

2. Alignment and Adjustments

2-1 Service Mode

2-1-1 How to Enter and Exit Service Mode

1. Turn the Power ON and select "STANDARD" for the Screen Adjustment Mode.
2. Turn the Power OFF and put the set in Stand-By Mode.
3. Press these buttons sequentially to enter Service Mode : Mute_1_8_2 and Power.
 - ♣ If you fail to enter Service Mode, try steps 1, 2 and 3 again.
4. After completing the adjustment, select Reset from Service Mode's initial screen to exit Service Mode and turn OFF the Power. After exiting, the user's custom starting screen will be selected.
5. Any adjustable data changed will be automatically saved.
 - There is no separate "Save" key.

2-1-2 Initial Display in Service Mode

1. When RF Patterns are Displayed

Deflection
480p offset
1080i offset
Convergence & NR
Video Adjust 1
Video Adjust 2
Video Adjust 3
Video Adjust 4
Video Adjust DNle
Option
CHECKSUM0000
Reset

2-1-3 Button Descriptions for Service Mode

MENU	Full Menu Display / Move to Parent Menu
Direction Keys ▲/▼	Item Selection by Moving the Cursor
Direction Keys ◀/ ▶	Data Increase/Decrease for the Selected Item

2-1-4 Cautions Regarding service Mode

1. Do not adjust the fixed attributes, only the adjustables.
2. For adjustments of RF and 1080i Modes, switch to the respective input source and proceed with the adjustments.

2-2 Factory Data

2-2-1 Deflection (RF)

* Do not change any fixed attributes

No	ITEM	Initial Value	Range	EEP-ROM Copy Data	Remark
				RF-Mode	
1	V Amp	31	0 ~ 63	31	Adjust
2	V Shift	29	0 ~ 63	29	*Fixed
3	H EW	31	0 ~ 63	31	Adjust
4	H Shift	35	0 ~ 63	35	*Fixed
5	V Llinearity	7	0 ~ 15	7	*Fixed
6	Upper Llinearity	0	0 ~ 15	0	*Fixed
7	Lower Llinearity	0	0 ~ 15	0	*Fixed
8	V SC	7	0 ~ 15	7	*Fixed
9	H Parabola	31	0 ~ 63	31	*Fixed
10	Upper Corner	31	0 ~ 63	31	*Fixed
11	Lower Corner	31	0 ~ 63	31	*Fixed
12	H Trapezium	31	0 ~ 63	31	*Fixed
13	Bow	31	0 ~ 63	31	*Fixed
14	Angle	31	0 ~ 63	31	*Fixed
15	V Position	31	0 ~ 63	31	*Fixed
16	CXA Left Blk	45	0 ~ 63	45	*Fixed
17	CXA Right Blk	20	0 ~ 63	20	*Fixed

2-2-2 480p Offset

* Do not change any fixed attributes

No	ITEM	Initial Value	Range	480p-Mode	Remark
1	V Amp	0	-63 ~ 63	0	Adjust
2	V Shift	0	-63 ~ 63	0	Adjust
3	H EW	0	-63 ~ 63	0	Adjust
4	H Shift	0	-63 ~ 63	0	Adjust
5	V Llinearity	0	-15 ~ 15	0	*Fixed
6	Upper Llinearity	0	-15 ~ 15	0	*Fixed
7	Lower Llinearity	0	-15 ~ 15	0	*Fixed
8	V SC	0	-15 ~ 15	0	*Fixed
9	H Parabola	0	-63 ~ 63	0	*Fixed
10	Upper Corner	0	-63 ~ 63	0	*Fixed
11	Lower Corner	0	-63 ~ 63	0	*Fixed
12	H Trapezium	0	-63 ~ 63	0	*Fixed
13	Bow	0	-63 ~ 63	0	*Fixed
14	Angle	0	-63 ~ 63	0	*Fixed
15	V Position	0	-63 ~ 63	0	*Fixed
16	CXA Left Blk	28	-63 ~ 63	28	*Fixed
17	CXA Right Blk	36	-63 ~ 63	36	*Fixed

2-2-3 1080i Offset

* Do not change any fixed attributes

No	ITEM	Initial Value	Range	1080i-Mode	Remark
1	V Amp	0	-63 ~ 63	0	Adjust
2	V Shift	0	-63 ~ 63	0	Adjust
3	H EW	0	-63 ~ 63	0	Adjust
4	H Shift	0	-63 ~ 63	0	Adjust
5	V Llinearity	0	-15 ~ 15	0	*Fixed
6	Upper Llinearity	0	-15 ~ 15	0	*Fixed
7	Lower Llinearity	0	-15 ~ 15	0	*Fixed
8	V SC	0	-15 ~ 15	0	*Fixed
9	H Parabola	0	-63 ~ 63	0	*Fixed
10	Upper Corner	0	-63 ~ 63	0	*Fixed
11	Lower Corner	0	-63 ~ 63	0	*Fixed
12	H Trapezium	0	-63 ~ 63	0	*Fixed
13	Bow	0	-63 ~ 63	0	*Fixed
14	Angle	0	-63 ~ 63	0	*Fixed
15	V Position	0	-63 ~ 63	0	*Fixed
16	CXA Left Blk	63	-63 ~ 63	63	*Fixed
17	CXA Right Blk	20	-63 ~ 63	20	*Fixed

2-2-4 Convergence & NR

* Do not change any fixed attributes

No	ITEM	Initial Value	Range	All-Mode	Remark
1	Offset Enable	0	0 ~ 1	0	*Fixed
2	V AMp	5	-63 ~ 63	5	*Fixed
3	V Shift	0	-63 ~ 63	0	*Fixed
4	H EW	0	-63 ~ 63	0	*Fixed
5	V Amp 1080i	5	-63 ~ 63	5	*Fixed
6	V Shift 1080i	0	-63 ~ 63	0	*Fixed
7	H EW 1080i	5	-63 ~ 63	5	*Fixed
8	NR High Ref	40	0 ~ 127	40	*Fixed
9	NR Low Ref	3	0 ~ 127	3	*Fixed
10	NR Hight Value	17	-128 ~ 127	17	*Fixed
11	NR Low Value	51	-128 ~ 127	51	*Fixed
12	NR Hight Ref (s)	20	0 ~ 127	20	*Fixed
13	NR Low Ref (s)	0	0 ~ 127	0	*Fixed
14	NR Hight Value (s)	17	-128 ~ 127	17	*Fixed
15	NR Low Value (s)	50	-128 ~ 127	50	*Fixed
16	V BLK 480i	51	0 ~ 255	51	*Fixed
17	V BLK 480p	133	0 ~ 255	133	*Fixed
18	V BLK 1080i	0	0 ~ 255	0	*Fixed
19	NR Read M/S				Read Data

2-2-5 Video Adjust 1

* Do not change any fixed attributes

No	Video Adjust 1 (RF/1080i is Separated)	Initial Value (RF/1080i)	Range	RF-Mode	1080i	Remark
1	R Cutoff	32 / 32	0 ~ 63	32	32	Adjust
2	G Cutoff	32 / 32	0 ~ 63	32	32	*Fixed
3	B Cutoff	32 / 32	0 ~ 63	32	32	Adjust
4	COLOR On/Off	1 / 1	0 ~ 1	1	1	*Fixed
5	CR Offset	32 / 32	0 ~ 63	32	32	Adjust
6	CB Offset	32 / 32	0 ~ 63	32	32	Adjust
7	R Drive	32 / 32	0 ~ 63	32	32	Adjust
8	G Drive	32 / 32	0 ~ 63	32	32	*Fixed
9	B Drive	32 / 32	0 ~ 63	32	32	Adjust
10	Sub Bright	15 / 30	0 ~ 63	15	30	Adjust
11	Sub Contrast	7 / 7	0 ~ 15	7	7	Adjust
12	Sub Color	17 / 15	0 ~ 23	17	15	*Fixed
13	Sub Tint	8 / 8	0 ~ 13	8	8	*Fixed
14	CTI Level	0 / 0	0 ~ 3	0	0	*Fixed
15	COL AXIS	0 / 0	0 ~ 3	0	0	*Fixed
16	LTI Level	1 / 2	0 ~ 3	1	2	*Fixed
17	9883 PHASE	168 / 168	0 ~ 255	168	168	*Fixed

2-2-6 Video Adjust 2

* Do not change any fixed attributes

No	Video Adjust 2 (RF/1080i is Separated)	Initial Value (RF/1080i)	Range	RF-Mode	1080i	Remark
1	ABL mode	2 / 3	0 ~ 3	2	3	*Fixed
2	Gamma	1 / 1	0 ~ 3	1	1	*Fixed
3	DPIC Level (DNP)	1 / 2	0 ~ 3	1	2	*Fixed
4	DC Tran	3 / 1	0 ~ 3	3	1	*Fixed
5	ABL TH	15 / 15	0 ~ 15	15	15	*Fixed
6	VM Level	3 / 2	0 ~ 3	3	2	*Fixed
7	VM Coring	0 / 0	0 ~ 3	0	0	*Fixed
8	VM fo	0 / 1	0 ~ 3	0	1	*Fixed
9	VM Limit	0 / 0	0 ~ 3	0	0	*Fixed
10	VM Delay	3 / 1	0 ~ 3	3	1	*Fixed
11	SHP CD	1 / 1	0 ~ 3	1	1	*Fixed
12	SHP fo	1 / 1	0 ~ 1	1	1	*Fixed
13	SHP f1 & P/O	11 / 13	0 ~ 15	11	13	*Fixed
14	AKB Time	16 / 16	0 ~ 31	16	16	*Fixed
15	YC Delay	31 / 30	0 ~ 31	31	30	*Fixed
16	PIP YC Delay	30 / 30	0 ~ 31	30	30	*Fixed
17	BandPass 9407	1 / 1	0 ~ 7	1	1	*Fixed
18	HighPass 9407	2 / 3	0 ~ 7	2	3	*Fixed
19	VSP_1E_DATA1	15 / 15	0 ~ 15	15	15	*Fixed
20	VSP_1E_DATA2	15 / 15	0 ~ 15	15	15	*Fixed
21	VSP_1E_DATA3	13 / 13	0 ~ 15	13	13	*Fixed

