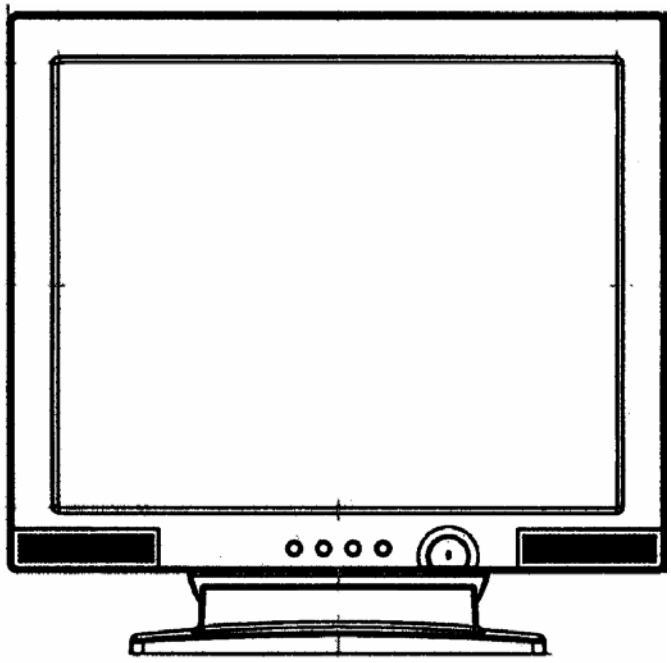
Service Manual



Model: Belinea 101920

Art. No. 111912

MAXDATA Systeme GmbH

Elbestr. 12-16

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Table of Contents

CONTENTS PAGE

Sections

Safety Precaution

WARNING
Service should not be attempted by anyone unfamiliar with the necessary precautions on this monitor.
The followings are the necessary precautions to be observed before servicing.

1. When managing this monitor, cover with shield plate to avoid to scrach on LCD surface.
2. When replacing a chassis in the cabinet, always be certain that all the protective devices are put back in place, such as nonmetallic control knobs, insulating covers, shields, isolation resistor capacitor network etc.
3. Before returning the monitor to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as signal connectors, terminals, screw heads, metal overlays, control shafts etc, to be sure the monitor is safe to operate without danger of electrical shock.

General Information

1. General Description

This 19"LCD color display monitor is operated in R,G,B drive mode input.

2.Operating instructions

2-1.Front
Power Switch, Menu, Select, Down, Up, DPMS (Power) LED
2-2.Rear
Input connector (AC &Signal Cable &DVI Cable &Audio Cable)
2-3.OSD Controls
Brightness, Contrast, Color Control, Position (H.V), Clock Phase, Miscellaneous (Recall, OSD Time, OSD Position, Auto Color), Language, Audio, Auto Adjust, Input Select

3.Electrical Characteristic

3-1.Power Supply
AC/DC-Input Voltage :100V~240V
Input Current :1.5A (Max)
Input Ferquency :47~63Hz
-Output Voltage 12V /2.2A,5V/1.8A
3-2.Video Input Signal
Level :0~770mV max analog signal (at 75 ohm termination to ground)
Polarity :Positive or Negative
3-3.Horizontal Synchronization Signal
Level :TTL High :1.6~5.0V
Low :0.0 ~ 1.2V
Polarity :-or +
Frequency :31kHz ~80kHz analog, 31kHz~64kHz digital
3-4.Vertical Synchronization Signal
Level :TTL High :1.6~5.0V
Low :0.0 ~ 1.2V
Polarity :-or +
Frequency :56Hz ~75Hz analog, 60Hz digital

Support Modes

***Analog R,G,B Input**

NO	Resolution	H Frequency(KHz)	V Frequency(KHz)
1	720 x 400	31.5	70.1
2	640 x 480	31.5	59.9
3	640 x 480	37.5	75.0
4	800 x 600	37.9	60.3
5	1024 x 768	48.4	60.0
6	1024 x 768	56.5	70.1
7	1024 x 768	60.0	75.0
8	1280 x 1024	63.9	60.0
9	1280 x 1024	79.9	75.0

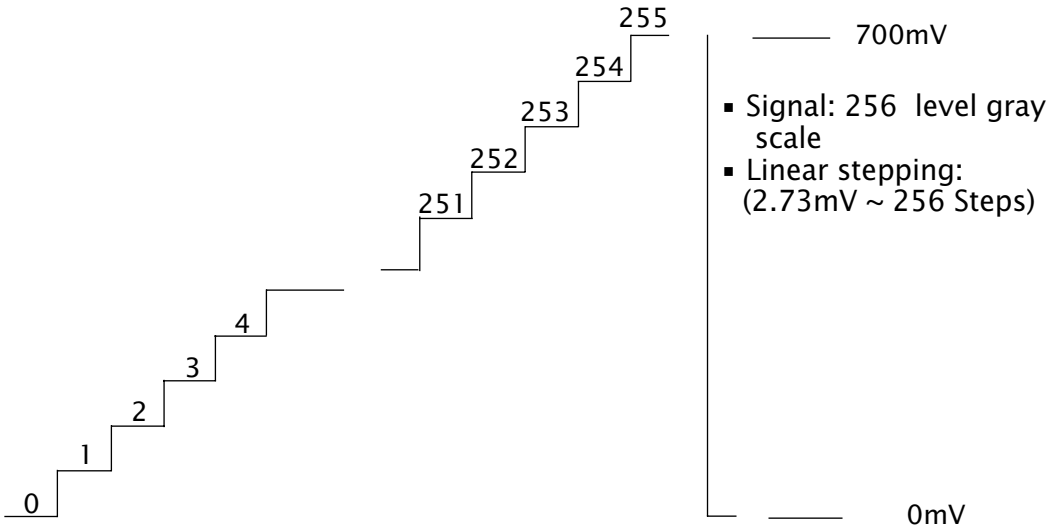
***Digital R,G,B Input**

NO	Resolution	H Frequency(KHz)	V Frequency(KHz)
1	640 x 480	31.5	59.9
2	800 x 600	37.9	60.3
3	1024 x 768	48.4	60.0
4	1280 x 1024	63.9	60.0

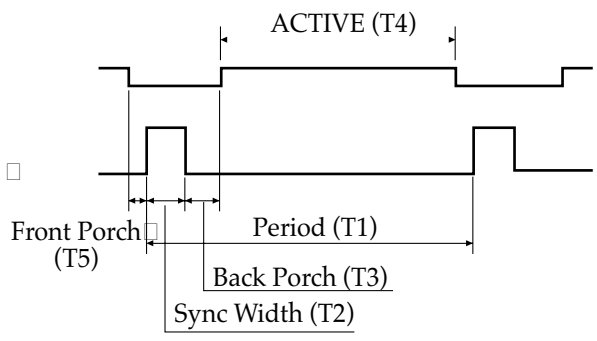
Video Input Signal

Recommended signal are shown below

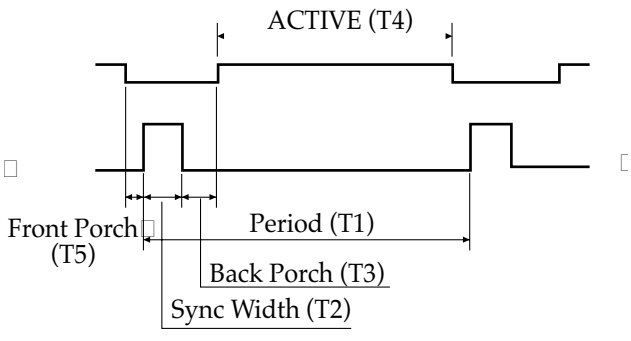
- **Video Signal**
  Video level : 0 to 770mV
  Polarity : positive or Negative
  Video Input : RGB separated
  Analog level
  Sync input : H-Sync(TTL level)
  V-Sync (TTL level)
- **Waveform**
  Video input(R.G.B)



▪ **H-Sync**



▪ **V-Sync**



Video Input Terminal

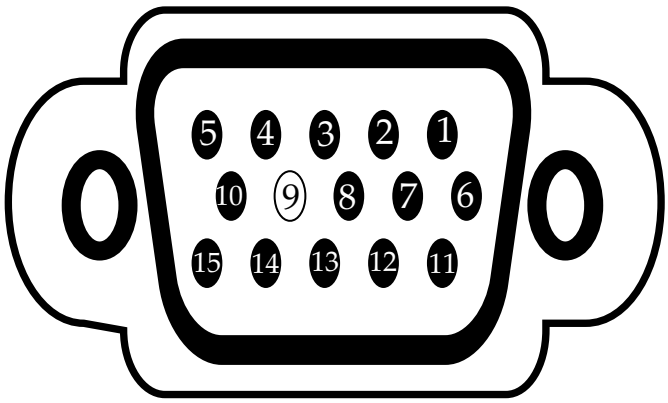
1. Analog

A 15 Pin D-sub connector is used as the input signal connector
Pin and input signals are shown in the table below.

Pin Description

SIGNAL / PIN NO.	SEPARATE SYNC/ DDC 1/2B
1	RED
2	GREEN
3	BLUE
4	GND
5	GROUND or Cable Detect
6	RED GROUND
7	GREEN GROUND
8	BLUE GROUND
9	N.C
10	GROUND or Cable Detect
11	GROUND
12	DDC Data
13	H-SYNC
14	V-SYNC
15	DDC Clock

D-Sub miniature connector



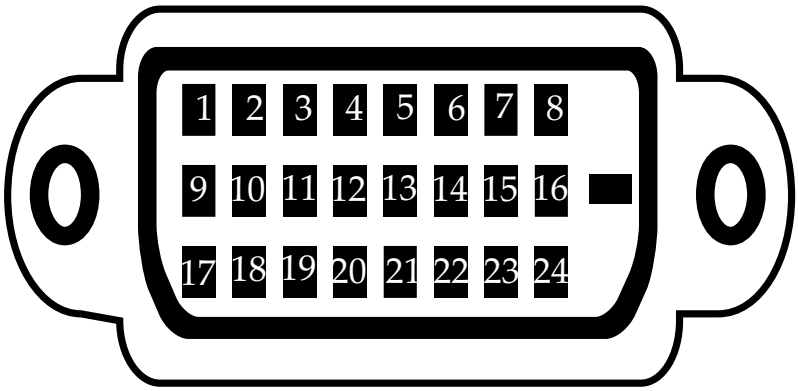
2. Digital

24 Pin DVI-D Interface connector is used as the input signal connector Pin and input signal are shown in the table below.

Pin Description

PIN NO.	SEPARATE SYNC/ DDC 1/2B	PIN NO.	SEPARATE SYNC/ DDC 1/2B
1	T.MD.S Data 2-	13	N.C
2	T.MD.S Data 2+	14	+5V Power
3	T.MD.S Data2/ Shield	15	Ground(for +5V)
4	N.C	16	Hot Plug Detect
5	N.C	17	T.M.D.S Data 0-
6	DDC Clock	18	T.M.D.S Data 0+
7	DDC Data	19	T.M.D.S Data 0/ Shield
8	No Connect	20	N.C
9	T.MD.S Data1-	21	N.C
10	T.MD.S Data1+	22	T.M.S.D Clock Shield
11	T.MD.S Data 1/3 Shield	23	T.M.D.S Clock +
12	N.C	24	T.M.D.S Clock -

Digital-Only Receptacle Connector



Theory of Operation

1. DC/AC INVERTER

Input voltage : DC 12V
Input current : 2.2A (Max)
Output current : 7.0mArms (TYP)
Frequency(switching) : 60KHz (Max)
Output Power : 17W (Typ.)
On/off control voltage : 5.0V

2. AC/DC ADATOR

This display device shall maintain the specified per formances in the range described below:
Frequency : 50/60Hz
Voltage : 100 - 240Vac RMS
The following consumption requirments shall be met:
Power Consumption : 45W (max absolut value)
Current consumption : < 1.0 Aac RMS
Output Specification:
Output1 : 12V/2.2A
Output2 : 5V/1.8A

3, Audio System

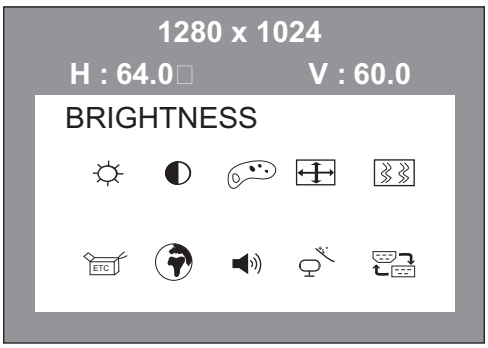
This monitor has a audio system including two micro loudspeakers.
Each of two micro loudspeakers has a 2W (Max) output power.
This system also supports a headphone (earphone) output.
- Auto Signal Input : < 600mVp-p(Max)
- Auto Amplifiers
  2W+2W Amplifier with DC Volume Control (for two miro loudspeakers)
  RL=8 Ω@THD=10% Vcc=14V (min, 10V, max. 15V)
- Dual-Audio Power Amplifier (for a headphone outpur)
  RL=32 Ω@THD=10% Vcc=4.5V (min, 1.8V, max. 15V)

-Speaker
Micro Loudspeaker spec.
Normal impedance 8 Ω +/- 15% at 1.0V 1.5KHz
Resonance Freq . 550Hz +/- 110Hz at 1.0V
Freq. Range 550Hz ~ 20KHz
Power Handling Capa. 1.0W / 8 Ω(2.83V)

4. DPMS MODE

Status	Signal			Power Consumption	Recovery Time	LED Indicator
	H-Sync	V-Sync	Video			
on	Pulse	Pulse	Active	45W With Audio	-	Green
off mode	No Pulse	No Pulse	Blank	Less Than 1W	Within 5 Sec	Orange
off switch	No Pulse	No Pulse	Blank	Less Than 1W	Within 5 Se	Dark

OSD MENU FUNCTIONS



Brightness

Controls the picture brightness.

Contrast

Controls the picture contrast.

Color Control

Color Control:
Three different color temperatures are available: **User**, **Bluish** and **Reddish**. Select the desired setting by pressing the ▼/**VOLUME** or ▲/**MUTE** buttons.

User:
You can also define the RGB values yourself. Press the ▼/**VOLUME** or ▲/**MUTE** buttons to select **Red**, **Green** or **Blue**. Then press the **SELECT/AUTO** button.

Position

H Position: Controls the picture's horizontal position.

V Position: Controls the picture's vertical position.

Clock Phase

Phase: Adjusts the internal clock's time lag in order to optimize the screen image.

Clock: Sets up the internal clock. Larger values make the displayed image appear wider; smaller values make it appear compressed.

Miscellaneous

Recall: Restores the image settings to their factory values.

OSD Time: Determines the time (in seconds) to wait before the OSD menu is automatically closed when no changes are made.

OSD Position: Controls the horizontal and vertical position of the OSD menu.

Auto Color: Automatic color settings.

Language

Language: OSD menu language selection: English, German, French, Italian, Spanish, Portuguese, Danish, Swedish, Finnish, Dutch, Korean, Japanese, Chinese.

Audio

Volume: Adjusts the monitor loudspeaker output volume. Select the desired volume by pressing the ▼/**VOLUME** or ▲/**MUTE** buttons.

Audio On/Off: You can mute sound output or switch the sound back on.

Auto Adjust

Automatically selects the optimal values for the image settings (image position, phase, etc.).

Input Select

Controls the selection of the input signal. The monitor allows you to make the following connections: analog graphics card via the 15-pin mini D-Sub interface (see fig. 2a), digital graphics card via the DVI-D interface (see fig. 2b).

