ADJUSTMENT PRECAUTIONS

This model's setting are adjusted in two different ways: though the I²C bus control and in the conventional analog manner. The adjustments via the I²C bus control include preset-only items and variable data.

1. Setting the service mode by the microprocessor.

① Make a short-circuit 137 and 138 for a second and release to switch to the service mode position and the microprocessor is in input mode. (Adjustment through the I²C bus control). (Use JWS Key to set as well).
② Press the CH DOWN / UP key on the remote controller to get ready to select the mode one by one.
③ Press the CH DOWN / UP key on the remote controller to select the modes reversibly one by one.
④ Using the VOLUME UP/ DOWN key on the remote controller, the data can be modified.
⑤ Make a short-circuit 137 and 138 for a second and release to switch to the normal mode (OFF) position and the microprocessor is in out of the service mode.

2. Factory Presetting.

① Make a short-circuit 137 and 138 for a second and release to switch to the service mode position and turn on the main power switch. Initial values are automatically preset, only when a new EEPROM is used (Judge with the first 4 bytes).
② The initial data are preset as listed in pages 4-6.
③ Make sure the data need modify or not (Initial data).

Note: Once the chassis has been assembly together and ready to be POWER ON for the FIRST TIME, make sure to make a short-circuit 137 and 138 switch to the service mode position first and then turn on the main power switch. (See 2-1 above).

Precaution: If haven't done this initiation, it may possibly generate excessive Beam current.

3. For reference please check with memory map (GA1 Series type RH-iX3368CE Attachment)

■ SERVICE MODE

(1) In the Service Mode, Key is used to select the mode in the following order.

FORWARD : CH DOWN KEY
REVERSE : CH UP   KEY

AGC & GEOMETRIC MODE	WHITE POINT ADJ. MODE	SUB ADJ. MODE
AGC TAKE OVER POINT (AGC)	W.P RED STD. W.T. (DRI-RS)	MAX VOLUME (SUB-VOL)
VERTICAL SLOPE (V-LIN)	W.P. GREEN STD. W.T.(DRI-GS)	SUB CONTRAST (SUB-CON)
VERTICAL AMP (V-AMP)	W.P.BLUE STD. W.P. (DRI-BS)	SUB COLOUR (SUB-COL)
VERTICAL SHIFT (V-CENT)	W.P. RED COOL W.P.(DRI-RC)	SUB BRIGHTNESS (SUB-BRI)
HORIZONTAL SHIFT (H-CENT)	W.P. GREEN COOL W.P.(DRI-GC)	SUB TINT (SUB-TINT)
EAST-WEST WIDTH (H-SIZE)	W.P. BLUE COOL W.P.(DRI-BC)	SUB SHARPNESS (SUB-SHP)
HORIZONTAL PARALLELOGRAM (EW//)	W.P. RED WARM W.P.(DRI-RW)	MAX HOTEL VOLUME (HTL-VOL)
EAST-WEST PARABOLA/WIDTH (PARA)	W.P. GREEN WARM W.P.(DRI-GW)	HOTEL PROGRAM NO(HTL-PRG)
EAST-WEST UPPER COR. PB (COR(U))	W.P. BLUE WARM W.P. (DRI-BW)	OSD GRB REFERENCE (RGB)
EAST-WEST LOWER COR. PB (COR(L))		BLACK LEVEL OFFSET R(CUT-R)
EAST WEST TRAPEZIUM (TRAPE)		BLACK LEVEL OFFSET G(CUT-G)
HORIZONTAL BOW (HB)		CATHODE DRIVE LEVEL(CDL)
S-CORRECTION (S-COR)		

FORWARD : CH DOWN KEY
REVERSE : CH UP   KEY
* (   ) means OSD display.

