Panasonic Service and Technology Company

Technical Guide

103” Plasma Display Monitor

National Training

Panasonic Service and Technology Company

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National Training

Warning

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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Specifications

Specifications	
Power Source	240 V AC, 50 / 60Hz
Power Consumption	1,500 W
Plasma Display panel	Drive method: AC type 103-inch, 16:9 aspect ratio
Screen size	89.5” (2,269 mm) (W) × 50.5” (1,277 mm) (H) × 103” (2,604 mm) (diagonal)
Mass (weight)	Approx. 500.0 lbs unpacked, 1000lbs Crated
	280 lbs for Pedestal mount, 55 lbs for wall mount
Resolution	1,920 horizontal x 1,080 vertical (1080P)
Contrast ratio	4000:1
Gradation	16-bit processing to produce 4,096 steps of gradation
Signal Type	1080/60p/50p, 1080/50i, 720/60p/50p, 480/60i/p, and 575/50i/p video signals
Slots	Three interchangeable slots

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Preparation of Installation using Pedestal Stand

Pedestal Stand (TY-ST103PF9)

1) The power source is to be 240V – 1550W
2) Floor strength is to be more than 500kg/m^2 (102.408lb/ft^2). To avoid damaging the floor, prepare an underlay board, more than 15mm (0.6”) thick and larger than the size of the bottom stand to disperse load.
3) To prevent personal injury or damage on goods, the following measures must be taken.
   * (1) Secure the Plasma by anchoring
   * (2) Secure the Plasma to the wall by wires or chains. (against toppling)
   * (3) (1)+(2) both

   Keep the earthquake-resistance strength and right construction procedure.
4) Prepare two fixing points at the wall or building structure to prevent toppling.
   (M10 anchor bolt, more than 45mm (2”) depth)
5) Prepare four fixing points for anchor bolts.
   (M12 anchor bolt, more than 60mm (2.4”) depth)
6) Keep more than 300mm (11.8”) of open space from the top and both sides of the unit. Keep more than 200mm (8”) from the rear cover of the Plasma for heat release.
7) For safety, more than 4 persons are recommended to do the work.
8) Prepare blankets or any soft fabric to prevent damaging the Plasma or the wall/floor during this installation work.
9) The Plasma Monitor weighs 220kg (500lbs) and the Pedestal Stand 122kg (280lbs). To perform the installation, a hanging appliance or machine (such as Chain-block) is recommended.
10) Be careful not to tighten the bolts/screws too much or too little.
11) Perform the installation on a flat surface and follow the instruction of the manual.

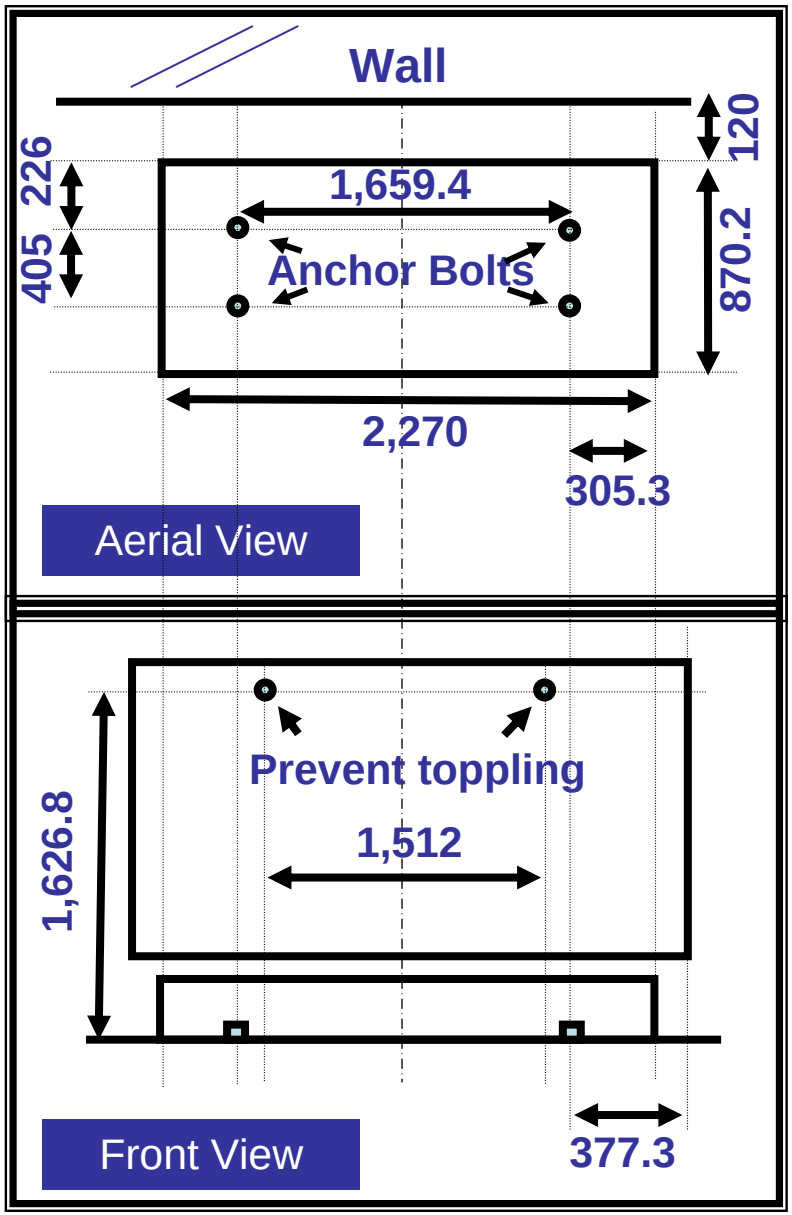
Electrical Work

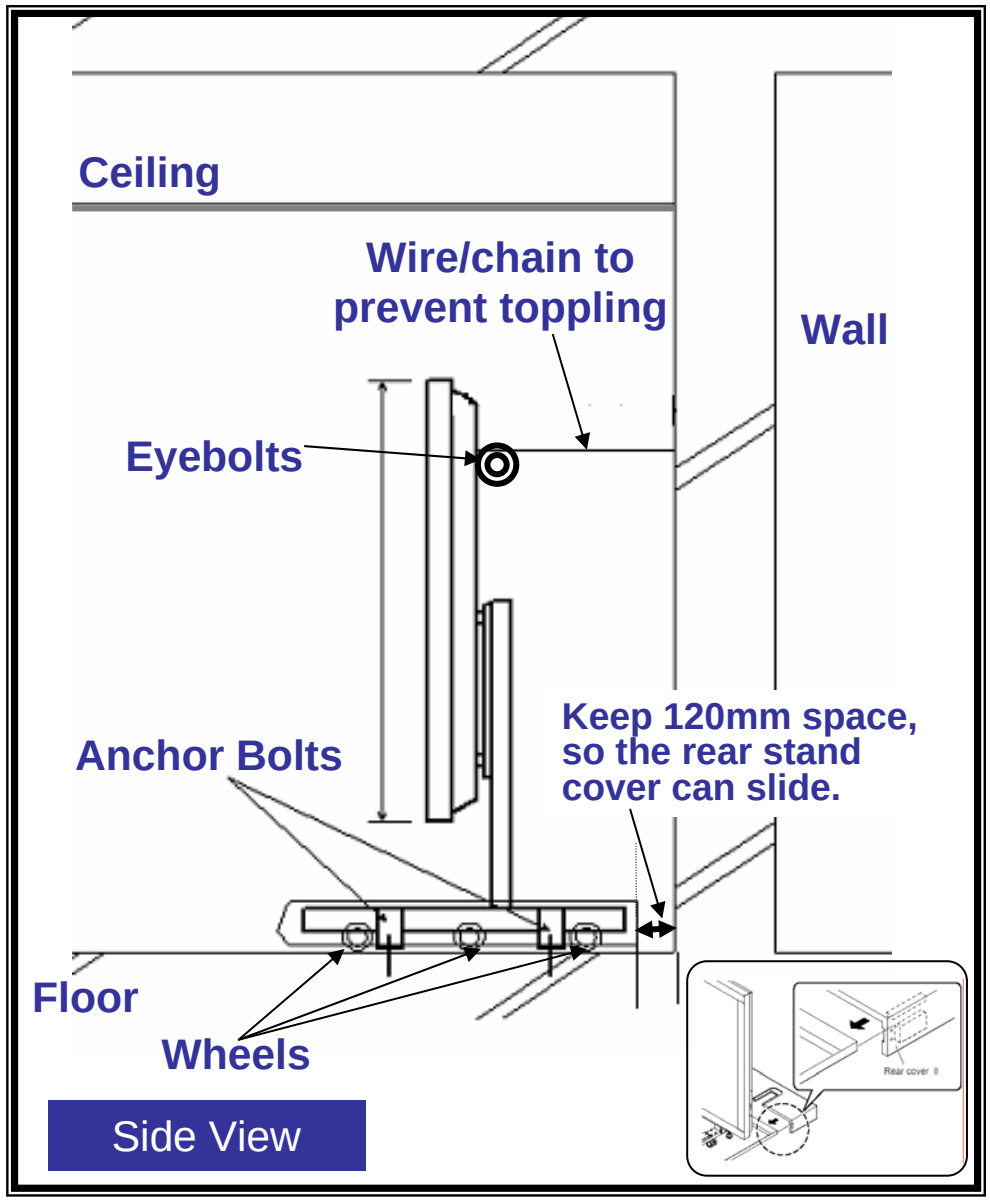
1) The power source for this plasma monitor is 240V-1550W.
   Confirm that the source voltage is of the right level and capacity before installation.
   (Electrical Work requires a licensed electrician)
2) The prepackaged power cable is 3m length.
3) Confirm the location of the power cord.
   Do not allow the cable to be pinched between walls, forcedly bent, or twisted. The wires within the cable should not be exposed or short-circuited to avoid possible electrification and the start of a fire.
4) Separate the signal cables from the power cord.

AC cord (included as an accessory)

Plug: Volex VS205A **(NEMA 6-15P)**

Drawing of Installation with Pedestal Stand





Pictures of Installation with Pedestal Stand (1)

Lifting devices must have enough strength to handle the load.

Installing 103 plasma on the wall-hanging bracket using a chain-block with stand.

Pictures of Installation with Pedestal Stand (2)

Switches (Power etc.)

Eyebolt (top)

Ir receiver & LED indicator

Pictures of Plasma unit and Eye bolts)

Slot (Interchangeable terminal)

Pictures of Eyebolt Cap unit and Power Inlet)

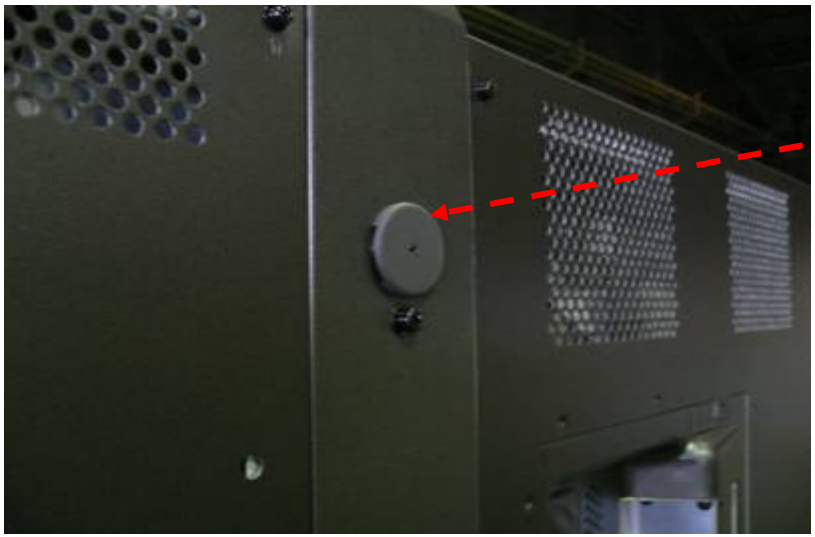
Eyebolt cap (side)

Power inlet

Pictures of Stand Hook and Location for Eyebolt

Stand-hook

Stand-hook position for Pedestal
(default)

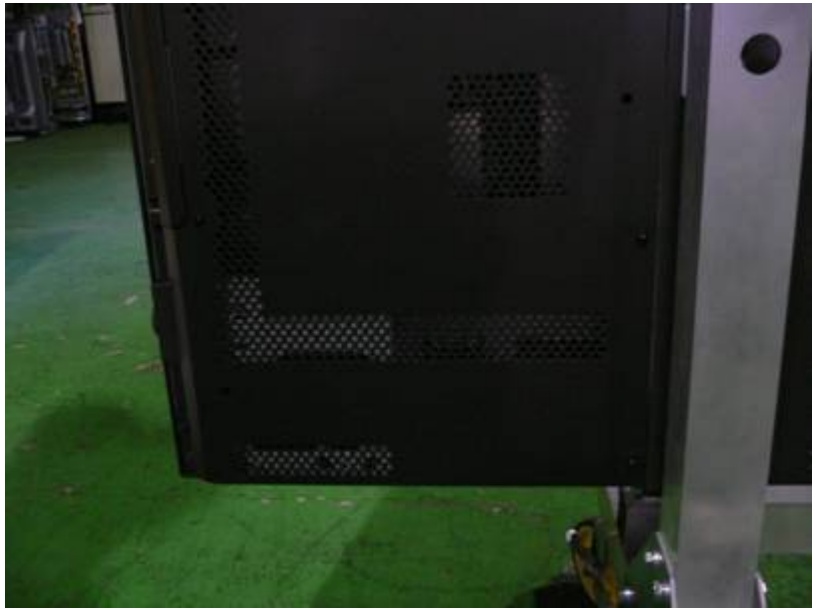


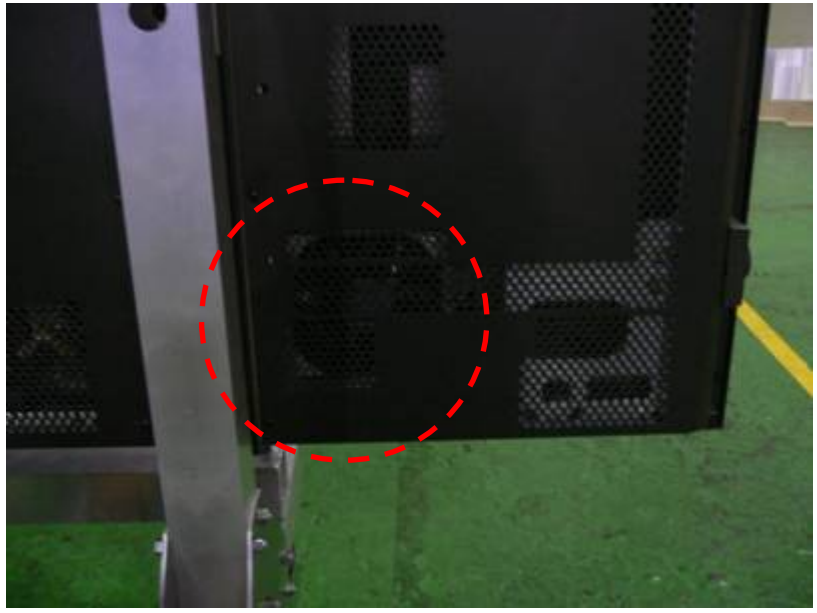
Eyebolt can be fixed here

Stand-hook position for wall-hanging / anti-toppling
(default : sealed by eyebolt cap)

Rear Panel and Vertical Installation

Rear panel



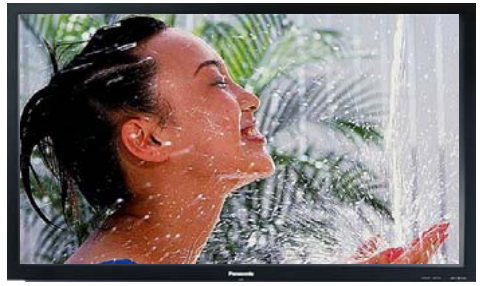


This side will be the upper side when the unit is Installed vertically
(with exhaust fan)

Wall Mount Installation

Wall Mount Installation

Pedestal Stand (TY-ST103PF9)



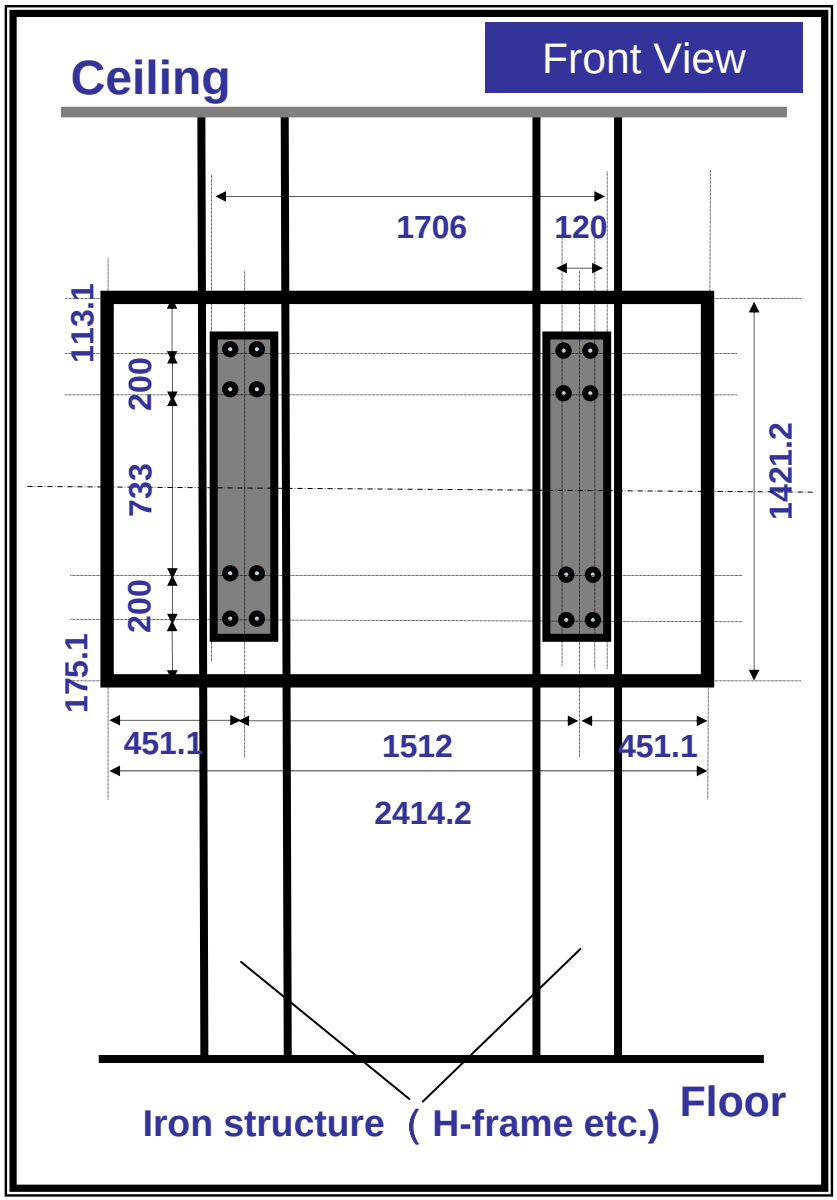
Horizontal Installation

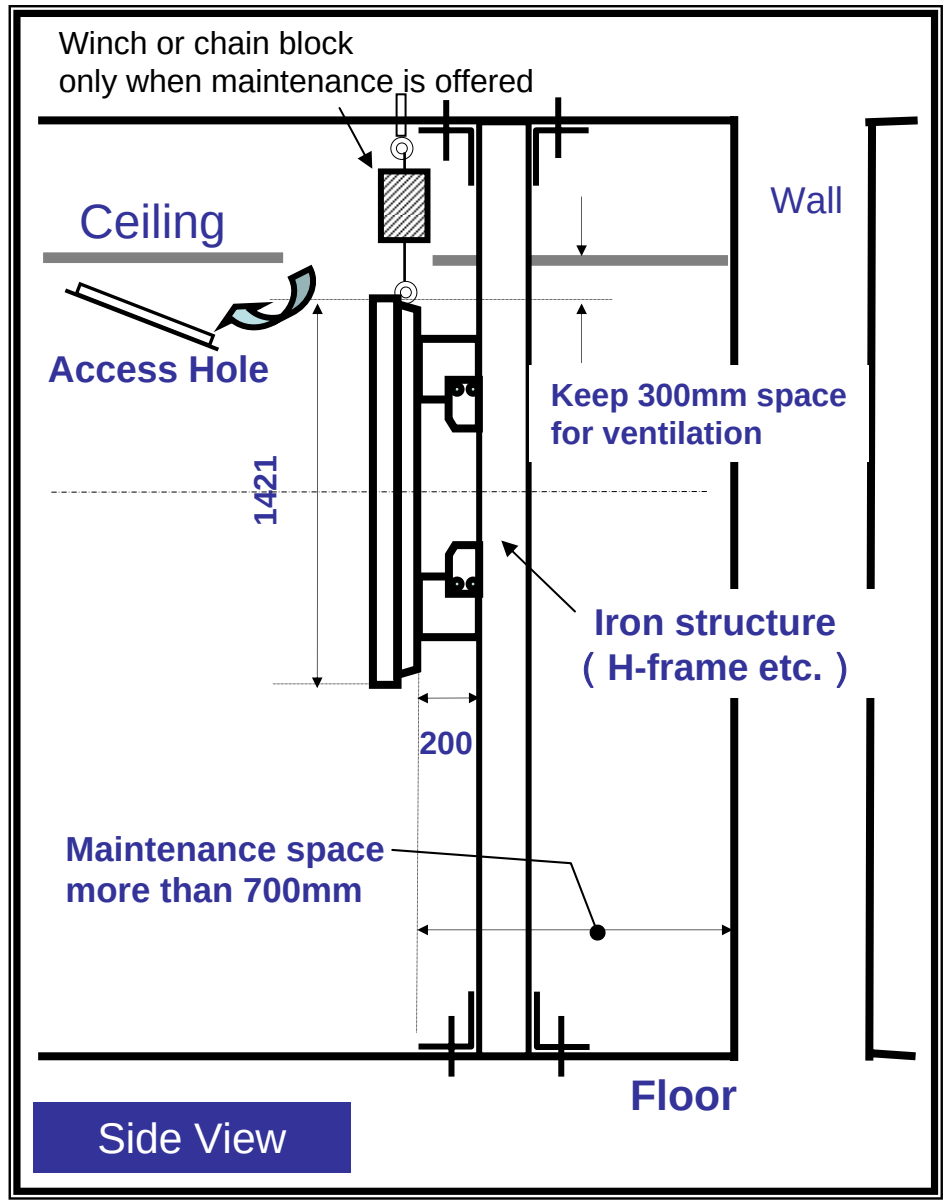
Vertical Installation

Preparation

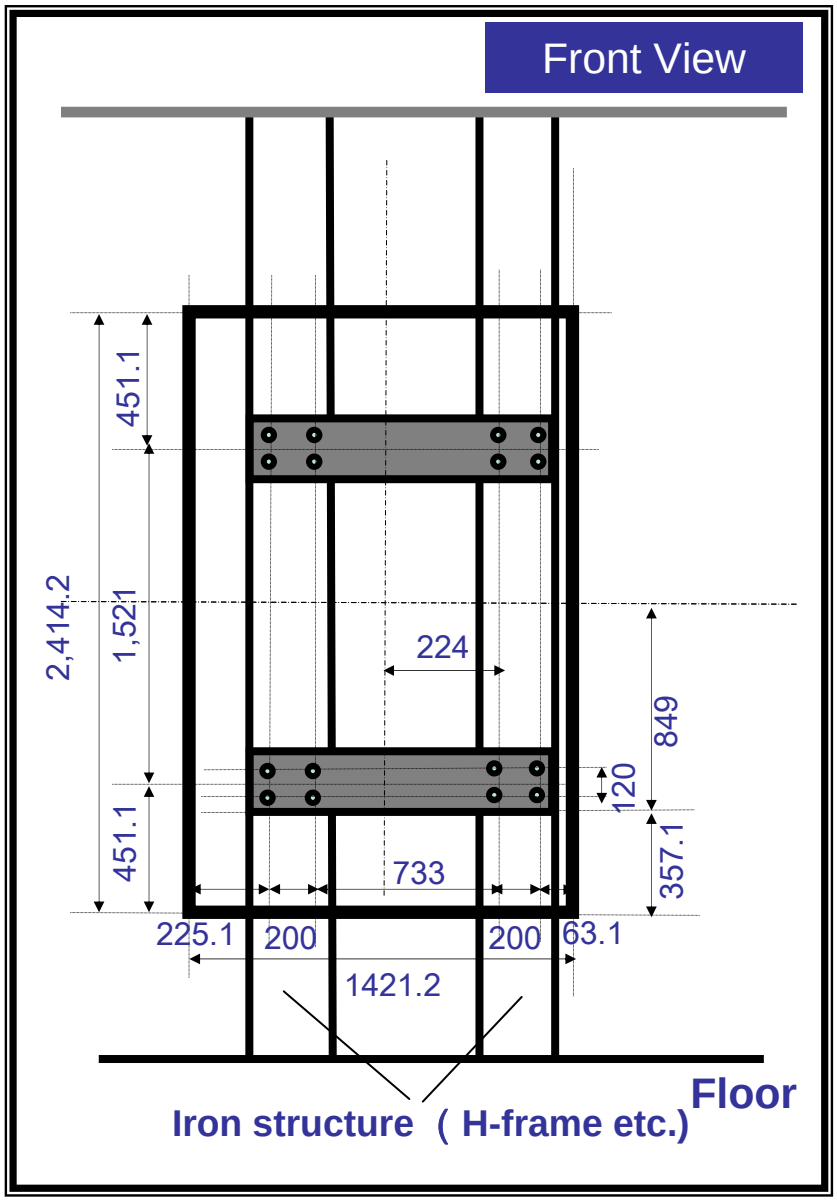
1) Power requirement is 240V-1550W. (refer : “Electrical Work”)
2) Keep more than 300mm of empty space from the top and both sides of the unit. Keep more than 200mm from the rear cover of the Plasma to maintain the ambient temperature at 40 degree C or less. Moreover, it is recommended to keep more than 700mm maintenance space at the backside.
3) Do not install the Plasma monitor in an environment that may cause troubles and problems to its performance.
   - near the sprinkler and any sensor
   - where it could receive vibration and shock
   - near a high voltage cable and power source
   - near a source that provides magnetic field, heat, moisture, oily smoke, etc.
   - where it can receive the air (exhaust) of a fan or a heater (to prevent dust accumulation)
4) Use appropriate construction methods to select the materials for the construction of the installation structure.
5) For wall fixing, use M12 x 80mm bolt (or equivalent, commercially available) which is appropriate to the construction materials (reinforcing steel, concrete and etc.)
7) Tolerance ;
   - Wall surface irregularity : 1.5mm
   - Pitch tolerance > horizontal installation : +/-1.0mm left/right, +/- 2.0mm top/bottom
     > vertical installation : +/-2.0mm left/right, +/- 1.0mm top/bottom

