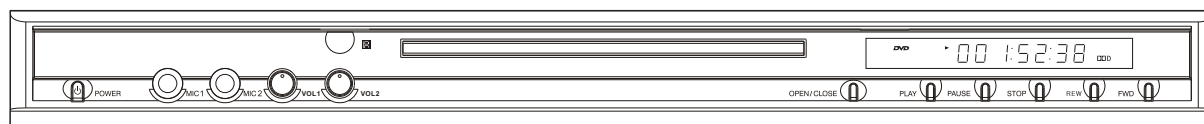


# SERVICE MANUAL

## bbk965S



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# 1. SAFETY PREAUTIONS

## 1.1 GENERAL GUIDELINES

1. When servicing, observe the original lead dress. if a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
2. After servicing, see to it that all the protective devices such as insulation barrier, insulation papers shields are properly installed.
3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

## 2.PREVENTION OF ELECTRO STATIC DISCHARGE(ESD)TO 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 electro static discharge(ESD).

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any ESD on your body by touching a known earth ground. Alternatively, obtain and wear a commercially availabel discharging ESD wrist strap, 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 alminum foil, to prevent electrostatic charge buildup 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 (ESD protected)can generate electrical charge sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges 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, alminum 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(ESD).

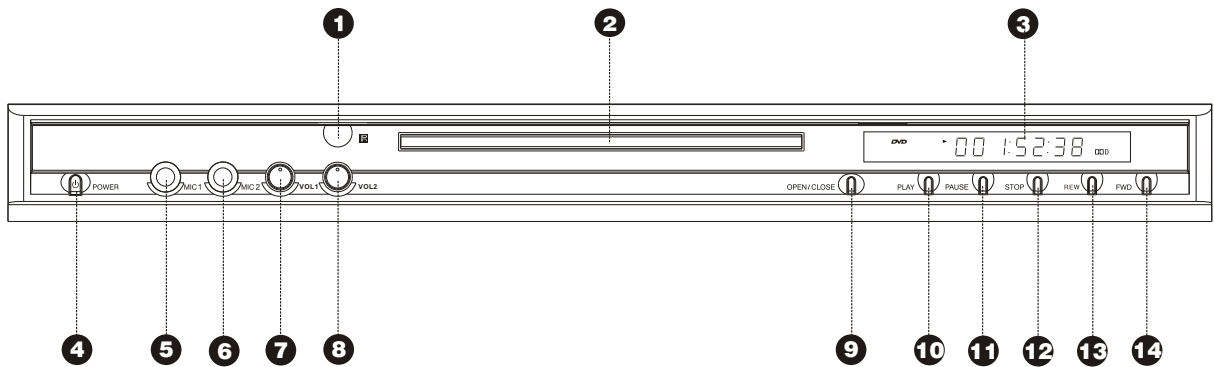
notice (1885x323x2 tiff)

### IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are imporant for safety. These parts are marked by  $\triangle$  in the schematic diagrams, Exploded Views and replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

# 3.Control Button Locations and Explanations

## ■ Front Panel Illustration



**1** IR SENSOR

**2** Disc tray

**3** VFD display window

**4** POWER switch

**5** MIC 1 jack

**6** MIC 2 VOLUME knob

**7** MIC 1 VOLUME knob

**8** MIC 2 VOLUME knob

**9** OPEN/CLOSE button

**10** PLAY button

**11** PAUSE button

**12** STOP button

**13** REW button

**14** FWD button

## 4. PREVENTION OF STATIC ELECTRICITY DISCHARGE

The laser diode in the traverse unit (optical pickup) may break down due to static electricity of clothes or human body. Use due caution to electrostatic breakdown when servicing and handling the laser diode.

### 4.1. Grounding for electrostatic breakdown prevention

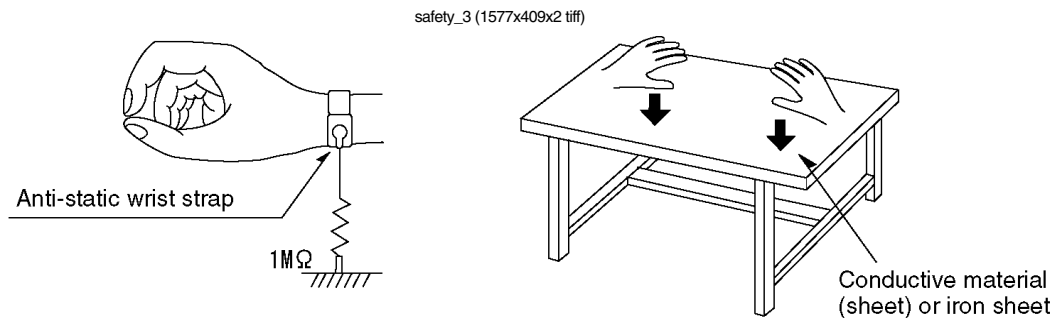
Some devices such as the DVD player use the optical pickup (laser diode) and the optical pickup will be damaged by static electricity in the working environment. Proceed servicing works under the working environment where grounding works is completed.

#### 4.1.1. Worktable grounding

1. Put a conductive material (sheet) or iron sheet on the area where the optical pickup is placed, and ground the sheet.

#### 4.1.2. Human body grounding

- 1 Use the anti-static wrist strap to discharge the static electricity from your body.



#### 4.1.3. Handling of optical pickup

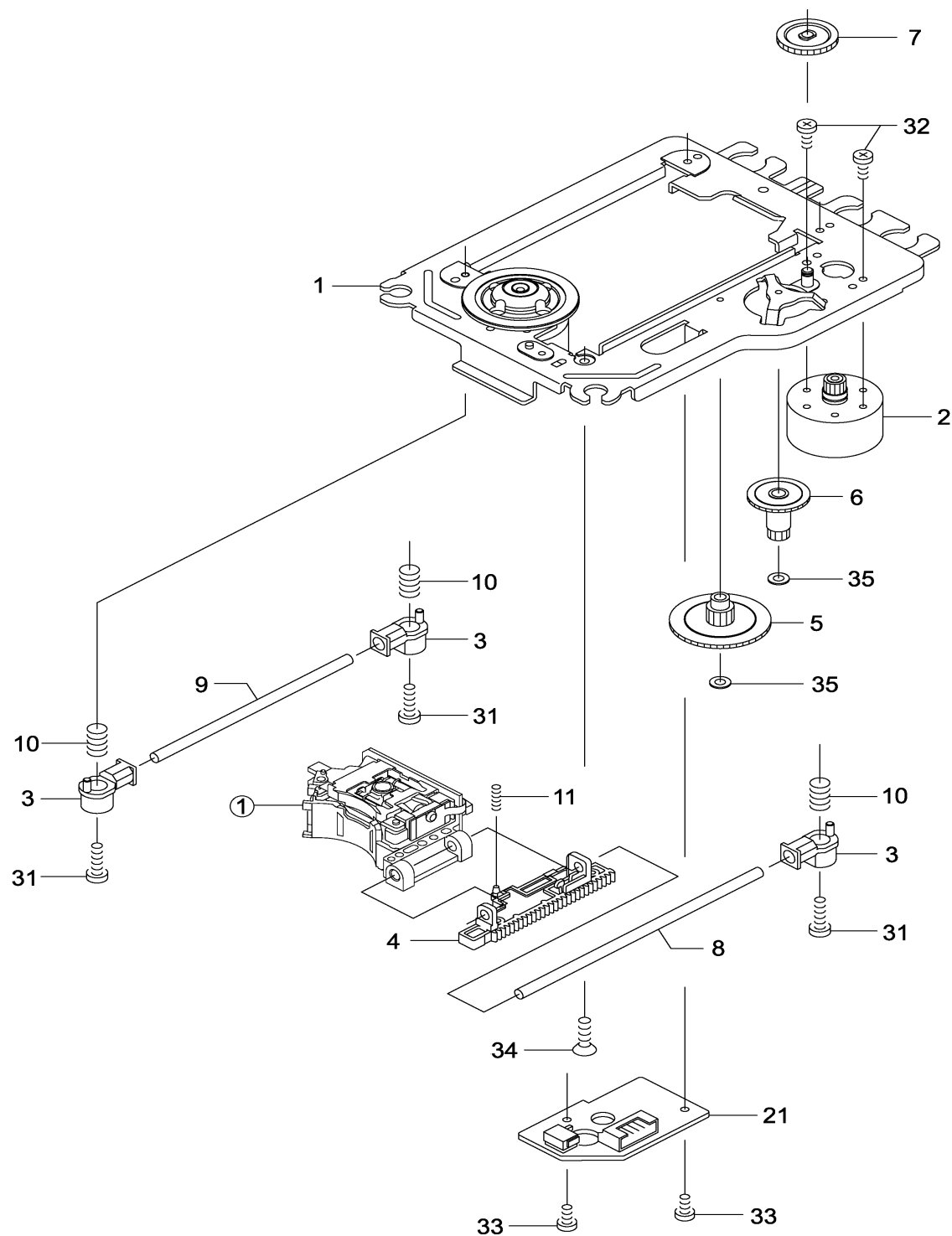
1. To keep the good quality of the optical pickup maintenance parts during transportation and before installation, the both ends of the laser diode are short-circuited. After replacing the parts with new ones, remove the short circuit according to the correct procedure. (See this Technical Guide).
2. Do not use a tester to check the laser diode for the optical pickup. Failure to do so will damage the laser diode due to the power supply in the tester.

### 4.2. Handling precautions for Traverse Unit (Optical Pickup)

1. Do not give a considerable shock to the traverse unit (optical pickup) as it has an extremely high-precision structure.
2. When replacing the optical pickup, install the flexible cable and cut its short lead with a nipper. See the optical pickup replacement procedure in this Technical Guide. Before replacing the traverse unit, remove the short pin for preventing static electricity and install a new unit. Connect the connector as short times as possible.
3. The flexible cable may be cut off if an excessive force is applied to it. Use caution when handling the cable.
4. The half-fixed resistor for laser power adjustment cannot be adjusted. Do not turn the resistor.

## 5. Assembling and disassembling the mechanism unit

### 5.1 Optical pickup Unit Exploded View and Part List



Pic (1)

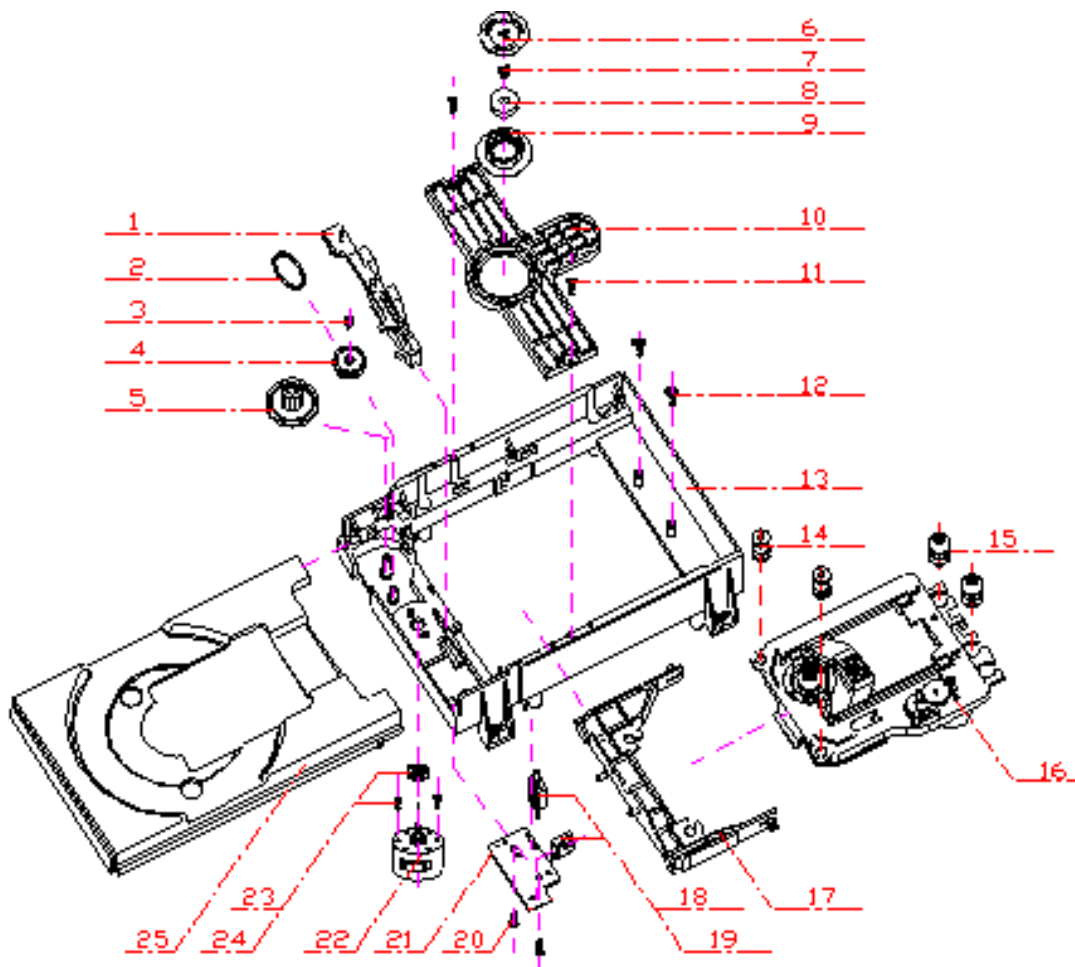
### Materials to Pic (1)

No.	PARTS CODE	PARTS NAME	Q' ty
①	14692200	SF-HD60	1
1	1EA0311A06300	ASSY, CHASSIS, COMPLETE	1
2	1EA0M10A15500	ASSY, MOTOR, SLED	1
Or	1EA0M10A15501	ASSY, MOTOR, SLED	1
3	1EA2451A24700	HOLDER, SHAFT	3
4	1EA2511A29100	GEAR, RACK	1
5	1EA2511A29200	GEAR, DRIVE	1
6	1EA2511A29300	GEAR, MIDDLE, A	1
7	1EA2511A29400	GEAR, MIDDLE, B	1
8	1EA2744A03000	SHAFT, SLIDE	1
9	1EA2744A03100	SHAFT, SLIDE, SUB	1
10	1EA2812A15300	SPRING, COMP, TYOUSEI	3
11	1EA2812A15400	SPRING, COMP, RACK	1
21	1EA0B10B20100	ASSY, PWB	1
Or	1EA0B10B20200	ASSY, PWB	1
31	SEXEA25700---	SPECIAL SCREW BIN+-M2X11	3
32	SEXEA25900---	SPECIAL SCREW M1.7X2.2	2
33	SFBPN204R0SE-	SCR S-TPG PAN 2X4	2
34	SFSFN266R0SE-	SCR S-TPG FLT 2.6X6	1
35	SWXEA15400---	SPECIAL WASHER 1.8X4 X0.25	2

[illegible]

Note : This parts list is not for service parts supply.

