CTV-1515 SERVICE MANUAL

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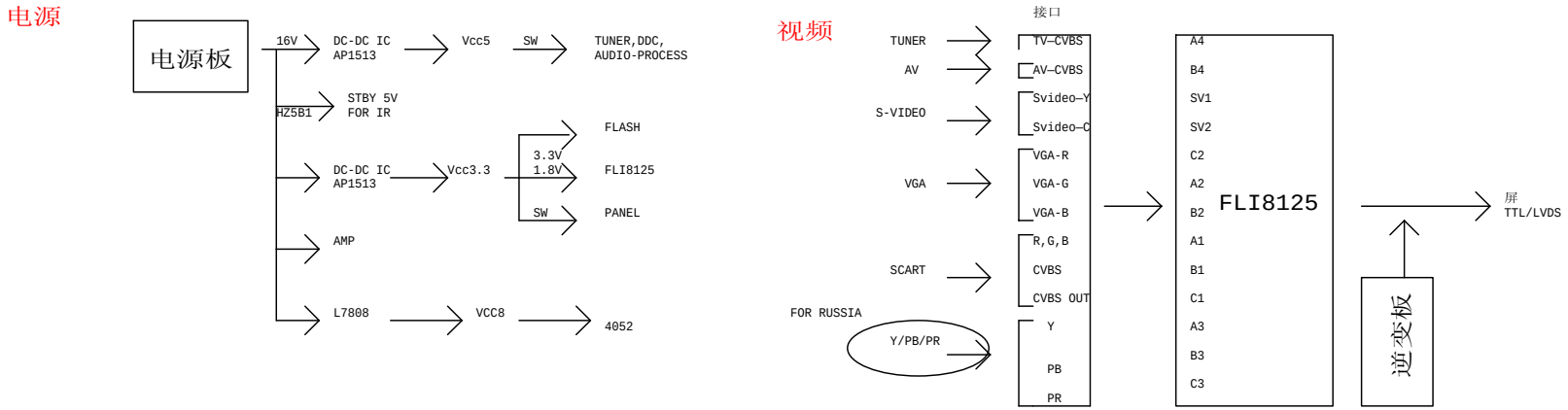
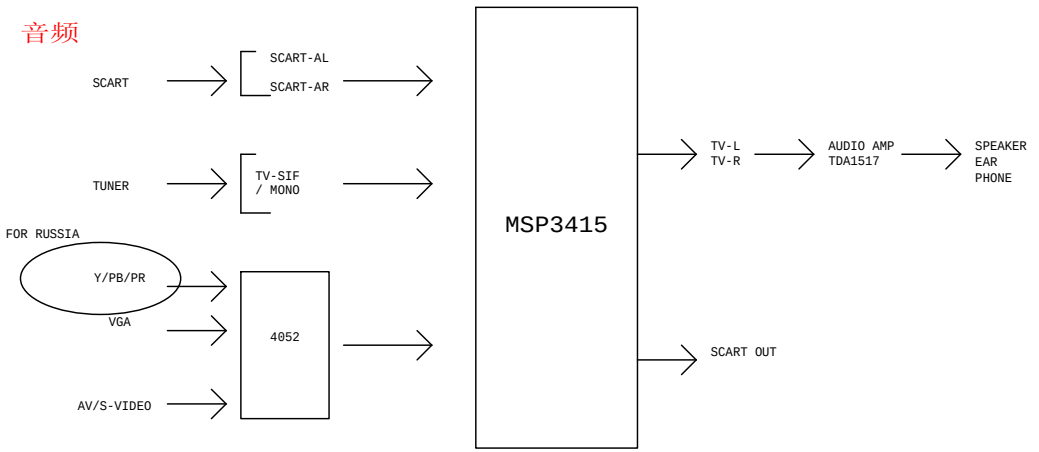
Part 1 Brief Introduction Of The CTV-1515 Schematic Diagram



