL command.
19) Adjust ABL to 32 ± 1FL of the luminance.
20) Exit from the program.

6. Adjustment for Focus.

1) Set the Brightness and Contrast to max.
2) Display H character in full screen at Mode 4.
3) Adjust two Focus control on the FBT that focus should be the best condition.

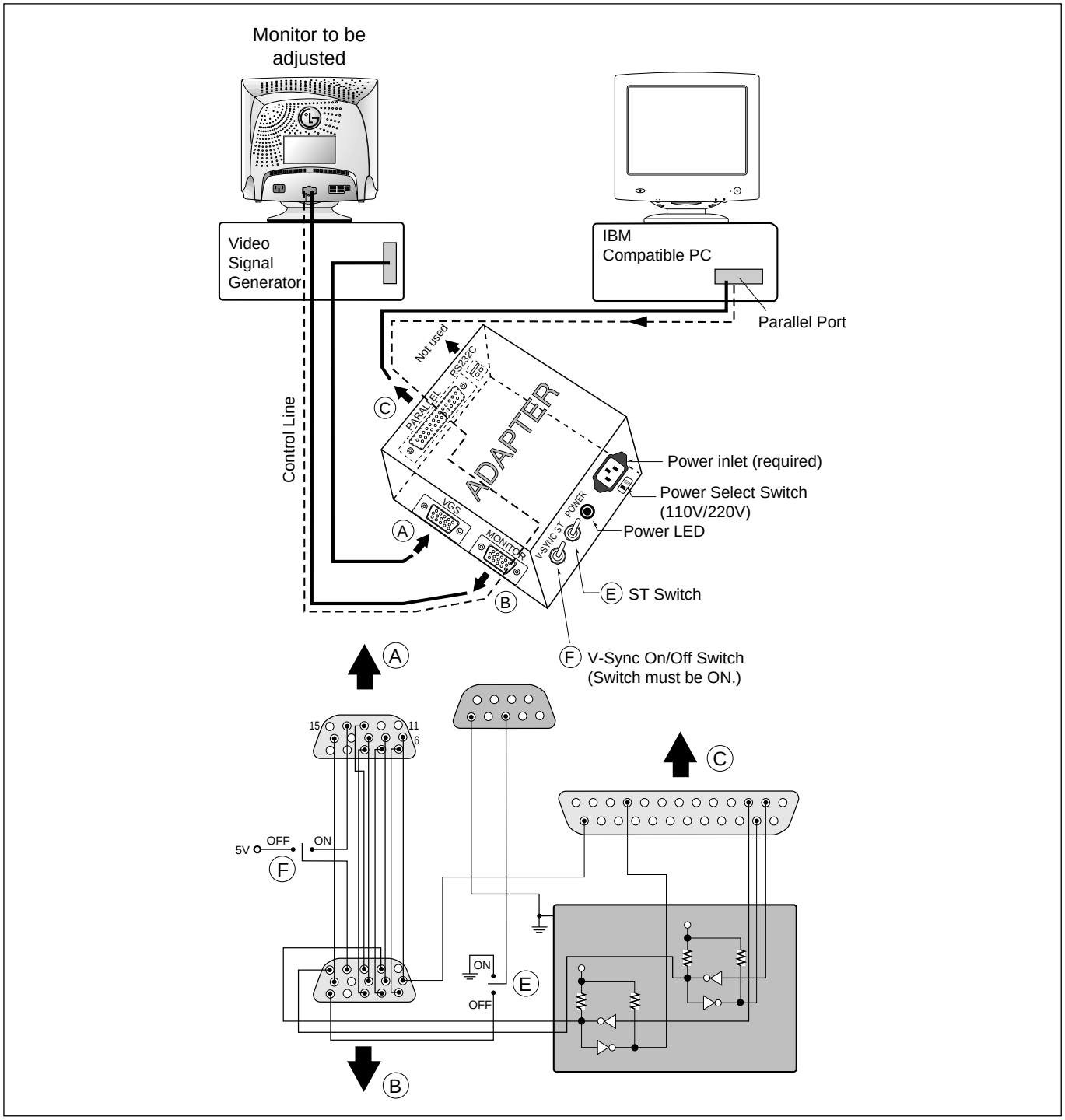
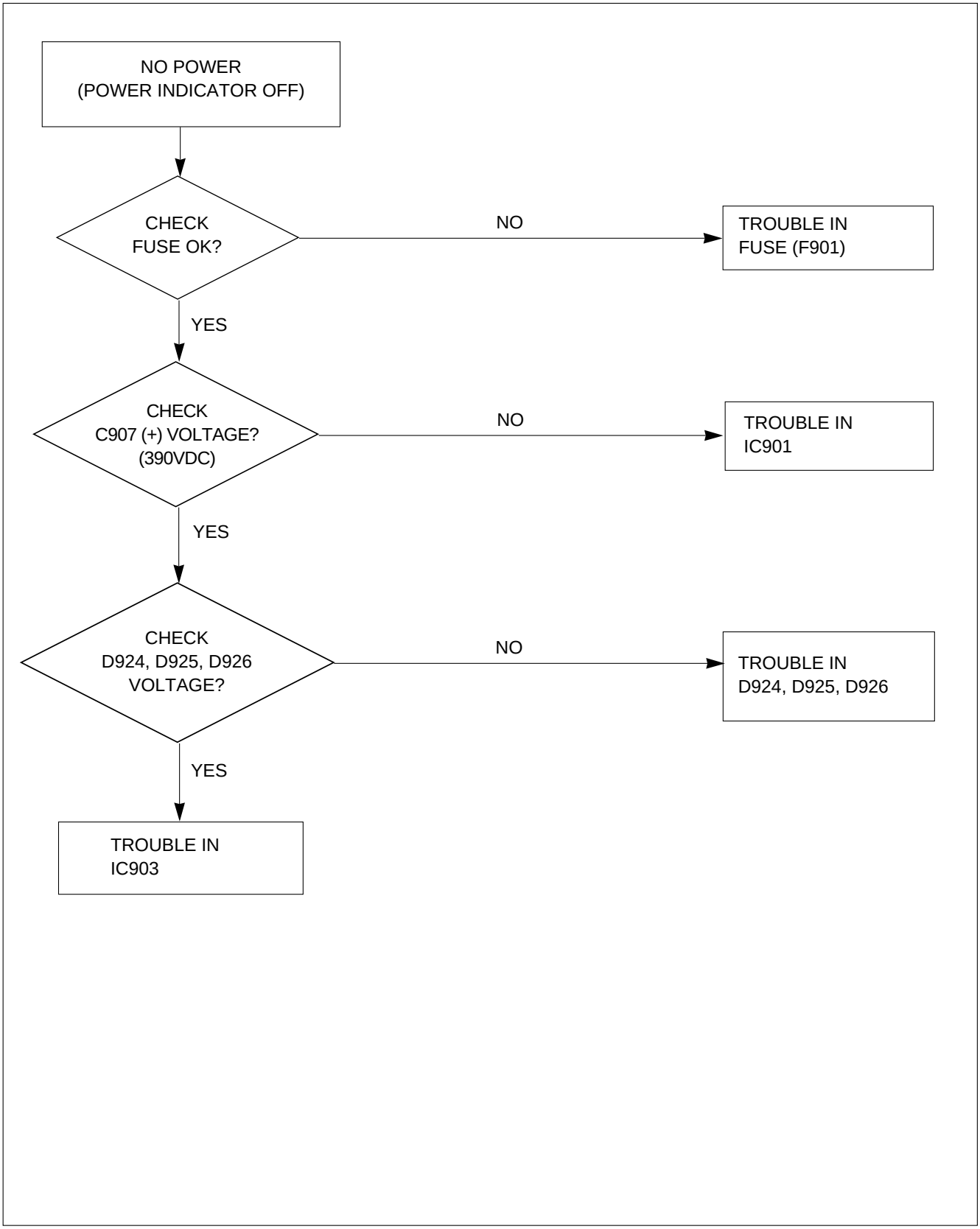


