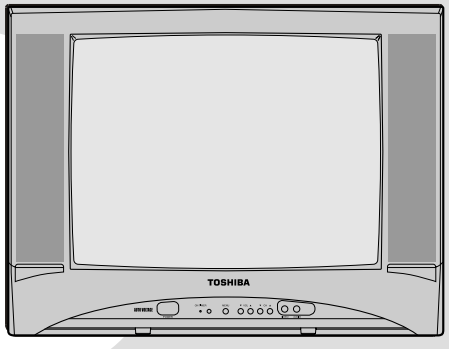
TOSHIBA

FILE NO. 050-200337

SERVICE MANUAL

COLOR TELEVISION

20AR33



DOCUMENT CREATED IN JAPAN, Aug., 2003

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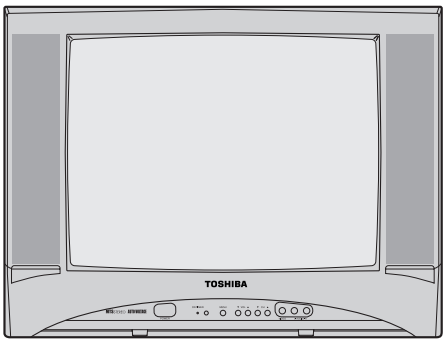


COLOR TELEVISION

Chassis No. MSA

MODELS 20AR33

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.

CONTENTS

ELECTRICAL SPECIFICATIONS

POWER INPUT ..... 110-220 V AC 50/60 Hz
POWER RATING
20AR33..... 79 W

PICTURE SIZE ..... 1,192 cm^2 (185sq inch)
CONVERGENCE ..... Magnetic
SWEEP DEFLECTION ..... Magnetic
FOCUS ..... QPF 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
20AR33 ..... 3.0 + 3.0 W (at 10% distortion)

SPEAKER
SIZE ..... 9 × 5 cm (Round)
VOICE COIL IMPEDANCE
20AR33..... 4 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.

IMPORTANT SERVICE SAFETY PRECAUTION

■ **Service work should be performed only by qualified service technicians who are thoroughly familiar with 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 (such as a test probe) between the picture tube ground and the anode lead. (AC line cord should be disconnected 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)

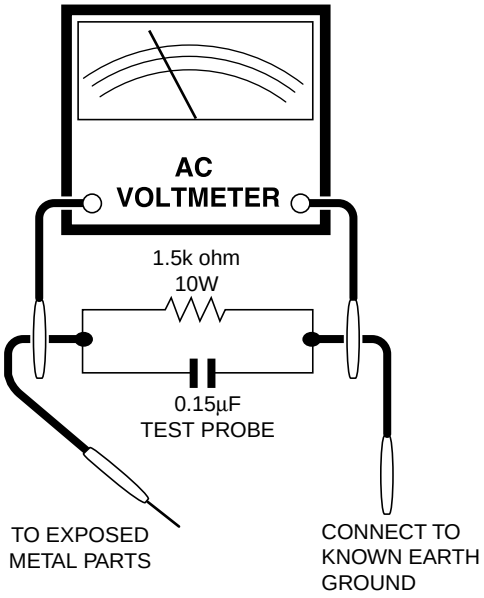
BEFORE RETURNING THE RECEIVER

(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 and 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 110~220 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 0.15µF 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 and etc.) and measure the AC voltage drop across the resistor.
  AII checks must be repeated with the AC ine 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.



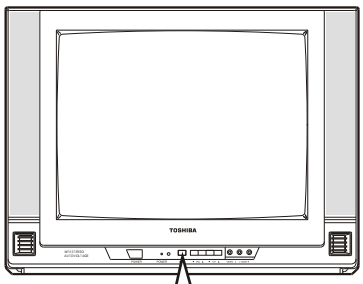
SAFETY NOTICE

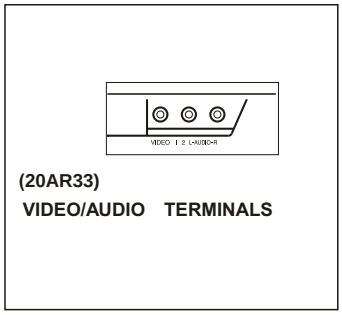
Many electrical and mechanical parts in television receivers have special safety-related characteristics. These characteristics are often not evident from visual inspection, nor can protection afforded by them be necessarily increased by using replacement components rated for higher voltage, wattage, 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





(20AR33)
VIDEO/AUDIO TERMINALS

POWER
Press → On.
Press again → Off.

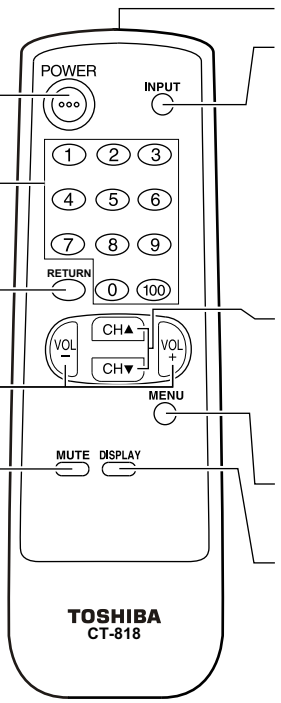
SENSOR AREA FOR REMOTE CONTROL

CHANNEL UP/DOWN
(▲) Selects next higher channel.
(▼) Selects next lower channel.

VOLUME UP/DOWN
(▲)Increases sound.
(▼)Decreases sound.

MENU
Press → Accesses MAIN MENU.
Press again → Exits MAIN MENU.

Basic Remote Control Functions



Infrared Transmitter Window

POWER
Press → On.
Press again → Off.

REMOTE KEYPAD
Accesses any channel from keypad.

RETURN
Returns to previous channel.

VOLUME UP/DOWN
(+) Increases sound.
(–) Decreases sound.
• In menu mode, changes or selects the TV adjustments.

MUTE
Press → Mutes sound.
Press again → Restores sound.
• CLOSED CAPTION appears when sound is muted.

INPUT
Press → Switch to external video input mode.
Press again → Switch to TV mode. (20AR33)

Press → Switch to external video INPUT 1 mode.
Press 2 times → Switch to external video INPUT 2 mode.
Press 3 times → Switch back to the original TV mode.

CHANNEL UP/DOWN
(▲) Selects next higher channel.
(▼) Selects next lower channel.
• Moves the " ⬍ " mark of the MENU screen.

MENU
Press → Accesses MAIN MENU.
Press again → Exits MAIN MENU.

DISPLAY
Press → Displays receiving channel for 4 seconds.
Press again → Removes display.
• Temporarily displays receiving channel when in Closed Caption mode.

INSTALLATION AND SERVICE INSTRUCTIONS

Note: (1) When performing any adjustments to resistor controls and transformers use non-metallic screwdrivers 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 AC line input.

+B DC REGULATOR CONFIRMATION

The + B DC output voltage adjustment is not included in this circuit.However, should confirmation be reguired proceed as follows.

1. Actuate receiver with 220V AC input voltage.
2. Receive a local channel.
3. Connect positive lead of digital voltmeter to C754 positive side on PWB-A ; negative lead to chassis ground.
4. Confirm this voltage reading is as below.

CAUTION: The reading should be within +130.0 ± 2.0V DC to ensure normal function and circuitry reliability.

X-RADIATION PROTECTOR CIRCUIT TEST

After service has been performed on the horizontal deflection system, high voltage system, B+ system, test the X-Radiation protection circuit to ascertain proper operation as follows:

1. Apply 220V 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 21.4 ± 1.5 V.
5. Apply external 27.9V 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 voltage is not adjustable but must be checked 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 110~220V AC line voltage, with a strong air signal or a properly tuned in test signal.
3. Receve a good local channel.
4. The voltage should be approximately, 25.5kV (at pictuer MAX Bright center condition).
   If a correct reading cannot be obtained, check circuitry for malfunctioning components.

For adjustments of this model, the bus data is converted to various analog signals by the D/A converter circuit.

Note: There are still a few analog adjustments in this series such as focus and master screen voltage. Follow the steps below whenever the service adjustment is required. See "Table-B" to determine, if service adjustments are required.

1. Service mode

Before putting unit into the service mode, check that customer adjustments are in the normal mode. Use the reset function in the video adjustment menu to ensure customer controls are in their proper (reset) position.

2. Service item selection

Once in the service mode, press the Ch-up or Ch-down button on the remote controller or at the set. The service adjustment item will vary in increments of one. Select the item you wish to adjust.

3. Data number selection

Press the Vol-up or down button to adjust the data number.

To enter the service mode and exit service mode.

Short JA137&JA138 for 1 Second and release to switch to the service mode position, and the microprocessor is in input mode.(Adjustment through the I^2C bus control.) To exit the service mode, turn the television off by pressing the power button.

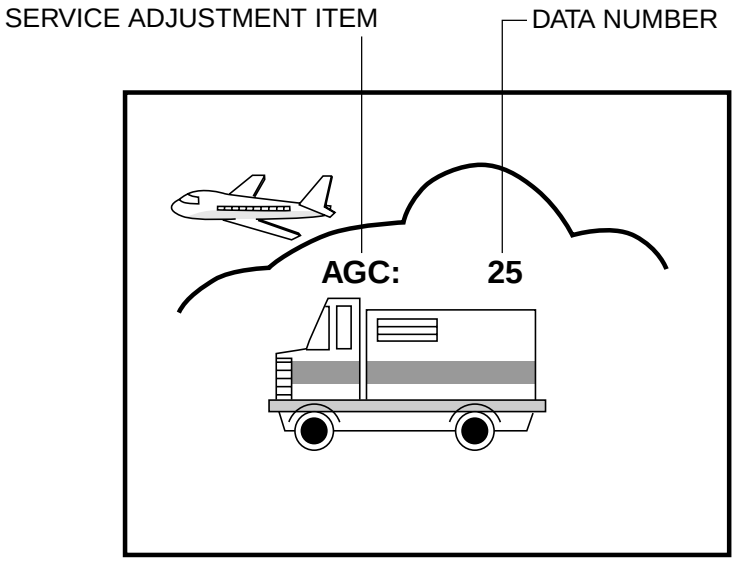
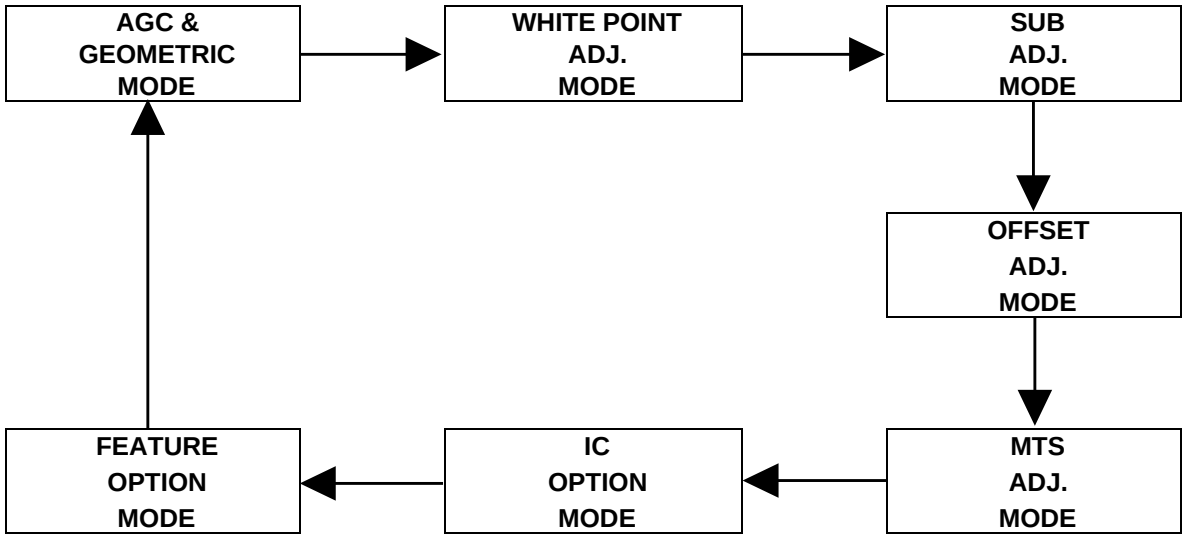


Figure A.

■SERVICE MODE

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



AGC & GEOMETRIC MODE

↓ AGC TAKE OVER POINT (AGC)
↓ VERTICAL SLOPE (V-LIN)
↓ VERTICAL AMP (V-AMP)
↓ VERTICAL SHIFT (V-CENT)
↓ VERTICAL ZOOM (V-ZOOM)
↓ HORIZONTAL SHIFT (H-CENT)
↓ EAST-WEST WIDTH (H-SIZE)
↓ HORIZONTAL PARALLELOGRAM (EW//)
↓ EAST-WEST PARABOLA / WIDTH (PARA)
↓ EAST-WEST UPPER CORNER PARABOLA (COR(U))
↓ EAST-WEST LOWER CORNER PARABOLA (COR(L))
↓ EAST-WEST TRAPEZIUM (TRAPE)
↓ HORIZONTAL BOW (HB)
↓ S-CORRECTION (S-COR)

WHITE POINT ADJ. MODE

↓ W.P. RED OFFSET HIGH / OFFSET BLUE TONE (DRI-R-HI)
↓ W.P. GREEN OFFSET HIGH / OFFSET BLUE TONE (DRI-G-HI)
↓ W.P.BLUE OFFSET HIGH / OFFSET BLUE TONE (DRI-B-HI)
↓ W.P. RED MH / STD (DRI-R-MH)
↓ W.P. GREEN MH / STD (DRI-G-MH)
↓ W.P. BLUE MH / STD (DRI-B-MH)
↓ W.P. RED OFFSET ML / OFFSET RED TONE (DRI-R-ML)
↓ W.P. GREEN OFFSET ML / OFFSET RED TONE (DRI-G-ML)
↓ W.P. BLUE OFFSET ML / OFFSET RED TONE (DRI-B-ML)
↓ W.P. RED OFFSET LOW (DRI-R-LO)
↓ W.P. GREEN OFFSET LOW (DRI-G-LO)
↓ W.P. BLUE OFFSET LOW (DRI-B-LO)

SUB ADJ. MODE

↓ MAX VOLUME (SUB-VOL)
↓ SUB CONTRAST (SUB-CON)
↓ SUB TINT (SUB-TINT)
↓ SUB COLOUR (SUB-COL)
↓ SUB BRIGHTNESS (SUB-BRI)
↓ SUB SHARPNESS (SUB-SHP)
↓ MAX HOTEL VOLUME (HTL-VOL)
↓ HOTEL PROGRAM NO(HTL-PRG)
↓ BLUE BACK CONTRAST (BB-CON)
↓ OSD GRB REFERENCE (RGB)
↓ BLACK LEVEL OFFSET R(CUT-R)
↓ BLACK LEVEL OFFSET G(CUT-G)
↓ CATHODE DRIVE LEVEL(CDL)

OFFSET ADJ. MODE

↓ Y-D TIME (TV) [YD] (DL-TV)
↓ Y-D TIME (AV) [YD] (DL-AV)
↓ INITIAL/DEFAULT LANGUAGE (INIT)
↓ FAO-MAX VOLUME (FAO-VOL)
↓ ENERGY SAVE OFFSET (ESV_OFFS)
↓ CLOSE CAPTION POSITION (CCPOS)

MTS ADJ. MODE

↓ ATTENUATE INPUT SIGNAL LEVEL (ATT)
↓ VCO FREE RUNNING FREQUENCY ADJ. (VCO)
↓ STEREO, SAP, DBX FILTER ADJ. (FILTER)
↓ STEREO SEPARATION ADJUSTMENT (300HZ) (WIDEBAND)
↓ STEREO SEPARATION ADJUSTMENT (3kHZ) (SPECTRAL)
↓ BASS LEVEL (BASS)
↓ TREBLE LEVEL (TREBLE)

IC OPTION MODE

↓ VERTICAL SCAN DISABLE (VSD)
↓ BLACK STRETCH (BKS)
↓ AUTOMATIC VOLUME LEVELLING (AVL)
↓ FAST FILTER IF-PLL (FFI)
↓ ENABLE VERTICAL GUARD (EVG)
↓ EHT TRACKING MODE (EHT)
↓ OVERSCAN SWITCH OFF (OSO)
↓ AUTO COLOUR LIMIT (ACL)
↓ FORCED COLOUR-ON (FCO)
↓ VIDEO MUTE AT IDENT LOSS (VMI)
↓ VIDEO MUTE AT PROGRAM/SOURCE CHANGE (VMC)
↓ HOTEL MODE (HTL)
↓ GAIN FM DEMODULATOR (BTSC)
↓ CHARGE PUMP (CP)
↓ FM WINDOW SELECTION (FMWS)
↓ SOUND MUTE BIT 0 (SM0)
↓ SOUND MUTE BIT 1 (SM1)
↓ IF AGC SPEED BIT 0 (AGC0)
↓ IF AGC SPEED BIT 1 (AGC1)
↓ PHI 1 TIME CONSTANT FOR FE (FOA-FE)
↓ PHI 1 TIME CONSTANT FOR FE (FOB-FE)
↓ PHI 1 TIME CONSTANT FOR AV (FOA-AV)
↓ PHI 1 TIME CONSTANT FOR AV (FOB-AV)
↓ FORCED SLICING LEVEL FOR VERTICAL SYNC.(FSL)
↓ SYNCHRONISATION OF OSD/TEXT DISPLAY (HP2)
↓ RGB BLANK (RGBL)