4

```
┌─────────────┐
│  Y-DELAY    │
│  ADJ.       │
│  MODE       │
└─────────────┘
       ↓
Y-D TIME FOR PAL (TV) (DL-PT)
       ↓
Y-D TIME FOR SECAM (TV) (DL-ST)
       ↓
Y-D TIME FOR N358 (TV) (DL-3T)
       ↓
Y-D TIME FOR N443 (TV) (DL-4T)
       ↓
Y-D TIME FOR B/W (TV) (DL-TV)
       ↓
Y-D TIME FOR PAL (AV) (DL-PA)
       ↓
Y-D TIME FOR SECAM (AV) (DL-SA)
       ↓
Y-D TIME FOR N358 (AV) (DL-3A)
       ↓
Y-D TIME FOR N443(AV) (DL-4A)
       ↓
Y-D TIME FOR B/W (AV) (DL-AV)
     *(Y-D : Y-DELAY)
```

```
┌─────────────┐
│  OFFSET     │
│  ADJ.       │
│  MODE       │
└─────────────┘
       ↓
COLOUR OFFSET (PAL) (COL-OP)
       ↓
COLOUR OFFSET (SECAM) (COL-OS)
       ↓
COLOUR OFFSET (NTSC358) (COL-O3)
       ↓
COLOUR OFFSET (NTSC443) (COL-O4)
       ↓
SHARPNESS OFFSET (PAL) (SHP-OP)
       ↓
SHARPNESS OFFSET (SECAM) (SHP-OS)
       ↓
SHARPNESS OFFSET (NTSC358) (SHP-O3)
       ↓
SHARPNESS OFFSET (NTSC443) (SHP-O4)
```

```
┌─────────────┐
│  IC         │
│  OPTION     │
│  MODE       │
└─────────────┘
       ↓
VERTICAL SCAN DISABLE(VSD)
       ↓
BLACK STRETCH (BKS)
       ↓
AUTO VOLUME LEVELING(AVL)
       ↓
FAST FILTER IF-PLL(FFI)
       ↓
ENABLE VERTICAL GUARD (EVG)
       ↓
EHT TRACKING MODE (EHT)
       ↓
OVERSCAN SWITCH OFF(OSO)
       ↓
AUTO COLOUR LIMIT(ACL)
       ↓
FORCED COLOUR LIMIT(FCO)
```

```
┌─────────────┐
│  MISC.      │
│  OPTION     │
│  MODE       │
└─────────────┘
       ↓
SOUND SYSTEM M (S-M)
       ↓
SOUND SYSTEM DK (S-DK)
       ↓
SOUND SYSTEM I (S-I)
       ↓
SOUND SYSTEM BG (S-BG)
       ↓
PLAYBACK SECAM (P-SECAM)
       ↓
FE (RF) NTSC 3.58 (F-N358)
       ↓
FE (RF) NTSC 4.43 (F-N443)
       ↓
FE (RF) SECAM (F-SECAM)
       ↓
VIDEO MUTE AT IDENT LOSS (VMI)
       ↓
VIDEO MUTE AT PROGRAM
/SOURCE CHANGE (VMC)
       ↓
HOTEL MODE (HTL)
       ↓
REDUCED FM DEMODULATION
GAIN FOR BTSC SIGNAL (BTSC)
       ↓
      (A)
```

```
      (A)
       ↓
NUMBER OF EXT AV SOURCE (AV)
       ↓
FM WINDOW SELECTION (FMWS)
       ↓
SOUND MUTE BIT 0 (SM0)
       ↓
SOUND MUTE BIT 1 (SM1)
       ↓
THAI LANGUAGE (THA)
       ↓
ARABIC LANGUAGE (ARA)
       ↓
MALAY LANGUAGE (MAL)
       ↓
CHINESE LANGUAGE (CHI)
       ↓
FRENCH LANGUAGE (FRE)
       ↓
RUSSIAN LANGUAGE (RUS)
       ↓
FORCED V-SYNC SLICING LEVEL(FSL)
       ↓
SYNC OF OSD (HP2)
       ↓
TUNER SELECTION (CPT)
       ↓
      (B)
```

```
      (B)
       ↓
BILINGUAL(BIL)
       ↓
IF AGC SPEED BIT 0 (AGC0)
       ↓
IF AGC SPEED BIT 1 (AGC1)
       ↓
FOA Time Constant-RF (FOA-FE)
       ↓
FOB Time Constant-RF (FOB-FE)
       ↓
FOA Time Constant-AV (FOA-AV)
       ↓
FOB Time Constant-AV (FOB-AV)
       ↓
LED BLINK SPEED (LED-F)
       ↓
VOLUME CONTROL TABLE (MSA)
       ↓
OUTPUT VERTICAL GUARD (NDF)
```

USER DATA IN SERVICE MODE

* While SERVICE mode ON, EEPROM DATA will switch to the service data.
  Also, once SERVICE mode OFF, EEPROM will switch back to previous USER DATA.
* In the service mode, the user data establish as below,

MODE	USER DATA
CONTRAST	MAX (64/64)
COLOUR	CENT (32/64)
BRIGHTNESS	CENT (32/64)
TINT	CENT (32/64)
SHARPNESS	CENT (32/64)
WHITE TEMP	STANDARD
S-VOLUME	MIN (1/60)
BLUE BACK	OFF
C SYSTEM	AUTO
S SYSTEM	B/G

  The flow of Mode lists as following,

* Direct Key-in Step1 Mode

RC COMMAND	SERVICE-ITEM
FUNCTION	AGC
CONTRAST DOWN	V-LIN
COLOUR DOWN	V-AMP
BRIGHTNESS DOWN	V-CENT
TINT DOWN	H-CENT
SHARPNESS DOWN	EW / /
SYSTEM	HB
BLUEBACK	S-COR
TIMER	SUB-VOL
CONTRAST UP	SUB-CON
COLOUR UP	SUB-COL
BRIGHTNESS UP	SUB-BRI
TINT UP	SUB TINT
SHARPNESS UP	SUB-SHP
CHANNEL 1	DRI-GS
CHANNEL 4	DRI-BS
CHANNEL 7	CUT-R
CHANNEL FLASHBACK	CUT-G
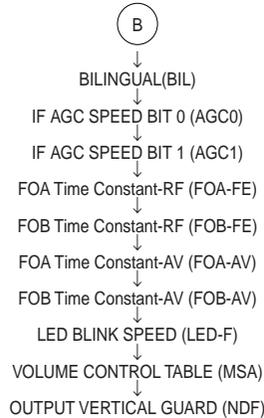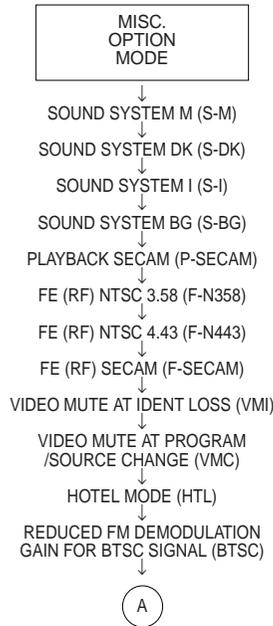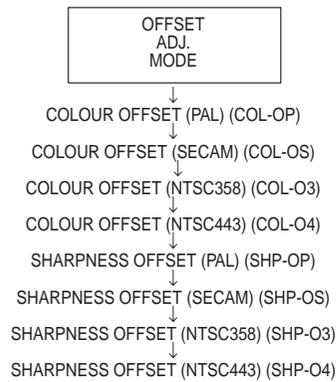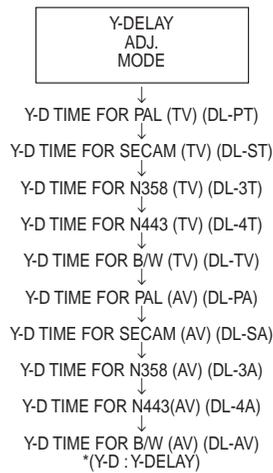
After short JA137 & 138, and turn on the main power switch, read data from E²PROM address 00H ~ 03H, and compare to the list below, if different, initialize the E²PROM.

