

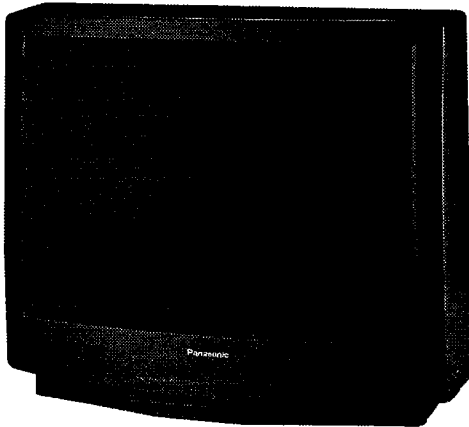
2045

Service Manual

(4642) Color Television

Main Manual (NA6DM)

Panasonic

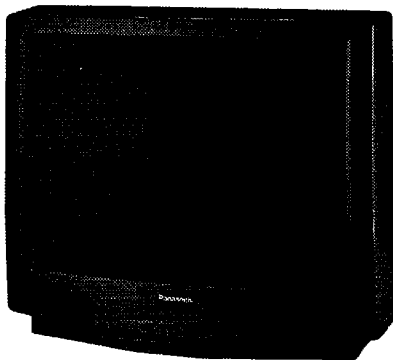


CT-35G23W & CT-36G23W/UW/CW

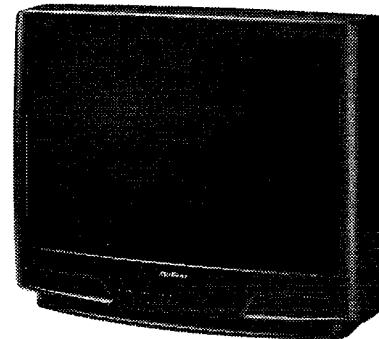
| Models | Chassis |
|--------------|---------|
| CT-35G23W | AEDP313 |
| CT-36G23W/UW | AEDP313 |
| CT-36G23CW | AEDP313 |
| CT-32G23W/UW | AEDP311 |
| CT-32G23CW | AEDP311 |

Quasar

| Models | Chassis |
|------------|----------|
| SP3231W/UW | ANEDC311 |



CT-32G23W/UW/CW



SP3231W/UW

NOTE: Model CT-36G23UW is identical to CT-36G23W; Model CT-32G23UW is identical to CT-32G23W; and model SP3231UW is identical to SP3231W except for the magnetic field used in the factory to adjust purity and convergence for different markets.

This **Service Manual** is issued as a service guide for the models of the NA6DM family listed above. Included in this manual are a set of schematics, alignment procedures, block diagrams and a complete parts list.

Note: Please refer to **NA6D/L Technical Guide (MTC9702684G1)** for more functional descriptions and block diagrams.

"WARNING! This Service Manual is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. **Products powered by electricity should be serviced or repaired only by experienced professional technicians.** Any attempt to service or repair the product or products dealt with in this Service Manual by anyone else could result in serious injury or death."

The service technician is required to read and follow the "Safety Precautions" and "Important Safety Notice" in this manual.

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Important Safety Notice

Special components are used in this television set which are important for safety. These parts are identified on the schematic diagram by the symbol \triangle and printed in **BOLD TYPE** on the replacement parts list. It is essential that these critical parts are replaced with the manufacturer's specified replacement parts to prevent X-ray radiation, shock, fire or other hazards. Do not modify the original design without the manufacturer's permission.

Safety Precautions

General Guidelines

An **Isolation Transformer** should always be used during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks. It will also protect the Receiver from being damaged by accidental shorting that may occur during servicing.

When servicing, observe the original lead dress, especially in the high voltage circuit. Replace all damaged parts (also parts that show signs of overheating.)

Always Replace Protective Devices, such as fishpaper, isolation resistors and capacitors, and shields after servicing the Receiver. Use only manufacturer's recommended rating for fuses, circuit breakers, etc.

High potentials are present when this Receiver is operating. Operation of the Receiver without the rear cover introduces danger from electrical shock. Servicing should not be performed by anyone who is not thoroughly familiar with the necessary precautions when servicing high-voltage equipment.

Extreme care should be practiced when **Handling the Picture Tube**. Rough handling may cause it to implode due to atmospheric pressure (14.7 lbs per sq. in.). Do not nick or scratch the glass or subject it to any undue pressure. When handling, use safety goggles and heavy gloves for protection. **Discharge the picture tube** by shorting the anode to chassis ground (not to the cabinet or to other mounting hardware). When discharging, connect cold ground (i.e. dag ground lead) to the anode with a well insulated wire or use a grounding probe.

Avoid prolonged exposure at close range to unshielded areas of the picture tube to prevent exposure to X-ray radiation.

The **Test Picture Tube** used for servicing the chassis at the bench should incorporate safety glass and magnetic shielding. The safety glass provides shielding for the tube viewing area against X-ray radiation as well as implosion. The magnetic shield limits X-ray radiation around the bell of the picture tube in addition to restricting magnetic effects. When using a picture tube test jig for service, ensure that the jig is capable of handling **41.2kV** without causing X-ray radiation.

Before returning a serviced receiver to the owner, the service technician must thoroughly test the unit to ensure that it is completely safe to operate. **Do not use a line isolation transformer when testing.**

Leakage Current Cold Check

Unplug the AC cord and connect a jumper between the two plug prongs.

Measure the resistance between the jumpered AC plug and exposed metallic parts such as screwheads,

antenna terminals, control shafts, etc. If the exposed metallic part has a return path to the chassis, the reading should be between 240k Ω and 5.2M Ω . If the exposed metallic part does not have a return path to the chassis, the reading should be infinite.

Leakage Current Hot Check (See Figure 1)

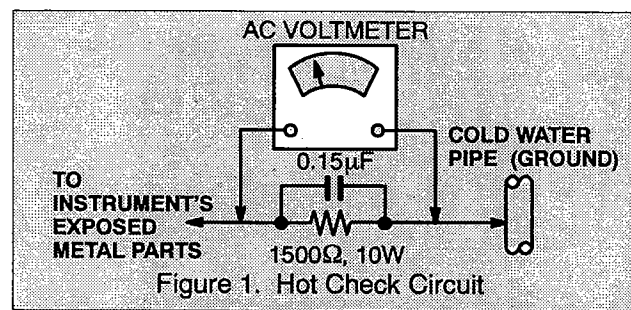
Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during the check.

Connect a 1.5k Ω 10 watt resistor in parallel with a 0.15 μ F capacitor between an exposed metallic part and ground. Use earth ground, for example a water pipe.

Using a DVM with a 1000 ohms/volt sensitivity or higher, measure the AC potential across the resistor.

Repeat the procedure and measure the voltage present with all other exposed metallic parts.

Verify that any potential does not exceed 0.75 volt RMS. A leakage current tester (such as a Simpson Model 229, Sencore Model PR57 or equivalent) may be used in the above procedure, in which case any current measure must not exceed 1/2 milliamp. If any measurement is out of the specified limits, there is a possibility of a shock hazard and the Receiver must be repaired and rechecked before it is returned to the customer.



X-ray Radiation

WARNING: The potential source of X-ray radiation in TV sets is in the High Voltage section and the picture tube.

NOTE: It is important to use an accurate, calibrated high voltage meter.

Set the **brightness, picture, sharpness** and **color** controls to Minimum.

Measure the High Voltage. The high voltage meter should indicate **29.25kV \pm 1.25kV for 32" models** and **31.5kV \pm 1.25kV for 35/36" models**. If the upper limit is out of tolerance, immediate service and correction is required to insure safe operation and to prevent the possibility of premature component failure.

Horizontal Oscillator Disable Circuit Test

This test must be performed as a final check before the Receiver is returned to the customer. See **Horizontal Oscillator Disable Circuit Procedure Check** in this manual.

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Service Notes

NOTE: These components are affixed with glue. Be careful not to break or damage any foil under the component or at the pins of the ICs when removing. Usually applying heat to the component for a short time while twisting with tweezers will break the component loose.

SPECIFICATIONS

Leadless Chip Components (surface mount)

Chip components must be replaced with identical chips due to critical foil track spacing. There are no holes in the board to mount standard transistors or diodes. Some chip capacitor or resistor board solder pads may have holes through the board, however the hole diameter limits standard resistor replacement to 1/8 watt. Standard capacitors may also be limited for the same reason. It is recommended that identical chip components be used.

OPERATION

Chip resistors have a three digit numerical resistance code - 1st and 2nd significant digits and a multiplier. Example: 162 = 1600 or 1.6K Ω resistor, 0 = 0 Ω (jumper).

Chip capacitors generally do not have the value indicated on the capacitor. The color of the component indicates the general range of the capacitance.

Chip transistors are identified by a two letter code. The first letter indicates the type and the second letter, the grade of transistor.

Chip diodes have a two letter identification code as per the code chart and are a dual diode pack with either common anode or common cathode. Check the parts list for correct diode number.

SERVICE

Component Removal

1. Use solder wick to remove solder from component end caps or terminals.
2. Without pulling up, carefully twist the component with tweezers to break the adhesive.
3. Do not reuse removed leadless or chip components since they are subject to stress fracture during removal.

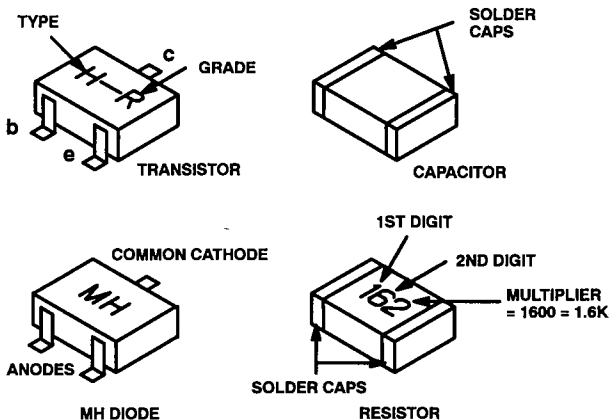
Chip Component Installation

1. Put a small amount of solder on the board soldering pads.
2. Hold the chip component against the soldering pads with tweezers or with a miniature alligator clip and apply heat to the pad area with a 30 watt iron until solder flows. Do not apply heat for more than 3 seconds.

BLOCK DIAGRAMS

PARTS LIST

Chip Components

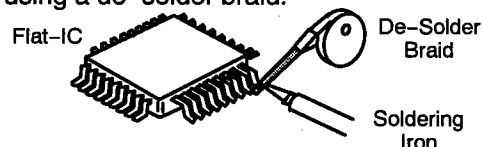


How to Replace Flat-IC

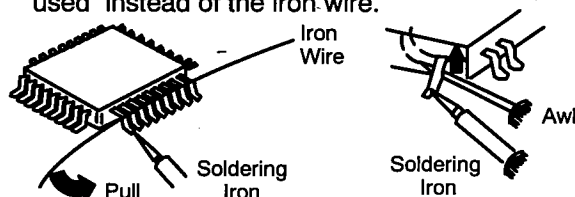
Required Tools -

- Soldering iron
- De-solder braids
- Iron wire or small awl
- Magnifier

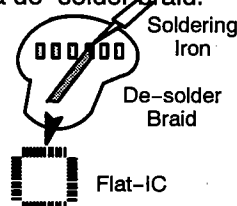
1. Remove the solder from all of the pins of a Flat-IC by using a de-solder braid.



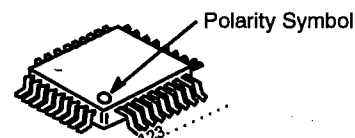
2. Put the iron wire under the pins of the Flat-IC and pull it in the direction indicated while heating the pins using a soldering iron. A small awl can be used instead of the iron wire.



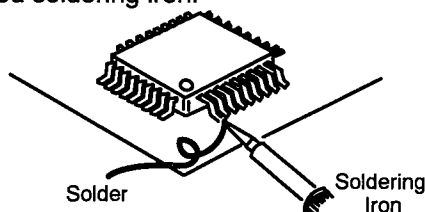
3. Remove the solder from all of the pads of the Flat-IC by using a de-solder braid.



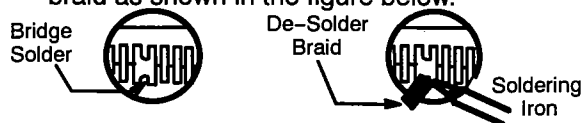
4. Position the new Flat-IC in place (apply the pins of the Flat-IC to the soldering pads where the pins need to be soldered). Properly determine the positions of the soldering pads and pins by correctly aligning the polarity symbol.



5. Solder all pins to the soldering pads using a fine tipped soldering iron.



6. Check with a magnifier for solder bridge between the pins or for dry joint between pins and soldering pads. To remove a solder bridge, use a de-solder braid as shown in the figure below.



Service Notes (Continued)

IMPORTANT: To protect against possible damage to the solid state devices due to arcing or static discharge, make certain that all ground wires and CRT DAG wire are securely connected.

CAUTION: The power supply circuit is above earth ground and the chassis cannot be polarized. Use an isolation transformer when servicing the Receiver to avoid damage to the test equipment or to the chassis. Connect the test equipment to the proper ground (∇) or (///) when servicing, or incorrect voltages will be measured.

WARNING: This Receiver has been designed to meet or exceed applicable safety and X-ray radiation protection as specified by government agencies and independent testing laboratories.

To maintain original product safety design standards relative to X-ray radiation and shock and fire hazard, parts indicated with the symbol \triangle on the schematic must be replaced with identical parts. Order parts from the manufacturer's parts center using the part numbers shown in this service manual, or provide the chassis number and the part reference number.

For optimum performance and reliability, all other parts should be replaced with components of identical specifications.

Horizontal Oscillator Disable Circuit

This chassis employs a special circuit to protect against excessive high voltage and beam current. If, for any reason, the high voltage and beam current exceed a predetermined level this protective circuit activates and detunes the horizontal oscillator that limits the high voltage.

The over-voltage protection circuit is not adjustable. However, if components indicated by the symbol \triangle on the schematic in either the horizontal sweep system or the over-voltage protection circuit itself are changed, the operation of the circuit should be checked using the following procedure.

Equipment needed to check the disable circuit:

1. Voltmeter (0 – 200V scale)
2. High Voltage Meter (0 – 50kV)
3. Variac or Isolation Transformer

Procedure:

1. Tune in a station to verify that the horizontal is in sync.
2. Obtain a Monoscope pattern or a signal generator crosshatch pattern.
3. Connect the voltmeter (–) lead to TPD2 and the (+) lead to TPD1 (junction of D555 anode, R556 & R557). Set **Bright** level to (0) and **Picture** for a 1.8 volt reading on the voltmeter.
4. Turn the Receiver OFF. Connect a jumper across IC803 pin 3 and pin 4.
5. Reduce the AC supply voltage to approximately 45V. Connect the high voltage meter to the CRT anode (H.V. button). **NOTE:** Use the Dag Ground (C10 of the CRT Board) to connect the (–) lead of the meter.
6. Turn the Receiver ON. Slowly increase the AC supply voltage and verify that the high voltage does not exceed **39.2kV for 32" models and 41.2kV for 35/36" models**, when horizontal just begins to pull out of sync. If the high voltage is not within the specified limit, the cause must be determined and corrected before the Receiver is returned to the customer.

SPECIFICATIONS

OPERATION

SERVICE

CIRCUITS &
BLOCK DIAGRAMS

PARTS LIST

Receiver Feature Table

SPECIFICATIONS

| FEATURE\MODEL | CT-32G23W/UW/CW | SP3231W/UW | CT-35G23W | CT-36G23W/UW/CW |
|-------------------------------|--|--|---|---|
| Chassis | NA6DM | NA6DM | NA6DM | NA6DM |
| Tuning system | New 40K | New 40K | New 40K | New 40K |
| # of channels | 181 | 181 | 181 | 181 |
| Menu language | ENG/SPAN/FR | ENG/SPAN/FR | ENG/SPAN/FR | ENG/SPAN/FR |
| Closed Caption | X | X | X | X |
| Picture in Picture (PIP) | 1T | 1T | 1T | 1T |
| 75 Ω Input | X | X | X | X |
| Remote Model # | EUR511170 | EUR511113 | EUR511170 | EUR511170 |
| Picture tube | M80JUA061X | M80JUA061X | A89LLD061X | A90LLD061X |
| Comb filter | 2DIG | 2DIG | 2DIG | 2DIG |
| Notch filter | P | P | P | P |
| V/A norm (X=both) | V | V | V | V |
| MTS/SAP/DBX | X | X | X | X |
| Built-in audio power | 1.5Wx2 (10%) | 1.5Wx2 (10%) | 3.5Wx2 (10%) | 3.5Wx2 (10%) |
| # of speakers | 2 | 2 | 2 | 2 |
| AI Sound (SMPL) | X | X | X | X |
| A/V In (rear/front) | 2/0 | 2/0 | 2/0 | 2/0 |
| S-VHS In (rear/front) | 1/0 | N/A | 1/0 | 1/0 |
| Audio Output | FAO, VAO | FAO, VAO | FAO, VAO | FAO, VAO |
| Dimensions mm (HxWxD) in | 694.0 x 770.0 x 537.0 27.32 x 30.32 x 21.14 | 694.0 x 770.0 x 537.0 27.32 x 30.32 x 21.14 | 764.00 x 878.00 x 641.00 30.08 x 34.57 x 25.24 | 764.00 x 878.00 x 641.00 30.08 x 34.57 x 25.24 |
| Weight (kg/lb) | 51.26 / 113.01 | 51.26 / 113.01 | 68.47 / 150.95 | 68.47 / 150.95 |
| Power source (V / Hz) | 120 / 60 | 120 / 60 | 120 / 60 | 120 / 60 |
| Power consumption, Max (A) | 2.0 | 2.0 | 2.2 | 2.2 |
| Anode voltage | 29.25kV \pm 1.25kV | 29.25kV \pm 1.25kV | 31.5kV \pm 1.25kV | 31.5kV \pm 1.25kV |
| Video input jack | 1V _{p-p} 75 Ω phono jack | 1V _{p-p} 75 Ω phono jack | 1V _{p-p} 75 Ω phono jack | 1V _{p-p} 75 Ω phono jack |
| Audio Input Jack | 500mV RMS 47k Ω | 500mV RMS 47k Ω | 500mV RMS 47k Ω | 500mV RMS 47k Ω |
| A-Board TNP2AH009 | BL | BB | AB | AB |
| C-Board TNP2AA035 | NIL | NIL | AD | AD |
| GM-Board TNP2AA029 | -- | -- | AB | AB |
| X-Board TNP2AA041 | AB | AC | AB | AB |
| Y-Board TNP2AA009 | AB | AB | AB | AB |
| Z-Board TNP2AA010 | NIL | NIL | AB | AB |

Table 1. Receiver Features

Specifications are subject to change without notice or obligation. Dimensions and weights are approximate.

Location of Controls (Receiver)

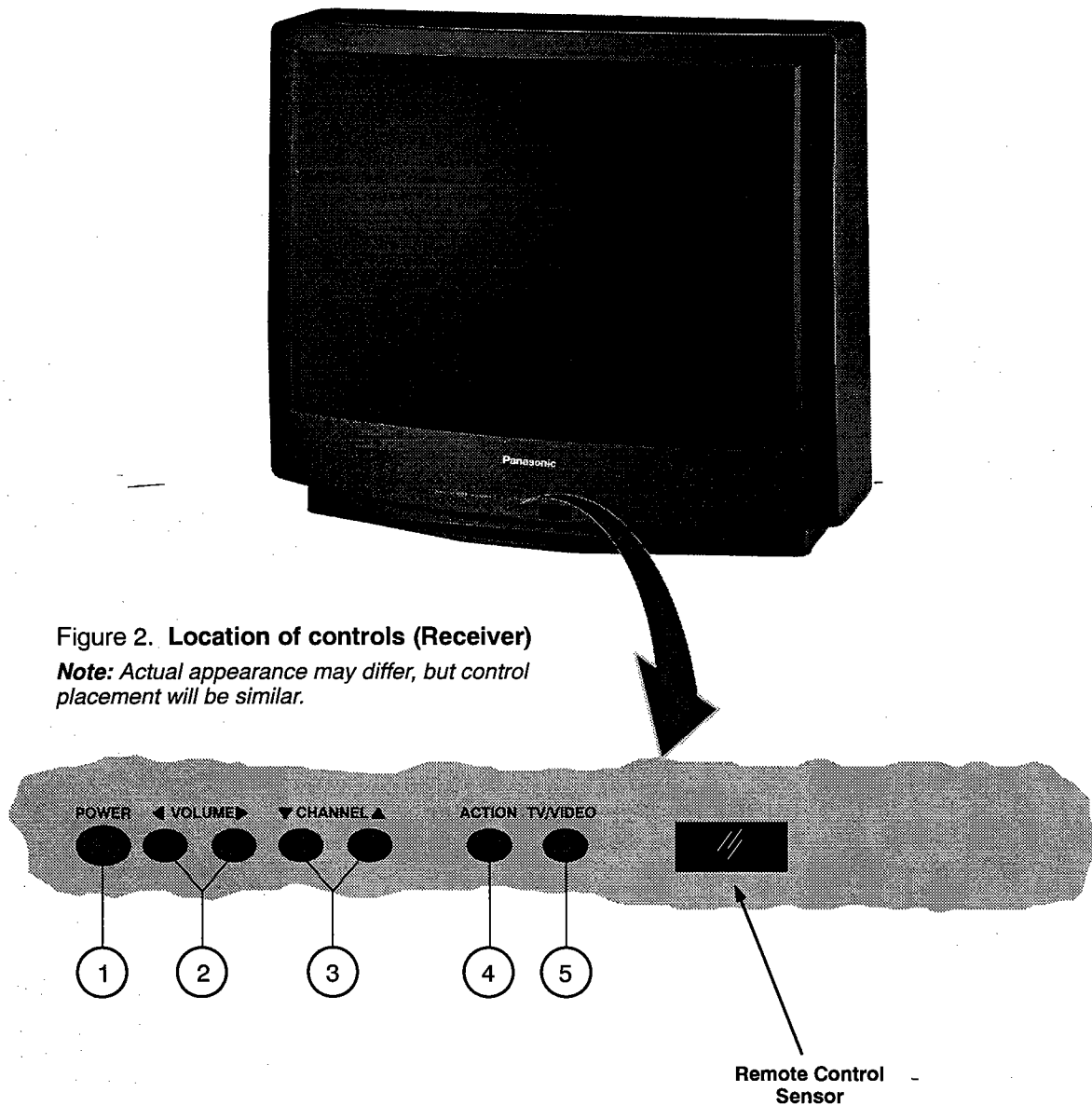


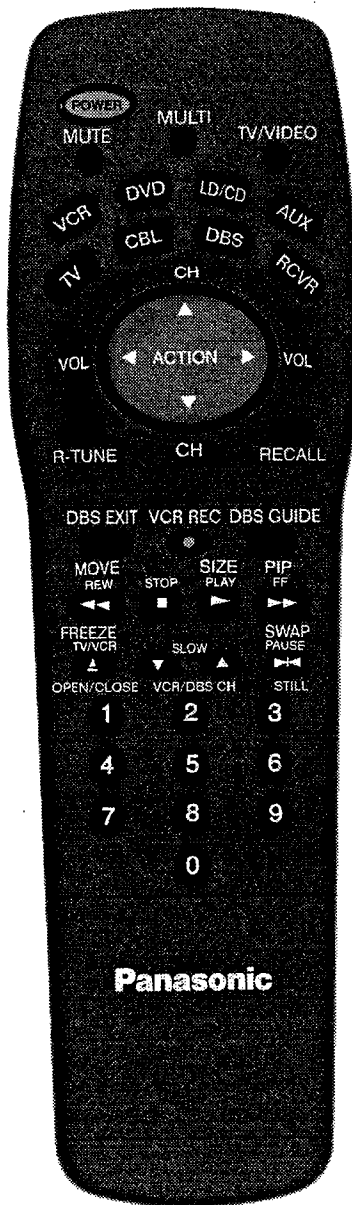
Figure 2. Location of controls (Receiver)

Note: Actual appearance may differ, but control placement will be similar.

- ① **Power Button** – Press to turn ON or OFF.
- ② **Volume Buttons** – Press to adjust Sound Level. Press to adjust Video Menus and select operating features when menus are displayed.
- ③ **Channel Buttons** – Press to select programmed channels. Press to highlight desired features when menus are displayed.
- ④ **Action Button** – Press to display Main Menu and access On Screen feature and Adjustment Menus.
- ⑤ **TV/Video Button** – Press to select TV or Video Input.

Location of Controls (Remote)

OPERATION



EUR511170
(CT-32G23W/UW/CW)
(CT-36G23W & CT-36G23W/UW/CW)

Power Button

Press to turn ON or OFF.

TV/Video Button

Press to select TV or Video Input.

Mute Button

Press to mute sound. A second press resumes sound. Press also to access and delete Closed Caption display.

Channel Buttons

Press to select channels. Use with Volume buttons to navigate in menus.

Volume Buttons

Press to adjust TV sound level. Use with Channel buttons to navigate in menus.

Action Button

Press to display Main Menu and access or exit On Screen feature and Adjustment Menus.

R-Tune (Rapid Tune) Button

Press to switch to the previous channel.

Recall Button

Press to display Time, status of Sleep Timer, Channel, Video Mode and Channel Caption (Station Identifier).

Keypad Buttons

Press desired channel number to randomly access any channel.



