1. Alignment and Adjustments

1-1 When entering the service mode;

1. Turn on the TV, and then select “DYNAMIC” on the picture adjustment mode.
2. Turn off the TV(STAND-BY).
3. Enter the service mode by pressing the remote control keys in the following sequence:
   Display -> Menu -> Mute -> Power ON

Note : If necessary, re-do steps 1~3.

Initial display when the service mode is switched.

1-1-1 WHEN A RF SIGNAL IS RECEIVED

MODEL((T_CM2P06_002)

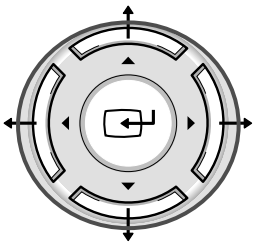
DEFLECTION
VIDEO ADJUST 1
VIDEO ADJUST 2
VIDEO ADJUST 3
VIDEO ADJUST 4
OPTION (87h 05ch)
YC DELAY
RESET
T_CM2906_002 yy.mm.dd

MODEL(T_CMDEAC_XXX)

DEFLECTION
VIDEO ADJUST 1
VIDEO ADJUST 2
VIDEO ADJUST 3
VIDEO ADJUST 4
OPTION (EF 8E 2E)
YC DELAY
RESET
T_CMDEAC_XXX yy.mm.dd

1-1-2 SERVICE MODE CONTROL KEYS

MAIN MENU	MENU DISPLAY
UP / DOWN	Select item by moving cursor
RIGHT / LEFT	Decrease or increase the adjustment values



[Navigation Key]

✍ **PRECAUTIONS**

1. When EEPROM IC (IC902) is replaced, first connect the power cord and wait for about 4~5 seconds.
2. After replacing EEPROM IC (IC902), enter the Service mode. Next, enter the standard data or the previous EEPROM IC data before replacement. And then check and adjust any items related to Geometric, Picture, Option.

1-2 FACTORY MODE MENU

1-2-1 MODEL(T_CM2906_002)

1-2-1(A) DEFLECTION

Item	Range	Initial Data		Remark
		4:3	Wide	
V Amp	0 ~ 63	39	31	Variable
V Shift	0 ~ 63	31	31	FIX
H EW	0 ~ 63	44	31	Variable
H Shift	0 ~ 63	31	31	FIX
V Linearity	0 ~ 15	7		FIX
Upper Linearity	0 ~ 15	0		FIX
Lower Linearity	0 ~ 15	0		FIX
V SC	0 ~ 15	7		FIX
H Parabolra	0 ~ 63	25	31	FIX
Upper Corner	0 ~ 63	37	31	FIX
Lower Corner	0 ~ 63	33	31	FIX
H Trapezium	0 ~ 63	31		FIX
Bow	0 ~ 63	31		FIX
Angle	0 ~ 63	31		FIX
V Position	0 ~ 63	31		FIX
Up UCG	0 ~ 3	0		FIX
Lo UCG	0 ~ 3	0		FIX
CXA Left Blk	0 ~ 63	50		FIX
CXA Right Blk	0 ~ 63	25		FIX

1-2-1(B) VIDEO ADJUST1

Item	Range	Initial Data	Remark
R Cutoff	0 ~ 63	25	Variable
G Cutoff	0 ~ 63	25	FIX
B Cutoff	0 ~ 63	25	Variable
Color On/Off	0 ~ 1	1	Variable
CB Offset	0 ~ 63	31	Variable
CR Offset	0 ~ 63	31	Variable
R Drive	0 ~ 63	25	Variable
G Drive	0 ~ 63	25	FIX
B Drive	0 ~ 63	25	Variable
Sub Bright	0 ~ 63	15	Variable
Sub Contrast	0 ~ 15	8	Variable
Sub Color	0 ~ 23	3	FIX
Sut Tint	0 ~ 63	31	FIX
CTI Level	0 ~ 3	1	FIX
COL Axis	0 ~ 3	1	FIX
LTI Level	0 ~ 3	1	FIX
VSU	0 ~ 15	2	FIX
Melody Volume	0 ~ 20	7	FIX
LIT Mode	0 ~ 3	1	FIX
System	0 ~ 3	1	FIX

1-2-1(C) VIDEO ADJUST2

Item	Range	Initial Data	Remark
ABL Level	0 ~ 3	3	FIX
Gamma	0 ~ 3	1	FIX
DPIC Level	0 ~ 3	2	-
DC Trans	0 ~ 3	3	FIX
ABL TH	0 ~ 15	15	FIX
VM Level	0 ~ 3	1	-
VM Corint	0 ~ 15	0	FIX
VM f0	0 ~ 3	1	FIX
VM Limit	0 ~ 3	1	FIX
VM Delay	0 ~ 3	1	FIX
SHP CD	0 ~ 3	0	FIX
SHP f0	0 / 1	1	FIX
SHP f1 & P/O	-	11	FIX
AKB Time	0 ~ 63	13	FIX
BandPass 9407	-	24	-
HighPass 9407	-	40	-
S ABL	0 ~ 3	0	FIX
P ABL	0 ~ 15	15	FIX

1-2-1(D) VIDEO ADJUST3

Item	Range	Initial Data		Remark
		4:3	Wide	
H Comp	0 ~ 15	8	13	FIX
V Comp	0 ~ 15	5	12	
Pin Comp	0 ~ 7	0		
AFC Comp	0 ~ 7	0		
H-Sync Phase	0 / 1	0		
NR Off Value	0 ~ 9	6		
CG HAO	0 ~ 20	10		
CG VAO	0 ~ 20	15		
NR High Ref	0 ~127	40		
NR Low Ref	0 ~127	3		
NR High Value	0 ~255	17		
NR Low Value	0 ~255	51		
NR Hight Ref(S)	0 ~127	20		
NR Low Ref(s)	0 ~127	0		
NR High Value(S)	0 ~255	17		
NR Low Value(S)	0 ~255	51		
NR Read M/S	0/27	0 0		

1-2-1(E) VIDEO ADJUST4

Item	Range	Initial Data	Remark
SECAM Color Main	0 ~255	28	FIX
SECAM Color Pip	0 ~255	28	
Picture Limit	0 ~ 3	3	
OSD Contrast	0 ~ 15	10	
TTX Contrast	0 ~ 15	3	

1-2-1(F) OPTION

Item	Setting Data	Appliance		Remark
		CW	CS	
SYSTEM	CS/CW	CW	CS	Area Option
SOUND	A2-NICAM/Dolby-Prologic	Dolby Prlogic		-
ASPECT	WIDE / 4:3	-		Inch Option
WIDE 4:3	ON/OFF	-		Inch Option
X-RAY	ON/OFF	ON		-
AUTO FM	ON/OFF	ON		-
PIP	ON/OFF	ON		-
LNA	ON/OFF	ON		-
Letter Box	ON/OFF	ON		-
TTX Lang.Grp	West/East/CIS/Turk&Grk	-		Area Option
AGC	ON/OFF	OFF		-
Natural Zoom	ON/OFF	OFF		-

1-2-1(G) YC DELAY

Item	Range
P.YC(AV) Delay	1
S.YC(AV) Delay	-5
N.YC(AV) Delay	1
P.BG.YC Dealy	1
P.DK.YC Delay	-2
P.I.YC Delay	0
P.M.YC Delay	0
P.N.YC Delay	0
S.BG.YC Delay	-7
S.DK.YC Delay	-9
S.I.YC Delay	-9
S.M.YC Delay	-7
S.L.YC Delay	-10
N.M.YC Delay	3
N4.43 YC Delay	-6

1-2-2 CS MODEL(T_CMDEAC_XXX)

1-2-2(A) DEFLECTION

Item	Range	Initial Data												Remark
		42W5		47W1		43T6/43T7		48T6		54T6		62T6		
		NTSC	PAL	NTSC	PAL	NTSC	PAL	NTSC	PAL	NTSC	PAL	NTSC	PAL	
V Amp	0 ~ 63	48	48	48	48	48	48	48	48	48	48	48	48	Variable
V Shift	0 ~ 63	31	31	31	31	31	31	31	31	31	31	31	31	FIX
H EW	0 ~ 63	48	48	48	48	48	48	48	48	48	48	48	48	Variable
H Shift	0 ~ 63	24	24	24	24	24	24	24	24	24	24	24	24	FIX
V Linearity	0 ~ 15	7		7		7		7		7		7		FIX
Upper Linearity	0 ~ 15	0		0		0		0		0		0		FIX
Lower Linearity	0 ~ 15	0		0		0		0		0		0		FIX
V SC	0 ~ 15	2		2		2		2		2		2		FIX
H Parabolra	0 ~ 63	15		15		15		15		15		15		FIX
Upper Corner	0 ~ 63	33		33		33		33		33		33		FIX
Lower Corner	0 ~ 63	33		33		33		33		33		33		FIX
H Trapezium	0 ~ 63	18		18		18		18		18		18		FIX
Bow	0 ~ 63	31		31		31		31		31		31		FIX
Angle	0 ~ 63	31		31		31		31		31		31		FIX
V Position	0 ~ 63	31		31		31		31		31		31		FIX
Up UCG	0 ~ 3	0		0		0		0		0		0		FIX
Lo UCG	0 ~ 3	0		0		0		0		0		0		FIX
CXA Left Blk	0 ~ 63	50		50		50		50		50		50		FIX
CXA Right Blk	0 ~ 63	25		25		25		25		25		25		FIX

1-2-2(B) VIDEO ADJUST1

Item	Range	Initial Data	Remark
R Cutoff	0 ~ 63	20	Variable
G Cutoff	0 ~ 63	20	Variable
B Cutoff	0 ~ 63	20	Variable
Color On/Off	0 ~ 1	1	FIX
CB Offset	0 ~ 63	31	Variable
CR Offset	0 ~ 63	31	Variable
R Drive	0 ~ 63	31	Variable
G Drive	0 ~ 63	31	Variable
B Drive	0 ~ 63	31	Variable
Sub Bright	0 ~ 63	20	Variable
Sub Contrast	0 ~ 15	8	Variable
Sub Color	0 ~ 23	15	FIX
Sut Tint	0 ~ 63	31	FIX
CTI Level	0 ~ 3	1	FIX
COL Axis	0 ~ 3	2	FIX
LTI Level	0 ~ 3	1	FIX
VSU	0 ~ 15	2	FIX
Melody Volume	0 ~ 20	4	FIX
LIT Mode	0 ~ 3	1	FIX
System	0 ~ 3	1	FIX

