PTV TRAINING

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HITACHI

MARCH 2006 Training Materials Prepared by: ALVIE RODGERS C.E.T.

PROJECTION TELEVISION

HITACHI DP-1X CHASSIS TRAINING

2001
MODEL RELEASE

DIGITAL
HD READY PTV

Chassis	Model #	Aspect
DP-14G	43UWX10B	16X9
	53UWX10B	
	61UWX10B	
DP-15	53UDX10B	4X3
	61UDX10B	
DP-15E	43FDX10B	4X3
	43FDX11B	
DP-17	53SWX10B	16X9
	61SWX10B	
	53SWX12B	Regional
	61SWX12B	Regional
	Anti-Glare	
	Ultra Shield Included	

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MICROPROCESSOR INFORMATION

DP-1X CHASSIS

SECTION 1

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DP-1X MICROPROCESSOR DATA COMMUNICATION DESCRIPTION

Microprocessor Data Communications circuit diagram. *(See Diagram on page 01-06)*
The Microprocessor must keep in communication with the Chassis to maintain control over the individual circuits. Some of the circuits must return information as well so the Microprocessor will know how to respond to different request.
The Microprocessor uses a combination of I^2C Bus communication and the Serial Data, Clock and Load lines for control. The I^2C communication scheme only requires 2 lines for control. These lines are called SDA and SCL. Serial Data and Serial Clock respectively.
The Microprocessor also requires the use of what are called Fan Out IC or DACs, (Digital to Analog Converters). This allows the Microprocessor to use only two lines to control many different circuits.
Also, due to the fact that this Microprocessor operates at the new 3.3Vdc voltage, it requires a Level Shift IC to bring up the DC level of the control lines to make it compatible with the connected ICs.
The Microprocessor communicates with the following ICs:

ON THE SIGNAL PWB:
Main Tuner U501
PinP Tuner U502
EEPROM I002
Flex Converter UC01
DAC1 I006
DAC3 I007
Level Shift I004
3D Y/C I301
Main Video Chroma I501
Rainforest IC01

ON THE TERMINAL PWB:
A/V Selector IX01
Sub Video Chroma IX03
Main Y Pr/Pb Selector IX04
Sub Y Pr/Pb Selector IX05

ON THE SURROUND PWB:
Front Audio Control IA01

The following explanation will deal with the communication paths used between the Microprocessor and the respected ICs.
ON THE SIGNAL PWB:
Main Tuner U501 (with MTS outputs).
The Microprocessor controls the Main Tuner by SDA (Data) and SCL (Clock) I^2C communication lines.
SCL1 and SDA1 lines for the Main Tuner are output from the Microprocessor at pins (**2 SDA1 and 3 SCL1**) respectively. These lines go directly to the Main Tuner, SDA1 at pin (**5**) and SCL1 at pin (**4**). These lines control band switching, programmable divider set-up information, pulse swallow tuning selection, etc...

PinP Tuner U502 (monaural only, but audio not used).
The Microprocessor controls the Main Tuner by SDA (Data) and SCL (Clock) I^2C communication lines.
SCL1 and SDA1 lines for the Main Tuner are output from the Microprocessor at pins (**2 SDA1 and 3 SCL1**) respectively. These lines go directly to the Main Tuner, SDA1 at pin (**5**) and SCL1 at pin (**4**). These lines control band switching, programmable divider set-up information, pulse swallow tuning selection, etc...

EEPROM I003
The EEPROM is ROM for many different functions of the Microprocessor. Channel Scan or Memory List, Customer set ups for Video, Audio, Surround etc… are memorized as well. Also, some of the Microprocessors internal sub routines have variables that are stored in the EEPROM, such as the window for Closed Caption detection.
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Data and Clock lines are **SDA1** from pin (**2**) of the Microprocessor to pin (**5**) of the **EEPROM** and **SCL2** from pin (**3**) of the Microprocessor to pin (**6**) of the **EEPROM**. Data travels in both directions on the Data line.

Flex Converter UC01

The projection television is capable of displaying NTSC as well as ATSC (DTV) including HD (High Definition). The Flex Converter is responsible for receiving any video input and converting it to 33.75 Khz output. This output is controlled by sync and by the customer's menu and how it is set up. The set up can be 4X3 or 16X9 for DTV, or letterbox. This set also has something called "Through Mode". This bypasses the Flex Converter completely and inputs the 1080i signal directly to the Rainforest IC. The Rainforest IC then output the signal directly as well as shrinking the vertical to match the 16 X 9 window by outputting "Vertical Squeeze", (V Squeeze not used for the 16 X 9 models). The Flex Converter can take any NTSC, S-In, Component, NTSC or Progressive, Interlaced, 480I, 720P, 1080i signal. *(Note: 1080i is routed through the Rainforest IC in 16 X 9 HD mode only).*

Control for the Flex Converter is Clock, Data and Enable lines.

Clock, Data and Enable lines for the Flex Converter are output from the Microprocessor at pins (**45 Data** and **46 FCENABLE**). The FCENABLE line is routed through the PFC1 connector pin 12 and the FCDATA line is routed through the PFC1 connector pin 11.

The **Clock** line must be routed through the Level Shift IC **I004** to be brought up to 5V. The Microprocessor output for Clock is pin 58, it arrives at **I004** at pins (**3 Clock**) and is output at pins (**17**). It arrives at the Flex Converter through the PFC1 connector pin 10.

DAC1 I006 *(See Diagram on page 01-07)*

This Digital to Analog converter acts as an extension of the Microprocessor. Sometimes called an Expansion IC. The purpose of this IC is to reduce the number of pins, (fan out) of the Main Microprocessor **I001**. The Main Microprocessor send Clock and Data via I^2C bus to the **DAC1** IC. The output from the Microprocessor is pin (**2 SDA1 and 3 SCL1**) which arrives at the **DAC1** IC **I006** at pins (**5 and 6**) respectively.

The following is a list of the input and output pins on DAC1.

PIN		FUNCTION
1.	Busy	Receives Busy from DCU stopping Microprocessor from responding to Remote commands.
2.	ST Det	Receives the Low from the Main Tuner indicating Stereo signal received.
3.	MTS	Places the Main Tuner into MTS mode if Stereo MTS Detected by Microprocessor
4.	F Mono	Places the Main Tuner into Forced MONO mode
5.	Ant	Switches the antenna block into Antenna A or Antenna B when selected.
6.	Cut Off	In Service Mode, if Set Up is selected, outputs High to collapse Vertical circuit and inhibit Vert. Sweep Loss Detection
7.	Magic Sw	Places the Unit into Magic Focus Mode, outputs Lo when MF activated by front control switch or Customer's Menu.
8.	Gnd	Ground
9.	D Size	During Magic Focus, the H and V Size has to be increased slightly for Sensor striking purposes. This pin goes Hi.
10.	SAP Det	Receives the Low from the Main Tuner indicating SAP signal received.
11.	Gnd	Ground Not Used
12.	Gnd	Ground Not Used
13.	STBY 5V	Standby +5 Volt input.
14.	SDA1	Serial Data from Microprocessor
15.	SCL1	Serial Clock from Microprocessor
16.	SBY +5V	Vcc SBY +5V

NOTE: Pin 1 Busy and Pin 9 D Size works as a tri-data-level-input according to table below.

Pin 1 Busy	Pin 9 D Size	Digital Convergence Module Active	Magic Focus
Lo	Lo	Inactive	Inactive
Hi	Lo	Active	Inactive
Hi	Hi	Active	Active
Lo	Hi	Not Possible	Not Possible

The Digital Convergence Module is active during Service Adjustment (DCAM), Magic Focus and/or Sensor Initialize.

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DAC3 I007 *(See Diagram on page 01-07)*

This Digital to Analog converter acts as an extension of the Microprocessor. Sometimes called an Expansion IC. The purpose of this IC is to reduce the number of pins, (fan out) of the Main Microprocessor **I001**. The Main Microprocessor send Clock and Data via I2C bus to the **DAC3** IC. The output from the Microprocessor is pin (**2 SDA1 and 3 SCL1**) which arrives at the **DAC3** IC at pins (**5 and 6**) respectively.

*The following is a list of the input and output pins on **DAC3**.*

PIN		FUNCTION
1	**Sig Det**	Detects the presents of Sync from Component Y signal for 1 or 2
2	**IR Det**	Detects IR from Remote for Auto Link Remote Set Up.
3	**P Vol**	Activates Perfect Volume determined by Customer
4	**AC3 Info**	T3 (Factory Use)
5	**FH Det Out 1**	T3 (Factory Use)
6	**FH Det Out 2**	T3 (Factory Use)
7	**FC Blue Back**	(Factory Use)
8	**Gnd**	Ground
9	**Magic Sw In**	When Magic Switch pressed on front Control Panel this pin goes Low, IC tells Microprocessor to output a Low from I006 pin 7 to start Magic Focus.
10	**IN5DET**	Detects Cr/Pr plug insertion for Component 5 input. (Component 4 is detected by Selector IC pin 7) • When no Cr/Pr plug inserted, set assumes Composite at the Y input.
11	**Gnd**	Ground Not Used
12	**Gnd**	Ground Not Used
13	**Gnd**	Ground Not Used
14	**SDA**	Data I^2C communications between DAC2 and Microprocessor
15	**SCL**	Clock I^2C communications between DAC2 and Microprocessor
16	**Vcc**	IC B+. (STBY +5V).

NOTE: Pin 2 The IR pulse from the Remote Control is monitored when Auto Link is set.

Level Shift I004

The Microprocessor operates at 3.3Vdc. Most of the Circuits controlled by the Microprocessor operate at 5Vdc. The Level Shift IC steps up the DC voltage to accommodate.

- Pin 4 output a Clock, used by the Flex Converter
- Pin 11 output Error Mute signal (ERRMUTE), used to mute the Out to Hi-Fi jacks on the SRS PWB.
- Pin 13 outputs a Speaker Off signal (FSPOFF), used to turn off the internal speakers.

3D Y/C I301 *(IC mounted directly on the Signal PWB).*

The 3D Y/C IC is a Luminance/Chrominance separator, as well as a 3D adder. Separation takes place digitally. Using advanced separation technology, this circuit separates using multiple lines and doesn't produce dot pattern interference or dot crawl. The 3D effect is a process of adding additional emphasis signals to the Luminance and Chrominance. These signals relate specifically to transitions. Transitions are the point where the signal goes from dark to light or vice versa. The 3D adds a little more black before the transition goes to white and a little more white just before it gets to white. It also adds a little more white just before it goes dark and a little more dark just before it arrives. This gives the impression that the signal pops out of the screen or a 3D effect. The Microprocessor communicates with the 3D Y/C IC via I^2C bus data and clock. The communications ports from the Microprocessor are pins (**59 SDA2** and **60 SCL2**) to the 3D Y/C **I301** pins (**59** and **60**) respectively. The Microprocessor also is able to turn on and off circuits within the 3D Y/C circuit determined by customer menu set-up.

Main Video Chroma I501

The Main Video Chroma IC processes the video and chroma from the 3D Y/C circuit for the main picture. It converts video into Y and chroma into Cr/Cb (NTSC Only). Communication from the Microprocessor via pins (**59 SDA2** and **60 SCL2**) to **I501** pins (**34** and **33**) respectively.

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Rainforest IC01 (Video/Chroma Processor)

The Video Processing IC (Rainforest) is responsible for controlling video/chroma processing before the signal is made available to the CRTs. Some of the emphasis circuits are controlled by the customer's menu. As well as some of them being controlled by AI, (Artificial Intelligence).
Communication from the Microprocessor via pins (**59 SDA2** and **60 SCL2**) to the Rainforest IC pins (**31** and **30**) respectively.

ON THE TERMINAL PWB: ***(Through the connector PST1)***

A/V Selector IX01

The A/V Selector IC is responsible for selecting the input source for the Main Picture as well as the source for the PinP or Sub picture. Communication from the Microprocessor via pins (**2 SDA1** and **3 SCL1**) to the PST1 connector pins (**5** and **4**) respectively then to **IX01** pins (**34** and **33**) respectively.

Sub Video Chroma IX03

The Sub Video Chroma IC processes the video and chroma for the Sub or PinP picture. It converts Luminance into Y and Chroma into Cr/Cb (NTSC Only). Communication from the Microprocessor via pins (**59 SDA2** and **60 SCL2**) to connector **PST1** pins (**8** and **7**) to **IX03** pins (**34** and **33**) respectively.

Main Y Pr/Pb Selector IX04

Any input that is not already in the Y Pr/Pb or Y Cr/Cb state, will have be converted to this state by **I501**.
The Main Y Pr/Pb Selector IC selects the appropriate input between the Tuner, AV Inputs, S-Inputs or Components. Communication from the Microprocessor via pins (**59 SDA2** and **60 SCL2**) to connector **PST1** pins (**8** and **7**) to **IX04** pins (**31** and **30**) respectively.

Sub Y Pr/Pb Selector IX04

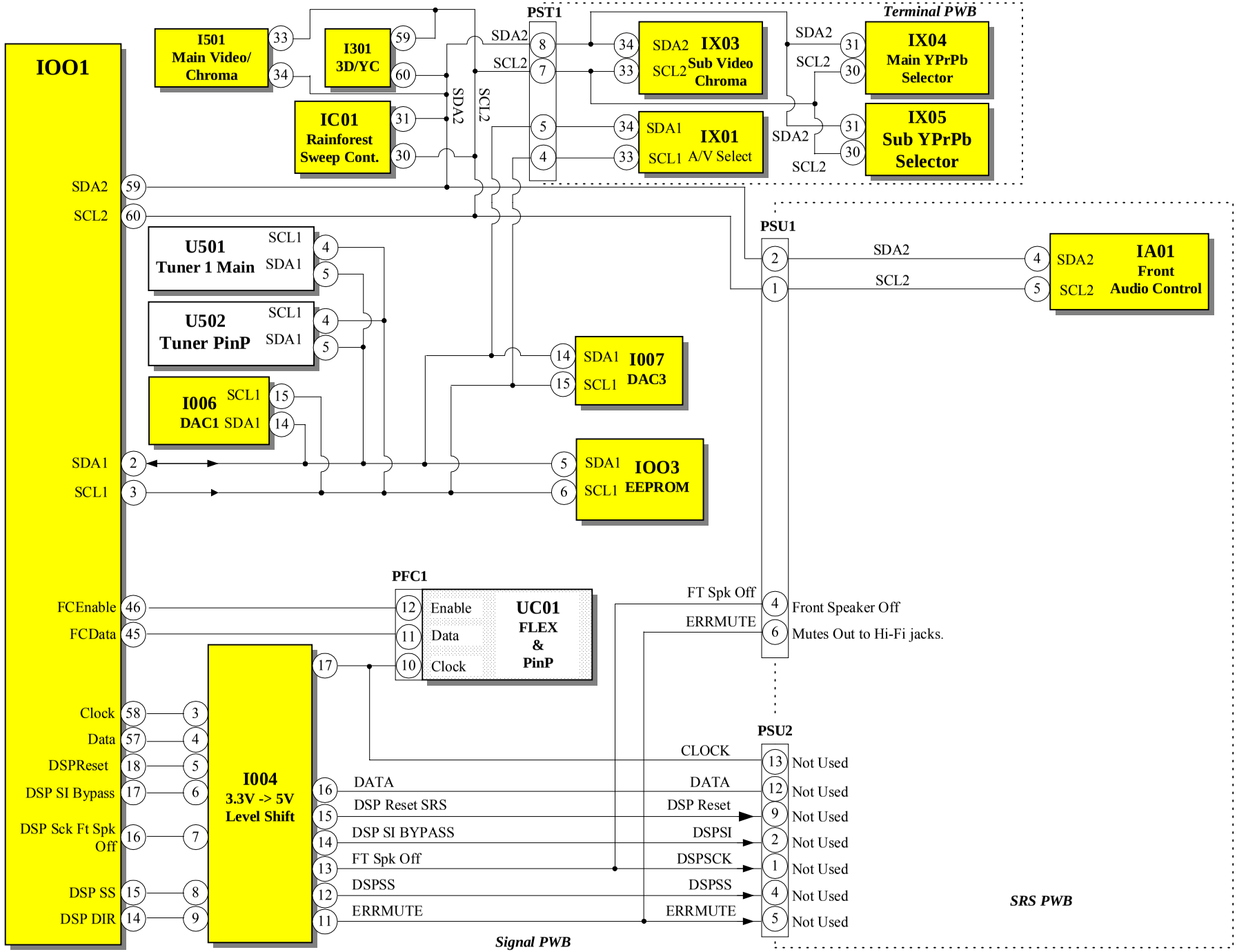
Any Sub input that is not already in the Y Pr/Pb or Y Cr/Cb state, will have be converted to this state by **IX03**.
The Sub Y Pr/Pb Selector IC selects the appropriate input between the Tuner, AV Inputs, S-Inputs or Components. Communication from the Microprocessor via pins (**59 SDA2** and **60 SCL2**) to connector **PST1** pins (**8** and **7**) to **IX05** pins (**31** and **30**) respectively.

ON THE SURROUND PWB *(Through the PSU1 connector)*:

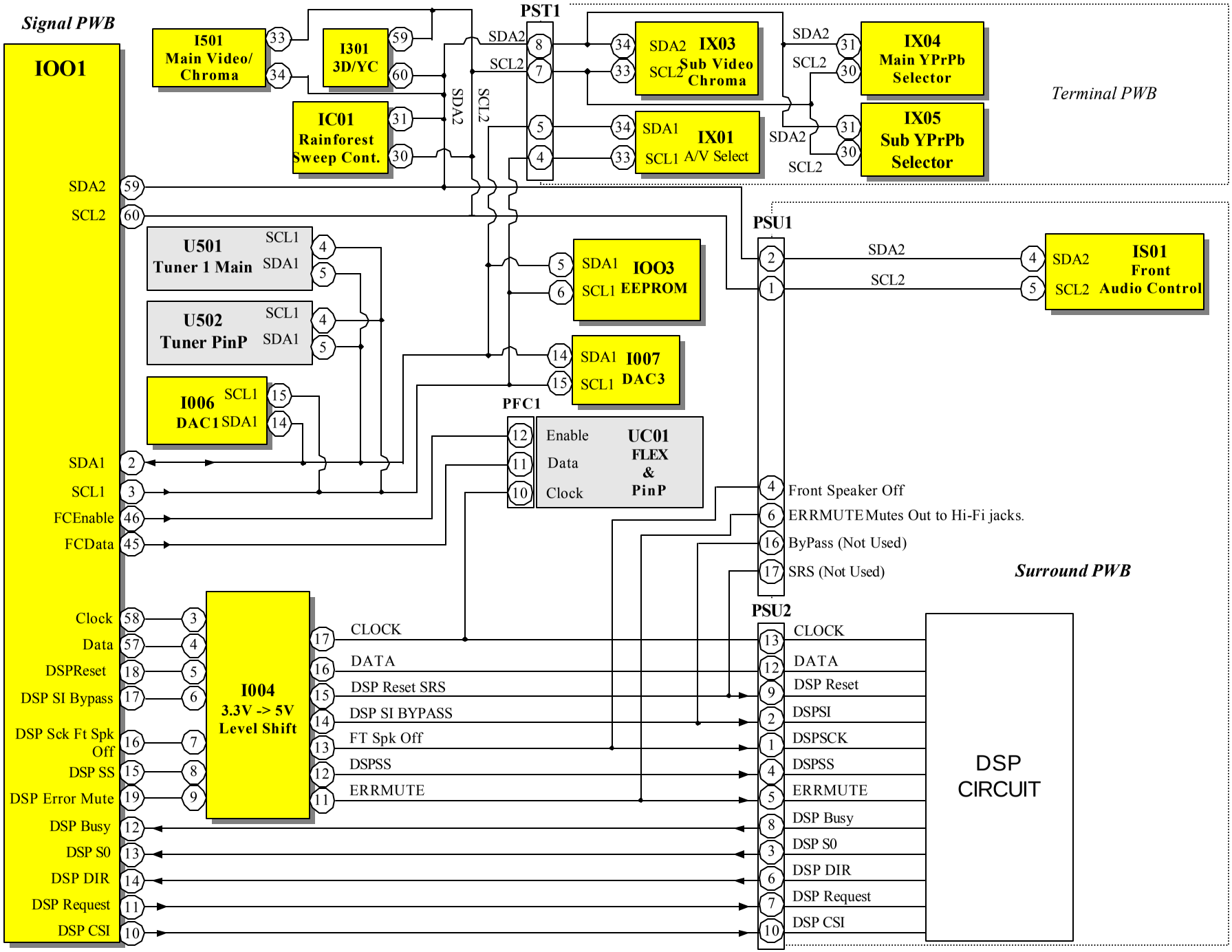
Front Audio Control IC IA01

Audio control is performed by this IC. Selection for different Audio modes, volume, base, treble, etc... The Main Microprocessor sends Clock and Data via I^2C bus to this IC. The output from the Microprocessor is pins (**59 SDA2 and 60 SCL2**) respectively then through the connector **PSU1** pins (**2** and **1**) which arrives at **IA01** at pins (**4 and 5**) respectively.

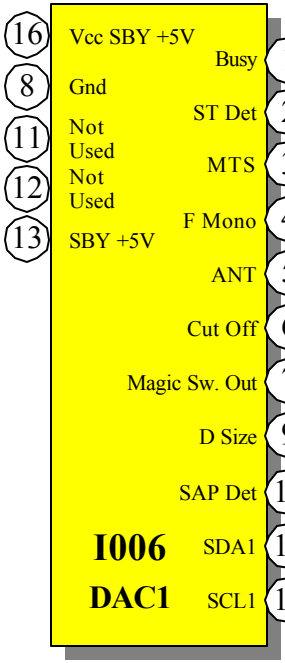
DP1X (Not DP17) CHASSIS MICROPROCESSOR DATA COMMUNICATIONS CIRCUIT DIAGRAM



DP-17 CHASSIS MICROPROCESSOR DATA COMMUNICATIONS CIRCUIT DIAGRAM



DP-1X SERIES CHASSIS DAC 1 and DAC 3 INFORMATION



1 ← Receives Busy from DCU stopping Microprocessor from responding to Remote commands.

2 ← Receives the Low from the Main Tuner indicating Stereo signal received.

3 → Places the Main Tuner into MTS mode if Stereo MTS Detected by Microprocessor

4 → Places the Main Tuner into Forced MONO mode

5 → Switches the Antenna Switch Assembly from Antenna 1 to Antenna 2

6 → In Service Mode, if Set Up is selected, outputs High to collapse Vertical circuit and inhibit Vert. Sweep Loss Detection

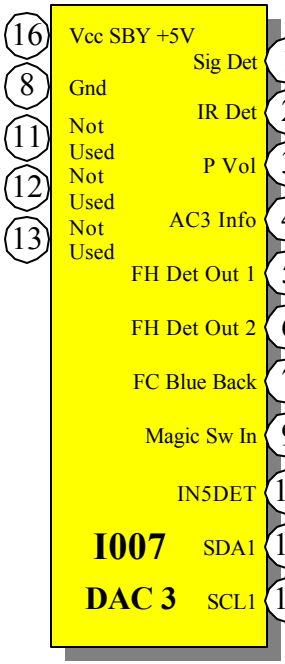
7 → When Magic Focus Sw pressed or from Menu Selection, this pin goes Low and Places the DCU into Magic Focus Mode

9 ← During Magic Focus, when the H and V Size has to be increased slightly for Sensor striking purposes. The DCU output D Size (Hi). (Not in the 16X9 models

10 ← Receives the Low from the Main Tuner indicating SAP signal received.

14 ↔ Serial Data from Microprocessor

15 ← Serial Clock from Microprocessor



1 ← Detects active Sync from Component Y signal for 1 or 2

2 ← Detects IR from Remote for Auto Link Remote Set Up

3 ← Activates Perfect Volume determined by Customer

4 ← T4 (Factory Use)

5 ← T5 (Factory Use)

6 ← T6 (Factory Use)

7 ← T7 (Factory Use)

9 ← When Magic Switch pressed on Ft. Control Panel, this pin goes low, Micro tells I006 pin 7 to go high.

10 ← Detect Pr/Cr plug insertion for Component 5 input. If NO, then composite is assumed.

14 ↔ Serial Data from Microprocessor

15 ← Serial Clock from Microprocessor

Note: Component 4 Pr/Cr is detected by the Selector IC.

DP-1X ON SCREEN DISPLAY (OSD) SIGNAL PATH DESCRIPTION

The Microprocessor is responsible for generating On Screen Display (OSD) related to the Main Menu, Volume Control, Channel Number, Closed Caption Display, Clock, etc… It also generates the OSD for the Service Menu. However there are actually two different sources for generating OSD, the Microprocessor and the Digital Convergence Unit, (DCU).

MICROPROCESSOR AS THE SOURCE FOR OSD:

The Microprocessor receives information related to timing for H. Blanking pin (**49**) and V. Blanking pin (**55**). The Microprocessor determines the position for each display using these signals as a timing pulse.
When it's necessary, the Microprocessor generates 1uSec pulses from pins **(37 Red, 38 Green and 39 Blue**) that are routed through (**QC21 Red, QC20 Green** and **QC19 Blue**) and then sent to the Rainforest IC **IC01** pins **(39 Red, 38 Green and 37 Blue**) as OSD signals. When the OSD signals are high, they turn on the output of the Red or Green or Blue chroma amps inside the Rainforest IC and output a pulse to the CRTs to generate that particular character in the particular color.

HALF TONE PIN (40):

This pin is responsible for controlling the background transparency of the Main Menu. When the customer calls up the Main Menu, they can select the CUSTOM section. Within the CUSTOM section is MENU BACKGROUND. There are three selections for this, GRAY, SHADED, and CLEAR.

- **CLEAR:** Selection turns off any background for the Menu and video is clearly seen behind the Menu.
  - CLEAR**:** No output during the display of the Menu.
- **SHADED:** Selection add a transparent background which makes the Menu easier to see and also some of the video behind the Menu.
  - SHADED**:** 1/2 Vcc pulse equal to the timing of the Menu background.
- **GRAY:** Selection generates a GRAY background for the MENU blocking video behind the Menu. This is accomplished by outputting any one of three different pulses from pin (**40**) of the Microprocessor. This signal is then routed to (**QC16**) and then to the Rainforest IC **IC01** pin (**36**) as **YS1** signal which does the following:
  - **GRAY:** Full Vcc equal to the timing of the Menu background.

OSD BLANKING PIN (51):

This pin is responsible for muting the video at the same time each character is produced by the Microprocessor. This pulse is in exact time with the character, however it is slightly longer. In other words, just before any character is produced, this pin goes high and just after any character turns off, this pin turns off. This clears up the video behind the OSD character to make it easier to read.
OSD Blk is produced from pin (**51**) of the Microprocessor. This signal is then routed to the Rainforest IC **IC01** pins (**50 YS2 OSD** and **51 YS1 OSD**) which mutes the video when these pins are high. They also prevent the output of the peak high Y component for Velocity Modulation.

CLOSED CAPTION DISPLAY FROM THE MICROPROCESSOR SOURCE:

The Microprocessor is also responsible for stripping the Closed Caption Display (CCD) from within the Vertical Sync on horizontal line 21. It receives the composite video signal at pin (**28**). This signal is tapped off the main video path before it arrives at sync separator **Q010~12**. The tapped video is routed through **Q014** to the Microprocessor at pin (**28**). *(See Sync Signal Path Circuit Diagram and Explanation for Details).*

DCU (Digital Convergence Unit HC2153) AS THE OSD SOURCE:

The DCU (Digital Convergence Unit) generates it's own OSD patterns and text. Like the Adjustment Grid, Cursor, certain blinking patterns, Words associated with DCAM, etc… The DCU generates OSD in the same fashion as the Microprocessor. The DCU generates Digital Red from pin (**11**), Digital Green from pin (**12**) and Digital Blue from pin (**10**) output from the **PDG** connector and then through (**QK06 Dig Red, QK07 Dig Green** and **QK08 Dig Blue**). The DCU OSD is then routed through the **PDK1** connector pins (**11 Red, 12 Green and 13 Blue**) and then through the **PSD1** connector pins (**2 Red, 4 Green and 6 Blue**) They then are sent through (**QC24 Red, QC23 Green** and **QC22 Blue**) and finally arrive at the Rainforest IC **IC01** pins (**35 Analog Red In, 34 Analog Green In and 33 Analog Blue In**) as Digital Convergence graphic signals.

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BUSY SIGNAL:

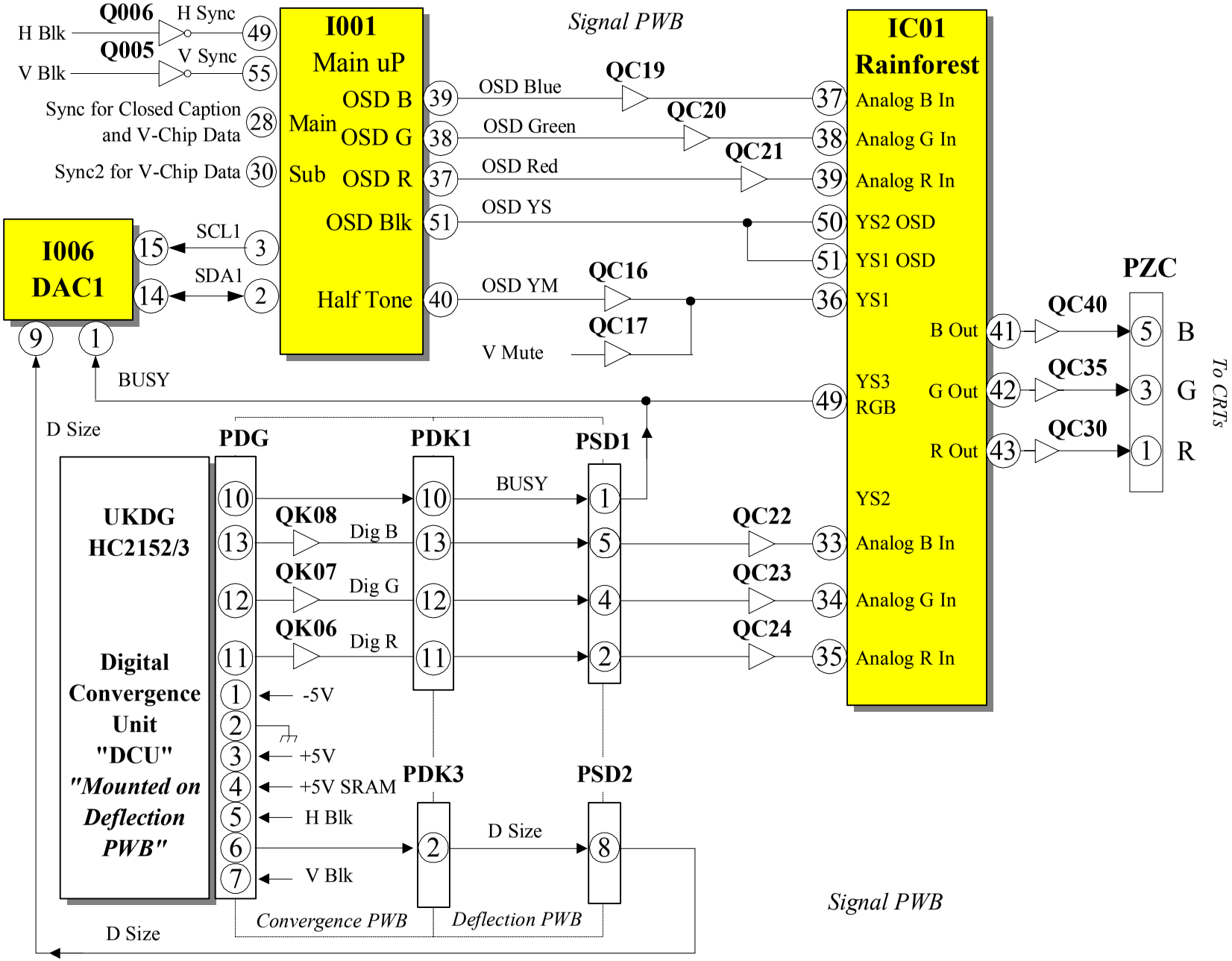
When the DCU is activated by pressing the Service Only switch on the Deflection PWB, the DCU outputs a **BUSY** signal. This signal does two things.

1. It tells the Microprocessor to ignore Infrared Remote commands. It does this by outputting the **BUSY** signal from pin (**10**) of the **PDG** connector, then through the **PDK1** connector pin (**10**). Then through the **PSD1** connector pin (**1**). Then to **I006** (*the Analog to Digital converter*). The Analog to Digital converter outputs this information in digital form through the I^2C bus to the microprocessor. The I^2C data is output from pin (**14 SDA1** and timed by the clock **15 SCL1**) They arrive at the Microprocessor **I001** pins (**2** and **3**). When the Microprocessor receives this BUSY signal, it ignores all Infrared Remote commands.
2. It blanks video so that the DCU graphics can be see easily. This is accomplished by the same **BUSY** signal being routed from pin (**10**) of the **PDG** connector, then through the **PDK1** connector pin (**10**). Then through the **PSD1** connector pin (**1**). It is then routed to the Rainforest IC **IC01** pin (**49**) as **YS3** signal which mutes video.

GRAPHICS PRODUCED BY THE DCU:

- Cross hatch grid.
- Colored Cursor which blinks indicating the adjustment point
- Different text such as, Read from ROM?, Write to ROM?
- Light pattern for Sensor Initialization
- Light pattern for Magic Focus.
- The DCU can also turn off individual colors during adjustment. Everything except Green. This is accomplished by not producing the particular color's characters from the DCU.

DP-1X CHASSIS "On Screen Display, OSD" SIGNAL CIRCUIT DIAGRAM



DP-1X AUDIO and VIDEO MUTE SIGNAL PATH DESCRIPTION

V MUTE 1 EXPLANATION: *(See Diagram on page 01-13)*
There are certain times when the Microprocessor or other circuits must Mute the video or audio. The Microprocessor is responsible for Muting the Audio/Video during Channel Change, Power On/Off, Child Lock, AVX Selected with no input, etc….
This is accomplished via pin (**56**) of the Microprocessor. When V Mute is activated, a high is routed through **D019** to the base of **Q023** turning it ON. The collector goes low and pulls the base of **Q022** low turning it ON. The emitter of **Q022** is connected to **STBY +11V**, so when it turns ON, it's collector output goes HIGH. This high is now called **V Mute 1**. V Mute 1 is routed to two circuits, for Video Mute and for Audio Mute.

FOR VIDEO MUTE:
There are two different signals that mute video on the Rainforest IC, **IC01** pin (**52 FBP In**):

1. **V MUTE 1**
   - This high is routed through the **PSZ2** connector pin (**6**) to **DX08**. DX08 sends this high to the base of **QX18** turning it OFF. The emitter of **QX18** is connected to the SW +9V line and when it turns OFF the emitter pulls up HIGH. This pulls up pin (**25**) of **IX01** the Rainforest IC and Mutes the Video. Oddly enough, this high is sent into the same pin as the Flyback Pulse used for horizontal blanking. So it can be thought of as an extremely long blank pulse.
2. **HALF TONE PIN:**
   This pin is responsible for controlling the background transparency of the Main Menu. When the customer calls up the Main Menu, they can select the CUSTOM section. Within the CUSTOM section is MENU BACKGROUND. There are three selections for this, GRAY, SHADED, and CLEAR.
   - **CLEAR:** Selection turns off any background for the Menu and video is clearly seen behind the Menu.
     - CLEAR**:** No output during the display of the Menu.
   - **SHADED:** Selection add a transparent background which makes the Menu easier to see and also some of the video behind the Menu.
     - SHADED**:** 1/2 Vcc pulse equal to the timing of the Menu background.
   - **GRAY:** Selection generates a GRAY background for the MENU blocking video behind the Menu. This is accomplished by outputting any one of three different pulses from pin (**40**) of the Microprocessor. This signal is then routed to (**QC16**) and then to the Rainforest IC **IC01** pin (**36**) as **YS1** signal which does the following:
     - GRAY: Full Vcc equal to the timing of the Menu background.

V Mute 1 FOR AUDIO MUTE:
The **V Mute 1** signal is also routed to the base of **Q021** turning it ON. The high produced on it's emitter is now called **V Mute 2** which is routed to two places.

1. To the anode of **DJ04**, to the base of **QJ03** which turn ON and grounds pin (**11**) of **IJ01** placing the Front Audio output IC into Mute.
2. To **PSU1** connector pin (5) which mutes the (**OUT TO HiFi**) audio. *See the SRS Mute Circuit diagram details*.

ERRMUTE pin (19) of the Microprocessor:
When the Microprocessor deems it necessary to mute the audio, it outputs a **ERRMute** signal from pin (**19**) to **I004** pin (**9**) the Level Shift IC. This IC outputs the high from pin (**11**) to two places;

1. To the anode of **DJ01**, then to the base of **QJ01** and **QJ02** which grounds the audio input to pin (**4** Right audio in and **2** Left audio in) of **IJ01** Audio Output IC.
2. To the **Surround PWB** via the **PSU1** connector pin (**6**) called Mute. Then to **DA02** to drive the base of **QA05** and **QA06** high, turning them on. They ground the audio outputs for (**OUT TO HiFi**) and they are muted.

See the Surround Mute Circuit diagram and explanation for details.

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F.Spk Off FRONT SPEAKER OFF:

When the customer accesses the Main Menu and selects the Front Speaker Off selection, the Microprocessor I001 outputs a high from pin (16). This high is routed to **I004** pin (**7**) the Level Shift IC. This IC outputs the high from pin (**13**) to the following circuit;

1. To the anode of **DJ02**, then to the base of **QJ01** and **QJ02** which grounds the audio input to pin (**4** Right audio in and **2** Left audio in) of **IJ01** Audio Output IC.

- ***NOTE:*** *This line also goes to* ***PSU1*** *connector pin* ***4****, but not used in this chassis.*

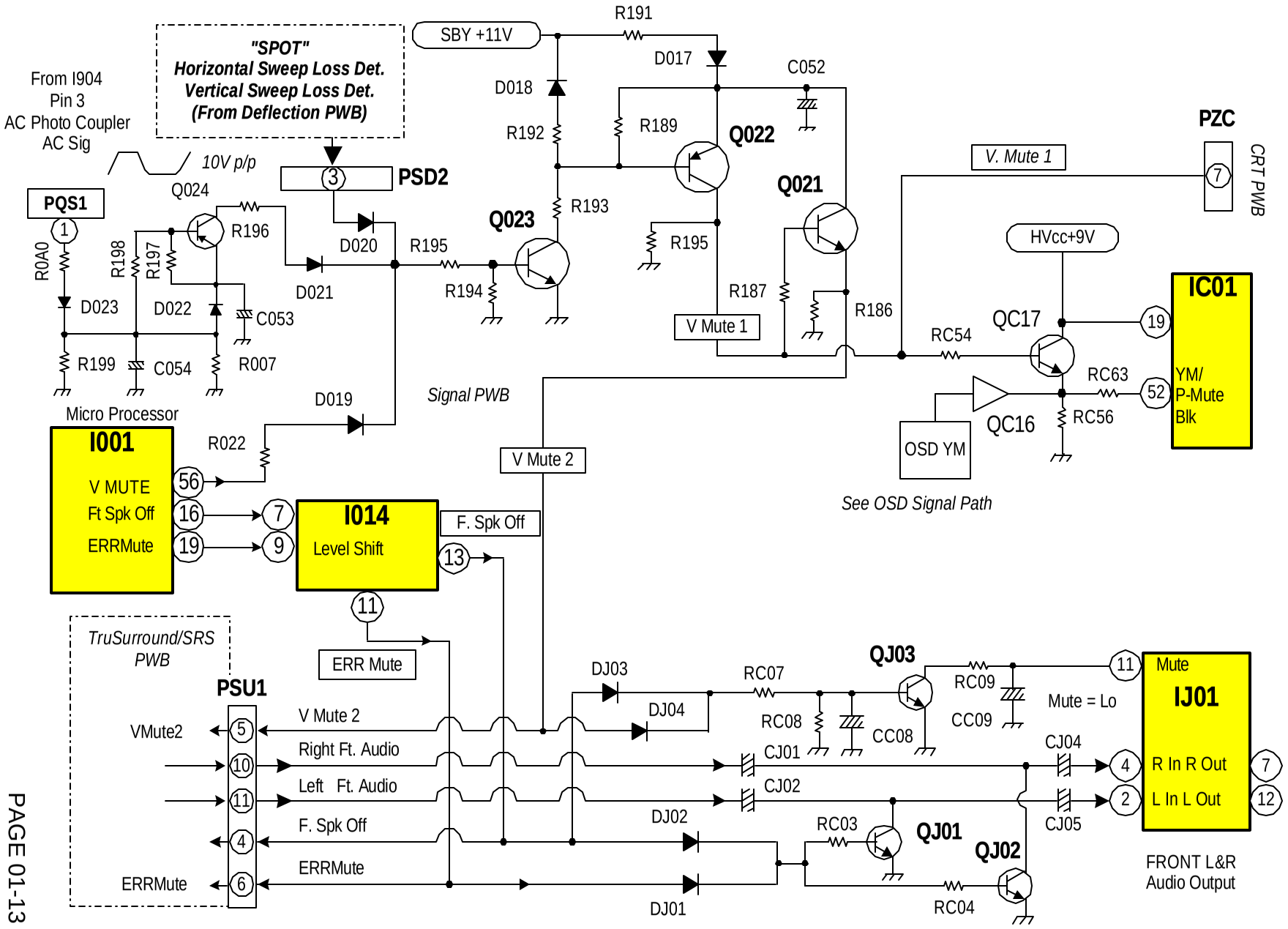
AC LOSS DETECTION:

AC is monitored by the AC Loss detection circuit. The AC input from **PQS1** pin (**1**) is rectified by **D023**. This charges up **C054** and through **DN22** it charges **C053**. When AC is first applied, **C053** charges slightly behind **C054** preventing activation of **Q024**. If AC is lost, **C054** discharges rapidly pulling the base of **Q024** low, however **D022** blocks **C053** from discharging and the emitter of **Q001** is held high. This action turns on **Q024** and produces a high on it's collector. This high is routed through **D021** to the base of **Q023** turning it ON. The collector goes low and pulls the base of **Q022** low turning it ON. The emitter of **Q022** is connected to **STBY +11V**, so when it turns ON, it's collector output goes HIGH. This high is now called **V Mute 1**. V Mute 1 is routed to two circuits, *see V Mute 1 explanation on the previous page.*

SPOT:

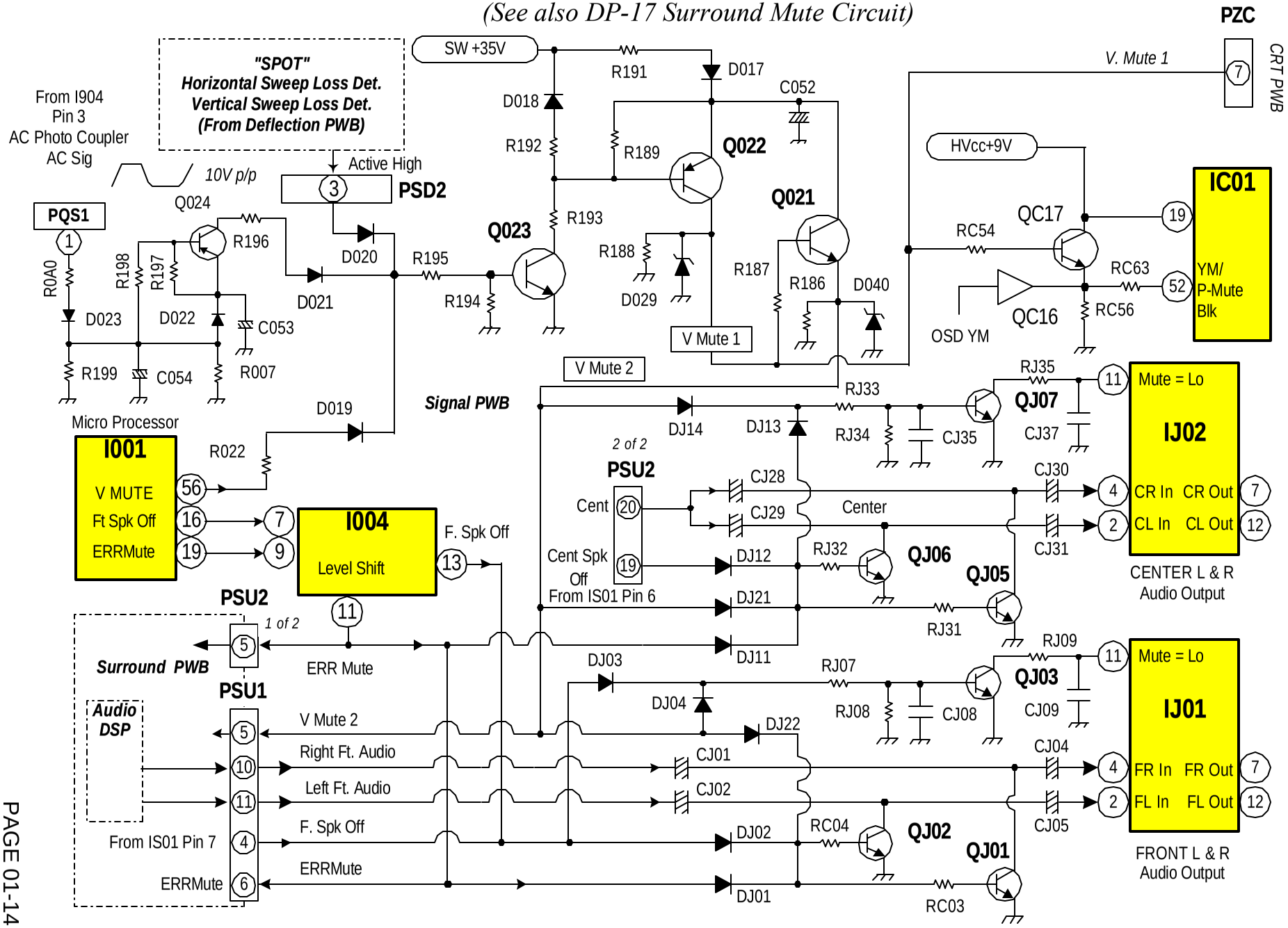
SPOT is generated from the deflection PWB when either Horizontal or Vertical deflection is lost. This is to prevent a horizontal or vertical line from being burnt into the CRTs. *See Horizontal and Vertical Sweep Loss Detection circuit and explanation for details.* This high is input from **PSD2** pin (**3**), through **D020** to the base of **Q023** turning it ON. The collector goes low and pulls the base of **Q022** low turning it ON. The emitter of **Q022** is connected to **STBY +11V**, so when it turns ON, it's collector output goes HIGH. This high is now called **V Mute 1**. V Mute 1 is routed to two circuits, *see V Mute 1 explanation on the previous page*.

DP-1X Series Chassis AUDIO and VIDEO MUTE Circuit
Without DSP *(See also Surround Mute Circuit)*



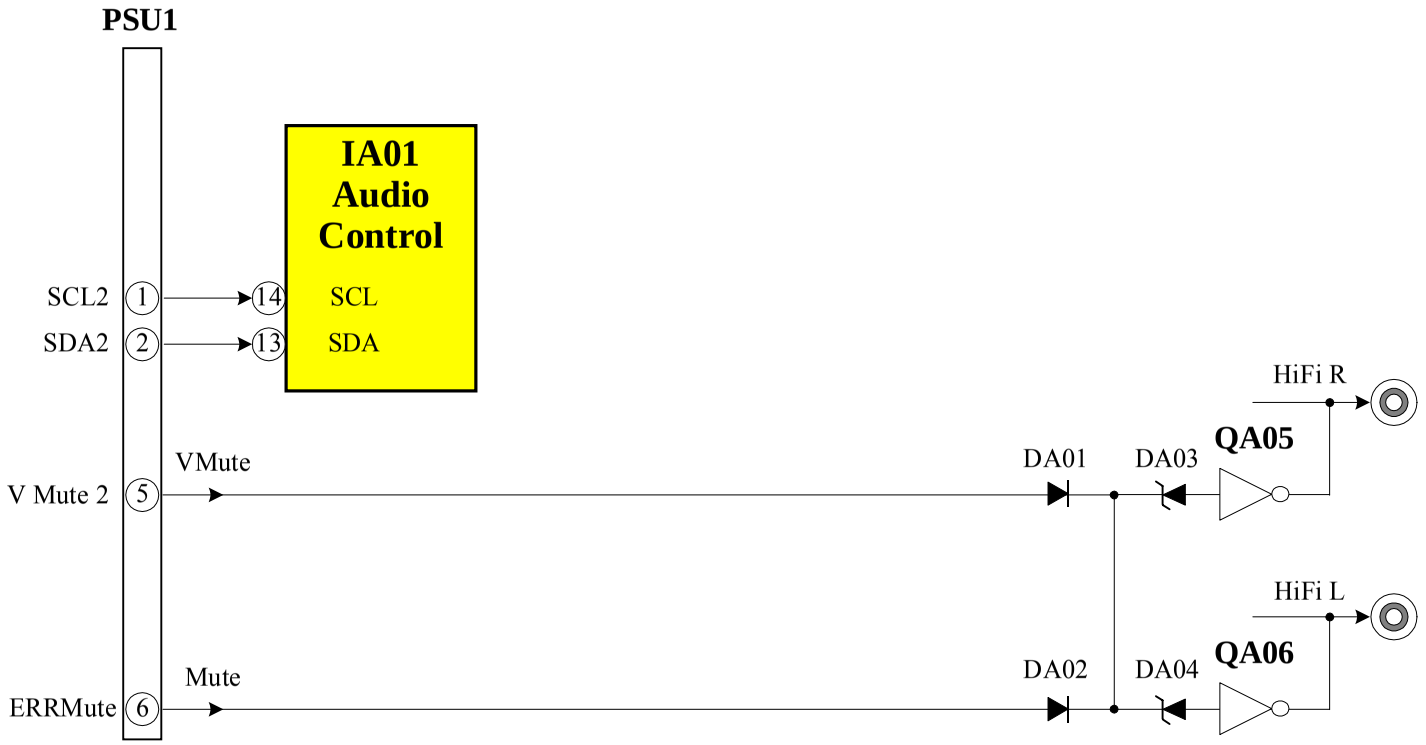
DP-17 Series Chassis AUDIO and VIDEO MUTE Circuit

(See also DP-17 Surround Mute Circuit)



DP-1X Series Chassis TruSurround / SRS MUTE Circuit

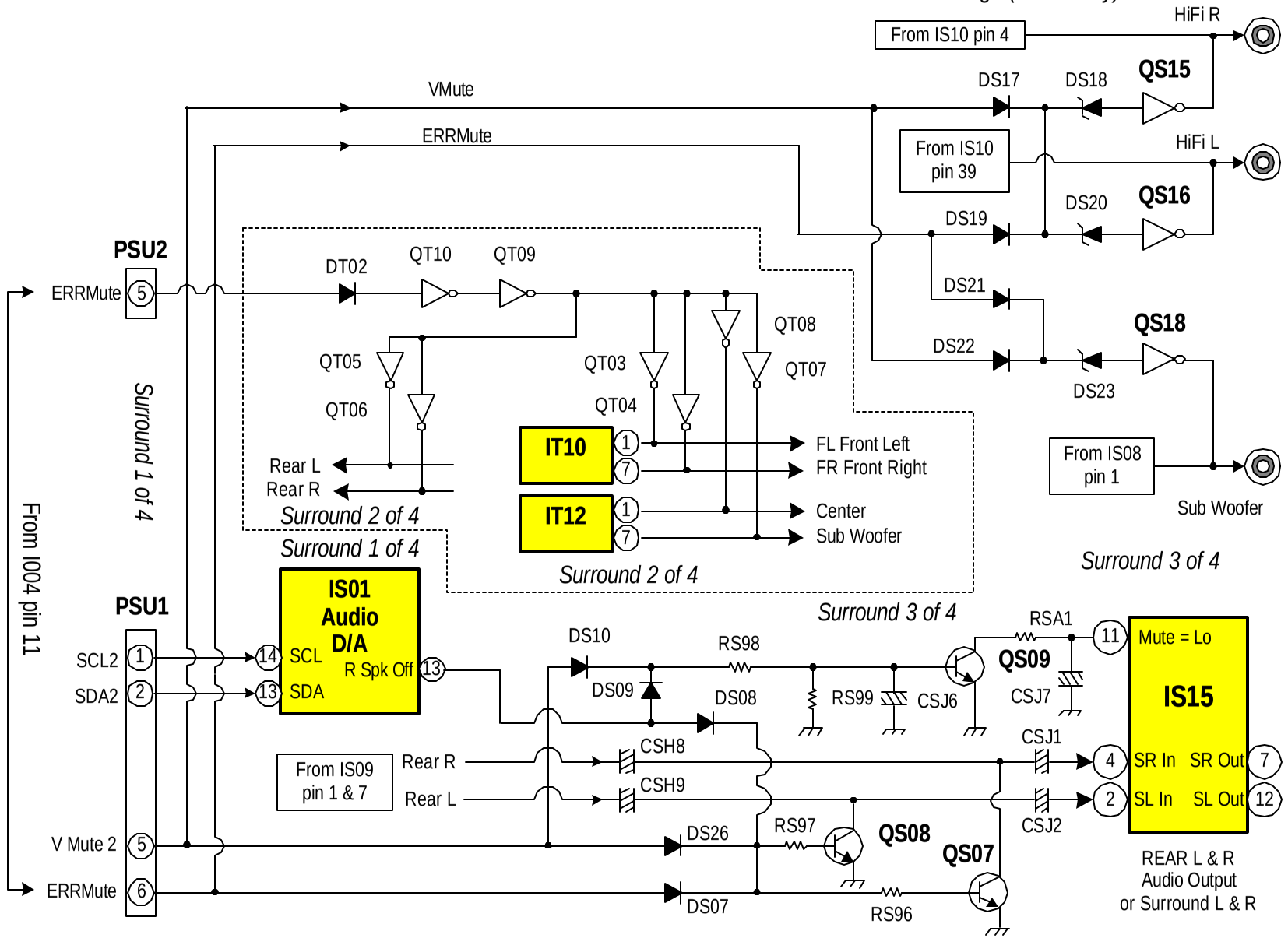
(See also Audio Video Mute Circuit)



DP-17 Chassis SURROUND MUTE Circuit

(See also DP-17 Audio Video Mute Circuit)

Surround # of 4 indicates this circuit on the Surround # of 4 Schematic Page (DP17 Only).

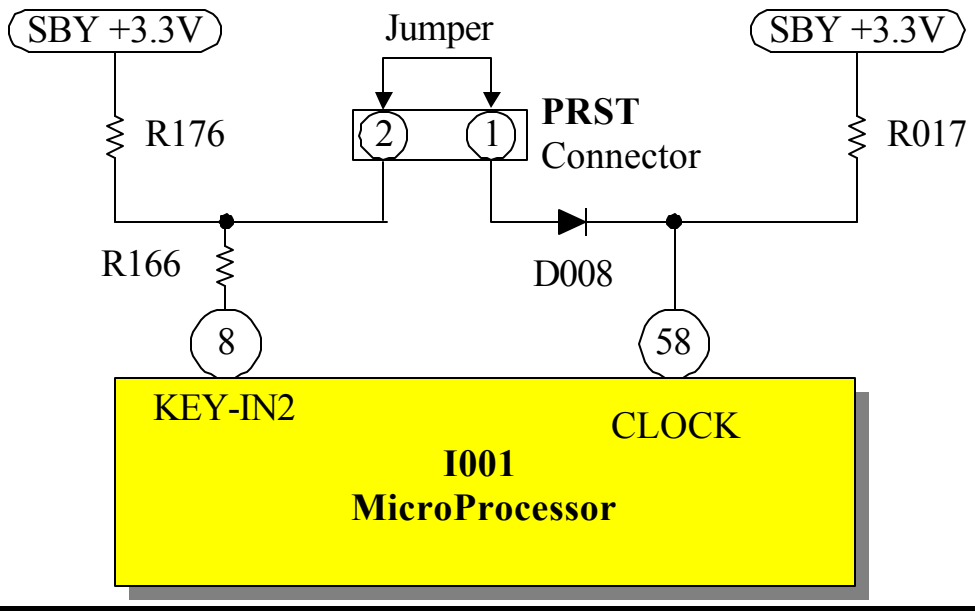


DP-1X MEMORY INITIALIZATION PROCEDURE (EEPROM RESET)

WARNING: This should only be done in extreme cases. I^2C Data will be reset as well.
Be sure and write down all data values before continuing.
NOTE: Sub Brightness and Horizontal Position for HD and Progressive will be reset to an incorrect value. Be sure to enter Service Menu, (with power off, press and hold the INPUT button, then press and hold POWER. I^2C Service Menu will appear. The second selection is SUB BRIT. Write this value down. On the Second page is H. POSI, write this value down in Progressive and in HD mode.

1) Disconnect Power to Television.
2) Remove the Back Cover.
3) Remove the two screws holding the Main chassis to the Cabinet if necessary.
4) Disconnect wiring harness clips to free up the chassis if necessary.
5) Reconnect Power to the Television and turn the set ON.
6) Locate **PRST** and add a jumper between pins 1 and 2 of the **PRST** connector as shown below.
7) Hold jumper in place for 5 seconds. (A beep will NOT be heard).
8) Remove the jumper.
9) Confirm EEPROM reset, Input source is now set to Air and not to Cable 1 or 2. No Child Lock, and only channels 2 through 13 are in memory.
10) Power Off
11) Reassemble Chassis and reinstall PTV back.
12) Enter the I^2C Service Menu and re-enter the values for SUB BRIT and H.POSI (Progressive and HD modes).

- Failure to re-enter these values will result in a dark picture and the horizontal centering will be shifted off to the right. Convergence may be affected as well.
- **DO NOT ATTEMPT TO CORRECT H. Centering** with Convergence Adjustments.
- NOTE: All customers' Auto Programming and Set-Ups are returned to factory settings.



DP-1X FACTORY RESET CONDITION

HITACHI USER CONTROL INITIALIZE (FACTORY RESET)

FUNCTION	INITIAL DATA/CONDITION
NTSC Channel (Main, Sub)	03 CH
INPUT MODE	Antenna A
SLEEP TIMER	Not Registered
HELP MODE	Off
MULTI WINDOW MODE	Off
PIP Mode	Single (Bottom Right)
Freeze Mode	Single (Bottom Right)

SET UP

MENU LANGUAGE	English
PLUG & PLAY	—
ANTENNA/CABLE	Antenna
CHANNEL MEMORY	2 ~ 13 CH
EDIT CHANNEL MEMORY	--
CLOCK SET	Not Registered
MAGIC FOCUS	--
PICTURE FORMATS	
ASPECT STYLE	Aspect 1
V. POSITION	0
COMPOSITE COLOR TYPE	SDTV/HD
VIDEO DISPLAY	1080i

CUSTOMIZE

NAME THE CHANNELS	Not Registered
NAME THE INPUTS	Not Registered
FAVORITE CHANNELS	Not Registered
PARENTAL LOCKS	Not Registered
PROGRAM TIMER	Not Registered
CAPTION / DISPLAY	Not Registered
CLOSED CAPTION	
CCD DISPLAY	Off
CCD MODE	C.C.
CCD CHANNEL	Channel 1
MENU BACKGROUND	Shaded

VIDEO

CONTRAST	100%
BRIGHTNESS	50%
COLOR	50%
TINT	Center
SHARPNESS	50%
ADVANCED SETTINGS	
PERFECT PICTURE	Off
AUTO COLOR	On
NOISE REDUCTION	Off
VELOCITY MODULATION	On
BLACK LEVEL EXPANSION	On
COLOR TEMPERATURE	Cool

DP-1X FACTORY RESET CONDITION

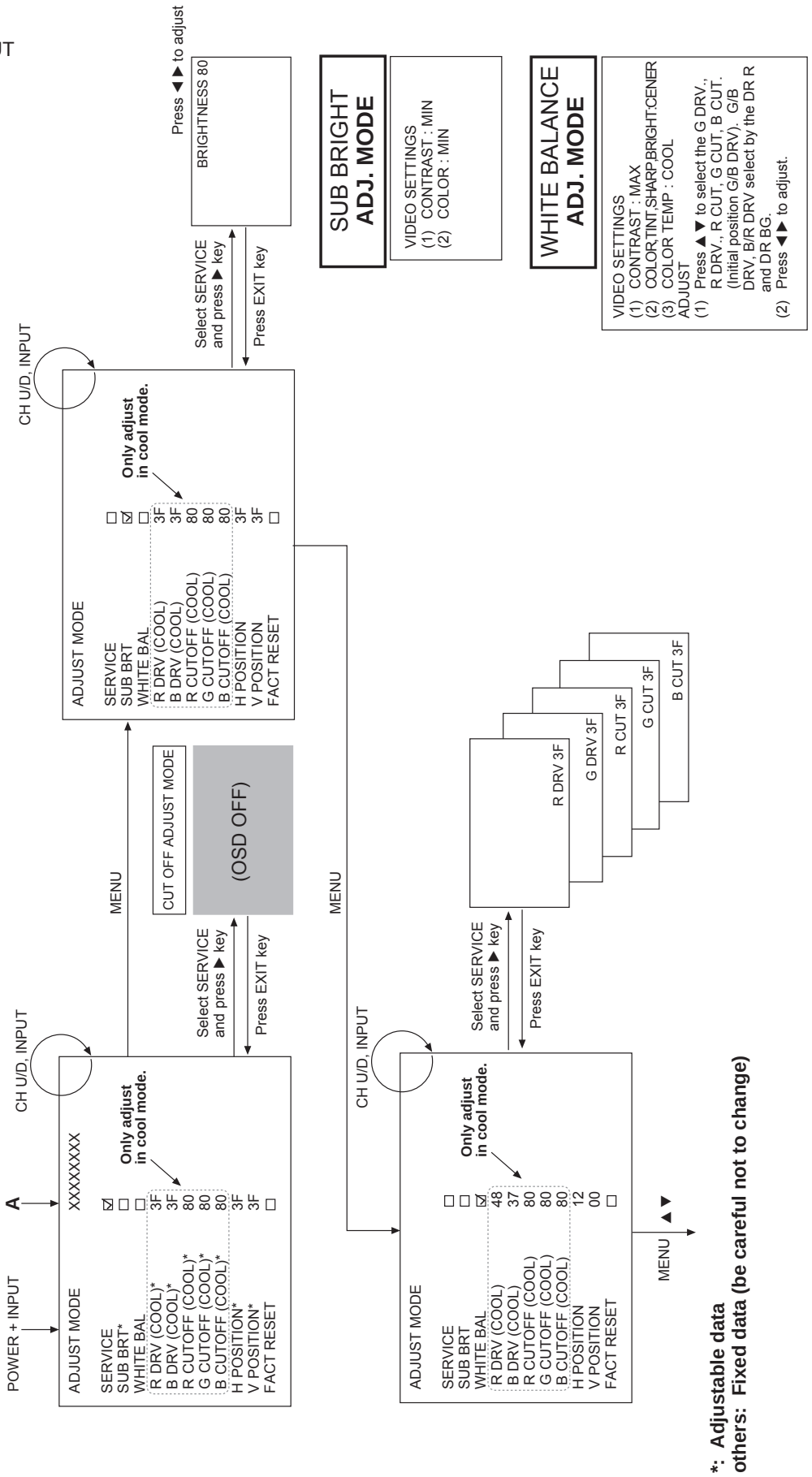
HITACHI USER CONTROL INITIALIZE (FACTORY RESET)

AUDIO	INITIAL DATA/CONDITION
BASS	63%
TREBLE	50%
BALANCE	Center
ADVANCED SETTINGS	
MTS Mode	Stereo
INTERNAL SPEAKERS	On
AUTO NOISE CANCEL	Off
LOUDNESS	Off
PERFECT VOLUME	Off
DYNAMIC BASS (DP17 Only)	On

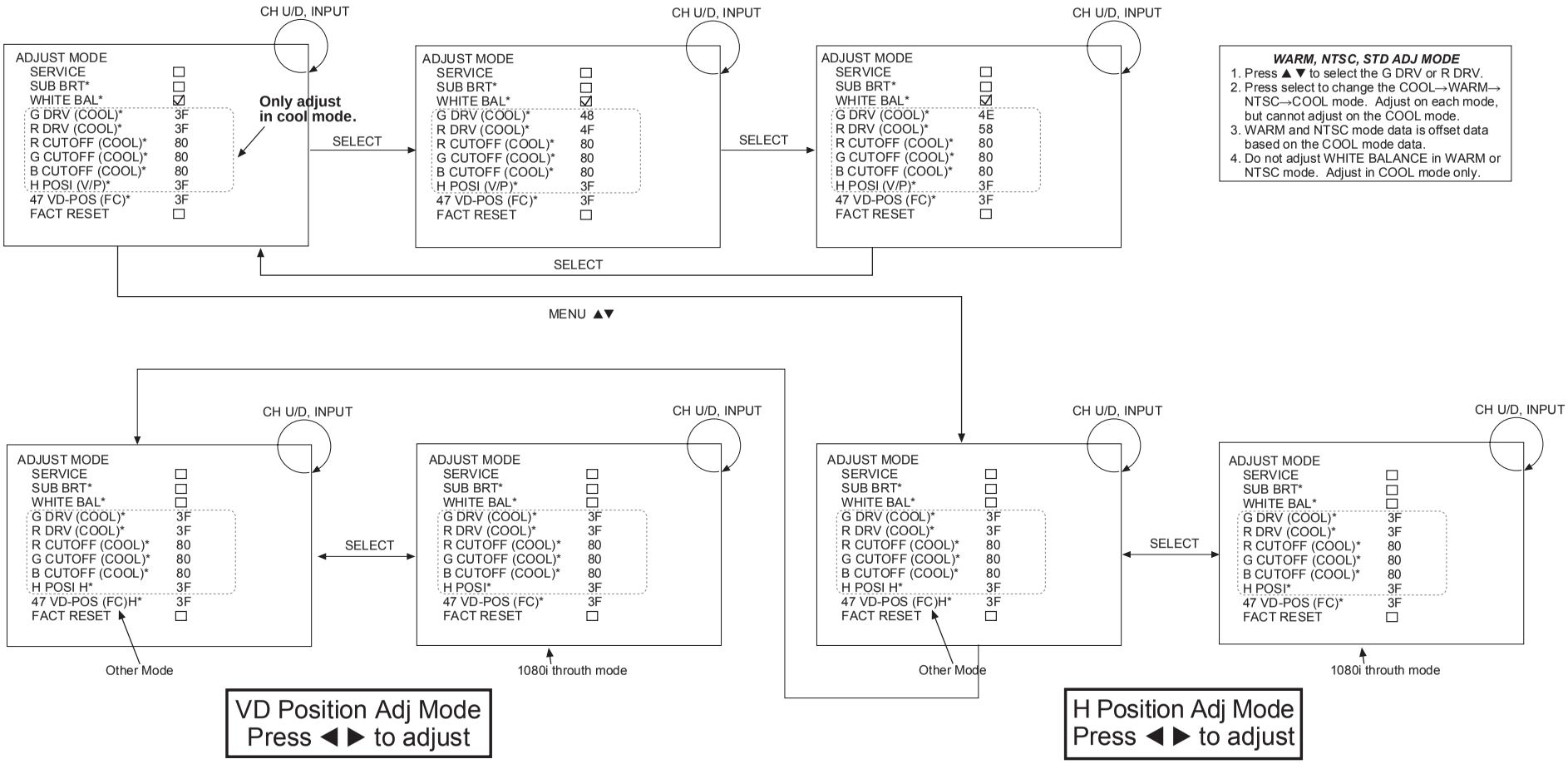
THEATER	
THEATER MODE	Sports
SURROUND	
SRS	On
BBE	Off
SURROUND (DP16 Only)	
TRUSURROUND/SRS/Off	TruSurround
SURROUND (DP17 Only)	
OFF/STADIUM/ROCK ARENA/JAZZ	Standard
INPUT SOURCE (DP17 Only)	Analog
VID 4	Optical
VID 5	Coaxial
LISTENING POSITION	Mid
LISTENING MODE	Standard
SPEAKER SET UP (DP17 Only)	
FRONT L/R	Internal
SURROUND	Yes
SUB WOOFER	Yes

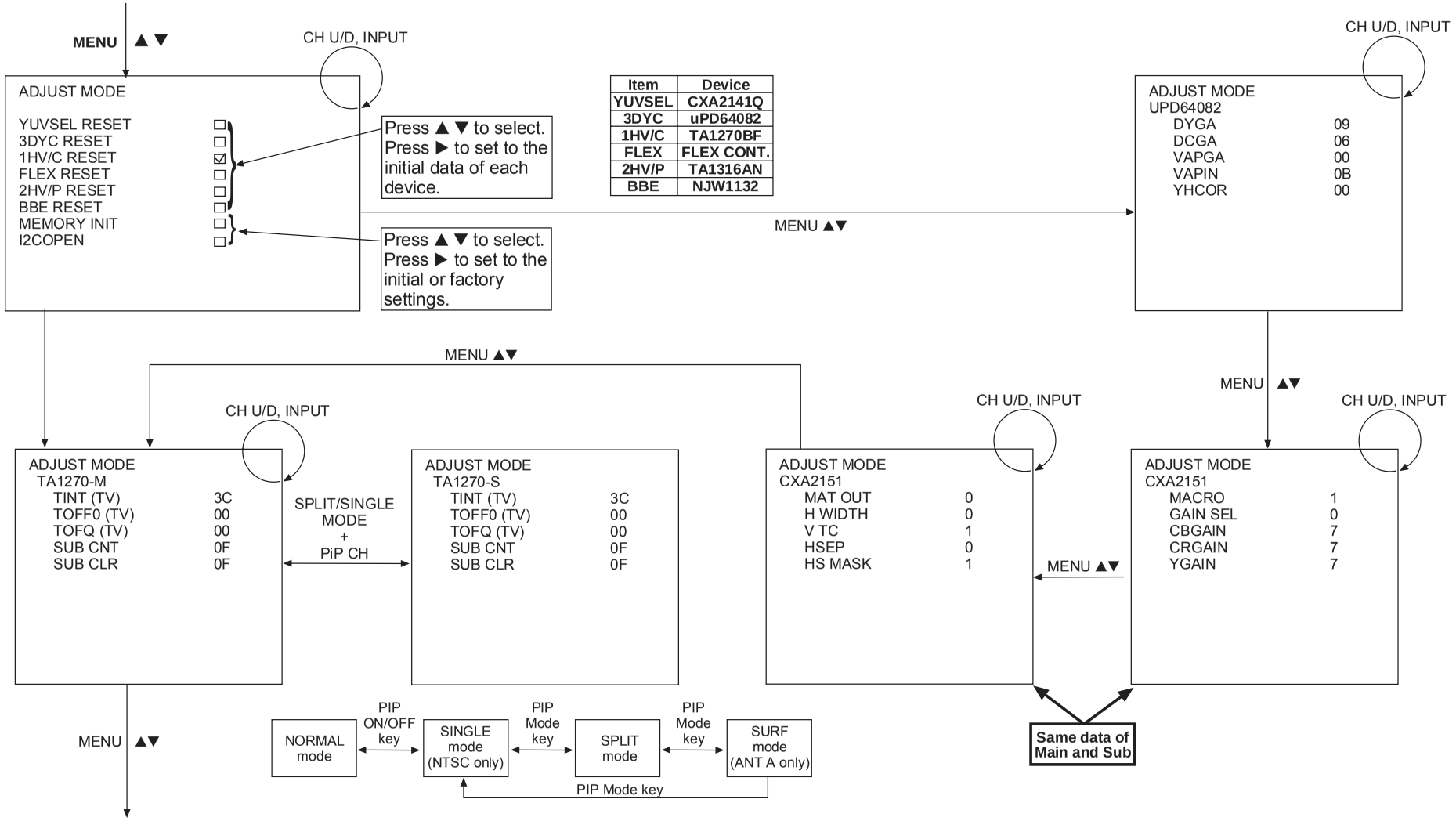
1. I2C Parameter List

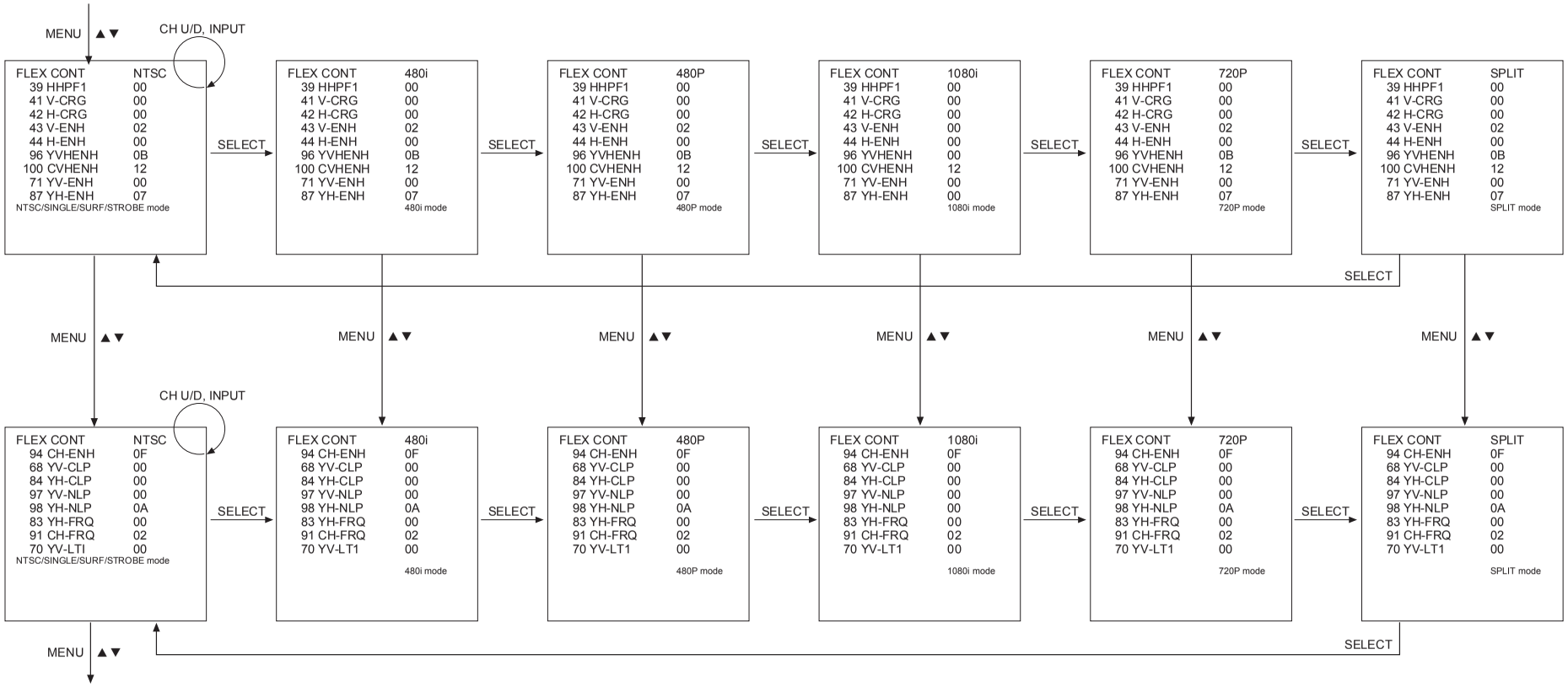
(1) Adjust Mode OSD
Press POWER + INPUT
of control panel.

