

harman/kardon

# AVR110

## A/V DOLBY DIGITAL RECEIVER

# SERVICE MANUAL



### CONTENTS

ESD WARNING.....	2	TECH TIP# HKTT2002-01.....	21
LEAKAGE TESTING.....	3	TECH TIP# HKTT2003-01.....	23
BASIC SPECIFICATIONS.....	4	UNIT EXPLODED VIEW.....	24
FRONT PANEL CONTROLS.....	5	EXPLODED VIEW PARTS LIST.....	25
REAR PANEL CONNECTIONS.....	9	BLOCK DIAGRAMS.....	26
REMOTE CONTROL FUNCTIONS.....	11	PCB DRAWINGS.....	28
TROUBLESHOOTING GUIDE.....	14	ELECTRICAL PARTS LIST.....	40
PROCESSOR RESET.....	14	SEMICONDUCTOR PINOUTS.....	61
IDLE CURRENT/TUNER ALIGNMENT.....	15	SCHEMATICS.....	109
BULLETIN # H/K2001-01.....	16	WIRING DIAGRAM.....	124
BULLETIN # H/K2001-03.....	18	PACKAGE.....	127
BULLETIN # H/K2003-07.....	19		

harman/kardon, Inc.  
 250 Crossways Park Dr.  
 Woodbury, New York 11797

Rev2 – 6/2005

## 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

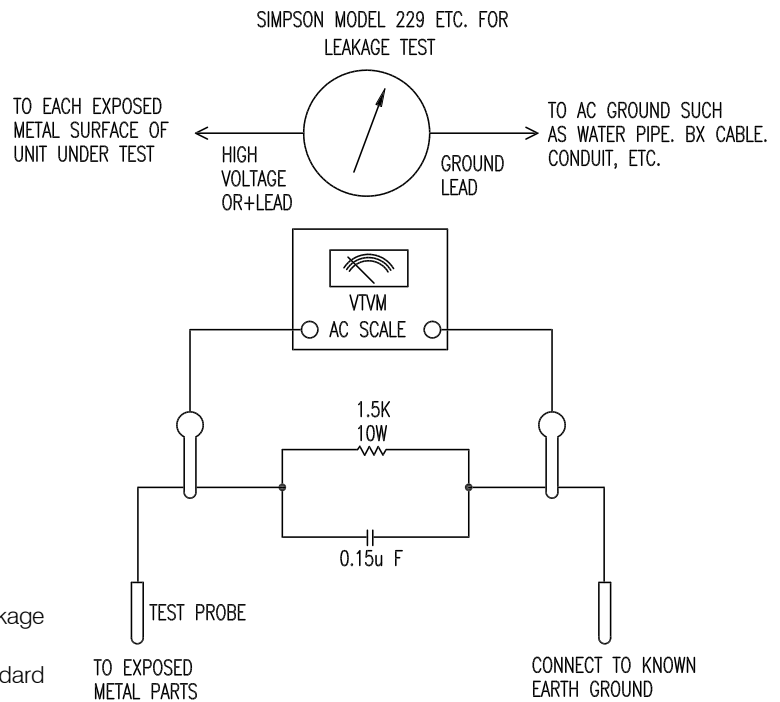
Each precaution in this manual should be followed during servicing.

Components identified with the IEC symbol  in the parts list are 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.



## Technical Specifications

### Audio Section

Stereo Mode	
Continuous Average Power (FTC)	
50 Watts per channel, 20Hz–20kHz, @ <0.07% THD, both channels driven into 8 ohms	
Five-Channel Surround Mode	
Power per Individual Channel	
Front L&R channels:	
40 Watts per channel @ <0.07% THD, 20Hz–20kHz into 8 ohms	
Center channel:	
40 Watts @ <0.07% THD, 20Hz–20kHz into 8 ohms	
Surround channels:	
40 Watts per channel @ <0.07% THD, 20Hz–20kHz into 8 ohms	
Input Sensitivity/Impedance	
Linear (High-Level)	200mV/47k ohms
Signal-to-Noise Ratio (IHF-A)	95dB
Surround System Adjacent Channel Separation	
Analog Decoding	40dB
(Pro Logic, etc.)	
Dolby Digital (AC-3)	55dB
DTS	55dB
Frequency Response	
@ 1W (+0dB, –3dB)	10Hz–100kHz
High Instantaneous	
Current Capability (HCC)	±25 Amps
Transient Intermodulation	
Distortion (TIM)	Unmeasurable
Rise Time	16 µsec
Slew Rate	40V/µsec

### FM Tuner Section

Frequency Range	87.5–108MHz
Usable Sensitivity	IHF 1.3µV/13.2dBf
Signal-to-Noise Ratio	Mono/Stereo 70/68dB
Distortion	Mono/Stereo 0.2/0.3%
Stereo Separation	40dB @ 1kHz
Selectivity	±400kHz, 70dB
Image Rejection	80dB
IF Rejection	90dB
Tuner Output Level	1kHz, ±75kHz Dev 500mV

### AM Tuner Section

Frequency Range	520–1710kHz
Signal-to-Noise Ratio	45dB
Usable Sensitivity	Loop 500µV
Distortion	1kHz, 50% Mod 0.8%
Selectivity	±10kHz, 30dB

### Video Section

Television Format	NTSC
Input Level/Impedance	1Vp-p/75 ohms
Output Level/Impedance	1Vp-p/75 ohms
Video Frequency	
Response	10Hz–8MHz (–3dB)

### General

Power Requirement	AC 120V/60Hz
Power Consumption	72W idle, 580W maximum (2 channels driven)
Dimensions	
Width	17.3 inches (440mm)
Height	6.5 inches (165mm)
Depth	17.1 inches (435mm)
Weight	31 lb (14.1kg)

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 registered trademark, and Power for the digital revolution is a trademark, of Harman Kardon, Inc.

\*Manufactured under license from Dolby Laboratories.

"Dolby," "Pro Logic," "AC-3" and the Double-D symbol are trademarks of Dolby Laboratories. Confidential Unpublished Works. ©1992–1999 Dolby Laboratories, Inc. All rights reserved.

DTS and DTS Surround are trademarks of Digital Theater Systems, Inc.

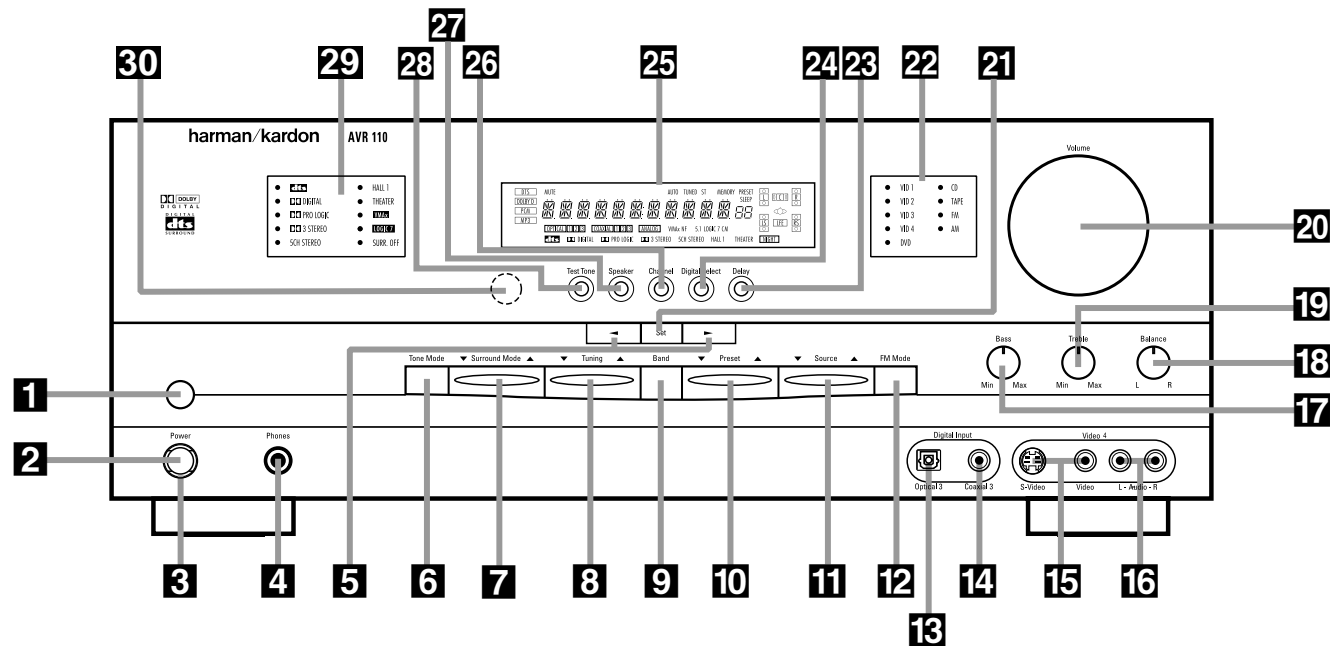
UltraStereo is a trademark of UltraStereo Corp.

VMAx is a registered trademark of Harman International Industries, Inc., and is an implementation of Cooper Bauck Transaural Stereo under patent license.

Logic 7 is a registered trademark of Lexicon, Inc., a Harman International Company.

Crystal is a registered trademark of Cirrus Logic Corp.

## Front Panel Controls



- 1** Main Power Switch
- 2** System Power Control
- 3** Power Indicator
- 4** Headphone Jack
- 5** Selector Buttons
- 6** Tone Mode
- 7** Surround Mode Selector
- 8** Tuning Selector
- 9** Tuner Band Selector
- 10** Preset Stations Selector

- 11** Input Source Selector
- 12** FM Mode Selector
- 13** Digital Optical 3 Input
- 14** Digital Coax 3 Jack
- 15** Video 4 Video Input Jacks
- 16** Video 4 Audio Input Jacks
- 17** Bass Control
- 18** Balance Control
- 19** Treble Control
- 20** Volume Control

- 21** Set Button
- 22** Input Indicators
- 23** Delay
- 24** Digital Input Selector
- 25** Main Information Display
- 26** Channel Select Button
- 27** Speaker Select Button
- 28** Test Tone Selector
- 29** Surround Mode Indicators
- 30** Remote Sensor Window

**1 Main Power Switch:** Press this button to apply power to the AVR 110. When the switch is pressed in, the unit is placed in a Standby mode, as indicated by the amber **Power Indicator 3** surrounding the **System Power Control 2**. This button MUST be pressed in to operate the unit. To turn the unit off and prevent the use of the remote control, this switch should be pressed until it pops out from the front panel so that the word "OFF" may be read at the top of the switch.

**NOTE:** This switch is normally left in the "ON" position.

**2 System Power Control:** When the **Main Power Switch 1** is "ON," press this button to turn on the AVR 110; press it again to turn

the unit off. Note that the **Power Indicator** surrounding the switch **3** will turn green when the unit is on.

**3 Power Indicator:** This LED will be illuminated in amber when the unit is in the Standby mode to signal that the unit is ready to be turned on. When the unit is in operation, the indicator will turn green.

**4 Headphone Jack:** This jack may be used to listen to the AVR 110's output through a pair of headphones. Be certain that the headphones have a standard 1/4" stereo phone plug. Note that the main room speakers will automatically be turned off when the headphone jack is in use.

**5 Selector Buttons:** When you are establishing the AVR 110's configuration settings, use these buttons to select from the choices available, as shown in the **Main Information Display 25**.

**6 Tone Mode:** Pressing this button enables or disables the Bass and Treble tone controls. When the button is pressed so that the words TONE IN appear in the **Main Information Display 25**, the settings of the **Bass 17** and **Treble 19** controls may be used to adjust the output signals. When the button is pressed so that the words TONE OUT appear in the **Main Information Display 25**, the output signal will be "flat," without any bass or treble alteration, no matter how the actual **Bass** and **Treble** controls **17/19** are adjusted.

## Front Panel Controls

**7 Surround Mode Selector:** Press this button to change the surround mode by scrolling through the list of available modes. Note that depending on the type of input, some modes are not always available. (See page 23 for more information about surround modes.)

**8 Tuning Selector:** Press the left side of the button to tune lower-frequency stations and the right side of the button to tune higher-frequency stations. When a station with a strong signal is reached, the **TUNED** indicator **U** will be illuminated in the **Main Information Display 25**.

To tune manually, tap the button lightly and note that the tuner will step up one frequency increment per button press. When the button is held for a few seconds you will note that the unit will quickly search the frequency band. Release it once the fast tuning starts; the tuner will automatically scan for the next station with an acceptable signal and then stop.

**9 Tuner Band Selector:** Pressing this button will automatically switch the AVR 110 to the Tuner mode. Pressing it again will switch between the AM and FM frequency bands. (See page 25 for more information on the tuner.)

**10 Preset Stations Selector:** Press this button to scroll up or down through the list or stations that have been entered into the preset memory. (See page 26 for more information on preset tuning.)

**11 Input Source Selector:** Press this button to change the input by scrolling up or down through the list of input sources.

**12 FM Mode Selector:** Press this button to select Auto or Manual tuning. When the button is pressed so that the **AUTO** indicator **V** lights, the tuner will search for the next station with an acceptable signal when the **Tuning Selector 8 21** is pressed. When the button is pressed so that the **AUTO** indicator **V** is not lit, each press of the **Tuning Selector 8 21** will increase the frequency. (See page 25 for more information on using the tuner.)

**13 Digital Optical 3 Input:** Connect the optical digital output of an audio or video product to this jack. When the Input is not in use, be certain to keep the plastic cap installed to avoid dust contamination that might degrade future performance.

**14 Digital Coax 3 Jack:** This jack is used for connection to the output of portable audio devices, video game consoles or other products that have a coax digital jack.

**15 Video 4 Video Input Jacks:** These jacks may be used for temporary connection to the composite or S-Video output of video games, camcorders or other portable video products.

**16 Video 4 Audio Input Jacks:** These audio/video jacks may be used for temporary connection to video games or portable audio/video products such as camcorders and portable audio players.

**17 Bass Control:** Turn this control to modify the low frequency output of the left/right channels by as much as  $\pm 10$ dB. Set this control to a suitable position for your taste or room acoustics.

**18 Balance Control:** Turn this control to change the relative volume for the front left/right channels.

**NOTE:** For proper operation of the surround modes this control should be at the midpoint or "12 o'clock" position.

**19 Treble Control:** Turn this control to modify the high frequency output of the left/right channels by as much as  $\pm 10$ dB. Set this control to a suitable position for your taste or room acoustics.

**20 Volume Control:** Turn this knob clockwise to increase the volume, counterclockwise to decrease the volume. If the AVR 110 is muted, adjusting volume control will automatically release the unit from the silenced condition.

**21 Set Button:** When making choices during the setup and configuration process, press this button to enter the desired setting as shown in the **Main Information Display 25** into the AVR 110's memory. The set button may also be used to change the display brightness. (See page 26.)

**22 Input Indicators:** A green LED will light next to the name of the input that is currently being used as the source for the AVR 110.

**23 Delay:** Press this button to begin the sequence of steps required to enter delay time settings. (See page 19 for more information on delay times.)

**24 Digital Input Selector:** When playing a source that has a digital output, press this button to select between the **Optical 13 26** and **Coaxial 14 27 Digital** inputs. (See pages 23–25 for more information on digital audio.)

**25 Main Information Display:** This display delivers messages and status indications to help you operate the receiver. (See pages 7–8 for a complete explanation of the Information Display.)

**26 Channel Select Button:** Press this button to begin the process of trimming the channel output levels using an external audio source. (For more information on output level trim adjustment, see page 26.)

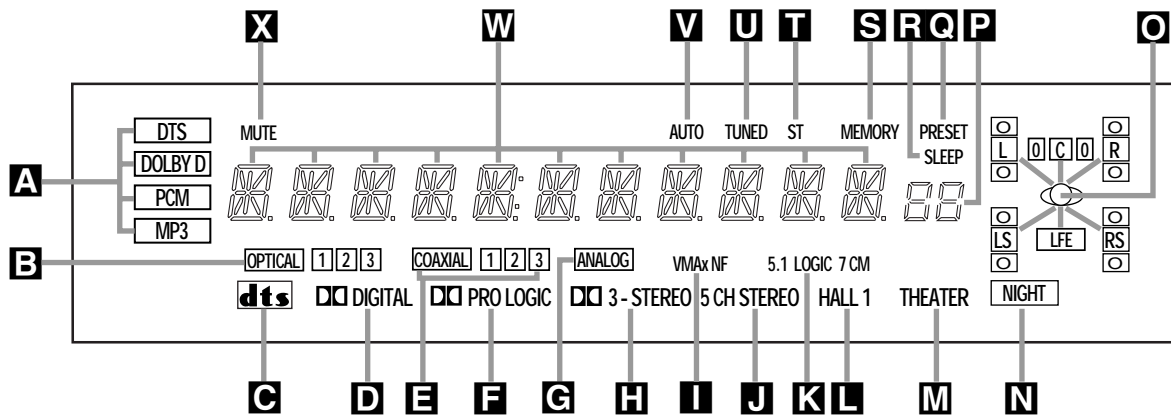
**27 Speaker Select Button:** Press this button to begin the process of selecting the speaker positions that are used in your listening room. (See page 17 for more information on speaker setup and configuration.)

**28 Test Tone Selector:** Press this button to begin the process of adjusting the channel output levels using the internal test tone as a reference. (For more information on output level adjustment, see page 26.)

**29 Surround Mode Indicators:** A green LED will light next to the name of the surround mode that is currently in use.

**30 Remote Sensor Window:** The sensor behind this window receives infrared signals from the remote control. Aim the remote at this area and do not block or cover it unless an external remote sensor is installed.

## Front Panel Information Display



- A** Bitstream Indicators
- B** Optical Source Indicators
- C** DTS Mode Indicator
- D** Dolby Digital Indicator
- E** Coaxial Source Indicators
- F** Dolby Pro Logic Indicator
- G** Analog Input Indicator
- H** Dolby 3 Stereo Indicator
- I** VMaX Mode Indicator
- J** 5-Channel Stereo Indicator
- K** Logic 7 Mode Indicators
- L** Hall Mode Indicator
- M** Theater Mode Indicator
- N** Night Mode Indicator
- O** Speaker/Channel Input Indicators
- P** Preset Number/Sleep Timer
- Q** Preset Indicator
- R** Sleep Indicator
- S** Memory Indicator
- T** Stereo Indicator
- U** Tuned Indicator
- V** Auto Indicator
- W** Main Information Display
- X** Mute Indicator

**A Bitstream Indicators:** When the input is a digital source, one of these indicators will light to display the specific type of data signal in use.

**B Optical Source Indicators:** These indicators light to show when an Optical Digital Input has been selected.

**C DTS Mode Indicator:** This indicator lights when a DTS-encoded source is playing.

**D Dolby Digital Indicator:** This indicator lights when a Dolby Digital source is playing.

**E Coaxial Source Indicators:** These indicators light to show when a Coaxial Digital Input has been selected.

**F Dolby Pro Logic Indicator:** This indicator lights when the Dolby Pro Logic mode has been selected.

**G Analog Input Indicator:** This indicator lights when an analog input source has been selected.

**H Dolby 3 Stereo Indicator:** This indicator lights when the Dolby 3 Stereo Mode has been selected.

**I VMaX Mode Indicator:** This indicator lights when the VMaX mode is in use. **VMaX F** appears when the Far Field VMaX mode is selected; **VMaX N** appears when the Near Field VMaX mode is selected. (See page 22 for a description of the VMaX modes.)

**J 5-Channel Stereo Indicator:** This indicator lights when the 5-Channel Stereo mode has been selected.

**K Logic 7 Mode Indicators:** These indicators light when the Logic 7 mode is in use. **LOGIC 7C** appears for the Cinema version of Logic 7; **LOGIC 7M** appears for the Music version of Logic 7. (See page 22 for a description of the Logic 7 modes.)

**L Hall Mode Indicator:** This indicator lights when the Hall mode has been selected.

**M Theater Mode Indicator:** This indicator lights to show that the Theater mode has been selected.

**N Night Mode Indicator:** This indicator lights when the AVR 110 is in the Night mode, which preserves the dynamic range of digital program material at low volume levels.

**O Speaker/Channel Input Indicators:** These indicators are multipurpose, indicating either the speaker type selected for each channel or the incoming data-signal configuration. The left, center, right, right surround and left surround speaker indicators are composed of three boxes, while the subwoofer is a single box. The center box lights when a "Small" speaker is selected, and all three boxes light when "Large" speakers are selected. When none of the boxes are lit for the center, surround or subwoofer channels, no speaker has been selected for one of those posi-

tions. (See page 17 for more information on configuring speakers.) The letters inside each of the center boxes display active input channels. For standard analog inputs, only the L and R will light, indicating a stereo input. When a digital source is playing, the indicators will light to display the channels being received at the digital input. When the letters flash, the digital input has been interrupted. (See page 18 for more information on the Channel Indicators.)

**P Preset Number/Sleep Timer:** When the tuner is in use, these numbers indicate the specific preset memory location in use. (See page 25 for more information on preset stations.) When the Sleep function is in use, these numbers show how many minutes remain before the unit goes into the Standby mode.

**Q Preset Indicator:** This indicator lights when the tuner is in use to show that the **Preset Number/Sleep Timer P** is showing the station's preset memory number. (See page 25 for more information on tuner presets.)

**R Sleep Indicator:** This indicator lights when the Sleep function is in use. The numbers in the Preset Number/Sleep Timer Indicators will show the minutes remaining before the AVR 110 goes into the Standby mode. (See page 21 for more information on the Sleep function.)

## Front Panel Information Display


**S Memory Indicator:** This indicator flashes when entering presets and other information into the tuner's memory.

**T Stereo Indicator:** This indicator lights when an FM station is being tuned in stereo.

**U Tuned Indicator:** This indicator lights when a station is being received with sufficient signal strength to provide acceptable listening quality.

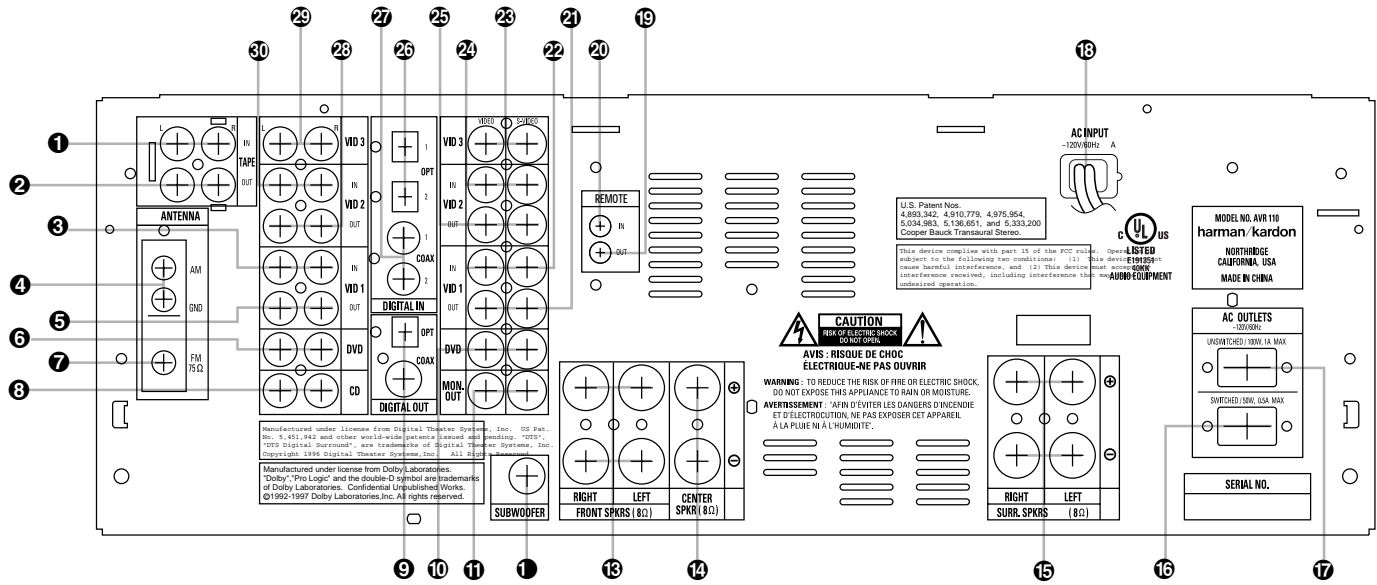
**V Auto Indicator:** This indicator lights when the tuner's Auto mode is in use.

**W Main Information Display:** This display shows messages relating to the status, input source, surround mode, tuner, volume level or other aspects of the AVR 110's operation.

**X Mute Indicator:** This indicator lights to remind you that the AVR 110's output has been silenced by pressing the **Mute** button . Press the Mute button again to return to the previously selected output level.



Rear Panel Connections



- 1 Tape Inputs
- 2 Tape Outputs
- 3 Video 1 Audio Inputs
- 4 AM Antenna
- 5 Video 1 Audio Outputs
- 6 DVD Audio Inputs
- 7 FM Antenna
- 8 CD Inputs
- 9 Digital Audio Outputs
- 10 DVD Video Inputs
- 11 Video Monitor Outputs
- 12 Subwoofer Output
- 13 Front Speaker Outputs
- 14 Center Speaker Outputs

- 15 Surround Speaker Outputs
- 16 Switched AC Accessory Outlet
- 17 Unswitched AC Accessory Outlet
- 18 AC Power Cord
- 19 Remote IR Output
- 20 Remote IR Input
- 21 Video 1 Video Outputs
- 22 Video 1 Video Inputs
- 23 Video 3 Video Inputs
- 24 Video 2 Video Inputs
- 25 Video 2 Video Outputs
- 26 Optical Digital Inputs
- 27 Coaxial Digital Inputs
- 28 Video 2 Audio Outputs

- 29 Video 3 Audio Inputs
- 30 Video 2 Audio Inputs

## Rear Panel Connections

**1 Tape Inputs:** Connect these jacks to the **PLAY/OUT** jacks of an audio recorder.

**2 Tape Outputs:** Connect these jacks to the **RECORD/INPUT** jacks of an audio recorder.

**3 Video 1 Audio Inputs:** Connect these jacks to the **PLAY/OUT** audio jacks on a VCR or other video source.

**4 AM Antenna:** Connect the AM loop antenna supplied with the receiver to these terminals. If an external AM antenna is used, make connections to the **AM** and **GND** terminals in accordance with the instructions supplied with the antenna.

**5 Video 1 Audio Outputs:** Connect these jacks to the **RECORD/INPUT** audio jacks on a VCR.

**6 DVD Audio Inputs:** Connect these jacks to the analog audio jacks on a DVD or other video source.

**7 FM Antenna:** Connect the supplied indoor or an optional external FM antenna to this terminal.

**8 CD Inputs:** Connect these jacks to the output of a compact disc player or CD changer.

**9 Digital Audio Outputs:** Connect these jacks to the matching digital input connector on a digital recorder such as a CD-R or MiniDisc recorder.

**10 DVD Video Inputs:** Connect these jacks to the composite or S-Video output jacks on a DVD or other video source.

**11 Video Monitor Outputs:** Connect this jack to the composite or S-Video input of a TV monitor or video projector to view the output of any standard video source selected by the receiver's video switcher.

**1 Subwoofer Output:** Connect this jack to the line-level input of a powered subwoofer. If an external subwoofer amplifier is used, connect this jack to the subwoofer amplifier input.

**13 Front Speaker Outputs:** Connect these outputs to the matching + and – terminals on your front left/right speakers.

**14 Center Speaker Outputs:** Connect these outputs to the matching + and – terminals on your center-channel speaker.

**15 Surround Speaker Outputs:** Connect these outputs to the matching + and – terminals on your left and right surround speakers.

**NOTE:** When making speaker connections always make certain to maintain correct polarity by connecting the red (+) terminals on the AVR 110 to the red (+) terminals on the speakers and the black (–) terminals on the AVR 110 to the black (–) terminals on the speakers. See page 14 for more information on speaker polarity.

**16 Switched AC Accessory Outlet:** This outlet may be used to power any device you wish to have turned on when the AVR 110 is turned on with the **System Power Control** switch **2**.

**17 Unswitched AC Accessory Outlet:** This outlet may be used to power any AC device. The power will remain on at this outlet regardless of whether the AVR 110 is on or off.

**NOTE:** The total power consumption of all devices connected to the accessory outlets should not exceed 100 watts.

**18 AC Power Cord:** Connect the AC plug to an unswitched AC wall outlet.

**19 Remote IR Output:** This connection permits the IR sensor in the receiver to serve other remote controlled devices. Connect this jack to the "IR IN" jack on Harman Kardon (or other compatible) equipment.

**20 Remote IR Input:** If the AVR 110's front panel IR sensor is blocked due to cabinet doors or other obstructions, an external IR sensor may be used. Connect the output of the sensor to this jack.

**21 Video 1 Video Outputs:** Connect these jacks to the **RECORD/INPUT** composite or S-Video jack on a VCR.

**22 Video 1 Video Inputs:** Connect these jacks to the **PLAY/OUT** composite or S-Video jacks on a VCR or other video source.

**23 Video 3 Video Inputs:** Connect these jacks to the **PLAY/OUT** composite or S-Video jacks on a VCR or other video source.

**24 Video 2 Video Inputs:** Connect these jacks to the **PLAY/OUT** composite or S-Video jacks on a VCR or other video source.

**25 Video 2 Video Outputs:** Connect these jacks to the **RECORD/INPUT** composite or S-Video jacks on a VCR.

**26 Optical Digital Inputs:** Connect the optical digital output from a DVD player, HDTV receiver, LD player or CD player to these jacks. The signal may be either a Dolby Digital signal, a DTS signal or a standard PCM digital source.

**27 Coaxial Digital Inputs:** Connect the coaxial digital output from a DVD player, HDTV receiver, LD player or CD player to these jacks. The signal may be either a Dolby Digital signal, DTS signal or a standard PCM digital source. Do not connect the RF digital output of an LD player to these jacks.

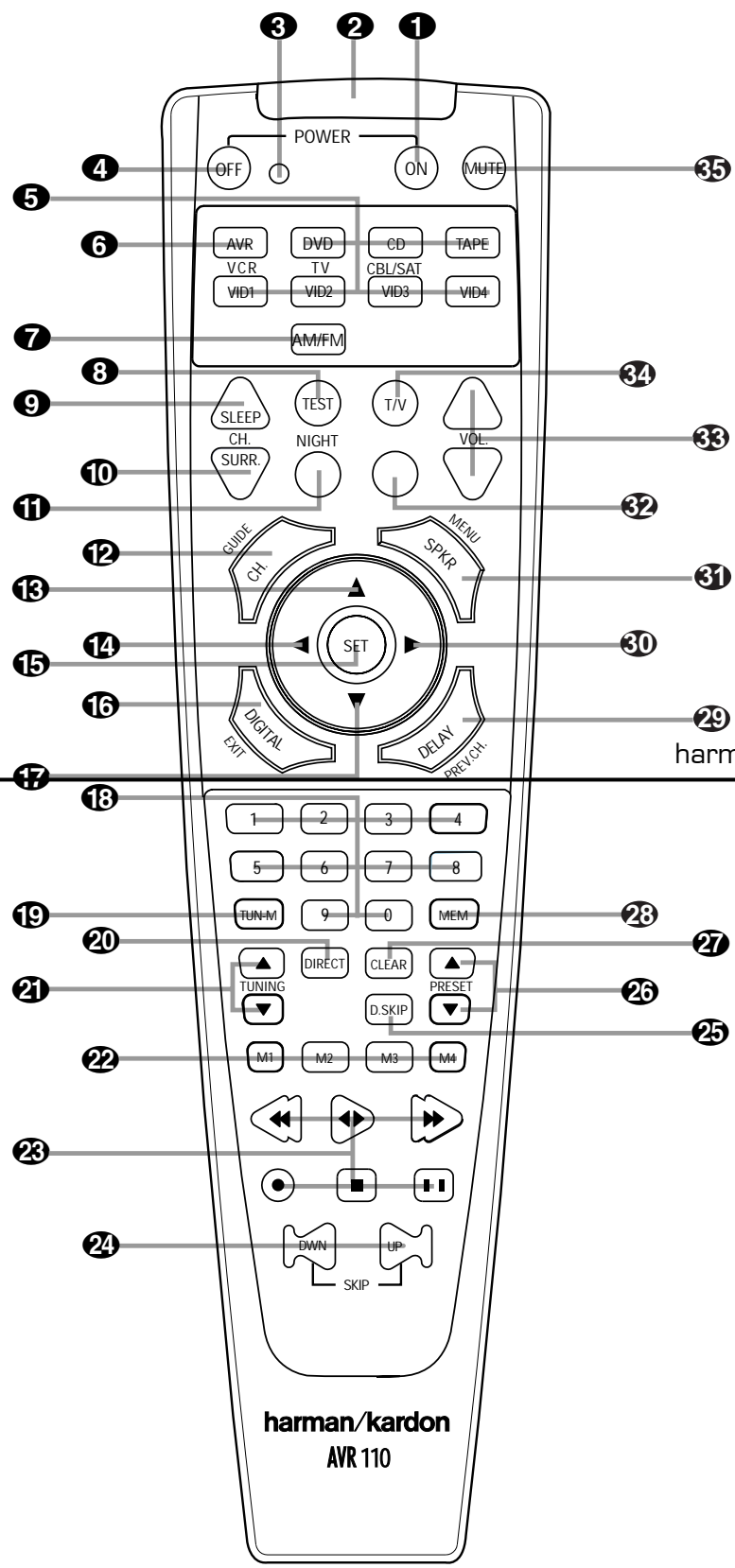
**28 Video 2 Audio Outputs:** Connect these jacks to the **RECORD/INPUT** audio jacks on a VCR or other video source.

**29 Video 3 Audio Inputs:** Connect these jacks to the **PLAY/OUT** audio jacks on a VCR or other video source.

**30 Video 2 Audio Inputs:** Connect these jacks to the **PLAY/OUT** audio jacks on a VCR or other video source.

# Remote Control Functions

- 1 Power On Button
- 2 IR Transmitter Window
- 3 Program Indicator
- 4 Power Off Button
- 5 Input Selectors
- 6 AVR Selector
- 7 AM/FM Tuner Select
- 8 Test Button
- 9 Sleep Button
- 10 Surround Mode Selector
- 11 Night Mode
- 12 Channel Select Button
- 13 ▲ Button
- 14 ▼ Button
- 15 Set Button
- 16 Digital Select
- 17 ▼ Button
- 18 Numeric Keys
- 19 Tuner Mode
- 20 Direct Button
- 21 Tuning Up/Down
- 22 Macro Buttons
- 23 Transport Controls
- 24 Skip Up/Down Buttons
- 25 Disc Skip Buttons
- 26 Preset Up/Down
- 27 Clear Button
- 28 M1-M4 Buttons
- 29 Delay/Prev. Ch.
- 30 ► Button
- 31 Speaker Select
- 32 Spare Button
- 33 Volume Up/Down
- 34 TV/Video Selector
- 35 Mute



**NOTE:** The function names shown here are each button's feature when used with the AVR 110. Most buttons have additional functions when used with other devices. See pages 31–32 for a list of these functions.

## Remote Control Functions

**IMPORTANT NOTE:** The AVR 110's remote may be programmed to control up to eight devices, including the AVR 110. Before using the remote, it is important to remember to press the **Input Selector** button **5** that corresponds to the unit you wish to operate. In addition, the AVR 110's remote is shipped from the factory to operate the AVR 110 and most Harman Kardon CD or DVD players and cassette decks. The remote is also capable of operating a wide variety of other products using the control codes that are part of the remote. Before using the remote with other products, follow the instructions on pages 27–29 to program the proper codes for the products in your system.

It is also important to remember that many of the buttons on the remote take on different functions, depending on the product selected using the **Input Selectors** **5** **7**. The descriptions shown here primarily detail the functions of the remote when it is used to operate the AVR 110. (See page 30 for information about alternate functions for the remote's buttons.)

**1 Power On Button:** Press this button to turn on the power to a device selected by pressing one of the **Input Selectors** **5**.

**2 IR Transmitter Window:** Point this window towards the AVR 110 when pressing buttons on the remote to make certain that infrared commands are properly received.

**3 Program Indicator:** This LED indicator is used to guide you through the process of programming the remote. (See page 27 for information on programming the remote.)

**4 Power Off Button:** Press this button to place the AVR 110 or a selected device in the Standby mode.

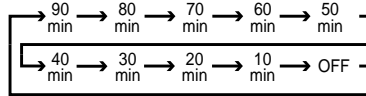
**5 Input Selectors:** Pressing one of these buttons will perform three actions at the same time. First, if the AVR 110 is not turned on, this will power up the unit. Next, it will select the source shown on the button as the input to the AVR 110. Finally, it will change the remote control so that it controls the device selected. After pressing one of these buttons you must press the **AVR Selector** button **6** again to operate the AVR 110's functions with the remote.

**6 AVR Selector:** Pressing this button will switch the remote so that it will operate the AVR 110's functions. If the AVR 110 is in the Standby mode, it will also turn the AVR 110 on.

**7 AM/FM Tuner Select:** Press this button to select the AVR 110's tuner as the listening choice. Pressing this button when the tuner is already in use will select between the AM and FM bands.

**8 Test Button:** Press this button to begin the sequence used to calibrate the AVR 110's output levels. (See page 18 for more information on calibrating the AVR 110.)

**9 Sleep Button:** Press this button to place the unit in the Sleep mode. After the time shown in the display, the AVR 110 will automatically go into the Standby mode. Each press of the button changes the time until turn-off in the following order:



Note that this button is also used to change channels on your TV when the TV is selected.

When the AVR 110 remote is being programmed with the codes to operate another device, this button is also used in the "Auto Search" process. (See page 27 for more information on programming the remote.)

**10 Surround Mode Selector:** Press this button to begin the process of changing the surround mode. After the button has been pressed, use the **▲/▼** buttons **13** **17** to select the desired surround mode. (See page 23 for more information.) Note that this button is also used to tune channels when the TV is selected using the device **Input Selector** **5**. When the AVR 110 remote is being programmed with the codes of another device, this button is also used in the "Auto Search" process. (See page 27 for more information on programming the remote.)

**11 Night Mode:** Press this button to activate the Night mode. This mode is available in specially encoded digital sources, and it preserves dialog (center-channel) intelligibility at low volume levels.

**12 Channel Select Button:** This button is used to start the process of setting the AVR 110's output levels to an external source. Once this button is pressed, use the **▲/▼** buttons **13** **17** to select the channel being adjusted, then press the **Set** button **15**, followed by the **▲/▼** buttons **13** **17** again, to change the level setting. (See page 18 for more information.)

**13 ▲ Button:** This multipurpose button is used to change or scroll through items in the on screen menus, or to change configuration settings such as output levels. When changing an item such as the surround mode or digital input directly, first press the function or mode to be changed (e.g., press the **Surround Mode** **10** to select a surround mode or the **Digital** button **16** to change the digital input) and then press this button to scroll through the list of available choices.

**14 ◀ Button:** This button is used to change the menu selection or setting during some of the setup procedures for the AVR 110.

**15 Set Button:** This button is used to enter settings into the AVR 110's memory. It is also used in the setup procedures for delay time, speaker configuration and channel output level adjustment.

**16 Digital Select:** Press this button to assign one of the digital inputs **26** **27** **14** to a source. (See page 23 for more information on using digital inputs.)

**17 ▼ Button:** This multi-purpose button is used to change or scroll through items in the on screen menus, or to change configuration settings such as output levels. When changing an item such as the surround mode or digital input directly, first press the function or mode to be changed (e.g., press the **Surround Mode** **10** to select a surround mode or the **Digital** button **16** to change the digital input) and then press this button to scroll through the list of available choices.

**18 Numeric Keys:** These buttons serve as a ten-button numeric keypad to enter tuner preset positions. They are also used to select channel numbers when **TV** has been selected on the remote, or to select track numbers on a CD, DVD or LD player, depending on how the remote has been programmed.

**19 Tuner Mode:** Press this button when the tuner is in use to select between automatic tuning and manual tuning. When the button is pressed so that the **AUTO** indicator **V** goes out, pressing the **Tuning** buttons **21** **8** will move the frequency up or down in single-step increments. When the FM band is in use, pressing this button when a station's signal is weak will change to monaural reception. (See page 25 for more information.)

## Remote Control Functions

**20 Direct Button:** Press this button when the tuner is in use to start the sequence for direct entry of a station's frequency. After pressing the button simply press the proper **Numeric Keys 18** to select a station. (See page 25 for more information on the tuner.)

**21 Tuning Up/Down:** When the tuner is in use, these buttons will tune up or down through the selected frequency band. If the **Tuner Mode** button **19 12** has been pressed so that the **AUTO** indicator **V** is illuminated, pressing and holding either of the buttons for three seconds will cause the tuner to seek the next station with acceptable signal strength for quality reception. When the **AUTO** indicator **V** is NOT illuminated, pressing these buttons will tune stations in single-step increments. (See page 25 for more information.)

**22 Macro Buttons:** Press these buttons to store or recall a "Macro", which is a preprogrammed sequence of commands stored in the remote. (See page 28 for more information on storing and recalling macros.)

**23 Transport Controls:** These buttons do not have any functions for the AVR 110, but they may be programmed for the forward/reverse play operation of a wide variety of CD or DVD players, and audio or video cassette recorders. (See page 27 for more information on programming the remote.)

**24 Skip Up/Down Buttons:** These buttons do not have a direct function with the AVR 110, but when used with a compatibly programmed CD or DVD changer they will change the disc currently being played in the changer.

**25 Disc Skip Buttons:** These buttons have no direct function for the AVR 110, but they are often used when the remote is programmed to operate a CD or DVD changer to change the discs in the changer. (See page 30 for more information on using the remote with other devices.)

**26 Preset Up/Down:** When the tuner is in use, press these buttons to scroll through the stations programmed into the AVR 110's memory. When some source devices, such as CD players, VCRs and cassette decks, are selected using the device **Input Selectors 5**, these buttons may function as Chapter Step or Track Advance.

**27 Clear Button:** Press this button to clear incorrect entries when using the remote to directly enter a radio station's frequency.

**28 Memory Button:** Press this button to enter a radio station into the AVR 110's preset memory. Once the **MEMORY** indicator **S** flashes, you have five seconds to enter a preset memory location using the **Numeric Keys 18**. (See page 26 for more information.)

**29 Delay/Prev Ch.:** Press this button to begin the process for setting the delay times used by the AVR 110 when processing surround sound. After pressing this button, the delay times are entered by pressing the **Set** button **15** and then using the **▲/▼** buttons **13 17** to change the setting. Press the **Set** button **15** again to complete the process. (See page 19 for more information.)

**30 ► Button:** Press this button to change a setting or selection when configuring many of the AVR 110's settings.

**31 Speaker Select:** Press this button to begin the process of configuring the AVR 110's bass management system for the type of speakers used in your system. Once the button has been pressed, use the **▲/▼** buttons **13 17** to select the channel you wish to set up. Press the **Set** button **15** and then select another channel to configure. When all adjustments have been completed, press the **Set** button **15** twice to exit the settings and return to normal operation. (See page 17 for more information.)

**32 Spare Button:** This button does not have any function for the operation of the AVR 110, but it is available for use to be programmed for a function from another remote.

**33 Volume Up/Down:** Press these buttons to raise or lower the system volume.

**34 TV/Video Button:** This button does not have a direct function on the AVR 110, but when used with a compatibly programmed VCR, DVD or satellite receiver that has a "TV/Video" function, pressing this button will switch between the output of the player or receiver and the external video input to that player. Consult the owner's manual for your specific player or receiver for the details of how it implements this function.

**35 Mute:** Press this button to momentarily silence the AVR 110 or TV set being controlled, depending on which device has been selected.

When the AVR 110 remote is being programmed to operate another device, this button is pressed with the **Input Selector** button **5** to begin the programming process. (See page 27 for more information on programming the remote.)

## Troubleshooting Guide

SYMPTOM	CAUSE	SOLUTION
Unit does not function when Main Power Switch is pushed	<ul style="list-style-type: none"> <li>No AC Power</li> </ul>	<ul style="list-style-type: none"> <li>Make certain AC power cord is plugged into a live outlet</li> <li>Check to see whether outlet is switch-controlled</li> </ul>
Display lights, but no sound or picture	<ul style="list-style-type: none"> <li>Intermittent input connections</li> <li><b>Mute</b> is on</li> <li>Volume control is down</li> </ul>	<ul style="list-style-type: none"> <li>Make certain that all input and speaker connections are secure</li> <li>Press <b>Mute</b> button</li> <li>Turn up volume control</li> </ul>
Unit turns on, but front-panel display does not light up	<ul style="list-style-type: none"> <li>Display brightness is turned off</li> </ul>	<ul style="list-style-type: none"> <li>Follow the instructions in the Display Brightness section on page 31 so that the display is set to <b>VFD FULL</b></li> </ul>
No sound from any speaker; light around power switch is red	<ul style="list-style-type: none"> <li>Amplifier is in protection mode due to possible short</li> <li>Amplifier is in protection mode due to internal problems</li> </ul>	<ul style="list-style-type: none"> <li>Check speaker wire connections for shorts at receiver and speaker ends</li> <li>Contact your local Harman Kardon service depot</li> </ul>
No sound from surround or center speakers	<ul style="list-style-type: none"> <li>Incorrect surround mode</li> <li>Input is monaural</li> <li>Incorrect configuration</li> <li>Stereo or Mono program material</li> </ul>	<ul style="list-style-type: none"> <li>Select a mode other than stereo</li> <li>There is no surround information from mono sources</li> <li>Check speaker mode configuration</li> <li>The surround decoder may not create center- or rear-channel information from nonencoded programs</li> </ul>
Unit does not respond to remote commands	<ul style="list-style-type: none"> <li>Weak batteries in remote</li> <li>Wrong device selected</li> <li>Remote sensor is obscured</li> </ul>	<ul style="list-style-type: none"> <li>Change remote batteries</li> <li>Press the AVR selector</li> <li>Make certain front panel sensor is visible to remote or connect remote sensor</li> </ul>
Intermittent buzzing in tuner	<ul style="list-style-type: none"> <li>Local interference</li> </ul>	<ul style="list-style-type: none"> <li>Move unit or antenna away from computers, fluorescent lights, motors or other electrical appliances</li> </ul>
Letters flash in the channel indicator display and digital audio stops	<ul style="list-style-type: none"> <li>Digital audio feed paused</li> </ul>	<ul style="list-style-type: none"> <li>Resume play for DVD</li> <li>Check that Digital Input is selected</li> </ul>

### Processor Reset

In the rare case where the unit's operation or the displays seem abnormal, the cause may involve the erratic operation of the system's memory or microprocessor.

To correct this problem, first unplug the unit from the AC wall outlet and wait at least three minutes. After the pause, reconnect the AC power cord and check the unit's operation. If the system still malfunctions, a system reset may clear the problem.

To clear the AVR 110's entire system memory including tuner presets, output level settings,

delay times and speaker configuration data, first put the unit in Standby by pressing the **System Power Control** button **2**. Next, press and hold the **Tone Mode** **6** and the **FM Mode Selector** **12** buttons for three seconds.

The unit will turn on automatically and display the **RESET** message in the **Main Information Display** **W**. Note that once you have cleared the memory in this manner, it is necessary to reestablish all system configuration settings and tuner presets.

**NOTE:** Resetting the processor will erase any configuration settings you have made for

speakers, output levels, surround modes, digital input assignments as well as the tuner presets. After a reset the unit will be returned to the factory presets, and all settings for these items must be reentered.

If the system is still operating incorrectly, there may have been an electronic discharge or severe AC line interference that has corrupted the memory or microprocessor.

If these steps do not solve the problem, consult an authorized Harman Kardon service depot.

### AVR110/210/310/510 IDLE CURRENT ADJUSTMENT:

Turn main power on; let unit idle (no load) for 5 minutes.

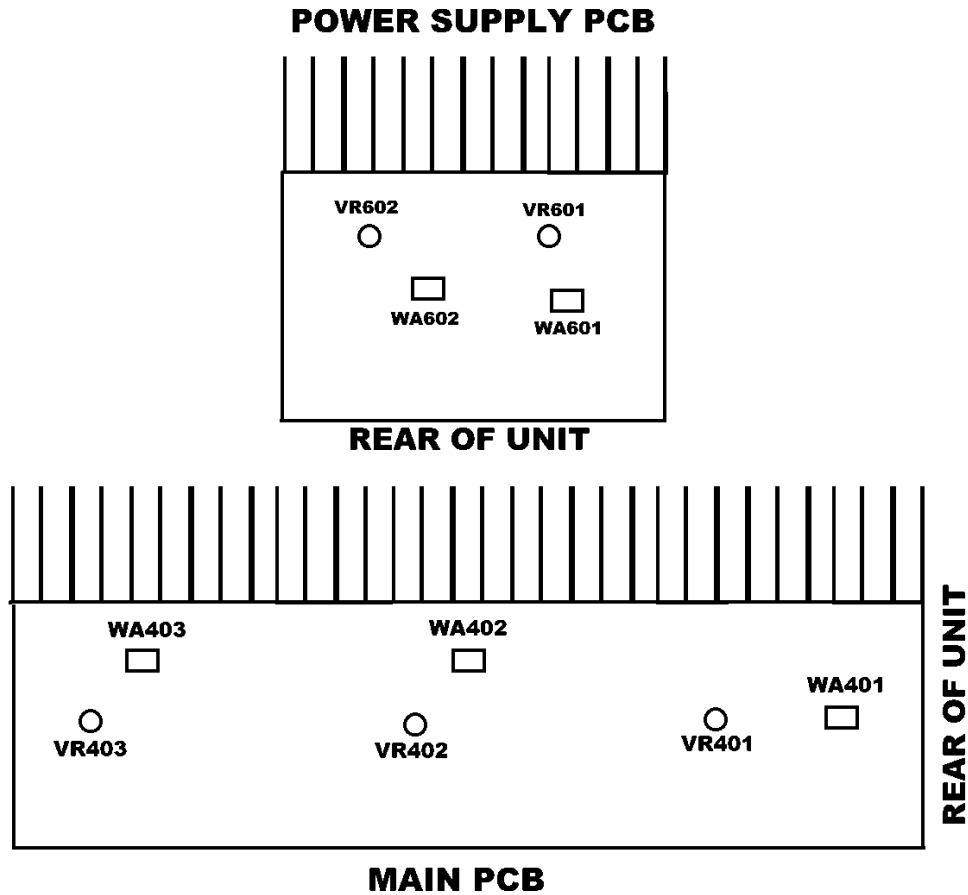
Check points: White female connectors: WA401,WA402,WA403,WA601,WA602

Adjust – Variable resistors: VR401,VR402,VR501,VR601,VR602

to **21mV +/- 3mV.**

Use caution not to short the two pins together in each connector.

After 5 min. more check again, and re-adjust if necessary.



### AVR110/210/310/510 TUNER ALIGNMENT

There is no tuner alignment possible on the AVR110/210/310/510 series. In the event of a misalignment or problem, traced to the Tuner PCB, order complete PCB below:

AVR110/210/310/510 (120V)	Part# J4099100170X
---------------------------	--------------------

# harman/kardon

# Service Bulletin

Service bulletin # H/K2001-01 June 2001

Warranty labor rate: MINOR repair

To: All harman/kardon Service Centers

Models: AVR110/210/310/510, AVR3000/4000/5000

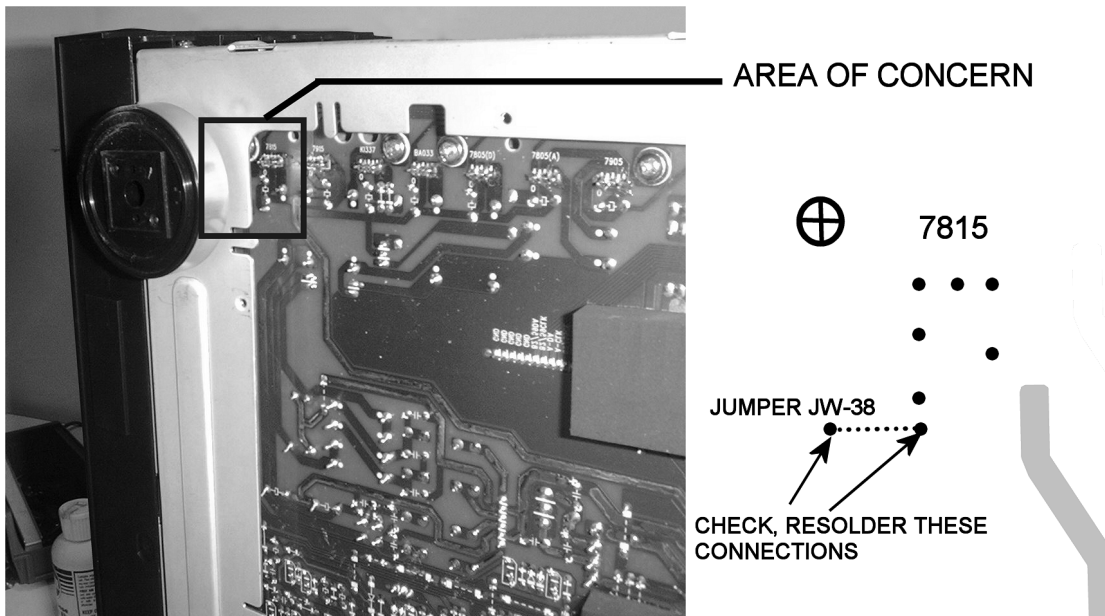
Subject: Unit Goes into Protection

In the event you receive an AVR110,210,310,510,3000,4000 or 5000 A/V receiver with the complaint: "The Receiver is going into protection (Red indicator in the power switch) as soon as it's turned on, or after a short delay", check both items below for possible solutions:

### AVR/210/310/510, AVR3000/4000

#### 1. Possible bad solder connection at jumper JW-38 on main PCB:

- a) Disconnect all external cables, lay unit on its left side on a padded surface.
- b) Remove the (10) Phillips screws holding the bottom chassis grille on, exposing the Main PCB.
- c) Refer to the illustration below; locate area of concern and resolder exposed ends of jumper JW-38 if needed.
- d) Reassemble and test unit.



Model	Serial Number 120V	Serial Number 230V RDS	STATUS	ACTION
AVR210	TH0015~01001 to TH0015~02966	n/a	Check jumper JW-38 for solder	Resolder JW-38 if needed
AVR310	TH0016~01001 to TH0016~04408	n/a	Check jumper JW-38 for solder	Resolder JW-38 if needed
AVR510	TH0017~01001 to TH0017~04403	n/a	Check jumper JW-38 for solder	Resolder JW-38 if needed
AVR3000	n/a	TH0019~01001 to TH0019~03369	Check jumper JW-38 for solder	Resolder JW-38 if needed
AVR4000	n/a	TH0020~01001 to TH0020~03423	Check jumper JW-38 for solder	Resolder JW-38 if needed



**AVR110/210/310/510, AVR3000/4000/5000**

**2. Possible blown line fuse; inspect and replace if necessary:** When line fuse FU981 is blown in the AVR series, the Amber Standby Indicator will still light, but when unit is switched ON, the unit will go into protection. (Red indicator)

- a) Remove (14) Phillips screws holding the top cover to the receiver; remove the cover.
- b) Line fuse FU981 is located at the rear, on the vertically mounted Standby PCB close to the connector where the main AC power cord enters the receiver. Long-nosed pliers or similar tool may be used to remove it. Connectors nearby it may have to be unplugged to access the fuse.
- c) See chart below for proper replacement fuse:

MODEL	DESCRIPTION	H/K PART#
AVR110/210	5A Slo-Blo 5x20mm 125V	J5502250320X
AVR310	6.3A Slo-Blo 5x20mm 125V	A091-0013-0
AVR510	7A Slo-Blo 5x20mm 125V	J5502270320X
AVR3000	2.5A Slo-Blo 5x20mm 250V	G65025225114
AVR4000	3.15A Slo-Blo 5x20mm 250V	J5503331330X
AVR5000	4A Slo-Blo 5x20mm 250V	J5502240320X

- d) Replace any connectors that were disconnected, replace the top cover; test the unit

NOTE: If line fuse FU981 blows again after a short period, with no speaker loads connected, problem is another, more serious issue not covered in this bulletin.



---

# harman/kardon

# Service Bulletin

---

Service bulletin # H/K2003-07 Sept. 2003

Warranty labor rate: MINOR repair

To: All harman/kardon Service Centers

Model: AVR110/210/310/510, AVR120/220; AVR320/520

Subject: Various Complaints

---

## **For Complaints:**

NO AUDIO  
NOISE  
INTERMITTENT NOISE  
INTERMITTENT AUDIO

## **Possible Solution:**

Voltages may be too high on DSP Buffer IC or DSP IC

All modifications are done to the DSP board.

### **AVR110/210/310/510 AVR120/220**

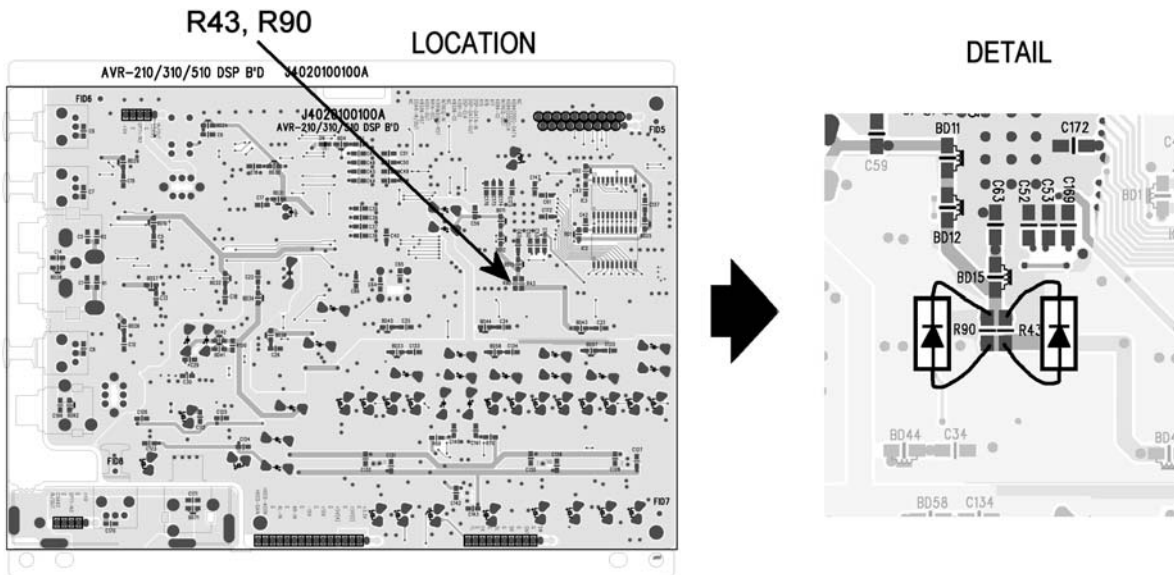
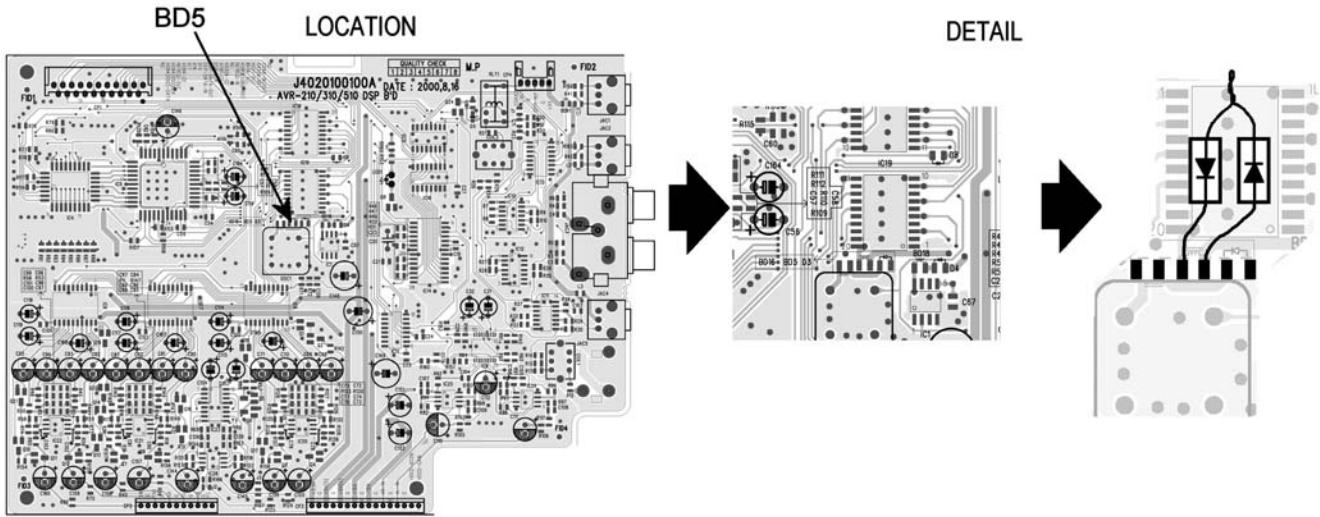
Remove BD5 and replace with two 1N4148 diodes in series.  
Remove R43 and R90 (3.3Ω) and replace each with a 1N4148 diode.  
(See diagram Page 2 for location and polarity)

### **AVR320/520**

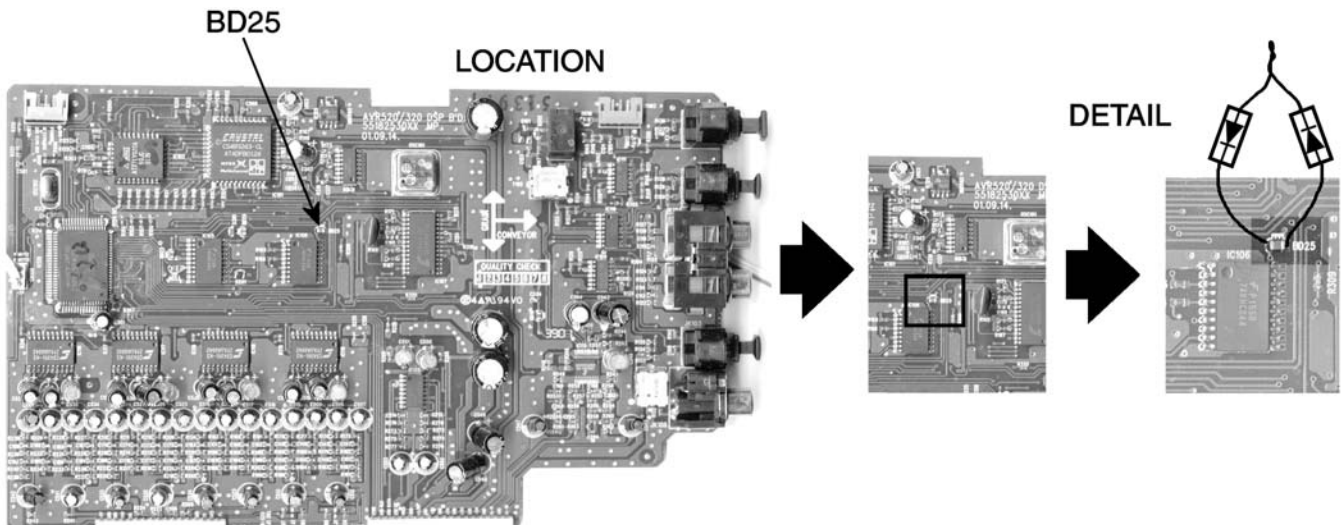
Remove BD25 and replace with two 1N4148 diodes in series.  
(See diagram Page 2 for location and polarity)

In all cases the 1N4148 diode(s) you need to add should be normal 2-lead axial components, like h/k part# 13-0482 or equivalent (not SMD devices).

