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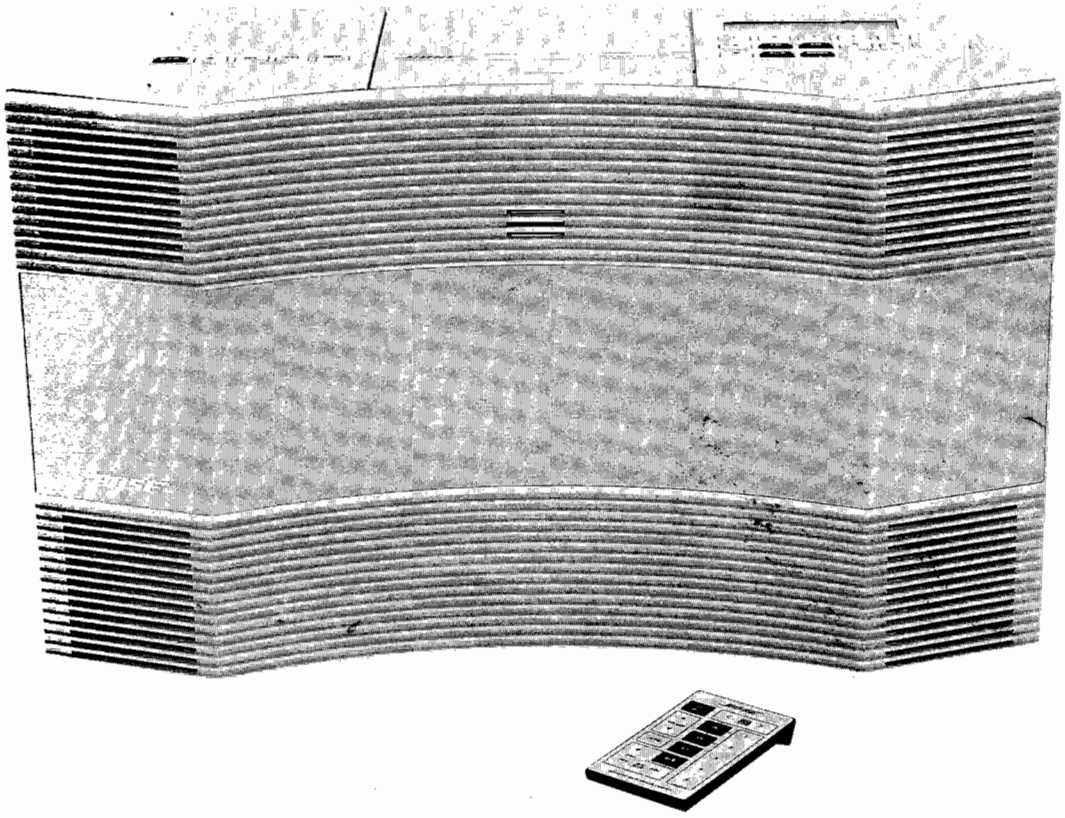
ACOUSTIC WAVE® MUSIC SYSTEM

SERIES III

MODEL CD 3000



Service Manual

Part Number 188188

Contents

ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICE HANDLING

This unit contains ESDS devices. We recommend the following precautions when repairing, replacing or transporting ESDS devices:

• Perform work at an electrically grounded work station.

• Wear wrist straps that connect to the station or heel straps that connect to conductive floor mats.

• Avoid touching the leads or contacts of ESDS devices or PC boards even if properly grounded. Handle boards by the edges only.

• Transport or store ESDS devices in ESD protective bags, bins, or totes. Do not insert unprotected devices into materials such as plastic, polystyrene foam, clear plastic bags, bubble wrap or plastic trays.

CAUTION: THE CD3000 CONTAINS NO USER-SERVICEABLE PARTS. TO PREVENT WARRANTY INFRACTIONS, REFER SERVICING TO WARRANTY SERVICE STATIONS OR FACTORY SERVICE.

SAFETY INFORMATION

1. Parts that have special safety characteristics are identified by the ⚠ symbol on schematics or by special notes on the parts list. Use only replacement parts that have critical characteristics recommended by the manufacturer.

2. Make leakage current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the unit to the customer. Use the following checks to perform these measurements:

   A. **Leakage Current Hot Check**-With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet.(Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.1 "Leakage Current for Appliances" and Underwriters Laboratories (UL) 1492 (71). With the unit AC switch first in the ON position and then in OFF position, measure from a known earth ground (metal water pipe, conduit,etc.) to all exposed metal parts of the unit (antennas,handle bracket, metal cabinet,screwheads,metallic overlays,control shafts,etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milliamp. Reverse the unit power cord plug in the outlet and repeat test. ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

   B. **Insulation Resistance Test Cold Check**-(1) Unplug the power supply and connect a jumper wire between the two prongs of the plug.(2)Turn on the power switch of the unit. (3) Measure the resistance with an ohmmeter be tween the jumpered AC plug and each exposed metallic cabinet part on the unit. When the exposed metallic part has a return path to the chassis, the reading should be between 1 and 5.2 Megohms. When there is no return path to the chassis, the reading must be "infinite". If it is not within the limits speci fied, there is the possibility of a shock hazard, and the unit must be repaired and rechecked before it is returned to the customer.

SPECIFICATIONS

GENERAL

Dimensions	(457W x 267H x 191D) mm	
Weight	22 pounds (10kg)	
Rear Panel Connections	Line level auxiliary inputs Line level Mic input Line level auxiliary outputs External antenna input :	 US: 75Ω - F type Europe: 75Ω - PAL type

TUNER

Tuning Range:	US: 87.7MHz-107.9MHz Euro: 87.50MHz-108.0MHz
De-emphasis	US: 75µs Euro: 50µs
Frequency Steps auto/manual	US: 200/200kHz Euro: 50/50kHz
Sensitivity Mono Usable	17dBf
Stereo (50dB quieting)	43dBf
Signal to Noise @ 65dBf	Mono: 70dB Stereo: 65dB
Harmonic Distortion (1kHz)	Mono: .3% Stereo: .6%
Capture Ratio:	2.0dB
AM Rejection @ 45dBf	55dB
Alternate Channel Selectivity @ 45dBf	65dB
Image Rejection	46dB
RF Intermodulation	60dB
Sub carrier Product Rejection @ 65dBf	45dB
Frequency Response 30HZ-15kHz	±1.0
Stereo Separation @ 1kHz	30dB
Auto Stop Level (SEEK)	30dBf
Mono/Stereo Threshold	48dBf

SPECIFICATIONS

(Continued)

TUNER

Channel Spacing	US: 10kHz Euro: 9kHz
Band Limits	US: 530kHz-1710kHz Euro: 522kHz-1611kHz
Usable Sensitivity IHF standard test loop antenna	48dBμV/m
Alternate Channel Selectivity	55dB
Adjacent Channel Selectivity	25dB
Image Rejection Ratio	35dB
Signal to Noise Ratio @ 100dBμV/m	40dB
Distortion @ 100dBμV/m	1.1%
Frequency Response	50Hz: -3dB 2kHz: -3dB 3kHz: -6dB
Auto Stop Level	60dBμV/m

LINE LEVEL INPUTS/OUTPUTS

Input Impedance	Auxiliary: 34kΩ ±20% Mic: 2.8kΩ ±10%
Maximum Input Level	2V
Line Output Impedance	800Ω ±10%
Auxiliary Gain	0dB ±1.5dB
Balance	0dB ±1.5dB
Auxiliary THD	< .08% 20-20kHz, 1.2Vrms
Frequency Response	±.5dB 50-15kHz, 1.2Vrms
Noise	<20μV
Channel Separation	70dB @ 1kHz 45dB @ 15kHz
Minimum Volume Gain	-75db
Mute Attenuation	-75dB

SPECIFICATIONS

(Continued)

AMPLIFIER/EQ/DYNAMIC EQ

(AUX in to Amp Outputs)

Woofer Output **2.1Ω, 50-500HZ, <1% THD**	20W	
Tweeter Output **11.2Ω, 500Hz-15kHz, <1% THD**	2 x 6.0W	
Noise	Woofer output: 2mV Tweeter output: .3mV	min. vol., C wgt min. vol., A wgt
System Quiescent Current @ 12V	Aux mode: Radio operation: CD play: Off (AC): Off (DC):	400mA 420mA 520mA 24mA 15mA
Minimum Voltage for Operation	CD, FM, AUX: 8.0V AM @ 1400kHz: 8.5V	

CD PLAYER

Digital to Analog Process	8x oversampling, dual ΣΔ single bit D/A
Maximum Output Level	1.2V ±2.0dB
THD + Noise	.05%, 1kHz@ 0db
Signal to Noise Ratio	100dB, A-weighted
Channel Separation	80dB @ 1kHz
Frequency Response	±0.1dB, 20Hz-18kHz
Low Level Linearity Error	5.0dB @ -90dB
Dynamic Range	88dB per EIAJ method
Cueing Time	3 seconds
De-emphasis	5kHz: -4.53dB ±1.0dB 16kHz: -9.04 dB ± 1.0dB

THEORY OF OPERATION

NOTES: All reference designators between 50 and 99 refer to components on the Power Supply PCB. All 400 series components are located on the MicroController PCB or the CD Switch PCB. All other components are located on the Main PCB.

1.0 Overview

The CD3000 is an AM/FM tuner, single disk CD player, and powered speaker system. In addition to the internal sources, external devices such as a tape deck can be connected through the unit's AUX input. The system has a line level output and a powered microphone may be connected for a karaoke feature. An infrared (IR) remote control can be used to control the unit.

2.0 Power Supply Electronics

2.1 Power Switching Circuitry

Since this product is designed to run off of a battery as well as the AC line, power management is an important issue; consequently, when parts of the circuit are not in use, they are shut off. The microcontroller (µC) is always powered up through the 5 volt regulator **U4** and it is what makes the power switching decisions.

When any of the sources are turned on, the signal **AUDIO_ON** goes true. This turns on the low-dropout 10 volt discrete regulator composed of **Q1, Q2** and **Q5.** The **AUDIO_ON** signal itself supplies the 5 volt reference to the base of **Q2** via **R14. Q2** and **Q5** form a differential pair that compares the reference voltage to the feedback provided through the voltage divider composed of **R13** and **R12.** This comparison creates an error current which drives the base of pass transistor **Q1. R21** is a fusing resistor which opens if too much current is pulled through either **VF** or **+10V.**

When the CD player is turned on, the signal **CD_ON** goes true which turns on **Q3** and **Q6** which supply **CD_5V** and **VM** respectively. In the **CD_5V** circuit, **Q4** turns on the pass transistor **Q3** which supplies the 5 volt regulator **U3. R22** is a pass resistor used to help dissipate power. **R2** is a fusing resistor designed to open-circuit if the current on **CD_5V** becomes too large. In the **VM** circuit, the **CD_ON** signal provides a 5 volt reference for the base of transistor **Q7** which along with **R26**, compares the 5V with a feedback voltage (actually a proportional current) supplied through **ZR10.** This comparison produces an error current that drives the base of pass transistor **Q6.** This circuit is actually a voltage limiter that is set at about 14 **volts.** It is designed so **Q6** will saturate when **V** is less than 14 volts. **R23** is a fusing resistor which is designed to open if the current on **VM** is too high.

The circuit containing **U5** is a comparator that generates a power fail warning for the µC, if the raw supply **V** sags below 8 volts.

2.2 Power Supply Circuitry

When the AC line cord is plugged into **J12**, the DC Jack portion of the connector is disconnected from the power supply by the switch in the connector at pins 1, 2 and 3. The 120V AC is connected to transformer **XFR1** which has a 10:1 turns ratio. The resultant secondary voltage is full-wave bridge rectified by **BR51** and filtered by **C56.** When the AC line cord is not plugged in, a battery plugged into the DC jack can be used to power the system.

3.0 Control Electronics

The embedded µC used in this system is a Toshiba TMP87xx20 series, where the xx digits define whether it's an OTP, masked part or what other options are used. Whenever there is a power source connected to the system, there is 5 volts supplied to the µC. **U402** is an automatic reset chip that monitors the 5 volts and pulls pin 12 of the µC LOW **(RESET/).** If the voltage drops below 4.75 volts, it also supplies the power-on reset. **X401** is the µC's external 8.00Mhz ceramic resonator. **U403** is an Electrically Erasable Programmable Read Only Memory (EEPROM) that is used to store presets.

All of the series resistors and shunting capacitors used on the signal lines leaving the board through **J1** and **J3** are helping control conducted RF emissions from the µC. **Q400** is turned on when the CD player is selected. It supplies pull-up voltage for **R437, R438** and **R439. Q401** is the driver transistor for the backlight. The series resistors for the **LCD** are used to slow down the waveform edges going to the **LCD** which helps with radiated RF emissions.

S401 through **S414** form a matrix of keys **("KEYOUTx"** by **"KEYINx")** that are used to control the unit. Normally the µC holds the **"KEYOUTx"** lines (µC pins 57 through 60) LOW and the **"KEYINx"** (pins 42 through 46) lines are pulled up. When a key is depressed, the µC begins scanning the **"KEYOUTx"** lines by pulling each line HIGH one at a time. This way, when one of the **"KEYINx"** lines goes HIGH, the µC can determine where in the matrix the depressed key is and execute the proper command. If the µC is powered from a battery (it knows this from the state of the **BATTERY** signal from the power supply) it goes into a low current "sleep" mode when the power is turned off. Depressing any key in the matrix pulls current through the base of **Q402** which pulls the µC's **"WAKEUP"** line (pin 16) HIGH and forces the µC out of it's "sleep".

4.0 Audio Electronics

The audio section is powered by a uni-polar 10 volt supply. A one-half supply "logical ground" **(LGND)** is generated by one quarter of **U101** and a resistive divider. **LGND** is used as a reference by the audio section as well as the output stages of the tuner and CD player.

The two internal sources (CD and tuner) and the AUX input are routed to the audio multiplexer/ volume control chip **U801**. **U801** selects one of the three inputs and routes the signal to pins 7 and 17 (right and left). One half of **U101** is used to buffer the audio signal for the **LINE OUT**. This stage also sums the **MIC IN** with the audio signal. This summed signal is then returned to **U801** on pins 6 and 16. The signal then passes through an EQ section determined by **R840-843** and **C840-843**. This section normally provides bass boost but during compression this section reduces the deep bass. The final stage of **U801** is the volume control. **U801** provides 80 dB of attenuation in 64 steps of 1.25 dB. The variable level signal is output on pins 24 and 25.

The audio signal is then split into two paths. The right and left signals are routed to **U100**, which provides active filtering for the tweeter channels. The right and left signals are also routed to one quarter of **U700** which sums the stereo signals to provide a mono bass signal. This **U700** stage also contains a +/- 1 dB adjustment to match the bass channel to the different tweeter sensitivities. The mono signal is then routed to **U701**. One quarter of **U701** along with **D701-703, C703-704** and **Q701-702** is a negative peak detector. This peak detector generates

a current, which controls transconductance amp **U702** and provides dynamic EQ. One quarter of **U701** provides the frequency selectivity for the dynamic EQ and the other half of **U701** provides the active filtering for the bass channel.

The three audio signals are fed to the Power Supply board through **J5** and **J8**. **U51** is a stereo bridged power amp used for the right and left channels. **U52** is a mono bridged amplifier for the bass channel. The tweeter amplifier outputs are routed through **J8** and **J14** to the main PCB where they connect to **J7** and **J6**. The bass output is routed on the Power Supply board to **J9**. **U52** also contains a clip detector that is output on pin 4. This signal **(COMP)** is used by the µC to determine the level of compression required.

5.0 Tuner Electronics

There are two major ICs in the tuner section. **U301**, an AM/FM radio chip with a built in stereo demultiplexer, and **U302**, a Phase Lock Loop (PLL) chip. Power to the PLL chip is applied, via the circuit containing **Q318**, whenever the +10V is true. The main system µC talks to the PLL chip using signals **SIO_CLK, SIO_DATA** and **PLL_ENB**. When the µC wants the radio on, it tells **U302** to drive it's pin 9 LOW. This turns on **Q316** and **Q317** which powers up the appropriate parts of the tuner. Power to the FM tuner is switched by **Q311** according to the state of the signal **AM/FM**, which originates at pin 8 of **U302** (Through **R363**).

In FM mode, the frequency of the local oscillator (LO) located in the **TUNER** is adjusted by the signal **VT** that is applied at pin 5 of the **TUNER**. The LO is then output on pin 8 of the **TUNER** and routed back to **U302** via **C343**. The PLL **(U302)** compares the frequency of the LO against a reference that is a division of the 7.2 MHz **U302** internal oscillator. The result of this comparison determines the density of the phase pulses that are output on pin 18 of **U302**. The phase pulses then go into the loop filter that is composed of **Q309, Q310** and the surrounding discrete components. The loop filter integrates the pulses to form **VT**, thus completing the LO control loop.

Inside the FM tuner the LO is mixed with the incoming RF to produce an IF signal of 10.7 MHz that is output on pin 7 of the **TUNER**. The IF signal then passes through ceramic filter **CF304,** the differential amp containing **Q303** and **Q304** and ceramic filter **CF301**. It is then routed into **U301**. Inside the chip the IF signal is amplified and output to the FM discriminator on pin 7. After detection, the stereo signal is then demultiplexed inside the chip and the stereo channels are output onto pins 14 and 15. The ceramic resonator **CF302** is used by the stereo demultiplexer's VCO. The comparator circuit composed of **U304** and **Q315** compares a reference voltage against the signal output on pin 25 of **U301** (this signal is related to RF signal strength, when in FM mode) and forces pin 9 of **U301** to 10V through a 3.32K resistor. If the reference voltage is greater than pin 25, the stereo demultiplexer turns off forcing the radio into the mono state. The Left and Right channel signals are then routed through 19KHz pilot reject filters composed of two op-amps in **U700** and the associated resistors and capacitors.

The AM Local Oscillator is composed of **L302, D370** and an amplifier inside of **U301**. The AM LO signal comes out of pin 30 of **U301** and is fed into **U302** via **R344** and **C340**. The PLL chip compares the LO frequency against a division of it's 7.2 MHz oscillator and outputs appropriate phase pulses from pin 18 into the loop filter containing **Q309** and **Q310**. The AM tuning voltage for the varactor diode D370 comes out of the loop filter through **R356**. This completes the AM LO control loop.

The inductance of the AM bar antenna forms a parallel resonance with the varactor diode **D370** producing antenna frequency selectivity. The RF from pin 1 of the antenna is routed into pin 27 of **U301**. Inside the chip the RF is amplified and mixed down to 450KHz (IF) and output to the IF filtering, **T301**, from pin 27. After the filter, the IF reenters **U301** through pin 24 where the audio is detected (**C307, R303** and **C306** are also part of the detector). The audio is then output onto pins 14 and 15.

6.0 CD Electronics

The CD circuitry consists of four major sections: analog signal processor (ASP) **U500**, digital signal processor (DSP) **U501**, power drivers **U502** and **U503** and the CD mechanism. **U500** contains the RF amplifier and servo control circuits. **U501** performs EFM demodulation, CIRC decoding, digital filtering and D to A conversion. It also extracts the subcode Q data (track #, time, etc.) and controls **U501** during track access.