EUR511113
(SP3231W/UW)

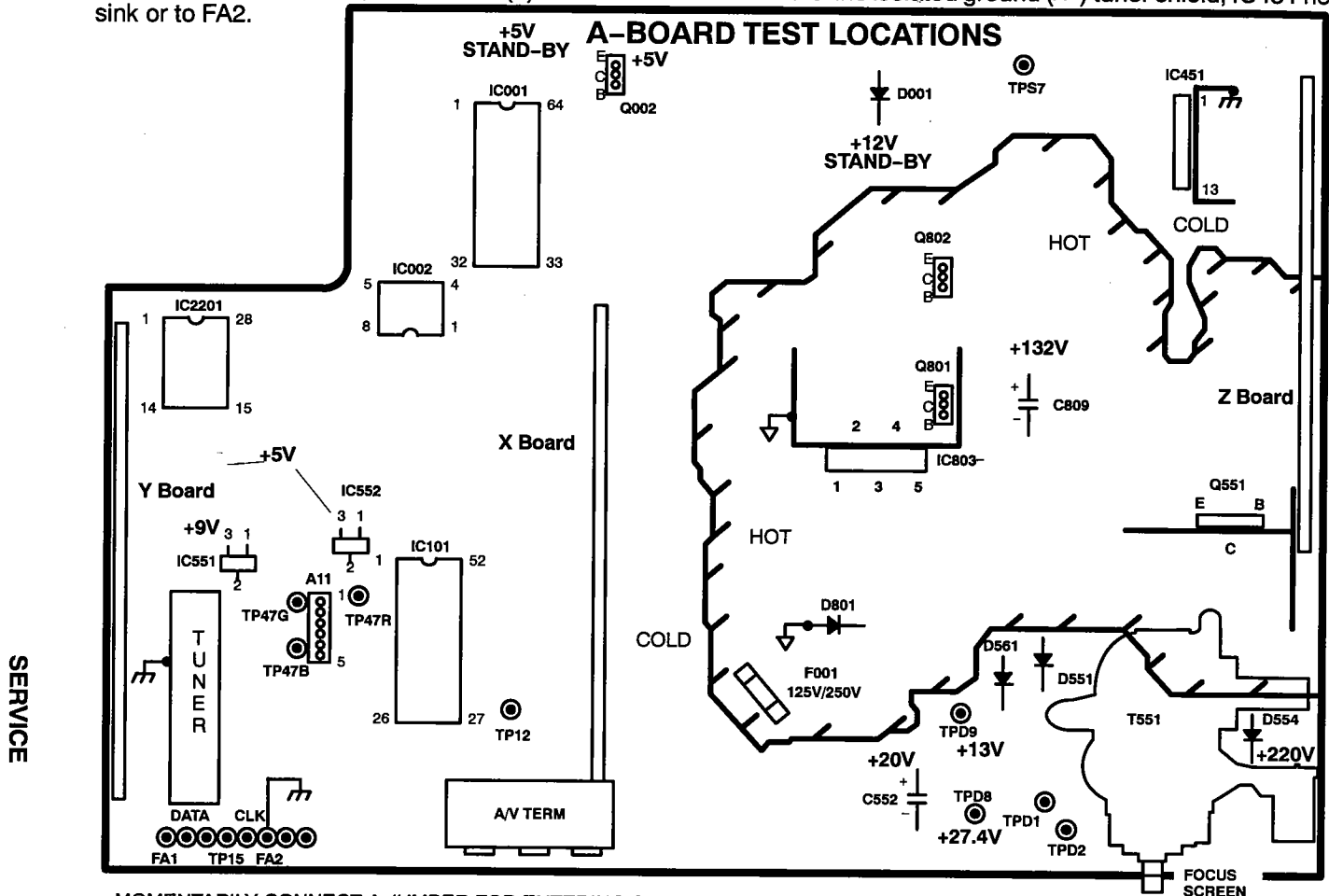
Figure 3. Location of controls (Remote)

Notes

Chassis Service Adjustment Procedures

All service adjustments are factory preset and should not require adjustments unless controls and/or associated components are replaced.

NOTE: Connect the (-) lead of the voltmeter to the appropriate ground for the circuit being checked. When necessary to use a line operated ground, the ground indication (⚡) is marked. For this ground use anode of D801 or IC803 heat sink. For all other circuits, connect the (-) lead of the voltmeter to the line isolated ground (⚡) tuner shield, IC451 heat sink or to FA2.



MOMENTARILY CONNECT A JUMPER FOR ENTERING SERVICE MODE (FA1/TP8 to FA2/TP3)

131.0V B+ Voltage Confirmation

1. Set the **Bright** and the **Picture** to Minimum by using the Picture Menu.
2. Connect a DVM between C809, + side and Hot ground (⚡).
3. Confirm that B+ voltage is **131.0V±2.5V**. This voltage supplies B+ to the Horizontal Output & Flyback circuits.

Source Voltage Chart

120V AC line input. Set the **Bright** and the **Picture** to Minimum by using the Picture Menu. Use cold ground (⚡) for the (-) lead of the DVM.

| | | |
|------------------------|-------|------------------------|
| IC551 pin 3 | | +9.0V ±0.5V |
| Cathode of D551 (TPD9) | | +13.0V ±2V |
| C552 (+ side) | | + 8.0V ±1V |
| Cathode of D561 (TPD8) | | +27.4V ±2V |
| | | (32" models) |
| Cathode of D561 (TPD8) | | +27.5V ±2V |
| | | (35/36" models) |
| Cathode of D554 | | +220V ±15V |

Adjust Picture menu for normalized video adjustments.

B+ 5V Source Voltages

Volatile 5V:

C572, + side = IC552 pin 3, Tuner BP, IC101 (B+ V_{cc}).

MPU 5V:

Emitter Q002 = IC001 (V_{DD}).

Standby 5V:

IC001 (Key in 1), I²C EEPROM (IC002), TIMER LED, Remote Receiver.

B+ 9V Source Voltage

IC551 pin 3 = IC101 (B+ V_{cc}), Tuner (BM).

B+ 12V (Stand-by) Note: +16V when power is on
Cathode D001 = RL801 (on-off relay), Q002 (+5V Reg).

High Voltage Check

1. Select an active TV channel and confirm that horizontal is in sync.
2. Adjust Brightness and Picture using Picture Icon menu so video just disappears.
3. Confirm B+ 131V is within limit.
4. Using a high voltage meter confirm that the High Voltage is **31.5kV ±1.25kV (35/36" models) or 29.25kV ±1.25kV (32" models)**

Disassembly for Service

Back Cover

Remove all the screws marked with an arrow (➡) from the back of the Receiver.

Note: screw configuration and number of screws may vary depending on the model of the Receiver serviced; various models are covered in this Manual.

1. 3 screws at the top edge of the Receiver.
2. 1 screw on the retainer plate for the AC power cord.
3. 1 screw by flyback assembly.
4. 2 screws by the A/V jacks.
5. 2 screws at the bottom edge of the Receiver.

A-Board – Main Chassis

1. Press tab on left rail.
2. Slide the chassis completely out of the guide rails.
NOTE: Some tie-wraps that secure the wire dressings may need to be unfastened for chassis removal.
3. Stand the Receiver on its edge. The underside of the board is completely accessible for component replacement.

C-Board – CRT Output

Plugs into the socket on the CRT neck.

X-Board – Comb Filter, A/V Jacks, Video Switching

Connected to the Main Chassis (A-Board). It is the board located close to the center of the A-Board. The X-Board is connected to the A-Board with 2 or 3 connectors. Pull on the X-Board, perpendicular to the A-Board, while releasing the snap tabs on connectors A1, A2 and A3 (some models).

Y-Board – PIP Processing

Connected to the Main Chassis (A-Board). It is the board located close to the left edge of the A-Board. The Y-Board is connected to the A-Board with 2 connectors. Pull on the Y-Board, perpendicular to the A-Board, while releasing the snap tabs on connectors A31 & A32.

Z-Board – Pincusion Correction Board

Connected to the Main Chassis (A-Board). It is the board located top right corner of the A-Board. The Z-Board is connected to the A-Board with connectors. Pull on the Z-Board, perpendicular to the A-Board, while releasing the snap tabs on connectors A7 and A8.

Keyboard Push Button Assembly

Fastened to the inside of the cabinet front with up to 3 screws.

Speakers

Secured to the cabinet by 2 screws each.

Disassembly for CRT Replacement

1. Discharge the CRT as instructed in the **Safety Precautions**.
2. Disconnect the yoke plug, degaussing coil plug and the CRT 2nd anode button from the main board.
3. Remove the C-Board from the CRT base and unplug the black wire (CRT dag ground) C10-1 from the board.
4. Disconnect the A12 and SP plugs from the A-Board.
5. Slide the main chassis assembly completely out with the CRT Board attached.

CRT Replacement

1. Perform **Disassembly for CRT Replacement** procedure.
2. Insure that the CRT H.V. anode button is discharged before handling the CRT. See the **Safety Precautions** on handling the picture tube.
3. Remove the components from the CRT neck and place the cabinet face down on a soft pad.
4. Note the original order of the CRT mounting hardware as they are removed from the CRT mounting brackets at each corner of the CRT.
5. Remove the CRT with the degaussing coil and the dag ground braid attached.
6. Note the original locations and mounting of the degaussing coil and the dag ground assembly to insure proper reinstallation on the replacement CRT.

To remove and re-mount the degaussing coil:

The degaussing coil is held in place by clampers fastened to the CRT corner ears.

These clampers must be installed onto the replacement CRT prior to mounting the degaussing coil.

To remove and re-mount the dag ground braid:

- Unhook the coil spring from the upper right CRT ear.
 - Release the braid loop from the upper left and the lower right CRT ear.
7. Mount the dag ground braid on the replacement CRT. Position the degaussing coil with new ties. Dress coil as was on the original CRT.
 8. Replace the components on the CRT neck and re-install into cabinet. Verify that all ground wires and circuit board plugs get connected.

Purity and Convergence Procedure

Adjustment is necessary only if the CRT or the deflection yoke is replaced or if the setting was disturbed. The complete procedure consists of:

1. Initial static convergence.
2. Setting the purity.
3. Final static convergence.

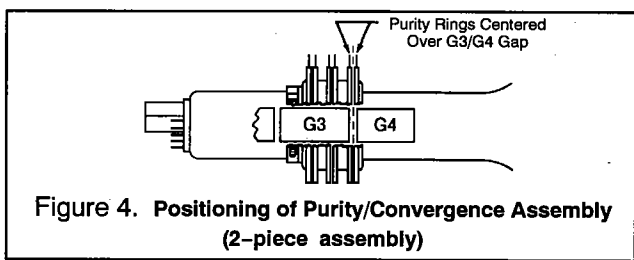
When the CRT or the Yoke is Replaced

Place the yoke on the CRT neck (do not tighten the clamp).

For a 2-piece assembly (see Figure 4):

Position purity/convergence assembly as shown and tighten clamp snugly. Cut the hot-melt glue seal on assembly and place like tabs of purity device together at 12 o'clock to reduce its magnetic field effect. Manually degauss the CRT.

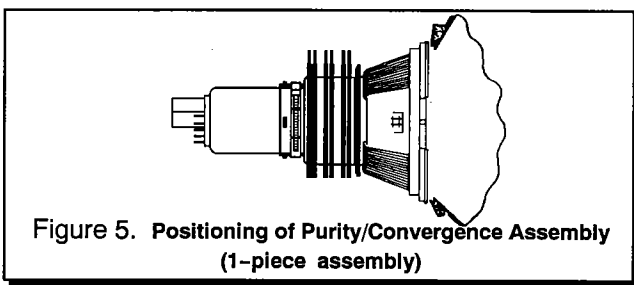
Turn the Receiver ON and slide the deflection yoke back and forth on the neck of the CRT. Stop at the position that produces a near white, uniform raster.



For a 1-piece assembly (see Figure 5):

Place like tabs of purity devices together at 12 O'Clock to reduce any magnetic field effect. Manually degauss the set.

Connect a Black/White pattern generator and tune the receiver to the signal. Slide the deflection yoke & purity ring assembly back and forth on the CRT neck. Stop at a position that produces a near white signal.



Initial Center Static Convergence

Connect a dot/crosshatch generator to the Receiver and tune in signal. Observe misconvergence at center of the screen only.

Adjust the 4 pole magnet (center rings); separate tabs and rotate to converge blue with red.

Adjust the 6 pole magnet (rear rings): separate tabs and rotate to converge blue and red (magenta) with green.

Note: Precise convergence at this point is not important.

Purity Adjustment

When the Receiver is in the Serviceman Mode for making electronic adjustments, press the **Recall** button on the Remote Control to enter Purity Check. (See **Service Adjustments Electronic Controls**.)

Operate the Receiver for 60 minutes using the first Purity check field (white screen) to stabilize the CRT.

Fully degauss the Receiver by using an external degaussing coil.

Geo-Magnetic Correction (35/36" models only)

The Geo-Magnetic correction circuit compensates for the differences in the Earth's magnetic field as it pertains to purity. Please perform the following procedure before continuing with the purity adjustments.

1. On the remote press the action key and select "SETUP".
2. Highlight "geomagnetic-corr". and select "yes" by using the volume controls (+/-) and confirm that the on-screen horizontal bar appears.
3. Press the volume up control and verify that the picture tilts clockwise (about 3 mm).
4. Press the volume down control and verify that the picture tilts counterclockwise (about 3 mm).
5. Set the data to "8".

Press the **Recall** button on the Remote Control again until the Purity Check (green screen) appears.

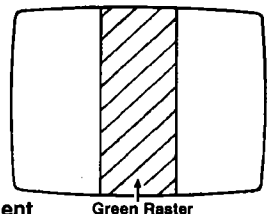
For a 2-piece assembly (see Figure 4):

Loosen the deflection yoke clamp screw and move the deflection yoke back as close to the purity magnet as possible.

Adjust the purity rings to set the vertical green raster precisely at the center of the screen (see Figure 6).

NOTES:

1. CRT warm up with white screen (three guns activated) is needed to stabilize the shadow mask expansion.
2. Initial center static convergence (roughly centers three gun beams) is required in order to perform purity adjustment.



Slowly move the deflection yoke forward until the best overall green screen is displayed.

For a 1-piece assembly (see Figure 5):

Slowly move the deflection yoke and purity rings assembly toward the CRT board and adjust the purity magnet rings to set vertical green raster at center of screen (see Figure 6).

Gradually move the deflection yoke & purity rings forward and adjust for the best overall green screen.

Continue from here for either assemblies:

Tighten the deflection yoke clamp screw.

Press the **Recall** button on the Remote Control again until the Purity Check (blue screen) and (red screen) appear and observe that good purity is obtained on each respective field.

Press the **Recall** button on the Remote Control again until Purity check (white screen) appears. Observe the screen for uniform white. If purity has not been achieved, repeat the above procedure.

Final Convergence Procedure (see Figure 7 through Figure 9):

Note: Vertical size and focus adjustments must be completed prior to performing the convergence adjustment. Connect a dot pattern generator to the Receiver. The **Brightness** level should not be higher than necessary to obtain a clear pattern.

Converge the red and blue dots at the center of the screen by rotating the 4 pole (R with B) Static Convergence Magnets.

Align the converged red/blue dots with the green dots at the center of the screen by rotating the 6 pole (R/B with G) Static Convergence Magnets.

Permalloy Convergence Corrector Strip (Part No. 0FMK014ZZ)

This strip is used in some sets to match the yoke and CRT for optimum convergence. If the yoke or CRT is replaced, the strip may not be required.

First converge the set without the strip and observe the corners.

G) Static Convergence Magnets. Melt wax with soldering iron to reseat the magnets.

Slightly tilt DY vertically and horizontally (do not rotate) the deflection yoke to obtain a good overall convergence.

If convergence is not reached at the edges, insert permalloy (see following section) from the DY corners to achieve proper convergence. Recheck for purity and readjust if necessary.

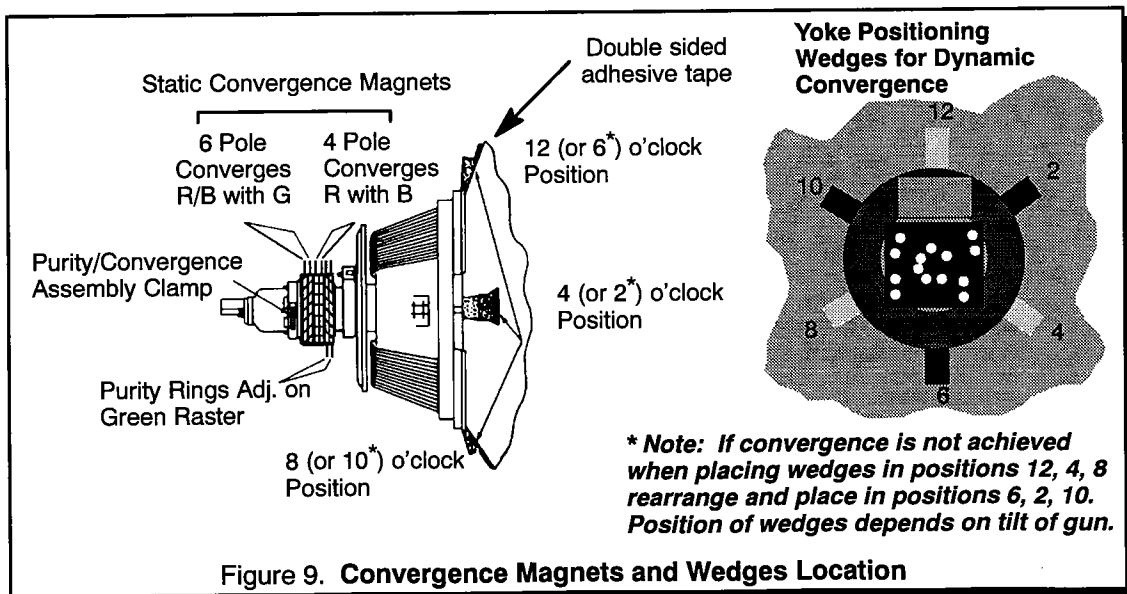
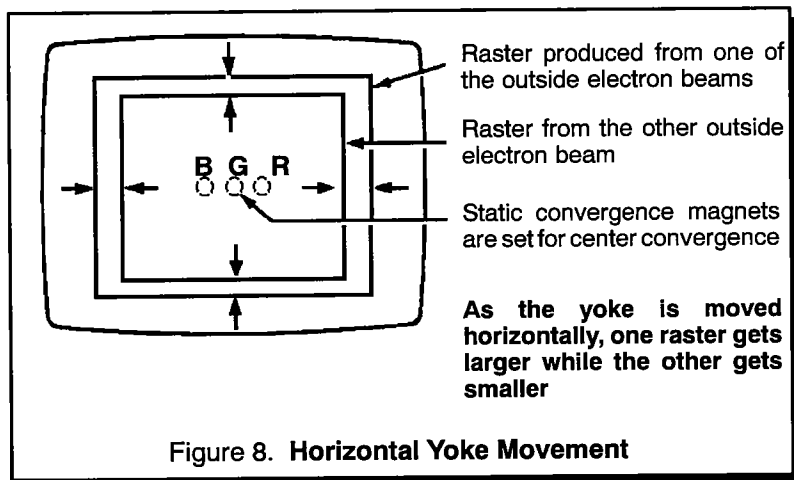
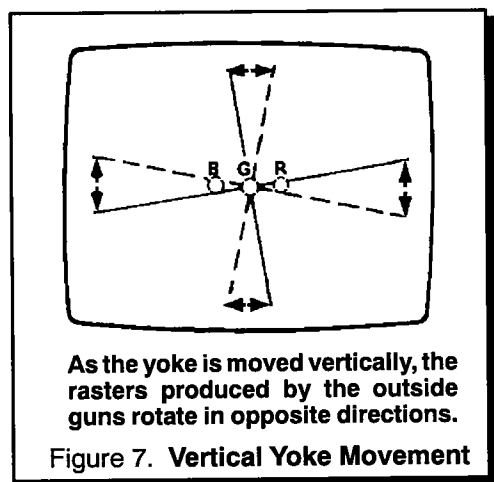
After vertical adjustment of the yoke, insert wedge at 6 (or 12*) o'clock position, then make the horizontal tilt adjustment.

Secure the deflection yoke by inserting two side wedges at 2 (or 4*) and 10 (or 8*) o'clock positions.

Apply double sided adhesive tape between tab (thin portion) of wedge and CRT and place tape over the tab to secure to the CRT.

If correction is needed:

1. Place strip between CRT and yoke, in quadrant needing correction. Slowly move it around for desired results.
2. Press adhesive tightly to the CRT and secure with tape.



Notes

SERVICE

Serviceman Mode (Electronic Controls)

This Receiver has electronic technology using the I²C Bus Concept. It performs as a control function and it replaces many mechanical controls. Instead of adjusting mechanical controls individually, many of the control functions are now performed by using the "On Screen Display Menu". (The **Serviceman Adjustment Mode**.)

Note: It is suggested that the technician reads all the way through and understand the following procedure for Entering/Exiting the **Serviceman Adjustment Mode**; then proceed with the instructions working with the Receiver. When becoming familiar with the procedure, the Flow Chart for Serviceman Mode may be used as a quick guide.

Quick Entry To Serviceman Mode:

At times when minor adjustments need to be done to the electronic controls, the method of Entering the Serviceman Mode without removal of the cabinet back is as follows using the Remote Control:

1. Select SET-UP icon and select CABLE mode.
2. Select TIMER Icon and set SLEEP timer for 30.
3. Press ACTION button twice to exit Menus.
Tune to Channel 124.
Adjust VOLUME to Minimum (0).

On Receiver press the VOL ◀ button (decrease). A red "CHK" followed by a hex code appear in upper corner.

The four digit hex code that follows the red "CHK", represents the total amount of time that the TV has been connected to power.

To toggle between Aging and Serviceman modes:

While the "CHK" is displayed on the left top corner of the CRT, pressing the **Action** and the **Volume Up** buttons on the Receiver simultaneously will toggle between the modes. Red "CHK" for Serviceman and yellow "CHK" for Aging.

4. Press the **Power** button on the Remote Control to select one of five Serviceman Adjustment Modes.
 - 1) B = Serviceman VCJ SUB ADJUSTMENTS
 - 2) C = Serviceman VCJ CUT-OFF ADJUSTMENTS
 - 3) S = Serviceman OPTIONS (PIP and CLOCK) ADJUSTMENTS
 - 4) M = Serviceman MTS ADJUSTMENTS
 - 5) "CHK" = Normal operation of CHANNEL ▲▼ and VOLUME ◀▶

Note: Only the applicable settings for the Receiver serviced will be available (see a in Figure 10).

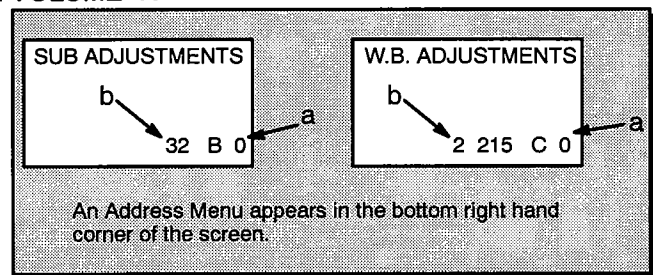


Figure 10. Serviceman Mode Menu Adjustments

For DAC Adjustments:

1. Press **Channel Up/Down** on the Remote Control to select one of the 8 available Service Adjustments (a in Figure 10).

Important Note: Write down the original value set (b in Figure 10) for each address before modifying anything. It is easy to erroneously adjust the wrong item.

2. Press **Volume Up/Down** on the Remote Control to adjust the level of the selected Service Adjustment (b in Figure 10).

| Sub Adjustment Mode | | | |
|---------------------|------------------|-------|---------|
| B7 | V-Size | 0~63 | 20 |
| B6 | Audio Adjustment | 0~31 | 16 |
| B5 | Video Adjustment | 0~15 | 8 |
| B4 | Killer/ABL/Gamma | 0~7 | 5 |
| B3 | Sub Contrast | 0~63 | 34 |
| B2 | Sub Brightness | 0~255 | 80 |
| B1 | Sub Tint | 0~63 | 33 |
| B0 | Sub color | 0~63 | 33 |
| Mode | Adjustment | Range | Default |

Figure 11. Sub Adjustment Mode

Press the **Power** button on the Remote Control to select the Serviceman White Balance Adjustment Mode.

For VCJ Cut-Off Adjustments:

1. Press **Channel Up/Down** on the Remote Control to select one of the 12 available Service Adjustments (a in Figure 10).

Important Note: Write down the original value set (b in Figure 10) for each address adjustment before modifying anything. It is easy to erroneously adjust the wrong item.

2. Press **Volume Up/Down** on the Remote Control to adjust the level of the selected Service Adjustment (b in Figure 10).

| Cut-Off Adjustment Mode | | | |
|-------------------------|-------------------|-------|---------|
| Cb | VCJ Test H | 0~2 | 2 |
| Ca | Beam Limit | 0~7 | 0 |
| C9 | Horizontal-Center | 0~31 | 16 |
| C8 | YNR | 0~7 | 0 |
| C7 | RF AGC | 0~127 | 64 |
| C6 | AFT | ** | 0 120 |
| C5 | YNR Switch | 0~1 | 0 |
| C4 | B Drive | 0~127 | 64 |
| C3 | R Drive | 0~127 | 64 |
| C2 | B Cut-Off | ** | 0 128 |
| C1 | G Cut-Off | 0~255 | 64 |
| C0 | R Cut-Off | ** | 0 128 |
| Mode | Adjustment | Range | Default |

**** Note:** Range is in steps:
0 0 ~ 0 255
1 0 ~ 1 255

Figure 12. White Balance Adjustment Mode

Press the **Power** button on the Remote Control to select the Serviceman MTS Adjustment Mode.

For Options (PIP and CLOCK) Adjustments:

1. Press **Channel Up/Down** on the Remote Control to select one of the 14 available Options Adjustments (a in Figure 10).

Important Note: Write down the original value set (b in Figure 10) for each address before modifying anything. It is easy to erroneously adjust the wrong item.

2. Press **Volume Up/Down** on the Remote Control to adjust the level of the selected Service Adjustment (b in Figure 10).