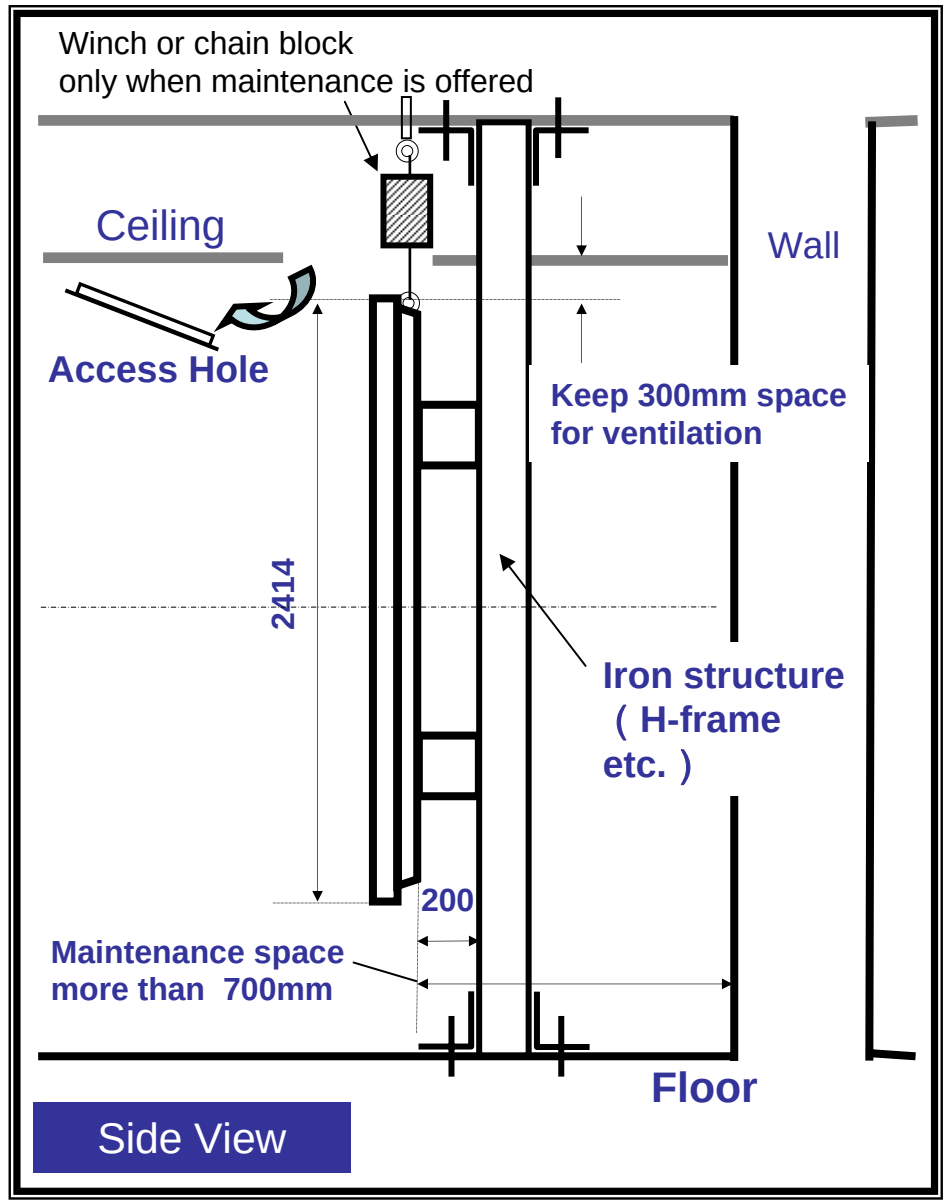
Wall Hanging Bracket (Horizontal) Building Frame Size





Wall Hanging Bracket (Vertical) Building Frame Size





103 Servicing Requirements

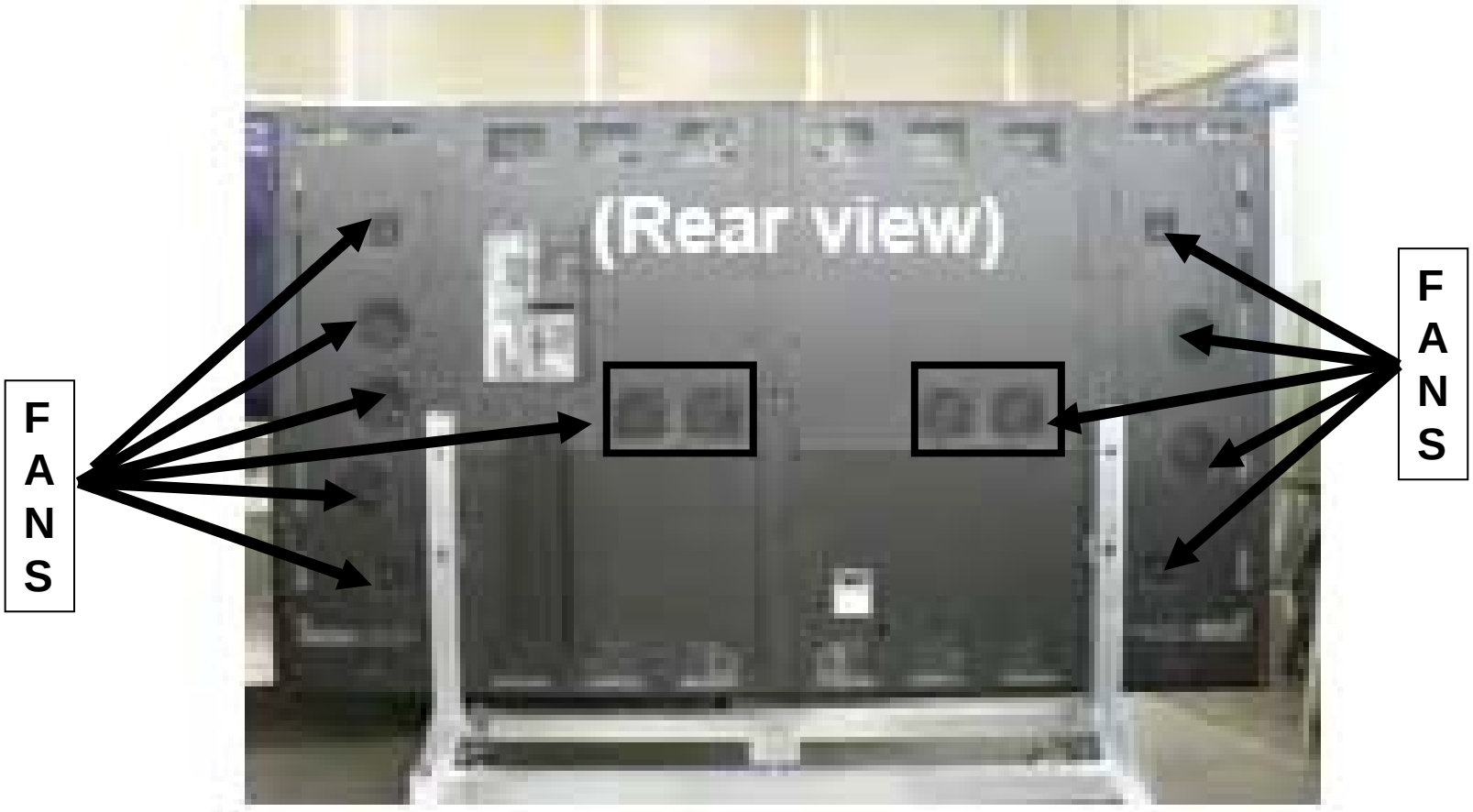
- ON- Site Service
- Panasonic Broadcast Field Engineers
- Migrate to additional servicing facilities
- Free Access to back of plasma
  - 24-36 inches access
  - Includes power up access

Servicing Requirements (1)

The rear side is covered with 6 pcs of rear covers.

Rear view after removing 6 pcs of rear covers.

Servicing Requirements (2)



Vents along perimeter

103” PDP easy facts (1 of 3)

Specifications:

Weight : 500 lbs unpacked

1,000 lbs crated

280 lbs for Pedestal mount, 55 lbs for wall mount

Size: 95” x 56”

Power: 220V AC +/- 10% single phase, 9 ft long power cord

1,550 W

Vertical Installation: Panasonic logo on the left side

Choice of pedestal or wall mount

Ventilation: factory recommends clearance:

- 12” top and both sides

- 8” back

For wall mount installations: the supporting structure should support 5 x total weight = 5x 555 lbs = 2,575 lbs

103” PDP easy facts (2 of 3)

Delivery and Installation:

Panasonic will ship the PDP using NVC Logistics company

We recommend that NVC will provide the following services:

-site survey for delivery purposes

-Delivery, uncrate, dispose of crating materials

-Transport the PDP to mounting location

-Test PDP for functionality

-Install PDP on pedestal (not on wall mount)

Wall mount or custom installations:

We recommend that the System Integrator, that reinforces the structure, be responsible for mounting the wall mounts and installation of the PDP.

103” PDP easy facts (3 of 3)

Delivery and Installation Pricing:

-**DSM/Rep to fill in attached questionnaire detailing level of Service requested, and email to Steve Beck, copy Theodore Radu**

-**Steve Beck will then provide a quote for delivery/Installation**

-**From Customer’s prospective: it is a Panasonic charge labeled as Freight**

-**Panasonic and NVC do not take any responsibility for reinforcing the structure (wall or floor)**

Recommended action for wall/custom installations:

-**The System Integrator is responsible for reinforcing the structure, mounting the equipment and billing the customer**

-**The customer will select the Integrator**

-**If no preferences please email Blue Water Technologies:**

Linda Cronowirth at LCronowirth@visual-productions.com, copy T.Radu

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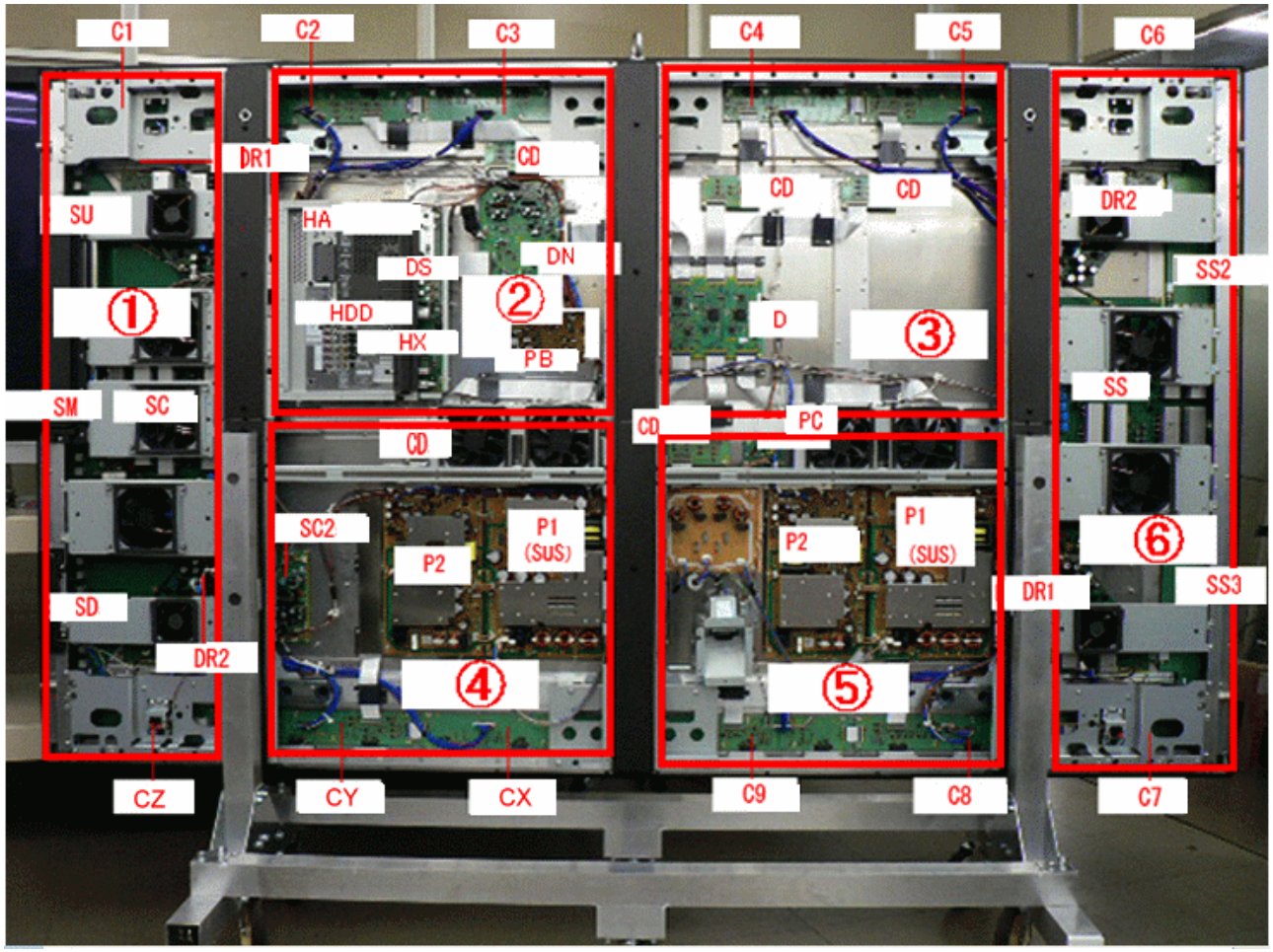
Chassis structure

Back Covers

The unit contains 6 back covers that provide access to different areas of the board assembly.



Zone	Board
①	SC, DR1/2, SU, SM, SD C1, CZ, FAN
②	PB, DS, HX, HA, DN HDD, CD, C3
③	D, CD×2, C4
④	P, CX
⑤	P, F, C9
⑥	SS, SS2, SS3, DR1/2 C6, C7, FAN
② + ④	FAN, CD
③ + ⑤	FAN, CD, PC
① + ②	C2
③ + ⑥	C5
① + ④	CY, SC2
⑤ + ⑥	C8

Back Covers

The unit contains six back covers that provide access to different areas of the board assembly. The areas are designated as zones that contain a specific set of boards.

Zone 1 contains the SC, SU, SM, SD, C1, CZ, DR1, DR2 boards and a portion of the SC2 board.

Zone 2 contains the PB, DS, DN, HX, HA, HDD, C2, C3, and one of the CD boards.

Zone 3 contains the D, CD, C4, C5 and two CD boards.

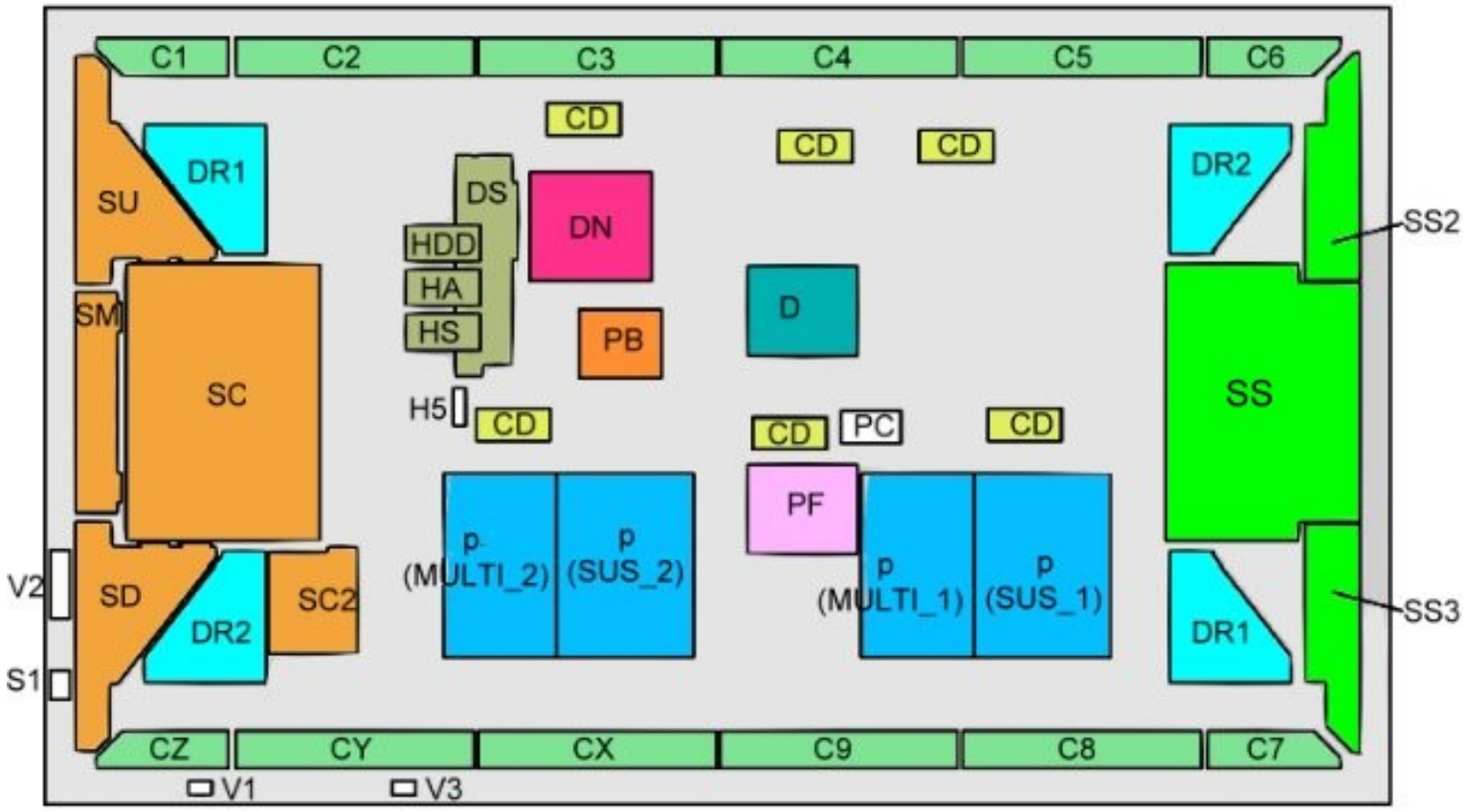
Zone 4 contains the P1/P2 (SC Side), CX, CY boards and a portion of the SC2 board.

Zone 5 contains the P1/P2 (SS Side), C8, and C9 boards.

Zone 6 contains the C7, SS, SS2, SS3, DR1, DR2, and C6 boards.

There are 13 fans in the unit.

Chassis Layout



The 103” plasma display monitor contains many more boards than the smaller size plasma display models that are on the market today. It contains:

1. Two P boards (power supply)
2. Twelve C boards (data drive)
3. There are six CD boards used to connect the D to the C boards
4. The SM board is added to complement the SU and SD of current models
5. There are four DR boards added to the unit, one at each corner, for Energy Data Recovery
6. There is the DS board that connects the HX, HA, and HDD to the DN board.

Boards and Part Numbers

Board Name	Function	Part Numbers	Board Name	Function	Part Numbers
D	Digital Signal Processor, Format Converter, Plasma AI Processor Sub-Field Processor	TZTNP02YLTJ	**CX**	Data Drive (X)	TNPA4027
			CY	Data Drive (Y)	TNPA4028
			CZ	Data Drive (Z)	TNPA4029
			H5	Audio Out	TNPA4058
DS	Slot Interface (Audio / Video / Sync Input Switch), SYNC Processor, Audio Processor, Speaker Out Amplifier, DC-DC Converter	TNPA4217	**S1**	Power Switch	TNPA4058
			SS2	Sustain Out (Upper)	TNPA4036
			SS3	Sustain Out (Lower)	TNPA4037
			V1	LED_G, R	TNPA4085
SS	Sustain Drive	TNPA4035	**V2**	Key Scan	TNPA4086
SC	Scan Drive	TNPA4033	**V3**	Remote control Receiver	TNPA4087
SC2	DC-DC Converter For Scan Drive	TNPA4034	**PB**	Fan Control	TNPA4103
SU	Scan Out (Upper)	TNPA4030	**P(SUS_1/2)**	Power Supply	ZTXMM641MG2
SM	Scan Out (Middle)	TNPA4031	**P(MULTI_1/2)**	Power Supply	ZTXMM641MG1
SD	Scan Out (Lower)	TNPA4032	**F**	Line Filter	TNPA4055
C1	Data Drive (1)	TNPA4018	**PC**	Power Control	TNPA4041
C2	Data Drive (2)	TNPA4019	**HX**	PC / RS-232C	TZTNP01YLTW
C3	Data Drive (3)	TNPA4020	**HA**	BNC Component Video	TXNHA10RBS
C4	Data Drive (4)	TNPA4021	**DN**	Digital Signal Processor, Micon	TZTNP01YLTU
C5	Data Drive (5)	TNPA4022	**HDD**	DVI-D Terminal	TNPA4052
C6	Data Drive (6)	TNPA4023	**CD**	C Board / D Board Connection	TNPA4040
C7	Data Drive (7)	TNPA4024	**DR1**	Energy Data Recovery	TNPA4039
C8	Data Drive (8)	TNPA4025	**DR2**	Energy Data Recovery	TNPA4087
C9	Data Drive (9)	TNPA4026			

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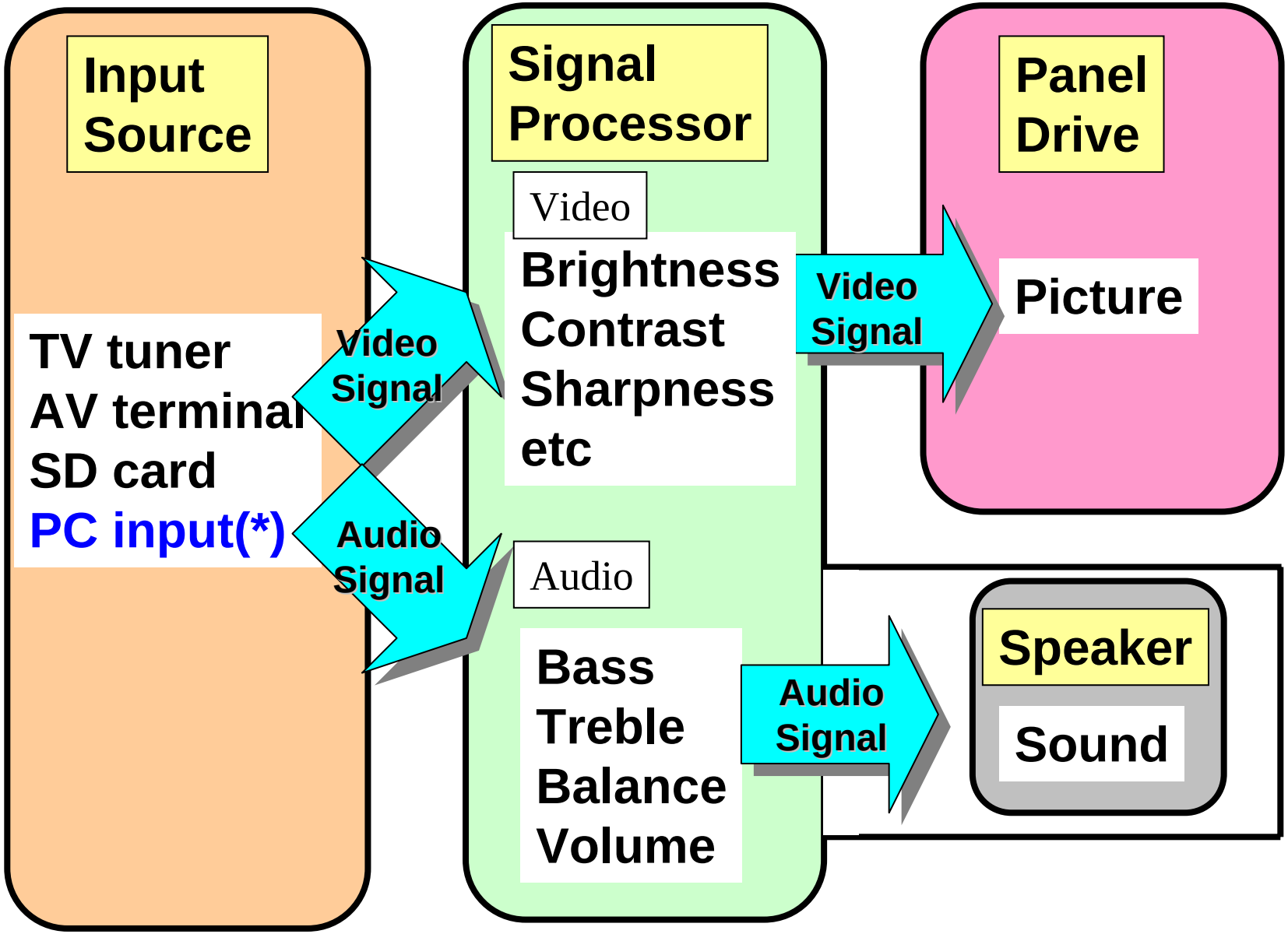
Signal Circuit Explanation

