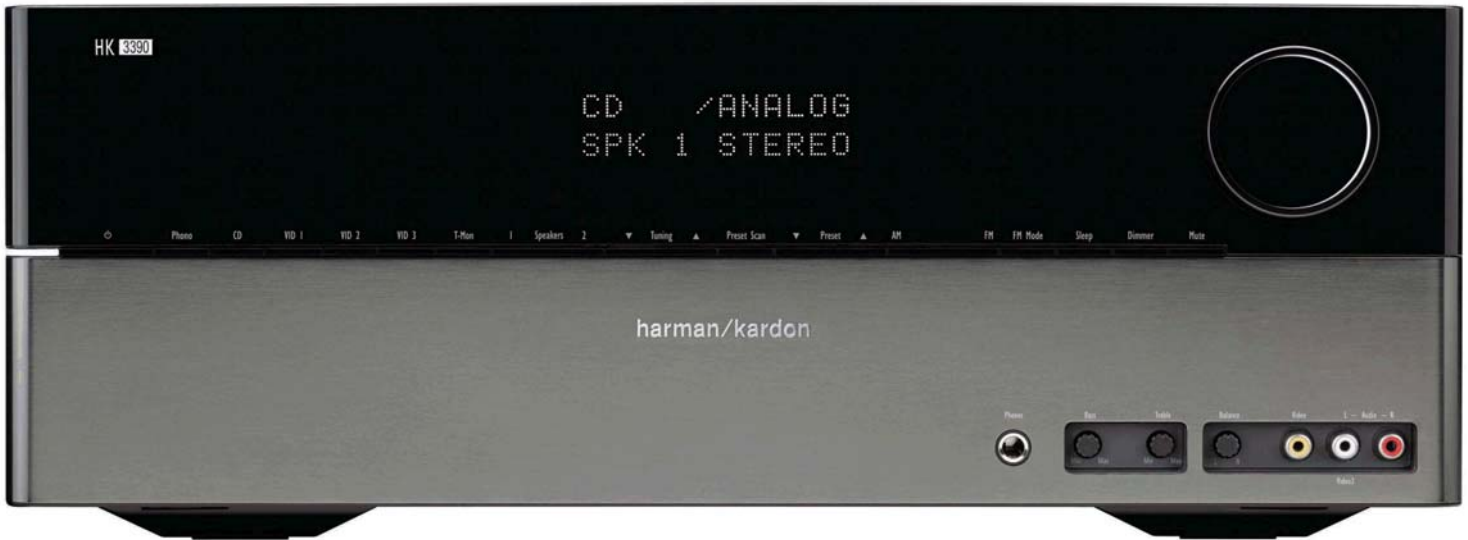


harman/kardon

# HK3390 STEREO RECEIVER

## SERVICE MANUAL



### CONTENTS

ESD WARNING.....	2	DISASSEMBLY.....	23
LEAKAGE TESTING.....	3	UNIT EXPLODED VIEW.....	26
BASIC SPECIFICATIONS.....	4	EXPLODED VIEW PARTS LIST.....	27
PACKAGING.....	5	AMP BIAS ADJUSTMENT.....	28
FRONT PANEL CONTROLS.....	6	BLOCK DIAGRAM.....	29
REAR PANEL CONNECTIONS.....	8	PCB DRAWINGS.....	30
REMOTE CONTROL FUNCTIONS.....	10	ELECTRICAL PARTS LIST.....	36
CONNECTIONS/INSTALLATION.....	12	SEMICONDUCTOR PINOUTS.....	53
OPERATION.....	18	SCHEMATICS.....	71
TROUBLESHOOTING GUIDE.....	22	WIRING DIAGRAM.....	74
PROCESSOR RESET.....	22		

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## ELECTROSTATICALLY SENSITIVE (ES) DEVICES

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field effect transistors and semiconductor "chip" components.

The following techniques should be used to help reduce the incidence of component damage caused by static electricity.



1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge build-up or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charge sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material.)
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

**CAUTION** : Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES devices.

## PRODUCT SAFETY NOTICE

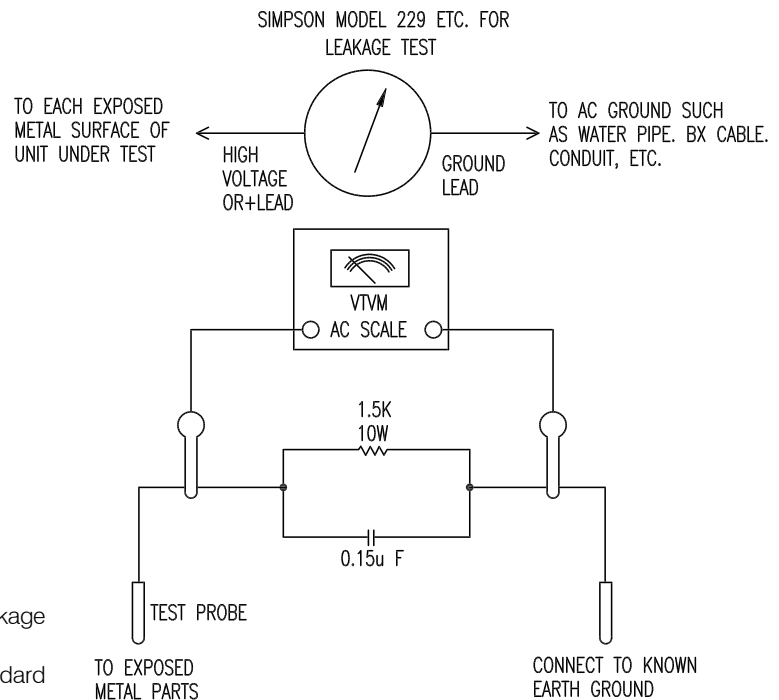
Each precaution in this manual should be followed during servicing.

Components identified with the IEC symbol  in the parts list are special significance to safety. When replacing a component identified with , use only the replacement parts designated, or parts with the same ratings or resistance, wattage, or voltage that are designated in the parts list in this manual. Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

## LEAKAGE TEST(FOR SERVICE ENGINEERS IN THE U.S.A)

Before returning the unit to the user, perform the following safety checks :

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the unit.
2. Be sure that any protective devices such as nonmetallic control knobs, insulating fish-papers, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacity networks, mechanical insulators, etc. Which were removed for the servicing are properly re-installed.
3. Be sure that no shock hazard exists ; check for leakage current using Simpson Model 229 Leakage Tester, standard equipment item No. 21641, RCA Model WT540A or use alternate method as follows : Plug the power cord directly into a 120 volt AC receptacle (do not use an Isolation Transformer for this test). Using two clip leads, connect a 1500 ohms, 10watt Resistor paralleled by a 0.15uF capacitor, in series with all exposed metal cabinet parts and a known earth ground, such as a water pipe or conduit. Use a VTVM or VOM with 1000 ohms per volt, or higher sensitivity to measure the AC voltage drop across the resistor. (See diagram) Move the resistor connection to each exposed metal part having a return path to the chassis (antenna, metal, cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor. (This test should be performed with the 0.35 volt RMS or more is excessive and indicates a potential shock hazard which must be corrected before returning the unit to the owner.



# HK 3390 TECHNICAL SPECIFICATIONS

## Audio Section

Stereo Mode:

Continuous Average Power (FTC):

80 Watts per channel, 20Hz – 20kHz,  
@ <0.07% THD, both channels driven into 8 ohms  
100 Watts per channel, 20Hz – 20kHz  
@ <0.2% THD, both channels driven into 4 ohms

Input Sensitivity/Impedance

Linear (High-Level): 200mV/47k ohms

Signal-to-Noise Ratio (IHF-A): 95dB

Frequency Response @ 1W (+0dB, -3dB): 10Hz – 110kHz

High Instantaneous Current Capability (HCC): ±42 Amps

Transient Intermodulation

Distortion (TIM): Unmeasurable

Rise Time: 16 µsec

Slew Rate: 40V/µsec

## FM Tuner Section

Frequency Range: 87.5 – 108.0MHz  
Usable Sensitivity: IHF 1.12µV/13.5dBf  
Signal-to-Noise Ratio: Mono/Stereo 73/72dB  
Distortion: Mono/Stereo 0.3/0.4%  
Stereo Separation: 40dB @ 1kHz  
Selectivity: ±400kHz, 65dB  
Image Rejection: >80dB  
IF Rejection: >100dB  
Tuner Output Level: 1kHz, ±100kHz, Dev 500mV

## AM Tuner Section

Frequency Range: 520 – 1720kHz  
Signal-to-Noise Ratio: >40dB  
Usable Sensitivity: Loop 500µV/M  
Distortion: 1kHz, 50% Mod 0.8%  
Selectivity: ±10kHz, >25dB

## Video Section

Television Format: NTSC/PAL/SECAM  
Signal Format: Composite  
Input Level: 1Vp-p  
Input Impedance: 75 Ohms, unbalanced  
Sync Polarity: Negative  
Output Level: 1Vp-p  
Output Impedance: 75 Ohms, unbalanced  
Video Frequency Response: 10Hz – 10MHz

## General

Power Requirement: AC 120V/60Hz  
Power Consumption: 3W standby, 200W maximum  
(both channels driven)

Dimensions:	(Product)	(Shipping)
Width:	17.3" (440mm)	22" (560mm)
Height:	6.6" (168mm)	10.6" (270mm)
Depth:	15" (382mm)	18.3" (465mm)
	(Product)	(Shipping)
Weight:	20.9 lb (9.5kg)	25.1 lb (11.4kg)

Depth measurement includes knobs, buttons and terminal connections.

Height measurement includes feet and chassis.

All features and specifications are subject to change without notice.

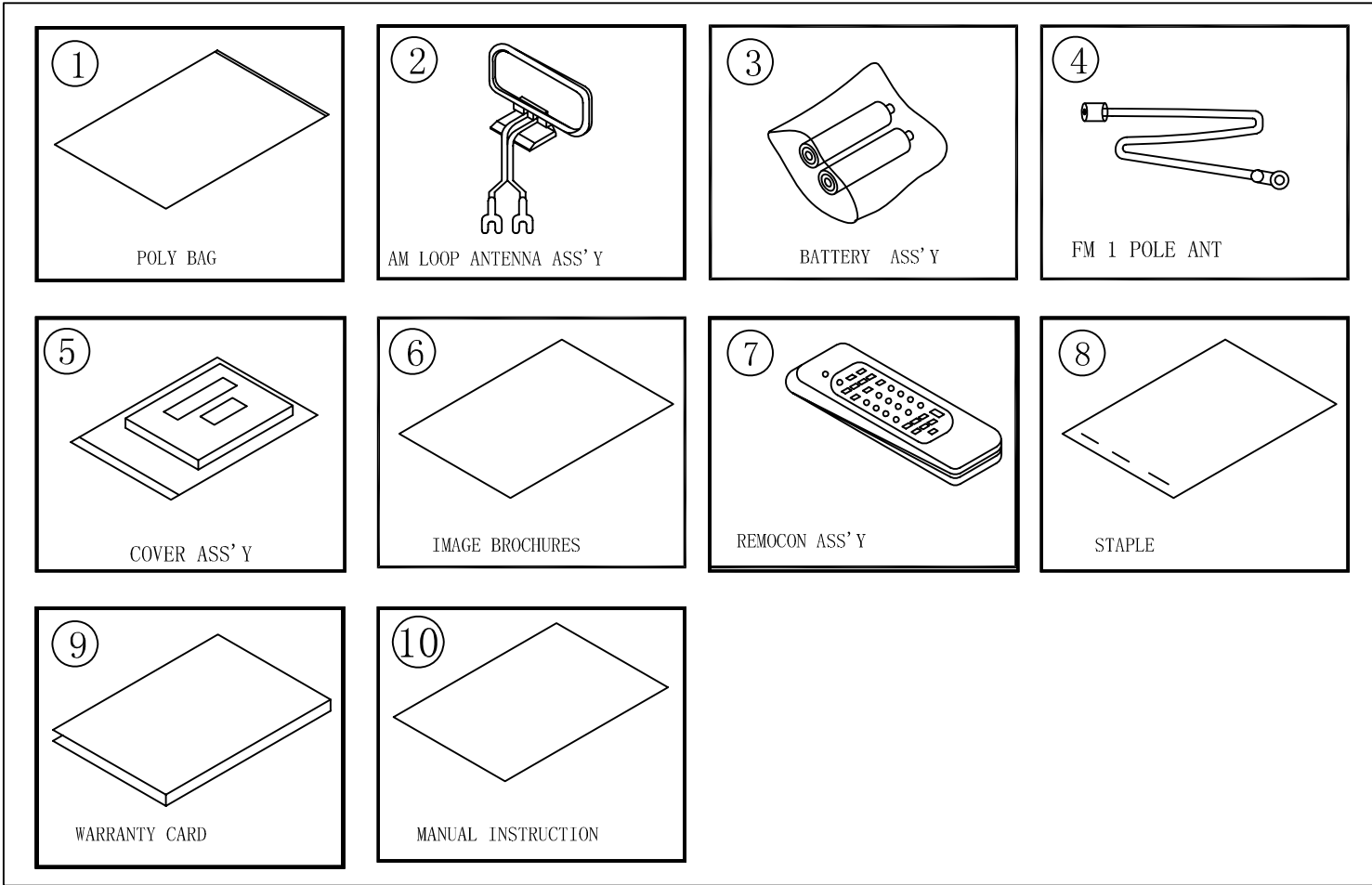
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CEA is a registered trademark of the Consumer Electronics Association.

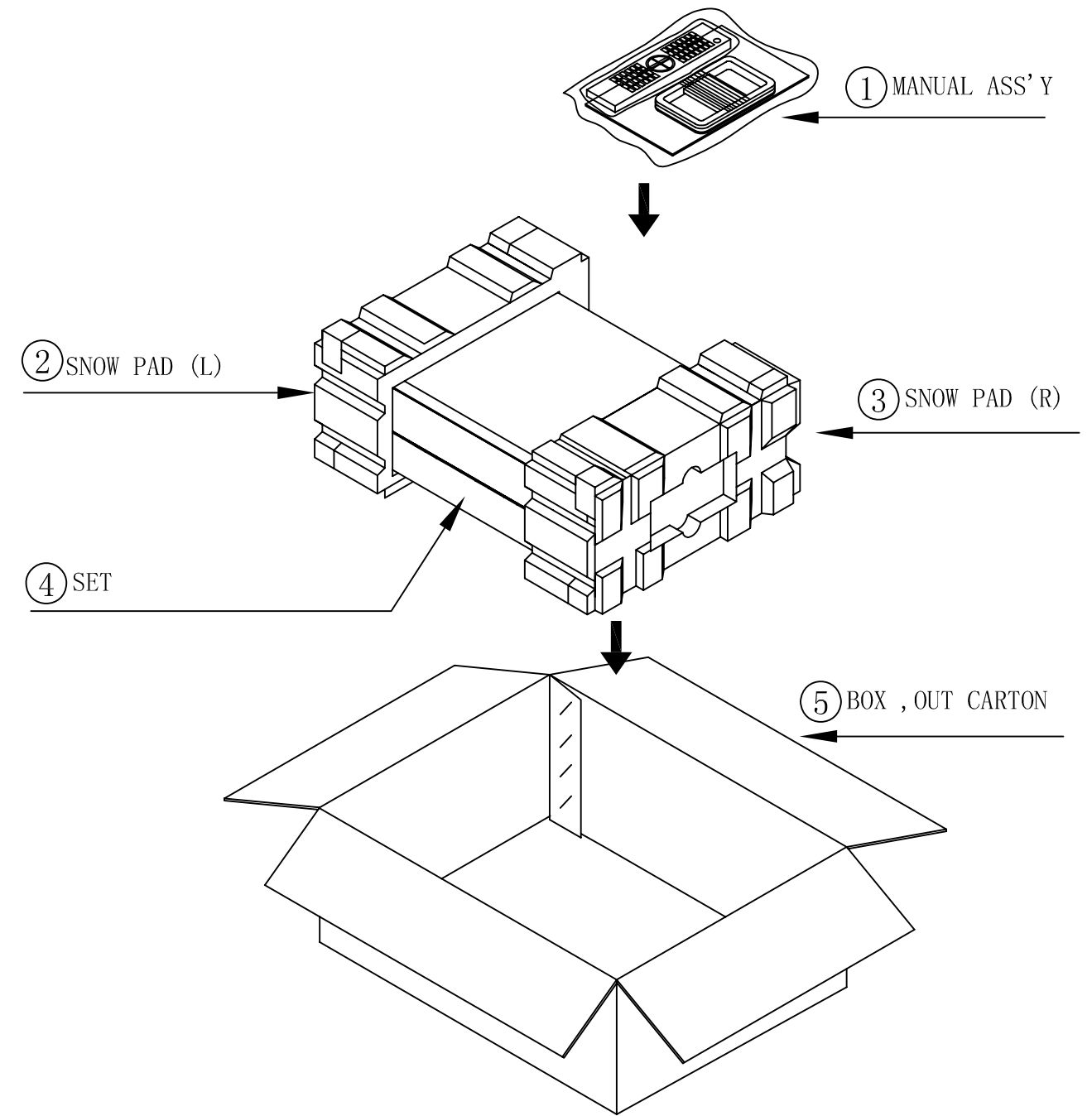
iPod is a registered trademark of Apple Inc., registered in the U.S. and other countries. iPhone is a trademark of Apple Inc.

Please register your product on our Web site at [www.harmankardon.com](http://www.harmankardon.com). Note: You'll need your serial number. At the same time, you can choose to be notified about our new products and/or special promotions.

# 1. Instruction manual ass'y - Accessories



# 2. Package Drawing



ACCESSORY-1			
NO	DESCRIPTION	PARTS NO.	Q, ty
1	POLY BAG		1
2	AM LOOP ANTENNA ASS' Y	CSA1A027Z	1
3	BATTERY		2
4	FM 1 POL ANT	CSA1A019Z	1
5	COVER ASS' Y	CGRHK3390ZA	1
	1 COVER A	CGR1A445	1
	2 COVER B	CGR1A446	1
	3 ORNAMENT , AL A	CGX1A391C66	1
	4 ORNAMENT , AL B	CGX1A392C66	1
	5 SHEET, FRONT COVER	CQE1A392Z	1
	6 PAD , COVER	CPS1A676	1
	7 BAG , POLY		1
6	IMAGE BROCHURES		1
7	REMOCON ASS' Y	CARTHK3390	1
8	STAPLE		3
9	WARRANTY CARD	CQE1A172X	1
10	MANUAL, INSTRUCTION	visit <a href="http://www.harmanardon.com">www.harmanardon.com</a>	1

NO	DESCRIPTION	PARTS NO.	Q, ty
1	ACCESSORY-1		1
2	SNOW, PAD(L)	CPS5A564	1
3	SNOW, PAD(R)	CPS5A565	1
4	<b>HK3390</b>	<b>HK 3390</b>	1
5	BOX, OUT CARTON	CPG1A743R	1

# FRONT-PANEL CONTROLS

**Power Indicator:** This LED has two modes. When power is turned off, the LED is amber to indicate that the receiver is plugged in and ready to be turned on. When the receiver is turned on, the LED turns white.

**Power Switch:** This electrical switch turns the receiver on for playback, or leaves it in Standby mode for quick turn-on using the remote control.

**Phono Source Selector:** Press this button to select a turntable connected to the Phono Inputs as the source.

**CD Source Selector:** Press this button to select the device connected to the CD Inputs as the source.

**Video Source Selectors:** Press any of these buttons to select the device connected to the corresponding Audio and Video Inputs for playback. Remember to turn on the source device, to connect the Video Monitor Output to your video display and to turn on your video display and select the correct Video Input.

**NOTE:** The Video 3 source device may be connected to either the front- or rear-panel connectors. To select the desired device, press the Video 3 Source Selector repeatedly. The VIDEO 3 message indicates that the rear-panel inputs are active, and the VIDEO F message indicates the front-panel inputs have been selected.

**Tape Source Selector:** Press this button to select the device connected to the Tape/CDR Audio Inputs as the source. If you are making a recording using a three-head tape deck or another unit with off-head playback, the T-MON message in the Message Display will flash when the recording is being monitored.

**Speaker 1/2:** Press the left side of this button to enable the HK 3390 to output audio to the speakers connected to the Speaker 1 Outputs, and press the right side of the button to enable the Speaker 2 Outputs. You may enable or disable both sets of speaker outputs simultaneously. This feature is a convenient way of hearing audio in more than one room at a time, although the same source material will be played through both sets of speakers.

**Message Display:** Various messages appear in this display in response to commands.

**Tuning:** Press either side of this button to tune a radio station. Tap the button briefly to tune one frequency step at a time, or press and hold the button to seek the next frequency with an acceptably strong signal.

**Preset Scan:** Press this button once to scan through the stations you have previously programmed as presets. Each station will play for five seconds before the tuner skips to the next preset station. Press the button a second time to select the current station. If no presets have been programmed, the 0 PRESET message will be displayed.

**Preset Stations:** Press this button to select a preset radio station. If no presets have been programmed, the 0 PRESET message will be displayed.

**Tuner Band:** Press this button to select the tuner as the source, or to select the AM (left side of button) or FM (right side of button) band.

**FM Mode:** This button toggles between Stereo and Mono modes when an FM station is tuned. Mono mode may improve reception of weaker signals.

**Sleep:** Press this button to activate the sleep timer, which shuts off the receiver after a programmed period of time up to 90 minutes.

**Dimmer:** Some people find the front-panel display distracting. Press this button once to dim the displays to half-brightness, and a second time to turn the displays completely off. The Power Indicator will always remain lit to remind you that the receiver is turned on. Press the button a third time to return the display to normal brightness. This setting is canceled when the unit is turned off.

**Mute:** Press this button to mute the HK 3390's speaker and headphone outputs temporarily. To end the muting, press this button or adjust the volume. Muting is also canceled when the receiver is turned off.

**Volume Control:** Turn this knob to raise or lower the volume, which will be shown in decibels (dB) in the Message Display.

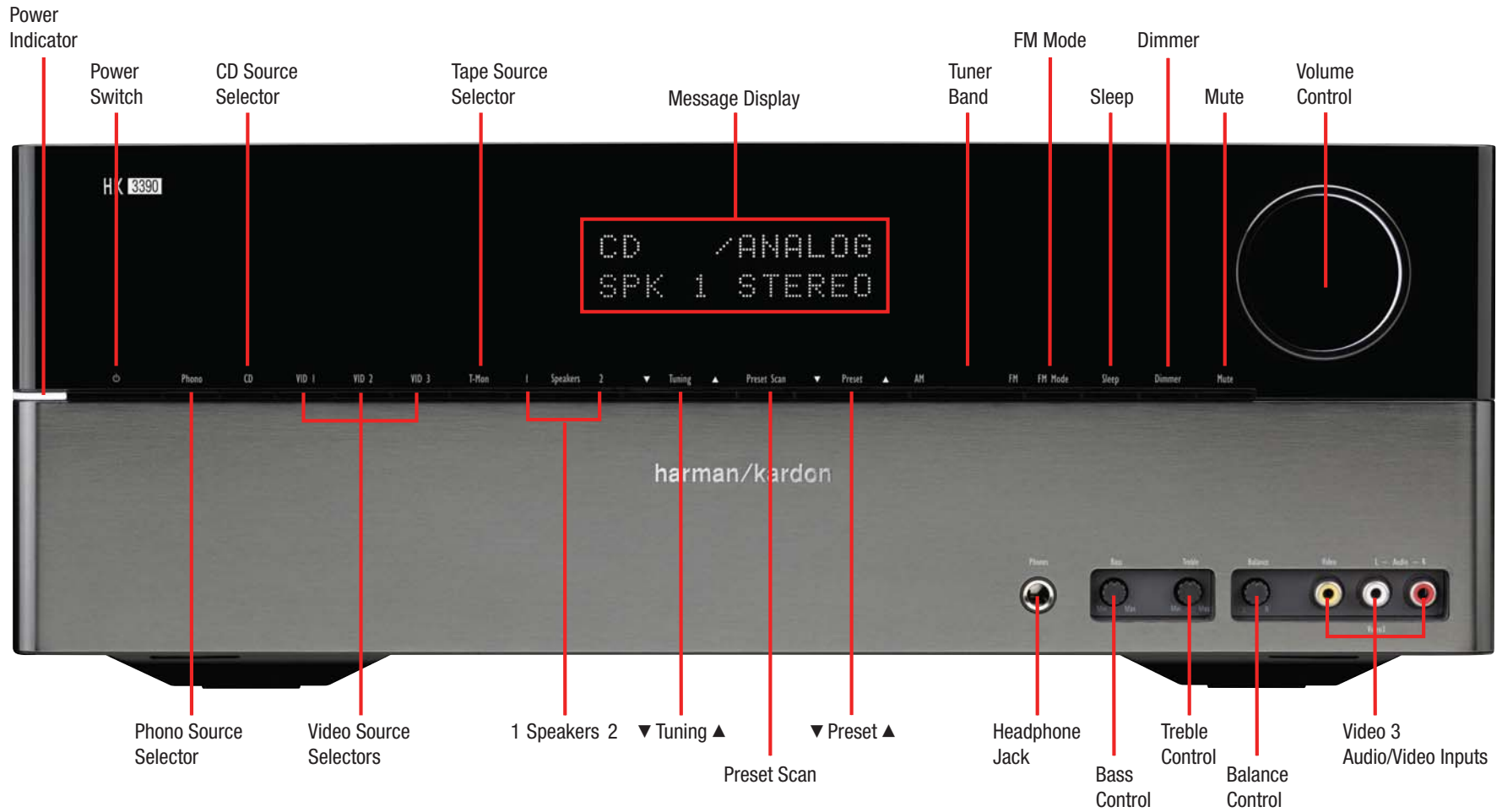
**Headphone Jack:** Plug a 1/4" headphone plug into this jack for private listening.

**Bass Control:** Turn the knob clockwise to boost low-frequency output by up to 10dB, or counterclockwise to cut low-frequency output by up to 10dB. Set the control to suit your taste and room acoustics.

**Treble Control:** Turn the knob clockwise to boost high-frequency output by up to 10dB, or counterclockwise to cut high-frequency output by up to 10dB. Set the control to suit your taste and room acoustics.

**Balance Control:** Turn the knob to adjust the relative volume of the left and right channels, which affects imaging and can compensate for room characteristics.

**Video 3 A/V Inputs:** Connect a source component that will only be used temporarily to these jacks, such as a camera or game console, or connect an iPod using the supplied audio/video cable.



**NOTE:** To make it easier to follow the instructions throughout the manual that refer to this illustration, a copy of this page may be downloaded from the Product Support section at [www.harmankardon.com](http://www.harmankardon.com).

# REAR-PANEL CONNECTIONS

**AM and FM Antenna Terminals:** Connect the included AM and FM antennas to their respective terminals for radio reception.

**Video 1, Video 2 and Video 3 Audio/Video Inputs:** These jacks may be used to connect your video-capable source components (e.g., VCR, DVD player, cable TV box) to the receiver.

**NOTE:** The Video 3 source has inputs on both the front and rear panels of the HK 3390, and you may connect different devices to each set of inputs. To select between the two sets of inputs, press the Video 3 Source Selector repeatedly. When VIDEO 3 appears in the Message Display, the device connected to the rear panel has been selected. When VIDEO F appears, the device connected to the front panel has been selected.

**Video 1 Audio/Video Outputs:** These jacks may be used to connect your VCR or another recorder.

**Video Monitor Output:** If some of your sources use video connections, connect the Video Monitor Output to the corresponding input on your television or video display to view the sources. No video signal will be available when an audio-only source input, such as CD or Tape, is selected.

**Remote Infrared (IR) Input and Output:** When the remote IR receiver on the front panel is blocked, such as when the HK 3390 is placed inside a cabinet, connect an optional IR receiver to the Remote IR Input jack for use with the remote control. The Remote IR Output may be connected to the Remote IR Input of a compatible source device (or other product) to enable remote control through the HK 3390. When several source devices are used, connect them in "daisy chain" fashion.

**AC Power Cord:** After you have made all other connections, plug the AC power cord into an unswitched outlet.

**Switched AC Accessory Outlets:** You may plug the AC power cord of one source device into each of these outlets, and it will turn on whenever you turn on the receiver. Do not use sources that consume more than 100 watts of power per outlet.

**Speaker 1 and 2 Outputs:** Use two-conductor speaker wire to connect each set of terminals to the correct speaker. Observe the correct polarity (positive and negative connections). Always connect the positive lead to the red or white terminal on the receiver and the red terminal on the speaker. Connect the negative lead to the black terminal on both the receiver and the speaker. Use the Speaker 1/2 Selectors on the front panel or remote to select either or both pairs of speakers for playback.

**Subwoofer Outputs:** If you have a powered subwoofer, connect these jacks to the line-level inputs on the subwoofer. The same full-range signal is output through both jacks. Thus, you have the option of connecting each jack to the line-level input on a separate subwoofer, or to use these full-range outputs to feed a remote room in a distributed-audio application. If you have only one subwoofer with a single line-level input, connect it to the right Subwoofer Output on the HK 3390.

**Subwoofer Trigger Outputs:** Connect these outputs to a compatible trigger input on the subwoofer connected to the Subwoofer Output immediately to the right of the Trigger Output. Consult the owner's manual for the subwoofer to set its trigger input correctly, and the subwoofer will automatically turn on or off when the HK 3390 is turned on or off. In addition, the Trigger Outputs are used with the Subwoofer Link Switches to conserve energy by powering off the subwoofer's amplifier when it is not needed. The Subwoofer Trigger Outputs send a signal of 15 volts DC.

**Subwoofer Link Switches:** Each switch affects the subwoofer connected to the jack immediately to the left of the switch. To use the switch, first connect the corresponding Subwoofer Trigger Output to a compatible trigger input on the subwoofer, and make sure the subwoofer's instructions are followed to activate its trigger input. When the Link Switch is on, the HK 3390 will remove the trigger signal whenever the corresponding pair of main speakers are not in use, thereby conserving energy that would otherwise be used to maintain the subwoofer's amplifier in standby mode. This feature is activated any time no signal is present at the main speaker outputs, including when the Speaker 1/2 Switch turns off both speaker pairs, when the HK 3390's output is muted, or when the headphones are plugged in. See Table A2 in the appendix for details.

**Main-Amp Inputs and Preamp Outputs:** These jacks are normally connected directly to each other with an included jumper. Some devices, such as equalizers and some loudspeaker systems, require connection between the Preamp Outputs and Main-Amp Inputs, in which case the jumpers should be removed and stored in a safe place for future use. You may also remove the jumpers if you wish to connect the Preamp Outputs to an external amplifier, or if you wish to connect another device's line-level output directly to the HK 3390's power amplifier for a special application.

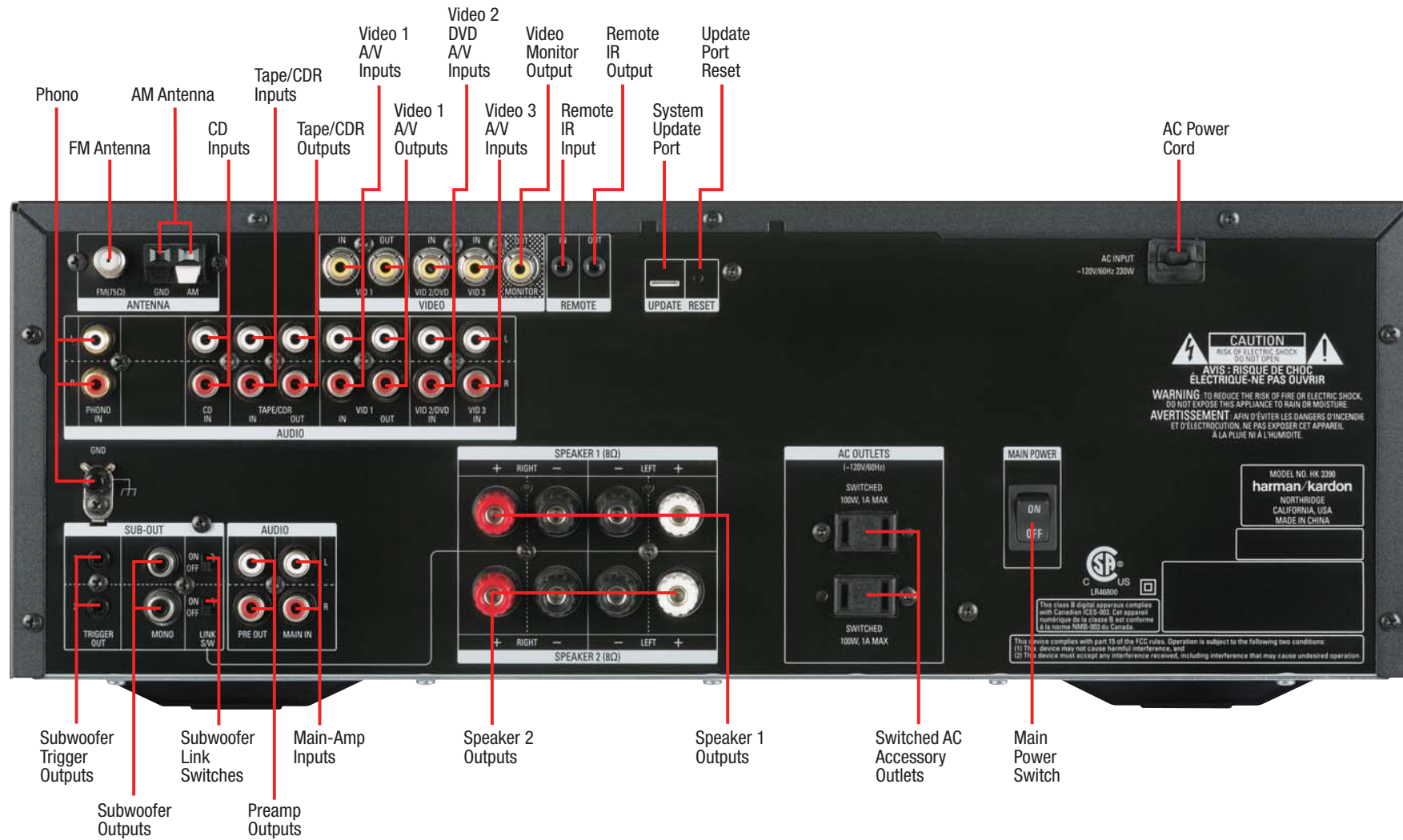
**Tape Outputs:** These jacks may be used to connect your CDR or another audio-only recorder.