U500 receives its input signal (through **P501**) from the mechanism's photo diode pickup. The A, B, C and D inputs are added together and amplified. The RF amplifier output appears on **RFSM** (**U500**, pin 41). This signal is the familiar "eye pattern". This signal is sent to **EFMIN** on **U501** pin 11 where it is sliced for EFM demodulation. The sliced output appears on **EFMO** (**U501** pin 10). A low-passed version of this signal appears on **SLC** (**U500** pin 43) and is used as a DC bias for the **RFSM** signal.

The **RFSM** signal is peak detected and compared to a reference to determine if there is a signal being received from the disc. The output appears on **DRF** (**U500** pin 54). This signal is used by the µC to determine if the lens is in focus. The envelop of the **RFSM** signal is used to determine when the laser crosses a track boundary during track access. The **HFL** signal (**U500** pin 37) conveys this information to **U501**.

The B+D signal **(FIN2)** is subtracted from the A+C signal **(FIN1)**. This produces the focus error signal **FE** (**U500** pin 20). This signal is amplified and filtered by the focus servo amplifier within **U500**. It then appears as an output **FD** (**U500** pin 16). The **FD** signal is fed to **U503**. **U503** generates a bridged output which is used to actuate the focus coil (**P502** pins 5 and 8).

The **E** and **F** signals are buffered by **U500**. **E** is then subtracted from **F** and this difference is the track error signal **TE** (**U500** pin 7). The **TE** signal is used by the anti-shock circuit and the tracking servo. **TE** is filtered at the **SCH** input (**U500** pin 9) to determine if the system has had a shock. If this occurs, **U500** increases the track gain internally to compensate for the shock. The **TE** signal is amplified and filtered by the tracking servo amplifier within U500. It then appears as an output **TO** (U500 pin 15). The **TO** signal is fed to **U503**. **U503** generates a bridged output which is used to actuate the track coil (**P502** pins 6 and 7).

The **TO** signal is also used as an input to the sled servo. This signal is filtered and fed to the sled servo amplifier on **SLEQ** (**U500** pin 28). This signal is amplified and added to the SLED signals from the µC. The sum appears on **SLD** (**U500** pin 29) which is fed to **U502**. **U502** generates a bridged output to drive the sled motor (**P503** pins 5 and 6).

The Constant Linear Velocity **(CLV)** servo is regulated by comparing the bit rate to a fixed reference frequency in **U501**. The error signal appears at **U501** pins 13 and 14 (**CLV+** and **CLV-**). These signals are subtracted and the difference appears on **SP** (**U500** pin 23). The **SP** signal is filtered and amplified. The signal then appears at the output on **SPD** (**U500** pin 27). **SPD** is fed to **U502**. **U502** generates a complimentary output (pins 11 and 14) which drives the spin motor (**P503** pins 1 and 2).

U500 regulates the laser power by monitoring the **LDS** input (**P502** pin 3). This signal is compared to a reference to generate the proper drive signal on **LDD** (**U500** pin 62). This signal biases **Q501**. **Q501** drives the laser diode output **LD** (**P502** pin 1). **U500's** main DC reference voltage is **VREF** which appears at pin 58. This voltage is nominally 2.5V.

U500 receives servo control commands from the µC on the serial bus (**U500** pins 51, 52 and 53). These commands are used to start focus and track offset cancellation, E/F balance adjustment, focus initialization, laser ON/OFF and 8/12 cm spindle gain.

The DSP clock is derived from a 16.9344 MHz crystal oscillator (**X500**). **U501** divides this clock by four to generate a 4.2336 MHz signal that is output as the signal **4.2M** (**U501** pin 72). **4.2M** is used as a system clock by the ASP.

U501 receives servo control commands from the µC on the serial bus (**U501** pins 64, 66 and 67). These commands include track jump, focus start, disk motor start/stop, muting on/off and track count. The tracking servo is controlled by the **TOFF, TGL** and **THLD** outputs (**U501** pins 23, 24 and 25). Track jumps are created by signals on the **JP+** and **JP-** lines (**U501** pins 28 and 29). Track jump detection is based on signals from **U500** on the **HFL** and **TES** inputs. **U501** removes the subcode Q data from the bitstream and makes it available to the µC. The µC extracts track, time and table of contents information from the subcode Q.

U501 receives its EFM input from **U500** on **EFMIN** (pin 11). This signal is sliced, EFM demodulated and CIRC decoded. The digital audio signal is passed through an 8x oversampling digital filter and D/A converter. The D/A converters have single bit pulse width modulated (PWM) differential outputs. These outputs appear on **RCHP, RCHN, LCHP** and **LCHN** (**U501** pins 53, 52, 48 and 49). The audio signals are routed to **U507**. One half of **U507** functions as difference amplifiers and the other half of **U507** is a pair of low-pass filters. This removes any residual out of band digital noise. The recovered audio is then routed to **U801**.

DISASSEMBLY/ASSEMBLY PROCEDURES

Note: Refer to figure 1 for the following procedures. Numbers in parentheses correspond to the item call outs in figure 1.

1. Top Cover Removal

1.1 Remove the five screws **(28)** that secure the top cover to the matrix **(12)**.

1.2 Lift up on the rear of the cover to release the catches from the front.

1.3 Remove the wire connectors from the PCB.

2. Top Cover Replacement

2.1 Connect the wires to the PCB.

2.2 Lower the top cover front end first onto the matrix **(12)** so that the front end is angled downward. This will allow the catches to catch properly on the front of the unit.

2.3 Replace the five screws **(28)** that secure the top cover to the matrix **(12)**.

3. Master Bracket Assembly Removal
Note: Perform procedure 1 first.

3.1 Remove the screw **(10)** located at the front center of the master bracket assembly **(15)** and the three screws located at the rear of the PCB. Remove the silver screw that secures the PCB to the antenna.

3.2 Remove the handle **(18)** that is located on the same side as the display. Push down on the catches with a flat blade screw driver to release the handle from the top cover **(24).**

3.3 Remove the two clips **(20)** that secure the master bracket assembly to the top cover by pushing them off.

3.4 Lift the master bracket assembly up from the front and slide it forward until the connectors in the rear clear the holes in the top cover.

4. Master Bracket Assembly Replacement

4.1 Lower the master bracket assembly **(15)** into the top cover **(24)** so that the connectors on the PCB protrude out the holes in the rear of the top cover.

4.2 Replace the handle **(18)** by pushing it into the top cover until it snaps into place. Make certain that the handle is positioned correctly.

4.3 Replace the screw **(10)** located at the front center of the master bracket assembly **(15)** and the three screws at the rear of the PCB. Replace the silver screw that secures the PCB to the antenna.

4.4 Replace the two clips **(20)** that secure the master bracket assembly to the top cover by pushing them on.

5. CD Door Removal

5.1 Perform procedures 1 and 3 first.

5.2 Remove the CD door **(31)** spring and the damper gear.

5.3 Open the CD door and face the front of the top cover **(24)** towards you. Push in on the right hinge of the CD door until the catch clears the top cover and then pull the door up.

5.4 With the door in the vertical position, twist the door to the left and then pull it to the right.

6. CD Door Replacement

6.1 Face the top cover **(24)** towards you.

6.2 With the CD door **(31)** vertical and at a slight angle to the left, place the left hinge into top cover so that the metal tab fits through the slot and the post fits into the hole on the door hinge.

6.3 Push in on the left hinge and lower it into the top cover until it snaps into place.

DISASSEMBLY/ASSEMBLY PROCEDURES

6.4 Replace the CD door spring and the damper gear.

7. Main PCB Removal
Note: Perform procedures 1 and 3 first.

7.1 Remove the five screws **(9)** that secure the main PCB **(11)** to the master bracket assembly **(15)**.

7.2 Lift the PCB up and remove all the cables connected to it.

8. Main PCB Replacement

8.1 Connect all the cables to the PCB **(11)** and lower it onto the master bracket assembly **(15)** so that the connectors are facing the rear.

8.2 Replace the five screws **(9)** that secure the main PCB to the master bracket assembly.

9. Display PCB Removal
Note: Perform procedures 1 and 3 first.

9.1 Remove the cables at J1 and J3 by carefully pulling straight out on the cable.

9.2 While pushing the catch that is located by the tune/seek buttons forward, Lift up on the front of the PCB **(11)** and then pull towards the front of the master bracket assembly **(15)**.

10. Display PCB Replacement

10.1 Lower the rear end of the PCB into the master bracket assembly **(15)** so that the tabs fit into the holders. Then lower the front end of the PCB **(11)** and at the same time push forward on the catch, that is located by the tune/seek button, until the PCB is seated.

10.2 Connect J1 and J3 to the display PCB **(11)** by carefully pushing the cable into the connector.

11. CD Control PCB Removal
Note: Perform procedures 1 and 3 first.

11.1 Remove the cable from the connector J2 by carefully pulling straight out on it.

11.2 Push the catch, located towards the front of the PCB **(11)**, forward until the PCB is released.

11.3 Lift the PCB up and out of the master bracket assembly **(15)**.

12. CD Control PCB Replacement

12.1 Lower the PCB **(11)** onto the master bracket assembly **(15)** so that the tabs on the PCB fit into their holders.

12.2 Lower the front of the PCB and at the same time push forward on the catch, that is located towards the front of the PCB, until the PCB is seated. Connect the cable to J2.

13. CD Mechanism Removal
Note: Perform procedures 1 and 3 first.

13.1 It is necessary to remove the display PCB **(11)** first (procedure 9).

13.2 Push the tab that is located under the platter to the left and lift the CD mechanism **(2)** straight up.

13.3 Before disconnecting the wires, the shorting pin has to be shorted to protect the laser. There are two square pads located on the CD mechanism's PCB next to the ribbon cable. Solder these two pads together. After this is done, the cables can be removed.

14. CD Mechanism Replacement

14.1 Connect the cables to the CD mechanism **(2)**. After the cables have been connected, remove the short between the two pads that are located next to the ribbon cable on the CD mechanism's PCB.

DISASSEMBLY/ASSEMBLY PROCEDURES

14.2 Lower the CD mechanism onto the master bracket assembly **(15)** and at the same time push the catch to the left until the CD mechanism is seated.
Note: Make sure that the correct colored grommets are in the right place. See the exploded view and the main part list for their locations.

15. Bottom Cover Removal

15.1 Remove the five screws **(28)** that secure the bottom cover **(29)** to the matrix **(12)**.

15.2 Pull the bottom cover off.

16. Bottom Cover Replacement

16.1 Place the bottom cover **(29)** onto the matrix **(12)** and replace the five screws **(28)** that secure the bottom cover to the matrix.

17. Power Supply/Amplifier/Transformer Removal.
Note: Perform procedure 15 first.

17.1 Remove the screw **(30)** that secures the AC/DC connector to the matrix **(12)**.

17.2 Lift the power supply/amplifier assembly out of the matrix and disconnect the cables at J8 and J9.

18. Power Supply/Amplifier/Transformer Replacement.

18.1 Lower the power supply/amplifier/transformer assembly into the matrix **(12)** and connect the cables at J8 and J9.

18.2 Replace the screw **(30)** that secures the AC/DC connector to the matrix **(12)**.

19. Power Supply/Amplifier/Transformer Disassembly.
Note: Perform procedures 15 and 17 first.

19.1 Remove the four T-15 torx screws **(1)** that secure the power module bracket **(14)** to the transformer **(13)** and the amplifier's heat sink.

19.2 Disconnect the cables at J10 and J11.

20. Power Supply/Amplifier/Transformer Assembly.

20.1 Connect the cables to J10 and J11. Position the transformer **(13)** so that the secondary (blue wire) side is facing towards the PCB **(11)**.

20.2 Replace the four T-15 torx screws **(1)** that secure the power module bracket **(14)** to the transformer and the amplifier's heat sink.

21. Woofer Cover Removal

21.1 Remove the nine screws that secure the woofer cover to the matrix **(12)** and lift the woofer cover up.

22. Woofer Cover Replacement

22.1 Place the woofer cover onto the matrix **(12)** and replace the nine screws that secure the cover to the matrix. The six shorter screws are used around the recessed area.

23. Woofer Removal
Note : Perform procedure 21 first.

23.1 Remove the three screws that secure the woofer to the matrix **(12)** and lift the woofer out.

23.2 Remove the two wires connected to the woofer by pulling on the connectors and not the wires.

24. Woofer Replacement

24.1 Lower the woofer into the matrix **(12)** so that the terminals face towards the rear of the matrix.

24.2 Replace the three screws that secure the woofer to the matrix **(12)** and replace the two wires. The wires can only go on one way.

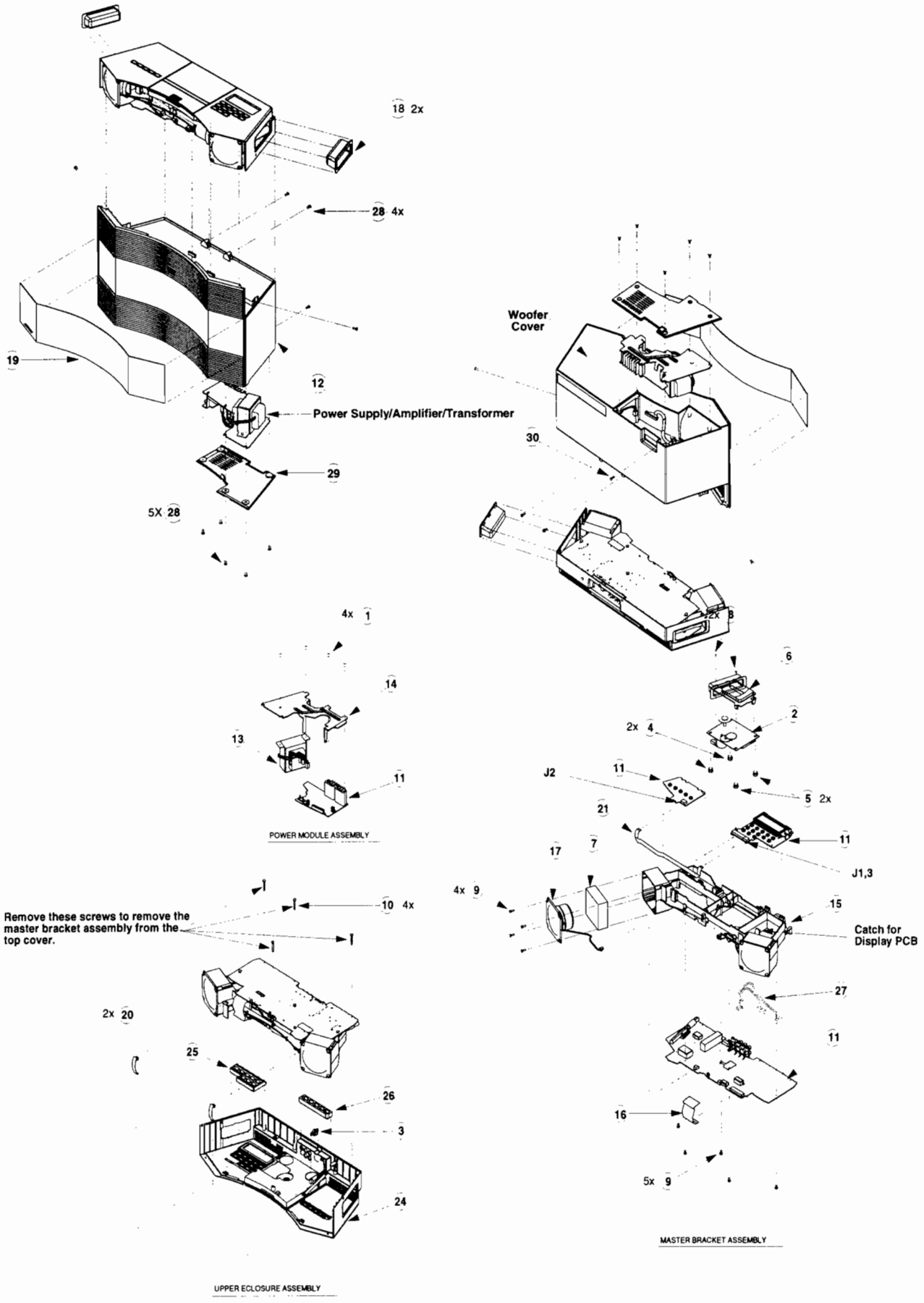
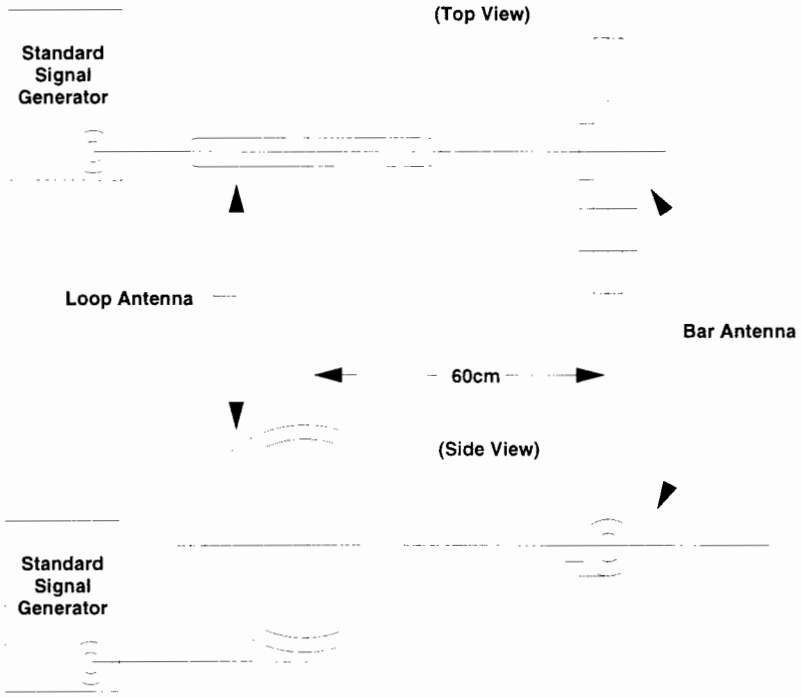


Figure 1. Exploded View

GENERAL TEST SETUP

All Speakers should be loaded with a 1.0kΩ, 5W resistor, unless otherwise noted. Test equipment connected to the amplifier's output should be isolated from ground (floated). The volume control should be set at maximum. AM/FM adjustments are located on the Main PCB.
Note: The amplifiers have an open load protection circuit. Connect a 1kΩ, 5W resistive load, unless otherwise noted, to the amplifier's output being tested and then momentarily connect a 4Ω resistive load in parallel with the 1kΩ load. This will allow the amplifier to turn on.



The equivalent field intensity is 26 dB less than the generator output level, or 1/20th of the output voltage.

Figure 2. AM Test Setup

TEST PROCEDURES

AUDIO TEST PROCEDURES

Important!! Read the general test setup procedures on page 16!