MODELS: AVR110/210/310/510  
AVR120/220



MODELS: AVR320/520



Troubleshooting tips and solutions to common service problems

## AVR Test Cable Kit Now Available

For models: **AVR35/45/65**  
**AVR100/200/300/500/7000**  
**AVR110/210/310/510**  
**AVR120/220/320/520**

TIP# HKTT2002-01

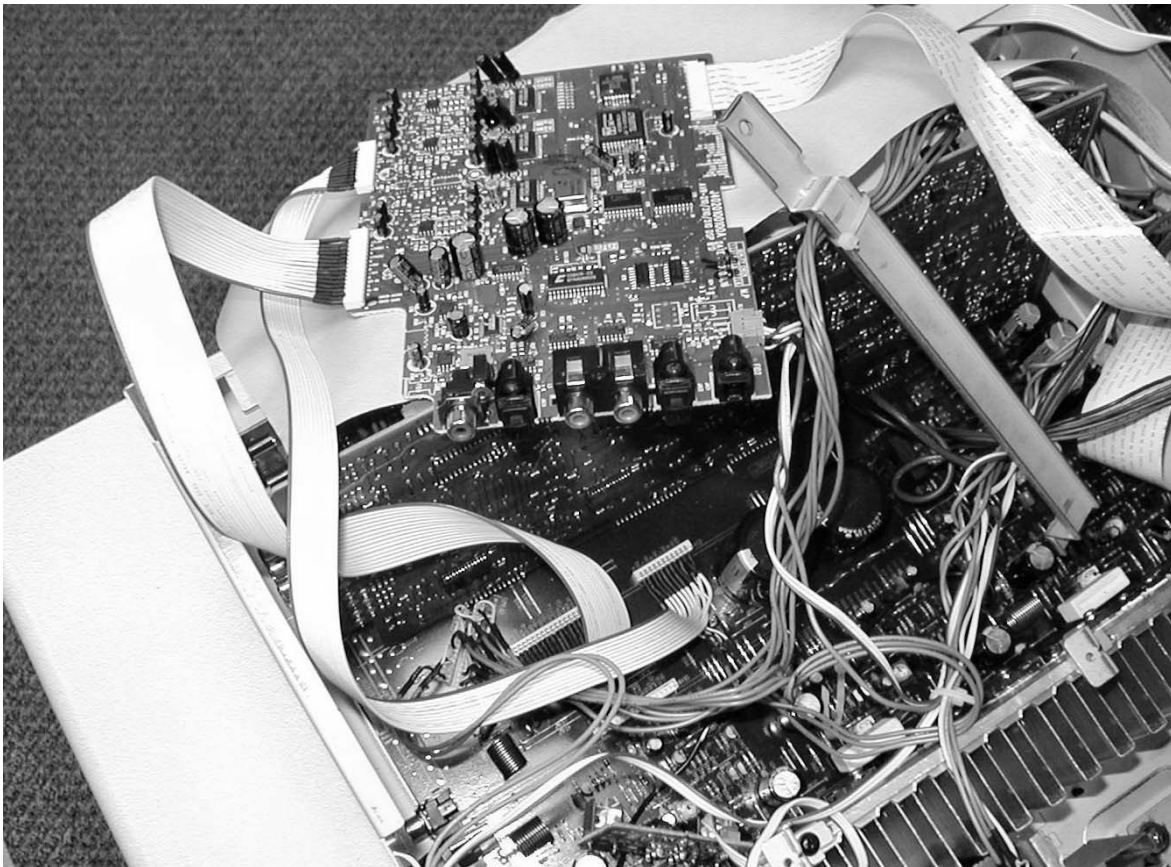
---

### Complaint:

The components on many of these PCB's can't be accessed with a test probe or other device because the boards are mounted so close together. If the board is physically removed, signal & power to the board is lost and the board/component cannot be tested.

### Solution:

Order h/k extension cable kit #AVR-CABLEASSYII. This kit, consisting of various ribbon cable assemblies, will allow you to extend the connectors so any PCB can be removed from the unit and still be "live".



**Kit includes:**

Qty. in bag	Conductors	Comment
5	2	3 pin connector but only 2 wires
6	3	
2	4	
2	5	
2	6	
6	7	
2	8	
2	9	
2	10	
6	11	
1	12	
1	14	
4	15	
1	16	
1	17	
4	19	
1	21	Split connector male/female *
1	22	Split connector male/female *
1	27	Split connector male/female *
1	29	Split connector male/female *
1	30	Split connector male/female *
1	31	Split connector male/female *

\* Connectors are wired together side-by-side to equal the higher pin counts

---

**harman/kardon****TECH TIPS**

---

**Troubleshooting tips and solutions to common service problems****For models: AVR110/120/210/220/310/320/510/520/7000****TIP# HKTT2003-01**

---

**Subject:** Backup Memory on AVR series receivers

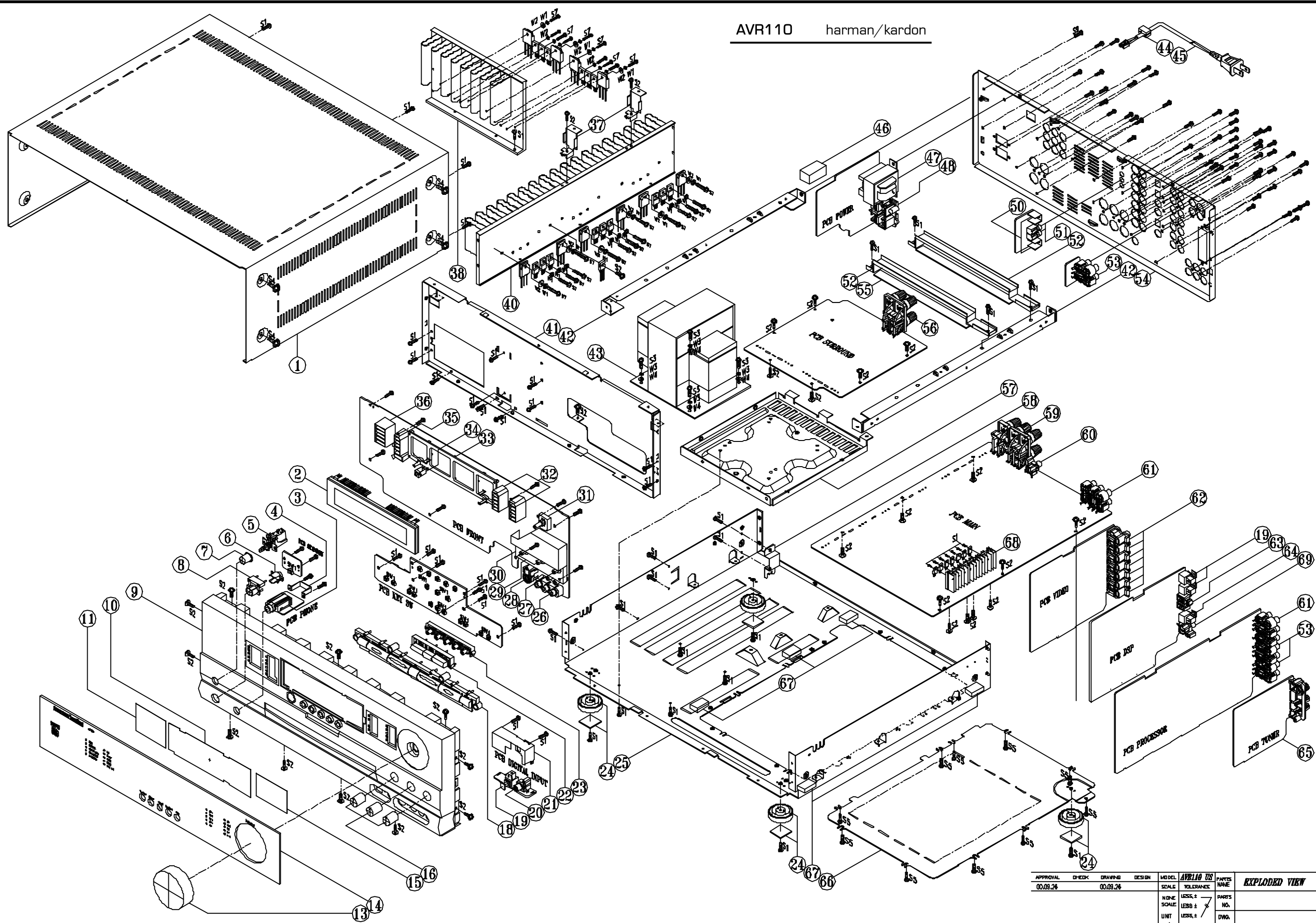
**In the event of a complaint of “the receiver is losing its memory (any programmed system settings) when the unit is turned off, or after the unit is unplugged (briefly\*)”:**

Check and replace:

**C216** (all models above except AVR7000)**C730** (AVR7000 only)

Location: On the front PCB, 0.047 Farad 5.5v capacitor, h/k part# 55134360.

\* After approximately two weeks of being disconnected from AC supply, even a normally functioning receiver will lose any programmed settings and switch to default settings.



APPROVAL	CHECK	DRAWING	DESIGN	MO. DEL.	AVR110 US	PARTS NAME	EXPLODED VIEW
00.09.24		00.09.24		SCALE	TOLERANCE		
				NONE	LESS ±	PARTS NO.	
				SCALE	LESS ±	NO.	
				UNIT	LESS ±	DWG.	
				in/m	LESS ±	NO.	



**AVR 110 US EXPLODED VIEW PART LIST**

NO	PARTS CODE	PARTS NAME	Q'TY	MATERIAL & SPEC	NO	PARTS CODE	PARTS NAME	Q'TY	MATERIAL & SPEC
1	J60100008000	COVER TOP	1	SECC+VCM	51	J44333000001	JACK STEREO 1P	2	JW-350S
2	J2352230020X	VFD SAMSUNG	1	HNA-16LL15	52	J60300501000	BKT PCB	2	SECC 1.0t
3	J44329000102	JACK PHONE KUNMING	1	HTJ-064-07BG	53	J44302401201	JACK RCA 4P WWRR	3	JW4104RS
4	J60300002000	BKT PHONE	1	SECC 1.0t	54	J60110009600	PANEL REAR	1	SECC 1.0t
5	J60300002000	SW PUSH POWER TV-3	1	SDDLBI4700	55	J97200503000	CUSHION BKT 11X45X2t	3	EVA
6	J85400019000	INDICATOR STANDBY	1	SAN	56	J44001400000	TERMINAL SCREW 4P	1	SH04103373P
7	J85200049000	BUTTON POWER	1	HIPS 94HB	57	J60120502000	TRANS BOTTOM	1	SECC 1.0t
8	J85200052000	BTN STANDBY	1	HIPS 94HB	58	J60300504000	BKT PROTECTION(ONLY AVR2000)	1	SECC 1.0t
9	J85000172000	PANEL FRONT	1	HIPS 94HB	59	J44001600000	TERMINAL SCREW 6P	1	SH0611701P
10	J85500004000	FILTER DISPLAY ACRYL 0.5t	1	R2117	60	J44301000300	JACK RCA 1P B	1	JE010003PN
11	J85940009000	DIFFUSER	1	PET 713F	61	J44306000101	JACK RCA 6P WWRRR JW	2	JW-4105RSS
12			1	ELECTROFORMING	62	J44312000100	JACK RCA+S-VIDEO YB	7	C5016031DN
13	J85100022000	KNOB MAIN	1	HIPS 94HB	63	J44302001100	JACK RCA 2P OO DAERYUNG	1	JC0200098N
14	J85300020401	WINDOW DISPLAY ACRYL	1	MITHUBISHI 530	64	J2123806002X	FIBER OPTICAL MODULE	1	
15	J85940002000	DIFFUSER	1	PET 713F	65	J4099100150X	ASS'Y TUNER MODULE	1	
16	J85100009000	KNOB TONE	3	HIPS 94HB	66	J60120501100	COVER BOTTOM	1	SECC 1.0t
17					67	J97200501000	CUSHION(B)	8	EVA
18	J85200093000	BTN 7 KEY	1	HIPS 94HB	68	J60530002100	HEATSINK 118X20X60H	1	AL 6063-T5
19	J2123806001X	FIBER OPTICAL MODULE	3		69	J44301000700	JACK RCA 1P ORANGE	1	JE010003MN
20	J44301000600	JACK RCA 1P D GOLD	1	JE010003MG	70	J44302000900	JACK RCA 2P BB	1	JE021163KN
21	J60600015000	SHIELD DIGITAL	1	ET 0.5t	71	J44303000500	JACK RCA 3P BBB	1	JE031164LN
22	J85200092000	BTN 5 KEY	1	HIPS 94HB	72				
23	J85200091000	BTN 3 KEY	1	HIPS 94HB	73				
24	J85900501000	A'SSY FOOT	4	ABS+TPR	74				
25	J60000010000	CH MAIN	1	SECC 1.0t	75				
26	J44303000100	JACK RCA 3P YWR DAERYUNG	1	JK03000B1C					
27	J32214000101	VR BALANCE J/ALPS	1	RK14K12400BQ					
28	J44311000100	JACK S-VIDEO DAERYUNG	1	C40160261N					
29	J32214000201	VR TONE J/ALPS	2	RK14K12400BR					
30	J60600006000	SHIELD FENCE TONE	1	ET 0.5t					
31	J32616100001	ENCODER J/ALPS	1	EC16B24204					
32	J85940003000	REFLECTOR 3	2	HIPS 94HB					
33	J85810009000	FL GUIDE	1	HIPS 94HB					
34	J2411320014X	REMDTE SENSOR	1	RPM 6938-					
35	J85940008000	REFLECTOR 6	1	HIPS 94HB					
36	J85940001000	REFLECTOR 1	1	HIPS 94HB					
37	J5214004010X	BKT PCB HEATSINK	2	SECC 1.0t					
38	J60500015000	HEATSINK SURROUND	1	AL 6063-T5					
39									
40	J60500014000	HEATSINK MAIN	1	AL 6063-T5					
41	J60020003200	CH FRONT	1	SECC 1.0t					
42	J60200012000	FRAME GUIDE	1	SECC 1.0t					
43	J2802210101X	POWER TRANS	1						
44	J65100000100	BUSHING AC CORD	1						
45	J43730100100	CORD AC POWER	1	UL SPT II					
46	J97200502000	CUSHION SPONGE	1						
47	J2812220012X	TRANS STANDBY	1						
48	J44900000110	AC OUTLET	1	A204D0043P					
49									
50	J60300028000	BKT GROUND	2	ET 0.5t					

NO	PARTS CODE	PARTS NAME
W1	5541-001-010	WASHER SPRING NO:2 M3 MC
W2	5541-001-020	WASHER FLAT P/W 3.3X8 0X0 5 MC
W3	5541-001-030	WASHER SPRING NO:2 M4 MC
W4	5541-001-040	WASHER FLAT P/W 4.7X1.2X1 MC

NO	PARTS CODE	PARTS NAME
S1	J5636140010X	SCREW A123010002 BTTB 3X10B
S2	J5636140040X	SCREW A183008000 BTTN W3X8Y
S3	J5636140080X	SCREW A124008000 BTTB 4X8Y
S4	J5636140150X	SCREW A180400802 #2 WPT 4X8B
S5	XXXXXX	SCREW 3X6B
S6		
S7	J5636140030X	SCREW A113016000,BTTB 3X16Y
S8		
S9	J80720301080	SCREW 3X10B BLACK TEETH

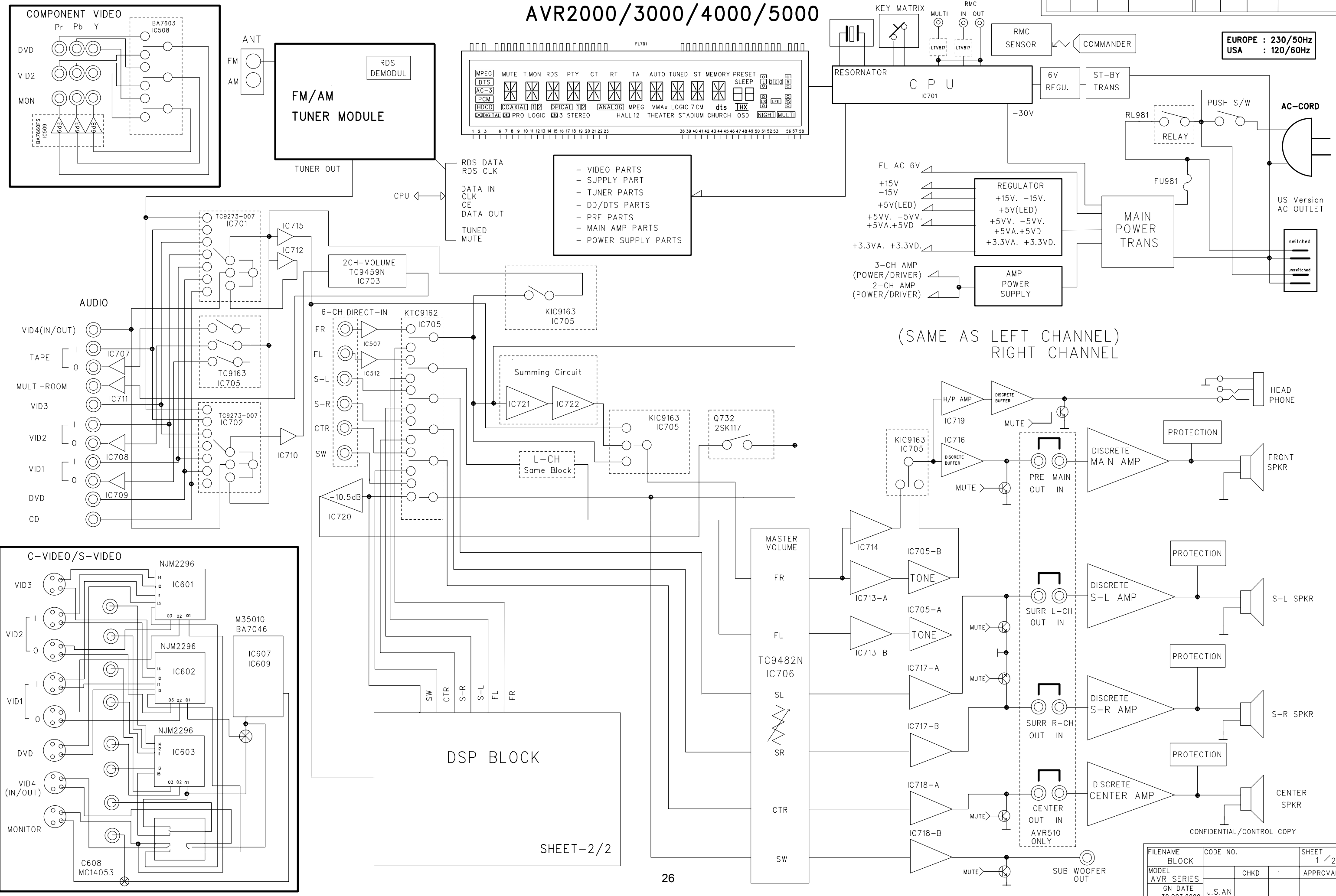
NO	PARTS CODE	PARTS NAME
SW1	J46500500501	SW TACT 2P SKQNAE 160qf

# BLOCK DIAGRAM

## MODEL: AVR110/210/310/510

## AVR2000/3000/4000/5000

NO	DATE	POS.	CONTENTS	NO	DATE	POS.	CONTENTS



SHEET-2/2

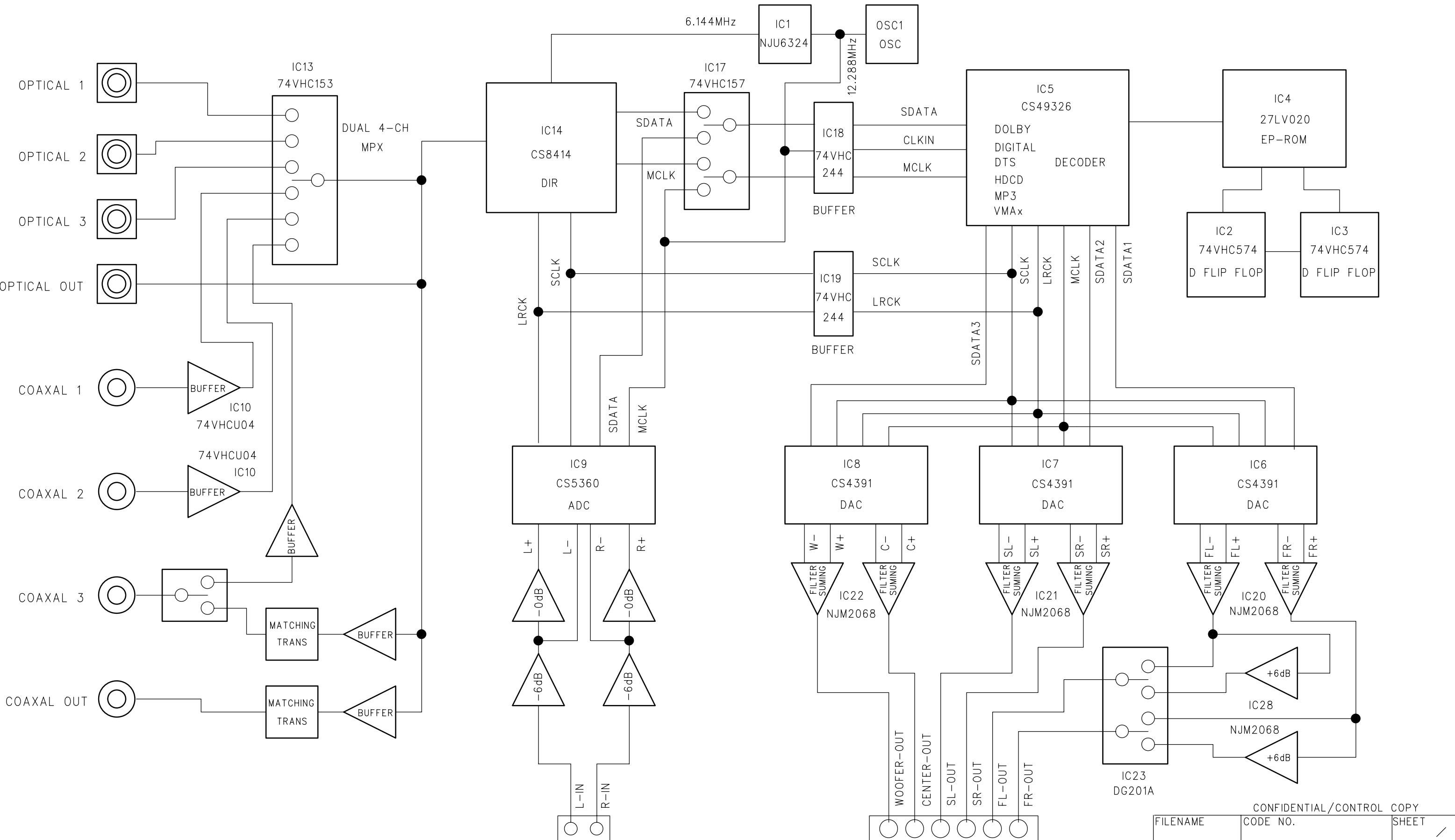
FILENAME BLOCK	CODE NO.	SHEET 1/2
MODEL AVR SERIES	CHKD	APPROVAL
GN DATE 30.OCT.2000	J.S.AN	

CONFIDENTIAL/CONTROL COPY

# BLOCK DIAGRAM

MODEL 110/210/310/510  
2000/3000/4000/5000

NO	DATE	POS.	CONTENTS	NO	DATE	POS.	CONTENTS



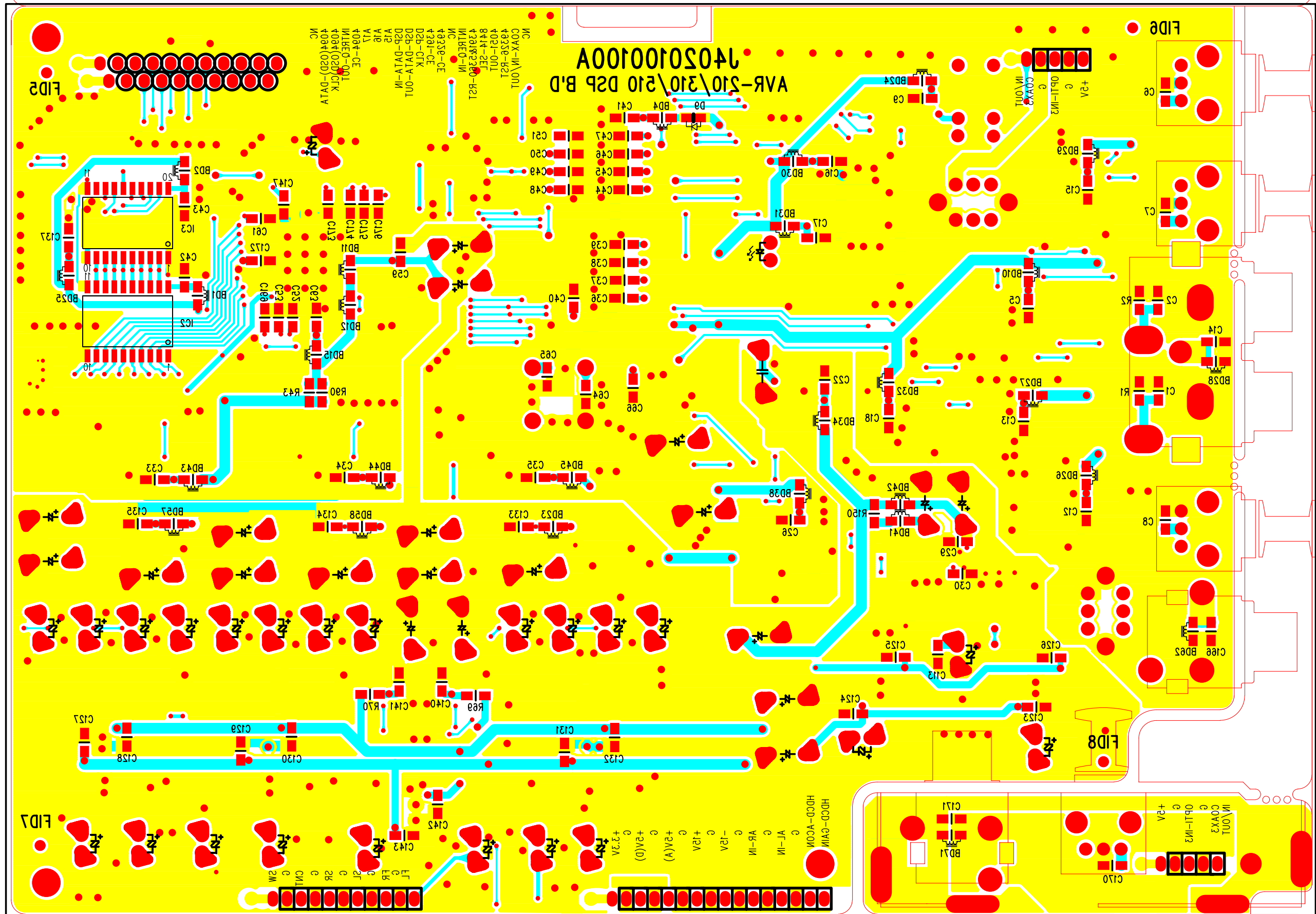
ANALOG

ANALOG

CONFIDENTIAL/CONTROL COPY

FILENAME	CODE NO.			SHEET /
MODEL	DESIGN	CHKD	CHKD	APPROVAL
DESIGN DATE				

AVR-210\310\210 DSP B'D 14050100100A



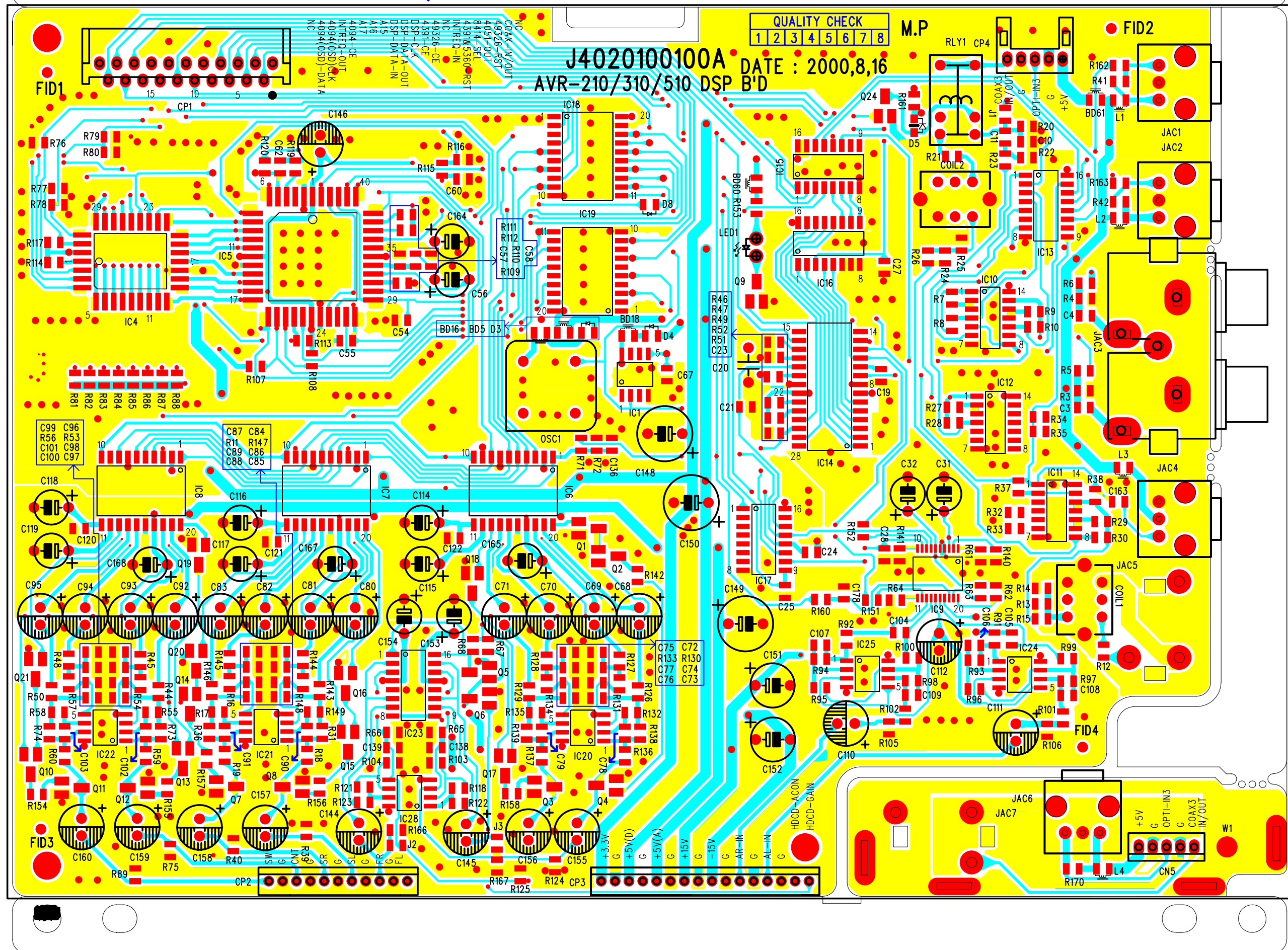




M.P DATE : 2000,8,16

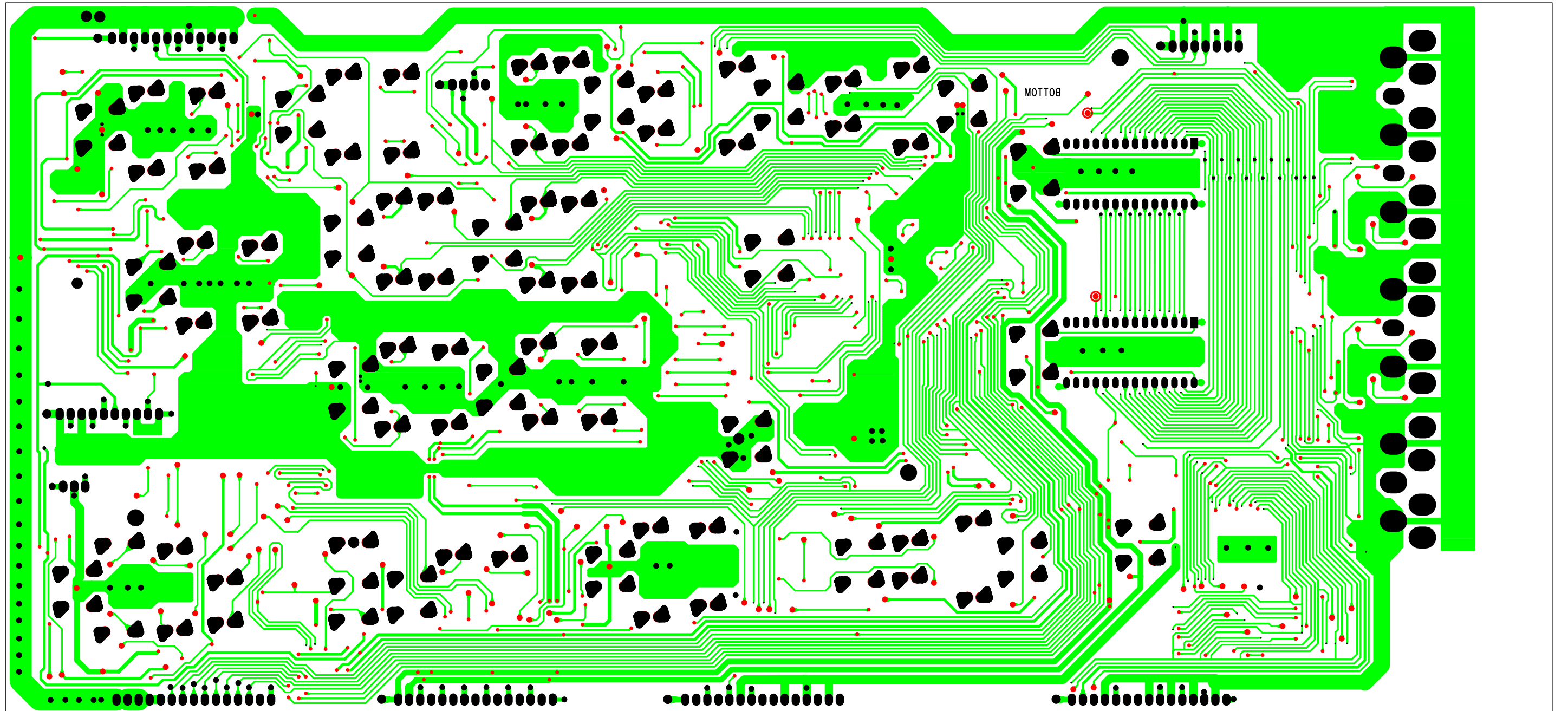


J4020100100A AVR-210/310/510 DSP B'D

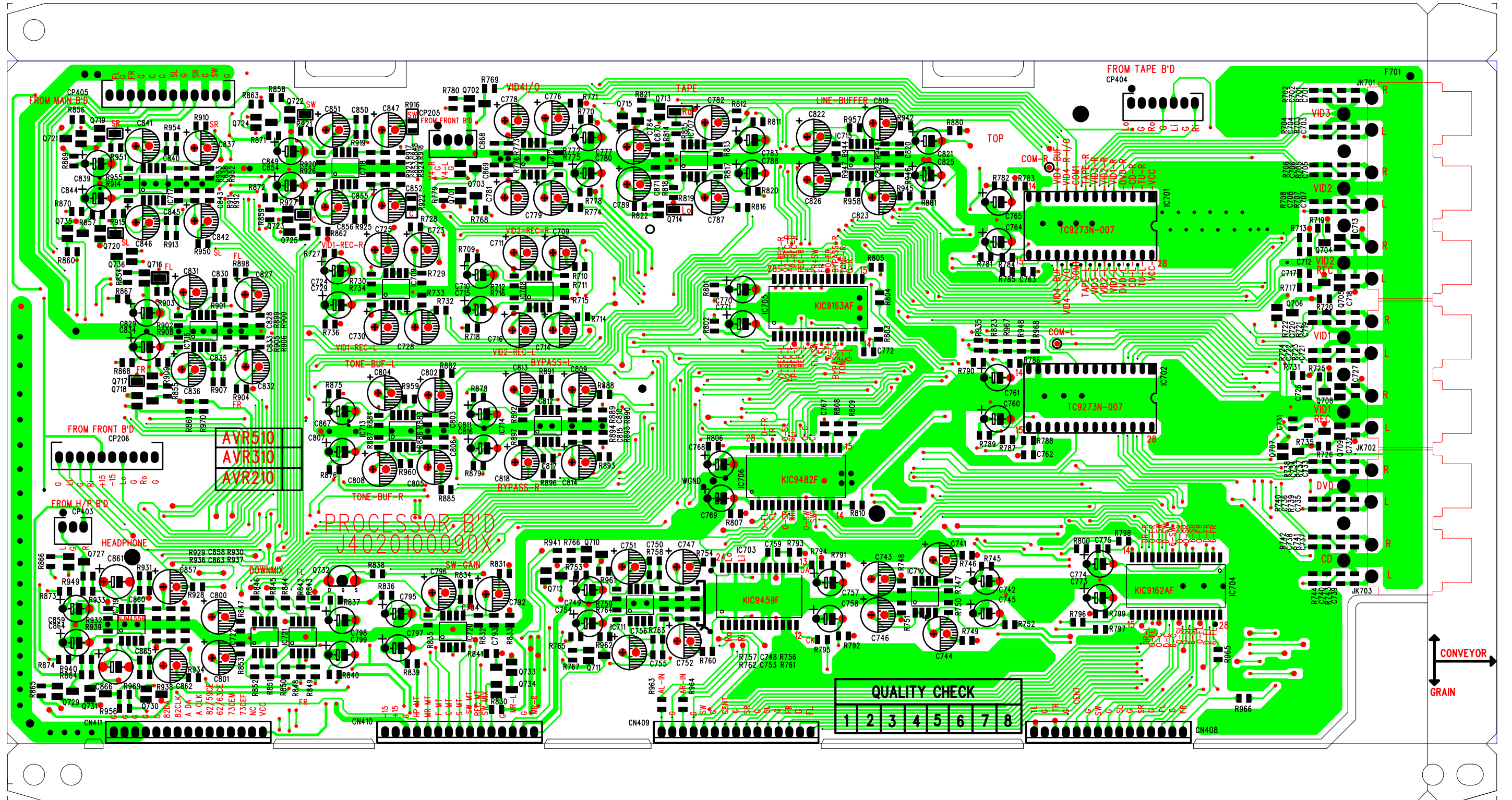


QUALITY CHECK							
1	2	3	4	5	6	7	8

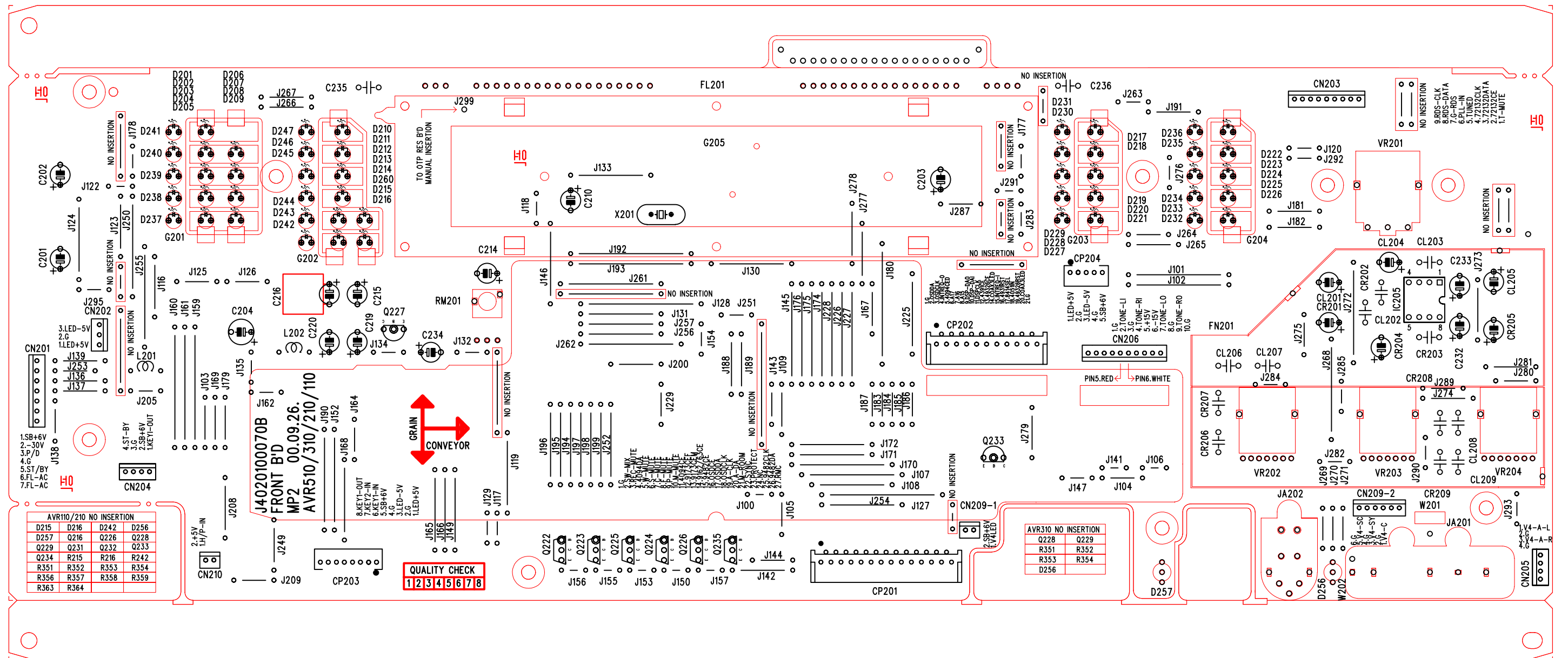
J4020100100A DATE : 2000,8,16 AVR-210/310/510 DSP B'D



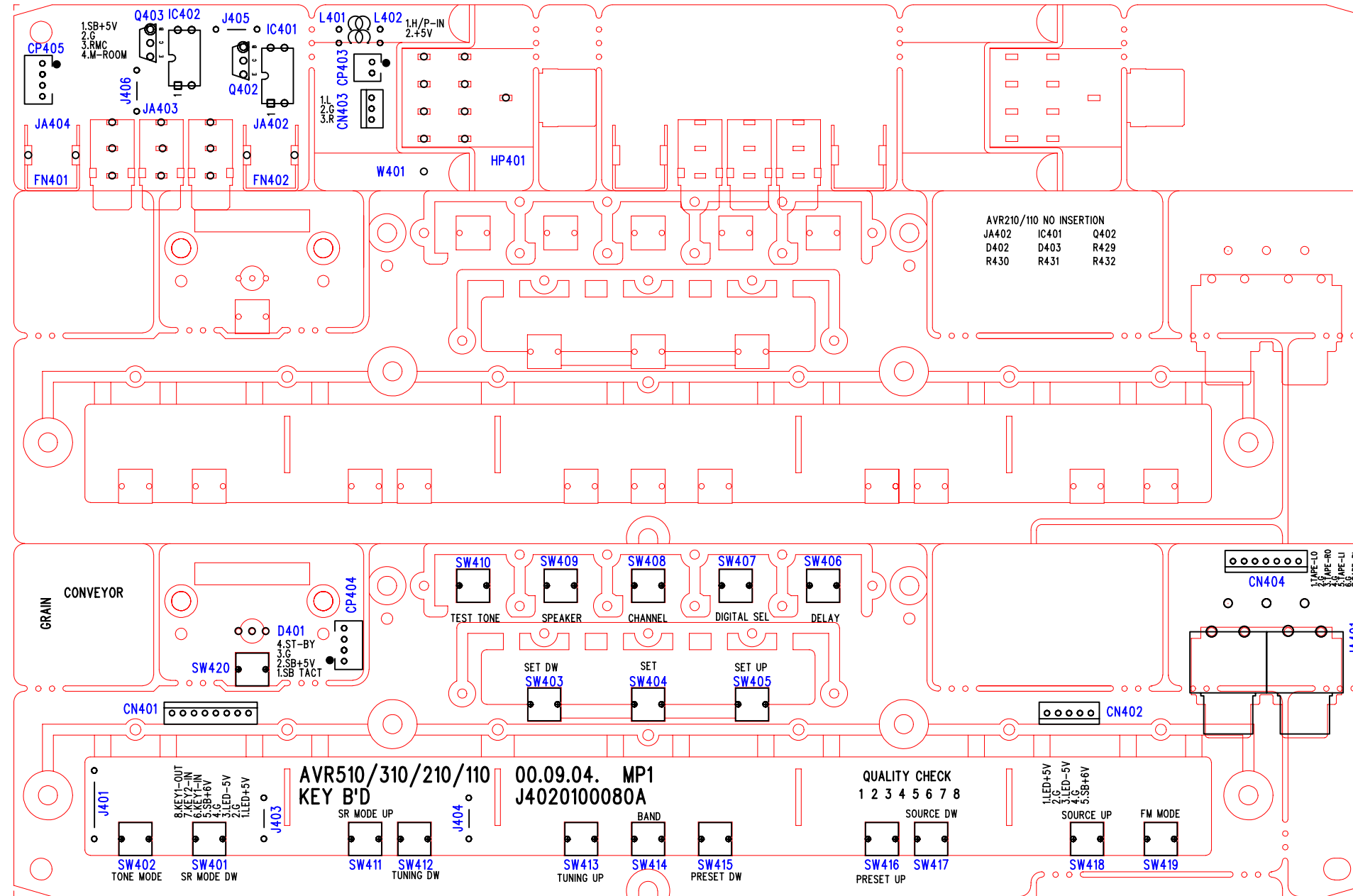


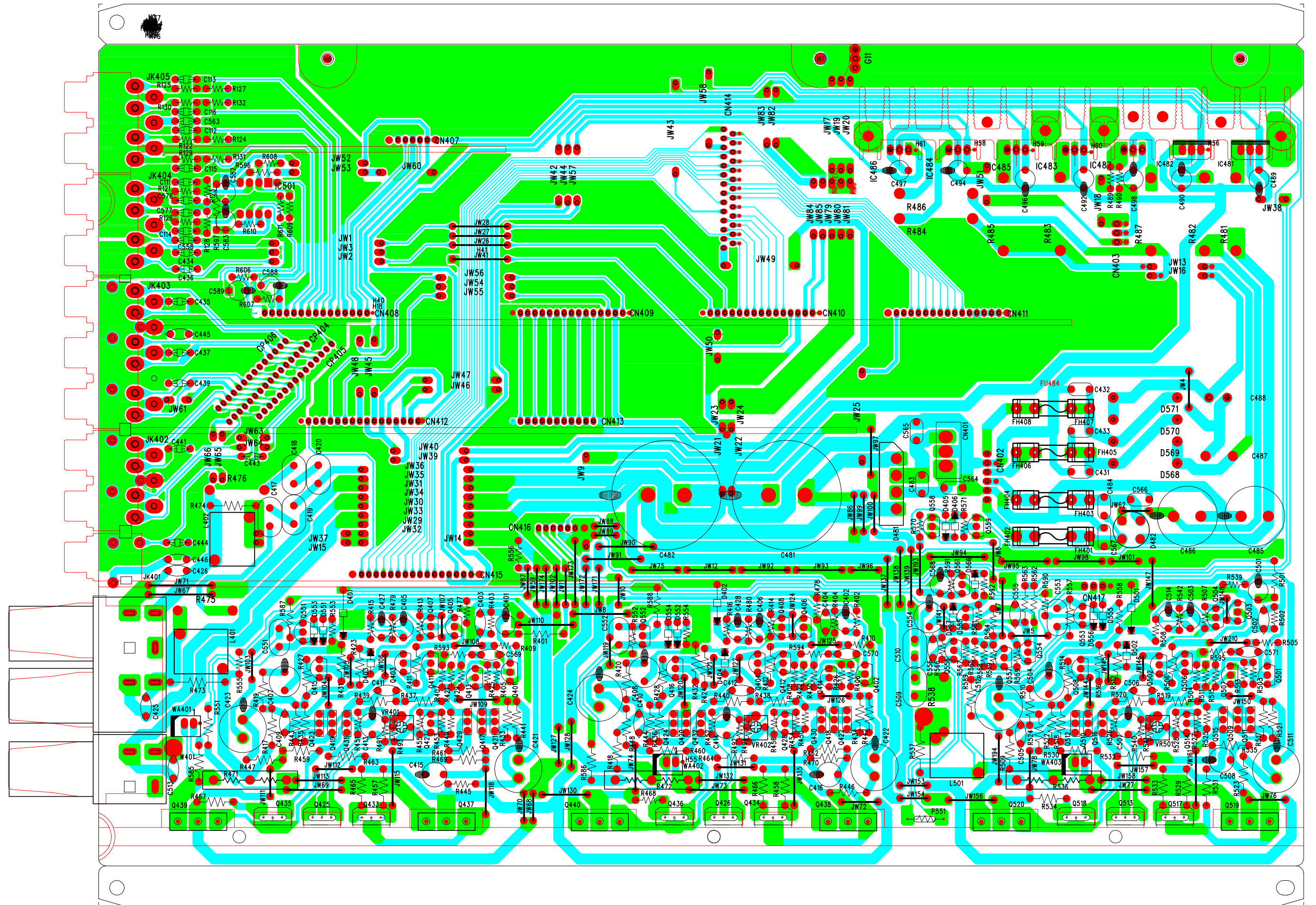


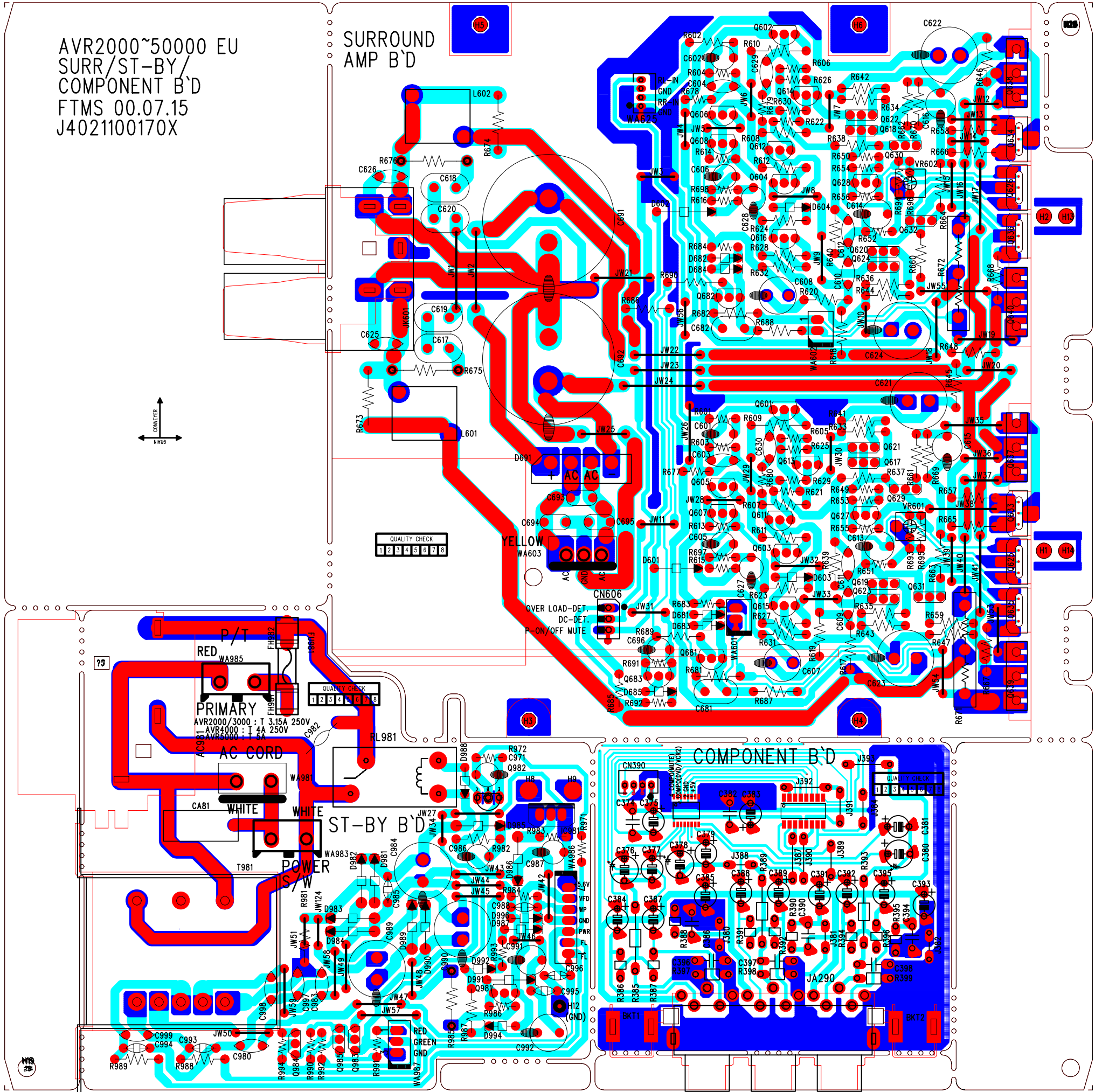












## AVR 110 Electrical Parts List

Note: All quantities on any line = 1  
unless otherwise noted.

