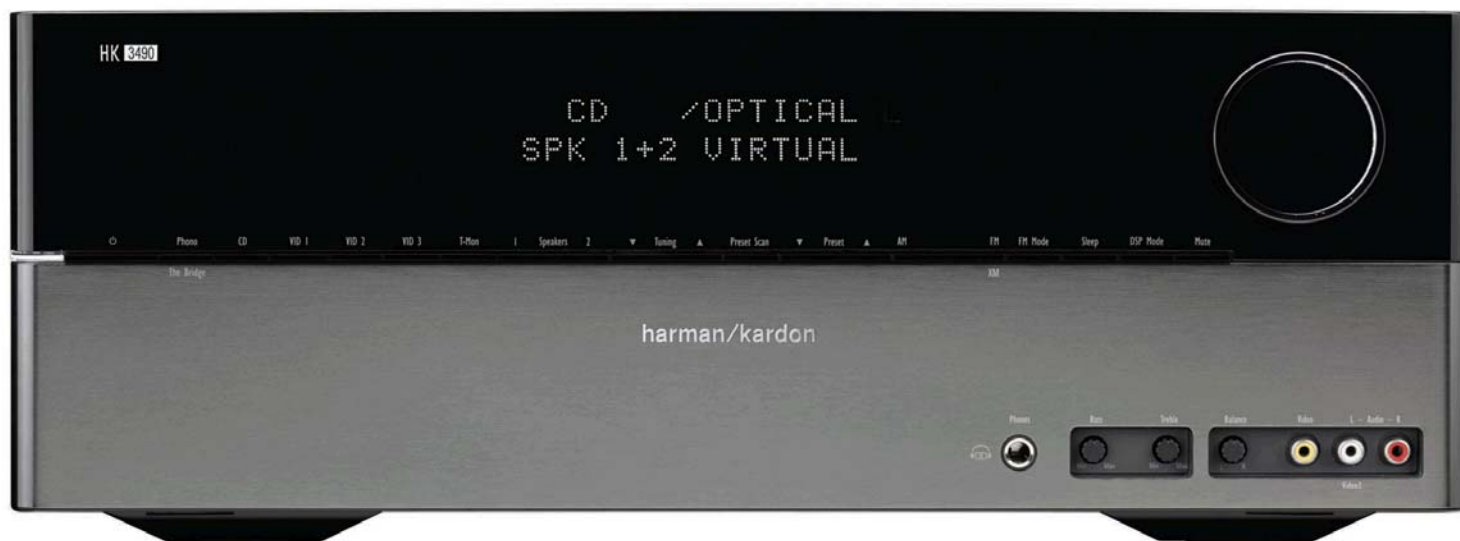


harman/kardon

HK3490

STEREO RECEIVER

SERVICE MANUAL



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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 change 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 of 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)

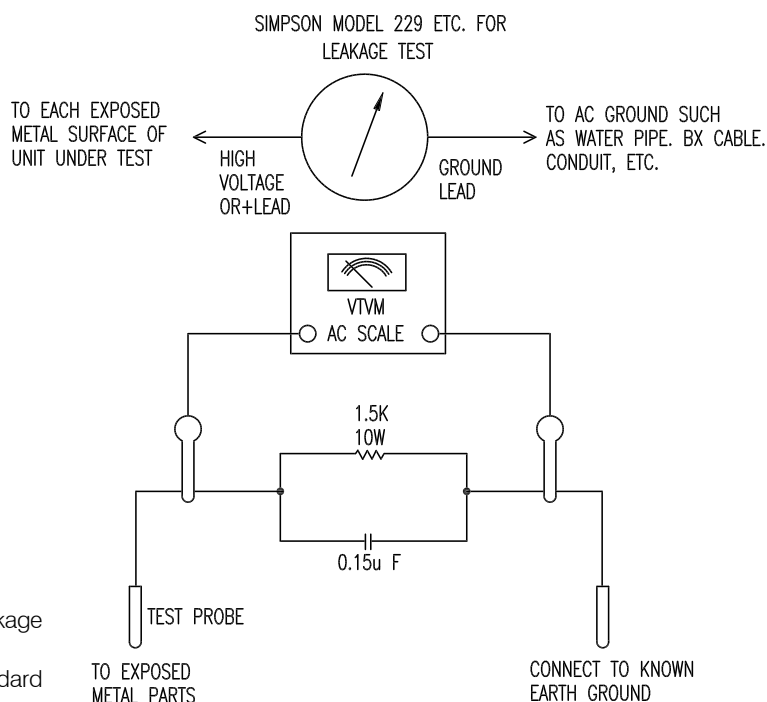
Before returning the unit to the user, perform the following safety checks :

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 3490 TECHNICAL SPECIFICATIONS

Audio Section

Stereo Mode:

Continuous Average Power (FTC):

120 Watts per channel, 20Hz – 20kHz,
@ <0.07% THD, both channels driven into 8 ohms
150 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): ±45 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 1.3µV/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: <1W standby, 310W maximum
(both channels driven)

Dimensions:	(Product)	(Shipping)
Width:	17-3/8" (442mm)	22" (560mm)
Height:	6-3/8" (163mm)	10-5/8" (270mm)
Depth:	15" (382mm)	18-5/16" (465mm)
	(Product)	(Shipping)
Weight:	23 lb (10.4kg)	27.3 lb (12.4kg)

Depth measurement includes knobs, buttons and terminal connections.

Height measurement includes feet and chassis.

All features and specifications are subject to change without notice.

Harman Kardon is a trademark of Harman International Industries, Incorporated, registered in the United States and/or other countries. Designed to Entertain and The Bridge logo are trademarks of Harman International Industries, Incorporated.

CEA is a registered trademark of the Consumer Electronics Association.

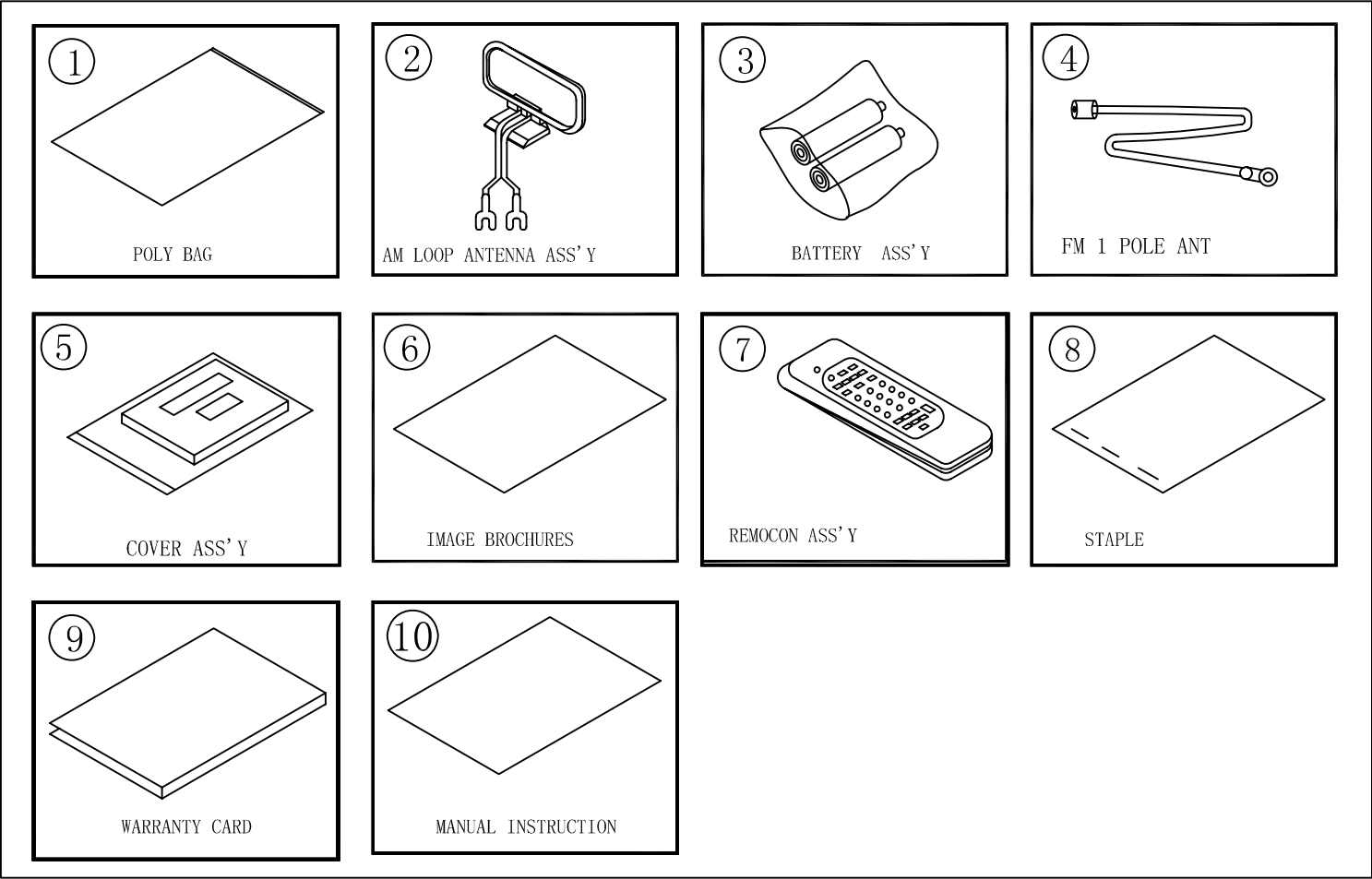
Dolby is a registered trademark of Dolby Laboratories.

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

XM and XM Ready are registered trademarks of XM Satellite Radio.

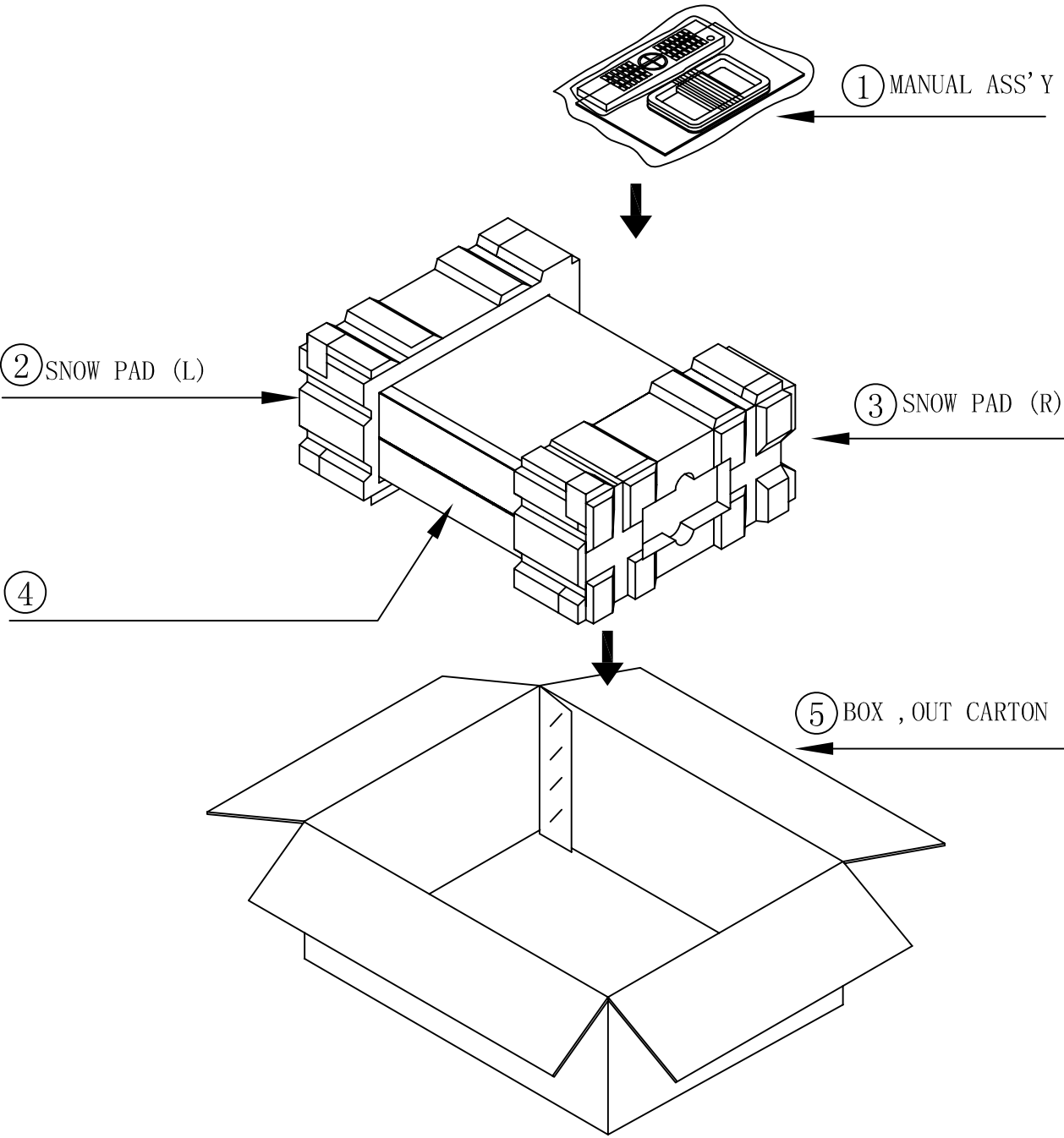
Please register your product at www.harmankardon.com. Note: You'll need your serial number.
At the same time, you can choose to be notified about new products and/or special promotions.

1. Instruction manual ass'y - Accessories



ACCESSORY-1			
NO	DESCRIPTION		PARTS NO.
			Q, ty
1	POLY BAG		1
2	AM LOOP ANTENNA ASS'Y		CSA1A027Z
3	BATTERY		2
4	FM 1 POL ANT		CSA1A019Z
5	COVER ASS'Y		CGRHK3390ZA
	1	COVER A	CGR1A445
	2	COVER B	CGR1A446
	3	ORNAMENT , AL A	CGX1A391C66
	4	ORNAMENT , AL B	CGX1A392C66
	5	SHEET, FRONT COVER	CQE1A392Z
	6	PAD , COVER	CPS1A676
	7	BAG , POLY	
6	IMAGE BROCHURES		1
7	REMOCON ASS'Y		CARTHK3490
8	STAPLE		3
9	WARRANTY CARD		CQE1A172X
10	MANUAL, INSTRUCTION		visit www.harmanardon.com

2. Package Drawing



NO	DESCRIPTION	PARTS NO.	Q, ty
1	ACCESSORY-1		1
2	SNOW, PAD (L)	CPS5A564	1
3	SNOW, PAD (R)	CPS5A565	1
4	HK3490	HK 3490	1
5	BOX, OUT CARTON	CPG1A743Q	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/The Bridge Source Selector: Press this button to select a turntable connected to the Phono Inputs as the source. Press it again to select an iPod docked in the optional Harman Kardon The Bridge II docking station as the source. Each additional press switches between these two sources.

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 to toggle between the front and rear inputs.

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, you will be able to monitor the recording as it is being made.

Speaker 1/2: Press the left side of this button to enable the HK 3490 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.

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. When listening to XM® Radio, each press displays the current playback information: channel name and number, category, artist and song title.

Preset Stations: Press this button to select a preset radio station. If no presets have been programmed, the 0 PRESET message will be displayed. When listening to XM Radio, each press changes the preset number within the current lettered bank.

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. Each press of the FM side of the button toggles between the FM and XM bands.

FM Mode: This button toggles between Stereo and Mono modes when an FM station is tuned. Mono mode may improve reception of weaker signals. When listening to XM radio, each press of this button changes the channel search mode as follows:

- **All Channel Search:** The Tuning Buttons and the ◀/▶ Buttons on the remote may be used to tune any channel.
- **Preset Search:** The ◀/▶ Buttons on the remote may be used to change the lettered bank of presets.
- **Category Search:** The Tuning Buttons and the ◀/▶ Buttons on the remote may be used to tune a channel within the current category.

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

DSP Mode: Each press of this button switches the digital signal processing mode as follows: Dolby® Virtual Speaker Wide, Dolby Virtual Speaker Reference, Stereo.

Mute: Press this button to mute the HK 3490'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.

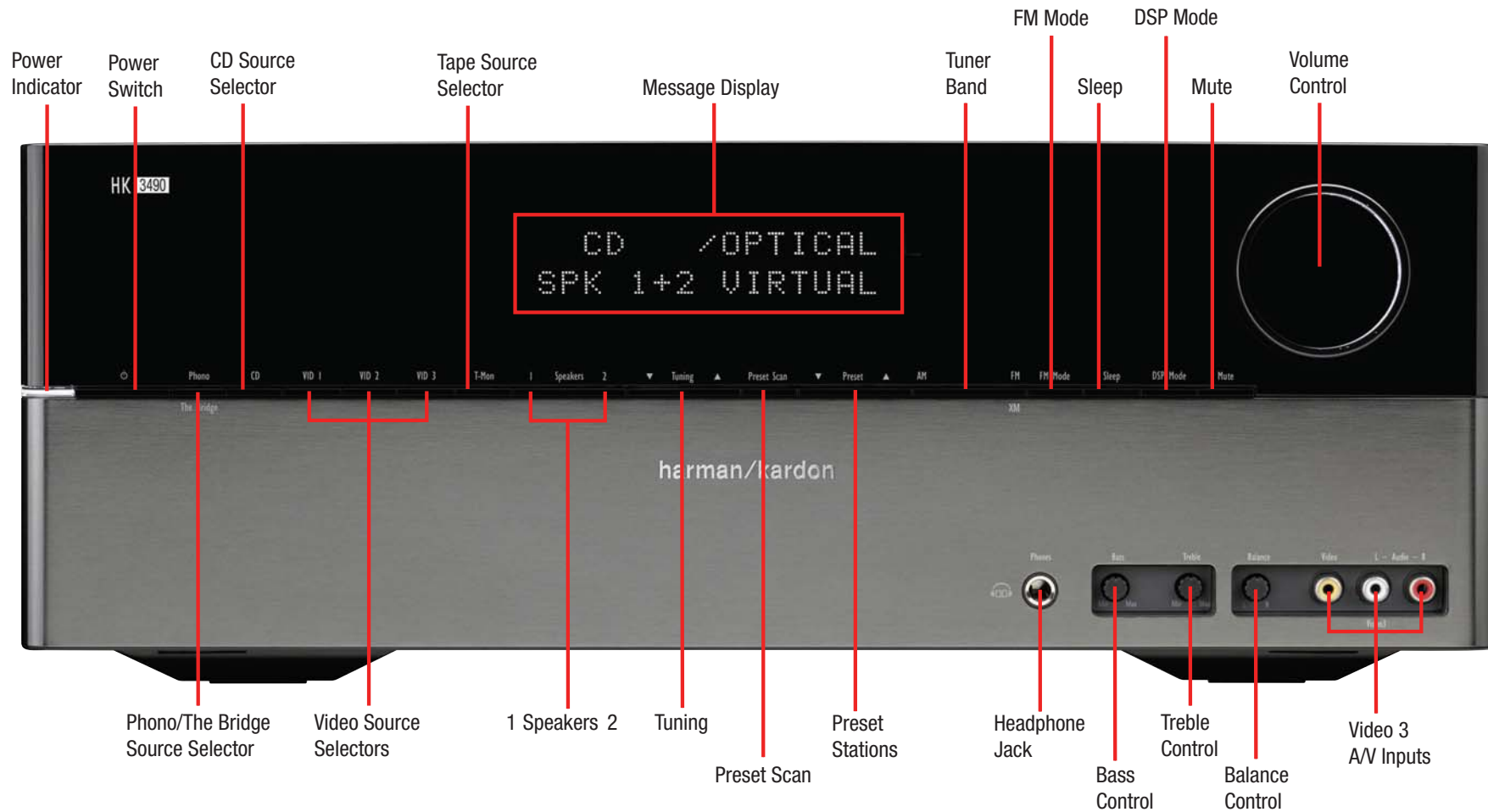
Treble Control: Turn the knob clockwise to boost high-frequency output by up to 10dB, or counterclockwise to cut high-frequency output by up to 10dB. Set the control to suit your taste and room acoustics.

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.

NOTE: To use the Bass, Treble or Balance Controls, gently press the knob until it unlatches. When finished, press the knob again to lock it.

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.

Message Display: Various messages appear in this display in response to commands. In normal use, the Upper Line will display the current source and audio input (analog or one of the digital audio inputs). The Lower Line displays the current speaker group (if any are active) and the DSP mode. Other messages may appear for some sources, such as The Bridge docking station and the tuner.



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.

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 3490, 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.

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 3490 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 3490. When several source devices are used, connect them in "daisy chain" fashion.

Update Port: This connection is for authorized service personnel only. It is used with a proprietary device in the event that a software update for the HK 3490 becomes available in the future. Do not make any connections to it.

Reset Button: In the event that the HK 3490 operates erratically, a system reset may restore proper functionality. Place the unit in Standby mode by pressing the Power Switch so that the Power Indicator turns amber. Then use a fine-point pen or other similar object to press the Reset Button.

The Bridge/DMP Input: Connect the optional Harman Kardon  or  docking station to this input for use with your iPod, iPod touch or iPhone (not included). Make sure the receiver is turned off (in Standby mode) when connecting The Bridge or The Bridge II docking station.

XM Antenna Jack: Plug in an XM antenna module here. The XM antenna module is purchased separately, and should specify that it is for home use with an XM Ready product. You will need to subscribe to the XM service, which is available separately, and activate the service for your antenna module. (XM service is not available in Alaska and Hawaii.)

Coaxial and Optical Digital Audio Inputs: If a source has a compatible digital audio output, connect it to one of these jacks for improved audio performance. Use only one type of digital audio connection for each source.

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.

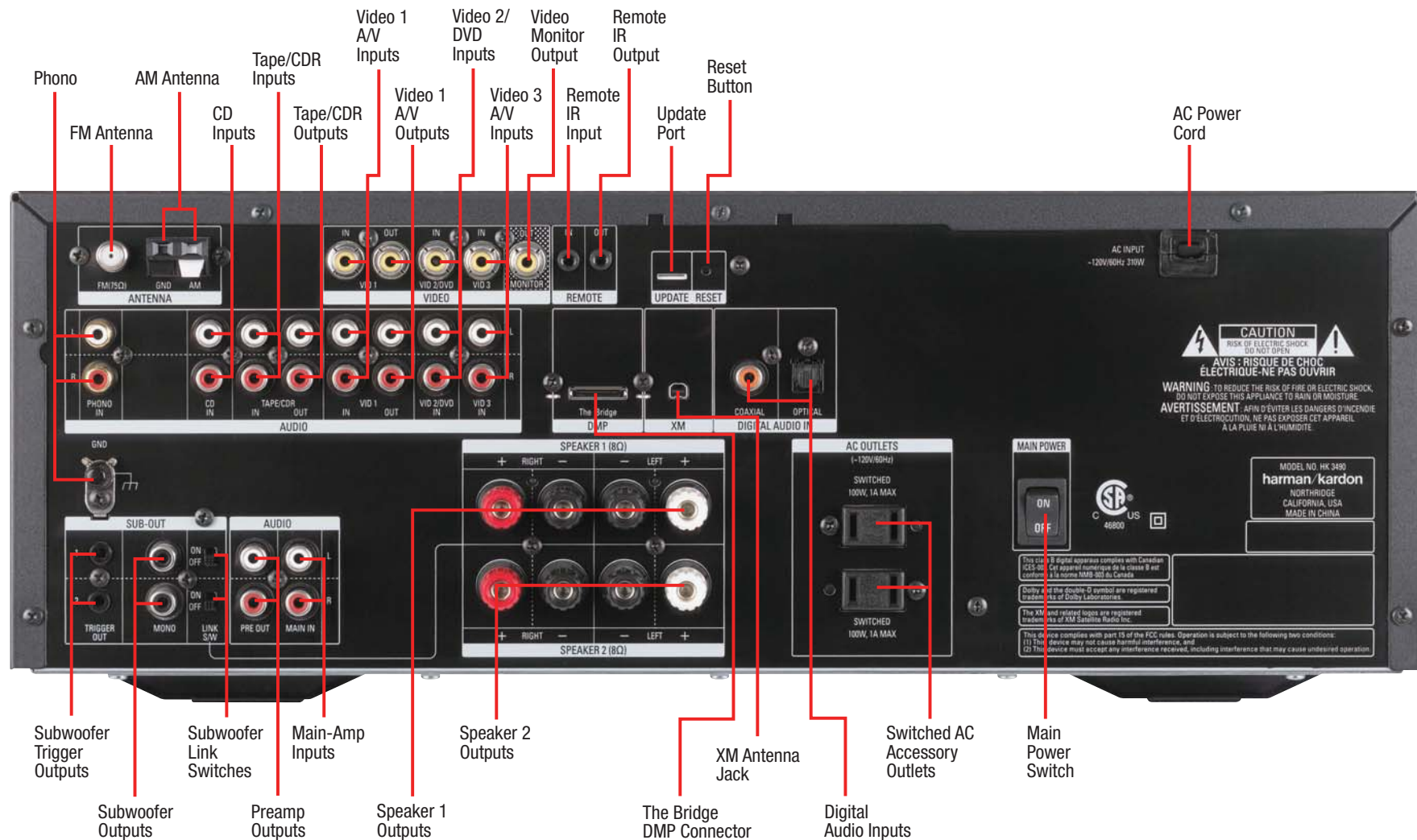
Subwoofer Outputs: If you have a powered subwoofer, connect these jacks to the line-level inputs on the subwoofer. The same full-range signal is output through both jacks. Thus, you have the option of connecting each jack to the line-level input on a separate subwoofer or to use the full-range outputs 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 3490.

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 3490 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 3490 will remove the trigger signal whenever the corresponding pair of main speakers is 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 3490'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 3490's power amplifier for a special application.

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



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.

REAR-PANEL CONNECTIONS

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 3490'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.

REMOTE CONTROL FUNCTIONS

The HK 3490 remote is capable of controlling six devices, including the HK 3490 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 3490 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 3490 and its internal tuner only.

XM: Controls the HK 3490 and its internal tuner only.

The Bridge: When an optional Harman Kardon The Bridge or The Bridge II docking station is connected and an iPod (not included) is docked, this mode controls navigation and playback of materials stored on the iPod.

The functions specific to the HK 3490 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 3490'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 3490 or another device.

Power On Button: Press this button to turn on the HK 3490 or another device.

Speaker 1/2: Press the Speaker 1 Button to enable the HK 3490 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. When XM Radio is in use, each press of this button changes the search mode, which controls how the ◀/▶ Buttons operate.

- **Preset Search Mode:** Each press of the ◀/▶ Buttons changes the lettered bank of preset stations. Each press of the ▲/▼ Buttons changes the numbered preset within the bank.
- **Category Search Mode:** Each press of the ◀/▶ Buttons jumps to the next category of stations, e.g., Decades.
- **All Channel Search Mode:** The ◀/▶ Buttons do nothing. The ▲/▼ Buttons change the channel number.

DSP Mode: Each press of this button switches the digital signal processing mode as follows: Dolby Virtual Speaker Wide, Dolby Virtual Speaker Reference, Stereo.

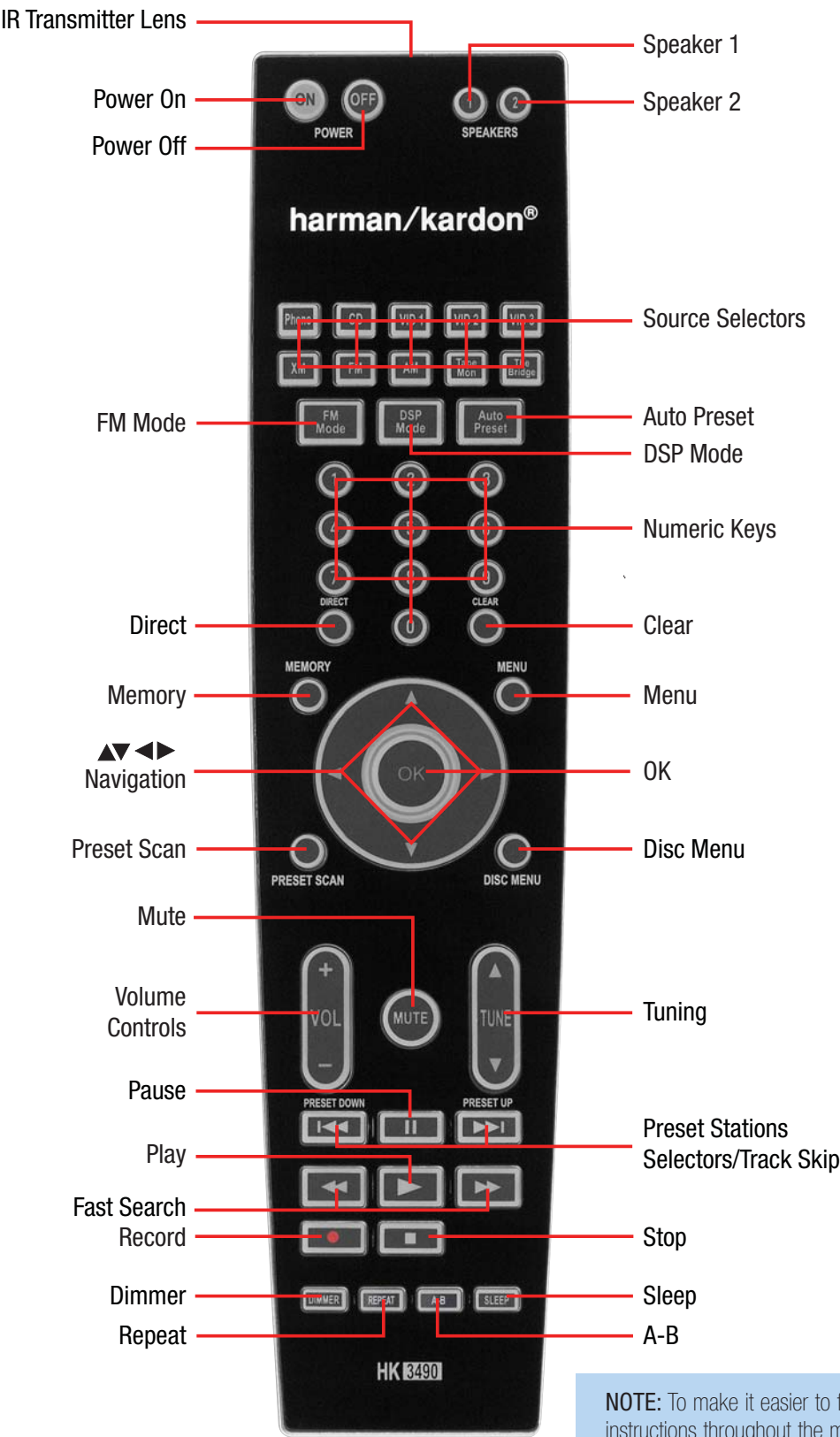
Auto Preset: The Auto Preset feature enables you to automatically set presets for all available FM radio stations in your area with a single button press. To start the process, make sure the FM tuner has been selected as the source. Press and hold this button. The AUTO PRESET message will appear as the HK 3490 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, except for XM), or to select station presets.

Direct: Press this button before using the Numeric Keys to directly enter a radio station frequency. It is not necessary to press this button before using the Numeric Keys to enter an XM Radio channel.