## 5.2 Bracket Exploded View and Part List



**Pic (2)**

### **Materials to Pic(2)**

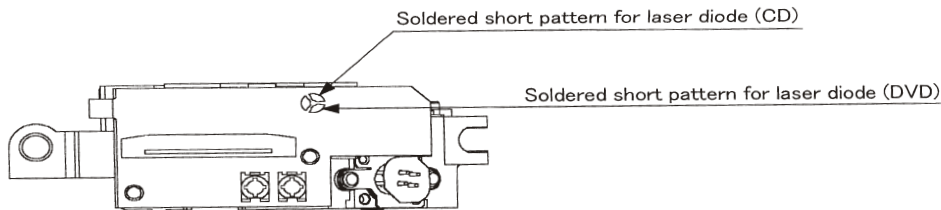
- |                                   |                          |
|-----------------------------------|--------------------------|
| 1.bracket                         | 14. front silicon rubber |
| 2.belt                            | 15. Back silicon rubber  |
| 3.screw                           | 16. Pick-up              |
| 4.belt wheel                      | 17. Pick-up              |
| 5.gearwheel                       | 18. switch               |
| 6.iron chip                       | 19. Five-pin flat plug   |
| 7. Immobility mechanism equipment | 20. screw                |
| 8. Magnet                         | 21. PCB                  |
| 9. Platen                         | 22. motor                |
| 10. Bridge bracket                | 23. Motor wheel          |
| 11. screw                         | 24. screw                |
| 12. screw                         | 25.tray                  |
| 13. Big bracket                   |                          |

**Before going process with disassembly and installation, please carefully both peruse the chart and confirm the materials.**

## 5.3 MISCELLANEOUS

### 5.3.1 Protection of the LD(Laser diode)

Short the parts of LD circuit pattern by soldering.



### 5.3.2 Cautions on assembly and adjustment

Make sure that the workbenches, jigs, tips, tips of soldering irons and measuring instruments are grounded, and that personnel wear wrist straps for ground.

Open the LD short lands quickly with a soldering iron after a circuit is connected.

Keep the power source of the pick-up protected from internal and external sources of electrical noise.

Refrain from operation and storage in atmospheres containing corrosive gases (such as  $H_2S$ ,  $SO_2$ ,  $NO_2$  and  $Cl_2$ ) or toxic gases or in locations containing substances (especially from the organic silicon, cyan, formalin and phenol groups) which emit toxic gases. It is particularly important to ensure that none of the above substances are present inside the unit. Otherwise, the motor may no longer run.

# 6.Electrical Confirmation

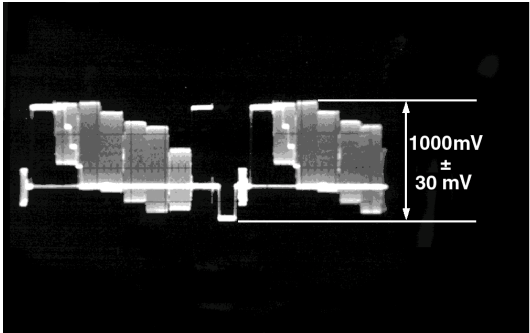
## 6.1. Video Output (Luminance Signal) Confirmation

DO this confirmation after replacing a P.C.B.

Measurement point	Mode	Disc
Video output terminal	Color bar 75% PLAY(Title 46):DVDT-S15 PLAY(Title 12):DVDT-S01	DVDT-S15 or DVDT-S01
Measuring equipment,tools	Confirmation value	
200mV/dir,10 μ sec/dir	1000mVp-p±30mV	

Purpose:To maintain video signal output compatibility.

- 1.Connect the oscilloscope to the video output terminal and terminate at 75 ohms.
- 2.Confirm that luminance signal(Y+S)level is 1000mVp-p±30mV



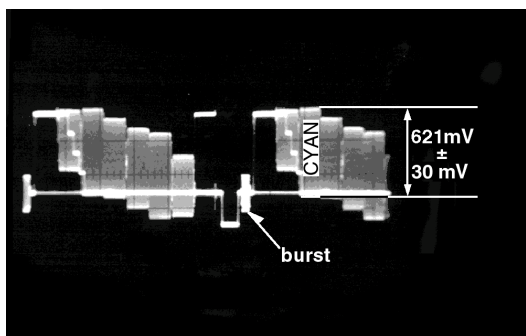
## 6.2 Video Output(Chrominance Signal) Confirmation

Do the confirmation after replacing P.C.B.

Measurement point	Mode	Disc
Video output terminal	Color bar 75% PLAY(Title 46):DVDT-S15 PLAY(Title 12):DVDT-S01	DVDT-S15 or DVDT-S01
Measuring equipment,tools	Confirmation value	
Screwdriver,Oscilloscope 200mV/dir,10 $\mu$ sec/dir	621mVp-p $\pm$ 30mV	

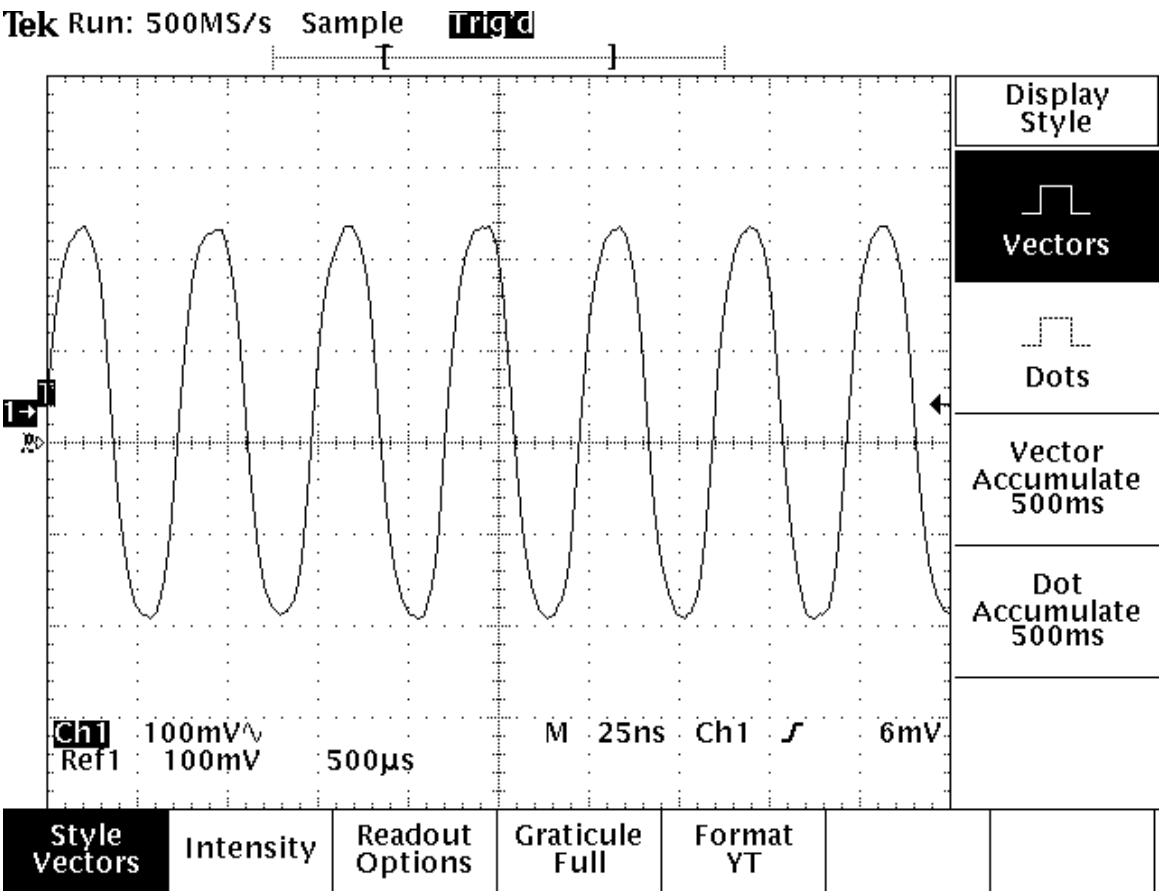
Purpose:To maintain video signal output compatibility.

- 1.Connect the oscilloscope to the video output terminal and terminate at 75 ohme.
- 2.Confirm that the chrominance signal(C)level is 621 mVp-p $\pm$ 30mV

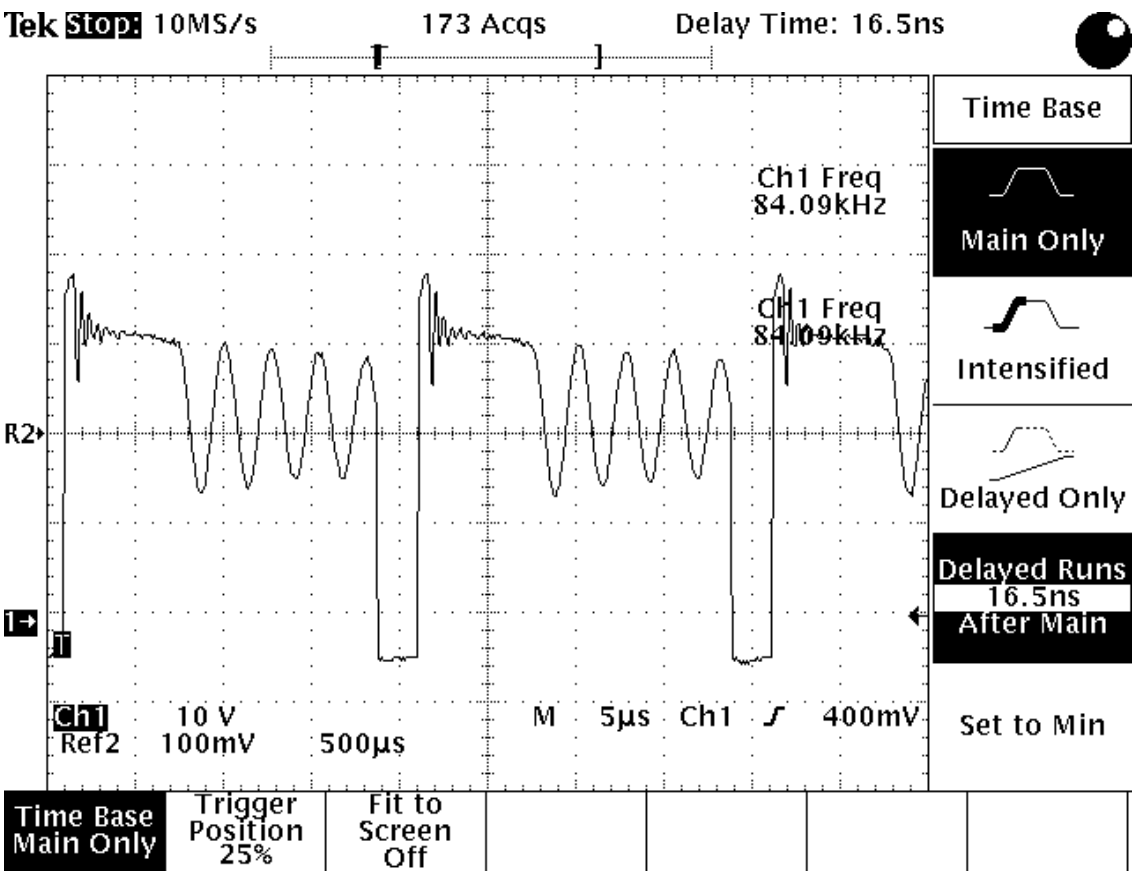


# 7.MPEG BOARD CHECK WAVEFORM

## 7.1 27MHz WAVEFORM



## 7.2 IC5L0380R PIN.2 WAVEFORM DIAGRAM



## 8. Am29LV160D

### 16 Megabit (2 M x 8-Bit/1 M x 16-Bit) CMOS 3.0 Volt-only Boot Sector Flash Memory

#### DISTINCTIVE CHARACTERISTICS

##### ■ Single power supply operation

- Full voltage range: 2.7 to 3.6 volt read and write operations for battery-powered applications
- Regulated voltage range: 3.0 to 3.6 volt read and write operations and for compatibility with high performance 3.3 volt microprocessors

##### ■ Manufactured on 0.23 $\mu$ m process technology

- Fully compatible with 0.32  $\mu$ m Am29LV160B device

##### ■ High performance

- Access times as fast as 70 ns

##### ■ Ultra low power consumption (typical values at 5 MHz)

- 200 nA Automatic Sleep mode current
- 200 nA standby mode current
- 9 mA read current
- 20 mA program/erase current

##### ■ Flexible sector architecture

- One 16 Kbyte, two 8 Kbyte, one 32 Kbyte, and thirty-one 64 Kbyte sectors (byte mode)
- One 8 Kword, two 4 Kword, one 16 Kword, and thirty-one 32 Kword sectors (word mode)
- Supports full chip erase
- Sector Protection features:
  - A hardware method of locking a sector to prevent any program or erase operations within that sector
  - Sectors can be locked in-system or via programming equipment
  - Temporary Sector Unprotect feature allows code changes in previously locked sectors

##### ■ Unlock Bypass Program Command

- Reduces overall programming time when issuing multiple program command sequences

##### ■ Top or bottom boot block configurations available

##### ■ Embedded Algorithms

- Embedded Erase algorithm automatically preprograms and erases the entire chip or any combination of designated sectors
- Embedded Program algorithm automatically writes and verifies data at specified addresses

##### ■ Minimum 1,000,000 write cycle guarantee per sector

##### ■ 20-year data retention at 125°C

- Reliable operation for the life of the system

##### ■ Package option

- 48-ball FBGA
- 48-pin TSOP
- 44-pin SO

##### ■ CFI (Common Flash Interface) compliant

- Provides device-specific information to the system, allowing host software to easily reconfigure for different Flash devices

##### ■ Compatibility with JEDEC standards

- Pinout and software compatible with single-power supply Flash
- Superior inadvertent write protection

##### ■ Data# Polling and toggle bits

- Provides a software method of detecting program or erase operation completion

##### ■ Ready/Busy# pin (RY/BY#)

- Provides a hardware method of detecting program or erase cycle completion (not available on 44-pin SO)

##### ■ Erase Suspend/Erase Resume

- Suspends an erase operation to read data from, or program data to, a sector that is not being erased, then resumes the erase operation

##### ■ Hardware reset pin (RESET#)

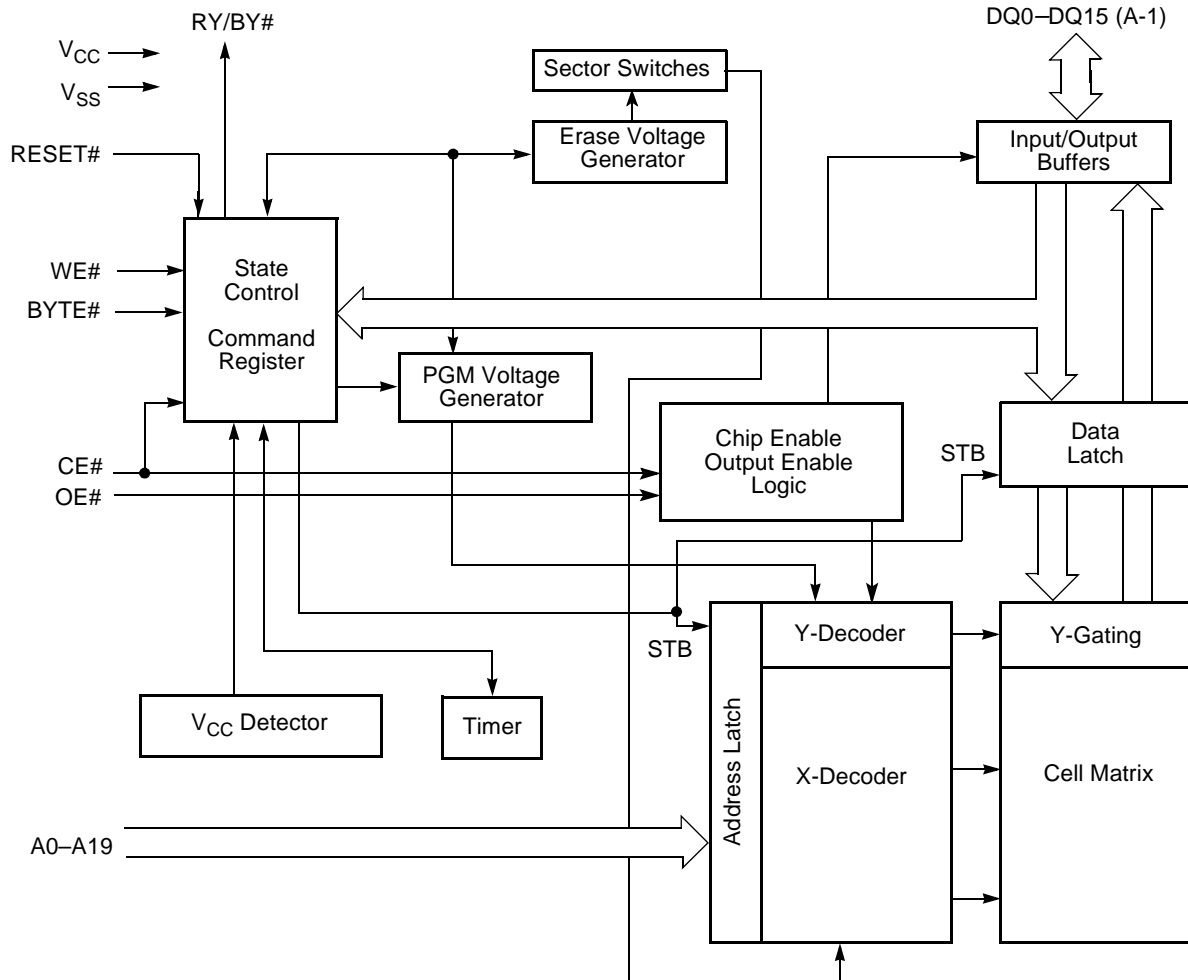
- Hardware method to reset the device to reading array data