2-2-7 Video Adjust 3

* Do not change any fixed attributes

No	Video Adjust 3 (All Mode Equality)	Initial Value	Range	ALL-mode	Remarks
1	Pilot Low	7	0 ~ 127	7	*Fixed
2	Pilot High	13	0 ~ 127	13	*Fixed
3	H Comp	10	0 ~ 15	10	*Fixed
4	V Comp	10	0 ~ 15	10	*Fixed
5	Pin Comp	0	0 ~ 7	0	*Fixed
6	AFC Comp	0	0 ~ 7	0	*Fixed
7	Sync Phase	0	0 ~ 1	0	*Fixed
8	NR Off Value	0	0 ~ 9	0	*Fixed
9	Melody Volume	6	0 ~ 20	6	*Fixed
10	Video Mute Time	5	0 ~ 1sec	500ms	*Fixed
11	PIXEL-SHIFT	1	0 ~ 5	1	*Fixed
12	SHIFT-TIME	60	0 ~ 60	60	*Fixed
13	COLOR KILL LEVER	191	0 ~ 255	185	*Fixed
14	Real Time(Hour)	72	0 ~ 255	72	*Fixed
15	P_ABL	5	0 ~ 15	5	*Fixed

2-2-8 Video Adjust 4

* Do not change any fixed attributes

No	Video Adjust 4 (Only Indicated Modes)	Initial Value	Range	Display Mode	Remark
1	System_RF	1	0 ~ 3	1	*Fixed
2	System_VSD_480p	2	0 ~ 3	2	*Fixed
3	System_1080i	2	0 ~ 3	2	*Fixed
4	Shp_Fo_VSD_480p	1	0 ~ 1	1	*Fixed
5	HPF_VSD	3	0 ~ 7	3	*Fixed
6	BPF_VSD	1	0 ~ 7	1	*Fixed
7	Chrm_bdwth_RF	28	0 ~ 63	28	*Fixed
8	Chrm_bdwth_Video	28	0 ~ 63	28	*Fixed
9	Chrm_bdwth_Svideo	30	0 ~ 63	30	*Fixed
10	Chrm_bdwth_DVD	28	0 ~ 63	28	*Fixed
11	IF_Comp_RF	2	0 ~ 7	2	*Fixed
12	IF_Comp_Video	4	0 ~ 7	4	*Fixed
13	IF_Comp_Svideo	5	0 ~ 7	5	*Fixed
14	IF_Comp_DVD	4	0 ~ 7	4	*Fixed
15	VM_Delay_480p	1	0 ~ 3	1	*Fixed
16	SW-Filter	100Hz	NOME~220Hz	100Hz	*Fixed

2-2-9 Video Adjust DNle

* Do not change any fixed attributes

No	ITEM	Initial Value	Range	RF-Mode	1080i-Mode	Remarks
1	NR Scale Max	48 / 48	0 ~ 255	48	48	*Fixed
2	NR Scale Min	26 / 26	0 ~ 255	26	26	*Fixed
3	NR HPF TH	0 / 0	0 ~ 7	0	0	*Fixed
4	NR EDGE TH	4 / 5	0 ~ 7	4	5	*Fixed
5	NR Sel	2 / 2	0 ~ 3	2	2	*Fixed
6	CE Upper	196 / 220	0 ~ 255	196	220	*Fixed
7	CE Cutoff	52 / 42	0 ~ 255	52	42	*Fixed
8	CE Gain L	45 / 45	0 ~ 255	45	45	*Fixed
9	CE Gain U	35 / 35	0 ~ 255	35	35	*Fixed
10	DCE Gain	64 / 64	0 ~ 255	64	64	*Fixed
11	DE Gain	40 / 96	0 ~ 127	40	96	*Fixed
12	DE Noise Gain	8 / 10	0 ~ 15	8	10	*Fixed
13	DE Coring	3 / 1	0 ~ 63	3	1	*Fixed
14	DE H Cont	8 / 128	0 ~ 255	8	128	*Fixed
15	DE V Cont	32 / 128	0 ~ 255	32	128	*Fixed
16	WS On	0 / 0	0 ~ 1	0	0	*Fixed
17	WS Gain	8 / 8	0 ~ 63	8	8	*Fixed
18	CTE Gain	0 / 32	0 ~ 255	0	32	*Fixed
19	WTE Gain	0 / 50	0 ~ 127	0	50	*Fixed
20	R NR On	0 / 1	0 ~ 1	0	1	*Fixed
21	R Noise TH1	8 / 3	0 ~ 127	8	3	*Fixed
22	R Noise TH2	72 / 25	0 ~ 255	72	25	*Fixed
23	R Noise TH3	128 / 45	0 ~ 255	128	45	*Fixed
24	R GAIN2	127 / 127	0 ~ 127	127	127	*Fixed
25	Red Gain Offset	255 / 255	0 ~ 255	127	127	Adjustable
26	Green Gain Offset	255 / 255	0 ~ 255	127	127	Adjustable
27	Blue Gain Offset	255 / 255	0 ~ 255	127	127	Adjustable

2-2-10 Option

MICOM NAME : T_THTNUS_0009 OPTION-BYTE

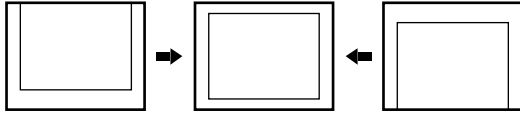
No	Option(D3h 98h 10h)	Initial Value	Range	43"	Remark
1	CRT	Wide	Wide	Wide	16:9 TV
2	PIP	On	On	On	PIP On/Off No Off Option
3	3D-COMB	Off	On↔Off	Off	3D-Comb is not applied No Options
4	Hi-Deviation	Off	On↔Off	Off	Options for Hi-Deviation CRT TV, No Options
5	DNSe	On	On↔Off	Off	DNSe is not applied No Options
6	AGC	Off	On↔Off	Off	No AGC option
7	X-Ray	On	On↔Off	On	No X-Ray On Option
8	PIP Sequence	Large	Large	Large	PIP
9	Letter Box	On	On	On	Options for Immediate Broadcastings, No Options
10	DNle	Demo	Off/On/Demo	Off	DNle Demo
11	SAMSUNG Logo	Off	On↔Off	Off	Option is not applied
12	HDMI	Off	On↔Off	On	
13	DVD	On	On↔Off	On	
14	SYSTEM	CT	CT↔CT-A	CT	
15	V-Chip	On	On↔Off	On	
16	ACS	On	On↔Off	On	

2-2-11 White Balance

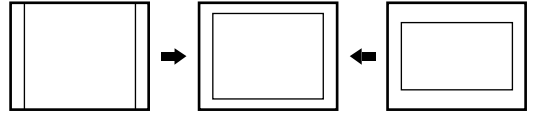
White Balance		W/B High	W/B Low	Remark
43"	RF	Hx : 310±5 Hy : 310±5 HY : 9±1	Hx : 305±10 Hy : 305±10 HY : 0.2±0.05	
	DTV	Hx : 310±5 Hy : 310±5 HY : 9±1	Hx : 305±10 Hy : 305±10 HY : 0.3±0.05	

2-3 Screen Change (When adjusting I²C Bus Geometric items)

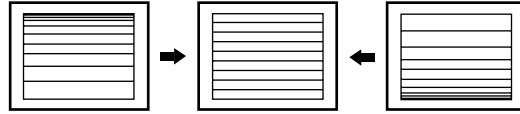
1 V SHIFT



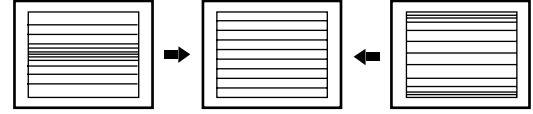
6 V SIZE



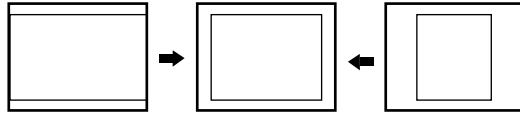
2 V LINEARITY



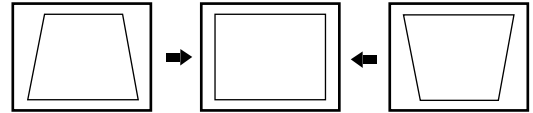
7 V - S - CORRECTION



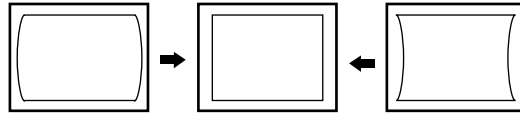
3 H SIZE



8 PIN PHASE



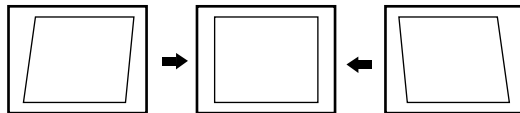
4 PIN AMP



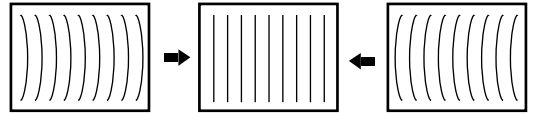
9 H SHIFT



5 V ANGLE



10 V BOW



2-4 Other Adjustments

2-4-1 Screen Adjustment



1. Warm up the TV for at least 30 minutes.
2. Select the "STANDARD" Video mode.
3. Turn to the Video Mode (No Signal) using a remote-control.
4. Connect an oscilloscope to RK,GK,BK.
5. Adjust the VR Screen (in the Focus Pack) to have 20VP-P for the RK, GK and BK pulse. (Turn the R,G and B VR screen fully counterclockwise at each flyback line.)

* Voltage adjustment cannot be done using a normal multi-tester.
For adjustment, use an oscilloscope.
The voltage shown by the tester is false data because the AC peak to peak voltage is adjusted under DC conditions.

2-4-2 White Balance Adjustment

1. Select the "STANDARD" video mode.
2. Input 100% white pattern.
3. In the stand-by mode, press the remote-control keys in the following sequence:





4. Warm up the TV for at least 30 minutes.
5. Input a 10-step signal.
6. R-cut off, B-cut off, and G-cut off by pressing the  keys.
7. Adjust the low light with viewing the dark side of the screen.
8. Select R-drive, G-drive, and B-drive by pressing the  keys.
9. Adjust the high light with viewing the light side of the screen.
10. If necessary, redo screen adjustments and 6~9.
11. Press the Add key to exit.

2-4-3 Sub-Brightness Adjustment

1. Input a sub-brightness adjustment signal. (TOSHIBA PATTERN)
2. In the stand-by mode, press the remote-control keys in the following sequence :



3. Select SBT by pressing the  keys.
4. Adjust so that the 63 step on the right side of the screen is not seen (Use the  keys).
5. Press the Menu key to exit.

2-4-4 High Voltage (29KV) Check

PRECAUTION

1. Input a lion head pattern.
2. Select "STANDARD" video mode.
3. Warm up the TV for at least 10 minutes.
4. Use a 1000:1 probe.