**CD and Tape Inputs:** These jacks may be used to connect your audio-only source components (e.g., CD player, tape deck). Do not connect a turntable to these jacks unless you are using the turntable with a phono preamp. When your recorder features three-head or off-head playback, you may monitor a recording as it is being made.

**Phono Inputs and Ground:** Connect the outputs of your turntable or tonearm to these jacks, and connect the ground wire from the turntable to this Ground Connector to reduce system hum. Only moving-magnet (MM-type) cartridges are compatible with the Phono Inputs. If your turntable is equipped with its own onboard phono preamp, you may connect it to any of the HK 3390's other audio inputs.

**Main Power Switch:** This mechanical switch turns the power supply on or off. It is usually left turned on (push the rocker in at the top), and cannot be turned on using the remote control. Turn this switch off when connecting or disconnecting source devices or loudspeakers to prevent any possibility of damage to components resulting from an unexpected power surge.





**NOTE:** To make it easier to follow the instructions throughout the manual that refer to this illustration, a copy of this page may be downloaded from the Product Support section at [www.harmankardon.com](http://www.harmankardon.com)

# REMOTE CONTROL FUNCTIONS

The HK 3390 remote is capable of controlling six devices, including the HK 3390 itself. The remote is preprogrammed at the factory to operate most Harman Kardon DVD, CD and CDR players. Each time you wish to use the codes for any component, first press its Selector Button. This changes the button functions to the appropriate codes.

**Phono:** Controls only the HK 3390 when a turntable is in use.

**Video 1:** Controls the Harman Kardon DMC 1000 digital media server.

**Video 2 and 3:** Controls DVD players. Each source uses a slightly different code set. Test the remote on your Harman Kardon DVD player, and refer to Table A3 in the appendix. Connect the DVD player to the source inputs corresponding to the code set that correctly operates the device.

**Tape:** Controls CD recorders.

**CD:** Controls CD players.

**AM/FM:** Controls the HK 3390 and its internal tuner only.

The functions specific to the HK 3390 are always available: Main Power On and Off, Speaker 1/2, source selection, Mute, Sleep, Dimmer and the Volume Controls.

Any given button may have different functions, depending on which component is being controlled. Some buttons are labeled with these functions. For example, the Track Skip Buttons are labeled with the transport control icons printed on the buttons themselves, and these functions are active when a CD or DVD player is in use. The Preset indications appear above these buttons, and those commands are active when the HK 3390's tuner is in use. See the Appendix for listings of the different functions for each type of component.

**IR Transmitter Lens:** As buttons are pressed on the remote, infrared codes are emitted through this lens. Make sure it is pointing toward the component being operated.

**Power Off Button:** Press this button to turn off the HK 3390 or another device.

**Power On Button:** Press this button to turn on the HK 3390 or another device.

**Speaker 1/2:** Press the Speaker 1 Button to enable the HK 3390 to output audio to the speakers connected to the Speaker 1 Outputs, and press the Speaker 2 Button to enable the Speaker 2 Outputs. You may enable or disable both sets of speaker outputs simultaneously. This feature is a convenient way of hearing audio in more than one room at a time, although the same source material will be played through both sets of speakers.

**Source Selectors:** Press one of these buttons to select a source device, which is a component where a playback signal originates, e.g., DVD, CD or the tuner. This will also turn on the receiver and switch the remote to the codes that operate the source device.

**NOTE:** The Video 3 source device may be connected to either the front- or rear-panel connectors. To select the desired device,

press the Video 3 Source Selector repeatedly. The VIDEO 3 message indicates that the rear-panel inputs are active, and the VIDEO F message indicates the front-panel inputs have been selected.

**FM Mode:** This button toggles between Stereo and Mono modes when an FM station is tuned.

**Auto Preset:** The Auto Preset feature enables you to automatically set presets for all available FM radio stations in your area with a single button press. To start the process, make sure the FM tuner has been selected as the source. Press and hold this button. The AUTO PRESET message will appear as the HK 3390 tuner scans through all FM stations with acceptable signal quality and programs them into the presets. If there are fewer than 30 stations, the tuner will cycle through again, filling up the higher preset slots with the same stations. The scan will stop when all 30 presets have been filled, or after two scans through the FM band.

**Numeric Keys:** Use these buttons to enter radio station frequencies when using the tuner (after pressing the Direct Button), or to select station presets.

**Direct:** Press this button before using the Numeric Keys to directly enter a radio station frequency.

**Clear:** Press this button to clear a radio station frequency you have started to enter.

**Memory:** After you have tuned a particular radio station, press this button, then the Numeric Keys, to save that station as a radio preset.

**Menu:** This button has no effect on the HK 3390, but is used with some source devices to access the source's setup menus.

**Navigation (▲/▼/◀/▶) and OK Buttons:** These buttons have no effect on the HK 3390, but are used to make selections within the on-screen menu system for some source devices. The OK Button transmits the Random Play command when used with CD players.

**Preset Scan:** Press this button once to scan through the stations you have previously programmed as presets. Each station will play for five seconds before the tuner skips to the next preset station. Press the button a second time to select the current station. If no presets have been programmed, the 0 PRESET message will be displayed.

**Disc Menu:** This button has no effect on the HK 3390, but is used with some DVD players to access the DVD disc's menus.

**Volume Controls:** Use this control to raise or lower the volume, which will be shown in decibels (dB) in the Message Display.

**Mute Button:** Press this button to mute the HK 3390's speaker and headphone outputs temporarily. To end the muting, press this button or adjust the volume. Muting is also canceled when the receiver is turned off. When the Subwoofer Trigger Output is connected to the correct input on the subwoofer, and the corresponding Subwoofer Link Switch is on, muting the HK 3390 will remove the trigger signal, turning off the subwoofer's amplifier to conserve energy. When normal listening resumes, the trigger signal will be reactivated, turning on the subwoofer.

# REMOTE CONTROL FUNCTIONS

**Tuning:** Use this control to tune a radio station. Tap one end of the button briefly to tune one frequency step at a time, or press and hold it to seek the next frequency with an acceptably strong signal.

**Preset Stations Selectors/Track Skip:** Press these buttons to select a preset radio station, or to change tracks or chapters on compatible Harman Kardon DVD and CD players.

**Stop, Record, Pause and Play:** These transport controls have no effect on the receiver, but are used to control compatible Harman Kardon DVD and CD players.

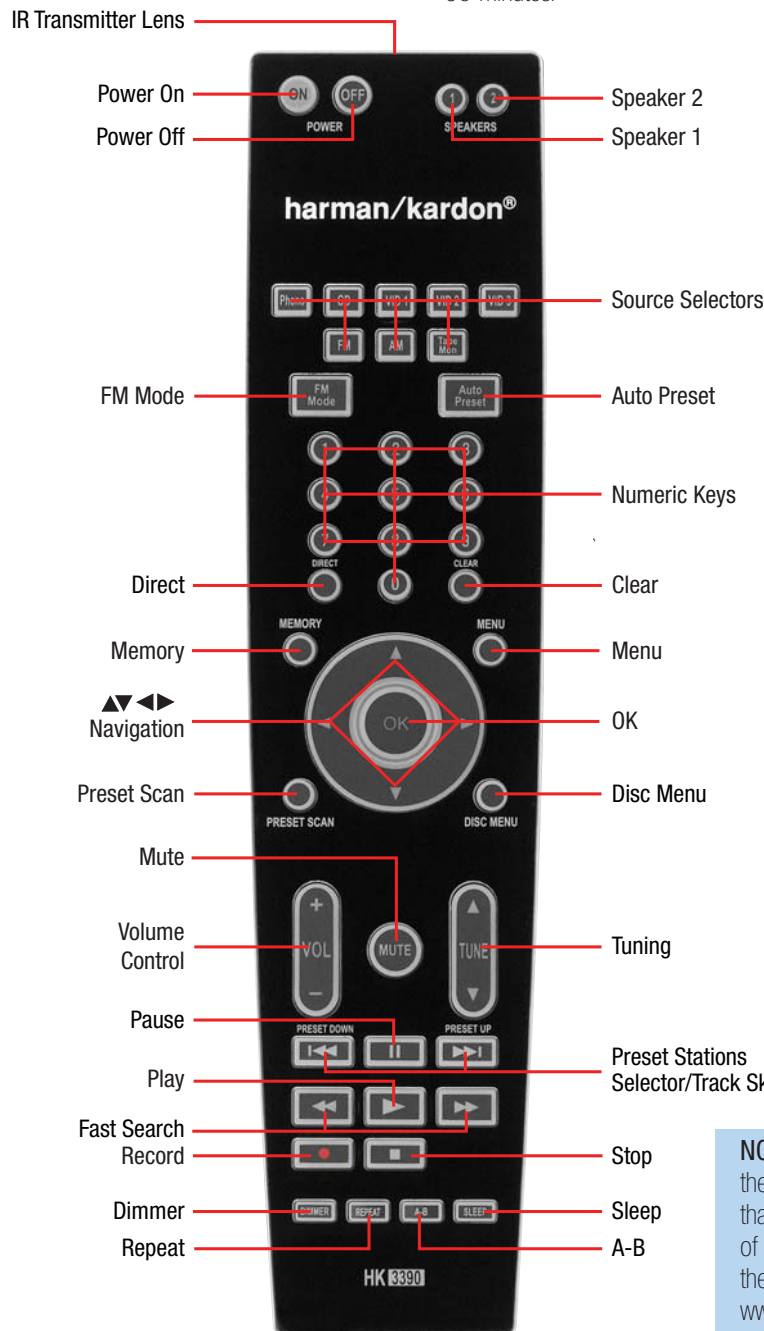
**Fast Search:** The Fast Search function is available with compatible Harman Kardon DVD and CD players.

**Dimmer:** Press this button to partially or fully dim the front-panel display.

**Repeat (V. Mode):** This button has no effect on the HK 3390, but issues the Repeat command when used with DVD and CD players. On some remotes this button is labeled "V. Mode", but it still issues the Repeat command.

**A-B (Source):** This button has no effect on the HK 3390, but issues the Repeat A-B command when used with DVD and CD players with that feature. On some remotes, this button is labeled "Source", but it still issues the Repeat A-B command.

**Sleep Button:** Press this button to activate the sleep timer, which shuts off the receiver after a programmed period of time up to 90 minutes.



**NOTE:** To make it easier to follow the instructions throughout the manual that refer to this illustration, a copy of this page may be downloaded from the Product Support section at [www.harmankardon.com](http://www.harmankardon.com).

# CONNECTIONS

There are different types of audio and video connections used to connect the receiver to the speakers and video display, and to connect the source devices to the receiver. To make it easier to keep them all straight, the Consumer Electronics Association (CEA®) has established a color-coding standard. Table 1 may be helpful to you as a reference while you set up your system.

**Table 1 – Connection Color Guide**

Audio Connections		
	Left	Right
Front (FL/FR)		
Video Connections		
Composite		

## Types of Connections

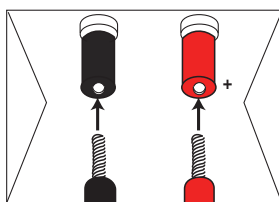
This section will briefly review different types of cables and connections that you may use to set up your system.

## Speaker Connections

Speaker cables carry an amplified signal from the receiver's speaker terminals to each loudspeaker. Speaker cables contain two wire conductors, or leads, inside plastic insulation. The two conductors are usually differentiated by using different colors, or stripes, or by adding a ridge to the insulation. Sometimes the wires are different colors, one being copper red and the other silver.

The differentiation is important because each speaker must be connected to the receiver's Speaker-Output terminals using two wires, one positive (+) and one negative (-). This is called speaker polarity. It's important to maintain the proper polarity for all speakers in the system. If some speakers have their negative terminals connected to the receiver's positive terminals, performance can suffer, especially for the low frequencies.

Always connect the positive terminal on the loudspeaker, which is usually colored red, to the positive terminal on the receiver, also colored red. Similarly, always connect the black negative terminal on the speaker to the black negative terminal on the receiver.



The HK 3390 uses binding-post speaker terminals that can accept banana plugs or bare-wire cables.

Banana plugs are simply plugged into the hole in the middle of the terminal cap. See Figure 1.

Figure 1 – Binding-Post Speaker Terminals With Banana Plugs

Bare-wire cables are installed as follows (see Figure 2):

1. Unscrew the terminal cap until the pass-through hole in the collar is revealed.
2. Insert the bare end of the wire into the hole.
3. Screw the cap back into place until the wire is held snugly.

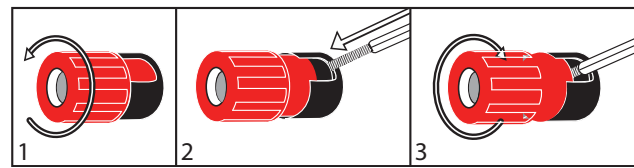


Figure 2 – Binding-Post Speaker Terminals With Bare Wires

## Subwoofer

The subwoofer is a specialized type of loudspeaker used to play only the low frequencies (bass), which require much more power than the other speaker channels. In order to obtain the best results, most speaker manufacturers offer powered subwoofers, in which the speaker contains its own amplifier on board. Usually, a line-level (nonamplified) connection is made from the receiver's Subwoofer Output to a corresponding jack on the subwoofer, as shown in Figure 3, but sometimes the subwoofer is connected to the receiver using the left and right speaker outputs, then the left and right speakers are connected to terminals on the subwoofer. The same full-range signal is output through both jacks. Thus, you have the option of connecting each jack to the line-level input on a separate subwoofer. If you have only one subwoofer with a single line-level input, connect it to the right Subwoofer Output on the HK 3390.

Connect the Subwoofer Trigger Output for each subwoofer to the corresponding trigger input on its amplifier. This enables the subwoofer to turn on or off together with the HK 3390. To further conserve energy, when the trigger connection is made, turn the Subwoofer Link Switch on to turn the subwoofer off when the corresponding pair of main speakers are not being used, such as during muting, when headphones are being used, or when the main speakers are turned off using the Speaker 1/2 switch.

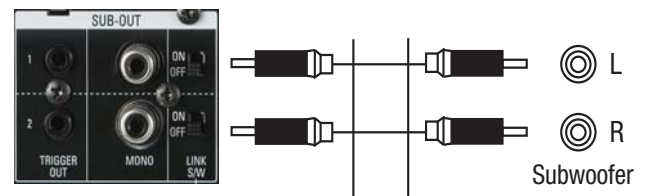


Figure 3 – Subwoofer

## Connecting Source Devices to the HK 3390

The HK 3390 is designed to process audio and video input signals, playing back the audio and displaying the video on a television or monitor connected to it. These signals originate in what are known as "source devices," including your DVD player, CD player, DVR (digital video recorder) or other recorder, tape deck, game console, cable or satellite television box, or MP3 player. Although the tuner is built into the HK 3390, it also counts as a source, even though no external connections are needed, other than the FM and AM antennas.

Separate connections are required for the audio and video portions of the signal.

# CONNECTIONS

## Analog Audio Connections

Analog audio connections require two cables, one for the left channel (white) and one for the right channel (red). These two cables are often attached to each other for most of their length. See Figure 4.

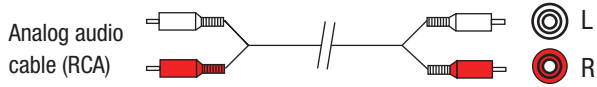


Figure 4 – Analog Audio

## Video Connections

Although some sources only produce an audio signal (e.g., CD player, tape deck), many sources output both audio and video signals (e.g., DVD player, cable television box, HDTV tuner, satellite box, VCR, DVR). In addition to the audio connection, make a video connection for each of these sources.

The composite video jack is usually color-coded yellow, and looks like an analog audio jack, although it is important never to confuse the two. Do not plug a composite video cable into an analog audio jack, and vice versa. Both the chrominance (color) and luminance (intensity) components of the video signal are transmitted using a single cable. See Figure 5.

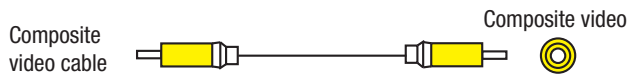


Figure 5 – Composite Video

## Antennas

The HK 3390 uses separate terminals for the included FM and AM antennas that provide proper reception for the tuner.

The FM antenna uses a 75-ohm F-connector. See Figure 6.



Figure 6 – FM Antenna

The AM loop antenna needs to be assembled. Connect the two leads to the spring terminals on the receiver. The AM antenna leads are polarized, and it is important to color-match the leads and terminals to maintain the proper polarity. See Figure 7.

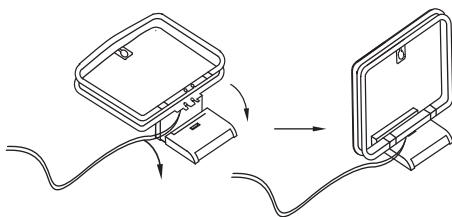


Figure 7 – AM Antenna

# INSTALLATION

You are now ready to connect your various components to your receiver. Before beginning, make sure that all components, including the HK 3390, are turned completely off and their power cords are unplugged. **Don't plug any of the power cords back in until you have finished making all of your connections.**

The receiver generates heat while it is on. Select a location that leaves several inches of space on all sides of the receiver. It is preferable to avoid completely enclosing the receiver inside a cabinet. It is also preferable to place components on separate shelves rather than directly on top of the receiver. Some surface finishes are delicate. Try to select a location with a sturdy surface finish.

## Step One – Connect the Speakers

If you have not yet done so, place your speakers in the listening room as described in the Speaker Placement section.

Connect the front left and right loudspeakers to the Speaker 1 speaker terminals on the HK 3390. Maintain the proper polarity by always connecting the positive and negative terminals on each speaker to the positive and negative terminals on the receiver. You may place a second pair of speakers in another room, or in the same room for additional sound power, connecting those speakers to the Speaker 2 Outputs, and maintaining polarity. Use the Speaker 1/2 Selector on the front panel or remote to activate either or both pairs of speakers simultaneously. See Figure 9.

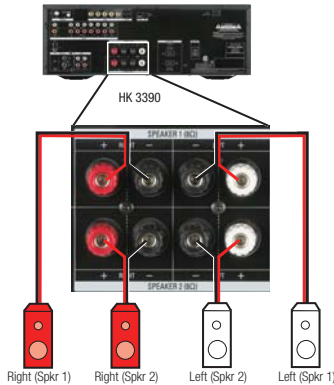


Figure 9 – Speaker Connections

## Step Two – Connect the Subwoofer

Connect the Subwoofer Outputs on the HK 3390 to the line-level inputs on your subwoofer. The same full-range signal is output through both jacks. Thus, you have the option of connecting each jack to the line-level input on a separate subwoofer. If both pairs of main speaker outputs are in use in different locations, you may install a separate subwoofer with each speaker pair. If you have only one subwoofer with a single line-level input, connect it to the right Subwoofer Output on the HK 3390. For optional auto turn-on/turn-off control over the subwoofer, connect the Subwoofer Trigger Output for each subwoofer to the corresponding trigger input on its amplifier. This enables the subwoofer to turn on or off together with the HK 3390. To further conserve energy, when the trigger connection is made, turn the Subwoofer Link Switch on to turn the subwoofer off when the

corresponding pair of main speakers is not being used, such as during muting, when headphones are being used, or when the speakers are turned off using the Speaker 1/2 switch. See Figure 10. Consult the manufacturer's guide for the subwoofer for additional information.

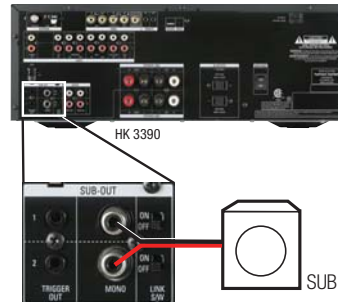


Figure 10 – Subwoofer Connection

## Step Three – Connect the Antennas

Connect the FM and AM antennas to their terminals. See Figure 11.

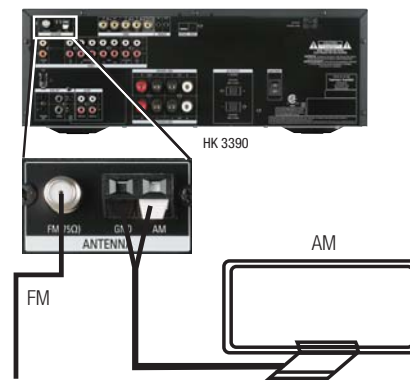


Figure 11 – Antenna Connections

## Step Four – Connect the Source Components

Use the worksheets in the Appendix to note which connections you will use for each of your source devices.

For each source, select a source input (Video 1, Video 2, Video 3, etc.). We recommend connecting certain types of sources to certain source inputs to make it easier to use the remote control.

The remote is preprogrammed to operate certain Harman Kardon components as shown in Table A1 of the appendix. However, you may connect any component with analog audio and/or composite video outputs to any source input on the HK 3390, with the exception of the Phono Inputs, and you may use the original remote control supplied with the component. It is not possible to reprogram the HK 3390 remote, or to change the device type associated with any source input.

We recommend you follow the guidelines in Table A1 when connecting various source components to the HK 3390. However, due to the limitations in the design of the HK 3390 remote control, when using source components manufactured by other brands, use the device's original remote control to operate it.

# INSTALLATION

For each audio-only source, such as a CD player, connect the left and right analog audio outputs of the source device to the corresponding inputs on the HK 3390. For audio/video devices, such as a cable television set-top box, in addition to the audio connections, connect the composite video output on the set-top box to the corresponding video input jack on the HK 3390.

## Phono (Turntable)

Connect the audio outputs of your turntable or tonearm with a moving-magnet (MM-type) cartridge to the Phono Inputs, and connect the ground wire to the Ground Terminal immediately below the Phono Inputs (not the AM Antenna Ground Terminal). If the cartridge is a moving-coil (MC-type) cartridge, it requires a separate phono preamp (available at your local electronics store) before you connect it to the Phono Inputs. See Figure 12.



Figure 12 – Phono Inputs and Ground

If your turntable has an MM-type cartridge and a built-in phono preamp, *do not* connect it to the Phono Inputs. Use one of the other available audio input sources on the HK 3390.

## Compact Disc (CD) Player

Connect the analog audio outputs of your CD player (or another audio-only device) to the CD Audio Inputs. See Figure 13.



Figure 13 – CD Audio Inputs

## Tape

The Tape source is used for audio recorders, such as a CDR, MiniDisc or cassette deck.

Connect the output jacks on your recorder to the Tape/CDR Audio Input jacks on the HK 3390, and the input jacks on your recorder to the Tape/CDR Output jacks on the HK 3390. See Figure 14.

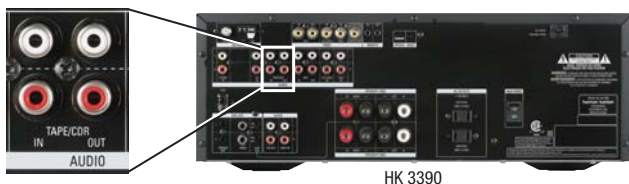


Figure 14 – Tape/CDR Audio Inputs and Outputs

To listen to the Tape/CDR source, press the T-Mon Button. The Upper Line of the Message Display will indicate the last-selected source, which is always available at the Tape/CDR Outputs for recording. The T-MON message will flash in the Lower Line, indicating that the HK 3390 is playing the signal present at the Tape/CDR inputs. When the recorder is in playback-only mode, this signal will originate in the recorder, e.g. when playing a commercial CD. If the recorder is in recording mode and has off-head playback capability, you may monitor recording of the source displayed in the Upper Line. If the recorder does not have off-head playback, you will not be able to monitor the recording. To hear the original source, press the T-Mon Button to stop monitoring the recording.

**NOTE:** To make recordings, insert blank media in the recording device and set it to recording mode. The fact that a signal is always available at the Tape/CDR Outputs doesn't mean recording is taking place if the recorder is not set to record.

## Video 1 Source

Since this source includes audio and video recording output jacks, it is best suited to a video recorder, such as your VCR or DVR, even though the remote codes are programmed to operate the DMC 1000. Simply use your video recorder's original remote.

Connect your recorder to the Video 1 Audio Inputs and Outputs. Then connect the recorder to the Video 1 Composite Video Input and Output. See Figure 15.



Figure 15 – Video 1 A/V Inputs and Outputs

Remember to connect the audio and video *output* jacks on your recorder to the Video 1 *Input* jacks on the HK 3390, and the audio and video *input* jacks on your recorder to the Video 1 *Output* jacks on the HK 3390.

## Video 2 Source

The Video 2 source is used only for playback. Since the remote is preprogrammed to operate a Harman Kardon DVD player when the Video 2 source is selected, we recommend that you connect a DVD player to the Video 2 Inputs.

You may have observed that the HK 3390 is not equipped with digital audio inputs or surround sound decoding. If you prefer the complete home theater experience, you may wish to consider purchasing a full-featured Harman Kardon AVR Series audio/video receiver. However, we hope you will find that using a DVD player with the HK 3390 in smaller settings, such as a bedroom or den, surpasses the audio performance of most televisions, including those with onboard stereo speakers.

# INSTALLATION

Connect the left and right analog audio outputs of the DVD player to the Video 2 Audio Inputs on the HK 3390. Then connect the composite video output of the DVD player, usually colored yellow, to the Video 2 Video Input. See Figure 16.



Figure 16 – Video 2 Audio and Video Inputs

**NOTE:** If you receive your television programming using your TV with an antenna or direct cable connection, connect the TV's analog audio outputs (if available) to the Video 2 Analog Audio Inputs. Do not connect any video output on the television set to any Video Input on the receiver. See Step Five for information on connecting the receiver's Video Monitor Outputs to the television.

## Video 3 Source

The Video 3 source is used only for playback. The Video 3 source has two sets of input jacks, one located on the HK 3390's rear panel and one set on the front panel. If you wish to connect a video device more or less permanently, you may prefer to connect it to the rear-panel inputs for a neater appearance. You may prefer to reserve the front-panel inputs for devices connected on a temporary basis, such as an iPod (not included), a camcorder, a game console, or another type of media player with analog audio and/or video outputs.

You may connect devices to both the front- and rear-panel inputs simultaneously. To select either device, press the Video 3 Source Selector on the HK 3390's front panel or remote repeatedly. When VIDEO 3 appears on the front panel of the HK 3390, the rear-panel inputs are active. When VIDEO F appears, the front-panel inputs are active.

Connect the left and right analog audio outputs of your device to the corresponding Video 3 Inputs on either the front or rear panel, and if available, connect the composite video output of the device to the Video 3 Video Input on the same panel. See Figure 17.



Figure 17 – Front- and Rear-Panel Video 3 A/V Inputs

To connect an iPod to the Video 3 Inputs, insert the 1/8" mini plug on the A/V cable included with the HK 3390 into the iPod's headphone jack. Insert the left and right analog audio plugs on the other end of the A/V cable into the Video 3 Audio Inputs on the front of the receiver. If the iPod is capable of playing videos or displaying images, insert the composite video plug of the A/V cable into the Video 3 Video Input.

**NOTE:** The iPod classic, iPod touch and iPhone require a special cable (not included) for video playback through the HK 3390. The cable features a dock receptacle at one end, and conventional A/V plugs at the other end that may be connected to the HK 3390 as described above.

When the front-panel inputs and tone controls are not in use, place the supplied covers over them for a cleaner appearance by snapping the covers in place. To remove the covers, gently press on the left side of each cover so that it pivots out.

Since the remote is preprogrammed to operate a Harman Kardon DVD player when the Video 3 source has been selected, use the original remote to control other components, or operate an iPod using its own controls.

## Step Five – Connect the Video Display

Only video connections should be made between the receiver and your video display (TV), unless your TV is the source for your television programming (see note below Figure 16).

To view video or images played by your source devices, connect the Video Monitor Output of the HK 3390 to a Composite Video Input on your television or video display. See Figure 18. Consult the manual for your TV so that you understand how to select the correct Video Input.



Figure 18 – Video Monitor Output

## Step Six – Connect the Remote IR Input and Output (Optional)

The HK 3390 is equipped with a Remote IR Input and a Remote IR Output to facilitate use of your system with a remote control in a variety of situations.

When the HK 3390 is placed in such a way that aiming the remote at the front-panel IR sensor is difficult, such as inside a cabinet or facing away from the listener, you may connect an external IR receiver, such as the optional Harman Kardon HE 1000, to the Remote IR Input jack.

If any of your source devices are equipped with a compatible Remote IR Input, use a 1/8" mini-plug interconnect cable (not included) to connect the HK 3390's Remote IR Output to the source device's Remote IR Input, which will pass any applicable remote signals transmitted through the HK 3390 to the source device. This enables



# INSTALLATION

you to control your sources even when the HK 3390 itself is controlled via an external IR receiver.

To control more than one source device using the Remote IR Output, connect all sources in a "daisy chain" fashion, with the HK 3390's Remote IR Output connected to the first device's Remote IR Input, that device's Remote IR Output connected to the next device's Remote IR Input, and so forth. See Figure 19.



Figure 19 – Remote IR Input and Output

**NOTE:** Not all remote-controllable devices are equipped with compatible IR inputs and outputs. Check with the manufacturer of the source device for more information on the type of IR signal expected. The HK 3390 will output a "stripped carrier" IR signal.

## Step Seven – Connect Optional External Equipment

If you wish to use the HK 3390 with an external power amplifier, remove the jumpers connecting the Preamp Outputs and Main-Amp Inputs. Store the jumpers in a safe place in case they are needed in the future. Connect the left and right Preamp Outputs of the HK 3390 to the analog audio inputs on the external power amplifier. See Figure 20.



Figure 20 – Preamp Outputs and Main-Amp Inputs

You may adjust the Volume and Tone Controls using the HK 3390's front panel or remote (volume only).

If you wish to install an external processor, such as an equalizer, connect it to the Preamp Outputs and Main-Amp Inputs. Remove the jumpers and store them in a safe place. Connect the HK 3390's Preamp Outputs to the processor's analog audio inputs, and then connect the processor's analog audio outputs to the Main-Amp Inputs on the HK 3390.

Alternatively, you may connect the external processor to the HK 3390's Tape Monitor Loop. See Figure 14.

## Step Eight – Plug In AC Power

Having made all of your wiring connections, it is now time to plug each component's AC power cord into a working outlet.

You may plug two devices into the AC Switched Accessory Outlets on the rear of the HK 3390. See Figure 21. Make sure each device draws

no more than 100 watts. The devices should have their mechanical or master power switches turned on, and they will power on any time the HK 3390 is turned on.



Figure 21 – Switched AC Accessory Outlets

## Step Nine – Insert Batteries in Remote

The HK 3390 remote control uses four AAA batteries, which are included.

To remove the battery cover located on the back of the remote, squeeze the tab and lift the cover.

Insert the batteries as shown in the diagram, making sure to observe the correct polarity. See Figure 22.



Figure 22 – Remote Battery Compartment

When using the remote, point the lens toward the front panel of the HK 3390. Make sure no objects, such as furniture, are blocking the remote's path to the receiver. Bright lights, fluorescent lights and plasma video displays may interfere with the remote's functioning. The remote has a range of about 20 feet, depending on the lighting conditions. It may be used at an angle of up to 30 degrees to either side of the HK 3390.

If the remote seems to operate intermittently, then make sure the batteries have been inserted correctly, or replace the batteries with fresh ones.

## Step Ten – Turn On the HK 3390

Place the HK 3390 in Standby mode by turning on the Main Power Switch on the rear panel. The Power Indicator will turn amber. The HK 3390 may be turned on from Standby mode by pressing the Power Switch or any Source Selector on either the front panel or the remote. See Figures 23 and 24.



Figure 23 – Front-Panel Power Switch



Figure 24 – Remote Control Power Switch

# OPERATION

Now that you have installed your system components, you are ready to begin enjoying your new audio system.

## Turning On the HK 3390

After you plug the power cord into an AC outlet and turn on the Main Power Switch on the rear panel, the Power Indicator should light up in amber. This indicates that the HK 3390 is in Standby mode and is ready to be turned on. See Figure 23.

The HK 3390 may be turned on by pressing the Power Switch or any Source Selector on the front panel or the remote. See Figure 24.

The Power Indicator will turn white to indicate that the HK 3390 is on. If the PROTECT message appears, unplug the receiver from AC power and check all of your wires and connections. Make sure no speaker wires are shorting out by touching each other, and that there are no breaks in the insulation covering any of the speaker wires, interconnects or the power cord. If the PROTECT message still appears when you plug in the HK 3390 and try to turn it on again, bring the receiver to an authorized Harman Kardon service center for assistance.

To turn the receiver off, press the Power Switch on the front panel, or press the Power Off Button on the remote. When the HK 3390 is left unplugged, any settings you have programmed, including system configuration and preset radio stations, will be preserved indefinitely.

## Sleep Timer

You may program the HK 3390 to play for up to 90 minutes and then turn off automatically using the sleep timer.

Press the Sleep Button on the front panel or remote, and the time until turn-off will be displayed. Each additional press of the Sleep Button will reduce the time until turn-off by 10 minutes, until the OFF setting is reached, which disables the sleep timer. See Figures 25 and 26.



Figure 25 – Front-Panel Sleep Button    Figure 26 – Remote Control Sleep Button

When the sleep timer has been set, the front-panel display will automatically dim to half-brightness. If you press any button on the remote or front panel, the display will return to full-brightness. The display will dim again several seconds after your last command.

If you press the Sleep Button after the timer has been set, the remaining time until turn-off will be displayed. You may press the Sleep Button to change the time until turn-off. Pressing and holding the Sleep Button will disable the sleep timer, and the SLEEP OFF message will appear.

## Volume Control

The volume may be adjusted either by turning the knob on the front panel (clockwise to increase volume or counterclockwise to decrease volume), or by pressing the Volume Control Buttons on the remote. See Figure 27. The volume is displayed as a negative number of decibels (dB) below the

0dB reference point. Unlike some volume controls on other products, 0dB is the maximum volume for the HK 3390. Although it's physically possible to turn the volume to a higher level, doing so may damage your hearing and your speakers. For certain more-dynamic audio materials, even 0dB may be too high, allowing for damage to equipment.



Figure 27 – Volume Controls

The HK 3390 is designed to reproduce audio with a minimum amount of distortion. This clarity may lead you to believe that your hearing and the equipment can handle higher volumes. We urge caution with regard to volume levels.

## Mute Function

To temporarily mute all speakers and the headphones, press the Mute Button on the front panel or remote. See Figure 28. Any recording in progress will not be affected. If the Subwoofer Trigger Outputs are in use and the Subwoofer Link Switch is on, muting will turn off the subwoofer's amplifier to conserve energy. The MUTE message will flash in the display as a reminder. To restore normal audio, either press the Mute Button again, or adjust the volume. Turning off the HK 3390 will also end muting.