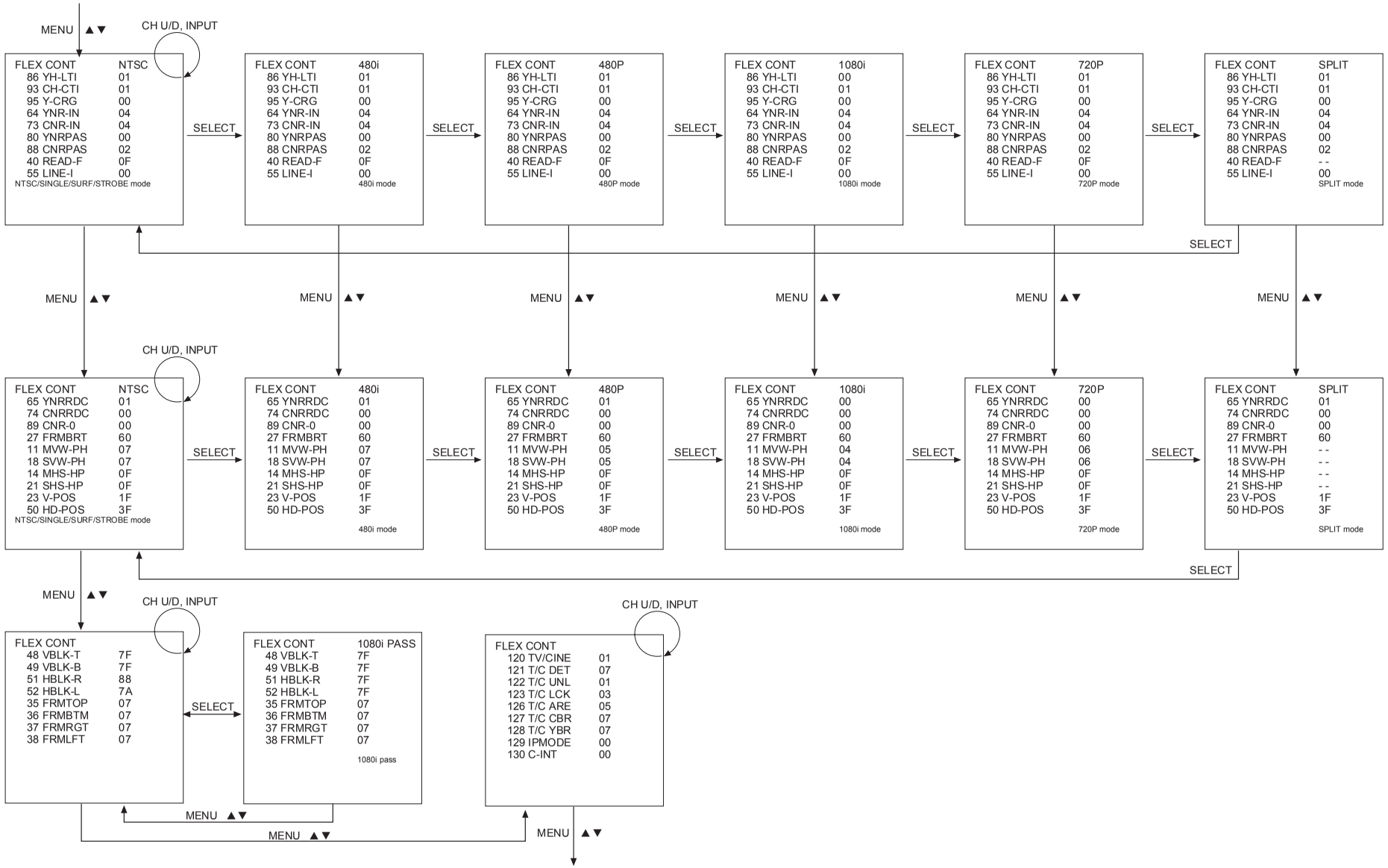


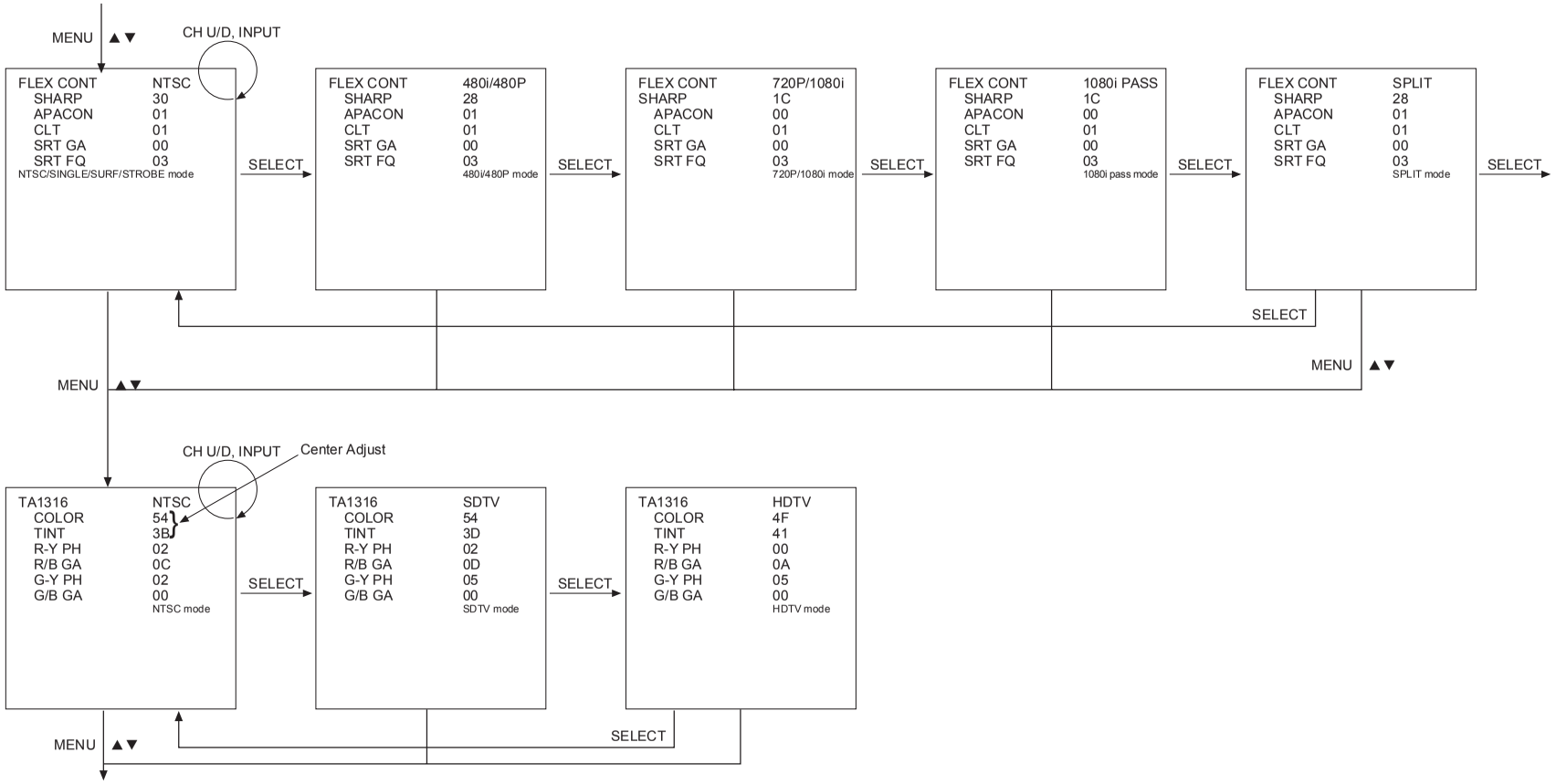
***: Adjustable data**
others: Fixed data (be careful not to change)

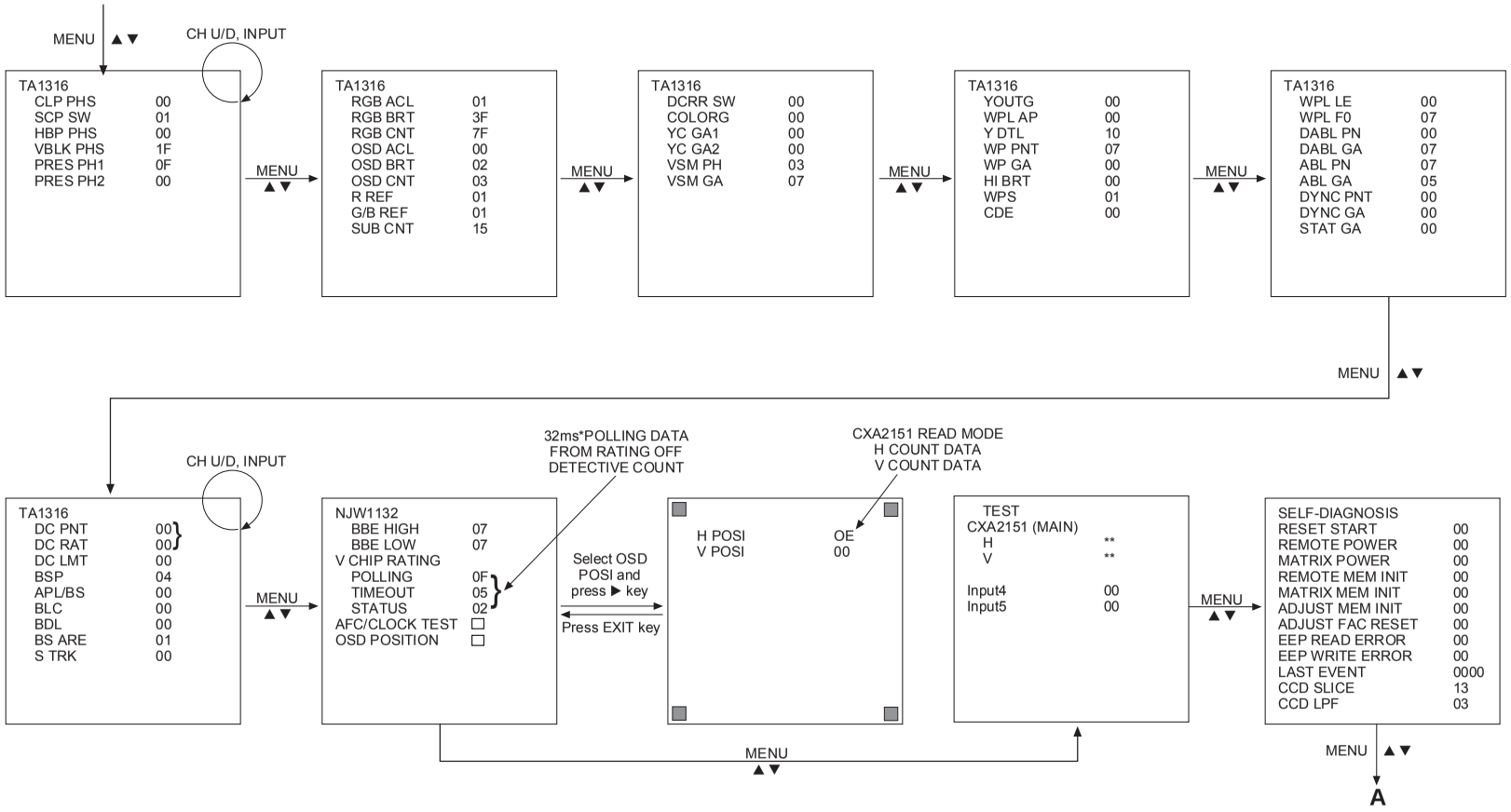

CH U/D, INPUT
ADJUST MODE
SERVICE ☐
SUB BRT* ☐
WHITE BAL* ☑
G DRV (COOL)* 3F
R DRV (COOL)* 3F
R CUTOFF (COOL)* 80
G CUTOFF (COOL)* 80
B CUTOFF (COOL)* 80
H POSI (V/P)* 3F
47 VD-POS (FC)* 3F
FACT RESET ☐
Only adjust in cool mode.
SELECT
G DRV (COOL)* 48
R DRV (COOL)* 4F
G DRV (COOL)* 4E
R DRV (COOL)* 58
MENU ▲▼
WARM, NTSC, STD ADJ MODE
1. Press ▲▼ to select the G DRV or R DRV.
2. Press select to change the COOL→WARM→ NTSC→COOL mode. Adjust on each mode, but cannot adjust on the COOL mode.
3. WARM and NTSC mode data is offset data based on the COOL mode data.
4. Do not adjust WHITE BALANCE in WARM or NTSC mode. Adjust in COOL mode only.
H POSI H* 3F
H POSI* 3F
47 VD-POS (FC)H* 3F
47 VD-POS (FC)* 3F
FACT RESET ☐
Other Mode
1080i throuth mode
VD Position Adj Mode
Press ◄ ► to adjust
H Position Adj Mode
Press ◄ ► to adjust


MENU ▲▼
CH U/D, INPUT
ADJUST MODE
YUVSEL RESET ☐
3DYC RESET ☐
1HV/C RESET ☑
FLEX RESET ☐
2HV/P RESET ☐
BBE RESET ☐
MEMORY INIT ☐
I2COPEN ☐
Press ▲▼ to select.
Press ▶ to set to the initial data of each device.
Press ▲▼ to select.
Press ▶ to set to the initial or factory settings.
Item | Device
YUVSEL | CXA2141Q
3DYC | uPD64082
1HV/C | TA1270BF
FLEX | FLEX CONT.
2HV/P | TA1316AN
BBE | NJW1132
MENU ▲▼
CH U/D, INPUT
ADJUST MODE
UPD64082
DYGA 09
DCGA 06
VAPGA 00
VAPIN 0B
YHCOR 00
MENU ▲▼
CH U/D, INPUT
ADJUST MODE
TA1270-M
TINT (TV) 3C
TOFF0 (TV) 00
TOFQ (TV) 00
SUB CNT 0F
SUB CLR 0F
SPLIT/SINGLE MODE + PiP CH
ADJUST MODE
TA1270-S
TINT (TV) 3C
TOFF0 (TV) 00
TOFQ (TV) 00
SUB CNT 0F
SUB CLR 0F
CH U/D, INPUT
ADJUST MODE
CXA2151
MAT OUT 0
H WIDTH 0
V TC 1
HSEP 0
HS MASK 1
MENU ▲▼
CH U/D, INPUT
ADJUST MODE
CXA2151
MACRO 1
GAIN SEL 0
CBGAIN 7
CRGAIN 7
YGAIN 7
Same data of Main and Sub
MENU ▲▼
NORMAL mode
PIP ON/OFF key
SINGLE mode (NTSC only)
PIP Mode key
SPLIT mode
PIP Mode key
SURF mode (ANT A only)
PIP Mode key


MENU ▲▼
CH U/D, INPUT
FLEX CONT NTSC
39 HHPF1 00
41 V-CRG 00
42 H-CRG 00
43 V-ENH 02
44 H-ENH 00
96 YVHENH 0B
100 CVHENH 12
71 YV-ENH 00
87 YH-ENH 07
NTSC/SINGLE/SURF/STROBE mode
SELECT
FLEX CONT 480i
39 HHPF1 00
41 V-CRG 00
42 H-CRG 00
43 V-ENH 02
44 H-ENH 00
96 YVHENH 0B
100 CVHENH 12
71 YV-ENH 00
87 YH-ENH 07
480i mode
SELECT
FLEX CONT 480P
39 HHPF1 00
41 V-CRG 00
42 H-CRG 00
43 V-ENH 02
44 H-ENH 00
96 YVHENH 0B
100 CVHENH 12
71 YV-ENH 00
87 YH-ENH 07
480P mode
SELECT
FLEX CONT 1080i
39 HHPF1 00
41 V-CRG 00
42 H-CRG 00
43 V-ENH 02
44 H-ENH 00
96 YVHENH 00
100 CVHENH 12
71 YV-ENH 00
87 YH-ENH 00
1080i mode
SELECT
FLEX CONT 720P
39 HHPF1 00
41 V-CRG 00
42 H-CRG 00
43 V-ENH 02
44 H-ENH 00
96 YVHENH 0B
100 CVHENH 12
71 YV-ENH 00
87 YH-ENH 07
720P mode
SELECT
FLEX CONT SPLIT
39 HHPF1 00
41 V-CRG 00
42 H-CRG 00
43 V-ENH 02
44 H-ENH 00
96 YVHENH 0B
100 CVHENH 12
71 YV-ENH 00
87 YH-ENH 07
SPLIT mode
SELECT
MENU ▲▼
MENU ▲▼
MENU ▲▼
MENU ▲▼
MENU ▲▼
MENU ▲▼
CH U/D, INPUT
FLEX CONT NTSC
94 CH-ENH 0F
68 YV-CLP 00
84 YH-CLP 00
97 YV-NLP 00
98 YH-NLP 0A
83 YH-FRQ 00
91 CH-FRQ 02
70 YV-LTI 00
NTSC/SINGLE/SURF/STROBE mode
SELECT
FLEX CONT 480i
94 CH-ENH 0F
68 YV-CLP 00
84 YH-CLP 00
97 YV-NLP 00
98 YH-NLP 0A
83 YH-FRQ 00
91 CH-FRQ 02
70 YV-LT1 00
480i mode
SELECT
FLEX CONT 480P
94 CH-ENH 0F
68 YV-CLP 00
84 YH-CLP 00
97 YV-NLP 00
98 YH-NLP 0A
83 YH-FRQ 00
91 CH-FRQ 02
70 YV-LT1 00
480P mode
SELECT
FLEX CONT 1080i
94 CH-ENH 0F
68 YV-CLP 00
84 YH-CLP 00
97 YV-NLP 00
98 YH-NLP 00
83 YH-FRQ 00
91 CH-FRQ 02
70 YV-LT1 00
1080i mode
SELECT
FLEX CONT 720P
94 CH-ENH 0F
68 YV-CLP 00
84 YH-CLP 00
97 YV-NLP 00
98 YH-NLP 0A
83 YH-FRQ 00
91 CH-FRQ 02
70 YV-LT1 00
720P mode
SELECT
FLEX CONT SPLIT
94 CH-ENH 0F
68 YV-CLP 00
84 YH-CLP 00
97 YV-NLP 00
98 YH-NLP 0A
83 YH-FRQ 00
91 CH-FRQ 02
70 YV-LT1 00
SPLIT mode
SELECT
MENU ▲▼


MENU ▲▼
CH U/D, INPUT
FLEX CONT NTSC
86 YH-LTI 01
93 CH-CTI 01
95 Y-CRG 00
64 YNR-IN 04
73 CNR-IN 04
80 YNRPAS 00
88 CNRPAS 02
40 READ-F 0F
55 LINE-I 00
NTSC/SINGLE/SURF/STROBE mode
SELECT
FLEX CONT 480i
86 YH-LTI 01
93 CH-CTI 01
95 Y-CRG 00
64 YNR-IN 04
73 CNR-IN 04
80 YNRPAS 00
88 CNRPAS 02
40 READ-F 0F
55 LINE-I 00
480i mode
FLEX CONT 480P
86 YH-LTI 01
93 CH-CTI 01
95 Y-CRG 00
64 YNR-IN 04
73 CNR-IN 04
80 YNRPAS 00
88 CNRPAS 02
40 READ-F 0F
55 LINE-I 00
480P mode
FLEX CONT 1080i
86 YH-LTI 00
93 CH-CTI 01
95 Y-CRG 00
64 YNR-IN 04
73 CNR-IN 04
80 YNRPAS 00
88 CNRPAS 02
40 READ-F 0F
55 LINE-I 00
1080i mode
FLEX CONT 720P
86 YH-LTI 01
93 CH-CTI 01
95 Y-CRG 00
64 YNR-IN 04
73 CNR-IN 04
80 YNRPAS 00
88 CNRPAS 02
40 READ-F 0F
55 LINE-I 00
720P mode
FLEX CONT SPLIT
86 YH-LTI 01
93 CH-CTI 01
95 Y-CRG 00
64 YNR-IN 04
73 CNR-IN 04
80 YNRPAS 00
88 CNRPAS 02
40 READ-F - -
55 LINE-I 00
SPLIT mode
FLEX CONT NTSC
65 YNRRDC 01
74 CNRRDC 00
89 CNR-0 00
27 FRMBRT 60
11 MVW-PH 07
18 SVW-PH 07
14 MHS-HP 0F
21 SHS-HP 0F
23 V-POS 1F
50 HD-POS 3F
NTSC/SINGLE/SURF/STROBE mode
FLEX CONT 480i
65 YNRRDC 01
74 CNRRDC 00
89 CNR-0 00
27 FRMBRT 60
11 MVW-PH 07
18 SVW-PH 07
14 MHS-HP 0F
21 SHS-HP 0F
23 V-POS 1F
50 HD-POS 3F
480i mode
FLEX CONT 480P
65 YNRRDC 01
74 CNRRDC 00
89 CNR-0 00
27 FRMBRT 60
11 MVW-PH 05
18 SVW-PH 05
14 MHS-HP 0F
21 SHS-HP 0F
23 V-POS 1F
50 HD-POS 3F
480P mode
FLEX CONT 1080i
65 YNRRDC 00
74 CNRRDC 00
89 CNR-0 00
27 FRMBRT 60
11 MVW-PH 04
18 SVW-PH 04
14 MHS-HP 0F
21 SHS-HP 0F
23 V-POS 1F
50 HD-POS 3F
1080i mode
FLEX CONT 720P
65 YNRRDC 00
74 CNRRDC 00
89 CNR-0 00
27 FRMBRT 60
11 MVW-PH 06
18 SVW-PH 06
14 MHS-HP 0F
21 SHS-HP 0F
23 V-POS 1F
50 HD-POS 3F
720P mode
FLEX CONT SPLIT
65 YNRRDC 01
74 CNRRDC 00
89 CNR-0 00
27 FRMBRT 60
11 MVW-PH - -
18 SVW-PH - -
14 MHS-HP - -
21 SHS-HP - -
23 V-POS 1F
50 HD-POS 3F
SPLIT mode
FLEX CONT
48 VBLK-T 7F
49 VBLK-B 7F
51 HBLK-R 88
52 HBLK-L 7A
35 FRMTOP 07
36 FRMBTM 07
37 FRMRGT 07
38 FRMLFT 07
FLEX CONT 1080i PASS
48 VBLK-T 7F
49 VBLK-B 7F
51 HBLK-R 7F
52 HBLK-L 7F
35 FRMTOP 07
36 FRMBTM 07
37 FRMRGT 07
38 FRMLFT 07
1080i pass
FLEX CONT
120 TV/CINE 01
121 T/C DET 07
122 T/C UNL 01
123 T/C LCK 03
126 T/C ARE 05
127 T/C CBR 07
128 T/C YBR 07
129 IPMODE 00
130 C-INT 00


MENU ▲▼
CH U/D, INPUT
FLEX CONT NTSC
SHARP 30
APACON 01
CLT 01
SRT GA 00
SRT FQ 03
NTSC/SINGLE/SURF/STROBE mode
SELECT
FLEX CONT 480i/480P
SHARP 28
APACON 01
CLT 01
SRT GA 00
SRT FQ 03
480i/480P mode
SELECT
FLEX CONT 720P/1080i
SHARP 1C
APACON 00
CLT 01
SRT GA 00
SRT FQ 03
720P/1080i mode
SELECT
FLEX CONT 1080i PASS
SHARP 1C
APACON 00
CLT 01
SRT GA 00
SRT FQ 03
1080i pass mode
SELECT
FLEX CONT SPLIT
SHARP 28
APACON 01
CLT 01
SRT GA 00
SRT FQ 03
SPLIT mode
SELECT
SELECT
MENU ▲▼
MENU ▲▼
CH U/D, INPUT
Center Adjust
TA1316 NTSC
COLOR 54
TINT 3B
R-Y PH 02
R/B GA 0C
G-Y PH 02
G/B GA 00
NTSC mode
SELECT
TA1316 SDTV
COLOR 54
TINT 3D
R-Y PH 02
R/B GA 0D
G-Y PH 05
G/B GA 00
SDTV mode
SELECT
TA1316 HDTV
COLOR 4F
TINT 41
R-Y PH 00
R/B GA 0A
G-Y PH 05
G/B GA 00
HDTV mode
SELECT
MENU ▲▼


MENU ▲▼
CH U/D, INPUT
TA1316
CLP PHS 00
SCP SW 01
HBP PHS 00
VBLK PHS 1F
PRES PH1 0F
PRES PH2 00
MENU ▲▼
TA1316
RGB ACL 01
RGB BRT 3F
RGB CNT 7F
OSD ACL 00
OSD BRT 02
OSD CNT 03
R REF 01
G/B REF 01
SUB CNT 15
MENU ▲▼
TA1316
DCRR SW 00
COLORG 00
YC GA1 00
YC GA2 00
VSM PH 03
VSM GA 07
MENU ▲▼
TA1316
YOUTG 00
WPL AP 00
Y DTL 10
WP PNT 07
WP GA 00
HI BRT 00
WPS 01
CDE 00
MENU ▲▼
TA1316
WPL LE 00
WPL F0 07
DABL PN 00
DABL GA 07
ABL PN 07
ABL GA 05
DYNC PNT 00
DYNC GA 00
STAT GA 00
MENU ▲▼
CH U/D, INPUT
TA1316
DC PNT 00
DC RAT 00
DC LMT 00
BSP 04
APL/BS 00
BLC 00
BDL 00
BS ARE 01
S TRK 00
MENU ▲▼
32ms*POLLING DATA
FROM RATING OFF
DETECTIVE COUNT
NJW1132
BBE HIGH 07
BBE LOW 07
V CHIP RATING
POLLING 0F
TIMEOUT 05
STATUS 02
AFC/CLOCK TEST ☐
OSD POSITION ☐
Select OSD
POSI and
press ▶ key
Press EXIT key
CXA2151 READ MODE
H COUNT DATA
V COUNT DATA
H POSI OE
V POSI 00
TEST
CXA2151 (MAIN)
H **
V **
Input4 00
Input5 00
MENU ▲▼
SELF-DIAGNOSIS
RESET START 00
REMOTE POWER 00
MATRIX POWER 00
REMOTE MEM INIT 00
MATRIX MEM INIT 00
ADJUST MEM INIT 00
ADJUST FAC RESET 00
EEP READ ERROR 00
EEP WRITE ERROR 00
LAST EVENT 0000
CCD SLICE 13
CCD LPF 03
MENU ▲▼
MENU ▲▼
A

POWER SUPPLY INFORMATION

DP-1X CHASSIS

SECTION 2

DP-1X POWER SUPPLY ON / OFF (STAND-BY) OPERATION EXPLANATION

Power On and Off Diagram explanation: *(See DP-1X Power On/Off Diagrams for details)*

This power supply runs all the time when the AC is applied. The use of the power supply creating Stand By Voltage supplies eliminates the need for a Stand-By transformer. The following explanation will describe the Turning ON and OFF of the projection television.
The Microprocessor **I001** generates the ON-OFF control signal from pin (**53**). The logic states of this pin are High = On and Low = Off. When the set is turned On, the high from pin (**53**) is routed to the Relay Drivers **Q003** and **Q004**. This turns on **Q003** and it's collector goes low which turns off **Q004** and it's collector goes High. This On/Off from the Relay Drivers will perform the following :

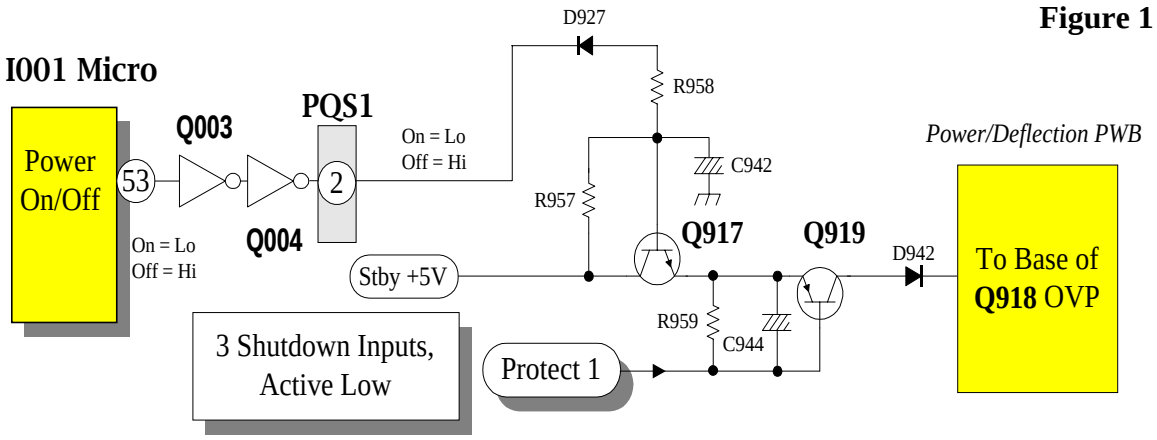
- Turns on the Shut Down "Power Shorted" detection circuit, **Q917** and **Q919**.
- Turns on the Relay **S901** through **Q914** providing AC to the Deflection Power Supply on the Power/ Deflection PWB.

SOME SHUT-DOWN DETECTION CIRCUITS SHUT OFF DURING STAND-BY: ***(See Figure 1)***
During Stand-By, some of the secondary voltages produced are turned off, except the STBY voltages after regulation. This could cause a potential problem with the Short Detection circuits for shutdown. To avoid accidental shut down, **Q917** also controls the activity of **Q919**. During Stand-By, the output from the Microprocessor On/ Off pin (**53**) is Low. This Low is inverted by **Q003** and inverted again by **Q004** and this Low is routed to the base of **Q917** turning it Off. This turns off **Q917** because it's base is pulled Low through **D927**. This action turns off **Q917**. When **Q917** is off, it doesn't supply emitter voltage to the Emitter of **Q919**. The base of **Q919** is connected to 3 Low Detection inputs from [PROTECT 1], *(See the Sub Power Supply Shut Down Circuit explanation and diagram for further details).*

PROTECT 1 monitors IC02, 3 & 4 on the Signal PWB. IC02 produces 5.5V, IC03 produces 3.3V, and IC04 produces 2.5V.
NOTE: PROTECT 1 will never go below 2.2 V, unless the 2.2V line is shorted.
NOTE: If the 5.5V or the 3.3V regulator OPENS, the set will not go into shut down, they must have a short to produce a shut down input on PROTECT 1.
The set will shut down after the Screens go excessively bright, but this is from the 115V over current sensor, not PROTECT 1.

When the power supply is in Stand By, the Short Detection circuit could activate. By turning off **Q919**, no accidental shut down operation can occur.

Figure 1



AT POWER ON, THE DEFLECTION CIRCUIT IS ENERGIZED: ***(See Figure 2)***
When the Microprocessor outputs a High from pin **53** when power is turned **ON**, the high is inverted by **Q003** to a LOW. This low is inverted by **Q004** to a HIGH and routed through the **PQS1** connector pin **2**. This high is routed through **R954, R951, D926** to the base of **Q914**. This transistor turns ON and it's collector goes LOW.

Continued From Previous Page

This low is the Ground return for the Relay **S901**. The B+ for the primary of the relay is the **SBY +5V** generated by the switching transformer pin **15**, rectified by **D920**, filtered by **C935, L915,** and **C936**. *(See DP-1X Power On/Off Diagrams for details).*
When the relay **S901** turns on, the contacts close and AC is routed to the Deflection circuit power supply and the Deflection Power Supply is Energized.

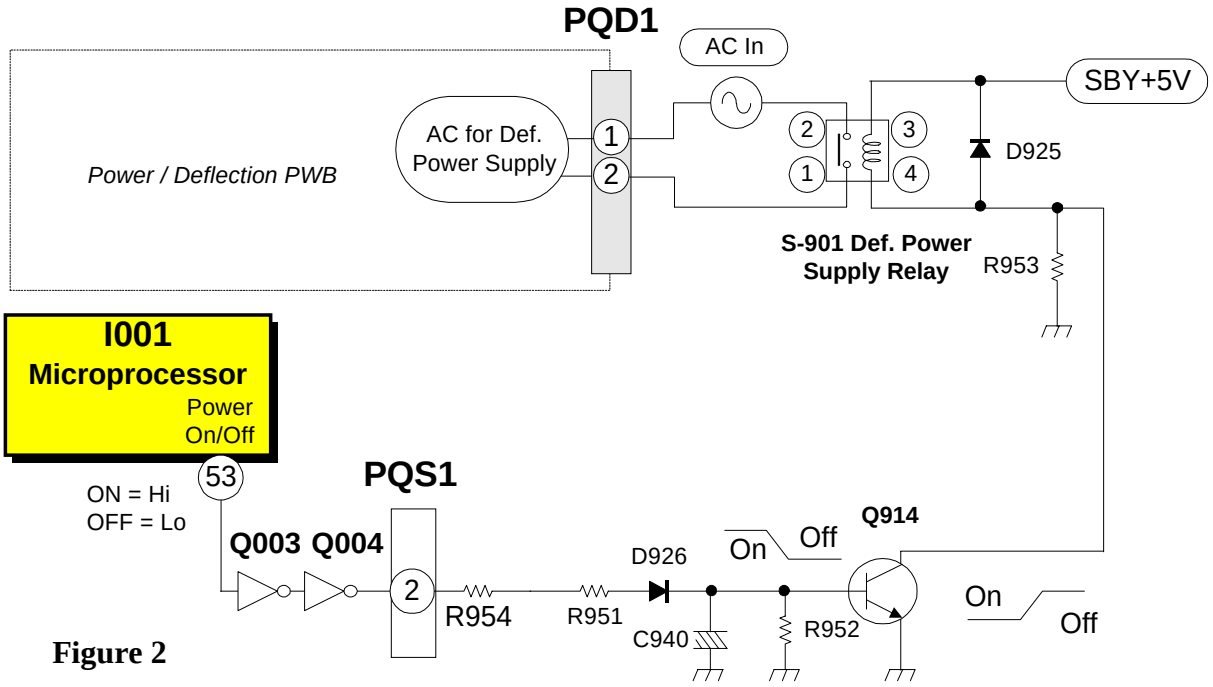
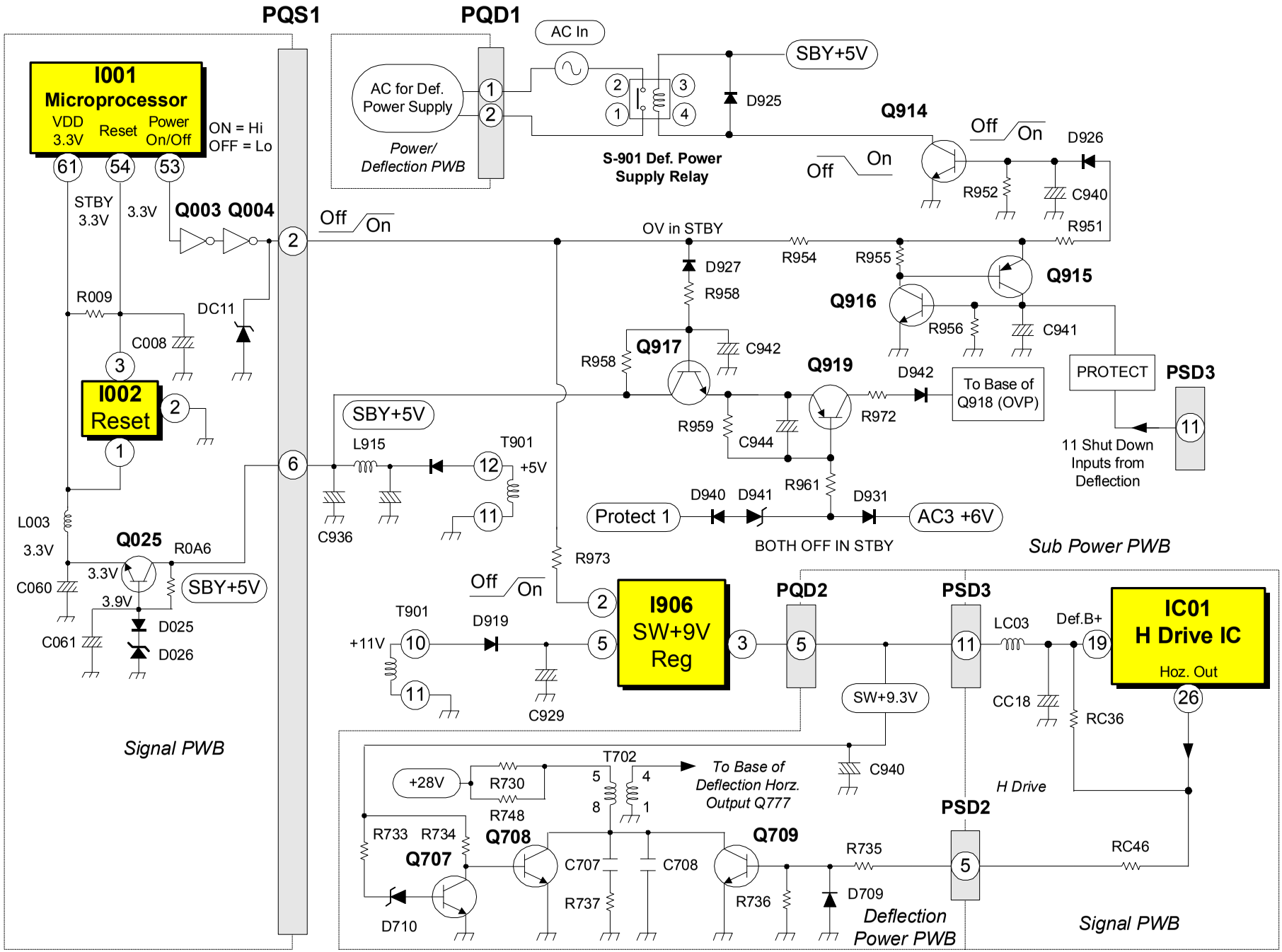


Figure 2

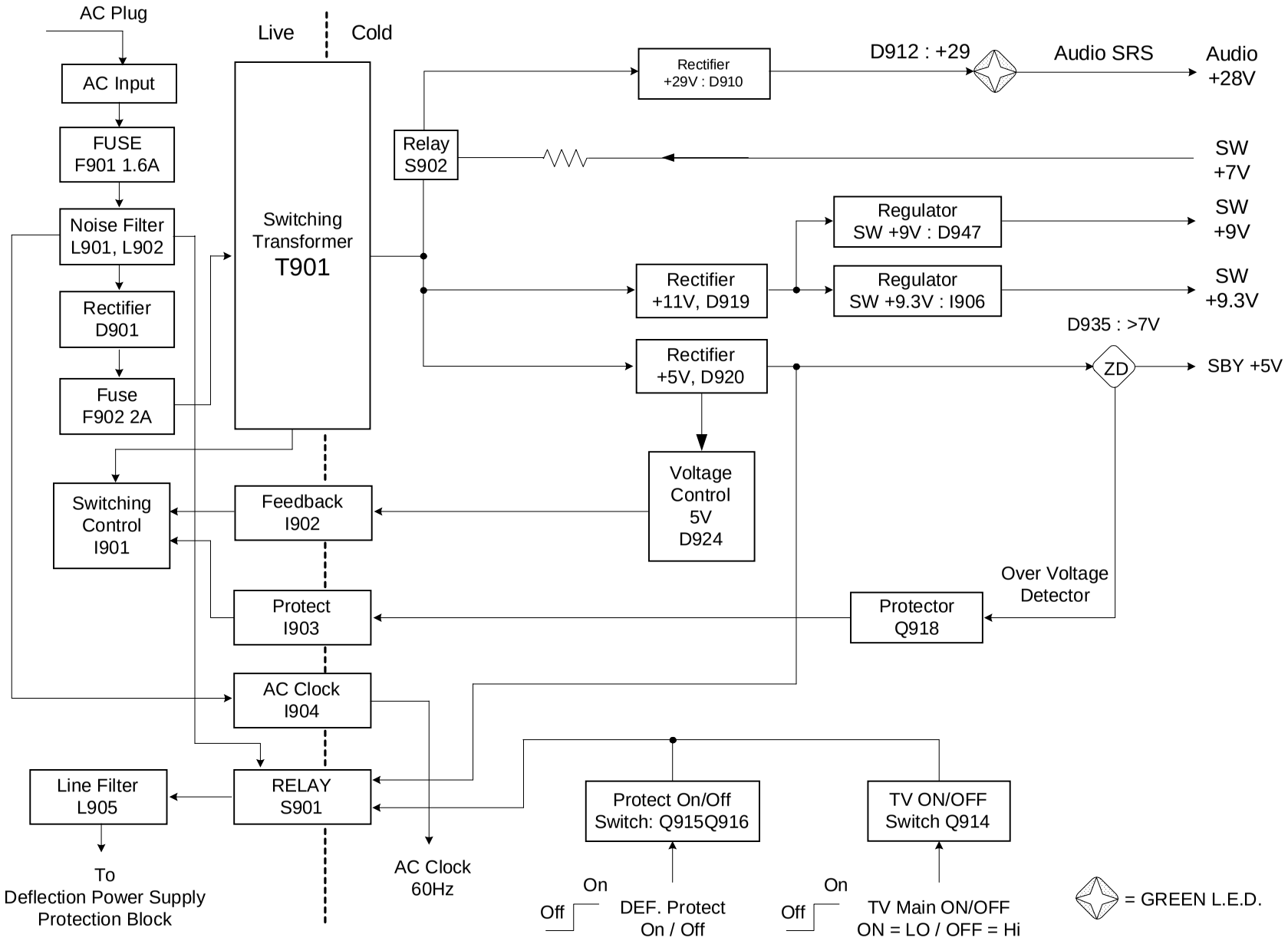
DEFLECTION HORIZONTAL DRIVE CIRCUIT ACTIVATION: (IC01 Rainforest IC)
When the set has AC applied, one of the switch pulses generated on the Sub Power PWB is the **+11V** pulse from pin **10** of the Switching Transformer **I901**. This **+11V** pulse is rectified by **D919** and filtered by **C929**. This +11V DC voltage is then routed to the +9V regulator **I906** pin **5**. When the set is turned ON, the Horizontal Drive Power supply **I906** is activated. This happens when pin **2** of **I906** goes high with the Power On/Off control line from **PQS1** pin **2**. The **+9V** is output via pin **3** to the **PQD2** connector pin **5**. From here the **+9V** (HVCC) is routed through the Deflection PWB to the Signal PWB via **PSD3** connector pin **11**, through the coil **LC03** to pin **19** of **IC01** the Rainforest IC. When this voltage is applied to pin **19**, the horizontal circuit inside the Rainforest IC is activated and a horizontal drive signal is output from pin **26**. This H. Drive signal is routed through the **PSD2** connector pin **5** to the base of the horizontal drive transistor **Q709** on the Deflection PWB. The collector of **Q709** produces a drive signal routed through the drive transformer **T702** and output from pin **4** to the base of the Deflection Horizontal Output Transistor **Q777** to begin driving the deflection circuit which in turn, activates the High Voltage circuit.
Two transistors monitor the **SW +9V** line, **Q707** and **Q708**. When the set is turned off, the H. Drive signal from **IC01** could stop too soon. If this were to happen, the Horizontal output transistor **Q777** would be damaged. To prevent this, if the **SW +9V** line drops, **Q707** senses this because it's base voltage drops. The base of **Q708** rises and turns on, grounding the output from the H. Drive Transistor **Q709**.

Q777 PROTECTION:
Two transistors monitor the **SW +9V** line, **Q707** and **Q708**. When the set is turned off, the H. Drive signal from **IC01** could stop too soon. If this were to happen, the Horizontal output transistor **Q777** would be damaged. To prevent this, if the **SW +9V** line drops, **Q707** senses this because it's base voltage drops. The base of **Q708** rises and turns on, grounding the output from the H. Drive Transistor **Q709**.

DP-1X SERIES "POWER ON & OFF" DIAGRAM



DP-1X SUB POWER SUPPLY PROTECTION DIAGRAM
(SIGNAL) LOW VOLTAGE



DP-1X SUB POWER SUPPLY SHUT DOWN CIRCUIT DESCRIPTION

(See Diagram on page 02-08)
The sub power supply in the DP-1X chassis works very similar to the previous models, with some very significant exceptions. The use of the power supply creating the SBY+11V supply eliminates the need for a Stand-By transformer. The following explanation will describe the Sub Power Supply Shut Down Circuit.

Power Supply Shutdown Explanation

This chassis utilizes I901 as the Osc.\Driver \Switch for the sub power supply, just as the previous chassis have done. The Shutdown circuit, *(cold ground side detection)*, removes **I901** B+ via the following circuit, **I903** *(the Photo Coupler)*, which isolates the Hot ground from the Cold ground and couples the Shutdown signal to the Hot Ground side, **Q902** on the hot ground side and **Q901** which latches **Q902** on. When **Q902** is on, it removes B+ from pin (**4**) of **I901** *(the Vin pin).*

The Power Supply utilizes a Shutdown circuit that can trigger **Q902** from **5** input sources. (**1** of these Short Detection circuits are not operational in Stand By mode). **I903** is activated by a Low being applied to pin **2**, which forward biases the internal LED. The light from this internal LED is then coupled to the receiver transistor. The receiver transistor turns On and output a High from pin **3**. This high is routed to the base of **Q902** turning it On, which grounds out the Vin at pin (**4**) of **I901**, disabling the power supply.

All of the Power Supply Shutdown circuitry can be broken down into the following groups;

- **Voltage Missing Detection**
- **Voltage Too High Detection**

In the following explanation, the Shutdown circuits will be grouped. This will assist the Service Technician with trouble shooting the Chassis, by understanding these circuits and having the associated circuit routs, the technician can then ***"Divide and Conquer"***.

Voltage Loss or Excessive Load Detection

(*See Figure 1)*

The second most common circuit used is the **Voltage Loss Detection** circuit. This is a very simple circuit that detects a loss of a particular power supply and supplies a Pull-Down path for the base of a PNP transistor.

This circuit consist of a diode connected by its cathode to a positive B+ power supply. Under normal conditions, the diode is reversed biases, which keeps the base of Q1 pulled up, forcing it OFF. However, if there is a short or excessive load on the B+ line, the diode in effect will have a LOW on its cathode, turning it ON. This will allow a current path for the base bias of Q1, which will turn it ON and generates a Shutdown Signal.

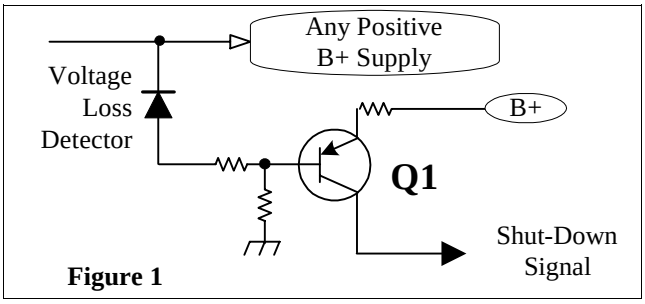


Figure 1

B+ Voltage Too High Detection.

(See Figure 2)

In this circuit, a Zener diode is connected to a voltage divider or in some cases, directly to a B+ power supply. If the B+ voltage increases, the voltage at the voltage divider or the cathode of the zener diode will rise. If it gets to a predetermined level, the zener will fire. This action creates a Shutdown Signal.

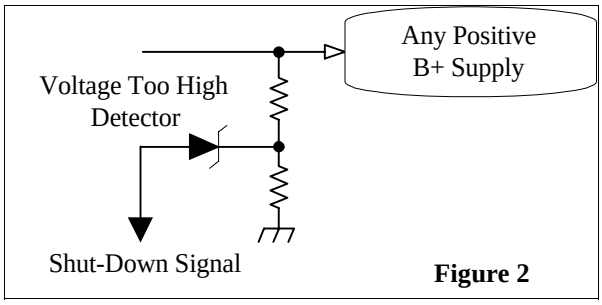


Figure 2

(Continued on page 6)

DP-1X SUB POWER SUPPLY SHUT DOWN CIRCUIT DESCRIPTION

(Continued from page 5)

DP-1X SHUT DOWN CIRCUIT:

There are a total of **6** individual Shutdown inputs. In addition, there are 3 Hot Ground side Shutdown inputs that are specifically detected by the main power driver IC **I901**. These sensors circuits protect **I901** from excessive current or over voltage.

HOT GROUND SIDE SHUT DOWN SENSING CIRCUITS. (INTERNAL TO I901).

LATCHED SHUT DOWN MONITORS: (AC must be removed to recover).

1. **Pin 4** is monitored for Over Voltage at pin **4** of **I901.**
2. **I901** itself is monitored for Excessive Heat. This block is labeled T.P.O. (Thermal Protection Overload).

RECOVERING SHUT DOWN INPUT: (Driver IC will recover on it's own when trouble is removed.)

3. **Pin 5** besides being used as a regulation input, is also monitoring the low ohm resistors, **R910, R911,** and **R912**. If these resistors have an excessive current condition caused by monitoring the current through the internal Switch MOS FET, the voltage will rise and pin **5** has an internal Over Voltage detection op-amp. If this voltage rises enough to trigger this op-amp, the IC will stop producing a drive signal.

COLD GROUND SIDE SHUT DOWN SENSING CIRCUITS. (AC must be removed to recover).

All of the Cold Ground side Shutdown detection circuits can be categorized by the two previously described circuits

Voltage Loss Detection

- Shorted STBY +3.3V (**Q025**) on Signal PWB through **PROTECT 2** to (**D938**) on Sub Power Supply PWB
- Shorted SW+2.5V (**IC04**) on Signal PWB through **PROTECT 1** to (**D940**) on Sub Power Supply PWB
- Shorted SW+3.3V (**IC03**) on Signal PWB through **PROTECT 1** to (**D940**) on Sub Power Supply PWB
- Shorted SW +5V (**IC02**) on Signal PWB through **PROTECT 1** to (**D940**) on Sub Power Supply PWB

Voltage Too High Detection

- STBY +9V monitored by (**D933, D934**)
- STBY +5V monitored by (**D935, D936**)

If any one of these circuits activate the power supply will STOP, and create a Power Supply Shutdown Condition.

SOME SHUTDOWN CIRCUITS ARE DEFEATED IN STANDBY MODE. (Set Off).

As indicated in the Power On/Off circuit diagram explanation, 3 of the 6 shut down inputs are not active when the set is in standby.

- Shorted SW +2.5V (**IC04**) on Signal PWB through Protect 1 to (**D940**) on Sub Power Supply PWB
- Shorted SW +3.3V (**IC03**) on Signal PWB through Protect 1 to (**D940**) on Sub Power Supply PWB
- Shorted SW +5V (**IC02**) on Signal PWB through Protect 1 to (**D940**) on Sub Power Supply PWB

These SW voltage loss sensing circuits are defeated because the Shorted SW (Switched) power supply detection circuits are turned off in standby to prevent faults triggering of the shutdown circuit.
Q919 supplies the high for shutdown if any of the voltage loss circuits become activated. **Q919** requires emitter voltage to operated. Emitter voltage is supplied from the emitter of **Q917**. **Q917s** base is connected to the power on/off line. When the set is not on or turned off, the power on/off line goes Low. This Low pulls the cathode of **D927** low, removing the base voltage of **Q917** turning it OFF. This removes the emitter voltage from **Q919** and this circuit can not function.

(Continued on page 7)

DP-1X SUB POWER SUPPLY SHUT DOWN CIRCUIT DESCRIPTION

(Continued from page 6)

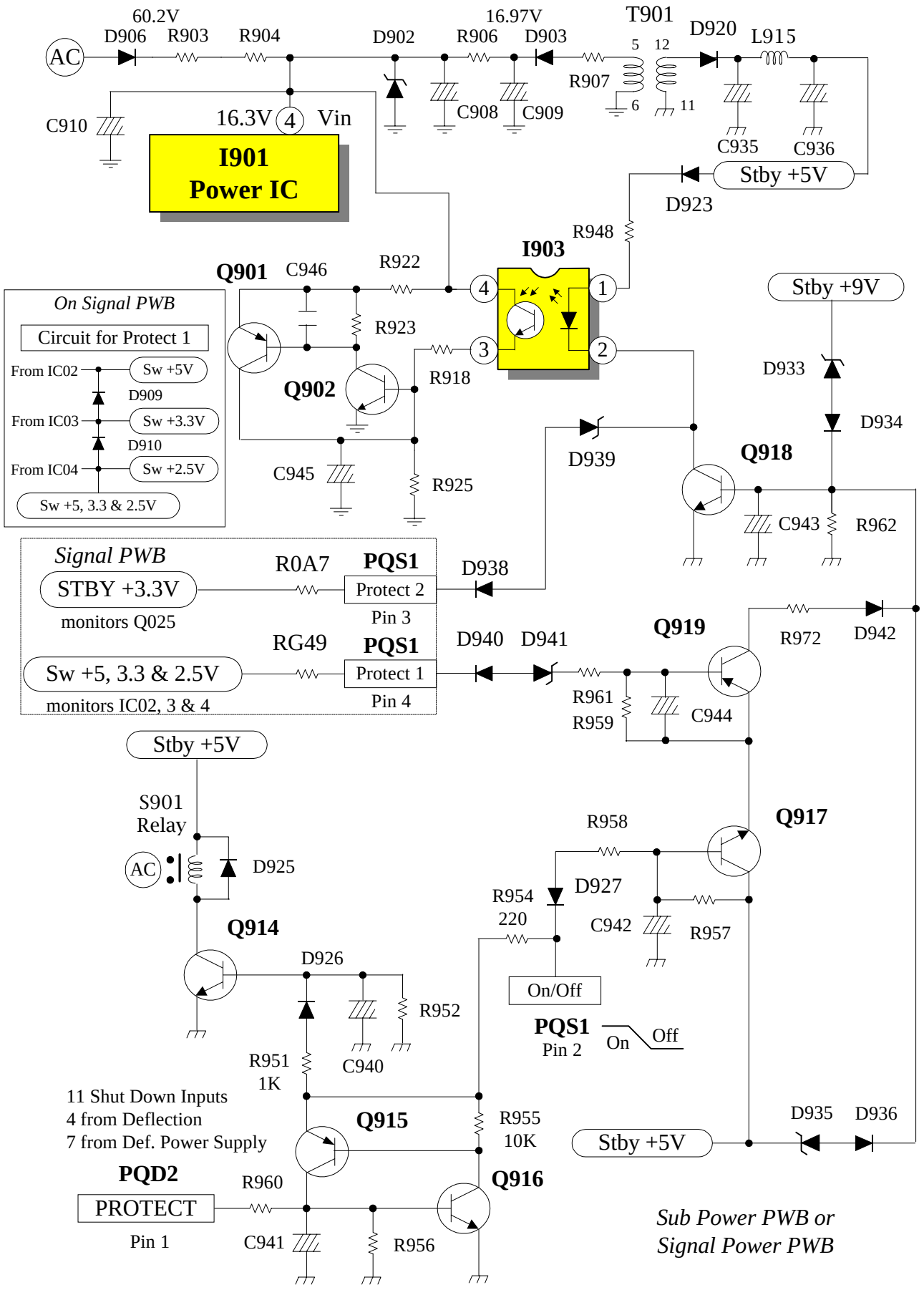
SHUT DOWN CIRCUIT:

Shut down occurs when the shutdown Photo Coupler **I903** is activated by pulling pin **2** low.
When **I903** is activated by pulling pin **2** low it give a ground path for the emitter of the LED inside **I903**. The light produced by turning on this LED turns on the internal photo receiver and generates a high out of pin (**3**). This high is routed to the base of **Q902** turning it on. This grounds pin (**4**) of **I901** removing Vin and the power supply stops working.
The reason for the photo sensor **I903** is to isolate hot and cold ground.

B+ GENERATION FOR THE SUB POWER SUPPLY DRIVER IC:

Vcc for the Driver IC is first generated by the AC input. This voltage is called Start Up Voltage. **I901** requires **16V** DC to operate normal. However, it will begin operation at **6.8V DC** on pin (**4**) of **I901**.
When AC is applied, AC is routed through the main fuse **F901** (a 6 Amp fuse), then through the Line filters **L901,** and **L902** to prevent any internal high frequency radiation for radiating back into the AC power line. After passing the filters it arrives at the main full wave bridge rectifier **D901** where it is converted to Raw 150V DC voltage to be supplied to the power supply switching transformer **T901** pin (**1**).
However, one leg of the AC is routed to a half wave rectifier **D906** where it is rectified, routed through **R903** and **R904** (both a 22K ohm resistor), filtered by **C910**, clamped by a 30V Zener **D902** and made available to pin (**4**) of **I901** as start up voltage. When this voltage reaches 6.8Vdc, the internal Regulator of **I901** is turned On and begins the operation of **I901**.
When the power supply begins to operate by turning on and off the internal Switch MOS FET, the Raw 150V DC routed through **T901**, in on pin **1** (Drain) and out on pin **2** which is the Source. The Source of the internal Switch MOS FET is routed out of pin (**2**) through three low ohm resistors to hot ground. When the internal Switch MOS FET turns on, it causes the transformer to saturate building up the magnet field. When the internal Switch MOS FET turns off, the magnet field collapses and the EMF is coupled over to the secondary windings, as well as the drive windings. The drive windings at pin (**5**) produce a run voltage pulse which is rectified by **D903**, filtered by **C909** then routed through **R906**, filtered again by **C908** clamped by **D902** and now becomes run voltage (**16V**) for **I901**.

DP-1X SIGNAL POWER SUPPLY (Low Voltage) SHUT-DOWN CIRCUIT



DP-1X LED USED FOR VISUAL TROUBLE SHOOTING DESCRIPTION

SUB POWER SUPPLY VISUAL LED. *(See page 02-10 for Circuit Diagram)*

DP-15 and DP-14G Chassis has 1 Green LED on Sub Power Supply PWB. (Not the DP-17)

This chassis utilizes 1 Green LED in the power supply cold side.
The power supply operates it two different modes, Standby and Projection On mode.