1-2-2(C) VIDEO ADJUST2

Item	Range	Initial Data	Remark
ABL Level	0 ~ 3	3	FIX
Gamma	0 ~ 3	1	FIX
DPIC Level	0 ~ 3	3	FIX
DC Trans	0 ~ 3	2	FIX
ABL TH	0 ~ 15	15	FIX
VM Level	0 ~ 3	2	FIX
VM Coring	0 ~ 15	0	FIX
VM f0	0 ~ 3	1	FIX
VM Limit	0 ~ 3	1	FIX
VM Delay	0 ~ 3	1	FIX
SHP CD	0 ~ 3	0	FIX
SHP f0	0 / 1	1	FIX
SHP f1 & P/O	-	11	FIX
AKB Time	0 ~ 63	13	FIX
BandPass 9407	-	24	FIX
HighPass 9407	-	40	FIX
S ABL	0 ~ 3	0	FIX
P ABL	0 ~ 15	15	FIX

1-2-2(D) VIDEO ADJUST3

Item	Range	Initial Data	Remark
H Comp	0 ~ 15	2	FIX
V Comp	0 ~ 15	4	
Pin Comp	0 ~ 7	3	
AFC Comp	0 ~ 7	0	
H-Sync Phase	0 / 1	0	
NR Off Value	-	6	
CG HAO	0 ~ 20	10	
CG VAO	0 ~ 20	15	
NR High Ref	0 ~127	40	
NR Low Ref	0 ~127	3	
NR High Value	-	17	
NR Low Value	-	51	
NR Hight Ref(S)	0 ~127	20	
NR Low Ref(s)	0 ~127	0	
NR High Value(S)	-	17	
NR Low Value(S)	-	51	
NR Read M/S	-	0 0	

1-2-2(E) VIDEO ADJUST4

Item	Range	Initial Data	Remark
SECAM Color Main	0 ~255	28	FIX
SECAM Color Pip	0 ~255	28	
Picture Limit	0 ~ 3	3	
OSD Contrast	0 ~ 15	10	
TTX Contrast	0 ~ 15	3	

1-2-2(F) OPTION

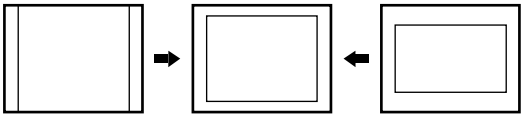
Item	Setting Data	Appliance (Southeast Asia)	Appliance (CHINA)	Appliance (Middle East)
LANGUAGE	ENG+THAI / ENG+CHINA ENG+MIDDLE / ONLY ENG	ONLY ENG ENG+THAI(Thailand)	ENG+CHINA	ENG+MIDDLE
SOUNG	A2-NICAM/Virtual Dolby /Dolby Prologic	Dolby Prologic	Dolby Prologic	Dolby Prologic
CRT	WIDE / 4:3	4:3(Option)	4:3(Option)	4:3(Option)
CHANNEL	100-channel / 200-channel /250-chanel	100-channel	200-channle	250-channle
X-LAY	OFF / ON	ON	ON	ON
TTX	OFF / ON	ON	OFF	ON
AUTO FM	OFF / ON	ON	ON	ON
PIP	OFF / 2-TUNER	2-TUNER	2-TUNER	2-TUNER
MULTI PIP	OFF / ON	ON	ON	ON
LNA	OFF / ON	ON	ON	ON
HIGH DEV	OFF / ON	OFF	OFF	OFF
SCART	RCA+1SCART+DVD / RCA+DVD	RCA+1SCART+DVD	RCA+DVD	RCA+1SCART+DVD
LETTER BOX	OFF / ON	ON	ON	ON
DW PIP	OFF / ON	ON	ON	ON
LIST PRIOR	OFF / ON	OFF 0N(AUSTRALIA)	OFF	OFF
TTX LANG	WEST EUROPE / EAST EUROPE RUSSIAN / GREEK-TURKEY ARABIC / FARSI / AREB-HEBREW	WEST EUROPE	WEST EUROPE	ARABIC
AGC	OFF / ON	OFF/0N(Thailand)	OFF	OFF
AV MEMORY	OFF / ON	OFF	OFF	OFF
AUSTRALIA	OFF / ON	OFF	OFF	OFF
CG BRIGHT	OFF/ON	OFF	OFF	OFF

1-2-2(G) YC DELAY

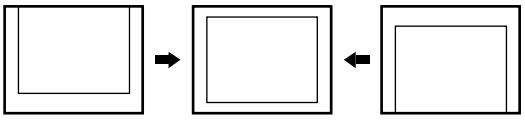
Item	Range
P.YC(AV) Delay	1
S.YC(AV) Delay	-5
N.YC(AV) Delay	1
P.BG.YC Dealy	1
P.DK.YC Delay	-2
P.I.YC Delay	-2
P.M.YC Delay	0
P.N.YC Delay	0
S.BG.YC Delay	-7
S.DK.YC Delay	-10
S.I.YC Delay	-9
S.M.YC Delay	-7
S.L.YC Delay	-10
N.M.YC Delay	3
N.443.YC Delay	-1

1-3 Screen Change (When Adjusting I²C Bus Geometric Items)

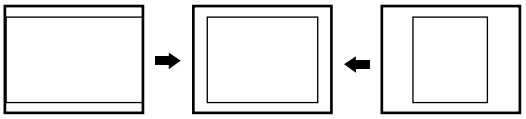
1 V AMP



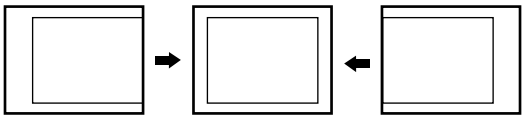
2 V SHIFT



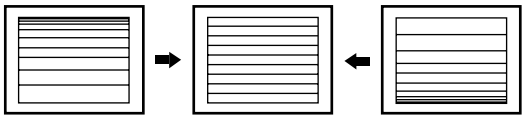
3 H EW



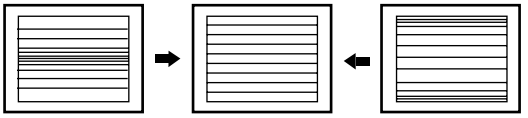
4 H SHIFT



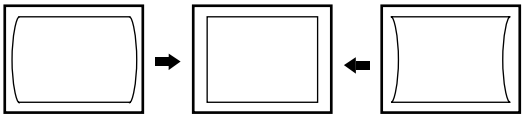
5 V LINEARITY



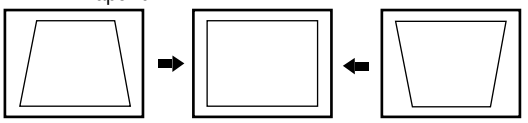
6 V - S - CORRECTION



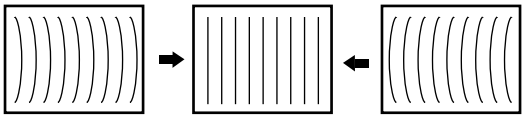
7 H Parabolra



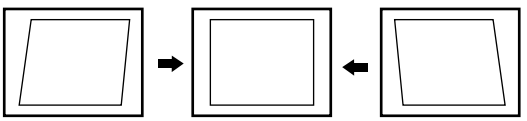
8 H Trapezium



9 BOW



10 ANGLE



1-4 Other Adjustments

1-4-1 Screen Adjustment

1. Warm up the TV for at least 30 minutes.
2. Select the “DYNAMIC” Video mode.
3. Trun to the Video Mode(No Signal) using a remote-control.
4. Connect an oscilloscope to RK, GK, BK.
5. Adjust the VR (VR501, VR531, VR561) screen so that RK, GK, BK pulse is 20Vp-p each. (Turn the R,G,B VR screen fully counterclockwise in the area of each flyback line.)

1-4-2 White Balance Adjustment

1. Select the “DYNAMIC” video mode.
2. Input 100% white pattern.
3. In the stand-by mode, press the remote-control keys in the following sequence:
   Displsy → Menu → Mute → Power ON
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 Volume +/- 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 Volume +/- keys.
9. Adjust the high light with viewing the light side of the screen.
10. If necessary, redo adjustments 6~9.
11. Press the Menu key to exit.

1-4-3 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 :
   Displsy → Menu → Mute → Power ON
3. Select Sub-Bright by pressing the Volume +/- keys.
4. Adjust so that the 63 step on the right side of the screen is not seen (Use the Volume +/- keys).
5. Press the Menu key to exit.

1-4-4 High Voltage (29KV) Check

PRECAUTION

1. Input a lion head pattern.
2. Select “DYNAMIC” 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 10000:1 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 DC290V ± 0.1V.

4-4-5 F.S. (Fail Safe) Circuit Check

Note : The finished product has a well-mounted VR(RR402S).
If necessary, do the F.S adjustments in the following sequece.

1. Use a digital multimeter.
2. Connect the digital multimeter to the JIG pin (DZ482S) terminals.
3. Adjust VR(RR402S) so that the voltage becoms 2.25V.
4. After the adjustments are complete be sure to mount VR(RR402S) correctly.

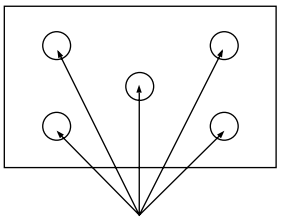
1-4-6 Static Focus Adjustment

PRECAUTION

1. Select the “DYNAMIC” video mode.
2. Input a crosshatch pattern.
3. Cover the lenses that are not being adjusted.
4. Connect a convergence jig and read data.
5. Adjust the lens for best focus.
   (See Fig, 4-1)

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. 4-1 Crosshatch Pattern.

1-4-7 Lens Focus Adjustment

PRECAUTIONS

1. Do this adjustment after the static focus adjustment and the tilt adjustment.
2. Select the “DYNAMIC” video mode.
   (Contrast:100, Brightness:50)
3. Input a crosshatch pattern.

ADJUSTMENT

1. Loosen the lens screws.
2. Cover the two lenses that are not being adjusted.
3. Adjust the lens, observing the color aberration vertically and horizontally within 3 blocks of the center of the crosshatch pattern.
4. When the lens is turned clockwise, the color aberration will change as follows:

Lens	Color Aberration Change
R	Orange - Crimson
G	Blue - Red
B	Purple - Green

5. Green lens adjustment:
   Set the lens at the point where Blue just changes to Red. If the color aberration is irregular throughout the picture screen, adjust the lens to show Red color aberration (approximately 1~3 mm area) within a 3-block grid around the horizontal center-line. If the color aberration is irregular, adjust the lens as shown in the diagram below. (Accurate alignment of Green is important for overall color quality.)
6. Red lens adjustment
   Set the Red lens at the point where Orange becomes Crimson.
7. Blue lens adjustment
   Set the Blue lens at the point where Purple becomes Green.