Figure 28 – Mute Buttons

## Tone Controls

You may boost or cut either the treble or the bass frequencies by up to 10dB.

The Bass and Treble Tone Controls may be adjusted using the knobs on the front panel. Remove the front-panel covers if necessary, then gently press the desired control knob until it unlatches and pops out. Turn the appropriate knob counterclockwise to reduce the levels of the low frequencies (Bass Control) or the high frequencies (Treble Control), and turn it clockwise to increase the levels for the low or high frequencies. See Figure 29.



Figure 29 – Tone Controls

You may also adjust the balance to compensate for speaker placement or the acoustic characteristics of your listening room. Ideally, the audio should be heard most clearly at a point exactly midway between the left

# OPERATION

and right speakers, unless the artist has mixed the recording in a way that pans sounds to one side or the other. If your speakers are not placed the same distance from the listening position, or if your room has other unusual characteristics, gently press the Balance Control knob until it unlatches and pops out. Then turn it counterclockwise to move the sound toward the left speaker or clockwise to move the sound toward the right speaker. See Figure 30.



Figure 30 – Balance Control

The Balance Control reduces the level of the speaker opposite the pointer. For example, turning the knob from the midpoint toward “R” reduces the level of the left speaker, leaving the right speaker unaffected. If two pairs of speakers are connected to the HK 3390, then both will be affected.

**IMPORTANT NOTE:** Do not attempt to install the front-panel covers with the tone and balance control knobs in the unlatched position. Gently press each knob until it latches. When locked, the controls cannot be adjusted, preventing inadvertent changes to your desired settings.

## Headphones

Plug the 1/4" plug on a pair of headphones into the headphone jack on the front of the receiver for private listening. See Figure 31.



Figure 31 – Headphone Jack

## Speaker 1/2

The HK 3390 may be used with up to two pairs of speakers for additional sound power in the main listening room, or if you wish to place the second pair of speakers in another room, or even outdoors (when you select weather-resistant loudspeakers). Select each pair of speakers by pressing its associated button on either the front panel or remote. See Figure 32.



Figure 32 – Speaker 1/2 Buttons

Press the button a second time to deactivate that pair of speakers. You may activate both speaker pairs simultaneously, or deactivate both pairs for private listening through the headphones. When either of the speaker pairs are deactivated, if the corresponding Subwoofer Trigger Output is connected to the subwoofer and the corresponding Subwoofer Link Switch is on, the trigger signal will be deactivated, turning off the subwoofer amplifier and conserving energy when the subwoofer is not needed.

## Source Selection

Select a source device connected to the HK 3390 for playback by pressing its associated button on the front panel or remote control. See Figure 33.



Figure 33 – Source Selectors

To enjoy video sources, make sure to connect the device's composite video output to the correct Video Input on the HK 3390. In addition, connect the HK 3390's Video Monitor Output to an input on your television or video display.

### NOTES:

- The HK 3390 is not an audio/video surround sound receiver. It is only capable of playing source programs in one- or two-channel formats, and any information encoded in additional channels will be lost. The HK 3390 is not equipped with digital audio inputs, and cannot decode digital surround sound programs. If you have connected the analog audio and composite video outputs of a DVD player to the HK 3390, remember to select two-channel audio in the DVD player and disc menus.
- The HK 3390 does not switch the last-selected video source when an audio-only source, such as Phono, CD or Tape/CDR, is selected subsequently. It is not possible to view video while listening to an audio-only source.
- You may select a device connected to either the front- or rear-panel Video 3 Inputs. Press the front-panel or remote Video 3 Source Selector repeatedly to toggle between the front- and rear-panel Video 3 Inputs, and observe the front-panel display. When the front-panel inputs are not in use, you may snap the supplied cover over them. Remove the cover by pressing on the left side until it pivots outward.
- If you have connected a three-head tape deck to the Tape/CDR Inputs, you may monitor a recording while it is being made so that you can confirm that the correct program material is being recorded and make any necessary adjustments to the recording level. Press the T-Mon Button on the front panel to hear playback from the tape deck's playback head. When the recording is being monitored, the T-MON message will flash. Press the T-Mon Button again to hear the original source.

## Using the Tuner

The HK 3390's built-in tuner may be selected in one of two ways (see Figure 34):

1. Press the front-panel AM or FM Button.

# OPERATION

2. Press the AM or FM Button on the remote.



Figure 34 – Tuner Input Selection

Radio stations may be selected in one of five ways (see Figure 35):

1. If you know the frequency number, enter it directly by first pressing the Direct Button on the remote, and then using the Numeric Keys.
2. After you have programmed preset stations (see below), either enter the preset number (1 through 30) using the remote or use the front-panel Preset Stations Button to scroll through the list of presets.
3. In Auto Tuning mode, press and hold the Tuning Buttons (front-panel or remote) to scan in the chosen direction until a station with acceptable signal strength is detected.
4. In Manual Tuning mode, with each press of the Tuning Buttons the HK 3390 will tune the next frequency increment (0.1MHz for FM, or 10kHz for AM) in the selected direction.
5. Press the Preset Scan Button on the front panel or remote to scan through the previously programmed preset stations. The tuner will pause for five seconds at each frequency before tuning to the next preset. Press the Preset Scan Button again to select the current station and stop scanning.



Figure 35 – Tuning a Station

When an FM station has been tuned, pressing the FM Mode Button will switch between stereo and mono tuning, which may improve reception of weaker stations. See Figure 36.



Figure 36 – FM Mode Button

To store a station in one of the 30 presets (see Figure 37):

1. Tune the desired station.
2. Press the Memory Button on the remote.
3. Use the Numeric Keys to enter the desired preset number.

To clear a station from the preset memory:

1. Tune the preset station using any of the methods described above.
2. Press the Memory Button.
3. Within five seconds, press the Clear Button.



Figure 37 – Programming Presets

## Auto Preset

You may automatically program all FM radio stations in your area that are received with acceptable signal strength into the HK 3390's presets. Press and hold the Auto Preset Button until the Memory and Preset Indicators flash in the front-panel display. The tuner will automatically scan through the entire FM band, entering all stations with acceptable signal strength into the presets until either all 30 presets have been filled, or the tuner has scanned the band twice.

**NOTE:** If there are a large number of FM stations in your area, Auto Preset will overwrite any presets you programmed previously. Stations with exceptionally strong signals may be programmed into more than one preset.

## Recording

Two-channel analog audio signals, as well as composite video signals, are normally available at the appropriate recording outputs. Thus, to make a recording, you need only make sure to connect your audio or video recorder to the appropriate output jacks, as described in the Installation section, insert blank media and make sure the recorder is turned on and recording while the source is playing.

You may monitor your recording if your recorder has separate record and playback heads. Press the front-panel T-Mon Button to monitor the recording using the playback head, indicated by the T-MON message flashing. This will not affect the recording being made from the original source. To hear the original source again, press the T-Mon Button again.

If your recorder does not have off-head playback, then you will not hear anything when you press the T-Mon Button, unless the recorder is being used for playback.

**NOTE:** Please make certain that you are aware of any copyright restrictions on any material you record. Unauthorized duplication of copyrighted materials is prohibited by federal law.

## Dim Function

Some people find the front-panel messages distracting and would prefer to dim them or turn them off altogether.

To dim the display, press the Dim Button on the front panel or remote. Each button press will cycle through the three settings of:

**VFD FULL:** Normal brightness

**VFD HALF:** Display is dimmed but still visible; the light inside the volume knob goes dark

**VFD OFF:** Display goes completely dark except for Power Indicator to remind you that the receiver is turned on

**NOTE:** When either the Video 1 or Video 2 source has been selected, the Dimmer Button on the remote will only affect the source device (if compatible), and will not affect the HK 3390.

## Processor Reset

If you wish to fully reset the HK 3390 to its factory defaults, or if it behaves erratically after a power surge, first turn the Master Power Switch off and unplug the AC power cord for at least three minutes. Plug the cord back in and turn the receiver back on. If this doesn't help, you may want to try a system reset.

**NOTE:** A system reset erases all user configurations, including tuner presets. After a reset, you will need to reenter all of these settings.

Place the receiver in Standby mode by pressing the Power Switch so that the Power Indicator turns amber. Simultaneously press and hold the front-panel Preset Scan and Mute Buttons for at least five seconds until the software version number, followed by the RESET message, appear in the display. The unit will return to Standby mode, and you may power it on.

If the receiver still does not function correctly after a processor reset, contact an authorized Harman Kardon service center for assistance. Service centers may be located by visiting our Web site at [www.harmankardon.com](http://www.harmankardon.com).

## Memory

If the HK 3390 is unplugged or experiences a power outage, it will retain user settings indefinitely.

# TROUBLESHOOTING GUIDE

SYMPTOM	CAUSE	SOLUTION
Unit does not function when Main Power Switch is pushed	<ul style="list-style-type: none"> <li>No AC power</li> </ul>	<ul style="list-style-type: none"> <li>Make certain AC power cord is plugged into a live outlet</li> <li>Check to see whether outlet is switch-controlled</li> </ul>
Display lights, but there's no sound or picture	<ul style="list-style-type: none"> <li>Intermittent input connections</li> <li>Mute is on</li> <li>Volume Control is down</li> <li>Desired source not selected</li> <li>Speakers deactivated</li> <li>Headphones are in use</li> <li>Jumper pins between Preamp Outputs and Main-Amp Inputs were removed</li> </ul>	<ul style="list-style-type: none"> <li>Make certain that all input and speaker connections are secure</li> <li>Press Mute Button</li> <li>Turn up Volume Control</li> <li>Press correct Source Selector</li> <li>Press Speaker 1 or Speaker 2 Button</li> <li>Unplug headphones</li> <li>Replace jumper pins or, if external amplifier is in use, make sure it is turned on</li> </ul>
No sound from any speaker; light around Power Switch is red	<ul style="list-style-type: none"> <li>Amplifier is in Protection mode due to possible short</li> <li>Amplifier is in Protection mode due to internal problems</li> </ul>	<ul style="list-style-type: none"> <li>Check speaker-wire connections for shorts at receiver and speaker ends</li> <li>Contact your local Harman Kardon service center</li> </ul>
Unit does not respond to remote commands	<ul style="list-style-type: none"> <li>Weak batteries in remote</li> <li>Remote sensor is obscured</li> </ul>	<ul style="list-style-type: none"> <li>Change remote batteries</li> <li>Make certain front-panel sensor is visible to remote or connect an optional remote sensor</li> </ul>
Intermittent buzzing in tuner	<ul style="list-style-type: none"> <li>Local interference</li> </ul>	<ul style="list-style-type: none"> <li>Move unit or antenna away from computers, fluorescent lights, motors or other electrical appliances</li> </ul>
Audio sources sound distorted	<ul style="list-style-type: none"> <li>CD player or other audio device incorrectly plugged into Phono Inputs</li> <li>Turntable not plugged into Phono Inputs</li> </ul>	<ul style="list-style-type: none"> <li>Only plug a device into the Phono Inputs if it is a turntable with a moving-magnet cartridge, or if it is a turntable with a moving-coil cartridge with a phono preamp</li> <li>Do not use a turntable with any inputs other than the Phono Inputs, unless it has a moving-magnet-type cartridge and includes a phono preamp</li> </ul>
No video image	<ul style="list-style-type: none"> <li>Source device's video output not connected to HK 3390</li> <li>Wrong source selected</li> <li>Video Monitor Output not connected to display</li> <li>Wrong video input on video display selected</li> <li>Audio-only source selected</li> </ul>	<ul style="list-style-type: none"> <li>Connect the source's composite video output to the correct video input on the HK 3390</li> <li>Press the correct Source Selector on the HK 3390</li> <li>Connect the HK 3390's Video Monitor Output to a composite video input on your television or video display</li> <li>Consult the manual for your television for instructions on selecting the correct video input</li> <li>It is not possible to view video while listening to the Phono, Tape/CDR or CD sources or to the tuner</li> </ul>

In addition to the items shown above, additional information on troubleshooting possible problems with your HK 3390, or on installation-related issues, may be found in the list of "Frequently Asked Questions," which is located in the Product Support section of our Web site at [www.harmankardon.com](http://www.harmankardon.com).

## Processor Reset

**If you wish to fully reset the HK 3390 to its factory defaults, or if it behaves erratically after a power surge, first turn the Master Power Switch off and unplug the AC power cord for at least three minutes. Plug the cord back in and turn the receiver back on. If this doesn't help, you may want to try a system reset.**

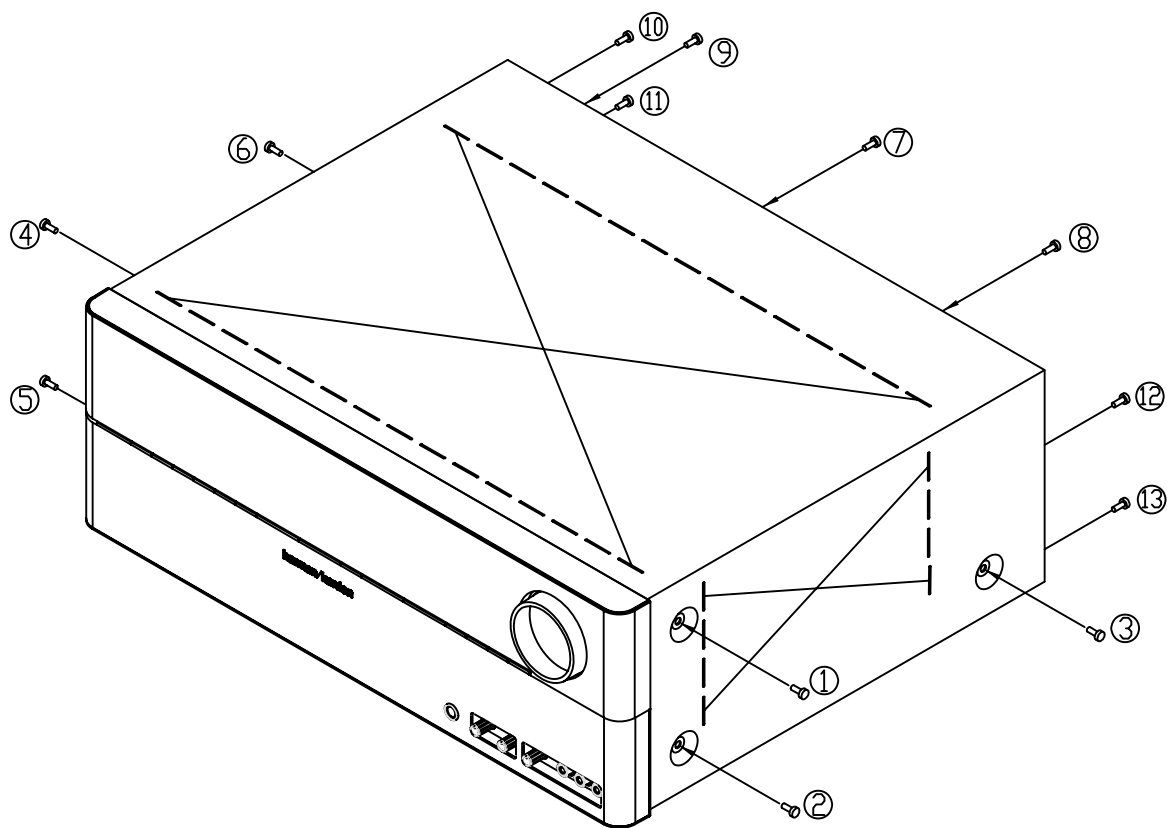
**NOTE: A system reset erases all user configurations, including tuner presets. After a reset, you will need to reenter all of these settings.**

**Place the receiver in Standby mode by pressing the Power Switch so that the Power Indicator turns amber. Simultaneously press and hold the front-panel Preset Scan and Mute Buttons for at least five seconds until the software version number, followed by the RESET message, appear in the display. The unit will return to Standby mode, and you may power it on.**

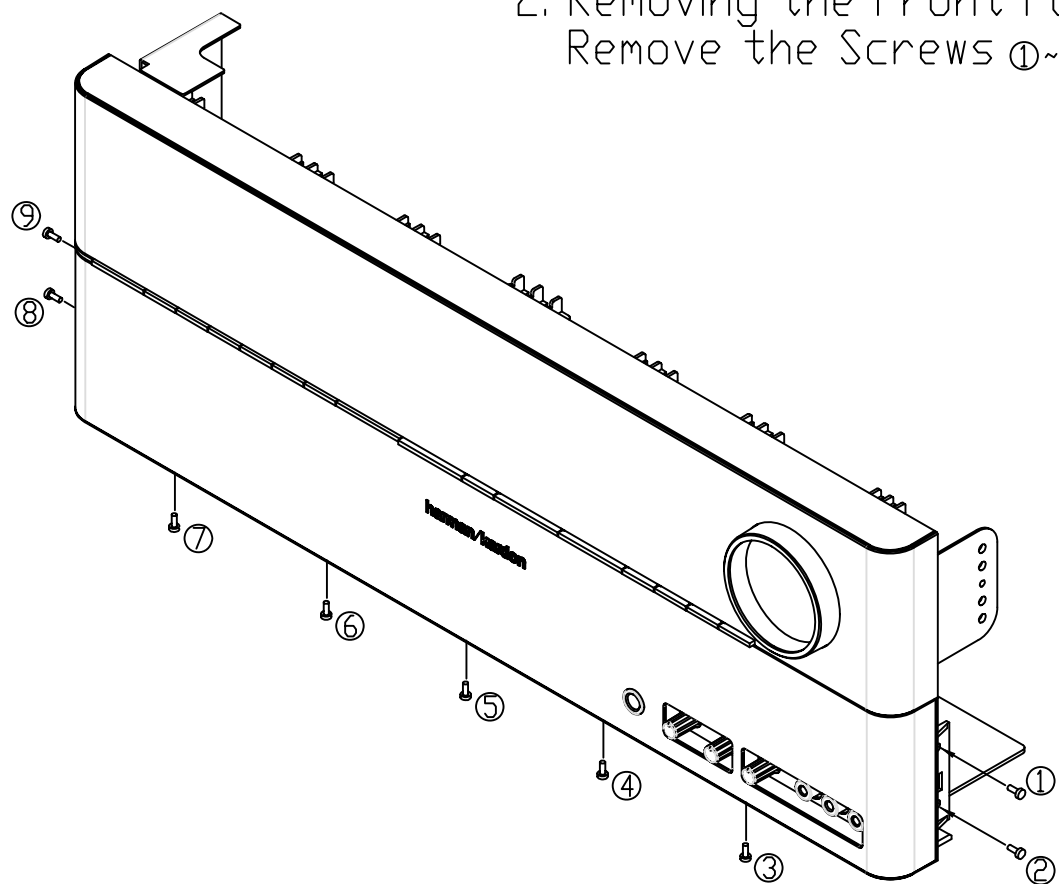
## Memory

**If the HK 3390 is unplugged or experiences a power outage, it will retain user settings indefinitely.**

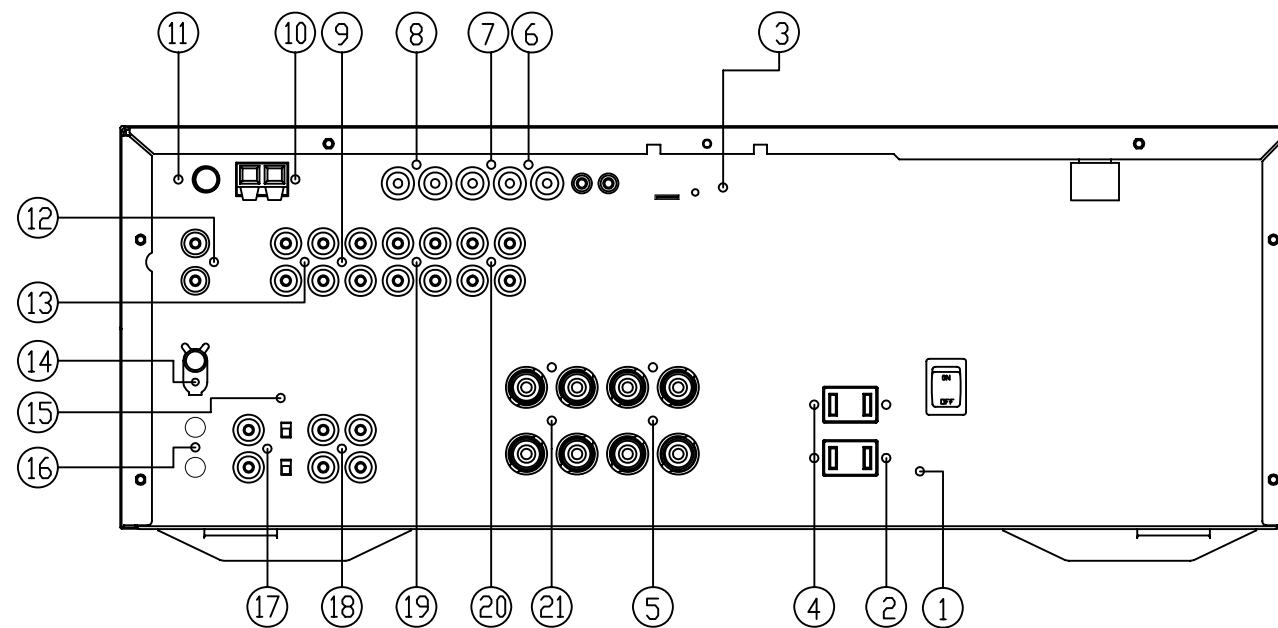
1. Removing the Top Cabinet  
Remove the Screws ①~⑬



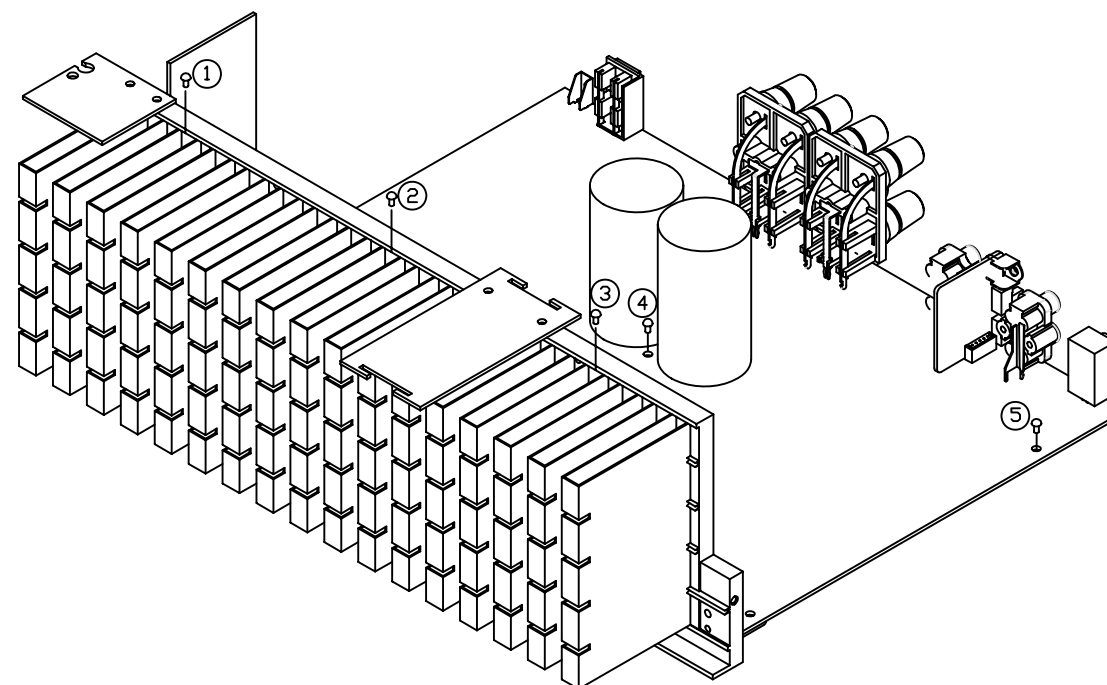
2. Removing the Front Panel  
Remove the Screws ①~⑨



3. Removing the Rear Panel  
Remove the Screws ①~⑳



4. Removing the Main PCB  
Remove the Screws ①~⑤



## **HK3390 DISASSEMBLY PROCEDURE**

### **1 TOP-CABINET (21) REMOVAL**

1. Remove 13 screws (S1) and then remove the Top-cabinet.

### **2 FRONT PANEL ASS'Y REMOVAL**

1. Remove the Top-cabinet, referring to the previous step 1.
2. Disconnect the lead wire (BN22-11P) on the Potentiometer PCB (43-4) from connector (CN22) on the Input PCB (45).
3. Disconnect lead wire (BN13-9P) on the Front PCB (43-1) from connector (CN13) on Main PCB (44-1).
4. Disconnect the connector (CN87-19P) on the Front PCB (43-1) from connector (CN87) on the Main PCB (44-1).
5. Disconnect the lead wire (BN73-5P) on the Phone PCB (43-3) from connector (CN73) on the Main PCB (44-1).
6. Disconnect the lead wire (BN84-5P) on the Front input video PCB (43-6) from connector (CN84) on the Input PCB (45).
7. Remove 1 screw (S6) and then lead wire (JW98,JW99-1P) on the PCB (43-5, 43-3).
8. Remove 1 screw (S6) and then lead wire (JW97-1P) on the Power LED PCB (43-2).
9. Remove 10 screws (S1) and then remove the Front Panel ASS'Y.

### **3 POTENTIOMETER PCB (43-4) REMOVAL**

1. Remove the Top-cabinet, referring to the previous step 1.
2. Remove the Front Panel ASS'Y, referring to the previous step 2.
3. Remove 2 screws (S3) and then remove the Potentiometer PCB (43-4).

### **4 PHONE PCB (43-3) REMOVAL**

1. Remove the Top-cabinet, referring to the previous step 1.
2. Remove the Front Panel ASS'Y, referring to the previous step 2.
3. Remove 2 screws (S4) and then remove the Phone PCB (43-3).
4. Disconnect the lead wire (BN73-5P) from connector (CN73) on the PHONE PCB (43-3).

### **5 VOLUME PCB (43-5) REMOVAL**

1. Remove the Top-cabinet, referring to the previous step 1.
2. Remove the Front Panel ASS'Y, referring to the previous step 2.
3. Pull out the Volume Knob ASS'Y .
4. Remove 4 screws (S3) and then Volume PCB (43-5).
5. Disconnect the lead wire (BN81-5P) from connector (CN81) on the Volume PCB (43-5).

### **6 POWER LED PCB (43-2) REMOVAL**

1. Remove the Top-cabinet, referring to the previous step 1.
2. Remove the Front Panel ASS'Y, referring to the previous step 2.
3. Remove 2 screws (S3) and then remove the Power LED PCB (43-2).
4. Disconnect the lead wire (BN82-5P) from connector (CN82) on the Power LED PCB (43-2).

### **7 FRONT INPUT VIDEO PCB (43-6) REMOVAL**

1. Remove the Top-cabinet, referring to the previous step 1.
2. Remove the Front Panel ASS'Y, referring to the previous step 2.
3. Remove 2 screws (S3) and then remove the Front input video PCB (43-6).

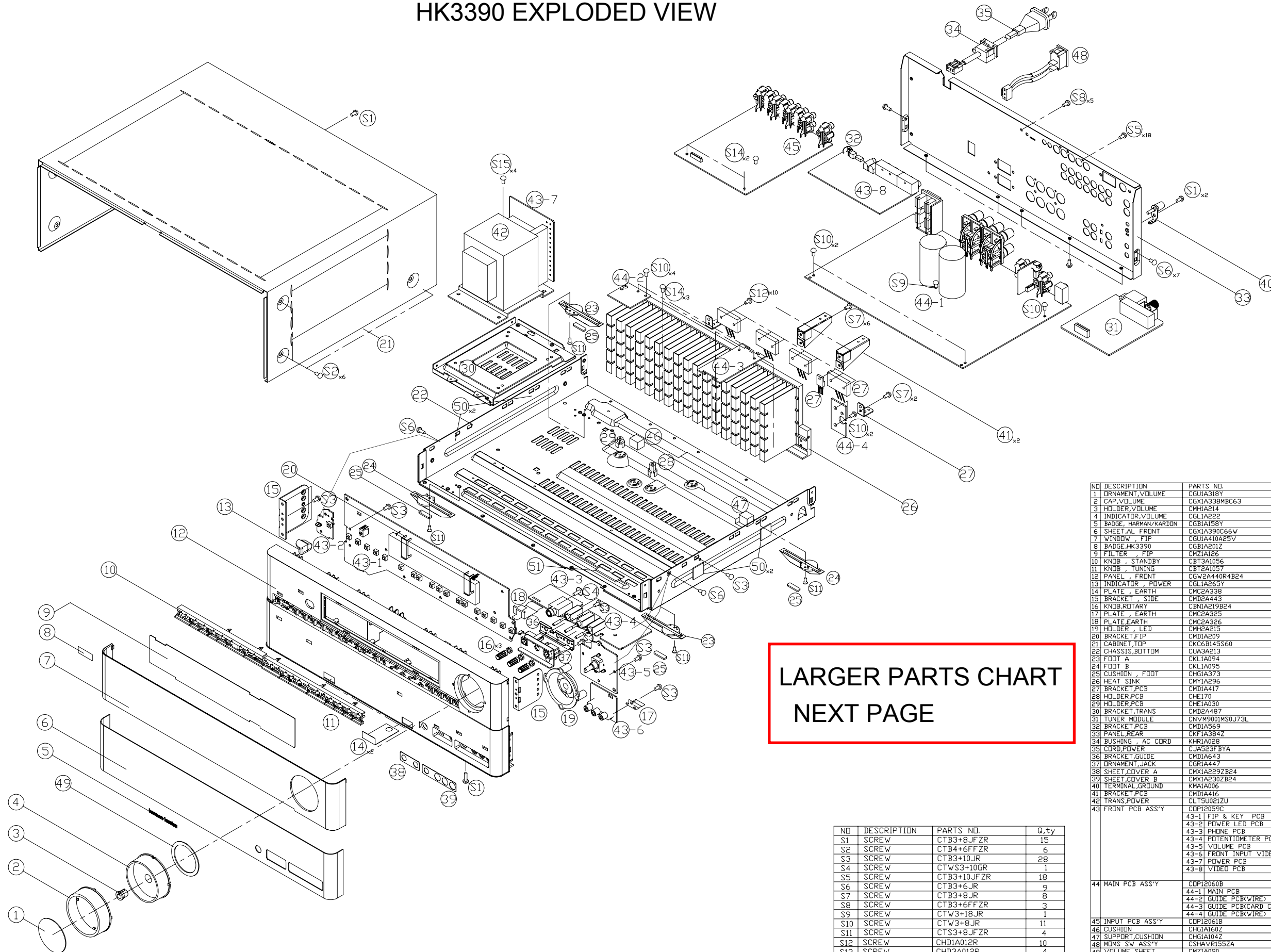
### **8 FRONT PCB (43-1) REMOVAL**

1. Remove the Top-cabinet, referring to the previous step 1.
2. Remove the Front Panel ASS'Y, referring to the previous step 2.
3. Remove the Potentiometer PCB (43-4) , referring to the previous step 3.
4. Remove the PHONE PCB (43-3), referring to the previous step 4.



5. Remove the Volume PCB (43-5), referring to the previous step 5.
  6. Remove the POWER LED PCB (43-2), referring to the previous step 6.
  7. Remove the Front input video PCB (43-6), referring to the previous step 7.
  8. Remove 12 screws (S3) and then remove the Front PCB (43-1).
- 9 TUNER MODULE (34) REMOVAL
1. Remove the Top-cabinet, referring to the previous step 1.
  2. Disconnect the connector (CON1-Card cable) from connector (CN26) on the Input PCB (45).
  3. Remove 2 screws (S5) and then remove the Tuner Module (47).
- 10 VIDEO PCB (43-8) REMOVAL
1. Remove the Top-cabinet, referring to the previous step 1.
  2. Disconnect the connector (CN85-Card cable) from connector (CN85) on the Input PCB (45).
  3. Remove 4 screws (S8,S5) and then remove the Video PCB (43).
- 11 INPUT PCB (46-1) REMOVAL
1. Remove the Top-cabinet, referring to the previous step 1.
  2. Disconnect the connector (CN21-Card cable) from connector (CN21) on the Main PCB (44-1).
  3. Disconnect the connector (CN24) from lead wire (BN24-5P) on the Main PCB (44-1).
  4. Remove 7 screws (S5,S14) and then remove the DSP PCB (46-1).
- 12 POWER TRANS (30) REMOVAL
1. Remove the Top-cabinet, referring to the previous step 1.
  2. Disconnect the connector (CN15,CN12) on the Trans PCB (43-7) from lead wire (BN15-3P,BN12-2P) on the Main PCB (44-1).
  3. Disconnect the connector (CN11,CN14,CN15) on the Main PCB (44-1) from lead wire (BN11-P,BN14-13P,BN15-3P) on the Trans PCB (43-7)
  4. Remove 4 Trans screws (S15) and then remove the Power Trans (42).
- 13 MAIN PCB ASS'Y (44) REMOVAL
1. Remove the Top-cabinet, referring to the previous step 1.
  2. Remove the Power Trans (43-7),referring to the previous step 13.
  3. Remove the TUNER MODULE (34), referring to the previous step 9.
  4. Remove the VIDEO PCB (43-8), referring to the previous step 10.
  5. Remove the DSP PCB (46-1), referring to the previous step 11.
  6. Remove the INPUT PCB (46-1), referring to the previous step 12.
  7. Disconnect the connector (CN13) from lead wire (BN13-9P) on the Front PCB (43-1).
  8. Disconnect the connector (CN73) from lead wire (BN73-5P) on the PHONE PCB (43-3).
  9. Disconnect the connector (CN61) from Power cord (35).
  10. Remove 15 screws (S5-7EA, S8-2EA,S14-3EA,S9-1EA,S10-1EA,S3-1EA) and then remove the Main PCB ASS'Y(44).