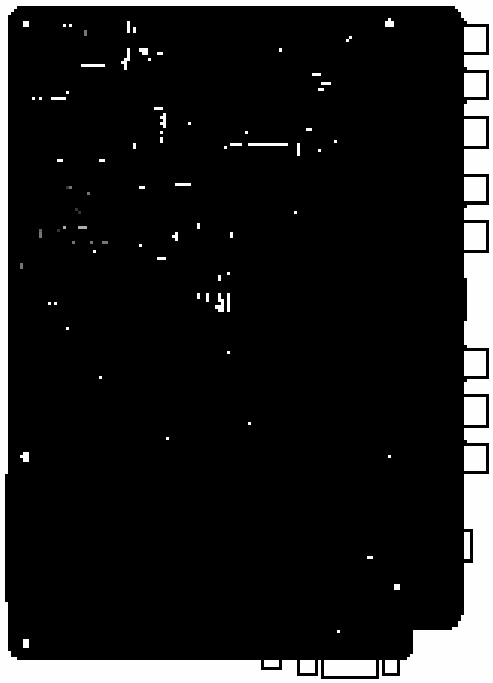
主板
电源板
逆变板
按键板
红外接收板



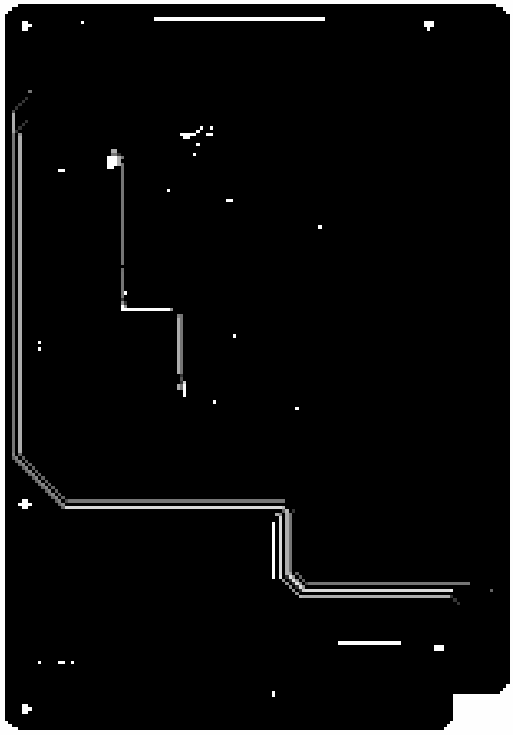
Printed Circuit

1. Main board

A: TOP LAYER

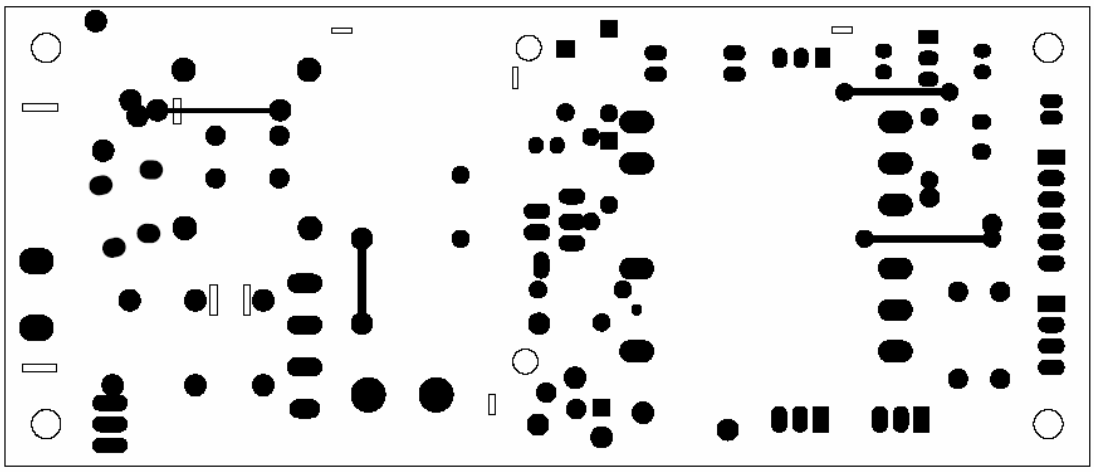


B: BOTTOM LAYER

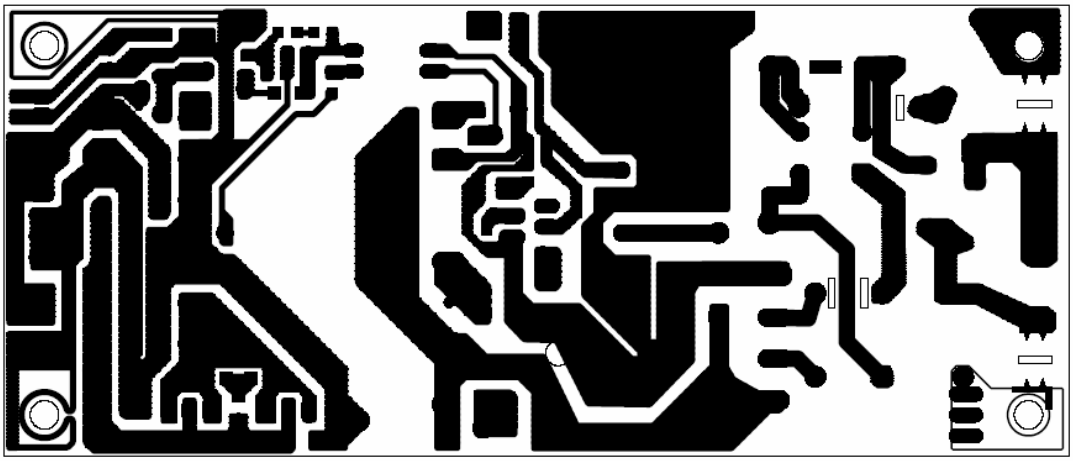


2. Power board

A: TOP LAYER

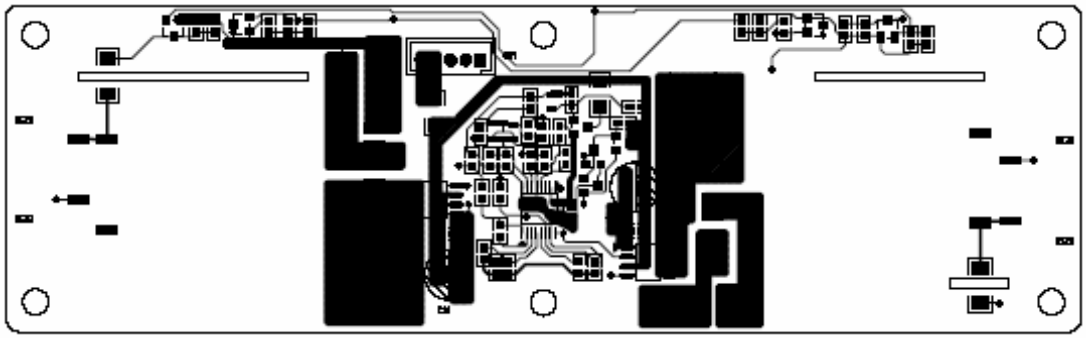


B: BOTTOM LAYER

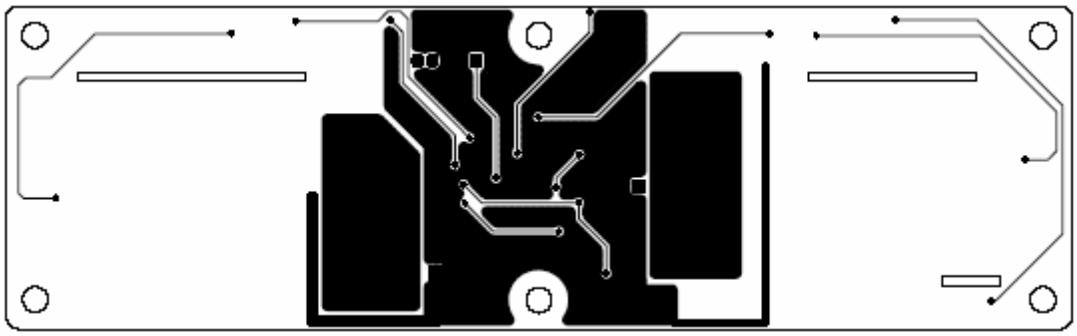


3. Inverter board

A: TOP LAYER

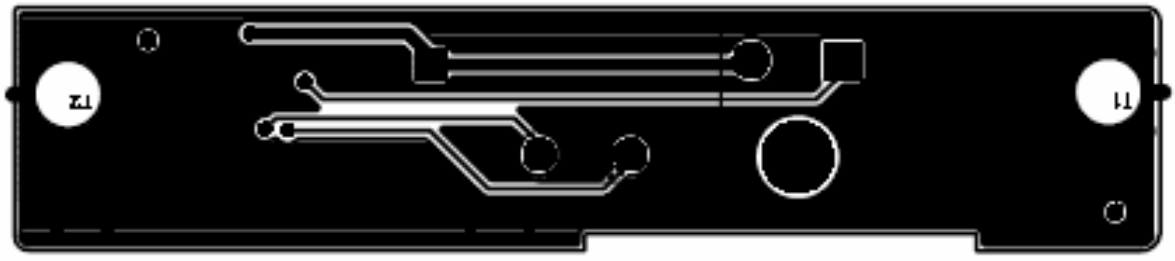


B: BOTTOM LAYER

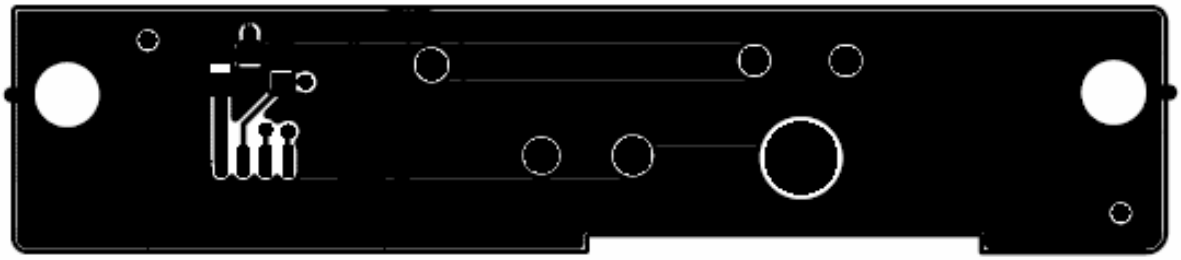


4. Remote Control Board

A: TOP LAYER



B: BOTTOM LAYER



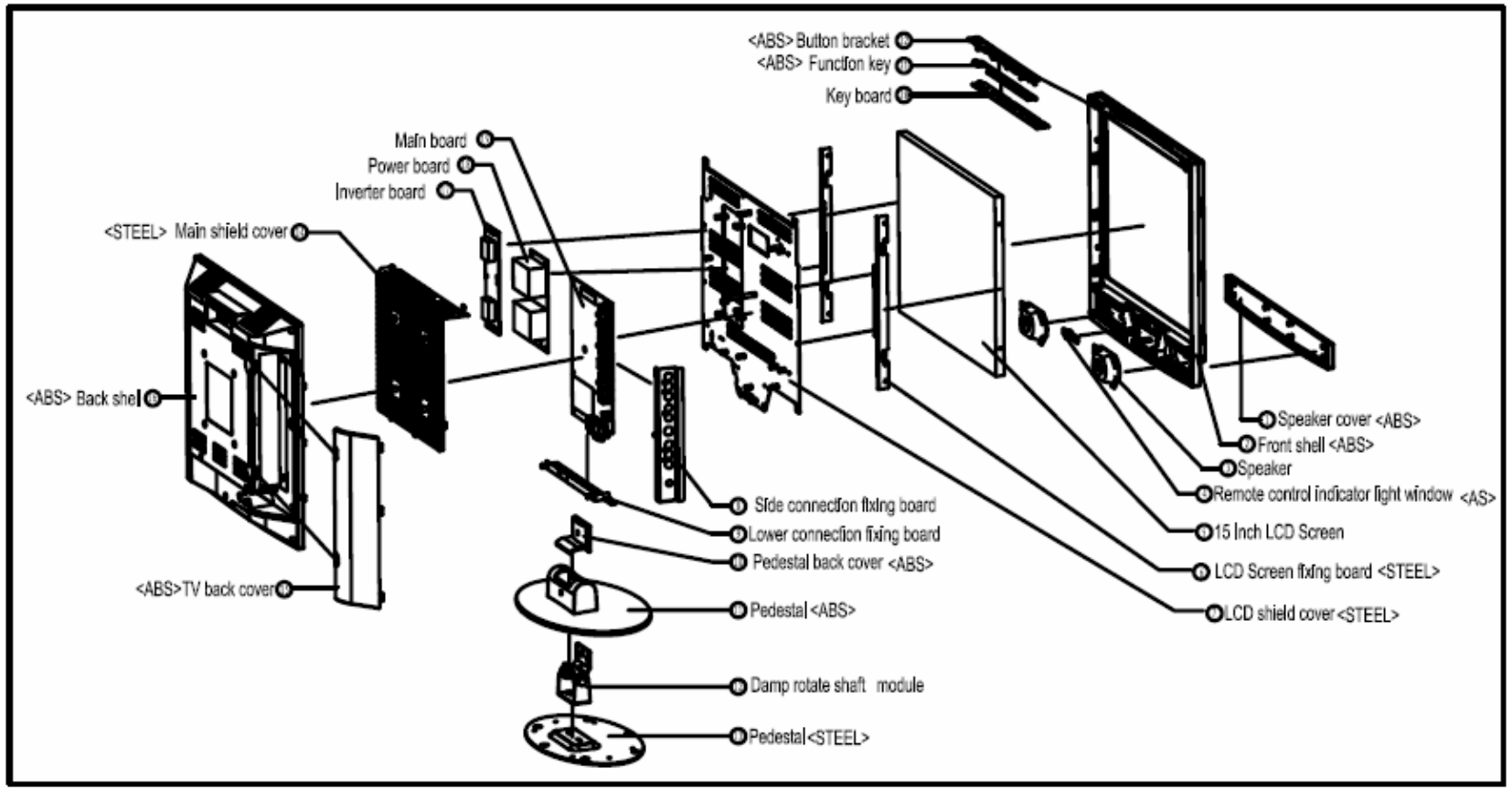
5. Key board

A: TOP LAYER

B: BOTTOM LAYER

Part 2 Exploded view

CTV-1515 exploded view



Part 3 Key ICs And Assemblies

On Main Board			On remote control board		
Serial No	Position	Type	Serial no	Position	Type
1	U1	W39L040AP70Z	1	4U1	HL38B17
2	U2	AT24C32AN	On power board		
3	U3	FLI8125-LF			
4	U4	24C02	1	U5	FSCM0765RGWDTU
5	U5	MSP3415G	2	U2	PC817
6	U6	CD4052	3	U3	KA431AZ
7	U7 U9	AP1513S	On HI-voltage Board		
8	U8	L7808C-V			
9	U10	AZ1117H-1.8	1	U1	Bit3193
10	U11	FDS9435	2	Q2,Q6	AP4511M
11	2U1	TDA1517P			

ICS ON MAIN BOARD

1. AP1513

■ Features

- Input voltage: 3.6V to 18V.
- Output voltage: 0.8V to V_{cc}.
- Duty ratio: 0% to 100% PWM control
- Oscillation frequency: 300KHz typ.
- Soft-start, Current limit, Enable function
- Thermal Shutdown function
- Built-in internal SW P-channel MOS
- SOP-8L **Pb-Free** Package.

■ Applications

- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD-Video Player
- Telecom Equipment
- ADSL Modem
- Printer and other Peripheral Equipment
- Microprocessor core supply
- Networking power supply

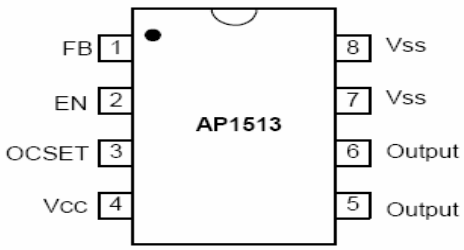
■ General Description

AP1513 consists of step-down switching regulator with PWM control. These devices include a reference voltage source, oscillation circuit, error amplifier, internal PMOS and etc.

AP1513 provides low-ripple power, high efficiency, and excellent transient characteristics. The PWM control circuit is able to very the duty ratio linearly from 0 up to 100%. This converter also contains an error amplifier circuit as well as a soft-start circuit that prevent s overshoot at startup. An enable function, an over current protect function and a short circuit protect function are built inside, and when OCP or SCP happens, the operation frequency will be reduced from 300KHz to 30KHz. Also, an internal compensation block is built in to minimum external component count.

With the addition of an internal P-channel Power MOS, a coil, capacitors, and a diode connected externally, these ICs can function as step-down switching regulators. They serve as ideal power supply units for portable devices when coupled with the SOP–8L mini-package, providing such outstanding features as low current consumption. Since this converter can accommodate an input voltage of up to 18V, it is also ideal when operating via an AC adapter.

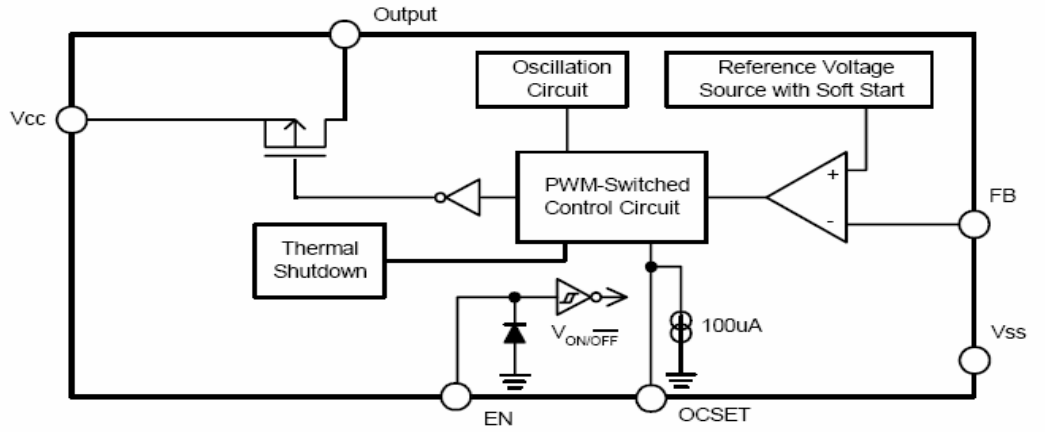
■ Pin Assignments



■ Pin Descriptions

Name	Pin	Description
FB	1	Feedback pin.
EN	2	Power-off pin H: Normal operation (Step-down operation) L: Step-down operation stopped (All circuits deactivated)
OCSET	3	Add an external resistor to set max output current.
Vcc	4	IC power supply pin
Output	5、6	Switch Pin. Connect external inductor/diode here. Minimize trace area at this pin to reduce EMI.
Vss	7、8	GND Pin

• Block Diagram



2. FDS9435A

Single P-Channel Enhancement Mode Field Effect Transistor

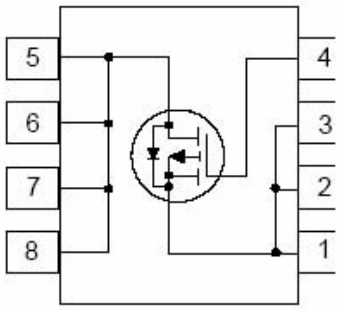
SO-8 P-Channel enhancement mode power field effect transistors are produced using Fairchild's proprietary, high cell density, DMOS technology. This very high density process is especially tailored to minimize on-state resistance and provide superior switching performance. These devices are particularly suited for low voltage applications such as notebook computer power management and other battery powered circuits where fast switching, low in-line power loss, and resistance to transients are needed.

- **Features**

-5.3 A, -30 V, $R_{DS(ON)}$ = 0.045 Ω @ V_{GS} = -10 V,
$R_{DS(ON)}$ = 0.075 Ω @ V_{GS} = - 4.5 V.

High density cell design for extremely low RDS(ON).

High power and current handling capability in a widely used surface mount package.



Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	FDS9435A	Units
V_{DSS}	Drain-Source Voltage	-30	V
V_{GSS}	Gate-Source Voltage	-20	V
I_D	Drain Current - Continuous (Note 1a)	- 5.3	A
	- Pulsed	-50	
P_D	Maximum Power Dissipation (Note 1a)	2.5	W
	(Note 1b)	1.2	
	(Note 1c)	1	
T_J,T_{STG}	Operating and Storage Temperature Range	-55 to 150	°C
THERMAL CHARACTERISTICS			
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 1a)	50	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case (Note 1)	25	°C/W

3. FLI8125

The FLI8125 is a cost-effective, highly-integrated, mixed signal solution for TV and Digital Video applications. It incorporates a multi-standard video decoder, high-speed triple 8-bit Analog-to-Digital Converter(ADC),and front end switching. An integrated VBI Slicer adds Closed Captioning(CC) and Teletext service support, and the built-in microprocessor enables full system control without external devices.

Features

INTEGRATED TRIPLE ADC

- RGB / YPbPr support up to 135MHz
- SCART – RGB + Fast Blank support
- Interlaced and progressive scan
- External OSD support

DIGITAL INPUT PORT

- 24-bit re-configurable input port

INTEGRATED 2D VIDEO DECODER

- Worldwide NTSC/PAL/SECAM support
- Macrovision / VCR trick mode support

EMBEDDED MICROPROCESSOR

- Turbo 186 core
- Internal RAM / ROM
- Serial Flash / Parallel ROM support
- 2-wire slave controller, UART support
- Internal RESET Controller
- GPIOs , Low Bandwidth ADC – 6 input
- Infra-red Interface

SCALING ENGINE

- Independent H & V scaling factors
- 4:2:2 YPbPr or 4:4:4 RGB scaling
- Anamorphic scaling (non-linear)

FAROUDJA DCDI – EDGE™

- Edge Correction
  - – Eliminates objectionable stair-casing
  - – Enhances clarity and realism
- Horizontal Enhancement
- Adaptive Contrast and Color (ACC)
- Active Color Management - II (ACM-II)

DIGITAL OUTPUT

- 18/24-bit 85Mhz TTL output
- Dual LVDS up to SXGA
- Energy Spectrum Management for reducing EMI
- Programmable CLUT for gamma correction

OSD CONTROLLER

- Up to 4 windows: 1, 2 or 4-bits per pixel color
- Programmable Font scalar to meet Teletext requirements

VBI SLICER

- V-Chip, Closed Captioning, XDS, CGMS, WSS decode
- Teletext 1.5 support

JTAG SUPPORT

- Boundary Scan support

- **PInput**

- **Pin List**

I/O Legend: A = Analog, **I** = Input, **O** = Output, **P** = Power, **G=** Ground

Table 1: Analog Input Port

Pin Name	No.	I/O	Description
VDD18_AB	158	AP	Analog Power (1.8V) for A & B Channels. Must be bypassed with 0.1uF capacitor to the analog system ground plane.
NC	159		No Connection. Leave this pin open for normal operation.
GND18_C	160	AG	Analog Ground (1.8V Return) for C channel. Must be directly connected to the analog system ground plane on board.
VDD18_C	161	AP	Analog Power (1.8V) for C Channel. Must be bypassed with 0.1uF capacitor to the analog system ground plane.
ADC_TEST	162	O	Analog Front End Test O/P. Leave this Pin open. Used for factory testing purpose only.
AVDD_ADC	163	AP	Analog Power (3.3V) for ADC. Must be bypassed with 0.1uF capacitor to the analog system ground plane.
AGND	164	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
AGND	165	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
SV1P	166	AI	Positive analog sync input for channel 1. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	167	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.

A1P	168	AI	Positive analog input 'A' for channel 1. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	169	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
B1P	170	AI	Positive analog input 'B' for channel 1. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	171	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
C1P	172	AI	Positive analog input 'C' for channel 1. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
AVDD_A	173	AP	Analog Power (3.3V) for ADC of Channel-A. Must be bypassed with 0.1uF capacitor to the analog system ground plane.
AN	174	AI	Negative analog input 'A' for channels 1 through 4. This acts as the return Path for the Sources connected to Channel-A Inputs. This has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network to Analog Ground Plane on board.
AGND	175	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
SV2P	176	AI	Positive analog sync input for channel 2. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	177	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
A2P	178	AI	Positive analog input 'A' for channel 2. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	179	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
B2P	180	AI	Positive analog input 'B' for channel 2. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	181	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
C2P	182	AI	Positive analog input 'C' for channel 2. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
AVDD_B	183	AP	Analog Power (3.3V) for ADC of Channel-B. Must be bypassed with 0.1uF capacitor to the analog system ground plane.
BN	184	AI	Negative analog input 'B' for channels 1 through 4. This acts as the return Path for the Sources connected to Channel-B Inputs. This has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network to Analog Ground Plane on board.
AGND	185	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
SV3P	186	AI	Positive analog sync input for channel 3. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
VDD18_AB	158	AP	Analog Power (1.8V) for A & B Channels. Must be bypassed with 0.1uF capacitor to the analog system ground plane.
GNDS	187	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
A3P	188	AI	Positive analog input 'A' for channel 3. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	189	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
B3P	190	AI	Positive analog input 'B' for channel 3. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	191	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
C3P	192	AI	Positive analog input 'C' for channel 3. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
AVDD_C	193	AP	Analog Power (3.3V) for ADC of Channel-C. Must be bypassed with 0.1uF capacitor to the analog system ground plane.
CN	194	AI	Negative analog input 'C' for channels 1 through 4. This acts as the return Path for the Sources connected to Channel-C Inputs. This has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network to Analog Ground Plane on board.
AGND	195	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
SV4P	196	AI	Positive analog sync input for channel 4. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	197	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
A4P	198	AI	Positive analog input 'A' for channel 4. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	199	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
B4P	200	AI	Positive analog input 'B' for channel 4. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
GNDS	201	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
C4P	202	AI	Positive analog input 'C' for channel 4. The input has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network.
AVDD_SC	203	AP	Analog Power (3.3V) for ADC of SYNC Channel. Must be bypassed with 0.1uF capacitor to the analog system ground plane.

SVN	204	AI	Negative analog sync input for channels 1 through 4. This acts as the return Path for the Sources connected to SV Channel Inputs. This has to be AC coupled using a series 20 Ohm resistor and 0.1uF Capacitor network to Analog Ground Plane on board.
VO_GND	205	AG	Analog Ground. Must be directly connected to the analog system ground plane on board.
VOUT2	206	AO	Analog VOUT signal This is the Analog Video Output from the Decoder in the Composite Video format. This can be amplified and be fed to any video display device.
VDD18_SC	207	AP	Analog Power (1.8V) for SYNC Channel. Must be bypassed with 0.1uF capacitor to the analog system ground plane.
GND18_SC	208	AG	Analog Ground (1.8V Return) for SYNC channel. Must be directly connected to the analog system ground plane on board.

Table 2: Low Bandwidth ADC Input Port

Pin Name	No	I/O	Description
VDDA33_LBADC	1	AP	Analog Power (3.3V) for Low Bandwidth ADC Block. Must be bypassed with 0.1uF capacitor.
LBADC_IN1	2	AI	Low Bandwidth Analog Input-1. The Input signal connected to this Pin, must be bypassed with a 0.1uF capacitor and could be in the range of 0V to 3.3V (peak to peak).
LBADC_IN2	3	AI	Low Bandwidth Analog Input-2. The Input signal connected to this Pin, must be bypassed with a 0.1uF capacitor and could be in the range of 0V to 3.3V (peak to peak).
LBADC_IN3	4	AI	Low Bandwidth Analog Input-3. The Input signal connected to this Pin, must be bypassed with a 0.1uF capacitor and could be in the range of 0V to 3.3V (peak to peak).
LBADC_IN4	5	AI	Low Bandwidth Analog Input-4. The Input signal connected to this Pin, must be bypassed with a 0.1uF capacitor and could be in the range of 0V to 3.3V (peak to peak).
LBADC_IN5	6	AI	Low Bandwidth Analog Input-5. The Input signal connected to this Pin, must be bypassed with a 0.1uF capacitor and could be in the range of 0V to 3.3V (peak to peak).
LBADC_IN6	7	AI	Low Bandwidth Analog Input-6. The Input signal connected to this Pin, must be bypassed with
LBADC_RTN	8	AG	This Pin provides the Return Path for LBADC inputs. Must be directly connected to the analog system ground plane on board.
VSSA33_LBADC	9	AG	Analog Ground for Low Bandwidth ADC Block. Must be directly connected to the analog system ground plane on board.