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. When XM Radio is in use, programming presets is somewhat different. First, tune to the desired channel. Then, press the Memory Button and the preset indication will flash. Use the ◀/▶ Buttons to select the desired preset bank (A through E), and then use the ▲/▼ Buttons



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.

REMOTE CONTROL FUNCTIONS

to select a numbered location (1 through 8) within the bank. Press the Memory Button to complete the process and let the HK 3490 return to normal operation.

Menu: This button has no effect on the HK 3490, but is used with some source devices to access the source's setup menus.

Navigation (▲/▼/◀/▶) and OK Buttons: When XM Radio is in use, the ◀/▶ Buttons may be used to change the channel category or the lettered bank of presets. As described above, press the FM Mode Button to select a search mode. Use the ▲/▼ Buttons to change the numbered preset within a bank when in Preset Search mode, or to change the channel sequentially when in All Channel Search mode. These buttons have no other effect on the HK 3490, 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. When XM Radio is in use, this button has nothing to do with preset stations. Instead, each press of this button changes the information displayed on the front panel as follows: channel name and number, channel category, artist name and song title.

Disc Menu: This button has no effect on the HK 3490, 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 3490'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 3490 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.

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. When XM Radio is in use, the digitally tuned channels are always of acceptable strength, and thus there is no seek function, although pressing and holding the Tuning Buttons scans through the channels faster. When the FM Mode Button has been used to activate Category Search Mode, the Tuning Buttons will only tune channels within the current category. Press the FM Mode Button until All Channel Search Mode has been selected to tune any channel.

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. XM presets are stored in one of five lettered banks. To switch banks, press the FM Mode

Button repeatedly until the PRESET SEARCH message appears in the Message Display, and use the ◀/▶ Buttons to change to the desired bank. Then use the Preset Stations Selectors to select the numbered preset within the bank.

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 3490, 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 3490, 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: Press this button to activate the sleep timer, which shuts off the receiver after a programmed period of time up to 90 minutes.

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 has established a CEA® 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)		
Digital Audio Connections		
Coaxial		
Optical	Input	
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.

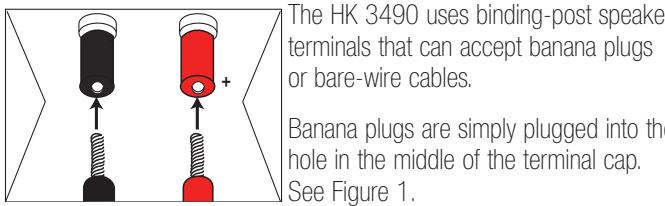


Figure 1 – Binding-Post Speaker Terminals With Banana Plugs

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.

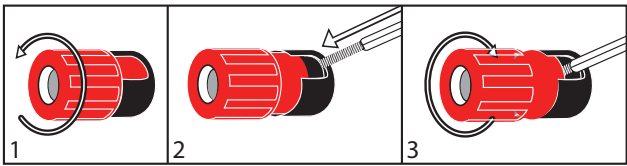


Figure 2 – Binding-Post Speaker Terminals With Bare Wires

The HK 3490 features two sets of speaker connections, with each set allowing connection of a left and right loudspeaker. This allows you to place a second set of speakers in another room, or even outdoors, when weather-resistant loudspeakers are used. You may play both sets of speakers simultaneously, one set at a time or neither set when using the headphones or making recordings. Use the Speaker 1/2 Buttons to activate or deactivate each pair of speakers. It is not possible to select different sources for each speaker pair.

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. 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 3490.

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 3490. 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.

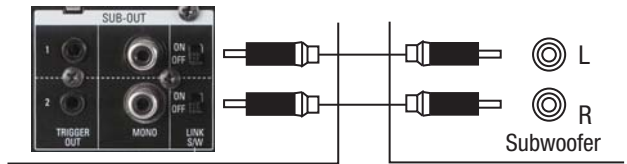


Figure 3 – Subwoofer

Connecting Source Devices to the HK 3490

The HK 3490 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

CONNECTIONS

HK 3490, it also counts as a source, even though no external connections are needed, other than the FM and AM antennas and the XM module.

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

Audio Connections

There are two formats for audio connections: digital and analog. Digital audio signals offer improved quality, free of distortion and with greater detail and presence. The HK 3490 uses two types of digital audio connections: coaxial and optical. Either type of digital audio connection may be used for each source device, but never both simultaneously for the same source. However, it's alright to make both analog and digital audio connections to the same source.

Digital Audio

Coaxial digital audio jacks are usually color-coded in orange. Although they look similar to analog jacks, they should not be confused, and you should not connect coaxial digital audio outputs to analog inputs or vice versa. See Figure 4.



Figure 4 – Coaxial Digital Audio

Optical digital audio connectors are normally covered by a shutter to protect them from dust. The shutter opens as the cable is inserted. Input connectors are color-coded using a black shutter, while outputs use a gray shutter. See Figure 5.



Figure 5 – Optical Digital Audio

Analog Audio

Analog 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 6. Most sources that have digital audio jacks also have analog audio jacks, although some older types of sources, such as tape decks, have only analog jacks. For sources that are capable of both digital and analog audio, you may wish to make both connections. If you wish to record materials from DVDs or other copy-protected sources, you may only be able to do so using analog connections. Remember to comply with all copyright laws if you choose to make a copy for your own personal use.



Figure 6 – 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 7.

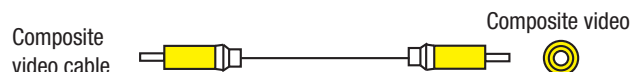


Figure 7 – Composite Video

Antennas

The HK 3490 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 8.

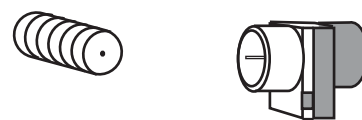


Figure 8 – FM Antenna

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 9.

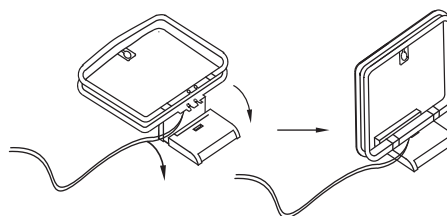


Figure 9 – AM Antenna

To enjoy XM satellite radio, purchase an XM antenna module designed for use with XM Ready devices and a subscription to the XM service. We recommend the XM Mini-Tuner and Home Dock Bundle, available at www.xmradio.com. The older Connect-and-Play module is also compatible with the HK 3490, but it may no longer be available in your area.

An XM Ready-compatible module uses the special connector on the HK 3490's rear panel that allows you to use the receiver's tuner, including its 40 preset station locations and remote control. Although you may use a module with standard audio connections, which may be indicated for "car and home use," you will not be able to enjoy the HK 3490's ease of control.

INSTALLATION

You are now ready to connect your various components to your receiver. Before beginning, make sure that all components, including the HK 3490, are turned completely off and their power cords are unplugged. **Don't plug in any of the power cords 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 3490. 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 11.

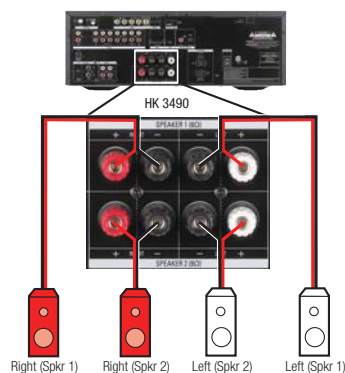


Figure 11 – Speaker Connections

Step Two – Connect the Subwoofer

Connect the Subwoofer Outputs on the HK 3490 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 3490. 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 3490. 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 12. Consult the manufacturer's guide for the subwoofer for additional information.

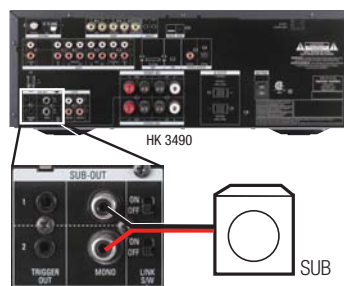


Figure 12 – Subwoofer Connection

Step Three – Connect the Antennas

Connect the FM and AM antennas to their terminals, and plug the XM antenna module (not included) into its connector. The XM module is purchased separately, and must be activated at the time you purchase a subscription. See Figure 13.

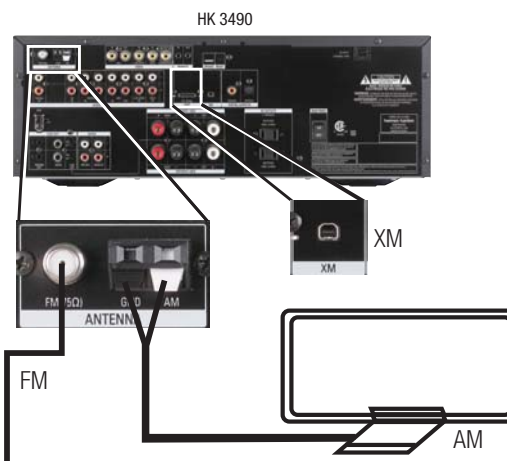


Figure 13 – Antenna Connections

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.). In Table A1 in the appendix, 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. However, you may connect any component with analog audio and/or composite video outputs to any source input on the HK 3490, 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 3490 remote, or to change the device type associated with any source input.

INSTALLATION

We recommend you follow the guidelines in Table A1 when connecting various source components to the HK 3490. However, due to the limitations in the design of the HK 3490 remote control, when using source components manufactured by other brands, use the device's original remote control to operate it.

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 3490.

For sources that have a digital audio output, connect it to the corresponding Optical or Coaxial Digital Audio Input on the HK 3490. You may connect a source's analog and digital audio outputs at the same time; only one connection is active at a time. To select the digital audio input, press and hold the front-panel Source Selector and simultaneously press the T-Mon Selector to change the audio input as follows: Analog, Optical, Coaxial.

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 3490.

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 14.



Figure 14 – 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 3490.

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 15.



Figure 15 – 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 3490, and the input jacks on your recorder to the Tape/CDR Output jacks on the HK 3490. See Figure 16.

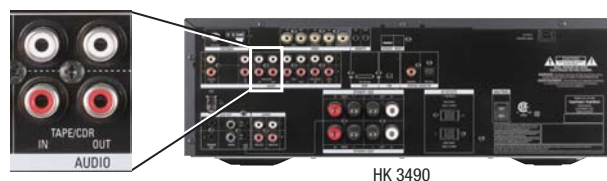


Figure 16 – Tape/CDR Audio Inputs and Outputs

To listen to the Tape/CDR source, press the Tape 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 3490 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 Tape Mon Button to stop monitoring the recording.

NOTE: To make recordings, insert blank media in the recording device and set it in 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 17.



Figure 17 – 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 3490, and the audio and video *input* jacks on your recorder to the Video 1 *Output* jacks on the HK 3490.

INSTALLATION

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 3490 does not feature surround sound decoding, other than Dolby Virtual Speaker. 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 3490 in smaller settings, such as a bedroom or den, surpasses the audio performance of most televisions, including those with onboard stereo speakers.

Connect the left and right analog audio outputs of the DVD player to the Video 2 Audio Inputs on the HK 3490. Then connect the composite video output of the DVD player, usually colored yellow, to the Video 2 Video Input. See Figure 18.



Figure 18 – 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 3490'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 3490's front panel or remote repeatedly. When VIDEO 3 appears on the front panel of the HK 3490, 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 19.



Figure 19 – 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 3490 into the headphone jack of the iPod. 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 3490. 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 3490 as described above. Visit www.apple.com for more information about the cable.

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 source device's original remote to control other components, or operate an iPod using its own controls.

The Bridge II Docking Station

With the optional The Bridge II docking station, you can listen to audio or view videos stored on your iPod, iPod touch or iPhone (not included), use your HK 3490 remote control to operate the iPod, and even charge the iPod while it's docked in The Bridge II docking station. Simply plug the proprietary cable from The Bridge II unit into the special connector on the rear of the HK 3490. See Figure 20. Refer to the owner's manual for The Bridge II model for more information.



Figure 20 – The Bridge II Connection

INSTALLATION

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 18).

To view video or images played by your source devices, connect the Video Monitor Output of the HK 3490 to a Composite Video Input on your television or video display. See Figure 21. Consult the manual for your TV so that you understand how to select the correct video input.



Figure 21 – Video Monitor Output

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

The HK 3490 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 3490 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 3490's Remote IR Output to the source device's Remote IR Input, which will pass any applicable remote signals transmitted through the HK 3490 to the source device. This enables you to control your sources even when the HK 3490 itself is controlled via an external IR receiver.

To control more than one source device using the Remote IR Output, connect all sources in "daisy chain" fashion, with the HK 3490'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 22.



Figure 22 – 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 3490 will output a "stripped carrier" IR signal.

Step Seven – Connect Optional External Equipment

If you wish to use the HK 3490 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 3490 to the analog audio inputs on the external power amplifier. See Figure 23.



Figure 23 – Preamp Outputs and Main-Amp Inputs

You may adjust the Volume and Tone Controls using the HK 3490'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 3490'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 3490.

Alternatively, you may connect the external processor to the HK 3490's Tape Monitor Loop. See Figure 16.

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 3490. See Figure 24. 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 3490 is turned on.

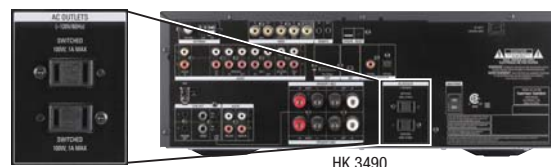


Figure 24 – AC Switched Accessory Outlets

Step Nine – Insert Batteries in Remote

The HK 3490 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 25.

INSTALLATION



Figure 25 – Remote Battery Compartment

When using the remote, point the lens toward the front panel of the HK 3490. 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 3490.

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 3490

Place the HK 3490 in Standby mode by turning on the Main Power Switch on the rear panel. The Power Indicator will turn amber. The HK 3490 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 26 and 27.



Figure 26 – Front-Panel Power Switch



Figure 27 – 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 3490

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 3490 is in Standby mode and is ready to be turned on. See Figure 26.

The HK 3490 may be turned on by pressing the Power Switch or any Source Selector on the front panel or the remote. See Figures 26 and 27.

The Power Indicator will turn white to indicate that the HK 3490 is on. If the PROTECT message appears in the Message Display, 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 3490 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 3490 is left unplugged, any settings you have programmed, including system configuration and preset radio stations, will be preserved indefinitely.

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 28. 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 3490. 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 28 – Volume Controls

The HK 3490 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 29. 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 3490 will also end muting.



Figure 29 – Mute Buttons

Sleep Timer

You may program the HK 3490 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 30 and 31.



Figure 30 – Front-Panel Sleep Button



Figure 31 – 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.

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 32.



Figure 32 – Tone Controls

You may also adjust the balance to compensate for speaker placement or the acoustic characteristics of your listening room. Ideally, the audio

OPERATION

should be heard most clearly at a point exactly midway between the left 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 33.



Figure 33 – 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 3490, 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 34.



Figure 34 – Headphone Jack

Speaker 1/2

The HK 3490 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 35.



Figure 35 – 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 3490 for playback by pressing its associated button on the front panel or remote control. See Figure 36.



Figure 36 – Source Selectors

To enjoy video sources, make sure to connect the device's composite video output to the correct Video Input on the HK 3490. In addition, connect the HK 3490's Video Monitor Output to an input on your television or video display.

To select whether the source will use its analog audio input or one of the digital audio inputs, press and hold the front-panel Source Selector and simultaneously tap the front-panel T-Mon Button repeatedly until the desired input appears in the Message Display. Audio input selection requires use of the front-panel controls and cannot be selected using the remote control.

To 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, as indicated in 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.

NOTES:

- The HK 3490 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 3490 cannot decode digital surround-sound programs. If you have connected the analog audio and composite video outputs of a DVD player to the HK 3490, remember to select two-channel audio in the DVD player and disc menus. However, you may press the DSP Surround Button to select a Dolby Virtual Surround mode (Reference or Wide) to expand the presentation of the sound field even though only two main loudspeakers are in use.

OPERATION

- The HK 3490 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.

Using the Tuner (AM, FM and XM Modes)

The HK 3490's built-in tuner may be selected in one of two ways (see Figure 37):

1. Press the front-panel AM or FM Button. The front-panel FM Button toggles between the FM and XM bands.
2. Press the AM, FM or XM Button on the remote.



Figure 37 – Tuner Input Selection

Radio stations may be selected in one of five ways (see Figures 38–40):

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. It is not necessary to press the Direct Button when XM Radio is in use.
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. When XM Radio is in use, first press the FM Mode Button repeatedly to select Preset Search mode. Then use the ◀/▶ Buttons to select a lettered bank of presets. To select a numbered preset within a bank, make sure the HK 3490 is in Preset Search mode, then use the Numeric Keys, the ▲/▼ Buttons or the Preset Stations Buttons.
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 3490 will tune the next frequency increment (0.1MHz for FM, or 10kHz for AM) in the selected direction.

NOTE: When XM Radio is in use, there are no auto or manual tuning modes. Use the Tuning Button or ▲/▼ Buttons (only when in All Channel Search mode) to select a channel. Press and hold the button to search faster.

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. When XM Radio is in use, this button is used to change the display as follows: channel name and number, category, artist and song title.



Figure 38 – 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 39.



Figure 39 – FM Mode Button

To store a station in one of the 30 AM/FM presets (see Figure 40):

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 40 – Programming Presets

When XM Radio is in use, programming presets is somewhat different.

1. Tune to the desired channel.
2. Press the Memory Button on the remote.
3. Use the ◀/▶ Buttons to select the desired preset bank (A through E).
4. Use the ▲/▼ Buttons to select a numbered location (1 through 8).

OPERATION

- Press the Memory Button on the remote to complete the process and let the HK 3490 return to normal operation.

To delete an XM Radio preset, tune to the preset station and press the Clear Button. To delete all XM Radio presets in all banks, press and hold the Clear Button until the ALL DELETED message appears. Table 2 may be helpful to you as a reference while using the XM Radio tuner.

Table 2 – Using the XM Radio Tuner

XM Radio Function	Remote Control Key	Front-Panel Button
Toggle Search Modes	FM Mode	FM Mode
Scroll Preset Numbers (1–8)	Preset Up/Up Arrow (▲)	Preset Up
	Preset Down/Down Arrow (▼)	Preset Down
Channel Search	Tuning Up	Tuning Up
	Tuning Down	Tuning Down
Display Mode	Preset Scan	Preset Scan
Exit All Channel Search	Left/Right Arrow (◀/▶)	N/A
Changes Category		
Changes Preset Group		
Enter/OK	OK	N/A
Preset Memory Mode	Memory	N/A
Clear Preset Memory Mode	Clear	N/A
Clear All Preset Memories	Press and Hold Clear	N/A
Enter Numeric Numbers	0–9 Numeric Keys	N/A

Auto Preset (FM Only)

You may automatically program all FM radio stations in your area that are received with acceptable signal strength into the HK 3490'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.

Using Docking Station

The Bridge II docking station is an optional unit that may be used with a compatible iPod, iPod touch or iPhone (not included). When The Bridge II docking station is connected to its proprietary input on the HK 3490 and the iPod is docked, you may play the audio materials on your iPod through your high-quality audio system, operate the iPod using the HK 3490 remote or the HK 3490's front-panel controls, and charge the iPod.

Either press the front-panel Phono Selector repeatedly until the DMP/THE BRIDGE IS CONNECTED message scrolls across the front panel, or press The Bridge Button on the remote to select The Bridge II docking station as the input source.

In normal operation, information from the iPod will appear in the HK 3490's Message Display. While a track is playing, its title will scroll once on the upper line, and the elapsed and remaining track times will appear on the lower line. While navigating the iPod, the menu title or current setting will appear on the upper line, and the current menu line or setting option will appear on the lower line.

Table 3 summarizes the controls available when The Bridge II unit is in use.

Table 3 – Using The Bridge II

iPod Function	Remote Control Key	Front Panel-Button
Play	Play (▶)	Preset Scan
Pause	Pause (⏸)	Preset Scan
Menu	Menu	FM Mode
Select	OK	Preset Scan
Scroll Reverse	Up Arrow (▲)	Preset Up
Scroll Forward	Down Arrow (▼)	Preset Down
Forward Search/Next Track	Right Arrow (▶▶)	Tuning Up
Reverse Search/Previous Track	Left Arrow (◀◀)	Tuning Down
Switch between normal operation and iPod Manual mode	Press and hold Menu	Press and hold FM Mode Button

When the HK 3490 is in Standby mode, the iPod is not charged.

It is not possible to view videos or still images stored on the iPod.

To access the full functions of the iPod, press and hold the Menu Button (FM Mode Button on front panel) to switch it to Manual mode. You may navigate the iPod using the HK 3490 remote while viewing its menus on the iPod screen. Manual mode allows access to functions such as Repeat and Shuffle. Although the audio portion of video content may be played, it will not be possible to view the content on a video display connected to the HK 3490. To return to normal operation, press and hold the Menu Button again until the check mark appears on the screen of the iPod.

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.

OPERATION

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 the remote is in the device mode for either the Video 1 or Video 2 source, the Dimmer Button on the remote will only affect the source device (if compatible), and will not affect the HK 3490.

Processor Reset

If you wish to fully reset the HK 3490 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, appears in the display.

The unit will return to Standby mode, and you may power it on.

You may reset the HK 3490 by using a sharp object to press the rear-panel Reset Button. This method does not erase user configurations.

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 www.harmankardon.com.

Memory

If the HK 3490 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	No AC power	- Make certain AC power cord is plugged into a live outlet - Check to see whether outlet is switch-controlled
Display lights, but there's no sound or picture	- Intermittent input connections - Mute is on - Volume Control is down - Desired source not selected - Speakers deactivated - Headphones are in use - Jumper pins between Preamp Outputs and Main-Amp Inputs were removed	- Make certain that all input and speaker connections are secure - Press Mute Button - Turn up Volume Control - Press correct Source Selector - Press Speaker 1 or Speaker 2 Button - Unplug headphones - Replace jumper pins or, if external amplifier is in use, make sure it is turned on
No sound from any speaker; light around Power Switch is red	- Amplifier is in Protection mode due to possible short - Amplifier is in Protection mode due to internal problems	- Check speaker-wire connections for shorts at receiver and speaker ends - Contact your local Harman Kardon service center
Unit does not respond to remote commands	- Weak batteries in remote - Remote sensor is obscured	- Change remote batteries - Make certain front-panel sensor is visible to remote or connect an optional remote sensor
Intermittent buzzing in tuner	Local interference	Move unit or antenna away from computers, fluorescent lights, motors or other electrical appliances
Audio sources sound distorted	- CD player or other audio device incorrectly plugged into Phono Inputs - Turntable not plugged into Phono Inputs	- 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 - 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
No video image	- Source device's video output not connected to HK 3490 - Wrong source selected - Video Monitor Output not connected to display - Wrong video input on video display selected - Audio-only source selected	- Connect the source's composite video output to the correct video input on the HK 3490 - Press the correct Source Selector on the HK 3490 - Connect the HK 3490's Video Monitor Output to a composite video input on your television or video display - Consult the manual for your television for instructions on selecting the correct video input - It is not possible to view video while listening to the Phono, Tape/CDR or CD sources or to the tuner

In addition to the items shown above, additional information on troubleshooting possible problems with your HK 3490, or on installation-related issues, may be found in the list of "Frequently Asked Questions," which is located in the Product Support section at www.harmankardon.com.

Processor Reset

If you wish to fully reset the HK 3490 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.

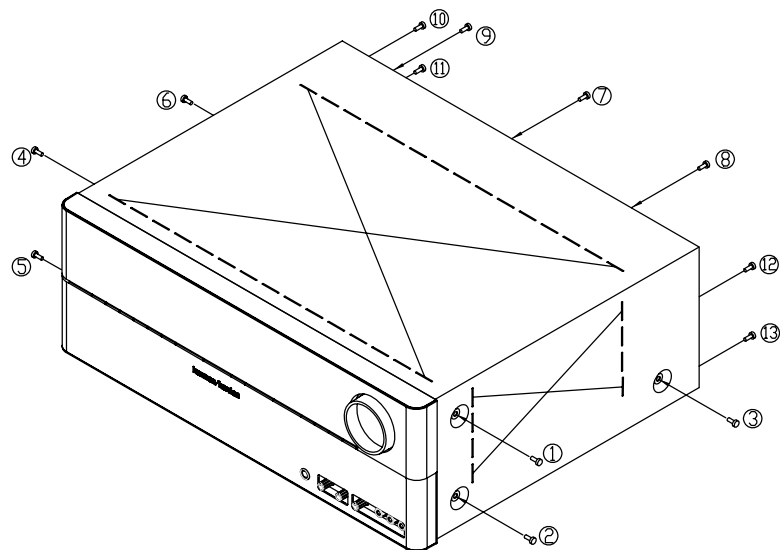
Place the receiver in Standby mode by pressing the Power Switch so that the Power Indicator turns amber. Simultaneously press and hold the front-panel Preset Scan and Mute Buttons for at least five seconds until the software version number, followed by the RESET message, appear in the display. The unit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

Memory

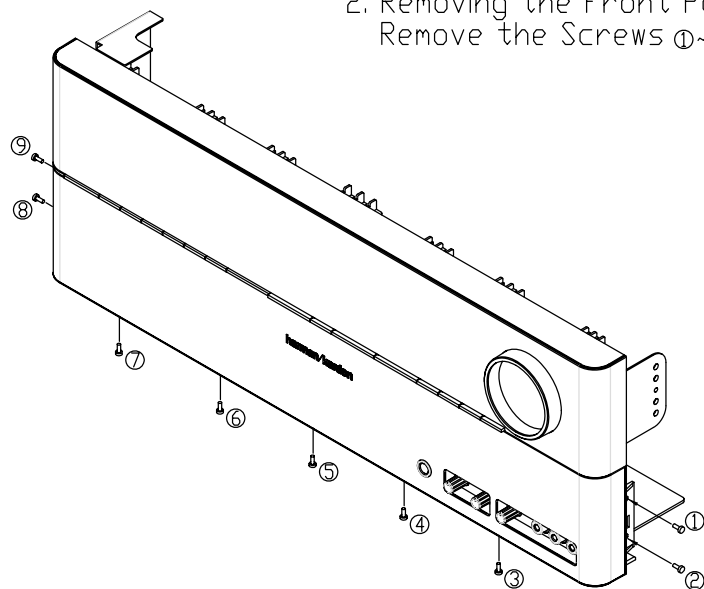
If the HK 3490 is unplugged or experiences a power outage, it will retain user settings indefinitely.

DISASSEMBLY

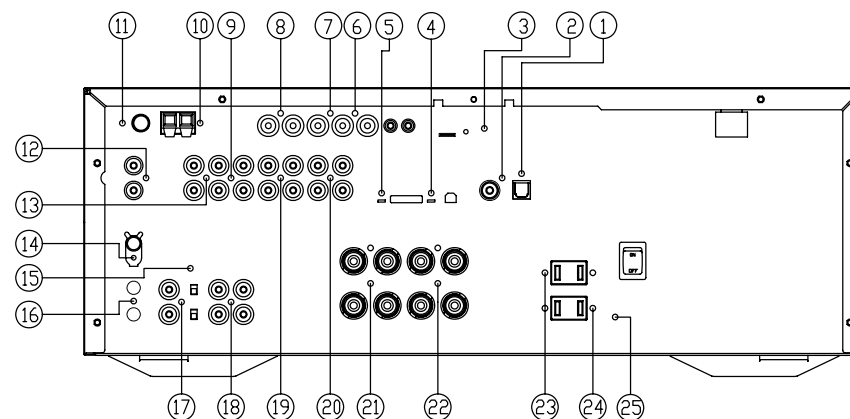
1. Removing the Top Cabinet
Remove the Screws ①~⑬



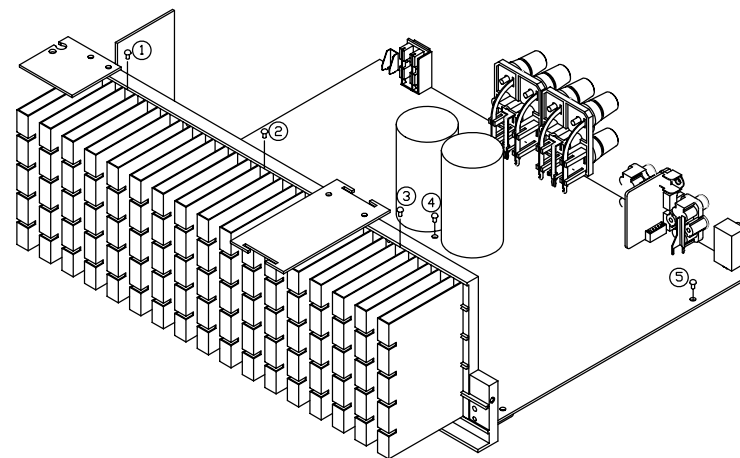
2. Removing the Front Panel
Remove the Screws ①~⑨



3. Removing the Rear Panel
Remove the Screws ①~②⑤



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



HK3490 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 the lead wire (BN13-9P) on the Front PCB (43-1) from connector (CN13) on the 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 step4.

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 DSP PCB (46-1) REMOVAL

1. Remove the Top-cabinet, referring to the previous step 1.
2. Disconnect the connector (CN51,52,71-Card cable) from connector (CN51,52,71) on Input PCB (45).
3. Disconnect the connector (CN51) from lead wire (BN51-11P) on the Tr PCB (46-2).
4. Remove 5 screws (S8,S5,S14) and then remove the DSP PCB (46-1).