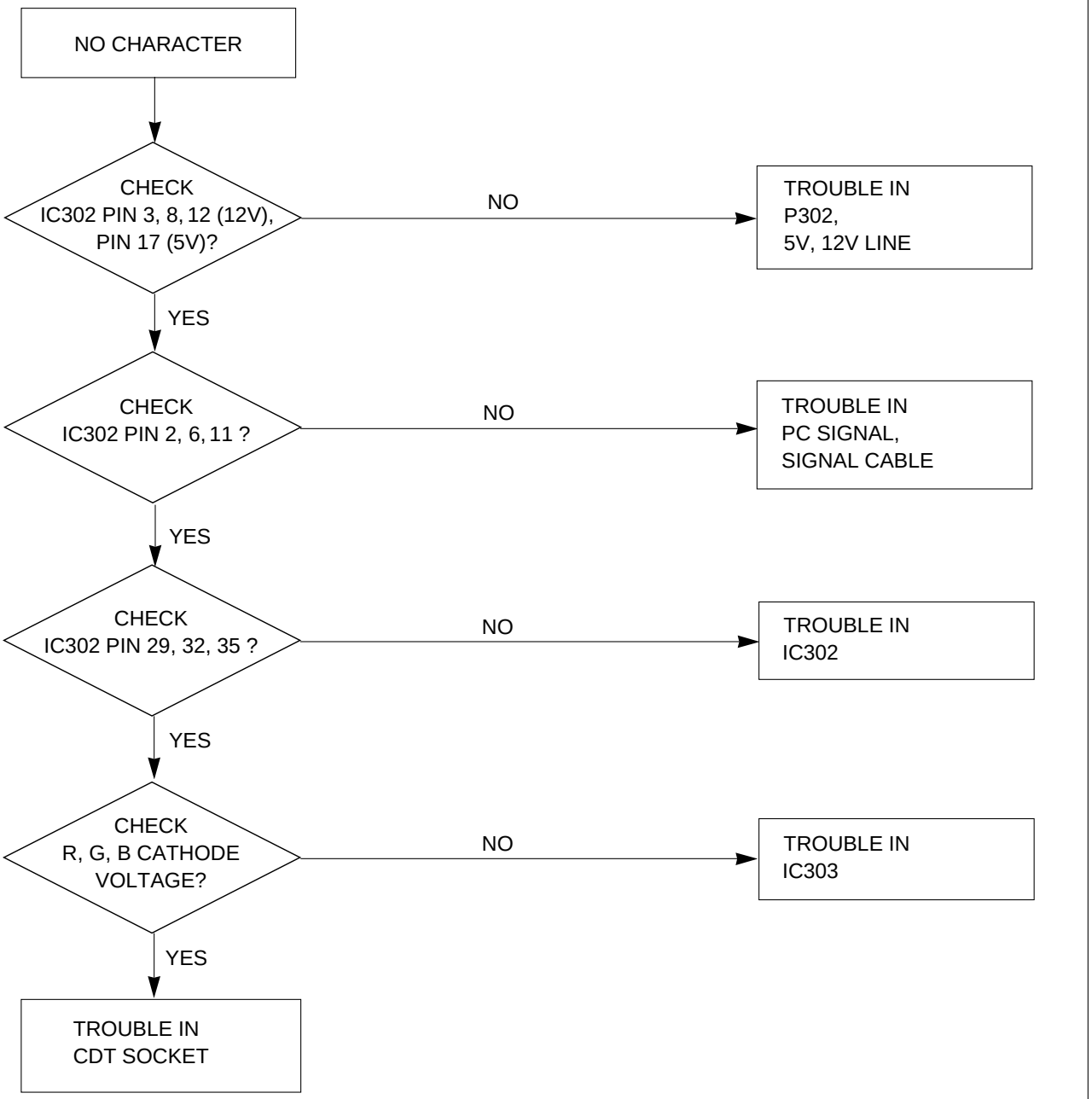
Figure 1. Cable Connection

TROUBLESHOOTING GUIDE

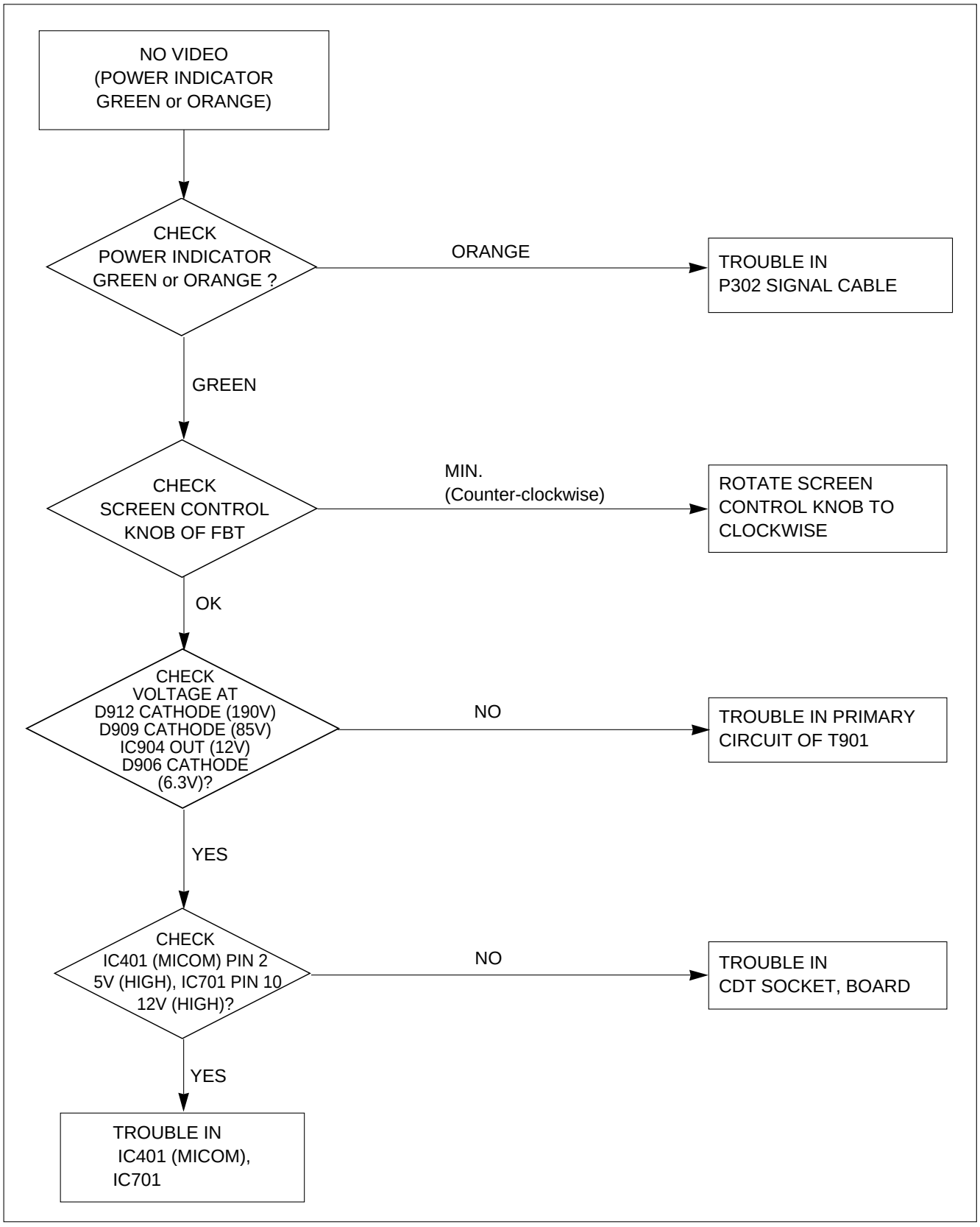
1. NO POWER



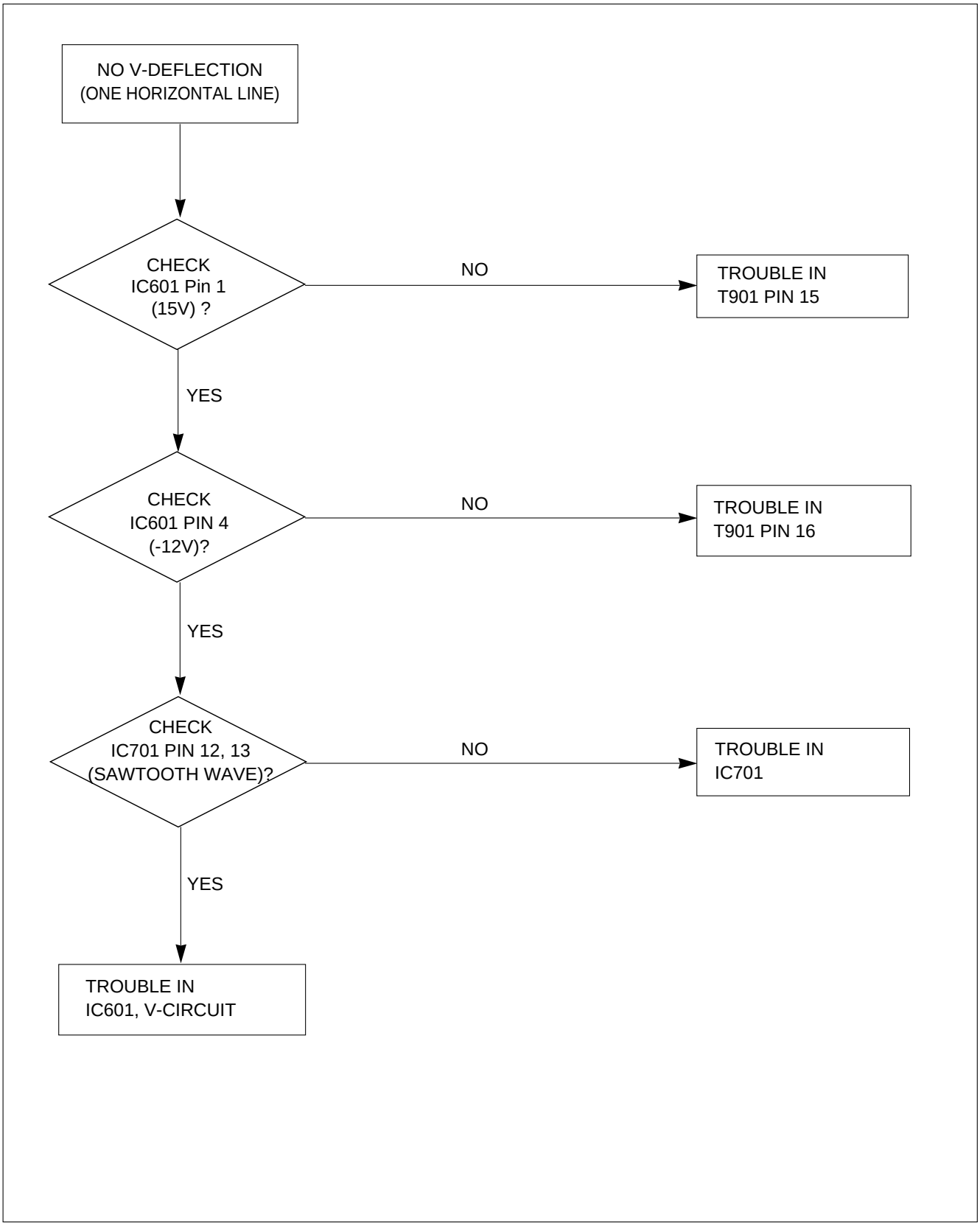
2. NO CHARACTER



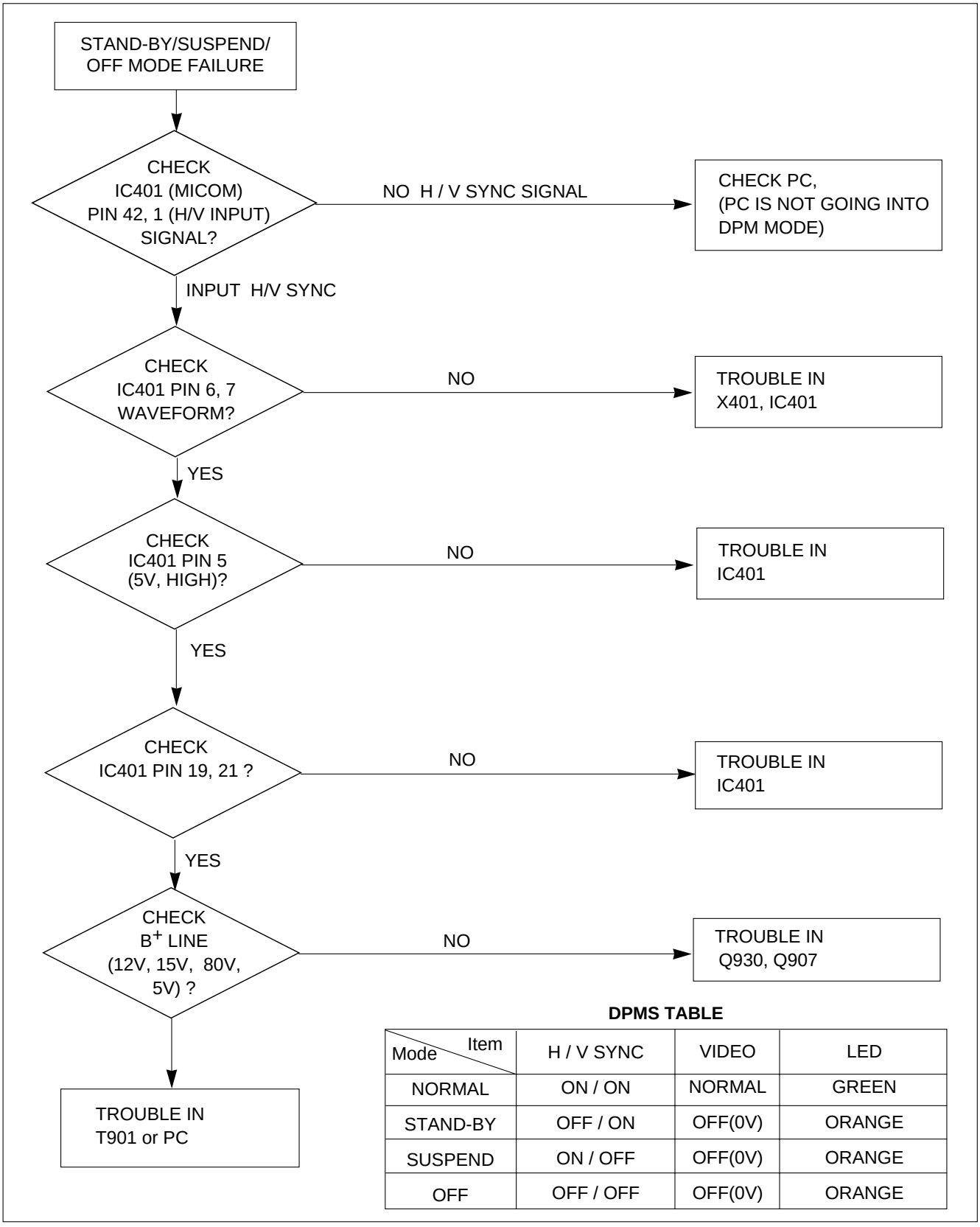
3. NO RASTER


NO VIDEO
(POWER INDICATOR
GREEN or ORANGE)
CHECK
POWER INDICATOR
GREEN or ORANGE ?
ORANGE
TROUBLE IN
P302 SIGNAL CABLE
GREEN
CHECK
SCREEN CONTROL
KNOB OF FBT
MIN.
(Counter-clockwise)
ROTATE SCREEN
CONTROL KNOB TO
CLOCKWISE
OK
CHECK
VOLTAGE AT
D912 CATHODE (190V)
D909 CATHODE (85V)
IC904 OUT (12V)
D906 CATHODE
(6.3V)?
NO
TROUBLE IN PRIMARY
CIRCUIT OF T901
YES
CHECK
IC401 (MICOM) PIN 2
5V (HIGH), IC701 PIN 10
12V (HIGH)?
NO
TROUBLE IN
CDT SOCKET, BOARD
YES
TROUBLE IN
IC401 (MICOM),
IC701