Table 3: RCLK PLL Pins

Pin Name	No	I/O	Description
GND_RPLL	11	DG	Digital GND for ADC clocking circuit. Must be directly connected to the digital system ground plane.
VDD_RPLL_18	12	DP	Digital power (1.8V) for ADC digital logic. Must be bypassed with capacitor to Ground Plane.
VBUFC_RPLL	13	O	Test Output. Leave this Pin Open. This is reserved for Factory Testing Purpose.
AGND_RPLL	14	AG	Analog ground for the Reference DDS PLL. Must be directly connected to the analog system ground plane.
XTAL	15	AO	Crystal oscillator output.
TCLK	16	AI	Reference clock (TCLK) from the 14.3MHz crystal oscillator.
AVDD_RPLL_33	17	AP	Analog Power (3.3V) for RCLK PLL. Must be bypassed with 0.1uF capacitor.

Table 4: Digital Video Input Port

Pin Name	No	I/O	Description
VID_CLK_1	153	I	Video port data clock input meant for Video Input – 1. Up to 75Mhz [Input, 5V-tolerant]
VIDIN_HS	122	I	When Video Input – 1 is in BT656 Mode, this Pin acts as Horizontal Sync Input for Video Input – 2. OR when Video Input – 1 is in 16 Bit Mode this Pin acts as Horizontal Sync Input for Video Input – 1. OR this Pin acts as Horizontal Sync Input for 24 Bit Video Input
VIDIN_VS	121	I	When Video Input – 1 is in BT656 Mode, this Pin acts as Vertical Sync Input for Video Input – 2. OR when Video Input – 1 is in 16 Bit Mode this Pin acts as Vertical Sync Input for Video Input – 1. OR this Pin acts as Vertical Sync Input for 24 Bit Video Input
VID_DATA_IN_0 VID_DATA_IN_1 VID_DATA_IN_2 VID_DATA_IN_3 VID_DATA_IN_4 VID_DATA_IN_5 VID_DATA_IN_6 VID_DATA_IN_7	135 136 137 138 139 140 141 142	IO	Input YUV data in 8-bit BT656 of Video Input – 1 [Bi-Directional, 5V-tolerant] OR Input Y Data in case of 16 Bit Video Input (CCIR601) of Video Input – 1 OR Input Red Data in case of 24 Bit Video Input
Pin Name	**No**	**I/O**	**Description**

VID_DATA_IN_8 VID_DATA_IN_9 VID_DATA_IN_10 VID_DATA_IN_11 VID_DATA_IN_12 VID_DATA_IN_13 VID_DATA_IN_14 VID_DATA_IN_15	145 146 147 148 149 150 151 152	IO	Input Pr / Pb Data in case of 16 Bit Video Input (CCIR601) of Video Input – 1 OR Input Green Data in case of 24 Bit Video Input
VID_DATA_IN_16 VID_DATA_IN_17 VID_DATA_IN_18 VID_DATA_IN_19 VID_DATA_IN_20 VID_DATA_IN_21 VID_DATA_IN_22 VID_DATA_IN_23	123 124 125 128 129 130 131 132	IO	Input Blue Data in case of 24 Bit Video Input OR Video Input – 2 in 8-bit with Embedded Sync / Separate Sync Sync in which case VID_DATA_IN_16 acts as the LSB of the 8-bit Video input and VID_DATA_IN_23 acts as the MSB of the 8-bit Video input.
VID_CLK2	118	I	Video port data clock input meant for Video Input – 2. Up to 75Mhz [Input, 5V-tolerant]
VID_DE/FLD	115	I	Video Active Signal Input or the Field Signal Input from external Digital Video Source.

Note: In case of Multiple Digital Video Input Sources, only one source could be in 8-Bit with embedded Sync (BT656 mode) format.

Table 5: System Interface

Pin Name	No	I/O	Description
RESETn	10	I	Hardware Reset (active low) [Schmitt trigger, 5v-tolerant] Connect to ground with 0.01uF (or larger) capacitor.
TEST	20	I	For normal mode of operation connect this Pin to Ground.
GPIO15	21	IO	This pin is available as a general-purpose input/output port. Also it is optionally programmable to give out the external chip select signal meant for external SRAM. Refer to note below.
HSYNC2	22	I	Horizontal Sync signal Input-2. Used when Analog RGB component signal carries separate HSYNC signal.
VSYNC2	23	I	Vertical Sync signal Input-2. Used when Analog RGB component signal carries separate VSYNC signal.
HOST_SCLK	24	IO	Host input clock or 186 UART Data In or JTAG clock signal. [Input, Schmitt trigger, 5V-tolerant]
HOST_SDATA	25	IO	Host input data or 186 UART Data Out or JTAG mode signal. [Bi-directional, Schmitt trigger, slew rate limited, 5V-tolerant]
DDC_SCLK	26	IO	DDC2Bi clock for VGA Port [internal 10KΩ pull-up resistor]
DDC_SDATA	27	IO	DDC2Bi data for VGA Port [internal 10KΩ pull-up resistor]
MSTR_SCLK	30	O	Clock signal from Master Serial 2 Wire Interface Controller
MSTR_SDATA	31	IO	Data signal meant for Master Serial 2 Wire interface Controller
TCK	34	IO	This Pin accepts the Input Clock signal in case of Boundary Scan Mode.
TDI	35	IO	This Pin accepts the Input Data signal in case of Boundary Scan Mode.
TMS	36	IO	This Pin accepts the Input Test Mode Select signal in case of Boundary Scan Mode.
TRST	37	IO	This Pin accepts the Boundary Scan Reset signal in case of Boundary Scan Mode.
GPIO6/IRin	38	IO	Input from Infra Red Decoder can be connected to this Pin. When not used, this pin is available as General Purpose Input/output Port.
GPIO7/IRQin	41	IO	Input Interrupt Request signal can be connected to this Pin. When not used, this pin is available as General Purpose Input/output Port.
GPIO8/IRQout	42	IO	This Pin will give out the Interrupt Signal to interrupt external Micro. When not used, this pin is available as General Purpose Input/output Port.
GPIO9/SIPC_SCLK	43	IO	This Pin accepts the Clock signal from External Serial 2 Wire interface Bus if FLI8125 is programmed to be in Slave mode. When not used, this pin is available as General Purpose Input/output Port.
GPIO10/SIPC_SDATA/ A18	44	IO	This Pin acts as the Data I/O signal when used with External Serial 2 Wire interface Bus if FLI8125 is programmed to be in Slave mode. Or this Pin is programmable to give out Address # 18 from the Internal Micro when used with 512K External Memory. When not used, this pin is available as General Purpose Input/output Port.
GPIO11/PWM0	47	IO	This Pin can be programmed to give out Pulse Width Modulated Output Pulses for external use. When not used, this pin is available as General Purpose Input/output Port.
GPIO12/PWM1	48	IO	This Pin can be programmed to give out Pulse Width Modulated Output Pulses for external use. When not used, this pin is available as General Purpose Input/output Port.
GPIO13/PWM2	51	IO	This Pin can be programmed to give out Pulse Width Modulated Output Pulses for external use. When not used, this pin is available as General Purpose Input/output Port.
Pin Name	**No**	**I/O**	**Description**

GPIO14/PWM3/ SCART16	52	IO	This Pin can be programmed to give out Pulse Width Modulated Output Pulses for external use. Or it can be programmed to sense the Fast Blank Input signal from a SCART I/P source. When not used, this pin is available as General Purpose Input/output Port.
TDO	55	O	This Pin provides the Output Data in case of Boundary Scan Mode.
HSYNC1	156	I	Horizontal Sync signal Input-1. Used when Analog RGB component signal carries separate HSYNC signal.
VSYNC1	157	I	Vertical Sync signal Input-1. Used when Analog RGB component signal carries separate VSYNC signal.
101		O	Clock Output meant for External OSD Controller
102		O	Horizontal Sync Output meant for External OSD Controller
XOSD_CLK	103	O	Vertical Sync Output meant for External OSD Controller
XOSD_HS	104	O	Field Signal Output meant for External OSD Controller
PD20/B4/GPIO0 PD21/B5/GPIO1 PD22/B6/GPIO2 PD23/B7/GPIO3	86 87 88 89	IO	These Pins provide the Panel Data as shown in the TTL Display Interface Table below. These are available as General Purpose Input / Output Pins when not used as Panel Data.

Table 6: LVDS Display Interface

Pin Name	No	I/O	Description
PBIAS	53	O	Panel Bias Control (backlight enable) [Tri-state output, 5V- tolerant]
PPWR	54	O	Panel Power Control [Tri-state output, 5V- tolerant]
AVDD_LV_33	56	DP	Digital Power for LVDS Block. Connect to digital 3.3V supply.
VCO_LV	57	O	Reserved. Output for Testing Purpose only at Factory.
AVSS_LV	58	G	Ground for LVDS outputs.
AVDD_OUT_LV_33	59	DP	Digital Power for LVDS outputs. Connect to digital 3.3V supply.
CH3P_LV_E	60	O	These form the Differential Data Output for Channel – 3 (Even).
CH3N_LV_E	61	O	
CLKP_LV_E	62	O	These form the Differential Clock Output Even Channel.
CLKN_LV_E	63	O	
CH2P_LV_E	64	O	These form the Differential Data Output for Channel – 2 (Even).
CH2N_LV_E	65	O	
CH1P_LV_E	66	O	These form the Differential Data Output for Channel – 1 (Even).
CH1N_LV_E	67	O	
CH0P_LV_E	68	O	These form the Differential Data Output for Channel – 0 (Even).
CH0N_LV_E	69	O	
AVSS_OUT_LV	70	G	Ground for LVDS outputs.
AVDD_OUT_LV_33	71	DP	Digital Power for LVDS outputs. Connect to digital 3.3V supply.
CH3P_LV_O	72	O	These form the Differential Data Output for Channel – 3 (Odd).
CH3N_LV_O	73	O	
CLKP_LV_O	74	O	These form the Differential Clock Output Odd Channel.
CLKN_LV_O	75	O	
CH2P_LV_O	76	O	These form the Differential Data Output for Channel – 2 (Odd).
CH2N_LV_O	77	O	
CH1P_LV_O	78	O	These form the Differential Data Output for Channel – 1 (Odd).
CH1N_LV_O	79	O	
CH0P_LV_O	80	O	These form the Differential Data Output for Channel – 0 (Odd).
CH0N_LV_O	81	O	
AVSS_OUT_LV	82	G	Ground for LVDS outputs.
AVDD_OUT_LV_33	83	DP	Digital Power for LVDS outputs. Connect to digital 3.3V supply.

Table 7: TTL Display Interface

Pin Name	No	I/O	Description For 8-bit panels	For 6-bit panels
PBIAS	53	O	Panel Bias Control (backlight enable) [Tri-state output, 5V- tolerant]	
PPWR	54	O	Panel Power Control [Tri-state output, 5V- tolerant]	
AVDD_LV_33	56	DP	Digital Power for TTL Block. Connect to digital 3.3V supply.	
VCO_LV	57	O	Reserved. Output for Testing Purpose only at Factory.	
AVSS_LV	58	G	Ground for TTL outputs.	
AVDD_OUT_LV_33	59	DP	Digital Power for TTL outputs. Connect to digital 3.3V supply.	
R0	60	O	Red channel bit 0 (Even)	Not used.
R1	61	O	Red channel bit 1 (Even)	Not used.
R2	62	O	Red channel bit 2 (Even)	Red channel bit 0 (Even)
R3	63	O	Red channel bit 3 (Even)	Red channel bit 1 (Even)
R4	64	O	Red channel bit 4 (Even)	Red channel bit 2 (Even)
R5	65	O	Red channel bit 5 (Even)	Red channel bit 3 (Even)
R6	66	O	Red channel bit 6 (Even)	Red channel bit 4 (Even)
R7	67	O	Red channel bit 7 (Even)	Red channel bit 5 (Even)
G0	68	O	Green channel bit 0 (Even)	Not used.
G1	69	O	Green channel bit 1 (Even)	Not used.
AVSS_OUT_LV	70	G	Ground for TTL outputs.	
AVDD_OUT_LV_33	71	DP	Digital Power for TTL outputs. Connect to digital 3.3V supply.	
G2	72	O	Green channel bit 2 (Even)	Green channel bit 0 (Even)
G3	73	O	Green channel bit 3 (Even)	Green channel bit 1 (Even)
G4	74	O	Green channel bit 4 (Even)	Green channel bit 2 (Even)
G5	75	O	Green channel bit 5 (Even)	Green channel bit 3 (Even)
G6	76	O	Green channel bit 6 (Even)	Green channel bit 4 (Even)
G7	77	O	Green channel bit 7 (Even)	Green channel bit 5 (Even)
B0	78	O	Blue channel bit 0 (Even)	Not used.
B1	79	O	Blue channel bit 1 (Even)	Not used.
B2	80	O	Blue channel bit 2 (Even)	Blue channel bit 0 (Even)
B3	81	O	Blue channel bit 3 (Even)	Blue channel bit 1 (Even)
AVSS_OUT_LV	82	G	Ground for TTL outputs.	
AVDD_OUT_LV_33	83	DP	Digital Power for TTL outputs. Connect to digital 3.3V supply.	
PD20/B4	86	O	Blue channel bit 4 (Even)	Blue channel bit 2 (Even)
PD21/B5	87	O	Blue channel bit 5 (Even)	Blue channel bit 3 (Even)
PD22/B6	88	O	Blue channel bit 6 (Even)	Blue channel bit 4 (Even)
PD23/B7	89	O	Blue channel bit 7 (Even)	Blue channel bit 5 (Even)
DEN	90	O	Display Data Enable	
DHS	91	O	Display Horizontal Sync.	
DVS	92	O	Display Vertical Sync.	
DCLK	93	O	Display Pixel Clock	
PD24	115	O	Red channel bit 0 (Odd)	Not used.
Pin Name	**No**	**I/O**	**Description** **For 8-bit panels**	**For 6-bit panels**
PD25	114	O	Red channel bit 1 (Odd)	Not used.
PD26	113	O	Red channel bit 2 (Odd)	Red channel bit 0 (Odd)
PD27	112	O	Red channel bit 3 (Odd)	Red channel bit 1 (Odd)
PD28	111	O	Red channel bit 4 (Odd)	Red channel bit 2 (Odd)
PD29	110	O	Red channel bit 5 (Odd)	Red channel bit 3 (Odd)
PD30	109	O	Red channel bit 6 (Odd)	Red channel bit 4 (Odd)
PD31	108	O	Red channel bit 7 (Odd)	Red channel bit 5 (Odd)
PD32	107	O	Green channel bit 0 (Odd)	Not used.
PD33	106	O	Green channel bit 1 (Odd)	Not used.
PD34	105	O	Green channel bit 2 (Odd)	Green channel bit 0 (Odd)
PD35	104	O	Green channel bit 3 (Odd)	Green channel bit 1 (Odd)
PD36	103	O	Green channel bit 4 (Odd)	Green channel bit 2 (Odd)
PD37	102	O	Green channel bit 5 (Odd)	Green channel bit 3 (Odd)
PD38	101	O	Green channel bit 6 (Odd)	Green channel bit 4 (Odd)
PD39	123	O	Green channel bit 7 (Odd)	Green channel bit 5 (Odd)
PD40	124	O	Blue channel bit 0 (Odd)	Not used.
PD41	125	O	Blue channel bit 1 (Odd)	Not used.
PD42	128	O	Blue channel bit 2 (Odd)	Blue channel bit 0 (Odd)
PD43	129	O	Blue channel bit 3 (Odd)	Blue channel bit 1 (Odd)
PD44	130	O	Blue channel bit 4 (Odd)	Blue channel bit 2 (Odd)
PD45	131	O	Blue channel bit 5 (Odd)	Blue channel bit 3 (Odd)

PD46	132	O	Blue channel bit 6 (Odd)	Blue channel bit 4 (Odd)
PD47	118	O	Blue channel bit 7 (Odd)	Blue channel bit 5 (Odd)

Note: In case of 24 Bit TTL Panels the RGB Odd Channel Outputs will not be used. In that case they can be made available for other purposes as Address & Data from On-Chip Micro or Digital Video Input Data.