# HK3390 EXPLODED VIEW



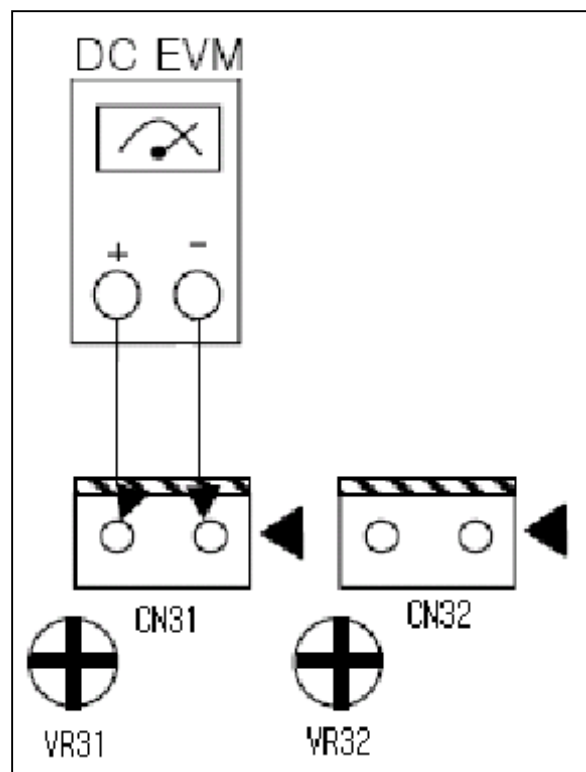
LARGER PARTS CHART  
NEXT PAGE

NO	DESCRIPTION	PARTS NO.	Q,ty
S1	SCREW	CTB3+8JFZR	15
S2	SCREW	CTB4+6FFZR	6
S3	SCREW	CTB3+10JR	28
S4	SCREW	CTWS3+10GR	1
S5	SCREW	CTB3+10JFZR	18
S6	SCREW	CTB3+6JR	9
S7	SCREW	CTB3+8JR	8
S8	SCREW	CTB3+6FFZR	3
S9	SCREW	CTW3+18JR	1
S10	SCREW	CTW3+8JR	11
S11	SCREW	CTS3+8JFZR	4
S12	SCREW	CHD1A012R	10
S13	SCREW	CHD3A012R	4
S14	SCREW	CHD4A012R	5
S15	SCREW,TRANS	CHD1A023R	4

NO	DESCRIPTION	PARTS NO.	Q,ty	REMARK
1	ORNAMENT,VOLUME	CGUIA318Y	1	
2	CAP,VOLUME	CGXIA338MBC63	1	
3	HOLDER,VOLUME	CMHA214	1	
4	INDICATOR,VOLUME	CGLIA222	1	
5	BADGE, HARMAN/KARDON	CGBIA158Y	1	
6	SHEET,AL FRONT	CGXIA390C66W	1	
7	WINDOW, FIP	CGUIA410A25V	1	
8	BADGE, HK3390	CGBIA201Z	1	
9	FILTER, FIP	CMZ1A126	1	
10	KNOB, STANDBY	CBT3A1056	1	
11	KNOB, TUNING	CBT2A1057	1	
12	PANEL, FRONT	CGW2A440R4B24	1	
13	INDICATOR, POWER	CGLIA265Y	1	
14	PLATE, EARTH	CMC2A338	2	
15	BRACKET, SIDE	CMD2A443	2	
16	KNOB,ROTARY	CBNIA219B24	3	
17	PLATE, EARTH	CMC2A325	1	
18	PLATE,EARTH	CMC2A326	1	
19	HOLDER, LED	CMHA215	1	
20	BRACKET,FIP	CMDIA209	2	
21	CABINET, TOP	CKC6B145S60	1	
22	CHASSIS,BOTTOM	CUA3A213	1	
23	FOOT A	CKLIA094	2	
24	FOOT B	CKLIA095	2	
25	CUSHION, FOOT	CHGIA373	4	
26	HEAT SINK	CMYA296	1	
27	BRACKET,PCB	CMDIA417	2	
28	HOLDER,PCB	CHE170	1	
29	HOLDER,PCB	CHE1A030	1	
30	BRACKET,TRANS	CMD2A487	1	
31	TUNER MODULE	CNV1M9001MS0J73L	1	
32	BRACKET,PCB	CMDIA569	3	
33	PANEL, REAR	CKFA384Z	1	
34	BUSHING, AC CDRD	KHR1A028	1	
35	CORD,POWER	CJA523F8YA	1	
36	BRACKET,GUIDE	CMDIA643	1	
37	ORNAMENT,JACK	CGRIA447	1	
38	SHEET,COVER A	CMXIA229ZB24	1	
39	SHEET,COVER B	CMXIA230ZB24	1	
40	TERMINAL,ORDUND	KMAIA006	1	
41	BRACKET,PCB	CMDIA16	2	
42	TRANS,POWER	CLTSU021ZU	1	
43	FRONT PCB ASS'Y	CDPI2059C	1	
		43-1 FIP & KEY PCB	1	
		43-2 POWER LED PCB	1	
		43-3 PHONE PCB	1	
		43-4 POTENTIOMETER PCB	1	
		43-5 VOLUME PCB	1	
		43-6 FRONT INPUT VIDED PCB	1	
		43-7 POWER PCB	1	
		43-8 VIDEO PCB	1	
44	MAIN PCB ASS'Y	CDPI2060B	1	
		44-1 MAIN PCB	1	
		44-2 GUIDE PCB(WIRE)	1	
		44-3 GUIDE PCB(CARD CABLE)	1	
		44-4 GUIDE PCB(WIRE)	1	
45	INPUT PCB ASS'Y	CDPI2061B	1	
46	CUSHION	CHGIA160Z	1	
47	SUPPORT,CUSHION	CHGIA104Z	1	
48	MDMS SW ASS'Y	CSHAVR155ZA	1	
49	VOLUME SHEET	CMZ1A090	1	
50	CUSHION	CHGIA354	4	
51	CUSHION	CHGIA333	1	

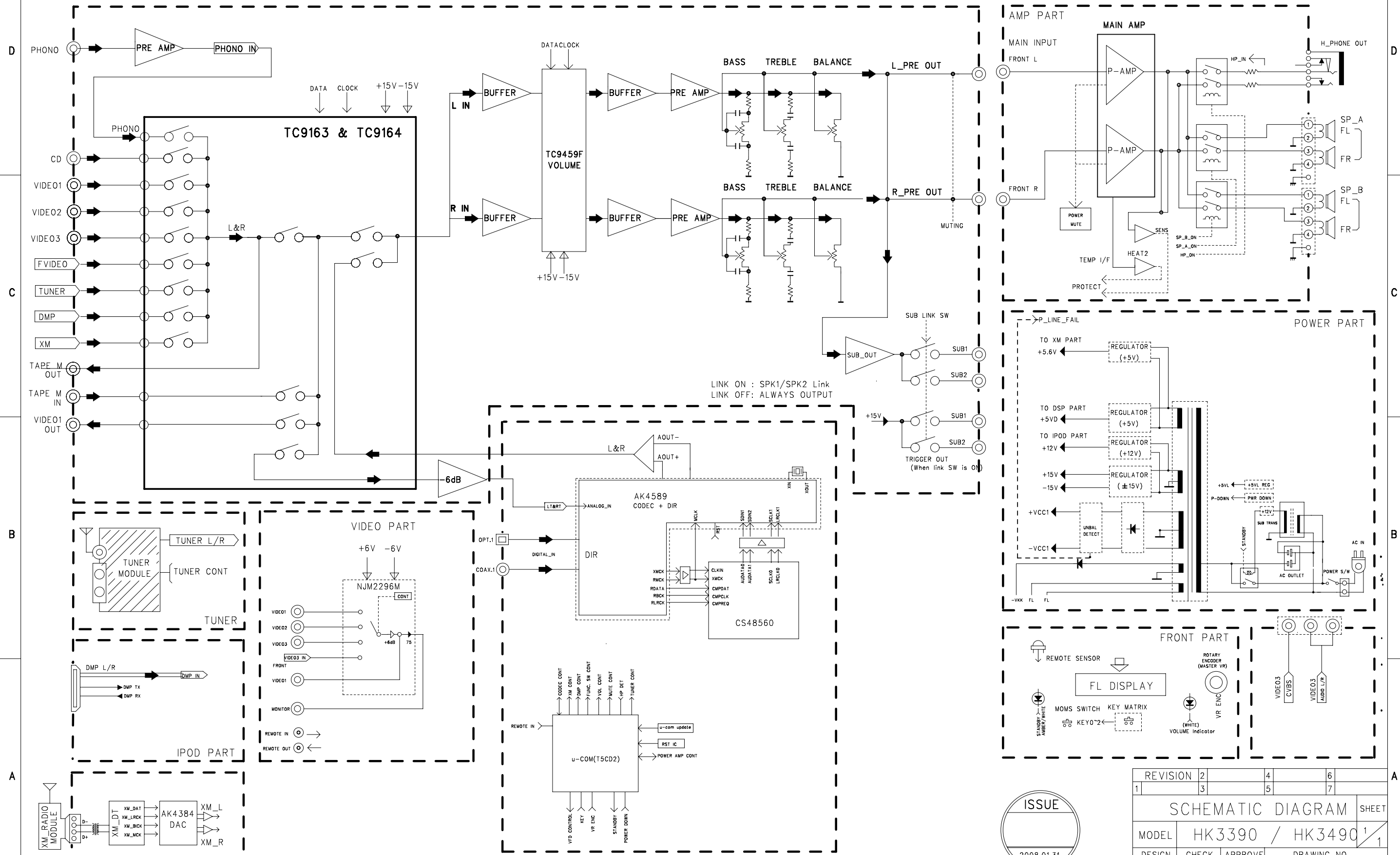
NO	DESCRIPTION	PART NO.	Qty
1	ORNAMENT,VOLUME	CGU1A318Y	1
2	CAP,VOLUME	CGX1A338MBC63	1
3	HOLDER,VOLUME	CMH1A214	1
4	INDICATOR,VOLUME	CGL1A222	1
5	BADGE, HARMAN/KARDON	CGB1A158Y	1
6	SHEET,AL FRONT	CGX1A390C66W	1
7	WINDOW , FIP	CGU1A410A25V	1
8	BADGE,HK3390	CGB1A201Z	1
9	FILTER , FIP	CMZ1A126	1
10	KNOB , STANDBY	CBT3A1056	1
11	KNOB , TUNING	CBT2A1057	1
12	PANEL , FRONT	CGW2A440R4B24	1
13	INDICATOR , POWER	CGL1A265Y	1
14	PLATE , EARTH	CMC2A338	2
15	BRACKET , SIDE	CMD2A443	2
16	KNOB,ROTARY	CBN1A219B24	3
17	PLATE , EARTH	CMC2A325	1
18	PLATE,EARTH	CMC2A326	1
19	HOLDER , LED	CMH2A215	1
20	BRACKET,FIP	CMD1A209	2
21	CABINET, TOP	CKC6B145S60	1
22	CHASSIS,BOTTOM	CUA3A213	1
23	FOOT A	CKL1A094	2
24	FOOT B	CKL1A095	2
25	CUSHION , FOOT	CHG1A373	4
26	HEAT SINK	CMY1A296	1
27	BRACKET,PCB	CMD1A417	2
28	HOLDER,PCB	CHE170	1
29	HOLDER,PCB	CHE1A030	1
30	BRACKET,TRANS	CMD2A487	1
31	TUNER MODULE	CNVM9001MS0J73L	1
32	BRACKET,PCB	CMD1A569	3
33	PANEL,REAR	CKF1A384Z	1
34	BUSHING , AC CORD	KHR1A028	1
35	CORD,POWER	CJA523F BYA	1
36	BRACKET,GUIDE	CMD1A643	1
37	ORNAMENT,JACK	CGR1A447	1
38	SHEET,COVER A	CMX1A229ZB24	1
39	SHEET,COVER B	CMX1A230ZB24	1
40	TERMINAL,GROUND	KMA1A006	1
41	BRACKET,PCB	CMD1A416	2
42	TRANS,POWER	CLT5U021ZU	1
43	FRONT PCB ASS'Y		1
		43-1 FIP & KEY PCB	1
		43-2 POWER LED PCB	1
		43-3 PHONE PCB	1
		43-4 POTENTIOMETER PCB	1
		43-5 VOLUME PCB	1
		43-6 FRONT INPUT VIDEO PCB	1
		43-7 POWER PCB	1
		43-8 VIDEO PCB	1
44	MAIN PCB ASS'Y		1
		44-1 MAIN PCB	1
		44-2 GUIDE PCB(WIRE)	1
		44-3 GUIDE PCB(CARD CABLE)	1
		44-4 GUIDE PCB(WIRE)	1
45	INPUT PCB ASS'Y		1
46	CUSHION	CHG1A160Z	1
47	SUPPORT,CUSHION	CHG1A104Z	1
48	MOMS SW ASS'Y	CSHAVR155ZA	1
49	VOLUME SHEET	CMZ1A090	1
50	CUSHION	CHG1A354	4
51	CUSHION	CHG1A333	1

## HK3490/3390 idle current Adjustment

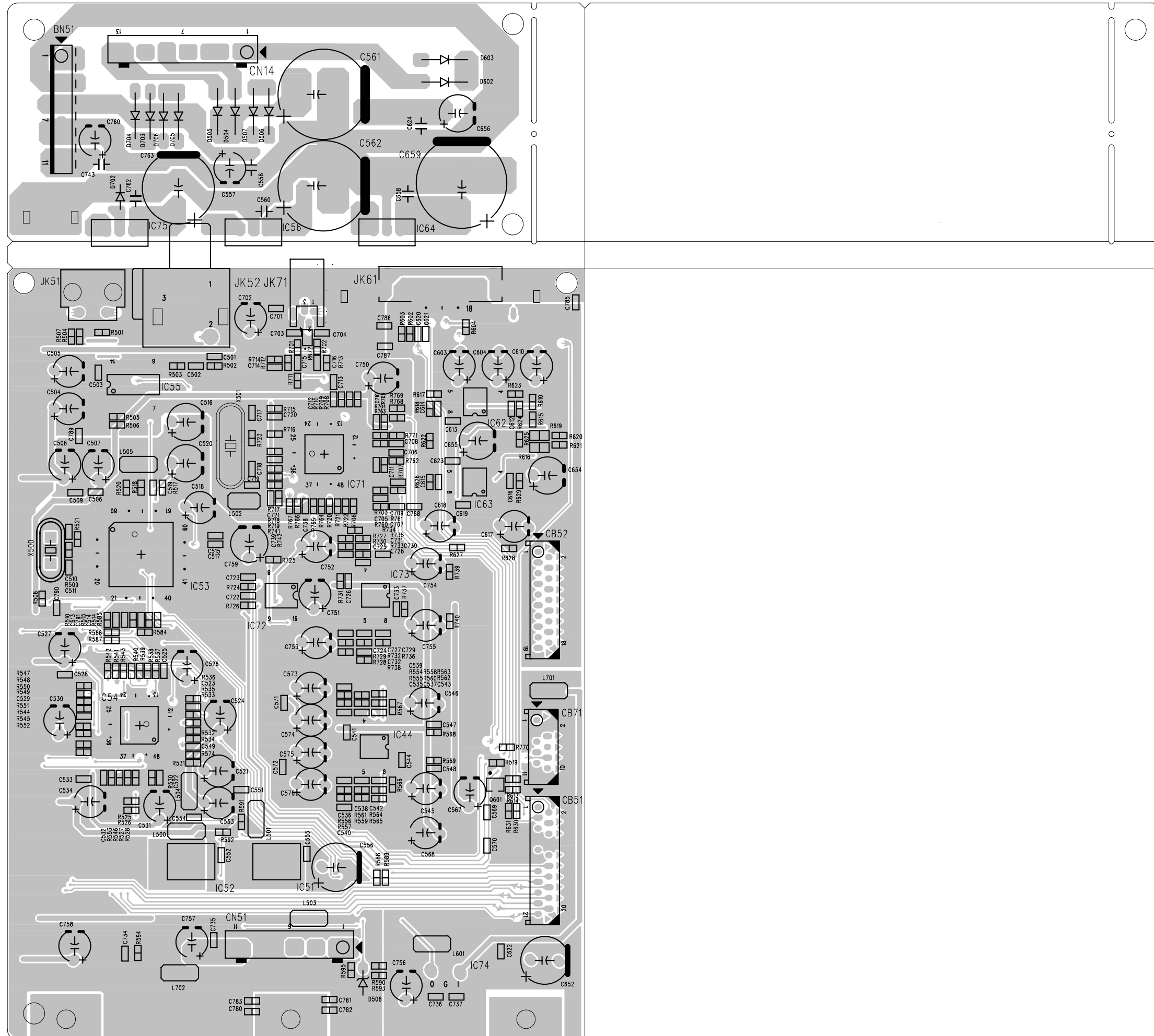


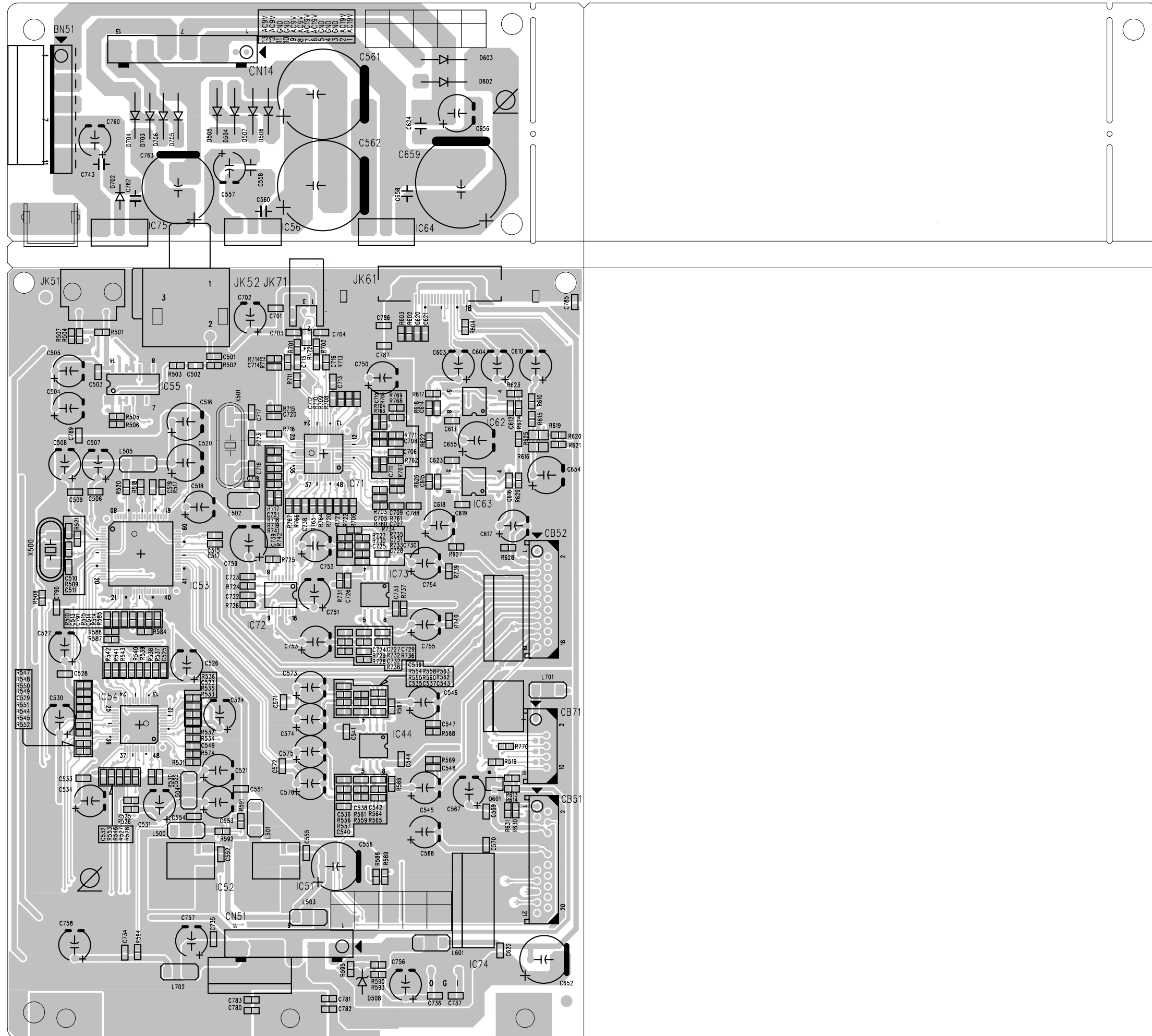
1. Adjust VR31 to set  $21.12\text{mV}(\pm 5\%)$  on DC EVM.
2. Adjust VR32 as same way above.

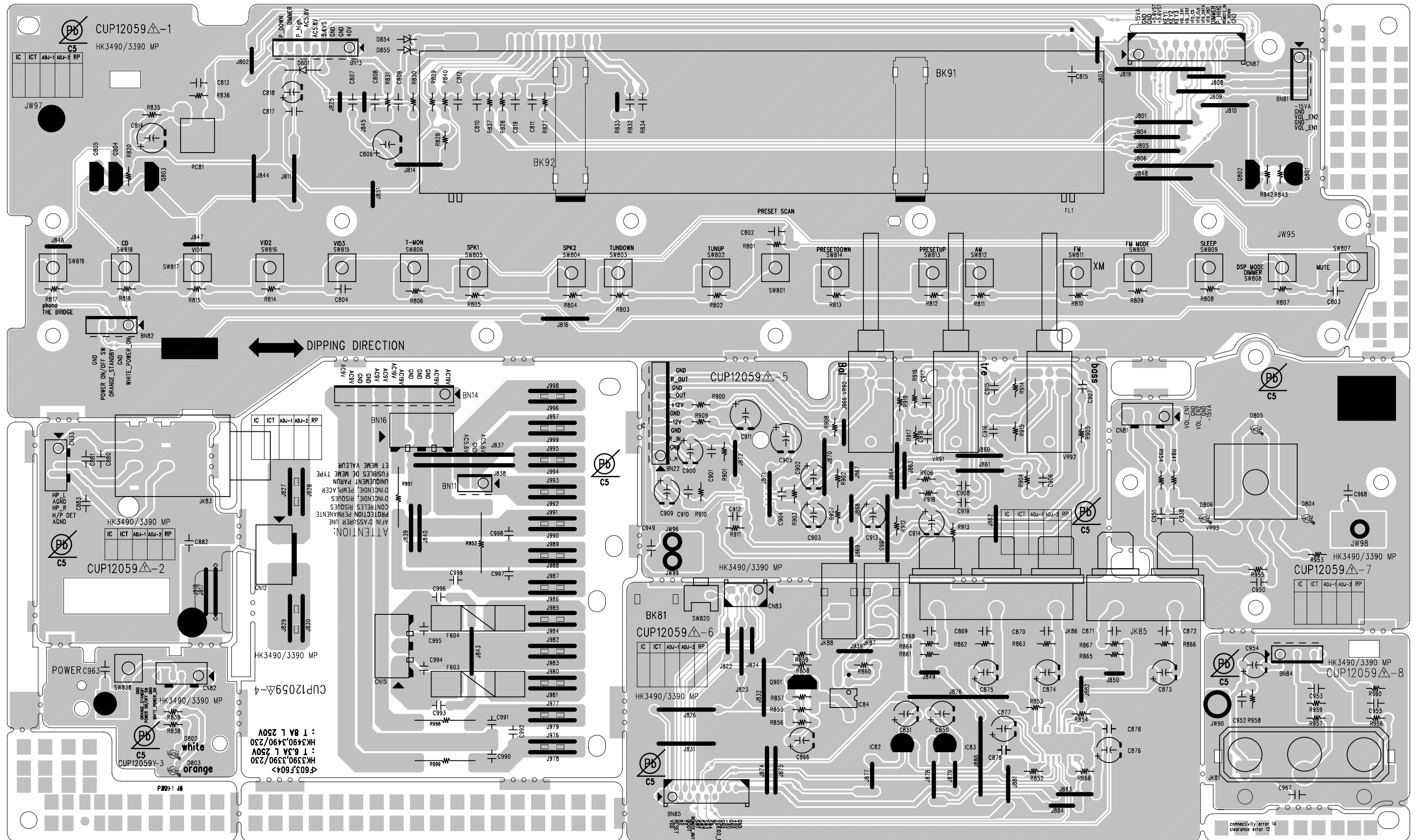
# HK3390/3490 BLOCK DIAGRAM



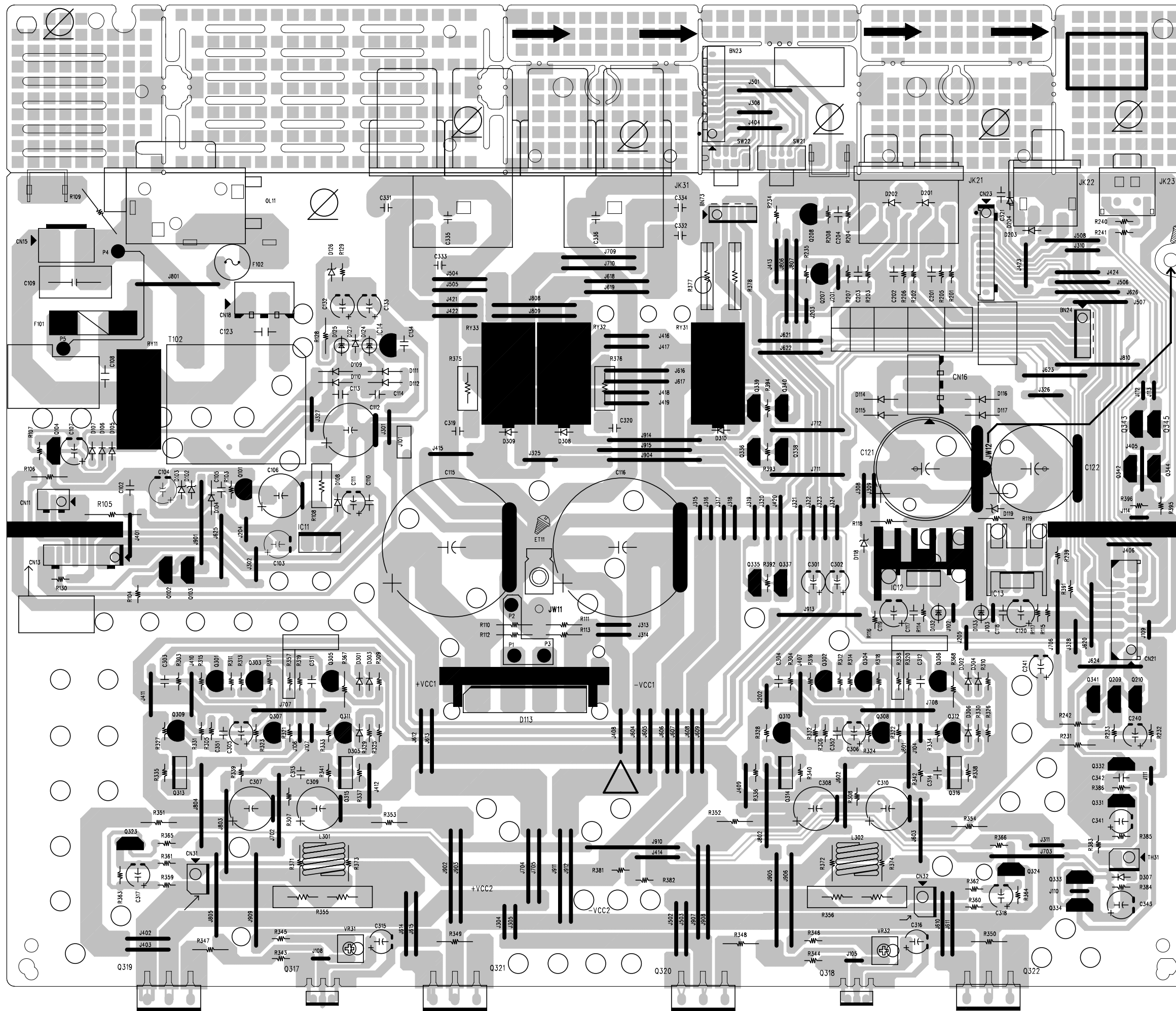
REVISION	2	4	6
1	3	5	7
SCHEMATIC DIAGRAM			SHEET
MODEL	HK3390 / HK3490		1/1
DESIGN	CHECK	APPROVE	DRAWING NO
Lee.H.W	Lee.K.M	Kim.J.H	12059BCMZ
2008.01.31	2008.01.31	2008.01.31	(BLOCK)