Address	:	Data	Address	:	Data
00H	:	55H	02H	:	43H
01H	:	4FH	03H	:	A1H

EEPROM ITEMS	OSD	DATA LENGTH	INITIAL DATA	FIX/ADJ	REMARK
AGC TAKE OVER POINT	AGC	0~63	14	ADJ	
VERTICAL SLOPE	V-LIN	0~63	32	ADJ	
VERTICAL AMPLITUDE	V-AMP	0~63	32	ADJ	
VERTICAL SHIFT	V-CENT	0~63	32	ADJ	
HORIZONTAL SHIFT	H-CENT	0~63	32	ADJ	
EAST-WEST WIDTH	H-SIZE	0~63	32	*FIX	
HORIZONTAL PARALLELOGRAM	EW//	0~63	32	*FIX	
EAST-WEST PARABOLA/WIDTH	PARA	0~63	32	*FIX	
EAST-WEST UPPER CORNER PARABOLA	COR (U)	0~63	32	*FIX	
EAST-WEST LOWER CORNER PARABOLA	COR (L)	0~63	32	*FIX	
EAST-WEST TRAPEZIUM	TRAPE	0~63	32	*FIX	
HORIZONTAL BOW	HB	0~63	32	*FIX	
S-CORRECTION	S-COR	0~63	0	ADJ	*3
WHITE POINT RED STD WHITE TEMP	DRI-RS	0~63	32	*FIX	
WHITE POINT GREEN STD WHITE TEMP	DRI-GS	0~63	32	ADJ	
WHITE POINT BLUE STD WHITE TEMP	DRI-BS	0~63	32	ADJ	
WHITE POINT RED COOL WHITE TEMP	DRI-RC	0~63	25	*FIX	
WHITE POINT GREEN COOL WHITE TEMP	DRI-GC	0~63	32	ADJ	(DRI-GS)- 7 DATA
WHITE POINT BLUE COOL WHITE TEMP	DRI-BC	0~63	32	ADJ	SAME AS (DRI-BS) DATA
WHITE POINT RED WARM WHITE TEMP	DRI-RW	0~63	32	*FIX	
WHITE POINT GREEN WARM WHITE TEMP	DRI-GW	0~63	32	ADJ	(DRI-GS)-7 DATA
WHITE POINT BLUE WARM WHITE TEMP	DRI-BW	0~63	32	ADJ	(DRI-BS)-7 DATA
MAX VOLUME	SUB-VOL	0~63	63	*FIX	
SUB CONTRAST	SUB-CON	0~63	63	ADJ	*5
SUB COLOUR	SUB-COL	0~63	32	ADJ	*4
SUB BRIGHTNESS	SUB-BRI	0~63	32	ADJ	
SUB TINT	SUB-TINT	0~63	32	ADJ	
SUB SHARPNESS	SUB-SHP	0~63	32 (20)	*FIX	
MAX HOTEL VOLUME	HTL-VOL	0~63	32	*FIX	
HOTEL PROGRAM NUMBER	HTL-PRG	0~99 OR>99FOR NONE	255	*FIX	
OSD GRB REFERENCE	RGB	0~15	15	ADJ	*6
BLACK LEVEL OFF-SET R	CUT-R	0~63	32	ADJ	
BLACK LEVEL OFF-SET G	CUT-G	0~63	32	ADJ	
CATHODE DRIVE LEVEL	CDL	0~15	0	ADJ	*2
Y-DELAY TIME FOR PAL(TV) [YD]	DL-PT	0~15	12	*FIX	
Y-DELAY TIME FOR SECAM(TV) [YD]	DL-ST	0~15	15	*FIX	
Y-DELAY TIME FOR N358 (TV) [YD]	DL-3T	0~15	12	*FIX	
Y-DELAY TIME FOR N443 (TV) [YD]	DL-4T	0~15	12	*FIX	
Y-DELAY TIME FOR B/W (TV) [YD]	DL-TV	0~15	12	*FIX	
Y-DELAY TIME FOR PAL (AV) [YD]	DL-PA	0~15	12	*FIX	
Y-DELAY TIME FOR SECAM (AV) [YD]	DL-SA	0~15	15	*FIX	
Y-DELAY TIME FOR N358 (AV) [YD]	DL-3A	0~15	12	*FIX	
Y-DELAY TIME FOR N443 (AV) [YD]	DL-4A	0~15	12	*FIX	
Y-DELAY TIME FOR B/W (AV) [YD]	DL-AV	0~15	12	*FIX	
COLOUR OFFSET (PAL)	COL-OP	0~15	8	*FIX	
COLOUR OFFSET (SECAM)	COL-OS	0~15	8	*FIX	
COLOUR OFFSET (NTSC358)	COL-03	0~15	4	*FIX	
COLOUR OFFSET (NTSC443)	COL-O4	0~15	4	*FIX	
SHARPNESS OFFSET (PAL)	SHP-OP	0~15	8	*FIX	
SHARPNESS OFFSET (SECAM)	SHP-OS	0~15	4	*FIX	