Table 8: Parallel/Serial ROM Interface

Pin Name	No	I/O	Description
A17 A16 A15 A14 A13 A12 A11 A10 A9 A8 A7 A6 A5 A4 A3 A2 A1 A0	95 96 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115	O	256K x8 PROM Address. These pins also have bootstrap functionality. For serial SPI ROM interface: - ROM_ADDR17 will be Serial Clock (ROM_SCLK) - ROM_ADDR16 will be Serial Data Output (ROM_SDO) For 512K X 8 PROM, Address Signal A18 is available thru Pin # 44 which is GPIO10.
D7 D6 D5 D4 D3 D2 D1 D0	132 131 130 129 128 125 124 123	IO	External PROM data input.
ROM_OEN	118	O	External PROM data Output Enable.
ROM_SDI/ ROM_WEN	97	O	External PROM data Write Enable (for In-System-Programming of FLASH) or Serial Data Input (SDI) for SPI ROM interface.
ROM_SCSN/ ROM_CSN	94	O	External PROM data Chip Select or Serial PROM Chip Select (ROM_SCSN) for SPI ROM interface.

Table 9: Digital Power and Ground

Pin Name	No	I/O	Description
RVDD_3.3	32 49 98 116 154	P	Ring VDD. Connect to digital 3.3V.
CVDD_1.8	18 28 39 45 84 119 126 133 143	P	Core VDD. Connect to digital 1.8V.
CRVSS	19 29 33 40 46 50 85 99 117 120 127 134 144 155	G	Chip ground for core and ring.

Table 10: JTAG Boundary Scan

Pin Name	No	I/O	Description
TCK	34	I	JTAG Boundary Scan TCK signal
TDO	55	O	JTAG Boundary Scan TDO signal
TDI	35	I	JTAG Boundary Scan TDI signal. Pad has internal 50K pull-up resistor.
TMS	36	I	JTAG Boundary Scan RST signal. Pad has internal 50K pull-up resistor.
TRST	37	I	JTAG Boundary Scan TMS signal. Pad has internal 50K pull-up resistor.

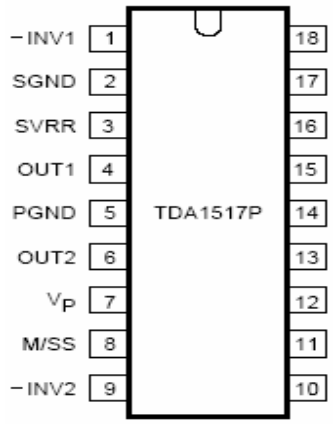
4. TDA1517P

2 x 6 W stereo power amplifier

The TDA1517 is an integrated class-B dual output amplifier in a plastic single in-line medium power package with fin (SIL9MPF), a plastic rectangular-bent single in-line medium power package with fin (RBS9MPF) or a plastic heat-dissipating dual in-line package (HDIP18). The device is primarily developed for multi-media applications.

- **Features**

Requires very few external components
High output power
Fixed gain
Good ripple rejection
Mute/standby switch
AC and DC short-circuit safe to ground and VP
Thermally protected
Reverse polarity safe
Capability to handle high energy on outputs (VP = 0 V)
No switch-on/switch-off plop
Electrostatic discharge protection



- **Pin Description**

SYMBOL	PIN	DESCRIPTION
-INV1	1	non-inverting input 1
SGND	2	signal ground
SVRR	3	supply voltage ripple rejection output
OUT1	4	output 1
PGND	5	power ground
OUT2	6	output 2
VP	7	supply voltage
M/SS	8	mute/standby switch input
-INV2	9	non-inverting input 2

- **DC Characteristics**

VP = 14.4 V; Tamb = 25 °C; measured in Fig.6; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply						
V_P	supply voltage	note 1	6.0	14.4	18.0	V
$I_{q(tot)}$	total quiescent current		–	40	80	mA
V_O	DC output voltage		–	6.95	–	V
Mute/standby switch						
V_8	switch-on voltage level	see Fig.5	8.5	–	–	V
Mute condition						
V_O	output signal in mute position	$V_{I(max)}$ = 1 V; f_i = 20 Hz to 15 kHz	–	–	2	mV
Standby condition						
I_{sb}	DC current in standby condition		–	–	100	µA
V_{sw}	switch-on current		–	12	40	µA

Note

The circuit is DC adjusted at VP = 6 to 18 V and AC operating at VP = 8.5 to 18 V.

5. AT24C32AN

2-Wire Serial EEPROM 32K (4096 x 8)

Features

- **Low-Voltage and Standard-Voltage Operation**
  - **2.7 (V_{CC} = 2.7V to 5.5V)**
  - **1.8 (V_{CC} = 1.8V to 5.5V)**
- **Low-Power Devices (I_{SB} = 2 µA @ 5.5V) Available**
- **Internally Organized 4096 x 8, 8192 x 8**
- **2-Wire Serial Interface**
- **Schmitt Trigger, Filtered Inputs for Noise Suppression**
- **Bidirectional Data Transfer Protocol**
- **100 kHz (1.8V) and 400 kHz (2.5V) Clock Rate for AT24C32A**
- **400 kHz (1.8V) Clock Rate for AT24C64A**
- **Write Protect Pin for Hardware Data Protection**
- **32-Byte Page Write Mode (Partial Page Writes Allowed)**
- **Self-Timed Write Cycle (10 ms max)**
- **High Reliability**
  - **Endurance: 1 Million Write Cycles**
  - **Data Retention: 100 Years**
- **Automotive Grade and Extended Temperature Devices Available**
- **8-Pin JEDEC PDIP and 8-Pin JEDEC SOIC Packages**

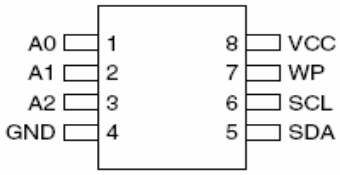
Description

The AT24C32A/64A provides 32,768/65,536 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 4096/8192 words of 8 bits each. The device's cascadable feature allows up to 8 devices to share a common 2-wire bus. The device is optimized for use in many industrial and commercial applications where low power and low voltage operation are essential. The AT24C32A/64A is available in space saving 8-pin JEDEC PDIP and 8-pin JEDEC SOIC packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 2.7V (2.7V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

Pin Configurations

Pin Name	Function
A0 - A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect

8-Pin SOIC



Pin Description

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

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

DEVICE/PAGE ADDRESSES (A2, A1, A0): The A2, A1 and A0 pins are device address inputs that are hard wired or left not connected for hardware compatibility with AT24C16. When the pins are hardwired, as many as eight 32K/64K devices may be addressed on a single bus system (device addressing is discussed in detail under the Device Addressing section). When the pins are not hardwired, the default A_2, A_1, and A_0 are zero.

WRITE PROTECT (WP): The write protect input, when tied to GND, allows normal write operations. When WP is tied high to V_{CC}, all write operations to the memory are inhibited. If left unconnected, WP is internally pulled down to GND. Switching WP to V_{CC} prior to a write operation creates a software write protect function.

6. CD4052B

The CD4052B is a differential 4-Channel multiplexer having two binary control inputs, A and B, and an inhibit input. The two binary signals select 1 of 4 pairs of channels to be turned on and connect the analog inputs to the outputs.

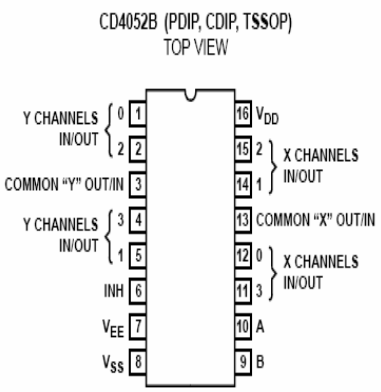
Features

- Wide Range of Digital and Analog Signal Levels
  - Digital . . . . . 3V to 20V
  - Analog. . . . . ≤20V_{P-P}
- Low ON Resistance, 125Ω (Typ) Over 15V_{P-P} Signal Input Range for V_{DD}-V_{EE} = 18V
- High OFF Resistance, Channel Leakage of ±100pA (Typ) at V_{DD}-V_{EE} = 18V
- Logic-Level Conversion for Digital Addressing Signals of 3V to 20V (V_{DD}-V_{SS} = 3V to 20V) to Switch Analog Signals to 20V_{P-P} (V_{DD}-V_{EE} = 20V)
- Matched Switch Characteristics, r_{ON} = 5Ω (Typ) for V_{DD}-V_{EE} = 15V
- Very Low Quiescent Power Dissipation Under All Digital-Control Input and Supply Conditions, 0.2μW (Typ) at V_{DD}-V_{SS} = V_{DD}-V_{EE} = 10V
- Binary Address Decoding on Chip
- 5V, 10V and 15V Parametric Ratings
- 10% Tested for Quiescent Current at 20V
- Maximum Input Current of 1μA at 18V Over Full Package Temperature Range, 100nA at 18V and 25°C
- Break-Before-Make Switching Eliminates Channel Overlap

Applications

- Analog and Digital Multiplexing and Demultiplexing
- A/D and D/A Conversion
- Signal Gating

• **PInputs**



ICS ON HI-VOLTAGE BOARD

1. BIT3193

High Performance PWM Controller

BIT3193 integrated circuit provides the essential features for general purpose PWM controller in a small low cost 16-pin package. BIT3193 has built-in a low frequency PWM generator for any specified application. BIT3193 includes latched off protection feature may make the system more reliable while compare to other similar products.

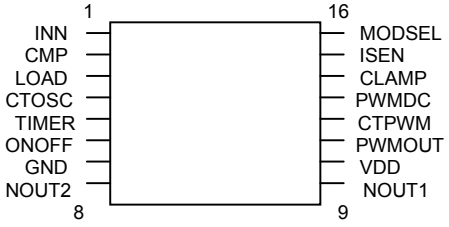
- **Features**
  - 4.5V ～ 8V operation
  - Fixed High Frequency, Voltage Mode PWM Control
  - Latched Off Protection
  - Build-In Low Frequency PWM Generator
  - Build-in UVLO
  - Low Power CMOS Process
  - Totem Pole Output
  - 16 Pin Package

- **Applications**
  - DC/DC Converters
  - LCD TV
  - LCD Monitor
  - Notebook Computer
  - Tablet PC
  - Personal Digital Assistants
  - Navigation Phone/ Door Phone
  - Portable consumer product

- **Recommended Operating Condition:**

Supply Voltage	4.5～8V
Operating Ambient Temperature	0～70 ° C
Operating Frequency	50K～400K Hz

- **Pin Layout:**



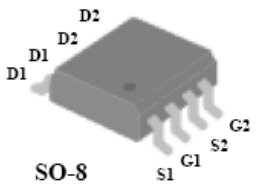
• **Pin Description**

Pin No.	Symbol	I/O	Descriptions
1	INN	I/O	The inverting input of the error amplifier.
2	CMP	O	Output of the error amplifier.
3	LOAD	I/O	A switch that connected to the high frequency triangle wave generator. This switch is open while ISEN pin <1.3V. An external resistor connected here may change the operation frequency of CTOSC in open load situation.
4	CTOSC	I/O	An external capacitor connected here can set the frequency of high frequency PWM controller.
5	TIMER	I/O	With internal reference current and an external capacitor connected here can set the required period of starting and the timing of initialization. The controller is forced to reset mode while TIMER<0.3V. During reset mode, a～60uA current will flow into the INN pin to reduce the output level of the error amplifier CMP to turn off the controller. The latched off protection function will be enable after this node is charged to>2.5V. System is latched off if any abnormal operation is detected if pin TIMER>2.5V. The output current of this pin is 20uA when TIMER<0.3V. The output current becomes to 1uA when TIMER>0.3V.
6	ONOFF	I	The control pin of turning on or off the IC.1V threshold with an internal 80K ±15% ohm pull-low resistor.
7	GND	I/O	The ground pin of the device.
8	NOUT2	O	The number 2 output driver for driving the NMOSFET switch.
9	NOUT1	O	The number 1 output driver for driving the NMOSFET switch.
10	VDD	I	The power supplies pin of the device.
11	PWMOUT	O	The output pin of low frequency PWM generator. A 2.5V or floating two state output is provided through this pin. The internal circuit limits the max. Duty-cycle to ～92%.
12	CTPWM	I/O	With the internal reference current and an external capacitor connected here can set the operation frequency of low frequency PWM generator with 1.0V～2.5V triangle wave output.
13	PWMDC	I	Low frequency PWM controlling input. A PWM output comes out by comparing this DC input and the 1.0～2.5V triangle wave that is generated by CTPWM.
14	CLAMP	I	Over voltage clamping. If a>2.0V voltage is detected. A～60uA current will flow into the INN pin to reduce the output of the error amplifier pin CMP to regulate the output voltage.
15	ISEN	I	Load current detection pin, the open load situation is detected if a less than 1.3V input is sensed.
16	MODSEL	O	To set the output polarity of the low frequency PWM controller.

2. **AP4511M**

N AND P-CHANNEL ENHANCEMENT MODE POWER MOSFET

- ▼ **Simple Drive Requirement**
- ▼ **Low On-resistance**
- ▼ **Fast Switching Performance**



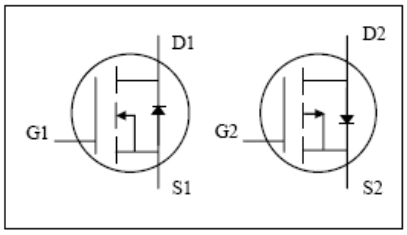
SO-8

N-CH	BV_{DSS}	35V
	$R_{DS(ON)}$	25mΩ
	I_D	7A
P-CH	BV_{DSS}	-35V
	$R_{DS(ON)}$	40mΩ
	I_D	-6.1A

Description

The Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The SO-8 package is universally preferred for all commercial-industrial surface mount applications and suited for low voltage applications such as DC/DC converters.