Designator Part Number Description

### Front/IR Remote/Headphone PCB

Designator Part Number Description

#### Semiconductors

Designator	Part Number	Description
	13-0482	D-SLP 1N4148 100.0
D201	J2301213022X	LED GN LTL1CHGEC 3
D202	J2301213022X	LED GN LTL1CHGEC 3
D203	J2301213022X	LED GN LTL1CHGEC 3
D204	J2301213022X	LED GN LTL1CHGEC 3
D205	J2301213022X	LED GN LTL1CHGEC 3
D206	J2301213022X	LED GN LTL1CHGEC 3
D207	J2301213022X	LED GN LTL1CHGEC 3
D208	J2301213022X	LED GN LTL1CHGEC 3
D209	J2301213022X	LED GN LTL1CHGEC 3
D210	J2301213022X	LED GN LTL1CHGEC 3
D211	J2301213022X	LED GN LTL1CHGEC 3
D212	J2301213022X	LED GN LTL1CHGEC 3
D213	J2301213022X	LED GN LTL1CHGEC 3
D214	J2301213022X	LED GN LTL1CHGEC 3
D215	J2301213022X	LED GN LTL1CHGEC 3
D216	J2301213022X	LED GN LTL1CHGEC 3
D217	J2301213022X	LED GN LTL1CHGEC 3
D218	J2301213022X	LED GN LTL1CHGEC 3
D219	J2301213022X	LED GN LTL1CHGEC 3
D220	J2301213022X	LED GN LTL1CHGEC 3
D221	J2301213022X	LED GN LTL1CHGEC 3
D222	J2301213022X	LED GN LTL1CHGEC 3
D223	J2301213022X	LED GN LTL1CHGEC 3
D224	J2301213022X	LED GN LTL1CHGEC 3
D225	J2301213022X	LED GN LTL1CHGEC 3
D226	J2301213022X	LED GN LTL1CHGEC 3
D227	J2301213022X	LED GN LTL1CHGEC 3
D228	J2301213022X	LED GN LTL1CHGEC 3
D229	J2301213022X	LED GN LTL1CHGEC 3
D230	J2301213022X	LED GN LTL1CHGEC 3
D231	J2301213022X	LED GN LTL1CHGEC 3
D232	J2301213022X	LED GN LTL1CHGEC 3
D233	J2301213022X	LED GN LTL1CHGEC 3
D234	J2301213022X	LED GN LTL1CHGEC 3
D235	J2301213022X	LED GN LTL1CHGEC 3
D236	J2301213022X	LED GN LTL1CHGEC 3
D237	J2301213022X	LED GN LTL1CHGEC 3
D238	J2301213022X	LED GN LTL1CHGEC 3
D239	J2301213022X	LED GN LTL1CHGEC 3
D240	J2301213022X	LED GN LTL1CHGEC 3
D241	J2301213022X	LED GN LTL1CHGEC 3
D242	J2301213022X	LED GN LTL1CHGEC 3
D243	J2301213022X	LED GN LTL1CHGEC 3
D244	J2301213022X	LED GN LTL1CHGEC 3
D245	J2301213022X	LED GN LTL1CHGEC 3
D246	J2301213022X	LED GN LTL1CHGEC 3
D247	J2301213022X	LED GN LTL1CHGEC 3
D256	J2302210012X	LED RED/GREEN 3F
D257	J2302210012X	LED RED/GREEN 3F
D260	J2301213022X	LED GN LTL1CHGEC 3
IC201	J2132314071X	IC CPU CXP82860-31
IC205	J2110212000X	IC OPAMP 2068DD
Q201	J2041220202X	TR DTC114TK SMT3
Q201	J2041220701X	TR KRC111S SOT23
Q202	J2041220202X	TR DTC114TK SMT3
Q202	J2041220701X	TR KRC111S SOT23
Q203	J2041220202X	TR DTC114TK SMT3
Q203	J2041220701X	TR KRC111S SOT23
Q204	J2041220202X	TR DTC114TK SMT3
Q222	J2021220001X	TR NPN KRC107M
Q222	J2021220102X	TR NPN DTC114YSA
Q223	J2021220001X	TR NPN KRC107M
Q223	J2021220102X	TR NPN DTC114YSA
Q224	J2021220001X	TR NPN KRC107M
Q224	J2021220102X	TR NPN DTC114YSA
Q225	J2021220001X	TR NPN KRC107M
Q225	J2021220102X	TR NPN DTC114YSA
Q226	J2021220001X	TR NPN KRC107M
Q226	J2021220102X	TR NPN DTC114YSA
Q227	J2021020801X	TR MPSA06 Y TO-92
Q233	J2021000601X	TR PNP MPSA56 Y
Q235	J2021220001X	TR NPN KRC107M
Q235	J2021220102X	TR NPN DTC114YSA
Q204	J2041220701X	TR KRC111S SOT23
Q205	J2041220202X	TR DTC114TK SMT3
Q205	J2041220701X	TR KRC111S SOT23
Q206	J2041220202X	TR DTC114TK SMT3
Q206	J2041220701X	TR KRC111S SOT23
Q207	J2041220202X	TR DTC114TK SMT3
Q207	J2041220701X	TR KRC111S SOT23
Q208	J2041220202X	TR DTC114TK SMT3
Q208	J2041220701X	TR KRC111S SOT23
Q209	J2041220202X	TR DTC114TK SMT3
Q209	J2041220701X	TR KRC111S SOT23
Q210	J2041220202X	TR DTC114TK SMT3
Q210	J2041220701X	TR KRC111S SOT23
Q211	J2041220202X	TR DTC114TK SMT3
Q211	J2041220701X	TR KRC111S SOT23
Q212	J2041220202X	TR DTC114TK SMT3
Q212	J2041220701X	TR KRC111S SOT23
Q213	J2041220202X	TR DTC114TK SMT3
Q213	J2041220701X	TR KRC111S SOT23
Q214	J2041220202X	TR DTC114TK SMT3
Q214	J2041220701X	TR KRC111S SOT23
Q215	J2041220202X	TR DTC114TK SMT3
Q215	J2041220701X	TR KRC111S SOT23
Q216	J2041220202X	TR DTC114TK SMT3
Q216	J2041220701X	TR KRC111S SOT23
Q217	J2041220202X	TR DTC114TK SMT3
Q217	J2041220701X	TR KRC111S SOT23
Q218	J2041220202X	TR DTC114TK SMT3
Q218	J2041220701X	TR KRC111S SOT23
Q219	J2041220202X	TR DTC114TK SMT3
Q219	J2041220701X	TR KRC111S SOT23
Q220	J2041220202X	TR DTC114TK SMT3
Q220	J2041220701X	TR KRC111S SOT23
Q221	J2041220202X	TR DTC114TK SMT3
Q221	J2041220701X	TR KRC111S SOT23
Q228	J2041220102X	TR NPN DTC114YKA
Q228	J2041220201X	TR CHIP NPN KRC107
Q229	J2041220102X	TR NPN DTC114YKA
Q229	J2041220201X	TR CHIP NPN KRC107
Q231	J2041220102X	TR NPN DTC114YKA
Q231	J2041220201X	TR CHIP NPN KRC107
Q232	J2041220102X	TR NPN DTC114YKA
Q232	J2041220201X	TR CHIP NPN KRC107
Q234	J2041220102X	TR NPN DTC114YKA
Q234	J2041220201X	TR CHIP NPN KRC107



Designator Part Number Description

Designator Part Number Description

Q236 J2041200101X TR PNP KRA107S  
 Q236 J2041200102X TR PNP DTA114YKA  
 Q237 J2041220102X TR NPN DTC114YKA  
 Q237 J2041220201X TR CHIP NPN KRC107  
 D248 J2244010104X DIODE CHIP 1SS355  
 D249 J2244010104X DIODE CHIP 1SS355  
 D250 J2244010104X DIODE CHIP 1SS355  
 D251 J2244010104X DIODE CHIP 1SS355  
 D253 J2244010104X DIODE CHIP 1SS355  
 D254 J2244010104X DIODE CHIP 1SS355  
 D255 J2244010104X DIODE CHIP 1SS355  
 D261 J2244010104X DIODE CHIP 1SS355  
 D262 J2244010104X DIODE CHIP 1SS355  
 D263 8044051091 RMGCFMIN 0 OHM +0%  
 D264 8044051091 RMGCFMIN 0 OHM +0%  
 IC202 J2141004002X IC BU4094 SOP16  
 IC203 J2141004002X IC BU4094 SOP16  
 IC204 J2141004002X IC BU4094 SOP16

**Capacitors**

C203 2026783030 CE 47U0F +20% 16.0  
 C210 2026888030 CE 10U0F +20% 50.0  
 C216 J3433247321X CAP GOLD 0.047F 5.  
 CL201 1500213030 CE 10U0F +20% 16.0  
 CL202 3093623071 CC 100P0F +5% -5%  
 CL203 8043459071 CC 22P0F +5% -5% 5  
 CL204 1500213030 CE 10U0F +20% 16.0  
 CL205 1500213030 CE 10U0F +20% 16.0  
 CL206 J3640183232X CAP M POLY 18NF 10  
 CL207 J3640823232X CAP M POLY 82NF 10  
 CL208 J3640332232X CAP POLY 3N3F 100V  
 CL209 J3640183232X CAP M POLY 18NF 10  
 CR201 1500213030 CE 10U0F +20% 16.0  
 CR202 3093623071 CC 100P0F +5% -5%  
 CR203 8043459071 CC 22P0F +5% -5% 5  
 CR204 1500213030 CE 10U0F +20% 16.0  
 CR205 1500213030 CE 10U0F +20% 16.0  
 CR206 J3640183232X CAP M POLY 18NF 10  
 CR207 J3640823232X CAP M POLY 82NF 10  
 CR208 J3640332232X CAP POLY 3N3F 100V  
 CR209 J3640183232X CAP M POLY 18NF 10  
 C201 2026783030 CE 47U0F +20% 16.0  
 C202 2026783030 CE 47U0F +20% 16.0  
 C204 2026901030 CE 47U0F +20% 50.0  
 C214 2026783030 CE 47U0F +20% 16.0  
 C215 2026783030 CE 47U0F +20% 16.0  
 C219 2026901030 CE 47U0F +20% 50.0  
 C220 2026888030 CE 10U0F +20% 50.0  
 C232 2026783030 CE 47U0F +20% 16.0  
 C233 2026783030 CE 47U0F +20% 16.0  
 C234 J3470110871X CE SG 0.1UF 50V M  
 C235 J3600473330X CP .047U 100V K  
 C236 J3600473330X CP .047U 100V K  
 CL211 1105867091 CCCFMIN 100P0F +5%  
 CR211 1105867091 CCCFMIN 100P0F +5%  
 C205 2026729091 CCCFMIN 100N0F +80  
 C206 5088236091 CCCFMIN 33P0F +5%  
 C208 5088236091 CCCFMIN 33P0F +5%  
 C209 2026729091 CCCFMIN 100N0F +80  
 C211 1507090091 CCCFMIN 820P0F +10  
 C212 1507090091 CCCFMIN 820P0F +10  
 C213 2026729091 CCCFMIN 100N0F +80  
 C217 2026729091 CCCFMIN 100N0F +80  
 C218 2026729091 CCCFMIN 100N0F +80  
 C228 1105867091 CCCFMIN 100P0F +5%  
 C229 1105867091 CCCFMIN 100P0F +5%

C230 1105867091 CCCFMIN 100P0F +5%  
 C237 2026729091 CCCFMIN 100N0F +80  
 C238 2026729091 CCCFMIN 100N0F +80  
 C239 2026729091 CCCFMIN 100N0F +80  
 C240 2026729091 CCCFMIN 100N0F +80  
 C241 2026729091 CCCFMIN 100N0F +80  
 C242 2026729091 CCCFMIN 100N0F +80  
 C244 2026729091 CCCFMIN 100N0F +80  
 C245 2026729091 CCCFMIN 100N0F +80  
 C246 1105867091 CCCFMIN 100P0F +5%  
 C247 1105867091 CCCFMIN 100P0F +5%  
 C248 1105867091 CCCFMIN 100P0F +5%

**Resistors**

RL201 2047195091 RMGCFMIN 1K0 OHM +  
 RL202 5088663091 RMGCFMIN 100K0 OHM  
 RL203 5088667091 RMGCFMIN 1M0 OHM +  
 RL204 1106648091 RMGCFMIN 47K0 OHM  
 RL205 9057440091 RMGCFMIN 470R0 OHM  
 RL206 5088663091 RMGCFMIN 100K0 OHM  
 RL207 2047194091 RMGCFMIN 680R0 OHM  
 RL208 6044439091 RMGCFMIN 3K9 OHM +  
 RL209 6044440091 RMGCFMIN 22K0 OHM  
 RL210 8044039091 RMGCFMIN 2K2 OHM +  
 RR201 2047195091 RMGCFMIN 1K0 OHM +  
 RR202 5088663091 RMGCFMIN 100K0 OHM  
 RR203 5088667091 RMGCFMIN 1M0 OHM +  
 RR204 1106648091 RMGCFMIN 47K0 OHM  
 RR205 9057440091 RMGCFMIN 470R0 OHM  
 RR206 5088663091 RMGCFMIN 100K0 OHM  
 RR207 2047194091 RMGCFMIN 680R0 OHM  
 RR208 6044439091 RMGCFMIN 3K9 OHM +  
 RR209 6044440091 RMGCFMIN 22K0 OHM  
 RR210 8044039091 RMGCFMIN 2K2 OHM +  
 R201 8044037091 RMGCFMIN 150R0 OHM  
 R202 8044037091 RMGCFMIN 150R0 OHM  
 R203 8044037091 RMGCFMIN 150R0 OHM  
 R204 8044037091 RMGCFMIN 150R0 OHM  
 R205 8044037091 RMGCFMIN 150R0 OHM  
 R206 8044037091 RMGCFMIN 150R0 OHM  
 R207 8044037091 RMGCFMIN 150R0 OHM  
 R208 8044037091 RMGCFMIN 150R0 OHM  
 R209 8044037091 RMGCFMIN 150R0 OHM  
 R210 8044037091 RMGCFMIN 150R0 OHM  
 R211 8044037091 RMGCFMIN 150R0 OHM  
 R212 8044037091 RMGCFMIN 150R0 OHM  
 R213 8044037091 RMGCFMIN 150R0 OHM  
 R214 8044037091 RMGCFMIN 150R0 OHM  
 R215 8044037091 RMGCFMIN 150R0 OHM  
 R216 8044037091 RMGCFMIN 150R0 OHM  
 R217 8044037091 RMGCFMIN 150R0 OHM  
 R218 8044037091 RMGCFMIN 150R0 OHM  
 R219 8044037091 RMGCFMIN 150R0 OHM  
 R220 8044037091 RMGCFMIN 150R0 OHM  
 R221 8044037091 RMGCFMIN 150R0 OHM  
 R222 8044037091 RMGCFMIN 150R0 OHM  
 R223 8044037091 RMGCFMIN 150R0 OHM  
 R224 8044037091 RMGCFMIN 150R0 OHM  
 R225 8044037091 RMGCFMIN 150R0 OHM  
 R226 8044037091 RMGCFMIN 150R0 OHM  
 R227 8044037091 RMGCFMIN 150R0 OHM  
 R228 8044037091 RMGCFMIN 150R0 OHM  
 R229 8044037091 RMGCFMIN 150R0 OHM  
 R230 8044037091 RMGCFMIN 150R0 OHM  
 R231 8044037091 RMGCFMIN 150R0 OHM  
 R232 8044037091 RMGCFMIN 150R0 OHM



Designator	Part Number	Description	Designator	Part Number	Description
CP202	J4422212140X	FPC PLUG 21P 1.25M	R416	5088659091	RMGCFMIN 2K7 OHM +
CP203	J4420030840X	CNT PLUG 2.0 ST 8P	R417	1106644091	RMGCFMIN 3K3 OHM +
CP204	J4420030540X	CNT PLUG 2.0 ST 5P	R418	8044040091	RMGCFMIN 5K6 OHM +
JA201	J44303000100	JACK RCA 3P	R419	1106646091	RMGCFMIN 8K2 OHM +
JA202	J44311000100	JACK S-VIDEO 1P	R420	9057443091	RMGCFMIN 18K0 OHM
L201	J2616247920X	COIL 4.7UH K	R421	6044437091	RMGCFMIN 180R0 OHM
L202	J2616247920X	COIL 4.7UH K	R422	6044437091	RMGCFMIN 180R0 OHM
RM201	J2411220017X	REM 38HZ	R423	2047194091	RMGCFMIN 680R0 OHM
RM201	J2411320014X	REM 38KHZ	R424	2047194091	RMGCFMIN 680R0 OHM
VR201	J32616100001	ENCODER EC 16E	R427	9057440091	RMGCFMIN 470R0 OHM
W201	J4305100025X	LUG WIRE 1P 200MM	R428	9057440091	RMGCFMIN 470R0 OHM
X201	J3911030020X	RESONATOR ZTA10MTT	R429	9057440091	RMGCFMIN 470R0 OHM

## Key PCB

### Semiconductors

Q401	J2041220102X	TR NPN DTC114YKA
Q401	J2041220201X	TR CHIP NPN KRC107
D402	J2244010104X	DIODE CHIP 1SS355
D403	J2244010104X	DIODE CHIP 1SS355
D404	J2244010104X	DIODE CHIP 1SS355
D405	J2244010104X	DIODE CHIP 1SS355
D406	J2244010104X	DIODE CHIP 1SS355
Q403	J2021200501X	TR PNP KRA107M
Q402	J2021200002X	TR PNP DTA114YS
Q402	J2021200501X	TR PNP KRA107M
Q403	J2021200002X	TR PNP DTA114YS
IC401	J2123239001X	IC PC-17T1 PHOTOCO
IC402	J2123239001X	IC PC-17T1 PHOTOCO
D401	J2302210012X	LED RED/GREEN 3F
D401	J2302310012X	LED RED/GREEN 5

### Capacitors

C401	3093924091	CCCFMIN 22N0F +10%
C402	3093924091	CCCFMIN 22N0F +10%
C403	1105933091	CCCFMIN 2N2F +10%
C404	1105933091	CCCFMIN 2N2F +10%
C405	2026729091	CCCFMIN 100N0F +80
C406	2026729091	CCCFMIN 100N0F +80
C409	1105867091	CCCFMIN 100P0F +5%
C410	1105867091	CCCFMIN 100P0F +5%
C411	1105867091	CCCFMIN 100P0F +5%
C412	1105867091	CCCFMIN 100P0F +5%
C413	1105867091	CCCFMIN 100P0F +5%
C414	1105867091	CCCFMIN 100P0F +5%
C415	2026729091	CCCFMIN 100N0F +80
C416	2026729091	CCCFMIN 100N0F +80

### Resistors

R401	5088661091	RMGCFMIN 10K0 OHM
R402	2047195091	RMGCFMIN 1K0 OHM +
R403	7043423091	RMGCFMIN 1K2 OHM +
R404	4043829091	RMGCFMIN 1K5 OHM +
R405	8044039091	RMGCFMIN 2K2 OHM +
R406	5088659091	RMGCFMIN 2K7 OHM +
R407	1106644091	RMGCFMIN 3K3 OHM +
R408	8044040091	RMGCFMIN 5K6 OHM +
R409	1106646091	RMGCFMIN 8K2 OHM +
R410	9057443091	RMGCFMIN 18K0 OHM
R411	5088661091	RMGCFMIN 10K0 OHM
R412	2047195091	RMGCFMIN 1K0 OHM +
R413	7043423091	RMGCFMIN 1K2 OHM +
R414	4043829091	RMGCFMIN 1K5 OHM +
R415	8044039091	RMGCFMIN 2K2 OHM +

R416	5088659091	RMGCFMIN 2K7 OHM +
R417	1106644091	RMGCFMIN 3K3 OHM +
R418	8044040091	RMGCFMIN 5K6 OHM +
R419	1106646091	RMGCFMIN 8K2 OHM +
R420	9057443091	RMGCFMIN 18K0 OHM
R421	6044437091	RMGCFMIN 180R0 OHM
R422	6044437091	RMGCFMIN 180R0 OHM
R423	2047194091	RMGCFMIN 680R0 OHM
R424	2047194091	RMGCFMIN 680R0 OHM
R427	9057440091	RMGCFMIN 470R0 OHM
R428	9057440091	RMGCFMIN 470R0 OHM
R429	9057440091	RMGCFMIN 470R0 OHM
R430	6044439091	RMGCFMIN 3K9 OHM +
R431	1106648091	RMGCFMIN 47K0 OHM
R432	6044435091	RMGCFMIN 47R0 OHM
R433	6044435091	RMGCFMIN 47R0 OHM
R434	6044438091	RMGCFMIN 270R0 OHM
R435	5088661091	RMGCFMIN 10K0 OHM
R436	1106648091	RMGCFMIN 47K0 OHM

### Miscellaneous

SW401	J46500500501	SW TACT SKQNAE
SW402	J46500500501	SW TACT SKQNAE
SW403	J46500500501	SW TACT SKQNAE
SW404	J46500500501	SW TACT SKQNAE
SW405	J46500500501	SW TACT SKQNAE
SW406	J46500500501	SW TACT SKQNAE
SW407	J46500500501	SW TACT SKQNAE
SW408	J46500500501	SW TACT SKQNAE
SW409	J46500500501	SW TACT SKQNAE
SW410	J46500500501	SW TACT SKQNAE
SW411	J46500500501	SW TACT SKQNAE
SW412	J46500500501	SW TACT SKQNAE
SW413	J46500500501	SW TACT SKQNAE
SW414	J46500500501	SW TACT SKQNAE
SW415	J46500500501	SW TACT SKQNAE
SW416	J46500500501	SW TACT SKQNAE
SW417	J46500500501	SW TACT SKQNAE
SW418	J46500500501	SW TACT SKQNAE
SW419	J46500500501	SW TACT SKQNAE
SW420	J46500500501	SW TACT SKQNAE
CN401	J4305100054X	CNT ASSY 8P 100MM
CN402	J4305100056X	CNT ASSY 5P 100MM
CN403	J4305100062X	CNT ASSY 3P 600MM
CN404	J4305100071X	CNT ASSY 7P 100MM
CP403	J4420030240X	CON WAFER 2P 2.0
CP404	J4420030440X	CNT PLUG 4P 2.0MM
CP405	J4420030440X	CNT PLUG 4P 2.0MM
FN401	J60300028000	BKT GROUND ET 0.5T
FN402	J60300028000	BKT GROUND ET 0.5T
HP401	J44329000102	JACK MIC 9P GOLD
JA401	J44302401201	JACK RCA 4P S
JA402	J44333000001	STEREO JACK JW-350
JA403	J44333000001	STEREO JACK JW-350
JA404	J44333000001	STEREO JACK JW-350
L401	J2616247020X	COIL 47UH
L402	J2616247020X	COIL 47UH
W401	J4305100025X	LUG WIRE 1P 200MM
J407	8044051091	RMGCFMIN 0 OHM +0%
J408	8044051091	RMGCFMIN 0 OHM +0%

### Video PCB

#### Semiconductors

Q602	J2021021501X	TR KTC2874 B NPN T
------	--------------	--------------------

Designator	Part Number	Description	Designator	Part Number	Description
Q602	J2021021601X	TR KTC2874 A NPN T	C608	1105867091	CCCFMIN 100P0F +5%
Q603	J2021021501X	TR KTC2874 B NPN T	C609	1105867091	CCCFMIN 100P0F +5%
Q603	J2021021601X	TR KTC2874 A NPN T	C611	1105867091	CCCFMIN 100P0F +5%
Q604	J2021021501X	TR KTC2874 B NPN T	C612	1105867091	CCCFMIN 100P0F +5%
Q604	J2021021601X	TR KTC2874 A NPN T	C619	1105867091	CCCFMIN 100P0F +5%
Q605	J2021000102X	TR PNP 2SA933S	C620	1105867091	CCCFMIN 100P0F +5%
Q609	J2021021501X	TR KTC2874 B NPN T	C629	1105934091	CCCFMIN 10N0F +10%
Q609	J2021021601X	TR KTC2874 A NPN T	C632	1105934091	CCCFMIN 10N0F +10%
Q610	J2021060001X	TR NPN KTD1302 B	C637	1105867091	CCCFMIN 100P0F +5%
Q614	J2021220002X	TR NPN 2SC1740S	C638	1105867091	CCCFMIN 100P0F +5%
Q615	J2021021501X	TR KTC2874 B NPN T	C640	1105867091	CCCFMIN 100P0F +5%
Q615	J2021021601X	TR KTC2874 A NPN T	C641	1105867091	CCCFMIN 100P0F +5%
Q616	J2021021501X	TR KTC2874 B NPN T	C642	1105867091	CCCFMIN 100P0F +5%
Q616	J2021021601X	TR KTC2874 A NPN T	C657	2026729091	CCCFMIN 100N0F +80
Q619	J2021220002X	TR NPN 2SC1740S	C658	1105867091	CCCFMIN 100P0F +5%
Q620	J2021000102X	TR PNP 2SA933S	C659	1105867091	CCCFMIN 100P0F +5%
Q621	J2021000102X	TR PNP 2SA933S	C670	1105867091	CCCFMIN 100P0F +5%
Q622	J2021000102X	TR PNP 2SA933S	C673	1105934091	CCCFMIN 10N0F +10%
Q623	J2021000102X	TR PNP 2SA933S	C674	4043518091	CCCFMIN 47P0F +5%
IC607	J2116209002X	IC OSD M35013	C676	5088236091	CCCFMIN 33P0F +5%
IC609	J2116204001X	IC VIDEO BA7046	C681	1105867091	CCCFMIN 100P0F +5%
D601	J2244010104X	DIODE CHIP 1SS355	C686	1105934091	CCCFMIN 10N0F +10%
D602	J2244010104X	DIODE CHIP 1SS355	C688	1105933091	CCCFMIN 2N2F +10%
D603	J2244010104X	DIODE CHIP 1SS355	C690	1105932091	CCCFMIN 1N0F +10%
D604	J2244010104X	DIODE CHIP 1SS355	C696	1105867091	CCCFMIN 100P0F +5%
D605	J2244010104X	DIODE CHIP 1SS355	C697	2026729091	CCCFMIN 100N0F +80
D606	J2244010104X	DIODE CHIP 1SS355	CC601	2026888030	CE 10U0F +20% 50.0
D607	J2244010104X	DIODE CHIP 1SS355	CC603	2026888030	CE 10U0F +20% 50.0
D608	J2244010104X	DIODE CHIP 1SS355	CC606	2026888030	CE 10U0F +20% 50.0
D609	J2244010104X	DIODE CHIP 1SS355	CF601	2026888030	CE 10U0F +20% 50.0
D611	J2244010104X	DIODE CHIP 1SS355	CF602	2026888030	CE 10U0F +20% 50.0
D612	J2244010104X	DIODE CHIP 1SS355	CF604	2026888030	CE 10U0F +20% 50.0
D613	J2244010104X	DIODE CHIP 1SS355	CF605	2026888030	CE 10U0F +20% 50.0
D614	J2244010104X	DIODE CHIP 1SS355	CF611	2026888030	CE 10U0F +20% 50.0
D615	J2244010104X	DIODE CHIP 1SS355	CF612	2026888030	CE 10U0F +20% 50.0
IC601	J2116012001X	IC VIDEO NJM2296	CS607	2026888030	CE 10U0F +20% 50.0
IC602	J2116012001X	IC VIDEO NJM2296	C601	2026888030	CE 10U0F +20% 50.0
IC603	J2116012001X	IC VIDEO NJM2296	C602	2026888030	CE 10U0F +20% 50.0
IC605	J2141004002X	IC BU4094 SOP16	C603	2026888030	CE 10U0F +20% 50.0
IC606	J2141004002X	IC BU4094 SOP16	C604	2026888030	CE 10U0F +20% 50.0
IC608	J2141004003X	IC BU4053	C605	2025267030	CE 470U0F +20% 10.
IC619	J2141004002X	IC BU4094 SOP16	C605	2026888030	CE 10U0F +20% 50.0
Q601	J2041220102X	TR NPN DTC114YKA	C606	2025267030	CE 470U0F +20% 10.
Q601	J2041220201X	TR CHIP NPN KRC107	C610	2026783030	CE 47U0F +20% 16.0
Q606	J2041200101X	TR PNP KRA107S	C613	2026888030	CE 10U0F +20% 50.0
Q606	J2041200102X	TR PNP DTA114YKA	C614	2026888030	CE 10U0F +20% 50.0
Q607	J2041220102X	TR NPN DTC114YKA	C615	2025267030	CE 470U0F +20% 10.
Q607	J2041220201X	TR CHIP NPN KRC107	C616	2026888030	CE 10U0F +20% 50.0
Q608	J2041200101X	TR PNP KRA107S	C617	2026888030	CE 10U0F +20% 50.0
Q608	J2041200102X	TR PNP DTA114YKA	C618	2025267030	CE 470U0F +20% 10.
Q611	J2041220102X	TR NPN DTC114YKA	C621	2026888030	CE 10U0F +20% 50.0
Q611	J2041220201X	TR CHIP NPN KRC107	C622	2026888030	CE 10U0F +20% 50.0
Q613	J2041220102X	TR NPN DTC114YKA	C623	2026888030	CE 10U0F +20% 50.0
Q613	J2041220201X	TR CHIP NPN KRC107	C624	2026888030	CE 10U0F +20% 50.0
			C625	2025267030	CE 470U0F +20% 10.
			C625	2026888030	CE 10U0F +20% 50.0
			C626	2025267030	CE 470U0F +20% 10.
			C626	2026888030	CE 10U0F +20% 50.0
			C627	2025267030	CE 470U0F +20% 10.
			C627	2026888030	CE 10U0F +20% 50.0
			C628	2025267030	CE 470U0F +20% 10.
			C628	2026888030	CE 10U0F +20% 50.0
			C630	2026885030	CE 2U2F +20% 50.0V
			C631	2026888030	CE 10U0F +20% 50.0
			C633	2026894030	CE 100U0F +20% 10.
			C639	2026884030	CE 1U0F +20% 50.0V
			C647	2025267030	CE 470U0F +20% 10.

**Capacitors**

CC602	2026729091	CCCFMIN 100N0F +80
CC604	2026729091	CCCFMIN 100N0F +80
CC607	2026729091	CCCFMIN 100N0F +80
CC609	2026729091	CCCFMIN 100N0F +80
CF603	2026729091	CCCFMIN 100N0F +80
CF606	2026729091	CCCFMIN 100N0F +80
CF608	1105944091	CCCFMIN 10P0F +0P2
CF610	1105944091	CCCFMIN 10P0F +0P2
CF613	2026729091	CCCFMIN 100N0F +80
CF615	1105944091	CCCFMIN 10P0F +0P2

Designator	Part Number	Description	Designator	Part Number	Description
C650	2025267030	CE 470U0F +20% 10.	RF617	8044051091	RMGCFMIN 0 OHM +0%
C651	2025267030	CE 470U0F +20% 10.	RS602	1106639091	RMGCFMIN 75R0 OHM
C652	2025267030	CE 470U0F +20% 10.	RS602	9057437091	RMGCFMIN 82R0 OHM
C653	2025267030	CE 470U0F +20% 10.	RS603	1106639091	RMGCFMIN 75R0 OHM
C660	2026783030	CE 47U0F +20% 16.0	RS603	9057437091	RMGCFMIN 82R0 OHM
C661	2026783030	CE 47U0F +20% 16.0	RS605	1106639091	RMGCFMIN 75R0 OHM
C662	2026908030	CE 220U0F +20% 10.	RS605	9057437091	RMGCFMIN 82R0 OHM
C663	2026908030	CE 220U0F +20% 10.	RS606	1106639091	RMGCFMIN 75R0 OHM
C664	2025267030	CE 470U0F +20% 10.	RS606	9057437091	RMGCFMIN 82R0 OHM
C665	2025267030	CE 470U0F +20% 10.	RS608	1106639091	RMGCFMIN 75R0 OHM
C666	2026783030	CE 47U0F +20% 16.0	RS608	9057437091	RMGCFMIN 82R0 OHM
C671	2026896030	CE 330N0F +20% 50.	RS609	1106639091	RMGCFMIN 75R0 OHM
C672	2026894030	CE 100U0F +20% 10.	RS609	9057437091	RMGCFMIN 82R0 OHM
C675	2026884030	CE 1U0F +20% 50.0V	RS611	1106639091	RMGCFMIN 75R0 OHM
C678	J3513180270X	CC/DISC 18P 50V J	RS611	9057437091	RMGCFMIN 82R0 OHM
C679	2026888030	CE 10U0F +20% 50.0	RS612	1106639091	RMGCFMIN 75R0 OHM
C682	2026894030	CE 100U0F +20% 10.	RS612	9057437091	RMGCFMIN 82R0 OHM
C683	J3513300270X	CC/DISC 30PF 50V J	RS620	1106639091	RMGCFMIN 75R0 OHM
C683	8043459071	CC 22P0F +5% -5% 5	RS620	9057437091	RMGCFMIN 82R0 OHM
C684	J3513300270X	CC/DISC 30PF 50V J	RS621	1106639091	RMGCFMIN 75R0 OHM
C684	8043459071	CC 22P0F +5% -5% 5	RS621	9057437091	RMGCFMIN 82R0 OHM
C685	2026894030	CE 100U0F +20% 10.	RS622	1106639091	RMGCFMIN 75R0 OHM
C687	2026894030	CE 100U0F +20% 10.	RS622	9057437091	RMGCFMIN 82R0 OHM
C691	2026884030	CE 1U0F +20% 50.0V	RS623	1106639091	RMGCFMIN 75R0 OHM
C698	2026783030	CE 47U0F +20% 16.0	RS623	9057437091	RMGCFMIN 82R0 OHM
C699	2026783030	CE 47U0F +20% 16.0	R608	3094427091	RMGCFMIN 68R0 OHM
<i>Resistors</i>			R609	8044041091	RMGCFMIN 7K5 OHM +
RC601	3094425091	RMGCFMIN 10R0 OHM	R610	1106644091	RMGCFMIN 3K3 OHM +
RC602	1106639091	RMGCFMIN 75R0 OHM	R612	8044043091	RMGCFMIN 43K0 OHM
RC602	9057437091	RMGCFMIN 82R0 OHM	R613	1106644091	RMGCFMIN 3K3 OHM +
RC603	3094425091	RMGCFMIN 10R0 OHM	R614	7043420091	RMGCFMIN 100R0 OHM
RC604	1106639091	RMGCFMIN 75R0 OHM	R615	2047199091	RMGCFMIN 12K0 OHM
RC604	9057437091	RMGCFMIN 82R0 OHM	R617	2047195091	RMGCFMIN 1K0 OHM +
RC606	1106639091	RMGCFMIN 75R0 OHM	R618	2047195091	RMGCFMIN 1K0 OHM +
RC606	9057437091	RMGCFMIN 82R0 OHM	R619	2047195091	RMGCFMIN 1K0 OHM +
RC607	1106639091	RMGCFMIN 75R0 OHM	R621	5088661091	RMGCFMIN 10K0 OHM
RC607	9057437091	RMGCFMIN 82R0 OHM	R622	5088661091	RMGCFMIN 10K0 OHM
RC608	3094425091	RMGCFMIN 10R0 OHM	R623	5088661091	RMGCFMIN 10K0 OHM
RC609	3094425091	RMGCFMIN 10R0 OHM	R624	5088661091	RMGCFMIN 10K0 OHM
RC610	1106639091	RMGCFMIN 75R0 OHM	R625	5088661091	RMGCFMIN 10K0 OHM
RC610	9057437091	RMGCFMIN 82R0 OHM	R626	5088661091	RMGCFMIN 10K0 OHM
RC612	1106639091	RMGCFMIN 75R0 OHM	R627	5088661091	RMGCFMIN 10K0 OHM
RC612	9057437091	RMGCFMIN 82R0 OHM	R628	5088661091	RMGCFMIN 10K0 OHM
RC614	1106639091	RMGCFMIN 75R0 OHM	R629	5088661091	RMGCFMIN 10K0 OHM
RC614	3094427091	RMGCFMIN 68R0 OHM	R632	1106639091	RMGCFMIN 75R0 OHM
RF601	8044037091	RMGCFMIN 150R0 OHM	R632	9057437091	RMGCFMIN 82R0 OHM
RF601	9057437091	RMGCFMIN 82R0 OHM	R633	1106639091	RMGCFMIN 75R0 OHM
RF602	3094425091	RMGCFMIN 10R0 OHM	R633	3094427091	RMGCFMIN 68R0 OHM
RF603	8044037091	RMGCFMIN 150R0 OHM	R634	5088663091	RMGCFMIN 100K0 OHM
RF603	9057437091	RMGCFMIN 82R0 OHM	R635	2047195091	RMGCFMIN 1K0 OHM +
RF604	3094425091	RMGCFMIN 10R0 OHM	R636	2047195091	RMGCFMIN 1K0 OHM +
RF606	5088661091	RMGCFMIN 10K0 OHM	R637	2047195091	RMGCFMIN 1K0 OHM +
RF608	5088661091	RMGCFMIN 10K0 OHM	R638	8044042091	RMGCFMIN 33K0 OHM
RF610	5088661091	RMGCFMIN 10K0 OHM	R639	3094427091	RMGCFMIN 68R0 OHM
RF611	8044037091	RMGCFMIN 150R0 OHM	R641	5088663091	RMGCFMIN 100K0 OHM
RF611	9057437091	RMGCFMIN 82R0 OHM	R642	2047195091	RMGCFMIN 1K0 OHM +
RF612	3094425091	RMGCFMIN 10R0 OHM	R643	1106648091	RMGCFMIN 47K0 OHM
RF615	1106639091	RMGCFMIN 75R0 OHM	R644	2047195091	RMGCFMIN 1K0 OHM +
RF615	3094426091	RMGCFMIN 22R0 OHM	R650	7043425091	RMGCFMIN 15K0 OHM
RF615	8044051091	RMGCFMIN 0 OHM +0%	R651	2047195091	RMGCFMIN 1K0 OHM +
RF616	1106639091	RMGCFMIN 75R0 OHM	R652	1106644091	RMGCFMIN 3K3 OHM +
RF616	3094426091	RMGCFMIN 22R0 OHM	R653	3094427091	RMGCFMIN 68R0 OHM
RF616	8044051091	RMGCFMIN 0 OHM +0%	R661	8044051091	RMGCFMIN 0 OHM +0%
RF617	1106639091	RMGCFMIN 75R0 OHM	R662	8044051091	RMGCFMIN 0 OHM +0%
RF617	3094426091	RMGCFMIN 22R0 OHM	R665	5088661091	RMGCFMIN 10K0 OHM
			R666	8044043091	RMGCFMIN 43K0 OHM
			R670	8044051091	RMGCFMIN 0 OHM +0%

Designator	Part Number	Description	Designator	Part Number	Description
R674	2047195091	RMGCFMIN 1K0 OHM +	CP601	J4423331600X	CNT PLUG BD'BD 2.0
R677	2047195091	RMGCFMIN 1K0 OHM +	CP602	J4420030840X	CNT PLUG 2.0 ST 8P
R678	2047195091	RMGCFMIN 1K0 OHM +	G001	J4305100030X	CNT ASSY 1P 100MM
R679	2047195091	RMGCFMIN 1K0 OHM +	JA601	J44312000100	JACK RCA+S GNDCAP
R680	4043830091	RMGCFMIN 6K8 OHM +	JA602	J44312000100	JACK RCA+S GNDCAP
R681	8044039091	RMGCFMIN 2K2 OHM +	JA603	J44312000100	JACK RCA+S GNDCAP
R682	5088661091	RMGCFMIN 10K0 OHM	JA604	J44312000100	JACK RCA+S GNDCAP
R683	1106646091	RMGCFMIN 8K2 OHM +	JA605	J44312000100	JACK RCA+S GNDCAP
R684	1106650091	RMGCFMIN 68K0 OHM	JA606	J44312000100	JACK RCA+S GNDCAP
R685	7043420091	RMGCFMIN 100R0 OHM	JA607	J44312000100	JACK RCA+S GNDCAP
R687	6044442091	RMGCFMIN 150K0 OHM	J034	J2631200012X	BEAD AXIAL 6MM
R688	5088667091	RMGCFMIN 1M0 OHM +	J050	J2631200012X	BEAD AXIAL 6MM
R689	6044437091	RMGCFMIN 180R0 OHM	J051	J2631200012X	BEAD AXIAL 6MM
R690	3094427091	RMGCFMIN 68R0 OHM	J052	J2631200012X	BEAD AXIAL 6MM
R691	3094425091	RMGCFMIN 10R0 OHM	X601	J3913010065X	CRYS 17.734475MHZ
R692	3094425091	RMGCFMIN 10R0 OHM	X601	J3913010075X	CRYS 14.31818MHZ
R693	9057440091	RMGCFMIN 470R0 OHM	TBD	J2616222020X	COIL LAL02 22UH K
R694	5088667091	RMGCFMIN 1M0 OHM +	TBD1	J2616247020X	COIL 47UH
R696	4043835091	RMGCFMIN 470K0 OHM	L601	J2616222020X	COIL LAL02 22UH K
R697	4043835091	RMGCFMIN 470K0 OHM	L602	J2616222020X	COIL LAL02 22UH K
R698	5088661091	RMGCFMIN 10K0 OHM	L603	J2616222020X	COIL LAL02 22UH K
R699	2047199091	RMGCFMIN 12K0 OHM			
R617	1105964016	RCF 1K0 OHM +5% 25			
R619	1105964016	RCF 1K0 OHM +5% 25			
R640	2046946016	RCF 2K2 OHM +5% 25			
R674	1105964016	RCF 1K0 OHM +5% 25			
R686	5088303016	RCF 150K0 OHM +5%			
R695	6044155016	RCF 330R0 OHM +5%			
J025	8044051091	RMGCFMIN 0 OHM +0%			
J031	8044051091	RMGCFMIN 0 OHM +0%			
J032	8044051091	RMGCFMIN 0 OHM +0%			
J033	8044051091	RMGCFMIN 0 OHM +0%			
J036	8044051091	RMGCFMIN 0 OHM +0%			
J039	8044051091	RMGCFMIN 0 OHM +0%			
J040	8044051091	RMGCFMIN 0 OHM +0%			
J041	8044051091	RMGCFMIN 0 OHM +0%			
J045	8044051091	RMGCFMIN 0 OHM +0%			
J048	8044051091	RMGCFMIN 0 OHM +0%			
J052	8044051091	RMGCFMIN 0 OHM +0%			
J058	8044051091	RMGCFMIN 0 OHM +0%			
J063	8044051091	RMGCFMIN 0 OHM +0%			
J065	8044051091	RMGCFMIN 0 OHM +0%			
J067	8044051091	RMGCFMIN 0 OHM +0%			
J072	8044051091	RMGCFMIN 0 OHM +0%			
J073	8044051091	RMGCFMIN 0 OHM +0%			
J074	8044051091	RMGCFMIN 0 OHM +0%			
J076	8044051091	RMGCFMIN 0 OHM +0%			
J077	8044051091	RMGCFMIN 0 OHM +0%			
J079	8044051091	RMGCFMIN 0 OHM +0%			
J081	8044051091	RMGCFMIN 0 OHM +0%			
J083	8044051091	RMGCFMIN 0 OHM +0%			
J086	8044051091	RMGCFMIN 0 OHM +0%			
J089	8044051091	RMGCFMIN 0 OHM +0%			
J090	8044051091	RMGCFMIN 0 OHM +0%			
J091	8044051091	RMGCFMIN 0 OHM +0%			
J099	8044051091	RMGCFMIN 0 OHM +0%			
J101	8044051091	RMGCFMIN 0 OHM +0%			
J116	8044051091	RMGCFMIN 0 OHM +0%			
J121	8044051091	RMGCFMIN 0 OHM +0%			

### Processor (Input) PCB

#### Semiconductors

Q732	J2021120003X	FET RA/TAP 2SK117Y
Q704	J2021060001X	TR NPN KTD1302 B
Q705	J2021060001X	TR NPN KTD1302 B
Q706	J2021200102X	TR PNP DTA114TS SP
Q707	J2021200102X	TR PNP DTA114TS SP
Q708	J2021060001X	TR NPN KTD1302 B
Q709	J2021060001X	TR NPN KTD1302 B
Q713	J2021060001X	TR NPN KTD1302 B
Q714	J2021060001X	TR NPN KTD1302 B
Q715	J2021200102X	TR PNP DTA114TS SP
Q716	J2021060001X	TR NPN KTD1302 B
Q717	J2021060001X	TR NPN KTD1302 B
Q718	J2021200102X	TR PNP DTA114TS SP
Q719	J2021060001X	TR NPN KTD1302 B
Q720	J2021060001X	TR NPN KTD1302 B
Q721	J2021200102X	TR PNP DTA114TS SP
Q722	J2021060001X	TR NPN KTD1302 B
Q723	J2021060001X	TR NPN KTD1302 B
Q724	J2021200102X	TR PNP DTA114TS SP
Q725	J2021200102X	TR PNP DTA114TS SP
Q727	J2021060001X	TR NPN KTD1302 B
Q729	J2021060001X	TR NPN KTD1302 B
Q730	J2021200102X	TR PNP DTA114TS SP
Q731	J2021220402X	TR NPN DTC114TS SP
Q732	J2021120003X	FET RA/TAP 2SK117Y
Q733	J2021200102X	TR PNP DTA114TS SP
Q734	J2021220402X	TR NPN DTC114TS SP
IC701	J2115206007X	IC TC9273N-007
IC702	J2115206007X	IC TC9273N-007
IC703	J2115006001X	IC VOL TC9459F SOP
IC704	J2121005001X	IC SW KIC9162AF SO
IC705	J2121005002X	IC SW KIC9163AF SO
IC706	J2115006002X	IC VOL TC9482F SOP
IC707	J2110012004X	IC OPAMP NJM2068
IC708	J2110012004X	IC OPAMP NJM2068
IC709	J2110012004X	IC OPAMP NJM2068
IC710	J2110012004X	IC OPAMP NJM2068
IC711	J2110012004X	IC OPAMP NJM2068
IC712	J2110012004X	IC OPAMP NJM2068
IC713	J2110012004X	IC OPAMP NJM2068
IC714	J2110012004X	IC OPAMP NJM2068

#### Miscellaneous

B601	J2631200022X	BEAD AX 80.5 OHM
B602	J2631200022X	BEAD AX 80.5 OHM
B603	J2631200022X	BEAD AX 80.5 OHM
CN602	J4305100065X	CNT ASSY 4P 380MM
CN603	J4305100064X	CNT ASSY 4P 250MM

Designator	Part Number	Description	Designator	Part Number	Description
IC715	J2110012004X	IC OPAMP NJM2068	C728	J3470910030X	CE RA/TAP 10UF 16V
IC716	J2110012004X	IC OPAMP NJM2068	C729	2026783030	CE 47U0F +20% 16.0
IC717	J2110012004X	IC OPAMP NJM2068	C730	J3470910030X	CE RA/TAP 10UF 16V
IC718	J2110012004X	IC OPAMP NJM2068	C764	2026783030	CE 47U0F +20% 16.0
IC719	J2110012005X	IC AMP NJM4556AM D	C765	2026783030	CE 47U0F +20% 16.0
IC720	J2110012004X	IC OPAMP NJM2068	C768	2026783030	CE 47U0F +20% 16.0
IC721	J2110012004X	IC OPAMP NJM2068	C769	2026783030	CE 47U0F +20% 16.0
IC722	J2110012004X	IC OPAMP NJM2068	C770	2026783030	CE 47U0F +20% 16.0
Q701	J2021220801X	TR NPN KTD1304	C771	2026783030	CE 47U0F +20% 16.0
Q702	J2021220801X	TR NPN KTD1304	C773	2026783030	CE 47U0F +20% 16.0
Q703	J2041200101X	TR PNP KRA107S	C774	2026783030	CE 47U0F +20% 16.0
Q703	J2041200102X	TR PNP DTA114YKA	C782	J3470910030X	CE RA/TAP 10UF 16V
Q704	J2021220801X	TR NPN KTD1304	C783	2026783030	CE 47U0F +20% 16.0
Q705	J2021220801X	TR NPN KTD1304	C784	J3470910030X	CE RA/TAP 10UF 16V
Q706	J2041200101X	TR PNP KRA107S	C787	J3470910030X	CE RA/TAP 10UF 16V
Q706	J2041200102X	TR PNP DTA114YKA	C788	2026783030	CE 47U0F +20% 16.0
Q707	J2041200101X	TR PNP KRA107S	C789	J3470910030X	CE RA/TAP 10UF 16V
Q707	J2041200102X	TR PNP DTA114YKA	C792	J3470910030X	CE RA/TAP 10UF 16V
Q708	J2021220801X	TR NPN KTD1304	C795	2026783030	CE 47U0F +20% 16.0
Q709	J2021220801X	TR NPN KTD1304	C796	J3470910030X	CE RA/TAP 10UF 16V
Q710	J2021220801X	TR NPN KTD1304	C797	2026783030	CE 47U0F +20% 16.0
Q711	J2021220801X	TR NPN KTD1304	C798	2026783030	CE 47U0F +20% 16.0
Q712	J2041200101X	TR PNP KRA107S	C799	2026783030	CE 47U0F +20% 16.0
Q712	J2041200102X	TR PNP DTA114YKA	C800	J3470910030X	CE RA/TAP 10UF 16V
Q713	J2021220801X	TR NPN KTD1304	C801	J3470910030X	CE RA/TAP 10UF 16V
Q714	J2021220801X	TR NPN KTD1304	C802	J3470910030X	CE RA/TAP 10UF 16V
Q715	J2041200101X	TR PNP KRA107S	C804	J3470910030X	CE RA/TAP 10UF 16V
Q715	J2041200102X	TR PNP DTA114YKA	C805	J3470910030X	CE RA/TAP 10UF 16V
Q716	J2021220801X	TR NPN KTD1304	C807	2026783030	CE 47U0F +20% 16.0
Q717	J2021220801X	TR NPN KTD1304	C808	J3470910030X	CE RA/TAP 10UF 16V
Q718	J2041200101X	TR PNP KRA107S	C809	J3470910030X	CE RA/TAP 10UF 16V
Q718	J2041200102X	TR PNP DTA114YKA	C811	2026783030	CE 47U0F +20% 16.0
Q719	J2021220801X	TR NPN KTD1304	C813	J3470910030X	CE RA/TAP 10UF 16V
Q720	J2021220801X	TR NPN KTD1304	C814	J3470910030X	CE RA/TAP 10UF 16V
Q721	J2041200101X	TR PNP KRA107S	C816	2026783030	CE 47U0F +20% 16.0
Q721	J2041200102X	TR PNP DTA114YKA	C818	J3470910030X	CE RA/TAP 10UF 16V
Q722	J2021220801X	TR NPN KTD1304	C819	J3470910030X	CE RA/TAP 10UF 16V
Q723	J2021220801X	TR NPN KTD1304	C821	2026783030	CE 47U0F +20% 16.0
Q724	J2041200101X	TR PNP KRA107S	C822	J3470910030X	CE RA/TAP 10UF 16V
Q724	J2041200102X	TR PNP DTA114YKA	C823	J3470910030X	CE RA/TAP 10UF 16V
Q725	J2041200101X	TR PNP KRA107S	C825	2026783030	CE 47U0F +20% 16.0
Q725	J2041200102X	TR PNP DTA114YKA	C826	J3470910030X	CE RA/TAP 10UF 16V
Q727	J2021220801X	TR NPN KTD1304	C827	J3470910030X	CE RA/TAP 10UF 16V
Q729	J2021220801X	TR NPN KTD1304	C829	2026783030	CE 47U0F +20% 16.0
Q730	J2041200101X	TR PNP KRA107S	C831	J3470910030X	CE RA/TAP 10UF 16V
Q730	J2041200102X	TR PNP DTA114YKA	C832	J3470910030X	CE RA/TAP 10UF 16V
Q731	J2041220102X	TR NPN DTC114YKA	C834	2026783030	CE 47U0F +20% 16.0
Q731	J2041220201X	TR CHIP NPN KRC107	C836	J3470910030X	CE RA/TAP 10UF 16V
Q733	J2041200101X	TR PNP KRA107S	C837	J3470910030X	CE RA/TAP 10UF 16V
Q733	J2041200102X	TR PNP DTA114YKA	C839	2026783030	CE 47U0F +20% 16.0
Q734	J2041220102X	TR NPN DTC114YKA	C841	J3470910030X	CE RA/TAP 10UF 16V
Q734	J2041220201X	TR PNP KRA107S	C842	J3470910030X	CE RA/TAP 10UF 16V
Q735	J2041200102X	TR PNP DTA114YKA	C844	2026783030	CE 47U0F +20% 16.0
Q736	J2041200101X	TR PNP KRA107S	C846	J3470910030X	CE RA/TAP 10UF 16V
Q736	J2041200102X	TR PNP DTA114YKA	C847	J3470910030X	CE RA/TAP 10UF 16V

**Capacitors**

C709	J3470910030X	CE RA/TAP 10UF 16V	C849	2026783030	CE 47U0F +20% 16.0
C710	2026783030	CE 47U0F +20% 16.0	C851	J3470910030X	CE RA/TAP 10UF 16V
C711	J3470910030X	CE RA/TAP 10UF 16V	C852	J3470910030X	CE RA/TAP 10UF 16V
C714	J3470910030X	CE RA/TAP 10UF 16V	C854	2026783030	CE 47U0F +20% 16.0
C715	2026783030	CE 47U0F +20% 16.0	C856	J3470910030X	CE RA/TAP 10UF 16V
C716	J3470910030X	CE RA/TAP 10UF 16V	C857	J3470910030X	CE RA/TAP 10UF 16V
C723	J3470910030X	CE RA/TAP 10UF 16V	C859	2026783030	CE 47U0F +20% 16.0
C724	2026783030	CE 47U0F +20% 16.0	C861	J3470133111X	CE 330U 6V3 M 6.3*
C725	J3470910030X	CE RA/TAP 10UF 16V	C862	J3470910030X	CE RA/TAP 10UF 16V
			C864	2026783030	CE 47U0F +20% 16.0
			C866	J3470133111X	CE 330U 6V3 M 6.3*
			C867	2026783030	CE 47U0F +20% 16.0

Designator	Part Number	Description	Designator	Part Number	Description
C709	J3470910030X	CE RA/TAP 10UF 16V	C819	J3470910030X	CE RA/TAP 10UF 16V
C710	2026783030	CE 47U0F +20% 16.0	C821	2026783030	CE 47U0F +20% 16.0
C711	J3470910030X	CE RA/TAP 10UF 16V	C822	J3470910030X	CE RA/TAP 10UF 16V
C714	J3470910030X	CE RA/TAP 10UF 16V	C823	J3470910030X	CE RA/TAP 10UF 16V
C715	2026783030	CE 47U0F +20% 16.0	C825	2026783030	CE 47U0F +20% 16.0
C716	J3470910030X	CE RA/TAP 10UF 16V	C826	J3470910030X	CE RA/TAP 10UF 16V
C723	J3470910030X	CE RA/TAP 10UF 16V	C827	J3470910030X	CE RA/TAP 10UF 16V
C724	2026783030	CE 47U0F +20% 16.0	C829	2026783030	CE 47U0F +20% 16.0
C725	J3470910030X	CE RA/TAP 10UF 16V	C831	J3470910030X	CE RA/TAP 10UF 16V
C728	J3470910030X	CE RA/TAP 10UF 16V	C832	J3470910030X	CE RA/TAP 10UF 16V
C729	2026783030	CE 47U0F +20% 16.0	C834	2026783030	CE 47U0F +20% 16.0
C730	J3470910030X	CE RA/TAP 10UF 16V	C836	J3470910030X	CE RA/TAP 10UF 16V
C741	J3470910030X	CE RA/TAP 10UF 16V	C837	J3470910030X	CE RA/TAP 10UF 16V
C742	2026783030	CE 47U0F +20% 16.0	C839	2026783030	CE 47U0F +20% 16.0
C743	J3470910030X	CE RA/TAP 10UF 16V	C841	J3470910030X	CE RA/TAP 10UF 16V
C744	J3470910030X	CE RA/TAP 10UF 16V	C842	J3470910030X	CE RA/TAP 10UF 16V
C745	2026783030	CE 47U0F +20% 16.0	C844	2026783030	CE 47U0F +20% 16.0
C746	J3470910030X	CE RA/TAP 10UF 16V	C846	J3470910030X	CE RA/TAP 10UF 16V
C747	J3470910030X	CE RA/TAP 10UF 16V	C847	J3470910030X	CE RA/TAP 10UF 16V
C749	2026783030	CE 47U0F +20% 16.0	C849	2026783030	CE 47U0F +20% 16.0
C751	J3470910030X	CE RA/TAP 10UF 16V	C851	J3470910030X	CE RA/TAP 10UF 16V
C752	J3470910030X	CE RA/TAP 10UF 16V	C852	J3470910030X	CE RA/TAP 10UF 16V
C754	2026783030	CE 47U0F +20% 16.0	C854	2026783030	CE 47U0F +20% 16.0
C756	J3470910030X	CE RA/TAP 10UF 16V	C856	J3470910030X	CE RA/TAP 10UF 16V
C757	2026783030	CE 47U0F +20% 16.0	C857	J3470910030X	CE RA/TAP 10UF 16V
C758	2026783030	CE 47U0F +20% 16.0	C859	2026783030	CE 47U0F +20% 16.0
C760	2026783030	CE 47U0F +20% 16.0	C861	J3470133111X	CE 330U 6V3 M 6.3*
C761	2026783030	CE 47U0F +20% 16.0	C862	J3470910030X	CE RA/TAP 10UF 16V
C764	2026783030	CE 47U0F +20% 16.0	C864	2026783030	CE 47U0F +20% 16.0
C765	2026783030	CE 47U0F +20% 16.0	C866	J3470133111X	CE 330U 6V3 M 6.3*
C768	2026783030	CE 47U0F +20% 16.0	C867	2026783030	CE 47U0F +20% 16.0
C769	2026783030	CE 47U0F +20% 16.0	C701	1105867091	CCCFMIN 100P0F +5%
C770	2026783030	CE 47U0F +20% 16.0	C702	1105867091	CCCFMIN 100P0F +5%
C771	2026783030	CE 47U0F +20% 16.0	C703	1105867091	CCCFMIN 100P0F +5%
C773	2026783030	CE 47U0F +20% 16.0	C704	1105867091	CCCFMIN 100P0F +5%
C774	2026783030	CE 47U0F +20% 16.0	C705	1105867091	CCCFMIN 100P0F +5%
C776	J3470910030X	CE RA/TAP 10UF 16V	C706	1105867091	CCCFMIN 100P0F +5%
C777	2026783030	CE 47U0F +20% 16.0	C707	1105867091	CCCFMIN 100P0F +5%
C778	J3470910030X	CE RA/TAP 10UF 16V	C708	1105867091	CCCFMIN 100P0F +5%
C779	J3470910030X	CE RA/TAP 10UF 16V	C712	1105867091	CCCFMIN 100P0F +5%
C780	2026783030	CE 47U0F +20% 16.0	C713	1105867091	CCCFMIN 100P0F +5%
C781	J3470910030X	CE RA/TAP 10UF 16V	C717	1105867091	CCCFMIN 100P0F +5%
C782	J3470910030X	CE RA/TAP 10UF 16V	C718	1105867091	CCCFMIN 100P0F +5%
C783	2026783030	CE 47U0F +20% 16.0	C719	1105867091	CCCFMIN 100P0F +5%
C784	J3470910030X	CE RA/TAP 10UF 16V	C720	1105867091	CCCFMIN 100P0F +5%
C787	J3470910030X	CE RA/TAP 10UF 16V	C721	1105867091	CCCFMIN 100P0F +5%
C788	2026783030	CE 47U0F +20% 16.0	C722	1105867091	CCCFMIN 100P0F +5%
C789	J3470910030X	CE RA/TAP 10UF 16V	C726	1105867091	CCCFMIN 100P0F +5%
C792	J3470910030X	CE RA/TAP 10UF 16V	C727	1105867091	CCCFMIN 100P0F +5%
C795	2026783030	CE 47U0F +20% 16.0	C731	1105867091	CCCFMIN 100P0F +5%
C796	J3470910030X	CE RA/TAP 10UF 16V	C732	1105867091	CCCFMIN 100P0F +5%
C797	2026783030	CE 47U0F +20% 16.0	C733	1105867091	CCCFMIN 100P0F +5%
C798	2026783030	CE 47U0F +20% 16.0	C734	1105867091	CCCFMIN 100P0F +5%
C799	2026783030	CE 47U0F +20% 16.0	C735	1105867091	CCCFMIN 100P0F +5%
C800	J3470910030X	CE RA/TAP 10UF 16V	C736	1105867091	CCCFMIN 100P0F +5%
C801	J3470910030X	CE RA/TAP 10UF 16V	C737	1105867091	CCCFMIN 100P0F +5%
C802	J3470910030X	CE RA/TAP 10UF 16V	C738	1105867091	CCCFMIN 100P0F +5%
C804	J3470910030X	CE RA/TAP 10UF 16V	C739	1105867091	CCCFMIN 100P0F +5%
C805	J3470910030X	CE RA/TAP 10UF 16V	C740	1105867091	CCCFMIN 100P0F +5%
C807	2026783030	CE 47U0F +20% 16.0	C750	5088236091	CCCFMIN 33P0F +5%
C808	J3470910030X	CE RA/TAP 10UF 16V	C755	5088236091	CCCFMIN 33P0F +5%
C809	J3470910030X	CE RA/TAP 10UF 16V	C759	1105867091	CCCFMIN 100P0F +5%
C811	2026783030	CE 47U0F +20% 16.0	C762	1105867091	CCCFMIN 100P0F +5%
C813	J3470910030X	CE RA/TAP 10UF 16V	C763	1105867091	CCCFMIN 100P0F +5%
C814	J3470910030X	CE RA/TAP 10UF 16V	C767	1105867091	CCCFMIN 100P0F +5%
C816	2026783030	CE 47U0F +20% 16.0	C772	1105867091	CCCFMIN 100P0F +5%
C818	J3470910030X	CE RA/TAP 10UF 16V	C775	1105867091	CCCFMIN 100P0F +5%



Designator	Part Number	Description	Designator	Part Number	Description
C793	1105933091	CCCFMIN 2N2F +10%	R743	9057440091	RMGCFMIN 470R0 OHM
C794	1105933091	CCCFMIN 2N2F +10%	R744	4043835091	RMGCFMIN 100R0 OHM
C812	5088236091	CCCFMIN 33P0F +5%	R746	9057440091	RMGCFMIN 470R0 OHM
C817	5088236091	CCCFMIN 100P0F +5%	R747	1106648091	RMGCFMIN 47K0 OHM
C824	1105867091	CCCFMIN 100P0F +5%	R748	5088663091	RMGCFMIN 100K0 OHM
C828	1105867091	CCCFMIN 100P0F +5%	R749	9057440091	RMGCFMIN 470R0 OHM
C830	5088236091	CCCFMIN 33P0F +5%	R750	1106648091	RMGCFMIN 47K0 OHM
C833	1105867091	CCCFMIN 33P0F +5%	R751	5088663091	RMGCFMIN 100K0 OHM
C838	1105867091	CCCFMIN 100P0F +5%	R752	7043420091	RMGCFMIN 100R0 OHM
C840	5088236091	CCCFMIN 33P0F +5%	R753	7043420091	RMGCFMIN 100R0 OHM
C843	1105867091	CCCFMIN 100P0F +5%	R754	9057440091	RMGCFMIN 470R0 OHM
C845	5088236091	CCCFMIN 33P0F +5%	R756	5088663091	RMGCFMIN 100K0 OHM
C848	1105867091	CCCFMIN 100P0F +5%	R757	2047195091	RMGCFMIN 1K0 OHM +
C850	1105933091	CCCFMIN 2N2F +10%	R758	5088660091	RMGCFMIN 5K1 OHM +
C853	1105867091	CCCFMIN 100P0F +5%	R759	5088663091	RMGCFMIN 100K0 OHM
C855	5088236091	CCCFMIN 33P0F +5%	R760	9057440091	RMGCFMIN 470R0 OHM
C858	8043682091	CCCFMIN 680P0F +10	R761	5088663091	RMGCFMIN 100K0 OHM
C860	8043682091	CCCFMIN 680P0F +10	R762	2047195091	RMGCFMIN 1K0 OHM +
C863	8043682091	CCCFMIN 680P0F +10	R763	5088660091	RMGCFMIN 5K1 OHM +
C865	8043682091	CCCFMIN 680P0F +10	R764	5088663091	RMGCFMIN 100K0 OHM
C868	1105867091	CCCFMIN 100P0F +5%	R765	7043420091	RMGCFMIN 100R0 OHM
C869	1105867091	CCCFMIN 100P0F +5%	R766	8044039091	RMGCFMIN 2K2 OHM +
C870	1105867091	CCCFMIN 100P0F +5%	R767	8044039091	RMGCFMIN 2K2 OHM +
C871	1105867091	CCCFMIN 100P0F +5%	R768	2047195091	RMGCFMIN 1K0 OHM +

## Resistors

R701	9057440091	RMGCFMIN 470R0 OHM	R772	4043835091	RMGCFMIN 470K0 OHM
R702	4043835091	RMGCFMIN 470K0 OHM	R773	5088663091	RMGCFMIN 100K0 OHM
R703	9057440091	RMGCFMIN 470R0 OHM	R774	9057440091	RMGCFMIN 470R0 OHM
R704	4043835091	RMGCFMIN 470K0 OHM	R775	4043835091	RMGCFMIN 470K0 OHM
R705	9057440091	RMGCFMIN 470R0 OHM	R776	5088663091	RMGCFMIN 100K0 OHM
R706	4043835091	RMGCFMIN 470K0 OHM	R778	7043420091	RMGCFMIN 100R0 OHM
R707	9057440091	RMGCFMIN 470R0 OHM	R779	8044039091	RMGCFMIN 2K2 OHM +
R708	4043835091	RMGCFMIN 470K0 OHM	R780	8044039091	RMGCFMIN 2K2 OHM +
R709	7043420091	RMGCFMIN 100R0 OHM	R781	7043420091	RMGCFMIN 100R0 OHM
R710	9057440091	RMGCFMIN 470R0 OHM	R782	7043420091	RMGCFMIN 100R0 OHM
R711	2047202091	RMGCFMIN 180K0 OHM	R783	2047195091	RMGCFMIN 1K0 OHM +
R712	5088663091	RMGCFMIN 100K0 OHM	R784	2047195091	RMGCFMIN 1K0 OHM +
R713	2047195091	RMGCFMIN 1K0 OHM +	R785	2047195091	RMGCFMIN 1K0 OHM +
R714	9057440091	RMGCFMIN 470R0 OHM	R786	2047195091	RMGCFMIN 1K0 OHM +
R715	2047202091	RMGCFMIN 180K0 OHM	R787	2047195091	RMGCFMIN 1K0 OHM +
R716	5088663091	RMGCFMIN 100K0 OHM	R788	2047195091	RMGCFMIN 1K0 OHM +
R717	2047195091	RMGCFMIN 100R0 OHM	R789	7043420091	RMGCFMIN 100R0 OHM
R719	8044039091	RMGCFMIN 2K2 OHM +	R790	7043420091	RMGCFMIN 100R0 OHM
R720	8044039091	RMGCFMIN 2K2 OHM +	R791	7043420091	RMGCFMIN 100R0 OHM
R721	9057440091	RMGCFMIN 470R0 OHM	R792	7043420091	RMGCFMIN 100R0 OHM
R722	4043835091	RMGCFMIN 470K0 OHM	R793	2047195091	RMGCFMIN 1K0 OHM +
R723	9057440091	RMGCFMIN 470R0 OHM	R794	2047195091	RMGCFMIN 1K0 OHM +
R724	4043835091	RMGCFMIN 470K0 OHM	R795	2047195091	RMGCFMIN 1K0 OHM +
R725	8044039091	RMGCFMIN 2K2 OHM +	R796	2047195091	RMGCFMIN 1K0 OHM +
R726	8044039091	RMGCFMIN 2K2 OHM +	R797	2047195091	RMGCFMIN 1K0 OHM +
R727	7043420091	RMGCFMIN 100R0 OHM	R798	2047195091	RMGCFMIN 1K0 OHM +
R728	9057440091	RMGCFMIN 470R0 OHM	R799	7043420091	RMGCFMIN 100R0 OHM
R729	2047202091	RMGCFMIN 180K0 OHM	R800	7043420091	RMGCFMIN 100R0 OHM
R730	5088663091	RMGCFMIN 100K0 OHM	R801	7043420091	RMGCFMIN 100R0 OHM
R731	2047195091	RMGCFMIN 1K0 OHM +	R802	7043420091	RMGCFMIN 100R0 OHM
R732	9057440091	RMGCFMIN 470R0 OHM	R803	2047195091	RMGCFMIN 1K0 OHM +
R733	2047202091	RMGCFMIN 180K0 OHM	R804	2047195091	RMGCFMIN 1K0 OHM +
R734	5088663091	RMGCFMIN 100K0 OHM	R805	2047195091	RMGCFMIN 1K0 OHM +
R735	2047195091	RMGCFMIN 1K0 OHM +	R806	7043420091	RMGCFMIN 100R0 OHM
R736	7043420091	RMGCFMIN 100R0 OHM	R807	7043420091	RMGCFMIN 100R0 OHM
R737	9057440091	RMGCFMIN 470R0 OHM	R808	2047195091	RMGCFMIN 1K0 OHM +
R738	4043835091	RMGCFMIN 470K0 OHM	R809	2047195091	RMGCFMIN 1K0 OHM +
R739	9057440091	RMGCFMIN 470K0 OHM	R810	2047195091	RMGCFMIN 1K0 OHM +
R741	9057440091	RMGCFMIN 470R0 OHM	R811	7043420091	RMGCFMIN 100R0 OHM
R742	4043835091	RMGCFMIN 470K0 OHM	R812	9057440091	RMGCFMIN 470R0 OHM