EEPROM ITEMS	OSD	DATA LENGTH	INITIAL DATA	FIX/ADJ	REMARK
SHARPNESS OFFSET (NTSC358)	SHP-O3	0~15	12	*FIX	
SHARPNESS OFFSET (NTSC443)	SHP-O4	0~15	8	*FIX	
VERTICAL SCAN DISABLE	VSD	0(DISABLE)/1(ENABLE)	0	*FIX	
BLACK STRETCH	BKS	0(DISABLE)/1(ENABLE)	1	*FIX	
AUTOMATIC VOLUME LEVELING	AVL	0(DISABLE)/1(ENABLE)	1	*FIX	
FAST FILTER IF-PLL	FFI	0(DISABLE)/1(ENABLE)	0	*FIX	
ENABLE VERTICAL GUARD (RGB BLANKING)	EVG	0(DISABLE)/1(ENABLE)	1	*FIX	
EHT TRACKING MODE (HCO)	EHT	0(DISABLE)/1(ENABLE)	1	*FIX	
OVERSCAN SWITCH OFF	OSO	0(DISABLE)/1(ENABLE)	0	*FIX	
AUTO COLOUR LIMIT	ACL	0(DISABLE)/1(ENABLE)	0	*FIX	
FORCED COLOUR LIMIT	FCO	0(DISABLE)/1(ENABLE)	0	*FIX	
SOUND SYSTEM M	S-M	0(DISABLE)/1(ENABLE)	0	*FIX	
SOUND SYSTEM DK	S-DK	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
SOUND SYSTEM I	S-I	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
SOUND SYSTEM BG	S-BG	0(DISABLE)/1(ENABLE)	1	*FIX	
PLAYBACK SECAM	P-SECAM	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
FE (RF) NTSC 3.58	F-N358	0(DISABLE)/1(ENABLE)	0	*FIX	
FE (RF) NTSC 4.43	F-N443	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
FE (RF) SECAM	F-SECAM	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
VIDEO MUTE AT IDENT LOSS	VMI	0(DISABLE)/1(ENABLE)	1	*FIX	
VIDEO MUTE AT PROGRAM/SOURCE CHANGE	VMC	0(DISABLE)/1(ENABLE)	1	*FIX	
HOTEL MODE	HTL	0(DISABLE)/1(ENABLE)	0	*FIX	
REDUCED FM DEMODULATOR GAIN FOR BTSC SIGNAL	BTSC	0(DISABLE)/1(ENABLE)	0	*FIX	
NUMBER OF EXTERNAL AV SOURCE	AV	0 FOR1 AV/1 FOR 2AV	1 (0)	*FIX	
FM WINDOW SELECTION	FMWS	0(DISABLE)/1(ENABLE)	0	*FIX	
SOUND MUTE BIT 0	SM0	0(DISABLE)/1(ENABLE)	1	*FIX	
SOUND MUTE BIT 1	SM1	0(DISABLE)/1(ENABLE)	0	*FIX	
THAI LANGUAGE	THA	0(DISABLE)/1(ENABLE)	0 (1)	*FIX	
ARABIC LANGUAGE	ARA	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
MALAY LANGUAGE	MAL	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
CHINESE LANGUAGE	CHI	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
FRENCH LANGUAGE	FRE	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
RUSSIAN LANGUAGE	RUS	0(DISABLE)/1(ENABLE)	1 (0)	*FIX	
FORCED V-SYNC SLICING LEVEL	FSL	0(DISABLE)/1(ENABLE)	0	*FIX	
SYNC OF OSD	HP2	0(DISABLE)/1(ENABLE)	0	*FIX	
TUNER SELECTION (0:SHARP/ALPS;1:MURATA)	CPT	0(DISABLE)/1(ENABLE)	0 (1)	*FIX	
BILINGUAL	BIL	0(DISABLE)/1(ENABLE)	0	ADJ	*7
IF AGC SPEED BIT 0	AGC0	0(DISABLE)/1(ENABLE)	1	*FIX	
IF AGC SPEED BIT 1	AGC1	0(DISABLE)/1(ENABLE)	0	*FIX	
PHI-1 TIME CONSTANT (RF)	FOA-FE	0(DISABLE)/1(ENABLE)	0	*FIX	
PHI-1 TIME CONSTANT (RF)	FOB-FE	0(DISABLE)/1(ENABLE)	0	*FIX	
PHI-1 TIME CONSTANT (OFF AIR)	FOA-AV	0(DISABLE)/1(ENABLE)	1	*FIX	
PHI-1 TIME CONSTANT (OFF AIR)	FOB-AV	0(DISABLE)/1(ENABLE)	1	*FIX	
LED BLINK SPEED	LED_F	0(DISABLE)/1(ENABLE)	0 (1)	*FIX	
VOLUME CONTROL PWM TABLE	MSA	0(DISABLE)/1(ENABLE)	0 (1)	*FIX	
OUTPUT VERTICAL GUARD	NDF	0(DISABLE)/1(ENABLE)	0 (1)	*FIX	

