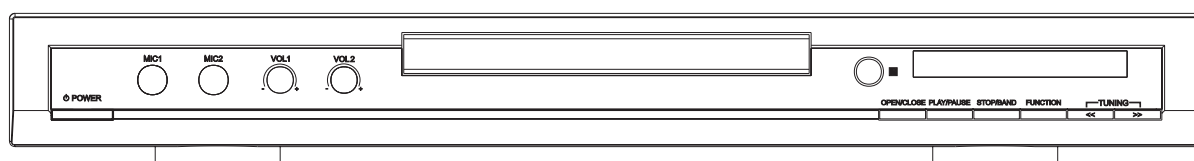


SERVICE MANUAL

DK929S



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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).

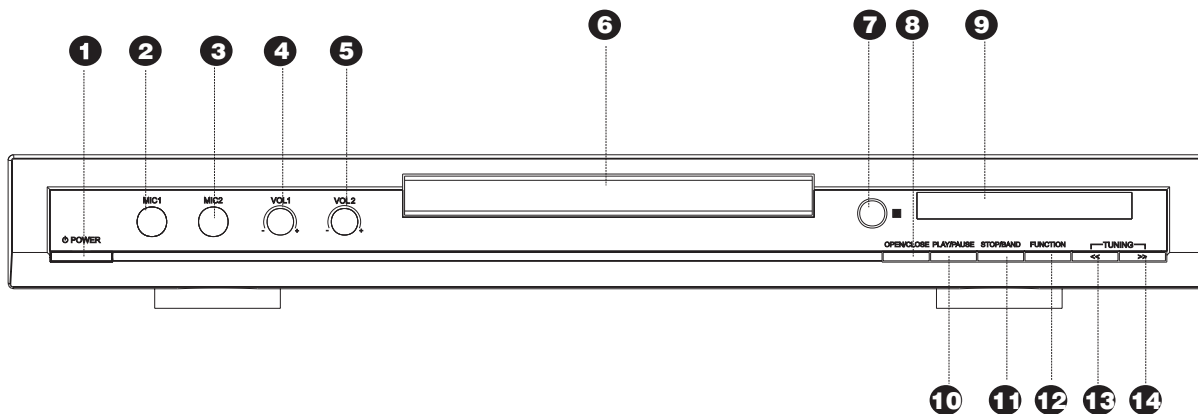
notice (1885x323x2 tiff)

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are imporant for safety. These parts are marked by Δ 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



- | | | |
|--|---|---|
| <ul style="list-style-type: none"> ❶ POWER switch ❷ MIC 1 jack ❸ MIC 2 jack ❹ MIC VOLUME 1 knob ❺ MIC VOLUME 2 knob | <ul style="list-style-type: none"> ❻ Disc tray ❼ Remote control signal sensor ❽ OPEN/CLOSE button ❾ VFD display window ❿ PLAY/PAUSE button | <ul style="list-style-type: none"> ⓫ STOP/BAND button ⓬ FUNCTION button ⓭ DVD MODE PREV button
TUNER MODE << TUNING button ⓮ DVD MODE: NEXT button
TUNER MODE: TUNING >> 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

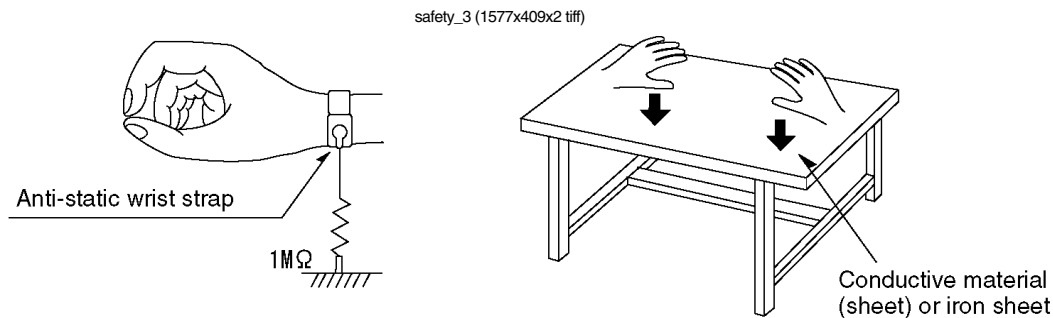
Some devices such as the DVD player use the optical pickup (laser diode) and the optical pickup will be damaged by static electricity in the working environment. Proceed servicing works under the working environment where grounding works is completed.

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

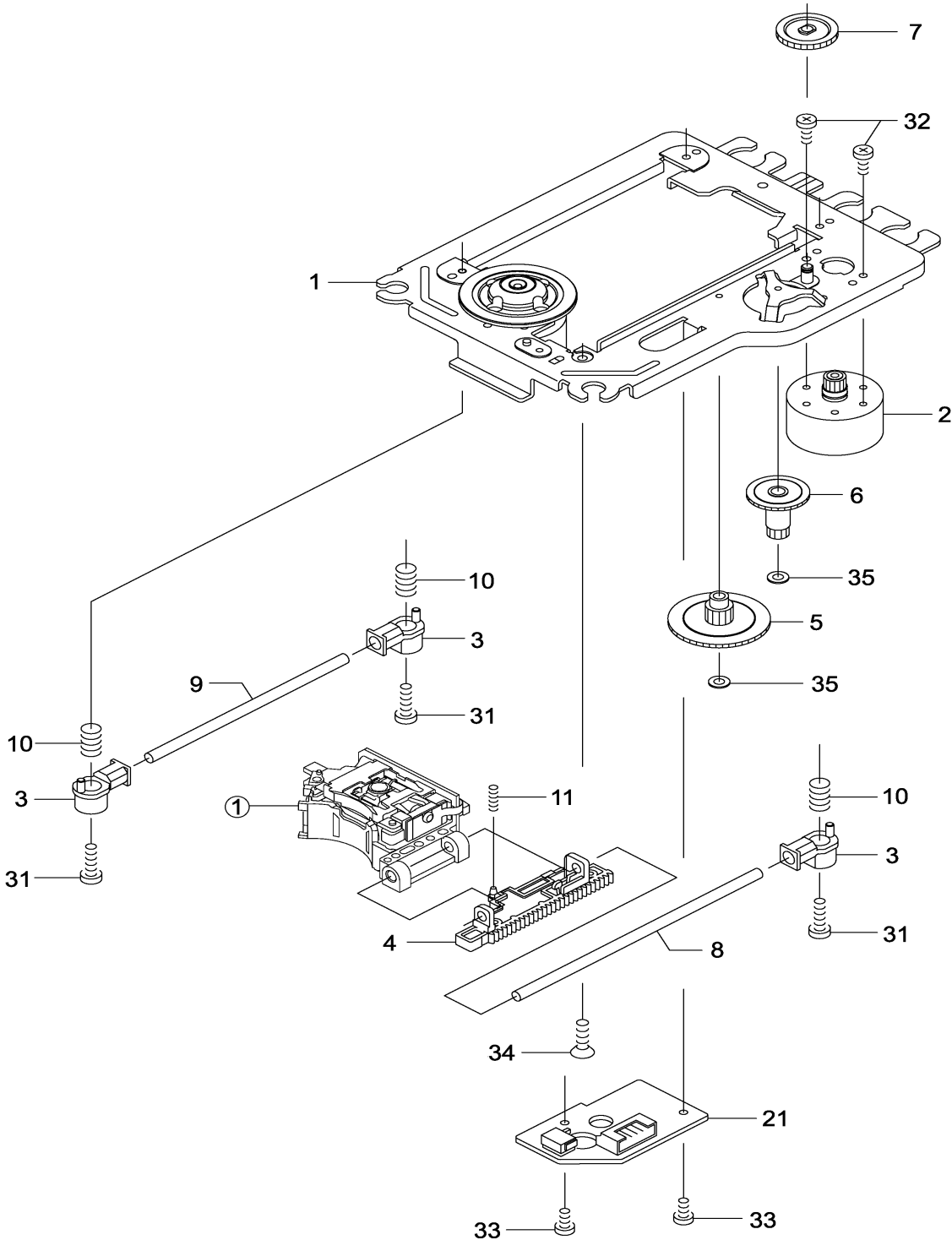
1. To keep the good quality of the optical pickup maintenance parts during transportation and before installation, the both ends of the laser diode are short-circuited. After replacing the parts with new ones, remove the short circuit according to the correct procedure. (See this Technical Guide).
2. 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 Explored View and Part List



Pic (1)

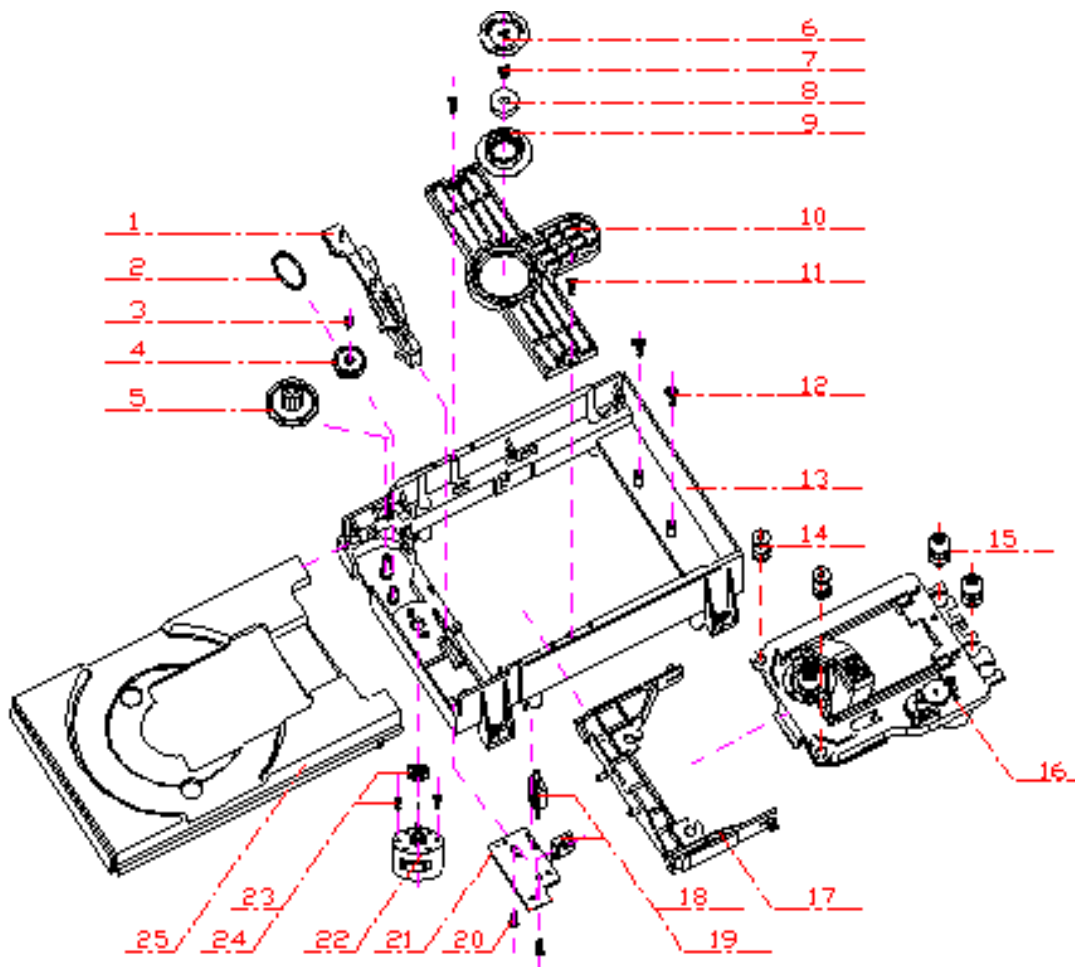
Materials to Pic (1)

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	SEXE25700---	SPECIAL SCREW BIN+-M2X11	3
32	SEXE25900---	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

□□□

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

5.2 Bracket Exploded View and Part List



Pic (2)

Materials to Pic(2)

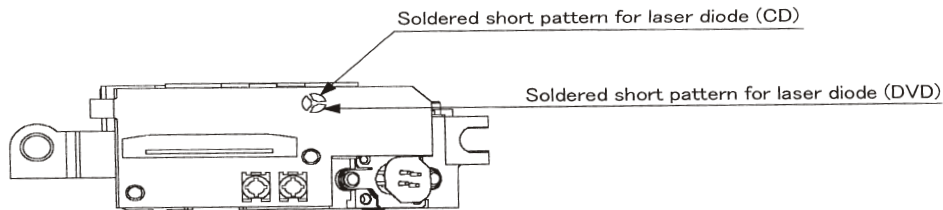
- | | |
|-----------------------------------|--------------------------|
| 1.bracket | 14. front silicon rubber |
| 2.belt | 15. Back silicon rubber |
| 3.screw | 16. Pick-up |
| 4.belt wheel | 17. Pick-up |
| 5.gearwheel | 18. switch |
| 6.iron chip | 19. Five-pin flat plug |
| 7. Immobility mechanism 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 H₂S, SO₂, NO₂ and Cl₂) 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

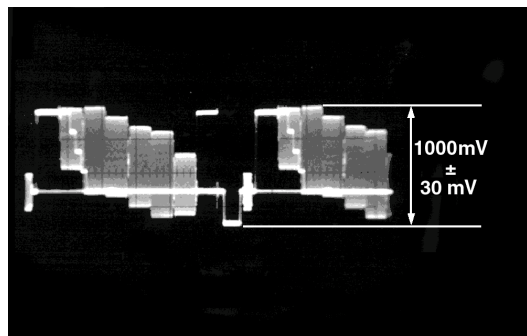
6.1. Video Output (Luminance Signal) Confirmation

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 \pm 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 \pm 30mV



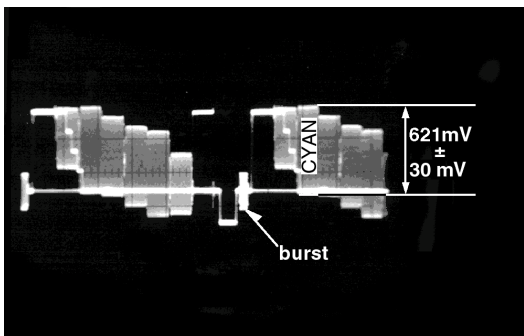
6.2 Video Output(Chrominance Signal) Confirmation

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 μ sec/dir	621mVp-p \pm 30mV	

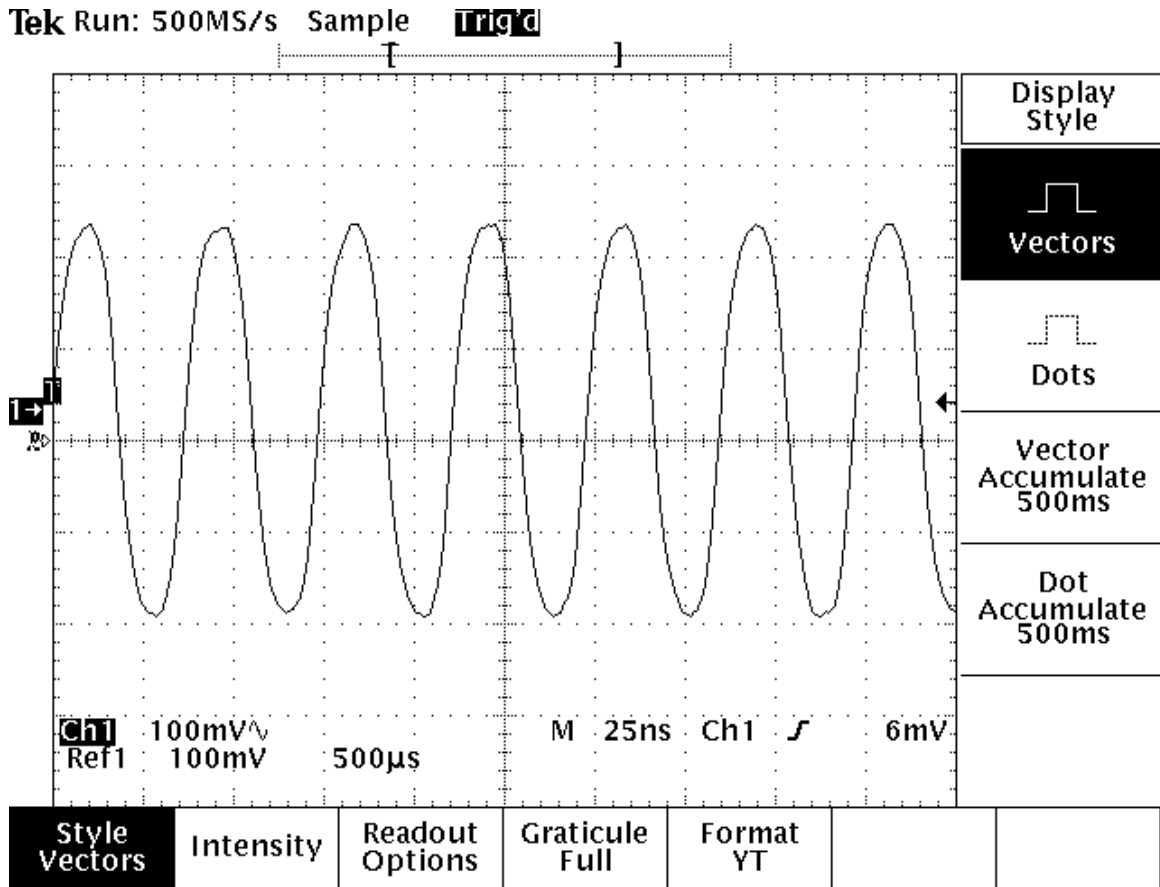
Purpose:To maintain video signal output compatibility.

- 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

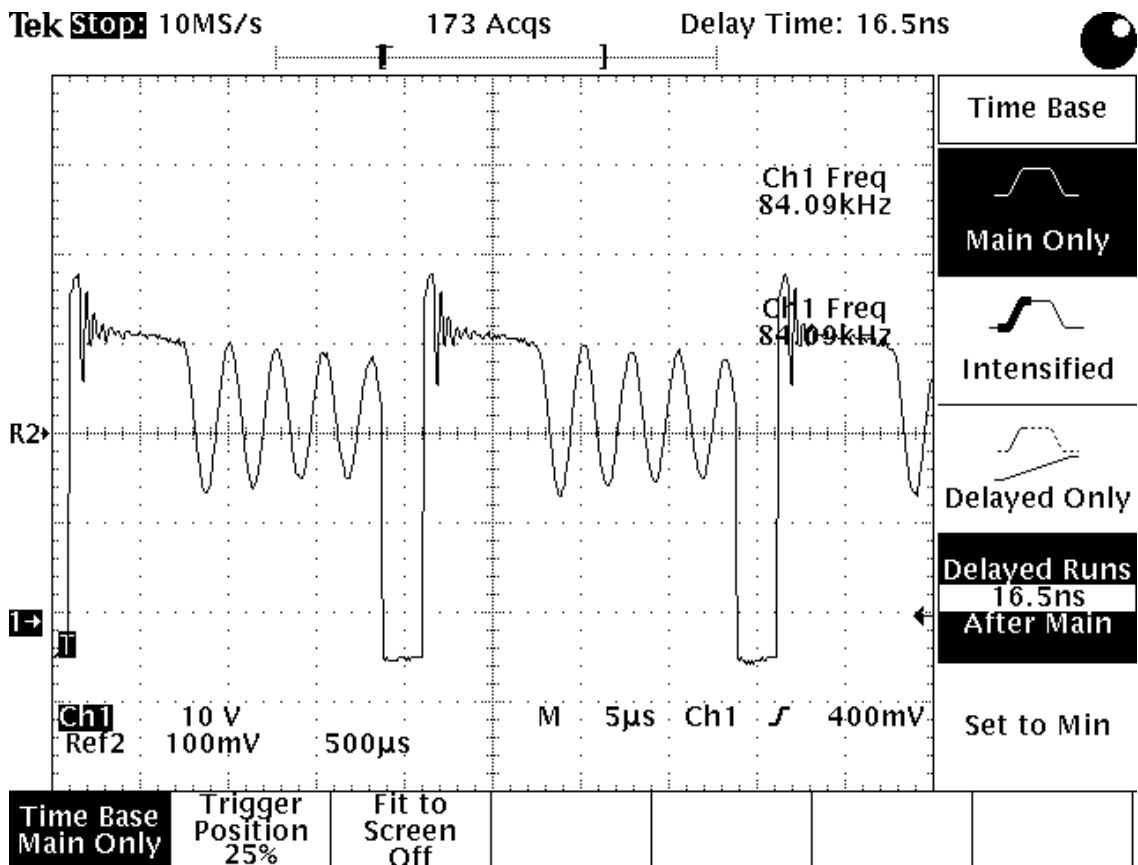


7.MPEG BOARD CHECK WAVEFORM

7.1 27MHz WAVEFORM



7.2 IC5L0380R PIN.2 WAVEFORM DIAGRAM





8. IC BLOCK DIAGRAM & DESCRIPTION

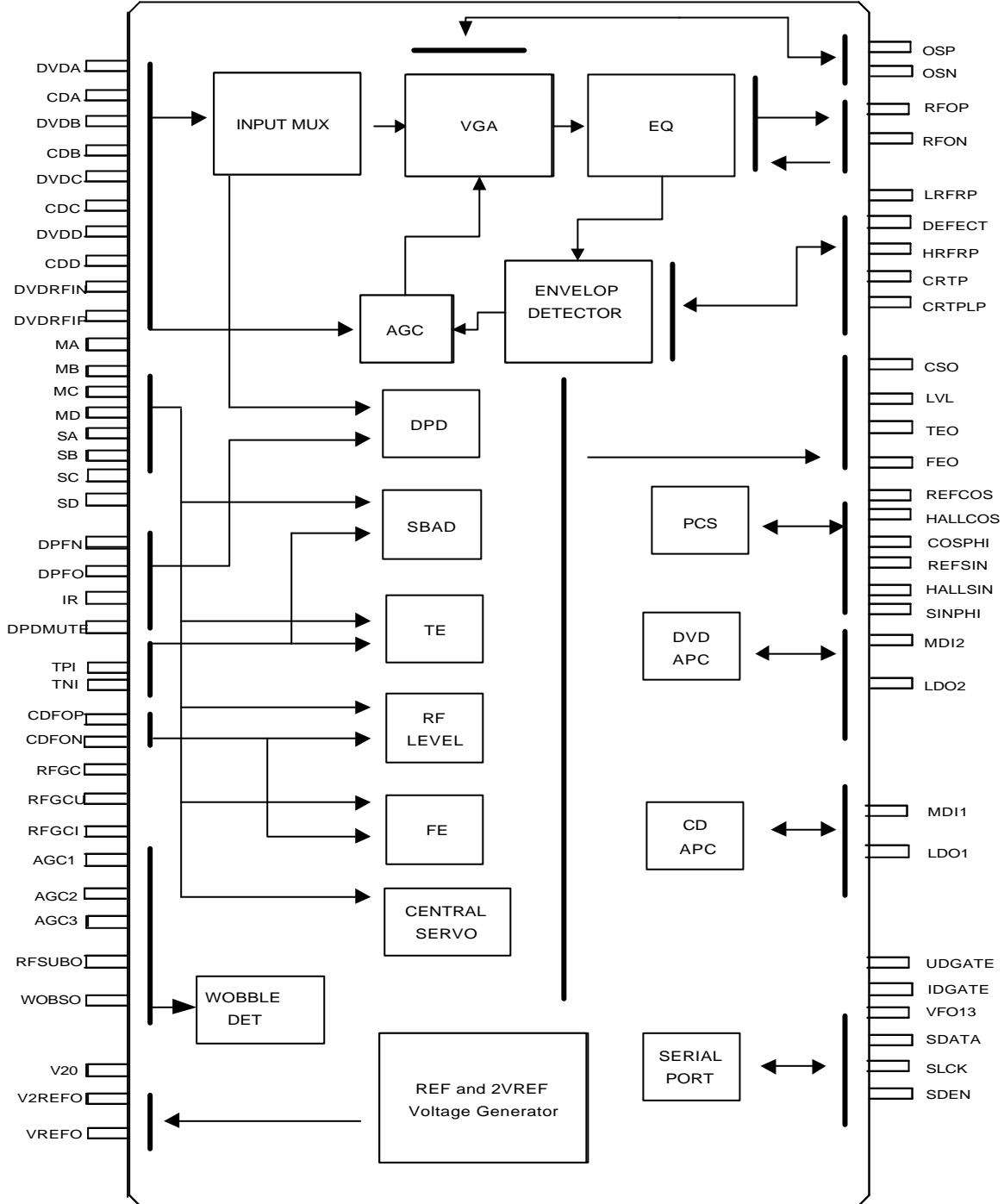
8.1 MT1336

GENERAL DESCRIPTION

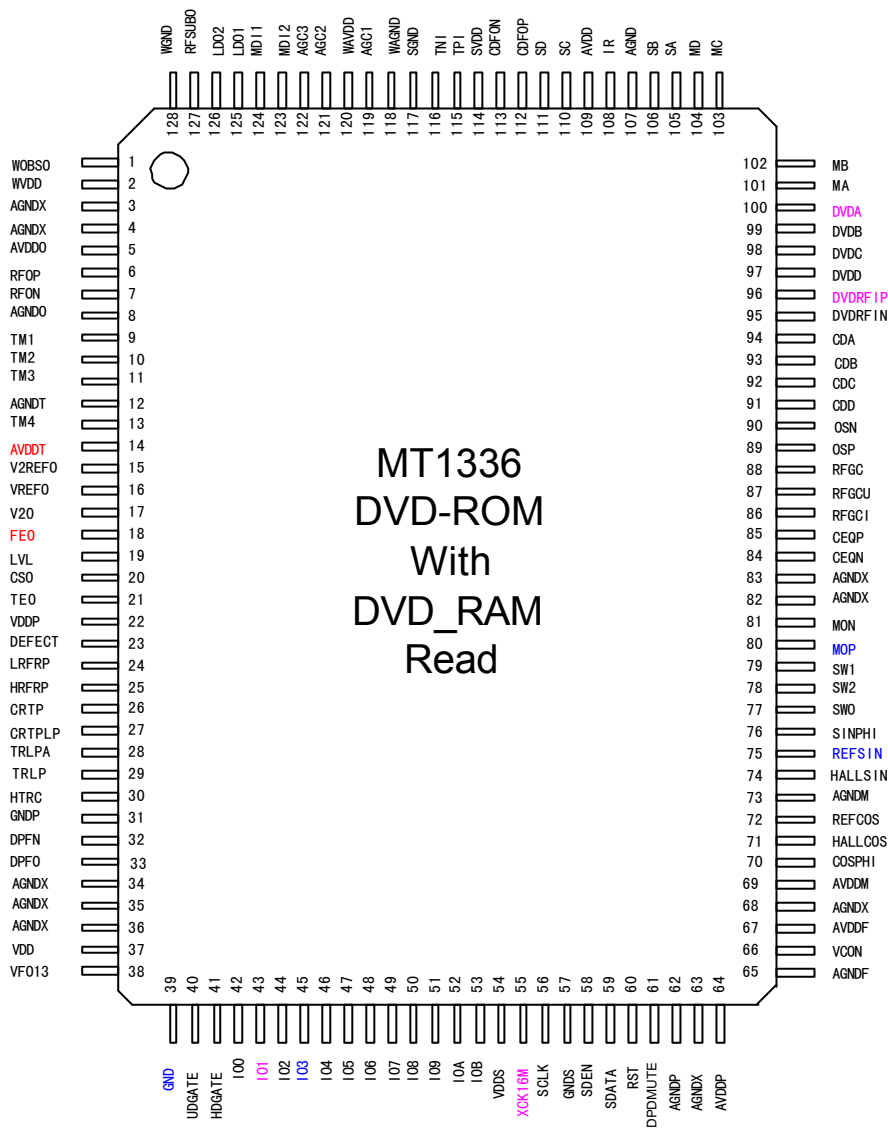
MT1336 is a high performance CMOS analog front-end IC for both CD-ROM driver up to 48XS and DVD-ROM driver up to 16XS. It also supports DVD-RAM read up to 4XS Version 2. It contains servo amplifiers to generate focusing error, 3-beam tracking error, 1 beam radial push-pull signal, RF level and SBAD for servo functions. It also includes DPD tracking error signal for DVD-ROM application. For DVD-RAM disks, there are also Differential Push-Pull (DPP) method for generating tracking signal and Differential Astigmatic Detection (DAD) for processing focusing signal. Programmable equalizer and AGC circuits are also incorporated in this chip to optimize read channel performance. In addition, this chip has dual automatic laser power control circuits for DVD-ROM (DVD-RAM) and CD-ROM separately and reference voltage generators to reduce external components. Programmable functions are implemented by the access of internal register through bi-directional serial port to configure modes selection.