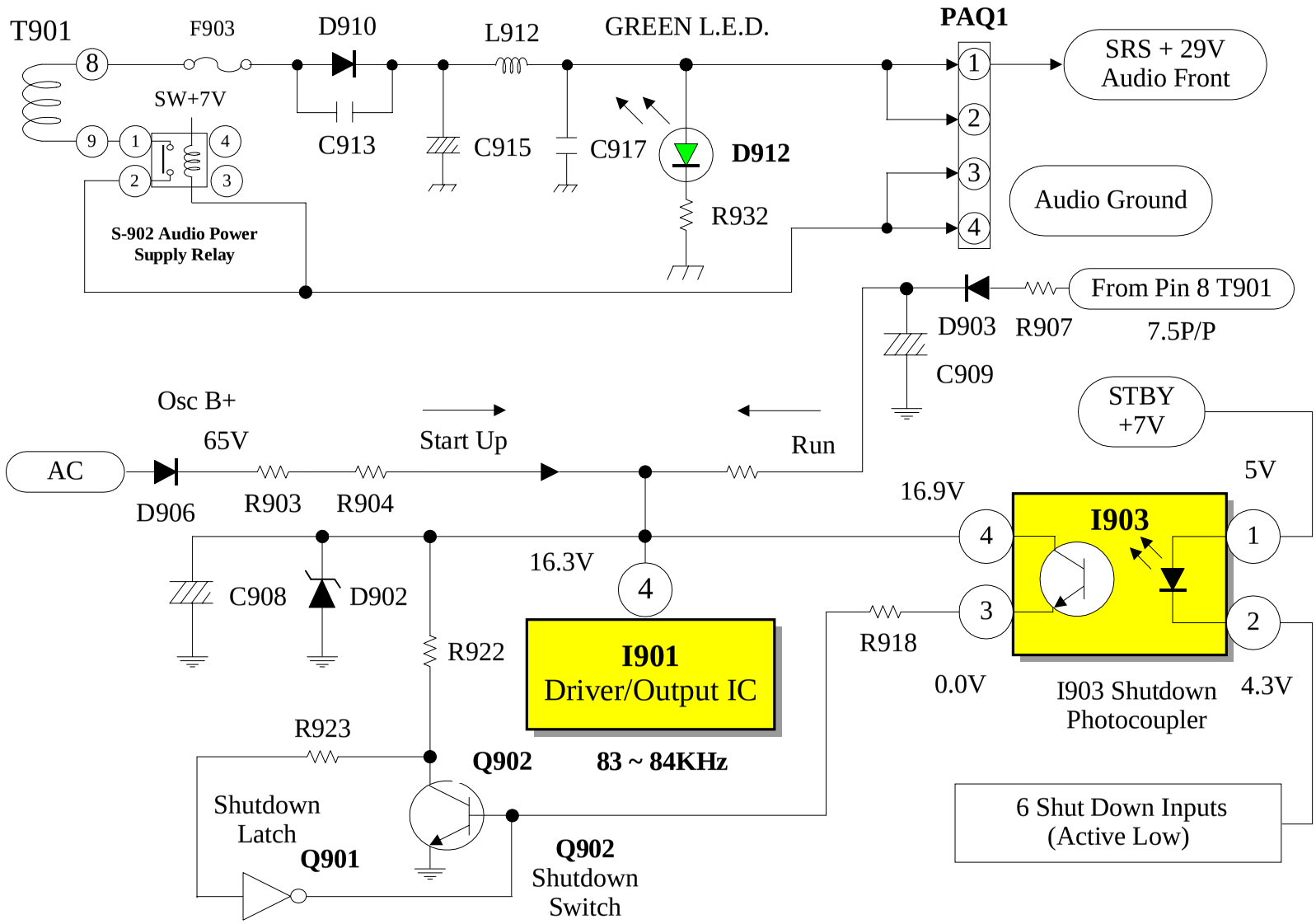
The LED is lit only in the Power On mode. During Standby with the AC applied and the TV; **S-902** is not engaged. This turns off the Audio B+ and the LED does not light.

- **SRS Audio Front 29V Regulator +29V indicated by D912 Color GREEN**

LED USAGE:
The Visual LED is very useful in Trouble Shooting. Without removing the back cover, some diagnostics can be made. With the set ON and by observing the operation of the Green LED, the technician can determine if the Sub Power Supply is generating Audio B+.
The following will examine how the LED is illuminated.

SRS Audio +29V Regulator indicated by D912.
When the set is turned ON, the relay **S-902** engages. This supplies a ground return path for pin (**9**) of the main switching transformer. This action allows generation of the pulse from pin (**8**) of **T901**.
The SRS Audio +29V supply is generated from pin (**8**) of **T901**. This output is rectified by **D910** and filtered by **C915**. The choke **L912** adds further filtration and **C917** removes high frequency switching noise. This supply is routed to the SRS Audio Output IC **IJ01** via the connector **PAQ1** pin **1** and **2**.
This voltage is what illuminates the Green Visual Trouble Shooting LED, **D912** when the set is turned ON.

DP-15 and DP-14G CHASSIS L.E.D. (VISUAL TROUBLE DETECTION) DIODES
SIGNAL POWER SUPPLY
(1 Total L.E.D. for visual trouble sensing observation)



DP-17 LED USED FOR VISUAL TROUBLE SHOOTING DESCRIPTION

DP-17 SUB POWER SUPPLY VISUAL LED.
(See Sub Power Supply Shut Down Circuit Diagram on next page)

The **DP-17** Chassis has **2** Green LEDs on Sub Power Supply PWB.
The Sub Power Supply operates it two different modes, Standby and Projection On mode.
The GREEN LEDs are lit ONLY in the Power On mode with the AC applied and the TV ON;

- **FRONT Audio** Front +29V Regulator indicated by **D913** Color GREEN
- **REAR and CENTER Audio** +29V Regulator indicated by **D912** Color GREEN

LED USAGE:
The Visual LED is very useful in Trouble Shooting. Without removing the back cover, some diagnostics can be made. By observing the operation of the Green LED, the technician can determine if the Sub Power Supply is running or not.

The following will examine how the LED is illuminated.

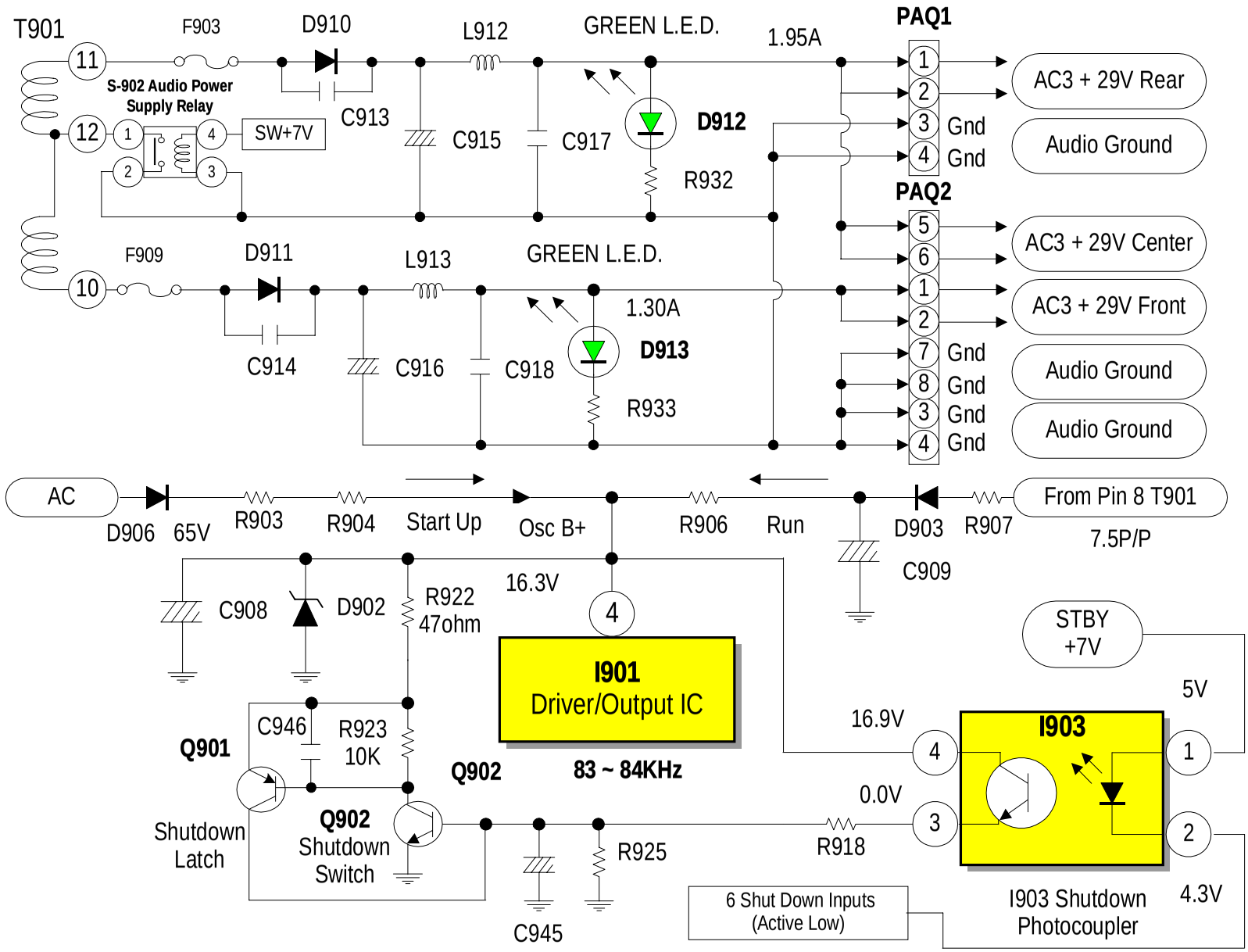
FRONT Audio Front + 29V Regulator indicated by D913 Color GREEN

- The Front Audio +29V supply is generated from pin (**10**) of **T901**. This output is rectified by **D911** and filtered by **C916**. The choke **L913** adds further filtration and **C918** removes high frequency switching noise. This supply is routed to the Front Audio Output IC **IJ01** via the connector **PAQ2** pins (**1**) and (**2**).

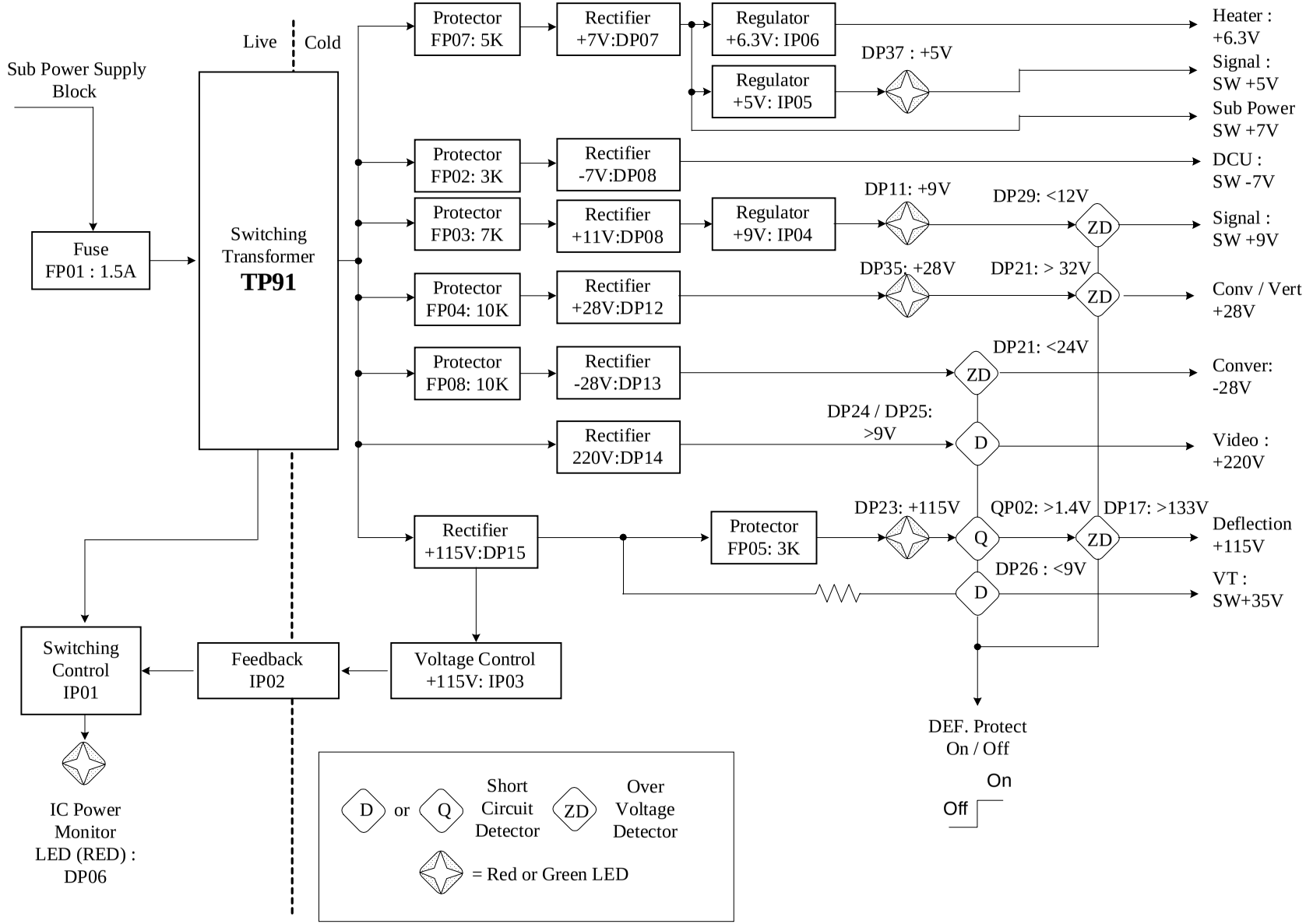
REAR and CENTER Audio Front + 29V Regulator indicated by D912 Color GREEN

- The Rear and Center Audio +29V supply is generated from pin (**11**) of **T901**. This output is rectified by **D910** and filtered by **C915**. The choke **L912** adds further filtration and **C917** removes high frequency switching noise. This supply is routed to the;
- Rear Audio Output IC **IS15** via the connector **PAQ1** pins (**1**) and (**2**) to the Surround PWB.
- Center Audio Output IC **IJ02** via the connector **PAQ2** pins (**5**) and (**6**) to the Signal PWB.

DP-17 CHASSIS L.E.D. (VISUAL TROUBLE DETECTION) DIODES SIGNAL POWER SUPPLY
(2 Total L.E.D. for visual trouble sensing observation)



DP-1X DEFLECTION POWER SUPPLY DISTRIBUTION DIAGRAM



DEFLECTION POWER SUPPLY SHUT DOWN CIRCUIT DESCRIPTION

DP-1X Def. Power Supply Shut Down Circuit Explanation: *(See page 02-19 for Circuit Diagram)*

POWER SUPPLY SHUTDOWN EXPLANATION

This chassis utilizes **IP01** as the Osc.\Driver \Switch for the Deflection power supply, just as the previous chassis have done. This IC is very similar to the previous versions. The Shutdown circuit, *(cold ground side detection),* is used to turn off the Relay **S901** via the following circuit, Connector **PQD2** pin **1**, **Q916** the Relay Driver on the Sub Power Supply PWB and the Relay **S901** also on the Sub Power Supply PWB.

The Power Supply utilizes a Shutdown circuit that produces a High from **12** different sources. When any of these inputs cause a high on the Connector **PQD2** pin **1**, the relay disengages, disabling the deflection power supply. All of the Power Supply Shutdown circuitry can be broken down into the following groups;

- **Voltage Missing Detection**
- **Excessive Current Detection**
- **Voltage Too High Detection**

In the following explanation, the Shutdown circuits will be grouped. This will assist the Service Technician with trouble shooting the Chassis, by understanding these circuits and having the associated circuit routs, the technician can then ***"Divide and Conquer"***.

COMMONLY USED SHUTDOWN DETECTION CIRCUITS

EXCESSIVE CURRENT DETECTION. *(See Figure 1)*

One very common circuit used in many Hitachi television products is the B+ **Excessive Current Sensing** circuit. In this circuit is a low ohm resistor in series with the particular power supply, *(labeled B+ in the drawing)*. The value of this resistor is determined by the maximum current allowable within a particular power supply. In the case of *Figure 1*, the value is shown as a **0.47 ohm**, however it could be any low ohm value. When the current demand increases, the voltage drop across the resistor increases. If the voltage drop is sufficient to reduce the voltage on the base of the transistor, the transistor will conduct, producing a Shutdown signal that is directed to the appropriate circuit.

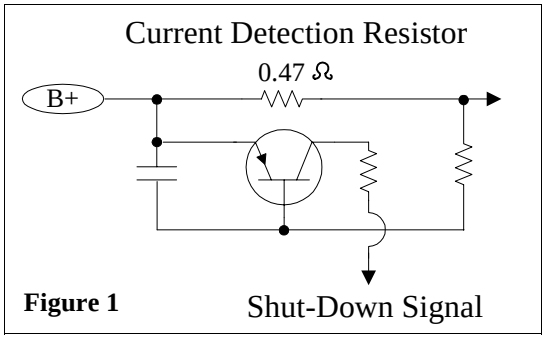


Figure 1

VOLTAGE LOSS OR EXCESSIVE LOAD DETECTION

(*See Figure 2)*

The second most common circuit used is the **Voltage Loss Detection** circuit. This is a very simple circuit that detects a loss of a particular power supply and supplies a Pull-Down path for the base of a PNP transistor. This circuit consist of a diode connected by its cathode to a positive B+ power supply. Under normal conditions, the diode is reversed biases, which keeps the base of Q1 pulled up, forcing it OFF. However, if there is a short or excessive load on the B+ line, the diode in effect will have a LOW on its cathode, turning it ON. This will allow a current path for the base bias of Q1, which will turn it ON and generates a Shutdown Signal.

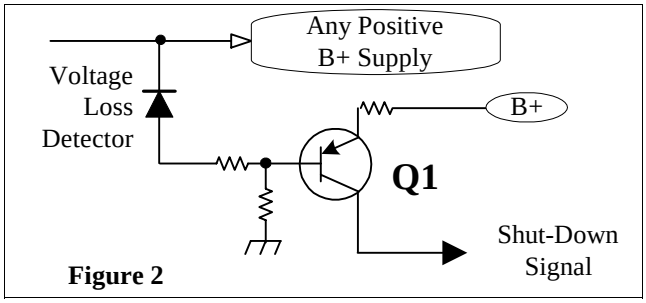


Figure 2

(Continued on page 15)

DEFLECTION POWER SUPPLY SHUT DOWN CIRCUIT DESCRIPTION

(Continued from page 14)

B+ VOLTAGE TOO HIGH DETECTION.
(See Figure 3)
In this circuit, a Zener diode is connected to a voltage divider or in some cases, directly to a B+ power supply. If the B+ voltage increases, the voltage at the voltage divider or the cathode of the zener diode will rise. If it gets to a predetermined level, the zener will fire. This action creates a Shutdown Signal.

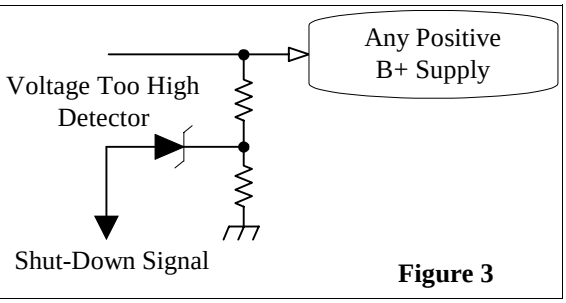


Figure 3

NEGATIVE VOLTAGE LOSS DETECTION.
(See Figure 4)
The purpose of the Negative Voltage Loss detection circuit is to compare the negative voltage with its' counter part positive voltage. If at any time, the negative voltage drops or disappears, the circuit will produce a Shutdown signal.
In Figure 5, there are two resistors of equal value. One to the positive voltage, *(shown here as +12V)* and one to the negative voltage, *(shown here as -12V)*. At their tie point, *(neutral point)*, the voltage is effectually zero (0) volts. If however, the negative voltage is lost due to an excessive load or defective negative voltage regulator, the neutral point will go positive. This in turn will cause the zener diode to fire, creating a Shutdown Signal.

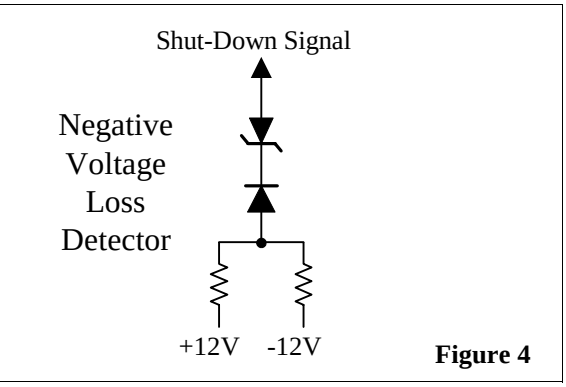


Figure 4

DP-1X SHUTDOWN CIRCUITS FOR THE DEFLECTION POWER SUPPLY

There are a total of **12** Cold Ground Side individual Shutdown inputs. In addition, there are also **3** Hot Ground Side Shutdown inputs that are specifically detected by the main power driver IC, **IP01** that protect it from excessive current or over voltage.
All of the Shutdown detection circuits can be categorized by the four previously described circuits

HOT GROUND SIDE SHUT DOWN SENSING CIRCUITS. (INTERNAL TO IP01).

LATCHED SHUT DOWN MONITORS: (AC must be removed to recover).
1. **Pin 4** is monitored for Over Voltage internal to **IP01.**
2. **IP01** itself is monitored for Excessive Heat. This block is labeled T.P.O. (Thermal Protection Overload).

RECOVERING SHUT DOWN INPUT: (Driver IC will recover on it's own when trouble is removed.)
3. **Pin 5** besides being used as a regulation input, is also monitoring the low ohm resistors, **RP10, RP11, RP12,** and **RP16,** (All are 0.22 ohm resistors). If these resistors have an excessive current condition caused by monitoring the current through the internal Switch MOS FET, the voltage will rise and pin **5** has an internal Over Voltage detection op-amp. If this voltage rises enough to trigger this op-amp, the IC will stop producing a drive signal.

(Continued on page 16)

DEFLECTION POWER SUPPLY SHUT DOWN CIRCUIT DESCRIPTION

(Continued from page 15)

COLD GROUND SIDE SHUT DOWN CIRCUITS:
These Circuits are broken down into the appropriate categories as described earlier.

VOLTAGE LOSS DETECTION

1. Shorted 220V (**DP24** and **DP25**) Inverted by **QP03** then through **DP28**
2. Shorted SW+35V (**DP26**) Inverted by **QP03** then through **DP28**
3. Shorted 28V (**DP27**) Inverted by **QP03** then through **DP28**
4. Shorted Deflection Transformer or Miss-operation (**D707** and **Q705**) then through **D705**

NEGATIVE VOLTAGE LOSS DETECTION

5. -M28V Loss Detection (**RP21, RP20, DP35, DP21** and **DP22**)

EXCESSIVE CURRENT DETECTION

6. 115V Deflection Power Supply (**RP24, QP02, DP18, DP19** and **DP20**)
7. 28V Vertical IC **I601** Power Supply (**R629, Q609, D608,** and **DP31**)

VOLTAGE TOO HIGH DETECTION

8. Excessive High Voltage Detection (**DH17, DH13 and DH15**). Sensed from the 50P Voltage generated from pin (**5**) of the Flyback Transformer **TH01**. Also, (**DH14**) sends a high command to the Horizontal Driver IC **IH01** pin **7**, to defeat Horizontal Drive Output if this voltage goes too high.
9. Side Pincushion failure generating a High. (**D702, and D703**).
10. Deflection B+ Too High. (**DP17, RP26 and RP27**).
11. SW +9V Voltage Too High Detection. (**DP29** and **DP30**)
12. ABL Voltage Too High Detection. (**DH15**)

If any one of these circuits are activated, the power supply will STOP, and create a Power Supply Shutdown Condition.

SHUT DOWN CIRCUIT:
Shut down occurs when pin (**1**) of Connector **PQD2** called ***PROTECT*** goes High. This High is routed to the Sub Power Supply PWB and is impressed on the base of the Relay Driver Transistor **Q916** turning it On. When **Q916** turns On, it removes the Power On High and the Relay **S901** will disengage and remove the AC source from the Deflection Power Supply.

DESCRIPTION OF EACH SHUT DOWN CIRCUIT:
Please use the Commonly Used Shutdown Detection Circuits for the description of how the circuit works.

VOLTAGE LOSS DETECTION

1. Shorted 220V (DP24 and DP25) Inverted by QP03 then through DP28

The cathode of **DP24** is connected directly to the 220V line. If it shorts this circuit is activated and pulls the base of **QP03** low and it's collector goes high. This High is routed through **DP28** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described above.

2. Shorted SW+35V (DP27) Inverted by QP03 then through DP28

The cathode of **DP27** is connected directly to the SW+35V line. If it shorts this circuit is activated and pulls the base of **QP03** low and it's collector goes high. This High is routed through **DP28** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described above.

3. Shorted 28V (DP27) Inverted by QP03 then through DP28

The cathode of **DP27** is connected directly to the 28V line. If it shorts this circuit is activated and pulls the base of **QP03** low and it's collector goes high. This High is routed through **DP28** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described above.

(Continued on page 17)

DEFLECTION POWER SUPPLY SHUT DOWN CIRCUIT DESCRIPTION

(Continued from page 16)

4. Shorted Deflection Transformer or Miss-operation (D707 and Q705) then through D705

The Deflection circuit generates the actual Drive signal used in the High Voltage section. If a problem occurs in this circuit, the CRTs could be damaged or burnt. **D707** is connected to **R728** which is normally passing the same pulse as used for generation of the H. Blanking signal. This pulse is generated off the Deflection Transformer **T752**. The pulse is rectified by **D707.** This rectified voltage is normally sent to the base of **Q705** keeping it On and it's collector Low. If the Deflection circuit fails to produce the pulses for rectification, the base voltage of **Q705** disappears and the transistor turns Off generating a High on its collector. This output High is routed through **D705**, **DP31** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described above.

NEGATIVE VOLTAGE LOSS DETECTION

Please use the Commonly Used Shutdown Detection Circuits for the description of how the circuit works.

5. -M28V Loss Detection (RP21, RP20, DP35, DP21 and **DP22)**

RP21 (15K ohm) is connected to the negative **–M28V** line and **RP20** (15K ohm) and **DP35** (LED) is connected to the positive **+28V** line. The Cathode of **DP21** monitors the neutral point where these components are connected. If the negative voltage disappears, the zener **DP21** fires. This high is routed through **DP22** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described above.

EXCESSIVE CURRENT DETECTION

Please use the Commonly Used Shutdown Detection Circuits for the description of how the circuit works.

6. 115V Deflection Power Supply (RP24, QP02, DP18, DP19 and DP20)

If an excessive current condition of the Deflection B+ is detected by **RP24** a 0.47 ohm resistor in the DP-15 or a 0.39 ohm in a DP-17 Chassis, the base of **QP02** would drop. This would turn on **QP02** and the high produced at the collector would fire zener **DP18**. This High would be routed through **DP19** through **DP20** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described above.

7. Vertical 28V for IC I601 Power Supply (R629, Q604, D608, and DP31)

If an excessive current condition of the Vertical B+ is detected by **R629** a 0.68 ohm resistor, the base of **Q609** would drop. This would turn on **Q604** and the high produced at the collector would be routed through **D608** through **DP31** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described above.

VOLTAGE TOO HIGH DETECTION

Please use the Commonly Used Shutdown Detection Circuits for the description of how the circuit works.

8. **Excessive High Voltage Detection (DH17, RH13, and DH15). Sensed from the Heater Voltage generated from pin (5) of the Flyback Transformer TH01.** Also, (DH14) sends a high command to the Horizontal Driver IC IH02, to defeat Horizontal Drive Output if this voltage goes too high.

The Flyback Transformer **TH01** generates a pulse called Heater. (Note: This does not go to the CRTs as heater voltage, its used for Excessive High Voltage Detection). If this voltage goes too high indicating an excessive High Voltage condition, the high would be impressed on the cathode of **DH15**. This high is routed **DP31** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described above.

NOTE: **DH17** is not in the **DP15** chassis, it is only in the **DP17** and **DP14G**.

NOTE: **LH06** coil has polarity, please check the "Dot" and confirm with the markings on the PWB. Failure to do so will result in intermittent "Shut Down".

(Continued on page 18)

DEFLECTION POWER SUPPLY SHUT DOWN CIRCUIT DESCRIPTION

(Continued from page 17)

9. Side Pincushion failure generating a High. (D702, and D703)

The Side Pin Cushion op-amp circuit is comprised of **I701.** If a problem occurred in this circuit it would create a High from pin **7** of **I701.** This high is impressed on the cathode of **D702**, and the zener would fire. This High will be routed through **D703** through **DP31** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described previously.

10. Deflection B+ Too High. (DP17, RP26 and RP27

RP26 and **RP27** form a voltage divider. The top side of **RP27** is monitored by **DP17**. If the Deflection 115V voltage goes too high, the zener **DP17** will fire. This high is routed through **DP20** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described previously.

11. SW +9V Power Supply Too High Detection. (DP29 and DP30)

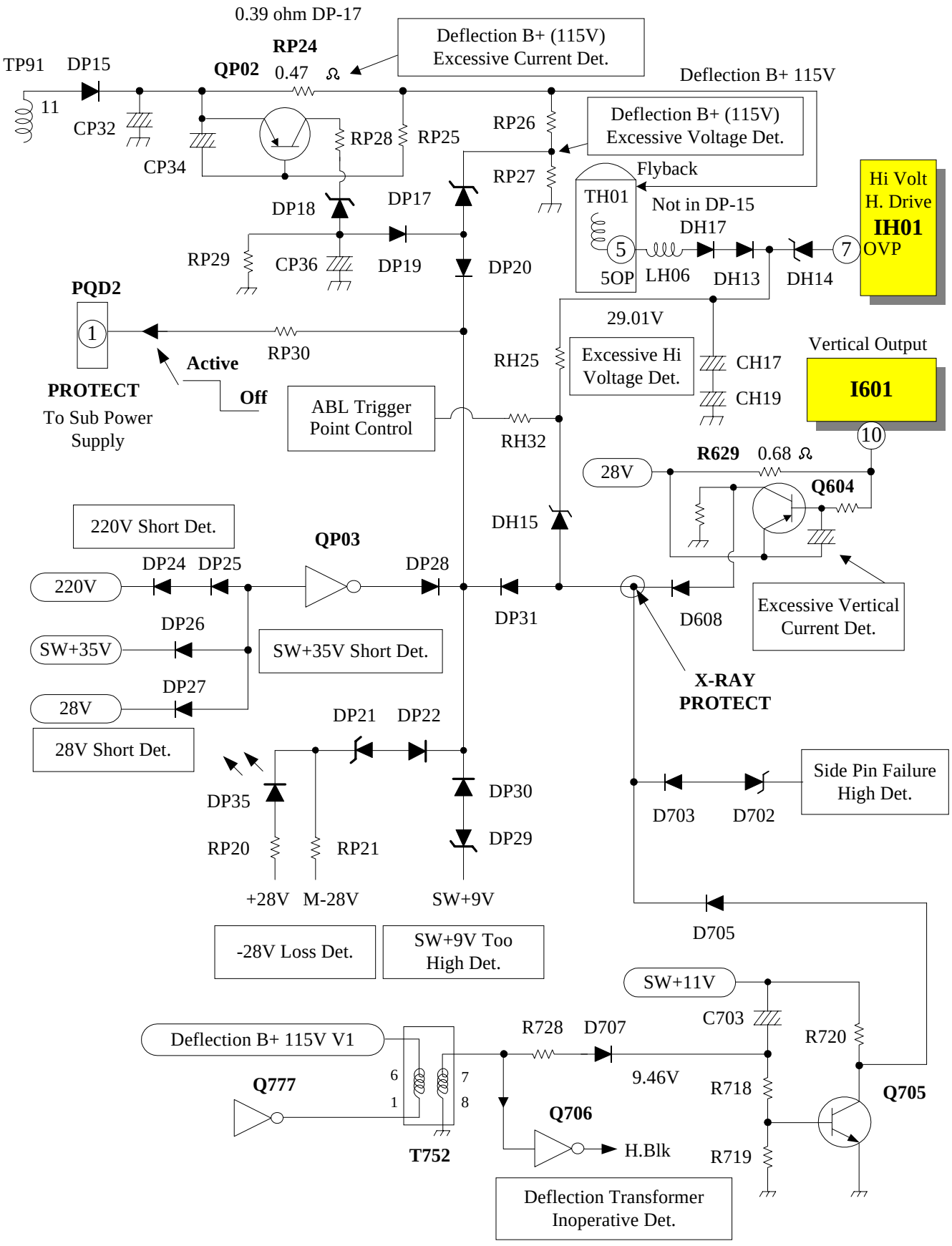
The **SW +9V** voltage is monitored by **DP29**. If this voltage goes too high, the zener **DP29** will fire. This high is routed through **DP30** and **RP30** to pin (**1**) of Connector **PQD2** called ***PROTECT*** and Shut Down occurs as described previously.

12. ABL Trigger Point Control. (RH32)

The ABL voltage is generated by the voltage drop across the ABL pull up resistors, (**RH27** and **RH28**), according to the Flyback current demands. (*See ABL circuit diagram for details).* The ABL voltage is clamped at a maximum of 11V by (**DH16**).

If the High Voltage fluctuates, this fluctuation manipulates the ABL voltage slightly to avoid an accidental trigger and to avoid ABL from over controlling the video through the Rainforest IC.

DP1X DEFLECTION POWER SUPPLY SHUTDOWN DIAGRAM



DP-1X LEDs USED FOR VISUAL TROUBLE SHOOTING DESCRIPTION

DEFLECTION POWER SUPPLY VISUAL LEDs. *(See page 02-24 for Circuit Diagram)*
DP-1X Chassis has 4 Green and 1 Red LEDs on Deflection Power Supply PWB.
This chassis utilizes 4 Green LEDs in the power supply cold side and a Red LED in the HOT side.

POWER ON MODE:
When the Power is turned ON, the LEDs lights;

1) **DP06 Indicating Vcc applied to the Power Supply Driver IC IP01 pin 4 (Colored RED)**
2) **DP23 Indicating 115V Deflection B+ is available (Colored GREEN)**
3) **DP37 Indicating SW +5V B+ is available (Colored GREEN)**
4) **DP11 Indicating SW +9V B+ is available (Colored GREEN)**
5) **DP35 Indicating 28V B+ is available (Colored GREEN)**

LED USAGE:
The Visual LEDs are very useful in Trouble Shooting. Without removing the back cover, some diagnostics can be made. By observing the operation of the Red and Green LEDs, the technician can determine if the Deflection Power Supply is running or not. Also, by monitoring these LEDs at turn on, one can determine if a line is loaded. If an LED tries to light this goes off, or only lights dimly, this a loaded condition should be considered.
Remember, ***this power supply doesn't operate when the set is in Standby.***
The following will examine each LED and how they are lit.

DP06 INDICATING VCC APPLIED TO THE POWER SUPPLY DRIVER IC IP01 PIN 4 (COLORED RED)
This LED can be used to determine any of two different scenarios,

1. Is there B+ (Vcc) available to the Deflection Power Supply Driver IC? LED will be ON
2. Is the B+ (Vcc) available to the Deflection Power Supply Driver IC missing? LED will be OFF

As can be see, there is 1 scenario that can cause **DP06** to be off, (1) Missing Start up voltage for the Driver IC.

DP23 INDICATING 115V DEFLECTION B+ IS AVAILABLE (COLORED GREEN)
This LED is connected directly to the 115 V deflection B+ line. If it's lit, 115V is available.

DP37 INDICATING SW +5V B+ IS AVAILABLE (COLORED GREEN)
This LED is connected directly to the SW +5V B+ line. If it's lit, +5V is available.

DP11 Indicating SW +9V B+ is available (Colored GREEN)
This LED is connected directly to the SW +9V B+ line. If it's lit, +9V is available.

DP35 Indicating 28V B+ is available (Colored GREEN)
This LED is connected directly to the +28V B+ line. If it's lit, +28V is available.

B+ GENERATION FOR THE DEFLECTION POWER SUPPLY DRIVER IC. ***See Figure 1***
START UP VOLTAGE GENERATION:
Vcc for the Driver IC is first generated by the AC input. This voltage is called Start Up Voltage. **IP01** requires 21V DC to operate normal. However, it will begin operation at 14V DC on pin (**4**) of **IP01**.
When AC is applied by the relay on the Sub Power Supply **R901**, AC is routed through the connector **PQD1**. Then it arrives at the main full wave bridge rectifier **DP01** where it is converted to DC voltage. One leg of the AC is routed through **RP02** and **RP03** (both a 3.9K ohm resistor), filtered by **CP05**, and made available to pin (**4**) of **IP01** as start up voltage. The Red LED **DP03** is illuminated by this power supply. When this voltage reaches 6.8Vdc, the internal Regulator of **IP01** is turned On and begins the operation of **IP01**.
RUN VOLTAGE GENERATION:
After the transformer **TP91** is started, a pulse is output from pin **8**. This pulse is rectified by **DP02,** filtered by **CP05** and takes over as Run Voltage (16.3V) at pin **4** of **IP01.**

(Continued on page 21)

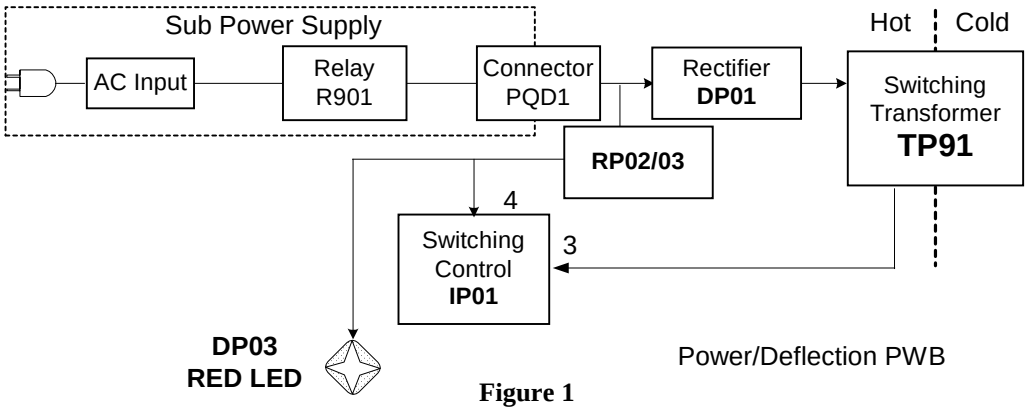


Figure 1

(Continued from page 20)

REGULATION:

Figure 2 is a simplified diagram of the main Power Supply used in the DP-1X series Projection Television chassis.

The primary control element of the power supply is IP01 (the Switching Regulator IC), in conjunction with transformer TP91. These two components, along with the supporting circuitry, comprise a *closed loop* regulation system.

Unlike previous Pulse Width Modulated (PWM) Switch Mode Hitachi power supplies, the regulation system in the this chassis utilizes Frequency Control Modulation with an operational frequency of 60KHZ to 85KHZ, corresponding to *full load* and *no load* conditions, respectively. Primary regulation is provided by **IP03, IP02** and into **IP01**, regulating the switching frequency at pin (**3**) of **I901** via pin 1.

Two primary secondary voltages are developed that are needed to sustain run and maintain regulation;

1. Run Voltage generated from pin (**8** and **9**) of **TP91** rectified by **DP02** and supplies run voltage to **IP01** pin (**4**) and
2. 115V Deflection Voltage generated from pin (**11**) of **TP91**, rectified by **DP15** and used for regulation and powering the Deflection and regulation circuitry.

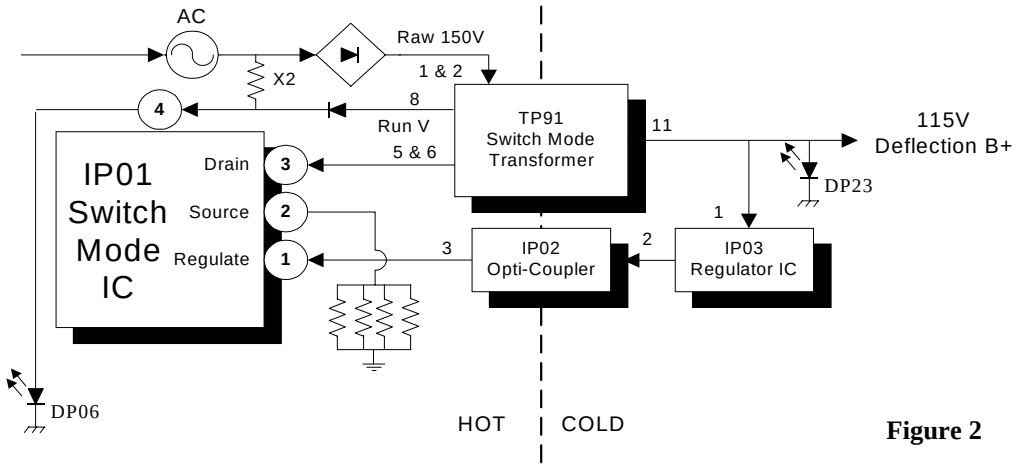
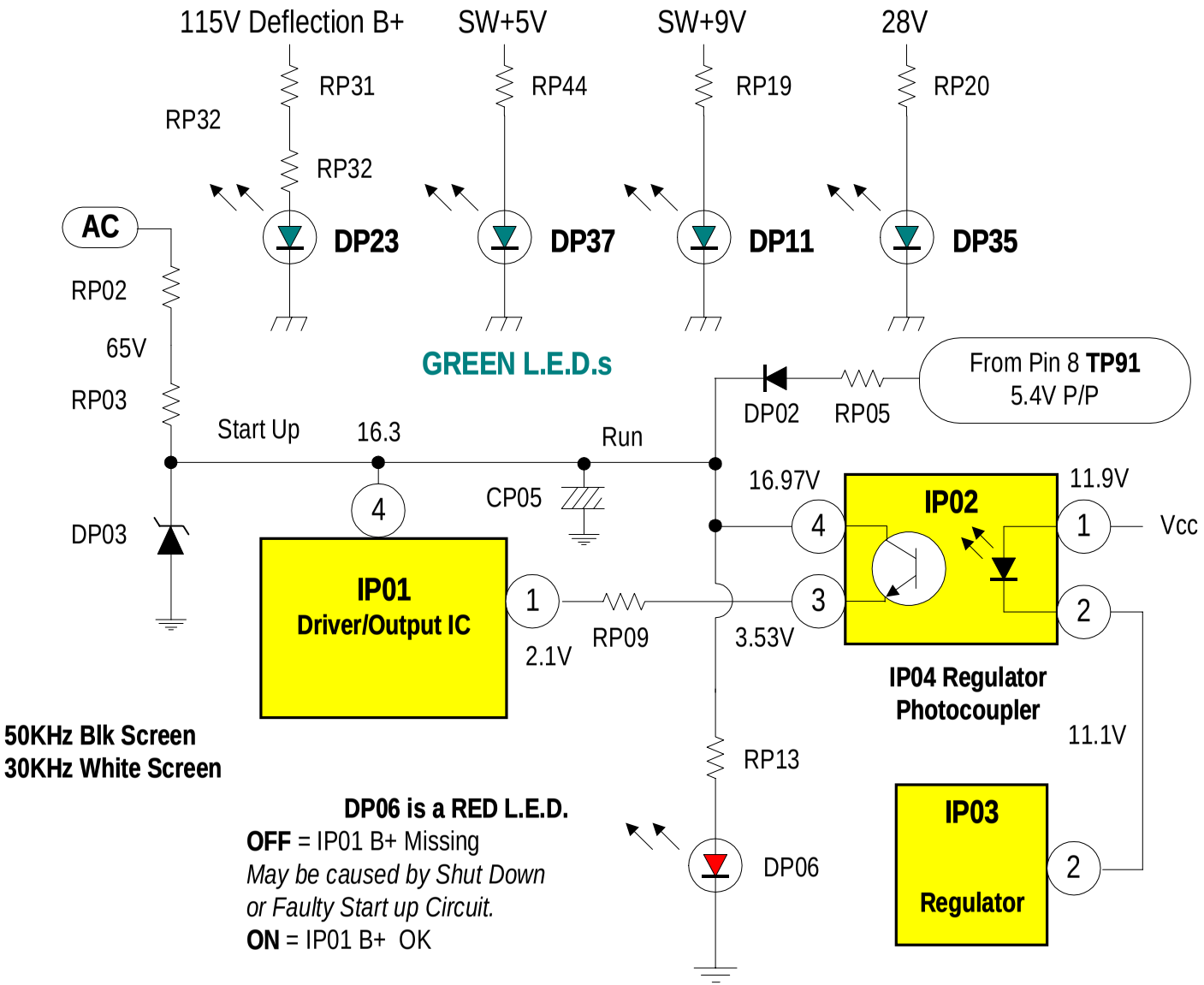


Figure 2

DP-1X CHASSIS L.E.D. (VISUAL TROUBLE DETECTION) DIODES
DEFLECTION PWB 4 GREEN L.E.D.s and 1 RED L.E.D.
(5 Total L.E.Ds. for visual trouble sensing observation)



DEFLECTION INFORMATION

DP-1X CHASSIS

SECTION 3

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DP-1X DEFLECTION BLOCK CIRCUIT DESCRIPTION

DEFLECTION BLOCK CIRCUIT DIAGRAM DESCRIPTION: *(See page 03-04 for Circuit Diagram)*
(Use the Horizontal Drive Circuit Diagram for more details)

CIRCUIT DESCRIPTION

When B+ arrives at the Rainforest IC **IC01** pin (**19**), horizontal drive is output from pin (**26**). The drive signal is routed through the connector **PSD2** pin **5** to the Horizontal Driver Transistor **Q751**. This transistor switches the ground return for pin (**8**) of the Driver transformer (**T751**). 28 volts is supplied to pin (**5**) and this switching allows EMF to develop. As this signal collapses, it creates a pulse on the output pin of (**T751**) at pin (**4**) to the base of the Deflection Horizontal output transistor **Q777**.
Two transistors monitor the **SW +9V** line, **Q707** and **Q708**. When the set is turned off, the H. Drive signal from **IC01** could stop too soon. If this were to happen, the Horizontal output transistor **Q777** would be damaged. To prevent this, if the **SW +9V** line drops, **Q707** senses this because it's base voltage drops. The base of **Q708** rises and turns on, grounding the output from the H. Drive Transistor **Q709**.
Q709 transistor switches the primary windings of the Deflection Transformer **T752**.

T702 TRANSFORMER PRODUCES THE FOLLOWING OUTPUT PULSES;

- **Deflection Pulse from pin (7):** This pulse is used by;
  1. To **X-Ray Protect through D707**: This signal is monitored by the X-Ray Protect circuit to place the power supply into shut down if the Deflection circuit doesn't operate.
  2. The **Dynamic Focus OUT Circuit PWB through PDK4 connector pin 5**: A Dynamic Focus waveform, (Horz. Parabola) is created. This is a parabolic waveform that is superimposed upon the static focus voltage to compensate for beam shape abnormalities which occur on the outside edges of the screen because the beam has to travel further to those locations.
  3. **1100V Generation circuit through D711, D712 and the connector PDF1 pin 1.** This is the Dynamic Focus output voltage.
- **+28V, M26V and RETRACE PULSE +28P and M28P:** The positive 28V and the negative 28V is routed to the Deflection transformer **T752**. They enter the transformer as a pure DC voltage then a 7.5V P/P horizontal pulse is added to the DC voltage and leaves as +28P and M28P. From here these voltages are routed to the Convergence output section and they are rectified. They become +33V and -33V respectively. This process prevents the need for another power supply. (*Note: the M stands for Minus voltage.*)

HORIZONTAL BLANKING (H. BLK) GENERATED FROM PIN (7):
The Horizontal Pulse is also routed to the Horizontal Blanking generation transistor **Q706**. This transistor generates the 13V P/P called **H Blk**. This signal goes to the following circuits;

- To pin the **PSD2** connector pin **7** to pin (**24**) of **IC01** as **FBP In.** Here this signal is used as a comparison signal. It is compared to the reference signal coming in at pin (**15**) Horizontal Sync. If there are any differences between these two signals, the output Drive signal from pin (**26**) is corrected.
  NOTE: When a 1080i signal is input through component inputs, the Rainforest IC detects this as well and outputs the Vertical Squeeze (**V. Squ**) signal from pin (**36)**. The Reference signal for Horizontal Sync now becomes the Y input from component, pin (**8)**.
- To the Convergence circuit for correction waveform generation.
- Sweep Loss Circuit (**QN01**) to shut off the CRTs if Horizontal deflection is lost.
- Through the connector **PSD2** pin (**7**): The H Blk signal is routed from here to the Signal PWB to be used by different circuits.
  The Microprocessor uses this signal for OSD positioning and for Station Detection during Auto programming within the coincidence detector.
  The PinP unit uses this signal for switching purposes. Like the read/write clock, positioning, etc…

- The Horizontal Blanking signal **H Blk** from **Q706** is also sent to the High Voltage Driver IC **IH01** pin (**3**). This IC uses this signal as its reference signal to produce the High Voltage Drive waveform output from pin (**1**). This output is routed to the driver transistors, **QH02**. Then to the High Voltage Horizontal Output Tran-

(Continued on page 2)

DP-1X DEFLECTION BLOCK CIRCUIT DESCRIPTION

(Continued from page 1)

sistor **QH01**. This transistor switches the primary of the Flyback transformer **TH01**. Deflection B+ 115V2 is sent through pin (**9**) and output pin (**10**) to the collector of the Horizontal Output Transistor **QH01**.

A sample of the High Voltage is output from the Flyback transformer **TH01** pin (**12**). This voltage is sent to pin (**9**) of the High Voltage Driver IC **IH01**. This voltage is compared to the reference voltage available at pin (**12**). If there is a difference between the two voltages, an error voltage is generated and output from pin (**10**) and input again at pin (**11**) where it manipulates the PWM (Pulse With Modulation) signal producing the Horizontal Drive signal output from pin (**1**).

The error signal from pin (**10**) is also sent to the Side Pen Cushion circuit through (**R752**). This signal manipulates the amount of pin cushion correction dependant upon the amount of High Voltage error voltage detected by the Side Pen Cushion op-amp (**I701**) at pin (**3**).

It's important to notice that the High Voltage circuit can not function without the Horizontal Deflection circuit providing a drive signal.

GENERAL INFORMATION:

The DP-1X deflection circuit differs from conventional projection product. It utilizes in a sense, two horizontal output circuits. One for Deflection and one for High Voltage. There are many terms around the Horizontal circuit that are not shown on the Diagram. Some of these terms are explained first:

CUT OFF:
Cut of collapses the Vertical circuit during I^2C Bus alignments, during CRT Set Up.

ABL:
ABL voltage is generated by monitoring the current through the Flyback transformer. This voltage will fluctuate down when the scene is bright and up when the scene is dark. The ABL voltage will manipulate the screen brightness and contrast to prevent blooming under these conditions.

H BLK:
- **H Blk:** Horizontal and Vertical Blanking is developed within the Deflection circuit. The Horizontal Blanking pulse operates around 13V P/P and is produced by taking a sample pulse from the Deflection transformer **T752**.

V BLK:
- **V Blk:** The Vertical Blanking pulse is generated from the Vertical output IC, **I601** pin (**11**). This pulse normally operates at 21V P/P.

IR:
The Infrared Pulses coming from the remote control are routed through the Deflection PWB to the Digital Convergence Unit. During DCAM (Digital Convergence Adjustment Mode), the Remote Control provides instruction codes for the DCU.

DIG RGB/ BUSY:
This indicates Digital RGB and BUSY.
- **Digital RGB** represents the On Screen Display produced by the DCU for generating the Digital Convergence adjustment grid and text produced during certain conditions such as Magic Focus, Sensor Initialization, Data Storage, etc…
- **Busy** notifies the DAC1 (I006 pin 1) which in turn notifies the Microprocessor I001 that the DCU has entered the DCAM. During this time, the Microprocessor ignores the remote control commands.

(Continued on page 3)

DP-1X DEFLECTION BLOCK CIRCUIT DESCRIPTION

(Continued from page 2)

MAGIC SW: (MAGIC FOCUS)
When the customer activates **MAGIC FOCUS** from the Front Control panel or via the Menu, **Magic Focus** is Energized by producing a low at pin **14** of the DCU.

D SIZE:
Digital Size is a control signal for raster enlargement when MAGIC FOCUS is operated. Raster enlargement is required for the MAGIC FOCUS PATTERN to hit the photo sensors.
This signal is output from DCU and routed to the base of **Q710** for enlarging horizontal size through the Pin Cushion circuit and through **Q603** to the Vertical Output IC **I601** pin (**4**) to enlarge the vertical size.
In some cases, this control signal is called "**A.SIZE**". It's the same function between DIG.SIZE and A.SIZE.

TO CONVERGENCE YOKES:
The DCU provides compensation signal for deflection abnormalities to the convergence output IC. The Convergence output IC in turn, amplify the signals and rout them to the convergence yokes.

+B 115V1:
The Deflection transformer receives the 115V V1 DC source.

+B 115V2:
The High Voltage Transformer **TH01** (Flyback) receives the 115V V2 DC source.

HV PARABOLA:
See DF Out.

SCREEN 700V: 700V Supplied to the screen grids on the CRT's.

FOCUS 12KV:
Focus voltage supplied to the CRT's.

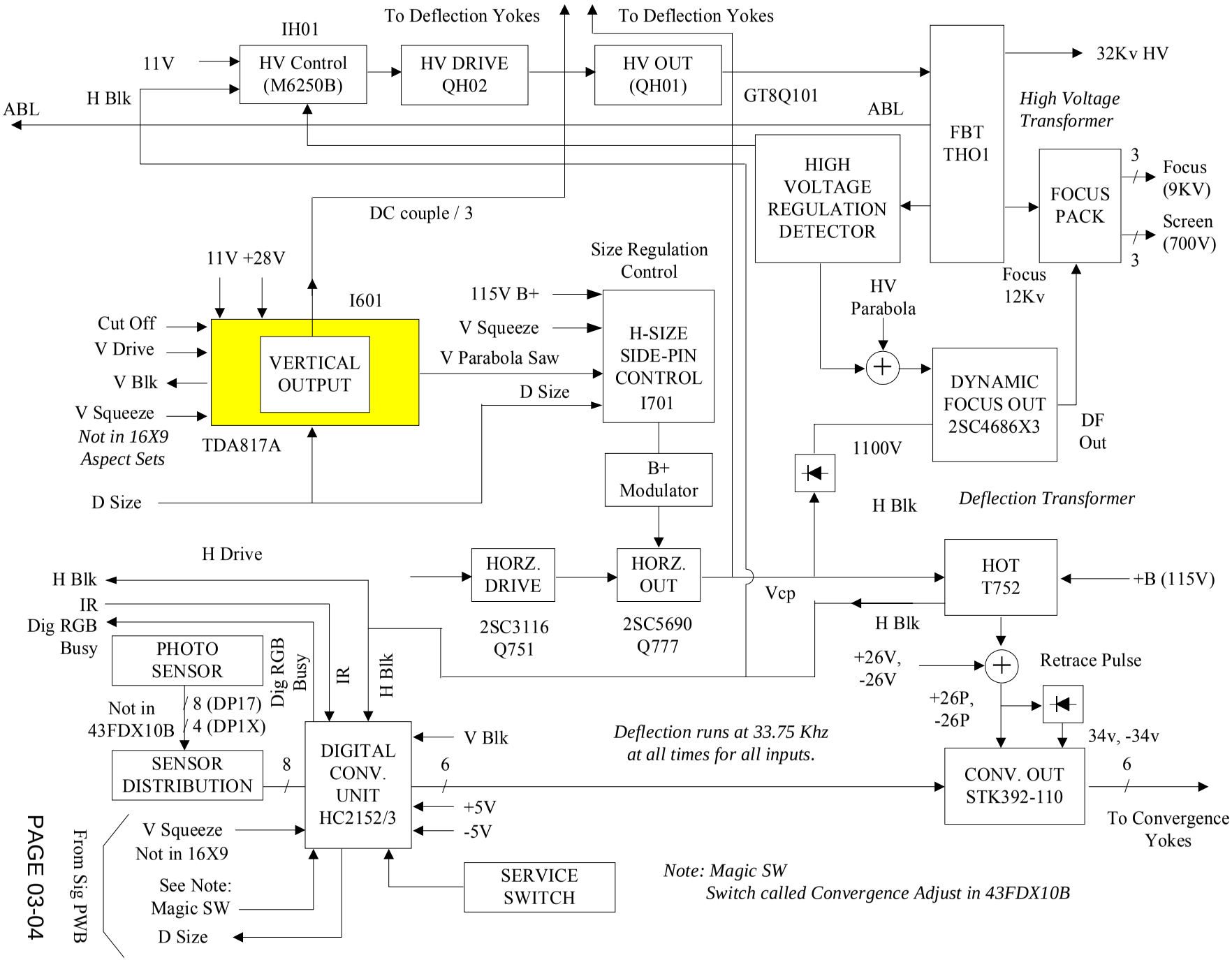
30Kv HV:
30,000 volts DC supplied to the CRT's anodes.

TO DEFLECTION YOKES:
Horizontal and Vertical deflection wave forms driving the deflection yokes.

V SQUEEZE: *(This signal is not used in the 16 X 9 screen aspect models).*
V. SQU is a signal that goes high when a 1080i signal is input through component in and Display 5 (**1080i Mode**) is selected through the customer's menu. This signal is generated by the Rainforest IC. When this signal goes high, it switches the DCU into a different set of memories for Convergence data and Magic Focus data. It also shrinks the Vertical Size to match the 16 X 9 image to squeeze all the visible horizontal lines into a 16 X 9 image. NOTE: 16 X 9 Aspect models have the ability to select 1080i mode as well. However, they do not produce the V. Squeeze signal because there's no need for it. 1080i Through Mode means that the signal bypasses the Flex Converter and is processed directly by the Rainforest IC.

SERVICE ONLY SWITCH:
Drops pin **9** of the **PDG** connector low and the DCU enters the Digital Convergence Adjustment Mode, (**DCAM**), producing the DCAM grid.

DP1X DEFLECTION BLOCK DIAGRAM



DP-1X HORIZONTAL DRIVE CIRCUIT DESCRIPTION

HORIZONTAL DRIVE CIRCUIT DIAGRAM DESCRIPTION: (See Circuit Diagram)
CIRCUIT DESCRIPTION
When B+ arrives at the Rainforest IC IC01 pin (19), horizontal drive is output from pin (26). The drive signal is routed through the connector PSD2 pin 5 to the Horizontal Driver Transistor Q709. This transistor switches the ground return for pin (8) of the Driver transformer (T702). 28 volts is supplied to pin (5) and this switching allows EMF to develop. As this signal collapses, it creates a pulse on the output pin of (T702) at pin (4) to the base of the Deflection Horizontal output transistor Q777.
Two transistors monitor the SW +9V line, Q707 and Q708. When the set is turned off, the H. Drive signal from IC01 could stop too soon. If this were to happen, the Horizontal output transistor Q777 would be damaged. To prevent this, if the SW +9V line drops, Q707 senses this because it's base voltage drops. The base of Q708 rises and turns on, grounding the output from the H. Drive Transistor Q709.
(Note: New Information: Q707 and Q708 SHOULD BE REMOVED from the Circuit if Q777 is ever found shorted or defective.)

Q777 transistor switches the primary windings of the Deflection Transformer T701.

T701 transformer produces the following output pulses;
Deflection Pulse from pin (7): This pulse is used by;

1) To X-Ray Protect through D707: This signal is generated by monitoring the Deflection Transformer. If a rectified DC voltage that is created by the Deflection transformer is not detected, the power supply is placed into shut down.
2) The Dynamic Focus OUT Circuit PWB through PDK4 connector pin 5: A Dynamic Focus waveform, (Horz. Parabola) is created. This is a parabolic waveform that is superimposed upon the static focus voltage to compensate for beam shape abnormalities which occur on the outside edges of the screen because the beam has to travel further to those locations.
3) 1100V Generation circuit through D711, D712 and the connector PDF1 pin 1.
    - This is the Dynamic Focus output voltage.

+28V, M26V and RETRACE PULSE +28P and M28P: The positive 28V and the negative 28V is routed to the Deflection transformer T701. They enter the transformer as a pure DC voltage then a 7.5V P/P horizontal pulse is added to the DC voltage and leaves as +28P and M28P. From here these voltages are routed to the Convergence output section and they are rectified. They become +33V and -33V respectively. This process prevents the need for another power supply. (Note: the M stands for Minus voltage.)

HORIZONTAL BLANKING (H. Blk) GENERATED from pin (7) of T701:

The Horizontal Pulse is also routed to the Horizontal Blanking generation transistor Q706. This transistor generates the 13V P/P called H Blk. This signal goes to the following circuits;

- To pin the PSD2 connector pin 7 to pin (24) of IC01 as FBP In. Here this signal is used as a comparison signal. It is compared to the reference signal coming in at pin (15) Horizontal Sync. If there are any differences between these two signals, the output Drive signal from pin (26) is corrected.
    - NOTE: When a 1080i signal is input through component inputs, the Rainforest IC detects this as well and outputs the Vertical Squeeze (V. Squ) signal from pin (36). (NOT in the 16 X 9 Aspect Models). The Reference signal for Horizontal Sync now becomes the Y input from component, pin (8).
- To the Convergence circuit for correction waveform generation.
- Sweep Loss Circuit (QN01) to shut off the CRTs if Horizontal deflection is lost.
- Through the connector PSD2 pin (7): The H Blk signal is routed from here to the Signal PWB to be used by different circuits.
- The Microprocessor uses this signal for OSD positioning and for Station Detection during Auto programming within the coincidence detector.
- The PinP unit uses this signal for switching purposes. Like the read/write clock, positioning, etc…

(Continued on page 6)

DP-1X HORIZONTAL DRIVE CIRCUIT DESCRIPTION

(Continued from page 5)

- The Horizontal Blanking signal H Blk from Q706 is also sent to the High Voltage Driver IC IH01 pin (3). This IC uses this signal as its reference signal to produce the High Voltage Drive waveform output from pin (1). This output is routed to the driver transistors, QH02. Then to the High Voltage Horizontal Output Transistor QH01. This transistor switches the primary of the Flyback transformer TH01. Deflection B+ 115V2 is sent through pin (9) and output pin (10) to the collector of the Horizontal Output Transistor QH01.

A sample of the High Voltage is output from the Flyback transformer TH01 pin (12). This voltage is sent to pin (9) of the High Voltage Driver IC IH01. This voltage is compared to the reference voltage available at pin (12). If there is a difference between the two voltages, an error voltage is generated and output from pin (10) and input again at pin (11) where it manipulates the PWM (Pulse Width Modulation) signal producing the Horizontal Drive signal output from pin (1).

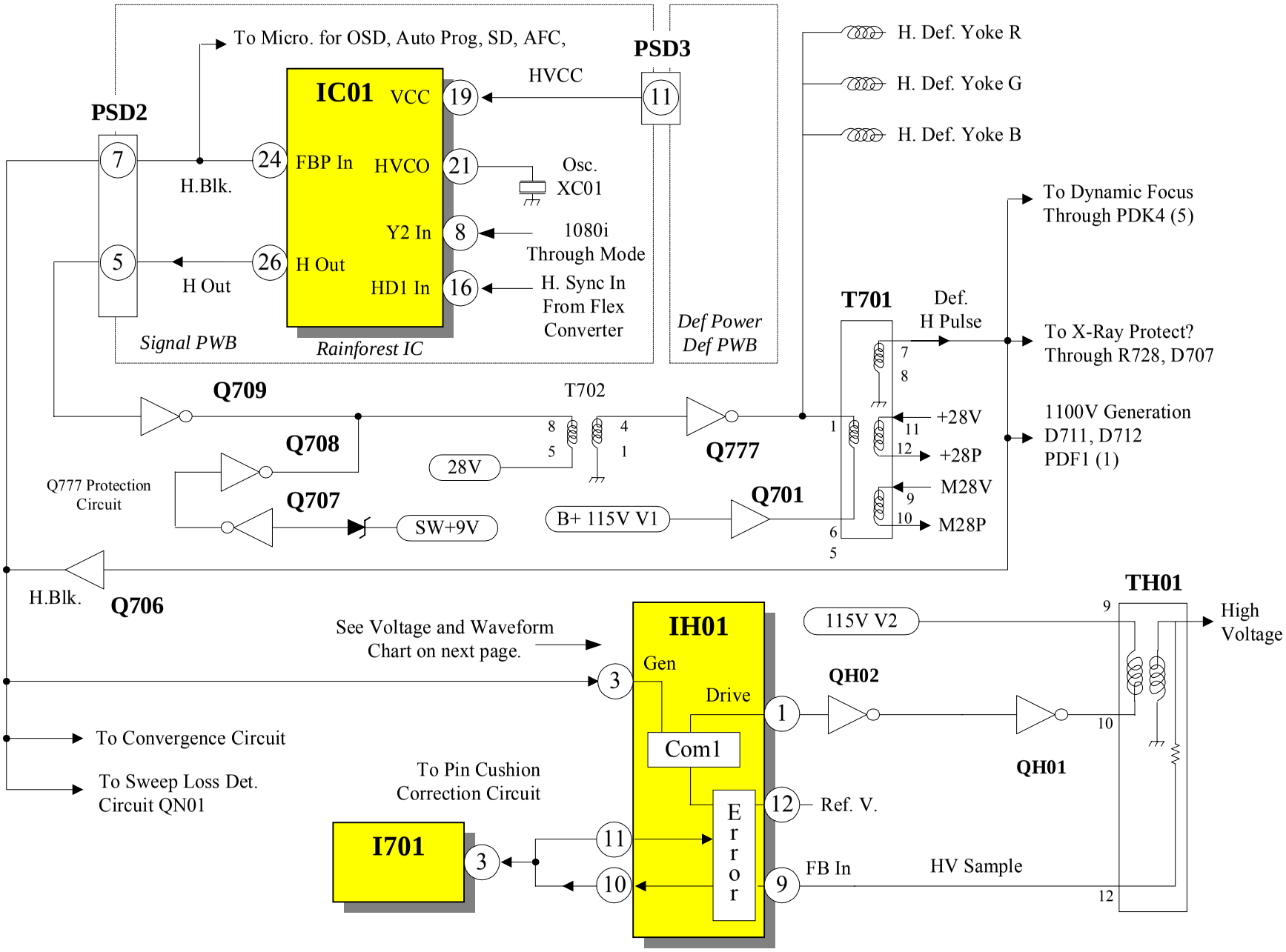
The error signal from pin (10) is also sent to the Side Pen Cushion circuit through (R752). This signal manipulates the amount of pin cushion correction dependant upon the amount of High Voltage error voltage detected by the Side Pen Cushion op-amp (I701) at pin (3).

It's important to notice that the High Voltage circuit can not function without the Horizontal Deflection circuit providing a drive signal.

GENERAL INFORMATION:

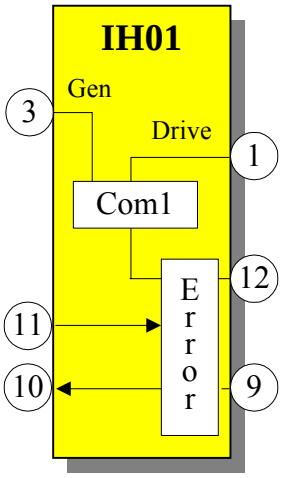
The DP-1X deflection circuit differs from conventional Hitachi product. It utilizes in a sense, two horizontal output circuits. One for Deflection and one for High Voltage. This allows for better deflection stabilization and is not influenced by fluctuations of the High Voltage circuit which may cause unacceptable breathing and side pulling of the deflection.