NOTE :
1) *FIX: PLEASE DO NOT CHANGE FIXED DATA WITHOUT SPECIFIC INSTRUCTION.
   Please set the EEPROM initial data according to the value in parenthesis ( ) before adjustment.
2) *2: CDL ADJUST = (7 FOR 20" and 21") and (5 FOR 14")
3) *3: S-COR ADJUST = (20 FOR 21") AND (17 FOR 14" AND 20").
4) *4: After SUB-COLOUR ADJUSTMENT, ADD 6 STEPS INTO THE DATA OF SUB-COL.
   NEW SUB-COL=SUB-COL DATA OF 75% WHITE & RED PORTIONS AT SAME LEVEL +6 STEPS.
5) *5: SUB-CON = (63 FOR 20" and 21") AND (52 FOR 14")
6) *6: RGB= (15 FOR 20" and 21") AND (6 FOR 14")
7) *7: BIL= (1 FOR 20" and 21") AND (0 FOR 14")

SHIPPING SETTING & CHECKING

(1) The following default data has been factory-set for the E²PROM.

ITEMS	DATA SETTING
LAST PROGRAM/CHANNEL	1
FLASHBACK PROGARM/CH	1
DIGIT	1
C-SYSTEM	AUTO
S-SYSTEM	B/G
SKIP	OFF
AFC	ON
VOLUME	1
CONTRAST	60 (MAX)
COLOUR	0 (CENTER)
BRIGHTNESS	0 (CENTER)
TINT	0 (CENTER)
SHARPNESS	0 (CENTER)
WHITE TEMP	STANDARD
REMINDER TIMER	In-active, "--:--"
ON TIMER	In-active, "--:--"
OFF TIMER	In-active, "--:--"
LAST POWER	POWER-ON
LANGUAGE	THAI
BLUE BACK MUTE	ON
HOTEL MODE	OFF
0 CHANNEL SKIP	ON
LAST TV/AV	TV

6

PIF ADJUSTMENT

| NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	Tuner IFT (PRESET)	1. Get the tuner ready to receive the E-9 CH signal, but with no signal input. Adjust the PLL data. 2. Connect the sweep generator's output cable to the tuner antenna. (RF SWEEP) 3. Adjust the sweep generator's to 80dBuV. 4. Connect the response lead (use LOW IMPEDANCE probe with wave detector; see **Fig.1**) to the tuner's IF output terminal. (This terminal must have the probe alone connected). 5. Set the RF AGC to 0 - 6 V with no saturation with the waveform. 6. Adjust the tuner IF coil to obtain the waveform as shown in **Fig. 2**. **Note: Be sure to keep the tuner cover in position during this adjustment.**	 **Fig. 1** **Fig. 2**
2	RF-AGC TAKE OVER POINT ADJUSTMENT (I²C BUS CONTROL)	1. Receive "PAL COLOUR BAR" signal. ● Signal Strength: 57 ±1 dBμV (75 ohm open) 2. Connect the oscilloscope to TP201 (Tuner's AGC Terminal) as shown in **Fig. 3**. ● Bias box: About 4.5 V **Fig. 3** 3. Call "AGC" mode in service mode. Adjust the "AGC" bus data to obtain the Tuner output voltage level at TP201 is drop 1 step data from maximum voltage. 4. Change the antenna input signal to 63~67dBμV, and make sure there is no noise. 5. Turn up the input signal to 90~95 dBμV to be sure that there is no cross modulation beat.	**Note:** **For the 50 ohm signal strength gauge, when not using 50/75 impedance adapter, signal strength is 52 ±1 dBμV(75 ohm open), instead of 57 ±1 dBμV (75 ohm open).** **Precaution:** **The loss of using impedance adapter**
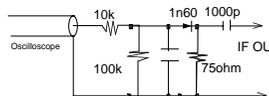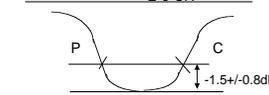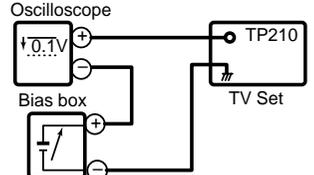
PURITY ADJUSTMENT