Simplified Block Diagram



Simplified Block Diagram

Roughly speaking, the unit consists of three signal circuit blocks:

1. Input Source
2. Video and Audio Signal Processor with speaker output
3. Panel Drive

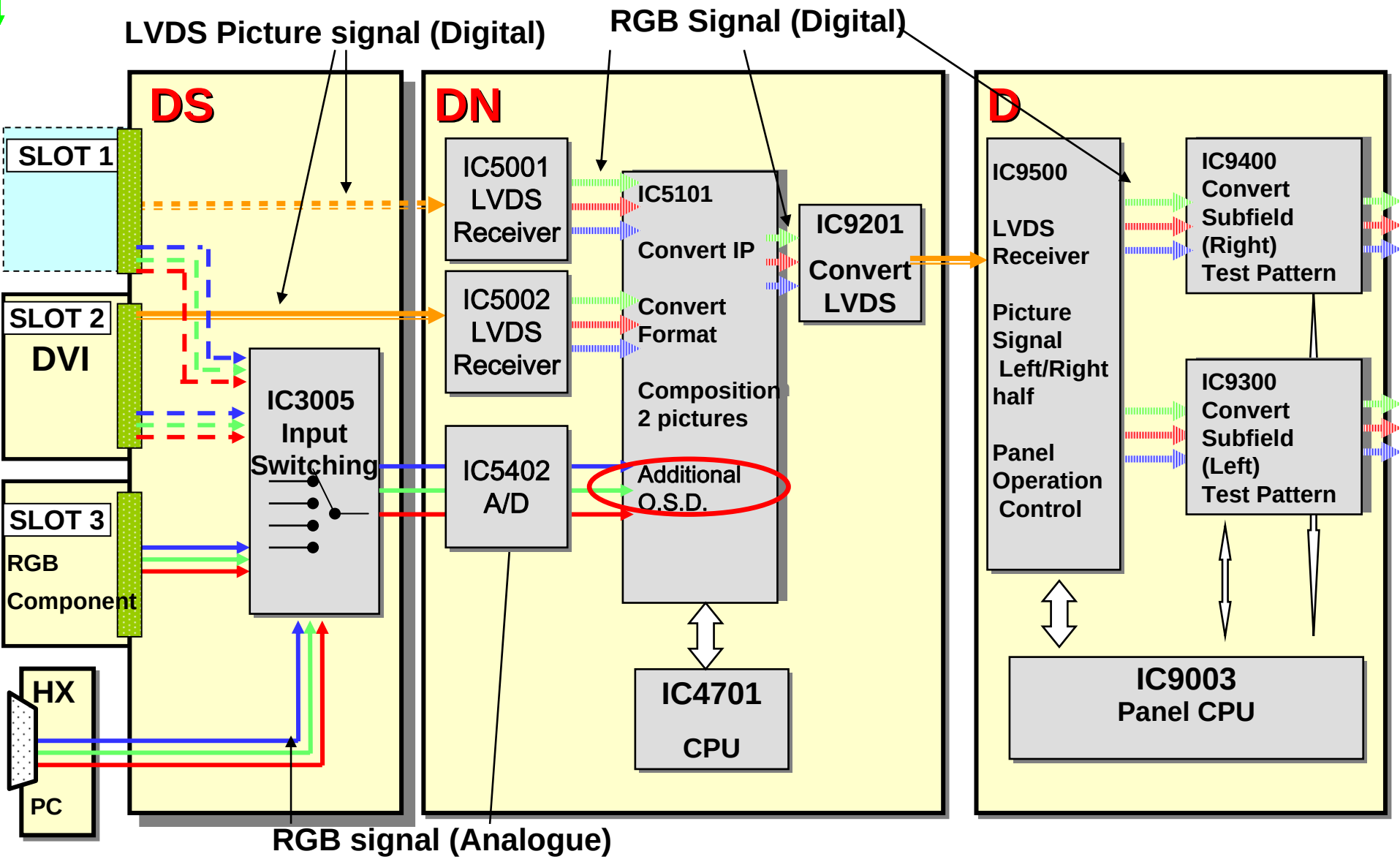
The unit contains a permanent PC input and three card slots that can be used for different types of input signals. The signals may be in the NTSC, ATSC, DVI, HDMI, or SD format. After selection, the video signal is provided to the video signal process block of the unit.

The video process circuit converts the video signal from analog to digital and performs picture control operations such as brightness, contrast, sharpness, color, tint, etc. The output signal of the board passes through an LVDS (Low Voltage Differential Signaling) transmitter for conversion into serial data.

The panel drive block is responsible for displaying the picture on the screen. It provides the scan, sustain and data drive signals to the panel.

Sound inputs to the unit are also selected in the input source block and provided to the sound process block. There, the sound undergoes sound control operations such as bass, treble, balance and volume before being output to the speaker terminals.

Picture signal flow



Picture signal flow

Slot 1 or Slot 2 may be used for component or DVI inputs. The drawing shows both connections for better understanding of the video selection and process of this unit.

The DS board is an input board that contains 3 slot terminals. The Slot terminals may be used in conjunction with boards that facilitate NTSC, ATSC, RGB, DVI, and SD video input. Component, RGB or PC Video are input to the DS board and selected by IC3005. The selected input is provided to the DN board for conversion into 10 bit parallel data and input to the Video Processor IC, IC5101. If slot 1 or 2 is used for DVI input, the LVDS data from the input board passes through the DS board without alteration and enter the DN board. On the DN board IC5001 and IC5002 converts the LVDS data into YUV data for application into IC5101, the Video Processor.

IC5101 performs input selection and picture control operations such as brightness, contrast, sharpness, color, tint, etc. It is also responsible for PIP (picture-in-picture) and IP conversion of the video signal. IC5101 also combines the OSD (On-Screen Display) signal from the system control Microprocessor with the main digital video signal. The RGB output signal of the DS board passes through a LVDS (Low Voltage Differential Signaling) transmitter for conversion into serial data.

IC9500 PLASMA AI (LSI27)

The LVDS receiver inside IC9500 of the D board converts the video signal to 10 bit RGB data, its original format.

The 10 bit data is memorized into two field data to drive the left and right side of the panel. The outputs are provided to the Subfield data circuits, IC9400 and IC9300.

IC9300 and IC9400 Subfield converter

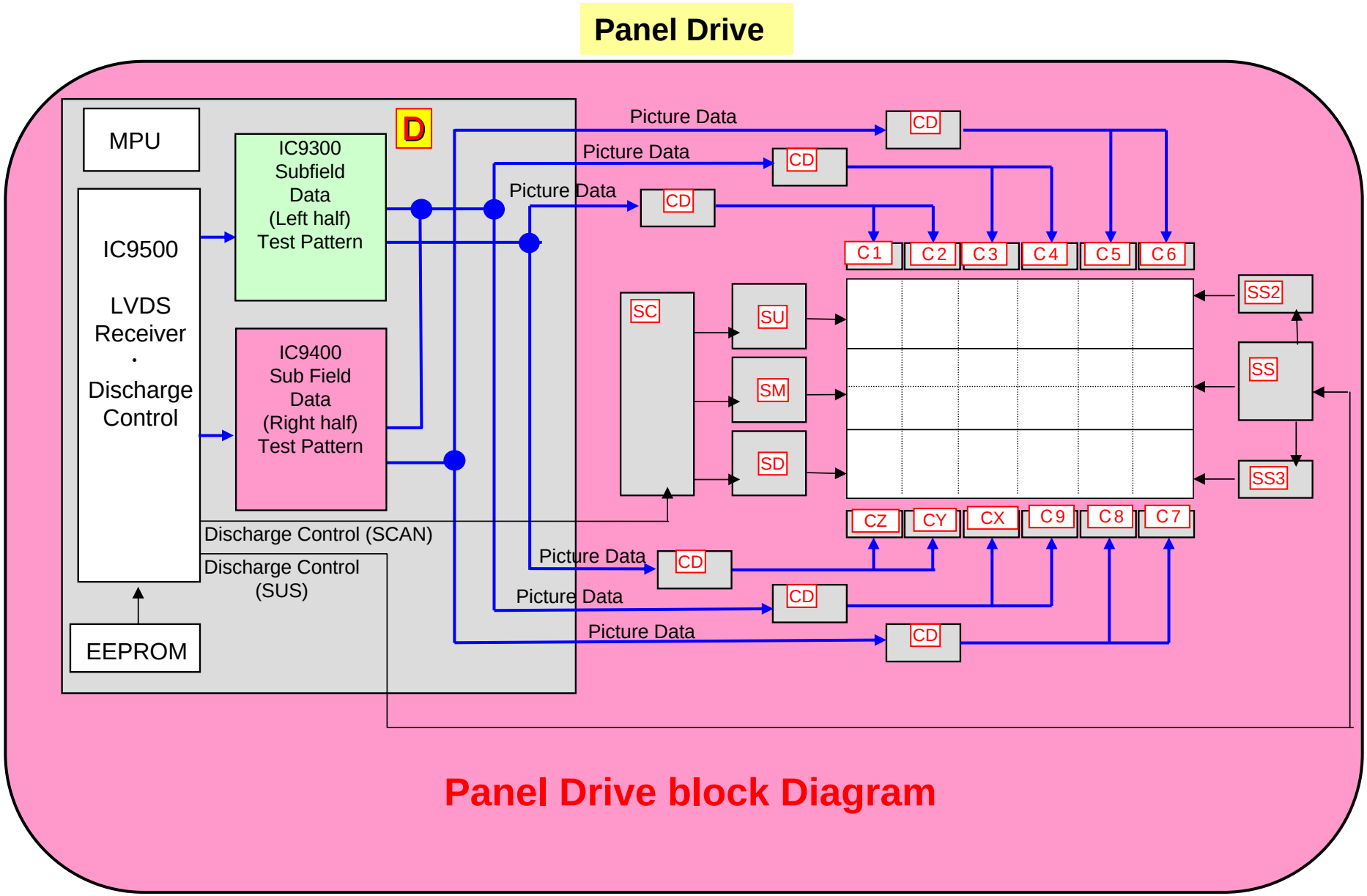
IC9400 and IC9300 are used to drive the left and right half of the panel. They each contain a format converter that changes the resolution of the video signal to match the size of the panel. They also contain the Plasma AI (Adaptive brightness Intensifier) circuits that analyze the APL* for the distribution of dark and bright components. They subsequently convert the picture data into 10, 11, or 12 subfields data to feed the data electrode of the panel.

IC9003 CPU

IC9003 is the CPU that controls the operation of the circuits that drive the panel. It also generates the OSD data (pattern) that is used to troubleshoot the panel's drive circuits.

APL = Average Picture Level

Panel Drive (Basic Circuit)



Panel Drive (Basic Circuit)

Discharge Control

IC9500 of the D board contains the Discharge Control circuit that analyzes the RGB and sync information of the video signal to create the Scan data to drive the Scan operation (SC) board and Sustain data to drive the Sustain operation (SS) board.

The SC board is responsible for the generation of the scan pulses. Scan pulses are used for initialization and selection of the pixels. The SU, SM, and SD boards are de-multiplexer boards that are responsible for converting the serial data output of the SC board into parallel data to drive the panel. Each board drives one third of the panel horizontally.

The SS board is responsible for the generation of the sustain pulses. Sustain pulses are used to initialize and control the brightness of the panel. The SS2 and SS3 boards are extension (connector) boards that connect the SS board to the panel.

Data Drive

The LVDS receiver inside IC9500 of the D board converts the video signal to 10 bit RGB data, its original format.

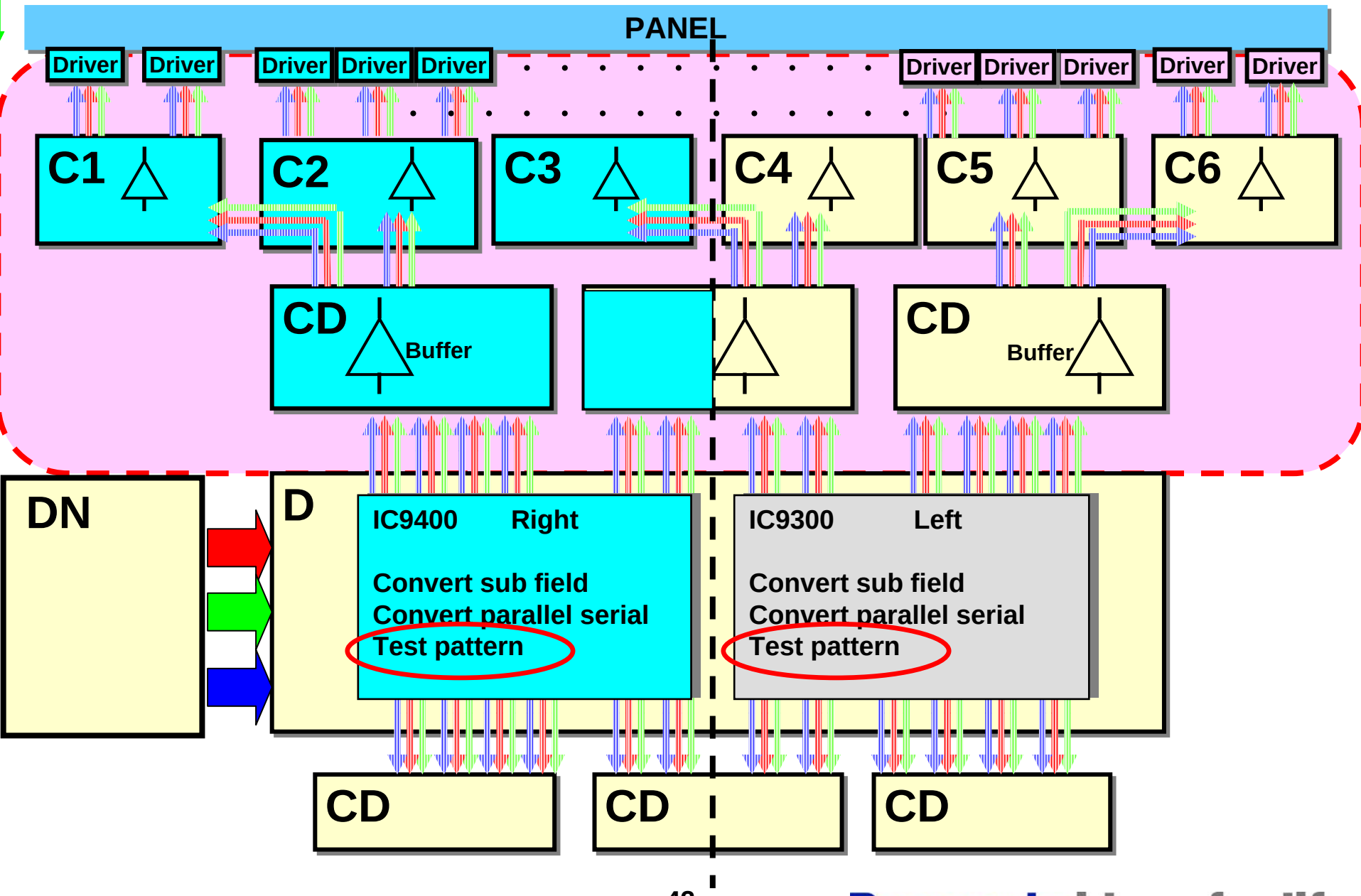
the 10 bit data is memorized into two field data to drive the left and right side of the panel. The outputs are provided to the Sub-field data circuits.

IC9300 and IC9400 drive the left and right half of the panel. They each contain a format converter that changes the resolution of the signal to match the size of the panel. They also contain the Plasma AI (Adaptive brightness Intensifier) circuits that analyze the APL* for the distribution of dark and bright components. They subsequently convert the picture data into the 10, 11, or 12 subfields data to feed the data electrode of the panel.

The data drive signals of IC9300 and IC9400 are output to the CD boards. All six CD boards are exactly the same and have the same part number. The CD boards are buffer boards that are used to distribute data to the 12 C boards. There are three CD boards that provide data to the C1-C6 boards. The C1-C6 boards buffer the data drive signals that are applied to the upper half of the panel. There are three other CD boards that provide data to the C7-CZ boards. The C7-CZ boards buffer the data drive signals that are applied to the lower half of the panel.

APL = Average Picture Level

Panel Drive (1)



Panel Drive (1)

This diagram shows the panel drive boards that are connected to the D board.

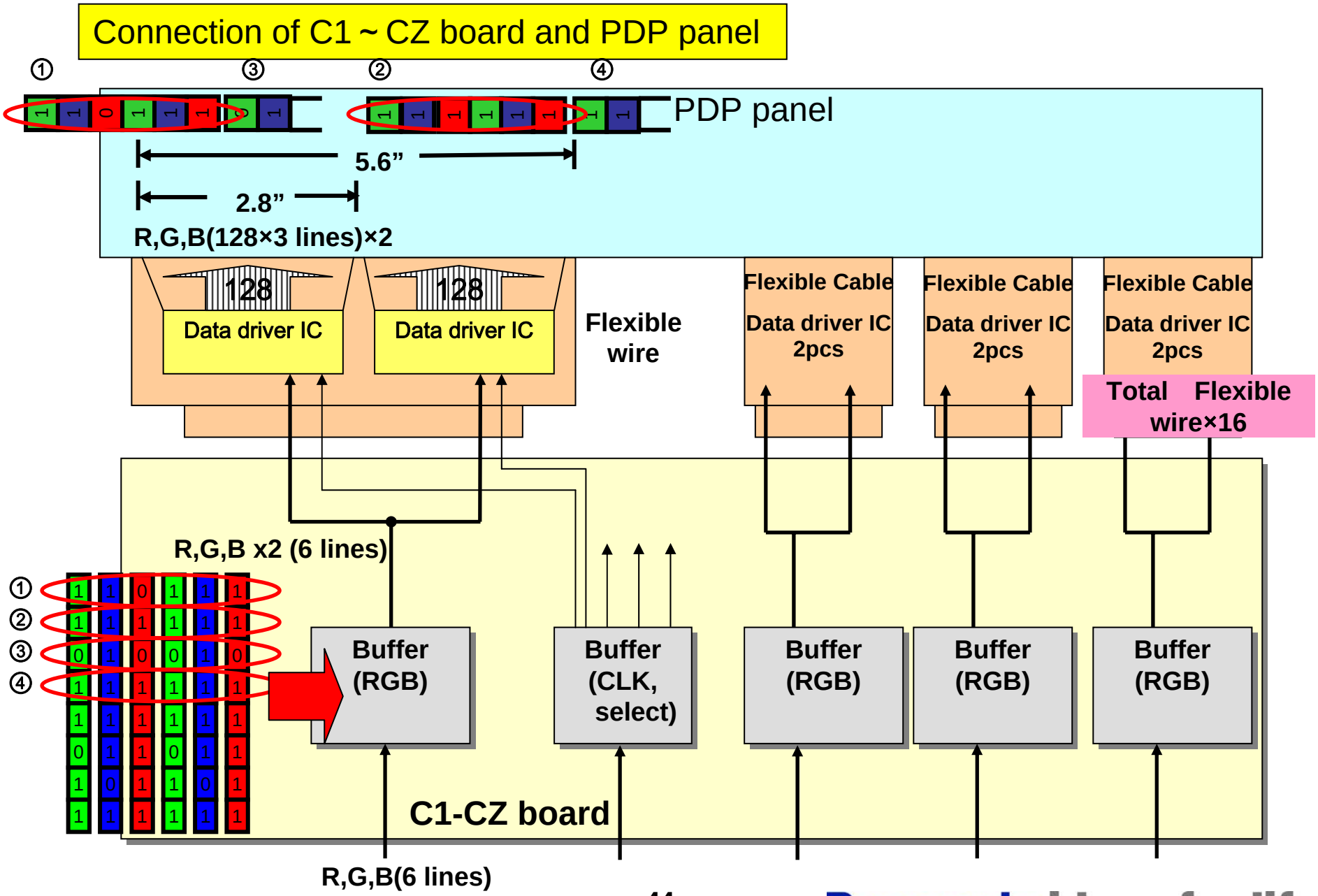
IC9300 and IC9400 provide data to six CD boards.

IC9400 sends picture data to both upper and lower CD boards that provide data to the left half of the panel. Conversely, IC9300 sends picture data to both upper and lower CD boards that provide data to the right half of the panel.

Each CD board supplies picture data to two C boards.

Each of the C2, C3, C4, C5, C8, C9, CX, CY buffer boards sends picture data to three panel drivers. Each of the C1, C6, C7, and CZ buffer boards provides picture data to two panel drivers.

Panel Drive (2)



Panel Drive (2)

There are 32 flexible cables that provide data drive signals to the panel, sixteen on the top and sixteen at the bottom of the panel . Two driver ICs are mounted on each flexible cable. Each driver IC provides data to 128 x 3 (RGB) lines of the panel. This is equivalent to addressing approximately 2.8” of the panel. The whole flexible cable addresses approximately 5.6” of the panel. The buffers on the C boards serve as a holding area, enabling the CPU to manipulate data before transferring it to the data driver IC.

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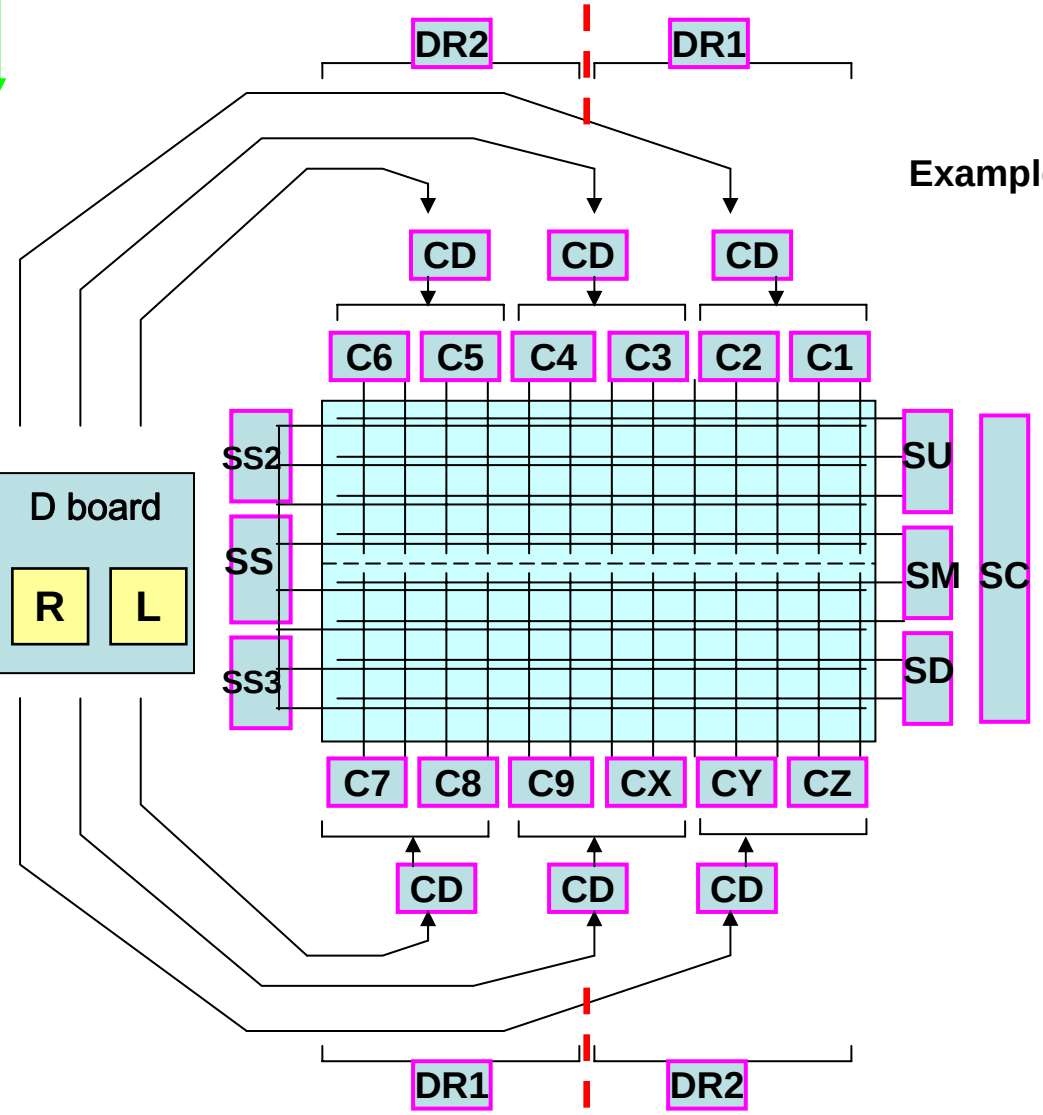
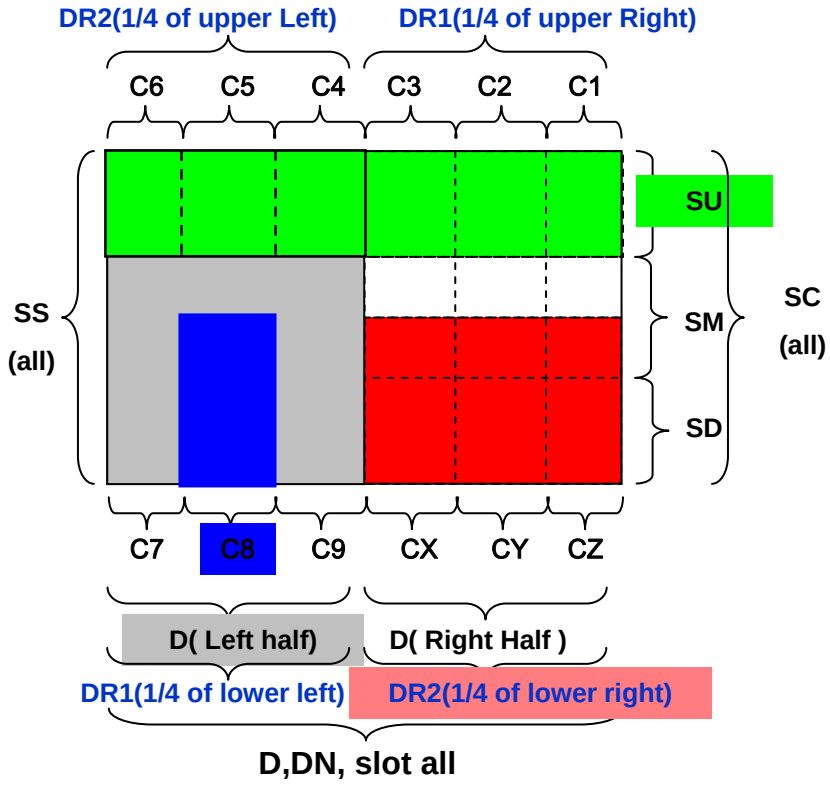
Troubleshooting for signal symptom