## PRODUCT SELECTOR GUIDE

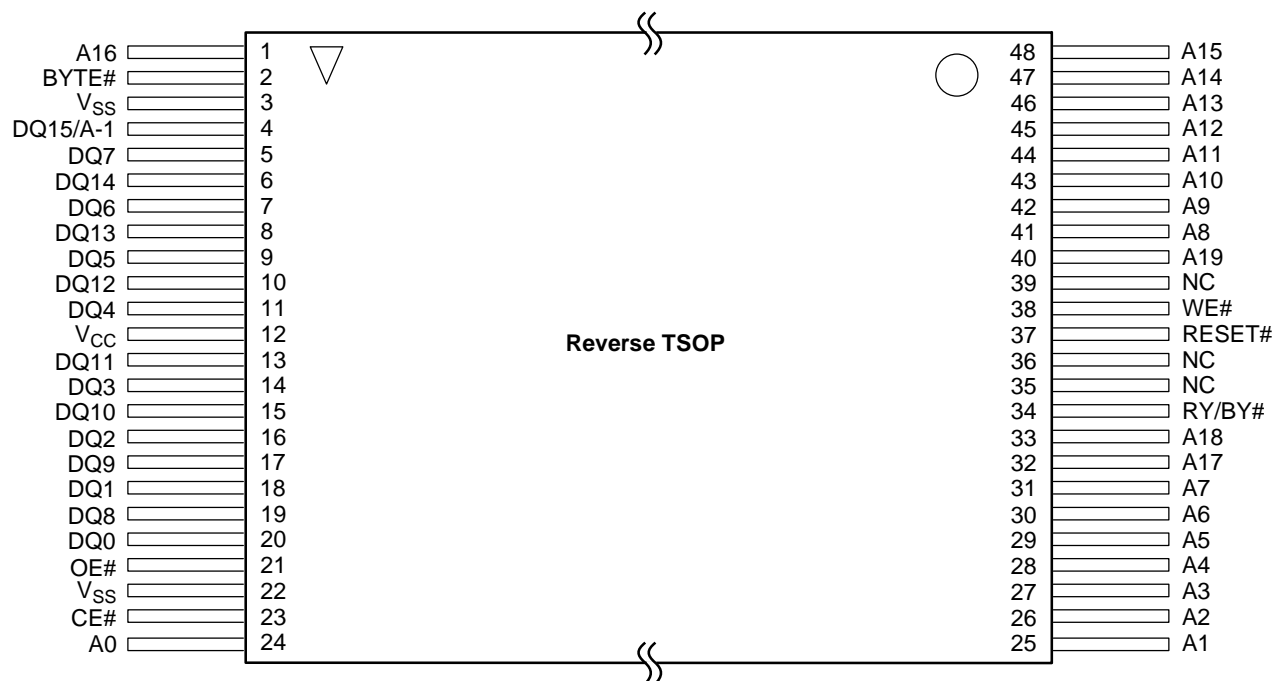
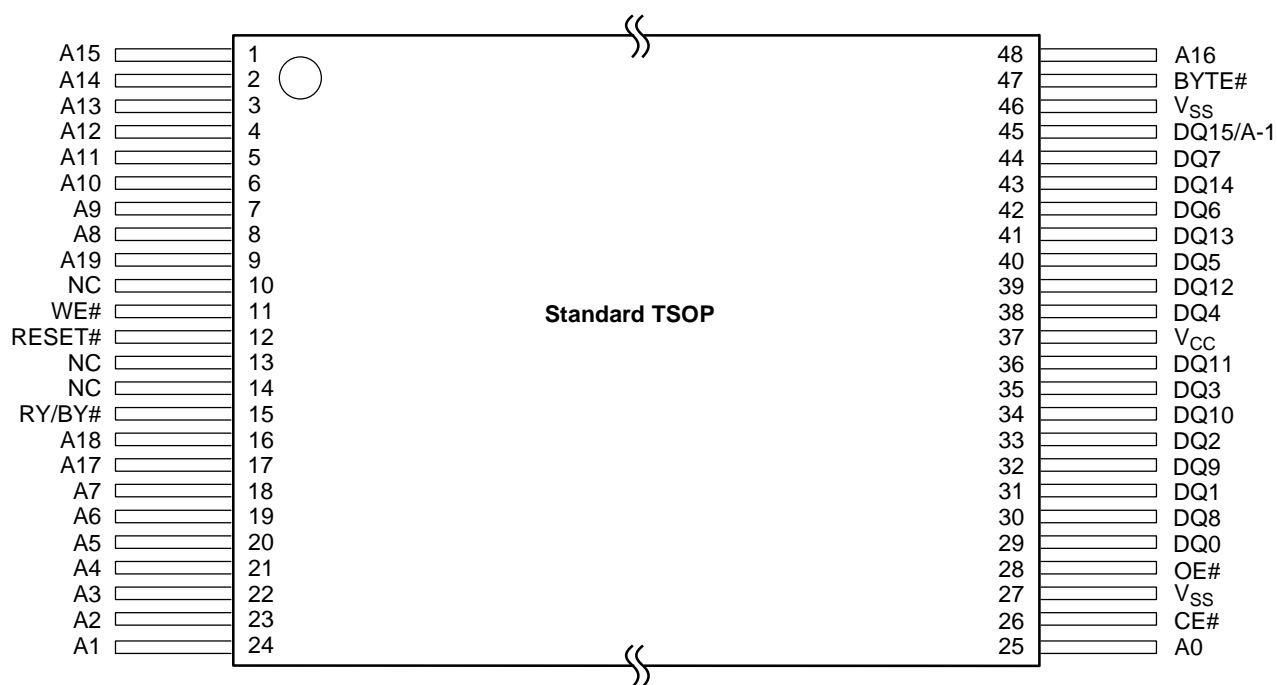
Family Part Number		Am29LV160D		
Speed Option	Voltage Range: $V_{CC} = 2.7\text{--}3.6\text{ V}$	<b>-70</b>	<b>-90</b>	<b>-120</b>
Max access time, ns ( $t_{ACC}$ )		70	90	120
Max CE# access time, ns ( $t_{CE}$ )		70	90	120
Max OE# access time, ns ( $t_{OE}$ )		30	35	50

**Note:** See “AC Characteristics” for full specifications.

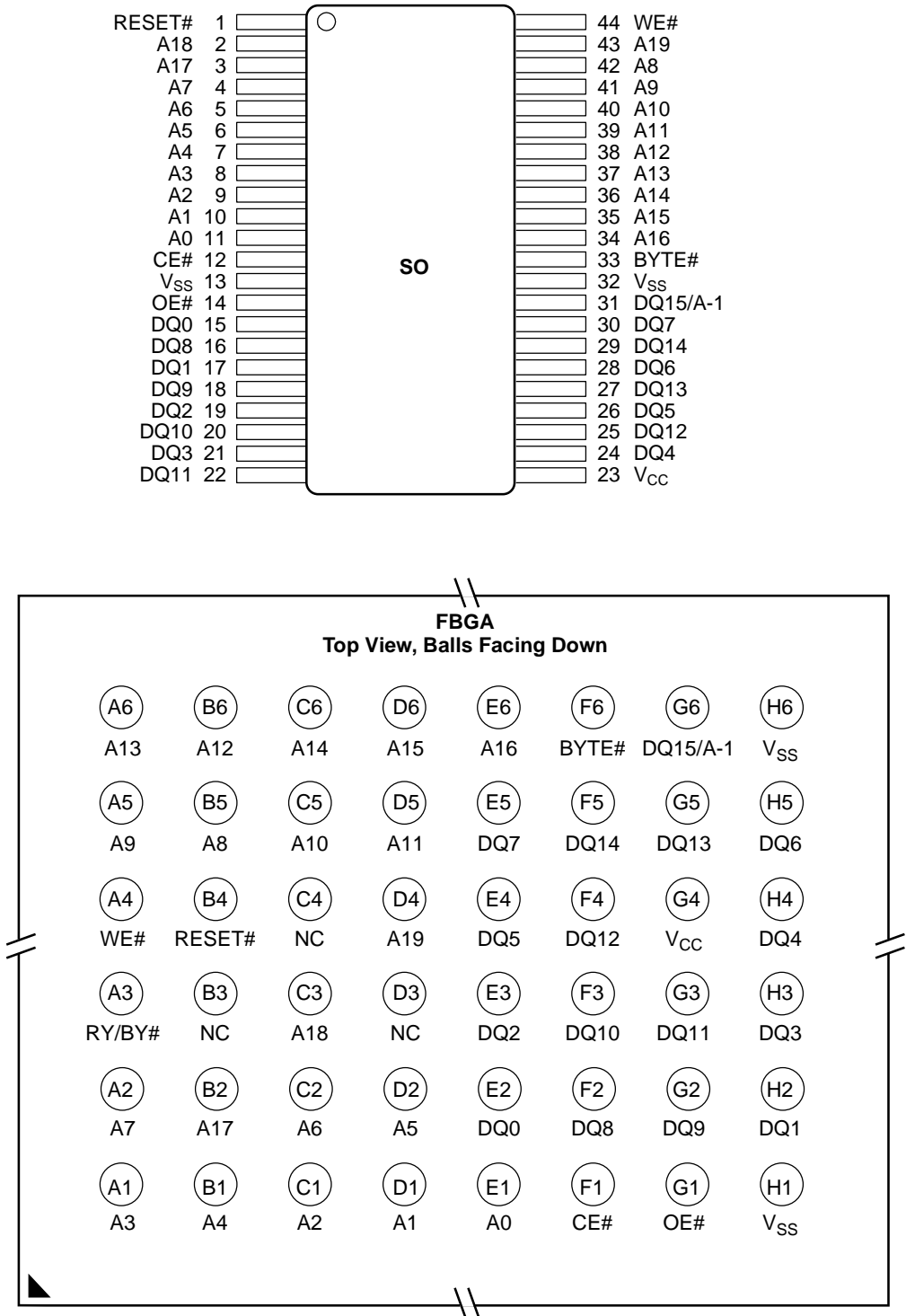
## BLOCK DIAGRAM



# CONNECTION DIAGRAMS



CONNECTION DIAGRAMS



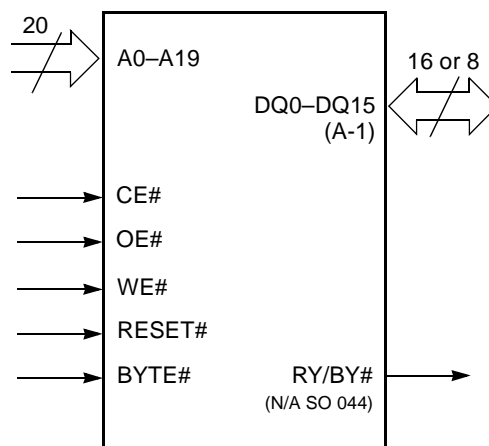
Special Handling Instructions

Special handling is required for Flash Memory products in FBGA packages.

Flash memory devices in FBGA packages may be damaged if exposed to ultrasonic cleaning methods. The package and/or data integrity may be compromised if the package body is exposed to temperatures above 150°C for prolonged periods of time.

**PIN CONFIGURATION**

A0–A19	=	20 addresses
DQ0–DQ14	=	15 data inputs/outputs
DQ15/A-1	=	DQ15 (data input/output, word mode), A-1 (LSB address input, byte mode)
BYTE#	=	Selects 8-bit or 16-bit mode
CE#	=	Chip enable
OE#	=	Output enable
WE#	=	Write enable
RESET#	=	Hardware reset pin
RY/BY#	=	Ready/Busy output (N/A SO 044)
V <sub>CC</sub>	=	3.0 volt-only single power supply (see Product Selector Guide for speed options and voltage supply tolerances)
V <sub>SS</sub>	=	Device ground
NC	=	Pin not connected internally

**LOGIC SYMBOL**

## 8.1 HY57V641620HG

### DESCRIPTION

The Hyundai HY57V641620HG is a 67,108,864-bit CMOS Synchronous DRAM, ideally suited for the main memory applications which require large memory density and high bandwidth. HY57V641620HG is organized as 4banks of 1,048,576x16.

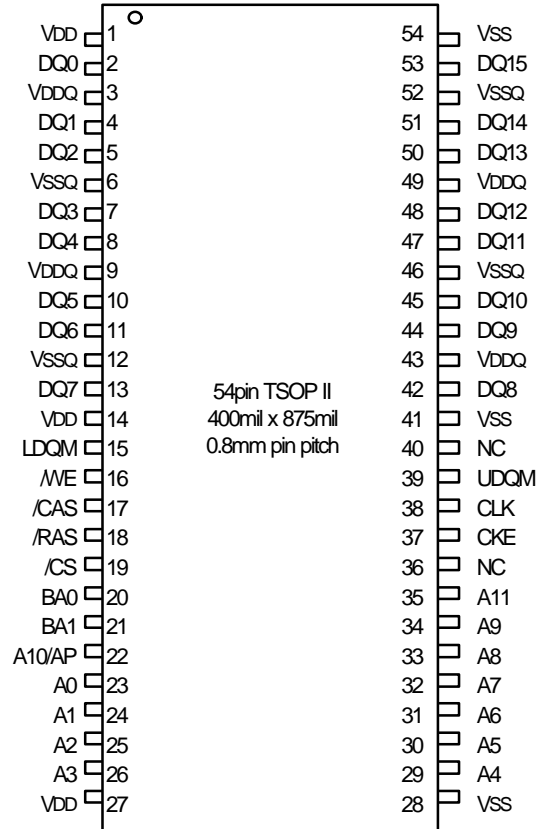
HY57V641620HG is offering fully synchronous operation referenced to a positive edge of the clock. All inputs and outputs are synchronized with the rising edge of the clock input. The data paths are internally pipelined to achieve very high bandwidth. All input and output voltage levels are compatible with LVTTTL.

Programmable options include the length of pipeline (Read latency of 2 or 3), the number of consecutive read or write cycles initiated by a single control command (Burst length of 1,2,4,8 or Full page), and the burst count sequence(sequential or interleave). A burst of read or write cycles in progress can be terminated by a burst terminate command or can be interrupted and replaced by a new burst read or write command on any cycle. (This pipelined design is not restricted by a `2N` rule.)

