

TV GENERAL	DLP-32B3TX
Chassis Type	LX
Screen Size	32"
Aspect Ratio	16:9 Widescreen

PANEL	
Picture Panel	TFT LCD
HD Ready	HD Ready
Brightness	500
Contrast	1000
Resolution	1366x768
Viewing Angle (Hor/Ver)	178/178
Response Time	10ms
Colors	16,7 Million/ 10 bit

PICTURE	
Digital Colour Transient Improvement (DCTI)	+
Digital Luminance Transition Improvement (DLTI)	+
Digital Motion De-Interlacing (DMDI)	+
Digital Combfilter (DCF)	+
Digital Noise Reduction (DNR)	+
Picture in Picture PIP / PAP / PAT (2 Tuner)	-
Picture in Picture PIP / PAP / PAT (1 Tuner)	-
Picture Freeze	+
Zoom	+
WSS	+
Picture Formats	4:3, 16:9, AUTO, 14:9 Letterbox, Subtitle, Panorama

SOUND	
Sound Quality (A2-Stereo/NICAM)	+/+
AV Stereo	+
Virtual Dolby / SRS	-/-
Subwoofer	-
Automatic Volume Levelling (AVL)	+
Smart Sound Mode (SSM)	+
Space Sound Effect	+
Preset Sound Modes	+
Sound Output (RMS)	2x10 W

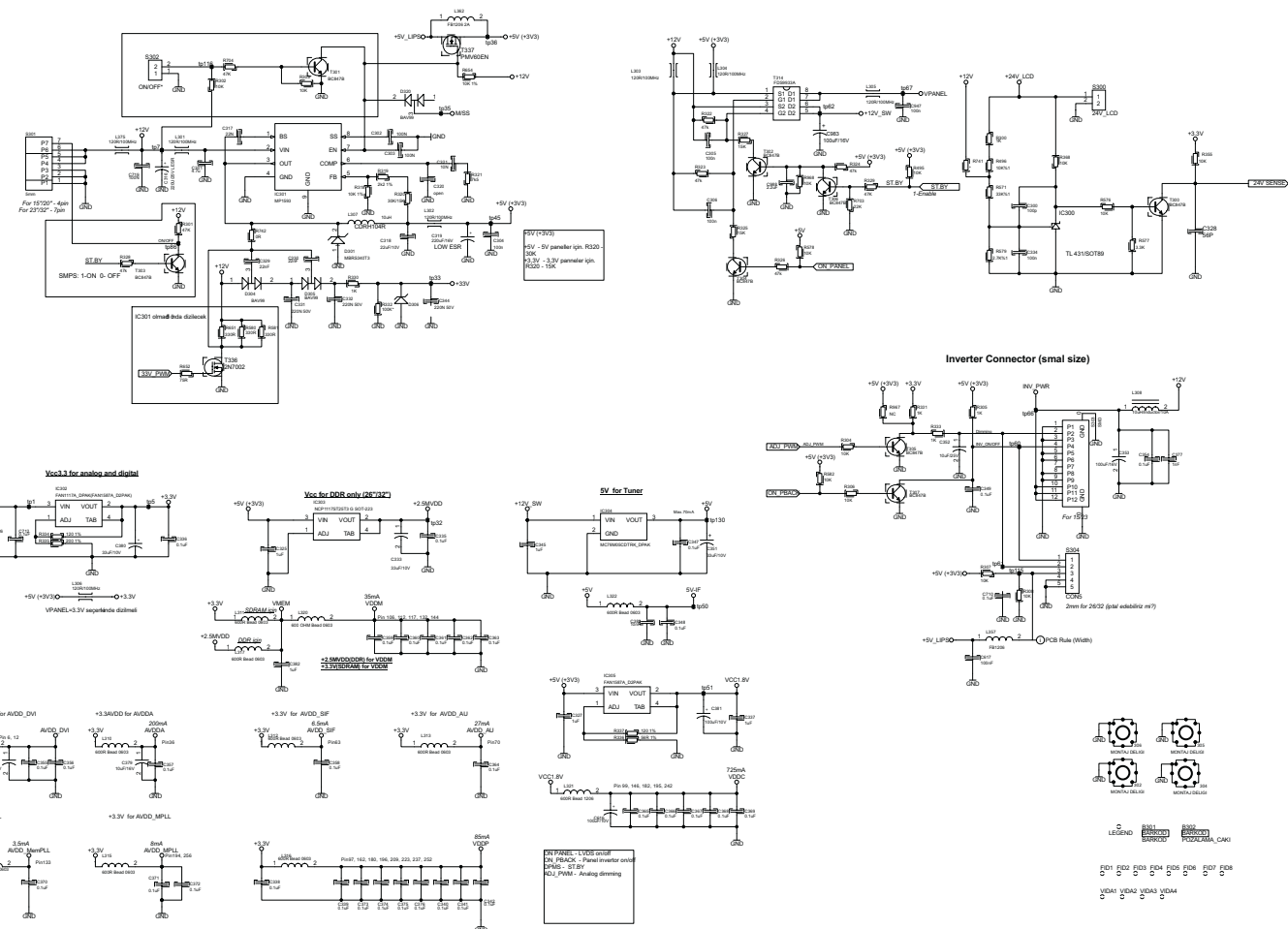
ELECTRONIC	
Programmable On-Off Timer / Sleep Timer	+/-
Intelligent Channel Search (Zapping function)*	opt
Recall Function (Swap)*	opt
Programme Edit	+
Auto Switch Off	+
Programme Memory TV/AV	100/AV
Teletext / Fastext / Toptext	+ / + / Opt.
Teletext Pages	10pg Fastext (opt.250pg) /1000pg Toptext
Panellock / Programlock	+ / +
Menu Languages OSD	26
Service Mode	+
Clock	+
* Only one of them is selectable at a time	

TUNING	
PLL Frequency Synthesize	+
Automatic Tuning System with Country Selection	Opt.
Frequency Based Auto Search	+
Multisystem Tuner	+
NTSC-Playback via Scart (3,58/4,43)	+

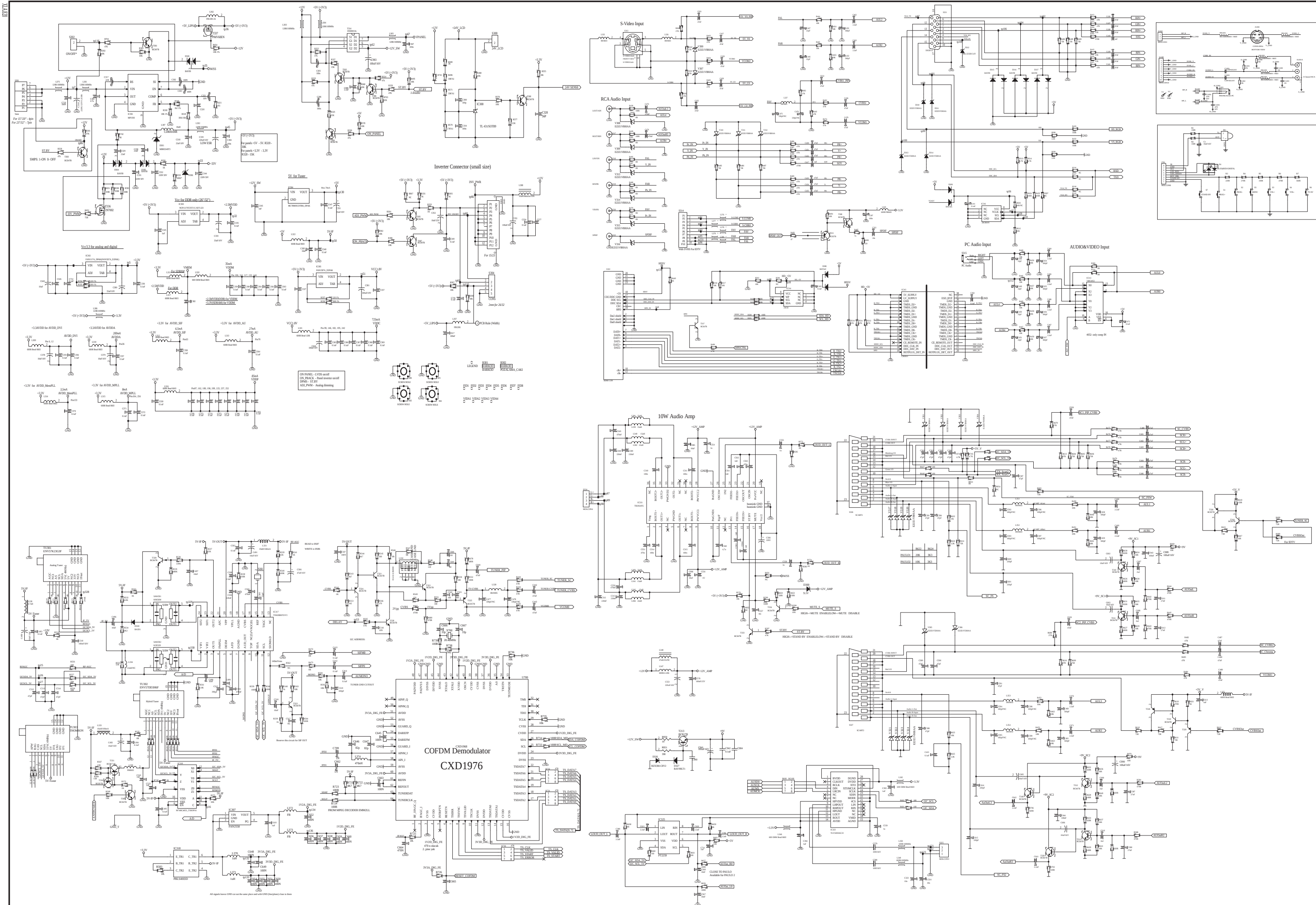
CONNECTIONS	
Euro-Scart Socket 1 (A/V in and A/V out)	+
Euro-Scart Socket 2 (A/V in and A/V out)	+
Euro-Scart Socket 3 (A/V in and A/V out)	-
Audio / Video in	+
S-VHS in	+
Audio Out (2CH)	+
Headphone	+
PC Audio In	+
YCbCr	+
VGA Input	+
DVI Input	-
HDMI Input	1
SPDIF Coaxial / SPDIF Optic	+/-

POWER SUPPLY	
Voltage / Current	140-265 V/ 50Hz-60Hz
Power Consumption Nominal	145W
Power Consumption Stand-by	<1,5 W

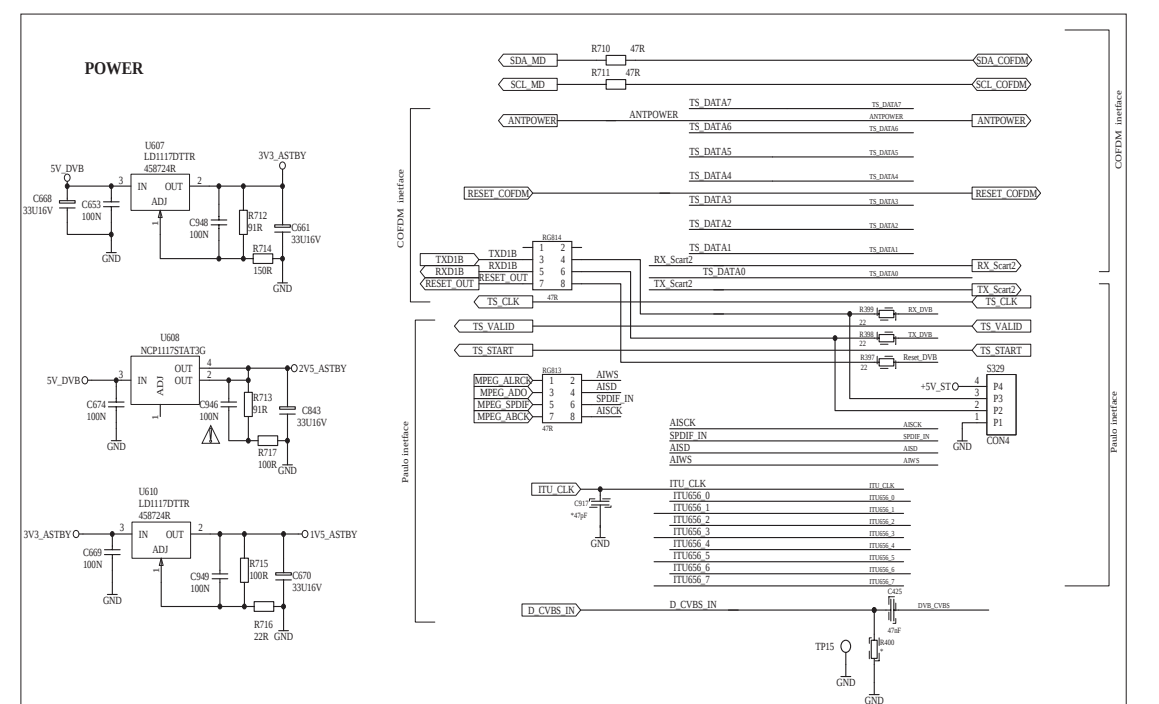
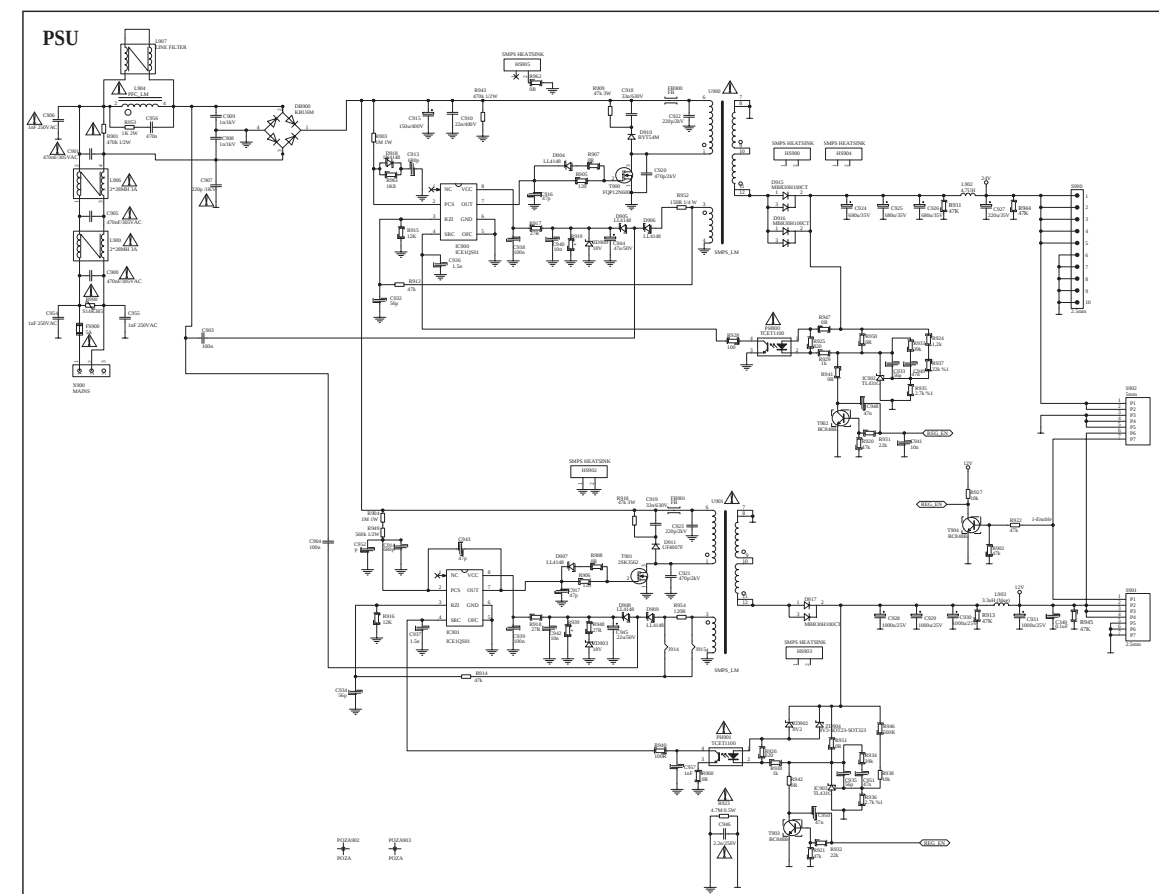
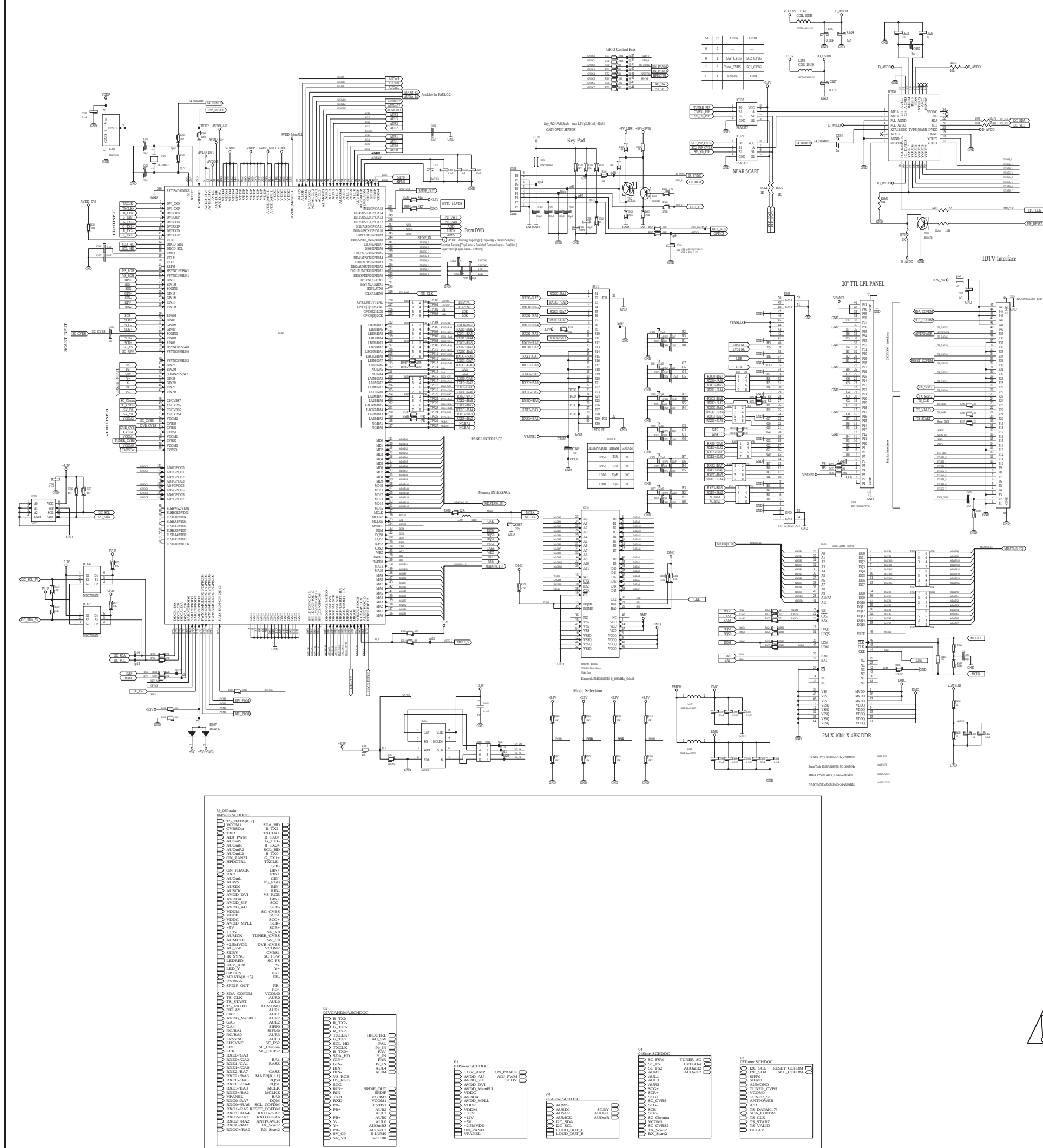
PHYSICAL CHARACTERISTICS	
Product Dimensions mm (WxDxH)	
Box Dimensions mm (WxDxH)	
Loading Quantity (20'-40')	
Weight (Kg) / Gross Weight (Kg)	



l'invertitore e il pannello sono identificati anche dal simbolo di sicurezza e devono essere sostituiti solo con parti originali prodotte e verificate dal produttore.



LX LCD CHASSIS

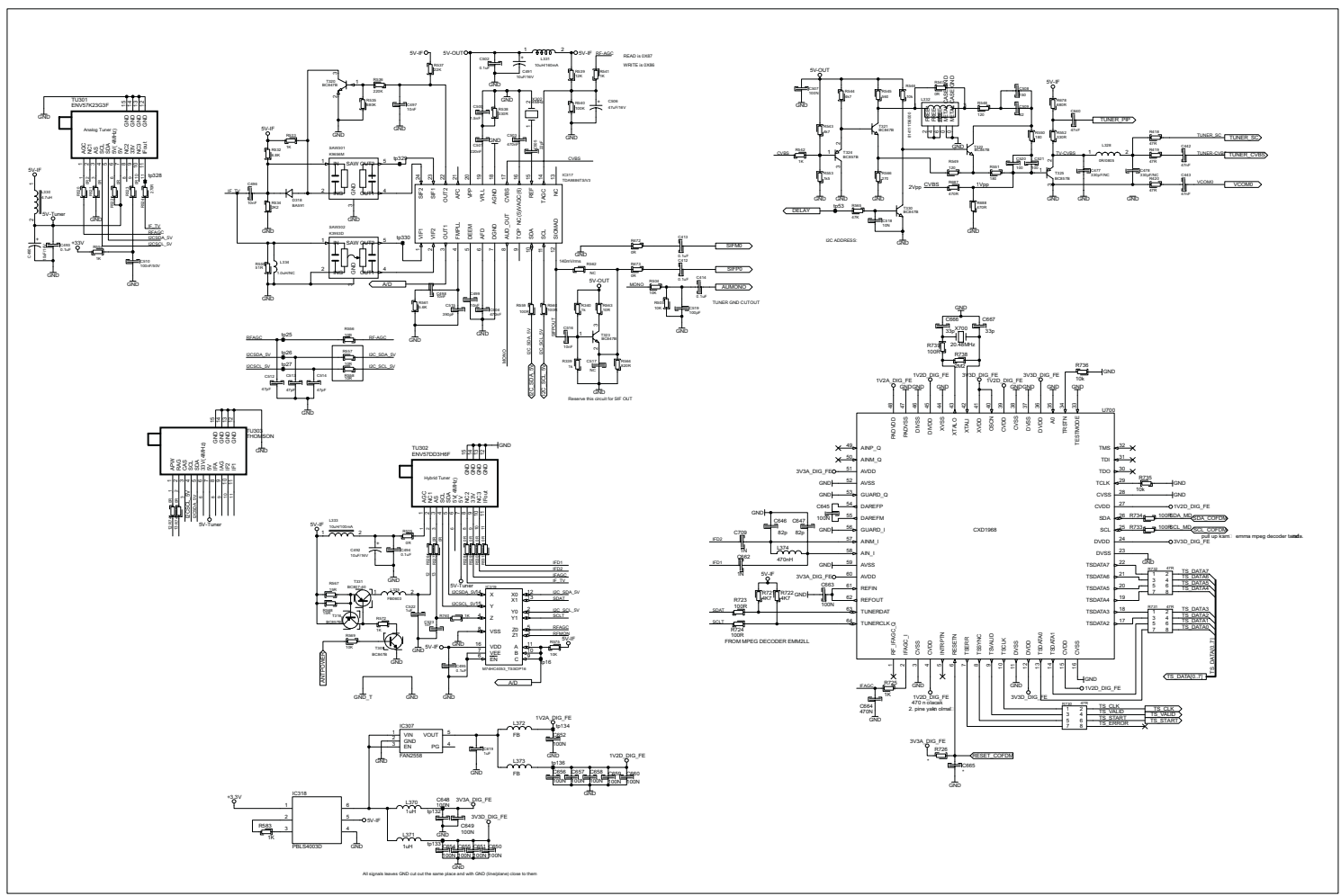
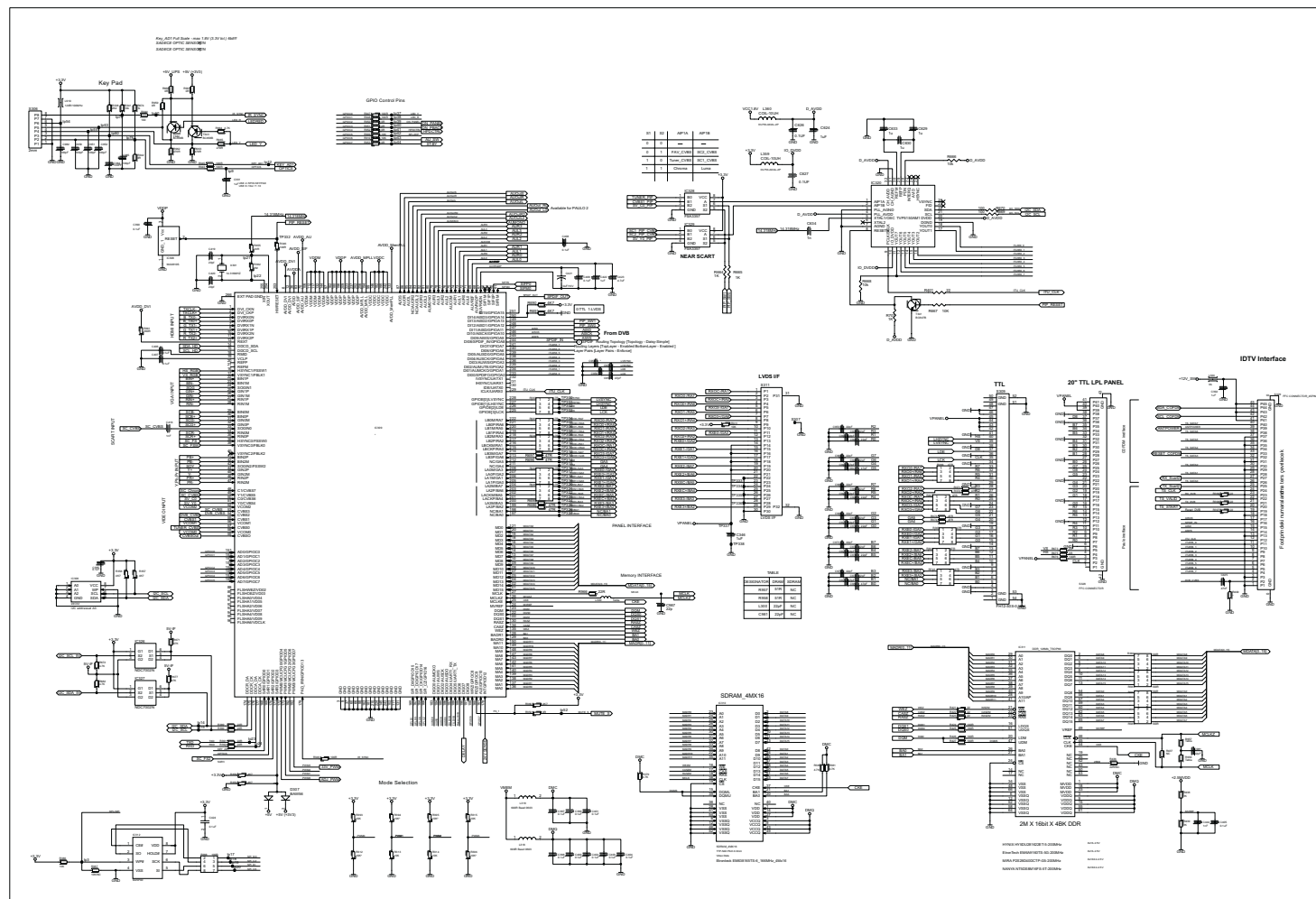
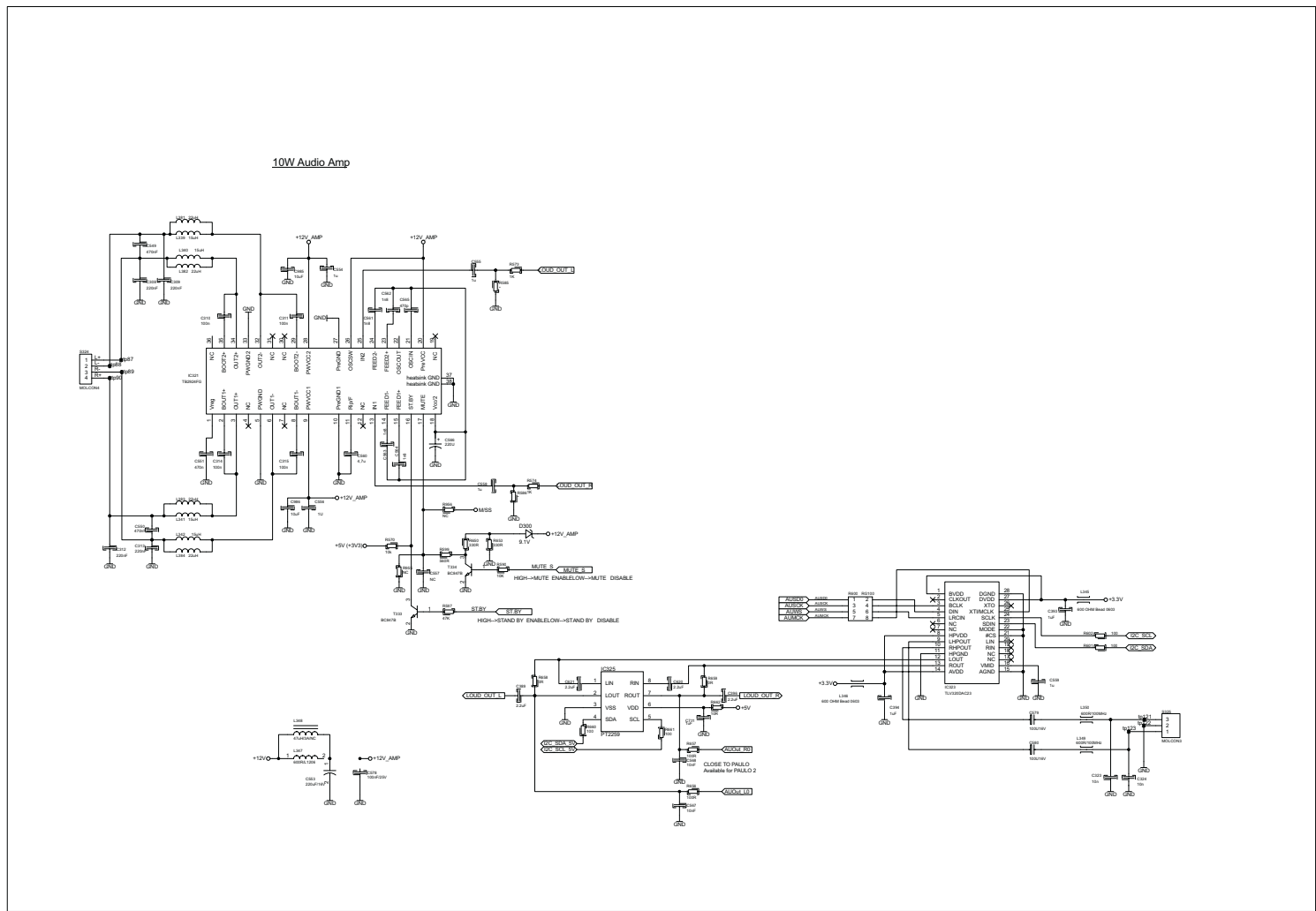
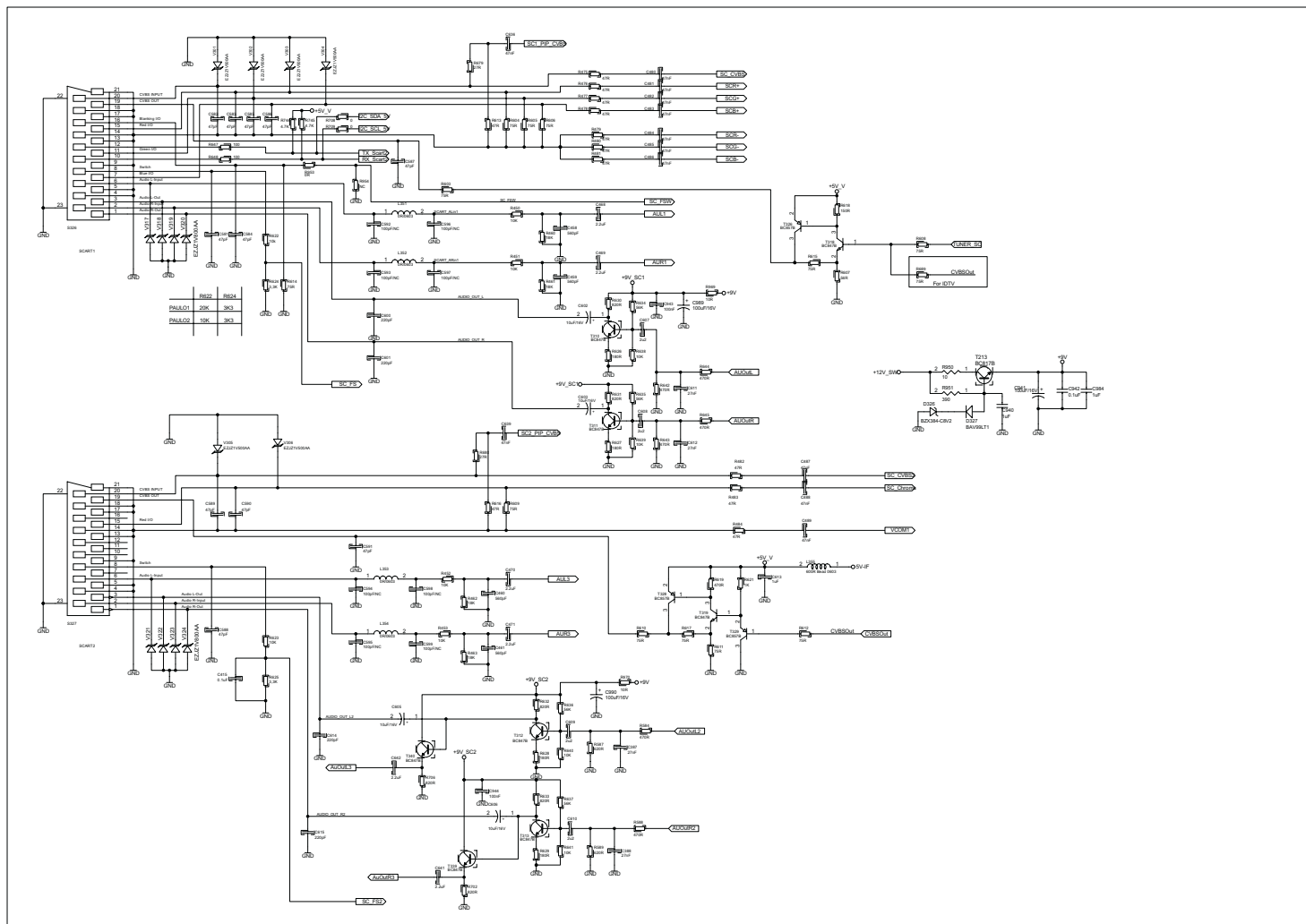


 Components designated by the safety symbol should only be replaced by original parts produced and proofed by the manufacturer.
Sicherheitsbauteile im Sinn der sicherheitsbestimmung. Diese Teile dürfen nur durch Originalteile ersetzt werden.

Contrassegno di sicurezza. I componenti devono, corrispondere a ricambi originali e devono essere montati a regola d'arte.

Note:
Inverter and panel are also designed by the safety symbol and should only be replaced by original parts produced and proofed by manufacturer.

Der Inverter und das Panel sind ebenfalls mit dem Sicherheitssymbol gekennzeichnet und sollten nur durch Originalersatzteile, die vom Hersteller erzeugt und genehmigt wurden, ersetzt werden.



CHASSIS LX	ADJUSTMENT STEPS	DATE : 11 May 2007
		VERSION NO : 1
BEKO PRODUCT	PROCESS	DEFINITION : Main Chassis
	SEQUENCE NO : 1	PAGE : 1
SERVICE MENU ADJUSTMENTS		
SEQUENCE OF ADJUSTMENT AND CHECKING		
SERVICE MENU OPTIONS <u>OPTIONS 0</u> STANDBY Customer : Customer mode ; Factory : Factory mode. TEXT Teletext type : Fast :Fasttext ; Fast_Top :Fasttext and Toplevel Note: Unless customer requests otherwise, set as Fast. TEXT TBL AUTO : Automatically sets TEXT table according to the chosen menu language. Note: This title is set to AUTO, unless customer makes a special request. WEST ; EAST ; CYRILLIC ; GREEK ; ARABIC LANGUAGE Used for setting the Menu language. Group A or Group B. Refer to User manual for language selections PANEL No adjustments necessary. Leave it as the way set in the Software. PLUG PLAY Demo mode. Set as ON after all adjustments and controls are complete. GAMMA No adjustments necessary. Leave it as the way set in the Software. 2D/3D DEINTERLACE Set as 3DDi. HDCP VERIFY In Test ayar process, check "OK" sign by entering with the right arrow. <u>OPTIONS 1</u> BLUEBACK Blueback feature ON :On ; OFF :Off Note: For Grundig set as ON, for other products set according to customer's request. DLC DLC feature ON :On ; OFF :Off Note: Unless customer requests otherwise, set as ON DNR Digital Noise Reduction feature ON :On , OFF :Off Note: Unless customer requests otherwise, set as ON PROTECTION Automatic Panel Protection feature AVAIL :On ; NAVAIL :Off. Note: Unless stated otherwise, set as AVAIL. PANORAMA Panorama feature AVAIL :On ; NAVAIL :Off. Note: Unless stated otherwise, set as AVAIL. REMOTE CONT RC type 44 Key:with 43 keys ; 45 key: with 45 keys. Not: Chose 44Key. KEYPAD Key Pad type 6 BUTTON ; 5 BUTTON Not: Set according to Product property.		
PREPARED BY EMİR TÜMEN	CONTROLLED BY BURAK ASLAN	APPROVED BY CENGİZ ARAT
ISSUE DATE 11 May 2007		

CHASSIS LX	ADJUSTMENT STEPS	DATE : 11 May 2007
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BEKO PRODUCT	PROCESS	DEFINITION : Main Chassis
	SEQUENCE NO : 2	PAGE : 1
SERVICE MENU ADJUSTMENTS		
SEQUENCE OF ADJUSTMENT AND CHECKING		
SERVICE MENU OPTIONS		
<u>OPTIONS 1</u> (continued)		
PAT Picture and Text feature AVAIL :On ; NAVAIL : Off		
Note: Unless stated so; it will be set as AVAIL.		
HOTEL Simple Hotel TV feature AVAIL :On ; NAVAIL : Off		
Not: Unless the customer requests as AVAIL, it will be set as NAVAIL.		
HOTEL VOL Maximum volume for HotelTV. Set as 20.		
TX PAGE SIZE Text Page Size 10 , 250 , 1000		
Not: Unless customer requests otherwise, set as 10.		
<u>OPTIONS 2</u>		
VGA AVAIL :ON ; NAVAIL : OFF (PC input)		
HDMI AVAIL :ON ; NAVAIL : OFF		
TV AVAIL :ON ; NAVAIL : OFF		
AV AVAIL :ON ; NAVAIL : OFF		
SV AVAIL :ON ; NAVAIL : OFF (sVideo input)		
SCART 1 AVAIL :ON ; NAVAIL : OFF		
SCART 2 AVAIL :ON ; NAVAIL : OFF		
YPBPR AVAIL :ON ; NAVAIL : OFF (Component input)		
Note: Above input connections are chosen according to the product properties.		
<u>SOUND OPTIONS</u>		
BG EUROPE : BG Europe ; NEWZ : BG New Zeland.		
AUST : BG Australia; NAVAIL : non-BG.		
DK AVAIL : DK ; NAVAIL : non-DK.		
I AVAIL : I ; NAVAIL : non-I.		
L/L AVAIL : LL' ; NAVAIL : non-LL' .		
Note: Sound system titles are adjusted according to the product property.		
HEADPHONE Headphone feature AVAIL : Feature On ; NAVAIL : Feature Off		
Note: Chosen according to the product property.		
ATS Channel sequencing after AutoProgram search : AVAIL:Active , NAVAIL: Not Active		
Note: For all domestic and all Toshiba-Daewoo-Grundig production set as AVAIL		
For other productions set as NAVAIL unless customer requests otherwise.		
HIDEV High Volume deviation supression adjustment.		
Note: Unless stated otherwise, set as NAVAIL.		
PREPARED BY EMİR TÜMEN	CONTROLLED BY BURAK ASLAN	APPROVED BY CENGİZ ARAT
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BEKO PRODUCT	PROCESS	DEFINITON : Main Chassis
	SEQUENCE NO : 3	PAGE : 1
SERVICE MENU ADJUSTMENTS		
SEQUENCE OF ADJUSTMENT AND CHECKING		
SERVICE MENU OPTIONS		
<u>IF SETTINGS</u>		
AGC VHF 11 AGC UHF 11 AGC LPRIME 12		
Note: It will be automatically adjusted. No changes will be made unless stated to do so.		
VIDEO AGC Set to ON for all productions.		
LOGO User Menu logo choice. OFF ; ARCELIK ; BEKO		
Note: Default setting is OFF and is adjusted to customer's request.		
<u>DIMMING</u>		
Not: It will be automatically adjusted according to the Panel used. No changes will be made unless stated to do so.		
<u>ADJUSTMENTS</u>		
Note: No adjustments will be made in this menu.		
<u>EEPROM EDIT</u>		
Note: No adjustments will be made in this menu.		
Note: "Factory Reset" parameter in this menu is for technical use and will not be changed unless stated to do so.		
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	SEQUENCE NO : 1	PAGE : 1
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SEQUENCE OF ADJUSTMENT AND CHECKING		
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SEQUENCE OF ADJUSTMENT AND CHECKING		
SERVICE MENU OPTIONS		
<u>OPTIONS 1</u> (continued)		
PAT Picture and Text feature AVAIL :On ; NAVAIL : Off		
Note: Unless stated so; it will be set as AVAIL.		
HOTEL Simple Hotel TV feature AVAIL :On ; NAVAIL : Off		
Not: Unless the customer requests as AVAIL, it will be set as NAVAIL.		
HOTEL VOL Maximum volume for HotelTV. Set as 20.		
TX PAGE SIZE Text Page Size 10 , 250 , 1000		
Not: Unless customer requests otherwise, set as 10.		
<u>OPTIONS 2</u>		
VGA AVAIL :ON ; NAVAIL : OFF (PC input)		
HDMI AVAIL :ON ; NAVAIL : OFF		
TV AVAIL :ON ; NAVAIL : OFF		
AV AVAIL :ON ; NAVAIL : OFF		
SV AVAIL :ON ; NAVAIL : OFF (sVideo input)		
SCART 1 AVAIL :ON ; NAVAIL : OFF		
SCART 2 AVAIL :ON ; NAVAIL : OFF		
YPBPR AVAIL :ON ; NAVAIL : OFF (Component input)		
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I AVAIL : I ; NAVAIL : non-I.		
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Note: Chosen according to the product property.		
ATS Channel sequencing after AutoProgram search : AVAIL:Active , NAVAIL: Not Active		
Note: For all domestic and all Toshiba-Daewoo-Grundig production set as AVAIL		
For other productions set as NAVAIL unless customer requests otherwise.		
HIDEV High Volume deviation supression adjustment.		
Note: Unless stated otherwise, set as NAVAIL.		
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SERVICE MENU OPTIONS		
<u>IF SETTINGS</u>		
AGC VHF 11 AGC UHF 11 AGC LPRIME 12		
Note: It will be automatically adjusted. No changes will be made unless stated to do so.		
VIDEO AGC Set to ON for all productions.		
LOGO User Menu logo choice. OFF ; ARCELIK ; BEKO		
Note: Default setting is OFF and is adjusted to customer's request.		
<u>DIMMING</u>		
Not: It will be automatically adjusted according to the Panel used. No changes will be made unless stated to do so.		
<u>ADJUSTMENTS</u>		
Note: No adjustments will be made in this menu.		
<u>EEPROM EDIT</u>		
Note: No adjustments will be made in this menu.		
Note: "Factory Reset" parameter in this menu is for technical use and will not be changed unless stated to do so.		
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LX TEST POINTS' WAVEFORMS

STD_BY SIGNAL

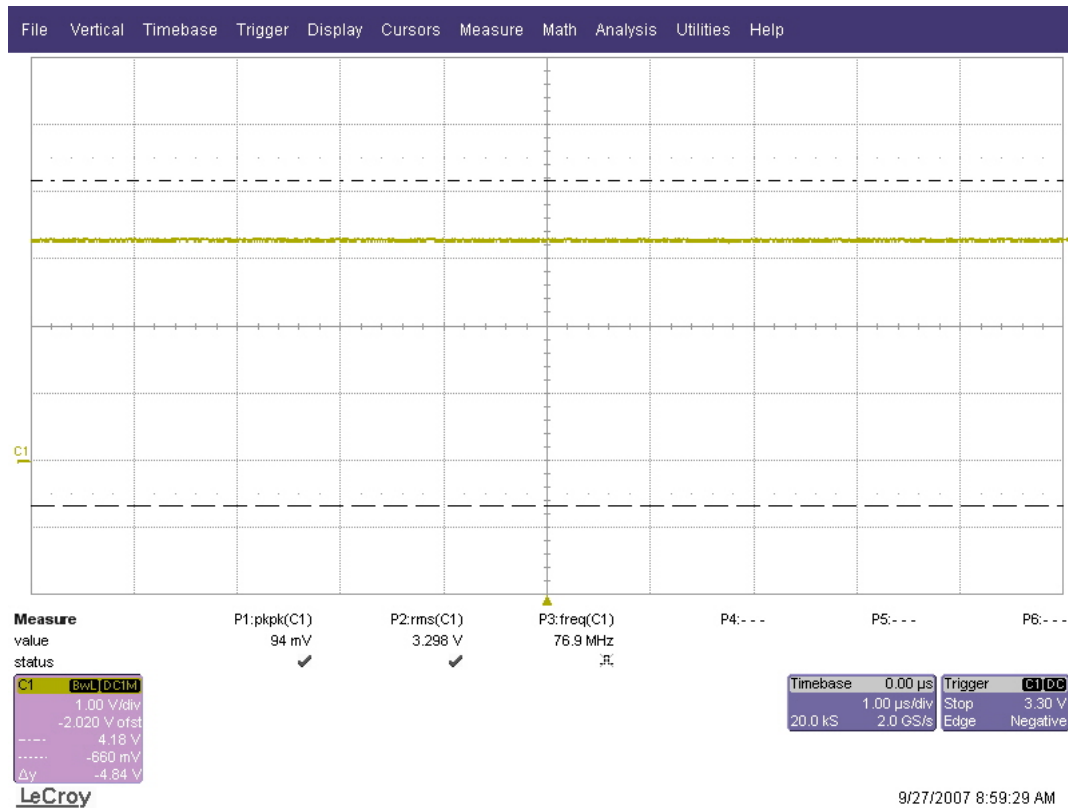


Figure 1 : Signal seen from R353 while TV is at Std-By.

I2C BUS SIGNAL

The signals those main IC communicates with other ICs and peripherals.

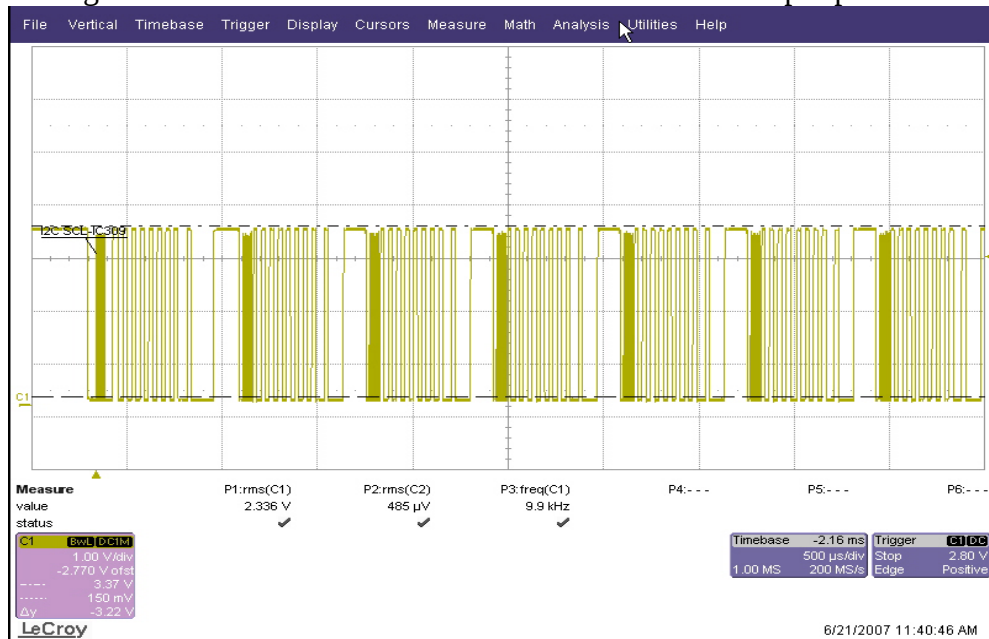


Figure 2 : I2C –SCL signal ,seen from output of main IC309.

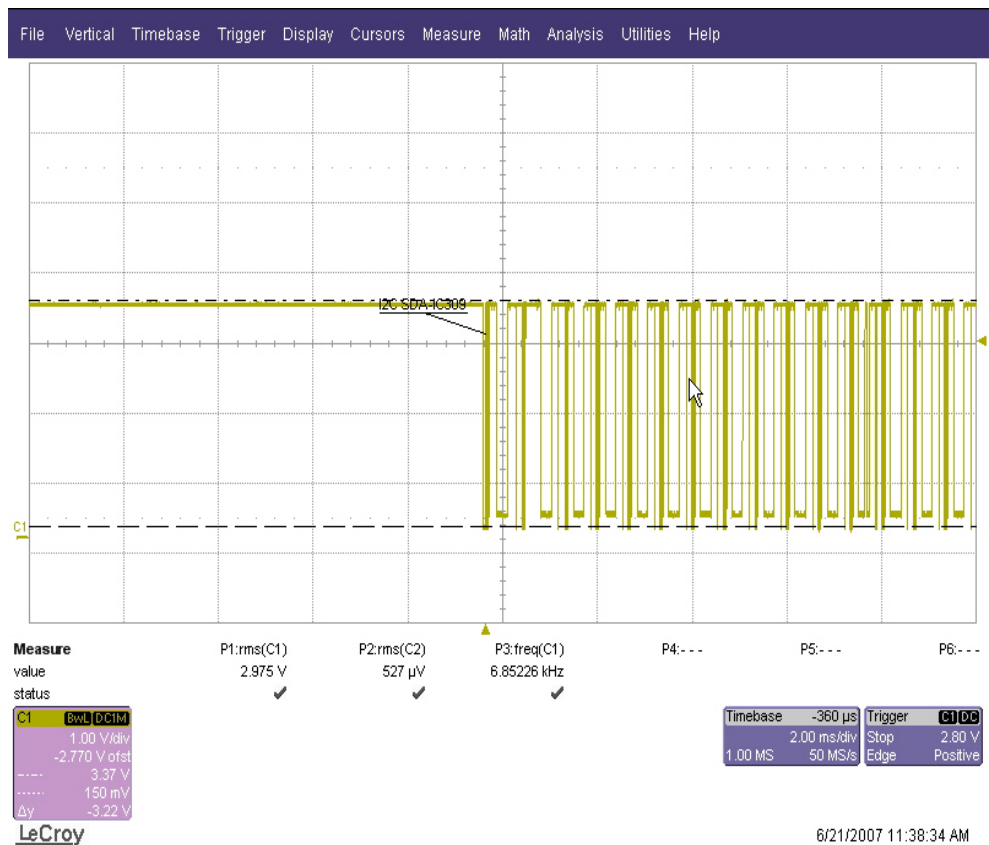


Figure 3 : I2C –SDA signal ,seen from output of main IC309.

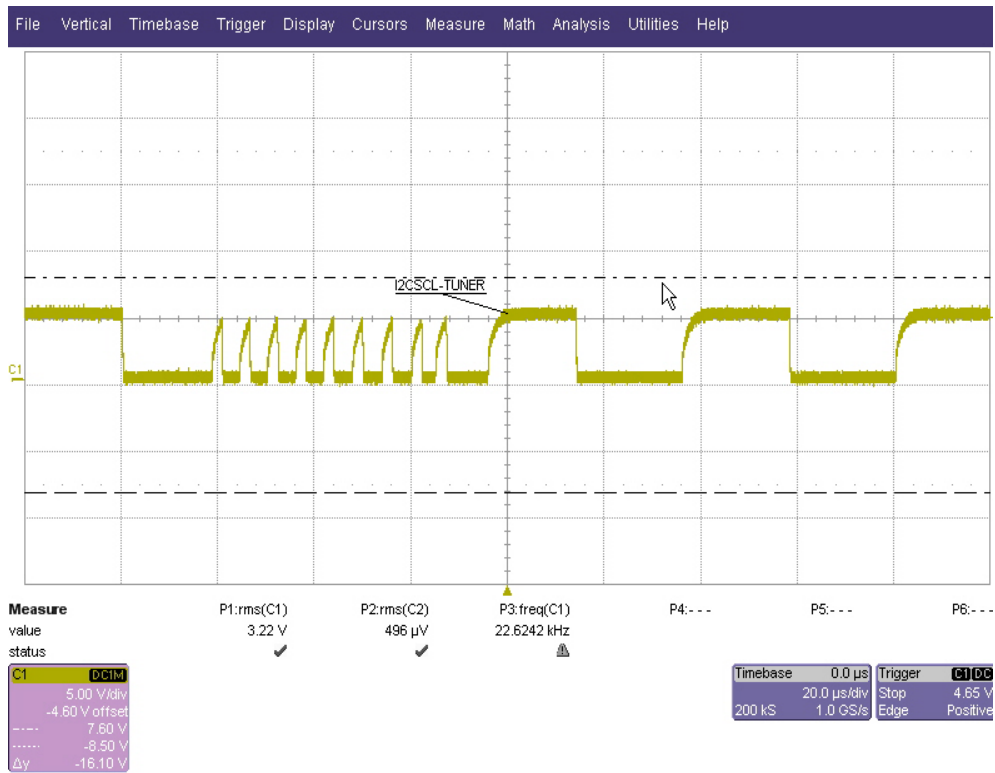


Figure 4 : I2C –SCL signal seen from the input of Tuner.

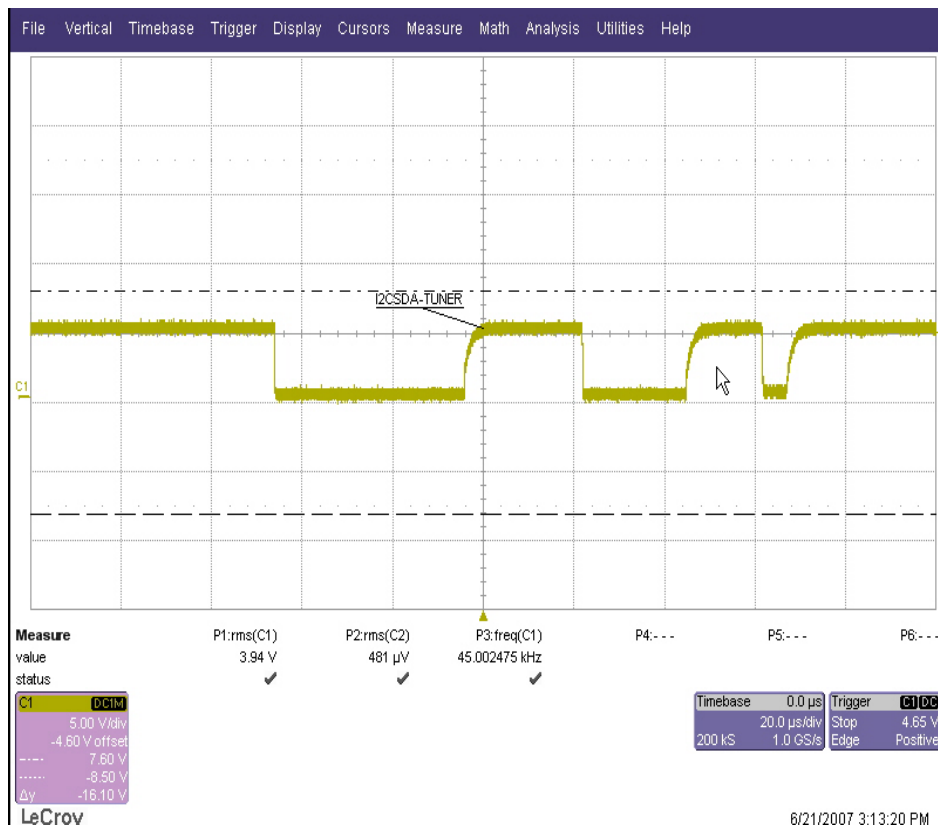


Figure 5 : I2C –SDA signal seen from the input of Tuner.

- IC302

3,3V is obtained from 5V_STD_BY.

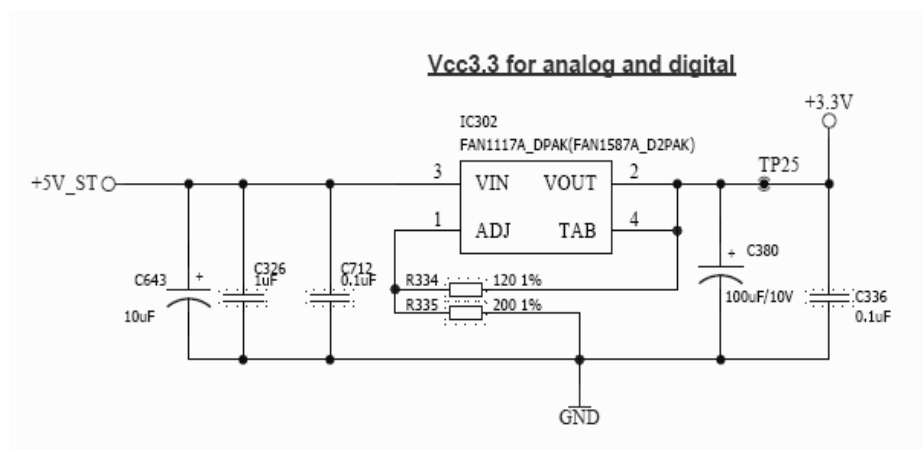
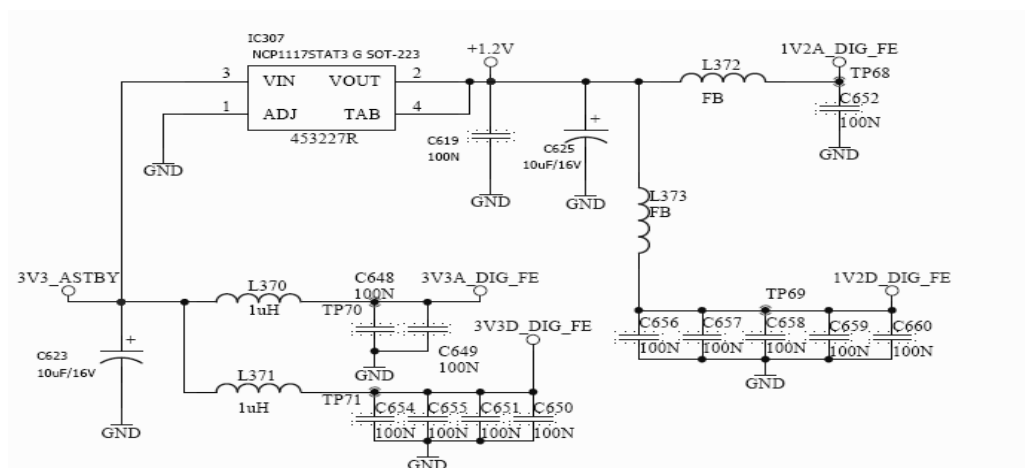




Figure 6 : Input (5V) and output (3,3V) voltages of IC302.

IC307

1,2V is obtained from 3,3V



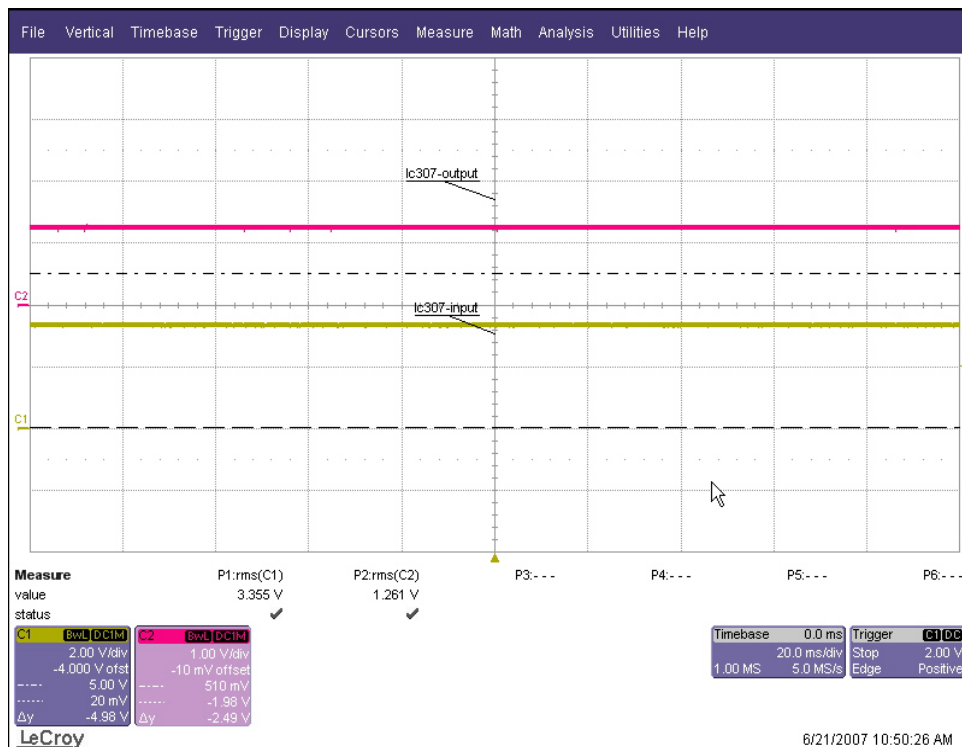


Figure 7 : Input (3,3V) and output (1,2V) voltages of IC307.

X301

It is the crystal of main IC. 14.3 Mhz oscillation signal is seen from the pins of X301 during working condition.

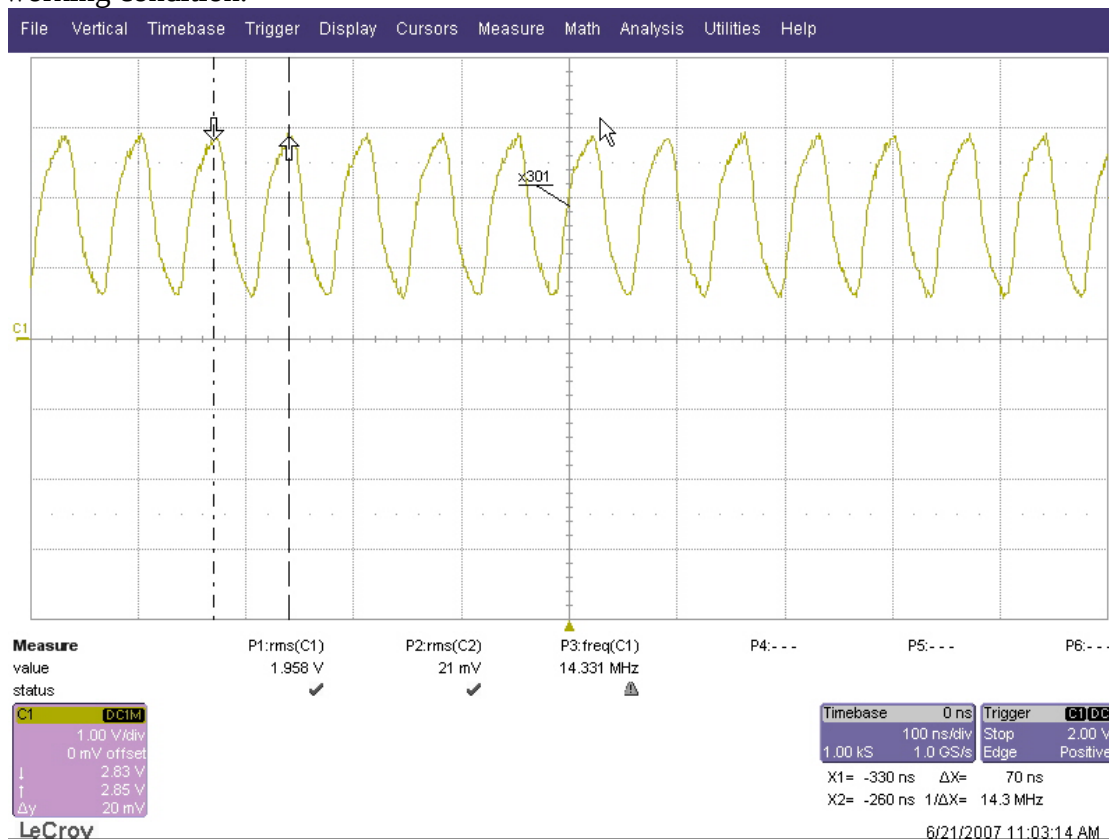


Figure 8 : Oscillation signal of X301.

CVBS (Composite Video Signal)

Video signal which is demodulated from IF. It is seen from Scart pin19 CVBS output of IF stage.

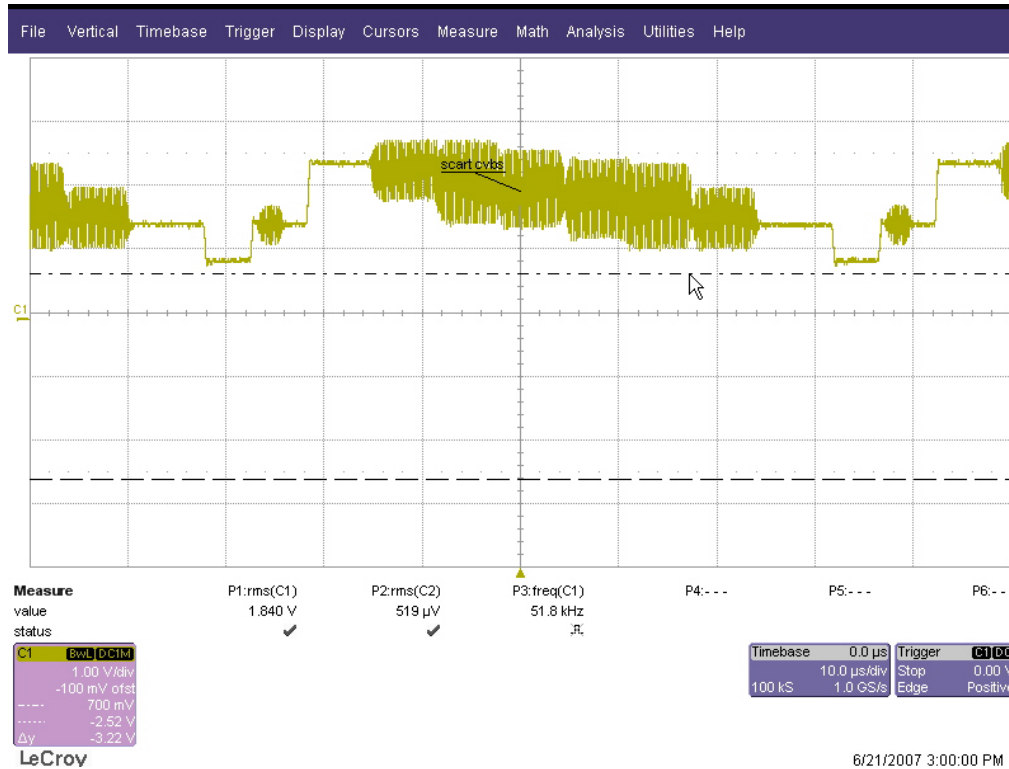


Figure 9 : CVBS signal.

Mute Signal

It is the signal ,seen from Mute_S pin of IC309 when the mute button was pressed. (TP124)

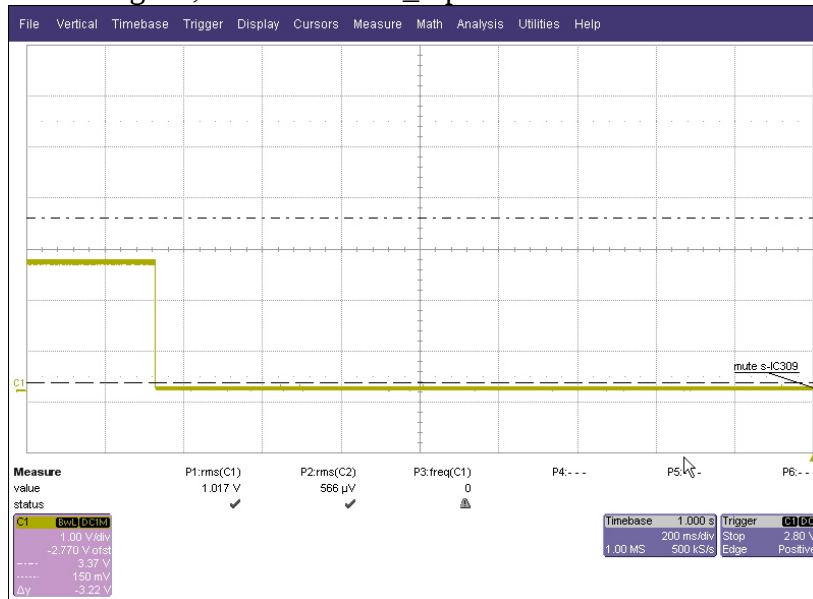


Figure 10 : Mute signal.

Panel_ON signal:

The signal which activates the feeding voltage of panel when TV goes out of Std_By.

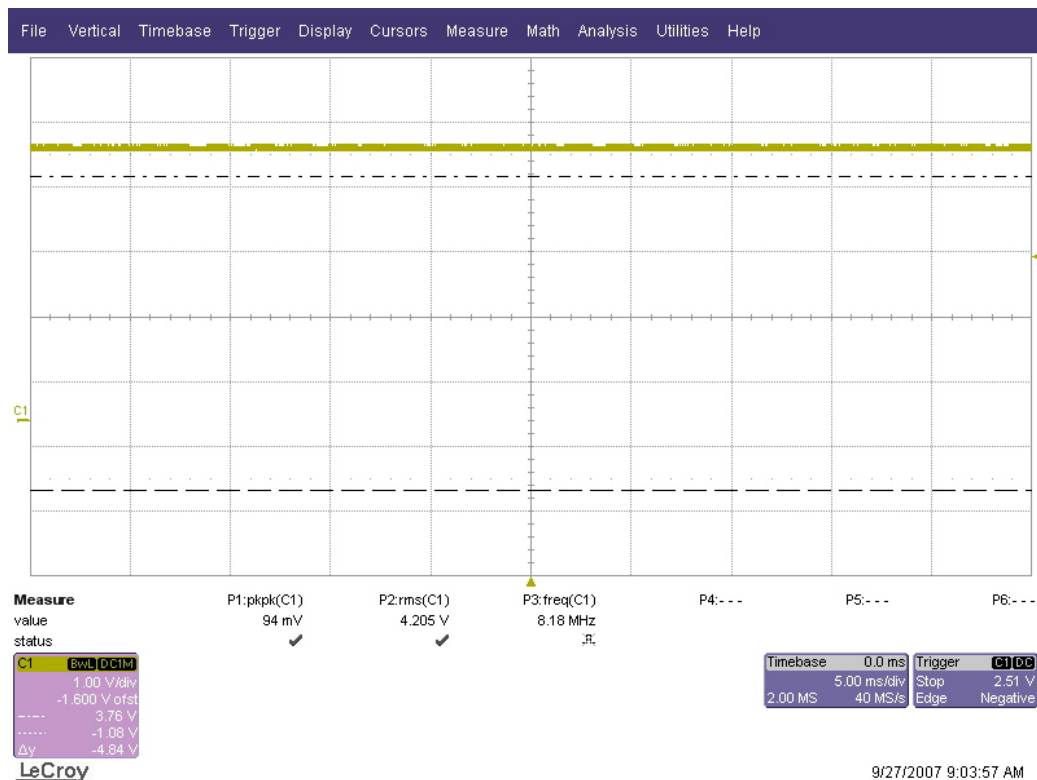


Figure 11 : Panel_ON signal.

IR RC signal :

Coded signals coming from remote controller. RC sends commands to main IC.

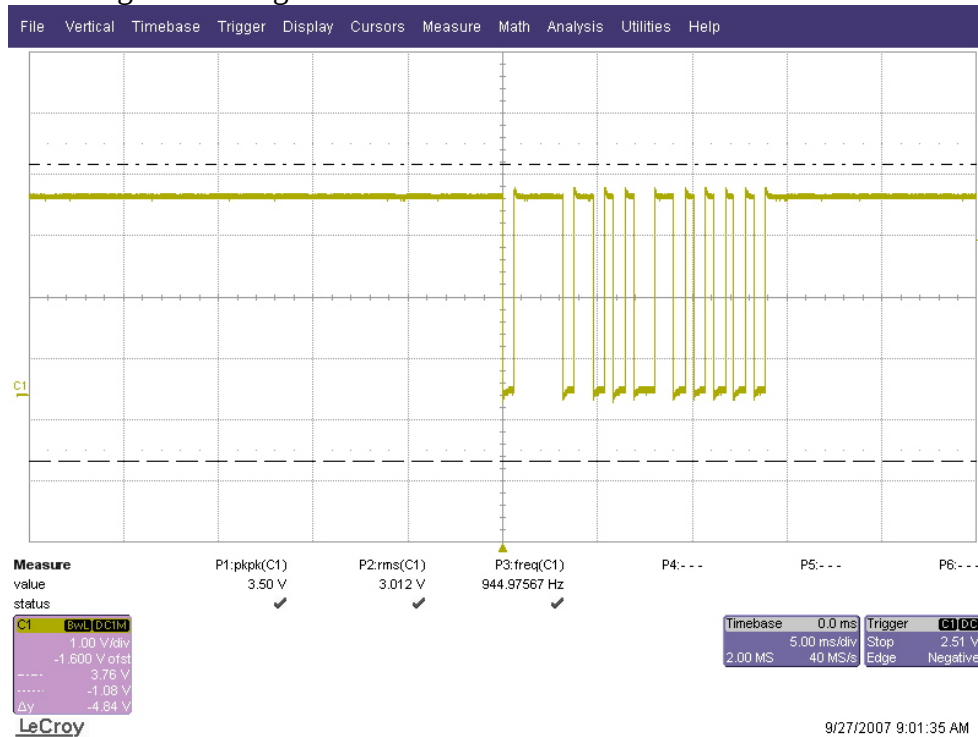
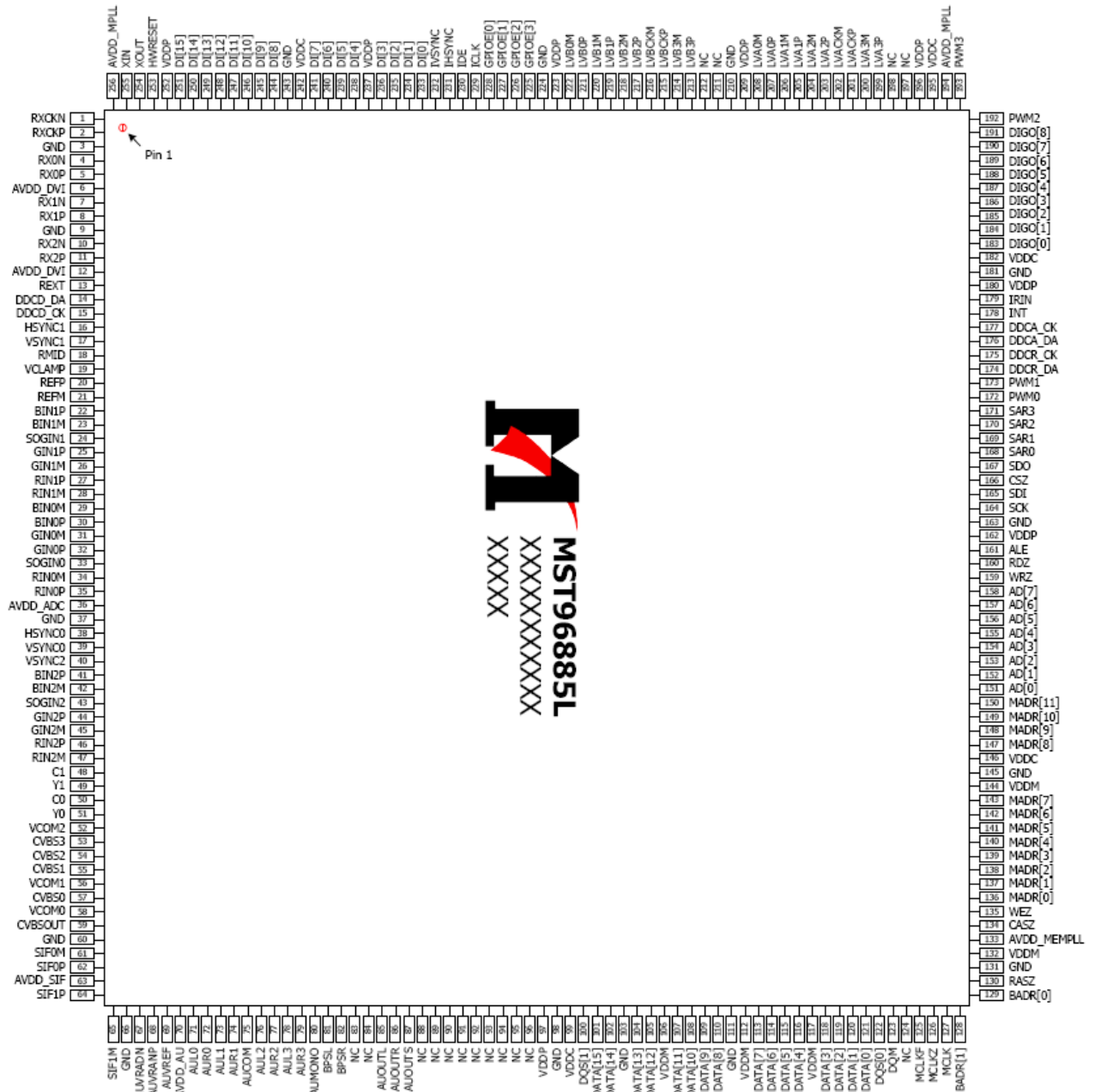


Figure 12 : IR signali (V+ command) .

MAIN IC PIN CONFIGURATION

PIN DIAGRAM (MST96885L)



Note 1: This pin diagram is based LVDS output. For details, please see the Output Type vs. Pin Configuration at the end of Pin Description section.

MAIN IC PIN DESCRIPTION

MCU Interface

Pin Name	Pin Type	Function	Pin
HWRESET	Schmitt Trigger Input w/ 5V-tolerant	Hardware Reset, active high	253
ALE	I/O w/ 5V-tolerant	MCU Bus ALE, active high / General Purpose Input/Output (GPIOC[10])	161
RDZ	I/O w/ 5V-tolerant	MCU Bus RDZ, active low / General Purpose Input/Output (GPIOC[9])	160
WRZ	I/O w/ 5V-tolerant	MCU Bus WDZ, active low / General Purpose Input/Output (GPIOC[8])	159
INT	I/O w/ 5V-tolerant	MCU Bus Interrupt; 4mA driving strength / General Purpose Output (GPIOD[12])	178
AD[7:0]	I/O w/ 5V-tolerant	8051 bus AD[7:0]; 4mA driving strength / External Flash/RAM Data Bus (FLSHD[7:0]) / General Purpose Input/Output (GPIOC[7:0])	158-151

Analog Interface

Pin Name	Pin Type	Function	Pin
RMID		Mid-Scale Voltage Bypass	18
VCLAMP		CVBS/YC Mode Clamp Voltage Bypass	19
REFP		Internal ADC Top De-coupling Pin	20
REFM		Internal ADC Bottom De-coupling Pin	21
REXT	Analog Input	External Resister 390 ohm to AVDD_DVI	13
HSYNC0	Schmitt Trigger Input w/ 5V-tolerant	Analog HSYNC Input from Channel 0 / Function Select Switch Input from Channel 0 (FSSW0)	38
VSYNC0	Schmitt Trigger Input w/ 5V-tolerant	Analog VSYNC Input from Channel 0 / Fast Blanking Input from Channel 0 (FBLK0)	39
BIN0M	Analog Input	Reference Ground for Analog Blue Input from Channel 0	29
BIN0P	Analog Input	Analog Blue Input from Channel 0	30
GIN0M	Analog Input	Reference Ground for Analog Green Input from Channel 0	31
GIN0P	Analog Input	Analog Green Input from Channel 0	32
SOGIN0	Analog Input	Sync On Green Input from Channel 0	33
RIN0M	Analog Input	Reference Ground for Analog Red Input from Channel 0	34
RIN0P	Analog Input	Analog Red Input from Channel 0	35
HSYNC1	Schmitt Trigger Input w/ 5V-tolerant	Analog HSYNC Input from Channel 1 / Function Select Switch Input from Channel 1 (FSSW1)	16

Pin Name	Pin Type	Function	Pin
VSYNC1	Schmitt Trigger Input w/ 5V-tolerant	Analog VSYNC Input from Channel 1 / Fast Blanking Input from Channel 1 (FBLK1)	17
BIN1M	Analog Input	Reference Ground for Analog Blue Input from Channel 1	23
BIN1P	Analog Input	Analog Blue Input from Channel 1	22
SOGIN1	Analog Input	Sync On Green Input from Channel 1	24
GIN1M	Analog Input	Reference Ground for Analog Green Input from Channel 1	26
GIN1P	Analog Input	Analog Green Input from Channel 1	25
RIN1M	Analog Input	Reference Ground for Analog Red Input from Channel 1	28
RIN1P	Analog Input	Analog Red Input from Channel 1	27
BIN2M	Analog Input	Reference Ground for Analog Blue Input from Channel 2	42
BIN2P	Analog Input	Analog Blue Input from Channel 2	41
VSYNC2	Schmitt Trigger Input w/ 5V-tolerant	Analog VSYNC Input from Channel 2 / Fast Blanking Input from Channel 2 (FBLK2)	40
SOGIN2	Analog Input	Sync On Green Input from Channel 2 / Function Select Switch input from Channel 2 (FSSW2)	43
GIN2M	Analog Input	Reference Ground for Analog Green Input from Channel 2	45
GIN2P	Analog Input	Analog Green Input from Channel 2	44
RIN2M	Analog Input	Reference Ground for Analog Red Input from Channel 2	47
RIN2P	Analog Input	Analog Red Input from Channel 2	46

Analog Video Input/Output Interface

Pin Name	Pin Type	Function	Pin
C1	Analog Input	Chroma Video Input 1 / CVBS Input Channel 7 (CVBS7)	48
Y1	Analog Input	Luma Video Input 1 / CVBS Input Channel 5 (CVBS5)	49
C0	Analog Input	Chroma Video Input 0 / CVBS Input Channel 6 (CVBS6)	50
Y0	Analog Input	Luma Video Input 0 / CVBS Input Channel 4 (CVBS4)	51
VCOM2	Analog Input	YC Video Input Reference Ground	52
VCOM1	Analog Input	CVBS1, CVBS2, CVBS3 Video Input Reference Ground	56
VCOM0	Analog Input	CVBS0 Video Input Reference Ground	58
CVBS3	Analog Input	CVBS (Composite) Video Input Channel 3	53
CVBS2	Analog Input	CVBS (Composite) Video Input Channel 2	54
CVBS1	Analog Input	CVBS (Composite) Video Input Channel 1	55
CVBS0	Analog Input	CVBS (Composite) Video Input Channel 0	57
CVBSOUT	Analog Output	CVBS (Composite) Video Output	59

Analog Audio Input/Output Interface

Pin Name	Pin Type	Function	Pin
SIF0M	Analog Input	Reference Ground for SIF Audio Input Channel 0	61
SIF0P	Analog Input	SIF Audio Input Channel 0	62
SIF1P	Analog Input	SIF Audio Input Channel 1	64
SIF1M	Analog Input	Reference Ground for SIF Audio Input Channel 1	65
AUVRADN		Negative Reference Ground for Audio ADC	67
AUVRADP		Positive Reference Voltage for Audio ADC	68
AUVREF		Reference Voltage for Audio Common Mode	69
AUL0	Analog Input	Audio Line Input Left Channel 0	71
AUR0	Analog Input	Audio Line Input Right Channel 0	72
AUL1	Analog Input	Audio Line Input Left Channel 1	73
AUR1	Analog Input	Audio Line Input Right Channel 1	74
AUCOM	Analog Input	Reference Ground for Audio Line Input	75
AUL2	Analog Input	Audio Line Input Left Channel 2	76
AUR2	Analog Input	Audio Line Input Right Channel 2	77
AUL3	Analog Input	Audio Line Input Left Channel 3	78
AUR3	Analog Input	Audio Line Input Right Channel 3	79
AUMONO	Analog Input	Mono Audio Input	80
BPSL	Analog Output	Bypass Audio Output Left Channel	81
BPSR	Analog Output	Bypass Audio Output Right Channel	82
AUOUTL	Analog Output	Main Audio Output Left Channel	85
AUOUTR	Analog Output	Main Audio Output Right Channel	86
AUOUTS	Analog Output	Main Audio Sub-Woofer Channel	87

DVI/HDMI Interface ^{note}

Pin Name	Pin Type	Function	Pin
RX0N	Input	DVI/HDMI Channel 0 Negative Data Input	4
RX0P	Input	DVI/HDMI Channel 0 Positive Data Input	5
RX1N	Input	DVI/HDMI Channel 1 Negative Data Input	7
RX1P	Input	DVI/HDMI Channel 1 Positive Data Input	8
RX2N	Input	DVI/HDMI Channel 2 Negative Data Input	10
RX2P	Input	DVI/HDMI Channel 2 Positive Data Input	11
RXCKN	Input	DVI/HDMI Negative Clock Input	1
RXCKP	Input	DVI/HDMI Positive Clock Input	2

LVDS Interface Note 1

Pin Name	Pin Type	Function	Pin
LVA0M	Output	LVDS A-Link Channel 0 Negative Data Output	208
LVA0P	Output	LVDS A-Link Channel 0 Positive Data Output	207
LVA1M	Output	LVDS A-Link Channel 1 Negative Data Output	206
LVA1P	Output	LVDS A-Link Channel 1 Positive Data Output	205
LVA2M	Output	LVDS A-Link Channel 2 Negative Data Output	204
LVA2P	Output	LVDS A-Link Channel 2 Positive Data Output	203
LVA3M	Output	LVDS A-Link Channel 3 Negative Data Output	200
LVA3P	Output	LVDS A-Link Channel 3 Positive Data Output	199
LVACKM	Output	LVDS A-Link Negative Clock Output	202
LVACKP	Output	LVDS A-Link Positive Clock Output	201
LVB0M	Output	LVDS B-Link Channel 0 Negative Data Output	222
LVB0P	Output	LVDS B-Link Channel 0 Positive Data Output	221
LVB1M	Output	LVDS B-Link Channel 1 Negative Data Output	220
LVB1P	Output	LVDS B-Link Channel 1 Positive Data Output	219
LVB2M	Output	LVDS B-Link Channel 2 Negative Data Output	218
LVB2P	Output	LVDS B-Link Channel 2 Positive Data Output	217
LVB3M	Output	LVDS B-Link Channel 3 Negative Data Output	214
LVB3P	Output	LVDS B-Link Channel 3 Positive Data Output	213
LVBCKM	Output	LVDS B-Link Negative Clock Output	216
LVBCKP	Output	LVDS B-Link Positive Clock Output	215

Note 1: Please see the Output Type vs. Pin Configuration at the end of Pin Description section.

TTL Interface Note 1

Pin Name	Pin Type	Function	Pin
LCK	Output w/ Pull-down Resistor	LCD Output Clock; 6mA driving strength	225
LDE	Output w/ Pull-down Resistor	LCD Data Enable Output; 6mA driving strength	226
LHSYNC	Output w/ Pull-down Resistor	LCD VSYNC; 6mA driving strength	227
LVSYNC	Output w/ Pull-down Resistor	LCD HSYNC; 6mA driving strength	228
RA[7:0]	Output w/ Pull-down Resistor	Port A Red Channel Bit[7:0]; 6mA driving strength	222-215
GA[7:0]	Output w/ Pull-down Resistor	Port A Green Channel Bit[7:0]; 6mA driving strength	214-211, 208-205
BA[7:0]	Output w/ Pull-down Resistor	Port A Blue Channel Bit[7:0]; 6mA driving strength	204-197

Note 1: Please see the Output Type vs. Pin Configuration at the end of Pin Description section.

Serial Flash Interface

Pin Name	Pin Type	Function	Pin
SCK	I/O w/ 5V-tolerant	SPI Flash Serial Clock / General Purpose Input/Output (GPIOD[14])	164
SDI	I/O w/ 5V-tolerant	SPI Flash Serial Data Input (Output Pin) / General Purpose Input/Output (GPIOD[15])	165
CSZ	I/O w/ 5V-tolerant	SPI Flash Chip select / General Purpose Input/Output (GPIOD[16])	166
SDO	I/O w/ 5V-tolerant	SPI Flash Serial Data Output (Input Pin) / General Purpose Input/Output (GPIOD[17])	167

GPIO Interface Note 2

Pin Name	Pin Type	Function	Pin
GPIOE[3:0]	I/O w/ 5V-tolerant	General Purpose Input/Output (GPIOE[3:0])	225-228
SAR3	I/O w/ 5V-Tolerant	SAR Low Speed ADC Input 3 / General Purpose Input/Output (GPIOD[3])	171
SAR2	I/O w/ 5V-Tolerant	SAR Low Speed ADC Input 2 / General Purpose Input/Output (GPIOD[2])	170
SAR1	I/O w/ 5V-Tolerant	SAR Low Speed ADC Input 1 / General Purpose Input/Output (GPIOD[1])	169
SAR0	I/O w/ 5V-Tolerant	SAR Low Speed ADC Input 0 / General Purpose Input/Output (GPIOD[0])	168
PWM3	I/O w/ 5V-Tolerant	Pulse Width Modulation Output 3; 4mA driving strength / General Purpose Output (GPIOD[7])	193
PWM2	I/O w/ 5V-Tolerant	Pulse Width Modulation Output 2; 4mA driving strength / General Purpose Output (GPIOD[6])	192

PWM1	I/O w/ 5V-Tolerant	Pulse Width Modulation Output 1; 4mA driving strength / General Purpose Output (GPIOD[5])	173
PWM0	I/O w/ 5V-Tolerant	Pulse Width Modulation Output 0; 4mA driving strength / General Purpose Output (GPIOD[4])	172
IRIN	I/O w/ 5V-tolerant	IR Receiver Input / General Purpose Output (GPIOD[13])	179
DIGO[8:6]	I/O w/ 5V-tolerant	General Purpose Input/Output (GPIOB[8:6])	191-189
DIGO[5]	I/O w/ 5V-tolerant	General Purpose Input/Output (GPIOB[5]) / Universal Asynchronous Transmitter 1 (UART1_TX)	188
DIGO[4]	I/O w/ 5V-tolerant	General Purpose Input/Output (GPIOB[4]) / Universal Asynchronous Receiver 1 (UART1_RX)	187
DIGO[3]	I/O w/ 5V-tolerant	General Purpose Input/Output (GPIOB[3]) / Programmable as Audio Serial Data Output 0 (AUSD0)	186
DIGO[2]	I/O w/ 5V-tolerant	General Purpose Input/Output (GPIOB[2]) / Programmable as Audio Serial Clock Output (AUSCK)	185
DIGO[1]	I/O w/ 5V-tolerant	General Purpose Input/Output (GPIOB[1]) / Programmable as Word Select Output (AUWS)	184
DIGO[0]	I/O w/ 5V-tolerant	General Purpose Input/Output (GPIOB[0]) / Programmable as Audio Master Clock Output (AUMCKO)	183

Pin Name	Pin Type	Function	Pin
ICLK	I/O w/ 5V-tolerant	Digital Input Clock / Universal Asynchronous Receiver 0 (UART0_RX) / General Purpose Input/Output (GPIOA[24])	229
IDE	I/O w/ 5V-tolerant	Digital Input DE / Universal Asynchronous Transmitter 0 (UART0_TX) / General Purpose Input/Output (GPIOA[25])	230
IHSYNC	I/O w/ 5V-tolerant	Digital Input HSYNC / Universal Asynchronous Receiver 1 (UART1_RX) / General Purpose Input/Output (GPIOA[26])	231
IVSYNC	I/O w/ 5V-tolerant	Digital Input VSYNC / Universal Asynchronous Transmitter 1 (UART1_TX) / General Purpose Input/Output (GPIOA[27])	232
DI[15:0] ^{Note 3}	I/O w/ 5V-tolerant	Video Digital Input Port / Digital Audio Port / General Purpose Input/Output (GPIOA[15:0])	251-244, 241-238, 236-233

Note 2: Please see Pin Configuration vs. Function at the end of Pin Description section.

Note 3: Please see Digital Video Input Format Table at the end of Pin Description section.

DRAM Interface

Pin Name	Pin Type	Function	Pin
MCLKE	Output	DRAM Memory Clock Enable	125
MCLKZ	Output	DRAM Memory Clock Complementary / Output (For Differential Clocks)	126
MCLK	Output	DRAM Memory Clock	127
BADR[1:0]	Output	DRAM Memory Bank Address	128, 129
RASZ	Output	Row Address Strobe, active low	130
CASZ	Output	Column Address Strobe, active low	134
WEZ	Output	Write Enable, active low	135
DQS[1:0]	Output	Data Strobe	100, 122
DQM	Output	Data Mask Byte Enable	123
MADR[11:0]	Output	DRAM Memory Address	150-147, 143-136
MDATA[15:0]	Input/Output	DRAM Memory Data Bus	101, 102, 104, 105, 107-110, 113-116, 118-121

No Connects

Pin Name	Pin Type	Function	Pin
NC		No connect. Leave these pins floating.	83, 84, 88-96, 124, 197, 198, 211, 212

Note 1: This NC pin table is based on TTL output. For details, please see the Output Type vs. Configuration at the end of Pin Description section.

Misc. Interface

Pin Name	Pin Type	Function	Pin
DDCD_DA	I/O w/ 5V-tolerant	HDCP Serial Bus Data / DDC Data of DVI Port	14
DDCD_CK	Input w/ 5V-tolerant	HDCP Serial Bus Clock / DDC Clock of DVI Port	15
DDCA_CK	I/O w/ 5V-tolerant	DDC Clock for Analog port / Universal Asynchronous Receiver 0 (UART0_RX)/ General Purpose Output (GPIOD[11])	177
DDCA_DA	I/O w/ 5V-tolerant	DDC Data for Analog port / Universal Asynchronous Transmitter 0 (UART0_TX) / General Purpose Output (GPIOD[10])	176
DDCR_CK	I/O w/ 5V-tolerant	DDC Clock for ROM / General Purpose Output (GPIOD[9])	175
DDCR_DA	I/O w/ 5V-tolerant	DDC Data for ROM / General Purpose Output (GPIOD[8])	174
XIN	Crystal Oscillator Input	Crystal Oscillator Input	255
XOUT	Crystal Oscillator Output	Crystal Oscillator Output	254

Power Pins

Pin Name	Pin Type	Function	Pin
AVDD_DVI	3.3V Power	DVI/HDMI Power	6, 12
AVDD_ADC	3.3V Power	ADC Power	36
AVDD_SIF	3.3V Power	SIF Power	63
AVDD_AU	3.3V Power	Audio Power	70
AVDD_MEMPLL	3.3V Power	PLL Power	133
AVDD_MPLL	3.3V Power	PLL Power	194, 256
VDDM	3.3V Power	Memory Interface Power	106, 112, 117, 132, 144
VDDP	3.3V Power	Digital Output Power	97, 162, 180, 196, 209, 223, 237, 252
VDDC	1.8V Power	Digital Core Power	99, 146, 182, 195, 242
GND	Ground	Ground	3, 9, 37, 60, 66, 98, 103, 111, 131, 145, 163, 181, 210, 224, 243

Note 1:

Output Type vs. Pin Configuration

Pin #197-228Pin	LVDS	TTL
197	NC	BA[0]
198	NC	BA[1]
199	LVA3P	BA[2]
200	LVA3M	BA[3]
201	LVACKP	BA[4]
202	LVACKM	BA[5]
203	LVA2P	BA[6]
204	LVA2M	BA[7]
115	LVA1P	GA[0]
206	LVA1M	GA[1]
207	LVA0P	GA[2]
208	LVA0M	GA[3]
209	VDDP	VDDP
210	GND	GND
211	NC	GA[4]
212	NC	GA[5]

Pin #197-228Pin	LVDS	TTL
213	LVB3P	GA[6]
214	LVB3M	GA[7]
215	LVBCKP	RA[0]
216	LVBCKM	RA[1]
217	LVB2P	RA[2]
218	LVB2M	RA[3]
219	LVB1P	RA[4]
220	LVB1M	RA[5]
221	LVB0P	RA[6]
222	LVB0M	RA[7]
223	VDDP	VDDP
224	GND	GND
225	GPIOE[3]	LCK
226	GPIOE[2]	LDE
227	GPIOE[1]	LHSYNC
228	GPIOE[0]	LVSYSN

Note 2:

Pin Configuration vs. Function

Pin #	Digital Video Input Data	Digital Audio I/O (AU_SWAP=0)	Digital Audio I/O (AU_SWAP=1)
233	DI[0]	SPDIFO	
234	DI[1]	AUMCKO	
235	DI[2]	AUMUTE	
236	DI[3]	AUWS	
238	DI[4]	AUSCK	
239	DI[5]	AUSD	
240	DI[6]		
241	DI[7]		
244	DI[8]	SPDIFI	SPDIFO
245	DI[9]	AIWS	AUMCKO
246	DI[10]	AISCK	AUMUTE
247	DI[11]	AISD	AUWS
248	DI[12]		AUSCK
249	DI[13]		AUSD
250	DI[14]		
251	DI[15]		

Audio Interface

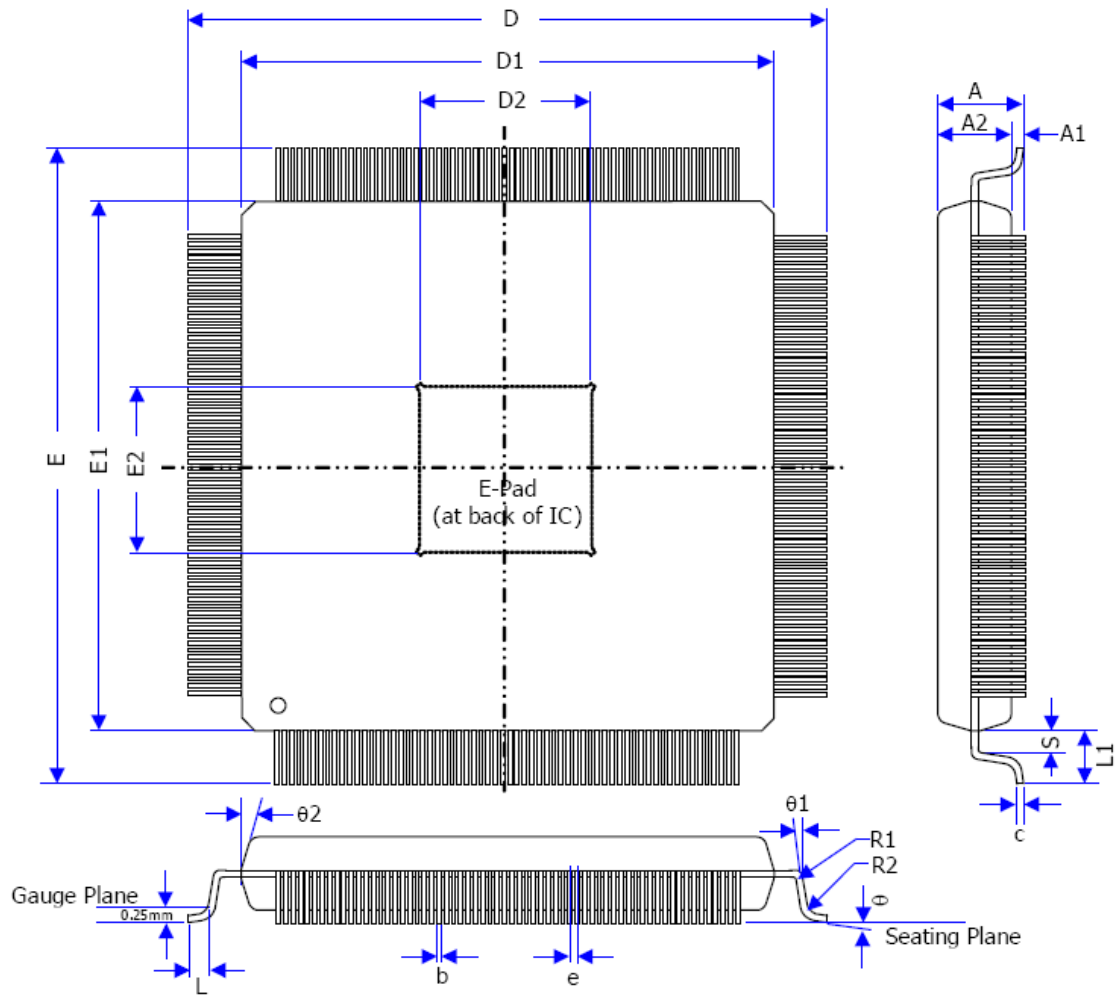
Pin Name	Pin Type	Function
AUSD	Output	Audio Serial Data Output
AUSCK	Output	Audio Serial Clock Output
AUWS	Output	Audio Serial Word Select Output
AUMUTE	Output	Audio Output Mute Control
AUMCKO	Output	Audio Master Clock Output
SPDIFO	Output	Audio S/PDIF Output
AISCK	Input	Audio Serial Clock Input
AIWS	Input	Audio Word Select Input
AISD	Input	Audio Serial Data Input
SPDIFI	Input	Audio S/PDIF Audio Input

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Units
3.3V Supply Voltages	V_{VDD_33}	-0.3		3.6	V
1.8V Supply Voltages	V_{VDD_18}	-0.3		1.98	V
Input Voltage (5V tolerant inputs)	$V_{IN5Vtol}$	-0.3		5.0	V
Input Voltage (non 5V tolerant inputs)	V_{IN}	-0.3		V_{VDD_33}	V
Ambient Operating Temperature	T_A	0		70	°C
Storage Temperature	T_{STG}	-40		150	°C
Junction Temperature	T_J			150	°C
Thermal Resistance (Junction to Air) Natural Conversion	θ_{JA}		TBD		°C/W
Thermal Resistance (Junction to Case) Natural Conversion	θ_{JC}		TBD		°C/W

Note: Stress above those listed under Absolute Maximum Rating may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions outside of those indicated in the operation sections of this specification is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.

MECHANICAL DIMENSIONS



Symbol	Millimeter			Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	-	-	1.6	-	-	0.063
A1	0.05	-	-	0.002	-	-
A2	1.35	1.40	1.45	0.053	0.055	0.057
D	30.00			1.181		
D1	28.00			1.102		
D2	8.50	-	9.05	0.346	-	0.356
E	30.00			1.181		
E1	28.00			1.102		
E2	8.50	-	9.05	0.346	-	0.356

Symbol	Millimeter			Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
θ	0°	-	7°	0°	-	7°
$\theta 1$	0°	-	-	0°	-	-
$\theta 2$	12° Ref			12° Ref		
b	0.11	0.16	0.21	0.004	0.006	0.008
c	0.12	-	0.20	0.005	-	0.008
e	0.40 TYP.			0.0157 TYP.		
L	0.45	0.60	0.75	0.018	0.024	0.030
L1	1.00 Ref			0.039 Ref		
S	0.20	-	-	0.008	-	-

FIRMWARE LOADING PROCEDURE FOR MSTAR CONCEPT**LOADING FIRMWARE
FOR MSTAR CONCEPT****Supported Projects:**

- LX
- LB (LX PRIME)

FIRMWARE LOADING PROCEDURE FOR MSTAR CONCEPT

1. LX Analogue Software loading:

1.1 Hardware Tools:



Picture 1 – Software Loading Tool

As you see in picture1 the debug tool is plugged to the PC via USB port. You have to plug a female-female VGA cable across the USB cable as in picture1. There is a switch on the adopter. You have to set its position closely to the VGA connector.

FIRMWARE LOADING PROCEDURE FOR MSTAR CONCEPT

1.2 Software Tools:

1.2.1 Debug Tool Driver:

First connect the debug tool via the USB cable.

Then you have to install the debug tool's driver. You can find it in "LX Firmware update" folder. Run the Setup.exe and follow the instructions.

1.2.2 ISP In System Programming User Interface

You can copy the "isp" folder to the desktop and you can run the "ISP_Tool v4.3.0.exe" without installing it.

Run ISP_Tool v4.3.0.exe.

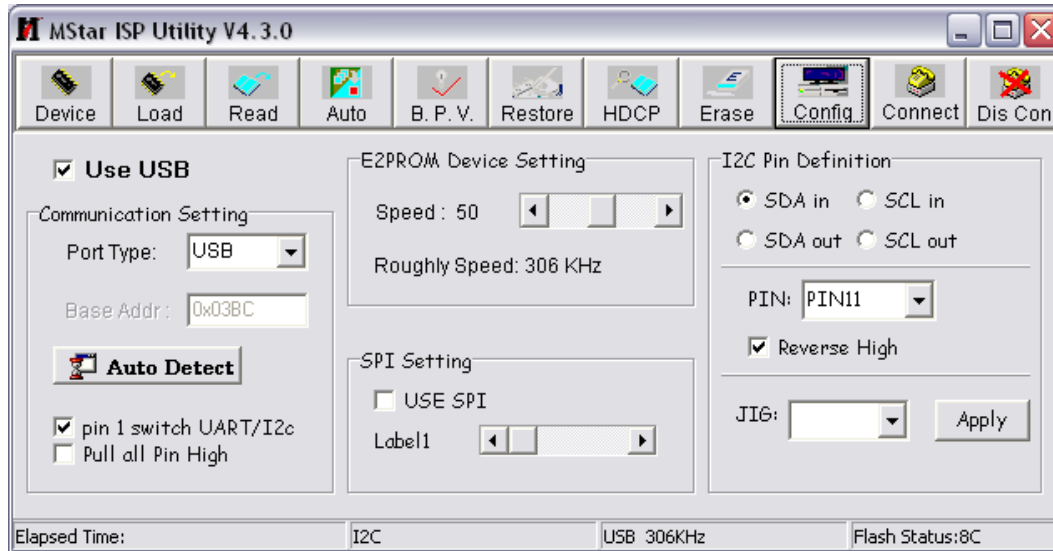


Picture 2 - Mstar ISP Program Main Window

When you run the program you will see the main window as you see in Picture2.