4. NO VERTICAL DEFLECTION



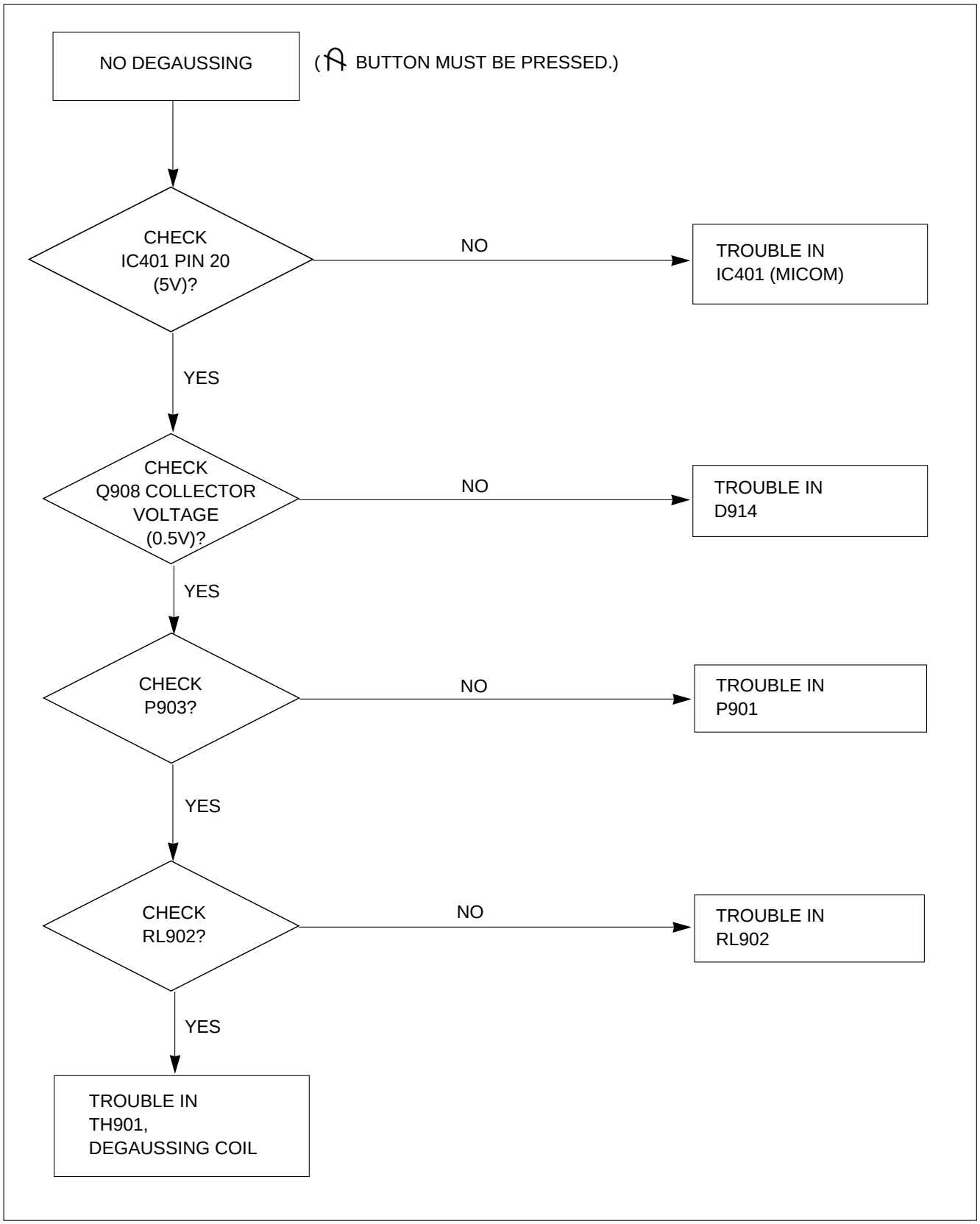
5. TROUBLE IN DPM



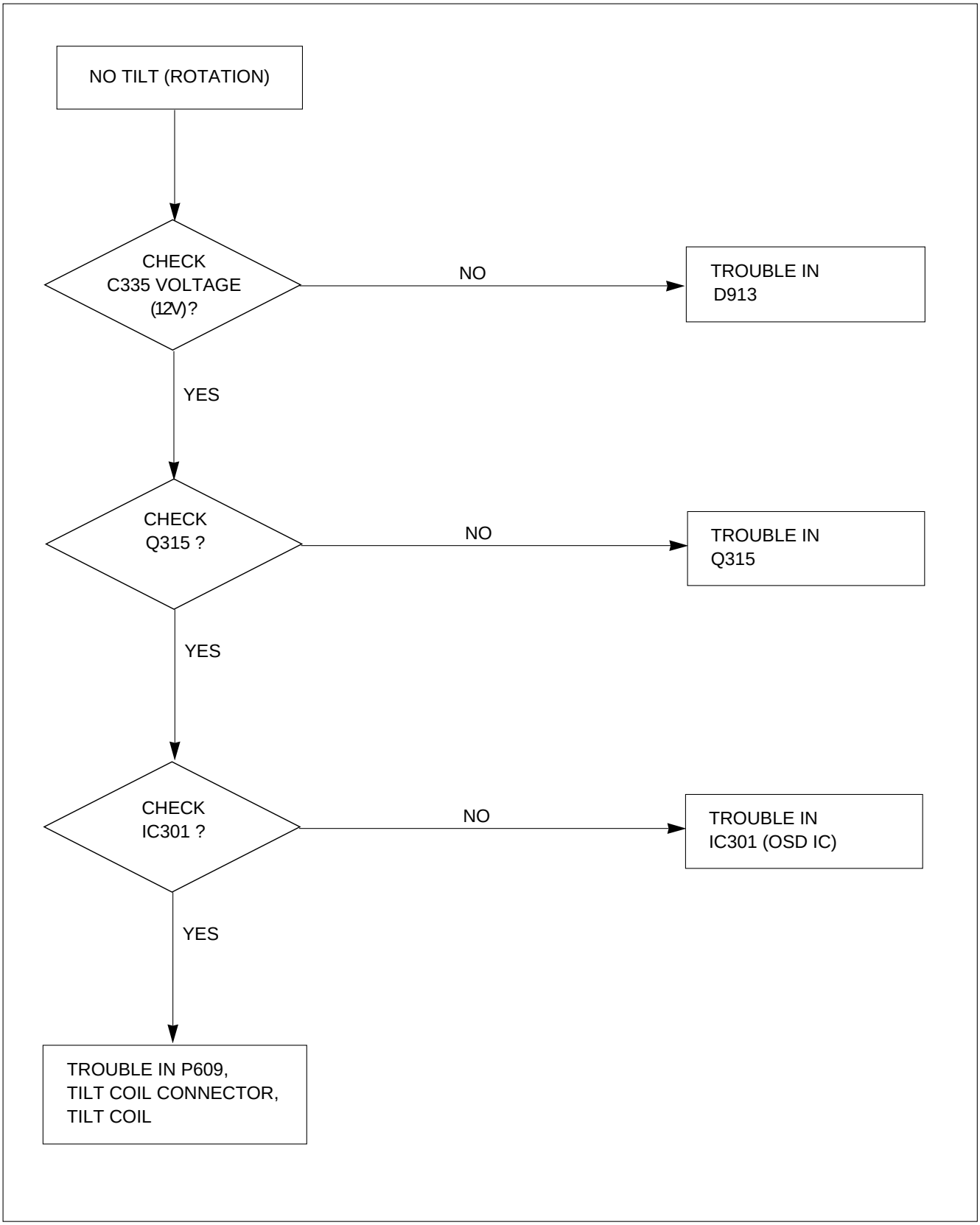
DPMS TABLE

Mode \ Item	H / V SYNC	VIDEO	LED
NORMAL	ON / ON	NORMAL	GREEN
STAND-BY	OFF / ON	OFF(0V)	ORANGE
SUSPEND	ON / OFF	OFF(0V)	ORANGE
OFF	OFF / OFF	OFF(0V)	ORANGE