FEATURES

- RF equalizer with programmable f_c from 3MHz to 70 MHz and programmable boost from 3dB to 13dB.
- MT1336 supports at least eight different kinds of pick-up heads with versatile input configuration for both RF input stages and servo signal blocks.
- Versatile on-line AGC.
- 3 beams tracking error signal generator for CD-ROM application.
- One beam differential phase tracking error (DPD) generator for DVD-ROM application.
- Differential push pull tracking error (DPP) generator for DVD-RAM application.
- Focusing error signal generator for CD-ROM, DVD-ROM and DVD-RAM (DAD method).
- RF level signal generator.
- Sub-beam added signal for 3 beams CD-ROM.
- One beam push-pull signal generator for central servo application.
- High speed RF envelop detection circuit with bandwidth up to 400KHz for CD-ROM.
- Defect and Blank detection circuits.
- Dual automatic laser power control circuits with programmable level of LD monitor voltage.
- $V_{ref}=1.4V$ voltage and $V_{2ref}=2.8V$ voltage generators.
- $V_{20}=2.0V$ voltage for pick-up head reference.
- Bi-directional serial port to access internal registers.



MT1336 FUNCTION BLOCKS DIAGRAM



MT1336 PIN ASSIGNMENT



MT1336 PIN DESCRIPTIONS

Pin Numbers	Symbol	Type	Description
LQFP128			
RF Flag Interface			
23	DEFECT	Digital Output	Flag of bad data output status
RF SIO interface			
56	SCLK	Digital Input	RF serial clock input
58	SDEN	Digital Input	RF serial data enable
59	SDATA	Digital IO	RF serial data IO
60	RST	Digital input	Reset (active high)
55	XCK16M	Digital Input	16.9MHz for verification
RF SERVO interface			
40	UDGATE	Digital Input	Control signal for DVD-RAM
41	IDGATE	Digital Input	Control signal for DVD-RAM
38	VFO13	Digital Input	DVD -RAM Header signal
RF			
100	DVDA	Analog input	AC coupled DVD RF signal input A
99	DVDB	Analog Input	AC coupled DVD RF signal input B
98	DVDC	Analog Input	AC coupled DVD RF signal input C
97	DVDD	Analog Input	AC coupled DVD RF signal input D
95	DVDRFIN	Analog Input	AC coupled DVD RF signal input RFIN
96	DVDRFIP	Analog Input	AC coupled DVD RF signal input RFIP
94	CDA	Analog Input	AC coupled CD RF signal input A
93	CDB	Analog Input	AC coupled CD RF signal input B
92	CDC	Analog Input	AC coupled CD RF signal input C
91	CDD	Analog Input	AC coupled CD RF signal input D
90	OSN	Analog	RF Offset cancellation capacitor connecting
89	OSP	Analog	RF Offset cancellation capacitor connecting
85	CEQP	Analog	RF Offset cancellation capacitor connecting
84	CEQN	Analog	RF Offset cancellation capacitor connecting
88	RFGC	Analog	RF AGC loop capacitor connecting for DVD -ROM



87	RFGCU	Analog	RF AGC loop capacitor connecting for DVD -RAM
86	RFGCI	Analog	RF AGC loop capacitor connecting for DVD -RAM
101	MA	Analog Input	DC coupled DVD-RAM main-beam RF signal input A
102	MB	Analog Input	DC coupled DVD-RAM main-beam RF signal input B
103	MC	Analog Input	DC coupled DVD-RAM main-beam RF signal input C
104	MD	Analog Input	DC coupled DVD-RAM main-beam RF signal input D
105	SA	Analog Input	DC coupled DVD-RAM sub-beam RF signal input A
106	SB	Analog Input	DC coupled DVD-RAM sub-beam RF signal input B
110	SC	Analog Input	DC coupled DVD-RAM sub-beam RF signal input C
111	SD	Analog Input	DC coupled DVD-RAM sub-beam RF signal input D
108	IR	Analog	External current bias resistor (R=20K)
119	AGC1	Analog	Wobble AGC loop1 capacitor
121	AGC2	Analog	Wobble AGC loop2 capacitor
122	AGC3	Analog	Wobble AGC loop3 capacitor
127	RFSUBO	Analog output	Header push-pull RF output signal
1	WOBSO	Digital output	Wobble signal output
6	RFOP	Analog output	RF positive output
7	RFON	Analog output	RF negative output
TRACKING ERROR			
32	DPFN	Analog	DPD amplifier negative input
33	DPFO	Analog	DPD amplifier output
61	DPDMUTE	Digital input	DPD mute control input
116	TNI	Analog Input	3 beam satellite PD signal negative input
115	TPI	Analog Input	3 beam satellite PD signal positive input
21	TEO	Analog Output	Tracking error output
FOCUSING ERROR & RF LEVEL & CENTRAL SERVO SIGNAL			
112	CDFOP	Analog Input	CD focusing error positive input
113	CDFON	Analog Input	CD focusing error negative input
18	FEO	Analog Output	Focusing error output
19	LVL	Analog Output	RF level output
20	CSO	Analog output	Central servo signal output
ALPC			



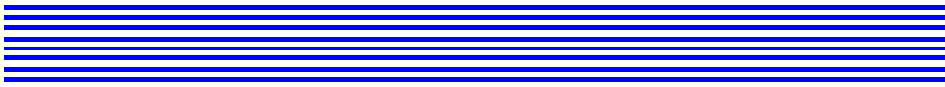
124	MDI1	Analog Input	Laser power monitor input
125	LDO1	Analog Output	Laser driver output
123	MDI2	Analog Input	Laser power monitor input
126	LDO2	Analog Output	Laser driver output
RF RIPPLE			
26	CRTP	Analog	RF top envelop filter capacitor connecting
27	CRTPLP	Analog	Defect level filter capacitor connecting
25	HRFRP	Analog output	High frequency RF ripple output or Blank detector' s output
24	LRFPR	Analog output	Low frequency RF ripple output
POWER			
67, 69	AVDD	Power	Master PLL Filter power
65, 73	AGND	GND	GND for Master PLL Filter
64	AVDD	Power	DPD Power
62	AGND	GND	DPD GND
109	AVDD	Power	RF path Power
107	AGND	GND	RF path GND
114	SVDD	Power	Servo Power
117	SGND	GND	Servo GND
2,120	WAVDD	Power	Wobble Power
128,118	WAGND	GND	Wobble GND
5	AVDDO	Power	Power for RF output
8	AGNDO	GND	GND for RF output
14	AVDDT	Power	Power for Trimming PAD
12	AGNDT	GND	GND for Trimming PAD
22	VDDP	Power	Peak Detection Power
31	GNDP	GND	Peak Detection GND
37,54	VDD	Power	Serial I/O Power
39,57	GND	GND	Serial I/O GND
REFERENCE VOLTAGE			
16	VREFO	Analog output	Reference voltage 1.4V
15	V2REFO	Analog output	Reference voltage 2.8V
17	V20	Analog Output	Reference voltage 2.0V



ALPC TRIMMING			
9	TM1	Analog input	Trimming pin for ALPC1
10	TM2	Analog input	Trimming pin for ALPC1
11	TM3	Analog input	Trimming pin for ALPC2
13	TM4	Analog input	Trimming pin for ALPC2
HIGH SPEED TRACK COUNTING			
29	TRLP	Analog	Low-pass filter capacitor connecting
28	TRLPA	Analog	Low-pass filter capacitor connecting
30	HTRC	Digital output	High speed track counting digital output
PCS			
74	HALLSIN	Analog input	Negative input of amplifier for hall sensor signal
75	REFSIN	Analog input	Positive input of amplifier for hall sensor signal
76	SINPHI	Analog output	Amplifier output for hall sensor signal
71	HALLCOS	Analog input	Negative input of amplifier for hall sensor signal
72	REFCOS	Analog input	Positive input of amplifier for hall sensor signal
70	COSPHI	Analog output	Amplifier output for hall sensor signal
FOR MONITOR ONLY			
81	MON	Analog output	
80	MOP	Analog output	
66	VCON	Analog output	
77	SWO	Analog output	Output from mux of SW1 & SW2
78	SW2	Analog input	External input for servo input select
79	SW1	Analog input	External input for servo input select
FOR SERIAL I/O			
42	IO0		
43	IO1		
44	IO2		
45	IO3		
46	IO4		
47	IO5		



48	IO6		
49	IO7		
50	IO8		
51	IO9		
52	IOA		
53	IOB		



Specifications are subject to change without notice

Progressive Scan DVD Player Combo Chip

8.2 MT1379

- Super Integration DVD player single chip
 - Servo controller and data channel processing
 - MPEG-1/MPEG-2/JPEG video decoding
 - Dolby AC-3/DTS/DVD-Audio audio decoding
 - Unified track buffer and A/V decoding buffer
 - Video processing for scaling and video quality enhancement
 - OSD & Sub-picture decoding
 - Built-in clock generator
 - Built-in TV encoder
 - Built-in progressive video output
 - Video input port and audio/SPDIF input port
- Speed Performance on Servo and Decoding
 - DVD-ROM up to 8XS
 - CD-ROM up to 24XS
 - Built-in a frequency programmable clock to μ P and RSPC Decoder to optimize the performance over power
- Channel Data Processor
 - Provides interface with analog front-end processor
 - Analog 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
 - Provide a varipitch speed control for 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
 - Built-in DSP for digital servo control
- Host 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 2M 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
 - Supports CD-ROM Mode 1, CD-ROM XA Mode 2 Form 1, CD-ROM XA Mode 2 Form 2, and CD-DA formats
 - 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
 - 8-bit counter for decode completion check
 - Programmable descrambling and error correction schemes
 - Automatically repeated error corrections
 - 8-bit C2 Pointer counter
 - 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/32-bit SDRAM data bus interface
 - Build in a DRAM interface programmable clock to optimize the DRAM performance
 - Provide the self-refresh mode SDRAM
 - Programmable DRAM access cycle and refresh

- cycle timings
 - Block-based sector addressing
 - Programmable buffering counter for buffer status tracking
 - Maximum DRAM speed is 133MHz
 - Support 5/3.3-Volt. DRAM Interface
 - Video Decode
 - Decodes MPEG1 video and MPEG2 main level, main profile video (720/480 and 720x576)
 - Maximum input bit-rate of 15Mbits/sec
 - Smooth digest view function with I, P and B picture decoding
 - Baseline, extended-sequential and progressive JPEG image decoding
 - RLE and non-RLE BMP 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
 - Provides 4 -color/32x32-pixel hardware cursor
 - Fade-in, Fade out, and Wipe functions as specified in the DVD-Audio Specification and other slide show transition effects
 - Progressive scan output
 - Audio Processing
 - Decoder format supports:
 - Dolby Digital (AC -3) decoding
 - DTS decoding
 - MLP decoding for DVD -Audio
 - MPEG-1 layer 1/layer 2 audio decoding
 - MPEG-2 layer1/layer2 2 -channel audio decoding
 - Dolby Pro Logic decoding
 - High Definition Compatible Digital (HDCD) decoding
 - Up to 6 channel linear PCM output for DVD Audio / DVD Video
 - Downmix function
 - Support 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 with adjustable echo level, echo -depth and delay length
 - Microphone tone control with three custom second-order IIR filter
 - Vocal mute/vocal assistant
 - Key shift up to +/- 8 keys controlled by 1/2 key
 - Channel equalizer
 - 3D surround processing include virtual surround and speaker separation
 - Power-down control
 - HDCD certified
- TV Encoder
 - Six 54MHz/12bit DA converters
 - Support NTSC, PAL-BDGHl, PAL-N, PAL-M interlace TV format and 480p, 576p progressive TV format
 - Automatically turn off unconnected channel(s).
 - Support PC monitor (VGA)
 - Support Macrovision 7.1
 - Progressive Output
 - Automatic detect film or video source
 - 3:2 pull down source detection
 - Advanced Motion adaptive de-interlace
 - Minimum external memory requirement
 - Audio/Video Output
 - Line-in/SPDIF-in for versatile audio processing
 - CCIR601/656 video input port
 - Support picture-in-picture for video decoding and input source
 - Outline
 - 216-pin LQFP package
 - 3.3/2.5-Volt. Dual operating voltages



PIN DEFINITIONS

Pin Number	Symbol	Type	Description
1	IREF	Analog Input	Current reference input. It generates reference current for data PLL. Connect an external 100K resistor to this pin and PLLVSS.
2	PLLVSS	Ground	Ground pin for data PLL and related analog circuitry
3	LPIOP	Analog Output	Positive output of the low pass filter
4	LPION	Analog Output	Negative output of the low pass filter
5	LPFON	Analog output	Negative output of loop filter amplifier
6	LPFIP	Analog Input	Positive input of loop filter amplifier
7	LPFIN	Analog Input	Negative input of loop filter amplifier
8	LPFOP	Analog Output	Positive output of loop filter amplifier
9	JITFO	Analog Output	RF jitter meter output
10	JITFN	Analog Input	Negative input of the operation amplifier for RF jitter meter
11	PLLVDD3	Power	3.3V power pin for data PLL and related analog circuitry
12	FOO	Analog Output	Focus servo output. PDM output of focus servo compensator
13	TRO	Analog Output	Tracking servo output. PDM output of tracking servo compensator
14	TROPENPWM	Analog Output	Tray open output, controlled by microcontroller. This is PWM output for TRWMEN27hRW2=1 or is digital output for TRWMEN27hRW2=0
15	PWMOUT1	Analog Output	The 1st general PWM output
16	PWMOUT2	Analog Output	The 2nd general PWM output
17	DVDD2	Power	2.5V power pin for internal fully digital circuitry
18	DMO	Analog Output	Disk motor control output. PWM output
19	FMO	Analog Output	Feed motor control. PWM output
20	DVSS	Ground	Ground pin for internal fully digital circuitry
21	FG	Input	Motor Hall sensor input
22	HIGHA0	Inout 2~16MA, SR PU	Microcontroller address 8
23	HIGHA1	Inout 2~16MA, SR PU	Microcontroller address 9
24	HIGHA2	Inout 2~16MA, SR PU	Microcontroller address 10
25	HIGHA3	Inout 2~16MA, SR PU	Microcontroller address 11
26	HIGHA4	Inout 2~16MA, SR PU	Microcontroller address 12
27	HIGHA5	Inout 2~16MA, SR PU	Microcontroller address 13
28	DVSS	Ground	Ground pin for internal digital circuitry

Pin Number	Symbol	Type	Description
29	HIGHA6	Inout 2~16MA, SR PU	Microcontroller address 14
30	HIGHA7	Inout 2~16MA, SR PU	Microcontroller address 15
31	AD7	Inout 2~16MA, SR	Microcontroller address/data 7
32	AD6	Inout 2~16MA, SR	Microcontroller address/data 6
33	AD5	Inout 2~16MA, SR	Microcontroller address/data 5
34	AD4	Inout 2~16MA, SR	Microcontroller address/data 4
35	DVDD3	Power	3.3V power pin for internal digital circuitry
36	AD3	Inout 2~16MA, SR	Microcontroller address/data 3
37	AD2	Inout 2~16MA, SR	Microcontroller address/data 2
38	AD1	Inout 2~16MA, SR	Microcontroller address/data 1
39	AD0	Inout 2~16MA, SR	Microcontroller address/data 0
40	IOA0	Inout 2~16MA, SR PU	Microcontroller address 0 / IO
41	IOA1	Inout 2~16MA, SR PU	Microcontroller address 1 / IO
42	DVDD2	Power	2.5V power pin for internal digital circuitry
43	IOA2	Inout 2~16MA, SR PU	Microcontroller address 2 / IO
44	IOA3	Inout 2~16MA, SR PU	Microcontroller address 3 / IO
45	IOA4	Inout 2~16MA, SR PU	Microcontroller address 4 / IO
46	IOA5	Inout 2~16MA, SR PU	Microcontroller address 5 / IO
47	IOA6	Inout 2~16MA, SR PU	Microcontroller address 6 / IO

Pin Number	Symbol	Type	Description
48	IOA7	Inout 2~16MA, SR PU	Microcontroller address 7 / IO
49	A16	Output 2~16MA, SR	Flash address 16
50	A17	Output 2~16MA, SR	Flash address 17
51	IOA18	Inout 2~16MA, SR SMT	Flash address 18 / IO
52	IOA19	Inout 2~16MA, SR SMT	Flash address 19 / IO
53	IOA20	Inout 2~16MA, SR SMT	Flash address 20 / IO OR Videoin Data PortB 0
54	APLLVSS	Ground	Ground pin for audio clock circuitry
55	APLLVDD3	Power	3.3V Power pin for audio clock circuitry
56	ALE	Inout 2~16MA, SR PU, SMT	Microcontroller address latch enable
57	IOOE#	Inout 2~16MA, SR SMT	Flash output enable, active low / IO
58	IOWR#	Inout 2~16MA, SR SMT	Flash write enable, active low / IO
59	IOCS#	Inout 2~16MA, SR PU, SMT	Flash chip select, active low / IO
60	DVSS	Ground	Ground pin for internal digital circuitry
61	UP1_2	Inout 4MA, SR PU, SMT	Microcontroller port 1-2
62	UP1_3	Inout 4MA, SR PU, SMT	Microcontroller port 1-3
63	UP1_4	Inout 4MA, SR PU, SMT	Microcontroller port 1-4
64	UP1_5	Inout 4MA, SR PU, SMT	Microcontroller port 1-5
65	UP1_6	Inout 4MA, SR PU, SMT	Microcontroller port 1-6
66	DVDD3	Power	3.3V power pin for internal digital circuitry

Pin Number	Symbol	Type	Description
67	UP1_7	Inout 4MA, SR PU, SMT	Microcontroller port 1-7
68	UP3_0	Inout 4MA, SR PU, SMT	Microcontroller port 3-0
69	UP3_1	Inout 4MA, SR PU, SMT	Microcontroller port 3-1
70	INT0#	Inout 2~16MA, SR PU, SMT	Microcontroller interrupt 0, active low
71	IR	Input SMT	IR control signal input
72	DVDD2	Power	2.5V power pin for internal digital circuitry
73	UP3_4	Inout	Microcontroller port 3-4
74	UP3_5	Inout	Microcontroller port 3-5
75	UWR#	Inout 2~16MA, SR PU, SMT	Microcontroller write strobe, active low
76	URD#	Inout 2~16MA, SR PU, SMT	Microcontroller read strobe, active low
77	DVSS	Ground	Ground pin for internal digital circuitry
78	RD7	Inout	DRAM data 7
79	RD6	Inout	DRAM data 6
80	RD5	Inout	DRAM data 5
81	RD4	Inout	DRAM data 4
82	DVDD2	Power	2.5V power pin for internal digital circuitry
83	RD3	Inout	DRAM data 3
84	RD2	Inout	DRAM data 2
85	RD1	Inout	DRAM data 1
86	RD0	Inout	DRAM data 0
87	RWE#	Output 2~16MA, SR	DRAM Write enable, active low
88	CAS#	Output 2~16MA, SR	DRAM columnaddress strobe, active low
89	RAS#	Output 2~16MA, SR	DRAM row address strobe, active low
90	RCS#	Output 2~16MA, SR	DRAM chip select, active low
91	BA0	Output 2~16MA, SR	DRAM bank address 0
92	DVSS	Ground	Ground pin for internal digital circuitry
93	RD15	Inout 2~16MA, SR PU/PD, SMT	DRAM data 15

Pin Number	Symbol	Type	Description
94	RD14	Inout 2~16MA, SR PU/PD, SMT	DRAM data 14
95	RD13	Inout 2~16MA, SR PU/PD, SMT	DRAM data 13
96	RD12	Inout 2~16MA, SR PU/PD, SMT	DRAM data 12
97	DVDD3	Power	3.3V power pin for internal digital circuitry
98	RD11	Inout 2~16MA, SR PU/PD, SMT	DRAM data 11
99	RD10	Inout 2~16MA, SR PU/PD, SMT	DRAM data 10
100	RD9	Inout 2~16MA, SR PU/PD, SMT	DRAM data 9
101	RD8	Inout 2~16MA, SR PU/PD, SMT	DRAM data 8
102	DVSS	Ground	Ground pin for internal digital circuitry
103	CLK	Output 2~16MA, SR	DRAM clock
104	CLE	Output 2~16MA, SR	DRAM clock enable
105	RA11	Output 2~16MA, SR	DRAM address bit 11 or audio serial data 3 (channel 7/8)
106	RA9	Output 2~16MA, SR	DRAM address 9
107	RA8	Output 2~16MA, SR	DRAM address 8
108	DMVDD3	Power	3.3V Power pin for DRAM clock circuitry
109	DMVSS	Ground	Ground pin for DRAM clock circuitry
110	RA7	Output 2~16MA, SR	DRAM address 7
111	DVDD3	Power	3.3V power pin for internal digital circuitry
112	RA6	Output 2~16MA, SR	DRAM address 6
113	RA5	Output 2~16MA, SR	DRAM address 5
114	RA4	Output 2~16MA, SR	DRAM address 4
115	DVSS	Ground	Ground pin for internal digital circuitry
116	DQM1	Output 2~16MA, SR	Mask for DRAM input/output byte 1

Pin Number	Symbol	Type	Description
117	DQM0	Output 2~16MA, SR	Mask for DRAM input/output byte 0
118	BA1	Output 2~16MA, SR	DRAM bank address 0
119	RA10	Output 2~16MA, SR	DRAM address10
120	DVDD2	Power	2.5V power pin for internal digital circuitry
121	RA0	Output 2~16MA, SR	DRAM address 0
122	RA1	Output 2~16MA, SR	DRAM address 1
123	RA2	Output 2~16MA, SR	DRAM address 2
124	RA3	Output 2~16MA, SR	DRAM address 3
125	DVSS	Ground	Ground pin for internal digital circuitry
126	RD31	Inout 2~16MA, SR PU/PD, SMT	DRAM data 31
127	RD30	Inout 2~16MA, SR PU/PD, SMT	DRAM data 30
128	RD29	Inout 2~16MA, SR PU/PD, SMT	DRAM data 29
129	RD28	Inout 2~16MA, SR PU/PD, SMT	DRAM data 28
130	DVDD3	Power	3.3V power pin for internal digital circuitry
131	RD27	Inout 2~16MA, SR PU/PD, SMT	DRAM data 27
132	RD26	Inout 2~16MA, SR PU/PD, SMT	DRAM data 26
133	RD25	Inout 2~16MA, SR PU/PD, SMT	DRAM data 25
134	RD24	Inout 2~16MA, SR PU/PD, SMT	DRAM data 24
135	DVSS	Ground	Ground pin for internal digital circuitry
136	DQM3	Output 2~16MA, SR	Mask for DRAM input/output byte 3
137	DQM2	Output 2~16MA, SR	Mask for DRAM input/output byte 2

Pin Number	Symbol	Type	Description
138	RD23	Inout 2~16MA, SR PU/PD, SMT	DRAM data 23 / Videoin Data PortA 7
139	RD22	Inout 2~16MA, SR PU/PD, SMT	DRAM data 22 / Videoin Data PortA 6
140	DVDD2	Power	2.5V power pin for internal digital circuitry
141	RD21	Inout 2~16MA, SR PU/PD, SMT	DRAM data 21 / Videoin Data PortA 5
142	RD20	Inout 2~16MA, SR PU/PD, SMT	DRAM data 20 / Videoin Data PortA 4
143	RD19	Inout 2~16MA, SR PU/PD, SMT	DRAM data 19 / Videoin Data PortA 3
144	RD18	Inout 2~16MA, SR PU/PD, SMT	DRAM data 18 / Videoin Data PortA 2
145	DVSS	Ground	Ground pin for internal digital circuitry
146	RD17	Inout 2~16MA, SR PU/PD, SMT	DRAM data 17 / Videoin Data PortA 1
147	RD16	Inout 2~16MA, SR PU/PD, SMT	DRAM data 16 / Videoin Data PortA 0
148	ABCK	Output 4MA	Audio bit clock
149	ALRCK	Inout 4MA, PD, SMT	(1) Audio left/right channel clock (2) Trap value in power-on reset : 1 : use external 373 0: use internal 373
150	DVDD3	Power	3.3V power pin for internal digital circuitry
151	ACLK	Inout 4MA	Audio DAC master clock (384/256 audio sample frequency)
152	MC_DATA	Input	Microphone serial input
153	SPDIF	Output 2~16MA, SR : ON/OFF	SPDIF output
154	ASDATA0	Inout 4MA PD SMT	(1) Audio serial data 0 (left/right channel) (2) Trap value in power-on reset : 1 : manufactory test mode 0 : normal operation
155	ASDATA1	Inout 4MA PD SMT	(1) Audio serial data 1 (surround left/surround right channel) (2) Trap value in power-on reset : 1 : manufactory test mode 0 : normal operation
156	ASDATA2	Inout 4MA PD SMT	(1) Audio serial data 2 (center/left channel) (2) Trap value in power-on reset : 1 : manufactory test mode 0 : normal operation