12 INPUT PCB (46-1) REMOVAL

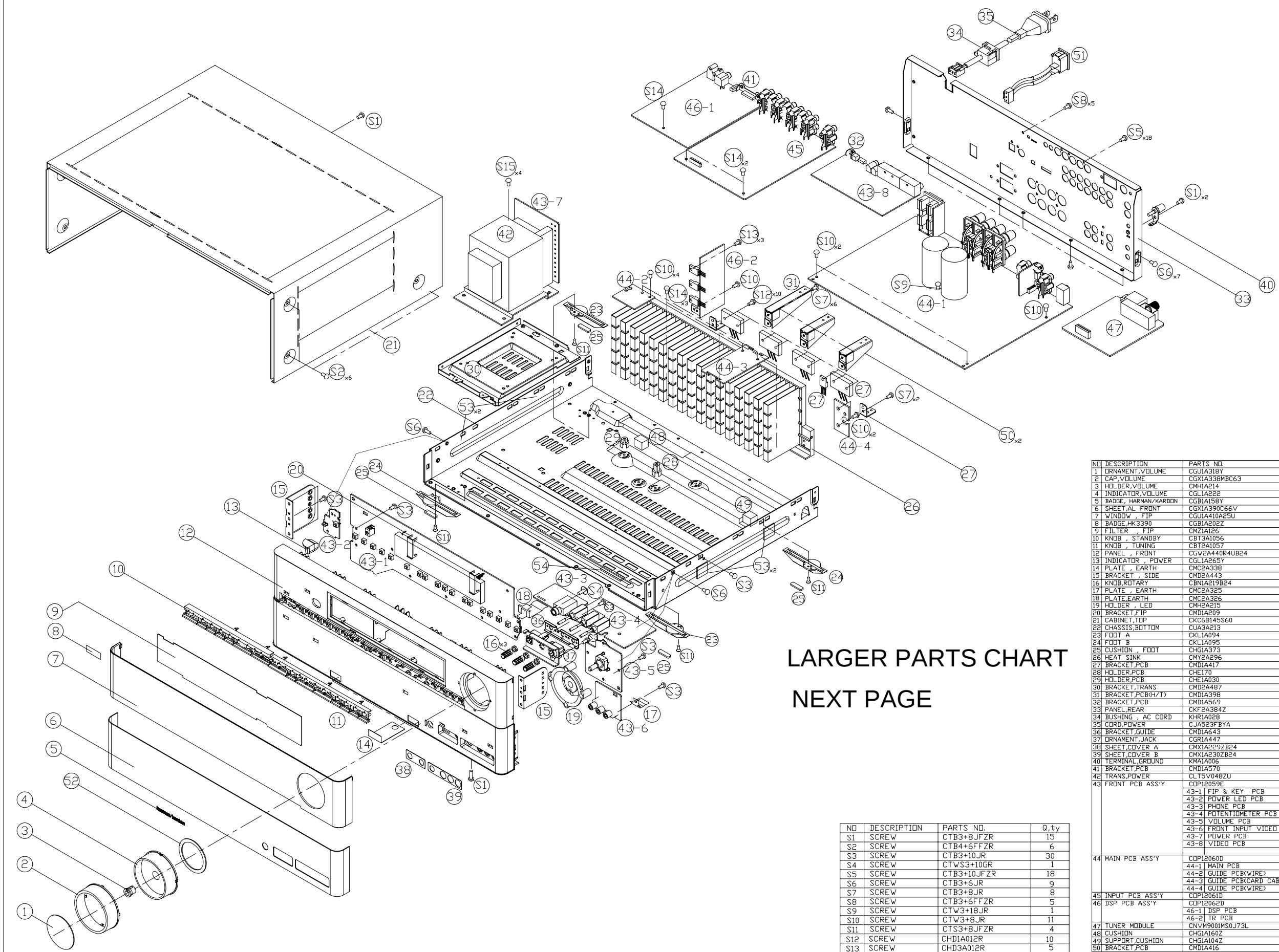
1. Remove the Top-cabinet, referring to the previous step 1.
2. Disconnect the connector (CN21-Card cable) from connector (CN21) on the Main PCB (44-1).
3. Disconnect the connector (CN24) from lead wire (BN24-5P) on the Main PCB (44-1).
4. Remove 7 screws (S5,S14) and then remove the DSP PCB (46-1).

13 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 (BN11-3P,BN14-13P,BN15-3P) on the Trans PCB (43-7)
4. Remove 4 Trans screws (S15) and then remove the Power Trans (42).

14 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).



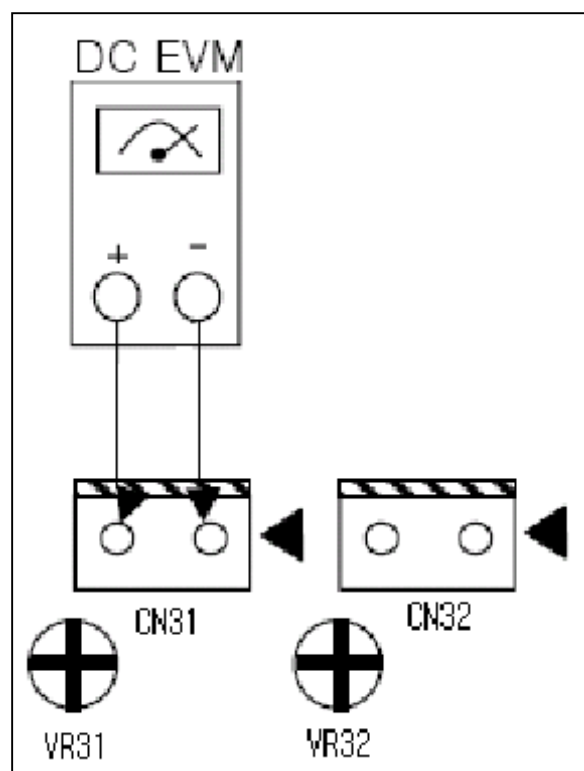
LARGER PARTS CHART
NEXT PAGE

NO	DESCRIPTION	PARTS NO.	Q.ty
S1	SCREW	CTB3+8JFZR	15
S2	SCREW	CTB4+6FFZR	6
S3	SCREW	CTB3+10JR	30
S4	SCREW	CTW3+10GR	1
S5	SCREW	CTB3+10JFZR	18
S6	SCREW	CTB3+6JR	9
S7	SCREW	CTB3+8JR	8
S8	SCREW	CTB3+6FFZR	5
S9	SCREW	CTW3+18JR	1
S10	SCREW	CTW3+8JR	11
S11	SCREW	CTS3+8JFZR	4
S12	SCREW	CHD1A012R	10
S13	SCREW	CHD3A012R	5
S14	SCREW	CHD4A012R	6
S15	SCREW,TRANS	CHD1A023R	4

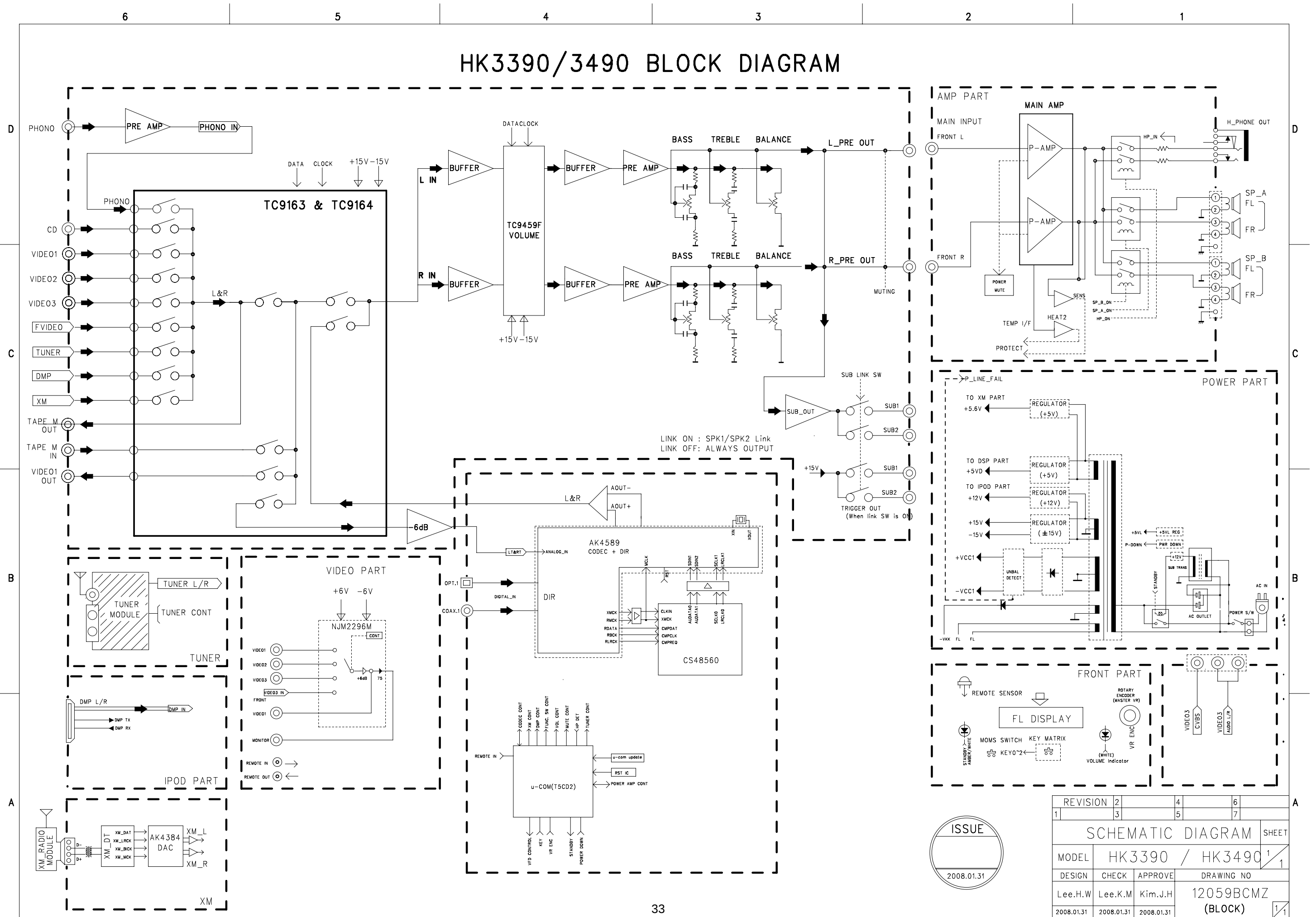
NO	DESCRIPTION	PARTS NO.	Q.ty	REMARK
1	ORNAMENT,VOLUME	CGUIA318Y	1	
2	CAP,VOLUME	CGX1A338MBC63	1	
3	HOLDER,VOLUME	CMH1A214	1	
4	INDICATOR,VOLUME	CGL1A222	1	
5	BADGE, HARMAN/KARDON	CGB1A158Y	1	
6	SHEET,AL.FRONT	CGX1A390C66V	1	
7	WINDOW, FIP	CGUIA410A25U	1	
8	BADGE,HK3390	CGB1A202Z	1	
9	FILTER, FIP	CMZ1A126	1	
10	KNOB, STANDBY	CBT3A1056	1	
11	KNOB, TUNING	CBT2A1057	1	
12	PANEL, FRONT	CGW2A440R4UB24	1	
13	INDICATOR, POWER	CGL1A265Y	1	
14	PLATE, EARTH	CMC2A338	2	
15	BRACKET, SIDE	CMD2A443	1	
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	CKG1A343S60	1	
22	CHASSIS,BOTTOM	CUA3A213	1	
23	FOOT, A	CKL1A094	2	
24	FOOT, B	CKL1A095	2	
25	CUSHION, FOOT	CHG1A373	4	
26	HEAT, SINK	CMY2A296	1	
27	BRACKET,PCB	CMD1A417	2	
28	HOLDER,PCB	CHE170	1	
29	HOLDER,PCB	CHE1A030	1	
30	BRACKET,TRANS	CMD2A487	1	
31	BRACKET,PCBH/T)	CMD1A398	1	
32	BRACKET,PCB	CMD1A569	3	
33	PANEL,REAR	CKF2A384Z	1	
34	BUSHING, AC CORD	KHR1A028	1	
35	CORD,POWER	CJAS23F8YA	1	
36	BRACKET,GUIDE	CMD1A648	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	CMD1A570	1	
42	TRANS,POWER	CLTSV048ZU	1	
43	FRONT PCB ASS'Y	COP12059E	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	COP12060D	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	COP12061D	1	
46	DSP PCB ASS'Y	COP12062D	1	
		46-1 DSP PCB	1	
		46-2 TR PCB	1	
47	TUNER MODULE	CNV1M9001MS0J73L	1	
48	CUSHION	CHG1A160Z	1	
49	SUPPORT,CUSHION	CHG1A104Z	1	
50	BRACKET,PCB	CMD1A416	2	
51	MONS, SW ASS'Y	CSHAVR155ZA	1	
52	VOLUME, SHEET	CMZ1A090	1	
53	CUSHION	CHG1A354	4	
54	CUSHION	CHG1A333	1	

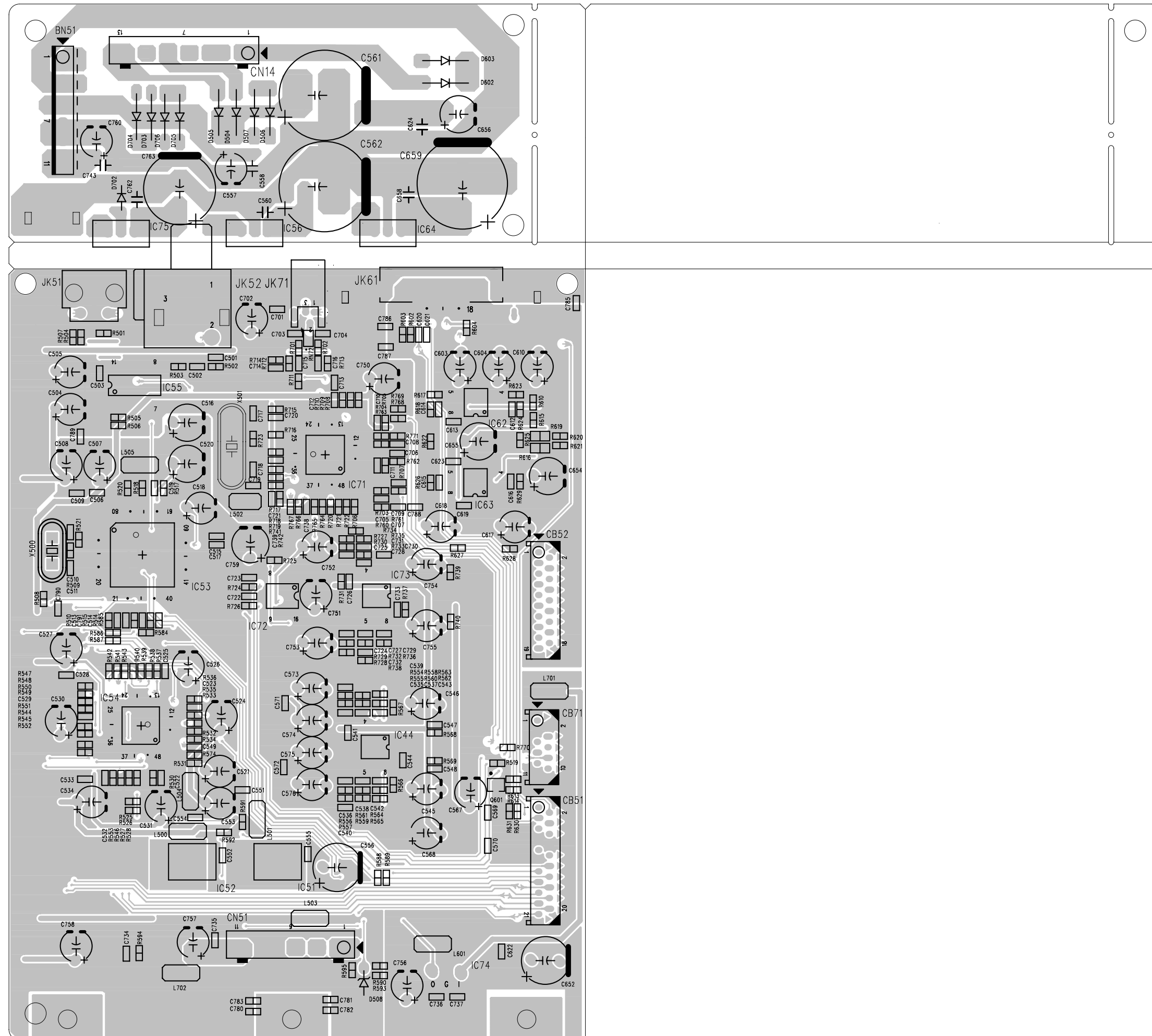
NO	DESCRIPTION	PART NO.	Qty
1	ORNAMENT,VOLUME	CGU1A318Y	1
2	CAP,VOLUME	CGX1A338MBC63	1
3	HOLDER,VOLUME	CMH1A214	1
4	INDICATOR,VOLUME	CGL1A222	1
5	BADGE, HARMAN/KARDON	CGB1A158Y	1
6	SHEET,AL FRONT	CGX1A390C66V	1
7	WINDOW , FIP	CGU1A410A25U	1
8	BADGE,HK3490	CGB1A202Z	1
9	FILTER , FIP	CMZ1A126	1
10	KNOB , STANDBY	CBT3A1056	1
11	KNOB , TUNING	CBT2A1057	1
12	PANEL , FRONT	CGW2A440R4UB24	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	CMY2A296	1
27	BRACKET,PCB	CMD1A417	2
28	HOLDER,PCB	CHE170	1
29	HOLDER,PCB	CHE1A030	1
30	BRACKET,TRANS	CMD2A487	1
31	BRACKET,PCB(H/T)	CMD1A398	1
32	BRACKET,PCB	CMD1A569	3
33	PANEL,REAR	CKF2A384Z	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	CMD1A570	1
42	TRANS,POWER	CLT5V048ZU	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	DSP PCB ASS'Y		1
		46-1 DSP PCB	1
		46-2 TR PCB	1
47	TUNER MODULE	CNV/M9001MS0J73L	1
48	CUSHION	CHG1A160Z	1
49	SUPPORT,CUSHION	CHG1A104Z	1
50	BRACKET,PCB	CMD1A416	2
51	MOMS SW ASS'Y	CSHAVR155ZA	1
52	VOLUME SHEET	CMZ1A090	1
53	CUSHION	CHG1A354	4
54	CUSHION	CHG1A333	1

HK3490/3390 idle current Adjustment



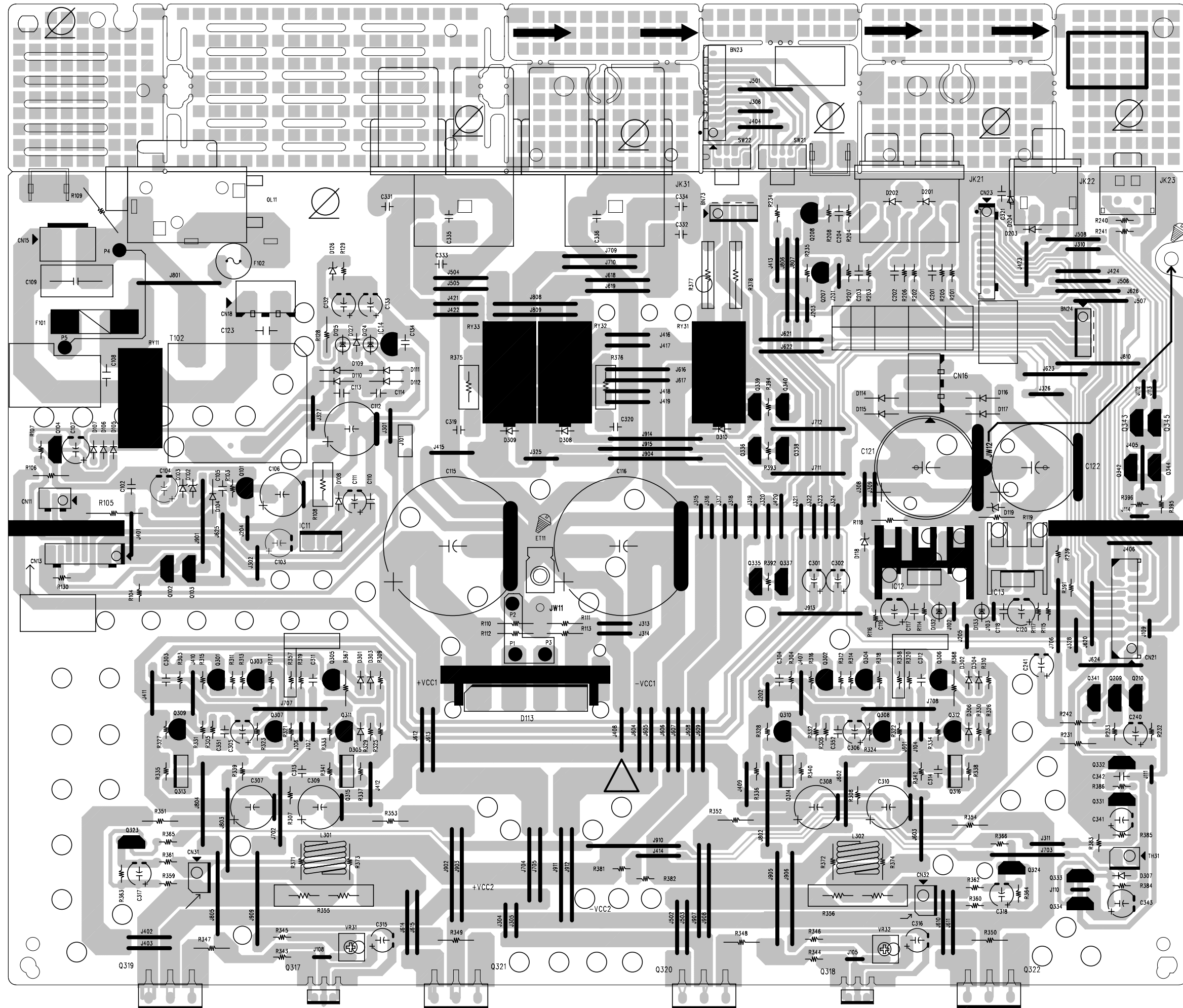
1. Adjust VR31 to set **21.12mV($\pm 5\%$)** on DC EVM.
2. Adjust VR32 as same way above.















HK3490 ELECTRICAL PARTS LIST					
Ref. Designator	Part Number	Description		Qty	
PCB, FRONT					
<i>Capacitors</i>					
C802	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000PF 50V	1	EA
C803	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000PF 50V	1	EA
C804	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000PF 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)	0.022UF 50V	1	EA
C810	CCBS1C222MXT	CAP , CERAMIC(2200PF/16V)	2200PF 16V	1	EA
C811	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000PF 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)	0.022UF 50V	1	EA
C817	CCBS1H473ZFT	CAP , CERAMIC(47000PF/50V)	0.047UF 50V	1	EA
C818	CCEA1CKS100T	CAP , ELECT	10UF 16V	1	EA
C819	CCBS1H102KBT	CAP , CERAMIC(1000PF/50V)	1000PF 50V	1	EA
C880	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100PF 50V	1	EA
C881	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100PF 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)	0.022UF 50V	1	EA
C951	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.022UF 50V	1	EA
C952	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100PF 50V	1	EA
C953	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100PF 50V	1	EA
C954	CCEA1HH100T	CAP , ELECT	10UF 50V	1	EA
C955	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100PF 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
C990	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1	EA
C991	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1	EA
C992	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	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

Ref. Designator	Part Number	Description		Qty	
PCB, FRONT					
C997	HCQI1H473JZT	CAP , MYLAR	0.047UF 50V J	1	EA
C998	HCQI1H473JZT	CAP , MYLAR	0.047UF 50V J	1	EA
C999	HCQI1H473JZT	CAP , MYLAR	0.047UF 50V J	1	EA
Semiconductors					
D854	CVDZJ8.2BT	DIODE , ZENER	ZJ8.2B 1/2W	1	EA
D855	CVDZJ8.2BT	DIODE , ZENER	ZJ8.2B 1/2W	1	EA
F603	KJCFC5S	HOLDER , FUSE	FUSE HOLDER	2	EA
F604	KJCFC5S	HOLDER , FUSE	FUSE HOLDER	2	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
IC91	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	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
Resistors					
R801	CRD20TF1001T	RES , CARBON	1K /1/5W /F	1	EA
R802	CRD20TF1501T	RES , CARBON	1.5K OHM /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 /1/5W F	1	EA
R807	CRD20TF1001T	RES , CARBON	1K /1/5W /F	1	EA
R808	CRD20TF1501T	RES , CARBON	1.5K OHM /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 /1/5W F	1	EA
R813	CRD20TF7501T	RES , CARBON (7.5K/F)	7.5K /1/5W F	1	EA
R814	CRD20TF1001T	RES , CARBON	1K /1/5W /F	1	EA
R815	CRD20TF1501T	RES , CARBON	1.5K OHM /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

Ref. Designator	Part Number	Description	Qty	
PCB, FRONT				
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
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
R998	CRQ1AJR47H	RES , FUSE	0.47 OHM 1W	1 EA
R999	CRQ1AJR47H	RES , FUSE	0.47 OHM 1W	1 EA
VR90	CVV2K21M104Z	RES , VARIABLE(100K, MN CURVE, PUSH LOCK)	100K OHM M CURVE	1 EA
VR91	CVV2K20C104Z	RES , VARIABLE(100K, C CURVE, PUSH LOCK)	100K OHM C CURVE	1 EA
VR92	CVV2K20C104Z	RES , VARIABLE(100K, C CURVE, PUSH LOCK)	100K OHM C CURVE	1 EA
VR95	CSR2A037Z	ENCODER	ENCODER	1 EA
Miscellaneous				
SW801	HST1A020ZT	SW , TACT	SW	1 EA
SW802	HST1A020ZT	SW , TACT	SW	1 EA
SW803	HST1A020ZT	SW , TACT	SW	1 EA
SW804	HST1A020ZT	SW , TACT	SW	1 EA
SW805	HST1A020ZT	SW , TACT	SW	1 EA
SW806	HST1A020ZT	SW , TACT	SW	1 EA
SW807	HST1A020ZT	SW , TACT	SW	1 EA
SW808	HST1A020ZT	SW , TACT	SW	1 EA
SW809	HST1A020ZT	SW , TACT	SW	1 EA
SW810	HST1A020ZT	SW , TACT	SW	1 EA
SW811	HST1A020ZT	SW , TACT	SW	1 EA
SW812	HST1A020ZT	SW , TACT	SW	1 EA
SW813	HST1A020ZT	SW , TACT	SW	1 EA
SW814	HST1A020ZT	SW , TACT	SW	1 EA
SW815	HST1A020ZT	SW , TACT	SW	1 EA
SW816	HST1A020ZT	SW , TACT	SW	1 EA
SW817	HST1A020ZT	SW , TACT	SW	1 EA
SW818	HST1A020ZT	SW , TACT	SW	1 EA
SW819	HST1A020ZT	SW , TACT	SW	1 EA
SW838	HST1A020ZT	SW , TACT	SW	1 EA
BK81	CMD1A569	BRACKET , PCB	BRACKET	1 EA
BK91	CMD1A209	BRACKET , FLT	BRACKET	1 EA
BK92	CMD1A209	BRACKET , FLT	BRACKET	1 EA

Ref. Designator	Part Number	Description	Qty	
PCB, FRONT				
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
BN14	CWB1C913300EN	WIRE ASS'Y (13P, 300mm)	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	SHIELD WIRE ASS'Y	1 EA
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 ,	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	SENSOR , REMOCON	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 , VOLUME	1 EA
	CGX1A390C66V	SHEET , AL FRONT HK3490	SHEET	1 EA
	CKC6B145S60	CABINET , TOP	CABINET	1 EA
	CMH1A214	HOLDER , VOLUME		1 EA
	CMZ1A127	FILTER , FIP	FILTER	1 EA
	CTB3+6FFZR	SCREW	SCREW	1 EA
	CTB3+8JFZR	SCREW	SCREW	14 EA
	CTB4+6FFZR	SCREW	SCREW	6 EA
PCB, MAIN				
<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)	0.022UF 50V	1 EA
C111	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C113	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.022UF 50V	1 EA
C114	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.022UF 50V	1 EA
C117	CCBS1H473ZFT	CAP , CERAMIC(47000PF/50V)	0.047UF 50V	1 EA
C118	CCBS1H473ZFT	CAP , CERAMIC(47000PF/50V)	0.047UF 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)	100PF 50V	1 EA
C202	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100PF 50V	1 EA
C203	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100PF 50V	1 EA
C204	CCBS1H101KBT	CAP , CERAMIC(100PF/50V)	100PF 50V	1 EA
C240	CCEA1HH1R0T	CAP , ELECT	1UF 50V	1 EA

Ref. Designator	Part Number	Description	Qty	
PCB, MAIN				
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
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	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C320	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C321	CCBS1H473ZFT	CAP , CERAMIC(47000PF/50V)	0.047UF 50V	1 EA
C331	HCQ1H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C332	HCQ1H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C333	HCQ1H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C334	HCQ1H562JZT	CAP , MYLAR	5600PF 50V J	1 EA
C335	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C336	HCQ1H473JZT	CAP , MYLAR	0.047UF 50V J	1 EA
C341	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C342	CCBS1H223ZFT	CAP , CERAMIC(22000PF/50V)	0.022UF 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	470UF 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	3300UF 16V	1 EA
C115	CCET63VKL5153NK	CAP , ELECT	15000UF 63V	1 EA
C116	CCET63VKL5153NK	CAP , ELECT	15000UF 63V	1 EA
C121	CCET35VKL5822NK	CAP , ELECT (35V/8200UF, 25X40)	8200UF 35V	1 EA
C122	CCET35VKL5682NK	CAP , ELECT	6800UF 35V	1 EA
C123	KCKDKS471ME	CAP , CERAMIC(KH TYPE)	470PF, 2.5KV	1 EA
C307	CCEA2AH101E	CAP , ELECT	100UF 100V	1 EA
C308	CCEA2AH101E	CAP , ELECT	100UF 100V	1 EA
C309	CCEA2AH101E	CAP , ELECT	100UF 100V	1 EA
C310	CCEA2AH101E	CAP , ELECT	100UF 100V	1 EA
Semiconductors				
D102	CVDZJ3.3BT	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

Ref. Designator	Part Number	Description	Qty	
PCB, MAIN				
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
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	TRANSISTOR , BIAS NPN TO-126	KTC3114A	1 EA
Q318	HVTKTC3114A	TRANSISTOR , BIAS NPN TO-126	KTC3114A	1 EA
Q319	HVT2SD2401P	TRANSISTOR , POWER(DARINGTON) NPN	2SD2401P	1 EA

Ref. Designator	Part Number	Description	Qty	
PCB, MAIN				
Q320	HVT2SD2401P	TRANSISTOR , POWER(DARINGTON) NPN	2SD2401P	1 EA
Q321	HVT2SB1570P	TRANSISTOR , POWER(DARINGTON) PNP	2SB1570P	1 EA
Q322	HVT2SB1570P	TRANSISTOR , POWER(DARINGTON) PNP	2SB1570P	1 EA
Q313	HVTKTA1360Y	TRANSISTOR , PRE DRIVE PNP TO-126	KTA1360Y	1 EA
Q314	HVTKTA1360Y	TRANSISTOR , PRE DRIVE PNP TO-126	KTA1360Y	1 EA
Q315	HVTKTC3423Y	TRANSISTOR , PRE DRIVE NPN TO-126	KTC3423Y	1 EA
Q316	HVTKTC3423Y	TRANSISTOR , PRE DRIVE NPN TO-126	KTC3423Y	1 EA
	HVIL7915CP	I.C, REGULATOR -15v	L7915CP	1 EA
IC14	HVIS-80842CNY-X	I.C , RESET	S-80842CNY-X	1 EA
	HVIL7815CP	I.C, REGULATOR +15v	L7815CP	1 EA
IC13	CVIL7915CPVA	I.C ASS'Y NEG -15V REG	HEAT SINK ASS'Y	1 EA
D113	CMY4A138ZA	HEAT SINK ASS'Y	HEAT SINK ASS'Y	1 EA
IC11	HVIKIA7805API	REGULATOR, +5V	7805API (KEC)	1 EA
IC12	CVIL7815CPHA	I.C REG HEAT SINK ASS'Y(CMY4A222)	HEAT SINK ASS'Y	1 EA
	HVDGBJ806MF	DIODE , BRIDGE	GBJ806MF	1 EA
Resistors				
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 J	1 EA
R107	CRD20TJ222T	RES , CARBON	2.2K OHM 1/5W J	1 EA
R110	CRD25TJ393T	RES , CARBON	39K OHM 1/4W J	1 EA
R111	CRD25TJ393T	RES , CARBON	39K OHM 1/4W J	1 EA
R112	CRD25TJ393T	RES , CARBON	39K OHM 1/4W J	1 EA
R113	CRD25TJ393T	RES , CARBON	39K OHM 1/4W J	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 J	1 EA
R119	CRD25TJ123T	RES , CARBON	12K OHM 1/4W J	1 EA
R128	CRD25TJ222T	RES , CARBON	2.2K OHM 1/4W J	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 J	1 EA
R206	CRD20TJ184T	RES , CARBON	180K OHM 1/5W J	1 EA
R207	CRD20TJ184T	RES , CARBON	180K OHM 1/5W J	1 EA
R208	CRD20TJ184T	RES , CARBON	180K OHM 1/5W J	1 EA
R231	CRD25TJ822T	RES , CARBON	8.2K OHM 1/4W J	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 J	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