FEATURE OPTION MODE

↓ V-CHIP (V-CHIP)
↓ MTS DECODING ENABLED (MTS)
↓ DEMO MODE (DEMO)
↓ REAL TIME CLOCK / ON TIMER (CLOCK)
↓ ENERGY SAVE (E-SAVE)
↓ PERSONAL PREFERENCE PROGRAM (P_PREF)
↓ UNIVERSAL PLUS (UNIV+)
↓ SPEAKER ON/OFF (SPEAKER)
↓ FIXED AUDIO OUT (FAO)
↓ VIEW TIMER (VIEW-TM)
↓ FRENCH LANGUAGE (FRENCH)
↓ EZ SETUP / AUTOPRESET (EZ-SETUP)
↓ WHITE TEMP OR FAVORITE COLOR (W-TEMP)
↓ AV ENABLED OR DISABLED (AV)
↓ AV2 ENABLED OR DISABLED (AV2)
↓ DYNAMIC SKIN CONTROL (DSK)
↓ RATIO PRE- AND OVERSHOOT BIT 0 (RPO0)
↓ RATIO PRE- AND OVERSHOOT BIT 1 (RPO1)
↓ GAIN FM DEMODULATOR (AGN)
↓ AUTO SWITCH OFF ENABLED (AUTO-OFF)

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

Figure B: ADJUSTMENT CATEGORIES

①Press the CH DOWN/UP key on the remote controller to get ready to select the mode one by one.
②Press the CH DOWN/UP key on the remote controller to select the modes reversibly one by one.
③Using the VOLUME UP/DOWN key on the remote controller, the data can be modified.
(OSD disturbance can be erased by R/C display key)

SERVICE MODE

SERVICE POSITION	ADJUST ITEM	DATA			REMARK
		RANGE	INITIAL VALUE	FIX/ADJ	
AGC	AGC TAKE OVER POINT	0~63	14	ADJ	
V-LIN	VERTICAL SLOPE	0~63	32	ADJ	
V-AMP	VERTICAL AMP	0~63	32	ADJ	
V-CENT	VERTICAL SHIFT	0~63	32	ADJ	
V-ZOOM	VERTICAL ZOOM	0~63	32	FIX	
H-CENT	HORIZONTAL SHIFT	0~63	32	ADJ	
H-SIZE	EAST-WEST WIDTH	0~63	32	FIX	
EW//	HORIZONTAL PARALLELOGRAM	0~63	32	FIX	
PARA	EAST-WEST PARABOLA / WIDTH	0~63	32	FIX	
COR(U)	EAST-WEST UPPER CORNER PARABOLA	0~63	32	FIX	
COR(L)	EAST-WEST LOWER CORNER PARABOLA	0~63	32	FIX	
TRAPE	EAST-WEST TRAPEZIUM	0~63	32	FIX	
HB	HORIZONTAL BOW	0~63	32	FIX	
S-COR	S-CORRECTION	0~63	0	FIX	must be "17"
DRI-R-HI	“W,P RED OFFSET HIGH / OFFSET BLUE TONE”	0~63	32	FIX	must be "32"
DRI-G-HI	W.P. GREEN OFFSET HIGH / OFFSET BLUE TONE	0~63	32	FIX	must be "33"
DRI-B-HI	W.P.BLUE OFFSET HIGH / OFFSET BLUE TONE	0~63	32	FIX	must be "37"
DRI-R-MH	W.P. RED MH / STD	0~63	25	FIX	must be "32"
DRI-G-MH	W.P. GREEN MH / STD	0~63	25	ADJ	
DRI-B-MH	W.P. BLUE MH / STD	0~63	25	ADJ	
DRI-R-ML	W.P. RED OFFSET ML / OFFSET RED TONE	0~63	32	FIX	must be "32"
DRI-G-ML	W.P. GREEN OFFSET ML / OFFSET RED TONE	0~63	32	FIX	must be "32"
DRI-B-ML	W.P. BLUE OFFSET ML / OFFSET RED TONE	0~63	32	FIX	must be "25"
DRI-R-LO	W.P. RED OFFSET LOW	0~63	32	FIX	must be "32"
DRI-G-LO	W.P. GREEN OFFSET LOW	0~63	32	FIX	must be "22"
DRI-B-LO	W.P. BLUE OFFSET LOW	0~63	32	FIX	must be "19"
SUB-VOL	MAX VOLUME	0~63	63	FIX	must be "63"
SUB-CON	SUB CONTRAST	0~63	63	FIX	must be "54"
SUB-COL	SUB COLOUR	0~63	32	ADJ	
SUB-BRI	SUB BRIGHTNESS	0~63	32	ADJ	
SUB-TINT	SUB TINT	0~63	32	ADJ	
SUB-SHP	SUB SHARPNESS	0~63	32	FIX	must be "27"
HTL-VOL	MAX HOTEL VOLUME	0~63	32	FIX	
HTL-PRG	HOTEL PROGRAM NO	0~125 or >125 for none	255	FIX	
BB-CON	BLUE BACK CONTRAST	0~15	10	FIX	must be "5"
RGB	OSD GRB REFERENCE	0~15	15	FIX	must be "5"
CUT-R	BLACK LEVEL OFFSET R	0~63	32	ADJ	
CUT-G	BLACK LEVEL OFFSET G	0~63	32	ADJ	
CDL	CATHODE DRIVE LEVEL	0~15	0	FIX	must be "4"
DL-TV	Y-D TIME (TV) [YD]	0~15	12	FIX	must be "2"
DL-AV	Y-D TIME (AV) [YD]	0~15	12	FIX	must be "8"
INIT	INITIAL/DEFAULT LANGUAGE	0(English), 1(Spanish), 2(French)	0	FIX	must be "1"
FAO-VOL	FAO-MAX VOLUME	0~63	63	FIX	must be "63"
ESV_OFFS	ENERGY SAVE OFFSET	0~63	10	FIX	must be "32"
CCPOS	CLOSE CAPTION POSITION	0~255	20	ADJ	
ATT	ATTENUATE INPUT SIGNAL LEVEL	0~15	10	FIX*	
VCO	VCO FREE RUNNING FREQUENCY ADJ.	0~63	32	FIX*	
FILTER	“STEREO, SAP, DBX FILTER ADJ. “	0~63	28	FIX*	
WIDEBAND	STEREO SEPARATION ADJUSTMENT (300HZ)	0~63	32	FIX*	20AR33=ADJ
SPECTRAL	STEREO SEPARATION ADJUSTMENT (3kHZ)	0~63	27	FIX*	
BASS	BASS LEVEL	0 -15	0	FIX	must be "8"
TREBLE	TREBLE LEVEL	0 -15	0	FIX	must be "8"
VSD	VERTICAL SCAN DISABLE	0 or 1 when item selected	0	FIX	
BKS	BLACK STRETCH	0(disable) or1(enable)	1	FIX	
AVL	AUTOMATIC VOLUME LEVELLING	0(disable) or1(enable)	1	FIX	
FFI	FAST FILTER IF-PLL	0(disable) or1(enable)	0	FIX	
EVG	ENABLE VERTICAL GUARD	0(disable) or1(enable)	1	FIX	must be "0"
EHT	EHT TRACKING MODE	0(disable) or1(enable)	1	FIX	
OSO	OVERSCAN SWITCH OFF	0(disable) or1(enable)	0	FIX	
ACL	AUTO COLOUR LIMIT	0(disable) or1(enable)	0	FIX	must be "1"
FCO	FORCED COLOUR-ON	0(disable) or1(enable)	0	FIX	
VMI	VIDEO MUTE AT IDENT LOSS	0(disable) or1(enable)	1	FIX	
VMC	VIDEO MUTE AT PROGRAM/SOURCE CHANGE	0(disable) or1(enable)	1	FIX	
HTL	HOTEL MODE	0(disable) or1(enable)	0	FIX	
BTSC	GAIN FM DEMODULATOR	0(disable) or1(enable)	0	FIX	
CP	CHARGE PUMP	0(fast tuning) or 1 (moderate speed tuning)	0	FIX	

Table - A

SERVICE POSITION	ADJUST ITEM	DATA			REMARK
		RANGE	INITIAL VALUE	FIX/ADJ	
FMWS	FM WINDOW SELECTION	0(disable) or1(enable)	0	FIX	
SM0	SOUND MUTE BIT 0 (SM0)	0(disable) or1(enable)	1	FIX	
SM1	SOUND MUTE BIT 1	0(disable) or1(enable)	0	FIX	
AGC0	IF AGC SPEED BIT 0	0(disable) or1(enable)	1	FIX	
AGC1	IF AGC SPEED BIT 1	0(disable) or1(enable)	0	FIX	
FOA-FE	PHI 1 TIME CONSTANT FOR FE	0(disable) or1(enable)	0	FIX	
FOB-FE	PHI 1 TIME CONSTANT FOR FE	0(disable) or1(enable)	0	FIX	
FOA-AV	PHI 1 TIME CONSTANT FOR AV	0(disable) or1(enable)	1	FIX	
FOB-AV	PHI 1 TIME CONSTANT FOR AV	0(disable) or1(enable)	1	FIX	
FSL	FORCED SLICING LEVEL FOR VERTICAL SYNC.	0(disable) or1(enable)	0	FIX	
HP2	SYNCHRONISATION OF OSD/TEXT DISPLAY	0(disable) or1(enable)	0	FIX	
RGBL	RGB BLANK	0(disable) or1(enable)	0	FIX	
V-CHIP	V-CHIP	0(disable) or1(enable)	0	FIX	
MTS	MTS DECODING ENABLED	0(disable) or1(enable)	0	FIX*	20AR33→1
DEMO	DEMO MODE	0(disable) or1(enable)	1	FIX	must be "0"
CLOCK	REAL TIME CLOCK / ON TIMER	0(disable) or1(enable)	1	FIX	must be "1"
E-SAVE	ENERGY SAVE	0(disable) or1(enable)	1	FIX	
P_PREF	PERSONAL PREFERENCE PROGRAM	0(disable) or1(enable)	0	FIX	
UNIV+	UNIVERSAL PLUS	0(disable) or1(enable)	0	FIX	
SPEAKER	SPEAKER ON/OFF	0(disable) or1(enable)	0	FIX	
FAO	FIXED AUDIO OUT	0(disable) or1(enable)	0	FIX	
VIEW-TM	VIEW TIMER	0(disable) or1(enable)	1	FIX	must be "1"
FRENCH	FRENCH LANGUAGE	0(disable) or1(enable)	0	FIX	must be "1"
EZ-SETUP	EZ SETUP / AUTOPRESET	0(AUTOPRESET) or 1(EZ SETUP)	1	FIX	must be "0"
W-TEMP	WHITE TEMP OR FAVORITE COLOR	0(FC) or 1(WT)	0	FIX	
AV	AV ENABLED OR DISABLED	0(without ext. source) or 1(with external source)	0	FIX	must be "1"
AV2	AV2 ENABLED OR DISABLED	0(1 input) or 1(2 input)	0	FIX*	20AR33→1
DSK	DYNAMIC SKIN CONTROL	0(disable) or1(enable)	0	FIX	
RPO0	RATIO PRE- AND OVERSHOOT BIT 0	0(disable) or1(enable)	0	FIX	
RPO1	RATIO PRE- AND OVERSHOOT BIT 1	0(disable) or1(enable)	0	FIX	
AGN	GAIN FM DEMODULATOR	0(normal) or1(+6dB)	0	FIX	
AUTO-OFF	AUTO SWITCH OFF ENABLED	0(disable) or1(enable)	1	FIX	
PON-CH		0(disable) or1(enable)	0	FIX	

Table - A

Holding down to short JA137 & JA138 and turn on the main power SW will automatically write the initial values into IC1003.
This is only can done when a new EEPROM is used. (Judge with the first 4 bytes.)

PART REPLACED	ADJUSTMENT		NOTES
	NECESSARY	UNNECESSARY	
IC801		X	Data is stored in IC1003.
IC1003	X		Holding down to short JA137 & JA138 and turn on the main power SW will automatically write the initial values into IC1003. This is only can done when a new EEPROM is used. (Judge with the first 4 bytes.)
CRT	X		Adjust items related to picture tube only.

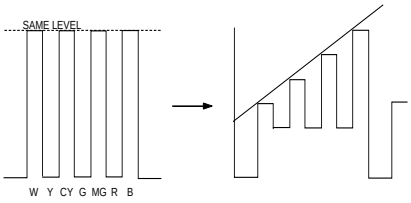
Table - B

■ SERVICE ADJUSTMENT

RF AGC Adjustment

1. Receive a good local channel.
2. Enter the service mode signal category and select the service adjustment "AGC".
3. Set the data value to point where no noise or beat appears.
4. Select another channel to confirm that no noise or beat appears.

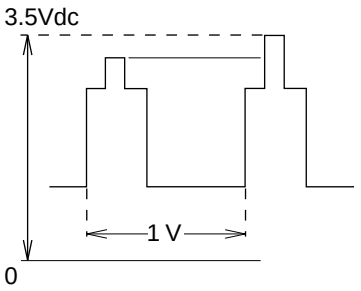
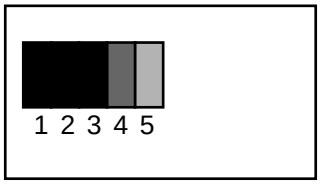
CHROMA ADJUSTMENT

No.	Adjusting point	Adjusting procedure/conditions	Waveform and others
1	**SUB-TINT (I^2C BUS CONTROL)**	1. Receive the "Colour Bar" signal through AV in. 2. Connect the oscilloscope to TP853 (Pin (5) of P882) 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. 4. "SUB-TINT" bus data decrease 4 steps to get final waveform. (Fig 2.) 5. Clear the SERVICE mode.	WAVEFORM 1 FINAL WAVEFORM  Fig 1 Fig 2

HORIZONTAL AND VERTICAL DEFLECTION LOOP ADJUSTMENT

No.	Adjusting point	Adjusting procedure/conditions	Waveform and others
1	**V-SLOPE(I^2C 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-CENTER (I^2C BUS CONTROL)**	1. Call the "V-CENT" mode. 2. Increase or decrease "V-CENT" by Volume key till the picture is centered.	
3	**V - AMP (I^2C BUS CONTROL)**	1. Call the "V-AMP" mode. 2. Increase or decrease "V - AMP" by Volume key to set overscan of 10.0% typical. Adjustment Spec 10.0% range ±1%.	
4	**S-CORRECTION (I^2C BUS CONTROL)**	**FIXED DATA, NO NEED TO ADJUST.**	
5	**H - CENTER**	1. Call the "H-CENT" mode. 2. Increase or decrease "H-CENT" by Volume key to center the picture horizontal.	
6	**Focus adjustment**	1. Receive the "Monoscope Pattern" signal. 2. Press R/C to set Picture NORMAL condition. 3. Adjust the focus control to get the best focus.	

CRT CUT-OFF, BACKGROUND AND SUB-CONTRAST ADJUSTMENT

No.	Adjusting point	Adjusting procedure/conditions	Waveform and others
1	**CRT CUTOFF ADJUSTMENT (I^2C BUS CONTROL)**	1. Switch TV to VIDEO mode,BLUE BACK OFF, with NO VIDEO signal. 2. Press R/C to set Picture Normal condition. 3. Connect the oscilloscope to Red OUT from IC801.(TP47R) Range : 1 V/Div (DC) Sweep : 5 msec/Div 4. Adjust SCREEN VR ,so that the tip of signal reach 3.5 Vdc + 0.1 Vdc.	
2	**SUB-BRIGHT-NESS ADJUSMENT (I^2C 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, 2 and 3 have the same darkness wherelse line 4 is slightly brighter than line 1, 2 and 3 and finally line 5 will be the brighter than line 4.	 1, 2, 3 are in same black level.
3	**WHITE BAL-ANCE SERV-ICE MODE ADJ. (I2C BUS CONTROL)**	1. Receive the "Monoscope Pattern" signal. 2. Press R/C to set Picture NORMAL condition. 3. Connect the DC miliammeter between the TP 602 (-) TP 603 (+). 4. Check Beam current should be around (990µA) 5. Set it to service mode and adjust the DRI-G-MH, & DRI-B-MH data to have a colour temperature of 11,600°K (white). 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 11,600°K. 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 500µA.** DRI-R-MH=32 (FIXED) DRI-G-MH=33 (FIXED) DRI-B-MH=37 (FIXED) DRI-R-MH=32 (FIXED)	# 11,600° K X : 0.273 Y : 0.280 (MINOLTA COLOUR ANALYZER CA-100) *NOTE: Above DATA can be UP/ DOWN by volume key. LOW HIGH 20" 1.8cd/m^2 115cd/m^2 * 11,600° K DRI-GW="DRI-GS"DATA-5 DRI-BW="DRI-BS" DATA-5
4	**Maximum beam check**	1. Receive the "Monoscope Pattern" signal. 2. Press R/C to set Picture NORMAL condition. 3. Connect the DC miliammeter between TP603 (+) and TP602 (–). (Full Scale: 3 mA Range) 4. Beam current must be within 990 ± 50 µA.	