Designator	Part Number	Description	Designator	Part Number	Description
R813	2047202091	RMGCFMIN 180K0 OHM	R885	9057440091	RMGCFMIN 470R0 OHM
R814	5088663091	RMGCFMIN 100K0 OHM	R886	2047202091	RMGCFMIN 180K0 OHM
R815	2047195091	RMGCFMIN 1K0 OHM +	R887	5088663091	RMGCFMIN 100K0 OHM
R816	9057440091	RMGCFMIN 470R0 OHM	R888	9057440091	RMGCFMIN 470R0 OHM
R817	2047202091	RMGCFMIN 180K0 OHM	R889	2047202091	RMGCFMIN 180K0 OHM
R818	5088663091	RMGCFMIN 100K0 OHM	R890	2047195091	RMGCFMIN 1K0 OHM +
R819	2047195091	RMGCFMIN 1K0 OHM +	R891	8044040091	RMGCFMIN 5K6 OHM +
R820	7043420091	RMGCFMIN 100R0 OHM	R892	5088663091	RMGCFMIN 100K0 OHM
R821	8044039091	RMGCFMIN 2K2 OHM +	R893	9057440091	RMGCFMIN 470R0 OHM
R822	8044039091	RMGCFMIN 2K2 OHM +	R894	2047202091	RMGCFMIN 180K0 OHM
R823	3094434091	RMGCFMIN 27K0 OHM	R895	2047195091	RMGCFMIN 1K0 OHM +
R823	5088661091	RMGCFMIN 10K0 OHM	R896	8044040091	RMGCFMIN 5K6 OHM +
R830	1106648091	RMGCFMIN 47K0 OHM	R897	5088663091	RMGCFMIN 100K0 OHM
R831	9057440091	RMGCFMIN 470R0 OHM	R898	9057440091	RMGCFMIN 470R0 OHM
R832	5088663091	RMGCFMIN 100K0 OHM	R899	5088663091	RMGCFMIN 100K0 OHM
R833	8044039091	RMGCFMIN 2K2 OHM +	R901	8044040091	RMGCFMIN 5K6 OHM +
R834	8044040091	RMGCFMIN 5K6 OHM +	R902	5088663091	RMGCFMIN 100K0 OHM
R835	5088663091	RMGCFMIN 100K0 OHM	R903	2047195091	RMGCFMIN 1K0 OHM +
R836	7043420091	RMGCFMIN 100R0 OHM	R904	9057440091	RMGCFMIN 470R0 OHM
R837	7043420091	RMGCFMIN 100R0 OHM	R905	5088663091	RMGCFMIN 100K0 OHM
R838	8044048091	RMGCFMIN 3M3 OHM +	R907	8044040091	RMGCFMIN 5K6 OHM +
R839	7043420091	RMGCFMIN 100R0 OHM	R908	5088663091	RMGCFMIN 100K0 OHM
R840	7043420091	RMGCFMIN 100R0 OHM	R909	2047195091	RMGCFMIN 1K0 OHM +
R841	5088663091	RMGCFMIN 100K0 OHM	R910	9057440091	RMGCFMIN 470R0 OHM
R842	2047199091	RMGCFMIN 12K0 OHM	R911	5088663091	RMGCFMIN 100K0 OHM
R843	2047199091	RMGCFMIN 12K0 OHM	R912	2047195091	RMGCFMIN 1K0 OHM +
R844	2047199091	RMGCFMIN 12K0 OHM	R913	8044040091	RMGCFMIN 5K6 OHM +
R845	1106644091	RMGCFMIN 3K3 OHM +	R914	5088663091	RMGCFMIN 100K0 OHM
R846	1106644091	RMGCFMIN 3K3 OHM +	R915	2047195091	RMGCFMIN 1K0 OHM +
R847	5088663091	RMGCFMIN 100K0 OHM	R916	9057440091	RMGCFMIN 470R0 OHM
R848	2047199091	RMGCFMIN 12K0 OHM	R917	5088663091	RMGCFMIN 100K0 OHM
R849	2047199091	RMGCFMIN 12K0 OHM	R918	2047195091	RMGCFMIN 1K0 OHM +
R850	2047199091	RMGCFMIN 12K0 OHM	R919	5088661091	RMGCFMIN 10K0 OHM
R851	1106644091	RMGCFMIN 3K3 OHM +	R920	5088663091	RMGCFMIN 100K0 OHM
R852	1106644091	RMGCFMIN 3K3 OHM +	R921	2047195091	RMGCFMIN 1K0 OHM +
R853	5088663091	RMGCFMIN 100K0 OHM	R922	9057440091	RMGCFMIN 470R0 OHM
R854	8044039091	RMGCFMIN 2K2 OHM +	R923	5088663091	RMGCFMIN 100K0 OHM
R855	8044039091	RMGCFMIN 2K2 OHM +	R924	2047195091	RMGCFMIN 1K0 OHM +
R856	8044039091	RMGCFMIN 2K2 OHM +	R925	8044040091	RMGCFMIN 5K6 OHM +
R857	8044039091	RMGCFMIN 2K2 OHM +	R926	5088663091	RMGCFMIN 100K0 OHM
R858	8044039091	RMGCFMIN 2K2 OHM +	R927	2047195091	RMGCFMIN 1K0 OHM +
R859	8044039091	RMGCFMIN 2K2 OHM +	R928	9057440091	RMGCFMIN 470R0 OHM
R860	3094432091	RMGCFMIN 9K1 OHM +	R929	5088663091	RMGCFMIN 100K0 OHM
R861	3094432091	RMGCFMIN 9K1 OHM +	R930	2047195091	RMGCFMIN 1K0 OHM +
R861	9057443091	RMGCFMIN 18K0 OHM	R931	2047196091	RMGCFMIN 1K8 OHM +
R862	9057443091	RMGCFMIN 18K0 OHM	R931	4043829091	RMGCFMIN 1K5 OHM +
R863	9057443091	RMGCFMIN 18K0 OHM	R931	8044039091	RMGCFMIN 2K2 OHM +
R864	2047192091	RMGCFMIN 220R0 OHM	R932	5088663091	RMGCFMIN 100K0 OHM
R865	8044039091	RMGCFMIN 2K2 OHM +	R933	2047192091	RMGCFMIN 220R0 OHM
R866	8044039091	RMGCFMIN 2K2 OHM +	R934	9057440091	RMGCFMIN 470R0 OHM
R867	7043420091	RMGCFMIN 100R0 OHM	R935	3094434091	RMGCFMIN 27K0 OHM
R868	7043420091	RMGCFMIN 100R0 OHM	R936	5088663091	RMGCFMIN 100K0 OHM
R869	7043420091	RMGCFMIN 100R0 OHM	R937	2047195091	RMGCFMIN 1K0 OHM +
R870	7043420091	RMGCFMIN 100R0 OHM	R938	2047196091	RMGCFMIN 1K8 OHM +
R871	7043420091	RMGCFMIN 100R0 OHM	R938	4043829091	RMGCFMIN 1K5 OHM +
R872	7043420091	RMGCFMIN 100R0 OHM	R938	8044039091	RMGCFMIN 2K2 OHM +
R873	7043420091	RMGCFMIN 100R0 OHM	R939	5088663091	RMGCFMIN 100K0 OHM
R874	7043420091	RMGCFMIN 100R0 OHM	R940	2047192091	RMGCFMIN 220R0 OHM
R875	7043420091	RMGCFMIN 100R0 OHM	R941	3094432091	RMGCFMIN 9K1 OHM +
R876	7043420091	RMGCFMIN 100R0 OHM	R942	9057440091	RMGCFMIN 470R0 OHM
R878	7043420091	RMGCFMIN 100R0 OHM	R943	2047202091	RMGCFMIN 180K0 OHM
R879	7043420091	RMGCFMIN 100R0 OHM	R944	5088663091	RMGCFMIN 100K0 OHM
R880	7043420091	RMGCFMIN 100R0 OHM	R945	9057440091	RMGCFMIN 470R0 OHM
R881	7043420091	RMGCFMIN 100R0 OHM	R946	2047202091	RMGCFMIN 180K0 OHM
R882	9057440091	RMGCFMIN 470R0 OHM	R947	5088663091	RMGCFMIN 100K0 OHM
R883	2047202091	RMGCFMIN 180K0 OHM	R948	3094434091	RMGCFMIN 27K0 OHM
R884	5088663091	RMGCFMIN 100K0 OHM	R949	2047192091	RMGCFMIN 220R0 OHM

Designator	Part Number	Description	Designator	Part Number	Description
R950	9057440091	RMGCFMIN 470R0 OHM	JK701	J44306000101	JACK RCA 6P GND W/
R951	2047195091	RMGCFMIN 1K0 OHM +	JK702	J44302401201	JACK RCA 4P S
R952	2047195091	RMGCFMIN 1K0 OHM +	JK703	J44302001401	JACK RCA 2P WR JW1
R953	5088663091	RMGCFMIN 100K0 OHM	JK703	J44302401201	JACK RCA 4P S
R954	8044040091	RMGCFMIN 5K6 OHM +			
R955	5088663091	RMGCFMIN 100K0 OHM			
R956	3094432091	RMGCFMIN 9K1 OHM +			
R956	9057443091	RMGCFMIN 18K0 OHM			
R957	2047195091	RMGCFMIN 1K0 OHM +			
R958	2047195091	RMGCFMIN 1K0 OHM +			
R959	2047195091	RMGCFMIN 1K0 OHM +			
R960	2047195091	RMGCFMIN 1K0 OHM +			
R961	2047195091	RMGCFMIN 1K0 OHM +			
R962	2047195091	RMGCFMIN 1K0 OHM +			
R963	5088655091	RMGCFMIN 560R0 OHM			
R964	5088655091	RMGCFMIN 560R0 OHM			
R965	9057440091	RMGCFMIN 470R0 OHM			
R966	9057440091	RMGCFMIN 470R0 OHM			
R967	3094434091	RMGCFMIN 27K0 OHM			
R968	3094434091	RMGCFMIN 27K0 OHM			
R969	9057443091	RMGCFMIN 18K0 OHM			
R970	9057443091	RMGCFMIN 18K0 OHM			
JUM10	8044051091	RMGCFMIN 0 OHM +0%			
JUM10	8044051091	RMGCFMIN 0 OHM +0%			
JUM12	8044051091	RMGCFMIN 0 OHM +0%			
JUM12	8044051091	RMGCFMIN 0 OHM +0%			
JUM15	8044051091	RMGCFMIN 0 OHM +0%			
JUM15	8044051091	RMGCFMIN 0 OHM +0%			
JUM15	8044051091	RMGCFMIN 0 OHM +0%			
JUM18	8044051091	RMGCFMIN 0 OHM +0%			
JUM19	8044051091	RMGCFMIN 0 OHM +0%			
JUM19	8044051091	RMGCFMIN 0 OHM +0%			
JUM20	8044051091	RMGCFMIN 0 OHM +0%			
JUM20	8044051091	RMGCFMIN 0 OHM +0%			
JUM21	8044051091	RMGCFMIN 0 OHM +0%			
JUM24	8044051091	RMGCFMIN 0 OHM +0%			
JUM24	8044051091	RMGCFMIN 0 OHM +0%			
JUM24	8044051091	RMGCFMIN 0 OHM +0%			
JUM26	8044051091	RMGCFMIN 0 OHM +0%			
JUM26	8044051091	RMGCFMIN 0 OHM +0%			
JUM27	8044051091	RMGCFMIN 0 OHM +0%			
JUM27	8044051091	RMGCFMIN 0 OHM +0%			
JUM27	8044051091	RMGCFMIN 0 OHM +0%			
JUM27	8044051091	RMGCFMIN 0 OHM +0%			
JUM27	8044051091	RMGCFMIN 0 OHM +0%			
JUM27	8044051091	RMGCFMIN 0 OHM +0%			
JUM5	8044051091	RMGCFMIN 0 OHM +0%			
JUM50	8044051091	RMGCFMIN 0 OHM +0%			
JUM51	8044051091	RMGCFMIN 0 OHM +0%			
JUM52	8044051091	RMGCFMIN 0 OHM +0%			
JUM53	8044051091	RMGCFMIN 0 OHM +0%			
JUM85	8044051091	RMGCFMIN 0 OHM +0%			
JUM9	8044051091	RMGCFMIN 0 OHM +0%			
JUM90	8044051091	RMGCFMIN 0 OHM +0%			
JUM92	8044051091	RMGCFMIN 0 OHM +0%			

**Miscellaneous**

CN408	J4423331500X	CNT 2.0 35237-1510
CN409	J4423331500X	CNT 2.0 35237-1510
CN410	J4423331500X	CNT 2.0 35237-1510
CN411	J4423331500X	CNT 2.0 35237-1510
CP205	J4420030440X	CNT PLUG 4P 2.0MM
CP206	J4420031040X	CNT PLUG 2.0 10P
CP403	J4420030340X	CNT PLUG 2.0 ST 3P
CP404	J4420030740X	CNT PLUG 2.0ST 7P
CP405	J4420031240X	CNT PLUG12P 2.0MM
JK701	J44302401201	JACK RCA 4P S

**DSP PCB****Semiconductors**

D003	J2244010104X	DIODE CHIP 1SS355
D004	J2244010104X	DIODE CHIP 1SS355
D005	J2244010104X	DIODE CHIP 1SS355
D008	J2244010104X	DIODE CHIP 1SS355
IC01	J2129012001X	C CLK NJU6324M
IC04	55172540AVR110	IC EPROM AT27LV020
IC05	J2135326005X	IC CS493263-CL PLC
IC06	J2133926005X	IC DAC CS4391-KS S
IC07	J2133926005X	IC DAC CS4391-KS S
IC08	J2133926005X	IC DAC CS4391-KS S
IC09	J2133926002X	IC ADC CS5360-KS
IC10	J2116007001X	IC 74HCU04M1R HEX
IC11	J2116007001X	IC 74HCU04M1R HEX
IC12	J2116007001X	IC 74HCU04M1R HEX
IC13	J2142032005X	IC 74VHC153MX
IC14	J2136926001X	IC DIR CS8414-CS
IC15	J2141004002X	IC BU4094 SOP16
IC16	J2141004001X	IC BU4051 SOP16
IC17	J2142032006X	IC 74VHC157MX
IC18	J2142032002X	IC TC74VHC244MX
IC19	J2142032002X	IC TC74VHC244MX
IC20	J2110012004X	IC OPAMP NJM2068
IC21	J2110012004X	IC OPAMP NJM2068
IC22	J2110012004X	IC OPAMP NJM2068
IC23	J2121012002X	IC SW NJU201AM
IC24	J2110012004X	IC OPAMP NJM2068
IC25	J2110012004X	IC OPAMP NJM2068
IC28	J2110012004X	IC OPAMP NJM2068
Q005	J2041220102X	TR NPN DTC114YKA
Q005	J2041220201X	TR CHIP NPN KRC107
Q006	J2041220102X	TR NPN DTC114YKA
Q006	J2041220201X	TR CHIP NPN KRC107
Q024	J2041220102X	TR NPN DTC114YKA
Q024	J2041220201X	TR CHIP NPN KRC107
D009	J2244010104X	DIODE CHIP 1SS355
IC02	J2142032001X	IC F/F 74VHC574MX
IC03	J2142032001X	IC F/F 74VHC574MX

**Capacitors**

C112	2025256030	CE 220U0F +20% 6.3
C148	20269180AM	CE 1M10F +20% 6.3V
C149	20269180AM	CE 1M10F +20% 6.3V
C150	20269180AM	CE 1M10F +20% 6.3V
C020	J3640683220X	CMP 0.068U 63V J
C031	2026884030	CE 1U0F +20% 50.0V
C032	2026884030	CE 1U0F +20% 50.0V
C056	2026885030	CE 2U2F +20% 50.0V
C068	J3470910030X	CE RA/TAP 10UF 16V
C069	J3470910030X	CE RA/TAP 10UF 16V
C070	J3470910030X	CE RA/TAP 10UF 16V
C071	J3470910030X	CE RA/TAP 10UF 16V
C080	J3470910030X	CE RA/TAP 10UF 16V
C081	J3470910030X	CE RA/TAP 10UF 16V
C082	J3470910030X	CE RA/TAP 10UF 16V
C083	J3470910030X	CE RA/TAP 10UF 16V
C092	J3470910030X	CE RA/TAP 10UF 16V

Designator	Part Number	Description	Designator	Part Number	Description
C093	J3470910030X	CE RA/TAP 10UF 16V	C104	1105933091	CCCFMIN 2N2F +10%
C094	J3470910030X	CE RA/TAP 10UF 16V	C105	1105933091	CCCFMIN 2N2F +10%
C095	J3470910030X	CE RA/TAP 10UF 16V	C106	1105867091	CCCFMIN 100P0F +5%
C110	J3470910030X	CE RA/TAP 10UF 16V	C107	1105867091	CCCFMIN 100P0F +5%
C111	J3470910030X	CE RA/TAP 10UF 16V	C108	1105867091	CCCFMIN 100P0F +5%
C114	2026884030	CE 1U0F +20% 50.0V	C109	1105867091	CCCFMIN 100P0F +5%
C115	2026884030	CE 1U0F +20% 50.0V	C120	2026729091	CCCFMIN 100N0F +80
C116	2026884030	CE 1U0F +20% 50.0V	C121	2026729091	CCCFMIN 100N0F +80
C117	2026884030	CE 1U0F +20% 50.0V	C122	2026729091	CCCFMIN 100N0F +80
C118	2026884030	CE 1U0F +20% 50.0V	C136	2026729091	CCCFMIN 100N0F +80
C119	2026884030	CE 1U0F +20% 50.0V	C138	1105867091	CCCFMIN 100P0F +5%
C144	J3470910030X	CE RA/TAP 10UF 16V	C139	1105867091	CCCFMIN 100P0F +5%
C145	J3470910030X	CE RA/TAP 10UF 16V	C163	7043420091	RMGCFMIN 100R0 OHM
C146	J3470910030X	CE RA/TAP 10UF 16V	C178	2026729091	CCCFMIN 100N0F +80
C151	2026902030	CE 100U0F +20% 16.	C001	6044108091	CCCFMIN 22P0F +5%
C152	2026902030	CE 100U0F +20% 16.	C002	6044108091	CCCFMIN 22P0F +5%
C153	2026783030	CE 47U0F +20% 16.0	C005	2026729091	CCCFMIN 100N0F +80
C154	2026783030	CE 47U0F +20% 16.0	C006	2026729091	CCCFMIN 100N0F +80
C155	J3470910030X	CE RA/TAP 10UF 16V	C007	2026729091	CCCFMIN 100N0F +80
C156	J3470910030X	CE RA/TAP 10UF 16V	C008	2026729091	CCCFMIN 100N0F +80
C157	J3470910030X	CE RA/TAP 10UF 16V	C009	2026729091	CCCFMIN 100N0F +80
C158	J3470910030X	CE RA/TAP 10UF 16V	C012	2026729091	CCCFMIN 100N0F +80
C159	J3470910030X	CE RA/TAP 10UF 16V	C013	2026729091	CCCFMIN 100N0F +80
C160	J3470910030X	CE RA/TAP 10UF 16V	C014	2026729091	CCCFMIN 100N0F +80
C164	2026783030	CE 47U0F +20% 16.0	C015	2026729091	CCCFMIN 100N0F +80
C165	2026783030	CE 47U0F +20% 16.0	C016	2026729091	CCCFMIN 100N0F +80
C167	2026783030	CE 47U0F +20% 16.0	C017	2026729091	CCCFMIN 100N0F +80
C168	2026783030	CE 47U0F +20% 16.0	C018	2026729091	CCCFMIN 100N0F +80
C003	1105934091	CCCFMIN 10N0F +10%	C022	2026729091	CCCFMIN 100N0F +80
C004	1105934091	CCCFMIN 10N0F +10%	C026	2026729091	CCCFMIN 100N0F +80
C010	6044108091	CCCFMIN 22P0F +5%	C029	2026729091	CCCFMIN 100N0F +80
C011	1105934091	CCCFMIN 10N0F +10%	C030	2026729091	CCCFMIN 100N0F +80
C019	2026729091	CCCFMIN 100N0F +80	C033	2026729091	CCCFMIN 100N0F +80
C021	4043518091	CCCFMIN 47P0F +5%	C034	2026729091	CCCFMIN 100N0F +80
C023	4043518091	CCCFMIN 47P0F +5%	C035	2026729091	CCCFMIN 100N0F +80
C024	4043518091	CCCFMIN 47P0F +5%	C036	4043518091	CCCFMIN 47P0F +5%
C025	4043518091	CCCFMIN 47P0F +5%	C037	4043518091	CCCFMIN 47P0F +5%
C028	4043518091	CCCFMIN 47P0F +5%	C040	2026729091	CCCFMIN 100N0F +80
C055	4043518091	CCCFMIN 47P0F +5%	C041	2026729091	CCCFMIN 100N0F +80
C057	2026732091	CCCFMIN 220N0F +80	C042	2026729091	CCCFMIN 100N0F +80
C060	2047195091	RMGCFMIN 1K0 OHM +	C043	2026729091	CCCFMIN 100N0F +80
C062	1105864091	CCCFMIN 27P0F +5%	C049	4043518091	CCCFMIN 47P0F +5%
C067	4043518091	CCCFMIN 47P0F +5%	C050	4043518091	CCCFMIN 47P0F +5%
C072	3093923091	CCCFMIN 2N7F +10%	C059	2026729091	CCCFMIN 100N0F +80
C073	3093923091	CCCFMIN 2N7F +10%	C061	2046897091	CCCFMIN 330P0F +5%
C074	1105871091	CCCFMIN 560P0F +5%	C063	2026729091	CCCFMIN 100N0F +80
C075	3093923091	CCCFMIN 2N7F +10%	C064	1105867091	CCCFMIN 100P0F +5%
C076	3093923091	CCCFMIN 2N7F +10%	C065	2026729091	CCCFMIN 100N0F +80
C077	1105871091	CCCFMIN 560P0F +5%	C066	2026729091	CCCFMIN 100N0F +80
C078	1105871091	CCCFMIN 560P0F +5%	C113	2026729091	CCCFMIN 100N0F +80
C079	1105871091	CCCFMIN 560P0F +5%	C123	2026729091	CCCFMIN 100N0F +80
C084	3093923091	CCCFMIN 2N7F +10%	C124	2026729091	CCCFMIN 100N0F +80
C085	3093923091	CCCFMIN 2N7F +10%	C125	2026729091	CCCFMIN 100N0F +80
C086	1105871091	CCCFMIN 560P0F +5%	C126	2026729091	CCCFMIN 100N0F +80
C087	3093923091	CCCFMIN 2N7F +10%	C127	2026729091	CCCFMIN 100N0F +80
C088	3093923091	CCCFMIN 2N7F +10%	C128	2026729091	CCCFMIN 100N0F +80
C089	1105871091	CCCFMIN 560P0F +5%	C129	2026729091	CCCFMIN 100N0F +80
C090	1105871091	CCCFMIN 560P0F +5%	C130	2026729091	CCCFMIN 100N0F +80
C091	1105871091	CCCFMIN 560P0F +5%	C131	2026729091	CCCFMIN 100N0F +80
C096	3093923091	CCCFMIN 2N7F +10%	C132	2026729091	CCCFMIN 100N0F +80
C097	3093923091	CCCFMIN 2N7F +10%	C133	2026729091	CCCFMIN 100N0F +80
C098	1105871091	CCCFMIN 560P0F +5%	C134	2026729091	CCCFMIN 100N0F +80
C099	2046934091	CCCFMIN 4N7F +10%	C135	2026729091	CCCFMIN 100N0F +80
C100	2046934091	CCCFMIN 4N7F +10%	C137	2026729091	CCCFMIN 100N0F +80
C101	1105932091	CCCFMIN 1N0F +10%	C140	2026729091	CCCFMIN 100N0F +80
C102	1105871091	CCCFMIN 560P0F +5%	C141	2026729091	CCCFMIN 100N0F +80
C103	1105932091	CCCFMIN 1N0F +10%	C142	2026729091	CCCFMIN 100N0F +80

Designator	Part Number	Description	Designator	Part Number	Description
C143	2026729091	CCCFMIN 100N0F +80	R062	5088661091	RMGCFMIN 10K0 OHM
C147	3093873091	CCCFMIN 220P0F +5%	R063	5088661091	RMGCFMIN 10K0 OHM
C166	2026729091	CCCFMIN 100N0F +80	R064	5088661091	RMGCFMIN 10K0 OHM
C169	2046897091	CCCFMIN 330P0F +5%	R065	5088663091	RMGCFMIN 100K0 OHM
C170	2026729091	CCCFMIN 100N0F +80	R066	5088663091	RMGCFMIN 100K0 OHM
C171	2026729091	CCCFMIN 100N0F +80	R067	5088661091	RMGCFMIN 10K0 OHM
C172	2026729091	CCCFMIN 100N0F +80	R068	5088661091	RMGCFMIN 10K0 OHM
C174	4043518091	CCCFMIN 47P0F +5%	R071	2047195091	RMGCFMIN 1K0 OHM +
C175	4043518091	CCCFMIN 47P0F +5%	R072	4043829091	RMGCFMIN 1K5 OHM +
C176	4043518091	CCCFMIN 47P0F +5%	R073	8044040091	RMGCFMIN 5K6 OHM +
			R074	8044040091	RMGCFMIN 5K6 OHM +
			R075	5088663091	RMGCFMIN 100K0 OHM
			R078	5088661091	RMGCFMIN 10K0 OHM
			R080	3094431091	RMGCFMIN 4K7 OHM +
			R081	5088661091	RMGCFMIN 10K0 OHM
			R082	5088661091	RMGCFMIN 10K0 OHM
			R083	5088661091	RMGCFMIN 10K0 OHM
			R084	5088661091	RMGCFMIN 10K0 OHM
			R085	5088661091	RMGCFMIN 10K0 OHM
			R086	5088661091	RMGCFMIN 10K0 OHM
			R087	5088661091	RMGCFMIN 10K0 OHM
			R088	5088661091	RMGCFMIN 10K0 OHM
			R089	5088663091	RMGCFMIN 100K0 OHM
			R091	8044037091	RMGCFMIN 150R0 OHM
			R092	8044037091	RMGCFMIN 150R0 OHM
			R093	5088661091	RMGCFMIN 10K0 OHM
			R094	5088661091	RMGCFMIN 10K0 OHM
			R095	5088661091	RMGCFMIN 10K0 OHM
			R096	5088661091	RMGCFMIN 10K0 OHM
			R097	5088661091	RMGCFMIN 10K0 OHM
			R098	5088661091	RMGCFMIN 10K0 OHM
			R099	8044037091	RMGCFMIN 150R0 OHM
			R100	8044037091	RMGCFMIN 150R0 OHM
			R101	3094433091	RMGCFMIN 20K0 OHM
			R102	3094433091	RMGCFMIN 20K0 OHM
			R103	2047195091	RMGCFMIN 1K0 OHM +
			R104	2047195091	RMGCFMIN 1K0 OHM +
			R105	5088663091	RMGCFMIN 100K0 OHM
			R106	5088663091	RMGCFMIN 100K0 OHM
			R107	3094431091	RMGCFMIN 4K7 OHM +
			R108	3094431091	RMGCFMIN 4K7 OHM +
			R109	5088661091	RMGCFMIN 10K0 OHM
			R111	5088661091	RMGCFMIN 10K0 OHM
			R112	3094431091	RMGCFMIN 4K7 OHM +
			R113	5088661091	RMGCFMIN 10K0 OHM
			R114	5088661091	RMGCFMIN 10K0 OHM
			R115	2047195091	RMGCFMIN 1K0 OHM +
			R116	2026729091	CCCFMIN 100N0F +80
			R117	5088661091	RMGCFMIN 10K0 OHM
			R118	7043423091	RMGCFMIN 1K2 OHM +
			R119	3094431091	RMGCFMIN 4K7 OHM +
			R120	3094431091	RMGCFMIN 4K7 OHM +
			R121	7043423091	RMGCFMIN 1K2 OHM +
			R122	5088655091	RMGCFMIN 560R0 OHM
			R123	5088655091	RMGCFMIN 560R0 OHM
			R124	2047202091	RMGCFMIN 180K0 OHM
			R125	2047202091	RMGCFMIN 180K0 OHM
			R126	5088660091	RMGCFMIN 5K1 OHM +
			R127	5088660091	RMGCFMIN 5K1 OHM +
			R128	5088660091	RMGCFMIN 5K1 OHM +
			R129	5088660091	RMGCFMIN 5K1 OHM +
			R130	8044040091	RMGCFMIN 5K6 OHM +
			R131	7043423091	RMGCFMIN 1K2 OHM +
			R132	7043423091	RMGCFMIN 1K2 OHM +
			R133	8044040091	RMGCFMIN 5K6 OHM +
			R134	7043423091	RMGCFMIN 1K2 OHM +
			R135	7043423091	RMGCFMIN 1K2 OHM +

**Resistors**

R003	1106648091	RMGCFMIN 47K0 OHM
R004	1106648091	RMGCFMIN 47K0 OHM
R005	5088655091	RMGCFMIN 560R0 OHM
R006	5088655091	RMGCFMIN 560R0 OHM
R007	8044039091	RMGCFMIN 2K2 OHM +
R008	1106648091	RMGCFMIN 47K0 OHM
R009	8044039091	RMGCFMIN 2K2 OHM +
R010	1106648091	RMGCFMIN 47K0 OHM
R011	8044040091	RMGCFMIN 5K6 OHM +
R012	3094425091	RMGCFMIN 10R0 OHM
R013	9057440091	RMGCFMIN 470R0 OHM
R014	7043420091	RMGCFMIN 100R0 OHM
R015	2047193091	RMGCFMIN 510R0 OHM
R016	7043423091	RMGCFMIN 1K2 OHM +
R017	7043423091	RMGCFMIN 1K2 OHM +
R018	5088655091	RMGCFMIN 560R0 OHM
R019	5088655091	RMGCFMIN 560R0 OHM
R020	1106639091	RMGCFMIN 75R0 OHM
R021	3094425091	RMGCFMIN 10R0 OHM
R022	1106648091	RMGCFMIN 47K0 OHM
R023	9057440091	RMGCFMIN 470R0 OHM
R024	9057440091	RMGCFMIN 470R0 OHM
R025	7043420091	RMGCFMIN 100R0 OHM
R026	2047193091	RMGCFMIN 510R0 OHM
R027	8044039091	RMGCFMIN 2K2 OHM +
R028	1106648091	RMGCFMIN 47K0 OHM
R029	8044039091	RMGCFMIN 2K2 OHM +
R030	1106648091	RMGCFMIN 47K0 OHM
R031	8044040091	RMGCFMIN 5K6 OHM +
R036	8044040091	RMGCFMIN 5K6 OHM +
R037	8044039091	RMGCFMIN 2K2 OHM +
R038	1106648091	RMGCFMIN 47K0 OHM
R039	5088663091	RMGCFMIN 100K0 OHM
R040	5088663091	RMGCFMIN 100K0 OHM
R041	2047195091	RMGCFMIN 1K0 OHM +
R042	2047195091	RMGCFMIN 1K0 OHM +
R044	8044040091	RMGCFMIN 5K6 OHM +
R045	8044040091	RMGCFMIN 5K6 OHM +
R046	5088661091	RMGCFMIN 10K0 OHM
R047	5088661091	RMGCFMIN 10K0 OHM
R048	5088660091	RMGCFMIN 5K1 OHM +
R049	9057440091	RMGCFMIN 470R0 OHM
R050	5088660091	RMGCFMIN 5K1 OHM +
R051	5088661091	RMGCFMIN 10K0 OHM
R052	5088661091	RMGCFMIN 10K0 OHM
R053	8044040091	RMGCFMIN 5K6 OHM +
R054	7043423091	RMGCFMIN 1K2 OHM +
R055	7043423091	RMGCFMIN 1K2 OHM +
R056	8044040091	RMGCFMIN 5K6 OHM +
R057	7043423091	RMGCFMIN 1K2 OHM +
R058	7043423091	RMGCFMIN 1K2 OHM +
R059	5088655091	RMGCFMIN 560R0 OHM
R060	5088655091	RMGCFMIN 560R0 OHM
R061	5088661091	RMGCFMIN 10K0 OHM

Designator	Part Number	Description	Designator	Part Number	Description
R136	5088655091	RMGCFMIN 560R0 OHM	JAC1	J2123806001X	FIBER TORX178B
R137	5088655091	RMGCFMIN 560R0 OHM	JAC2	J2123806001X	FIBER TORX178B
R138	8044040091	RMGCFMIN 5K6 OHM +	JAC3	J44302001100	JACK RA 2P OO JC02
R139	8044040091	RMGCFMIN 5K6 OHM +	JAC4	J2123806002X	FIBER OPT TRANS
R141	1106648091	RMGCFMIN 47K0 OHM	JAC5	J44301000700	JACK RCA 1P O W/GN
R143	8044040091	RMGCFMIN 5K6 OHM +	JAC6	J2123806001X	FIBER TORX178B
R144	8044040091	RMGCFMIN 5K6 OHM +	JAC7	J44301000600	JACK RCA 1P O W/GN
R145	8044040091	RMGCFMIN 5K6 OHM +	OSC1	J3914010025X	CRY 12.28MHZ
R146	8044040091	RMGCFMIN 5K6 OHM +	RLY1	J5511610020X	RELAY TSC-105L3H
R147	8044040091	RMGCFMIN 5K6 OHM +	W001	J4305100020X	LUG WIRE 1P 100MM
R148	7043423091	RMGCFMIN 1K2 OHM +	BD01	J2631300204X	BEAD CHIP/TAP HB-1
R149	7043423091	RMGCFMIN 1K2 OHM +	BD02	J2631300204X	BEAD CHIP/TAP HB-1
R151	7043420091	RMGCFMIN 100R0 OHM	BD04	J2631300204X	BEAD CHIP/TAP HB-1
R152	7043420091	RMGCFMIN 100R0 OHM	BD10	J2631300204X	BEAD CHIP/TAP HB-1
R159	9057440091	RMGCFMIN 470R0 OHM	BD11	J2631300204X	BEAD CHIP/TAP HB-1
R160	2047195091	RMGCFMIN 1K0 OHM +	BD12	J2631300204X	BEAD CHIP/TAP HB-1
R161	6044435091	RMGCFMIN 47R0 OHM	BD15	J2631300224X	BEAD CHIP/TAP,HH-1
R162	3094425091	RMGCFMIN 10R0 OHM	BD23	J2631300204X	BEAD CHIP/TAP HB-1
R163	3094425091	RMGCFMIN 10R0 OHM	BD24	J2631300204X	BEAD CHIP/TAP HB-1
R164	9057440091	RMGCFMIN 470R0 OHM	BD25	J2631300204X	BEAD CHIP/TAP HB-1
R165	9057440091	RMGCFMIN 470R0 OHM	BD26	J2631300204X	BEAD CHIP/TAP HB-1
R166	2047202091	RMGCFMIN 180K0 OHM	BD27	J2631300204X	BEAD CHIP/TAP HB-1
R167	2047202091	RMGCFMIN 180K0 OHM	BD28	J2631300204X	BEAD CHIP/TAP HB-1
R168	9057440091	RMGCFMIN 470R0 OHM	BD29	J2631300204X	BEAD CHIP/TAP HB-1
R169	9057440091	RMGCFMIN 470R0 OHM	BD30	J2631300204X	BEAD CHIP/TAP HB-1
R170	2047195091	RMGCFMIN 1K0 OHM +	BD31	J2631300204X	BEAD CHIP/TAP HB-1
R171	3094428091	RMGCFMIN 120R0 OHM	BD32	J2631300204X	BEAD CHIP/TAP HB-1
R172	9057440091	RMGCFMIN 470R0 OHM	BD34	J2631300204X	BEAD CHIP/TAP HB-1
R173	5088655091	RMGCFMIN 560R0 OHM	BD38	J2631300204X	BEAD CHIP/TAP HB-1
R174	5088655091	RMGCFMIN 560R0 OHM	BD41	J2631300204X	BEAD CHIP/TAP HB-1
R175	8044037091	RMGCFMIN 150R0 OHM	BD42	J2631300204X	BEAD CHIP/TAP HB-1
R176	5088655091	RMGCFMIN 560R0 OHM	BD43	J2631300204X	BEAD CHIP/TAP HB-1
R177	5088655091	RMGCFMIN 560R0 OHM	BD44	J2631300204X	BEAD CHIP/TAP HB-1
R178	5088655091	RMGCFMIN 560R0 OHM	BD45	J2631300204X	BEAD CHIP/TAP HB-1
R179	5088655091	RMGCFMIN 560R0 OHM	BD57	J2631300204X	BEAD CHIP/TAP HB-1
R180	5088655091	RMGCFMIN 560R0 OHM	BD58	J2631300204X	BEAD CHIP/TAP HB-1
R181	5088655091	RMGCFMIN 560R0 OHM	BD62	J2631300204X	BEAD CHIP/TAP HB-1
R182	5088655091	RMGCFMIN 560R0 OHM	BD71	J2631300204X	BEAD CHIP/TAP HB-1
R183	7043420091	RMGCFMIN 100R0 OHM			
R184	5088655091	RMGCFMIN 560R0 OHM			
R001	1106639091	RMGCFMIN 75R0 OHM			
R002	1106639091	RMGCFMIN 75R0 OHM			
R043	1511259091	RMGCFMIN 3R3 OHM +			
R069	7043420091	RMGCFMIN 100R0 OHM			
R070	7043420091	RMGCFMIN 100R0 OHM			
R090	1511259091	RMGCFMIN 3R3 OHM +			
R150	1035519091	RMGCFMIN 2R2 OHM +			
J002	8044051091	RMGCFMIN 0 OHM +0%			
J003	8044051091	RMGCFMIN 0 OHM +0%			
J004	8044051091	RMGCFMIN 0 OHM +0%			

**Miscellaneous**

J001	J2611447822X	COIL CHIP 0.47UH K
L001	J2611433022X	COIL CHIP 33UH K F
L002	J2611433022X	COIL CHIP 33UH K F
L003	J2611433022X	COIL CHIP 33UH K F
L004	J2611433022X	COIL CHIP 33UH K F
BD05	J2631300204X	BEAD CHIP/TAP HB-1
BD16	J2631300204X	BEAD CHIP/TAP HB-1
BD18	J2631300204X	BEAD CHIP/TAP HB-1
BD61	J2631300204X	BEAD CHIP/TAP HB-1
CN05	J4305100060X	CNT ASSY 5P 480MM
COIL1	J2831020205X	TRANS PULSE 110UH
COIL2	J2831020305X	TRANS PULSE 110UH
CP01	J4422212140X	FPC PLUG 21P 1.25M
CP02	J4423331100X	CNT PLUG BD'BD 2.0
CP03	J4423331600X	CNT PLUG BD'BD 2.0
CP04	J4420130540X	CNT 2.0MM 5P

**Main PCB***Semiconductors*

IC481	J2112505021X	IC 7815PI TO-220IS
IC482	J2112505018X	IC KIA7915PI TO220
IC483	J2112504001X	IC BA033T
IC484	J2112505019X	IC KIA7805PI TO220
IC485	J2112505019X	IC KIA7805PI TO220
IC486	J2112505014X	IC KIA7905PI
IC487	J2112503001X	IC REG ADJ KA337 TO220
IC501	J2110212000X	IC OPAMP 2068DD
D481	J2202306007X	DIODE BU8-04F
D481	J2202376107X	DIODE BU10-04
D482	J2203336007X	DIODE W2-04F
D568	J2221244000X	DIODE RECT 1N5402S
D569	J2221244000X	DIODE RECT 1N5402S
D570	J2221244000X	DIODE RECT 1N5402S
D571	J2221244000X	DIODE RECT 1N5402S
Q425	J2021520302X	TR NPN 2SC4883A
Q426	J2021520302X	TR NPN 2SC4883A
Q433	J2021500102X	TR PNP 2SA1859A
Q434	J2021500102X	TR PNP 2SA1859A
Q435	J2021520302X	TR NPN 2SC4883A
Q436	J2021520302X	TR NPN 2SC4883A
Q437	J2002520103X	TR NPN 2SC5358-R
Q437	J2002520203X	TR NPN 2SC5198-R(1
Q438	J2002520103X	TR NPN 2SC5358-R
Q438	J2002520203X	TR NPN 2SC5198-R(1
Q439	J2002500103X	TR PNP 2SA1986-R

Designator	Part Number	Description	Designator	Part Number	Description
Q439	J2002500203X	TR PNP 2SA1941-R(1	FU481	J5503320330X	FUSE T 250V/2.0A
Q440	J2002500103X	TR PNP 2SA1986-R	FU482	J5502220320X	FUSE 2A/125V
Q440	J2002500203X	TR PNP 2SA1941-R(1	FU482	J5503320330X	FUSE T 250V/2.0A
Q513	J2021520302X	TR NPN 2SC4883A	FU483	J5502220320X	FUSE 2A/125V
Q517	J2021500102X	TR PNP 2SA1859A	FU483	J5503320330X	FUSE T 250V/2.0A
Q518	J2021520302X	TR NPN 2SC4883A	FU484	J5502220320X	FUSE 2A/125V
Q519	J2002520103X	TR NPN 2SC5358-R	FU484	J5503320330X	FUSE T 250V/2.0A
Q519	J2002520203X	TR NPN 2SC5198-R(1	G011	J4200020000X	GND PLATE
Q520	J2002500103X	TR PNP 2SA1986-R	JK401	J44301000300	JACK RCA 1P BK GND
Q520	J2002500203X	TR PNP 2SA1941-R(1	JK401	J44301001100	JACK RCA 1P BROWN

**Capacitors**

C421	13076940AM	CE 470U0F +20% 63.
C422	13076940AM	CE 470U0F +20% 63.
C423	13076940AM	CE 470U0F +20% 63.
C424	13076940AM	CE 470U0F +20% 63.
C481	J34204103661	CE 10000UF 63V
C481	J3420468266X	CE 6800UF 63V
C481	J3420482266X	CAPE82 00UF63V
C482	J34204103661	CE 10000UF 63V
C482	J3420468266X	CE 6800UF 63V
C482	J3420482266X	CAPE82 00UF63V
C485	J3470122261X	CE 2200UP 35V
C486	J3470122261X	CE 2200UP 35V
C487	J3420668236X	CE SHL 6800U 16V M
C488	J3470122231X	CE 2200UF 16V
C511	13076940AM	CE 470U0F +20% 63.
C512	13076940AM	CE 470U0F +20% 63.

**Resistors**

R471	J3076228421X	RES MPR 0.22 5W J
R472	J3076228421X	RES MPR 0.22 5W J
R475	J3010100620X	RES OXIDE 10 1W J
R476	J3010100620X	RES OXIDE 10 1W J
R481	J3030100720X	RES 10 OHM 2W J
R482	J3030100720X	RES 10 OHM 2W J
R483	J3030100720X	RES 10 OHM 2W J
R484	J3030479720X	RES 4R7 OHM 2W J
R485	J3030479720X	RES 4R7 OHM 2W J
R486	J3030479720X	RES 4R7 OHM 2W J
R487	J3030339720X	RES OX 3R3 2W J
R536	J3076228421X	RES MPR 0.22 5W J
R538	J3010100620X	RES OXIDE 10 1W J
VR401	J3211310210X	RES SEMI 1K
VR402	J3211310210X	RES SEMI 1K
VR501	J3211310210X	RES SEMI 1K

**Miscellaneous**

CN401	J4420050300X	CNT ST 35313-0310
CN402	J4420040600X	CNT PLUG 2.5 6P
CN403	J4420040300X	CNT PLUG 2.5 3P
CN407	J4423230500X	CNT 2.0MM 35336-05
CN408	J4423231500X	CNT 2.0 35336-1510
CN409	J4423231500X	CNT 2.0 35336-1510
CN410	J4423231500X	CNT 2.0 35336-1510
CN411	J4423231500X	CNT 2.0 35336-1510
CN412	J4423231600X	CONNECTOR
CN413	J4423231100X	CONNECTOR
CN414	J4422112740X	FPC PLUG 27P 1.25
CN415	J4423231600X	CONNECTOR
CN416	J4420030640X	CNT PLUG 2.0 6P ST
CN417	J4420040300X	CNT PLUG 2.5 3P
CP404	J4305100067X	CNT ASSY12P 390MM
CP405	J4305100068X	CNT ASSY 10P 390+5
CP406	J4305100069X	CNT ASSY 10P 390+5
FU481	J5502220320X	FUSE 2A/125V

**Surround/Standby Power Supply/  
Video Component PCB****Semiconductors**

Q401	J2021020701X	TR NPN KTC3200 BL
Q402	J2021020701X	TR NPN KTC3200 BL
Q403	J2021020701X	TR NPN KTC3200 BL
Q404	J2021020701X	TR NPN KTC3200 BL
Q405	J2021020701X	TR NPN KTC3200 BL
Q406	J2021020701X	TR NPN KTC3200 BL
Q407	J2021020201X	TR NPN KTC3198 BL
Q408	J2021020201X	TR NPN KTC3198 BL
Q411	J2021005101X	TR PNP KTA1268 BL
Q412	J2021005101X	TR PNP KTA1268 BL
Q413	J2021005101X	TR PNP KTA1268 BL
Q414	J2021005101X	TR PNP KTA1268 BL
Q415	J2021020701X	TR NPN KTC3200 BL
Q416	J2021020701X	TR NPN KTC3200 BL
Q417	J2021000101X	TR PNP KTA1024
Q418	J2021000101X	TR PNP KTA1024
Q419	J2021020501X	TR NPN KTC3206
Q420	J2021020501X	TR NPN KTC3206
Q421	J2021000101X	TR PNP KTA1024
Q422	J2021000101X	TR PNP KTA1024
Q423	J2021020501X	TR NPN KTC3206
Q424	J2021020501X	TR NPN KTC3206
Q427	J2021020701X	TR NPN KTC3200 BL
Q428	J2021020701X	TR NPN KTC3200 BL
Q429	J2021020501X	TR NPN KTC3206
Q430	J2021020501X	TR NPN KTC3206
Q431	J2021000101X	TR PNP KTA1024
D401	7043654016	D-SLP 1N4148 100.0
D402	7043654016	D-SLP 1N4148 100.0
D403	7043654016	D-SLP 1N4148 100.0
D404	7043654016	D-SLP 1N4148 100.0
D405	7043654016	D-SLP 1N4148 100.0
D406	7043654016	D-SLP 1N4148 100.0
D501	7043654016	D-SLP 1N4148 100.0
D502	7043654016	D-SLP 1N4148 100.0
D551	7043654016	D-SLP 1N4148 100.0
D552	7043654016	D-SLP 1N4148 100.0

Designator	Part Number	Description	Designator	Part Number	Description
D553	7043654016	D-SLP 1N4148 100.0	D988	7043654016	D-SLP 1N4148 100.0
D554	7043654016	D-SLP 1N4148 100.0	D991	J2221430635X	D-ZENER .5W 30V J
D555	7043654016	D-SLP 1N4148 100.0	D992	7043654016	D-SLP 1N4148 100.0
D556	7043654016	D-SLP 1N4148 100.0	D994	J2221475535X	D-Z/AX 0.5W 7.5V U
D566	7043654016	D-SLP 1N4148 100.0	D996	J2221451535X	D-ZENER .5W 5V1 J
D567	7043654016	D-SLP 1N4148 100.0	Q601	J2021020701X	TR NPN KTC3200 BL
IC390	J2116004001X	IC BA7660FS 3-CH	Q602	J2021020701X	TR NPN KTC3200 BL
IC391	J2116004003X	IC BA7603F VIDEO	Q603	J2021020701X	TR NPN KTC3200 BL
IC981	J2112505000X	IC KIA7805P TO-220	Q604	J2021020701X	TR NPN KTC3200 BL
Q625	J2021520302X	TR NPN 2SC4883A	Q605	J2021020701X	TR NPN KTC3200 BL
Q626	J2021520302X	TR NPN 2SC4883A	Q606	J2021020701X	TR NPN KTC3200 BL
Q633	J2021500102X	TR PNP 2SA1859A	Q607	J2021020201X	TR NPN KTC3198 BL
Q634	J2021500102X	TR PNP 2SA1859A	Q608	J2021020201X	TR NPN KTC3198 BL
Q635	J2021520302X	TR NPN 2SC4883A	Q611	J2021005101X	TR PNP KTA1268 BL
Q636	J2021520302X	TR NPN 2SC4883A	Q612	J2021005101X	TR PNP KTA1268 BL
Q637	J2002520103X	TR NPN 2SC5358-R	Q613	J2021005101X	TR PNP KTA1268 BL
Q637	J2002520203X	TR NPN 2SC5198-R(1	Q614	J2021005101X	TR PNP KTA1268 BL
Q638	J2002520103X	TR NPN 2SC5358-R	Q615	J2021020701X	TR NPN KTC3200 BL
Q638	J2002520203X	TR NPN 2SC5198-R(1	Q616	J2021020701X	TR NPN KTC3200 BL
Q639	J2002500103X	TR PNP 2SA1986-R	Q617	J2021000101X	TR PNP KTA1024
Q639	J2002500203X	TR PNP 2SA1941-R(1	Q618	J2021000101X	TR PNP KTA1024
Q640	J2002500103X	TR PNP 2SA1986-R	Q619	J2021020501X	TR NPN KTC3206
Q640	J2002500203X	TR PNP 2SA1941-R(1	Q620	J2021020501X	TR NPN KTC3206
D691	J2202306007X	DIODE BU8-04F	Q621	J2021000101X	TR PNP KTA1024
D691	J2202366007X	DIODE BU6-04F	Q622	J2021000101X	TR PNP KTA1024
D981	2041506016	D-SR 1N4004 400.0V	Q623	J2021020501X	TR NPN KTC3206
D982	2041506016	D-SR 1N4004 400.0V	Q624	J2021020501X	TR NPN KTC3206
D983	2041506016	D-SR 1N4004 400.0V	Q627	J2021020701X	TR NPN KTC3200 BL
D984	2041506016	D-SR 1N4004 400.0V	Q628	J2021020701X	TR NPN KTC3200 BL
D985	2041506016	D-SR 1N4004 400.0V	Q629	J2021020501X	TR NPN KTC3206
D986	2041506016	D-SR 1N4004 400.0V	Q630	J2021020501X	TR NPN KTC3206
D989	2041506016	D-SR 1N4004 400.0V	Q631	J2021000101X	TR PNP KTA1024
D990	2041506016	D-SR 1N4004 400.0V	Q632	J2021000101X	TR PNP KTA1024
Q432	J2021000101X	TR PNP KTA1024	Q681	J2021020701X	TR NPN KTC3200 BL
Q501	J2021020701X	TR NPN KTC3200 BL	Q682	J2021020701X	TR NPN KTC3200 BL
Q502	J2021020701X	TR NPN KTC3200 BL	Q683	J2021005101X	TR PNP KTA1268 BL
Q503	J2021020701X	TR NPN KTC3200 BL	Q981	J2021005101X	TR PNP KTA1268 BL
Q504	J2021020201X	TR NPN KTC3198 BL	Q982	J2021020801X	TR MPSA06 Y TO-92
Q506	J2021005101X	TR PNP KTA1268 BL			
Q507	J2021005101X	TR PNP KTA1268 BL			
Q508	J2021020701X	TR NPN KTC3200 BL			
Q509	J2021000101X	TR PNP KTA1024			
Q510	J2021020501X	TR NPN KTC3206			
Q511	J2021000101X	TR PNP KTA1024			
Q512	J2021020501X	TR NPN KTC3206			
Q514	J2021020701X	TR NPN KTC3200 BL			
Q515	J2021020501X	TR NPN KTC3206			
Q516	J2021000101X	TR PNP KTA1024			
Q551	J2021020701X	TR NPN KTC3200 BL			
Q552	J2021020701X	TR NPN KTC3200 BL			
Q553	J2021020701X	TR NPN KTC3200 BL			
Q554	J2021020201X	TR NPN KTC3198 BL			
Q555	J2021020201X	TR NPN KTC3198 BL			
Q556	J2021020201X	TR NPN KTC3198 BL			
Q557	J2021000201X	TR PNP KTA1266 Y			
Q558	J2021000101X	TR PNP KTA1024			
Q559	J2021220001X	TR NPN KRC107M			
Q559	J2021220102X	TR NPN DTC114YSA			
Q561	J2021005101X	TR PNP KTA1268 BL			
D601	7043654016	D-SLP 1N4148 100.0			
D602	7043654016	D-SLP 1N4148 100.0			
D603	7043654016	D-SLP 1N4148 100.0			
D604	7043654016	D-SLP 1N4148 100.0			
D681	7043654016	D-SLP 1N4148 100.0			
D682	7043654016	D-SLP 1N4148 100.0			
D683	7043654016	D-SLP 1N4148 100.0			
D684	7043654016	D-SLP 1N4148 100.0			
D685	7043654016	D-SLP 1N4148 100.0			
D987	7043654016	D-SLP 1N4148 100.0			

### Capacitors

C621	13073530AM	CE 470U0F +20% 50.
C621	13076940AM	CE 470U0F +20% 63.
C622	13073530AM	CE 470U0F +20% 50.
C622	13076940AM	CE 470U0F +20% 63.
C623	13073530AM	CE 470U0F +20% 50.
C623	13076940AM	CE 470U0F +20% 63.
C624	13073530AM	CE 470U0F +20% 50.
C624	13076940AM	CE 470U0F +20% 63.
C691	J3420447256X	CE DL 4700U 50V
C691	J3420468256X	CE 6800UF 50V
C691	J3420468266X	CE 6800UF 63V
C692	J3420447256X	CE DL 4700U 50V
C692	J3420468256X	CE 6800UF 50V
C692	J3420468266X	CE 6800UF 63V
C982	J3531472412X	CAP AC250V 472-M
C984	13073530AM	CE 470U0F +20% 50.
C989	13073530AM	CE 470U0F +20% 50.
C990	13073530AM	CE 470U0F +20% 50.
C111	2093665016	CC 100P0F +10% -10
C112	2093665016	CC 100P0F +10% -10
C113	2093665016	CC 100P0F +10% -10
C114	2093665016	CC 100P0F +10% -10
C115	2093665016	CC 100P0F +10% -10
C116	2093665016	CC 100P0F +10% -10
C401	2026888030	CE 10U0F +20% 50.0
C402	2026888030	CE 10U0F +20% 50.0
C403	1105530071	CC 68P0F +5% -5% 5
C404	1105530071	CC 68P0F +5% -5% 5



Designator	Part Number	Description	Designator	Part Number	Description
C405	2026907030	CE 100U0F +20% 25.	C582	2026783030	CE 47U0F +20% 16.0
C406	2026907030	CE 100U0F +20% 25.	C583	2026783030	CE 47U0F +20% 16.0
C407	2026908030	CE 220U0F +20% 10.	C588	1500213030	CE 10U0F +20% 16.0
C408	2026908030	CE 220U0F +20% 10.	C589	1500213030	CE 10U0F +20% 16.0
C409	3093607071	CC 12P0F +5% -5% 5	C374	2024647071	CC 100N0F +80% -20
C410	3093607071	CC 12P0F +5% -5% 5	C375	2026783030	CE 47U0F +20% 16.0
C411	6043915071	CC 33P0F +5% -5% 5	C376	2026902030	CE 100U0F +20% 16.
C412	6043915071	CC 33P0F +5% -5% 5	C377	2026889030	CE 22U0F +20% 25.0
C413	2026888030	CE 10U0F +20% 50.0	C378	2026907030	CE 100U0F +20% 25.
C414	2026888030	CE 10U0F +20% 50.0	C379	2026889030	CE 22U0F +20% 25.0
C415	2026888030	CE 10U0F +20% 50.0	C380	2026902030	CE 100U0F +20% 16.
C416	2026888030	CE 10U0F +20% 50.0	C381	2026889030	CE 22U0F +20% 25.0
C417	J3640104320X	CP MET .1U 63V -K	C382	2024647071	CC 100N0F +80% -20
C418	J3640104320X	CP MET .1U 63V -K	C383	2026783030	CE 47U0F +20% 16.0
C419	J3640104320X	CP MET .1U 63V -K	C384	2026884030	CE 1U0F +20% 50.0V
C420	J3640104320X	CP MET .1U 63V -K	C387	2026884030	CE 1U0F +20% 50.0V
C425	1105556071	CC 3N3F +10% -10%	C388	2026884030	CE 1U0F +20% 50.0V
C426	1105556071	CC 3N3F +10% -10%	C389	2026884030	CE 1U0F +20% 50.0V
C431	J3600473330X	CP .047U 100V K	C392	2026884030	CE 1U0F +20% 50.0V
C432	J3600473330X	CP .047U 100V K	C395	2026884030	CE 1U0F +20% 50.0V
C433	J3600473330X	CP .047U 100V K	C396	2093665016	CC 100P0F +10% -10
C434	2025004016	CC 220P0F +10% -10	C397	2093665016	CC 100P0F +10% -10
C435	2025004016	CC 220P0F +10% -10	C398	2093665016	CC 100P0F +10% -10
C436	2025004016	CC 220P0F +10% -10	C399	2029347016	CC 100N0F +80% -20
C437	2025004016	CC 220P0F +10% -10	C601	2026888030	CE 10U0F +20% 50.0
C439	2025004016	CC 220P0F +10% -10	C602	2026888030	CE 10U0F +20% 50.0
C441	2025004016	CC 220P0F +10% -10	C603	1105530071	CC 68P0F +5% -5% 5
C443	2025004016	CC 220P0F +10% -10	C604	1105530071	CC 68P0F +5% -5% 5
C444	2025004016	CC 220P0F +10% -10	C605	2026907030	CE 100U0F +20% 25.
C445	2024647071	CC 100N0F +80% -20	C606	2026907030	CE 100U0F +20% 25.
C446	2024647071	CC 100N0F +80% -20	C607	2026908030	CE 220U0F +20% 10.
C483	J3640104350X	CP MET .1U 250V -M	C608	2026908030	CE 220U0F +20% 10.
C484	J3600473330X	CP .047U 100V K	C609	3093607071	CC 12P0F +5% -5% 5
C489	2026888030	CE 10U0F +20% 50.0	C610	3093607071	CC 12P0F +5% -5% 5
C490	2026888030	CE 10U0F +20% 50.0	C611	6043915071	CC 33P0F +5% -5% 5
C492	2026888030	CE 10U0F +20% 50.0	C612	6043915071	CC 33P0F +5% -5% 5
C494	2026888030	CE 10U0F +20% 50.0	C613	2026888030	CE 10U0F +20% 50.0
C496	2026888030	CE 10U0F +20% 50.0	C614	2026888030	CE 10U0F +20% 50.0
C497	2026888030	CE 10U0F +20% 50.0	C615	2026888030	CE 10U0F +20% 50.0
C498	2026888030	CE 10U0F +20% 50.0	C616	2026888030	CE 10U0F +20% 50.0
C501	2026888030	CE 10U0F +20% 50.0	C617	J3640104320X	CP MET .1U 63V -K
C502	1105530071	CC 68P0F +5% -5% 5	C618	J3640104320X	CP MET .1U 63V -K
C503	2026907030	CE 100U0F +20% 25.	C619	J3640104320X	CP MET .1U 63V -K
C504	2026908030	CE 220U0F +20% 10.	C620	J3640104320X	CP MET .1U 63V -K
C505	3093607071	CC 12P0F +5% -5% 5	C625	1105556071	CC 3N3F +10% -10%
C506	6043915071	CC 33P0F +5% -5% 5	C626	1105556071	CC 3N3F +10% -10%
C507	2026888030	CE 10U0F +20% 50.0	C629	4043358071	CC 68P0F +10% -10
C508	2026888030	CE 10U0F +20% 50.0	C630	4043358071	CC 68P0F +10% -10
C509	J3640104320X	CP MET .1U 63V -K	C681	J3640683220X	CMP 0.068U 63V J
C510	J3640104320X	CP MET .1U 63V -K	C682	J3640683220X	CMP 0.068U 63V J
C513	1105556071	CC 3N3F +10% -10%	C693	J3640104350X	CP MET .1U 250V -M
C551	J3640683220X	CMP 0.068U 63V J	C694	J3640104350X	CP MET .1U 250V -M
C552	J3640683220X	CMP 0.068U 63V J	C695	J3640104350X	CP MET .1U 250V -M
C553	J3640683220X	CMP 0.068U 63V J	C696	1500213030	CE 10U0F +20% 16.0
C554	J3470147121X	CE SG 470U 10V M	C971	2026884030	CE 1U0F +20% 50.0V
C555	7042852071	CC 10N0F +10% -10%	C983	7042852071	CC 10N0F +10% -10%
C556	7042852071	CC 10N0F +10% -10%	C985	2049503016	CC 100N0F +10% -10
C558	2029347016	CC 100N0F +80% -20	C986	2026884030	CE 1U0F +20% 50.0V
C563	2029347016	CC 100N0F +80% -20	C987	2026888030	CE 10U0F +20% 50.0
C564	J3640104350X	CP MET .1U 250V -M	C988	2049503016	CC 100N0F +10% -10
C565	J3640104350X	CP MET .1U 250V -M	C991	2026901030	CE 47U0F +20% 50.0
C566	J3600473330X	CP .047U 100V K	C992	1303935030	CE 100U0F +20% 35.
C567	J3600473330X	CP .047U 100V K	C993	2049503016	CC 100N0F +10% -10
C568	1500213030	CE 10U0F +20% 16.0	C994	2049503016	CC 100N0F +10% -10
C569	4043358071	CC 68P0F +10% -10	C995	2049503016	CC 100N0F +10% -10
C570	4043358071	CC 68P0F +10% -10	C997	7042852071	CC 10N0F +10% -10%
C571	4043358071	CC 68P0F +10% -10	C998	7042852071	CC 10N0F +10% -10%
C576	2093665016	CC 100P0F +10% -10	C999	7042852071	CC 10N0F +10% -10%
C577	2093665016	CC 100P0F +10% -10			