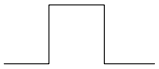
DP1X SERIES CHASSIS HORIZONTAL DRIVE CIRCUIT

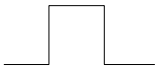


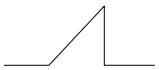
DP-1X SERIES CHASSIS HORIZONTAL DRIVE IC VOLTAGES & WAVE FORMS

Pin 1 = 4.79V (6.2V with Blank Raster) Varies with Brightness levels.
Pin 2 = 11.58V
Pin 3 = 0.68V
Pin 4 = 2.34V
Pin 5 = 1.52V
Pin 6 = 0.0V
Pin 7 = 1.65V
Pin 8 = 0.0V
Pin 9 = 7.11V
Pin 10 = 7.11V
Pin 11 = 7.11V
Pin 12 = 7.11V
Pin 13 = 2.34V
Pin 14 = 1.85V
Pin 15 = 4.89V
Pin 16 = 0.0V



Pin 1  1.4V P/P 33.75Khz

Pin 3  600mV P/P 33.75Khz

Pin 4  296mV P/P 33.75Khz

DP-1X Sweep Loss Circuit Diagram Explanation

(See Circuit Diagram on Page 03-10)
The key component in the Sweep Loss Detection circuit is **QN02**. This transistor is normally biased off. When the base becomes more negative, it will be turned on, causing the SW +11V to be applied to two different circuits, the ***Spot*** circuit and the ***High Voltage Drive*** circuit.

SPOT CIRCUIT

When **QN02** is turned on, the SW +11V will be applied to the anode of **DN11**, forward biasing it. This voltage will then pass through **DN11**. It will then be clamped by **DN12**, and arrive at pin **3** of **PSD2**. It will then be directed to the Signal PWB where it will activate the Video Mute circuitry **Q023 - Q021**. This is done to prevent CRT burns.
Another input to this circuit is pin **4** of **PSD2** called "**CUT OFF**". This will activate when accessing certain adjustments parameters in the service mode; i.e. turning off vertical drive for making CRT drive or cut-off adjustments. When Vertical Drive is defeated, the Vertical Sweep loss circuit would activate. Cut Off is routed to **QN06** to "inhibit" the Spot line from activating and shutting off the CRTs.

HIGH VOLTAGE DRIVE CIRCUIT

When **QN02** is turned on, the SW +11V will also be routed through **RN15** and **DN09** and applied to the High Voltage Drive IC **IH01** at pin **14**. When this occurs, the IC will stop generating the drive signal that is used to produce High Voltage via **QH02**, the High Voltage Driver. Again, this is done to prevent CRT burn, especially during sweep loss.

CONCERNING QN02

There are several factors that can affect the operation of **QN02**; loss of vertical or horizontal blanking.

Loss of Vertical Blanking (V Blk)

The Vertical pulse at the base of **QN05** switches **ON05** on and off at the vertical rate. This discharges **CN03** sufficiently enough to prevent the base of **QN04** from going high to turn it on and activate **QN02**.

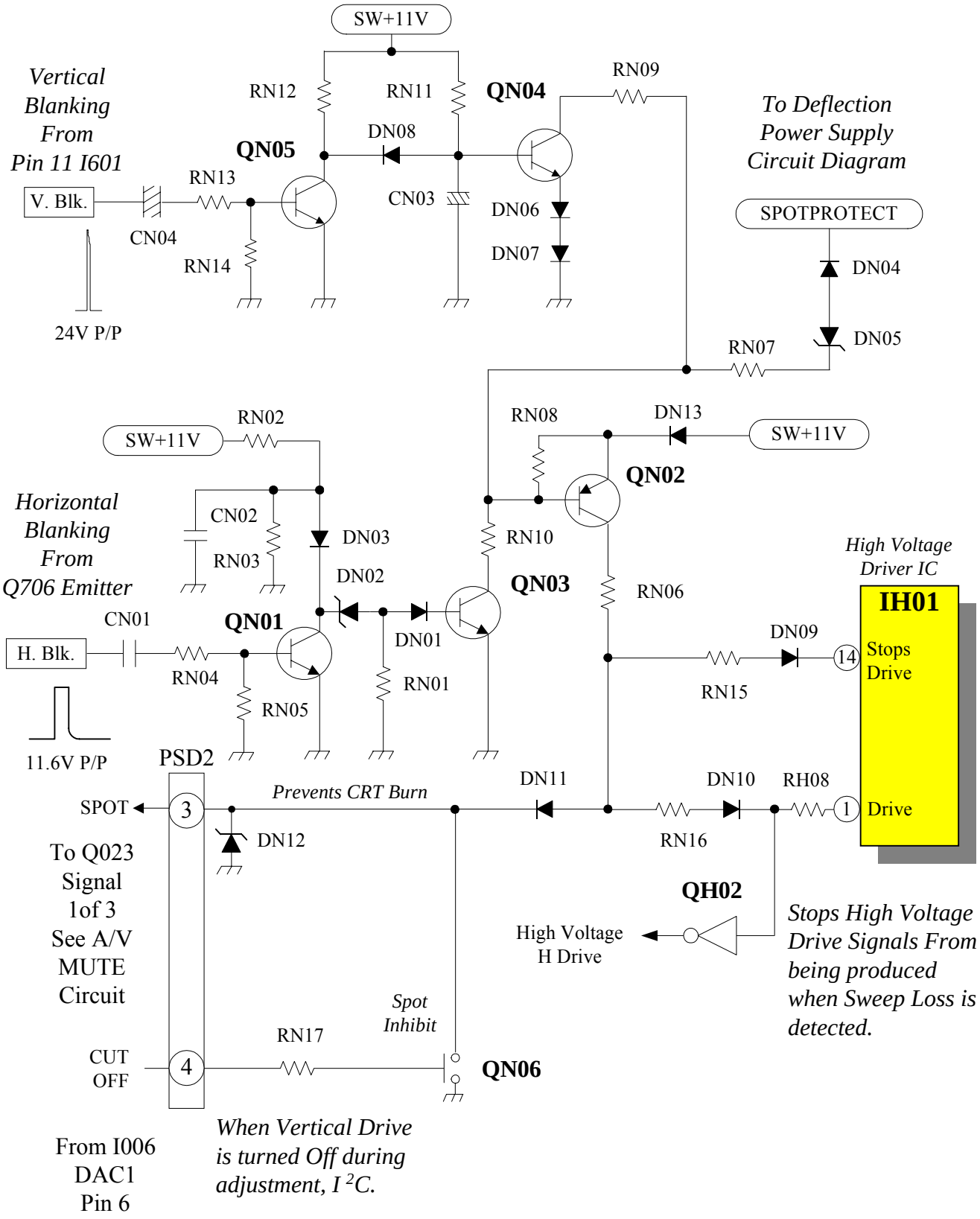
When the 24 Vp/p positive vertical blanking pulse is missing from the base of QN05, it will be turned off, which will cause the collector to go high because **CN03** charges up through **RN11**. This in turn will cause **QN04** to turn on because it's base pulls up high, creating an increase of current flow from emitter to collector and up through **RN08**, (which is located across the emitter base junction of **QN02**), to the SW +11V supply. This increase of current flow through **RN08** will bias on **QN02** and the events described in "Spot Circuit Activation" above will occur.

Loss of Horizontal Blanking (H Blk)

The Horizontal pulse at the base of **QN01** switches **ON01** on and off at the horizontal rate. This discharges **CN02** sufficiently enough to prevent the base of **QN03** from going high to turn it on and activate **QN02**.

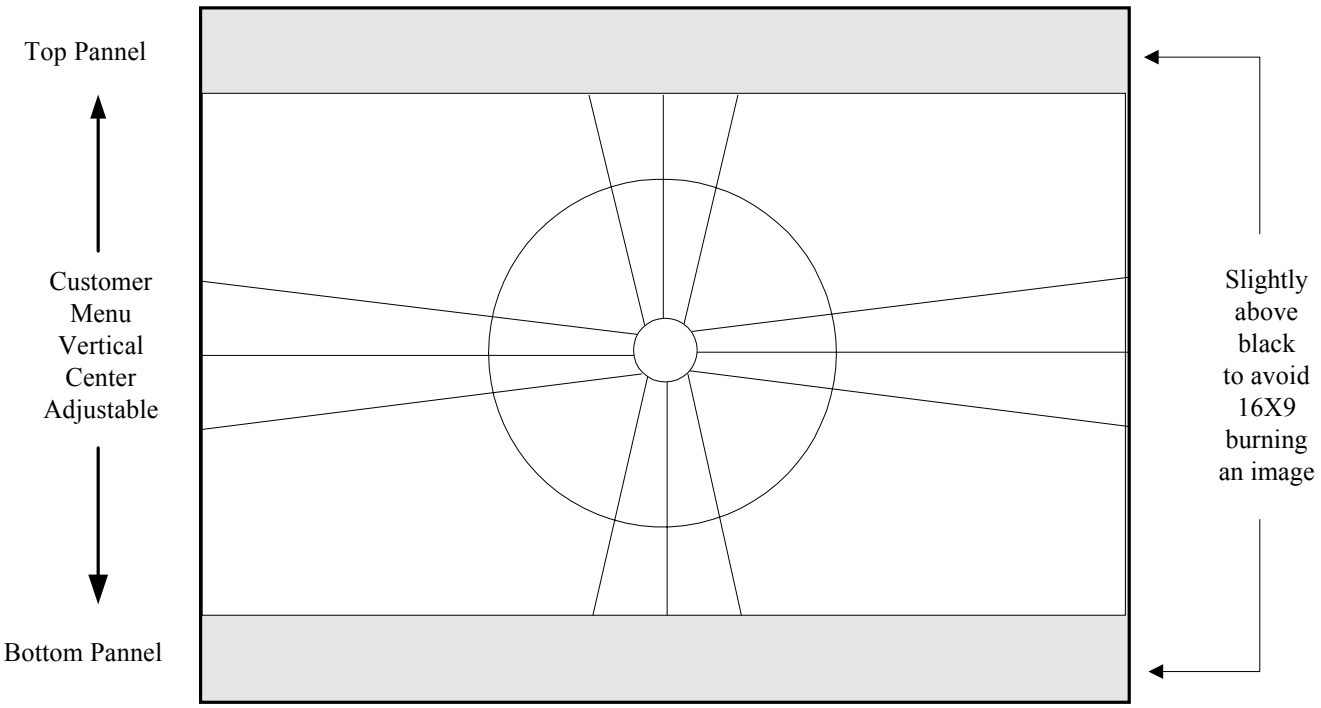
When the 11.6 Vp/p positive horizontal blanking pulse is missing from the base of **QN01**, it will be turned off, which will cause the collector to go high through **DN03**, **RN02** and SW +11V as **CN02** charges. This in turn will cause **QN03** to turn on because it's base is pulled up high when **DN02** fires. When **QN03** turns on, an increase of current flow from emitter to collector, through **RN07**, and up through **RN08**. This increase of current flow through RN08 will bias on **QN02** and the events described in "Spot Circuit Activation" above will occur.

DP1X SWEEP LOSS DETECTION CIRCUIT

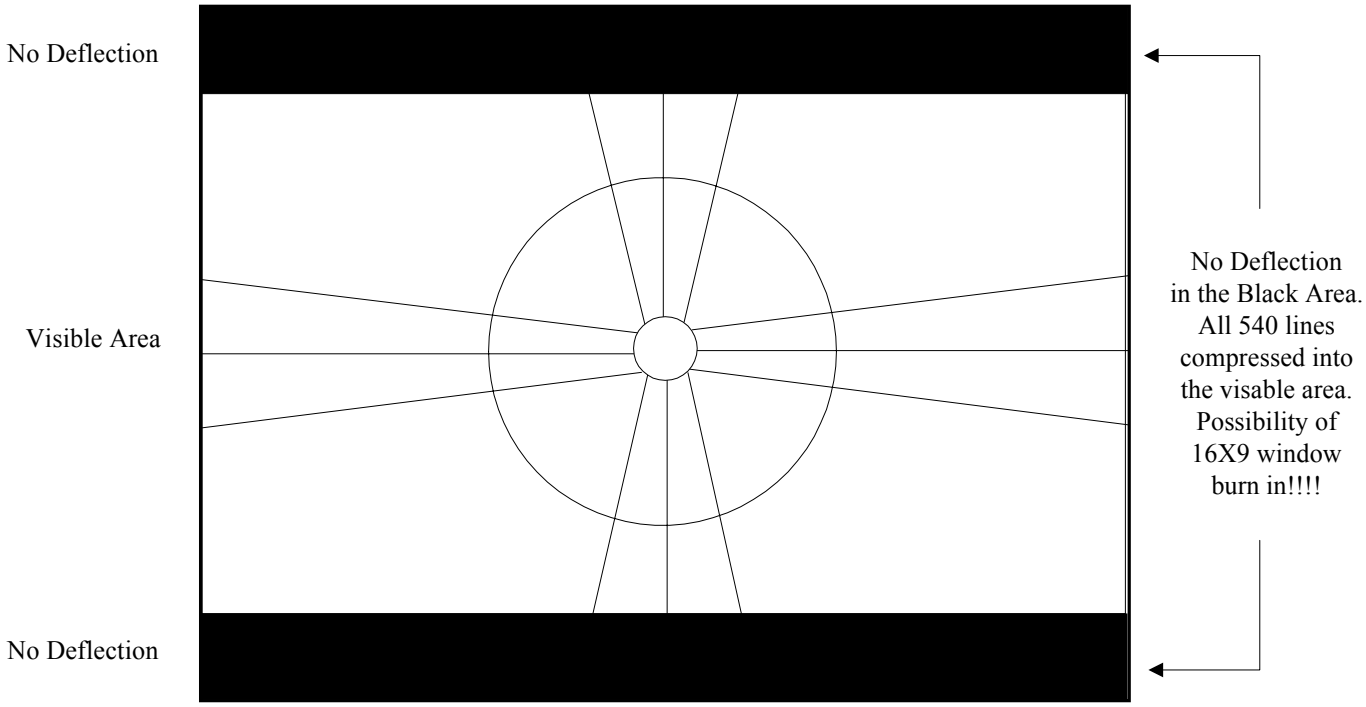


DP-1X CHASSIS DISPLAYING A (16x9) IMAGE ON (4X3) DISPLAY

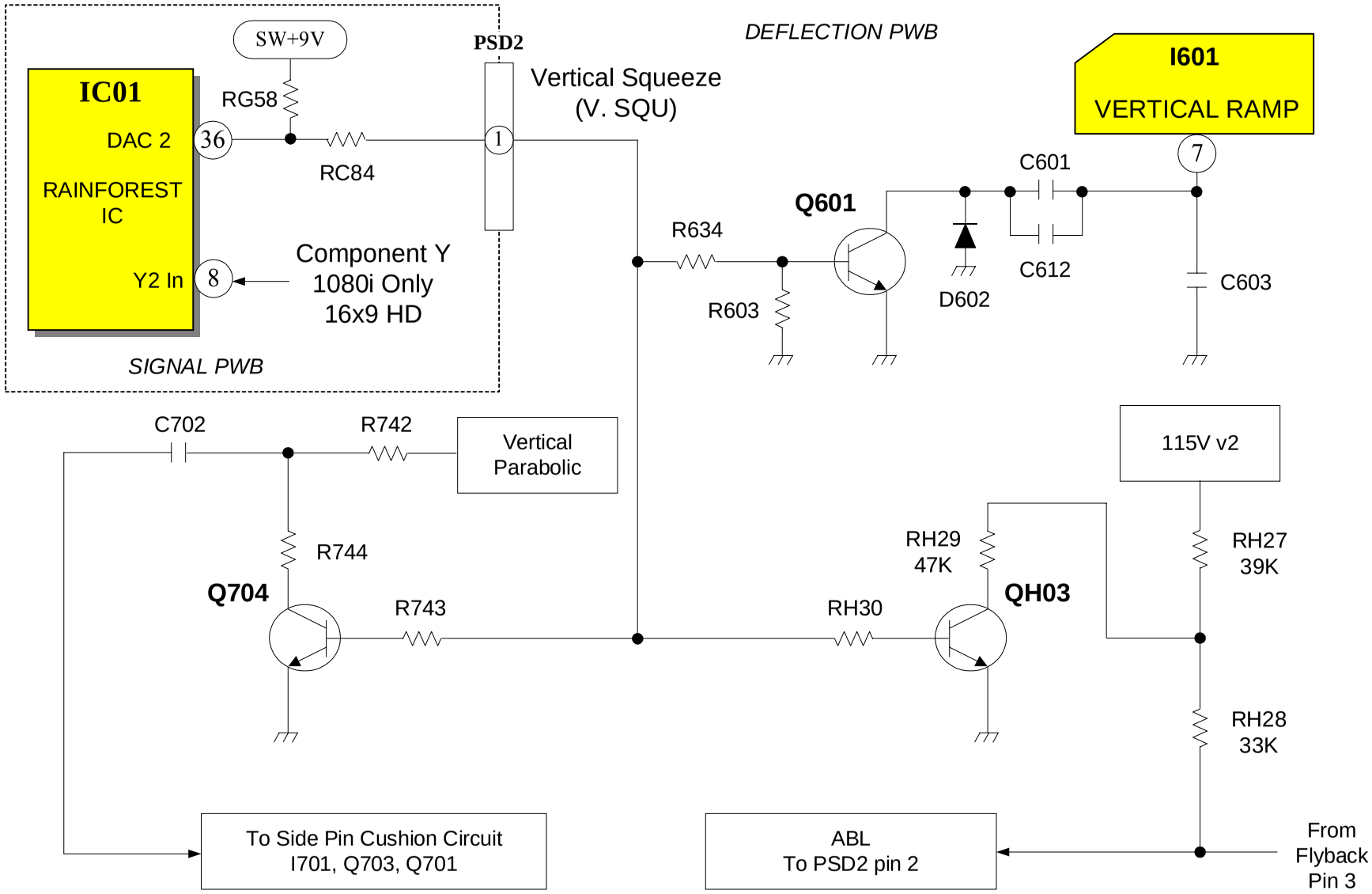
TOP AND BOTTOM PANNELS ARE OSD GENERATED



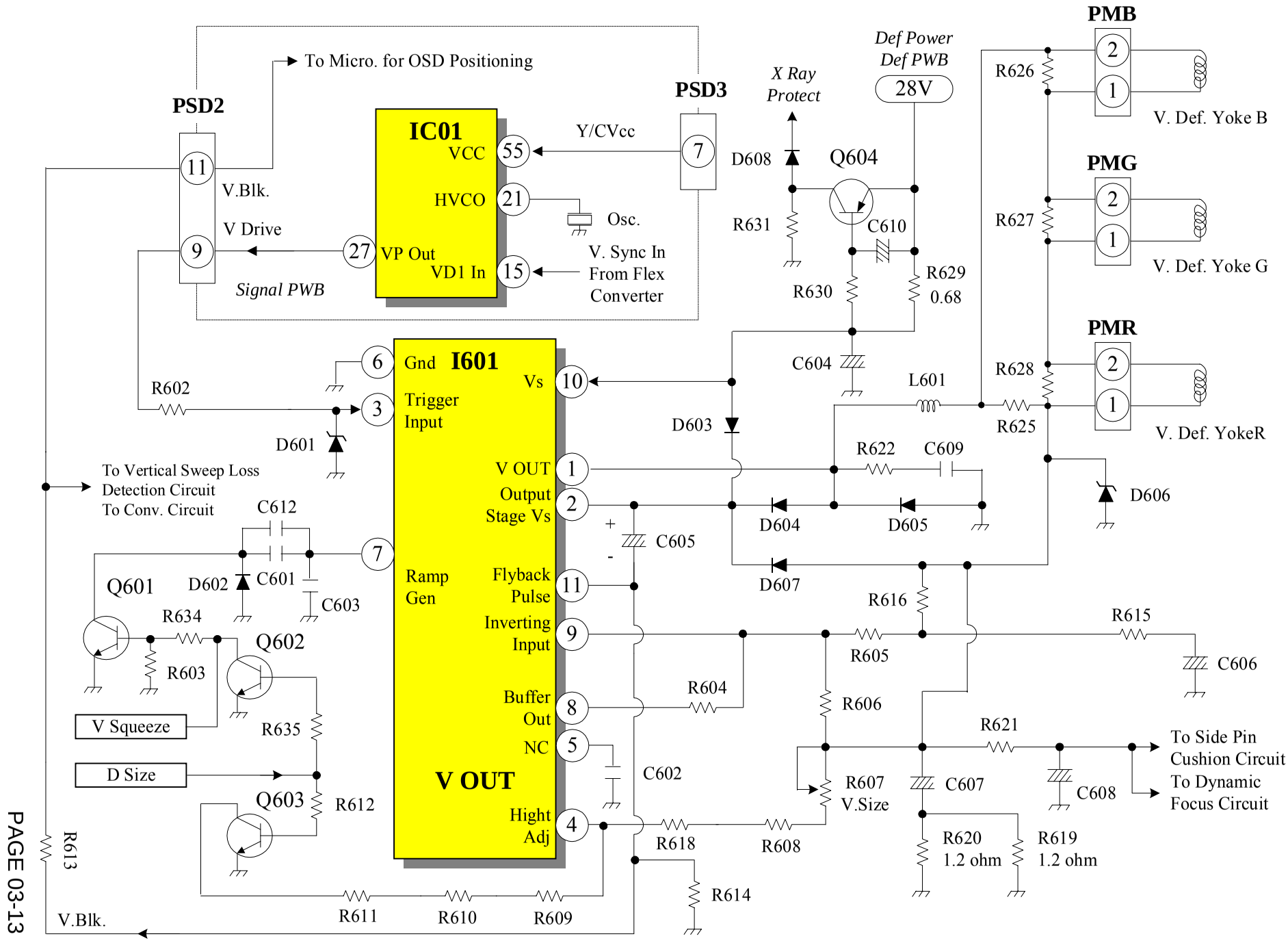
THROUGH MODE, VERTICAL IS COLLAPSED



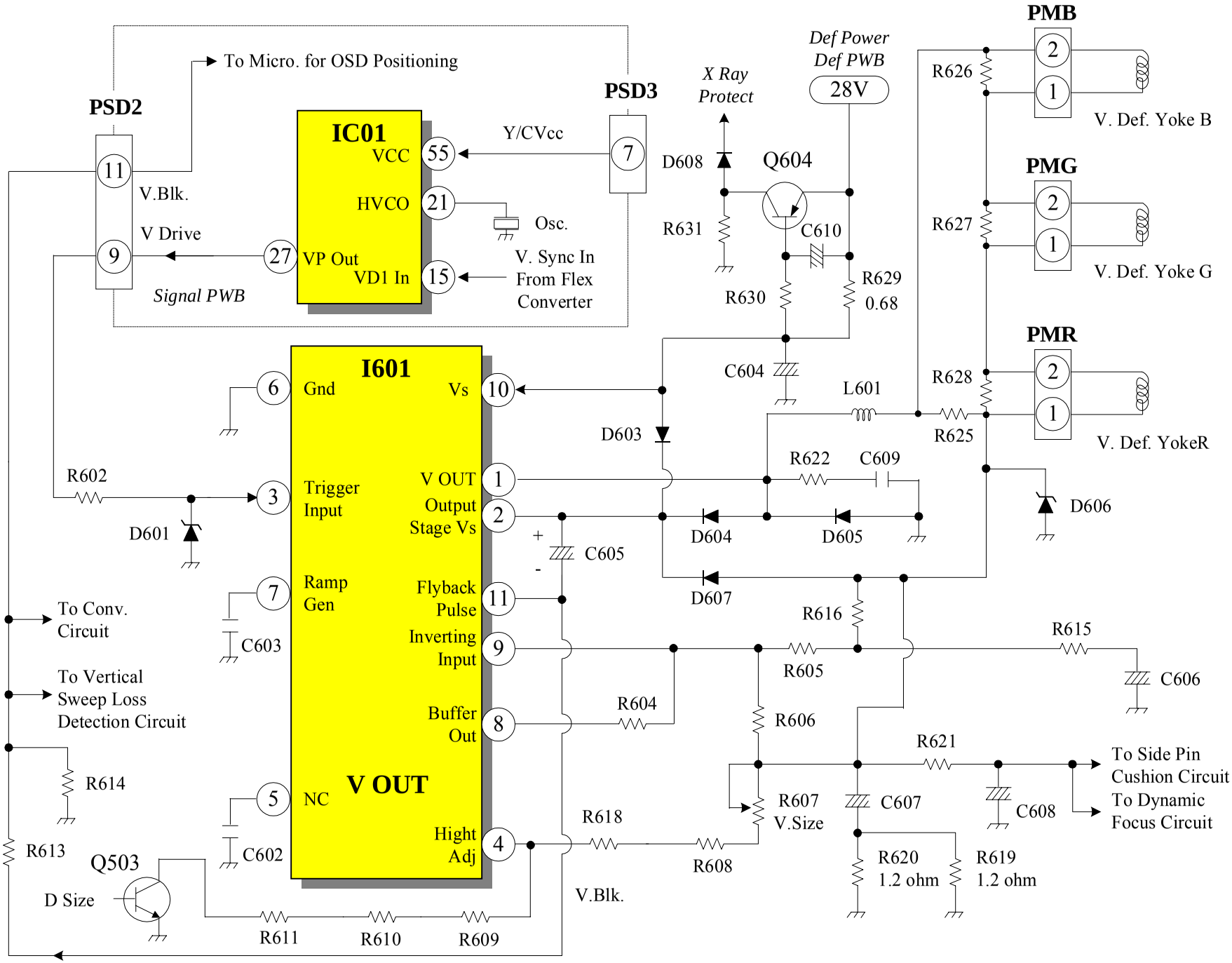
VERTICAL SQUEEZE FOR 1080i THROUGH MODE
NOT FOR THE 16 X 9 ASPECT MODELS



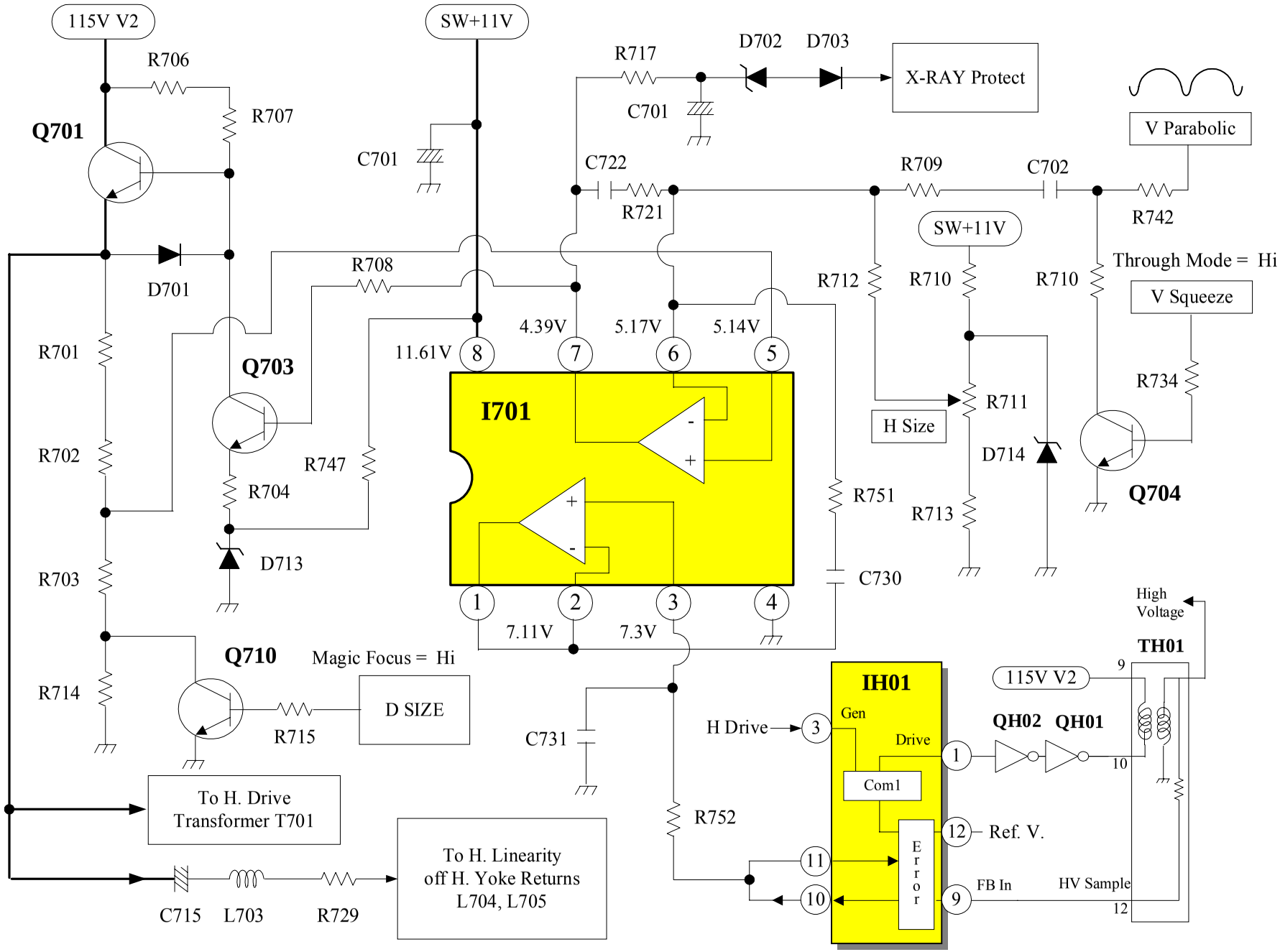
DP-1X (4 X 3 Aspect Models) SERIES CHASSIS VERTICAL OUTPUT CIRCUIT



DP-14G (16 X 9 Aspect Models) SERIES CHASSIS VERTICAL OUTPUT CIRCUIT



DP-1X SIDE PINCUSHION CIRCUIT DIAGRAM



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DIGITAL CONVERGENCE INFORMATION

DP-1X CHASSIS

SECTION 4

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DP-1X DIGITAL CONVERGENCE INTERCONNECT DESCRIPTION

Use this explanation in conjunction with the Digital Convergence Interconnect circuit diagram Page 04-05.
The Digital Convergence circuit is responsible for maintaining proper convergence of all three colors being produced by the CRTs. Many different abnormalities can be quickly corrected by running ***Magic Focus***.
The Digital convergence Interconnect Diagram depicts how the Digital Convergence Circuit is interfaced with the rest of the Projection's circuits. The main components and/or circuits are;

- ***THE DIGITAL CONVERGENCE UNIT (DCU)***
- ***INFRARED REMOTE RECEIVER***
- ***ON SCREEN DISPLAY PATH***
- ***CONVERGENCE OUTPUT STKs***
- ***CONVERGENCE YOKES***
- ***MAGIC FOCUS SENSORS AND INTERFACE***
- ***MICROPROCESSOR***
- ***RAINFOREST IC (Video Processor).***
- ***SERVICE ONLY SWITCH***
- ***MAGIC FOCUS activation control utilizing the Magic Focus Switch on Front Control Panel.***

THE DIGITAL CONVERGENCE UNIT (DCU) (Generic for 8 sensor array models).
The DCU is the heart of the Digital convergence circuit. Held within are all the necessary components for generating the necessary waveforms for correction, and associated memories for the adjustment data and Magic Focus Data.

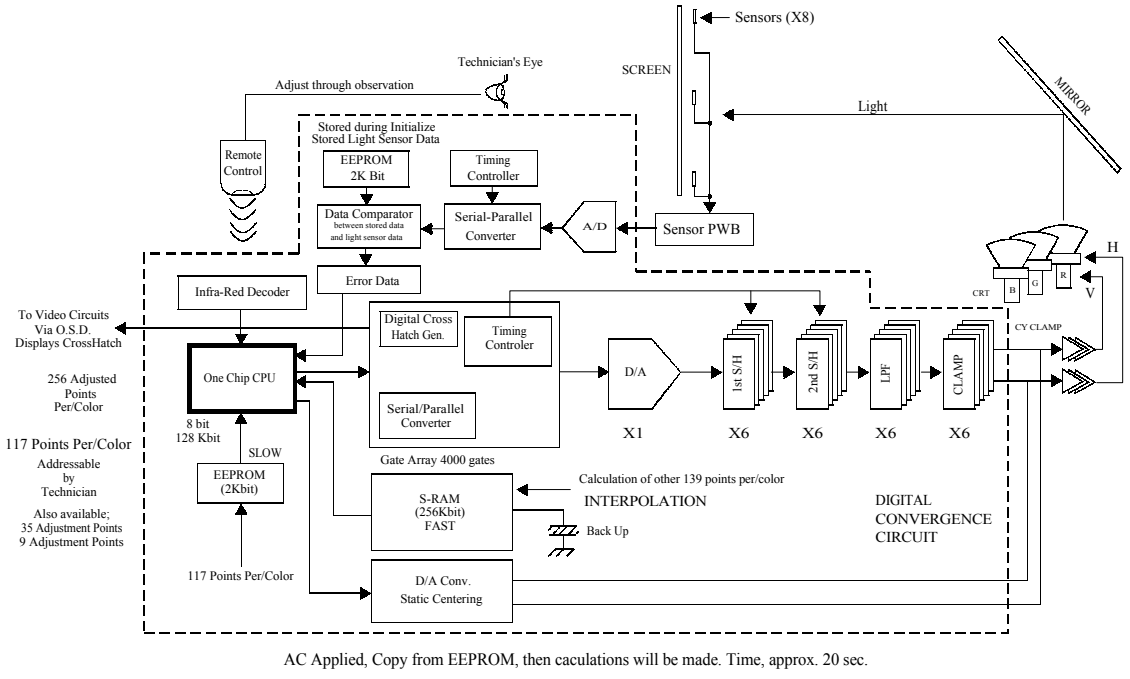


Figure 1

The Block above shows the relationship of the DCU to the rest of the set. Note that the light being produced by the CRTs is what is used by the sensors for Magic Focus. This allows the DCU to make adjustments regardless of circuit changes, magnet influence or mechanical, by actually using the light on the screen to make judgments.

EEPROM AND SRAM SHOWN IN FIGURE 1: (8 Sensor Array only) (4 Sensor for Centering only).
Each color can be adjusted in any one of 117 different locations. The internal workings of the DCU can actually make 256 adjustment points per color. These adjustment points are actual digital data stored in memory. This data

(Continued on page 2)

(Continued from page 1)
represents a specific correction signal for that specific location. When the Service Technician makes any adjustment, the new information must be stored in memory, EEPROM. The EEPROM only stores the 117 different adjustment points data, the SRAM interpolates to come up the additional 139 adjustment points for a total of 256 per color. The EEPROM data is slow in relationship to the actual deflection raster change. The SRAM is a very fast memory. So, during the first application of AC power, the EEPROM data is read and the SRAM makes the interpolation and as long as power remains, interpolation no longer has to be made.
This can be seen during an adjustment. If the Interpolation key is pressed on the remote control, what is happening is that the SRAM must make those additional calculations beyond the 117 made by the Servicer and this is all placed into memory.

INFRARED REMOTE CONTROL INPUT SHOWN IN FIGURE 1:
As can be seen in Figure 1, the Infrared Remote control signals actually manipulate the internal data when the Service Only Switch is pressed on the Deflection PWB. This process actually prevents the Microprocessor from responding to Remote commands, via a Busy line output from the DCU. (*See Microprocessor Port Description page for further details*.)

INTERNAL CONTROLLER, D/A CONVERTERS SHOWN IN FIGURE 1:
The internal controller, takes the stored data and converts it to a complicated Convergence correction waveform for each color. The Data is converted through the D/A converter, 1st and 2nd sample and hold, the Low Pass Filter that smoothes out the parasitic harmonic pulses from the digital circuit and the output Clamp that fixes the DC offset level.
The DC offset voltage is adjusted by several things. *(16X9 aspect SWX models with 8 Sensors only.)*

- **Raster Centering**. The Raster Centering adjustment actually moves the DC offset voltage for Horizontal and Vertical direction. This Offset voltage will move the entire raster Up or Down, Left or Right.
- **Static Centering**. This is accessed by holding down the Magic Focus button on the front control panel for more that 10 Seconds. The word Static will come up on the screen, generated by the DCU, and using the remote controls up/down/left or right cursor buttons, the Red or Blue raster can again be moved up/down/left or right. This allows adjustment of the entire raster for Red or Blue to match the Green Raster.

By holding down the Magic button for more that 5 seconds, but not more than 10, the word **Center** comes up on screen. Again generated from the DCU. This adjustment only moves the center 60% of the raster for Red or Blue. The assumption for this adjustment was related to the location of the Magic Focus sensors located on the outside perimeter of the inside cabinet. It was assumed possible that the outside could have been corrected, but the inside middle might not. This adjustment is rarely necessary if at all.

MAGIC FOCUS MEMORY SHOWN IN FIGURE 1:
NOTE: These sets have two Digital Convergence Memories. One for Normal display mode and one for 1080i Through Mode display. (4X3 Aspect Models only).

Normal requires a complete Digital Convergence adjustment procedure along with Magic Focus Sensor Initialization and 1080i Through Mode does too! (4X3 Aspect Models only).

When a complete Digital Convergence procedure has been performed and the adjustment information stored in memory by pressing the **PROG** button twice (2), it is mandatory to run Sensor Initialization. This is done by pressing the **PROG** button on the remote once (1), then pressing the **PIP CH** button. This begins a preprogrammed generation of different light patterns. Magic Focus memory memorizes the characteristics of the light pattern produced by the digital convergence module. If a convergence touchup is required in the future, the customer simply presses the **Magic Focus** button on the front panel and the set begins another preprogrammed production of different light patterns. This automated process duplicates the same light pattern it memorized from the initialization process, re-aligns the set to the memorized convergence condition.

(Continued on page 3)

(Continued from page 2)

"MAGIC* FOCUS"** ***SENSORS SHOWN ON FIGURE 1:

This process is a joint effort between the digital convergence module and ***4 Photo-sensors,*** physically located on the middle edges of the cabinet, just behind the screen. The physical placement of the sensors assures that they will not produce a shadow on the screen that can be seen by the customer.

Magic is activated when the set is on and by pressing the Magic ***button*** inside the front control panel door. An on-screen graphic will be displayed to confirm that the automatic convergence mode (Magic Focus) has begun.

The digital convergence module produces different patterns for each CRT, and the sensors pick up the transmitted light, generate a DC voltage. This voltage is sent to the DCU and converted to digital data and compared with the memorized sensor initialization data. Distinct patterns will be generated in each primary color. As the process continues, the digital module manipulates the convergence correction waveforms that it is producing to force the convergence back into the original memorized configuration.

When all cycles have been completed, the set will return to the original signal and the convergence will be corrected. In most cases, activating the Magic Focus will allow the set to correct itself, without further adjustments.

EXPLANATION OF THE DIGITAL CONVERGENCE INTERCONNECT DIAGRAM:

INFRARED RECEIVER:

During normal operations, the ***IR*** receiver directs it signal to the Main Microprocessor where it interprets the incoming signal and performs a predefined set of operations. However, when the Service Only Switch is pressed, the Main Microprocessor must ignore remote control commands. Now the DCU receives theses commands and interprets them accordingly. The Microprocessor is notified when the DCU begins its operation by the BUSY line. As long as the BUSY line is active, the Main Microprocessor ignores the ***IR*** signal.

ON SCREEN DISPLAY PATH:

MICROPROCESSOR SOURCE FOR OSD:

The On Screen Display signal path is shown with the normal OSD information such as Channel Numbers, Volume Graphic Bar, Main Menu, etc… sent from the Main Microprocessor to the ***Rainforest*** IC IC01 pins 37, 38 and 39. These are positive going pulses, about 5 V p/p and about 3uS in length dependant upon there actual horizontal time for display. *(See the On Screen Display Path Circuit Diagram Explanation for further details).*

DCU SOURCE FOR OSD:

The DCU has to produce graphics as well. When the ***Service Only*** switch is pressed, the Main Microprocessor knows the DCU is Busy as described before. Now the On Screen Display path is from the DCU to the ***Rainforest*** IC IC01 pins 33, 34 and 35.

The output for the DCU OSD characters is out the **PDG** connector pins (**11 Dig Red, 12 Dig Green and 13 Dig Blue**). These are routed through their buffers (**QK06 Dig Red, QK07 Dig Green and QK08 Dig Blue**) to the **PDK1** connector pins (**2 Dig Red, 4 Dig Green and 5 Dig Blue**). Then through their buffers, (**QC24 Dig Red, QC23 Dig Green and QC22 Dig Blue**). Then it arrives at the Rainforest IC **IC01** at pins (**35 Dig Red, 34 Dig Green and 33 Dig Blue**). When a character pulse arrives at any of these pins, the internal color amp is saturated and the output is generated to the CRTs. Any combination for these inputs generates either the primary color Red, Green or Blue or the complementary color Red and Green which creates Yellow, Red and Blue which creates Magenta or Green and Blue which creates Cyan.

(See the On Screen Display Path Circuit Diagram Explanation for further details).

OUTPUT STKs:

These are output amplifiers that take the correction waveforms generated by the DCU and amplify them to be used by the Convergence Yoke assemblies for each color.

RV is Red Vertical Convergence correction. Adjust the location either up or down for Red.
RH is Red Horizontal Convergence correction. Adjust the location either left or right for Red.
GV is Green Vertical Convergence correction. Adjust the location either up or down for Red.
GH is Green Horizontal Convergence correction. Adjust the location either left or right for Red.
BV is Blue Vertical Convergence correction. Adjust the location either up or down for Red.
BH is Blue Horizontal Convergence correction. Adjust the location either left or right for Red.

(Continued on page 4)

(Continued from page 3)

CONVERGENCE YOKES:
Each CRT has a Deflection Yoke and a Convergence Yoke assembly. The Deflection manipulates the beam in accordance to the waveforms produced within the Horizontal Deflection circuit or the Vertical Deflection circuit. The Convergence Yoke assembly manipulates the Beam in accordance with the correction waveforms produced by the DCU.

MAGIC FOCUS SENSORS AND INTERFACE: (4 Sensor Array) Same for 8 Sensor Array.
Each of the four photo cells, called solar batteries in the service manual, have their own amps which develop the DC potential produced by the cells. Each amp is routed through the **PDS1** connector and arrives at the **PDS** connector on the DCU where the DCU converts this DC voltage to Digital signals. These digital signals are used only when the Magic Focus Button is pressed and Magic Focus runs.

MICROPROCESSOR:
The Microprocessor is only involved in the Digital Convergence circuit related to IR (Infrared Remote Control Signals). When the DCU is put into the Digital Convergence Adjustment Mode, DCAM, the Microprocessor ignores IR pulses. This is accomplished by the **BUSY** signal from the DCU. The **BUSY** signal is routed from the DUC out the **PDG** connector pin **10**, to the **PDK1** connector pin **1**, then the **PSD1** connector pin **1** to the **DAC1 I006** pin **1**. Through **I^2C** data communications **SCL1** and **SDA1**, the **DAC1** IC tell the microprocessor that the DCU is busy.

RAINFOREST IC (Video Processor).
The Rainforest IC, IC01 is only involved with the Digital Convergence circuit related to OSD.

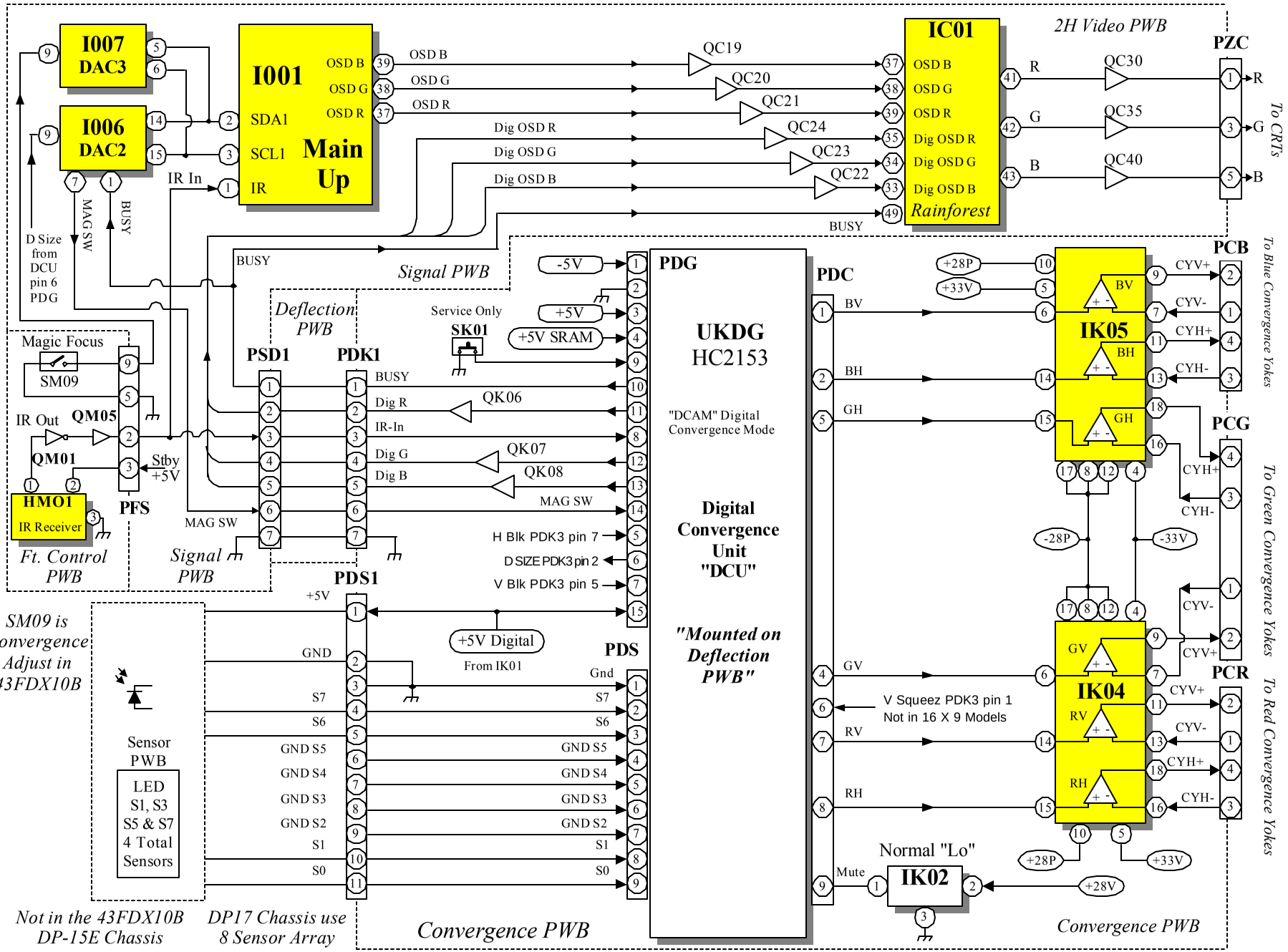
SERVICE ONLY SWITCH:
The Service Only Switch is located just in front of the DCU on the Convergence Output PWB. If the front speaker grills are removed and the front access panel is opened, the switch will be on the far left hand side. When this button is pressed with the TV ON, the DCU enters the Digital Convergence Adjustment Mode.
If the button is pressed and held down with the TV OFF and the power button is pressed, the Digital Convergence RAM is cleared. This turns off any influence from the DCU related to beam deflection. Magnetic centering is performed in the mode as well as the ability to enter the 3X3, (9 adjustment points) mode.
Note: For the 4X3 Aspect models only, this will clear RAM for the 1080i through mode as well.

MAGIC FOCUS SWITCH:
- Located on the Front Control panel is the Magic Focus switch. When Magic Focus is activated by the customer pressing this switch, the DCU enters the ***"MAGIC* FOCUS"** adjustment mode described earlier.
- However, this year there is a change as to how the Magic Focus Switch works.
- When the Customer presses the Magic Focus Switch, the low is sent to I007 pin 9 (DAC3). This IC communicates with the Microprocessor. The Microprocessor then communicates with I006 (DAC2) and it outputs a low on pin 7 (Magic Sw). This in turn starts the Magic Focus function.
- Also this year, the Magic Focus can be started from the Customer's Menu. When selected by the customer, the same communication is performed to I006 (DAC2) and a low is sent out pin 7 to the DCU to start Magic Focus.

MAGIC FOCUS MEMORY:
NOTE: These sets have two Digital Convergence Memories. One for Normal display mode and one for 1080i Through Mode display. (4X3 Aspect Models only).

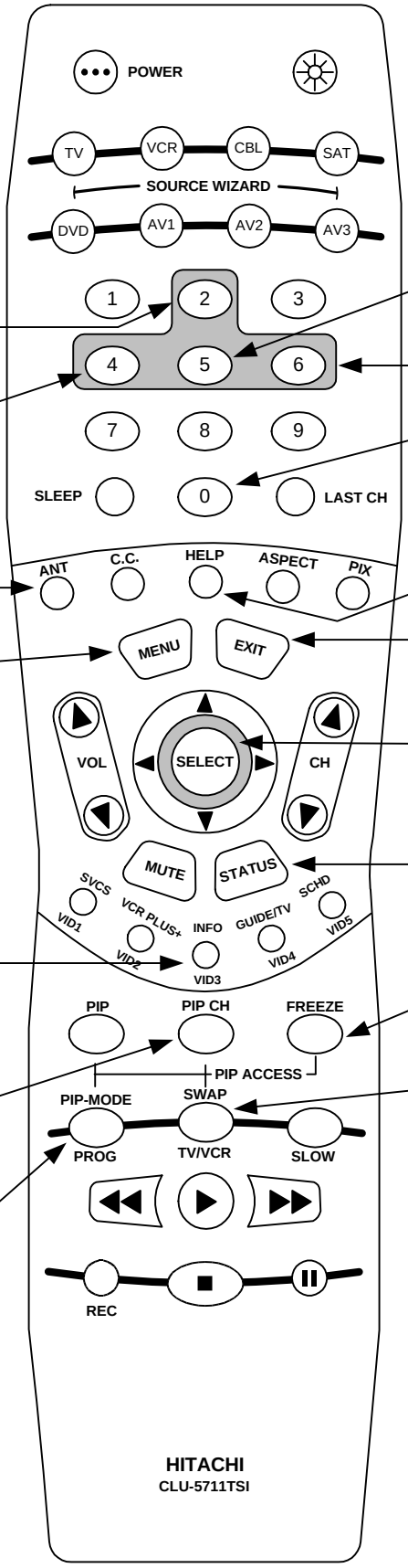
Normal requires a complete Digital Convergence adjustment procedure along with Magic Focus Sensor Initialization and 1080i Through Mode does too! (4X3 Aspect Models only).

DP-1X CHASSIS "DIGITAL CONVERGENCE" INTERCONNECTION CIRCUIT DIAGRAM



REMOTE CONTROL CLU-5711 TSI (P/N HL01641)

USED IN MODELS:
61SWX10B, 61SWX12B
53SWX10B, 53SWX12B
43UWX10B, 53UWX10B
61UDX10B, 53UDX10B
43FDX11B, 43FDX10B



CURSOR UP

CURSOR DOWN

CURSOR LEFT

CURSOR RIGHT

RED (7 X 5)

RASTER PHASE

BLUE (13X9)

CROSSHATCH VIDEO

REMOVE COLOR

CORRECTION BUTTONS

GREEN (3 X 3)

CALCULATE

CENTERING

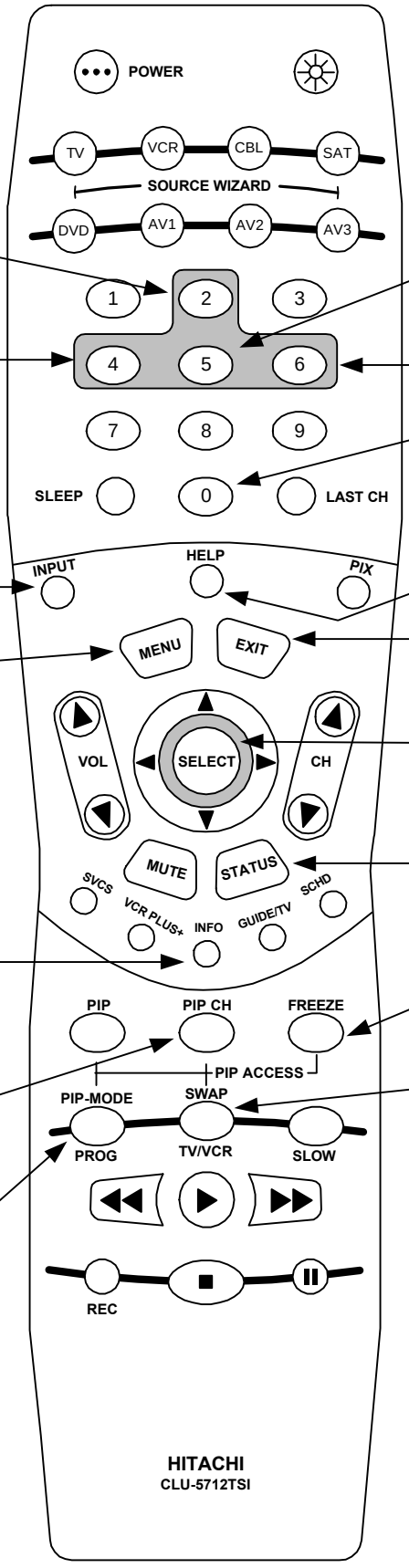
READ OLD ROM DATA PRESS (2X)

INITIALIZE PIP MODE + PIP CH

WRITE TO ROM PRESS (2X)

REMOTE CONTROL CLU-5712 TSI (P/N HL01642)

USED IN MODELS:
53SBX10B



CURSOR UP

CURSOR DOWN

CURSOR LEFT

CURSOR RIGHT

RED (7 X 5)

RASTER PHASE

BLUE (13X9)

CROSSHATCH VIDEO

REMOVE COLOR

CORRECTION BUTTONS

GREEN (3 X 3)

CALCULATE

CENTERING

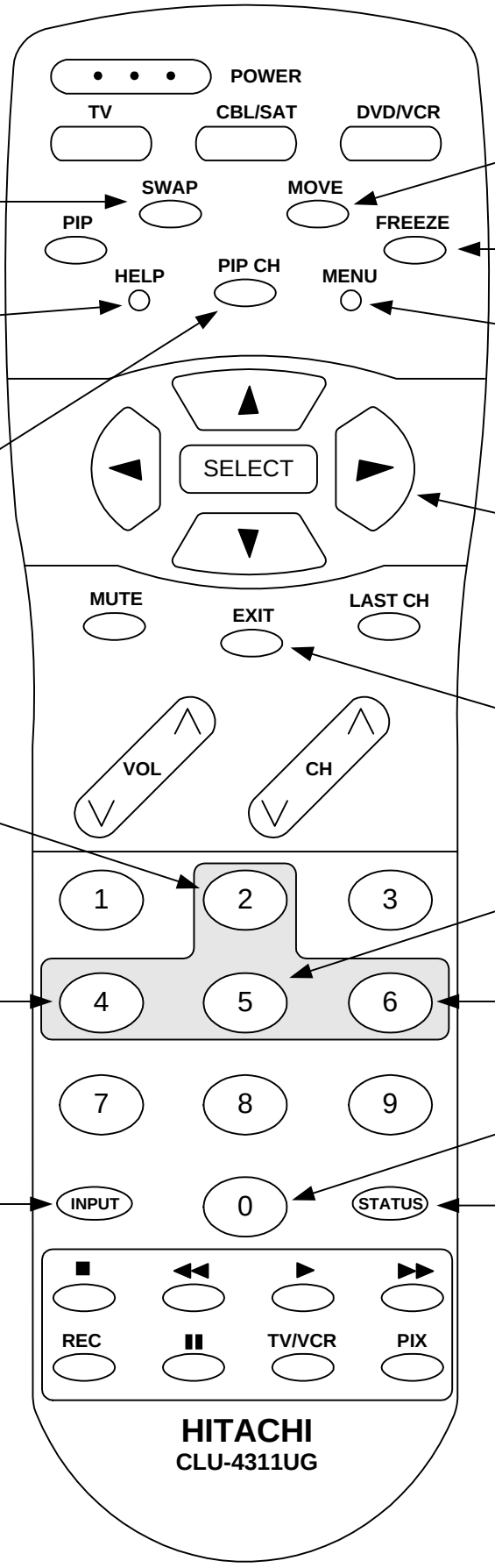
INITIALIZE PIP MODE + PIP CH

READ OLD ROM DATA PRESS (2X)

WRITE TO ROM PRESS (2X)

REMOTE CONTROL CLU-4311UG (P/N HL01651)

Used with
60DX10B, 50DX10B
43GX10B, 50GX30B
HP-1X Chassis



READ OLD ROM DATA PRESS (2X)

WRITE TO ROM PRESS (2X)

CENTERING

RASTER PHASE

REMOVE COLOR

INITIALIZE PIP MODE + PIP CH

CORRECTION BUTTONS

CROSSHATCH VIDEO

CURSOR UP

CURSOR DOWN

CURSOR LEFT

CURSOR RIGHT

RED (7 X 5)

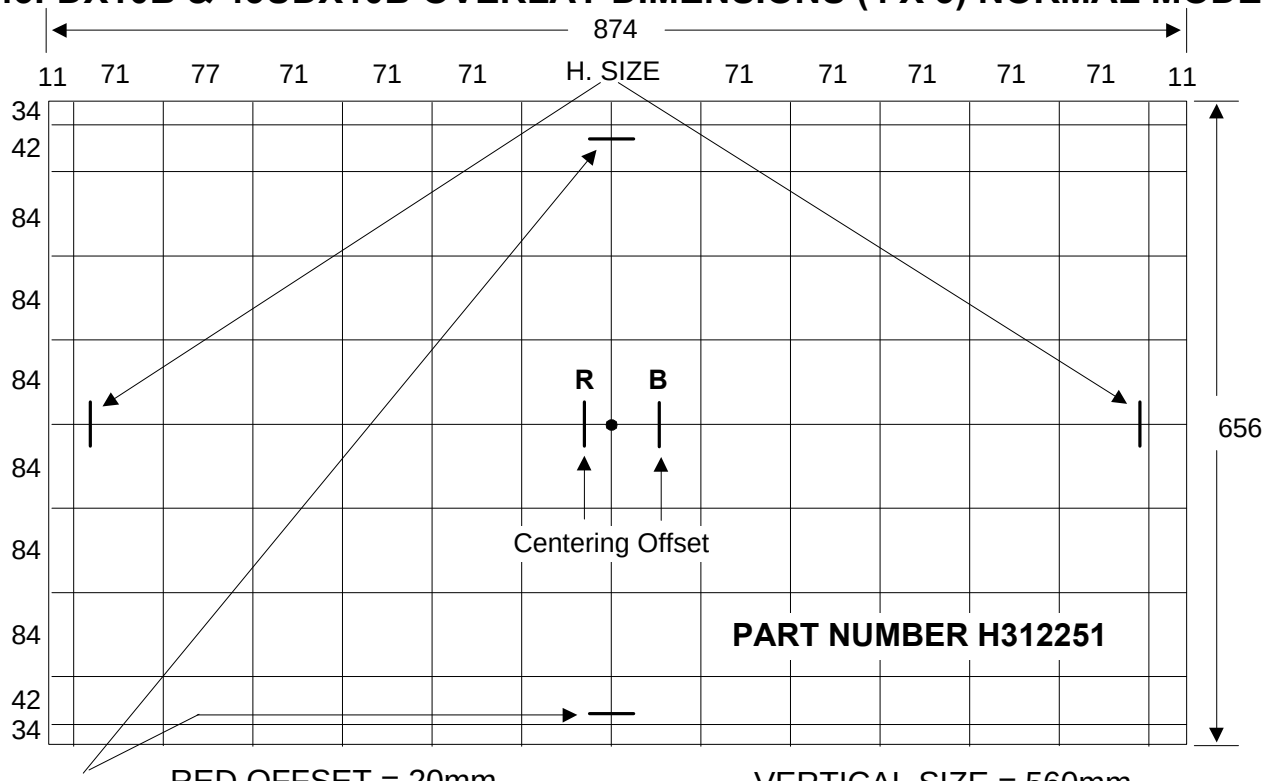
BLUE (13X9)

GREEN (3 X 3)

DIGITAL CONVERGENCE OVERLAY DIMENSIONS

NOTE: Aspect may not be correct but dimensions are correct.

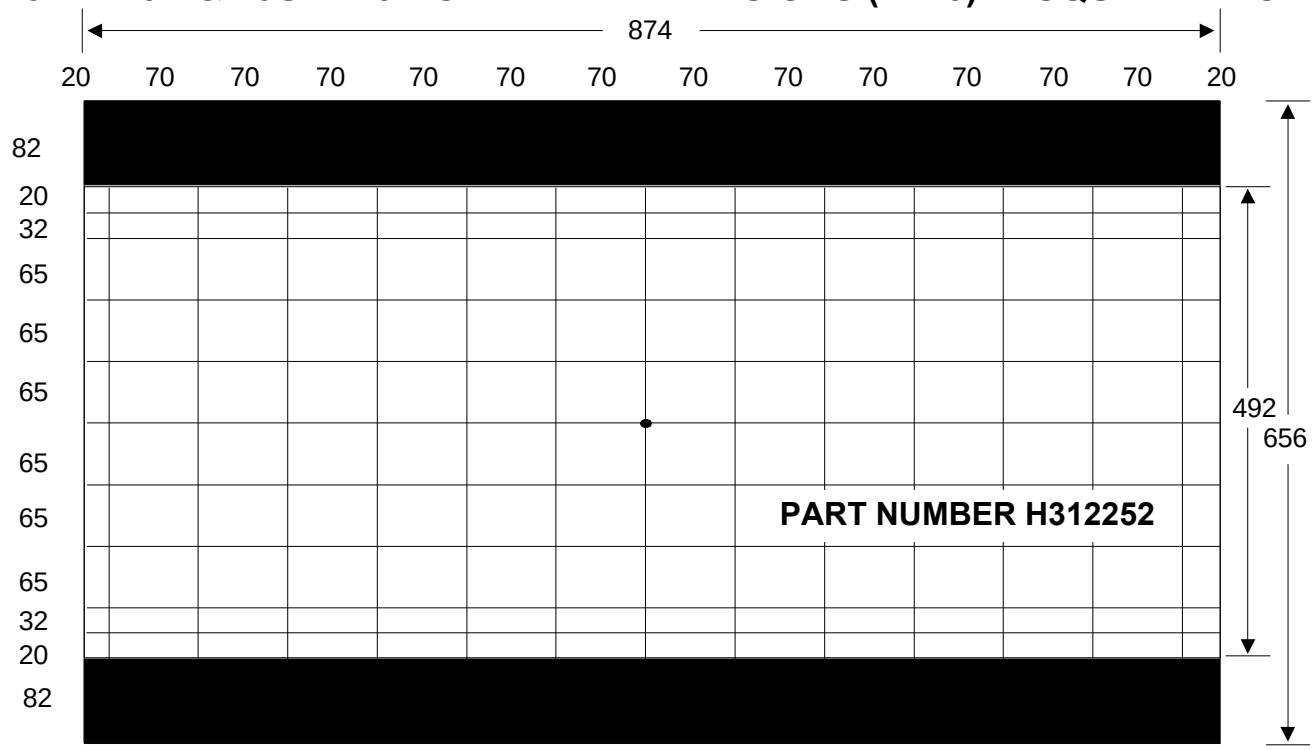
43FDX10B & 43UDX10B OVERLAY DIMENSIONS (4 X 3) NORMAL MODE



RED OFFSET = 20mm
BLUE OFFSET = 25mm (43UDX)
BLUE OFFSET = 35mm (43FDX)

VERTICAL SIZE = 560mm
HORIZONTAL SIZE = 825mm

43FDX10B & 43UDX10B OVERLAY DIMENSIONS (4 X 3) V. SQUEEZE MODE

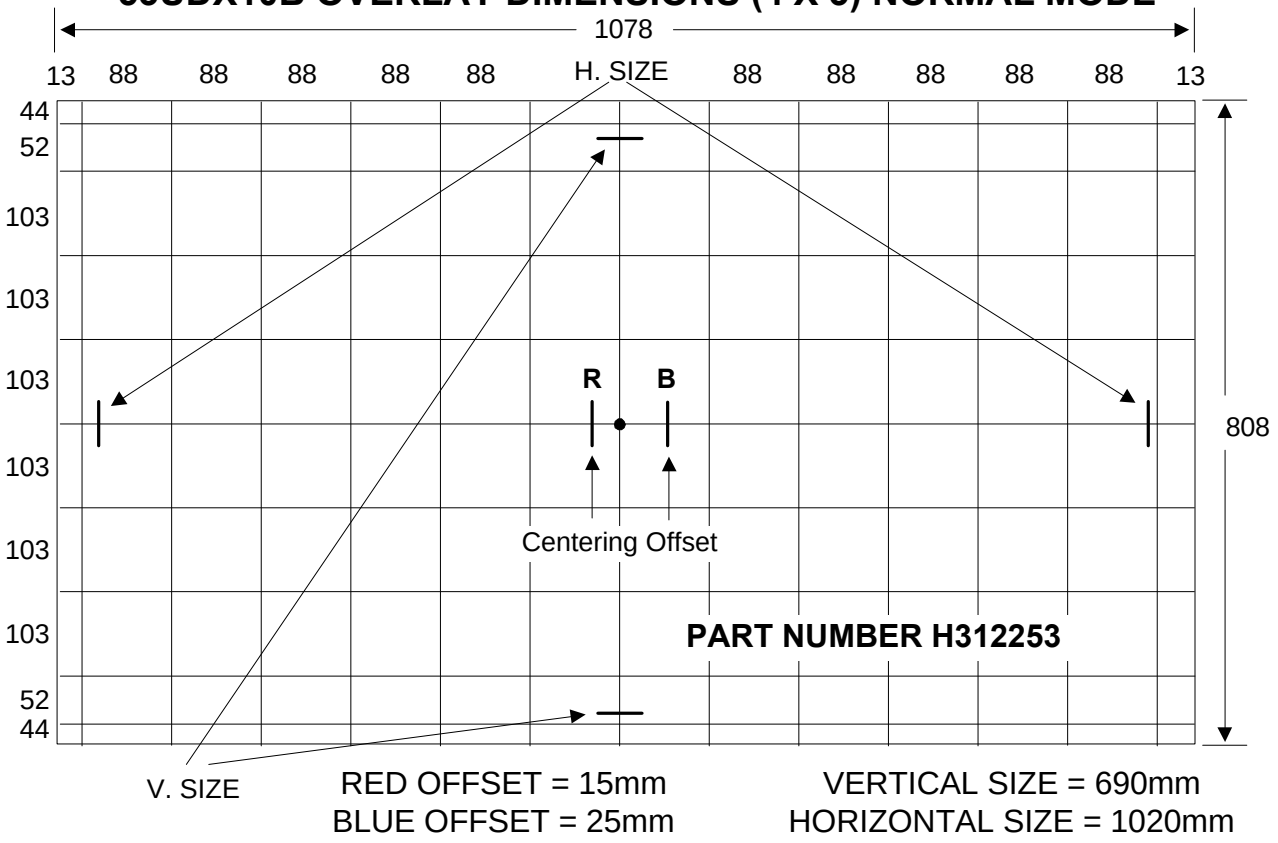


V SQUEEZE 16 X 9 HD MODE

DIGITAL CONVERGENCE OVERLAY DIMENSIONS

NOTE: Aspect may not be correct but dimensions are correct.