Absolute Maximum Ratings

Symbol	Parameter	Rating		Units
		N-channel	P-channel	
V_{DS}	Drain-Source Voltage	35	-35	V
V_{GS}	Gate-Source Voltage	±20	±20	V
I_D@T_A=25℃	Continuous Drain Current[3]	7	-6.1	A
I_D@T_A=70℃	Continuous Drain Current[3]	5.7	-5	A
I_{DM}	Pulsed Drain Current[1]	30	-30	A
P_D@T_A=25℃	Total Power Dissipation	2.0		W
	Linear Derating Factor	0.016		W/℃
T_{STG}	Storage Temperature Range	-55 to 150		℃
T_J	Operating Junction Temperature Range	-55 to 150		℃

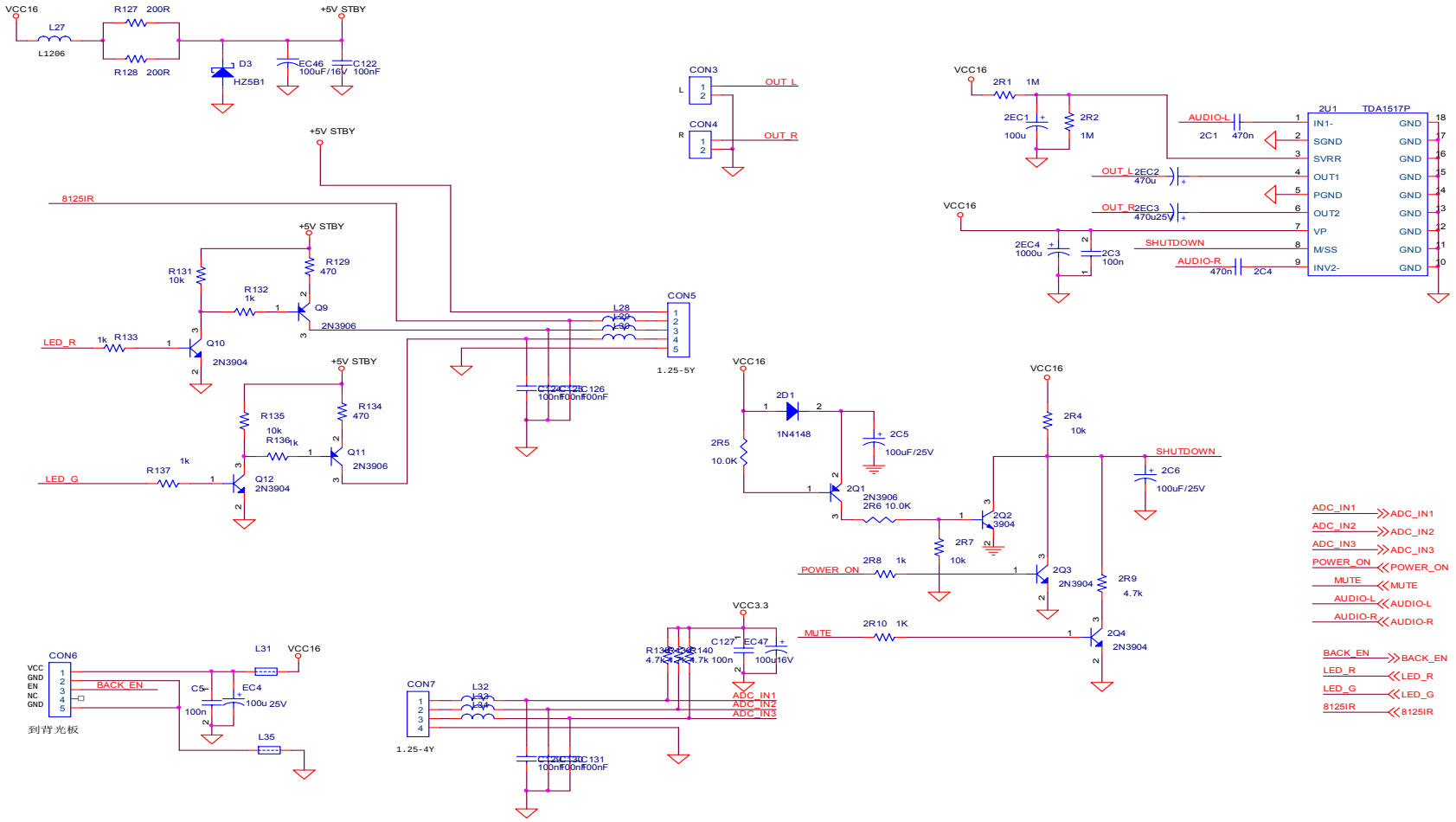
Thermal Data

Symbol	Parameter		Value	Unit
Rthj-a	Thermal Resistance Junction-ambient[3]	Max.	62.5	℃/W

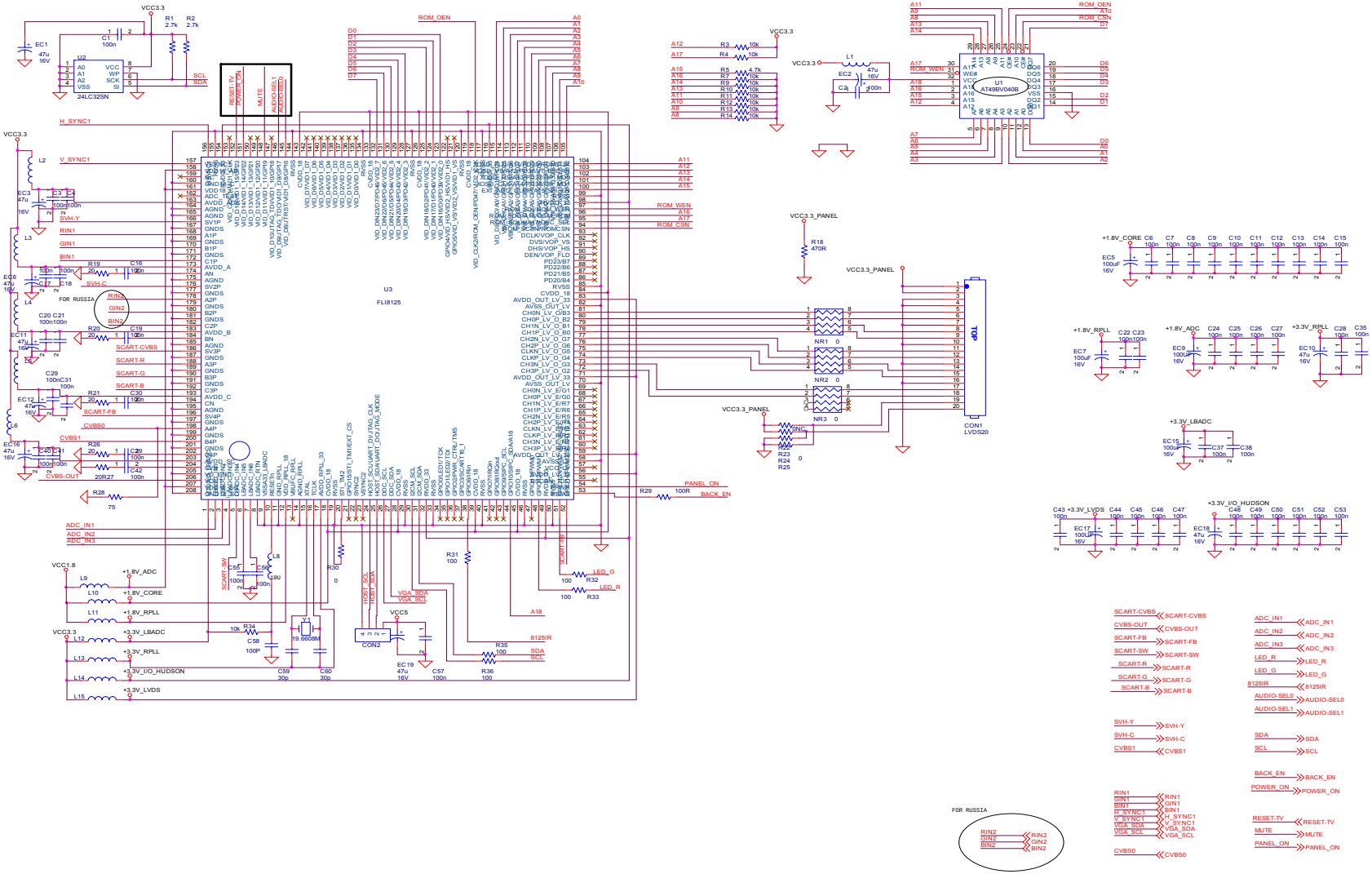
Part 4 Detailed Circuit

MAIN BOARD

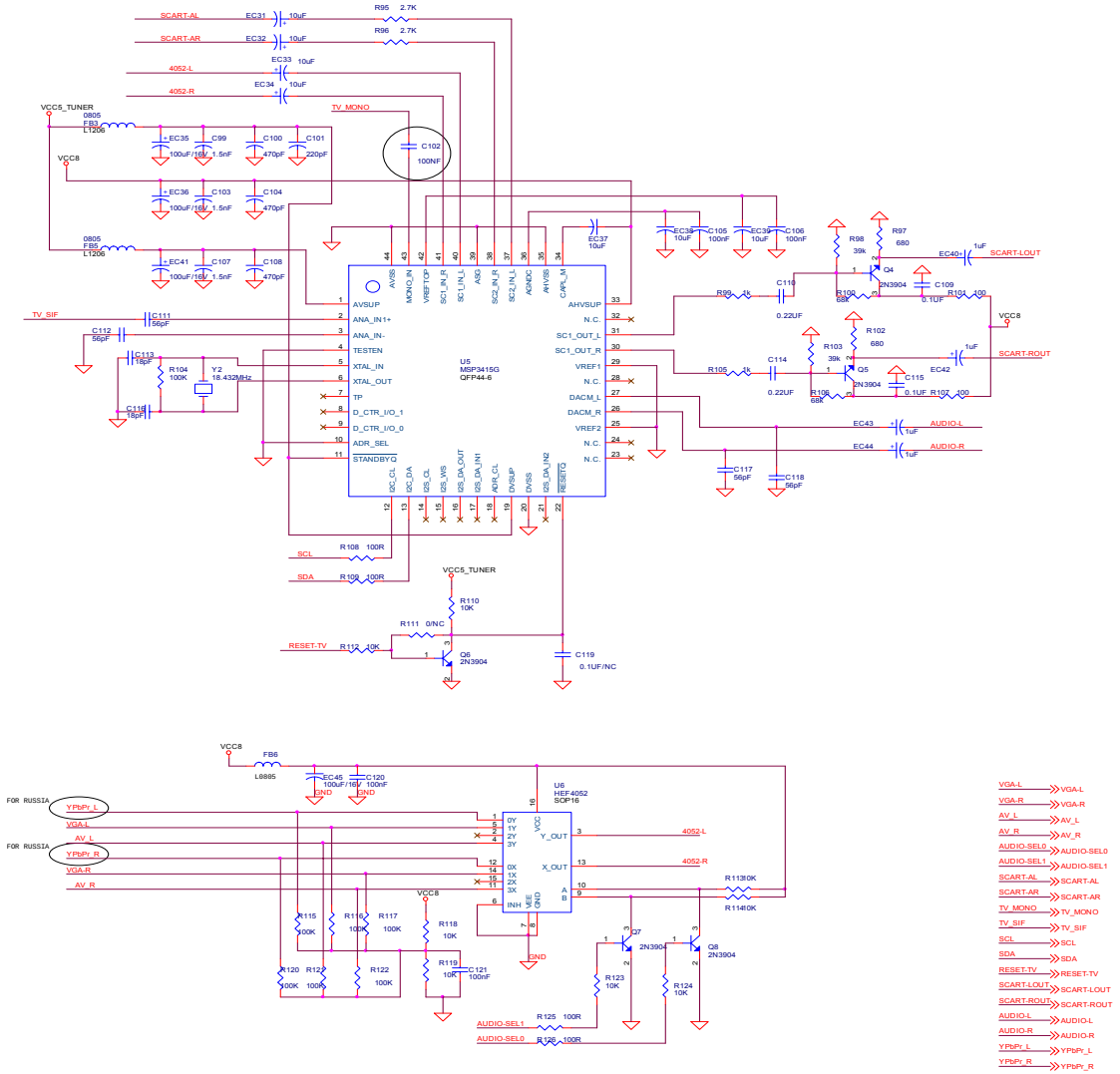
1. Interface



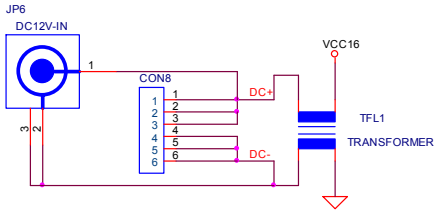
2. Hundson

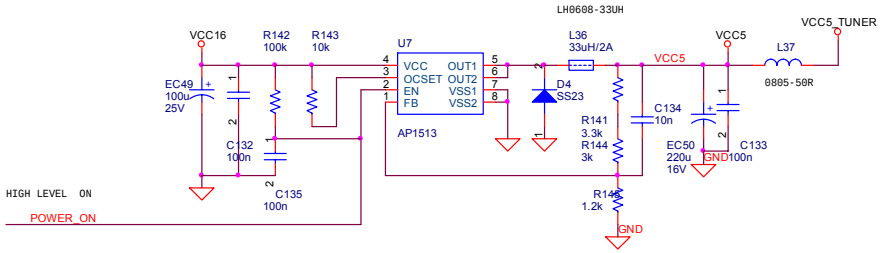


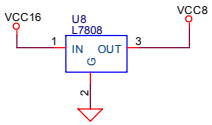
3. Audio

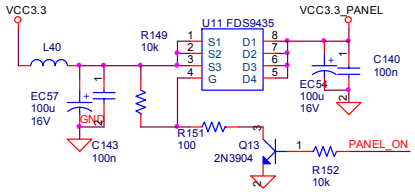

SCART-AL
SCART-AR
4052-L
4052-R
TV_MONO
VCC5_TUNER
VCC8
TV_SIF
SCL
SDA
RESET-TV
SCART-LOUT
SCART-ROUT
AUDIO-L
AUDIO-R
U5
MSP3415G
QFP44-6
U6
HEF4052
SOP16
FOR RUSSIA
YPbPr_L
VGA-L
AV_L
YPbPr_R
VGA-R
AV_R
AUDIO-SEL1
AUDIO-SEL0
GND

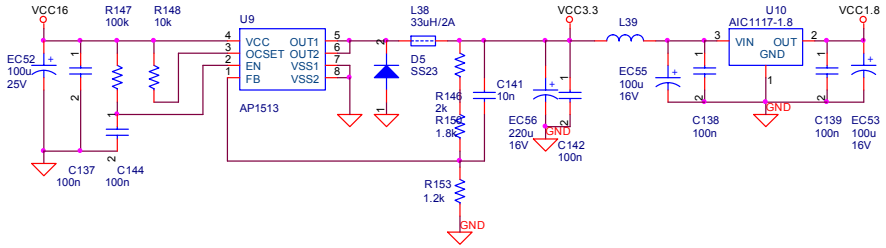
4. Power

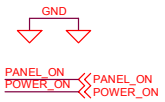

JP6
DC12V-IN
CON8
DC+
DC-
VCC16
TFL1
TRANSFORMER


LH0608-33UH
VCC16
R142
100k
R143
10k
U7
AP1513
L36
33uH/2A
VCC5
VCC5_TUNER
L37
0805-50R
EC49
100u
25V
C132
100n
C135
100n
D4
SS23
R141
3.3k
R144
3k
C134
10n
EC50
220u
16V
C133
100n
R145
1.2k
HIGH LEVEL ON
POWER_ON
GND