Pin Number	Symbol	Type	Description
157	ASDATA3	Inout 4MA PD SMT	(1) Audio serial data 3 (surround left/surround right channel) (2) Trap value in power-on reset : 1 : manufactory test mode 0 : normal operation OR Videoin Data PortB 1
158	ASDATA4	Inout 4MA PD SMT	(1) Audio serial data 4 (center/left channel) (2) Trap value in power-on reset : 1 : manufactory test mode 0 : normal operation OR Videoin Data PortB 2
159	DACVDDC	Power	3.3V power pin for VIDEO DAC circuitry
160	VREF	Analog input	Bandgap reference voltage
161	FS	Analog output	Full scale adjustment
162	YUV0/CIN	Output 4MA, SR	Video data output bit 0 / Compensation capacitor
163	DACVSSC	Ground	Ground pin for VIDEO DAC circuitry
164	YUV1/C	Output 4MA, SR	Video data output bit 1 / Analog chroma output
165	DACVddb	Power	3.3V power pin for VIDEO DAC circuitry
166	YUV2/Y	Output 4MA, SR	Video data output bit 2 / Analog Y output
167	DACVSSB	Ground	Ground pin for VIDEO DAC circuitry
168	YUV3/CVBS	Output 4MA, SR	Video data output bit 3 / Analog composite output
169	DACVDDA	Power	3.3V power pin for VIDEO DAC circuitry
170	YUV4/G	Output 4MA, SR	Video data output bit 4 / Green or Y
171	DACVSSA	Ground	Ground pin for VIDEO DAC circuitry
172	YUV5/B	Output 4MA, SR	Video data output bit 5 / Blue or CB
173	YUV6/R	Output 4MA, SR	Video data output bit 6 / Red or CR
174	ICE	Input PD, SMT	Microcontroller ICE mode enable
175	BLANK#	Inout 4MA, SR SMT	Video blank area, active low / Videoin Field_601
176	VSYN	Inout 4MA, SR SMT	Vertical sync / Videoin Vsync_601
177	YUV7	Inout 4MA, SR SMT	Video data output bit 7 / Videoin Data PortB 3
178	DVSS	Ground	Ground pin for internal digital circuitry
179	HSYN	Inout 4MA, SR SMT	Horizontal sync / Videoin Hsync_601
180	SPMCLK	Input	Audio DAC master clock of SPDIF input / Videoin Data PortB 4

Pin Number	Symbol	Type	Description
181	SPDATA	Input	Audio data of SPDIF input / Videoin Data PortB 5
182	DVDD2	Power	2.5V power pin for internal digital circuitry
183	SPLRCK	Input	Audio left/right channel clock of SPDIF input / Videoin Data PortB 6
184	SPBCK	Input	Audio bit clock of SPDIF input / Videoin Data PortB 7
185	DVDD3	Power	3.3V power pin for internal digital circuitry
186	XTALO	Output	Crystal output
187	XTALI	Input	Crystal input
188	PRST	Input PD, SMT	Power on reset input, active high
189	DVSS	Ground	Ground pin for internal digital circuitry
190	VFO13	Output	The 1st, 3rd header VFO pulse output
191	IDGATE	Output	Header detect signal output
192	DVDD3	Power	3.3V power pin for internal digital circuitry
193	UDGATE	Output	DVD_RAM recording data gate signal output
194	WOBSI	Input	Wobble signal input
195	SDATA	Output	RF serial data output
196	SDEN	Output	RF serial data latch enable
197	SLCK	Output	RF serial clock output
198	BDO	Input	Flag of defect data input status
199	ADCVSS	Ground	Ground pin for ADC circuitry
200	ADIN	Analog Input	General A/D input
201	RFSUBI	Analog Input	RF subtraction signal input terminal
202	TEZISLV	Analog Input	Tracking error zero crossing low pass input
203	TEI	Analog Input	Tracking error input
204	CSO	Analog Input	Central servo input
205	FEI	Analog Input	Focus error input
206	RFLEVEL	Analog Input	Sub beam add input or RFRP low pass input
207	RFRP_DC	A Input	RF ripple detect input
208	RFRP_AC	Analog Input	RF ripple detect input (through AC coupling)
209	HRFZC	Analog Input	High frequency RF ripple zero crossing
210	PWMVREF	A Input	A reference voltage input for PWM circuitry. A typical value of 4.0 v
211	PWM2VREF	A Input	A reference voltage input for PWM circuitry. A typical value of 2.0 v
212	ADCVDD3	Power	3.3V power pin for ADC circuitry
213	RFDTSLVP	Analog Output	Positive RF data slicer level output
214	RFDTSLVN	Analog Output	Negative RF data slicer level output
215	RFIN	Analog Input	Negative input of RF differential signal
216	RFIP	Analog Input	Positive input of RF differential signal

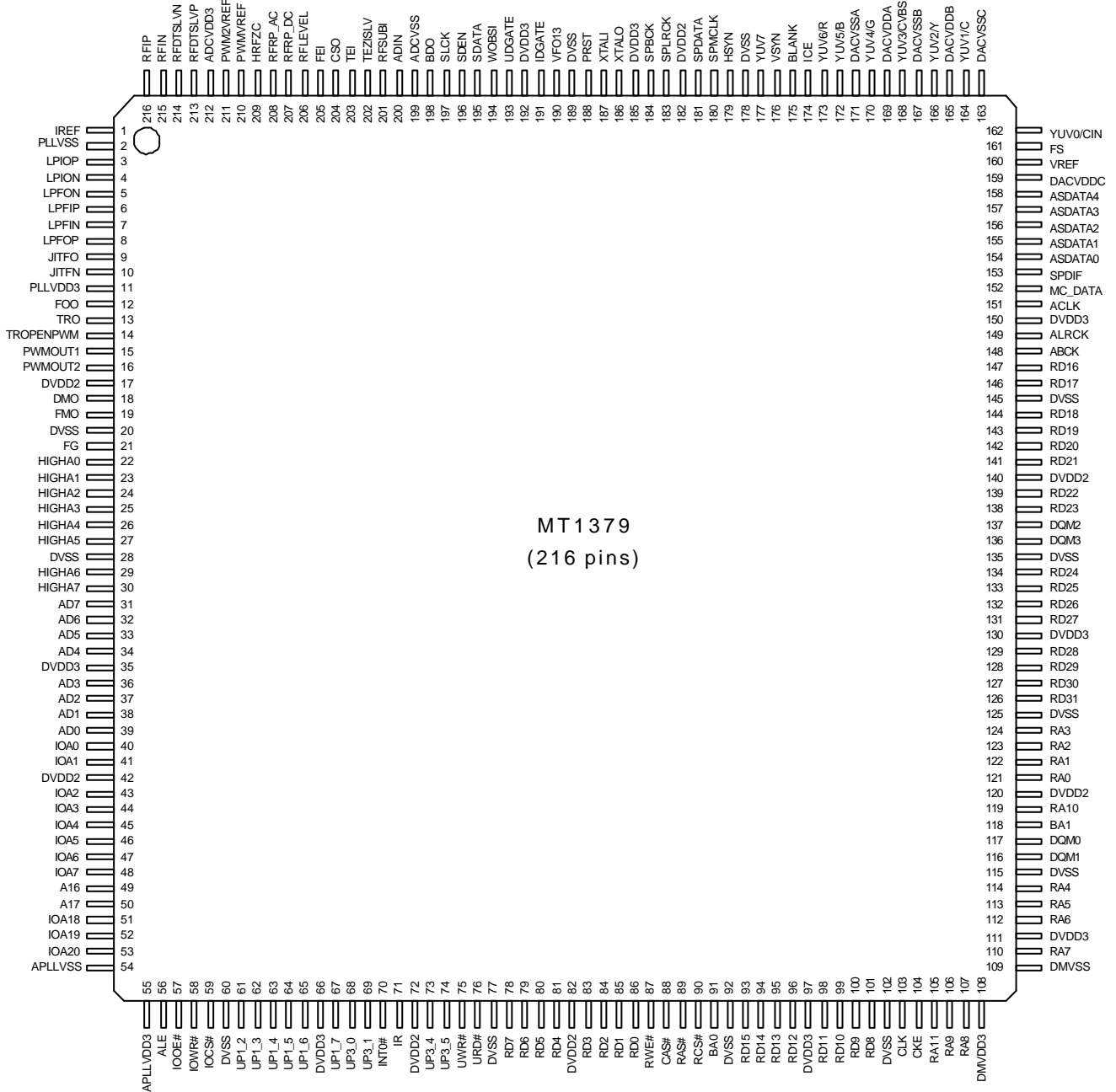


MT1379

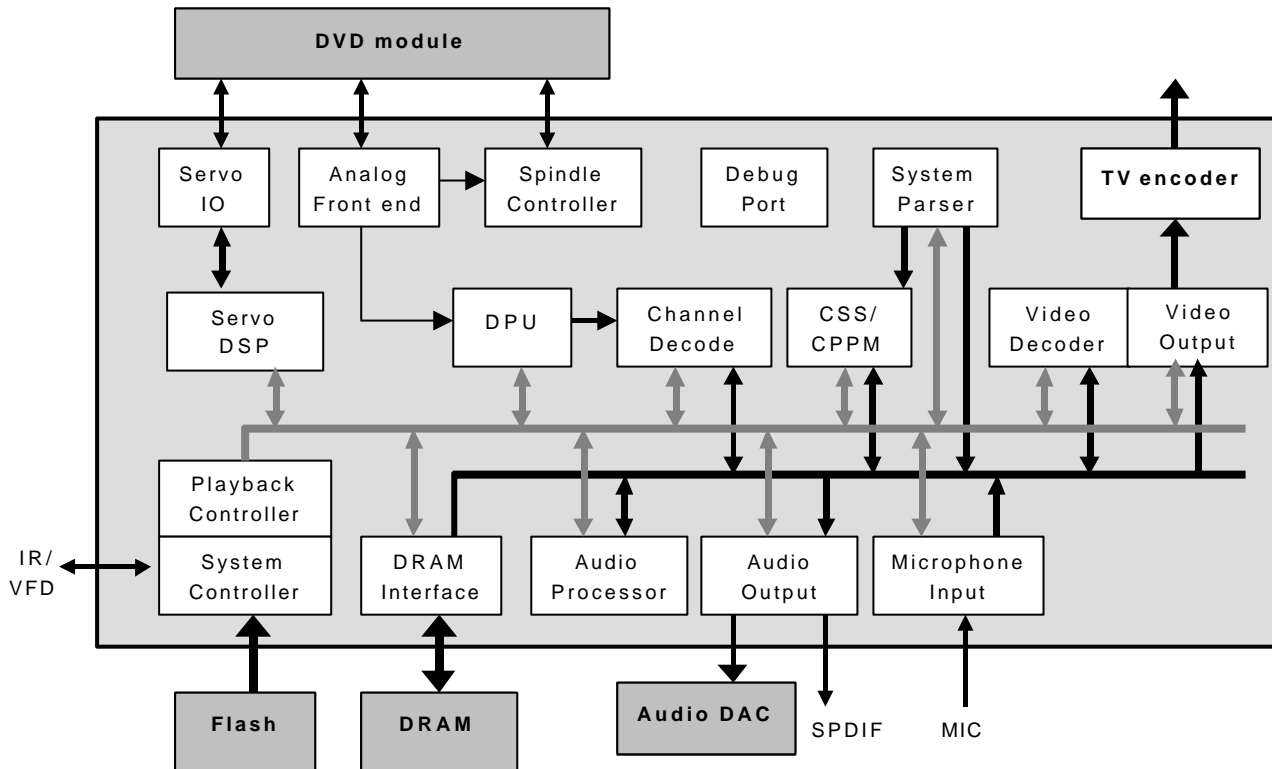
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FUNCTIONAL BLOCK



Servo Controller

The servo control is accomplished through the servo DSP (Servo Digital Signal Processor) and its accessory I/O circuits. This servo DSP is capable of performing complex operations and also provides a friendly interface for the system controller. By issuing type 1 and type 2 commands from the system controller, the servo DSP can accomplish various complicated servo control functions, such as tracking, seeking and MT1336/MT1376 chip register programming. As for the servo I/O circuits, it provides interface between the input servo signals and the Servo DSP. It has built-in ADCs to digitize the servo control signal and DACs to provide signals for the actuator and sledge motor. It also has a serial interface to communicate with the MT1336/MT1376 chip.

Analog Front End

The analog front end contains a data slicer circuit and a data PLL circuit. The RF analog signal from MT1336/MT1376 is quantized by the data slicer to form the EFM/EFM+ bit stream, from which the channel bit clock is extracted by the data PLL. The EFM/EFM+ bit stream and bit clock are then output to DPU for channel bit processing.

DPU

Data path unit (DPU) provides protection on data with lost synchronization patterns and demodulates EFM/EFM+ bit stream into the channel raw data that will be corrected by the decoder. The synchronization protection makes data after the synchronization pattern to be extracted even if the synchronization pattern is not found.

Spindle Controller

The spindle controller is used to control disc spindle motor. It includes a varipitch CLV clock generator, a CLV/CAV controller, and a PWM generator. The varipitch CLV clock generator generates a reference colck for the speed of operation. The CLV/CAV

controller changes the mode and speed of operation according to servo register setting. The PWM generator generates pulse-width-modulated signal to drive disc spindle motor driver.

CSS/CPPM

The CSS/CPPM module provides functions necessary for decoding discs conforming to CSS/CPPM specification.

System Parser

The system parser is used to help the system controller to decode DVD/SVCD/VCD bitstream just after the channel decoder performing error correction. Acting as a DMA master, it moves bitstream data from RSPC buffer to video, audio, or sub-picture buffer according to system controller request. It also decrypts the scramble data of the CSS/CPPM sectors. Another function of system parser is providing system controller/DSP a DRAM memory copy controller to enhance system controller/DSP performance.

Video Decoder

The primary function of MT1379 is to support MPEG1 and MPEG2 video decoding. The video decode engine comprises of variable length decoder (VLD), inverse transformer (IT), motion compensator (MC), and block reconstructor (BR). The video decode engine decodes the variable length encoded symbols in MPEG bitstream and performs inverse scan, inverse quantization, mismatch control and inverse discrete cosine transform onto the variable length decoded data. The motion compensator fetches prediction data from reference picture buffer according to motion vectors and motion prediction mode for P and B pictures. Finally, the block reconstructor combines both the results of inverse transformer and motion compensator to derive the reconstructed image macroblock and write back to picture buffer.

The video decode engine can also support JPEG and BMP file decoding by common image compression hardware kernels.

Video Output

The Video Output unit contains Video Processor, SPU, OSD, Cursor, TV encoder units, it performs

- Reading decoded video from DRAM buffer
- Scaling the image
- Gamma/Brightness/Hue/Saturation adjustment and edge enhancement
- Reading and decoding SPU and OSD data from DRAM buffer
- Generating hardware cursor image
- Merging the video data, SPU, OSD and cursor

Video Processor

The Video Processor unit controls the transfer of video data stored in the DRAM to an internal or external TV encoder. It uses FIFOs to buffer outgoing luminance and chrominance data, and performs YUV420 to YUV422 conversion and arbitrary vertical/horizontal decimation/interpolation, from 1/4x to 256x. With this arbitrary ratio scaling capability, the Video Processor can perform arbitrary image conversion, such as PAL to NTSC, NTSC to PAL, MPEG1 to MPEG2, Letterbox, Pan-Scan conversion or zoom in, zoom out. It is also capable of interlace to progressive conversion.

The Video Processor unit performs the following functions:

- Requests and receives the decoded picture data from the picture buffer in external DRAM for display
- Resample vertical data to create 4:2:2 sample format
- Optionally performs vertical/horizontal resampling of both luminance and chrominance data
- Performs optional Gamma correction, luminance/chrominance adjustment, and edge enhancement

The Video Processor unit contains two 2-tap vertical filters for luminance and chrominance. These filters are used to interpolate and reposition luminance and chrominance line to improve picture quality. These filters are capable of generating up to eight, unique subline value between two consecutive scan lines. The generation of lines depends on the ratio between the height of the source image and the target image. In applications where DRAM bandwidth are critical the filters can be configured as simple line-repeating to reduce the DRAM bandwidth required.

The Video Processor unit integrates two separate horizontal postprocessing filter, a simple 2-tap linear horizontal filter and an 8-tap programmable filter. These filters are provided for scaling images horizontally along the scan line. These two filters is capable of generating up to eight, unique subpixel values between two consecutive pixels on a scan line. The generation of pixels depends on the ratio between the width of the source image and the target image.

SPU



This is a hardware sub-picture decoder. It decodes the compressed SPU image bitstream and CHG_COLCON commands according to SPU header information previously decoded by system controller. The SPU module also allows two SPU objects to be displayed at the same time. SPU image is blended with main video stream.

OSD

The OSD module can operate with 2/4/16/256-color bitmap format (1/2/4/8 bits), and 16/256 color RLC format, all have 16 levels of transparency. In addition, it accepts a special WARP mode, which inserts one programmable RLC code in the bitmap to reduce the image size stored in DRAM. It also features automatic shadow/outline generation in 2-color mode, 2 Highlight areas, 1 ChangeColor area and 1 OSDVoid area. One OSD area can occupy the full or a partial screen, or multiple OSDs can occur in a screen at the same time, only if they don't occupy the same horizontal line. The output image is blended with the video-SPU mixed stream.

Cursor

A hardware cursor generator is integrated in Video Output Unit. The cursor image is a 32x32 4-color bitmap image, each colors are programmable. Cursor can be enlarged by 2 in both vertical and horizontal directions. Cursor image is multiplexed with video-SPU-OSD mixed stream.

Audio Interface

Audio interface consists of Audio Output Interface and Microphone Input Interface.

Audio Output Interface

The MT1379 can support up to 8 channel audio outputs. The output formats can be 16, 24, or 32-bit frames. Left alignment, right alignment, or I²S formats are all supported.

With built-in PLL, MT1379 can provide the audio clock (ACLK) for external audio DAC at 384Fs, where Fs is usually 32KHz, 44.1KHz, 48KHz, 96KHz, or 192KHz. ACLK can also be programmed to be from outside MT1379. When ACLK is input to MT1379, the frequency could be 128*n Fs, where n is from 1 to 7.

Audio raw (encoded) data or cooked (decoded) data can be output on a single line using S/PDIF interface. The output slew rate and driving force of this pad are programmable.

Microphone Input Interface

The MT1379 provides a microphone input interface. Two independent microphones' data could be input to the MT1379. There are two independent digital volume control for these two input channels. The input data formats can also be left alignment, right alignment, or I²S formats.

System Controller

MT1379 uses an embedded Turbo-8032 as System Controller and provide ICE interface to increase the feasibility of F/W development. Also, MT1379 includes an build-in internal 373 to latch lower byte address from 8032 Port 0 and provide a glue-logic free solution. MT1379 supports up to 1M X 16 bits Flash ROM to store 8032 code, H/W related data, User data, etc. F/W upgrade can be achieved either by debug interface or by disk.



ELECTRICAL CHARACTERISTICS

Absolute Maximum Rating

Symbol	Parameters	Value	Unit
VDD3	3.3V Supply voltage	-0.3 to 3.6	V
VDD2	2.5V Supply voltage	-0.3 to 3.0	V
VDDA	Analog Supply voltage	-0.3 to 3.6	V
V _{IN}	Input Voltage	-0.3 to 5.5	V
V _{OUT}	Output Voltage	-0.3 to VDD3+0.3	V
Ta	Ambient Temperature	0 to 70	°C

DC Characteristics

Symbol	Parameters	Min	Typ	Max	Unit
V _{IH}	Input voltage high	2.4	-	3.6	V
V _{IL}	Input voltage low	-	-	0.8	V
V _{OH}	Output voltage high	3.0	-	VDD3	V
V _{OL}	Output voltage low	-	-	0.5	V
I _{IH}	High level input current			10	uA
I _{IL}	Low level input current	-10			uA
P _D	Power dissipation		1.0		W
P _{Down}	Power down mode			0.1	W

8.3 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 μm process technology

- Fully compatible with 0.32 μm 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#)

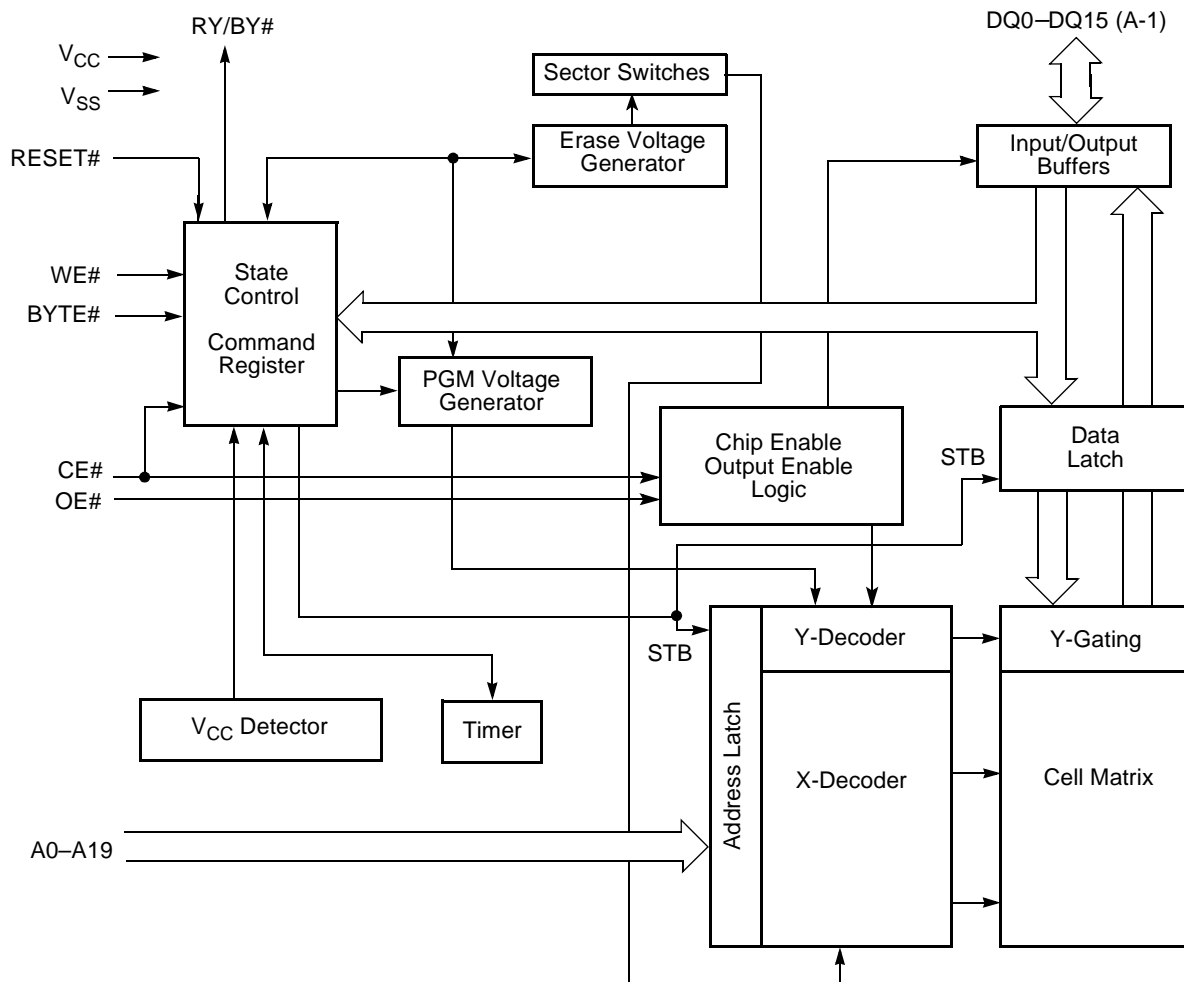
- Hardware method to reset the device to reading array data

PRODUCT SELECTOR GUIDE

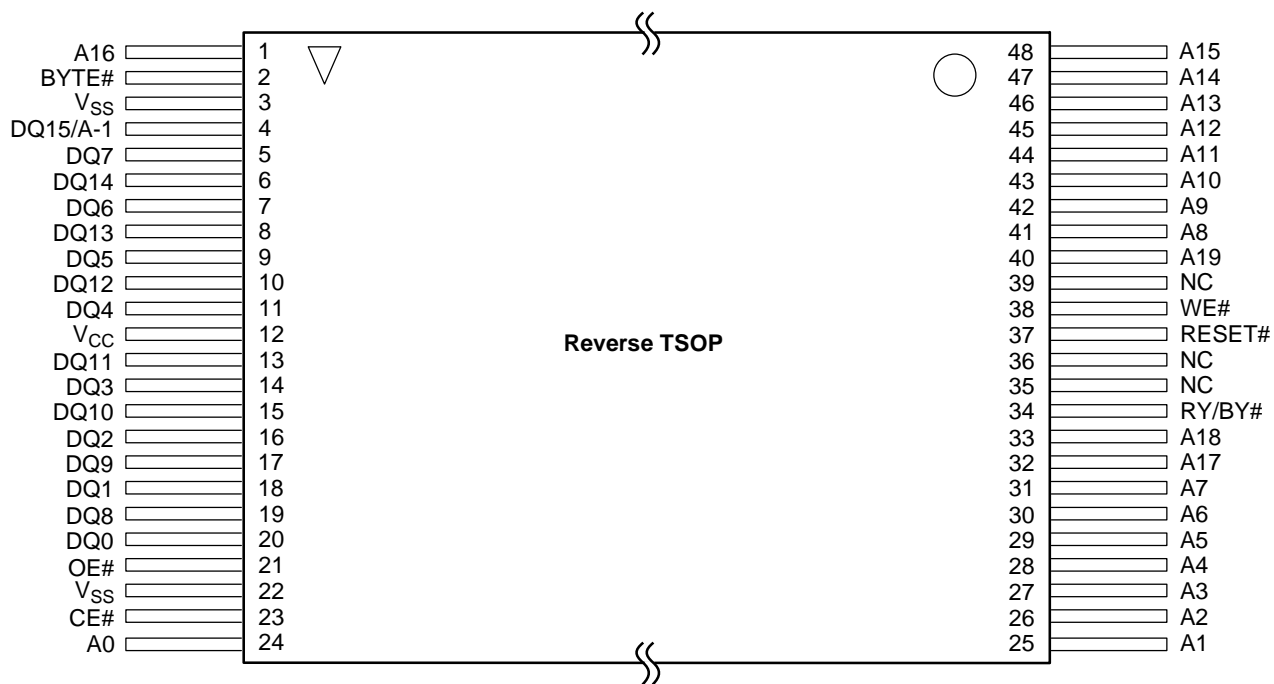
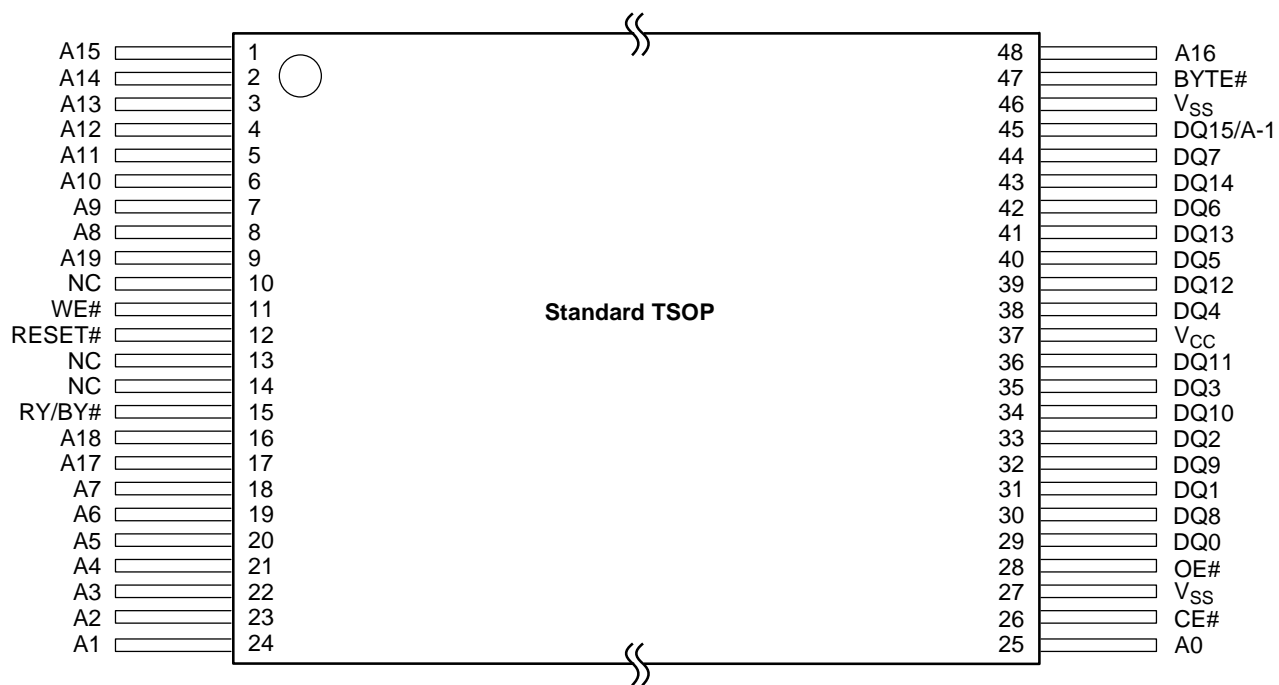
Family Part Number		Am29LV160D		
Speed Option	Voltage Range: $V_{CC} = 2.7\text{--}3.6\text{ V}$	-70	-90	-120
Max access time, ns (t_{ACC})		70	90	120
Max CE# access time, ns (t_{CE})		70	90	120
Max OE# access time, ns (t_{OE})		30	35	50

Note: See "AC Characteristics" for full specifications.