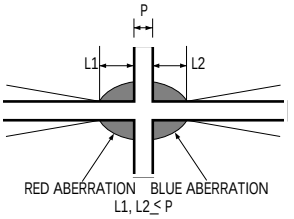


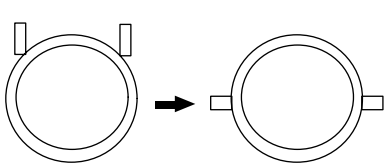
Fig. 4-2 Color Aberration

1-5 Beam alignment Adjustments

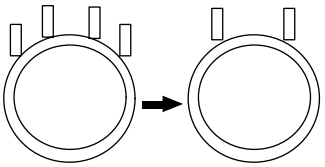
1. Select the “DYNAMIC” video mode.
2. Warm up the set at least for 10 minutes.
3. Enter the Convergence mode by pressing the remote control buttons in the following sequence :

   Mute → 1 → 8 → 3

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

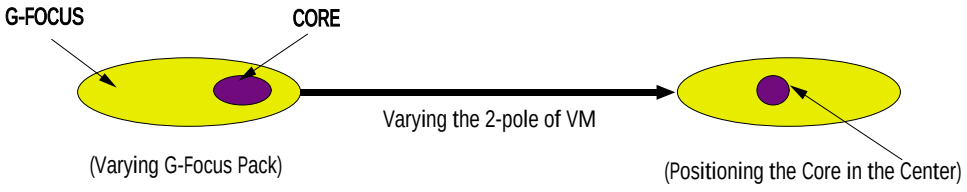


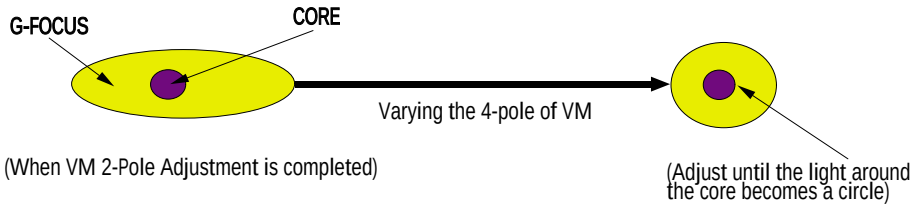
(Creation of CPM Zero Magnet)



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

5. Check the squarewave at the point where the focus is misaligned.
6. Press the 7 button on the remote control during 3~5 sec and vibrating dot-pattern appears.
7. Adjust the Focus-pack VR for defocusing.
8. Mute the other patterns (R/B) other than G-PATTERN.
   (Use / TV 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 7 button on the remote control, and the mode changes to the Convergence Adjustment mode.
16. Press the S.STD button on the remote control to return to normal viewing.

1-6 High Voltage Part

1-6-1 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)

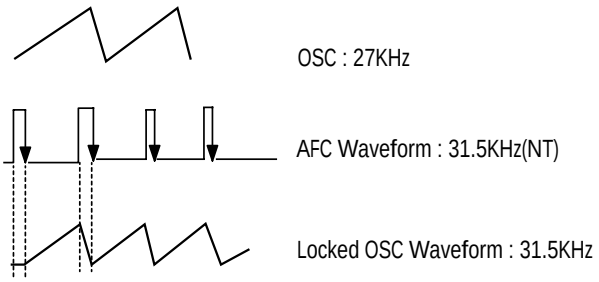
FBT pin 11 detects DC high voltage fluctuation. The detected DC high voltage value is input to PWM IC471 pin1 through R473, VR471, R471, and then it is input to a differential AMP circuit that differentiates the gap after comparing with the reference voltage input to pin2.

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), 31.25kHz(PAL), 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.

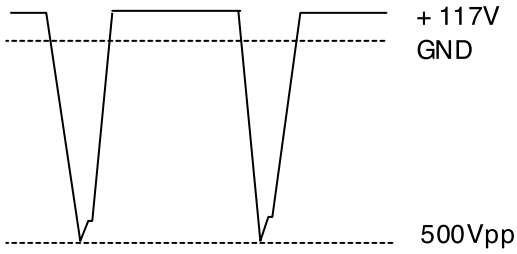


4. Dead Time (HV Protect)

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 conparator . 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 valtage TR emitter is as shown in the figure below.



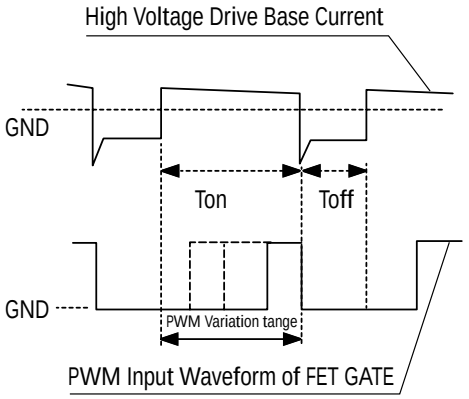
6. Paraneters according to beam

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

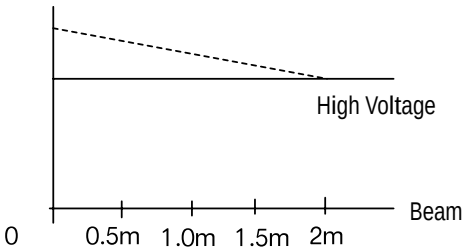
To reduce unstable high voltage fluctuation, the existing high voltage type REG circuit controls dynamic fluctuation by using C-block capacitor. But, it can't detect actual dynamic fluctuation. Also, its velocity of response to static fluctuation is late because +B power supply changes per about 1V. 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.

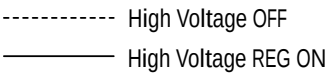


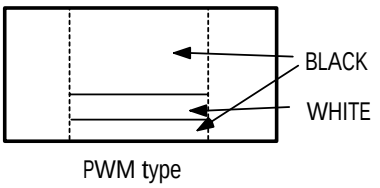
8. Application Effects

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

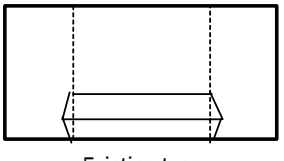
The figures below show characteristics when a PWM high voltage REG circuit is applied.







PWM type



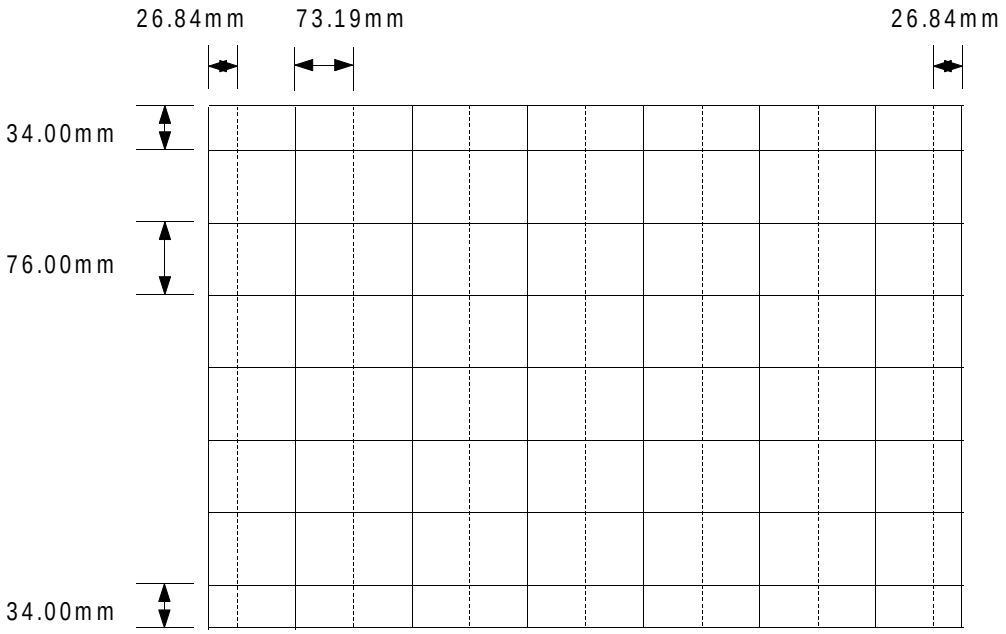
When a Toshiba Pattern is recrived, the screen is displayed as shown in figute side

Existing type

1-6 SCREEN-JIG

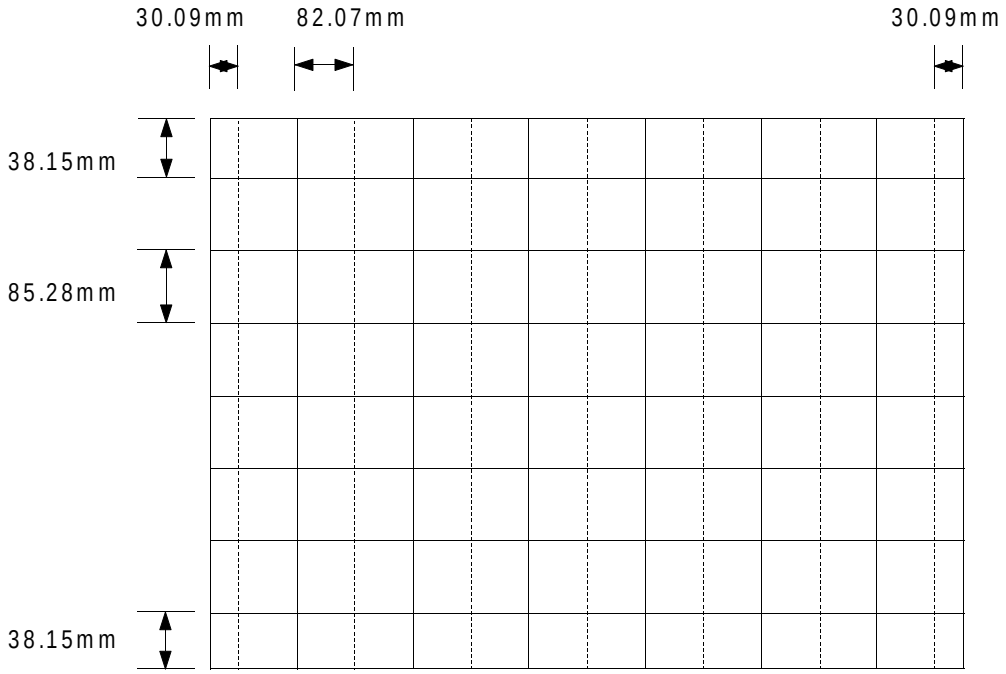
1-6-1 42W5

42W5 Screen Size : X 932, Y 524 (X:764 = 22 x 2 + 60 x 12, Y:262 = 17 x 2 + 38 x 6)-PAL MODE