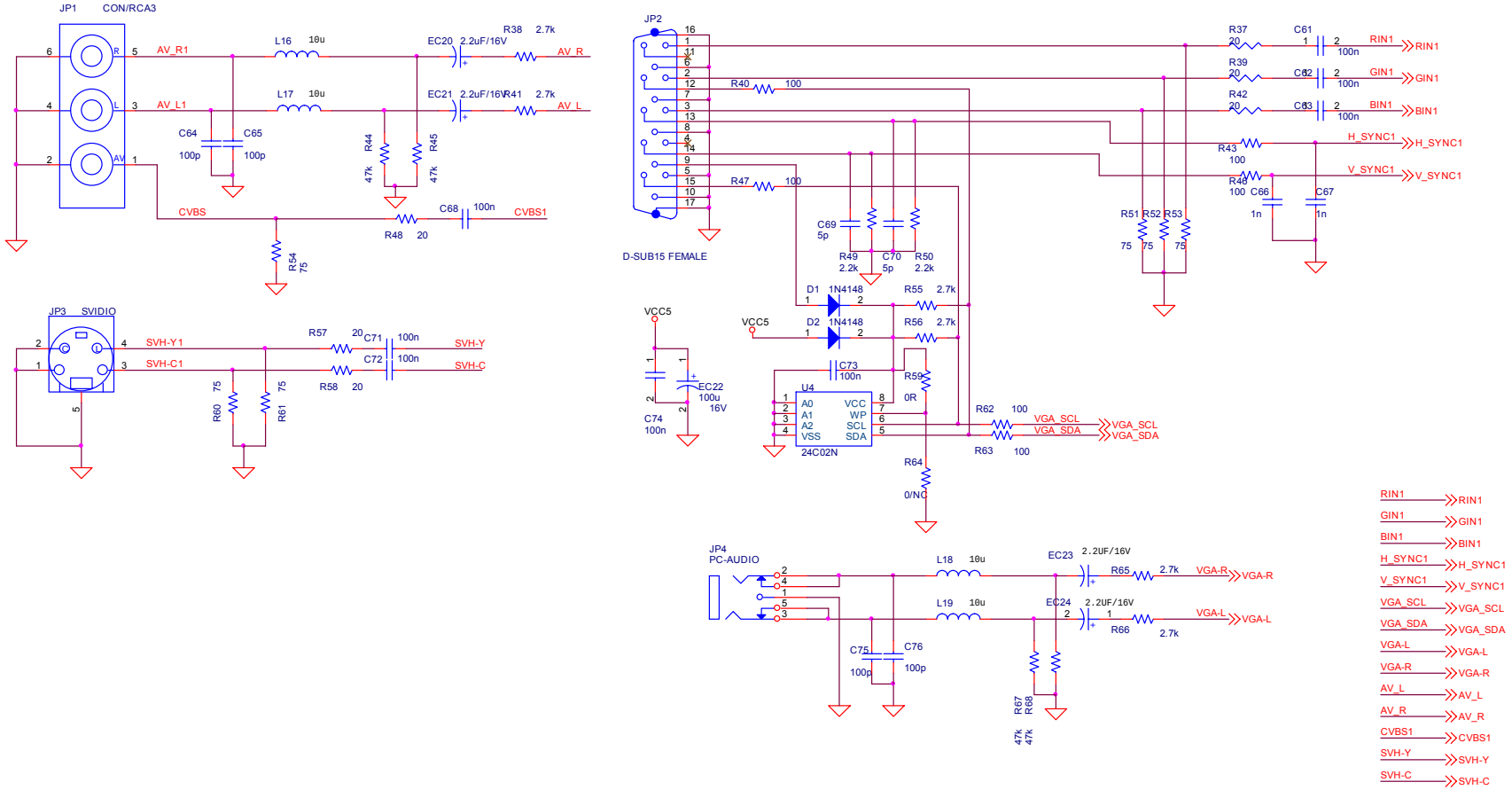

VCC16
U8
L7808
VCC8


VCC3.3
L40
EC57
100u
16V
R149
10k
U11 FDS9435
VCC3.3_PANEL
C140
100n
EC54
100u
16V
R151
100
Q13
2N3904
PANEL_ON
R152
10k
C143
100n
GND

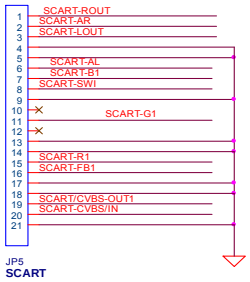

VCC16
R147
100k
R148
10k
U9
AP1513
L38
33uH/2A
VCC3.3
L39
U10
AIC1117-1.8
VCC1.8
EC52
100u
25V
D5
SS23
R146
2k
R154
1.8k
C141
10n
EC56
220u
16V
C142
100n
EC55
100u
16V
C138
100n
C139
100n
EC53
100u
16V
R153
1.2k
C137
100n
C144
100n
GND

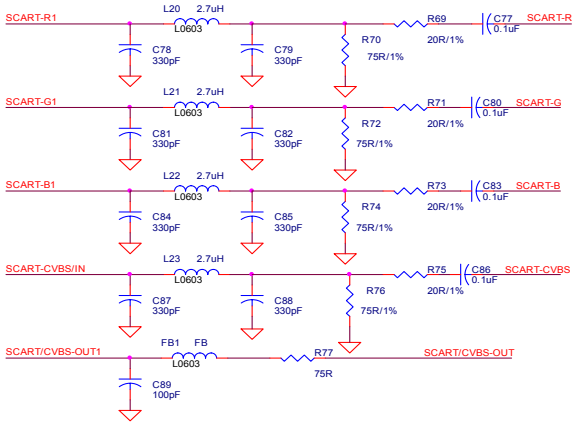

GND
PANEL_ON
POWER_ON
PANEL_ON
POWER_ON

5.CVBS&VGA

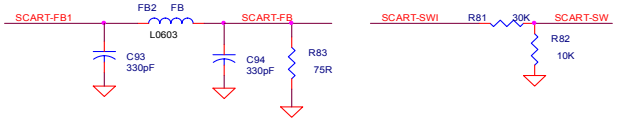

JP1
CON/RCA3
AV_R1
AV_L1
L16 10u
L17 10u
EC20 2.2uF/16V
EC21 2.2uF/16V
R38 2.7k
R41 2.7k
AV_R
AV_L
C64 100p
C65 100p
R44 47k
R45 47k
CVBS
C68 100n
CVBS1
R48 20
R54 75
JP3 SVIDIO
SVH-Y1
SVH-C1
R57 20
C71 100n
C72 100n
R58 20
SVH-Y
SVH-C
R60 75
R61 75
JP2
D-SUB15 FEMALE
R40 100
R47 100
C69 5p
R49 2.2k
C70 5p
R50 2.2k
R37 20
R39 20
R42 20
R43 100
R46 100
C61 100n
C62 100n
C63 100n
C66 1n
C67 1n
R51 75
R52 75
R53 75
RIN1
GIN1
BIN1
H_SYNC1
V_SYNC1
D1 1N4148
D2 1N4148
R55 2.7k
R56 2.7k
VCC5
C73 100n
EC22 100u 16V
C74 100n
U4
24C02N
A0
A1
A2
VSS
VCC
WP
SCL
SDA
R59 0R
R62 100
R63 100
VGA_SCL
VGA_SDA
R64 0/NC
JP4
PC-AUDIO
L18 10u
L19 10u
EC23 2.2UF/16V
EC24 2.2UF/16V
R65 2.7k
R66 2.7k
VGA-R
VGA-L
C75 100p
C76 100p
R67 47k
R68 47k
AV_L
AV_R
CVBS1
SVH-Y
SVH-C

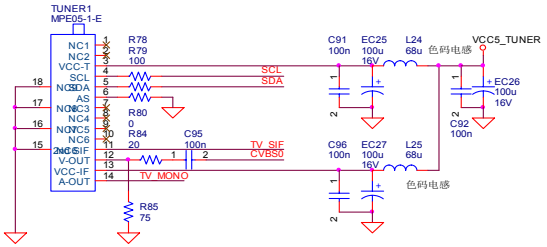
6. SCART & TUNER

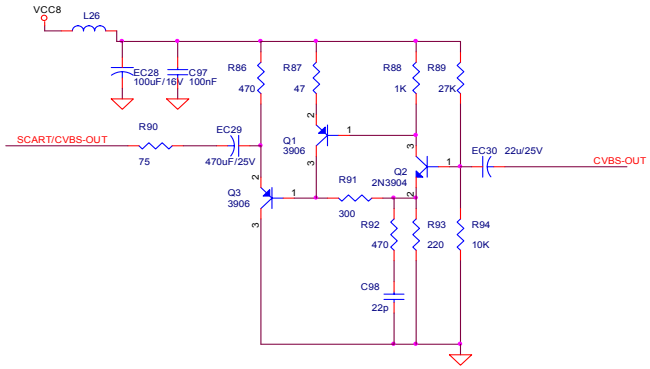


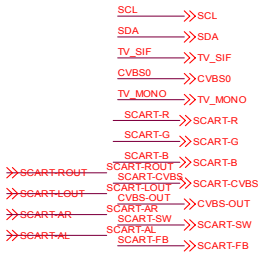


SCART-SW LEVEL	DESCRIPTION
0V - 2.0V	SCART ABSENT
4.5V - 7.0V	SCART PRESENT 16:9 INPUT
9.5V - 12.0V	SCART PRESENT 4:3 INPUT