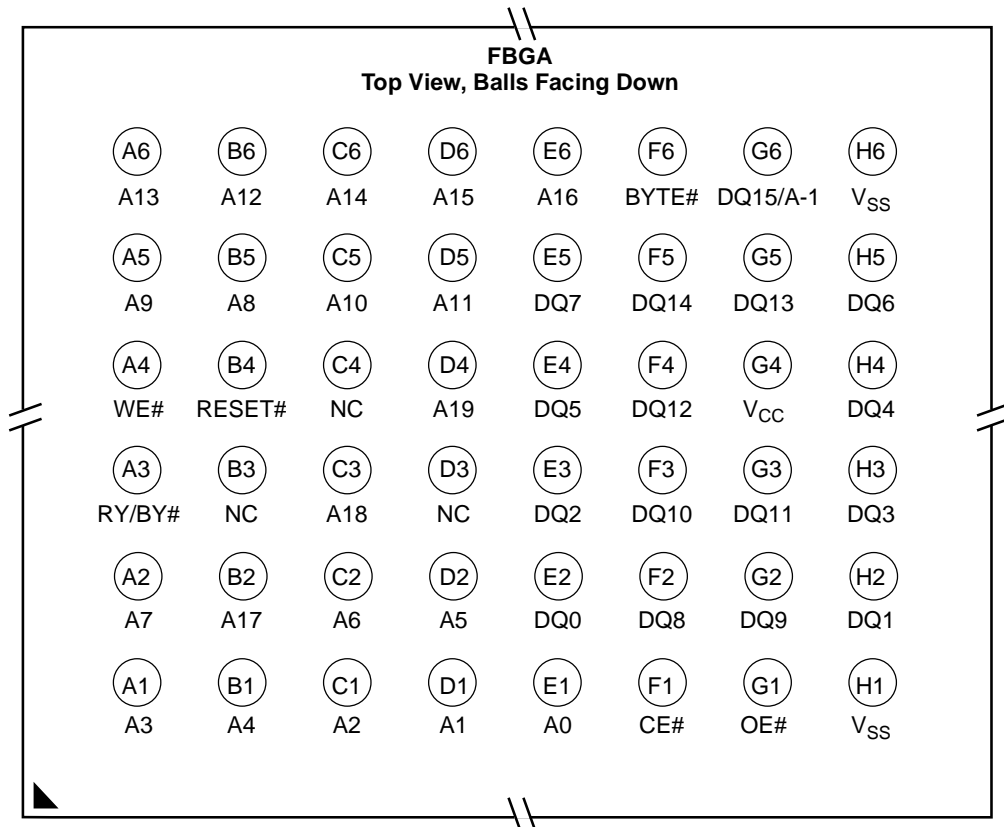
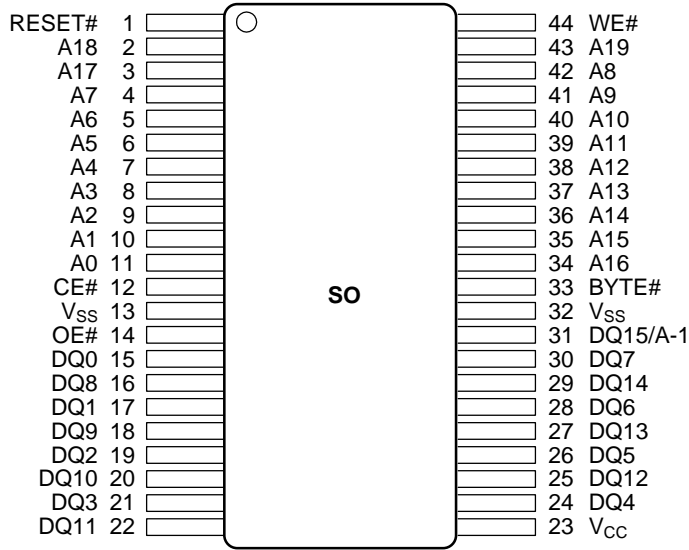
BLOCK DIAGRAM



CONNECTION DIAGRAMS



CONNECTION DIAGRAMS



Special Handling Instructions

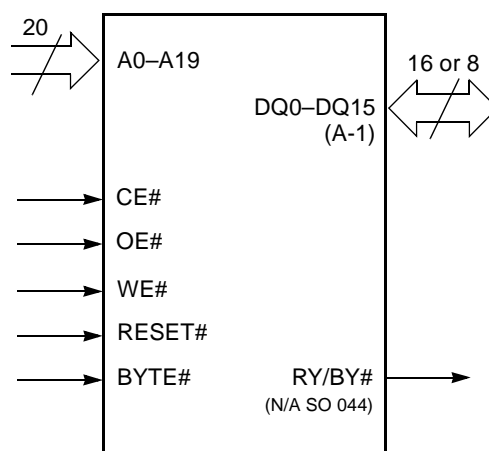
Special handling is required for Flash Memory products in FBGA packages.

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_{CC} = 3.0 volt-only single power supply
(see Product Selector Guide for speed
options and voltage supply tolerances)
- V_{SS} = Device ground
- NC = Pin not connected internally

LOGIC SYMBOL



8.4 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.

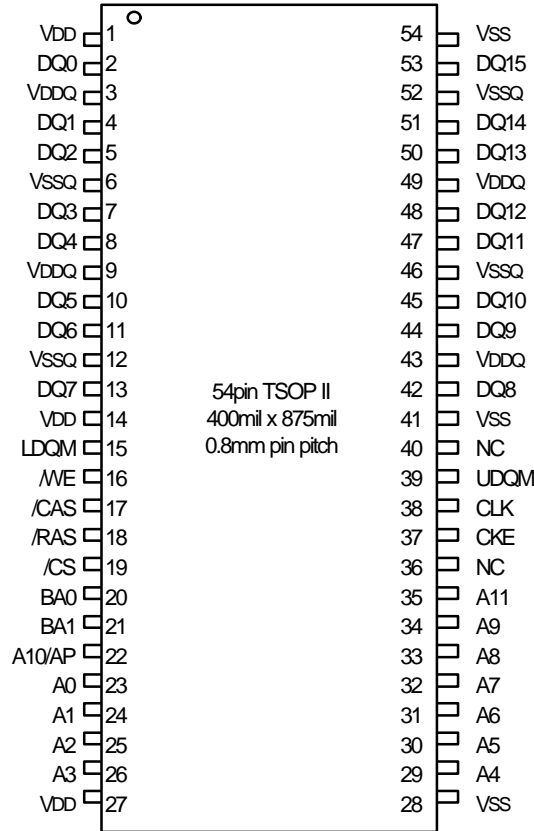
HY57V641620HG is offering fully synchronous operation referenced to a positive edge of the clock. All inputs and outputs are synchronized with the rising edge of the clock input. The data paths are internally pipelined to achieve very high bandwidth. All input and output voltage levels are compatible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

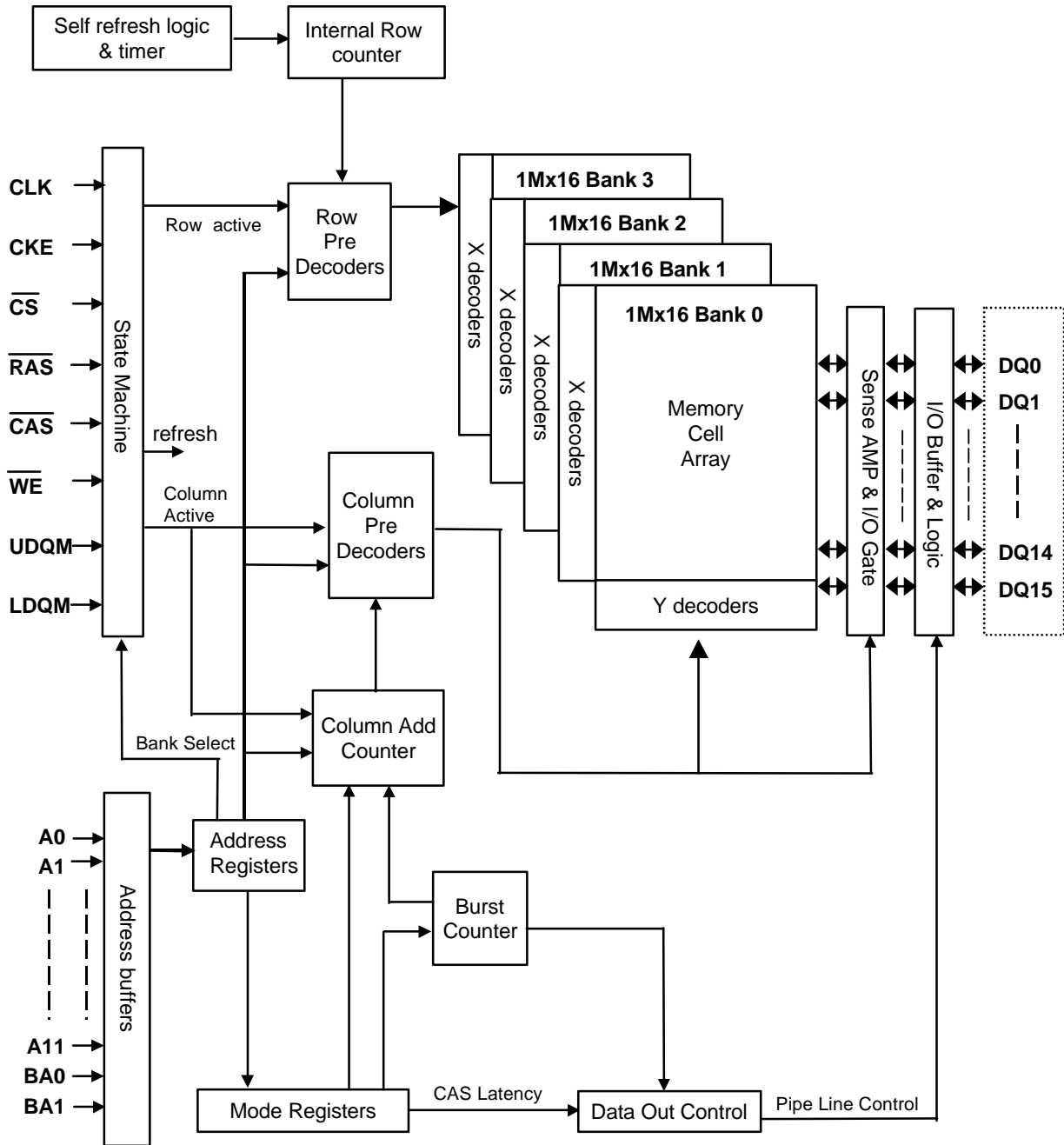


PIN DESCRIPTION

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
\overline{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