Note: Some adjustment modes may not be available in some models depending on available options.

| Options Adjustment Mode | | | |
|-------------------------|-----------------------|-------|---------|
| Sd | Loudness Compensation | 0~63 | 52 |
| Sc | PIP Tint | 0~63 | 50 |
| Sb | Clock Adjustment | 0~255 | 128 |
| Sa | Freerun (N/A) | ** | 0 |
| S9 | Right 1/16 | 0~255 | 118 |
| S8 | Left 1/16 | 0~255 | 09 |
| S7 | Down 1/16 | 0~255 | 163 |
| S6 | Up 1/16 | 0~255 | 27 |
| S5 | Right 1/9 | 0~255 | 103 |
| S4 | Left 1/9 | 0~255 | 09 |
| S3 | Down 1/9 | 0~255 | 146 |
| S2 | Up 1/9 | 0~255 | 26 |
| S1 | PIP Contrast | 0~127 | 52 |
| S0 | PIP Color | 0~127 | 80 |
| Mode | Adjustment | Range | Default |

**** Factory use only**

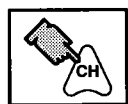
Figure 13. Options Adjustment Mode

Press the **Power** button on the Remote Control to select the Serviceman MTS Adjustment Mode.

For MTS Adjustments:

1. Press **Channel Up/Down** on the Remote Control to select one of the 5 available MTS Adjustments (a in Figure 10).

***Important Note:** Write down the original value set (b in Figure 10) for each address before modifying anything. It is easy to erroneously adjust the wrong item.*
2. Press **Volume Up/Down** on the Remote Control to adjust the level of the selected Service Adjustment (b in Figure 10).
3. Press the **POWER** button on the remote control to loop back to setting of the SUB ADJ Mode.



| MTS ADJUSTMENT Mode | | | |
|---------------------|-----------------------|-------|---------|
| M4 | High-Level Separation | 0~63 | 31 |
| M3 | Low-Level Separation | 0~63 | 31 |
| M2 | Filter | 0~63 | 31 |
| M1 | Stereo PLLVCO | 0~63 | 31 |
| M0 | Input Level | 0~63 | 31 |
| Mode | Adjustment | Range | Default |

Figure 14. MTS Adjustment Mode

OR

Press **ACTION** and **POWER** buttons on the Receiver simultaneously for at least 2 seconds to return the Receiver to normal mode (exit Serviceman Mode).

To Check Purity:

Press the **Recall** button on the Remote Control when in Serviceman Modes (red "CHK" is displayed) to enter the Purity Field Check Mode.

***Note:** The Receiver must be in the Serviceman Mode to display color.*

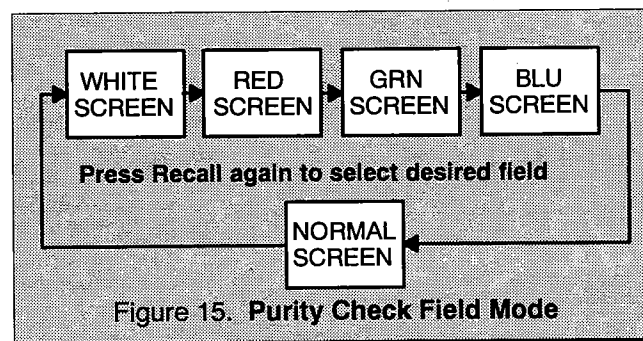


Figure 15. Purity Check Field Mode

SERVICE

IMPORTANT NOTE:

Always Exit the Serviceman Mode following Adjustments.

Exiting the Serviceman Mode:

Press the **Action** and the **Power** buttons on the Receiver simultaneously for at least 2 seconds.

"The Receiver exits Serviceman Mode".

The Receiver momentarily shuts off; then comes back on tuned to channel 3 with a preset level of sound.

Helpful Hints

Entering Serviceman Mode (Other Method – back open):

1. While the Receiver is ON and operating in Normal Mode, momentarily short test point FA1 to cold ground (\rightarrow) FA2 (A-Board: TP pin 8 to pin 3).
"The Receiver enters the Aging Mode".
Yellow letters "CHK" appear in the upper left corner of the CRT.
(The Volume Up/Down will adjust rapidly.)
2. Simultaneously press the **Action** and the **Volume Up** buttons on the Receiver Control Panel.
"The Receiver enters the Serviceman's Mode".
The letters in "CHK" turn red.
(The Volume Up/Down will adjust normally.)
(All customer controls are set to a nominal level.)

Instructional Flow Chart for Serviceman Mode

Caution: Always EXIT Serviceman Mode

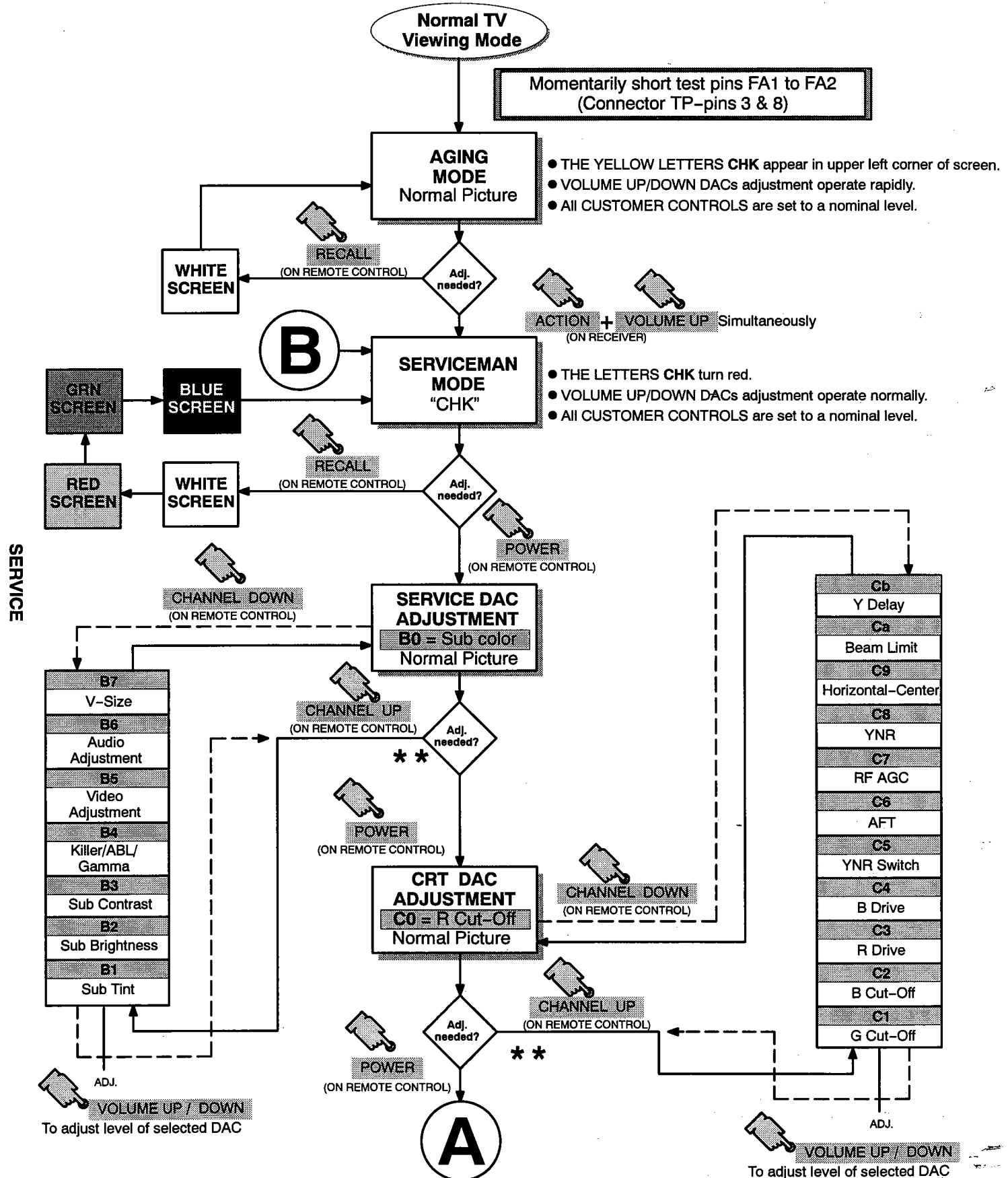


Figure 16. Flow Chart for Serviceman Mode

Instructional Flow Chart for Serviceman Mode – Continued

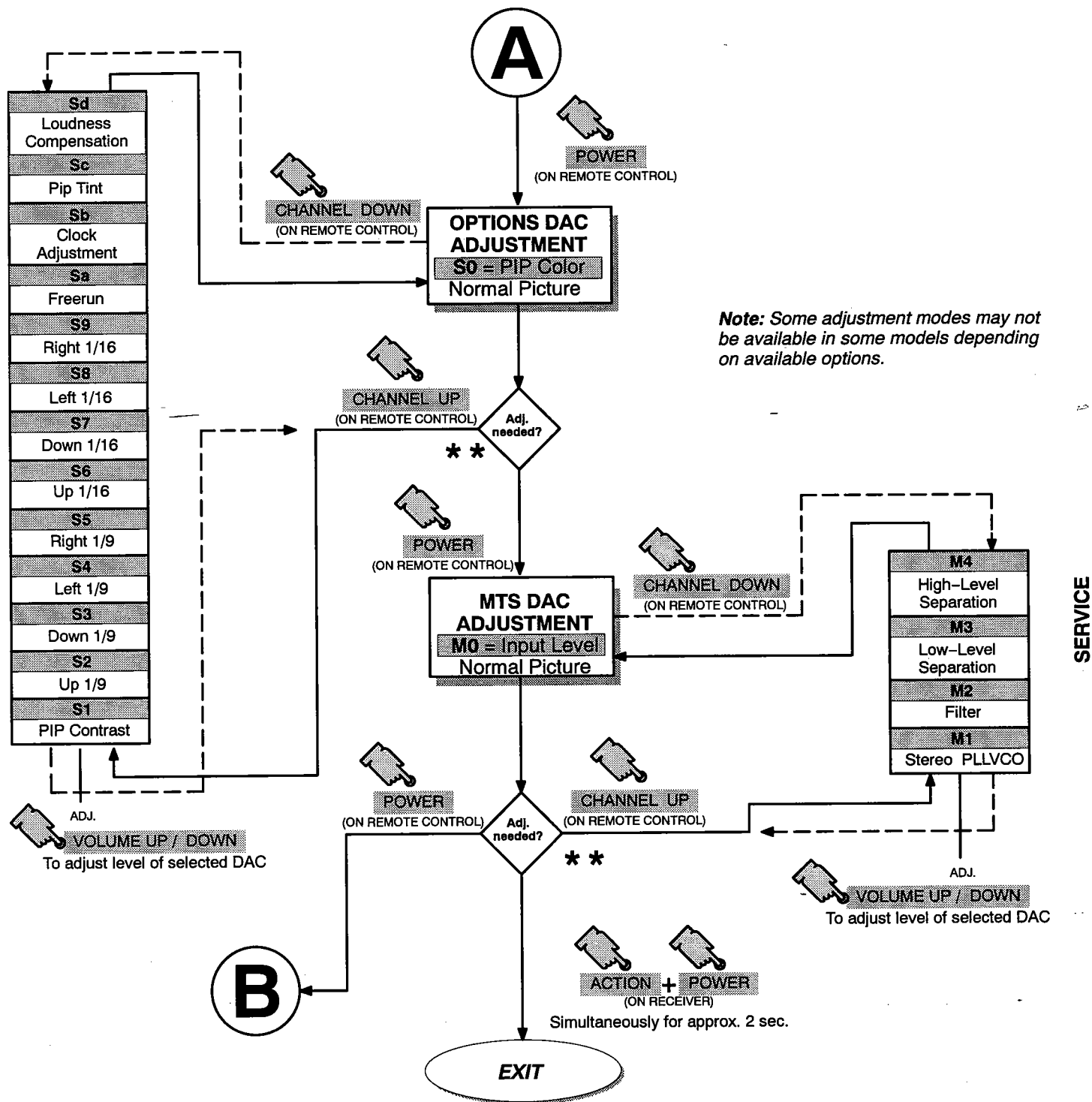


Figure 17. Flow Chart for Serviceman Mode (Continued)

Note: When **EXITING**, the Receiver shuts off; then turns on, TUNED TO CHANNEL 3 WITH A PRESET SOUND LEVEL.

Any Programmed Channels, Channels Caption data and some other user defined settings will be erased.

* * Important Note

Before making any DAC adjustments note the existing values!

Service Adjustments (Electronic Controls)

Video Adjustment Level

Serviceman DAC Adjustment (B5)

Preparation:

1. Obtain an NTSC color bar pattern with 100 IRE white and 87.5% modulation.
2. Connect the oscilloscope to TP12. Use cold ground for scope connection. Set the scope at Horizontal Sweep rate (20 μ s) time base.

Procedure:

1. In the Serviceman Mode for making electronic adjustments, select DAC Video Adjustment Level (B5) and adjust for 1.0V \pm 0.05V from sync tip to white level. See Figure 18.

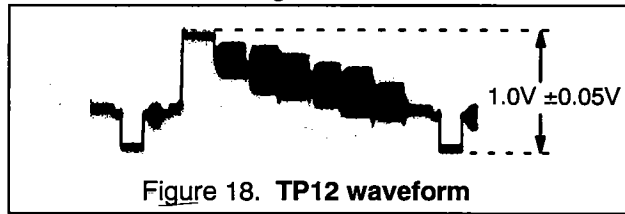


Figure 18. TP12 waveform

2. Set the DAC Sub-Contrast Adjustment (B3).

Sub-Contrast

Serviceman DAC Adjustment (B3)

This adjustment is factory set. **Do not adjust** unless repairs are made to associated circuits, the CRT Board, or when the CRT is replaced.

Preparation:

1. Apply a color bar signal pattern with 87.5% modulation, 70% saturated color bar with a 100 IRE white and 7.5 black.

NOTE: The pattern used in this procedure is an EIA color bar pattern with 87.5% modulation with 100 IRE white and 7.5 black. Correlate the information in this procedure to the pattern used if another signal is used.

2. Preset the following controls:
 - Brightness Center
 - Color Min
 - Picture Max.
 - Sharpness Center
3. Connect the oscilloscope to the CRT-Board connector C1-2. Set the scope time base to 20 μ s (horizontal).
4. Connect a jumper from TPD2 to ground (⌚).
5. Connect a jumper from IC101 pin 28 to ground (⌚).

Procedure:

1. In the Serviceman Mode for electronic adjustments, select DAC Sub-Brightness Adjustment (B2) and adjust for 1.0-1.5Vp-p between blanking and 7.5 IRE level so that the black level cannot be compressed. (see video waveforms detail, Figure 19).
2. In the Serviceman Mode for electronic adjustments, select DAC Sub-Contrast Adjustment (B3) and adjust for 2.8Vp-p \pm 0.1V from white level to black level on video waveform (see video waveforms detail, Figure 19).

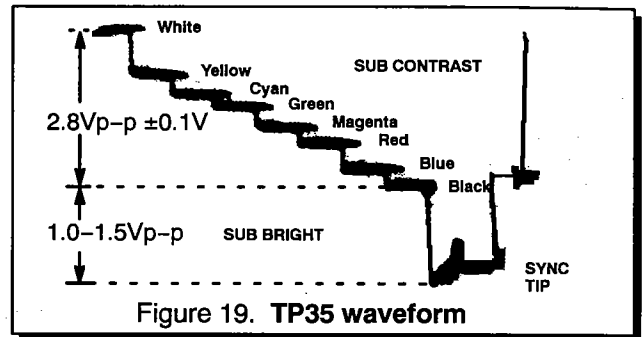


Figure 19. TP35 waveform

3. Remove the jumpers (Preparation steps 4 and 5).

Tint/Color Adjustment

Serviceman DAC Adjustment (B1) (B0)

Preparation:

1. Apply a rainbow color bar signal.
2. Preset the following controls:
 - Brightness Min.
 - Color Center
 - Picture Max.
 - Sharpness Min
 - Tint Center
3. Connect the oscilloscope to TP47B (A-Board) or to connector C1 pin 3.
4. Connect a jumper from TPD2 to GND (⌚).
5. Connect a jumper from IC101 pin 28 to ground (⌚).

Procedure:

1. In the Serviceman Mode for making electronic adjustments, select DAC Sub-Tint Adjustment (B1). Adjust until the waveform measured is as the one shown in Figure 20.

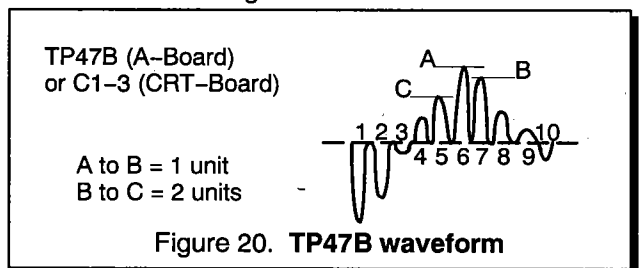


Figure 20. TP47B waveform

2. Connect the oscilloscope to TP47G (A-Board) or to connector C1 pin 2 (CRT-Board).
3. Select DAC Sub-Color Adjustment (B0) and adjust for peak to peak amplitude to be 0.8V p-p \pm 0.05V (Figure 21).

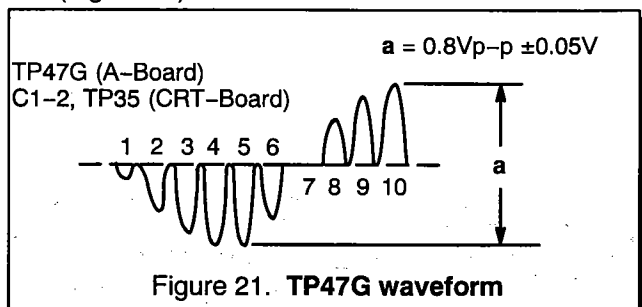


Figure 21. TP47G waveform

4. Remove the jumpers (Preparation steps 4 and 5).

Service Adjustments (Electronic Controls,cont.)

Color Temperature Adjustment (B/W Tracking)

Serviceman DAC Adjust. (C0) (C1) (C2) (C3) (C4)

Minor Touch-Up Method

OBSERVE low and high brightness areas of a B/W picture for proper tracking. Adjust only as required for "good grey scale and warm highlights".

1. LOW LIGHT areas - In Serviceman Mode for making electronic adjustments, select Cutoff (C0) RED, (C1) GRN, (C2) BLU and adjust the picture for grey.
2. HIGH LIGHT areas - In Serviceman Mode for making electronic adjustments, select Drive (C3) RED, (C4) BLU and adjust the picture for warm whites.

Complete Adjustment

Preparation:

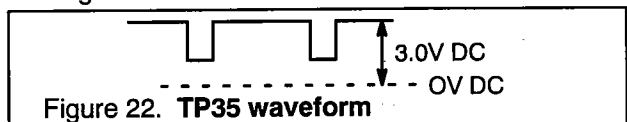
1. Turn the Receiver "ON" and allow 10 minutes warm up at high brightness.
2. Apply a color bar signal with color "OFF".
3. Turn the SCREEN control (part of FBT T551) fully counterclockwise.

Procedure:

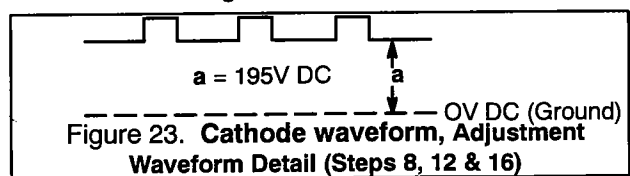
Preset the following Serviceman DAC's for the best results.

- C0 0 128
- C1 64
- C2 0 128
- C3 64
- C4 64

1. Connect the oscilloscope to C1-2 (CRT-Board).
2. In Serviceman Mode for making electronic adjustment, select the Sub-Bright DAC (B2).
3. Press the R-Tune key on the remote.
4. Observe the oscilloscope waveform at Horizontal rate and adjust the Serviceman Mode Sub-Bright DAC (B2) level until a scanning period of 3.0V above DC ground is measured, as indicated in Figure 22.



5. Connect the scope to GRN Cathode (KG) on the CRT-Board.
6. In the Serviceman Mode for making electronic adjustments, select the GREEN CUTOFF DAC (C1).
7. Press the R-Tune key on the remote.
8. View scope trace at Horizontal rate and adjust the Serviceman Mode DAC (C1) level until a scanning period of 195V above DC ground is measured, as indicated in Figure 23.



9. Connect the scope to the RED Cathode (KR).
10. In Serviceman Mode for making electronic adjustments, select the RED CUTOFF DAC (C0).
11. Press the R-Tune key on the remote.
12. View the scope trace and adjust the Serviceman Mode DAC (C0) for the scanning period to be 195V above DC ground. (See Figure 23)
13. Connect the scope to the BLU Cathode (KB).
14. In Serviceman Mode for making electronic adjustments, select the BLU CUTOFF (C2).
15. Press the R-Tune key on the remote.
16. View the scope trace and adjust the Serviceman Mode DAC (C2) for the scanning period to be 195V above DC ground. (See Figure 23)
17. Turn the Screen Control (part of FBT) slowly clockwise until a color horizontal line appears.
18. With the other two colors Serviceman Mode DAC CUTOFF adjustments (C0) RED, (C1) GRN, (C2) BLU; increase the colors to create a white horizontal line.
19. Confirm that a good gray scale is established by viewing B/W color bar pattern.
20. In the Serviceman Mode for making electronic adjustments select the DAC DRIVE adjustments (C3) RED, (C4) BLU and adjust for warm white in a white color bar pattern.
25. EXIT the Serviceman Mode.
26. Adjust the Picture Menu Video Adjustments **Bright** and **Picture** from low scale to high scale and check Black and White tracking.
27. If correction is needed: Re-Enter the Serviceman Mode and perform the **Minor Touch - Up Method**.
28. Perform **Sub-Brightness** Adjustment procedure.

Sub-Brightness

Serviceman DAC Adjustment (B2)

Adjustment of this control is important for setting proper operation of customer brightness and picture controls. This adjustment must be made after Sub-Contrast or Color Temperature adjustments are made. **Do not adjust** SCREEN after the Sub-Brightness is set.

Preparation:

1. Apply a color bar signal with 100 IRE white and 7.5 IRE black. (Switch Color to "OFF" on the signal generator.) Operate the Receiver for a minimum of 10 minutes prior to performing this adjustment.
2. Preset the following controls:
 - Color Center
 - Picture Max.
 - Tint Center

Procedure:

In the Serviceman Mode for making electronic adjustments, select the DAC adjustment (B2) and adjust until the black bar starts to look grey. Then decrease the level to the point where grey turns to black.

Service Adjustments (Electronic Controls,cont.)

Horizontal Centering

Serviceman DAC Adjustment (C9)

Preparation:

Connect a crosshatch generator.

Procedure:

1. In the Serviceman Mode for making electronic adjustments. Select the Horizontal Centering Adjustment DAC (C9) and adjust until the center of the crosshatch pattern is centered on CRT.
2. EXIT the Serviceman Adjustment Mode.

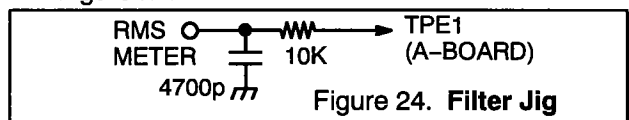
Audio Adjustment

Serviceman DAC Adjustment (B6)

This adjustment is factory set and needs to be performed only when IC002 or IC101 is replaced.

Preparation:

1. Apply the following signal at the antenna (70dB \pm 5dB, 75 Ω open P/S 10dB): audio signal set to monaural, 300Hz. 100% modulation; video input of 100 IRE flat-field, 30% modulation.
2. Connect the RMS Meter with filter jig as shown in Figure 24.



Procedure:

1. In the Serviceman Mode for making electronic adjustments, select the Audio Adjustment DAC (B6) and adjust until the RMS meter reading are:
150mV RMS \pm 7.5mV RMS (Stereo models)
250mV RMS \pm 12.5mV RMS (Mono models)
2. EXIT the Serviceman Adjustment Mode.

Clock Adjustment (Sb)

Preparation:

Connect the frequency counter from TPS1 (IC001 Pin 13) to cold ground (---).

NOTE: Frequency Counter probe capacitance should be 8pF or less.

Procedure:

1. Turn the Receiver "OFF" with the AC power applied.
2. Measure TPS1 (IC001 pin 13) for the frequency of the waveform and record the reading.

Note: Pin 13 measurement must have at least four digits of resolution following the decimal point Example: 000.0000

3. Turn the Receiver "ON".
4. Place the Receiver into Serviceman Mode for making electronic adjustment, select the Clock Adjustment DAC (Sb).
5. Calculate and set Sb based on the following formula:

$$Sb = 128 + 0.901 \times 10^6 \times \frac{\{244.1406 - \text{pin 13 [Hz]}\}}{244.1406}$$

NOTE: Pin 13 measurement will not change regardless of the value stored in Sb.

Vertical Size (B7)

1. Adjust the VERTICAL SIZE DAC control, B7, until the top and the bottom edges of the raster are visible.
2. Adjust the VERTICAL SIZE control B7, until the top and the bottom of the raster touch the bezel edge. Then advance SIZE control to obtain an approximately 10% overscan. Linearity adjustment is done automatically when the size is being adjusted. (Best results can be obtained with a round test pattern.)

Service Adjustments (Mechanical Controls)

VCO Field Alignment L105

1. Connect a balance antenna and select a midband channel (Ch 10, 11 or 12)
2. Attenuate the signal strength for a weak noisy video.
3. While observing the picture tube, adjust L105 until best picture appears.
4. Change channels and observe that they are tuning properly.
5. If the channel monitored is not clear, repeat steps 1, 3 and 4 while applying a stronger signal.

Focus (Part of T551)

Preparation:

Connect a Signal generator and select a dot pattern.

Procedure:

Adjust the FOCUS control to obtain the sharpest and clearest dot pattern.

- a. adjust for best center.
- b. adjust for best area between the center and top right corner.