ADJUSTMENT

1. Connect the (+) terminal of the 1000:1 probe to the high voltage distributor and the (-) terminal to GND (located on the deflection board).
2. Adjust RR471S (located on the deflection board) so that the digital meter indicates DC 29V ± 0.1V.

2-4-5 F.S. (Fail Safe) Adjustment

Note : The finished product has VR (RR402S) adjusted and glued at the factory.
If necessary, do the F.S. adjustments in the following sequence.

1. Use a digital multimeter.
2. Connect the digital multimeter to the JIG pin (DZ482S) terminals

3. Adjust VR (RR402S) so that the voltage becomes 2.25V.
4. After the adjustments are complete, be sure to glue VR (RR402S) correctly.

* Point voltage of 2.25V. Adjust to protect the CRT and internal circuits from over-voltage, exceeding 43KV, caused by the Set's internal & external conditions.

* Adjustment Results:

- FBT is replaced
- High-Voltage Module is replaced
- 29KV high voltage is adjusted

2-4-6 F.S. (Fail Safe) Circuit Check

Note : The F.S. Circuit check must be performed after servicing.

1. Turn on the TV.
2. Select the "STANDARD" video mode.
3. Short F/S Test point (located on the SUB PCB). Then, both sound and picture disappear. (Note: Even if the shorted terminals are removed, both sound and picture do not appear. This proves the F.S. circuit is working.)
4. To restore both sound and picture, turn off the TV and reset it after about 30 seconds.

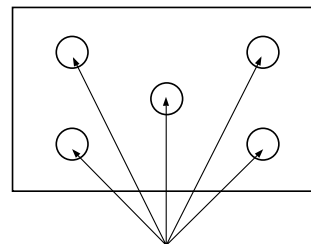
2-4-7 Static Focus Adjustment

PRECAUTION

1. Select the "STANDARD" video mode.
2. Input a crosshatch pattern.
3. Cover the lenses that are not being adjusted.
4. Adjust the lens for best focus. (See Fig. 2-1)

STATIC FOCUS (CONTINUED)

Vary the focus pack VR (Red, Blue) on the front cabinet. Adjust the TV for best possible focus around the center of the crosshatch pattern, without losing overall screen balance.
Figure Crosshatch Pattern
Examine these points together.



Examine these points together

Fig. 2-1 Crosshatch Pattern.

2-4-8 Lens Focus Adjustment

1. Preparation

- ① Set the Screen to "STANDARD".
Contrast : 100
Brightness : 50
- ② Set the pattern to Crosshatch.
- ③ Adjust the electric focus before beginning.
- ④ Adjust the DY tilt (TILT) before beginning.

2. How to Adjust (Green Lens Adjustment)

- ① Loosen the lens screw for easier adjustment.
- ② Press Mute, 1, 8 and 3, sequentially to enter Convergence Mode.
- ③ Display only the Green pattern by using the +100, 0, and Previous Channel Keys in order to turn the R, G, and B patterns On/Off respectively.
- ④ Turn the Green Lens clockwise/Counterclockwise to adjust for optimum status. (Repeat if unsuccessful, varying the VR of the front Focus Pack.)
- ⑤ Perform steps 1~3 for the R and B Lenses.

3. Note

Green determines picture quality; pay close attention for exact adjustment.

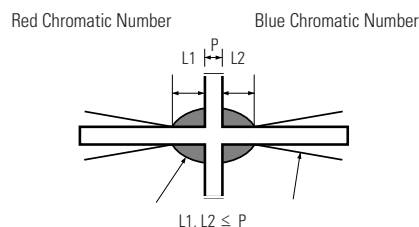
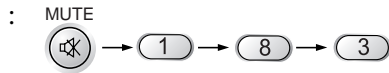


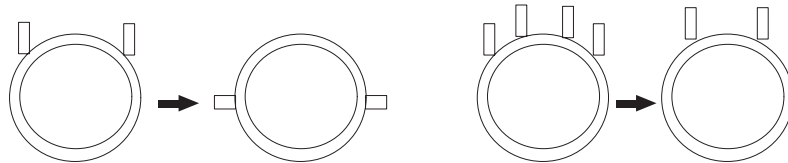
Fig. 2-2 Color Aberration

2-5 Beam alignment Adjustments

1. Select the "STANDARD" video mode.
2. Warm up the set at least for 10 minutes.
3. Enter the Convergence mode by pressing the remote control buttons in the following sequence



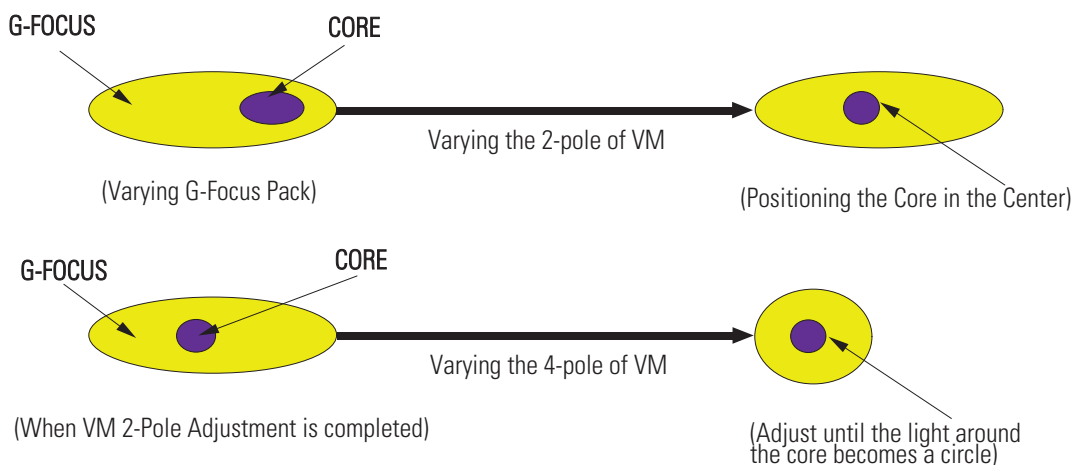
4. Set the Beam Alignment Adjustment CY to Zero magnetic field area.



(Creation of CPM Zero Magnet)

(Creation of the 2-pole/4-pole zero magnets)

5. Check the squarewave at the point where the focus is misaligned (Use an audio oscillator).
6. Press the button on the remote control, and a vibrating dot-pattern appears.
7. Adjust the Focus-pack VR for defocusing.
8. Mute the other patterns (R/B) other than G-PATTERN.
(Use / buttons on the remote control.)
9. Adjust the 2, 4 polarities of VM-COIL as shown in figure below.
10. Adjust the G-Focus until any light around the core disappears.



11. Adjust G-Focus so that the surrounding flash can disappear from the spot.
12. After G-Focus adjustments are complete, adjust R-Focus as above procedures.
13. The B-CRT adjustments can be omitted because the variance of beam focus is small.
(Only Vm-coil is mounted.)
14. Adjust the Focus-pack VR for fine focusing.
15. Press the button on the remote control, and the mode changes to the Convergence Adjustment mode.
16. Press the button on the remote control to return to normal viewing.

2-6 High Voltage Part

2-6-1 PWM REG Circuit

For the existing high voltage REG circuit (input voltage variation type), a dynamic REG response is not provided. So it is difficult for both beam linearity and uniformity in screen size to be maintained on the screen with rapidly changing beams.

A PWM (Pulse Width Modulation) type of high voltage, however, provides the maintenance of beam linearity and uniformity in screen size via a quick response to beam change by performing sync lock every 1H line, and detecting beam fluctuation at 1H line, and then controlling the IC current of high voltage output circuit.

1. High Voltage Fluctuation Detect (DC Detect)

FBT pin 11 detects DC high voltage fluctuation. The detected DC high voltage value is input to PWM IC471 pin1 through R473, VR471, R471, and then it is input to a differential AMP circuit that differentiates the gap after comparing with the reference voltage input to pin2.

2. High Voltage Fluctuation Detect (AC Detect)

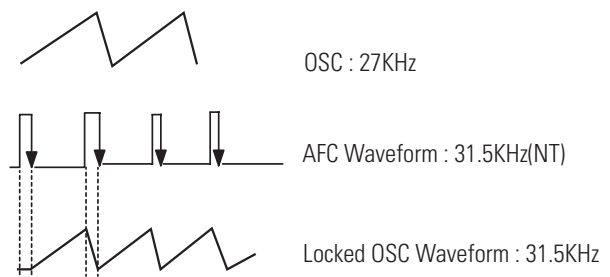
To check AC high voltage fluctuation, the output from FBT is detected by using a capacitor inside the high voltage distributor. The detection of AC high voltage fluctuation, a detection of dynamic beam current change is required in order to keep beam linearity and uniformity in size.

Regarding the capacitor, a capacity of less than 3000P should be applied to a PWM type. (The existing type needs a capacity of about 6000P.) AC detect circuit eliminates unnecessary high frequency by using C476, D472. Also, AC gain is limited to + / - 0.7V (D472). This AC gain is combined with the detection value of DC high voltage fluctuation by using C478.

3. PWM IC OSC Sync Lock

A PWM type IC needs sync lock for PWM pulse and horizontal scan line.

The standard time constant of OSC circuit is determined by C487, R475 (PWM IC pins 5 and 6). And the standard OSC frequency is about 27 kHz. The horizontal frequency of scan line is 31.5kHz(NT), 3375kHz(DTV), 15.75kHz(Interface), so sync lock for this horizontal frequency should be performed using sync lock circuit. The sync lock circuit consists of Q481(Tr KSC815-Y), D479, D478, and C492. The input AFC signal is connected to PWM IC pin 5 through D479 so that it can be negative Trig.

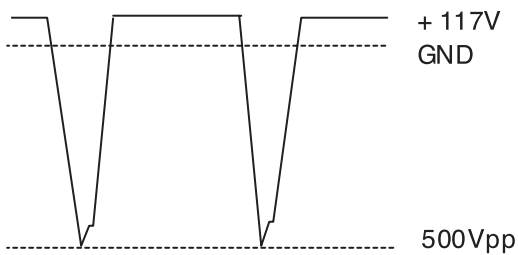


4. Dead Time (HV Protect)

Dead Time (PWM IN pin4) consists of C481, delays high voltage for a certain time to soft start in power on, a x-ray protection circuit. The voltage of Dead Time is detected by FBT pin7 and through DC Feedback. The normal voltage of Dead Time is +27V. When high voltage increases, however, detected voltage is in proportion to high voltage. Then, the detected voltage is applied to ICR01S(TL431). If the voltage is over 2.5V (normal: about 2.25V), TL431 turns ON, the base port of QR401S becomes low, and then an emitter current flows. At this time, a high voltage protection point is set. When QR401S turns ON, high voltage is applied to PWM IC pin4 and then muted.