Specification

LCD Module	SIZE	19” Viewable diagonal
	Pixel Pitch	0.294 mm
	Contrast Ratio	600 : 1(TYP)
	Brightness	250 cd/m² (TYP)
	Response Time	25ms (TYP.)
Input	Signal	R.G.B Analog, Digital TMDS
	Connector	15 pin D-SUB Connector/Digital 24Pin DVI
SYNC	H-Freq	31.0 kHz~80 kHz
	V-Freq	56Hz ~75 Hz
Display	Area	376.32 X301.056(V)mm
	Color	16.7M
Recommand Resolution		1280X1024 @ 60Hz
Video Bandwidth		135Mhz
User Control & OSD Control		**BRIGHTNESS, CONTRAST, COLOR CONTROL, MISCELLANEOUS, AUTO ADJUST, RECALL, LANGUAGE, H.V-POSITION, CLOCK-PHASE, INPUT SELECT**
Power Management		VESA DPMS Standard
Plug & Play		VESA DDC 1/2B
Safety & Regulation	EMC	FCC CLASS B , CE , VCCI
	Safety	cULus, CE, TUV-GS, SEMKO, FIMKO
	Ergomomi	TCO03
Temperature	Operating	0 to 35 ˚C
	Storage	- 5 to 45 ˚C
VESA FPMPMI		5 to 90%(Non-condensing)
Weight	unpacked	5.6Kg
	packed	7.9Kg
Dimension(LxHxD mm)		415 X 443 X 201mm

Critcal Parts Specification

1. LCD Module

LTM190EU-L03is a color active matrix TFT (Thin Film Transistor) liquid crystal display(LCD)that uses amorphous silicon TFTs as switching devices.This model is composed of a TFT LCD panel, a driver circuit and a back-light system. The resoution of a 19.0" contains 1280x1024 pixels and can display up to 16.7 million colors with wide viewing angle of 89° or higher in all directions(Vertical viewing angle : 178°, Horizontal viewing angle : 178°)

Display area	376.32(H)X301.056(V)mm
Drive system	A-Si TFT
Display color	16.7M Colors
Number of Pixel	1280x1024
Pixel arrangement	RGB vertical strip
Pixel pitch	0.294(H)X0.294(V)mm
Weight	2.75kg
Contrast ratio	600:1
Viewing angle	
Horizontal	89 degree, 89 degree
Vertical	89 degree, 89 degree
Response time	25ms (max)
Luminance	250cd/m2 (typ)
Signal voltage	Digital RGB signals, Sync signals (H, V-Sync),
Supply Voltage	5.0V
Backlight	Edge light type : Four colt catdode fluorescent lamps With in-verter
LCD Type	LTM190E1-L03

MST7131A

FEATURES

- Ÿ High-quality zoom and shrink scaling engine (Compatible with VGA thru SXGA)
- Ÿ Integrated 8-bit triple-ADC/PLL
- Ÿ On-screen display controller (OSD)
- Ÿ Supports single-RGB inputs
- Ÿ Integrated DVI receiver
- Ÿ Supports composite sync and SOG separator
- Ÿ Programmable 10-bit gamma correction
- Ÿ Integrated Brightness & Contrast control adjustment
- Ÿ Supports PWM backlight intensity control
- Ÿ Supports sRGB
- Ÿ Green PC and low EMI features
- Ÿ Built-in LVDS transmitter
- Ÿ Low standby power mode (< 16mA)

n High-Performance Scaling Engine
- Ÿ Programmable shrink/zoom capabilities
- Ÿ High-quality scaling for all VESA and IBM mode to fit screen
- Ÿ Variable sharpness control

n Analog RGB Compliant Input Port
- Ÿ Supports up to SXGA at 75Hz
- Ÿ Supports Composite Sync and SOG (Sync-on-Green) separator

n Integrated DVI Receiver
- Ÿ Operates up to 135 MHz
- Ÿ Single link on-chip DVI receiver
- Ÿ Direct connect to all DVI compliant transmitters

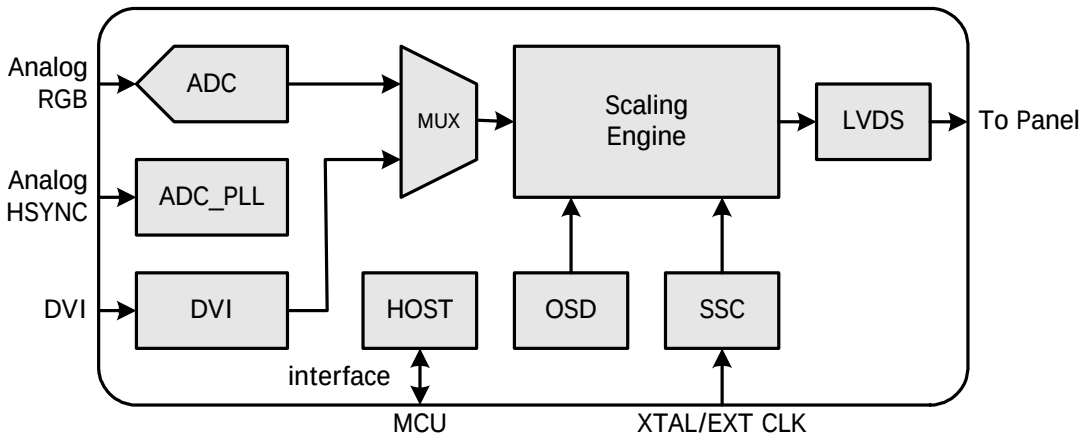
n Auto-Detection/Tune
- Ÿ Auto input signal format (SOG, Composite, Separated HSYNC, VSYNC, and DE), and input mode (all VESA & IBM modes w/ resolution and polarity) detection
- Ÿ Auto-tuning function including phasing, positioning, offset, gain, and jitter detection
- Ÿ Smart screen-fitting

n On-Screen OSD Controller
- Ÿ Built-in OSD generator with 256 character font programmable RAM
- Ÿ Supports for 4/8 multi-color fonts
- Ÿ Gradient color function
- Ÿ Supports button function
- Ÿ Pattern generator for production test
- Ÿ Supports OSD MUX and alpha blending capability

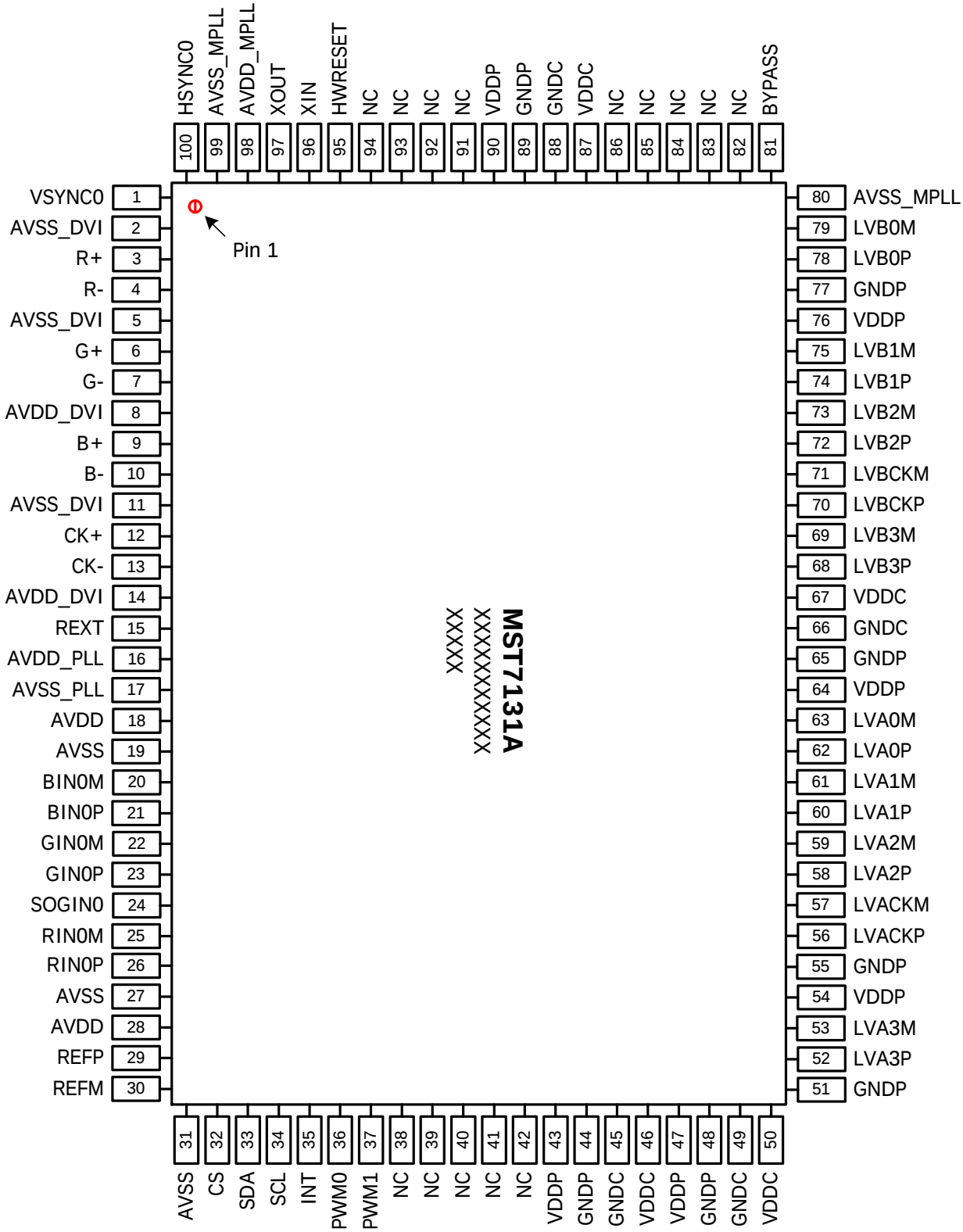
n LVDS Display Interface
- Ÿ Supports Dual Link up to 135MHz dot clock for SXGA
- Ÿ Supports 2 data output formats: Thine & TI data mappings
- Ÿ Compatible with TIA/EIA
- Ÿ With 6/8 bits options
- Ÿ Supports reduced swing LVDS for low EMI
- Ÿ Supports flexible spread spectrum frequency with 360Hz~11.8MHz and up to 25% modulation

n External Connection/Component
- Ÿ Supports serial bus (up to 400Kbit/sec)

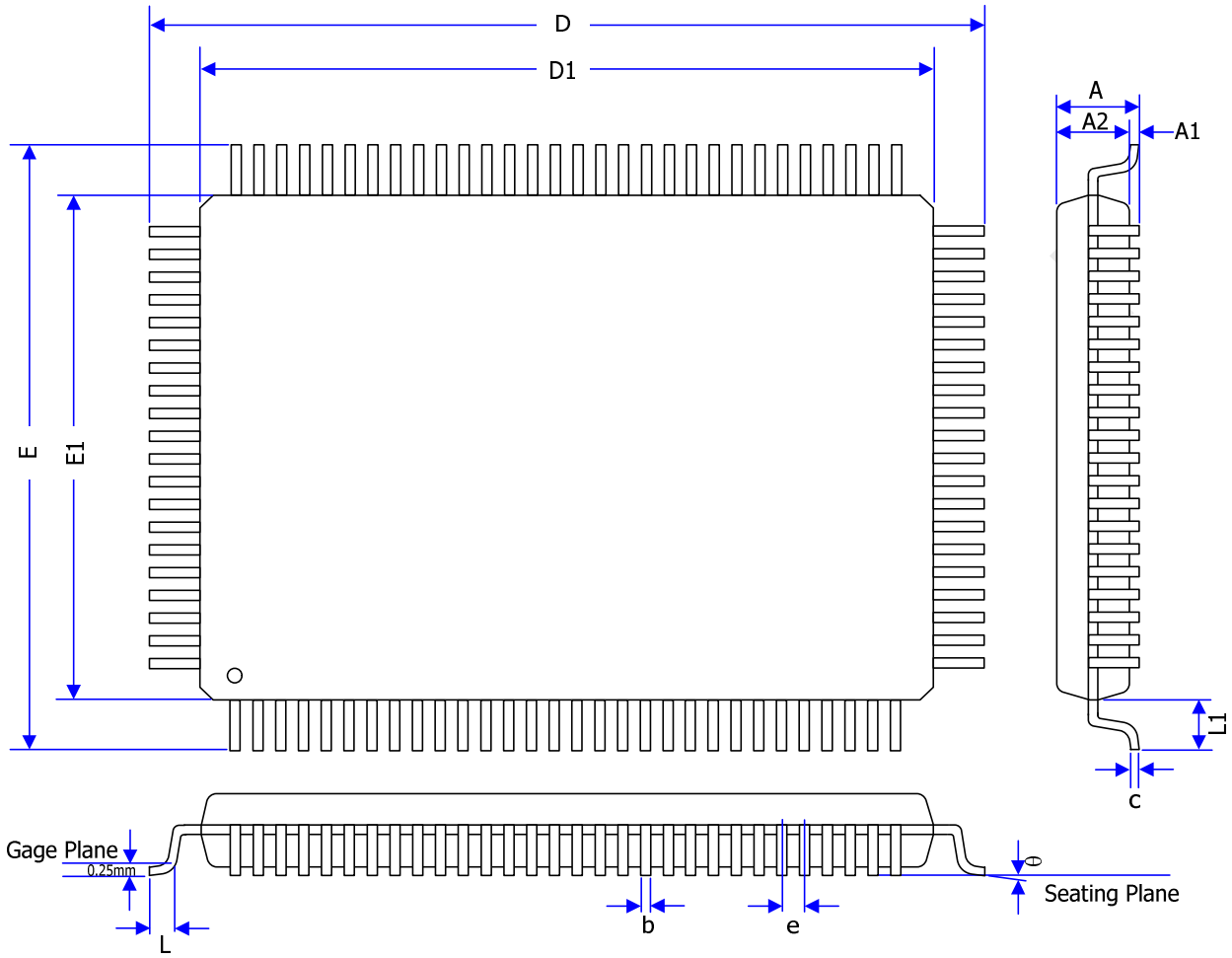
BLOCK DIAGRAM



PIN DIAGRAM (MST7131A)



MECHANICAL DIMENSIONS



Symbol	Millimeter			Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	-	-	3.30	-	-	0.130
A1	0.20	-	-	0.008	-	-
A2	2.72	2.85	2.98	0.107	0.112	0.117
D	22.95	23.20	23.45	0.903	0.913	0.923
D1	19.90	20.00	20.10	0.783	0.787	0.791
E	16.95	17.20	17.45	0.667	0.677	0.687
E1	13.90	14.00	14.10	0.547	0.551	0.555

Symbol	Millimeter			Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
θ	0°	-	8°	0°	-	8°
b	0.26	-	0.36	0.010	-	0.014
c	0.14	0.15	0.16	0.006	0.006	0.006
e	0.50	0.65	0.80	0.020	0.026	0.032
L	0.73	0.88	1.03	0.029	0.035	0.041
L1	1.45	1.60	1.75	0.057	0.063	0.069

24LC21A

1.0 ELECTRICAL CHARACTERISTICS

1.1 Maximum Ratings*

VCC.....7.0V
All inputs and outputs w.r.t. VSS ..... -0.6V to VCC +1.0V
Storage temperature .....-65°C to +150°C
Ambient temp. with power applied .....-65°C to +125°C
Soldering temperature of leads (10 seconds) .....+300°C
ESD protection on all pins.....≥ 4 kV

***Notice:** Stresses above those listed under "Maximum ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational listings of this specification is not implied. Exposure to maximum rating conditions for extended periods may affect device reliability.

TABLE 1-1: PIN FUNCTION TABLE

Name	Function
$\overline{WP}$	Write Protect (active low)
VSS	Ground
SDA	Serial Address/Data I/O
SCL	Serial Clock (Bi-directional Mode)
VCLK	Serial Clock (Transmit-Only Mode)
VCC	+2.5V to 5.5V Power Supply
NC	No Connection

TABLE 1-2: DC CHARACTERISTICS

	VCC = +2.5V to 5.5V Commercial (C): Tamb = 0°C to +70°C Industrial (I): Tamb = -40°C to +85°C				
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Conditions**
SCL and SDA pins:					
High level input voltage	VIH	0.7 VCC		V	
Low level input voltage	VIL		0.3 VCC	V	
Input levels on VCLK pin:					
High level input voltage	VIH	2.0	0.8	V	VCC ≥ 2.7V (Note)
Low level input voltage	VIL		0.2 VCC	V	VCC < 2.7V (Note)
Hysteresis of Schmitt trigger inputs	VHYS	.05 VCC	—	V	(Note)
Low level output voltage	VOL1		0.4	V	IOL = 3 mA, VCC = 2.5V (Note 1)
Low level output voltage	VOL2		0.6	V	IOL = 6 mA, VCC = 2.5V
Input leakage current	ILI	-10	10	µA	VIN = 0.1V to VCC
Output leakage current	ILO	-10	10	µA	VOUT = 0.1V to VCC
Pin capacitance (all inputs/outputs)	CINT		10	pF	VCC = 5.0V (Note1), Tamb = 25°C, FCLK = 1 MHz
Operating current	ICC Write	—	3	mA	VCC = 5.5V, SCL = 400 kHz
	ICC Read	—	1	mA	
Standby current	ICCS	—	30	µA	VCC = 3.0V, SDA = SCL = VCC
			100	µA	VCC = 5.5V, SDA = SCL = VCC

Note: This parameter is periodically sampled and not 100% tested.

1.0 ELECTRICAL CHARACTERISTICS

1.1 Maximum Ratings*

V_{CC}.....7.0V
All inputs and outputs w.r.t. V_{SS} ..... -0.6V to V_{CC} +1.0V
Storage temperature .....-65°C to +150°C
Ambient temp. with power applied .....-65°C to +125°C
Soldering temperature of leads (10 seconds) .....+300°C
ESD protection on all pins.....≥ 4 kV

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Name	Function
$\overline{WP}$	Write Protect (active low)
V_{SS}	Ground
SDA	Serial Address/Data I/O
SCL	Serial Clock (Bi-directional Mode)
VCLK	Serial Clock (Transmit-Only Mode)
V_{CC}	+2.5V to 5.5V Power Supply
NC	No Connection

TABLE 1-2: DC CHARACTERISTICS

	V_{CC} = +2.5V to 5.5V Commercial (C): Tamb = 0°C to +70°C Industrial (I): Tamb = -40°C to +85°C				
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Conditions**
SCL and SDA pins:					
High level input voltage	V_{IH}	0.7 V_{CC}		V	
Low level input voltage	V_{IL}		0.3 V_{CC}	V	
Input levels on VCLK pin:					
High level input voltage	V_{IH}	2.0	0.8	V	V_{CC} ≥ 2.7V (Note)
Low level input voltage	V_{IL}		0.2 V_{CC}	V	V_{CC} < 2.7V (Note)
Hysteresis of Schmitt trigger inputs	V_{HYS}	.05 V_{CC}	—	V	(Note)
Low level output voltage	V_{OL1}		0.4	V	I_{OL} = 3 mA, V_{CC} = 2.5V (Note 1)
Low level output voltage	V_{OL2}		0.6	V	I_{OL} = 6 mA, V_{CC} = 2.5V
Input leakage current	I_{LI}	-10	10	µA	V_{IN} = 0.1V to V_{CC}
Output leakage current	I_{LO}	-10	10	µA	V_{OUT} = 0.1V to V_{CC}
Pin capacitance (all inputs/outputs)	C_{INT}		10	pF	V_{CC} = 5.0V (Note1), Tamb = 25°C, F_{CLK} = 1 MHz
Operating current	I_{CC} Write I_{CC} Read	— —	3 1	mA mA	V_{CC} = 5.5V, SCL = 400 kHz
Standby current	I_{CCS}	—	30 100	µA µA	V_{CC} = 3.0V, SDA = SCL = V_{CC} V_{CC} = 5.5V, SDA = SCL = V_{CC}

Note: This parameter is periodically sampled and not 100% tested.