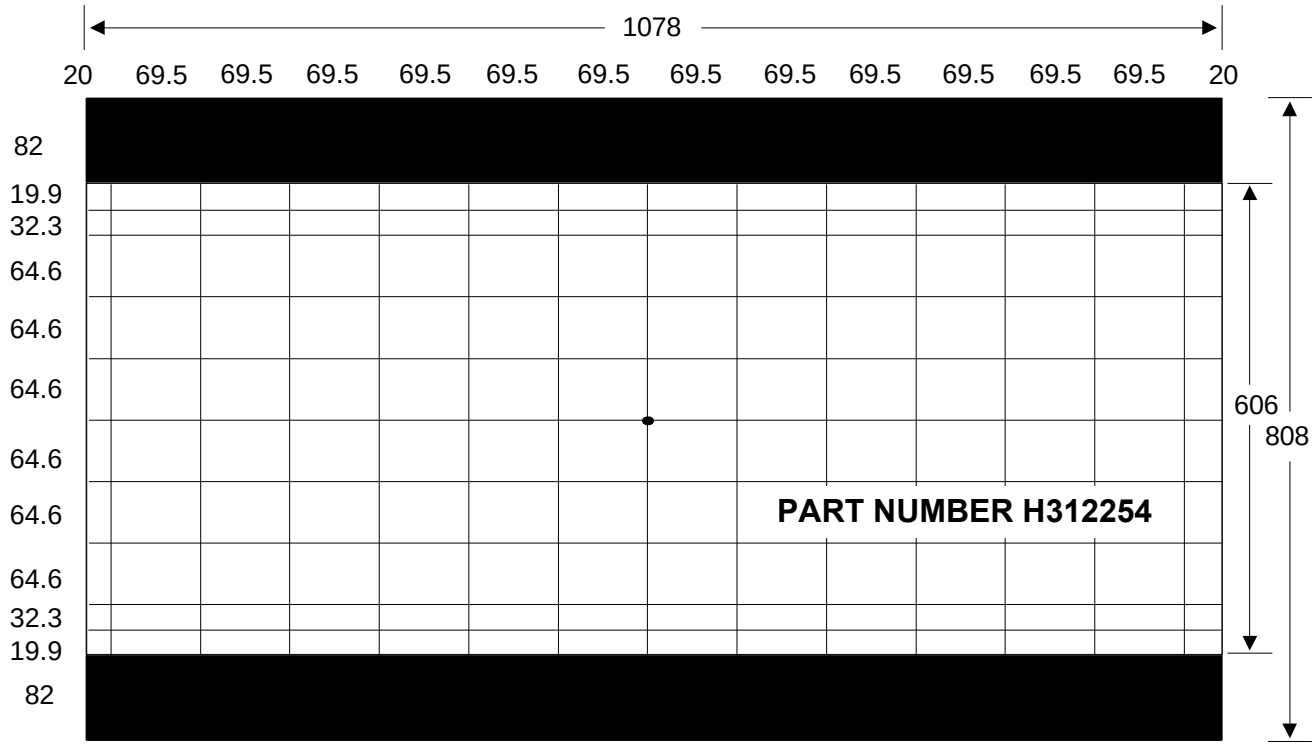
53UDX10B OVERLAY DIMENSIONS (4 X 3) NORMAL MODE



RED OFFSET = 15mm
BLUE OFFSET = 25mm

VERTICAL SIZE = 690mm
HORIZONTAL SIZE = 1020mm

53UDX10B OVERLAY DIMENSIONS (4 X 3) V. SQUEEZE

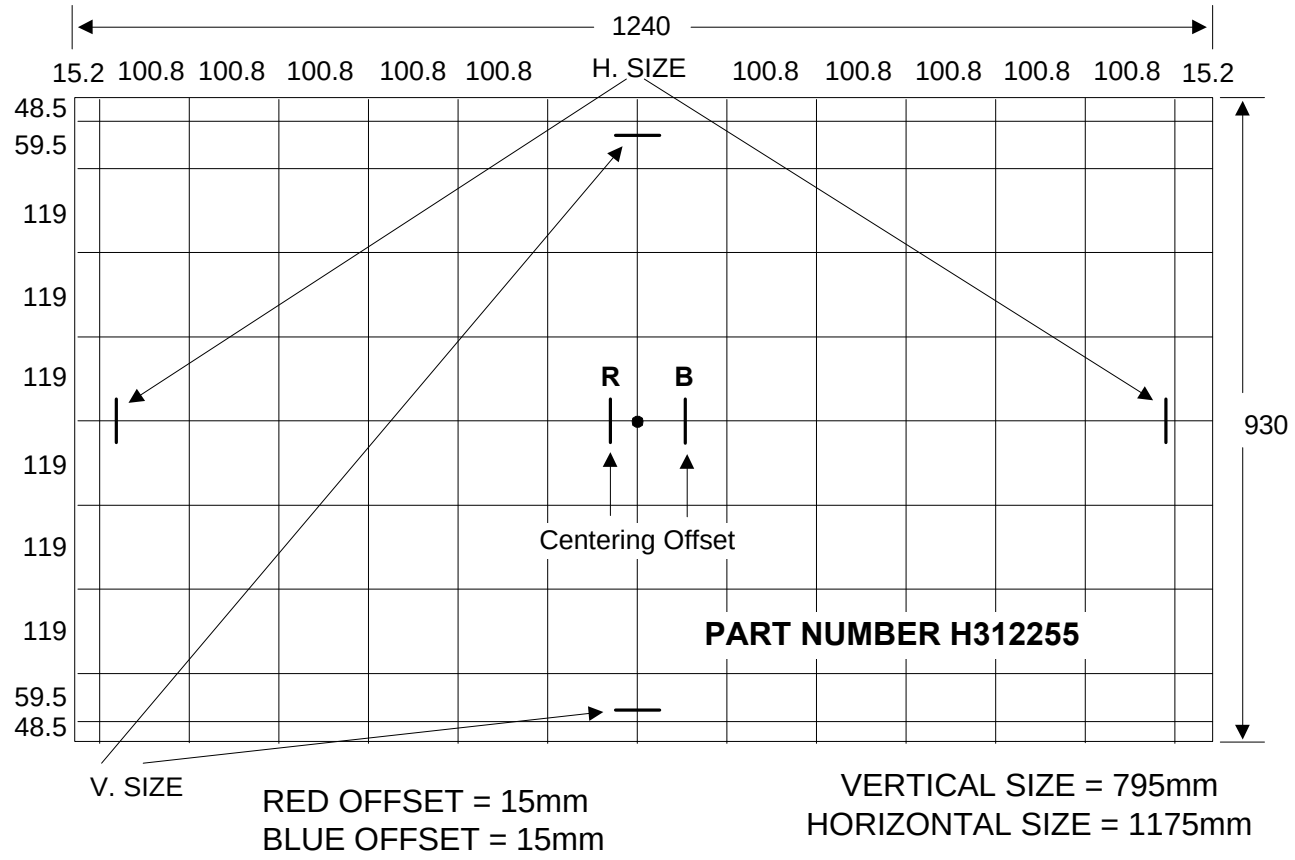


V SQUEEZE 16 X 9 HD MODE

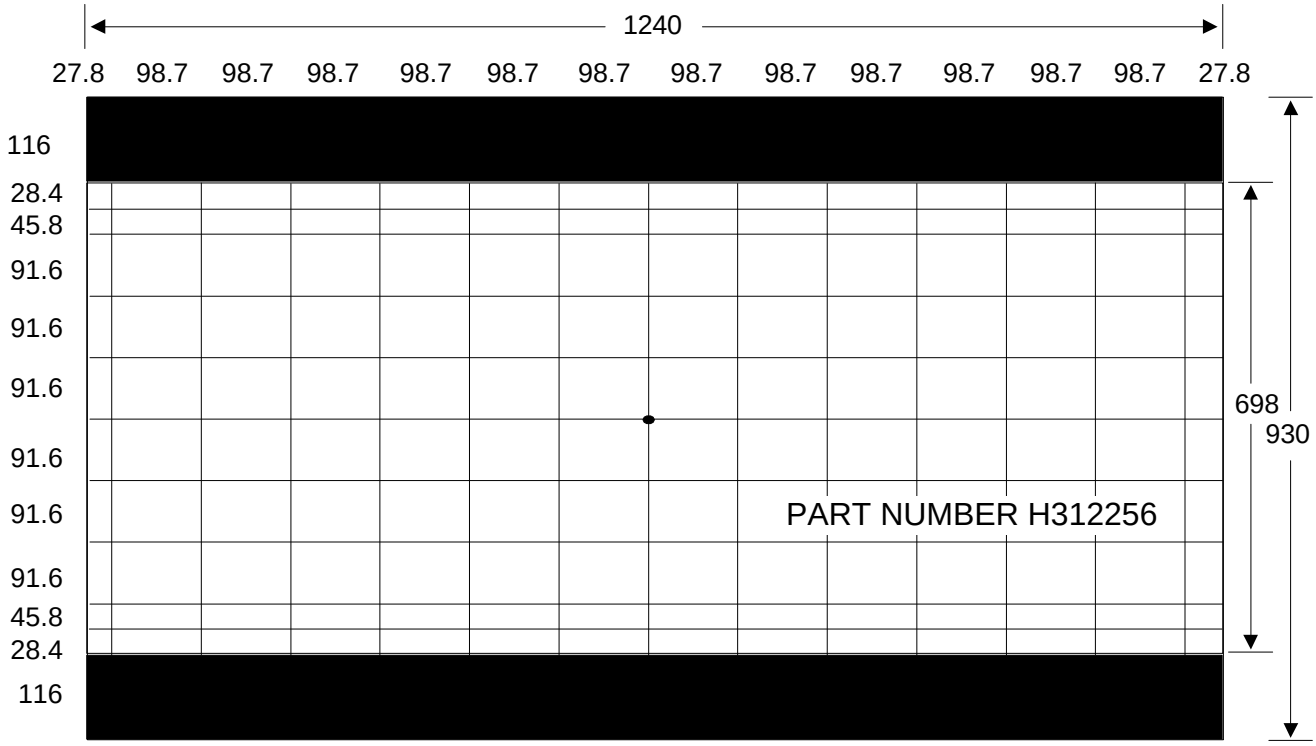
DIGITAL CONVERGENCE OVERLAY DIMENSIONS

NOTE: Aspect may not be correct but dimensions are correct.

61UDX10B OVERLAY DIMENSIONS (4 X 3) NORMAL MODE



61UDX10B OVERLAY DIMENSIONS (4 X 3) V SQUEEZE MODE

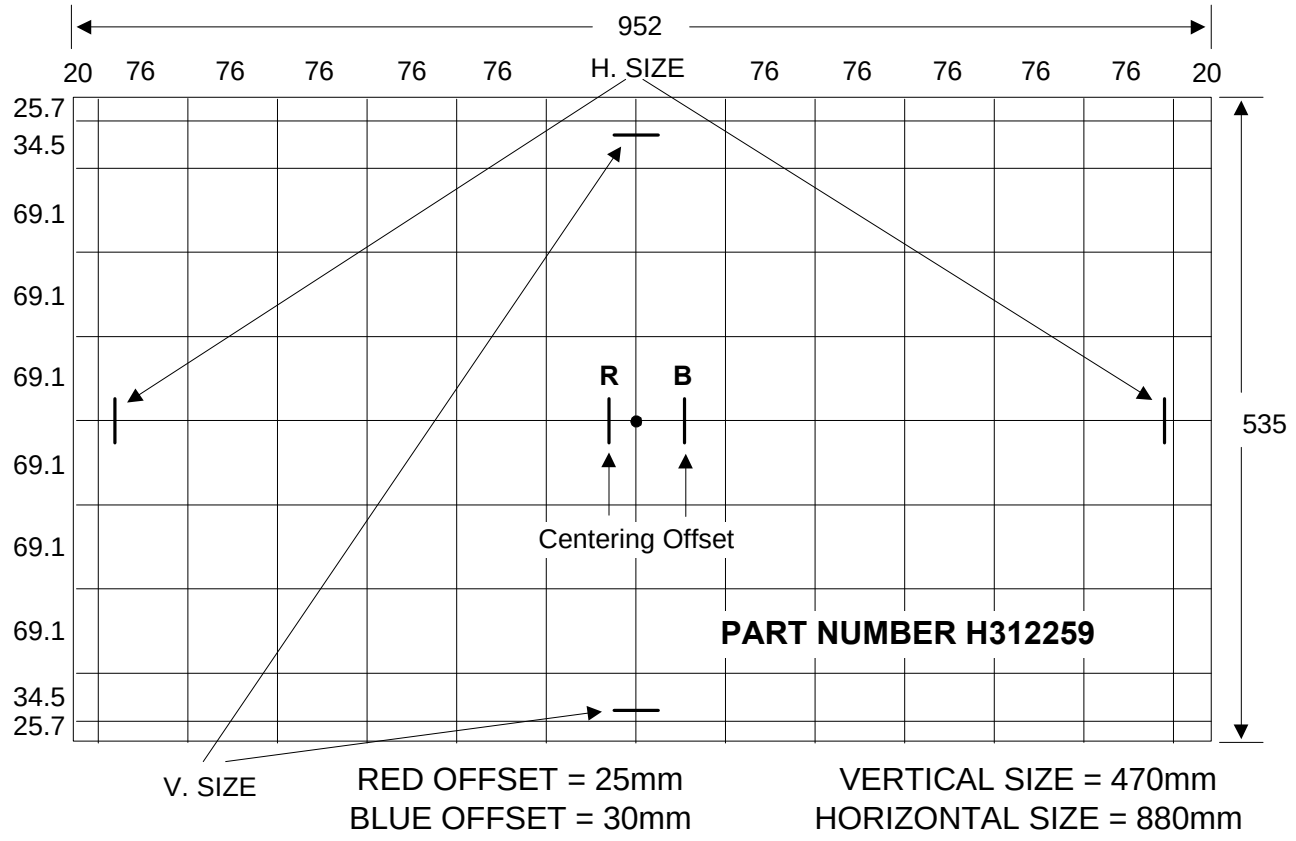


V SQUEEZE 16 X 9 HD MODE

DIGITAL CONVERGENCE OVERLAY DIMENSIONS

NOTE: Aspect may not be correct but dimensions are correct.

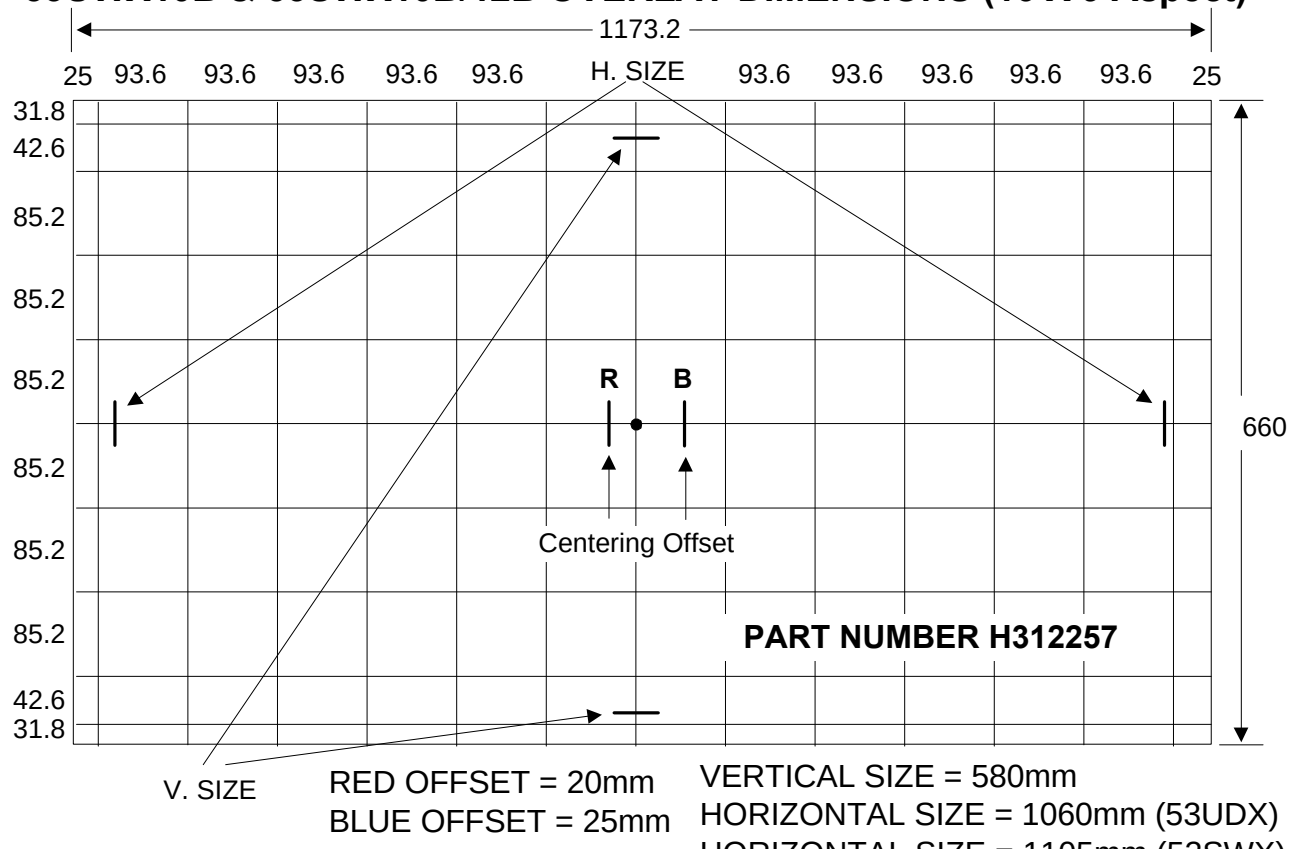
43UWX10B" OVERLAY DIMENSIONS (16 X 9 Aspect)



RED OFFSET = 25mm
BLUE OFFSET = 30mm

VERTICAL SIZE = 470mm
HORIZONTAL SIZE = 880mm

53UWX10B & 53SWX10B/12B OVERLAY DIMENSIONS (16 X 9 Aspect)



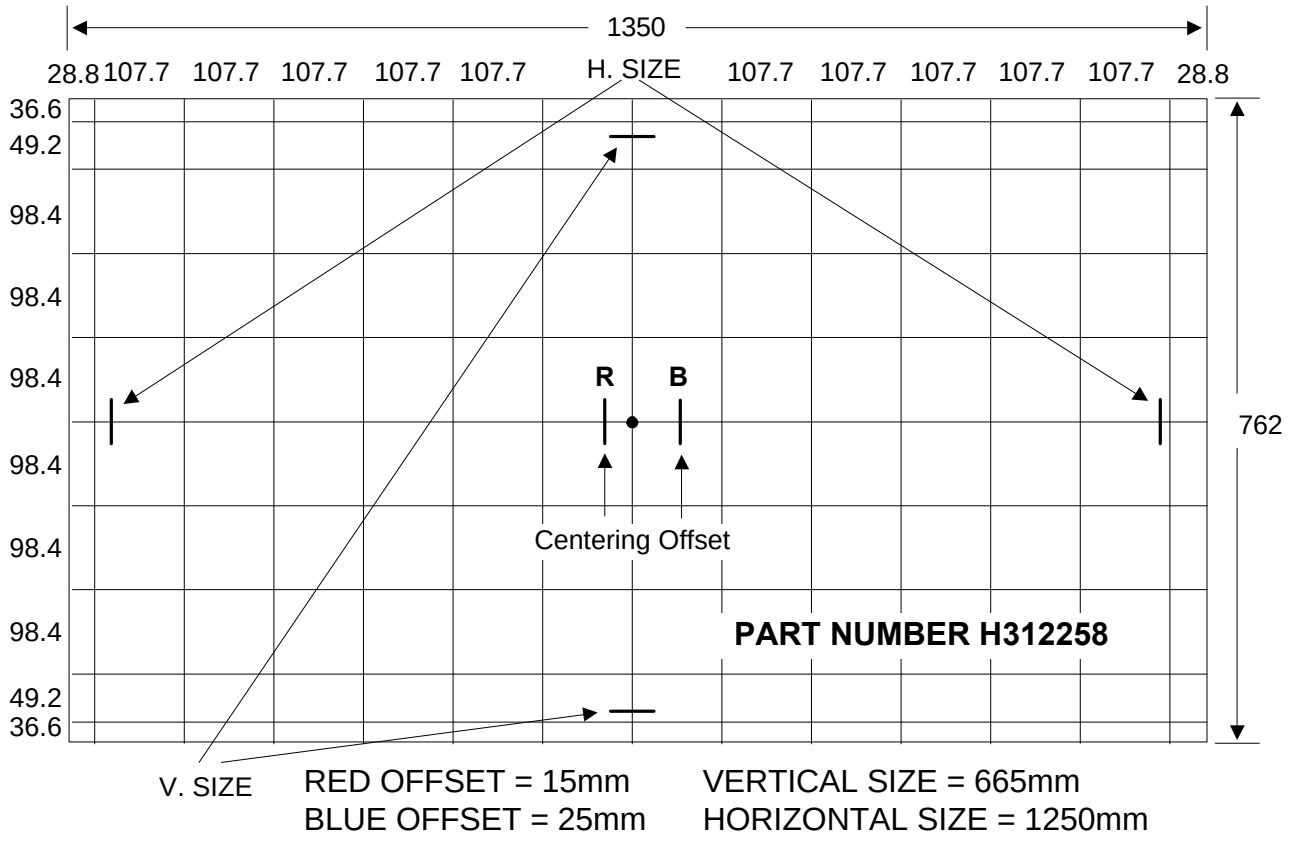
RED OFFSET = 20mm
BLUE OFFSET = 25mm

VERTICAL SIZE = 580mm
HORIZONTAL SIZE = 1060mm (53UDX)
HORIZONTAL SIZE = 1105mm (53SWX)

DIGITAL CONVERGENCE OVERLAY DIMENSIONS

NOTE: Aspect may not be correct but dimensions are correct.

61UWX10B & 61SWX10B/12B OVERLAY DIMENSIONS (16 X 9 Aspect)



Below is the jig screen part number for the 2H models.

2001 Models

HITACHI MODELS:

H312251 43” 4x3 Full Mode
H312252 43” 4x3 V Squeeze Mode
H312253 53” 4x3 Full Mode
H312254 53” 4x3 V Squeeze Mode
H312255 61” 4x3 Full Mode
H312256 61” 4x3 V Squeeze Mode
H312259 43” 16x9
H312257 53” 16x9
H312258 61” 16x9

PHILIPS MODELS:

H312261 60” Phillips 4x3 Full Mode
H312262 60” Phillips 4x3 V Squeeze Mode
H312263 55” Phillips 4x3 Full Mode
H312264 55” Philips 4x3 V Squeeze Mode

ZENITH MODELS:

H312265 56” Zenith 16x9
H312266 65” Zenith 16x9

VIDEO INFORMATION

DP-1X CHASSIS

SECTION 5

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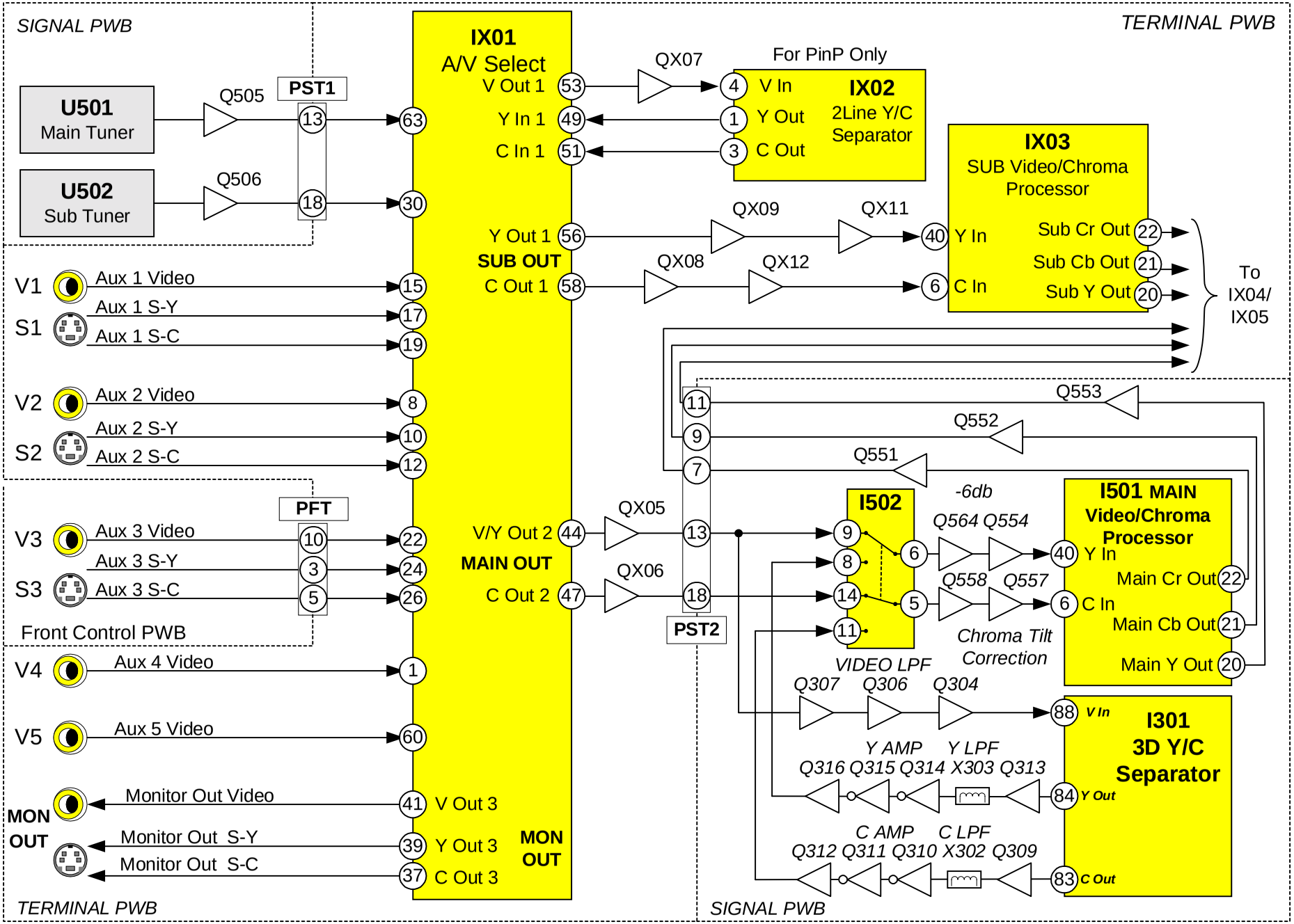
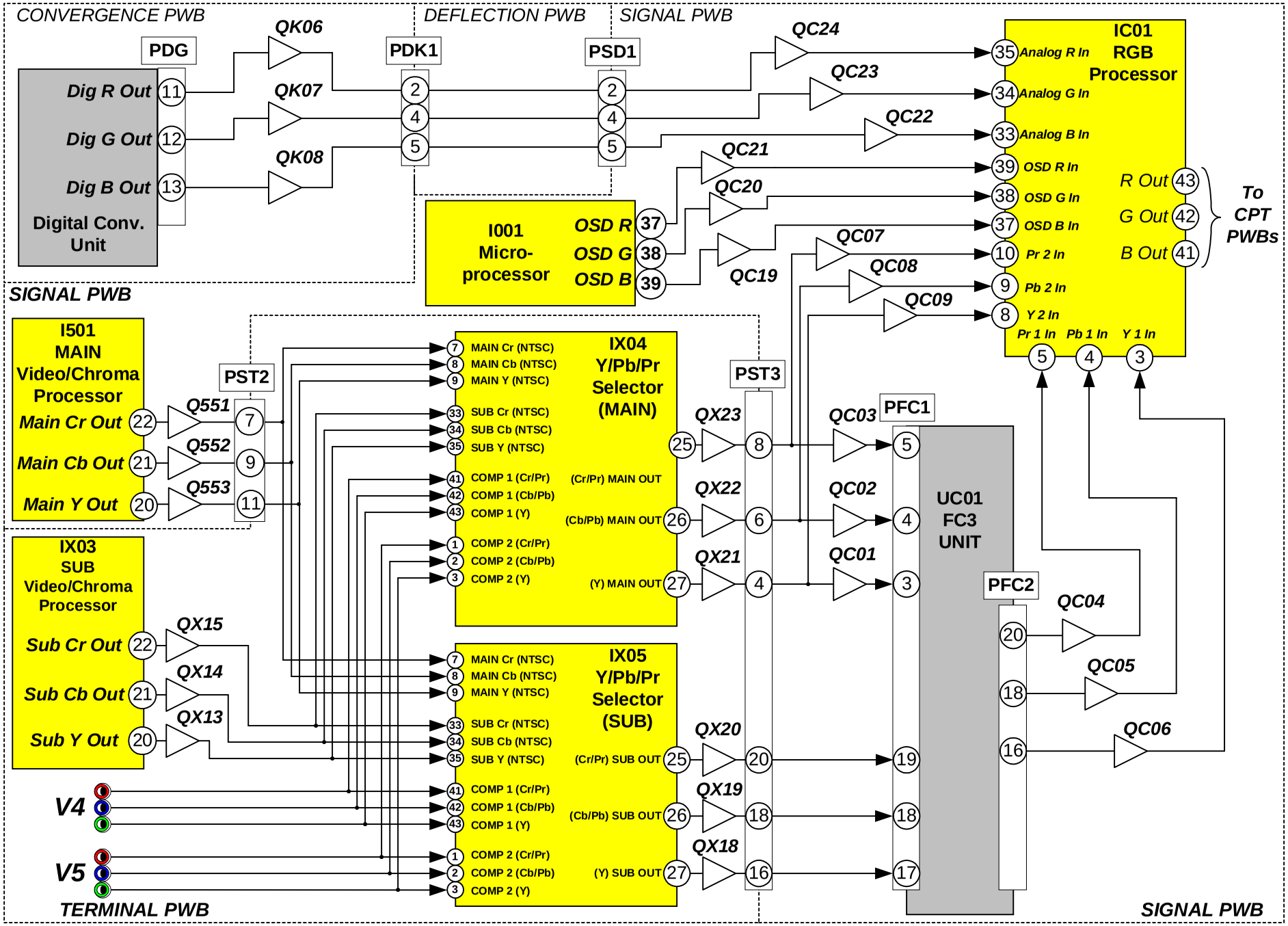
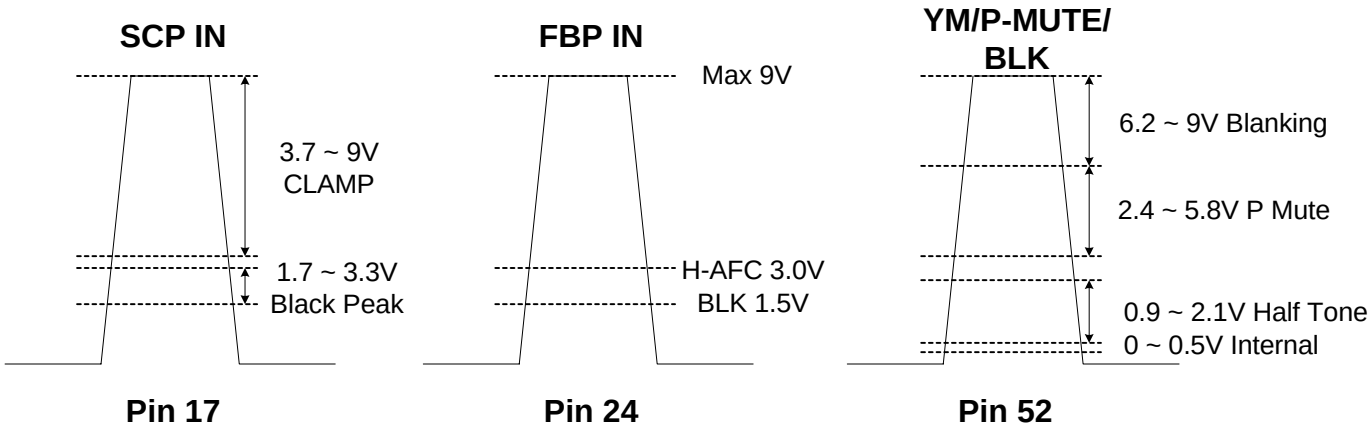
DP-1X Chassis Video Signal Path - NTSC



DP-1X Chassis Video Signal Path - NTSC,Component, OSD



DP-1X RAINFOREST IC INFORMATION (IC01)



Pin 17 = SCP.
Black Peak: This input is utilized for establishing the Black Peak level used in Black Peak expansion circuit. Here the Black Peak is expanded towards Black to increase the contrast ratio.
CLAMP: The clamp pulse is utilized for DC restoration and blanking timing.

Pin 24 = FBP. Combination of the following.
Fly back pulse: 1.5V ~ 3.0V H-AFC: This input is received from the Horizontal Blanking (H. Blk) signal generated in the Deflection circuit by Q706. This signal is used as a sample pulse in the Horizontal AFC circuit, which synchronizes the Horizontal Drive signal with the incoming Video sync signal input at pin 16. In Through Mode, pin 8.
Fly back pulse: 3.0V ~ 9.0V Max: This input is received from the Flex Converter and is a combination of Horizontal and Vertical blanking signals.
H Blk from the Flex Converter Pin 12 through QC15
V Blk from the Flex Converter Pin 4 through QC14
Used within the Rainforest is for DC restoration, Pedestal level detection and Clamping signals, such as Burst Gate Pulse.

Pin 52 = YM/P-MUTE/BLK. Combination of the following.
INTERNAL: 0.0V ~ 0.5V Used internal within the Rainforest IC.
HALFTONE: 0.9V ~ 2.1V: This input is received from the Microprocessor and is used to establish the Transparency effect of OSD. This also mutes the video in exact timing with On Screen Display pulses (OSD). Half Tone from the Microprocessor Pin 40 through QC16.
P MUTE: 2.4V ~ 5.8V: This input is received from the Video Mute Circuit and blanks the picture when there a loss of Vertical or Horizontal Sweep, AC is lost or the Microprocessor output a V Mute High signal during Channel Change, Child Lock, etc. Audio is also Muted during this time. See below for routing.
V MUTE from the Microprocessor Pin 56 through D019, Q023, Q022, QC17 to pin 52 of IC01.
AC LOSS through Q024, D021, to Q023, Q022, QC17 to pin 52 of IC01.
VERTICAL SWEEP LOSS through QN05, QN04, QN02, PSD2 connector pin 3, D020 to Q023, Q022, QC17 to pin 52 of IC01.
HORIZONTAL SWEEP LOSS through QN01, QN03, QN02, PSD2 connector pin 3, D020 to Q023, Q022, QC17 to pin 52 of IC01.

DP-1X Automatic Brightness Limiter (ABL) Circuit Diagram Explanation

(See Circuit Diagram on page 05-05)
The ABL voltage is generated from the ABL pin (**3**) of the Flyback transformer, TH01. The ABL pull-up resistors are **RH27** and **RH28**. They receive their pull up voltage from the B+ 115V2) line for Deflection generated from the Power Supply via **TP91** pin **11**, rectified by **DP15**, filtered by **CP32** and then routed through the excessive current sensing resistor **RP24**.

ABL VOLTAGE OPERATION

The ABL voltage is determined by the current draw through the Flyback transformer. As the picture brightness becomes brighter or increases, the demand for replacement of the High Voltage being consumed is greater. In this case, the Flyback will work harder and the current through the Flyback increases. This in turn will decrease the ABL voltage. The ABL voltage is inversely proportionate to screen brightness.

Also connected to the ABL voltage line is **DH16**. This zener diode acts as a clamp for the ABL voltage. If the ABL voltage tries to increase above 11V due to a dark scene which decreases the current demand on the flyback, the ABL voltage will rise to the point that **DH16** dumps the excess voltage into the 11 line.

ACCL TRANSISTOR OPERATION

The ABL voltage is routed through the **PSD2** connector pin **2**, through the acceleration circuit **RC62** and **DC02** to the base of **QX18**. Under normal conditions, this transistor is nearly saturated. **QX18** determines the voltage being supplied to the cathode of **DC01**, which is connected to pin **53** of the Rainforest IC, **IC01**. During an ABL voltage decrease due to an excessive bright circumstance, the base of **QX18** will go down, this will drop the emitter voltage which in turn drops the cathode voltage of **DC01**. This in turn will pull voltage away from pin **53** of the Rainforest IC, **IC01**. Internally, this reduces the contrast and brightness voltage which is being controlled by the **I^2C** bus data communication from the Microprocessor arriving at pins **30** and **31** of the Rainforest IC and reduces the overall brightness, preventing blooming as well as reducing the Color saturation level to prevent color smear.

SUB BRIGHTNESS ADJUSTMENT - I^2C Alignment

The purpose for the Sub Brightness Adjustment alignment is to set up the Lowest DC level to which the Brightness control voltage can be set. Again, this voltage is controlled internally within **IC01** via **I^2C** bus data from the Microprocessor arriving at pins **30** and **31**. The adjustment is performed within the Service Menu. To enter this adjustment menu, with the set turned off, press and hold the Input button, then press the Power button. This will bring up a Service Menu. In the first Page of the menu, the 2nd selection is Sub Bright Adj **[SUB BRT]**. Selection is made using the cursor Up/Down buttons and adjusting the data values are made using the Cursor Left/Right buttons.
In the field it is very difficult to make this adjustment according to factory specifications. However, there is a relatively easy way to do this adjustment and get if relatively close to factory specs.

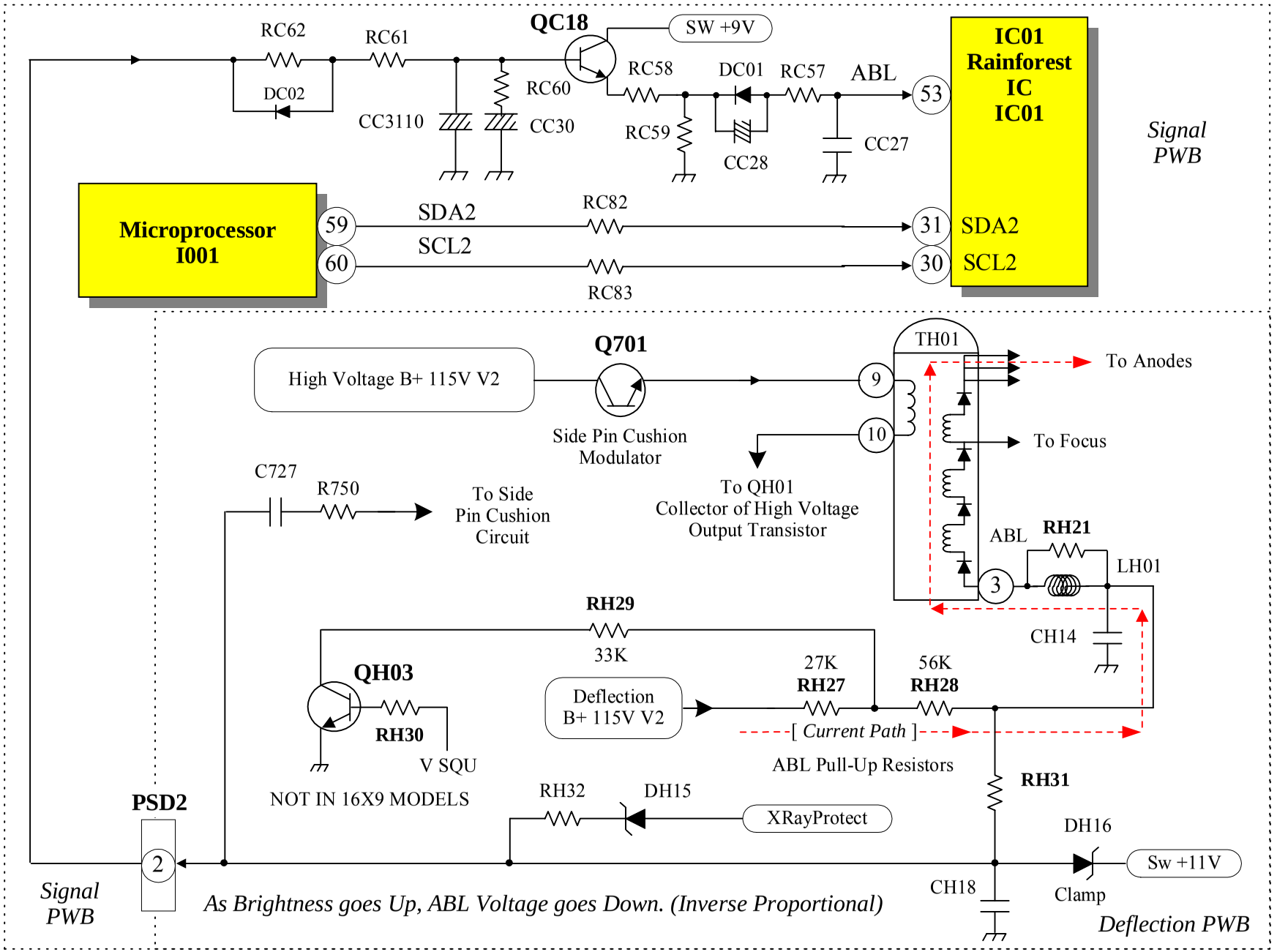
1) Start adjustment 20 minutes or more after the power is turned on.
2) Receive a tuner signal.
3) Set the contrast and color controls to minimum.
4) Set the brightness to minimum position on the display.
5) The room light should be very low.

ADJUSTMENT PROCEDURE
Adjust Sub Brightness (***Number 2***) **SUBBRT**, so that only the brightest points of the picture can be seen on screen.

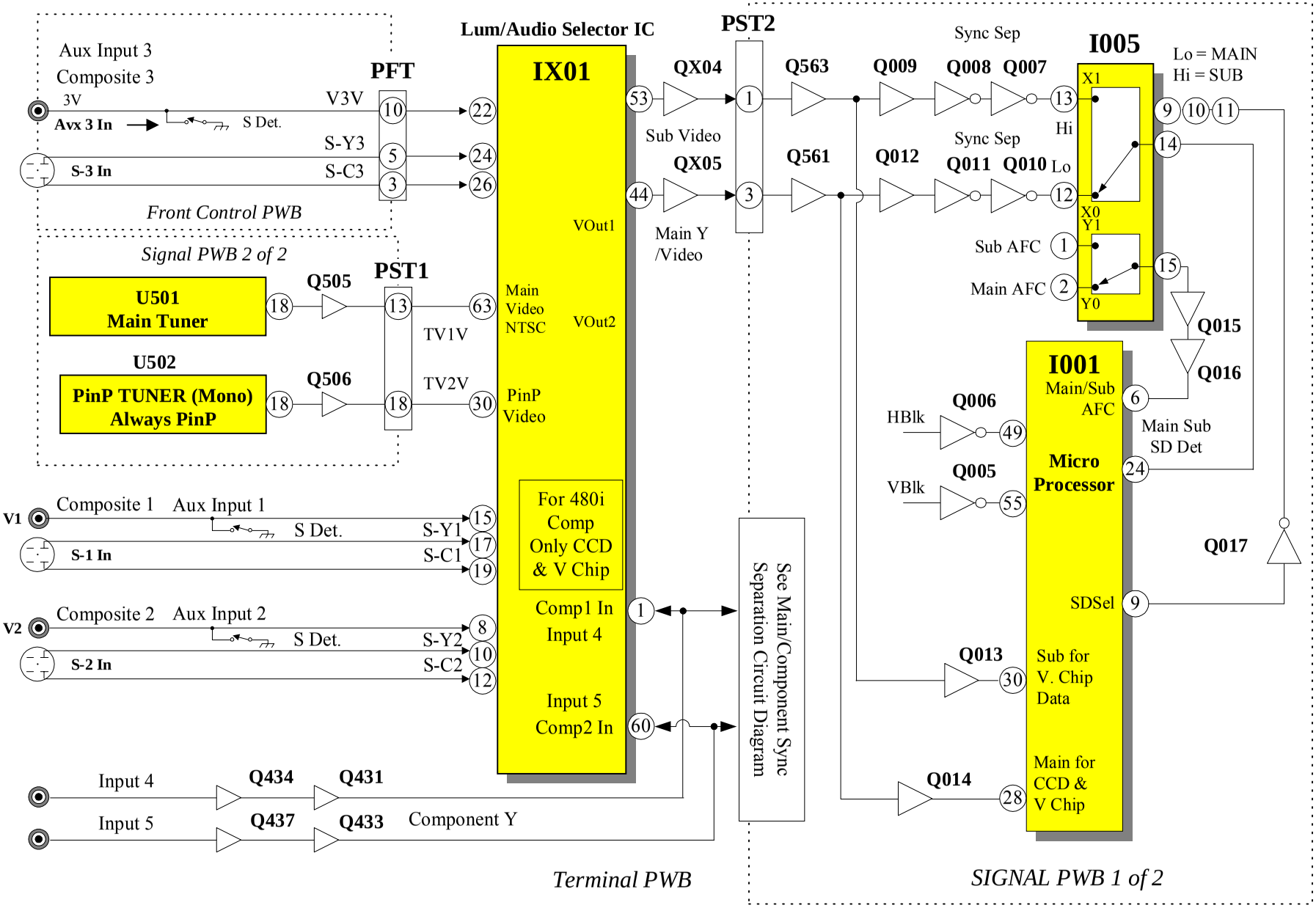
USING A GENERATOR:

1. Use the input signal below, **(GRAY SCALE)**
2. Adjust Sub Brightness (***Number 2***), so that the first bar sinks to black and the second bar is slightly visible, using I^2C Bus alignment procedure.

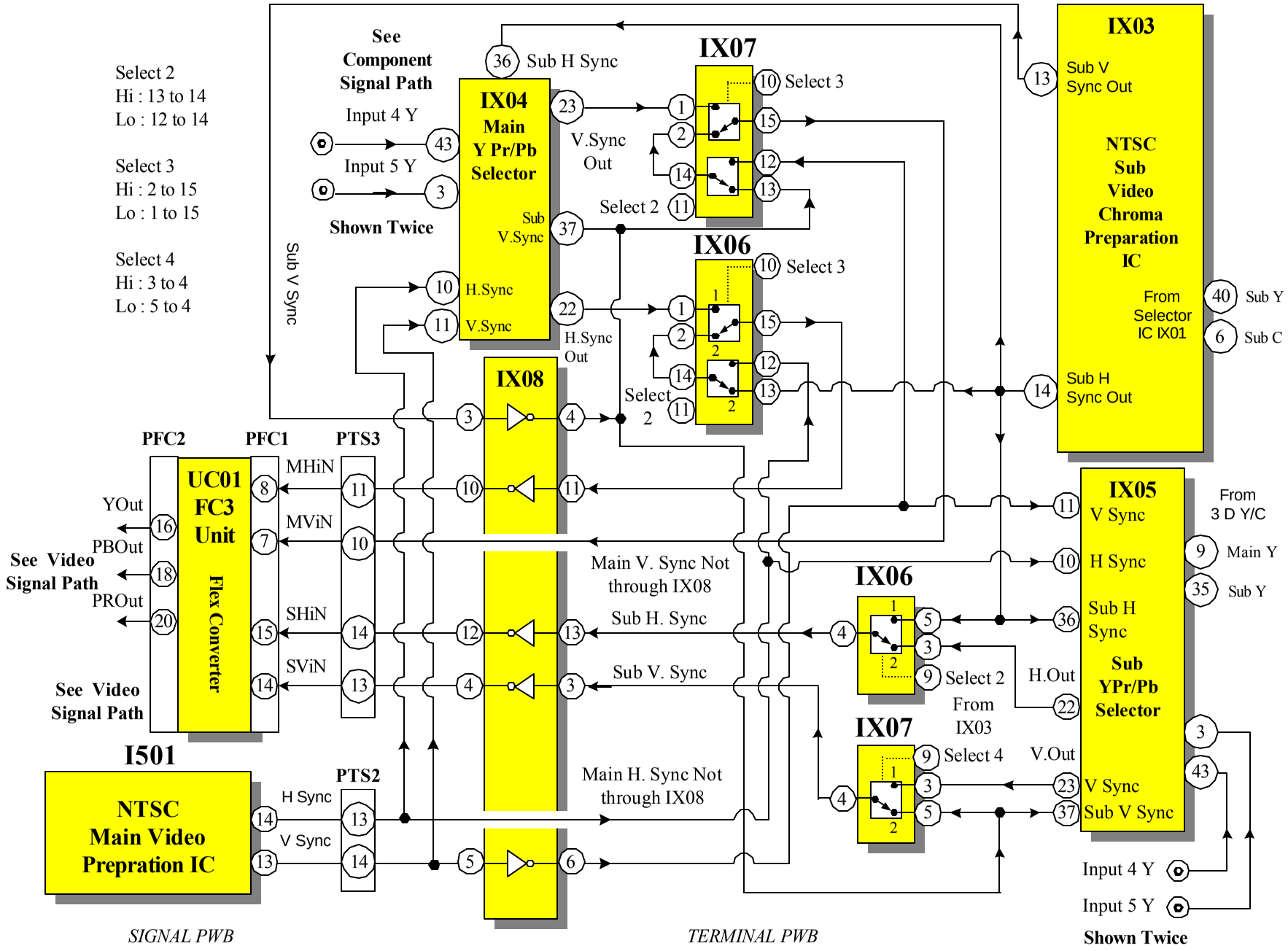
DP1X CHASSIS A.B.L. CIRCUIT DIAGRAM



DP-1X SERIES CHASSIS NTSC SYNC SIGNAL PATH



DP-1X SERIES CHASSIS MAIN/COMPONENT SYNC SEPARATION SIGNAL PATH



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ADJUSTMENT INFORMATION

DP-1X CHASSIS

SECTION 6

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DP-1X CHASSIS ADJUSTMENT ORDER

It is necessary to follow an order when doing adjustments in the DP-1X chassis.

DP-1X SERVICE ADJUSTMENT ORDER "PREHEAT BEFORE BEGINNING"

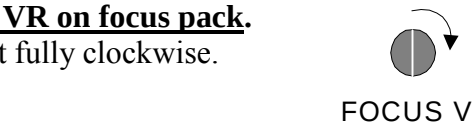
Order	Adjustment Item	Screen Format	Signal	DCU Data
	Pre HEAT (30 Minutes)	Normal Mode	NTSC	N/A
1	Cut Off	Normal Mode	NTSC	N/A
2	Pre Focus Lens and Static	Normal Mode	NTSC	N/A
3	DCU Phase Data Setting	Normal Mode	NTSC	N/A
4	DCU Phase Data Setting	16X9 HD	2.14H	HD Not for 16X9 Models
5	Horz. Position Adj. (Coarse)	Normal Mode	NTSC	N/A
6	Horz. Position Adj. (Coarse)	16X9 HD	2.14H	N/A
7	Raster Tilt	Normal Mode	NTSC	CLEAR
8	Beam Alignment	Normal Mode	NTSC	CLEAR
9	Raster Position	Normal Mode	NTSC	CLEAR
10	Vertical Size Adjust	Normal Mode	NTSC	CLEAR
11	Horz. Size Adjust	Normal Mode	NTSC	CLEAR
12	Beam Form	Normal Mode	NTSC	
13	Lens Focus Adjust	Normal Mode	NTSC	
14	Static Focus Adjust	Normal Mode	NTSC	
15	Blue Defocus	Normal Mode	NTSC Color Bar	
16	White Balance Adjustment	Normal Mode	NTSC	
17	Sub Brightness Adjustment	Normal Mode	NTSC	
18	Sub Picture Adjustment	Normal Mode	NTSC	
19	Horz. Position Adjust (Fine)	Normal Mode	NTSC	Clear to start
20	Horz. Position Adjust (Fine)	16X9 HD	2.14H	
21	DCU Character Set Up	Normal & HD	NTSC/1080i	HD Not for 16X9 Models
22	DCU Pattern Set Up	Normal & HD	NTSC/1080i	HD Not for 16X9 Models
23	Convergence Alignment	Normal & HD	NTSC/1080i	HD Not for 16X9 Models
24	Sensor Initialize	Normal & HD	NTSC/1080i	HD Not for 16X9 Models
25	PIP Amplitude Adjustment	Normal Mode	NTSC	

DP-1X CHASSIS PRE-HEAT RUN ADJUSTMENTS

PRESET EACH ADJUSTMENT VR TO CONDITION AS SHOWN:

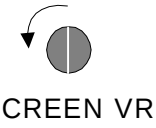
1. **<u>Before Pre Heat Run.</u>**
   Enter I^2C Service Menu. Pre-set the Green DRV and Red DRV to 3F. This is considered "Center" position.
   (With power Off, press the SOURCE button on front panel and then press the POWER ON button then release. The Service Menu is displayed.)

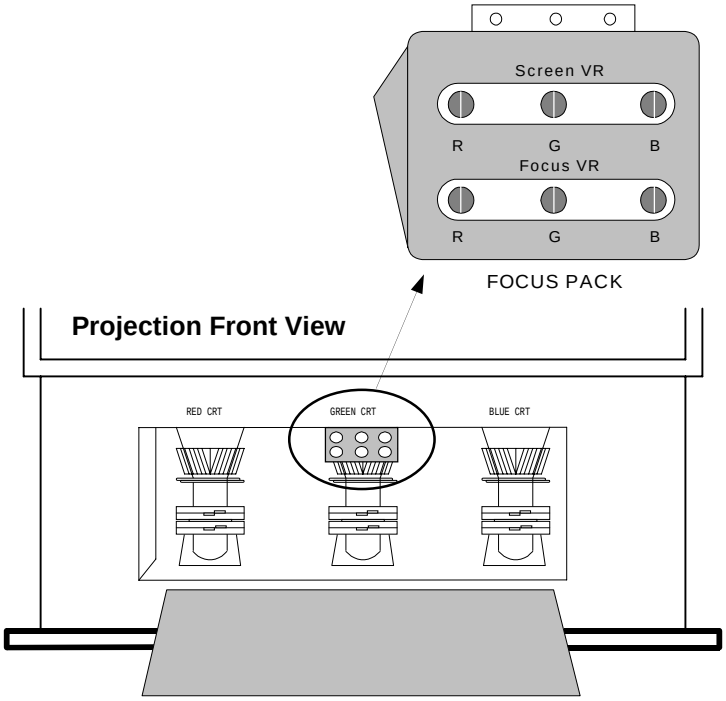
2. **<u>SCREEN VR ON FOCUS PACK</u>.**
   Pre Set fully counter clockwise.



3. **<u>Focus VR on focus pack</u>.**
   Pre Set fully clockwise.

<u>Allow set to operate at least 30 Minutes before beginning adjustments.</u>





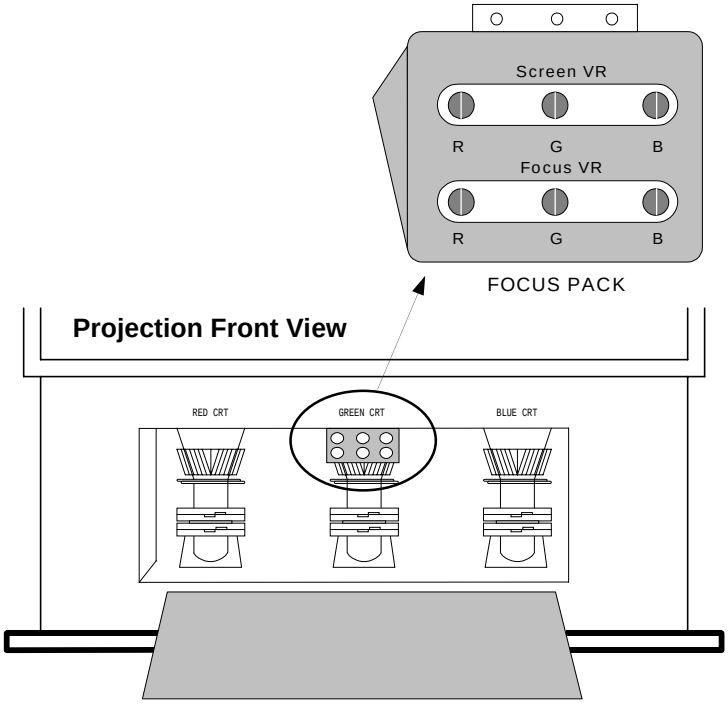
DP-1X CHASSIS CUT-OFF (SCREENS) ADJUSTMENT

ADJUSTMENT PREPARATION:

- Pre Heat Run should be finished.
- Be sure Screen Color Temperature setting is in the **COOL** mode on Customer's Menu.
- Room Light should be minimal.

ADJUSTMENT PROCEDURE:

1) Go to I^2C ADJ. Mode. *(With power Off, press the SOURCE button on front panel and then press the POWER ON button then release. The Service Menu is displayed.)*
2) Set R DRV (COOL) to center data value (**3F**).
3) Set G DRV (COOL) to center data value (**3F**).
4) Set R, G, and B CUTOFF (COOL) data settings to [**80**].
5) Adjust Screen VRs on Focus Pack fully counter clock wise.
6) Choose SERVICE item [1] of I^2C ADJ. Mode. Select CURSOR RIGHT [▶] and the Vertical will collapses.
7) Adjust any Screen VR. Screen VR should be turned clockwise gradually until that particular color is barely visible.
8) Repeat for the other two colors.
9) Exit SERVICE by pressing the cursor on remote to the left [◀].
10) Exit SERVICE MENU by pressing the MENU key on remote.



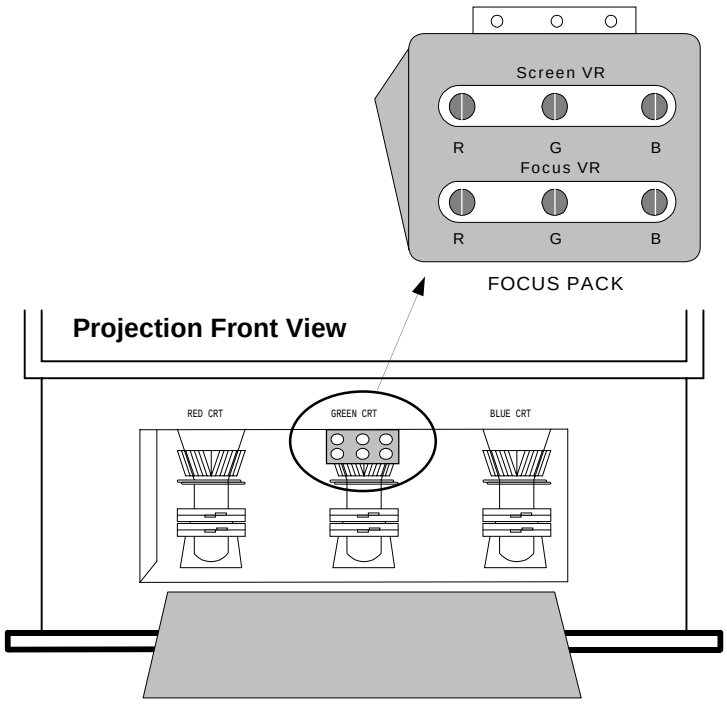
DP-1X CHASSIS PRE-FOCUS ADJUSTMENT

ADJUSTMENT PREPARATION:
A) Pre Heat Run should be finished.

FOCUS ADJUSTMENT:

1) Short the 2pin sub-miniature connector on the CRT PWB (**PTS**), to remove any color not being adjusted and adjust one color at a time. *(The adjustment order of R, G and B is just an example.)*
2) Adjust the Focus VR for Red until Focus is achieved. (A Fine Adjustment will be made later.)
3) Repeat for Blue and Green.

NOTE:
- **PTSR** connector on RED CRT PWB.
- **PTSG** connector on GREEN CRT PWB.
- **PTSB** connector on BLUE CRT PWB.



DP-1X CHASSIS DCU CROSSHATCH PHASE ADJUSTMENT

Adjustment Preparation:

- Cut Off adjustment should be finished.
- Video Control: Brightness 90%, Contrast Max.

Adjustment Procedure:

NORMAL MODE

1) Receive any NTSC signal.
2) Screen Format is **Normal**
3) Press the **SERVICE ONLY** switch on the Convergence PWB to enter DCAM.
4) Press the **HELP** key on the Remote, Green Cross hatch appears.
5) Then press the **EXIT** key. (This is the Phase adjustment mode).
6) Adjust data value using the keys indicated in the chart, until the data matches the values indicated in the chart.

Exiting Adjustment Mode:

7) Press **Help** key on remote control.
8) Press **PIP MODE** key **TWICE** to store the information.
9) When Green dots are displayed, press the MUTE key twice to return to DCAM grid.

16X9 HD Mode Adjustment

Mode: (Not for 16X9 Models)

10) Change the Display Format to **16X9 HD** Mode.
11) Repeat steps 3 through 9 for the **16X9 HD** mode.

Shortcut to change to 16X9 HD MODE

NOTE: Remote still in DCA mode.

a) Press the EXIT key on Remote Control 5 times to exit to video mode.
b) Change input to receive 1080i signal.
c) Change format to 16X9 HD. Top and bottom panels should now be black.
d) Exit Menu.
e) Press the Service Only Switch. DCAM grid should now appear in the 16X9 HD mode.

***DCA** stands for (Digital Convergence Adjustment)

PHASE MODE	Display Format NORMAL		Display Format 16X9 HD	
ADJUST USING	Address	Data Value	Address	Data Value
4 and 6 keys on Remote	PH-H	BF	PH-H	BF
2 and 5 keys on Remote	PH-V	07	PH-V	07
Cursor Left ◀ and Right ▶ on Remote	CR-H	4C	CR-H	4C
Cursor Up ▲ and Down ▼ on Remote	CR-V	0C	CR-V	0C

DP-1X CHASSIS HORIZONTAL PHASE (COARSE) ADJUSTMENT

Adjustment Preparation:

- Video Control: Brightness 90%,
- Contrast Max.

Adjustment Procedure
NORMAL MODE:

1) Receive any NTSC crosshair signal.
2) Screen Format is **NORMAL.**
3) Press the **SERVICE ONLY** switch on the convergence PWB and display the Digital Convergence Crosshatch pattern.
4) Mark the center of the Digital Convergence Crosshatch Pattern with finger.
5) Press the **SERVICE ONLY** switch to return to normal mode.
6) Enter the I^2C Service Menu and select Item **H POSI** and adjust the data so that the center of Video matches the location of the Digital Crosshatch pattern noted in step {4}.
7) Exit from the I^2C Menu.

16X9 HD Mode Adjustment:

NOTE: I^2C Service Menu Can Not be entered in the 16X9 HD Mode.

8) Receive any 1080i (2.14H) signal.
9) Change Screen Format **16X9 HD** mode.
10) Press the **SERVICE ONLY** switch on the deflection PWB and display the Digital Convergence Crosshatch pattern.
11) Mark the center of the Digital Convergence Crosshatch Pattern with finger.
12) Press the **SERVICE ONLY** switch to return to normal mode.
13) Power Set OFF and back ON or change FORMAT to NORMAL.
14) Enter the **I^2C** Bus alignment menu and select Item [9] **H POSI**
15) Press **SELECT** key on Remote Control. (**H POSI**) option is changed to **HD** mode. **H POSI H** appears). **H POSI** data of 16X9 HD mode can now be changed.
16) Adjust the data up or down slightly.
17) Exit from the **I^2C** Menu.
18) Change Screen Format to **16X9 HD** mode.
19) Confirm that the Center of Video matches the Center of the DCU Crosshatch determined in step (11).
20) If the Horizontal Position isn't correct, repeat steps (8) through (18) until center is matched.

***NOTE:** To enter the **I^2C** Bus alignment menu, with Power Off, press the **INPUT** button and hold it down, then press the **POWER** button and release. **I^2C** adjustment menu will appear.*

DP-1X CHASSIS TILT (RASTER INCLINATION) ADJUSTMENT

Adjustment Preparation:

- The set can face any direction.
- Receive the Cross-Hatch Signal
- **VIDEO CONTROLS:** Factory Preset.
- **SCREEN FORMAT:** should be **NORMAL** mode.
- The lens focus should have been coarse adjusted.
- The electrical focus should have been coarse adjusted.
- The Digital Convergence **RAM** should be cleared. *(Turn power off, press and hold the SERVICE ONLY switch on the Convergence PWB, then press the POWER button).*

Adjustment Procedure :

GREEN:

1) Apply covers to the RED and BLUE lenses or short the 2P Sub Mini connector [**PTS**] on R&B CRT PWB to produce only **GREEN**.
2) Turn the **Green** deflection yoke and adjust the TILT until the green is level.
3) **[+/- 2mm tolerance]**. See diagram.

RED:

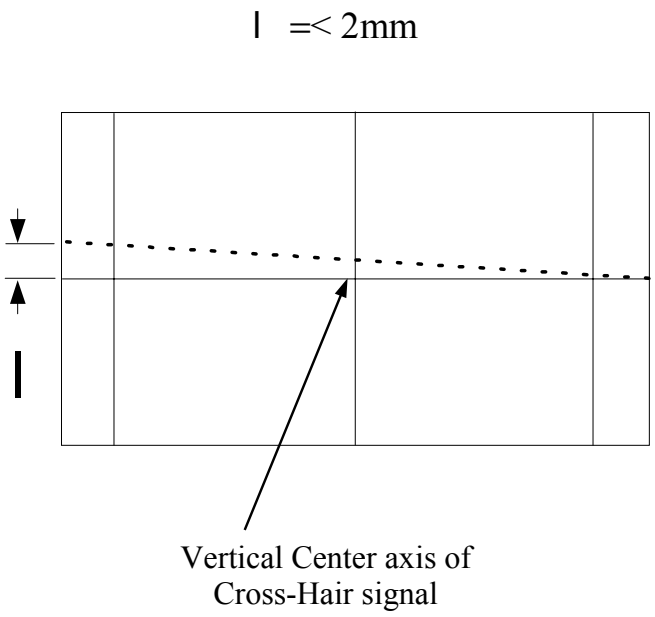
4) Remove cover or PTS short from **RED** CRT and align RED with GREEN.
5) **[+/- 1mm tolerance when compared to Green]**

BLUE:

6) Remove cover or PTS short from **BLUE** and cover the RED CRT. Align BLUE with GREEN.
7) **[+/- 1mm tolerance when compared to Green]**

After Completion:

8) Tighten DY Yoke Screws to 12+/-2 kg-cm.
9) REMOVE ALL COVERS or SHORTS on the PTS connectors.
10) Turn the power off.



DP-1X CHASSIS BEAM ALIGNMENT ADJUSTMENT

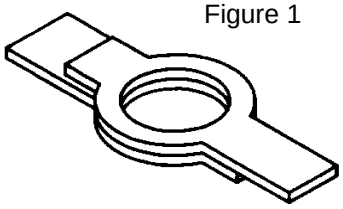
Preparation for adjustment:

- Pre Heat, Pre-optical focus, DCU Phase Data, H. POSI Course and Raster Tilt adjustment should be completed.
- Brightness: 90%
- Contrast Max.
- Receive cross hatch signals, or dot pattern
- RASTER TILT adjustment should be finished.
- SCREEN FORMAT should
- be NORMAL mode.