1. Bass Channel DC Offset

1.1 With all aux inputs shorted, measure the DC offset for the Bass Channel. It should be 0±70mV.

2. Bass Channel Output Noise

2.1 With all audio inputs shorted the Bass channel output noise should be <1 mV unweighted.

3. Bass Channel Reference Gain
Note: A 1kΩ resistor must be placed in parallel with R703 to perform this test.

3.1 Apply an 80mVrms, 200Hz signal to the left and right auxiliary input.

3.2 Reference a dB meter to the applied signal.

3.3 Measure the Bass channel output. It should be 26.4 dB ± 2.7dB.

4. Bass Channel Relative Response

4.1 Apply an 80mVrms, 200Hz signal to the left and right auxiliary input. Reference a dB meter to the Bass channel output.

4.2 Measure the Bass channel output according to the following table referenced to the measurement taken in 4.1.

Frequency	Output (dB)	Tolerance (dB)
500Hz	-11.9	±1.8
100Hz	+6.9	±0.8
55Hz	+10.4	±2.5
30Hz	-14.2	±2.1

5. Bass Channel Dynamic EQ

5.1 Apply a 100mVrms, 55Hz signal to the left and right auxiliary inputs.
Note: This will turn off the dynamic equalizer.

5.2 Apply a 10mVrms, 55Hz signal to the left and right auxiliary inputs.

5.3 Reference a dB meter to the Bass channel output. This must be done quickly.

5.4 After a few seconds, the bass channel's output will begin to rise. This is the dynamic equalizer turning on. The output should rise 7.8dB ±1.5dB referenced to the measurement taken in 5.3.

6. Bass Channel Small Signal Distortion
Note: Connect an 11Ω, 5W resistive load across the bass channel output.

6.1 Apply a 200Hz signal to the left and right auxiliary inputs at a level to obtain a 1.0Vrms level at the Bass channel output.

6.2 Measure the distortion at the Bass channel output. It should be < 0.2% THD.

7. Bass Channel Large Signal Distortion
Note: Connect an 11Ω, 5W resistive load across the bass channel output.

7.1 Apply a 200Hz signal to the left and right auxiliary inputs to obtain a 6.1Vrms level at the Bass channel output.

7.2 Measure the distortion at the Bass Channel output. It should be < 1.0% THD.

8. Compressor Test

8.1 Apply a 125mVrms, 55Hz signal to the left and right auxiliary inputs.

8.2 Measure the distortion at the Bass channel output. It should be < 3.0% THD.

9. Left/Right channel DC Offset

9.1 With all audio inputs shorted, measure the DC offset for the left and right channel. It should be 0 ± 70mV.

TEST PROCEDURES

10. Left/Right Channel Output Noise

10.1 With all audio inputs shorted, the left/right channel outputs should be < 800μVrms.

11. Left/Right Channel Reference Gain

11.1 Apply a 180mVrms, 1kHz signal to the left and right auxiliary inputs.

11.2 Reference a dB meter to the applied signal.

11.3 Measure the left/right channel output. It should be 28.0 dB ± 2.4 dB.

12. Left/Right Channel Balance

12.1 Apply a 180mVrms, 1kHz signal to the left and right auxiliary inputs.

12.2 Reference a dB meter to the right channel output.

12.3 Measure the left channel output. It should be 0 dB ± 2 dB referenced to the measurement taken in 12.2.

13. Left/Right Channel Relative Response

13.1 Apply a 180mVrms, 1KHz signal to the left/right auxiliary input.

13.2 Reference a dB meter to the left/right channel output. Measure the response according to the following table.

Frequency	Output (dB)	Tolerence (dB)
500Hz	-3.5	±1.2
2.5kHz	-4.3	±0.7
8.0 kHz	+2.0	±0.6
20kHz	-12.3	±1.8

14. Bass/High Frequency Balance

14.1 Perform procedure number three and eleven and record the results.

14.2 The difference between the Bass channel reference gain and the average of the left/right channel reference gain should be -1.6 dB ± 2.2 dB (Bass - [L+R]/2).

15. Left/Right Channel Small Signal Distortion
Note: Connect an 11Ω, 5W resistive load across the left/right channel output.

15.1 Apply a 1kHz signal to the left/right auxiliary input at a level to obtain a 1.05 Vrms level at the left/right channel output.

15.2 Measure the distortion at the left/right channel output. It should be < 0.25% THD.

16. Left/Right Channel Large Signal Distortion
Note: Connect an 11Ω, 10W resistive load across the left/right channel output.

16.1 Apply a 1kHz signal to the left and right auxiliary input at a level to obtain a 7.78Vrms level at the left/right channel output.

16.2 Measure the distortion at the left/right channel output. It should be < 1.0% THD.

17. Left/Right Channel Separation

17.1 Apply a 180mVrms, 1kHz signal to the left auxiliary input. Short the right channel auxiliary input.

17.2 Reference a dB meter to the left channel output.

17.3 Measure the right channel output. It should be ≤ -30 dB referenced to the measurement taken in 17.2.
Note: Repeat this test for the right channel.

TEST PROCEDURES

AM TEST PROCEDURES

AM GENERAL TEST SETUP

Important!!!

Set the RF generator to 1500kHz, 74 dB (EMF) output, 30% modulation 400Hz, unless otherwise noted. Refer to figure 2 for antenna placement. Audio is measured at the left line output.

18. AM Tuner Adjustment

18.1 Adjust the trim cap TC370 for peak audio output measured at the left line output.

18.2 Set the RF generator to 600 kHz. Adjust L302 for peak audio output measured at the left line output.

18.3 Set the RF generator to 1500 kHz. Adjust the trim cap TC370 for peak audio output measured at the left line output.

19. AM Sensitivity

19.1 Set the RF generator to 79 dB (EMF) at 1080 kHz. Measure the audio output at the left line output. It should be 115mVrms -45, +50 mV.

19.2 Reference a dB meter to the left line output with the conditions described in 19.1.

19.2.3 Turn off the 400Hz audio modulation.

19.2.4 Measure the left line output. It should be ≤ -20 dB referenced to the measurement taken in 19.2.

20. AM Stop Level Adjustment

20.1 Set the RF generator to 76 dB (EMF) at 1080 kHz.

20.2 Adjust R359 clockwise until the + (positive) terminal of C316 is less than 2.8 Vdc. Adjust R359 counterclockwise until the + (positive) terminal of C316 is greater than 2.8 Vdc. The proper adjustment is between these two points.

20.3 Set the generator to 79 dB (EMF) and verify that the + (positive) terminal of C316 is less than 2.8 Vdc.

20.4 Set the RF generator to 81 dB (EMF) at 1170 kHz. Place the unit in the seek mode. The unit should stop at 1170 kHz.

FM TEST PROCEDURES

FM GENERAL TEST SETUP

Important!!!

Set the RF generator to 98.1 MHz, 64 dB (EMF), mono modulation, 75 kHz deviation and 1 kHz audio modulation, unless otherwise noted. Place the antenna switch in the external position.

21. IF Alignment

21.1 Set the generator to 40 dB (EMF) mono modulation, pilot off.

21.2 Adjust the IF coil in TUNER 1 for maximum DC level measured at U304, pin 2. This value should be within 20mV of the peak value. The IF coil is the only adjustable coil located in Tuner 1.

22. FM Detector Adjust

22.1 Adjust T303 for minimum distortion. The distortion measured at the left line output should be ≤ 0.6%.

22.2 Verify that there is a 375 ± 130mVrms audio output level at the left line output.

23. FM Stop Level

23.1 Set the RF generator to 25 dB (EMF).

23.2 Rotate R361 clockwise until the + (positive) terminal of C316 goes below 2.8 Vdc then counter clockwise until it goes above 2.8 Vdc. The proper adjustment is between these two points.

23.3 Set the RF generator to 28 dB (EMF) and verify that the + (positive) terminal of C316 is below 2.8 Vdc.

23.4 Set the RF generator to 35 dB (EMF) at 100.1 MHz. Place the unit in the seek mode. Verify that the FM tuner stops at 100.1 MHz.

24. Stereo Threshold

24.1 Set the RF generator to 100% FM stereo modulation left mode, 10% pilot and 48 dB (EMF).

24.2 Rotate R368 fully counter clockwise then rotate R368 clockwise until U304 pin 1 goes low.

24.3 Set the RF generator to 43 dB (EMF) and verify that U304 pin 1 is high.

25. Stereo Separation

25.1 Set the RF generator for 100% FM stereo modulation, left mode, 10% pilot.

25.2 Reference a dB meter to the left line output.

25.3 Switch the generator to the right mode and measure the left line output. It should be ≤ -20 dB referenced to the measurement taken in 25.2.

26. FM Sensitivity

26.1 Set the RF generator to 25 dB (EMF).

26.2 Reference a dB meter to the left line output.

26.3 Turn off the 1 kHz modulation. Measure the left channel line output. It should be ≤ -30 dB.

CD TEST PROCEDURES

27. CD Long Playability

27.1 Play the ABEX Test Disc TCD784 or equivalent. The unit should be able to play track 26. A equivalent disc should have a length of 71' 42".

28. CD Eccentricity Playability

28.1 Play the ABEX Test Disc TCD-713R (210 mm) or equivalent.

28.2 Access track 1 and confirm that the unit can play this track.

28.3 Access track 15 and confirm that the unit can play this track with no skips or dropouts for a minimum of four seconds playing time.

29. CD Warp Playability

29.1 Play the Abex Test Disc SCD-2851 or equivalent.

29.2 Access track 5 and 16. Confirm that the unit plays these tracks with no skips or dropouts for a minimum of four seconds.

29.4 Confirm that the disc is not scraping against the CD mechanism or the system housing.

30. CD Optical Effects

30.1 Play the ABEX Test CD TCD-725 or equivalent. Play the tracks listed in the following table for the amount of time listed. There should not be any skipping or drop-outs.

Track Number	Description	Time (seconds)
6	Void (1mm)	6
9	Black Dot (0.8)	8
15	Fingerprint (75µm)	10

Note: There are no adjustments that can be made to the CD player. Replace any CD mechanism that fails these tests.

PART LIST NOTES

1. This part is not normally available from Customer Service. Approval from the Field Service Manager is required before ordering.

2. The individual parts located on the PCB are listed in the parts list.

3.  This part is critical for safety purposes. Failure to use a substitute replacement with the same safety characteristics as the recommended replacement part might create shock, fire and or other hazards.

MAIN ASSEMBLY PART LIST

(Figure 3)

Item Number	Description	Part Number	Qty. Per Assy	See Note
1	SCREW, TAPP, 6-32x.375, PAN, TORX	122994-06	4	
2	CD MECHANISM, CD90V1, W/APC	146074	1	
3	GEAR, DAMPER, PINK	146816-06	1	
4	GROMMET, CD SUPPORT, GRAY	146822-01	2	
5	GROMMET, CD SUPPORT, VIOLET	146822-02	2	
6	COVER, CD MECH	148787	1	
7	BATTING, POLYESTER, 5x4x2	149563	2	
8	SCREW, TAPP,2mmx6mm, PAN, XREC	149954-04	2	
9	SCREW, HILO, #6x.375, PAN, XREC	175972-06	13	
10	SCREW, HILO, 6x1, PAN, XREC	175972-16	4	
11	PCB ASSY, CD3000, 120V PCB ASSY, CD3000, 220/240V	180904-1A 180904-2A	1	1, 2
12	MATRIX ASSY, AWMS	180909	1	1
13	TRANSFORMER, 120V, AWMS TRANSFORMER, 220/240V, AWMS	180912 180993	1	3 
14	BRACKET, POWER MODULE	180913	1	
15	BRACKET, MASTER, AWMS	180917	1	
16	CABLE, FLEX, 28 CONDUCTOR	180920	1	
17	TWEETER, 76MM, AWMS	180921	2	
18	HANDLES, AWMS	180941	2	
19	PANEL, DECORATIVE	180942	1	
20	CLIP, MATRIX	180947	2	
21	CABLE, FLAT RIBBON, FLD, 7 COND	180994	1	
22	SCREW, MACH, 6-19X.5, PAN,XREC	180996-08	5	
23	SCREW, MACH, M3x0.5x10, PAN, XREC	183435-10	1	
24	TOP COVER ASSY, AWMS	186888	1	
25	PAD, SWITCH, AWMS, 5 POS	183445	1	
26	PAD, SWITCH, AWMS, 13 POS	183446	1	
27	HARNESS, CD	183777	1	
28	SCR, TAPP,#6-20, PAN,BT, XREC/SQ.	186883-08	4	
29	POWER COVER ASSY, AWMS	186869	1	
30	SCREW, TAPP,4-40X.750, TYPE AB, X	186881-12	1	
31	CD DOOR	188249	1	
-	FOOT, RUBER	180935	4	
-	BRACKET, ANTENNA	183449	1	
-	SPRING, DOOR	186148	1	
-	CLIP, TINNERMAN	180940	2	
-	GASKET, TWEETER, AWMS	186884	2	
-	ANTENNA, WHIP, FM	186146	1	

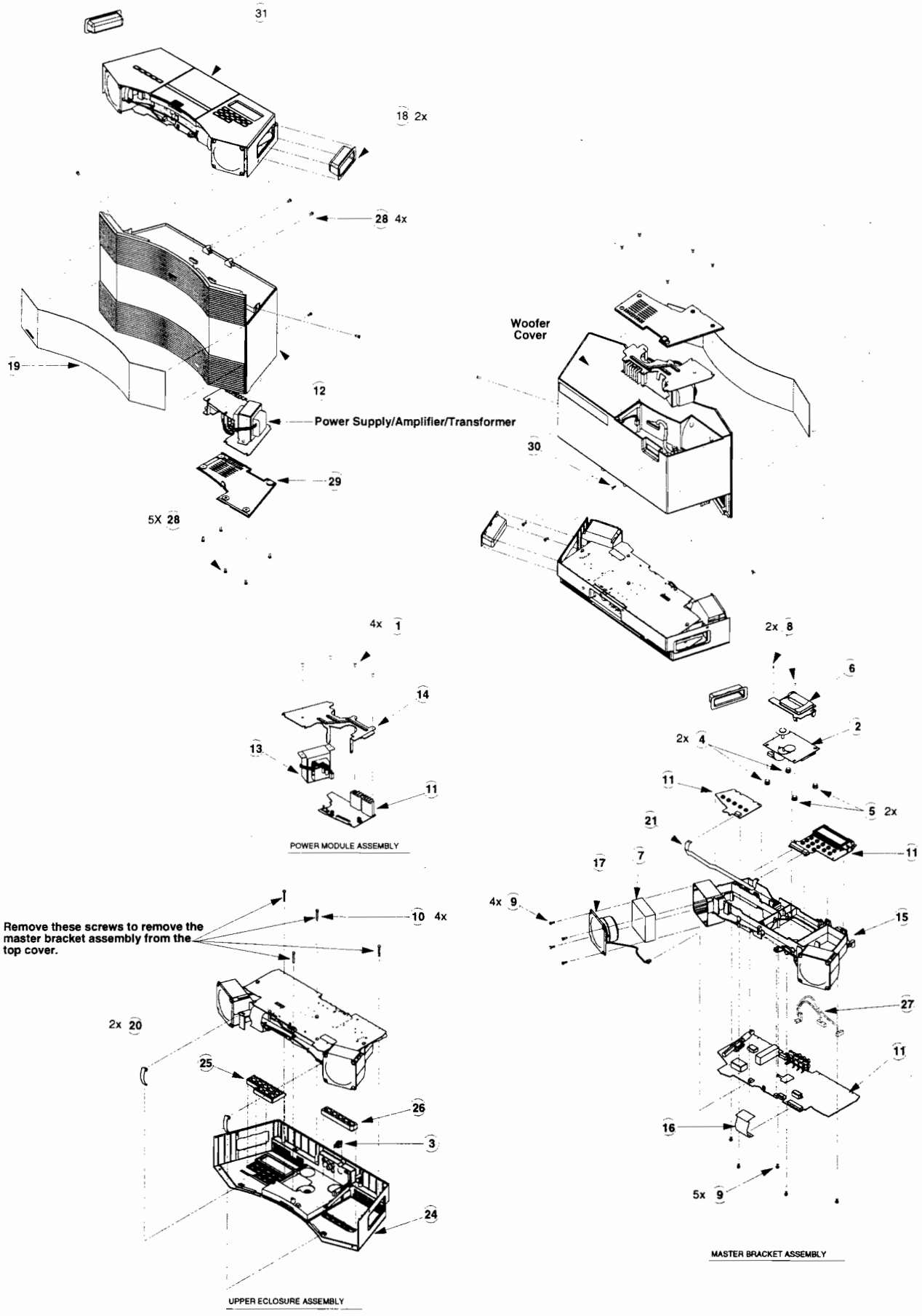


Figure 3. Exploded View

ELECTRICAL PART LIST

Resistors

Reference Designator	Description	Part Number	See Note
R2	8.2 Ω, FUSING, 5%, .5W, 2010	180956-8R2H	3 ⚠
R10, 438, 439, 723	2.49K, 0805, 1/10W, 1%	133625-2491	
R11, 14, 53, 54, 59, 106, 110, 206, 210, 308, 330, 332, 337, 340-342, 344, 345, 355, 357, 358, 379, 380, 402, 419-424, 470-487, 497, 511, 551, 568, 577, 580, 581, 583, 737, 742, 808, 800-806, 810, 836, 850, 851	1K, CHIP, 0805, 5%	133626-1025	
R12, 13, 55, 56, 60, 61 300, 336, 346, 400, 401, 842, 843, 823, 825	4.75K, CHIP, 0805, 1%	133625-4751	
R15, 528	56.2K, CHIP, 0805, 1%	133625-5622	
R16, 310, 314, 398, 399, 509	100K, CHIP, 0805, 1 %	133625-1003	
R17, 527	121K, CHIP, 0805, 1%	133625-1213	
R18-20, 25, 305, 317, 339, 343, 369, 375, 406-408, 412, 414, 415, 426, 437, 734, 747	10K, CHIP, 0805, 1/10W, 5%	133626-1035	
R21	3Ω, FUSING, 5%, .25W, 1210	180956-3R0E	3 ⚠
R22	130 Ω, 2512, 1W, 5%	181895-1300	
R23	.75Ω, FUSING, 5%, .25W, 1210	180956-R75E	3 ⚠
R24, 498, 508	2.21K, CHIP, 0805, 1/10W, 1%	133625-2211	
R26, 27	221 Ω, 1/8W 1206, 1%	124894-2210	
R28, 348, 370, 404, 405, 413, 489, 490, 573	47K, CHIP, CF, 5%	133626-4735	
R51	10MEG, 15MM,	183436-1511065	3 ⚠
R539	51.1K, CHIP, 0805, 1%	133625-5112	
R58	5.76K, CHIP, 0805, 1%	133625-5761	
R100, 200	5.11K, CHIP, 0805, 1/10W, 1%	133625-5111	
R101, 201	15.8K, 0805, 1/10W, 1%	133625-1582	
R102, 103, 105, 202, 203, 205	6.04K, CHIP, 0805, 1/10W, 1%	133625-6041	
R104, 204	38.3K, 0805, 1/10W, 1%	133625-3832	