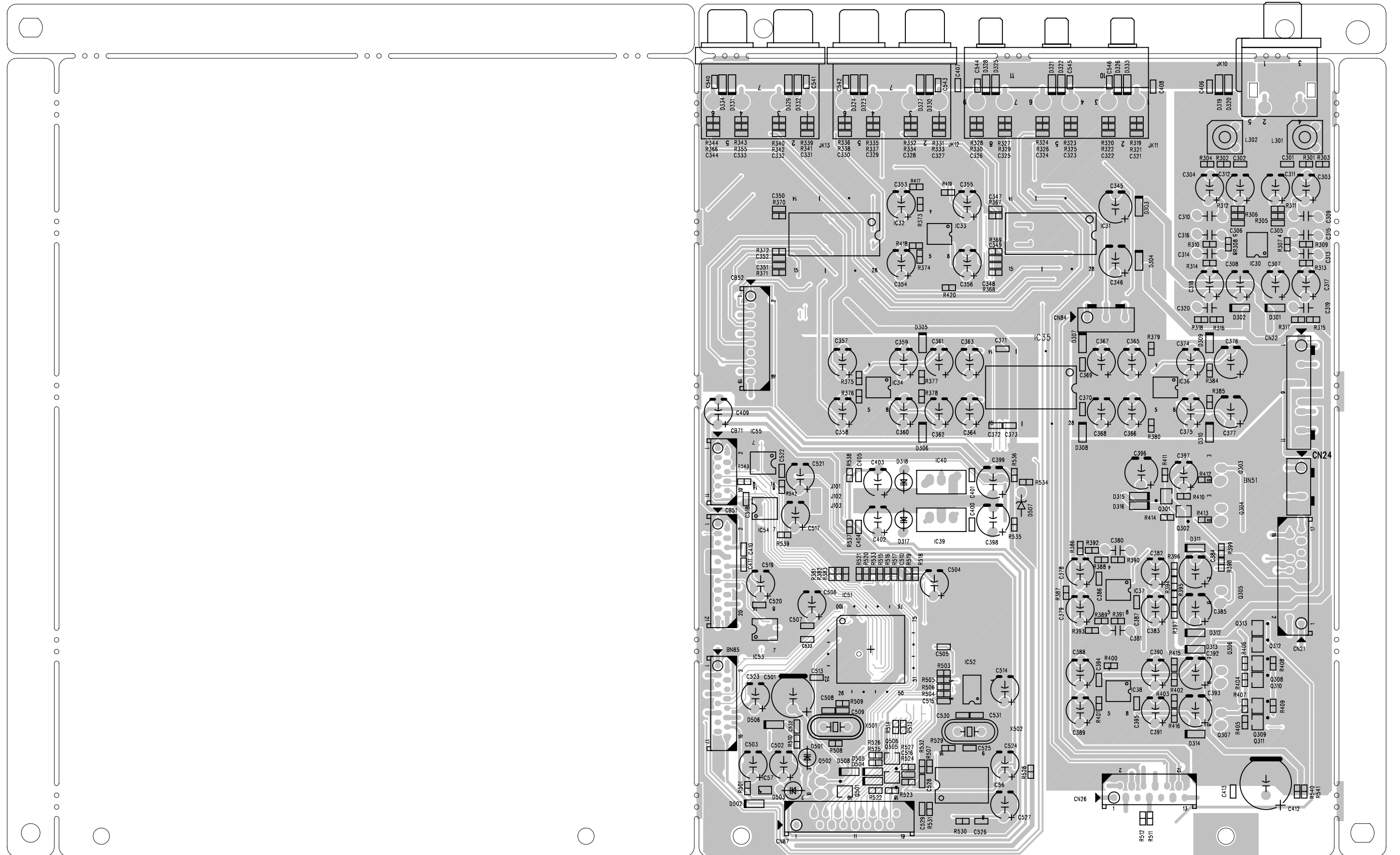


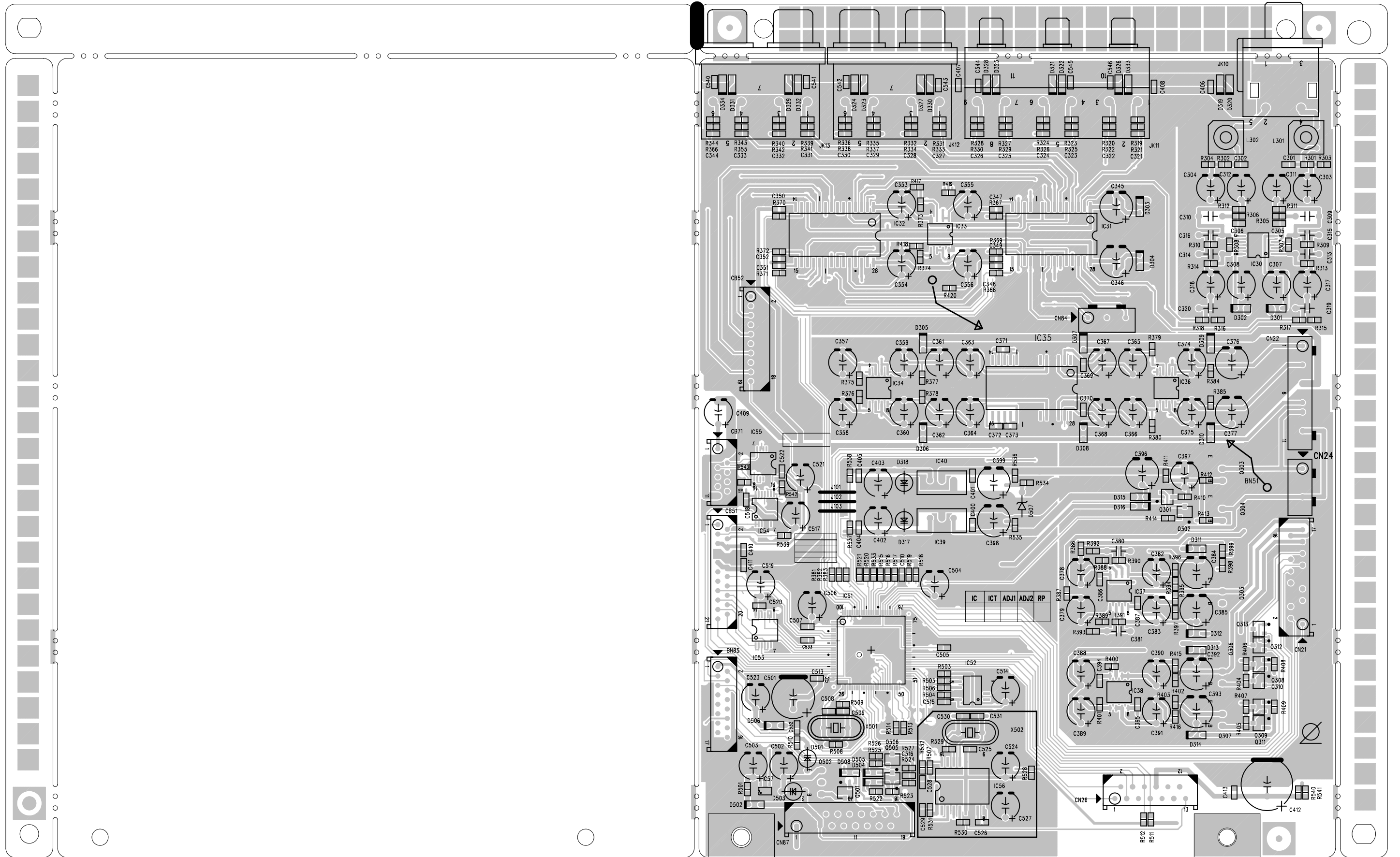












HK3390 ELECTRICAL PARTS LIST				
Ref. Designator	Part Number	Description		Qty
<b>PCB, FRONT</b>				
<i>Capacitors</i>				
C802	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000 pF, 50V	1 EA
C803	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000 pF, 50V	1 EA
C804	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000 pF, 50V	1 EA
C806	CCEA1AH471T	CAP , ELECT	470UF 10V	1 EA
C807	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C808	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C809	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.02 uF, 50V	1 EA
C810	CCBS1C222MXT	CAP , CERAMIC(2200PF/16V)	2200 pF, 16V	1 EA
C811	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000 pF, 50V	1 EA
C812	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C814	CCEA1AH331T	CAP , ELECT	330UF 10V	1 EA
C815	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.02 uF, 50V	1 EA
C817	CCBS1H473ZFT	CAP , CERAMIC(47000PF/50V)	0.047 uF, 50V	1 EA
C818	CCEA1CKS100T	CAP , ELECT	10UF 16V	1 EA
C819	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000 pF, 50V	1 EA
C880	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100 pF, 50V	1 EA
C881	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100 pF, 50V	1 EA
C882	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C883	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C900	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C901	CCKT1H101KB	CAP , CERAMIC	100PF 50V K	1 EA
C902	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C903	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C904	CCCT1H470JC	CAP , CERAMIC	47PF 50V J	1 EA
C905	CCEA1HH470T	CAP , ELECT	47UF 50V	1 EA
C906	HCQ1H183JZT	CAP , MYLAR	0.018UF 50V J	1 EA
C907	HCQ1H183JZT	CAP , MYLAR	0.018UF 50V J	1 EA
C908	HCQ1H332JZT	CAP , MYLAR	3300PF 50V J	1 EA
C909	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C910	CCKT1H101KB	CAP , CERAMIC	100PF 50V K	1 EA
C911	CCEA1HH470T	CAP , ELECT	47UF 50V	1 EA
C912	CCCT1H470JC	CAP , CERAMIC	47PF 50V J	1 EA
C913	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C914	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C915	HCQ1H823JZT	CAP , MYLAR	0.082UF 50V J	1 EA
C916	HCQ1H823JZT	CAP , MYLAR	0.082UF 50V J	1 EA
C917	HCQ1H183JZT	CAP , MYLAR	0.018UF 50V J	1 EA
C918	HCQ1H183JZT	CAP , MYLAR	0.018UF 50V J	1 EA
C919	HCQ1H332JZT	CAP , MYLAR	3300PF 50V J	1 EA
C938	CCBS1E103ZFT	CAP , CERAMIC(10000PF/25V)	0.01uF, 25V	1 EA
C949	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C950	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.02 uF, 50V	1 EA
C951	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.02 uF, 50V	1 EA
C952	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100 pF, 50V	1 EA
C953	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100 pF, 50V	1 EA
C954	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C955	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100 pF, 50V	1 EA
C963	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C967	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C968	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C993	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C994	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C995	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C996	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C997	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C998	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C999	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>PCB, FRONT</b>				
<i>Semiconductors</i>				
D854	CVDZJ8.2BT	DIODE , ZENER	ZJ8.2B 1/2W	1 EA
D855	CVDZJ8.2BT	DIODE , ZENER	ZJ8.2B 1/2W	1 EA
Q801	HVTKTC3203YT	TRANSISTOR NPN	KTC3203Y	1 EA
Q802	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
Q803	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q804	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q805	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
D801	HVD1N5819T	DIODE , SCHOTTKY	1N5819	1 EA
D802	CVD1L0345W31BOCT20	L.E.D , WHITE	L.E.D , WHITE	1 EA
D803	CVD30ASOGCAA-S7	L.E.D , ORANGE	L.E.D , ORANGE	1 EA
D804	CVD1L0345W31BOCT20	L.E.D , WHITE	L.E.D , WHITE	1 EA
D805	CVD1L0345W31BOCT20	L.E.D , WHITE	L.E.D , WHITE	1 EA
D806	CVD1L0345W31BOCT20	L.E.D , WHITE	L.E.D , WHITE	1 EA
IC91	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
<i>Resistors</i>				
R801	CRD20TF1001T	RES , CARBON	1K /1/5W /F	1 EA
R802	CRD20TF1501T	RES , CARBON	1.5K /1/5W /F	1 EA
R803	CRD20TF1801T	RES , CARBON	1.8K /1/5W /F	1 EA
R804	CRD20TF2701T	RES , CARBON	2.7K /1/5W/F	1 EA
R805	CRD20TF3301T	RES , CARBON	3.3K /1/5W/F	1 EA
R806	CRD20TF5601T	RES , CARBON(5.6K/F)	5.6K OHM 1/5W	1 EA
R807	CRD20TF1001T	RES , CARBON	1K /1/5W /F	1 EA
R808	CRD20TF1501T	RES , CARBON	1.5K /1/5W /F	1 EA
R809	CRD20TF1801T	RES , CARBON	1.8K /1/5W /F	1 EA
R810	CRD20TF2701T	RES , CARBON	2.7K /1/5W/F	1 EA
R811	CRD20TF3301T	RES , CARBON	3.3K /1/5W/F	1 EA
R812	CRD20TF5601T	RES , CARBON(5.6K/F)	5.6K OHM 1/5W	1 EA
R813	CRD20TF7501T	RES , CARBON (7.5K/F)	7.5K OHM 1/5W	1 EA
R814	CRD20TF1001T	RES , CARBON	1K /1/5W /F	1 EA
R815	CRD20TF1501T	RES , CARBON	1.5K /1/5W /F	1 EA
R816	CRD20TF1801T	RES , CARBON	1.8K /1/5W /F	1 EA
R817	CRD20TF2701T	RES , CARBON	2.7K /1/5W/F	1 EA
R820	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R826	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R827	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R828	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R829	CRD20TJ123T	RES , CARBON	12K OHM 1/5W J	1 EA
R830	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R831	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R832	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
R833		WIRE , COPPER	SN95/PB5 , 0.6	1 EA
R834	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
R835	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R837	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R838	CRD20TJ221T	RES , CARBON	220 OHM 1/5W J	1 EA
R839	CRD20TJ681T	RES , CARBON	680 OHM 1/5W J	1 EA
R840	CRD20TJ473T	RES , CARBON	47K OHM 1/5W J	1 EA
R841	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R842	CRD20TJ103T	RES , CARBON	10K OHM 1/5W J	1 EA
R843	CRD20TJ222T	RES , CARBON	2.2K OHM 1/5W J	1 EA
R900	CRD20TJ101T	RES , CARBON	100 OHM 1/5W J	1 EA
R901	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J	1 EA
R902	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J	1 EA
R903	CRD20TJ105T	RES , CARBON	1M OHM 1/5W J	1 EA
R904	CRD20TJ223T	RES , CARBON	22K OHM 1/5W J	1 EA
R905	CRD20TJ223T	RES , CARBON	22K OHM 1/5W J	1 EA
R906	CRD20TJ222T	RES , CARBON	2.2K OHM 1/5W J	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>PCB, FRONT</b>				
R907	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J	1 EA
R908	CRD20TJ331T	RES , CARBON	330 OHM 1/5W J	1 EA
R909	CRD20TJ101T	RES , CARBON	100 OHM 1/5W J	1 EA
R910	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J	1 EA
R911	CRD20TJ105T	RES , CARBON	1M OHM 1/5W J	1 EA
R912	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J	1 EA
R913	CRD20TJ104T	RES , CARBON	100K OHM 1/5W J	1 EA
R914	CRD20TJ392T	RES , CARBON	3.9K OHM 1/5W J	1 EA
R915	CRD20TJ392T	RES , CARBON	3.9K OHM 1/5W J	1 EA
R916	CRD20TJ681T	RES , CARBON	680 OHM 1/5W J	1 EA
R917	CRD20TJ681T	RES , CARBON	680 OHM 1/5W J	1 EA
R918	CRD20TJ222T	RES , CARBON	2.2K OHM 1/5W J	1 EA
R919	CRD20TJ331T	RES , CARBON	330 OHM 1/5W J	1 EA
R953	CRD20TJ101T	RES , CARBON	100 OHM 1/5W J	1 EA
R954	CRD20TJ272T	RES , CARBON	2.7K OHM 1/5W J	1 EA
R955	CRD20TJ272T	RES , CARBON	2.7K OHM 1/5W J	1 EA
R956	CRD20TJ471T	RES , CARBON	470 OHM 1/5W J	1 EA
R957	CRD20TJ471T	RES , CARBON	470 OHM 1/5W J	1 EA
R958	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
R959	CRD20TJ474T	RES , CARBON	470K OHM 1/5W	1 EA
R960	CRD20TJ474T	RES , CARBON	470K OHM 1/5W	1 EA
R951	CRQ1AJR47H	RES , FUSE	0.47 OHM 1W	1 EA
R952	CRQ1AJR47H	RES , FUSE	0.47 OHM 1W	1 EA
VR90	CVV2K21M104Z	RES , VARIABLE(100K, PUSH LOCK) BAL	100K OHM M CURVE	1 EA
VR91	CVV2K20C104Z	RES , VARIABLE(100K, PUSH LOCK) TREBLE	100K OHM C CURVE	1 EA
VR92	CVV2K20C104Z	RES , VARIABLE(100K, PUSH LOCK) BASS	100K OHM C CURVE	1 EA
VR95	CSR2A037Z	ENCODER	ENCODER	1 EA
<i>Miscellaneous</i>				
SW801	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW802	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW803	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW804	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW805	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW806	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW807	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW808	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW809	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW810	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW811	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW812	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW813	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW814	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW815	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW816	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW817	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW818	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW819	HST1A020ZT	SW , TACT	SW 1A020	1 EA
SW838	HST1A020ZT	SW , TACT	SW 1A020	1 EA
BK81	CMD1A569	BRACKET , PCB	BRACKET	1 EA
BK91	CMD1A209	BRACKET , FLT	BRACKET	1 EA
BK92	CMD1A209	BRACKET , FLT	BRACKET	1 EA
BK99	CMC2A325	PLATE , EARTH AVR155	EARTH PLATE	1 EA
BN11	CWB1C903150EN	WIRE ASS'Y (150MM)	WIRE ASS'Y	1 EA
BN13	CWB2B909350EN	WIRE ASS'Y	WIRE ASS'Y	1 EA
BN16	CWB3F903350UZ	WIRE ASS'Y (3P, 350mm)	WIRE ASS'Y	1 EA
BN22	CWZHK3490BN22	SHIELD WIRE ASS'Y	11P, 300MM, 2MM PITCH	1 EA
BN81	CWB2B905080EN	WIRE ASS'Y	WIRE ASS'Y	1 EA
BN82	CWB2B905080EN	WIRE ASS'Y	WIRE ASS'Y	1 EA
BN84	CWZHK3390BN84	SHIELD WIRE ASS'Y	WIRE ASS'Y	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>PCB, FRONT</b>				
CN12	CJP02KA060ZY	WAFER	WAFER	1 EA
CN15	CJP03GA90ZY	WAFER	WAFER	1 EA
CN33	CJP05GA19ZY	WAFER , STRAIGHT	WAFER	1 EA
CN81	CJP05GA19ZY	WAFER , STRAIGHT	WAFER	1 EA
CN82	CJP05GA19ZY	WAFER , STRAIGHT	WAFER	1 EA
CN87	CJP19GA115ZY	WAFER	WAFER	1 EA
FL1	CFL17BT031GINK	F.I.P , AVR355	17-BT-31GINK	1 EA
JK81	CJJ4S028Y	JACK , BOARD (3P SILVER)	JACK	1 EA
JK83	CJJ2E026Z	JACK , HEADPHONE(SILVER PLATE)	JACK	1 EA
JW90	CWE8202120RV	WIRE ASS'Y	WIRE ASS'Y	1 EA
JW96	CWE8202120RV	WIRE ASS'Y	WIRE ASS'Y	1 EA
JW97	CWE8202120RV	WIRE ASS'Y	WIRE ASS'Y	1 EA
JW98	CWE8202120RV	WIRE ASS'Y	WIRE ASS'Y	1 EA
JW99	CWE8202080RV	WIRE ASS'Y(1P)	WIRE ASS'Y	1 EA
RC81	HRVNJL34H380A	SENSOR , REMOCON	REMOCON SENSOR	1 EA
	CTB3+10JR	SCREW	SCREW	30 EA
	CTWS3+10GR	SCREW	SCREW	1 EA
CB87	CWC4C4A19B220B	CABLE , CARD(19P, 220MM,1.25MM)	CARD CABLE	1 EA
	CGX1A338MBC63	CAP , VOLUME	CAP	1 EA
	CGX1A390C66W	SHEET , AL FRONT HK3390	SHEET	1 EA
	KKC6B145S60	CABINET , TOP AVR350	CABINET	1 EA
	CMH1A214	HOLDER , VOLUME	AVR130/230/330	1 EA
	CMZ1A127	FILTER , FIP AVR255	FILTER	1 EA
	CTB3+6FFZR	SCREW	SCREW	1 EA
	CTB3+8JFZR	SCREW	SCREW	14 EA
	CTB4+6FFZR	SCREW	SCREW	6 EA
<b>PCB, MAIN</b>				
<i>Capacitors</i>				
C102	CCBS1E103ZFT	CAP , CERAMIC(10000PF/25V)	0.01uF, 25V	1 EA
C103	CCEA1JH470TS	CAP , ELECT	63V/47UF/105°C	1 EA
C104	CCEA1JH470TS	CAP , ELECT	63V/47UF/105°C	1 EA
C105	CCBS1E103ZFT	CAP , CERAMIC(10000PF/25V)	0.01uF, 25V	1 EA
C107	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C110	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.02 uF, 50V	1 EA
C111	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C113	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.02 uF, 50V	1 EA
C114	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.02 uF, 50V	1 EA
C117	CCBS1H473ZFT	CAP , CERAMIC(47000PF/50V)	0.047 uF, 50V	1 EA
C118	CCBS1H473ZFT	CAP , CERAMIC(47000PF/50V)	0.047 uF, 50V	1 EA
C119	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C120	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C132	CCEA1HHR47T	CAP , ELECT	0.47UF 50V	1 EA
C133	CCEA1HH220T	CAP , ELECT	22UF 50V	1 EA
C134	CCBS1H104ZFT	CAP , CERAMIC	0.1UF 50V Z	1 EA
C201	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100 pF, 50V	1 EA
C202	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100 pF, 50V	1 EA
C203	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100 pF, 50V	1 EA
C204	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100 pF, 50V	1 EA
C240	CCEA1HH1R0T	CAP , ELECT	1UF 50V	1 EA
C241	CCEA1HH0R1T	CAP , ELECT	0.1UF 50V	1 EA
C301	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C302	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C303	CCKT1H471KB	CAP , CERAMIC	470PF 50V K	1 EA
C304	CCKT1H471KB	CAP , CERAMIC	470PF 50V K	1 EA
C305	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C306	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C311	CCCT1H120JC	CAP , CERAMIC	12PF 50V J	1 EA
C312	CCCT1H120JC	CAP , CERAMIC	12PF 50V J	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>PCB, MAIN</b>				
C313	CCCT1H330JC	CAP , CERAMIC	33PF 50V J	1 EA
C314	CCCT1H330JC	CAP , CERAMIC	33PF 50V J	1 EA
C315	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C316	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C317	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C318	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C319	HCQ11H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C320	HCQ11H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C321	CCBS1H473ZFT	CAP , CERAMIC(47000PF/50V)	0.047 uF, 50V	1 EA
C331	HCQ11H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C332	HCQ11H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C333	HCQ11H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C334	HCQ11H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C335	HCQ11H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C336	HCQ11H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C341	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C342	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.02 uF, 50V	1 EA
C343	CCEA1AH471T	CAP , ELECT	470UF 10V	1 EA
C351	CCKT1H101KB	CAP , CERAMIC	100PF 50V K	1 EA
C352	CCKT1H101KB	CAP , CERAMIC	100PF 50V K	1 EA
C106	CCEA1JH471E	CAP , ELECT	470 uF, 63V	1 EA
C108	KCKDKS472ME	CAP , CERAMIC(X1/Y2/SC)	0.0047UF/2.5KV	1 EA
C109	HCQE2E104KDE	CAP , LINE ACROSS	0.1 uF, 250V	1 EA
C112	CCEA1CH332E	CAP , ELECT	3300 uF, 16V	1 EA
C115	CCET63VKL5103NK	CAP , ELECT	10000 uF, 63V	1 EA
C116	CCET63VKL5103NK	CAP , ELECT	10000 uF, 63V	1 EA
C121	CCET35VKL5822NK	CAP, ELECT (35V/8200UF, 25X40)	8200 uF, 35V	1 EA
C122	CCET35VKL5682NK	CAP , ELECT	6800UF/35V (22X35)	1 EA
C123	KCKDKS471ME	CAP , CERAMIC(KH TYPE)	470pF, 2.5KV	1 EA
C307	CCEA2AH101E	CAP , ELECT	100 uF, 100V	1 EA
C308	CCEA2AH101E	CAP , ELECT	100 uF, 100V	1 EA
C309	CCEA2AH101E	CAP , ELECT	100 uF, 100V	1 EA
C310	CCEA2AH101E	CAP , ELECT	100 uF, 100V	1 EA
<b>Semiconductors</b>				
D102	CVDZJ33BT	DIODE , ZENER	ZJ33B 1/2W	1 EA
D103	CVDZJ6.8BT	DIODE , ZENER	ZJ6.8B 1/2W	1 EA
D104	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D105	CVD1SS133MT	DIODE	1SS133	1 EA
D106	CVD1SS133MT	DIODE	1SS133	1 EA
D107	CVD1SS133MT	DIODE	1SS133	1 EA
D108	CVD1SS133MT	DIODE	1SS133	1 EA
D109	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D110	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D111	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D112	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D114	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D115	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D116	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D117	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D118	CVDZJ27BT	DIODE , ZENER	ZJ27B 1/2W	1 EA
D119	CVDZJ27BT	DIODE , ZENER	ZJ27B 1/2W	1 EA
D124	CVD1N4003SRT	DIODE , RECT	1N4003	1 EA
D125	CVD1N4003SRT	DIODE , RECT	1N4003	1 EA
D126	CVDZJ6.2BT	DIODE , ZENER	ZJ6.2B 1/2W	1 EA
D127	CVD1SS133MT	DIODE	1SS133	1 EA
D132	CVD1N4003SRT	DIODE , RECT	1N4003	1 EA
D133	CVD1N4003SRT	DIODE , RECT	1N4003	1 EA
D201	CVD1SS133MT	DIODE	1SS133	1 EA
D202	CVD1SS133MT	DIODE	1SS133	1 EA



Ref. Designator	Part Number	Description	Qty	
<b>PCB, MAIN</b>				
D203	CVD1SS133MT	DIODE	1SS133	1 EA
D204	CVD1SS133MT	DIODE	1SS133	1 EA
D301	CVD1SS133MT	DIODE	1SS133	1 EA
D302	CVD1SS133MT	DIODE	1SS133	1 EA
D303	CVD1SS133MT	DIODE	1SS133	1 EA
D304	CVD1SS133MT	DIODE	1SS133	1 EA
D305	CVD1SS133MT	DIODE	1SS133	1 EA
D306	CVD1SS133MT	DIODE	1SS133	1 EA
D307	CVD1SS133MT	DIODE	1SS133	1 EA
D308	CVD1SS133MT	DIODE	1SS133	1 EA
D309	CVD1SS133MT	DIODE	1SS133	1 EA
D310	CVD1SS133MT	DIODE	1SS133	1 EA
Q101	HVTKSC2316YT	TRANSISTOR NPN	KSC2316Y	1 EA
Q102	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q103	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q104	HVTKSC2785YT	TRANSISTOR NPN	KSC2785Y	1 EA
Q207	HVTKTC2874BT	TRANSISTOR , MUTE NPN	KTC2874B	1 EA
Q208	HVTKTC2874BT	TRANSISTOR , MUTE NPN	KTC2874B	1 EA
Q209	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
Q210	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q301	HVTKTC3200GRT	TRANSISTOR NPN	KTC3200GR	1 EA
Q302	HVTKTC3200GRT	TRANSISTOR NPN	KTC3200GR	1 EA
Q303	HVTKTC3200GRT	TRANSISTOR NPN	KTC3200GR	1 EA
Q304	HVTKTC3200GRT	TRANSISTOR NPN	KTC3200GR	1 EA
Q305	HVTKTC3200GRT	TRANSISTOR NPN	KTC3200GR	1 EA
Q306	HVTKTC3200GRT	TRANSISTOR NPN	KTC3200GR	1 EA
Q307	HVTKTA1268GRT	TRANSISTOR PNP	KTA1268GR	1 EA
Q308	HVTKTA1268GRT	TRANSISTOR PNP	KTA1268GR	1 EA
Q309	HVTKTA1268GRT	TRANSISTOR PNP	KTA1268GR	1 EA
Q310	HVTKTA1268GRT	TRANSISTOR PNP	KTA1268GR	1 EA
Q311	HVTKTC3200GRT	TRANSISTOR NPN	KTC3200GR	1 EA
Q312	HVTKTC3200GRT	TRANSISTOR NPN	KTC3200GR	1 EA
Q323	HVTKSC2785YT	TRANSISTOR NPN	KSC2785Y	1 EA
Q324	HVTKSC2785YT	TRANSISTOR NPN	KSC2785Y	1 EA
Q331	HVTKSA1175YT	TRANSISTOR PNP	KSA1175Y(DEAD)	1 EA
Q332	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
Q333	HVTKSC2785YT	TRANSISTOR NPN	KSC2785Y	1 EA
Q334	HVTKSC2785YT	TRANSISTOR NPN	KSC2785Y	1 EA
Q335	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q336	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q337	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
Q338	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
Q339	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q340	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
Q341	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q342	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
Q343	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q344	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
Q345	HVTKRC107MT	TRANSISTOR NPN	KRC107M	1 EA
Q317	HVTKTC3114A	T.R , BIAS NPN TO-126	KTC3114A	1 EA
Q318	HVTKTC3114A	T.R , BIAS NPN TO-126	KTC3114A	1 EA
Q319	HVT2SD2401P	T.R , POWER(DARINGTON) NPN	2SD2401P	1 EA
Q320	HVT2SD2401P	T.R , POWER(DARINGTON) NPN	2SD2401P	1 EA
Q321	HVT2SB1570P	T.R , POWER(DARINGTON) PNP	2SB1570P	1 EA
Q322	HVT2SB1570P	T.R , POWER(DARINGTON) PNP	2SB1570P	1 EA
Q313	HVTKTA1360Y	T.R , PRE DRIVE PNP TO-126	KTA1360Y	1 EA
Q314	HVTKTA1360Y	T.R , PRE DRIVE PNP TO-126	KTA1360Y	1 EA
Q315	HVTKTC3423Y	T.R , PRE DRIVE NPN TO-126	KTC3423Y	1 EA
Q316	HVTKTC3423Y	T.R , PRE DRIVE NPN TO-126	KTC3423Y	1 EA
D113	CMY4A138ZA	HEAT SINK ASS'Y	HEAT SINK ASS'Y	1 EA
	HVDGBJ806MF	DIODE , BRIDGE	GBJ806MF(MIC)	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>PCB, MAIN</b>				
IC11	HVIKIA7805API	REGULATOR, +5V	KIA7805API	1 EA
IC12	CVIL7815CPHA	I.C REG HEAT SINK ASS'Y(CMY4A222)	I.C ASS'Y	1 EA
	HVIL7815CP	I.C, REGULATOR	L7815CP	1 EA
IC13	CVIL7915CPVA	I.C ASS'Y NEG -15V REG	I.C ASS'Y	1 EA
	HVIL7915CP	I.C, REGULATOR NEG -15V	L7915CP	1 EA
IC14	HVIS-80842CNY-X	I.C , RESET	S-80842CNY-X	1 EA
<i>Resistor</i>				
R103	CRD20TJ122T	RES , CARBON	1.2K OHM 1/5W J	1 EA
R104	CRD20TJ473T	RES , CARBON	47K OHM 1/5W J	1 EA
R106	CRD25TJ820T	RES , CARBON	82 OHM 1/4W	1 EA
R107	CRD20TJ222T	RES , CARBON	2.2K OHM 1/5W J	1 EA
R110	CRD25TJ393T	RES , CARBON	39K OHM 1/4W	1 EA
R111	CRD25TJ393T	RES , CARBON	39K OHM 1/4W	1 EA
R112	CRD25TJ393T	RES , CARBON	39K OHM 1/4W	1 EA
R113	CRD25TJ393T	RES , CARBON	39K OHM 1/4W	1 EA
R114	CRD20TJ182T	RES , CARBON	1.8K OHM 1/5W J	1 EA
R115	CRD20TJ182T	RES , CARBON	1.8K OHM 1/5W J	1 EA
R116	CRD20TJ182T	RES , CARBON	1.8K OHM 1/5W J	1 EA
R117	CRD20TJ182T	RES , CARBON	1.8K OHM 1/5W J	1 EA
R118	CRD25TJ123T	RES , CARBON	12K OHM 1/4W	1 EA
R119	CRD25TJ123T	RES , CARBON	12K OHM 1/4W	1 EA
R128	CRD25TJ222T	RES , CARBON	2.2K OHM 1/4W	1 EA
R129	CRD20TJ103T	RES , CARBON	10K OHM 1/5W J	1 EA
R130	CRD20TJ473T	RES , CARBON	47K OHM 1/5W J	1 EA
R201	CRD20TJ101T	RES , CARBON	100 OHM 1/5W J	1 EA
R202	CRD20TJ101T	RES , CARBON	100 OHM 1/5W J	1 EA
R203	CRD20TJ101T	RES , CARBON	100 OHM 1/5W J	1 EA
R204	CRD20TJ101T	RES , CARBON	100 OHM 1/5W J	1 EA
R205	CRD20TJ184T	RES , CARBON	180K OHM 1/5W	1 EA
R206	CRD20TJ184T	RES , CARBON	180K OHM 1/5W	1 EA
R207	CRD20TJ184T	RES , CARBON	180K OHM 1/5W	1 EA
R208	CRD20TJ184T	RES , CARBON	180K OHM 1/5W	1 EA
R231	CRD25TJ822T	RES , CARBON	8.2K OHM 1/4W	1 EA
R232	CRD20TJ103T	RES , CARBON	10K OHM 1/5W J	1 EA
R233	CRD20TJ562T	RES , CARBON	5.6K OHM 1/5W J	1 EA
R234	CRD20TJ332T	RES , CARBON	3.3K OHM 1/5W J	1 EA
R235	CRD20TJ332T	RES , CARBON	3.3K OHM 1/5W J	1 EA
R239	CRD20TJ105T	RES , CARBON	1M OHM 1/5W J	1 EA
R240	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R241	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R242	CRD25TJ103T	RES , CARBON	10K OHM 1/4W	1 EA
R303	CRD20TJ333T	RES , CARBON	33K OHM 1/5W J	1 EA
R304	CRD20TJ333T	RES , CARBON	33K OHM 1/5W J	1 EA
R305	CRD20TJ471T	RES , CARBON	470 OHM 1/5W J	1 EA
R306	CRD20TJ471T	RES , CARBON	470 OHM 1/5W J	1 EA
R307	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R308	CRD20TJ100T	RES , CARBON	10 OHM 1/5W J	1 EA
R309	CRD20TJ271T	RES , CARBON	270 OHM 1/5W J	1 EA
R310	CRD20TJ271T	RES , CARBON	270 OHM 1/5W J	1 EA
R311	CRD20TJ121T	RES , CARBON	120 OHM 1/5W J	1 EA
R312	CRD20TJ121T	RES , CARBON	120 OHM 1/5W J	1 EA
R313	CRD20TJ121T	RES , CARBON	120 OHM 1/5W J	1 EA
R314	CRD20TJ121T	RES , CARBON	120 OHM 1/5W J	1 EA
R315	CRD20TJ152T	RES , CARBON	1.5K OHM 1/5W J	1 EA
R316	CRD20TJ152T	RES , CARBON	1.5K OHM 1/5W J	1 EA
R317	CRD20TJ152T	RES , CARBON	1.5K OHM 1/5W J	1 EA
R318	CRD20TJ152T	RES , CARBON	1.5K OHM 1/5W J	1 EA
R319	CRD20TJ333T	RES , CARBON	33K OHM 1/5W J	1 EA
R320	CRD20TJ333T	RES , CARBON	33K OHM 1/5W J	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>PCB, MAIN</b>				
R321	CRD20TJ122T	RES , CARBON	1.2K OHM 1/5W J	1 EA
R322	CRD20TJ122T	RES , CARBON	1.2K OHM 1/5W J	1 EA
R323	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R324	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R325	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R326	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R327	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R328	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R329	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R330	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R331	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R332	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R333	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R334	CRD20TJ561T	RES , CARBON	560 OHM 1/5W J	1 EA
R335	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
R336	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
R337	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
R338	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
R339	CRD20TJ223T	RES , CARBON	22K OHM 1/5W J	1 EA
R340	CRD20TJ223T	RES , CARBON	22K OHM 1/5W J	1 EA
R341	CRD20TJ223T	RES , CARBON	22K OHM 1/5W J	1 EA
R342	CRD20TJ223T	RES , CARBON	22K OHM 1/5W J	1 EA
R343	CRD20TJ122T	RES , CARBON	1.2K OHM 1/5W J	1 EA
R344	CRD20TJ122T	RES , CARBON	1.2K OHM 1/5W J	1 EA
R345	CRD20TJ331T	RES , CARBON	330 OHM 1/5W J	1 EA
R346	CRD20TJ331T	RES , CARBON	330 OHM 1/5W J	1 EA
R347	CRD25FJ3R3T	RES , CARBON	3.3 OHM 1/4W J	1 EA
R348	CRD25FJ3R3T	RES , CARBON	3.3 OHM 1/4W J	1 EA
R349	CRD25FJ3R3T	RES , CARBON	3.3 OHM 1/4W J	1 EA
R350	CRD25FJ3R3T	RES , CARBON	3.3 OHM 1/4W J	1 EA
R351	CRD25FJ470T	RES , CARBON	47 OHM 1/4W J	1 EA
R352	CRD25FJ470T	RES , CARBON	47 OHM 1/4W J	1 EA
R353	CRD25FJ470T	RES , CARBON	47 OHM 1/4W J	1 EA
R354	CRD25FJ470T	RES , CARBON	47 OHM 1/4W J	1 EA
R357	CRD20TJ511T	RES , CABON	510 OHM 1/5W	1 EA
R358	CRD20TJ511T	RES , CABON	510 OHM 1/5W	1 EA
R359	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R360	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R361	CRD20TJ182T	RES , CARBON	1.8K OHM 1/5W J	1 EA
R362	CRD20TJ182T	RES , CARBON	1.8K OHM 1/5W J	1 EA
R363	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R364	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R365	CRD20TJ103T	RES , CARBON	10K OHM 1/5W J	1 EA
R366	CRD20TJ103T	RES , CARBON	10K OHM 1/5W J	1 EA
R367	CRD25TJ223T	RES , CARBON	22K OHM 1/4W J	1 EA
R368	CRD25TJ223T	RES , CARBON	22K OHM 1/4W J	1 EA
R371	CRD25TJ470T	RES , CARBON	47 OHM 1/4W	1 EA
R372	CRD25TJ470T	RES , CARBON	47 OHM 1/4W	1 EA
R373	CRD25TJ470T	RES , CARBON	47 OHM 1/4W	1 EA
R374	CRD25TJ470T	RES , CARBON	47 OHM 1/4W	1 EA
R381	CRD20TJ273T	RES , CARBON	27K OHM 1/5W J	1 EA
R382	CRD20TJ273T	RES , CARBON	27K OHM 1/5W J	1 EA
R383	CRD20TJ473T	RES , CARBON	47K OHM 1/5W J	1 EA
R384	CRD20TJ152T	RES , CARBON	1.5K OHM 1/5W J	1 EA
R385	CRD20TJ473T	RES , CARBON	47K OHM 1/5W J	1 EA
R386	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R391	CRD20TJ470T	RES , CARBON	47 OHM 1/5W J	1 EA
R392	CRD20TJ470T	RES , CARBON	47 OHM 1/5W J	1 EA
R393	CRD20TJ470T	RES , CARBON	47 OHM 1/5W J	1 EA
R394	CRD20TJ470T	RES , CARBON	47 OHM 1/5W J	1 EA
R395	CRD20TJ470T	RES , CARBON	47 OHM 1/5W J	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>PCB, MAIN</b>				
R396	CRD20TJ393T	RES , CARBON	39K OHM 1/5W	1 EA
VR31	CVN1RA221B02T	RES , SEMI FIXED (220, B CURVE)	220 OHM semi fixed	1 EA
VR32	CVN1RA221B02T	RES , SEMI FIXED (220, B CURVE)	220 OHM semi fixed	1 EA
R105	CRQ1AJR47H	RES , FUSE	0.47 OHM 1W	1 EA
R108	CRG1ANJ100H	RES , METAL OXIDE FILM	10 OHM 1W J	1 EA
R355	CRF5EKR22HX2	RES , CEMENT	0.22OHM(*2), 5W	1 EA
R356	CRF5EKR22HX2	RES , CEMENT	0.22OHM(*2), 5W	1 EA
R375	CRG1ANJ100H	RES , METAL OXIDE FILM	10 OHM 1W J	1 EA
R376	CRG1ANJ100H	RES , METAL OXIDE FILM	10 OHM 1W J	1 EA
R377	CRG2ANJ271H	RES , METAL OXIDE FILM(2W/270 OHM)	270 OHM 2W	1 EA
R378	CRG2ANJ271H	RES , METAL OXIDE FILM(2W/270 OHM)	270 OHM 2W	1 EA
<i>Miscellaneous</i>				
	CMYHK3390	HEAT SINK ASSY	HEAT SINK ASS'Y	1 EA
	CHD1A012R	SCREW , SPECIAL	SCREW	10 EA
	CMD1A416	BRACKET , PCB(H/T)	BRACKET	2 EA
	CMD1A417	BRACKET , PCB	BRACKET	2 EA
	CMY1A296	HEAT SINK HK3390	HEAT SINK	1 EA
	CTB3+8JR	SCREW	SCREW	6 EA
	CTW3+8JR	SCREW	SCREW	8 EA
BK11	CMD1A569	BRACKET , PCB	BRACKET	1 EA
BK12	CMD1A569	BRACKET , PCB	BRACKET	1 EA
BN12	CWZHK3490BN12	WIRE ASS'Y	2P, 180MM, 3.96MM PITCH	1 EA
BN15	CWB3FE03350UP	WIRE ASS'Y	3P, 350MM, 3.96MM PITCH	1 EA
BN23	CJP11GB99ZY	WAFER	WAFER	1 EA
BN24	CWZHK3490BN24	SHIELD WIRE ASS'Y	5P, 50MM, 2MM PITCH	1 EA
BN73	CWZHK3390BN73	WIRE ASS'Y (5P, 600mm)	WIRE ASS'Y	1 EA
CN11	CJP03GA19ZY	WAFER , STRAIGHT(3PIN)	WAFER	1 EA
CN13	CJP09GA19ZY	WAFER, STRAIGHT, 9PIN	WAFER	1 EA
CN15	CJP02KA060ZY	WAFER	WAFER	1 EA
CN16	CJP03GA90ZY	WAFER	WAFER	1 EA
CN18	CJP02GA89ZY	WAFER	WAFER	1 EA
CN21	CJP17GA115ZY	WAFER , CARDCABLE	WAFER	1 EA
CN23	CJP11GA98ZY	WAFER	WAFER	1 EA
CN31	CJP02GA01ZY	WAFER , STRAIGHT, 2PIN	WAFER	1 EA
CN32	CJP02GA01ZY	WAFER , STRAIGHT, 2PIN	WAFER	1 EA
ET11	HJT1A025	PLATE , EARTH	EARTH PLATE	1 EA
F101	KJCF5S	HOLDER , FUSE	FUSE HOLDER	2 EA
F102	KBA2D2500TLET	FUSE	250V, 2.5A	1 EA
	CTB3+10JR	SCREW	SCREW	1 EA
	CTB3+8JR	SCREW	SCREW	1 EA
	CMY4A222	HEAT SINK	HEAT SINK	1 EA
	CTB3+8JR	SCREW	SCREW	1 EA
	CMY1A043	HEAT SINK , TR	HEAT SINK	1 EA
	CMY4A138	HEAT SINK , DIODE	HEAT SINK	1 EA
JK21	CJJ4P014W	JACK , IN/OUT	JACK	1 EA
JK22	CJJ4N082Z	JACK , IN/OUT(BK, BK)	JACK	1 EA
JK23	HJJ1D002Z	JACK , STEREO(2P 3.5PIE)	JACK	1 EA
JK31	CJJ5Q018Z	TERMINAL , 8P SPEAKER(SCREW, RD/BK/BK)	JACK	1 EA
JW12	CWE8202120RV	WIRE ASS'Y	WIRE ASS'Y	1 EA
L301	CLEY0R5KAK	COIL , SPEAKER	0.5UH K	1 EA
L302	CLEY0R5KAK	COIL , SPEAKER	0.5UH K	1 EA
OL11	KJJ7A015Z	OUTLET , AC(UL/2P/SEP)	AC, OUTLET	1 EA
RY11	HSL1A008ZE	RELAY	SDT-S-112DMR	1 EA
RY31	HSL4A004ZU	RELAY	OSA-SS-212DM3	1 EA
RY32	HSL4A004ZU	RELAY	OSA-SS-212DM3	1 EA
RY33	HSL4A004ZU	RELAY	OSA-SS-212DM3	1 EA
SW21	KSS2B016Z	SWITCH , SLIDE	SW	1 EA
SW22	KSS2B016Z	SWITCH , SLIDE	SW	1 EA
TH31	KRTP42T7D330B	THERMAL SENSOR , POSISTOR	P42T7D330BW20	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>PCB, MAIN</b>				
T102	CLT5J033ZU	TRANS , SUB	SR-68	1 EA
	CHD3A012R	SCREW , SPECIAL		1 EA
<b>INPUT PCB</b>				
<i>Capacitors</i>				
C301	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C302	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C305	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C306	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C321	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C322	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C323	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C324	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C325	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C326	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C327	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C328	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C329	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C330	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C331	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C332	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C333	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C344	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C347	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C348	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C349	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C350	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C351	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C352	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C369	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C370	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C371	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C372	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C373	CCUS1H101JA	CAP , CHIP	100PF 50V J	1 EA
C386	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C387	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C394	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C395	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C400	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C401	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C404	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C405	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C406	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA
C407	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA
C408	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA
C413	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C505	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C507	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C508	CCUS1H270JA	CAP , CHIP	27PF 50V J	1 EA
C509	CCUS1H270JA	CAP , CHIP	27PF 50V J	1 EA
C510	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C513	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C515	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C516	CCUS1H151JA	CAP , CHIP	150PF 50V J	1 EA
C532	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C533	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C540	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA
C541	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA
C542	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>INPUT PCB</b>				
C543	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA
C544	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA
C545	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA
C546	CCUS1A105KC	CAP , CHIP	1UF 10V K	1 EA
C303	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C304	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C307	CCEA1EH470T	CAP , ELECT	47UF 25V	1 EA
C308	CCEA1EH470T	CAP , ELECT	47UF 25V	1 EA
C309	HCQ1H102JZT	CAP , MYLAR	1000PF 50V J	1 EA
C310	HCQ1H102JZT	CAP , MYLAR	1000PF 50V J	1 EA
C311	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C312	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C313	HCQ1H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C314	HCQ1H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C315	HCQ1H152JZT	CAP , MYLAR	1500PF 50V J	1 EA
C316	HCQ1H152JZT	CAP , MYLAR	1500PF 50V J	1 EA
C317	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C318	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C319	HCQ1H183JZT	CAP , MYLAR	0.018UF 50V J	1 EA
C320	HCQ1H183JZT	CAP , MYLAR	0.018UF 50V J	1 EA
C345	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C346	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C357	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C358	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C359	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C360	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C361	CCEA1EH470T	CAP , ELECT	47UF 25V	1 EA
C362	CCEA1EH470T	CAP , ELECT	47UF 25V	1 EA
C363	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C364	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C365	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C366	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C367	CCEA1EH470T	CAP , ELECT	47UF 25V	1 EA
C368	CCEA1EH470T	CAP , ELECT	47UF 25V	1 EA
C374	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C375	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C376	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C377	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C378	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C379	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C380	HCQ1H102JZT	CAP , MYLAR	1000PF 50V J	1 EA
C381	HCQ1H102JZT	CAP , MYLAR	1000PF 50V J	1 EA
C382	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C383	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C384	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C385	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C388	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C389	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C390	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C391	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C392	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C393	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C396	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C397	CCEA1HHR22T	CAP , ELECT	0.22UF 50V	1 EA
C398	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C399	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C402	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C403	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C501	CCEA0JH102T	CAP , ELECT	1000UF 6.3V	1 EA
C502	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C503	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>INPUT PCB</b>				
C504	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C506	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C514	CCEA1AH101T	CAP , ELECT	100UF 10V	1 EA
C523	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C412	CCEA1EH102E	CAP , ELECT	1000UF 25V	1 EA
<i>Semiconductors</i>				
D301	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D302	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D303	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D304	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D305	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D306	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D307	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D308	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D309	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D310	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D311	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D312	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D313	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D314	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D315	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D316	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D319	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D320	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D321	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D322	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D323	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D324	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D325	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D326	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D327	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D328	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D329	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D330	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D331	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D332	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D333	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D334	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D502	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D504	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D505	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D506	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
D508	CVD1SS355T	DIODE , CHIP	1SS355T	1 EA
IC30	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
IC31	HVITC9163CFG	I.C , FUNCTION SW	TC9163CFG	1 EA
IC32	HVITC9164CFG	I.C , FUNCTION SW	TC9164CFG	1 EA
IC34	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
IC35	HVITC9459BFG	I.C , 2CH VOLUME	TC9459BFG	1 EA
IC36	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
IC37	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
IC38	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
IC51	CVIT5CD2	I.C , U-COM	T5CD2	1 EA
IC52	HVIAT24C08N10SC	I.C EEPROM	AT24C08N10SC2.7	1 EA
IC57	HVIS-80145ALMC	I.C RESET	S-80145ALMC	1 EA
Q301	HVTKRA107S	TRANSISTOR , PNP, CHIP	KRA107S	1 EA
Q302	HVTKRC107S	TRANSISTOR , CHIP NPN	KRC107S	1 EA
Q308	HVTKRA107S	TRANSISTOR , PNP, CHIP	KRA107S	1 EA
Q309	HVTKRA107S	TRANSISTOR , PNP, CHIP	KRA107S	1 EA
Q310	HVTKRC107S	TRANSISTOR , CHIP NPN	KRC107S	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>INPUT PCB</b>				
Q311	HVTKRC107S	TRANSISTOR , CHIP NPN	KRC107S	1 EA
Q312	HVTKRA107S	TRANSISTOR , PNP, CHIP	KRA107S	1 EA
Q313	HVTKRA107S	TRANSISTOR , PNP, CHIP	KRA107S	1 EA
Q501	HVTKRC107S	TRANSISTOR , CHIP NPN	KRC107S	1 EA
Q505	HVTKTA2014GR	TRANSISTOR , PNP, CHIP	KTA2014GR	1 EA
Q506	HVTKTC3875SYRTK	TRANSISTOR , NPN, CHIP	KTC3875S Y RTK	1 EA
D317	CVD1N4003SRT	DIODE , RECT	1N4003	1 EA
D318	CVD1N4003SRT	DIODE , RECT	1N4003	1 EA
D501	CVD1N4003SRT	DIODE , RECT	1N4003	1 EA
D503	CVD1N4003SRT	DIODE , RECT	1N4003	1 EA
D507	CVDZJ4.3BT	DIODE , ZENER	ZJ4.3B 1/2W	1 EA
Q303	HVTKTC2874BT	TRANSISTOR , MUTE NPN	KTC2874B	1 EA
Q304	HVTKTC2874BT	TRANSISTOR , MUTE NPN	KTC2874B	1 EA
Q305	HVTKTC2874BT	TRANSISTOR , MUTE NPN	KTC2874B	1 EA
Q306	HVTKTC2874BT	TRANSISTOR , MUTE NPN	KTC2874B	1 EA
Q307	HVTKTC2874BT	TRANSISTOR , MUTE NPN	KTC2874B	1 EA
Q502	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
IC39	HVIKIA7808API	I.C , REGULATOR +8V	KIA7808	1 EA
IC40	CVIKIA7908PI	I.C , REGULATOR(TO-220IS) -8V	KIA7908PI	1 EA
<i>Resistor</i>				
R301	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R302	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R303	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R304	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R305	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R306	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R307	CRJ10DJ564T	RES , CHIP	560K OHM 1/10W	1 EA
R308	CRJ10DJ564T	RES , CHIP	560K OHM 1/10W	1 EA
R309	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R310	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R311	CRJ10DJ681T	RES , CHIP	680 OHM 1/10W	1 EA
R312	CRJ10DJ681T	RES , CHIP	680 OHM 1/10W	1 EA
R313	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R314	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R315	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R316	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R317	CRJ10DJ821T	RES , CHIP	820 OHM 1/10W	1 EA
R318	CRJ10DJ821T	RES , CHIP	820 OHM 1/10W	1 EA
R319	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R320	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R321	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R322	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R323	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R324	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R325	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R326	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R327	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R328	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R329	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R330	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R331	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R332	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R333	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R334	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R335	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R336	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R337	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R338	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R339	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA



Ref. Designator	Part Number	Description	Qty	
<b>INPUT PCB</b>				
R340	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R341	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R342	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R343	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R344	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R355	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R366	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R367	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R368	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R369	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R370	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R371	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R372	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R375	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R376	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R377	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R378	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R379	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R380	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R381	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R382	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R383	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R384	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R385	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R386	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R387	CRJ10DJ471T	RES , CHIP	470 OHM 1/10W	1 EA
R388	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R389	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R390	CRJ10DJ112T	RES , CHIP	1.1K OHM 1/10W	1 EA
R391	CRJ10DJ112T	RES , CHIP	1.1K OHM 1/10W	1 EA
R392	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R393	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R394	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
R395	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
R396	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R397	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R398	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R399	CRJ10DJ105T	RES , CHIP	1M OHM 1/10W	1 EA
R400	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R401	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R402	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R403	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R404	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R405	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R406	CRJ10DJ105T	RES , CHIP	1M OHM 1/10W	1 EA
R407	CRJ10DJ105T	RES , CHIP	1M OHM 1/10W	1 EA
R408	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R409	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R410	CRJ10DJ562T	RES , CHIP	5.6K OHM 1/10W	1 EA
R412	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R413	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R414	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R415	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R416	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R501	CRJ10DJ562T	RES , CHIP	5.6K OHM 1/10W	1 EA
R503	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R504	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R505	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R506	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R507	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R508	CRJ10DJ105T	RES , CHIP	1M OHM 1/10W	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>INPUT PCB</b>				
R509	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R510	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R511	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R512	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R513	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R514	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R515	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R516	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R517	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R518	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R519	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R520	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R521	CRJ10DJ153T	RES , CHIP	15K OHM 1/10W	1 EA
R522	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R523	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R524	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R525	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R526	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R527	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R533	CRJ10DJ123T	RES , CHIP	12K OHM 1/10W	1 EA
R534	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
R535	CRJ10DJ273T	RES , CHIP	27K OHM 1/10W	1 EA
R536	CRJ10DJ333T	RES , CHIP	33K OHM 1/10W	1 EA
R537	CRJ10DJ183T	RES , CHIP	18K OHM 1/10W	1 EA
R538	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R539	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R540	CRJ10DJ100T	RES , CHIP	10 OHM 1/10W	1 EA
R541	CRJ10DJ100T	RES , CHIP	10 OHM 1/10W	1 EA
<i>Miscellaneous</i>				
BN51	CWE8202120AA	WIRE , 1P BLACK(120MM)	WIRE	1 EA
CN21	CJP17GA115ZY	WAFER , CARDCABLE	WAFER	1 EA
CN22	CJP11GA19ZY	WAFER , STRAIGHT	WAFER	1 EA
CN24	CJP05GA19ZY	WAFER , STRAIGHT	WAFER	1 EA
CN26	CJP13GA115ZY	WAFER , CARD CABLE	WAFER	1 EA
CN84	CJP05GA19ZY	WAFER , STRAIGHT	WAFER	1 EA
CN85	CJP17GA117ZY	WAFER	WAFER	1 EA
CN87	CJP19GA115ZY	WAFER	WAFER	1 EA
JK10	CJJ4N060Z	JACK , BOARD 2P (GOLD)	JACK	1 EA
JK11	CJJ4R019W	TERMINAL , IN/OUT	JACK	1 EA
JK12	CJJ4P014W	JACK , IN/OUT	JACK	1 EA
JK13	CJJ4P014W	JACK , IN/OUT	JACK	1 EA
L301	CLU9S004Z	COIL, TOROIDAL	COIL	1 EA
L302	CLU9S004Z	COIL, TOROIDAL	COIL	1 EA
X501	HOX20000E220C	CRYSTAL	20MHZ	1 EA
<b>PCB, VIDEO</b>				
<i>Capacitors</i>				
C868	CCKT1H101KB	CAP , CERAMIC	100PF 50V K	1 EA
C869	CCKT1H101KB	CAP , CERAMIC	100PF 50V K	1 EA
C870	CCKT1H101KB	CAP , CERAMIC	100PF 50V K	1 EA
C871	CCKT1H101KB	CAP , CERAMIC	100PF 50V K	1 EA
C872	CCKT1H101KB	CAP , CERAMIC	100PF 50V K	1 EA
C873	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C874	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C875	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C866	CCEA1HH220T	CAP , ELECT	22UF 50V	1 EA
C850	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>PCB, VIDEO</b>				
C851	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C876	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C877	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C878	CCFT1H473ZF	CAP , CERAMIC	0.047UF 50V Z	1 EA
C879	CCFT1H473ZF	CAP , CERAMIC	0.047UF 50V Z	1 EA
<i>Semiconductors</i>				
IC82	CVIKIA79S06PAT	I.C , REGULATOR(TO-92) NEG -6V	KIA79S06PAT	1 EA
IC83	CVIKIA78S06PAT	I.C , REGULATOR(TO-92) POS +8V	KIA78S06PAT	1 EA
IC81	HVINJM2296M	I.C , VIDEO SW	NJM2296M	1 EA
IC84	BVIKP1010B	IC, PHOTO COUPLER	KP1010B	1 EA
Q901	HVTKRA107MT	TRANSISTOR PNP	KRA107M	1 EA
<i>Resistor</i>				
R865	CRD20TJ332T	RES , CARBON	3.3K OHM 1/5W J	1 EA
R866	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
R861	CRD20TJ332T	RES , CARBON	3.3K OHM 1/5W J	1 EA
R862	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
R863	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
R864	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
R855	CRD20TJ332T	RES , CARBON	3.3K OHM 1/5W J	1 EA
R856	CRD20TJ101T	RES , CARBON	100 OHM 1/5W J	1 EA
R868	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R852	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R853	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R854	CRD20TJ102T	RES , CARBON	1K OHM 1/5W J	1 EA
R859	CRD20TJ470T	RES , CARBON	47 OHM 1/5W J	1 EA
R860	CRD20TJ271T	RES , CARBON	270 OHM 1/5W J	1 EA
R857	CRD20TJ392T	RES , CARBON	3.9K OHM 1/5W J	1 EA
R858	CRD20TJ473T	RES , CARBON	47K OHM 1/5W J	1 EA
R867	CRD20TJ750T	RES , CARBON	75 OHM 1/5W J	1 EA
<i>Miscellaneous</i>				
JK85	CJJ4N043Z	JACK , BOARD	JACK	1 EA
JK86	CJJ4S010Z	JACK , BOARD	JACK	1 EA
JK87	CJJ2D008Z	JACK , STEREO	JACK	1 EA
JK88	CJJ2D008Z	JACK , STEREO	JACK	1 EA
BN85	CJP17GA117ZY	WAFER	WAFER	1 EA
CN83	CJP07GB113ZY	WAFER , CARD CABLE	WAFER	1 EA
SW820	CST1A010Z	SW , TACT	SW	1 EA
<b>MISCELLANEOUS/MECHANICAL</b>				
	CHE154	CLAMPER , ARM	CLAMPER	0.12 M
	CGB1A158Y	BADGE , FRONT HARMAN/KARDON	BADGE , FRONT HARMAN/KAR	1 EA
	CGB1A201Z	BADGE , HK3390	BADGE , HK3390	1 EA
	CGL1A222	INDICATOR , VOLUME	AVR130/230/330	1 EA
	CGU1A318Y	ORNAMENT , VOLUME	ORNAMENT , VOLUME AVR255	1 EA
	CGU1A410A25R	WINDOW , FIP	WINDOW , FIP	1 EA
	CGWHK3390	FRONT PANEL ASS'Y	HK3390	1 EA
	CBN1A219B24	ROTARY KNOB	ROTARY KNOB	3 EA
	CBT2A1057	KNOB , TUNING	KNOB , TUNING AVR350	1 EA
	CBT3A1056	KNOB , STANDBY	KNOB , STANDBY AVR155	1 EA
	CGL1A265Y	INDICATOR , POWER	INDICATOR , POWER AVR155	1 EA
	CGR1A447	ORNAMENT , JACK	ORNAMENT , JACK	1 EA
	CGW2A440R4B24	PANEL , FRONT HK3390	PANEL , FRONT HK3390	1 EA
	CHR301	CLAMPER	CLAMPER	10 EA
	CMC2A326	PLATE , EARTH	PLATE , EARTH	1 EA

Ref. Designator	Part Number	Description	Qty	
<b>MISCELLANEOUS/MECHANICAL</b>				
	CMC2A338	PLATE , EARTH	PLATE , EARTH	2 EA
	CMD1A643	BRACKET , GUIDE HK3390	BRACKET , GUIDE HK3390	1 EA
	CMD2A443	BRACKET , SIDE	BRACKET , SIDE	2 EA
	CMH2A215	HOLDER , LED	HOLDER , LED	1 EA
	CUAHK3390	BOTTOM CHASSIS ASS'Y	HK3390	1 EA
	CHD1A012ZR	SCREW , SPECIAL	SCREW , SPECIAL	2 EA
	CHD1A023R	SCREW , SPECIAL	SCREW , SPECIAL	4 EA
	CHD4A012R	SCREW , SPECIAL	SCREW , SPECIAL	3 EA
	CHE170	HOLDER , PCB	HOLDER , PCB	1 EA
	CHG1A104Z	CUSHUON , RUBBER	CUSHUON , RUBBER	1 EA
	CHG1A160Z	CUSHION , RUBBER	CUSHION , RUBBER	1 EA
	CHG1A333	CUSHION , TRANS	CUSHION , TRANS	1 EA
	CHG1A354	CUSHION , SUPPORT	CUSHION , SUPPORT	4 EA
	CHG1A373	CUSHION , FOOT	CUSHION , FOOT	4 EA
	CJA523FBYA	CORD , POWER	CORD , POWER	1 EA
	CJT1A020	PIN , SHORT	PIN , SHORT	2 EA
	CKF1A384Z	PANEL , REAR HK3390	PANEL , REAR HK3390	1 EA
	CKL1A094	FOOT , A	FOOT , A	2 EA
	CKL1A095	FOOT , B	FOOT , B	2 EA
	CLZ9W003Z	FERRITE , RING	29X7.7X19	1 EA
	CLZ9Z028Z	FERRITE CORE(21.2X6.4X12.7)	K5C T	1 EA
	CMD2A487	BRACKET , TRANS	BRACKET , TRANS	1 EA
	CSHAVR155ZA	MOMS SW ASS'Y	MOMS SW ASS'Y	1 EA
	CSH1A009ZV	SWITCH , MOMS	SWITCH , MOMS	1 EA
	CWZAVR255ZA	WIRE , ASS'Y(2P,150mm)	WIRE , ASS'Y(2P,150mm)	1 EA
	CTB3+10JFZR	SCREW	SCREW	17 EA
	CTB3+6FFZR	SCREW	SCREW	3 EA
	CTB3+6JR	SCREW	SCREW	8 EA
	CTB3+8JFZR	SCREW	SCREW	1 EA
	CTB3+8JR	SCREW	SCREW	7 EA
	CTS3+8JFZR	SCREW	SCREW	4 EA
	CTW3+18JR	SCREW	SCREW	1 EA
	CTW3+8JR	SCREW	SCREW	11 EA
	CUA3A213	BOTTOM CHASSIS	BOTTOM CHASSIS	1 EA
	KHR1A028	BUSHING , AC CORD	BUSHING , AC CORD	1 EA
	KMA1A006	TERMINAL , GROUND	TERMINAL , GROUND	1 EA
CB21	CWC4C4A17B120B	CABLE , CARD	CABLE , CARD	1 EA
CB26	CWC4C4A13B120B	CABLE , CARD	CABLE , CARD	1 EA
CB85	CWC4F4A17A180B	CABLE , CARD(17P, 180mm)	CABLE , CARD(17P, 180mm)	1 EA
F101	KBA2C6300TLEY	FUSE	250V, 6.3A	1 EA
F603	KBA2C6300TLEY	FUSE	250V, 6.3A	1 EA
F604	KBA2C6300TLEY	FUSE	250V, 6.3A	1 EA
	KJCF5S	HOLDER , FUSE	for F603	2 EA
	KJCF5S	HOLDER , FUSE	for F604	2 EA
<b>HK3390 TUNER MODULE</b>		<b>CNVM9001MS0J73L</b>		

**TOSHIBA****T5CD2**

CMOS 16 Bit Microcontroller

# T5CD2

Product No.	ROM (Flash ROM)	RAM	Package
T5CD2	128K bytes	8K bytes	LQFP100-P-1414-0.50F

## 1.1 Features

- High-speed 16-bit CPU (900/L1 CPU)
  - Instruction mnemonics are upward-compatible with TLCS-900,900/H,900/L
  - 16 Mbytes of linear address space
  - General-purpose registers and register banks
  - 16-bit multiplication and division instructions; bit transfer and arithmetic instructions
  - Micro DMA: 4 channels (800ns/2 bytes at 20MHz)
- Minimum instruction execution time:200ns (at 20MHz)
- Built-in memory
  - ROM:128K bytes (Flash ROM)
  - RAM:8K bytes
- External memory expansion
  - Expandable up to 16 Mbytes (shared program/data area)
  - Can simultaneously support 8/16-bit width external data bus

### Dynamic data bus syzing

- 8-bit timers: 6 channels
- 16-bit timers: 5 channels
- General-purpose serial interface: 5 channels
  - UART/Synchronous mode: 3 channels
  - I<sup>2</sup>C bus mode: 2 channels
- 10-bit AD converter (Built-in Sample hold circuit): 16 channels
- Special timer for CLOCK
- Watchdog timer

1.2 Pin Assignment Diagram

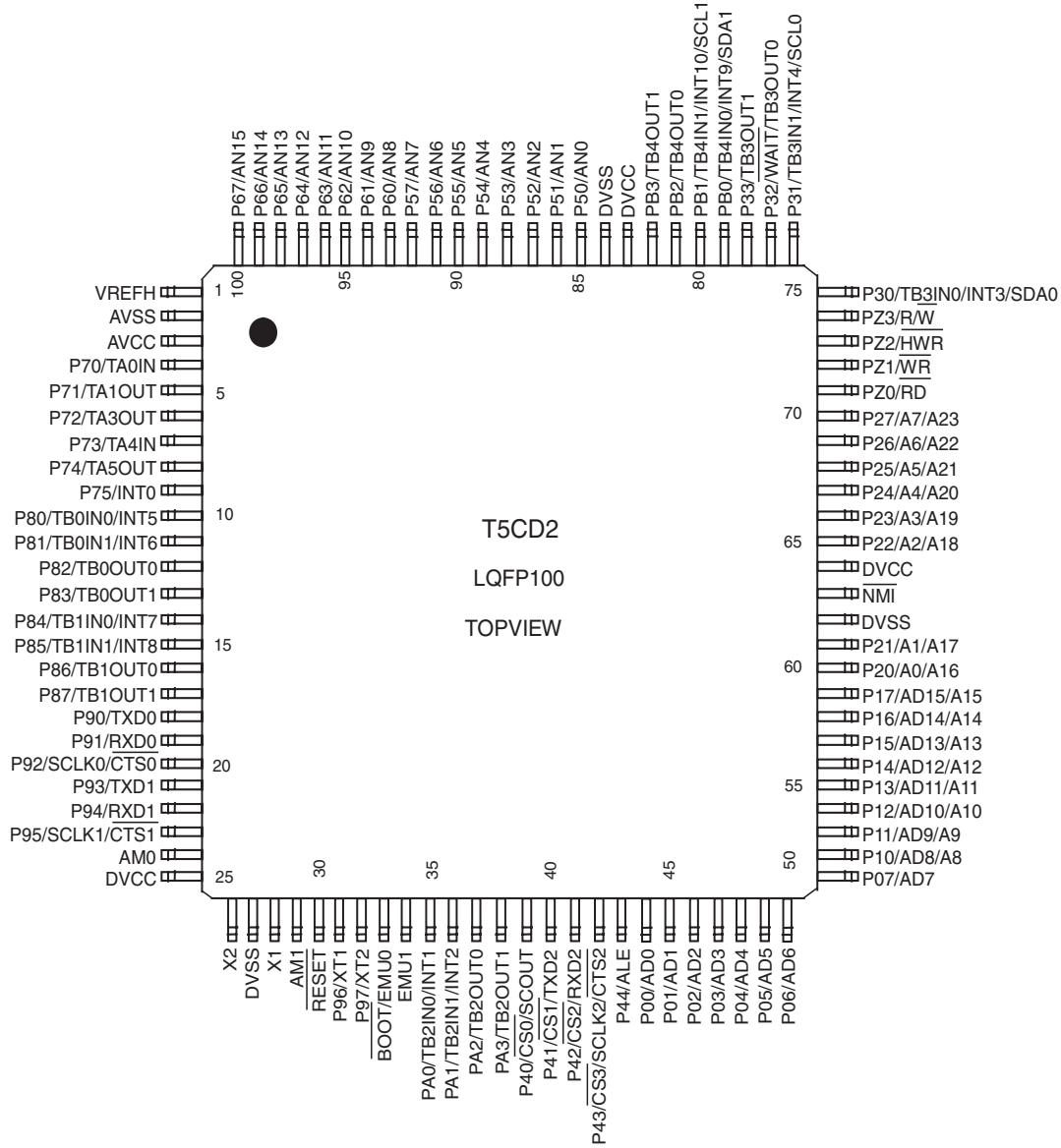


Figure 1-1 Pin Assignment

1.3 Block Diagram

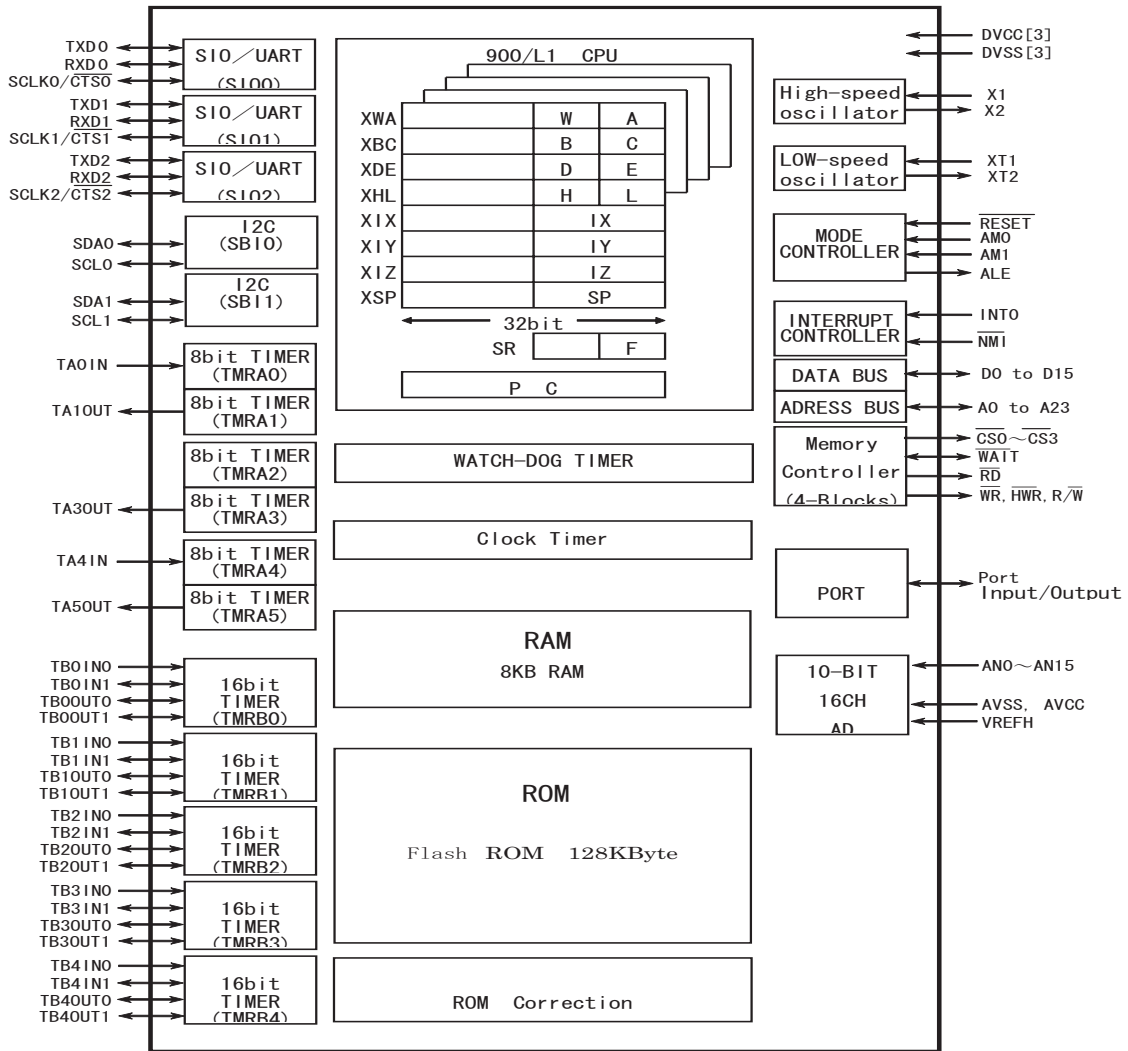


Figure 1-2 Block Diagram

## 1.4 Pin Names and Functions

Table 1-1 Pin Names and Functions(1/3)