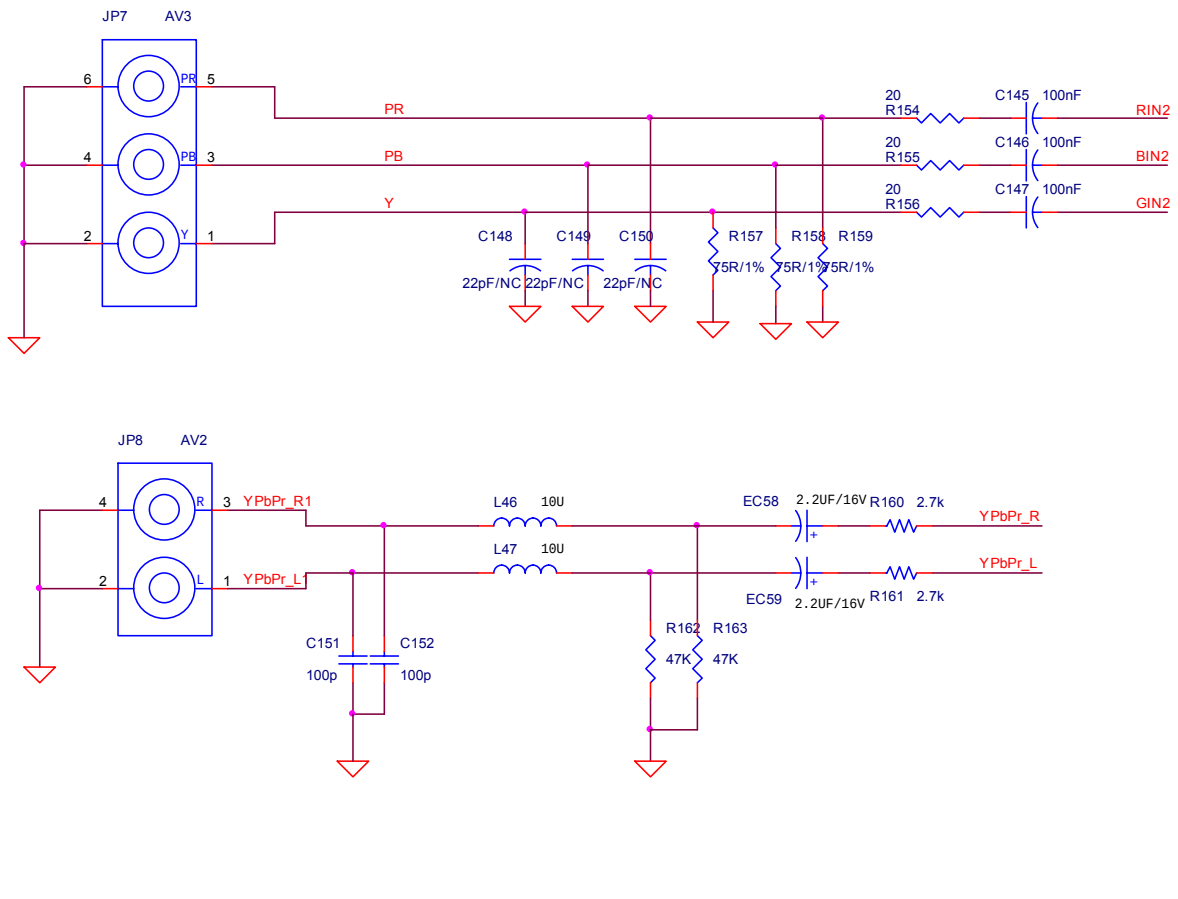




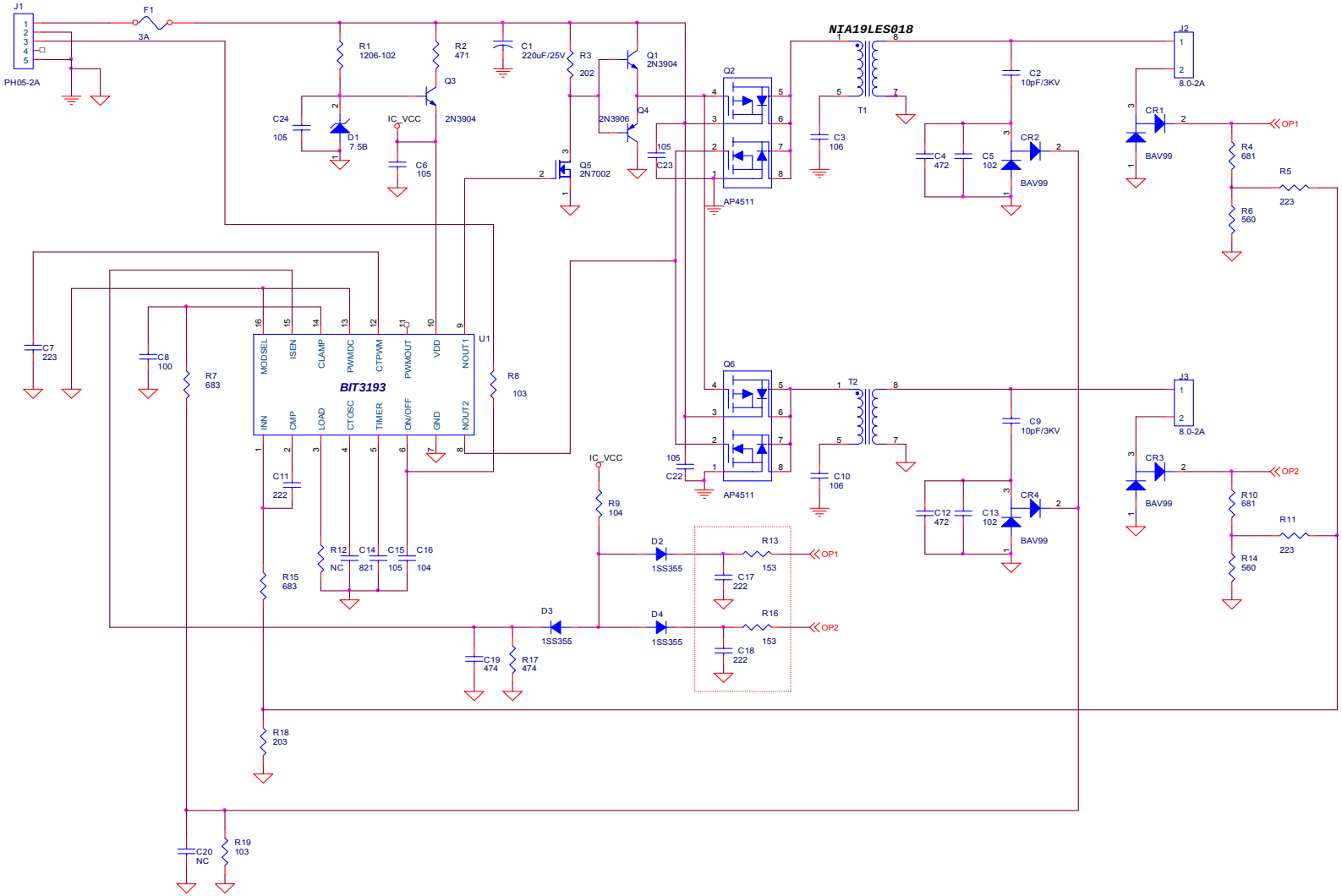


7. Y/PB/PR

FOR RUSSIA



HI-VOLTAGE BOAD



Part5 Part list of CTV-1515

Bom No	Part No	Part No	QTY	
LTD06P-2956C01	02.19.LTD06P2956C01	Power board	1	
Part No	Name	Specification	QTY	LOCA NO
01.57.R.3.E681J	SMD resistor	0805-680Ω ±5%	1	R9
01.57.R.3.E472J	SMD resistor	0805-4.7KΩ ±5%	1	R13
01.57.R.3.E222J	SMD resistor	0805-2.2KΩ ±5%	1	R12
01.57.R.3.E123J	SMD resistor	0805-12KΩ ±5%	2	R3 R11
01.57.R.4.E4R7J	SMD resistor	1206-4.7Ω ±5%	1	R6
01.57.R.4.E390J	SMD resistor	1206-39Ω ±5%	2	R7 R8
01.57.R.4.E222J	SMD resistor	1206-2.2KΩ ±5%	1	R10
01.57.R.4.E514J	SMD resistor	1206-510KΩ ±5%	2	R1 R2
01.57.R.4.E392J	SMD resistor	1206-3.9KΩ ±5%	1	R15
01.57.R.C.EC105	Carbon film resistor	RT1/6W-1MΩ	1	R4
01.57.R.C.EG563	Carbon film resistor	RT2W-56KΩ	1	R5
01.57.R.R.E5D11	Hot agile resistor	NTC-5D-11	1	TH1
01.57.R.Y.E10K	Press agile resistor	10K.471	1	VR1
01.54.CS.3.E104X	SMD capacitor	0805-104 X7R± 10%/50V	2	C13 C10
01.54.CS.3.E473X	SMD capacitor	0805-473 X7R± 10%/50V	1	C5
01.54.CS.4.E102X200V	SMD capacitor	1206-102 X7R± 10%/200V	1	C6
01.34.CL.D.E150U400V	Electrolyse capacitor	150uF/400V 18*36 ±20% 105℃ Low ESR	1	C1
01.34.CL.D.E1000U25V	Electrolyse capacitor	1000uF/25V 10*20 ±20% 105℃ Low ESR	2	C7 C8
01.34.CL.D.E470U25V	Electrolyse capacitor	470uF/25V 8*20 ± 20% 105℃ Low ESR	1	C9
01.00.CD.CP.E1031KV	Ceramic capacitor	103/1KV	1	C2
01.00.CD.CP.E2221KVA	Ceramic capacitor	222/1KV	1	C3
01.00.CD.GY.E104275V	Hi-voltage capacitor	104/275V X2	1	CX2
01.00.CD.GY.E224275V	Hi-voltage capacitor	224/275V X2	1	CX1
01.00.CD.GY.E471400V	Hi-voltage capacitor	471/400V Y1	2	CY1 CY2
01.00.CD.GY.E222400V	Hi-voltage capacitor	222/400V Y1	1	CY3
01.34.CL.D.E22U35VB	Electrolyse capacitor	CD11X-22UF/35V 5*7(105℃)	1	C4
01.13.L.L.D.E155	Filter	LCL-401	1	Lc1
01.13.L.L.D.E180	Filter	LCL-203B DIP	1	Lc2
01.13.L.L.D.E181	Inductor	L620-3uH DIP	1	L1
01.13.L.Z.ED50B	DIP magnetism bead	50Ω (3.5*4.7*0.8)	1	L2
01.41.D.PD.E1U08	Diode	1U08 DIP	1	D1
01.41.D.PD.EFR107	Diode	FR107 DIP	1	D1

01.41.D.PD.EFR104	Diode	FR104 DIP	1	D2
01.41.D.PD.ESF20NC15	Diode	SF20NC15M DIP	2	D3 D4
01.41.D.PD.E2015CT	Diode	MBRF20150CT DIP	2	D3 D4
01.41.D.WD.E10V	DIP zener diode	10V	1	ZD1
01.41.D.WD.E20V	DIP zener diode	20V	1	ZD2
01.44.IC.D.EM0765	IC	FSCM0765RGWDTU DIP	1	U5
01.44.IC.D.EPC817	IC	PC817 DIP	1	U2
01.44.IC.D.EKA431A	IC	KA431AZ DIP	1	U3
01.41.D.PD.EUS4K80	Diode	US4K 80R DIP	1	BD1
01.41.D.PD.EGBU406	Diode	GBU406 DIP	1	BD1
01.41.D.PD.EGBU408	Diode	GBU408 DIP	1	BD1
01.41.D.PD.EPQ322001	Transformer	BCK-PQ3220-01 DIP	1	TR1
01.40.CON.DCZ.E129	Connection	VH	1	CN1
01.40.CON.DTJ.E008	Jack	TJC3-4A	1	CN3
01.40.CON.DTJ.E012	Jack	TJC3-6A	1	CN4
01.38.FUSE.D.E3K315	Fuse	3K 3.15A 250V DIP	1	F1
01.38.FUSE.D.E32S315	Fuse	32S 3.15A 250V DIP	1	F1
01.38.FUSE.D.E315A250V	Fuse	ICP 3.15A250V	1	F1
01.00.FZ.ZZ.E010	J line	15mm	2	J1 J5
01.00.FZ.ZZ.E003	J line	10mm	2	J2 J3
01.00.FZ.ZZ.E007	J line	12.5mm	1	J4
01.37.PCB.1.E2956C2	Circuit board	Power board2956C-V2.0	1	
Bom No	Part No	Part No	QTY	
LTV06T-3560C01	02.22.LTV06T3560C01	Remote control receive board	1	
Part No	Name	Specification	QTY	LOCA NO
01.57.R.2.E100J	SMD resistor	0603-10Ω±5%	1	4R1
01.54.CS.2.E104Y	SMD capacitor	0603-104 Y5V-20+80%/50V	1	4C1
01.34.CL.D.EV47U16VA	Electrolyse capacitor	CDV-47UF/16V 5*5	1	(CE1)
01.41.D.FD.E4RB	Radiation diode	Φ4	1	4D1
01.44.IC.D.E38B17	IC	HL38B17 DIP	1	4U1
01.40.CON.S13.AY.E009	SMD jack	1.25-5A	1	1CON2
01.37.PCB.2.E3560C2	Circuit board	Remote control receive board3560C-V2.0	1	

Bom No	Part No	Part No	QTY	
LTV06K-3670C01	02.15.LTD06K3670C01	Key board	1	
Part No	Name	Specification	QTY	LOCA NO
01.57.R.2.E102J	SMD resistor	0603-1KΩ ±5%	3	R1 R2 R3
01.57.R.2.E202J	SMD resistor	0603-2KΩ ±5%	2	R4 R5
01.57.R.2.E472J	SMD resistor	0603-4.7KΩ ±5%	2	R6 R7
01.54.CS.2.E104Y	SMD capacitor	0603-104 Y5V-20+80%/50V	3	C1 C2 C3
01.54.CS.B.E150	Press agile resistor	AVLC18S03015	3	EP1 EP2 EP3
01.39.SW.QC.ED665	Touch switch	6*6*5(DIP 300g)	7	S1 S2 S3 S4 S5 S6 S7
01.40.CON.S13.AY.E018	SMD jack	1.25-4A	1	CON1
01.37.PCB.2.E3670C1	Circuit board	Key board3670C-V1.0	1	
Bom No	Part No	Part No	QTY	
LTV06M-3671C01	02.11.LTV06M3671C01	Main board	1	
Bom Name	Name	Specification	QTY	LOCA NO
01.57.R.2.E000J	SMD resistor	0603-0Ω ±5%	4	R25 R30 R59 R80
01.57.R.2.E200F	SMD resistor	0603-20Ω 1%	15	R19 R20 R21 R26 R27 R37 R39 R42 R48 R57 R58 R84 R154 R155 R156
01.57.R.2.E750F	SMD resistor	0603-75Ω ±1%	10	R51 R52 R53 R54 R60 R61 R85 R157 R158 R159
01.57.R.2.E101J	SMD resistor	0603-100Ω ±5%	17	R31 R32 R33 R35 R36 R40 R43 R46 R47 R62 R63 R78 R79 R151 R29 R108 R109
01.57.R.2.E471J	SMD resistor	0603-470Ω ±5%	1	R18
01.57.R.2.E102J	SMD resistor	0603-1KΩ ±5%	6	R132 R133 R136 R137 R129 R134
01.57.R.2.E122J	SMD resistor	0603-1.2KΩ ±5%	2	R153 R145
01.57.R.2.E182J	SMD resistor	0603-1.8KΩ ±5%	1	R150
01.57.R.2.E202J	SMD resistor	0603-2KΩ ±5%	1	R146
01.57.R.2.E222J	SMD resistor	0603-2.2KΩ ±5%	2	R49 R50
01.57.R.2.E272J	SMD resistor	0603-2.7KΩ ±5%	10	R1 R2 R38 R41 R55 R56 R65 R66

				R160 R161
01.57.R.2.E302J	SMD resistor	0603-3KΩ±5%	1	R144
01.57.R.2.E332J	SMD resistor	0603-3.3KΩ±5%	1	R141
01.57.R.2.E472J	SMD resistor	0603-4.7KΩ±5%	5	R5 2R9 R138 R139 R140
01.57.R.2.E103J	SMD resistor	0603-10KΩ±5%	31	R3 R4 R6 R7 R9 R10 R11 R12 R13 R14 2R4 2R7 R34 R110 R112 R113 R114 R118 R119 R123 R124 R131 R135 R143 R148 R149 R152 2R6 2R5 2R8 2R10
01.57.R.2.E473J	SMD resistor	0603-47KΩ±5%	6	R44 R45 R67 R68 R162 R163
01.57.R.2.E104J	SMD resistor	0603-100KΩ±5%	5	R104 R116 R117 R142 R147
01.57.R.4.E105J	SMD resistor	1206-1MΩ±5%	2	2R1 2R2
01.57.R.3.E201J	SMD resistor	0805-200Ω±5%	2	R127 R128
01.54.CS.B.E150	Press agile resistor	AVLC18S03015	21	EP1 EP2 EP3 EP4 EP5 EP6 EP13 EP14 EP15 EP16 EP17 EP18 EP19 EP20 EP21 EP22 EP23 EP24 EP25 EP26 EP27
01.57.R.8.EP0004	SMD resistor row	0Ω*4 ±5%	3	NR1 NR2 NR3
01.54.CS.2.E5P0N	SMD capacitor	0603-5P NP0± 0.25PF/50V	2	C70 C69
01.54.CS.2.E6P0N	SMD capacitor	0603-6P NP0± 0.25%/50V	2	(C116) (C113)
01.54.CS.2.E330N	SMD capacitor	0603-33P NP0± 5%/50V	2	(C59) (C60)
01.54.CS.2.E560N	SMD capacitor	0603-56P NP0± 5%/50V	2	C111 (C112)
01.54.CS.2.E101N	SMD capacitor	0603-100P NP0± 5%/50V	14	C58 C64 C65 C75 C76 C151 C152 C124 C125 C129 C130 C131 C66 C67
01.54.CS.2.E221N	SMD capacitor	0603-220P NP0± 5%/50V	1	(C101)
01.54.CS.2.E471X	SMD capacitor	0603-470P X7R± 10%/50V	3	C100 C104 C108
01.54.CS.2.E152X	SMD capacitor	0603-152 X7R± 10%/50V	3	C99 C103 C107

01.54.CS.2.E102X	SMD capacitor	0603-102 X7R± 10%/50V	2	(C117) (C118)
01.54.CS.2.E103Y	SMD capacitor	0603-103 Y5V-20+80%/50V	2	C134 C141
01.54.CS.2.E104X	SMD capacitor	0603-104 X7R± 10%/50V	85	C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 2C3 C24 C25 C26 C27 C28 C29 C30 C31 C35 C37 C38 C39 C40 C41 C42 C43 C44 C45 C46 C47 C48 C49 C50 C51 C52 C53 C55 C56 C57 C61 C62 C63 C68 C71 C72 C73 C74 C91 C92 C95 C96 C127 C132 C133 C135 C137 C138 C139 C140 C142 C143 C144 C102 C105 C106 C120 C121 C122 C145 C146 C147
01.54.CS.2.E474X	SMD capacitor	0603-474 X7R± 10%/10V	2	(2C4) (2C1)
01.34.CL.D.E1U16VC	Electrolyse capacitor	CD110-1UF/16V 5*11	2	EC43 EC44
01.34.CL.D.E2U216VC	Electrolyse capacitor	CD110-2.2UF/16V 5*11	6	EC21 EC20 EC23 EC24 EC58 EC59
01.34.CL.D.E10U16VC	Electrolyse capacitor	CD110-10UF/16V 5*11	5	EC33 EC34 EC37 EC38 EC39
01.34.CL.D.E47U16VC	Electrolyse capacitor	CD110-47UF/16V 5*11	10	EC1 EC2 EC3 EC6 EC10 EC11 EC12 EC16 EC18 EC19
01.34.CL.D.E100U16VC	Electrolyse capacitor	CD110-100UF/16V 5*11	10	EC5 EC7 EC9 EC15 EC17 EC35 EC36 EC41 EC45 EC46
01.34.CL.D.E100U25VD	Electrolyse capacitor	CD110-100UF/25V 6.3*12	15	EC4 2EC1 EC22 EC25 EC26 EC27 EC47 EC49 EC52 EC53 EC54 EC55 EC57 2C5 2C6
01.34.CL.D.E220U16VD	Electrolyse capacitor	CD110-220UF/16V 6.3*12	2	EC56 EC50

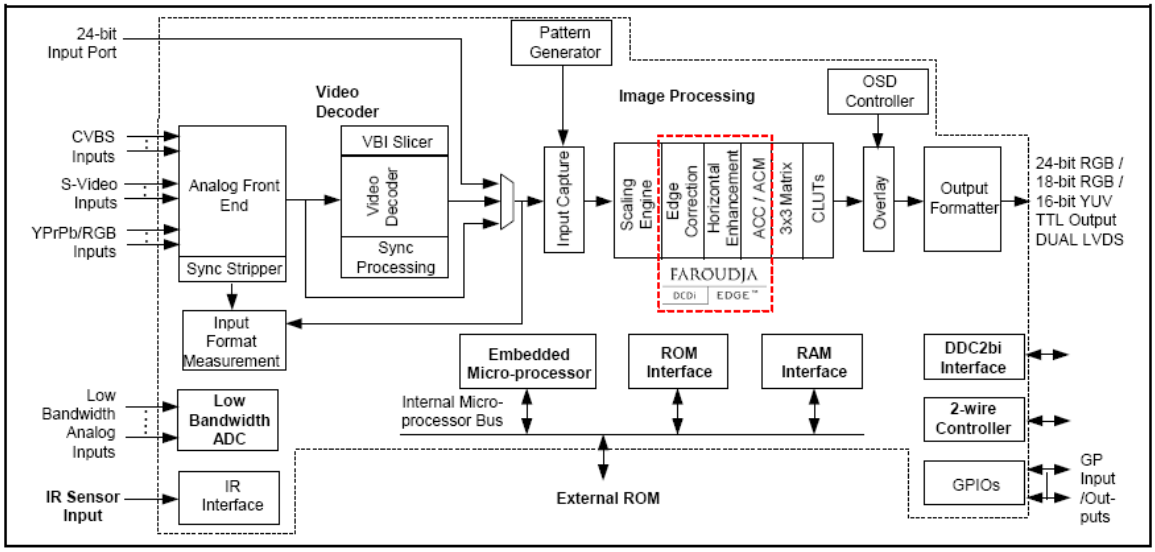
01.34.CL.D.E470U25VE	Electrolyse capacitor	CD110-470UF/25V 8*14	2	2EC3 2EC2
01.34.CL.D.E1000U25VG1	Electrolyse capacitor	CD110-1000uF/25V 10*20	1	2EC4
01.13.L.Z.ESA50	SMD magnetism bead	0603-50Ω	13	L8 L28 L29 L30 L32 L33 L34 L16 L17 L18 L19 L46 L47
01.13.L.L.D.E150	DIP inductor	LH0608-33UH	2	L36 L38
01.13.L.L.D.E038	Color code inductor	33UH	2	L25 L24
01.13.L.L.D.E056	DIP inductor	LCL-11201HA	1	TFL1
01.13.L.Z.ESC50	SMD magnetism bead	1206-50Ω	25	FB3 FB5 FB6 L37 L39 L1 L2 L3 L4 L5 L6 L7 L9 L10 L11 L12 L13 L14 L15 L41 L42 L43 L44 L45 L27
01.13.L.Z.ESC50P	SMD magnetism bead	1206-50Ω PB	2	L40 (L48)
01.41.D.WS.E5V1	SMD zener diode	5.1V	1	D3
01.13.L.Z.ED50A	DIP magnetism bead	50Ω (3.5*6.0*0.8)	2	L31 L35
01.41.D.PS.ELL4148	Diode	LL4148 SMD	3	D1 D2 2D1
01.41.D.PS.ESS24	Diode	SS24 SMD	2	D4 D5
01.42.Q.S.E2N3906	Audion	2N3906 SMD	3	Q9 Q11 2Q1
01.42.Q.S.E2N3904	Audion	2N3904 SMD	10	Q6 Q7 Q8 Q10 Q12 Q13 Q14 2Q3 2Q4 2Q2
01.00.JZ.E196608A	DIP oscillator	19.6608MHZ-49S-20P	1	Y1
01.00.JZ.E18432A	DIP oscillator	18.432MHZ-49S-12P	1	Y2
01.31.GPT.E063	Tuner	MPE05-1-E	1	TUNER1
01.46.IC.EW39L040AP70Z	IC	W39L040AP70Z SMD	1	U1
01.44.IC.S.E24C32	IC	AT24C32AN SMD	1	U2
01.44.IC.S.E8125	IC	FLI8125-LF SMD	1	U3
01.46.IC.E24C02	IC	24C02 SMD	1	U4
01.44.IC.S.E3415	IC	MSP3415G SMD	1	U5
01.44.IC.S.E4052	IC	CD4052 SMD	1	U6
01.44.IC.S.E1513S	IC	AP1513S SMD	2	U9 U7
01.44.IC.D.EL7808	IC	L7808C-V DIP	1	U8
01.44.IC.S.EA11171V8	IC	AZ1117H-1.8 SMD	1	U10
01.44.IC.S.ES9435	IC	FDS9435 SMD	1	U11
01.44.IC.D.ETDA1517P	IC	TDA1517P DIP	1	2U1
01.40.CON.S13.AY.E018	SMD jack	1.25-4A	1	CON7
01.40.CON.S13.AY.E009	SMD jack	1.25-5A	1	CON5