### FEATURES

- Single 3.3±0.3V power supply <sup>Note)</sup>
- All device pins are compatible with LVTTTL interface
- JEDEC standard 400mil 54pin TSOP-II with 0.8mm of pin pitch
- All inputs and outputs referenced to positive edge of system clock
- Data mask function by UDQM or LDQM
- Internal four banks operation
- Auto refresh and self refresh
- 4096 refresh cycles / 64ms
- Programmable Burst Length and Burst Type
  - 1, 2, 4, 8 or Full page for Sequential Burst
  - 1, 2, 4 or 8 for Interleave Burst
- Programmable  $\overline{\text{CAS}}$  Latency ; 2, 3 Clocks

### PIN CONFIGURATION

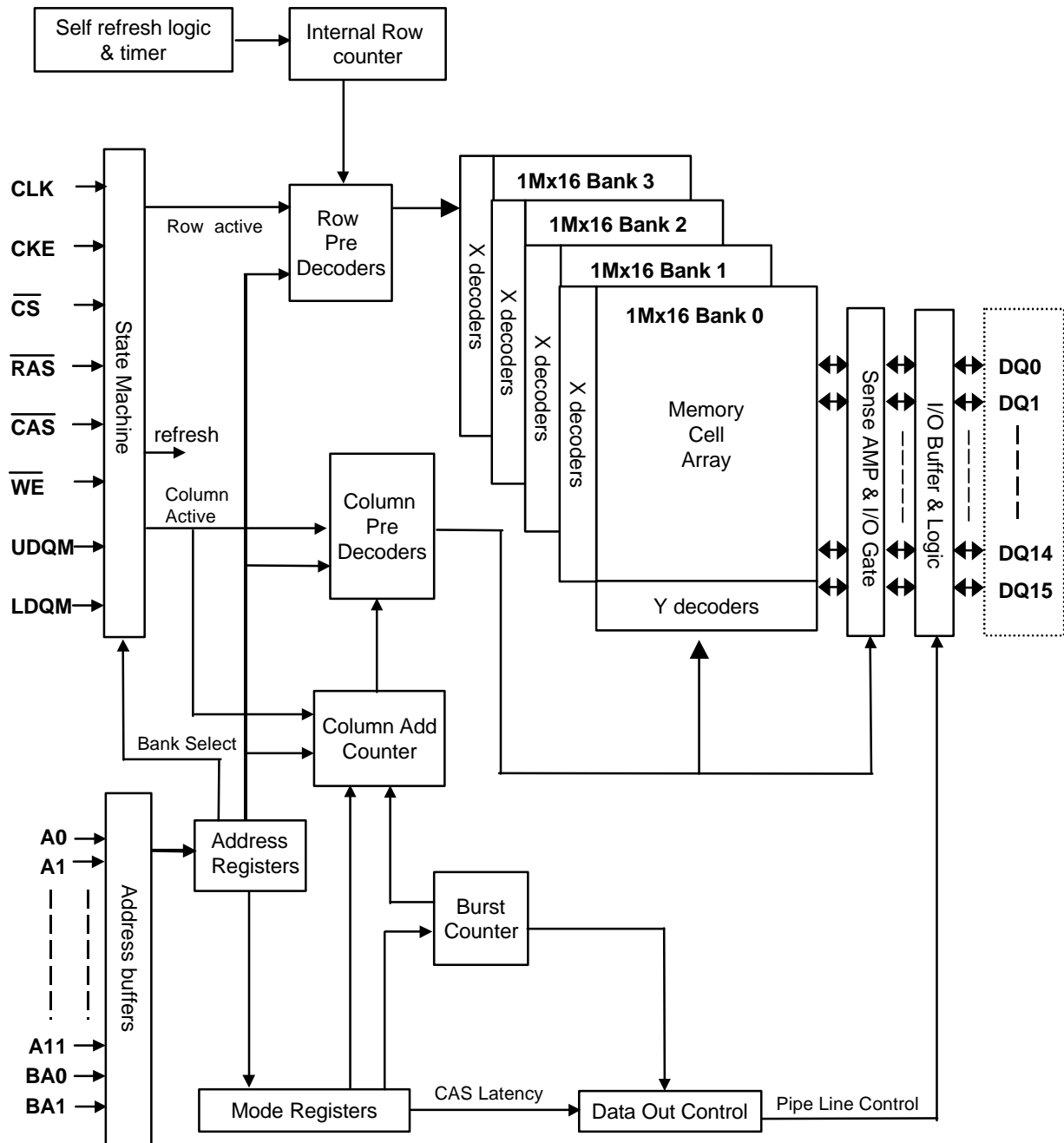


### PIN DESCRIPTION

PIN	PIN NAME	DESCRIPTION
CLK	Clock	The system clock input. All other inputs are registered to the SDRAM on the rising edge of CLK
CKE	Clock Enable	Controls internal clock signal and when deactivated, the SDRAM will be one of the states among power down, suspend or self refresh
CS	Chip Select	Enables or disables all inputs except CLK, CKE and DQM
BA0,BA1	Bank Address	Selects bank to be activated during $\overline{RAS}$ activity Selects bank to be read/written during $\overline{CAS}$ activity
A0 ~ A11	Address	Row Address : RA0 ~ RA11, Column Address : CA0 ~ CA7 Auto-precharge flag : A10
$\overline{RAS}$ , $\overline{CAS}$ , $\overline{WE}$	Row Address Strobe, Column Address Strobe, Write Enable	$\overline{RAS}$ , $\overline{CAS}$ and $\overline{WE}$ define the operation Refer function truth table for details
LDQM, UDQM	Data Input/Output Mask	Controls output buffers in read mode and masks input data in write mode
DQ0 ~ DQ15	Data Input/Output	Multiplexed data input / output pin
VDD/VSS	Power Supply/Ground	Power supply for internal circuits and input buffers
VDDQ/VSSQ	Data Output Power/Ground	Power supply for output buffers
NC	No Connection	No connection

## FUNCTIONAL BLOCK DIAGRAM

1Mbit x 4banks x 16 I/O Synchronous DRAM



## 8.2 MT1389

## MT1389

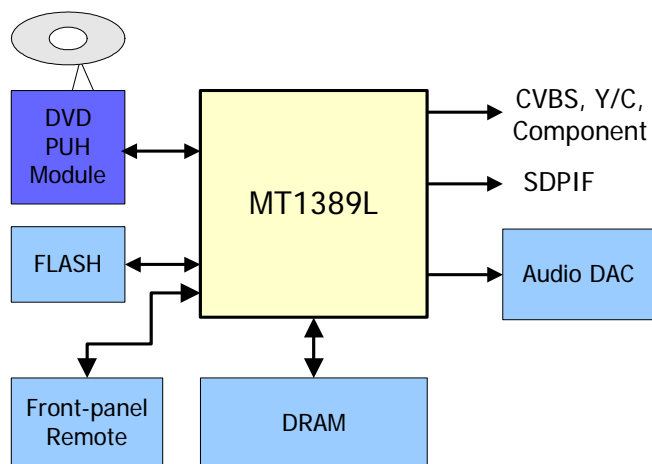
### Progressive-Scan DVD Player SOC

*Specifications are subject to change without notice*

**MediaTek MT1389** is a DVD player system-on-chip (SOC) which incorporates advanced features like high quality TV encoder and state-of-art de-interlace processing. The MT1389 enables consumer electronics manufacturers to build high quality, cost-effective DVD players, portable DVD players or any other home entertainment audio/video devices.

Based on MediaTek's world-leading DVD player SOC architecture, the MT1389 is the 3<sup>rd</sup> generation of the DVD player SOC. It integrates the MediaTek 2<sup>nd</sup> generation front-end analog RF amplifier and the Servo/MPEG AV decoder.

The progressive scan of the MT1389 utilized a proprietary advanced motion-adaptive de-interlace algorithm to achieve the best movie/video playback. It can easily detect 3:2/2:2 pull down source and restore the correct original pictures. It also supports a patent-pending edge-preserving algorithm to remove the saw-tooth effect.



DVD Player System Diagram Using MT1389

#### Key Features

- RF/Servo/MPEG Integration
- High Performance Audio Processor
- Motion-Adaptive, Edge-Preserving De-interlace
- 108MHz/12-bit, 6 CH TV Encoder

#### Applications

- Standard DVD Players
- Portable DVD Players

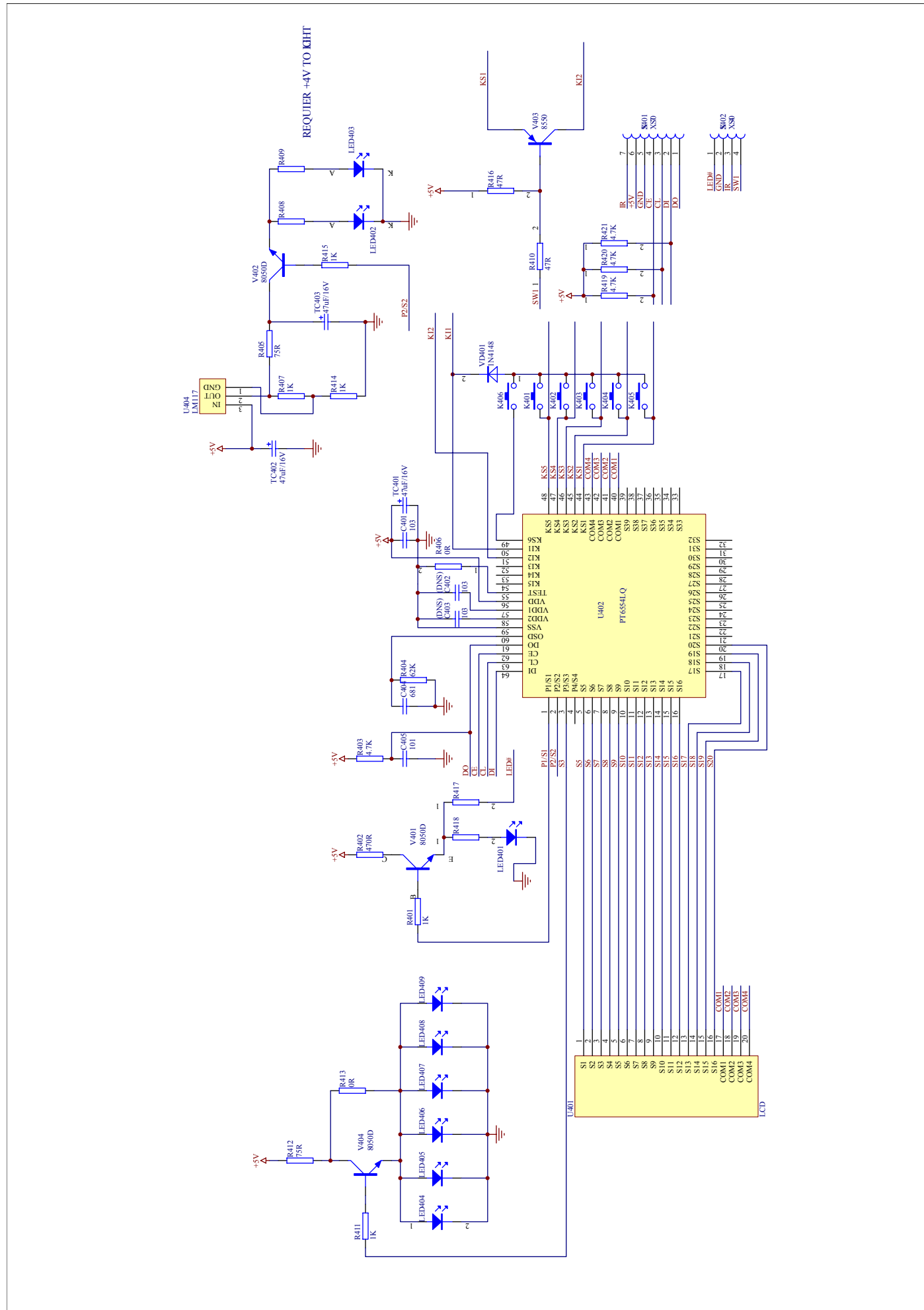
## General Feature List

- Super Integration DVD player single chip
  - High performance analog RF amplifier
  - Servo controller and data channel processing
  - MPEG-1/MPEG-2/JPEG video
  - Dolby AC-3/DTS/DVD-Audio
  - Unified memory architecture
  - Versatile video scaling & quality enhancement
  - OSD & Sub-picture
  - 2-D graphic engine
  - Built-in clock generator
  - Built-in high quality TV encoder
  - Built-in progressive video processor
  - Audio effect post-processor
  - Audio input port
- High Performance Analog RF Amplifier
  - Programmable fc
  - Dual automatic laser power control
  - Defect and blank detection
  - RF level signal generator
- Speed Performance on Servo/Channel Decoding
  - DVD-ROM up to 4XS
  - CD-ROM up to 24XS
- Channel Data Processor
  - Digital data slicer for small jitter capability
  - Built-in high performance data PLL for channel data demodulation
  - EFM/EFM+ data demodulation
  - Enhanced channel data frame sync protection & DVD-ROM sector sync protection
- Servo Control and Spindle Motor Control
  - Programmable frequency error gain and phase error gain of spindle PLL to control spindle motor on CLV and CAV mode
  - Built-in ADCs and DACs for digital servo control
  - Provide 2 general PWM
  - Tray control can be PWM output or digital output
- Embedded Micro controller
  - Built-in 8032 micro controller
  - Built-in internal 373 and 8-bit programmable lower address port
- 1024-bytes on-chip RAM
- Up to 4M bytes FLASH-programming interface
- Supports 5/3.3-Volt. FLASH interface
- Supports power-down mode
- Supports additional serial port
- DVD-ROM/CD-ROM Decoding Logic
  - High-speed ECC logic capable of correcting one error per each P-codeword or Q-codeword
  - Automatic sector Mode and Form detection
  - Automatic sector Header verification
  - Decoder Error Notification Interrupt that signals various decoder errors
  - Provide error correction acceleration
- Buffer Memory Controller
  - Supports 16Mb/32Mb/64Mb/128Mb SDRAM
  - Supports 16-bit SDRAM data bus
  - Provide the self-refresh mode SDRAM
  - Block-based sector addressing
  - Support 3.3 Volt. DRAM Interface
- Video Decode
  - Decodes MPEG1 video and MPEG2 main level, main profile video (720/480 and 720x576)
  - Smooth digest view function with I, P and B picture decoding
  - Baseline, extended-sequential and progressive JPEG image decoding
  - Support CD-G titles
- Video/OSD/SPU/HLI Processor
  - Arbitrary ratio vertical/horizontal scaling of video, from 0.25X to 256X
  - 65535/256/16/4/2-color bitmap format OSD,
  - 256/16 color RLC format OSD
  - Automatic scrolling of OSD image
  - Slide show transition as DVD-Audio Specification
- 2-D Graphic Engine
  - Support decode Text and Bitmap
  - Support line, rectangle and gradient fill
  - Support bitblt
  - Chroma key copy operation
  - Clip mask