Resistors

Reference Designator	Description	Part Number	See Note
R107, 207, 349, 371, 409-411, 425, 493-496, 499, 403, 510, 523, 538, 541, 702, 730	10.0K, CHIP, 0805, 1%	133625-1002	
R108, 208	5.90K, 0805, 1/10W, 1%	133625-5901	
R109, 209	7.50K, CHIP, 0805, 1%	133625-7501	
R111, 211, 338, 574-576, 704, 735	499Ω, CHIP, 0805, 1/10W/, 1%	133625-4990	
R301, 367, 440-463, 705, 706, 725, 809, 811, 815, 816, 830-832, 835, 840, 841	100K, CHIP, 0805, 5%	133626-1045	
R302, 307, 362	CHIP,0805,1%, 4.99K	133625-4991	
R303, 360, 820, 821, 822, 824	12.1K CHIP, 0805, 1/10W, 1%	133625-1212	
R304	3.9K, CHIP, 0805, 1/10W, 5%	133626-3925	
R309, 313, 356	3.48K, 0805, 1/10W, 1%	133625-3481	
R311	2.00K ,CHIP, 0805, 1%	133625-2001	
R312, 316, 733	6.19K, CHIP, 0805, 1/10W, 1%	133625-6191	
R315-417, 491, 492	47.5 Ω, 1206, 1/8W, 1%	124894-47R5	
R318, 324, 331, 350, 351, 353	100 Ω, CHIP, 0805, 1%	133625-1000	
R319, 321,543, 710	330 Ω, CHIP, 0805, 1/10W, 5%	133626-3315	
R320, 333	590 Ω, CHIP, 0805, 1/10W, 1%	133625-5900	
R322, 533, 540, 708	20.0K, CHIP, 0805, 1%	133625-2002	
R323, 505, 549	27.4K, CHIP, 0805, 1/10W, 1%	133625-2742	
R329	39 Ω , 1206, 1/8W, 5%	124895-3905	
R334	6.8K, CHIP, 0805, 1/10W, 5%	133626-6825	
R335, 364	1.6K, CHIP, 0805, 1/10W, 5%	133626-1625	
R352, 354	86.6 Ω, 1206, 1/8W, 1%	124894-86R6	
R331, 512-514, 517, 519-520, 529, 530, 542	22.1K, CHIP, FILM, 0805, 1%	133625-2212	
R359	10K Ω, POT, TRIM RTRY, 30%, 1/2W	177494-103	
R361, 368	20KΩ, POT, TRIM, RTRY, 30%, 1/2W	177494-203	
R363, 548, 569, 707	1.21K, 0805, 1/10W, 1%	133625-1211	
R365, 501	3.32K, 0805, 1/10W, 1%	133625-3321	

Resistors

Reference Designator	Description	Part Number	See Note
R366, 703	1 MEG, CHIP, 0805, 5%	133626-1055	
R500	10 Ω, CHIP, 0805, 5%	133626-1005	
R502	560Ω, 0805, 1/10W, 5%	133626-5615	
R521	11.0k, 0805, 1/10W, 1%	133625-1102	
R554, 555, 562, 563	14.7K, CHIP, 0805, 1%	133625-1472	
R57, 507	68.1K, 0805, 1/10W, 1%	133625-6812	
R522, 547	33.2K, CHIP, 0805, 1/10W, 1%	133625-3322	
R504	221K, CHIP, 0805, 1%	133625-2213	
R515, 516, 518	44.2K, 0805, 1/10W, 1%	133625-4422	
R720	18.7K, CHIP, 0805, 1/10W, 1%	133625-1872	
R525, 712	53.6K, 0805, 1/10W, 1%	133625-5362	
R526, 535, 537, 724, 807, 812, 856	49.9K, CHIP, 0805 1%	133625-4992	
R534, 558, 559, 566, 567, 817, 819	2K, 0805, 1/10W, 1%	133625-1821	
R503, 532, 536, 713, 716, 718	15.0K, CHIP, 0805, 1%	133625-1502	
R544, 546	470 Ω, CHIP, 0805, 1/10W, 5%	133626-4715	
R524, 550	681 Ω, CHIP, 0805, 1/10W, 1%	133625-6810	
R552, 553, 560, 561	8.25K, CHIP, 0805, 1/10W, 1%	133625-8251	
R556, 557, 564, 565	24.3K, CHIP, 0805, 1%	133625-2432	
R700, 701	8.66K, CHIP, 0805, 1%	133625-8661	
R709	2.80K, 0805, 1/10W, 1%	133625-2801	
R711, 717	2.0K, CHIP, 0805, 1/10W, 5%,	133626-2025	
R714	7.87K, 0805, 1/10W, 1%	133625-7871	
R715, 837	27 Ω, CHIP, CF, 0805, 5%	133626-2705	
R719	4.02K, 0805, 1/10W, 1%	133625-4021	
R721, 722	26.7K, CHIP, 0805, 1%	133625-2672	
R726, W301	JUMPER, CHIP 0805	133627	
R506, 728	13.3K, CHIP, 0805, 1/10W, 1%	133625-1332	
R729	1.96K, 0805, 1/10W, 1%	133625-1961	
R732	3.09K, CHIP, 0805, 1%	133625-3091	

Resistors

Reference Designator	Description	Part Number	See Note
R736	1.78K, 0805, 1/10W, 1%	133625-1781	
R745, 746	2.67K, 0805, 1/10W, 1%	133625-2671	
R826, 827	200 Ω, CHIP, 0805, 1/10W, 5%	133626-2015	
R828, 829	604 Ω, 0805, 1/10W, 1%	133625-6040	
R901	1.00K, 1/8W, 1206, 5%	124895-1025	
W700, 701	RES, JUMPER, 0Ω	139942	

Capacitors

Reference Designator	Description	Part Number	See Note
C20, 23-26, 30, 33, 300, 310, 317, 330, 390, 511, 521, 525, 702-704, 826, 828	10uF, 25V, EL, 85, 20%	149947-100E	
C21, 29, 338, 343, 348, 357, 360, 530, 551, 552, 556, 557, 569, 577, 846-853	100pF, 0805, COG, 50V, 5%	133622-101	
C22, 57, 59, 329, 391, 500, 565-567, 729, 730	1000pF, 50V 0805, X7R, 10%	133623-102	
C27, 28, 67, 68, 70, 71, 356, 361, 524, 541, 545, 549, 560, 561, 568, 845	.10uF, 25V, 0805, Y5V, 80%	133624	
C51	.0047uF, DISC, 60, AC, 100%	149016	3 ⚠
C52-55, 306, 371, 490	.1uF , 25V, 1206, X7R, 5%	131754-104	
C56	15000UF, EL, PC MNT, 105C, 25V	180915-153E	
C58, 60, 61, 65	10uF, EL, 20%	137126-100	
C62, 64, 710-712	.47uF, 50V, BOX, 85, 5%	137127-474	
C63, 69, 72-75, 333, 339, 354, 358, 513, 522, 564, 570, 719, 721-728, 809	.01uF, 50V, 0805, X7R, 10%	133623-103	
C66	47.0uF, EL, 20%	137126-470	
C100, 101, 200, 201	.027uF, BOX, 85, 63V, 5%	137127-273	
C102, 202	.012uF, 100V, BOX, 85, 5%	137127-123	
C103, 203	680pF, CHIP, 0805, 50V, 5%	133622-681	
C104, 105, 204, 205, 529	.0056uF, 100V, BOX, 85, 5%	137127-562	
C301, 314, 324, 325, 328, 340, 344, 353	.047uF, 50V, 0805, X7R, 10%	133623-473	

Capacitors

Reference Designator	Description	Part Number	See Note
C302, 308, 501, 548, 836	47uF, 16V, EL, 85, 20%	149947-470C	
C303, 321	.022uF, 100V, BOX, 85, 5%	137127-223	**120V Only**
C303, 321, 506	.015uF, 100V, BOX, 85, 5%	137127-153	**220V Only**
C304	3.3uF, 50V, EL, 85, 20%	149947-3R3H	
C305, 512	220uF, 16V, EL, 85, 20%	149948-221C	
C307, 720	3300pF, 50V 0805, X7R, 10%	133623-332	
C309, 342, 442	2.2uf, MONO, 1206, Y5V, 16V, 80%	178212-225	
C312, 316, 320, 334, 517	1.0uF, 50V, EL, 85, 20%	149947-1R0H	
C313	.33uF, 50V, EL, 85, 20%	149947-R33H	
C315	4.7uF, 50V, EL, 85, 20%	149947-4R7H	
C332	2.2uF, 50V EL, BP, 85, 20%	147522-2R2	
C336, 345, 515, 520	100uF, 16V, EL, 85, 20%	149948-101C	
C337	27pf, CHIP, 0805, 5%	133622-270	
C341	.15uF, 50V, 0805, X7R, 10%	133623-153	
C346, 348	470pF, 50V, 0805, COG, 5%	133622-471	
C347, 351	.0022uF, 100V, BOX, 85, 5%	137127-222	
C349, 350, 504, 535	.0033uF, 100V, BOX, 85, 5%	137127-332	
C352	33pF, 50V, 0805, COG, 5%	133622-330	
C370	430pF, 50V, 0805, COG, 2%	177269-431	
C373, 536	3.9pF, 50V, 0805, COG, 5%	133622-3R9	
C400, 407, 420, 421, 423, 470-485, 486, 487, 497, 509	330pF, 50V, 0805, COG, 5%	133622-331	
C402, 403	1uF, 1206, Y5V, 16V, 80%	173383-105	
C410, 411	39pF, 50V, 0805, COG, 5%	133622-390	
C491, 492, 575, 576	47pF, 50V, 0805, COG, 5%	133622-470	
C503, 505, 526, 531	.12uF, 50V, BOX, 85, 5%	137127-154	
C502, 543	.047uF, 63V, BOX, 85, 5%	137127-473	
C507, 542	.1uF, 50V, BOX, 85, 5%	137127-104	
C508, 537	.033uF, 63V, BOX, 85, 5%	137127-333	
C510, 706, 707, 840-843	.22uF, 50V, BOX, 85, 5%	137127-224	

Capacitors

Reference Designator	Description	Part Number	See Note
C507, 514, 528, 700, 701	.33uF, 50V, BOX, 85, 5%	137127-334	
C516	.022uF, 50V, 0805, X7R, 10%	133623-223	
C519, 527, 539	.01uF, BOX, 85, 100V, 5%	137127-103	
C523, 533, 810	10UF, EL, 85, 16V, 20%	177902-100C	
C718	.18uF, 50V, BOX, 85, 5%	137127-184	
C534	47uF, EL, 5.5MM, 16V, 20%	177902-470C	
C532, 538	.001uF, 100V, BOX, 85, 5%	137127-102	
C540, 546, 547	10pF, 0805, COG, 50V, 5%	133622-100	
C544, 807, 808	100uF, EL, 85, 6.3	174109-101JB	
C550, 555, 805, 806, 819, 821, 825, 827	270pF, 50V, 0805, COG, 5%	133622-271	
C553, 558	.0012uF, 100V, BOX, 85, 5%	137127-122	
C554, 559, 714	.0047uF,100V, BOX, 85, 5%	137127-472	
C708	.033uF, 50V, 0805, X7R, 10%	133623-333	
C713	.039uF, 63V, BOX, 85, 5%	137127-393	
C715-717	.056uF, 63V, BOX, 85, 5%	137127-563	
C802, 804, 817, 818, 820, 822	2.2UF, 50V, EL, 85, 20%	149947-2R2H	
C829, 830	4.7uF, 50V, EL, 5MM, 85, 20%	174109-4R7HB	

Transistors

Reference Designator	Description	Part Number	See Note
Q1, 6	PNP, TO-126	147529-S	
Q2, 3, 5, 7, 18, 401	NPN, SOT, MMBT3904	146819	
Q3	PNP, SMALL	119168	
Q4, 312, 313, 315	NPN, SOT, 47K	146817	
Q303, 304	NPN, TO-92, 2SC2839E	147565	
Q309, 701, 702	2SC2812 SOT23	134741	
Q310	JFET, N, 40V, 10mA, TO-92	147561-3	
Q311, 316, 400	PNP, SOT, 47K	146818	
Q501, 317, 402	PNP, SOT, MMBT3906	148596	
Q901	SENSOR, IR, 2.5MM, TAPED	180970-2	

Transistors

Reference Designator	Description	Part Number	See Note
U3, 4	VOLT REG, POS, 5V	172942-05	
U5, 304	IC,DUAL COMPARITOR, SO-8, LM393	148584	
U51	QUAD POWER AMP, MW15	180050	
U52	PWR AMP, MULT-11, 45W, TDA7396	177279	
U100, 507, 701	OP AMP, QUAD, DIP-14, TL074BCN	179633	

Integrated Circuit

Reference Designator	Description	Part Number	See Note
U101	QUAD OP AMP	120535	
U301	AM/FM TUNER, SO-30, LA1851NM	180911	
U302	IC, PLL FREQUENCY SYNTHESIZER	147527	
U400	UC, TMP87PH20F, PRGRMD, CD3000	184592	
U402	IC, RESET, VOLTAGE SPV, DS1233-10	181016-10	
U403	EEPROM, 1K, S08	184044	
U500	ASP, LA9230	180952	
U501	CD DSP, QFP 80, LC78621E	180953	
U502, 503	MOTOR DRIVER, LA6531	146808	
U700	QUAD OP AMP	120535	
U702	CA3080	119834	
U801	VOLUME, CONTROL, TDA7313D	177983	

Diodes

Reference Designator	Description	Part Number	See Note
D300	SMT, S1G	178380-4	
D311, 703, 901	1N4531,5MM	136603	
D370	VARACTOR, DUAL, 20V, 50mA	177495-5	
D701	SOT-23, BAV 70	147249	
D702	BAV99, SOT23	147239	
BR51	RECTIFIER, BRIDGE, 100V, 6A	170214	3 ⚠
ZR10	ZENER, SMT, 5.1V, IN5231	174265-5231	

Inductors

Reference Designator	Description	Part Number	See Note
L301	100uH, IND, SMT, LEM4532	178370-101	
L302	OSCILLATOR	180647	
L304, 500, 501, 503, 504	10uH, IND, SMT, LEM4532	178370-100	
L400	1uH, IND, SMT, LM4532	178370-1R0	
T302	COIL, FTZ FILTER	147558	**220V Only**

Filters

Reference Designator	Description	Part Number	See Note
CF301, 304	FILTER, CER, 10.7 MHZ, 180 ± 20KHZ	179028	
CF302	RESONATOR, CERAMIC, 456KHz	147233	
T301	FILTER, CER, AM IF	177492	
T303	DETECTOR, FM, SINGLE TUNED	147234	
TC370	20pF, TRIM, NPO, 100V	148768-T200	
TUNER	TUNER, FM, 3GANG, 7V	187631	**120V Only**
TUNER	TUNER, FM, 4GANG, 7V	184589	**220V Only**

Crystals

Reference Designator	Description	Part Number	See Note
X301	CRYSTAL, QUARTZ, 7.2MHz, 50PPM	147223	
X401	RESONATOR, CER, +/-5%, 8.00Mhz	180997	
X500	CRYSTAL, 16.93444MHz, 100PPM	147533	

Switches

Reference Designator	Description	Part Number	See Note
S300	SWITCH, SLIDE, DPDT	143958	
S401-418	SWITCH, TACTILE DOME	172999-02	
S421	SWITCH, DOOR	183442	

Reference Designator	Description	Part Number	See Note
J1, 2	CONN, HEADER, SIDE ENTRY, 7 POS	177258-07	
J10_AC/XFR	CONN, HEADER, 2 POS, 8MM	178742-2	
J12	CONN, AC/DC POWER, UL, PC MOUNT	180914	**120V Only** **3** 
J12	CONN, AC/DC POWER, EUR	180998	**220V Only** **3** 
J14	CONN, BTM ENTRY, .10", 5 POS	141596-05	
J3, 4	CONN, HEADER, SIDE ENTRY, 28 POS	177258-28	
J309	CONN, THREADED BARREL	147225	**120V Only**
J309	CONN, PAL	149565	**220V Only**
J5	CONN, HEADER, JST, 8 CONTACT	141596-08	
J6, 7	CONN, HEADER, RTANG, 2.5mm, 2 POS	145402-02	
J8	HEADER, TE, 13P, 2.5MM, JST B13BXH	133224-13	
J800	CONN, HOUSING, PHONO, 6 POS, FEM	148766	
J9, 11	HEADER, 2 POS, .156 CENTER	133220-02	
F51	5.0A, 250V	135678-13	**3** 
F52	0.5A, 250V	135678-03	**120V Only** **3** 
F52	0.25A, 250V	135678-01	**220V Only** **3** 
P501	HEADER, LOW CURRENT 6 POLE	133224-06	
P502	CONN, HEADER, PC MNT, 8 POS, MALE	133224-08	
P503	HARNESS, 6CND, XH/PH, 28AWG, 80MM	180990-080	

Miscellaneous

Reference Designator	Description	Part Number	See Note
LCD400	DISPLAY, LCD	180922	
OVER_U302	SHIELD, TOP, PLL	180987	
REF:HS/PCB	SCREW, TAPP, 6-32x.375, TORX	122994-06	
REF:U1	CLIP, SPRING	142864	
REF:U301	SHIELD, AM/FM	180983	
AM_ANT	ANTENNA, AM BAR, PCMOUNT	180948	
BACKLIGHT	BACKLIGHT, LCD	180969	
	CLIP, SPRING	142864	
	HEATSINK, POWER MODULE	180916	
	HOLDER, LCD	180923	
	HEATSINK, SPRING CLIP, RECIFIER	180977	
	SHIELD, BOTTOM, PLL	183427	
	SHIELD, CD MOTOR, AWMS	186156	
	CLIP, SPRING	142864	

PACKAGING PART LIST

(Figure 4)

Item Number	Description	Part Number	Qty. Per Assy	See Note
1	FOLDER/SLIPSHEET ASSY, AWMS	186872	1	US only
2	BROCHURE, ALL PRODUCTS	141478	1	US only
3	SHEET, SAFETY	176236	1	US only
4	LINE CORD, 120V, DETACHABLE LINE CORD, EUR, DETACH, 96", WH	172045 184599-01	1	3 ⚠
5	CARD, WARRANTY, MULTI LANG	180925	1	US only
6	OWNER'S MANUAL, AWMS	180958	1	US only
7	CARTON, OUTER, AWMS	180960-001	1	
8	CD, AWMS	180959	1	
9	PACKING, INSERT, AWMS	180963-001	1	
10	REMOTE CONTROL ASSEMBLY, AWMS-3	180973	1	
11	BELLYBAND, AWMS FOLDER	183447	1	US only
12	BATTERY, LITHIUM, 2032	180991	1	
13	CABLE, AUDIO, DUAL RCA	185931-01	1	
14	PACKING PAD, 13.5X3.0, AWMS	186152	1	
15	SEAL, FOLDER, AWMS	186878	1	US only
16	FOAM INSERT	138619	1	
17	POLYBAG, LINE CORD, REMOTE, BAT	144348	2	
18	POLYBAG, 14.38 X 9.87 X 2 MIL	103351	1	EU only
19	SHEET, DEC OF CONFORMITY	186157	1	EU only
20	OWNER'S MANUAL, AWMS, EUR	186879	1	EU only
21	SHEET, CD CREDIT, AWMS	186880	1	EU only
-	BAG, POLY, 19X8X21X2MIL , UNIT	180962	1	