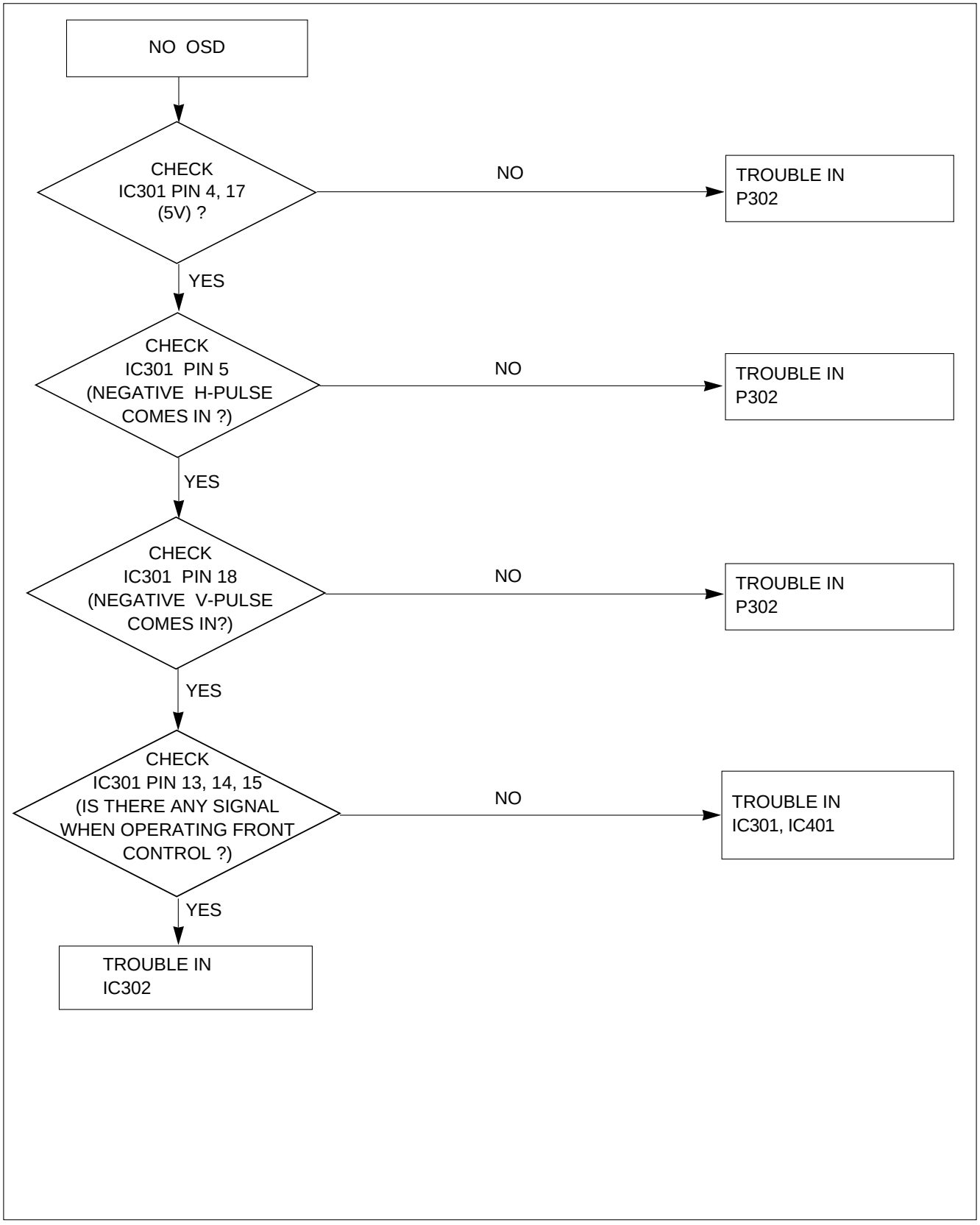
6. NO DEGAUSSING



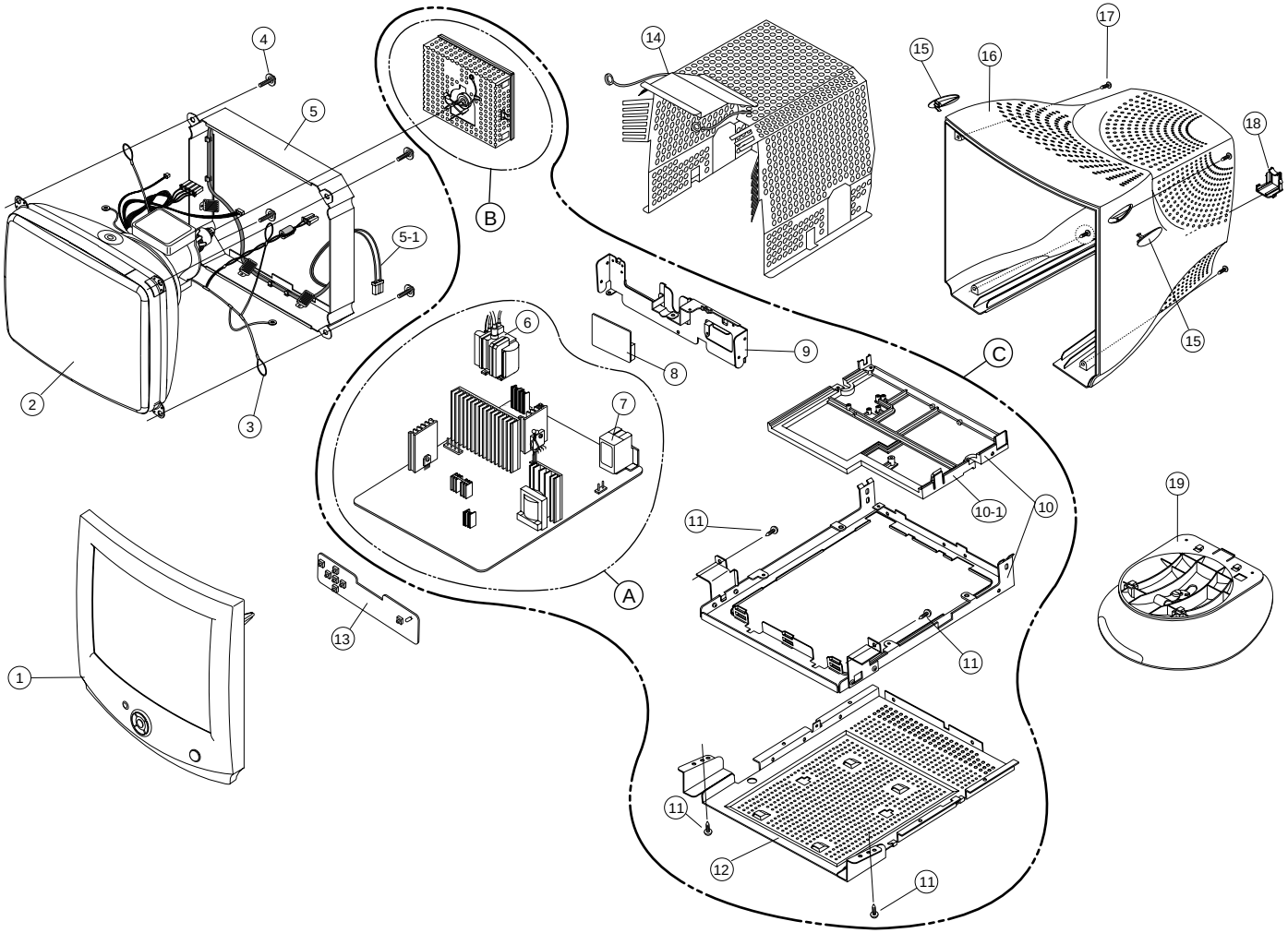
7. NO TILT (ROTATION)