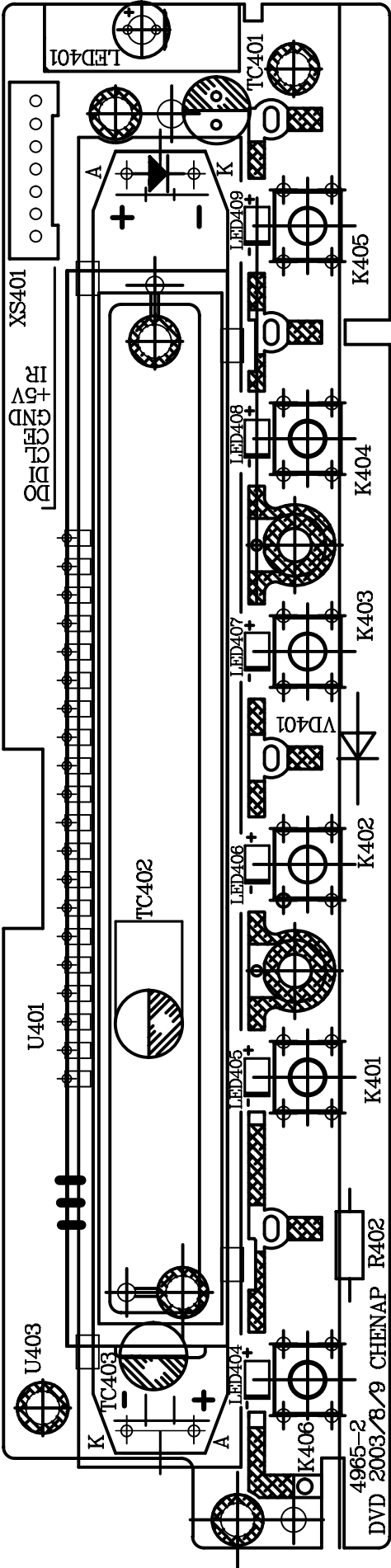
- Audio Effect Processing
  - Dolby Digital (AC-3)/EX decoding
  - DTS/DTS-ES decoding
  - MLP decoding for DVD-Audio
  - MPEG-1 layer 1/layer 2 audio decoding
  - MPEG-2 layer1/layer2 2-channel audio
  - High Definition Compatible Digital (HDCD)
  - Windows Media Audio (WMA)
  - Advanced Audio Coding (AAC)
  - Dolby ProLogic II
  - Concurrent multi-channel and downmix out
  - IEC 60958/61937 output
    - PCM / bit stream / mute mode
    - Custom IEC latency up to 2 frames
  - Pink noise and white noise generator
  - Karaoke functions
    - Microphone echo
    - Microphone tone control
    - Vocal mute/vocal assistant
    - Key shift up to +/- 8 keys
    - Chorus/Flanger/Harmony/Reverb
  - Channel equalizer
  - 3D surround processing include virtual surround and speaker separation
- TV Encoder
  - Six 108MHz/12bit DACs
  - Support NTSC, PAL-BDGHINM, PAL-60
  - Support 525p, 625p progressive TV format
  - Automatically turn off unconnected channels
  - Support PC monitor (VGA)
  - Support Macrovision 7.1 L1, Macrovision 525P and 625P
  - CGMS-A/WSS
  - Closed Caption
- Progressive Output
  - Automatic detect film or video source
  - 3:2 pull down source detection
  - Advanced Motion adaptive de-interlace
  - Edge Preserving
  - Minimum external memory requirement
- Audio Input
  - Line-in/SPDIF-in for versatile audio processing
- Outline
  - 256-pin LOFP package
  - 3.3/1.8-Volt. Dual operating voltages