Adjustment procedure:

1) Green (G) tube beam alignment adjustment:
   Short-circuit 2P subminiature connector plug pins of Red (R) and Blue (B) on the CRT boards and project only Green (G).
2) Put Green (G) tube beam alignment magnet to the cancel state as shown in *Figure 1*.
3) Turn the Green (G) static focus VR counterclockwise all the way and make sure of position of cross hatch center on screen.
4) Turn Green (G) static focus VR clockwise all the way.
5) Turn two Beam alignment magnet in any desired direction and move cross hatch center to position found in step (3). *(See Figure 2 below).*
6) If image position does not shift when Green static focus VR is turned, adjustment complete.
7) If image position does move, repeat steps [2] through [6].
8) Conduct beam alignment for Red and Blue in the same way.
9) Red (R) focus on focus pack.
10) Blue (B) focus on focus pack.
11) Upon completion of adjustment, place a small amount of white paint on the beam alignment magnets, to assure they don't move. *(If available).*

Figure 1



The figure shows that the long and short knobs of the 2P magnet are aligned, this is the cancel state.

NOTE: This is the Centering Magnet not the Beam Alignment Magnets.
This is just shown for reference, but the principle remains the same.

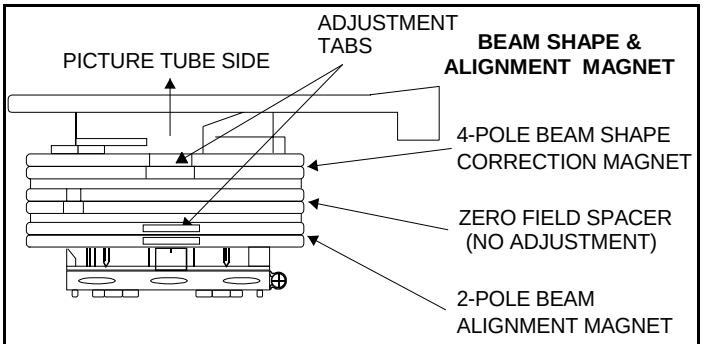


Figure 2

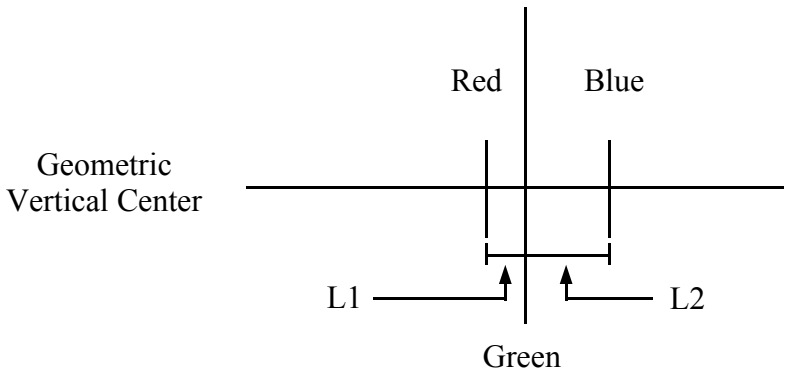
DP-1X CHASSIS RED AND BLUE RASTER OFF SET ADJUSTMENT

INFORMATION:
Raster Off set is necessary to conserve Memory allocation.
It is very important to remember that the Red is off-set Left of Center and Blue is off-set Right of center.
Please use the following information to accurately offset Red and Blue from center.
Also see Overlay Dimensions for further details.

Preparation for adjustment:
- With Power Off, press the Service Only switch on the Convergence PWB. While holding the Service Only Switch down, press the Power On button and Release. DCU Grid will appear without convergence correction. NOTE: After entering DCAM, with each press of the Service Only Switch, the picture will toggle between Video mode and DCU Grid.
- Video Control should be set at Factory Preset condition.
- Static Focus adjustment should be finished.

Adjustment Procedure
1. Turn the centering magnets of Red, Green and Blue and adjust so that the center point of the cross-hatch pattern satisfies the diagram below. (DCU data is cleared). Remember Green is Centered. Red is to the left of Green and Blue is to the right of Green as indicated below.
- All Vertical positions are geometric center of screen.
- Parameters are +/- 2mm.

DP15/DP15E/ DP15F	L1	L2	DP14G	L1	L2	DP17	L1	L2
61 inch	15mm	15mm	**61 inch**	15mm	25mm	**61 inch**	15mm	25mm
53 inch	15mm	25mm	**53 inch**	20mm	25mm	**53 inch**	20mm	25mm
43 inch	20mm	25mm (43UDX) 35mm (43FDX)	**43 inch**	25mm	30mm			



Geometric Horizontal Center

DP-1X VERTICAL SIZE ADJUSTMENT

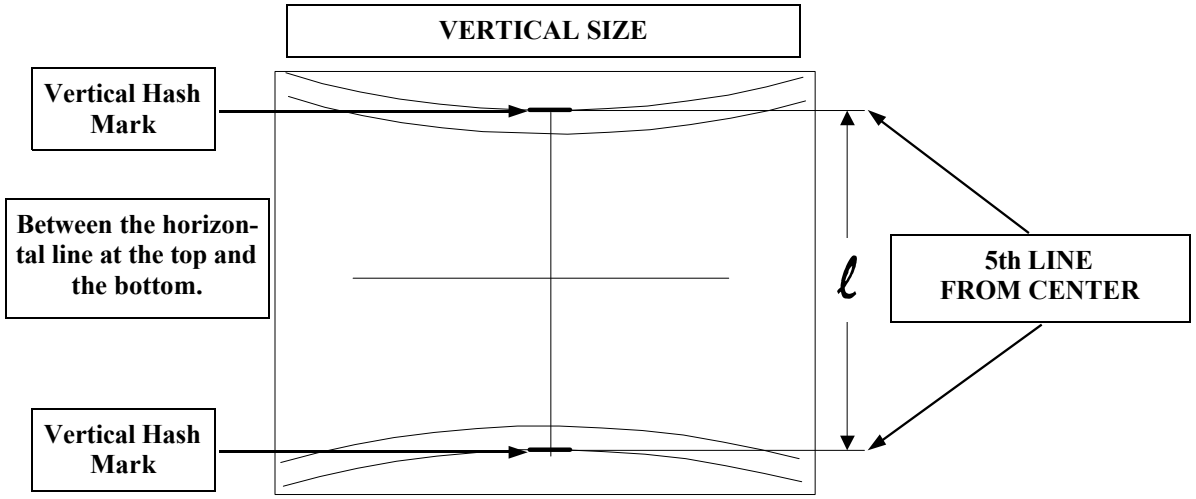
VERTICAL SIZE:

1) Receive an NTSC signal.
2) With Power Off, press the Service Only switch on the Convergence PWB. While holding the Service Only Switch down, press the Power On button and Release. DCU Grid will appear without convergence correction. NOTE: After entering DCAM, with each press of the Service Only Switch, the picture will toggle between Video mode and DCU Grid.
3) Select GREEN (**A/CH**) and press the **MENU** button to remove Red and Blue.
4) **Adjust using R607** (Vertical Size Adj. VR) to match marks on the Overlay. (See Figure Below)

NOTE: Centering magnet may be moved to facilitate. Distance is important, not centering.

NOTE: The Vertical Frequency is shared between Normal and 16X9 HD modes.

Alternate Method:
Adjust Vertical Size until the size matches the chart below.



DP15/DP15E/DP15F	ℓ=		DP14G/DP17	ℓ=
61 inch	795mm		**61 inch**	665mm
53 inch	690mm		**53 inch**	580mm
43 inch	560mm		**43 inch**	470mm

DP-1X HORIZONTAL SIZE ADJUSTMENT

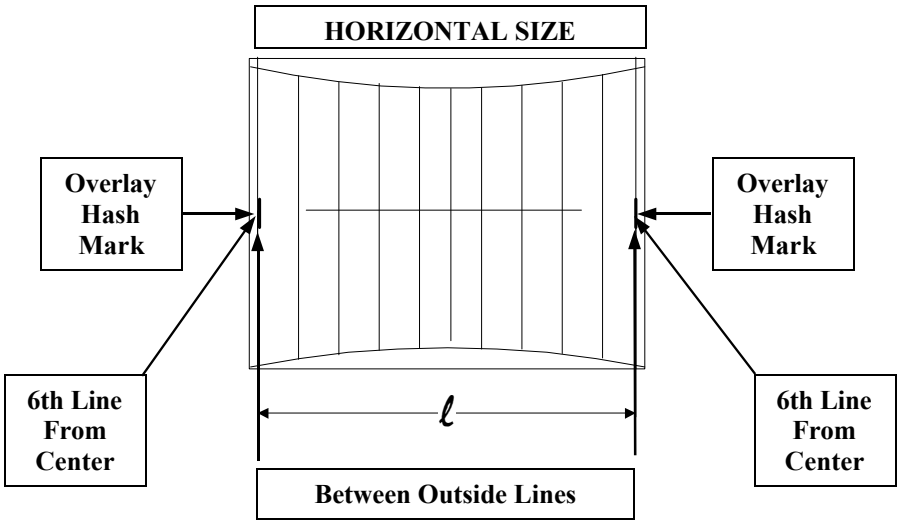
HORIZONTAL SIZE:
(Display Mode NORMAL)

- Install the correct Overlay.
- Input an NTSC Signal.
- Digital Convergence RAM should be cleared. With Power Off, press the Service Only switch on the Convergence PWB. While holding the Service Only Switch down, press the Power On button and Release. DCU Grid will appear without convergence correction. NOTE: After entering DCAM, with each press of the Service Only Switch, the picture will toggle between Video mode and DCU Grid.
- Project only the Green raster by selecting Green Adjustment mode and pressing the MENU button on remote.

ADJUSTMENT

1) **Adjust using R711** (Horz. Size Adj. VR) to match marks on the Overlay. (See Figure Below)
2) Press **"Power Off"** to exit DCAM. (Digital Convergence Adjustment Mode.)

Alternate Method:
Adjust Horizontal Size until the size matches the chart below.



DP15 DP15F DP15E	ℓ=		DP14G	ℓ=		DP17	ℓ=
61 inch	1175mm		**61 inch**	1250mm		**61 inch**	1250mm
53 inch	1020mm		**53 inch**	1060mm		**53 inch**	1105mm
43 inch	825mm		**43 inch**	880mm			

DP-1X BEAM FORM ADJUSTMENT

BEAM SHAPE (FORM)

Preparation for adjustment

- *IMPORTANT: Screen format should be "NORMAL"*.
- Pre Heat, Cut-Off, Pre-optical focus, DCU Phase Data, H. Pos Course, Raster Tilt, Beam Alignment, Raster Position, Vertical and Horizontal Size adjustment should be completed.
- Brightness: 90%, Contrast: Max.
- Input a NTSC DOT signal.

Adjustments procedure:

1) Green CRT beam shape adjustment.
2) Short-circuit 2P sub-mini connectors on Red and Blue CRT PWB to project only the Green beam.
3) Turn the green static focus VR fully clockwise.
4) Make the dot at the screen center a true circle, using the 4-Pole magnet shown in *Figure 2* below.
5) Also adjust the Red and Blue CRT beam shapes according to the steps (1) to (4).
6) After the adjustment is completed, return R, G and B static VRs to the Best Focus point.

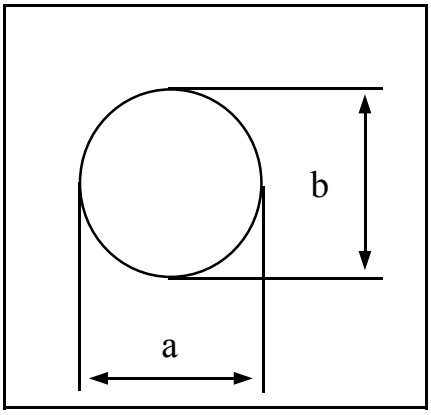


Figure 1

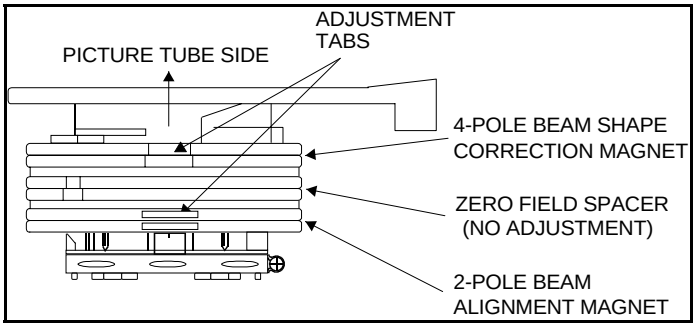


Figure 2

DP-1X LENS FOCUS ADJUSTMENT

Preparation for adjustment

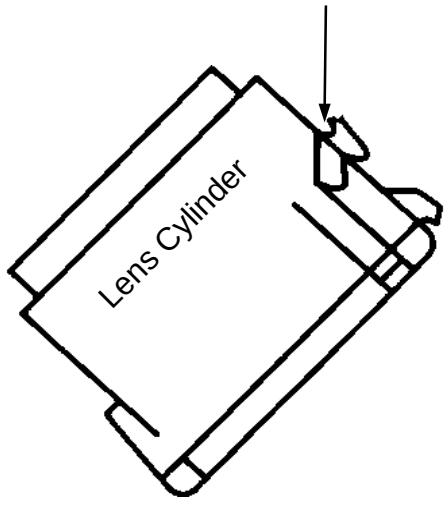
- Receive the Cross-hatch pattern signal.
- The electrical focus adjustment should have been completed.
- Deflection Yoke tilt should have been adjusted.
- Brightness = 50%
- Contrast = 60% to 70%

Adjustment procedure

1) Short the 2 pin sub-miniature connector on the CRT P.W.B. TS, to produce only the color being adjusted and adjust one at a time. (The adjustment order of R, G and B is just an example.)
2) *(See Figure 1)* Loosen the fixing screw on the lens assembly so that the lens cylinder can be turned. (Be careful not to loosen the screw too much, as this may cause movement of the lens cylinder when tightening.)
3) Rotate the cylinder back and forth to obtain the best focus point, while observing the Cross-Hatch. (Observe the center of the screen).

- *Hint: Located just below the screen are the two wooden panels. Remove the panels to allow access to the focus rings on the Lenses.*

4) After completing optical focus, tighten the fixing screws for each lens.
5) When adjusting the Green Optical focus, be very careful. Green is the most dominant of the color guns and any error will be easily seen.
6) Repeat Electrical Focus if necessary.



LENS ASSEMBLY R, G, B.

Figure 1

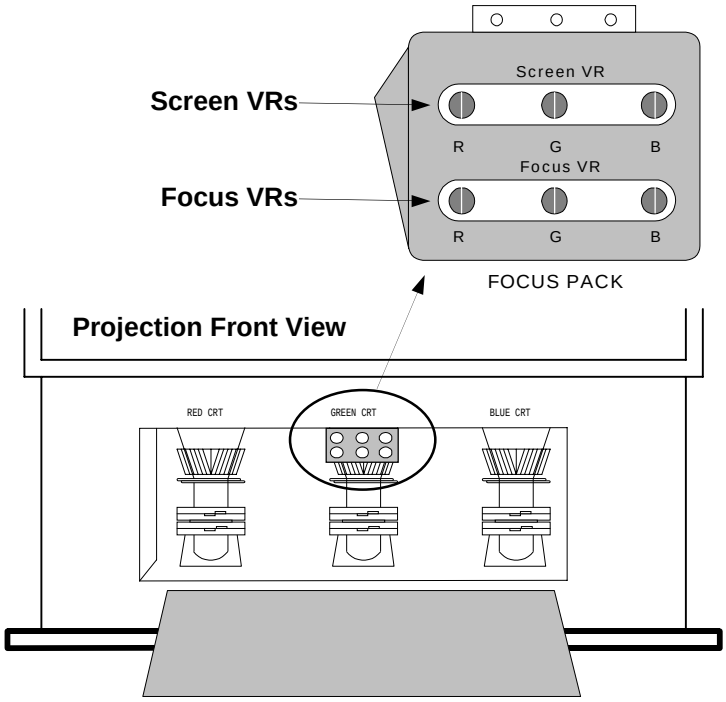
DP-1X STATIC FOCUS ADJUSTMENT

ADJUSTMENT PREPARATION:

- Pre Heat Run should be finished.

FOCUS ADJUSTMENT:

1) Short the 2pin sub-miniature connector on the CRT PWB (**PTS**), to remove any color not being adjusted and adjust one color at a time. *(The adjustment order of R, G and B is just an example.)*
2) Adjust the Focus VR for Red until maximum Focus is achieved.
3) Repeat for Blue and Green.



DP-1X BLUE DE-FOCUS ADJUSTMENT

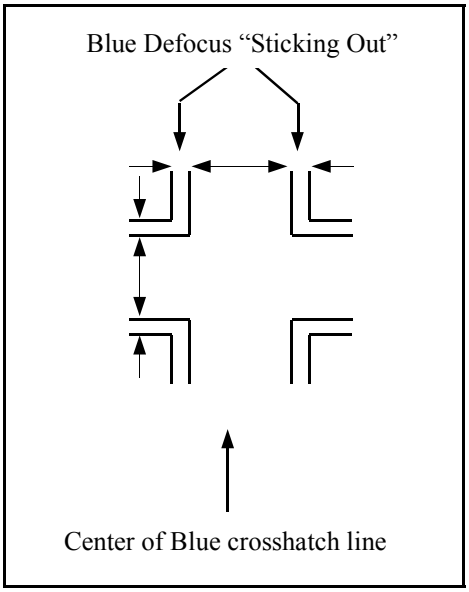
Adjustment Preparation:

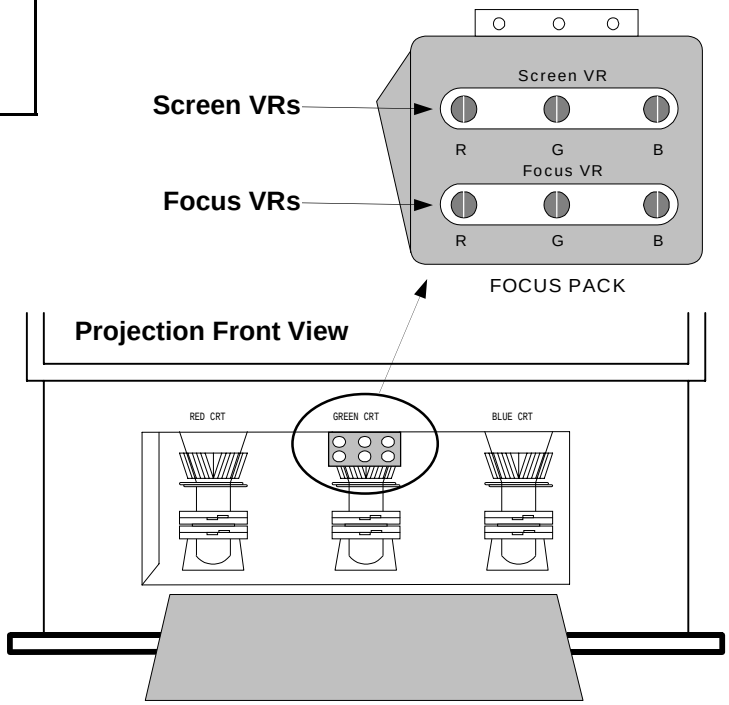
- Video Control: Brightness 90%, Contrast Max.
- SCREEN FORMAT should be PROGRESSIVE mode.

Adjustment Procedure

1) Receive any NTSC cross-hatch signal.
2) Turn the **B FOCUS VR** fully clockwise.
3) Adjust BLUE defocus according to the following specifications.

1mm on each side equaling 2mm total. See figure Below.





DP-1X WHITE BALANCE and SUB BRIGHTNESS ADJUSTMENT

Adjustment Conditions:

- Cut Off and Blue Defocus must be complete.
- High brightness white balance
- Low brightness white balance

Screen adjustment VRs on Focus Block
Drive adjustment performed using I^2C Bus Alignment within Service Menu.

Preparation for adjustment

- Start adjustment 20 minutes or more after the power is turned on.
- Turn the brightness and black level OSD to minimum by remote control.
- Receive a tuner signal, (any channel, B/W would be best).
- Set the drive adjustment within I^2C Service Menu to their Data Centers (3F).
- Set Color Temperature to **COOL** on Customer's Menu.

Adjustment procedure
Sub Brightness:

1) Go to I^2C ADJ. Mode. With power Off, press **INPUT** and **POWER** buttons at the same time, then release. Service Menu is displayed.

2) Adjust the Sub Brightness **Number [2] SUBBRT** using I^2C Bus alignment procedure so only the slightest white portions of the raster can be seen.

3) Exit Service Menu by pressing **MENU** button.

4) Input a gray scale signal into any Video input and select that input using the SOURCE button on the remote or front control panel.

5) Turn the Brightness and Contrast OSD all the way up.

6) Enter the Service Menu again.

7) Make the whites as white as possible using the Red DRV (Cool) and Green DRV (Cool) Drive adjustment within I^2C Service Menu . (10800K)

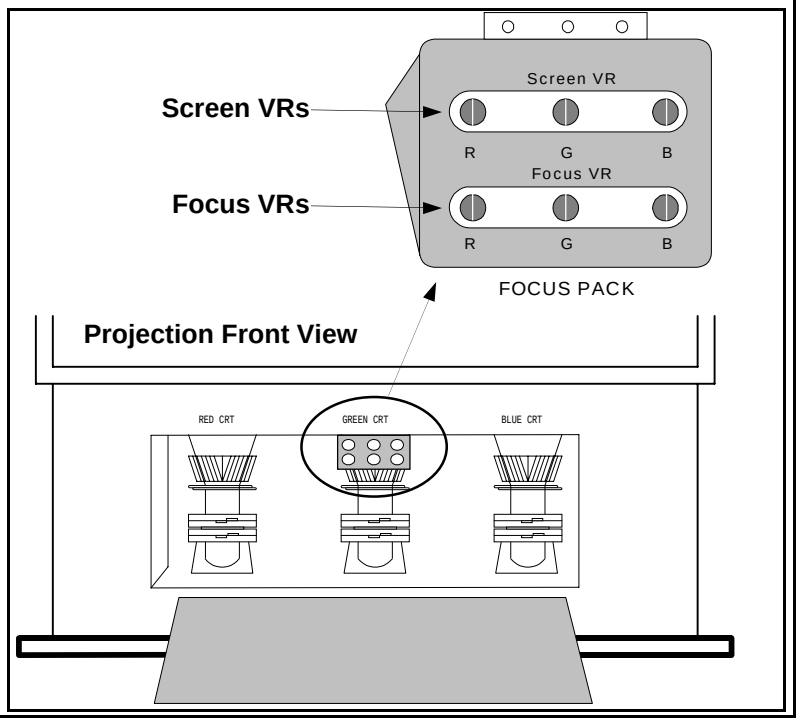
8) Set the Brightness and Contrast to minimum.

9) Adjust the low brightness areas to black and white, using screen adjustment VRs (red, green, blue) on the Focus Block assembly. (10800 K)

10) Check the high brightness whites again. If not OK, repeat steps 6 through 9.

11) Press the **MENU** key on remote to Exit Service Menu.

Remember: When adjusting the Screen controls. After the Cut Off adjustment has been completed, never adjust the controls clockwise. Always adjust counter clockwise. This lengthens tube life.



DP-1X HORIZONTAL POSITIONS (FINE) ADJUSTMENT

Adjustment Preparation:

- Video Control: Brightness 90%,
- Contrast Max.

Adjustment Procedure NORMAL MODE:

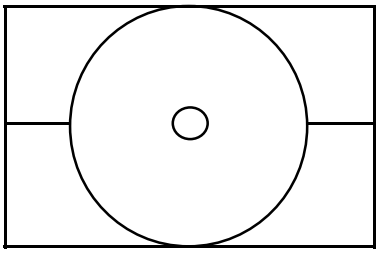
1) Receive any NTSC crosshair signal.
2) Screen Format is NORMAL.
3) Press the **SERVICE ONLY** switch on the convergence PWB and display the Digital Convergence Crosshatch pattern.
4) Mark the center of the Digital Convergence Crosshatch Pattern with finger and press the **SERVICE ONLY** switch to return to normal mode.
5) Enter the I^2C Bus alignment menu and select Item **H POSI** and adjust the data so that the center of Video matches the location of the Digital Crosshatch pattern noted in step {4}.
6) Exit from the I^2C Menu.

16X9 HD Mode Adjustment:
NOT for the 16X9 aspect models.
NOTE: I^2C Service Menu Can Not be entered in the 16X9 HD Mode.

7) Receive any 1080i (2.14H) signal.
8) Change Screen Format **16X9 HD** mode.
9) Press the **SERVICE ONLY** switch on the deflection PWB and display the Digital Convergence Crosshatch pattern.
10) Mark the center of the Digital Convergence Crosshatch Pattern with finger and press the **SERVICE ONLY** switch to return to normal mode.
11) Power set Off and then back On.
12) Enter the **I^2C** Bus alignment menu and select Item [9] **H POSI**
13) Press **MENU** key on R/C. (**H POSI**) option is changed to **HD** mode. **H POSI H** appears). The data for **H POSI** 16X9 HD mode can now be changed.
14) Adjust the data up or down slightly.
15) Exit from the **I^2C** Menu.
16) Change Screen Format to **16X9 HD** mode.
17) Confirm that the Center of Video matches the Center of the DCU Crosshatch determined in step (10).
18) If the Horizontal Position isn't correct, repeat steps (7) through (18) until center is matched.

***NOTE:** To enter the **I^2C** Bus alignment menu, with Power Off, press the **INPUT** button and hold it down, then press the **POWER** button and release. **I^2C** adjustment menu will appear.*

NORMAL MODE:
Balance left and right side display position.



DP-1X CHASSIS MAGIC FOCUS "CHARACTER SET UP"

NOTE: This instruction should be applied when a new DCU is being replaced.

This DCU can be set up for three different types of wording during Intellisense.

1. **INTELLISENSE 99**
   - Phillips
2. **MAGIC FOCUS 77**
   - Hitachi
3. **HD FOCUS AA**
   - Zenith

Adjustment Preparation:

1. Receive NTSC RF or Video Signal.
2. With Power Off, Press and HOLD the **SERVICE ONLY** button on the Convergence/ Focus PWB, then press the Power On/Off and release. When picture appears, release Service Only switch. (DCU grid is displayed without convergence correction data.

Adjustment Procedure:

1. Press the **FREEZE** key on R/ C. (One additional line appears near the top and bottom.
2. Press the **PIP CH** key, the ADJ. PARAMETER mode is displayed as following.

ADJ.PARAMETER

——> ADJ. DISP. : 77

SEL. STAT. : 00
DEMO.WAIT : 2f

3. Press the ◄ or ► Cursor to change the ADJ. DISP. Data as follows;
   - **77** for **HITACHI**

DATA VALUES CONFIRMATION:

4. Use the Cursor ▼ and ▲ keys to scroll through the ADJ. PARAMETER table. Confirm Data values in accordance with **TABLE** 1 to the right. To make data value changes, Press the ◄ or ► Cursor keys.
5. Press the **PIP MODE** key 2 time to write the changed data into EEPROM. (First press, ADJ PARAMETER ROM WRITE ? Is displayed for alarm. 2nd press writes data into EEPROM. Green dots appear after completion of operation).
6. Press the **MUTE** button 3 times exit.

16 X 9 HD MODE ADJ:

6. Input a 1080i signal.
7. Press the **EXIT** key on remote 5 time to exit to the video mode.
8. Change input to receive 1080i input.
9. Enter Customer's Menu and select FORMAT. Change to **Through Mode**.
10. Exit Menu.
11. Press the **Service Only Switch** to return to DCAM.
12. Repeat Steps 2 ~ 8.
13. Power set off.

TABLE 1		Not for 16X9 aspect models.
Parameter	**Normal**	**Squeeze**
ADJ.DISP	77	•
SEL. STAT	00	•
DEMO WAIT	2f	•
INT STEP 1	02	•
INT A DLY	0a	•
INT C DLY	0a	5a
INT BAR	1c	•
MGF STEP 1	00	•
MGF A DLY	0a	•
MGF C DLY	0a	5a
MGF BAR	0e	•
SENSOR CK	00	•
SENSOR 0	ff	•
SENSOR 1	00	•
SENSOR 2	ff	•
SENSOR 3	01	•
SENSOR 4	ff	•
SENSOR 5	06	•
SENSOR 6	ff	•
SENSOR 7	07	•
AD LEVEL	03	•
E. DISPLAY	00	•
ADJ. TIMS	60	•
AD LEVEL	05	•
AD NOISE	80	•
PHASE MOT	60	•
H. BLK-RV	06	03
H. BLK-GV	01	•
H. BLK-BV	06	03
H. BLK-H	00	•
PON DELAY	0c	•
IR-CODE	00	•
INITIAL 50	9e	•
MGF 50	96	•
9 POINT 50	fe	•
STAT 50	fe	•
DYNA 50	9f	•

DP-1X CHASSIS MAGIC FOCUS "PATTERN SET UP"

NOTE: This instruction should be applied when a new DCU is being replaced.

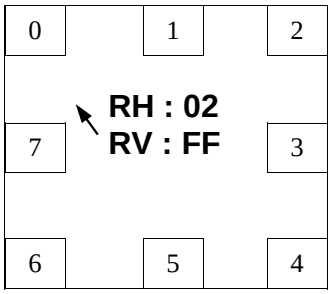
NOTE: This instruction shows how to set up the pattern position for Intellisense. Each model has a specific set up pattern position.

Adjustment Preparation:

- Receive NTSC RF or Video Signal.
- With Power Off, Press and HOLD the SERVICE ONLY button on the Convergence/ Focus PWB, then press the Power On/Off at the same time, until picture appears, then release both. (Picture is displayed without conv. Correction data. Press the Service Only button to bring up Internal Crosshatch.)

Adjustment Procedure:

1. Press the **FREEZE** key on R/C. (One additional line appears near the top and bottom.
2. Press the **HELP** key, the PATTERN mode is displayed as following.



3. Use the 6 Key to rotate Arrow. Arrow rotates clockwise with each press on the 6 Key.
4. Use the following Keys to switch color of patterns.
   - STATUS : GREEN
   - 0 : RED
   - ANT : BLUE
5. Press the ◄ or ► Cursor to change the Pattern Position Data in horizontal Direction. Press the ▲ or ▼ Cursor keys to change the Pattern Position Data in Vertical Direction.
6. Set the Data Values as shown below.
7. Press the **PIP MODE** key 2 times to write the changed data into EEPROM. (First press, ADJ PARAMETER ? ROM WRITE ? Is displayed for alarm. 2nd press writes data into EEPROM. Green dots appear after completion of operation).
8. Press the **MUTE** button 3 times exit Pattern Mode.

16X9 HD MODE

9. CHANGE DISPLAY TO **16X9 HD MODE**.
10. Press the **EXIT** key on R/C 5 times to exit to video mode.
11. Change input to receive 1080i signal.
12. Change format to 16X9 HD. Top and bottom panels should now be black.
13. Exit Menu.
14. Repeat Steps 2 through 8
15. Power set off.

NORMAL MODE:

	0	1	2	3	4	5	6	7
RH	X	02	X	fa	X	02	X	04
RV	X	00	X	00	X	02	X	00
GH	X	00	X	fa	X	00	X	04
GV	X	00	X	00	X	02	X	00
BH	X	00	X	fa	X	00	X	04
BV	X	00	X	00	X	02	X	00

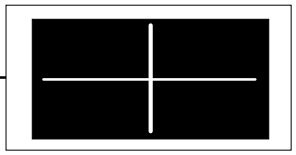
16X9 HD MODE: V. SQUEEZE ACTIVATED Not in 16X9 aspect models.

	0	1	2	3	4	5	6	7
RH	X	02	X	fa	X	02	X	06
RV	X	00	X	00	X	02	X	00
GH	X	00	X	fa	X	00	X	06
GV	X	00	X	00	X	02	X	00
BH	X	00	X	fa	X	00	X	06
BV	X	00	X	00	X	02	X	00

Complete Digital Convergence Alignment

Center the Overlay Jig geometrically on the screen

Receive any NTSC signal (Crosshair if possible)
Set SCREEN FORMAT TO NORMAL mode



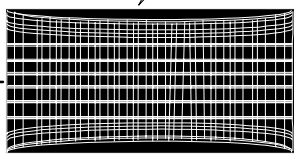
Clear RAM data (DCU RAM)

Service only switch is on the Convergence PWB.

Press and hold the SERVICE ONLY SWITCH, then press the POWER Button and release, picture appears. Release the SERVICE ONLY SWITCH again. DCU Grid appars.

Internal Digital "Cross Hatch Signal" is projected

No DCU Correction added results in severe pincushion distortion



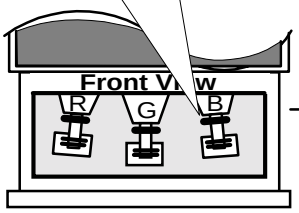
Center Magnet Adjustments

Select the External Center Cross Signal by pressing the EXIT button 5 times, then the Remote SOURCE button .

Use the Centering Magnets closest to the Yoke

Align the G,R,B individual center crosses to their respective marks on the Overlay using the Yoke Center Magnets

External Selected Center Cross with no DCU center data

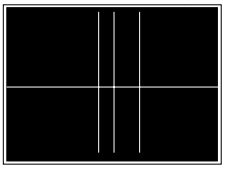


Red = Left

Blue = Right

Green = Center

R G B



A

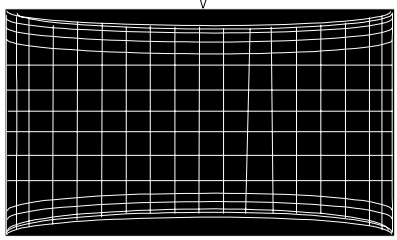
See Offset Chart for exact distances Page 06-09

A

Static Centering Alignments (*Moves Entire Raster*)
Press EXIT 5 times to return to DCU Grid.

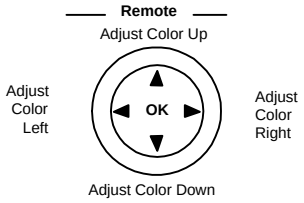
Press the Remote **F**REEZE button (extra lines will appear at top and bottom)

Internal Cross Hatch Signal selected



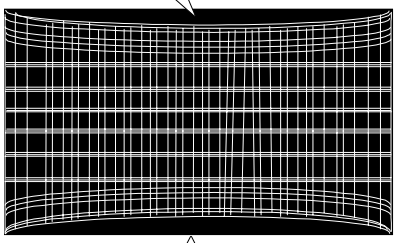
Extra Lines appear indicating Raster Mode

Press the Remote Cursor buttons to match the selected Crosshatch (red and blue) to the green.



TO SELECT COLORS
Status : Selects GREEN
0 : Selects RED
ANT : Selects BLUE

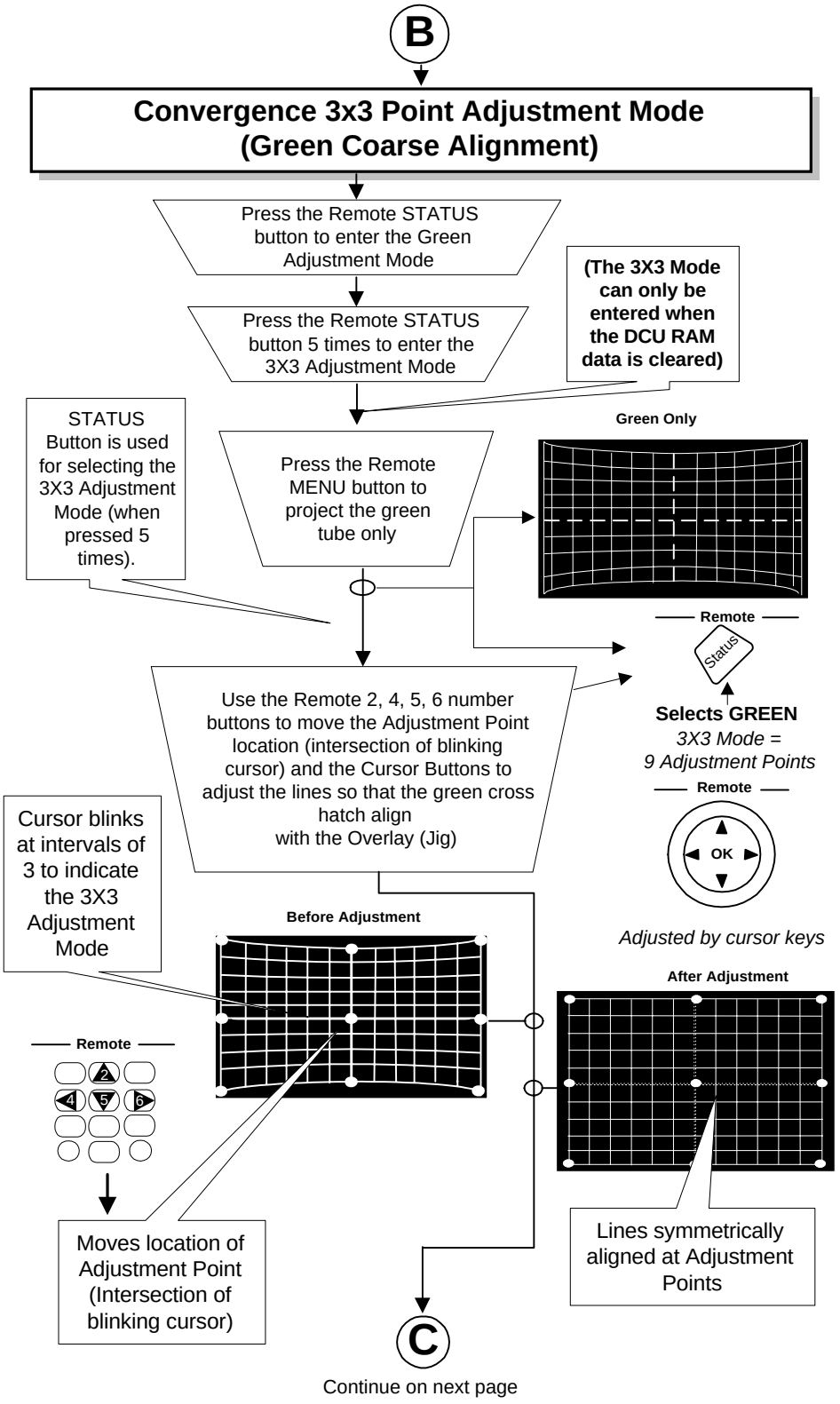
Align Red and Blue static centers



Green should already be centered

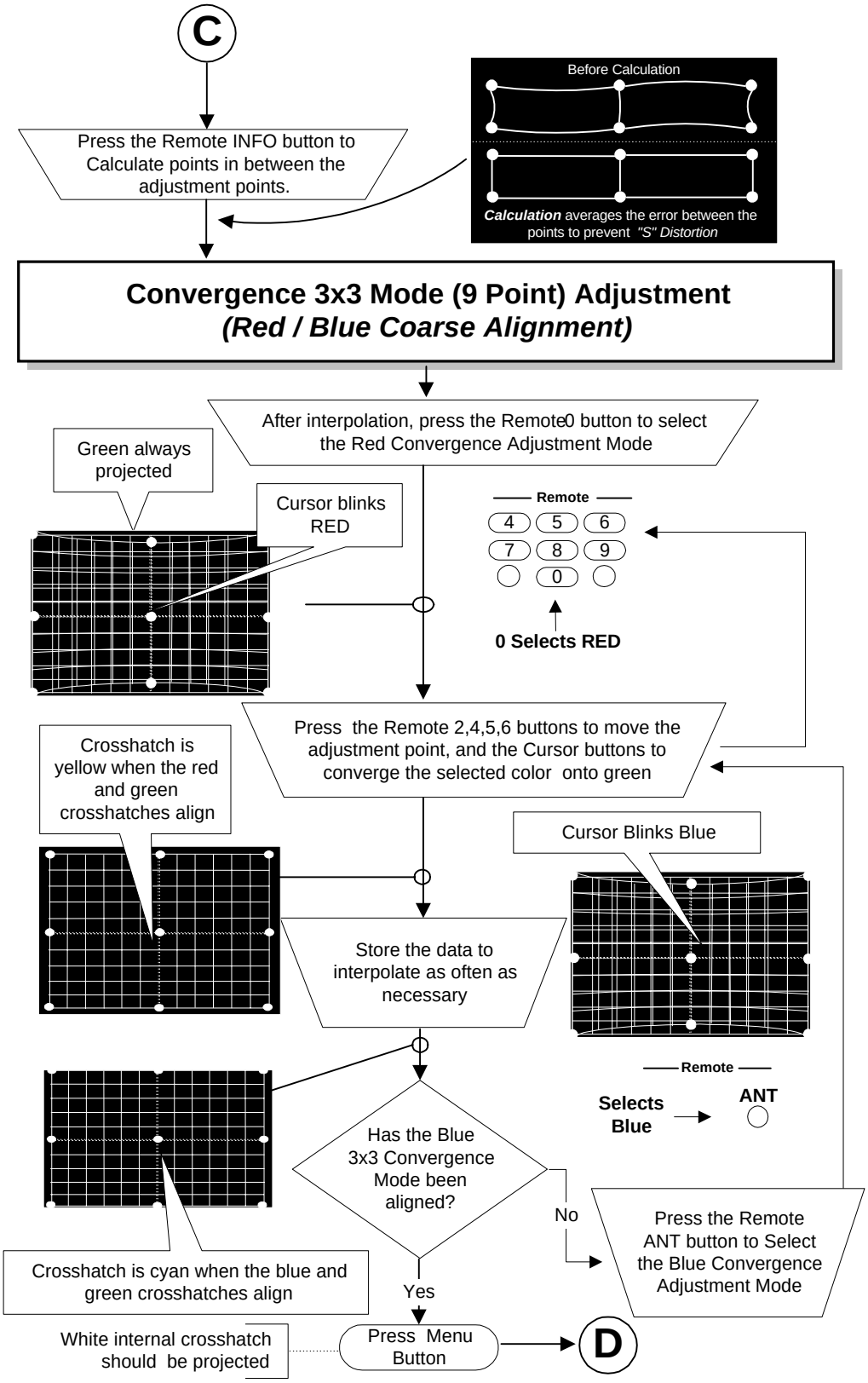
Press the Remote FREEZE button to exit Raster Position. (extra lines will disappear)

B



Continue on next page

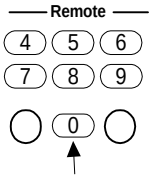
DP-1X DIGITAL CONVERGENCE ALIGNMENT PROCEDURES



D

Convergence 7x5 Point Adjustment (Green Only Alignment)

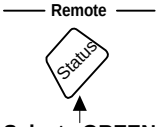
Press the Remote 0 button five times to enter the 7X5 mode



Selects the 7X5 mode

If selected Color isn't already Red, it will take 6 presses of 0 button

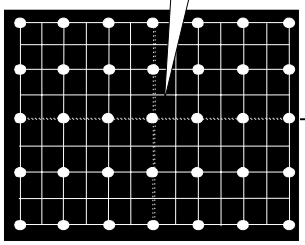
Press the Remote STATUS button to project the green only

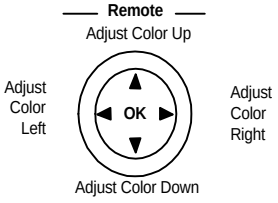


Selects GREEN

Use the Remote Cursor and 2,4,5,6 buttons to perform convergence point adjustment at every other intersection of the crosshatch

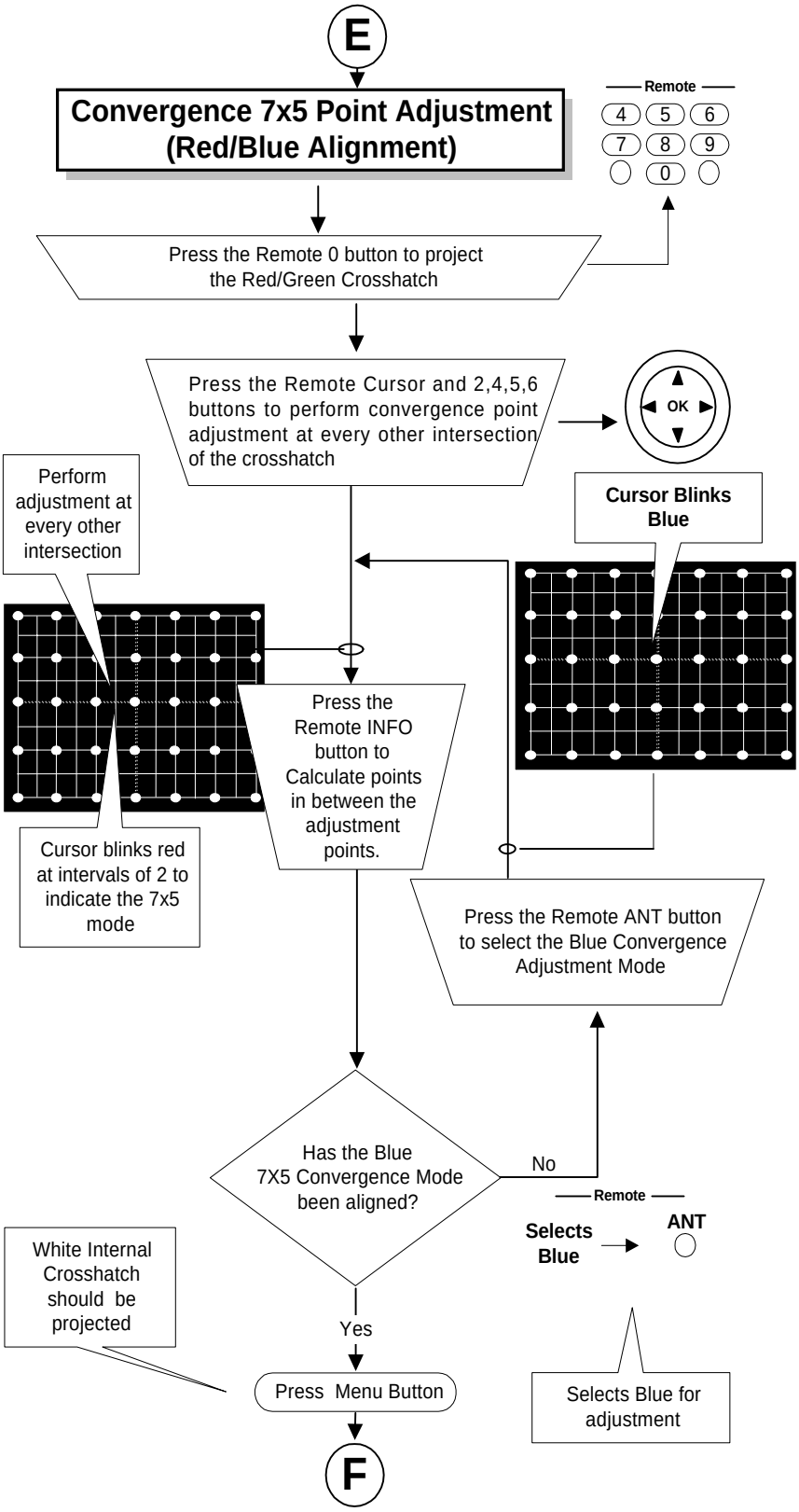
35 convergence adjustment points in 7X5 mode





Press the Remote INFO button to Calculate points in between the adjustment points.

E


E
Convergence 7x5 Point Adjustment (Red/Blue Alignment)
Remote
4 5 6
7 8 9
0
Press the Remote 0 button to project the Red/Green Crosshatch
Press the Remote Cursor and 2,4,5,6 buttons to perform convergence point adjustment at every other intersection of the crosshatch
OK
Perform adjustment at every other intersection
Cursor Blinks Blue
Press the Remote INFO button to Calculate points in between the adjustment points.
Cursor blinks red at intervals of 2 to indicate the 7x5 mode
Press the Remote ANT button to select the Blue Convergence Adjustment Mode
Has the Blue 7X5 Convergence Mode been aligned?
No
Remote
Selects Blue
ANT
White Internal Crosshatch should be projected
Yes
Press Menu Button
Selects Blue for adjustment
F

F

Convergence 13X9 Point Adjustment (Green Only Alignment)

Press the Remote ANT button five times to enter the 13X9 mode

Remote

ANT

Pressed 5 times, Selects the 13X9 mode

If selected Color isn't already Blue, it will take 6 presses of Source button

Remote

Status

Selects GREEN

Press the Remote A/CH button to project the green only

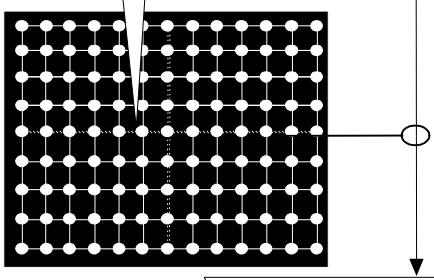
Remote

OK

2 4 5 6

Use the Remote Cursor and 2,4,5,6 buttons to perform convergence point adjustment at every other intersection of the crosshatch

117 convergence adjustment points in 13X9 mode



Remote

Adjust Color Up

Adjust Color Left

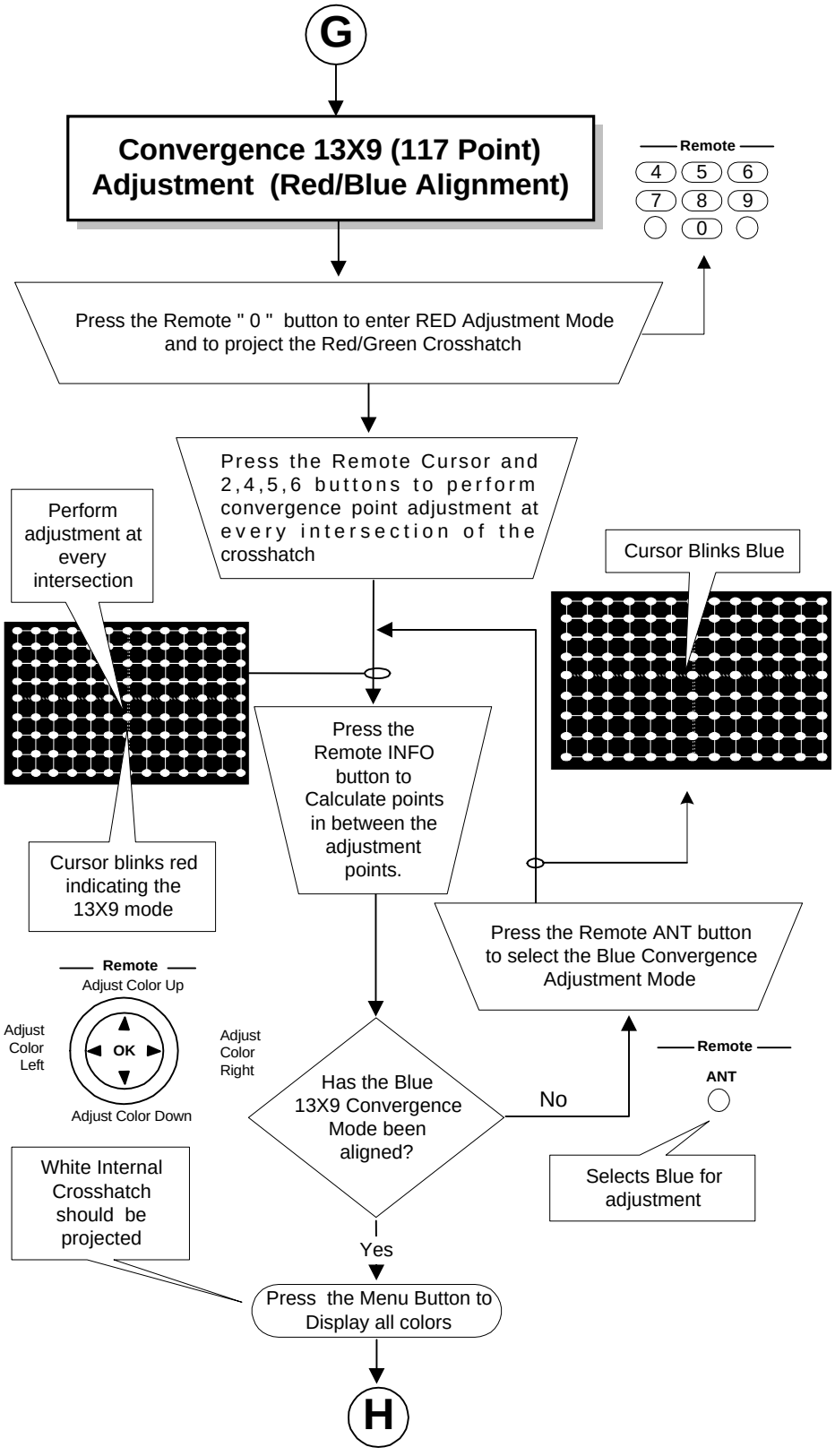
OK

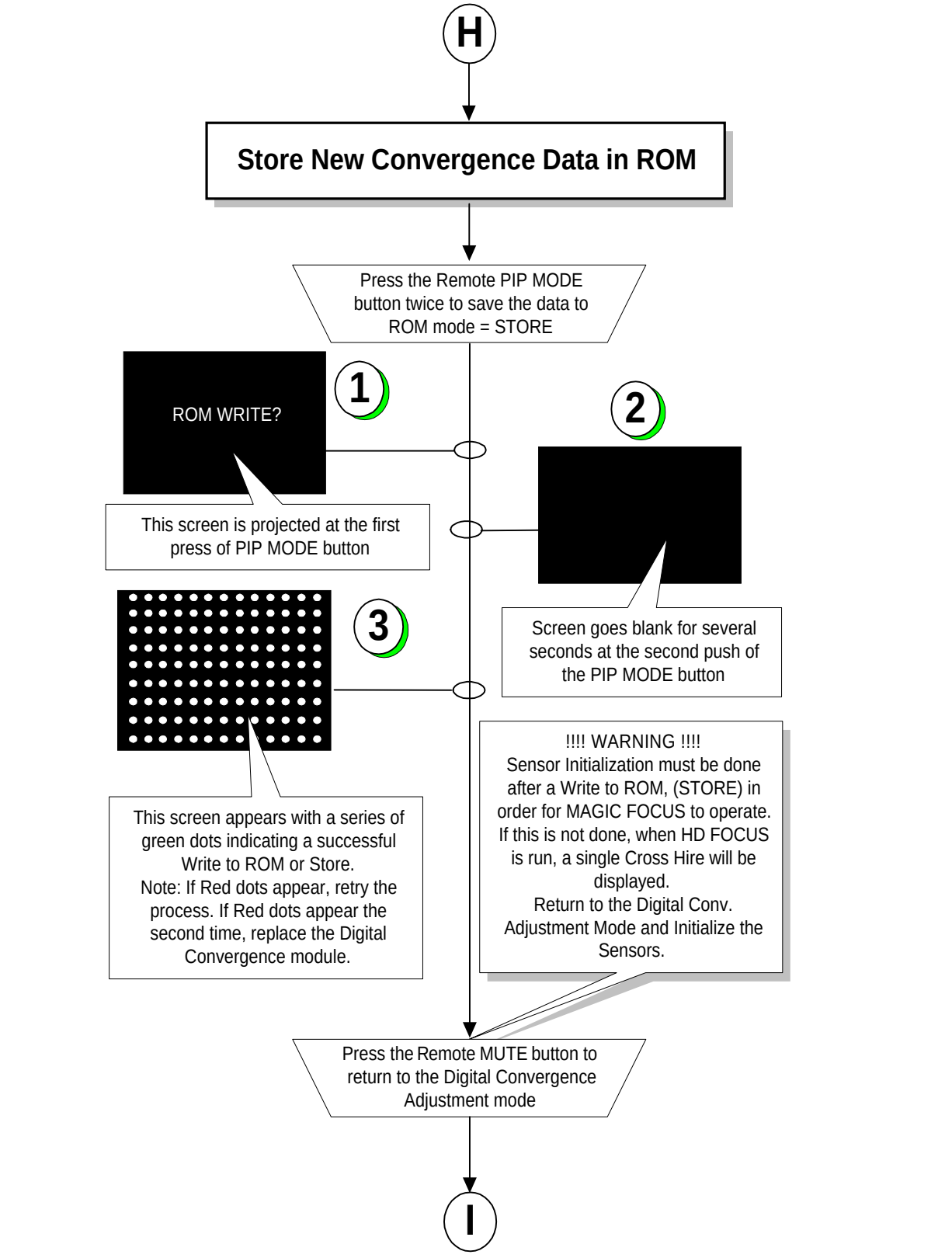
Adjust Color Right

Adjust Color Down

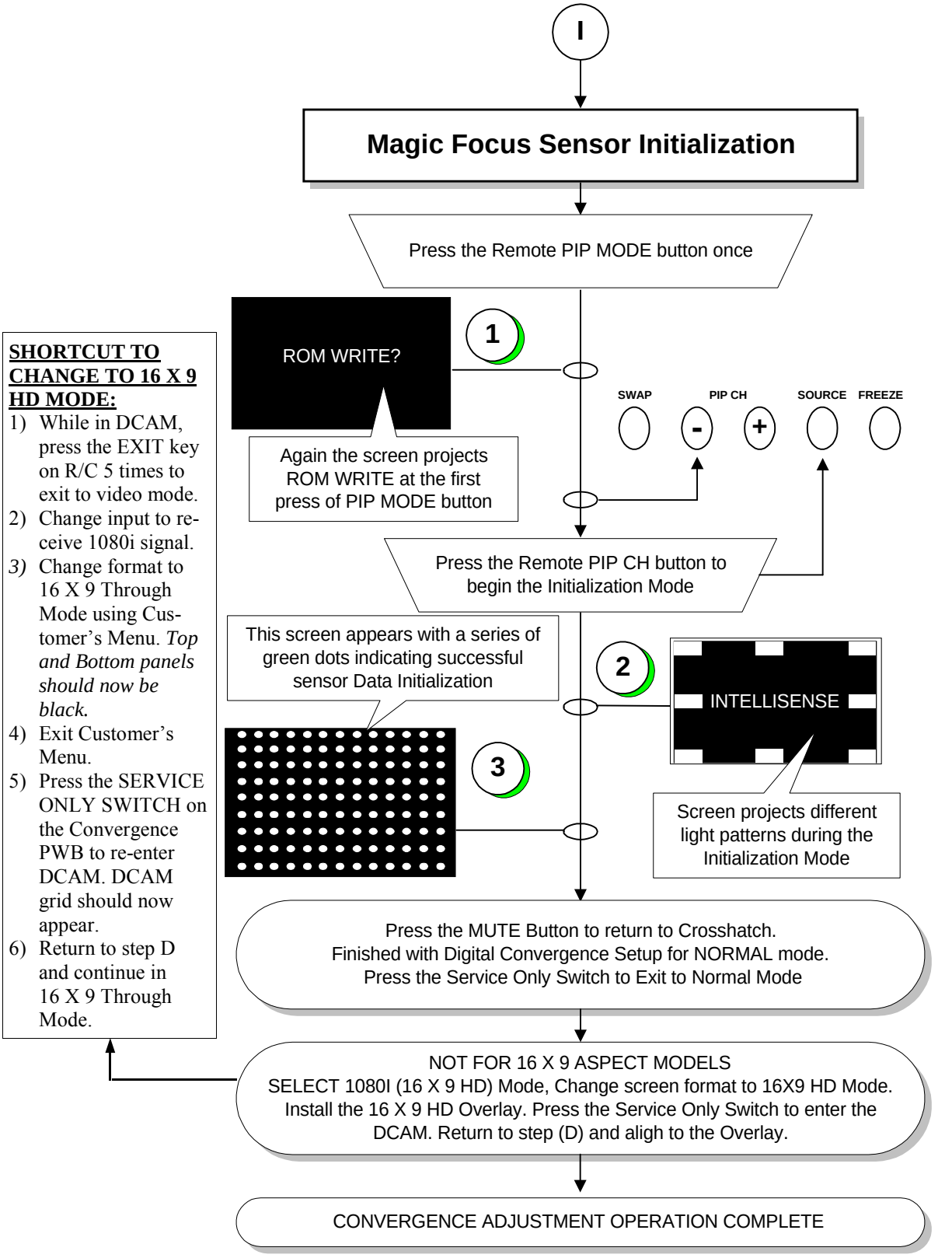
Press the Remote INFO button to Calculate points in between the adjustment points.

G


G
Convergence 13X9 (117 Point) Adjustment (Red/Blue Alignment)
Remote
4 5 6
7 8 9
0
Press the Remote " 0 " button to enter RED Adjustment Mode and to project the Red/Green Crosshatch
Press the Remote Cursor and 2,4,5,6 buttons to perform convergence point adjustment at every intersection of the crosshatch
Perform adjustment at every intersection
Cursor Blinks Blue
Cursor blinks red indicating the 13X9 mode
Press the Remote INFO button to Calculate points in between the adjustment points.
Press the Remote ANT button to select the Blue Convergence Adjustment Mode
Remote
Adjust Color Up
Adjust Color Left
OK
Adjust Color Right
Adjust Color Down
Has the Blue 13X9 Convergence Mode been aligned?
No
Remote
ANT
Selects Blue for adjustment
White Internal Crosshatch should be projected
Yes
Press the Menu Button to Display all colors
H


H
Store New Convergence Data in ROM
Press the Remote PIP MODE button twice to save the data to ROM mode = STORE
ROM WRITE?
1
This screen is projected at the first press of PIP MODE button
2
Screen goes blank for several seconds at the second push of the PIP MODE button
3
This screen appears with a series of green dots indicating a successful Write to ROM or Store.
Note: If Red dots appear, retry the process. If Red dots appear the second time, replace the Digital Convergence module.
!!!! WARNING !!!!
Sensor Initialization must be done after a Write to ROM, (STORE) in order for MAGIC FOCUS to operate. If this is not done, when HD FOCUS is run, a single Cross Hire will be displayed.
Return to the Digital Conv. Adjustment Mode and Initialize the Sensors.
Press the Remote MUTE button to return to the Digital Convergence Adjustment mode
I

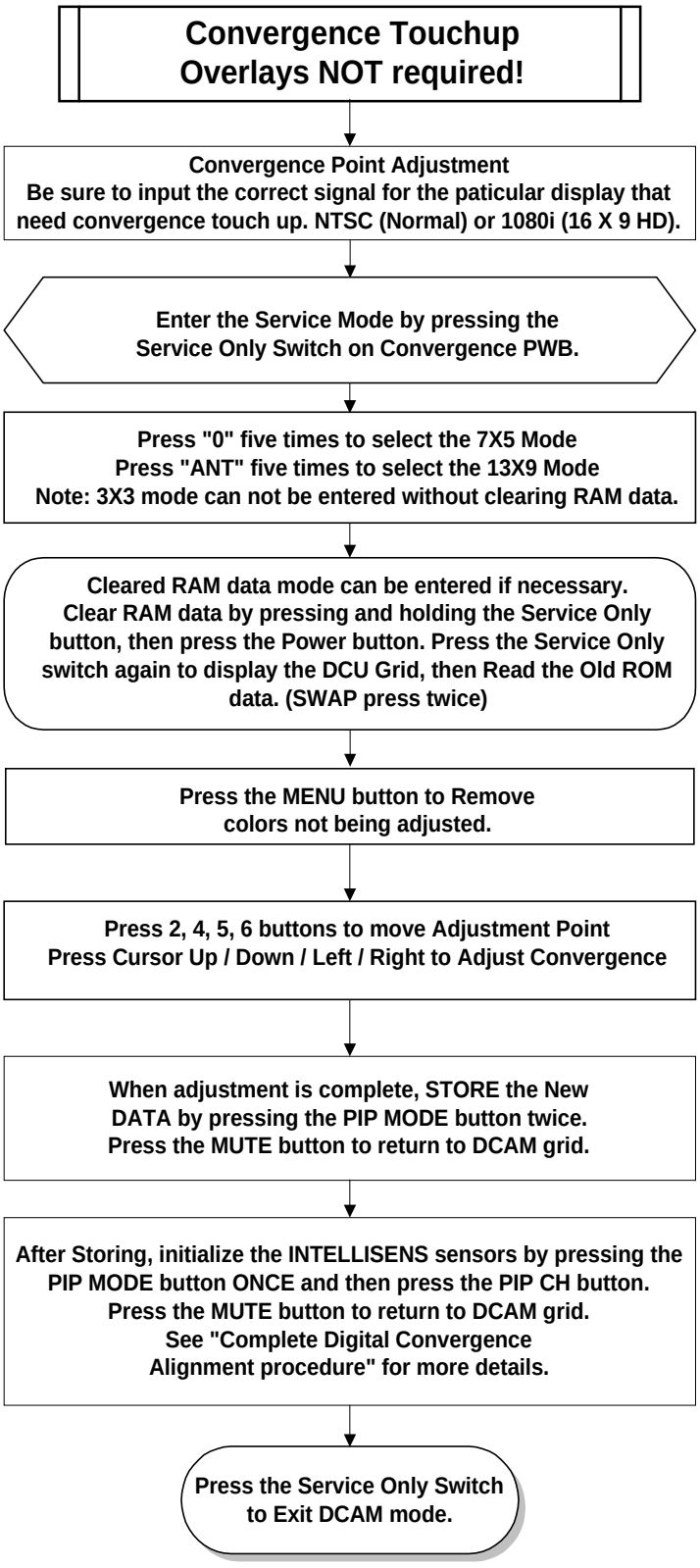
DP-1X DIGITAL CONVERGENCE ALIGNMENT PROCEDURES



SHORTCUT TO CHANGE TO 16 X 9 HD MODE:

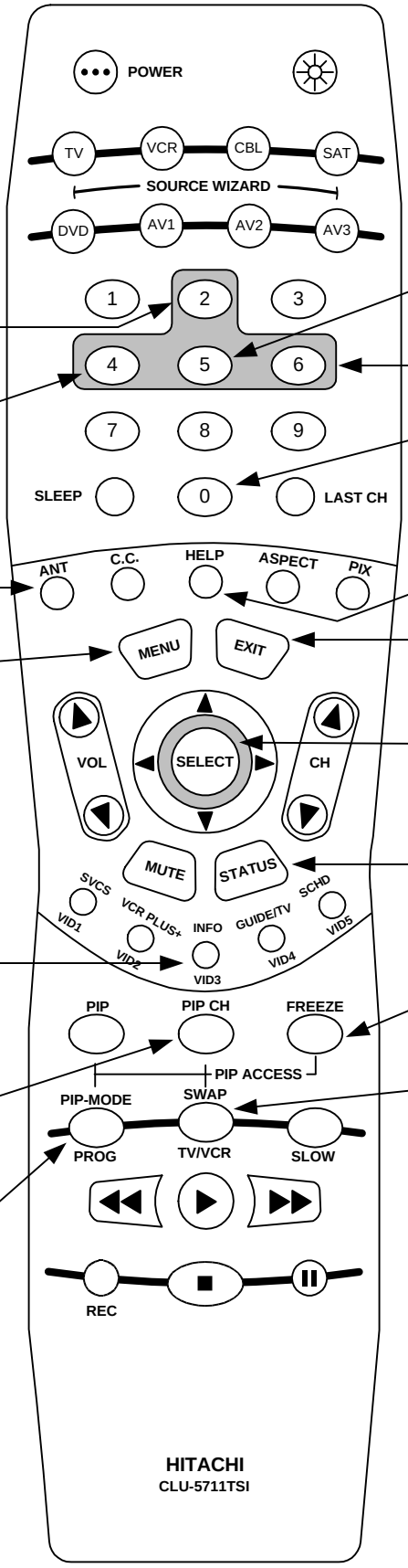
1) While in DCAM, press the EXIT key on R/C 5 times to exit to video mode.
2) Change input to receive 1080i signal.
3) Change format to 16 X 9 Through Mode using Customer's Menu. *Top and Bottom panels should now be black.*
4) Exit Customer's Menu.
5) Press the SERVICE ONLY SWITCH on the Convergence PWB to re-enter DCAM. DCAM grid should now appear.
6) Return to step D and continue in 16 X 9 Through Mode.