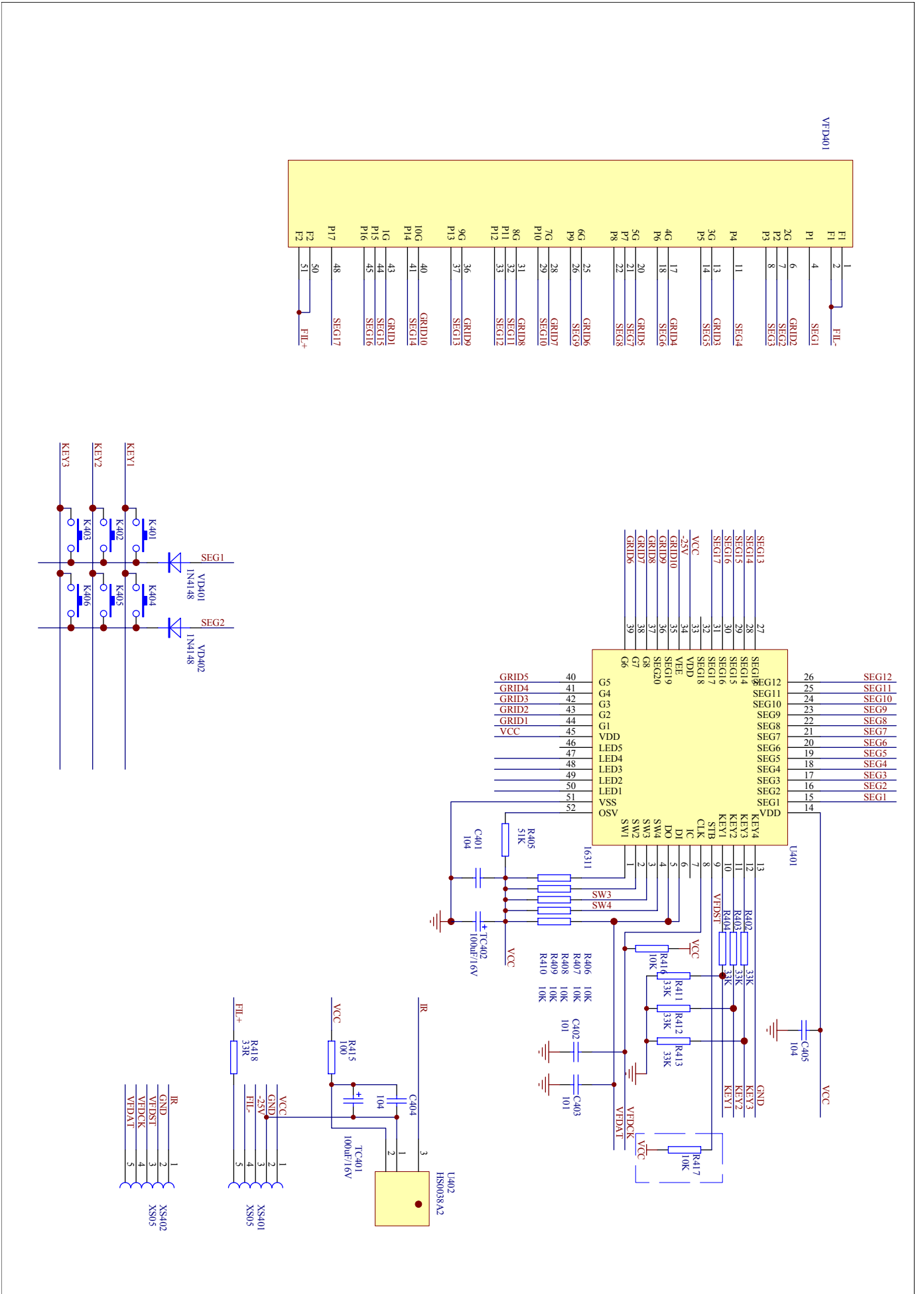
FUNCTIONAL BLOCK DIAGRAM

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

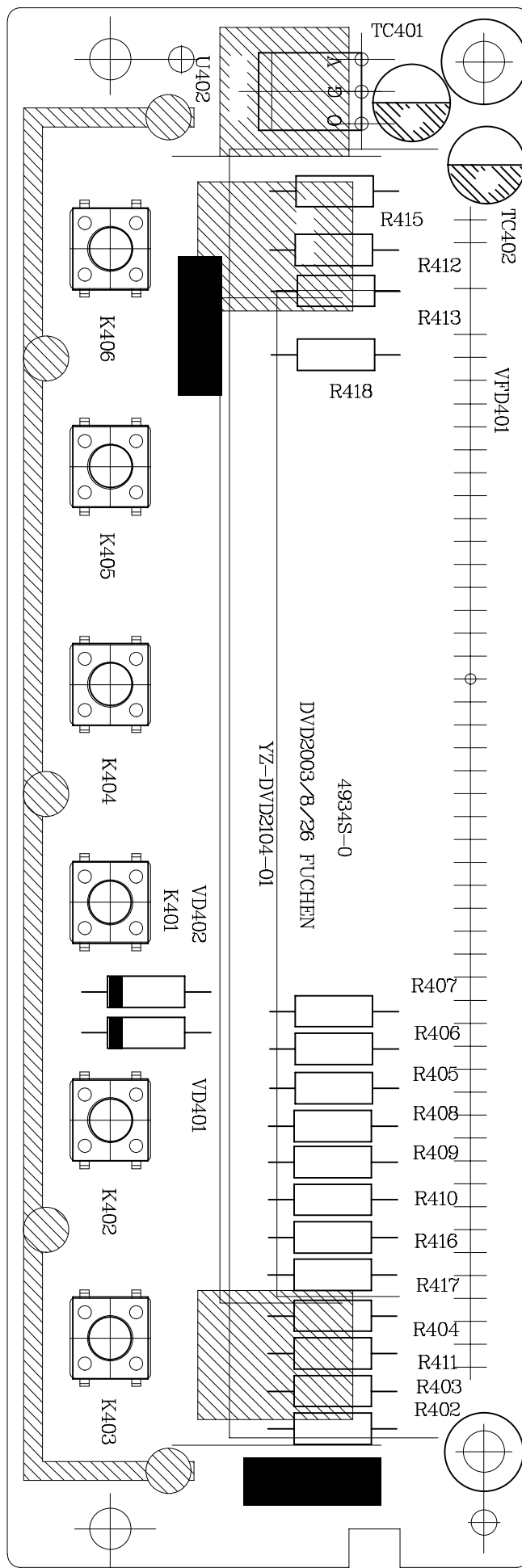


9. SCHEMATIC & PCB WIRING DIAGRAM

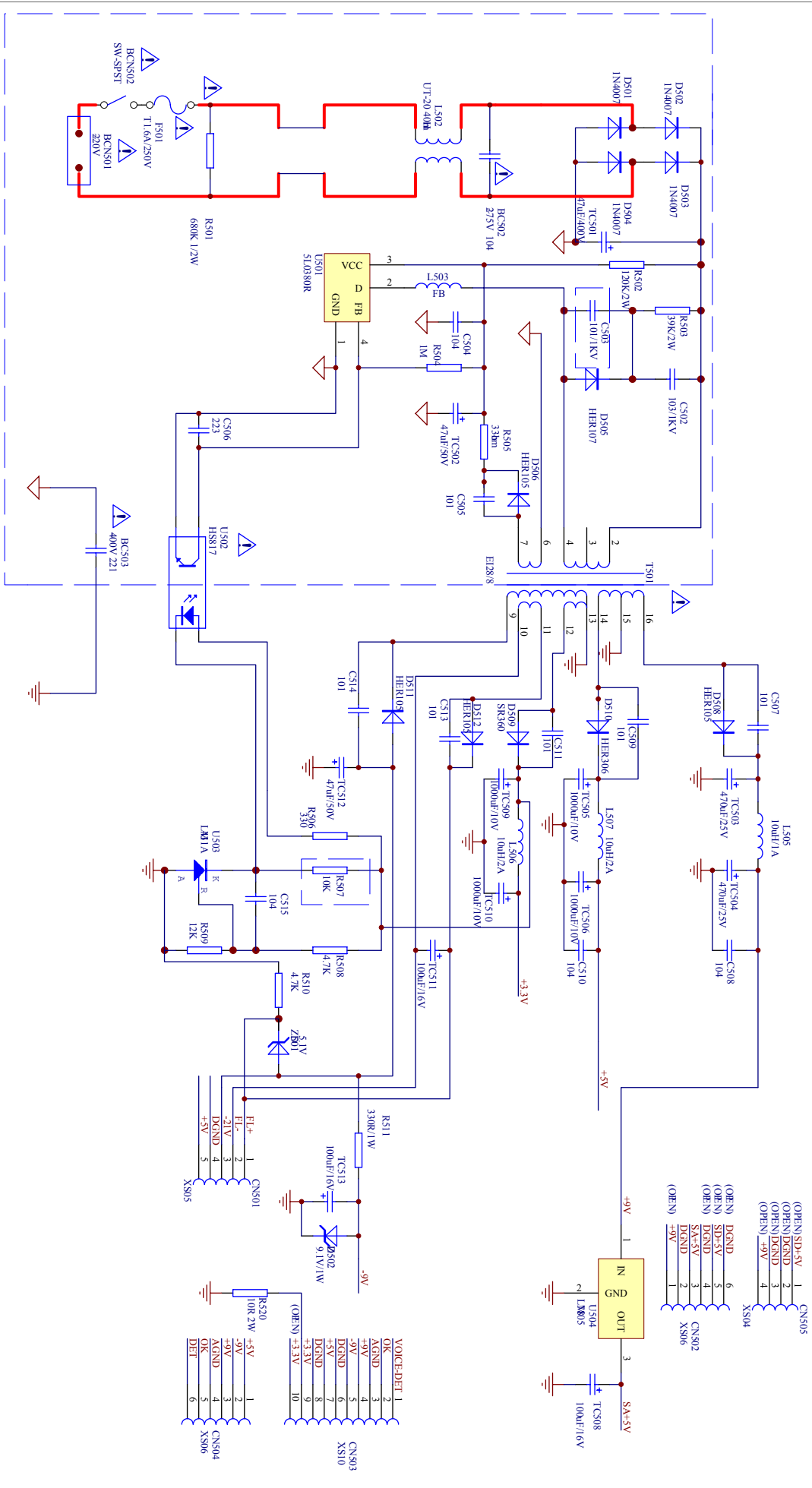
FRONT SCHEMATIC DIAGRAM



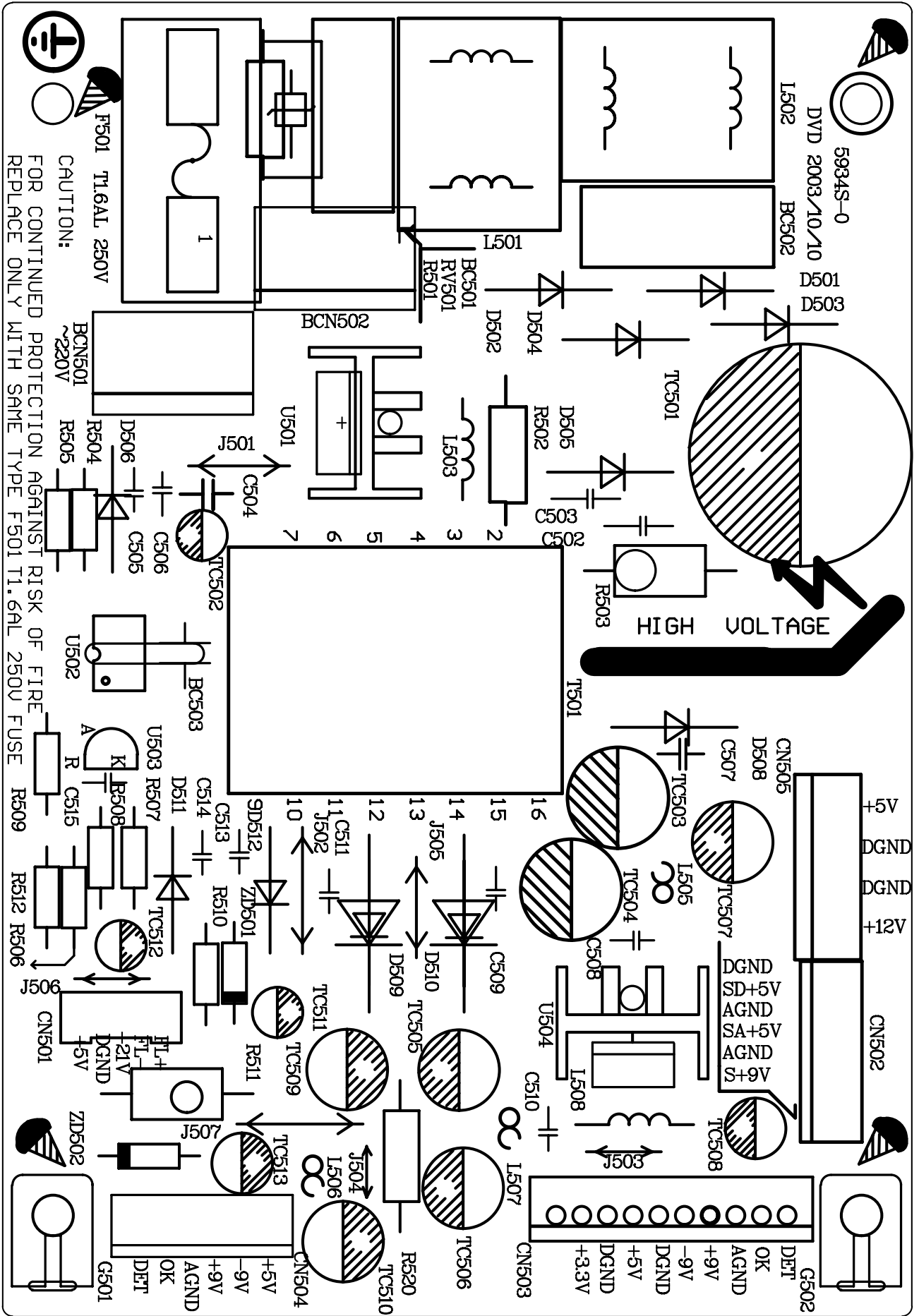
FRONT SCHEMATIC DIAGRAM



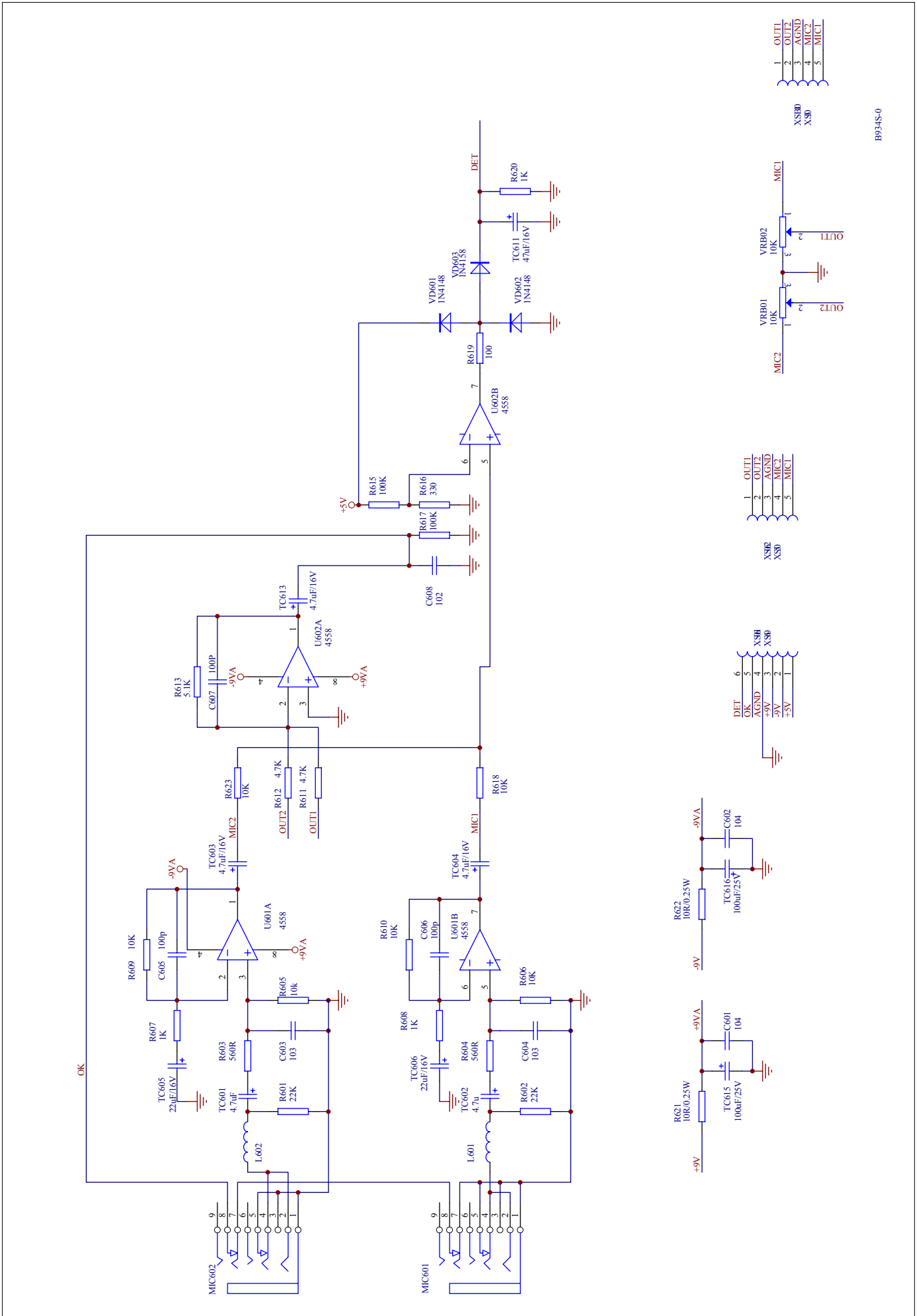
POWER BOARD SCHEMATIC DIAGRAM



POWER BOARD SCHEMATIC DIAGRAM

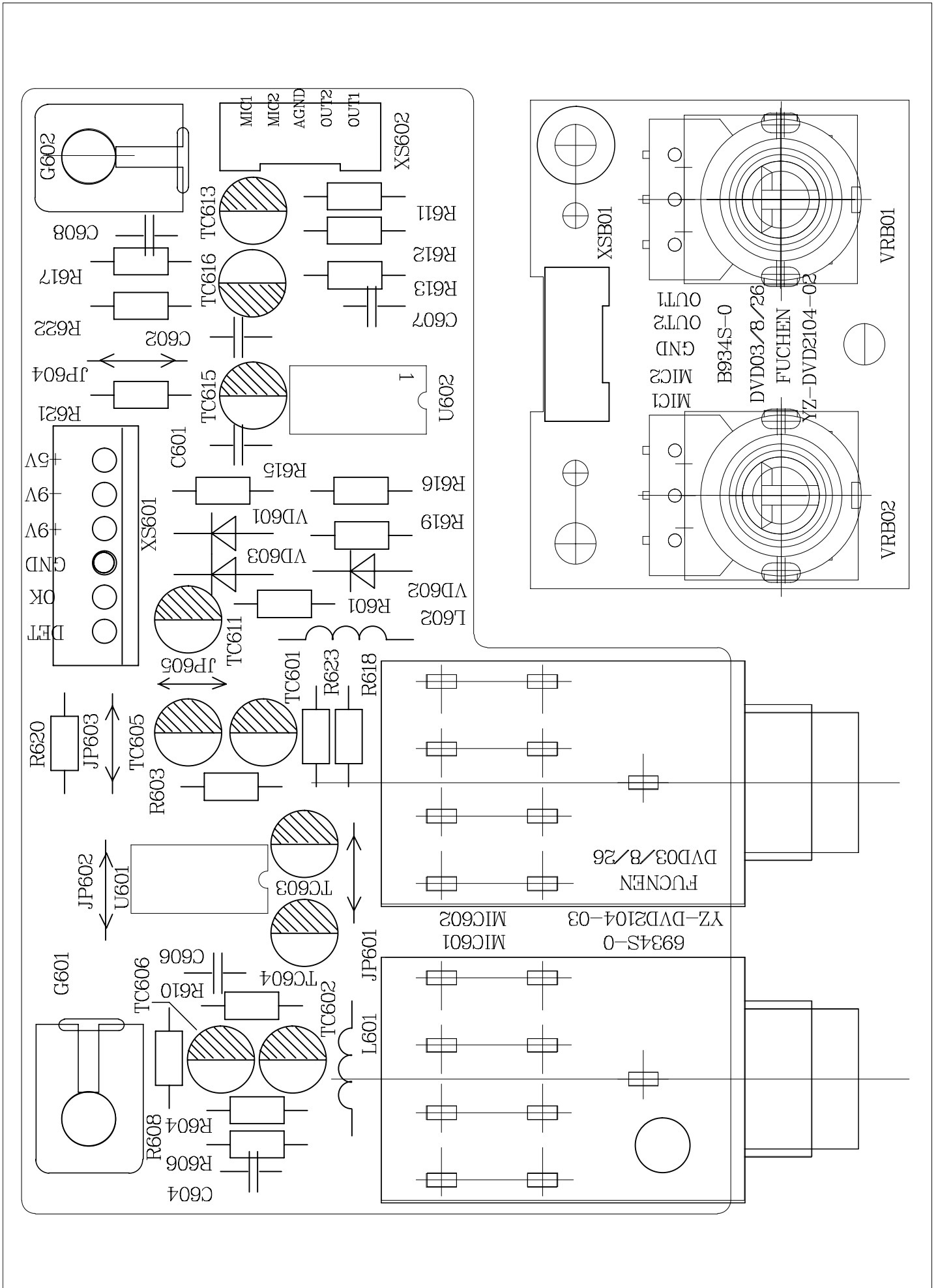


OK SCHEMATIC DIAGRAM

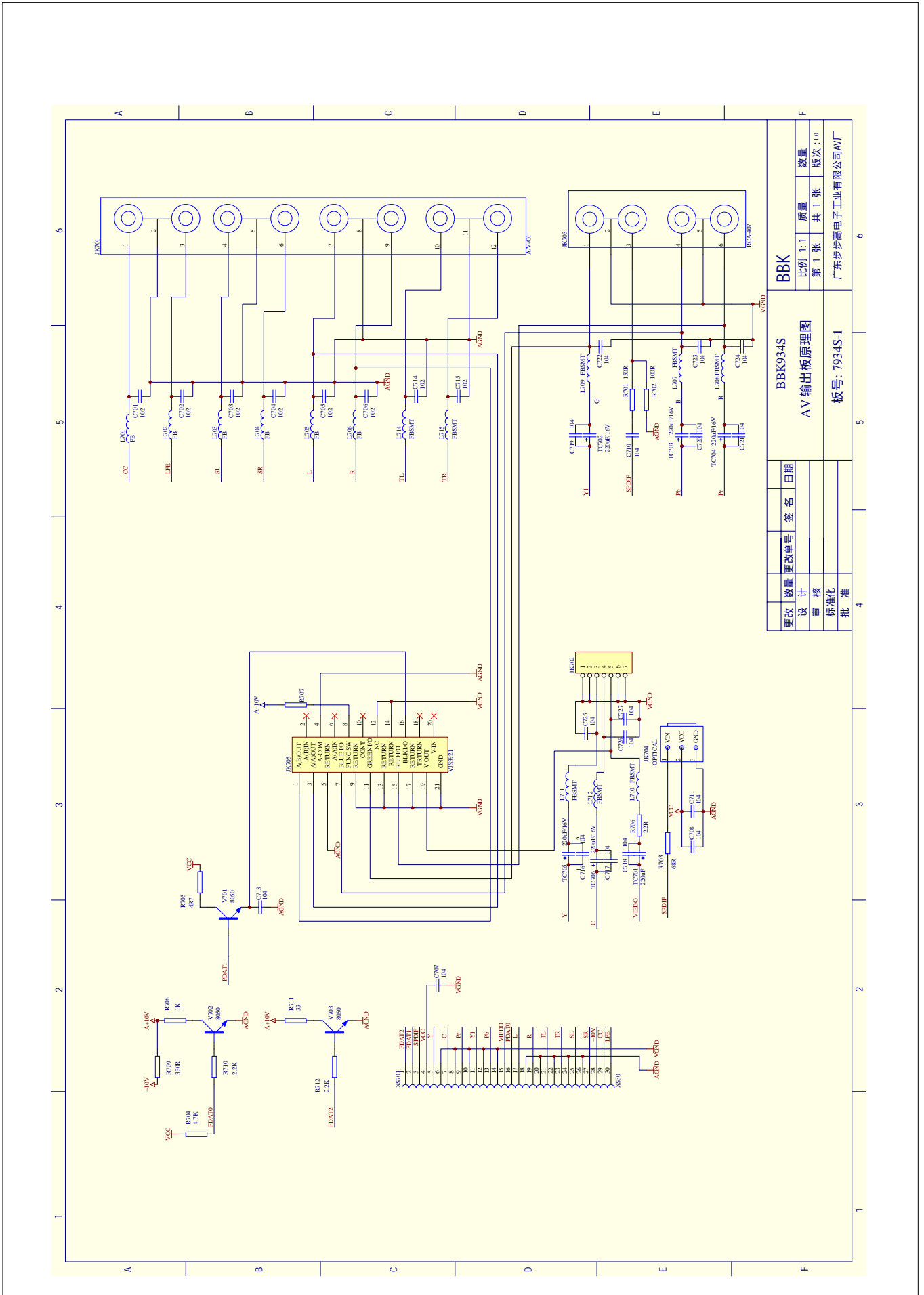


B934S-0

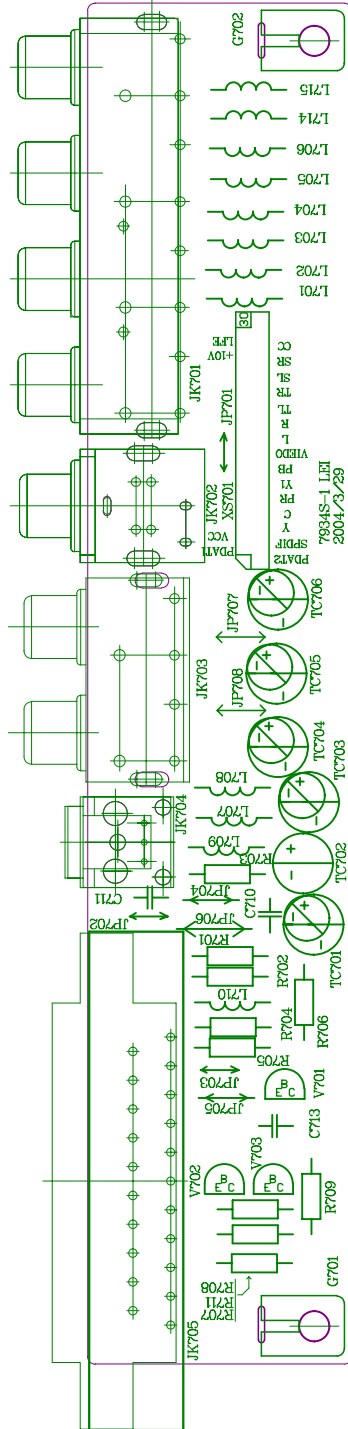
OK SCHEMATIC DIAGRAM



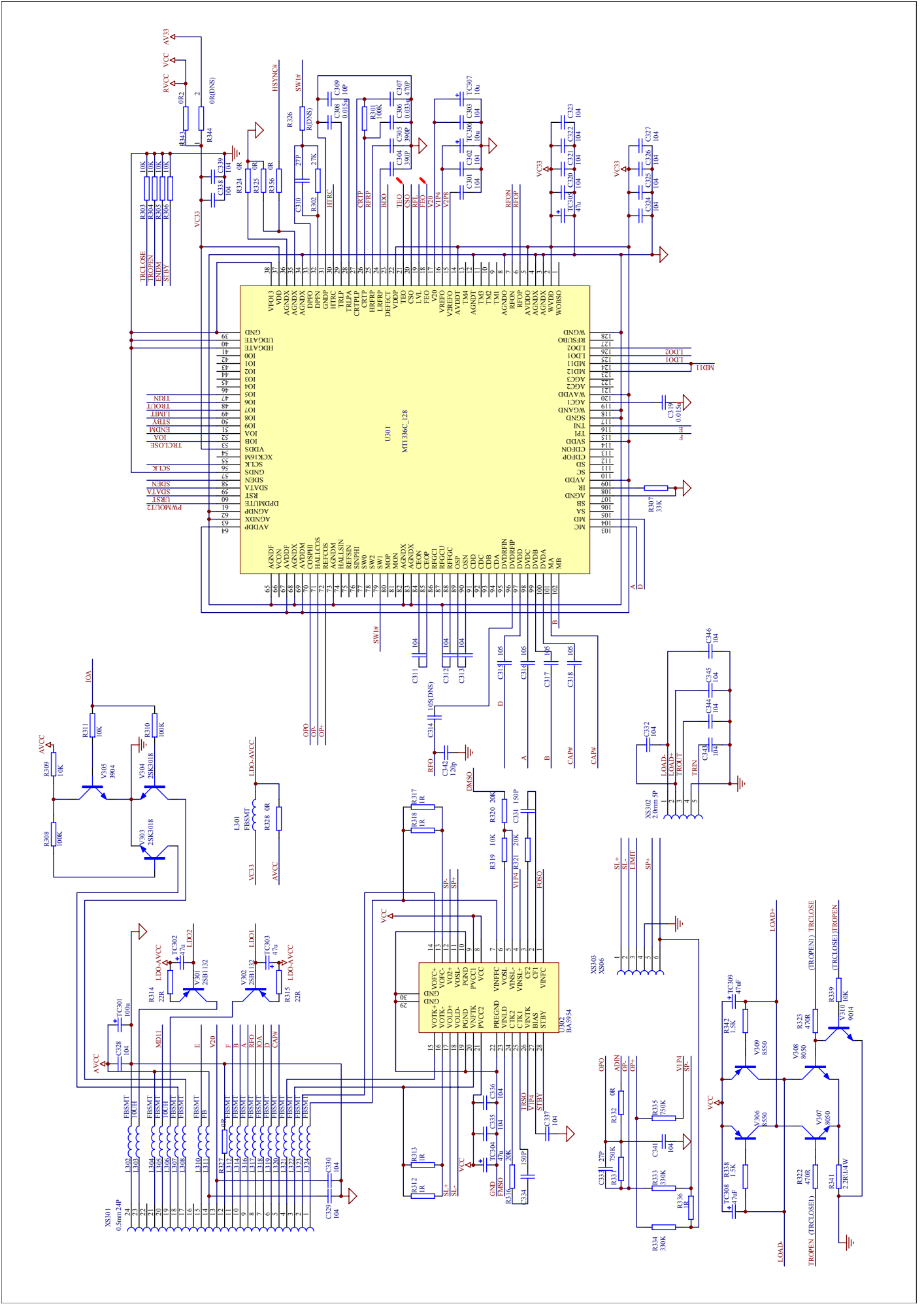
OUTPUT BOARD SCHEMATIC DIAGRAM



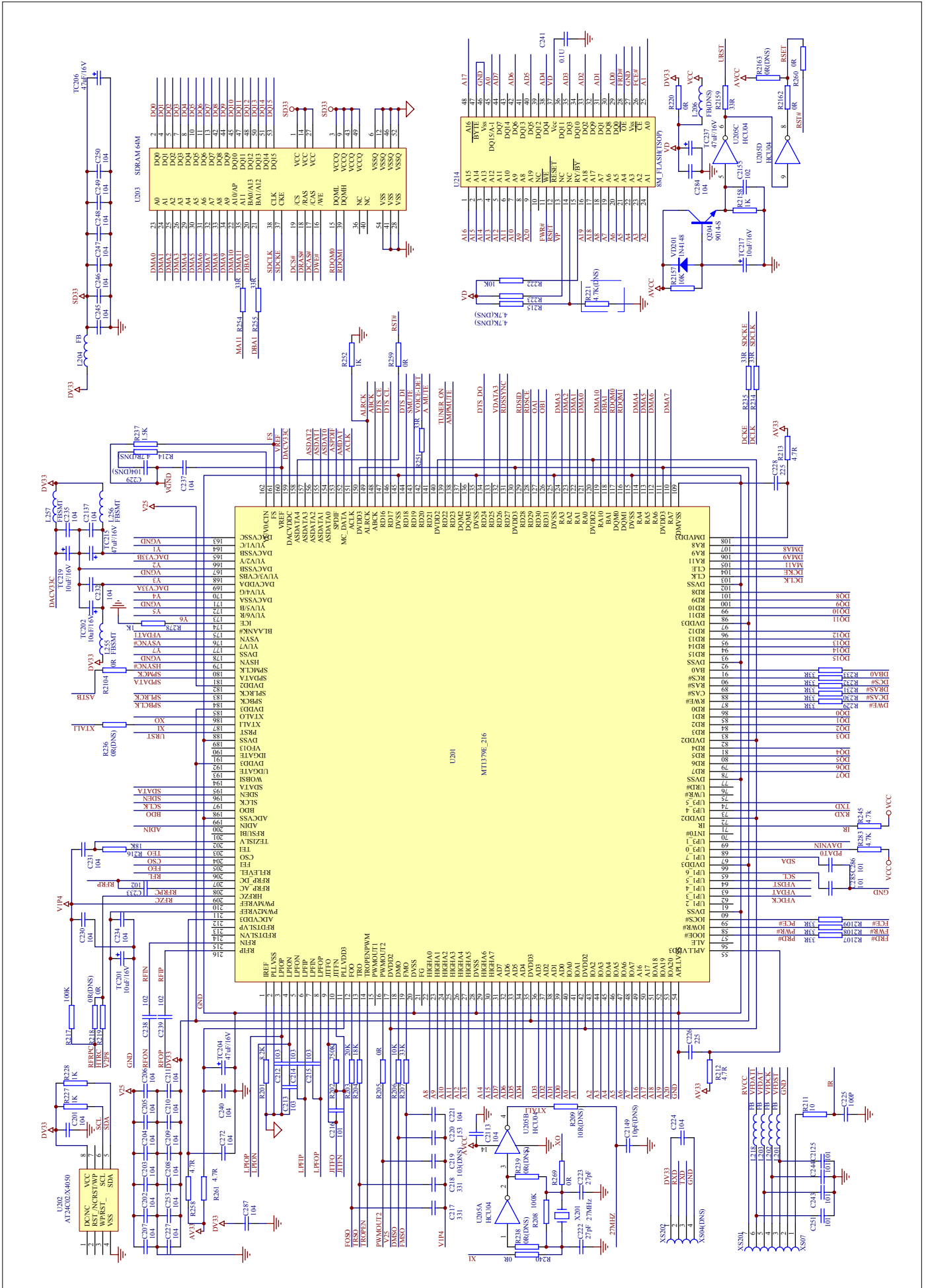
OUTPUT BOARD SCHEMATIC DIAGRAM



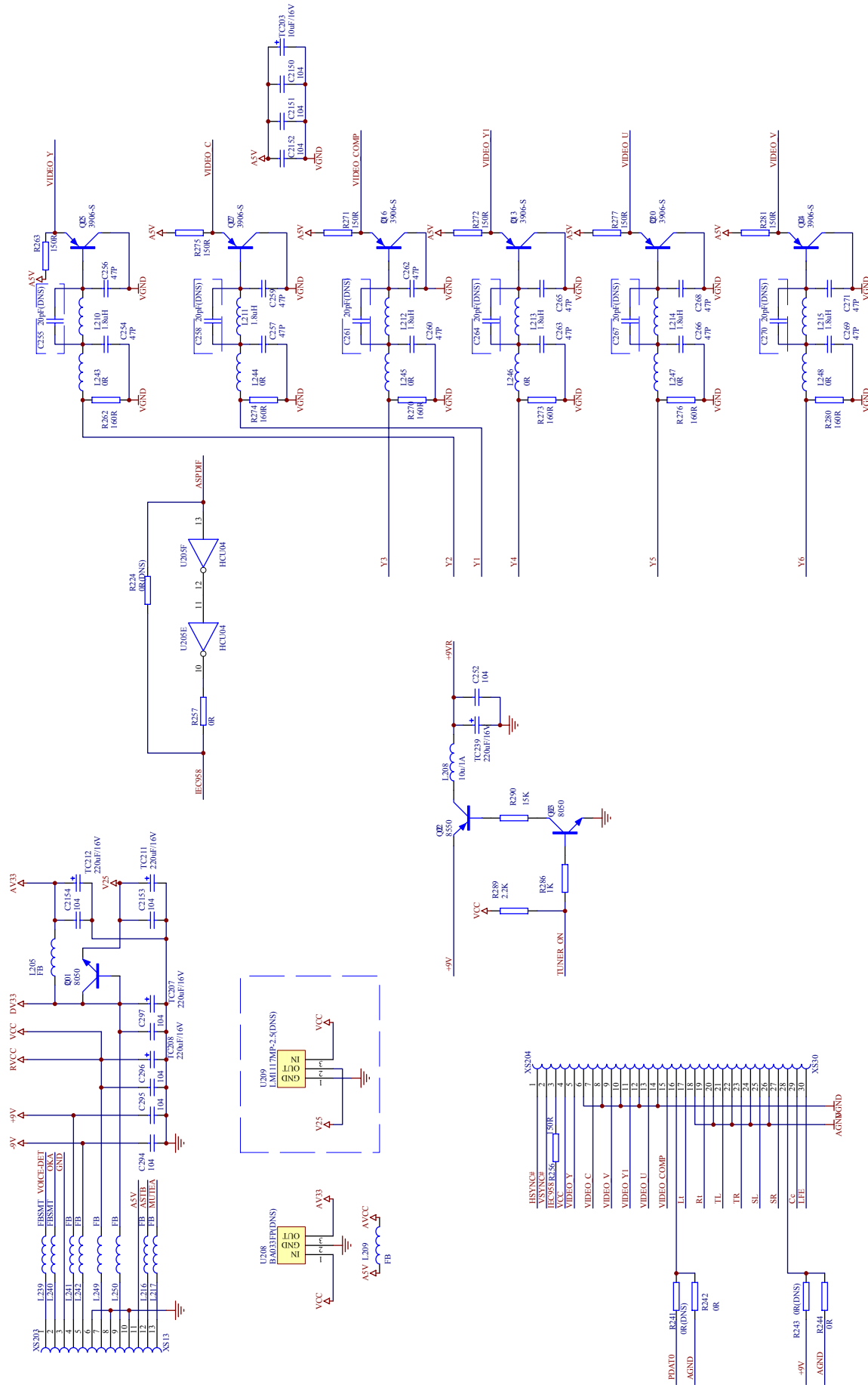
MIAN SCHEMATIC DIAGRAM



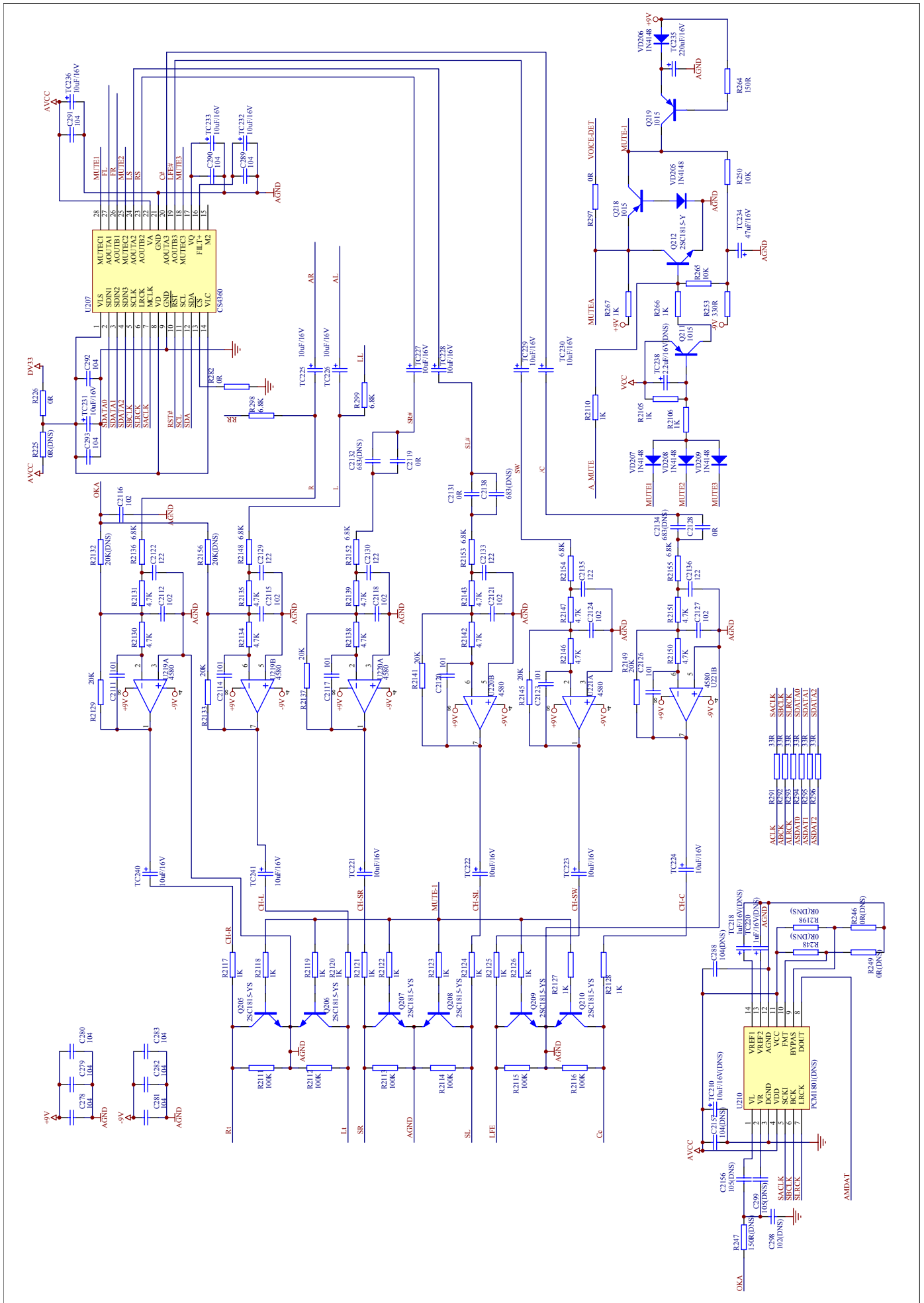
MIAN SCHEMATIC DIAGRAM



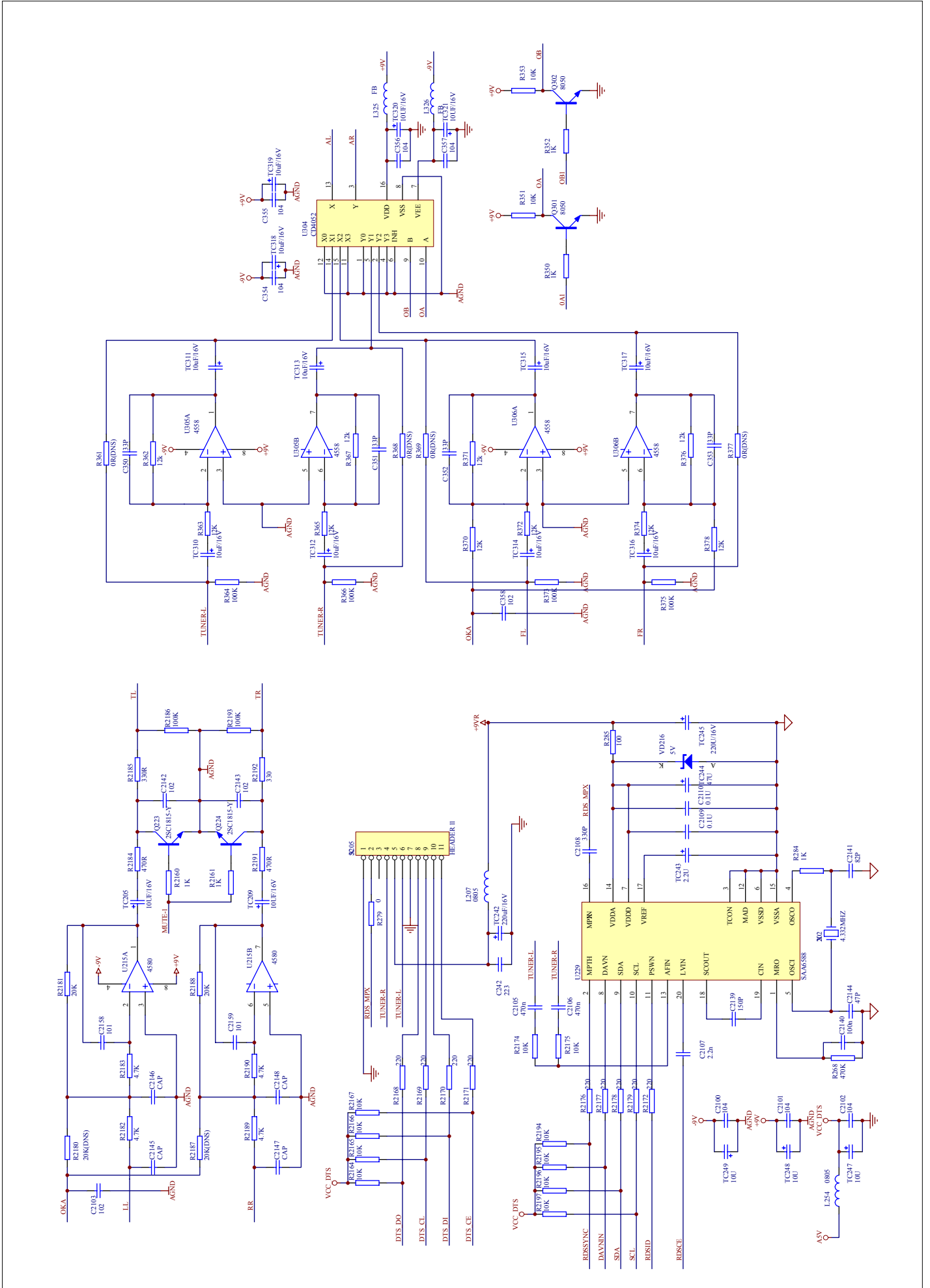
MIAN SCHEMATIC DIAGRAM



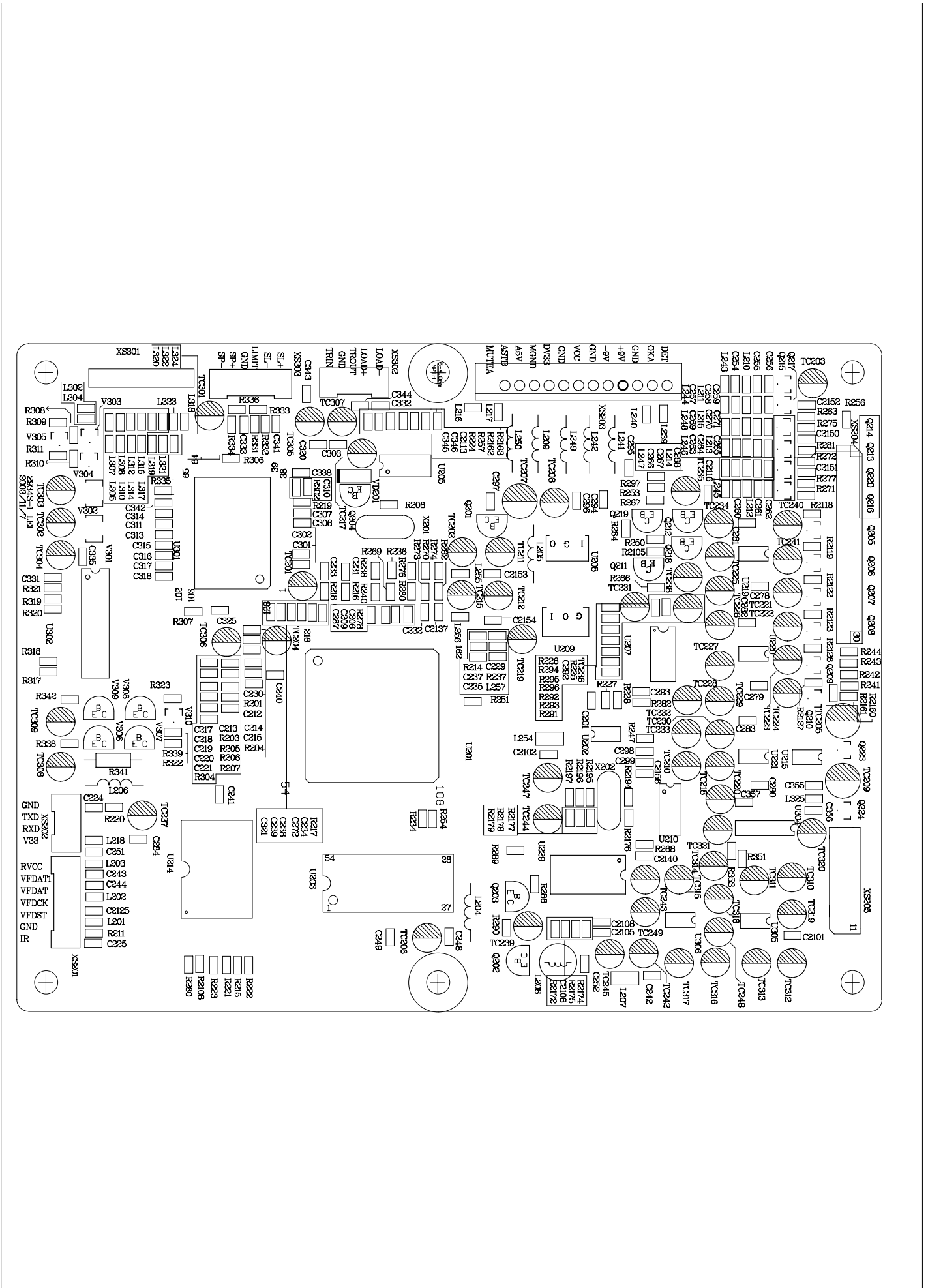
MIAN SCHEMATIC DIAGRAM



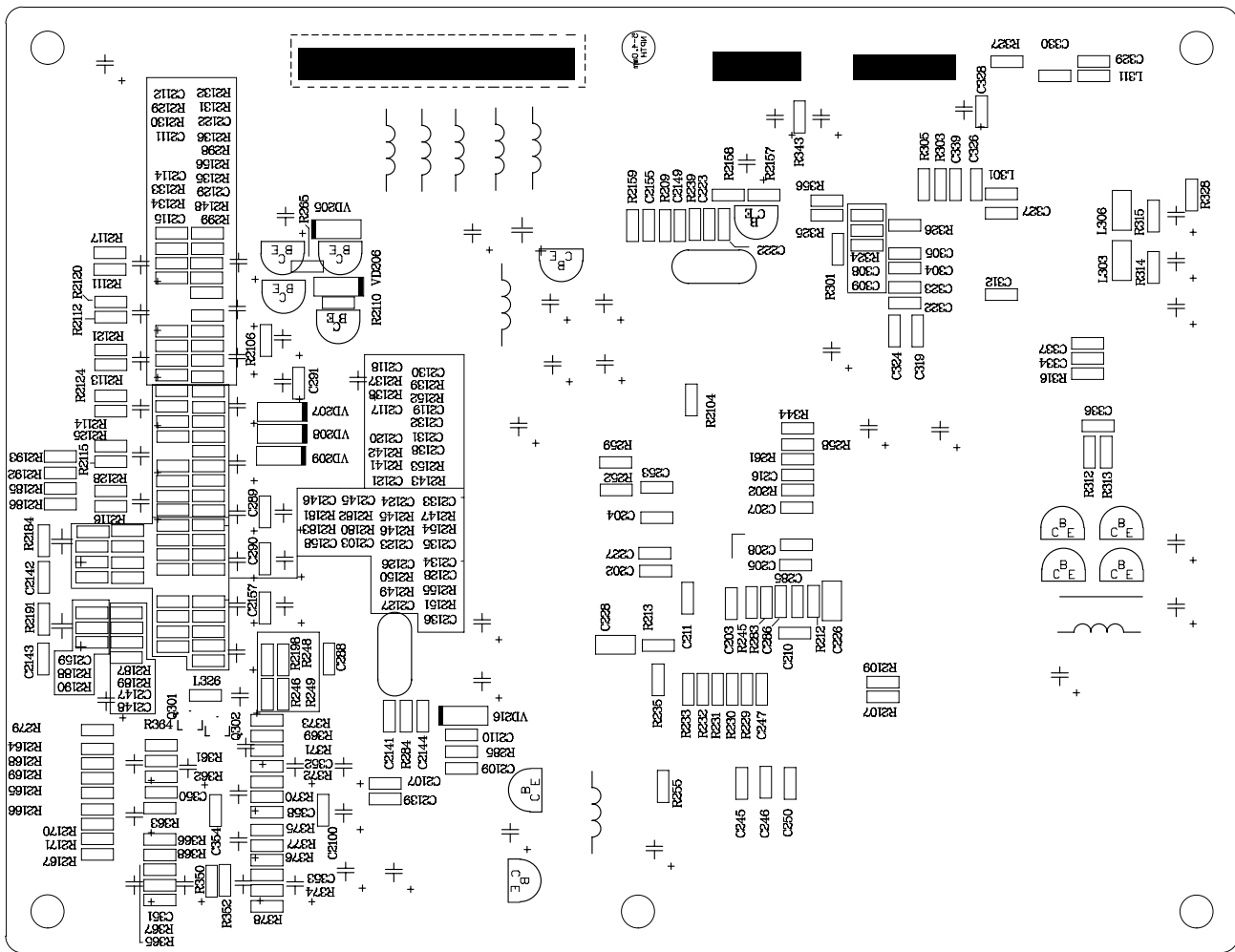
MIAN SCHEMATIC DIAGRAM



MIAN SCHEMATIC DIAGRAM



MIAN SCHEMATIC DIAGRAM



10. SPARE PARTS LIST

DK929S-2 MATERIAL LIST

1. POWER BOARD

MATERIAL CO	MATERIAL NAME	SPECIFICATIONS	UNIT	QUANTITY	LOCATION
0000273	CARBON FILM RESISTOR	1/4W33 ±5% SHAPED 10	PCS	1	R505
0000278	CARBON FILM RESISTOR	1/4W330 ±5% SHAPED 10	PCS	1	R506
0000294	CARBON FILM RESISTOR	1/4W10K±5% SHAPED 10	PCS	1	R507
0000289	CARBON FILM RESISTOR	1/4W4.7K±5% SHAPED 10	PCS	1	R510
0000310	CARBON FILM RESISTOR	1/4W1M ±5% SHAPED 10	PCS	1	R504
0010057	METAL FILM RESISTOR	1/4W4.7K±1%	PCS	1	R508
0010101	METAL FILM RESISTOR	1/4W12K±1% SHAPED 10	PCS	1	R509
0010134	METAL OXIDE FILM RESISTOR	1W330 ±5% SHAPED R 15×8	PCS	1	R511
0010135	METAL OXIDE FILM RESISTOR	2W39K±5% SHAPED FLAT 15×9	PCS	1	R503
0010159	METAL OXIDE FILM RESISTOR	2W39K±5% SHAPED FLAT 15×7	PCS	1	R503
0010148	METAL OXIDE FILM RESISTOR	2W120K±5% SHAPED FLAT 15×7	PCS	1	R502
0010219	METAL OXIDE FILM RESISTOR	2W10 ±5% SHAPED FLAT 15×7	PCS	1	R520
0070001	HIGH VOLTAGE RESISTOR	1/2W680K±5%	PCS	1	R501
0200105	PORCELAIN CAPACITOR	50V 100P ±10% 5mm	PCS	6	C505,C507,C509,C511,C513,C514
0200138	PORCELAIN CAPACITOR	50V 104 ±20% 5mm	PCS	4	C504,C508,C510,C515
0200223	PORCELAIN CAPACITOR	1000V 101 +80%-20% 7.5mm	PCS	1	C503
0200228	PORCELAIN CAPACITOR	1000V 101 ±10% 7.5mm	PCS	1	C503
0200224	PORCELAIN CAPACITOR	1000V 103 +80%-20% 7.5mm	PCS	1	C502
0200267	CERAMIC CAPACITOR	CT81 250VAC221±20% 10mm	PCS	1	BC503
0200268	CERAMIC CAPACITOR	CT81 250VAC221±10% 10mm	PCS	1	BC503
0210023	TERYLENE CAPACITOR	100V 223 ±10% 5mm	PCS	1	C506
0210066	TERYLENE CAPACITOR	275V 104 ±20% 15mm	PCS	1	BC501
0210070	TERYLENE CAPACITOR	275V 104 ±10% 15mm	PCS	1	BC501
0260557	CD	CD11T 16V100u±20%6×12 2.5	PCS	3	TC508,TC511,TC513
0260558	CD	CD11T 25V470u±20%10×16 5	PCS	2	TC503,TC504
0260559	CD	CD11T 50V47u±20%6×12 2.5	PCS	2	TC502,TC512
0260560	CD	CD11T 10V1000u±20%8×16 3.5	PCS	4	TC505,TC506,TC509,TC510
0260527	CD	CD288H 400V47U±20%22×25 10	PCS	1	TC501
0390057	MAGNETIC BEADS INDUCTOR	RH354708	PCS	1	L503
0410010	CHOKER COIL	VERTICAL 10UH 1A 5mm	PCS	1	L505
0410011	CHOKER COIL	VERTICAL 10UH 2A 5mm	PCS	2	L506,L507
0460282	SWITCHING POWER TRANSFORMER	BCK-28-0286	PCS	1	T501
0460283	SWITCHING POWER TRANSFORMER	BCK2801-624	PCS	1	T501
0570013	DIODE	HER105	PCS	4	D506,D508,D511,D512
0570028	DIODE	HER306	PCS	1	D510
0680007	SCHOTTKY DIODE	SR360	PCS	1	D509
0570014	DIODE	HER107	PCS	1	D505
0580006	VOLTAGE REGULATOR DIODE	5.1V 1/2W	PCS	1	ZD501
0580054	VOLTAGE REGULATOR DIODE	9.1V 1W	PCS	1	ZD502
0570005	DIODE	1N4007	PCS	4	D501~D504
0880765	IC	5L0380R YDTU	PCS	1	U501
0880553	IC	LM431ACZ TO-92	PCS	1	U503
0880581	IC	TL431C TO-226AA(LP)	PCS	1	U503
0880800	IC	431L TO-92	PCS	1	U503
0880888	IC	KA431AZ TO-92	PCS	1	U503
1000004	POWER GRID FILTER	UT-20 40mH ±20% 10×13	PCS	1	L501
1080011	PHOTOELECTRIC COUPLER	HS817	PCS	1	U502
0880379	IC	LM7805 金封 TO-220	PCS	1	U504
1562710	PCB	5934S-0	PCS	1	
1940024	SOCKET	5P 2.0mm	PCS	1	CN501
1940029	SOCKET	9P 2.5mm	PCS	1	CN503