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	PURITY ADJ.	1. Receive the GREEN-ONLY signal. Adjust the beam current to ~ 700 µA (20" & 21") and ~ 500 µA (14"). 2. Degauss the CRT enough with the degausing coil. 3. Maintain the purity magnet at the zero magnetic field and keep the static convergence roughly adjusted. 4. Observe the points a, b, as shown in **Fig. 1-1** through the microscope. Adjust the landings to A rank requirement. 5. Orient the raster rotation to 0 eastward. 6. Tighten up the deflection coil screws. ● Tightening torque: 108N ± 20 N (11kgf ± 2 kgf) 7. Make sure the CRT corners landing meet the A rank requirements. If not, stick the magnet sheet to correct it. **Note: This adjustment must be done after warming up the unit for 30 minutes or longer with a beam current over 700 µA (For 14", the beam current, should be over 500 µA).** * For the following colours press R/C RGB key to change. Green-only → Blue-only → Red-only ↑ Signal-colour screen cleared ↓	**Fig. 1-1** a b **Fig. 1-2** Rank "A" (on the right of the CRT) A = B **Fig. 1-3** Rank "A" (on the left of the CRT) A = B * Press R/C RGB key for 1 second in NORMAL MODE, the colour will change to RGB mono colour mode.
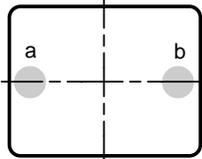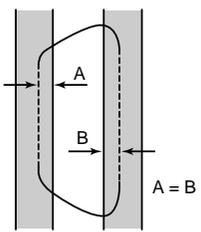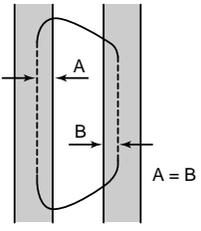
CONVERGENCE ADJUSTMENT

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	CONVERGENCE ADJ. **(To be done after the purity adjustment.)**	1. Receive the "Crosshatch Pattern" signal. 2. Using the remote controller, call NORMAL mode. Static convergence 1. Turn the 4-pole magnet to a proper opening angle in order to superpose the blue and red colours. 2. Turn the 6-pole magnet to a proper opening angle in order to superpose the green colour over the blue and red colours. Dynamic convergence 1. Adjust the convergence on the fringes of the screen in the following steps. a) Fig. a : Drive the wedge at point "a" and swing the deflection coil upward. b) Fig. b : Drive the wedge at point "b" and "c" and swing the deflection coil downward. c) Fig. c : Drive the "c" wedge deeper and swing the deflection coil rightward. d) Fig. d : Drive the "b" wedge deeper and swing the deflection coil leftward. 2. Fix all the wedges on the CRT and apply glass tape over them. 3. Apply lacquer to the deflection yoke lock screw, magnet unit (purity, 4-pole, 6-pole magnets) and magnet unit lock screw. Finally received the Red-only and Blue-only signals to make sure there is no other colours on the screen.	**Fig. a** BGR / BGR **Fig. b** RGB / RGB **Fig. c** BGR / RGB **Fig. d** RGB / BGR 4-pole magnet 6-pole magnet CRT neck Purity magnet Lacquer 20mm (20"/21") 35mm (14") Wedge "a" About 100° About 100° Lacquer Wedge "b" Wedge "c"
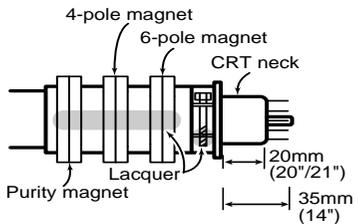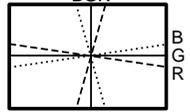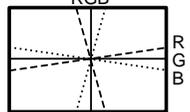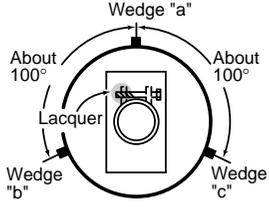
# CRT CUT-OFF, BACKGROUND AND SUB-CONTRAST ADJUSTMENT

| NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	CRT CUTOFF ADJUSTMENT (I²C BUS CONTROL)	Remark **1. Before CRT cutoff adjustment, SUB-BRIGHT, DRI-RS/RW/RC, DRI-GS/GW/GC, DRI-BS/BW/BC, CUT-R and CUT-G must be INITIAL DATA.** **2. CRT Cutoff adjustment must be done inside a dark room.** 1. Switch TV to VIDEO mode, BLUE BACK OFF, with NO VIDEO signal. 2. Press R/C to set Picture Normal condition. 3. First, off the screen by adjust screen variable resistor. *4. Next, checking AKB circuit function by slowly increase screen variable resistor until colour raster suddenly on and off (AKB start function). 5. Then continue adjust until retrace line appear. 6. Finally, slowly decrease the screen variable resistor until screen retrace line cut off (Not Raster) Note : Must confirm the AKB function in set before continue the next adjustment.	*Alternative Procedure (1) Step (1), (2), (3) and (4) are same as beside procedure. (2) Then continue adjust until retrace line appear and make sure the colour appear whether red, green or blue. (3) Connect the oscilloscope to related test points as below which is based on colour appear at (2) RED=TP47R, GREEN=TP47G, BLUE=TP47B (4) Then adjust Screen VR until the tip of signal reach (3.2Vdc for 21" and 20", 3.3Vdc for 14") 3.2Vdc /3.3VDdc
2	SUB-BRIGHTNESS ADJUSTMENT (I²C BUS CONTROL)	1. Call " SUB-BRI" in service mode. (Receive Cross-hatch pattern with 5 black level windows) *(2) Adjust the " SUB BRIGHT " bus data in order that the line 1 and 2 have the same darkness whereIse line 3 is one step (data) brighter than line 2. Finally data minus 1 to make line 1, 2, and 3 are in same level (darkness).	1 1 2 3 4 5 Line 3 is one step (data) brighter than line 2 2 1 2 3 4 5

3	WHITE BALANCE SERVICE MODE ADJ. (I²C BUS CONTROL)	1. Receive the "WHITE" pattern with BURST signal.
		2. Press R/C to set Picture NORMAL condition.
		3. Connect the DC miliammeter between TP602 (-) TP603 (+).
		4. Check Beam current should be around 1100 μA. (14" around 800 μA).
		5. Set it to service mode and adjust the DRI-GS, & DRI-BS data to have a colour temperature of 12300°K (white). * Note .
		6. Receive "WHITE" pattern, WITH BURST signal, and set BRIGHTNESS Y by generator, to **10 cd/m2 (MINOLTA CA-100) by reducing LUMINATE Y signal.
		7. Adjust "CUT-R" & "CUT-G" to get desired colour temperature #. Then go back NORMAL mode (HIGH BRIGHT**) to check colour temperature. If out of range, back to 1.
		