DP-1X DIGITAL CONVERGENCE ALIGNMENT PROCEDURES



REMOTE CONTROL CLU-5711 TSI (P/N HL01641)

USED IN MODELS:
61SWX10B, 61SWX12B
53SWX10B, 53SWX12B
43UWX10B, 53UWX10B
61UDX10B, 53UDX10B
43FDX11B, 43FDX10B



CURSOR UP

CURSOR DOWN

CURSOR LEFT

CURSOR RIGHT

RED (7 X 5)

RASTER PHASE

BLUE (13X9)

CROSSHATCH VIDEO

REMOVE COLOR

CORRECTION BUTTONS

GREEN (3 X 3)

CALCULATE

CENTERING

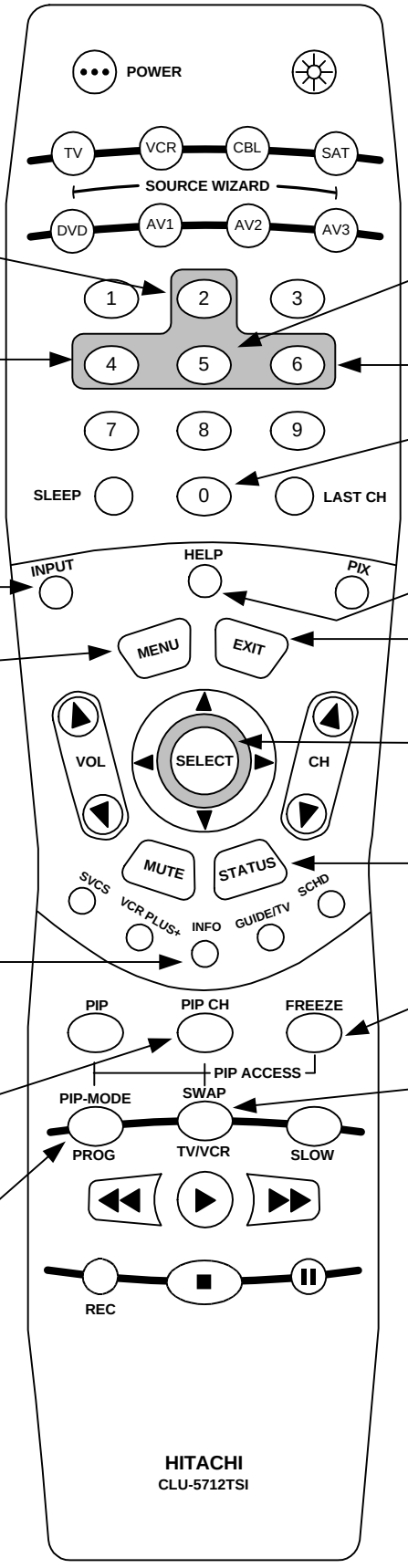
READ OLD ROM DATA PRESS (2X)

INITIALIZE PIP MODE + PIP CH

WRITE TO ROM PRESS (2X)

REMOTE CONTROL CLU-5712 TSI (P/N HL01642)

USED IN MODELS:
53SBX10B



CURSOR UP

CURSOR DOWN

CURSOR LEFT

CURSOR RIGHT

RED (7 X 5)

RASTER PHASE

BLUE (13X9)

CROSSHATCH VIDEO

REMOVE COLOR

CORRECTION BUTTONS

GREEN (3 X 3)

CALCULATE

CENTERING

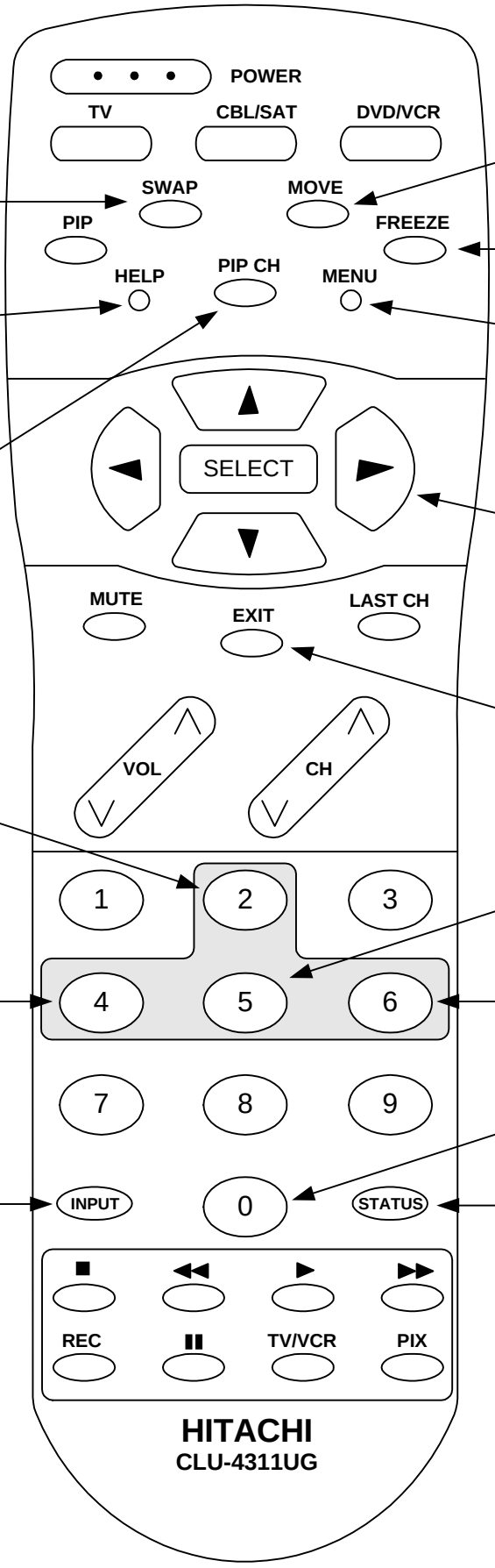
READ OLD ROM DATA PRESS (2X)

INITIALIZE PIP MODE + PIP CH

WRITE TO ROM PRESS (2X)

REMOTE CONTROL CLU-4311UG (P/N HL01651)

Used with
60DX10B, 50DX10B
43GX10B, 50GX30B
HP-1X Chassis



WRITE TO ROM PRESS (2X)

READ OLD ROM DATA PRESS (2X)

CENTERING

RASTER PHASE

REMOVE COLOR

INITIALIZE PIP MODE + PIP CH

CORRECTION BUTTONS

CROSSHATCH VIDEO

CURSOR UP

CURSOR DOWN

CURSOR LEFT

CURSOR RIGHT

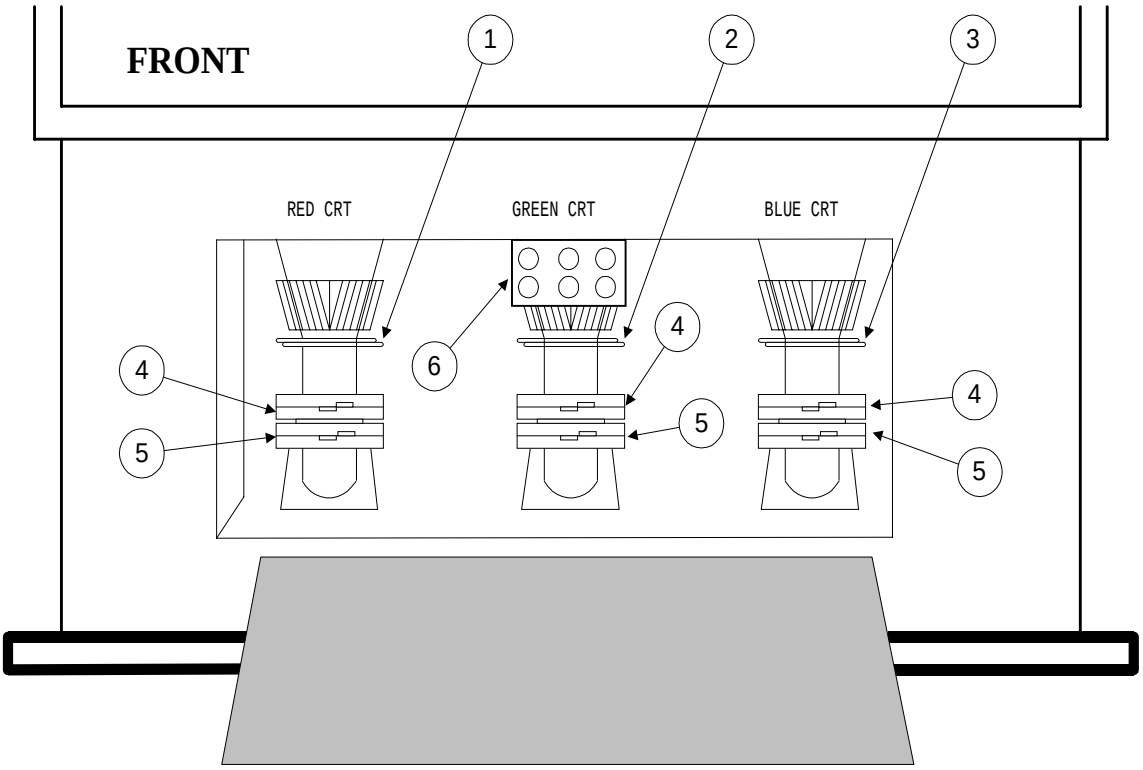
RED (7 X 5)

BLUE (13X9)

GREEN (3 X 3)

DP-1X MAGNET AND YOKE LOCATION

DP-1X MAGNETS
Adjustment Points



(1) Centering magnet RED
(2) Centering magnet GREEN
(3) Centering magnet BLUE
(4) Beam Form Magnets
(5) Beam Alignment magnets
(6) Focus Block Assembly
RED, GREEN & BLUE FOCUS CONTRO
Also: SCREEN CONTROLS for
RED, GREEN & BLUE

DP-1X SUB PICTURE AMPLITUDE ADJUSTMENT

Preparation for Adjustment

- Sub Brightness adjustment should be finished.
- Start adjustment 20 minutes after the power is turned on.
- Condition should be set as follows:
- Contrast = MAX
- Brightness = Center
- Press "**PIP**" button on Remote Control. PIP appears on screen
- Select Single mode. Receive NTSC white signal, for the Main Picture and the Sub-Picture. (Do not use Component Signals).
- Connect Probe on the P852 (CRT PWB — Green) to check sub-picture amplitude.

Adjustment Procedure

1) Go to I^2C adjustment Mode.
2) Press "**MENU**" on remote to scroll through adjustment pages, until **TA1270-M** appears at the top of the page.
3) Press "**PIP CH**" on remote control, TA1270-M changes to **TA1270-S**.
4) Observe **P852** on the CRT PWB and change the TA1270-S "**SUB CNT**" I^2C data so that the amplitude of the Sub Picture is the same level as that of the main picture. Shown below.
5) Exit Service Menu.

Enter I^2C adjustment Menu. Press Menu and scroll through pages until TA1270-M appears.

ADJUST MODE

TA1270-M

TINT (TV)	3C
TOFFO (TV)	00
TOFQ	00
SUB CNT	0F
SUB CLR	

Sub Picture

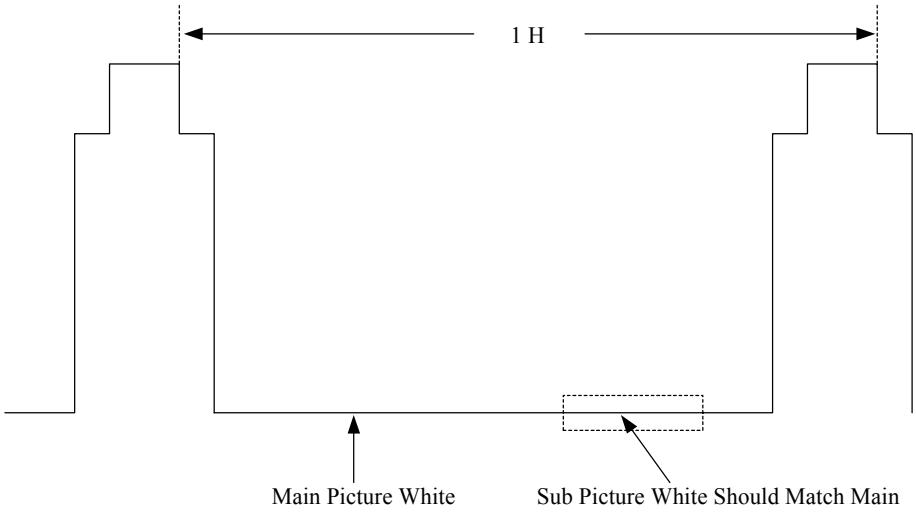
Press PIP CH

ADJUST MODE

TA1270-S

TINT (TV)	3C
TOFFO (TV)	00
TOFQ	00
SUB CNT	**0F**
SUB CLR	

Sub Picture



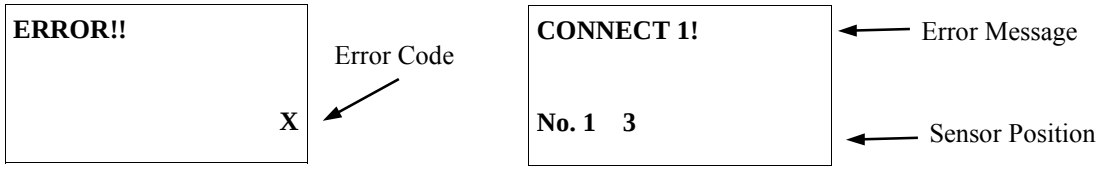
Adjust SUB CNT until peak white of PinP matches peak white of the main picture.

MAGIC FOCUS ERROR CODES FOR THE DP-1X CHASSIS

CONVERGENCE ERRORS:

If an error message or code appears while performing MAGIC FOCUS or initialize (PIP MODE and PIP CH in Digital Convergence Adjustment Mode, follow this confirmation and repair method.

1) Turn on Power and receive any signal.
2) Press the Service Only Switch on the Convergence Output PWB.
3) Press **SWAP** and then the **PIP CH** buttons on the remote control.
4) Error code will be displayed in bottom right corner of screen.
5) If there is no error, and **INITIAL OK** will appear on screen.



6) Follow repair table for errors.

ERROR!!.

Error Code	Error Display Code	Countermeasure	Application	
			Initialize	Magic Focus
1	VF Error	Replace DCU	X	X
2 *2	Connect 1	1. Darken Outside Light 2. Placing of Sensor 3. Is pattern hitting sensor? 4. Check connection and solder bridge of sensor 5. Replace Sensor. 6. Replace Sensor PWB. 7. Sensor Connector check. 8. Replace DCU. 9. Adjustment check (H/V size, centering).	X	—
3*2	A/D Level	Same as Error Code 2	X	X
4	Over Flow	1. Check the placement 2. Adjustment check (H/V size, centering). 3. Conv. Amp. Gain check*1 (check resistor values only)	X	X
5	Convergence	Same as Error Code 4	X	X
7	Operation	Same as Error Code 4	—	X
9	Connect 2	Same as Error Code 2	X	X
10	Noise	Input strong field. Strong signal. Check the wiring of connector between sensor and DCU	X	X
11	Sync	Input strong field. Strong signal. Check the wiring of connector between sensor and DCU	X	X

*1 = RK 42, 46, 50, 54, 58, 62 check these resistors. *2 = Sensor Position

AUDIO INFORMATION

DP-1X CHASSIS

SECTION 7

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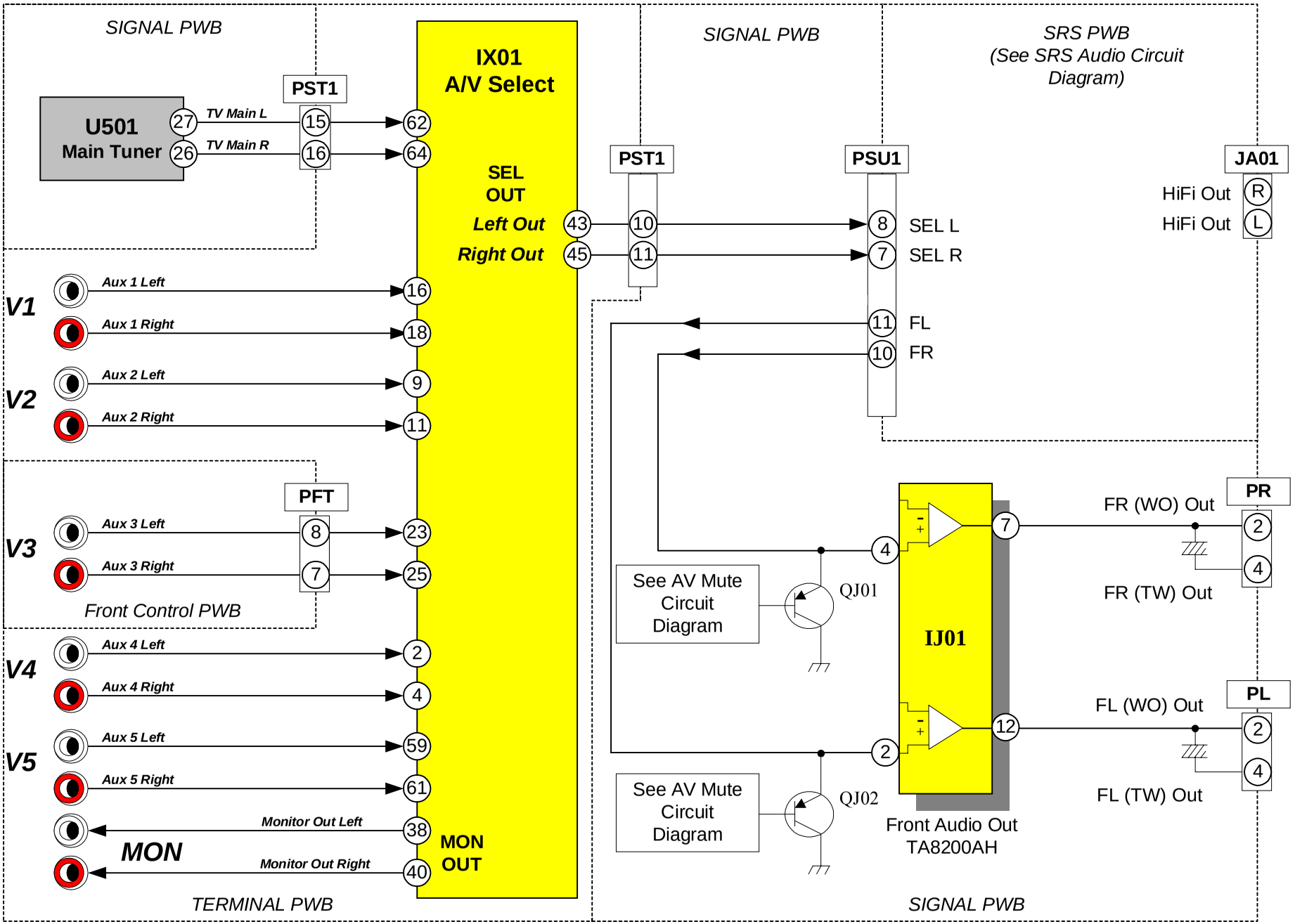
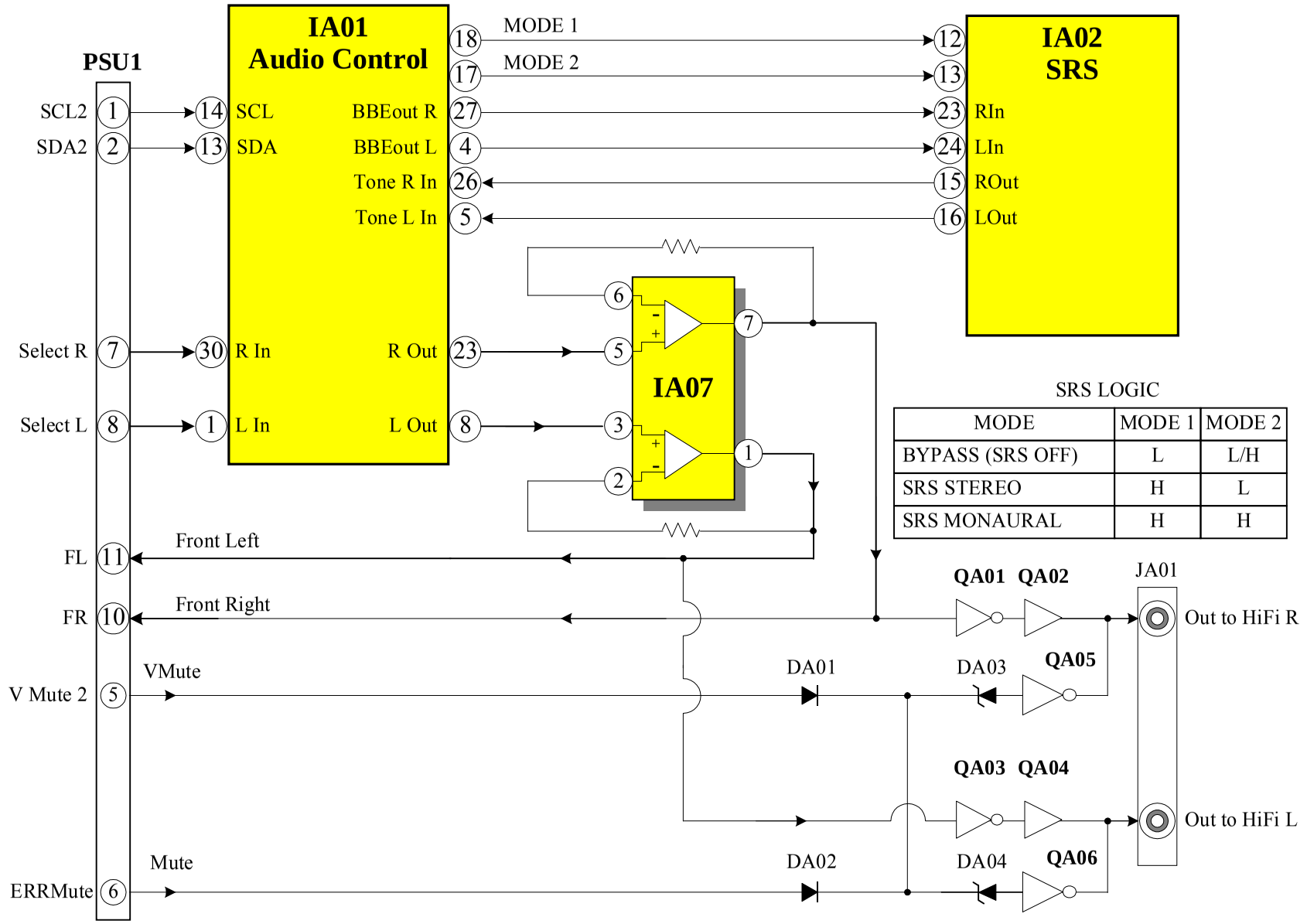
DP-1X Chassis Audio (Main-Terminal) Signal Path



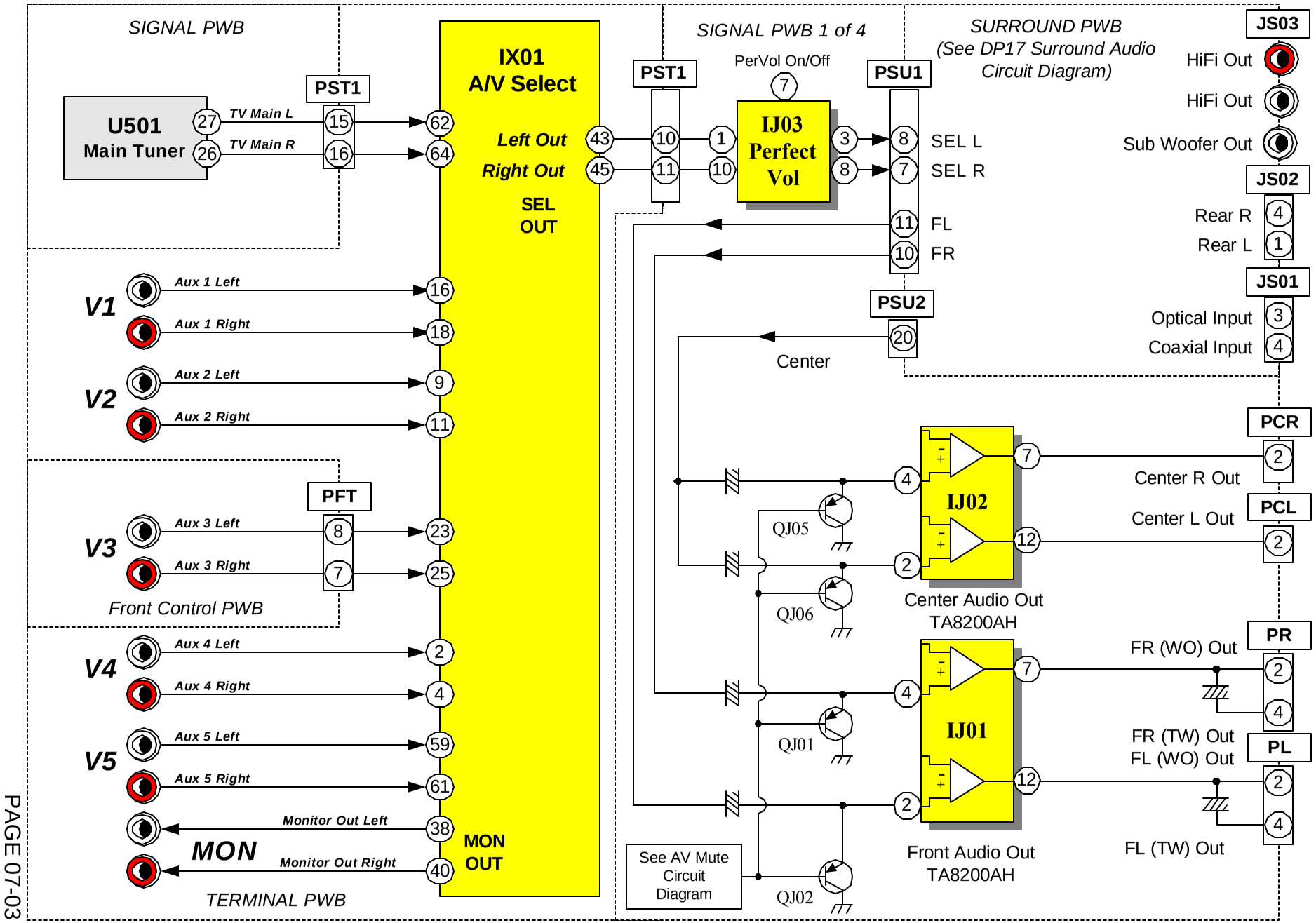
DP-14G, 15, 15F, PP15, ZP14 Series Chassis TruSurround / SRS AUDIO Circuit
(This Circuit is not for the DP-17) *(Also, see Audio Main and Terminal PWB Circuit)*



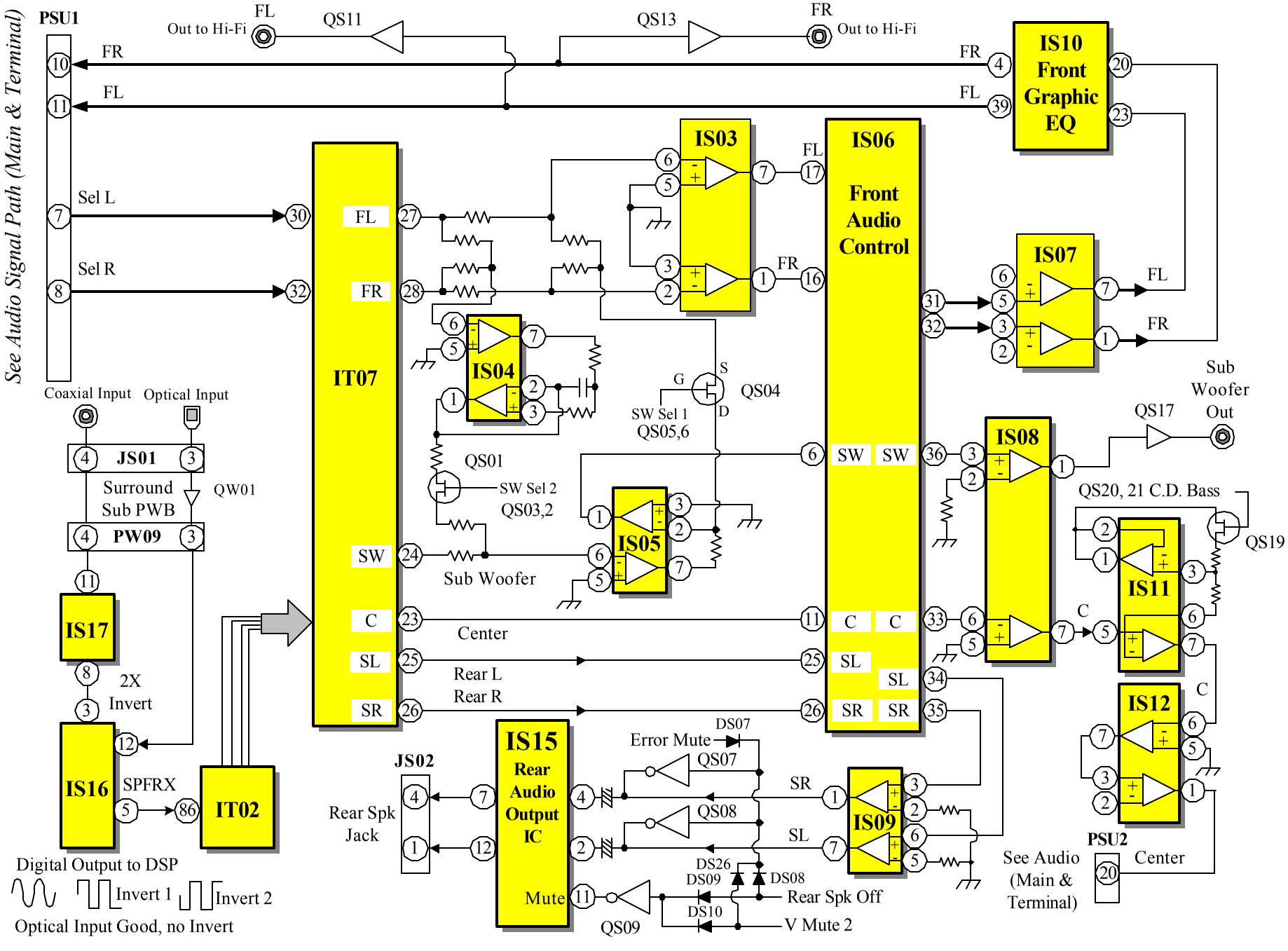
SRS LOGIC

MODE	MODE 1	MODE 2
BYPASS (SRS OFF)	L	L/H
SRS STEREO	H	L
SRS MONAURAL	H	H

DP-17 Chassis Audio (Main-Terminal) Signal Path



DP-17 CHASSIS SURROUND AUDIO SIGNAL PATH



MISCELLANEOUS INFORMATION

DP-1X CHASSIS

SECTION 8

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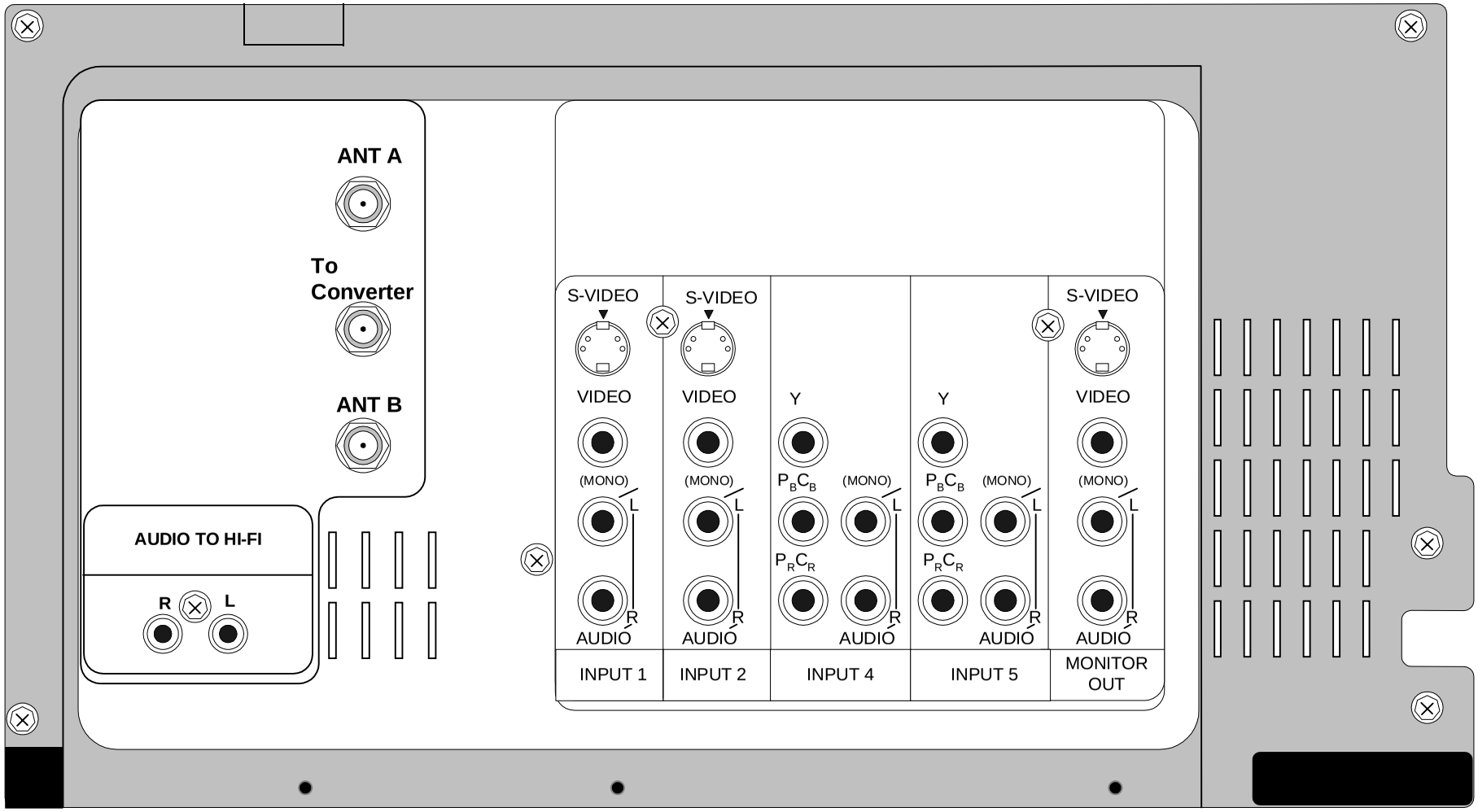
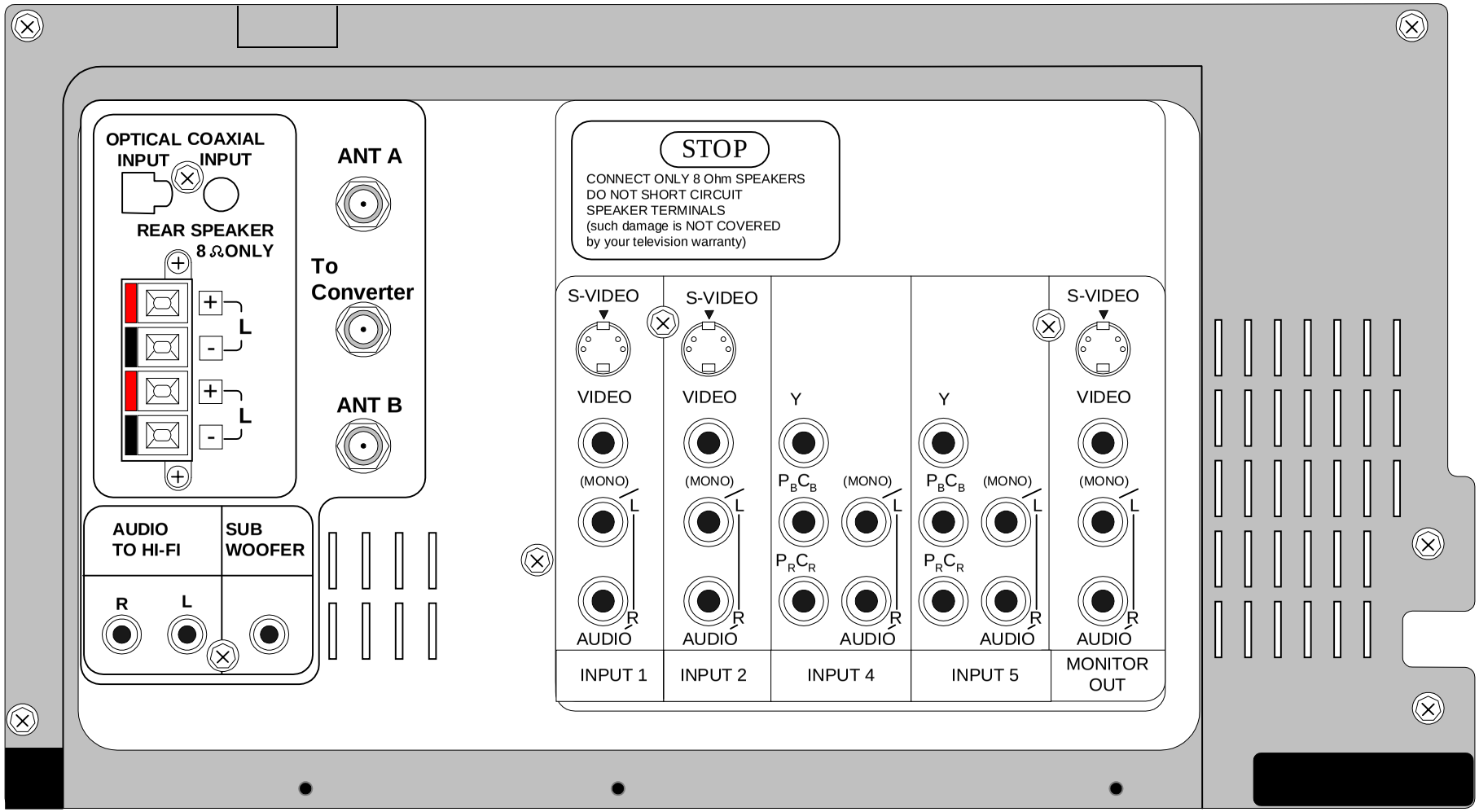
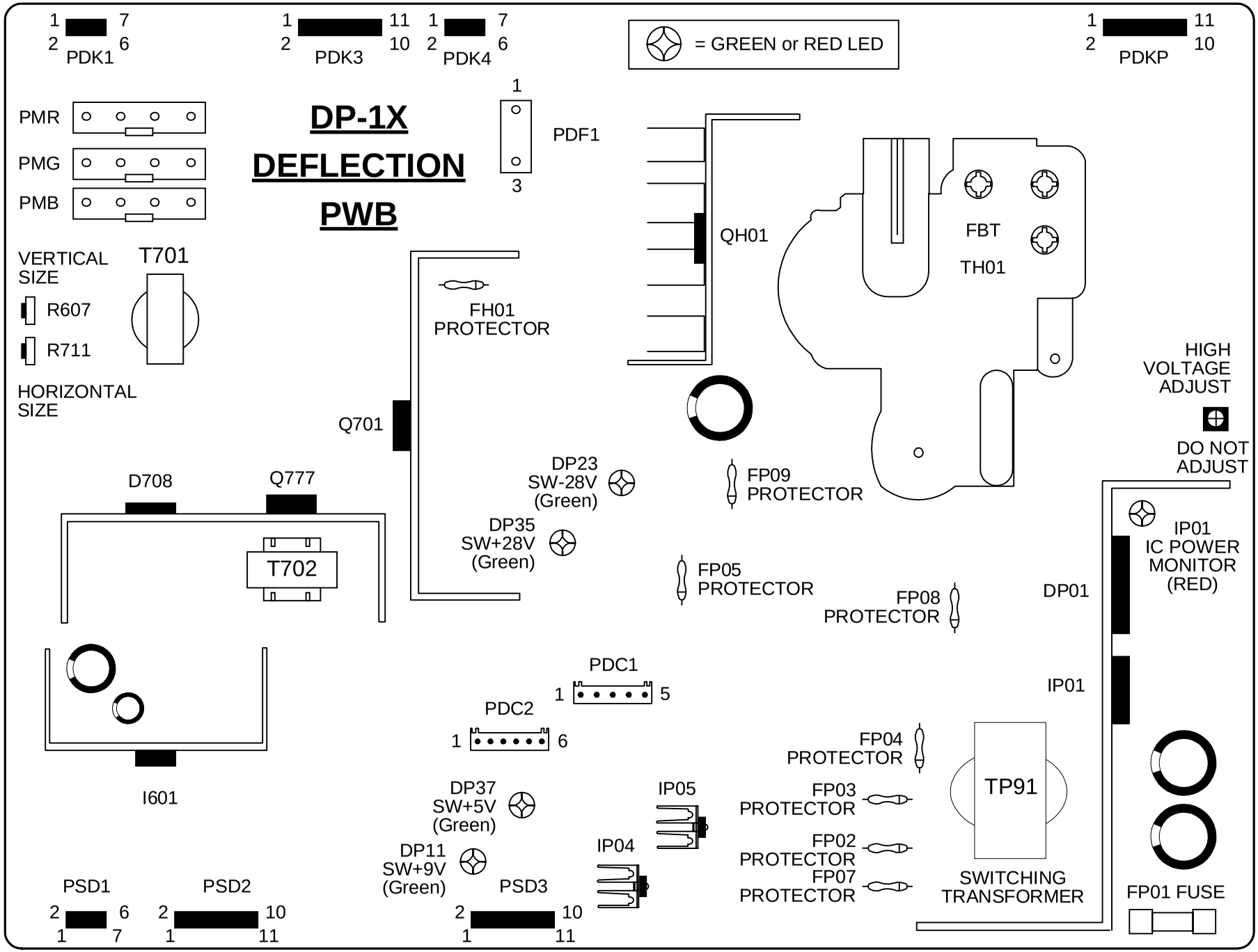
REAR PANEL for the (DP-1X except DP-17) MODELS

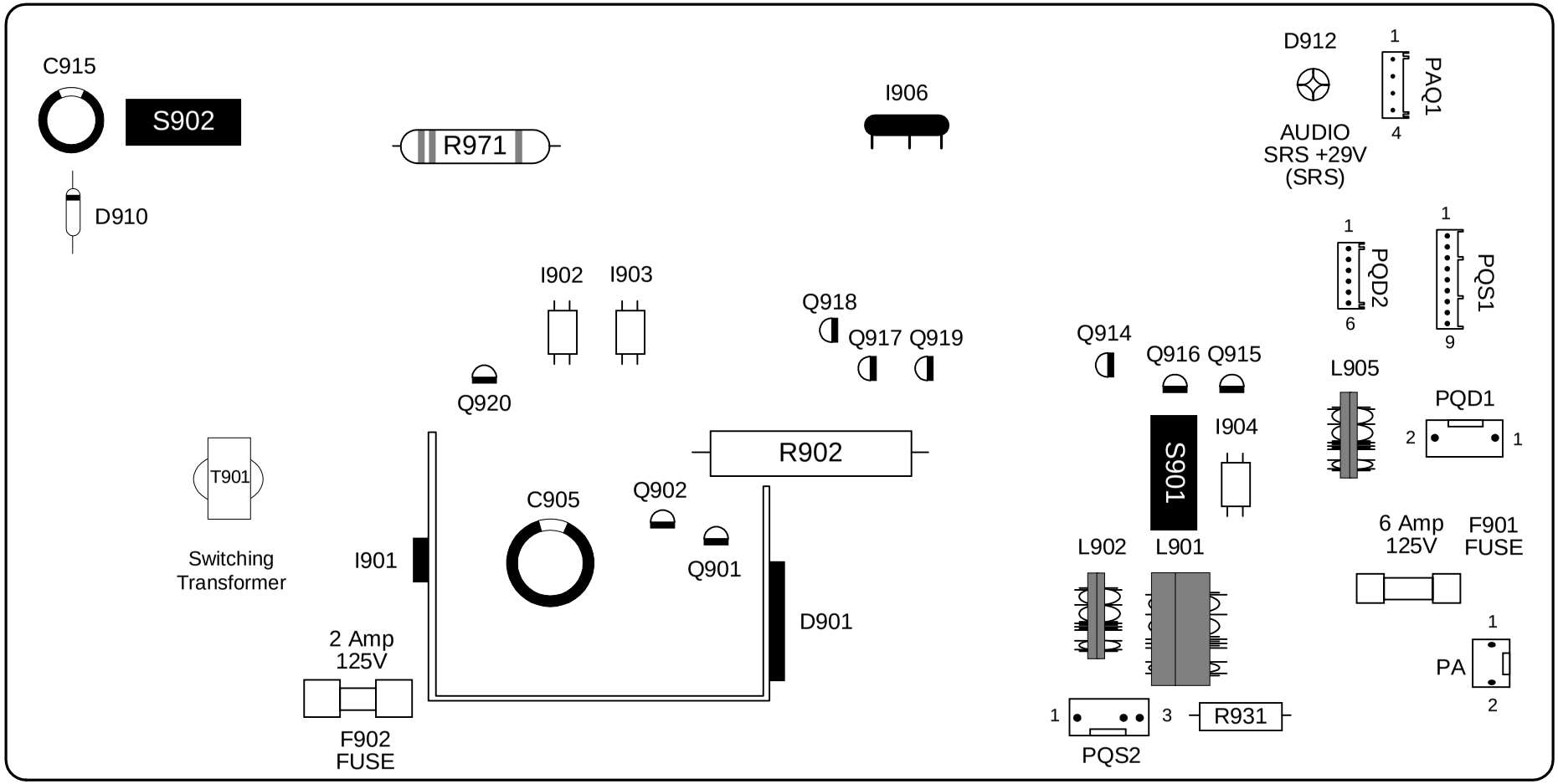


REAR PANEL for the (DP-17) MODELS



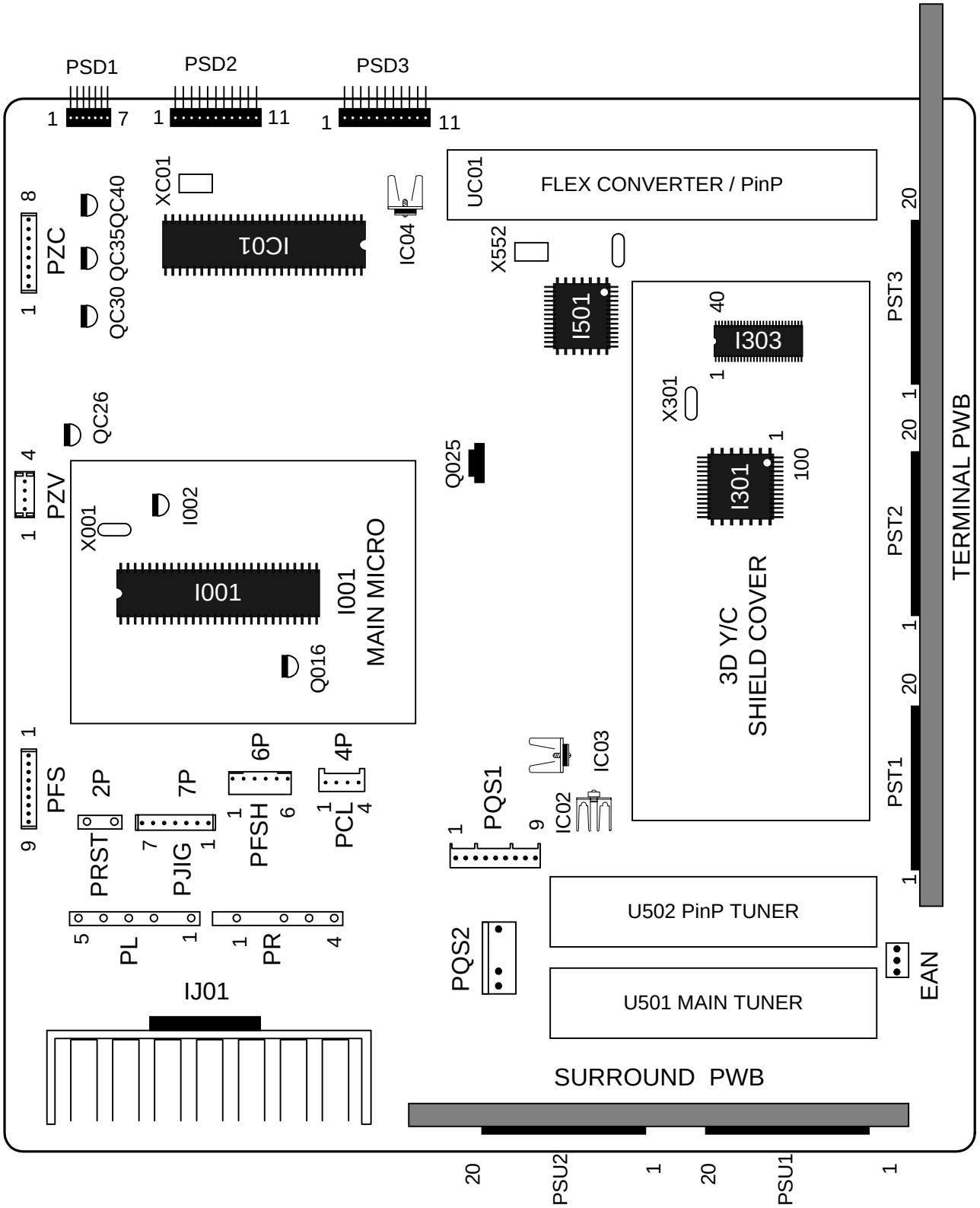

DP-1X
DEFLECTION
PWB
PDK1
PDK3
PDK4
PDKP
= GREEN or RED LED
PMR
PMG
PMB
PDF1
QH01
FBT
TH01
VERTICAL SIZE
T701
R607
R711
HORIZONTAL SIZE
FH01 PROTECTOR
Q701
HIGH VOLTAGE ADJUST
DO NOT ADJUST
DP23 SW-28V (Green)
FP09 PROTECTOR
D708
Q777
T702
DP35 SW+28V (Green)
FP05 PROTECTOR
FP08 PROTECTOR
DP01
IP01 IC POWER MONITOR (RED)
IP01
PDC1
PDC2
I601
FP04 PROTECTOR
FP03 PROTECTOR
FP02 PROTECTOR
FP07 PROTECTOR
TP91
SWITCHING TRANSFORMER
FP01 FUSE
DP37 SW+5V (Green)
IP05
IP04
DP11 SW+9V (Green)
PSD1
PSD2
PSD3

DP-1X SUB POWER PWB

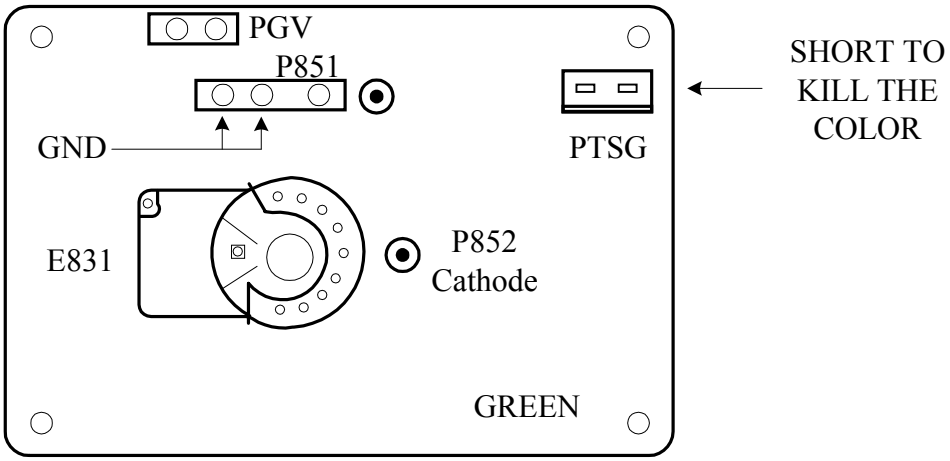


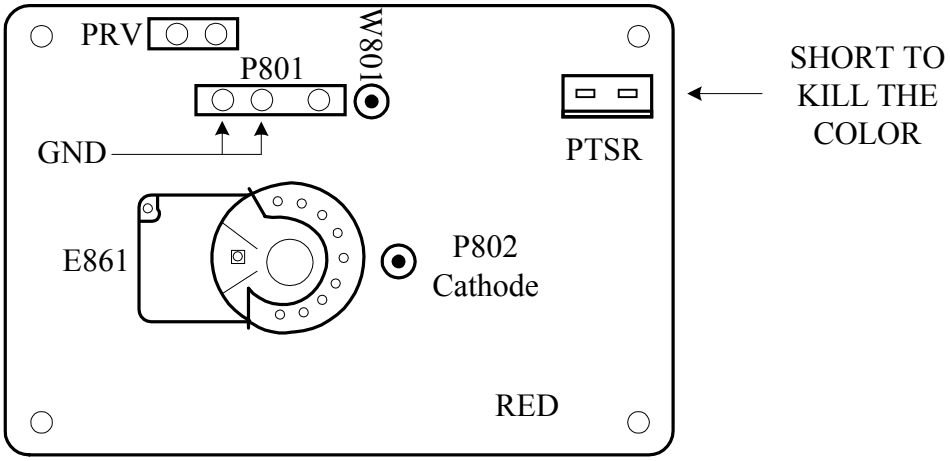
= GREEN or RED LED

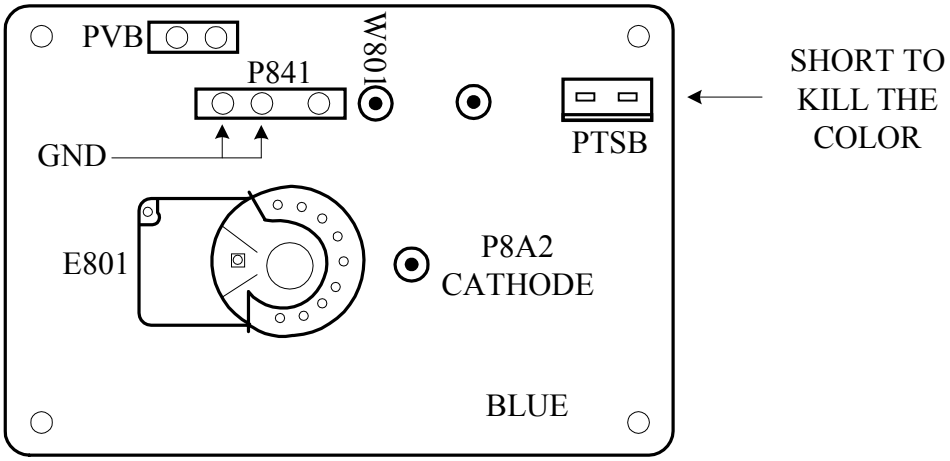
DP-1X SIGNAL PWB DOUBLE SIDED



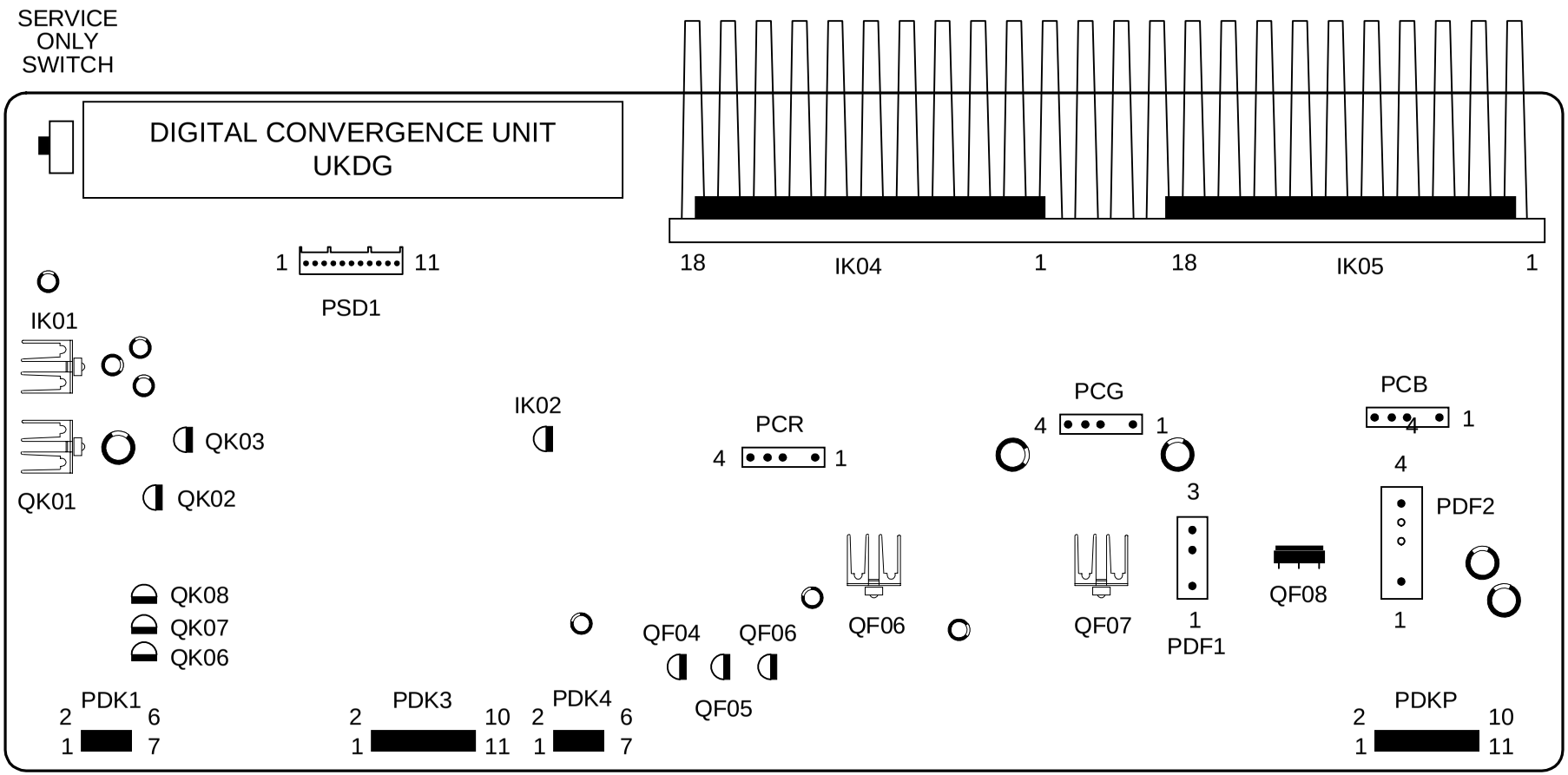
DP-0X CHASSIS CRT PWB



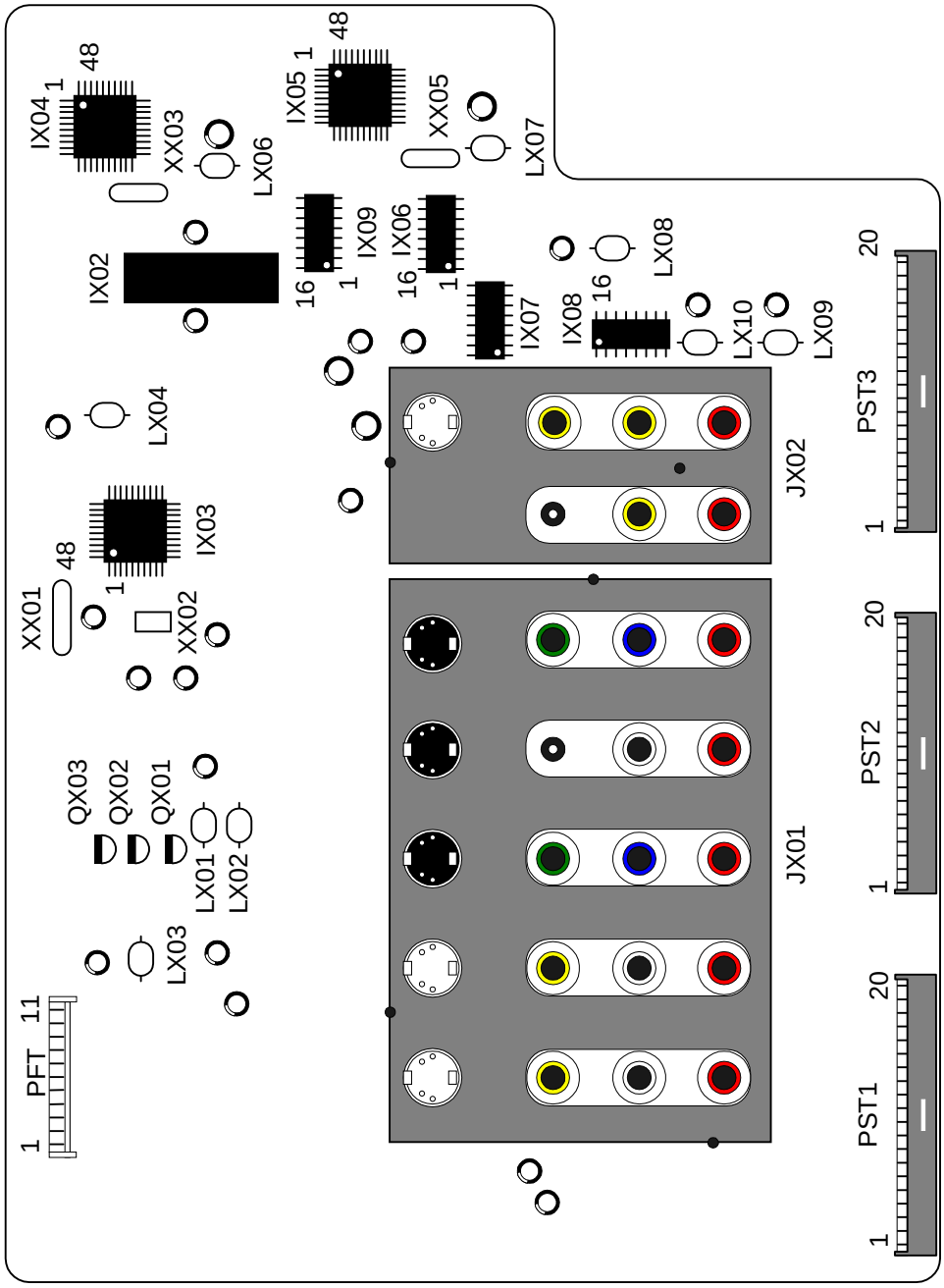




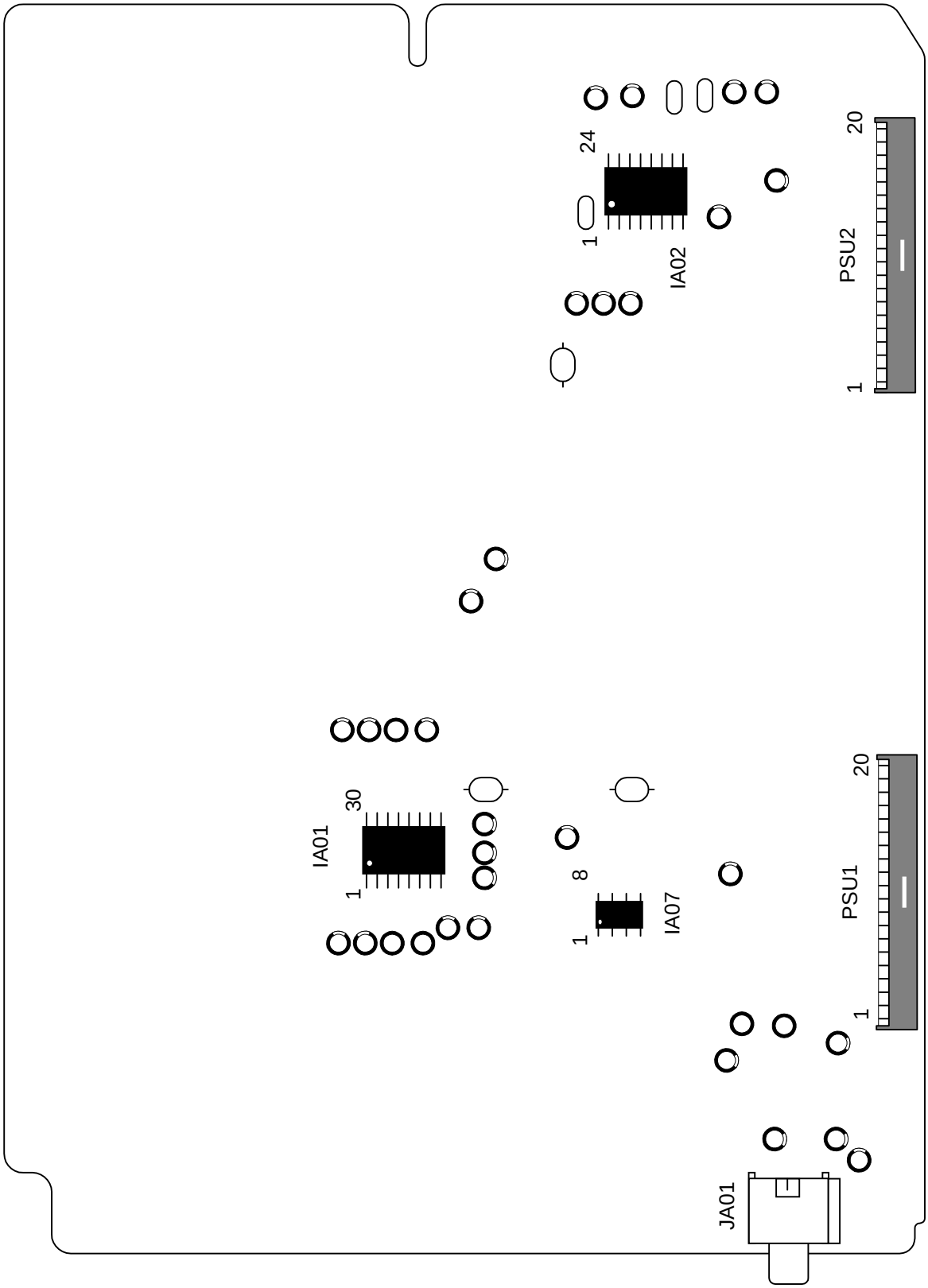
DP1X CONVERGENCE PWB



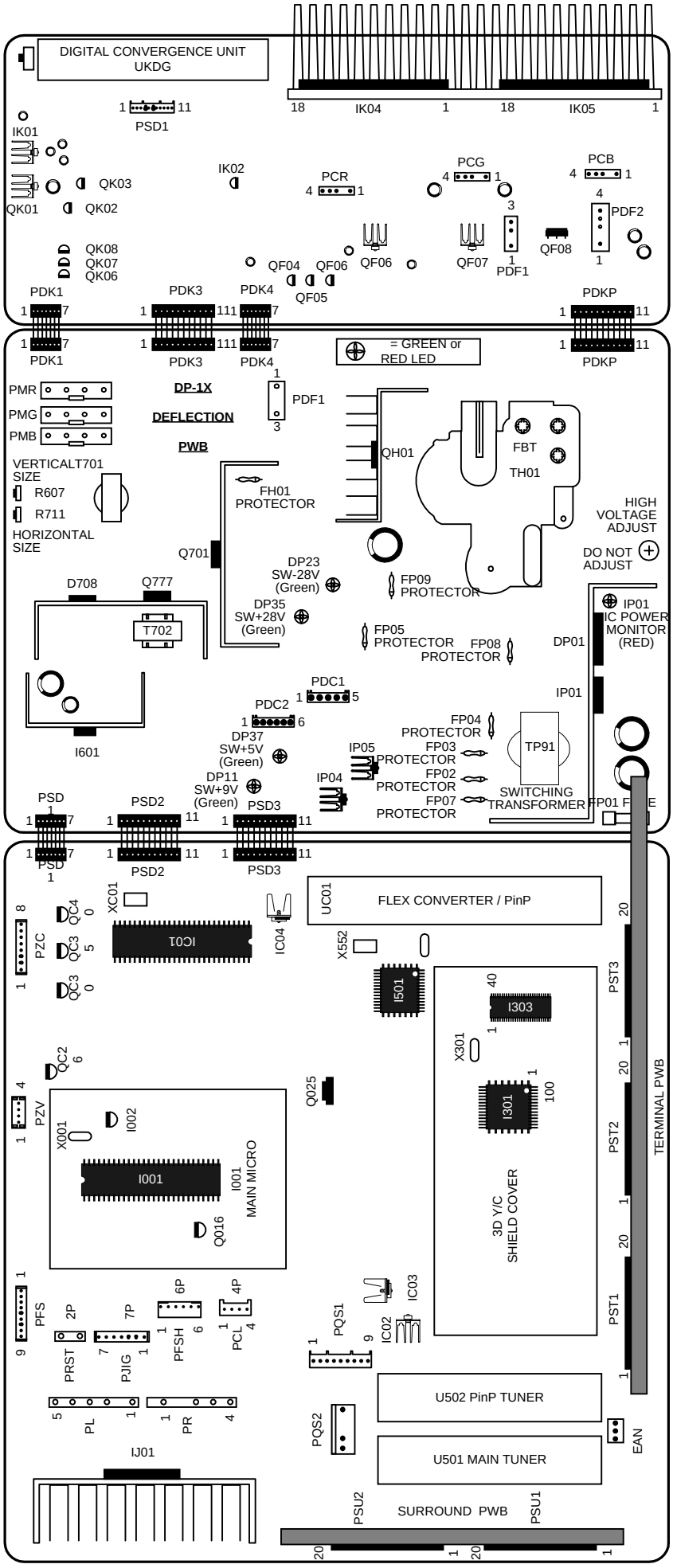
DP-1X TERMINAL PWB
DOUBLE SIDED



DP-1X SRS (Surround) PWB
DOUBLE SIDED



DP1X CHASSIS COMPLETE



DC VOLTAGES **Signal (1/5)**

Circuit No.	Pin No.	Voltage DC
I001	1	0.0
	2	4.8
	3	4.8
	4	3.8
	5	3.5
	6	1.6
	7	3.5
	8	3.3
	9	2.9
	10	0.0
	11	0.0
	12	0.0
	13	0.0
	14	0.0
	15	0.0
	16	0.0
	17	0.0
	18	0.0
	19	0.0
	20	3.5
	21	0.0
	22	0.0
	23	1.8
	24	2.9
	25	3.4
	26	2.2
	27	2.5
	28	0.6
	29	0.0
	30	0.6
	31	2.5
	32	1.5
	33	3.5
	34	2.0
	35	1.7
	36	1.8
	37	0.0
	38	0.0
	39	0.0
	40	0.0
	41	1.6
	42	1.6
	43	0.0
	44	0.0
	45	4.7
	46	4.5
	47	1.9
	48	1.9
	49	3.0
	50	3.5
	51	0.0
	52	3.5
	53	3.2
	54	3.5