DESCRIPTION OF SCHEMATIC DIAGRAM

NOTES:

1. *The unit of resistance "ohm" is omitted. (K=kΩ=1000Ω, M=MΩ)*
2. *All resistors are 1/16 watt, unless otherwise noted.*
3. *All capacitors are μ F, unless otherwise noted. (P=pF=μμF)*
4. *(G) indicates ±2% tolerance may be used.*
5. ⏚ *indicates line isolated ground.*
6. ⏚ *indicates hot 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 1000μ V B & W or Color signal.*

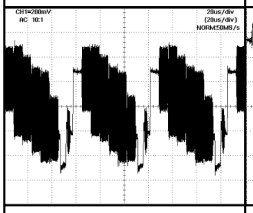
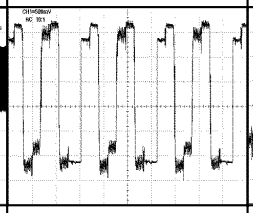
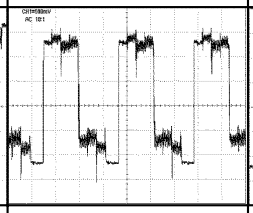
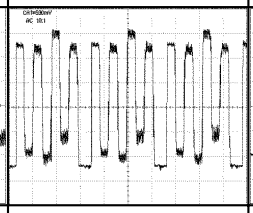
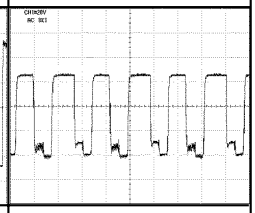
WAVEFORM MEASUREMENT CONDITIONS:

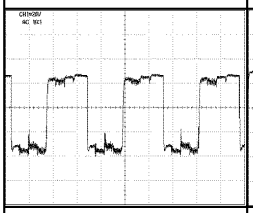
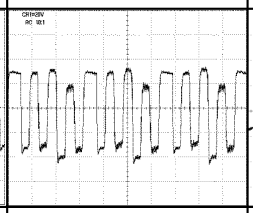
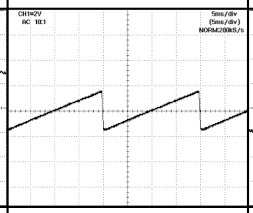
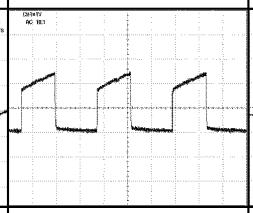
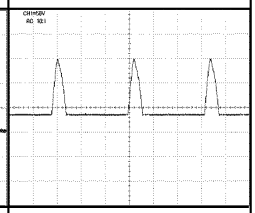
1. *Photographs taken on a standard gated color bar signal, the tint setting adjusted for proper color. The wave shapes at the red, green and blue cathodes of the picture tube depend on the tint, color level and picture control.*
2. ◶ *indicates waveform check points (See chart, waveforms are measured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

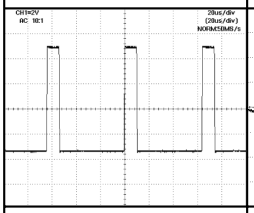
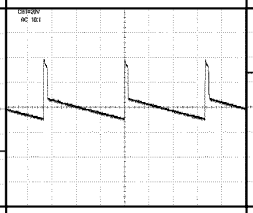
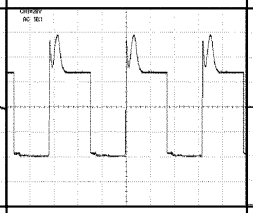
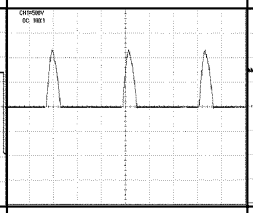
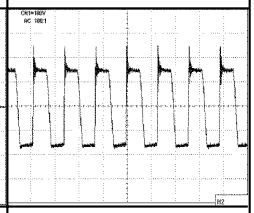
⚠ *AND SHADED ( ) COMPONENTS = SAFETY RELATED PARTS.*
▲ *MARK= X-RAY RELATED PARTS.*

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

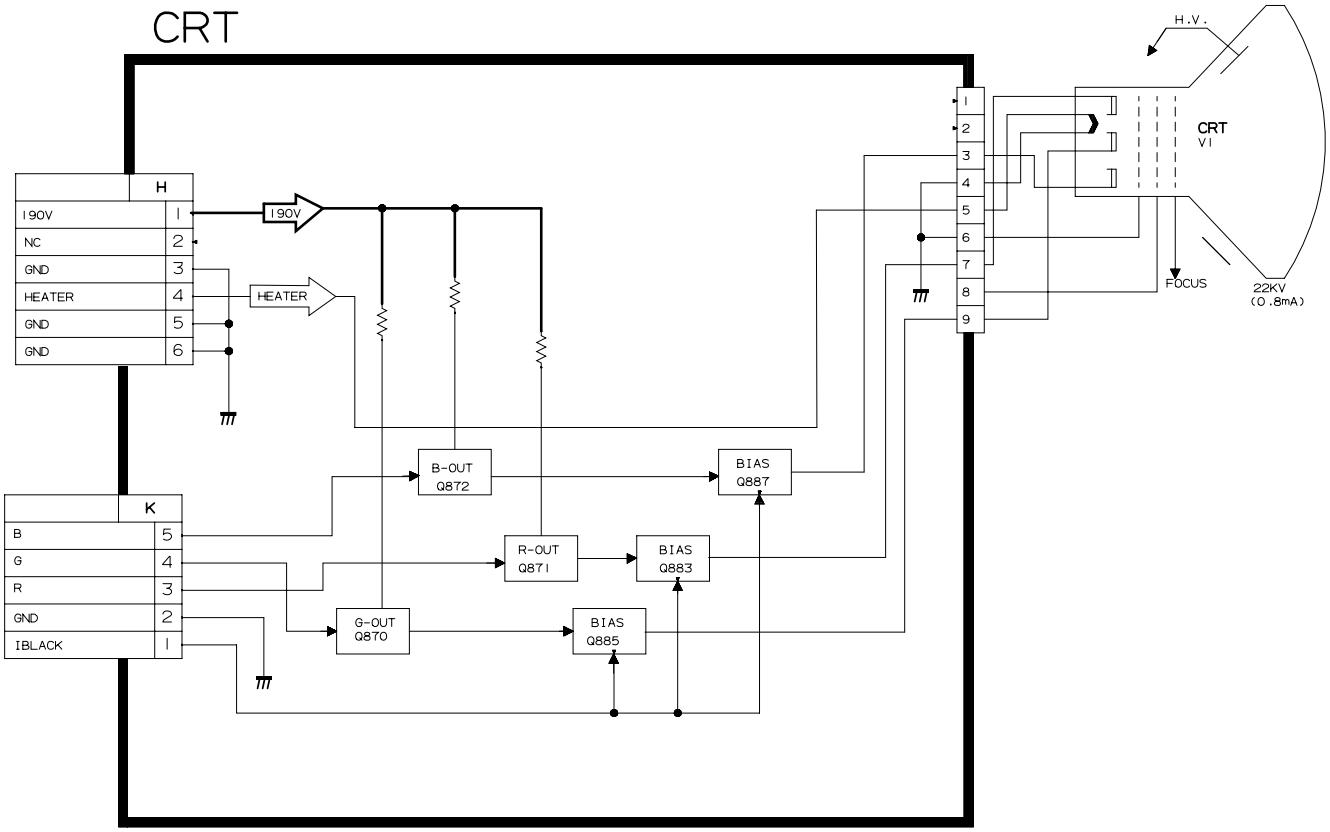
WAVEFORMS

① 1.0 Vp-p	② 2.8 Vp-p	③ 2.6 Vp-p	④ 2.7 Vp-p	⑤ 65.0 Vp-p
				
Horiz. Rate	Horiz. Rate	Horiz. Rate	Horiz. Rate	Horiz. Rate

⑥ 67.0 Vp-p	⑦ 80.0 Vp-p	⑧ 3.0 Vp-p	⑨ 2.3 Vp-p	⑩ 116.0 Vp-p
				
Horiz. Rate	Horiz. Rate	Vert. Rate	Horiz. Rate	Horiz. Rate

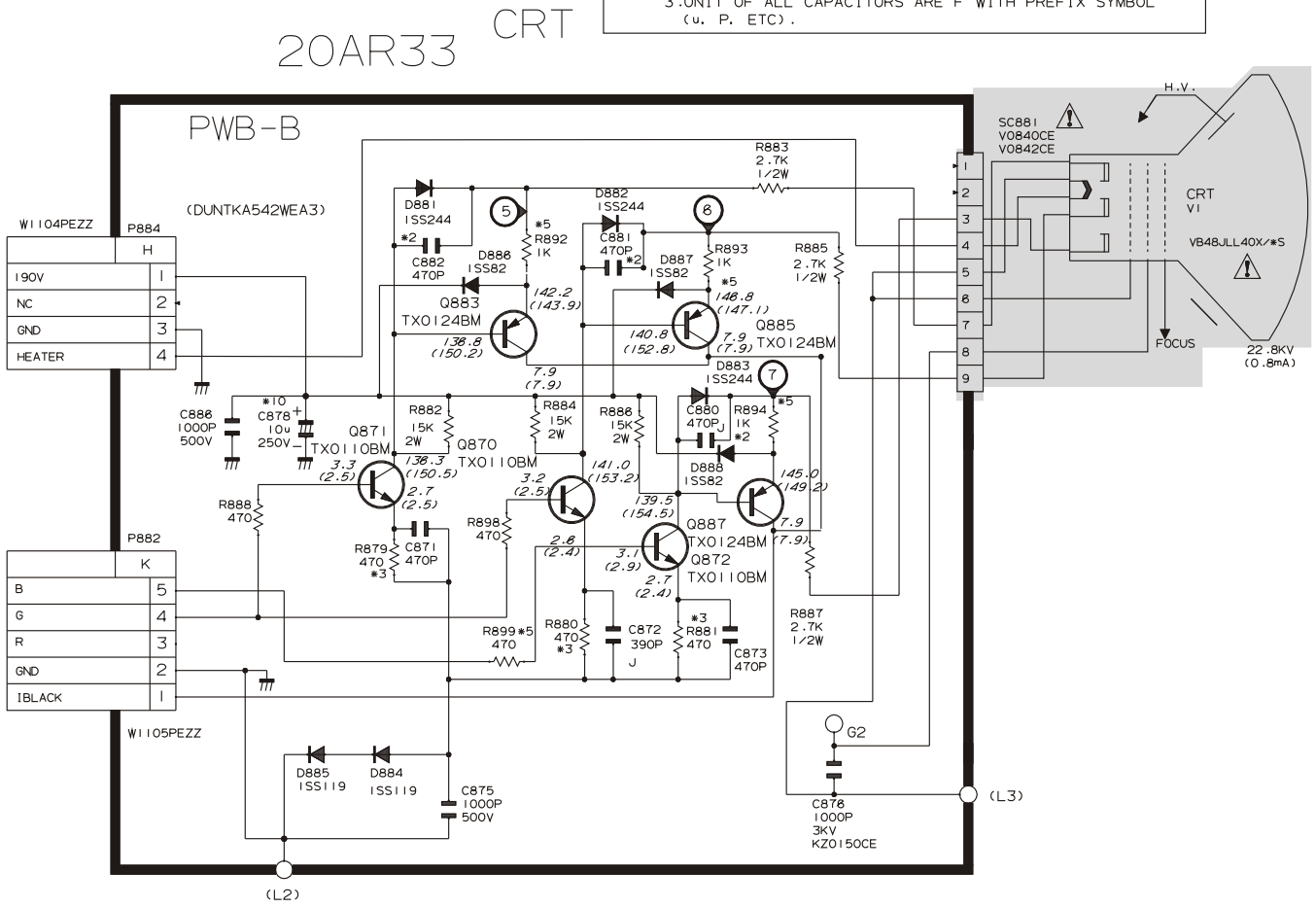
⑪ 8.4 Vp-p	⑫ 40.8 Vp-p	⑬ 98.0 Vp-p	⑭ 1,160 Vp-p	⑮ 415.0 Vp-p
				
Horiz. Rate	Vert. Rate	Horiz. Rate	Horiz. Rate	Power Supply Rate

BLOCK DIAGRAM-1

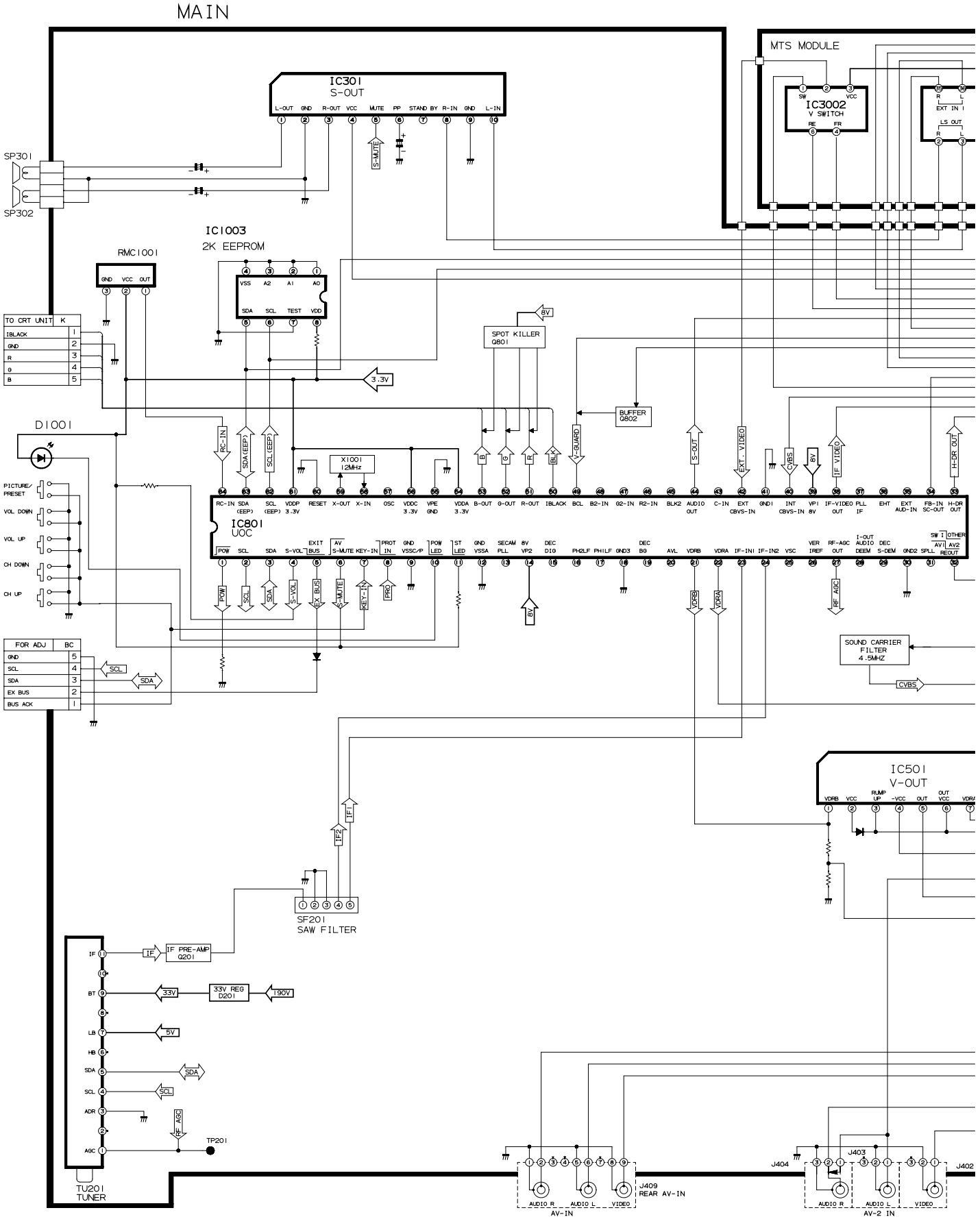


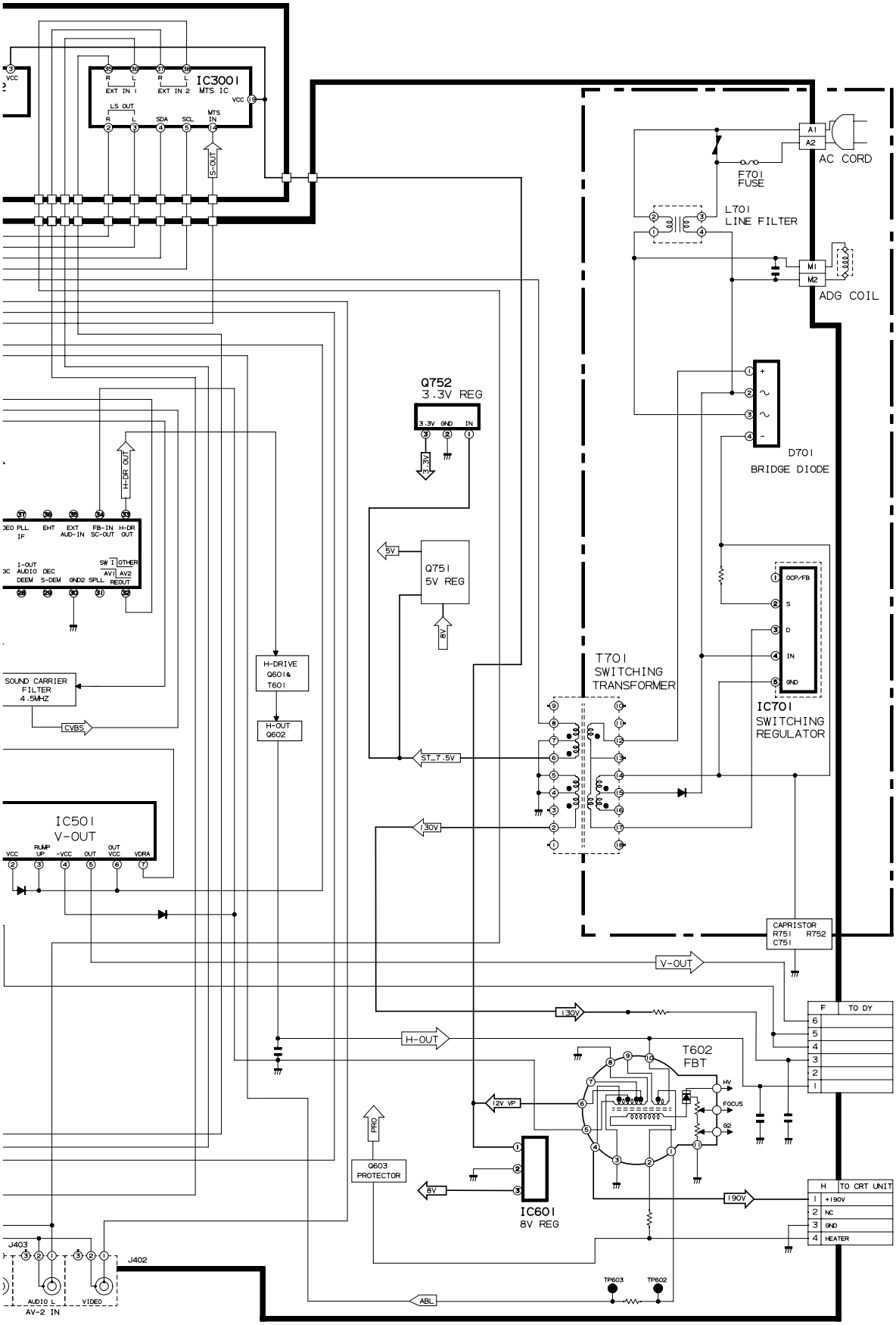
SCHEMATIC DIAGRAM: CRT Unit

NOTE: 1.THE UNIT OF RESISTANCE "OHM" IS OMITTED
(K=1000 OHMS. M=MEGAOHM).
2.ALL RESISTORS ARE 1/16 WATT.UNLESS OTHERWISE NOTED.
3.UNIT OF ALL CAPACITORS ARE F WITH PREFIX SYMBOL
(u. P. ETC).