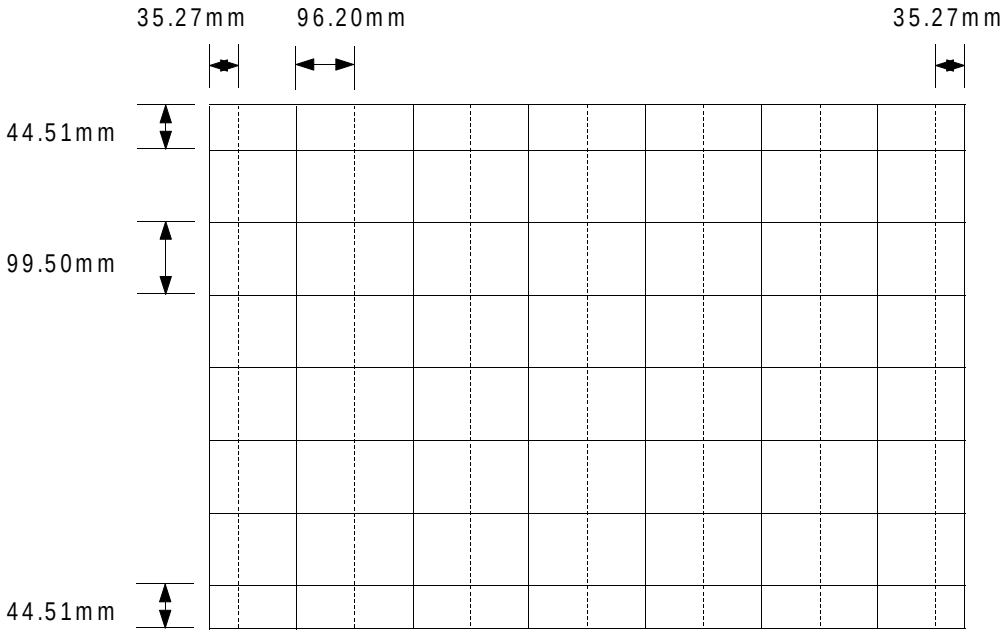
1-6-2 47W3

47W3 Screen Size : X 1045, Y 588 (X:764 = 22 x 2 + 60 x 12, Y:262 = 17 x 2 + 38 x 6)-PAL MODE



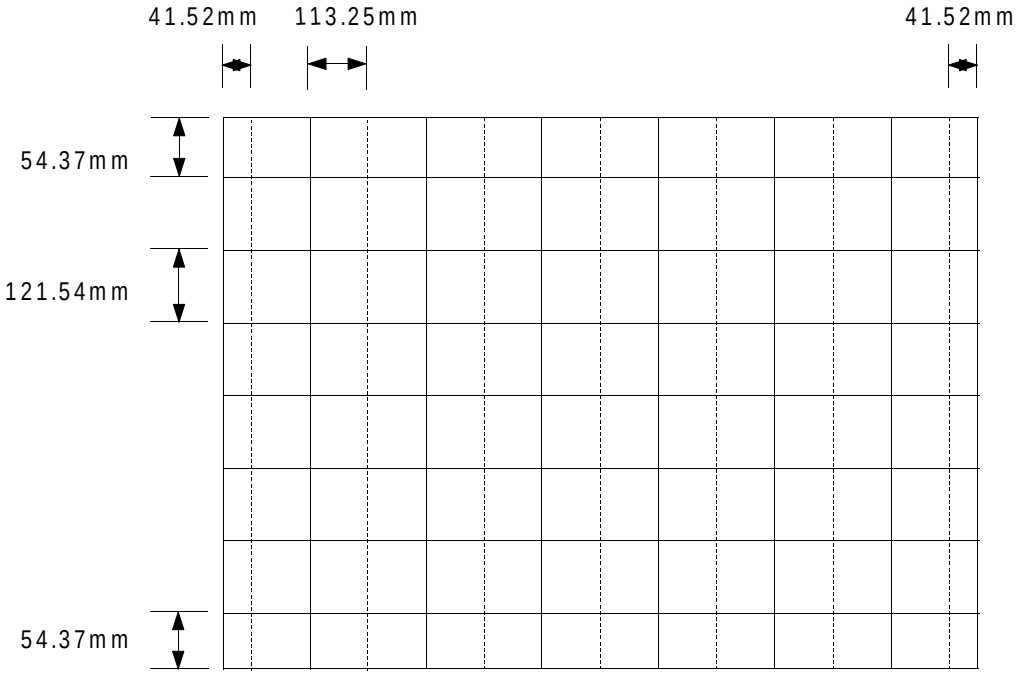
1-6-3 55W3

55W3 Screen Size : X 1225, Y 686 (X:764 = 22 x 2 + 60 x 12, Y:262 = 17 x 2 + 38 x 6)-PAL MODE



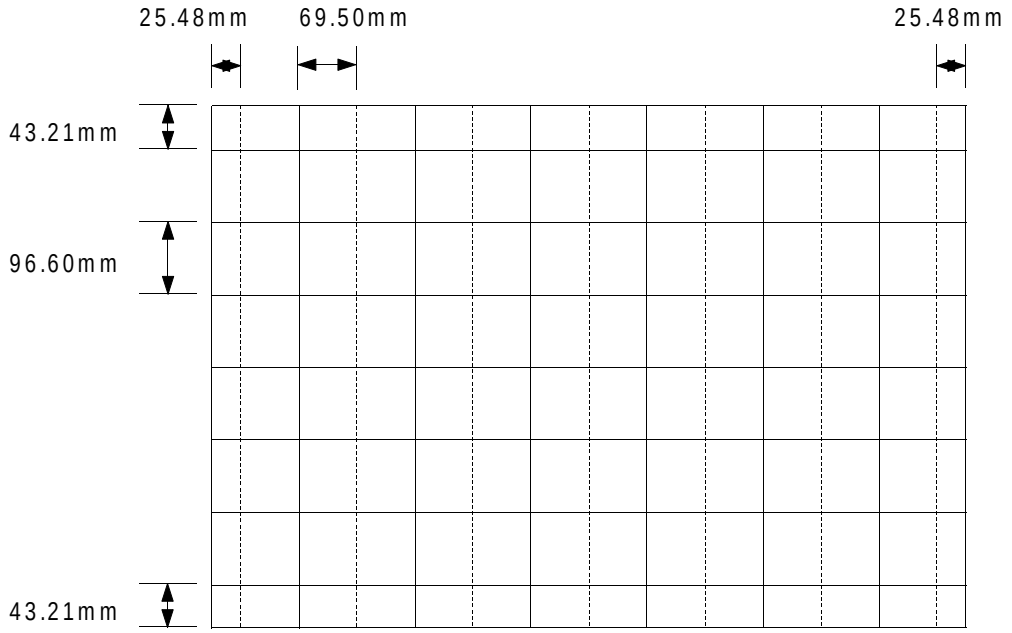
1-6-4 65W3

65W3 Screen Size : X 1442, Y 838 (X:764 = 22 x 2 + 60 x 12, Y:262 = 17 x 2 + 38 x 6)-PAL MODE



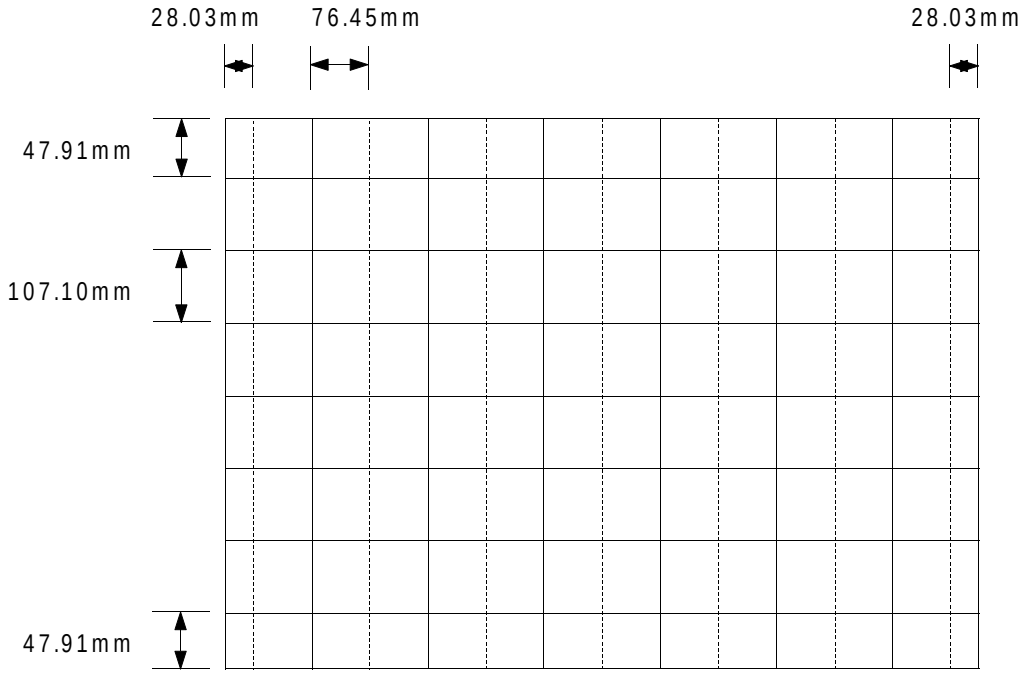
1-6-5 43T6/43T7

43T6 Screen Size : X 885, Y 666 (X:764 = 22 x 2 + 60 x 12, Y:262 = 17 x 2 + 38 x 6)-PAL MODE