Audio Signal Path Block Diagram (All Models except SP3231W/UW)

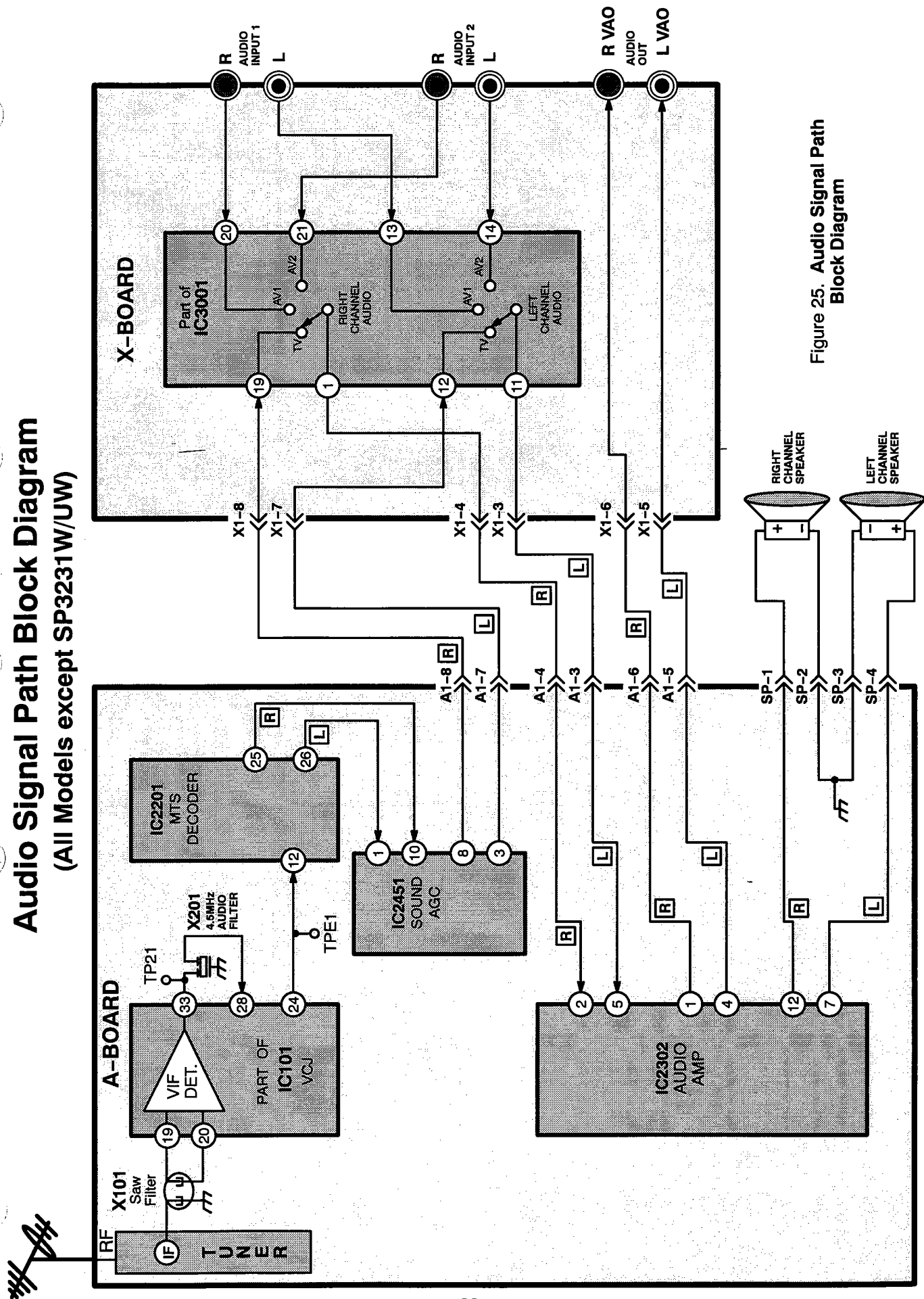


Figure 25. Audio Signal Path Block Diagram

**CIRCUITS &
BLOCK DIAGRAMS**

Audio Signal Path Block Diagram

(SP3221W/UW)

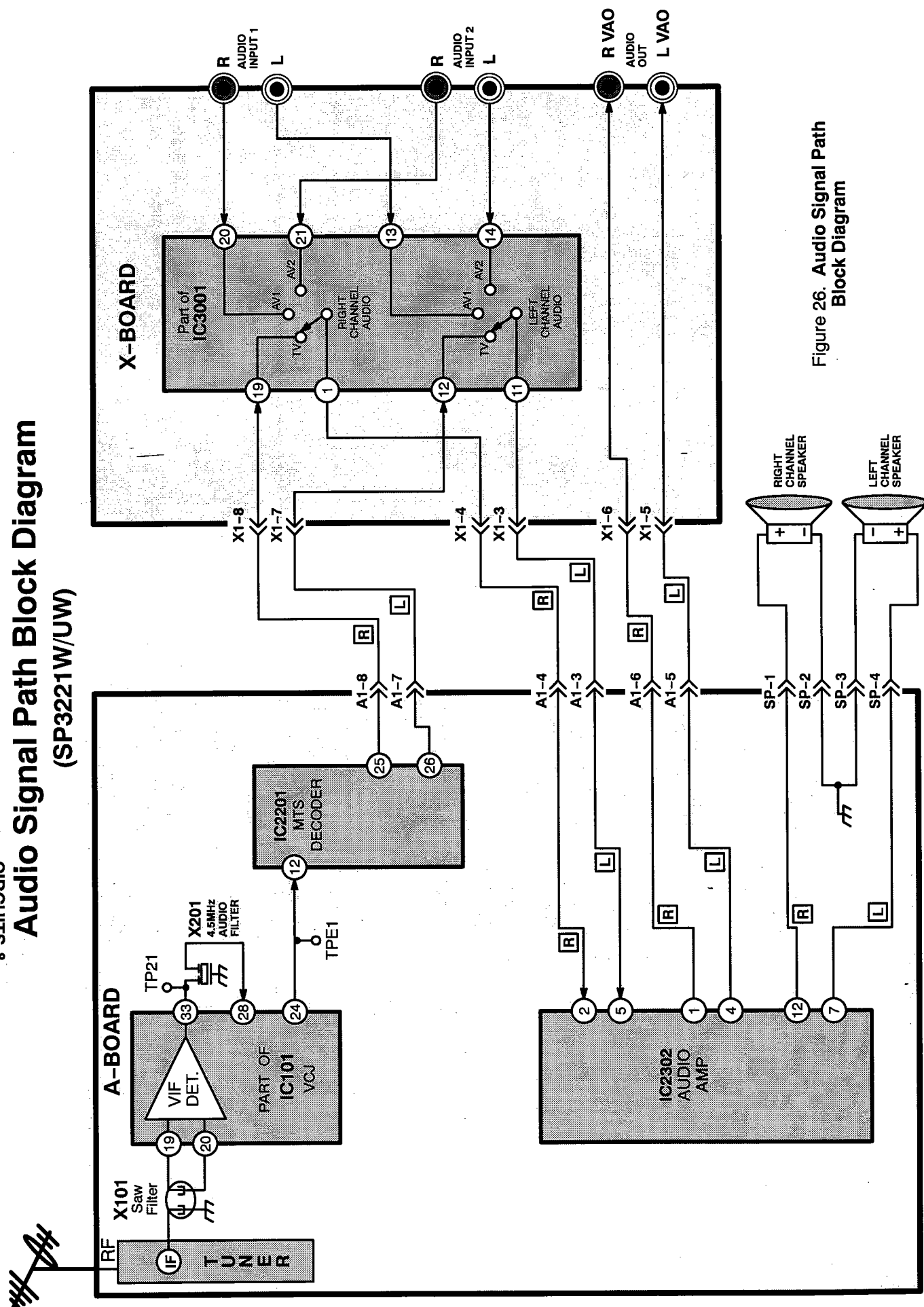


Figure 26. Audio Signal Path Block Diagram

Video-Chroma Signal Path Block Diagram

(All Models except SP3231W/UW)

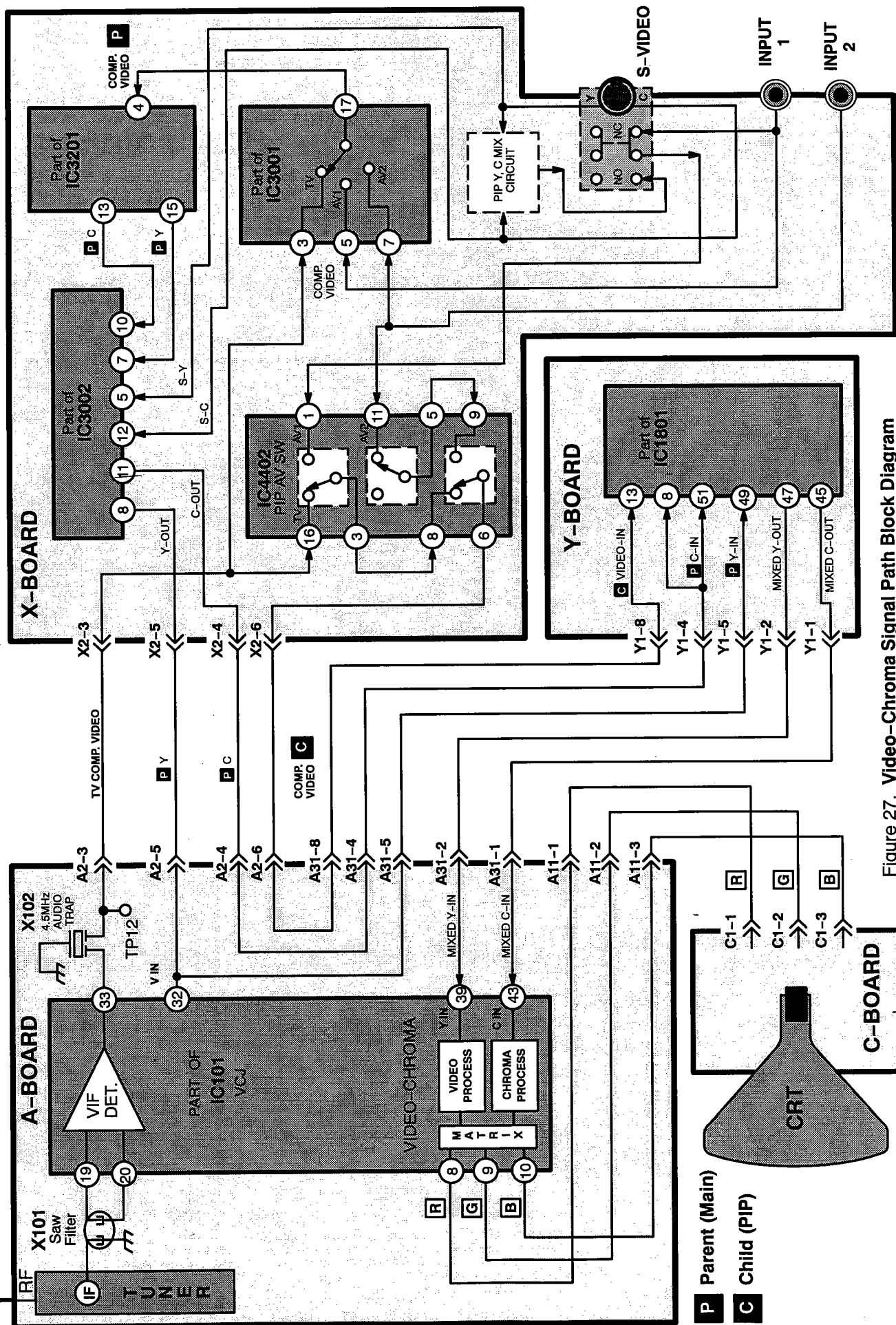


Figure 27. Video-Chroma Signal Path Block Diagram

A-B

X-B

Y-B

CRT

Legend:

- P** Parent (Main)
- C** Child (PIP)

Components:

- X101** Saw Filter
- X102** 4.5MHz AUDIO TRAP
- TP12**

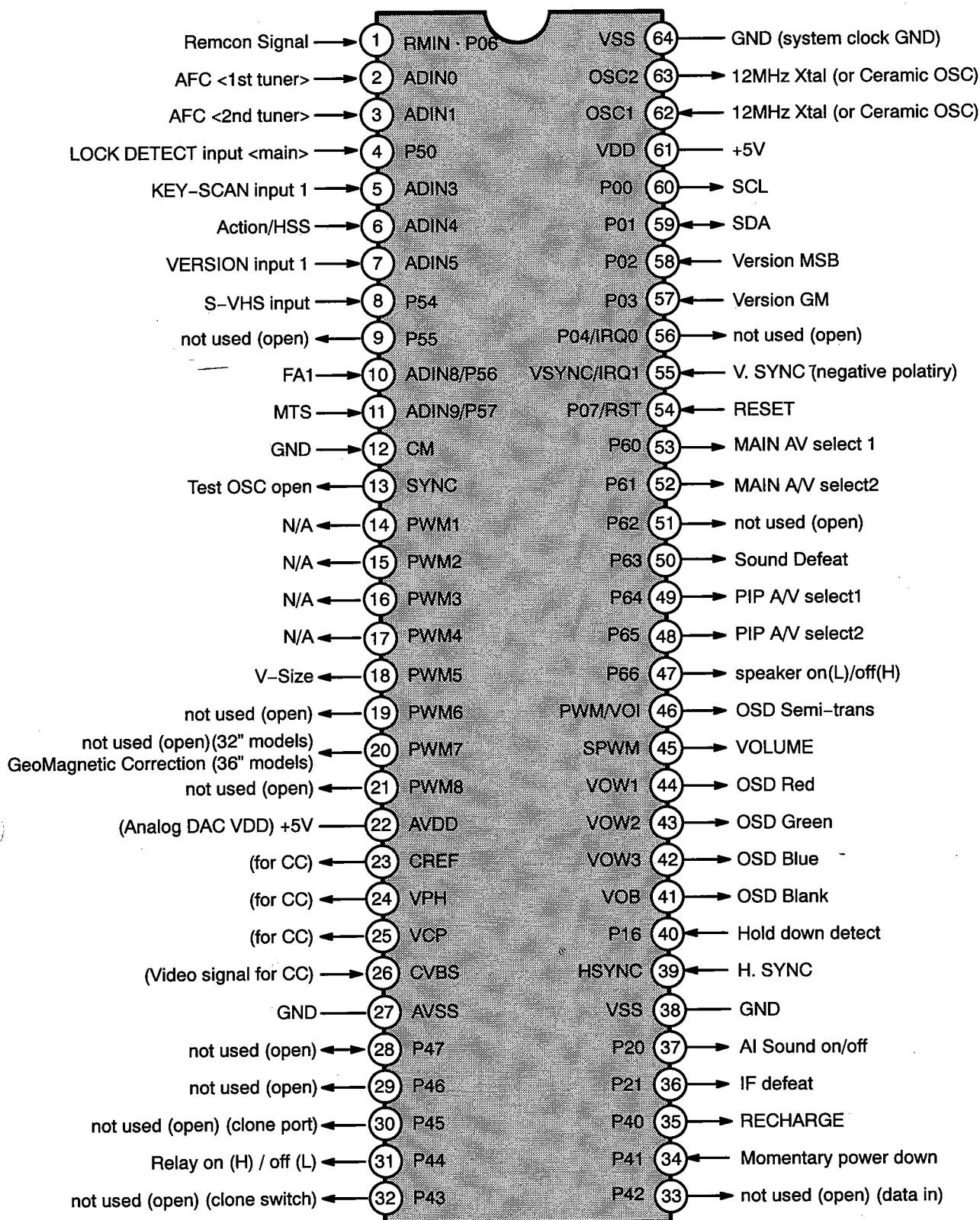
Connections:

- RF** input to **TUNER** (IF 19, 20).
- VIF DET.** (PART OF IC101 VCU) outputs to **VIDEO-CHROMA** (8, 9, 10).
- VIDEO-CHROMA** (M A T R I X, VIDEO PROCESS, CHROMA PROCESS) outputs to **VIDEO-IN** (39) and **C-IN** (43) of **IC1801**.
- IC1801** (Y-B) outputs to **MIXED Y-IN** (49) and **MIXED C-IN** (47) of **IC4402**.
- IC4402** (X-B) outputs to **COMP. VIDEO** (1, 11, 5, 9) and **TV** (16, 3, 8, 6).
- IC3001** (X-B) outputs to **COMP. VIDEO** (3, 5, 7) and **TV** (17).
- IC3201** (X-B) outputs to **COMP. VIDEO** (4) and **TV** (13, 15).
- Inputs:** **INPUT 1** and **INPUT 2** connect to **COMP. VIDEO** and **TV** lines.
- Outputs:** **Y1-1** to **Y1-8** connect to **COMP. VIDEO** and **TV** lines.
- Legend:** **P** Parent (Main), **C** Child (PIP).

Figure 28. Video-Chroma Signal Path Block Diagram

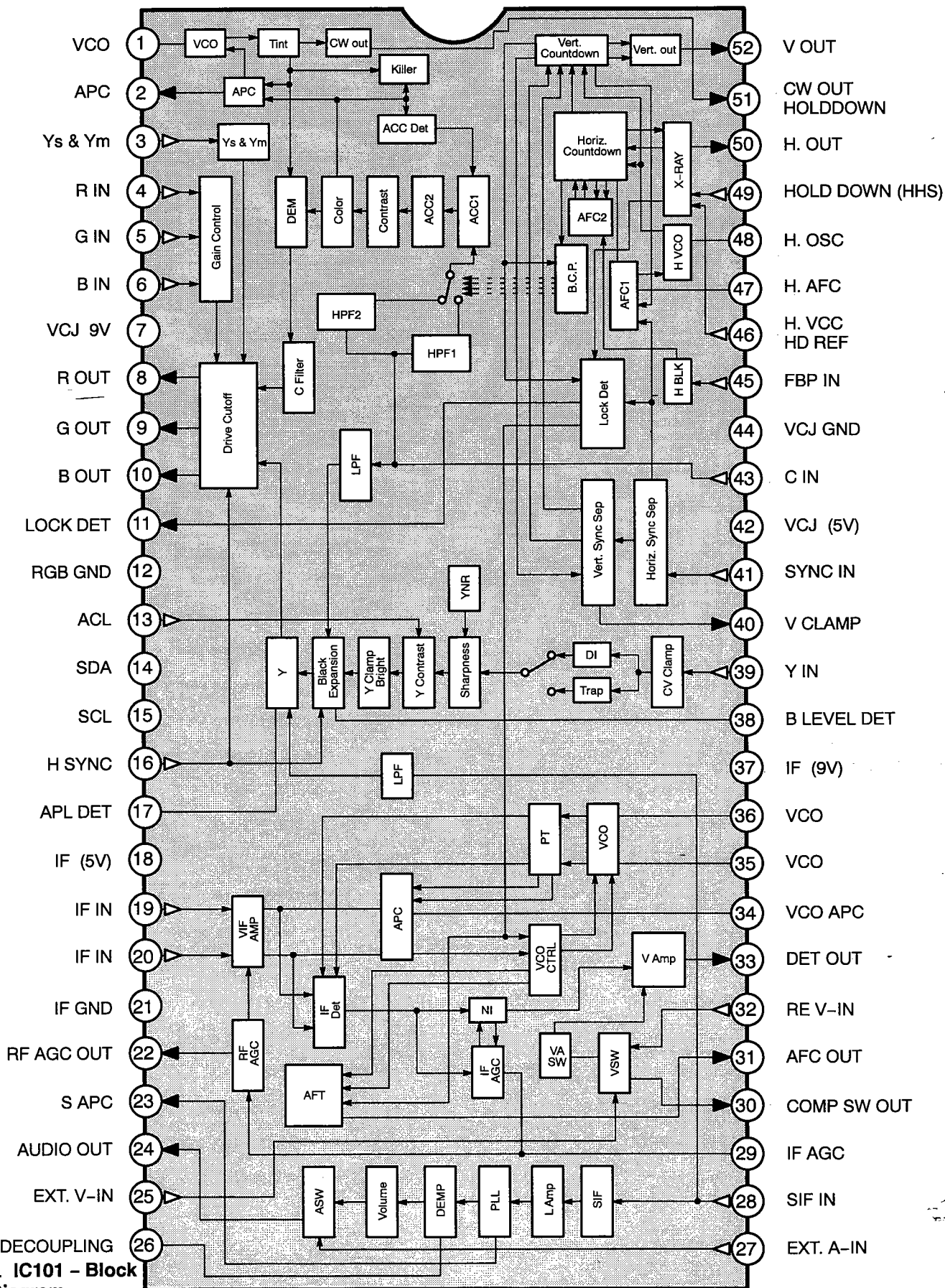
IC001 MPU IN/OUT Pins and Functions

MN1874085TJW



IC101 Block Diagram

INPUT PINS = ◁ ▷ OUTPUT PINS = ◀ ▶



CIRCUITS & BLOCK DIAGRAMS

Figure 29. IC101 - Block Diagram

REPLACEMENT PARTS LIST

(Models: CT-32G23W/CW/UW & SP3231W/UW)

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|-------------------|--------------------|------------------------------|-------------|---------------------|------------------------------|
| CAPRISTORS | | | C357 | ECEA1HN010U | CAP,E 1UF/50V |
| CRA801 | EXNG471P365 | RES-CAP 470PF/3.6 MEG | C401 | ECQB1H153JF | CAP,P .015UF-J-50V |
| CRA802 | EXNG471P365 | RES-CAP 470PF/3.6 MEG | C402 | ECUX1H471JCX | CAP,C 470PF-J-50V |
| CAPACITORS | | | C403 | ECA1HM2R2 | CAP,E 2.2UF/50V |
| C001 | ECA1AM101 | CAP,E 100UF/10V | C451 | ECA1CHG470B | CAP,E 47UF-16V |
| C003 | ECA1HM4R7 | CAP,E 4.7UF/50V | C452 | ECSF1EE105 | CAP,T 1.0UF/25V |
| C008 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C453 | ECEA1HFS010 | CAP,E 1UF/50V |
| C010 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C454 | ECA1EM102 | CAP,E 1000UF/25V |
| C011 | ECA1CM221 | CAP,E 220UF/16V | C455 | ECA1VHG101B | CAP,E 100UF-G-35V |
| C013 | ECA0JM101 | CAP,E 100UF/6.3V | C456 | ECQB1H103JF | CAP,P .01UF-J-50V |
| C016 | ECUX1H101JCX | CAP,C 100PF-J-50V | C459 | ECA1VHG471E | CAP,E 470UF-35V |
| C017 | ECUX1H220JCX | CAP,C 22PF-J-50V | C460 | ECQM1104JZ | CAP,P .1UF-J-100V |
| C018 | ECUX1H220JCX | CAP,C 22PF-J-50V | C462 | ECA1HM100 | CAP,E 10UF/50V |
| C019 | ECA0JM101 | CAP,E 100UF/6.3V | C501 | ECUX1H821KBX | CAP,C 820PF-K-50V |
| C020 | ECA0JM101 | CAP,E 100UF/6.3V | C502 | ECQB1H223JF | CAP,P .022UF-J-50V |
| C021 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C503 | ECA1HM2R2 | CAP,E 2.2UF/50V |
| C022 | ECA1CM471 | CAP,E 470UF/16V | C504 | ECUX1H221JCX | CAP,C 220PF-J-50V |
| C024 | ECA1EM4R7 | CAP,E 4.7UF/25V | C505 | ECUX1H221JUX | CAP,C 220PF-J-50V |
| C025 | ECUX1H101JCX | CAP,C 100PF-J-50V | C506 | ECA1CM221 | CAP,E 220UF/16V |
| C026 | ECA1HM010 | CAP,E 1.0UF/50V | C510 | ECCD2H100D | CAP,C 10PF-D-500V |
| C031 | ECUX1H821KBX | CAP,C 820PF-K-50V | C511 | ECKD2H821KB | CAP,C 820PF-K-500V |
| C032 | ECA1CM470 | CAP,E 47UF/16V | C512 | ECKD2H101KB | CAP,C 100PF-K-500V |
| C036 | ECUX1H220JCX | CAP,C 22PF-J-50V | C531 | ECA1EM220 | CAP,E 22UF/25V |
| C037 | ECUX1H220JCX | CAP,C 22PF-J-50V | C532 | ECA1CM102 | CAP,E 1000UF/16V |
| C038 | ECUX1H220JCX | CAP,C 22PF-J-50V | C534 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C101 | ECUX1H223ZFX | CAP,C .022UF-Z-50V | C551 | ECA1VM331 | CAP,E 330UF/35V |
| C102 | ECA1EM100 | CAP,E 10UF/25V | C552 | ECA1CM331 | CAP,E 330UF/16V |
| C103 | ECUX1H300JCX | CAP,C 30PF-J-50V | C553 | ECA1CM331 | CAP,E 330UF/16V |
| C105 | ECUX1H221JCX | CAP,C 220PF-J-50V | C554 | ECKD2H561KB | CAP,C 560PF-K-500V |
| C106 | ECA1HMR47 | CAP,E .47UF/50V | C555 | ECEA2EU220 | CAP,E 22UF/250V |
| C107 | ECUX1H470JCX | CAP,C 47PF-J-50V | C556 | ECA1CM102 | CAP,E 1000UF/16V |
| C108 | ECA1HMR22 | CAP,E .22UF/50V | C557 | ECKD2H102KB | CAP,C .001UF-K-500V |
| C109 | ECEA1EN4R7U | CAP,E 4.7UF-25V | C558 | ECA1CM221 | CAP,E 220UF/16V |
| C110 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C559 | ECA1HM220 | CAP,E 22UF/50V |
| C111 | ECA1EM100 | CAP,E 10UF/25V | C560 | ECEA1HN2R2U | CAP,E 2.2UF/50V |
| C113 | ECA1EM100 | CAP,E 10UF/25V | C561 | ECKD2H561KB | CAP,C 560PF-K-500V |
| C114 | ECUX1H040CCX | CAP,C 4PF-C-50V | C562 | ECKD2H561KB | CAP,C 560PF-K-500V |
| C151 | ECA1HMR22 | CAP,E .22UF/50V | C563 | ECWH12H133JS | CAP,P .013UF-J-1.2KV |
| C201 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C564 | ECWH12H122JS | CAP,P .0012UF-J-1.2KV |
| C202 | ECUX1H101JCX | CAP,C 100PF-J-50V | C565 | ECKD3D561JB | CAP,C 560PF-J-2KV |
| C203 | ECA1EM4R7 | CAP,E 4.7UF/25V | C566 | ECKD3D181JB | CAP,C 180PF-J-2KV |
| C301 | ECUX1H390JCX | CAP,C 39PF-J-50V | C567 | ECQM4562JZ | CAP,P 5600UF-J-400V |
| C302 | ECEA1HN010U | CAP,E 1UF/50V | C568 | ECQM4473JZ | CAP,P .047UF-J-400V |
| C304 | ECEA1HNR47U | CAP,E .47UF-50V | C569 | ECWF2474JBK | CAP,M .47UF-J-200V |
| C305 | ECA1HM4R7 | CAP,E 4.7UF/50V | C571 | ECA1CM471 | CAP,E 470UF/16V |
| C306 | ECA1CM221 | CAP,E 220UF/16V | C572 | ECA1EM100 | CAP,E 10UF/25V |
| C308 | ECQB1H823JF | CAP,P .082UF-J-50V | C573 | ECA1CM101 | CAP,E 100UF/16V |
| C309 | ECA1AM101 | CAP,E 100UF/10V | C574 | ECKD2H471KB | CAP,C 470PF-K-500V |
| C310 | ECA1EM4R7 | CAP,E 4.7UF/25V | C601 | ECUX1H102KBX | CAP,C .001UF-K-50V |
| C311 | ECA1EM4R7 | CAP,E 4.7UF/25V | C604 | ECUX1H150JUX | CAP,C 15PF-J-50V |
| C312 | ECA1EM330 | CAP,E 33UF/25V | C605 | ECUX1H332KBX | CAP,C .0033UF-K-50V |
| C315 | ECUX1H680JCX | CAP,C 68PF-J-50V | C606 | ECA1HM010 | CAP,E 1.0UF/50V |
| C351 | TACCW331T50V | CAP,C 330PF/50V | C754 | ECQB1H104JF | CAP,P .1UF-J-50V |
| C352 | TACCW331T50V | CAP,C 330PF/50V | C755 | ECQB1H104JF | CAP,P .1UF-J-50V |
| C353 | TACCW331T50V | CAP,C 330PF/50V | C756 | ECA1CM221 | CAP,E 220UF/16V |
| C354 | ECKD3D102KB | CAP,C .001UF-K-2KV | C757 | ECA1VM221 | CAP,E 220UF/35V |