Ref. Designator	Part Number	Description	Qty	
PCB, MAIN				
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
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	CRD20TJ271T	RES , CARBON	270 OHM 1/5W J	1 EA
R358	CRD20TJ271T	RES , CARBON	270 OHM 1/5W J	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	47OHM 1/4W J	1 EA
R372	CRD25TJ470T	RES , CARBON	47OHM 1/4W J	1 EA
R373	CRD25TJ470T	RES , CARBON	47OHM 1/4W J	1 EA
R374	CRD25TJ470T	RES , CARBON	47OHM 1/4W J	1 EA
R381	CRD20TJ273T	RES , CARBON	27K OHM 1/5W J	1 EA
R382	CRD20TJ273T	RES , CARBON	27K OHM 1/5W J	1 EA

Ref. Designator	Part Number	Description	Qty	
PCB, MAIN				
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
R396	CRD20TJ393T	RES , CARBON	39K OHM 1/5W J	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 J	1 EA
R378	CRG2ANJ271H	RES , METAL OXIDE FILM(2W/270 OHM)	270 OHM 2W J	1 EA
Miscellaneous				
	CMYHK3490	HEAT SINK ASSY	HEAT SINK ASS'Y	1 EA
	CHD1A012R	SCREW , SPECIAL	SCREW	10 EA
	CMD1A398	BRACKET , PCB	BRACKET	1 EA
	CMD1A416	BRACKET , PCB(H/T)	BRACKET	2 EA
	CMD1A417	BRACKET , PCB	BRACKET	2 EA
	CMY2A296	HEAT SINK HK3490	HEAT SINK	1 EA
	CTB3+8JR	SCREW	SCREW	8 EA
	CTW3+8JR	SCREW	SCREW	9 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	KBA2C8000TLEY	LITTLE FUSE	250V, 8A	1 EA
	KJCF5S	HOLDER , FUSE	FUSE HOLDER F101	2 EA
F102	KBA2D2500TLET	FUSE	250V, 2.5A	1 EA
	CMY4A138	HEAT SINK , DIODE	HEAT SINK	1 EA
	CTB3+10JR	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
	CTB3+8JR	SCREW	SCREW	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/WH)	JACK	1 EA

Ref. Designator	Part Number	Description		Qty	
PCB, MAIN					
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)	JACK	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
T102	CLT5J033ZU	TRANS , SUB	SR-68	1	EA
	CHD3A012R	SCREW , SPECIAL		4	EA
INPUT PCB					
Capacitors					
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
C410	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C411	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C413	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA

Ref. Designator	Part Number	Description	Qty	
INPUT PCB				
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
C518	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C520	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C522	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	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
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
C353	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C354	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C355	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	1 EA
C356	CCEA1HH4R7T	CAP , ELECT	4.7UF 50V	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

Ref. Designator	Part Number	Description	Qty	
INPUT PCB				
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
C409	CCEA1HH100T	CAP , ELECT	10UF 50V	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
C504	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C506	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C514	CCEA1AH101T	CAP , ELECT	100UF 10V	1 EA
C517	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C519	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C521	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C523	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C412	CCEA1EH102E	CAP , ELECT	1000UF 25V	1 EA
Semiconductors				
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

Ref. Designator	Part Number	Description	Qty	
INPUT PCB				
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
IC33	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	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
IC53	HVITC74VHCT08FT	IC , AND-GATE	TC74VHCT08FT	1 EA
IC54	HVITC74VHCT08FT	IC , AND-GATE	TC74VHCT08FT	1 EA
IC55	CVITC74VHC08FT	I.C QUAD 2-INPUT AND GATE	TC74VHC08FT	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
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	KTC3875SYRTK	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)	KIA7908PI	1 EA
Resistors				
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

Ref. Designator	Part Number	Description	Qty	
INPUT PCB				
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
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
R373	CRJ10DJ682T	RES , CHIP	6.8K OHM 1/10W	1 EA
R374	CRJ10DJ682T	RES , CHIP	6.8K 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

Ref. Designator	Part Number	Description	Qty	
INPUT PCB				
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
R417	CRJ10DJ562T	RES , CHIP	5.6K OHM 1/10W	1 EA
R418	CRJ10DJ562T	RES , CHIP	5.6K OHM 1/10W	1 EA
R419	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R420	CRJ10DJ101T	RES , CHIP	100 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
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	CRJ10DJ242T	RES , CHIP	2.4K 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

Ref. Designator	Part Number	Description		Qty	
INPUT PCB					
R541	CRJ10DJ100T	RES , CHIP	10 OHM 1/10W	1	EA
Miscellaneous					
BN51	CWE8202120AA	WIRE , 1P BLACK(120MM)	WIRE ASS'Y	1	EA
CB51	CJP21GA117ZY	WAFER	WAFER	1	EA
CB52	CJP19GA117ZY	CARD CABLE , WAFER	WAFER	1	EA
CB71	CJP11GA117ZY	WAFER	WAFER	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
PCB, VIDEO					
Capacitors					
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
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
Semiconductors					
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
Resistors					
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

Ref. Designator	Part Number	Description		Qty	
PCB, VIDEO					
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
Miscellaneous					
BN85	CJP17GA117ZY	WAFER	WAFER	1	EA
CN83	CJP07GB113ZY	WAFER , CARD CABLE	WAFER	1	EA
SW820	CST1A010Z	SW , TACT	SW	1	EA
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
PCB, DSP					
Capacitors					
C501	CCUS1H181JA	CAP , CHIP	180PF 50V J	1	EA
C502	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C503	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C506	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C509	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C510	CCUS1H220JA	CAP , CHIP	22PF 50V J	1	EA
C511	CCUS1H220JA	CAP , CHIP	22PF 50V J	1	EA
C513	CCUS1H102KC	CAP , CHIP	1000PF 50V K	1	EA
C514	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C515	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C517	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C519	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C522	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C523	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C525	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C528	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C529	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C532	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C533	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C535	CCUS1H272KC	CAP , CHIP	2700PF 50V K	1	EA
C536	CCUS1H272KC	CAP , CHIP	2700PF 50V K	1	EA
C537	CCUS1H391JA	CAP , CHIP	390PF 50V J	1	EA
C538	CCUS1H391JA	CAP , CHIP	390PF 50V J	1	EA
C539	CCUS1H272KC	CAP , CHIP	2700PF 50V K	1	EA
C540	CCUS1H272KC	CAP , CHIP	2700PF 50V K	1	EA
C541	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C542	CCUS1H391JA	CAP , CHIP	390PF 50V J	1	EA
C543	CCUS1H391JA	CAP , CHIP	390PF 50V J	1	EA
C544	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C549	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C551	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C552	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C554	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C555	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C569	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C570	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1	EA
C571	CCUS1H471JA	CAP , CHIP	470PF 50V J	1	EA

Ref. Designator	Part Number	Description	Qty	
PCB, DSP				
C572	CCUS1H471JA	CAP , CHIP	470PF 50V J	1 EA
C612	CCUS1H220JA	CAP , CHIP	22PF 50V J	1 EA
C613	CCUS1H223KC	CAP , CHIP	0.022UF 50V K	1 EA
C614	CCUS1H220JA	CAP , CHIP	22PF 50V J	1 EA
C615	CCUS1H471JA	CAP , CHIP	470PF 50V J	1 EA
C616	CCUS1H471JA	CAP , CHIP	470PF 50V J	1 EA
C619	CCUS1H223KC	CAP , CHIP	0.022UF 50V K	1 EA
C622	CCUS1H473KC	CAP , CHIP	0.047UF 50V K	1 EA
C623	CCUS1H223KC	CAP , CHIP	0.022UF 50V K	1 EA
C705	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C706	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C707	CCUS1H102KC	CAP , CHIP	1000PF 50V K	1 EA
C708	CCUS1H102KC	CAP , CHIP	1000PF 50V K	1 EA
C709	CCUS1H102KC	CAP , CHIP	1000PF 50V K	1 EA
C710	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C711	CCUS1H102KC	CAP , CHIP	1000PF 50V K	1 EA
C712	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C713	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C714	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C715	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C716	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C717	CCUS1H180JA	CAP , CHIP(18PF/50V)	18PF 50V J	1 EA
C718	CCUS1H180JA	CAP , CHIP(18PF/50V)	18PF 50V J	1 EA
C719	CCUS1H181JA	CAP , CHIP	180PF 50V J	1 EA
C720	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C721	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C722	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C723	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C724	CCUS1H331JA	CAP , CHIP	330PF 50V J	1 EA
C725	CCUS1H331JA	CAP , CHIP	330PF 50V J	1 EA
C726	CCUS1H223KC	CAP , CHIP	0.022UF 50V K	1 EA
C727	CCUS1H122KC	CAP , CHIP	1200PF 50V K	1 EA
C728	CCUS1H122KC	CAP , CHIP	1200PF 50V K	1 EA
C729	CCUS1H271JA	CAP , CHIP	270PF 50V J	1 EA
C730	CCUS1H271JA	CAP , CHIP	270PF 50V J	1 EA
C731	CCUS1H102KC	CAP , CHIP	1000PF 50V K	1 EA
C732	CCUS1H102KC	CAP , CHIP	1000PF 50V K	1 EA
C733	CCUS1H223KC	CAP , CHIP	0.022UF 50V K	1 EA
C734	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C735	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C736	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C737	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C738	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C739	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C780	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
C781	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
C782	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
C783	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
C785	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C786	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C787	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C788	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C789	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C970	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C971	CCUS1H104KC	CAP , CHIP	0.1UF 50V K	1 EA
C504	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C505	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C507	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C508	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C516	CCEA1AH471T	CAP , ELECT	470UF 10V	1 EA
C518	CCEA1HH2R2T	CAP , ELECT	2.2UF 50V	1 EA

Ref. Designator	Part Number	Description	Qty	
PCB, DSP				
C520	CCEA1AH471T	CAP , ELECT	470UF 10V	1 EA
C521	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C524	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C526	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C527	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C530	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C531	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C534	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C545	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C546	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C553	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C556	CCEA0JH102T	CAP , ELECT	1000UF 6.3V	1 EA
C557	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C558	CCFT1H473ZF	CAP , CERAMIC	0.047UF 50V Z	1 EA
C560	CCFT1H473ZF	CAP , CERAMIC	0.047UF 50V Z	1 EA
C567	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C568	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C573	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C574	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C575	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C576	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C603	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C604	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C610	CCEA1HH1R0T	CAP , ELECT	1UF 50V	1 EA
C617	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C618	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C624	CCFT1H473ZF	CAP , CERAMIC	0.047UF 50V Z	1 EA
C652	CCEA1CH471T	CAP , ELECT	470UF 16V	1 EA
C654	CCEA1AH331T	CAP , ELECT	330UF 10V	1 EA
C655	CCEA1CH221T	CAP , ELECT	220UF 16V	1 EA
C656	CCEA1EH101T	CAP , ELECT	100UF 25V	1 EA
C658	CCFT1H473ZF	CAP , CERAMIC	0.047UF 50V Z	1 EA
C743	CCFT1H473ZF	CAP , CERAMIC	0.047UF 50V Z	1 EA
C750	CCEA1HH220T	CAP , ELECT	22UF 50V	1 EA
C751	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C752	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C753	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C754	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C755	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C756	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C757	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C758	CCEA1HH100T	CAP , ELECT	10UF 50V	1 EA
C759	CCEA1AH471T	CAP , ELECT	470UF 10V	1 EA
C760	CCEA1CH101T	CAP , ELECT	100UF 16V	1 EA
C762	CCFT1H473ZF	CAP , CERAMIC	0.047UF 50V Z	1 EA
C561	CCEA1CH682E	CAP , ELECT	6800UF 16V	1 EA
C562	CCEA1CH682E	CAP , ELECT	6800UF 16V	1 EA
C659	CCEA1VH222E	CAP , ELECT	2200UF 35V	1 EA
C763	CCEA1CH222E	CAP , ELECT	2200UF 16V	1 EA
Semiconductors				
IC44	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
IC51	CVIKIA1117S18	I.C , REGULATOR(SOT-223)	KIA1117S/F18, SOT-223	1 EA
IC52	CVIKIA1117S33	I.C , REGULATOR(SOT-223)	KIA1117S/F33, SOT-223	1 EA
IC53	HVIK4589VQ-T	I.C , CODEC + DIR	AK4589VQ	1 EA
IC54	CVICS48560CQZ	I.C , DSP	CS48560-CQZ	1 EA
IC55	HVI74HCU04AFNG	I.C , INVERTER	TC74HCU04AFNG(TOSHIBA)	1 EA
IC62	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
IC63	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
IC71	CVIXMDTIC	I.C , XM V3B	XMDTIC	1 EA

Ref. Designator	Part Number	Description	Qty	
PCB, DSP				
IC72	CVIK4384ET	I.C , ADC	AK4384ET	1 EA
IC73	HVINJM2068MDTE1	I.C , DUAL OP AMP	NJM2068MD-TE1	1 EA
D504	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D505	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D506	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D507	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D508	CVDZJ4.3BT	DIODE , ZENER	ZJ4.3B 1/2W	1 EA
D602	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D603	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D701		WIRE , COPPER	SN95/PB5 , 0.6	1 EA
D702	CVD1SS133MT	DIODE	1SS133	1 EA
D703	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D704	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D705	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
D706	CVD1N4003ST	DIODE , RECT	1N4003	1 EA
IC74	CVIKIA78S05PAT	I.C , REGULATOR(5V, TO-92)	KIA78S05PAT	1 EA
IC56	HVIL7805CP	I.C, REGULATOR POS +5V	L7805CP	1 EA
IC64	HVIL7812CP	I.C , REGULATOR POS +12V	L7812	1 EA
IC75	HVIL7805CP	I.C, REGULATOR POS +5V	L7805CP	1 EA
Q601	HVTKRC102S	TRANSISTOR , CHIP PNP	KRC102S	1 EA
<i>Resistor</i>				
RN72	CRJ102DJ220T	RES , CHIP NETWORK 1/10W, 22ohm, J , 1608 2 ARF	22 OHM X 2 1/10W	1 EA
R501	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R502	CRJ10DJ750T	RES , CHIP	75 OHM 1/10W	1 EA
R503	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R504	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R505	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R506	CRJ10DJ472T	RES , CHIP	4.7K OHM 1/10W	1 EA
R507	CRJ10DJ472T	RES , CHIP	4.7K OHM 1/10W	1 EA
R508	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R509	CRJ10DJ105T	RES , CHIP	1M OHM 1/10W	1 EA
R510	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R514	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R515	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R517	CRJ10DF1202T	RES , CHIP 1%	12K OHM 1/10W F	1 EA
R518	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R519	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R520	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R521	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R525	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R526	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R527	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R528	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R530	CRJ10DF5101T	RES. CHIP (5.1K 1%)	5.1K OHM 1/10W	1 EA
R531	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R532	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R533	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R534	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R535	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R536	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R537	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R538	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R539	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R540	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R541	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R542	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R543	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R544	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R545	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA

Ref. Designator	Part Number	Description	Qty	
PCB, DSP				
R546	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R547	CRJ10DJ330T	RES , CHIP	33 OHM 1/10W	1 EA
R548	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R549	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R550	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R551	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R552	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R553	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R554	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R555	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R556	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R557	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R558	CRJ10DJ682T	RES , CHIP	6.8K OHM 1/10W	1 EA
R559	CRJ10DJ682T	RES , CHIP	6.8K OHM 1/10W	1 EA
R560	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
R561	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
R562	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
	CRJ10DJ682T	RES , CHIP	6.8K OHM 1/10W	1 EA
R564	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
R565	CRJ10DJ682T	RES , CHIP	6.8K OHM 1/10W	1 EA
R566	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R567	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R568	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R569	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R574	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R584	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R585	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R586	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R587	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R588	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R589	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R590	CRJ10DJ333T	RES , CHIP	33K OHM 1/10W	1 EA
R591	CRJ10DJ682T	RES , CHIP	6.8K OHM 1/10W	1 EA
R592	CRJ10DJ123T	RES , CHIP	12K OHM 1/10W	1 EA
R593	CRJ10DJ153T	RES , CHIP	15K OHM 1/10W	1 EA
R594	CRJ10DJ153T	RES , CHIP	15K OHM 1/10W	1 EA
R595	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
R602	CRJ10DF5493T	RES , CHIP 549KOHM/1608/1%	549K OHM 1/10W F	1 EA
R603	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R610	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R613	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R614	CRJ10DJ474T	RES , CHIP	470K OHM 1/10W	1 EA
R615	CRJ10DJ473T	RES , CHIP	47K OHM 1/10W	1 EA
R616	CRJ18AJ221T	RES , CHIP	220 OHM 1/8W	1 EA
R617	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R618	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R619	CRJ18AJ221T	RES , CHIP	220 OHM 1/8W	1 EA
R620	CRJ10DJ220T	RES , CHIP	22 OHM 1/10W	1 EA
R621	CRJ10DJ220T	RES , CHIP	22 OHM 1/10W	1 EA
R622	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R623	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R624	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R625	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R626	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R627	CRJ10DJ474T	RES , CHIP	470K OHM 1/10W	1 EA
R628	CRJ10DJ474T	RES , CHIP	470K OHM 1/10W	1 EA
R629	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R630	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R631	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
R703	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R704	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA

Ref. Designator	Part Number	Description	Qty	
PCB, DSP				
R705	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R706	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R707	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R708	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R709	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R710	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R711	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R712	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R713	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R714	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R715	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R716	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R717	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R718	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R719	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R720	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R721	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R722	CRJ10DJ223T	RES , CHIP	22K OHM 1/10W	1 EA
R723	CRJ10DJ105T	RES , CHIP	1M OHM 1/10W	1 EA
R725	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R726	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R727	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R728	CRJ10DJ103T	RES , CHIP	10K OHM 1/10W	1 EA
R729	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
R730	CRJ10DJ152T	RES , CHIP	1.5K OHM 1/10W	1 EA
R731	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R732	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R733	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R734	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R735	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R736	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R737	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R738	CRJ10DJ332T	RES , CHIP	3.3K OHM 1/10W	1 EA
R739	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R740	CRJ10DJ104T	RES , CHIP	100K OHM 1/10W	1 EA
R741	CRJ10DJ0R0T	RES , CHIP	0 OHM 1/10W	1 EA
R760	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R761	CRJ10DJ101T	RES , CHIP	100 OHM 1/10W	1 EA
R764	CRJ10DJ220T	RES , CHIP	22 OHM 1/10W	1 EA
R765	CRJ10DJ220T	RES , CHIP	22 OHM 1/10W	1 EA
R766	CRJ10DJ220T	RES , CHIP	22 OHM 1/10W	1 EA
R767	CRJ10DJ220T	RES , CHIP	22 OHM 1/10W	1 EA
R768	CRJ10DJ102T	RES , CHIP	1K OHM 1/10W	1 EA
R769	CRJ10DJ222T	RES , CHIP	2.2K OHM 1/10W	1 EA
Miscellaneous				
JK61	HJJ9L003Z	JACK , IPOD	JACK	1 EA
L500	CLZ9Z014Z	FERRITE , CHIP BEAD(60ohm, 4516)	10UH	1 EA
L501	CLZ9Z014Z	FERRITE , CHIP BEAD(60ohm, 4516)	10UH	1 EA
L502	CLQ06E2R7KRZ	INDUCTOR , CHIP	2.7UH	1 EA
L503	CLZ9Z014Z	FERRITE , CHIP BEAD(60ohm, 4516)	10UH	1 EA
L504	CLZ9Z014Z	FERRITE , CHIP BEAD(60ohm, 4516)	10UH	1 EA
L505	CLZ9Z014Z	FERRITE , CHIP BEAD(60ohm, 4516)	10UH	1 EA
L601	CLZ9Z014Z	FERRITE , CHIP BEAD(60ohm, 4516)	10UH	1 EA
L701	CLZ9Z014Z	FERRITE , CHIP BEAD(60ohm, 4516)	10UH	1 EA
L702	CLZ9Z014Z	FERRITE , CHIP BEAD(60ohm, 4516)	10UH	1 EA
X501	COX45158E180S	X-TAL, 45.1584MHZ (SMD)	45.1584MHZ	1 EA
BK41	CMD1A387	BRACKET , PCB	BRACKET	1 EA
BK61	CMD1A570	BRACKET , PCB	BRACKET	1 EA
BN51	CWB1C911200EN	WIRE ASS'Y	WIRE ASS'Y	1 EA

Ref. Designator	Part Number	Description		Qty	
PCB, DSP					
CB51	CJP21GA117ZY	WAFER	WAFER	1	EA
CB52	CJP19GA117ZY	CARD CABLE , WAFER	WAFER	1	EA
CB71	CJP11GA117ZY	WAFER	WAFER	1	EA
CN14	CJP13GA19ZY	WAFER, STRAIGHT, 13PIN	WAFER	1	EA
CN51	CJP11GA19ZY	WAFER , STRAIGHT	WAFER	1	EA
JK51	HJSTORX177L	MODULE , OPTICAL(RX)	TORX177L	1	EA
JK52	CJJ4M041Y	JACK , BOARD (COAX)	JACK	1	EA
JK71	CJJ9L006Z	JACK , XM	JACK	1	EA
X500	COX24576E180TF	CRYSTAL , 24.576MHz	24.576MHZ	1	EA
HK3490 TUNER MODULE		CNVM9001MS0J73L			

IC71 XM IC

PRELIMINARY (14 Aug 04)

User Spec - XM Digital Transceiver Integrated Circuit - Rev 3

1. Overview

The XM Digital Transceiver Integrated Circuit (XM/DT IC) provides a cost effective means for an electronics equipment manufacturer to be XM Satellite Radio compatible by multiplexing data and audio streams between the XM Receiver and User Interface Controller into a 2 wire time division duplex (TDD) high frequency serial link.

In a typical application, two XM/ DT IC devices connect to each other via a differential link as depicted on Figure 1.1 below. In the 'Slave' unit ("XM/DT Digital Transceiver" (antenna)), the XM/DT IC interfaces directly to the XM Radio receiver chipset taking in a real-time PCM (I2S) audio stream along with data information. The XM/DT IC stores this data in internal RAM and then time division multiplexes the data on a 2-wire serial communication link. This link provides for the physical decoupling of the Slave and Master side of up 100 meters with software transparency

between the Master side processor and audio circuitry and the Slave side XM Satellite Radio receiver chip set.

In the Master unit ("XM/DT Ready Radio"), the XM/DT IC demultiplexes the received data, buffers it internally and reproduces it for consumption. The XM/DT IC is capable of simultaneously sending and receiving serial frames while multiplexing and de-multiplexing them in real time, formatting them and then routing them into the appropriate Slave or Master side interfaces.

The software interface between the user interface and the receiver is unaffected by the introduction of the XM/DT IC link pair.

An input pin on the XM/DT IC configures the part's functionality as either Master (user interface end) or Slave (XM Digital Transceiver end) allowing the same IC to be used at either end of the link.

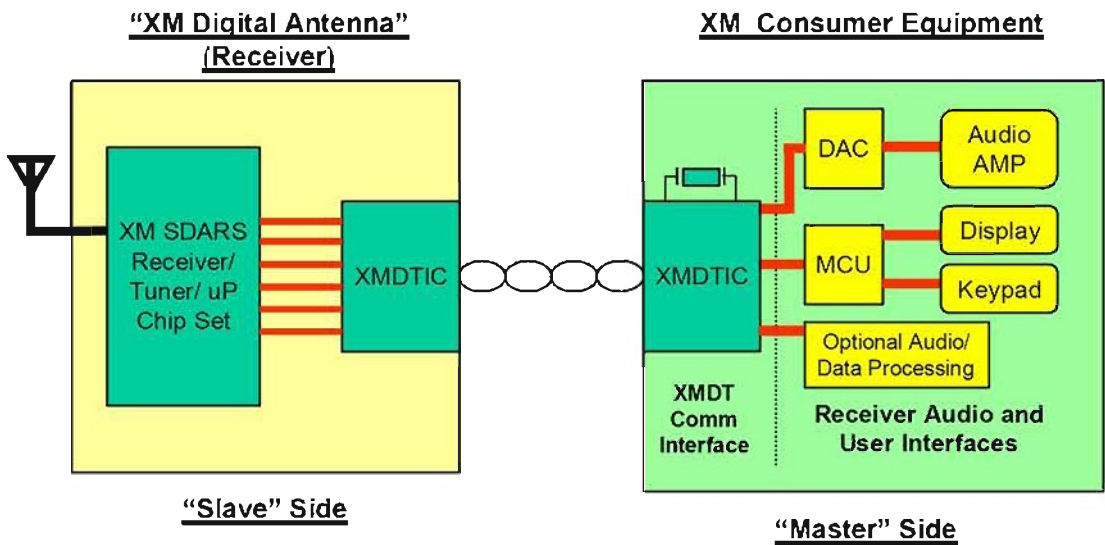


Figure 1.1 - Typical XM/DT Application

2. Functional Description

Figure 2.1 below shows a basic top level diagram showing each functional block in the XM/DT device.

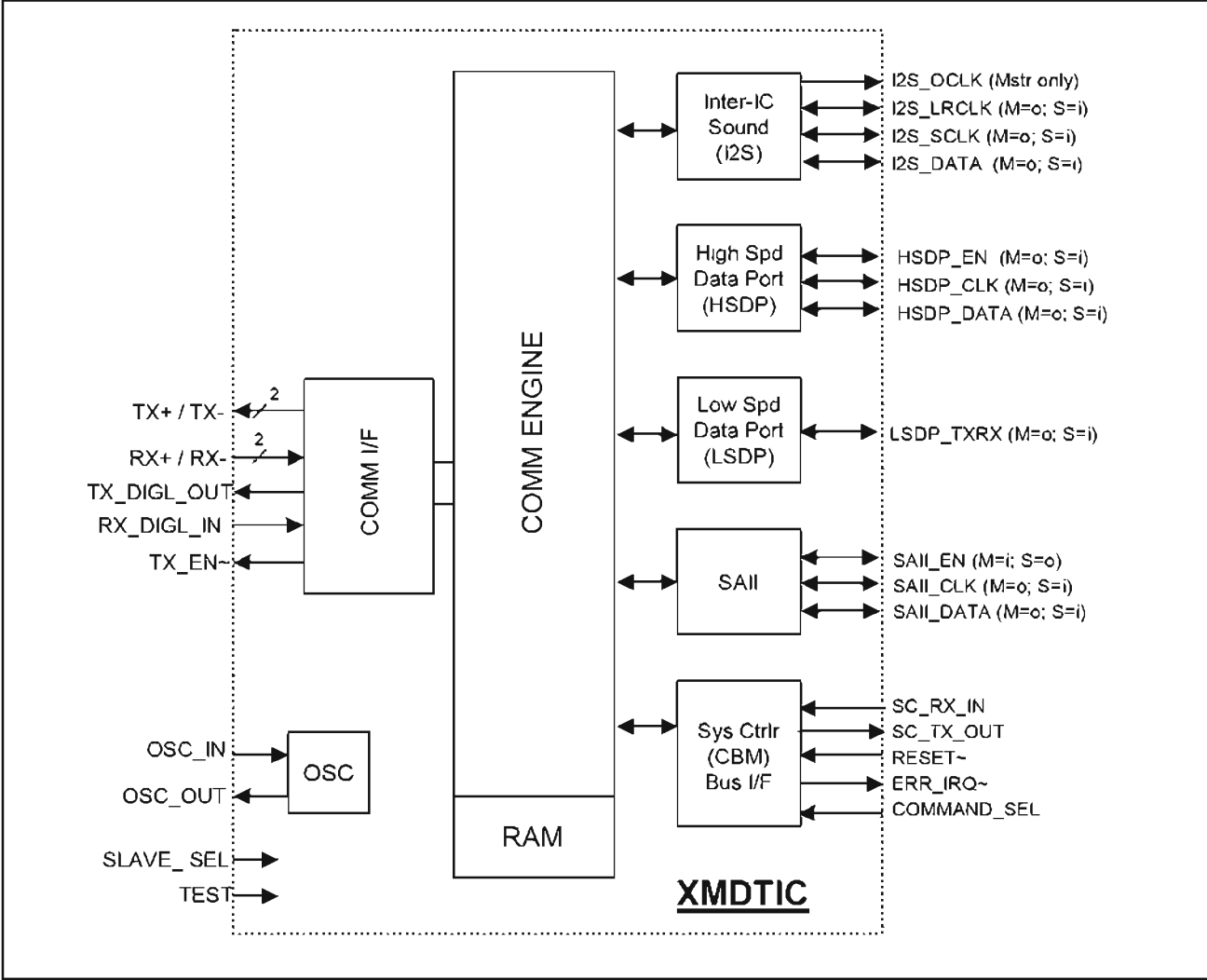


Figure 2.1 XM/DT Top Level Diagram

The XM/DT IC is broken into the following functional blocks:

SC I/F – System Controller Interface

The System Controller Interface transports the serial communication commands and data between the microprocessor in the user interface device and the microprocessor in the XM Digital Antenna. The commands and data transported follow typically follow the XM CBM (Common Bus Messaging) protocol.

The System Controller Interface functional block consists of a full duplex asynchronous serial interface. The SC I/F is used for both the software configuration of the XM/DT IC, monitoring of XM/DT link status, and transparent communications with the SC I/F at the other end of the communications link. The SC I/F block contains five signals, SC_RX_IN, SC_TX_OUT, COMMAND_SEL, ERR_IRQ#, and RESET#.

The SC_RX_IN and SC_TX_OUT connect the asynchronous serial communications to the respective microprocessors. The SC I/F

communicates at a default mode of 9600 baud, no parity, 8 data bits, and 1 stop bit. The baud rate can be changed using the XM/DT IC Command Mode. The Master and Slave baud rates must be set to the same rate by their respective microprocessors.

The COMMAND_SEL input allows configuration of the XM/DT IC and to retrieve feedback of the link status during normal operation. This signal is logic low for normal operation and logic high for Command/Stat Mode. Details of the operation of this signal are described in the Programming section of this specification.

The ERR_IRQ# output signal is active low when an error occurs on the link if interrupts are enabled via the Interrupt Mask register. Access to the Interrupt Mask register is gained via the Command Mode and the interrupt source identification is obtained via the Status Mode. Details of these modes are described in the Programming section of this specification.

The RESET# input signal is used to perform a complete asynchronous reset of the XM/DT IC. The RESET# signal is also used to place the XM/DT IC into Command Mode. Refer to the Programming section.

SAII – Synchronous Audio Input Interface

The SAI Interface functional block provides a synchronous interface with hardware flow control from the Master to the Slave devices.

In Master mode, the XM/DT IC receives SAI Data and SAI Clock from the SAI source in the "playback unit". The SAI Enable (SAI_EN) output signal is fed back to the SAI source to control the flow of input data based on the state of the SAI_EN signal at the Slave Device.