9. SCHEMATIC & PCB WIRING DIAGRAM

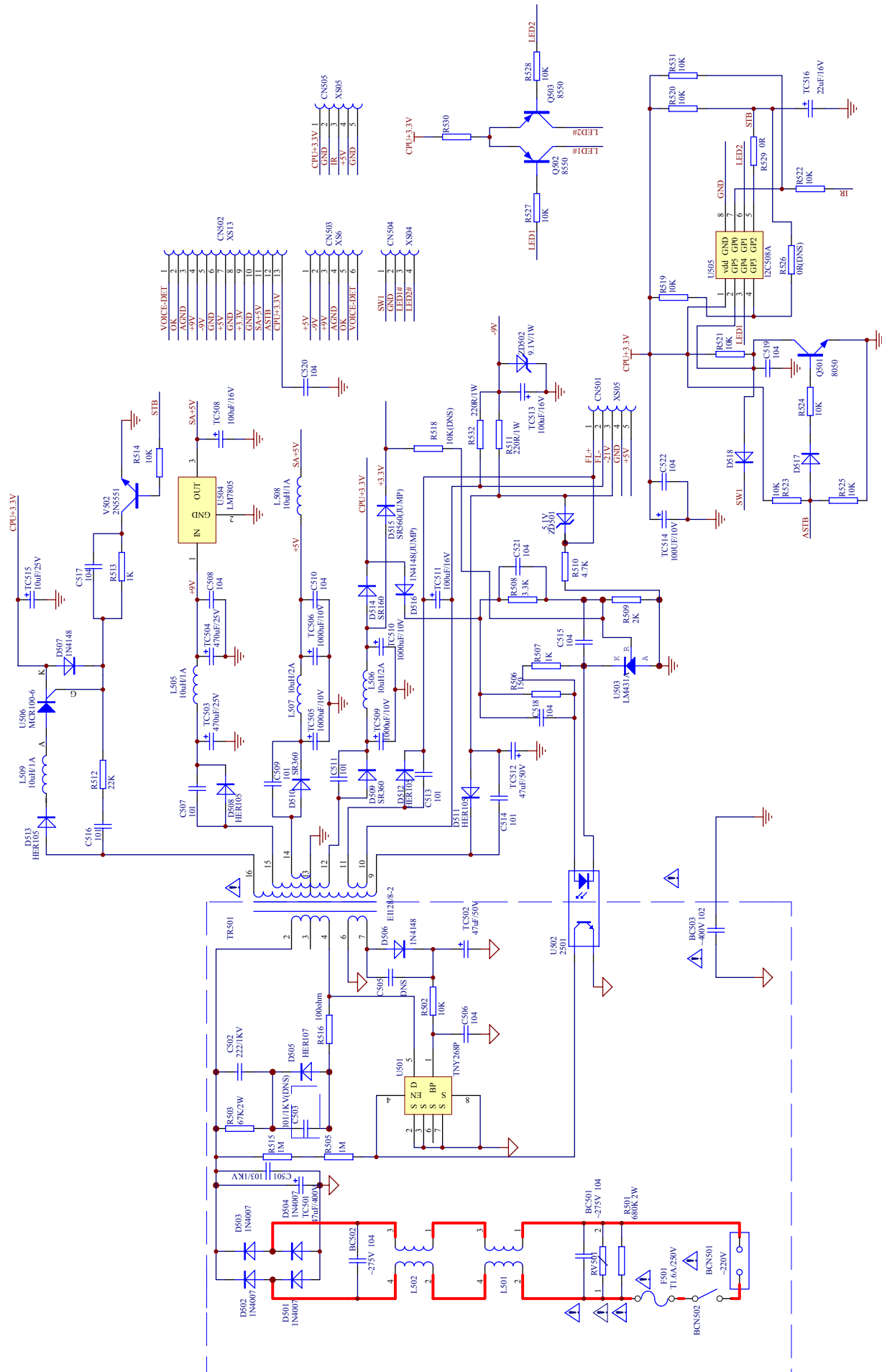
FRONT SCHEMATIC DIAGRAM



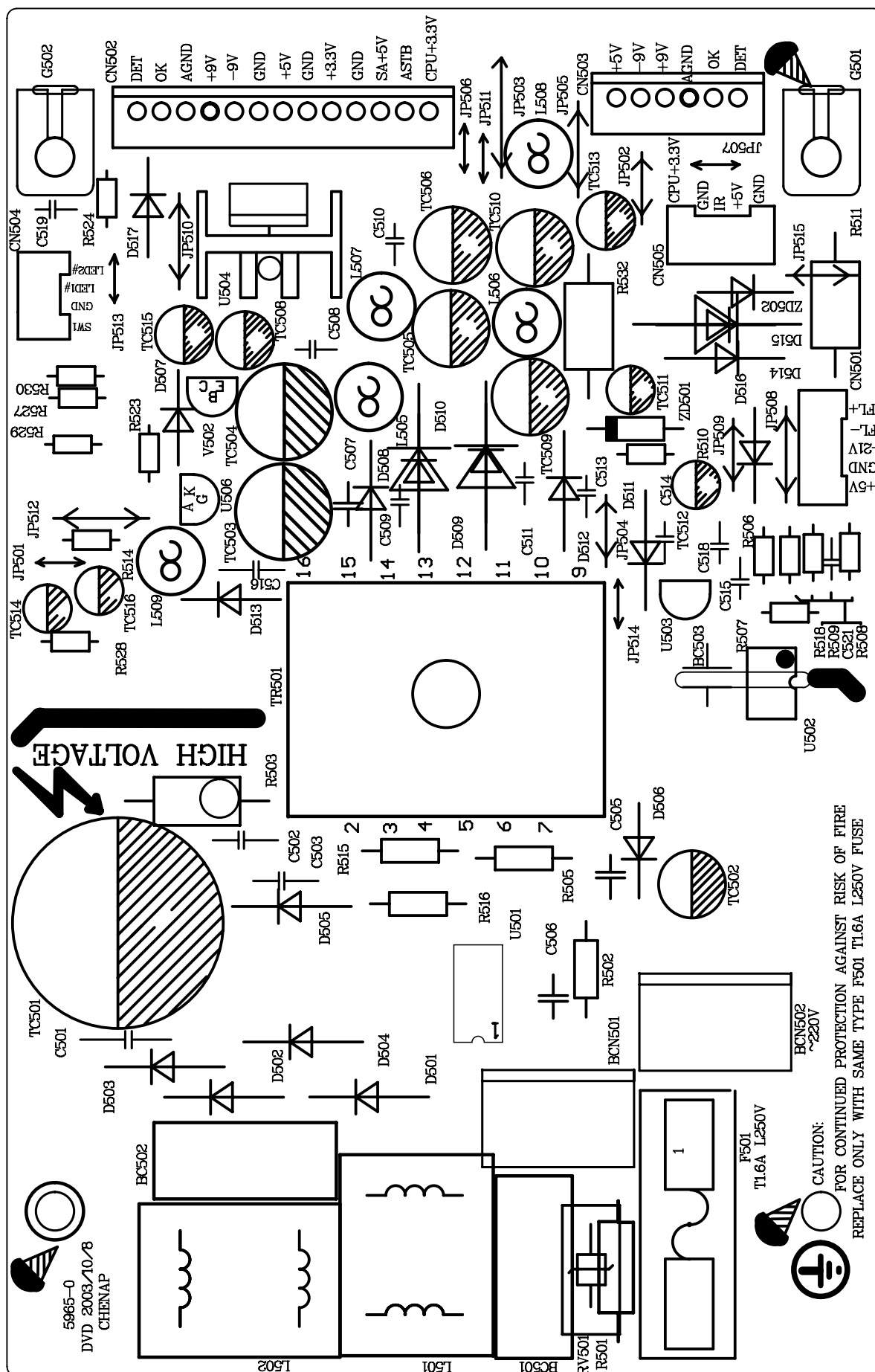
FRONT SCHEMATIC DIAGRAM



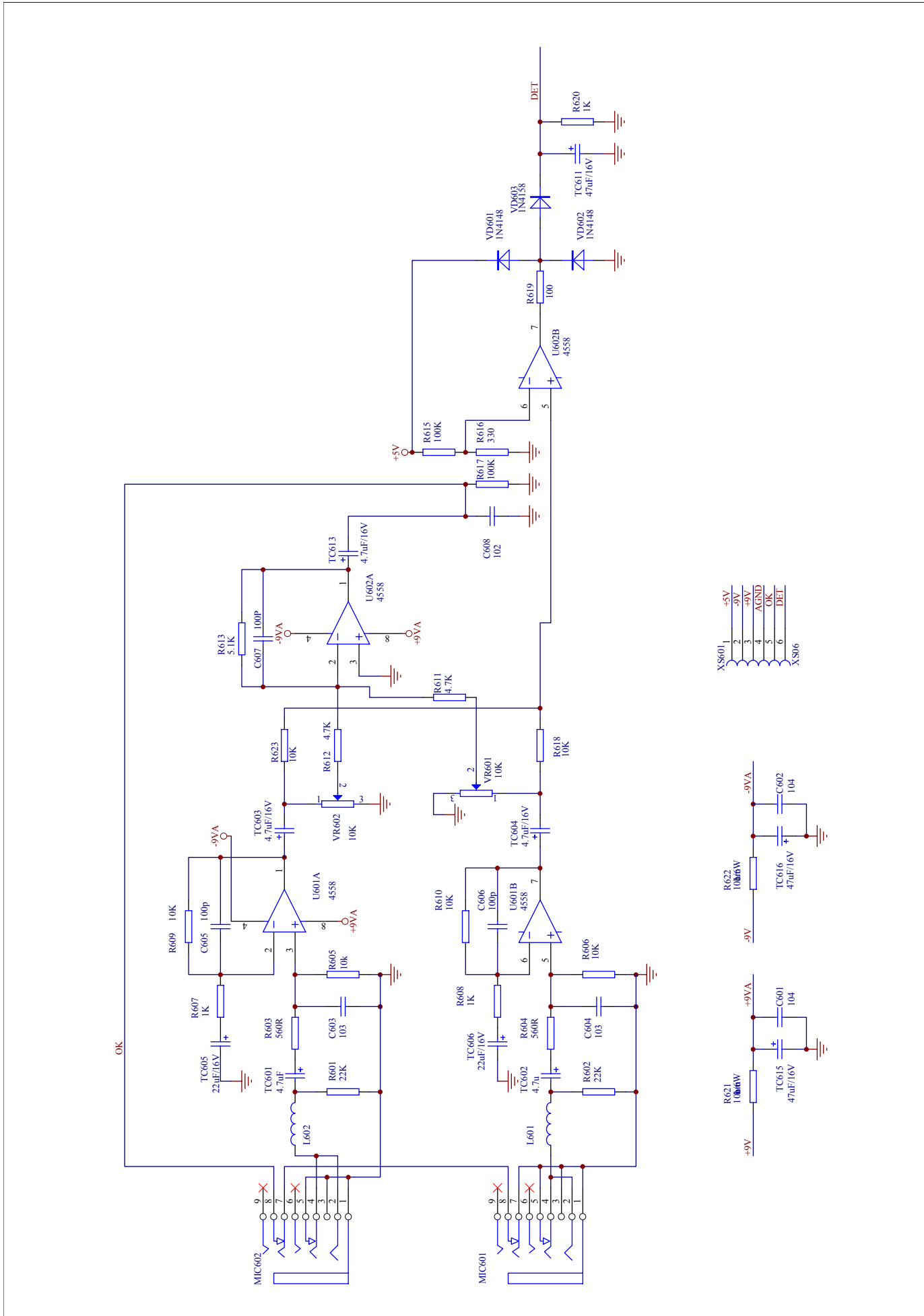
# POWER BOARD SCHEMATIC DIAGRAM



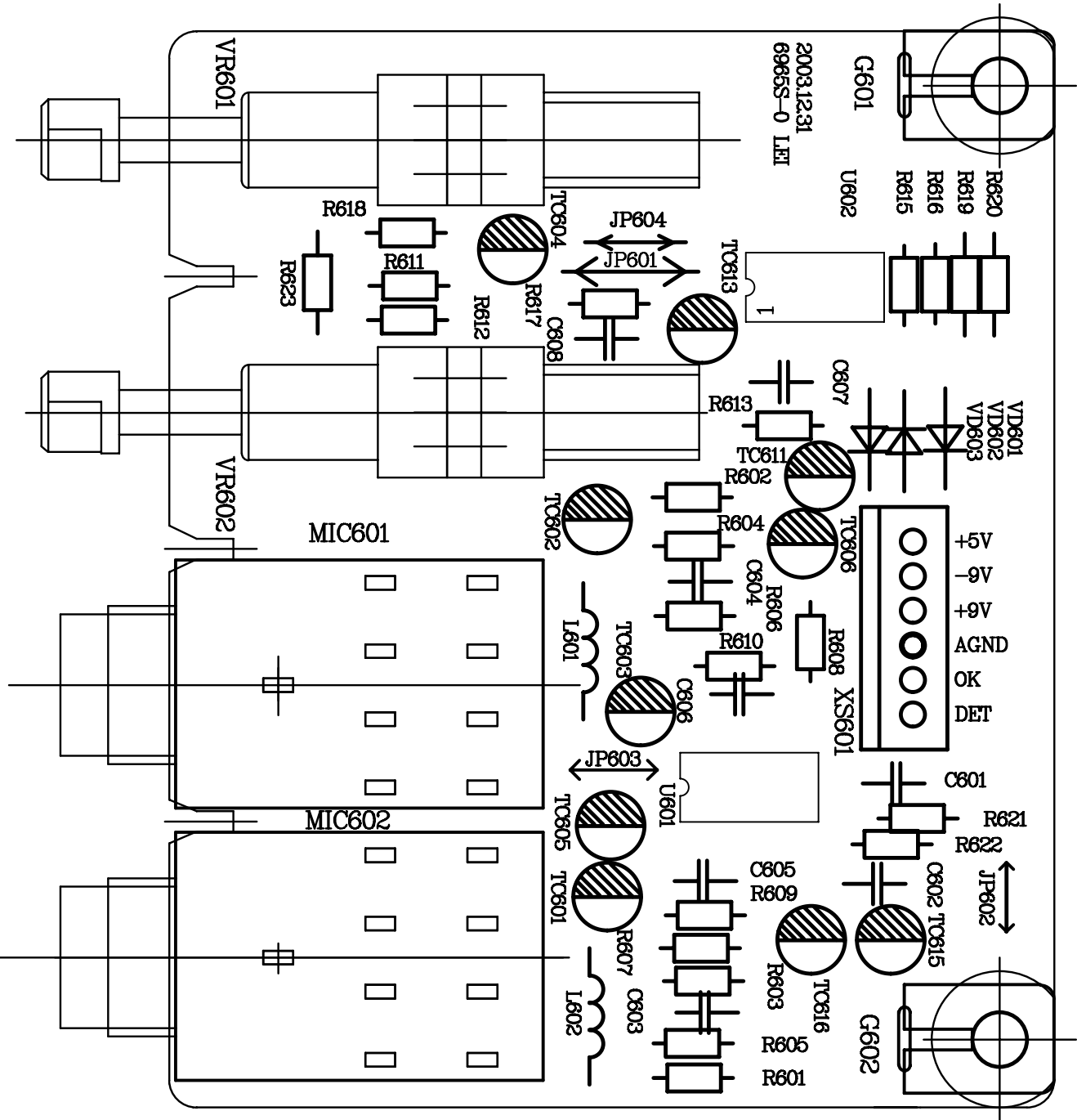
## POWER BOARD SCHEMATIC DIAGRAM



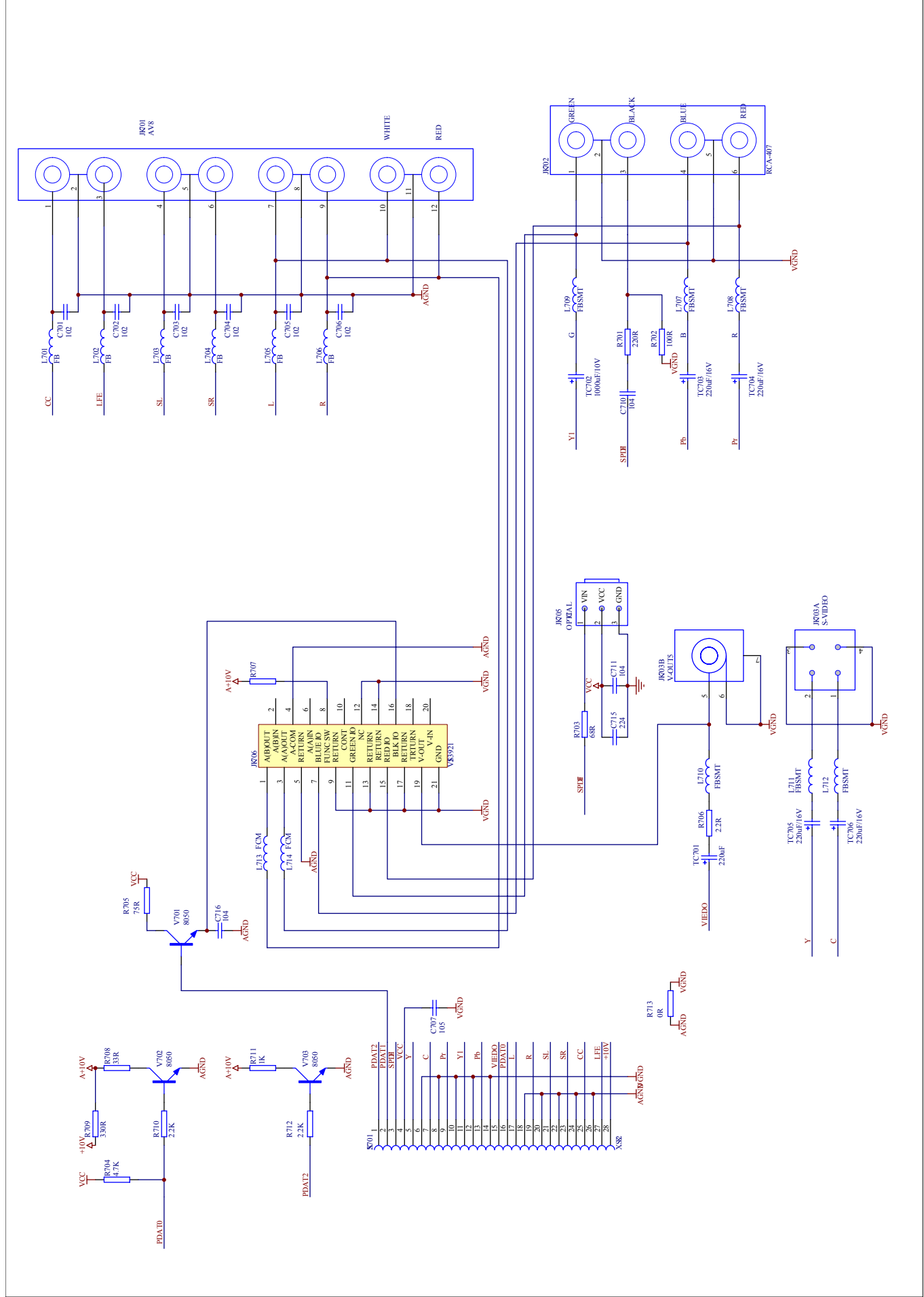
OK SCHEMATIC DIAGRAM



OK SCHEMATIC DIAGRAM

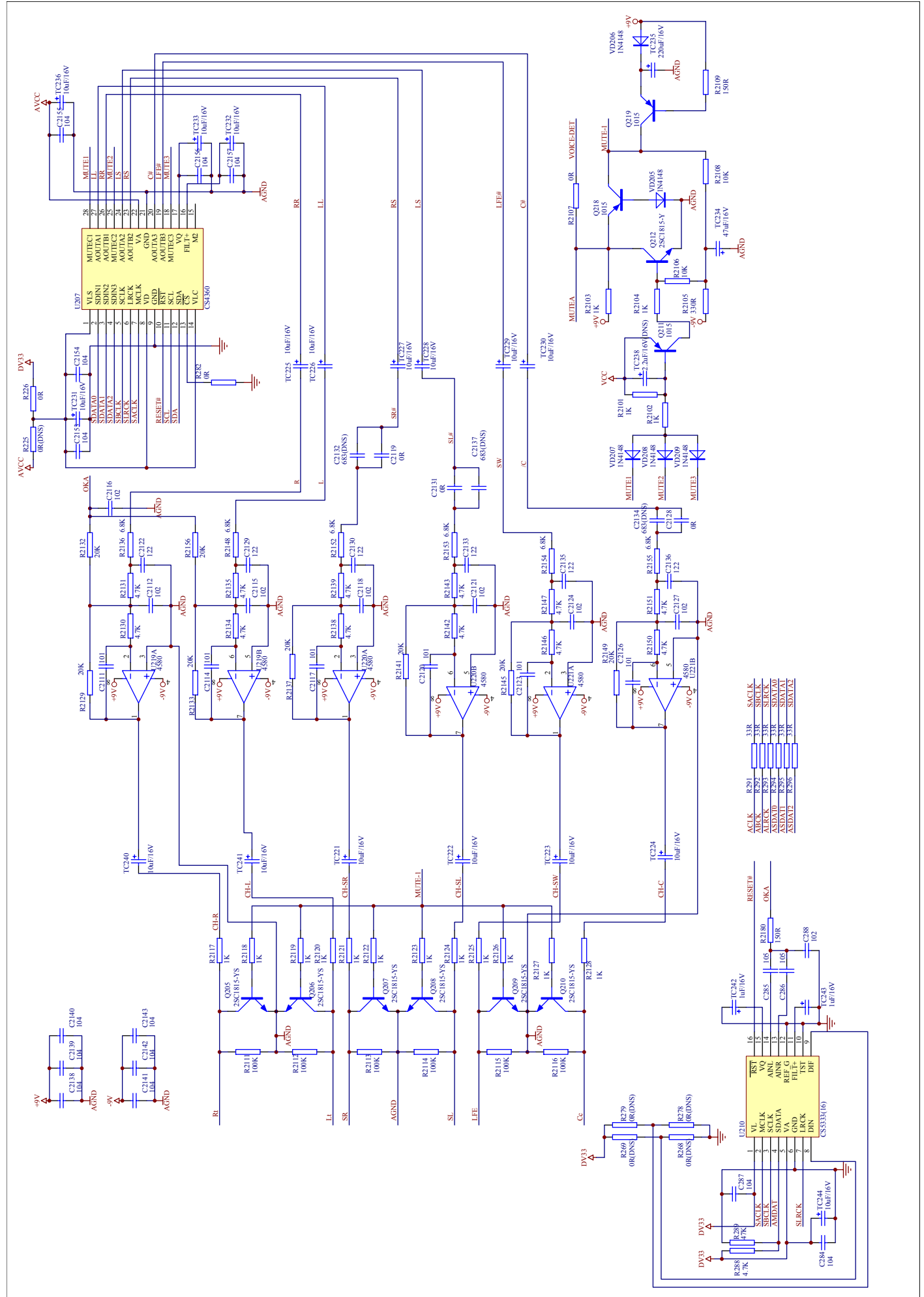


OUTPUT BOARD SCHEMATIC DIAGRAM

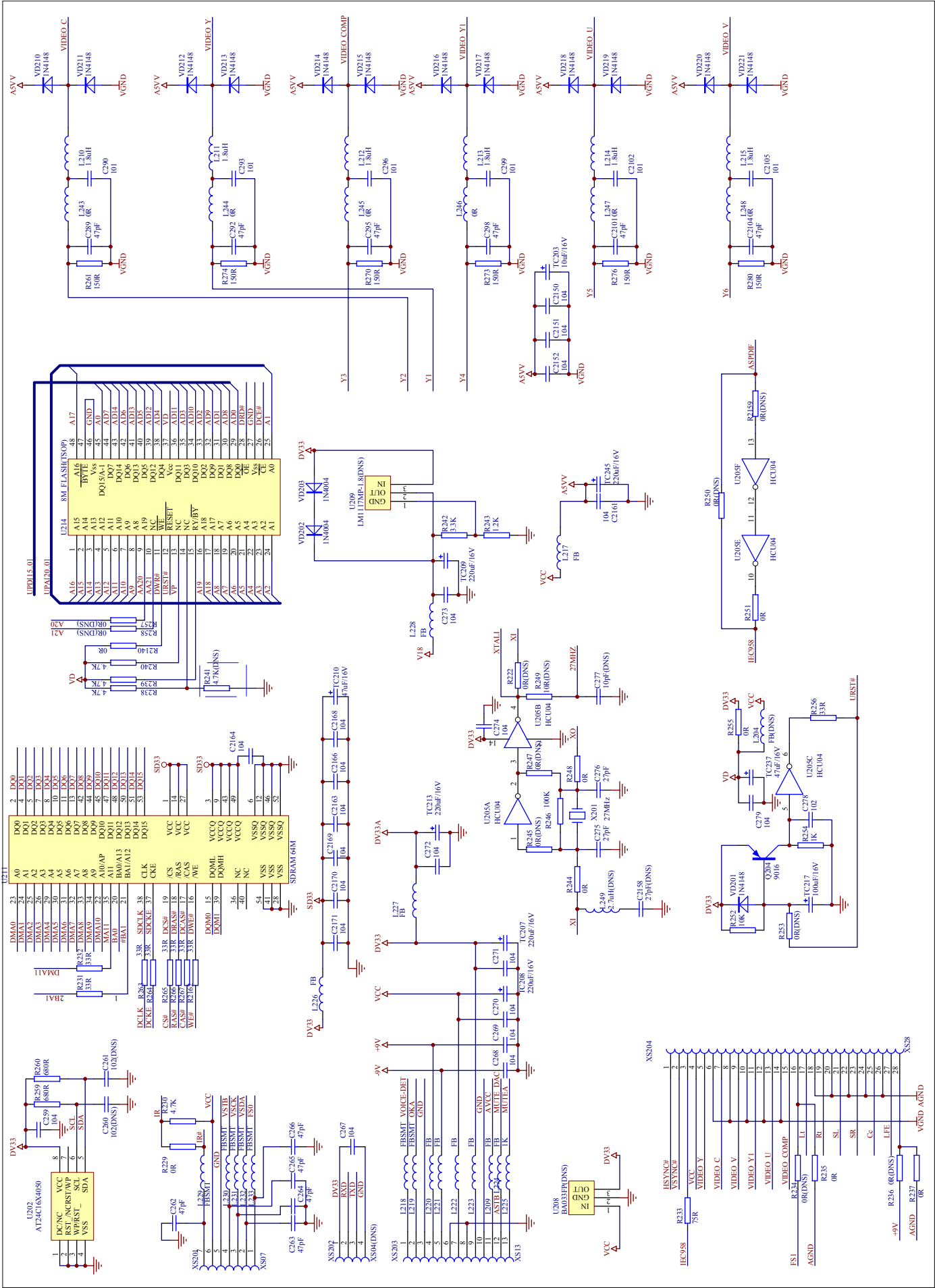




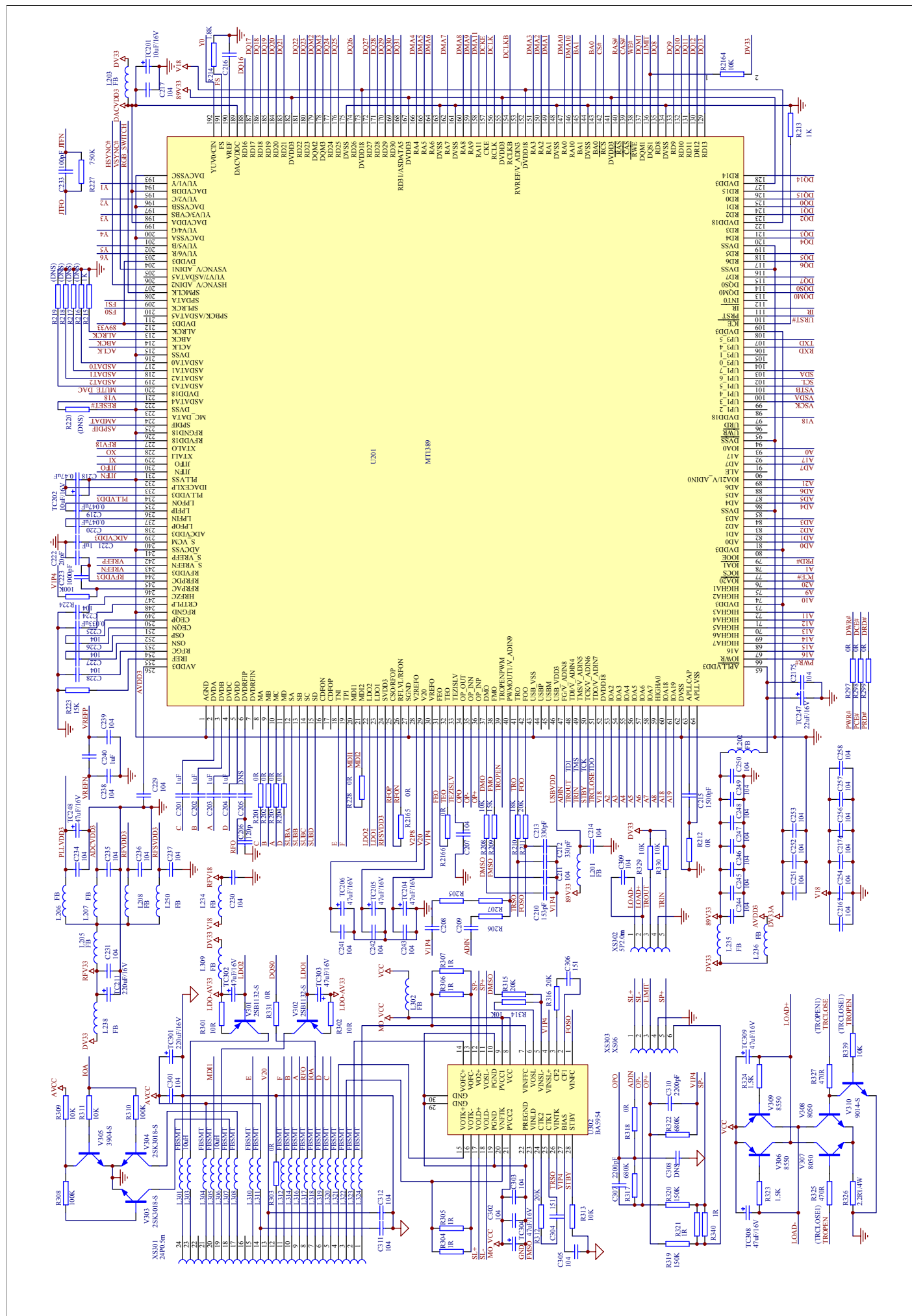
# MIAN SCHEMATIC DIAGRAM



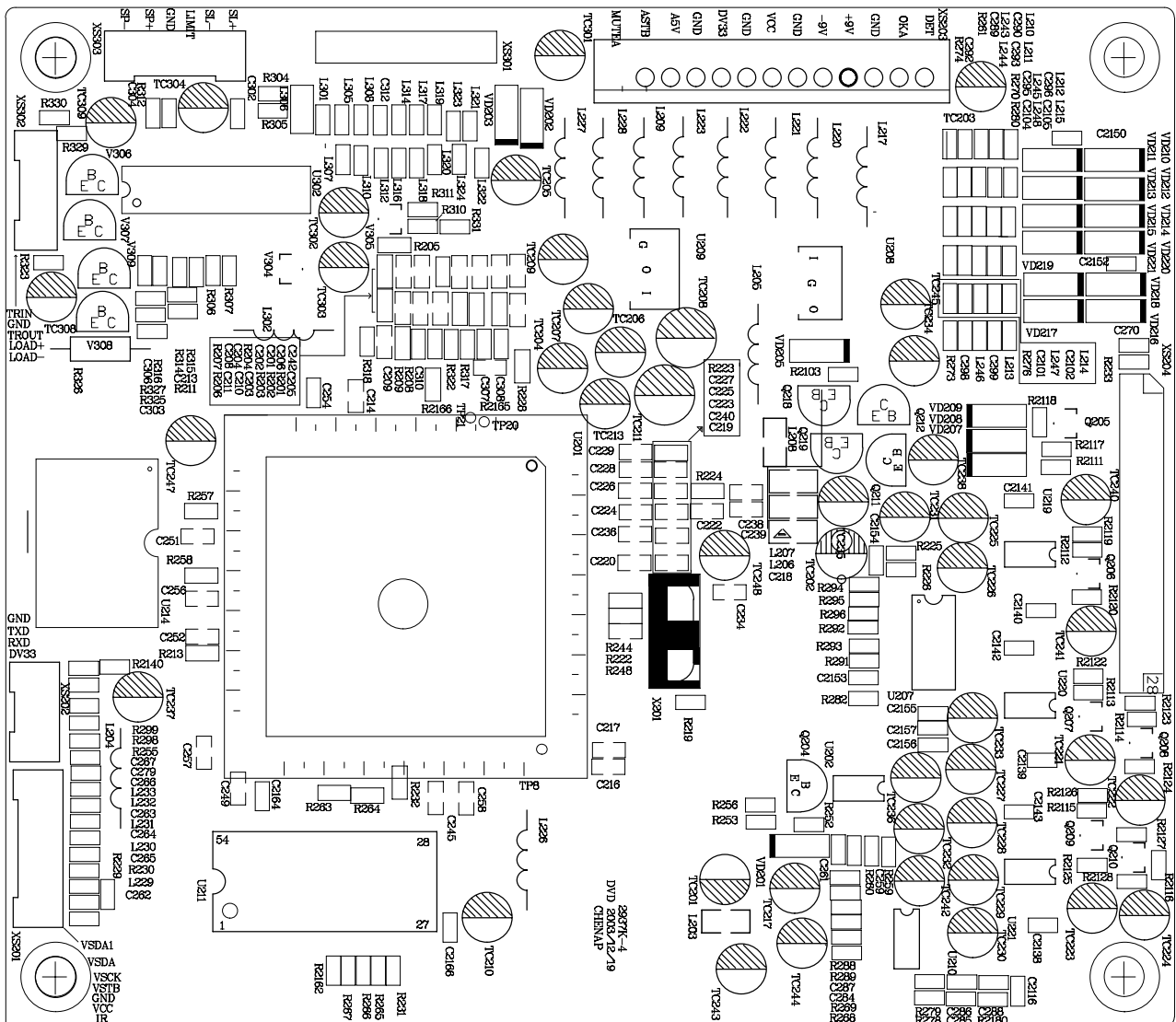
MIAN SCHEMATIC DIAGRAM



# MIAN SCHEMATIC DIAGRAM



# MIAN SCHEMATIC DIAGRAM



# 10. SPARE PARTS LIST

## bbk965S MATERIAL LIST

### 1. DECODE BOARD

NO		MATERIAL	SPECIFICATIONS/PART NUMBER	QUANTITY	LOCATION
1		SMD RESISTOR	1/16W 0Ω ±5%	36	C2119,C2128,C2131,L210~L215,R201~R204,R212,R226,R228,R234,R236,R245,R247,R222,R251,R255,R257,R258,R282,R297,R298,R299,R303,R318,R331,R2107,R2159,R268,R279
2		SMD RESISTOR	1/16W 75Ω ±5%	7	R233,R261,R270,R273,R274,R276,R280
3		CARBON FILM RESISTOR	1/4W2.2Ω±5%	1	R326
4		SMD RESISTOR	1/16W1Ω±5%	6	R304~R307,R321,R340
5		SMD RESISTOR	1/16W 10Ω ±5%	2	R301,R302
6		SMD RESISTOR	1/16W 33Ω ±5%	16	R231,R232,R256,R263~R267,R291~R296,R2162 ,L202
7		SMD RESISTOR	1/16W 150Ω ±5%	2	R2109,R2180
8		SMD RESISTOR	1/16W 330Ω ±5%	1	R2105
9		SMD RESISTOR	1/16W 470Ω ±5%	2	R325,R327
10		SMD RESISTOR	1/16W 680Ω ±5%	2	R259,R260
11		SMD RESISTOR	1/16W 1K ±5%	20	L225,R213,R215,R2101~R2104,R2117,R2118~R2128 ,R254
13		SMD RESISTOR	1/16W 1.5K ±5%	3	R323,R324,R243
14		SMD RESISTOR	1/16W 510Ω ±5%	1	R214
15		SMD RESISTOR	1/16W 3.3K ±5%	1	R242
16		SMD RESISTOR	1/16W 4.7K ±5%	16	R238~R240,R2130,R2131,R2134,R2135,R2138~R2140,R2142,R2143,R2146,R2147,R2150,R2151
17		SMD RESISTOR	1/16W 6.8K ±5%	6	R2136,R2148,R2152~R2155
18		SMD RESISTOR	1/16W 10K ±5%	11	R208,R229,R252,R309,R311,R313,R314,R329,R330,R339 ,R2164
19		SMD RESISTOR	1/16W 15K ±5%	2	R209,R223
20		SMD RESISTOR	1/16W 20K ±5%	4	R211,R312,R315,R316
21		SMD RESISTOR	1/16W24K±5%	6	R2129,R2133,R2137,R2141,R2145,R2149
22		SMD RESISTOR	1/16W 18K ±5%	1	R210
23		SMD RESISTOR	1/16W 47K ±5%	1	R289
24		SMD RESISTOR	1/16W 150K ±5%	2	R319,R320
25		PRECISION SMD RESISTOR	1/16W 680K ±1%	2	R317,R322
26		PRECISION SMD RESISTOR	1/16W 750K ±1%	1	R227
27		SMD RESISTOR	1/16W 100K ±5%	10	R224,R308,R310,R2111~R2116 ,R246
28		CD	CD11 16V10U±20%5×11 2	20	TC201,TC202,TC217,TC221~TC233,TC236, TC240,TC241 ,TC244
29		CD	CD11 16V1U±20%5×11 2	2	TC242,TC243
30		CD	CD11 16V220U±20%6×12 2.5	8	TC207~TC209,TC211,TC213,TC235,TC245,TC301
31		CD	CD11 16V47U±20%5×11 2	13	TC204~TC206,TC210,TC234,TC237,TC302~TC304,TC308,TC309 ,TC247,TC248

32		SMD CAPACITOR	50V 20P ±5% NPO 0603	1	C222
33		SMD CAPACITOR	50V 27P ±5% NPO 0603	2	C275,C276
34		SMD CAPACITOR	50V 47P ±5% NPO 0603	17	C262~C266,C289,C290,C292,C293,C295,C296,C298,C299,C2101,C2102,C2104,C2105
35		SMD CAPACITOR	50V 101 ±5% NPO 0603	8	C233,C2111,C2114,C2117,C2120,C2123,C2126,C206