Circuit No.	Pin No.	Voltage DC
I001	55	3.5
	56	0.0
	57	3.4
	58	3.4
	59	4.6
	60	4.6
	61	3.5
	62	1.8
	63	1.8
	64	0.0
I002	1	3.5
	2	0.0
	3	3.5
I003	1	0.0
	2	0.0
	3	0.0
	4	0.0
	5	4.7
	6	4.7
	7	0.0
	8	5.1
I004	1	5.1
	2	0.0
	3	0.0
	4	3.5
	5	0.0
	6	0.0
	7	0.0
	8	0.0
	9	0.0
	10	0.0
	11	0.0
	12	0.0
	13	0.0
	14	0.0
	15	0.0
	16	5.1
	17	4.9
	18	0.0
	19	0.0
	20	5.1
I005	1	2.6
	2	2.3
	3	0.0
	4	0.0
	5	0.0
	6	0.0
	7	0.0
	8	0.0
	9	0.0
	10	0.0
	11	0.0
	12	2.9
	13	2.9

Circuit No.	Pin No.	Voltage DC
I005	14	2.9
	15	2.3
	16	8.9
I006	1	0.0
	2	4.9
	3	4.1
	4	4.1
	5	4.7
	6	0.4
	7	4.7
	8	0.0
	9	0.0
	10	4.9
	11	0.0
	12	0.0
	13	5.0
	14	4.8
	15	4.7
	16	5.0
I007	1	0.0
	2	0.3
	3	0.4
	4	1.9
	5	0.4
	6	0.4
	7	0.4
	8	0.0
	9	5.0
	10	0.9
	11	0.0
	12	0.0
	13	0.0
	14	4.7
	15	4.7
	16	5.0
Q001	E	0.0
	B	0.0
	C	3.4
Q002	E	3.5
	B	3.4
	C	0.0
Q003	E	0.0
	B	0.8
	C	0.0
Q004	E	0.0
	B	0.0
	C	1.9
Q005	E	0.0
	B	0.0
	C	3.4
Q006	E	0.0
	B	-1.5
	C	3.0
Q007	E	0.0
	B	0.2
	C	2.9

Circuit No.	Pin No.	Voltage DC
Q008	E	5.7
	B	5.8
	C	0.5
Q009	E	5.2
	B	5.2
	C	0.0
Q010	E	0.0
	B	0.0
	C	2.9
Q011	E	5.8
	B	5.8
	C	0.6
Q012	E	5.8
	B	5.2
	C	0.0
Q013	E	4.6
	B	5.2
	C	8.9
Q014	E	4.6
	B	5.2
	C	8.9
Q015	E	3.0
	B	2.4
	C	0.0
Q016	E	2.4
	B	3.0
	C	8.9
Q017	E	0.0
	B	0.8
	C	0
Q018	E	3.5
	B	2.8
	C	3.4
Q019	E	0.0
	B	0.4
	C	1.9
Q020	E	0.0
	B	0.4
	C	1.6
Q021	E	0.0
	B	0.0
	C	35.1
Q022	E	35.1
	B	34.9
	C	0.0
Q023	E	0.0
	B	0.0
	C	34.9
Q024	E	3.1
	B	3.1
	C	0.0
Q025	E	3.6
	B	4.1
	C	5.1
Q026	E	0.0
	B	0.7
	C	0.0

DC VOLTAGES **Signal (2/5)**

Circuit No.	Pin No.	Voltage DC
I301	1	0.0
	2	0.0
	3	1.6
	4	1.6
	5	1.6
	6	1.6
	7	1.6
	8	1.6
	9	1.6
	10	1.1
	11	2.9
	12	2.5
	13	1.3
	14	1.3
	15	1.3
	16	0.0
	17	2.6
	18	2.6
	19	1.9
	20	2.1
	21	0.7
	22	1.6
	23	0.0
	24	1.6
	25	2.1
	26	0.0
	27	0.0
	28	0.0
	29	0.0
	30	0.0
	31	1.6
	32	3.3
	33	0.0
	34	0.0
	35	0.0
	36	0.0
	37	0.0
	38	0.0
	39	0.0
	40	0.0
	41	0.0
	42	0.0
	43	0.0
	44	0.0
	45	3.3
	46	3.3
	47	1.9
	48	0.0

Circuit No.	Pin No.	Voltage DC
I301	49	0.0
	50	1.6
	51	0.0
	52	0.0
	53	3.4
	54	0.0
	55	0.0
	56	0.0
	57	3.3
	58	0.0
	59	4.6
	60	4.6
	61	0.0
	62	0.0
	63	0.0
	64	3.3
	65	0.0
	66	0.0
	67	0.0
	68	0.0
	69	0.0
	70	0.0
	71	0.0
	72	0.0
	73	0.0
	74	0.0
	75	0.0
	76	0.0
	77	0.0
	78	0.0
	79	0.0
	80	0.0
	81	3.3
	82	0.0
	83	0.0
	84	0.0
	85	1.1
	86	0.0
	87	0.0
	88	1.2
	89	0.9
	90	1.1
	91	1.6
	92	3.3
	93	0.0
	94	0.0
	95	3.3
	96	0.0

Circuit No.	Pin No.	Voltage DC
I301	97	0.0
	98	0.6
	99	1.6
	100	3.3
I302	1	0.0
	2	0.0
	3	0.0
	4	3.3
	5	3.3
I303	1	5.0
	2	2.1
	3	2.1
	4	1.9
	5	2.1
	6	5.0
	7	1.8
	8	1.6
	9	1.6
	10	0.7
	11	0.0
	12	0.0
	13	2.9
	14	0.6
	15	0.0
	16	1.6
	17	1.6
	18	1.6
	19	1.6
	20	5.0
	21	0.0
	22	1.6
	23	1.6
	24	1.6
	25	1.6
	26	1.6
	27	2.5
	28	1.1
	29	1.1
	30	0.0
	21	1.3
	32	3.0
	33	1.9
	34	2.1
	35	0.0
	36	2.5
	37	1.9
	38	2.1
	39	2.1
	40	0.0

Circuit No.	Pin No.	Voltage DC
I501	1	4.0
	2	4.0
	3	4.0
	4	2.2
	5	0.0
	6	1.8
	7	6.0
	8	3.0
	9	0.0
	10	7.3
	11	0.0
	12	5.7
	13	4.8
	14	0.0
	15	1.0
	16	0.0
	17	0.6
	18	8.9
	19	8.9
	20	4.5
	21	4.3
	22	4.3
	23	0.0
	24	0.0
	25	5.8
	26	0.0
	27	0.0
	28	0.0
	29	0.0
	30	0.0
	31	5.5
	32	0.0
	33	0.0
	34	4.6
	35	0.0
	36	0.0
	37	2.2
	38	2.8
	39	0.0
	40	0.0
	41	5.0
	42	5.0
	43	0.0
	44	3.1
	45	0.0
	46	3.8
	47	2.3
	48	2.5

DC VOLTAGES **Signal (3/5)**

Circuit No.	Pin No.	Voltage DC
I502	1	2.5
	2	0.0
	3	1.8
	4	0.0
	5	1.8
	6	1.8
	7	0.0
	8	2.4
	9	2.8
	10	0.0
	11	2.5
	12	0.0
	13	5.0
	14	2.5
	15	0.0
	16	2.5
I503	1	0.0
	2	0.2
	3	5.0
	4	4.7
	5	0.0
	6	0.0
	7	0.0
	8	0.0
	9	0.0
	10	4.9
	11	4.9
	12	5.0
	13	0.3
	14	0.0
	15	4.7
	16	5.0
Q301	E	2.0
	B	2.3
	C	3.1
Q302	E	3.3
	B	3.1
	C	0.0
Q303	E	0.0
	B	0.0
	C	2.8
Q304	E	0.4
	B	0.0
	C	0.0

Circuit No.	Pin Name	Voltage DC
Q305	E	0.0
	B	0.0
	C	1.7
Q306	E	0.0
	B	0.0
	C	0.0
Q307	E	3.0
	B	3.6
	C	8.9
Q308	E	2.5
	B	1.9
	C	0.0
Q309	E	0.0
	B	0.4
	C	0.0
Q310	E	0.0
	B	0.4
	C	1.6
Q311	E	1.7
	B	1.6
	C	1.2
Q312	E	1.1
	B	1.2
	C	1.7
Q313	E	0.0
	B	0.0
	C	0.0
Q314	E	1.2
	B	1.8
	C	8.3
Q315	E	8.9
	B	8.3
	C	5.2
Q316	E	4.6
	B	0.0
	C	8.9
Q317	E	2.7
	B	2.1
	C	0.0

Circuit No.	Pin Name	Voltage DC
Q501	E	0.0
	B	0.8
	C	0.0
Q504	E	0.0
	B	0
	C	4.9
Q505	E	1.6
	B	2.2
	C	0.0
Q551	E	4.9
	B	4.3
	C	0.0
Q552	E	4.9
	B	4.3
	C	0.0
Q553	E	5.1
	B	4.5
	C	0
Q554	E	4.8
	B	0
	C	8.9
Q555	E	3.3
	B	0.0
	C	8.9
Q556	E	0
	B	0
	C	8.9
Q557	E	3.2
	B	3.8
	C	0.0
Q558	E	1.2
	B	1.8
	C	8.9

Circuit No.	Pin Name	Voltage DC
Q559	E	0.0
	B	0.7
	C	0.0
Q560	E	5.2
	B	5.0
	C	8.9
Q561	E	4.1
	B	3.5
	C	0.0
Q562	E	5.2
	B	5.0
	C	8.9
Q563	E	4.2
	B	3.6
	C	0.0
Q564	E	2.3
	B	1.7
	C	0.0

DC VOLTAGES **Signal (4/5)**

Circuit No.	Pin No.	Voltage DC
IC01	1	1.6
	2	5.5
	3	5.3
	4	5.2
	5	5.1
	6	0.0
	7	0.2
	8	5.2
	9	5.2
	10	5.2
	11	7.1
	12	3.3
	13	4.8
	14	2.1
	15	3.3
	16	3.3
	17	1.6
	18	1.6
	19	9.2
	20	6.7
	21	5.5
	22	2.9
	23	2.6
	24	1.2
	25	0.0
	26	1.4
	27	5.1
	28	0.2
	29	2.2
	30	4.6
	31	4.6
	32	0.0
	33	4.1
	34	4.1
	35	4.1
	36	0.6
	37	4.1
	38	4.1
	39	4.1
	40	9.2
	41	2.7
	42	2.7
	43	2.7
	44	0.0
	45	9.2
	46	4.9
	47	4.9
	48	4.7
	49	0.0
	50	0.0

Circuit No.	Pin No.	Voltage DC
IC01	51	0.0
	52	0.0
	53	5.8
	54	4.2
	55	9.2
	56	5.6
IC02	1	7.2
	2	0.0
	3	5.0
IC03	1	4.2
	2	0.0
	3	3.4
IC04	1	5.0
	2	0.0
	3	2.5
QC01	E	0.0
	B	0.6
	C	1.7
QC02	E	0.5
	B	0.6
	C	1.7
QC03	E	0.5
	B	0.6
	C	0.0
QC04	E	3.5
	B	4.1
	C	9.2
QC05	E	3.4
	B	4.0
	C	9.2
QC06	E	3.5
	B	4.1
	C	0.0
QC07	E	1.1
	B	1.2
	C	1.8
QC08	E	0.0
	B	1.2
	C	0.0
QC09	E	1.1
	B	1.1
	C	1.8

Circuit No.	Pin Name	Voltage DC
QC10	E	0.4
	B	0.0
	C	9.2
QC11	E	9.2
	B	9.2
	C	1.0
QC12	E	0.0
	B	0.0
	C	1.8
QC13	E	1.6
	B	0.0
	C	0.0
QC14	E	1.2
	B	0.0
	C	9.2
QC15	E	1.2
	B	0.6
	C	9.2
QC16	E	0.0
	B	0.0
	C	9.2
QC17	E	0.0
	B	0.0
	C	9.2
QC18	E	6.9
	B	7.5
	C	9.2
QC19	E	0.7
	B	0.0
	C	0.0
QC20	E	0.7
	B	0.0
	C	0.0
QC21	E	0.7
	B	0.0
	C	0.0
QC22	E	0.7
	B	0.0
	C	0.0
QC23	E	0.7
	B	0.0
	C	0.0

Circuit No.	Pin Name	Voltage DC
QC24	E	0.7
	B	0.0
	C	0.0
QC26	E	3.5
	B	4.2
	C	9.3
QC30	E	3.3
	B	2.6
	C	0.0
QC31	E	8.0
	B	0.0
	C	3.3
QC35	E	3.3
	B	2.6
	C	0.0
QC36	E	8.0
	B	0.0
	C	0.0
QC40	E	3.4
	B	2.7
	C	0.0
QC41	E	0.0
	B	7.3
	C	3.4
QC42	E	0.0
	B	0.4
	C	0.0

DC VOLTAGES

Signal (5/5)

Circuit No.	Pin Name	Voltage DC
IJ01	1	1.6
	2	0.0
	3	0.0
	4	0.0
	5	1.6
	6	10.8
	7	14.8
	8	5.1
	9	31.7
	10	0.0
	11	4.3
	12	14.4

Circuit No.	Pin Name	Voltage DC
QJ01	E	0.0
	B	0.0
	C	0.0
QJ02	E	0.0
	B	0.0
	C	0.0
QJ03	E	0.0
	B	0.0
	C	4.2
QJ04	E	0.0
	B	0.0
	C	10.8

Circuit No.	Pin No.	Voltage DC
QH01	E	0.4
	B	3.8
	C	90.0
QH02	E	0.0
	B	0.5
	C	3.8
QH03	E	0.0
	B	0.5
	C	59.1

Deflection

Circuit No.	Pin No.	Voltage DC
I601	1	14.3
	2	26.6
	3	4.9
	4	6.7
	5	4.5
	6	0.0
	7	5.3
	8	6.1
	9	4.5
	10	27.0
	11	1.0
IH01	1	5.2
	2	11.6
	3	0.8
	4	2.5
	5	1.7
	6	0.0
	7	0.9
	8	0.0
	9	7.1
	10	7.1
	11	7.1
	12	7.1
	13	2.5
	14	1.9
	15	5.0
	16	0.0

Circuit No.	Pin No.	Voltage DC
QN01	E	0.0
	B	0.0
	C	0.5
QN02	E	11.4
	B	11.4
	C	0.0
QN03	E	0.0
	B	0.0
	C	11.4
QN04	E	0.5
	B	0.9
	C	11.4
QN05	E	0.0
	B	0.0
	C	11.5
QN06	E	0.0
	B	0.4
	C	0.0

Circuit No.	Pin Name	Voltage DC
Q601	E	0.0
	B	0.3
	C	4.2
Q602	E	0.0
	B	0.0
	C	0.5
Q603	E	0.0
	B	0.0
	C	5.2
Q604	E	27.2
	B	27.0
	C	0.0
Q701	E	92.1
	B	93.1
	C	115.5
Q703	E	2.3
	B	3.0
	C	93.1
Q704	E	0.0
	B	0.5
	C	14.1
Q705	E	0.0
	B	0.7
	C	0.0
Q706	E	1.3
	B	0.8
	C	11.6
Q707	E	0.0
	B	0.7
	C	0.0
Q708	E	0.0
	B	0.0
	C	11.1
Q709	E	0.0
	B	0.4
	C	11.1
Q710	E	0.0
	B	0.3
	C	0.0
Q777	E	0.0
	B	0.0
	C	90.0

Power Deflection

Circuit No.	Pin Name	Voltage DC
IP01	1	2.0
	2	0.0
	3	161.3
	4	15.4
	5	0.0
IP02	1	12.0
	2	11.1
	3	3.0
	4	15.4
IP03	1	115.6
	2	11.0
	3	0.0
IP04	1	11.7
	2	9.1
	3	0.0
	4	1.9
IP05	1	7.4
	2	5.1
	3	0.0
	4	1.9
IP06	1	7.4
	2	6.3
	3	0.0
	4	2.1

Circuit No.	Pin Name	Voltage DC
QP02	E	116.0
	B	115.5
	C	1.3
QP03	E	9.1
	B	9.1
	C	0.0

DC VOLTAGES

SRS/BBE

Circuit No.	Pin No.	Voltage DC
IA01	1	4.5
	2	4.5
	3	4.5
	4	4.5
	5	4.5
	6	4.5
	7	4.5
	8	4.5
	9	0.8
	10	4.5
	11	1.2
	12	1.2
	13	4.5
	14	4.5
	15	0.0
	16	8.9
	17	0.0
	18	4.8
	19	1.4
	20	1.4
	21	4.5
	22	4.5
	23	4.5
	24	4.5
	25	4.5
	26	4.5
	27	4.5
	28	4.5
	29	4.5
	30	4.5
IA02	1	0.0
	2	4.5
	3	4.5
	4	4.5
	5	4.5
	6	4.5
	7	4.5
	8	4.5
	9	4.5
	10	8.9
	11	0.0
	12	4.5
	13	0.0
	14	0.0
	15	4.5
	16	4.5
	17	4.5
	18	4.5
	19	0.0

Circuit No.	Pin No.	Voltage DC
IA02	20	4.5
	21	4.5
	22	4.5
	23	4.5
	24	4.5
IA07	1	4.9
	2	4.9
	3	4.9
	4	0.0
	5	4.8
	6	4.8
	7	4.8
	8	8.9

Circuit No.	Pin Name	Voltage DC
QA01	E	1.4
	B	2.1
	C	8.2
QA02	E	8.9
	B	8.2
	C	5.0
QA03	E	1.4
	B	2.1
	C	8.2
QA04	E	8.9
	B	8.2
	C	4.9
QA05	E	0.0
	B	0.0
	C	0.0

VM

Circuit No.	Pin Name	Voltage DC
QE01	E	2.6
	B	3.3
	C	12.5
QE02	E	12.5
	B	11.8
	C	27.4
QE03	E	12.5
	B	13.1
	C	22.1
QE04	E	21.4
	B	22.1
	C	27.4
QE05	E	1.6
	B	2.2
	C	15.3
E07	E	16.0
	B	15.4
	C	0.0
QE08	E	15.4
	B	16.0
	C	27.4
QE10	E	14.8
	B	14.4
	C	27.4
QE11	E	14.6
	B	14.0
	C	0.0
QE22	E	214.5
	B	214.0
	C	10.6
QE23	E	213.4
	B	213.0
	C	121.6
QE24	E	121.6
	B	134.1
	C	116.4
QE25	E	16.6
	B	17.1
	C	116.0
QE26	E	0.9
	B	1.5
	C	16.6
QE35	E	11.8
	B	12.3
	C	155.0
QE36	E	11.8
	B	12.5
	C	27.4

FOCUS

Circuit No.	Pin Name	Voltage DC
QF03	E	0.6
	B	1.2
	C	5.7
QF04	E	5.6
	B	5.7
	C	0.7
QF05	E	0.3
	B	0.7
	C	11.2
QF06	E	11.4
	B	11.6
	C	302.0
QF07	E	401.0
	B	301.0
	C	788.0
QF08	E	10.2
	B	10.7
	C	354.0

DC VOLTAGES

Power supply

Circuit No.	Pin No.	Voltage DC
I901	1	163.9
	2	0.0
	3	0.0
	4	16.9
	5	2.4
I902	1	5.2
	2	4.3
	3	3.5
	4	17.5
I903	1	5.0
	2	4.3
	3	0.0
	4	16.8
I904	1	4.8
	2	5.5
	3	5.2
	4	2.4
I906	1	0.0
	2	1.9
	3	9.5
	4	9.1
	5	11.0

Convergence

Circuit No.	Pin No.	Voltage DC
IK01	1	11.6
	2	0.0
	3	5.1
IK02	1	4.0
	2	5.0
	3	0.0
IK04	1	0.0
	2	0.0
	3	-29.3
	4	-30.4
	5	31.0
	6	0.0
	7	0.0
	8	-26.9
	9	0.0
	10	27.2
	11	0.0
	12	-26.9
	13	0.0
	14	0.0
	15	0.0
	16	0.0
	17	-26.9
	18	0.0
IK05	1	0.0
	2	0.0
	3	-29.3
	4	-30.4
	5	31.0
	6	0.0
	7	0.0
	8	-26.9
	9	0.0
	10	27.2
	11	0.0
	12	-26.9
	13	0.0
	14	0.0
	15	0.0
	16	0.0
	17	-26.9
	18	0.0

Sensor

Circuit No.	Pin No.	Voltage DC
QK01	E	-7.1
	B	-6.5
	C	-5.3
QK02	E	0.6
	B	0.0
	C	0.0
QK03	E	0.6
	B	0
	C	-5.8
QK06	E	0
	B	0
	C	5.1
QK07	E	0
	B	0
	C	5.1
QK08	E	0.0
	B	0.0
	C	5.1

Circuit No.	Pin No.	Voltage DC
QL10	E	5.1
	B	4.7
	C	0
QL11	E	5.2
	B	4.7
	C	1.6
QL16	E	5.1
	B	4.7
	C	0.0
QL17	E	0.5
	B	4.7
	C	0.0

DC VOLTAGES Terminal (1 of 2)

Circuit No.	Pin No.	Voltage DC
IX01	1	3.9
	2	4.4
	3	4.0
	4	4.4
	5	4.4
	6	8.3
	7	0.0
	8	3.9
	9	4.4
	10	3.9
	11	4.4
	12	4.4
	13	0.0
	14	4.8
	15	3.9
	16	4.4
	17	3.9
	18	4.4
	19	4.4
	20	0.0
	21	4.8
	22	4.4
	23	4.4
	24	3.9
	25	4.4
	26	4.4
	27	0.0
	28	4.8
	29	4.4
	30	4.4
	31	4.4
	32	0.0
	33	4.7
	34	4.7
	35	0.0
	36	0.0
	37	4.4
	38	4.4
	39	3.5
	40	4.4
	41	4.2
	42	8.8
	43	4.4
	44	4.2
	45	4.4
	46	3.5
	47	4.4
	48	0.0

Circuit No.	Pin No.	Voltage DC
IX01	49	4.7
	50	4.4
	51	4.4
	52	4.4
	53	4.2
	54	4.4
	55	3.6
	56	4.0
	57	0.0
	58	4.3
	59	4.4
	60	3.9
	61	4.4
	62	4.4
	63	4.2
	64	4.4
IX02	1	6.3
	2	0.0
	3	3.8
	4	4.9
	5	8.7
IX03	1	4.0
	2	4.0
	3	4.0
	4	2.2
	5	0.0
	6	1.8
	7	5.9
	8	2.9
	9	0.0
	10	7.2
	11	0.0
	12	5.6
	13	4.7
	14	0.0
	15	1.0
	16	0.0
	17	0.6
	18	8.7
	19	8.7
	20	4.4
	21	4.4
	22	4.2
	23	8.7
	24	0.0
	25	5.7
	26	5.7
	27	5.5

Circuit No.	Pin No.	Voltage DC
IX03	28	0.0
	29	5.5
	30	5.5
	31	5.5
	32	0.6
	33	4.4
	34	4.5
	35	0.0
	36	0.0
	37	2.2
	38	0.0
	39	0.0
	40	2.7
	41	4.9
	42	4.9
	43	0.0
	44	3.1
	45	0.0
	46	3.7
	47	2.3
	48	2.2
IX04	1	2.8
	2	2.8
	3	2.8
	4	1.0
	5	1.0
	6	0.0
	7	2.8
	8	2.8
	9	2.8
	10	1.1
	11	1.1
	12	4.9
	13	3.4
	14	3.4
	15	3.2
	16	3.0
	17	0.0
	18	1.1
	19	0.0
	20	2.9
	21	0.0
	22	0.0
	23	0.0
	24	0.0
	25	2.5
	26	2.5
	27	2.3

Circuit No.	Pin No.	Voltage DC
IX04	28	4.9
	29	0.0
	30	4.6
	31	4.6
	32	0.0
	33	2.8
	34	2.8
	35	2.8
	36	1.1
	37	1.2
	38	2.2
	39	2.4
	40	4.9
	41	2.8
	42	2.8
	43	2.8
	44	1.1
	45	1.1
	46	0.0
	47	2.4
	48	0.0
IX05	1	2.8
	2	2.8
	3	2.8
	4	1.0
	5	1.0
	6	0.0
	7	2.8
	8	2.8
	9	2.8
	10	1.1
	11	1.1
	12	4.9
	13	3.4
	14	3.4
	15	3.2
	16	3.0
	17	0.0
	18	1.1
	19	0.0
	20	2.9
	21	0.0
	22	0.0
	23	0.0
	24	0.0
	25	2.5
	26	2.5
	27	2.3

DC VOLTAGES **Terminal (2 of 2)**

Circuit No.	Pin No.	Voltage DC
IX05	28	4.9
	29	0.0
	30	4.6
	31	4.6
	32	4.9
	33	2.8
	34	2.8
	35	2.8
	36	1.1
	37	1.2
	38	2.2
	39	2.4
	40	4.9
	41	2.8
	42	2.8
	43	2.8
	44	1.1
	45	1.1
	46	0.0
	47	2.4
	48	0.0
IX06	1	0.0
	2	0.0
	3	0.0
	4	0.0
	5	0.0
	6	0.0
	7	0.0
	8	0.0
	9	0.0
	10	0.0
	11	0.0
	12	0.0
	13	0.0
	14	0.0
	15	0.0
	16	5.0
IX07	1	0.0
	2	0.0
	3	0.0
	4	0.0
	5	0.0
	6	0.0
	7	0.0
	8	0.0
	9	0.0
	10	0.0
	11	0.0

Circuit No.	Pin No.	Voltage DC
IX07	12	0.0
	13	0.0
	14	0.0
	15	0.0
	16	5.0
IX08	1	0.0
	2	5.0
	3	4.7
	4	0.0
	5	4.8
	6	0.0
	7	0.0
	8	5.0
	9	0.0
	10	4.8
	11	0.0
	12	0.0
	13	0.0
	14	5.0
IX09	1	0.0
	2	5.0
	3	5.0
	4	5.0
	5	0.6
	6	0.0
	7	4.6
	8	0.0
	9	0.0
	10	0.0
	11	5.0
	12	4.4
	13	0.0
	14	0.0
	15	0.0
	16	5.0

Circuit No.	Pin No.	Voltage DC
QX01	E	3.5
	B	4.2
	C	8.8
QX02	E	2.9
	B	3.5
	C	8.8
QX03	E	3.7
	B	4.3
	C	8.8
QX04	E	3.6
	B	4.2
	C	8.8
QX05	E	3.5
	B	4.2
	C	8.8
QX06	E	3.7
	B	4.4
	C	8.8
QX07	E	3.6
	B	4.2
	C	8.8
QX08	E	4.9
	B	4.3
	C	0.0
QX09	E	4.6
	B	4.0
	C	0.0
QX10	E	5.0
	B	5.6
	C	8.8
QX11	E	6.0
	B	6.6
	C	8.8
QX12	E	6.2
	B	6.8
	C	8.8

Circuit No.	Pin Name	Voltage DC
QX13	E	5.0
	B	4.4
	C	0.0
QX14	E	4.8
	B	4.3
	C	0.0
QX15	E	4.8
	B	4.2
	C	0.0
QX16	E	2.6
	B	3.2
	C	4.9
QX17	E	2.5
	B	3.2
	C	4.9
QX18	E	2.9
	B	2.3
	C	0.0
QX19	E	3.2
	B	2.6
	C	0.0
QX20	E	3.2
	B	2.5
	C	0.0
QX21	E	2.9
	B	2.3
	C	0.0
QX22	E	3.2
	B	2.6
	C	0.0
QX23	E	3.2
	B	2.5
	C	0.0
QX24	E	5.2
	B	4.6
	C	0.0
QX36	E	0.5
	B	1.1
	C	9.2
QX37	E	0.0
	B	0.6
	C	5.5
QX40	E	0.0
	B	0.0
	C	0.0
QX41	E	0.0
	B	0.0
	C	0.0

DC VOLTAGES

CPT

Circuit No.	Pin Name	Voltage DC
Q801	E	3.0
	B	3.5
	C	8.3
Q802	E	8.3
	B	8.6
	C	0.0
Q803	E	8.6
	B	9.1
	C	168.0
Q804	E	169.0
	B	168.4
	C	1.1
Q805	E	169.0
	B	170.0
	C	225.0
Q812	E	1.0
	B	1.7
	C	1.1
Q851	E	3.1
	B	3.5
	C	8.3
Q852	E	8.3
	B	8.6
	C	9.1

CPT

Circuit No.	Pin Name	Voltage DC
Q853	E	8.6
	B	9.1
	C	156.4
Q854	E	157.0
	B	156.0
	C	1.1
Q855	E	157.0
	B	157.0
	C	224.9
Q858	E	2.5
	B	1.8
	C	0.0
Q859	E	1.8
	B	2.5
	C	9.1
Q862	E	1.1
	B	1.8
	C	1.1
Q8A1	E	3.2
	B	3.8
	C	8.3
Q8A2	E	8.2
	B	8.6
	C	9.1
Q8A3	E	8.6
	B	9.1
	C	150.0
Q8A4	E	151.6
	B	150.8
	C	1.1
Q8A5	E	152.0
	B	152.0
	C	224.0
Q8A6	E	3.0
	B	3.0
	C	0.0
Q8A7	E	3.0
	B	3.7
	C	9.1
Q8C1	E	0.0
	B	0.0
	C	9.0
Q8C2	E	1.1
	B	0.0
	C	1.1

Power Supply

Circuit No.	Pin Name	Voltage DC
Q901	E	16.9
	B	16.9
	C	0.0
Q902	E	0.0
	B	0.0
	C	16.9
Q914	E	0.0
	B	0.9
	C	0.5
Q915	E	1.9
	B	1.9
	C	0.1
Q916	E	0.0
	B	0.1
	C	1.9
Q917	E	2.2
	B	2.5
	C	5.2
Q918	E	0.0
	B	0.0
	C	4.3
Q919	E	2.2
	B	2.2
	C	0.1
Q920	E	2.9
	B	3.5
	C	17.5

Control

Circuit No.	Pin Name	Voltage DC
QM01	E	0.0
	B	0.8
	C	0.0
QM03	E	1.8
	B	2.5
	C	9.0
QM04	E	1.9
	B	2.5
	C	8.9
QM05	E	0.0
	B	0.0
	C	5.2

Below is the jig screen part number for the 2H models.

2001 Models

HITACHI MODELS:

H312251 43” 4x3 Full Mode
H312252 43” 4x3 V Squeeze Mode
H312253 53” 4x3 Full Mode
H312254 53” 4x3 V Squeeze Mode
H312255 61” 4x3 Full Mode
H312256 61” 4x3 V Squeeze Mode
H312259 43” 16x9
H312257 53” 16x9
H312258 61” 16x9

PHILIPS MODELS:

H312261 60” Phillips 4x3 Full Mode
H312262 60” Phillips 4x3 V Squeeze Mode
H312263 55” Phillips 4x3 Full Mode
H312264 55” Philips 4x3 V Squeeze Mode

ZENITH MODELS:

H312265 56” Zenith 16x9
H312266 65” Zenith 16x9

SERVICE BULLETINS AND OTHER INFORMATION

DP-1X CHASSIS

SECTION 9

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BULLETIN

SERVICE

HITACHI

PTV 01-01

March, 2001

Hitachi America, Ltd., Home Electronics Division
National Service

PTV

MODEL: **43FDX01B, 53FDX01B**
53SDX01B, 61SDX01B
53SWX01W, 61SWX01W

SUBJECT: **CLARIFICATION OF MEMORY INITIALIZATION PROCEDURE**

When servicing any of the above mentioned models, the service technician should be cautioned that the standard technique of blindly re-initializing the memory whenever a problem is presented could possibly cause additional labor in order to bring the set back to it's original settings. ***Be sure to note the values for sub brightness (SUB BRT) and horizontal centering (H-POSI) before proceeding with a complete memory initialization***, as the values that will show up after performing memory initialization may not be correct. Uncorrected or misadjusted **SUB BRT** will result in either a darker or lighter picture than before. (And the customer **will** notice!) Uncorrected or misadjusted **H POSI** will result in a shadow or fold-over on either side of the screen. Do not attempt to make corrections via Digital Convergence correction; instead, input the correct values for these settings. When an initialization of memory is needed, there are two methods: electronic (preferred) and mechanical.

Electronic Memory Initialization (Service Adjust Mode)

1. The set should be off, but plugged in to AC.
2. Press and hold the INPUT button on the front panel.
3. Press the POWER button on the front panel.
4. Release both buttons.
5. The Service Adjust Mode menu should appear on screen. (See ***Figure 1)***. Before proceeding to **MEMORY INITIAL**, it is highly recommended to note the existing setting for Sub Brightness as well as the existing settings for Horizontal Centering in both progressive and high definition modes.
6. Select **SUB BRT** using the ▲ or ▼ buttons on the remote, then press the ▶cursor key on the remote. The screen will darken considerably and **SUB BRT** with its associated value will appear on screen. Note the existing value. To adjust, press cursor ◀ or ▶. To exit from **SUB BRT** adjustment, press cursor ▲ or ▼. In case the memory was initialized prior to acquisition of the existing data value, refer to the service manual in order to correctly adjust the **SUB BRT**.

ADJUST MODE		
SUB BRT	☐	Brings up sub brightness adjust (cursor ▶)
SERVICE	☐	Collapses vertical for setting color temp
DEF RESET	☐	Select when replace DEF PWB
V/P RESET	☐	Select when replace SIG PWB
3DYC RESET	☐	Select when replace 3DYC comb filter
FLEX RESET	☐	Select when replace FLEX CONVERTER
DSP RESET	☐	Select when replace DSP module
CCD RESET	☐	Select whenever closed caption fails to track
FACTORY RESET	☐	Resets all customer settings
MEMORY INITIAL	☐	Resets all of the above (**ONLY DO IF NECESSARY***)

Figure 1 - Service Menu Page 1

(continued)

7. To access the horizontal centering adjustment for progressive, display NTSC (or 480i), then go to service menu page 2 (***Figure 2***) by either pressing the MENU button once, or using the ▼cursor key on the remote to scroll down through service menu page 1. The first menu selection on service menu page 2 is **H POSI**. Note the existing value. Also note that the setting for TA1300 is 315 (31.5 KHz). In case the memory was initialized prior to acquisition of the existing data value, refer to the service manual in order to correctly set up the **H POSI** for progressive.
8. To access the horizontal centering adjustment for high definition, display 1080i, then go to service menu page 2 (***Figure 3***) by either pressing the MENU button once, or using the ▼cursor key on the remote to scroll down through service menu page 1. The first menu selection on service menu page 2 is **H POSI**. Note the existing value. Also note that the setting for TA1300 is 3375 (33.75 KHz). In case the memory was initialized prior to acquisition of the existing data value, refer to the service manual in order to correctly set up the **H POSI** for high definition.
9. After the existing values for **SUB BRT** and **H POSI** have been noted, proceed to **MEMORY INITIAL** by using the ▲ or ▼ buttons on the remote to navigate to service menu page 1, then press the ▶cursor key on the remote to initialize the memory.
10. Re-enter recorded data values, if known, for (1) **SUB BRT** and (2) **H POSI** in both progressive and high definition modes.
11. To exit from Service Adjust Mode, press the INPUT button on the front panel.

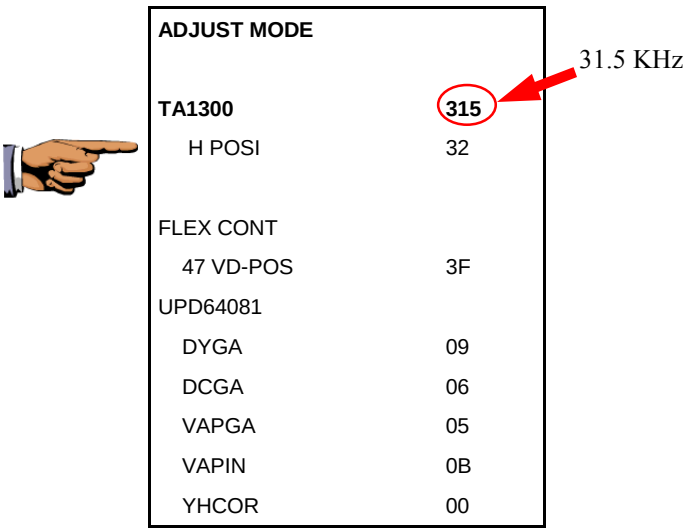


Figure 2 - Service Menu Page 2 (NTSC)

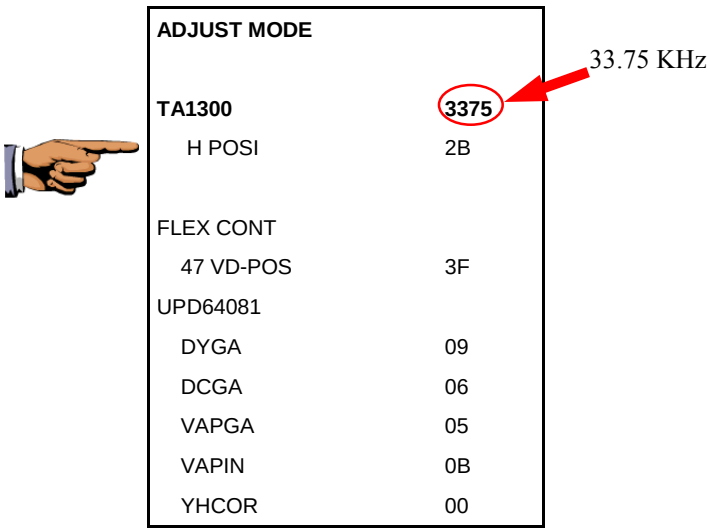


Figure 3 - Service Menu Page 2 (1080i)

Mechanical Memory Initialization (PERFORM ONLY WHEN NECESSARY*)

1. Disconnect power to the set.
2. Remove the back cover.
3. Remove the two screws holding the chassis to the cabinet, if necessary.
4. Disconnect wiring harness clips to free up the chassis, if necessary.
5. Reconnect power to the television and turn the set on.
6. If possible, go into service adjust mode (as previously described) and note settings for **SUB BRT** and **H POSI**.
7. Locate PP1 and place a jumper across pins 1 and 2. See ***Figure 4***.
8. Hold jumper in place for approximately five seconds. (There will **not** be an audible tone).
9. Remove the jumper.
10. Confirm EEPROM reset. Input source is now set to AIR, and not CABLE 1 or 2, no CHILD LOCK, and only channels 2-13 are in memory.
11. If step 6 was performed, re-enter settings for **SUB BRT** and **H POSI**.
12. If step 6 was not performed, adjust both **SUB BRT** and **H POSI** in accordance with the applicable service manual.
13. Re-assemble chassis and re-install PTV back cover. Set is now ready for operation.

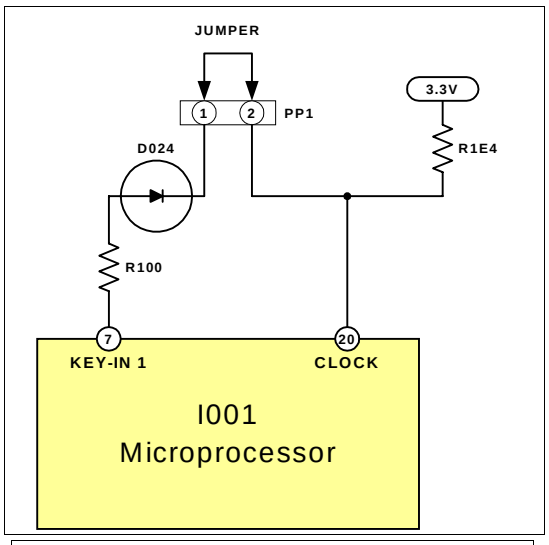


Figure 4 - Schematic Location of Connector PP1

*** Definition of Necessary**

Perform Mechanical Memory Initialization only if I001 (main micro) or I002 (EEPROM) have been replaced **and** there is no visible display.

BULLETIN

SERVICE

HITACHI

July, 2001

PTV 01-02

Hitachi America, Ltd., Home Electronics Division
National Service

PTV

MODEL: **43FDX01B, 53FDX01B**
53SDX01B, 61SDX01B
53SWX01W, 61SWX01W

SUBJECT: HORIZONTAL NOISE PRESENT WHEN COLD

Phenomenon:
There have been reports from the field of isolated cases involving the above mentioned models that may experience a kind of horizontal noise symptom when operated from a cold start. (See ***Figures 1*** and ***2***). This symptom will gradually decay as it warms up, until it is no longer noticeable. This problem can be attributed to the anode cap connector. The anode cap connector may not be firmly secured to the PRT, thus causing interference noise due to high voltage arcing and leakage. A new and improved anode cap connector utilizes a tension mechanism, in the form of a silicone rubber insert. (See ***Figures 3*** and ***4***).

Countermeasure:
To identify which PRT has a problem, wait until the arcing has stopped, then carefully wiggle the anode connector wire with a wooden stick. **BE CAREFUL NOT TO WIGGLE THE ANODE CONNECTOR WIRE TOO HARD**. When the defective PRT has been located, replace the entire anode cap connector and wire using Hitachi part number EZ01322.

Procedure:
1. Turn off the PTV.
2. Remove back of PTV and disconnect all cables going to the suspect PRT.
3. Remove screen frame assembly.
4. Remove the PRT assembly.
5. Remove the HV anode lead and cup from the PRT.
6. Ensure that HV anode cup location is completely cleaned of all old silicon sealant residue.
7. Install new and improved HV anode lead. Place a 3/8" bead of silicon sealant (Hitachi part number 9413926) on the CRT around the lip of the HV anode. NOTE: Do not allow sealant to contact any metal connector parts.
8. Re-assemble PTV and adjust if necessary.

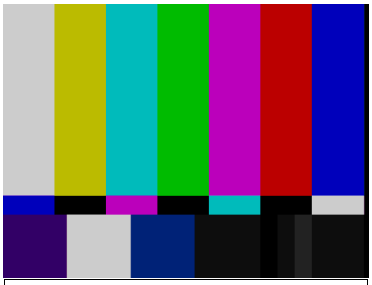


Figure 1
NTSC Color Bars

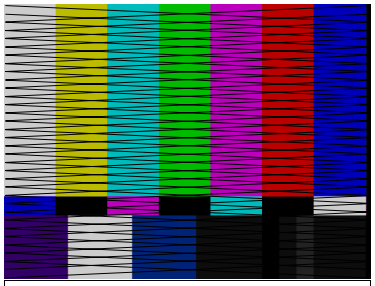


Figure 2
NTSC Color Bars with horizontal noise

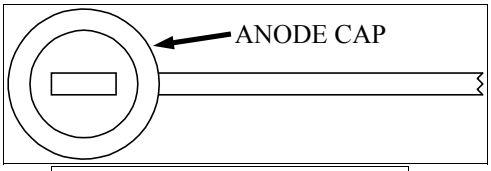


Figure 3
Old Cap - No silicone rubber insert

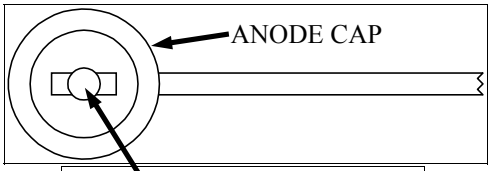


Figure 4
New Cap - silicone rubber insert added

BULLETIN

SERVICE

HITACHI

PTV 01-04

August, 2001

Hitachi America, Ltd., Home Electronics Division
National Service

PTV

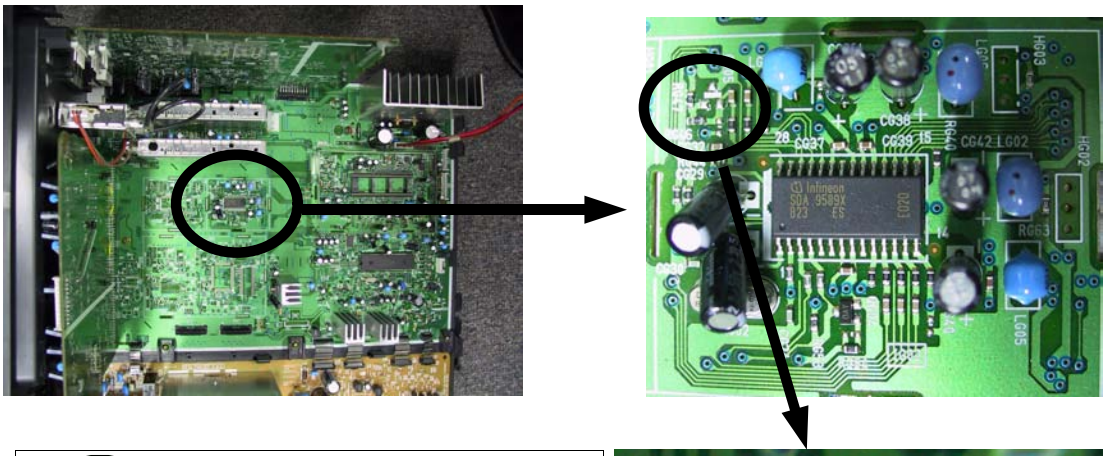
MODEL:	**50DX10B, 60DX10B**	**HP11 CHASSIS**
	43GX10B, 50GX30B	**HP12 CHASSIS**
	53SBX10B, 61SBX10B	**HP13 CHASSIS**

SUBJECT: **CUSTOMER COMPLAINT OF EXCESSIVE NOISE IN PINP**

Details:
Reportedly, some customers may complain about noise in the sub-picture. This symptom can ***only*** manifest under two coexisting conditions, (i.e. both conditions must be met). (1) Only when using a source of composite video. (2) Only with certain brand name DVD or VCR as a source for Picture-In-Picture. If this complaint is received, perform the following circuit improvement.

Procedure:
1. Replace RG46 (0.0 ohm chip resistor jumper) with 1.0K ohm chip resistor (p/n 0700041).
2. Replace RG47 (0.0 ohm chip resistor jumper) with 270 ohm chip resistor (p/n 0700033M).
3. Add C1 100pf capacitor (p/n 0890074) as per Figure 1.
4. Add C2 100pf capacitor (p/n 0890074) as per Figure 1.
5. Add L1 100uh coil (p/n 2122956M) as per Figure 1.

The above mentioned parts can be obtained by ordering parts kit X480231.



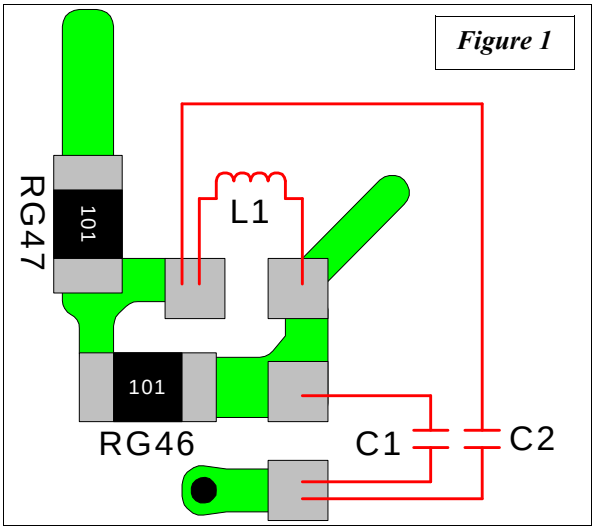


Figure 1

SERVICE BULLETIN

HITACHI

August, 2001

PTV 01-05

Hitachi America, Ltd., Home Electronics Division
National Service

PTV

MODEL	CHASSIS	MODEL	CHASSIS	MODEL	CHASSIS
43UWX10B	DP14G	43FDX01B	DP05F	50DX10B	HP11
53UWX10B	DP14G	53FDX01B	DP05	60DX10B	HP11
61UWX10B	DP14G	53SDX01B	DP06	43GX10B	HP12
		61SDX01B	DP06	50GX30B	HP12
		53SWX01W	DP07	53SBX10B	HP13
53UDX10B	DP15	61SWX01W	DP07	61SBX10B	HP13
61UDX10B	DP15				
53SWX10B	DP17				
53SWX12B	DP17				
61SWX10B	DP17				
61SWX12B	DP17				

SUBJECT: DIGITAL CONVERGENCE ADJUSTMENT MODE ACCESS

Details:
In the past, when the technician needed to enter the Digital Convergence Adjustment Mode (DCAM), it was necessary to open the front of the unit to access the service switch. Now, to access the DCAM without removing the front panel, please follow the below instructions.

Procedure for Chassis DP14G, DP15, DP17:
1. Press the MAGIC FOCUS button on front panel.
2. While Magic Focus is running, press MAGIC FOCUS button again to "stop".
3. When "STOP" is displayed in OSD, press RECALL or STATUS button on remote control.
4. The unit will now be in the DCAM.

Procedure for Chassis DP06, DP07, HP13:
1. Press and hold the MAGIC FOCUS button on front panel.
2. While the button is held down, the OSD will change from "MAGIC FOCUS" to "CENTER MODE", then to "STATIC MODE".
3. When "STATIC MODE" is displayed in OSD, press INPUT or ANT button on remote control.
4. The unit will now be in the DCAM.

Procedure for Chassis DP05F, DP05, HP11, HP12:
1. Press and hold the DIGITAL ARRAY or CONVERGENCE ADJUST button on front panel.
2. While the button is held down, then press the INPUT or ANT button on remote control.
3. The unit will now be in the DCAM.

NOTE:
1. Proceed with digital convergence adjustment. Remember to save/initialize the correction data.
2. To exit, press POWER button on the front panel.

NOTE: DP-15E (43FDX10B and 43FDX11B) can not enter DCAM via remote.

SERVICE BULLETIN

HITACHI

August, 2001

PTV 01-06

Hitachi America, Ltd., Home Electronics Division
National Service

PTV

MODEL	CHASSIS
43FDX01B	**DP05F**
53FDX01B, 53FDX01BA	**DP05**
53SDX01B, 61SDX01B	**DP06**
53SWX01W, 61SWX01W	**DP07**

SUBJECT: INTERMITTENT BLACK HORIZONTAL BARS

Details:
We have received isolated field reports with a symptom of highly intermittent black horizontal bars appearing in the picture. If the unit is removed from the customers location, the symptom more than likely will not show up. The cause of this phenomenon results from low AC. These models are designed to operate normally when using 120VAC ±10% (108VAC - 132VAC). The symptom will occur when AC drops below 90VAC.

Countermeasure:
(NOTE - Only perform this countermeasure for specific customer complaint)

Procedure:
1. Change value of capacitor C009 from 10uF/16V to 22uf/16V. Use locally procured part for new capacitor (22uf/16V). C009 is located on the SIGNAL PWB near the IC01 heat sink and the PR connector.
2. Verify the effectiveness of this countermeasure by dropping AC to less than 90VAC using a variable AC isolation transformer. Symptom may still manifest at lower than 80VAC.

SERVICE BULLETIN

HITACHI

September, 2001

PTV 01-08A

Hitachi America, Ltd., Home Electronics Division
National Service

PTV

MODEL: ALL PTV WITH ULTRA-SHIELD PROTECTOR

SUBJECT: REMOVAL OF PROTECTIVE PLASTIC SHEET

DETAILS:
It has been discovered that on some TV sets with screen protectors, the plastic sheet leaves a film or a glue residue after it's removal. To remove the glue residue from the screen protector, please follow the approved method listed below.

CORRECTION:
1. Remove the screen protector sheet.
2. Use the cleaner ***Endust™ for Electronics** (see ***Figure 1***) and spray over area with glue residue on the screen.
3. Clean with a soft towel after application.
4. Observe that the glue residue has been removed.

If the glue residue persists:

1. Use ****Lava® Heavy-Duty Hand Cleaner Towels** (see ***Figure 2***) to remove glue residue.
2. Observe that the glue residue has been removed.
3. Clean off the soap film left by the ****Lava® Heavy-Duty Hand Cleaner Towels** using any generic type window cleaning solution.

PARTS:
***Endust™ for Electronics**
©1996
KIWI BRANDS
DOUGLASSVILLE, PA
19518-1239

****Lava® Heavy-Duty Hand Cleaner Towels**
WD-40 Company
San Diego, CA 92110

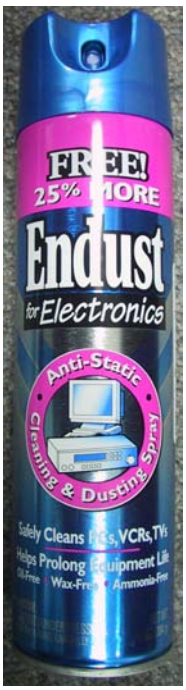


Figure 1

Figure 2

BULLETIN

SERVICE

HITACHI

October, 2001

PTV 01-10

Hitachi America, Ltd., Home Electronics Division
National Service

PTV

MODEL:	**43UWX10B**	**DP-14G CHASSIS**
	53UWX10B, 53UWX10BA	**DP-14G CHASSIS**
	61UWX10B, 61UWX10BA	**DP-14G CHASSIS**
	53UDX10B, 53UDX10BA	**DP-15 CHASSIS**
	61UDX10B	**DP-15 CHASSIS**
	53SBX10B	**HP-13 CHASSIS**

SUBJECT: MAGIC FOCUS METHOD

DETAILS:
Some of the new 2001 Projection TV models are using 'Magic-S' convergence technology instead of the prior single cross-hatch technology. This new 'Magic-S' technology uses four sensors instead of eight. When the MAGIC FOCUS button on the front panel is pressed, the television will automatically adjust itself to the factory adjusted data.

NOTE:
BEFORE INITIATING MAGIC FOCUS, THE TELEVISION MUST BE TURNED "ON" AND HEAT RUN FOR A MINIMUM OF 20 MINUTES. IF THE MAGIC FOCUS BUTTON IS PRESSED BEFORE THE WARM-UP PERIOD IS COMPLET, THE CONVERGENCE RESULTS MAY BE ABNORMAL. To correct abnormal convergence, turn off the television and allow for cool down, approximately 30 seconds. Turn on the television again, and allow for minimum of 20 minutes for warm up. If after pressing MAGIC FOCUS button still returns abnormal convergence, follow the below procedure to access the Digital Convergence Adjustment Mode (DCAM), then first attempt to correct by reading old ROM data into memory. If this fails, proceed with digital convergence adjustments.

PROCEDURE FOR DP14G AND DP15 CHASSIS:
1. Press the MAGIC FOCUS button on front panel.
2. While Magic Focus is running, press the MAGIC FOCUS button again to "***STOP***".
3. When "***STOP***" is displayed on the OSD, press the RECALL or the STATUS button on the remote control.
4. The unit will now be in the DCAM.
5. Press the SWAP button twice to read old ROM data into memory. ***"READ FROM ROM?"*** will display on the OSD after the first press of the SWAP button.
6. Proceed with digital convergence adjustments ONLY if ***READ FROM ROM*** did not clear up the convergence error.
7. Remember to save the correction data and initialize the MAGIC FOCUS sensors. To save the correction data, press the PIP MODE button twice. "***WRITE TO***

(continued)

ROM?" will display on the OSD after the first press of the PIP MODE button. After the second press of the PIP MODE button, the screen will go dark for approximately 20 seconds. When the data has been saved, or ROM WRITE has been completed, green dots will appear on the OSD corresponding to the 13 x 9 crosshatch intersection adjustment points. After the green dots appear, press the MUTE button to return to the DCAM. To initialize the Magic Focus sensors, first press the PIP MODE button once. Again, "***WRITE TO ROM?"*** will display on the OSD. Then press the PIP CH button to start the sensor data position initialization procedure. When this process has completed, you will again see the green dots on the OSD, unless an error has occurred in the initialization procedure, in which case the technician would be presented with an error code in the lower left corner in the OSD corresponding to what the actual error is. Failure to initialize MAGIC FOCUS sensors after saving convergence correction data will result in a STATIC (+) display when MAGIC FOCUS attempts to run. The technician will then be **required** to access the service only switch behind the front cover to get back into the DCAM to initialize the sensors, since the procedure to access DCAM without removing the front panel, requires MAGIC FOCUS to be running.

8. To exit, press the POWER button on the front panel.

PROCEDURE FOR HP13 CHASSIS:

1. Press and hold the MAGIC FOCUS button on the front panel.
2. While the button is held down, the OSD will change from "***MAGIC FOCUS***" to "***CENTER MODE***", then to "***STATIC MODE***".
3. When "***STATIC MODE***" is displayed on the OSD, press the INPUT or the ANT button on the remote control.
4. The unit will now be in the DCAM.
5. Press the SWAP button twice to read old ROM data into memory. ***"READ FROM ROM?"*** will display on the OSD after the first press of the SWAP button.
6. Proceed with digital convergence adjustments ONLY if ***READ FROM ROM*** did not clear up convergence error.
7. Remember to save the correction data and initialize the MAGIC FOCUS sensors. To save the correction data, press the PIP MODE button twice. "***WRITE TO ROM?"*** will display on the OSD after the first press of the PIP MODE button. After the second press of the PIP MODE button, the screen will go dark for approximately 20 seconds. When the data has been saved, or ROM WRITE has been completed, green dots will appear on the OSD corresponding to the 13 x 9 crosshatch intersection adjustment points. After the green dots appear, press the MUTE button to return to the DCAM. To initialize the Magic Focus sensors, first press the PIP MODE button once. Again, "***WRITE TO ROM?"*** will display on the OSD. Then press the PIP CH button to start the sensor data position initialization procedure. When this process has completed, you will again see the green dots on the OSD, unless an error has occurred in the initialization procedure, in which case the technician would be presented with an error code in the lower left corner in the OSD corresponding to what the actual error is. Failure to initialize MAGIC FOCUS sensors after saving convergence correction data will result in a STATIC (+) display when MAGIC FOCUS attempts to run.
8. To exit, press the POWER button on the front panel.

BULLETIN

SERVICE

HITACHI

December, 2001

PTV 01-14

Hitachi America, Ltd., Home Electronics Division
National Service

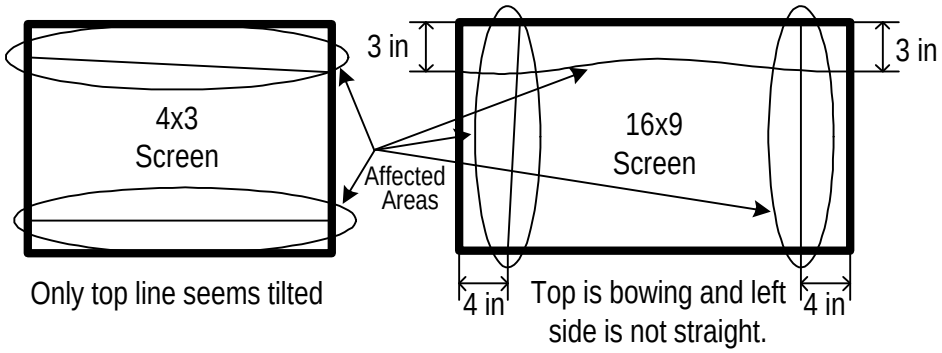
PTV

MODEL: **All Digital Models (2H)**

SUBJECT: **Convergence & Symmetry Adjustments.**

Complete Convergence Adjustments.
The only time a Screen Jig would be needed is when a new DCU is installed, or if the DCU RAM has been cleared and saved "by accident". If so, follow S/M instructions very closely, paying special attention to the R and B OFFSET and Horizontal size and position on the I^2C bus.

Touch Up:
All other conditions will be considered "touch up". In other words, the original reference was never lost. Most times, customers notice one or two areas where the colors are separated, or are *not symmetrical*, as in the following examples: *NOTE: The values given on these examples are used for reference ONLY.



The Main Problem:
When customers complain that they notice a line that is not straight (see both examples given) generally the convergence is adjusted to make the line white….*but it will still be bowed or tilted*. This will become more obvious when viewing Widescreen formatted DVD on a 4x3, a menu from a Set Top Box or when displaying a 4x3 format on the 16x 9 screen.

To touch it up:
Make sure Horizontal Position is correct– check Center before attempting touch up.
Turn OFF red and blue, work on GREEN only. Use a straight reference to place on top of the affected line. In this case tape a string from side to side using the frame as a measuring reference and adjust the affected line to match the reference. Once the green is straight, turn red on and match to green; then do the same with the blue.
A straight reference line may need to be placed on the left, top, bottom, right, etc,...if those areas are affected.

Goal:
Assure the Green reference is straight and then make sure to place the red and blue on top of the green. Make sure to adjust symmetry as well as convergence.

Note 1:
If unit has Magic Focus, make sure to save to RAM and then re-initialize Magic Focus sensors – Test Magic Focus before leaving customer's home. If unit does not have Magic Focus, just save to RAM...DO NOT try to re-initialize Magic Focus sensors. If this is done, unit will display errors….this is normal, because there are no sensors to re-initialize.

Note 2:
There are TWO Convergence Modes on ALL Digital PTVs – Normal or Progressive and HD or High Definition. Treat each independently of each other, each has a separate memory. Adjust or touch up normal and save, adjust or touch up HD and save to RAM and to MF if applicable. DP-1X has two modes **only** on 4x3 screens; Normal and V Squeeze or Through Mode (Aspect 5). All DP-1X 16x9 screens have only one mode, regardless of signal being used.

Note 3:
The HD mode is accessible ONLY when feeding 720p or 1080i from a Set Top Box or a Generator, even if there is no signal present. Just make sure the output of the Set Top Box is set to 1080i. There is no need for an HD source or generator to do a touch up or complete convergence on Normal mode.

February, 2002

Hitachi America Ltd. Home Electronics Division

National Service

MODEL:

53SDX89B, 60SDX88B DP-86 CHASSIS

43FDX01B, 53FDX01B DP-05 CHASSIS

53SDX01B, 61SDX01B DP-06 CHASSIS

53SWX01B, 61SWX01B DP-07 CHASSIS

SUBJECT:

POOR QUALITY PICTURE WHEN DISPLAYING 1H SIGNAL ON 2H PTV

PHENOMENOM:

There have been a number of reports regarding the picture quality of 2H sets while receiving a 1H signal. Reports have included, but are not limited to, fuzzy picture, frame lag, picture blurring with motion, etc.

REPLY:

HITACHI Engineering has received, reviewed, and confirmed these reports and found the symptom to be normal. The reason is the signal sent by the broadcaster is 1H while the set is scanning at 2H. When the TV is receiving a 1H signal, the Flex Converter circuitry has to artificially generate an extra line for each line received. These extra lines are not the actual signal, but are re-created line samples from the internal RAM of the Flex Converter. When the signal changes rapidly, as in fast zooming, or panning at a high rate, these extra lines are re-created at a fixed rate and occasionally are not created as rapidly as the signal is changing.

THINGS YOU SHOULD KNOW

Please see the Web site; http://www.hitachiserviceusa.com for a current Things You Should Know section, as this section is updated frequently.

NOTES:

NOTES: