# SHARP SERVICE MANUAL

TVSM056-21V-FR95S(SL)

## COLOR TELEVISION

***Chassis No. GA-4M***

## MODEL 21V-FR95S (SL)

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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## ELECTRICAL SPECIFICATIONS

POWER INPUT ..... 110-230 V AC,60 Hz

POWER RATING ..... 85 W

PICTURE SIZE ..... 1,239 $cm^2$ (192sq inch)

CONVERGENCE ..... Magnetic

SWEEP DEFLECTION ..... Magnetic

FOCUS ..... Hi-Bi-Potential Electrostatic

INTERMEDIATE FREQUENCIES

Picture IF Carrier Frequency ..... 45.75 MHz

Sound IF Carrier Frequency ..... 41.25 MHz

Color Sub-Carrier Frequency ..... 42.17 MHz (Nominal)

AUDIO POWER OUTPUT RATING ..... 3 W + 3 W

SPEAKER

SIZE ..... 9 cm x 5 cm

VOICE COIL IMPEDANCE ..... 16 ohm at 400 Hz

ANTENNA INPUT IMPEDANCE

VHF/UHF .....75 ohm Unbalanced

TUNING RANGES

VHF-Channels ..... 2 thru 13

UHF-Channels ..... 14 thru 69

CATV Channels ..... 1 thru 125

***Specifications are subject to change without prior notice.***


**SHARP (PHILS.) CORPORATION**

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# IMPORTANT SERVICE SAFETY PRECAUTION

● Service work should be performed only by qualified service technicians who are thoroughly familiar will all safety checks and the servicing guidelines which follow:

## WARNING

1. For continued safety, no modification of any circuit should be attempted.
2. Disconnect AC power before servicing.
3. Semiconductor heat sinks are potential shock hazards when the chassis is operating.
4. The chassis in this receiver has two ground systems which are separated by insulating material. The non-isolated (hot) ground system is for the B+ voltage regulator circuit and the horizontal output circuit. The isolated ground system is for the low B+ DC voltages and the secondary circuit of the high voltage transformer.
   To prevent electrical shock use an isolation transformer between the line cord and power receptacle, when servicing this chassis.

## SERVICING OF HIGH VOLTAGE SYSTEM AND PICTURE TUBE

When servicing the high voltage system, remove the static charge by connecting a 10k ohm resistor in series with an insulated wire (suc h as a test pr obe) between the picture tube gr ound and the anode lead. (AC line cord should be connected from AC outlet.)

1. Picture tube in this receiver employs integral implosion protection.
2. Replace with tube of the same type number for continued safety.
3. Do not lift picture tube by the neck.
4. Handle the picture tube only when wearing shatterproof goggles and after discharging the high voltage anode completely.

## X-RADIATION AND HIGH VOLTAGE LIMITS

1. Be sure all service personnel are aware of the procedures and instructions covering X-radiation. The only potential source of X-ray in current solid state TV receivers is the picture tube. However, the picture tube does not emit measurable X-Ray radiation, if the high voltage is as specified in the "High Voltage Check" instructions.
   It is only when high voltage is excessive that X-radiation is capable of penetrating the shell of the picture tube including the lead in the glass material. The important precaution is to keep the high voltage below the maximum level specified.
2. It is essential that servicemen have available at all times an accurate high voltage meter.
   The calibration of this meter should be checked periodically.
3. High voltage should always be kept at the rated value - no higher. Operation at higher voltages may cause a failure of the picture tube or high voltage circuitry and;also, under certain conditions, may produce radiation in exceeding of desirable levels.
4. When the high voltage regulator is operating properly there is no possibility of an X-radiation problem. Every time a color chassis is serviced, the brightness should be tested while monitoring the high voltage with a meter to be certain that the high voltage does not exceed the specified value and that it is regulating correctly.
5. Do not use a picture tube other than that specified or make unrecommended circuit modifications to the high voltage circuitry.
6. When trouble shooting and taking test measurements on a receiver with excessive high voltage, avoid being unnecessarily close to the receiver.
   Do not operate the receiver longer than is necessary to locate the cause of excessive voltage.

# IMPORTANT SERVICE SAFETY PRECAUTION

(Continued)

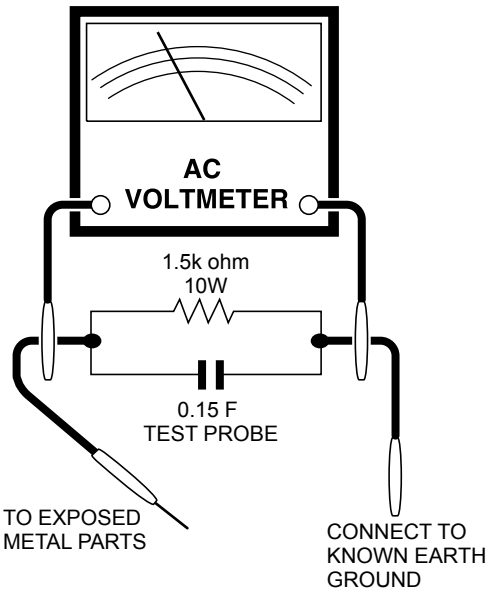
## BEFORE RETURNING THE RECEIVER

## (Fire & Shock Hazard)

Before returning the receiver to the user, perform the following safety checks.

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the receiver.
2. Inspect all protective devices such as non-metallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc.
3. To be sure that no shock hazard exists, check for leakage current in the following manner.

- Plug the AC cord directly into a 110~230 volt AC outlet, (Do not use an isolation transformer for this test).
- Using two clip leads, connect a 1.5k ohm, 10 watt resistor paralleled by a 0.15uF capacitor in series with all exposed metal cabinet parts and a known earth ground, such as electrical conduit or electrical ground connected to earth ground.
- Use an AC voltmeter having with 5000 ohm per volt, or higher, sensitivity to measure the AC voltage drop across the resistor.
- Connect the resistor connection to all exposed metal parts having a return to the chassis (antenna, metal cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor.
  All checks must be repeated with the AC line cord plug connection reversed. (If necessary, a non-polarized adapter plug must be used only for the purpose of completing these check.)
  Any current measured must not exceed 0.5 milliamp. Any measurements not within the limits outlined above indicate of a potential shock hazard and corrective action must be taken before returning the instrument to the customer.



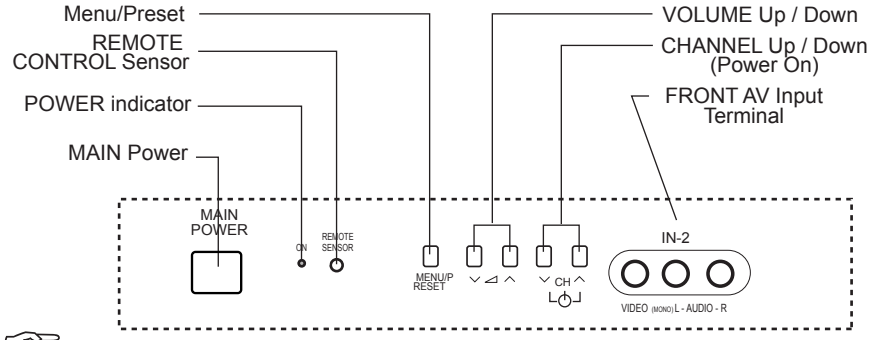

## SAFETY NOTICE

Many electrical and mechanical parts in television receivers have special safety-related characteristics. These characteristics are often not evident from visual inspection, nor can protection afforded by them be necessarily increased by using replacement components rated for higher voltage, wattage, etc.
Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by "⚠" and shaded areas in the Replacement Parts Lists and Schematic Diagrams.

For continued protection, replacement parts must be identical to those used in the original circuit. The use of substitute replacement parts which do not have the same safety characteristics as the factory recommended replacement parts shown in this service manual, may create shock, fire, X-radiation or other hazards.

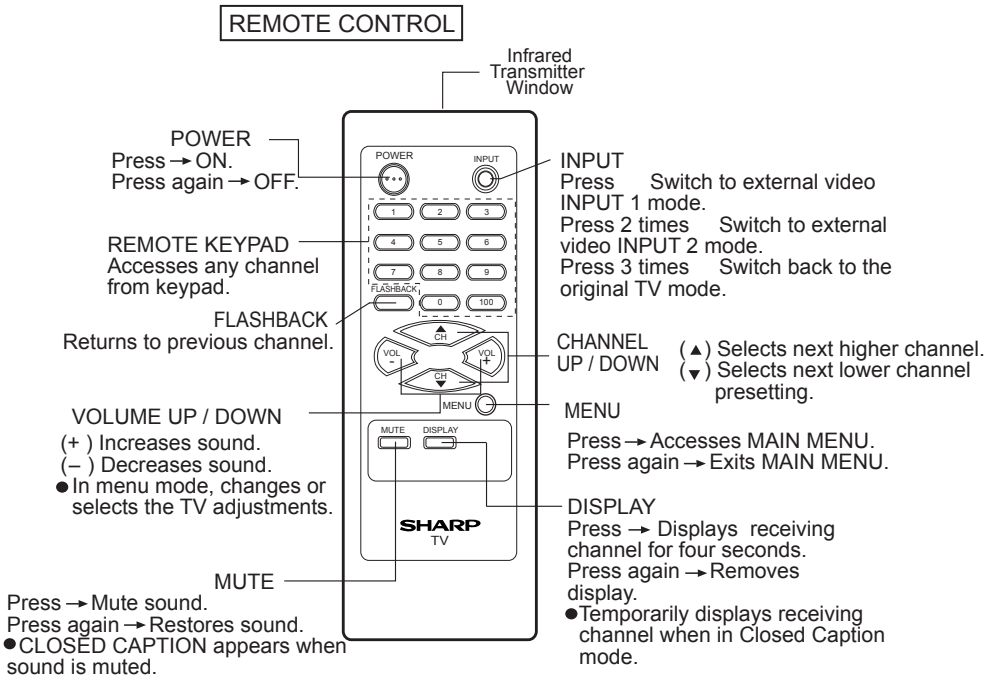
# LOCATION OF USER'S CONTROL

## Front Panel




Note: Appearance design may vary depending on models ;

## Basic Remote Control Functions



# INSTALLATION AND SERVICE INSTRUCTIONS

Note: (1) When performing any adjustments to resistor controls and transformers, use non-mettalic screw drivers or TV alignment tools.
(2) Before performing adjustments, the TV set must be on at least 15 minutes.

## CIRCUIT PROTECTION

The receiver is protected by a 3.15A fuse (F701), mounted on PWB-A, wired into one side of the A C line input.

## X-RADIATION PROTECTOR CIRCUIT TEST

After ser vice has been perf ormed on the horizontal deflection system, high v olta ge system, B+ system, test the X-Radiation pr otection cir cuit to ascer tain proper operation as f ollo ws:

1. Apply 110~230V AC using a variac transformer for accurate input voltage.
2. Allow for warm up and adjust all customer controls for normal picture and sound.
3. Receive a good local channel.
4. Connect a digital voltmeter to TP653 and make sure that the voltmeter reads 26 ±1.1V.
5. Apply external 27V DC at TP653 by using an external DC supply, TV must be shut off.
6. To reset the protector, unplug the AC cord and make a short circuit between TP651 and TP652. Now make sure that normal picture appears on the screen.
7. If the operation of the horizontal oscillator does not stop in step 5, the circuit must be repaired before the set is returned to the customer.

## HIGH VOLTAGE CHECK

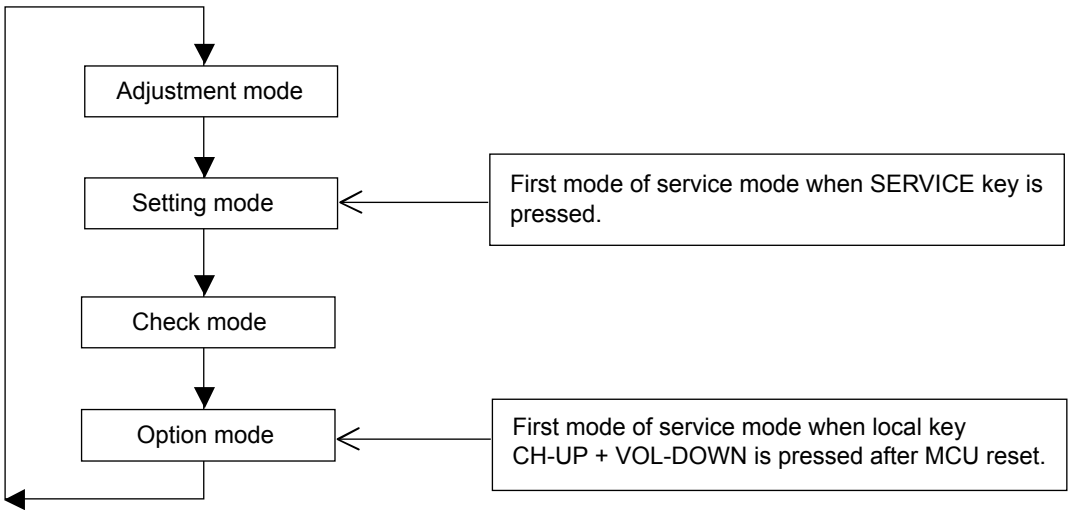
High v oltage is not adjustab le but m ust be c hecked to verify that the receiver is operating within safe and efficient design limitations as specified checks should be as follows:

1. Connect an accurate high voltage meter between ground and anode of picture tube.
2. Operate receiver for at least 15 minutes at 110~230V AC line voltage, with a strong air signal or a properly tuned in test signal.
3. Enter the service mode and set Y-mute ON by using Service R/C.
4. The voltage should be approximately 30 kV (at zero beam).
   If a correct reading cannot be obtained, check circuitry for malfunctioning components. After the voltage test, make Y-mute off to the normal mode.

# SERVICE MODE

## Service Mode Overview

1. Service mode is entered by SERVICE key input or CH-UP +VOL-DOWN input during reset.
2. Service mode is cleared by entering SERVICE key command during service mode.
3. If key input port (SERVICE) input is LOW, then it is in service mode.
4. During key input port (SERVICE) input is LOW, clearing service mode by key input SERVICE is disabled.
5. Service mode can be switched to 4 modes as follows by key input MENU;




6. AFT processing is disabled during service mode. PLL setting data is set to fo data.
7. All user data are set to default during service mode. FAO and SPEAKER user settings are off and on respectively in service mode. Energy Save is off.
8. Sleep timer, View timer, on timer and off timer are inactivated in Service mode.
9. Sound is muting in service mode except at Adjustment Items V20, M01, M03, M04, M05, and M06.

## Adjustment Mode Items

| No. | Item Name | IC | Register | Range | Default |
|---|---|---|---|---|---|
| V01 | SUB-PICTURE | 1 Chip | CONTRAST | 0~127 | 127 |
| V02 | SUB-TINT | 1 Chip | TINT | 0~127 | 64 |
| V03 | SUB-COLOR | 1 Chip | COLOR | 0~127 | 64 |
| V04 | SUB-BRIGHT | 1 Chip | BRIGHT | 0~255 | 128 |
| V05 | SUB-SHARP | 1 Chip | VIDEO-TONE | 0~63 | 43 |
| V06 | V-SHIFT | 1 Chip | V-SHIFT | 0~7 | 4 |
| V07 | H-SHIFT | 1 Chip | H-PHASE | 0~31 | 16 |
| V08 | RF-AGC | 1 Chip | RF-DELAY | 0~127 | 127 |
| V09 | V-SIZE | 1 Chip | V-SIZE | 0~63 | 32 |
| V10 | PIF-VCO | 1 Chip | VIF-VCO | 0~63 | 32 |
| V11 | R-CUTOFF | 1 Chip | R-CUTOFF | 0~255 | 127 |
| V12 | G-CUTOFF | 1 Chip | G-CUTOFF | 0~255 | 127 |
| V13 | B-CUTOFF | 1 Chip | B-CUTOFF | 0~255 | 127 |
| V14 | R-DRIVE | 1 Chip | R-DRIVE | 0~127 | 64 |
| V15 | B-DRIVE | 1 Chip | B-DRIVE | 0~127 | 64 |
| V16 | SUB-COLOR(YUV) | 1 Chip | COLOR | 0~127 | 64 |
| V17 | SUB-TINT(YUV) | 1 Chip | BASEBAND-TINT | 0~127 | 64 |
| V18 | CC-POS | MICON | CC-POS | 0~255 | 32 |
| V19 | SCREEN CUT OFF | 1 Chip | CUT OFF | 0~2 | 0 |
| V20 | SUB-VOL | 1 Chip | A-ATT | 0~127 | 127 |
| V21 | H-VCO | 1 Chip | H-VCO | 0~7 | 4 |
| M01 | MTS-ATT | MTS | ATT (MTS) | 0~15 | 10 |
| M02 | MTS-VCO | MTS | VCO (MTS) | 0~63 | 32 |
| M03 | MTS-FILTER | MTS | FILTER (MTS) | 0~63 | 28 |
| M04 | MTS-WIDEBAND | MTS | WIDEBAND (MTS) | 0~63 | 27 |
| M05 | MTS-SPECTRAL | MTS | SPECTRAL (MTS) | 0~63 | 32 |
| M06 | SUB-VOL | MTS | VOL (MTS) | 0~63 | 63 |

# ● SELF ADJUSTMENT

## H-VCO

1. When there is H-VCO self-adjustment key input for adjustment item H-VCO, self-adjustment is performed.
2. H-FREE(1chip) is set to 1.
3. H-OUT is set by intelligent monitor output.
4. IM input is set as TIM input.
5. H-VCO(1chip) data is changed so that the number of input pulse is 125 inside 8ms interval.
6. When adjustment completed, OSD display and H-VCO self-adjustment status data of EEPROM are updated.
7. H-FREE(1chip), intelligent monitor output and IM input mode are recovered.

## RF-AGC

1. When there is RF-AGC self-adjustment key input for adjustment item RF-AGC, self-adjustment is performed.
2. AGC-OUT is set by intelligent monitor output.
3. IM input is set as AD input.
4. By decreasing RF-AGC (1chip) data from current RF-AGC adjustment value to 0, AFT input voltage becomes the maximum setting value.
5. Increase RF-AGC(1chip) data, when AFT input voltage is at (max. 0.3V) point, adjustment is completed.
6. When adjustment completed, OSD display and RF-AGC self-adjustment status data of EEPROM are updated.
7. Intelligent monitor output and IM input mode are recovered.

## PIF-VCO

1. When there is PIF-VCO self-adjustment key input for adjustment item PIF-VCO, self-adjustment is performed.
2. VIF-DEF(1chip) is set to 1.
3. AFC is set by intelligent monitor output.
4. IM input is set as AD input.
5. VIF-VCO(1chip) data is changed so that input voltage becomes 2.5V.
6. When adjustment completed, OSD display and PIF-VCO self-adjustment status data of EEPROM are updated.
7. VIF-DEF(1chip), intelligent monitor output and IM input mode are recovered.

## Setting Mode Items

| No. | Item Name | IC | Register | Range | Default |
|---|---|---|---|---|---|
| F01 | VIDEO TONE -GAIN (TV) | 1 Chips | V-TONE | 0/1 | 0 |
| F02 | VIDEO TONE -GAIN (AV) | 1 Chips | V-TONE | 0/1 | 0 |
| F03 | VIDEO TONE -GAIN (S-AV) | 1 Chips | V-TONE | 0/1 | 0 |
| F04 | VIDEO TONE -GAIN(YUV) | 1 Chips | V-TONE | 0/1 | 0 |
| F05 | ABCL | 1 Chips | ABCL | 0/1 | 0 |
| F06 | BS | 1 Chips | BS-OFF | 0/1 | 0 |
| F07 | ABCL-G | 1 Chips | ABCL-G | 0/1 | 0 |
| F08 | SHP-AV | OFFSET | VIDEO-TONE(OFFSET) | -16~+16 | 0 |
| F09 | SHP-SAV | OFFSET | VIDEO-TONE(OFFSET) | -16~+16 | 0 |
| F10 | SHP-YUV | OFFSET | VIDEO-TONE(OFFSET) | -16~+16 | 0 |
| F11 | RGB-CLIP | 1 Chips | EXTRGB-CLIP | 0/1 | 0 |
| F12 | E-SAVE | OFFSET | CONTRAST(OFFSET) | 0~63 | 30 |
| F13 | FAO-VOL | 1 Chips | A-ATT | 0~127 | 120 |
| F14 | PIF-G | 1 Chips | VIF-GAIN | 0~7 | 4 |
| F15 | Y-DELAY(TV) | 1 Chips | Y-DELAY | 0~7 | 0 |
| F16 | Y-DELAY(AV) | 1 Chips | Y-DELAY | 0~7 | 0 |
| F17 | Y-DELAY(SAV) | 1 Chips | Y-DELAY | 0~7 | 0 |
| F18 | Y-DELAY(YUV) | 1 Chips | Y-DELAY | 0~7 | 0 |
| F19 | TINT-AV | OFFSET | TINT(OFFSET) | -32~+32 | 0 |
| F20 | TINT-SAV | OFFSET | TINT(OFFSET) | -32~+32 | 0 |
| F21 | COL-AV | OFFSET | COLOR(OFFSET) | -32~+32 | 0 |
| F22 | COL-SAV | OFFSET | COLOR(OFFSET) | -32~+32 | 0 |
| F23 | R-DRI(R2) | OFFSET | R-DRI(OFFSET) | -32~+32 | 0 |
| F24 | R-DRI( R) | OFFSET | R-DRI(OFFSET) | -32~+32 | 0 |
| F25 | R-DRI(B) | OFFSET | R-DRI(OFFSET) | -32~+32 | 0 |
| F26 | B-DRI(R2) | OFFSET | B-DRI(OFFSET) | -32~+32 | 0 |
| F27 | B-DRI( R) | OFFSET | B-DRI(OFFSET) | -32~+32 | 0 |
| F28 | B-DRI(B) | OFFSET | B-DRI(OFFSET) | -32~+32 | 0 |
| F29 | V-FREE | 1 Chips | V-FREE | 0/1 | 0 |
| F30 | GAMMA | 1 Chips | GAMMA | 0~3 | 0 |
| F31 | TRAP(TV) | 1 Chips | TRAP-FINE | 0~3 | 2 |
| F32 | TRAP(AV) | 1 Chips | TRAP-FINE | 0~3 | 2 |
| F33 | H-FREE | 1 Chips | H-FREE | 0/1 | 0 |
| F34 | 1W(TV) | 1 Chips | V.WINDOW | 0/1 | 0 |
| F35 | 1W(AV) | 1 Chips | V.WINDOW | 0/1 | 0 |
| F36 | YLPF | 1 Chips | YSW-LPF | 0/1 | 1 |
| F37 | BS-D | 1 Chips | BS-DISCHARGE | 0~3 | 0 |
| F38 | BS-C | 1 Chips | BS-CHARGE | 0~3 | 0 |
| F39 | SL(TV) | 1 Chips | S-SLICE DOWN | 0~3 | 0 |
| F40 | SL(AV) | 1 Chips | S-SLICE DOWN | 0~3 | 0 |
| F41 | SL(SAV) | 1 Chips | S-SLICE DOWN | 0~3 | 0 |
| F42 | SL(YUV) | 1 Chips | S-SLICE DOWN | 0~3 | 0 |
| F43 | AFC2 | 1 Chips | AFC2-G | 0/1 | 0 |
| F44 | VD(TV) | 1 Chips | VSYNC-DET | 0/1 | 0 |
| F45 | VD(AV) | 1 Chips | VSYNC-DET | 0/1 | 0 |
| F46 | AS(TV) | 1 Chips | AUTO-SLICE | 0/1 | 0 |
| F47 | AS(AV) | 1 Chips | AUTO-SLICE | 0/1 | 0 |
| F48 | AS(SAV) | 1 Chips | AUTO-SLICE | 0/1 | 0 |
| F49 | AS(YUV) | 1 Chips | AUTO-SLICE | 0/1 | 0 |
| F50 | FBP(TV) | 1 Chips | FBP VTH | 0/1 | 0 |
| F51 | FBP(AV) | 1 Chips | FBP VTH | 0/1 | 0 |
| F52 | FBP(SAV) | 1 Chips | FBP VTH | 0/1 | 0 |
| F53 | FBP(YUV) | 1 Chips | FBP VTH | 0/1 | 0 |
| F54 | C.CLIP LEVEL | 1 Chips | C.CLIP LEVEL | 0/1 | 0 |

Setting Mode Items (Continued)

| No. | Item Name | IC | Register | Range | Default |
|---|---|---|---|---|---|
| F55 | PSW | MTS | PSW | 0/1 | 0 |
| F56 | FAO-VOL | MTS | VOL | 0~63 | 60 |
| F57 | CP | PLL | CHARGE PUMP | 0/1 | 0 |
| F58 | CC LEVEL | MICON | CC LEVEL | 0/1 | 0 |
| F59 | OSD POS | MICON | OSD POS | 0/1 | 0 |
| F60 | OFFSET-ADJ-COL | 1 Chips | COLOR | -32~+32 | 0 |
| F61 | OFFSET-ADJ-TINT | 1 Chips | TINT | -32~+32 | 0 |
| F62 | OFFSET-ADJ-TINT-YUV | 1 Chips | BASEBAND-TINT | -32~+32 | 0 |
| F63 | TIMER4-LOW SPEED | 1 Chips | TIMER4 VALUE | 0~225 | 50 |
| F64 | TIMER4-HIGH SPEED | 1 Chips | TIMER4 VALUE | 0~225 | 125 |
| F65 | R-CUT-YUV | 1 Chips | R-CUT(OFFSET) | -63~+63 | 0 |
| F66 | G-CUT-YUV | 1 Chips | G-CUT(OFFSET) | -63~+63 | 0 |
| F67 | B-CUT-YUV | 1 Chips | B-CUT(OFFSET) | -63~+63 | 0 |
| F68 | R-DRI-YUV | 1 Chips | R-DRI(OFFSET) | -63~+63 | 0 |
| F69 | B-DRI-YUV | 1 Chips | B-DRI(OFFSET) | -63~+63 | 0 |
| F70 | CLOCK-ADJ | 1 Chips | | 0~25 | 25 |

## Option Mode Items

| No | OPTION FUNCTION | 0 | 1 | Default Data |
|---|---|---|---|---|
| 001 | DEMO | Without DEMO | With DEMO | 1 |
| 002 | DOWNLOAD | Without V-CHIP OP | With V-CHIP OP | 0 |
| 003 | V-CHIP | Without V-CHIP | With V-CHIP | 0 |
| 004 | SPEAKER | Without SPEAKER | With SPEAKER | 1 |
| 005 | FAO | Without FAO | With FAO | 1 |
| 006 | P.PREF | Without P.REF | With P.REF | 1 |
| 007 | UNIV+ | Without UNIV+ | With UNIV+ | 1 |
| 008 | VIEW TIMER | Without VIEW TIMER | With VIEW TIMER | 1 |
| 009 | EZ-SETUP | EZ-SETUP | AUTO PRESET | 0 |
| 010 | PON-CH | Without POWER-ON | With POWER-ON | 0 |
| 011 | FAV-COL | FAV-COL | COL-TEMP | 1 |
| 012 | COMPONENT | Without COMPONENT | With COMPONENT | 1 |
| 013 | AV | Without AV | With AV | 1 |
| 014 | AV2 | AV1 system | AV2 system | 1 |
| 015 | MTS | Without MTS | With MTS | 1 |
| 016 | TONE-CTRL | Without S-ADJ | With S-ADJ | 1 |
| 017 | AUTO-OFF | Without AUTO-OFF | With AUTO-OFF | 1 |
| 018 | INIT-LANG | ENGLISH | SPANISH | 1 |
| 019 | SETUP-FLAG | NO SET UP | AUTO SET UP | 1 |
| 020 | AV-FR | "0"=NO AV "1"=REAR "2"=FRONT "3"=REAR & FRONT | | 3 |
| 021 | AV3/S-IN | Without AV3/S-IN | With AV3/S-IN | 0 |
| 022 | COMB | Without COMB | With COMB | 0 |
| 023 | AUTO-INPUT | Without AUTO-INPUT | With AUTO-INPUT | 1 |
| 024 | CLOCK | Without CLOCK | With CLOCK | 1 |
| 025 | LED | SEMEX MODEL | SPC MODEL | 0 |
| 026 | FLAT | Not FLAT MODEL | FLAT MODEL | 1 |
| 027 | BASS BOOST | Without BASS BOOST | With BASS BOOST | 0 |
| 028 | DSE | Without DSE | With DSE | 0 |
| 029 | SRS | Without SRS | With SRS | 0 |
| 030 | WHITE-OUT | Without WHITE-OUT | With WHITE-OUT | 1 |

## Check Mode

Micron mask version, software version and ROM correction function status are displayed in check mode.

# ADJUSTMENT METHOD

Caution: to get into the service mode, one of the ways is press direct key for service items.

There is three stage of Service Mode data
First stage data from V01 ~ M06
to go into second stage of service mode data, press MENU key
Second stage data from F01 ~ F70
to go into third stage of service mode data, press MENU key
Third stage data from 001 ~ 030

Below is the contents of these data

First Stage

| Data | Service Mode | Function | Range | Default Data |
|---|---|---|---|---|
| V01 | SUB-PICTURE | CONTRAST | 0~127 | 127 |
| V02 | SUB-TINT | TINT | 0~127 | 64 |
| V03 | SUB-COLOR | COLOR | 0~127 | 64 |
| V04 | SUB-BRIGHT | BRIGHT | 0~255 | 128 |
| V05 | SUB-SHARP | VIDEO-TONE | 0~63 | 43 |
| V06 | V-SHIFT | V-SHIFT | 0~7 | 4 |
| V07 | H-SHIFT | H-PHASE | 0~31 | 16 |
| V08 | RF-AGC | RF-DELAY | 0~127 | 127 |
| V09 | V-SIZE | V-SIZE | 0~63 | 32 |
| V10 | PIF-VCO | VIF-VCO | 0~63 | 32 |
| V11 | R-CUTOFF | R-CUTOFF | 0~255 | 127 |
| V12 | G-CUTOFF | G-CUTOFF | 0~255 | 127 |
| V13 | B-CUTOFF | B-CUTOFF | 0~255 | 127 |
| V14 | R-DRIVE | R-DRIVE | 0~127 | 64 |
| V15 | B-DRIVE | B-DRIVE | 0~127 | 64 |
| V16 | SUB-COLOR(YUV) | COLOR | 0~127 | 64 |
| V17 | SUB-TINT(YUV) | BASEBAND-TINT | 0~127 | 64 |
| V18 | CC-POS | CC-POS | 0~255 | 32 |
| V19 | SCREEN CUT OFF | CUT OFF | 0~2 | 0 |
| V20 | SUB-VOL | A-ATT | 0~127 | 127 |
| V21 | H-VCO | H-VCO | 0~7 | 4 |
| M01 | MTS-ATT | ATT (MTS) | 0~15 | 10 |
| M02 | MTS-VCO | VCO (MTS) | 0~63 | 32 |
| M03 | MTS-FILTER | FILTER (MTS) | 0~63 | 28 |
| M04 | MTS-WIDEBAND | WIDEBAND (MTS) | 0~63 | 27 |
| M05 | MTS-SPECTRAL | SPECTRAL (MTS) | 0~63 | 32 |
| M06 | SUB-VOL | VOL (MTS) | 0~63 | 63 |

Auto Adjustment Item
1. H-VCO
2. RF-AGC
3. PIF-VCO

Second Stage

| Data | Service Mode | Function | Range | Default Data |
|---|---|---|---|---|
| F01 | VIDEO TONE -GAIN (TV) | V-TONE | 0/1 | 0 |
| F02 | VIDEO TONE -GAIN (AV) | V-TONE | 0/1 | 0 |
| F03 | VIDEO TONE -GAIN (S-AV) | V-TONE | 0/1 | 0 |
| F04 | VIDEO TONE -GAIN(YUV) | V-TONE | 0/1 | 0 |
| F05 | ABCL | ABCL | 0/1 | 0 |
| F06 | BS | BS-OFF | 0/1 | 0 |
| F07 | ABCL-G | ABCL-G | 0/1 | 0 |
| F08 | SHP-AV | VIDEO-TONE(OFFSET) | -16~+16 | 0 |
| F09 | SHP-SAV | VIDEO-TONE(OFFSET) | -16~+16 | 0 |
| F10 | SHP-YUV | VIDEO-TONE(OFFSET) | -16~+16 | 0 |
| F11 | RGB-CLIP | EXTRGB-CLIP | 0/1 | 0 |
| F12 | E-SAVE | CONTRAST(OFFSET) | 0~63 | 30 |
| F13 | FAO-VOL | A-ATT | 0~127 | 120 |
| F14 | PIF-G | VIF-GAIN | 0~7 | 4 |
| F15 | Y-DELAY(TV) | Y-DELAY | 0~7 | 0 |
| F16 | Y-DELAY(AV) | Y-DELAY | 0~7 | 0 |
| F17 | Y-DELAY(SAV) | Y-DELAY | 0~7 | 0 |
| F18 | Y-DELAY(YUV) | Y-DELAY | 0~7 | 0 |
| F19 | TINT-AV | TINT(OFFSET) | -32~+32 | 0 |
| F20 | TINT-SAV | TINT(OFFSET) | -32~+32 | 0 |
| F21 | COL-AV | COLOR(OFFSET) | -32~+32 | 0 |
| F22 | COL-SAV | COLOR(OFFSET) | -32~+32 | 0 |
| F23 | R-DRI(R2) | R-DRI(OFFSET) | -32~+32 | 0 |
| F24 | R-DRI( R) | R-DRI(OFFSET) | -32~+32 | 0 |
| F25 | R-DRI(B) | R-DRI(OFFSET) | -32~+32 | 0 |
| F26 | B-DRI(R2) | B-DRI(OFFSET) | -32~+32 | 0 |
| F27 | B-DRI( R) | B-DRI(OFFSET) | -32~+32 | 0 |
| F28 | B-DRI(B) | B-DRI(OFFSET) | -32~+32 | 0 |
| F29 | V-FREE | V-FREE | 0/1 | 0 |
| F30 | GAMMA | GAMMA | 0~3 | 0 |
| F31 | TRAP(TV) | TRAP-FINE | 0~3 | 2 |
| F32 | TRAP(AV) | TRAP-FINE | 0~3 | 2 |
| F33 | H-FREE | H-FREE | 0/1 | 0 |
| F34 | 1W(TV) | V.WINDOW | 0/1 | 0 |
| F35 | 1W(AV) | V.WINDOW | 0/1 | 0 |
| F36 | YLPF | YSW-LPF | 0/1 | 1 |
| F37 | BS-D | BS-DISCHARGE | 0~3 | 0 |
| F38 | BS-C | BS-CHARGE | 0~3 | 0 |
| F39 | SL(TV) | S-SLICE DOWN | 0~3 | 0 |
| F40 | SL(AV) | S-SLICE DOWN | 0~3 | 0 |
| F41 | SL(SAV) | S-SLICE DOWN | 0~3 | 0 |
| F42 | SL(YUV) | S-SLICE DOWN | 0~3 | 0 |
| F43 | AFC2 | AFC2-G | 0/1 | 0 |
| F44 | VD(TV) | VSYNC-DET | 0/1 | 0 |
| F45 | VD(AV) | VSYNC-DET | 0/1 | 0 |
| F46 | AS(TV) | AUTO-SLICE | 0/1 | 0 |
| F47 | AS(AV) | AUTO-SLICE | 0/1 | 0 |
| F48 | AS(SAV) | AUTO-SLICE | 0/1 | 0 |
| F49 | AS(YUV) | AUTO-SLICE | 0/1 | 0 |
| F50 | FBP(TV) | FBP VTH | 0/1 | 0 |
| F51 | FBP(AV) | FBP VTH | 0/1 | 0 |
| F52 | FBP(SAV) | FBP VTH | 0/1 | 0 |
| F53 | FBP(YUV) | FBP VTH | 0/1 | 0 |
| F54 | C.CLIP LEVEL | C.CLIP LEVEL | 0/1 | 0 |
| F55 | PSW | PSW | 0/1 | 0 |
| F56 | FAO-VOL | VOL | 0~63 | 60 |

Second Stage (Continued)

| Data | Service Mode | Function | Range | Default Data |
|---|---|---|---|---|
| F57 | CP | CHARGE PUMP | 0/1 | 0 |
| F58 | CC LEVEL | CC LEVEL | 0/1 | 0 |
| F59 | OSD POS | OSD POS | 0/1 | 0 |
| F60 | OFFSET-ADJ-COL | COLOR | -32~+32 | 0 |
| F61 | OFFSET-ADJ-TINT | TINT | -32~+32 | 0 |
| F62 | OFFSET-ADJ-TINT-YUV | BASEBAND-TINT | -32~+32 | 0 |
| F63 | TIMER4-LOW SPEED | TIMER4 VALUE | 0~225 | 50 |
| F64 | TIMER4-HIGH SPEED | TIMER4 VALUE | 0~225 | 125 |
| F65 | R-CUT-YUV | R-CUT(OFFSET) | -63~+63 | 0 |
| F66 | G-CUT-YUV | G-CUT(OFFSET) | -63~+63 | 0 |
| F67 | B-CUT-YUV | B-CUT(OFFSET) | -63~+63 | 0 |
| F68 | R-DRI-YUV | R-DRI(OFFSET) | -63~+63 | 0 |
| F69 | B-DRI-YUV | B-DRI(OFFSET) | -63~+63 | 0 |
| F70 | CLOCK-ADJ | | 0~25 | 25 |

Third Stage

| Data | OPTION FUNCTION | DATA = "0" | DATA ="1" | Default Data |
|---|---|---|---|---|
| 001 | DEMO | DEMO DISABLE | ENABLE | 1 |
| 002 | DOWNLOAD | V-CHIP OP DISABLE | ENABLE | 0 |
| 003 | V-CHIP | V-CHIP DISABLE | ENABLE | 0 |
| 004 | SPEAKER | SPEAKER DISABLE | ENABLE | 1 |
| 005 | FAO | FAO DISABLE | ENABLE | 1 |
| 006 | P.PREF | P.REF DISABLE | ENABLE | 1 |
| 007 | UNIV+ | UNIV+ DISABLE | ENABLE | 1 |
| 008 | VIEW TIMER | VIEW TIMER DISABLE | ENABLE | 1 |
| 009 | EZ-SETUP | EZ-SETUP | AUTO PRESET | 0 |
| 010 | * PON-CH | POWER-ON DISABLE | ENABLE | 0 |
| 011 | FAV-COL | FAV-COL | COL-TEMP | 1 |
| 012 | COMPONENT | COMPONENT DISABLE | ENABLE | 1 |
| 013 | AV | AV DISABLE | ENABLE | 1 |
| 014 | AV2 | AV1 | AV2 | 1 |
| 015 | MTS | MTS DISABLE | ENABLE | 1 |
| 016 | TONE-CTRL | S-ADJ DISABLE | ENABLE | 1 |
| 017 | AUTO-OFF | AUTO-OFF DISABLE | ENABLE | 1 |
| 018 | INIT-LANG | ENGLISH | SPANISH | 1 |
| 019 | SETUP-FLAG | NO SET UP | AUTO SET UP | 1 |
| 020 | AV-FR | "0"=NO AV "1"=REAR "2"=FRONT "3"=REAR & FRONT | | 3 |
| 021 | AV3/S-IN | AV3/S-IN DISABLE | ENABLE | 0 |
| 022 | COMB | COMB DISABLE | ENABLE | 0 |
| 023 | AUTO-INPUT | AUTO-INPUT DISABLE | ENABLE | 1 |
| 024 | CLOCK | CLOCK DISABLE | ENABLE | 1 |
| 025 | LED | SEMEX MODEL | SPC MODEL | 0 |
| 026 | FLAT | FLAT DISABLE | ENABLE | 1 |
| 027 | BASS BOOST | BASS BOOST DISABLE | ENABLE | 0 |
| 028 | DSE | DSE DISABLE | ENABLE | 0 |
| 029 | SRS | SRS DISABLE | ENABLE | 0 |
| 030 | WHITE-OUT | WHITE-OUT DISABLE | ENABLE | 1 |

**POWER ON BY CH-UP/CH-DOWN KEY

| ADJUSTMENT ITEM | OPTION SET UP | | |
|---|---|---|---|
| ADJUSTMENT POSITION | REFER AS BELOW | STEP RANGE | REFER AS BELOW |
| CONTROL | - | | |
| PRE-ADJUST REQUIREMENT | - | | |
| CONTENT | - | | |
| INPUT CONDITION | 21V-FR85S/21V-FR95S/21V-FR350S | | |
| OUTPUT | OSD CHECKING | | |

ADJUSTMENT PROCEDURE

BUS OPTION FOR THIRD STAGE SERVICE DATA

| FUNCTION | 001 DEMO | 002 DOWNLOAD | 003 V-CHIP | 004 SP | 005 FAO | 006 P.PREF | 007 UNIV+ | 008 VIEW | 009 EZ | 010 PON-CH |
|---|---|---|---|---|---|---|---|---|---|---|
| 21V-FR85S /21V-FR95S /21V-FR350S | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 |
| | | | | | | | | | | |
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| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| DEF | "0" =DISABLE "1" = ENABLE<br>009 -> "0" = EZ-SETUP "1" = AUTO PRESET | | | | | | | | | |

BUS OPTION FOR THIRD STAGE SERVICE DATA

| FUNCTION | 011 FAV-COL | 012 COMP | 013 AV | 014 AV2 | 015 MTS | 016 TONE | 017 AUTO | 018 LAN | 019 SETUP | 020 AV-FR |
|---|---|---|---|---|---|---|---|---|---|---|
| 21V-FR85S /21V-FR95S /21V-FR350S | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 3 |
| | | | | | | | | | | |

| FUNCTION | 021 AV3 | 022 COMB | 023 A-IN | 024 CLOCK | 025 LED | 026 FLAT | 027 BASS | 028 DSE | 029 SRS | 030 WHITE |
|---|---|---|---|---|---|---|---|---|---|---|
| 21V-FR85S /21V-FR95S /21V-FR350S | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | |
| DEF | 011 -> "0" = FAV-COL "1" = COL-TEMP<br>018 -> "0" = ENGLISH "1" = SPANISH<br>019 -> "0" = NO SET UP "1" = AUTO SETIP<br>025 -> "0" = SEMEX SPEC "1" = SPC SPEC | | | | | | | | | |

| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, |
|---|---|---|



| ADJUSTMENT ITEM | BUS SET UP | | |
|---|---|---|---|
| ADJUSTMENT POSITION | REFER AS BELOW | STEP RANGE | REFER AS BELOW |
| CONTROL | - | | |
| PRE-ADJUST REQUIREMENT | - | | |
| CONTENT | - | | |
| INPUT CONDITION | 21V-FR85S/21V-FR95S/21V-FR350S | | |
| OUTPUT | OSD CHECKING | | |

ADJUSTMENT PROCEDURE

DATA SETUP FOR FIRST AND SECOND STAGE SERVICE DATA

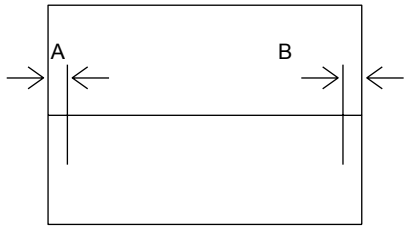
| FUNCTION | V05 SHARP | F15 Y-DL(TV) | F16 Y-DL(AV) | F19 TINT-AV | F21 COL-AV | F23 R-D(R2) | F24 R-D(R) | F25 R-D(B) | F26 B-D(R2) | F27 B-D(R) | F28 B-D(B) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21V-FR85S /21V-FR95S /21V-FR350S | 43 | 5 | 2 | -2 | +2 | +8 | +3 | -2 | -18 | -8 | +6 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| DEF | | | | | | | | | | | |

DATA SETUP FOR FIRST AND SECOND STAGE SERVICE DATA

| FUNCTION | F30 GAMMA | F35 1W(AV) | F39 SL(TV) | F40 SL(AV) | F44 VD(TV) | F46 AS(TV) | F47 AS(AV) | F56 FAO-VOL | F57 CP | F60 C-OF | F61 TINT-OF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 58 | 1 | +10 | +8 |
| | | | | | | | | | | | |

| FUNCTION | F62 TI-YUV | F66 G-C-YUV | F67 B-C-YUV | F36 YLPF | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 21V-FR85S /21V-FR95S /21V-FR350S | -12 | +36 | +2 | 0 | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| DEF | | | | | | | | | | | |

| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, |
|---|---|---|

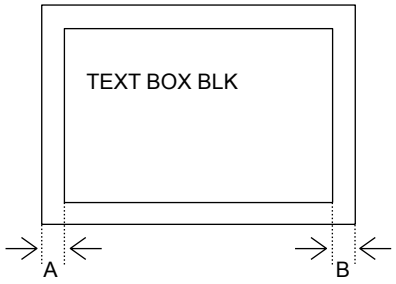
| ADJUSTMENT ITEM | H-POSITION | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V07 | STEP RANGE | 0-31 |
| CONTROL | I²C BUS CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, CRT-PURITY | | |
| CONTENT | US 6 CH LION HEAD (MONOSCOPE) | | |
| INPUT CONDITION | AC 230V, US MAGNETIC FIELD | | |
| OUTPUT | CONFIRMATION BY CRT SCREEN | | |
| ADJUSTMENT PROCEDURE | 1. ADJUST THE V07 BUS DATA TO HAVE A BALANCE POSITION TO SPEC OF A=B.<br>2. IF CANNOT MAKE IT TO A=B, ADJ FROM THE BEST POINT SO THAT B SLIDELY SMALLER THAN A<br>  <br> | | |
| | [CHECKING SPEC]<br>LEFT AND RIGHT SYMMETRICAL | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |



| ADJUSTMENT ITEM | V-SIZE | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V09 | STEP RANGE | 0~63 |
| CONTROL | I²C CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, CRT PURITY, V-PHASE, +B ADJUST | | |
| CONTENT | US 6 CH LION HEAD | | |
| INPUT CONDITION | AC 230V | | |
| OUTPUT | CONFIRMATION BY CRT SCREEN | | |
| ADJUSTMENT PROCEDURE | ADJUST THE V09 BUS DATA UNTILL THE OVERSCAN BECOME AS SPECIFIED BELOW.<br>CAUTION: - PLEASE AGING TV MORE THAN 10 MINUTES BEFORE ADJUSTMENT. | | |
| | [CHECKING SPEC]<br>OVERSCAN 10 ± 2.5% | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

| ADJUSTMENT ITEM | V-PHASE | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V06 | STEP RANGE | 0-7 |
| CONTROL | I²C CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, CRT-PURITY | | |
| CONTENT | US 6 CH LION HEAD (MONOSCOPE PATTERN) | | |
| INPUT CONDITION | 230V, RF INPUT, ZERO MAGNETIC FIELD | | |
| OUTPUT | CONFIRMATION ON CRT SCREEN | | |
| ADJUSTMENT PROCEDURE | ADJUST V06 BUS DATA TO HAVE MOST ACCEPTABLE VERTICAL POSITION.<br>THE MONOSCOPE PATTERN SHOULD BE BALANCE IN VERTICAL POSITION<br>NOTE: THE DATA FOR V06 LIMIT AT <= 04, EVEN POSITION GOOD ENOUGH | | |
| | [CHECKING CONFIRMATION] | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |



| ADJUSTMENT ITEM | CLOSED CAPTION SET UP | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V18 | STEP RANGE | 0~255 |
| CONTROL | I²C CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP | | |
| CONTENT | US 6 CH LION HEAD | | |
| INPUT CONDITION | AC 230V | | |
| OUTPUT | CONFIRMATION ON CRT DISPLAY. | | |
| ADJUSTMENT PROCEDURE | 1) BY SELECTING THE V18, BOX BLK TEXT WILL BE APPEARED.<br>2) ADJUST THE V18 BUS DATA TO HAVE A BALANCE POSITION TO SPEC OF A=B.<br>  <br> | | |
| | [CHECKING SPEC]<br>LEFT AND RIGHT SYMMETRICAL | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

| ADJUSTMENT ITEM | H-VCO | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V21 | STEP RANGE | 0-7 |
| CONTROL | I²C CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP | | |
| CONTENT | NO SIGNAL (RASTER) CONDITION | | |
| INPUT CONDITION | AC 230V | | |
| OUTPUT | IC 801 PIN 11 | | |
| ADJUSTMENT PROCEDURE | (MANUAL ADJ)<br>1) GO TO SERVICE MODE,<br>2) GO TO SERVICE DATA V21, ADJ UNTIL FREQ AS BELOW<br><br>(SELF ADJ)<br>1) GO TO SERVICE MODE,BY SELECTING THE SERVICE DATA V21<br>2) PRESS THE R/C TO OPERATE AUTO H-VCO,OSD APPEAR "OK" AT SCREEN<br>3) IF APPEAR "NG" PLS REPEAT STEP2 | | |
| | [CHECKING SPEC]<br>FREQ = 15.735 ± 0.2 KHz | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

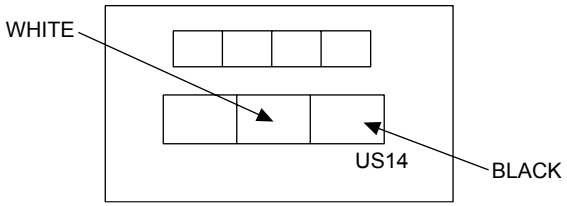


| ADJUSTMENT ITEM | PIF-VCO | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V10 | STEP RANGE | 0~63 |
| CONTROL | I²C CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP | | |
| CONTENT | NO SIGNAL (RASTER) CONDITION | | |
| INPUT CONDITION | AC 230V | | |
| OUTPUT | CONFIRMATION ON CRT DISPLAY (AUTO), IC801 PIN 2 VOLTAGE (MANUAL). | | |
| ADJUSTMENT PROCEDURE | (AT SELF ADJUSTMENT MODE)<br>1) GO INTO SERVICE MODE, BY SELECTING THE SERVICE DATA V10<br>2) PRESS THE R/C FOR AUTO PIF-VCO KEY, OSD APPEAR "OK" AT SCREEN<br>3) IF APPEAR "NG" PLS REPEAT STEP 2<br><br>(AT MANUAL ADJUSTMENT MODE)<br>1) GO INTO SERVICE MODE, BY SELECTING THE SERVICE DATA V10<br>2) ADJUST THE DATA UP/DOWN UNTIL IC801 PIN 2 VOLTAGE BECOME AS SPECIFIED BELOW | | |
| | [CHECKING SPEC]<br>2.5 ± 0.5 V DC (CHECKING SPEC : 2.50 ± 1.5V) | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

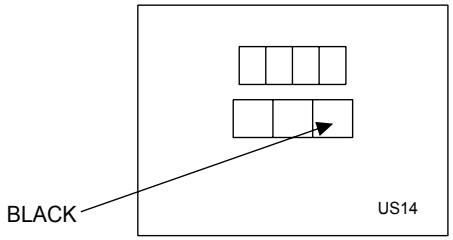
| ADJUSTMENT ITEM | RF-AGC | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V08 | STEP RANGE | 0-127 |
| CONTROL | I²C CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP | | |
| CONTENT | US10CH HALF COLOR BAR | | |
| INPUT CONDITION | RF INPUT<br>FIELD STRENGTH 53dB uV (FIX) | | |
| OUTPUT | TUNER AGC TERMINAL (TP 201) OR CRT DISPLAY CONFIRMATION | | |
| ADJUSTMENT PROCEDURE | (AT SELF ADJUSTMENT MODE)<br>1. GO TO SERVICE MODE<br>2. GO TO SERVICE DATA V08, PRESS R/C TO OPERATE AUTO-AGC KEY AND CONFIRM THE OK DISPLAY ON THE SCREEN.<br>3. IF APPEAR NG PLS REPEAT STEP 2 AGAIN.<br><br>(AT MANUAL ADJUSTMENT MODE)<br>1. ADJUST THE V08 BUS DATA UNTIL AGC TERMINAL VOLTAGE BECOME MAXIMUM, THEN DROP 0.1V BELOW MAXIMUM VOLTAGE.<br>2. CHANGE THE ANTENNA INPUT SIGNAL TO 63-67 dBmV, AND MAKE SURE THERE IS NO NOISE<br>3. CHANGE THE ANTENNA INPUT SIGNAL TO 90-95 dBmV TO BE SURE THAT THERE IS NO CROSS MODULATION BEAT. | | |
| | [VOLTAGE CONFIRMATION]<br>MAX - 0.1V dc | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

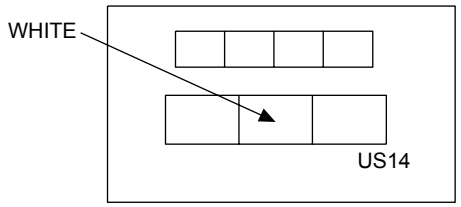


| ADJUSTMENT ITEM | SCREEN | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V11,V12,V13 | STEP RANGE | 0-255 |
| CONTROL | I²C CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP | | |
| CONTENT | WINDOW PATTERN OR US6 CH LION HEAD | | |
| INPUT CONDITION | 230V | | |
| OUTPUT | CONFIRMATION ON CRT DISPLAY | | |
| ADJUSTMENT PROCEDURE | 1) IN SERVICE MODE, SET V04&V11&V12&V13 TO 127; V14&V15 TO 64, GET IN Y-MUTE BY R/C AND SET V19 TO "1", PICTURE APPEAR IN CUT-OFF CONDITION<br>2) ADJUST THE SCREEN SO THAT CUT-OFF LINE APPEAR IN LOW BRIGHT, THEN JUDGE THAT WHETHER THE CUT-OFF LINE APPEAR IN RED OR GREEN OR BLUE COLOR, IN THIS CONDITION V11=R-CUTOFF, V12=G-CUTOFF, V13=B-CUT-OFF, FIX THE DATA OF THE COLOR APPEAR IN CUTOFF LINE AND USE R/C TO ADJUST THE OTHER TWO CUT-OFF DATA SO THAT CUT-OFF LINE COLOR BECOME WHITE.<br>3) TURN THE SCREEN VR OF FBT SO THAT CUT-OFF LINE JUST DISAPPEAR AND USE R/C TO SET V19 TO "0", NEXT DIASBLE THE Y-MUTE SO THAT PICTURE APPEAR IN NORMAL MODE. | | |
| | [VOLTAGE CONFIRMATION] | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

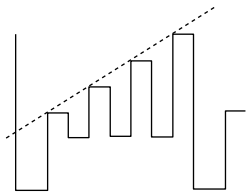
| ADJUSTMENT ITEM | WHITE BALANCE | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V14,V15,V11,V12,V13 | STEP RANGE | 0-127, 0~255 |
| CONTROL | I²C BUS CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, SCREEN | | |
| CONTENT | 23CH 501RE WINDOW PATTERN | | |
| INPUT CONDITION | 230V | | |
| OUTPUT | CRT SCREEN DISPLAY. | | |
| ADJUSTMENT PROCEDURE | 1) WHITE (HIGH BEAM)<br>FIRST LET THE GUN POINT AT BLACK POSITION (AS DRAWING ATTACH), ADJ V04 UNTIL BRIGHTNESS Y BECOME 5 cd/m2 , THEN LET THE GUN POINT AT WHITE POSITION (AS DRAWING ATTACH), ADJUST V01 UNTIL BRIGHTNESS Y BECOME 150 cd/m2 , ADJUST THE BUS DATA OF V14 (R DRIVE), V15(B DRIVE) UNTIL THE AXIS OF COLOR TEMPERATURE BECOME X=0.273, Y=0.280<br>2) BLACK (LOW BEAM)<br>LET THE GUN POINT AT BLACK POSITION, IF THE VALUE SHIFTED AWAY FROM THE DATA ADJUSTED IN STEP 1), ADJUST AGAIN THE TWO SERVICE DATA WHICH HAVE CHOSEN AT SCREEN ADJUST SO THAT TO OBTAIN THE SIMILAR AXIS AS ABOVE.<br>*WARNING: DO NOT DISTURB THE MINI STEP GUN DATA DURING THIS ADJUSTMENT.<br>**REPEAT STEP 1), 2) TO GET A REGULATED POSITION.<br>  <br> | | |
| | [CHECKING CONFIRMATION]<br>X=0.273, Y=0.280 (11,600°K + 1 MPCD) | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

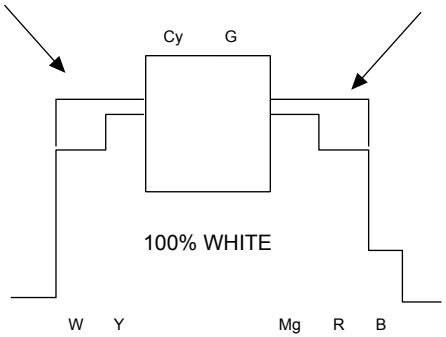


| ADJUSTMENT ITEM | SUB-BRIGHT | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V04 | STEP RANGE | 0-255 |
| CONTROL | I²C CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, SCREEN, WHITE BALANCE | | |
| CONTENT | WINDOW PATTERN | | |
| INPUT CONDITION | 230V | | |
| OUTPUT | CRT SCREEN DISPLAY. | | |
| ADJUSTMENT PROCEDURE | 1) LET THE GUN POINT AT BLACK POSITION (AS ATTACH DRAWING), ADJUST V04 BUS DATA UNTIL BRIGHTNESS Y=0.5 cd/m2, THEN STEP DOWN MORE 4 STEP<br>  <br> | | |
| | [VOLTAGE CONFIRMATION]<br>BRIGHTNESS Y=0.5 cd/m2, THEN STEP DOWN MORE 4 STEP | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

| ADJUSTMENT ITEM | SUB-PICTURE | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V01 | STEP RANGE | 0-127 |
| CONTROL | I²C BUS CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, SCREEN, WHITE BALANCE, SUB-BRIGHTNESS | | |
| CONTENT | WINDOW PATTERN | | |
| INPUT CONDITION | 230V | | |
| OUTPUT | CRT SCREEN DISPLAY. | | |
| ADJUSTMENT PROCEDURE | 1) LET THE GUN POINT AT WHITE POSITION (AS ATTACH DRAWING), ADJUST V01 BUS DATA UNTIL BRIGHTNESS Y=150 cd/m2.<br>NOTE: ALLOWABLE DATA FOR V01 IS >= 90, EVEN Y CAN'T MATCH THE SPEC<br>  <br> | | |
| | [VOLTAGER CONFIRMATION]<br>BRIGHTNESS Y=150 cd/m2 | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |



| ADJUSTMENT ITEM | SUB-TINT | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V02 | STEP RANGE | 0-127 |
| CONTROL | I²C CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, VCO ADJ, RF-AGC | | |
| CONTENT | US 10 CH HALF COLOR BAR PATTERN | | |
| INPUT CONDITION | 230V | | |
| OUTPUT | B-AMP TR BASE (TP853)<br>CONFIRM WITH OSCILLOSCOPE | | |
| ADJUSTMENT PROCEDURE | 1) GET IN Y-MUTE FUNCTION BY R/C.<br>2) ADJUST THE V02 BUS DATA TO GET A WAVEFORM AS BELOW.<br>3) DISABLE THE Y-MUTE<br>**PLS TAKE NOTE THAT SERVICE MODE DATA F61 NEED TO SET +8<br>  <br>B-AMP BASE (TP853) MUST BE IN STEPPING LEVEL | | |
| | [CONFIRMATION] | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

| ADJUSTMENT ITEM | SUB-COLOR | | |
|---|---|---|---|
| ADJUSTMENT POSITION | V03 | STEP RANGE | 0-127 |
| CONTROL | $I^2C$ BUS CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, VCO ADJ, RF-AGC, SUB-PICT, SUB-TNT | | |
| CONTENT | US 10 CH HALF COLOR BAR PATTERN | | |
| INPUT CONDITION | 230V | | |
| OUTPUT | R-AMP TR BASE (TP851)<br>CONFIRM WITH OSCILLOSCOPE | | |
| ADJUSTMENT PROCEDURE | 1) SET THE V03 BUS DATA TO GET A WAVEFORM AS BELOW<br>2) THIS WAVEFORM SHOWS THAT THE 75% WHITE & RED PORTIONS OF COLOR BAR BEAT AT THE SAME LEVEL<br>*PLEASE TAKE NOTE THAT SERVICE DATA F60 MUST SET TO +10<br>  <br> | | |
| | [CHECKING CONFIRMATION] | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |



| ADJUSTMENT ITEM | X-RAY PROTECTION OPERATING CONFIRMATION | | |
|---|---|---|---|
| ADJUSTMENT POSITION | - | STEP RANGE | - |
| CONTROL | - | | |
| PRE-ADJUST REQUIREMENT | AFTER ALL ADJUSTMENT FINISHED. | | |
| CONTENT | US 6 CH LION HEAD (MONOSCOPE PATTERN) | | |
| INPUT CONDITION | AC 230V, RF INPUT | | |
| OUTPUT | CONFIRMATION BY THE CRT | | |
| ADJUSTMENT PROCEDURE | SET THE USER CONTROL TO SHIPMENT POSITION.<br><br>[VOLTAGE CONFIRMATION]<br>CHECK THE VOLTAGE OF P603 PIN 3 AS SPECIFIED BELOW.<br><br>[OPERATION CONFIRMATION]<br>SUPPLY THE DC VOLTAGE TO P603 PIN 3 AND MAKE SURE THE PROTECTOR IS FUNCTIONED.<br>HORIZONTAL OSCILATION STOP AND PICTURE DISAPPEAR.<br><br>[RECOVER INFORMATION]<br>PULL OUT THE AC CORD.<br><br>[CAUTION]<br>FROM THE RECOVER CONFIRMATION MENTIONED ABOVE, THE AC CODE MUST BE PULLED OUT AT LEAST 4 SECOND BEFORE PLUGGING IN AGAIN.(IN ORDER TO MAKE SURE THE u-COM HAS BEEN RESET.) | | |
| | [VOLTAGE CONFIRMATION]<br><br>TP VOLTAGE: 26± 1.1V DC<br>OPERATION VOLTAGE: 27V | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

| ADJUSTMENT ITEM | HIGH VOLTAGE | | |
|---|---|---|---|
| ADJUSTMENT POSITION | - | STEP RANGE | - |
| CONTROL | - | | |
| PRE-ADJUST REQUIREMENT | AFTER ALL ADJUSTMENT FINISHED. | | |
| CONTENT | US 6 CH LION HEAD (MONOSCOPE PATTERN) | | |
| INPUT CONDITION | AC 230V, RF INPUT | | |
| OUTPUTW | CRT ANODE VOLTAGE | | |
| ADJUSTMENT PROCEDURE | SET THE USER CONTROL TO SHIPMENT SETTING POSITION. PUSH ON Y-MUTE BY R/C CONFIRM THE VOLTAGE OF CRT ANODE BY HIGH VOLTAGE METER AND MAKE SURE THE READING IS AS BELOW.<br><br>HIGH VOLTAGE: BELOW 30kV<br><br>[CAUTION POINT]<br>USE ELECTROSTATIC HI-VOLTAGE METER AND FOLLOW THE UL/ DHHS STANDARD TO MAKE CORRECTION AND CONTROL. | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

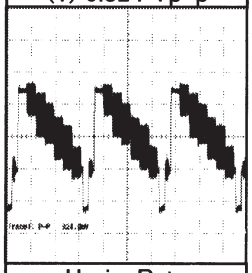


| ADJUSTMENT ITEM | MS LEVEL ADJUSTMENT | | |
|---|---|---|---|
| ADJUSTMENT POSITION | M01 | STEP RANGE | 0~15 |
| CONTROL | $I^2C$ BUS CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, VCO ADJ, RF-AGC | | |
| CONTENT | MONORAL SIGNAL (400HZ 100% MODULATION) | | |
| INPUT CONDITION | AC 230V, RF INPUT | | |
| OUTPUT | IC 3001 39 PIN | | |
| ADJUSTMENT PROCEDURE | 1) SET THE SOUND VOLUME CONTROL MORE THAN 1.<br>2) ADJUST BUS DATA OF M01 UNTIL THE VOLTAGE OF 39 PIN BE-COME AS SPECIFIED BELOW.<br><br>[CHECKING SPEC]<br>490 ± 10mVrms (CHECKING SPEC :490 ± 20mVrms) | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

| | | | |
|---|---|---|---|
| ADJUSTMENT ITEM | SEPARATION ADJUSTMENT | | |
| ADJUSTMENT POSITION | M04, M05 | STEP RANGE | 0~63 |
| CONTROL | $I^2C$ BUS CONTROL | | |
| PRE-ADJUST REQUIREMENT | OPTION SET UP, BUS SET UP, VCO ADJ, RF-AGC, MS-LEVEL, MTS-VCO, FILTER | | |
| CONTENT | STEREO SIGNAL SIGNAL 1,: MODULATION 30%, L-CH ONLY, NR-ON, 300Hz<br>SIGNAL 2,: MODULATION 30%, L-CH ONLY, NR-ON, 3kHz | | |
| INPUT CONDITION | RF INPUT | | |
| OUTPUT | IC 3001 39 PIN | | |
| ADJUSTMENT PROCEDURE | 1) INPUT SIGNAL 1, ADJUST BUS DATA OF M04 UNTIL THE OF 39 PIN BECOME MINIMUM LEVEL.<br>2) INPUT SIGNAL 2, ADJUST BUS DATA OF M05 UNTIL THE AC VOLTAGE OF 39 PIN BECOME MINIMUM LEVEL.<br>3) REPEAT STEP 1) AND 2).<br><br>SET THE SOUND VOLUME TO MAXIMUM THEN MAKE SURE THE READING FROM THE SPEAKER TERMINAL MUST BE OVER THE SPEC AS SPECIFIED BELOW. | | |
| | [CHECKING SPEC]<br>OVER 25 dB (CHECKING SPEC : OVER 20 dB) | | |
| HISTORY OF REVISION | SYMBOL | REVISED CONTENT, | |

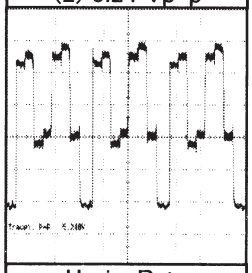
# WAVEFORMS

(1) 0.824 Vp-p



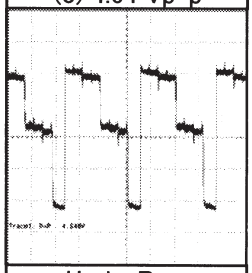
Horiz. Rate

(2) 5.24 Vp-p



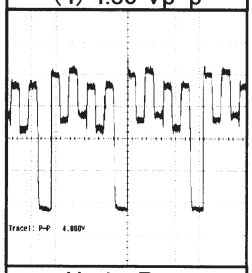
Horiz. Rate

(3) 4.64 Vp-p



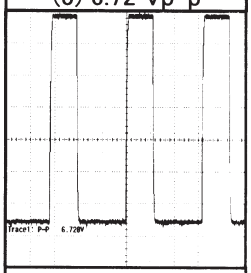
Horiz. Rate

(4) 4.80 Vp-p



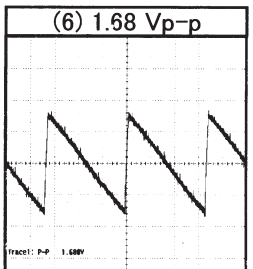
Horiz. Rate

(5) 6.72 Vp-p



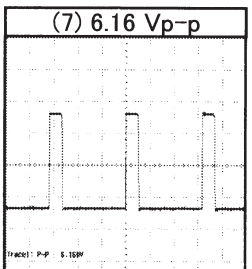
Horiz. Rate

(6) 1.68 Vp-p



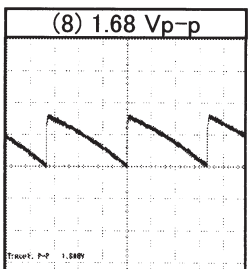
Vert. Rate

(7) 6.16 Vp-p



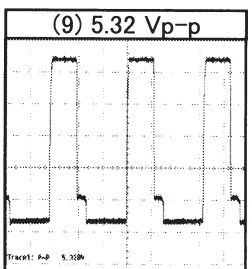
Horiz. Rate

(8) 1.68 Vp-p



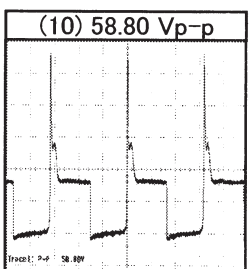
Vert. Rate

(9) 5.32 Vp-p



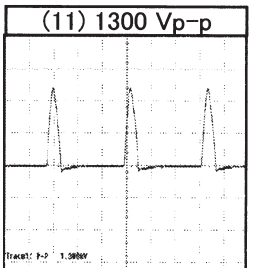
Horiz. Rate

(10) 58.80 Vp-p



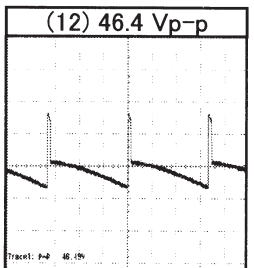
Horiz. Rate

(11) 1300 Vp-p



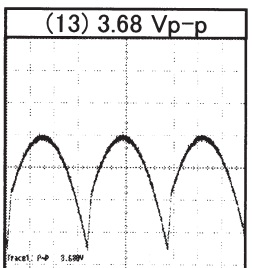
Horiz. Rate

(12) 46.4 Vp-p



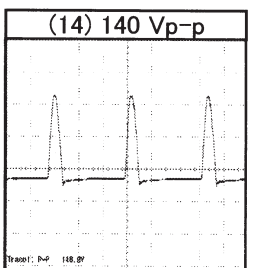
Vert. Rate

(13) 3.68 Vp-p



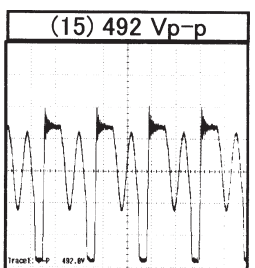
Vert. Rate

(14) 140 Vp-p



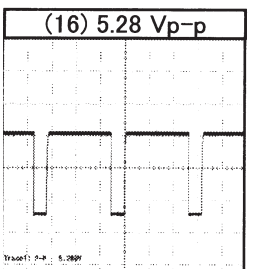
Horiz. Rate

(15) 492 Vp-p



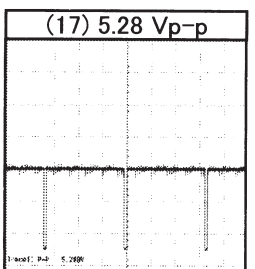
–

(16) 5.28 Vp-p



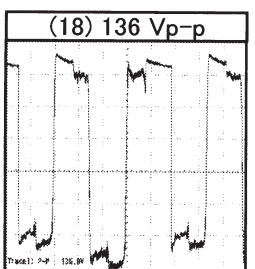
Horiz. Rate

(17) 5.28 Vp-p



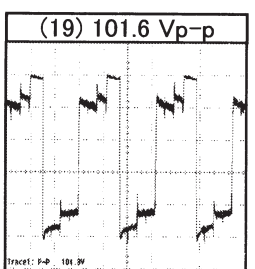
Vert. Rate

(18) 136 Vp-p



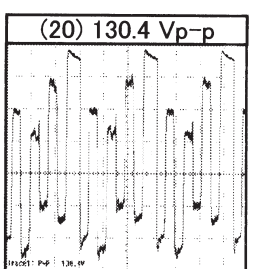
Horiz. Rate

(19) 101.6 Vp-p



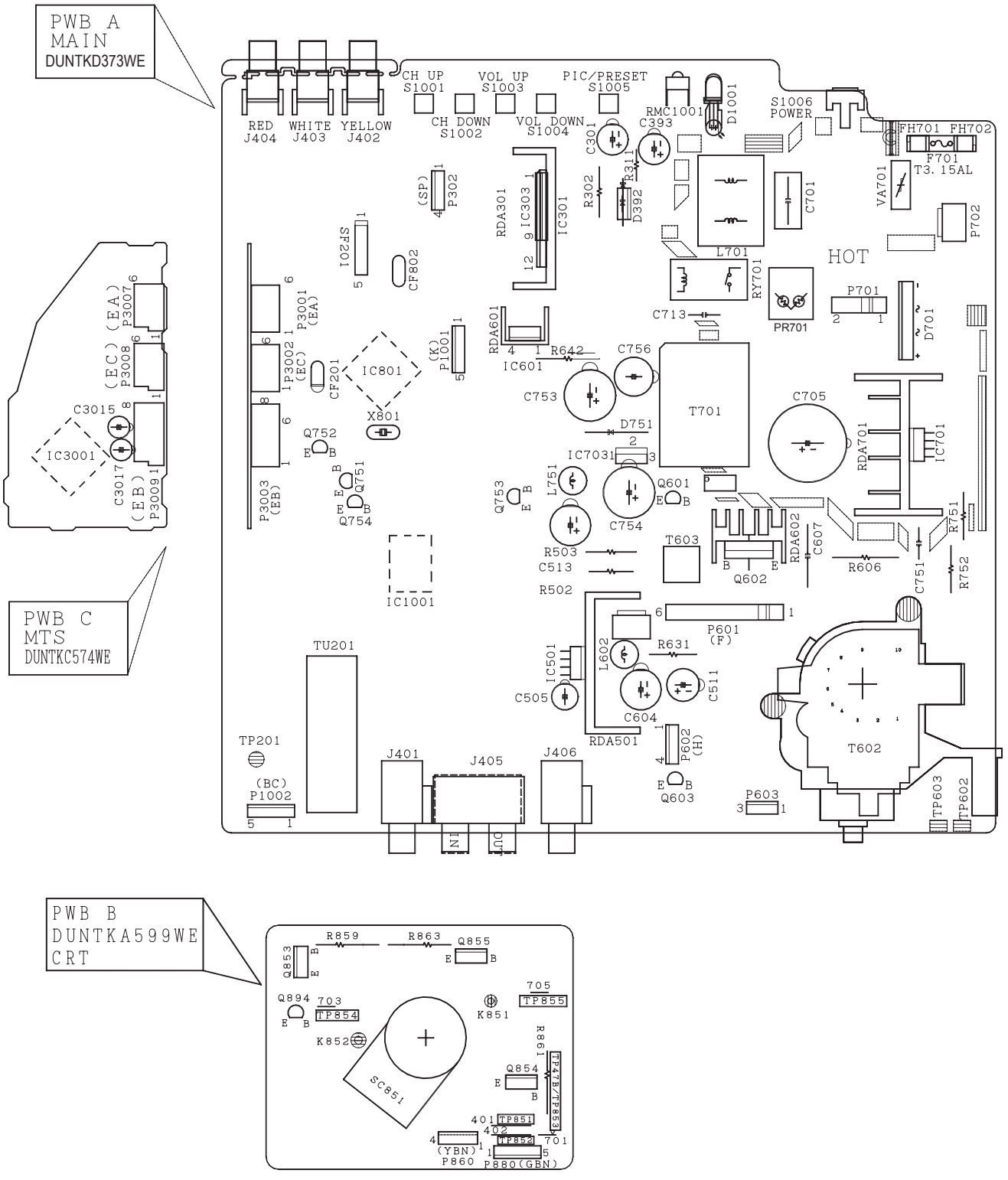
Horiz. Rate

(20) 130.4 Vp-p

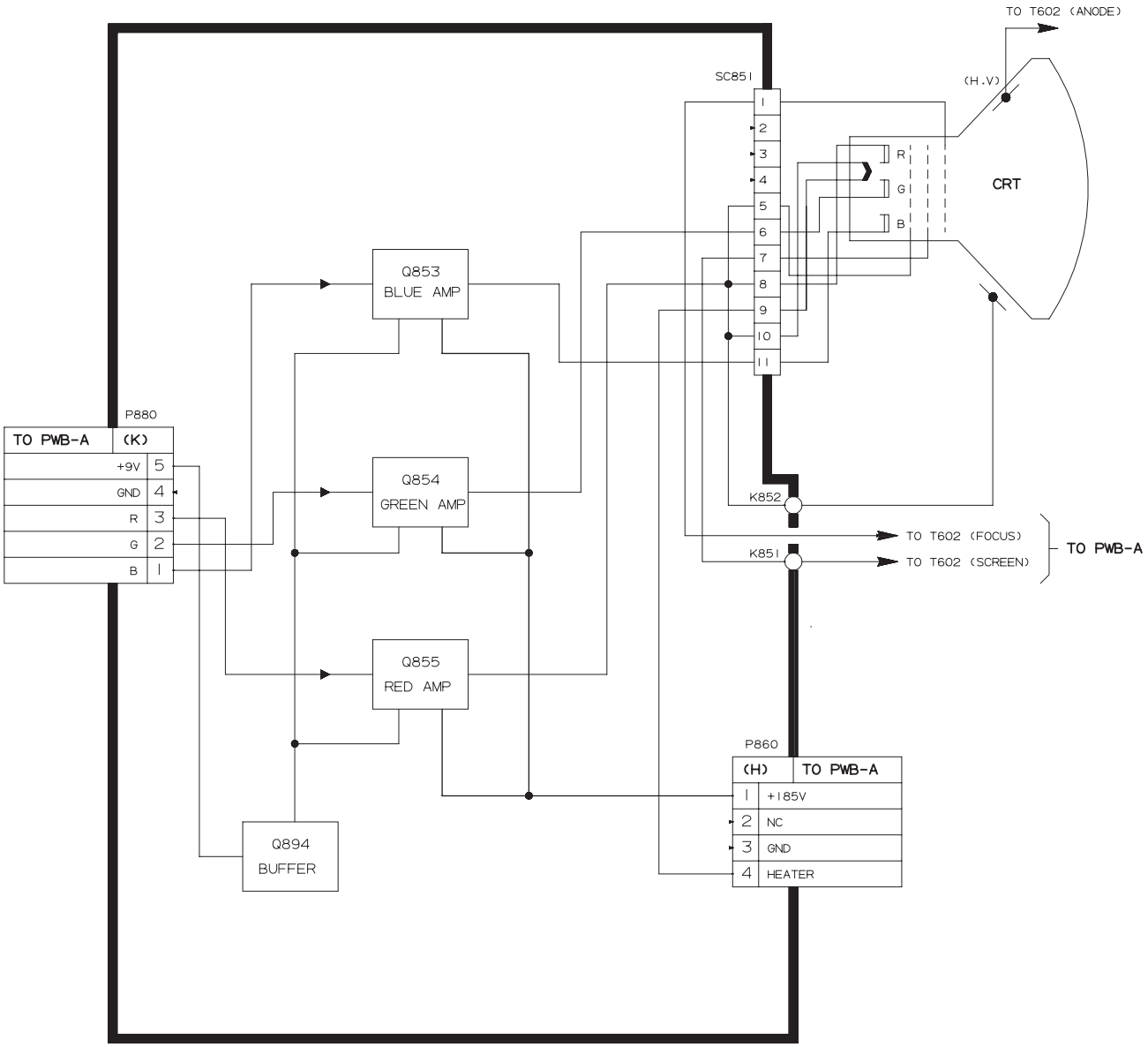


Horiz. Rate

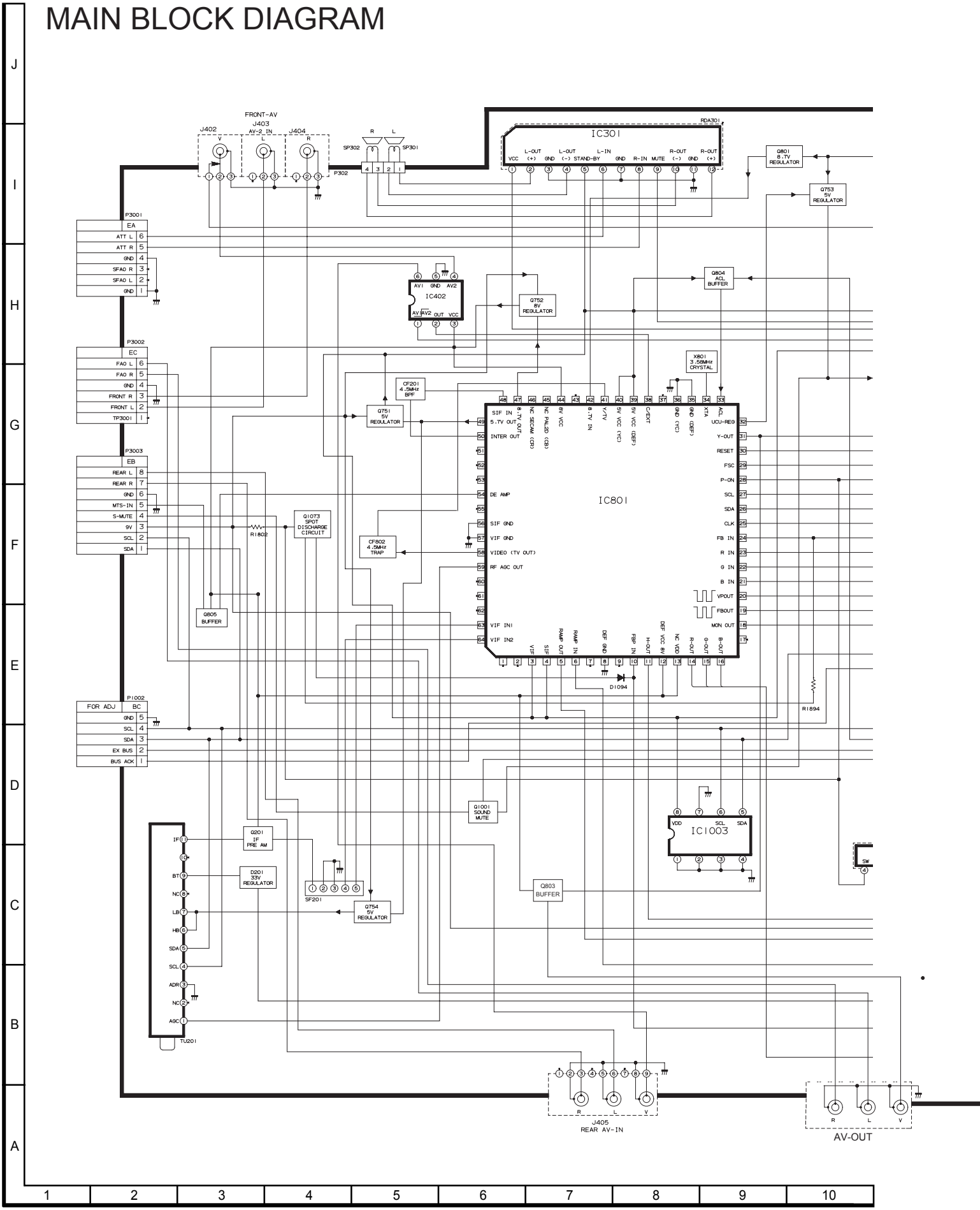
# CHASSIS LAYOUT

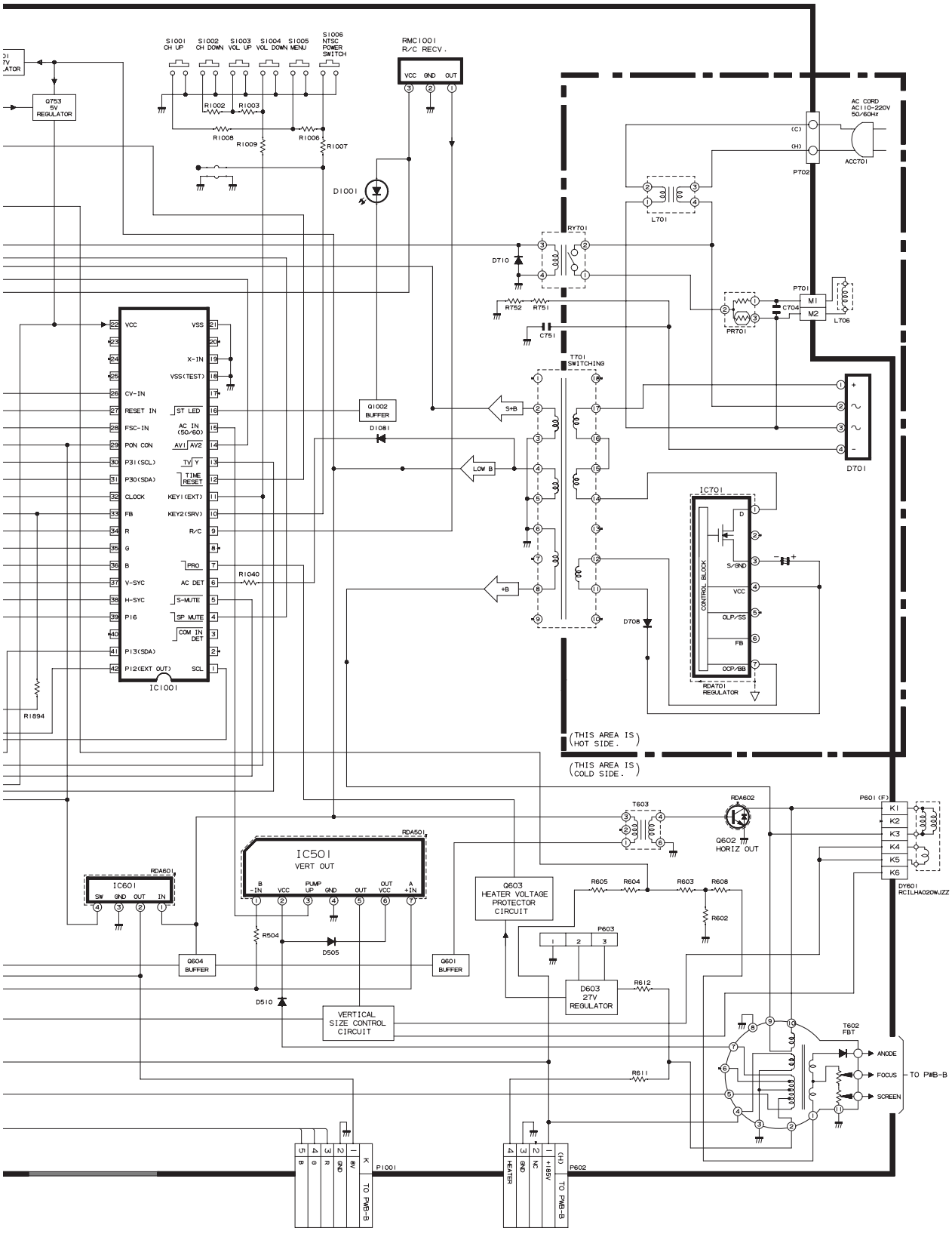


# CRT BLOCK DIA GRAM



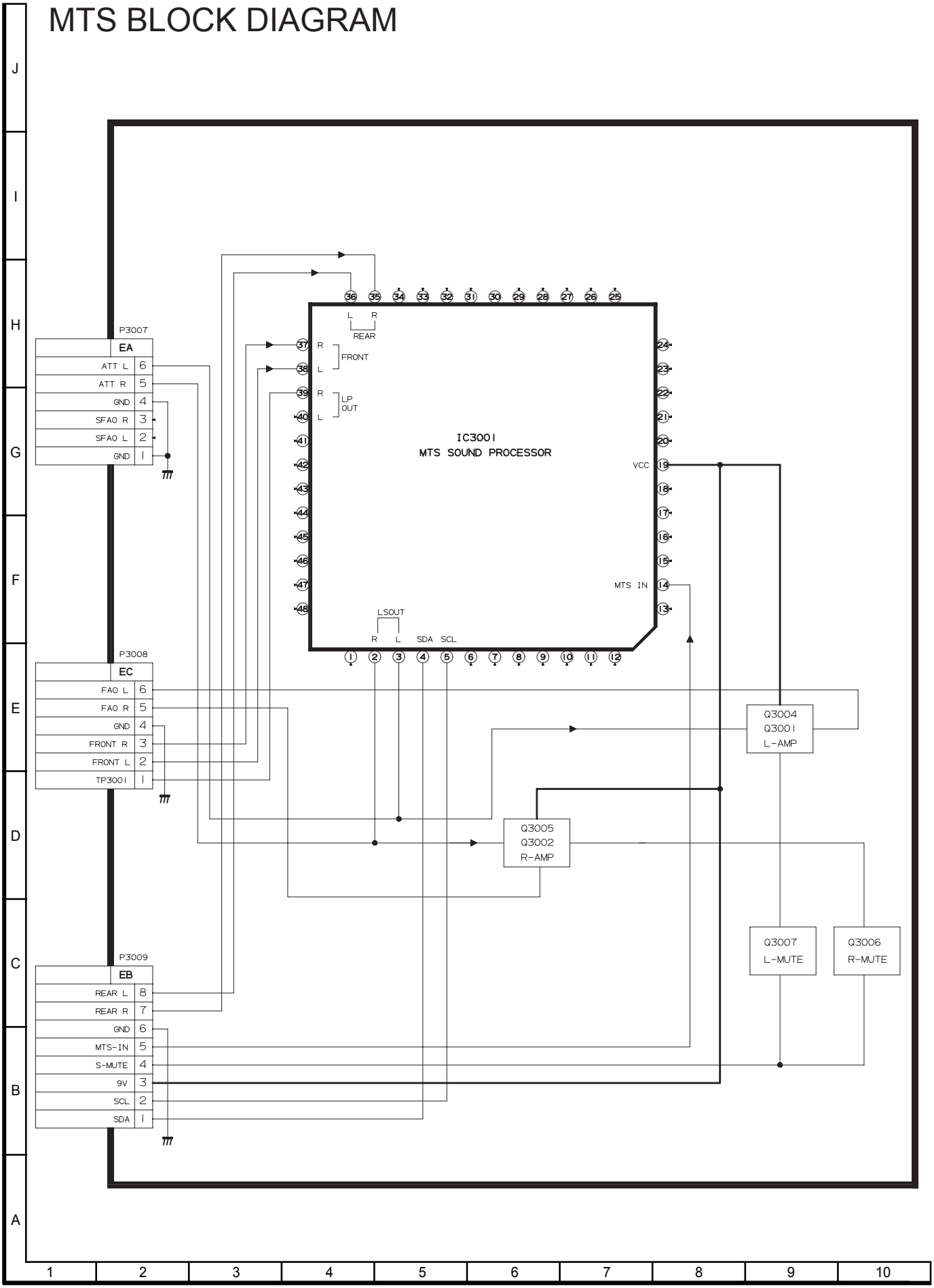
# MAIN BLOCK DIAGRAM






| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|

# MTS BLOCK DIAGRAM



# DESCRIPTION OF SCHEMATIC DIAGRAM

*NOTES:*

1. *The unit of resistance "ohm" is omitted. (K=kW=1000W, M=MW)*
2. *All resistors are 1/16 watt, unless otherwise noted.*
3. *All capacitors are mF, unless otherwise noted. (P=pF=mmF)*
4. *(G) indicates ±2% tolerance may be used.*
5. *⏚ indicates line isolated ground.*

*VOLTAGE MEASUREMENT CONDITIONS:*

1. *All DC voltages are measured with DVM connected between points indicated and chassis ground, line voltage set at 120V AC and all controls set for normal picture unless otherwise indicated.*
2. *All voltages measured with 1000mV B & W or Color signal.*

*WAVEFORM MEASUREMENT CONDITIONS:*

1. *Photographs taken on a standard gated color bar signal, the tint setting adjusted for proper color. The wave shapes at the red, green and blue cathodes of the picture tube depend on the tint, color level and picture control.*
2. *indicates waveform check points (See chart, waveforms are measured from point indicated to chassis ground.)*

*Œ AND SHADED ( ) COMPONENTS = SAFETY RELATED PARTS.*
*MARK= X-RAY RELATED PARTS.*

*DRGANNES MARQUES Œ ET HACHRES ( ): PIECES RELATIVES A LA SECURITE.*
*MARQUE : PIECS RELATIVE AUX RAYONS X.*

*This circuit diagram is a standard one, printed circuits may be subject to change for product improvement without prior notice.*

# 21V-FR85S 21V-FR95S MAIN

⚠ AND SHADED(▬▬) COMPONENTS = SAFETY RELATED PARTS.
▲ MARK = X-RAY RELATED PARTS.

NOTE:1.THE UNIT OF RESISTANCE "OHM" IS OMITTED (K=1000 OHMS, M=MEGAOHM).
2.ALL RESISTORS ARE 1/8W WATT.UNLESS OTHERWISE NOTED.
3.UNIT OF ALL CAPACITORS ARE F WITH PREFIX SYMBOL. (u, P, ETC).

PWB-A
QPWBF0373WJZZ
(QUNTH0373WEA0)

FRONT-AV
J402 E02102CE04 V
J403 E02102CE09 AV-2 IN L
J404 E02102CE02 R

IC301 AN17821A
IC402 MM1501XN
IC801 M61250CF
IC1001 IXA983WJ
IC1003 BR24L04F
IC501 STV9302A VERT OUT
IC601 KA78R09A
IC701 STRW5453

Q1073 D601AR
Q751 D468-C
Q752 D468-C
Q753 C3198-G
Q754 D468-C
Q803 D601AR
Q804 D601AR
Q805 B709AR
Q901 C5735
Q904 B709AR
Q1001 D601AR
Q1002 D601AR
Q601 C2235Y HORIZ DRIVER
Q602 TT2140+++ HORIZ OUT
Q603 C3198-G

D1001 PX0013PE
D701 DX0476CE
D1094 1SS119
D1801 1SS119
D801 D601AR
D802 EX0630GE (9.1V)
D803 1SS119
D1095 1SS119
D1803 EX1393CE (5.1V)
D1804 EX1393CE (5.1V)
D1805 EX1393CE (5.1V)
D1806 EX1393CE (5.1V)
D1807 EX1393CE (5.1V)
D1808 EX1393CE (5.1V)
D1809 EX1393CE (5.1V)
D1810 EX1393CE (5.1V)
D1811 EX1393CE (5.1V)
D1812 EX1393CE (5.1V)
D1813 EX1393CE (5.1V)
D1814 EX1393CE (5.1V)
D1815 EX1393CE (5.1V)
D1816 EX1393CE (5.1V)
D1817 EX1393CE (5.1V)
D1818 EX1393CE (5.1V)
D1819 EX1393CE (5.1V)
D1820 EX1393CE (5.1V)
D1821 EX1393CE (5.1V)
D1822 EX1393CE (5.1V)
D1823 EX1393CE (5.1V)
D1824 EX1393CE (5.1V)
D1825 EX1393CE (5.1V)
D1826 EX1393CE (5.1V)
D1827 EX1393CE (5.1V)
D1828 EX1393CE (5.1V)
D1829 EX1393CE (5.1V)
D1830 EX1393CE (5.1V)
D1831 EX1393CE (5.1V)
D1832 EX1393CE (5.1V)
D1833 EX1393CE (5.1V)
D1834 EX1393CE (5.1V)
D1835 EX1393CE (5.1V)
D1836 EX1393CE (5.1V)
D1837 EX1393CE (5.1V)
D1838 EX1393CE (5.1V)
D1839 EX1393CE (5.1V)
D1840 EX1393CE (5.1V)
D1841 EX1393CE (5.1V)
D1842 EX1393CE (5.1V)
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D1844 EX1393CE (5.1V)
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D1846 EX1393CE (5.1V)
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D1848 EX1393CE (5.1V)
D1849 EX1393CE (5.1V)
D1850 EX1393CE (5.1V)
D1851 EX1393CE (5.1V)
D1852 EX1393CE (5.1V)
D1853 EX1393CE (5.1V)
D1854 EX1393CE (5.1V)
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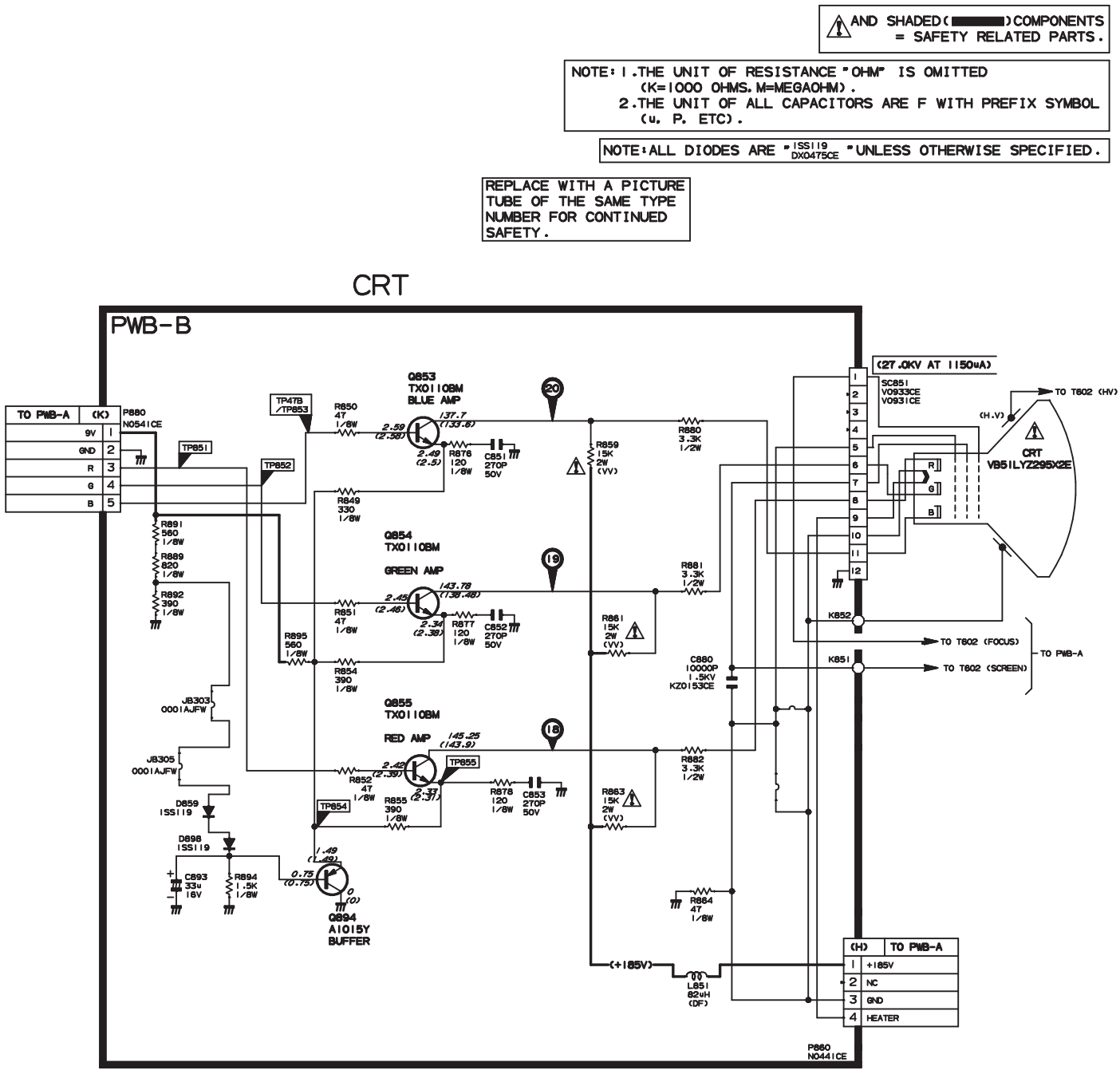
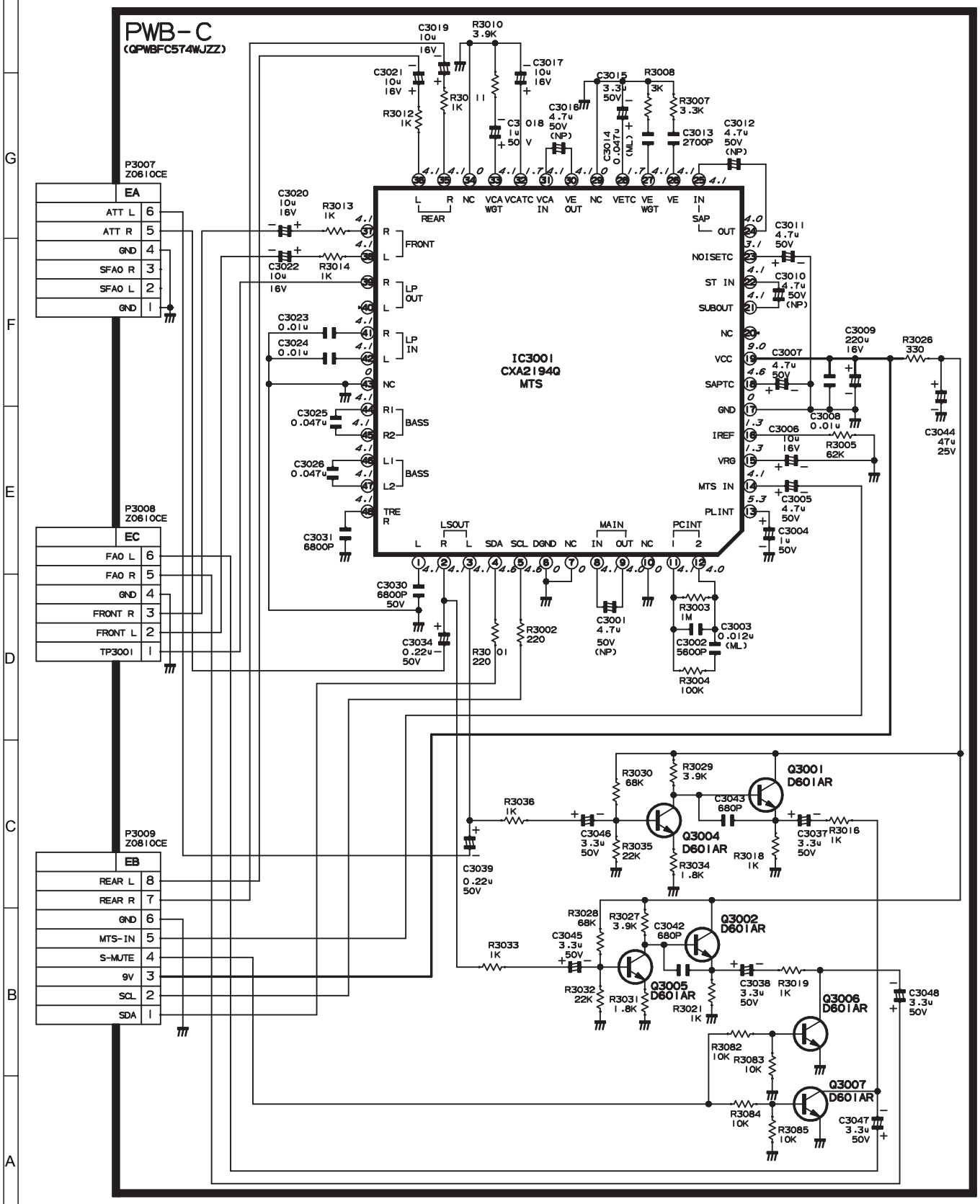
D2097 EX1393CE (5.1V)
D2098 EX1393CE (5.1V)
D2099 EX1393CE (5.1V)
D2100 EX1393CE (5.1V)

RMC1001 A022WJZZ R/C RECV.
S1001 S1002 S1003 S1004 S1005 K0003AJ CH UP CH DOWN VOL UP VOL DOWN MENU
AC CORD AC110-220V 50/60Hz ACCT01 QACC2A050MJPZ
LINE CORD PLUG IS POLARIZED. THE NARROW BLADE CONNECTS TO THE HOT SIDE OF THE AC LINE.
(THIS AREA IS HOT SIDE.)
(THIS AREA IS COLD SIDE.)
CONTROL BLOCK
TO PWB-B
TO PWB-A
AV-1 IN
R-IN L-IN V-IN R-OUT L-OUT V-OUT
ANODE FOCUS SCREEN

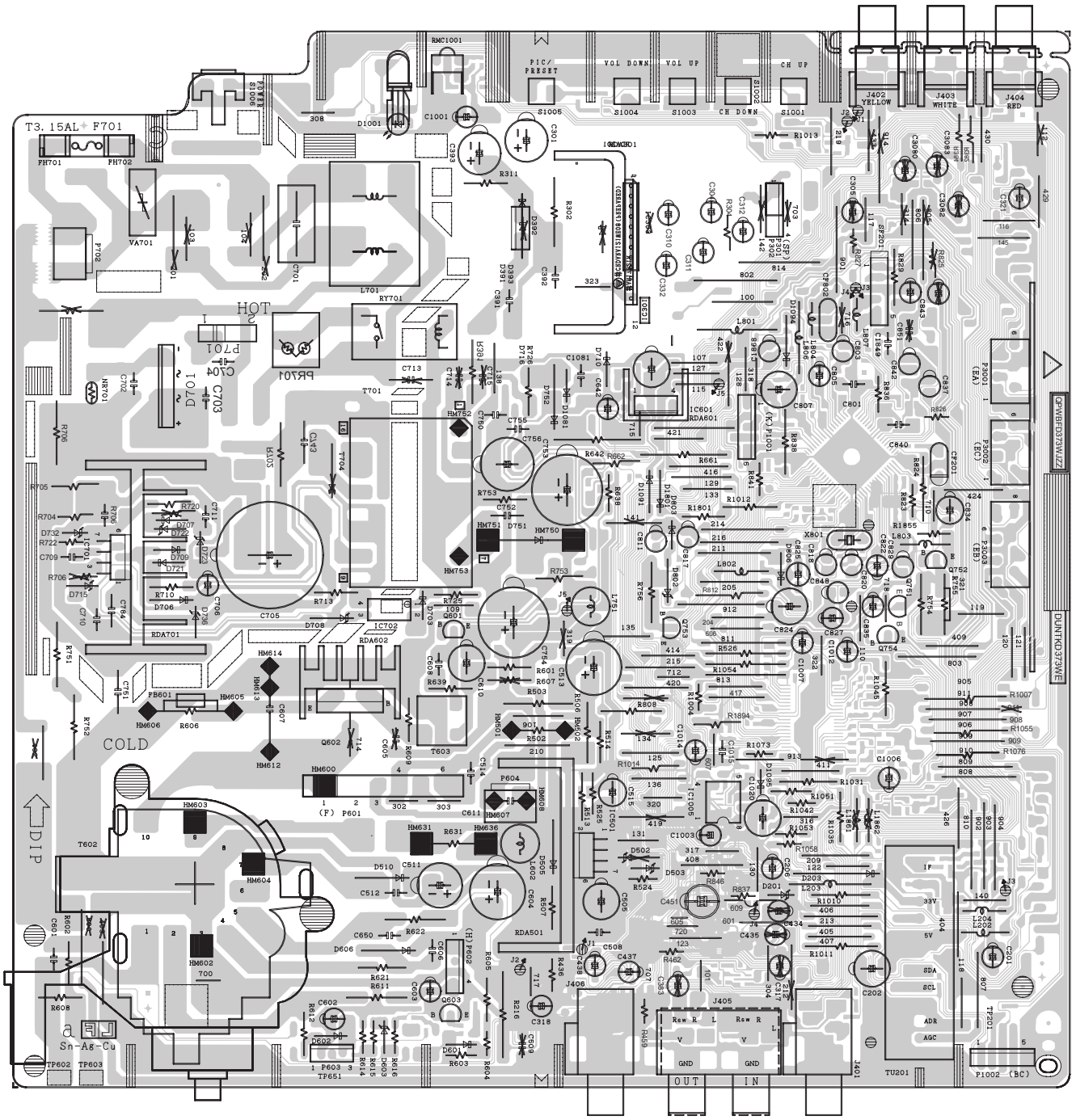
# SCHEMATIC DIAGRAM: CRT Unit



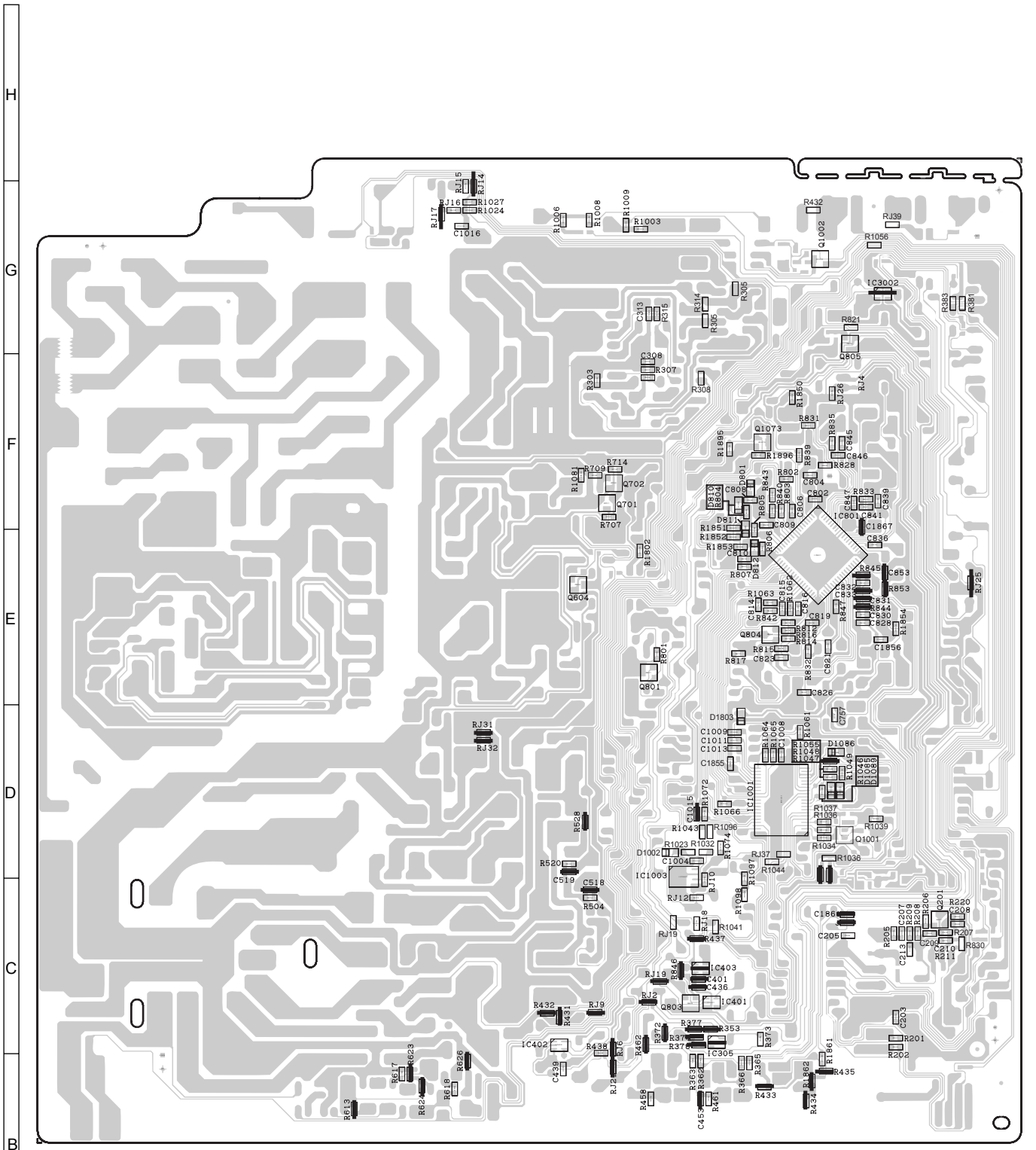
# SCHEMATIC DIAGRAM: MTS Unit



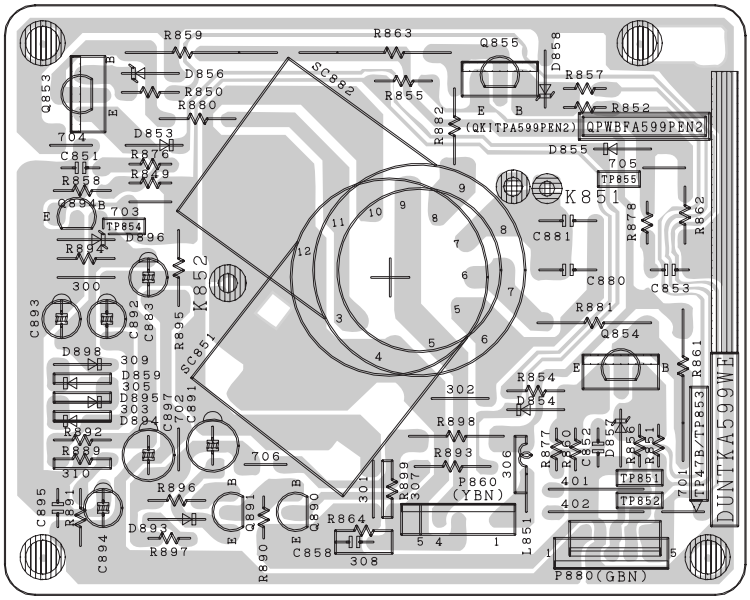
# PRINTED WIRING BOARD ASSEMBLIES



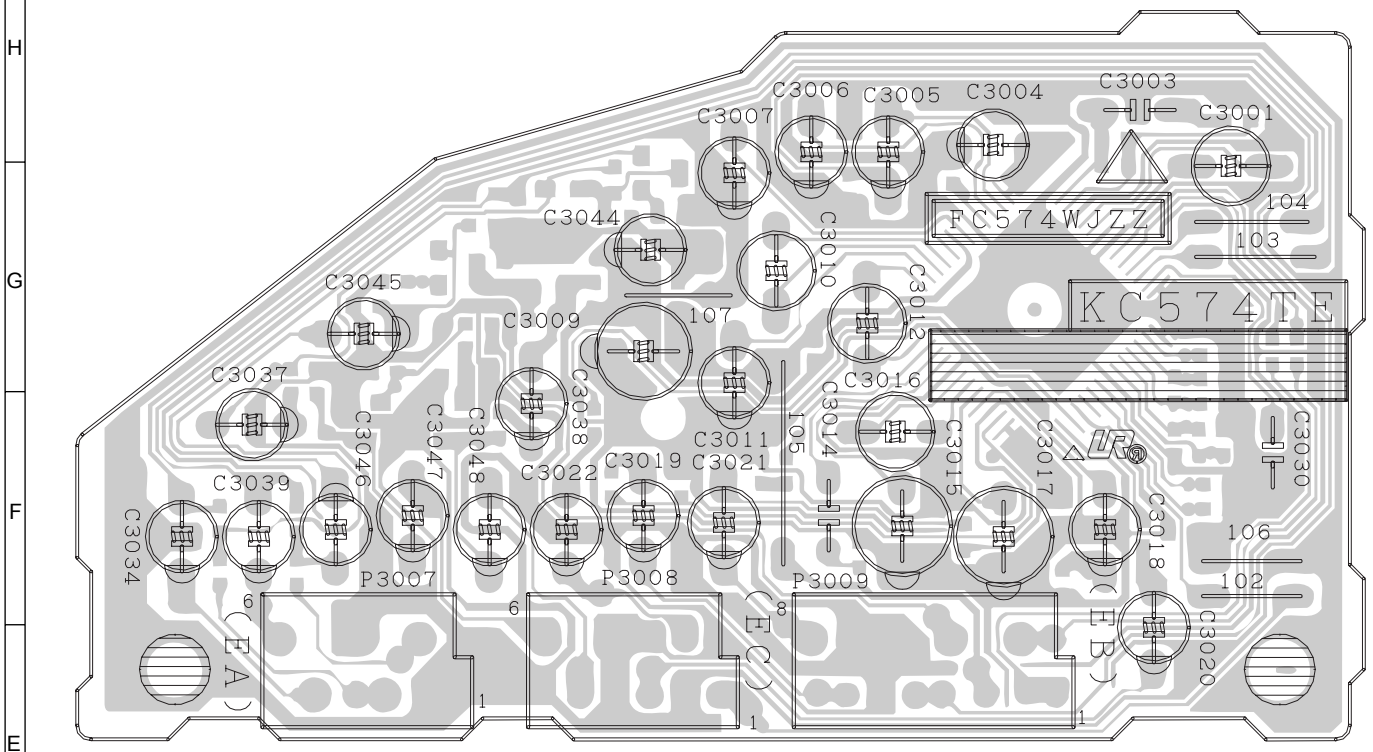

PWB-A: MAIN Unit (Wiring Side)



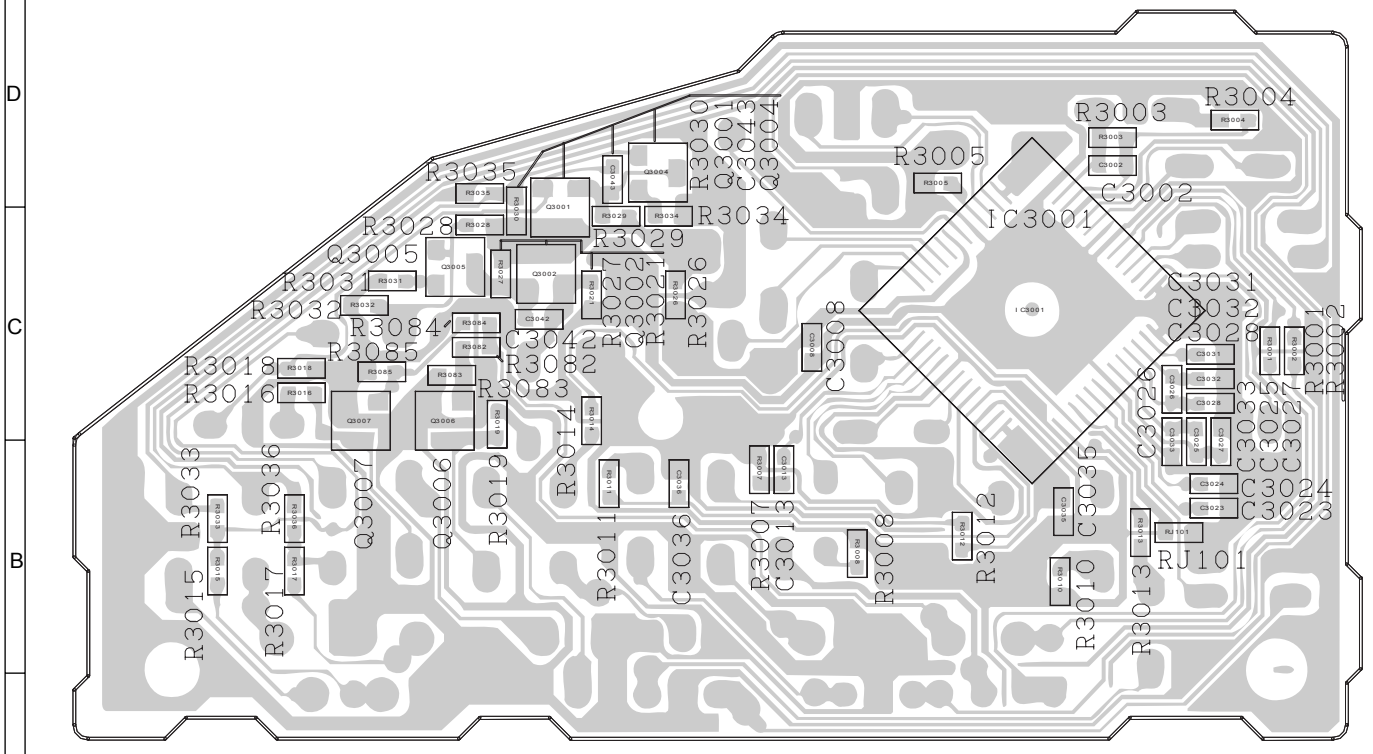
PWB-A: MAIN Unit (Chip Parts Side)




PWB-B: CRT Unit (Wiring Side)




PWB-C: MTS Unit (Wiring Side)




PWB-C: MTS Unit (Chip Parts Side)

# REPLACEMENT PARTS LIST

Replacement parts which have these special safety characteristics identified in this manual; electrical components having such features are identified by ⚠ And shaded areas in the Replacement Parts Lists and Schematic Diagrams. The use of a substitute replacement part which does not have the same safety characteristic as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

## "HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

▲ MARK: X-RAY RELATED PARTS

| Ref. No. | Part No. | Description |
|---|---|---|
| **PICTURE TUBE** | | |
| ▲⚠V101 | VB51LYZ295X2E | Picture Tube |
| ▲⚠DY601 | ITC TYPE CRT | DY |
| ⚠L706 | RCILGA095WJZZ | Degaussing Coil |
| | QEARCA012WJZZ | CRT Ground Wire |
| | ITC TYPE CRT | Purity Magnet |
| | ITC TYPE CRT | Spacer |
| | LHLDW0003PEKZ | Wire Holder |
| | LBNDC0001PFZZ | Wire Holder |
| **PRINTED WIRING BOARD ASSEMBLIES (NOT REPLACEMENT ITEM)** | | |
| PWB-A | DUNTKD373WEA0 | MAIN Unit |
| PWB-B | DUNTKA599WEI1 | CRT Unit |
| PWB-C | DUNTKC574WEA3 | MTS Unit |

| Ref. No. | Part No. | Description |
|---|---|---|
| **PWB-A: DUNTKD373WEA0 MAIN UNIT** | | |
| **TUNER** | | |
| ***NOTE: THE PARTS HERE SHOWN ARE SUPPLIED AS AN ASSEMBLY BUT NOT INDEPENDENTLY.*** | | |
| ⚠TU201 | VTUVT1Y5UF201 | Tuner |
| **INTEGRATED CIRCUITS** | | |
| IC301 | VHIAN17821A-1 | AN17821A |
| IC402 | VHIMM1501XN-1 | MM1501XN |
| ⚠IC501 | VHITDA9302H-1 | TDA9302H |
| IC601 | VHIKA78R09AP1 | KA78R09AP |
| ⚠IC701 | VHISTRW5453-1 | STRW5453 |
| IC801 | VHIM61250CF1EQ | M61250CF |
| IC1001 | RH-IXA983WJZZ | IXA983WJ |
| IC1003 | VHIBR24L04F-1* | BR24L04F |
| **TRANSISTORS** | | |
| Q201 | VS2SC2735//1E | 2SC2735 |
| Q601 | VS2SC2235Y/1E | 2SC2235Y |
| Q602 | VSTT2140+++-F | TT2140++ |
| Q603 | VS2SC3198-G-1 | 2SC3198-G |
| Q604 | VS2SD601AR/-1 | 2SD601AR |
| Q751 | VS2SD468-C/-1 | 2SD468-C |
| Q752 | VS2SD468-C/-1 | 2SD468-C |
| Q753 | VS2SC3198-G-1 | 2SC3198-G |
| Q754 | VS2SD468-C/-1 | 2SD468-C |
| Q801 | VS2SD601AR/-1 | 2SD601AR |
| Q803 | VS2SD601AR/-1 | 2SD601AR |
| Q804 | VS2SB709AR/-1 | 2SB709AR |
| Q805 | VS2SB709AR/-1 | 2SB709AR |
| Q1001 | VS2SD601AR/-1 | 2SD601AR |
| Q1002 | VS2SD601AR/-1 | 2SD601AR |
| Q1073 | VS2SD601AR/-1 | 2SD601AR |
| **DIODES** | | |
| D201 | RH-EX0676GEZZ | Zener, EX0676GE |
| D203 | VHD1SS119//-1 | D1SS119 |
| D393 | RH-DX0247CEZZ | DX0247CE |
| D503 | RH-EX0612GEZZ | Zener, EX0612GE |
| D505 | RH-DX0441CEZZ | DX0441CE |
| D510 | RH-DX0131CEZZ | DX0131CE |
| D601 | VHD1SS119//-1 | D1SS119 |
| D602 | VHD1SS244//-1 | 1SS244 |
| D603 | RH-EX0667GEZZ | Zener, EX0667GE |
| D606 | RH-DX0131CEZZ | DX0131CE |
| ⚠D701 | RH-DX0476CEZZ | DX0476CE |
| D706 | RH-DX0066GEZZ | DX0066GE |
| D707 | RH-DX0066GEZZ | DX0066GE |
| D709 | RH-DX0066GEZZ | DX0066GE |
| D710 | VHD1SS119//-1 | D1SS119 |
| D715 | RH-EX0615GEZZ | Zener, EX0615GE |
| D721 | RH-DX0066GEZZ | DX0066GE |
| D722 | RH-EX0669GEZZ | Zener, EX0669GE |
| D723 | RH-EX0640GEZZ | Zener, EX0640GE |

| Ref. No. | Part No. | Description |
|---|---|---|
| **PWB-A: DUNTKD373WEA0 MAIN UNIT (Continued)** | | |
| D732 | RH-EX0626GEZZ | Zener, EX0626GE |
| D736 | RH-EX0683GEZZ | Zener, EX0683GE |
| D751 | RH-DXA006WJZZ | DXA006WJ |
| D752 | RH-DX0247CEZZ | DX0247CE |
| D801 | RH-EX1393CEZZ | Zener, EX1393CE |
| D802 | RH-EX0630GEZZ | Zener, EX0630GE |
| D803 | VHD1SS119//-1 | D1SS119 |
| D806 | VHD1SS119//-1 | D1SS119 |
| D810 | RH-EX0263TAZZ | Zener, EX0263TA |
| D811 | RH-EX0263TAZZ | Zener, EX0263TA |
| D812 | RH-EX0263TAZZ | Zener, EX0263TA |
| D1001 | RH-PX0013PEZZ | LED, Power |
| D1081 | VHD1SS119//-1 | D1SS119 |
| D1085 | RH-EX1393CEZZ | Zener, EX1393CE |
| D1086 | RH-EX1393CEZZ | Zener, EX1393CE |
| D1089 | RH-EX1393CEZZ | Zener, EX1393CE |
| D1091 | VHD1SS119//-1 | D1SS119 |
| D1094 | VHD1SS119//-1 | D1SS119 |
| D1095 | VHD1SS119//-1 | D1SS119 |
| D1801 | VHD1SS119//-1 | D1SS119 |
| D1802 | RH-EX1393CEZZ | Zener, EX1393CE |
| D1803 | RH-EX1393CEZZ | Zener, EX1393CE |
| VA701 | RH-VX0073CEZZ | Varistor |
| **PACKAGED CIRCUITS** | | |
| NR701 | RH-HXA013WJZZ | Thermistor |
| ⚠PR701 | RMPTP0085CEZZ | Packaged Circuit |
| X801 | RCRSAA010WJZZ | Crystal Oscillator |
| **FILTERS AND COILS** | | |
| CF201 | RFILC0447CEZZ | Ceramic Filter |
| CF802 | RFILC0446CEZZ | Ceramic Filter |
| L203 | VP-DF270K0000 | Peaking 27 μH |
| L204 | VP-XF1R2K0000 | Peaking 1.2 μH |
| L602 | RCILP0223CEZZ | Coil 3.3 μH |
| ⚠L701 | RCILFA060WJZZ | Coil |
| L751 | RCILP0179CEZZ | Coil |
| L801 | VP-DF100K0000 | Peaking 10 μH |
| L802 | VP-DF100K0000 | Peaking 10 μH |
| L803 | VP-DF100K0000 | Peaking 10 μH |
| L804 | VP-XF150K0000 | Peaking 15 μH |
| L806 | VP-DF100K0000 | Peaking 10 μH |
| L807 | VP-XF1R2K0000 | Peaking 1.2 μH |
| SF201 | RFILCA045WJPZ | SAW Filter |
| **TRANSFORMERS** | | |
| ▲⚠T602 | RTRNFA113WJZZ | H-Volt Transformer |
| ⚠T603 | RTRNZA058WJZZ | Transformer |
| ⚠T701 | RTRNWA193WJZZ | Transformer |
| **CAPACITORS** | | |
| *[EL. …Electrolytic, M-Poly. …Metalized Polypro Film]* | | |
| C201 | VCEA0A1CW476M | 47, 16V EL. |
| C202 | VCEA0A0JW108M | 1000, 6.3V EL. |
| C203 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C205 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C206 | VCEA0A1HW106M | 10, 50V EL. |
| C207 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C208 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C209 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C210 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C213 | VCKYCY1HB102K | 1000p, 50V Ceramic |
| C301 | VCEA0A1CW477M | 470, 16V EL. |
| C304 | VCEA9M1CW106M | 10, 16V EL. |
| C308 | VCKYCY1HB822K | 8200, 50V Ceramic |
| C310 | VCEA0A1HW105M | 1, 50V EL. |
| C311 | VCEA0A1HW105M | 1, 50V EL. |
| C312 | VCEA0A1HW335M | 3.3, 50V EL. |
| C313 | VCKYCY1HB822K | 8200, 50V Ceramic |
| C318 | VCEA0A1CW107M | 100, 16V EL |
| C321 | VCEA0A1HW335M | 3.3, 50V EL. |
| C322 | VCEA0A1HW105M | 1, 50V EL. |
| C391 | VCKYPA1HB102K | 1000p, 50V Ceramic |
| C392 | VCQYTA1HM103J | 0.01, 50V Ceramic |
| C393 | VCEA0A1EW108M | 1000, 25V EL. |
| C437 | VCE9GA1HW106M | 10, 50V EL. |
| C438 | VCEA0A1CW106M | 10, 16V EL. |
| C439 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C451 | VCEA0A1CW477M | 470, 16V EL. |
| C505 | VCEA0A1HW107M | 100, 50V EL. |
| C508 | VCFYAA2AA224J | 0.22, 100V M-Poly. |
| C511 | VCEA0A1VW477M | 470, 35V EL. |
| C512 | VCKYPA2HB102K | 1000p, 500V Ceramic |
| C513 | RC-EZA332WJZZ | EZA332WJ |
| C515 | VCEACA1HC335J | 3.3, 50V EL. |
| C601 | VCQYTA1HM563J | 0.056, 50V Mylar |
| C602 | VCEA0A1HW475M | 4.7, 50V EL. |
| C603 | VCEA0A1HW105M | 1, 50V EL. |
| C604 | VCEA0A2EW336M | 33, 250V EL. |
| C606 | VCKYPA2HB102K | 1000p, 500V Ceramic |
| ▲⚠C607 | VCFPVC3ZA972H | 9700p, 1800V M-Poly. |
| C608 | VCQYTA2AA103K | 0.01, 100V Mylar |
| C610 | VCEA0A1EW227M | 220, 25V EL. |
| C611 | VCFPVC2DB334J | 0.33, 200V M-Poly |
| C642 | VCEA0A1EW476M | 47, 25V EL. |
| C643 | VCEA0A1CW477M | 470, 16V EL. |
| C650 | VCKYPA2HB101K | 100p, 500V Ceramic |
| ⚠C701 | RC-FZ029SCEZZ | 0.22, 275V M-Poly. |
| C702 | RC-KZ0029CEZZ | 0.01, 250V Ceramic |
| C703 | RC-KZ0029CEZZ | 0.01, 250V Ceramic |
| C704 | RC-KZ0029CEZZ | 0.01, 250V Ceramic |
| ⚠C705 | RC-EZA533WJZZ | 220, 400V EL. |
| C706 | VCEA0A1HW336M | 33, 50V EL. |
| C708 | VCKYPA1HB221K | 220p, 50V Ceramic |
| C709 | VCKYPA1HB103K | 0.01, 50V Ceramic |
| C710 | VCFYFA1HA103J | 0.01, 50V M-Poly |
| C711 | VCKYPA1HB472K | 4700p, 50V Ceramic |
| C719 | VCFYFA1HA105J | 1, 50V M-Poly |
| C743 | VCKYPH3DB561K | 560p, 2kV Ceramic |
| ⚠C750 | VCKYPA2HB102K | 1000p, 500V Ceramic |
| ⚠C751 | RC-KZ0102GEZZ | 680p, AC250V Porcelain |
| C752 | VCKYPH3DB561K | 560p, 2kV Ceramic |
| C753 | RC-EZA523WJZZ | 100, 160V EL. |
| C754 | RC-EZA522WJZZ | 33, 160V EL. |
| C755 | VCQYTA1HM103J | 0.01, 50V Mylar |
| C756 | VCEA0A1EW228M | 2200, 25V EL. |
| C757 | VCKYCY1HB471K | 470p, 50V Ceramic |

| Ref. No. | Part No. | Description |
|---|---|---|
| **PWB-A: DUNTKD373WEA0 MAIN UNIT (Continued)** | | |
| C784 | RC-KZ1018CEZZ | 1000p, 2kV Ceramic |
| C801 | VCFYFA1HA105J | 1, 50V M-Poly. |
| C802 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C803 | VCEA9M1CW476M | 47, 16V EL. |
| C804 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C805 | VCEA0A1HW105M | 1, 50V EL. |
| C806 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C807 | VCEA0A1CW337M | 330, 16V EL. |
| C808 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C809 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C810 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C811 | VCEA9M1CW106M | 10, 16V EL. |
| C814 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C815 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C816 | VCKYCY1EF104Z | 0.1, 25V Ceramic |
| C817 | VCEA9M1CW107M | 100, 16V EL. |
| C818 | VCEA9M1HW475M | 4.7, 50V EL. |
| C819 | VCCCCY1HH220J | 22p, 50V Ceramic |
| C820 | VCEA9M1HW474M | 0.47, 50V EL. |
| C821 | VCKYCY1HF153Z | 0.015, 50V Ceramic |
| C822 | VCE9GA1HW105M | 1, 50V EL. |
| C823 | VCKYCY1EF104Z | 0.1, 25V Ceramic |
| C824 | VCEA0A1CW337M | 330, 16V EL. |
| C825 | VCE9GA1HW105M | 1, 50V EL. |
| C826 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C827 | VCEA0A1CW476M | 47, 16V EL. |
| C828 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C829 | VCEA9M1CW476M | 47, 16V EL. |
| C830 | VCKYCY1CF224Z | 0.22, 16V Ceramic |
| C832 | VCKYCY1CF224Z | 0.22, 16V Ceramic |
| C834 | VCEA0A1CW107M | 100, 16V EL. |
| C835 | VCEA0A1CW106M | 10, 16V EL. |
| C836 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C837 | VCEA0A1HW105M | 1, 50V EL. |
| C839 | VCCCCY1HH680J | 68p, 50V, Ceramic |
| C840 | VCFYFA1HA105J | 1, 50V M-Poly. |
| C841 | VCCCCY1HH101J | 100p, 50V Ceramic |
| C842 | VCEA0A1HW474M | 0.47, 50V EL. |
| C843 | VCEA0A1HW105M | 1, 50V EL. |
| C845 | VCKYCY1CF224Z | 0.22, 16V Ceramic |
| C846 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C847 | VCCCCY1HH220J | 22p, 50V Ceramic |
| C848 | VCEA9M1HW105M | 1, 50V EL. |
| C1001 | VCEA0A0JW107M | 100, 6.3V EL. |
| C1003 | VCEA0A1CW226M | 22, 16V EL. |
| C1004 | VCKYCY1CF474Z | 0.47, 16V Ceramic |
| C1006 | VCEA0A1HW225M | 2.2, 50V EL. |
| C1007 | VCEA0A1CW107M | 100, 16V EL. |
| C1008 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C1009 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C1011 | VCKYCY1HB221K | 220p, 50V Ceramic |
| C1012 | VCEA0A1HW105M | 1, 50V EL. |
| C1013 | VCKYCY1HB102K | 1000p, 50V Ceramic |
| C1014 | VCE9GA1HW475M | 4.7, 50V EL. |
| C1015 | VCCCPA1HH101J | 100p, 50V Ceramic |
| C1016 | VCKYCY1EF104Z | 0.1, 25V Ceramic |
| C1020 | VCEA0A0JW477M | 470, 6.3V EL. |
| C1081 | VCQYTA1HM104J | 0.1, 50V Mylar |
| C1849 | VCFYFA1HA223J | 0.022, 50V M-Poly. |
| C1855 | VCKYCY1HB561K | 560p, 50V Ceramic |
| C1856 | VCKYCY1HB102K | 1000p, 50V Ceramic |
| C1868 | VCEA9M1CW336M | 33, 16V EL. |

**RESISTORS**

*[M-Ox. …Metal Oxide, M-Film …Metal Film]*

| | | |
|---|---|---|
| RJ15 | VRS-CY1JF000J | 0, 1/16W M-Ox. |
| RJ16 | VRS-CY1JF000J | 0, 1/16W M-Ox. |
| RJ18 | VRS-CY1JF000J | 0, 1/16W M-Ox. |
| RJ19 | VRS-CY1JF000J | 0, 1/16W M-Ox. |
| RJ26 | VRS-CY1JF000J | 0, 1/16W M-Ox. |
| RJ33 | VRS-CY1JF000J | 0, 1/16W M-Ox. |
| RJ37 | VRS-CY1JF000J | 0, 1/16W M-Ox. |
| RJ39 | VRS-CY1JF000J | 0, 1/16W M-Ox. |
| R201 | VRS-CY1JF101J | 100, 1/16W M-Ox. |
| R202 | VRS-CY1JF101J | 100, 1/16W M-Ox. |
| R205 | VRS-CY1JF680J | 68, 1/16W M-Ox. |
| R206 | VRS-CY1JF122J | 1.2k, 1/16W M-Ox. |
| R207 | VRS-CY1JF221J | 220, 1/16W M-Ox. |
| R208 | VRS-CY1JF331J | 330, 1/16W M-Ox. |
| R209 | VRS-CY1JF392J | 3.9k, 1/16W M-Ox. |
| R216 | VRS-VV3LB333J | 33k, 3W, M-Ox. |
| R220 | VRS-CY1JF221J | 220, 1/16W M-Ox. |
| R301 | VRD-RA2BE102J | 1k, 1/8W Carbon |
| R302 | VRN-VV3DBR47J | 0.47, 2W M-Film |
| R303 | VRS-CY1JF473J | 47k, 1/16W M-Ox. |
| R304 | VRD-RA2BE683J | 68k, 1/8W Carbon |
| R305 | VRS-CY1JF274J | 270k, 1/16W M-Ox. |
| R307 | VRS-CY1JF222J | 2.2k, 1/16W M-Ox. |
| R308 | VRS-CY1JF392J | 3.9k, 1/16W M-Ox. |
| R311 | VRD-RA2BE103J | 10k, 1/8W Carbon |
| R314 | VRS-CY1JF392J | 3.9k, 1/16W M-Ox. |
| R315 | VRS-CY1JF222J | 2.2k, 1/16W M-Ox. |
| R362 | VRS-CY1JF332J | 3.3k, 1/16W M-Ox. |
| R363 | VRS-CY1JF564J | 560k, 1/16W M-ox. |
| R365 | VRS-CY1JF564J | 560k, 1/16W M-ox. |
| R366 | VRS-CY1JF332J | 3.3k, 1/16W M-Ox. |
| R381 | VRS-CY1JF564J | 560k, 1/16W M-ox. |
| R382 | VRD-RA2BE332J | 3.3k, 1/8W Carbon |
| R383 | VRS-CY1JF564J | 560k, 1/16W M-ox. |
| R384 | VRD-RA2BE332J | 3.3k, 1/8W Carbon |
| R391 | VRN-VV3ABR22J | 0.22, 1W M-Film |
| R431 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R432 | VRS-CY1JF750J | 75, 1/16W M-Ox. |
| R436 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R458 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R459 | VRD-RA2EE750J | 75, 1/4W Carbon |
| R461 | VRS-CY1JF750J | 75, 1/16W M-Ox. |
| R462 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R501 | VRD-RA2BE103J | 10k, 1/8W Carbon |
| R503 | VRN-VV3DB1R2J | 1.2, 2W M-Film |
| R504 | VRS-CY1JF222J | 2.2, 1/16W M-Ox. |
| R506 | VRS-VV3AB331J | 330, 1W M-Ox. |
| R507 | VRD-RM2HD1R0J | 1, 1/2W Carbon |
| R513 | VRD-RM2HD333J | 33k, 1/2W Carbon |
| R514 | VRD-RM2HD682J | 6.8k, 1/2W Carbon |
| R520 | VRS-CY1JF153J | 15k, 1/16W M-Ox. |

| Ref. No. | Part No. | Description |
|---|---|---|
| **PWB-A: DUNTKD373WEA0 MAIN UNIT (Continued)** | | |
| R524 | VRD-RA2BE103J | 10k, 1/8W Carbon |
| R525 | VRD-RA2BE102J | 1k, 1/8W Carbon |
| R526 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R601 | VRD-RM2HD270J | 27, 1/2W Carbon |
| R602 | VRD-RA2BE393J | 39k, 1/8W Carbon |
| R603 | VRD-RA2BE393J | 39k, 1/8W Carbon |
| R604 | VRD-RA2BE473J | 47k, 1/8W Carbon |
| R605 | VRD-RM2HD104J | 100k, 1/2W Carbon |
| R606 | VRN-VV3LBR22J | 0.22, 3W M-Film |
| ⚠R608 | VRD-RM2HD102J | 1k, 1/2W Carbon |
| ⚠R609 | VRD-RM2HD270J | 27, 1/2W Carbon |
| ⚠R611 | VRN-VV3AB1R5J | 1.5, 1W M-Film |
| R612 | VRD-RM2HD270J | 27, 1/2W Carbon |
| R614 | VRD-RA2BE154J | 150k, 1/8W Carbon |
| R615 | VRD-RA2BE102J | 1k, 1/8W Carbon |
| R616 | VRD-RA2BE102J | 1k, 1/8W Carbon |
| R617 | VRS-CY1JF123J | 12k, 1/16W M-Ox. |
| R618 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R621 | VRN-SV2HC4R7J | 4.7, 1/2W M-Film |
| R622 | VRS-VV3DB682J | 6.8k, 2W M-Ox. |
| R631 | VRS-KT3LB391J | 390, 3W M-Ox. |
| R637 | VRD-RA2BE331J | 330, 1/8W Carbon |
| R638 | VRD-RA2BE181J | 180, 1/8W Carbon |
| R639 | VRD-RM2HD271J | 270, 1/2W Carbon |
| R642 | VRN-VV3DB2R2J | 2.2, 2W Carbon |
| R661 | VRD-RA2BE102J | 1k, 1/8W Carbon |
| R662 | VRD-RA2BE103J | 10k, 1/8W Carbon |
| R702 | VRN-VV3DB124J | 120k, 2W M-Film |
| R704 | VRD-RA2BE221J | 220, 1/8W Carbon |
| R705 | VRN-VV3DBR82J | 0.82, 2W M-Film |
| R706 | VRN-VV3DBR22J | 0.22, 2W M-Film |
| R710 | VRD-RM2HD1R0J | 1, 1/2W Carbon |
| R720 | VRD-RA2EE472J | 4.7k, 1/4W Carbon |
| R722 | VRD-RA2BE153J | 15k, 1/8W Carbon |
| R726 | VRN-SV2HCR47J | 0.47, 1/2W M-Film |
| R733 | VRD-RA2BE273J | 27k, 1/8W Carbon |
| ⚠R751 | RR-HZ0014GEZZY | 12M, 1W Solid |
| R753 | VRD-RM2HD124J | 120k, 1/2W Carbon |
| R754 | VRN-VV3AB8R2J | 8.2, 1W M-Film |
| R756 | VRS-VV3DB121J | 120, 2W M-Ox. |
| R801 | VRS-CY1JF561J | 560, 1/16W M-Ox. |
| R802 | VRS-CY1JF682J | 6.8k, 1/16W M-Ox. |
| R803 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R804 | VRS-CY1JF222J | 2.2k, 1/16W M-Ox. |
| R805 | VRS-CY1JF222J | 2.2k, 1/16W M-Ox. |
| R806 | VRS-CY1JF222J | 2.2k, 1/16W M-Ox. |
| R807 | VRS-CY1JF222J | 2.2k, 1/16W M-Ox. |
| R808 | VRD-RA2BE273J | 27k, 1/8W Carbon |
| R812 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R814 | VRS-CY1JF473J | 47k, 1/16W M-Ox. |
| R815 | VRS-CY1JF473J | 47k, 1/16W M-Ox. |
| R816 | VRS-CY1JF223J | 22k, 1/16W M-Ox. |
| R817 | VRS-CY1JF473J | 47k, 1/16W M-Ox. |
| R821 | VRS-CY1JF182J | 1.8k, 1/16W M-ox. |
| R823 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R824 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R826 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R827 | VRD-RA2BE472J | 4.7k, 1/8W Carbon |
| R828 | VRS-CY1JF471J | 470, 1/16W M-Ox. |
| R829 | VRD-RA2BE472J | 4.7k, 1/8W Carbon |
| R830 | VRS-CY1JF393J | 39k, 1/16W M-Ox. |
| R831 | VRS-CY1JF271J | 270, 1/16W M-Ox. |
| R832 | VRS-CY1JF822J | 8.2k, 1/16W M-Ox. |
| R833 | VRS-CY1JF221J | 220, 1/16W M-Ox. |
| R835 | VRS-CY1JF332J | 3.3k, 1/16W M-Ox. |
| R836 | VRD-RA2BE470J | 47, 1/8W Carbon |
| R837 | VRD-RM2HD151J | 150, 1/2W Carbon |
| R838 | VRD-RA2BE105J | 1M, 1/8W Carbon |
| R839 | VRS-CY1JF101J | 100, 1/16W M-Ox. |
| R840 | VRS-CY1JF124J | 120k, 1/16W M-Ox. |
| R841 | VRD-RA2BE821J | 820, 1/8W Carbon |
| R842 | VRS-CY1JF471J | 470, 1/16W M-Ox. |
| R843 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R846 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R847 | VRS-CY1JF475J | 4.7M, 1/16W M-Ox. |
| R1002 | VRS-CY1JF183J | 18k, 1/16W M-Ox. |
| R1003 | VRS-CY1JF822J | 8.2k, 1/16W M-Ox. |
| R1004 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R1006 | VRS-CY1JF822J | 8.2k, 1/16W M-Ox. |
| R1007 | VRD-RA2BE103J | 10k, 1/8W Carbon |
| R1008 | VRS-CY1JF183J | 18k, 1/16W M-Ox. |
| R1009 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1011 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R1013 | VRD-RA2BE391J | 390, 1/8W Carbon |
| R1023 | VRS-CY1JF271J | 270, 1/16W M-Ox. |
| R1024 | VRS-CY1JF101J | 100, 1/16W M-Ox. |
| R1027 | VRS-CY1JF104J | 100k, 1/16W M-Ox. |
| R1031 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R1032 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1034 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1035 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R1036 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1037 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1038 | VRS-CY1JF562J | 5.6k, 1/16W M-Ox. |
| R1039 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R1040 | VRD-RA2BE273J | 27k, 1/8W Carbon |
| R1041 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1042 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R1043 | VRS-CY1JF104J | 100k, 1/16W M-Ox. |
| R1044 | VRS-CY1JF101J | 100, 1/16W M-Ox. |
| R1045 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R1046 | VRS-CY1JF101J | 100, 1/16W M-Ox. |
| R1047 | VRS-CY1JF183J | 18k, 1/16W M-Ox. |
| R1048 | VRS-CY1JF101J | 100, 1/16W M-Ox. |
| R1049 | VRS-CY1JF183J | 18k, 1/16W M-Ox. |
| R1051 | VRD-RA2BE473J | 47k, 1/8W Carbon |
| R1054 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R1055 | VRD-RA2BE332J | 3.3k, 1/8W Carbon |
| R1056 | VRS-CY1JF332J | 3.3k, 1/16W M-Ox. |
| R1058 | VRD-RA2BE103J | 10k, 1/8W Carbon |
| R1061 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R1062 | VRS-CY1JF105J | 1M, 1/16W M-Ox. |