Relationship of board and display area



Example of picture problems due to a defective board



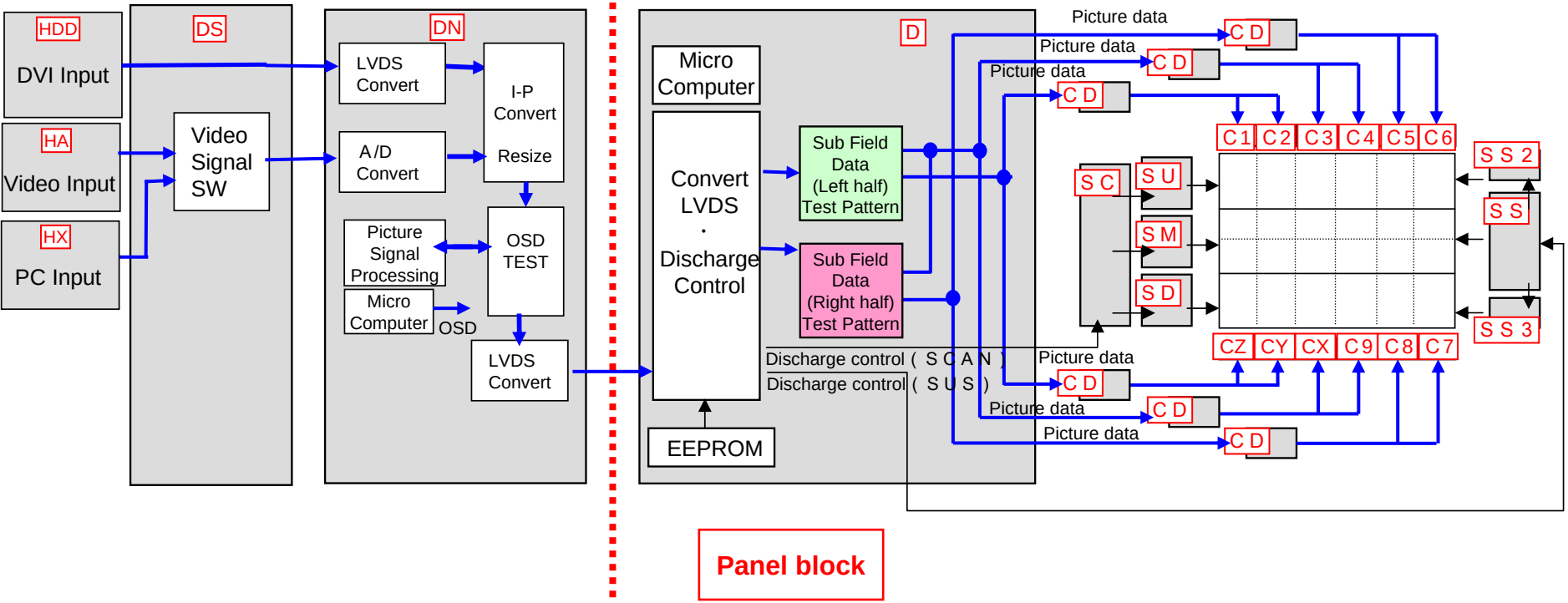
Relationship of board and display area

This picture shows the role of each board with respect to the display area.
There are twelve C boards, six CD boards and four DR boards.
Assuming you remember the board layout and function of each board.

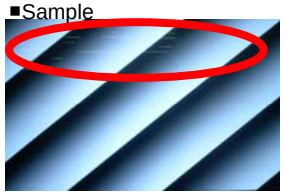
1. If the C8 board is defective, picture information (black bar) will be missing from the center to the bottom area supplied by C8. This is due to the dual scan system.
2. If the DR2 board at the bottom right of the panel is defective, a quarter of the screen will not display picture information.This phenomenon occurs because the DR board supplies operating voltage to the panel driver ICs connected to the CX, XY, and CZ boards.
3. If the D board is defective, half of the picture may be missing from the screen.
4. If the SU board is defective, the top third of the picture will be missing.

Picture Trouble (1)

■Picture trouble (Vertical line all area, horizontal line, Color problem, Others)



■Sample



Thin horizontal line

Discolor picture (No green)

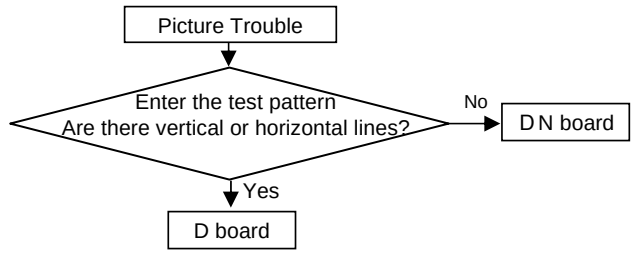
Noise picture

Thin vertical line at all screen

Horizontal line noise at half side (right)

Discolor picture (No blue)

■Flowchart for vertical line problem



Note: The white test pattern, that contains numbers, is generated by the DN board. Press the OK button of the remote control to display subsequent patterns generated by the D board.

If you cannot enter the test pattern, unplug the connector D5 of the D board to obtain a white raster.

Picture Trouble (1)

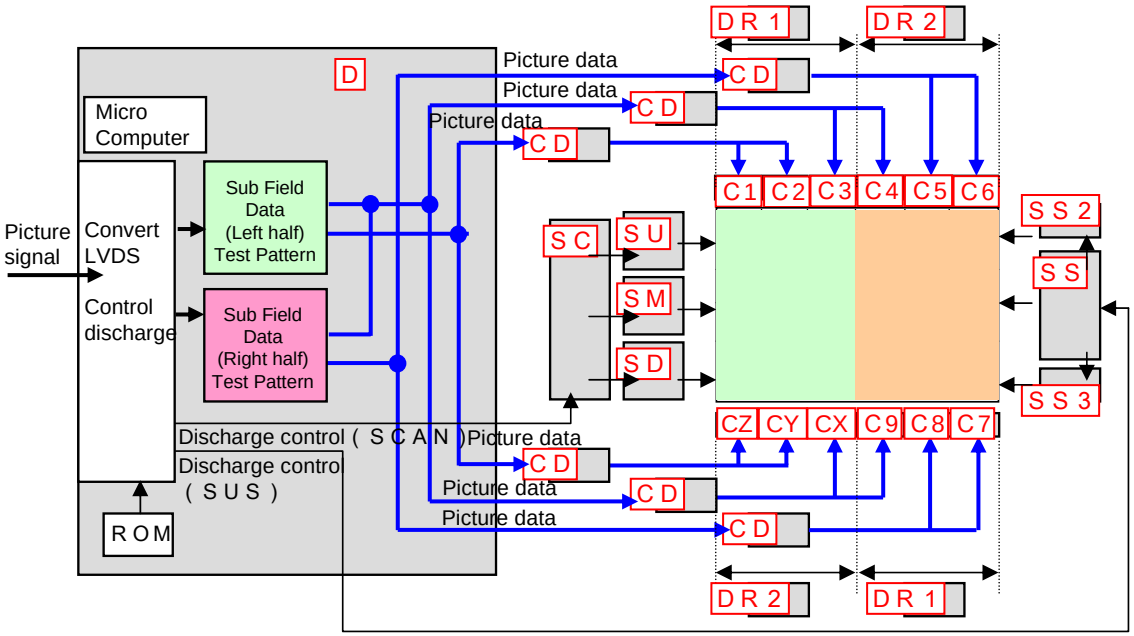
This page covers the type of distortion one might notice in the picture. It is very easy to determine that a black bar on the screen is a panel drive problem. When we experience a color problem, it becomes somewhat difficult to determine whether the problem is due to a defect in the panel drive circuits or video processing circuit (DN board).

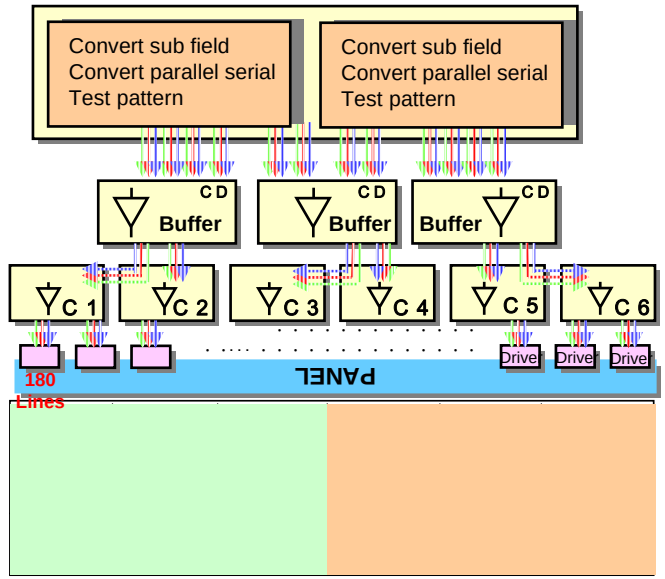
To troubleshoot a signal problem such as distortion in the picture, disconnect the connector D5 from the D board. A white raster appears automatically.

1. If the white raster does not appear or the raster is colorful (Ie. magenta in appearance), the D board is defective.
2. If the white raster is normal, the DN board is defective.

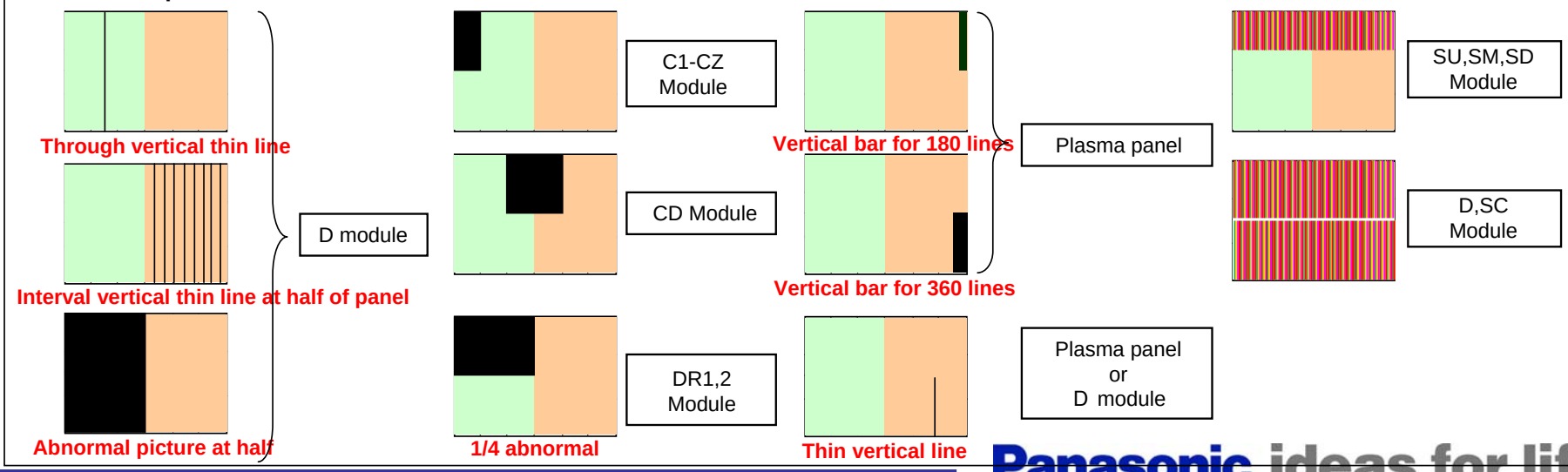
Picture Trouble (2)

■Picture trouble (Vertical line at part of screen, abnormal picture) Normal sound





■Trouble sample

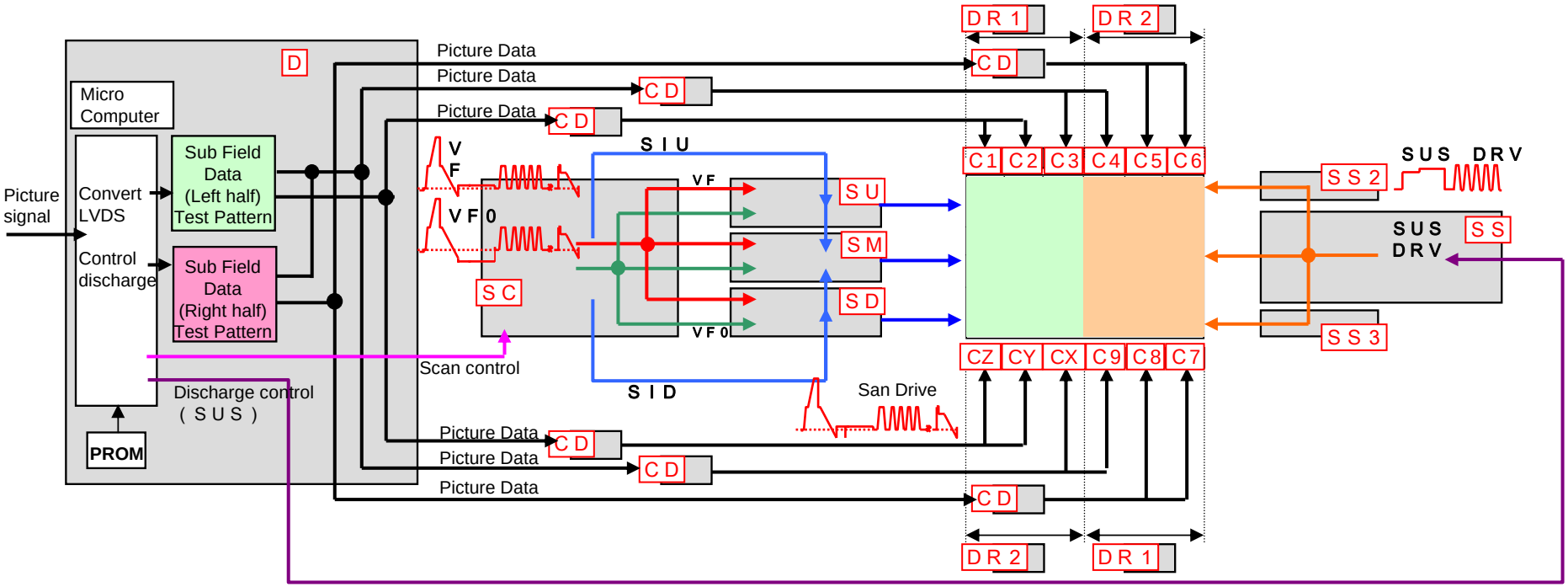


Picture Trouble (2)

The emphasis in this drawing is the type of defect one can expect from the boards that drive the panel or the panel itself.

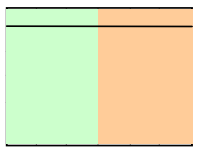
1. One or more thin black lines from the top to the bottom of the panel is usually due to a D board defect.
2. No picture in either the left or right side of the panel is also caused by a D board defect.
3. A vertical black bar from the center to the top or bottom of the panel that occupies the area driven by a C board is usually caused by a defective C board.
4. A Black area from the center to the top or bottom of the panel that occupies 1/6 of the screen is usually caused by a defective CD board.
5. A Black area from the center to the top or bottom of the panel that occupies 1/4 of the screen is usually caused by a defective DR board.
6. A vertical black bar from the center to the top or bottom of the panel that is approximately 2.8 or 5.6 inches wide is usually caused by a defective panel.
7. One thin black line from the center to the top or bottom of the panel may be due to a defective D board or panel.
8. Multiple colored lines that occupy the top, center, or bottom 1/3 of of the panel are caused by a defective SU, SM, or SD board.
9. Multiple colored lines that occupy the whole screen are caused by a defective D or SC board.

Picture Trouble(3)



■**Trouble sample**

●**Horizontal line at part of screen**

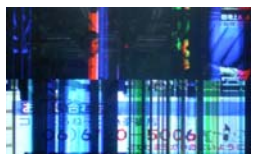


Thin horizontal line

Horizontal bar same as board width.

SU,SM,SD Module

●**Abnormal Discharge**



SC,D Module

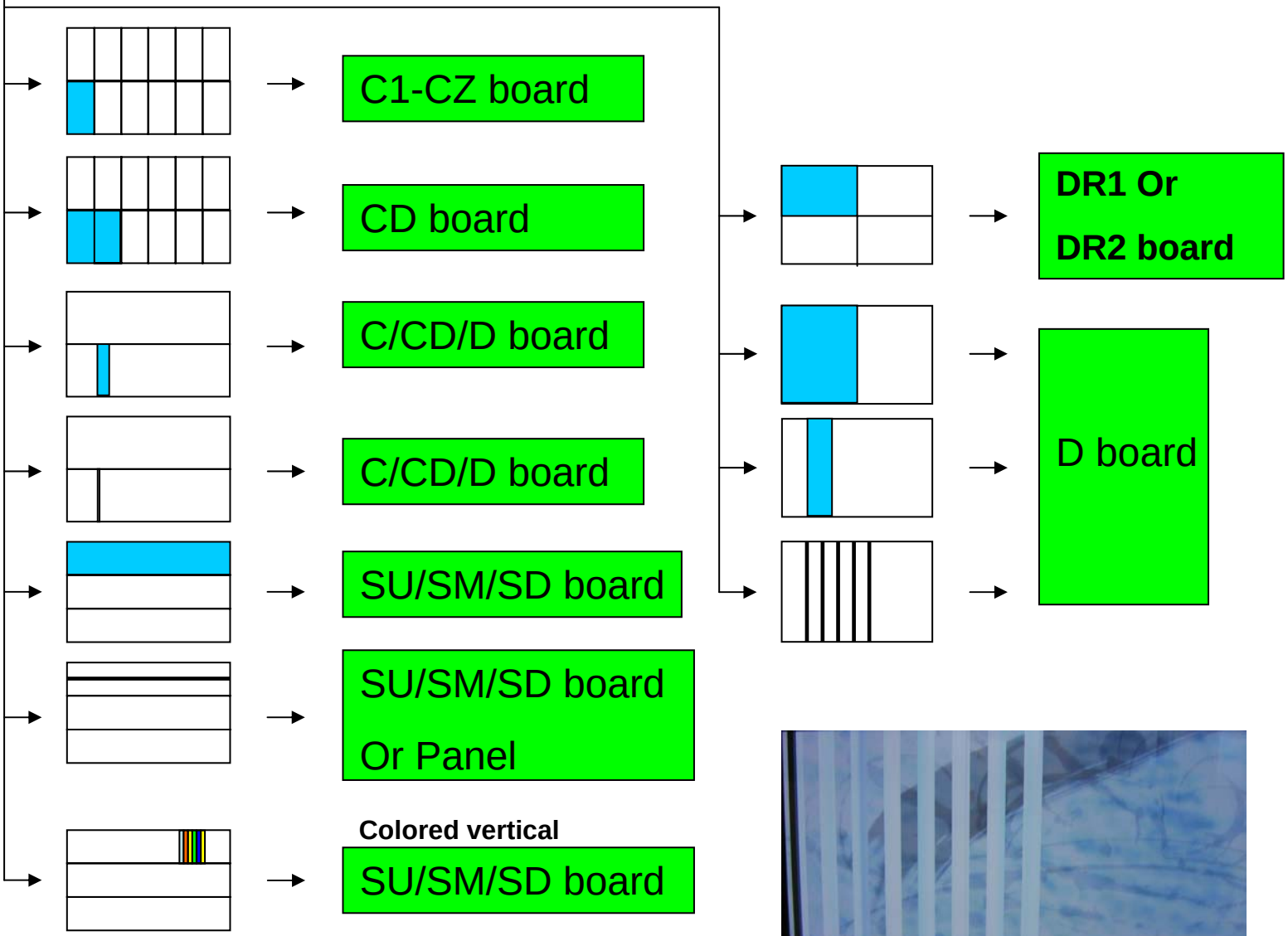
Picture Trouble(3)

The emphasis in this drawing is the type of defect one can expect from a scan operation problem.

1. One or more thin horizontal black lines are caused by a defective SU, SM, or SD board.
2. A horizontal black bar that occupies 1/3 of the screen is caused by a defective SU, SM, or SD board.
3. A totally black screen or a picture that is distorted throughout is caused by a defective SC or D board.

Summary of Picture Trouble and defective board

Diagnosis of board defect



Picture trouble all area

Picture Trouble (all areas)

Do all the video Inputs provide the symptom?

No

Video or PC → DN or DS board

DVI → HDD board

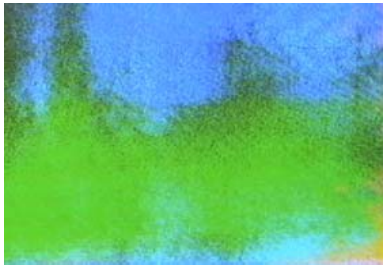
Video → HA board

PC → HX board

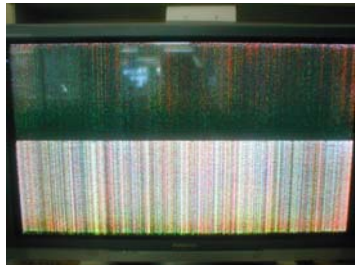
All input sources

What is the symptom?

Abnormal discharge → SC/SS board



Group of vertical line → SU/SM/SD board



Do the Internal Test Patterns provide the same symptom?

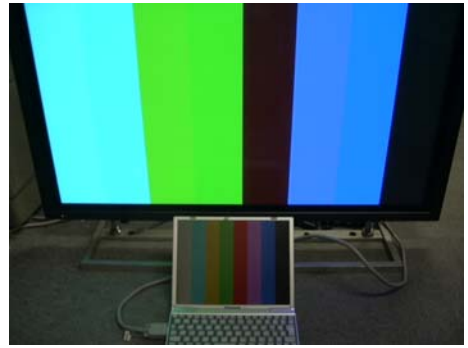
NG → D board

OK

Is the OSD visible on screen?