REPLACEMENT PARTS LIST

(Models: CT-32G23W/CW/UW & SP3231W/UW)

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|----------|--------------|----------------------|----------|--------------|----------------------|
| C759 | ECQE1395KN | CAP,P 3.9UF-K-100V | C1837 | ECUX1H104ZFX | CAP,C .1UF-Z-50V |
| C760 | TACCV101T50V | CAP,C 100PF/50V | C1839 | ECUX1H680JCX | CAP,C 68PF-J-50V |
| C801 | ECKD2H472PU | CAP,C .0047UF-P-500V | C1840 | ECUX1H680JCX | CAP,C 68PF-J-50V |
| C802 | ECKD2H472PU | CAP,C .0047UF-P-500V | C2201 | AP335K016CAE | CAP,T 3.3UF/16V |
| C803 | ECKD2H472PU | CAP,C .0047UF-P-500V | C2202 | ECA1EM4R7 | CAP,E 4.7UF/25V |
| C804 | ECKD2H472PU | CAP,C .0047UF-P-500V | C2203 | ECA1HM010 | CAP,E 1.0UF/50V |
| C805 | EC0S2DA331BB | CAP,E 330UF/200V | C2204 | ECA1EM4R7 | CAP,E 4.7UF/25V |
| C806 | EC0S2DA331BB | CAP,E 330UF/200V | C2205 | ECA1EM4R7 | CAP,E 4.7UF/25V |
| C807 | ECA1HM2R2 | CAP,E 2.2UF/50V | C2206 | ECA1EM4R7 | CAP,E 4.7UF/25V |
| C808 | ECA1CM101 | CAP,E 100UF/16V | C2207 | ECA1EM4R7 | CAP,E 4.7UF/25V |
| C809 | EC0S2DG151DG | CAP,E 151UF/200V | C2208 | ECA1EM4R7 | CAP,E 4.7UF/25V |
| C810 | ECQU2A153MV | CAP,P .015UF-M-250V | C2209 | ECA1CM101 | CAP,E 100UF/16V |
| C811 | ECQU2A153MV | CAP,P .015UF-M-250V | C2210 | ECA1HMR33 | CAP,E .33UF/50V |
| C812 | ECQU2A224MV | CAP,P .22F-M-250VAC | C2211 | ECEA1HUR68 | CAP,E .68UF/50V |
| C814 | ECQB1H823JF | CAP,P .082UF-J-50V | C2212 | ECA1HM2R2 | CAP,E 2.2UF/50V |
| C815 | ECA1EHG101B | CAP,E 100UF-25V | C2213 | ECA1EM100 | CAP,E 10UF/25V |
| C818 | ECKD3A821KB | CAP,C 820PF-K-1KVDC | C2214 | ECQB1H104JF | CAP,P .1UF-J-50V |
| C820 | ECA1JHG100B | CAP,E 10UF-63V | C2215 | ECQB1H223JF | CAP,P .022UF-J-50V |
| C821 | ECKD2H561KB | CAP,C 560PF-K-500V | C2216 | ECUX1H332KBX | CAP,C .0033UF-K-50V |
| C822 | ECA1EM221 | CAP,E 220UF/25V | C2217 | ECEA1HN010U | CAP,E 1UF/50V |
| C823 | ECEA160V33Z | CAP,E 33UF/160V | C2218 | ECEA1HN010U | CAP,E 1UF/50V |
| C824 | ECKD3A331KB | CAP,C 330PF-K-1KVDC | C2219 | AP106K016CAE | CAP,T 10UF/16V |
| C825 | ECKD3A471KB | CAP,C 470PF-K-1KV | C2220 | ECEA1CN100U | CAP,E 10UF-16V |
| C1801 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2221 | TCUX1H103KBN | CAP,C .01UF-K-50V |
| C1802 | ECQB1H154JF | CAP,P .15UF-J-50V | C2222 | ECUX1H472KBX | CAP,C .0047UF-K-50V |
| C1803 | ECA1HMR22 | CAP,E .22UF/50V | C2301 | ECA1EM102 | CAP,E 1000UF/25V |
| C1804 | ECEA1HKAR22 | CAP,E .22UF/50V | C2302 | ECA1HM010 | CAP,E 1.0UF/50V |
| C1805 | ECUX1H333ZFX | CAP,C .033UF-Z-50V | C2305 | ECA1HM010 | CAP,E 1.0UF/50V |
| C1806 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2306 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C1807 | ECA1CM470 | CAP,E 47UF/16V | C2307 | ECA1CM102 | CAP,E 1000UF/16V |
| C1808 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2309 | ECQB1H473JF | CAP,P .047UF-J-50V |
| C1809 | ECA1CM470 | CAP,E 47UF/16V | C2311 | ECA1HM3R3 | CAP,E 3.3UF/50V |
| C1810 | ECUX1H104ZFX | CAP,C .1UF-Z-50V | C2313 | ECA1EM101 | CAP,E 100UF/25V |
| C1811 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2314 | ECQB1H473JF | CAP,P .047UF-J-50V |
| C1812 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2315 | ECA1EM100 | CAP,E 10UF/25V |
| C1813 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2321 | ECA1EM100 | CAP,E 10UF/25V |
| C1814 | ECA1CM470 | CAP,E 47UF/16V | C2324 | ECA1EM100 | CAP,E 10UF/25V |
| C1815 | ECUX1H104ZFX | CAP,C .1UF-Z-50V | C2325 | ECA1CM102 | CAP,E 1000UF/16V |
| C1816 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2331 | ECEA1CN100U | CAP,E 10UF-16V |
| C1817 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2332 | ECEA1CN100U | CAP,E 10UF-16V |
| C1818 | ECA1CM100 | CAP,E 10UF/16V | C2351 | ECEA1HN010U | CAP,E 1UF/50V |
| C1819 | ECUX1H104ZFX | CAP,C .1UF-Z-50V | C2353 | ECEA1HN010U | CAP,E 1UF/50V |
| C1820 | ECA1CM470 | CAP,E 47UF/16V | C2359 | ECA1HM010 | CAP,E 1.0UF/50V |
| C1821 | ECUX1H150JCX | CAP,C 15PF-J-50V | C2360 | ECA1HM010 | CAP,E 1.0UF/50V |
| C1822 | ECUX1H120JCX | CAP,C 12PF-J-50V | C2362 | ECA1AM470 | CAP,E 47UF/10V |
| C1823 | ECUX1H680JCX | CAP,C 68PF-J-50V | C2451 | ECA1EM100 | CAP,E 10UF/25V |
| C1826 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | | | CT-32G23CW |
| C1827 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | | | CT-32G23W CT-32G23UW |
| C1828 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2452 | ECA1EM100 | CAP,E 10UF/25V |
| C1829 | ECUX1H104ZFX | CAP,C .1UF-Z-50V | | | CT-32G23CW |
| C1830 | ECUX1H151JCX | CAP,C 150PF-J-50V | | | CT-32G23W CT-32G23UW |
| C1831 | ECUX1H104ZFX | CAP,C .1UF-Z-50V | C2453 | ECA1EM4R7 | CAP,E 4.7UF/25V |
| C1832 | ECUX1H104ZFX | CAP,C .1UF-Z-50V | | | CT-32G23CW |
| C1833 | ECUX1H104ZFX | CAP,C .1UF-Z-50V | | | CT-32G23W CT-32G23UW |
| C1835 | ECA1CM100 | CAP,E 10UF/16V | C2454 | ECA1CM221 | CAP,E 220UF/16V |
| C1836 | ECUX1H680JCX | CAP,C 68PF-J-50V | | | CT-32G23CW |
| | | | C3003 | ECA1HM010 | CAP,E 1.0UF/50V |
| | | | C3006 | ECA1HM010 | CAP,E 1.0UF/50V |
| | | | C3011 | ECA1HM010 | CAP,E 1.0UF/50V |

PARTS LIST

REPLACEMENT PARTS LIST

(Models: CT-32G23W/CW/UW & SP3231W/UW)

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|----------|--------------|--|---------------|-------------------|--------------------------|
| C3012 | ECA1HM010 | CAP,E 1.0UF/50V | C4411 | ECA1CM100 | CAP,E 10UF/16V |
| C3013 | ECA1CM100 | CAP,E 10UF/16V | C4412 | ECA1CM100 | CAP,E 10UF/16V |
| C3014 | ECA1CM100 | CAP,E 10UF/16V | C4414 | ECA1CM100 | CAP,E 10UF/16V |
| C3016 | TCUX1H103ZFN | CAP,C .01UF-Z-50V CT-32G23CW CT-32G23W CT-32G23UW | C4415 | ECA1CM100 | CAP,E 10UF/16V |
| C3017 | TCUX1H103ZFN | CAP,C .01UF-Z-50V CT-32G23CW CT-32G23W CT-32G23UW | C4416 | ECA1CM100 | CAP,E 10UF/16V |
| C3018 | ECA1HM010 | CAP,E 1.0UF/50V | DIODES | | |
| C3019 | ECA1HM010 | CAP,E 1.0UF/50V | D001 | ERA15-01 | DIODE |
| C3020 | ECA1CM470 | CAP,E 47UF/16V CT-32G23CW CT-32G23W CT-32G23UW | D002 | MA165 | DIODE |
| C3022 | ECA1CM220 | CAP,E 22UF/16V CT-32G23CW CT-32G23W CT-32G23UW | D003 | MA4047H | DIODE |
| C3023 | ECA1AM101 | CAP,E 100UF/10V | D006 | MA4330H | DIODE |
| C3024 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D008 | MA165 | DIODE |
| C3025 | ECA1AM470 | CAP,E 47UF/10V | D009 | MA165 | DIODE |
| C3036 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D011 | MA165 | DIODE |
| C3037 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D014 | MA165 | DIODE |
| C3071 | ECA1CM220 | CAP,E 22UF/16V CT-32G23CW CT-32G23W CT-32G23UW | D015 | MA165 | DIODE |
| C3072 | TCUX1H103ZFN | CAP,C .01UF-Z-50V CT-32G23CW CT-32G23W CT-32G23UW | D016 | MA165 | DIODE |
| C3201 | ECUX1H680JCX | CAP,C 68PF-J-50V | D017 | MA165 | DIODE |
| C3202 | ECUX1H270JCX | CAP,C 27PF-J-50V | D051 | MA4062M | DIODE, ZENER |
| C3206 | ECA1CM220 | CAP,E 22UF/16V CT-32G23CW CT-32G23W CT-32G23UW | D451 | ERA15-01 | DIODE |
| C3207 | TCUX1H103ZFN | CAP,C .01UF-Z-50V CT-32G23CW CT-32G23W CT-32G23UW | D452 | MA4047M | DIODE, ZENER |
| C3214 | ECA1HMR47 | CAP,E .47UF/50V | D501 | MA4082L | DIODE |
| C3216 | ECUX1H390JCX | CAP,C 39PF-J-50V | D531 | AS01 | DIODE |
| C3219 | ECUX1H470JCX | CAP,C 47PF-J-50V | D532 | MA4062L | DIODE |
| C3221 | ECA1AM470 | CAP,E 47UF/10V | D551 | TVSRU2N | DIODE |
| C3222 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D554 | BYD33G-143 | DIODE |
| C3225 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D555 | MA165 | DIODE |
| C3226 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D556 | MA4360H | DIODE, ZENER |
| C3227 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D557 | AU02 | DIODE |
| C3228 | ECA1AM470 | CAP,E 47UF/10V | D558 | RS3FS | DIODE |
| C3229 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D559 | BYD33G-113 | DIODE |
| C3230 | ECUX1H181JCX | CAP,C 180PF-J-50V | D560 | MA165 | DIODE |
| C3231 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D561 | BYD33G-143 | DIODE |
| C3232 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D751 | MA2270B | DIODE |
| C3233 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D801 | GP15KL-042 | DIODE |
| C3234 | ECA1AM470 | CAP,E 47UF/10V | D802 | GP15KL-042 | DIODE |
| C3235 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D805 | TAP107M003 | THERMISTOR (PTC) |
| C3236 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D806 | MA4047H | DIODE |
| C4304 | ECEA1CKA100 | CAP,E 10UF/16V | D807 | MA165 | DIODE |
| C4307 | ECEA1CKN100 | CAP,E 10UF/16V | D809 | AU02 | DIODE |
| C4313 | ECUX1H391KBX | CAP,C 390PF-K-50V | D820 | EU02V1 | DIODE |
| C4314 | ECA1HMR47 | CAP,E .47UF/50V | D821 | EU02V1 | DIODE |
| C4315 | ECUX1H152KBX | CAP,C .0015UF-K-50V | D822 | EU02V1 | DIODE |
| C4316 | ECA0JM331 | CAP,E 330UF/6.3V | D823 | RL30A | DIODE |
| C4317 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D824 | EU02V1 | DIODE |
| C4319 | ECUX1H391JCX | CAP,C 390PF-J-50V | D825 | TVSSR2KL | DIODE, PROTECTION |
| C4320 | ECUX1H681KBX | CAP,C 680PF-K-50V | D826 | EU02V1 | DIODE |
| C4357 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D829 | MA165 | DIODE |
| C4358 | ECA1AM470 | CAP,E 47UF/10V | D830 | MA4270M | DIODE |
| | | | D2301 | MA165 | DIODE |
| | | | D2303 | MA4082M | DIODE |
| | | | D2315 | MA165 | DIODE |
| | | | D2342 | MA151K | DIODE |
| | | | D2343 | MA151K | DIODE |
| | | | D3001 | MA165 | DIODE |
| | | | D3003 | MA4062L | DIODE |

REPLACEMENT PARTS LIST

(Models: CT-32G23W/CW/UW & SP3231W/UW)

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|----------------------------|---------------------|-------------------------------|--------------------|-------------------|----------------------|
| D3011 | MA3110M | DIODE, ZENER CT-32G23CW | L555 | TSKA072 | FERRITE BEAD |
| | | CT-32G23W CT-32G23UW | L556 | TSKA072 | FERRITE BEAD |
| D3014 | MA3110M | DIODE, ZENER CT-32G23CW | L751 | ELC18B301L | COIL, CHOKE |
| | | CT-32G23W CT-32G23UW | L752 | EXCELD35 | FERRITE BEAD |
| D3015 | MA3110M | DIODE, ZENER CT-32G23CW | L801 | ELF20N020A | COIL, 2UH |
| | | CT-32G23W CT-32G23UW | L803 | ELF17N007A | LINE FILTER |
| D3018 | MA3110M | DIODE, ZENER CT-32G23CW | L804 | TSKA076 | FERRITE BEAD |
| | | CT-32G23W CT-32G23UW | L805 | TSKA076 | FERRITE BEAD |
| D3019 | MA3110M | DIODE, ZENER | L1801 | TLTACT1R5K | COIL, PEAKING |
| D3020 | MA3110M | DIODE, ZENER | L1803 | TLTACT2R2K | COIL, PEAKING 2.2UH |
| D3021 | MA3110M | DIODE, ZENER | L1804 | TLTACT150J | COIL, PEAKING 15UH |
| D3022 | MA3110M | DIODE, ZENER | L1806 | TLTACT1R0K | COIL, PEAKING 1UH |
| D3023 | MA3110M | DIODE, ZENER | L1807 | TLTACT1R0K | COIL, PEAKING 1UH |
| D3024 | MA3110M | DIODE, ZENER | L1808 | EXCELD25 | COIL |
| D3025 | MA3110M | DIODE, ZENER | L2201 | ELESN102JA | COIL, PEAKING 1000UH |
| D3026 | MA3110M | DIODE, ZENER | L2202 | ELESN471JA | COIL, PEAKING 470UH |
| D4301 | MA3036H | DIODE | L2302 | EXCELD25 | COIL |
| FUSES | | | L2303 | EXCELD25 | COIL |
| F801 | 0BA1C63NU100 | FUSE, 6.3A/125V | L3203 | ELESN150JA | COIL, PEAKING 15UH |
| INTEGRATED CIRCUITS | | | L3206 | ELESN390JA | COIL, PEAKING 39UH |
| IC001 | MN1874085TJW | INT CKT | L3208 | ELESN100KA | COIL, PEAKING 10UH |
| IC002 | 24LC04BIP | INT CKT | L3209 | ELESN100KA | COIL, PEAKING 10UH |
| IC003 | RPM-637CBRS1 | IR RECEIVER, REMOTE CONTROL | L3210 | ELESN100KA | COIL, PEAKING 10UH |
| IC101 | AN5165K | INT CKT | L4301 | TLTACT2R2K | COIL, PEAKING 2.2UH |
| IC451 | LA7838 | INT CKT | TRANSISTORS | | |
| IC551 | AN78M09 | PLUS 9V AVR | Q001 | MSD601-RT1 | TRANSISTOR |
| IC552 | AN78M05 | PLUS 5V AVR | Q002 | JC501PQ | TRANSISTOR |
| IC801 | 0N3131R | INT CKT | Q003 | MSB709-RT1 | TRANSISTOR |
| IC803 | STR58041A | INT CKT | Q004 | MSB709-RT1 | TRANSISTOR |
| IC1801 | M65617SP | PIP CONTROLLER | Q302 | MSD601-RT1 | TRANSISTOR |
| IC2201 | AN5819K | INT CKT | Q303 | MSB709-RT1 | TRANSISTOR |
| IC2302 | AN5272 | INT CKT | Q304 | MSD601-RT1 | TRANSISTOR |
| IC2451 | AN5285K | INT CKT CT-32G23CW | Q305 | MSD601-RT1 | TRANSISTOR |
| | | CT-32G23W CT-32G23UW | Q306 | MSB709-RT1 | TRANSISTOR |
| IC3001 | M52472P | INT CKT | Q307 | MSB709-RT1 | TRANSISTOR |
| IC3002 | LA7222-TV | INT CKT CT-32G23CW | Q351 | 2SC3063 | TRANSISTOR |
| | | CT-32G23W CT-32G23UW | Q352 | 2SC3063 | TRANSISTOR |
| IC3201 | TC90A45P | INT CKT | Q353 | 2SC3063 | TRANSISTOR |
| IC3202 | AN78L05 | INT CKT | Q430 | MSD601-RT1 | TRANSISTOR |
| IC4402 | M52055P | INT CKT | Q451 | MSD601-RT1 | TRANSISTOR |
| COILS | | | Q452 | MSD601-RT1 | TRANSISTOR |
| L001 | TSKA074 | FERRITE BEAD | Q501 | 2SC4212H | TRANSISTOR |
| L002 | ELESN390KA | COIL, PEAKING 39UH | Q551 | 2SD2539MA1 | TRANSISTOR |
| L003 | TLTABT2R2K | COIL, PEAKING 2.2UH | Q751 | JC501PQ | TRANSISTOR |
| L004 | TLTABT2R2K | COIL, PEAKING 2.2UH | Q752 | JA101PQ | TRANSISTOR |
| L005 | EXCELSA24T | FERRITE BEAD | Q753 | 2SD1266 | TRANSISTOR |
| L006 | TSKA072 | FERRITE BEAD | Q801 | 2SC1685RSTA | TRANSISTOR |
| L008 | TLTABT470K | COIL, PEAKING 47UH | Q802 | 2SC1384RS | TRANSISTOR |
| L011 | EXCELSA24T | FERRITE BEAD | Q804 | 2SA1767Q | TRANSISTOR |
| L103 | ELESN120JA | COIL, PEAKING 12UH | Q1801 | MSD601-RT1 | TRANSISTOR |
| L104 | TLTABT2R2K | COIL, PEAKING 2.2UH | Q1802 | MSD601-RT1 | TRANSISTOR |
| L105 | EIV7EN053B | COIL, VCO | Q1803 | MSD601-RT1 | TRANSISTOR |
| L106 | ELESN180JA | COIL, PEAKING 18UH | Q1804 | MSB709-RT1 | TRANSISTOR |
| L351 | TLTABT101K | COIL, PEAKING | Q1805 | MSB709-RT1 | TRANSISTOR |
| L551 | ELH5L7102 | COIL, HORIZ. LINEARITY | Q2302 | MSB709-RT1 | TRANSISTOR |
| L554 | TSKA072 | FERRITE BEAD | Q2303 | MSD601-RT1 | TRANSISTOR |

PARTS LIST

REPLACEMENT PARTS LIST

(Models: CT-32G23W/CW/UW & SP3231W/UW)

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|------------------|-----------------|---|----------|--------------|----------------------|
| Q2305 | MSB709-RT1 | TRANSISTOR | R035 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 |
| Q2362 | MSB709-RT1 | TRANSISTOR | R036 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 |
| Q2409 | MSD601-RT1 | TRANSISTOR | R037 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q2410 | MSD601-RT1 | TRANSISTOR | R038 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q3001 | MSD601-RT1 | TRANSISTOR | R039 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| Q3011 | MSD601-RT1 | TRANSISTOR CT-32G23CW CT-32G23W CT-32G23UW | R040 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q3012 | MSD601-RT1 | TRANSISTOR CT-32G23CW CT-32G23W CT-32G23UW | R041 | ERDS2TJ471 | RES,C 470-J-1/4 |
| Q3013 | MSD601-RT1 | TRANSISTOR CT-32G23CW CT-32G23W CT-32G23UW | R042 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q3014 | MSD601-RT1 | TRANSISTOR CT-32G23CW CT-32G23W CT-32G23UW | R043 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q3201 | MSB709-RT1 | TRANSISTOR | R044 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| Q3203 | MSB709-RT1 | TRANSISTOR | R045 | ERDS2TJ102 | RES,C 1K-J-1/4 |
| Q3205 | MSB709-RT1 | TRANSISTOR | R046 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q3207 | MSD601-RT1 | TRANSISTOR | R048 | ERJ6GEYJ221 | RES,M 220-J-1/10 |
| Q4309 | MSB709-RT1 | TRANSISTOR | R049 | ERJ6GEYJ221 | RES,M 220-J-1/10 |
| Q4310 | MSD601-RT1 | TRANSISTOR | R050 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q4311 | MSB709-RT1 | TRANSISTOR | R051 | ERDS2TJ471 | RES,C 470-J-1/4 |
| Q4312 | MSD601-RT1 | TRANSISTOR | R052 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q4313 | MSD601-RT1 | TRANSISTOR | R055 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q4315 | 2SC1384Q | TRANSISTOR | R057 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| RELAYS | | | R060 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| RL801 | TSEH8007 | RELAY | R065 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| RESISTORS | | | R066 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 |
| R002 | ERJ6GEYJ182 | RES,M 1.8K-J-1/10 | R067 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 |
| R003 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 | R068 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 |
| R004 | ERDS1TJ181 | RES,C 180-J-1/2 | R101 | ERJ6GEYJ750 | RES,M 75-J-1/10 |
| R005 | ERDS2TJ101 | RES,C 100-J-1/4 | R102 | ERJ6GEYJ683 | RES,M 68K-J-1/10 |
| R006 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R103 | ERJ6GEYJ183 | RES,M 18K-J-1/10 |
| R007 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R104 | ERJ6GEYJ681 | RES,M 680-J-1/10 |
| R008 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 | R105 | ERJ6GEYJ681 | RES,M 680-J-1/10 |
| R010 | ERJ6GEYJ154 | RES,M 150K-J-1/10 | R107 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R011 | ERJ6GEYJ684 | RES,M 680K-J-1/10 | R108 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 |
| R012 | ERJ6GEYJ473 | RES,M 47K-J-1/10 | R152 | ERDS2TJ183 | RES,C 18K-J-1/4 |
| R014 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 | R153 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| R015 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 | R154 | ERDS2TJ393 | RES,C 39K-J-1/4 |
| R016 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 | R201 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R017 | ERDS2TJ472 | RES,C 4.7K-J-1/4 | R202 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 |
| R020 | ERJ6GEYJ474 | RES,M 470K-J-1/10 | R203 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 |
| R021 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R303 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 |
| R022 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R304 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 |
| R023 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R305 | ERDS2CKF3001 | RES,M 3K-F-1/4 |
| R025 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | R306 | ERJ6ENF1601 | RES,M 1.6K-F-1/10W |
| R026 | ERJ6GEYJ133 | RES,M 13K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW | R308 | ERDS2TJ102 | RES,C 1K-J-1/4 |
| R026 | ERJ6GEYJ223 | RES,M 22K-J-1/10 SP3231W SP3231UW | R309 | ERJ6GEYJ683 | RES,M 68K-J-1/10 |
| R027 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | R310 | ERJ6GEYJ273 | RES,M 27K-J-1/10 |
| R028 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | R311 | ERJ6GEYJ185 | RES,M 1.8MEG-J-1/10W |
| R030 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R313 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R031 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R314 | ERDS2TJ471 | RES,C 470-J-1/4 |
| R032 | ERJ6ENF1002 | RES,M 10K-F-1/10 | R317 | ERJ6GEYJ684 | RES,M 680K-J-1/10 |
| R033 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | R319 | ERJ6GEYJ122 | RES,M 1.2K-J-1/10 |
| R034 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | R320 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| | | | R324 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 |
| | | | R325 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| | | | R326 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 |
| | | | R327 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 |
| | | | R328 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| | | | R335 | ERJ6GEYJ471 | RES,M 470-J-1/10 |