TABLE 1-3: AC CHARACTERISTICS

Parameter	Symbol	Vcc= 2.5-5.5V		Vcc= 4.5 - 5.5V		Units	Remarks
		Min	Max	Min	Max		
Clock frequency	FCLK	0	100	0	400	kHz	
Clock high time	THIGH	4000	—	600	—	ns	
Clock low time	TLOW	4700	—	1300	—	ns	
SDA and SCL rise time	TR	—	1000	—	300	ns	(Note 1)
SDA and SCL fall time	TF	—	300	—	300	ns	(Note 1)
START condition hold time	THD:STA	4000	—	600	—	ns	After this period the first clock pulse is generated
START condition setup time	TSU:STA	4700	—	600	—	ns	Only relevant for repeated START condition
Data input hold time	THD:DAT	0	—	0	—	ns	(Note 2)
Data input setup time	TSU:DAT	250	—	100	—	ns	
STOP condition setup time	TSU:STO	4000	—	600	—	ns	
Output valid from clock	TAA	—	3500	—	900	ns	(Note 2)
Bus free time	TBUF	4700	—	1300	—	ns	Time the bus must be free before a new transmission can start
Output fall time from VIH minimum to VIL maximum	TOF	—	250	20 + 0.1 CB	250	ns	(Note 1), CB ≤ 100 pF
Input filter spike suppression (SDA and SCL pins)	TSP	—	100	—	50	ns	(Note 3)
Write cycle time	TWR	—	10	—	10	ms	Byte or Page mode
Transmit-Only Mode Parameters							
Output valid from VCLK	TVAA	—	2000	—	1000	ns	
VCLK high time	TVHIGH	4000	—	600	—	ns	
VCLK low time	TVLOW	4700	—	1300	—	ns	
VCLK setup time	TVHST	0	—	0	—	ns	
VCLK hold time	TSPVL	4000	—	600	—	ns	
Mode transition time	TVHZ	—	500	—	500	ns	
Transmit-Only power up time	TVPU	0	—	0	—	ns	
Input filter spike suppression (VCLK pin)	TSPV	—	100	—	100	ns	
Endurance	—	10M	—	10M	—	cycles	25° C, VCC = 5.0V, Block Mode (Note 4)

Note 1: Not 100% tested. CB = total capacitance of one bus line in pF.

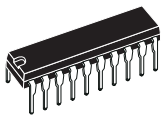
2: As a transmitter, the device must provide an internal minimum delay time to bridge the undefined region (minimum 300 ns) of the falling edge of SCL to avoid unintended generation of START or STOP conditions.

3: The combined TSP and VHYS specifications are due to Schmitt trigger inputs which provide noise and spike suppression. This eliminates the need for a TI specification for standard operation.

4: This parameter is not tested but guaranteed by characterization. For endurance estimates in a specific application, please consult the Total Endurance Model which can be obtained on our BBS or website.

TDA7496L

- 2W+2W OUTPUT POWER
  R_L = 8Ω @THD = 10% V_{CC} = 14V
- ST-BY AND MUTE FUNCTIONS
- LOW TURN-ON TURN-OFF POP NOISE
- LINEAR VOLUME CONTROL DC COUPLED WITH POWER OP. AMP.
- NO BOUCHEROT CELL
- NO ST-BY RC INPUT NETWORK
- SINGLE SUPPLY RANGING UP TO 15V
- SHORT CIRCUIT PROTECTION
- THERMAL OVERLOAD PROTECTION
- INTERNALLY FIXED GAIN
- SOFT CLIPPING
- VARIABLE OUTPUT AFTER VOLUME CONTROL CIRCUIT
- POWERDIP (14+3+3) PACKAGE



Powerdip (14+3+3)

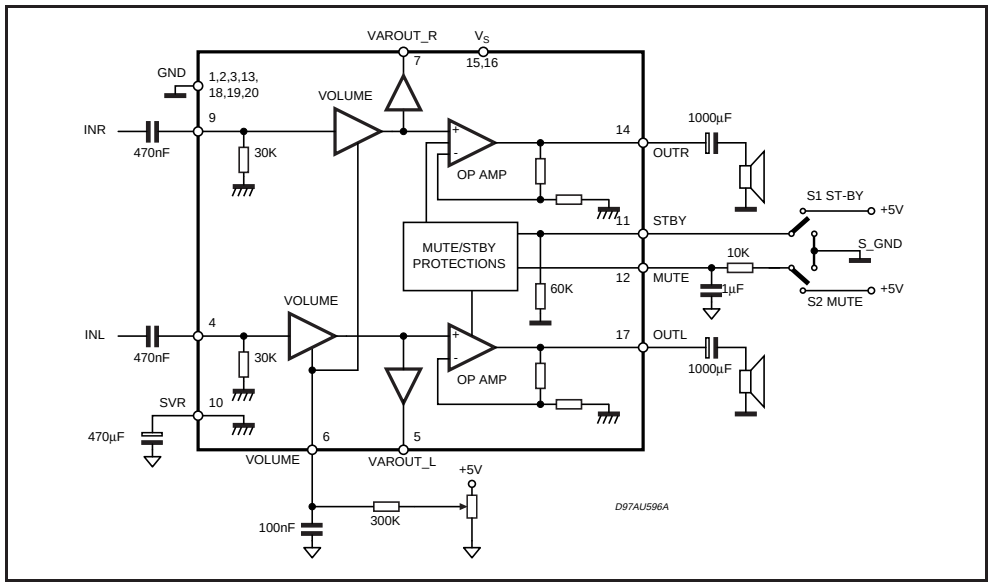
ORDERING NUMBER: TDA7496L

DESCRIPTION

The TDA7496L is a stereo 2W+2W class AB power amplifier assembled in the @ Powerdip 14+3+3 package, specially designed for high quality sound, TV and Monitor applications.

Features of the TDA7496L include linear volume control, Stand-by and mute functions.

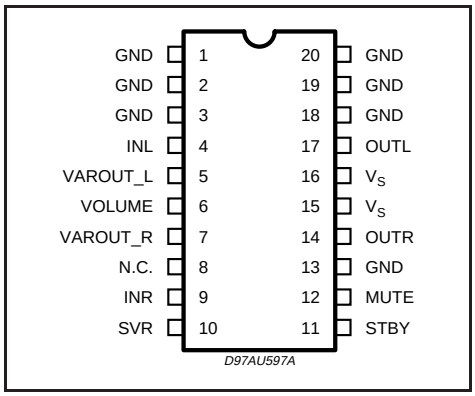
BLOCK DIAGRAM



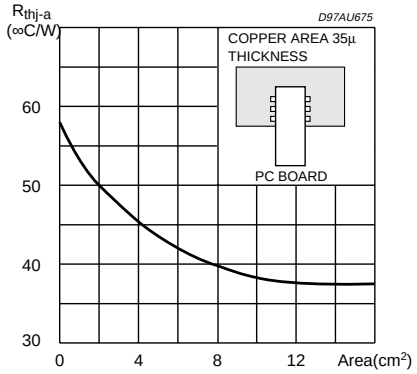
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	DC Supply Voltage	26	V
V_{IN}	Maximum Input Voltage	8	Vpp
P_{tot}	Total Power Dissipation (T_{case} = 60°C)	6	W
T_{amb}	Ambient Operating Temperature	0 to 70	°C
T_{stg}, T_j	Storage and Junction Temperature	-40 to 150	°C
V_6	Volume CTRL DC voltage	7	V

PIN CONNECTION



Rth with "on board" Square Heatsink vs. copper area.



THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ j\text{-}pins}$	Thermal Resistance Junction-pins	max.	15	°C/W
$R_{th\ j\text{-}amb}$ (*)	Thermal Resistance Junction-ambient	max.	50	°C/W

(*) Mounted on PCB with no heatsink

ELECTRICAL CHARACTERISTICS (Refer to the test circuit V_S = 14V; R_L = 8Ω, R_g = 50Ω, T_{amb} = 25°C).

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_S	Supply Voltage Range		10		18	V
I_q	Total Quiescent Current			25	50	mA
DCV_{OS}	Output DC Offset Referred to SVR Potenial	No Input Signal		200		mV
V_O	Quiescent Output Voltage			7		V
P_O	Output Power	THD = 10%; R_L = 8Ω;	1.6	2		W
		THD = 1%; R_L = 8Ω;		1.3		W
THD	Total Harmonic Distortion	G_V = 30dB; P_O = 1W; f = 1KHz;			0.4	%
I_{peak}	Output Peak Current	(internally limited)	0.7	0.9		A
V_{in}	Input Signal				2.8	Vrms
G_V	Closed Loop Gain	Vol Ctrl > 4.5V	28.5	30	31.5	dB
G_{VLine}	Monitor Out Gain	Vol Ctrl > 4.5V; Zload > 30KΩ	-1.5	0	1.5	dB
$A_{Min\ VOL}$	Attenuation at Minimum Volume	Vol Ctrl < 0.5V	80			dB
BW				0.6		MHz

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
e_N	Total Output Noise	f = 20Hz to 22KHz Play, max volume		500	800	µV
		f = 20Hz to 22KHz Play, max attenuation		100	250	µV
		f = 20Hz to 22KHz Mute		60	150	µV
SR	Slew Rate		5	8		V/µs
R_i	Input Resistance		22.5	30		KΩ
$R_{Var\ Out}$	Variable Output Resistance			30	100	Ω
$R_{load\ Var\ Out}$	Variable Output Load		2			KΩ
SVR	Supply Voltage Rejection	f = 1kHz; max volume C_{SVR} = 470µF; V_{RIP} = 1V_{rms}	35	39		dB
		f = 1kHz; max attenuation C_{SVR} = 470µF; V_{RIP} =1V_{rms}	55	65		dB
T_M	Thermal Muting			150		°C
T_S	Thermal Shut-down			160		°C
MUTE STAND-BY & INPUT SELECTION FUNCTIONS						
$V_{ST\ ON}$	Stand-by ON Threshold		3.5			V
$V_{ST\ OFF}$	Stand-by OFF Threshold				1.5	V
$V_{M\ ON}$	Mute ON Threshold		3.5			V
$V_{M\ OFF}$	Mute OFF Threshold				1.5	V
I_{qST-BY}	Quiescent Current @ Stand-by			0.6	1	mA
A_{MUTE}	Mute Attenuation		50	65		dB
$I_{stbyBIAS}$	Stand-by bias current	Stand by on V_{ST-BY} = 5V V_{MUTE} = 5V		80		µA µA
		Play or Mute	-20	-5		µA
$I_{muteBIAS}$	Mute bias current	Mute		1	5	µA
		Play		0.2	2	µA

APPLICATION SUGGESTIONS

The recommended values of the external components are those shown on the application circuit of figure 1A. Different values can be used, the following table can help the designer.

COMPONENT	SUGGESTION VALUE	PURPOSE	LARGER THAN SUGGESTION	SMALLER THAN SUGGESTION
R1	300K	Volume control circuit	Larger volume regulation time	Smaller volume regulation time
R2	10K	Mute time constant	Larger mute on/off time	Smaller mute on/off time
P1	50K	Volume control circuit		
C1	1000µF	Supply voltage bypass		Danger of oscillation
C2	470nF	Input DC decoupling	Lower low frequency cutoff	Higher low frequency cutoff
C3	470nF	Input DC decoupling	Lower low frequency cutoff	Higher low frequency cutoff
C4	470µF	Ripple rejection	Better SVR	Worse SVR
C5	100nF	Volume control time costant	Larger volume regulation time	Smaller volume regulation time
C6	1000µF	Output DC decoupling	Lower low frequency cutoff	Higher low frequency cutoff
C7	1µF	Mute time costant	Larger mute on/off time	Smaller mute on/off time
C8	1000µF	Output DC decoupling	Lower low frequency cutoff	Higher low frequency cutoff
C9	100nF	Supply voltage bypass		Danger of oscillation

RC1117X33

Features

- Low dropout voltage
- Load regulation: 0.05% typical
- Trimmed current limit
- On-chip thermal limiting
- Standard SOT-223, TO-263, and TO-252 packages
- Three-terminal adjustable or fixed 2.5V, 2.85V, 3.3V, 5V

Applications

- Active SCSI terminators
- High efficiency linear regulators
- Post regulators for switching supplies
- Battery chargers
- 5V to 3.3V linear regulators
- Motherboard clock supplies

Description

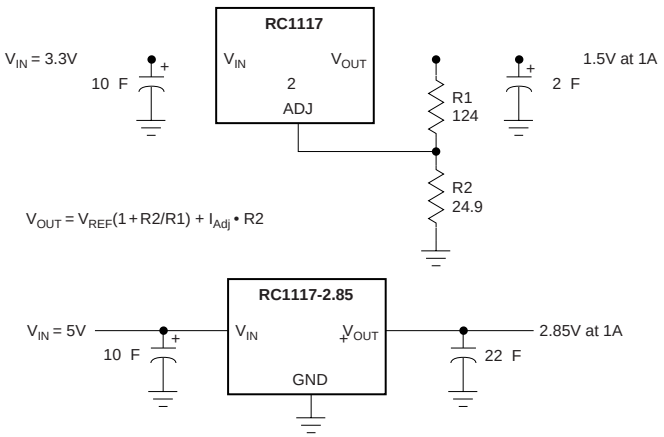
The RC1117 and RC1117-2.5, -2.85, -3.3 and -5 are low dropout three-terminal regulators with 1A output current capability. These devices have been optimized for low voltage where transient response and minimum input voltage are critical. The 2.85V version is designed specifically to be used in Active Terminators for SCSI bus.

Current limit is trimmed to ensure specified output current and controlled short-circuit current. On-chip thermal limiting provides protection against any combination of overload and ambient temperatures that would create excessive junction temperatures.

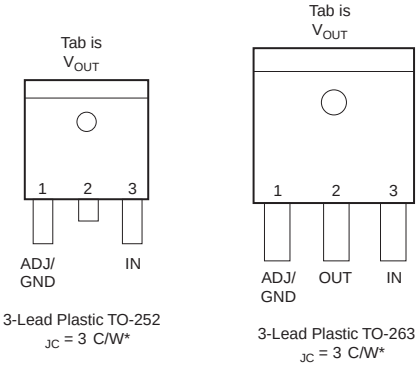
Unlike PNP type regulators where up to 10% of the output current is wasted as quiescent current, the quiescent current of the RC1117 flows into the load, increasing efficiency.

The RC1117 series regulators are available in the industry-standard SOT-223, TO-263 (D2PAK), and TO-252 (DPAK) power packages.

Typical Applications



Pin Assignments



*With package soldered to 0.5 square inch copper area over backside ground plane or internal power plane., $_{JA}$ can vary from 30°C/W to more than 50°C/W. Other mounting techniques may provide better thermal resistance than 30°C/W.

Absolute Maximum Ratings

Parameter	Min.	Max.	Unit
V_{IN}		7.5	V
Operating Junction Temperature Range	0	125	C
Storage Temperature Range	-65	150	C
Lead Temperature (Soldering, 10 sec.)		300	C

Electrical Characteristics

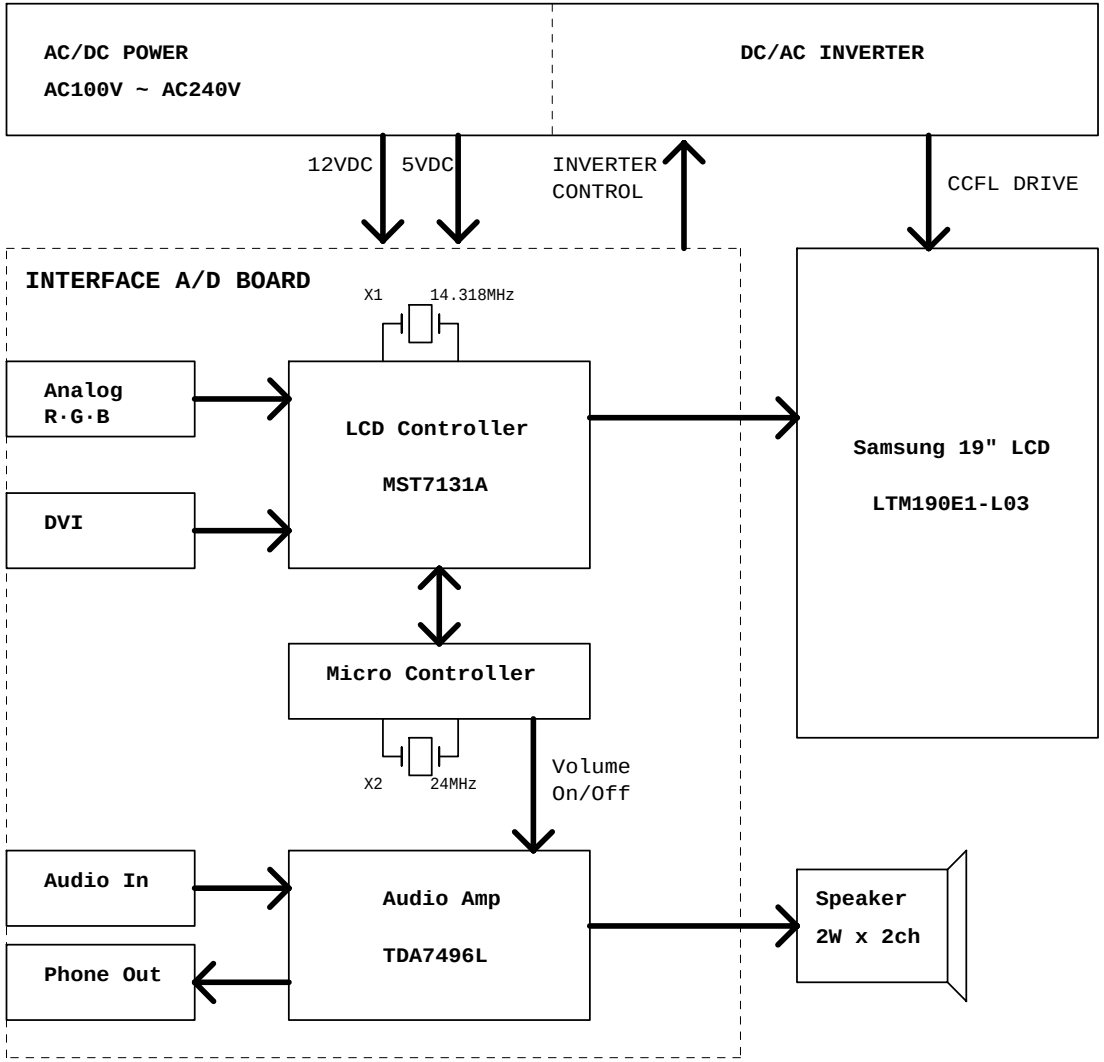
Operating Conditions: V_{IN} 7V, T_J = 25°C unless otherwise specified.
The denotes specifications which apply over the specified operating temperature range.