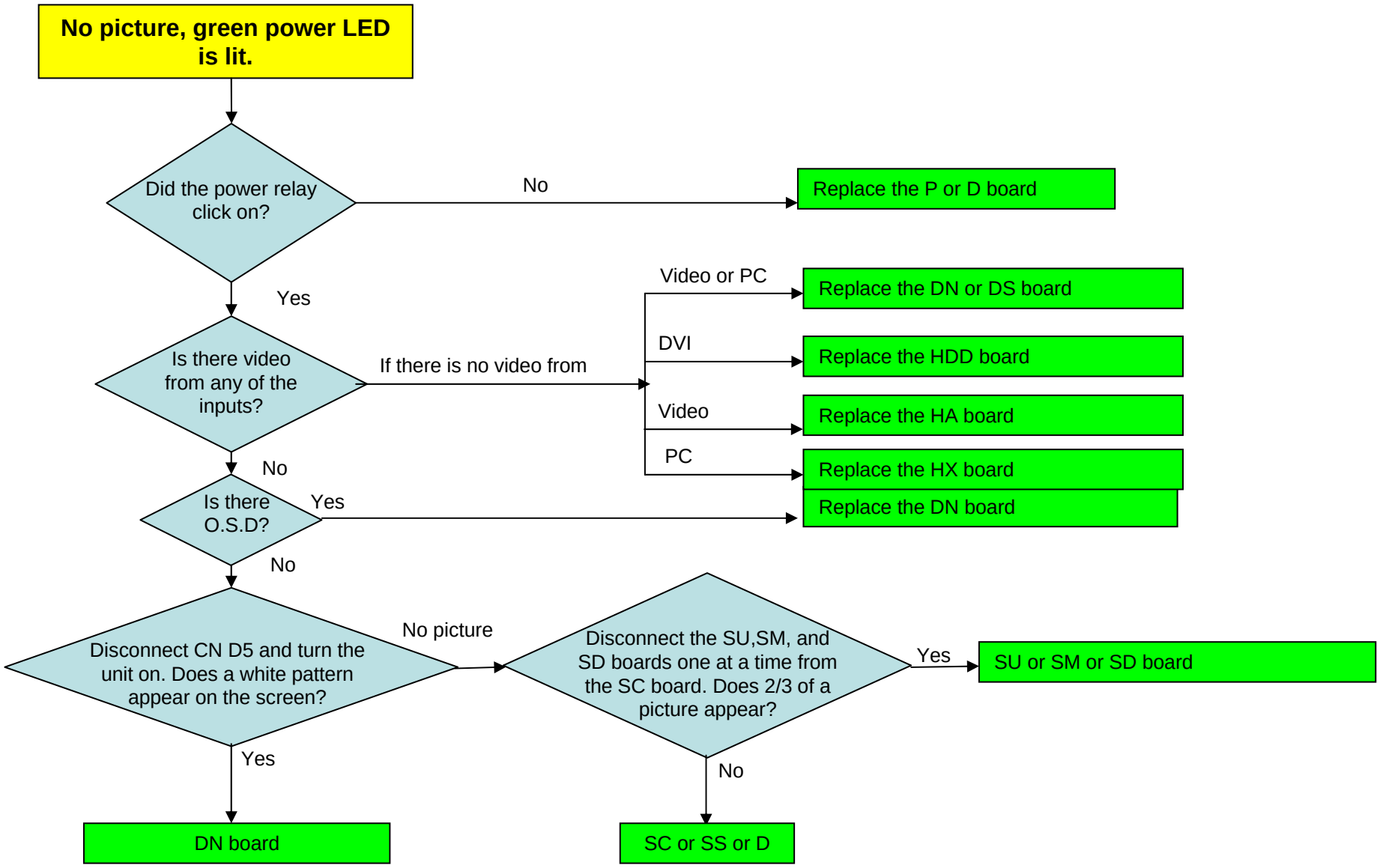
NG → D or DN board

OK → DN board

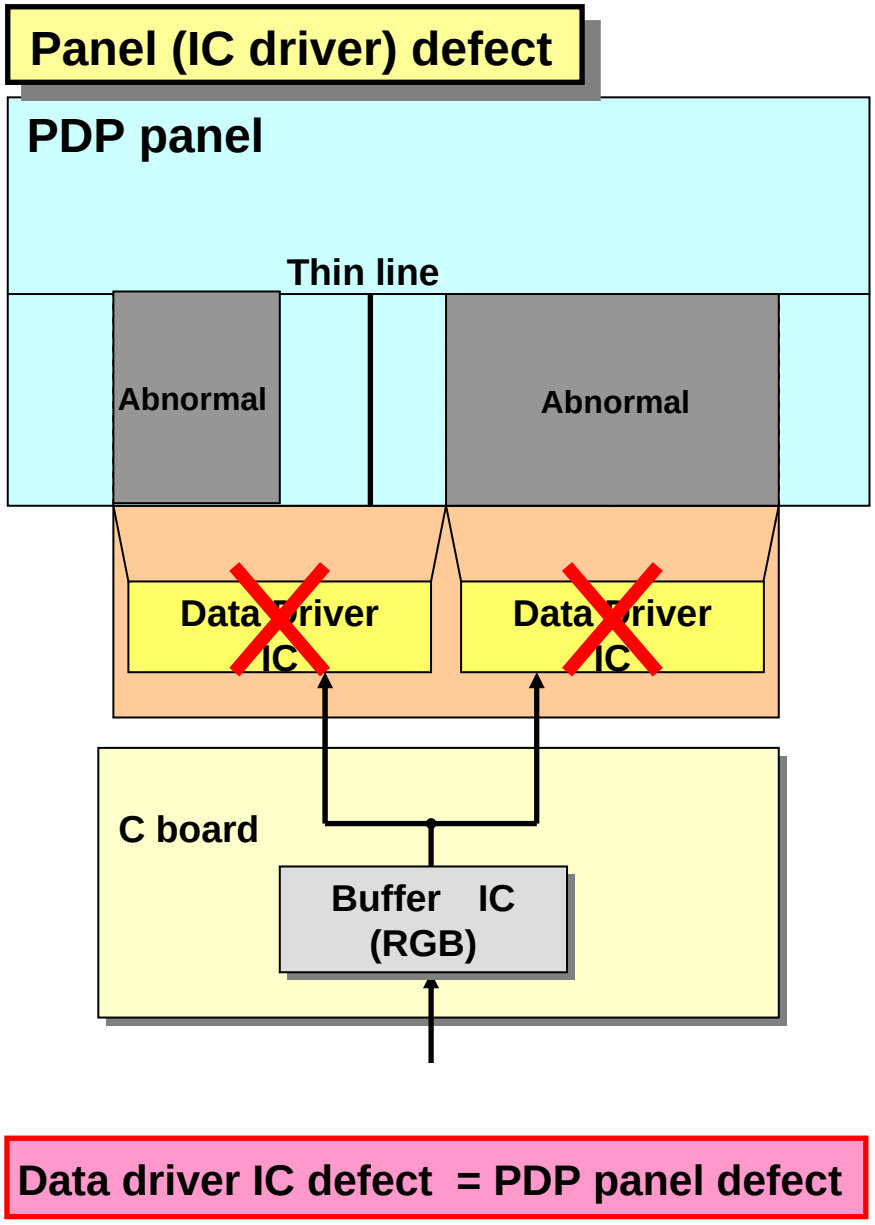


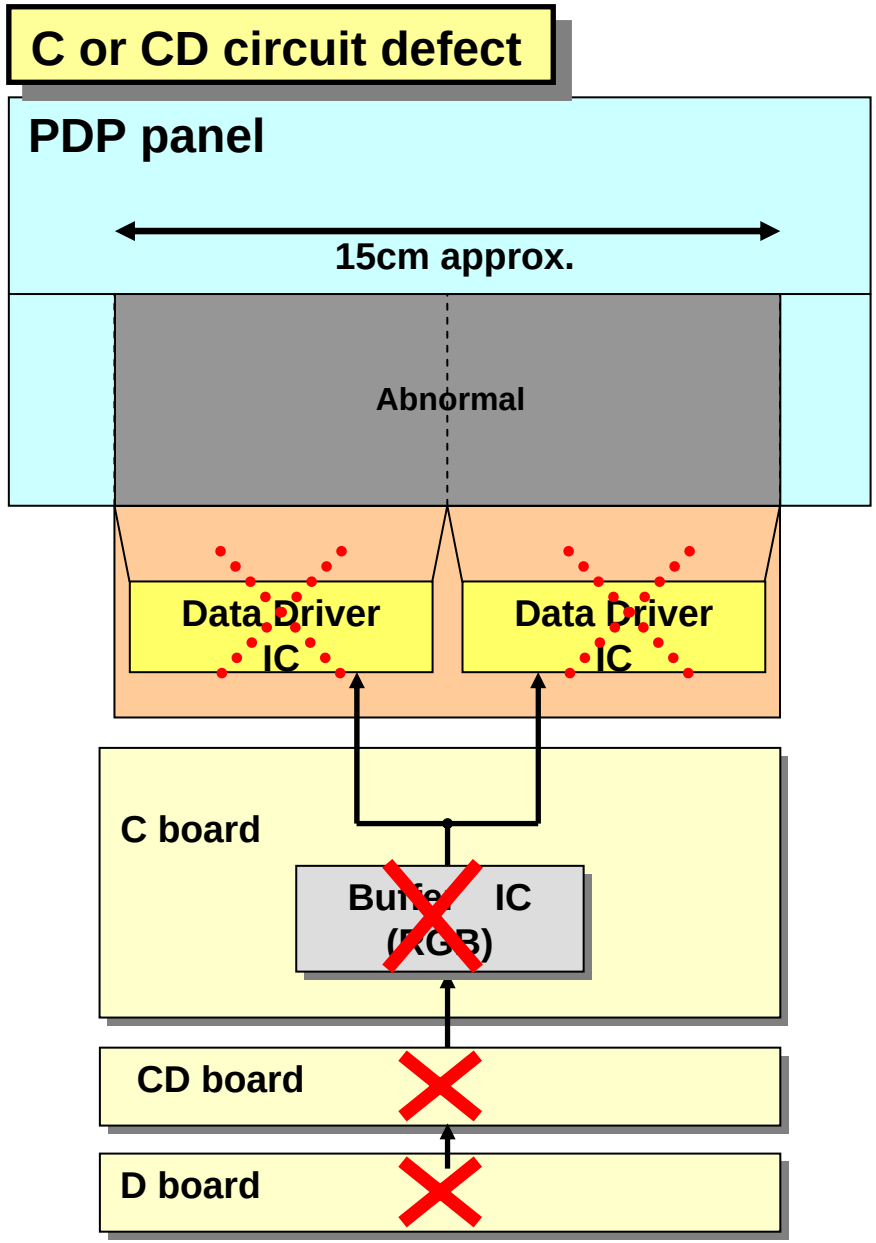
Ex.RGB input (No red)

Picture trouble (3)



Picture Trouble (Vertical line)

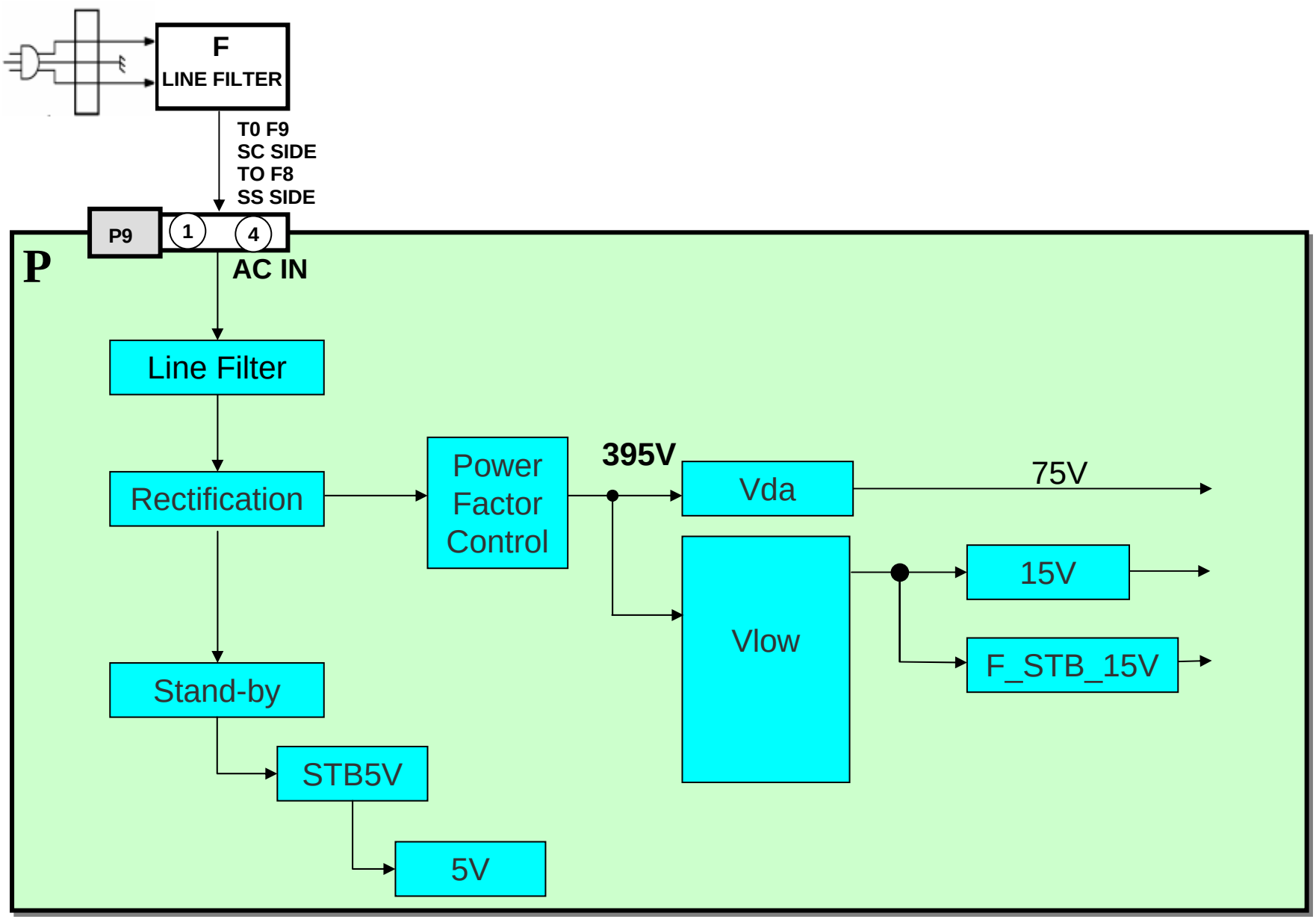




Intentionally Blank

Power Supply Circuit Explanation

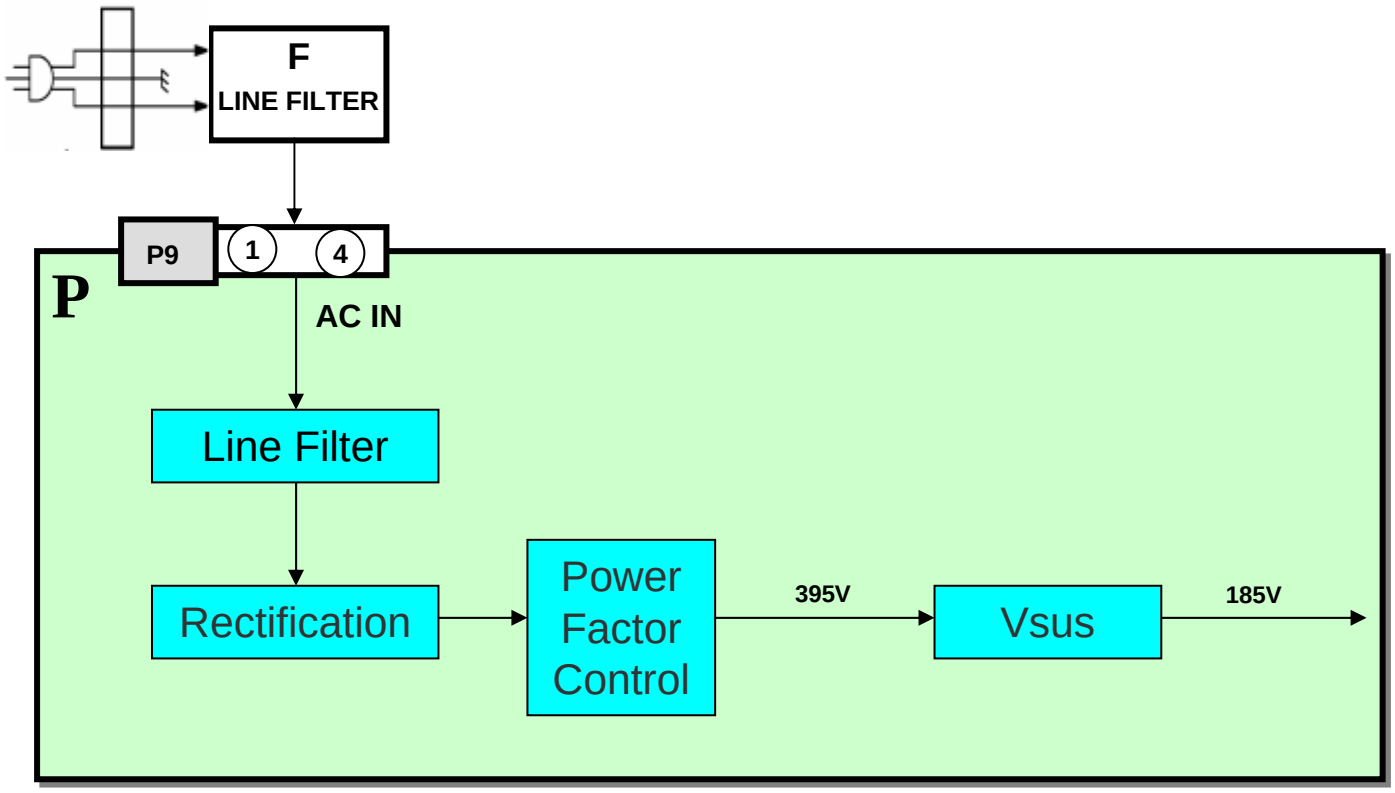
Power supply circuit (VDA and Low Voltages)



Power supply circuit (VDA and Low Voltages)

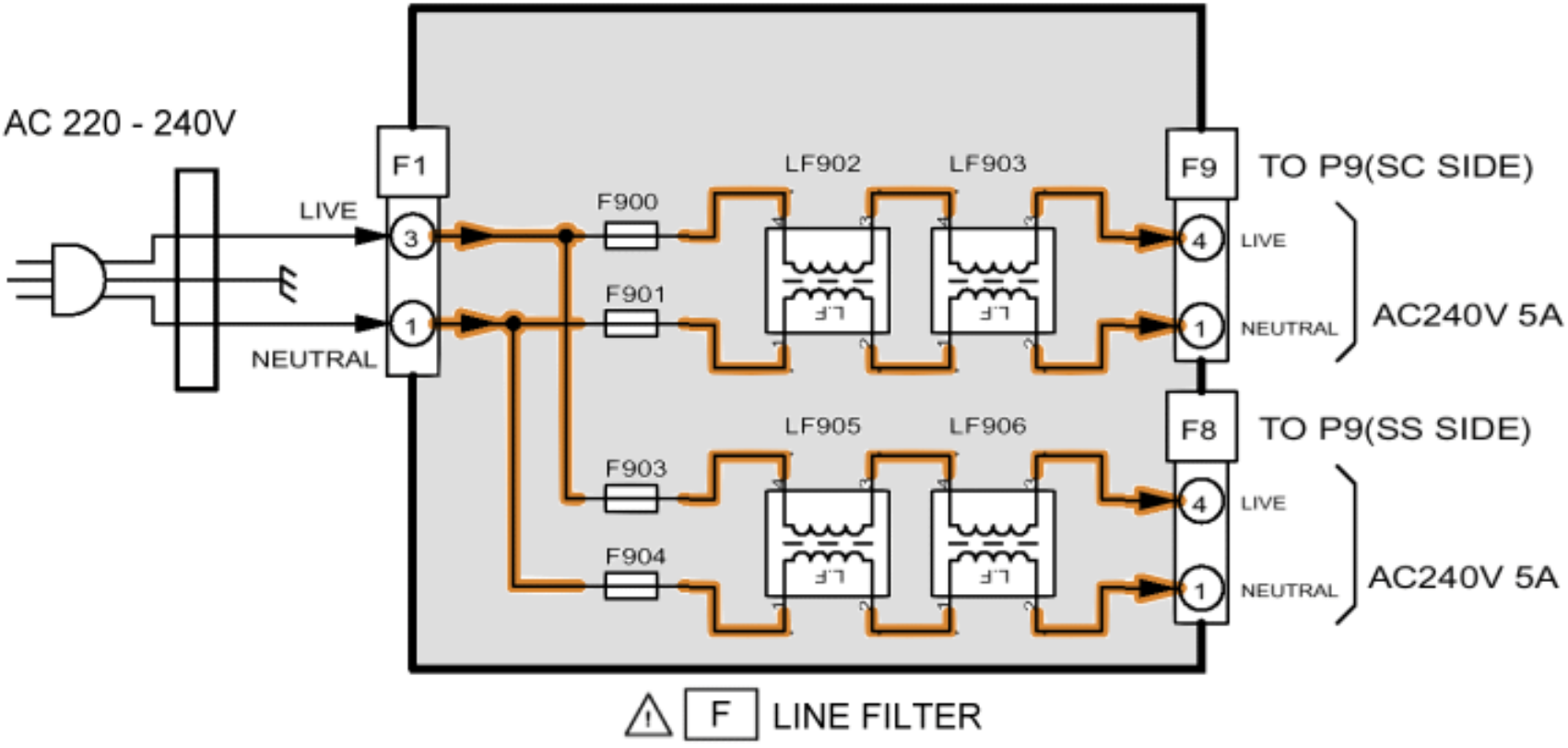
The basic operation of the new P board is the same as that of the older Plasma Display Monitors. The Standby circuit supplies STB5V for system control operation and 5V for Panel operation. The main circuit supplies Vda voltage for data drive , 15V for sustain, scan, and fan operations. The F_STB_15V is used on the DS board to generate other operating voltages for the the video processing circuit.

Power supply circuit (VSUS)



Due to the amount of current required to drive this plasma display panel, a separate circuit is used to generate the VSUS voltage. Its basic operation is the same as previously used power supplies. The incoming AC voltage is filtered and rectified. The DC voltage is applied to a power factor control circuit to improve the power ratio. The output is then applied to a switch mode power supply for the generation of the VSUS voltage. There are two VSUS power supplies, one on the P BOARD SS SIDE and the other on the P BOARD SC SIDE.

Line Filter

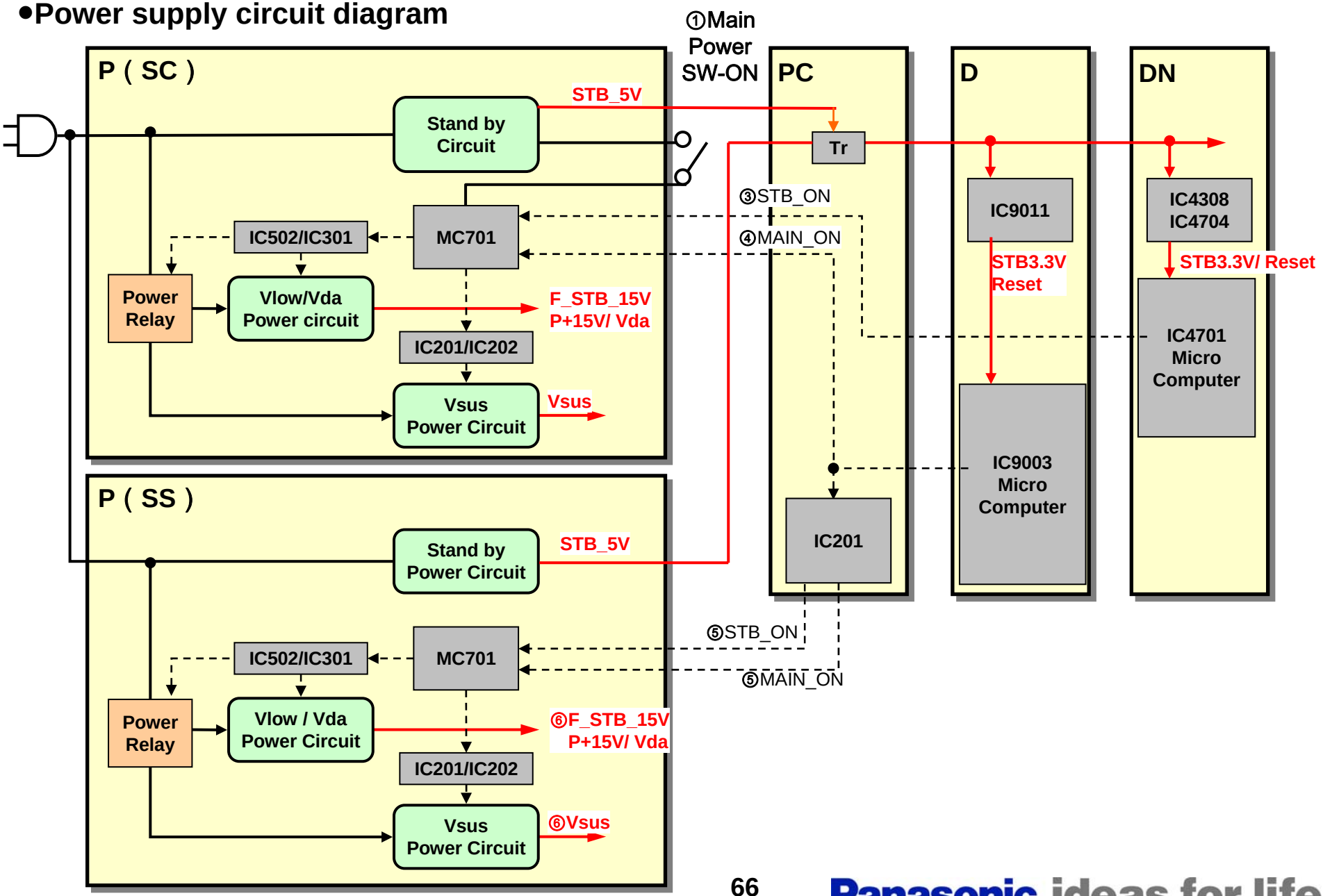


The F board of the older Plasma Display Monitors is reintroduced in this model.

The function of the line filter is to block incoming noise from the AC outlet to the unit and outgoing noise from the unit to the AC outlet. It provides two outputs that are connected to two separate but identical power supply boards. One of the power supply boards (P SC SIDE) is used to power the scan drive circuits and the other (P SS Side) the sustain drive circuit.

Power Supply Circuit Block Diagram

●Power supply circuit diagram



Power supply Circuit

This is a diagram of the two power supply boards incorporated in this unit. One is primarily used by the SC board for scan operation and the other by the SS board for sustain operation. The AC voltage that enters the two power supply boards are filtered by the F board (not shown in the diagram). The main power switch path is routed through the SC2 board to the S1 board.

Power ON operation via the main Power Switch

P board SC

After plug in, the standby power circuit begins to work immediately to produce the STB 5V source. Upon activation of the main power switch, MC701 allows the output of the STB 5V to the PC, D and DN boards. The STB 5V is regulated to 3.3V to power and reset the microprocessor of the D and DN boards. IC4701 and IC9003 output the STB_ON and MAIN ON commands (approximately 2.5V) to MC701. MC701 outputs the power ON command to IC201 and IC202 to generate the Vsus voltage. The VSUS voltage is used for scan and sustain operation. MC701 also outputs the power ON command to IC502 and IC301 to generate the Vda, 15V, and STB 15V supplies. The Vda voltage is used to power the shift register ICs that are connected to the data electrodes of the panels. The VDA voltage is also used by the DR boards for energy recovery operation. The 15V output is primarily used by the D, SC, and SS boards.

P board SS

Operation of the P board (SS side) is exactly the same as the P board (SC side).

PC board

The PC board is a logic board that is used as an extension of the system control circuits to trigger and monitor the operation of the power supply boards. During standby operation, the F STB_ON command is only provided to the P SC Side power supply. The P SC SIDE power supply continues to output the F_ STB_15V to the DS board.

When the unit is turned on, the MAIN_ON command goes to the P SC SIDE power supply to turn it on. At the same time a logic circuit on the PC board converts the MAIN_ON command into both, STB_ON and MAIN_ON to turn on the P SS Board Power supply. The PC BOARD also contains an OR gate that monitors the SOS outputs of the two power supplies to provide one output to the MPU IC9003. Go to page 67 to see the block diagram of the PC board.