5. Output Circuit

The voltages, which are detected form an error detection circuit of PWM IC (Differential AMP) and Dead Time, each is applied to PWM comparator . Due to these detection coltages, Q1, Q2 (Output TR) parallel operate. Q482 (External TR), however, functions as a buffer; natches inpedance between the output port of PWM IC and the final output TR(IRFS640). The PWM pulse (applied to the final output FET (IRFS640 GATE) varies the IC current of high voltage TR(Q473) by adjusting the load impedance of starage Trans (T431). Due to this variation of current, the gain for Q473 emitter pulse changes T444(FBT)makes this emitter pulse became high voltage. Such change keeps both dynamic and static changes fixed. The output waveform of high voltage TR emitter is as shown in the figure below.



6. Paranners according to beam

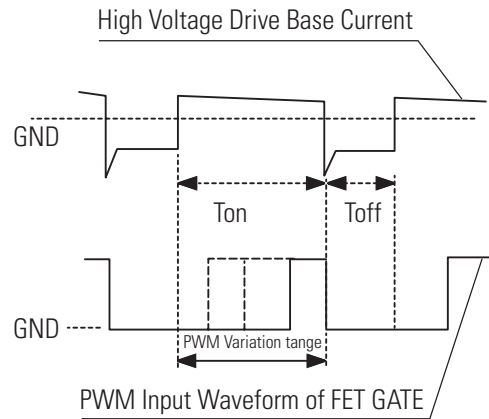
To maintain the set high voltage value (31kV), parmaters such as +Ve (DC), Vcp High Voltage change (See the table below).

Factor of high voltage change	Parameters			
	Width of FET Gate Pulse	+ Ve (DC)	Vcp	High Voltage
Beam ↓ (High voltage ↑)	↓	↑	↓	↓
Beam ↓ (High voltage ↑)	↑	↓	↑	↑

7. Response Waveform

To reduce unstable high voltage fluctuation, the existing high voltage type REG circuit controls dynamic fluctuation by using C-block capacitor. But, it can't detect actual dynamic fluctuation. Also, its velocity of response to static fluctuation is late because +B power supply changes per

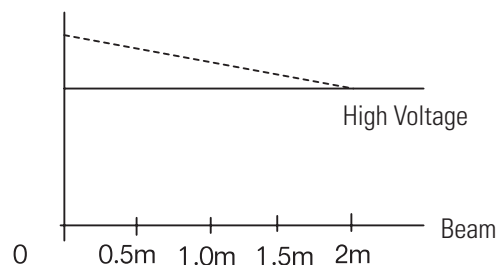
about 1V. A PWM modulation type REG detects static, dynamic high voltage fluctuation for only Ton Time (when the current of the output TR collector flows) each 1H, and modulates the width of PWM pulse. So, this PWM type has better improvement in the characteristic of high voltage REG as compared to the existing type.



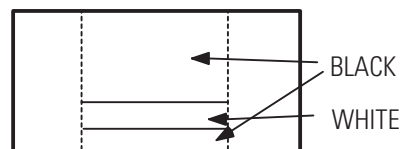
8. Application Effects

- 1) Improvement of horizontal size fluctuation
- 2) Linearity improved
- 3) Embodiment of X-ray protection circuit

The figures below show characteristics when a PWM high voltage REG circuit is applied.



----- High Voltage OFF
 _____ High Voltage REG ON



PWM type



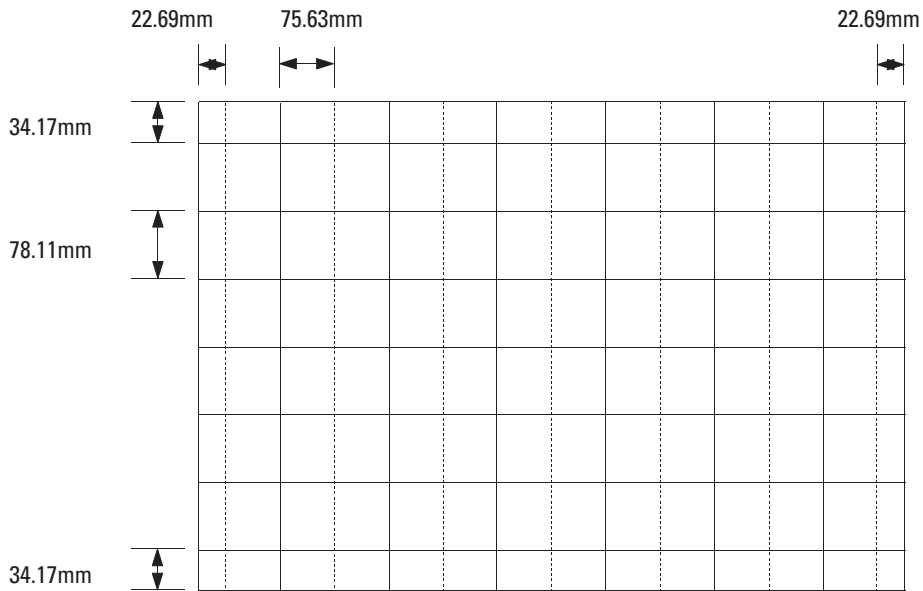
Existing type

When a Toshiba Pattern is received, the screen is displayed as shown in figure side

2-7 Convergence-Jig

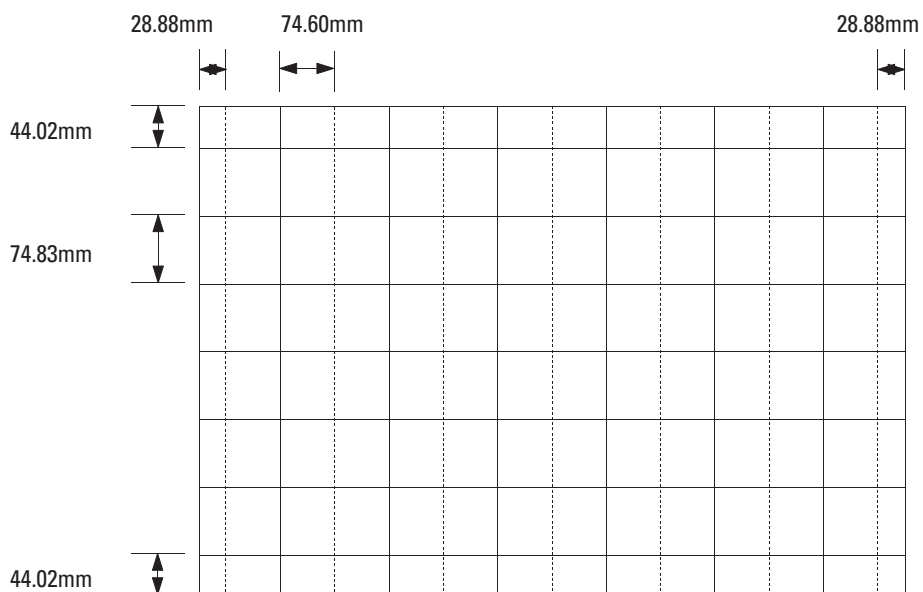
2-7-1 4363W RF Mode

43W6 Screen Size : X 953, Y 537 (X: 378=9*2 +30*12, Y:440=28* 2+64* 6)



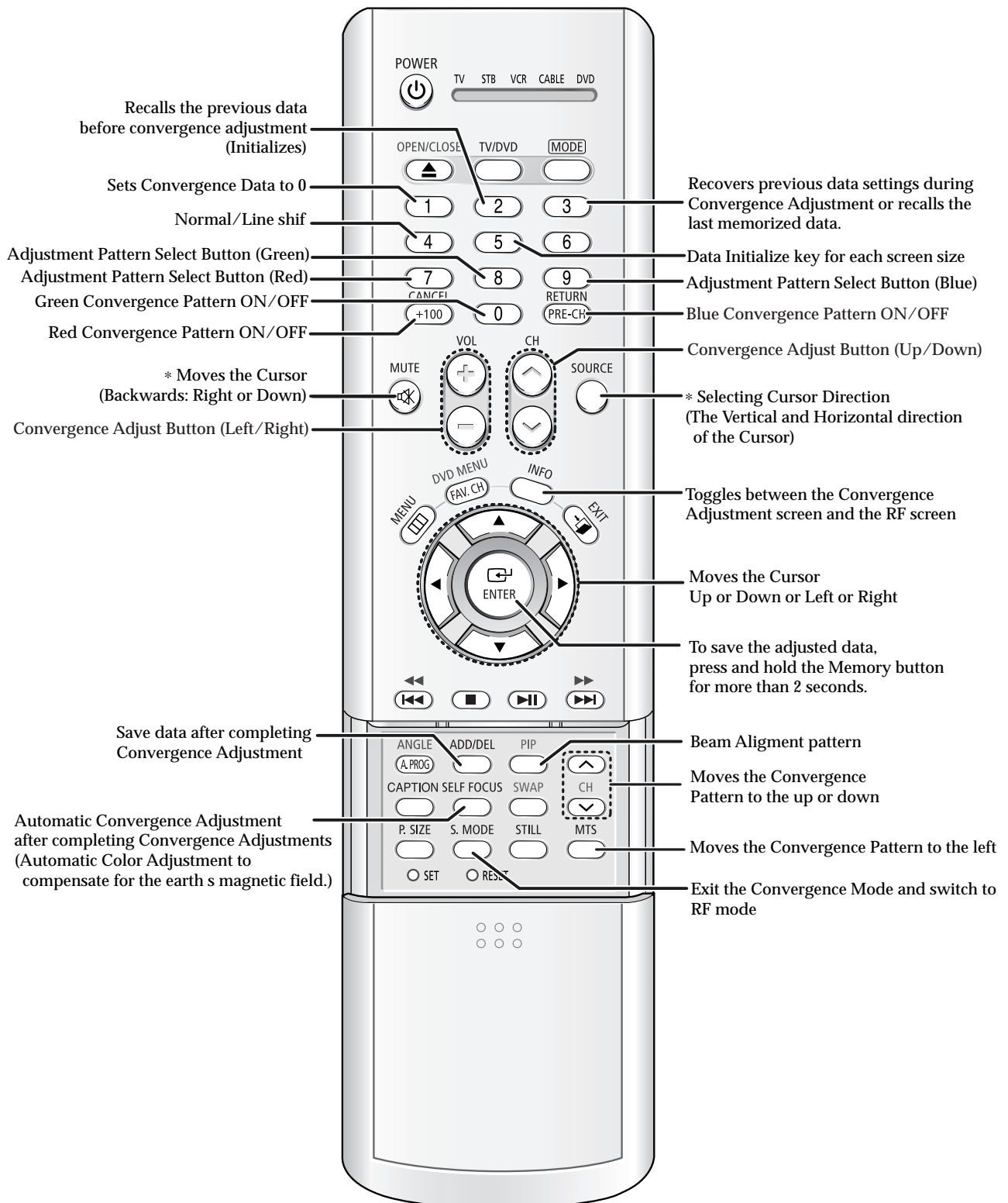
2-7-2 4363W DTV Mode

43W6 Screen Size : X 953, Y 537 (X: 396=12* 2+31* 12, Y: 488=40 *2+68 *6)


















♣ The DTV Mode Adjustment is available only when a Set-top Box is connected.