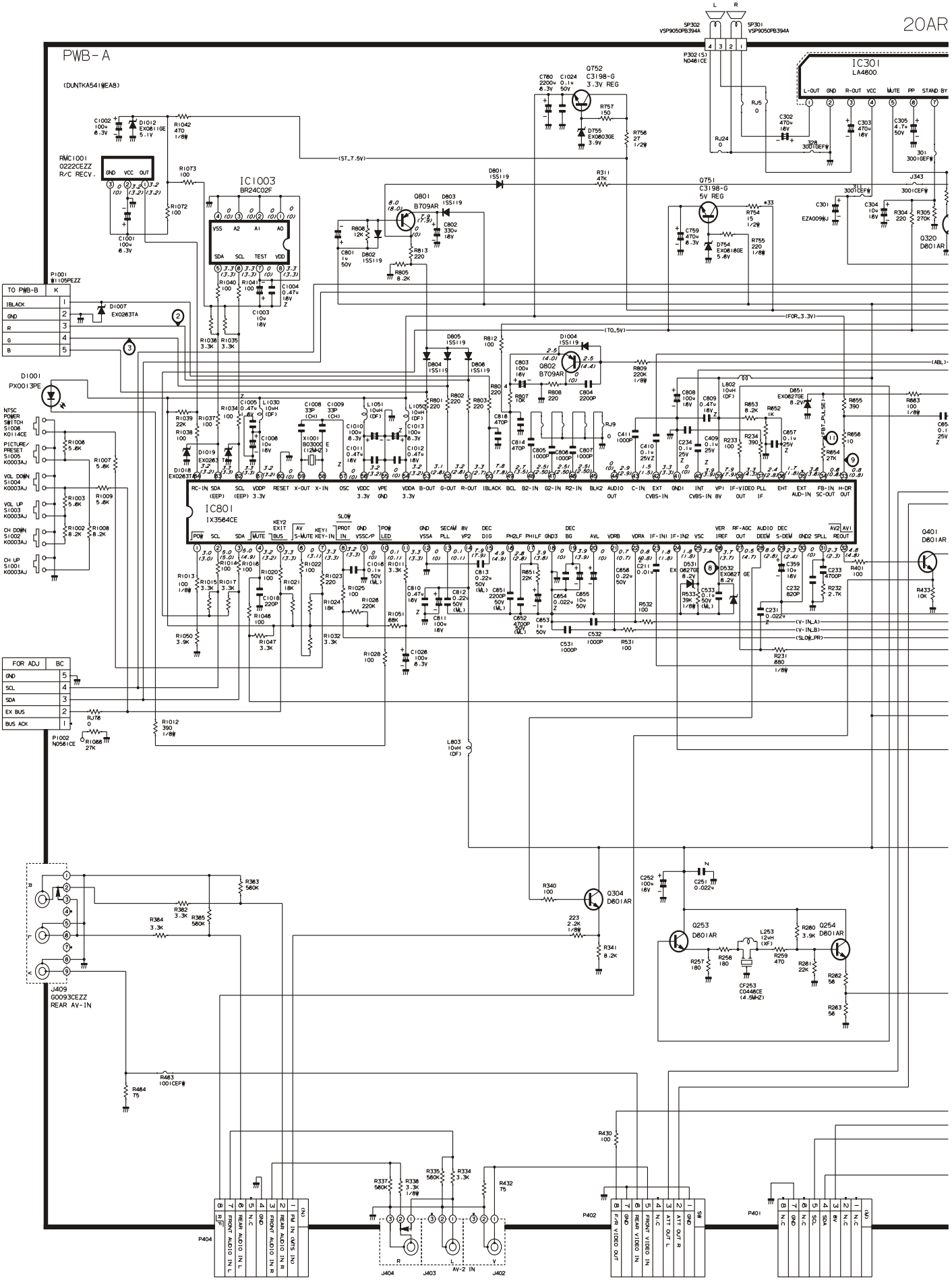


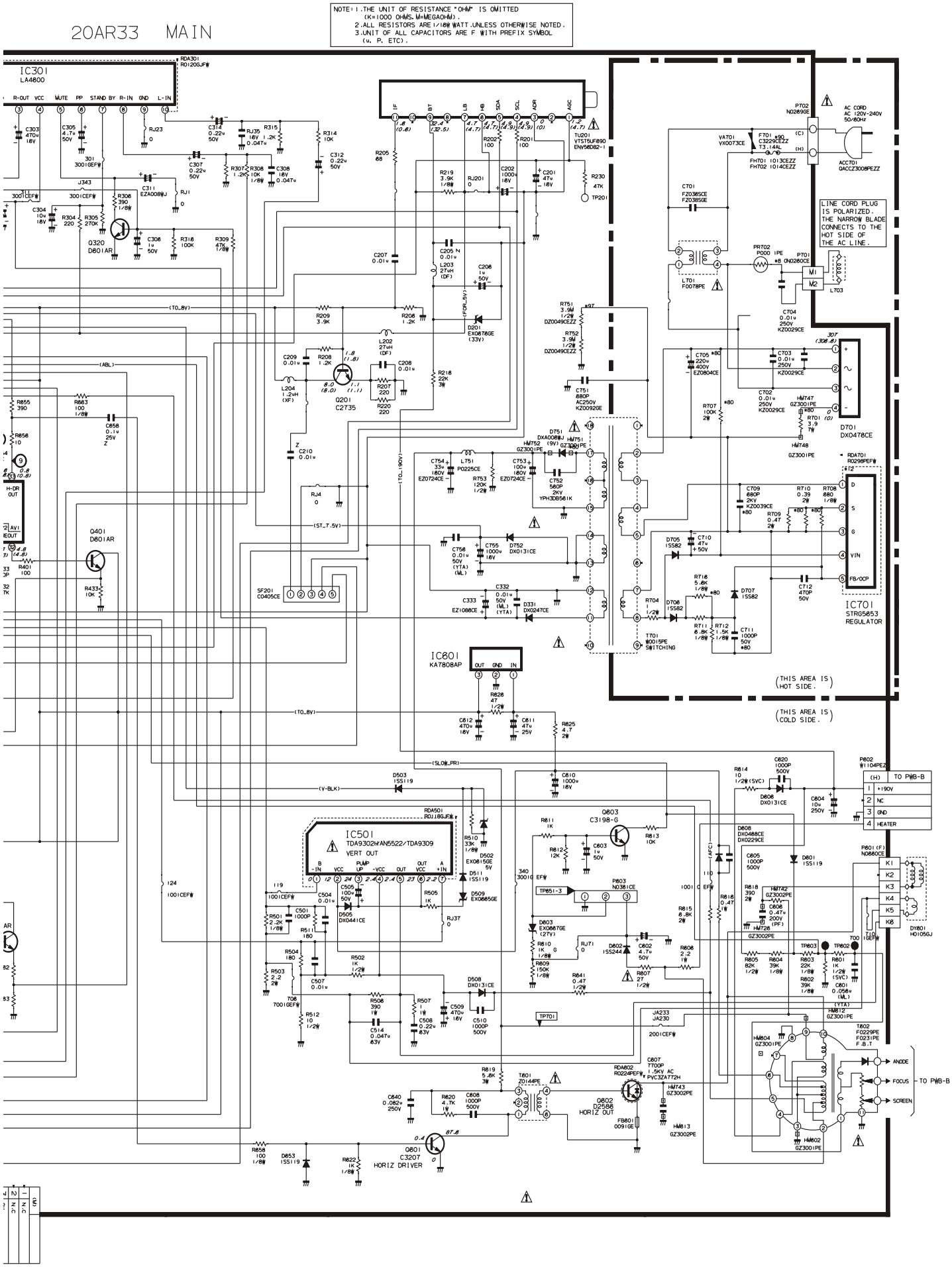
MODEL 20AR33 BLOCK DIAGRAM-2



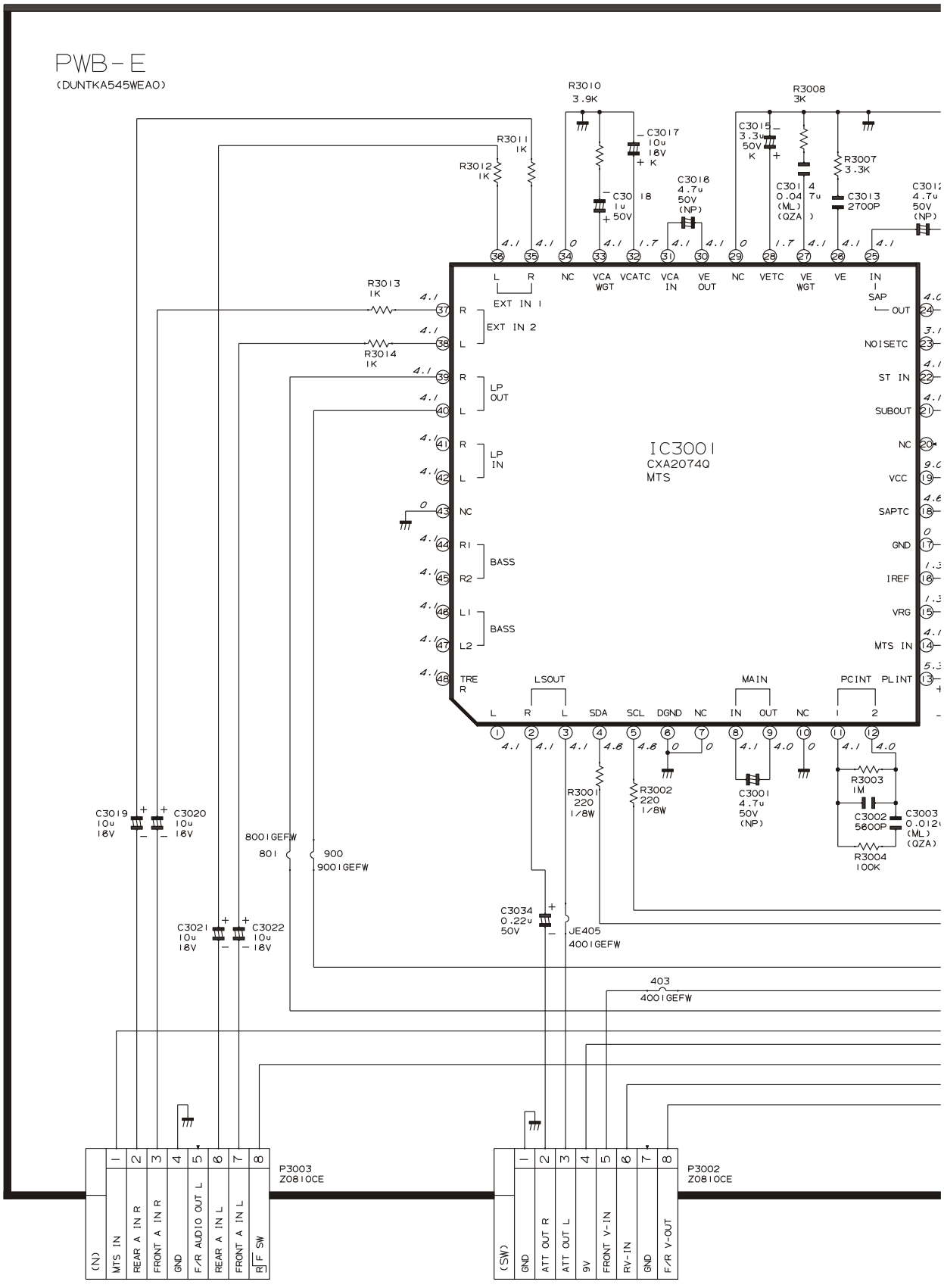

IC3001
MTS IC
EXT IN 1
EXT IN 2
LS OUT
MTS IN
S-OUT
F701
FUSE
AC CORD
L701
LINE FILTER
ADG COIL
D701
BRIDGE DIODE
Q752
3.3V REG
Q751
5V REG
H-DR OUT
H-DRIVE
Q601&
T601
H-OUT
Q602
SOUND CARRIER
FILTER
4.5MHZ
CVBS
T701
SWITCHING
TRANSFORMER
IC701
SWITCHING
REGULATOR
IC501
V-OUT
CAPRISTOR
R751 R752
C751
V-OUT
130V
H-OUT
T602
FBT
12V VP
Q603
PROTECTOR
IC601
8V REG
PRO
ABL
TP603
TP602
J403
J402
AUDIO L
VIDEO
AV-2 IN
F TO DY
H TO CRT UNIT
+190V
NC
GND
HEATER

	7	8	9	10	11	12


PWB - A
20AR
IC801
IX3564CE
IC1003
BR24C02F
IC301
LA4800
Q752
C3198-G
3.3V REG
Q751
C3198-G
5V REG
Q801
B709AR
Q802
B709AR
Q304
D801AR
Q253
D801AR
Q254
D801AR
Q401
D801AR
D1001
PX0013PE
P1001
W1105PEZZ
P1002
N0581CE
J409
G0093CEZZ
REAR AV-IN
P404
P402
P401
J404
J403
J402
AV-2 IN
TO PWB-B
IBLACK
GND
R
G
B
FOR ADJ
GND
SCL
SDA
EX BUS
BUS ACK
NTSC POWER SWITCH S1006 K0114CE
PICTURE/ PRESET S1005 K0003AJ
VOL DOWN S1004 K0003AJ
VOL UP S1003 K0003AJ
CH DOWN S1002 K0003AJ
CH UP S1001 K0003AJ
RMC1001 0222CEZZ R/C RECV.
(DUNTKA541WEAB)
(ST_7.5V)
(TO_5V)
(FOR_3.3V)
(ABL)
(V-IN_A)
(V-IN_B)
(SLOW_PR)
SP302 VSP9050PB394A
SP301 VSP9050PB394A
P302(S) N0481CE
RJ5 0
RJ24 0
RJ76 0
R1066 27K
L803 10uH (DF)
L802 10uH (DF)
RC-IN SDA SCL VDDP RESET X-OUT X-IN OSC VDDC VPE VDDA B-OUT G-OUT R-OUT IBLACK BCL B2-IN G2-IN R2-IN BLK2 AUDIO OUT C-IN EXT CVBS-IN GND1 INT CVBS-IN VP1 IF-VIDEO OUT PLL IF EHT EXT AUD-IN FB-IN SC-OUT H-DR OUT
POW SCL SDA MUTE KEY2 EXIT AV S-MUTE KEY1 KEY-IN PROT IN GND VSSC/P POW LED GND VSSA SECAM PLL BV VP2 DEC DIG PH2LF PH1LF GND3 DEC BG AVL VDRB VDRA IF-IN1 IF-IN2 VSC VER IREF RF-AGC OUT AUDIO DEC DEEM S-DEM GND2 SPLL AV2 REOUT AV1