Parameter	Conditions		Min.	Typ.	Max.	Units
Reference Voltage, V_{REF}[3]	1.5V (V_{IN} - V_{OUT}) 5.75V, 10mA I_{OUT} 1A		1.225 (-2%)	1.250	1.275 (+2%)	V
Output Voltage	10mA I_{OUT} 1A RC1117-2.5, 4V V_{IN} 7V RC1117-2.85, 4.35V V_{IN} 7V RC1117-3.3, 4.8V V_{IN} 7V RC1117-5, 6.5V V_{IN} 7V		 2.450 2.793 3.234 4.900	 2.5 2.85 3.3 5.0	 2.550 2.907 3.366 5.100	 V V V V
Line Regulation[1,2]	(V_{OUT} + 1.5V) V_{IN} 7V, I_{OUT} = 10mA			0.005	0.2	%
Load Regulation[1,2]	(V_{IN} – V_{OUT}) = 2V, 10mA I_{OUT} 1A			0.05	0.5	%
Dropout Voltage	V_{REF} = 1%, I_{OUT} = 1A			1.100	1.200	V
Current Limit	(V_{IN} – V_{OUT}) = 2V		1.1	1.5		A
Adjust Pin Current, I_{Adj}[3]				35	120	A
Adjust Pin Current Change[3]	1.5V (V_{IN} – V_{OUT}) 5.75, 10mA I_{OUT} 1A			0.2	5	A
Minimum Load Current	1.5V (V_{IN} – V_{OUT}) 5.75		10			mA
Quiescent Current	V_{IN} = V_{OUT} + 1.25V			4	13	mA
Ripple Rejection	f = 120Hz, C_{OUT} = 22 F Tantalum, (V_{IN} – V_{OUT}) = 3V, I_{OUT} = 1A		60	72		dB
Thermal Regulation	T_A = 25 C, 30ms pulse			0.004	0.02	%/W
Temperature Stability				0.5		%
Long-Term Stability	T_A = 125 C, 1000hrs.			0.03	1.0	%
RMS Output Noise (% of V_{OUT})	T_A = 25 C, 10Hz f 10kHz			0.003		%
Thermal Resistance, Junction to Case	SOT-223			15		C/W
	TO-252, TO-263			3		C/W
Thermal Shutdown	Junction Temperature			155		C
Thermal Shutdown Hysteresis				10		C

Notes:

1. See thermal regulation specifications for changes in output voltage due to heating effects. Load and line regulation are measured at a constant junction temperature by low duty cycle pulse testing.
2. Line and load regulation are guaranteed up to the maximum power dissipation (18W). Power dissipation is determined by input/output differential and the output current. Guaranteed maximum output power will not be available over the full input/output voltage range.
3. RC1117 only.

BLOCK DIAGRAM



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Size: A4	Document Number: <Doc> Belinea 101920	Rev: 0
Date: Wednesday, June 16, 2004	Sheet 1 of 1	

PART LIST

NO	LOCATION	PART NUMBER	DESCRIPTION	REMARK
1		304100108402	PCB-DOUBLE,Q19	
2	CN14	3720101983	CONN-M,12507WR-30A00 30	
3	C102	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
4	C103	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
5	C104	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
6	C105	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
7	C106	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
8	C107	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
9	C108	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
10	C110	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
11	C111	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
12	C112	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
13	C113	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
14	C115	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
15	C116	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
16	C118	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
17	C120	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
18	C121	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
19	C123	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
20	C124	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
21	C125	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
22	C127	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
23	C131	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
24	C132	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
25	C133	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
26	C134	2125090017	CAP-C-C,5PF 50V J COG 1608	
27	C135	2122210028	CAP-C-C,220PF 50V J COG 1608	
28	C139	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
29	C140	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
30	C141	CC7FCA1H220J	CAP-CC,22PF 50V J 1608	
31	C142	CC7FCA1H220J	CAP-CC,22PF 50V J 1608	
32	C143	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
33	C187	2014700009	CAP-AL-C,47UF 16V M 6352	
34	C201	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
35	C202	2121050045	CAP-C-C,1UF 50V Z Y5V 1608	
36	C203	2014790003	CAP-AL-C,4.7UF 25V M 3052	

NO	LOCATION	PART NUMBER	DESCRIPTION	REMARK
37	C204	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
38	C205	CC7FCA1H220J	CAP-CC,22PF 50V J 1608	
39	C206	2014700009	CAP-AL-C,47UF 16V M 6352	
40	C207	CC7FCA1H220J	CAP-CC,22PF 50V J 1608	
41	C208	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
42	C209	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
43	C210	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
44	C212	2124710037	CAP-C-C,470PF 50V J COG 1608	
45	C215	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
46	C303	2012200008	CAP-AL-C,22UF 16V M 5052 105.	
47	C306	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
48	C308	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
49	C310	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
50	C311	2012200008	CAP-AL-C,22UF 16V M 5052 105.	
51	C312	2011010014	CAP-AL-C,100UF 16V M 6357	
52	C313	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
53	C314	2121050045	CAP-C-C,1UF 50V Z Y5V 1608	
54	C315	2011010014	CAP-AL-C,100UF 16V M 6357	
55	C316	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
56	C410	2121050045	CAP-C-C,1UF 50V Z Y5V 1608	
57	C414	2124740025	CAP-C-C,0.47UF 50V Z Y5V 1608	
58	C415	2124740025	CAP-C-C,0.47UF 50V Z Y5V 1608	
59	C417	RK1JC0T0000J	RES-C,0 0.063W J 1608	
60	C418	RK1JC0T0000J	RES-C,0 0.063W J 1608	
61	C419	2011000007	CAP-AL-C,10UF 16V M 4052 105.	
62	C420	2013310002	CAP-AL-C,330UF 16V M 8010 105	
63	C421	2013310002	CAP-AL-C,330UF 16V M 8010 105	
64	C424	2013310002	CAP-AL-C,330UF 16V M 8010 105	
65	C65	2121040045	CAP-C-C,0.1UF 50V Z Y5V 1608	
66	D01	3100100038	DI-AR,KDS226 SMD	
67	D02	3100100038	DI-AR,KDS226 SMD	
68	D03	3100100038	DI-AR,KDS226 SMD	
69	D04	3100100038	DI-AR,KDS226 SMD	
70	D05	3100100038	DI-AR,KDS226 SMD	
71	D06	3101000376	DI-ZN,Z02W6.2V SMD	
72	D07	3101000376	DI-ZN,Z02W6.2V SMD	
73	D08	DTRLS4148	DIODE,CHIP S/W RLS4148	
74	D09	3101000376	DI-ZN,Z02W6.2V SMD	
75	D1	3100100038	DI-AR,KDS226 SMD	

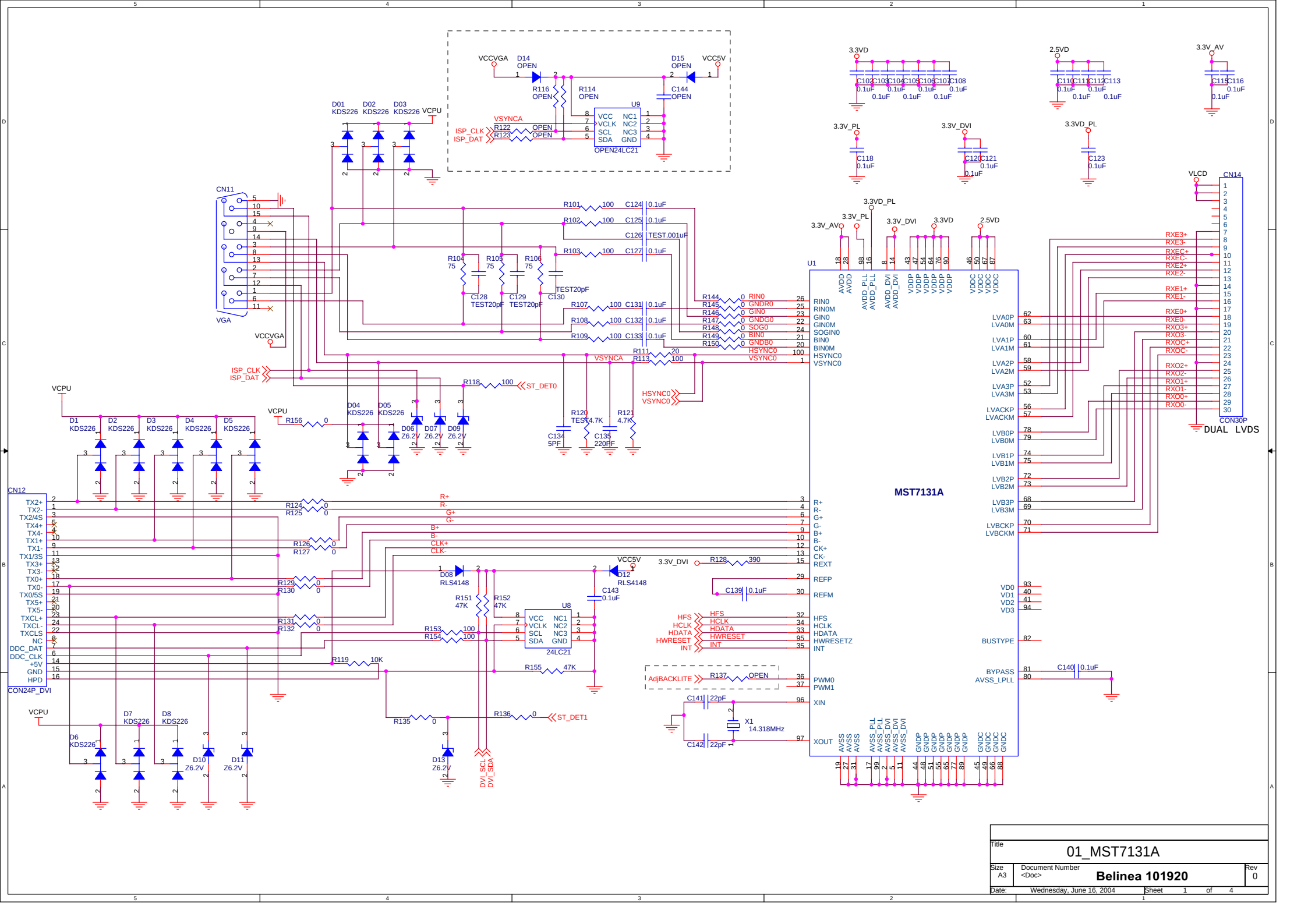
NO	LOCATION	PART NUMBER	DESCRIPTION	REMARK
76	D10	3101000376	DI-ZN,Z02W6.2V SMD	
77	D11	3101000376	DI-ZN,Z02W6.2V SMD	
78	D12	DTRLS4148	DIODE,CHIP S/W RLS4148	
79	D13	3101000376	DI-ZN,Z02W6.2V SMD	
80	D2	3100100038	DI-AR,KDS226 SMD	
81	D3	3100100038	DI-AR,KDS226 SMD	
82	D4	3100100038	DI-AR,KDS226 SMD	
83	D5	3100100038	DI-AR,KDS226 SMD	
84	D6	3100100038	DI-AR,KDS226 SMD	
85	D7	3100100038	DI-AR,KDS226 SMD	
86	D8	3100100038	DI-AR,KDS226 SMD	
87	Q1	TT2N3904D	TR,SMD 2N3904D TAPPING	
88	Q5	TT2N3904D	TR,SMD 2N3904D TAPPING	
89	Q6	TT2N3904D	TR,SMD 2N3904D TAPPING	
90	RN1	2594701009	RES-C-NET,4.7K 0.063W J 3216	
91	R101	RK1JC0T0101J	RES-C,100 0.063W J 1608	
92	R102	RK1JC0T0101J	RES-C,100 0.063W J 1608	
93	R103	RK1JC0T0101J	RES-C,100 0.063W J 1608	
94	R104	2607509010	RES-C,75 0.063W F 1608	
95	R105	2607509010	RES-C,75 0.063W F 1608	
96	R106	2607509010	RES-C,75 0.063W F 1608	
97	R107	RK1JC0T0101J	RES-C,100 0.063W J 1608	
98	R108	RK1JC0T0101J	RES-C,100 0.063W J 1608	
99	R109	RK1JC0T0101J	RES-C,100 0.063W J 1608	
100	R111	2602009011	RES-C,20 0.063W J 1608	
101	R113	RK1JC0T0101J	RES-C,100 0.063W J 1608	
102	R118	RK1JC0T0101J	RES-C,100 0.063W J 1608	
103	R119	RK1JC0T0103J	RES-C,10K 0.063W J 1608	
104	R121	RK1JC0T0472J	RES-C,4.7K 0.063W J 1608	
105	R124	RK1JC0T0000J	RES-C,0 0.063W J 1608	
106	R125	RK1JC0T0000J	RES-C,0 0.063W J 1608	
107	R126	RK1JC0T0000J	RES-C,0 0.063W J 1608	
108	R127	RK1JC0T0000J	RES-C,0 0.063W J 1608	
109	R128	2603900008	RES-C,390 0.063W F 1608	
110	R129	RK1JC0T0000J	RES-C,0 0.063W J 1608	
111	R130	RK1JC0T0000J	RES-C,0 0.063W J 1608	
112	R131	RK1JC0T0000J	RES-C,0 0.063W J 1608	
113	R132	RK1JC0T0000J	RES-C,0 0.063W J 1608	
114	R151	RK1JC0T0473J	RES-C,47K 0.063W J 1608	

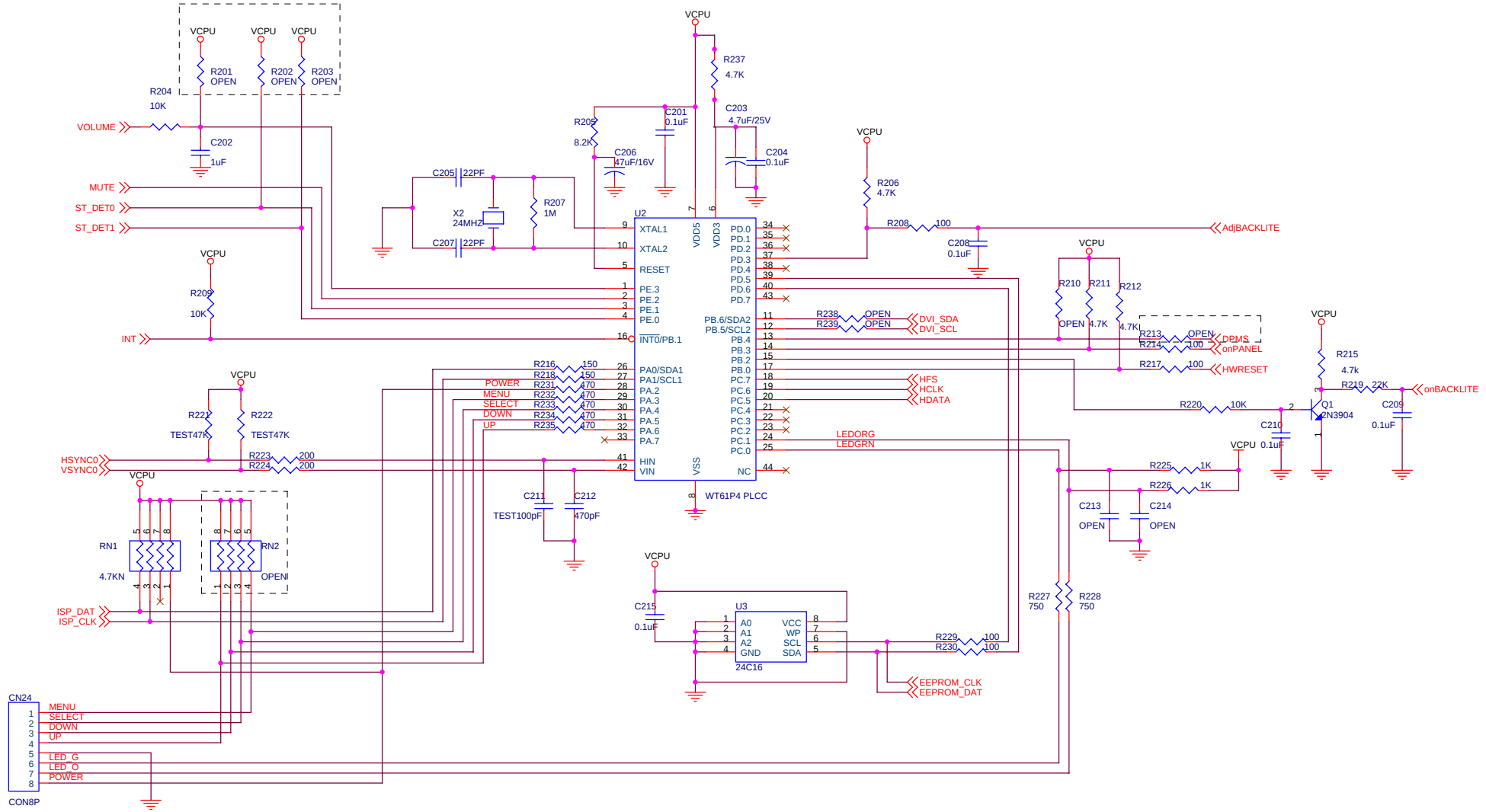
NO	LOCATION	PART NUMBER	DESCRIPTION	REMARK
115	R152	RK1JC0T0473J	RES-C,47K 0.063W J 1608	
116	R153	RK1JC0T0101J	RES-C,100 0.063W J 1608	
117	R154	RK1JC0T0101J	RES-C,100 0.063W J 1608	
118	R155	RK1JC0T0473J	RES-C,47K 0.063W J 1608	
119	R156	RK1JC0T0000J	RES-C,0 0.063W J 1608	
120	R204	RK1JC0T0103J	RES-C,10K 0.063W J 1608	
121	R205	2608201013	RES-C,8.2K 0.1W J 1608	
122	R206	RK1JC0T0472J	RES-C,4.7K 0.063W J 1608	
123	R207	RK1JC0T0105J	RES-C,1M 0.063W J 1608	
124	R208	RK1JC0T0101J	RES-C,100 0.063W J 1608	
125	R209	RK1JC0T0103J	RES-C,10K 0.063W J 1608	
126	R211	RK1JC0T0472J	RES-C,4.7K 0.063W J 1608	
127	R212	RK1JC0T0472J	RES-C,4.7K 0.063W J 1608	
128	R214	RK1JC0T0101J	RES-C,100 0.063W J 1608	
129	R215	RK1JC0T0472J	RES-C,4.7K 0.063W J 1608	
130	R216	RK1JC0T0151J	RES CHIP 150 J 0.063W 1608	
131	R217	RK1JC0T0101J	RES-C,100 0.063W J 1608	
132	R218	RK1JC0T0151J	RES CHIP 150 J 0.063W 1608	
133	R219	2602202015	RES-C,22K 0.063W J 1608	
134	R220	RK1JC0T0103J	RES-C,10K 0.063W J 1608	
135	R223	2602000010	RES-C,200 0.063W J 1608	
136	R224	2602000010	RES-C,200 0.063W J 1608	
137	R225	RK1JC0T0102J	RES-C,1K 0.063W J 1608	
138	R226	RK1JC0T0102J	RES-C,1K 0.063W J 1608	
139	R227	2607500012	RES-C,750 0.063W J 1608	
140	R228	2607500012	RES-C,750 0.063W J 1608	
141	R229	RK1JC0T0101J	RES-C,100 0.063W J 1608	
142	R230	RK1JC0T0101J	RES-C,100 0.063W J 1608	
143	R231	RK1JC0T0471J	RES-C,470 0.063W J 1608	
144	R232	RK1JC0T0471J	RES-C,470 0.063W J 1608	
145	R233	RK1JC0T0471J	RES-C,470 0.063W J 1608	
146	R234	RK1JC0T0471J	RES-C,470 0.063W J 1608	
147	R235	RK1JC0T0471J	RES-C,470 0.063W J 1608	
148	R237	RK1JC0T0472J	RES-C,4.7K 0.063W J 1608	
149	R36	RK1JC0T0473J	RES-C,47K 0.063W J 1608	
150	R401	RK1JC0T0103J	RES-C,10K 0.063W J 1608	
151	R406	RK1JC0T0151J	RES CHIP 150 J 0.063W 1608	
152	R407	RK1JC0T0102J	RES-C,1K 0.063W J 1608	
153	R409	RK1JC0T0151J	RES CHIP 150 J 0.063W 1608	