		Note:This adjustment must be done after warming up the unit for 30 minutes or longer with a beam current over 700μA. (For 14" the beam current should be over 500μA).
		
		* Adjust DRI-GC/GW, DRI-BC/BW as following DATA, after finishing DRI-BS and DRI-GS DATA ADJUSTMENT.
		DRI-RW = 32 (FIXED), DRI-RS = 32 (FIXED)
		DRI-BC = "DRI-BS"
		(For 12300° K Condition)
			# 12300°K X : 0.272
			                        Y : 0.275
			
			(MINOLTA COLOUR ANALYZER CA-100)
			*Note: Above Data can be UP/DOWN by Volume key.
			
			              LOW HIGH
			14" 10cd/m2 200cd/m2
			21" 10cd/m2 120cd/m2
			
			* 12300°K DRI-GW="DRI-GS"-7
			            DRI-BW="DRI-BS"-7
			            DRI-GC="DRI-GS"-7
			            DRI-RC=25

4	Max. beam check	1. Receive the "Monoscope Pattern" signal. 2. Press R/C to set Picture NORMAL condition. 3. Connect the DC miliammeter between TP603 (+) & TP602 (–). (Full Scale: 3 mA Range) 4. Beam current must be within 1100 ± 100 μA.(21") 800 ± 100 μA.(14")	

HORIZONTAL AND VERTICAL DEFLECTION LOOP ADJUSTMENT

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	V-SLOPE (I²C BUS CONTROL)	1. Receive Monoscope Pattern Signal. 2. Call the "V-LIN" mode. 3. Increase or decrease "V-LIN" by Volume key till the horizontal line in the center of monoscope is just at the position where the blanking starts.	
2	V-SHIFT-50 (I²C BUS CONTROL)	1. Call the "V-CENT" mode. 2. Increase or decrease "V-CENT" by Volume key till the picture is centered.	
3	V-AMP50 (I²C BUS CONTROL)	1. Call the "V-AMP" mode. 2. Increase or decrease "V - AMP" by Volume key to set overscan of 9.5% typical. Adjustment Spec 9.5% range +1% -0%.	
4	H-SHIFT (50) (H-CENTER)	1. Call the "H-CENT" mode. 2. Increase or decrease "H-CENT" by Volume key to center the picture horizontal.	
5	S-CORRECTION (I²C BUS CONTROL)	1. SET DATA TO (20 FOR 21") AND (17 FOR 14" & 20") * Check the E-5 CH Monoscope Pattern then re-adjust V-Slope, V-Shift and V-Amp to makesure adjustment is in acceptable Ring-Shaped.	
6	SUB-SHARPNESS	1. SET DATA TO 20 FOR ALL MODELS	
1	Focus	1. Receive the "Monoscope Pattern" signal. 2. Press R/C to set Picture NORMAL condition. 3. Adjust the focus control to get the best focusing.	

PAL CHROMA ADJUSTMENT

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	SUB COLOUR (I²C BUS CONTROL)	1. Receive the "PAL Color Bar" signal. 2. Press R/C to set Picture Normal condition. 3. Connect the oscilloscope to Red cathode(D882 Chathode) for 21" (Normal Neck). Red cathode(D881 Chathode) for 14"/20" (Mini Neck). ● Range : 20 V/div. (AC) (Using 10:1 probe) ● Sweep time : 10 μsec/div. 4. Using the R/C call "SUB COL" in SERVICE mode. Adjust SUB COLOUR bus data, so that the 75% White & Red portions of PAL Color Bar be at the same level shown as **Fig. 1-1**. 5. Add another 6 steps up into the value of SUB-COL obtained in 4. 6. Clear the SERVICE Mode.	Cy G B W Y 100%W Mg R 75% **Fig. 1-1**

NTSC CHROMA ADJUSTMENT

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	SUB-TINT (I²C BUS CONTROL)	1. Receive the "NTSC3.58 Colour Bar" signal thru AV in. 2. Connect the oscilloscope to TP47B (P882 pin 5) BLUE-OUT. • Range : 100mV/div. (AC) (Use Probe 10:1) • Sweep time: 10 μsec/div. 3. Call the "SUB-TINT" mode in service mode. Adjust the "SUB-TINT" bus data to obtain the waveform shown as **Fig. 1-1**. 4. Clear the SERVICE mode.	SAME LEVEL W Y Cy G Mg R B **Fig. 1-1**
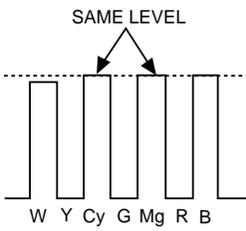
PROTECTOR OPERATION CHECKING