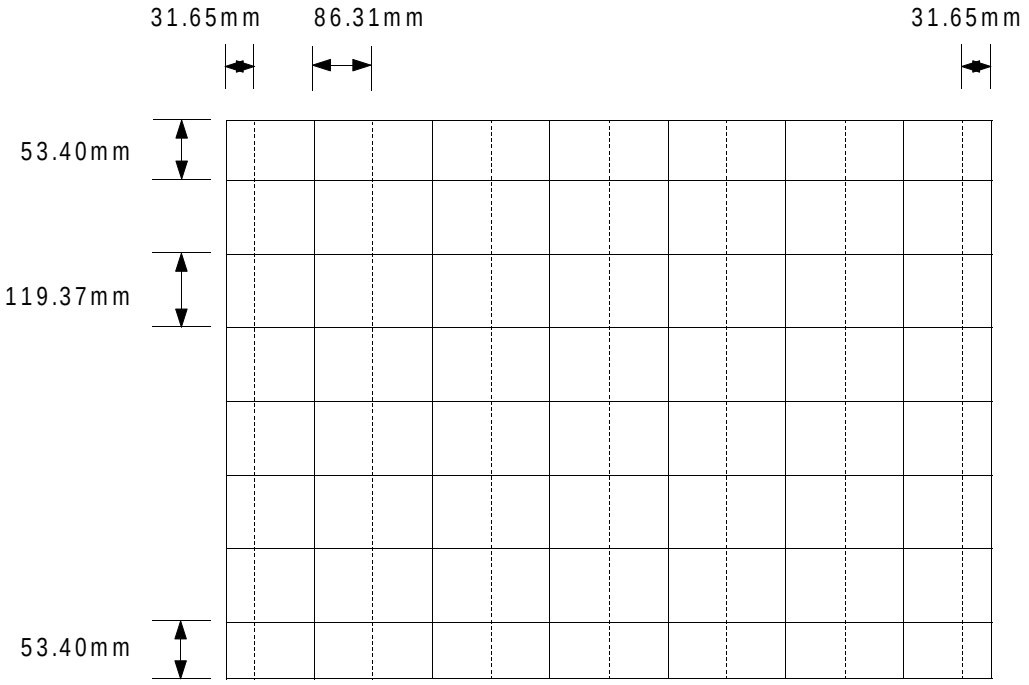
1-6-6 48T6

48T6 Screen Size : X 973.4 Y 738.4 (X:764 = 22 x 2 + 60 x 12, Y:262 = 17 x 2 + 38 x 6)-PAL MODE



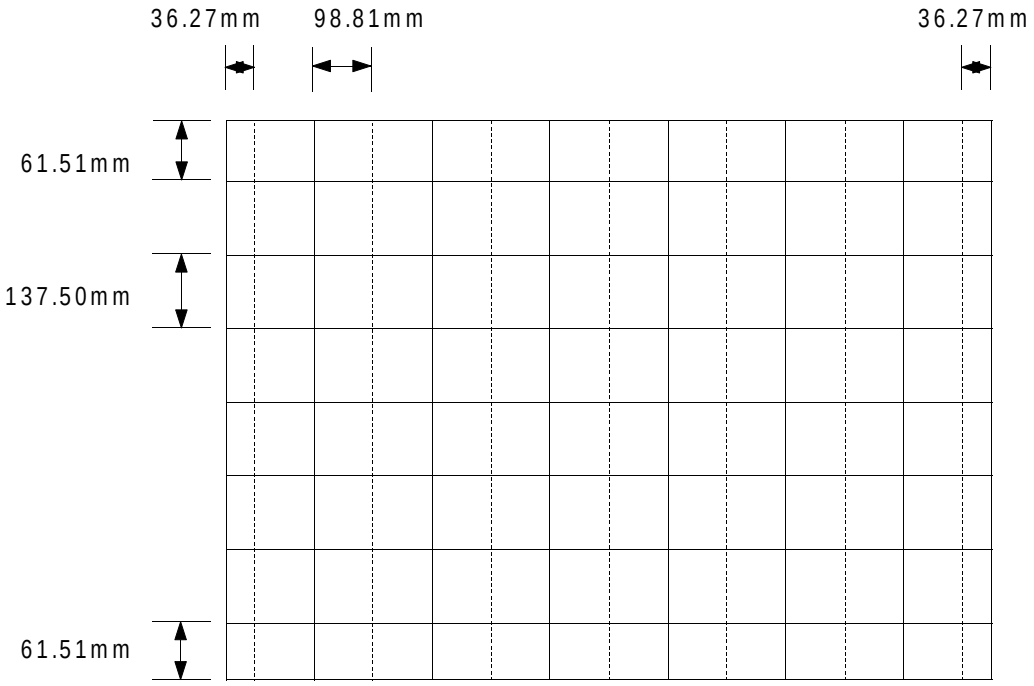
1-6-7 54T6

54T6 Screen Size : X 1099 Y 823 (X:764 = 22 x 2 + 60 x 12, Y:262 = 17 x 2 + 38 x 6)-PAL MODE

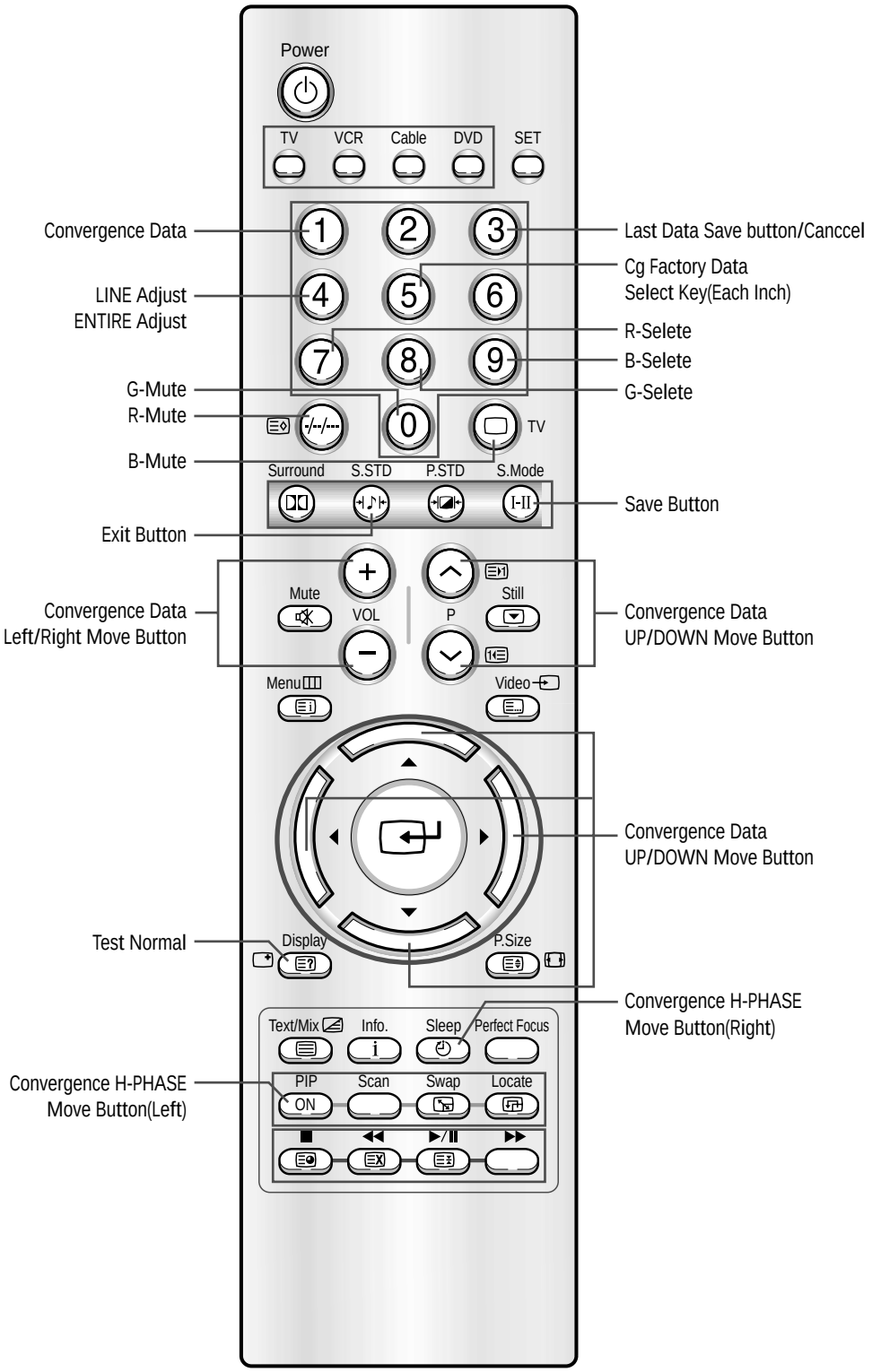


1-6-8 62T6

62T6 Screen Size : X 1259.4, Y 948 (X:764 = 22 x 2 + 60 x 12, Y:262 = 17 x 2 + 38 x 6)-PAL MODE



1-7 Remote Control for Servicing(Convergence Mode)



1-7-1 KEY Function

1. R-SELECT (7)
   Press to select RED color.

2. G-SELECT (8)
   Press to select GREEN color.

3. B-SELECT (9)
   Press to select BLUE color.

4. R-MUTE -/--/--
   Press to mute RED color.

5. G-MUTE (0)
   Press to mute GREEN color.

6. B-MUTE TV
   Press to mute BLUE color.

7. CANCEL KEY (3)
   Press to revert to the previous data during the Convergence Adjustment.

8. TEST / NORMAL Display
   Press to check TV mode in the Convergence Mode.

9. LINE SHIFT (4)
   Press to move a line up / down or left / right.

10. FACTORY DATA SELECT BUTTON (2)
    Press to call the factory default values.

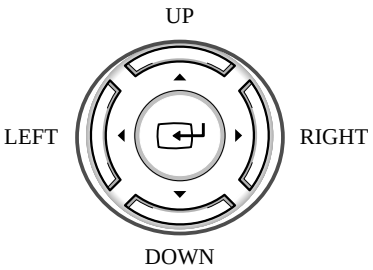
11. SAVE BUTTON S.Mode (I-II)
    After the Convergence Adjustments are completed, press to save data.

12. EXIT BUTTON S.STD
    After the Convergence adjustments are completed, press to exit to TV mode.

13. CURSOR MOVE BUTTON

Press to move the cursor up / down or right / left.

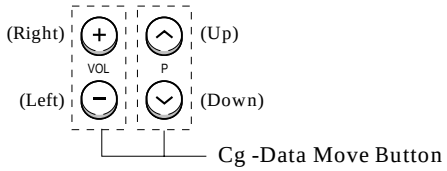
①



②

③ (Mute) Press to move the cursor left or up.
(Video) Press to move the cursor right or down.
(Menu) Press switch the cursor direction horizontally or vertically.