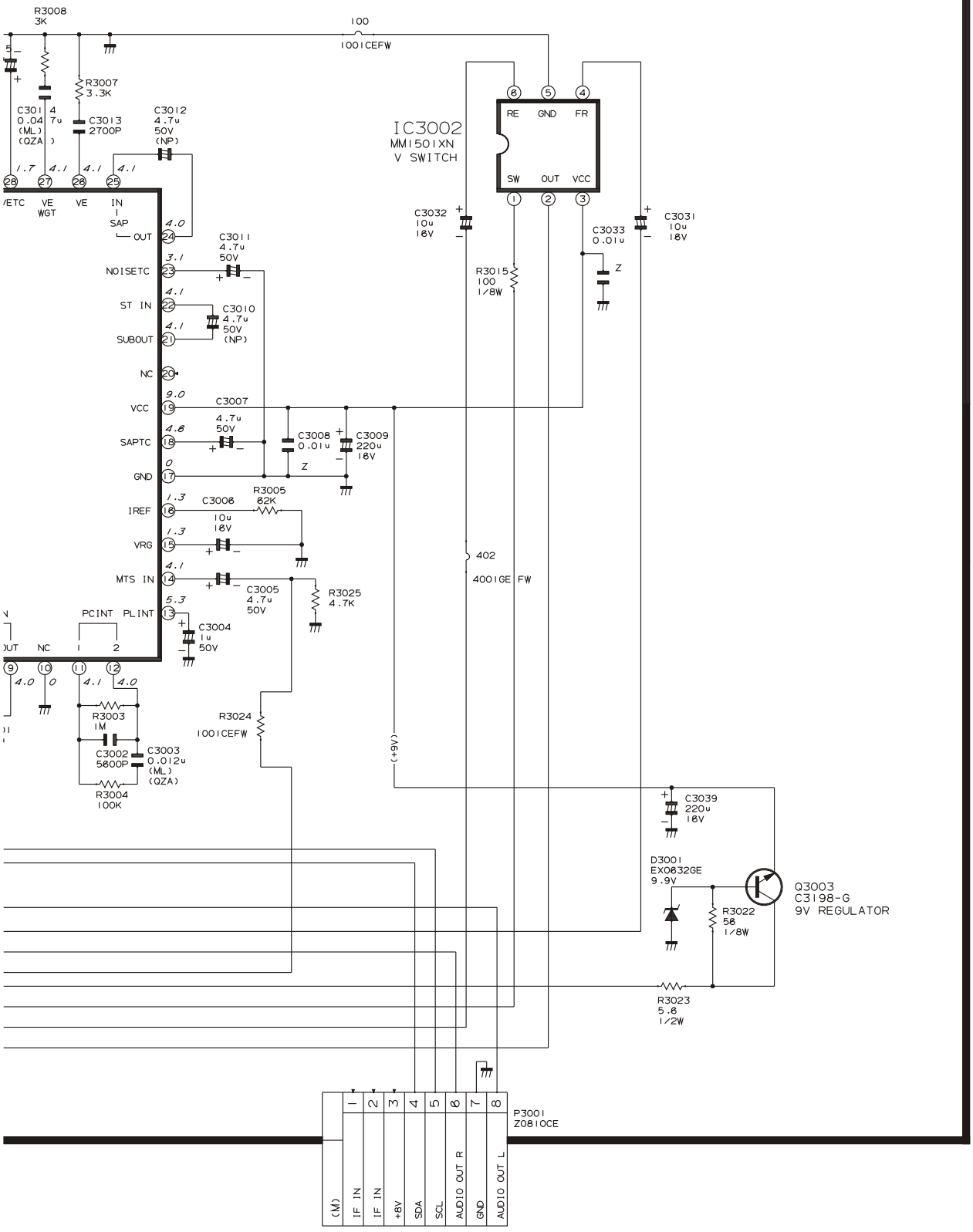

20AR33 MAIN
NOTE: 1.THE UNIT OF RESISTANCE "OHM" IS OMITTED (K=1000 OHMS, M=MEGAOHM).
2.ALL RESISTORS ARE 1/8W WATT.UNLESS OTHERWISE NOTED.
3.UNIT OF ALL CAPACITORS ARE F WITH PREFIX SYMBOL (u, P, ETC).
IC301 LA4600
IC501 TDA9302/AN5522/TDA9309 VERT OUT
IC801 KA7808AP
IC701 STR65853 REGULATOR
Q320 D801AR
Q401 D801AR
Q201 C2735
Q803 C3198-G
Q801 C3207 HORIZ DRIVER
Q802 D2588 HORIZ OUT
T701 W0015PE SWITCHING
T801 Z0144PE
T802 F0229PE F0231PE F.B.T
TU201 VTS75UF690 ENV56D82-1
VA701 VX0073CE
F701 ±90 C3229CEZZ T3.14AL
FH701 1013CEZZ FH702 1014CEZZ
AC CORD AC 120V-240V 50/60Hz
ACC701 QACCZ3008PEZZ
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.)
TO PWB-B
ANODE
FOCUS
SCREEN
(TO_8V)
(TO_190V)
(ABL)
(ST_7.5V)
(SLOW_PR)
(V-BLK)

20AR33 MTS MODULE

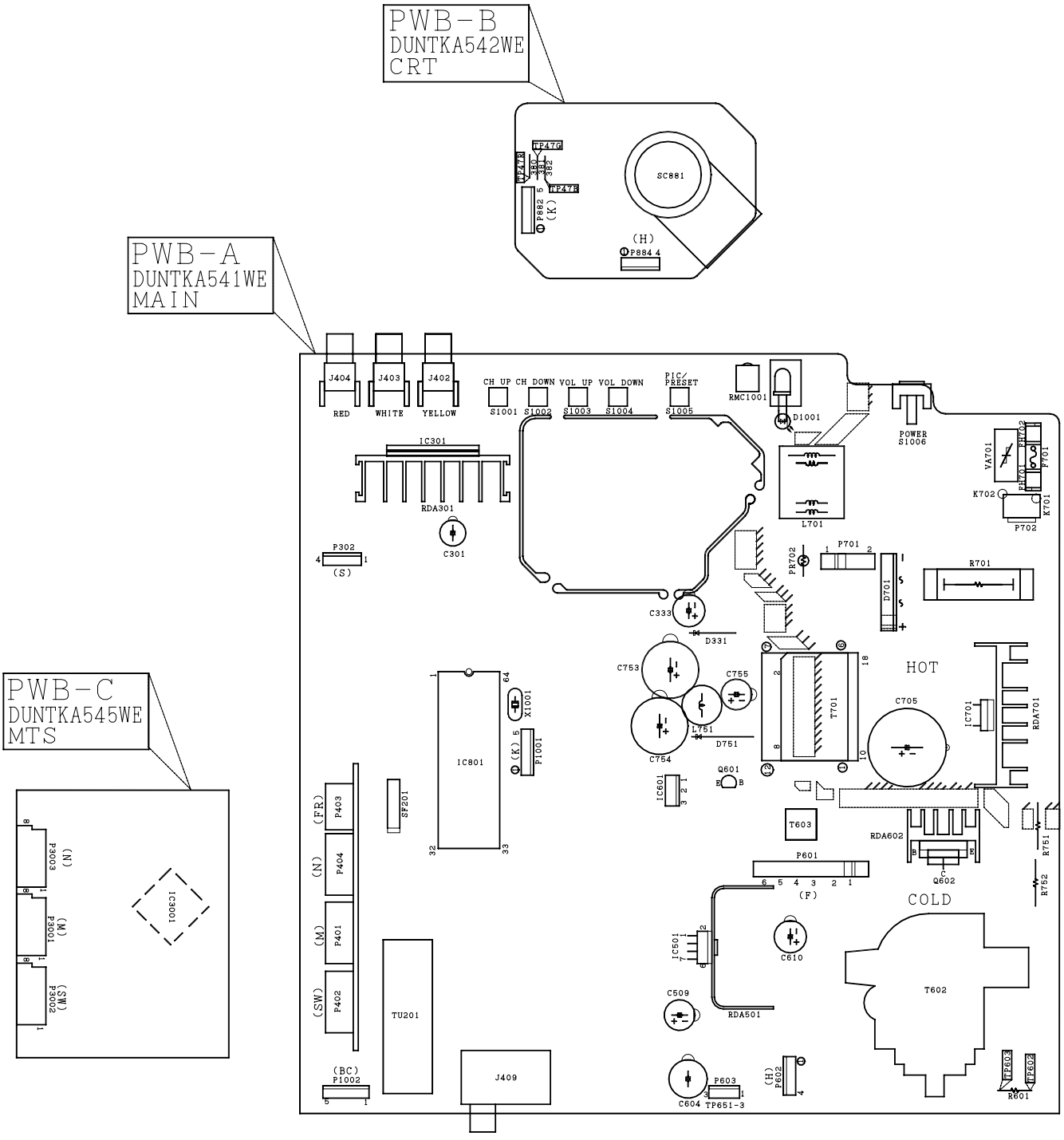


⚠ AND SHADED(▬) COMPONENTS = SAFETY RELATED PARTS.
▲ MARK = X-RAY RELATED PARTS.

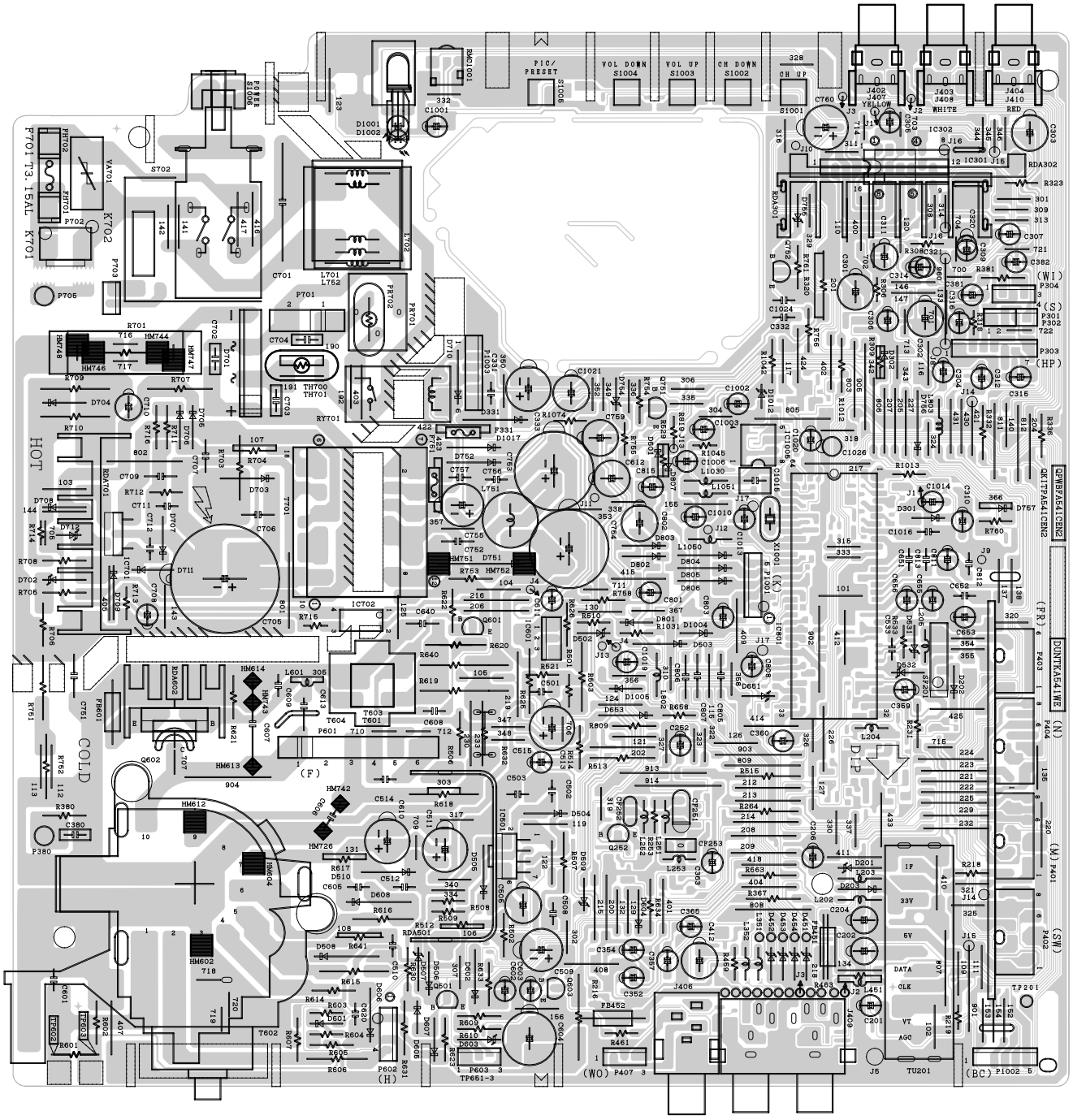
NOTE: 1. THE UNIT OF RESISTANCE "OHM" IS OMITTED (K=1000 OHMS, M=MEGAOHM).
2. ALL RESISTORS ARE 1/12 WATT. UNLESS OTHERWISE NOTED.
3. UNIT OF ALL CAPACITORS ARE F WITH PREFIX SYMBOL (u, P, ETC).



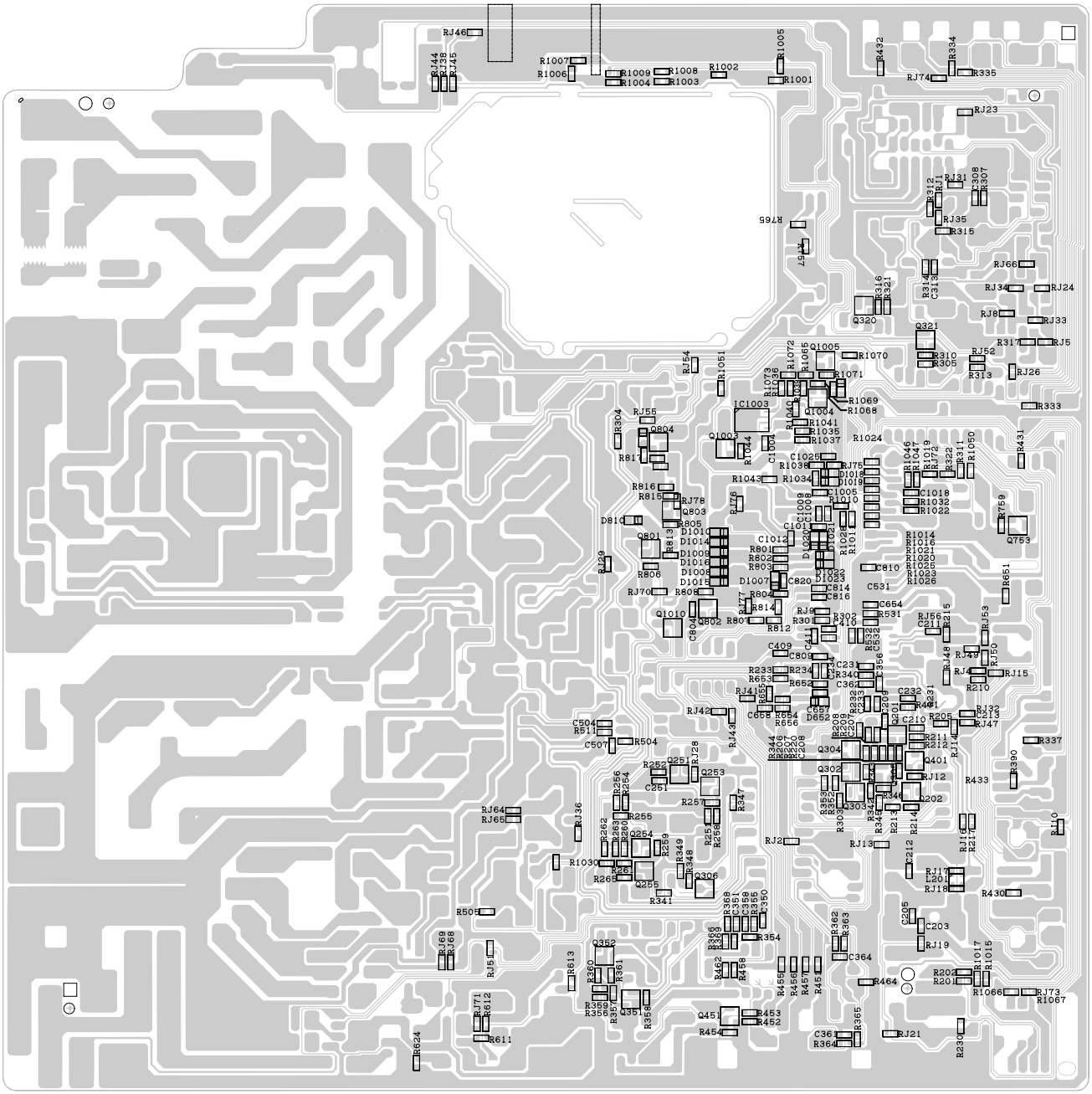
MODEL 20AR33 CHASSIS LAYOUT



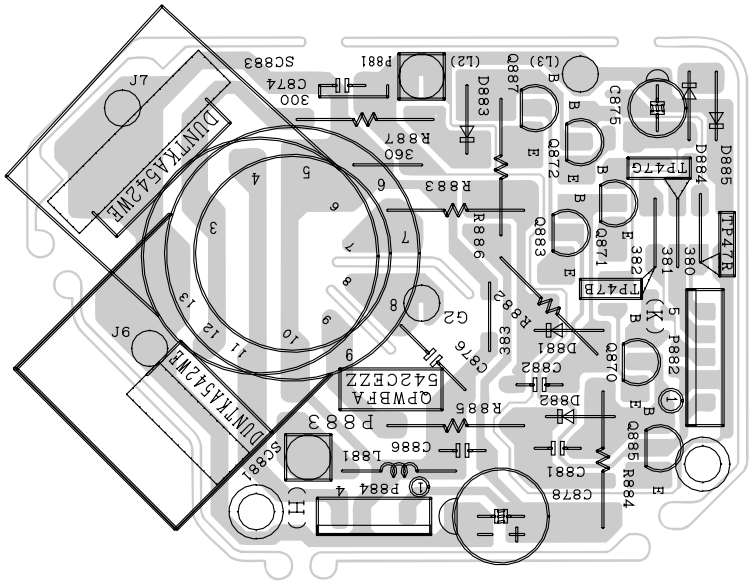
PRINTED WIRING BOARD ASSEMBLIES



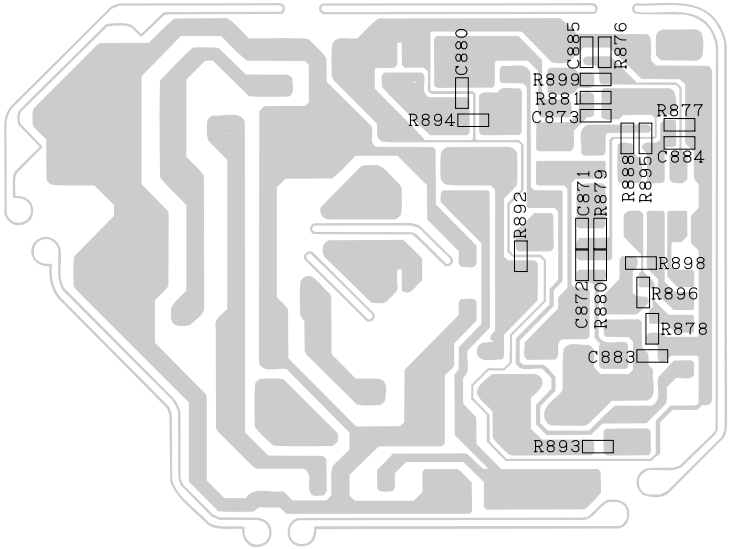
PWB-A: MAIN Unit (Wiring Side)