2-8 P61A Remote Control Descriptions for Convergence Mode



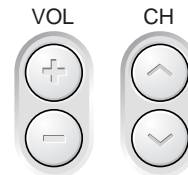
2-8-1 KEY Function

1. R-SELECT KEY 
Press to select RED color.
2. G-SELECT KEY 
Press to select GREEN color.
3. B-SELECT KEY 
Press to select BLUE color.
4. R-MUTE 
Press to mute RED color.
5. G-MUTE 
Press to mute GREEN color.
6. B-MUTE 
Press to mute BLUE color.
7. CANCEL KEY 
Recalls the previous data during convergence Adjustment.
(Recalls the last memorized data)
8. TEST/NORMAL 
Used for switching back to the Normal screen after entering Convergence Mode while receiving a general input signal. Allows for comparison between the Adjustment screen and the Normal screen during adjustment.
♣ Each press of the key will switch between modes.
9. LINE SHIFT KEY 
(Repeat Fine Adjustment (no indication) → Line Adjustment → Enter Mode)
- This key moves the line or whole pattern selected by the cursor, in the following directions :
up/down/left/right, at the beginning of the Convergence Adjustment.
- Press the  key 2 more times for fine Adjustment.
10. FACTORY DATA SELECT KEY 
Press to call the factory default values.
11. H/V DIRECTION SELECT KEY 
Press to switch the cursor direction horizontally or vertically.
12. SAVE KEY 
After the Convergence Adjustments are completed, press to save data.
13. EXIT KEY 
After the Convergence adjustments are completed, press to exit to TV mode.


14. MOVE CURSOR FORWARD 
 Press to move the cursor right or down.

15. MOVE CURSOR REVERSE 
 Press to move the cursor left or up.

16. CONVERGENCE PICTURE MOVE BUTTON
 Use the Channel button (▲, ▼) to adjust Convergence Data up/down and use the Volume buttons (+, -) for left/right adjustment



16-1. Remocon (TM63A) : Using the Joystick
 Move the cursor up, down, left and right by using the Joystick, and adjust the Convergence Data by using the Channel ▲, ▼ and Volume +, - buttons.

17. CONVERGENCE ADJUSTMENT PATTERN MOVE KEY 
 Move the whole Convergence Adjustment Pattern to the left or adjust the H-POS value in Convergence Factory Mode.
 (Before beginning Convergence Adjustment, precisely match the center of the TV screen with the center of the Convergence screen.)

18. CONVERGENCE DATA ZERO KEY 
 Press to zero the convergence correction data.

19. FINE/COARSE KEY 

♣ Changes when applying Almighty-Cg, Module (How to extract the basic Cg Data)

Inch (Type)	Model Name	Basic Data	Screen Display	Discription
	Representative Model	Number after entering the Cg-Mode		
43" (4363W)	HC-P4363W	5-431 (Press in regular order)	++++	White Cross on the background (white cross)

2-8-2 Convergence Adjustment



<Cautions regarding Automatic Color Adjustment>

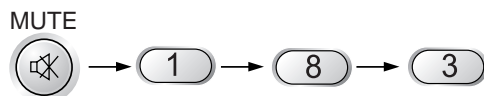
1. This model employs the Automatic Color Adjustment function to prevent distortion of the Convergence by the earth's magnetic field. For it to function properly, the Convergence should be precisely adjusted.
2. The Screen Jig should be used for precise adjustment, so it does not escape the sensor's detection area. Sensors are on the center of each of the 4 faces.
3. Adjustment should be precise, otherwise an Automatic Color Adjustment error occurs.

1. Aging the TV over 30 minutes is required.
2. Apply the NTSC input signal from the antenna or other external input source.

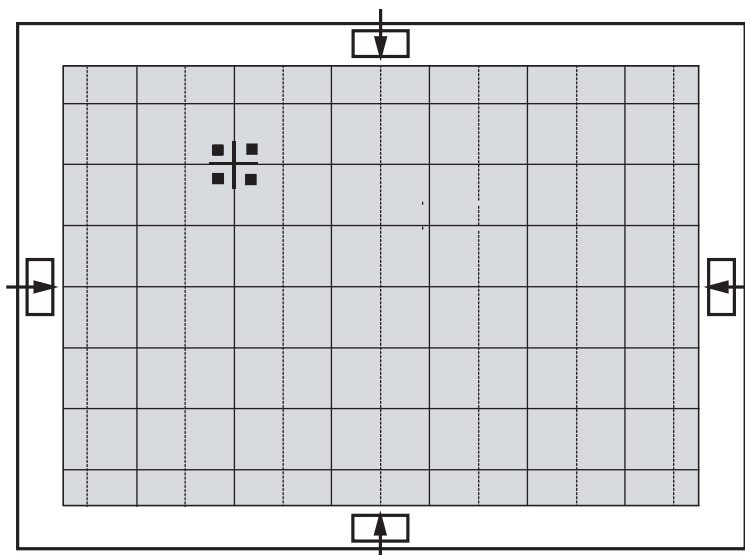


Before adjusting the Green, Red and Blue patterns, adjust the DY of the CRT to avoid having a tilted center line.

3. Press Mute, 1, 8, and 3 (on the remote control) sequentially to enter Convergence Mode. The Test Pattern is displayed.



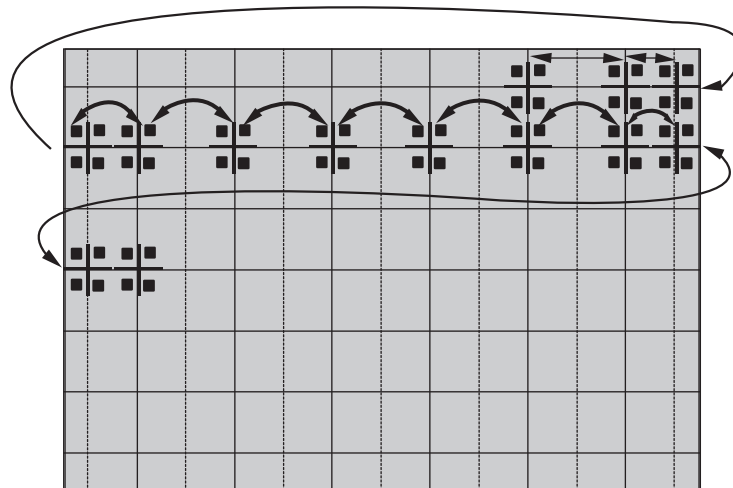
If an OSD (On-Screen Display) appears during the process, press the ^{S.MODE} key to exit Convergence mode and then re-enter Convergence mode.



- Press R-MUTE (+100) and B-MUTE (PRE-CH) to mute out Red and Blue. Press G-SELECT (8) to adjust the Green Color Convergence first.
(For the first entrance, Green Color Convergence will automatically be selected.)

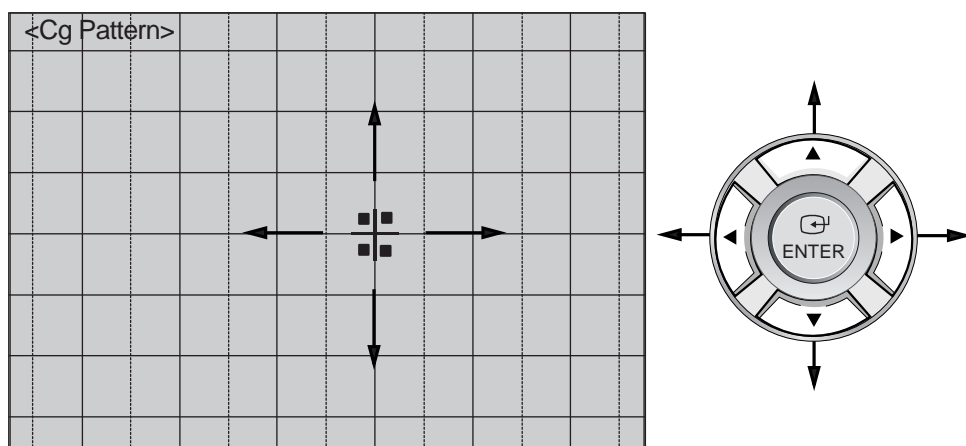


- Press the MUTE (MUTE) key to move the cursor right, the P.MODE (P.MODE) button to move the cursor left.

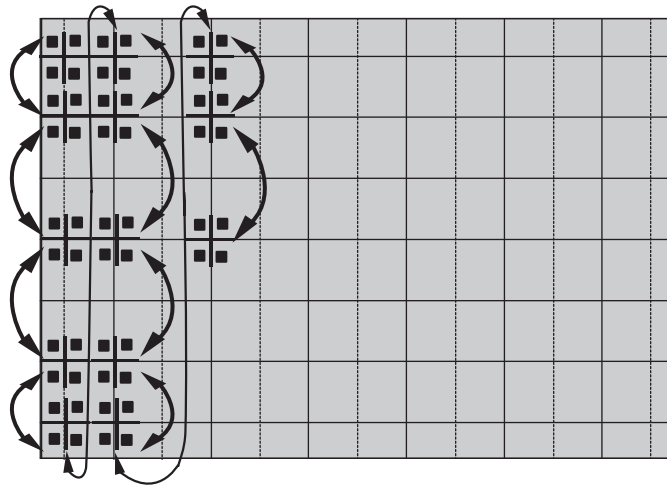


6. Scene Adjustment

Use the left (◀)/right (▶)/up (▲)/down (▼) buttons to move the cursor, and use the channel ▲, ▼ button and the volume +, - buttons to adjust the convergence.