In Slave mode, the XM/DT IC sends SAI Data and SAI Clock to the Slave device SAI receiver, and receives the SAI_EN signal from the SAI receiver to control the flow of transmitted data.

The Master XM/DT IC adapts to the incoming SAI data rate.

LSDP – Low Speed Data Port

The LSDP functional block consists of a unidirectional asynchronous serial interface.

In Master mode, the LSDP transmits data out of the device. In Slave mode, the LSDP receives data into the device.

This interface operates in default mode at 115200, no parity, 8 data bits, and 1 stop bit.

HSDP – High Speed Data Port Interface

The HSDP Interface functional block provides a synchronous serial interface combined with a framing signal from the Slave XM/DT IC to the Master XM/DT IC.

The source of the HSDP is typically the XM receiver chipset. The HSDP data is typically received by the Host microprocessor. The HSDP signals include a serial data bitstream (HSDP_DA), a synchronous clock (HSDP_CLK), and a framing signal (HSDP_EN). The framing signal can be used as a gating mechanism for the clock or an interrupt source to indicate the beginning and end of the HSDP data burst.

In Slave mode, the HSDP Interface receives HSDP_DA, HSDP_CLK, and HSDP_EN from the HSDP source. In Master mode, the HSDP Interface transmits HSDP_DA, HSDP_CLK, and HSDP_EN.

I2S – Inter-IC Sound (I2S) digital audio Interface

The I2S functional block receives and transmits timing and frame sensitive data. The I2S interface is also referred to as the PCM interface.

In Slave mode, the XM/DT IC I2S Interface receives the I2S digital audio from the XM Receiver chipset. The XM/DT IC automatically adjusts to the incoming I2S data sampling rate.

In Master mode, the XM/DT IC I2S Interface generates all required signals to drive an I2S compatible audio DAC.

COMM2W – Two Wire Communications Interface

The COMM2W functional block enables communications between two XM/DT ICs. The COMM2W is differential Time-Division-Duplex Interface.

3. Physical Description

3.1 Device Pin-out

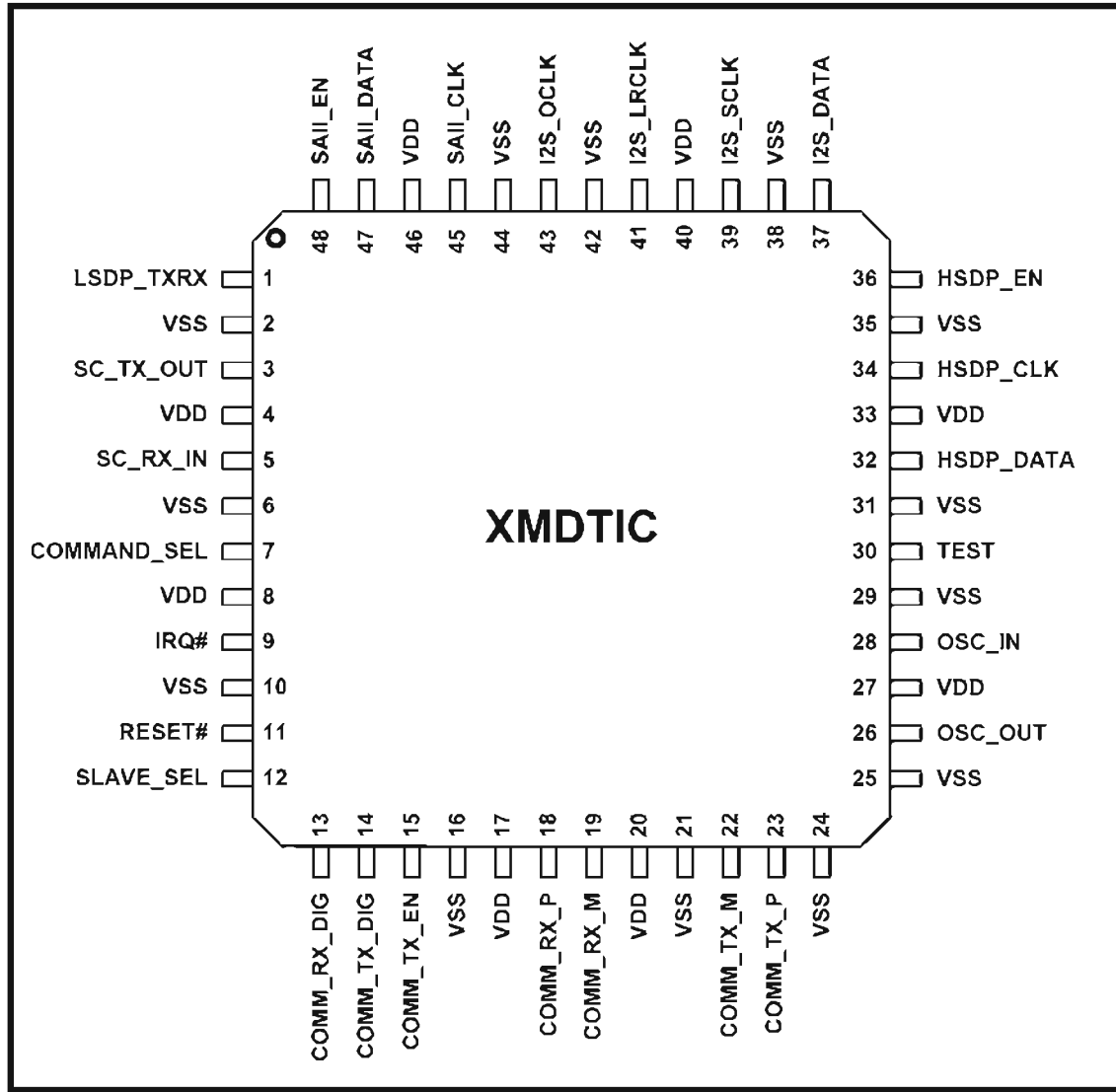


Figure 3.1 – Pin Connection (Top View)

3.2 Pin Descriptions

Table 3.2 Pin Descriptions

Pin #	Pin Name	Type	Function in Slave Mode	Function in Master Mode	Notes
1	LSDP_TXRX	S=In M=Out	Low Speed Data Port Output	Low Speed Data Port Input	LVTTTL S/T
3	SC_TX_OUT	S=Out M=Out	System Controller Bus (CBM) Transmit Data Out	System Controller Bus (CBM) Transmit Data Out	4mA, SLC
5	SC_RX_IN	S=In M=In	System Controller Bus (CBM) Receive Data In	System Controller Bus (CBM) Receive Data In	LVTTTL S/T
7	COMMAND_SEL	S=In M=In	Command Mode Select In (1= Command Mode, 0=Normal Mode)	Command Mode Select In (1= Command Mode, 0=Normal Mode)	LVTTTL S/T
9	IRQ#	S=Out M=Out	Interrupt Request Out (Active Low)	Interrupt Request Out (Active Low)	4mA Open Drain
11	RESET#	S=In M=In	Asynchronous Reset In, (Active Low)	Asynchronous Reset In, (Active Low)	LVTTTL S/T
12	SLAVE_SEL	S=In M=In	M/S Mode Select In (High = Slave Mode)	M/S Mode Select In (Low = Master Mode)	LVTTTL S/T
13	COMM_RX_DIG	S=In M=In	DT Comm Bus External Transceiver Receive Data In	DT Comm Bus External Transceiver Receive Data In	LVTTTL S/T
14	COMM_TX_DIG	Output	DT Comm Bus External Transceiver Transmit Data Out	DT Comm Bus External Transceiver Transmit Data Out	LVTTTL S/T
15	COMM_TX_EN	Output	DT Comm Bus External Transceiver Direction Out (1=Transmit, 0=Receive)	DT Comm Bus External Transceiver Direction Out (1=Transmit, 0=Receive)	LVTTTL S/T
18	COMM_RX_P	S=In M=In	DT Comm Bus Internal Receiver Differential Positive In	DT Comm Bus Internal Receiver Differential Positive In	LVDS in+
19	COMM_RX_M	S=In M=In	DT Comm Bus Internal Receiver Differential Negative In	DT Comm Bus Internal Receiver Differential Negative In	LVDS in-
22	COMM_TX_M	Output	DT Comm Bus Internal Transmitter Differential Negative Out	DT Comm Bus Internal Transmitter Differential Negative Out	LVDS out-
23	COMM_TX_P	Output	DT Comm Bus Internal Transmitter Differential Positive Out	DT Comm Bus Internal Transmitter Differential Positive Out	LVDS out+
26	OSC_OUT	Output	Crystal Output	Crystal Output	Crystal Buffer
28	OSC_IN	S=In M=In	Crystal Input	Crystal Input	Crystal Buffer
30	TEST	S=In M=In	Factory Test Mode Select (1=Test, 0= Normal Oper.)	Factory Test Mode Select (1=Test, 0= Normal Oper.)	LVTTTL S/T
32	HSDP_DATA	S=In M=Out	High Speed Data Port Data Input	High Speed Data Port Data Output	Out= 4mA, SLC In=LVTTTL S/T
34	HSDP_CLK	S=In M=Out	High Speed Data Port Clock Input	High Speed Data Port Clock Output	Out= 4mA, SLC In=LVTTTL S/T
36	HSDP_EN	S=Out M=In	High Speed Data Port Enable Output	High Speed Data Port Enable Input	Out= 4mA, SLC In=LVTTTL S/T
37	I2S_DATA	S=In M=Out	I2S Digital Port Data In	I2S Digital Audio Port Data Out	Out= 4mA, SLC In=LVTTTL S/T

PRELIMINARY (14 Aug 04)

User Spec - XM Digital Transceiver Integrated Circuit - Rev 3

Pin #	Pin Name	Type	Function in Slave Mode	Function in Master Mode	Notes
39	I2S_SCLK	S=In M=Out	I2S Digital Audio Port Bit Clock In	I2S Digital Audio Port Bit Clock Out	Out= 4mA, SLC In=LVTTL S/T
41	I2S_LRCLK	S=In M=Out	I2S Digital Audio Port Left/Right Clock In	I2S Digital Audio Port Left/Right Clock Out	Out= 4mA, SLC In=LVTTL S/T
43	I2S_OCLK	S=In M=Out	I2S Digital Audio Port Oversample Clock (not used - connect to Gnd???)	I2S Digital Audio Port Oversample Clock Out	Out= 4mA, SLC
45	SAII_CLK	S=Out M=In	SAII Port Clock Output	SAII Port Clock Input	Out= 4mA, SLC 3.3V S/T
47	SAII_DATA	S=Out M=In	SAII Port Data Output	SAII Port Data Input	Out= 4mA, SLC In=LVTTL S/T
48	SAII_REQ	S=In M=Out	SAII Port Request Input	SAII Port Request Output	Out= 4mA, SLC In=LVTTL S/T

Pin#	Pin Name	Type	Function in Slave Mode	Function in Master Mode	Notes
4, 8, 17, 20, 27, 33, 40, 46	VDD	PWR	+3.3V Supply Voltage	+3.3V Supply Voltage	
2, 6, 10, 16, 21, 24, 25, 29, 31, 25, 38, 42, 44	VSS	GND	Digital Ground	Digital Ground	

Notes: All Inputs are 3.3V LVTTL compatible; S/T = Schmitt Trigger inputs; SLC = Slew Rate Controller Output

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
 - I²C bus mode: 2 channels
- 10-bit AD converter (Built-in Sample hold circuit): 16 channels
- Special timer for CLOCK
- Watchdog timer

TOSHIBA

T5CD2

1.2 Pin Assignment Diagram

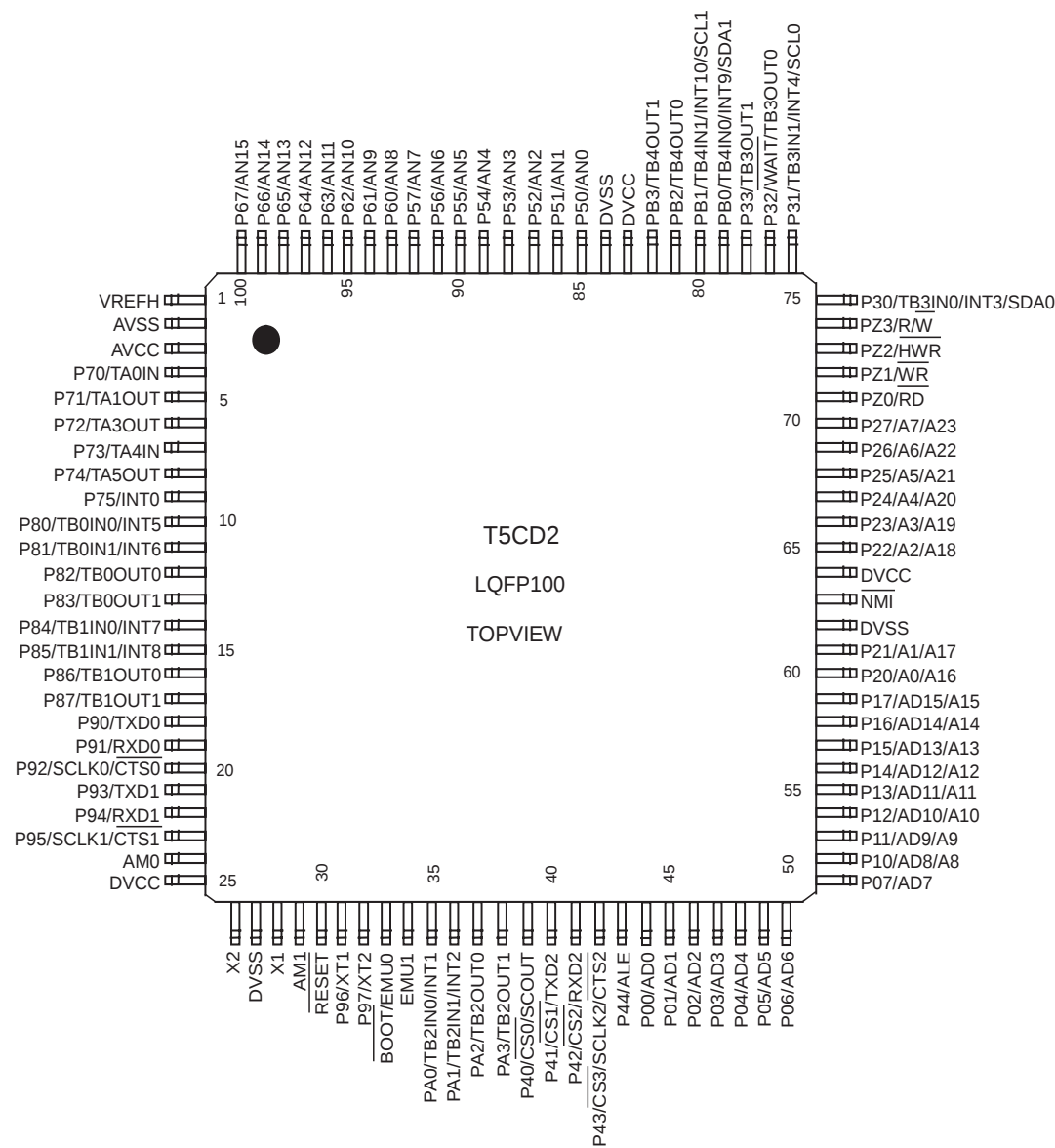


Figure 1-1 Pin Assignment

1.3 Block Diagram

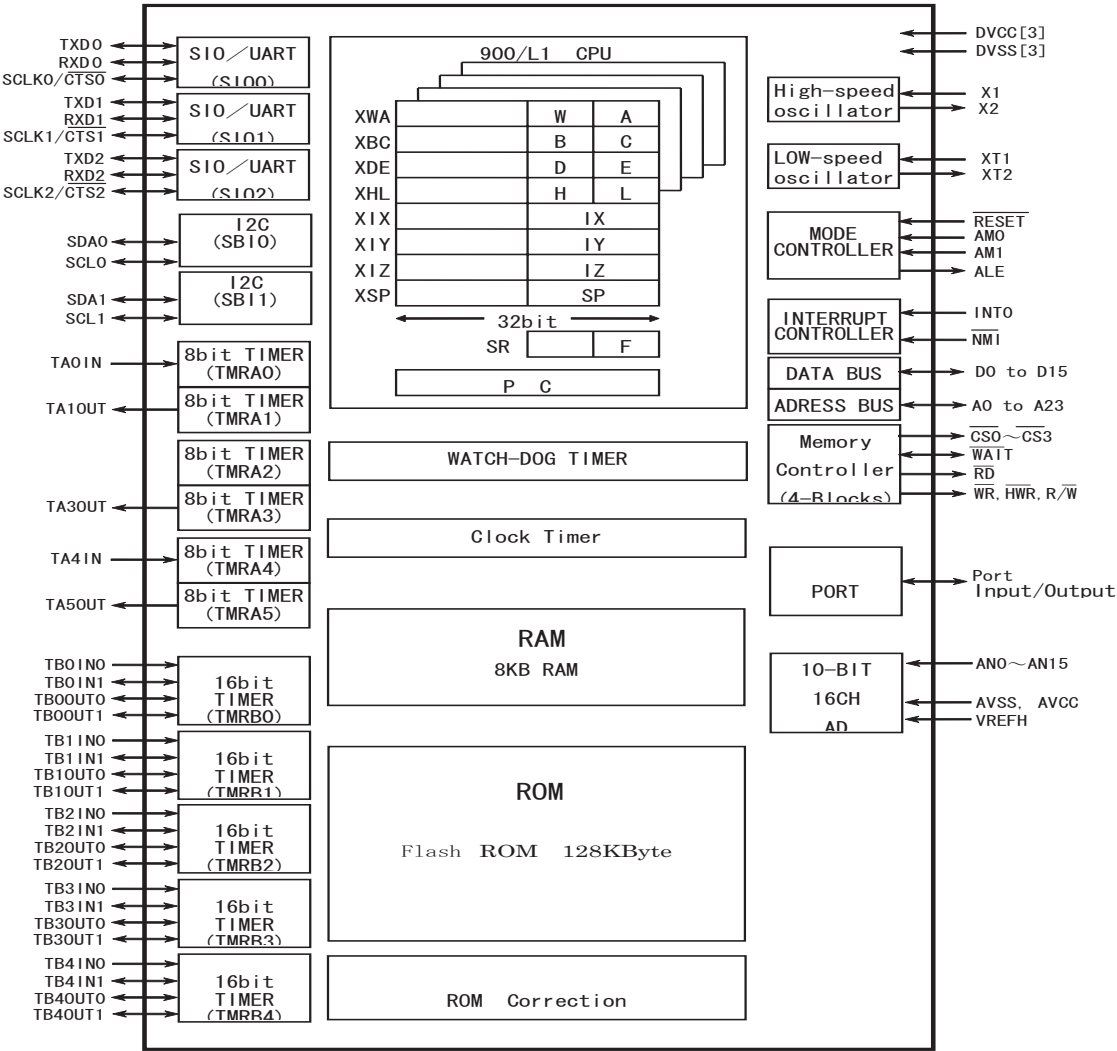


Figure 1-2 Block Diagram

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 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 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 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 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 f_s clock.
P41 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 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 CS3 SCLK2 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.



CS48500 Data Sheet

FEATURES

- ❑ Cost-effective, High-performance 32-bit DSP
 - 300,000,000 MAC/S (multiply accumulates per second)
 - Dual MAC cycles per clock
 - 72-bit accumulators are the most accurate in the industry
 - 24k x 32 SRAM, 2k blocks - assignable to data or program
 - Internal ROM contains a variety of configurable sound enhancement feature sets
 - 8-channel internal DMA
 - Internal watch-dog DSP lock-up prevention
- ❑ DSP Tool Set w/ Private Keys for Protecting Customer IP
- ❑ Configurable Serial Audio Inputs/Outputs
 - Configurable for all input/output types
 - Maximum 32-bit @ 192 kHz
 - Supports 32-bit audio sample I/O between DSP chips
 - TDM input modes (multiple channels on same line)
 - 192 kHz SPDIF transmitter
 - Multi-channel DSD direct stream digital SACD input
- ❑ Supports Two Different Input Fs Sample Rates
 - Output can be master or slave
 - Dual processing path capability
 - Input supports dual domain slave clocking
 - Hardware assist time sampling for sample rate conversion
- ❑ Integrated Clock Manager/PLL
 - Can operate from external crystal, external oscillator
- ❑ Input Fs Auto Detection
- ❑ Host & Boot via Serial Interface
- ❑ Configurable GPIOs and External Interrupt Input
- ❑ 1.8V Core / 3.3V I/O that are +5V Tolerant
- ❑ Low-power Mode
 - "Energy-Star Ready" via low-power mode, 350uW in standby

Differentiating from the legacy Cirrus multi-standard, multi-channel decoders, this new CS48500 family is still based on the same high-performance 32-bit fixed point DSP Digital Signal Processor core but instead is equipped with much less memory, tailoring it for more cost-effective applications associated with multi-channel and virtual-channel sound enhancements. Target applications are:

- Digital Televisions
- Multimedia Peripherals
- iPod® Docking Stations
- Automotive Head Units
- Automotive Outboard Amplifiers
- HD-DVD & Blu-ray Disc DVD Receivers
- PC Speakers

In these applications there are a wide variety of licensable DSP IP codes available today from:

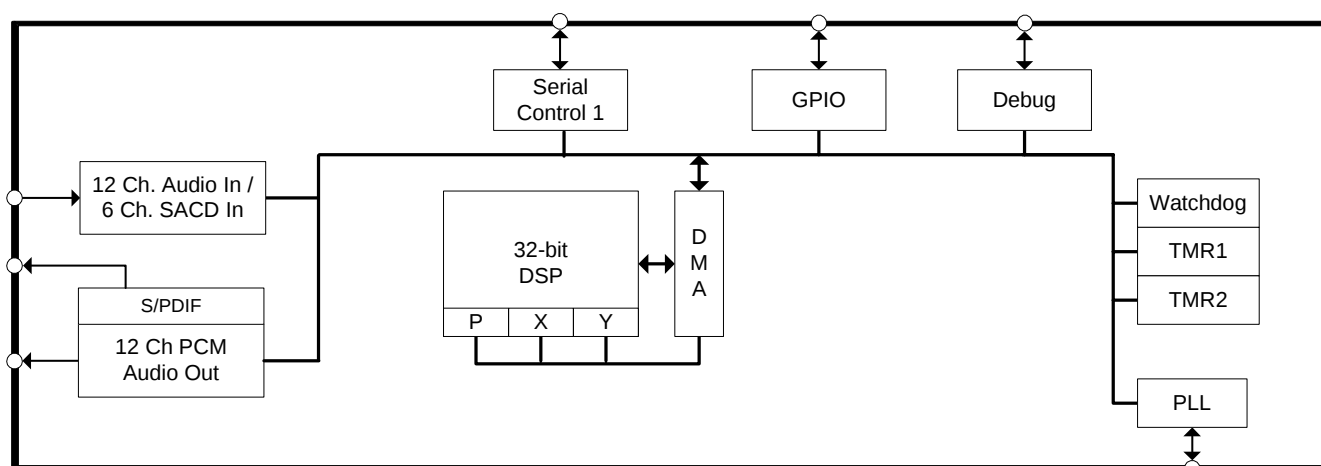


Cirrus also has developed, or is developing their own royalty-free versions of popular features sets like Cirrus Bass Manager, Cirrus Dynamic Volume Leveler, Cirrus Original Multichannel Surround, Cirrus Virtual Speaker & Cirrus 3D-Audio.

The CS48500 is programmed using the Cirrus proprietary DSP Composer™ GUI development tool. Processing chains may be designed using a drag-and-drop interface to place/utilize functional macro audio DSP primitives. The end result is a software image that is down-loaded to the DSP via serial host or serial boot modes.

Ordering Information:

See [page 23](#) for ordering information



Advance Product Information

This document contains information for a new product.
Cirrus Logic reserves the right to modify this product without notice.

CS48500 Data Sheet
32-bit Audio Decoder DSP Family



8. Device Pinout Diagrams

8.1 CS48520, 48-pin LQFP Pinout Diagram

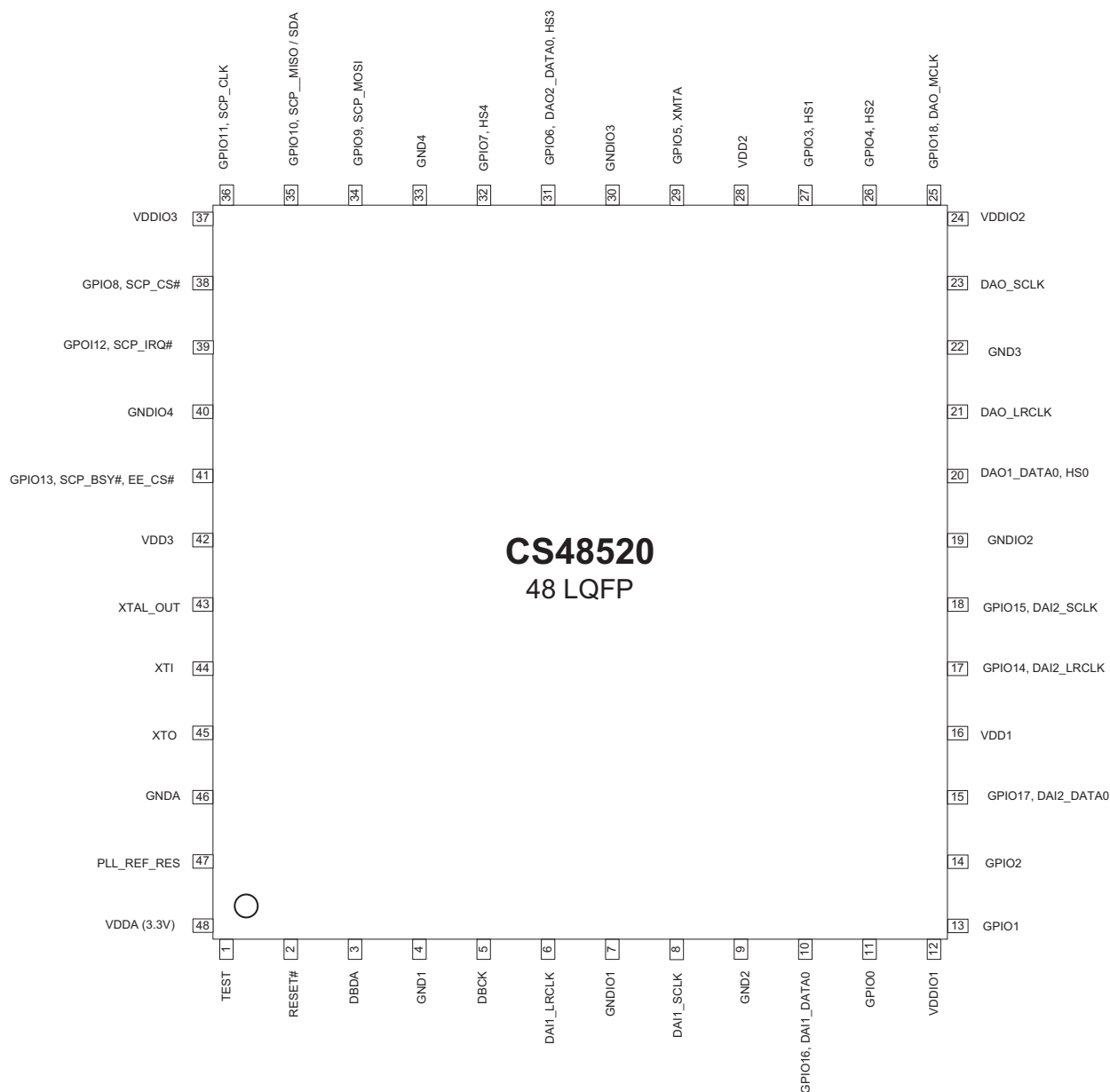


Figure 12. CS48520, 48-Pin LQFP Pinout

CS48500 Data Sheet
32-bit Audio Decoder DSP Family



8.3 CS48560, 48-pin LQFP Pinout Diagram

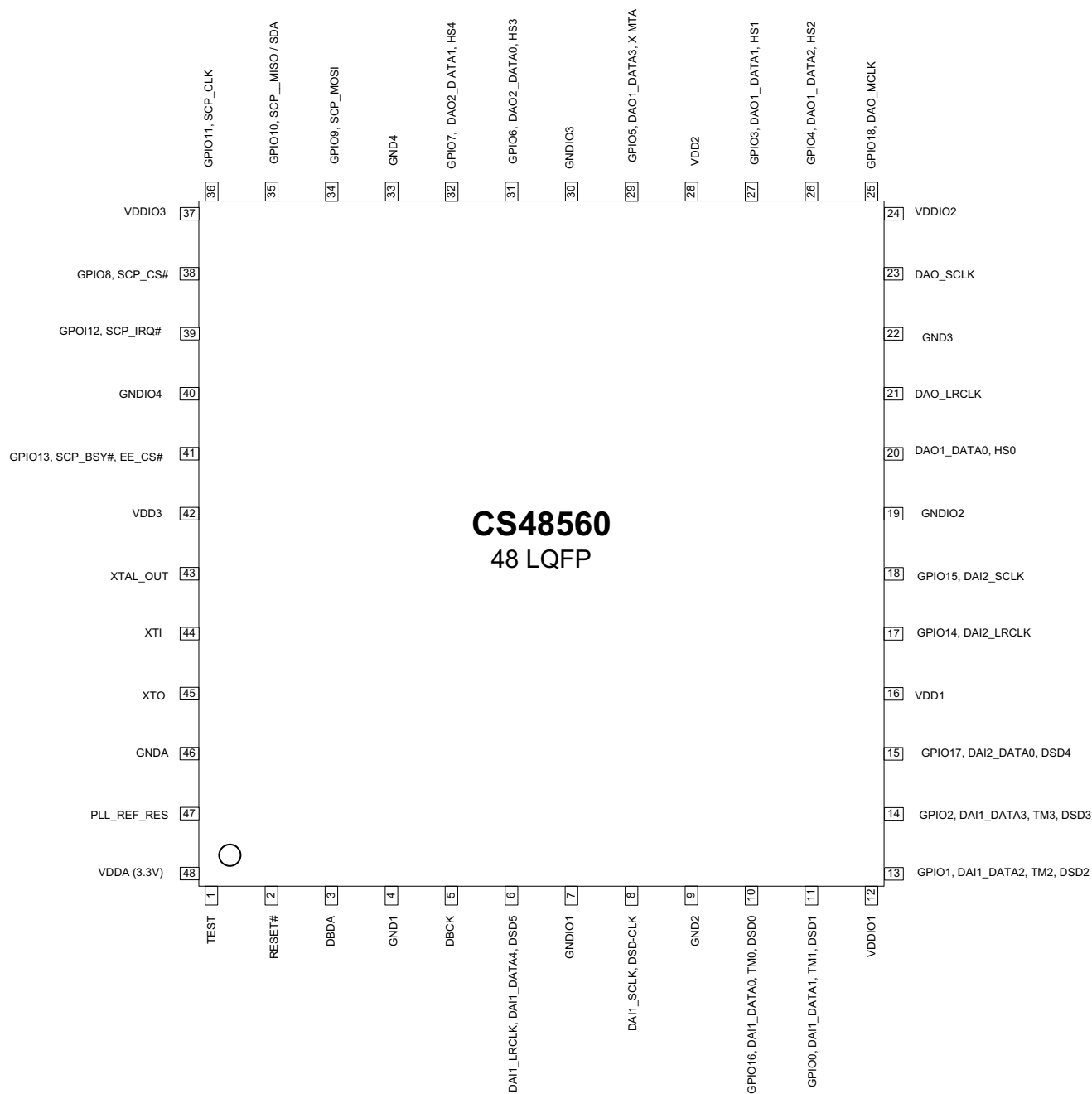


Figure 14. CS48560, 48-Pin LQFP Pinout

Features

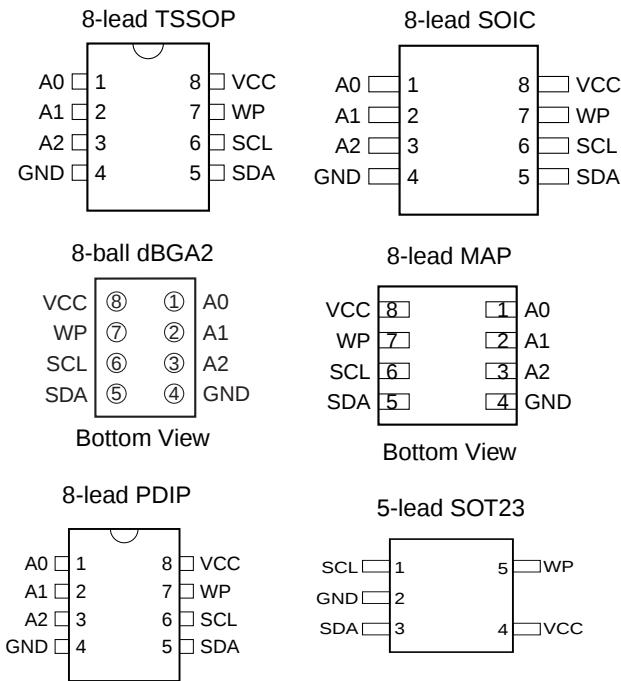
- Low-voltage and Standard-voltage Operation
 - 2.7 (V_{CC} = 2.7V to 5.5V)
 - 1.8 (V_{CC} = 1.8V to 5.5V)
- Internally Organized 128 x 8 (1K), 256 x 8 (2K), 512 x 8 (4K), 1024 x 8 (8K) or 2048 x 8 (16K)
- Two-wire Serial Interface
- Schmitt Trigger, Filtered Inputs for Noise Suppression
- Bidirectional 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