REPLACEMENT PARTS LIST

(Models: CT-32G23W/CW/UW & SP3231W/UW)

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| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|-------------|--------------------|----------------------------|-------------|--------------------|---------------------------|
| R351 | ERG2FJ123H | RES,M 12K-J-2W | R552 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 |
| R352 | ERG2FJ123H | RES,M 12K-J-2W | R554 | ERG3FJ270H | RES,M 27-J-3W |
| R353 | ERG2FJ123H | RES,M 12K-J-2W | R556 | ERDS2TJ272 | RES,C 2.7K-J-1/4 |
| R354 | ERDS1TJ272 | RES,C 2.7K-J-1/2 | R557 | ERDS2TJ103 | RES,C 10K-J-1/4 |
| R355 | ERDS1TJ272 | RES,C 2.7K-J-1/2 | R558 | ERQ2CJP1R8 | RES,F 1.8-J-2W |
| R356 | ERDS1TJ272 | RES,C 2.7K-J-1/2 | R559 | ERG2FJ683H | RES,M 12K-J-2W |
| R357 | ERDS2TJ241 | RES,C 240-J-1/4 | R560 | ERG2FJ122H | RES,M 12K-J-2W |
| R358 | ERDS2TJ241 | RES,C 240-J-1/4 | R561 | ERG2FJ102H | RES,M 1K-J-2W |
| R359 | ERDS2TJ241 | RES,C 240-J-1/4 | R563 | ERDS2TJ683 | RES,C 68K-J-1/4 |
| R360 | ERDS2TJ751 | RES,C 750-J-1/4 | R564 | ERDS2TJ563 | RES,C 56K-J-1/4 |
| R361 | ERDS2TJ751 | RES,C 750-J-1/4 | R565 | ERDS2TJ103 | RES,C 10K-J-1/4 |
| R362 | ERDS2TJ751 | RES,C 750-J-1/4 | R566 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 |
| R363 | ERDS2TJ101 | RES,C 100-J-1/4 | R602 | ERJ6GEYJ331 | RES,M 330-J-1/10 |
| R364 | ERDS2TJ101 | RES,C 100-J-1/4 | R603 | ERJ6GEYJ331 | RES,M 330-J-1/10 |
| R365 | ERDS2TJ101 | RES,C 100-J-1/4 | R604 | ERJ6GEYJ331 | RES,M 330-J-1/10 |
| R401 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R614 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 |
| R430 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | R752 | ERDS2TJ333 | RES,C 33K-J-1/4 |
| R432 | ERDS2TJ102 | RES,C 1K-J-1/4 | R753 | ERDS2TJ103 | RES,C 10K-J-1/4 |
| R451 | ERDS1FJ1R2 | RES,C 1.2-J-1/2 | R754 | ERG3FJ562 | RES,M 5.6K-J-3W |
| R454 | ERJ6GEYJ393 | RES,M 39K-J-1/10 | R755 | ERDS2TJ563 | RES,C 56K-J-1/4 |
| R455 | ERJ6GEYJ183 | RES,M 18K-J-1/10 | R756 | ERDS2TJ103 | RES,C 10K-J-1/4 |
| R456 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | R757 | ERDS2TJ224 | RES,C 220K-J-1/4 |
| R457 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 | R758 | ERDS2TJ273 | RES,C 27K-J-1/4 |
| R458 | ERJ6GEYJ333 | RES,M 33K-J-1/10 | R759 | ERDS2TJ222 | RES,C 2.2K-J-1/4 |
| R459 | ERJ6GEYJ683 | RES,M 68K-J-1/10 | R760 | EVND8AA03B53 | CONTROL 5K |
| R460 | ERDS2TJ102 | RES,C 1K-J-1/4 | R761 | EVND8AA03B14 | CONTROL 10K |
| R462 | ERJ6GEYJ473 | RES,M 47K-J-1/10 | R762 | ERDS2TJ182 | RES,C 1.8K-J-1/4 |
| R463 | ERJ6GEYJ473 | RES,M 47K-J-1/10 | R763 | ERDS2TJ183 | RES,C 18K-J-1/4 |
| R464 | ERDS1FJ1R5 | RES,C 1.5-J-1/2 | R764 | ERDS2TJ154 | RES,C 150K-J-1/4 |
| R465 | ERDS2TJ103 | RES,C 10K-J-1/4 | R765 | ERDS2TJ272 | RES,C 2.7K-J-1/4 |
| R466 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | R766 | ERDS2TJ362 | RES,C 3.6K-J-1/4 |
| R467 | ERJ6GEYJ104 | RES,M 100K-J-1/10 | R767 | ERDS2TJ222 | RES,C 2.2K-J-1/4 |
| R468 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R768 | ERQ2CJP100 | RES,F 10-J-2W |
| R469 | ERJ6GEYJ220 | RES,M 22-J-1/10 | R801 | ERF7ZK1R5 | RES,W 1.5-K-7W |
| R471 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | R804 | ERW12PK1R8 | RES,W 1.8-K-1/2W |
| R501 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R805 | ERDS2TJ274 | RES,C 270K-J-1/4 |
| R502 | ERDS2TJ562 | RES,C 5.6K-J-1/4 | R806 | ERDS2TJ274 | RES,C 270K-J-1/4 |
| R503 | ERJ6GEYJ822 | RES,M 8.2K-J-1/10 | R808 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 |
| R504 | ERJ6GEYJ561 | RES,M 560-J-1/10 | R809 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 |
| R505 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 | R810 | ERDS1FJ272 | RES,C 2.7K-J-1/2 |
| R506 | ERJ6GEYJ182 | RES,M 1.8K-J-1/10 | R812 | ERDS1TJ183 | RES,C 18K-J-1/2 |
| R507 | ERJ6GEYJ392 | RES,M 3.9K-J-1/10 | R813 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 |
| R508 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 | R815 | ERC12ZGM825 | RES,S 8.2MEG-M-1/2 |
| R509 | ERDS2TJ331 | RES,C 330-J-1/4 | R819 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 |
| R510 | ERG3FJ362H | RES,M 3.6K-J-3W | R820 | ERDS2TJ153 | RES,C 15K-J-1/4 |
| R511 | ERG3FJ362H | RES,M 3.6K-J-3W | R821 | ERDS2TJ392 | RES,C 3.9K-J-1/4 |
| R512 | ERG2FJ392H | RES,M 3.9K-J-2W | R822 | ERD50FJ474 | RES,C 470K-J-1/2W |
| R513 | ERJ6GEYJ333 | RES,M 33K-J-1/10 | R823 | ERDS2TJ222 | RES,C 2.2K-J-1/4 |
| R515 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 | R824 | ERG3FJ390 | RES,M 39-J-3W |
| R531 | ERD25FJ470 | RES,C 47-J-1/4 | R825 | ERDS2TJ102 | RES,C 1K-J-1/4 |
| R532 | ERJ6ENF5362 | RES,M 53.6K-F-1/10W | R826 | ERF2AKR18 | RES,W .18-K-2W |
| R533 | ERJ6ENF1692 | RES,M 16.9K-F-1/10 | R827 | ERDS1FJ561 | RES,C 560-J-1/2 |
| R535 | ERJ6GEYJ684 | RES,M 680K-J-1/10 | R828 | ERG3FJ470 | RES,M 47-J-3W |
| R536 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | R829 | ERQ14AJ6R8 | RES,F 6.8-J-1/4 |
| R537 | ERJ6GEYJ473 | RES,M 47K-J-1/10 | R1801 | ERJ6GEYJ301 | RES,M 300-J-1/10 |
| R551 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 | R1802 | ERJ6GEYJ104 | RES,M 100K-J-1/10 |

PARTS LIST

REPLACEMENT PARTS LIST

(Models: CT-32G23W/CW/UW & SP3231W/UW)

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|----------|-------------|-------------------|----------|-------------|--|
| R1803 | ERJ6GEYJ474 | RES,M 470K-J-1/10 | R2418 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R1804 | ERJ6GEYJ202 | RES,M 2K-J-1/10 | R2419 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R1805 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R2451 | ERJ6GEYJ225 | RES,M 2.2MEG-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R1807 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | R2455 | ERJ6GEYJ243 | RES,M 24K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R1808 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | R2456 | ERJ6GEYJ223 | RES,M 22K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R1809 | ERJ6GEYJ473 | RES,M 47K-J-1/10 | R3001 | ERJ6GEYJ473 | RES,M 47K-J-1/10 |
| R1810 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | R3002 | ERJ6GEYJ104 | RES,M 100K-J-1/10 |
| R1811 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 | R3003 | ERJ6GEYJ104 | RES,M 100K-J-1/10 |
| R1812 | ERJ6GEYJ153 | RES,M 15K-J-1/10 | R3011 | ERJ6GEYJ680 | RES,M 68-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R1813 | ERJ6GEYJ153 | RES,M 15K-J-1/10 | R3012 | ERJ6GEYJ750 | RES,M 75-J-1/10 |
| R1814 | ERJ6GEYJ361 | RES,M 360-J-1/10 | R3013 | ERJ6GEYJ184 | RES,M 180K-J-1/10 |
| R1815 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R3014 | ERJ6GEYJ184 | RES,M 180K-J-1/10 |
| R1818 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R3015 | ERJ6GEYJ750 | RES,M 75-J-1/10 |
| R1819 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R3016 | ERJ6GEYJ184 | RES,M 180K-J-1/10 |
| R1822 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 | R3017 | ERJ6GEYJ750 | RES,M 75-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R1823 | ERJ6GEYJ473 | RES,M 47K-J-1/10 | R3018 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R1825 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R3019 | ERJ6GEYJ184 | RES,M 180K-J-1/10 |
| R1827 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R3021 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R1828 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R3022 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R1830 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R3024 | ERJ6GEYJ390 | RES,M 39-J-1/10 |
| R1856 | ERJ6GEYJ153 | RES,M 15K-J-1/10 | R3026 | ERJ6GEYJ101 | RES,M 100-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2201 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 | R3027 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R2202 | ERJ6GEYJ153 | RES,M 15K-J-1/10 | R3028 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R2203 | ERJ6GEYJ104 | RES,M 100K-J-1/10 | R3030 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R2204 | ERJ6GEYJ473 | RES,M 47K-J-1/10 | R3031 | ERJ6GEYJ101 | RES,M 100-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2205 | ERJ6GEYJ154 | RES,M 150K-J-1/10 | R3032 | ERJ6GEYJ102 | RES,M 1K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2206 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R3033 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R2207 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R3034 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R2208 | ERJ6ENF9102 | RES,M 91K-F-1/10 | R3035 | ERJ6GEYJ471 | RES,M 470-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2212 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 | R3041 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R2221 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R3042 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R2301 | ERQ2CJP3R9 | RES,F 3.9-J-2W | R3071 | ERJ6GEYJ223 | RES,M 22K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2305 | ERD25FJ180 | RES,C 18-J-1/4 | R3072 | ERJ6GEYJ683 | RES,M 68K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2306 | ERD25FJ180 | RES,C 18-J-1/4 | R3073 | ERJ6GEYJ683 | RES,M 68K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2307 | ERJ6GEYJ221 | RES,M 220-J-1/10 | R3074 | ERJ6GEYJ223 | RES,M 22K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2308 | ERJ6GEYJ221 | RES,M 220-J-1/10 | R3075 | ERJ6GEYJ101 | RES,M 100-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2311 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 | R3076 | ERJ6GEYJ471 | RES,M 470-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2312 | ERJ6GEYJ822 | RES,M 8.2K-J-1/10 | R3077 | ERJ6GEYJ102 | RES,M 1K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2315 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R3078 | ERJ6GEYJ102 | RES,M 1K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW |
| R2316 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 | | | |
| R2318 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 | | | |
| R2319 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | | | |
| R2323 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | | | |
| R2328 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | | | |
| R2329 | ERJ6GEYJ681 | RES,M 680-J-1/10 | | | |
| R2330 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | | | |
| R2331 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | | | |
| R2332 | ERJ6GEYJ681 | RES,M 680-J-1/10 | | | |
| R2333 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | | | |
| R2352 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 | | | |
| R2357 | ERJ6GEYJ221 | RES,M 220-J-1/10 | | | |
| R2359 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 | | | |
| R2361 | ERJ6GEYJ271 | RES,M 270-J-1/10 | | | |
| R2362 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | | | |
| R2366 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | | | |
| R2367 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | | | |

REPLACEMENT PARTS LIST

(Models: CT-32G23W/CW/UW & SP3231W/UW)

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|-----------------|-------------|--|-------------------------|--------------|---|
| R3079 | ERJ6GEYJ471 | RES,M 470-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW | S004 | EVQQKH06K | SWITCH, PUSH SP3231W SP3231UW |
| R3080 | ERJ6GEYJ152 | RES,M 1.5K-J-1/10 CT-32G23CW CT-32G23W CT-32G23UW | S005 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW |
| R3200 | ERJ6GEYJ561 | RES,M 560-J-1/10 | S005 | EVQQKH06K | SWITCH, PUSH SP3231W SP3231UW |
| R3201 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | S006 | EVQQKH06K | SWITCH, PUSH SP3231W SP3231UW |
| R3202 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | S007 | EVQQKH06K | SWITCH, PUSH SP3231W SP3231UW |
| R3206 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | S008 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW |
| R3207 | ERJ6GEYJ101 | RES,M 100-J-1/10 | S009 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW |
| R3208 | ERJ6GEYJ152 | RES,M 1.5K-J-1/10 | TRANSFORMERS | | |
| R3210 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | T001 | TLP16297 | TRANSFORMER, POWER SUPPLY |
| R3213 | ERJ6GEYJ471 | RES,M 470-J-1/10 | T501 | TLH15452 | TRANSFORMER, HORIZONTAL DRIVER |
| R3217 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | T502 | ETE19Z30AY | TRANSFORMER, HORIZONTAL COUPLING |
| R3220 | ERJ6GEYJ821 | RES,M 820-J-1/10 | T551 | KFT5AB106F | TRANSFORMER, FLYBACK |
| R3221 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | T751 | ETE19Z30BY | TRANSFORMER |
| R3222 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | T801 | ETS29AK2R6NC | TRANSFORMER |
| R3231 | ERJ6GEYJ471 | RES,M 470-J-1/10 | CRYSTALS/FILTERS | | |
| R3232 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | X001 | TSS2080MX | CRYSTAL, 12 MHZ CLOCK |
| R4310 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | X101 | M1969M | SAW FILTER |
| R4311 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | X102 | EFCWS4504AB | FILTER 4.5MHZ |
| R4326 | ERJ6GEYJ471 | RES,M 470-J-1/10 | X201 | EFC54R5MS5W | FILTER 4.5MHZ BANDPASS |
| R4327 | ERJ6GEYJ331 | RES,M 330-J-1/10 | X501 | TAFC5B503F38 | CRYSTAL, CLOCK |
| R4328 | ERJ6GEYJ560 | RES,M 56-J-1/10 | X601 | TSS2AA001 | CRYSTAL |
| R4329 | ERJ6GEYJ182 | RES,M 1.8K-J-1/10 | X1801 | TSSA050 | CRYSTAL OSCILLATOR |
| R4330 | ERJ6GEYJ561 | RES,M 560-J-1/10 | OTHERS | | |
| R4331 | ERJ6GEYJ471 | RES,M 470-J-1/10 | TNR001 | ENV56D37G3 | TUNER |
| R4332 | ERJ6GEYJ393 | RES,M 39K-J-1/10 | M001 | EUR511113 | TRANSMITTER, REMOTE CONTROL SP3231W SP3231UW |
| R4333 | ERJ6GEYJ304 | RES,M 300K-J-1/10 | M002 | UR51EC883A | BATTERY COVER, REMOTE SP3231W SP3231UW |
| R4334 | ERJ6GEYJ152 | RES,M 1.5K-J-1/10 | M003 | EUR511170 | TRANSMITTER, REMOTE CONTROL CT-32G23W CT-32G23UW CT-32G23CW |
| R4336 | ERJ6GEYJ680 | RES,M 68-J-1/10 | M004 | UR51EC892A | BATTERY COVER, REMOTE CT-32G23W CT-32G23UW CT-32G23CW |
| R4338 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | M005 | M80JUA061X | CRT 32" |
| R4339 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | M006 | TJSC00300 | CRT SOCKET |
| R4340 | ERJ6GEYJ471 | RES,M 470-J-1/10 | M007 | TXF3A01AFR | ASSY, DAG GND |
| R4341 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | M008 | TAS2AA0005 | SPEAKER 16-OHM 1.5W |
| R4342 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | M009 | TBM17454-2 | BADGE, QUASAR SP3231W SP3231UW |
| R4344 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 | M010 | TBM2AA0021 | BADGE, PANASONIC CT-32G23W CT-32G23UW CT-32G23CW |
| R4345 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | M011 | TBX2AA1001AG | BUTTON, 7-KEY CT-32G23W CT-32G23UW |
| R4417 | ERJ6GEYJ101 | RES,M 100-J-1/10 | M012 | TBX2A50271G | BUTTON, 7 KEY SP3231W SP3231UW |
| R4418 | ERJ6GEYJ101 | RES,M 100-J-1/10 | SWITCHES | | |
| R4427 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | S001 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW |
| SWITCHES | | | S001 | EVQQKH06K | SWITCH, PUSH SP3231W SP3231UW |
| S001 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW | S002 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW |
| S001 | EVQQKH06K | SWITCH, PUSH SP3231W SP3231UW | S002 | EVQQKH06K | SWITCH, PUSH SP3231W SP3231UW |
| S002 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW | S003 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW |
| S002 | EVQQKH06K | SWITCH, PUSH SP3231W SP3231UW | S003 | EVQQKH06K | SWITCH, PUSH SP3231W SP3231UW |
| S003 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW | S004 | EVQPF106K | SWITCH CT-32G23CW CT-32G23W CT-32G23UW |

PARTS LIST

REPLACEMENT PARTS LIST

(Models: CT-32G23W/CW/UW & SP3231W/UW)

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF. NO. | PART NO. | DESCRIPTION | REF. NO. | PART NO. | DESCRIPTION |
|-------------|-------------------|--|------------|-----------------|---|
| M013 | TQB2AA0248 | MANUAL, OWNERS CT-32G23W CT-32G23UW | M022 | TXFKU1297SER | ASSY, CABINET BACK 32" SP3231W SP3231UW |
| M014 | TQB2AA0249 | MANUAL, OWNERS (ENG/FR) CT-32G23CW | M023 | TXFKY0997SER | ASSY, CABINET FRONT 32" CT-32G23W CT-32G23UW CT-32G23CW |
| M015 | TQB2AA0253 | MANUAL, OWNERS SP3231W SP3231UW | M024 | TXFKY4996SER | ASSY, CABINET FRONT 32" SP3231W SP3231UW |
| M016 | TQB2AA7017 | REMOTE CONTROL GUIDE (ENG/SP) SP3231W SP3231UW | DY | TLYA007 | YOKE, DEFLECTION |
| M017 | TQB2AA7018 | REMOTE CONTROL GUIDE (ENG/SP) CT-32G23W CT-32G23UW | M025 | TMM2A30702 | WEDGE, YOKE |
| M018 | TQB2AA7020 | REMOTE CONTROL GUIDE (ENG/FR) CT-32G23CW | M026 | ETC33X82NA | YOKE, CONVERGENCE |
| M019 | TMW2A97121 | STRAIN RELIEF, AC LINE CORD | M027 | 0FMK014ZZ | CONVERGENCE CORRECTOR STRIP |
| M020 | TSX2AA0011 | LINE CORD | DEG | 0LK19050 | COIL, DEGAUSSING 32" |
| M021 | TXFKU0797SER | ASSY, CABINET BACK 32" CT-32G23W CT-32G23UW CT-32G23CW | JK3031 | TJB18619 | TERMINAL, A/V CT-32G23CW CT-32G23W CT-32G23UW |
| | | | JK3031 | TJB18623 | TERMINAL A/V SP3231W SP3231UW |

REPLACEMENT PARTS LIST

Models: CT-35G23W, CT-36G23W/CW/UW

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF NO. | PART NO. | DESCRIPTION | REF NO. | PART NO. | DESCRIPTION |
|-------------------|--------------|-----------------------|-------------|---------------------|------------------------------|
| CAPRISTORS | | | C315 | ECUX1H680JCX | CAP,C 68PF-J-50V |
| CRA801 | EXNG471P365 | RES-CAP 470PF/3.6 MEG | C351 | TACCW331T50V | CAP,C 330PF/50V |
| CRA802 | EXNG471P365 | RES-CAP 470PF/3.6 MEG | C352 | TACCW331T50V | CAP,C 330PF/50V |
| CAPACITORS | | | C353 | TACCW331T50V | CAP,C 330PF/50V |
| C001 | ECA1AM101 | CAPE 100UF/10V | C354 | ECKD3D102KB | CAP,C .001UF-K-2KV |
| C003 | ECA1HM4R7 | CAPE 4.7UF/50V | C357 | ECEA1HN010U | CAPE 1UF/50V |
| C008 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C401 | ECQB1H153JF | CAP,P .015UF-J-50V |
| C010 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C402 | ECUX1H471JCX | CAP,C 470PF-J-50V |
| C011 | ECA1CM221 | CAPE 220UF/16V | C403 | ECA1HM2R2 | CAPE 2.2UF/50V |
| C013 | ECA0JM101 | CAPE 100UF/6.3V | C451 | ECA1CHG470B | CAPE 47UF-16V |
| C016 | ECUX1H101JCX | CAP,C 100PF-J-50V | C452 | ECSF1EE105 | CAP,T 1.0UF/25V |
| C017 | ECUX1H220JCX | CAP,C 22PF-J-50V | C453 | ECEA1HFS2R2 | CAPE 2.2UF/50V |
| C018 | ECUX1H220JCX | CAP,C 22PF-J-50V | C454 | ECA1EHG102E | CAPE 1000UF-25V |
| C019 | ECA0JM101 | CAPE 100UF/6.3V | C455 | ECA1VHG221B | CAPE 220UF-35V |
| C020 | ECA0JM101 | CAPE 100UF/6.3V | C456 | ECQB1H103JF | CAP,P .01UF-J-50V |
| C021 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C459 | ECA1VHG471E | CAPE 470UF-35V |
| C022 | ECA1CM471 | CAPE 470UF/16V | C460 | ECQM1104JZ | CAP,P .1UF-J-100V |
| C024 | ECA1EM4R7 | CAPE 4.7UF/25V | C462 | ECA1HM100 | CAPE 10UF/50V |
| C025 | ECUX1H101JCX | CAP,C 100PF-J-50V | C501 | ECUX1H821KBX | CAP,C 820PF-K-50V |
| C026 | ECA1HM010 | CAPE 1.0UF/50V | C502 | ECQB1H223JF | CAP,P .022UF-J-50V |
| C031 | ECUX1H821KBX | CAP,C 820PF-K-50V | C503 | ECA1HM2R2 | CAPE 2.2UF/50V |
| C032 | ECA1CM470 | CAPE 47UF/16V | C504 | ECUX1H221JCX | CAP,C 220PF-J-50V |
| C036 | ECUX1H220JCX | CAP,C 22PF-J-50V | C505 | ECUX1H221JUX | CAP,C 220PF-J-50V |
| C037 | ECUX1H220JCX | CAP,C 22PF-J-50V | C506 | ECA1CM221 | CAPE 220UF/16V |
| C038 | ECUX1H220JCX | CAP,C 22PF-J-50V | C510 | ECCD2H100D | CAP,C 10PF-D-500V |
| C101 | ECUX1H223ZFX | CAP,C .022UF-Z-50V | C511 | ECKD2H821KB | CAP,C 820PF-K-500V |
| C102 | ECA1EM100 | CAPE 10UF/25V | C512 | ECKD2H101KB | CAP,C 100PF-K-500V |
| C103 | ECUX1H300JCX | CAP,C 30PF-J-50V | C531 | ECA1EM220 | CAPE 22UF/25V |
| C105 | ECUX1H221JCX | CAP,C 220PF-J-50V | C532 | ECA1CM102 | CAPE 1000UF/16V |
| C106 | ECA1HMR47 | CAPE .47UF/50V | C534 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C107 | ECUX1H470JCX | CAP,C 47PF-J-50V | C551 | ECA1VM331 | CAPE 330UF/35V |
| C108 | ECA1HMR22 | CAPE .22UF/50V | C552 | ECA1CM331 | CAPE 330UF/16V |
| C109 | ECEA1EN4R7U | CAPE 4.7UF-25V | C553 | ECA1CM331 | CAPE 330UF/16V |
| C110 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C554 | ECKD2H561KB | CAP,C 560PF-K-500V |
| C111 | ECA1EM100 | CAPE 10UF/25V | C555 | ECEA2EU220 | CAPE 22UF/250V |
| C113 | ECA1EM100 | CAPE 10UF/25V | C556 | ECA1CM102 | CAPE 1000UF/16V |
| C114 | ECUX1H040CCX | CAP,C 4PF-C-50V | C557 | ECKD2H102KB | CAP,C .001UF-K-500V |
| C151 | ECA1HMR22 | CAPE .22UF/50V | C558 | ECA1CM221 | CAPE 220UF/16V |
| C201 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C559 | ECA1HM220 | CAPE 22UF/50V |
| C202 | ECUX1H101JCX | CAP,C 100PF-J-50V | C560 | ECEA1HN2R2U | CAPE 2.2UF/50V |
| C203 | ECA1EM4R7 | CAPE 4.7UF/25V | C561 | ECKD2H561KB | CAP,C 560PF-K-500V |
| C301 | ECUX1H390JCX | CAP,C 39PF-J-50V | C562 | ECKD2H561KB | CAP,C 560PF-K-500V |
| C302 | ECEA1HN010U | CAPE 1UF/50V | C563 | ECWH12H153JS | CAP,P .015UF-J-1.2KV |
| C304 | ECEA1HNR47U | CAPE .47UF-50V | C564 | ECWH12H152JS | CAP,P .0015UF-J-1.2KV |
| C305 | ECA1HM4R7 | CAPE 4.7UF/50V | C565 | ECKD3D821JB | CAP,C 820PF-J-2KV |
| C306 | ECA1CM221 | CAPE 220UF/16V | C566 | ECKD3D181JB | CAP,C 180PF-J-2KV |
| C308 | ECQB1H823JF | CAP,P .082UF-J-50V | C567 | ECQM4562JZ | CAP,P 5600PF-J-400V |
| C309 | ECA1AM101 | CAPE 100UF/10V | C568 | ECQM4473JZ | CAP,P .047UF-J-400V |
| C310 | ECA1EM4R7 | CAPE 4.7UF/25V | C569 | ECWF2624JBK | CAP,M .62UF-J-200V |
| C311 | ECA1EM4R7 | CAPE 4.7UF/25V | C571 | ECA1CM471 | CAPE 470UF/16V |
| C312 | ECA1EM330 | CAPE 33UF/25V | C572 | ECA1EM100 | CAPE 10UF/25V |