8. TROUBLE IN OSD



EXPLODED VIEW

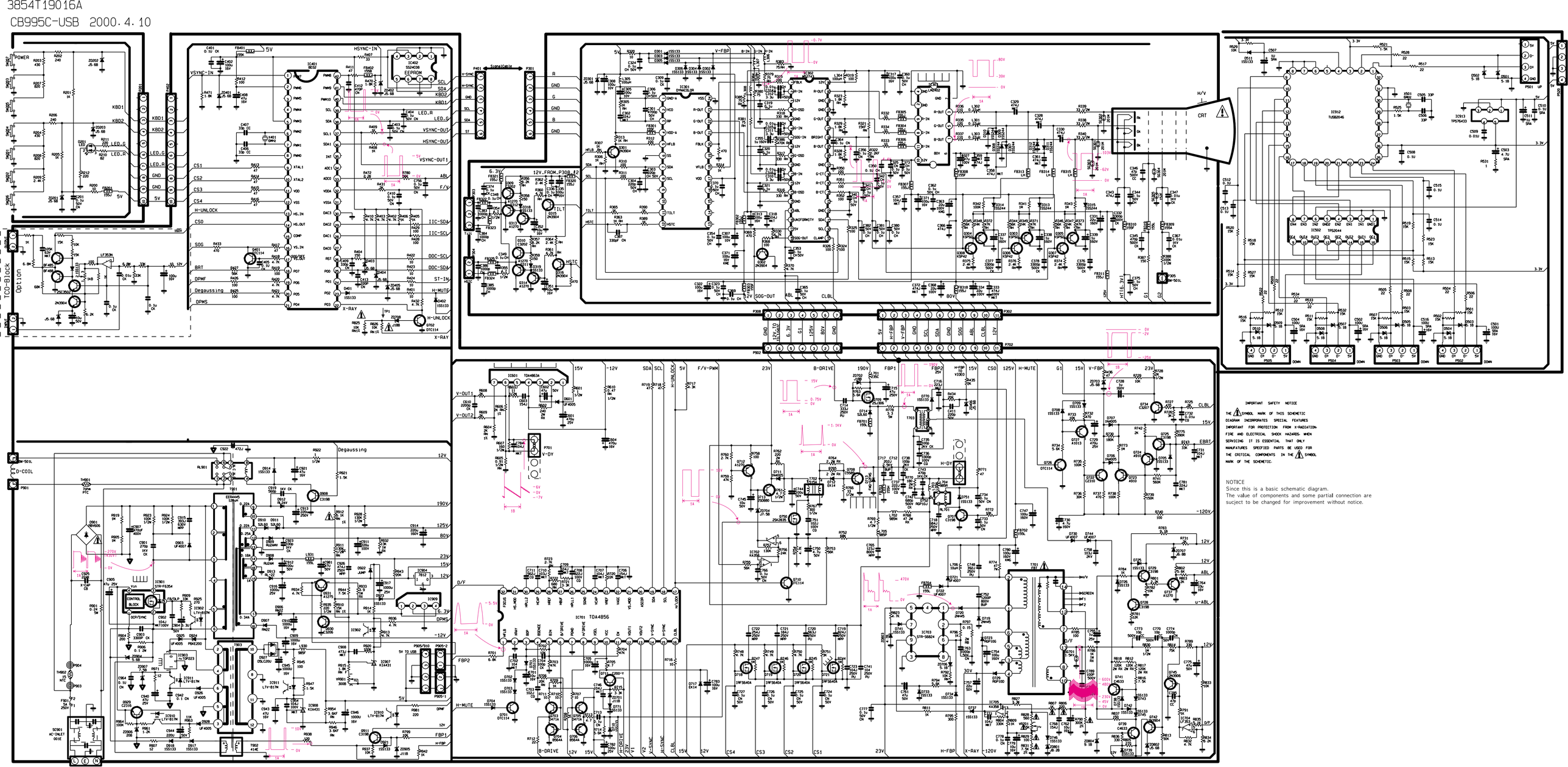


EXPLODED VIEW PARTS LIST

Ref. No.	Part No.	Description	Q'ty	Material
1	3091TKC038A	CABINET ASS'Y	1	LGC AF345-12446B
2	2423GG2E91S	CDT, M46QCG913X 02NPUD	1	
3	6868T19001C	CDT EARTH	1	
4	339-002H	SCREW ASS'Y, PHP+5x20+GW18	4	
5	4951TKS045D	METAL FRAME ASS'Y	1	
5-1	6140TC2006A	DEGAUSSING COIL	1	
6	6174Z-1018E	FBT, FMMTC61-M1018E	1	
7	6200TJB001E	AC SOCKET	1	
8	6871TUT005B	PCB ASS'Y, USB TOTAL	1	
9	4951TKK028A	SHIELD, REAR BRACKET	1	
10	4951TKS030E	METAL ASS'Y, SHIELD	1	
10-1	4810TKM027D	MAIN BRACKET	1	LGC GN5001TF UL94-5V
11	332-102C	SCREW, PVS+4x12	4	
12	4951TKK015B	METAL ASS'Y, FRAME BOTTOM	1	
13	6871TST120A	CONTROL PCB ASS'Y	1	
14	4815TKT010D	TOP SHIELD ASS'Y	1	SPTE-C (t=0.5)
15	3550TKK069A	SCREW COVER	2	LGC AF345-12446B
16	3809TKC020H	BACK COVER ASS'Y	1	LGC AF345-12446B
17	332-102J	SCREW, PTP+4x20	4	
18	4810TKK116A	BRACKET, SIGNAL CABLE HOLDER	1	
19	3043TKK046B	TILT SWIVEL ASS'Y	1	LGC HIPS 60HR UL94-HB
A	6871TMT167B	MAIN PCB ASS'Y	1	
B	6871TVT111A	VIDEO PCB ASS'Y	1	
C	3313T19021B	CHASSIS TOTAL ASS'Y	1	

3854T19016A

CB995C-USB 2000.4.10



IMPORTANT SAFETY NOTICE

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION FIRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IT IS ESSENTIAL THAT ONLY MANUFATURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

NOTICE

Since this is a basic schematic diagram.
The value of components and some partial connection are
sucject to be changed for improvement without notice.