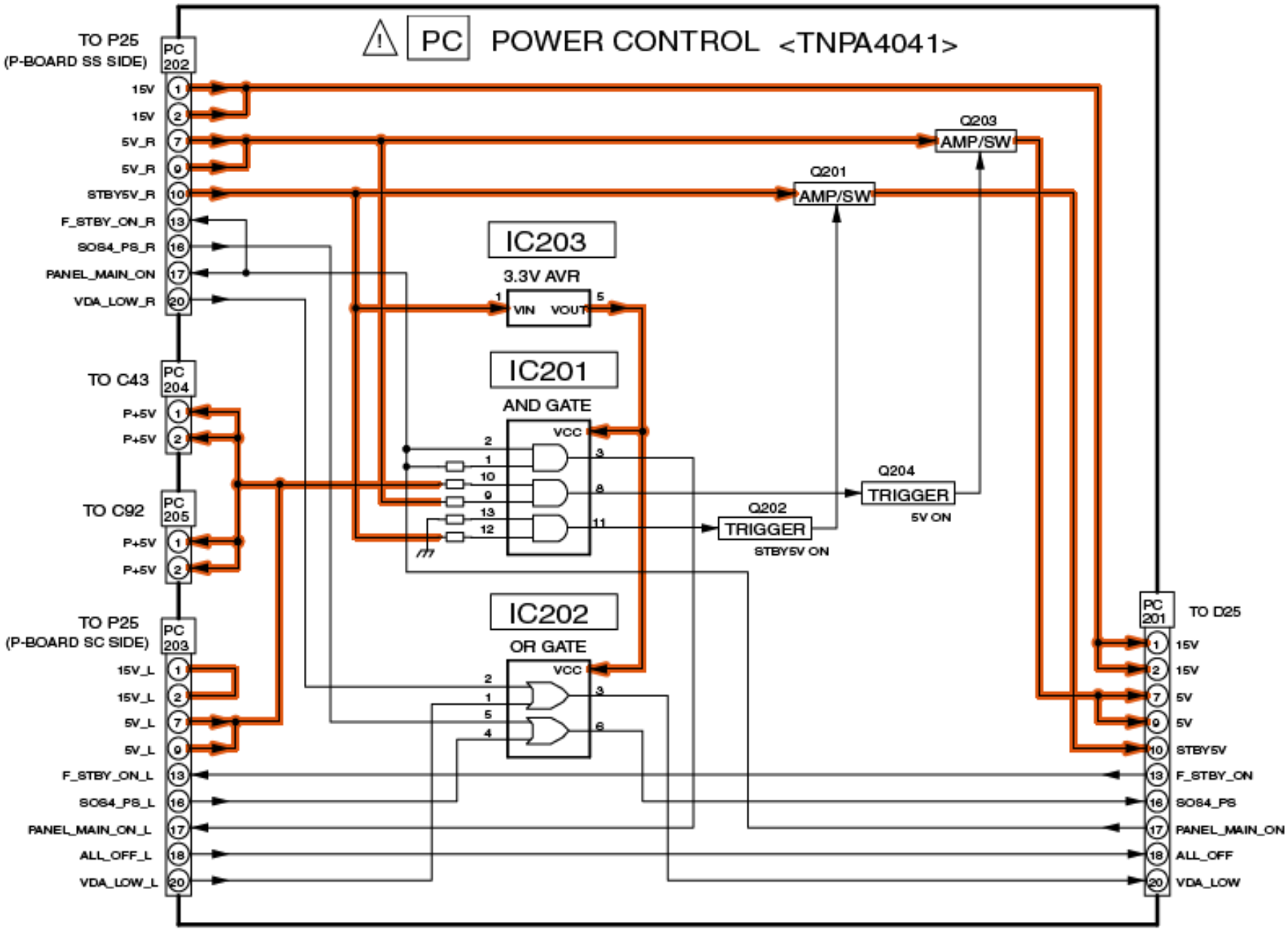
Power supply Circuit (SC side)

Power on via the remote control

When the unit is turned off using the remote control, a red standby indicator LED remains illuminated in front of the screen. At this time power on/off operation is possible via the remote control. During standby operation, the F STB_ON command is only provided to the P SC Side power supply. The P SC SIDE power supply continues to output the F_ STB_15V to the DS board to keep the unit in the standby mode.

When the unit is turned on, the MAIN_ON command goes to the P SC SIDE power supply to turn it on. At the same time a logic circuit on the PC board converts the MAIN_ON command into both, STB_ON and MAIN_ON to turn on the P SS Board Power supply.

PC Board Block Diagram

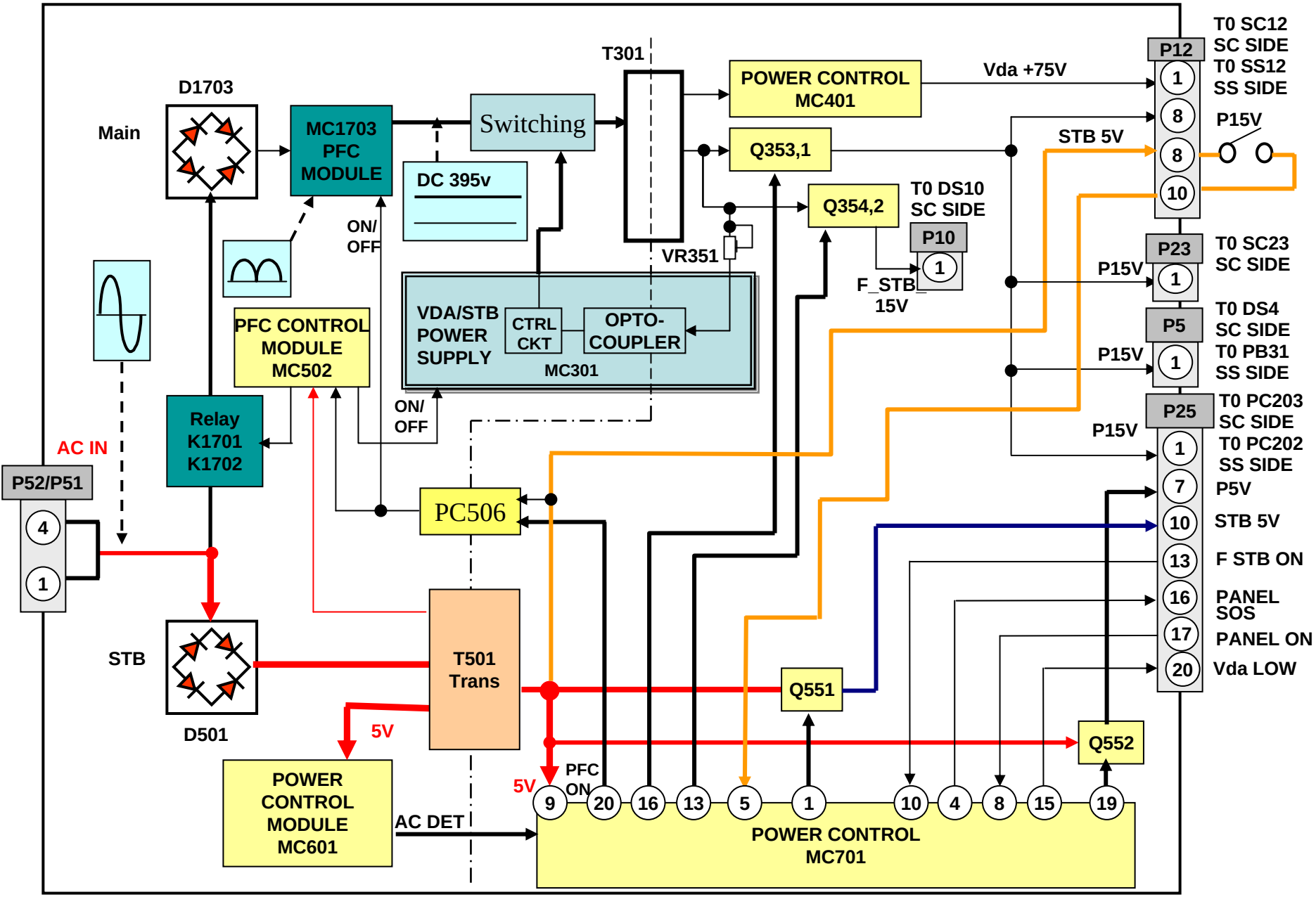


PC Board Block Diagram

The PC board is a logic board that is used as an extension of the MPU to trigger and monitor the operation of the power supply boards. During standby operation, the F STB_ON command is only provided to the P SC Side power supply. The P SC SIDE power supply continues to output the F_ STB_15V to the DS board.

When the unit is turned on, the MAIN_ON command goes to the P SC SIDE power supply to turn it on. At the same time a logic circuit on the PC board converts the MAIN_ON command into both, STB_ON and MAIN_ON to turn on the P SS Board Power supply. The PC BOARD also contains an OR gate that monitors the SOS outputs of the two power supplies to provide one output to the MPU IC9003.

P Board Circuit (Standby Operation 1)



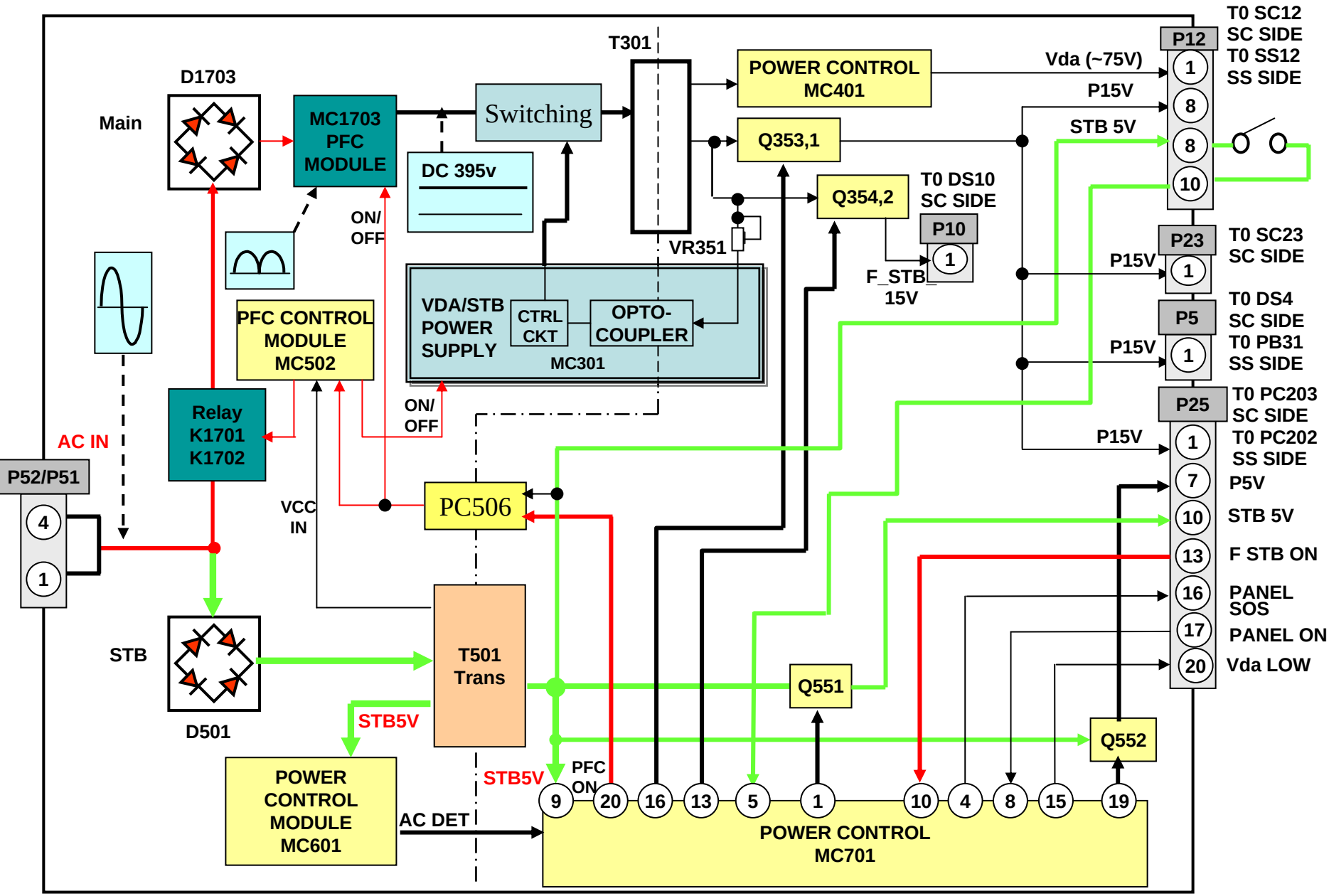
P Board Circuit (Standby Operation 1)

This a block diagram of the power supply circuit incorporated in this unit.

Standby Power Supply

The incoming AC from connector P51 is converted to DC by the rectifier D501. The DC from D501 is applied to the standby circuit (T501, IC501 and MC601) where three STB5V supplies are developed. The STB5V is applied to the Power Control Module MC202 (Not shown in the diagram, It is used for VSUS). The second STB5V is applied to the Power control IC MC701 and the third to the STB Power Control IC MC601 (Use hot ground to measure voltage on MC601). When the main power switch is activated, the standby 5Vdc is applied to pin 5 of MC701. Subsequently pin 1 of MC701 goes low to turn on Q551 and allow the STB5V to output at pin 10 of connector P25.

P Board Circuit (Standby Operation 2)



P Board Circuit (Standby Operation 2)

Standby Power Supply

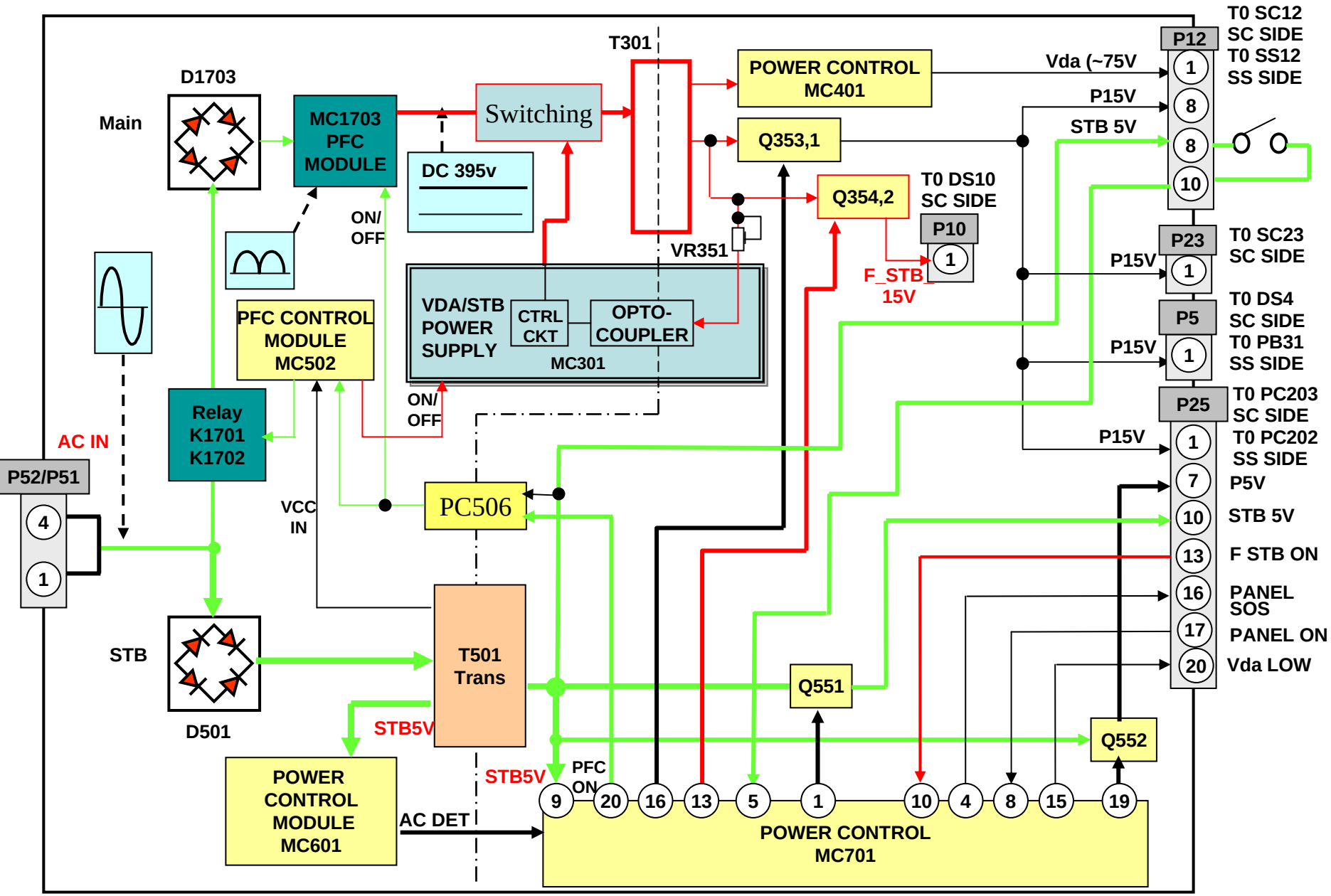
The STB5V out put at pin 10 of connector P25 is regulated to 3.3V and applied to the DN board MPU, IC4701. Pin 1 of IC4701 outputs 2.5V (Tuner SUB_ON) to the P board via pin 29 of the connectors DN2/D3 and pin 13 of the connector D25/P25. It is then connected to pin 10 (F. STB ON) of the “Power Control” IC, MC701.

The power control IC, MC701 outputs the “PFC ON” command to the PFC Control Module MC502 and the PFC MODULE MC1703 via the Photo-coupler PC506. MC502 outputs the “Relay ON” command to activate the relays K1701 and K1703.

The diode D1703 rectifies the 120VAC from the relay and outputs to the “PFC MODULE” MC1703.

The PFC Module MC1703 converts the DC voltage from the rectifier to 395Vdc to improve the power ratio.

P Board Circuit (Standby Operation 3)

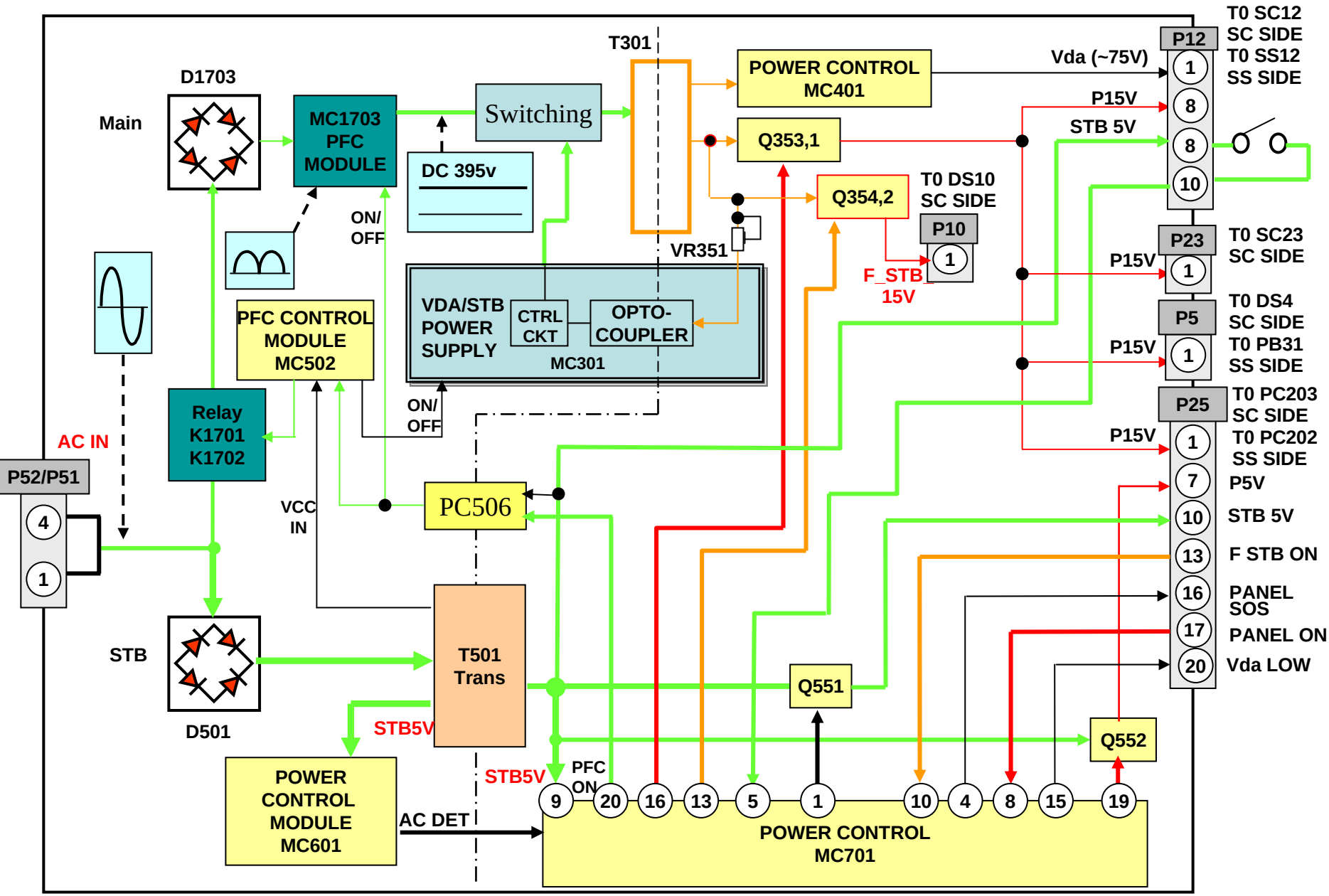


P Board Circuit (Standby Operation 3)

Standby Power Supply

The 395Vdc is then applied to a switch mode power supply that consists of T301, MC301, and the switching circuit. The secondary output of the transformer T301 provides the Vda, 15V, and F STB 15V lines. Due to the critical nature of the VDA voltage, it is stabilized by the power control IC MC401. During standby operation, both the Vda, and 15V supplies are switched off. Only the **“**F STB 15V**”** is output from the power supply module.

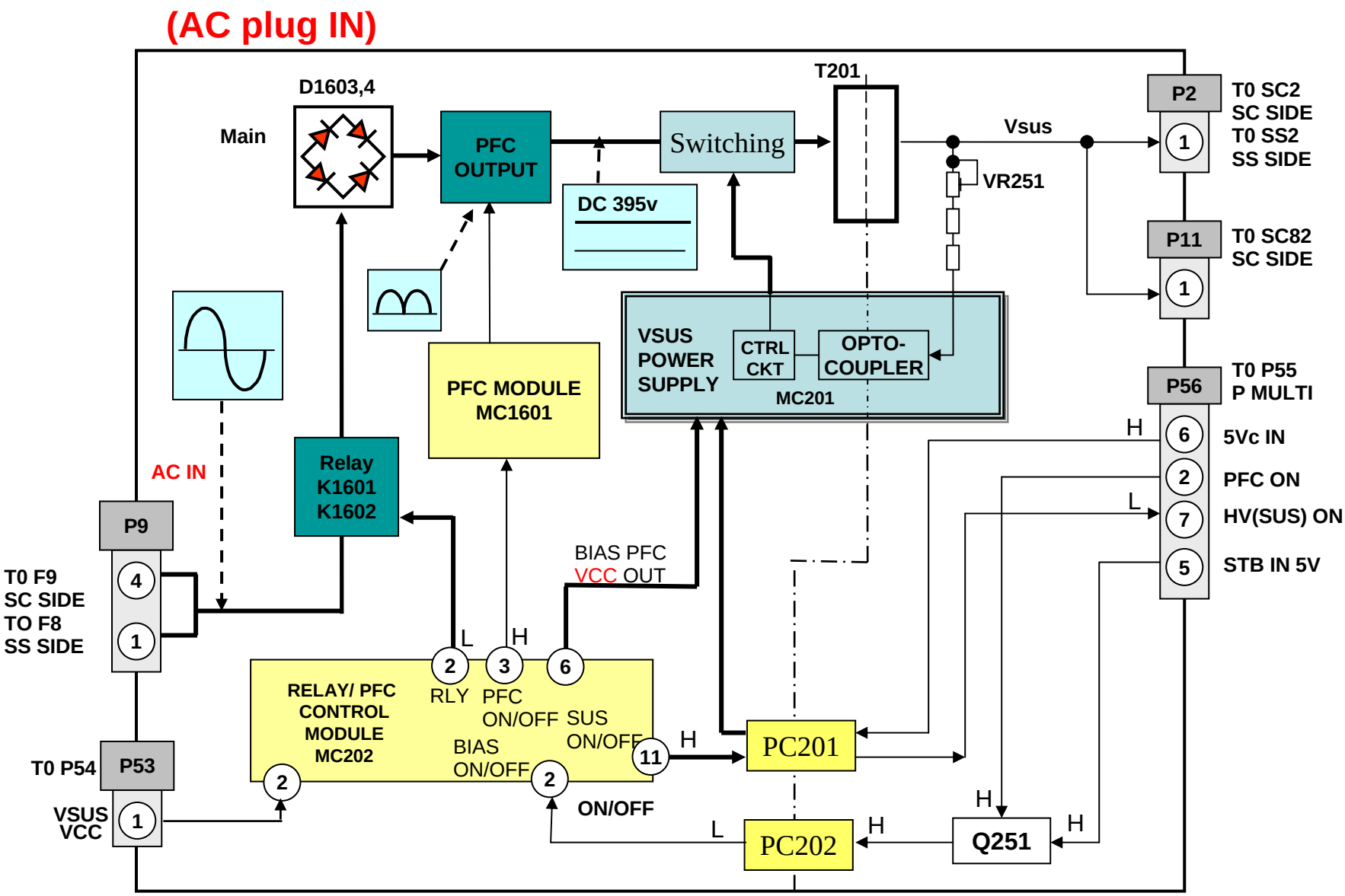
P Board Circuit (Main Voltages)



P Board Circuit (Main Voltages)

When the unit is turned on, the MAIN_ON command (3.2V) of the D board Microprocessor enters pin 8 of MC701 via pin 17 of connector P25. As a result, Pin 16 of MC701 switches from 5V to 1.3V, and pin 19 from a low to a high. The 1.3V at pin 11 causes Q353 and Q351 to turn on and output 15Vdc. The 15V source is primarily used by the D, SC, and SS boards. The high at pin 19 of MC701 causes Q552 to turn on and output 5Vdc. The 5V source is connected to every board involved with panel drive operation. The Power Control Module MC401 also receives a trigger (not shown in the diagram) from MC701 to output the Vda voltage. The Vda voltage is used to power the shift register ICs that are connected to the data electrodes of the panels. Prior to entering the panel, it passes through the DR boards for energy recovery operation.