PARTS LIST

REPLACEMENT PARTS LIST

Models: CT-35G23W, CT-36G23W/CW/UW

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF NO. | PART NO. | DESCRIPTION | REF NO. | PART NO. | DESCRIPTION |
|---------|--------------|----------------------|---------|--------------|---------------------|
| C573 | ECA1CM101 | CAP,E 100UF/16V | C1819 | ECUX1H104ZFX | CAP,C .1UF-Z-50V |
| C574 | ECKD2H471KB | CAP,C 470PF-K-500V | C1820 | ECA1CM470 | CAPE 47UF/16V |
| C601 | ECUX1H102KBX | CAP,C .001UF-K-50V | C1821 | ECUX1H150JCX | CAP,C 15PF-J-50V |
| C604 | ECUX1H150JUX | CAP,C 15PF-J-50V | C1822 | ECUX1H120JCX | CAP,C 12PF-J-50V |
| C605 | ECUX1H332KBX | CAP,C .0033UF-K-50V | C1823 | ECUX1H680JCX | CAP,C 68PF-J-50V |
| C606 | ECA1HM010 | CAPE 1.0UF/50V | C1826 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C754 | ECQB1H104JF | CAP,P .1UF-J-50V | C1827 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C755 | ECQB1H104JF | CAP,P .1UF-J-50V | C1828 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C756 | ECA1CM221 | CAPE 220UF/16V | C1829 | ECUX1H104ZFX | CAP,C .1UF-Z-50V |
| C757 | ECA1VM221 | CAPE 220UF/35V | C1830 | ECUX1H151JCX | CAP,C 150PF-J-50V |
| C759 | ECQE1395KN | CAP,P 3.9UF-K-100V | C1831 | ECUX1H104ZFX | CAP,C .1UF-Z-50V |
| C760 | TACCV101T50V | CAP,C 100PF/50V | C1832 | ECUX1H104ZFX | CAP,C .1UF-Z-50V |
| C801 | ECKD2H472PU | CAP,C .0047UF-P-500V | C1833 | ECUX1H104ZFX | CAP,C .1UF-Z-50V |
| C802 | ECKD2H472PU | CAP,C .0047UF-P-500V | C1835 | ECA1CM100 | CAPE 10UF/16V |
| C803 | ECKD2H472PU | CAP,C .0047UF-P-500V | C1836 | ECUX1H680JCX | CAP,C 68PF-J-50V |
| C804 | ECKD2H472PU | CAP,C .0047UF-P-500V | C1837 | ECUX1H104ZFX | CAP,C .1UF-Z-50V |
| C805 | EC0S2DA471BB | CAP,E 470UF/160V | C1839 | ECUX1H680JCX | CAP,C 68PF-J-50V |
| C806 | EC0S2DA471BB | CAP,E 470UF/160V | C1840 | ECUX1H680JCX | CAP,C 68PF-J-50V |
| C807 | ECA1HM2R2 | CAPE 2.2UF/50V | C2201 | AP335K016CAE | CAP,T 3.3UF/16V |
| C808 | ECA1CM101 | CAPE 100UF/16V | C2202 | ECA1EM4R7 | CAPE 4.7UF/25V |
| C809 | EC0S2DG151DG | CAP,E 151UF/200V | C2203 | ECA1HM010 | CAPE 1.0UF/50V |
| C810 | ECQU2A153MV | CAP,P .015UF-M-250V | C2204 | ECA1EM4R7 | CAPE 4.7UF/25V |
| C811 | ECQU2A153MV | CAP,P .015UF-M-250V | C2205 | ECA1EM4R7 | CAPE 4.7UF/25V |
| C812 | ECQU2A224MV | CAP,P .22UF-M-250V | C2206 | ECA1EM4R7 | CAPE 4.7UF/25V |
| C814 | ECQB1H823JF | CAP,P .082UF-J-50V | C2207 | ECA1EM4R7 | CAPE 4.7UF/25V |
| C815 | ECA1VHG221B | CAPE 220UF-35V | C2208 | ECA1EM4R7 | CAPE 4.7UF/25V |
| C818 | ECKD3A821KB | CAP,C 820PF-K-1KVDC | C2209 | ECA1CM101 | CAPE 100UF/16V |
| C820 | ECA1JHG100B | CAP,E 10UF-63V | C2210 | ECA1HMR33 | CAPE .33UF/50V |
| C821 | ECKD3A561KB | CAP,C 560PF-K-1KV | C2211 | ECEA1HUR68 | CAPE .68UF/50V |
| C822 | ECA1EM221 | CAP,E 220UF/25V | C2212 | ECA1HM2R2 | CAPE 2.2UF/50V |
| C823 | ECEA160V33Z | CAP,E 33UF/160V | C2213 | ECA1EM100 | CAPE 10UF/25V |
| C824 | ECKD3A331KB | CAP,C 330PF-K-1KV | C2214 | ECQB1H104JF | CAP,P .1UF-J-50V |
| C825 | ECKD3A471KB | CAP,C 470PF-K-1KV | C2215 | ECQB1H223JF | CAP,P .022UF-J-50V |
| C1801 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2216 | ECUX1H332KBX | CAP,C .0033UF-K-50V |
| C1802 | ECQB1H154JF | CAP,P .15UF-J-50V | C2217 | ECEA1HN010U | CAPE 1UF/50V |
| C1803 | ECA1HMR22 | CAPE .22UF/50V | C2218 | ECEA1HN010U | CAPE 1UF/50V |
| C1804 | ECEA1HKAR22 | CAPE .22UF/50V | C2219 | AP106K016CAE | CAP,T 10UF/16V |
| C1805 | ECUX1H333ZFX | CAP,C .033UF-Z-50V | C2220 | ECEA1CN100U | CAPE 10UF-16V |
| C1806 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2221 | TCUX1H103KBN | CAP,C .01UF-K-50V |
| C1807 | ECA1CM470 | CAPE 47UF/16V | C2222 | ECUX1H472KBX | CAP,C .0047UF-K-50V |
| C1808 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2301 | ECA1EM222 | CAPE 2200UF-25V |
| C1809 | ECA1CM470 | CAPE 47UF/16V | C2302 | ECA1HM010 | CAPE 1.0UF/50V |
| C1810 | ECUX1H104ZFX | CAP,C .1UF-Z-50V | C2305 | ECA1HM010 | CAPE 1.0UF/50V |
| C1811 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2306 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C1812 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2307 | ECA1CM102 | CAPE 1000UF/16V |
| C1813 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2309 | ECQB1H473JF | CAP,P .047UF-J-50V |
| C1814 | ECA1CM470 | CAPE 47UF/16V | C2311 | ECA1HM3R3 | CAPE 3.3UF/50V |
| C1815 | ECUX1H104ZFX | CAP,C .1UF-Z-50V | C2313 | ECA1EM101 | CAPE 100UF/25V |
| C1816 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2314 | ECQB1H473JF | CAP,P .047UF-J-50V |
| C1817 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C2315 | ECA1EM100 | CAPE 10UF/25V |
| C1818 | ECA1CM100 | CAPE 10UF/16V | C2321 | ECA1EM100 | CAPE 10UF/25V |

PARTS LIST

REPLACEMENT PARTS LIST

Models: CT-35G23W, CT-36G23W/CW/UW

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| REF NO. | PART NO. | DESCRIPTION | REF NO. | PART NO. | DESCRIPTION |
|---------|--------------|-------------------|---------------|--------------|---------------------|
| C2324 | ECA1EM100 | CAPE 10UF/25V | C3235 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C2325 | ECA1CM102 | CAPE 1000UF/16V | C3236 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C2331 | ECEA1CN100U | CAPE 10UF-16V | C4304 | ECEA1CKA100 | CAPE 10UF/16V |
| C2332 | ECEA1CN100U | CAPE 10UF-16V | C4307 | ECEA1CKN100 | CAPE 10UF/16V |
| C2351 | ECEA1HN010U | CAPE 1UF/50V | C4313 | ECUX1H391KBX | CAP,C 390PF-K-50V |
| C2353 | ECEA1HN010U | CAPE 1UF/50V | C4314 | ECA1HMR47 | CAPE .47UF/50V |
| C2359 | ECA1HM010 | CAPE 1.0UF/50V | C4315 | ECUX1H152KBX | CAP,C .0015UF-K-50V |
| C2360 | ECA1HM010 | CAPE 1.0UF/50V | C4316 | ECA0JM331 | CAPE 330UF/6.3V |
| C2362 | ECA1AM470 | CAPE 47UF/10V | C4317 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C2451 | ECA1EM100 | CAPE 10UF/25V | C4319 | ECUX1H391JCX | CAP,C 390PF-J-50V |
| C2452 | ECA1EM100 | CAPE 10UF/25V | C4320 | ECUX1H681KBX | CAP,C 680PF-K-50V |
| C2453 | ECA1EM4R7 | CAPE 4.7UF/25V | C4357 | TCUX1H103ZFN | CAP,C .01UF-Z-50V |
| C2454 | ECA1CM221 | CAPE 220UF/16V | C4358 | ECA1AM470 | CAPE 47UF/10V |
| C3003 | ECA1HM010 | CAPE 1.0UF/50V | C4411 | ECA1CM100 | CAPE 10UF/16V |
| C3006 | ECA1HM010 | CAPE 1.0UF/50V | C4412 | ECA1CM100 | CAPE 10UF/16V |
| C3011 | ECA1HM010 | CAPE 1.0UF/50V | C4414 | ECA1CM100 | CAPE 10UF/16V |
| C3012 | ECA1HM010 | CAPE 1.0UF/50V | C4415 | ECA1CM100 | CAPE 10UF/16V |
| C3013 | ECA1CM100 | CAPE 10UF/16V | C4416 | ECA1CM100 | CAPE 10UF/16V |
| C3014 | ECA1CM100 | CAPE 10UF/16V | C4801 | ECA1VM470 | CAPE 47UF/35V |
| C3016 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C4803 | ECQV1H334JM | CAPP .33UF-J-50V |
| C3017 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | C4820 | ECA1HM2R2 | CAPE 2.2UF/50V |
| C3018 | ECA1HM010 | CAPE 1.0UF/50V | DIODES | | |
| C3019 | ECA1HM010 | CAPE 1.0UF/50V | D001 | ERA15-01 | DIODE |
| C3020 | ECA1CM470 | CAPE 47UF/16V | D002 | MA165 | DIODE |
| C3022 | ECA1CM220 | CAPE 22UF/16V | D003 | MA4047H | DIODE |
| C3023 | ECA1AM101 | CAPE 100UF/10V | D006 | MA4330H | DIODE |
| C3024 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D008 | MA165 | DIODE |
| C3025 | ECA1AM470 | CAPE 47UF/10V | D009 | MA165 | DIODE |
| C3036 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D011 | MA165 | DIODE |
| C3037 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D014 | MA165 | DIODE |
| C3071 | ECA1CM220 | CAPE 22UF/16V | D015 | MA165 | DIODE |
| C3072 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D016 | MA165 | DIODE |
| C3201 | ECUX1H680JCX | CAP,C 68PF-J-50V | D017 | MA165 | DIODE |
| C3202 | ECUX1H270JCX | CAP,C 27PF-J-50V | D051 | MA4056M | DIODE |
| C3206 | ECA1CM220 | CAPE 22UF/16V | D451 | ERA15-01 | DIODE |
| C3207 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D452 | MA4047M | DIODE, ZENER |
| C3214 | ECA1HMR47 | CAPE .47UF/50V | D501 | MA4082L | DIODE |
| C3216 | ECUX1H390JCX | CAP,C 39PF-J-50V | D531 | AS01 | DIODE |
| C3219 | ECUX1H470JCX | CAP,C 47PF-J-50V | D532 | MA4062L | DIODE |
| C3221 | ECA1AM470 | CAPE 47UF/10V | D551 | TVSRU2N | DIODE |
| C3222 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D554 | BYD33G-143 | DIODE |
| C3225 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D555 | MA165 | DIODE |
| C3226 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D556 | MA4360H | DIODE, ZENER |
| C3227 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D557 | AU02 | DIODE |
| C3228 | ECA1AM470 | CAPE 47UF/10V | D558 | RS3FS | DIODE |
| C3229 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D559 | BYD33G-113 | DIODE |
| C3230 | ECUX1H181JCX | CAP,C 180PF-J-50V | D560 | MA165 | DIODE |
| C3231 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D561 | BYD33G-143 | DIODE |
| C3232 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D751 | MA2270B | DIODE |
| C3233 | TCUX1H103ZFN | CAP,C .01UF-Z-50V | D801 | GP15KL-042 | DIODE |
| C3234 | ECA1AM470 | CAPE 47UF/10V | D802 | GP15KL-042 | DIODE |

PARTS LIST

REPLACEMENT PARTS LIST

Models: CT-35G23W, CT-36G23W/CW/UW

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| REF NO. | PART NO. | DESCRIPTION | REF NO. | PART NO. | DESCRIPTION |
|----------------------------|------------------|-----------------------------|--------------|-------------------|-------------------------------|
| D805 | TAP107M003 | THERMISTOR (PTC) | IC2302 | AN5272 | INT CKT |
| D806 | MA4047H | DIODE | IC2451 | AN5285K | INT CKT |
| D807 | MA165 | DIODE | IC3001 | M52472P | INT CKT |
| D809 | RU3YX-M | DIODE | IC3002 | LA7222-TV | INT CKT |
| D820 | EU02V1 | DIODE | IC3201 | TC90A45P | INT CKT |
| D821 | EU02V1 | DIODE | IC3202 | AN78L05 | INT CKT |
| D822 | EU02V1 | DIODE | IC4402 | M52055P | INT CKT |
| D823 | RL30A | DIODE | IC4801 | LA6515 | INT CKT |
| D824 | EU02V1 | DIODE | COILS | | |
| D825 | TVSSR2KL | DIODE, PROTECTION | L001 | TSKA074 | FERRITE BEAD |
| D826 | EU02V1 | DIODE | L002 | ELESN390KA | COIL, PEAKING 39UH |
| D829 | MA165 | DIODE | L003 | TLTABT2R2K | COIL, PEAKING 2.2UH |
| D830 | MA4270M | DIODE | L004 | TLTABT2R2K | COIL, PEAKING 2.2UH |
| D2301 | MA165 | DIODE | L005 | EXCELSA24T | FERRITE BEAD |
| D2303 | MA4082M | DIODE | L006 | TSKA072 | FERRITE BEAD |
| D2315 | MA165 | DIODE | L008 | TLTABT470K | COIL, PEAKING 47UH |
| D2342 | MA151K | DIODE | L011 | EXCELSA24T | FERRITE BEAD |
| D2343 | MA151K | DIODE | L103 | ELESN120JA | COIL, PEAKING 12UH |
| D3001 | MA165 | DIODE | L104 | TLTABT2R2K | COIL, PEAKING 2.2UH |
| D3003 | MA4062L | DIODE | L105 | EIV7EN053B | COIL, VCO |
| D3011 | MA3110M | DIODE, ZENER | L106 | ELESN180JA | COIL, PEAKING 18UH |
| D3014 | MA3110M | DIODE, ZENER | L351 | TLTABT101K | COIL, PEAKING |
| D3015 | MA3110M | DIODE, ZENER | L551 | ELH5L7101 | COIL, HORIZ. LINEARITY |
| D3018 | MA3110M | DIODE, ZENER | L554 | TSKA072 | FERRITE BEAD |
| D3019 | MA3110M | DIODE, ZENER | L555 | TSKA072 | FERRITE BEAD |
| D3020 | MA3110M | DIODE, ZENER | L556 | TSKA072 | FERRITE BEAD |
| D3021 | MA3110M | DIODE, ZENER | L557 | TLUABTA2R2K | COIL, PEAKING 2.2UH |
| D3022 | MA3110M | DIODE, ZENER | L751 | ELC18B301L | COIL, CHOKE |
| D3023 | MA3110M | DIODE, ZENER | L752 | EXCELD35 | FERRITE BEAD |
| D3024 | MA3110M | DIODE, ZENER | L801 | ELF20N020A | COIL, 2UH |
| D3025 | MA3110M | DIODE, ZENER | L803 | ELF17N007A | LINE FILTER |
| D3026 | MA3110M | DIODE, ZENER | L804 | TSKA076 | FERRITE BEAD |
| D4301 | MA3036H | DIODE | L805 | TSKA076 | FERRITE BEAD |
| D4801 | MA165 | DIODE | L1801 | TLTACT1R5K | COIL, PEAKING |
| D4802 | MA165 | DIODE | L1803 | TLTACT2R2K | COIL, PEAKING 2.2UH |
| D4803 | MA165 | DIODE | L1804 | TLTACT150J | COIL, PEAKING 15UH |
| JS134 | MA4056M | DIODE | L1806 | TLTACT1R0K | COIL, PEAKING 1UH |
| FUSES | | | L1807 | TLTACT1R0K | COIL, PEAKING 1UH |
| F801 | 0BA1C63NU100 | FUSE (6.3A-125V) | L1808 | EXCELD25 | COIL |
| INTEGRATED CIRCUITS | | | L2201 | ELESN102JA | COIL, PEAKING 1000UH |
| IC001 | MN1874085TJW | INT CKT | L2202 | ELESN471JA | COIL, PEAKING 470UH |
| IC002 | 24LC04BIP | INT CKT | L2302 | EXCELD25 | COIL |
| IC003 | RPM-637CBRS1 | IR RECEIVER, REMOTE CONTROL | L2303 | EXCELD25 | COIL |
| IC101 | AN5165K | INT CKT | L3203 | ELESN150JA | COIL, PEAKING 15UH |
| IC451 | LA7838 | INT CKT | L3206 | ELESN390JA | COIL, PEAKING 39UH |
| IC551 | AN78M09 | PLUS 9V AVR | L3208 | ELESN100KA | COIL, PEAKING 10UH |
| IC552 | AN78M05 | PLUS 5V AVR | L3209 | ELESN100KA | COIL, PEAKING 10UH |
| IC801 | 0N3131R | INT CKT | L3210 | ELESN100KA | COIL, PEAKING 10UH |
| IC803 | STR58041A | INT CKT | L4301 | TLTACT2R2K | COIL, PEAKING 2.2UH |
| IC1801 | M65617SP | PIP CONTROLLER | JS566 | EXCELD35 | FERRITE BEAD |
| IC2201 | AN5819K | INT CKT | J135 | EXCELD35 | FERRITE BEAD |

REPLACEMENT PARTS LIST

Models: CT-35G23W, CT-36G23W/CW/UW

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| REF NO. | PART NO. | DESCRIPTION | REF NO. | PART NO. | DESCRIPTION |
|--------------------|-------------------|-------------------|------------------|-------------|-------------------|
| TRANSISTORS | | | RELAYS | | |
| Q001 | MSD601-RT1 | TRANSISTOR | RL801 | TSEH8007 | RELAY |
| Q002 | JC501PQ | TRANSISTOR | RESISTORS | | |
| Q003 | MSB709-RT1 | TRANSISTOR | R002 | ERJ6GEYJ182 | RES,M 1.8K-J-1/10 |
| Q004 | MSB709-RT1 | TRANSISTOR | R003 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 |
| Q302 | MSD601-RT1 | TRANSISTOR | R004 | ERDS1TJ181 | RES,C 180-J-1/2 |
| Q303 | MSB709-RT1 | TRANSISTOR | R005 | ERDS2TJ101 | RES,C 100-J-1/4 |
| Q304 | MSD601-RT1 | TRANSISTOR | R006 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| Q305 | MSD601-RT1 | TRANSISTOR | R007 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| Q306 | MSB709-RT1 | TRANSISTOR | R008 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 |
| Q307 | MSB709-RT1 | TRANSISTOR | R010 | ERJ6GEYJ154 | RES,M 150K-J-1/10 |
| Q351 | 2SC3063 | TRANSISTOR | R011 | ERJ6GEYJ684 | RES,M 680K-J-1/10 |
| Q352 | 2SC3063 | TRANSISTOR | R012 | ERJ6GEYJ473 | RES,M 47K-J-1/10 |
| Q353 | 2SC3063 | TRANSISTOR | R014 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 |
| Q430 | MSD601-RT1 | TRANSISTOR | R015 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 |
| Q451 | MSD601-RT1 | TRANSISTOR | R016 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 |
| Q452 | MSD601-RT1 | TRANSISTOR | R017 | ERDS2TJ472 | RES,C 4.7K-J-1/4 |
| Q501 | 2SC4212H | TRANSISTOR | R018 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| Q551 | 2SD2539MA1 | TRANSISTOR | R019 | ERDS2TJ101 | RES,C 100-J-1/4 |
| Q751 | JC501PQ | TRANSISTOR | R020 | ERJ6GEYJ474 | RES,M 470K-J-1/10 |
| Q752 | JA101PQ | TRANSISTOR | R021 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| Q753 | 2SD1266 | TRANSISTOR | R022 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| Q801 | 2SC1685RSTA | TRANSISTOR | R023 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| Q802 | 2SC1384RS | TRANSISTOR | R025 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q804 | 2SA1767Q | TRANSISTOR | R026 | ERJ6GEYJ133 | RES,M 13K-J-1/10 |
| Q1801 | MSD601-RT1 | TRANSISTOR | R027 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q1802 | MSD601-RT1 | TRANSISTOR | R028 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q1803 | MSD601-RT1 | TRANSISTOR | R030 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| Q1804 | MSB709-RT1 | TRANSISTOR | R031 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| Q1805 | MSB709-RT1 | TRANSISTOR | R032 | ERJ6ENF1002 | RES,M 10K-F-1/10 |
| Q2302 | MSB709-RT1 | TRANSISTOR | R033 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 |
| Q2303 | MSD601-RT1 | TRANSISTOR | R034 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 |
| Q2305 | MSB709-RT1 | TRANSISTOR | R035 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 |
| Q2362 | MSB709-RT1 | TRANSISTOR | R036 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 |
| Q2409 | MSD601-RT1 | TRANSISTOR | R037 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q2410 | MSD601-RT1 | TRANSISTOR | R038 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q3001 | MSD601-RT1 | TRANSISTOR | R039 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| Q3011 | MSD601-RT1 | TRANSISTOR | R040 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q3012 | MSD601-RT1 | TRANSISTOR | R041 | ERDS2TJ471 | RES,C 470-J-1/4 |
| Q3013 | MSD601-RT1 | TRANSISTOR | R042 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q3014 | MSD601-RT1 | TRANSISTOR | R043 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q3201 | MSB709-RT1 | TRANSISTOR | R044 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| Q3203 | MSB709-RT1 | TRANSISTOR | R045 | ERDS2TJ102 | RES,C 1K-J-1/4 |
| Q3205 | MSB709-RT1 | TRANSISTOR | R046 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q3207 | MSD601-RT1 | TRANSISTOR | R048 | ERJ6GEYJ221 | RES,M 220-J-1/10 |
| Q4309 | MSB709-RT1 | TRANSISTOR | R049 | ERJ6GEYJ221 | RES,M 220-J-1/10 |
| Q4310 | MSD601-RT1 | TRANSISTOR | R050 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| Q4311 | MSB709-RT1 | TRANSISTOR | R051 | ERDS2TJ471 | RES,C 470-J-1/4 |
| Q4312 | MSD601-RT1 | TRANSISTOR | R052 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q4313 | MSD601-RT1 | TRANSISTOR | R057 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| Q4315 | 2SC1384Q | TRANSISTOR | R058 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |

PARTS LIST

REPLACEMENT PARTS LIST

Models: CT-35G23W, CT-36G23W/CW/UW

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| REF NO. | PART NO. | DESCRIPTION | REF NO. | PART NO. | DESCRIPTION |
|---------|--------------|----------------------|-------------|--------------------|----------------------------|
| R060 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R365 | ERDS2TJ101 | RES,C 100-J-1/4 |
| R065 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R401 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R066 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | R430 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R067 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | R432 | ERDS2TJ102 | RES,C 1K-J-1/4 |
| R068 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | R451 | ERDS1FJ1R2 | RES,C 1.2-J-1/2 |
| R101 | ERJ6GEYJ750 | RES,M 75-J-1/10 | R452 | ERDS1FJ3R3 | RES,C 3.3-J-1/2 |
| R102 | ERJ6GEYJ683 | RES,M 68K-J-1/10 | R454 | ERJ6GEYJ393 | RES,M 39K-J-1/10 |
| R103 | ERJ6GEYJ183 | RES,M 18K-J-1/10 | R455 | ERJ6GEYJ183 | RES,M 18K-J-1/10 |
| R104 | ERJ6GEYJ681 | RES,M 680-J-1/10 | R456 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| R105 | ERJ6GEYJ681 | RES,M 680-J-1/10 | R457 | ERJ6GEYJ272 | RES,M 2.7K-J-1/10 |
| R107 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R458 | ERJ6GEYJ333 | RES,M 33K-J-1/10 |
| R108 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | R459 | ERJ6GEYJ683 | RES,M 68K-J-1/10 |
| R152 | ERDS2TJ183 | RES,C 18K-J-1/4 | R460 | ERDS2TJ102 | RES,C 1K-J-1/4 |
| R153 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | R462 | ERJ6GEYJ473 | RES,M 47K-J-1/10 |
| R154 | ERDS2TJ393 | RES,C 39K-J-1/4 | R463 | ERJ6GEYJ473 | RES,M 47K-J-1/10 |
| R201 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R464 | ERDS1FJ1R5 | RES,C 1.5-J-1/2 |
| R202 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 | R465 | ERDS2TJ103 | RES,C 10K-J-1/4 |
| R203 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 | R466 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R303 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 | R467 | ERJ6GEYJ104 | RES,M 100K-J-1/10 |
| R304 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 | R468 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R305 | ER0S2CKF3001 | RES,M 3K-F-1/4 | R469 | ERJ6GEYJ220 | RES,M 22-J-1/10 |
| R306 | ERJ6ENF1541 | RES,M 1.54K-F-1/10 | R470 | ERDS2TJ152 | RES,C 1.5K-J-1/4 |
| R308 | ERDS2TJ102 | RES,C 1K-J-1/4 | R471 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| R309 | ERJ6GEYJ683 | RES,M 68K-J-1/10 | R501 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R310 | ERJ6GEYJ273 | RES,M 27K-J-1/10 | R502 | ERDS2TJ562 | RES,C 5.6K-J-1/4 |
| R311 | ERJ6GEYJ185 | RES,M 1.8MEG-J-1/10W | R503 | ERJ6GEYJ822 | RES,M 8.2K-J-1/10 |
| R313 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R504 | ERJ6GEYJ561 | RES,M 560-J-1/10 |
| R314 | ERDS2TJ471 | RES,C 470-J-1/4 | R505 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 |
| R317 | ERJ6GEYJ684 | RES,M 680K-J-1/10 | R506 | ERJ6GEYJ182 | RES,M 1.8K-J-1/10 |
| R319 | ERJ6GEYJ122 | RES,M 1.2K-J-1/10 | R507 | ERJ6GEYJ392 | RES,M 3.9K-J-1/10 |
| R320 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R508 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 |
| R324 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | R509 | ERDS2TJ331 | RES,C 330-J-1/4 |
| R325 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R510 | ERG3FJ332H | RES,M 2.3K-J-3W |
| R326 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 | R511 | ERG3FJ272H | RES,M 2.7K-J-3W |
| R327 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 | R512 | ERG2FJ392H | RES,M 3.9K-J-2W |
| R328 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R513 | ERJ6GEYJ333 | RES,M 33K-J-1/10 |
| R335 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R515 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 |
| R351 | ERG2FJ123H | RES,M 12K-J-2W | R531 | ERD25FJ470 | RES,C 47-J-1/4 |
| R352 | ERG2FJ123H | RES,M 12K-J-2W | R532 | ERJ6ENF5362 | RES,M 53.6K-F-1/10W |
| R353 | ERG2FJ123H | RES,M 12K-J-2W | R533 | ERJ6ENF1692 | RES,M 16.9K-F-1/10 |
| R354 | ERDS1TJ272 | RES,C 2.7K-J-1/2 | R535 | ERJ6GEYJ684 | RES,M 680K-J-1/10 |
| R355 | ERDS1TJ272 | RES,C 2.7K-J-1/2 | R536 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| R356 | ERDS1TJ272 | RES,C 2.7K-J-1/2 | R537 | ERJ6GEYJ473 | RES,M 47K-J-1/10 |
| R357 | ERDS2TJ271 | RES,C 270-J-1/4 | R550 | ERDS1FJ1R8 | RES,C 1.8-J-1/2 |
| R358 | ERDS2TJ271 | RES,C 270-J-1/4 | R551 | ERDS1FJ1R8 | RES,C 1.8-J-1/2 |
| R359 | ERDS2TJ271 | RES,C 270-J-1/4 | R552 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 |
| R360 | ERDS2TJ821 | RES,C 820-J-1/4 | R554 | ERG3FJ270H | RES,M 27-J-3W |
| R361 | ERDS2TJ821 | RES,C 820-J-1/4 | R556 | ERDS2TJ272 | RES,C 2.7K-J-1/4 |
| R362 | ERDS2TJ821 | RES,C 820-J-1/4 | R557 | ERDS2TJ103 | RES,C 10K-J-1/4 |
| R363 | ERDS2TJ101 | RES,C 100-J-1/4 | R558 | ERQ2CJP1R3 | RES,F 1.3-J-2W |
| R364 | ERDS2TJ101 | RES,C 100-J-1/4 | R559 | ERG2FJ683H | RES,M 12K-J-2W |

REPLACEMENT PARTS LIST

Models: CT-35G23W, CT-36G23W/CW/UW

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| REF NO. | PART NO. | DESCRIPTION | REF NO. | PART NO. | DESCRIPTION |
|-------------|--------------------|---------------------------|---------|-------------|-------------------|
| R560 | ERG2FJ102H | RES,M 1K-J-2W | R1804 | ERJ6GEYJ202 | RES,M 2K-J-1/10 |
| R561 | ERG2FJ102H | RES,M 1K-J-2W | R1805 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R563 | ERDS2TJ683 | RES,C 68K-J-1/4 | R1807 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R564 | ERDS2TJ563 | RES,C 56K-J-1/4 | R1808 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R565 | ERDS2TJ103 | RES,C 10K-J-1/4 | R1809 | ERJ6GEYJ473 | RES,M 47K-J-1/10 |
| R566 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 | R1810 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R602 | ERJ6GEYJ331 | RES,M 330-J-1/10 | R1811 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 |
| R603 | ERJ6GEYJ331 | RES,M 330-J-1/10 | R1812 | ERJ6GEYJ153 | RES,M 15K-J-1/10 |
| R604 | ERJ6GEYJ331 | RES,M 330-J-1/10 | R1813 | ERJ6GEYJ153 | RES,M 15K-J-1/10 |
| R614 | ERJ6GEYJ332 | RES,M 3.3K-J-1/10 | R1814 | ERJ6GEYJ361 | RES,M 360-J-1/10 |
| R752 | ERDS2TJ333 | RES,C 33K-J-1/4 | R1815 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R753 | ERDS2TJ103 | RES,C 10K-J-1/4 | R1818 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R754 | ERG3FJ562 | RES,M 5.6K-J-3W | R1819 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R755 | ERDS2TJ563 | RES,C 56K-J-1/4 | R1822 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 |
| R756 | ERDS2TJ103 | RES,C 10K-J-1/4 | R1823 | ERJ6GEYJ473 | RES,M 47K-J-1/10 |
| R757 | ERDS2TJ224 | RES,C 220K-J-1/4 | R1825 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R758 | ERDS2TJ273 | RES,C 27K-J-1/4 | R1827 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R759 | ERDS2TJ222 | RES,C 2.2K-J-1/4 | R1828 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R760 | EVND8AA03B53 | CONTROL 5K | R1830 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R761 | EVND8AA03B14 | CONTROL 10K | R1856 | ERJ6GEYJ153 | RES,M 15K-J-1/10 |
| R762 | ERDS2TJ182 | RES,C 1.8K-J-1/4 | R2201 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 |
| R763 | ERDS2TJ183 | RES,C 18K-J-1/4 | R2202 | ERJ6GEYJ153 | RES,M 15K-J-1/10 |
| R764 | ERDS2TJ154 | RES,C 150K-J-1/4 | R2203 | ERJ6GEYJ104 | RES,M 100K-J-1/10 |
| R765 | ERDS2TJ272 | RES,C 2.7K-J-1/4 | R2204 | ERJ6GEYJ473 | RES,M 47K-J-1/10 |
| R766 | ERDS2TJ362 | RES,C 3.6K-J-1/4 | R2205 | ERJ6GEYJ154 | RES,M 150K-J-1/10 |
| R767 | ERDS2TJ222 | RES,C 2.2K-J-1/4 | R2206 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R768 | ERQ2CJP100 | RES,F 10-J-2W | R2207 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R801 | ERF7ZK1R5 | RES,W 1.5-K-7W | R2208 | ERJ6ENF9102 | RES,M 91K-F-1/10 |
| R804 | ERW12PK1R8 | RES,W 1.8-K-1/2W | R2212 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 |
| R805 | ERDS2TJ274 | RES,C 270K-J-1/4 | R2221 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R806 | ERDS2TJ274 | RES,C 270K-J-1/4 | R2301 | ERQ2CJP1R0 | RES,F 1.0-J-2W |
| R808 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 | R2305 | ERD25FJ180 | RES,C 18-J-1/4 |
| R809 | ERDS1FJ1R0 | RES,C 1.0-J-1/2 | R2306 | ERD25FJ180 | RES,C 18-J-1/4 |
| R810 | ERDS1FJ272 | RES,C 2.7K-J-1/2 | R2307 | ERJ6GEYJ221 | RES,M 220-J-1/10 |
| R812 | ERDS1TJ183 | RES,C 18K-J-1/2 | R2308 | ERJ6GEYJ221 | RES,M 220-J-1/10 |
| R813 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 | R2311 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 |
| R815 | ERC12ZGM825 | RES,S 8.2MEG-M-1/2 | R2312 | ERJ6GEYJ822 | RES,M 8.2K-J-1/10 |
| R818 | ERQ12HJR56 | RES,F .56-J-1/2 | R2315 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R820 | ERDS2TJ153 | RES,C 15K-J-1/4 | R2316 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 |
| R821 | ERDS2TJ392 | RES,C 3.9K-J-1/4 | R2318 | ERJ6GEYJ562 | RES,M 5.6K-J-1/10 |
| R822 | ERD50FJ474 | RES,C 470K-J-1/2W | R2319 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| R823 | ERDS2TJ222 | RES,C 2.2K-J-1/4 | R2323 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R824 | ERG3ANJ330 | RES,M 33-J-3W | R2328 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R825 | ERDS2TJ102 | RES,C 1K-J-1/4 | R2329 | ERJ6GEYJ681 | RES,M 680-J-1/10 |
| R826 | ERF2AKR15 | RES,W .15-K-2W | R2330 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R827 | ERDS1FJ561 | RES,C 560-J-1/2 | R2331 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R828 | ERG3FJ470 | RES,M 47-J-3W | R2332 | ERJ6GEYJ681 | RES,M 680-J-1/10 |
| R829 | ERQ14AJ2R2 | RES,F 2.2-J-1/4 | R2333 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R1801 | ERJ6GEYJ301 | RES,M 300-J-1/10 | R2352 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 |
| R1802 | ERJ6GEYJ104 | RES,M 100K-J-1/10 | R2357 | ERJ6GEYJ221 | RES,M 220-J-1/10 |
| R1803 | ERJ6GEYJ474 | RES,M 470K-J-1/10 | R2359 | ERJ6GEYJ472 | RES,M 4.7K-J-1/10 |

PARTS LIST

REPLACEMENT PARTS LIST

Models: CT-35G23W, CT-36G23W/CW/UW

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| REF NO. | PART NO. | DESCRIPTION | REF NO. | PART NO. | DESCRIPTION |
|---------|-------------|---------------------|-----------------|-------------|-------------------|
| R2361 | ERJ6GEYJ271 | RES,M 270-J-1/10 | R3208 | ERJ6GEYJ152 | RES,M 1.5K-J-1/10 |
| R2362 | ERJ6GEYJ103 | RES,M 10K-J-1/10 | R3210 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R2366 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | R3213 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R2367 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 | R3217 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R2418 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R3220 | ERJ6GEYJ821 | RES,M 820-J-1/10 |
| R2419 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R3221 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R2451 | ERJ6GEYJ225 | RES,M 2.2MEG-J-1/10 | R3222 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R2455 | ERJ6GEYJ243 | RES,M 24K-J-1/10 | R3231 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R2456 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | R3232 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R3001 | ERJ6GEYJ473 | RES,M 47K-J-1/10 | R4310 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R3002 | ERJ6GEYJ104 | RES,M 100K-J-1/10 | R4311 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R3003 | ERJ6GEYJ104 | RES,M 100K-J-1/10 | R4326 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R3005 | EXCELD35 | FERRITE BEAD | R4327 | ERJ6GEYJ331 | RES,M 330-J-1/10 |
| R3011 | ERJ6GEYJ680 | RES,M 68-J-1/10 | R4328 | ERJ6GEYJ560 | RES,M 56-J-1/10 |
| R3012 | ERJ6GEYJ750 | RES,M 75-J-1/10 | R4329 | ERJ6GEYJ182 | RES,M 1.8K-J-1/10 |
| R3013 | ERJ6GEYJ184 | RES,M 180K-J-1/10 | R4330 | ERJ6GEYJ561 | RES,M 560-J-1/10 |
| R3014 | ERJ6GEYJ184 | RES,M 180K-J-1/10 | R4331 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R3015 | ERJ6GEYJ750 | RES,M 75-J-1/10 | R4332 | ERJ6GEYJ393 | RES,M 39K-J-1/10 |
| R3016 | ERJ6GEYJ184 | RES,M 180K-J-1/10 | R4333 | ERJ6GEYJ304 | RES,M 300K-J-1/10 |
| R3017 | ERJ6GEYJ750 | RES,M 75-J-1/10 | R4334 | ERJ6GEYJ152 | RES,M 1.5K-J-1/10 |
| R3018 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R4336 | ERJ6GEYJ680 | RES,M 68-J-1/10 |
| R3019 | ERJ6GEYJ184 | RES,M 180K-J-1/10 | R4338 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 |
| R3021 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R4339 | ERJ6GEYJ102 | RES,M 1K-J-1/10 |
| R3022 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R4340 | ERJ6GEYJ471 | RES,M 470-J-1/10 |
| R3024 | ERJ6GEYJ390 | RES,M 39-J-1/10 | R4341 | ERJ6GEYJ222 | RES,M 2.2K-J-1/10 |
| R3026 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R4342 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| R3027 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R4344 | ERJ6GEYJ682 | RES,M 6.8K-J-1/10 |
| R3028 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R4345 | ERJ6GEYJ103 | RES,M 10K-J-1/10 |
| R3030 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R4417 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R3031 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R4418 | ERJ6GEYJ101 | RES,M 100-J-1/10 |
| R3032 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R4427 | ERJ6GEYJ223 | RES,M 22K-J-1/10 |
| R3033 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R4802 | ERDS2TJ562 | RES,C 5.6K-J-1/4 |
| R3034 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R4803 | ERDS2TJ102 | RES,C 1K-J-1/4 |
| R3035 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R4805 | ERDS2TJ473 | RES,C 47K-J-1/4 |
| R3041 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R4806 | ERDS2TJ473 | RES,C 47K-J-1/4 |
| R3042 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R4807 | ERDS2TJ333 | RES,C 33K-J-1/4 |
| R3071 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | R4808 | ERDS2TJ683 | RES,C 68K-J-1/4 |
| R3072 | ERJ6GEYJ683 | RES,M 68K-J-1/10 | R4809 | ERDS2TJ100 | RES,C 10-J-1/4 |
| R3073 | ERJ6GEYJ683 | RES,M 68K-J-1/10 | R4810 | ERDS2TJ180 | RES,C 18-J-1/4 |
| R3074 | ERJ6GEYJ223 | RES,M 22K-J-1/10 | R4811 | ERDS1FJ180 | RES,C 18-J-1/2 |
| R3075 | ERJ6GEYJ101 | RES,M 100-J-1/10 | R4820 | ERDS2TJ822 | RES,C 8.2K-J-1/4 |
| R3076 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R4821 | ERDS2TJ912 | RES,C 9.1K-J-1/4 |
| R3077 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R4822 | ERDS2TJ683 | RES,C 68K-J-1/4 |
| R3078 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | R4823 | ERDS2TJ223 | RES,C 22K-J-1/4 |
| R3079 | ERJ6GEYJ471 | RES,M 470-J-1/10 | R4824 | ERDS2TJ222 | RES,C 2.2K-J-1/4 |
| R3080 | ERJ6GEYJ152 | RES,M 1.5K-J-1/10 | SWITCHES | | |
| R3200 | ERJ6GEYJ561 | RES,M 560-J-1/10 | S001 | EVQPF106K | SWITCH |
| R3201 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | S002 | EVQPF106K | SWITCH |
| R3202 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | S003 | EVQPF106K | SWITCH |
| R3206 | ERJ6GEYJ102 | RES,M 1K-J-1/10 | S004 | EVQPF106K | SWITCH |
| R3207 | ERJ6GEYJ101 | RES,M 100-J-1/10 | S005 | EVQPF106K | SWITCH |

REPLACEMENT PARTS LIST

Models: CT-35G23W, CT-36G23W/CW/UW

Important Safety Notice: Components printed in **BOLD TYPE** have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

| REF NO. | PART NO. | DESCRIPTION |
|-------------------------|--------------|----------------------------------|
| S008 | EVQPF106K | SWITCH |
| S009 | EVQPF106K | SWITCH |
| TRANSFORMERS | | |
| T001 | TLP16297 | TRANSFORMER, POWER SUPPLY |
| T501 | TLH15452 | TRANSFORMER, HORIZONTAL DRIVER |
| T502 | ETE19Z30AY | TRANSFORMER, HORIZONTAL COUPLING |
| T551 | KFT6AB056F | TRANSFORMER (FBT) |
| T751 | ETE19Z30BY | TRANSFORMER |
| T801 | ETS29AK1Z5NC | TRANSFORMER |
| CRYSTALS/FILTERS | | |
| X001 | TSS2080MX | CRYSTAL, 12 MHZ CLOCK |
| X101 | M1969M | SAW FILTER |
| X102 | EFCWS4504AB | FILTER 4.5MHZ |
| X201 | EFC54R5MS5W | FILTER 4.5MHZ BANDPASS |
| X501 | TAFC5B503F3B | CRYSTAL, CLOCK |
| X601 | TSS2AA001 | CRYSTAL, 3.58MHZ |
| X1801 | TSSA050 | CRYSTAL OSCILLATOR |
| OTHERS | | |
| M001 | A89LLD061X | CRT 35" CT-35G23W |
| M002 | A90LLD061X | CRT 36" CT-36G23CW CT-36G23UW |
| M003 | TJSC00300 | CRT SOCKET |
| M004 | TXF3A025QA | ASSY, DAG GND |
| M005 | ETC39C6NA | YOKE, CONVERGENCE |
| DY | KDY42L632F | YOKE, DEFLECTION |
| DEG | OLK19049A-1 | COIL, DEGAUSSING 36" |

| REF NO. | PART NO. | DESCRIPTION |
|---------|--------------|---|
| M006 | 0FMK014ZZ | CONVERGENCE CORRECTOR STRIP |
| M007 | TSP2AF001 | COIL, GEOMAGNETIC |
| M008 | TMM2A30702 | WEDGE, YOKE |
| TNR001 | ENV56D37G3 | TUNER |
| M009 | EUR511170 | TRANSMITTER, REMOTE CONTROL |
| M010 | UR51EC892A | BATTERY COVER, REMOTE |
| M011 | TAS2AA0004 | SPEAKER 8-OHM 7W |
| M012 | TBM2AA0021 | BADGE, PANASONIC |
| M013 | TBX2AA1201G | BUTTON, 7-KEY |
| M014 | TQB2AA0248-1 | MANUAL, OWNERS (ENG/SP) CT-35G23W CT-36G23CW CT-36G23UW |
| M015 | TQB2AA0249 | MANUAL, OWNERS (ENG/FR) CT-36G23CW |
| M016 | TQB2AA7018 | REMOTE CONTROL GUIDE (ENG/SP) CT-36G23UW CT-35G23W CT-36G23W |
| M017 | TQB2AA7020 | REMOTE CONTROL GUIDE (ENG/FR) CT-36G23CW |
| M018 | TMW2A97121 | STRAIN RELIEF AC LINE CORD |
| M019 | TSX2AA0011 | LINE CORD |
| M020 | TXFKU2097SER | ASSY, CABINET BACK 36" |
| M021 | TXFKY2597SER | ASSY, CABINET FRONT 36" |
| JK3031 | TJB18619 | TERMINAL, A/V |
| JS134 | MA4056M | DIODE |
| JS566 | EXCELD35 | FERRITE BEAD |
| J135 | EXCELD35 | FERRITE BEAD |

DESCRIPTION OF ABBREVIATIONS GUIDE

| RESISTOR | | | |
|----------|-------------|-----------|---------|
| TYPE | | TOLERANCE | |
| C | Carbon | F | +/- 1% |
| F | Fuse | J | +/- 5% |
| M | Metal Oxide | K | +/- 10% |
| S | Solid | M | +/- 20% |
| W | Wire Wound | G | +/- 2% |

RES, C 270-J-1/4

| CAPACITOR | | | |
|-----------|--------------|-----------|------------|
| TYPE | | TOLERANCE | |
| C | Ceramic | C | +/- 0.25pF |
| E | Electrolytic | D | +/- 0.5pF |
| P | Polyester | F | +/- 1pF |
| S | Styrol | J | +/- 5% |
| T | Tantalum | K | +/- 10% |
| | | L | +/- 15% |
| | | M | +/- 20% |
| | | P | +100% -0% |
| | | Z | +80% -20% |

CAP, P .068UF-K-50V

SERVICEMAN MODE (ELECTRONIC CONTROL) SERVICE ADJUSTMENT VALUES

Model _____ Ser # _____ Date _____

Note: Record the original settings PRIOR to modifying the registers.

| Mode | Service Adjustment | Adjustment Range | Def. Val. | Original Value | New Value |
|----------------------------------|--------------------|------------------|-----------|----------------|-----------|
| Sub Adjustments | | | | | |
| B0 | Sub Color | 0 ~ 63 | 33 | | |
| B1 | Sub Tint | 0 ~ 63 | 33 | | |
| B2 | Sub Brightness | 0 ~ 255 | 80 | | |
| B3 | Sub Contrast | 0 ~ 63 | 34 | | |
| B4 | Killer/ABL/Gamma | 0 ~ 7 | 5 | | |
| B5 | Video Adjustment | 0 ~ 15 | 8 | | |
| B6 | Audio Adjustment | 0 ~ 31 | 16 | | |
| B7 | V-Size | 0 ~ 63 | 20 | | |
| White Balance Adjustments | | | | | |
| C0 | RED Cutoff | * | 0 128 | | |
| C1 | GRN Cutoff | 0 ~ 255 | 64 | | |
| C2 | BLU Cutoff | * | 0 128 | | |
| C3 | R Drive | 0 ~ 127 | 64 | | |
| C4 | Blue Drive | 0 ~ 127 | 64 | | |
| C5 | YNR Switch | 0 ~ 1 | 0 | | |
| C6 | AFT | * | 0 120 | | |
| C7 | RF AGC | 0 ~ 127 | 64 | | |
| C8 | YNR | 0 ~ 7 | 0 | | |
| C9 | Horizontal-Center | 0 ~ 31 | 16 | | |
| Ca | Beam Limit | 0 ~ 7 | 0 | | |
| Cb | VCJ Test H | 0 ~ 2 | 2 | | |

* Adjustment indicated in steps:

0 0 ~ 0 255

1 0 ~ 1 255

| Mode | Service Adjustment | Adjustment Range | Def. Val. | Original Value | New Value |
|----------------------------|-----------------------|------------------|-----------|----------------|-----------|
| Options Adjustments | | | | | |
| S0 | PIP Color | 0 ~ 127 | 80 | | |
| S1 | PIP Contrast | 0 ~ 127 | 52 | | |
| S2 | Up 1/9 | 0 ~ 255 | 26 | | |
| S3 | Down 1/9 | 0 ~ 255 | 146 | | |
| S4 | Left 1/9 | 0 ~ 255 | 09 | | |
| S5 | Right 1/9 | 0 ~ 255 | 103 | | |
| S6 | Up 1/16 | 0 ~ 255 | 27 | | |
| S7 | Down 1/16 | 0 ~ 255 | 163 | | |
| S8 | Left 1/16 | 0 ~ 255 | 09 | | |
| S9 | Right 1/16 | 0 ~ 255 | 118 | | |
| Sa | Freerun | ** | 0 | | |
| Sb | Clock Adjustment | 0 ~ 255 | 128 | | |
| Sc | PIP Tint | 0 ~ 255 | 50 | | |
| Sd | Loudness Compensation | 0 ~ 63 | 52 | | |
| MTS Adjustments | | | | | |
| M0 | Input Level | 0 ~ 63 | 31 | | |
| M1 | Stereo PLLVCO | 0 ~ 63 | 31 | | |
| M2 | Filter | 0 ~ 63 | 31 | | |
| M3 | Low-level Separation | 0 ~ 63 | 31 | | |
| M4 | High-level Separation | 0 ~ 63 | 31 | | |

** N/A (Not Applicable--set to 0)

Note: Some adjustment modes may not be available in some models depending on available options.