1940001	SOCKET	2P 2.5mm	PCS	1	CN502
1940006	SOCKET	6P 2.5mm	PCS	1	CN504
1940045	SOCKET	2P 8.0mm 2#	PCS	2	BCN501,BCN502
2100003	CONNECTION CORDS	0.6 SHAPED 7.5mm	PCS	2	J506,J503
2100004	CONNECTION CORDS	0.6 SHAPED 10mm	PCS	4	L502,J501,J505
2100006	CONNECTION CORDS	0.6 SHAPED 12.5mm	PCS	2	J502,J507
2100010	CONNECTION CORDS	0.6 SHAPED 5mm	PCS	1	J504
2300007	FUSE	T1.6AL 250V	PCS	1	F501

3020402	FUSE HOLDER	BLX-2	PCS	1	FOR F501
3580039	HEAT RADIATION BOARD	11×15×25 AB009K	PCS	2	U501,U504 FOR HEAT RADIATION
3580054	HEAT RADIATION BOARD	11×15×25 WHITE AB905	PCS	2	U501,U504 FOR HEAT RADIATION
3870115	GROUND CHIP OF POWER BOARD	AB903	PCS	2	G501~G502
4000073	TAPPING SCREW	BT 3×8 BLACK	PCS	2	FIXED HEAT RADIATION BOARD

2. MAIN BOARD

MATERIAL CO	MATERIAL NAME	SPECIFICATIONS	UNIT	QUANTITY	LOCATION
0000216	CARBON FILM RESISTOR	1/4W10K±5%	PCS	7	R406,R407,R408,R409,R410,R416,R417
0000294	CARBON FILM RESISTOR	1/4W10K±5% SHAPED 10	PCS	7	R406,R407,R408,R409,R410,R416,R417
0000227	CARBON FILM RESISTOR	1/4W33K±5%	PCS	6	R402,R403,R404,R411,R412,R413
0000300	CARBON FILM RESISTOR	1/4W33K±5% SHAPED 10	PCS	6	R402,R403,R404,R411,R412,R413
0000268	CARBON FILM RESISTOR	1/4W2.2 ±5% SHAPED 10	PCS	1	R418
0000231	CARBON FILM RESISTOR	1/4W51K±5%	PCS	1	R405
0000302	CARBON FILM RESISTOR	1/4W51K±5% SHAPED 10	PCS	1	R405
0000276	CARBON FILM RESISTOR	1/4W100 ±5% SHAPED 10	PCS	1	R415
0310047	SMD CAPACITOR	50V 101 ±5% NPO 0603	PCS	2	C402,C403
0310084	SMD CAPACITOR	50V 104 +80%-20% 0603	PCS	3	C401,C404,C405
0260201	CD	CD11C 16V100U±20%6×7 2.5	PCS	2	TC401,TC402
0570006	DIODE	1N4148	PCS	2	VD401,VD402
0570036	DIODE	1N4148 SHAPED 10mm	PCS	2	VD401,VD402
1340003	LIGHT TOUCH RESTORE SWITCH	HORIZONTAL 6×6×1	PCS	6	K401~K406
2360002	IR SENSOR	HS0038B	PCS	1	U402
0880275	IC	PT6311 QFP	PCS	1	U401
1200500	DISPLAY SCREEN	10-BT-255GNK	PCS	1	VFD401
5231636	VFD SPONGE SPACER	12×10×6	PCS	2	
5232919	SOFT SPONGE SPACER	7×7×10 DOUBLE-FACED, HARD	PCS	1	
2121225	FLAT CABLE	5P100 2.0 2 SOCKET WITH NEEDLE, THE SAME DIRECTION	PCS	1	XS402
2121226	FLAT CABLE	5P400 2.0 2 SOCKET WITH NEEDLE, THE SAME DIRECTION	PCS	1	XS401
1631192	PCB	4934S-0	PCS	1	

3. AV BOARD

MATERIAL CO	MATERIAL NAME	SPECIFICATIONS	UNIT	QUANTITY	LOCATION
0000167	CARBON FILM RESISTOR	1/4W33Ω±5%	PCS	1	R708
0090017	SMD RESISTOR	1/16W 2.2K ±5%	PCS	2	R710,R712
0000268	CARBON FILM RESISTOR	1/4W2.2 ±5% SHAPED 10	PCS	1	R706
0000289	CARBON FILM RESISTOR	1/4W4.7K±5% SHAPED 10	PCS	1	R704
0000431	CARBON FILM RESISTOR	1/4W75 ±5% SHAPED 10	PCS	1	R705
0000195	CARBON FILM RESISTOR	1/4W1K±5%	PCS	1	R711
0000171	CARBON FILM RESISTOR	1/4W68Ω±5%	PCS	1	R703
0000276	CARBON FILM RESISTOR	1/4W100 ±5% SHAPED 10	PCS	1	R702
0000181	CARBON FILM RESISTOR	1/4W220Ω±5%	PCS	1	R701
0000278	CARBON FILM RESISTOR	1/4W330 ±5% SHAPED 10	PCS	1	R709
0310066	SMD CAPACITOR	50V 102 ±10% 0603	PCS	8	C701~C706,C714,C715
0310084	SMD CAPACITOR	50V 104 +80%-20% 0603	PCS	1	C708
0200138	PORCELAIN CAPACITOR	50V 104 ±20% 5mm	PCS	3	C710,C711,C713
0200139	PORCELAIN CAPACITOR	50V 104 +80%-20% 5mm	PCS	3	C710,C711,C713
0310234	SMD CAPACITOR	16V 105 +80%-20% 0603	PCS	7	C707,C716~C721
0260015	CD	CD11 10V1000U±20%8×16 3.5	PCS	5	TC701~TC705
260237	CD	CD11 10V1000U±20%8×14 3.5	PCS	5	TC701~TC705
0260252	CD	GS 10V1000U±20%8×16 3.5	PCS	5	TC701~TC705
0260352	CD	GS 10V1000U±20%8×14 3.5	PCS	5	TC701~TC705
0390057	MAGNETIC BEADS	RH354708	PCS	12	L701~L710,L714,L715
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	PCS	2	L711,L712
0780050	TRIODE	S8050D	PCS	3	V701~V703
2100004	CONNECTION CORDS	0.6 SHAPED 10mm	PCS	2	R707,JP706

2100003	CONNECTION CORDS	0.6 SHAPED 7.5mm	PCS	4	JP704,JP705,JP707,JP708
2100010	CONNECTION CORDS	0.6 SHAPED 5mm	PCS	3	JP701~JP703
1910079	TERMINAL SOCKET	AV8-8.4-6G-3	PCS	1	JK701
1910094	TERMINAL SOCKET	AV4-8.4-6G-5	PCS	1	JK703
1090045	ELECTRO-OPTIC TRANSFORMER	TX179ATW	PCS	1	JK704
1090024	ELECTRO-OPTIC TRANSFORMER	TX179AT	PCS	1	JK704
1860029	SCART SOCKET	SCART-01	PCS	1	JK705
1910059	TERMINAL SOCKET	CS-09	PCS	1	JK702
1940193	CABLE SOCKET	15P 1.0mm STRAIGHT DUAL TOUCH POINT LINE PLUG	PCS	1	XS701
1563090	PCB	7934S-1	PCS	1	