P Board Circuit (VSUS)



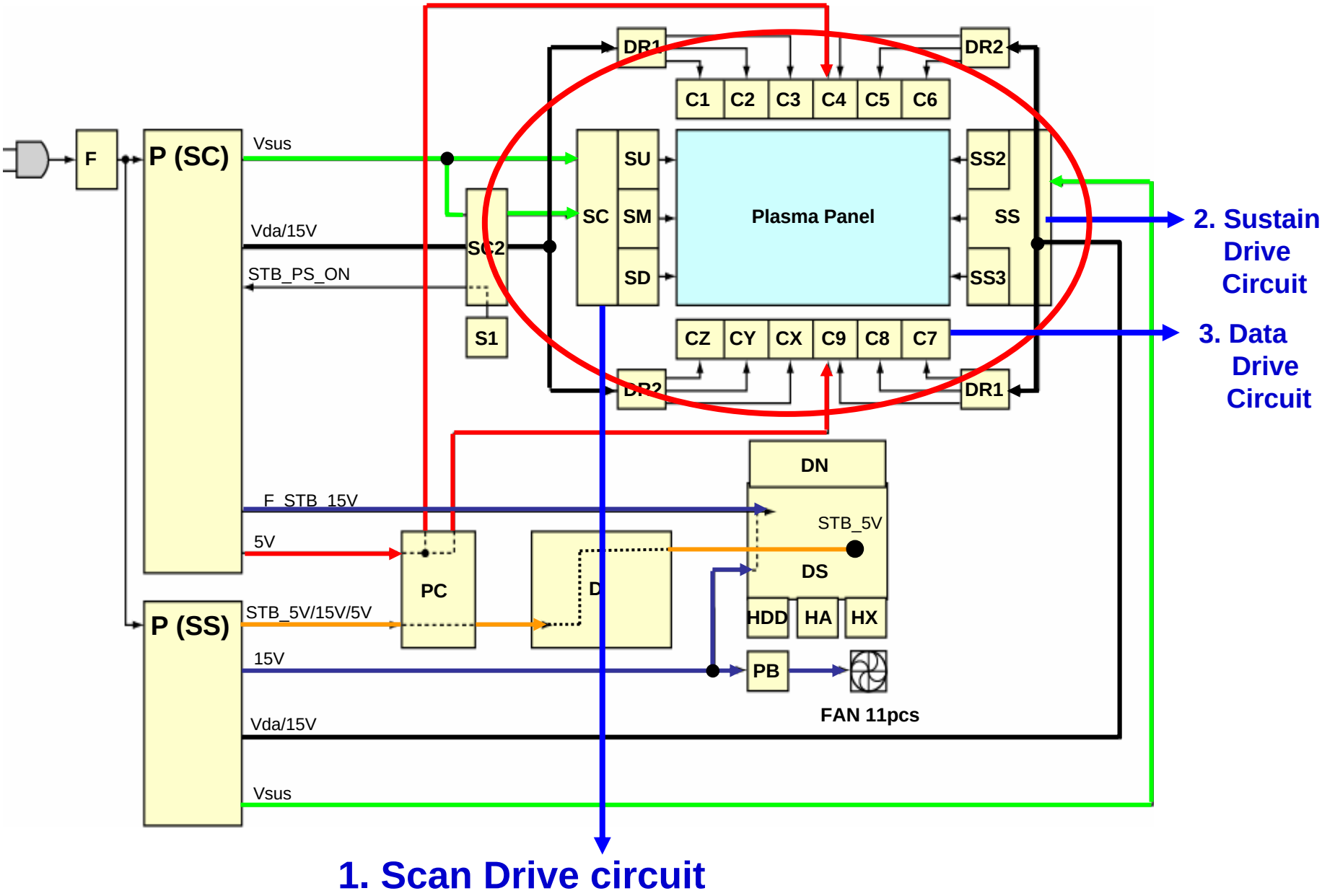
P Board Circuit (VSUS)

The input voltages in this drawing originate at the standby power supply. The commands that trigger the operation of this circuit originate at MC701. One of the STB5V generated by the standby power supply enters pin 2 of the Power Control Module MC202 via pin 1 of connector P53. Another STB5V generated by the same standby power supply enters pin 5 of connector P56. When the monitor is turned on, the PFC_ON command turns on the transistor Q251 to output the STB5V to PC202. Consequently, PC202 turns on to provide a low to pin 2 of MC202. The HV SUS_ON command enters pin 7 of connector P55/P56 to turn on the photo-coupler PC201. The high at pin 11 of MC202 passes through PC201 to turn on MC201. At the same time, pin 6 of MC202 outputs the B+ voltage to power MC201. Pin 2 goes low to provide a current path for the power relays K1601 and K1602. Simultaneously, Pin 3 of MC202 goes high to bias the PFC module MC1701.

The rectifier “D1603, 4” rectifies the 120VAC from the relay and outputs to the “PFC MODULE” MC1601. The DC voltage from the rectifier is converted to 395Vdc by MC1601 to improve the power ratio.

The 395Vdc is then applied to the switch mode power supply that consists of T201, MC201, and switching circuit. The output of the secondary of the transformer T201 provides the AC voltage that is rectified into the VSUS voltage. The Sustain and Scan operation circuits use this voltage.

Voltage Distribution



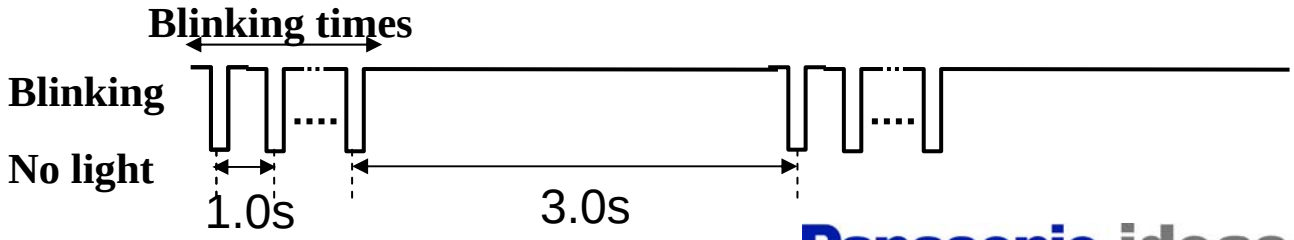
Intentionally Blank

Protection Circuits

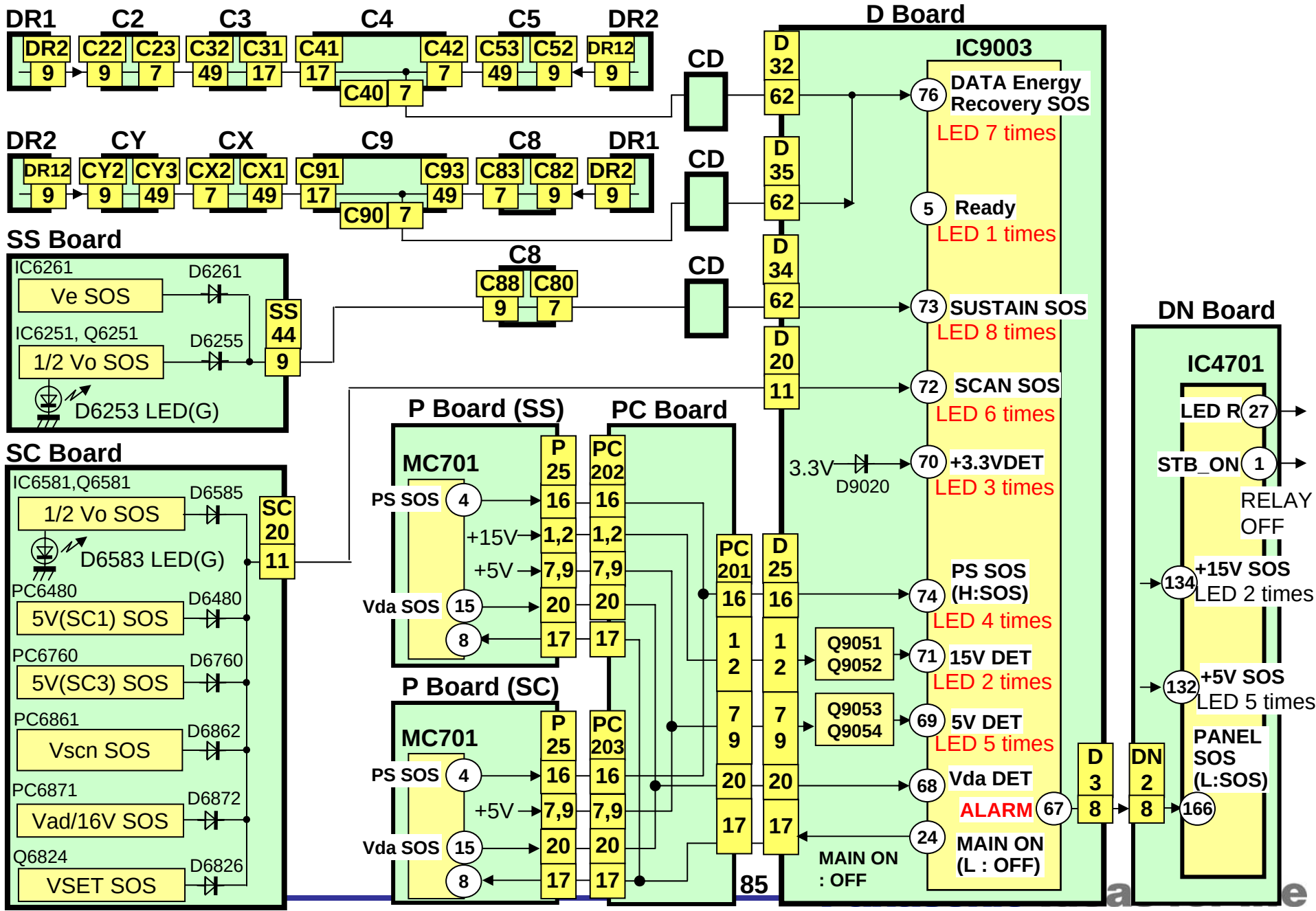
LED blinking (Not final)

LED Blinking time	SOS item	D board CPU IC9003's Pin No.	DN board CPU IC4701's Pin No.	Defective board mainly
1	Micro computer error	No.5 L:SOS	No.165 L:SOS	D, DN
2	15V SOS	No.71 L:SOS	No.134 L:SOS	P(Multi/SS), D, DN, SS, PB, DR1/2
3	3.3V SOS	No.70 L:SOS		D
4	P board SOS (Vsus, Vda)	No.74 H:SOS		P(SUS/SC), P(Multi/SC), P(SUS/SS), P(Multi/SS)
5	5V SOS	No.69 L:SOS	No.132 L:SOS	P(Multi/SC), P(Multi/SS), D, DN, C1-CZ, SC, SS, DR1/2
6	SC board Power SOS SC board floating voltage SOS	No.72 H:SOS		SC, SC2, SU, SM, SD, D, P(SUS/SC),P(Multi/SC)
7	Data signal power collect SOS	No.76 H:SOS		DR1/2, D, P(SUS/SC), P(Multi/SC), P(SUS/SS), P(Multi/SS), C1-CZ
8	SS board power collect SOS	No.73 H:SOS		SS, D, P(SUS/SC), P(Multi/SS)
9	ROM access error	EEPROM data		D
10	DS board, Slot power SOS		IC3004 contact	SLOT1, SLOT2, SLOT3, DS
11	F A N SOS		No.130 H:SOS	FAN ,PB
13	DN board power SOS (3.3V, 2.5V, 1.8V, 1.5V)		No.139 L:SOS	DN , P(SUS/Multi)
15	Model code error		EEPROM data	DN

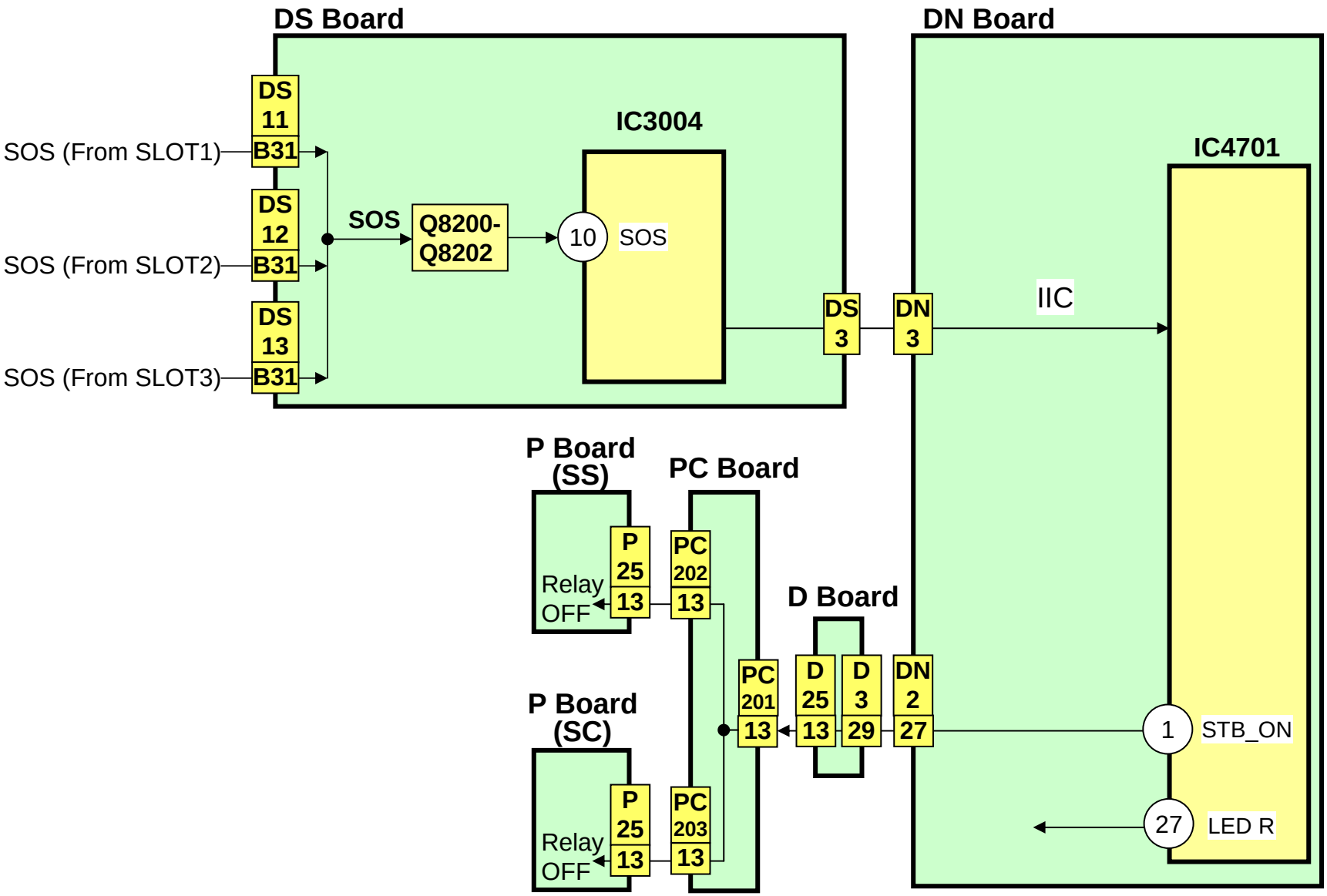
RED LED Blinking



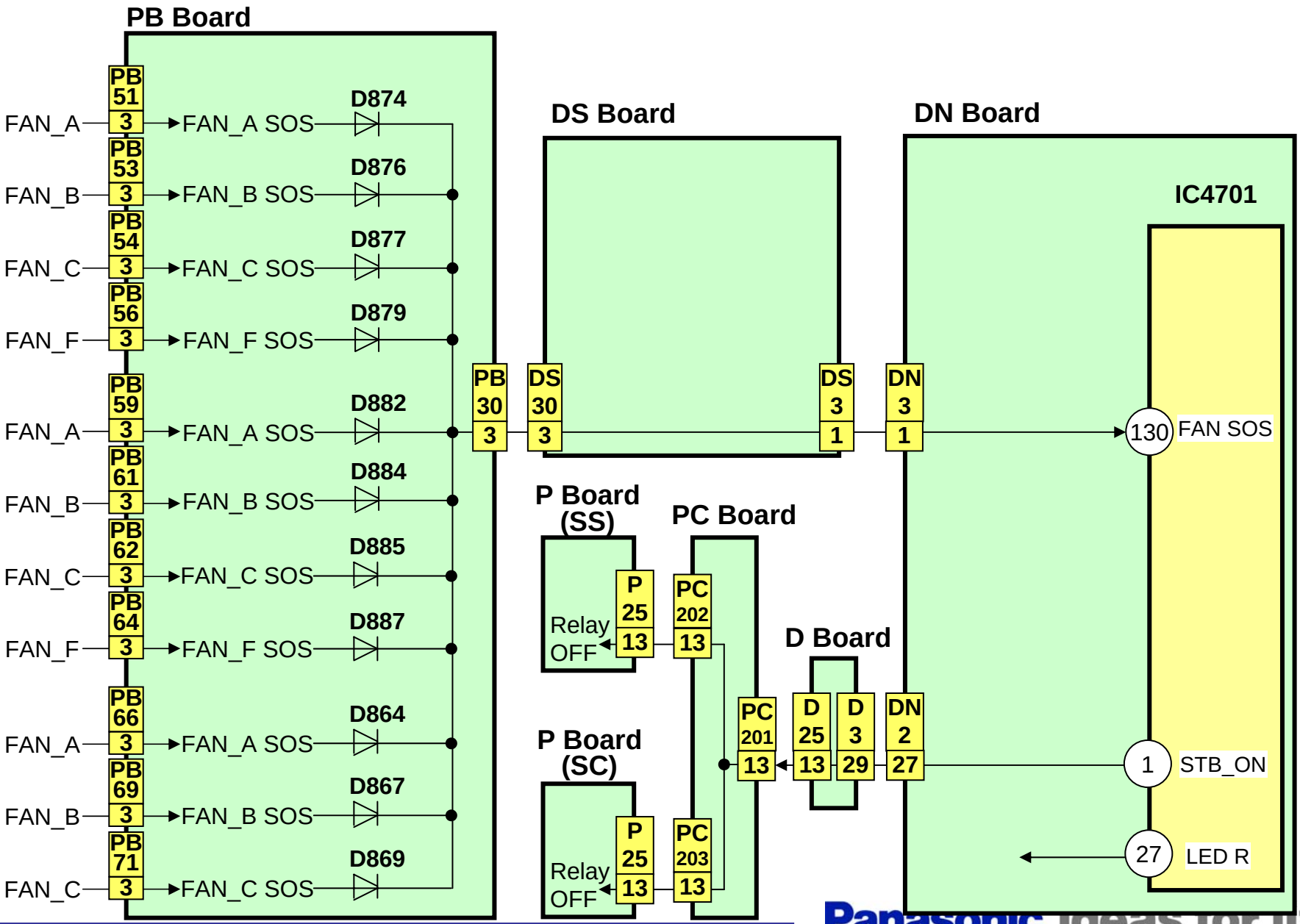
Panel SOS Circuit _ Power LED Blinks 1~8 times



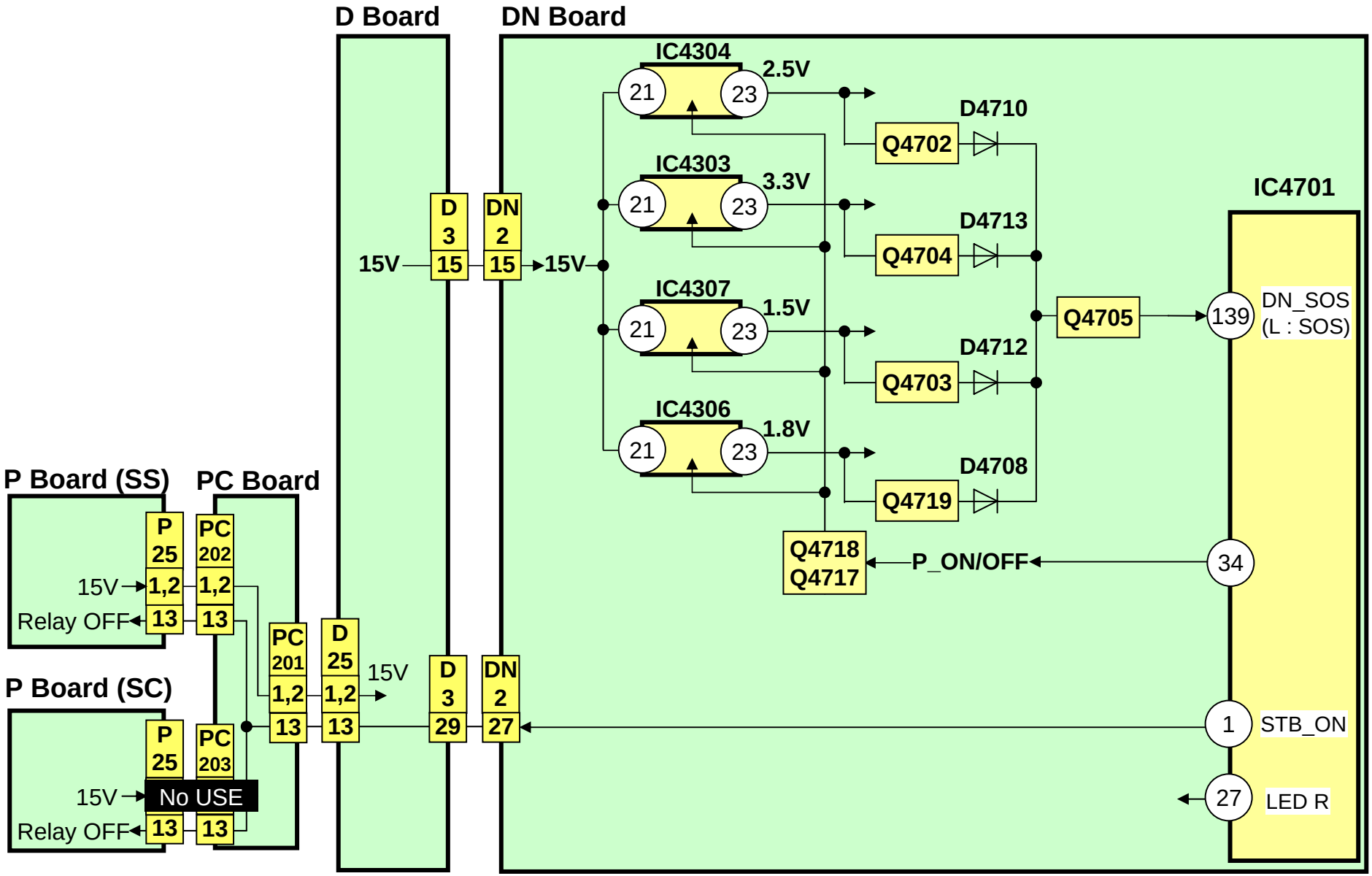
DS Board SOS Circuit _ Power LED Blinks 10 times



FAN SOS _ Power LED Blinks 11 times



DN Board SOS Power LED Blinks 13 times



Alignment Procedure

Driver Set-up

Item / Preparation:

1. Access the IIC mode and set the Aging Pattern to 0 (Vset adjustment pattern).
2. Set the picture adjustment items as follows:
   - Picture menu : Standard
   - Color temperature : Normal
   - Picture : 25
   - Aspect : Full

Caution:

1. First perform Vsus voltage adjustment.
2. Confirmation of Vscn voltage should be performed after the adjustment of Vad voltage

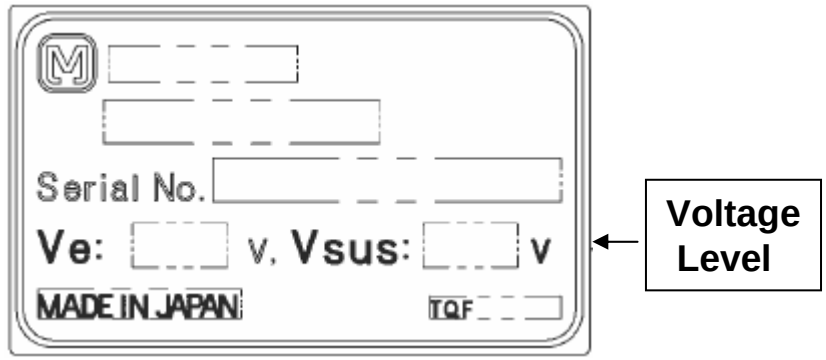
When Vad = -85V, Vscn Voltage is 55V ± 4V.

Adjustments

Perform the Driver Setup Adjustments.
Check or adjust the voltages with a multimeter.

Note: Refer to the panel data on the panel label for voltages that are not listed in the service manual.