14. CONVERGENCE PICTURE MOVE BUTTON



15. CONVERGENCE MOVE BUTTON

Press to move the convergence right (PIP ON) or left (Sleep) .

16. CONVERGENCE DATA ZERO BUTTON ①

Press to zero the convergence correction data.

17. INITIAL DATA SET BUTTON ②

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

Inch (Type)	Model Name	Basic Data	Screen Display
	Representative Model	Number after entring the Cg-Mode	
42” (42W5)	SP42W5	5-425 (Press in regular order)	□□□□ □□□□
47” (47W3)	SP47W3	5-473(Press in regular order)	□□□□
55” (55W3)	SP55W3	5-553(Press in regular order)	□□□□□
43” (43T6	SP43T6	5-436(Press in regular order)	┼┼┼┼
43” (43T7)	SP43T7	5-437(Press in regular order)	┼┼┼┼┼
48” (48T6)	SP48T6	5-485(Press in regular order)	┼┼┼┼┼┼
54” (54T6)	SP54T6	5-545(Press in regular order)	┼┼┼┼
62” (62T6)	SP62T6	5-625(Press in regular order)	┼┼┼┼ ┼┼┼┼
65”(65W3)	SP65W3		

18. Data shift Button Locate Press to transmit data(PAL Mode / NTSC Mode).

1-8 Convergence Adjustment

1-8-1 Convergence Adjustment

NOTE

Special Notes

- A sensor is attached on the center of each side of the Convergence Mode pattern (see figure below). The sensors are required for normal Perfect Focus function.
- Use a screen jig to do the convergence adjustments correctly (Especially, perform correct convergence adjustments on the center of each side where a sensor is located.)
- Do the convergence adjustments correctly. Otherwise, any Perfect Focus error can happen.

1. Warm up the TV for a least 30 minutes.

2. Input an PAL Signal.(Use an antenna or AV source.)

NOTE

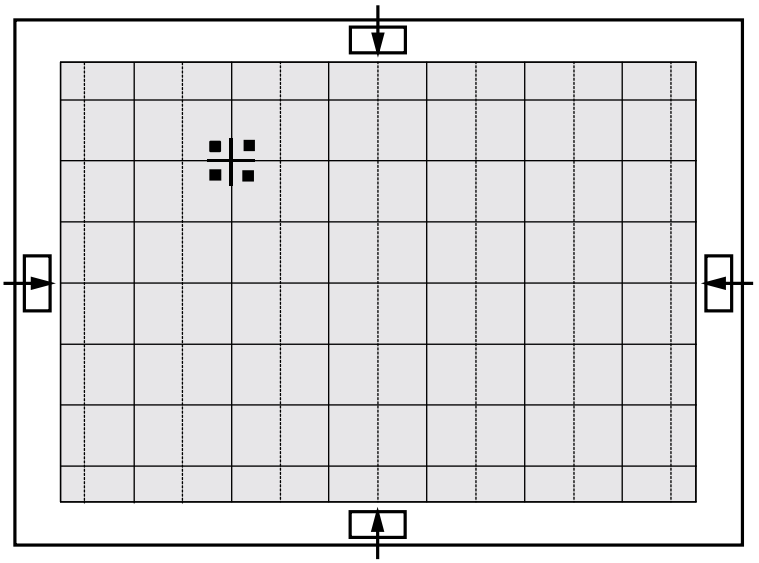
Make sure that deflection yoke are properly adjusted so that the center of Green, Red, Blue pattern is aligned on the center of screen jig.

3. Enter the Convergence Mode by Pressing the remote control keys in the following sequence:

Mute → 1 → 8 → 3

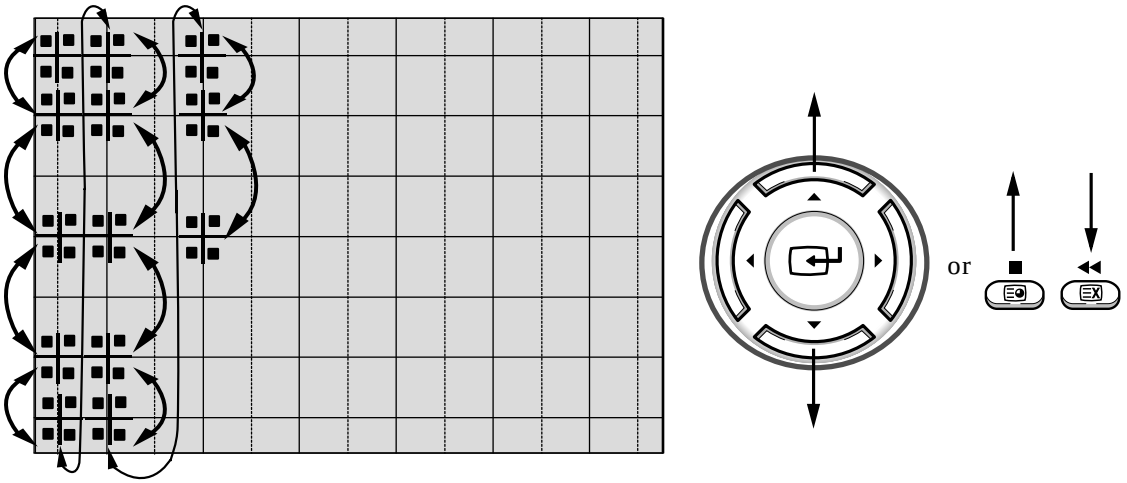
NOTE

If OSD displayed as shown in figure below, press the S.STD key to exit.
Then, redo step 3 to enter the Convergence Mode.
After entering the Convergence Mode, Stand by for about five seconds before doing the adjustments.



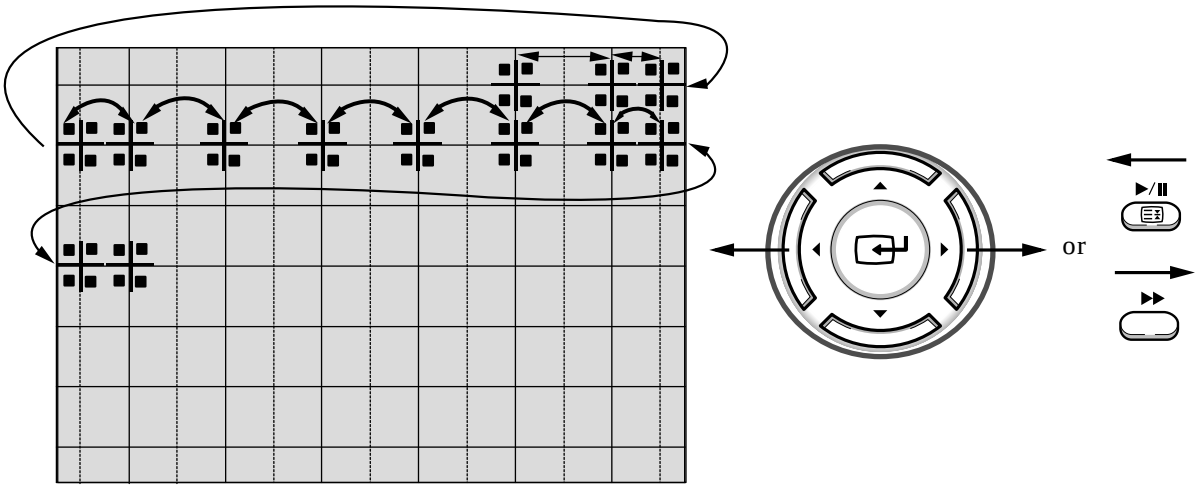
4. To adjust GREEN, first press the -/--/--- and the TV keys, and then press the 8 key.

5. The Menu key moves the cursor horizontally or vertically

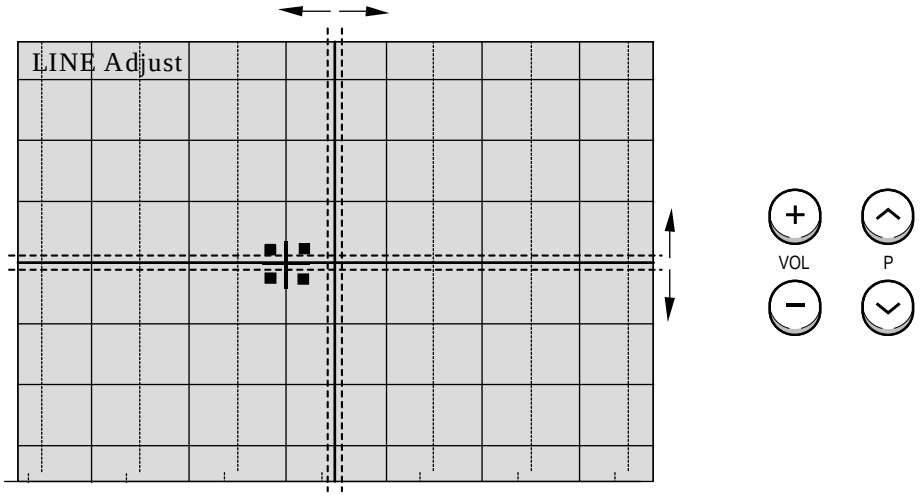


NOTE When the Menu key is pressed once again, the cursor moves horizontally.

6. The Mute key moves the cursor right, and the P.Size key moves the cursor left.



7. Use the (4) key for overall balance.

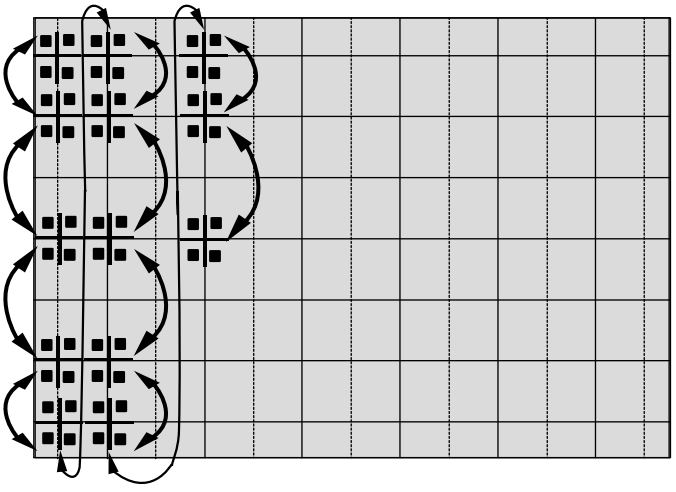


8. After the Line Shift is cancelled by pressing the (4) key, use the Channel and Volume keys (Up/Down/Right/Left) to make big adjustments.