Designator Part Number Description

Designator Part Number Description

## Resistors

R671 J3076228421X RES MPR 0.22 5W J  
R672 J3076228421X RES MPR 0.22 5W J  
R675 J3010100620X RES OXIDE 10 1W J  
R676 J3010100620X RES OXIDE 10 1W J  
R995 J3091335033X RES 3.3MOHM 1/2W  
R121 5088297016 RCF 470R0 OHM +5%  
R122 5088297016 RCF 470R0 OHM +5%  
R123 3093951016 RCF 100K0 OHM +5%  
R124 3093951016 RCF 100K0 OHM +5%  
R125 5088297016 RCF 470R0 OHM +5%  
R126 5088297016 RCF 470R0 OHM +5%  
R127 3093951016 RCF 100K0 OHM +5%  
R128 3093951016 RCF 100K0 OHM +5%  
R129 5088297016 RCF 470R0 OHM +5%  
R130 2046946016 RCF 2K2 OHM +5% 25  
R131 3093951016 RCF 100K0 OHM +5%  
R132 3093951016 RCF 100K0 OHM +5%  
R401 6044155016 RCF 330R0 OHM +5%  
R402 6044155016 RCF 330R0 OHM +5%  
R403 3093949016 RCF 33K0 OHM +5% 2  
R403 8043703016 RCF 27K0 OHM +5% 2  
R403 9057113016 RCF 39K0 OHM +5% 2  
R404 3093949016 RCF 33K0 OHM +5% 2  
R404 8043703016 RCF 27K0 OHM +5% 2  
R404 9057113016 RCF 39K0 OHM +5% 2  
R405 4043563016 RCF 1K5 OHM +5% 25  
R406 4043563016 RCF 1K5 OHM +5% 25  
R407 4043563016 RCF 1K5 OHM +5% 25  
R408 4043563016 RCF 1K5 OHM +5% 25  
R409 2046945016 RCF 220R0 OHM +5%  
R410 2046945016 RCF 220R0 OHM +5%  
R411 2046945016 RCF 220R0 OHM +5%  
R412 2046945016 RCF 220R0 OHM +5%  
R413 1105961016 RCF 270R0 OHM +5%  
R414 1105961016 RCF 270R0 OHM +5%  
R415 2046951016 RCF 43K0 OHM +5% 2  
R416 2046951016 RCF 43K0 OHM +5% 2  
R417 3093949016 RCF 33K0 OHM +5% 2  
R417 8043703016 RCF 27K0 OHM +5% 2  
R417 9057113016 RCF 39K0 OHM +5% 2  
R418 3093949016 RCF 33K0 OHM +5% 2  
R418 8043703016 RCF 27K0 OHM +5% 2  
R418 9057113016 RCF 39K0 OHM +5% 2  
R419 1105966016 RCF 2K0 OHM +5% 25  
R419 8043701016 RCF 1K8 OHM +5% 25  
R420 1105966016 RCF 2K0 OHM +5% 25  
R420 8043701016 RCF 1K8 OHM +5% 25  
R421 6044156016 RCF 560R0 OHM +5%  
R422 6044156016 RCF 560R0 OHM +5%  
R423 6044156016 RCF 560R0 OHM +5%  
R424 6044156016 RCF 560R0 OHM +5%  
R425 6044156016 RCF 560R0 OHM +5%  
R426 6044156016 RCF 560R0 OHM +5%  
R427 6044156016 RCF 560R0 OHM +5%  
R428 6044156016 RCF 560R0 OHM +5%  
R429 6044156016 RCF 560R0 OHM +5%  
R430 6044156016 RCF 560R0 OHM +5%  
R431 6044156016 RCF 560R0 OHM +5%  
R432 6044156016 RCF 560R0 OHM +5%  
R433 5088296016 RCF 150R0 OHM +5%  
R434 5088296016 RCF 150R0 OHM +5%  
R435 5088296016 RCF 150R0 OHM +5%  
R436 5088296016 RCF 150R0 OHM +5%  
R437 5088301016 RCF 15K0 OHM +5% 2  
R438 5088301016 RCF 15K0 OHM +5% 2  
R439 5088301016 RCF 15K0 OHM +5% 2  
R440 5088301016 RCF 15K0 OHM +5% 2

R441 5088296016 RCF 150R0 OHM +5%  
R442 5088296016 RCF 150R0 OHM +5%  
R443 5088296016 RCF 150R0 OHM +5%  
R444 5088296016 RCF 150R0 OHM +5%  
R445 3093936016 RCF 10R0 OHM +5% 2  
R446 3093936016 RCF 10R0 OHM +5% 2  
R447 3093936016 RCF 10R0 OHM +5% 2  
R448 3093936016 RCF 10R0 OHM +5% 2  
R449 1105964016 RCF 1K0 OHM +5% 25  
R450 1105964016 RCF 1K0 OHM +5% 25  
R451 6044156016 RCF 560R0 OHM +5%  
R452 6044156016 RCF 560R0 OHM +5%  
R453 4043564016 RCF 4K7 OHM +5% 25  
R454 4043564016 RCF 4K7 OHM +5% 25  
R455 7043056016 RCF 5K6 OHM +5% 25  
R456 7043056016 RCF 5K6 OHM +5% 25  
R457 5088295016 RCF 100R0 OHM +5%  
R458 5088295016 RCF 100R0 OHM +5%  
R459 5088295016 RCF 100R0 OHM +5%  
R460 5088295016 RCF 100R0 OHM +5%  
R461 3093937016 RCF 15R0 OHM +5% 2  
R462 3093937016 RCF 15R0 OHM +5% 2  
R463 3093937016 RCF 15R0 OHM +5% 2  
R464 3093937016 RCF 15R0 OHM +5% 2  
R465 4043891016 RCF 2R2 OHM +5% 25  
R466 4043891016 RCF 2R2 OHM +5% 25  
R467 4043891016 RCF 2R2 OHM +5% 25  
R468 4043891016 RCF 2R2 OHM +5% 25  
R469 1105959016 RCF 82R0 OHM +5% 2  
R470 1105959016 RCF 82R0 OHM +5% 2  
R473 3093936016 RCF 10R0 OHM +5% 2  
R474 3093936016 RCF 10R0 OHM +5% 2  
R477 3093936016 RCF 10R0 OHM +5% 2  
R478 3093936016 RCF 10R0 OHM +5% 2  
R489 2046945016 RCF 220R0 OHM +5%  
R490 1105963016 RCF 680R0 OHM +5%  
R501 6044155016 RCF 330R0 OHM +5%  
R502 3093949016 RCF 33K0 OHM +5% 2  
R502 8043703016 RCF 27K0 OHM +5% 2  
R502 9057113016 RCF 39K0 OHM +5% 2  
R503 4043563016 RCF 1K5 OHM +5% 25  
R504 4043563016 RCF 1K5 OHM +5% 25  
R505 2046945016 RCF 220R0 OHM +5%  
R506 2046945016 RCF 220R0 OHM +5%  
R507 1105961016 RCF 270R0 OHM +5%  
R508 2046951016 RCF 43K0 OHM +5% 2  
R509 3093949016 RCF 33K0 OHM +5% 2  
R509 8043703016 RCF 27K0 OHM +5% 2  
R509 9057113016 RCF 39K0 OHM +5% 2  
R510 1105966016 RCF 2K0 OHM +5% 25  
R510 8043701016 RCF 1K8 OHM +5% 25  
R511 6044156016 RCF 560R0 OHM +5%  
R512 6044156016 RCF 560R0 OHM +5%  
R513 6044156016 RCF 560R0 OHM +5%  
R514 6044156016 RCF 560R0 OHM +5%  
R515 6044156016 RCF 560R0 OHM +5%  
R516 6044156016 RCF 560R0 OHM +5%  
R517 5088296016 RCF 150R0 OHM +5%  
R518 5088296016 RCF 150R0 OHM +5%  
R519 5088301016 RCF 15K0 OHM +5% 2  
R520 5088301016 RCF 15K0 OHM +5% 2  
R521 5088296016 RCF 150R0 OHM +5%  
R522 5088296016 RCF 150R0 OHM +5%  
R523 3093936016 RCF 10R0 OHM +5% 2  
R524 3093936016 RCF 10R0 OHM +5% 2  
R525 1105964016 RCF 1K0 OHM +5% 25  
R526 6044156016 RCF 560R0 OHM +5%  
R527 4043564016 RCF 4K7 OHM +5% 25  
R528 7043056016 RCF 5K6 OHM +5% 25

Designator	Part Number	Description	Designator	Part Number	Description
R529	5088295016	RCF 100R0 OHM +5%	R606	4043563016	RCF 1K5 OHM +5% 25
R530	5088295016	RCF 100R0 OHM +5%	R607	4043563016	RCF 1K5 OHM +5% 25
R531	3093937016	RCF 15R0 OHM +5% 2	R608	4043563016	RCF 1K5 OHM +5% 25
R532	3093937016	RCF 15R0 OHM +5% 2	R609	2046945016	RCF 220R0 OHM +5%
R533	4043891016	RCF 2R2 OHM +5% 25	R610	2046945016	RCF 220R0 OHM +5%
R534	4043891016	RCF 2R2 OHM +5% 25	R612	2046945016	RCF 220R0 OHM +5%
R535	1105959016	RCF 82R0 OHM +5% 2	R613	1105961016	RCF 270R0 OHM +5%
R537	3093936016	RCF 10R0 OHM +5% 2	R614	1105961016	RCF 270R0 OHM +5%
R539	3093936016	RCF 10R0 OHM +5% 2	R615	2046951016	RCF 43K0 OHM +5% 2
R551	4043563016	RCF 1K5 OHM +5% 25	R616	2046951016	RCF 43K0 OHM +5% 2
R552	4043563016	RCF 1K5 OHM +5% 25	R617	3093949016	RCF 33K0 OHM +5% 2
R553	5088301016	RCF 15K0 OHM +5% 2	R617	8043703016	RCF 27K0 OHM +5% 2
R554	5088301016	RCF 15K0 OHM +5% 2	R617	9057113016	RCF 39K0 OHM +5% 2
R555	6044158016	RCF 22K0 OHM +5% 2	R618	3093949016	RCF 33K0 OHM +5% 2
R556	6044158016	RCF 22K0 OHM +5% 2	R618	8043703016	RCF 27K0 OHM +5% 2
R557	4043563016	RCF 1K5 OHM +5% 25	R618	9057113016	RCF 39K0 OHM +5% 2
R558	5088301016	RCF 15K0 OHM +5% 2	R619	1105966016	RCF 2K0 OHM +5% 25
R559	6044158016	RCF 22K0 OHM +5% 2	R619	8043701016	RCF 1K8 OHM +5% 25
R561	7043057016	RCF 8K2 OHM +5% 25	R620	1105966016	RCF 2K0 OHM +5% 25
R562	1105971016	RCF 56K0 OHM +5% 2	R620	8043701016	RCF 1K8 OHM +5% 25
R563	1105971016	RCF 56K0 OHM +5% 2	R621	6044156016	RCF 560R0 OHM +5%
R564	1105971016	RCF 56K0 OHM +5% 2	R622	6044156016	RCF 560R0 OHM +5%
R565	9057112016	RCF 12K0 OHM +5% 2	R623	6044156016	RCF 560R0 OHM +5%
R566	5088295016	RCF 100R0 OHM +5%	R624	6044156016	RCF 560R0 OHM +5%
R567	3093948016	RCF 10K0 OHM +5% 2	R625	6044156016	RCF 560R0 OHM +5%
R568	3093948016	RCF 10K0 OHM +5% 2	R626	6044156016	RCF 560R0 OHM +5%
R569	3093948016	RCF 10K0 OHM +5% 2	R627	6044156016	RCF 560R0 OHM +5%
R570	1105961016	RCF 270R0 OHM +5%	R628	6044156016	RCF 560R0 OHM +5%
R571	8043703016	RCF 27K0 OHM +5% 2	R629	6044156016	RCF 560R0 OHM +5%
R585	4043563016	RCF 1K5 OHM +5% 25	R630	6044156016	RCF 560R0 OHM +5%
R586	4043563016	RCF 1K5 OHM +5% 25	R631	6044156016	RCF 560R0 OHM +5%
R587	9057113016	RCF 39K0 OHM +5% 2	R632	6044156016	RCF 560R0 OHM +5%
R588	9057113016	RCF 39K0 OHM +5% 2	R633	5088296016	RCF 150R0 OHM +5%
R589	4043563016	RCF 1K5 OHM +5% 25	R634	5088296016	RCF 150R0 OHM +5%
R590	9057113016	RCF 39K0 OHM +5% 2	R635	5088296016	RCF 150R0 OHM +5%
R591	3093948016	RCF 10K0 OHM +5% 2	R636	5088296016	RCF 150R0 OHM +5%
R592	9057113016	RCF 39K0 OHM +5% 2	R637	5088301016	RCF 15K0 OHM +5% 2
R593	5088297016	RCF 470R0 OHM +5%	R638	5088301016	RCF 15K0 OHM +5% 2
R594	5088297016	RCF 470R0 OHM +5%	R639	5088301016	RCF 15K0 OHM +5% 2
R595	5088297016	RCF 470R0 OHM +5%	R640	5088301016	RCF 15K0 OHM +5% 2
R596	5088295016	RCF 100R0 OHM +5%	R641	5088296016	RCF 150R0 OHM +5%
R597	5088295016	RCF 100R0 OHM +5%	R642	5088296016	RCF 150R0 OHM +5%
R606	3093951016	RCF 100K0 OHM +5%	R643	5088296016	RCF 150R0 OHM +5%
R607	3093951016	RCF 100K0 OHM +5%	R644	5088296016	RCF 150R0 OHM +5%
R608	1105964016	RCF 1K0 OHM +5% 25	R645	3093936016	RCF 10R0 OHM +5% 2
R609	9057112016	RCF 12K0 OHM +5% 2	R646	3093936016	RCF 10R0 OHM +5% 2
R610	1105964016	RCF 1K0 OHM +5% 25	R647	3093936016	RCF 10R0 OHM +5% 2
R611	9057112016	RCF 12K0 OHM +5% 2	R648	3093936016	RCF 10R0 OHM +5% 2
R385	7043052016	RCF 75R0 OHM +5% 2	R649	1105964016	RCF 1K0 OHM +5% 25
R386	7043052016	RCF 75R0 OHM +5% 2	R650	1105964016	RCF 1K0 OHM +5% 25
R387	7043052016	RCF 75R0 OHM +5% 2	R651	6044156016	RCF 560R0 OHM +5%
R389	7043052016	RCF 75R0 OHM +5% 2	R652	6044156016	RCF 560R0 OHM +5%
R391	7043052016	RCF 75R0 OHM +5% 2	R653	4043564016	RCF 4K7 OHM +5% 25
R392	7043052016	RCF 75R0 OHM +5% 2	R654	4043564016	RCF 4K7 OHM +5% 25
R393	7043052016	RCF 75R0 OHM +5% 2	R655	7043056016	RCF 5K6 OHM +5% 25
R394	7043052016	RCF 75R0 OHM +5% 2	R656	7043056016	RCF 5K6 OHM +5% 25
R396	7043052016	RCF 75R0 OHM +5% 2	R657	5088295016	RCF 100R0 OHM +5%
R397	3093948016	RCF 10K0 OHM +5% 2	R658	5088295016	RCF 100R0 OHM +5%
R398	3093948016	RCF 10K0 OHM +5% 2	R659	5088295016	RCF 100R0 OHM +5%
R399	3093948016	RCF 10K0 OHM +5% 2	R660	5088295016	RCF 100R0 OHM +5%
R601	6044155016	RCF 330R0 OHM +5%	R661	3093937016	RCF 15R0 OHM +5% 2
R602	6044155016	RCF 330R0 OHM +5%	R662	3093937016	RCF 15R0 OHM +5% 2
R603	3093949016	RCF 33K0 OHM +5% 2	R663	3093937016	RCF 15R0 OHM +5% 2
R603	8043703016	RCF 27K0 OHM +5% 2	R664	3093937016	RCF 15R0 OHM +5% 2
R603	9057113016	RCF 39K0 OHM +5% 2	R665	4043891016	RCF 2R2 OHM +5% 25
R604	3093949016	RCF 33K0 OHM +5% 2	R666	4043891016	RCF 2R2 OHM +5% 25
R604	8043703016	RCF 27K0 OHM +5% 2	R667	4043891016	RCF 2R2 OHM +5% 25
R604	9057113016	RCF 39K0 OHM +5% 2	R668	4043891016	RCF 2R2 OHM +5% 25
R605	4043563016	RCF 1K5 OHM +5% 25	R669	1105959016	RCF 82R0 OHM +5% 2

Designator	Part Number	Description	Designator	Part Number	Description
R670	1105959016	RCF 82R0 OHM +5% 2	WA986	J4420040700X	CNT PLUG 2.5 7P
R673	3093936016	RCF 10R0 OHM +5% 2	W301	J4305100073X	CNT ASSY 1P 80MM #
R674	3093936016	RCF 10R0 OHM +5% 2	W302	J4305100073X	CNT ASSY 1P 80MM #
R677	3093936016	RCF 10R0 OHM +5% 2	FH401	J4210020001X	FUSE CLIP 0.3T
R678	3093936016	RCF 10R0 OHM +5% 2	FH402	J4210020001X	FUSE CLIP 0.3T
R679	5088297016	RCF 470R0 OHM +5%	FH403	J4210020001X	FUSE CLIP 0.3T
R680	5088297016	RCF 470R0 OHM +5%	FH404	J4210020001X	FUSE CLIP 0.3T
R681	4043563016	RCF 1K5 OHM +5% 25	FH405	J4210020001X	FUSE CLIP 0.3T
R682	4043563016	RCF 1K5 OHM +5% 25	FH406	J4210020001X	FUSE CLIP 0.3T
R683	5088301016	RCF 15K0 OHM +5% 2	FH407	J4210020001X	FUSE CLIP 0.3T
R684	5088301016	RCF 15K0 OHM +5% 2	FH408	J4210020001X	FUSE CLIP 0.3T
R685	6044158016	RCF 22K0 OHM +5% 2	FH981	J4210020001X	FUSE CLIP 0.3T
R686	6044158016	RCF 22K0 OHM +5% 2			
R687	4043563016	RCF 1K5 OHM +5% 25			
R688	4043563016	RCF 1K5 OHM +5% 25			
R689	9057113016	RCF 39K0 OHM +5% 2			
R690	9057113016	RCF 39K0 OHM +5% 2			
R691	3093948016	RCF 10K0 OHM +5% 2			
R692	9057113016	RCF 39K0 OHM +5% 2			
R971	3093948016	RCF 10K0 OHM +5% 2			
R972	3093951016	RCF 100K0 OHM +5%			
R981	2047253016	RCF 4R7 OHM +5% 25			
R982	2046946016	RCF 2K2 OHM +5% 25			
R983	1105964016	RCF 1K0 OHM +5% 25			
R984	1105967016	RCF 2K7 OHM +5% 25			
R985	3093938016	RCF 22R0 OHM +5% 2			
R986	2046946016	RCF 2K2 OHM +5% 25			
R987	6044156016	RCF 560R0 OHM +5%			
R988	1106757016	RCF 1R0 OHM +5% 25			
R989	1106757016	RCF 1R0 OHM +5% 25			
R993	7043056016	RCF 5K6 OHM +5% 25			
VR601	J3211310210X	RES SEMI 1K			
VR602	J3211310210X	RES SEMI 1K			

**AVR110 COMPLETE TUNER  
PCB ASS'Y PART# J4099100170X**

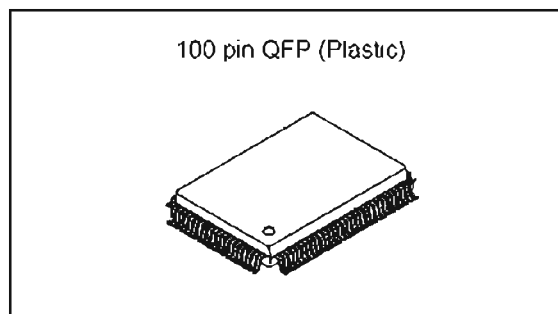
*Miscellaneous*

RL981	J5511300010X	RELAY 10A 12V
RL981	J5511300020X	RELAY SDT-S-112DMR
	J60530006000	HEAT SINK 16X7.5X3
	J5636140010X	SCREW
	J90400038000	LABEL FUSE SB5A/12
AC981	J1561000006X	AC OUTLET CE
AC981	J44900000110	AC OUTLET A204D004
AC981	J44901000100	AC OUTLET A304D007
BKT1	J60300028000	BKT GROUND ET 0.5T
BKT2	J60300028000	BKT GROUND ET 0.5T
CA81	J3926100000X	X-C .1U PCX2 335M
CN606	J4305100066X	CNT ASSY 3P 900MM
CP390	J4420030440X	CNT PLUG 4P 2.0MM
FU981	J5502250320X	FUSE SB 5A/125V
FU981	J5502263320X	FUSE SB 6.3A/125V
FU981	J5502270320X	FUSE SB 7A/125V
FU981	J5503331330X	FUSE 250V 3.15A
FU981	J5503340330X	FUSET 4A/250V
FU981	J5503350330X	FUSE 5A/250V
H012	J4305100026X	LUG WIRE 1P 200MM
H020	J4305100026X	LUG WIRE 1P 200MM
JA290	J44309000000	JACK RCA 9P GND CAP
JK601	J44001400000	TERMINAL SCREW 4P
L601	J1451000030X	COIL-AF CHOKE .7UH
L602	J1451000030X	COIL-AF CHOKE .7UH
T981	55175760	ST'BY TRANS
WA601	J4420040200X	CNT ST 5267-02A
WA602	J4420040200X	CNT ST 5267-02A
WA603	J4420050300X	CNT ST 35313-0310
WA625	J4420030440X	CNT PLUG 4P 2.0MM
WA981	J4420060260X	CONNECTOR
WA983	J4420060200X	CONNECTOR
WA985	J4420060200X	CONNECTOR

**SONY****CXP82832/82840/82852/82860****CMOS 8-bit Single Chip Microcomputer****Description**

The CXP82832/82840/82852/82860 is a CMOS 8-bit single chip microcomputer integrating on a single chip an A/D converter, serial interface, timer/counter, time base timer, capture timer/counter, fluorescent display panel controller/driver, remote control reception circuit, and PWM output besides the basic configurations of 8-bit CPU, ROM, RAM, and I/O port.

The CXP82832/82840/82852/82860 also provides sleep/stop function that enables lower power consumption.

**Structure**

Silicon gate CMOS IC

**Features**

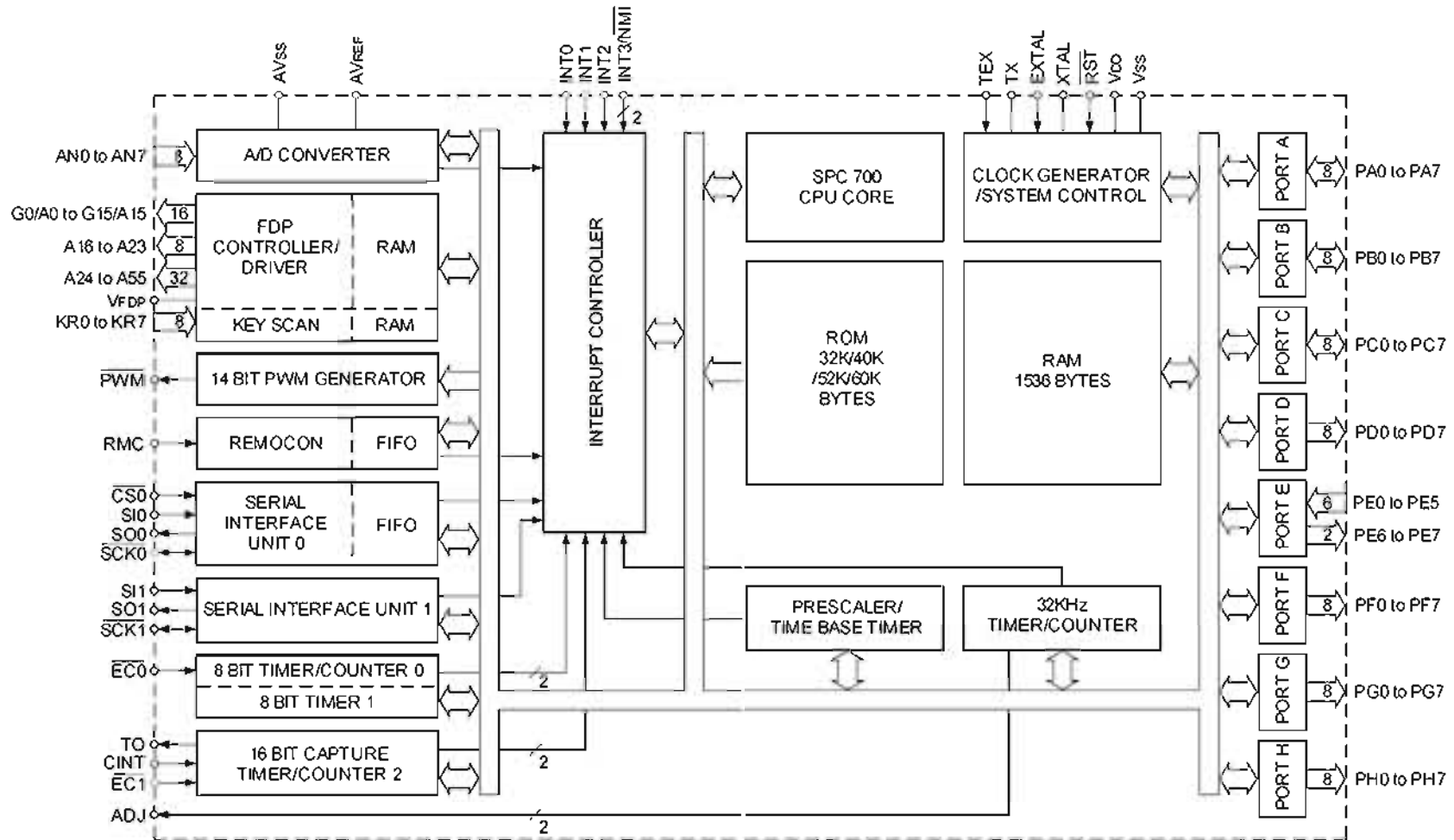
- Wide-range instruction system (213 instructions) to cover various types of data
  - 16-bit arithmetic/multiplication and division/boolean bit operation instructions
- Minimum instruction cycle
  - 400ns at 10MHz operation
  - (122 $\mu$ s at 32kHz operation)
- Incorporated ROM capacity
  - 32K bytes (CXP82832)
  - 40K bytes (CXP82840)
  - 52K bytes (CXP82852)
  - 60K bytes (CXP82860)
- Incorporated RAM capacity
  - 1536 bytes (including fluorescent display area)
- Peripheral functions
  - A/D converter
    - 8 bits, 8 channels, successive approximation method
    - (Conversion time of 32 $\mu$ s/10MHz)
  - Serial interface
    - 8-bit, 8-stage FIFO incorporated
    - (Auto transfer for 1 to 8 bytes), 1 channel
    - 8-bit clock synchronized type, 1 channel
  - Timers
    - 8-bit timer, 8-bit timer/counter, 19-bit time base timer
    - 16-bit capture timer/counter, 32kHz timer/counter
  - Fluorescent display panel controller/driver
    - Supports the universal grid fluorescent display panel.
    - High voltage drive output port of 56 pins (40V)
    - Maximum of 640 segments display possible
    - Display timing number of 1 to 20
    - Dimmer function
    - Incorporated pull-down resistor (Mask option)
    - Hardware key scan function (Maximum of 16  $\times$  8 key matrix supportable)
  - Remote control reception circuit
    - 8-bit pulse measurement counter, 6-stage FIFO
  - PWM output
    - 14 bits, 1 channel
- Interruption
  - 16 factors, 15 vectors, multi-interruption possible
- Standby mode
  - SLEEP/STOP
- Package
  - 100-pin plastic QFP
- Piggyback/evaluation chip
  - CXP82800 100-pin ceramic QFP

Sony reserves the right to change products and specifications without prior notice. This information does not convey any license by any implication or otherwise under any patents or other right. Application circuits shown, if any, are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits.

Block Diagram



CXP82832/82840/82852/82860



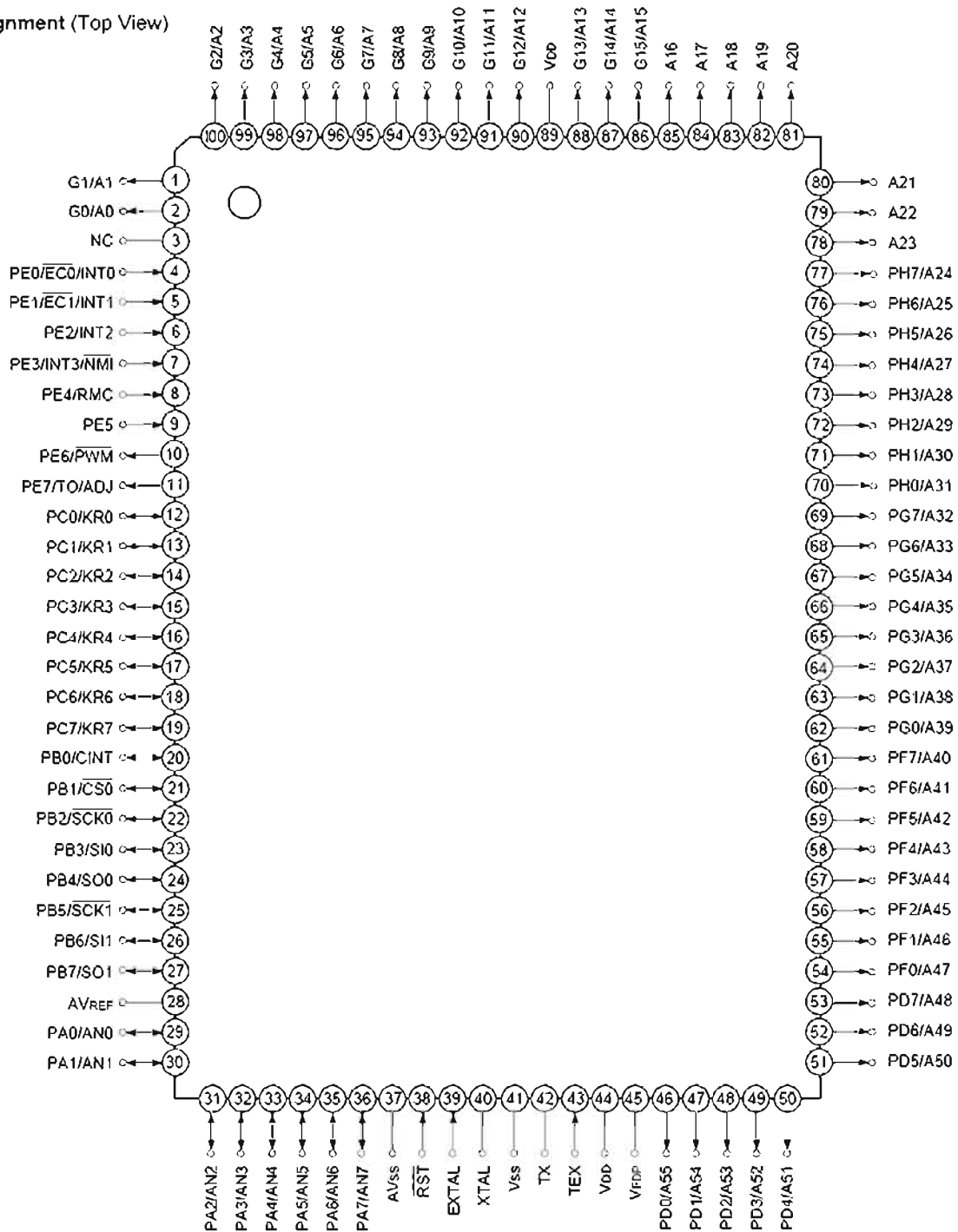
# CMOS 8-Bit Single Chip Microcomputer IC

# CXP82860

SONY

CXP82832/82840/82852/82860

Pin Assignment (Top View)



- Note)** 1. NC (Pin 3) must be connected to VDD.  
 2. VDD (Pins 44 and 89) must be connected to VDD.

Pin code	I/O	Functions		
PA0/AN0 to PA7/AN7	I/O/ Analog input	(Port A) 8-bit I/O port. I/O can be set in a unit of single bits. Incorporation of the pull-up resistor can be set through the software in a unit of 4 bits. (8pins)	Analog inputs to A/D converter. (8 pins)	
PB0/CINT	I/O/Input	(Port B) 8-bit I/O port. I/O can be set in a unit of single bits. Incorporation of the pull-up resistor can be set through the software in a unit of 4 bits. (8 pins)	Capture input to 16-bit timer/counter.	
PB1/ $\overline{CS0}$	I/O/Input		Chip select input for serial interface (CH0).	
PB2/ $\overline{SCK0}$	I/O/I/O		Serial clock I/O (CH0).	
PB3/SI0	I/O/Input		Serial data input (CH0).	
PB4/SO0	I/O/Output		Serial data output (CH0).	
PB5/ $\overline{SCK1}$	I/O/I/O		Serial clock I/O (CH1).	
PB6/SI1	I/O/Input		Serial data input (CH1).	
PB7/SO1	I/O/Output		Serial data output (CH1).	
PC0/KR0 to PC7/KR7	I/O/Input	(Port C) 8-bit I/O port. I/O can be set in a unit of single bits. Can drive 12mA sync current. Incorporation of the pull-up resistor can be set through the software in a unit of 4 bits. (8 pins)	Serves as key return inputs when operating key scan with fluorescent display panel (FDP) segment signal. (8 pins)	
PD0/A55 to PD7/A48	Output/Output	(Port D) 8-bit output port. (8 pins)	FDP segment signal (anode connection) outputs.	
PE0/INT0/ $\overline{EC0}$	Input/Input/Input	(Port E) 8-bit port. Lower 6 bits are for inputs; upper 2 bits are for outputs. (8 pins)	Inputs for external interruption request. (4 pins)	External event inputs for timer/counter. (2 pins)
PE1/INT1/ $\overline{EC1}$	Input/Input/Input			
PE2/INT2	Input/Input		Non-maskable interruption request input.	
PE3/INT3/ NMI	Input/Input/Input			
PE4/RMC	Input/Input		Remote control reception circuit input.	
PE5	Input			
PE6/ $\overline{PWM}$	Output/Output		14-bit PWM output.	
PE7/TO/ADJ	Output/Output/ Output		Output for the 16-bit timer/counter rectangular waves, and 32kHz oscillation frequency division.	
PF0/A47 to PF7/A40	Output/Output	(Port F) 8-bit output port. (8pins)	FDP segment signal (anode connection) outputs.	



Pin code	I/O	Functions	
PG0/A39 to PG7/A32	Output/Output	(Port G) 8-bit output port. (8 pins)	FDP segment signal (anode connection) outputs. (8 pins)
PH0/A31 to PH7/A24	Output/Output	(Port H) 8-bit output port. (8 pins)	FDP segment signal (anode connection) outputs. (8 pins)
A16 to A23	Output	FDP segment signal (anode connection) outputs. (8 pins)	
G0/A0 to G15/A15	Output/Output	Outputs for FDP timing signals (grid connection)/segment signals (anode connection). (16 pins)	
V <sub>FDP</sub>		FDP voltage supply when incorporated pull-down (PD) resistor is set by mask option.	
EXTAL	Input	Crystal connectors for system clock oscillation. When the clock is supplied externally, input to EXTAL; opposite phase clock should be input to XTAL.	
XTAL	Output		
TEX	Input	Crystal connectors for 32kHz timer/counter clock oscillation. For usage as event input, input to TEX, and open TX.	
TX	Output		
$\overline{\text{RST}}$	Input	Low-level active, system reset	
NC		NC. Under normal operation, connect to V <sub>DD</sub> .	
AV <sub>REF</sub>	Input	Reference voltage input for A/D converter.	
AV <sub>SS</sub>		A/D converter GND.	
V <sub>DD</sub>		V <sub>CC</sub> supply.	
V <sub>SS</sub>		GND.	

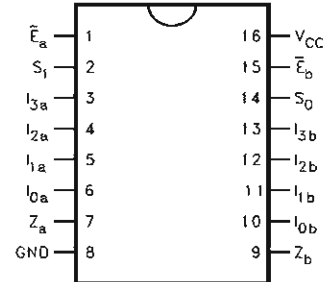
# 74VHC153MX

## Dual 4-Input Multiplexer

### Pin Descriptions

Pin Names	Description
I <sub>0a</sub> -I <sub>3a</sub>	Side A Data Inputs
I <sub>0b</sub> -I <sub>3b</sub>	Side B Data Inputs
S <sub>0</sub> , S <sub>1</sub>	Common Select Inputs
$\bar{E}_a$	Side A Enable Input
$\bar{E}_b$	Side B Enable Input
Z <sub>a</sub>	Side A Output
Z <sub>b</sub>	Side B Output

### Connection Diagram



### Functional Description

The VHC153 is a dual 4-input multiplexer. It can select two bits of data from up to four sources under the control of the common Select inputs (S<sub>0</sub>, S<sub>1</sub>). The two 4-input multiplexer circuits have individual active-LOW Enables ( $\bar{E}_a$ ,  $\bar{E}_b$ ) which can be used to strobe the outputs independently. When the Enables ( $\bar{E}_a$ ,  $\bar{E}_b$ ) are HIGH, the corresponding outputs (Z<sub>a</sub>, Z<sub>b</sub>) are forced LOW. The VHC153 is the logic implementation of a 2-pole, 4-position switch, where the position of the switch is determined by the logic levels supplied to the Select inputs. The logic equations for the outputs are shown below.

$$Z_a = \bar{E}_a \cdot (I_{0a} \cdot \bar{S}_1 \cdot \bar{S}_0 + I_{1a} \cdot \bar{S}_1 \cdot S_0 + I_{2a} \cdot S_1 \cdot \bar{S}_0 + I_{3a} \cdot S_1 \cdot S_0)$$

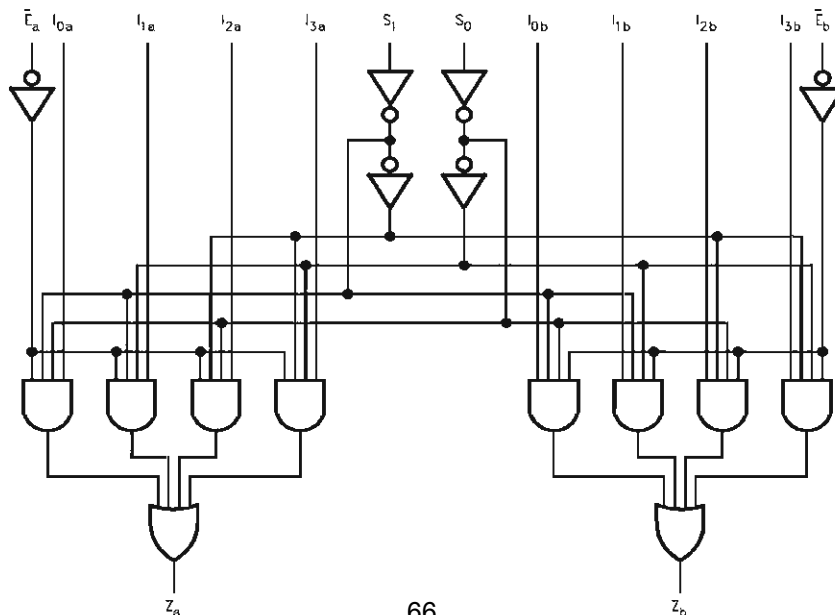
$$Z_b = \bar{E}_b \cdot (I_{0b} \cdot \bar{S}_1 \cdot \bar{S}_0 + I_{1b} \cdot \bar{S}_1 \cdot S_0 + I_{2b} \cdot S_1 \cdot \bar{S}_0 + I_{3b} \cdot S_1 \cdot S_0)$$

### Truth Table

Select Inputs		Inputs (a or b)					Output
S <sub>0</sub>	S <sub>1</sub>	$\bar{E}$	I <sub>0</sub>	I <sub>1</sub>	I <sub>2</sub>	I <sub>3</sub>	Z
X	X	H	X	X	X	X	L
L	L	L	L	X	X	X	L
L	L	L	H	X	X	X	H
H	L	L	X	L	X	X	L
H	L	L	X	H	X	X	H
L	H	L	X	X	L	X	L
L	H	L	X	X	H	X	H
H	H	L	X	X	X	L	L
H	H	L	X	X	X	H	H

H = HIGH Voltage Level  
 L = LOW Voltage Level  
 X = Immaterial

### Logic Diagram



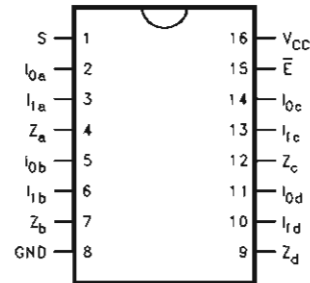
# 74VHC157MX

## Quad 2-Input Multiplexer

### Pin Configuration

Pin Names	Description
$I_{0a}$ – $I_{0d}$	Source 0 Data Inputs
$I_{1a}$ – $I_{1d}$	Source 1 Data Inputs
$\bar{E}$	Enable Input
S	Select Input
$Z_a$ – $Z_d$	Outputs

### Connection Diagram



### Truth Table

Inputs				Outputs
$\bar{E}$	S	$I_0$	$I_1$	Z
H	X	X	X	L
L	H	X	L	L
L	H	X	H	H
L	L	L	X	L
L	L	H	X	H

H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial

### Functional Description

The VHC157 is a quad 2-input multiplexer. It selects four bits of data from two sources under the control of a common Select input (S). The Enable input ( $\bar{E}$ ) is active-LOW. When  $\bar{E}$  is HIGH, all of the outputs (Z) are forced LOW regardless of all other inputs. The VHC157 is the logic implementation of a 4-pole, 2-position switch where the position of the switch is determined by the logic levels supplied to the Select input. The logic equations for the outputs are shown below:

$$Z_a = \bar{E} \cdot (I_{1a} \cdot S + I_{0a} \cdot \bar{S})$$

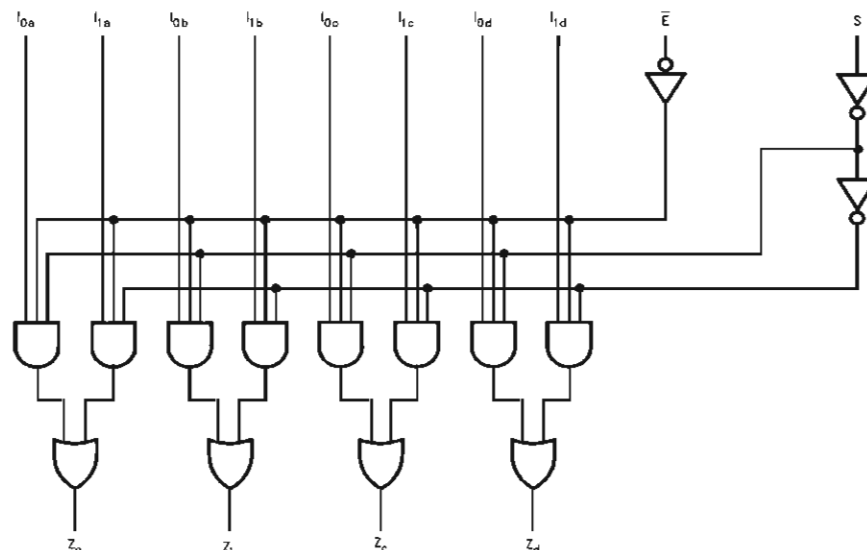
$$Z_b = \bar{E} \cdot (I_{1b} \cdot S + I_{0b} \cdot \bar{S})$$

$$Z_c = \bar{E} \cdot (I_{1c} \cdot S + I_{0c} \cdot \bar{S})$$

$$Z_d = \bar{E} \cdot (I_{1d} \cdot S + I_{0d} \cdot \bar{S})$$

A common use of the VHC157 is the moving of data from two groups of registers to four common output busses. The particular register from which the data comes is determined by the state of the Select input. A less obvious use is as a function generator. The VHC157 can generate any four of the sixteen different functions of two variables with one variable common. This is useful for implementing gating functions.

### Logic Diagram



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

# 74VHC574

## OCTAL D-TYPE FLIP FLOP WITH 3 STATE OUTPUTS NON INVERTING

- HIGH SPEED:
- $f_{MAX} = 180 \text{ MHz (TYP.) at } V_{CC} = 5\text{V}$
- LOW POWER DISSIPATION:  
 $I_{CC} = 4 \mu\text{A (MAX.) at } T_A = 25^\circ\text{C}$
- HIGH NOISE IMMUNITY:  
 $V_{NIH} = V_{NIL} = 28\% V_{CC} \text{ (MIN.)}$
- POWER DOWN PROTECTION ON INPUTS
- SYMMETRICAL OUTPUT IMPEDANCE:  
 $|I_{OH}| = I_{OL} = 8 \text{ mA (MIN)}$
- BALANCED PROPAGATION DELAYS:  
 $t_{PLH} \approx t_{PHL}$
- OPERATING VOLTAGE RANGE:  
 $V_{CC}(\text{OPR}) = 2\text{V to } 5.5\text{V}$
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 574
- IMPROVED LATCH-UP IMMUNITY
- LOW NOISE:  $V_{OLP} = 0.9\text{V (MAX.)}$

### DESCRIPTION

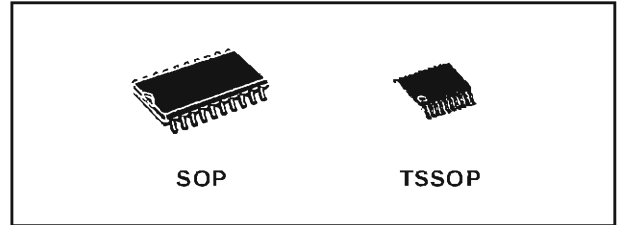
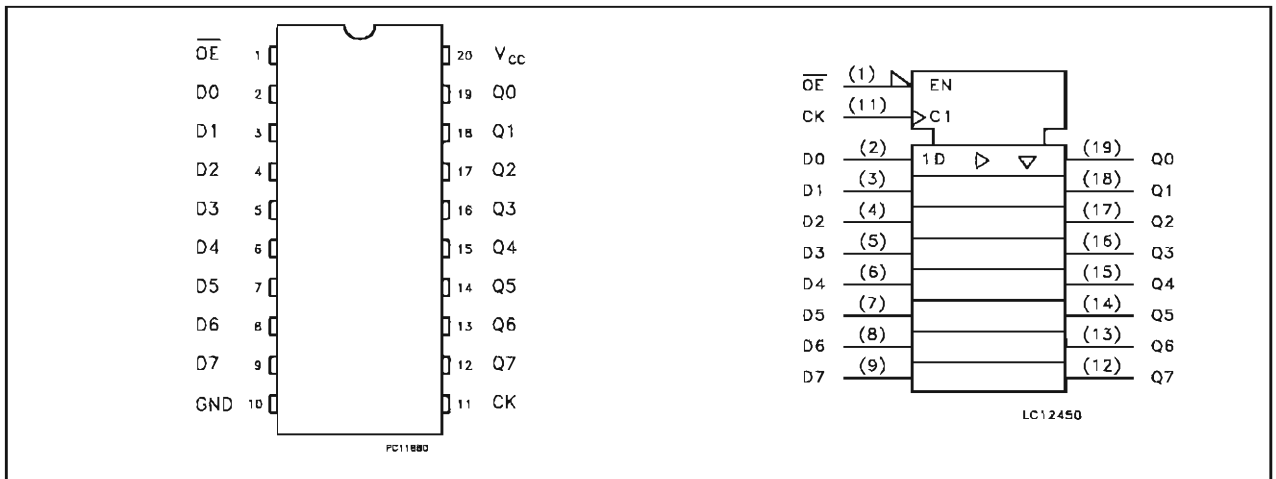
The 74VHC574 is an advanced high-speed CMOS OCTAL D-TYPE FLIP FLOP with 3 STATE OUTPUTS NON INVERTING fabricated with sub-micron silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology.

These 8 bit D-Type flip-flop is controlled by a clock input (CK) and an output enable input ( $\overline{OE}$ ).

On the positive transition of the clock, the Q outputs will be set to the logic states that were setup at the D inputs.

While the ( $\overline{OE}$ ) input is low, the 8 outputs will be in a normal logic state (high or low logic level) and

### PIN CONNECTION AND IEC LOGIC SYMBOLS



### ORDER CODES

PACKAGE	TUBE	T & R
SOP	74VHC574M	74VHC574MTR
TSSOP		74VHC574TTR

while high level the outputs will be in a high impedance state.

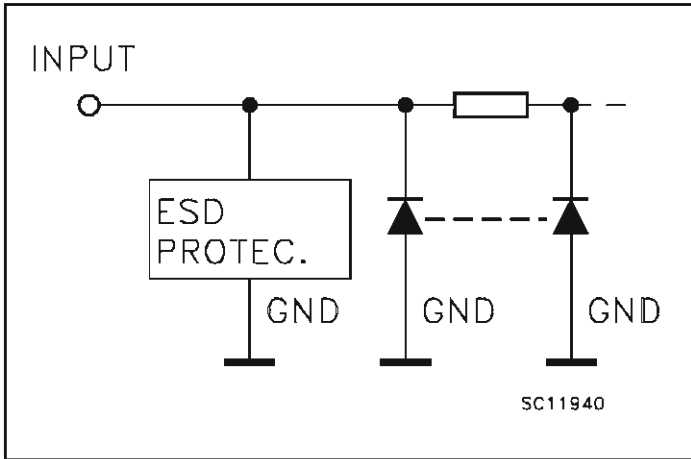
The Output control does not affect the internal operation of flip flop; that is, the old data can be retained or the new data can be entered even while the outputs are off.

Power down protection is provided on all inputs and 0 to 7V can be accepted on inputs with no regard to the supply voltage. This device can be used to interface 5V to 3V.

All inputs and outputs are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.

74VHC574

INPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

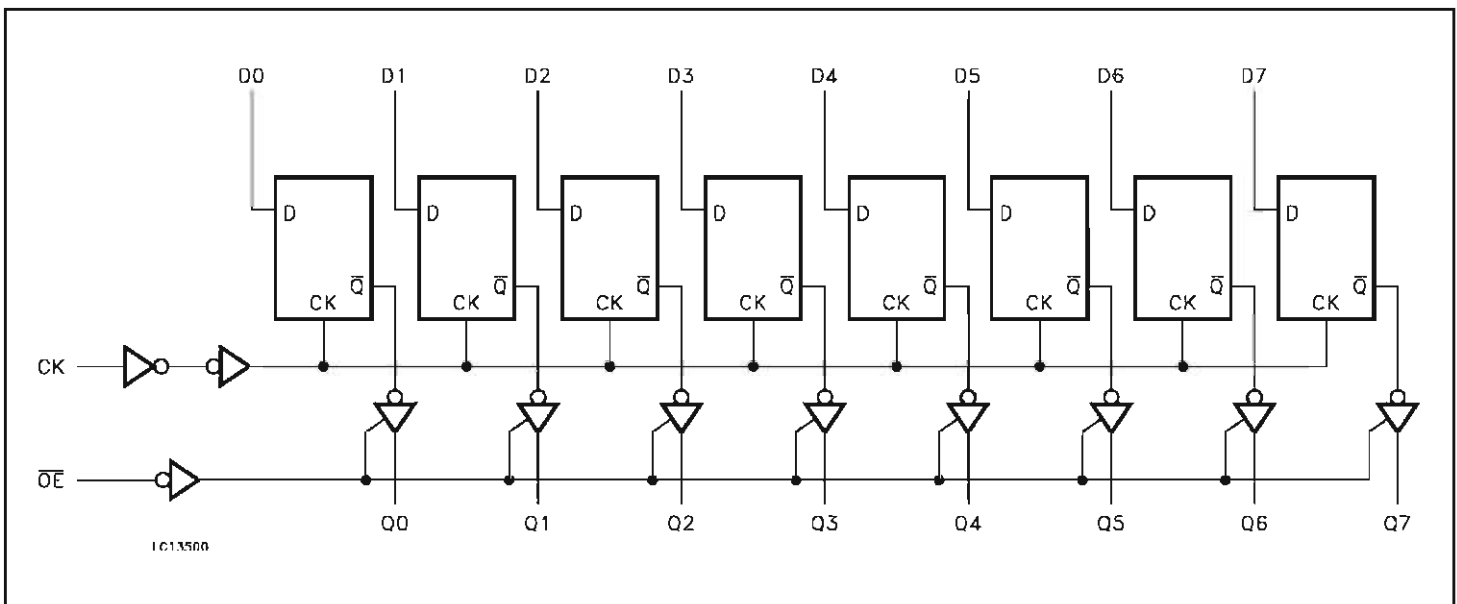
PIN No	SYMBOL	NAME AND FUNCTION
1	$\overline{OE}$	3-State Output Enable Input (Active LOW)
2, 3, 4, 5, 6, 7, 8, 9	D0 to D7	Data Inputs
12, 13, 14, 15, 16, 17, 18, 19	Q0 to Q7	3-State Outputs
11	CK	Clock Input (LOW-to-HIGH Edge Triggered)
10	GND	Ground (0V)
20	V <sub>CC</sub>	Positive Supply Voltage

TRUTH TABLE

INPUTS			OUTPUT
$\overline{OE}$	CK	D	Q
H	X	X	Z
L		X	NO CHANGE
L		L	L
L		H	H

X : Don't Care  
Z : High Impedance

LOGIC DIAGRAM



This logic diagram has not be used to estimate propagation delays

## Features

- Fast Read Access Time – 120 ns, see AT27BV020 for Faster Speeds
- Dual Voltage Range Operation
  - Low Voltage Power Supply Range, 3.0V to 3.6V
  - or Standard 5V  $\pm$  10% Supply Range
- Compatible with JEDEC Standard AT27C020
- Low Power CMOS Operation
  - 20  $\mu$ A Max (Less than 1  $\mu$ A Typical) Standby for  $V_{CC} = 3.6V$
  - 29 mW Max Active at 5 MHz for  $V_{CC} = 3.6V$
- JEDEC Standard Packages
  - 32-lead PLCC
  - 32-lead TSOP
  - 32-lead VSOP
- High Reliability CMOS Technology
  - 2,000V ESD Protection
  - 200 mA Latchup Immunity
- Rapid Programming Algorithm – 100  $\mu$ s/Byte (Typical)
- Two-line Control
- CMOS and TTL Compatible Inputs and Outputs
  - JEDEC Standard for LVTTTL
- Integrated Product Identification Code
- Industrial Temperature Range
- Green (Pb/Halide-free) Packaging Option

## 1. Description

The AT27LV020A is a high-performance, low-power, low-voltage 2,097,152 bit one-time programmable read-only memory (OTP EPROM) organized as 256K by 8 bits. It requires only one supply in the range of 3.0 to 3.6V in normal read mode operation, making it ideal for fast, portable systems using battery power.

Atmel's innovative design techniques provide fast speeds that rival 5V parts while keeping the low power consumption of a 3V supply. At  $V_{CC} = 3.0V$ , any byte can be accessed in less than 120 ns. With a typical power dissipation of only 18 mW at 5 MHz and  $V_{CC} = 3.3V$ , the AT27LV020A consumes less than one fifth the power of a standard 5V EPROM. Standby mode supply current is typically less than 1  $\mu$ A at 3.3V.

The AT27LV020A is available in industry-standard JEDEC approved one-time programmable (OTP) plastic PLCC, TSOP, and VSOP. All devices feature two-line control ( $\overline{CE}$ ,  $\overline{OE}$ ) to give designers the flexibility to prevent bus contention.

The AT27LV020A operating with  $V_{CC}$  at 3.0V produces TTL level outputs that are compatible with standard TTL logic devices operating at  $V_{CC} = 5.0V$ . The device is also capable of standard 5-volt operation making it ideally suited for dual supply range systems or card products that are pluggable in both 3-volt and 5-volt hosts.

Atmel's AT27LV020A has additional features to ensure high quality and efficient production use. The Rapid Programming Algorithm reduces the time required to program the part and guarantees reliable programming. Programming time is typically only 100  $\mu$ s/byte. The Integrated Product Identification Code electronically identifies the device and manufacturer. This feature is used by industry standard programming equipment to select the proper programming algorithms and voltages. The AT27LV020A programs exactly the same way as a standard 5V AT27C020 and uses the same programming equipment.



**2-Megabit  
(256K x 8)  
Low Voltage  
OTP EPROM**

**AT27LV020A**

0549F-EPROM-05/05

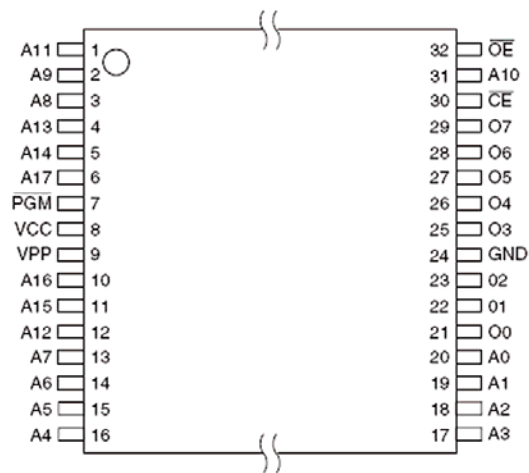




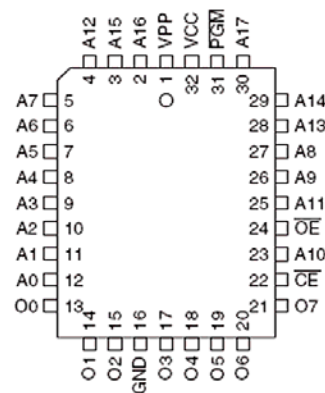
## 2. Pin Configurations

Pin Name	Function
A0 - A17	Addresses
O0 - O7	Outputs
$\overline{CE}$	Chip Enable
$\overline{OE}$	Output Enable
$\overline{PGM}$	Program Strobe
NC	No Connect

### 2.1 32-lead TSOP/VSOP (Type 1) Top View



### 2.2 32-lead PLCC – Top View



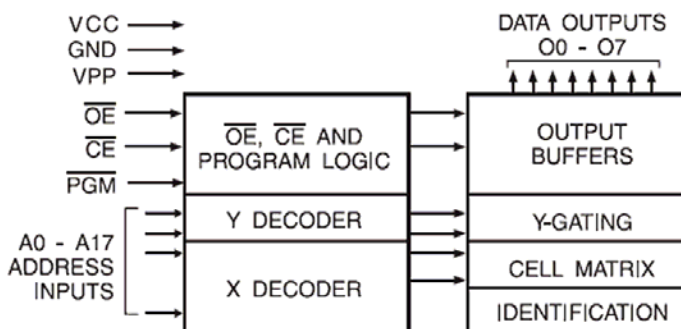
**AT27LV020A**

# AT27LV020A

## 3. System Considerations

Switching between active and standby conditions via the Chip Enable pin may produce transient voltage excursions. Unless accommodated by the system design, these transients may exceed datasheet limits, resulting in device non-conformance. At a minimum, a 0.1  $\mu$ F high frequency, low inherent inductance, ceramic capacitor should be utilized for each device. This capacitor should be connected between the  $V_{CC}$  and Ground terminals of the device, as close to the device as possible. Additionally, to stabilize the supply voltage level on printed circuit boards with large EPROM arrays, a 4.7  $\mu$ F bulk electrolytic capacitor should be utilized, again connected between the  $V_{CC}$  and Ground terminals. This capacitor should be positioned as close as possible to the point where the power supply is connected to the array.

## 4. Block Diagram



## 5. Absolute Maximum Ratings\*

Temperature Under Bias.....	-40°C to +85°C
Storage Temperature.....	-65°C to +125°C
Voltage on any Pin with with Respect to Ground.....	-2.0V to +7.0V <sup>(1)</sup>
Voltage on A9 with Respect to Ground.....	-2.0V to +14.0V <sup>(1)</sup>
$V_{PP}$ Supply Voltage with Respect to Ground.....	-2.0V to +14.0V <sup>(1)</sup>

\*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.

Notes: 1. Minimum voltage is -0.6V DC which may undershoot to -2.0V for pulses of less than 20 ns. Maximum output pin voltage is  $V_{CC} + 0.75V$  DC which may be exceeded if certain precautions are observed (consult application notes) and which may overshoot to +7.0V for pulses of less than 20 ns.

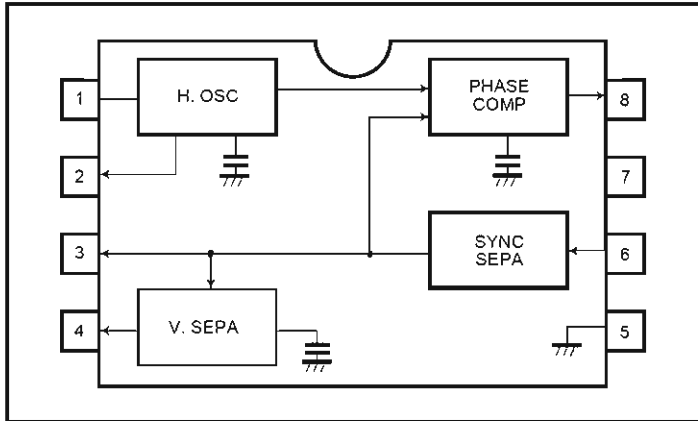




# BA7046/BA7046F

## SYNC Separator IC with AFC

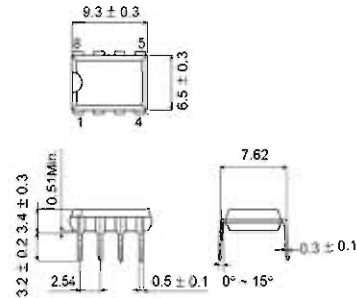
● Block diagrams



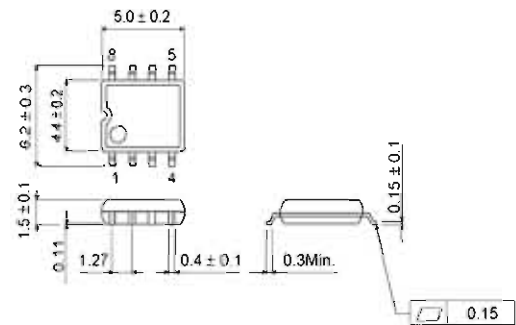
● Pin descriptions

Pin No.	Function
1	Horizontal oscillator resistor
2	H <sub>b</sub> output
3	SYNC output (open collector)
4	V <sub>D</sub> output
5	GND
6	Video input
7	Power supply
8	Phase comparator output

BA7046



BA7046F



● Input / output circuits

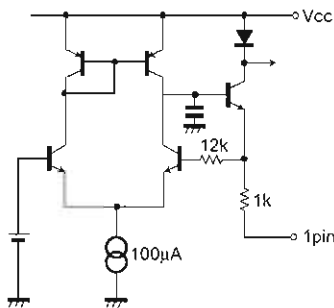


Fig. 1

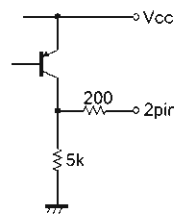


Fig. 2

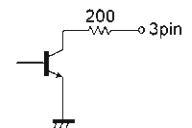


Fig. 3

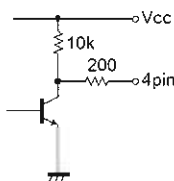


Fig. 4

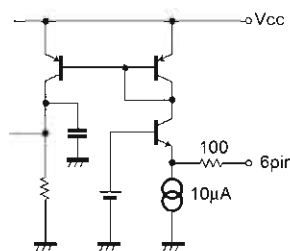


Fig. 5

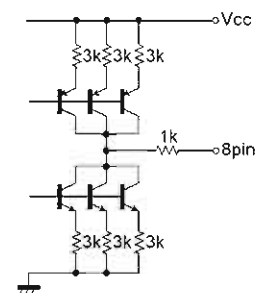
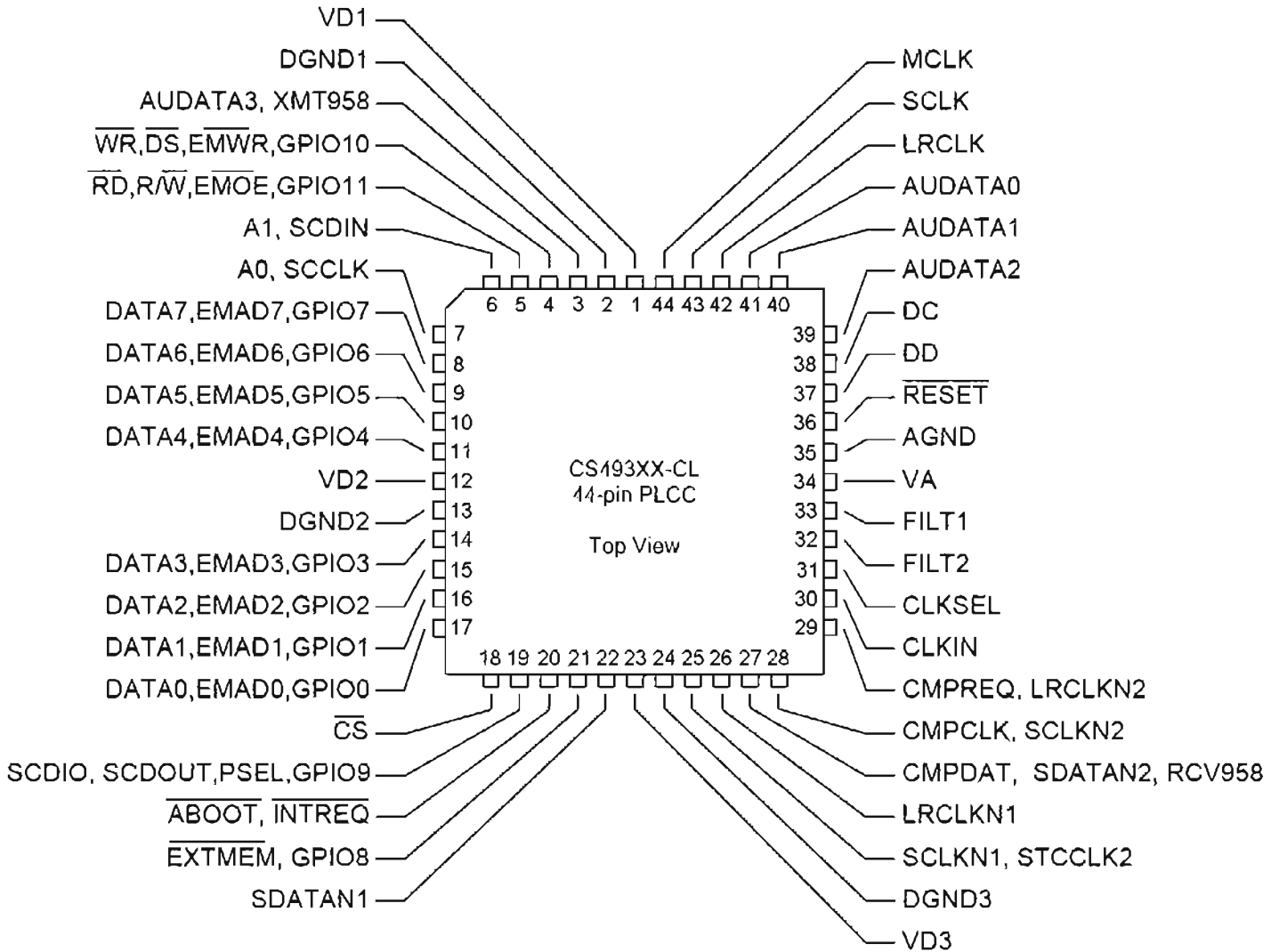


Fig. 6

24-Bit Multi Standard  
Audio DSP Decoder

# CS493263



# Video signal switcher

Multimedia ICs

## BA7603 / BA7603F

The BA7603 and BA7603F are switching ICs developed for use in VCRs. Each contains three two-channel analog multi-plexers. The switches have sync-tip clamped inputs and are ideal for switching video signals.

### ●Applications

Video cassette recorders and televisions

### ●Features

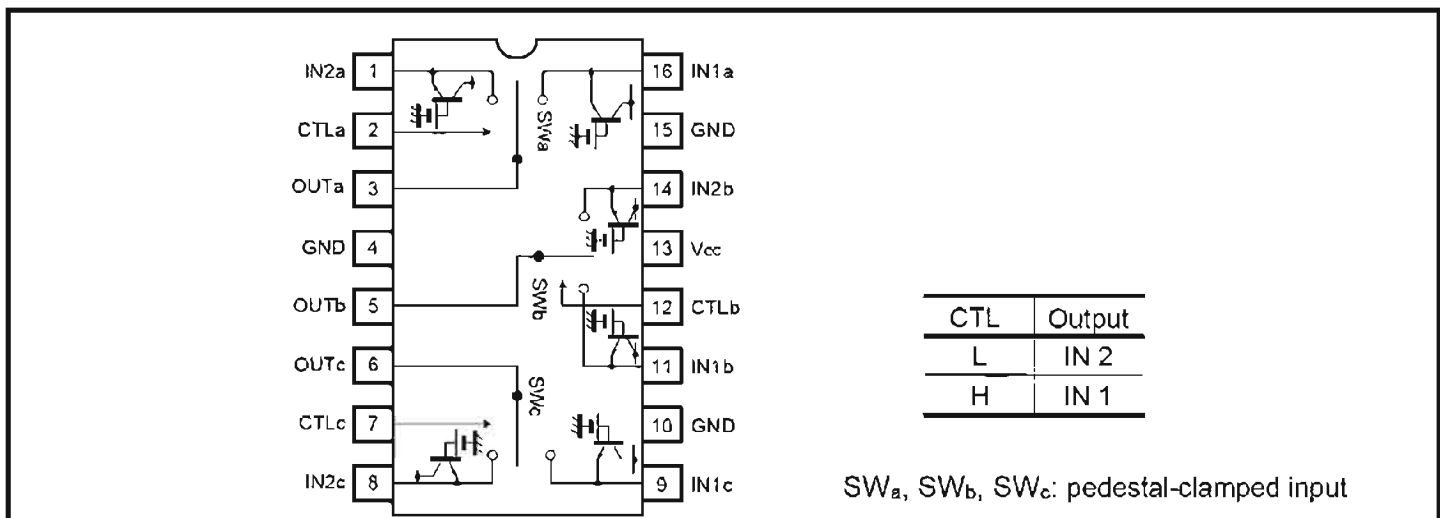
- 1) Three 2-input / 1-output switches.
- 2) Sync-tip clamped inputs.
- 3) 5V power supply.
- 4) Low power consumption (62.5mW Typ.).
- 5) Excellent frequency characteristics (10MHz, 0dB Typ.).
- 6) Wide dynamic range (2.9V<sub>P-P</sub> Typ.).
- 7) Fast switching speed (50ns Typ.).

### ●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>CC</sub>	9	V
Power dissipation	P <sub>d</sub>	500*	mW
Operating temperature	T <sub>opr</sub>	- 40 ~ + 85	°C
Storage temperature	T <sub>stg</sub>	- 55 ~ + 125	°C

\* Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.

### ●Block diagram



### ■Reference data

Pin DC voltages (reference values)

Units: V<sub>dc</sub>

Pin No.	DC voltage	Pin No.	DC voltage
1	2.05	9	2.05
2	4.91	10	0
3	0.65	11	2.05
4	0	12	4.91
5	0.65	13	5.00
6	0.85	14	2.05
7	4.91	15	0
8	2.05	16	2.05

### Electrical characteristics

Parameter	Min.	Typ.	Max.	Unit
Sync tip clamp level	0.49	0.65	0.80	V <sub>dc</sub>
Input impedance (with clamp)	—	1.7M	—	Ω
Output impedance	—	30	—	Ω

The input coupling capacitor values should be 0.1μF to 1μF

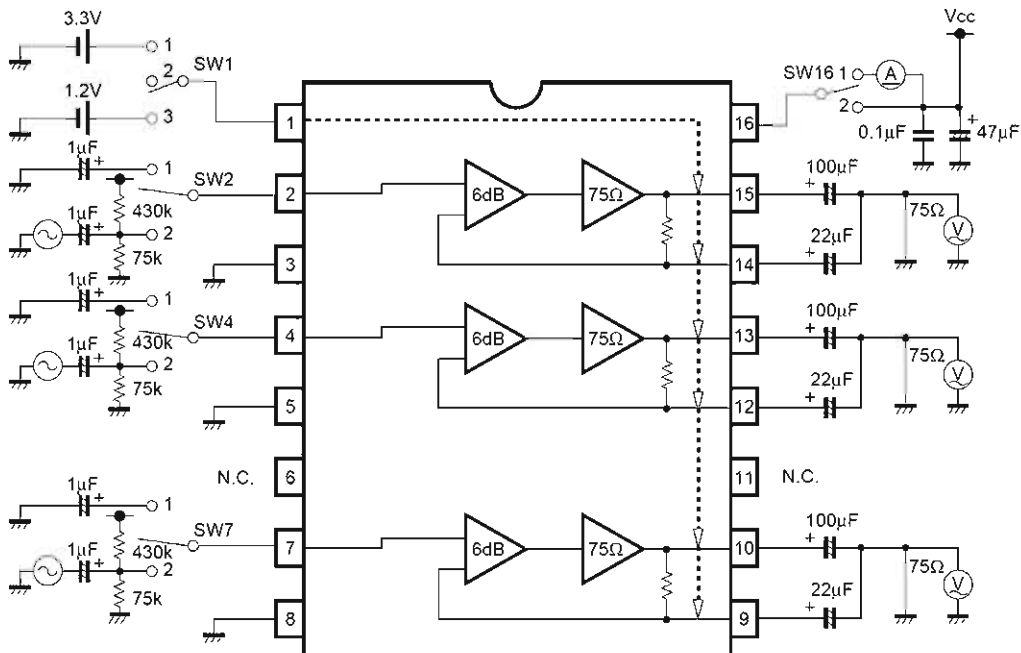
**BA7660FS****3-Channel 75 Ohm Driver**● Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Circuit current	$I_{CC}$	11.4	22.8	34.2	mA	With no signal
Maximum output level	$V_{OM}$	2.6	3.0	—	V <sub>P-P</sub>	$f = 1\text{kHz}$ , THD = 1%
Voltage gain	$G_V$	5.5	6.0	6.5	dB	$f = 4.43\text{MHz}$ , 1V <sub>P-P</sub>
Frequency characteristic	$G_f$	- 1.0	0.0	1.0	dB	$f = 7\text{MHz} / 1\text{MHz}$ , 1V <sub>P-P</sub>
Muting attenuation	$M_T$	—	- 60	—	dB	$f = 4.43\text{MHz}$ , 1V <sub>P-P</sub>
Muting switching level HIGH	$V_{THH}$	3.5	—	$V_{CC}$	V	—
Muting switching level LOW	$V_{THL}$	0	—	1.0	V	—

● Guaranteed design parameters (unless otherwise noted,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 5\text{V}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential gain	DG	—	0.5	1.5	%	1.0V <sub>P-P</sub> reference staircase signal
Differential phase	DP	—	0.5	1.5	deg	1.0V <sub>P-P</sub> reference staircase signal
Interchannel crosstalk	$C_T$	—	- 60	- 55	dB	$f = 4.43\text{MHz}$ , 1V <sub>P-P</sub>
Interchannel voltage gain differential	$\Delta G_V$	- 0.5	0.0	0.5	dB	$f = 4.43\text{MHz}$ , 1V <sub>P-P</sub>

## ● Measurement circuit



# BA7660FS

●Pin descriptions and input / output circuits

Pin. No	Pin name	IN	OUT	Reference voltage	Equivalent circuit	Function
1	MUTE	○	—	—		<p>Muting control</p> <p>If MUTE (pin 1) is set to HIGH, muting is carried out simultaneously on all three channels.</p>
2 4 7	INA INB INC	○	—	—		<p>Signal input</p> <p>Input signals consist of composite video signals, Y signals, C signals, RGB, and others. The input level is within a range of 0 to 1.3 (min.) to 1.5 (typ.).</p>
3 5 8	GND	—	—	0V		Ground
14 12 9	OUTA2 OUTB2 OUTC2	—	○	0.9V		<p>Signal output</p> <p>The signal output level is <math>(0.9 + 2 \times \text{input voltage [V]})</math>. Pins 9, 12, and 14 are the pins for sag correction. If pins 10, 13, and 15 are set to 0.2V or less, the protective circuit is triggered and the power-saving mode is accessed.</p>
15 13 10	OUTA1 OUTB1 OUTC1	—	○	0.95V		
16	V <sub>cc</sub>	—	—	5.0V		Power supply

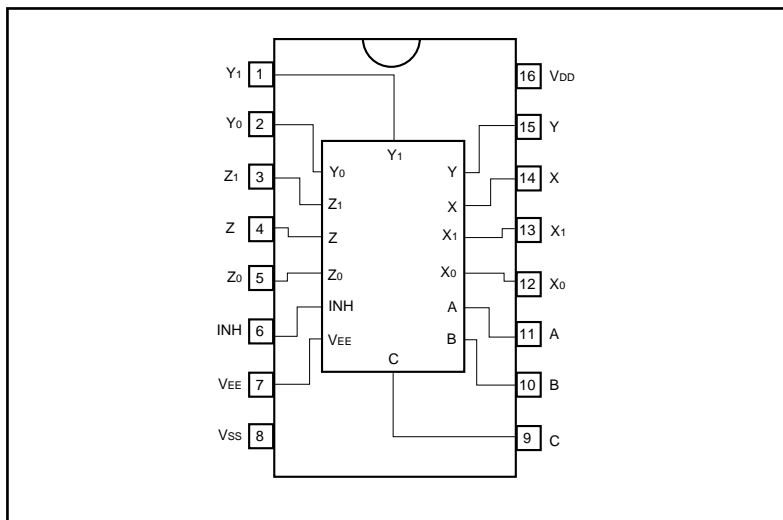
# Triple 2-channel analog multiplexer / demultiplexer

## BU4053BC / BU4053BCF / BU4053BCFV

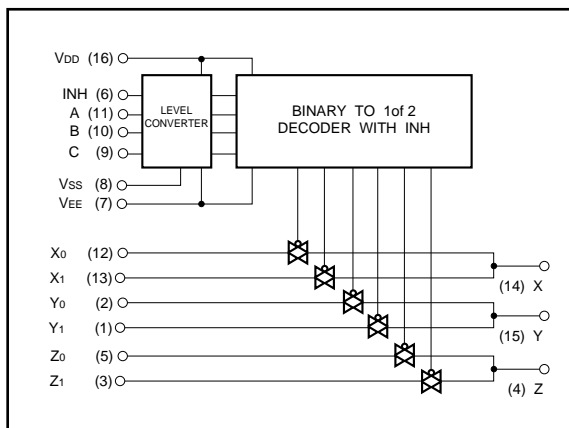
The BU4053BC, BU4053BCF, and BU4053BCFV are multiplexers / demultiplexers capable of selecting and combining analog signals and digital signals in a 2 ch × 3 configuration. Inhibit signals and control signals are used to turn on the switch corresponding to each of the channels. In addition, even if the logical amplitude ( $V_{DD}-V_{SS}$ ) of the control signal is low, signals with a large amplitude ( $V_{DD}-V_{EE}$ ) can be switched.

Also, as each switch has a low ON resistance, it can be connected to a low impedance circuit.

●Block diagram



●Logic circuit diagram



●Truth table

INH	A	B	C	ON SWITCH
L	L	L	L	X <sub>0</sub> Y <sub>0</sub> Z <sub>0</sub>
L	H	L	L	X <sub>1</sub> Y <sub>0</sub> Z <sub>0</sub>
L	L	H	L	X <sub>0</sub> Y <sub>1</sub> Z <sub>0</sub>
L	H	H	L	X <sub>1</sub> Y <sub>1</sub> Z <sub>0</sub>
L	L	L	H	X <sub>0</sub> Y <sub>0</sub> Z <sub>1</sub>
L	H	L	H	X <sub>1</sub> Y <sub>0</sub> Z <sub>1</sub>
L	L	H	H	X <sub>0</sub> Y <sub>1</sub> Z <sub>1</sub>
L	H	H	H	X <sub>1</sub> Y <sub>1</sub> Z <sub>1</sub>
H	X	X	X	NONE

X: Irrelevant

# 8-bit compatible shift / store register

## BU4094BC / BU4094BCF / BU4094BCFV

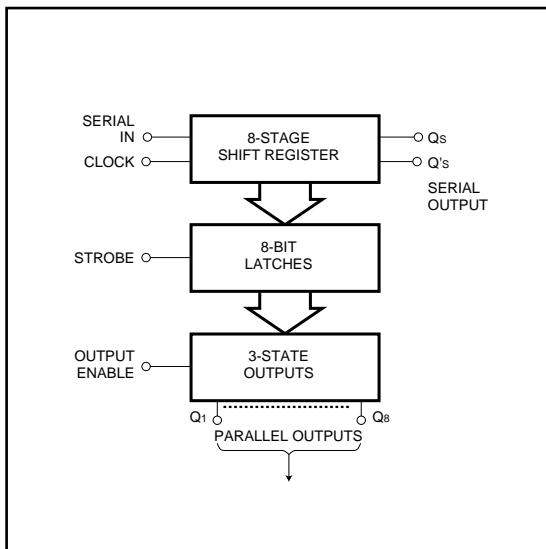
The BU4094BC, BU4094BCF, and BU4094BCFV are shift / store registers, each consisting of an 8-bit register and an 8-bit latch.

As the data in the shift register can be latched by an asynchronous strobe input, it is possible to hold the output in the data transfer mode.

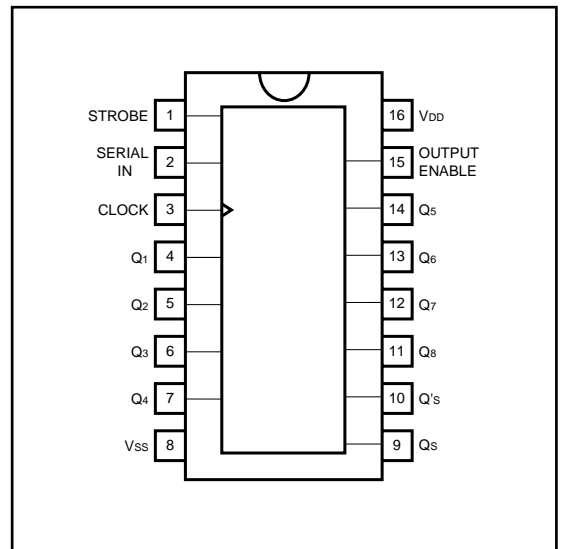
The tri-state parallel output can be connected directly with an 8-bit bus line.

These registers are suitable for in-line / parallel data conversion, data receivers and other similar applications.

### ●Logic circuit diagram



### ●Block diagram



### ●Truth table

CLOCK	OUTPUT ENABLE	STROBE	SERIAL IN	Parallel output		Serial output	
				Q <sub>1</sub>	Q <sub>n</sub>	Q <sub>s</sub>	Q' <sub>s</sub>
$\downarrow$	H	H	L	L	Q <sub>n-1</sub>	Q <sub>7</sub>	NC
$\downarrow$	H	H	H	H	Q <sub>n-1</sub>	Q <sub>7</sub>	NC
$\downarrow$	H	L	X	NC	NC	Q <sub>7</sub>	NC
$\downarrow$	L	X	X	Z	Z	Q <sub>7</sub>	NC
$\uparrow$	H	X	X	NC	NC	NC	Q <sub>s</sub>
$\uparrow$	L	X	X	Z	Z	NC	Q <sub>s</sub>

NC: No Change Z: High Impedance X: Irrelevant


**CS4391**

## 24-Bit, 192 kHz Stereo DAC with Volume Control

### Features

- Complete Stereo DAC System: Interpolation, D/A, Output Analog Filtering
- 108 dB Dynamic Range
- 94 dB THD+N
- Direct Stream Digital Mode
- Low Clock Jitter Sensitivity
- +5 V to +3 V Power Supply
- ATAPI Mixing
- On-Chip Digital De-emphasis for 32, 44.1, and 48 kHz
- Volume Control with Soft Ramp
  - 119 dB Attenuation
  - 1 dB Step Size
  - Zero Crossing Click-Free Transitions
- 36 mW with 3 V supply
- Direct Interface with 5 V to 1.8 V Logic

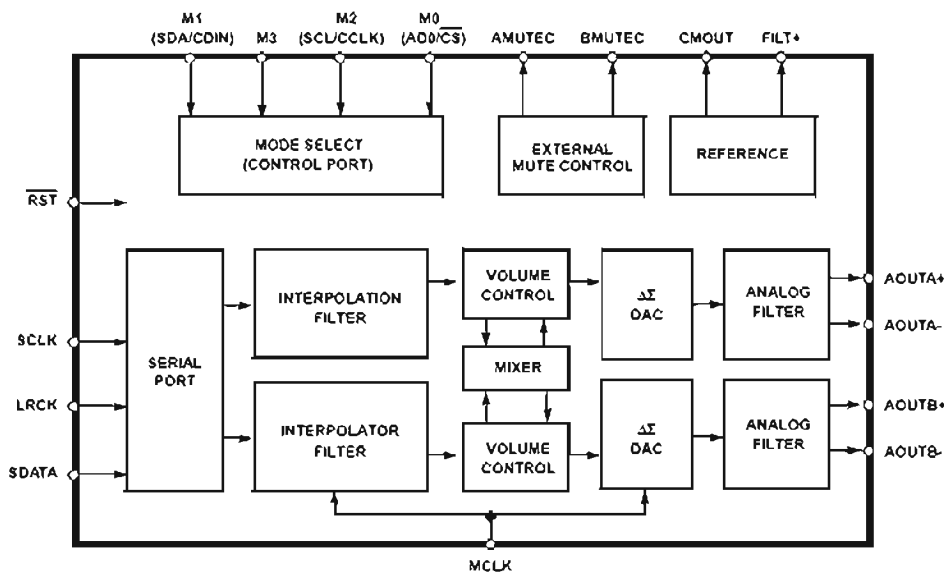
### Description

The CS4391 is a complete stereo digital-to-analog system including digital interpolation, fourth-order delta-sigma digital-to-analog conversion, digital de-emphasis, volume control, channel mixing and analog filtering. The advantages of this architecture include: ideal differential linearity, no distortion mechanisms due to resistor matching errors, no linearity drift over time and temperature and a high tolerance to clock jitter.

The CS4391 accepts PCM data at sample rates from 2 kHz to 192 kHz, DSD audio data, consumes very little power and operates over a wide power supply range. These features are ideal for DVD, A/V receivers, CD and set-top box systems.

### ORDERING INFORMATION

CS4391-KZ	20-pin TSSOP	-10 to 70 °C
CDB4391	Evaluation Board	







CS4391

## PIN DESCRIPTION - PCM DATA MODE

Reset	$\overline{\text{RST}}$	1	20	AMUTEC	Channel A Mute Control
Logic Voltage	VL	2	19	AOUTA-	Differential Output
Serial Data	SDATA	3	18	AOUTA+	Differential Output
Serial Clock	SCLK	4	17	VA	Analog Power
Left/Right Clock	LRCK	5	16	AGND	Analog Ground
Master Clock	MCLK	6	15	AOUTB+	Differential Output
	M3	7	14	AOUTB-	Differential Output
	(SCL/CCLK) M2	8	13	BMUTEC	Channel B Mute Control
	(SDA/CDIN) M1	9	12	CMOUT	Common Mode Voltage
	(AD0/CS) M0	10	11	FILT+	Positive Voltage Reference

## PIN DESCRIPTION - DSD MODE

Reset	$\overline{\text{RST}}$	1	20	AMUTEC	Refer to PCM Mode
Logic Voltage	VL	2	19	AOUTA-	Refer to PCM Mode
Channel A Data	DSD_A	3	18	AOUTA+	Refer to PCM Mode
Channel B Data	DSD_B	4	17	VA	Refer to PCM Mode
DSD Mode Select	DSD_MODE	5	16	AGND	Refer to PCM Mode
Master Clock	MCLK	6	15	AOUTB+	Refer to PCM Mode
DSD Serial Clock	DSD_SCLK	7	14	AOUTB-	Refer to PCM Mode
Refer to PCM Mode	(SCL/CCLK) M2	8	13	BMUTEC	Refer to PCM Mode
Refer to PCM Mode	(SDA/CDIN) M1	9	12	CMOUT	Refer to PCM Mode
Refer to PCM Mode	(AD0/CS) M0	10	11	FILT+	Refer to PCM Mode

# M74HCU04

## HEX INVERTER (SINGLE STAGE)

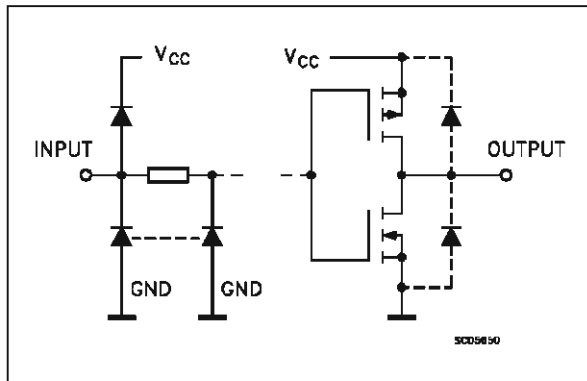
### DESCRIPTION

The M54/74HCU04 is a high speed CMOS HEX INVERTER (SINGLE STAGE) fabricated in silicon gate C<sup>2</sup>MOS technology. It has the same high speed performance of LSTTL combined with true CMOS low power consumption.

As the intrnal circuit is composed of a single stage inverter, it can be used in crystal oscillator.

All inputs are equipped with circuits against static discharge and transient excess voltage.

### INPUT AND OUTPUT EQUIVALENT CIRCUIT



### PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1, 3, 5, 9, 11, 13	1A to 6A	Data Inputs
2, 4, 6, 8, 10, 12	1Y to 6Y	Data Outputs
7	GND	Ground (0V)
14	Vcc	Positive Supply Voltage

**B1R**  
(Plastic Package)

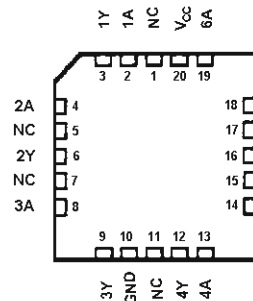
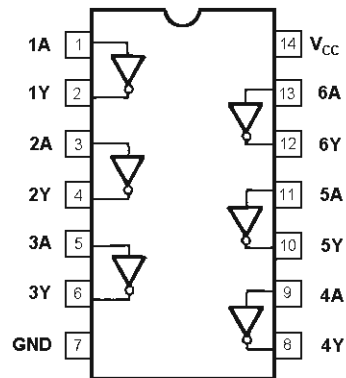
**F1R**  
(Ceramic Package)

**M1R**  
(Micro Package)

**C1R**  
(Chip Carrier)

**ORDER CODES :**  
 M54HCU04F1R    M74HCU04M1R  
 M74HCU04B1R    M74HCU04C1R

### PIN CONNECTIONS (top view)



NC =  
No Internal  
Connection


**CS5360**

## 24-Bit Stereo A/D Converter for Digital Audio

### Features

- 24 Bit Conversion
- 105 dB Dynamic Range
- -95 dB THD+N
- 128X Oversampling
- Fully Differential Inputs
- Linear Phase Digital Anti-Alias Filtering
  - 21.7 kHz passband ( $F_s = 48\text{kHz}$ )
  - 85 dB stop band attenuation
  - 0.0025 dB pass band ripple
- High Pass Filter - DC Offset Removal
- Peak Signal Level Detector
  - High Resolution and Bar Graph Modes
- Pin Compatible with CS5334 and CS5335

### Description

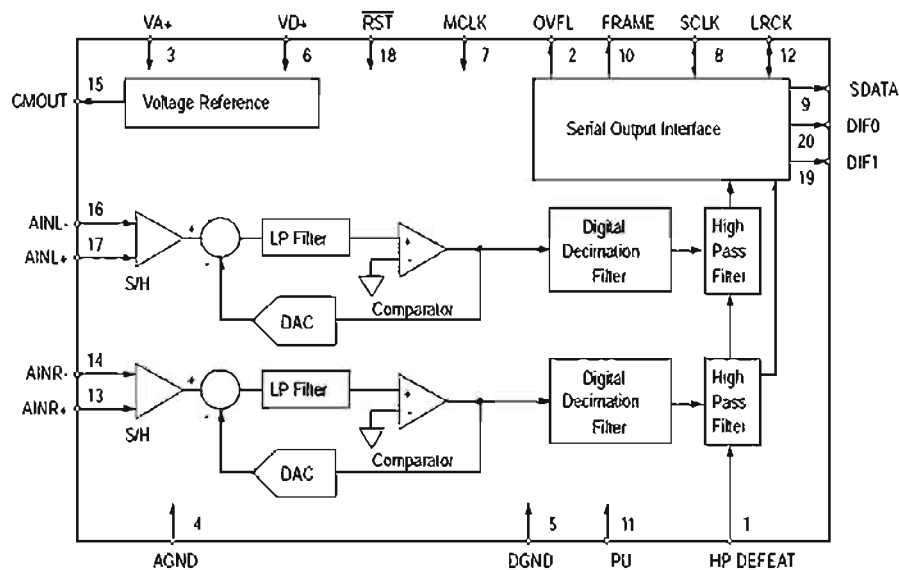
The CS5360 is a 2-channel, single +5 V supply, 24-bit analog-to-digital converter for digital audio systems. The CS5360 performs sampling, analog-to-digital conversion and anti-alias filtering, generating 24-bit values for both left and right inputs in serial form. The output word rate can be up to 50 kHz per channel.

The CS5360 uses 4th-order, delta-sigma modulation with 128X oversampling followed by digital filtering and decimation, which removes the need for an external anti-alias filter. This ADC uses a differential architecture which provides excellent noise rejection.

The CS5360 has a filter passband to 21.7 kHz. The filter has linear phase, 0.0025 dB passband ripple, and >85 dB stopband rejection. An on-chip high pass filter is also included to remove DC offsets.

### ORDERING INFORMATION

CS5360-KS	-10° to 70°C	20-pin Plastic SSOP
CS5360-BS	-40° to 85°C	20-pin Plastic SSOP





CS5360

## 5. PIN DESCRIPTIONS

High Pass Filter Defeat	HPDEFEAT	1	20	DIF0	Digital Interface Format 0
Overflow	OVFL	2	19	DIF1	Digital Interface Format 1
Analog Power	VA+	3	18	$\overline{\text{RST}}$	Reset
Analog Ground	AGND	4	17	AINL+	Non-Inverting Left Channel Input
Digital Ground	DGND	5	16	AINL-	Inverting Left Channel Input
Digital Power	VD+	6	15	CMOUT	Common Mode Output
Master Clock	MCLK	7	14	AINR-	Inverting Right Channel Input
Serial Data Clock	SCLK	8	13	AINR+	Non-Inverting Right Channel Input
Serial Data Output	SDATA	9	12	LRCK	Left / Right Clock
Frame Signal	FRAME	10	11	PU	Peak Update

### High Pass Filter Defeat - HP DEFEAT

*Pin 1, Input*

*Function*

A high logic level on this pin disables the digital high pass filter. A low logic level on this pin enables the high pass filter.

### Overflow - $\overline{\text{OVFL}}$

*Pin 2, Input*

*Function*

Overflow indicates analog input overrange, for both the Left and Right channels, since the last update request on the PEAK UPDATE (PU) pin. A value of 1 in the register indicates an overrange condition. The left channel information is output on  $\overline{\text{OVFL}}$  during the left channel portion of LRCK. The right channel information is available on  $\overline{\text{OVFL}}$  during the right channel portion of LRCK. The registers are updated with a high to low transition on the PEAK UPDATE pin. A 47 k $\Omega$  pull-down resistor on this pin will set the CS5360 in Master Mode.

### Positive Analog Power - VA+

*Pin 3, Input*

*Function:*

Positive analog supply. Nominally +5 volts.

### Analog Ground - AGND

*Pin 4, Input*

*Function:*

Analog ground reference.

### DGND - Digital Ground

*Pin 5, Input*

*Function:*

Digital ground reference.



CS5360

**Positive Digital Power - VD+***Pin 6, Input**Function:*

Positive digital supply. Nominally +5 volts.

**Master Clock - MCLK***Pin 7, Input**Function:*

Clock source for the delta-sigma modulator sampling and digital filters. In Master Mode, the frequency of this clock must be 256x the output sample rate,  $F_s$ . In Slave Mode, the frequency of this clock must be either 256x, 384x or 512x  $F_s$ .

**Serial Data Clock - SCLK***Pin 8, Input/Output**Function:*

Clocks the individual bits of the serial data out from the SDATA pin. The relationship between LRCK, SCLK and SDATA is controlled by DIF0 and DIF1. In Master Mode, SCLK is an output clock with a frequency of 64x the output sample rate,  $F_s$ . In Slave Mode, SCLK is an input.

**Serial Data Output - SDATA***Pin 9, Output**Function:*

Two's complement MSB-first serial data of 24 bits is output on this pin. Included in the serial data output is the 8-bit Input Signal Level Bits. The data is clocked out via the SCLK clock and the channel is determined by LRCK. The relationship between LRCK, SCLK and SDATA is controlled by DIF0 and DIF1.

**Peak Update - PU***Pin 11, Input**Function:*

Transfers the Peak Signal Level contents of the Active Registers to the Output Registers on a high to low transition on this pin. This transition will also reset the Active register.

**Frame Signal - FRAME***Pin 10, Output**Function:*

Frames the Peak Signal Level (PSL) Bits. FRAME goes high coincident with the leading edge of the first PSL bit and falls coincident with the trailing edge of the last PSL bit as shown in Figures 8-10. A 47 k $\Omega$  pull-down resistor on this pin will set the Peak Signal Level Monitoring format to "Bar Graph" mode.

**Left/Right Clock - LRCK***Pin 12, Input/Output**Function:*

LRCK determines which channel, left or right, is to be output on SDATA. The relationship between LRCK, SCLK and SDATA is controlled by DIF0 and DIF1. Although the outputs for each channel are transmitted at different times, Left/Right pairs represent simultaneously sampled analog inputs. In Master Mode, LRCK is an output clock whose frequency is equal to the output sample rate,  $F_s$ . In Slave Mode, LRCK is an input clock whose frequency must be equal to  $F_s$ .



CS5360

**Differential Right Channel Analog Input - AINR+, AINR-***Pin 13 and Pin 14, Input**Function:*

Analog input connections of the right channel differential inputs. Typically 2 Vrms differential (1Vrms for each input pin) for a full-scale analog input signal.

**Common Mode Output - CMOUT***Pin 15, Output**Function:*

This output, nominally 2.2 V, can be used to bias the analog input circuitry to the common mode voltage of the CS5360. CMOUT is not buffered and the maximum current is 10  $\mu$ A.

**Differential Left Channel Analog Input - AINL+, AINL-***Pin 16 and Pin 17, Input**Function:*

Analog input connections of the left channel differential inputs. Typically 2 Vrms differential (1Vrms for each input pin) for a full-scale analog input signal.

**Reset -  $\overline{\text{RST}}$** *Pin 18, Input**Function:*

A low logic level on this pin activates Reset.

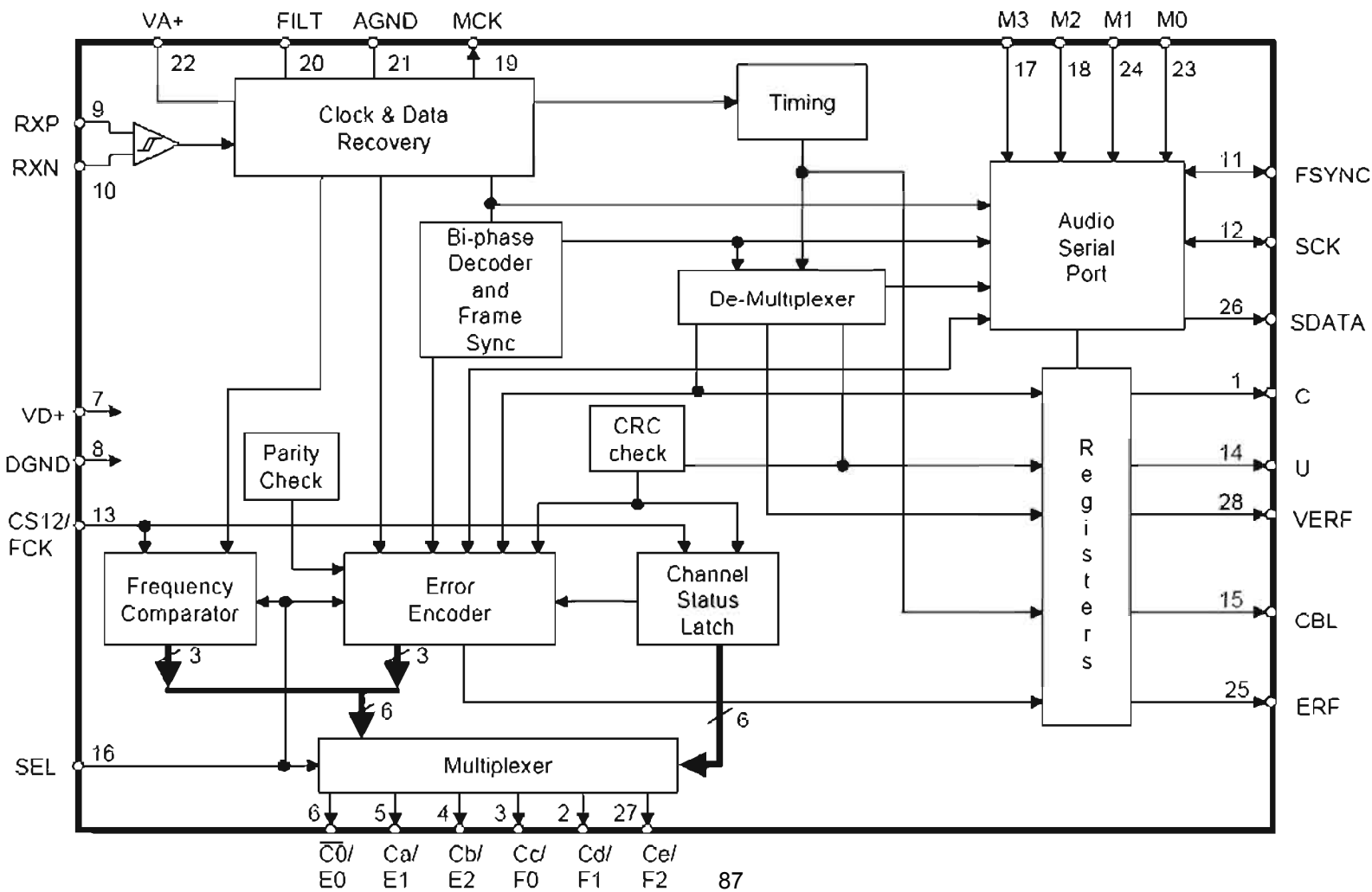
**Digital Interface Format - DIF0, DIF1***Pins 19 and 20, Input**Function:*

These two pins select one of 3 digital interface formats or power-down. The format determines the relationship between SCLK, LRCK and SDATA. The formats are detailed in Figures 8-10.

# CS8414

## 96 kHz Digital Audio Receiver

CHANNEL STATUS OUTPUT	C	1	28	VERF	VALIDITY + ERROR FLAG
CS d/FREQ REPORT 1	Cd/F1	2	27	Ce/F2	CS e/FREQ REPORT 2
CS c/FREQ REPORT 0	Cc/F0	3	26	SDATA	SERIAL OUTPUT DATA
CS b/ERROR CONDITION 2	Cb/E2	4	25	ERF	ERROR FLAG
CS a/ERROR CONDITION 1	Ca/E1	5	24	M1	SERIAL PORT MODE SELECT 1
CS 0/ERROR CONDITION 0	C0/E0	6	23	M0	SERIAL PORT MODE SELECT 0
DIGITAL POWER	VD+	7	22	VA+	ANALOG POWER
DIGITAL GROUND	DGND	8	21	AGND	ANALOG GROUND
RECEIVE POSITIVE	RXP	9	20	FILT	FILTER
RECEIVE NEGATIVE	RXN	10	19	MCK	MASTER CLOCK
FRAME SYNC	FSYNC	11	18	M2	SERIAL PORT MODE SELECT 2
SERIAL DATA CLOCK	SCK	12	17	M3	SERIAL PORT MODE SELECT 3
CHANNEL SELECT/FCLOCK	CS12/FCK	13	16	SEL	FREQ/CS SELECT
USER DATA OUTPUT	U	14	15	CBL	CS BLOCK START





## CS8413 CS8414

## PIN DESCRIPTIONS: CS8414

		CS8414			
CHANNEL STATUS OUTPUT	C	1 ●	28	VERF	VALIDITY + ERROR FLAG
CS d/FREQ REPORT 1	Cd/F1	2	27	Ce/F2	CS e/FREQ REPORT 2
CS c/FREQ REPORT 0	Cc/F0	3	26	SDATA	SERIAL OUTPUT DATA
CS b/ERROR CONDITION 2	Cb/E2	4	25	ERF	ERROR FLAG
CS a/ERROR CONDITION 1	Ca/E1	5	24	M1	SERIAL PORT MODE SELECT 1
CS $\bar{0}$ /ERROR CONDITION 0	$\bar{C0}/E0$	6	23	M0	SERIAL PORT MODE SELECT 0
DIGITAL POWER	VD+	7	22	VA+	ANALOG POWER
DIGITAL GROUND	DGND	8	21	AGND	ANALOG GROUND
RECEIVE POSITIVE	RXP	9	20	FILT	FILTER
RECEIVE NEGATIVE	RXN	10	19	MCK	MASTER CLOCK
FRAME SYNC	FSYNC	11	18	M2	SERIAL PORT MODE SELECT 2
SERIAL DATA CLOCK	SCK	12	17	M3	SERIAL PORT MODE SELECT 3
CHANNEL SELECT/FCLOCK	CS12/FCK	13	16	SEL	FREQ/CS SELECT
USER DATA OUTPUT	U	14	15	CBL	CS BLOCK START

Power Supply Connections**VD+** - Positive Digital Power, PIN 7.

Positive supply for the digital section. Nominally +5 volts.

**VA+** - Positive Analog Power, PIN 22.

Positive supply for the analog section. Nominally +5 volts.

**DGND** - Digital Ground, PIN 8.

Ground for the digital section. DGND should be connected to same ground as AGND.

**AGND** - Analog Ground, PIN 21.

Ground for the analog section. AGND should be connected to same ground as DGND.



**CS8413 CS8414**Audio Output Interface**SCK - Serial Clock, PIN 12.**

Serial clock for SDATA pin which can be configured (via the M0, M1, M2, and M3 pins) as an input or output, and can sample data on the rising or falling edge. As an output, SCK will generate 32 clocks for every audio sample. As an input, 32 SCK periods per audio sample must be provided in all normal modes.

**FSYNC - Frame Sync, PIN 11.**

Delineates the serial data and may indicate the particular channel, left or right, and may be an input or output. The format is based on M0, M1, M2, and M3 pins.

**SDATA - Serial Data, PIN 26.**

Audio data serial output pin.

**M0, M1, M2, M3 - Serial Port Mode Select, PINS 23, 24, 18, 17.**

Selects the format of FSYNC and the sample edge of SCK with respect to SDATA. M3 selects between eight normal modes (M3 = 0), and six special modes (M3 = 1).

Control Pins**VERF - Validity + Error Flag, PIN 28.**

A logical OR'ing of the validity bit from the received data and the error flag. May be used by interpolation filters to interpolate through errors.

**U - User Bit, PIN 14.**

Received user bit serial output port. FSYNC may be used to latch this bit externally. (Except in I<sup>2</sup>S modes when this pin is updated on the active edge of FSYNC.)

**C - Channel Status Output, PIN 1.**

Received channel status bit serial output port. FSYNC may be used to latch this bit externally. (Except in I<sup>2</sup>S modes when this pin is updated on the active edge of FSYNC.)

**CBL - Channel Status Block Start, PIN 15.**

The channel status block output is high for the first four bytes of channel status and low for the last 20 bytes.

**SEL - Select, PIN 16.**

Control pin that selects either channel status information (SEL = 1) or error and frequency information (SEL = 0) to be displayed on six of the following pins.



## CS8413 CS8414

### **C0, Ca, Cb, Cc, Cd, Ce - Channel Status Output Bits, PINS 2-6, 27.**

These pins are dual function with the 'C' bits selected when SEL is high. Channel status information is displayed for the channel selected by CS12. C0, which is channel status bit 0, defines professional (C0 = 0) or consumer (C0 = 1) mode and further controls the definition of the Ca-Ce pins. These pins are updated with the rising edge of CBL.

### **CS12 - Channel Select, PIN 13.**

This pin is also dual function and is selected by bringing SEL high. CS12 selects sub-frame 1 (when low) or sub-frame 2 (when high) to be displayed by channel status pins C0 and Ca through Ce.

### **FCK - Frequency Clock, PIN 13.**

Frequency Clock input that is enabled by bringing SEL low. FCK is compared to the received clock frequency with the value displayed on F2 through F0. Nominal input value is 6.144 MHz.

### **E0, E1, E2 - Error Condition, PINS 4-6.**

Encoded error information that is enabled by bringing SEL low. The error codes are prioritized and latched so that the error code displayed is the highest level of error since the last clearing of the error pins. Clearing is accomplished by bring SEL high for more than 8 MCK cycles.

### **F0, F1, F2 - Frequency Reporting Bits, PINS 2-3, 27.**

Encoded sample frequency information that is enabled by bringing SEL low. A proper clock on FCK must be input for at least two thirds of a channel status block for these pins to be valid. They are updated three times per block, starting at the block boundary. These pins are invalid when the PLL is out of lock.

### **ERF - Error Flag, PIN 25.**

Signals that an error has occurred while receiving the audio sample currently being read from the serial port. Three errors cause ERF to go high: a parity or biphase coding violation during the current sample, or an out of lock PLL receiver.

### Receiver Interface

#### **RXP, RXN - Differential Line Receivers, PINS 9, 10.**

RS422 compatible line receivers.

### Phase Locked Loop

#### **MCK - Master Clock, PIN 19.**

Low jitter clock output of 256 times the received sample frequency.

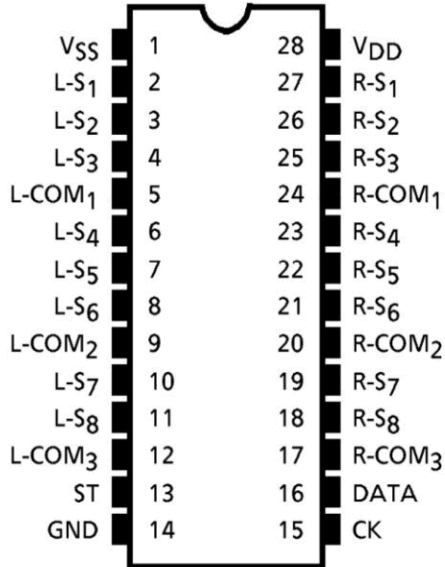
#### **FILT - Filter, PIN 20.**

An external 470Ω resistor and 0.068μF capacitor is required from FILT pin to analog ground.

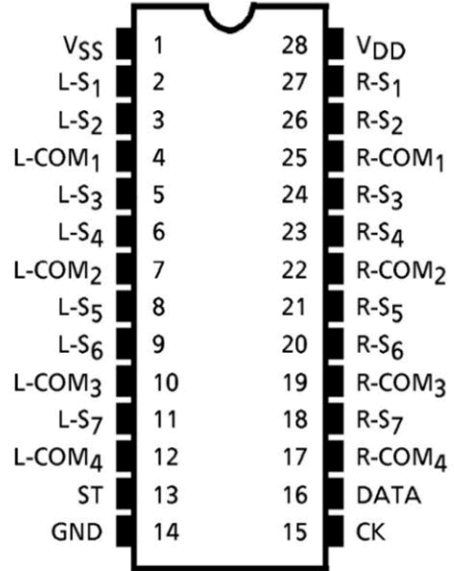
# KIC9162AF - KIC9163AF

High Voltage Analog Function Switch Array

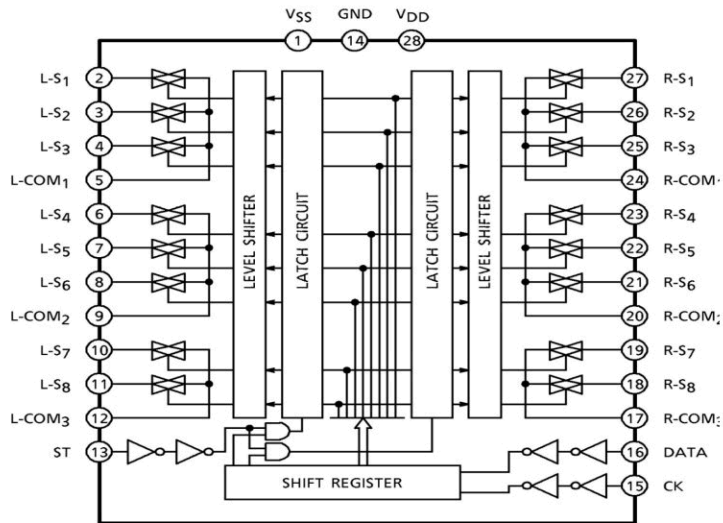
KIC9163AF



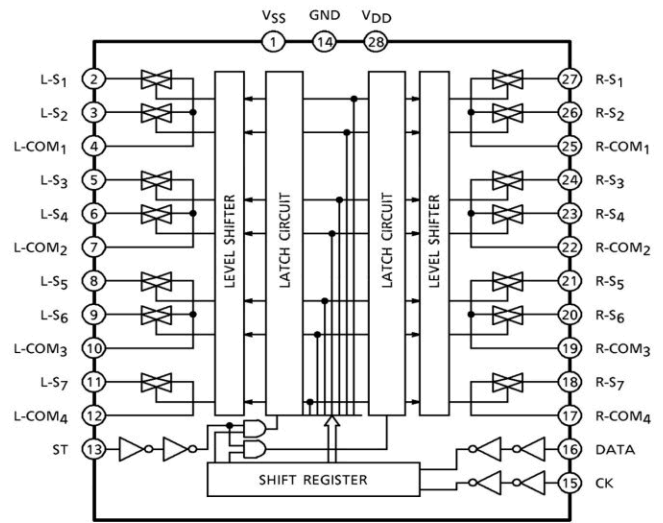
KIC9162AF



KIC9163AF Block Diagram



KIC9162AF Block Diagram



# MITSUBISHI MICROCOMPUTERS M35012-XXXSP, M35013-XXXSP

## SCREEN CHARACTER and PATTERN DISPLAY CONTROLLERS

### DESCRIPTION

The M35012-XXXSP and M35013-XXXSP are TV screen display control IC which can be used to display information such as program schedules, the date and messages on the TV screen.

The differences among M35012-XXXSP and M35013-XXXSP are noted below.

The descriptions that follow describe the M35013-XXXSP unless otherwise noted.

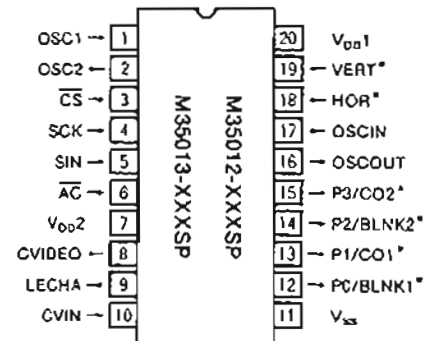
Type name	M35012-XXXSP	M35013-XXXSP
Characters available	256	128
Data input	16 bits serial input	8 bits serial input
Exclusion function	Exclusion 1 and 2 function	Exclusion 1 function
CONT7F function	Normal/7F <sub>16</sub> writing mode	Normal/7F <sub>16</sub> writing mode

For M35013-001SP and M35012-001SP that are standard ROM version of M35013-XXXSP and M35012-XXXSP respectively, the I/O polarity of pin and the character pattern are also mentioned.

### FEATURES

- Screen composition..... 24 columns X 10 lines
- Number of characters displayed..... 240 (Max.)
- Character composition ..... 12 X 18 dot matrix
- Characters available
  - M35013-XXXSP..... 128 characters
  - M35012-XXXSP..... 256 characters
- Character sizes available ... 4 (horizontal) X 4 (vertical)
- Display locations available
  - Horizontal direction ..... 62 locations
  - Vertical direction..... 64 locations
- Blinking ..... Character units
  - Cycle : approximately 1 second, or approximately 0.5 seconds
  - Duty : 25%, 50%, or 75%
- Data Input
  - M35013-XXXSP..... By the 8-bit serial input function
  - M35012-XXXSP..... By the 16-bit serial input function
- Coloring
  - Background coloring (composite video signal)
- Blanking
  - Total blanking (14 X 18 dots)
  - Border size blanking
  - Character size blanking
- Synchronization signal
  - Composite synchronization signal generation (PAL, NTSC, M-PAL)
- Synchronized separation circuit..... Built-in
- 4 output ports (2 digital lines)
- Oscillation stop function
  - Be possible to stop the oscillation for display and for synchronized signal generation

### PIN CONFIGURATION (TOP VIEW)



Outline 20P4B

Note : The pins remarked "\*" are selectable the input or output polarity when the character ROM masked.

- Exclusion function
  - M35013-XXXSP..... 1
  - M35012-XXXSP..... 2
- Reversed character display function

### APPLICATION

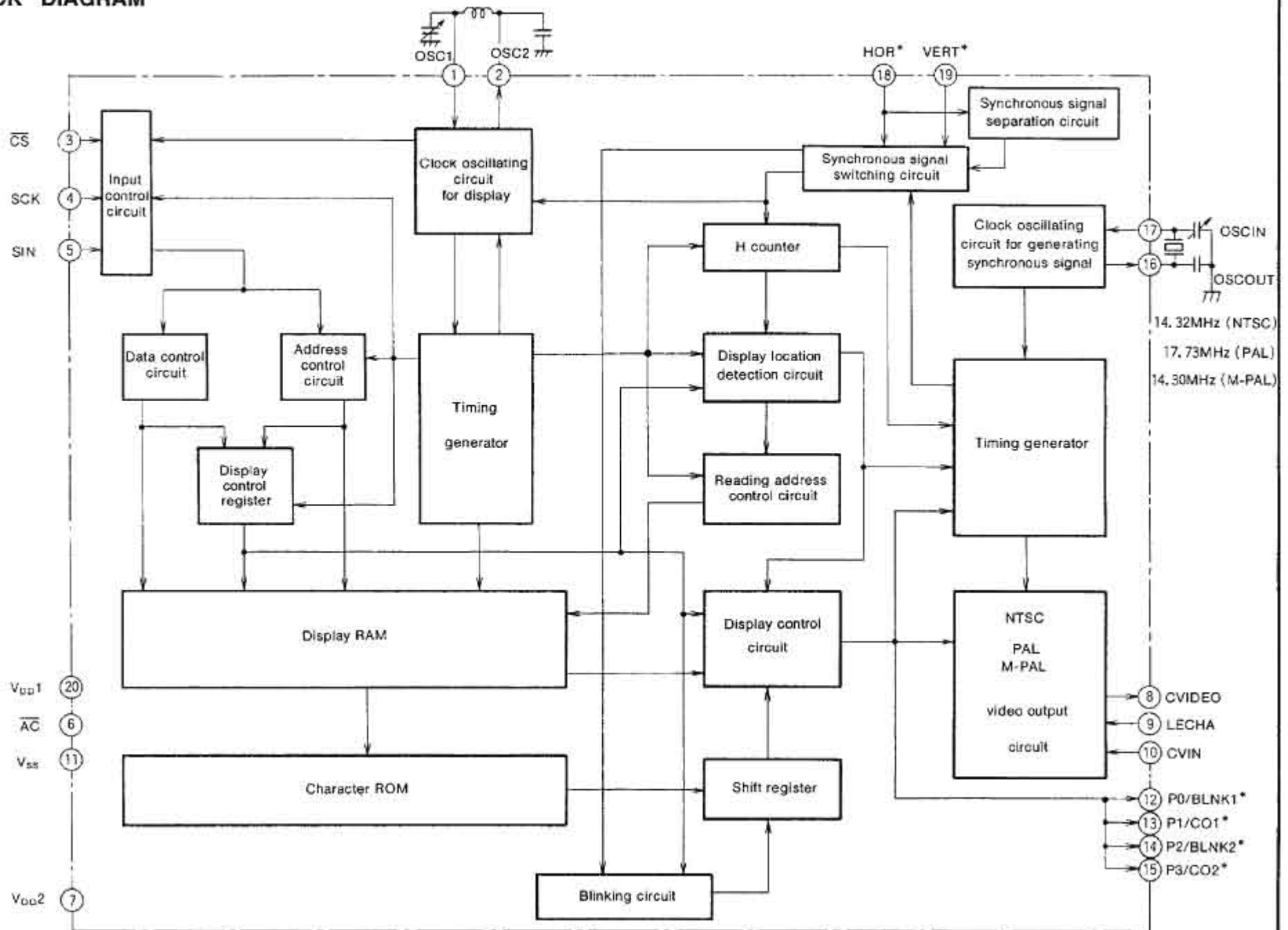
TV, VCR, Camcorder

MITSUBISHI MICROCOMPUTERS

**M35012-XXXSP, M35013-XXXSP**

**SCREEN CHARACTER and PATTERN DISPLAY CONTROLLERS**

**BLOCK DIAGRAM**



Note: The pins remarked "\*" are selectable the input or output polarity when the character ROM masked.

## MITSUBISHI MICROCOMPUTERS M35012-XXXSP, M35013-XXXSP

### SCREEN CHARACTER and PATTERN DISPLAY CONTROLLERS

#### PIN DESCRIPTION

Pin Number	Symbol	Pin name	Input /Output	Function
1	OSC1	Pins for attachment of external oscillator circuit	Input	There are the pins for attaching an external display oscillator circuit. The standard oscillation frequency is approximately 7MHz. This oscillation frequency determines the horizontal position of the display on the TV screen and the width of the characters.
2	OSC2		Output	
3	$\overline{CS}$	Chip select input	Input	This is the chip select pin, and when serial data transmission is being carried out, it goes to "L". Hysteresis input. Includes built-in pull-up resistor.
4	SCK	Serial clock input	Input	When $\overline{CS}$ pin is "L", SIN serial data is taken in when SCK rises. Hysteresis input. Built-in pull-up resistor is included.
5	SIN	Serial data input	Input	This is the pin for serial input of data and addresses for the display control register and the display data memory. Hysteresis input. Includes built-in pull-up resistor.
6	$\overline{AC}$	Auto-clear input	Input	When "L", this pin resets the internal IC circuit. Hysteresis input. Includes built-in pull-up resistor.
7	$V_{DD2}$	Power pin	—	Please connect to +5V with the analog circuit power pin.
8	CVIDEO	Composite video signal output	Output	This is the output pin for composite video signals. It outputs 2V <sub>pp</sub> composite video signals. In superimpose mode, character output etc. is superimposed on the external composite video signals from CVIN.
9	LECHA	Character level input	Input	This is the input pin which determines the "white" character color level in the composite video signal.
10	CVIN	Composite video signal input	Input	This is the input pin for external composite video signals. In superimpose mode, character output etc. is superimposed on these external composite video signals.
11	$V_{SS}$	Earthing pin	—	Please connect to GND using circuit earthing pin.
12	P0	Port P0 output	Output	This pin can be toggled between port pin output and BLNK1* (character background) signal output. Polarity can be selected when the character ROM is masked.
13	P1	Port P1 output	Output	This pin can be toggled between port pin output and CO1* (character) signal output. Polarity can be selected when the character ROM is masked.
14	P2	Port P2 output	Output	This pin can be toggled between port pin output and BLNK2* (character background) signal output. Polarity can be selected when the character ROM is masked.
15	P3	Port P3 output	Output	This pin can be toggled between port pin output and CO2* (character) signal output. Polarity can be selected when the character ROM is masked.
16	OSCOU	Pins for attachment of external oscillator circuit for synchronization signal generation	Output	These are the pins for attaching an external oscillator circuit for generating the synchronization signal. An oscillation of 14.32MHz is needed for NTSC, 17.73MHz is needed for PAL and 14.30MHz is needed for M-PAL.
17	OSCI		Input	
18	HOR*	Horizontal synchronization signal input	Input	This pin inputs the horizontal synchronization signal. Hysteresis input. Polarity can be selected when the character ROM is masked.
19	VERT*	Vertical synchronization signal input	Input	This pin inputs the vertical synchronization signal. Hysteresis input. Polarity can be selected when the character ROM is masked.
20	$V_{DD1}$	Power pin	—	Please connect to +5V with the digital circuit power pin.

Note : The pins remarked "\*" are selectable the input or output polarity when the character ROM masked.

# NJM2068

## LOW-NOISE DUAL OPERATIONAL AMPLIFIER

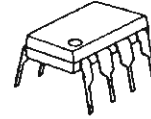
### ■ GENERAL DESCRIPTION

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% typ. )
- Low Noise Voltage ( FLAT+JISA,  $0.56\mu V$  typ. )
- High Slew Rate (  $6V/\mu s$  typ. )
- Unity Gain Bandwidth ( 27MHz @  $f=10kHz$  )
- Package Outline DIP8, DMP8, SIP8, SSOP8
- Bipolar Technology

### ■ PACKAGE OUTLINE



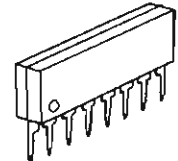
NJM2068D



NJM2068M

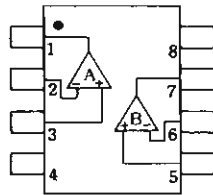


NJM2068V

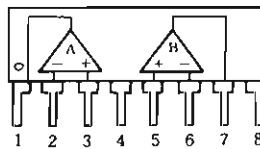


NJM2068L

### ■ PIN CONFIGURATION



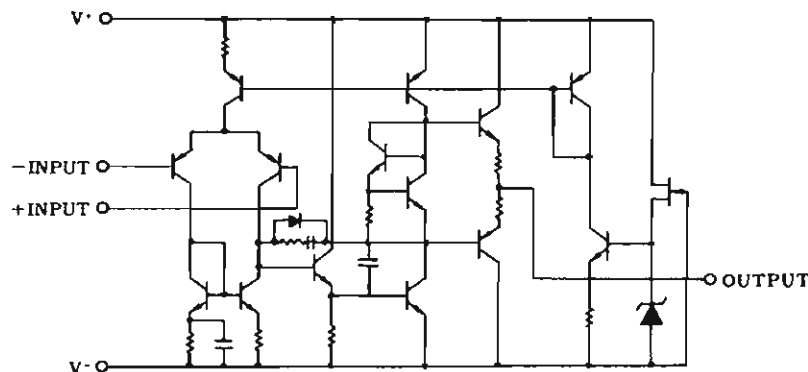
NJM2068D  
NJM2068M  
NJM2068V



NJM2068L

- PIN FUNCTION**
- 1.A OUTPUT
  - 2.A -INPUT
  - 3.A +INPUT
  - 4.V<sup>-</sup>
  - 5.B +INPUT
  - 6.B -INPUT
  - 7.B OUTPUT
  - 8.V<sup>+</sup>

### ■ EQUIVALENT CIRCUIT ( 1/2 Shown )



# NJM2296

## 5-INPUT 3-OUTPUT VIDEO SW

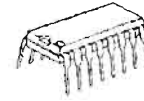
### ■ GENERAL DESCRIPTION

The NJM2296 is a 5-input 3-output video switch.

Its switches select one from five signals received from VTR, TV, TV GAME and others.

This IC is designed for audio items, such as AV amplifier and receivers, and others

### ■ PACKAGE OUTLINE



NJM2296D

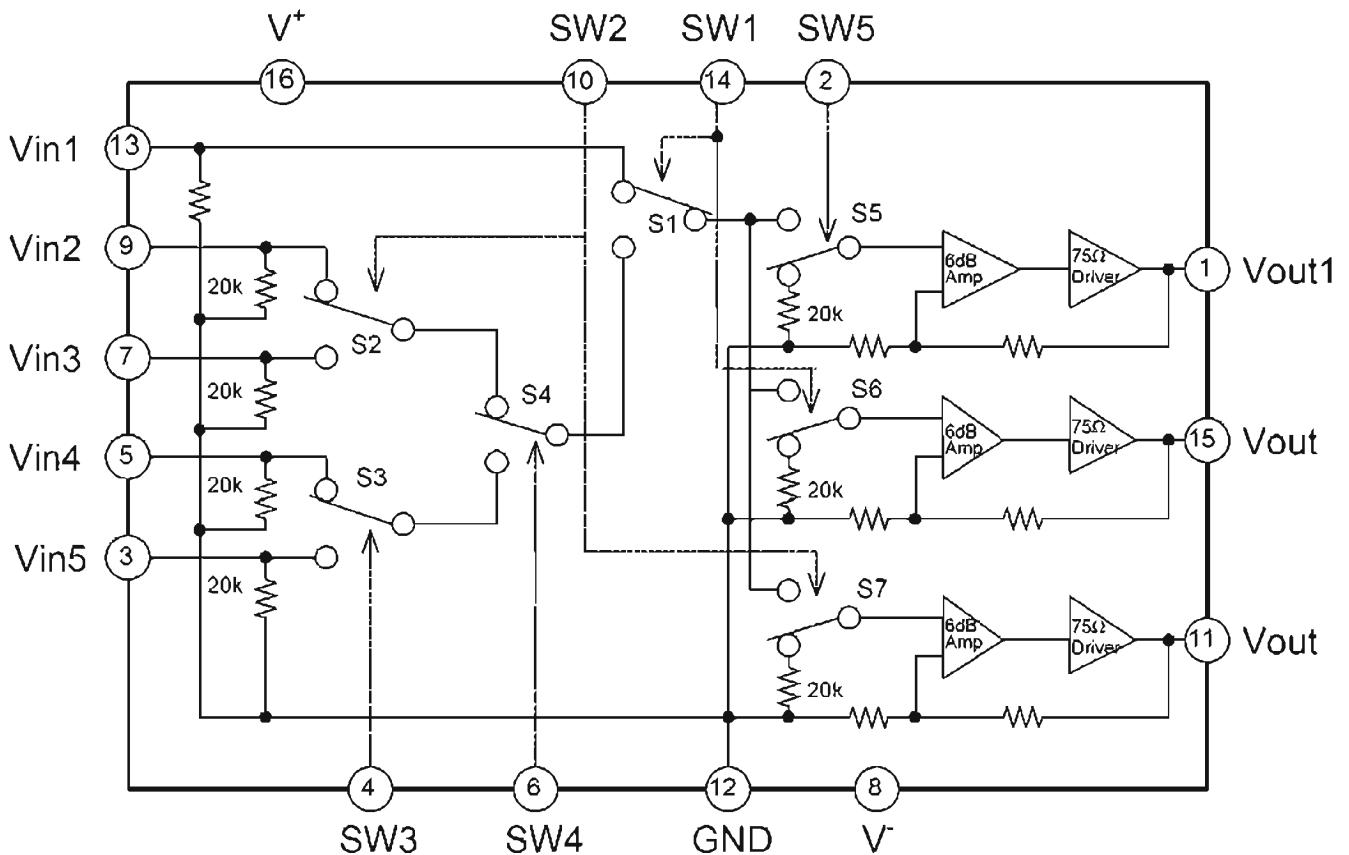


NJM2296M

### ■ FEATURES

- 5-input 3-output
- Operating Voltage  $\pm 4.0$  to  $\pm 6.5V$
- Operating Current  $\pm 31mA$  typ. at  $V_{cc} = \pm 5V$
- Crosstalk  $-65dB$  typ.
- Internal 6dB Amplifier
- Internal  $75\Omega$  Driver
- Bipolar Technology
- Package Outline DIP16, DMP16

### ■ BLOCK DIAGRAM





# NJM4556A

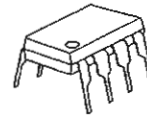
## DUAL HIGH CURRENT OPERATIONAL AMPLIFIER

### ■ GENERAL DESCRIPTION

The NJM4556A integrated circuit is a high-gain, high output current dual operational amplifier capable of driving  $\pm 70\text{mA}$  into  $150\ \Omega$  loads ( $\pm 10.5\text{V}$  output voltage), and operating low supply voltage ( $V^+/V^- = \pm 2\text{V} \sim$ ).

The NJM4556A combines many of the fetures of the popular NJM4558 as well as having the capability of driving  $150\ \Omega$  loads. In addition, the wide band-width, low noise, high slew rate and low distortion of the NJM4556A make it ideal for many audio, telecommunications and instrumentation applications.

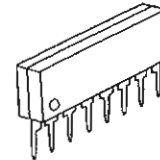
### ■ PACKAGE OUTLINE



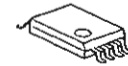
NJM4556AD



NJM4556AM



NJM4556AL

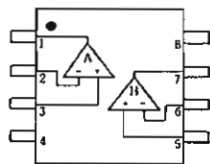


NJM4556AV

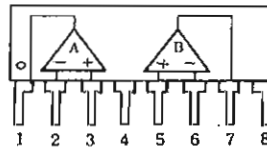
### ■ FEATURES

- Operating Voltage ( $\pm 2\text{V} \sim \pm 18\text{V}$ )
- High Output Current ( $I_o = 70\text{mA}$ )
- Slew Rate ( $3\text{V}/\mu\text{s}$  typ.)
- Gain Band Width Product ( $8\text{MHz}$  typ.)
- Package Outline DIP8, DMP8, SIP8, SSOP8
- Bipolar Technology

### ■ PIN CONFIGURATION



NJM4556AD  
NJM4556AM  
NJM4556AV

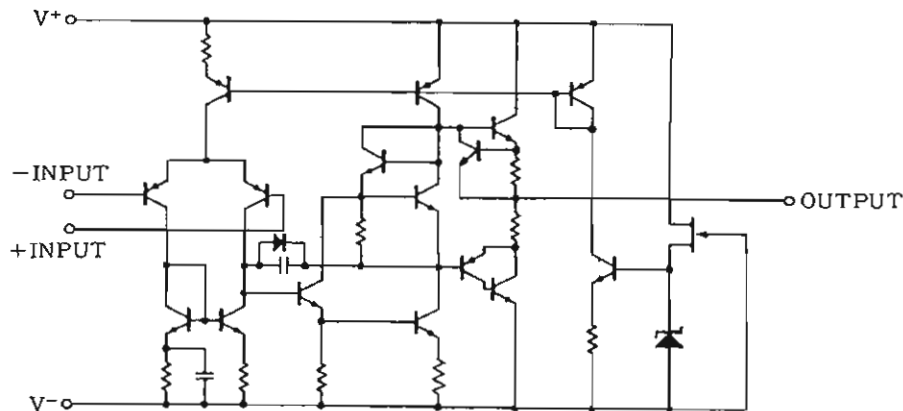


NJM4556AL

#### 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)



**NJU201A**

**C-MOS QUAD SPST ANALOG SWITCH**

■ GENERAL DESCRIPTION

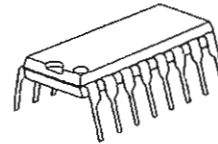
The NJU201A is a quad break-before-make SPST analog switch protected up to 44V operating voltage.

All switches are controlled by TTL or C-MOS compatible input.

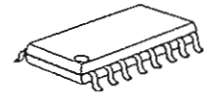
The low on-state resistance is about half compare with the NJU7301.

The NJU201A is functionally and pin-to-pin compatible with SILICONIX DG201A.

■ PACKAGE OUTLINE



NJU201AD

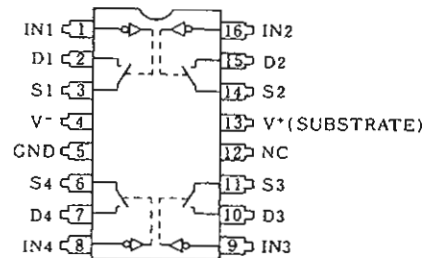


NJU201AM

■ FEATURES

- High Break Down Voltage    -- 44V
- Low On-state Resistance
- Package Outline                -- DIP/DMP 16
- C-MOS Technology

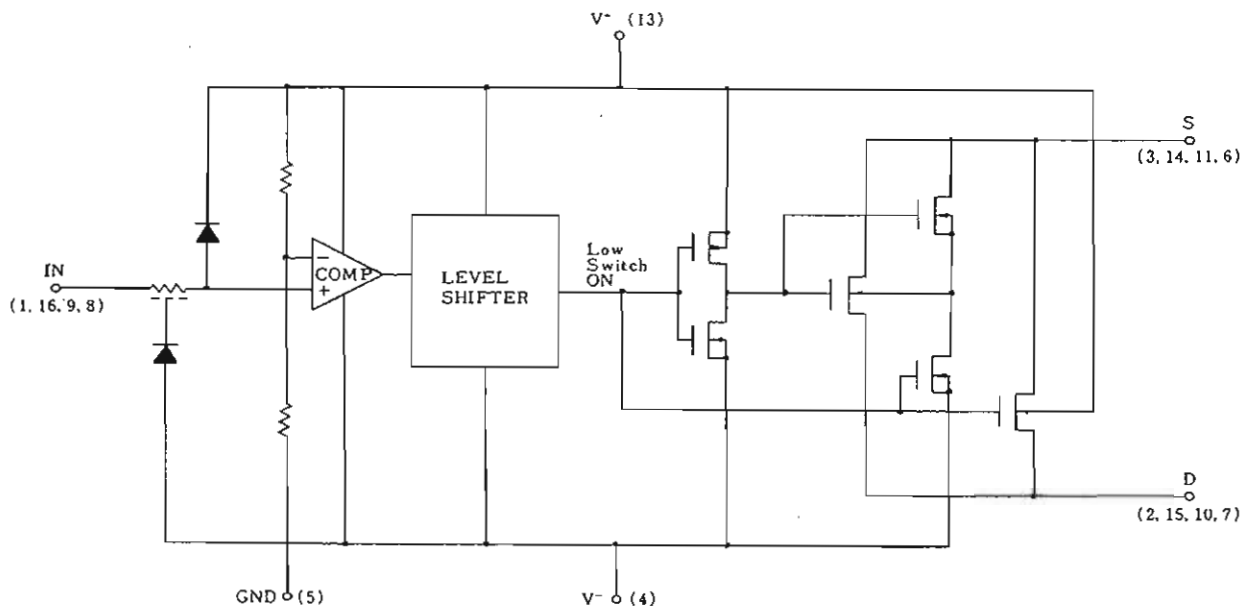
■ PIN CONFIGURATION



■ TRUTH TABLE

Logic (In)	Switch
0	ON
1	OFF

■ EQUIVALENT CIRCUIT



\* Logic input threshold voltage  $V_{TH}$  is about  $V^+ \times 0.128(V)$ .  
When the designing, enough margin is required.

NJU6324 Series

QUARTZ CRYSTAL OSCILLATOR

■ GENERAL DESCRIPTION

The NJU6324 series is a C-MOS quartz crystal oscillator which consists of an oscillation amplifier, 3-stage divider and 3-state output buffer.

The oscillation frequency is as wide as up to 50MHz and the symmetry of 45-55% is realized over full oscillation frequency range.

The oscillation amplifier incorporates feed-back resistance and oscillation capacitors( $C_g$ ,  $C_d$ ), therefore, it requires no external component except quartz crystal.

The 3-stage divider generates  $f_o$ ,  $f_o/2$ ,  $f_o/4$  and  $f_o/8$  and only one frequency selected by internal circuits is output

The 3-state output buffer is C-MOS compatible and capable of 10 LSTTL driving.

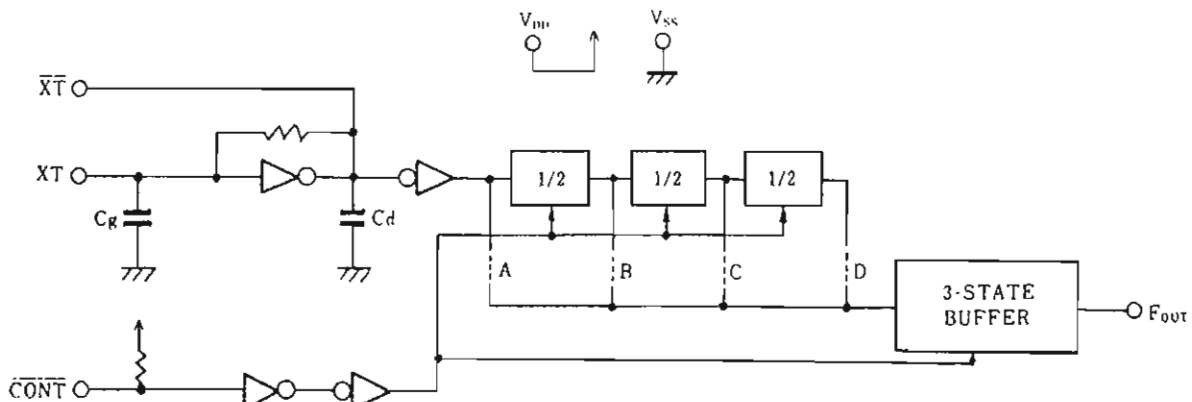
■ FEATURES

- Operating Voltage -- 3.0~6.0V
- Maximum Oscillation Frequency -- 50MHz
- Low Operating Current
- High Fan-out -- LSTTL 10
- 3-state Output Buffer
- Selected Frequency Output (mask option)  
Only one frequency out of  $f_o$ ,  $f_o/2$ ,  $f_o/4$  and  $f_o/8$  output
- Oscillation Capacitors  $C_g$  and  $C_d$  on-chip
- Oscillation and/or Output Stand-by Function
- Package Outline -- CHIP/EMP 8
- C-MOS Technology

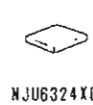
■ LINE-UP TABLE

Type No.	Output Frequency	$C_g$	$C_d$
NJU6324L	$f_o$	23pF	23pF
NJU6324M	$f_o/2$	23pF	23pF
NJU6324N	$f_o/4$	23pF	23pF
NJU6324U	$f_o/8$	23pF	23pF

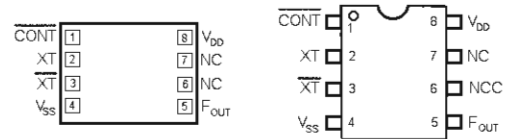
■ BLOCK DIAGRAM



■ PACKAGE OUTLINE



■ PIN CONFIGURATION/PAD LOCATION



■ COORDINATES

Unit:  $\mu m$

No.	PAD	X	Y
1	CONT	170	649
2	XT	170	483
3	XT	170	316
4	VSS	170	143
5	F <sub>OUT</sub>	1094	143
6	NC	-	-
7	NC	1094	462
8	V <sub>DD</sub>	1094	649

Chip Size : 1.24 X 0.8mm  
 Chip Thickness : 400  $\mu m \pm 30 \mu m$   
 (Note) No. 6 and 7 terminals are only for package type information. There is No.7 PAD on the chip but no No.6.

**TOSHIBA**

**TC74VHC240,244F/FW/FT**

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

**TC74VHC240F, TC74VHC240FW, TC74VHC240FT**  
**TC74VHC244F, TC74VHC244FW, TC74VHC244FT**

**OCTAL BUS BUFFER**  
**TC74VHC240F/FW/FT INVERTED, 3 - STATE OUTPUTS**  
**TC74VHC244F/FW/FT NON - INVERTED, 3 - STATE OUTPUTS**

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

The TC74VHC240 and 244 are advanced high speed CMOS OCTAL BUS BUFFERS fabricated with silicon gate C<sup>2</sup>MOS technology.

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

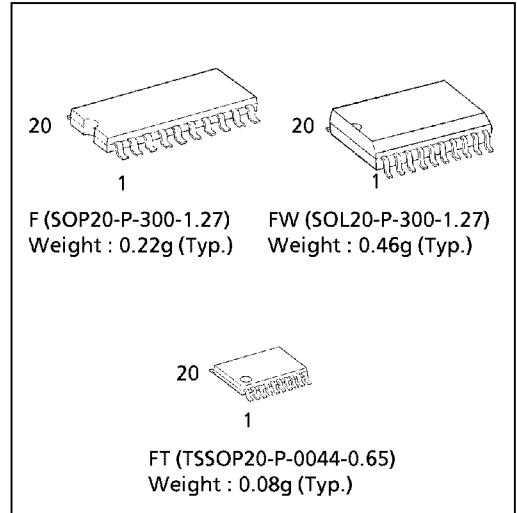
The 74VHC240 is an inverting 3 - state buffer having two active - low output enables. The TC74VHC244 is a non - inverting 3 - state buffer, and has two active - low output enables.

These devices are designed to be used with 3 - state memory address drivers, etc.

An input protection circuit ensures that 0 to 7V can be applied to the input pins without regard to the supply voltage. This device can be used to interface 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.....  $t_{pd} = 3.9ns(\text{typ.})$  at  $V_{CC} = 5V$
- Low Power Dissipation.....  $I_{CC} = 4\mu A(\text{Max.})$  at  $T_a = 25^\circ C$
- High Noise Immunity.....  $V_{NIH} = V_{NIL} = 28\% V_{CC} (\text{Min.})$
- Power Down Protection is provided on all inputs.
- Balanced Propagation Delays.....  $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range.....  $V_{CC} (\text{opr}) = 2V \sim 5.5V$
- Low Noise.....  $V_{OLP} = 0.9V (\text{Max.})$
- Pin and Function Compatible with 74ALS240/244

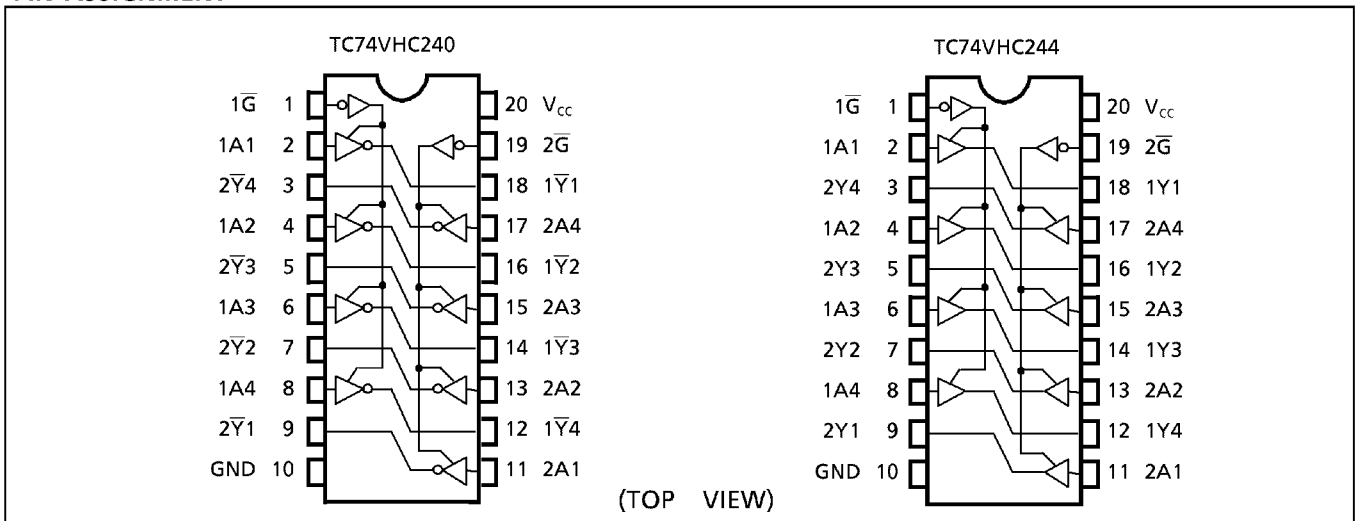


**TRUTH TABLE**

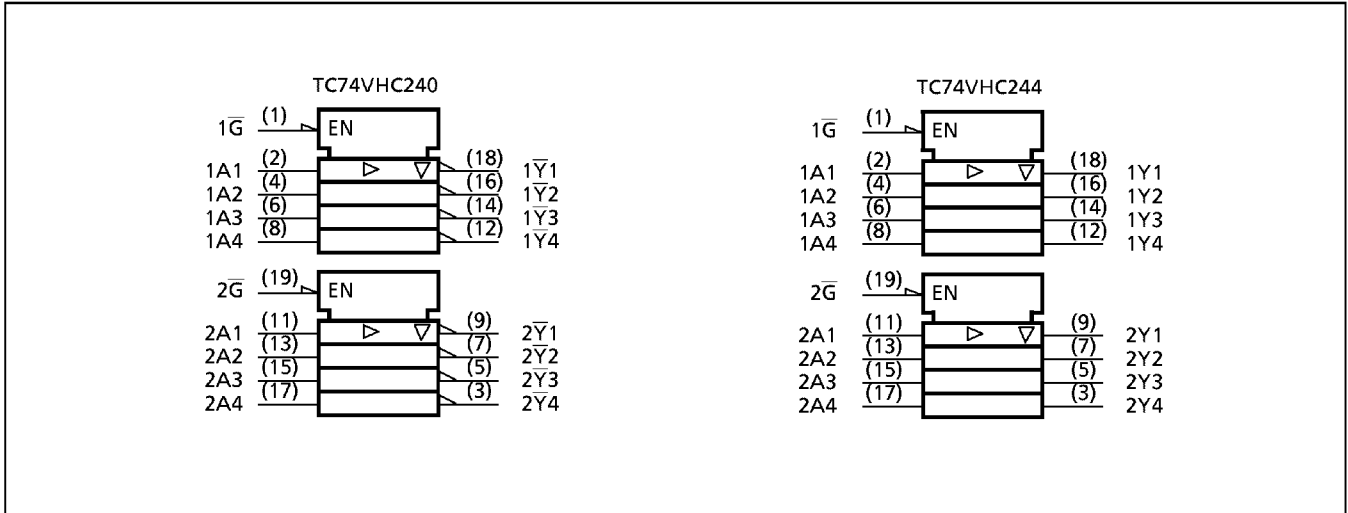
INPUTS		OUTPUTS	
$\bar{G}$	$A_n$	$Y_n$	$\bar{Y}_n$
L	L	L	H
L	H	H	L
H	X	Z	Z

X : Don't Care  
 Z : High Impedance  
 $Y_n$  : TC74VHC244  
 $\bar{Y}_n$  : TC74VHC240

**PIN ASSIGNMENT**



961001EBA2

**TOSHIBA****TC74VHC240,244F/FW/FT****IEC LOGIC SYMBOL****ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	$V_{CC}$	-0.5~7.0	V
DC Input Voltage	$V_{IN}$	-0.5~7.0	V
DC Output Voltage	$V_{OUT}$	-0.5~ $V_{CC} + 0.5$	V
Input Diode Current	$I_{IK}$	-20	mA
Output Diode Current	$I_{OK}$	$\pm 20$	mA
DC Output Current	$I_{OUT}$	$\pm 25$	mA
DC $V_{CC}$ /Ground Current	$I_{CC}$	$\pm 75$	mA
Power Dissipation	$P_D$	180	mW
Storage Temperature	$T_{stg}$	-65~150	$^{\circ}C$

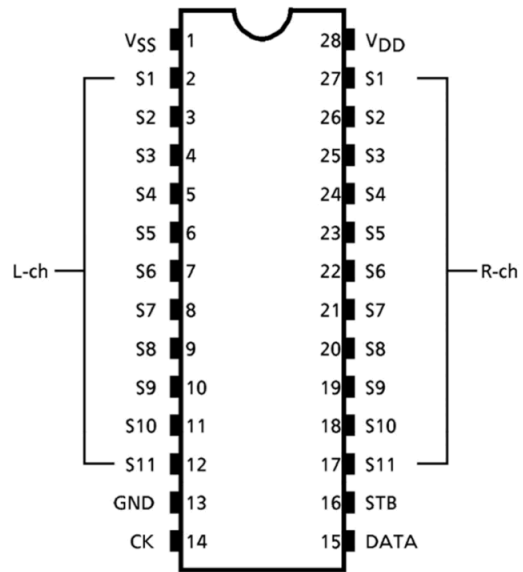
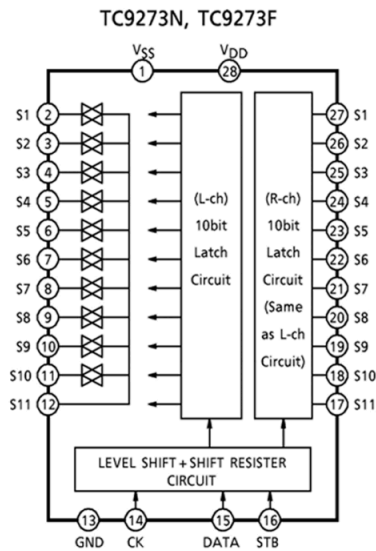
**RECOMMENDED OPERATING CONDITIONS**

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	$V_{CC}$	2.0~5.5	V
Input Voltage	$V_{IN}$	0~5.5	V
Output Voltage	$V_{OUT}$	0~ $V_{CC}$	V
Operating Temperature	$T_{opr}$	-40~85	$^{\circ}C$
Input Rise and Fall Time	dt / dv	0~100 ( $V_{CC} = 3.3 \pm 0.3V$ ) 0~20 ( $V_{CC} = 5 \pm 0.5V$ )	ns / V

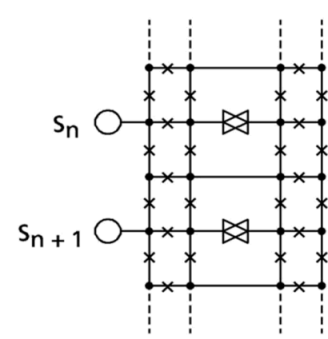
# TC9273N

## CMOS Digital IC

**BLOCK DIAGRAM**



**PIN FUNCTION (Left channel / right channel)**

PIN No.			SYMBOL	PIN NAME	FUNCTION AND OPERATION	NOTE
TC9273N / F	TC9274N	TC9274F				
1	1	40	V <sub>SS</sub>	Negative power supply pin	Dual power supply $V_{DD} = 8.0 \sim 17V$ $GND = 0V$ $V_{SS} = -8.0 \sim -17V$	—
13	20	16	GND	Digital ground pin		
28	42	38	V <sub>DD</sub>	Positive power supply pin		
2 / 27	2 / 41	41 / 37	S1	Input / output pins	Analog switch input pins.    × : Aluminum mask switch. ● : Open or closed can be specified. Connection for right and left channels can be different.	—
3 / 26	3 / 40	42 / 36	S2			
4 / 25	4 / 39	43 / 35	S3			
5 / 24	5 / 38	44 / 34	S4			
6 / 23	6 / 37	1 / 33	S5			
7 / 22	7 / 36	2 / 32	S6			
8 / 21	8 / 35	3 / 31	S7			
9 / 20	9 / 34	4 / 30	S8			
10 / 19	10 / 33	5 / 29	S9			
11 / 18	11 / 32	6 / 28	S10			
—	13 / 30	8 / 26	S12			
—	14 / 29	9 / 25	S13			
—	15 / 28	10 / 24	S14			
—	16 / 27	11 / 23	S15			
—	17 / 26	12 / 22	S16			
—	18 / 25	13 / 21	S17			
—	19 / 24	14 / 20	S18			
—	—	17 / 39	NC			
14	21	16	CK	Clock input pin	Clock input for data transfer	Low threshold value input pins
15	22	18	DATA	Data input pin	Serial data input for setting switches	
16	23	19	STB	Strobe input pin	Strobe input for data writing	



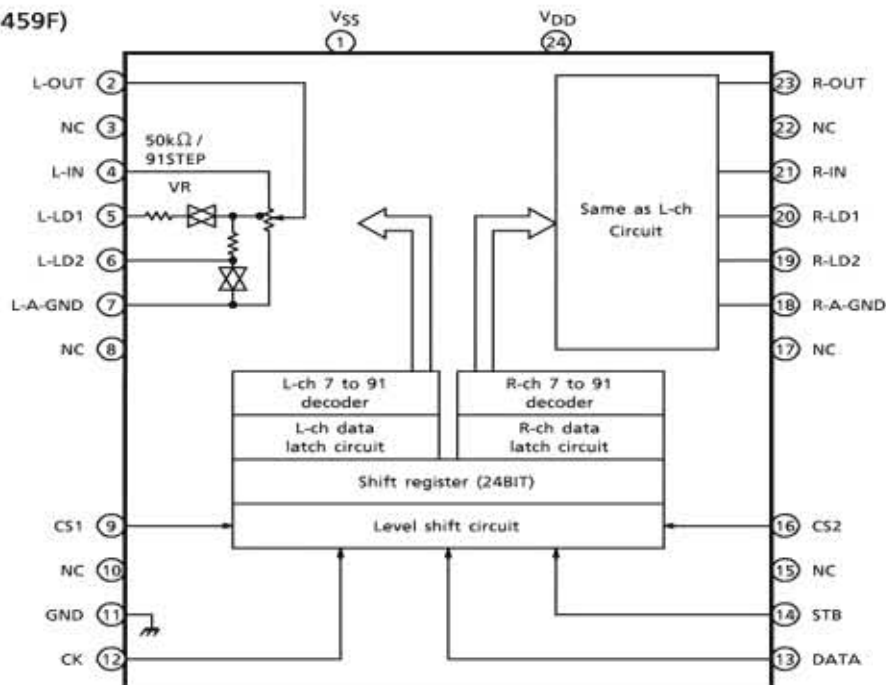
TC9459N/F

**PIN DESCRIPTION**

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

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

**BLOCK DIAGRAM (TC9459F)**





**TOSHIBA****TC9482N/F**

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

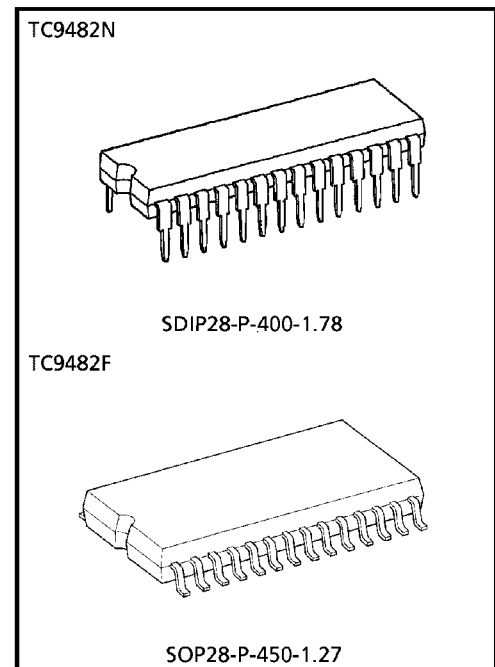
# TC9482N, TC9482F

## SYSTEM ELECTRONIC VOLUME CONTROL

The TC9482N and TC9482F are six-channel electronic volume control ICs developed for Hi-Fi audio equipment. Since all six channels can be individually controlled, the devices are optimum for audio equipment with multiple outputs.

### FEATURES

- Sound volume can be controlled in 97 steps from 0 to -95dB or up to an infinite level in 1dB increments.
- Incorporating six channels of volume control circuits, the device allows independent volume control.
- Can operate with a single or dual power supplies.
- Can control up to 4 chips on the same bus by using chip select input.
- Built-in interface for 5-V microcomputers.
- Thanks to its polysilicon resistor, the device allows you to configure a low-distortion, high-performance volume control system.
- Two packages supported: 28-pin shrink DIP and 28-pin flat package.

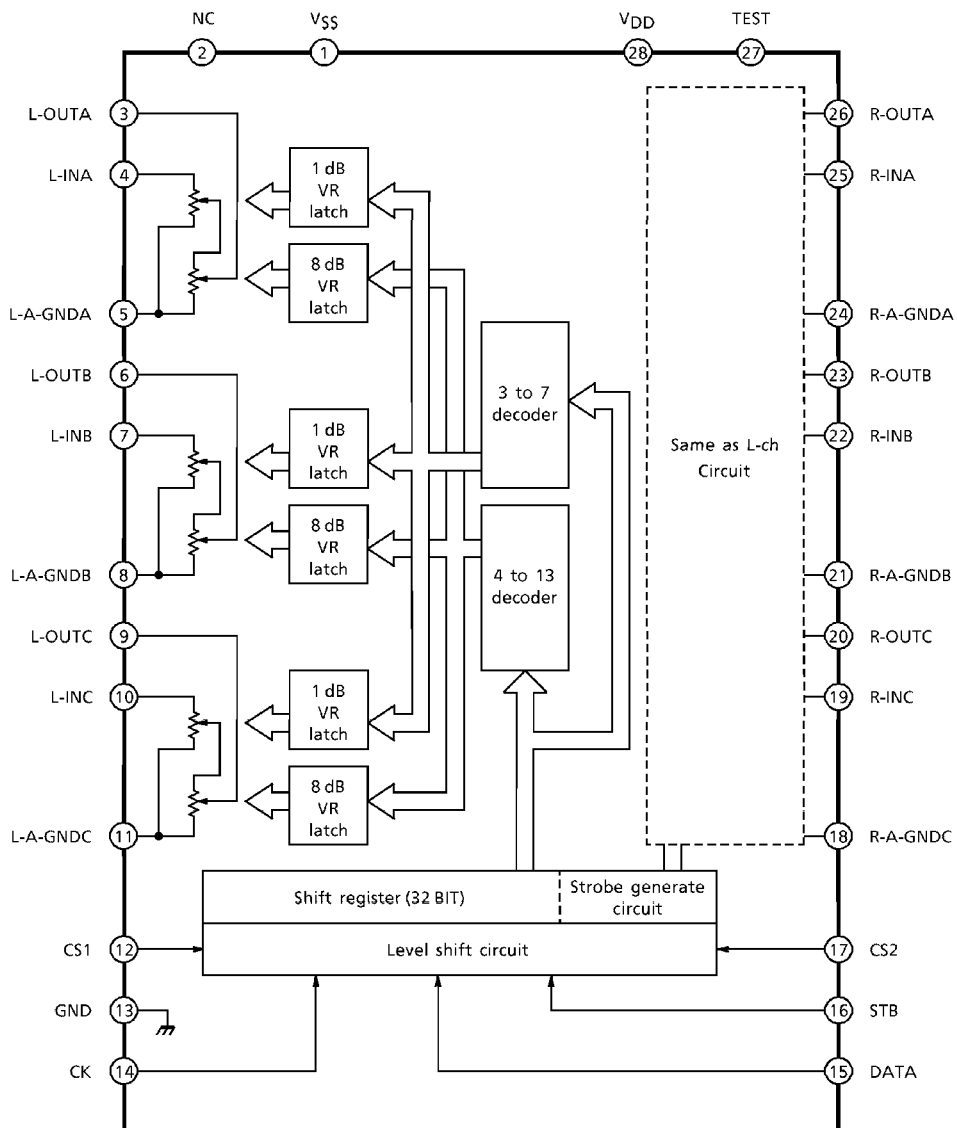
**Weight**

SDIP28-P-400-1.78 : 2.2 g (Typ.)  
 SOP28-P-450-1.27 : 0.8 g (Typ.)

**PIN CONNECTIONS**

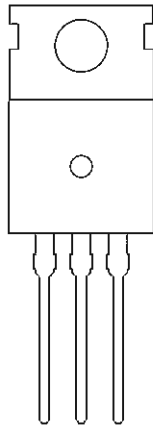
V <sub>SS</sub>	1	28	V <sub>DD</sub>
NC	2	27	TEST
L-OUTA	3	26	R-OUTA
L-INA	4	25	R-INA
L-A-GNDA	5	24	R-A-GNDA
L-OUTB	6	23	R-OUTB
L-INB	7	22	R-INB
L-A-GNDB	8	21	R-A-GNDB
L-OUTC	9	20	R-OUTC
L-INC	10	19	R-INC
L-A-GNDC	11	18	R-A-GNDC
CS1	12	17	CS2
GND	13	16	STB
CK	14	15	DATA

**BLOCK DIAGRAM**



3-Terminal 1.5A Negative Adjustment Regulator IC

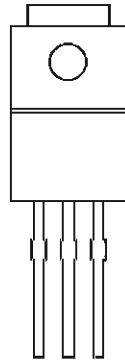
KA337



- 1. Adj.
- 2. Input
- 3. Output

Low Saturation Voltage Type 3-Pin Regulator IC

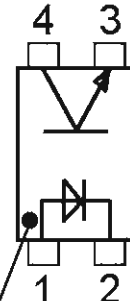
BA033T



- 1 Vcc
- 2 Ground
- 3 Out

Photocoupler IC

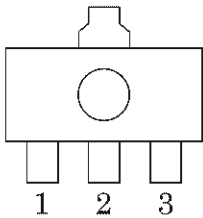
PC-17T1



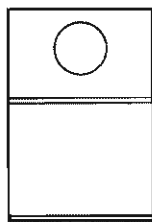
Anode Mark

**POSITIVE REGULATORS VARIOUS STYLES 7805, 7815**

SOT-89

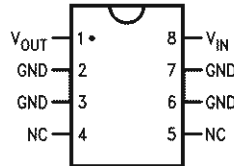


- 1. OUT
- 2. GND
- 3. IN



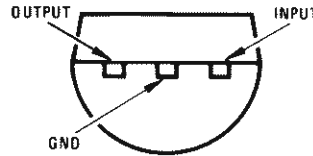
- 1. IN
- 2. GROUND
- 3. OUT

SO-8 Plastic (M) (Narrow Body)



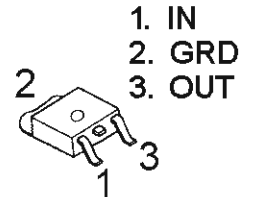
Top View

(TO-92) Plastic Package (Z)



Bottom View

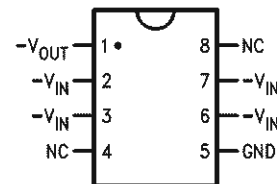
TO-252



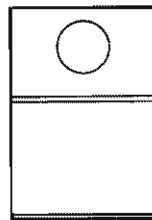
- 1. IN
- 2. GRD
- 3. OUT

**NEGATIVE REGULATORS VARIOUS STYLES 7905, 7915**

SO-8 Plastic (Narrow Body)

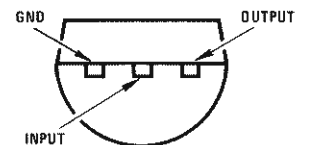


Top View



- 1. GROUND
- 2. IN
- 3. OUT

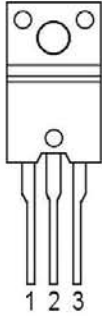
TO-92 Plastic Package (Z)



Bottom View

Silicon Transistor

2SA1859 PNP  
2SC4883 NPN



1 Base  
2 Collector  
3 Emitter

Small Signal Bi-Polar PNP Transistor

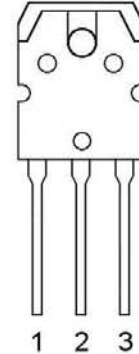
2SA933AS



1 Emitter  
2 Collector  
3 Base

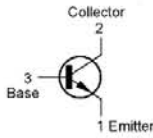
Silicon Transistor

2SA1986, 2SA1941, 2SB1560 PNP  
2SC5198, 2SC5358, 2SD2390 NPN

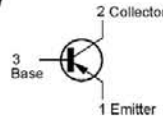


1 Base  
2 Collector (Heat Sink)  
3 Emitter

KTC3206



KRC107  
KTA1268  
KTA1266  
KTA1024



EPITAXIAL PLANAR TRANSISTOR

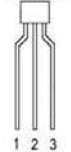
KTC3200  
KTC2874  
KTC3198  
KRA107M PNP



1 Emitter  
2 Collector  
3 Base

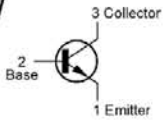
Silicon PNP Transistor

2SA1740S  
DTA114TSA

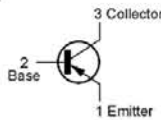


1 Emitter  
2 Collector  
3 Base

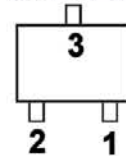
MPSA06



MPSA56



KRA107S PNP  
KTD1304 NPN  
KRC111S NPN  
DTC114TKA NPN  
DTC114YKA NPN



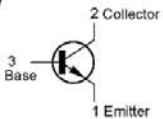
1) Emitter  
2) Base  
3) Collector

DTA114YSA  
DTC114YSA NPN



1) Ground  
2) In  
3) Out

KTD1302

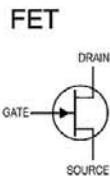


2SC4137

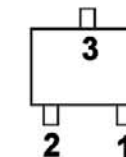


1. Emitter  
2. Collector  
3. Base

2SK117



DTA114YKA



1) Ground  
2) In  
3) Out

Silicon NPN Transistor

DTC114TSA



1 Emitter  
2 Collector  
3 Base

AVR110/210/310/510/2000/3000/4000/5000

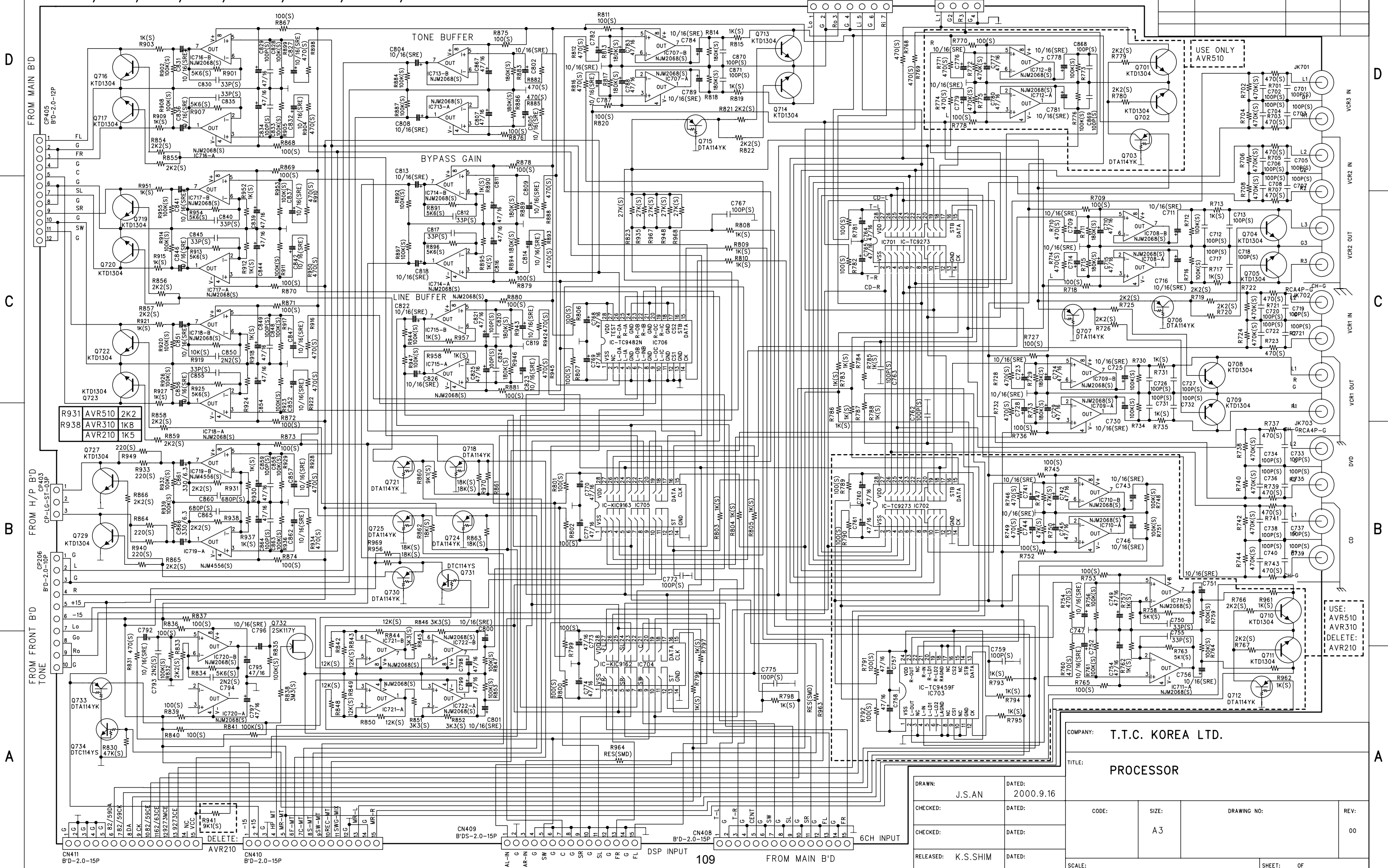
# SCHEMATIC DIAGRAM

FROM TAPE B'D  
CP404  
CP-LG-ST-07P

VID4 I/O  
FROM FRONT B'D  
CP205  
CP-LG-ST-04P

# MP

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:



COMPANY: **T.T.C. KOREA LTD.**

TITLE: **PROCESSOR**

DRAWN: J.S.AN	DATED: 2000.9.16
CHECKED:	DATED:
CHECKED:	DATED:
RELEASED: K.S.SHIM	DATED:

CODE:	SIZE: A3	DRAWING NO:	REV: 00
SCALE:	SHEET: OF		

# AVR110/210/310/510/2000/3000/4000/5000

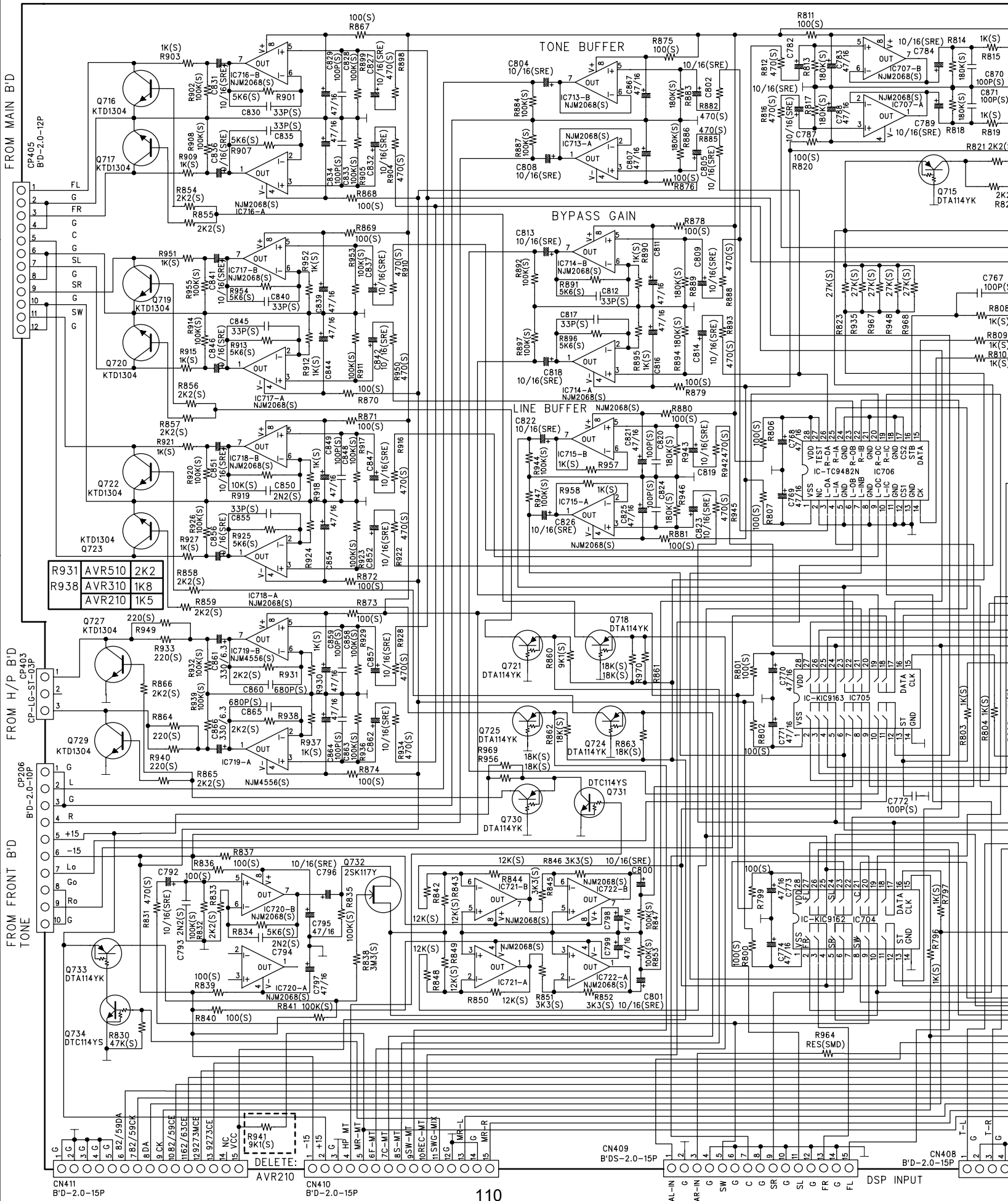
# SCHEMATIC DIAGR

D

C

B

A



# DIAGRAM

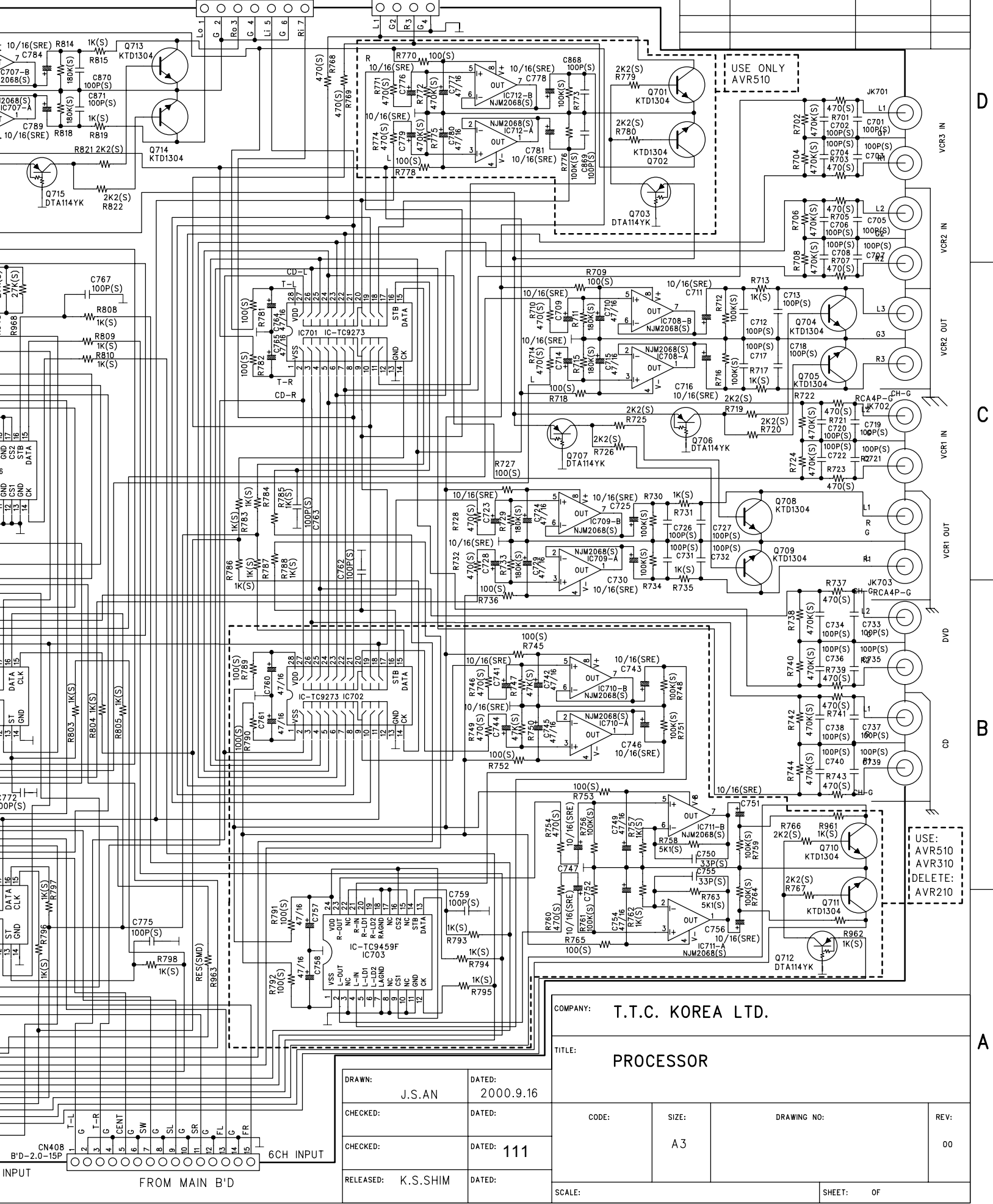
FROM TAPE B'D  
CP404  
CP-LG-ST-07P

VID4 I/O  
FROM FRONT B'D  
CP205  
CP-LG-ST-04P

# MP

REVISION RECORD

LTR	ECO NO:	APPROVED:	DATE:



COMPANY: T.T.C. KOREA LTD.

TITLE: PROCESSOR

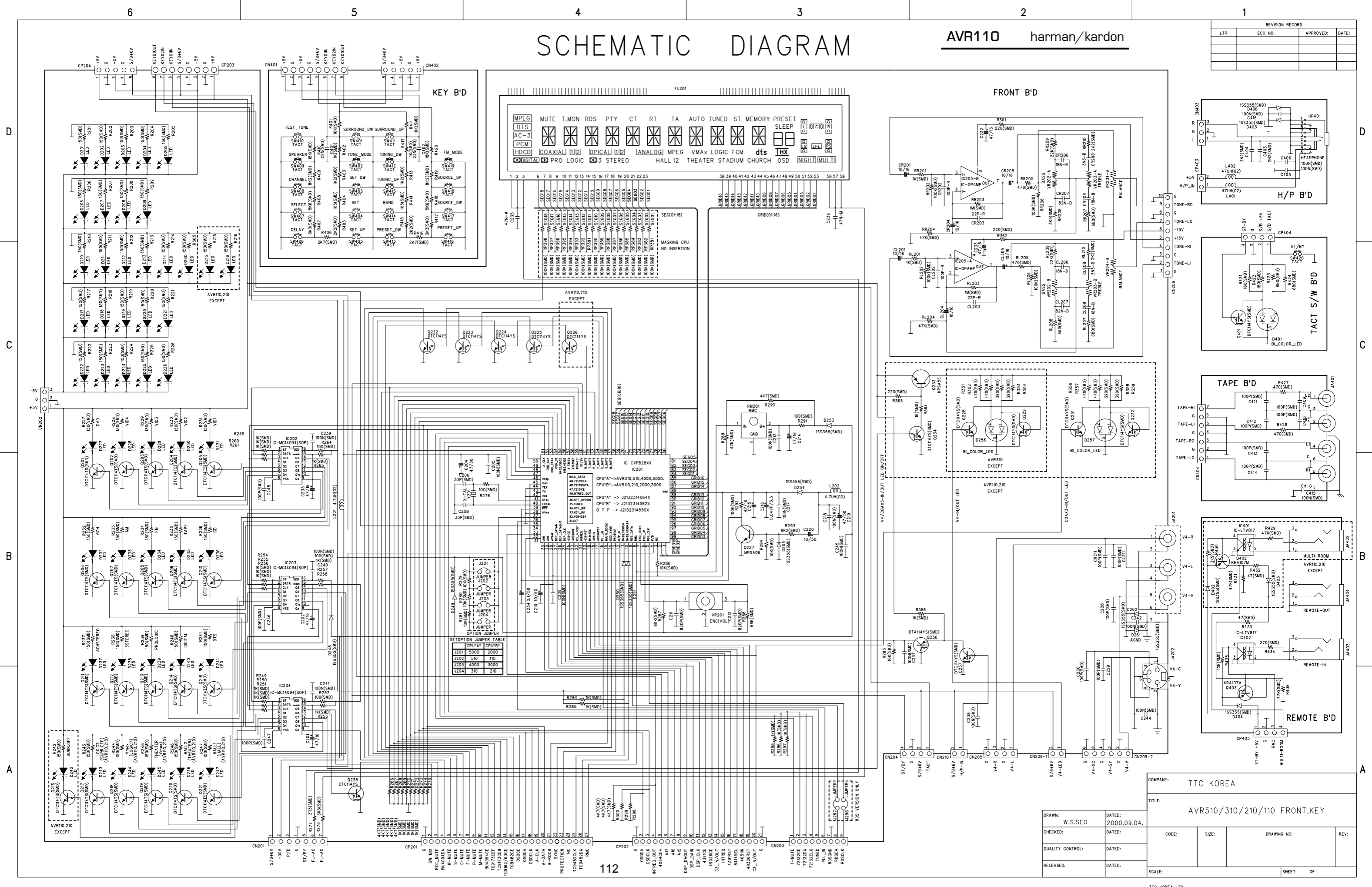
DRAWN: J.S.AN	DATED: 2000.9.16
CHECKED:	DATED:
CHECKED:	DATED: 111
RELEASED: K.S.SHIM	DATED:

CODE:	SIZE: A3	DRAWING NO:	REV: 00
SCALE:	SHEET: OF		

# SCHEMATIC DIAGRAM

AVR110 harman/kardon

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:



OPTION JUMPER TABLE

J201	5000	2000
J202	510	110
J203	4000	3000
J204	310	210

COMPANY: TTC KOREA

TITLE: AVR510/310/210/110 FRONT,KEY

DRAWN: W.S.SEO DATED: 2000.09.04.

CHECKED: DATED:

QUALITY CONTROL: DATED:

RELEASED: DATED:

SCALE:

DRAWING NO: REV:

SHEET: OF



# SCHEMATIC

6

5

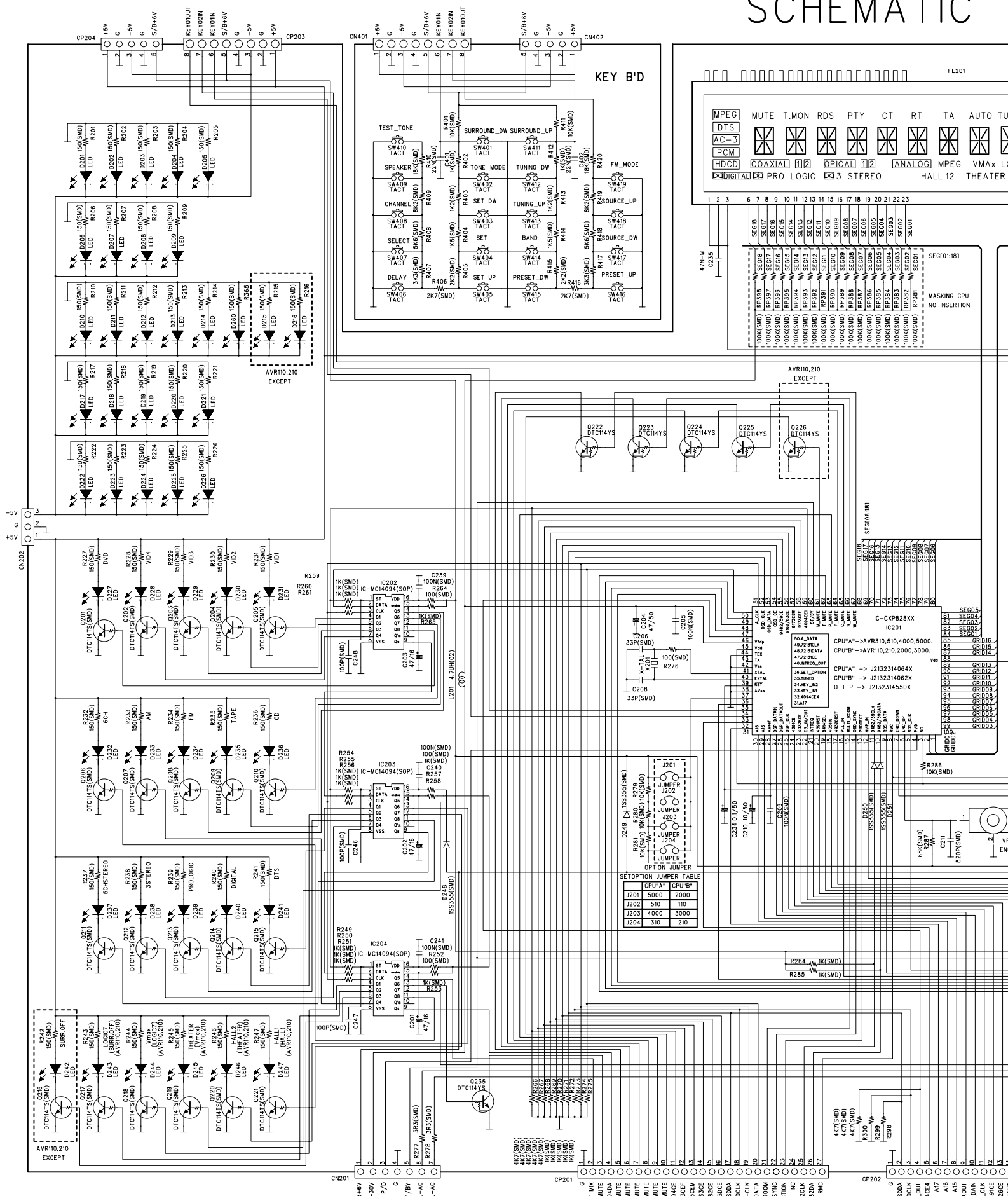
4

D

C

B

A

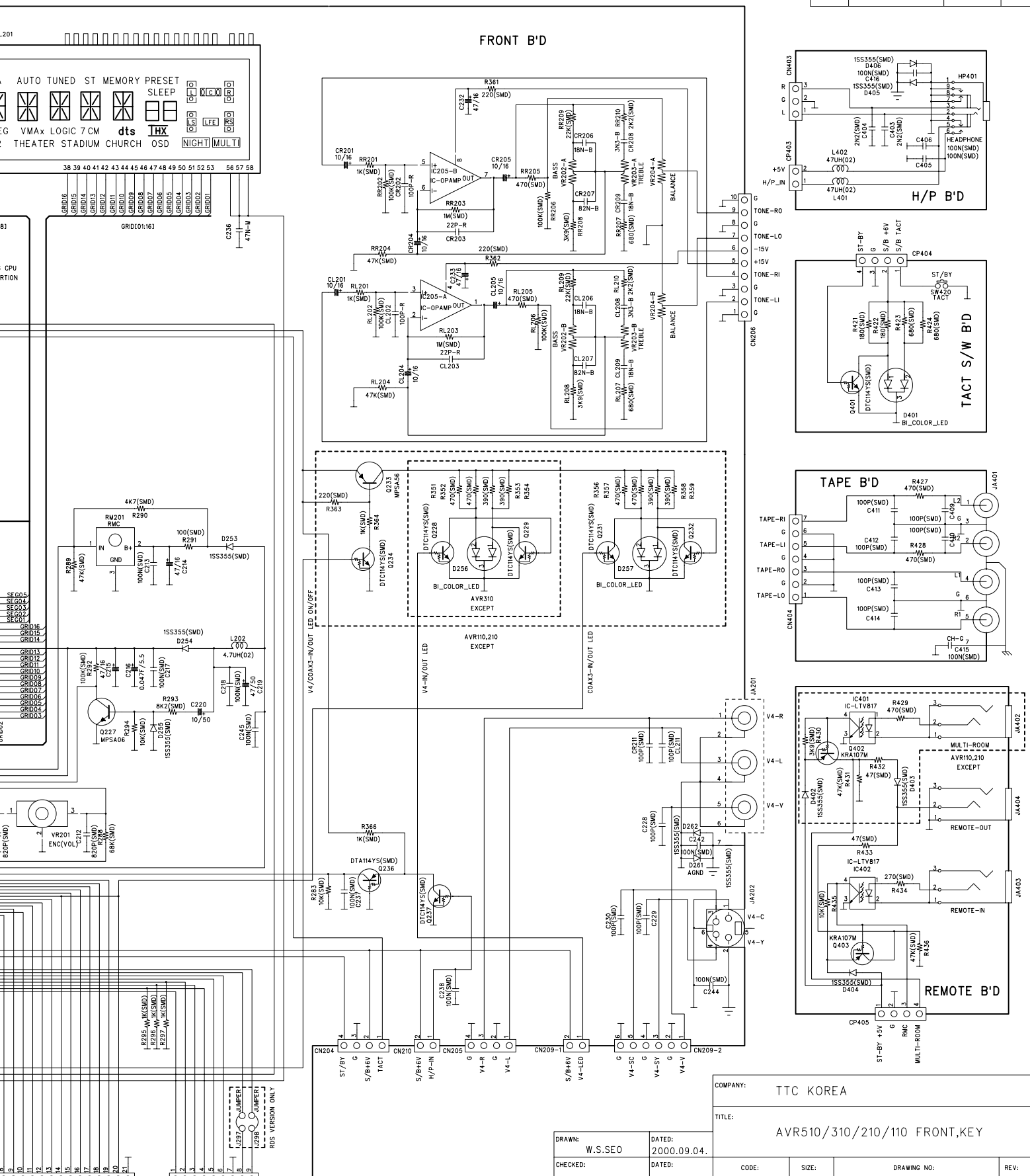


SET OPTION JUMPER TABLE

JUMPER	CPU"A"	CPU"B"
J201	5000	2000
J202	510	110
J203	4000	3000
J204	310	210

# CIRCUIT DIAGRAM

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:



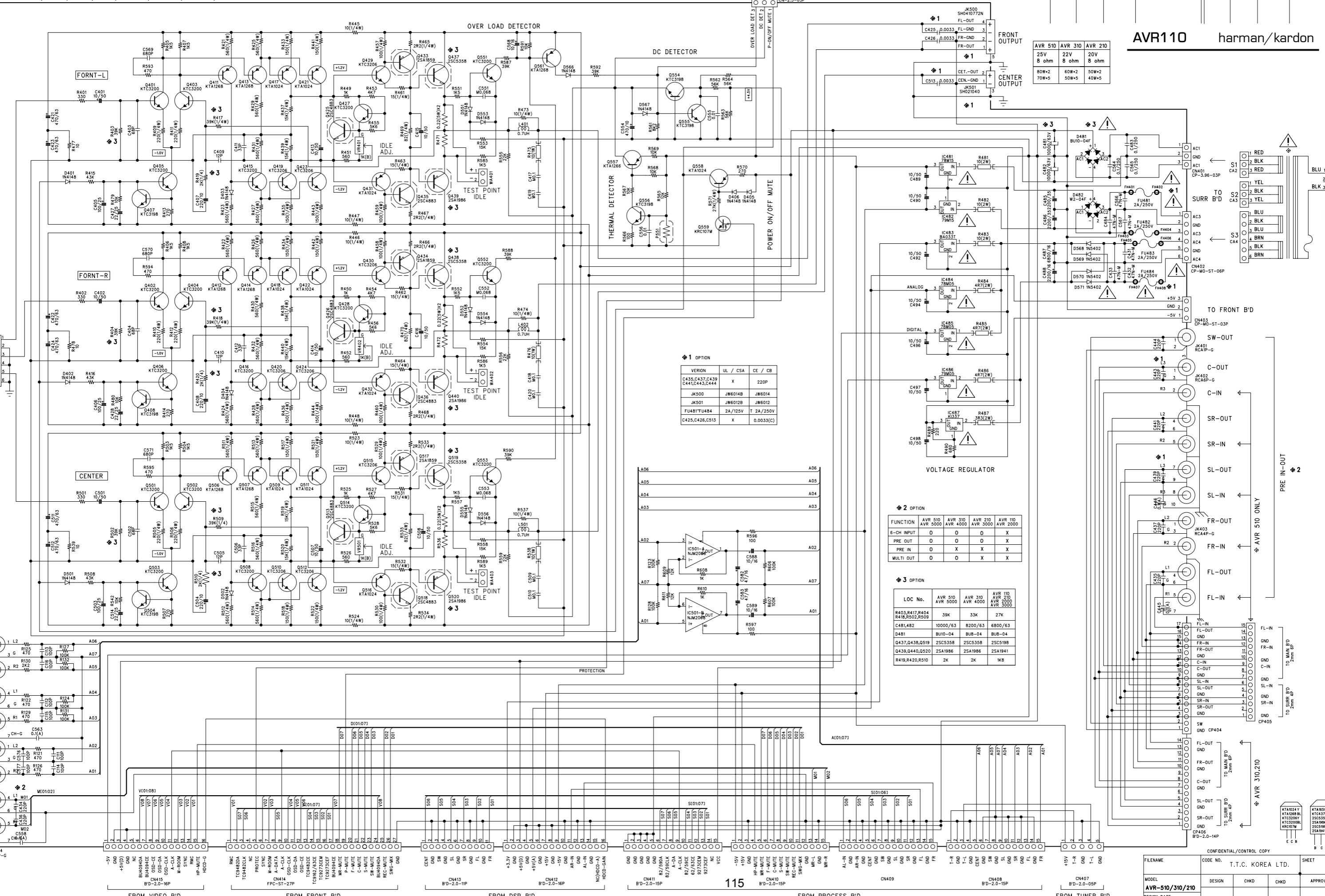
1	T-MUTE	2	73132C
2	73132C	3	73132C
3	73132C	4	73132C
4	73132C	5	73132C
5	73132C	6	73132C
6	73132C	7	73132C
7	73132C	8	73132C
8	73132C	9	73132C
9	73132C	10	73132C
10	73132C	11	73132C
11	73132C	12	73132C
12	73132C	13	73132C
13	73132C	14	73132C
14	73132C	15	73132C
15	73132C	16	73132C
16	73132C	17	73132C
17	73132C	18	73132C
18	73132C	19	73132C
19	73132C	20	73132C
20	73132C	21	73132C
21	73132C	22	73132C
22	73132C	23	73132C
23	73132C	24	73132C
24	73132C	25	73132C
25	73132C	26	73132C
26	73132C	27	73132C
27	73132C	28	73132C
28	73132C	29	73132C
29	73132C	30	73132C
30	73132C	31	73132C
31	73132C	32	73132C
32	73132C	33	73132C
33	73132C	34	73132C
34	73132C	35	73132C
35	73132C	36	73132C
36	73132C	37	73132C
37	73132C	38	73132C
38	73132C	39	73132C
39	73132C	40	73132C
40	73132C	41	73132C
41	73132C	42	73132C
42	73132C	43	73132C
43	73132C	44	73132C
44	73132C	45	73132C
45	73132C	46	73132C
46	73132C	47	73132C
47	73132C	48	73132C
48	73132C	49	73132C
49	73132C	50	73132C
50	73132C	51	73132C
51	73132C	52	73132C
52	73132C	53	73132C
53	73132C	54	73132C
54	73132C	55	73132C
55	73132C	56	73132C
56	73132C	57	73132C
57	73132C	58	73132C
58	73132C	59	73132C
59	73132C	60	73132C
60	73132C	61	73132C
61	73132C	62	73132C
62	73132C	63	73132C
63	73132C	64	73132C
64	73132C	65	73132C
65	73132C	66	73132C
66	73132C	67	73132C
67	73132C	68	73132C
68	73132C	69	73132C
69	73132C	70	73132C
70	73132C	71	73132C
71	73132C	72	73132C
72	73132C	73	73132C
73	73132C	74	73132C
74	73132C	75	73132C
75	73132C	76	73132C
76	73132C	77	73132C
77	73132C	78	73132C
78	73132C	79	73132C
79	73132C	80	73132C
80	73132C	81	73132C
81	73132C	82	73132C
82	73132C	83	73132C
83	73132C	84	73132C
84	73132C	85	73132C
85	73132C	86	73132C
86	73132C	87	73132C
87	73132C	88	73132C
88	73132C	89	73132C
89	73132C	90	73132C
90	73132C	91	73132C
91	73132C	92	73132C
92	73132C	93	73132C
93	73132C	94	73132C
94	73132C	95	73132C
95	73132C	96	73132C
96	73132C	97	73132C
97	73132C	98	73132C
98	73132C	99	73132C
99	73132C	100	73132C

COMPANY: TTC KOREA		TITLE: AVR510/310/210/110 FRONT,KEY	
DRAWN: W.S.SEO	DATED: 2000.09.04.	CODE:	SIZE:
CHECKED:	DATED:	DRAWING NO:	REV:
QUALITY CONTROL:	DATED:	SCALE:	SHEET: OF
RELEASED:	DATED:		

NO	DATE	POS.	CONTENTS	NO	DATE	POS.	CONTENTS

**AVR110** harman/kardon

AVR 510	AVR 310	AVR 210
25V 8 ohm	22V 8 ohm	20V 8 ohm
80W+2 70W+5	60W+2 50W+5	50W+2 40W+5



❖ 1 OPTION

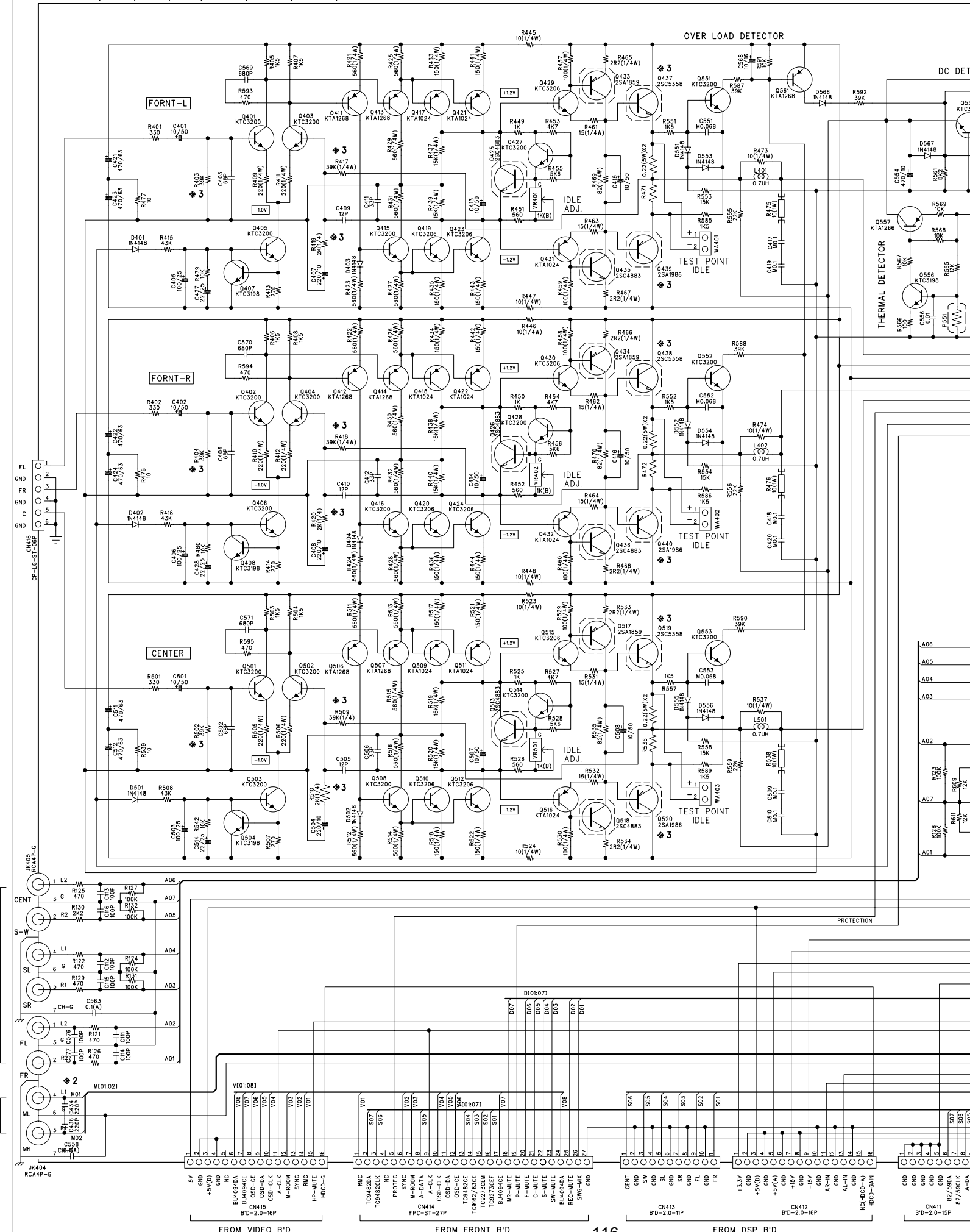
VERION	UL / CSA	CE / CB
C435,C437,C439 C441,C443,C444	X	220P
JK500	JW6014B JW6012B	JW6014 JW6012
JK501	JW6012B	JW6012
FU481*FU484	2A/125V 2A/250V	T 2A/250V
C425,C426,C513	X	0.0033(C)

❖ 2 OPTION

FUNCTION	AVR 510 AVR 5000	AVR 310 AVR 4000	AVR 210 AVR 3000	AVR 110 AVR 2000
6-CH INPUT	0	0	0	X
PRE OUT	0	0	0	X
PRE IN	0	X	X	X
MULTI OUT	0	0	X	X

❖ 3 OPTION

LOC No.	AVR 510 AVR 5000	AVR 310 AVR 4000	AVR 210 AVR 3000	AVR 110 AVR 2000
R403,R417,R404 R418,R502,R509	39K	33K	27K	
C481,482	10000/63	8200/63	6800/63	
D481	BU10-04	BU8-04	BU8-04	
Q437,Q438,Q519	2SC5358	2SC5358	2SC5198	
Q439,Q440,Q520	2SA1986	2SA1986	2SA1941	
R419,R420,R510	2K	2K	1K8	

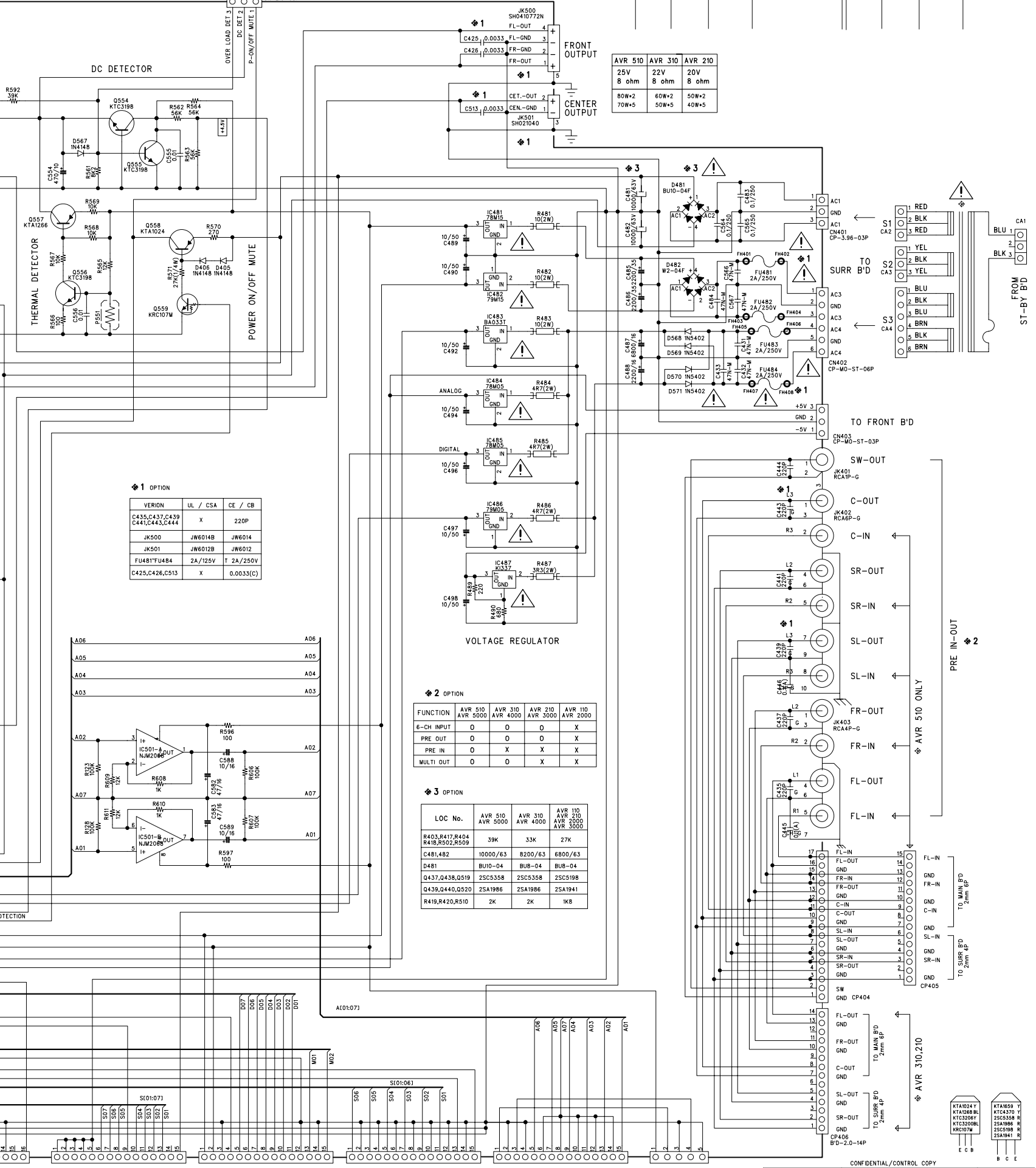


# DIAGRAM

TO SURR B'D  
CN417  
CN-2,5-03P

# M.P

NO	DATE	POS.	CONTENTS	NO	DATE	POS.	CONTENTS



❖ 1 OPTION

VERSION	UL / CSA	CE / CB
C435,C437,C439 C441,C443,C444	X	220P
JK500	JW6014B	JW6014
JK501	JW6012B	JW6012
FU481FU484	2A/125V	T 2A/250V
C425,C426,C513	X	0.0033(C)

❖ 2 OPTION

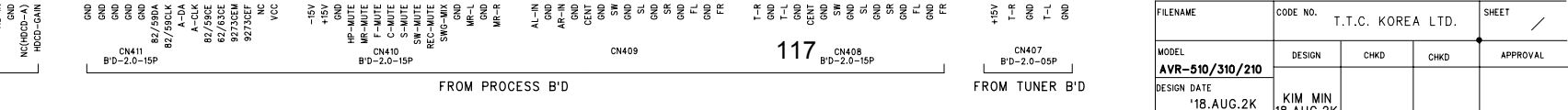
FUNCTION	AVR 510 AVR 5000	AVR 310 AVR 4000	AVR 210 AVR 3000	AVR 110 AVR 2000
E-CH INPUT	O	O	O	X
PRE OUT	O	O	O	X
PRE IN	O	X	X	X
MULTI OUT	O	O	X	X

❖ 3 OPTION

LOC No.	AVR 510 AVR 5000	AVR 310 AVR 4000	AVR 210 AVR 3000
R403,R417,R404 R418,R502,R509	39K	33K	27K
C481,482	10000/63	8200/63	6800/63
D481	BU10-04	BUB-04	BUB-04
Q437,Q438,Q519	2SC5358	2SC5358	2SC5198
Q439,Q440,Q520	2SA1986	2SA1986	2SA1941
R419,R420,R510	2K	2K	1K8

CONFIDENTIAL/CONTROL COPY

FILENAME	CODE NO.	T.T.C. KOREA LTD.	SHEET
MODEL	DESIGN	CHKD	APPROVAL
AVR-510/310/210			
DESIGN DATE	'18.AUG.2K	KIM MIN	'18.AUG.2K





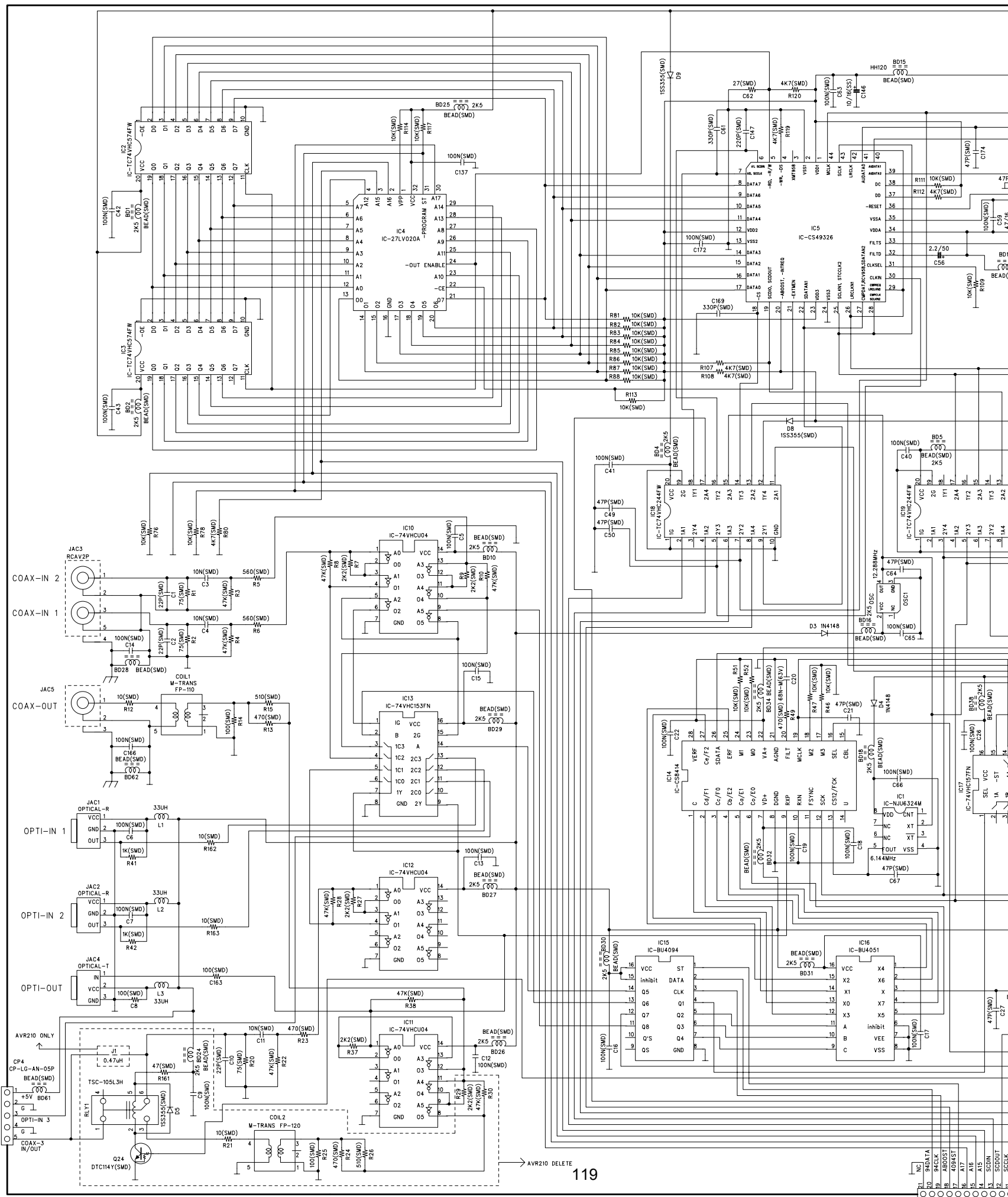
# SCHEMATIC DIAGRAM

D

C

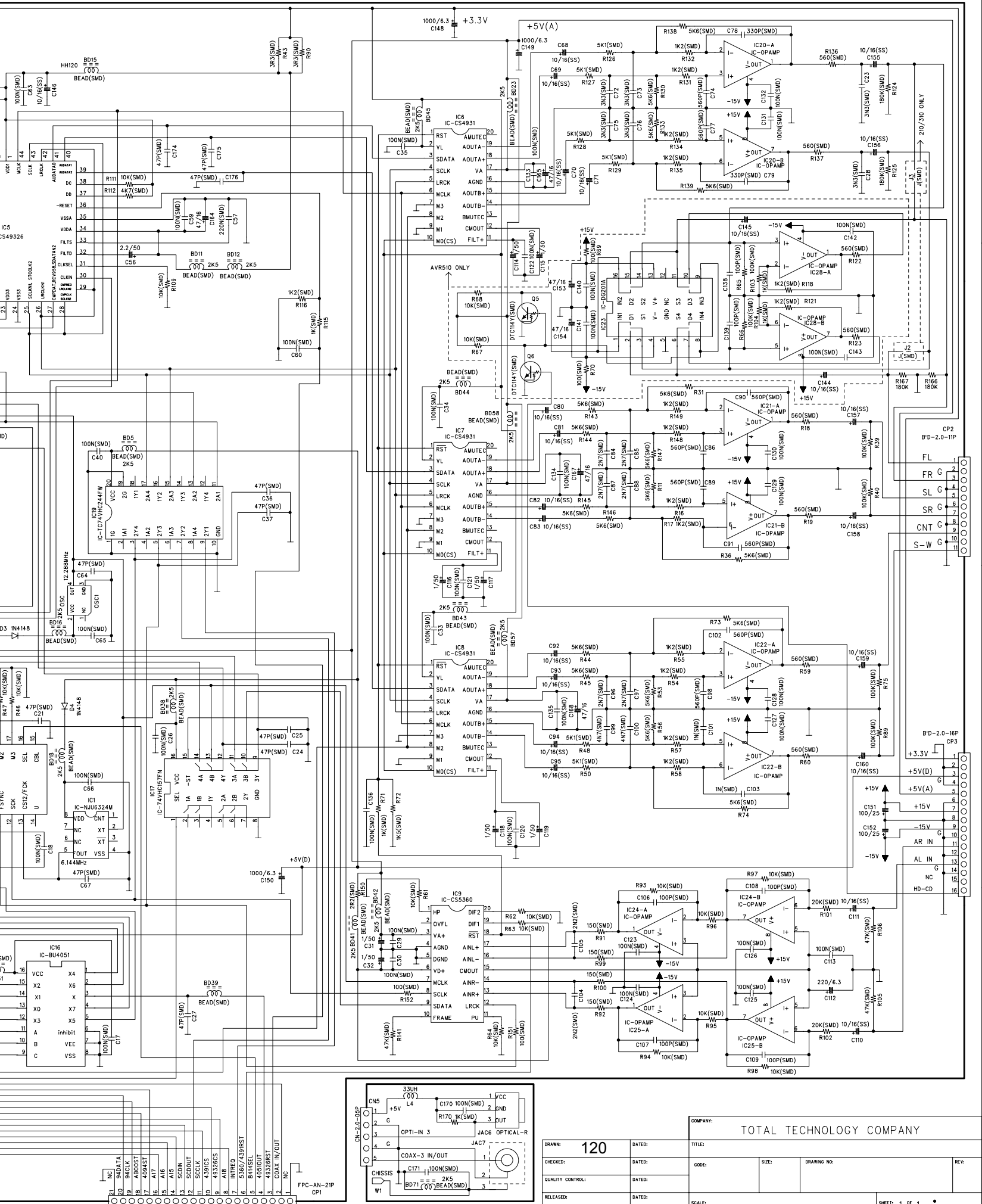
B

A



# DIAGRAM MP AVR110/210/310/510 DSP B'D

REVISION RECORD			
LTR	ECO NO.	APPROVER:	DATE:



D

C

B

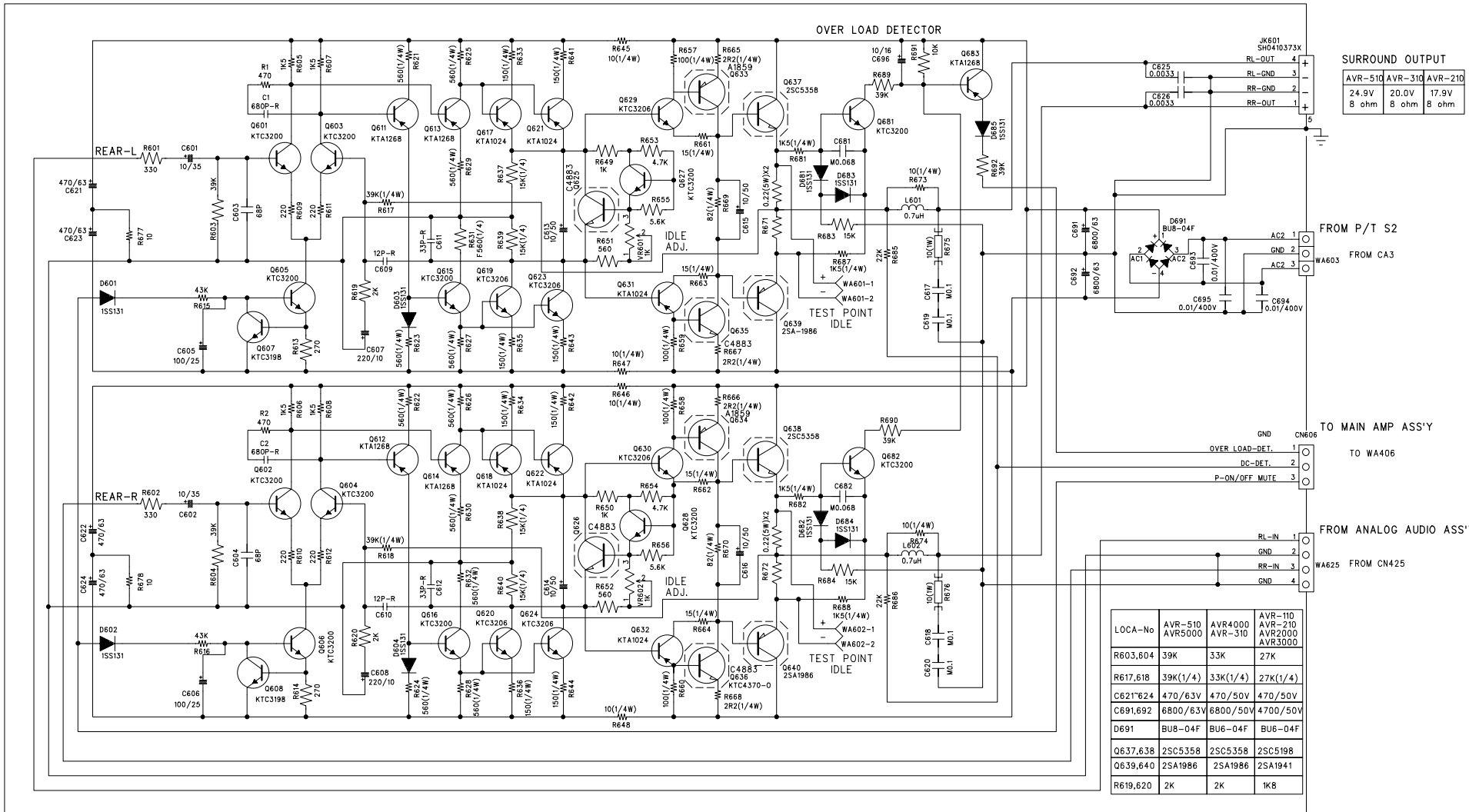
A

COMPANY: TOTAL TECHNOLOGY COMPANY	
DRAWN: 120	DATED:
CHECKED:	DATED:
QUALITY CONTROL:	DATED:
RELEASED:	DATED:
TITLE:	CODE:
SIZE:	DRAWING NO.:
SCALE:	SHEET: 1 of 1

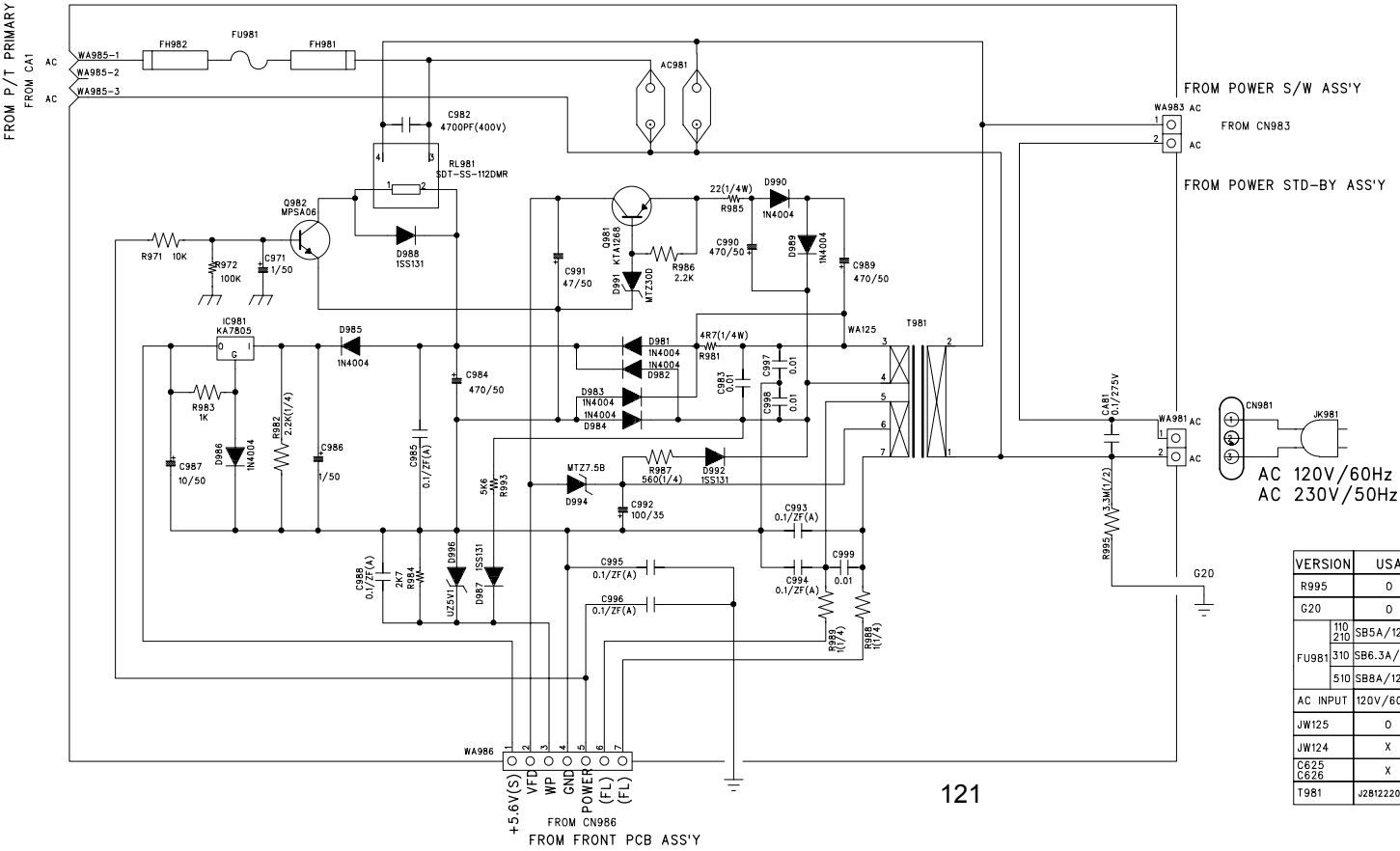


# SURROUND AMP SCHEMATIC DIAGR

## REAR AMP ASS'Y



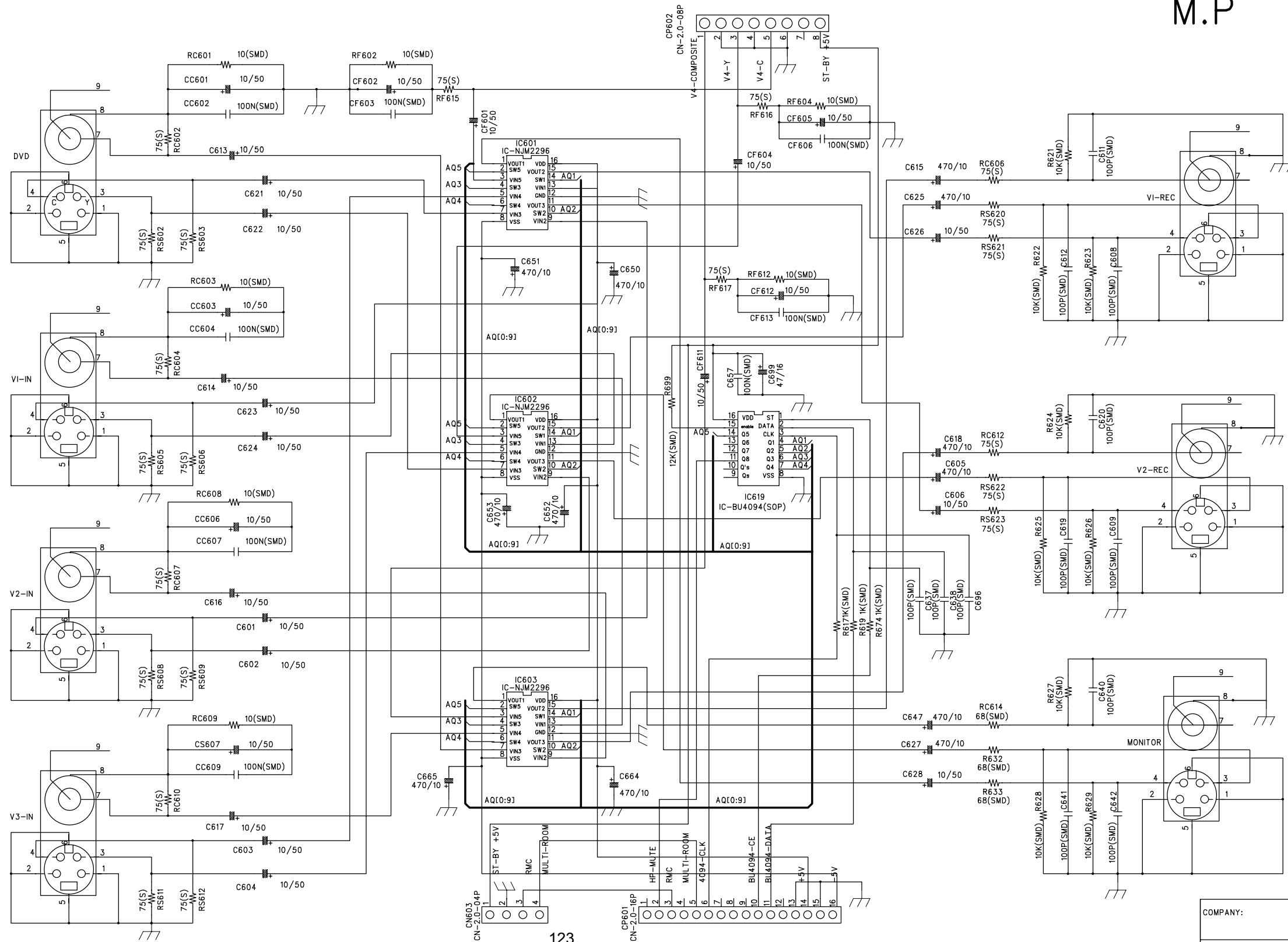
## SUB POWER SUPPLY ASS'Y





# AVR110/2000 VIDEO SCHEMATIC DIAGRAM

M.P



AVR110 harman/kardon

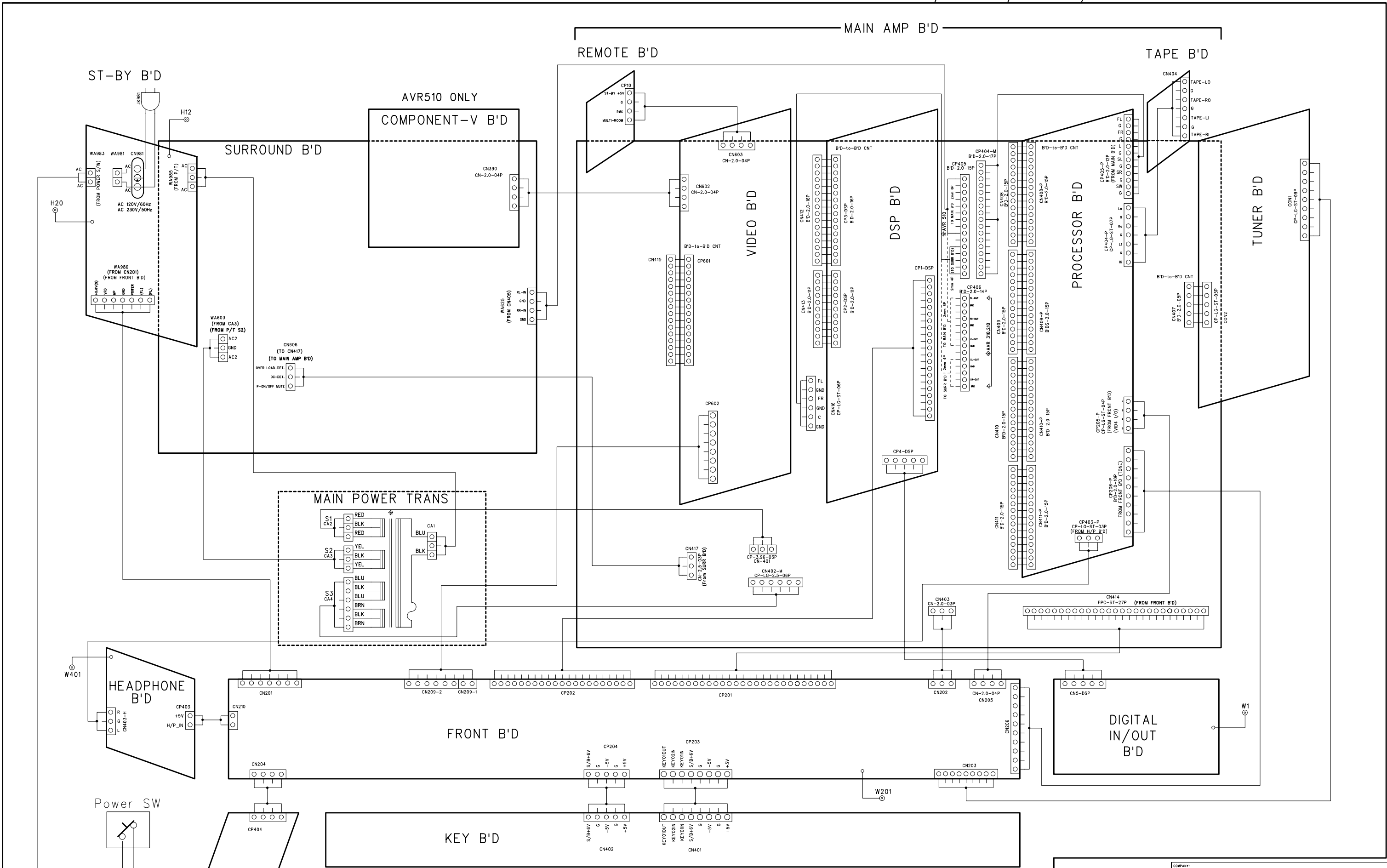
# WIRING DIAGRAM

MODEL: AVR110/210/310/510  
AVR2000/3000/4000/5000

REVISION RECORD			
LTN	ECO NO.	APPROVED	DATE

D  
C  
B  
A

D  
C  
B  
A



DRAWN: H J AN		DATED: JUN.19, 2000		COMPANY: T.T.C. KOREA LTD.	
CHECKED:		DATED:		TITLE: WIRING	
QUALITY CONTROL:		DATED:		CODE: SIZE: DRAWING NO: REV:	
RELEASED:		DATED:		SCALE: SHEET: 1 of 1	

D

C

B

A

REMOTE B'D

ST-BY B'D

AVR510 ONLY

COMPONENT-V B'D

SURROUND B'D

VIDEO B'D

AVR110 harman/kardon

MAIN POWER TRANS

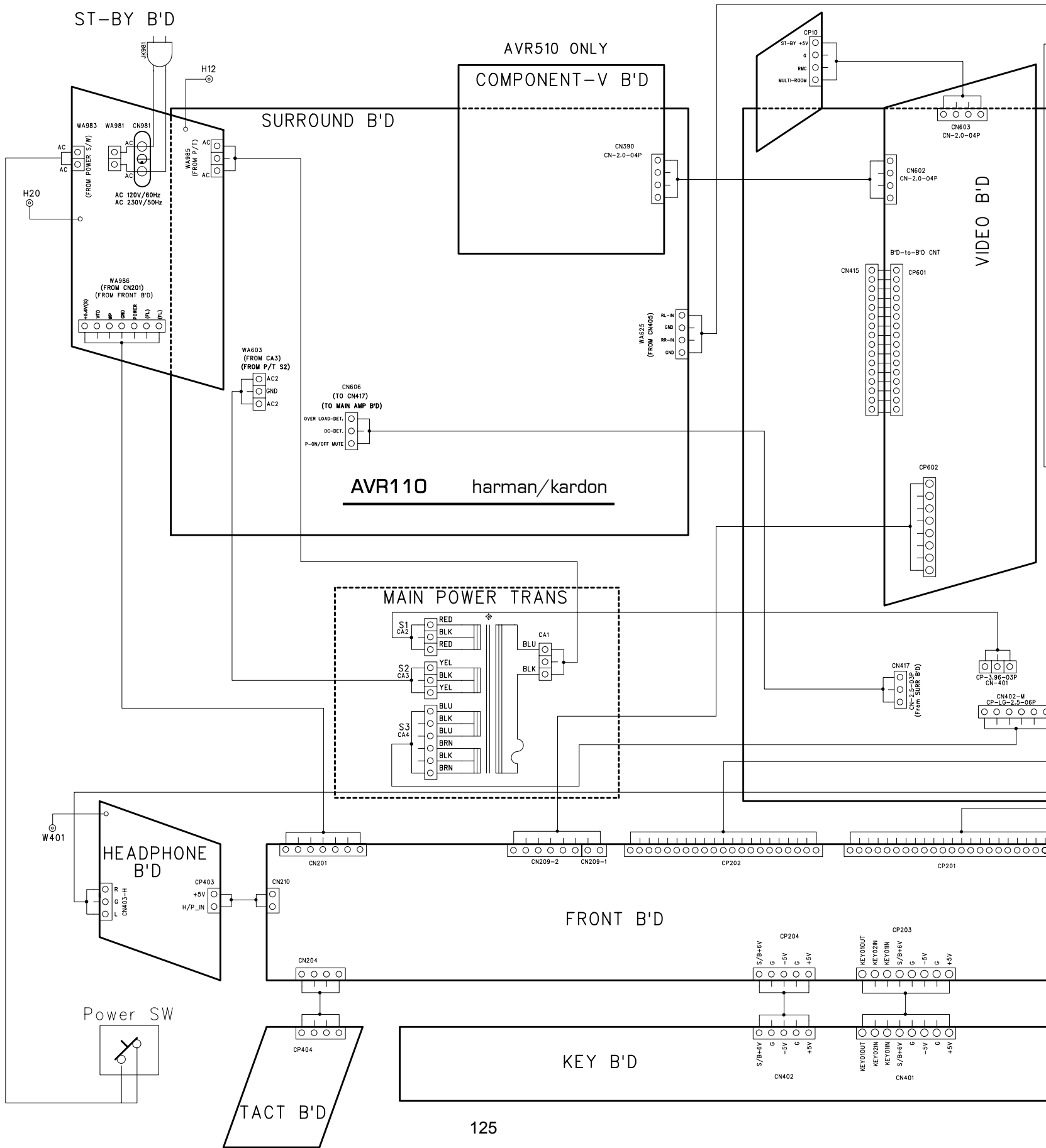
HEADPHONE B'D

FRONT B'D

Power SW

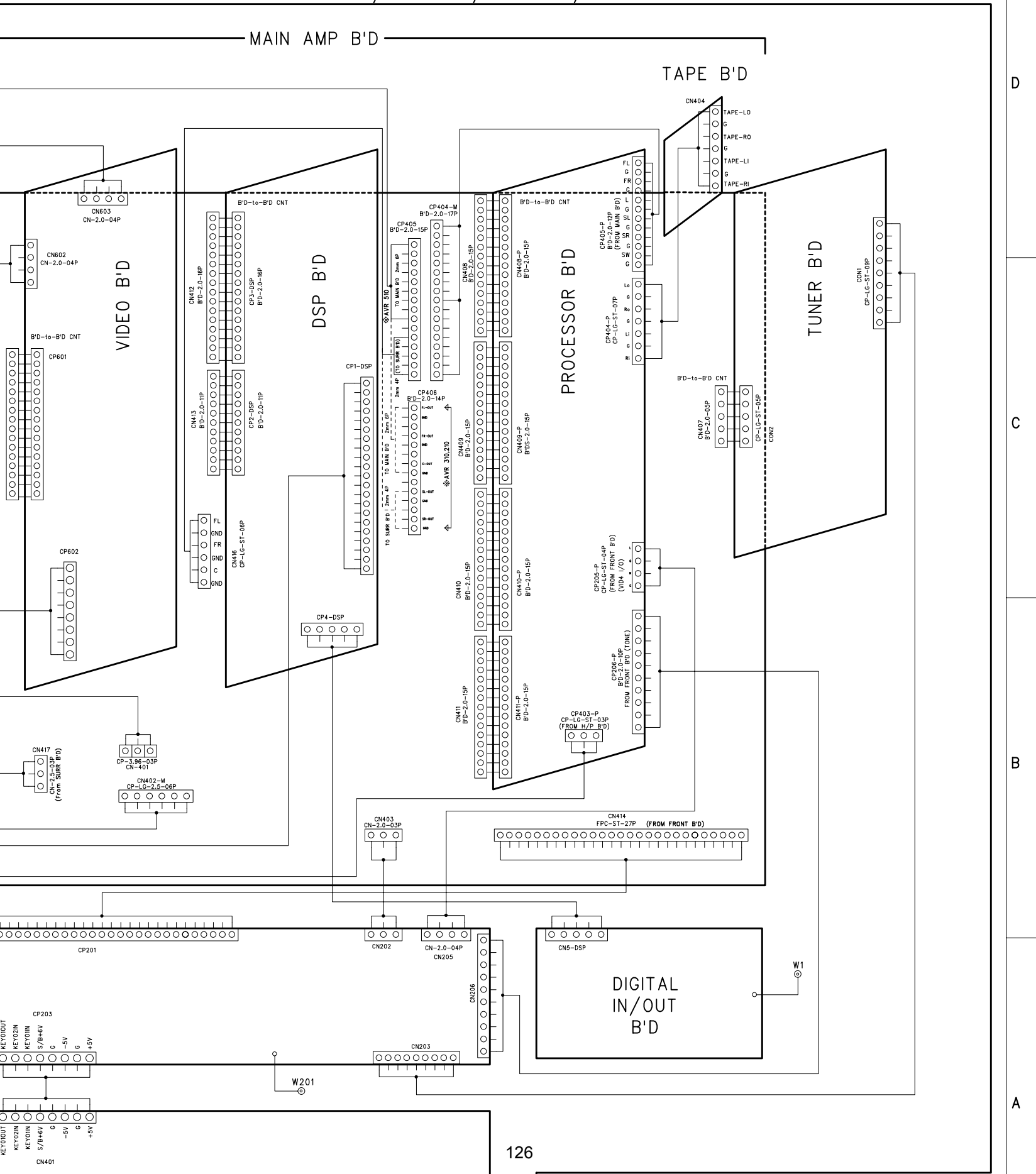
TACT B'D

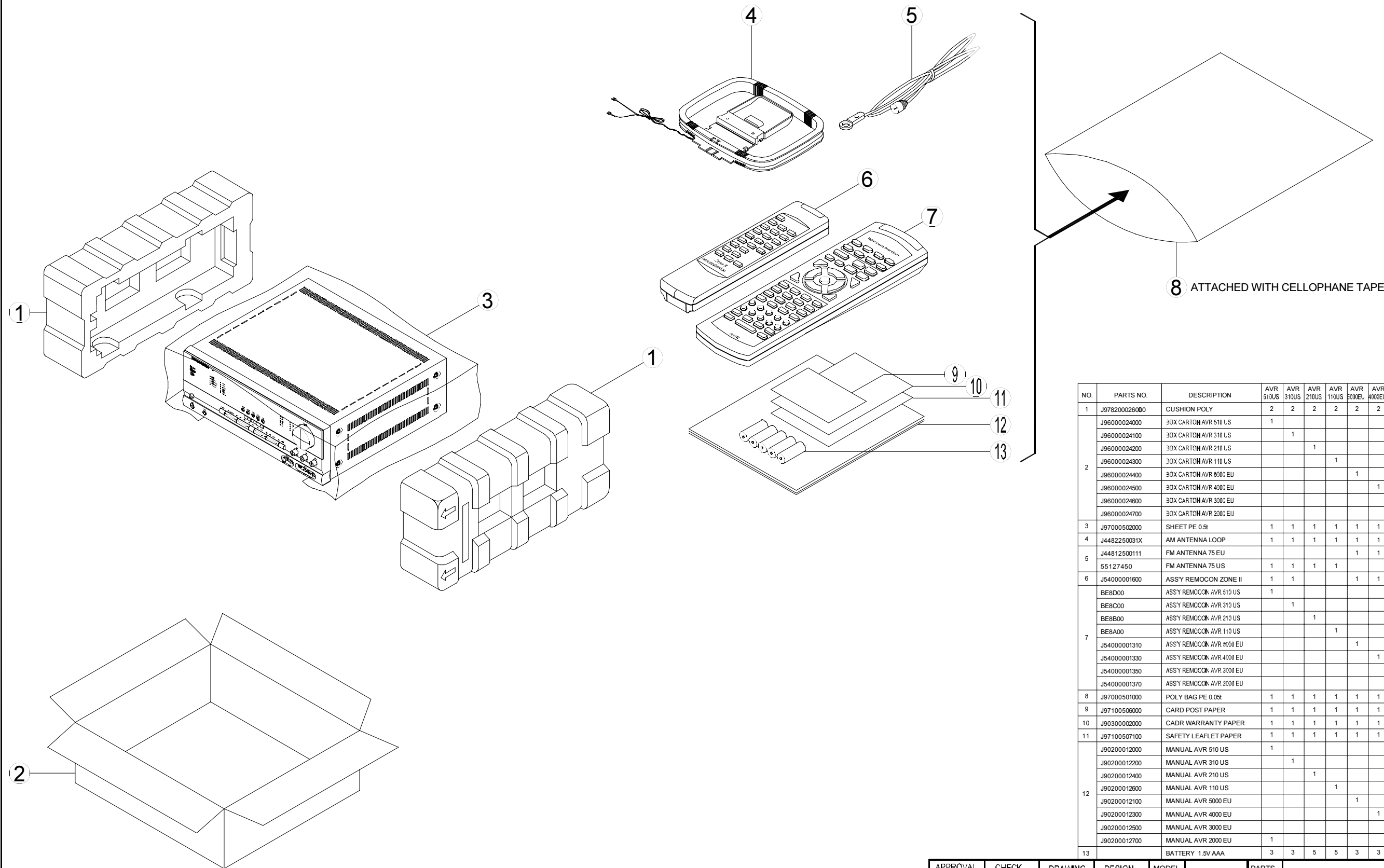
KEY B'D



# MODEL:AVR110/210/310/510 AVR2000/3000/4000/5000

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:





NO.	PARTS NO.	DESCRIPTION	AVR 510US	AVR 310US	AVR 210US	AVR 110US	AVR 5000EU	AVR 4000EU	AVR 3000EU	AVR 2000EU
1	J978200026000	CUSHION POLY	2	2	2	2	2	2	2	2
	J96000024000	30X CARTON AVR 510 LS	1							
	J96000024100	30X CARTON AVR 310 LS		1						
	J96000024200	30X CARTON AVR 210 LS			1					
	J96000024300	30X CARTON AVR 110 LS				1				
2	J96000024400	30X CARTON AVR 5000 EU					1			
	J96000024500	30X CARTON AVR 4000 EU						1		
	J96000024600	30X CARTON AVR 3000 EU							1	
	J96000024700	30X CARTON AVR 2000 EU								1
3	J97000502000	SHEET PE 0.5t	1	1	1	1	1	1	1	1
4	J4482250031X	AM ANTENNA LOOP	1	1	1	1	1	1	1	1
5	J44812500111	FM ANTENNA 75 EU					1	1	1	1
	55127450	FM ANTENNA 75 US	1	1	1	1				
6	J54000001600	ASSY REMOCON ZONE II	1	1			1	1		
	BE8D00	ASSY REMOCON AVR 510 US	1							
	BE8C00	ASSY REMOCON AVR 310 US		1						
	BE8B00	ASSY REMOCON AVR 210 US			1					
	BE8A00	ASSY REMOCON AVR 110 US				1				
7	J54000001310	ASSY REMOCON AVR 5000 EU					1			
	J54000001330	ASSY REMOCON AVR 4000 EU						1		
	J54000001350	ASSY REMOCON AVR 3000 EU							1	
	J54000001370	ASSY REMOCON AVR 2000 EU								1
8	J97000501000	POLY BAG PE 0.05t	1	1	1	1	1	1	1	1
9	J97100506000	CARD POST PAPER	1	1	1	1	1	1	1	1
10	J90300002000	CADR WARRANTY PAPER	1	1	1	1	1	1	1	1
11	J97100507100	SAFETY LEAFLET PAPER	1	1	1	1	1	1	1	1
	J90200012000	MANUAL AVR 510 US	1							
	J90200012200	MANUAL AVR 310 US		1						
	J90200012400	MANUAL AVR 210 US			1					
	J90200012600	MANUAL AVR 110 US				1				
	J90200012100	MANUAL AVR 5000 EU					1			
	J90200012300	MANUAL AVR 4000 EU						1		
	J90200012500	MANUAL AVR 3000 EU							1	
	J90200012700	MANUAL AVR 2000 EU	1							1
13		BATTERY 1.5V AAA	3	3	5	5	3	3	5	5

APPROVAL	CHECK	DRAWING	DESIGN	MODEL		PARTS	PACKING DRAWING
00.07.05		00.07.05		SCALE	TOLERANCE	NAME	
Chae il Lee		Dong il Choi		N / S	LESS: ±	MODEL NO.	
				UNIT	LESS: ±		
				m/m	LESS:		AVR 510/310/210/110 US AVR 5000/4000/3000/2000 EU