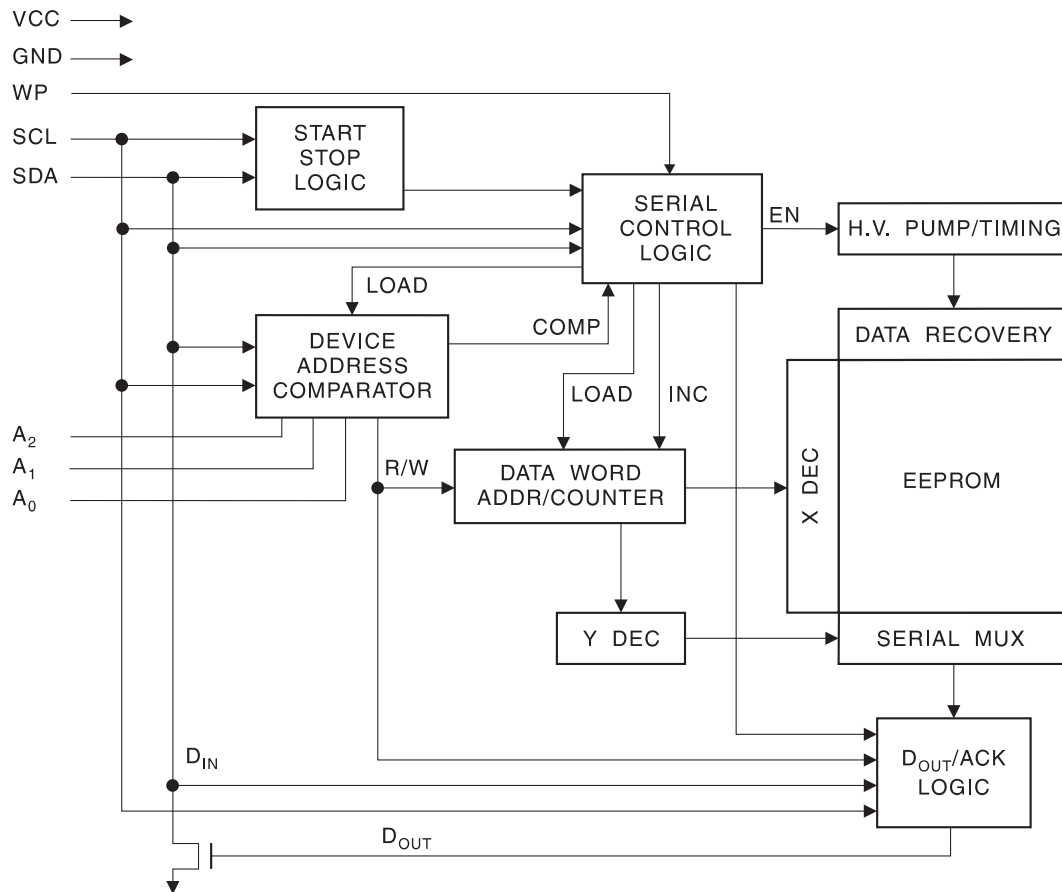


Absolute Maximum Ratings

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.



AK4589

2/8-Channel Audio CODEC with DIR

GENERAL DESCRIPTION

The AK4589 is a single chip CODEC that includes two channels of ADC and eight channels of DAC. The ADC outputs 24bit data and the DAC accepts up to 24bit input data. The ADC has the Enhanced Dual Bit architecture with wide dynamic range. The DAC introduces the new developed Advanced Multi-Bit architecture, and achieves wider dynamic range and lower outband noise. The AK4589 has a dynamic range of 102dB for ADC, 114dB for DAC and is well suited for digital surround for home theater audio. The AK4589 also has the balance volume control corresponding to the Dolby Digital (AC-3) system.

The also has digital audio receiver (DIR) and transmitter (DIT) compatible with 192kHz, 24bits. The DIR has 8-channel input selector and can automatically detect a Non-PCM bit stream. The AK4589 provides a compatibility of hardware and software with the AK4588.

*Dolby Digital (AC-3) is a trademark of Dolby Laboratories.

FEATURES

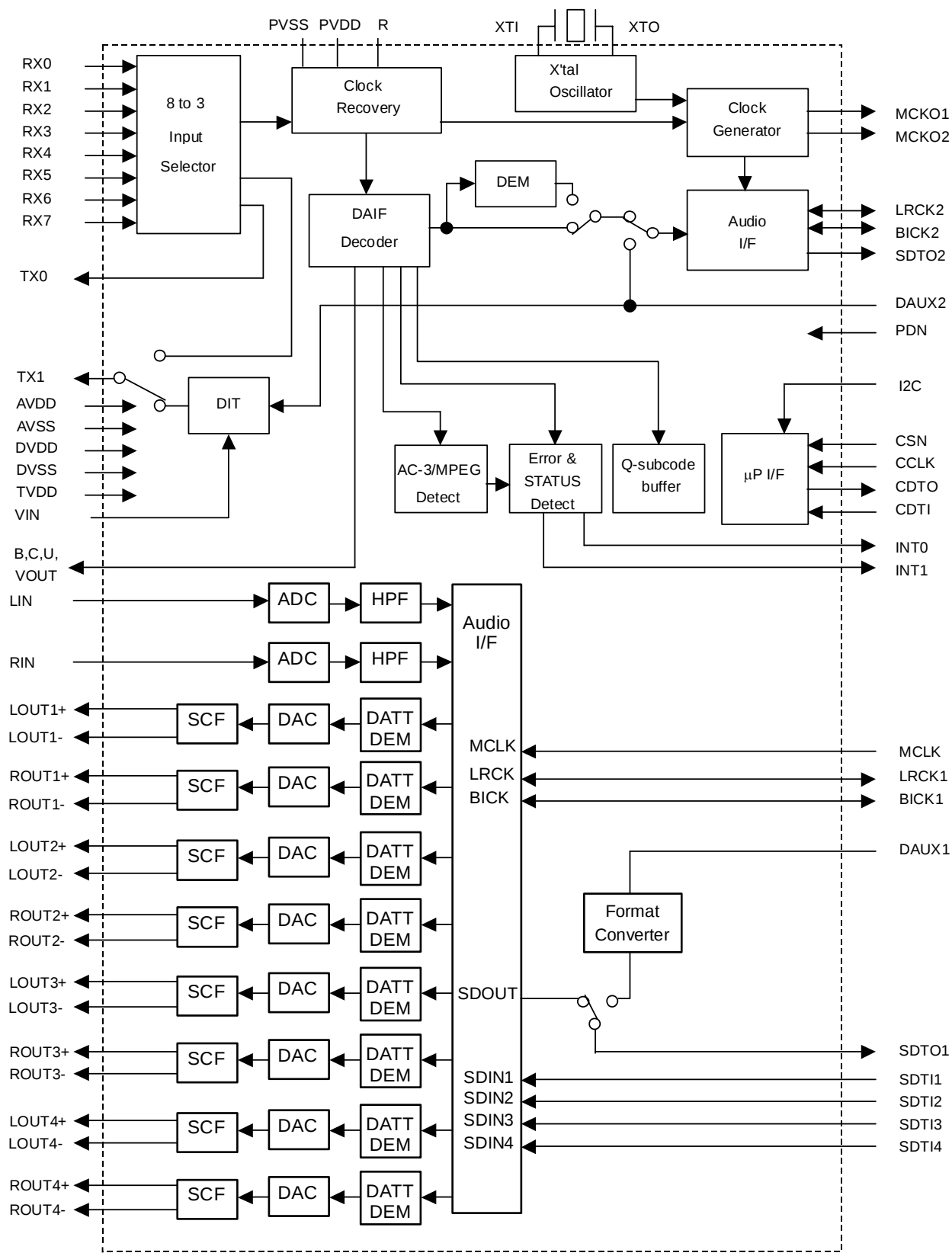
□ ADC/DAC part

- 2ch 24bit ADC
 - 64x Oversampling
 - Sampling Rate up to 96kHz
 - Linear Phase Digital Anti-Alias Filter
 - Single-Ended Input
 - S/(N+D): 92dB
 - Dynamic Range, S/N: 102dB
 - Digital HPF for offset cancellation
 - Overflow flag
- 8ch 24bit DAC
 - 128x Oversampling
 - Sampling Rate up to 192kHz
 - 24bit 8 times Digital Filter
 - Differential Outputs
 - On-chip Switched-Capacitor Filter
 - S/(N+D): 94dB
 - Dynamic Range, S/N: 114dB
 - Individual channel digital volume with 128 levels and 0.5dB step
 - Soft mute
 - De-emphasis for 32kHz, 44.1kHz, 48kHz
 - Zero Detect Function
- High Jitter Tolerance
- Extenal Master Clock Input:
 - 256fs, 384fs, 512fs (fs=32kHz ~ 48kHz)
 - 128fs, 192fs, 256fs (fs=64kHz ~ 96kHz)
 - 128fs (fs=120kHz ~ 192kHz)

☐ DIR/DIT Part

- AES3, IEC60958, S/PDIF, EIAJ CP1201 Compatible
- Low jitter Analog PLL
- PLL Lock Range : 32kHz to 192kHz
- Clock Source: PLL or X'tal
- 8-channel Receiver input
- 2-channel Transmission output (Through output or DIT)
- Auxiliary digital input
- De-emphasis for 32kHz, 44.1kHz, 48kHz and 96kHz
- Detection Functions
 - Non-PCM Bit Stream Detection
 - DTS-CD Bit Stream Detection
 - Sampling Frequency Detection
(32kHz, 44.1kHz, 48kHz, 88.2kHz, 96kHz, 176.4kHz, 192kHz)
 - Unlock & Parity Error Detection
 - Validity Flag Detection
- Up to 24bit Audio Data Format
- Audio I/F: Master or Slave Mode
- 40-bit Channel Status Buffer
- Burst Preamble bit Pc and Pd Buffer for Non-PCM bit stream
- Q-subcode Buffer for CD bit stream
- Serial μ P I/F
- Two Master Clock Outputs: 64fs/128fs/256fs/512fs

- ☐ TTL Level Digital I/F
- ☐ 4-wire Serial and I²C Bus μ P I/F for mode setting
- ☐ Operating Voltage: 4.75 to 5.25V with 5V tolerance
- ☐ Power Supply for output buffer: 2.7 to 5.25V
- ☐ 80pin LQFP Package (0.5mm pitch)
- ☐ AK4588 compatible w/o analog outputs

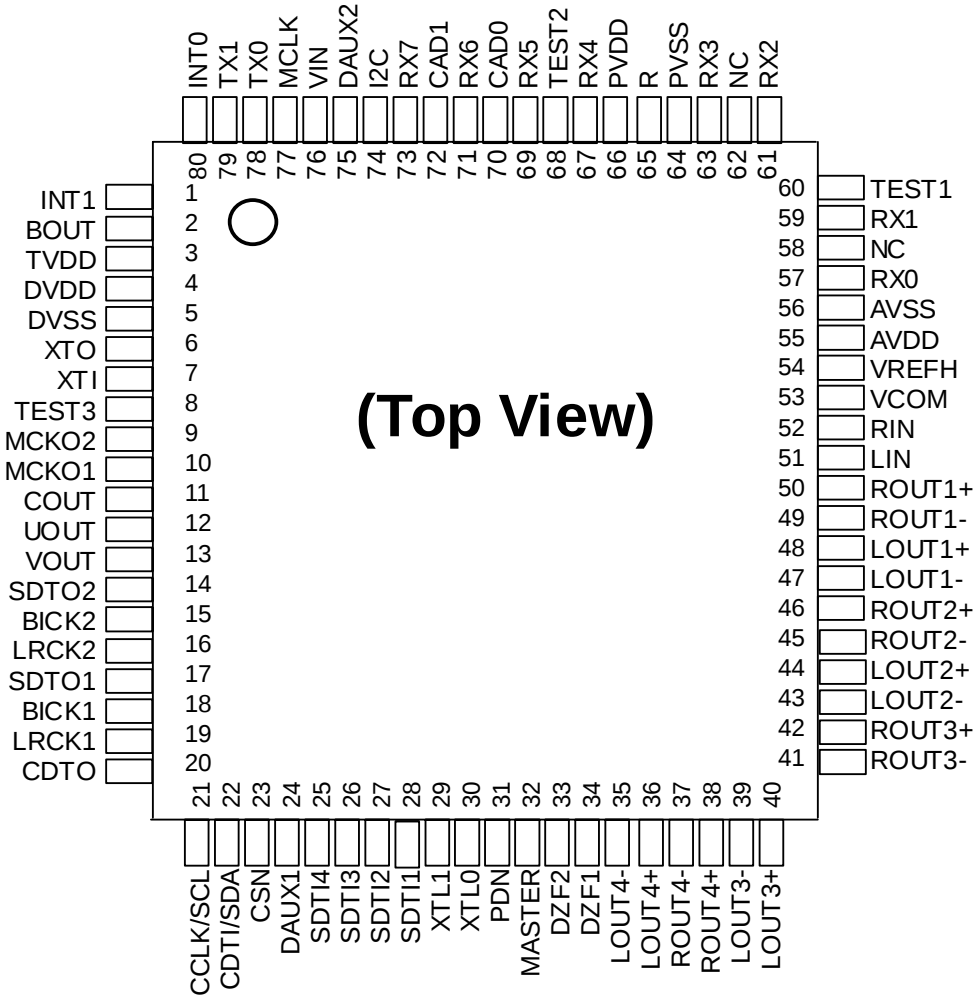


■ Ordering Guide

AK4589VQ -10 ~ +70°C 80pin LQFP(0.5mm pitch)

AKD4589 Evaluation Board for AK4589

■ Pin Layout



■ Compatibility with AK4588

Functions	AK4588	AK4589
DAC output	Single end	Differential
DAC S/(N+D)	90dB	94dB
DAC S/N	106dB	114dB
DAC Output voltage	Typ 3.0Vpp	Typ ± 2.7 Vpp
DAC AOOUT	AOOUT=0.6xVREFH	AOOUT=0.54xVREFH
Load Resistance	5k ohm	2k ohm
Frequency Response 80kHz	± 1.0	+0/-0.6
Output pin	#35, #37, #39, #41, #43, #45, #47, #49	#35 - #50
Power Supply voltage	Min=4.5V, Max=5.5V	Min=4.75V, Max=5.25V

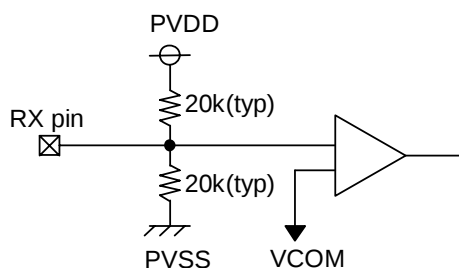
(*) The AK4589 has two register maps including ADC/DAC part (compatible with the AK4588) and DIR/DIT part (compatible with AK4588). Each register is selected by Chip Address.

PIN/FUNCTION			
No.	Pin Name	I/O	Function
1	INT1	O	Interrupt 1 Pin
2	BOUT	O	Block-Start Output Pin for Receiver Input “H” during first 40 frames.
3	TVDD	-	Output Buffer Power Supply Pin, 2.7V~5.25V
4	DVDD	-	Digital Power Supply Pin, 4.75V~5.25V
5	DVSS	-	Digital Ground Pin
6	XTO	O	X'tal Output Pin
7	XTI	I	X'tal Input Pin
8	TEST3	I	Test 3 Pin This pin should be connected to DVSS.
9	MCKO2	O	Master Clock Output 2 Pin
10	MCKO1	O	Master Clock Output 1 Pin
11	COUT	O	C-bit Output Pin for Receiver Input
12	UOUT	O	U-bit Output Pin for Receiver Input
13	VOUT	O	V-bit Output Pin for Receiver Input
14	SDTO2	O	Audio Serial Data Output Pin (DIR/DIT part)
15	BICK2	I/O	Audio Serial Data Clock Pin (DIR/DIT part)
16	LRCK2	I/O	Channel Clock Pin (DIR/DIT part)
17	SDTO1	O	Audio Serial Data Output Pin (ADC/DAC part)
18	BICK1	I/O	Audio Serial Data Clock Pin (ADC/DAC part)
19	LRCK1	I/O	Input Channel Clock Pin
20	CDTO	O	Control Data Output Pin in Serial Mode, I2C= “L”.
21	CCLK	I	Control Data Clock Pin in Serial Mode, I2C= “L”
	SCL	I	Control Data Clock Pin in Serial Mode, I2C= “H”
22	CDTI	I	Control Data Input Pin in Serial Mode, I2C= “L”.
	SDA	I/O	Control Data Pin in Serial Mode, I2C= “H”.
23	CSN	I	Chip Select Pin in Serial Mode, I2C= “L”.
		I	This pin should be connected to DVSS, I2C= “H”.
24	DAUX1	I	AUX Audio Serial Data Input Pin (ADC/DAC part)
25	SDTI4	I	DAC4 Audio Serial Data Input Pin
26	SDTI3	I	DAC3 Audio Serial Data Input Pin
27	SDTI2	I	DAC2 Audio Serial Data Input Pin
28	SDTI1	I	DAC1 Audio Serial Data Input Pin
29	XTL1	I	X'tal Frequency Select 0 Pin
30	XTL0	I	X'tal Frequency Select 1 Pin

No.	Pin Name	I/O	Function
31	PDN	I	Power-Down Mode Pin When “L”, the AK4589 is powered-down, all digital output pins go “L”, all registers are reset. When CAD1/0 pins are changed, the AK4589 should be reset by PDN pin.
32	MASTER	I	Master Mode Select Pin “H”: Master mode, “L”: Slave mode
33	DZF2	O	Zero Input Detect 2 Pin (Table 13) When the input data of the group 1 follow total 8192 LRCK cycles with “0” input data, this pin goes to “H”. And when RSTN bit is “0”, PWDAN bit is “0”, this pin goes to “H”. It always is in “L” when P/S pin is “H”.
	OVF	O	Analog Input Overflow Detect Pin This pin goes to “H” if the analog input of Lch or Rch overflows.
34	DZF1	O	Zero Input Detect 1 Pin (Table 13) When the input data of the group 1 follow total 8192 LRCK cycles with “0” input data, this pin goes to “H”. And when RSTN bit is “0”, PWDAN bit is “0”, this pin goes to “H”. Output is selected by setting DZFE pin when P/S pin is “H”.
35	LOUT4-	O	DAC4 Lch Negative Analog Output Pin
36	LOUT4+	O	DAC4 Lch Positive Analog Output Pin
37	ROUT4-	O	DAC4 Rch Negative Analog Output Pin
38	ROUT4+	O	DAC4 Rch Positive Analog Output Pin
39	LOUT3-	O	DAC3 Lch Negative Analog Output Pin
40	LOUT3+	O	DAC3 Lch Positive Analog Output Pin
41	ROUT3-	O	DAC3 Rch Negative Analog Output Pin
42	ROUT3+	O	DAC3 Rch Positive Analog Output Pin
43	LOUT2-	O	DAC2 Lch Negative Analog Output Pin
44	LOUT2+	O	DAC2 Lch Positive Analog Output Pin
45	ROUT2-	O	DAC2 Rch Negative Analog Output Pin
46	ROUT2+	O	DAC2 Rch Positive Analog Output Pin
47	LOUT1-	O	DAC1 Lch Negative Analog Output Pin
48	LOUT1+	O	DAC1 Lch Positive Analog Output Pin
49	ROUT1-	O	DAC1 Rch Negative Analog Output Pin
50	ROUT1+	O	DAC1 Rch Positive Analog Output Pin
51	LIN	I	Lch Analog Input Pin
52	RIN	I	Rch Analog Input Pin
53	VCOM	-	Common Voltage Output Pin 2.2μF capacitor should be connected to AVSS externally.
54	VREFH	-	Positive Voltage Reference Input Pin, AVDD

No.	Pin Name	I/O	Function
55	AVDD	-	Analog Power Supply Pin, 4.75V~5.25V
56	AVSS	-	Analog Ground Pin, 0V
57	RX0	I	Receiver Channel 0 Pin (Internal biased pin. Internally biased at PVDD/2)
58	NC	-	No Connect pin No internal bonding. This pin should be connected to PVSS.
59	RX1	I	Receiver Channel 1 Pin (Internal biased pin. Internally biased at PVDD/2)
60	TEST1	I	Test 1 Pin This pin should be connected to PVSS.
61	RX2	I	Receiver Channel 2 Pin (Internal biased pin. Internally biased at PVDD/2)
62	NC	-	No Connect pin No internal bonding. This pin should be connected to PVSS.
63	RX3	I	Receiver Channel 3 Pin (Internal biased pin. Internally biased at PVDD/2)
64	PVSS	-	PLL Ground pin
65	R	-	External Resistor Pin 12k Ω +/-1% resistor should be connected to PVSS externally.
66	PVDD	-	PLL Power supply Pin, 4.75V~5.25V
67	RX4	I	Receiver Channel 4 Pin (Internal biased pin. Internally biased at PVDD/2)
68	TEST2	I	Test 2 Pin This pin should be connected to PVSS.
69	RX5	I	Receiver Channel 5 Pin (Internal biased pin. Internally biased at PVDD/2)
70	CAD0	I	Chip Address 0 Pin (ADC/DAC part)
71	RX6	I	Receiver Channel 6 Pin (Internal biased pin. Internally biased at PVDD/2)
72	CAD1	I	Chip Address 1 Pin (ADC/DAC part)
73	RX7	I	Receiver Channel 7 Pin (Internal biased pin. Internally biased at PVDD/2)
74	I2C	I	Control Mode Select Pin. “L”: 4-wire Serial, “H”: I ² C Bus
75	DAUX2	I	Auxiliary Audio Data Input Pin (DIR/DIT part)
76	VIN	I	V-bit Input Pin for Transmitter Output
77	MCLK	I	Master Clock Input Pin
78	TX0	O	Transmit Channel (Through Data) Output 0 Pin
79	TX1	O	Transmit Channel Output1 pin When DIT bit = “0”, Through Data. When DIT bit = “1”, DAUX2 Data.
80	INT0	O	Interrupt 0 Pin

Note: All input pins except internal biased pins and Analog input pins (RX0-7, LIN, RIN) should not be left floating.



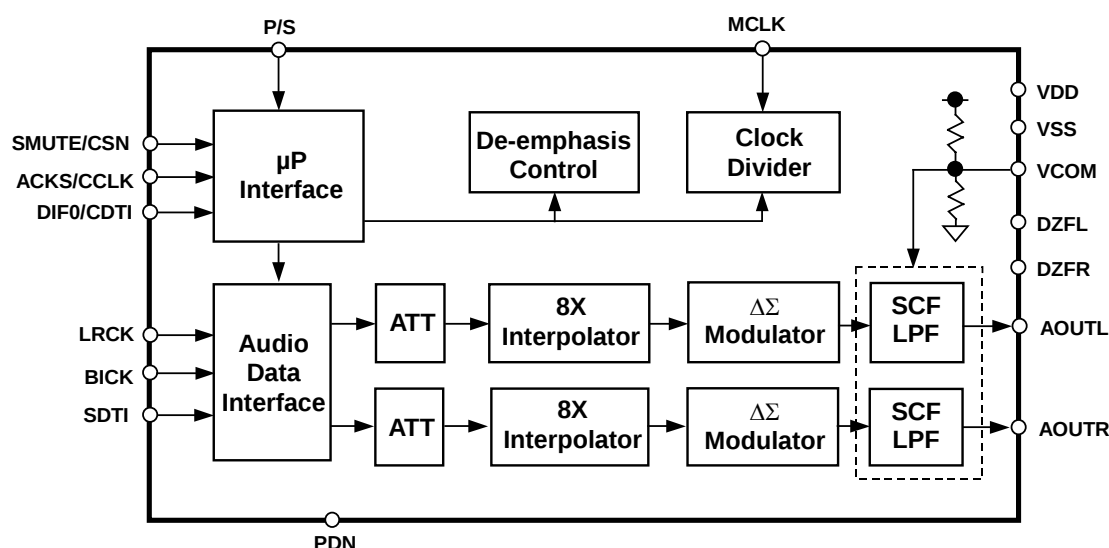
Internal biased pin Circuit

AKM**AK4384****106dB 192kHz 24-Bit 2ch $\Delta\Sigma$ DAC****GENERAL DESCRIPTION**

The AK4384 offers the perfect mix for cost and performance based audio systems. Using AKM's multi bit architecture for its modulator the AK4384 delivers a wide dynamic range while preserving linearity for improved THD+N performance. The AK4384 integrates a combination of SCF and CTF filters increasing performance for systems with excessive clock jitter. The 24 Bit word length and 192kHz sampling rate make this part ideal for a wide range of applications including DVD-Audio. The AK4384 is offered in a space saving 16pin TSSOP package.

FEATURES

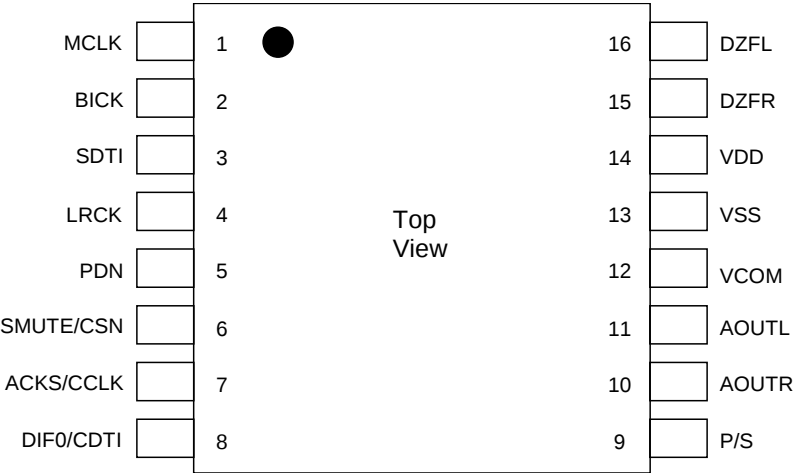
- ☐ Sampling Rate Ranging from 8kHz to 192kHz
- ☐ 128 times Oversampling (Normal Speed Mode)
- ☐ 64 times Oversampling (Double Speed Mode)
- ☐ 32 times Oversampling (Quad Speed Mode)
- ☐ 24-Bit 8 times FIR Digital Filter
- ☐ SCF with High Tolerance to Clock Jitter
- ☐ 2nd order Analog LPF
- ☐ Single Ended Output Buffer
- ☐ Digital de-emphasis for 32k, 44.1k and 48kHz sampling
- ☐ Soft mute
- ☐ Digital Attenuator (Linear 256 steps)
- ☐ I/F format: 24-Bit MSB justified, 24/20/16-Bit LSB justified or I^2S
- ☐ Master clock: 256fs, 384fs, 512fs, 768fs or 1152fs (Normal Speed Mode)
128fs, 192fs, 256fs or 384fs (Double Speed Mode)
128fs, 192fs (Quad Speed Mode)
- ☐ THD+N: -94dB
- ☐ Dynamic Range: 106dB
- ☐ Power supply: 4.5 to 5.5V
- ☐ Very Small Package: 16pin TSSOP (6.4mm x 5.0mm)



■ Ordering Guide

AK4384ET	-20 ~ +85°C	16pin TSSOP (0.65mm pitch)
AK4384VT	-40 ~ +85°C	16pin TSSOP (0.65mm pitch)
AKD4384	Evaluation Board for AK4384	

■ Pin Layout



PIN/FUNCTION			
No.	Pin Name	I/O	Function
1	MCLK	I	Master Clock Input Pin An external TTL clock should be input on this pin.
2	BICK	I	Audio Serial Data Clock Pin
3	SDTI	I	Audio Serial Data Input Pin
4	LRCK	I	L/R Clock Pin
5	PDN	I	Power-Down Mode Pin When at “L”, the AK4384 is in the power-down mode and is held in reset. The AK4384 must be reset once upon power-up.
6	SMUTE	I	Soft Mute Pin in parallel mode “H”: Enable, “L”: Disable
	CSN	I	Chip Select Pin in serial mode
7	ACKS	I	Auto Setting Mode Pin in parallel mode “L”: Manual Setting Mode, “H”: Auto Setting Mode
	CCLK	I	Control Data Clock Pin in serial mode
8	DIF0	I	Audio Data Interface Format Pin in parallel mode
	CDTI	I	Control Data Input Pin in serial mode
9	P/S	I	Parallel/Serail Select Pin (Internal pull-up pin) “L”: Serial control mode, “H”: Parallel control mode
10	AOUTR	O	Rch Analog Output Pin
11	AOUTL	O	Lch Analog Output Pin
12	VCOM	O	Common Voltage Pin, VDD/2 Normally connected to VSS with a 0.1μF ceramic capacitor in parallel with a 10μF electrolytic cap.
13	VSS	-	Ground Pin
14	VDD	-	Power Supply Pin
15	DZFR	O	Rch Data Zero Input Detect Pin
16	DZFL	O	Lch Data Zero Input Detect Pin

Note: All input pins except pull-up pin should not be left floating.