9. After the green convergence adjustments are completed, press the S.Mode (I-II) key to save the data.

10. Superimpose the Red and Green colors by pressing the -/--/--- and the (7) keys.

11. To adjust RED, redo steps 5~7.



When the cursor moves vertically Menu

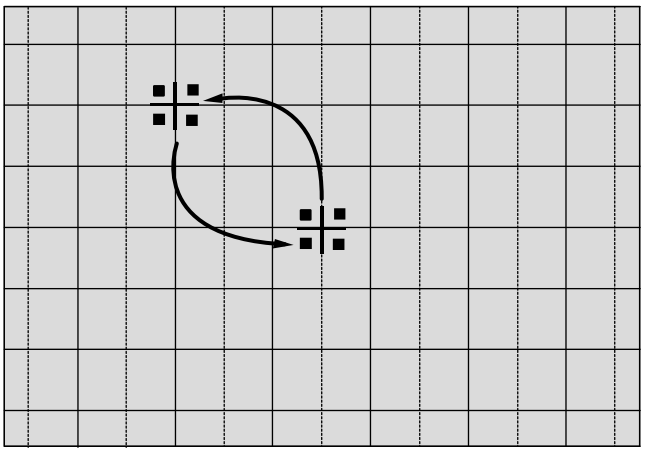
12. To superimpose the blue and green colors, press (1) the -/--/--- key for R-Mute, (2) the TV key to cancel the B-Mute, and (3) the 9 key for B-select.

13. To adjust BLUE, redo steps 5 ~ 7, 13.

14. If any color is not properly adjusted when displaying the red, blue and green colors, readjust the color.

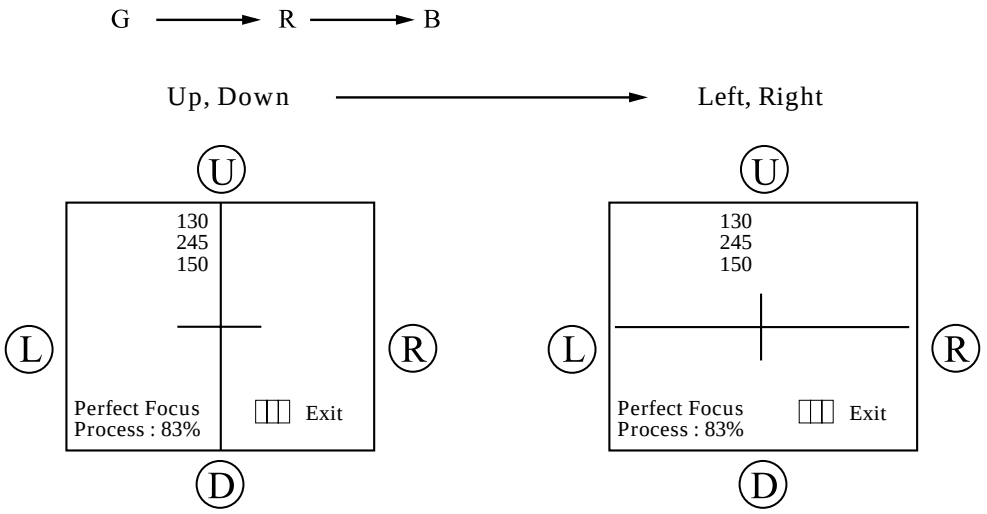
15. After the color adjustments are completed, press the S.Mode I-II key to save the data.

NOTE The cursor moves to center, and then automatically moves up and to the left about five seconds later.



1-8-2 Perfect Focus(Factory Mode)

1. After the adjustment is completely saved, press the Perfect Focus key to perform Auto Convergence(Factory Mode). Auto Convergence is performed in the following sequences:



When Auto Convergence is complete, the data is automatically saved and the convergence pattern reverts.

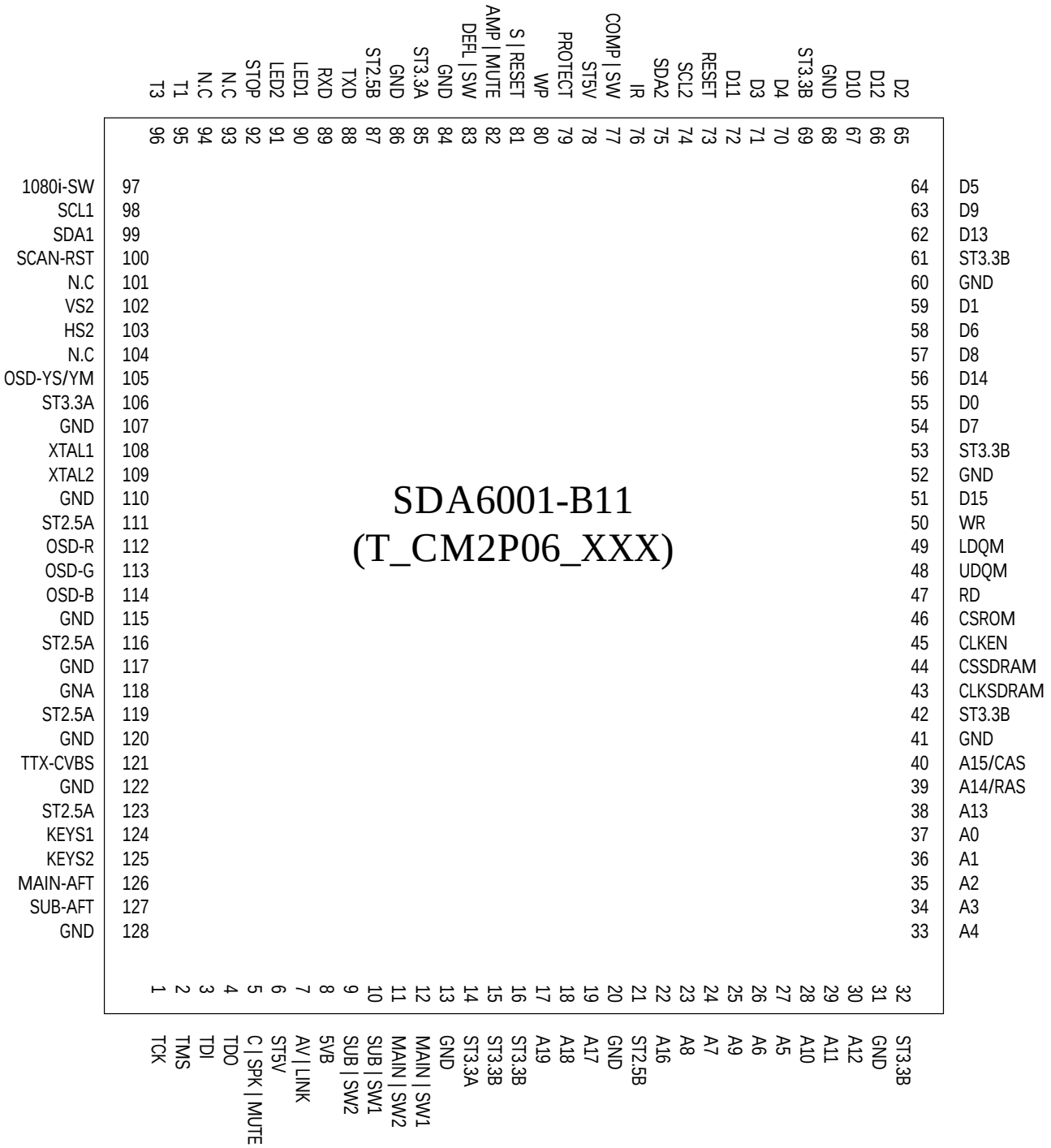
NOTE

- After Factory Auto Convergence is complete, make sure that the cursor flickers for about 1 second on the center and then it is saved.
- Check the presence of error through the flicker of the cursor.
- When any error happens, be sure to re-do Factory Auto Convergence.
- When Convergence Adjustment is not normally done or the convergence center is misaligned with the sensing point, any adjustment error happens. Therefore, be sure to use a screen jig to correctly adjust during troubleshooting.

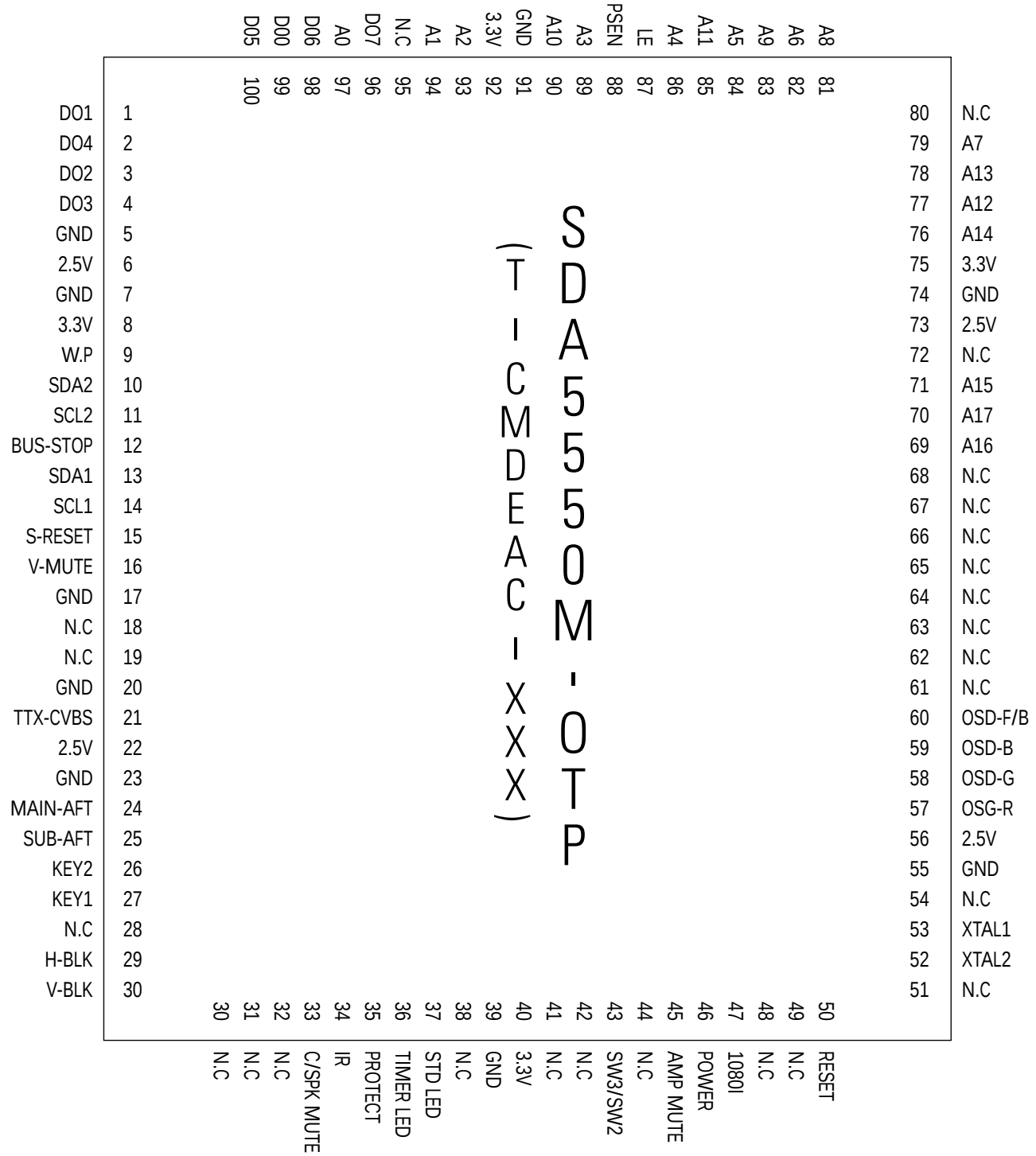
2. After the Convergence Adjustments are completed, press the S.STD key to exit.