Pin Name	Pin Number	Input / Output	Functions
P00-P07 AD0-AD7	8	IO IO	Port 0: I/O port that allows I/O to be selected at the level Address data (Lower): 0 to 7 address/data bus
P10-P17 AD8-AD15 A8-A15	8	IO IO O	Port1: I/O port that allows I/O to be selected at the bit level Address data (Upper): 8 to 15 of address/data bus Address: 8 to 15 of address bus
P20-P27 A0-A7 A16-A23	8	IO O O	Port 2: I/O port that allows I/O to be selected at the bit level Address: 0 to 7 of address bus Address: 16 to 23 of address bus
PZ0 $\overline{RD}$	1	O O	Port Z0: Output port Read: Strobe signal for reading external memory
PZ1 WR	1	O O	Port Z1: Output port Write: Strobe signal for writing data to pins AD0 to AD7
PZ2 $\overline{HWR}$	1	IO O	Port Z2: I/O port (with pull-up resistor) High write: Strobe signal for writing data to pins AD8 to AD15
PZ3 R/W	1	IO O	Port Z3: I/O port (with pull-up resistor) Read/Write: 1 represents Read or Dummy cycle; 0 represents Write cycle.
P30 TB3IN0 INT3 SDA0	1	IO I I IO	Port 30: I/O port 16-bit timer 3 input 0: Timer B3 count/capture trigger Input 0 Interrupt Request Pin 3: Interrupt request pin with programmable rising edge / falling edge. Serial bus interface data 0 in I2C bus Mode.
P31 TB3IN1 INT4 SCL0	1	IO I I IO	Port 31: I/O port 16-bit timer 3 input 1: Timer B3 count/capture trigger Input 1 Interrupt Request Pin 4: Interrupt request on rising edge Serial bus interface clock 0 in I2C bus Mode.
P32 $\overline{WAIT}$ TB3OUT0	1	IO I O	Port 32: I/O port Wait: Pin used to request CPU bus wait ((1 N) wait mode) 16-bit timer 3 output 0: Timer B3 Output 0
P33 TB3OUT1	1	IO O	Port 33: I/O port 16-bit timer 3 output 1: Timer B3 Output 1
P40 $\overline{CS0}$ SCOUT	1	IO O O	Port 40: I/O port (with pull-up resistor) Chip Select 0: Outputs 0 when address is within specified address area System Clock Output: Outputs $f_{PPH}$ or fs clock.
P41 $\overline{CS1}$ TXD2	1	IO O O	Port 41: I/O port (with pull-up resistor) Chip Select 1: Outputs 0 when address is within specified address area Serial Send Data 2
P42 $\overline{CS2}$ RXD2	1	IO O I	Port 42: I/O port (with pull-up resistor) Chip Select 2: Outputs 0 when address is within specified address area Serial Receive Data 2
P43 $\overline{CS3}$ SCLK2 $\overline{CTS2}$	1	IO O IO I	Port 43: I/O port (with pull-up resistor) Chip Select 3: Outputs 0 when address is within specified address area Serial Clock I/O 2 Serial Data Send Enable 2 (Clear to Send)
P44 ALE	1	IO O	Port 44: I/O port (with pull-up resistor) Address Latch Enable
P50-57 AN0-AN7	8	IO I	Port 5: I/O port Analog input: Pin used to input to AD converter



Table 1-1 Pin Names and Functions(2/3)

Pin Name	Pin Number	Input / Output	Functions
P60-67 AN8-AN15	8	IO I	Port 6: I/O port Analog input: Pin used to input to AD converter
P70 TA0IN	1	IO I	Port 70: I/O port 8-bit timer 0 input: Timer A0 Input
P71 TA1OUT	1	IO O	Port 71: I/O port 8-bit timer 1 output: Timer A1 Output
P72 TA3OUT	1	IO O	Port 72: I/O port 8-bit timer 3 output: Timer A3 Output
P73 TA4IN	1	IO I	Port 73: I/O port 8-bit timer 4 input: Timer A4 Input
P74 TA5OUT	1	IO O	Port 74: I/O port 8-bit timer 5 output: Timer A5 Output
P75 INT0	1	IO I	Port 75: I/O port Interrupt Request Pin 0: Interrupt request pin with programmable level / rising edge / falling edge.
P80 TB0IN0 INT5	1	IO I I	Port 80: I/O port 16-bit timer 0 input 0: Timer B0 count/capture trigger Input 0 Interrupt Request Pin 5: Interrupt request pin with programmable rising edge / falling edge.
P81 TB0IN1 INT6	1	IO I I	Port 81: I/O port 16-bit timer 0 input 1: Timer B0 count/capture trigger Input 1 Interrupt Request Pin 6: Interrupt request on rising edge
P82 TB0OUT0	1	IO O	Port 82: I/O port 16-bit timer 0 output 0: Timer B0 Output 0
P83 TB0OUT1	1	IO O	Port 83: I/O port 16-bit timer 0 output 1: Timer B0 Output 1
P84 TB1IN0 INT7	1	IO I I	Port 84: I/O port 16-bit timer 1 input 0: Timer B1 count/capture trigger Input 0 Interrupt Request Pin 7: Interrupt request pin with programmable rising edge / falling edge.
P85 TB1IN1 INT8	1	IO I I	Port 85: I/O port 16-bit timer 1 input 1: Timer B1 count/capture trigger Input 1 Interrupt Request Pin 8: Interrupt request on rising edge
P86 TB1OUT0	1	IO O	Port 86: I/O port 16-bit timer 1 output 0: Timer B1 Output 0
P87 TB1OUT1	1	IO O	Port 87: I/O port 16-bit timer 1 output 1: Timer B1 Output 1
P90 TXD0	1	IO O	Port 90: I/O port Serial Send Data 0
P91 RXD0	1	IO I	Port 91: I/O port Serial Receive Data 0
P92 SCLK0 CTS0	1	IO IO I	Port 92: I/O port Serial Clock I/O 0 Serial Data Send Enable 0 (Clear to Send)
P93 TXD1	1	IO O	Port 93: I/O port Serial Send Data 1
P94 RXD1	1	IO I	Port 94: I/O port Serial Receive Data 1

**TOSHIBA****T5CD2**

Table 1-1 Pin Names and Functions(3/3)

Pin Name	Pin Number	Input / Output	Functions
P95 SCLK1 CTS1	1	IO IO I	Port 95: I/O port Serial Clock I/O 1 Serial Data Send Enable 1 (Clear to Send)
P96 XT1	1	IO I	Port 96: I/O port Low-frequency oscillator connection pin
P97 XT2	1	IO O	Port 97: I/O port Low-frequency oscillator connection pin
PA0 TB2IN0 INT1	1	IO I I	Port A0: I/O port 16-bit timer 2 input 0:Timer B2 count/capture trigger Input 0 Interrupt Request Pin 1: Interrupt request pin with programmable rising edge / falling edge.
PA1 TB2IN1 INT2	1	IO I I	Port A1: I/O port 16-bit timer 2 input 1:Timer B2 count/capture trigger Input 1 Interrupt Request Pin 2: Interrupt request on rising edge
PA2 TB2OUT0	1	IO O	Port A2: I/O port 16-bit timer 2 output 0: Timer B2 Output 0
PA3 TB2OUT1	1	IO O	Port A3: I/O port 16-bit timer 2 output 1: Timer B2 Output 1
PB0 TB4IN0 INT9 SDA1	1	IO I I IO	Port B0: I/O port 16-bit timer 4 input 0:Timer B4 count/capture trigger Input 0 Interrupt Request Pin 9: Interrupt request pin with programmable rising edge / falling edge. Serial bus interface data 1 in I2C bus Mode.
PB1 TB4IN1 INT10 SCL1	1	IO I I IO	Port B1: I/O port 16-bit timer 4 input 1:Timer B4 count/capture trigger Input 1 Interrupt Request Pin 10: Interrupt request on rising edge Serial bus interface clock 1 in I2C bus Mode.
PB2 TB4OUT0	1	IO O	Port B2: I/O port 16-bit timer 4 output 0: Timer B4 Output 0
PB3 TB4OUT1	1	IO O	Port B3: I/O port 16-bit timer 4 output 1: Timer B4 Output 1
$\overline{\text{NMI}}$	1	I	Non-Maskable Interrupt Request Pin: Interrupt request pin with programmable falling edge or both edge.
AM0-1	2	I	Operation mode:Fixed to AM1 "1", AM0 "1".
EMU0-1	2	O	Set to Open pins
$\overline{\text{RESET}}$	1	I	Reset: initializes T5CD2. (with pull-up resistor)
VREFH	1	I	Pin for reference voltage input to AD converter
AVCC	1		Power supply pin for AD converter
AVSS	1		Power GND pin for AD converter (0 V)
X1/X2	2	IO	High frequency oscillator connection pins
DVCC	3		Power supply pins (All DVCC pins should be connected with the power supply pin.)
DVSS	3		GND pins (0 V) (All DVSS pins should be connected with the GND (0V) pin.)

Note: All pins that have built-in pull-up resistors (other than the  $\overline{\text{RESET}}$  pin) can be disconnected from the built-in pull-up resistor by software.

## Features

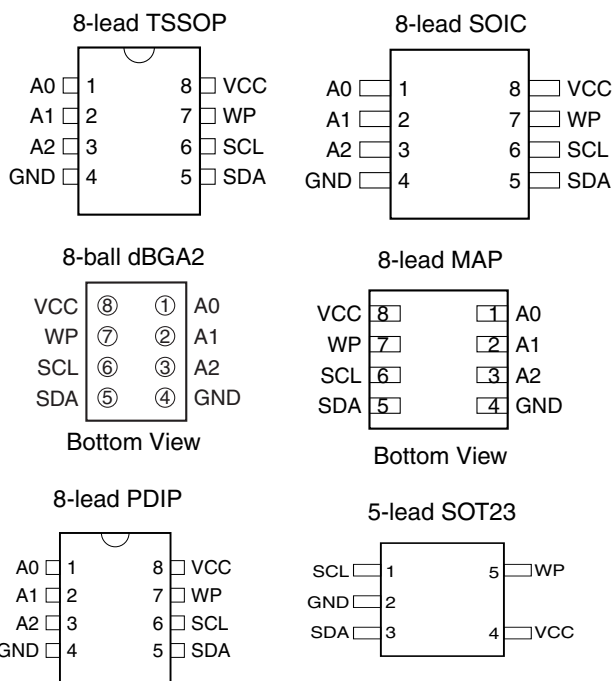
- Low-voltage and Standard-voltage Operation
  - 2.7 (V<sub>CC</sub> = 2.7V to 5.5V)
  - 1.8 (V<sub>CC</sub> = 1.8V to 5.5V)
- Internally Organized 128 x 8 (1K), 256 x 8 (2K), 512 x 8 (4K), 1024 x 8 (8K) or 2048 x 8 (16K)
- Two-wire Serial Interface
- Schmitt Trigger, Filtered Inputs for Noise Suppression
- Bidirectional Data Transfer Protocol
- 100 kHz (1.8V) and 400 kHz (2.7V, 5V) Compatibility
- Write Protect Pin for Hardware Data Protection
- 8-byte Page (1K, 2K), 16-byte Page (4K, 8K, 16K) Write Modes
- Partial Page Writes Allowed
- Self-timed Write Cycle (5 ms max)
- High-reliability
  - Endurance: 1 Million Write Cycles
  - Data Retention: 100 Years
- Automotive Grade and Lead-free/Halogen-free Devices Available
- 8-lead PDIP, 8-lead JEDEC SOIC, 8-lead MAP, 5-lead SOT23, 8-lead TSSOP and 8-ball dBGA2 Packages
- Die Sales: Wafer Form, Waffle Pack and Bumped Wafers

## Description

The AT24C01A/02/04/08A/16A provides 1024/2048/4096/8192/16384 bits of serial electrically erasable and programmable read-only memory (EEPROM) organized as 128/256/512/1024/2048 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low-power and low-voltage operation are essential. The AT24C01A/02/04/08A/16A is available in space-saving 8-lead PDIP, 8-lead JEDEC SOIC, 8-lead MAP, 5-lead SOT23 (AT24C01A/AT24C02/AT24C04), 8-lead TSSOP, and 8-ball dBGA2 packages and is accessed via a Two-wire serial interface. In addition, the entire family is available in 2.7V (2.7V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

**Table 1.** Pin Configuration

Pin Name	Function
A0 - A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect
GND	Ground
VCC	Power Supply



## Two-wire Serial EEPROM

1K (128 x 8)

2K (256 x 8)

4K (512 x 8)

8K (1024 x 8)

16K (2048 x 8)

**AT24C01A**

**AT24C02**

**AT24C04**

**AT24C08A**

**AT24C16A**

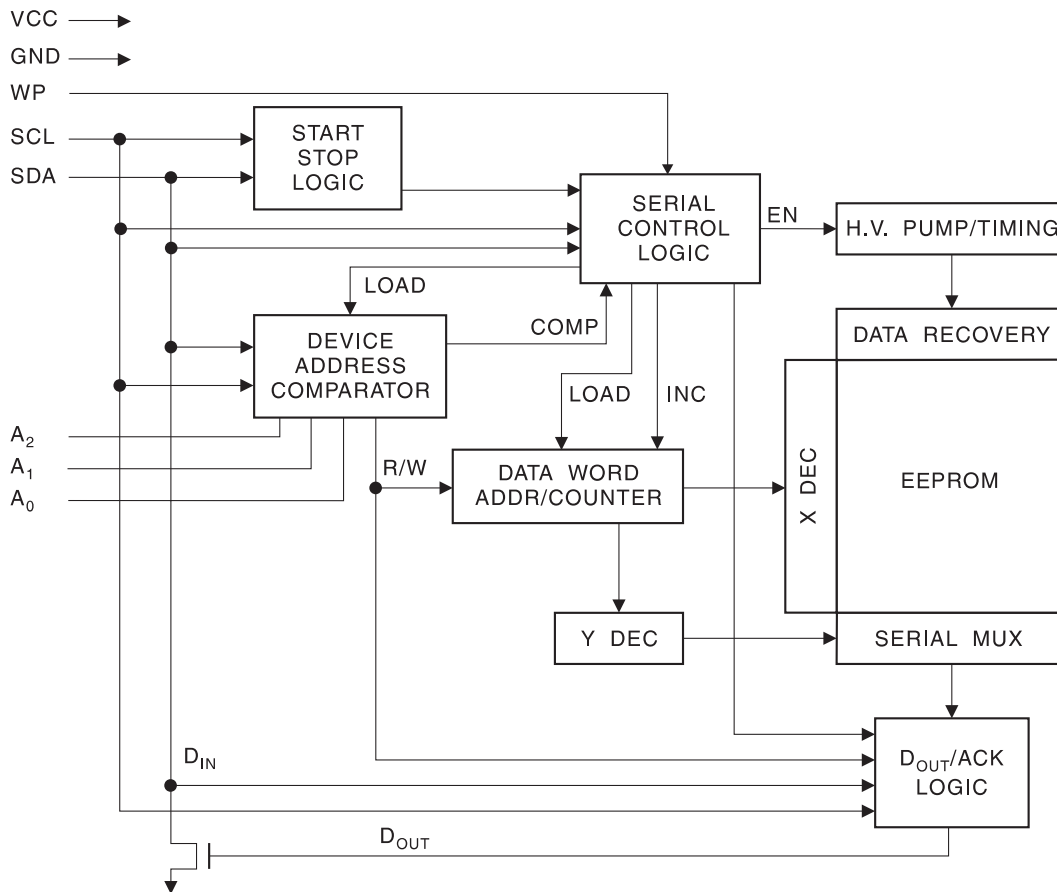


### Absolute Maximum Ratings

Operating Temperature .....	-55°C to +125°C
Storage Temperature .....	-65°C to +150°C
Voltage on Any Pin with Respect to Ground .....	-1.0V to +7.0V
Maximum Operating Voltage .....	6.25V
DC Output Current.....	5.0 mA

**\*NOTICE:** Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**Figure 1.** Block Diagram



## AT24C01A/02/04/08A/16A

### Pin Description

**SERIAL CLOCK (SCL):** The SCL input is used to positive edge clock data into each EEPROM device and negative edge clock data out of each device.

**SERIAL DATA (SDA):** The SDA pin is bidirectional for serial data transfer. This pin is open-drain driven and may be wire-ORed with any number of other open-drain or open-collector devices.

**DEVICE/PAGE ADDRESSES (A2, A1, A0):** The A2, A1 and A0 pins are device address inputs that are hard wired for the AT24C01A and the AT24C02. As many as eight 1K/2K devices may be addressed on a single bus system (device addressing is discussed in detail under the Device Addressing section).

The AT24C04 uses the A2 and A1 inputs for hard wire addressing and a total of four 4K devices may be addressed on a single bus system. The A0 pin is a no connect.

The AT24C08A only uses the A2 input for hardwire addressing and a total of two 8K devices may be addressed on a single bus system. The A0 and A1 pins are no connects.

The AT24C16A does not use the device address pins, which limits the number of devices on a single bus to one. The A0, A1 and A2 pins are no connects.

**WRITE PROTECT (WP):** The AT24C01A/02/04/08A/16A has a Write Protect pin that provides hardware data protection. The Write Protect pin allows normal Read/Write operations when connected to ground (GND). When the Write Protect pin is connected to  $V_{CC}$ , the write protection feature is enabled and operates as shown in Table 2.

**Table 2. Write Protect**

WP Pin Status	Part of the Array Protected				
	24C01A	24C02	24C04	24C08A	24C16A
At $V_{CC}$	Full (1K) Array	Full (2K) Array	Full (4K) Array	Full (8K) Array	Full (16K) Array
At GND	Normal Read/Write Operations				

### Memory Organization

**AT24C01A, 1K SERIAL EEPROM:** Internally organized with 16 pages of 8 bytes each, the 1K requires a 7-bit data word address for random word addressing.

**AT24C02, 2K SERIAL EEPROM:** Internally organized with 32 pages of 8 bytes each, the 2K requires an 8-bit data word address for random word addressing.

**AT24C04, 4K SERIAL EEPROM:** Internally organized with 32 pages of 16 bytes each, the 4K requires a 9-bit data word address for random word addressing.

**AT24C08A, 8K SERIAL EEPROM:** Internally organized with 64 pages of 16 bytes each, the 8K requires a 10-bit data word address for random word addressing.

**AT24C16A, 16K SERIAL EEPROM:** Internally organized with 128 pages of 16 bytes each, the 16K requires an 11-bit data word address for random word addressing.





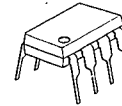
# NJM2068

## LOW-NOISE DUAL OPERATIONAL AMPLIFIER

### GENERAL DESCRIPTION

The NJM2068 is a high performance, low noise dual operational amplifier. This amplifier features popular pin-out, superior noise performance, and superior total harmonic distortion. This amplifier also features guaranteed noise performance with substantially higher gain-bandwidth product and slew rate which far exceeds that of the 4558 type amplifier. The specially designed low noise input transistors allow the NJM2068 to be used in very low noise signal processing applications such as audio preamplifiers and servo error amplifier.

### PACKAGE OUTLINE



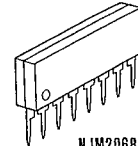
NJM2068D



NJM2068M



NJM2068V



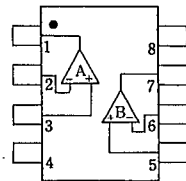
NJM2068L

### FEATURES

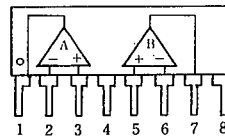
- Operating Voltage (±4V ~ ±18V)
- Low Total Harmonic Distortion (0.001% typ.)
- Low Noise Voltage (FLAT+JISA, 0.56 μV typ.)
- High Slew Rate (6V/μs typ.)
- Unity Gain Bandwidth (27MHz @f=10kHz)
- Package Outline DIP8, DMP8, SIP8, SSOP8
- Bipolar Technology

## 4

### PIN CONFIGURATION



NJM2068D  
NJM2068M  
NJM2068V

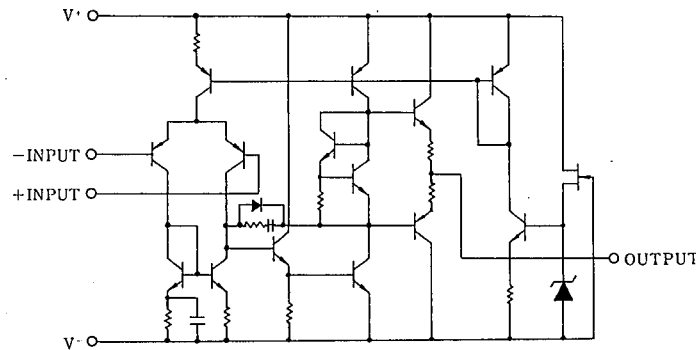


NJM2068L

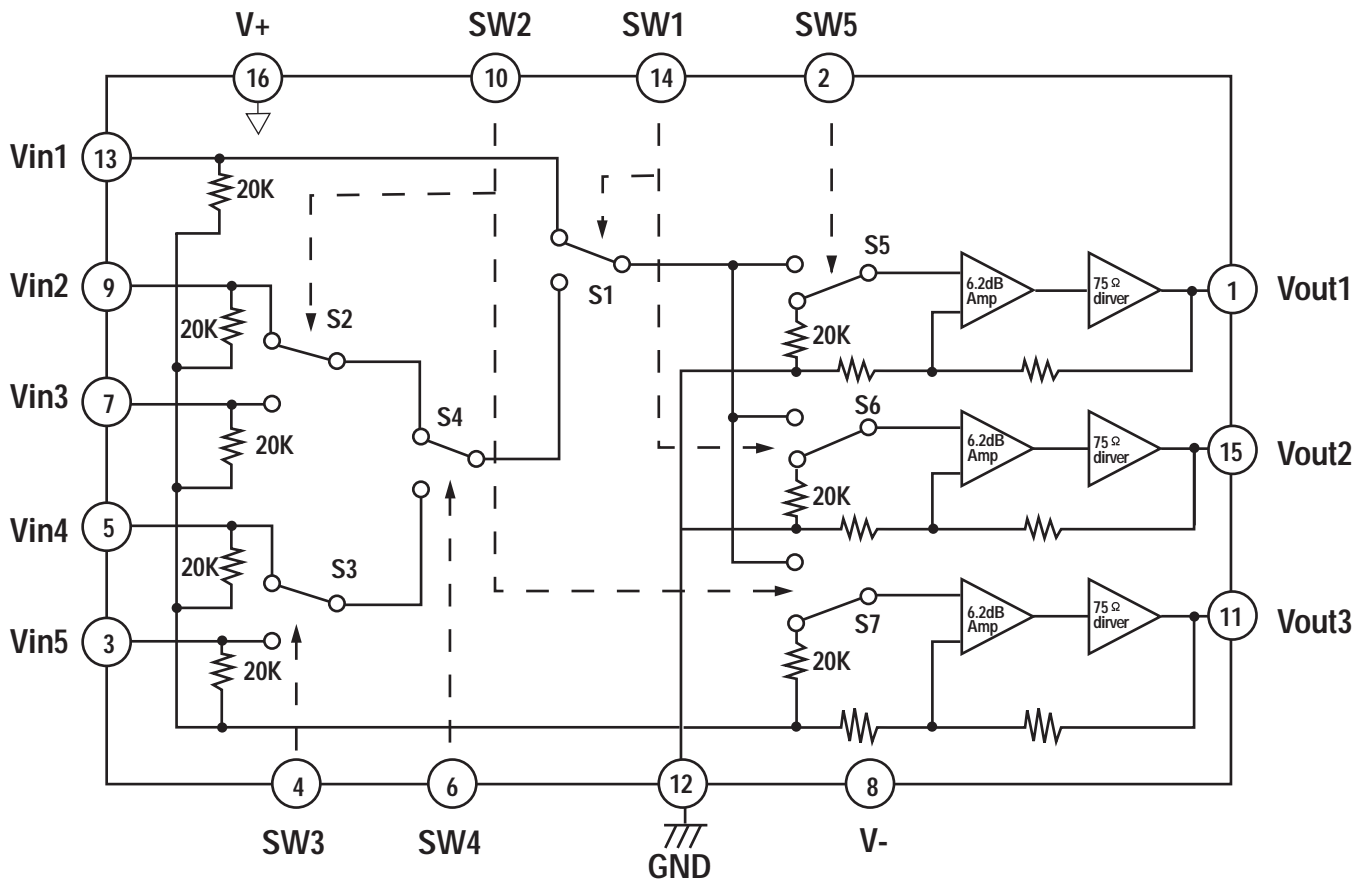
#### PIN FUNCTION

1. A OUTPUT
2. A-INPUT
3. A+INPUT
4. V-
5. B+INPUT
6. B-INPUT
7. B OUTPUT
8. V+

### EQUIVALENT CIRCUIT (1/2 Shown)



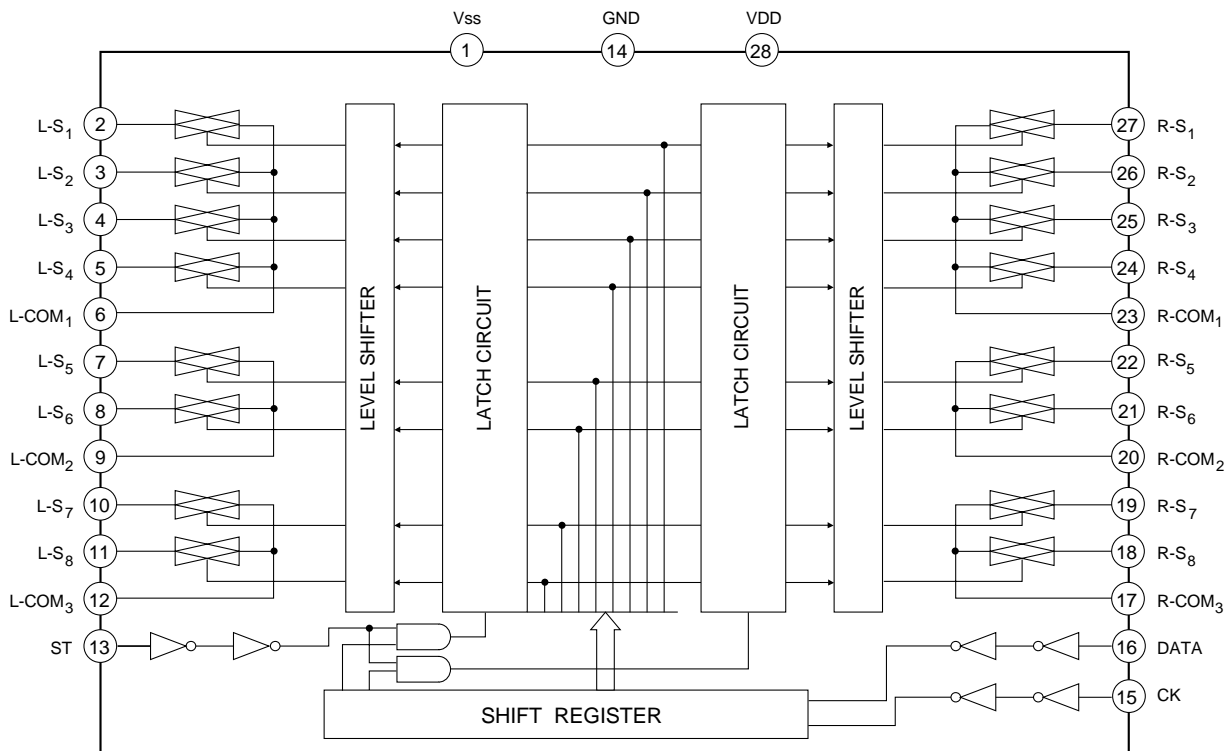
**BLOCK DIAGRAM NJM2296M IC81 VIDEO SWITCH**



**\* Normally mute**  
**Above circuits show that the switches are set at low.**

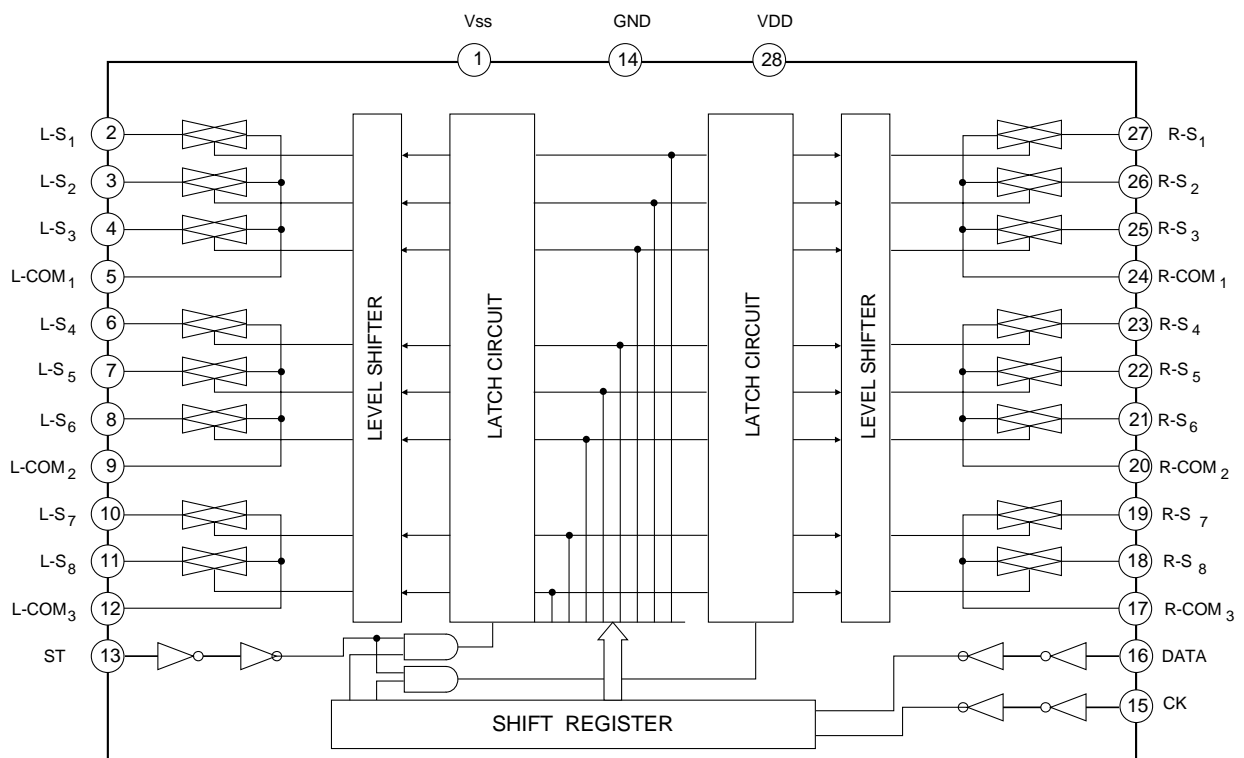
**TC9164AF (FUNCTION/INPUT) :**

**■ BLOCK DIAGRAM**



**TC9163AF (FUNCTION/INPUT) :**

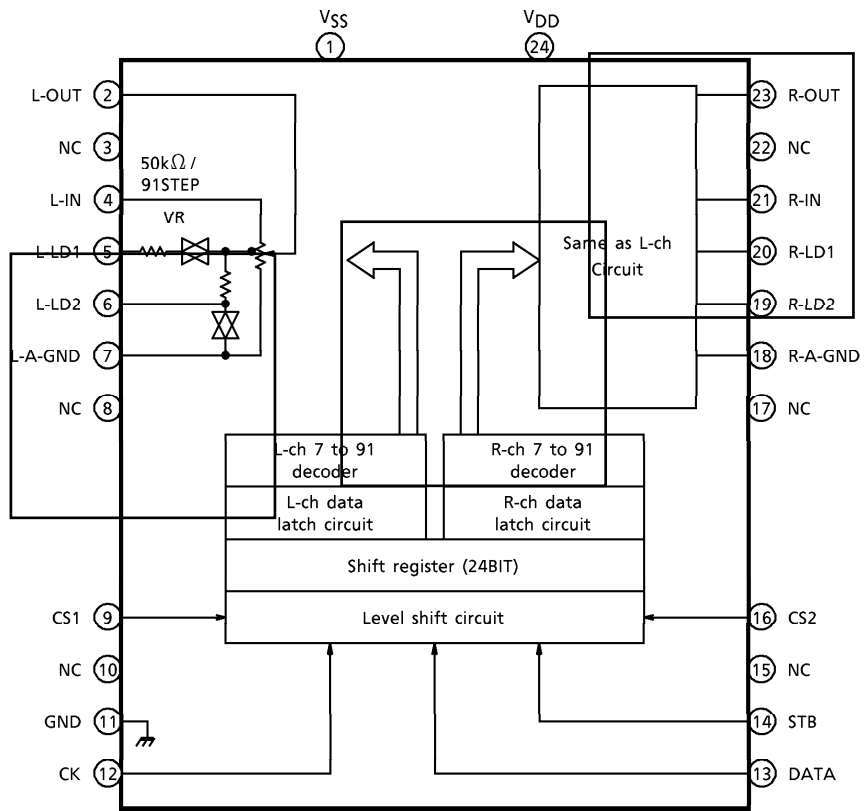
**■ BLOCK DIAGRAM**





**ELECTRONIC VOLUME CONTROL IC**

**BLOCK DIAGRAM (TC9459F)**



**PIN DESCRIPTION**

Numeral in ( ) means the pin No. of TC9459F.