NO	LOCATION	PART NUMBER	DESCRIPTION	REMARK
154	R410	RK1JC0T0103J	RES-C,10K 0.063W J 1608	
155	R411	RK1JC0T0102J	RES-C,1K 0.063W J 1608	
156	R412	RK1JC0T0102J	RES-C,1K 0.063W J 1608	
157	R413	RK1JC0T0102J	RES-C,1K 0.063W J 1608	
158	R415	2602700001	RES-C,270 0.063W J 1608	
159	R416	2602700001	RES-C,270 0.063W J 1608	
160	U1	3205001433	IC-U,MST7131A-DUAL SXGA	
161	U10	3200001392	IC-LIN,RC1117-3.3 SOT	
162	U2	3721100621	CONN-F,PLL-44-PPS-T-M 44	
163	U3	3203000879	IC-MEMO,S524A60X81-SCT0	
164	U5	3200001462	IC-LIN,RC1117ST-2.5 SOT	
165	U6	3114000189	FET,GFC654 SMD	
166	U8	3203000745	IC-MEMO,24LC211/SN SOI	
167	X1	3530200505	VIB-QUARTZ,SX-1 SMD 14.31818MH	
168	X2	3530200586	VIB-QUARTZ,SMD 24MHZ 22PF	
169	CN11	3721101233	CONN-F,D-SUB 15P R/A 15	
170	CN12	3721101228	CONN-F,DVI FEMALE RIGHT ANG 24	
171	CN2	372010138601	CONN-M,SMAW200-04P	
172	CN3	372010139001	CONN-M,SMAW200-08P	
173	CN31	3725005292	INVERTER CABLE, L50S/L70S	
174	CN402	3721101252	CONN-F, HEAD PHONE JACK	
175	J1	3721101253	CONN-F, AUDIO INPUT JACK	
176	U4	3200001310	IC-LIN,TDA7496L DIP	
177		6128011833	GASKET EMI 18 X 8 X 12(T)	
178		6128011834	GASKET EMI 26 X 6 X 12(T)	
179	U1	6124038500	HEAT SINK SCALER,VT500	
180	U2	3205001409	WT61P4 PLCC	
181		B4204673650	KIT LAB & MAN,Q19/03 MAXDATA/S	
182		631634929001	HI-POT STICKER MAXDATA	
183		6316349353	STICKER MAXDATA L70D/9/Q19(120	
184		6316356578	BACK LABEL, L70P/03(SILVER) MA	
185		6320238600	MANUAL U/G, Q19/03(SILVER) MAX	
186		6327023927	STAND QUICK GUIDE MAXDATA	
187		B4210341200	PACKING ASSY,Q19 MAX	
188		6223066800	HOLDER,HANDLE TOP	
189		6223066900	HOLDER,HANDLE BOTTOM	
190		6243028300	BAG,PE(ST) CLEAR 14/15ALL	
191		6243037901	MANUAL PE BAG	
192		6253127800	CUSHION TOP 19" MAX	

NO	LOCATION	PART NUMBER	DESCRIPTION	REMARK
193		6253127900	CUSHION BOTTOM 19" MAX	
194		B4210341300	LCD MEC ASSY,Q19 MAX	
195		B4210341400	KIT COVER ASSY,Q19 MAX SILVER	
196		6201336350	FRONT COVER ASSY,Q19 MAX SILVE	
197		6201334950	FRONT COVER,Q19 MAX	
198		6220087400	LENS LED	
199		6201336450	REAR COVER ASSY,Q19 MAX BLACK	
200		6201335050	REAR COVER,Q19 MAX BLACK	
201		6215246000	KNOB PAD	
202		M17744006012	SCREW,BIN(+) M4*6 MSZPC	
203		5001000670	SCR-MC,FLT + MC 3*8	
204		5001000681	SCR-MC,WSP + M3X5	
205		5001000686	SCR-MC BIN MC4*10(BLACK)	
206		500100069201	SCR-MC, FLT + M4X8 BLACK	
207		5004000192	SCR-TT,BIN + MC 3*6	
208		5004000227	SCR-TT2,BIN + MC 3 * 6 BLACK	
209		6101229950	MAIN FRAME ASSY Q19 MAX	
210		6101227601	MAIN FRAME Q19	
211		6128011827	EMI GASKET 290*5.0*0.5T,VT900	
212		6128011832	GASKET EMI 100 X 5X0.5(T)	
213		6210107103	EMI SHEET(AL) 30X20	
214		6201341202	STAND ASSY,Q19 MAX BLACK	
215		5001000666	SCR-MC,BIN + MC 3*5	
216		5004000190	SCR-TT,BIN + MC 3*8	
217		6101230400	LIFT BODY BRKT MAXDATA	
218		6101230500	LIFT FRAME MAXDATA	
219		6115028600	HINGE ASSY,19" MAX	
220		6115028100	PIVOT BRKT 19" MAX	
221		6115028200	HINGE BODY MAXDATA	
222		6115028300	HINGE TILT L/R MAXDATA	
223		6123000100	GROUND SPRING(ELF)	
224		6123000200	LIFT PIN ASSY	
225		6123000300	LIFT PIN	
226		6316349351	LIFT PIN LABEL	
227		6128011829	GASKET EMI,10X1TX15	
228		6201339501	HINGE CAP MAX BLACK	
229		6201339601	HINGE CCVER MAX BLACK	
230		6201339701	LIFT REAR MAX BLACK	
231		6201339801	LIFT FRONT MAX BLACK	

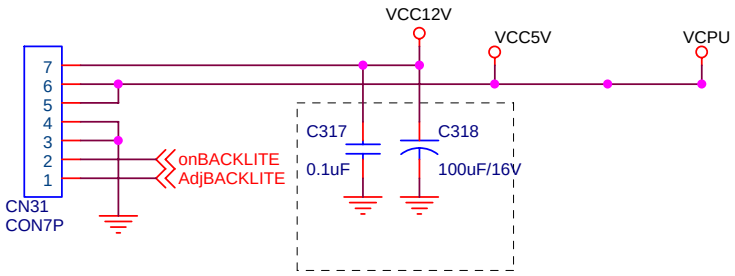
NO	LOCATION	PART NUMBER	DESCRIPTION	REMARK
232		6201339900	SPRING COVER NYLON MAX	
233		6201340000	SPRING GUIDE MAXDATA	
234		6201340100	STOPPER LIFT MAXDATA	
235		6201340201	STAND FRONT MAX BLACK	
236		6201340301	STAND REAR MAX BLACK	
237		6201341401	STAND BASE ASSY,MAX BLACK	
238		B4209500302A	BAG PE,Q15N HECMVEL(350x300)	
239		5004000242	SCR-TT,FLT + MC 4X11	
240		6101230600	BASE FRAME MAXDATA	
241		6201340401	STAND BASE MAX BLACK	
242		6261046500	RUBBER FOOT,MAX	
243		6210107102	EMI SHEET(AL)110X20	
244		6210107111	AL TAPE,80X80 PE COATING	
245		6215244000	CABLE HOLDER	
246		6242027901	PROTECT FILM,Q19 MAX	
247		E4205024001	MAIN ASSY(M1),Q19 MAXDATA EXP	
248		E4208625801	PCBA MAIN(TM),Q19 MAXDATA	
249		E4208525801	PCBA MAIN(MM),Q19 MAXDATA	
250		E4208425811	PCBA MAIN(AM),Q19 MAXDATA	
251		3010700953	OSD B/D ASSY,Q19 MAXDATA	
252		3550100123	SPEAKER ASSY,Q19	
253		3610200126	POWER+INVERTER,Q19	
254		372500531701	CONN-A,30P LVDS CABLE 120MM	
255		3725005359	CONN-A,8P OSD CABLE 290mm Q19	
256		LMQ19MS00BFS12	PCB ASSY(CR..)	
257		3330500283	LCD,LTM190E1-L03 SS	
258		3758000217	CBL-PWR,BK WALL EUROPE 1.8MT C	
259		3758500493	CBL-SGN,1.8MT BLACK 5.5PAI DET	
260		3758500497	AUDIO CABLE 1.8M BLACK	
261		6301191400	PAD PALLET,SW-3 ALL MODEL	
262		6301197100	PAD PALLET,BOTTOM ALL MODEL(80	
263		6301199800	CTN BOX DW-2(W) Q19 MAXDATA	
264		6309030000	PAD CTN,PALLET PBE/U 1517	

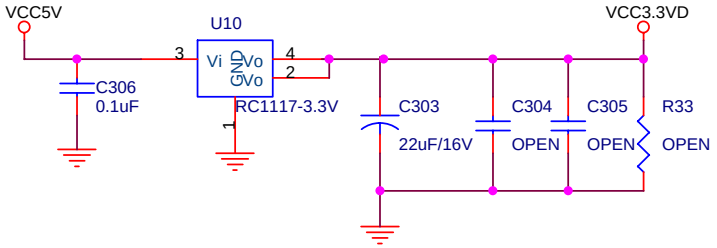

MST7131A
U1
CN11
VGA
CN12
CON24P_DVI
CON30P
DUAL LVDS
U8
24LC21
U9
OPEN24LC21
X1
14.318MHz
01_MST7131A
Belinea 101920
Wednesday, June 16, 2004

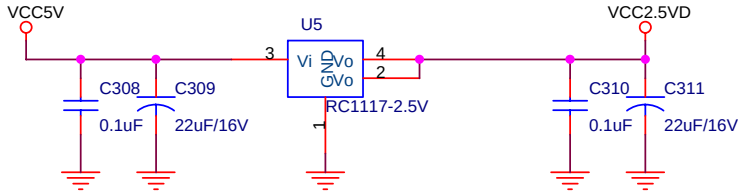


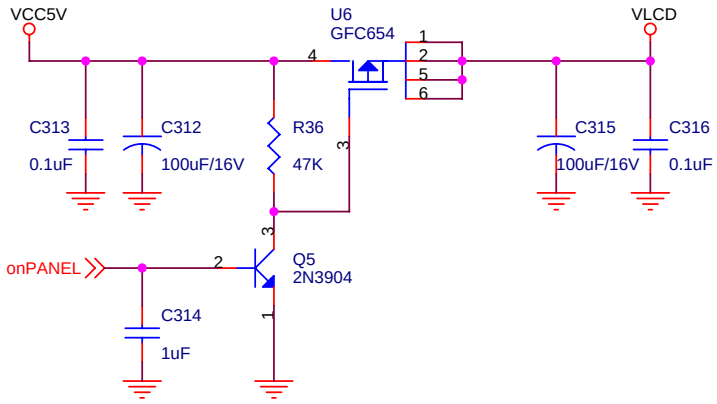
to KEY PAD

Title	02_MCU		
Size A3	Document Number <Doc>	Belinea 101920	Rev 0
Date: Wednesday, June 16, 2004	Sheet 2 of 4		

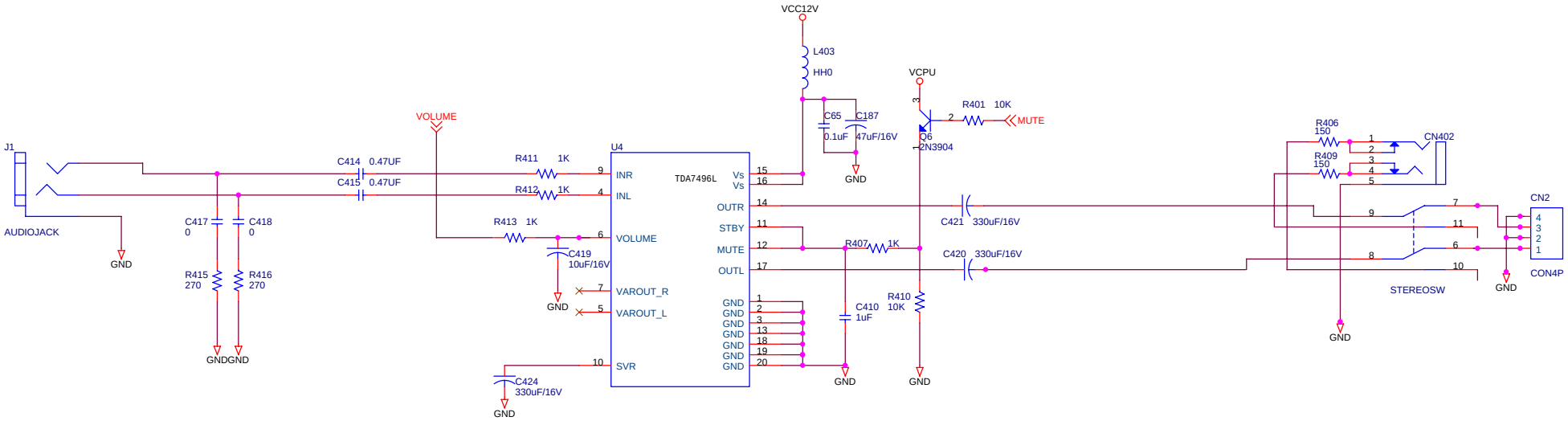








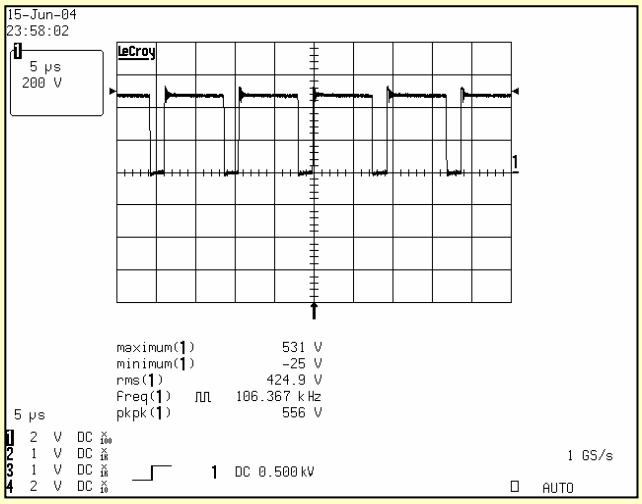
Title	03_POWER		
Size A4	Document Number <Doc>	**Belinea 101920**	Rev 0
Date: Wednesday, June 16, 2004	Sheet 3 of 4		



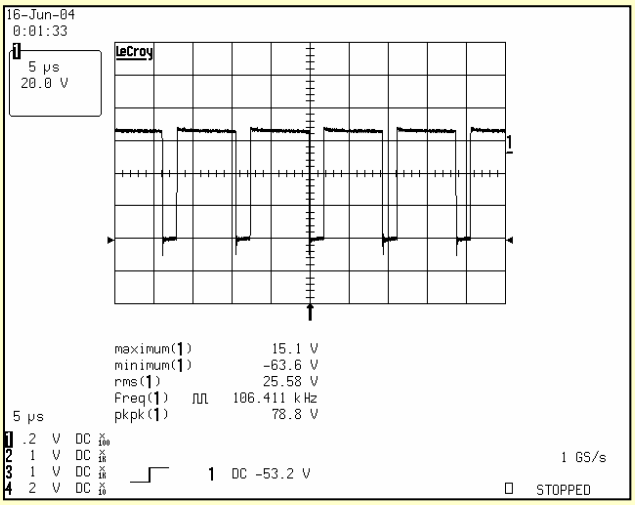
Title	04_AUDIO	
Size A3	Document Number **Belinea 101920**	Rev 0
Date:	Sheet 4 of 4	