1-9 MICOM and Pins Voltage

1-9-1 Pin Layout(T_CM2P06_XXX)



1-9-2 Pin Layout(T_CMDEAC_XXX)



1-9-3 MICOM MODULE Pins

PIN NO.	ITEM	FUNCTION	OUT VOLT
1	KEY 1	KEY SCAN1	2.28[V]
2	PROTECT	PROTECT PORT	0.83[mV]
3	KEY 2	KEY SCAN2	2.25[V]
4	GND	GND	-
5	N.C	N.C	-
6	STB-5(V)	VCC	4.91[V]
7	IR IN	REMOCON INPUT	3.74[V]
8	POWER	POWER ON/OFF RELAY CONTROL	1.03[V]
9	TIMER-LED	TIMER LED	2.07[V]
10	N.C	N.C	-
11	GND	GND	-
12	V-RESET	VIDEO RESET	2.84[mV]
13	SCL1	SERIAL CLOCK LINE1	3.43[V]
14	GND	GND	-
15	SDA1	SEREAL DATA LINE1	3.49[V]
16	S-RESET	SOUND RESET	4.21[V]
17	ST-BY-LED	STAND-BY LED	2.95[V]
18	RESET	RESET	2.47[V]
19	AMP-MUTE	SOUND AMP MUTE	0.89[mV]
20	N.C	N.C	-
21	GND	GND	-
22	N.C	N.C	-
23	SCL2	SERIAL CLOCK LINE2	3.27[V]
24	C-SPK MUTE	CENTER SPEAKER MUTE	3.26[V]
25	SDA2	SERIAL DATA LINE2	3.27[V]
26	SW3	SW3(CONTROL)	5[mV]
27	GND	GND	-
28	SW2	SW2(CONTROL)	2.08[V]
29	SUB-AFT	SUB TUNER AFT CONTROL	2.57[V]
30	GND	GND	-
31	MAIN-AFT	MAIN TUNER AFT CONTROL	1.04[V]
32	BUS-STOP	IIC BUS STOP	3.27[V]

PIN NO.	ITEM	FUNCTION	OUT VOLT
33	5[V]	5[V]	4.96[V]
34	H-BLANK	HORIZONTAL BLANK	215.8[mV]
35	GND	GND	-
36	V-BLANK	VERTICAL BLANK	-12.10[mV]
37	N.C	N.C	-
38	GND	GND	-
39	GND	GND	-
40	N.C	N.C	-
41	VS1	VERTICAL SYNC	-
42	N.C	N.C	-
43	HS1	HORIZONTAL SYNC	215.51[mV]
44	N.C	N.C	-
45	GND	GND	-
46	N.C	N.C	-
47	TTX-CVBS	TTX/CAPTION-CVBS	1.19[V]
48	GND	GND	-
49	GND	GND	-
50	N.C	N.C	-
51	AN-LINK	NOT USE	-
52	N.C	N.C	-
53	GND	GND	-
54	N.C	N.C	-
55	N.C	N.C	-
56	GND	GND	-
57	N.C	N.C	-
58	OSD-TTX-R	ON SCREEN DISPLAY RED	168[mV]
59	GND	GND	-
60	OSD-TTX-G	ON SCREEN DISPLAY GREEN	0.46[V]
61	WP	WRITE PROTECT	-
62	OSD-TTX-B	ON SCREEN DISPLAY BLUE	0.46[V]
63	3.3[V]	3.3[V]	3.26[V]
64	OSD-TTX-FB	OSD/TTX-FB	7.31[mV]

1-9-4 PROSCAN MODULE Pins

PIN NO.	ITEM	FUNCTION	OUT VOLT
1	EW	EAST WEST OUT	2.26[V]
2	V-BLK	VERTICAL BLANK	-12.07[mV]
3	ABL	ABL(Automatic Brightness Limiter)	2.26[V]
4	VD-	VERTICAL DRIVE(-VOLTAGE)	3.46[V]
5	VD+	VERTICAL DRIVE(+VOLTAGE)	3.53[V[
6	H-BLK	HORIZONTAL BLANK	215.93[mV]
7	HD	HORIZONTAL DRIVE	2.38[V]
8	GND	GND	-
9	OSD/TTX-FB	OSD/TTX-FB	7.29[mV]
10	OSD/TTX-B	ON SCREEN DISPLAY BLUE IN	0.46[mV]
11	OSD/TTX-G	ON SCREEN DISPLAY GREEN IN	0.46[mV]
12	OSD/TTX-R	ON SCREEN DISPLAY RED IN	167.99[mV]
13	V-RESET	VIDEO RESET	2.94[mV]
14	GND	GND	-
15	SCL1	SERIAL CLOCK LINE	3.42[V]
16	SDA1	SERIAL DATA LINE	3.50[V]
17	N.C	N.C	-
18	COMP	COMP	27.28[mV]
19	GND	GND	-
20	CG-R	CONVERGENCE RED	0.27[mV]
21	CG-G	CONVERGENCE GREEN	0.27[mV]
22	CG-B	CONVERGENCE BLUE	0.29[mV]
23	CG-SYNC	CONVERGENCE SYNC	180.03[mV]
24	D/F	DYNAMIC FOCUS	1.5[V]
25	GND	GND	-
26	9[V]	9[V]	9[V]
27	N.C	N.C	-
28	N.C	N.C	-
29	N.C	N.C	-
30	N.C	N.C	-
31	GND	GND	-
32	13.5[V]	13.5[V]	14.05[V]

PIN NO.	ITEM	FUNCTION	OUT VOLT
33	5[V]-DW1	5[V]-DW1	4.97[V]
34	VM-Y	VM-Y OUTPUT	1.97[V]
35	SW3	SW3(CONTROL)	4.98[mV]
36	SW2	SW2(CONTROL)	2.08[V]
37	N.C	N.C	-
38	GND	GND	-
39	PIP-C	PIP-C INPUT	1.20[mV]
40	PIP-Y CVBS	PIP-Y/CVBS INPUT	1.33[mV]
41	GND	GND	-
42	MAIN-C	MAIN-C INPUT	1.34[mV]
43	MAIN-Y CVBS	MAIN-Y/CVBS INPUT	1.57[mV]
44	N.C	N.C	-
45	GND	GND	-
46	N.C	N.C	-
47	GND	GND	-
48	RF2-CVBS	RF2-CVBS	-
49	DVD-Pr/R	DVD-Pr/R(SCART)	-
50	DVD-Y/G	DVD-Y/G(SCART)	-
51	DVD-Pb/B	DVD-Pb/B(SCART)	-
52	FB	FB(SCART)	-
53	GND	GND	-
54	N.C	N.C	-
55	N.C	N.C	-
56	N.C	N.C	-
57	GND	GND	-
58	DVD-Pr	DVD-Pr	-
59	DVD-Y	DVD-Y	-
60	DVD-Pb	DVD-Pb	-
61	GND	GND	-
62	5[V]-DW2	5[V]-DW2	4.89[V]
63	N.C	N.C	-
64	N.C	N.C	-

1-9-5 CONVERGENCE MODULE Pins

PIN NO.	ITEM	FUNCTION	OUT VOLT
1	5[V]-CG	5[V]-CG	5.2[V]
2	GND	GND	-
3	D/F	DYNAMIC FOCUS	1.5[V]
4	GND	GND	-
5	SCL1	SERIAL CLOCK LINE1	3.4[V]
6	CG-SYNC	CONVERGENCE SYNC	179[mV]
7	GND	GND	-
8	N.C	N.C	5.2[V]
9	CG-R	CONVERGENCE RED	0.27[mV]
10	CG-G	CONVERGENCE GREEN	0.26[mV]
11	CG-B	CONVERGENCE BLUE	0.29[mV]
12	SDA1	SERIAL DATA LINE1	3.5[V]
13	N.C	N.C	-
14	IR	INPUT REMOCON	3.7[V]
15	N.C	N.C	-
16	GND	GND	-
17	GND	GND	-
18	GND	GND	-
19	BV	BLUE VERTICAL OUT	34.27[mV]
20	BH	BLUE HORIZONTAL OUT	-107.32[mV]
21	GV	GREEN VERTICAL OUT	101.52[mV]
22	GH	GREEN HORIZONTAL OUT	-15.83[mV]
23	RV	RED VERTICAL OUT	104.32[mV]
24	RH	RED HORIZONTAL OUT	-88.95[mV]
25	GND	GND	-
26	H-BLK	HORIZONTAL BLANK	275[mV]
27	V-BLK	VERTICAL BLANK	-13.22[mV]
28	GND	GND	-
29	N.C	N.C	-
30	-5[V]	-5[V]	-4.99[V]
31	5[V]	5[V]	5.24[V]
32	GND	GND	-

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