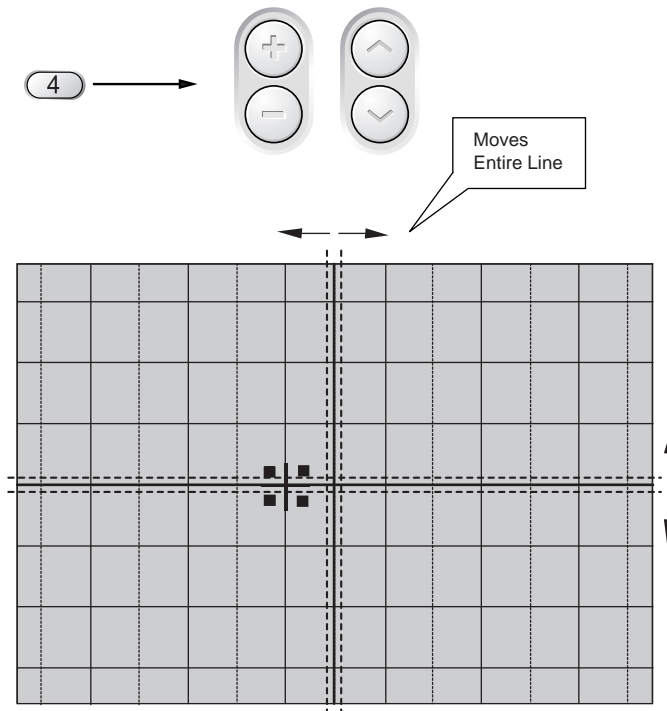


7. For vertical moves, select SOURCE and press MUTE to move up, and P.MODE to move down.

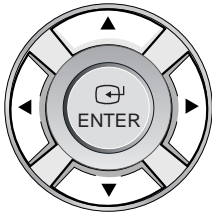


Pressing the SOURCE key again will switch to horizontal movement.

8. Use the Line Move Key 4 for global shaping in the beginning stages of Convergence Adjustment.

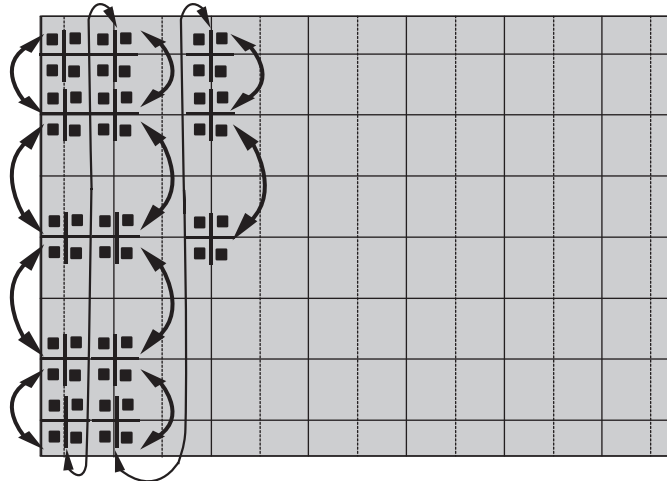


9. For general adjustment, press **4** to exit the line moving. Perform the general adjustment using




up (▲)/down (▼)/ left (◀)/right (▶) button, channel ▲,▼ button, and the volume +, - buttons.

10. After completing Green Color Convergence, save the data by pressing the **ADD/DEL** key.
11. Adjust the Red Color based on the Green Color. Press the **7** button to release the Red Color from mute and select the Red Color by pressing the **+100** key.
12. Perform steps 5 ~ 10 to adjust the Red Color Convergence.

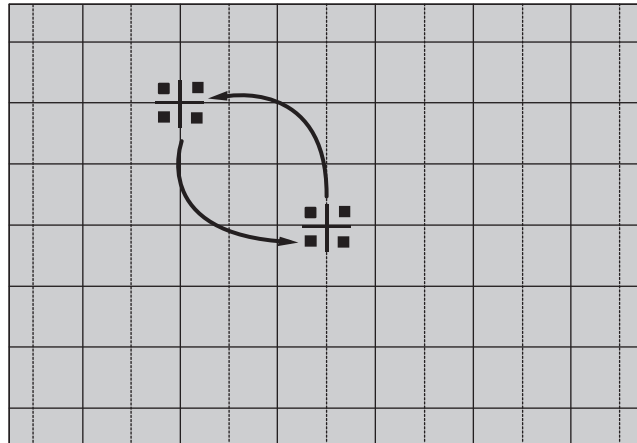



13. Adjust the Blue Color based on the Green Color. Press the **+100** button to mute the Red Color again. Release the Blue Color from mute by pressing **PRE-CH** and select the Blue Color by pressing the **9** key.
14. Adjust the Blue Color Convergence by performing steps 5 ~ 10 and 13.
15. After adjusting all the colors, fill the screen with R, G and B color to validate. Adjust again if required, by selecting the corresponding color key.


16. Save the data by using the  key after the Red and Blue Color Convergence adjustment has been completed.



The Cursor will move to the center and blink two times before it automatically moves back to its original position.



After completing and saving the R, G and B Convergence Adjustment, the data should be saved by pressing the  button before exiting Convergence Mode.

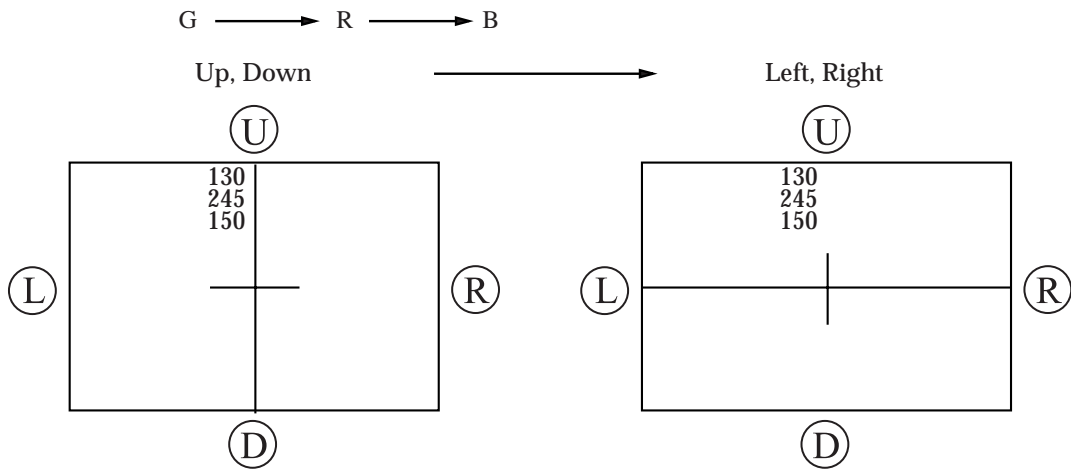
17. After completing the Convergence Adjustment, exit Convergence Mode by using the  key.
18. Follow the same procedure for DTV (1080i) Convergence Adjustment as you did for Normal Mode Convergence Adjustment.

Note

If Convergence Adjustment is not properly done, or the Convergence Center escaped the sensor's detection area, an adjustment error occurs. Therefore, the Jig Screen should be used for precise Convergence Adjustment during servicing.

2-7-3 Self Focus (Convergence Mode)

1. After finishing the Convergence adjustment, press the Memory button to save the adjusted data and switch the external source to Video Mode. Enter Convergence Mode and press the “Automatic Color Adjustment” button to start the adjustment.



- ♣ When auto Convergence is complete, the data is automatically saved and the convergence pattern reverts.

2-9 Pin Spec

2-9-1 MICOM Module

CN901			
PIN	NAME	PIN	NAME
1	KEYS1	33	5VB
2	PROTECT	34	H- BLK
3	KEYS2	35	GND
4	GND	36	V-BLK
5	KEY 3	37	DVD RESET
6	ST5V	38	GND
7	IR	39	GND
8	POWER	40	N.C
9	TIMER	41	TV-DATA IN
10	1080i -SW	42	STROBE
11	GND	43	TV-DATA OUT
12	V-RESET	44	TV-CLOCK
13	SCL1	45	GND
14	GND	46	N.C
15	SDA1	47	TTX-C VBS
16	S-RESET	48	GND
17	STBY LED	49	GND
18	RESET	50	N.C
19	AMP- MUTE	51	N.C
20	N.C	52	SW2
21	GND	53	GND
22	SW1	54	SW3
23	SCL2	55	RXD
24	DNle-RESET	56	GND
25	SDA2	57	TXD
26	SW3	58	OSD-R
27	GND	59	GND
28	2RF- SW	60	OSD-G
29	SUB- AFT	61	WP
30	GND	62	OSD-B
31	MAIN-AFT	63	N.C
32	BUS-STOP	64	OSD- YS/YM

2-9-2 HDMI Module

CN703			
PIN	NAME	PIN	NAME
1	N.C	33	N.C
2	O_CR	34	N.C
3	N.C	35	N.C
4	O_CB	36	GND
5	N.C	37	N.C
6	O_Y	38	N.C
7	N.C	39	N.C
8	GND	40	N.C
9	N.C	41	GND
10	O_V	42	GND
11	N.C	43	5V
12	O_H	44	N.C
13	N.C	45	GND
14	GND	46	N.C
15	N.C	47	SCL5
16	SEL_CR	48	MAIN_RESET
17	N.C	49	SDA5
18	SEL_CB	50	GND
19	N.C	51	GND
20	SEL_Y	52	N.C
21	N.C	53	N.C
22	GND	54	N.C
23	N.C	55	N.C
24	SEL_V	56	GND
25	N.C	57	N.C
26	SEL_H	58	N.C
27	N.C	59	N.C
28	GND	60	N.C
29	N.C	61	N.C
30	N.C	62	N.C
31	N.C	63	N.C
32	N.C	64	N.C

2-9-3 Convergence Module

CNZ01			
PIN	NAME	PIN	NAME
1	N.C	17	GND
2	GND	18	GND
3	DF	19	BV
4	GND	20	BH
5	SCL	21	GV
6	CG- SYNC	22	GH
7	GND	23	RV
8	GND	24	RH
9	CG- R	25	GND
10	CG-G	26	H- BLK
11	CG-B	27	V-BLK
12	SDA-1	28	GND
13	GND	29	GND
14	IR	30	-5V
15	GND	31	5V-CG
16	GND	32	GND

2-9-4 H/V Module

CN01	
PIN	NAME
1	HV-D R1
2	GND
3	HV-AC
4	GND
5	HV- REG
6	V- BLK
7	PROTECT
8	X-R AY
9	GND
10	HV-DC
11	GND
12	DETECT
13	H-B LK
14	2H-B LK
15	GND
16	EW

CN02	
PIN	NAME
1	38V
2	GND
3	HD
4	HD-OU T
5	12V

2-10 Deck

2-10-1 Disassembling the Disk Tray

- (1) Insert a screwdriver ① into the Emergency hole ② and push the Slide Housing ③ in the direction of arrow "A".
- (2) The Disk Tray ④ will pop out a little bit, then pull it in the direction of arrow "B".
- (3) Pull the Disk Tray ④ to separate it while at the same time pushing the stoppers ⑤ (Left / Right) in the direction of arrows "C" and "D" respectively.