POWER & INVERTER WAVE FORM

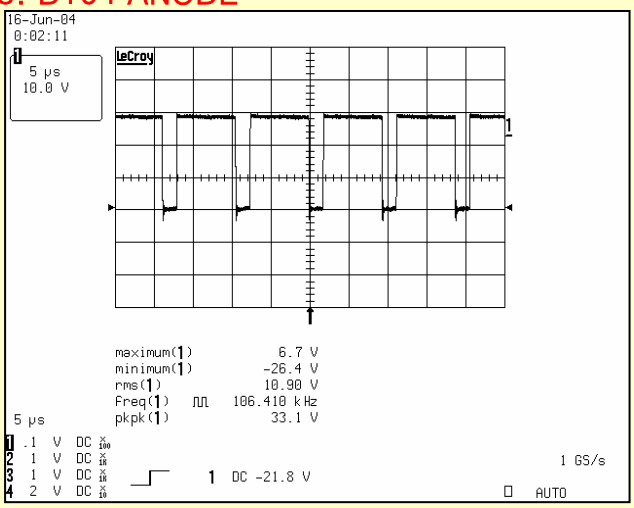
1. Q101 DRAIN



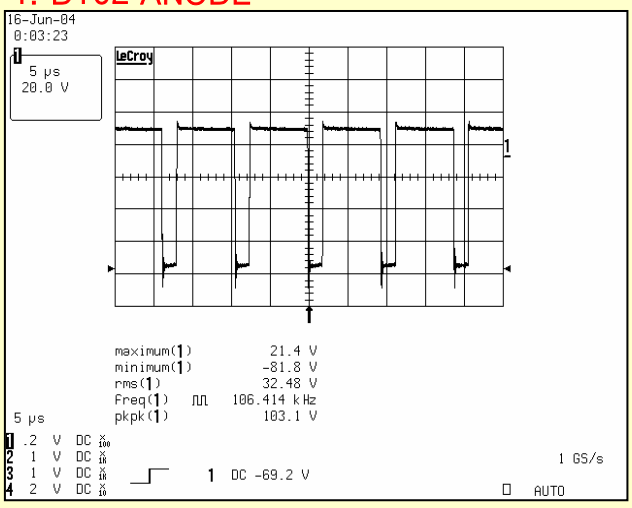
2. D103 ANODE



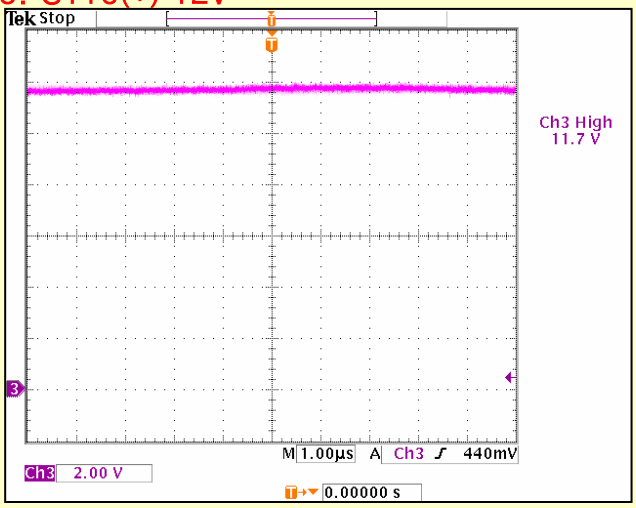
3. D104 ANODE



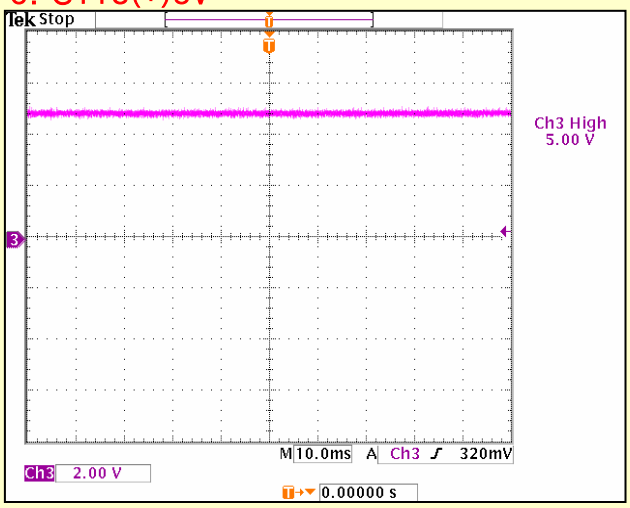
4. D102 ANODE



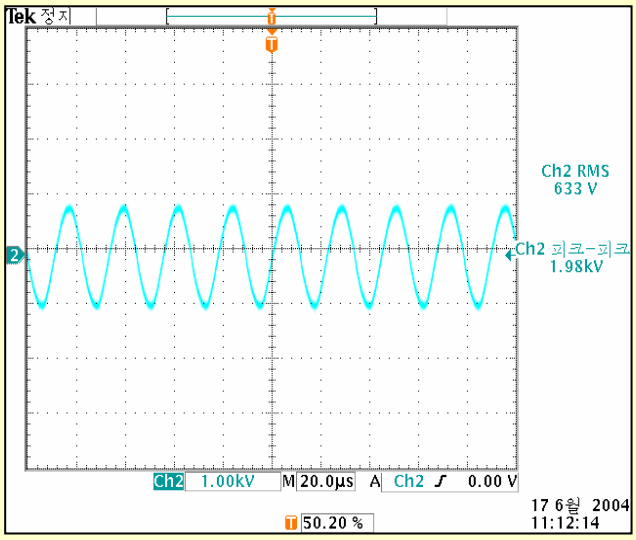
5. C116(+) 12V



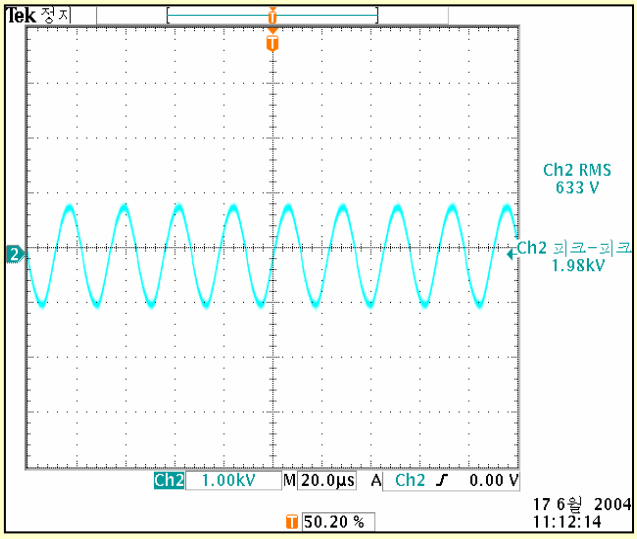
6. C118(+)5V



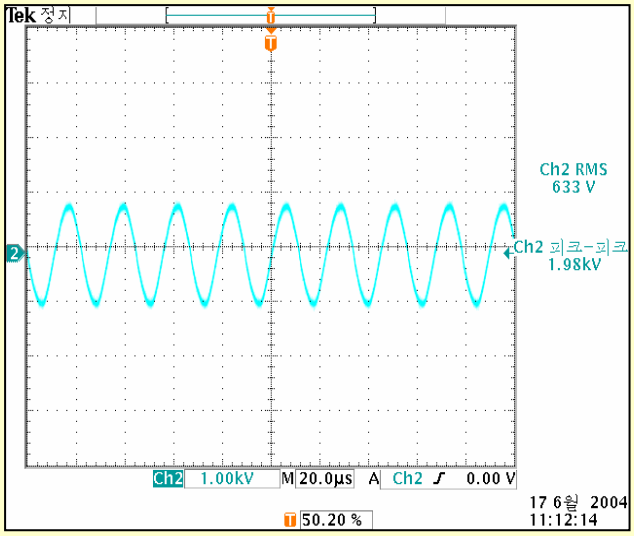
7. CN1



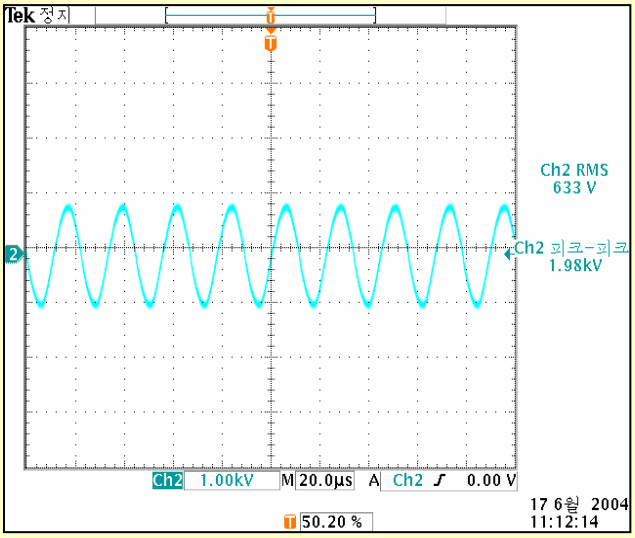
8. CN2



9. CN3

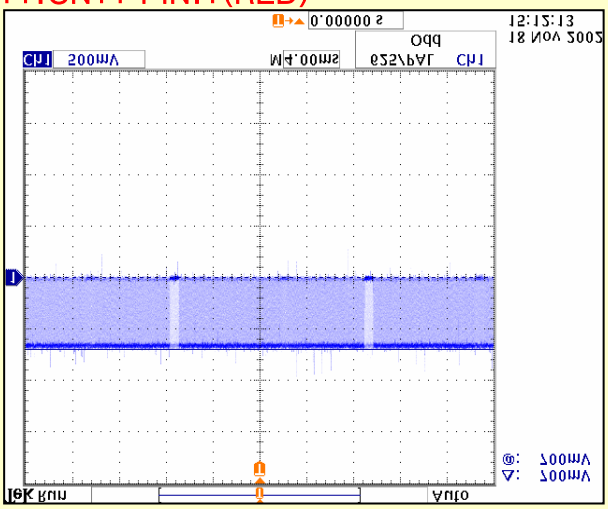


10. CN4

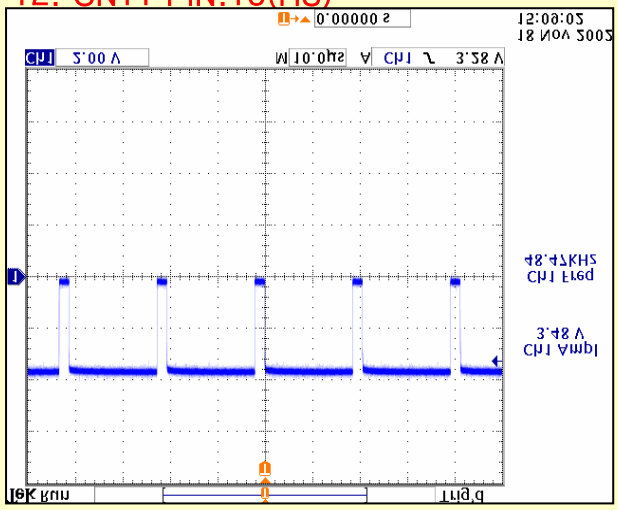


AD BOARD WAVE FORM

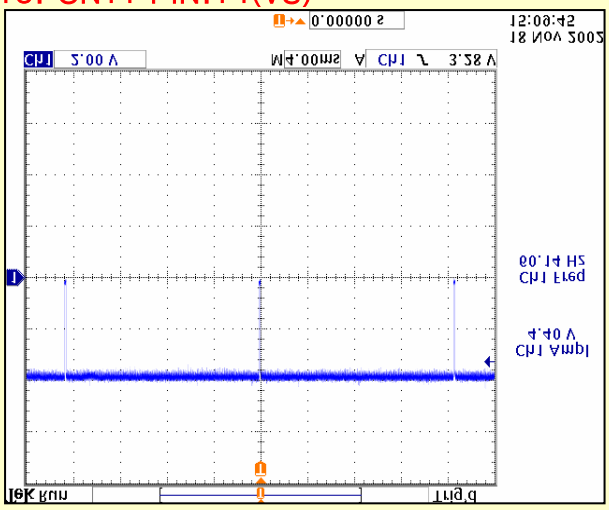
11.CN11 PIN.1(RED)



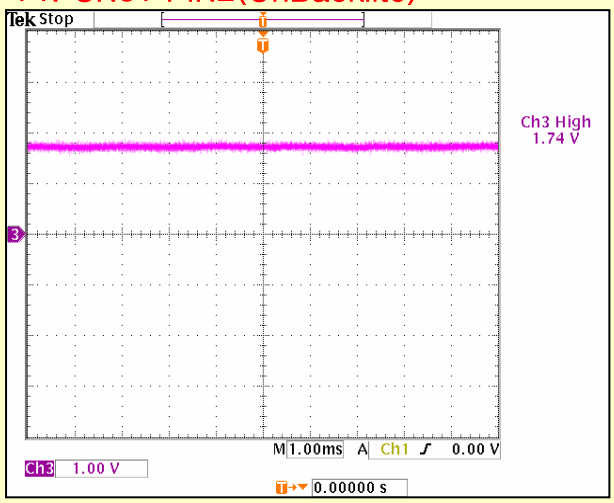
12. CN11 PIN.13(HS)



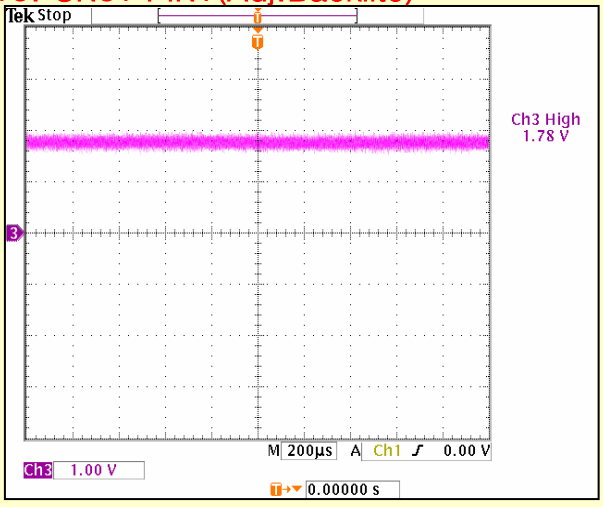
13. CN11 PIN.14(VS)



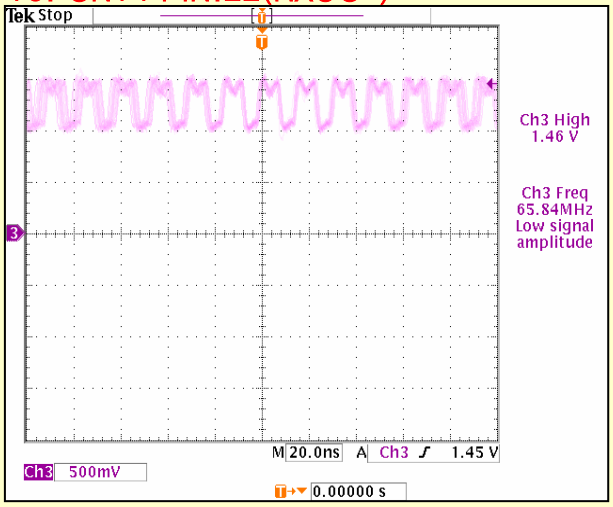
14. CN31 PIN2(OnBacklite)



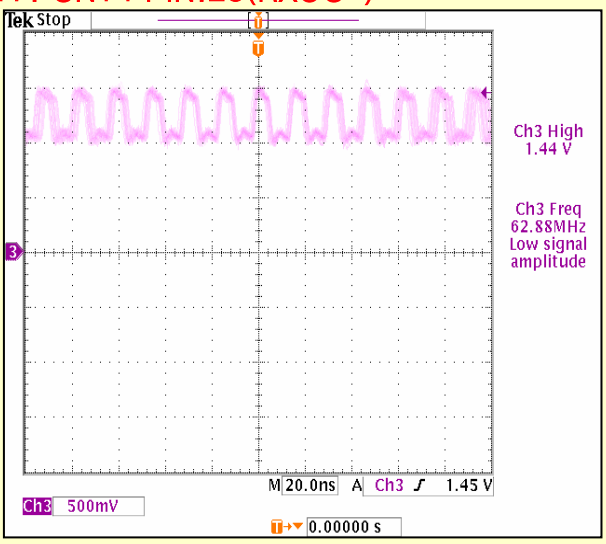
15. CN31 PIN1(Adj.Backlite)



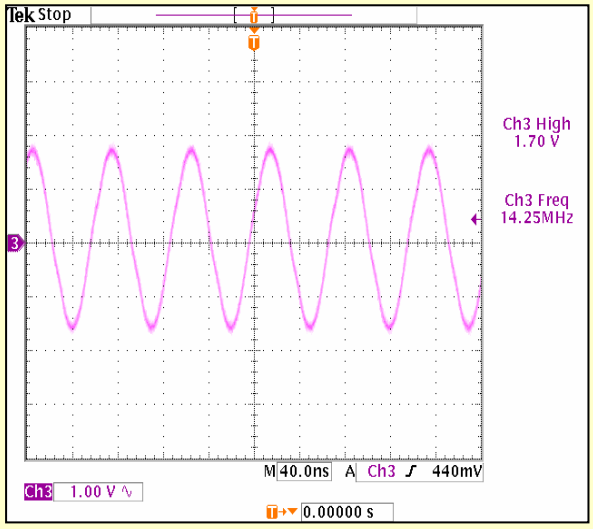
16. CN14 PIN.22(RXOC+)



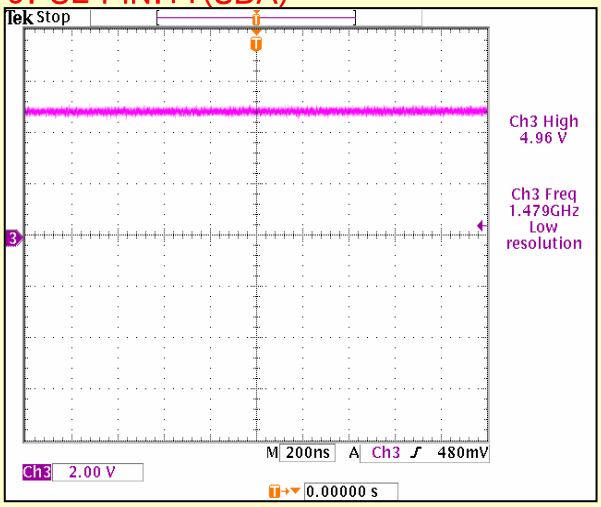
17. CN14 PIN.23(RXOC-)



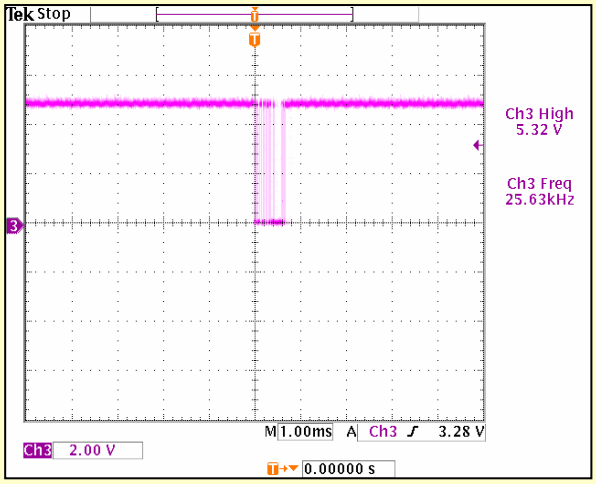
18. U1 PIN.96(X1)



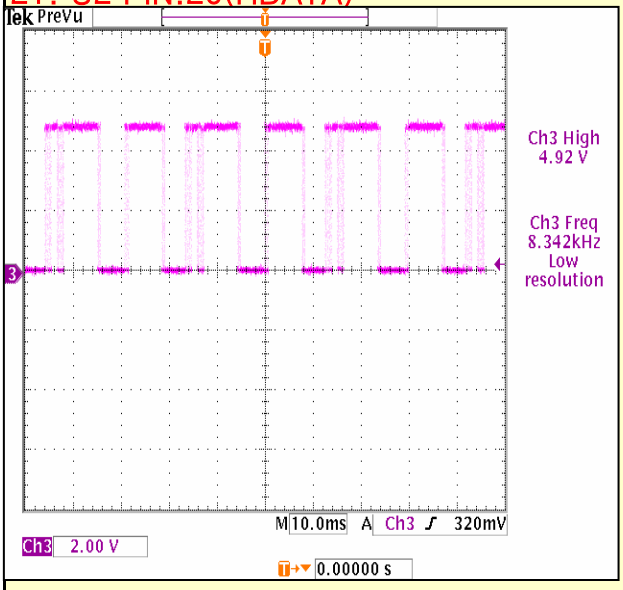
19. U2 PIN.11(SDA)



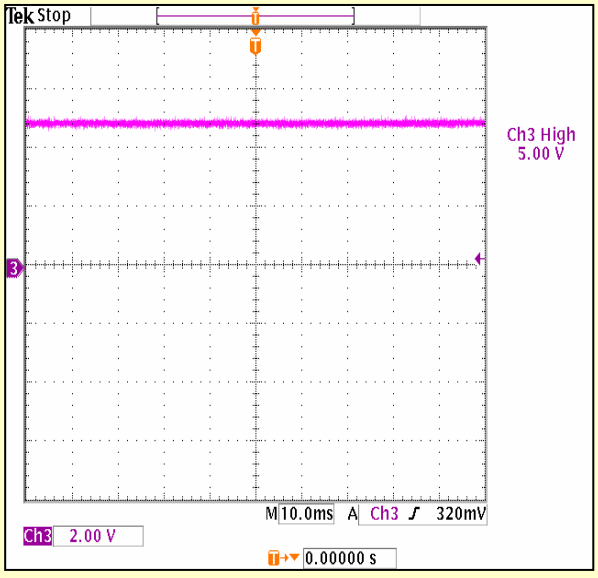
20. U2 PIN.12(SCL)



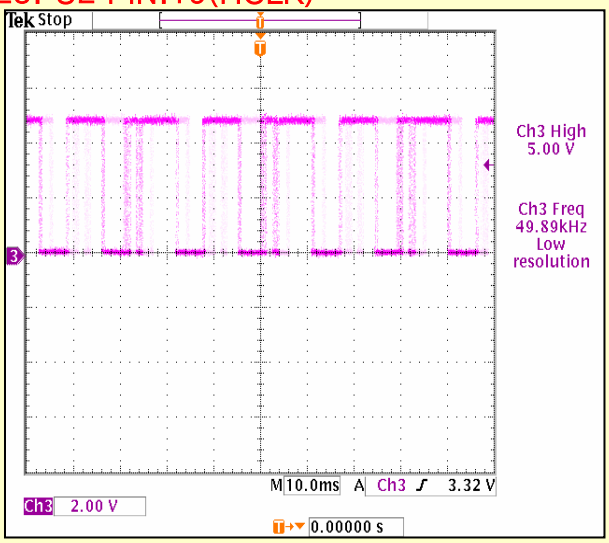
21. U2 PIN.20(HDATA)



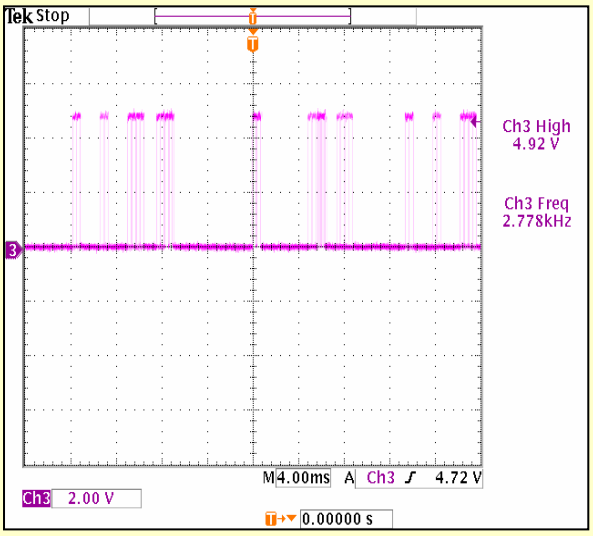
22. U2 PIN.7(VDD)



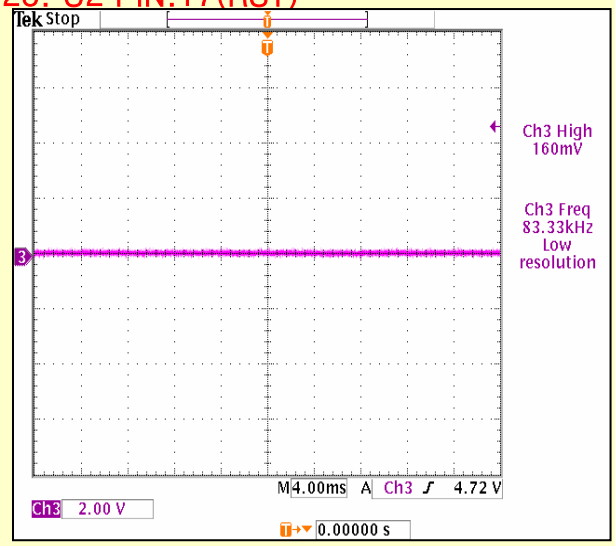
23. U2 PIN.19(HCLK)



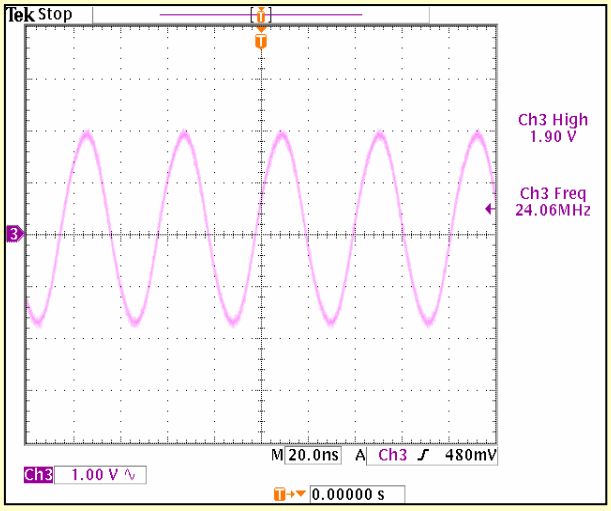
24. U2 PIN.18(HFS)



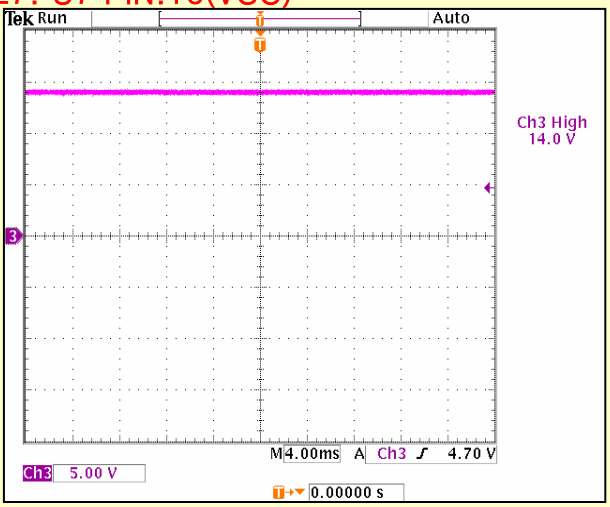
25. U2 PIN.17(RST)



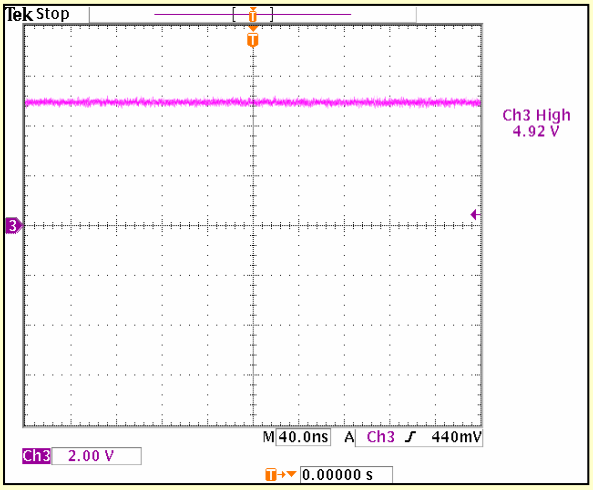
26. U2 PIN.9(X2)



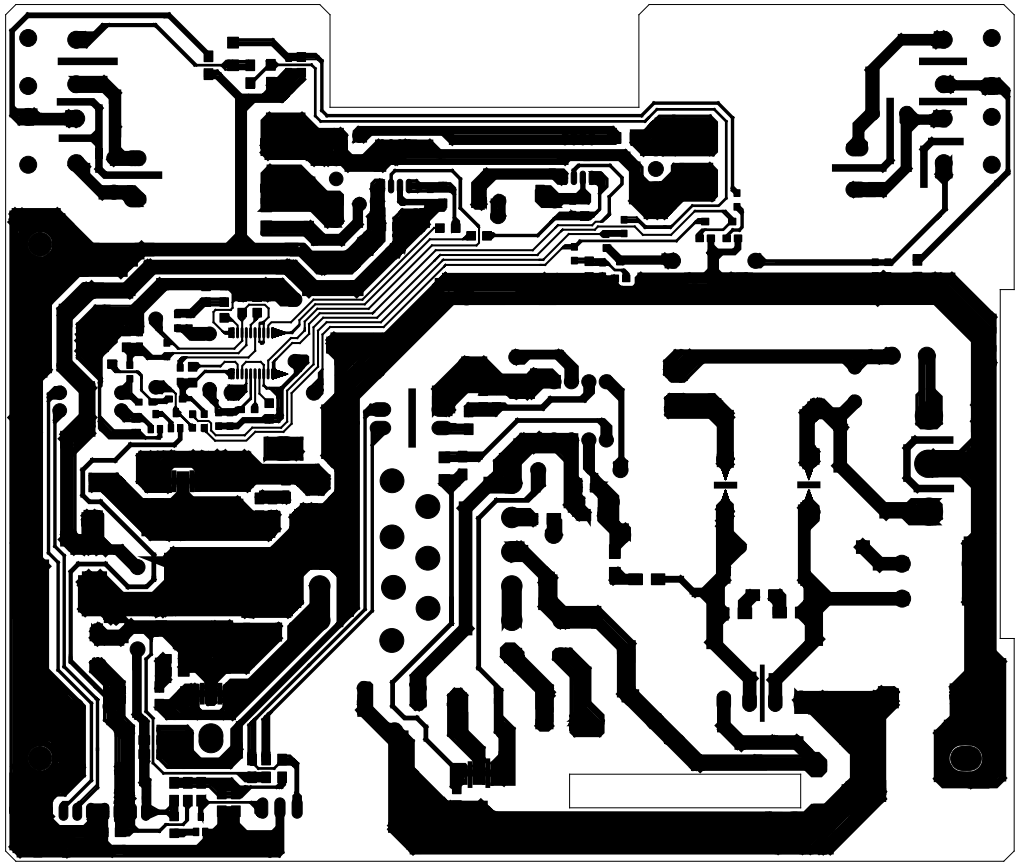
27. U7 PIN.16(VCC)



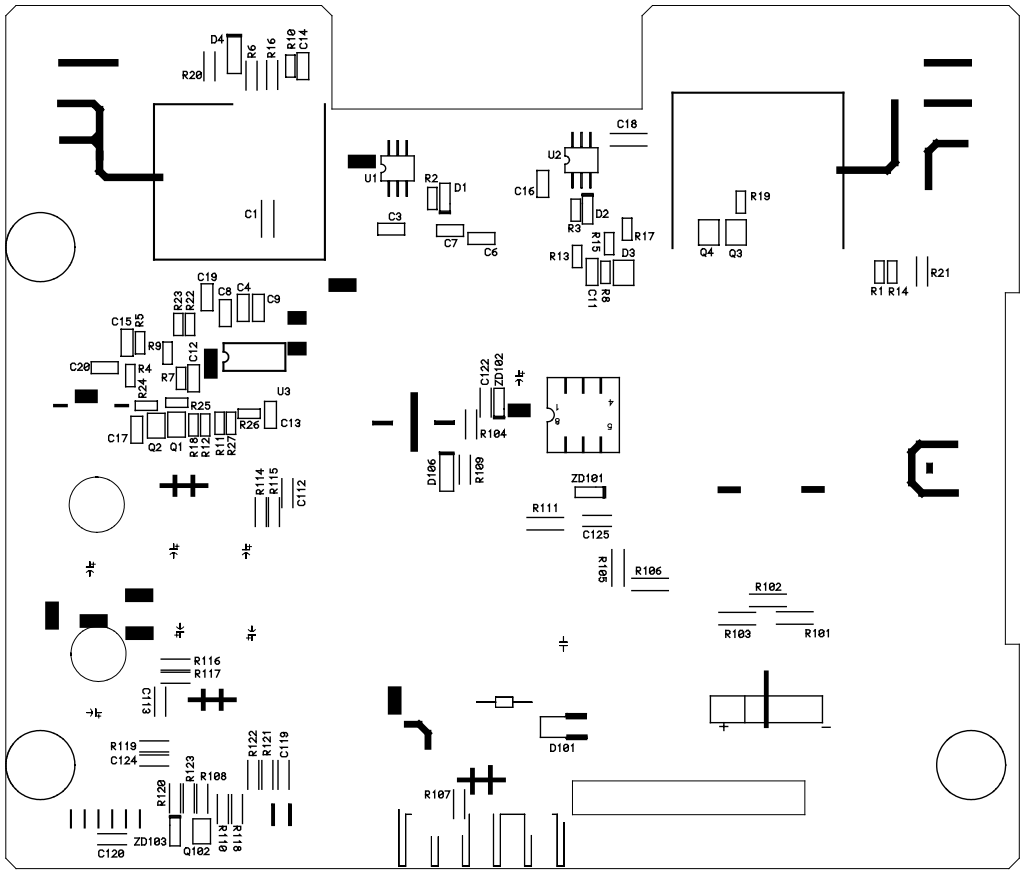
28. CN14 PIN.1(VLCD)



11-1. PCB DRAWING (TOP,TOS)

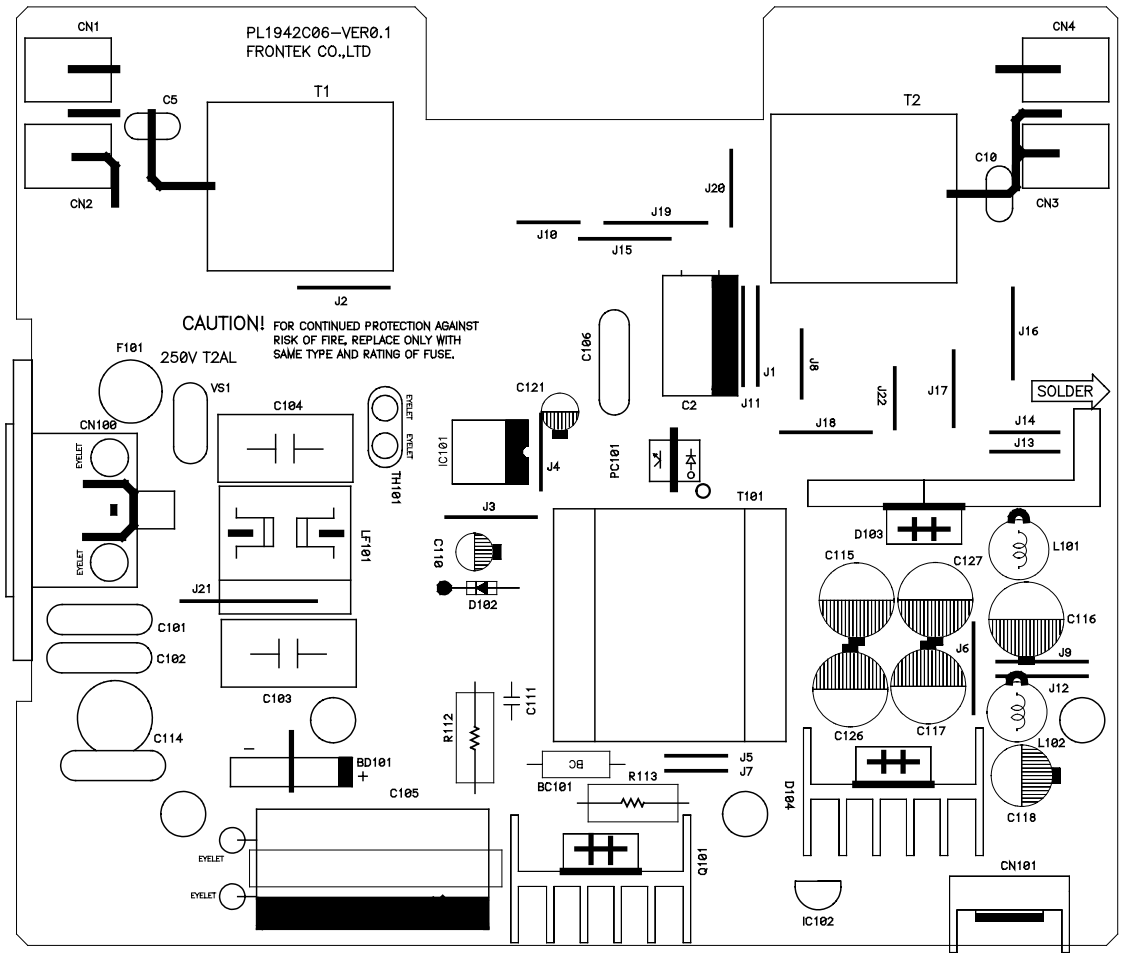


TOP



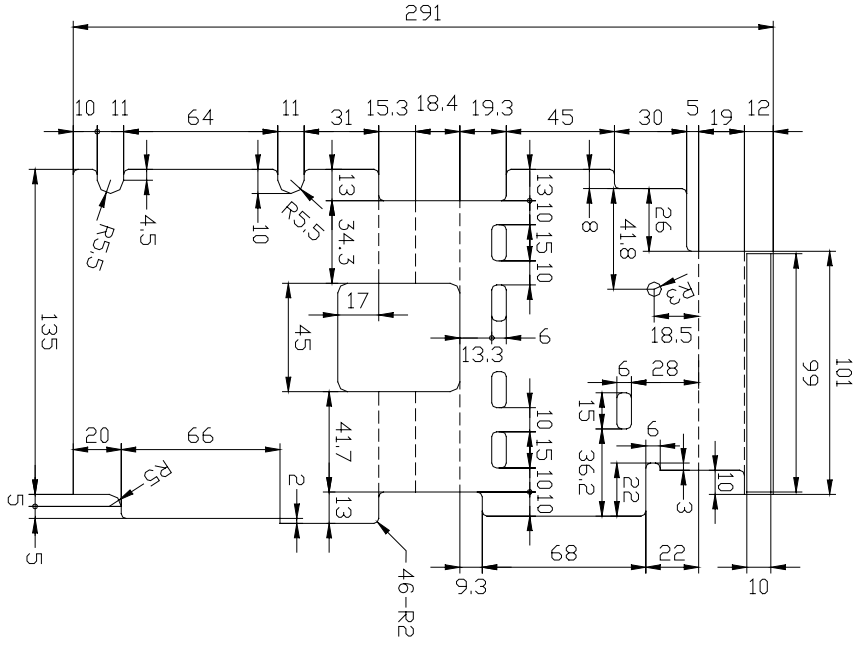
TOS

11-2. PCB DRAWING (BOS)