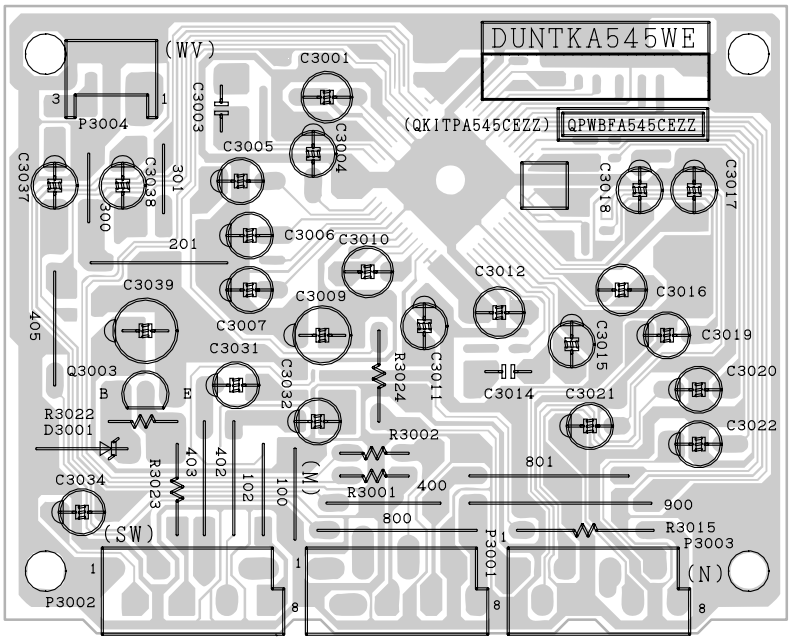
PWB-A: MAIN Unit (Chip Parts Side)



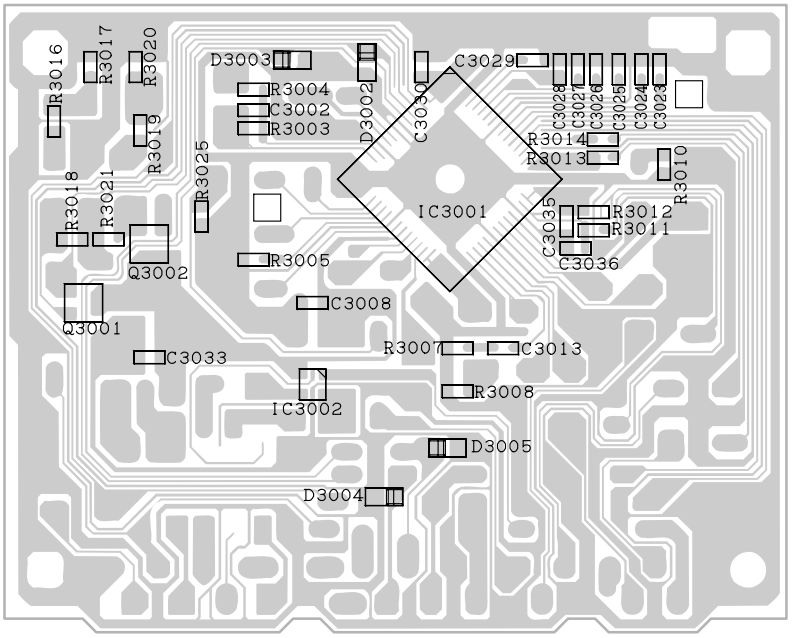
PWB-B: CRT Unit (Wiring Side)



PWB-B: CRT Unit (Chip Parts Side)



PWB-E: MTS MODULE Unit (Wiring Side)



PWB-E: MTS MODULE Unit (Chip Parts Side)

PARTS LIST

PARTS REPLACEMENT

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 no 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: SPARE PARTS-DELIVERY SECTION

▲ MARK : X- RAY RELATED PARTS

	Toshiba Part No.	Part No.	Ref.No.	Description

PICTURE TUBE

⚠	AD100444	VB48JLL40X/*S	V1	Picture Tube
⚠	AD100396	RCiLG0074PEZZ	L703	Degaussing Coil
⚠	AD100397	RCiLH0105GJZZ	DY601	Deflection Yoke
	AD100333	LHLDW0102GJKZ		Wire Holder, x5
	AD100350	PMAGF3045CEZZ		Purity Magne
	AD100363	QEARC2016PEZZ		Grounding Strap
	AD100356	PSPAG0012MEZZ		Wedge, x3

PRINTED WIRING BOARD ASSEMBLIES
(NOT REPLACEMENT ITEM)

PWB-A DUNTKA541WEA8	–	MAIN Unit (20AR33)	—
PWB-B DUNTKA542WEA1	–	CRT Unit	—
PWB-E DUNTKA545WEA0	–	MTS MODULE Unit	—

	Toshiba Part No.	Part No.	Ref.No.	Description	

PWB-A: DUNTK541WEA8 (20AR33)
MAIN UNIT

NOTE: THE PARTS HERE SHOWN ARE SUPPLIED AS AN ASSEMBLY BUT NOT INDEPENDENTLY.

U	AD100718	VTUVTST5UF690		Tuner	

INTEGRATED CIRCUITS

	AD100661	VHiLA4600++-1	IC301	LA4600	
U	AD100662	VHiTDA9302H-1	IC501	TDA9302H	
		or			
	AD100637	VHIAN5522++-1			
		or			
	AD100663	VHiTDA9308			
	AD100640	VHiKA7808AP-1	IC601	KA7808API	
U	AD100641	VHiSTRG5653-1	IC701	STRG5653	
	AD100722	RH-iX3564CEN3	IC801	IX3564CE	
	AD100639	VHiBR24C02F1E	IC1003	BR24C02F-W	

TRANSISTORS

	AD100655	VS2SC2735//1E	Q201	2SC2735	
	AD100310	VS2SD601AR/-1	Q253	2SD601A	
	AD100310	VS2SD601AR/-1	Q254	2SD601A	
	AD100598	VS2SD601A//-1	Q320	2SD601A	
	AD100598	VS2SD601A//-1	Q401	2SD601A	
	AD100596	VS2SC3207//-1	Q601	2SC3207	
	AD100597	VS2SD2586//1E	Q602	2SD2586	
	AD100595	VS2SC3198-G-1	Q603	2SC3198-G	
	AD100595	VS2SC3198-G-1	Q751	2SC3198-G	
	AD100595	VS2SC3198-G-1	Q752	2SC3198-G	
	AD100594	VS2SB709A//-1	Q801	2SB709A	
	AD100594	VS2SB709A//-1	Q802	2SB709A	

DIODES

	AD100423	RH-EX0676GEZZ	D201	Zener	Diode, 33V
U	AD100508	RH-DX0247CEZZ	D331	Diode	
	AD100417	RH-EX0615GEZZ	D502	Zener	Diode, 5V
	AD100504	VHD1SS119//-1	D503	Diode	
	AD100410	RH-DX0441CEZZ	D505	Diode	
	AD100406	RH-DX0131CEZZ	D508	Diode	
	AD100421	RH-EX0665GEZZ	D509	Zener	Diode
	AD100504	VHD1SS119//-1	D511	Diode	
	AD100419	RH-EX0627GEZZ	D531	Zener	Diode, 8.2V
	AD100419	RH-EX0627GEZZ	D532	Zener	Diode, 8.2V
	AD100412	RH-DX0475CEZZ	D601	Diode	
U	AD100505	VHD1SS244//-1	D602	Diode	
U	AD 100422	RH-EX0667GEZZ	D603	Zener	Diode, 27V
U	AD100406	RH-DX0131CEZZ	D606	Diode	
U	AD100411	RH-DX0468CEZZ	D608	Diode	
		or			
	AD100407	RH-DX0229CEZZ			
	AD100419	RH-EX0627GEZZ	D651	Zener	Diode, 8.2V
	AD100504	VHD1SS119//-1	D653	Diode	
	AD100413	RH-DX0476CEZZ	D701	Diode	
	AD100506	VHD1SS82///1A	D705	Diode	
	AD100506	VHD1SS82///1A	D706	Diode	
	AD100506	VHD1SS82///1A	D707	Diode	
U	AD100720	RH-DXA006WJZZ	D751	Diode	
U	AD100406	RH-DX0131CEZZ	D752	Diode	Diode, 5.6V
	AD100418	RH-EX0616GEZZ	D754	Zener	Diode, 3.9V
	AD100415	RH-EX0603GEZZ	D755	Zener	
	AD100504	VHD1SS119//-1	D801	Diode	
	AD100504	VHD1SS119//-1	D802	Diode	
	AD100504	VHD1SS119//-1	D803	Diode	
	AD100504	VHD1SS119//-1	D804	Diode	
	AD100504	VHD1SS119//-1	D805	Diode	
	AD100504	VHD1SS119//-1	D806	Diode	

Toshiba Part No.	Part No.	Ref.No.	Description	

PWB-A: DUNTK541WEA8 (20AR33)
MAIN UNIT (Continued)

	AD100424	RH-PX0013PEZZ	AD1001	LED,	POWER
	AD100504	VHD1SS119//-1	D1004	Diode	
	AD100414	RH-EX0263TAZZ	D1007	Zener	Diode
	AD100416	RH-EX0611GEZZ	D1012	Zener	Diode
	AD100414	RH-EX0263TAZZ	D1018	Zener	Diode
	AD100414	RH-EX0263TAZZ	D1019	Zener	Diode
⚠	AD100427	RH-VX0073CEZZ	VA701	Varistor	

PACKAGED CIRCUITS

	AD100428	RMPTP0001PEZZ	PR702	Packaged	Circuit
	AD100403	RCRSB0300CEZZ	X1001	Crystal	

FILTERS AND COILS

	AD100721	RFiLC0013CEZZ	CF253	Ceramic	Filter
	AD100510	VP-DF270K0000	L202	Peaking	27µH
	AD100510	VP-DF270K0000	L203	Peaking	27µH
	AD100512	VP-XF1R2K0000	L204	Peaking	1.2µH
	AD100511	VP-XF120K0000	L253	Peaking	12µH
⚠	AD100726	RCiLF0078PEZZ	L701	Coil	
⚠	AD100398	RCiLP0225CEZZ	L751	Coil	
	AD100509	VP-DF100K0000	L802	Peaking	10µH
	AD100509	VP-DF100K0000	L803	Peaking	10µH
	AD100509	VP-DF100K0000	L1030	Peaking	10µH
	AD100509	VP-DF100K0000	L1050	Peaking	10µH
	AD100509	VP-DF100K0000	L1051	Peaking	10µH
	AD100404	RFiLC0405CEZZ	SF201	S.A.W	Filter

TRANSFORMERS

⚠	AD100435	RTRNZ0144PEZZ	T601	Transformer
⚠	AD100432	RTRNF0229PEZZ	T602	H-Volt Transformer
		or		
	AD100665	RTRNF0231PEZZ		
⚠	AD100434	RTRNW0015PEZZ	T701	Transformer

CAPACITORS

	AD100456	VCEA0A1CW476M	C201	47	16V	EL.
	AD100719	VCEA0A1AW108M	C202	1000	10V	EL.
	AD100491	VCKYCY1HF103Z	C205	0.01	50V	Ceramic
	AD100460	VCEA0A1HW105M	C206	1	50V	EL.
	AD100482	VCKYCY1HB103K	C207	0.01	50V	Ceramic
	AD100482	VCKYCY1HB103K	C208	0.01	50V	Cerami
	AD100482	VCKYCY1HB103K	C209	0.01	50V	Ceramic
	AD100491	VCKYCY1HF103Z	C210	0.01	50V	Ceramic
	AD100491	VCKYCY1HF103Z	C211	0.01	50V	Ceramic
	AD100492	VCKYCY1HF223Z	C231	0.022	50V	Ceramic
	AD100490	VCKYCY1HB821K	C232	820p	50V	Ceramic
	AD100488	VCKYCY1HB472K	C233	4700p	50V	Ceramic
	AD100480	VCKYCY1EF104Z	C234	0.1	25V	Ceramic
	AD100492	VCKYCY1HF223Z	C251	0.022	50V	Ceramic
	AD100453	VCEA0A1CW107M	C252	100	16V	EL.
	AD100393	RC-EZA009WJZZ	C301	220	16V	EL.
	AD100458	VCEA0A1CW477M	C302	470	16V	EL.
	AD100458	VCEA0A1CW477M	C303	470	16V	EL.
	AD100452	VCEA0A1CW106M	C304	10	16V	EL.
	AD100465	VCEA0A1HW475M	C305	4.7	50V	EL.
	AD100460	VCEA0A1HW105M	C306	1	50V	EL.
	AD400463	VCEA0A1HW224M	C307	0.22	50V	EL.
	AD100478	VCKYCY1CB473K	C308	0.047	16V	Ceramic
	AD100392	RC-EZA008WJZZ	C311	100	16V	EL.
	AD100463	VCEA0A1HW224M	C312	0.22	50V	EL.
	AD100478	VCKYCY1CB473K	C313	0.047	16V	Ceramic
	AD100471	VCEAKA1HW224M	C314	0.22	50V	EL.
⚠	AD100498	VCQYTA1HM103J	C332	0.01	50V	Mylar
⚠	AD100391	RC-EZ1086CEZZ	C333	1000	16V	EL.
	AD100452	VCEA0A1CW106M	C359	10	16V	EL.
	AD100480	VCKYCY1EF104Z	C409	0.1	25V	Ceramic
	AD100480	VCKYCY1EF104Z	C410	0.1	25V	Ceramic
	AD100481	VCKYCY1HB102K	C411	1000p	50V	Ceramic
	AD100494	VCKYPA1HB102K	C501	1000p	50V	Ceramic
	AD100482	VCKYCY1HB103K	C504	0.01	50V	Ceramic
	AD100462	VCEA0A1HW107M	C505	100	50V	EL.
	AD100482	VCKYCY1HB103K	C507	0.01	50V	Ceramic
	AD100475	VCFYSA1JB224J	C508	0.22	63V	Mylar
	AD100458	VCEA0A1CW477M	C509	470	16V	EL.
	AD100496	VCKYPA2HB102K	C510	1000p	500V	Ceramic
	AD100476	VCFYSA1JB473J	C514	0.047	63V	Mylar
	AD100481	VCKYCY1HB102K	C531	1000p	50V	Ceramic
	AD100481	VCKYCY1HB102K	C532	1000p	50V	Ceramic
	AD100499	VCQYTA1HM104J	C533	0.1	50V	Mylar
	AD100503	VCQYTA1HM563J	C601	0.056	50V	Mylar
	AD100465	VCEA0A1HW475M	C602	4.7	50V	EL.
	AD100460	VCEA0A1HW105M	C603	1	50V	EL.
	AD100467	VCEA0A2EW106M	C604	10	250V	EL.
	AD100496	VCKYPA2HB102K	C605	1000p	500V	Ceramic
	AD100472	VCFPVC2DB474J	C606	0.47	200V	M-Poly.
	AD100473	VCFPVC3ZA772H	C607	7700p	1.8kV	M-Poly.
	AD100496	VCKYPA2HB102K	C608	1000p	500V	Ceramic
	AD100454	VCEA0A1CW108M	C610	1000	16V	EL.
	AD100459	VCEA0A1EW476M	C611	47	25V	EL.
	AD100458	VCEA0A1CW477M	C612	470	16V	EL.
	AD100496	VCKYPA2HB102K	C620	1000p	500V	Ceramic
	AD100477	VCFYSB2EB823J	C640	0.082	250V	
	AD100501	VCQYTA1HM222J	C651	2200p	50V	Mylar
	AD100502	VCQYTA1HM472J	C652	4700p	50V	Mylar
	AD100460	VCEA0A1HW105M	C653	1	50V	EL.
	AD100492	VCKYCY1HF223Z	C654	0.022	50V	Ceramic
	AD100461	VCEA0A1HW106M	C655	10	50V	EL.
	AD100463	VCEA0A1HW224M	C656	0.22	50V	EL.
	AD100480	VCKYCY1EF104Z	C657	0.1	25V	Ceramic
	AD100480	VCKYCY1EF104Z	C658	0.1	25V	Ceramic
⚠	AD100394	RC-FZ036SCEZZ	C701	0.1	275V	Plastic
	AD100399	RC-KZ0029CEZZ	C702	0.01	250V	Ceramic
	AD100399	RC-KZ0029CEZZ	C703	0.01	250V	Ceramic
	AD100399	RC-KZ0029CEZZ	C704	0.01	250V	Ceramic
	AD100390	RC-EZ0804CEZZ	C705	220	400V	EL.
	AD100400	RC-KZ0039CEZZ	C709	680	2kV	Ceramic
	AD100466	VCEA0A1HW476M	C710	47	50V	EL.
	AD100494	VCKYPA1HB102K	C711	1000p	50V	Ceramic
	AD100495	VCKYPA1HB471K	C712	470p	50V	Ceramic
⚠	AD100401	RC-KZ0092GEZZ	C751	3300p	AC250V	Ceramic
⚠	AD100497	VCKYPH3DB561K	C752	560p	2000V	Ceramic
⚠	AD100389	RC-EZ0724CEZZ	C753	100	16V	EL.
⚠	AD100389	RC-EZ0724CEZZ	C754	33	160V	EL.
⚠	AD10 0454	VCEA0A1CW108M	C755	1000	16V	EL.
⚠	AD100498	VCQYTA1HM103J	C756	0.01	50V	Mylar
	AD100450	VCEA0A0JW477M	C759	470	6.3V	EL.
	AD100449	VCEA0A0JW228M	C760	2200	6.3V	EL.
	AD100460	VCEA0A1HW105M	C801	1	50V	EL.
	AD100456	VCEA0A1CW337M	C802	330	16V	EL.
	AD100453	VCEA0A1CW107M	C803	100	16V	EL.
	AD100484	VCKYCY1HB222K	C804	2200p	50V	Ceramic
	AD100493	VCKYD41HB102K	C805	1000p	50V	Ceramic
	AD100493	VCKYD41HB102K	C806	1000p	50V	Ceramic
	AD100493	VCKYD41HB102K	C807	1000p	50V	Ceramic
	AD100453	VCEA0A1CW107M	C808	100	16V	EL.
	AD100479	VCKYCY1CF474Z	C809	0.47	16V	Ceramic
	AD100479	VCKYCY1CF474Z	C810	0.47	16V	Ceramic
	AD100453	VCEA0A1CW107M	C811	100	16V	EL.
	AD100474	VCFYFA1HA224J	C812	0.22	50V	Mylar
	AD100474	VCFYFA1HA224J	C813	0.22	50V	Mylar
	AD100487	VCKYCY1HB471K	C814	470p	50V	Ceramic
	AD100487	VCKYCY1HB471K	C816	470p	50V	Ceramic