| Ref. No. | Part No. | Description |
|---|---|---|
| **PWB-A: DUNTKD373WEA0 MAIN UNIT (Continued)** | | |
| R1063 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1064 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1065 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1066 | VRS-CY1JF561J | 560, 1/16W M-Ox. |
| R1072 | VRS-CY1JF221J | 220, 1/16W M-Ox. |
| R1073 | VRD-RA2BE101J | 100, 1/8W Carbon |
| R1074 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1076 | VRD-RA2BE102J | 1k, 1/8W Carbon |
| R1081 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1096 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1097 | VRS-CY1JF472J | 4.7k, 1/16W M-Ox. |
| R1098 | VRS-CY1JF104J | 100k, 1/16W M-Ox. |
| R1801 | VRD-RA2BE222J | 2.2k, 1/8W Carbon |
| R1802 | VRS-CY1JF124J | 120k, 1/16W M-Ox. |
| R1850 | VRS-CY1JF472J | 4.7k, 1/16W M-Ox. |
| R1851 | VRS-CY1JF221J | 220, 1/16W M-Ox. |
| R1852 | VRS-CY1JF221J | 220, 1/16W M-Ox. |
| R1853 | VRS-CY1JF221J | 220, 1/16W M-Ox. |
| R1854 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R1855 | VRD-RA2BE122J | 1.2k, 1/8W Carbon |
| R1894 | VRD-RA2BE103J | 10k, 1/8W Carbon |
| R1895 | VRS-CY1JF473J | 47k, 1/16W Carbon |
| R1896 | VRS-CY1JF473J | 47k, 1/16W Carbon |
| | **SWITCHES** | |
| S1001 | QSW-K0003AJZZ | Switch, CH-Up |
| S1002 | QSW-K0003AJZZ | Switch, CH-Down |
| S1003 | QSW-K0003AJZZ | Switch, VOL-Up |
| S1004 | QSW-K0003AJZZ | Switch, VOL-Down |
| S1005 | QSW-K0003AJZZ | Switch, MENU |
| S701 | QSW-P0612CEZZ | Switch, Power |
| | **MISCELLANEOUS PARTS** | |
| ⚠F701 | QFS-B0102PFZZ | Fuse, T3.15A |
| ⚠FH701 | QFSHD1013CEZZ | Fuse Holder |
| ⚠FH702 | QFSHD1014CEZZ | Fuse Holder |
| J402 | QJAKE0210CE04 | Jack, Video IN |
| J403 | QJAKE0210CE09 | Jack, L-Audio IN |
| J404 | QJAKE0210CE02 | Jack, R-Audio IN |
| J405 | QTANJ0644CEZZ | Rear AV IN/OUT |
| P302 | QPLGN0441CEZZ | Plug, 4-pin (S) |
| P601 | QPLGN0660CEZZ | Plug, 6-pin (F) |
| P602 | QPLGN0441CEZZ | Plug, 4-pin (H) |
| P603 | QPLGN0341CEZZ | Plug, 3-pin (TP651~3) |
| P701 | QPLGN0260CEZZ | Plug, 2-pin (M) |
| P702 | QPLGN0269GEZZ | Plug, 2-pin |
| P1001 | QPLGNA110WJZZ | Plug, 5-pin (K) |
| P1002 | QPLGNA110WJZZ | Plug, 5-pin (BC) |
| RDA301 | PRDARA121WJFW | S-Out Heatsink |
| RDA501 | PRDARA120WJFW | V-Out Heatsink |
| RDA601 | PRDARA181WJFW | IC601 Heatsink |
| RDA602 | PRDAR0337PEFW | Horizontal Heatsink |
| RDA701 | PRDARA119WJFW | Power Heatsink |
| RMC1001 | RRMCUA022WJZZ | R/C Receiver |
| RY701 | RRLYJ0089CEZZ | Relay |
| | LHLDP1066PE00 | LED Holder |
| | LX-BZ3100CEF7 | Screw |
| | LX-BZ3049GEF7 | Screw |
| | LHLDW1047PEZZ | Wire Holder |

## PWB-B: DUNTKA599WEI1 CRT UNIT

| Ref. No. | Part No. | Description |
|---|---|---|
| | **TRANSISTORS** | |
| Q853 | RH-TX0110BMZZ | TX0110BM |
| Q854 | RH-TX0110BMZZ | TX0110BM |
| Q855 | RH-TX0110BMZZ | TX0110BM |
| Q894 | VS2SA1015Y/1E | 2SA1015Y |
| | **DIODES** | |
| D859 | VHD1SS119//-1 | D1SS119 |
| D898 | VHD1SS119//-1 | D1SS119 |
| | **COIL** | |
| L851 | VP-MK820K0000 | Peaking 82 μH |
| | **CAPACITORS** | |
| | *[EL. …Electrolytic]* | |
| C851 | VCKYPA1HB271K | 220p, 50V Ceramic |
| C852 | VCKYPA1HB271K | 220p, 50V Ceramic |
| C853 | VCKYPA1HB271K | 220p, 50V Ceramic |
| C880 | RC-KZ0153CEZZ | 0.001, 3.15kV Ceramic |
| C893 | VCEA0A1CW336M | 33, 16V EL. |
| | **RESISTORS** | |
| | *[M-Ox. …Metal Oxide]* | |
| R849 | VRD-RA2BE331J | 330, 1/8W Carbon |
| R850 | VRD-RA2BE470J | 47, 1/8W Carbon |
| R851 | VRD-RA2BE470J | 47, 1/8W Carbon |
| R852 | VRD-RA2BE470J | 47, 1/8W Carbon |
| R854 | VRD-RA2BE391J | 390, 1/8W Carbon |
| R855 | VRD-RA2BE391J | 390, 1/8W Carbon |
| ⚠R859 | VRS-VV3DB153J | 15k, 2W M-Ox. |
| ⚠R861 | VRS-VV3DB153J | 15k, 2W M-Ox. |
| ⚠R863 | VRS-VV3DB153J | 15k, 2W M-Ox. |
| R864 | VRD-RA2BE470J | 47, 1/8W Carbon |
| R876 | VRD-RA2BE121J | 120, 1/8W Carbon |
| R877 | VRD-RA2BE121J | 120, 1/8W Carbon |
| R878 | VRD-RA2BE121J | 120, 1/8W Carbon |
| R880 | VRD-RM2HD332J | 3.3k, 1/2W Carbon |
| R881 | VRD-RM2HD332J | 3.3k, 1/2W Carbon |
| R882 | VRD-RM2HD332J | 3.3k, 1/2W Carbon |
| R889 | VRD-RA2BE821J | 820, 1/8W Carbon |
| R891 | VRD-RA2BE561J | 560, 1/8W Carbon |
| R892 | VRD-RA2BE391J | 390, 1/8W Carbon |
| R894 | VRD-RA2BE152J | 1.5k, 1/8W Carbon |
| R895 | VRD-RA2BE561J | 560, 1/8W Carbon |
| | **MISCELLANEOUS PARTS** | |
| P860 | QPLGN0441CEZZ | Plug, 4-pin (H) |
| P880 | QPLGNA110WJZZ | Plug, 5-pin (K) |
| SC851 | QSOCV0933CEZZ | CRT Socket |

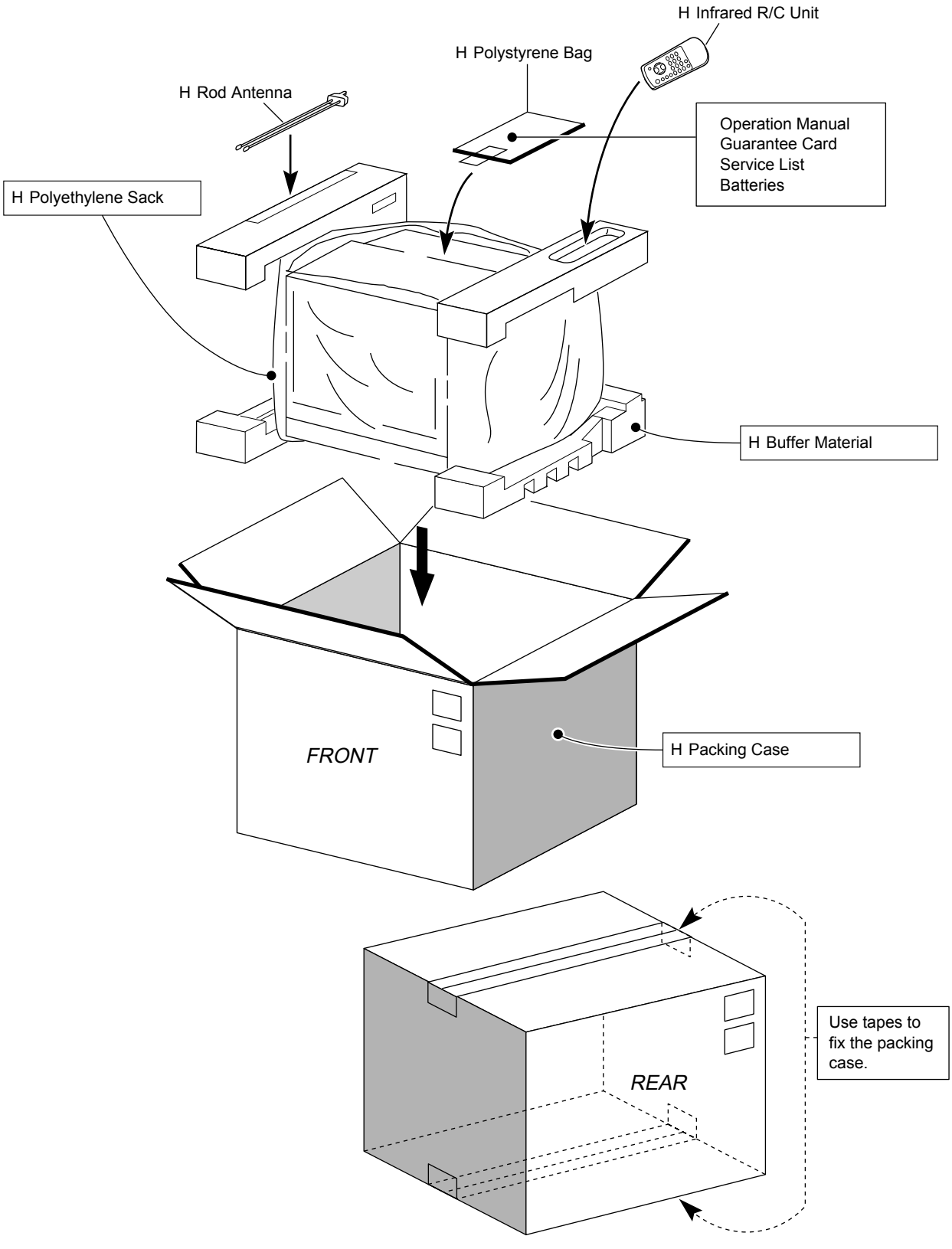
## PWB-C: DUNTKC574WEA3 MTS UNIT

| Ref. No. | Part No. | Description |
|---|---|---|
| | **INTEGRATED CIRCUITS** | |
| IC3001 | VHICXA2194Q-1S | CXA2194Q |
| | **TRANSISTORS** | |
| Q3001 | VS2SD601AR/-1 | 2SD601AR |
| Q3002 | VS2SD601AR/-1 | 2SD601AR |
| Q3004 | VS2SD601AR/-1 | 2SD601AR |
| Q3005 | VS2SD601AR/-1 | 2SD601AR |
| Q3006 | VS2SD601AR/-1 | 2SD601AR |
| Q3007 | VS2SD601AR/-1 | 2SD601AR |
| | **CAPACITORS** | |
| | *[EL. …Electrolytic]* | |
| C3001 | VCE9GA1HW475M | 4.7, 50V EL. |
| C3002 | VCKYCY1HB562K | 5600p, 50V Ceramic |
| C3003 | VCQYTA1HM123K | 0.012, 50V Mylar |
| C3004 | VCEA0A1HW105M | 1, 50V EL. |
| C3005 | VCEA0A1HW475M | 4.7, 50V EL. |
| C3006 | VCEA0A1CW106M | 10, 16V EL. |
| C3007 | VCEA0A1HW475M | 4.7, 50V EL. |
| C3008 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C3009 | VCEA0A1CW227M | 220, 16V EL. |
| C3010 | VCE9GA1HW475M | 4.7, 50V EL. |
| C3011 | VCEA0A1HW475M | 4.7, 50V EL. |
| C3012 | VCE9GA1HW475M | 4.7, 50V EL. |
| C3013 | VCKYCY1HB272K | 2700p, 50V Ceramic |
| C3014 | VCQYTA1HM473K | 0.047, 50V Mylar |
| C3015 | VCEACA1HC335K | 3.3, 50V EL. |
| C3016 | VCE9GA1HW475M | 4.7, 50V EL. |
| C3017 | VCEACA1CC106K | 10, 16V EL. |
| C3018 | VCEA0A1HW105M | 1, 50V EL. |
| C3019 | VCEA0A1CW106M | 10, 16V EL. |
| C3020 | VCEA0A1CW106M | 10, 16V EL. |
| C3021 | VCEA0A1CW106M | 10, 16V EL. |
| C3022 | VCEA0A1CW106M | 10,16V EL. |
| C3023 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C3024 | VCKYCY1HF103Z | 0.01, 50V Ceramic |
| C3025 | VCKYCY1HF473Z | 0.047, 50V Ceramic |
| C3026 | VCKYCY1HF473Z | 0.047, 50V Ceramic |
| C3030 | VCQYTA1HM682K | 6800p, 50V Mylar |
| C3031 | VCKYCY1HF682Z | 6800p, 50V Mylar |
| C3034 | VCEA0A1HW224M | 0.22, 50V EL. |
| C3037 | VCEA0A1HW335M | 3.3, 50V EL. |
| C3038 | VCEA0A1HW335M | 3.3, 50V EL. |
| C3039 | VCEA0A1HW224M | 0.22, 50V EL. |
| C3042 | VCKYCY1HB681K | 680p, 50V Ceramic |
| C3043 | VCKYCY1HB681K | 680p, 50V Ceramic |
| C3044 | VCEA0A1EW476M | 47, 25V EL. |
| C3045 | VCEA0A1HW335M | 3.3, 50V EL. |
| C3046 | VCEA0A1HW335M | 3.3, 50V EL. |
| C3047 | VCEA0A1HW335M | 3.3, 50V EL. |
| C3048 | VCEA0A1HW335M | 3.3, 50V EL. |

| Ref. No. | Part No. | Description |
|---|---|---|
| **PWB-C: DUNTKC574WEA3 MTS UNIT (Continued)** | | |
| | **RESISTORS** | |
| | *[M-Ox. …Metal Oxide]* | |
| RJ101 | VRS-CY1JF000J | 0, 1/16W M-Ox. |
| R3001 | VRS-CY1JF221J | 220, 1/16W M-Ox. |
| R3002 | VRS-CY1JF221J | 220, 1/16W M-Ox. |
| R3003 | VRS-CY1JF105J | 1M, 1/16W M-Ox. |
| R3004 | VRS-CY1JF104J | 0.1M, 1/16W M-Ox. |
| R3005 | VRS-CY1JF623J | 62k, 1/16W M-Ox. |
| R3007 | VRS-CY1JF332J | 3.3k, 1/16W M-Ox. |
| R3008 | VRS-CY1JF302J | 3k, 1/16W M-Ox. |
| R3010 | VRS-CY1JF392J | 3.9k, 1/16W M-Ox. |
| R3011 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3012 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3013 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3014 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3016 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3018 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3019 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3021 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3026 | VRS-CY1JF331J | 330, 1/16W M-Ox. |
| R3027 | VRS-CY1JF392J | 3.9k, 1/16W M-Ox. |
| R3028 | VRS-CY1JF683J | 68k, 1/16W M-Ox. |
| R3029 | VRS-CY1JF392J | 3.9k, 1/16W M-Ox. |
| R3030 | VRS-CY1JF683J | 68k, 1/16W M-Ox. |
| R3031 | VRS-CY1JF182J | 1.8k, 1/16W M-Ox. |
| R3032 | VRS-CY1JF223J | 22k, 1/16W M-Ox. |
| R3033 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3034 | VRS-CY1JF182J | 1.8k, 1/16W M-Ox. |
| R3035 | VRS-CY1JF223J | 22k, 1/16W M-Ox. |
| R3036 | VRS-CY1JF102J | 1k, 1/16W M-Ox. |
| R3082 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R3083 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R3084 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| R3085 | VRS-CY1JF103J | 10k, 1/16W M-Ox. |
| | **MISCELLANEOUS PARTS** | |
| P3007 | QPLGZ0610CEZZ | Plug, 6-pin (EA) |
| P3008 | QPLGZ0610CEZZ | Plug, 6-pin (EC) |
| P3009 | QPLGZ0810CEZZ | Plug, 8-pin (EB) |

| Ref. No. | Part No. | Description |
|---|---|---|
| | **MISCELLANEOUS PARTS** | |
| ⚠ | QACCZA050WJPZ | AC Cord |
| | VSP9050PB53WA | Speaker |
| | LANGSA010WJZZ | Speaker Bracket |
| | LBNDC0001PFZZ | Wire Holder |
| | LHLDK0012PEZZ | AC Cord Holder |
| | LHLDW1047PEZZ | Wire Holder |
| | LHLDW1060PEZZ | Wire Holder |
| | LHLDZ0063PEZZ | H/V Holder |
| | LX-TZ3004CEFD | Screw |
| | QCNW-A871WJZZ | "YBN" Wire |
| | QCNW-A872WJZZ | "GBN" Wire |
| | QCNW-A873WJZZ | Speaker Wire |
| | TLABHA102WJZZ | Bar Code Sticker |
| | TLABMC222WJZZ | Model Label |
| | TLABN0106PFZZ | Serial No. Sticker |
| | XTASD40P12000 | Speaker Screw |
| | XTRSD60P35000 | CRT Screw |
| | XWHSD80-18170 | CRT Washer |
| | XWHSD87-10170 | CRT Washer |
| | **SUPPLIED ACCESSORIES** | |
| | QANTD2001PJZZ | Dipole Antenna |
| | RRMCGA257WJSB | Remote Control |
| | RTRNZ0004PJZZ | Antenna Adaptor |
| | TINSEA105WJZZ | Operation Manual |
| | UBATC0001PJZZ | AA SHD Battery |
| | **PACKING PARTS (NOT REPLACEMENT ITEMS)** | |
| | SPAKCC299WJZZ | Packing Case |
| | SPAKAA233WJZZ | P-Add (top) |
| | SPAKAA234WJZZ | P-Add (bottom) |
| | SSAKA0172PFZZ | Polybag |
| | SSAKH0207PJZZ | Polybag for Unit |
| | **CABINET PARTS** | |
| | CCABAB176WEA3 | Front Cab Assy |
| | GCABAB176WJSB | Front Cabinet |
| | HBDGB0206PJSA | Sharp Badge |
| | HDECQA593WJZZ | R/C LED Lens |
| | JBTN-A514WJSA | Power Button |
| | JBTNC0106PJSB | Control Button B |
| | JBTNC0112PJSA | Control Button A |
| | LX-TZ3004CEFD | Screw for Button |
| | MSPRC0005PEFW | Spring (Pow But) |
| | PCUSF0022PJZZ | U/D Mask Spacer |
| | PSPAH0156PE00 | L/R Mask Spacer |
| | GCABBA688WJSA | Rear Cabinet |
| | HINDPB513WJZZ | Indication Plate |
| | LHLDW1047PEZZ | Wire Holder |
| | LX-TZ3004CEFD | Screw |
| | XTASD40P20000 | Screw |

# PACKING OF THE SET




MARK H : Not replacement items.

SHARP

| I. NAKAMURA | M. GABIT | A. UGALDE | A. CALING | 1 | |
|---|---|---|---|---|---|
| Noted | Approved | Checked | Prepared | Issue No. | Date |

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|---|
| Received by |