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	BEAM PROTECTOR	1. Receive "Monoscope Pattern" signal. 2. Set CONTRAST MAX. 3. Set BRIGHT MAX. 4. During the Collector & Emitter of Q883/5/7 short, make sure the protector ON and switch to standby mode.	* Select one of Q883/5/7 to do each short test.
2	H, V PROTECTOR	1. Receive "Monoscope Pattern" signal. 2. Connect output of Bias Box to D603 cathode (R610 side). 3. Set voltage of Bias Box to 18V and make sure the protector is not work. 4. Set voltage of Bias Box to 27V, and make sure the protector is work.	
3	Other protectors	1. Once finish rectified Electrolytic Capacitor short testing in +B line, check all possible damaged components on +B line. (Use random selected set for inspection)	

A/V INPUT AND OUTPUT CHECKING

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	VIDEO AND AUDIO OUTPUT CHECK	1. Receive the "PAL Color Bar" signal (100% White Color Bar, Sound 400 Hz 100% Mod). 2. Terminate the Video output with a 75 ohm impedance. Make sure the output is as specified (1.0 Vp-p ±3 dB). 3. Terminate the Audio output with a 10k ohm impedance. Make sure the O/P is as specified (1.76 Vp-p ±3 dB).	
2	VIDEO AND AUDIO INPUT CHECK	1. Using the TV/AV key on the remote controller, make sure that the modes change in order of TV, AV & TV again and the video & audio output are according to the input terminal for each mode.IF connect input to Front and Rear AV terminal, input terminal of Front AV will be selected.	14GT-16C have rear AV terminal Only.

FUNCTION OPERATION CHECKING (VIDEO AND AUDIO)

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	CONTRAST key	1. Receive "Monoscope Pattern" signal. 2. Set P-Mode to select CONTRAST. 3. Press Volume Up/Down key to check whether the CONTRAST effect is OK or not.	
2	COLOUR key	1. Receive "Colour Bar" signal. 2. Set P-Mode to select COLOUR. 3. Press Volume Up/Down key to check whether the COLOUR effect is OK or not.	
3	BRIGHTNESS key	1. Receive "Monoscope Pattern" signal. 2. Set P-Mode to select BRIGHTNESS. 3. Press Volume Up/Down key to check whether the BRIGHTNESS effect is OK or not	
4	TINT key	1. Receive the "NTSC Colour Bar" signal thru AV in. 2. Set P-Mode to select TINT. 3. Press Volume Up/Down key to check TINT, UP for GREEN direction and DOWN for PURPLE direction whether is OK or not.	
5	SHARPNESS Key	1. Receive "Monoscope Pattern" signal. 2. Set P-mode to select SHARPNESS. 3. Press Volume Up/Down key to check whether the SHARPNESS effect is OK or not.	
6	CH DISPLAY COLOUR	1. All Ch (1~99) will have an OSD display of the channel number in green colour under AFT ON condition.	
7	NORMAL Key	1. Once in PICTURE Mode, and the NORMAL key is pressed, all the settings will be present to normal setting. (Normal setting value for every mode). • CONTRAST : MAX • COLOUR : CENTER • BRIGHTNESS : CENTER • TINT : CENTER • SHARPNESS : CENTER	
8	White Temp	1. Receive "Monoscope Pattern" signal. 2. Set FUNCTION to select WHITE TEMP. 3. Press Volume Up/Down key to check WHITE TEMP Option, STANDARD: NORMAL SETTING, WARM for more REDDISH direction changing, COOL for more BLUISH direction changing.	

FUNCTION OPERATION CHECKING (VIDEO AND AUDIO)
(Continued)

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
9	Colour system	1. Receive the "PAL COLOUR BAR" signal, press the COLOUR SYSTEM key to select modes except PAL, check the COLOUR is not working properly. Then, select the "PAL" mode. Check again its colour so that it is working properly. 2. Receive "NTSC 4.43/3.58 COLOUR BAR" signal thru AV, press COLOUR SYSTEM key to select modes except N4.43/3.58, check the COLOUR is not working properly. Then, select the "NTSC 4.43/3.58" mode. Check again its colour so that it is working properly.	
10	Sound system	Receive "PAL-B/G" signal, check the sound output to make sure it is working properly.	
11	NOISE MUTE CHECKING	1. Receive "PAL COLOUR BAR" signal. 2. Turn up the volume control to maximum, make sure the sound is heard from the speakers. Then put the unit in no signal state. 3. Check the sound mute is effective. 4. Finally turn sound level of CTV to minimum.	
12	OSD LANGUAGE QUANTITY CHECK	Check OSD LANGUAGE quantity and type. TWO OSD LANGUAGE: ENGLISH THAILAND.	

HEADPHONE JACK CHECKING

NO.	Adjustment part	Adjusting procedure and conditions	Waveform and others
1	HEADPHONE OUTPUT CHECKING	1. Receive PAL COLOUR PAR with SOUND 400Hz, 100% MODULATION (±50kHz Dev). 2. Maximum volume, and check the headphone output with 400Hz sound and no sound out from speaker.	14GT-16C do not have Headphone

NO.	Adjustment point	Adjusting procedure and conditions	Waveform and others
1	BILINGUAL FUNCTION CHECKING	1. Receive bilingual channel. 2. Press R/C "BILINGUAL" button and the sound will change from sound 1 to sound 2.	Only for model 20GT-21C and 21GT-21C.