4. OK BOARD

MATERIAL CO	MATERIAL NAME	SPECIFICATIONS	UNIT	QUANTITY	LOCATION
0000118	CARBON FILM RESISTOR	1/6W10 ±5% SHAPED 7.5	PCS	2	R621,R622
0000122	CARBON FILM RESISTOR	1/6W100 ±5% SHAPED 7.5	PCS	1	R619
0000123	CARBON FILM RESISTOR	1/6W330 ±5% SHAPED 7.5	PCS	1	R616
0000126	CARBON FILM RESISTOR	1/6W560 ±5% SHAPED 7.5	PCS	2	R603,R604
0000129	CARBON FILM RESISTOR	1/6W1K±5% SHAPED 7.5	PCS	2	R608,R620
0090014	SMD RESISTOR	1/16W 1K ±5%	PCS	1	R607
0000134	CARBON FILM RESISTOR	1/6W5.1K±5% SHAPED 7.5	PCS	1	R613
0000137	CARBON FILM RESISTOR	1/6W10K±5% SHAPED 7.5	PCS	4	R606,R618,R623,R610
0090023	SMD RESISTOR	1/16W 10K ±5%	PCS	2	R605,R609
0000140	CARBON FILM RESISTOR	1/6W22K±5% SHAPED 7.5	PCS	1	R601
0090026	SMD RESISTOR	1/16W 22K ±5%	PCS	1	R602
0000146	CARBON FILM RESISTOR	1/6W100K±5% SHAPED 7.5	PCS	2	R615,R617
0000133	CARBON FILM RESISTOR	1/6W4.7K±5% SHAPED 7.5	PCS	2	R611,R612
0200035	PORCELAIN CAPACITOR	50V 47P ±5% NPO 5mm	PCS	1	C606
0200149	PORCELAIN CAPACITOR	50V 47P ±5% 5mm	PCS	1	C606
0200152	PORCELAIN CAPACITOR	50V 47P ±10% 5mm	PCS	1	C606
0310045	SMD CAPACITOR	50V 47P ±5% NPO 0603	PCS	1	C605
0200105	PORCELAIN CAPACITOR	50V 100P ±10% 5mm	PCS	1	C607
0200131	PORCELAIN CAPACITOR	50V 103 ±10% 5mm	PCS	1	C604
0310072	SMD CAPACITOR	50V 103 ±10% 0603	PCS	1	C603
0200138	PORCELAIN CAPACITOR	50V 104 ±20% 5mm	PCS	2	C601,C602
0200124	PORCELAIN CAPACITOR	50V 102 ±20% 5mm	PCS	1	C608
0260094	CD	CD110 16V47U±20%5×11 2	PCS	3	TC611,TC615,TC616
0260025	CD	CD11 16V47U±20%5×11 2	PCS	3	TC611,TC615,TC616
0260200	CD	CD11C 16V47U±20%5×7 2	PCS	3	TC611,TC615,TC616
0260127	CD	CD11 16V4.7U±20%5×11 2	PCS	5	TC601~TC604,TC613
0260021	CD	CD11 16V22U±20%5×11 2	PCS	2	TC605,TC606
0260037	CD	CD11 25V22U±20%5×11 2	PCS	2	TC605,TC606
0390057	MAGNETIC BEADS INDUCTOR	RH354708	PCS	2	L601,L602
0570006	DIODE	1N4148	PCS	3	VD601~VD603
0880124	IC	NJM4558D DIP	PCS	2	U601,U602
0880308	IC	KA4558 DIP	PCS	2	U601,U602
2120463	FLAT CABLE	6P80 2.5 2 SOCKET WITH NEEDLE	PCS	1	XS601
1980017	MIC SOCKET	CK3-6.35-106 WITH NUT	PCS	2	MIC601,MIC602
3870758	MIC METAL BRACKET	bbk934S(RU)	PCS	1	
1940024	SOCKET	5P 2.0mm	PCS	1	XS602
2100010	CONNECTION CORDS	0.6 SHAPED 5mm	PCS	1	JP605
2100003	CONNECTION CORDS	0.6 SHAPED 7.5mm	PCS	4	JP601~JP604
1562711	PCB	6934S-0	PCS	1	

5. SUBSIDIARY OK BOARD

MATERIAL CO	MATERIAL NAME	SPECIFICATIONS	UNIT	QUANTITY	LOCATION
0120002	SLIDING POTENTIOMETER	10K R1212N11A1	PCS	2	VRB01,VRB02
0160074	ROTATED POTENTIOMETER	W121-2C-F20-B10K	PCS	2	VRB01,VRB02
2121227	FLAT CABLE	5P50 2.0 2 SOCKET WITH L NEEDLE, THE SAME DIRECTION	PCS	1	XSB01
1562712	PCB	B934S-0	PCS	1	

6. DECODE BOARD

MATERIAL CO	MATERIAL NAME	SPECIFICATIONS	UNIT	QUANTITY	LOCATION
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0090001	SMD RESISTOR	1/16W 0Ω ±5%	PCS	29	C2119,C2128,C2131,L243~L248,R205,R219,R220,R226,R240,R241,R243,R257,R259,R269,R282,R332,R327,R2162,R344,L301,R246,R249,R2185,R2192
0000375	CARBON FILM RESISTOR	1/4W2.2Ω±5%	PCS	1	R341
0090272	SMD RESISTOR	1/16W1Ω±5%	PCS	5	R312,R313,R317,R318,R336
0090106	SMD RESISTOR	1/16W 4.7Ω ±5%	PCS	4	R212,R213,R258,R261
0090003	SMD RESISTOR	1/16W 10Ω ±5%	PCS	1	R211
0090179	SMD RESISTOR	1/16W 15Ω ±5%	PCS	2	R314,R315
0090005	SMD RESISTOR	1/16W 33Ω ±5%	PCS	19	R2107~R2109,R2159,R229~R235,R254,R255,R291~R296
90011	SMD RESISTOR	1/16W 470Ω ±5%	PCS	2	R322,R323
0090232	SMD RESISTOR	1/16W 150Ω ±5%	PCS	15	R256,R262~R264,R270~R277,R280,R281,R247
0090008	SMD RESISTOR	1/16W 220Ω ±5%	PCS	4	R2168~R2171
0090009	SMD RESISTOR	1/16W 330Ω ±5%	PCS	1	R253
0090014	SMD RESISTOR	1/16W 1K ±5%	PCS	30	R227,R228,R252,R266,R267,R2104,R2105,R2106,R2110,R2117~R2128,R2158,R2160,R2161,R290,R286,R2184,R2191,R350,R352
0090016	SMD RESISTOR	1/16W 1.5K ±5%	PCS	2	R338,R342
0090019	SMD RESISTOR	1/16W 4.7K ±5%	PCS	20	R245,R2130,R2131,R2134,R2135,R2138,R2139,R2142,R2143,R2146,R2147,R2150,R2151,R2182,R2183,R2189,R2190,R222,R223,R289
0090021	SMD RESISTOR	1/16W 6.8K ±5%	PCS	8	R2136,R2148,R2152~R2155 , R298 , R299
90022	SMD RESISTOR	1/16W 8.2K ±5%	PCS	1	R201
0090023	SMD RESISTOR	1/16W 10K ±5%	PCS	18	R206,R250,R265,R303~R306,R309,R311,R319,R339,R2157,R2164~R2167,R351,R353
0090187	SMD RESISTOR	1/16W 12K ±5%	PCS	4	R371,R372,R374,R376
0090024	SMD RESISTOR	1/16W 15K ±5%	PCS	6	R207,R363,R365 , R362,R367 , R307
0090025	SMD RESISTOR	1/16W 20K ±5%	PCS	4	R203,R316,R320,R321
0090188	SMD RESISTOR	1/16W 18K ±5%	PCS	2	R204,R216
0090255	SMD RESISTOR	1/16W24K±5%	PCS	8	R2129,R2133,R2137,R2141,R2145,R2149,R2181,R2188
0090223	SMD RESISTOR	1/16W 2K ±5%	PCS	1	R237
0090229	PRECISION SMD RESISTOR	1/16W 330K ±1%	PCS	2	R333,R334
0090319	PRECISION SMD RESISTOR	1/16W 750K ±1%	PCS	3	R202,R331,R335
0090034	SMD RESISTOR	1/16W 100K ±5%	PCS	16	R208,R2111~R2116,R217,R308,R310,R373,R375,R2186,R2193,R364,R366

0260019	CD	CD11 16V10U±20%5×11 2	PCS	41	TC201,TC202,TC203,TC217,TC219,TC221~TC233,TC236,TC240,TC241,TC306,TC307,TC247,TC248,TC249,TC318,TC319,TC205,TC209,TC310,TC312,TC314,TC316,TC311,TC313,TC315,TC317,TC320,TC321, TC210
0260028	CD	CD11 16V220U±20%6×12 2.5	PCS	9	TC207,TC208,TC211,TC212,TC235,TC301,TC242,TC245,TC239
0260025	CD	CD11 16V47U±20%5×11 2	PCS	11	TC204,TC206,TC215,TC234,TC237,TC302~TC305,TC308,TC309
0260126	CD	CD11 16V1U±20%5×11 2	PCS	2	TC218,TC220
0310190	SMD CAPACITOR	50V 27P ±5% NPO 0603	PCS	3	C222,C223,C333
0310044	SMD CAPACITOR	50V 33P ±5% NPO 0603	PCS	4	C350~C353
0310045	SMD CAPACITOR	50V 47P ±5% NPO 0603	PCS	15	C254,C256,C257,C259,C260,C262,C263,C265,C266,C268,C269,C271,C243,C244,C2125
0310047	SMD CAPACITOR	50V 101 ±5% NPO 0603	PCS	13	C216,C225,C285,C286,C342,C2111,C2114,C2117,C2120,C2123,C2126,C2158,C2159
0310051	SMD CAPACITOR	50V 331 ±5% NPO 0603	PCS	2	C217,C218
0310048	SMD CAPACITOR	50V 151 ±5% NPO 0603	PCS	2	C331,C334
0310064	SMD CAPACITOR	50V 391 ±10% 0603	PCS	1	C304
0310084	SMD CAPACITOR	50V 104 +80%-20% 0603	PCS	91	C201~C211,C221,C224,C227,C230~C232,C234,C235,C237,C240,C241,C245~C250,C252,C253,C272,C278~C283,C284,C287,C289~C297,C301~C303,C312~C313,C320~C330,C332,C335~C339,C341,C343~C346,C2113,C2137,C2150~C2154,C2100~C2102,C354,C355,C356,C357,C2157,C288
0310058	SMD CAPACITOR	25V 104 +80%-20% 0603	PCS	91	C201~C211,C221,C224,C227,C230~C232,C234,C235,C237,C240,C241,C245~C250,C252,C253,C272,C278~C283,C284,C287,C289~C297,C301~C303,C312~C313,C320~C330,C332,C335~C339,C341,C343~C346,C2113,C2137,C2150~C2154,C2100~C2102,C354,C355,C356,C357,C2157,C288
0310234	SMD CAPACITOR	16V 105 +80%-20% 0603	PCS	6	C315~C318,C2156,C299
0310364	SMD CAPACITOR	10V 225 +80%-20% 0805	PCS	2	C226,C228
0310066	SMD CAPACITOR	50V 102 ±10% 0603	PCS	15	C233,C238,C239,C2103,C2112,C2115,C2116,C2118,C2121,C2124,C2127,C2146,C2148,C2155,C298
0310231	SMD CAPACITOR	50V 122 ±10% 0603	PCS	8	C2122,C2129,C2130,C2133,C2135,C2136,C2145,C2147
0310072	SMD CAPACITOR	50V 103 ±10% 0603	PCS	4	C212~C215
0310201	SMD CAPACITOR	50V 153 ±10% 0603	PCS	3	C220,C308,C319

0310055	SMD CAPACITOR	16V 333 ±10% 0603	PCS	2	C306,C242
0310053	SMD CAPACITOR	50V 471 ±5% NPO 0603	PCS	1	C311
0310046	SMD CAPACITOR	50V 82P ±5% NPO 0603	PCS	1	C305
0390044	SMD INDUCTOR	10UH ±10% 2012	PCS	3	L254,L303,L306
0410010	CHOKE COIL	VERTICAL 10UH 1A 5mm	PCS	1	L208
0390096	SMD INDUCTOR	1.8UH ±10% 1608	PCS	6	L210~L215
0390057	MAGNETIC BEADS INDUCTOR	RH354708	PCS	7	L204,L205,L209,L241,L242,L249,L250
0390095	SMD MAGNETIC BEADS	FCM1608K-221T05	PCS	28	L201~L203,L239,L240,L302,L304,L305,L307,L308,L310,L311,L312,L314,L316~L324, L255~L257 , L325,L326
0390087	SMD MAGNETIC BEADS	FCM2012V-221T07	PCS	1	L207
0700007	SMD DIODE	1N4148	PCS	6	VD201,VD205~VD209
0700001	SMD DIODE	LS4148	PCS	6	VD201,VD205~VD209
0700002	SMD DIODE	LL4148	PCS	6	VD201,VD205~VD209
0780029	TRIODE	C8050	PCS	4	V307,V308,Q201,Q203
0780030	TRIODE	8550C	PCS	3	V306,V309,Q202
0780032	TRIODE	9014C	PCS	1	Q204
0780020	TRIODE	C1815Y	PCS	1	Q212
0780197	SMD TRIODE	C1815	PCS	8	Q205~Q210,Q223,Q224
0780043	TRIODE	2SA1015	PCS	3	Q211,Q218,Q219
0780041	SMD TRIODE	3906	PCS	6	Q213~Q217,Q220
0780040	SMD TRIODE	3904	PCS	1	V305
0780062	SMD TRIODE	9014C	PCS	1	V310
0780085	SMD TRIODE	8050D	PCS	2	Q301,Q302
0780193	SMD TRIODE	2SK3018	PCS	2	V303,V304
0780115	SMD TRIODE	2SB1132	PCS	2	V301,V302
0880185	IC	NJM4558M SOP	PCS	6	U219,U220,U221 , U215 , U305 , U306
0880562	IC	4580 SOP	PCS	6	U219,U220,U221 , U215 , U305 , U306
0880361	IC	4558 SOP	PCS	6	U219,U220,U221 , U215 , U305 , U306
0880322	IC	MM74HCU04M SOP	PCS	1	U205
0880513	IC	HCU04 SOP	PCS	1	U205
0881415	IC	HY57V641620HGT-7 TSOP	PCS	1	U203
0881693	IC	TL 74HC4052D SOP	PCS	1	U304
0881886	IC	36C7T 3MCD4052BM SOP	PCS	1	U304
0881057	IC	CS4360 SSOP	PCS	1	U207
0881031	IC	24C02N SOP	PCS	1	U202
0881690	IC	MT1336E-C QFP	PCS	1	U301
0881689	IC	MT1379EE-C QFP	PCS	1	U201
0881378	IC	BA5954FP HSOP	PCS	1	U302
0881263	IC	PCM1801U SOP	PCS	1	U210
0960020	CRYSTAL OSCILLATOR	27.00MHz 49-S	PCS	1	X201
1940193	CABLE SOCKET	15P 1.0mm STRAIGHT DUAL TOUCH POINT LINE PLUG	PCS	1	XS204
1940072	CABLE SOCKET	6/5P 1.25mm STRAIGHT DUAL LINE PLUG	PCS	1	XS205
1940024	SOCKET	5P 2.0mm	PCS	2	XS201,XS302
1940005	SOCKET	6P 2.0mm	PCS	1	XS303
1940098	SOCKET	11P 2.5mm	PCS	1	XS203
1940094	CABLE SOCKET	24P 0.5mm SMD WITH CLASP	PCS	1	XS301
1631286	PCB	2934S-1	PCS	1	

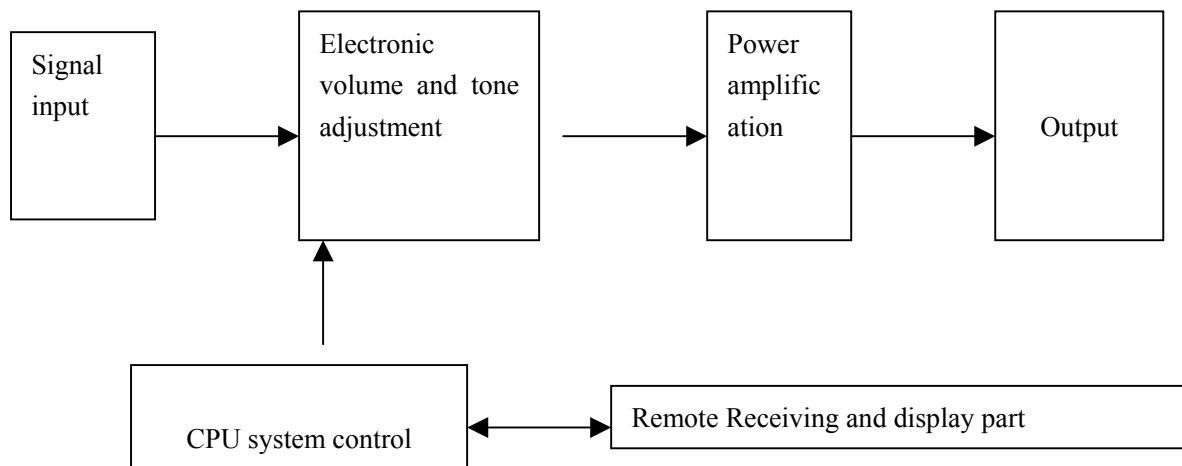
SPEAKERS PART

DK929S Principles and Maintenance

DK929S is a medium-grade active sound box consisting of one subwoofer sound box, two pre-positioned satellite sound boxes, two surround sound boxes and one centrally positioned sound box. The product features good sound effect in appropriate space, and it has the following features:

- 1) 2.1/5.1 sound channel output;
- 2) Built-in five sound channel power amplification, and adaptable to AC-3/DTS and stereo music replay;
- 3) Six sound channel volume control and independent level control, with tone adjustment function.

二、 Principle block diagram



三、 System composition

The device comprises input board, output board, power amplification board and control panel. The input board and output board only consist of

a few terminals. The power amplification board is the most important part, fulfilling control, amplification and power supply for the whole system. In the following is the brief description of the principles for the power amplification board.

1、 Power supply part

In consideration of the big output power of the subwoofer, the device employs a ring transformer for power supply. A group of 18V(AC) voltages is output from the transformer, which will be subject to rectification and filtering and will output +22 V voltage to power IC TDA8947 and IC TFA9843 for power supply.

One line of output 22V voltage goes through the current limiting resistor R101, voltage regulating diode VD104 and capacitor C108 and then output +9V voltage to IC 75347; the other line goes through R100 and voltage regulating diode VD105 and then output 5V voltage power supply for the CPU and the control panel.

2. Signal input, volume adjustment

The device has six channels for signal input. The signals input through each channel will go through the filtering capacitor before being directly delivered to the IC TDA7448 for volume adjustment. In addition, one line of signals will be derived from the L and R main sound channels and overlapped on the SW input. As a result, 2.1 output result will be

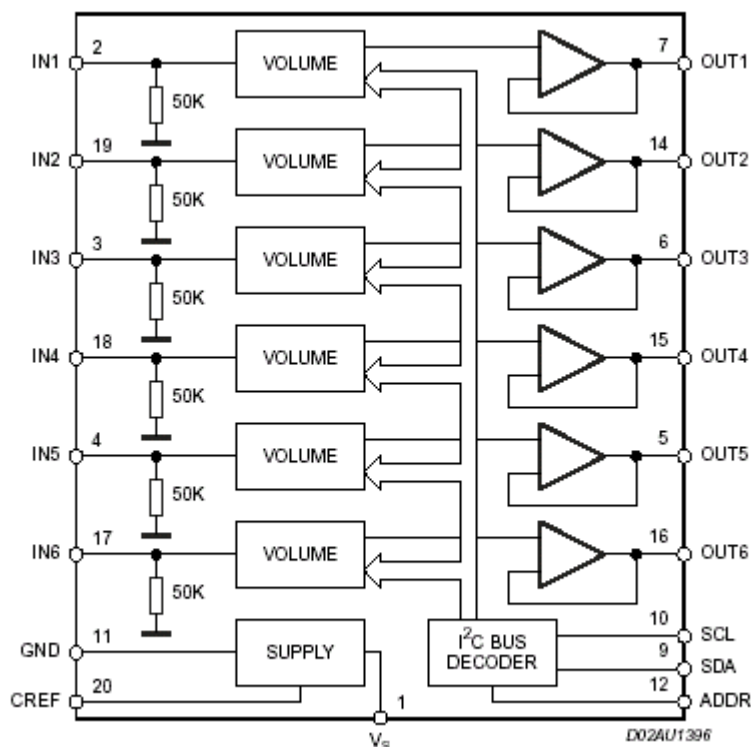
achieved even when there are only L and R sound channel inputs.

IC TDA7448 is an IC with six-channel independent volume adjustment. With its gains adjustable from 0 to 79 single DB, it is applicable to home theater products. With benefits such as small range of power supply, low power consumption and wide temperature scope, it is a quite competent IC, and the functions of its main pins are listed in the following table:

Pin name	Pin Numbering	Function description
IN1	2	Signal input
IN2	19	Signal input
IN3	3	Signal input
IN4	18	Signal input
IN5	4	Signal input
IN6	17	Signal input
OUT1	7	Signal output
OUT2	14	Signal output
OUT3	6	Signal output
OUT4	15	Signal output
OUT5	5	Signal output
OUT6	16	Signal output
GND	11	Grounding pin
CREF	20	Reference voltage

VS	1	Power voltage
SCL	10	Clock control line
SDA	9	Data control line
ADDR	12	Digital voltage

The IC principle diagram is illustrated in the following figure:



2、 Amplifying circuit part

Principle: as far as the signals output from the IC 7448 are concerned, the signals of the main sound channel will be delivered to the N101 IC TFA9843 for power amplification; the central surround signals will be filtered and delivered to the N106 IC TDA8947 for amplification; the subwoofer signals will first pass experience amplitude limit (the amplitude limit circuit comprises VD110 and VD113 diodes) and pretreatment before being delivered to the N102 IC TFA9843. Amplitude

limit is aimed at preventing excessive size of signals, which may, after amplification, damage the loudspeaker due to excessive power. Because the power supply of the amplification IC is fulfilled by a single power source, all amplified and output signals will have DC, therefore, the signals will still experience filtering before being output to the loudspeaker.

IC TFA9843J is used for dual sound channel power amplification. With standby and mute modes, free from switch impact, and with functions such as short circuit protection and overheat protection, it can effectively be prevented from being damaged in case of IC abnormality. In ordinary output mode, the IC can supply for each channel a maximum of 20W power output. When BTL output is employed, the power can be as high as 40W. In addition, the IC features powerful anti-ripple performance, with little power consumption in the standby state.

The functions of the various pins of the IC TFA9843J are listed in the following table:

Symbol	Pin	Function
IN2+	1	2nd channel input
OUT2-	2	2nd channel output
CIV	3	Common mode input voltage suppression

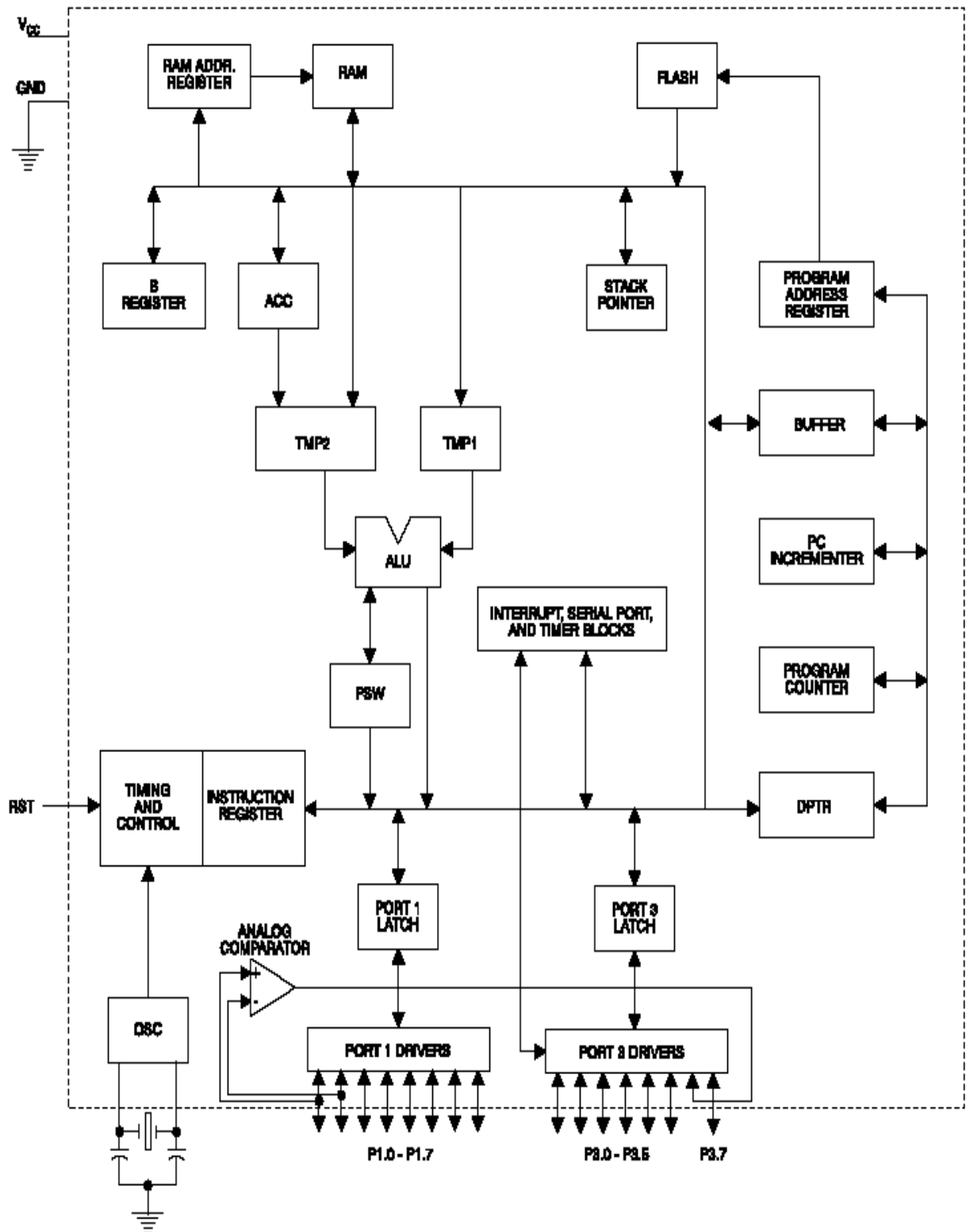
1N1+	4	1st channel input
GND	5	Ground
SVR	6	Reference voltage
MODE	7	Mode selection
OUT1+	8	1st channel output
VCC	9	Power supply

IC TDA8947J is used for four channel power amplification. Its features are similar to those of the IC TFA9843J, however, its output power is bigger, and a single sound channel can be as high as 25 W.

3、 Control circuit

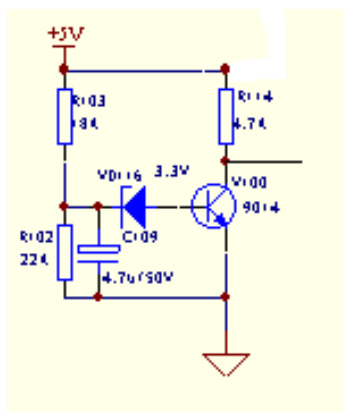
The device employs IC AT89C2051 to serve as its core part to control the operation of the whole device. With low voltage and high performance, it employs 8-bit 2K bytes flash and ROM single-chip. Boasting 15 I/O ports and six interrupt sources; it has features such as low power consumption and standby mode.

The principle block diagram of the IC is illustrated in the following figure:



Reset circuit:

The device employs high level for resetting. By making use of the feature of the capacitor C109 that there is no jump for of voltage, the device ensures that there is no jump of capacitor voltage at the instant of power on. The base electrode of the triode V100 has low level, so that the triode is not on, and the 5V voltage is added to the first pin of the CMP through resistor R114. With capacitor charging, the positive voltage of the capacitor gradually climbs; when the voltage attains a certain limit, the voltage regulating diode is reversely on, so that the base electrode of the triode has high level, the triode is on, the reset pin voltage turns into low level, thus fulfilling resetting. The circuit diagram is illustrated in the following figure:



Reset circuit

Mainly remote control is employed for adjustment of the status of the device. The signals received by the remote controller are delivered to the sixth pin of the CPU. After the signals are processed inside the CPU, pins 8 and 9 deliver control signals to adjust the volume of the device. Then there will be corresponding display on the control panel through P1 port,

so that users are able to understand the status of the device. In addition, pins 2 and 3 of the CPU are used to control the mute state of the main sound channel and the central surround.