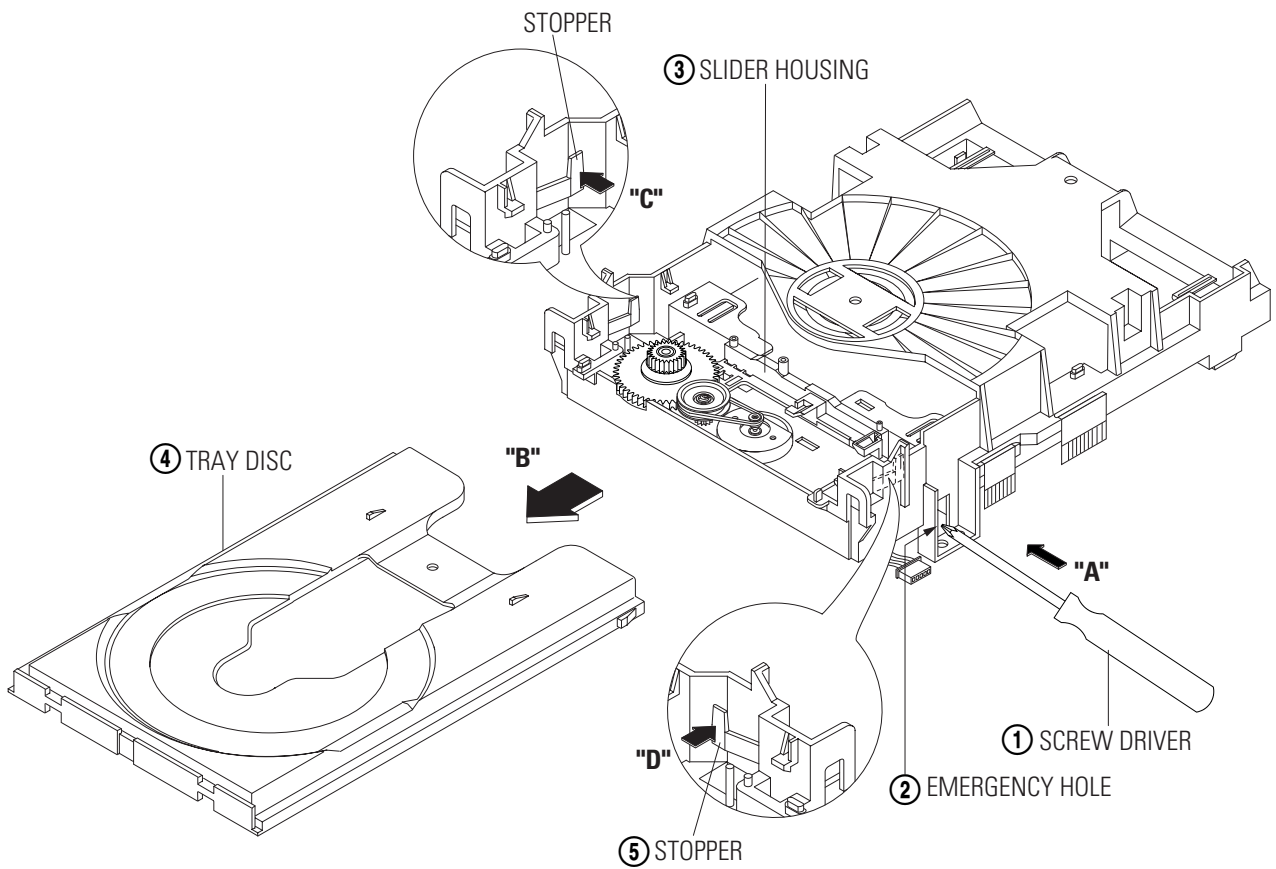


Fig. 2-3 Disassembling the Disk Tray

2-10-2 Disassembling the Assembly-Pickup Deck

- (1) Separate DCN2 ① and DCN2 ②.
- (2) Pull the Assembly-Pickup Deck ③ downwards to separate while pushing Hooks ④ and ⑤ in the direction of arrows "A" and "B" respectively.

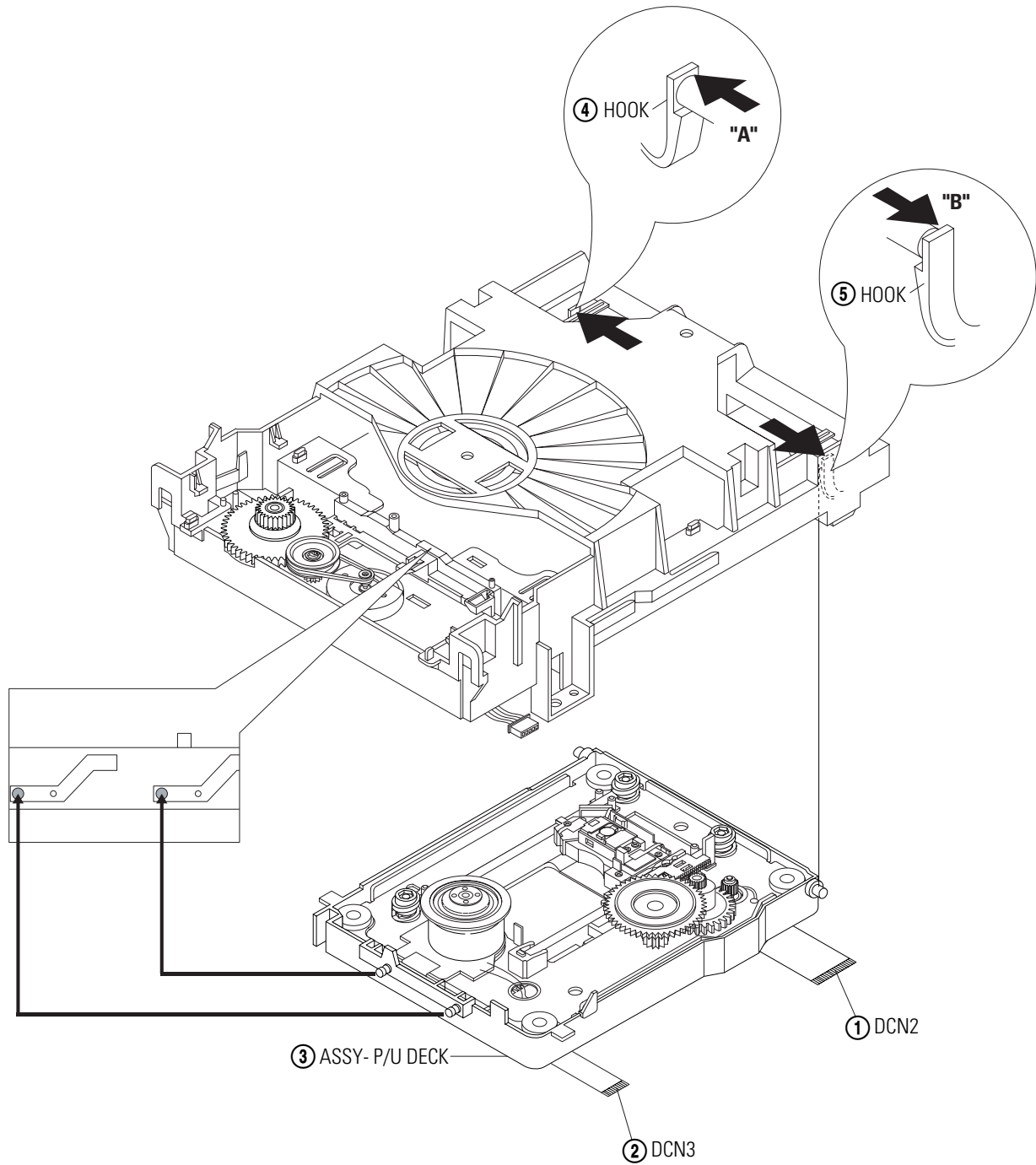


Fig. 2-4 Disassembling the Assembly-Pickup Deck

2-10-3 Disassembling the Housing Assembly

- (1) Separate the Belt ①.
- (2) Lift up the Pulley gear ③ while pushing the Hook ② in the direction of arrow "A".
- (3) Lift up the Gear Tray ④ while pushing the Slide Housing ⑤ in the direction of arrow "B".
- (4) Lift up the Slide Housing ⑤.
- (5) Remove the 2 screws ⑥ and separate the Motor Loader assembly ⑦ in a downward direction.
- (6) Separate the Clamp-Assembly ⑧.