PWB-A: DUNTK541WEA8 (20AR33)
MAIN UNIT (Continued)

CAPACITORS

Toshiba Part No.	Part No.	Ref.No.			Description
AD100448	VCEA0A0JW107M	C1001	100	6.3V	EL.
AD100448	VCEA0A0JW107M	C1002	100	6.3V	EL.
AD100452	VCEA0A1CW106M	C1003	10	16V	EL.
AD100479	VCKYCY1CF474Z	C1004	0.47	16V	Ceramic
AD100479	VCKYCY1CF474Z	C1005	0.47	16V	Ceramic
AD100452	VCEA0A1CW106M	C1006	10	16V	EL.
AD100445	VCCCCY1HH330J	C1008	33p	50V	Ceramic
AD100445	VCCCCY1HH330J	C1009	33p	50V	Ceramic
AD100448	VCEA0A0JW107M	C1010	100	6.3V	EL.
AD100479	VCKYCY1CF474Z	C1011	0.47	16V	Ceramic
AD100479	VCKYCY1CF474Z	C1012	0.47	16V	Ceramic
AD100448	VCEA0A0JW107M	C1013	100	6.3V	EL.
AD100499	VCQYTA1HM104J	C1016	0.1	50V	Mylar
AD100483	VCKYCY1HB221K	C1018	220p	50V	Ceramic
AD100499	VCQYTA1HM104J	C1024	0.1	50V	Mylar
AD100448	VCEA0A0JW107M	C1026	100	6.3V	EL.

RESISTORS

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

Toshiba Part No.	Part No.	Ref.No.			Description
AD100552	VRS-CY1JF000J	RJ1	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ2	00	1/16W	M-Ox.
AD100552□	VRS-CY1JF000J□	RJ4□	00□	1/16W□	M-Ox.
AD100552	VRS-CY1JF000J	RJ5	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ8	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ9	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ10	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ13	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ14	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ15	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ16	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ17	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ19	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ21	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ23	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ24	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ26	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ28	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ32	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ34	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ37	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ38	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ41	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ42	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ43	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ46	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ49	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ50	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ51	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ52	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ53	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ55	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ70	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ71	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ73	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ75	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ76	00	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	RJ77	00	1/16W	M-Ox.
AD100552	VRS-CY1JF101J	R201	00	1/16W	M-Ox.
AD100552	VRS-CY1JF101J	R202	00	1/16W	M-Ox.
AD100580	VRS-CY1JF680J	R205	00	1/16W	M-Ox.
AD100558	VRS-CY1JF122J	R206	00	1/16W	M-Ox.
AD100563	VRS-CY1JF221J	R207	00	1/16W	M-Ox.
AD100558	VRS-CY1JF122J	R208	00	1/16W	M-Ox.
AD100572	VRS-CY1JF392J	R209	3.9k	1/16W	M-Ox.
AD100589	VRS-RG3LB223J	R216	22k	3W	M-Ox.
AD100526	VRD-RA2BE392J	R219	3.9k	1/8W	Carbon
AD100563	VRS-CY1JF221J	R220	220	1/16W	M-Ox.
AD100575	VRS-CY1JF473J	R230	47k	1/16W	M-Ox.
AD100532	VRD-RA2BE681J	R231	680	1/8W	Carbon
AD100566	VRS-CY1JF272J	R232	2.7k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R233	100	1/16W	M-Ox.
AD100571	VRS-CY1JF391J	R234	390	1/16W	M-Ox.
AD100561	VRS-CY1JF181J	R257	180	1/16W	M-Ox.
AD100561	VRS-CY1JF181J	R258	180	1/16W	M-Ox.
AD100573	VRS-CY1JF471J	R259	470	1/16W	M-Ox.
AD100572	VRS-CY1JF392J	R260	3.9k	1/16W	M-Ox.
AD100564	VRS-CY1JF223J	R261	22k	1/16W	M-Ox.
AD100576	VRS-CY1JF560J	R262	56	1/16W	M-Ox.
AD100576	VRS-CY1JF560J	R263	56	1/16W	M-Ox.
AD100563	VRS-CY1JF221J	R304	220	1/16W	M-Ox.
AD100568	VRS-CY1JF274J	R305	270k	1/16W	M-Ox.
AD100525□	VRD-RA2BE391J□	R306□	390□	1/8W□	Carbon
AD100558	VRS-CY1JF122J	R307	1.2k	1/16W	M-Ox.
AD100516	VRD-RA2BE103J	R308	10k	1/8W	Carbon
AD100529	VRD-RA2BE473J	R309	47k	1/8W	Carbon
AD100575	VRS-CY1JF473J	R311	47k	1/16W	M-Ox.
AD100555	VRS-CY1JF103J	R314	10k	1/16W	M-Ox.
AD100558	VRS-CY1JF122J	R315	1.2k	1/16W	M-Ox.
AD100556	VRS-CY1JF104J	R316	100k	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R334	3.3k	1/16W	M-Ox.
AD100578	VRS-CY1JF564J	R335	560k	1/16W	M-Ox.
AD100523	VRD-RA2BE332J	R336	3.3k	1/8W	Carbon
AD100578	VRS-CY1JF564J	R337	560k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R340	100	1/16W	M-Ox.
AD100583	VRS-CY1JF822J	R341	8.2k	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R362	3.3k	1/16W	M-Ox.
AD100578	VRS-CY1JF564J	R363	560k	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R364	3.3k	1/16W	M-Ox.
AD100578	VRS-CY1JF564J	R365	560k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R430	100	1/16W	M-Ox.

PWB-A: DUNTK541WEA8 (20AR33)
MAIN UNIT (Continued)

Toshiba Part No.	Part No.	Ref.No.			Description
AD100582	VRS-CY1JF750J	R432	75	1/16W	M-Ox.
AD100555	VRS-CY1JF103J	R433	10k	1/16W	M-Ox.
AD100582	VRS-CY1JF750J	R464	75	1/16W	M-Ox.
AD100520	VRD-RA2BE222J	R501	2.2k	1/8W	Carbon
AD100535	VRD-RM2HD102J	R502	1.0k	1/2W	Carbon
AD100547	VRN-RL3DB2R2J	R503	2.2	2W	M-Film
AD100561	VRS-CY1JF181J	R504	180	1/16W	M-Ox.
AD100554	VRS-CY1JF102J	R505	1.0k	1/16W	M-Ox.
AD100585	VRS-RG3AB391J	R506	390	1W	M-Ox.
AD100544	VRN-RL3AB1R0J	R507	1	1W	M-Film
AD100524	VRD-RA2BE333J	R510	33k	1/8W	Carbon
AD100561	VRS-CY1JF181J	R511	180	1/16W	M-Ox.
AD100534	VRD-RM2HD100J	R512	10	1/2W	Carbon
AD100553	VRS-CY1JF101J	R531	100	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R532	100	1/16W	M-Ox.
AD100527	VRD-RA2BE393J	R533	39k	1/8W	Carbon
AD100584	VRS-RG2HC102J	R601	1.0k	1/2W	M-Ox.
AD100527	VRD-RA2BE393J	R602	39k	1/8W	Carbon
AD100521	VRD-RA2BE223J	R603	22k	1/8W	Carbon
AD100527	VRD-RA2BE393J	R604	39k	1/8W	Carbon
AD100542	VRD-RM2HD823J	R605	82k	1/2W	Carbon
⚠ AD100545	VRN-RL3AB2R2	R606	2.2	1W	M-Film
⚠ AD100538	VRD-RM2HD270J	R607	27	1/2W	Carbon
⚠ AD100518	VRD-RA2BE154J	R609	150k	1/8W	Carbon
⚠ AD100514	VRD-RA2BE102G	R610	1.0k	1/8W	Carbon
AD100554	VRS-CY1JF102J	R611	1.0k	1/16W	M-Ox.
AD100559	VRS-CY1JF123J	R612	12k	1/16W	M-Ox.
AD100555	VRS-CY1JF103J	R613	10k	1/16W	M-Ox.
⚠ AD100727	VRD-RG2HC100J	R614	10	1/2W	Carbon
AD100588	VRS-RG3DB682J	R615	6.8k	2W	M-Ox.
AD100546	VRN-RL3ABR47J	R616	0.47	1W	M-Film
AD100587	VRS-RG3DB391J	R618	390	2W	M-Ox.
AD100590	VRS-RG3LB562J	R619	5.6k	3W	M-Ox.
AD100586	VRS-RG3AB472J	R620	4.7k	1W	M-Ox.
AD100514	VRD-RA2BE102J	R622	1.0k	1/8W	Carbon
AD100551	VRN-VV3DB4R7J	R625	4.7	2W	M-Film
AD100540	VRD-RM2HD470J	R626	47	1/2W	Carbon
AD100543	VRN-RL2HCR47J	R641	0.47	1/2W	M-Film
AD100564	VRS-CY1JF223J	R651	22k	1/16W	M-Ox.
AD100554	VRS-CY1JF102J	R652	1.0k	1/16W	M-Ox.
AD100583	VRS-CY1JF822J	R653	8.2k	1/16W	M-Ox.
AD100567	VRS-CY1JF273J	R654	27k	1/16W	M-Ox.
AD100571	VRS-CY1JF391J	R655	390	1/16W	M-Ox.
AD100562	VRS-CY1JF100J	R656	10	1/16W	M-Ox.
AD100513	VRD-RA2BE101J	R658	100	1/8W	Carbon
AD100513	VRD-RA2BE101J	R663	100	1/8W	Carbon
AD100593	VRW-KQ3NC3R9K	R701	3.9	7W	Cement
AD100550	VRN-SV2HC1R0J	R704	1	1/2W	M-Film
AD100591	VRS-VV3DB104J	R707	100k	2W	M-Ox.
AD100532	VRD-RA2BE681J	R708	680	1/8W	Carbon
AD100549	VRN-RL3DBR47J	R709	0.47	2W	M-Film
AD100548	VRN-RL3DBR39J	R710	0.39	2W	M-Film
AD100533	VRD-RA2BE682J	R711	6.8k	1/8W	Carbon
AD100517	VRD-RA2BE152J	R712	1.5k	1/8W	Carbon
AD100531	VRD-RA2BE562J	R716	5.6k	1/8W	Carbon
⚠ AD100429	RR-DZ0049CEZZ	R751	3.9M	1/2W	Solid
⚠ AD100429	RR-DZ0049CEZZ	R752	3.9M	1/2W	Solid
⚠ AD100536	VRD-RM2HD124J	R753	120k	1/2W	Carbon
AD100537	VRD-RM2HD150J	R754	15	1/2W	Carbon
AD100519	VRD-RA2BE221J	R755	220	1/8W	Carbon
AD100538	VRD-RM2HD270J	R756	27	1/2W	Carbon
AD100560	VRS-CY1JF151J	R757	150	1/16W	M-Ox.
AD100563	VRS-CY1JF221J	R801	220	1/16W	M-Ox.
AD100563	VRS-CY1JF221J	R802	220	1/16W	M-Ox.
AD100563	VRS-CY1JF221J	R803	220	1/16W	M-Ox.
AD100563	VRS-CY1JF221J	R804	220	1/16W	M-Ox.
AD100583	VRS-CY1JF822J	R805	8.2k	1/16W	M-Ox.
AD100559	VRS-CY1JF123J	R806	12k	1/16W	M-Ox.
AD100555	VRS-CY1JF103J	R807	10k	1/16W	M-Ox.
AD100563	VRS-CY1JF221J	R808	220	1/16W	M-Ox.
AD100522	VRD-RA2BE224J	R809	220k	1/8W	Carbon
AD100553	VRS-CY1JF101J	R812	100	1/16W	M-Ox.
AD100563	VRS-CY1JF221J	R813	220	1/16W	M-Ox.
AD100583	VRS-CY1JF822J	R1002	8.2k	1/16W	M-Ox.
AD100577	VRS-CY1JF562J	R1003	5.6k	1/16W	M-Ox.
AD100577	VRS-CY1JF562J	R1006	5.6k	1/16W	M-Ox.
AD100577	VRS-CY1JF562J	R1007	5.6k	1/16W	M-Ox.
AD100583	VRS-CY1JF822J	R1008	8.2k	1/16W	M-Ox.
AD100577	VRS-CY1JF562J	R1009	5.6k	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R1011	3.3k	1/16W	M-Ox.
AD100525	VRD-RA2BE391J	R1012	390	1/8W	Carbon
AD100513	VRD-RA2BE101J	R1013	100	1/8W	Carbon
AD100553	VRS-CY1JF101J	R1014	100	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R1015	3.3k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1016	100	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R1017	3.3k	1/16W	M-Ox.
AD100552	VRS-CY1JF000J	R1019	0	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1020	100	1/16W	M-Ox.
AD100562	VRS-CY1JF183J	R1021	18k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1022	100	1/16W	M-Ox.
AD100563	VRS-CY1JF221J	R1023	220	1/16W	M-Ox.
AD100562	VRS-CY1JF183J	R1024	18k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1025	100	1/16W	M-Ox.
AD100565	VRS-CY1JF224J	R1026	220k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1028	100	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R1032	3.3k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1034	100	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R1035	3.3k	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R1036	3.3k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1037	100	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1038	100	1/16W	M-Ox.
AD100564	VRS-CY1JF223J	R1039	22k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1040	100	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1041	100	1/16W	M-Ox.
AD100528	VRD-RA2BE471J	R1042	470	1/8W	Carbon
AD100553	VRS-CY1JF101J	R1046	100	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R1047	3.3k	1/16W	M-Ox.
AD100572	VRS-CY1JF392J	R1050	3.9k	1/16W	M-Ox.
AD100581	VRS-CY1JF683J	R1051	68k	1/16W	M-Ox.
AD100567	VRS-CY1JF273J	R1066	27k	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1072	100	1/16W	M-Ox.
AD100553	VRS-CY1JF101J	R1073	100	1/16W	M-Ox.
AD100520	VRD-RA2BE222J	JA223	2.2k	1/8W	Carbon

SWITCHES

AD100385	QSW-K0003AJZZ	S1001	Switch,	CH UP
AD100385	QSW-K0003AJZZ	S1002	Switch,	CH DOWN
AD100385	QSW-K0003AJZZ	S1003	Switch,	VOL UP
AD100385	QSW-K0003AJZZ	S1004	Switch,	VOL DOWN
AD100385	QSW-K0003AJZZ	S1005	Switch,	PICTURE /PRESET
AD100386	QSW-K0114CEZZ	S1006	Switch,	POWER

MISCELLANEOUS PARTS

AD100364	QFS-C3229CEZZ	F701	Fuse,	T3.14AL	
AD100387	RBLN-0091GEZZ	FB601	Ferrite	Bead	
AD100365	QFSHD1013CEZZ	FH701	Fuse	Holder	
AD100366	QFSHD1014CEZZ	FH702	Fuse	Holder	
AD100370	QJAKE0211CE04	J402	Jack,	Video (AV)	
AD100371	QJAKE0211CE09	J403	Jack,	Audio	(L)(AV)
AD100367	QJAKE0210CE02	J404	Jack,	Audio	(R)(AV)
AD100373	QJAKG0093CEZZ	J409	Jack,	Rear	AV