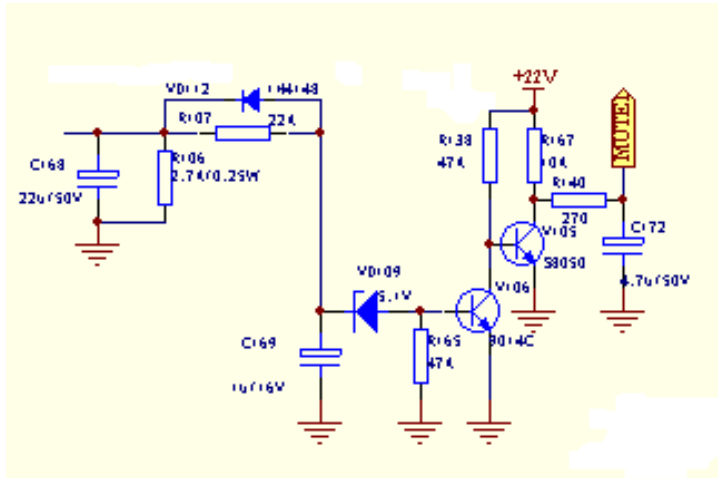
5. Control panel

The control panel of the device consists of a remote control receiver and a nixie tube. Because the device is operated through remote control, the remote control receiver is the sole path for man-machine communication. The nixie tube is used to display the ongoing operation and the state of the whole system.

6. Power on/off mute and mute circuit

Power on/off mute: as shown in the figure, at the instant of power on, the voltages on both sides of capacitor C169 won't experience jump-off, as a result, the low level will remain unchanged, the triode V106 is off, V105 is on, MUTE1 output turns into low level, LRM and SCM signal levels turn lower, and then there is mute. When the capacitor is charged to turn on VD109 5.1V voltage regulator tube and V104 9014 triode, the level of the V105 base electrode will become lower, so that triode V105 turns off, MUTE1 outputs high level, and the mute then comes to an end. The same case applies to power off. Capacitor C169 experiences fast discharge through diode VD112, so that the positive voltage experiences fast decrease, triode V106 turns off, V105 turns on, MUTE outputs low

level and turns on. It is through this circuit that we achieve no impact sound when power is on/off.



Mute circuit: the mute function is realized through the mute signals transmitted by the CPU. Press the MUTE key on the remote controller, the remote control receiver will receive signals and transmitted them to the CPU for processing. Then, pins 2 and 3 of the CPU will transmit high level, so that triodes V107 and V108 turn on, LRM and SCM levels become lower, and the mute is on. It makes use of the mode selection feature of the IC TDA9843 and IC TDA8947. For more details, please refer to the information for the IC TDA9843.

四、 Troubleshooting

The electronic circuit inside the device is relatively simple, without too many complicated control and detection circuits. As a result, signal injection method is employed for the maintenance of the device, namely, signals are added to the input end, and flow along the signal procedure. If

signals are interrupted at a certain place, then we can determine that the fault may happen here.

The maintenance of the device is in compliance with the following procedures:

- 1、 Check whether the power supply part is normal, namely, check whether the power supply of 22V, 9V and 5V is normal;
- 2、 In case of abnormal sound but normal power supply, check whether the mute level is normal, and then consider whether it is attributed to the wrongness of other parts;
- 3、 For a device with abnormal display, first determine whether there is anything wrong with the nixie tube, and then check whether there is anything wrong with the CPU.

*****ATTACHMENT*****

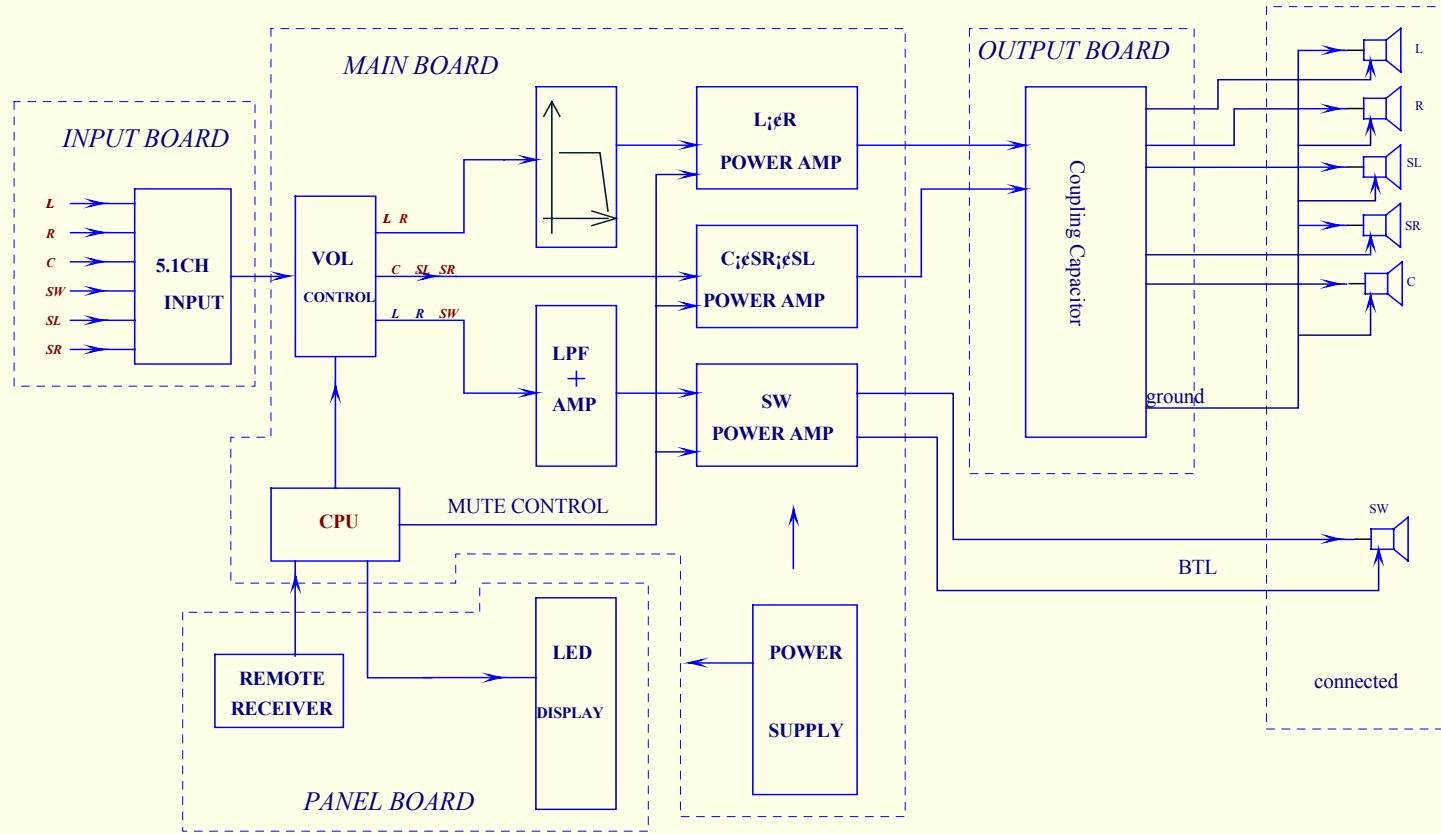
1: Block diagram

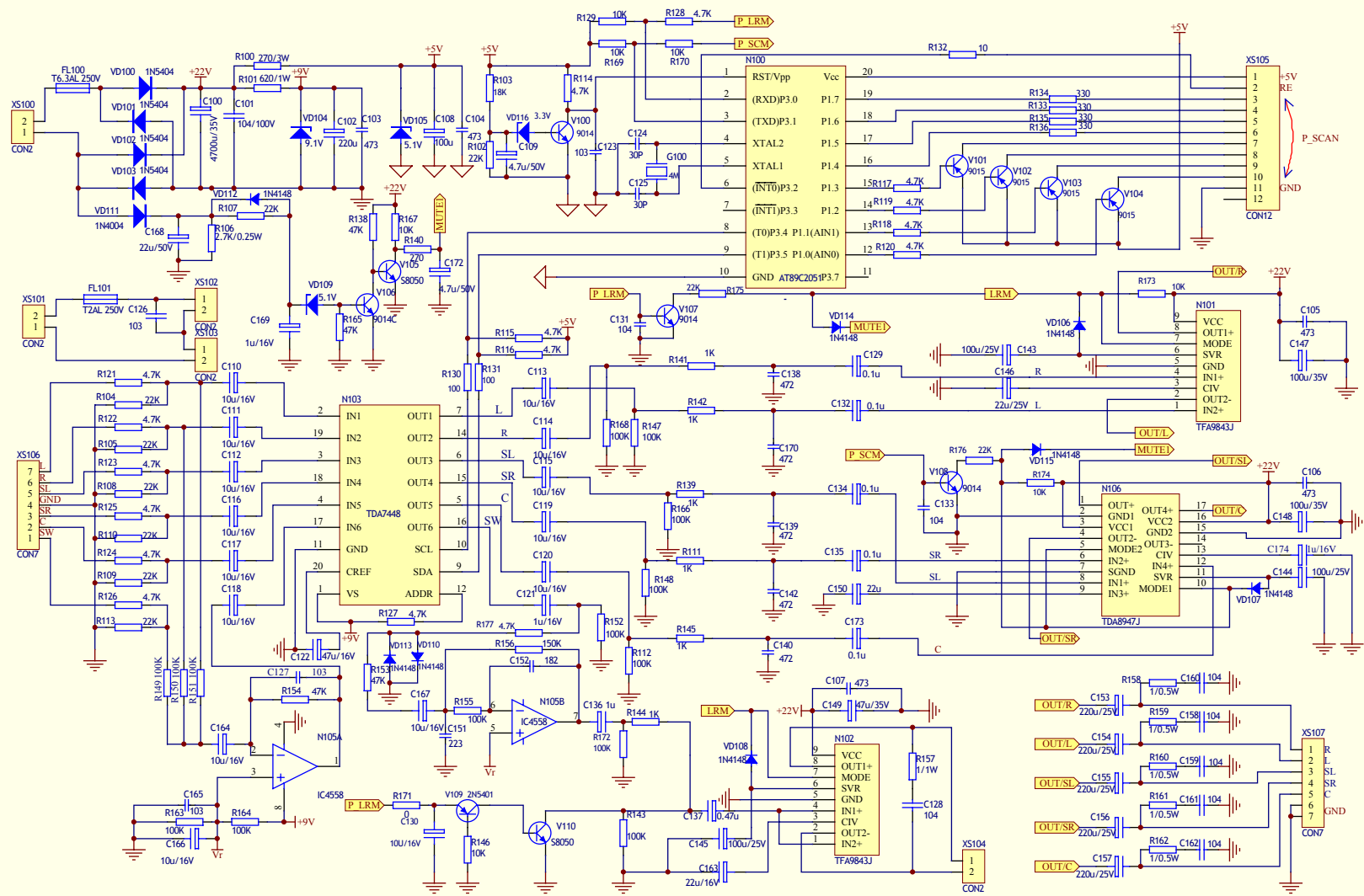
2: Electronic diagram

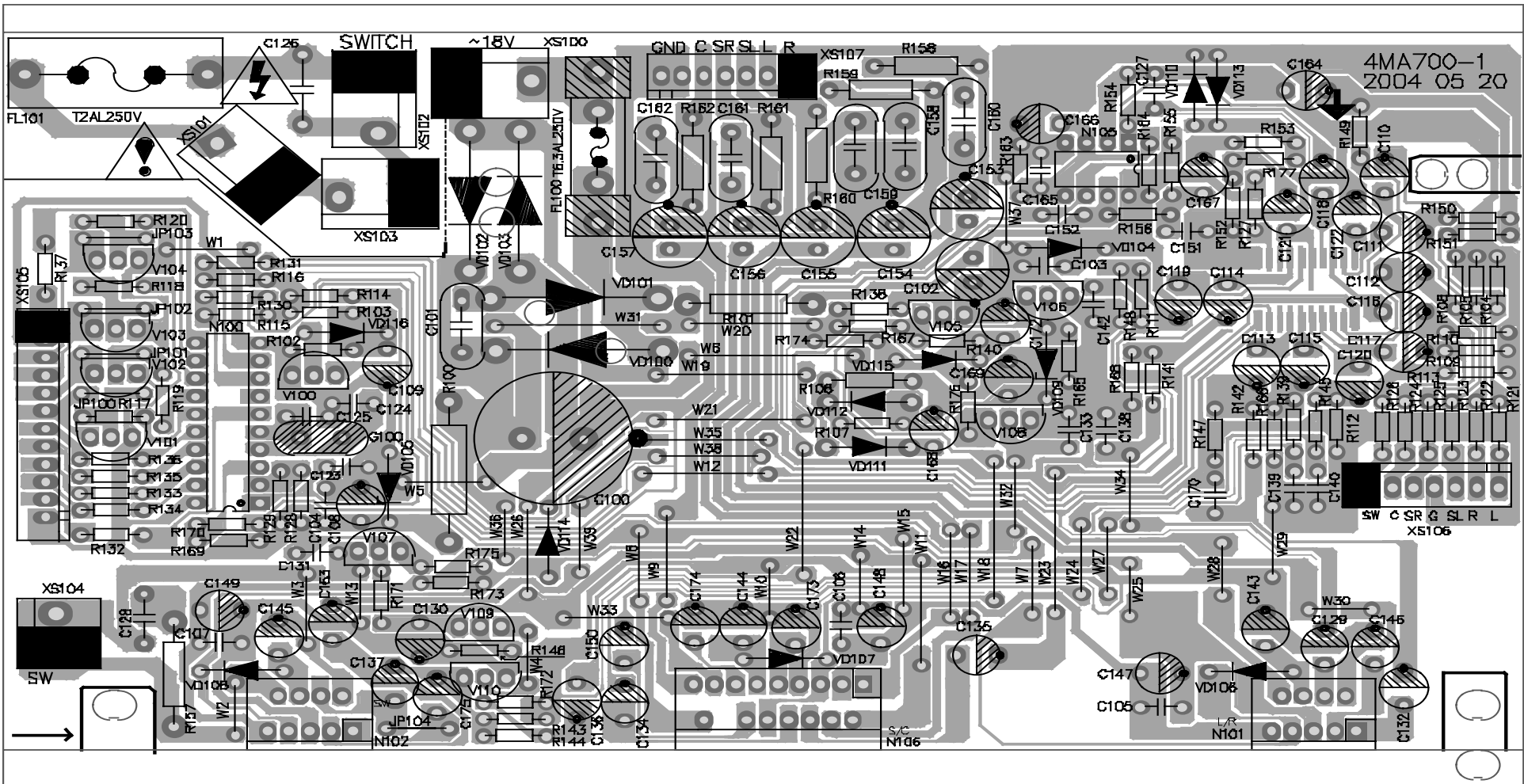
3: PCB silk screen

4: IC specifications

CONNECTED BLOCK





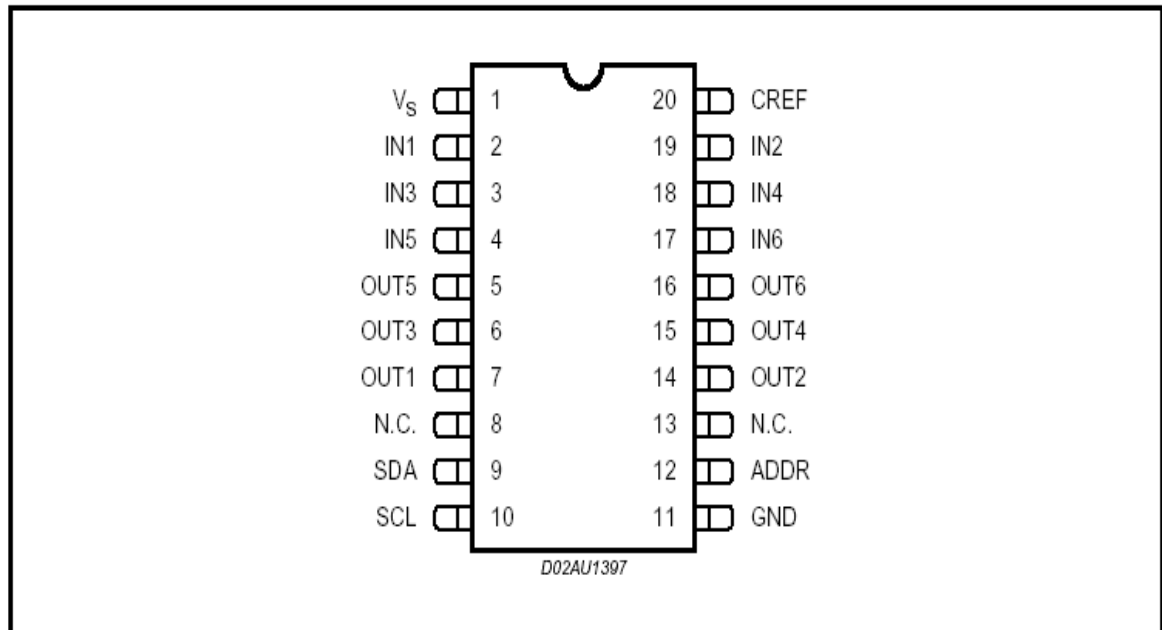


TDA7448

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _S	Operating Supply Voltage	10.5	V
T _{amb}	Operating Ambient Temperature	-10 to 85	°C
T _{stg}	Storage Temperature Range	-55 to 150	°C

PIN CONNECTION



THERMAL DATA

Symbol	Parameter	Value	Unit
R _{th j-pin}	thermal Resistance junction-pins	150	°C/W

QUICK REFERENCE DATA

Symbol	Parameter	Min.	Typ.	Max.	Unit
V _S	Supply Voltage	4.75	9	10	V
V _{CL}	Max Input Signal Handling	2			V _{rms}
THD	Total Harmonic Distortion V = 1V _{rms} f = 1KHz		0.01	0.1	%
S/N	Signal to Noise Ratio V _{out} = 1V _{rms}		100		dB
S _C	Channel Separation f = 1KHz		90		dB
	Volume Control (1dB step)	-79		0	dB
	Mute Attenuation		90		dB

ELECTRICAL CHARACTERISTICS (refer to the test circuit $T_{amb} = 25^{\circ}\text{C}$, $V_S = 9\text{V}$, $R_L = 10\text{K}\Omega$, $R_G = 600\Omega$, unless otherwise specified)

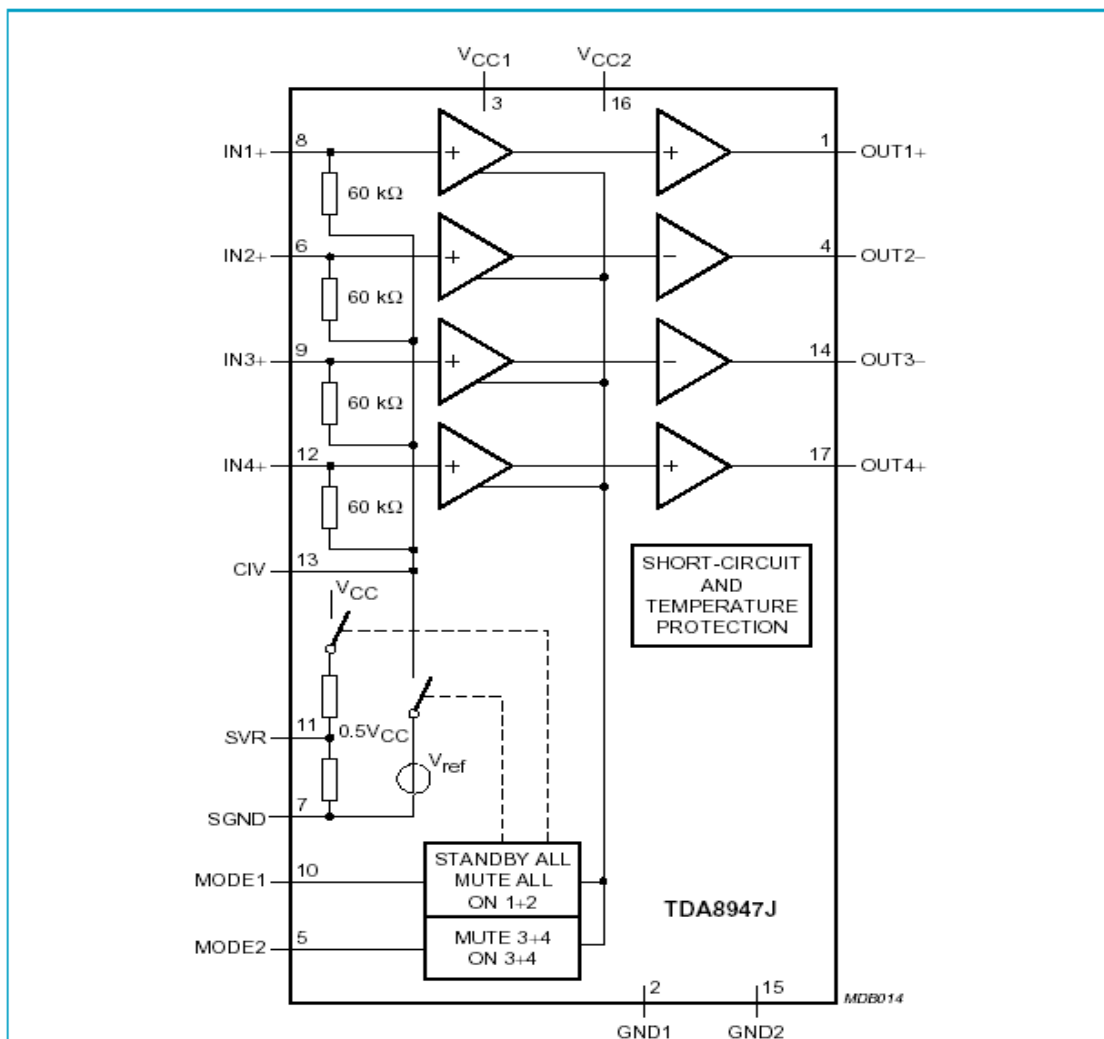
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
SUPPLY						
V_S	Supply Voltage		4.75	9	10	V
I_S	Supply Current			7		mA
SVR	Ripple Rejection			80		dB
INPUT STAGE						
R_{IN}	Input Resistance		35	50	65	$\text{K}\Omega$
V_{CL}	Clipping Level	THD = 0.3%	2	2.5		V _{rms}
S_{IN}	Input Separation	The selected input is grounded through a 2.2 μ capacitor		90		dB
VOLUME CONTROL						
C_{RANGE}	Control Range			79		dB
A_{VMAX}	Max. Attenuation			79		dB
A_{STEP}	Step Resolution		0.5	1	1.5	dB
E_A	Attenuation Set Error	$A_V = 0$ to -24dB	-1	0	1	dB
		$A_V = -24$ to -79dB	-2.0	0	2.0	dB
E_T	Tracking Error	$A_V = 0$ to -24dB	-1	0	1	dB
		$A_V = -24$ to -79dB	-2	0	2	dB
V_{DC}	DC Step	adjacent attenuation steps	-3	0	3	mV
A_{mute}	Mute Attenuation			90		db
AUDIO OUTPUTS						
V_{CLIP}	Clipping Level	THD = 0.3%	2	2.5		V _{rms}
R_L	Output Load Resistance		2			$\text{K}\Omega$
V_{DC}	DC Voltage Level			4.5		V
GENERAL						
E_{NO}	Output Noise	BW = 20Hz to 20KHz All gains = 0dB, Flat		10	15	μV
S/N	Signal to Noise Ratio	All gains = 0dB; $V_O = 1\text{V}_{rms}$		100		dB
S_C	Channel Separation left/Right		80	90		dB
THD	Distortion	$A_V = 0$; $V_I = 1\text{V}_{rms}$		0.01	0.1	%
BUS INPUT						
V_{IL}	Input Low Voltage				1	V
V_{IH}	Input High Voltage		2.5			V
I_{IN}	Input Current	$V_{IN} = 0.4\text{V}$	-5		5	μA
V_O	Output Voltage SDA Acknowledge	$I_O = 1.6\text{mA}$		0.4	0.8	V

4. Quick reference data

Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC}	supply voltage	operating	9	18	26	V
		no (clipping) signal	[1]	-	28	V
I_q	quiescent supply current	$V_{CC} = 18\text{ V}; R_L = \infty$	-	100	145	mA
I_{stb}	standby supply current		-	-	10	μA
$P_{o(SE)}$	SE output power	THD = 10 %; $R_L = 4\ \Omega$				
		$V_{CC} = 18\text{ V}$	7	8.5	-	W
		$V_{CC} = 22\text{ V}$	-	14	-	W
$P_{o(BTL)}$	BTL output power	THD = 10 %; $R_L = 8\ \Omega$				
		$V_{CC} = 18\text{ V}$	16	18	-	W
		$V_{CC} = 22\text{ V}$	-	29	-	W
THD	total harmonic distortion	SE; $P_o = 1\text{ W}$	-	0.1	0.5	%
		BTL; $P_o = 1\text{ W}$	-	0.05	0.5	%
$G_{v(max)}$	maximum voltage gain	SE	25	26	27	dB
		BTL	31	32	33	dB
SVRR	supply voltage ripple rejection	SE; $f = 1\text{ kHz}$	-	60	-	dB
		BTL; $f = 1\text{ kHz}$	-	65	-	dB

[1] The amplifier can deliver output power with non clipping output signals into nominal loads as long as the ratings of the IC are not exceeded.



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V_{CC}	supply voltage	operating	9	18	26	V
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I_q	quiescent supply current	$V_{CC} = 18\text{ V}; R_L = \infty$	-	60	100	mA
I_{stb}	standby supply current		-	-	10	μA
P_o	SE output power	THD = 10 %; $R_L = 4\ \Omega; V_{CC} = 18\text{ V}$	7	8.5	-	W
		THD = 10 %; $R_L = 4\ \Omega; V_{CC} = 22\text{ V}$	-	14	-	W
	BTL output power	THD = 10 %; $R_L = 8\ \Omega; V_{CC} = 18\text{ V}$	16	18	-	W
		THD = 10 %; $R_L = 8\ \Omega; V_{CC} = 22\text{ V}$	-	29	-	W
THD	total harmonic distortion	SE; $P_o = 1\text{ W}$	-	0.1	0.5	%
		BTL; $P_o = 1\text{ W}$	-	0.05	0.5	%
G_v	voltage gain	SE	25	26	27	dB
		BTL	31	32	33	dB
SVRR	supply voltage ripple rejection	SE; $f = 1\text{ kHz}$	-	60	-	dB
		BTL; $f = 1\text{ kHz}$	-	65	-	dB

Block diagram