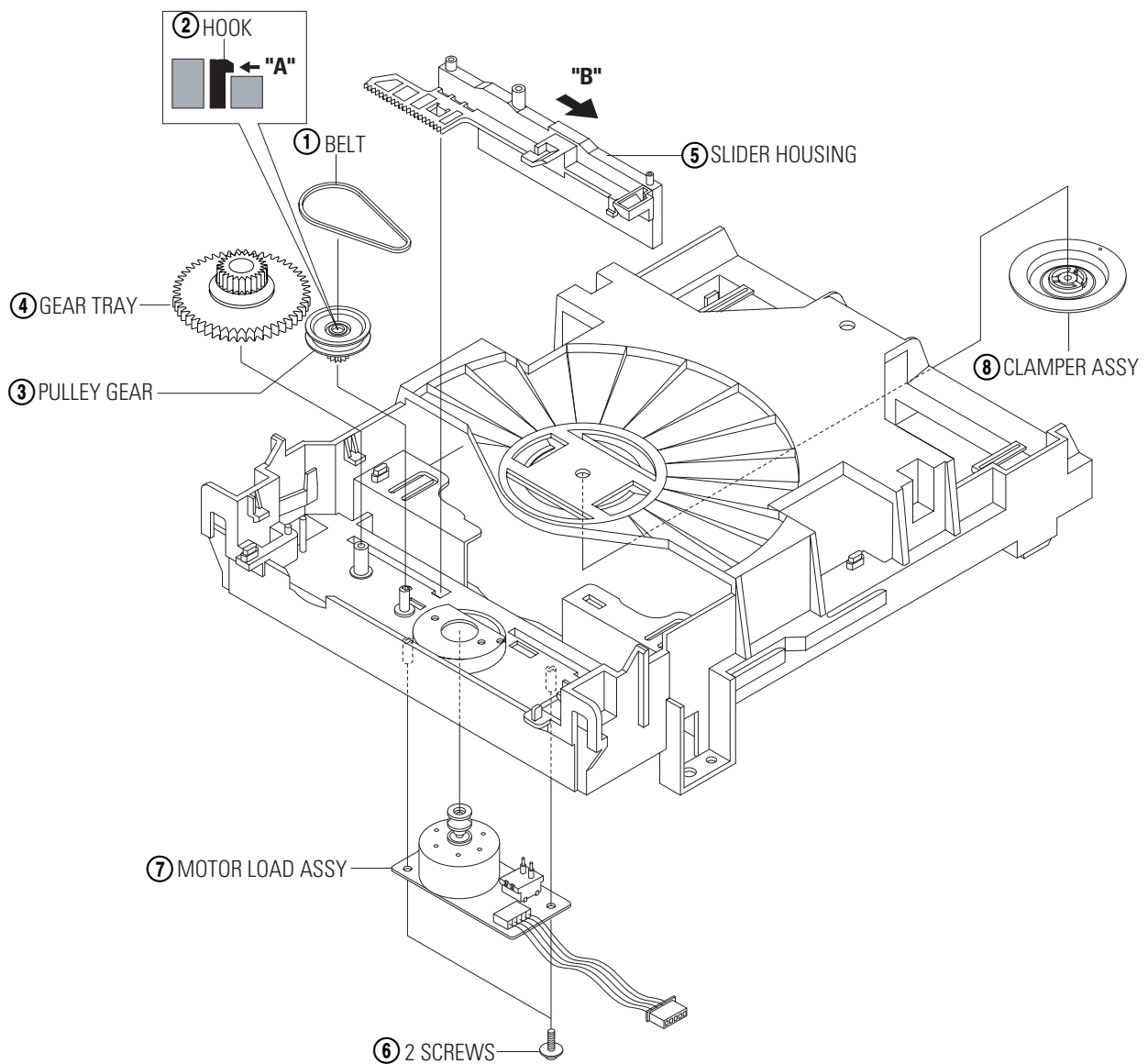


Fig. 2-5 Disassembling the Housing Assembly

2-10-4 Disassembling the Sub Chassis

- (1) Remove the soldering on the Motor Feed ① +, - leads.
- (2) Remove the 4 screws ②.
- (3) Lift up the Assembly-Bracket Deck ③.

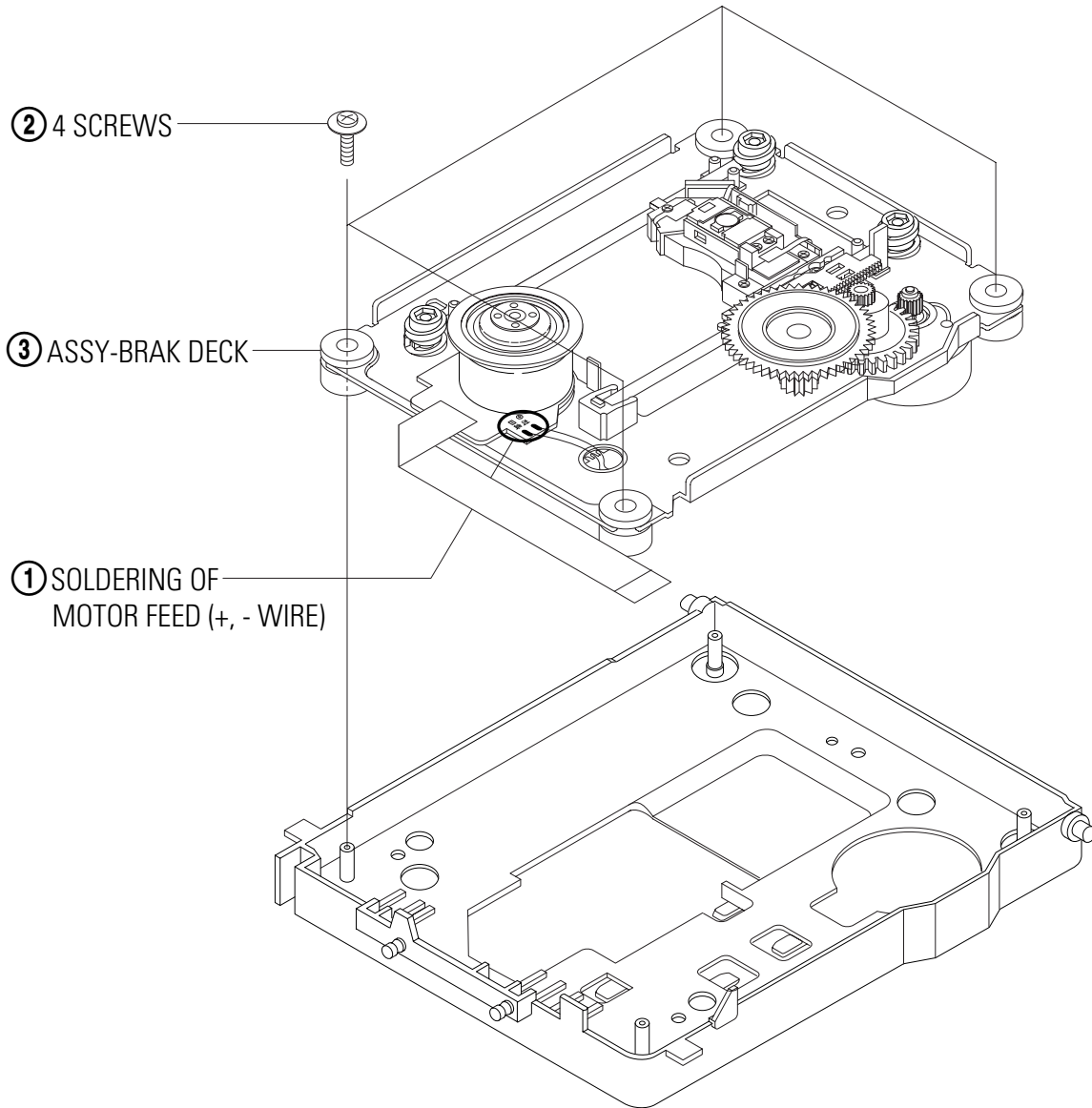


Fig. 2-6 Disassembling the Sub Chassis

2-10-5 Disassembling the Assembly-Bracket Deck

- (1) Lift up Gear Feed B ② while pushing the Hook ① in the direction of "A".
- (2) Remove the 3 screws ③ and separate the 3 Holder Cam Skews ④.
- (5) Separate the Shaft Pickup ⑤ and Pickup-Assembly ⑥.
- (4) Separate the Gear Feed A ⑦.
- (5) Remove the 2 screws ⑧.
- (6) Separate the Motor Feed-Assembly ⑨.
- (7) Remove the 3 screws ⑩.
- (8) Separate the Motor Spindle ⑪.

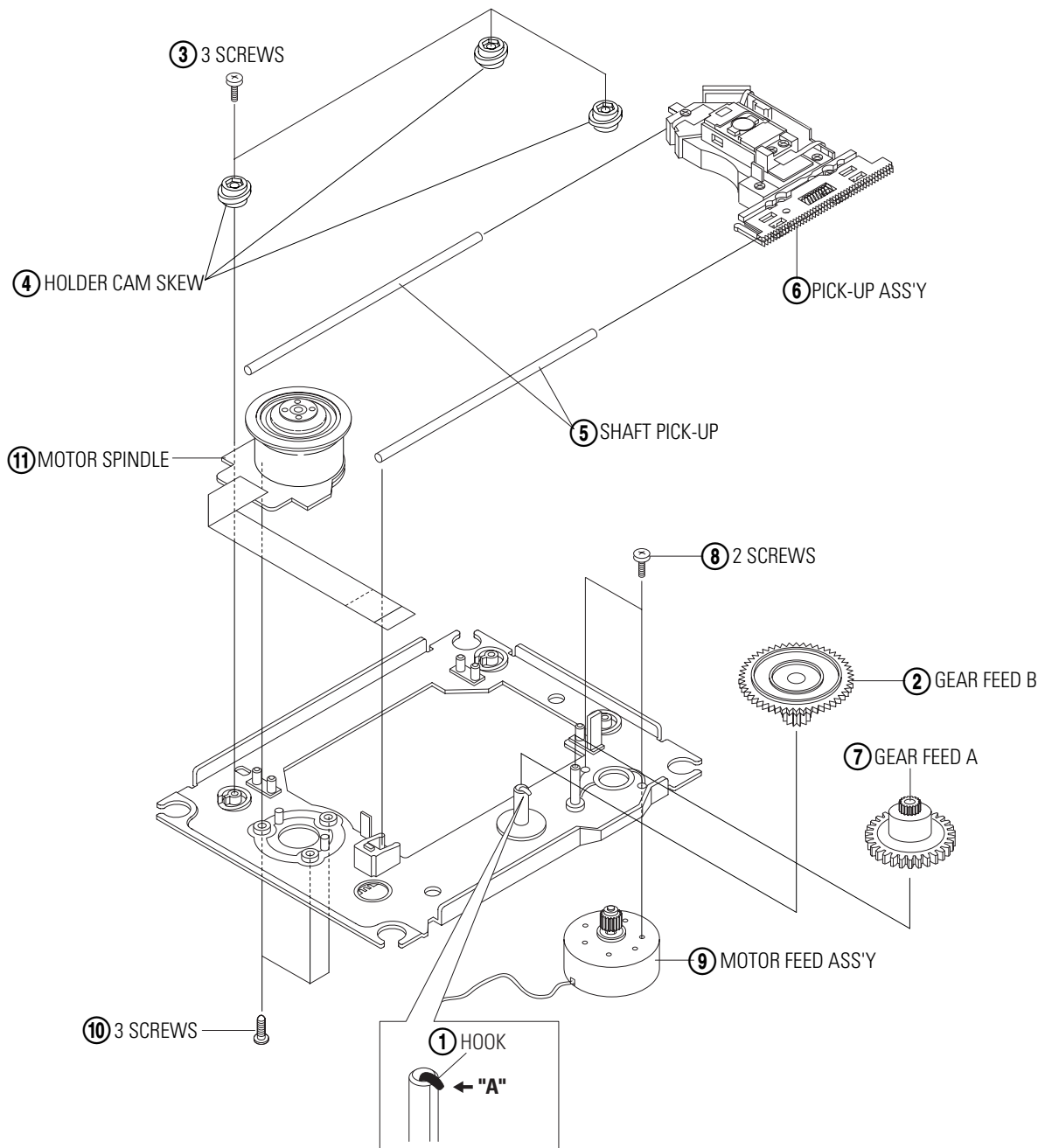


Fig. 2-7 Disassembling the Assembly-Bracket Deck

MEMO