Panel Label



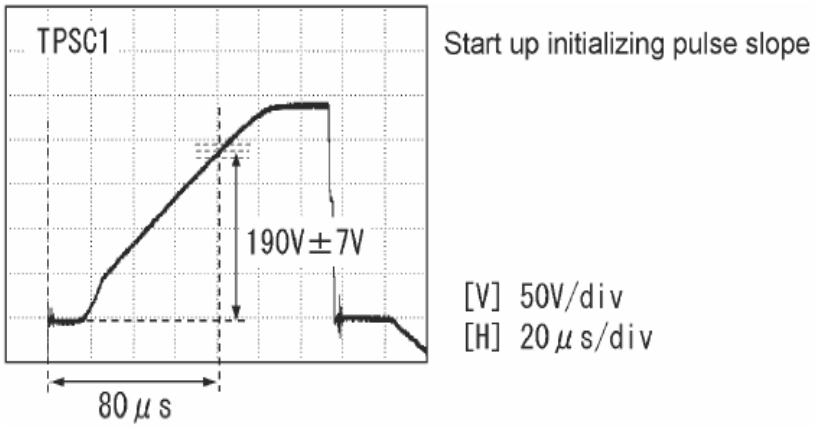
Driver Setup Voltages

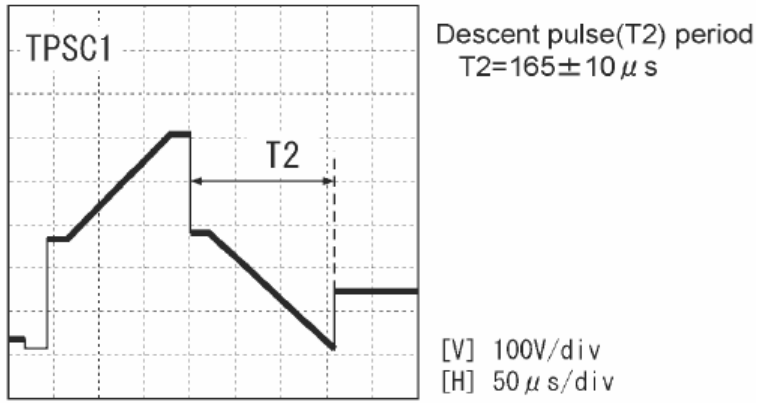
Name	Test Point	Voltage	Volume	Remarks
Vsus	TPVSUS (SS)	Vsus ± 0.5V	VR251 (P_SS side)	*
Vsus	TPVSUS (SC)	Vsus ± 0.5V	VR251 (P_SC side)	*
Ve	TPVE (SS)	Ve ± 1V	VR6000 (SS)	*
Ve2	TPVE2 (SS)	5± 1V	(Fixed)	
Vad	TPVAD (SC2)	-85V ± 1V	VR6600 (SC2)	
Vscn	TPVSCN (SC2)	Vad + 140 ± 4V	VR6605 (SC2)	
Vset	TPVSET (SC2)	240 ± 1V	VR6604 (SC2)	
Vset2	TPVSET2 (SC)	Vad + 8 + 1V, -0V	VR6603 (SC)	
Vbk	TPVBK (SC2)	150 ± 1V	VR6351 (SC2)	
Vda	TPVDA (DR1)	75 ± 1V	(Fixed) (P_SC side)	
Vda	TPVDA (DR2)	75 ± 1V	(Fixed) (P_SC side)	
Vda	TPVDA (DR1)	75 ± 1V	(Fixed) (P_SS side)	
Vda	TPVDA (DR2)	75 ± 1V	(Fixed) (P_SS side)	
Vc	TPVC (DR1)	45 ± 0.5V	VR600 (DR1_SC)	
Vc	TPVC (DR2)	45 ± 0.5V	VR650 (DR2_SC)	
Vc	TPVC (DR1)	34.5 ± 0.5V	VR600 (DR1_SS)	
Vc	TPVC (DR2)	34.5 ± 0.5V	VR650 (DR2_SS)	

Initialization Pulse Adjustment

1. Access the IIC mode and Set the Aging pattern to 0 (Vset adjustment pattern).
2. Set the picture adjustment items as follows.
   - Picture menu : Standard
   - Color temperature : Normal
   - Picture : 25
   - Aspect : Full
3. Connect the Oscilloscope to TPSC1 and adjust VR6601 for 190V ± 7V.
4. Connect the Oscilloscope to TPSC1 (T2) and adjust VR6602 for 165 ± 10µ Sec.

	Test point	Volume	Level
	TPSC1 (SC)	VR6601 (SC)	190V ± 7V
T2	TPSC1 (SC)	VR6602 (SC)	165 ± 10µ Sec





Quick adjustment after P.C.B. Replacement

Caution

After disconnecting AC power from the unit, allow 1 minute for capacitors to discharge before exchanging a P.C.B.

Quick adjustment after P.C.B. Replacement.

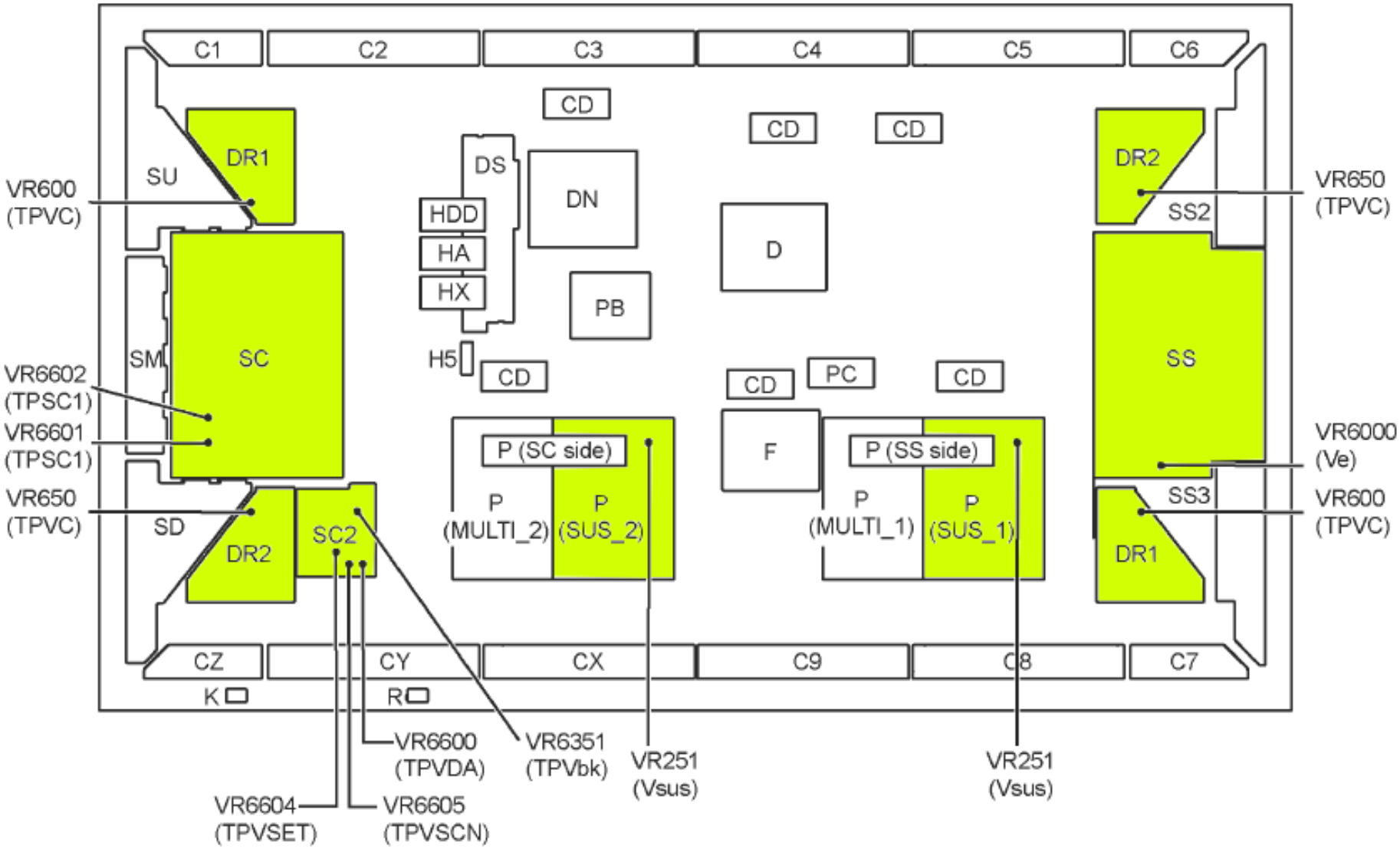
Adjust the following voltages with a multimeter

P.C.B.	Name	Test Point	Voltage	Volume	Remarks
P Board (SUS)	Vsus	TPVSUS (SS)	Vsus ± 0.5V	VR251 (P_SS side)	*
	Vsus	TPVSUS (SC)	Vsus ± 0.5V	VR251 (P_SC side)	*
SC2 Board	Vad	TPVAD (SC2)	-85V ± 1V	VR6600 (SC2)	
	Vscn	TPVSCN (SC2)	Vad + 140V ± 4V	VR6605 (SC2)	
	Vset	TPVSET (SC2)	240V ± 1V	VR6604 (SC2)	
	Vbk	TPVBK (SC2)	150V ± 1V	VR6351 (SC2)	
SS Board	Ve	TPVE (SS)	Ve ± 1V	VR6000 (SS)	*
DR1 Board	Vc	TPVC (DR1)	45 ± 0.5V	VR600 (SC side)	
			34.5 ± 0.5V	VR600 (SS side)	
DR2 Board	Vc	TPVC (DR2)	45 ± 0.5V	VR650 (SC side)	
			34.5 ± 0.5V	VR650 (SS side)	
D, DS Board	White balance and Sub brightness for NTSC, PAL, HD, PC and 625i signals				
DN Board	Set Market Select Number to correct destination by Ms mode (See chap. 10.1.4)				

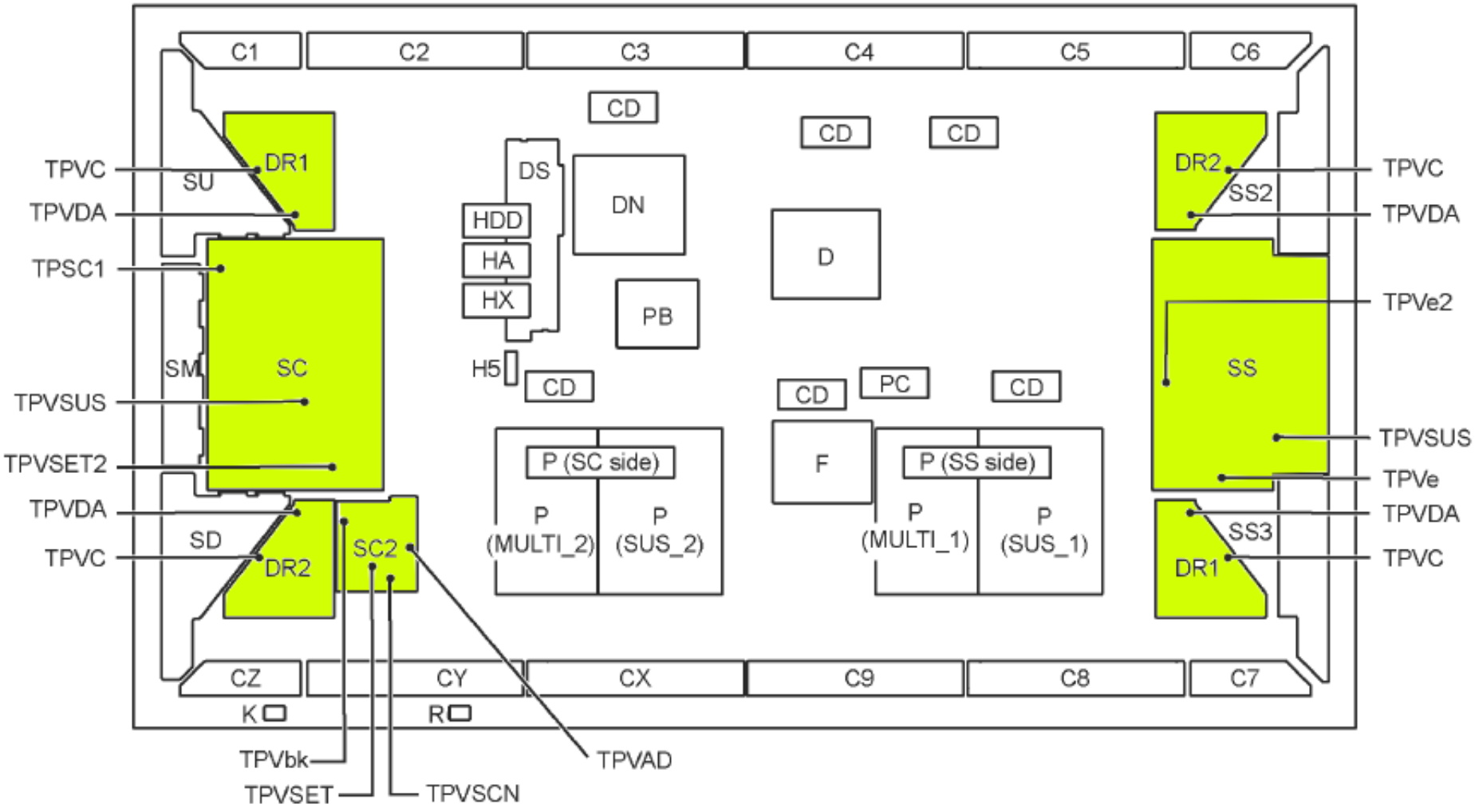
*See the Panel label.

Caution: Absolutely do not reduce Vsus voltage below Ve to avoid damaging the P.C.B.

Adjustment Volume Location



Adjustment Test Point Location

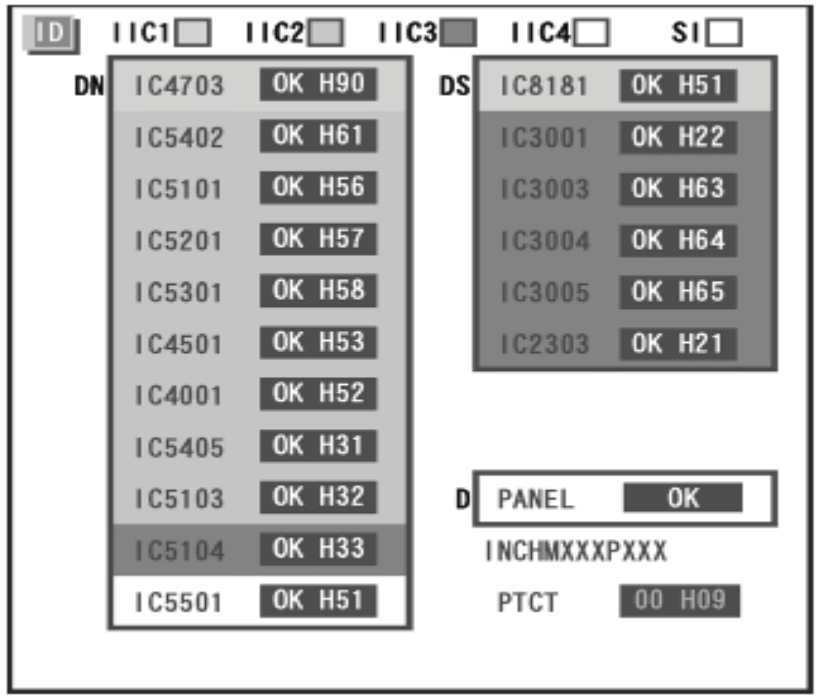


How to Enter the Self-check Screen (Reset)

1. Self-check is used to automatically check the communication status of the IIC bus lines.
2. To get into the Self-check mode, press the volume down button located on the side of the set.
3. At the same time press the OFF-TIMER button on the remote control. An OSD resembling the picture on the right shows up on the screen. If a CCU port is checked and found to be incorrect or not located, then **"--"** (two dashes) appear in place of "OK".
4. "01" in the "PTCT" line represents the number of blinks emitted by the Power LED after a shutdown.
5. "H09" in the "PTCT" line is the error code.

Note: The code displayed in the "PTCT" line is present in the first "Self-check Screen" activation only.

Self-check Screen



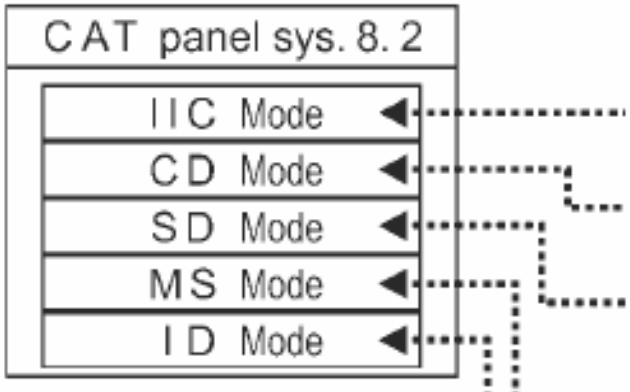
To exit the Self-check screen and reset the unit, disconnect the unit from AC power.

How to Enter the CAT (Serviceman) Mode

How to access the CAT mode.

Press and hold the **Volume/Down button** on the front panel of the unit and press the **status button** on the remote control three times within one second. The unit enters the CAT Mode.

To exit the **CAT** mode, access the **ID mode** and switch off the main power.



Mode	Function	Access button
IIC	Service Alignment	Action
CD (Complete Diagnostics)	Software version information EEPROM edit	Mute more than 5 seconds
SD (Status Display)	MTBF parameter	Action
MS Mode	Market Select	Mute more than 5 seconds
ID Mode	LSI Check	Mute more than 5 seconds

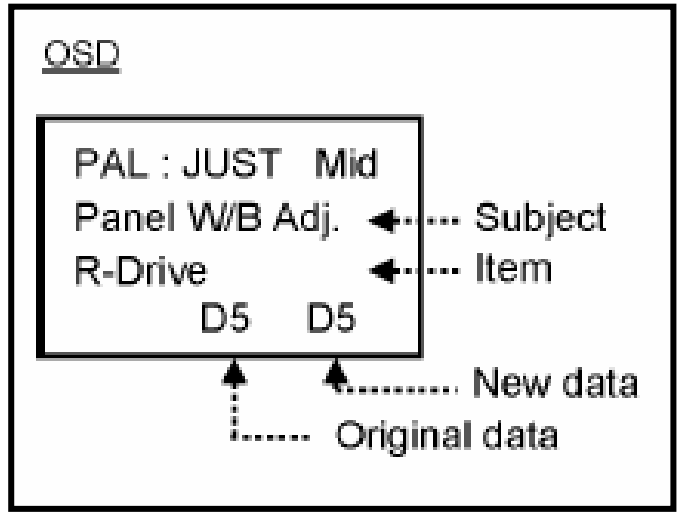
How to Enter the IIC Mode

Select the I²C mode by pressing the **Up/Down button** on the remote control from the front page of the CAT menu, and then press the **Action button** on the remote control.

How to use the I²C mode?

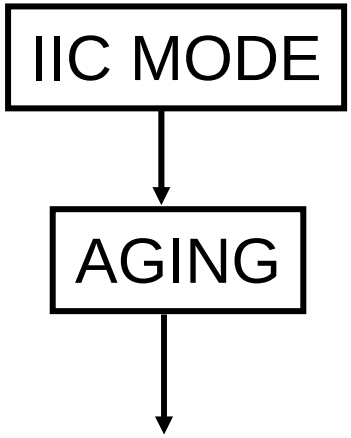
1. Select the alignment subject by pressing **the UP/Down buttons** on the remote control.
2. Select the alignment item by pressing the **Left and Right buttons** on the remote control.
3. Adjust the optimum setting by pressing **the Volume Up/Down buttons** on the remote control.
4. The data is memorized when the **R button** is pressed on the remote control or the alignment Subject (or item) is changed.

To exit the I²C mode, press the **R button** on the remote control.



How to Access the pattern generator

To access the internal pattern generator, select **AGING** from the main adjustment item of the IIC mode menu and press the **ACTION** button of the remote control. Press the **ACTION** button to navigate through the different patterns.

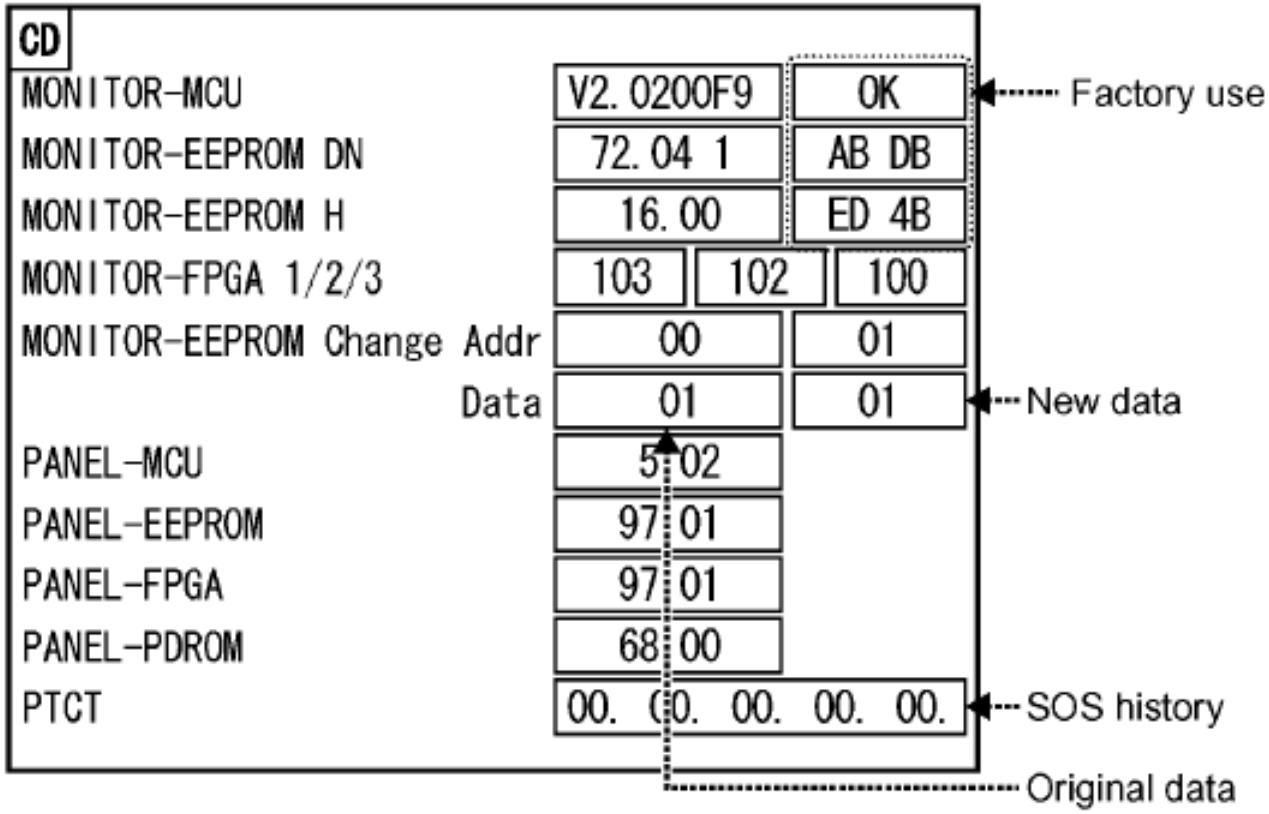


0 Vset ADJUSTMENT PATTERN
1 WHITE
2 RED
3 GREEN
4 BLUE
6 RAMP_W
7 RAMP_R
8 RAMP_G
9 RAMP_B
A 1%WINDOW
B COLOR BAR
C A/B ZONE
D SCROLL BAR
E BRIGHTNESS MEASUREMENT PATTERN

To Exit the internal pattern generator, press the [**R**] button of the remote control

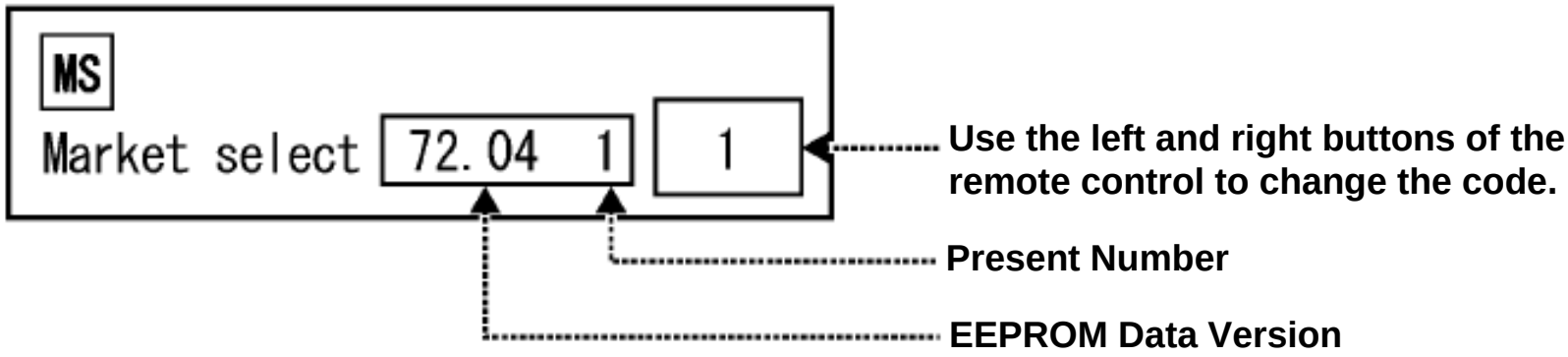
How to Enter the CD Mode

Select the **CD mode** of the CAT menu by using the **Up/Down button** on the remote control, then press the **Mute button** on the remote control for more than 5 seconds.



How to Enter the MS Mode

Select the **MS mode** of the CAT menu by using the **Up/Down button** on the remote control, then press the **Mute button** on the remote control for more than 5 seconds.



To exit the MS mode, press the **R button** on the remote control.
Caution: Market Select should be set after exchanging the DN Board.

North America's Market Code is "1".

North America's Hotel Model Market Code is "9".