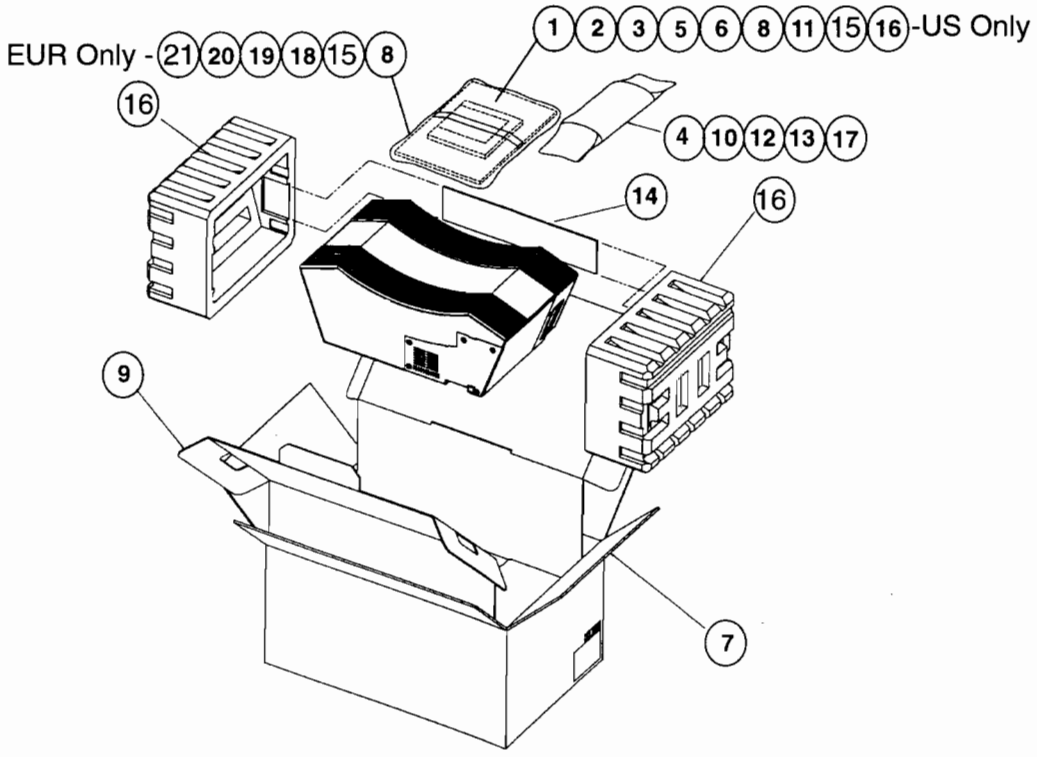


Figure 4. Packaging View

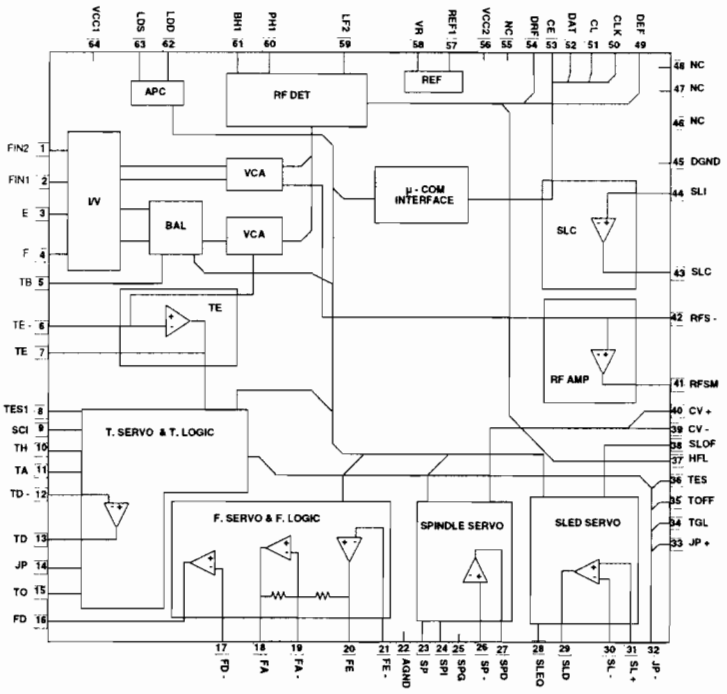


Figure 5. Block Diagram IC LA9230M

PIN DESCRIPTION
PIN 1 GROUND
PIN 2 $\overline{\text{RESET}}$
PIN 3 VCC

Figure 6. Pin Out IC DS1233

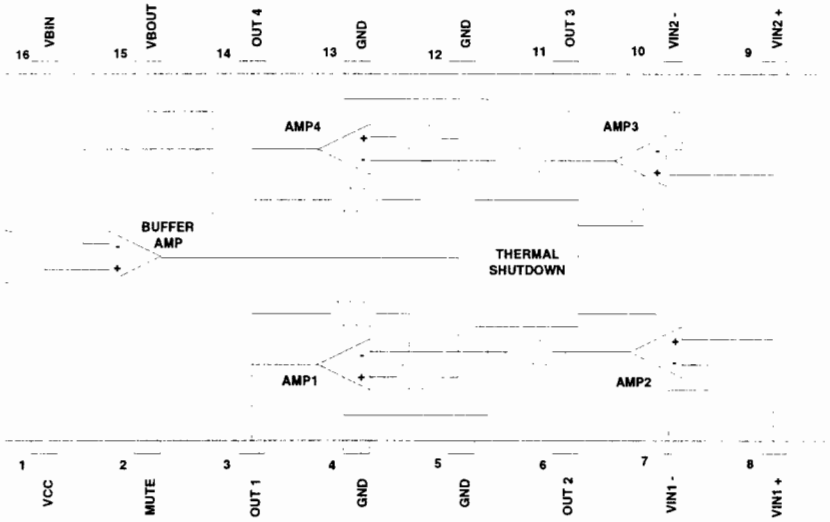
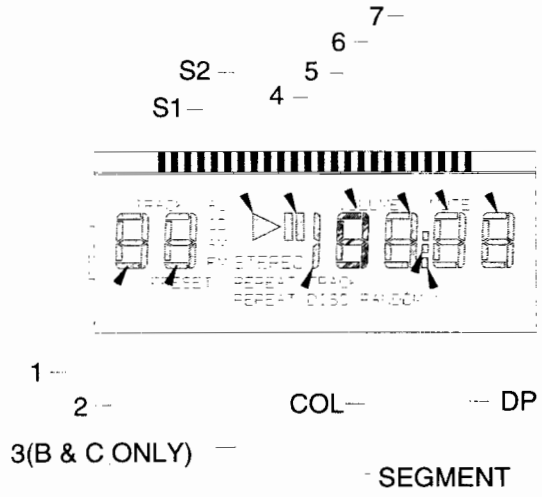
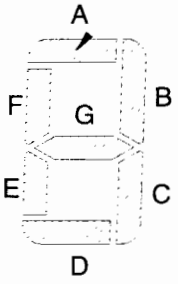


Figure 7. Block Diagram LA6531





Each segment in a digit is described by a number and a letter. So, 2E refers to the E segment in digit 2.

PIN	COM1	COM2	COM3
1	NC	NC	COM3
2	COM1	NC	NC
3	1F	1E	1D
4	1A	1G	1C
5	TRACK	1B	PRESET
6	2F	2E	2D
7	2A	2G	2C
8	AUX	2B	NC
9	CD	FM	REPEAT
10	AM	STEREO	REPEAT TRACK
11	S1	S2	3B, 3C
12	4F	4E	4D
13	4A	4G	4C
14	VOLUME	4B	DP
15	5F	5E	5D
16	5A	5G	5C
17	COL	5B	NC
18	6F	6E	6D
19	6A	6G	6C
20	MUTE	6B	RANDOM
21	7F	7E	7D
22	7A	7G	7C
23	NC	7B	DISC
24	NC	COM2	NC

Figure 8. LCD Display and Pin Definition

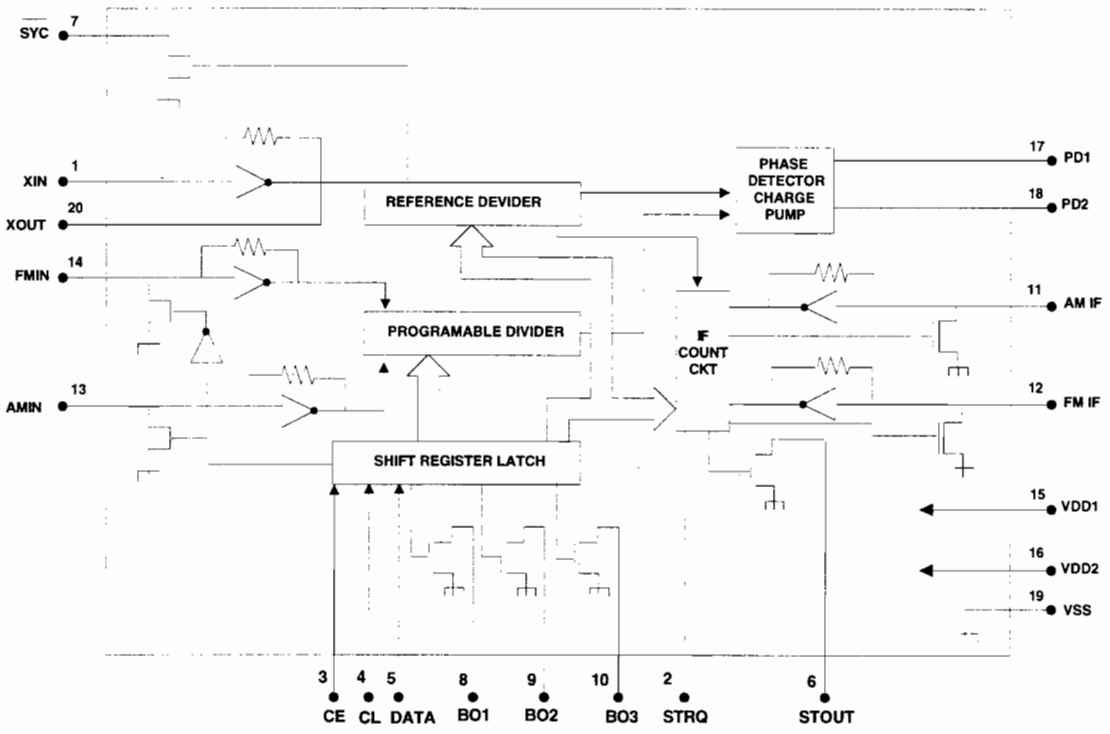


Figure 9. Block Diagram IC LM700

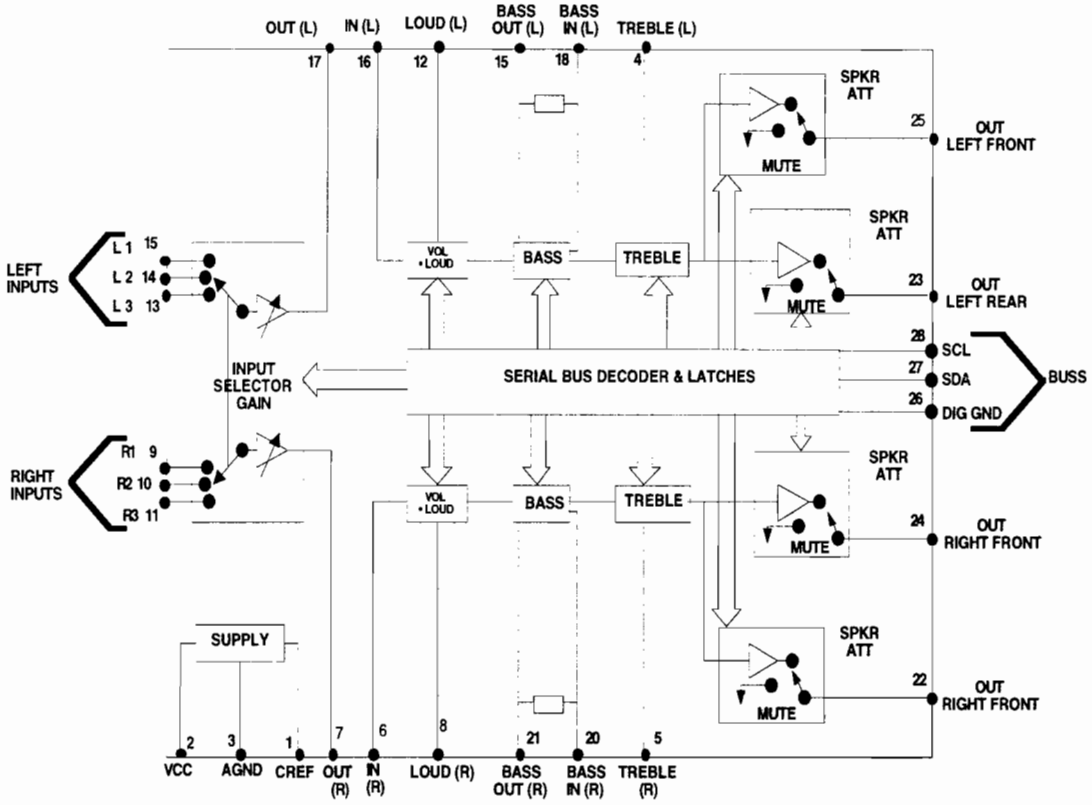
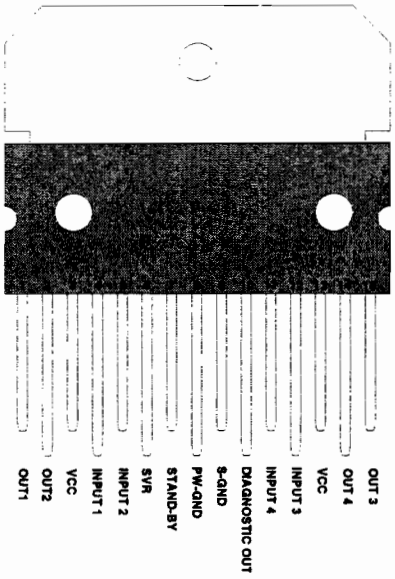


Figure 10. Block Diagram IC TDA7313



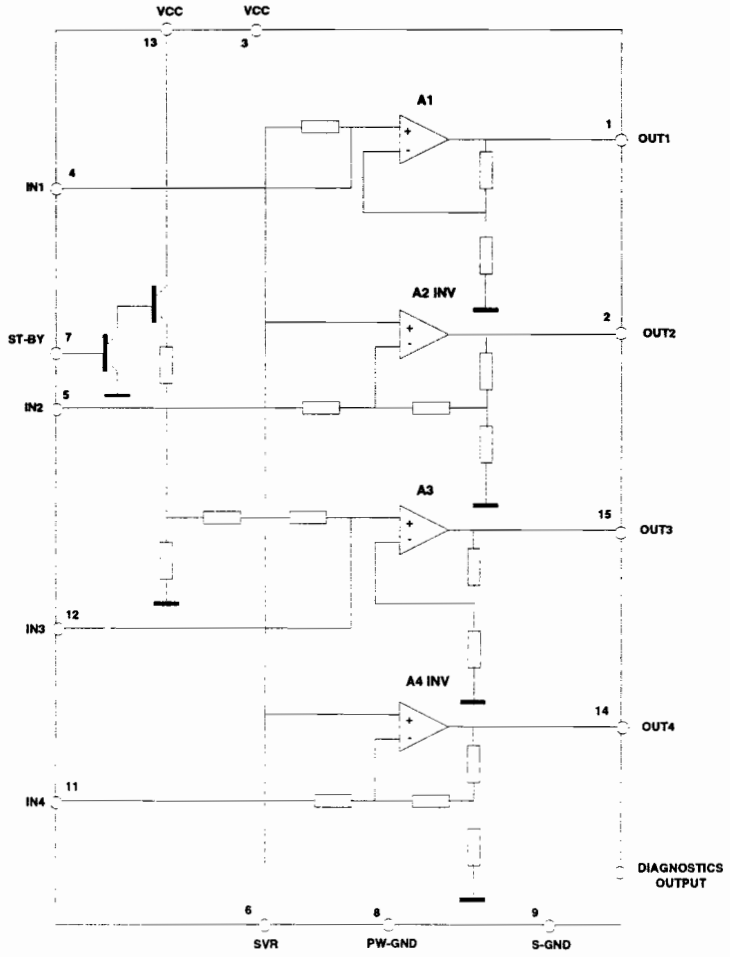
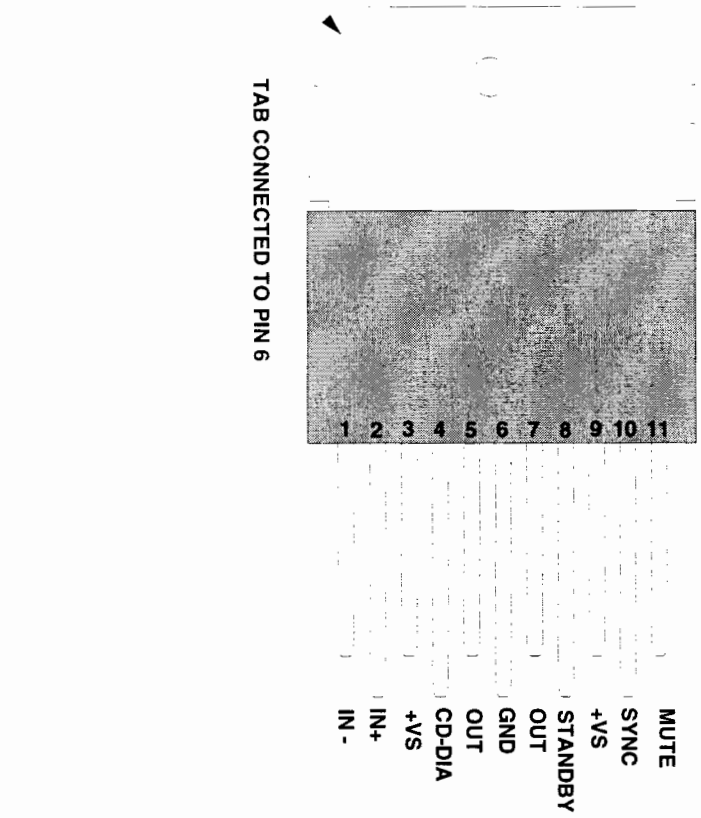