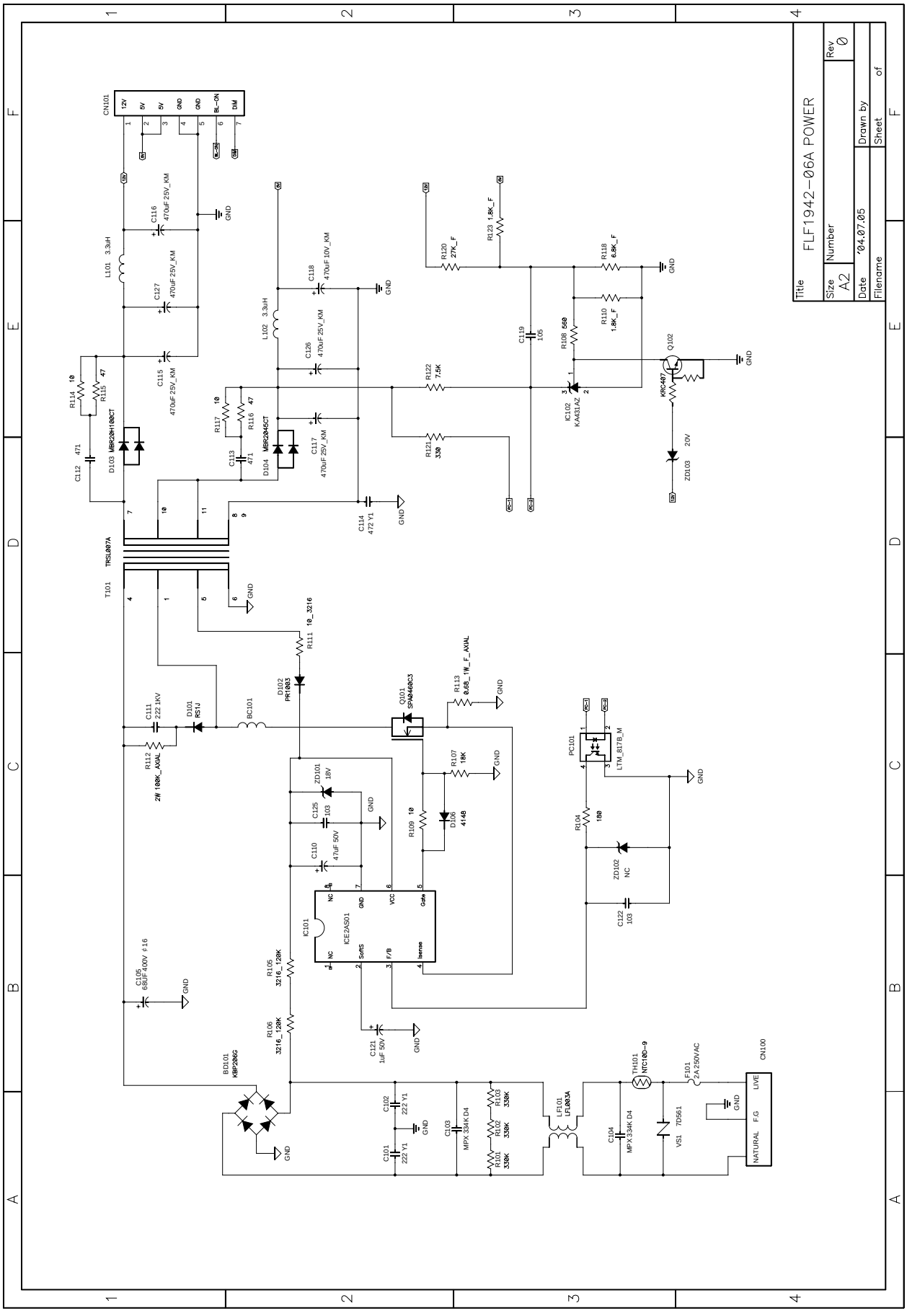


*. EYE-LET : CN100 Live and Nutural, TH101, C105

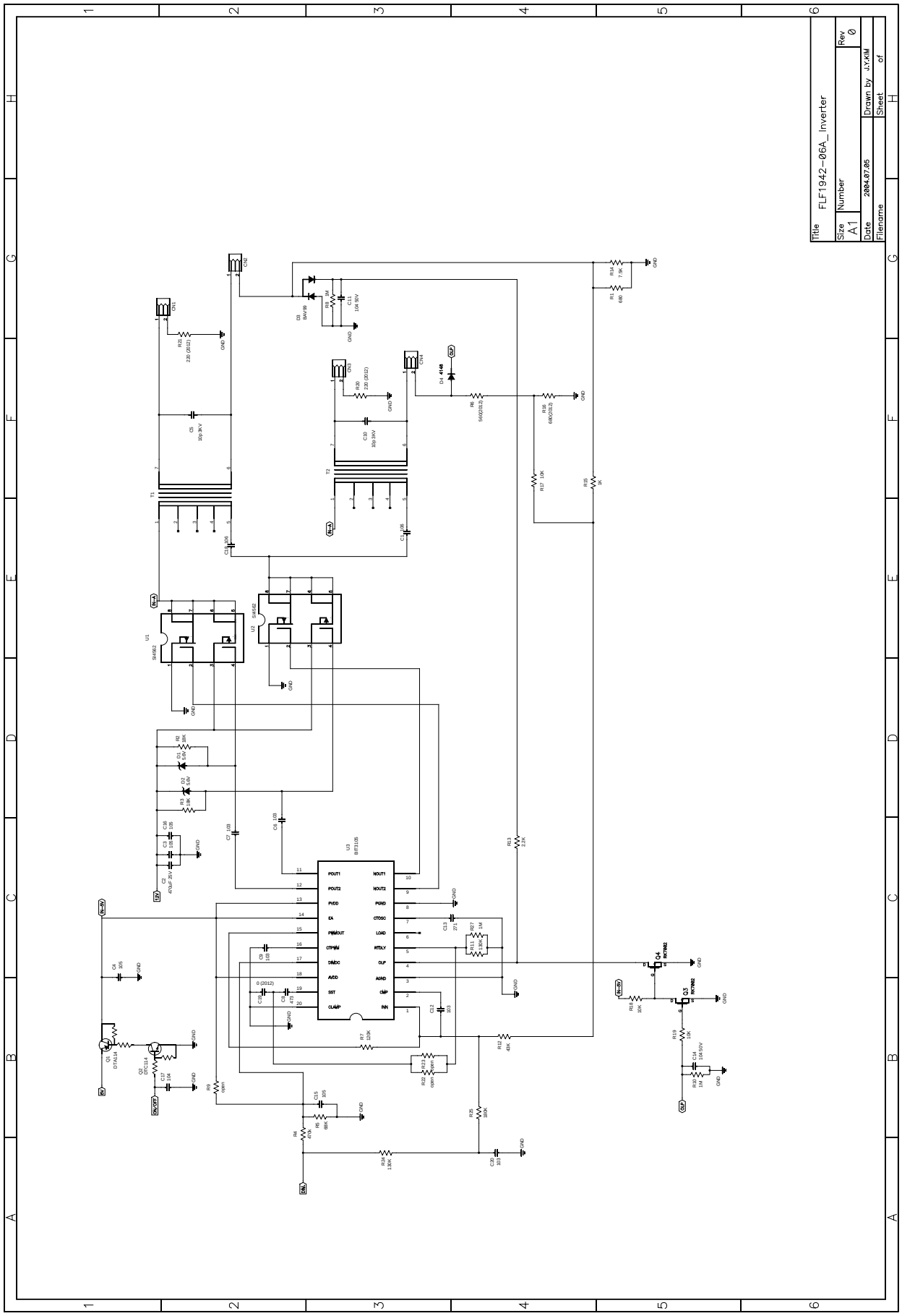
12. INSULATION COVER (0.4T)

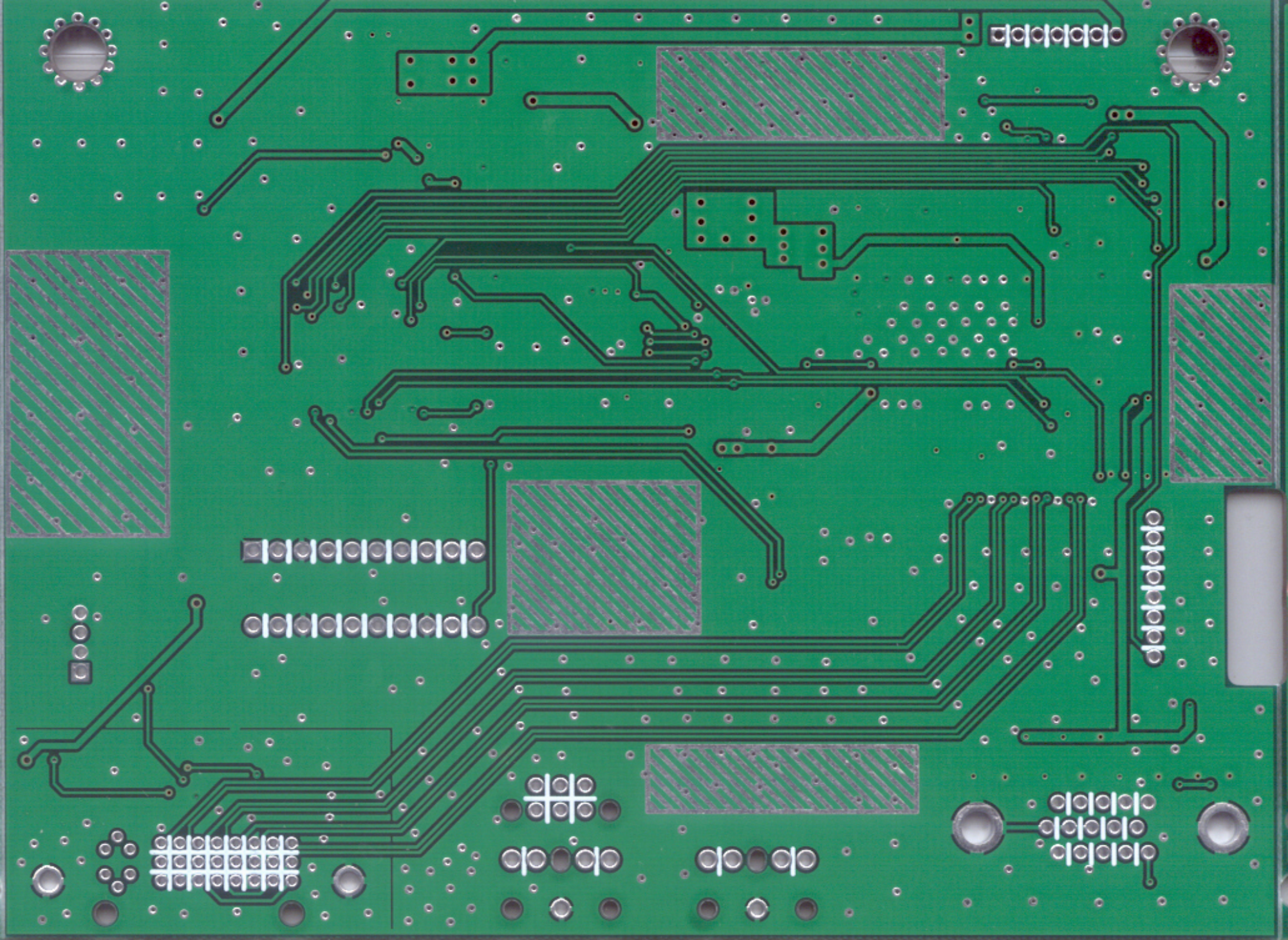


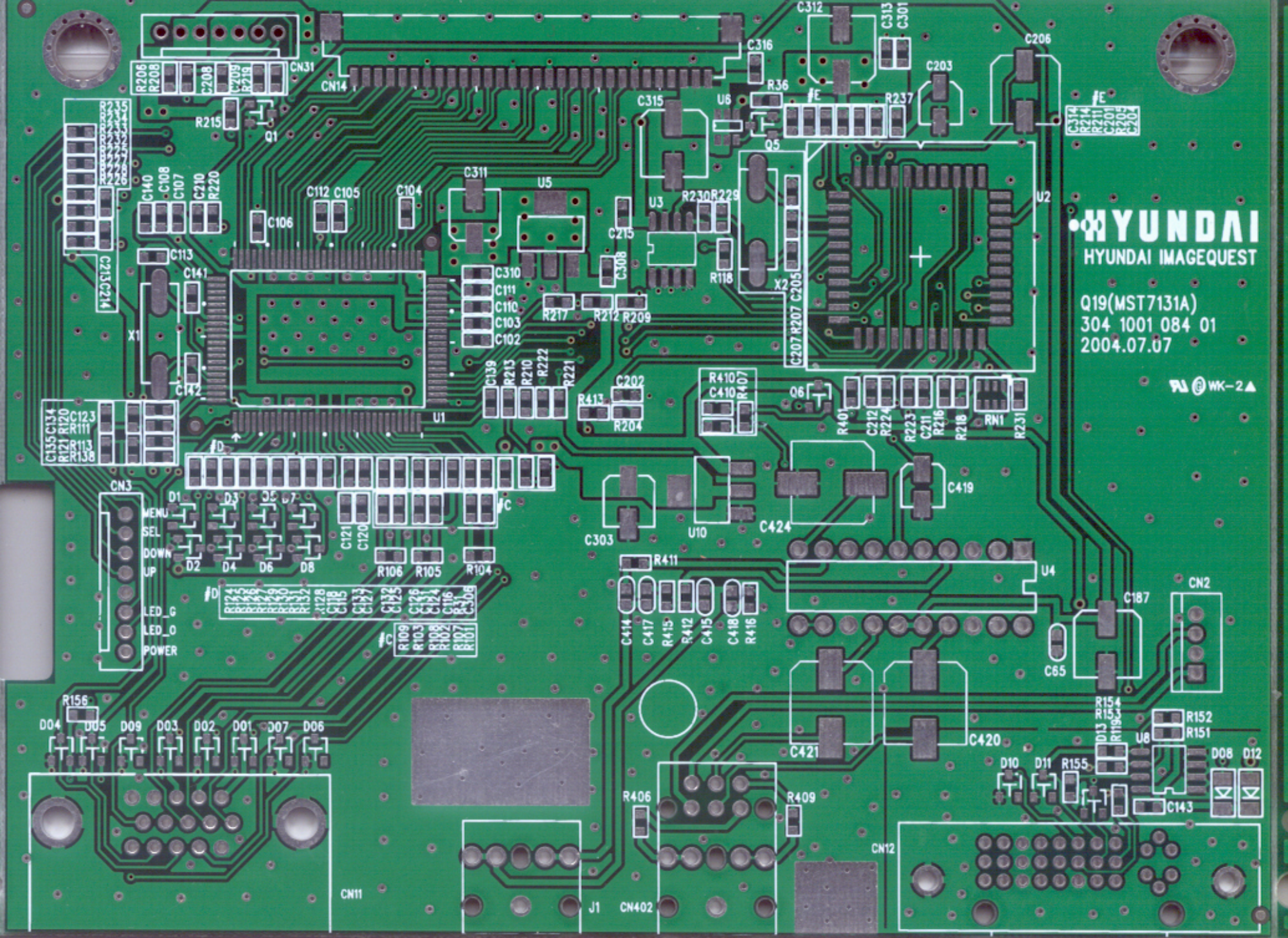
13. Adapter circuit



7. Inverter circuit






HYUNDAI
HYUNDAI IMAGEQUEST
Q19(MST7131A)
304 1001 084 01
2004.07.07
WK-2
CN31
CN14
CN3
MENU
SEL
DOWN
UP
LED_G
LED_O
POWER
CN11
CN12
CN2
CN402
J1
U1
U2
U3
U4
U5
U6
U8
U10
Q1
Q5
Q6
X1
X2
RN1