PWB-A: DUNTK541WEA8 (20AR33)
MAIN UNIT (Continued)

Toshiba Part No.	Part No.	Ref.No.	Description	
AD100379	QPLGN0461CEZZ	P302	Plug,	4-pin (S)
AD100381	QPLGN0660CEZZ	P601	Plug,	6-pin (K)
AD100378	QPLGN0361CEZZ	P603	Plug,	3-pin (TP651-
AD100376	QPLGN0260CEZZ	P701	Plug,	2-pin (M)
AD100377	QPLGN0269GEZZ	P702	Plug,	2-pin
AD100380	QPLGN0561CEZZ	P1002	Plug,	5-pin (BC)
AD100431	RRMCU0222CEZZ	RMC1001	R/C	Receiver
AD100353	PRDAR0120GJFW	RDA301	Heat	Sink, for IC301
AD100351	PRDAR0118GJFW	RDA501	Heat	Sink, for IC501
AD100354	PRDAR0224PEFW	RDA602	Heat	Sink, for Q602
AD100355	PRDAR0298PEFW	RDA701	Heat	Sink, for IC701
AD100374	QLUGP0102PEZZ	TP201	Lug,	Test Point
AD100332	LHLDP1066PE00		Holder	
AD100339	LHLDW1104PEZZ		Holder	
AD100340	LHLDW1105PEZZ		Holder	
AD100344	LX-BZ0086TAFD		Screw	
AD100345	LX-BZ3049GEFD		Screw	
AD100347	LX-TZ3004CEFD		Screw	
AD100361	QCNW-2619PEZZ		Connecting	Cord
AD100362	QCNW-2620PEZZ		Connecting	Cord

PWB-B: DUNTK542WEA3
CRT UNIT

TRANSISTORS

Toshiba Part No.	Part No.	Ref.No.	Description
AD100425	RH-TX0110BMZZ	Q870	TX0110BM
AD100425	RH-TX0110BMZZ	Q871	TX0110BM
AD100425	RH-TX0110BMZZ	Q872	TX0110BM
AD100426	RH-TX0124BMZZ	Q883	TX0110BM
AD100426	RH-TX0124BMZZ	Q885	TX0124BM
AD100426	RH-TX0124BMZZ	Q887	TX0124BM

DIODES

Toshiba Part No.	Part No.	Ref.No.	Description
AD100504	VHD1SS119//-1	D881	Diode
AD100504	VHD1SS119//-1	D882	Diode
AD100504	VHD1SS119//-1	D883	Diode
AD100504	VHD1SS119//-1	D884	Diode
AD100504	VHD1SS119//-1	D885	Diode

CAPACITORS

[EL. …Electrolytic]

Toshiba Part No.	Part No.	Ref.No.			
AD100446	VCCSCY1HL471J	C871	470p	50V	Ceramic
AD100446	VCCSCY1HL471J	C872	470p	50V	Ceramic
AD100446	VCCSCY1HL471J	C873	470p	50V	Ceramic
AD100496	VCKYPA2HB102K	C875	1000p	500V	Ceramic
AD100402	RC-KZ0150CEZZ	C876	1000p	3kV	Ceramic
AD100467	VCEA0A2EW106M	C878	10	250V	EL.
AD100446	VCCSCY1HL471J	C880	470p	50V	Ceramic
AD100495	VCKYPA1HB471K	C881	470p	50V	Ceramic
AD100495	VCKYPA1HB471K	C882	470p	50V	Ceramic
AD100496	VCKYPA2HB102K	C886	1000p	500V	Ceramic

RESISTORS

[M-Ox. …Metal Oxide]

Toshiba Part No.	Part No.	Ref.No.			
AD100573	VRS-CY1JF471J	R879	470	1/16W	M-Ox.
AD100573	VRS-CY1JF471J	R880	470	1/16W	M-Ox.
AD100573	VRS-CY1JF471J	R881	470	1/16W	M-Ox.
AD100592	VRS-VV3DB153J	R882	15k	2W	M-Ox.
AD100539	VRD-RM2HD272J	R883	2.7k	1/2W	Carbon
AD100592	VRS-VV3DB153J	R884	15k	2W	M-Ox.
AD100539	VRD-RM2HD272J	R885	2.7k	1/2W	Carbon
AD100592	VRS-VV3DB153J	R886	15k	2W	M-Ox.
AD100539	VRD-RM2HD272J	R887	2.7k	1/2W	Carbon
AD100573	VRS-CY1JF471J	R888	470	1/16W	M-Ox.
AD100554	VRS-CY1JF102J	R892	1.0k	1/16W	M-Ox.
AD100554	VRS-CY1JF102J	R893	1.0k	1/16W	M-Ox.
AD100554	VRS-CY1JF102J	R894	1.0k	1/16W	M-Ox.
AD100573	VRS-CY1JF471J	R898	470	1/16W	M-Ox.
AD100573	VRS-CY1JF471J	R899	470	1/16W	M-Ox.

MISCELLANEOUS PARTS

Toshiba Part No.	Part No.	Ref.No.		
AD100383	QSOCV0840CEZZ	SC881	CRT	Socket
	or			
AD100384	QSOCV0841CEZZ			

Toshiba Part No.	Part No.	Ref.No.	Description

PWB-E: DUNTK545WEA0
MTS MODULE UNIT

INTEGRATED CIRCUITS

AD100507	VHiCXA2074Q-1	IC3001	CXA2074Q
AD100508	VHiMM1501XN-1	IC3002	MM1501XNRE

TRANSISTORS

AD100595	VS2SC3198-G-1	Q3003	C3198-G

DIODE

AD100420	RH-EX0632GEZZ	D3001	Zener Diode

CAPACITORS

[EL. …Electrolytic]

AD100447	VCE9GA1HW475M	C3001	4.7	50V	EL. (N.P)
AD100489	VCKYCY1HB562K	C3002	5600p	50V	Ceramic
AD100500	VCQYTA1HM123K	C3003	0.012	50V	Mylar
AD100460	VCEA0A1HW105M	C3004	1	50V	EL.
AD100468	VCEA9A1HW475M	C3005	4.7	50V	EL.
AD100452	VCEA0A1CW106M	C3006	10	16V	EL.
AD100465	VCEA0A1HW475M	C3007	4.7	50V	EL.
AD100491	VCKYCY1HF103Z	C3008	0.01	50V	Ceramic
AD100455	VCEA0A1CW227M	C3009	220	16V	EL.
AD100447	VCE9GA1HW475M	C3010	4.7	50V	EL. (N.P)
AD100465	VCEA0A1HW475M	C3011	4.7	50V	EL.
AD100447	VCE9GA1HW475M	C3012	4.7	50V	EL. (N.P)
AD100485	VCKYCY1HB272K	C3013	2700p	50V	Ceramic
AD100470	VCEACA1HC335K	C3015	3.3	50V	EL.
AD100447	VCE9GA1HW475M	C3016	4.7	50V	EL. (N.P)
AD100469	VCEACA1CC106K	C3017	10	16V	EL.
AD100460	VCEA0A1HW105M	C3018	1	50V	EL.
AD100452	VCEA0A1CW106M	C3019	10	16V	EL.
AD100452	VCEA0A1CW106M	C3020	10	16V	EL.
AD100452	VCEA0A1CW106M	C3021	10	16V	EL.
AD100452	VCEA0A1CW106M	C3022	10	16V	EL.
AD100452	VCEA0A1CW106M	C3031	10	16V	EL.
AD100452	VCEA0A1CW106M	C3032	10	16V	EL.
AD100491	VCKYCY1HF103Z	C3033	0.01	50V	Ceramic
AD100463	VCEA0A1HW224M	C3034	0.22	50V	EL.
AD100455	VCEA0A1CW227M	C3039	220	16V	EL.

RESISTORS

[M-Ox. …Metal Oxide]

AD100519	VRD-RA2BE221J	R3001	220	1/8W	Carbon
AD100519	VRD-RA2BE221J	R3002	220	1/8W	Carbon
AD100557	VRS-CY1JF105J	R3003	1.0M	1/16W	M-Ox.
AD100556	VRS-CY1JF104J	R3004	100k	1/16W	M-Ox.
AD100579	VRS-CY1JF623J	R3005	62k	1/16W	M-Ox.
AD100570	VRS-CY1JF332J	R3007	3.3k	1/16W	M-Ox.
AD100569	VRS-CY1JF302J	R3008	3.0k	1/16W	M-Ox.
AD100572	VRS-CY1JF392J	R3010	3.9k	1/16W	M-Ox.
AD100554	VRS-CY1JF102J	R3011	1.0k	1/16W	M-Ox.
AD100554	VRS-CY1JF102J	R3012	1.0k	1/16W	M-Ox.
AD100554	VRS-CY1JF102J	R3013	1.0k	1/16W	M-Ox.
AD100554	VRS-CY1JF102J	R3014	1.0k	1/16W	M-Ox.
AD100513	VRD-RA2BE101J	R3015	100	1/8W	Carbon
AD100530	VRD-RA2BE560J	R3022	56	1/8W	Carbon
AD100541	VRD-RM2HD5R6J	R3023	5.6	1/2W	Carbon
AD100574	VRS-CY1JF472J	R3025	4.7k	1/16W	M-Ox.

MISCELLANEOUS PARTS

AD100382	QPLGZ0810CEZZ	P3001	Plug,	8-pin	(M)
AD100382	QPLGZ0810CEZZ	P3002	Plug,	8-pin	(SW)
AD100382	QPLGZ0810CEZZ	P3003	Plug,	8-pin	(N)

MISCELLANEOUS PARTS

	Toshiba Part No.	Part No.	Ref.No.	Description	
⚠	AD100359	QACCZ3008PEZZ	ACC701	AC Cord	(R)
	AD100599	VSP9050PB394A	SP301	Speaker	(L)
	AD100599	VSP9050PB394A	SP302	Speaker	Holder
	AD100331	LHLDK0012PEZZ		AC Cord	
	AD100334	LHLDW1003PEZZ		Holder	
	AD100335	LHLDW1009PEZZ		Holder	
	AD100336	LHLDW1033PEZZ		Holder	
	AD100337	LHLDW1060CEZZ		Holder	
	AD100339	LHLDW1104PEZZ		Holder	
	AD100340	LHLDW1105PEZZ		Holder	
	AD100341	LHLDZ0063PEZZ		Holder	
	AD100346	LX-TZ0104GJFD		CRT Screw,	x4
	AD100348	LX-WZ0102GJFD		CRT Washer,	x4
	AD100338	LHLDW1070PEKZ		Holder	
	AD100342	LHLDZ1002GJZZ		Holder	
	AD100343	LHLDZ1003GJZZ		Holder	
	AD100347	LX-TZ3004CEFD		Screw	
	AD100357	PSPAH0117GJ00		Spacer	
	AD100358	PSPAH0118GJ00		Spacer	
	AD100360	QCNW-2562PEZZ		Connecting	Cord
	AD100717	TLABZA134WJZZ		Label	
	AD100443	TLABM0109GJZZ		Model Label	
	AD100601	XTASD40P20000		Screw	

SUPPLIED ACCESORRIES

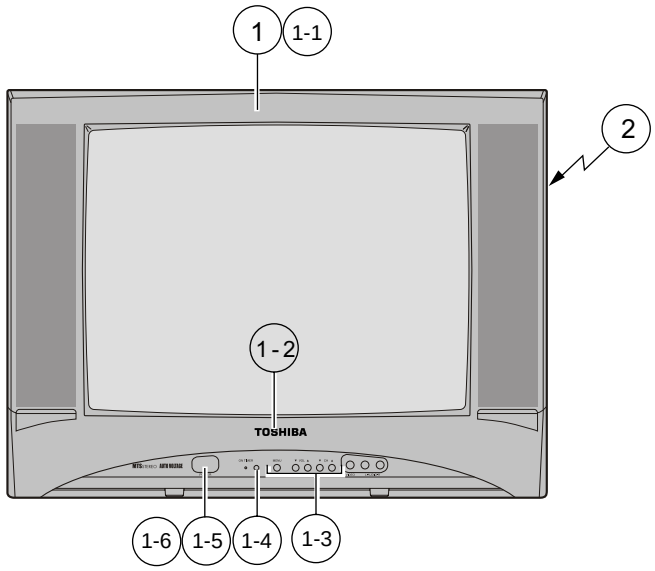
Toshiba Part No.	Part No.	Description
AD100375	QPLGA0017CEZZ	AC Plug Adapter
AD100430	RRMCG1589CESA	Infrared R/C Unit
AD100812	TINS-A762WJZZ	Operation Manual

PACKING PARTS
(NOT REPLACEMANT ITEM)

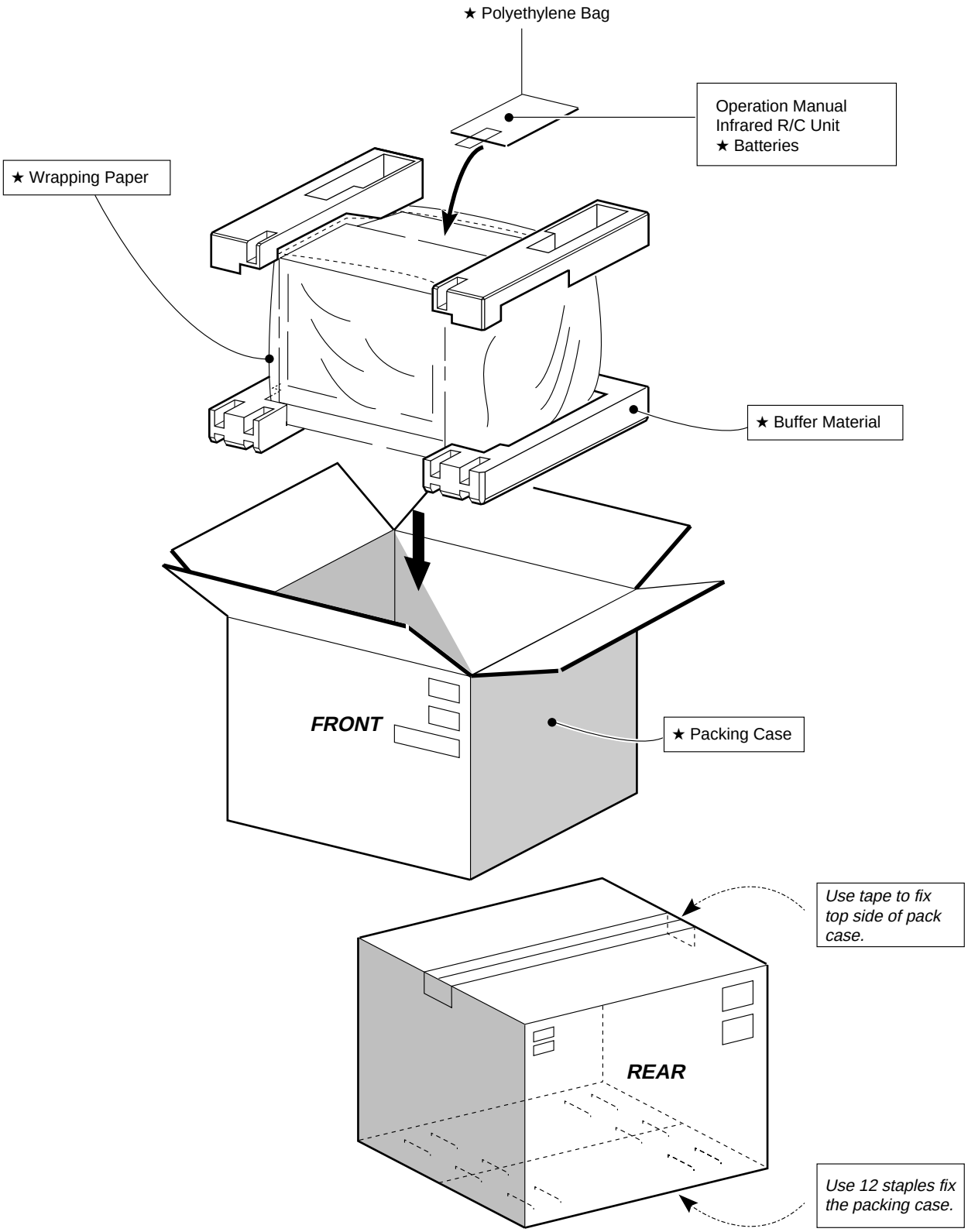
Toshiba Part No.	Part No.	Ref.No.	Description	
AD100815	SPAKCA904WJZZ	–	Packing Case	—
AD100437	SPAKP0102GJZZ	–	Wrapping Paper	—
AD100811	SPAKXA258WJZZ	–	Buffer Material	—
AD100439	SSAKA0101GJZZ	–	Polyethylene Bag	—

CABINET PARTS

Toshiba Part No.	Part No.	Ref.No.	Description	
AD100814	CCABAA107WEH0	1	Front Cabinet Ass'y	
	Not Available	1--1	Front Cabinet	
AD100807	GCOVAA418WJSA	1--3	Cover for LED,R/C	
AD100808	HBDGBA027WJSA	1--4	Badge, "TOSHIBA"	
AD100809	JBTN-A160WJSA	1--2	Button, Menu,	CH-up/down, Vol-up/down
AD100810	JBTN-A161WJSA	1--5	Button, Power	
AD100349	MSPRC0005PEFW	1--6	Spring for	Power Button
AD100323	GCABB0129GJKA	2	Rear Cabinet	



PACKING OF THE SET



★ **MARK** : Not Replacement Items.

TOSHIBA CORPORATION
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