Figure 11. Block Diagram and Pin Out IC 7375



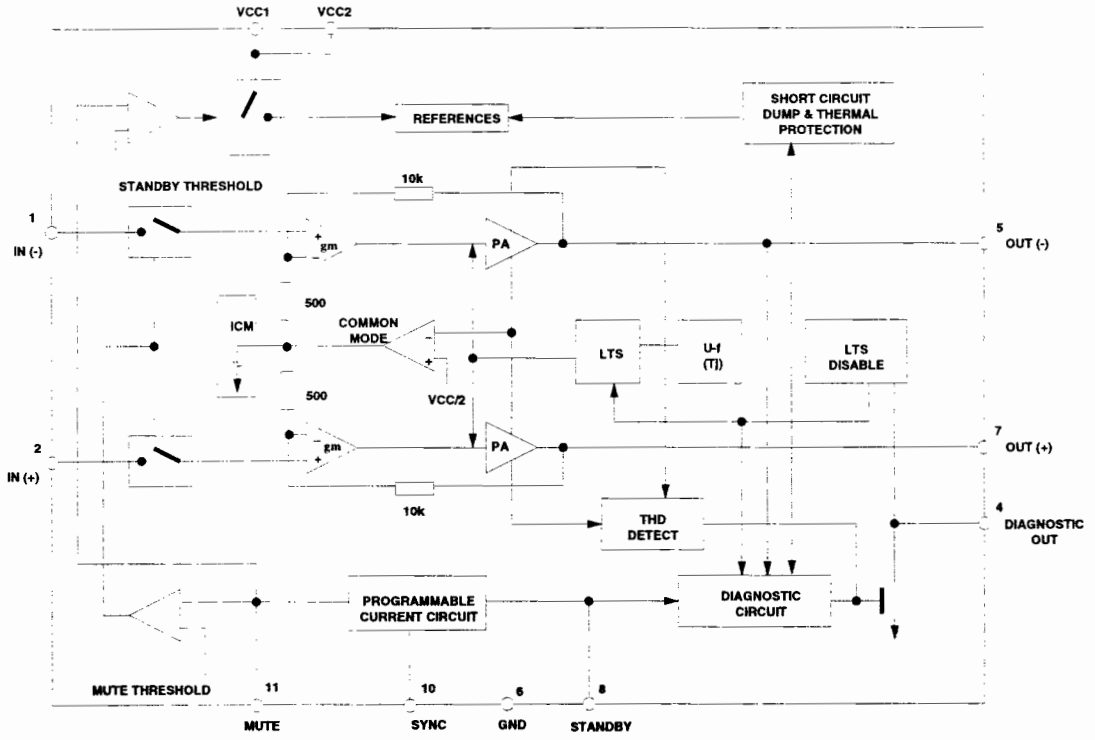


Figure 12. Block Diagram and Pin Out IC TDA 7396

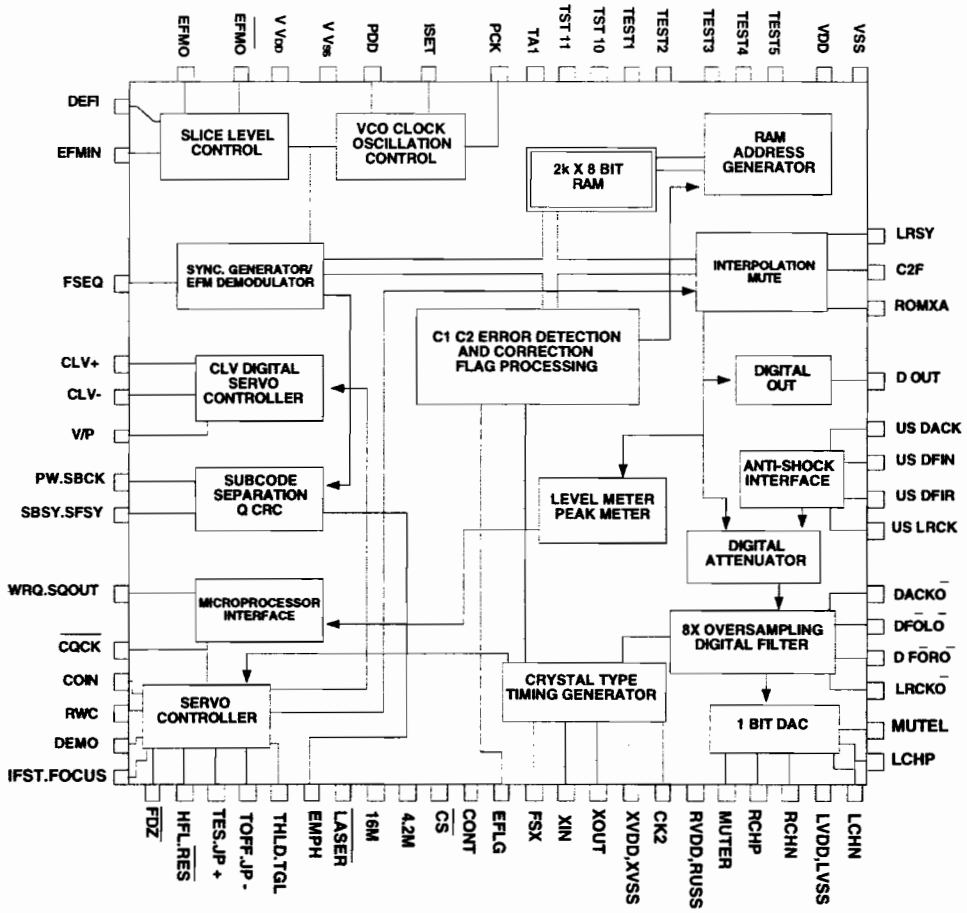


Figure 13. Block Diagram IC LC7821E

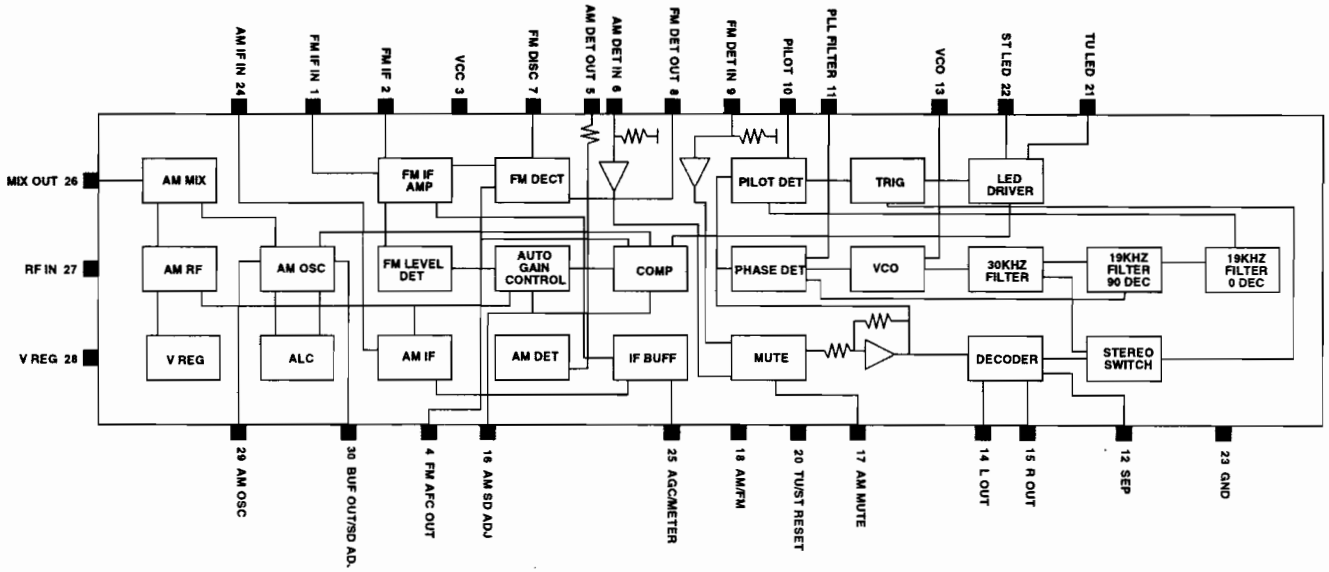


Figure 14. Block Diagram IC 1851NM AM/FM Tuner

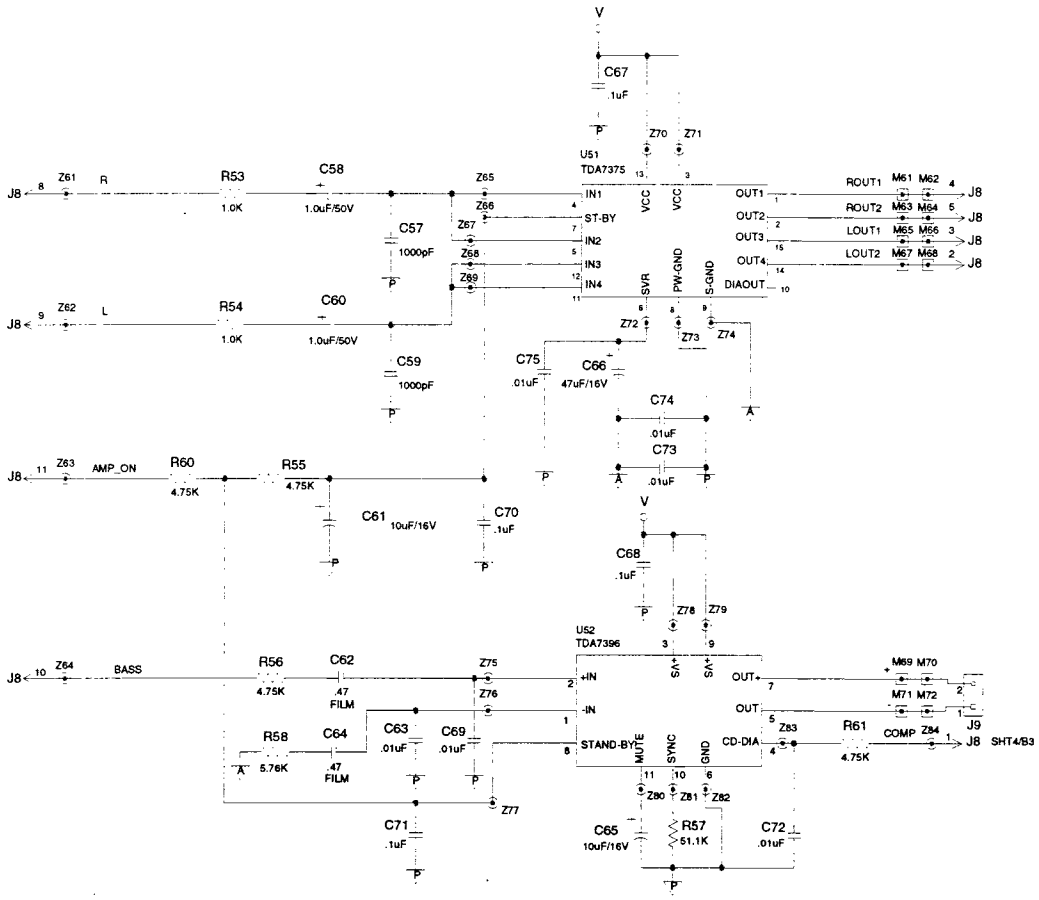
IC LC7821E FUNCTION CHART

No.	Name	I/O	Pin Description	
1	DEFI	I	Defect detection signal (DEF) input. "L" when not used.	
2	TAI	I	For PLL	Test input. Built-in pull down resistor.
3	PDO	O		Phase Comparison output for external VCO control.
4	V_{VSS}			Power source for internal VCO; normally 0V.
5	ISET	AI		Connects to current adjusting resistor of PDO output.
6	V_{VDD}			Connects to internal VCO; normally 5V.
7	FR	AI		For adjusting VCO frequency range.
8	V_{SS}		Ground pin for digital system.	
9	$\overline{EFMO}$	O	For slice level control	EFM signal inverting output
10	EFMO	O		EFM signal output.
11	EFMIN	I		EFM signal output.
12	TEST2	I	Test input. Built-in pull down resistor.	
13	CLV+	O	Output for spindle servo control. CLV + accelerates at "H", and CLV - decelerates at "H".	
14	CLV -	O	3 Output values possible depending on the command.	
15	V/P	O	Output for auto-switch monitoring of rough servo/phase control. Rough servo at "H", and phase control mode at "L".	
16	FOCS	O	Output for focus-servo ON/OFF. Focus-servo ON at "L".	
17	FST	O	Focus-start-pulse output. Open-drain output.	
18	FZD	I	Focus error zero-cross signal input. "L" when not used.	
19	HFL	I	Focus detection signal input. Schmitt input.	
20	TES	I	Focus error signal input. Schmitt input.	
21	PCK	O	Clock monitor for EFM data playback. 4.3218 MHZ at phase lock.	
22	FSEQ	O	Synchronizing signal detection output. "H" when the synchronizing signal detected from EFM signal and internally generated synchronizing signals match.	
23	TOFF	O	Tracking OFF output.	
24	TGL	O	Output for tracking-gain switching. Raising gain at "L".	
25	THLD	O	Tracking-hold output.	
26	TEST3	I	Test input. Built-in pull down resistor.	
27	V_{DD}		Digital system power source. Normally 5 V.	
28	JP +	O	Output for track jump. When JP + is "H", jump to the outside accelerates while jump to the inside decelerates. When JP - is "H", jump to the inside accelerates while jump to the outside decelerates.	
29	JP -	O	Output of 3 values possible depending on the command.	
30	DEMO	I	Sound demo input for set adjustment process. Built-in pull down resistor.	
31	TEST4	I	Test input. Built-in pull down resistor.	
32	EMPH	O	De-emphasis monitoring output. De-emphasis disc playback at "H".	
33	LRCKO	O	Digital filter Output	Word-clock output.
34	DFORO	O		Rch data output.
35	DFOLO	O		Lch data output.
36	DACKO	O		Bit-clock output.
37	TST10	O	Test output. Open (normally "L" output).	
38	USDACK	I	Input for anti shock "L" when not used	Bit-clock input.
39	USDFIN	I		LRch data.
40	USDFIR	I		Test input. Normally "L".
41	USLRCK	O		Word-clock input. ("L" when not used).

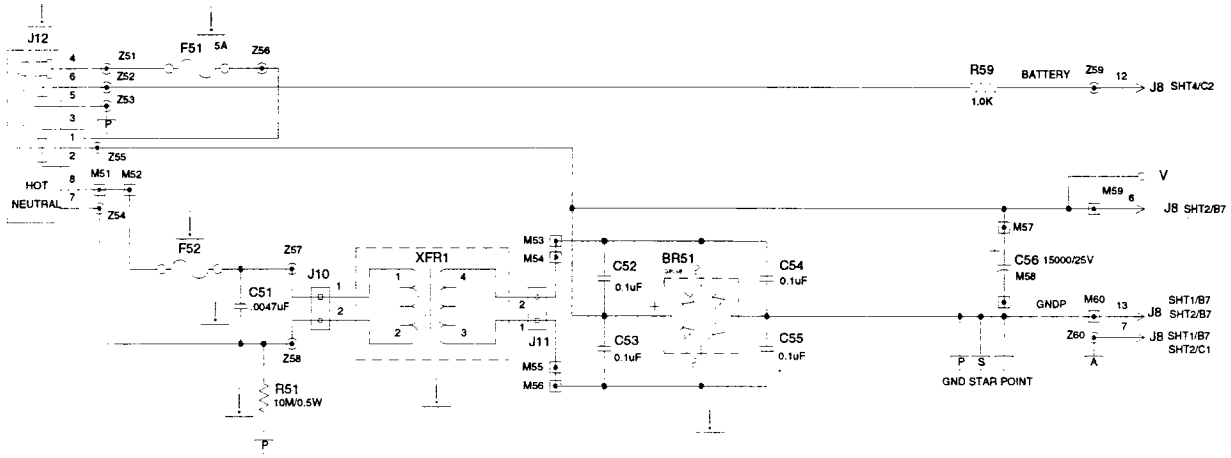
IC LC7821E FUNCTION CHART

(CONTINUED)

No.	Name	I/O		Pin Description		
42	LRSY	O	Output for ROMXA	L/R clock output.		
43	CK2	O		Bit-clock output.	DACLK (at RES).	Polarity inversion (CK2CON mode).
44	ROMXA	O		Data output.	Data (interpolation) (at RES).	ROMOUT (ROMXA mode).
45	C2F	O		C2 Flag output.		
46	MUTEL	O	For 1-bit DAC	Mute output.		
47	LV_{DD}	O		Power source for L channel. Normally 5 V.		
48	LCHP	O		L channel P output.		
49	LSHN	O		L channel N output.		
50	LV_{SS}	O		Ground pin for L channel. Normally 0 V.		
51	RV_{SS}	O		Ground pin for R channel. Normally 0 V.		
52	RCHN	O		R channel N output.		
53	RSHP	O		R channel P output.		
54	RV_{DD}	O		Power source for R channel. Normally 5 V.		
55	MUTER	O		Mute output.		
56	DOUT	O	Digital out output.			
57	SBSY	O	Synchronizing signal output for subcode block.			
58	EFLG	O	Correction monitor for C1, C2, 1-fold, and 2-fold			
59	PW	O	Output for subcodes P, Q, R, S, T, U, W.			
60	SFSY	O	Output for subcode frame synchronizing signal. Stops when subcode enters stand-by.			
61	SBCK	O	Subcode readout clock input. Schmitt input.			
62	FSX	O	Output of 7.3 kHz synchronizing signal via frequency division from crystal oscillator.			
63	WRQ	O	Standby output of subcode Q output.			
64	RWC	I	Read/Write control input.			
65	SQOUT	O	Subcode Q output.			
66	COIN	I	Command input from microprocessor.			
67	CQCK	I	Input of the clock taking in command input, or the clock taking out subcode from SQOUT. Schmitt input.			
68	RES	I	Chip reset input. Set first to "L", when turning power on.			
69	TST11	O	Test output, open (normally "L" output).			
70	LASER	O	Output for laser ON/OFF. Control by serial data command from microprocessor.			
71	16M	O	16.9344 MHz output. However, in 4 x speed playback mode, output is 33.8688MHz.			
72	4.2M	O	4.2336 MHz output.			



120V
or
220-240V
AC IN



Power Supply/Output Schematic Diagram

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SUPPLEMENT

Acoustic Wave® Music System Series III Model CD 3000

The part number for U51, left/right channel output amp, has changed. Part number 180050 has been replaced by part number 250117 power amp, MW15, TDA7375A. Make a note in the Acoustic Wave® Music System Series III Model CD 3000 service manual part number 188188.