NJM2068

LOW-NOISE DUAL OPERATIONAL AMPLIFIER

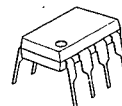
■ GENERAL DESCRIPTION

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.

■ FEATURES

- Operating Voltage $(\pm 4V \sim \pm 18V)$
- Low Total Harmonic Distortion $(0.001\% \text{ typ.})$
- Low Noise Voltage (FLAT+JISA, $0.56 \mu V \text{ typ.}$)
- High Slew Rate $(6V/\mu s \text{ typ.})$
- Unity Gain Bandwidth $(27\text{MHz @ } f=10\text{kHz})$
- Package Outline DIP8, DMP8, SIP8, SSOP8
- Bipolar Technology

■ PACKAGE OUTLINE



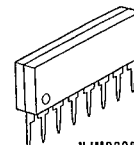
NJM2068D



NJM2068M



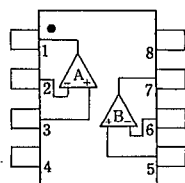
NJM2068V



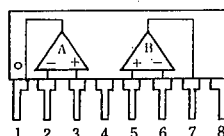
NJM2068L

4

■ PIN CONFIGURATION



NJM2068D
NJM2068M
NJM2068V

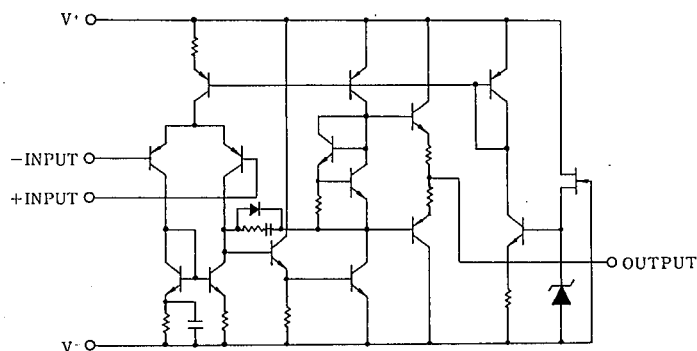


NJM2068L

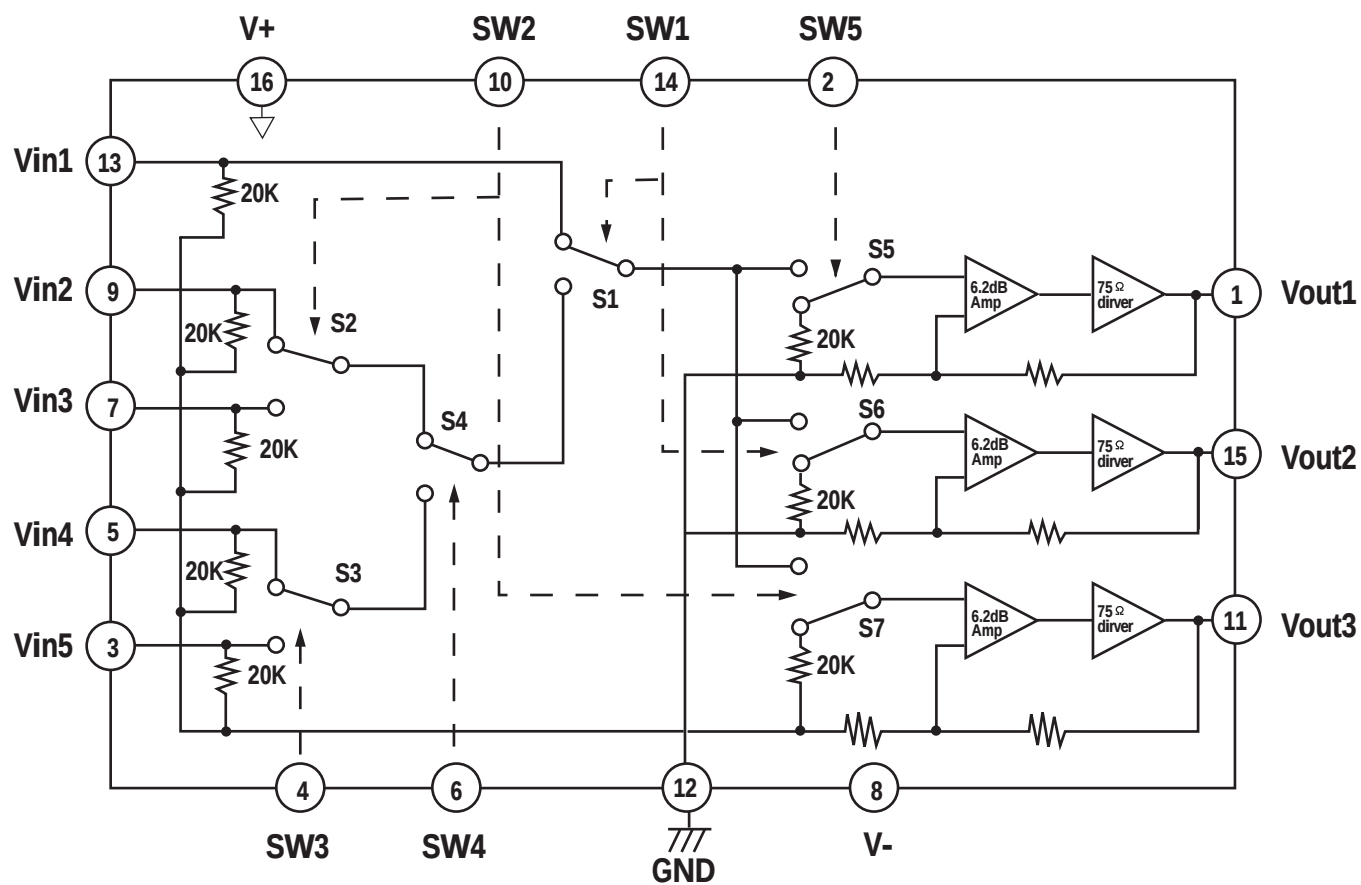
PIN FUNCTION

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.

TOSHIBA

TC74HCU04AP/AF/AFN

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74HCU04AP, TC74HCU04AF, TC74HCU04AFN

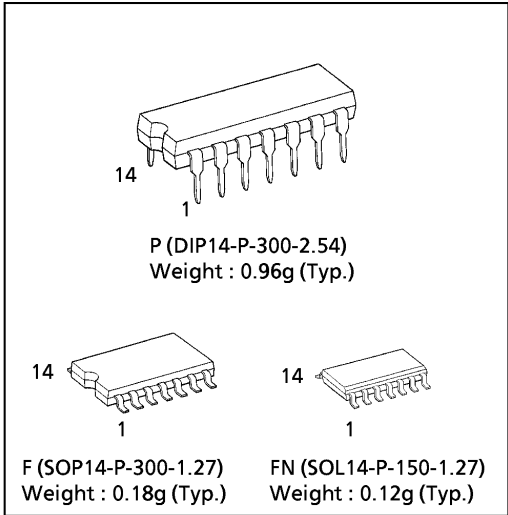
HEX INVERTER

(Note) The JEDEC SOP (FN) is not available in Japan.

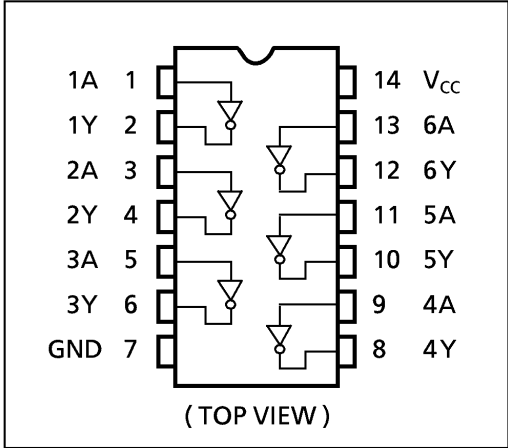
The TC74HCU04A is a high speed CMOS INVERTER fabricated with silicon gate C²MOS technology. It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation. Since the internal circuit is composed of a single stage inverter, it can be used in analog applications such as crystal oscillators. All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES :

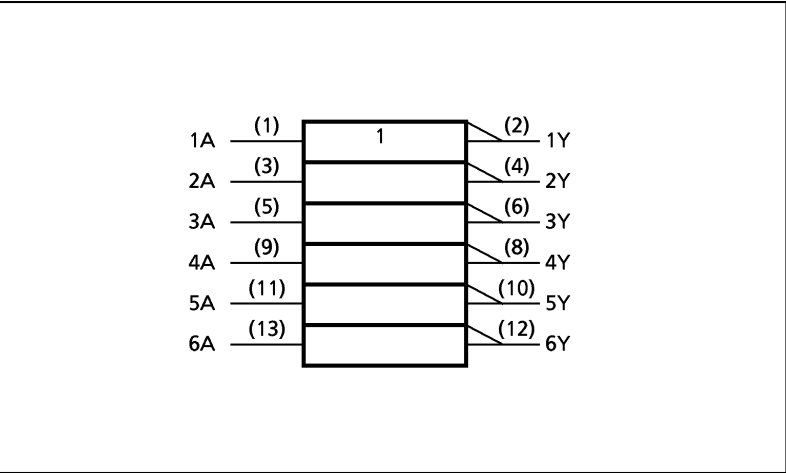
- High Speed..... $t_{pd} = 4\text{ns}(\text{typ.})$ at $V_{CC} = 5\text{V}$
- Low Power Dissipation..... $I_{CC} = 1\mu\text{A}(\text{Max.})$ at $T_a = 25^\circ\text{C}$
- High Noise Immunity..... $V_{NIH} = V_{NIH} = 10\%V_{CC}(\text{Min.})$
- Output Drive Capability..... 10 LSTTL Loads
- Symmetrical Output Impedance... $|I_{OH}| = I_{OL} = 4\text{mA}(\text{Min.})$
- Balanced Propagation Delays..... $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range... $V_{CC}(\text{opr.}) = 2\text{V} \sim 6\text{V}$
- Pin and Function Compatible with 74LS04



PIN ASSIGNMENT



IEC LOGIC SYMBOL



TRUTH TABLE

A	Y
L	H
H	L

961001EBA2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

TOSHIBA

TC74VHCT08AF/AFN/AFT

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74VHCT08AF, TC74VHCT08AFN, TC74VHCT08AFT

QUAD 2-INPUT AND GATE

The TC74VHCT08A is an advanced high speed CMOS 2-INPUT AND GATE fabricated with silicon gate C²MOS technology.

It achieves the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.

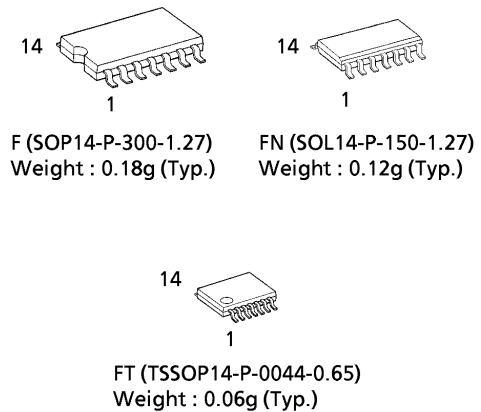
The input voltage are compatible with TTL output voltage. This device may be used as a level converter for interfacing 3.3V to 5V system.

Input protection and output circuit ensure that 0 to 5.5V can be applied to the input and output*1 pins without regard to the supply voltage. These structure prevents device destruction due to mismatched supply and input/output voltages such as battery back up, hot board insertion, etc.

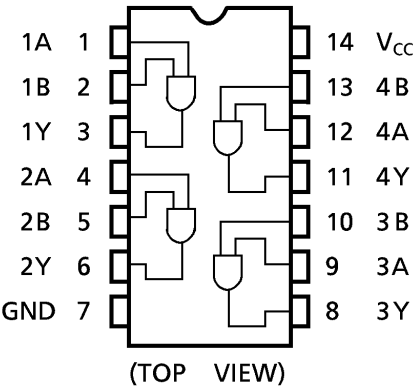
*1: V_{CC}=0V

- FEATURES :
- High Speed.....t_{pd} = 5.0ns(typ.) at V_{CC} = 5V
 - Low Power Dissipation.....I_{CC} = 2μA(Max.) at Ta = 25°C
 - Compatible with TTL outputs....V_{IL} = 0.8V (Max.)
V_{IH} = 2.0V (Min.)
 - Power Down Protection is provided on all inputs and outputs.
 - Balanced Propagation Delays.....t_{pLH} ≈ t_{pHL}
 - Low NoiseV_{OLP} = 0.8V (Max.)
 - Pin and Function Compatible with the 74 series (74AC / HC / F / ALS / LS etc.) 08 type.

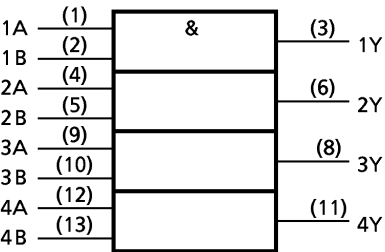
(Note) The JEDEC SOP (FN) is not available in Japan.



PIN ASSIGNMENT



IEC LOGIC SYMBOL



TRUTH TABLE

A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

961001EBA2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

TOSHIBA

TC74VHC08F/FN/FT

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74VHC08F, TC74VHC08FN, TC74VHC08FT

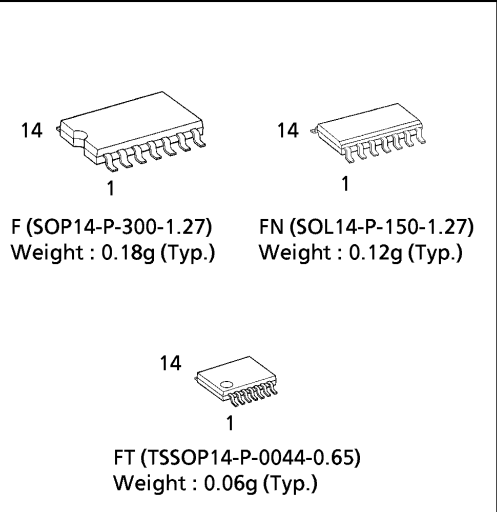
QUAD 2-INPUT AND GATE

The TC74VHC08 is an advanced high speed CMOS 2-INPUT AND GATE fabricated with silicon gate C²MOS technology. It achieves the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.

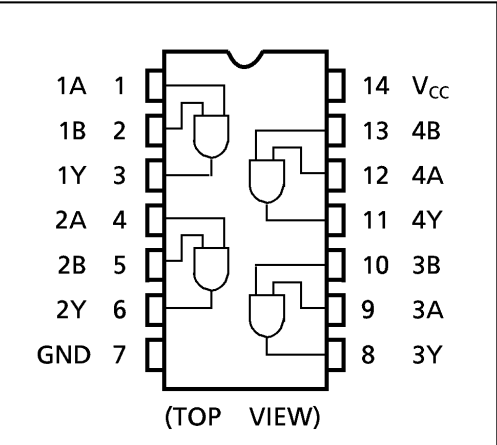
The internal circuit is composed of 4 stages including buffer output, which provide high noise immunity and stable output. An input protection circuit ensures that 0 to 5.5V can be applied to the input pins without regard to the supply voltage. This device can be used to interface from 5V to 3V systems and two supply systems such as battery back up. This circuit prevents device destruction due to mismatched supply and input voltages.

- FEATURES:
- High Speed..... $t_{pd} = 4.3ns(typ.)$ at $V_{CC} = 5V$
 - Low Power Dissipation..... $I_{CC} = 2\mu A(Max.)$ at $T_a = 25^{\circ}C$
 - High Noise Immunity..... $V_{NIH} = V_{NIL} = 28\% V_{CC} (Min.)$
 - Power Down Protection is provided on all inputs.
 - Balanced Propagation Delays..... $t_{pLH} \approx t_{pHL}$
 - Wide Operating Voltage Range..... $V_{CC} (opr) = 2V \sim 5.5V$
 - Low Noise $V_{OLP} = 0.8V (Max.)$
 - Pin and Function Compatible with 74ALS08

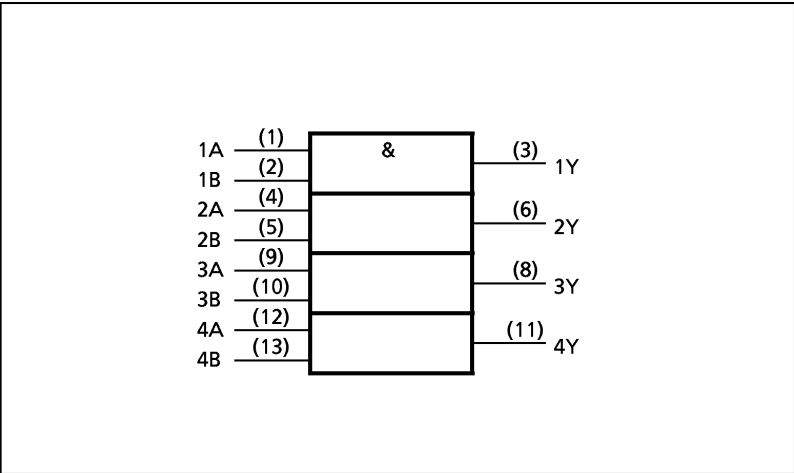
(Note) The JEDEC SOP (FN) is not available in Japan.



PIN ASSIGNMENT



IEC LOGIC SYMBOL



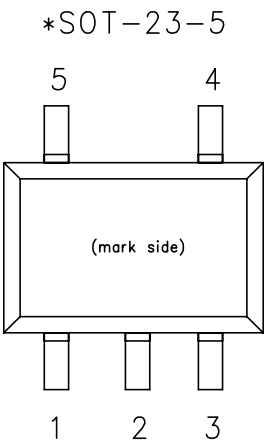
TRUTH TABLE

A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

980910EBA2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

S-80145ALMC (RESET I.C) :

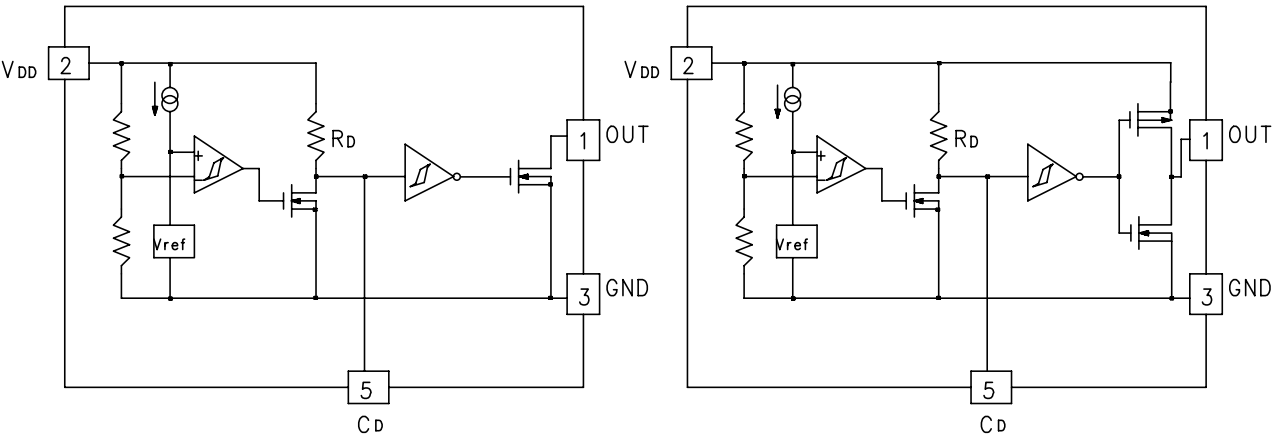


PIN DESCRIPTION

Pin No.	Symbol	Description
1	OUT	Output Pin
2	VDD	Input and power source for device itself
3	GND	Ground Pin
4	NC	No Connection
5	C _D	Pin for external capacitor

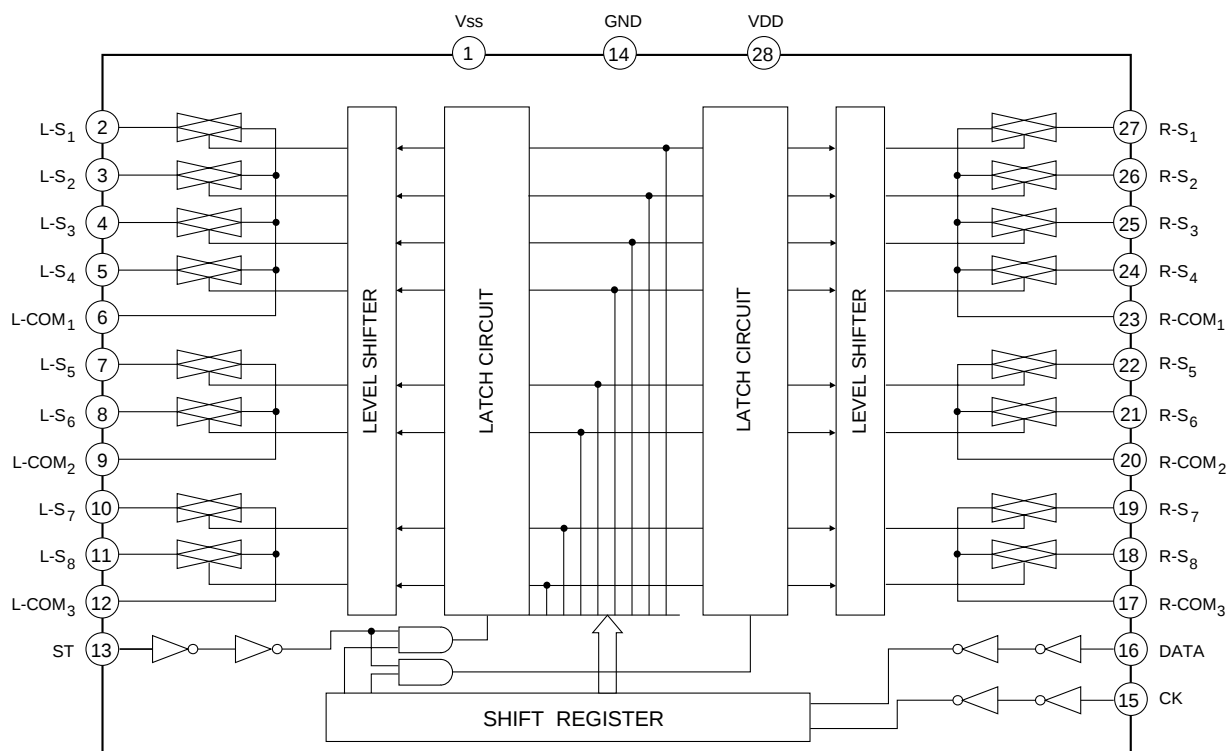
BLOCK DIAGRAMS

*Nch Open Drain Output(RN5VDxxA) *CMOS Output (RN5VDxxC)



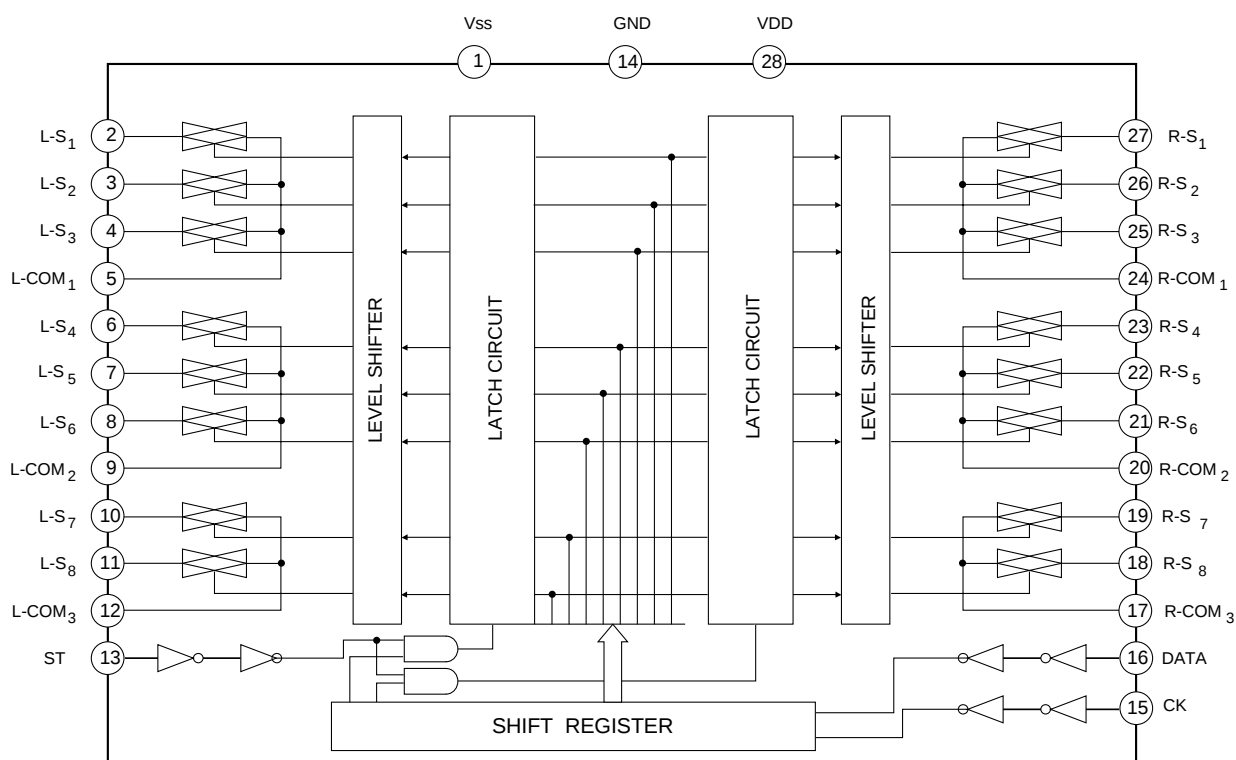
TC9164AF (FUNCTION/INPUT) :

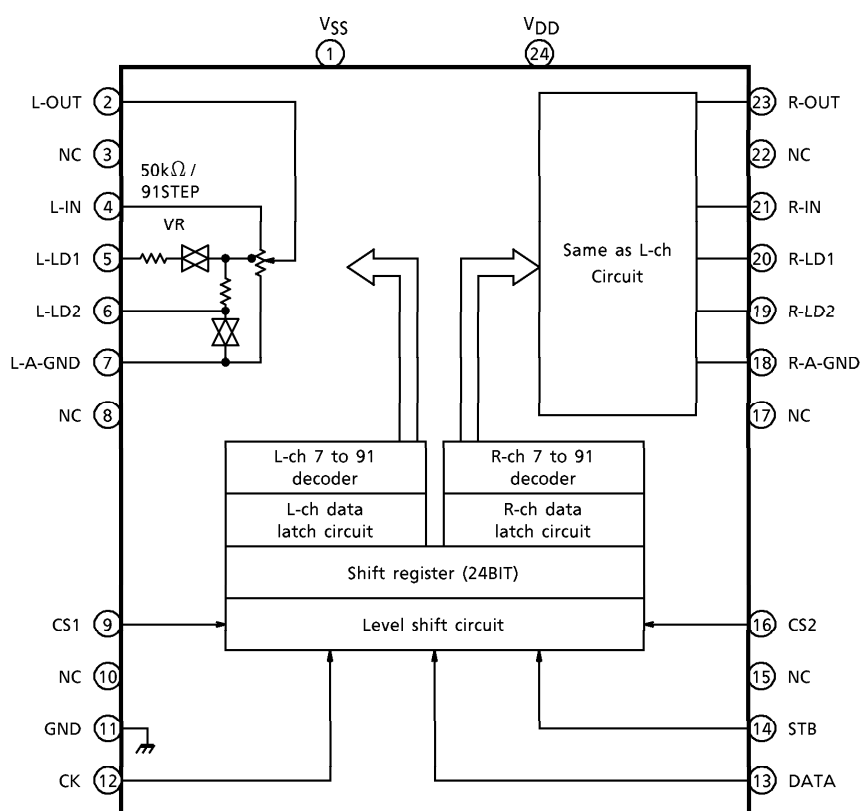
■ BLOCK DIAGRAM



TC9163AF (FUNCTION/INPUT) :

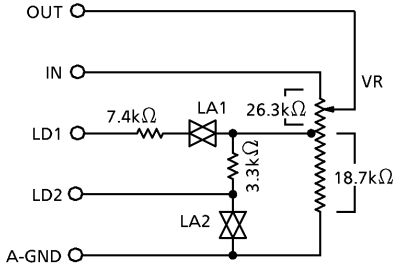
■ BLOCK DIAGRAM



TOSHIBA**TC9459N/F****ELECTRONIC VOLUME CONTROL IC****BLOCK DIAGRAM (TC9459F)**

TOSHIBA**TC9459N/F****PIN DESCRIPTION**

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

PIN No.	SYMBOL	PIN NAME	FUNCTION	REMARK									
1 (1)	V _{SS}	Negative power supply pin	When using dual power supplies V_{DD} = 6.0~17V GND = 0V V_{SS} = - 6.0~ - 17V When using a single power supply V_{DD} = 6.0~18V GND = V_{SS} = 0V	—									
28 (24)	V _{DD}	Positive power supply pin											
13 (11)	GND	Digital GND pin											
3 (2)	L-OUT	Volume output pin	• Volume circuit  <table><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											
26 (23)	R-OUT												
5 (4)	L-IN	Volume input pin											
24 (21)	R-IN												
6 (5)	L-LD1	Loudness tap output pin											
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)													

KEC

SEMICONDUCTOR

TECHNICAL DATA

KIA1117S/F00~
KIA1117S/F50

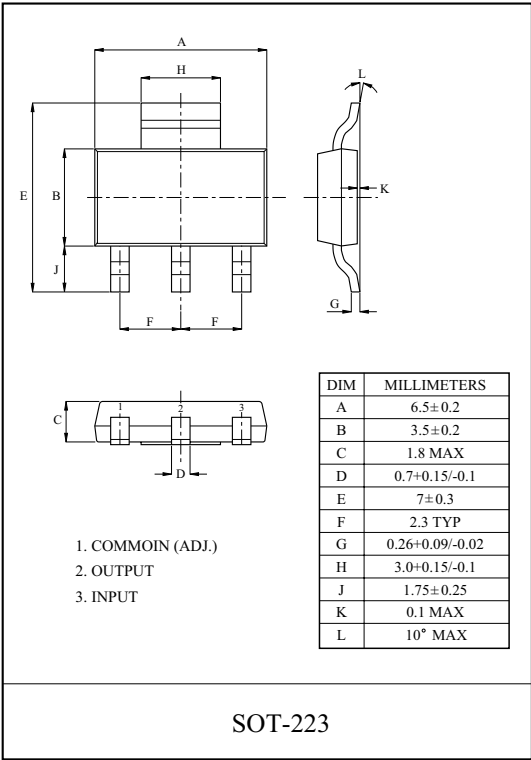
BIPOLAR LINEAR INTEGRATED CIRCUIT

LOW DROP FIXED AND ADJUSTABLE
POSITIVE VOLTAGE REGULATOR

The KIA1117S/F × × is a Low Drop Voltage Regulator able to provide up to 1A of output current, available even in adjustable version (Vref=1.25V)

FEATURES

- Low Dropout Voltage : 1.1V/Typ. (Iout=1.0A)
- Very Low Quiescent Current : 4.2 mA/Typ.
- Output Current up to 1A
- Fixed Output Voltage of 1.5V, 1.8V, 2.5V, 2.85V, 3.3V, 5.0V
- Adjustable Version Availability : Vref=1.25V
- Internal Current and Thermal Limit
- Only 10 μF for stability
- Available in ±2%(at 25 °C) and 4% in full Temperature range
- High Ripple Rejection : 80dB/Typ
- Temperature Range : 0 °C ~ 125 °C



LINE UP

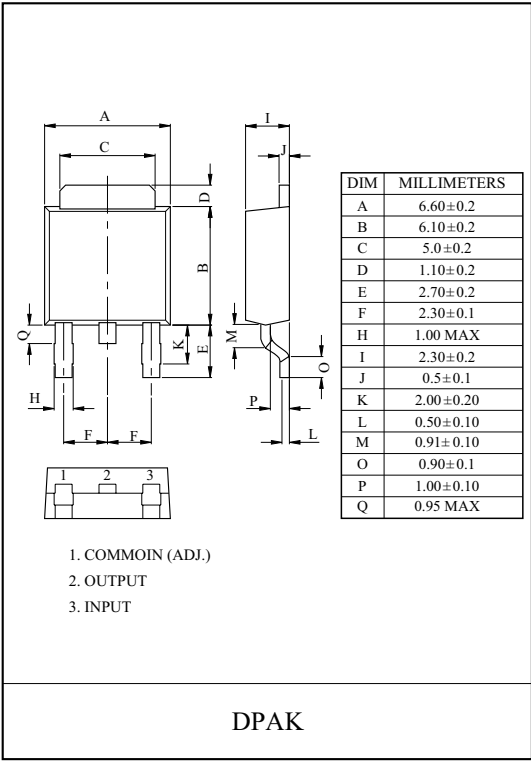
ITEM	OUTPUT VOLTAGE (V)	PACKAGE
KIA1117S/F00	Adjustable (1.25~10V)	S : SOT-223 F : DPAK
KIA1117S/F15	1.5	
KIA1117S/F18	1.8	
KIA1117S/F25	2.5	
KIA1117S/F28	2.85	
KIA1117S/F33	3.3	
KIA1117S/F50	5.0	

MAXIMUM RATINGS (Ta=25 °C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Input Voltage		V _{IN}	10	V
Output Current	S/F	I _{OUT}	1.0	A
Power Dissipation 1 (No heatsink)	S (Note)	P _{D1}	1.0	W
	F		1.3	
Power Dissipation 2 (Without heatsink)	S	P _{D2}	8.3	W
	F		13	
Operating Temperature		T _{opr}	0 ~ 125	°C
Storage Temperature		T _{stg}	-55 ~ 150	°C

Note) Package Mounted on FR-4 PCB 36 × 18 × 1.5 mm.