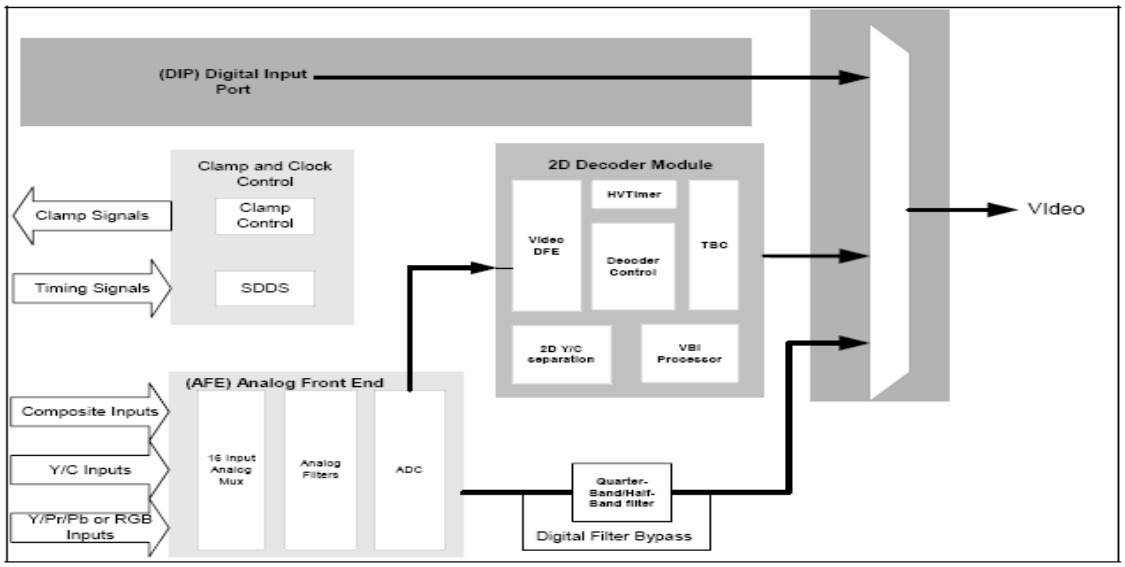
01.40.CON.S13.AY.E002	SMD jack	1.25-20A	1	CON1
01.40.CON.DPH.E020	Jack	PH-4A	1	CON2
01.40.CON.DPH.E024	Jack	PH-5A	1	CON6
01.40.CON.DTJ.E004	Jack	TJC3-2A	2	CON3 CON4
01.40.CON.DTJ.E012	Jack	TJC3-6A	1	CON8
01.40.CON.DCZ.E007	VGA jack	EV-015FC/15	1	JP2
01.40.CON.DDZ.ES-081-9	S end seed	S-081-9	1	JP3
01.40.CON.DCZ.E102	Perch earphone jack	CKX-3.5-02(without switch)	1	JP4
01.40.CON.DCZ.E164	Same core jack	AV3-8.4-14G	1	JP1
01.40.CON.DCZ.E089	Same core jack	AV3-8.4-14G	1	JP7
01.40.CON.DCZ.E450	Same core jack	AV2-8.4-14/PB	1	JP8
01.40.CON.DCZ.E018	Power jack	DDK2.5	1	JP6
01.37.PCB.2.E3671C	Circuit board	Main board3671C	1	
Bom No	Part No	Part Name	QTY	
MINV15-07SVA1B03	02.07.MINV1507SVA1B03	Inverter board	1	
Part No	Name	Specification	QTY	LOCA NO
01.57.R.4.E471J	SMD resistor	1206-470Ω ±5%	1	R2
01.57.R.2.E152J	SMD resistor	0603-1.5KΩ ±5%	1	R1
01.57.R.2.E561F	SMD resistor	0603-560Ω ±1%	2	R6 R14
01.57.R.2.E681J	SMD resistor	0603-680Ω ±5%	2	R4 R10
01.57.R.2.E202J	SMD resistor	0603-2KΩ ±5%	1	R3
01.57.R.2.E103J	SMD resistor	0603-10KΩ ±5%	2	R19 R8
01.57.R.2.E153J	SMD resistor	0603-15KΩ ±5%	2	R13 R16
01.57.R.2.E203J	SMD resistor	0603-20KΩ ±5%	1	R18
01.57.R.2.E223J	SMD resistor	0603-22KΩ ±5%	2	R5 R11
01.57.R.2.E683J	SMD resistor	0603-68KΩ ±5%	2	R7 R15
01.57.R.2.E104J	SMD resistor	0603-100KΩ ±5%	1	R9
01.57.R.2.E474J	SMD resistor	0603-470KΩ ±5%	1	R17
01.54.CS.2.E101N	SMD Capacitor	0603-100P NPO± 5%/50V	1	C8
01.54.CS.2.E821N	SMD Capacitor	0603-820P NPO± 5%/50V	1	C14
01.54.CS.2.E222X	SMD Capacitor	0603-222 X7R± 10%/50V	3	C11 C17 C18
01.54.CS.2.E472X	SMD Capacitor	0603-472 X7R± 10%/50V	2	C12 C4
01.54.CS.2.E102X	SMD Capacitor	0603-102 X7R± 10%/50V	2	C5 C13
01.54.CS.2.E223X	SMD Capacitor	0603-223 X7R± 10%/50V	1	C7

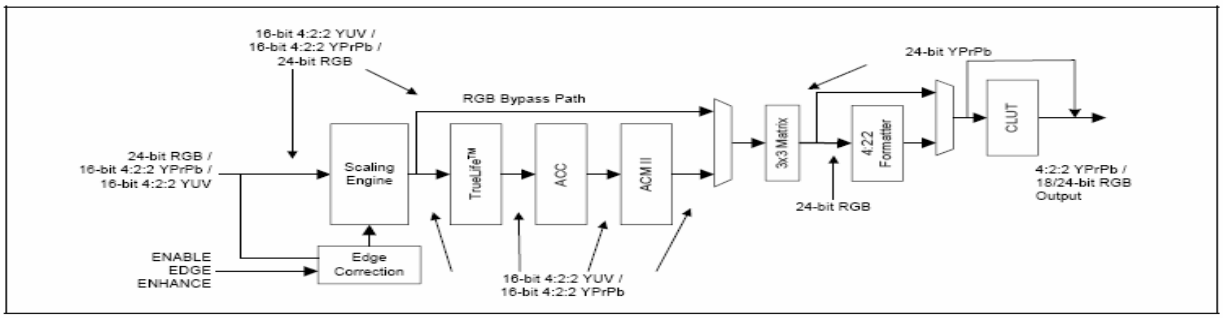
01.54.CS.2.E104X	SMD Capacitor	0603-104 X7R± 10%/50V	1	C16
01.54.CS.2.E474Y	SMD Capacitor	0603-474 Y5V+80-20%/50V	1	C19
01.54.CS.2.E105Y16V	SMD Capacitor	0603-105 Y5V-20+80%/16V	4	C6 C15 C22 C23
01.54.CS.2.E225Y	SMD Capacitor	0603-225 Y5V-20+80%/10V	1	C24
01.35.CC.E121010U25VX	SMD ceramic Capacitor	C3225X5R1E106KT	2	C10 C3
01.54.CS.6.E100	SMD Capacitor	1808-10P/3KV NPO± 5%	2	C2 C9
01.34.CL.D.EKW220U25VO	Electrolyse capacitor	KW-220UF/25V 8*9	2	C1 C21
01.41.D.WS.EUDZ7V5B	Diode	UDZ7V5B(7.5V)	1	D1
01.41.D.PS.E1SS355	Diode	1SS355 SMD	3	D2 D3 D4
01.41.D.PS.EBAV99	Diode	BAV99LT1 SMD	4	CR1 CR2 CR3 CR4
01.42.Q.S.E2N3904	Audion	2N3904 SMD	2	Q3 Q1
01.42.Q.S.E2N3906	Audion	2N3906 SMD	1	Q4
01.42.Q.S.E2N7002	Transistor	2N7002 SMD	1	Q5
01.44.IC.S.EAP4511GM	Transistor	AP4511GM SMD	2	Q2 Q6
01.13.L.R.E112	Transformer	NIA19LES018	2	T1 T2
01.00.YS.TZ.T.E747	Transformer label	Label001	2	label
01.38.FUSE.S.E66002	Fuse	0466002.NR	1	F1
01.38.FUSE.S.EF1206HI3000	Fuse	F1206HI-3000 SMD	1	F1
01.44.IC.S.E3193	IC	Bit3193 SMD	1	U1
01.40.CON.DPH.E024	Jack	PH-5A	1	CN1
01.40.CON.S80.E001	SMD hi-voltage jack	BHR-2VS	2	CN2 CN3
01.37.PCB.2.E3835C	Circuit board	Inverter board3835C	1	

Part 6 Debugging Procedures

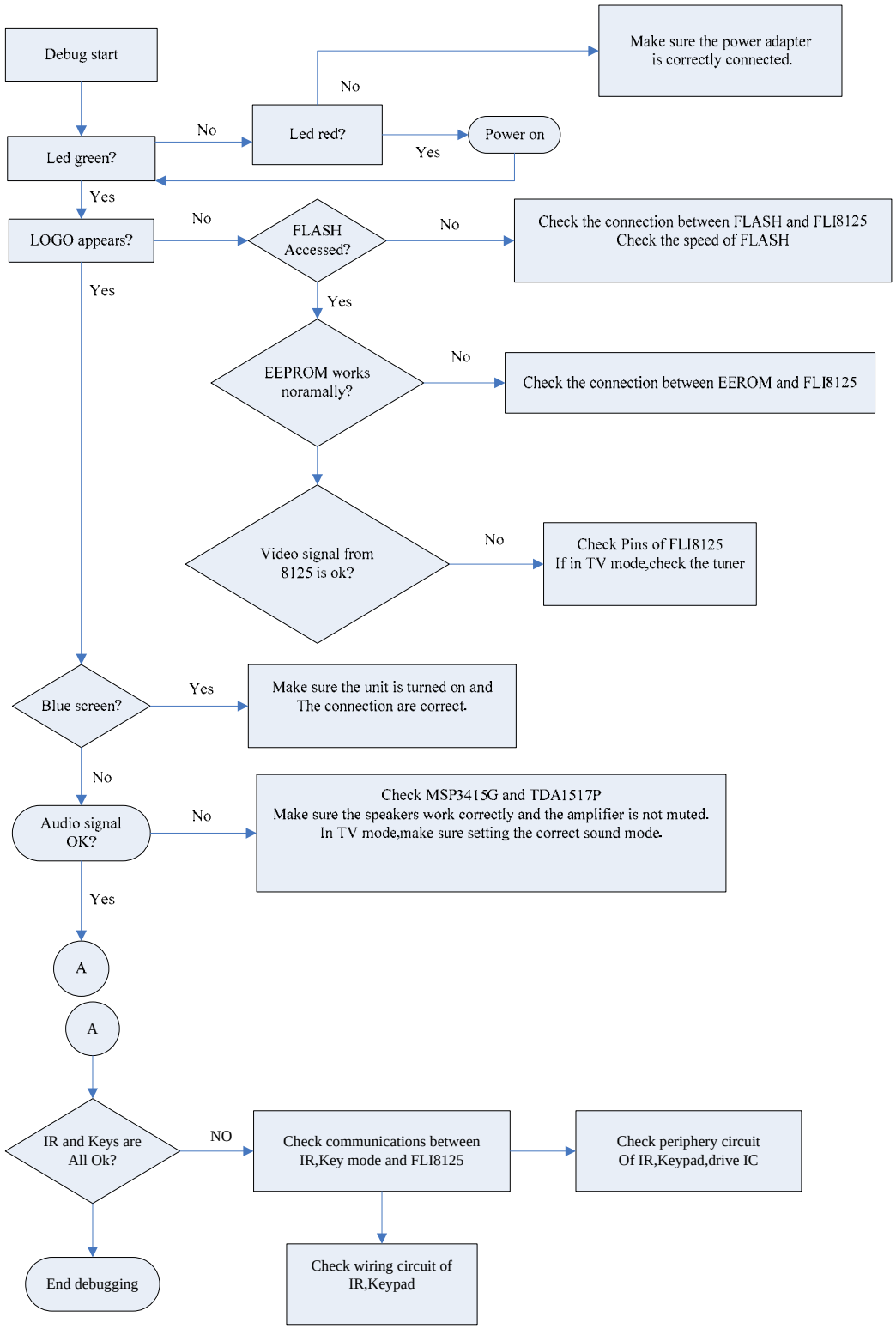
1. Signal process diagram







2. Debugging Strategy



3. Tips Of Some Typical Troubleshooting

White screen

First check voltage in HI-voltage Board; otherwise check the voltage of MAIN board , if abnormal , the problem occurs in U7or U9. If the voltage is OK, check the LVDS. At last the connection between the main board and drive board may be the target for troubleshooting.

Black screen

This problem often arise from the voltage input to the screen, so the first step is to check the voltage of invert circuit. Otherwise check if the status is standby. If in TV mode, check the power for tuner is correct.

No color

Check if the connection with the external device is correct. Otherwise make sure the saturation is not zero. At last the problem may arise from the FLI8125.

Abnormal picture

Check if the range of the signal input to FLI8125 is correct. If no, the problem may be in the AFE(Analog Front End). Otherwise make sure the color system is correct. Then check the LVDS and the LCD Screen.

Pictures with no sound

Firstly, make sure the speakers works well. If so, the trouble mostly occurred in TDA1517 in2U1 in main board, then MSP3415G in U5.

Sounds with no picture

Check if any signal inputs to FLI8125, if yes, the problem may be in the AFE. Otherwise check the LVDS.