Rev. 00 11/99

Supplement
Part Number 188188-S5

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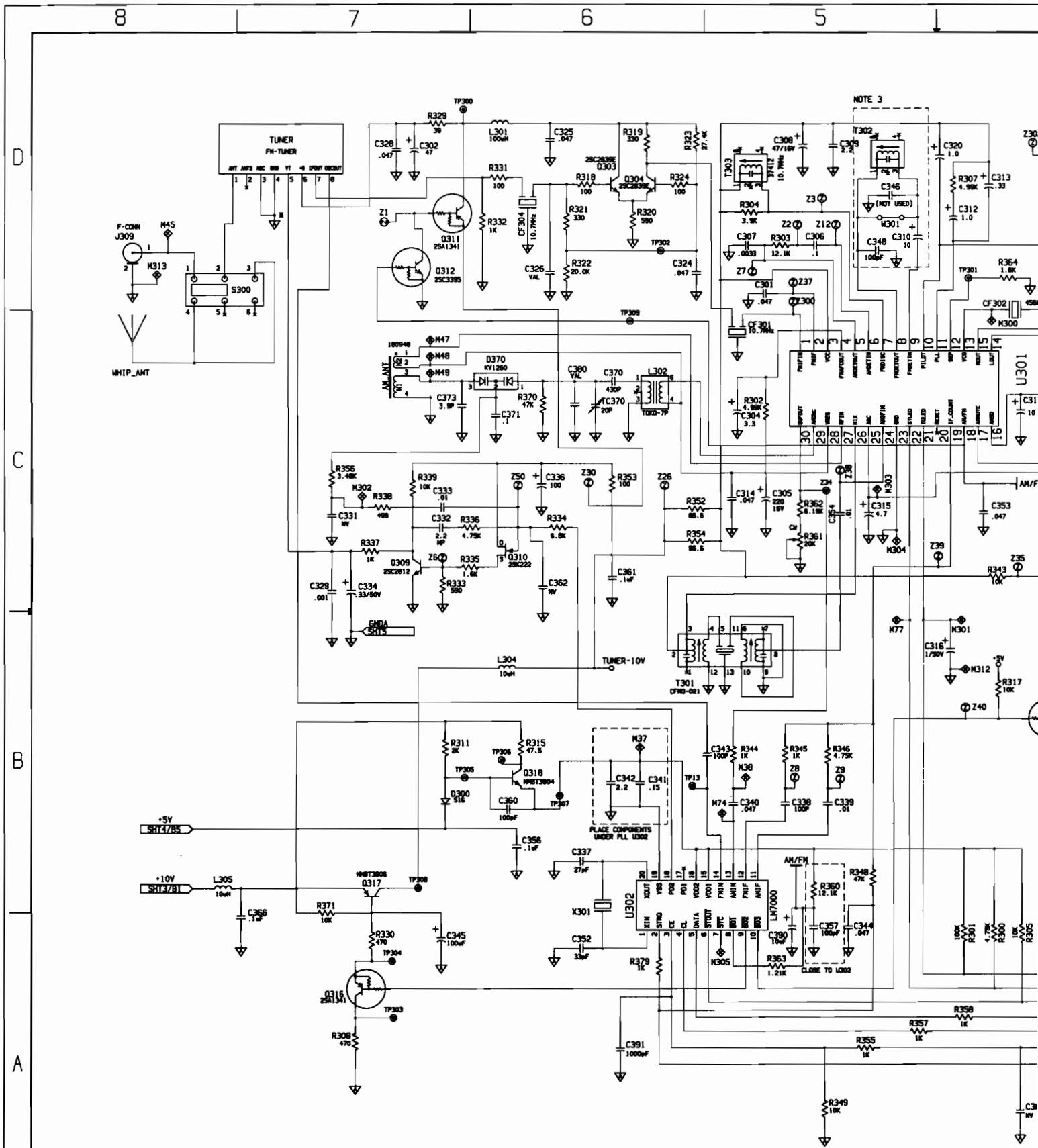
AWMS™ III (CD3000) TROUBLESHOOTING GUIDE

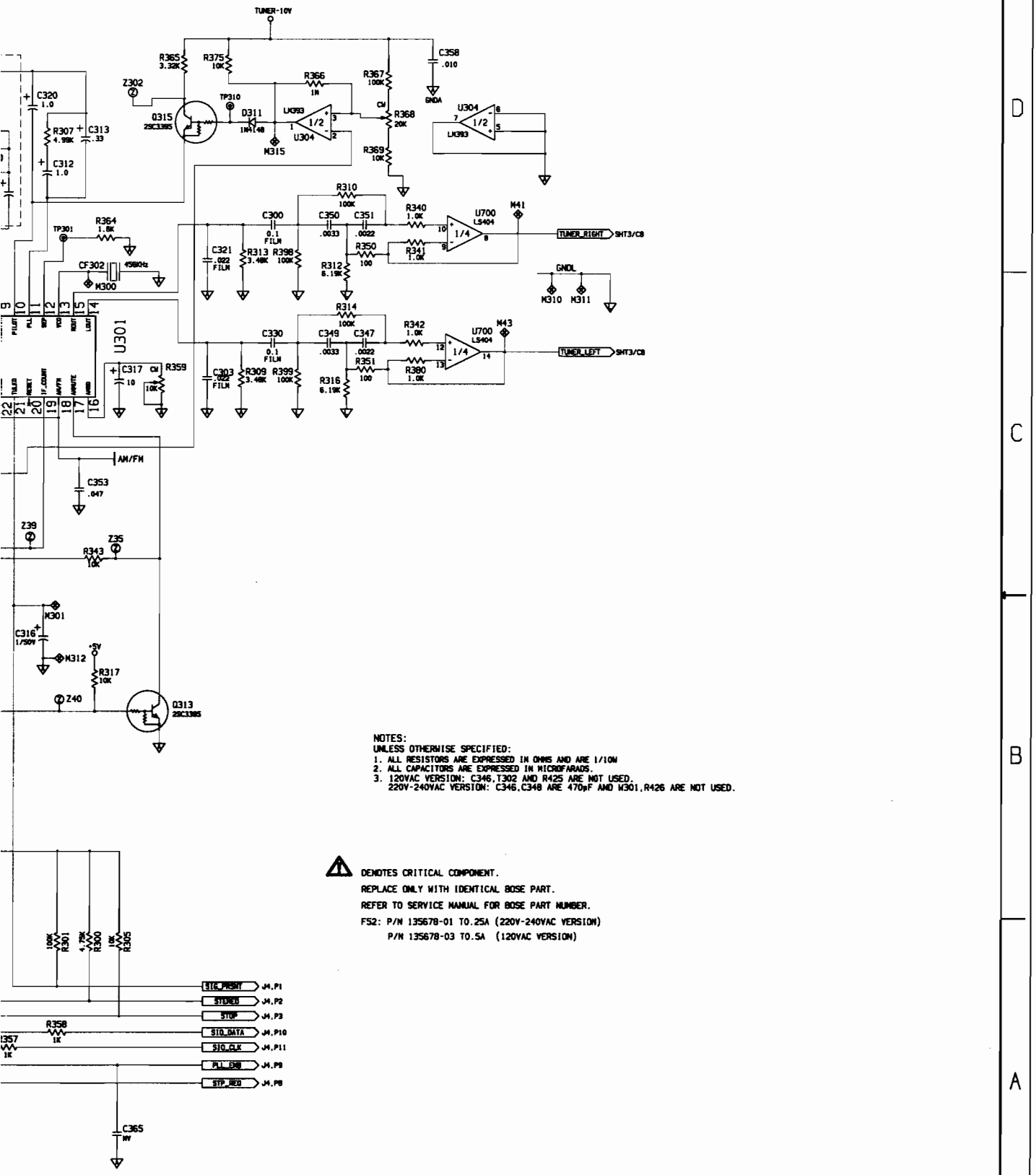
Refer to the AWMS III (CD3000) service manual, part number 188188, for schematics, PCB layouts and part lists.

Symptom	Reason(s)	Action
No audio on AM, FM or CD.	R21 open.	Check R21. Also check Q1, Q2 and Q5 in the +10V supply circuit.
Hum below 91.1MHz of the FM band.	The PLL circuit gain is too high below 91.1MHz.	Remove C334. See service bulletin 188188-B3.
Low frequency hum in the speakers and power supply.	Low/missing voltages.	Check Q2 and Q5.
No audio on AM or FM.	Shield short to the PCB at U302.	Replace U301 and U302.
No AM or FM audio output. Static only. Tuning voltage at pin 5 of the FM tuner does not change. Stereo light on at all times.	Voltage missing at PLL IC U302.	Check for +5V at pins 15 and 16 of U302. Check X301, Q310, Q309 and Q318.
No FM. AM okay. All voltages seem okay.	FM Tuner defective	Replace FM tuner.
Intermittent FM.	FM Tuner defective	Replace FM tuner.
No FM or AM.	Fractured/poor solder at PLL IC U302	Check pin 10 of U302 for fractured or poor solder joints.
Stereo light stays on. AM and FM playback okay.	Defective/damaged 28 pin flex cable.	Replace 28 pin flex cable, part number 180920.
Tuner stays on one frequency. Display changes but station does not change on both AM and FM.	Problem in PLL circuit.	Replace U302, Check crystal X301.
Unit does not read CD.	1. Fractured/poor solder joints on X500. 2. Missing drive voltage for CD motor.	1. Check solder joints on X500. 2. Check for the CD +5Vdc level (VM) at Q6 collector and at U502 pin 1.
CD mechanism spins at high speed:	Defective/damaged cable or failed CD mechanism.	Check the 28 pin flex cable. Replace CD mechanism if necessary.
CD sled all the way out. CD spins.	Missing voltage. Defective/damaged flex cable.	Check for +5Vdc at pin 2 of regulator U3. Check voltages at Q4. Check 28 pin flex cable.
CD spins then stops.	1. Missing/low +5V. 2. CD door assembly damaged/defective.	1. Check outputs of U502 and U503 at P502 and P503. Check R23 and Q7. 2. Replace CD door part number 188249.
CD does not spin.	Missing/low +5V.	Check R23 and voltages at Q7.
CD laser will not turn on.	Missing drive voltage for laser diode.	Check Q501.



CD3000 188188-S1

PCB 186896

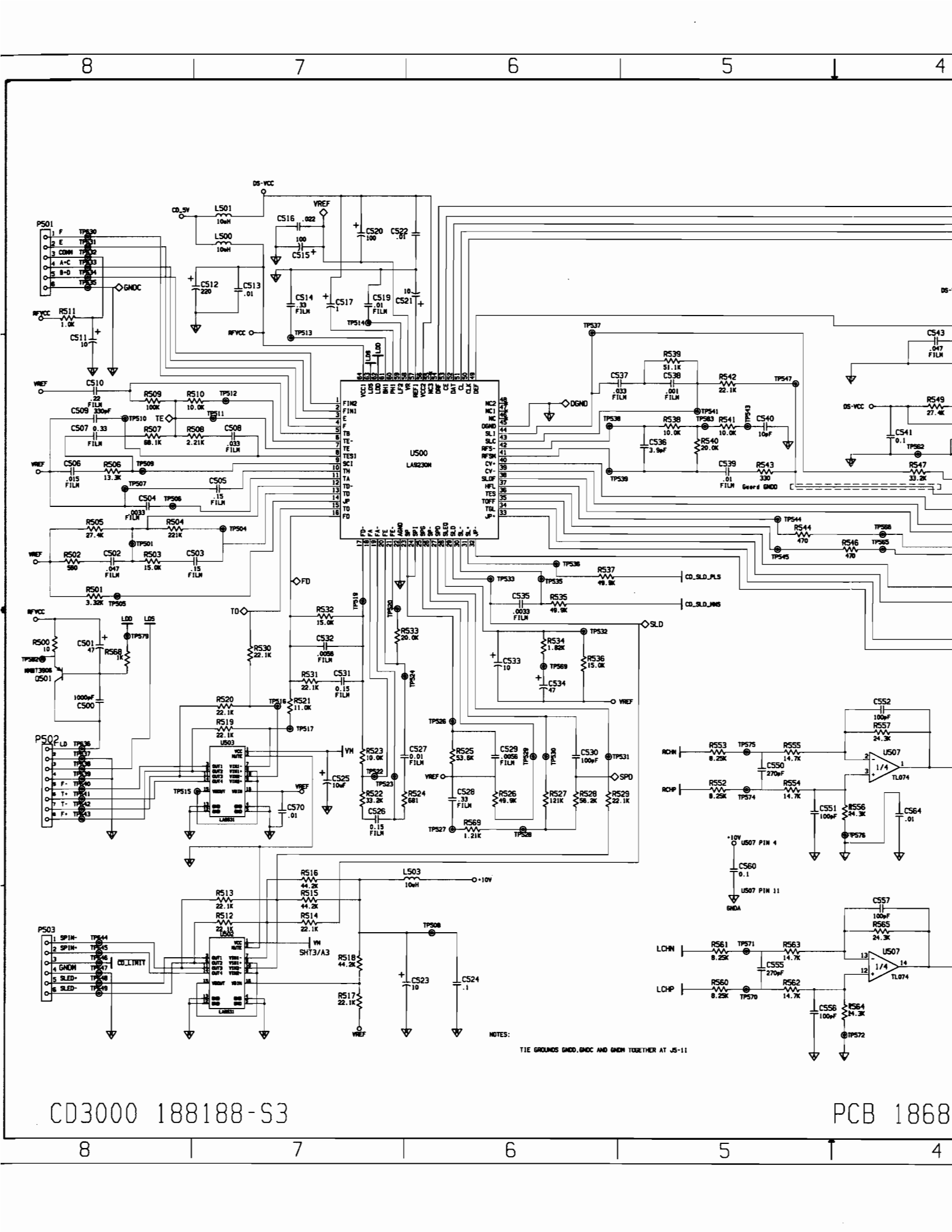


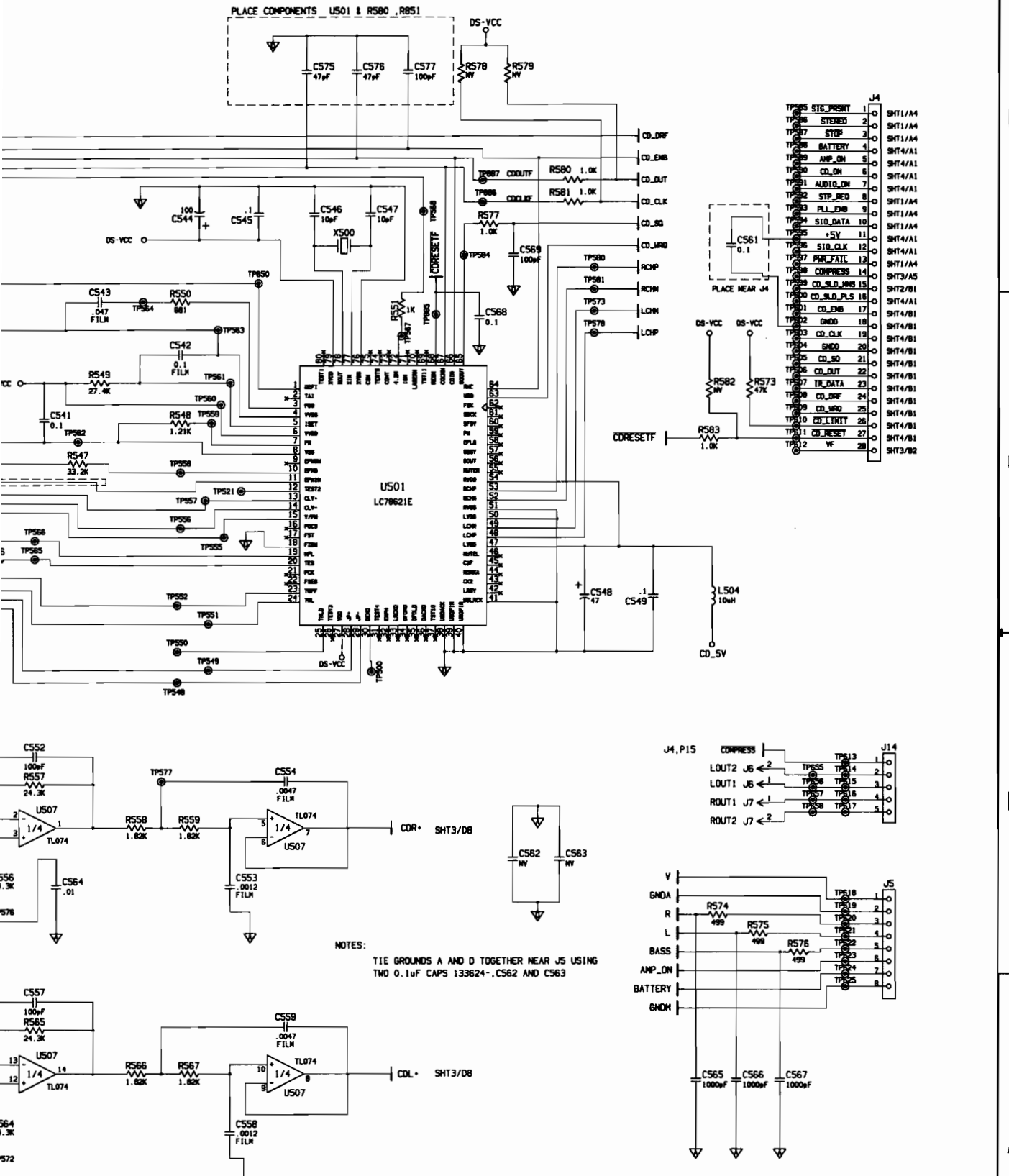
NOTES:
UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTORS ARE EXPRESSED IN OHMS AND ARE 1/10W
2. ALL CAPACITORS ARE EXPRESSED IN MICROFARADS.
3. 120VAC VERSION: C346,T302 AND R425 ARE NOT USED.
   220V-240VAC VERSION: C346,C348 ARE 470pF AND W301,R426 ARE NOT USED.