: mounting pad for the GND Lead min. 6 cm²



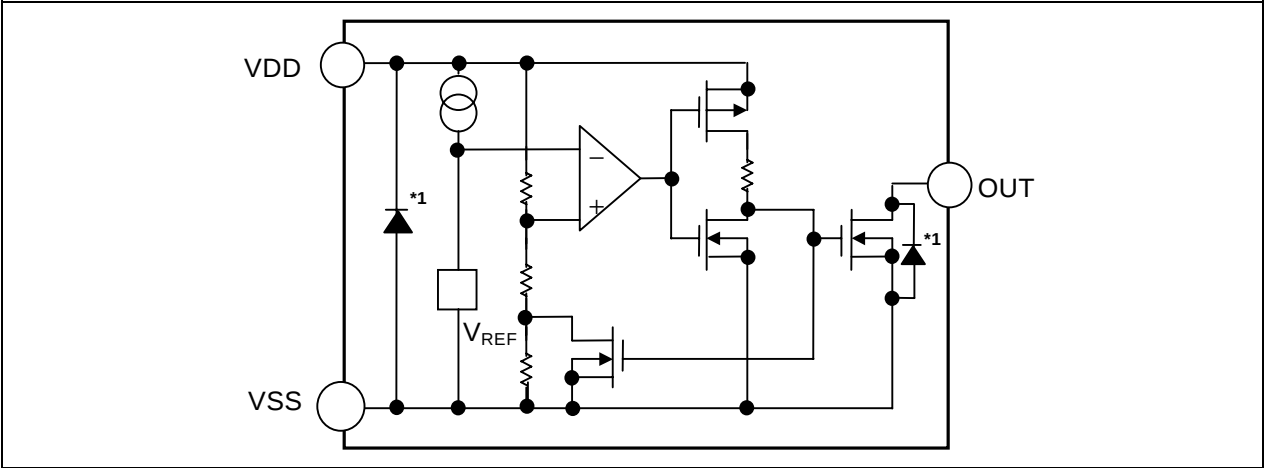
ULTRA-SMALL PACKAGE HIGH-PRECISION
VOLTAGE DETECTOR

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

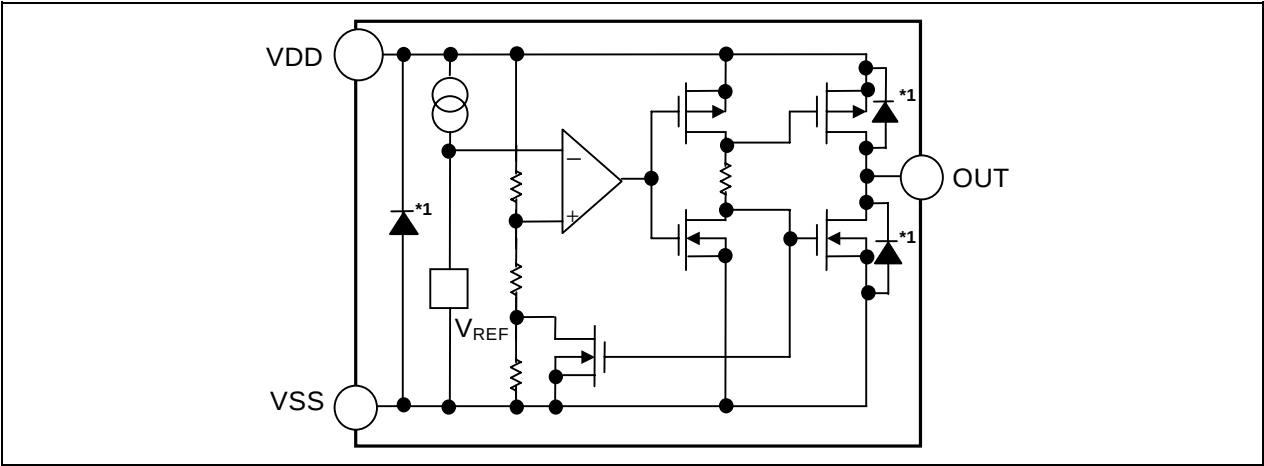
1. Nch Open-drain Output Products



*1. Parasitic diode

Figure 1

2. CMOS Output Products



*1. Parasitic diode

Figure 2

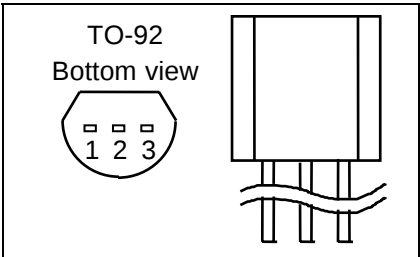


Figure 8

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

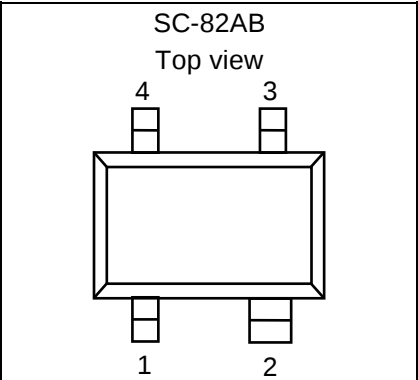


Figure 4

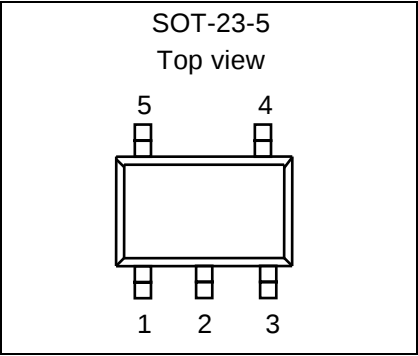


Figure 5

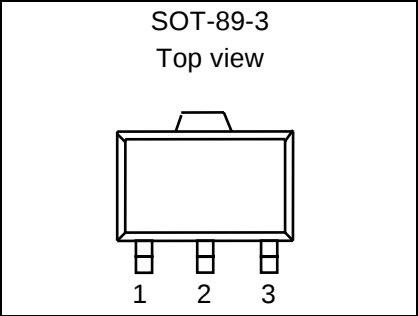


Figure 6

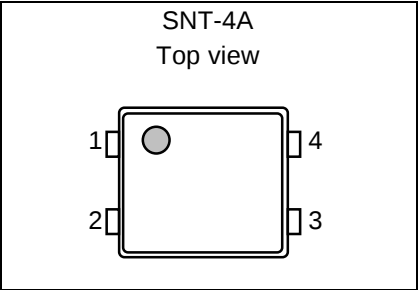


Figure 7

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

Table 9

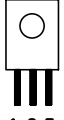
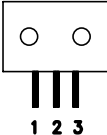
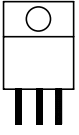
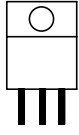
Pin No.	Pin name	Pin description
1	OUT	Voltage detection output pin
2	VDD	Voltage input pin
3	VSS	GND pin

Table10

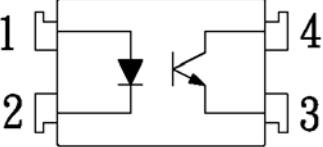
Pin No.	Pin name	Pin description
1	OUT	Voltage detection output pin
2	VSS	GND pin
3	NC ^{*1}	No connection
4	VDD	Voltage input pin

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

TRANSISTOR , REGULATOR IC BLOCK DIAGRAM

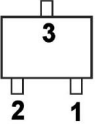
T0-92M  1. Emitter 2. Collector 3. Base KRA107M KRC107M KSA1175Y KSC2785Y KTC2874B	T0-92  1. Emitter 2. Collector 3. Base KTA1271Y KSC945CY KTA1268GR KTC3200GR KTC3203	T0-126  1. Emitter 2. Collector 3. Base KTA1360Y KTC3423Y KTC3114A
T0-3P  1. Base 2. Collector 3. Emitter 2SB1570 2SD2401	T0-220  1. INPUT 2. GND 3. OUTPUT L7805CP L7815CP KIA7808 KIA7812	T0-220  1. GND 2. INPUT 3. OUTPUT L7905CP L7915CP KIA7908

KP1010 photocoupler



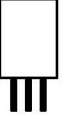
1. Anode
2. Cathode
3. Emitter
4. Collector

KRC102S
KRA107S
KRC107S
KTA2014
KTC3875



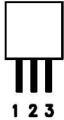
1) Emitter
2) Base
3) Collector

KSC2316
T0-92



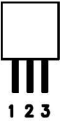
1. Emitter
2. Collector
3. Base

KIA79S06
T0-92 Regulator

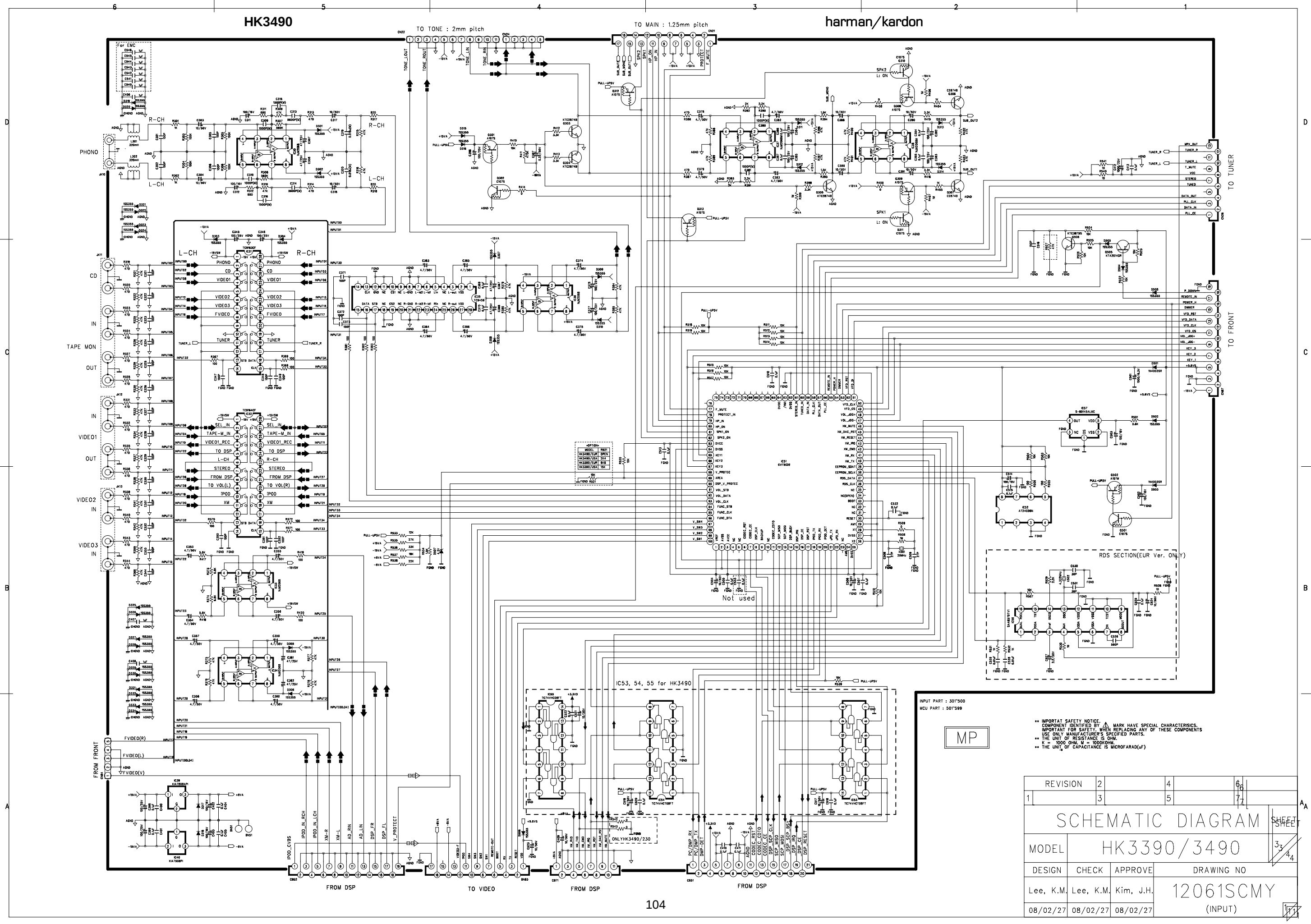


1. Ground
2. Input
3. Output

KIA78S06
T0-92 Regulator



1. Output
2. Ground
3. Input



INPUT PART : 301'500
MCU PART : 501'599



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 = 1000K OHM.
* THE UNIT OF CAPACITANCE IS MICROFARAD (UF)

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)	

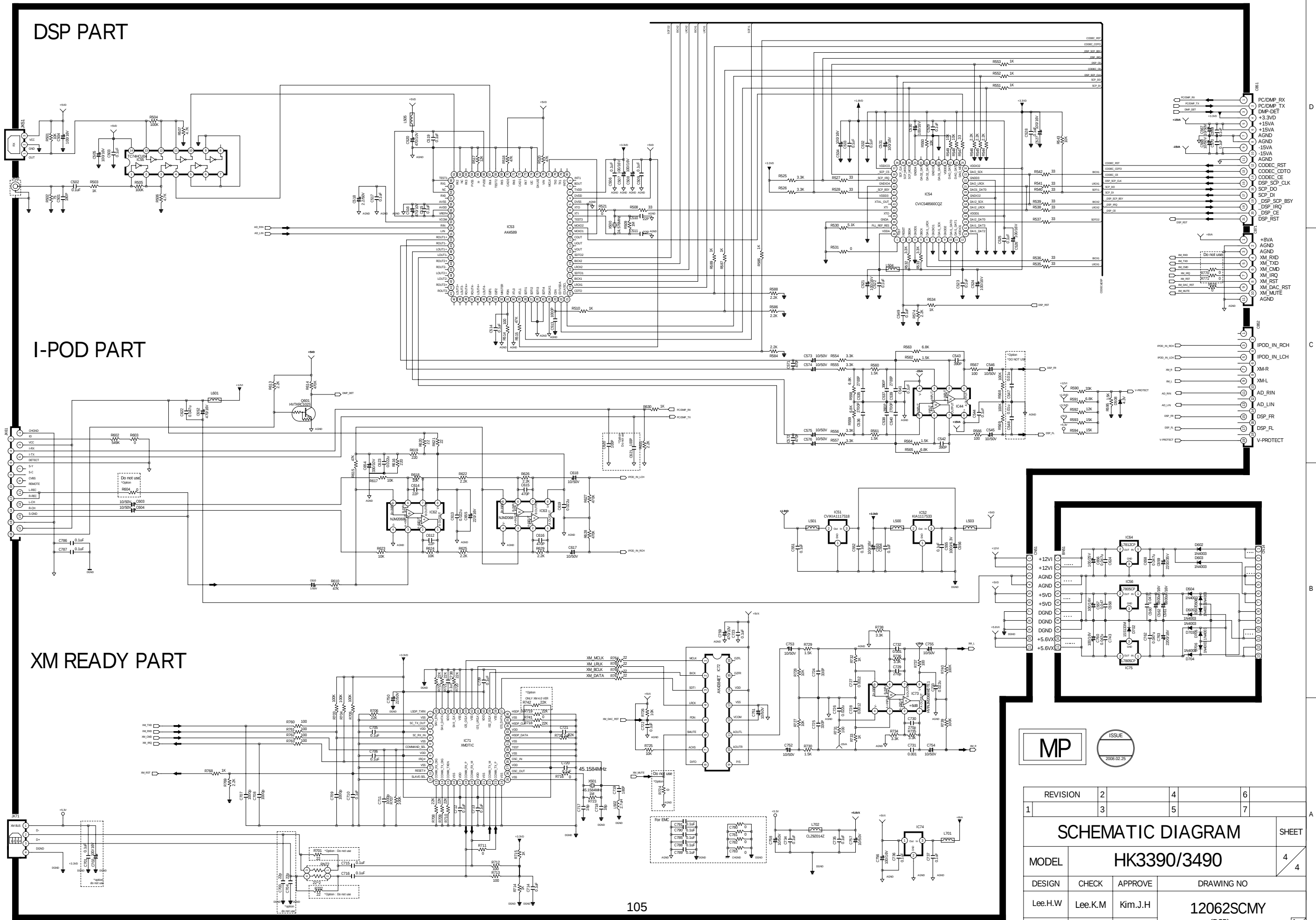
DSP PART

I-POD PART

XM READY PART



REVISION		2	4	6
1	3		5	7
SCHEMATIC DIAGRAM				
MODEL		HK3390/3490		
DESIGN	CHECK	APPROVE	DRAWING NO	
Lee.H.W	Lee.K.M	Kim.J.H	12062SCMY	
08.02.25	08.02.25	08.02.25	(DSP)	



D

C

B

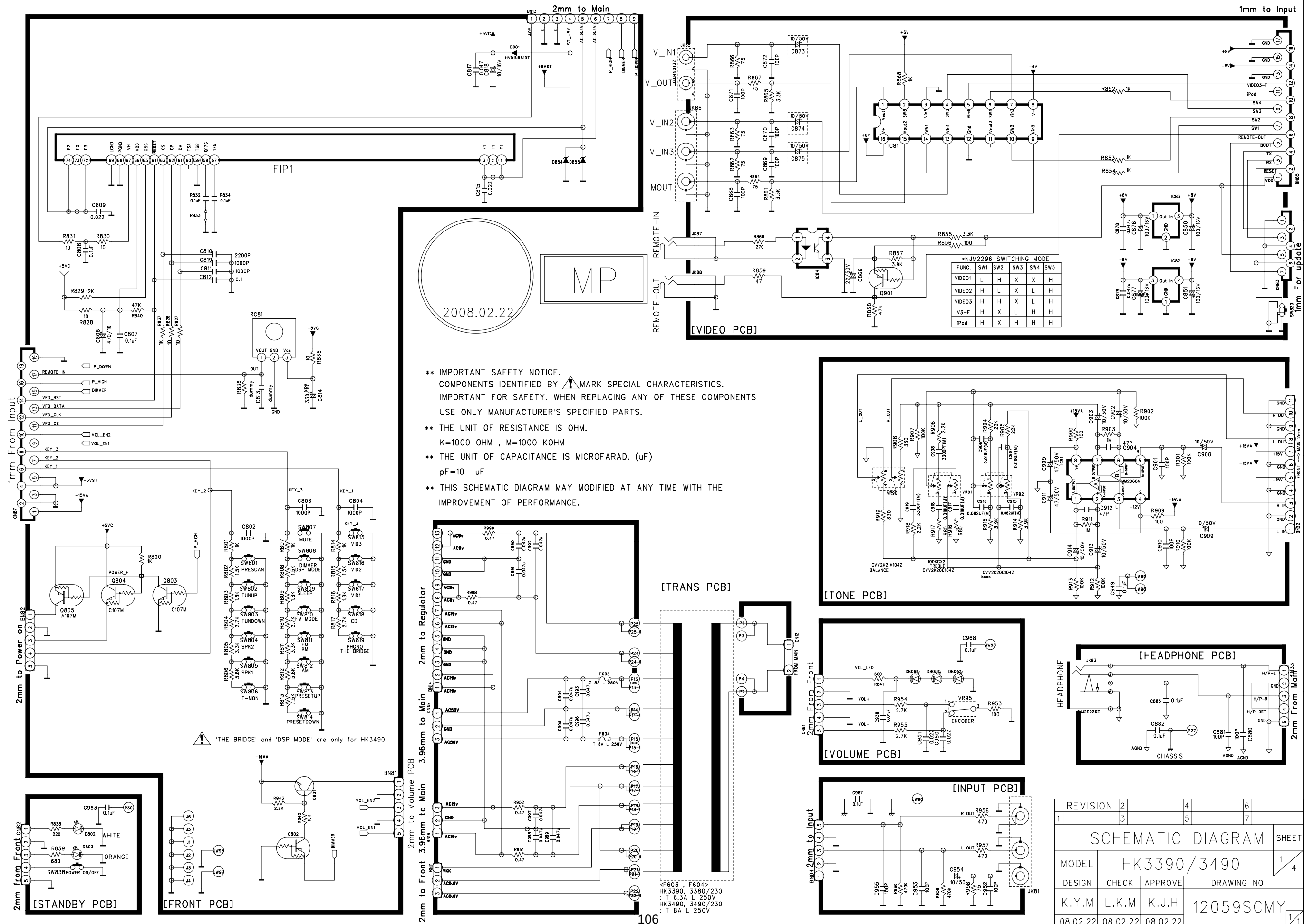
A

D

C

B

A

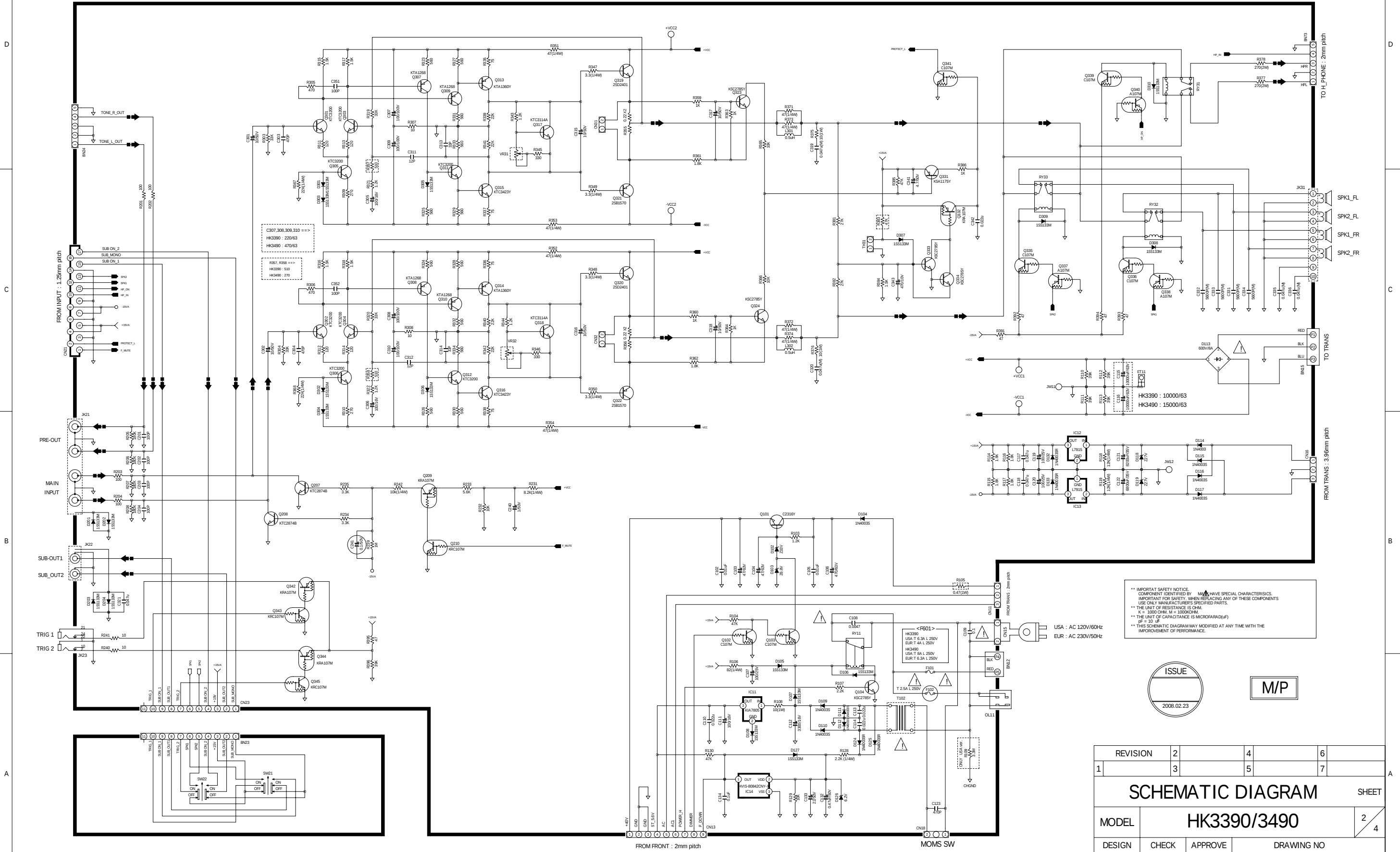


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IMPORTANT FOR SAFETY. WHEN REPLACING ANY OF THESE COMPONENTS
USE ONLY MANUFACTURER'S SPECIFIED PARTS.

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

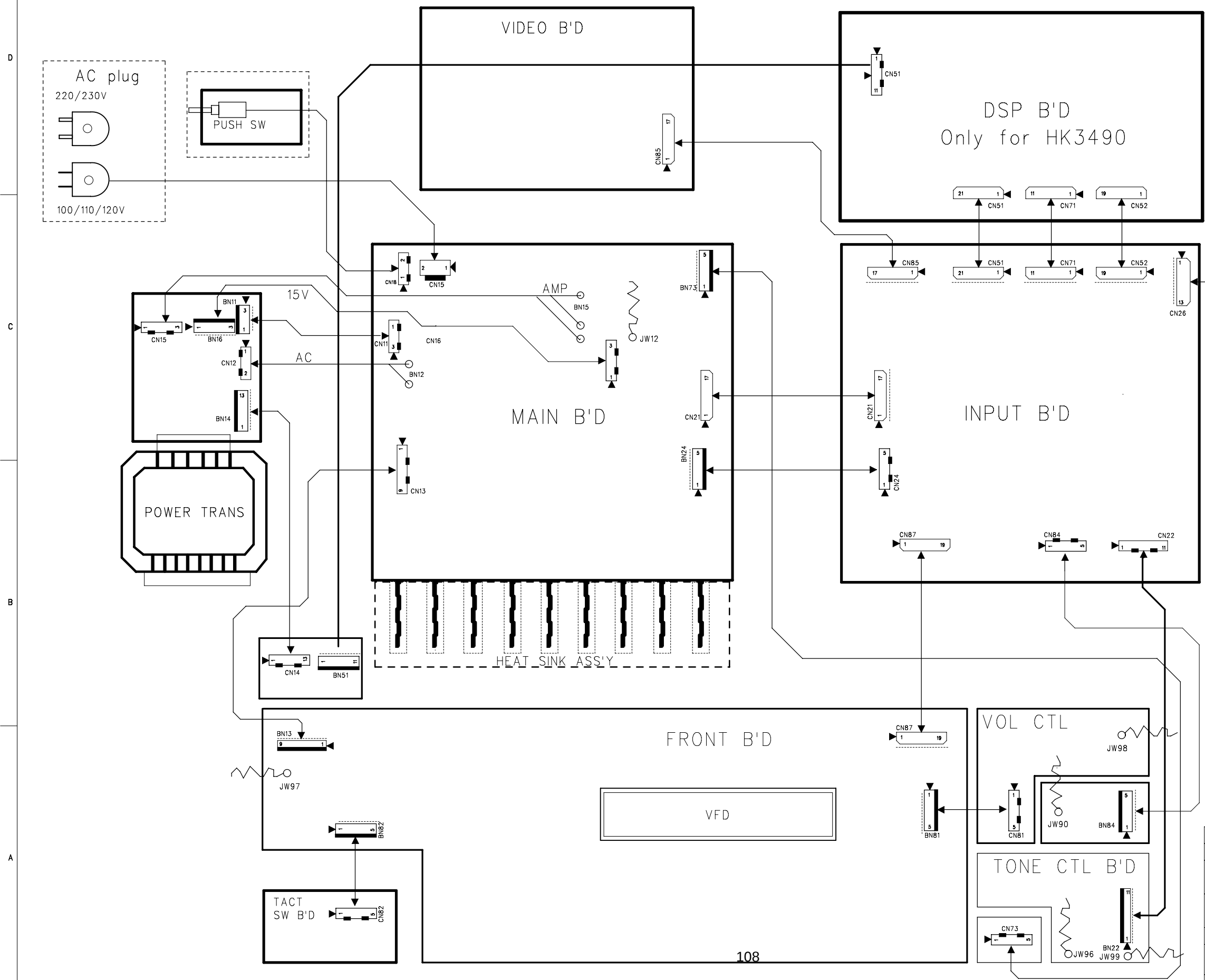
** THE UNIT OF CAPACITANCE IS MICROFARAD. (uF)
pF=10 uF

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



REVISION		2	4	6
1	3	5	7	
SCHEMATIC DIAGRAM				SHEET
MODEL	HK3390/3490			2/4
DESIGN	Choi.D.C	Lee.K.M	Kim.J.H	DRAWING NO
08.02.23	08.02.23	08.02.23	12060SCMY (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	DRAWING NO		
Y.M. Kim	K.M. Lee	J.H. Kim	12059WCMZ		
08.03.21	08.03.21	08.03.21	(Wiring Diagram)		