36		SMD CAPACITOR	50V 331 ±5% NPO 0603	2	C212,C213
37		SMD CAPACITOR	50V 151 ±5% NPO 0603	2	C304,C306
38		SMD CAPACITOR	50V 104 +80%-20% 0603	74	C207,C211,C214,C216,C217,C224,C226~C231,C234~C239,C241~C254,C256~C259,C267~C274,C279,C2170~C2171,C301~C303,C305,C309,C311,C312,C2138~C2143,C2153~C2157,C2161,C2163,C2166,C2174,C2175,C2169,C2168,C284,C287
	38.1	SMD CAPACITOR	25V 104 +80%-20% 0603	74	C207,C211,C214,C216,C217,C224,C226~C231,C234~C239,C241~C254,C256~C259,C267~C274,C279,C2170~C2171,C301~C303,C305,C309,C311,C312,C2138~C2143,C2153~C2157,C2161,C2163,C2166,C2174,C2175,C2169,C2168,C284,C287
39		SMD CAPACITOR	16V 105 +80%-20% 0603	8	C201~C204,C221,C240 ,C285,C286
40		SMD CAPACITOR	50V 102 ±10% 0603	9	C2112,C2115,C288,C2118,C2121,C2124,C2127,C223,C278
41		SMD CAPACITOR	50V 122 ±10% 0603	6	C2122,C2129,C2130,C2133,C2135,C2136
42		SMD CAPACITOR	50V 152 ±10% 0603	1	C215
43		SMD CAPACITOR	50V 222 ±10% 0603	2	C307,C310
44		SMD CAPACITOR	50V 153 ±10% 0603	1	C210
45		SMD CAPACITOR	16V 333 ±10% 0603	1	C225
46		SMD CAPACITOR	16V 473 ±10% 0603	2	C219,C220
47		SMD CAPACITOR	16V474 +80%-20% 0603	1	C218
48		SMD INDUCTOR	10UH ±10% 2012	2	L303,L306
49		SMD INDUCTOR	1.8UH ±10% 1608	6	L243~L248
50		MAGNETIC BEADS INDUCTOR	RH354708	11	L205,L209,L217,L220,L221,L222,L223,L227,L228,L226,L302
51		SMD MAGNETIC BEADS	FCM1608K-221T05	36	L201,L203,L207~L208,L224,L234~L236,L238,L250,L309,L218,L219,L229~L233,L301,L304,L305,L307,L308,L310~L312,L314,L316~L324
52		SMD RESISTOR	1/16W 4.7Ω ±5%	1	L206
53		SMD DIODE	1N4148	18	VD201,VD205~VD221
	53.1	SMD DIODE	LS4148	18	VD201,VD205~VD221
	53.2	SMD DIODE	LL4148	18	VD201,VD205~VD221
54		TRIODE	C8050	2	V307,V308
55		TRIODE	8550C	2	V306,V309

56		SMD TRIODE	9014C	1	V310
57		TRIODE	9015C	1	Q204
58		TRIODE	C1815Y	1	Q212
59		SMD TRIODE	C1815	6	Q205~Q210
60		TRIODE	2SA1015	3	Q211,Q218,Q219
61		SMD TRIODE	3904	1	V305
62		SMD TRIODE	2SK3018	2	V303,V304
63		SMD TRIODE	2SB1132	2	V301,V302
64		IC	NJM4558M SOP	3	U219, U220, U221
	64.1	IC	RC4558D SOP	3	U219, U220, U221
65		IC	MM74HCU04M SOP	1	U205
	65.1	IC	HCU04 SOP	1	U205
66		IC	HY57V641620HGT-7 TSOP	1	U211
	66.1	IC	KSV464P4JA-70 TSOP	1	U211
67		IC	LM1117MP-ADJ SOT-223	1	U209
68		IC	CS4360 SSOP	1	U207
69		IC	24C02N SOP	1	U202
70		IC	MT1389EE QFP	1	U201
71		IC	BA5954FP HSOP	1	U302
72		IC	CS5333 SSOP	1	U210
73		CRYSTAL OSCILLATOR	27.00MHz 49-S	1	X201
74		CABLE SOCKET	14P 1.0mm STRAIGHT DUAL LINE PLUG	1	XS204
75		PCB	2937K-4	1	
76		SOCKET	5P 2.0mm	1	XS302
77		SOCKET	6P 2.0mm	1	XS303
78		SOCKET	7P 2.0mm	1	XS201
79		SOCKET	13P 2.5mm	1	XS203
80		CABLE SOCKET	24P 0.5mm SMD WITH CLASP	1	XS301

## 2. POWER BOARD

NO	MATERIAL	SPECIFICATIONS/PART NUMBER	QUANTITY	LOCATION
1	SMD DIODE	1N4148	1	D518
2	CARBON FLIM RESISTOR	1/4W100 $\Omega$ $\pm$ 5% SHAPED 10	1	R516
3	CARBON FLIM RESISTOR	1/6W150 $\Omega$ $\pm$ 5% SHAPED 7.5	1	R506
4	CARBON FLIM RESISTOR	1/6W100 $\Omega$ $\pm$ 5% SHAPED 7.5	1	R530
5	CARBON FLIM RESISTOR	1/6W1K $\pm$ 5% SHAPED 7.5	2	R507,R527
6	SMD RESISTOR	1/16W 1K $\pm$ 5%	1	R513
7	SMD RESISTOR	1/16W 10 $\Omega$ $\pm$ 5%	1	R522
8	METAL FILM RESISTOR	1/6W2K $\pm$ 1%	1	R509

9		METAL FILM RESISTOR	1/6W3.3K±1%	1	R508
10		CARBON FLIM RESISTOR	1/6W10K±5% SHAPED 7.5	2	R524,R514
11		SMD RESISTOR	1/16W 10K ±5%	3	R519~R521
12		CARBON FLIM RESISTOR	1/4W10K±5% SHAPED 10	1	R502
13		SMD RESISTOR	1/16W 4.7K ±5%	1	R531
14		METAL OXIDE FILM RESISTOR	1W330 Ω ±5% SHAPED R 15×8	1	R511
15		SMD RESISTOR	1/16W 22K ±5%	1	R512
16		METAL OXIDE FILM RESISTOR	2W68K±5% SHAPED FLAT 15×7	1	R503
17		HIGH VOLTAGE RESISTOR	1/2W680K±5%	1	R501
18		CARBON FLIM RESISTOR	1/4W1MΩ±5%	2	R505,R515
19		PORCELAIN CAPACITOR	50V 100P ±10% 5mm	4	C507,C509,C511,C514
20		PORCELAIN CAPACITOR	1000V 222±20% NPO7.5mm	1	C502
21		CERAMIC CAPACITOR	1000V 103±20% NPO10mm	1	C501
22		PORCELAIN CAPACITOR	50V 104 ±20% 5mm	7	C506,C508,C510,C515,C518,C519,C521
23		SMD CAPACITOR	50V 104 ±20% 0805	3	C517,C520,C522
24		PORCELAIN CAPACITOR	1000V 101 +80%-20% 7.5mm	1	C516
	24.1	PORCELAIN CAPACITOR	1000V 101 ±10% 7.5mm	1	C516
25		CERAMIC CAPACITOR	CT81 250VAC471±10% 10mm	1	BC503
26		TERYLENE CAPACITOR	275V 104 ±20% 15mm	1	BC501
	26.1	TERYLENE CAPACITOR	275V 104 ±10% 15mm	1	BC501
27		CD	CD11T 16V100u±20%6×12 2.5	2	TC508,TC513
28		CD	CD11T 25V470u±20%10×16 5	2	TC503,TC504
29		CD	CD11T 50V47u±20%6×12 2.5	4	TC502,TC512,TC515,TC514
30		CD	CD11T 10V22U±20%5×11 2	1	TC516
31		CD	CD11T 10V1000u±20%8×16 3.5	4	TC505,TC506,TC509,TC510
32		CD	CD288H 400V47U±20%22×25 10	1	TC501
33		CHOKE COIL	VERTICAL 10UH 1A 5mm	2	L505,L509
34		IC	LM7805 GOLD SEALED TO-220	1	U504
35		HEAT RADIATION BOARD	11×15×25 AB009K	1	U504 FOR HEAT RADIATION
	35.1	HEAT RADIATION BOARD	11×15×25 WHITE AB905	1	U504 FOR HEAT RADIATION
36		CHOKE COIL	VERTICAL 10UH 2A 5mm	2	L506,L507
37		SWITCHING POWER TRANSFORMER	BCK-28-0332	1	T501
38		DIODE	HER105	4	D511,D513,D514,D508
39		SCHOTTKY DIODE	SR360	3	D509,D510,D515
40		DIODE	HER107	1	D505
41		VOLTAGE REGULATOR DIODE	9.1V 1W	1	ZD502

42		DIODE	1N4148	3	D506,D507,D517
43		DIODE	1N4007	4	D501~D504
44		SMD TRIODE	8050D	1	Q501
45		SMD TRIODE	8550D	1	Q502
46		TRIODE	2N5551	1	V502
47		IC	TNY268P DIP	1	U501
48		IC	TLV431 TO-92	1	U503
49		POWER GRID FILTER	UT-20 40mH $\pm 20\%$ 10 $\times$ 13	1	L501
50		PHOTOELECTRIC COUPLER	HS817	1	U502
51		CONTROLLABLE SILICON	MCR100-6	1	U506
	51.1	CONTROLLABLE SILICON	NCR169D TO-92	1	U506
52		SOCKET	6P 2.5mm	1	CN503
53		SOCKET	4P 2.0mm	1	CN504
54		SOCKET	3P 2.0mm	1	CN505
55		SOCKET	13P 2.5mm	1	CN502
56		SOCKET	2P 8.0mm 2#	2	BCN501,BCN502
57		PCB	5965-0	1	
58		CONNECTION CORDS	$\Phi 0.6$ SHAPED 5mm	4	JP501,JP506,JP511, JP514
59		CONNECTION CORDS	$\Phi 0.6$ SHAPED 10mm	6	JP505,JP510,L502,D516,JP512
60		CONNECTION CORDS	$\Phi 0.6$ SHAPED 12.5mm	1	JP503
61		CONNECTION CORDS	$\Phi 0.6$ SHAPED 7.5mm	4	JP502,JP504,JP515,R529
62		SOFTWARE PROGRAM	EPROM969S-0A (512B)	1	
63		FUSE	T1.6AL 250V	1	F501
64		FUSE HOLDER	BLX-2	1	FOR F501
65		TAPPING SCREW	AB903	2	G501,G502
66		TAPPING SCREW	BT 3 $\times$ 8 BLACK	1	FIXED HEAT RADIATION BOARD

### 3. MAIN FRONT PANEL

NO	MATERIAL	SPECIFICATIONS/PART NUMBER	QUANTITY	LOCATION
1	CARBON FILM RESISTOR	1/4W47 $\Omega \pm 5\%$	1	R402
2	CD	CD11C 10V100U $\pm 20\%$ 6 $\times$ 5 2.5	2	TC401, TC403
3	DIODE	1N4148	1	VD401
4	CD	CD11C 10V47U $\pm 20\%$ 4 $\times$ 7 1.5	1	TC402
5	RADIATION DIODE	2B3HC LOLORLESS WITH BLUE	1	LED401
6	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL 6 $\times$ 6 $\times$ 1	6	K401~K406
7	IC	PT6554Q QFP	1	U402
8	IC	LM1117MP-ADJ SOT-223	1	U404
9	SOCKET	4P 2.0mm	1	XS402

10		SOFT FLAT CABLE	7P120 2.0 2 SOCKET WITH L NEEDLE, THE SAME DIRECTION	1	XS401
11		SMD RESISTOR	1/16W 0Ω ±5%	2	R406, R405
12		SMD RESISTOR	1/16W 15Ω ±5%	2	R408,R409
13		SMD RESISTOR	1/16W 1K ±5%	2	R401,R415
14		SMD RESISTOR	1/16W 3K ±5%	1	R410
15		SMD RESISTOR	1/16W 10K ±5%	4	R416,R419~R421
16		SMD TRIODE	UTC 8050S (D9-D)	2	V402,V401
17		SMD RESISTOR	1/16W 180Ω ±5%	1	R414
18		SMD RESISTOR	1/16W 100Ω ±5%	1	R407
19		SMD RESISTOR	1/16W 4.7K ±5%	1	R403
20		SMD RESISTOR	1/16W 62K ±5%	1	R404
21		SMD CAPACITOR	50V 104 +80%-20% 0603	3	C401~C403
22		SMD CAPACITOR	50V 681 ±5% NPO 0603	1	C404
23		SMD TRIODE	8550D	1	V403
24		SMD RESISTOR	1/16W 2.2Ω ±5%	2	R417,R418
25		PCB	4965-2	1	

#### 4. SUBSIDIARY BOARD

NO	MATERIAL	SPECIFICATIONS/PART NUMBER	QUANTITY	LOCATION
1	CARBON FILM RESISTOR	1/4W100Ω±5%	1	R901
2	PORCELAIN CAPACITOR	50V 103 ±10% 5mm	1	C902
3	CD	CD11C 10V100U±20%5×7 2	1	TC901
4	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL 6×6×1	1	K901
5	RADIATION DIODE	3R3HC COLORLESS WITH RED	1	LED901
6	RADIATION DIODE	3B3SC COLORLESS WITH BLUE BRIGHTNESS 2300MCD	1	LED902
7	FLAT CABLE	11-4/3/4 380/110/130 2.0 T4	1	XS901
8	CONNECTION CORDS	Φ0.6 SHAPED 7.5mm	1	JP903
9	CONNECTION CORDS	Φ0.6 SHAPED 5mm	1	JP902
10	CONNECTION CORDS	Φ0.6 SHAPED 10mm	1	JP901
11	IR SENSOR	HS0038B3V	1	REM901
12	SOFE SPONGE SPACER	10×6×6.5 DOUBLE FACED, HARD	1	
13	PCB	9965-1	1	

#### 5. OK BOARD

NO	MATERIAL	SPECIFICATIONS/PART NUMBER	QUANTITY	LOCATION
1	CARBON FILM RESISTOR	1/6W10 Ω ±5% SHAPED 7.5	2	R621,R622
2	CARBON FILM RESISTOR	1/6W100 Ω ±5% SHAPED 7.5	1	R619
3	CARBON FILM RESISTOR	1/6W330 Ω ±5% SHAPED 7.5	1	R616

4		CARBON FILM RESISTOR	1/6W560 $\Omega$ $\pm$ 5% SHAPED 7.5	2	R603,R604
5		CARBON FILM RESISTOR	1/6W1K $\pm$ 5% SHAPED 7.5	3	R607,R608,R620
6		CARBON FILM RESISTOR	1/6W5.1K $\pm$ 5% SHAPED 7.5	1	R613
7		CARBON FILM RESISTOR	1/6W10K $\pm$ 5% SHAPED 7.5	6	R605,R606,R618, R623,R609,R610
8		CARBON FILM RESISTOR	1/6W22K $\pm$ 5% SHAPED 7.5	2	R601,R602
9		CARBON FILM RESISTOR	1/6W100K $\pm$ 5% SHAPED 7.5	2	R615,R617
10		CARBON FILM RESISTOR	1/6W4.7K $\pm$ 5% SHAPED 7.5	2	R611,R612
11		ROTATED POTENTIOMETER	WH09NTX-1C-A10K-F30	2	VR601,VR602
12		PORCELAIN CAPACITOR	50V 47P $\pm$ 5% NPO 5mm	2	C605,C606
	12.1	PORCELAIN CAPACITOR	50V 47P $\pm$ 5% 5mm	2	C605,C606
	12.2	PORCELAIN CAPACITOR	50V 47P $\pm$ 10% 5mm	2	C605,C606
13		PORCELAIN CAPACITOR	50V 100P $\pm$ 10% 5mm	1	C607
14		PORCELAIN CAPACITOR	50V 103 $\pm$ 10% 5mm	2	C603,C604
15		PORCELAIN CAPACITOR	50V 104 $\pm$ 20% 5mm	2	C601,C602
16		PORCELAIN CAPACITOR	50V 102 $\pm$ 20% 5mm	1	C608
17		CD	CD110 16V47U $\pm$ 20%5 $\times$ 11 2	3	TC611,TC615,TC616
	17.1	CD	CD11 16V47U $\pm$ 20%5 $\times$ 11 2	3	TC611,TC615,TC616
	17.2	CD	CD11C 16V47U $\pm$ 20%5 $\times$ 7 2	3	TC611,TC615,TC616
18		CD	CD11 16V4.7U $\pm$ 20%5 $\times$ 11 2	5	TC601~TC604, TC613
19		CD	CD11 16V22U $\pm$ 20%5 $\times$ 11 2	2	TC605,TC606
	19.1	CD	CD11 25V22U $\pm$ 20%5 $\times$ 11 2	2	TC605,TC606
20		MAGNETIC BEADS INDUCTOR	RH354708	2	L601,L602
21		DIODE	1N4148	3	VD601~VD603
22		IC	NJM4558D DIP	2	U601,U602
	22.1	IC	KA4558 DIP	2	U601,U602
23		PCB	6965S-0	1	
24		FLAT CABLE	6P90 2.5 2 SOCKET WITH L NEEDLE REVERSE	1	XS601
25		MICROPHONE SOCKET	CK3-6.35-4 GREY	2	MIC601,MIC602
26		CONNECTION CORDS	$\Phi$ 0.6 SHAPED 7.5mm	2	JP604,JP603
27		CONNECTION CORDS	$\Phi$ 0.6 SHAPED 10mm	1	JP601
28		CONNECTION CORDS	$\Phi$ 0.6 SHAPED 5mm	1	JP602

#### 6. OUTPUT BOARD

NO		MATERIAL	SPECIFICATIONS/PART NUMBER	QUANTITY	LOCATION
1		SMD RESISTOR	1/16W 100 $\Omega$ $\pm$ 5%	1	R702
2		CARBON FILM RESISTOR	1/4W68 $\Omega$ $\pm$ 5%	1	R703
3		SMD RESISTOR	1/16W 2.2 $\Omega$ $\pm$ 5%	1	R706
4		CARBON FILM RESISTOR	1/4W220 $\Omega$ $\pm$ 5%	1	R701
5		SMD CAPACITOR	50V 102 $\pm$ 10% 0603	6	C701~C706
6		SMD CAPACITOR	25V 104 +80%-20% 0805	2	C710,C711
	6.1	SMD CAPACITOR	50V 104 +80%-20% 0805	2	C710,C711

7		SMD CAPACITOR	50V104 ±20% 0603	1	C716
8		SMD CAPACITOR	50V 224 +80-20% 0805	1	C715
	8.1	SMD CAPACITOR	25V 224 +80%-20% 0805	1	C715
	8.2	SMD CAPACITOR	16V 224 +80%-20% 0805	1	C715
9		CONNECTION CORDS	Φ0.6 SHAPED 2.5mm	5	TC701,TC703~TC706
10		CONNECTION CORDS	Φ0.6 SHAPED 3.5mm	1	TC702
11		MAGNETIC BEADS INDUCTOR	RH354708	12	L701~L712
12		ELECTRO-OPTIC TRANSFORMER	TX179ATW	1	JK705
	12.1	ELECTRO-OPTIC TRANSFORMER	TX179AT	1	JK705
13		TERMINAL SOCKET	AV4-8.4-6G-3	1	JK702
14		TERMINAL SOCKET	DASW-8	1	JK703
15		TERMINAL SOCKET	AV8-8.4-6G-3	1	JK701
16		CABLE SOCKET	14P 1.0mm STRAIGHT DUAL LINE PLUG	1	XS701
17		CONNECTION CORDS	Φ0.6 SHAPED 5mm	7	JP704,JP706,JP707,JP710,JP711,JP712,JP701
18		CONNECTION CORDS	Φ0.6 SHAPED 10mm	4	JP705,R707,L713,L714
19		SCART SOCKET	SCART-01	1	JK706
20		CONNECTION CORDS	Φ0.6 SHAPED 7.5mm	4	JP702,JP703,JP708,JP709
21		PCB	7969-2	1	
22		SMD MAGNETIC BEADS	FCM1608K-221T05	2	L715,L716
23		SMD CAPACITOR	50V 20P ±5% NPO 0603	1	C713
24		PORCELAIN CAPACITOR	50V 20P ±10% NPO 5mm	1	C712
25		TRIODE	S8050D	3	V701~V703
26		SMD RESISTOR	1/16W 4.7K ±5%	1	R704
27		CARBON FILM RESISTOR	1/4W330Ω±5%	1	R709
28		CARBON FILM RESISTOR	1/4W33Ω±5%	1	R708
29		CARBON FILM RESISTOR	1/4W2.2K±5%	1	R712
30		SMD RESISTOR	1/16W 1K ±5%	1	R711
31		SMD RESISTOR	1/16W 2.2K ±5%	1	R710
32		SMD RESISTOR	1/16W 75Ω ±5%	1	R705
33		SMD CAPACITOR	16V 105 +80%-20% 0603	1	C707