⚠ DENOTES CRITICAL COMPONENT.
REPLACE ONLY WITH IDENTICAL BOSE PART.
REFER TO SERVICE MANUAL FOR BOSE PART NUMBER.
F52: P/N 135678-01 T0.25A (220V-240VAC VERSION)
P/N 135678-03 T0.5A (120VAC VERSION)

186896

Sheet 1 of 5


8
7
6
5
4
U500
LA9230M
U501
U502
U503
U507
TL074
P501
P502
P503
Q501
NOTES:
TIE GROUNDS GNDD,GNDC AND GNDM TOGETHER AT J5-11
CD3000 188188-S3
PCB 1868



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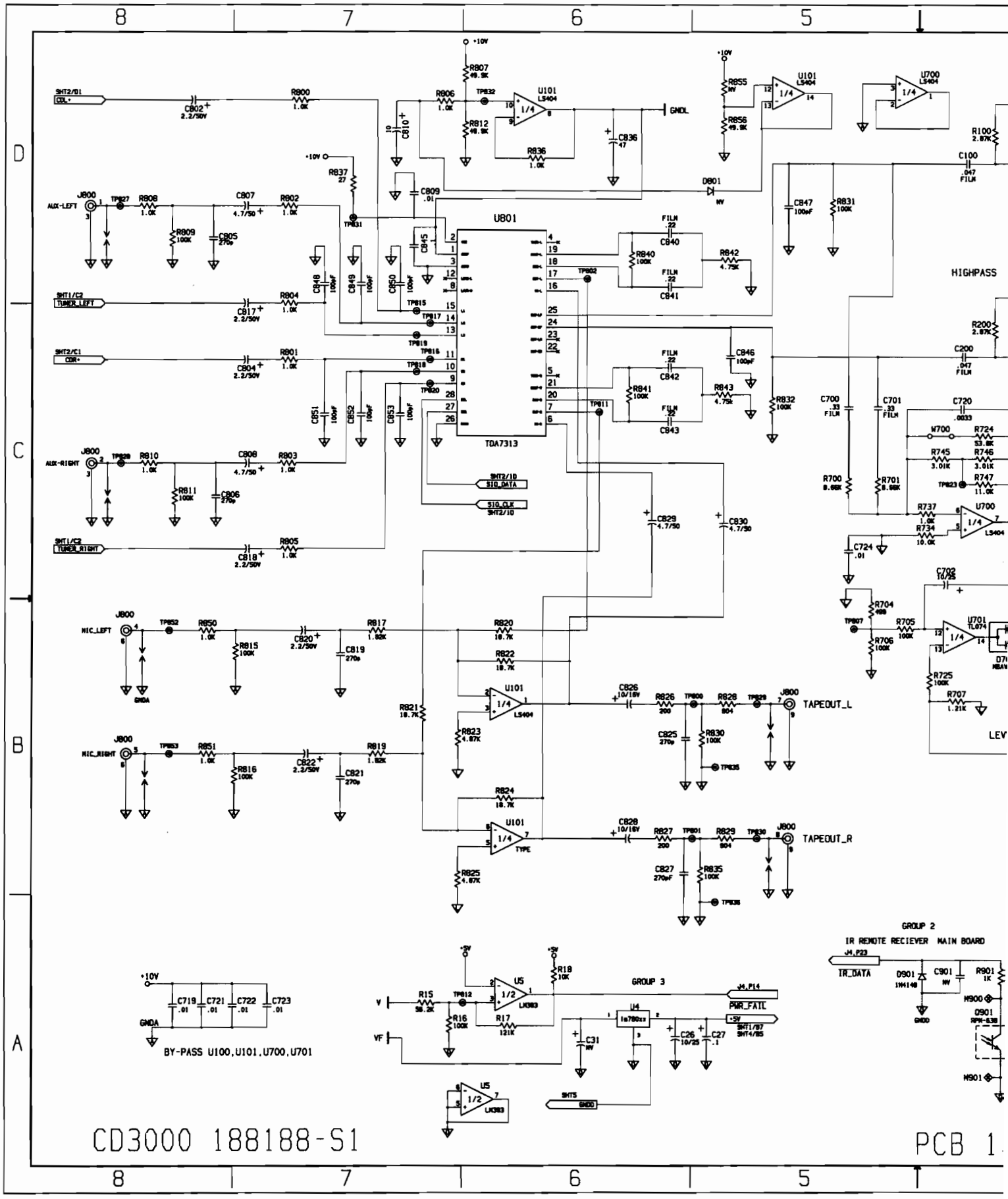
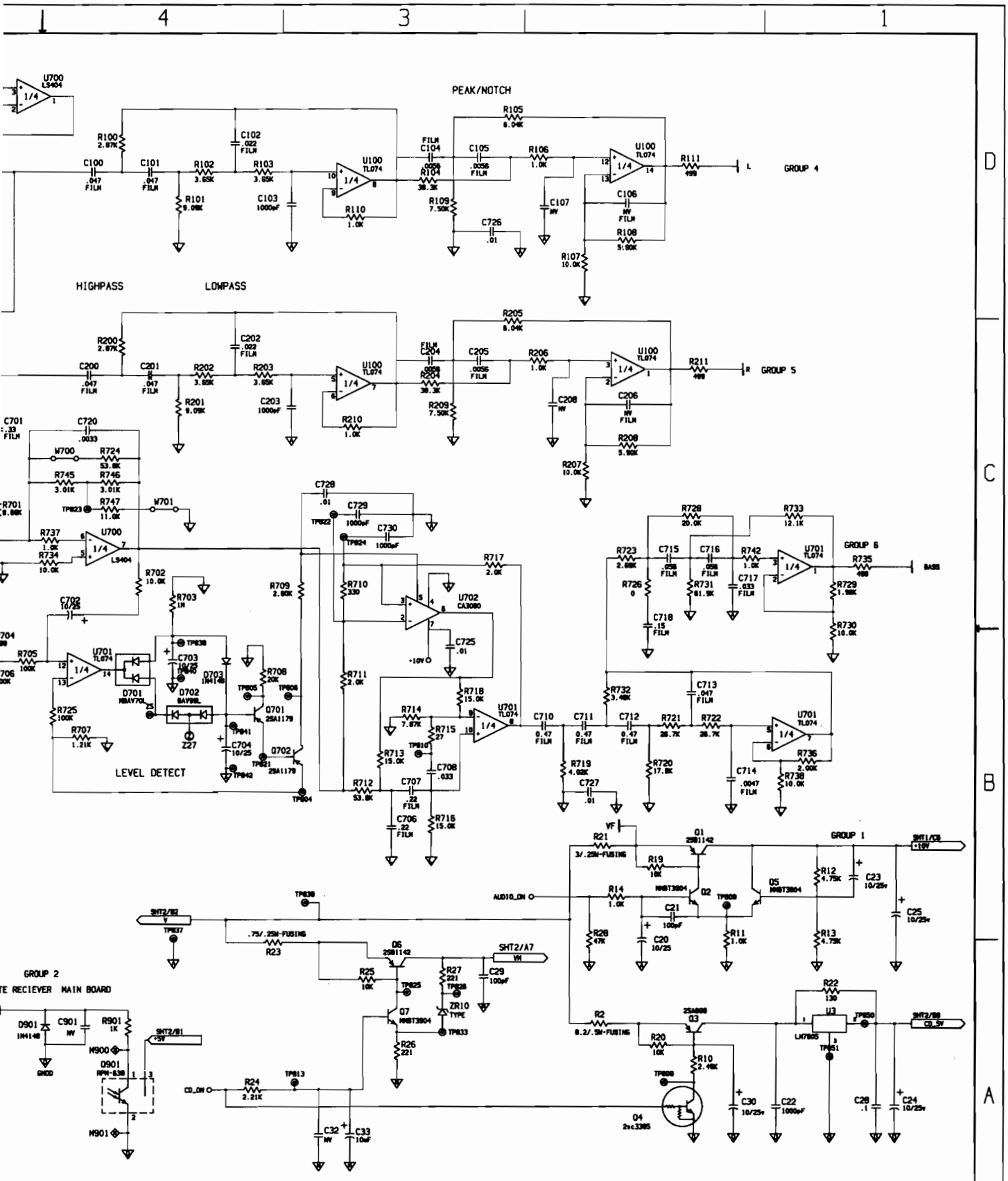

8
7
6
5
D
C
B
A
U801
TDA7313
HIGHPASS
AUX-LEFT
AUX-RIGHT
TUNER_LEFT
TUNER_RIGHT
MIC_LEFT
MIC_RIGHT
TAPEOUT_L
TAPEOUT_R
BY-PASS U100,U101,U700,U701
GROUP 2
IR REMOTE RECIEVER MAIN BOARD
IR_DATA
GROUP 3
PWR_FAIL
CD3000 188188-S1
PCB 1



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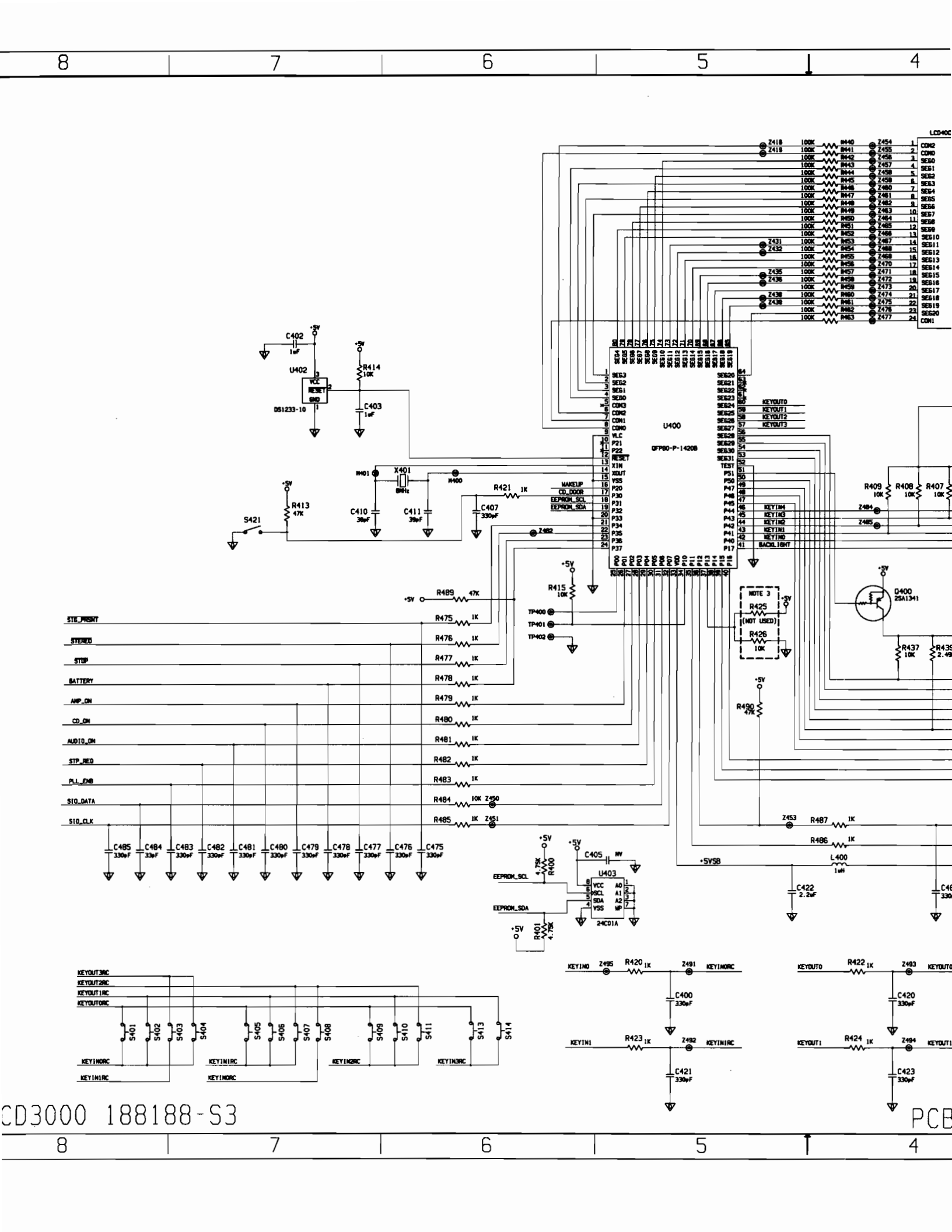
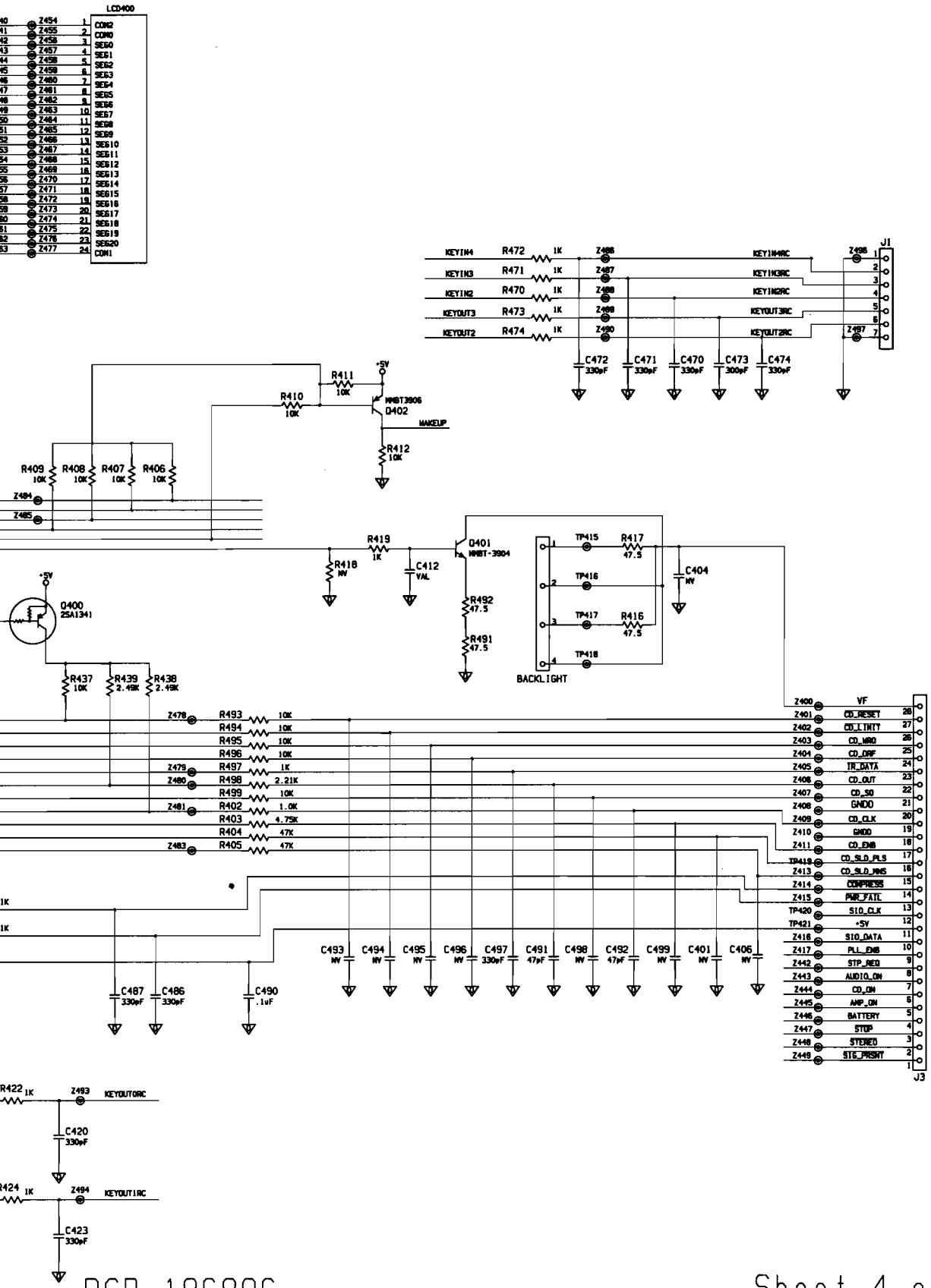
Sheet 3 of 5



CD3000 188188-S3

PCB



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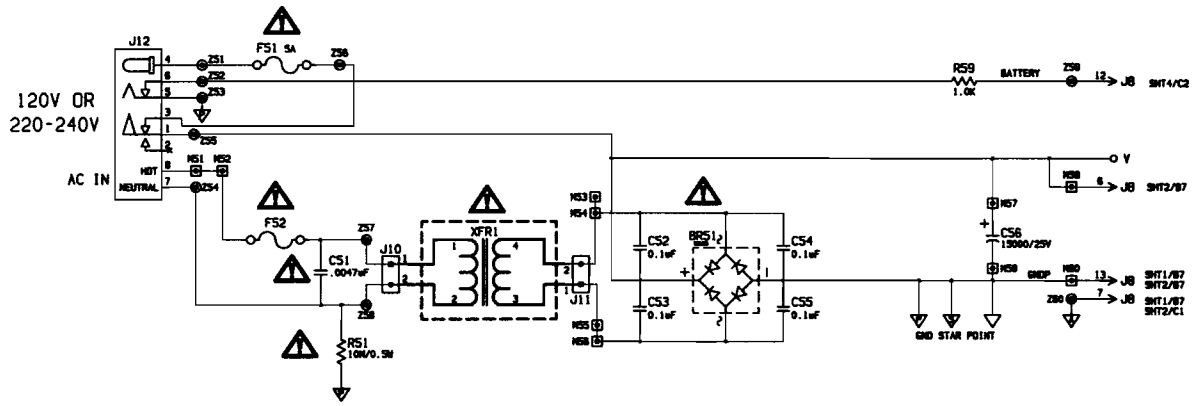
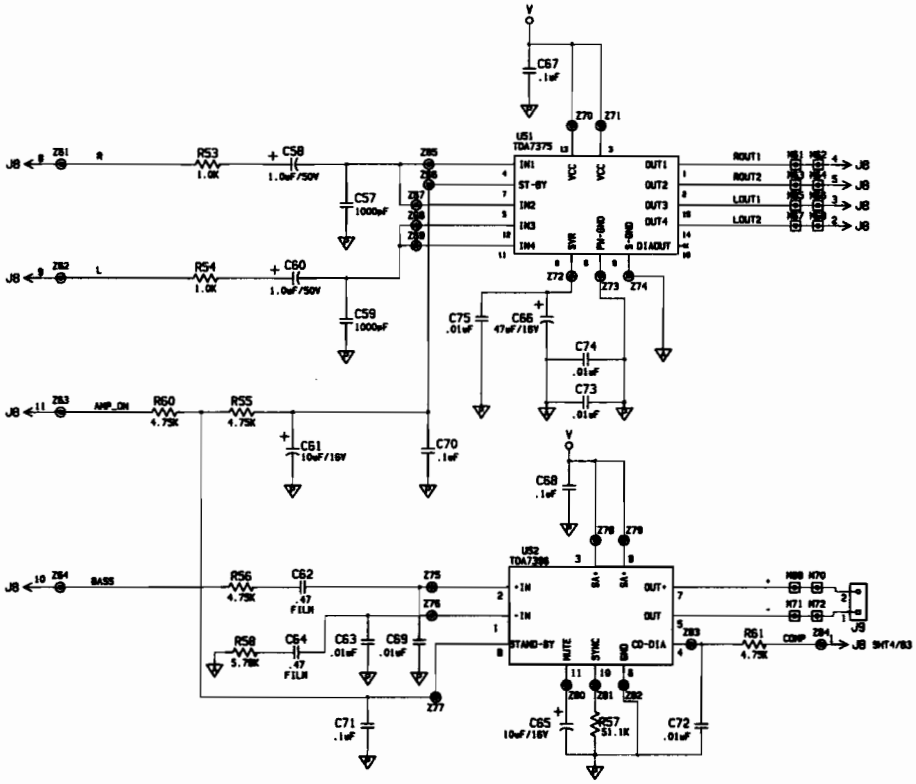
Sheet 4 of 5



CD3000 188188-S3

PCB 1



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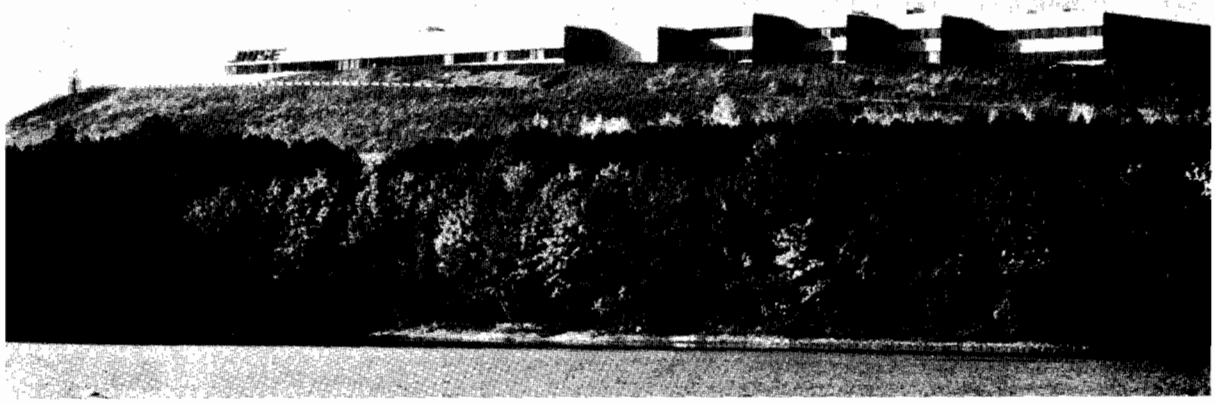

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

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THE MOUNTAIN
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