PIN No.	SYMBOL	PIN NAME	FUNCTION	REMARK										
1 (1)	V <sub>SS</sub>	Negative power supply pin	When using dual power supplies $V_{DD} = 6.0 \sim 17V$ $GND = 0V$ $V_{SS} = -6.0 \sim -17V$  When using a single power supply $V_{DD} = 6.0 \sim 18V$ $GND = V_{SS} = 0V$	—										
28 (24)	V <sub>DD</sub>	Positive power supply pin												
13 (11)	GND	Digital GND pin												
3 (2)	L-OUT	Volume output pin	• Volume circuit 	—										
26 (23)	R-OUT													
5 (4)	L-IN	Volume input pin												
24 (21)	R-IN													
6 (5)	L-LD1	Loudness tap output pin			<table border="1"> <tr> <td></td> <td>LA1</td> <td>LA2</td> </tr> <tr> <td>LOUDNESS "ON"</td> <td>ON</td> <td>OFF</td> </tr> <tr> <td>LOUDNESS "OFF"</td> <td>OFF</td> <td>ON</td> </tr> </table>		LA1	LA2	LOUDNESS "ON"	ON	OFF	LOUDNESS "OFF"	OFF	ON
	LA1					LA2								
LOUDNESS "ON"	ON					OFF								
LOUDNESS "OFF"	OFF					ON								
23 (20)	R-LD1													
7 (6)	L-LD2													
22 (19)	R-LD2													
8 (7)	L-A-GND	Analog GND pin												
21 (18)	R-A-GND													
10 (9)	CS1	Chip select input pin	Up to 4 chips on the same bus can be used by switching over chip select code.	—										
19 (16)	CS2													
14 (12)	CK	Clock input pin	Data transfer clock input	Low threshold value input pin										
15 (13)	DATA	Data input pin	Volume setup serial data input											
16 (14)	STB	Strobe input pin	Data write strobe input											
2 (3)	NC	No connection	—	—										
27 (22)														
4														
25														
9 (8)														
20 (17)														
11														
18														
12 (10)														
17 (15)														

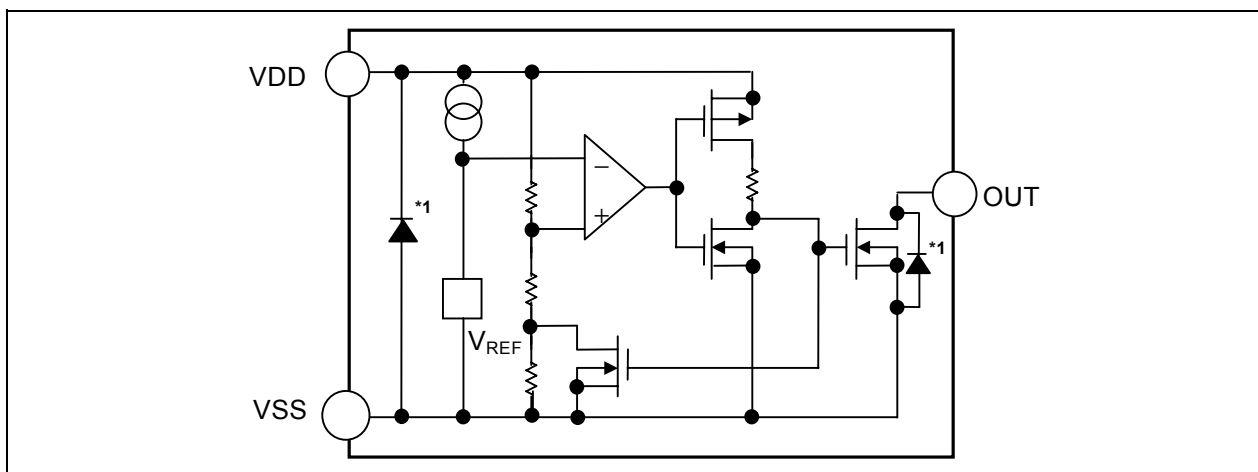
**ULTRA-SMALL PACKAGE HIGH-PRECISION VOLTAGE DETECTOR**

**S-808xxC Series**

The S-808xxC series is a series of high-precision voltage detectors developed using CMOS process. The detection voltage is fixed internally with an accuracy of  $\pm 2.0\%$ . Two output forms, Nch open-drain and CMOS output, are available. Ultra-low current consumption and miniature package lineup can meet demand from the portable device applications.

**■ Block Diagrams**

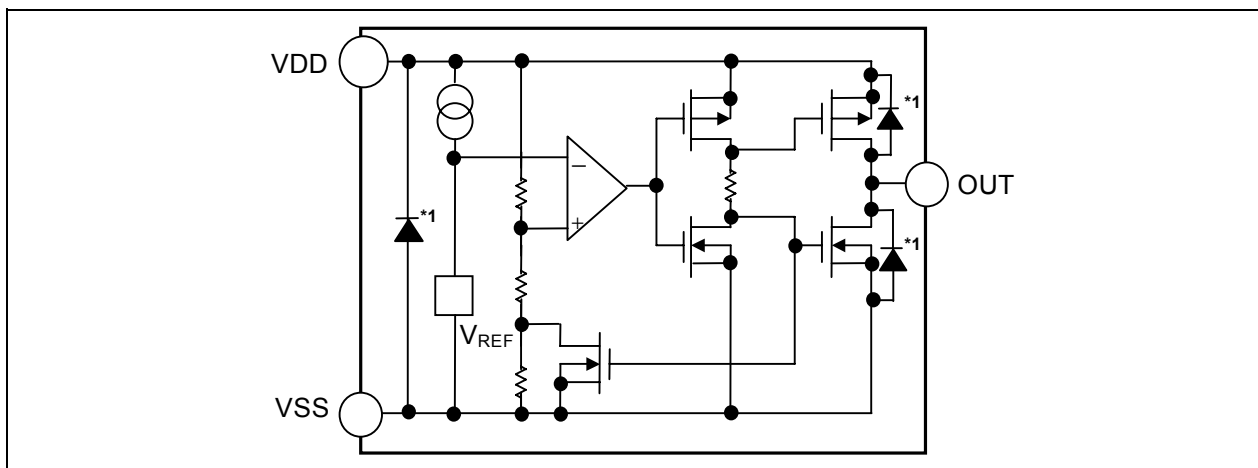
**1. Nch Open-drain Output Products**



\*1. Parasitic diode

Figure 1

**2. CMOS Output Products**



\*1. Parasitic diode

Figure 2

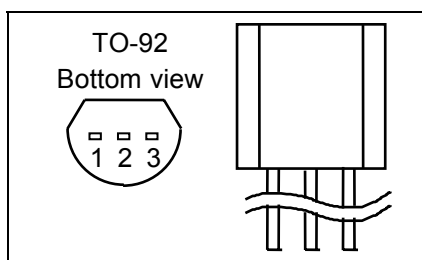


Figure 8

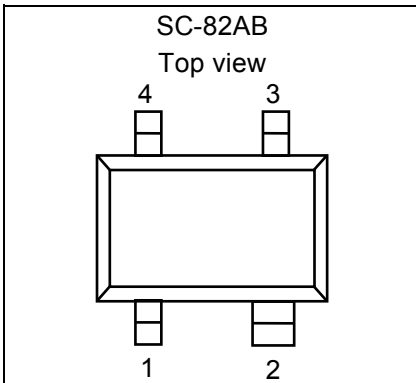
Table 11

Pin No.	Pin name	Pin description
1	OUT	Voltage detection output pin
2	VDD	Voltage input pin
3	VSS	GND pin

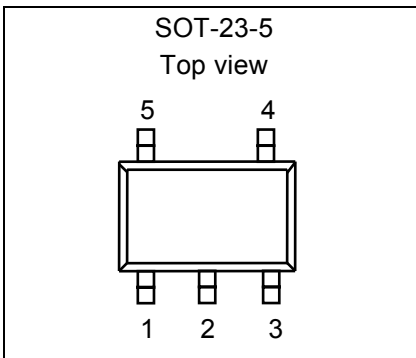
**ULTRA-SMALL PACKAGE HIGH-PRECISION VOLTAGE DETECTOR**  
**S-808xxC Series**

Rev.3.2\_00

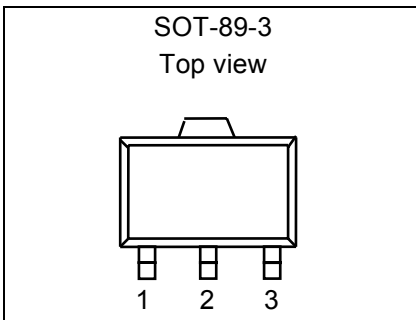
■ **Pin Configurations**



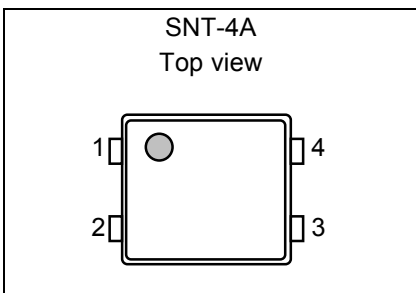
**Figure 4**



**Figure 5**



**Figure 6**



**Figure 7**

**Table 7**

Pin No.	Pin name	Pin description
1	OUT	Voltage detection output pin
2	VDD	Voltage input pin
3	NC*1	No connection
4	VSS	GND pin

\*1. The NC pin is electrically open.  
 The NC pin can be connected to VDD or VSS.

**Table 8**

Pin No.	Pin name	Pin description
1	OUT	Voltage detection output pin
2	VDD	Voltage input pin
3	VSS	GND pin
4	NC*1	No connection
5	NC*1	No connection

\*1. The NC pin is electrically open.  
 The NC pin can be connected to VDD or VSS.

**Table 9**

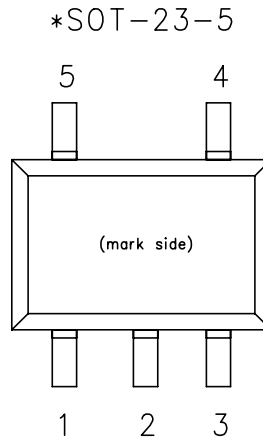
Pin No.	Pin name	Pin description
1	OUT	Voltage detection output pin
2	VDD	Voltage input pin
3	VSS	GND pin

**Table10**

Pin No.	Pin name	Pin description
1	OUT	Voltage detection output pin
2	VSS	GND pin
3	NC*1	No connection
4	VDD	Voltage input pin

\*1. The NC pin is electrically open.  
 The NC pin can be connected to VDD or VSS.

# S-80145ALMC (RESET I.C) :



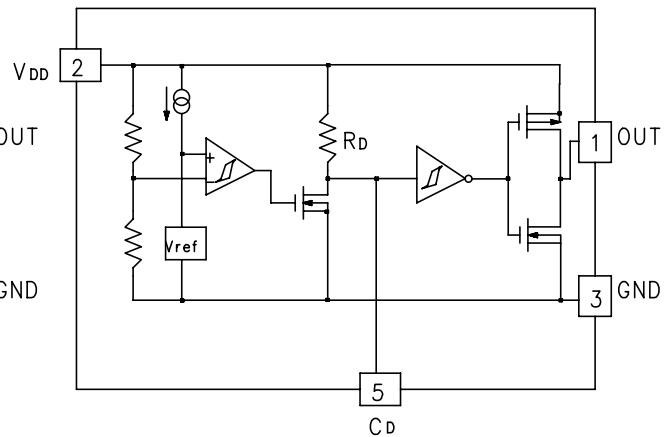
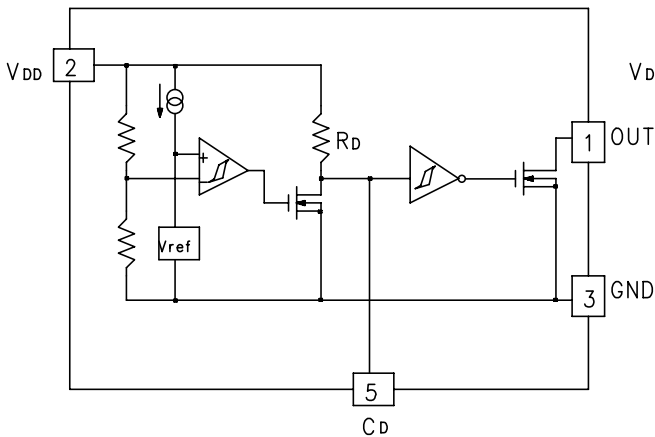
## PIN DESCRIPTION

Pin No.	Symbol	Description
1	OUT	Output Pin
2	V <sub>DD</sub>	Input and power source for device itself
3	GND	Ground Pin
4	NC	No Connection
5	C <sub>D</sub>	Pin for external capacitor

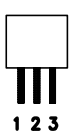
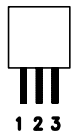
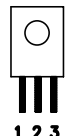
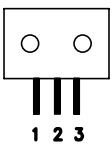
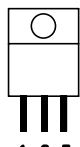
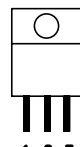
## BLOCK DIAGRAMS

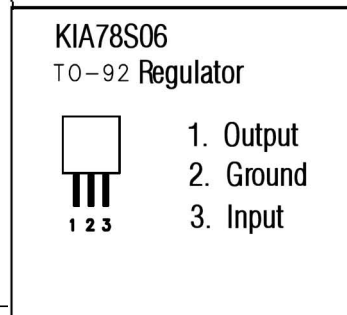
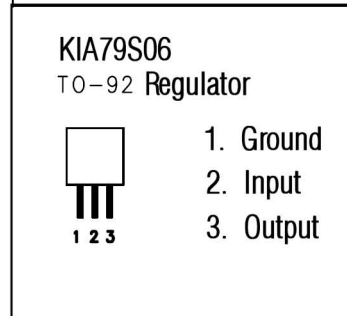
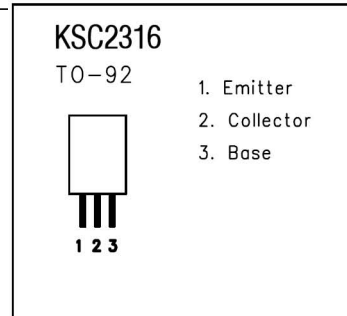
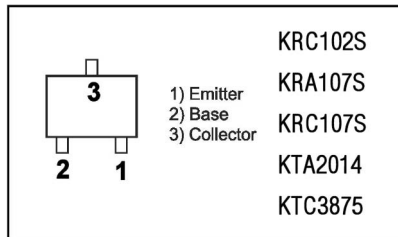
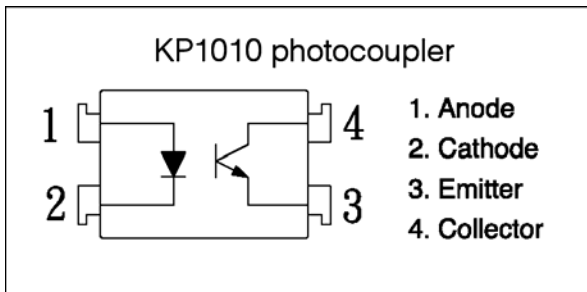
\*Nch Open Drain Output(RN5VDxxA)

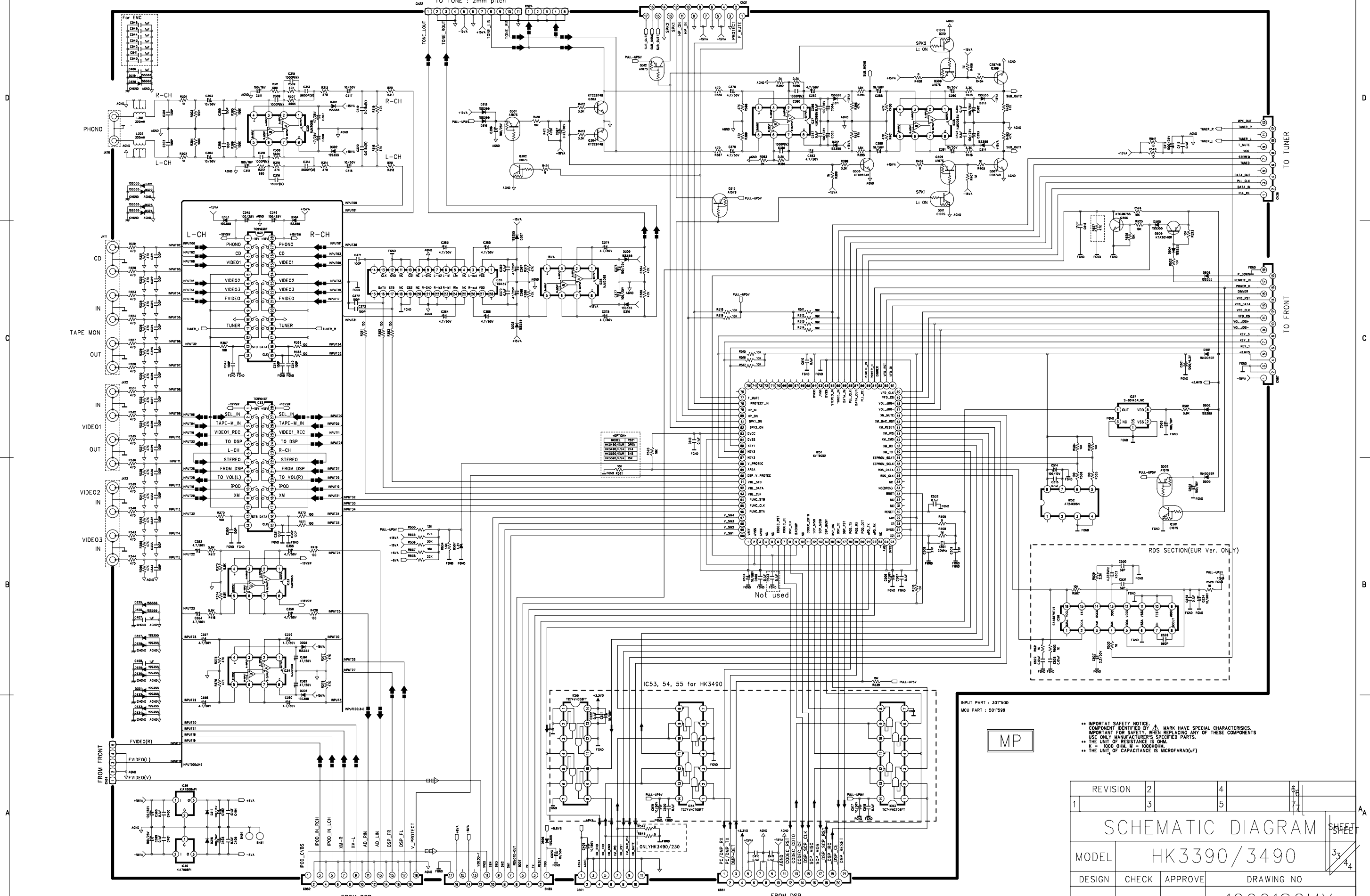
\*CMOS Output (RN5VDxxC)



### TRANSISTOR , REGULATOR IC BLOCK DIAGRAM

<p><b>TO-92M</b></p>  <p>1. Emitter 2. Collector 3. Base</p> <p><b>1 2 3</b></p> <p>KRA107M    KRC107M KSA1175Y    KSC2785Y KTC2874B</p>	<p><b>TO-92</b></p>  <p>1. Emitter 2. Collector 3. Base</p> <p><b>1 2 3</b></p> <p>KTA1271Y    KSC945CY KTA1268GR    KTC3200GR KTC3203</p>	<p><b>TO-126</b></p>  <p>1. Emitter 2. Collector 3. Base</p> <p><b>1 2 3</b></p> <p>KTA1360Y    KTC3423Y KTC3114A</p>
<p><b>TO-3P</b></p>  <p>1. Base 2. Collector 3. Emitter</p> <p><b>1 2 3</b></p> <p>2SB1570    2SD2401</p>	<p><b>TO-220</b></p>  <p>1. INPUT 2. GND 3. OUTPUT</p> <p><b>1 2 3</b></p> <p>KIA7805 L7805CP    L7815CP KIA7808    KIA7812</p>	<p><b>TO-220</b></p>  <p>1. GND 2. INPUT 3. OUTPUT</p> <p><b>1 2 3</b></p> <p>L7905CP    L7915CP KIA7908</p>

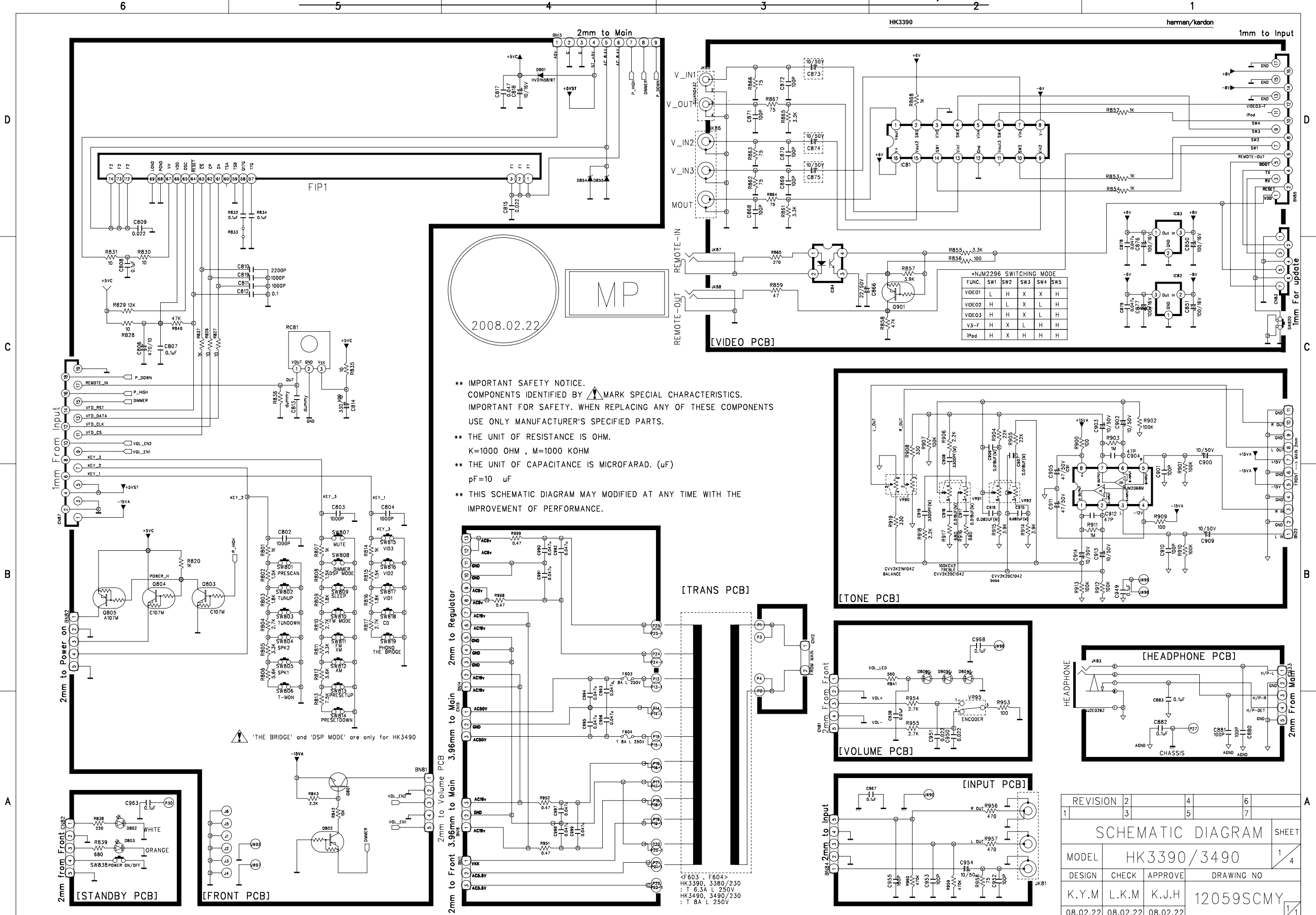




MP

IMPORTANT SAFETY NOTICE:  
 COMPONENT IDENTIFIED BY ▲ MARK HAVE SPECIAL CHARACTERISTICS.  
 IMPORTANT FOR SAFETY, WHEN REPLACING ANY OF THESE COMPONENTS,  
 USE ONLY MANUFACTURER'S SPECIFIED PARTS.  
 ● THE UNIT OF RESISTANCE IS OHM.  
 ● K = 1000 OHM, M = 100000 OHM.  
 ● THE UNIT OF CAPACITANCE IS MICROFARAD(μF)

REVISION	2	4	6
1	3	5	7
SCHEMATIC DIAGRAM SHEET			
MODEL	HK3390/3490		
DESIGN	CHECK	APPROVE	DRAWING NO
Lee, K.M.	Lee, K.M.	Kim, J.H.	12061SCMY
08/02/27	08/02/27	08/02/27	(INPUT)



**\*\* IMPORTANT SAFETY NOTICE.**  
COMPONENTS IDENTIFIED BY MARK SPECIAL CHARACTERISTICS.  
IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS  
USE ONLY MANUFACTURER'S SPECIFIED PARTS.

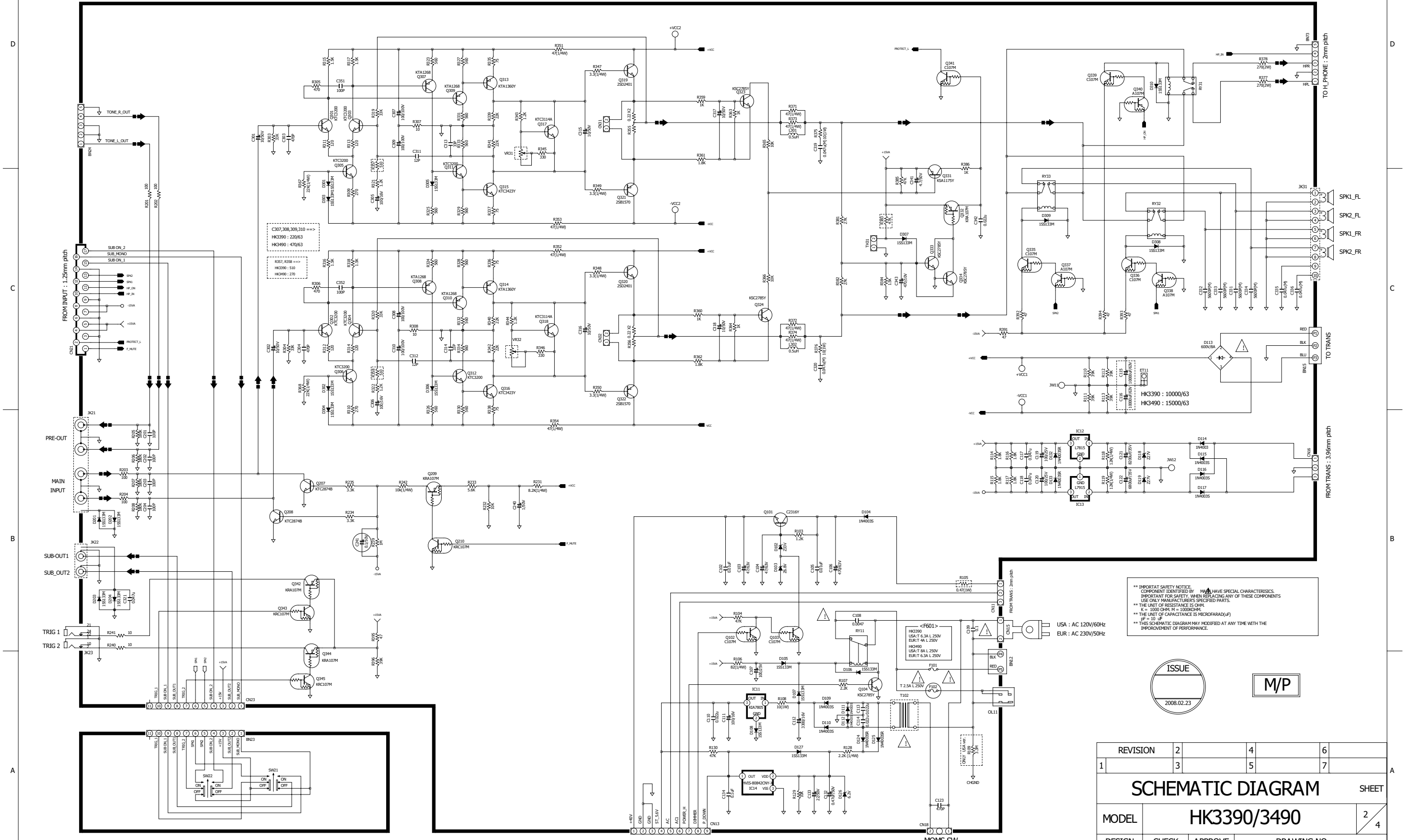
**\*\* THE UNIT OF RESISTANCE IS OHM.**  
K=1000 OHM , M=1000 KOHM

**\*\* THE UNIT OF CAPACITANCE IS MICROFARAD. (uF)**  
pF=10 uF

**\*\* THIS SCHEMATIC DIAGRAM MAY MODIFIED AT ANY TIME WITH THE  
IMPROVEMENT OF PERFORMANCE.**

REVISION	2	4	6
	3	5	7
SCHEMATIC DIAGRAM SHEET			
MODEL	HK3390/3490		
DESIGN	CHECK	APPROVE	DRAWING NO
K.Y.M	L.K.M	K.J.H	12059SCMY
08.02.22	08.02.22	08.02.22	





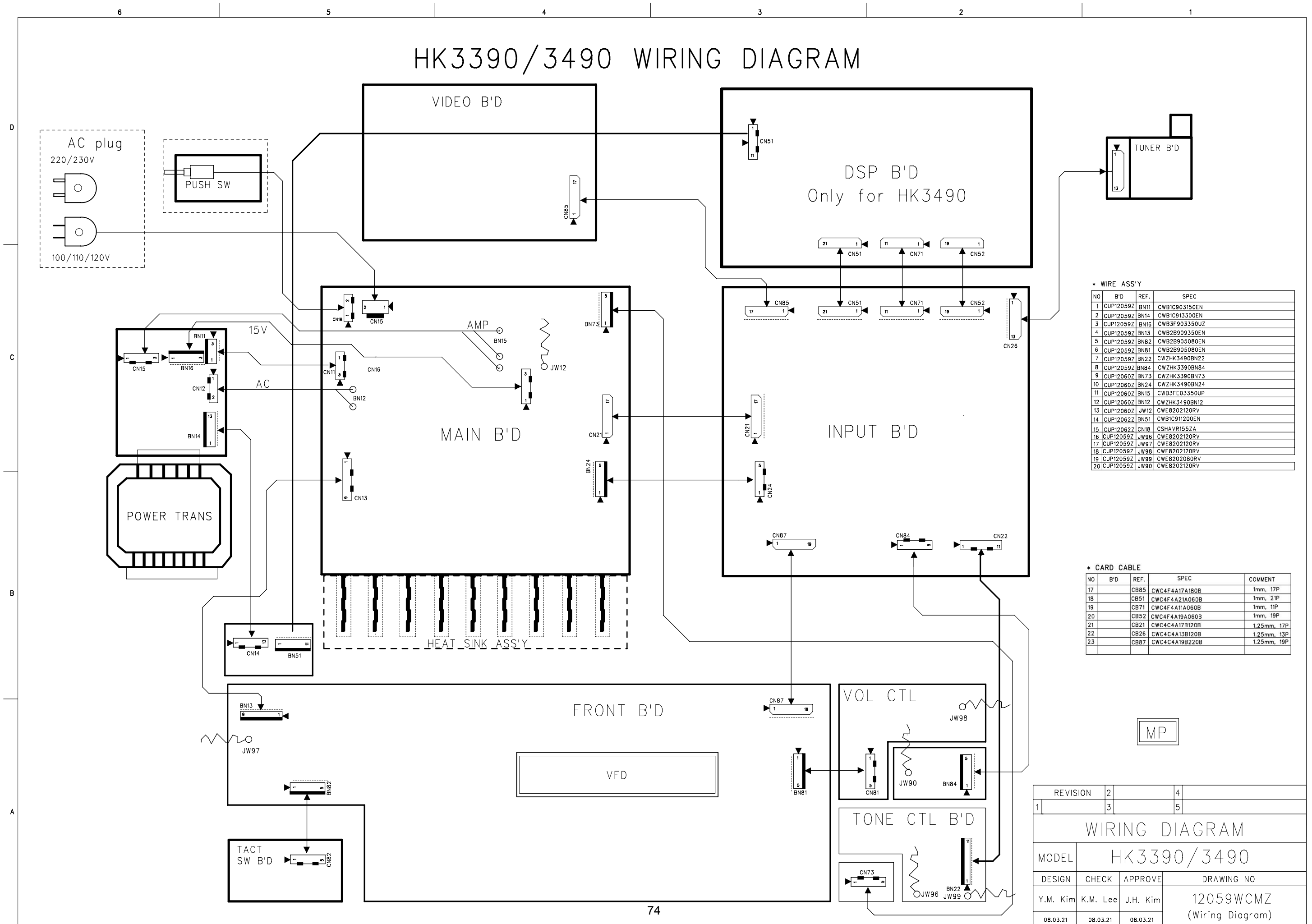
\*\* IMPORTANT SAFETY NOTICE: COMPONENT IDENTIFIED BY HAVE SPECIAL CHARACTERISTICS. IMPORTANT FOR SAFETY, WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY MANUFACTURER'S SPECIFIED PARTS.  
 \*\* THE LIMIT OF CAPACITANCE IS MICROFARAD(μF)  
 \*\* THE UNIT OF RESISTANCE IS OHM  
 \*\* THE UNIT OF INDUCTANCE IS MILLIHENRY (mH)  
 \*\* THIS SCHEMATIC DIAGRAM MAY BE MODIFIED AT ANY TIME WITH THE IMPROVEMENT OF PERFORMANCE.

ISSUE  
2008.02.23

M/P

REVISION	2	4	6
1	3	5	7
<b>SCHEMATIC DIAGRAM</b>			
MODEL	HK3390/3490		SHEET 2 4
DESIGN	CHOI	APPROVE	DRAWING NO
Choi.D.C	Lee.K.M	Kim.J.H	<b>12060SCMY</b>
08.02.23	08.02.23	08.02.23	(MAIN)

# HK3390/3490 WIRING DIAGRAM



\* WIRE ASS'Y

NO	B'D	REF.	SPEC
1	CUP12059Z	BN11	CWB1C903150EN
2	CUP12059Z	BN14	CWB1C913300EN
3	CUP12059Z	BN16	CWB3F903350UZ
4	CUP12059Z	BN13	CWB2B909350EN
5	CUP12059Z	BN82	CWB2B905080EN
6	CUP12059Z	BN81	CWB2B905080EN
7	CUP12059Z	BN22	CWZHK3490BN22
8	CUP12059Z	BN84	CWZHK3390BN84
9	CUP12060Z	BN73	CWZHK3390BN73
10	CUP12060Z	BN24	CWZHK3490BN24
11	CUP12060Z	BN15	CWB3FE03350UP
12	CUP12060Z	BN12	CWZHK3490BN12
13	CUP12060Z	JW12	CWE8202120RV
14	CUP12062Z	BN51	CWB1C911200EN
15	CUP12062Z	CN18	CSHAVR155ZA
16	CUP12059Z	JW96	CWE8202120RV
17	CUP12059Z	JW97	CWE8202120RV
18	CUP12059Z	JW98	CWE8202120RV
19	CUP12059Z	JW99	CWE8202080RV
20	CUP12059Z	JW90	CWE8202120RV

\* CARD CABLE

NO	B'D	REF.	SPEC	COMMENT
17		CB85	CWC4F4A17A180B	1mm, 17P
18		CB51	CWC4F4A21A060B	1mm, 21P
19		CB71	CWC4F4A11A060B	1mm, 11P
20		CB52	CWC4F4A19A060B	1mm, 19P
21		CB21	CWC4C4A17B120B	1.25mm, 17P
22		CB26	CWC4C4A13B120B	1.25mm, 13P
23		CB87	CWC4C4A19B220B	1.25mm, 19P

REVISION	2	4
1	3	5
WIRING DIAGRAM		
MODEL	HK3390/3490	
DESIGN	CHECK	APPROVE
Y.M. Kim	K.M. Lee	J.H. Kim
08.03.21	08.03.21	08.03.21
		DRAWING NO
		12059WCMZ
		(Wiring Diagram)