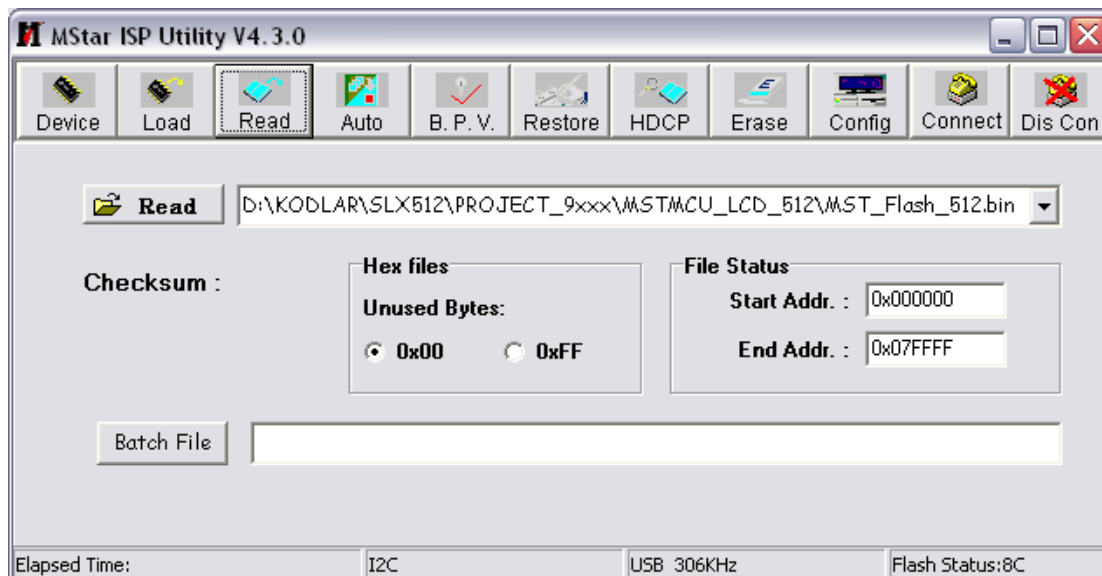
You have to do some adjustments for once if they aren't as in Picture3.

FIRMWARE LOADING PROCEDURE FOR MSTAR CONCEPT



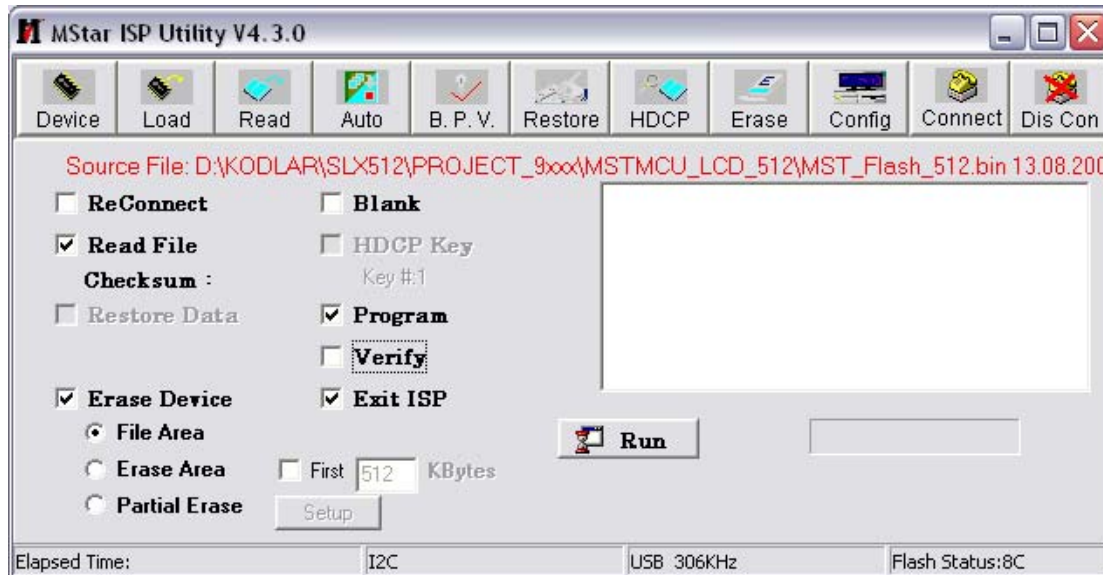
Picture 3 - MSTAR ISP Configuration

Press “READ” button to load the *.bin flash file to the program.



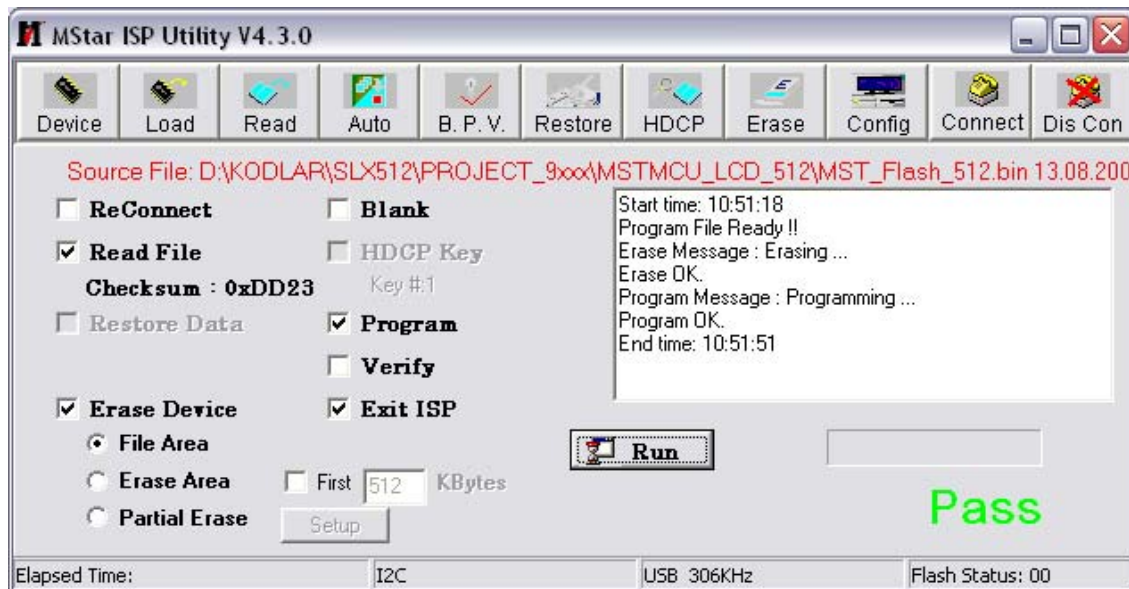
Picture 4 – Select the flash file

After selecting the *.bin file press “AUTO” button.

FIRMWARE LOADING PROCEDURE FOR MSTAR CONCEPT**Picture 5 – Loading The Firmware**

After equaling the settings as you see in picture5 press “Dis Con” then “Connect” buttons simultaneously to make the TV to go in ISP mode. After that, press the “Run” button to start downloading the code to the TV.

If downloading succeeds “Pass” message appears as you can see in picture6.

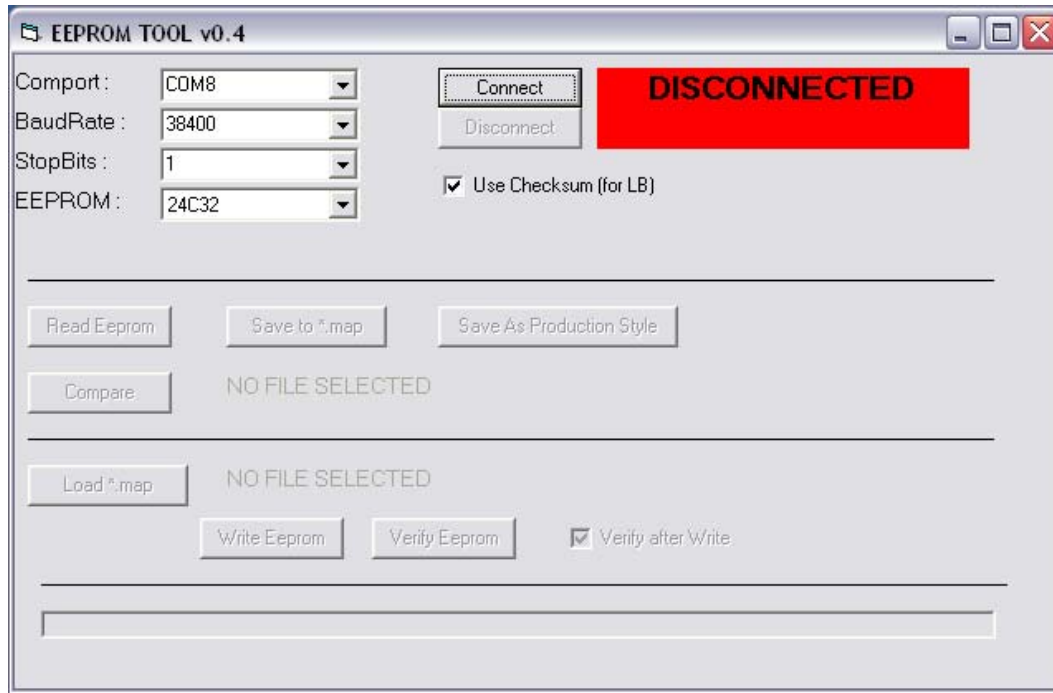
**Picture 6 – Downloading the code succeeded**

After loading the flash *.bin file you have to load an eeprom map to the tv. This file is panel dependent and you have to load the specified eeprom map for the firmware. This map also contains the white balance adjustments for the panel.

FIRMWARE LOADING PROCEDURE FOR MSTAR CONCEPT

1.2.3 Loading The Eeprom Map

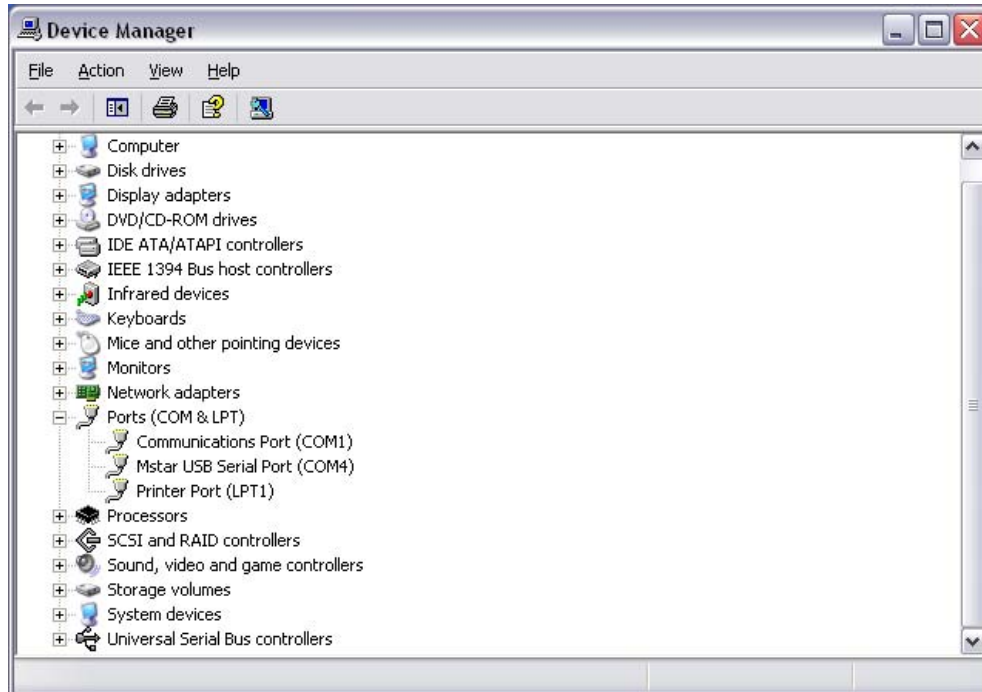
First, you have to install the eeprom map downloader. You can find it in “LX eeprom tool V4” folder. Run the Setup.exe and follow the instructions. After installing it you can find the shortcut in the start menu group. When you run the program you will see a form as in picture7.



Picture 7 - LX Eeprom Tool

You have to know the debug tools COM port to select it in the eeprom tool. You can find that information in Device Manager. You can see it in picture8.

FIRMWARE LOADING PROCEDURE FOR MSTAR CONCEPT

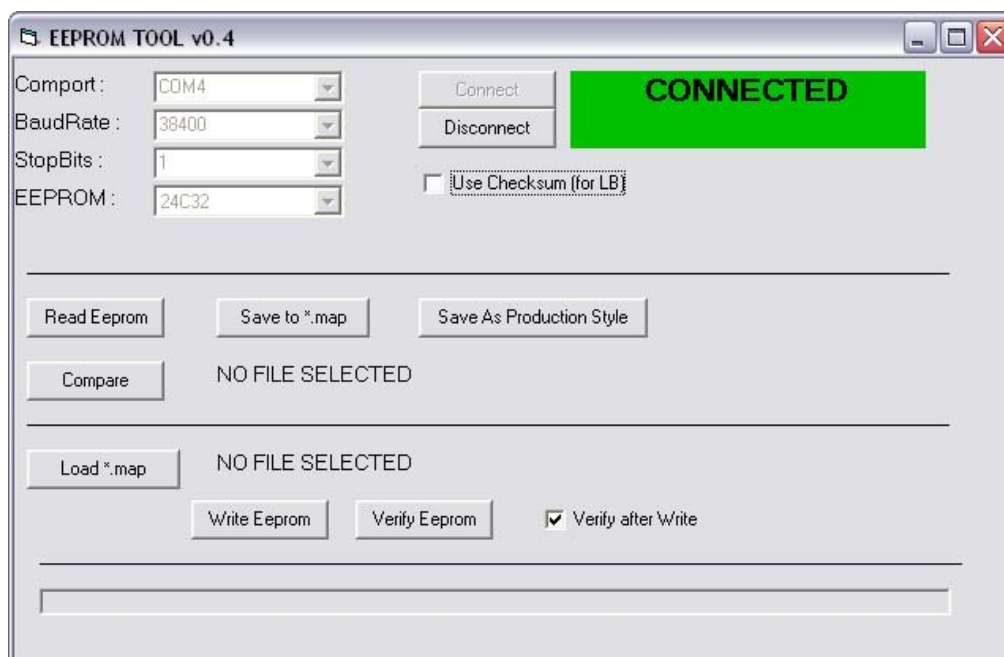


Picture 8 - Mstar Debug tool COM port

After selecting the COM port left Baud Rate, Stop bit, eeprom options as default.

Use checksum option which varies according to the chassis. In LB chassis it must be checked but for LX chassis for now, we do not need that feature but if you see a “Trying to connect” message for a while try to select it and start the procedure again.

If you selected the correct COM port you will see “connected” message in green when you press the connect button as in picture9.



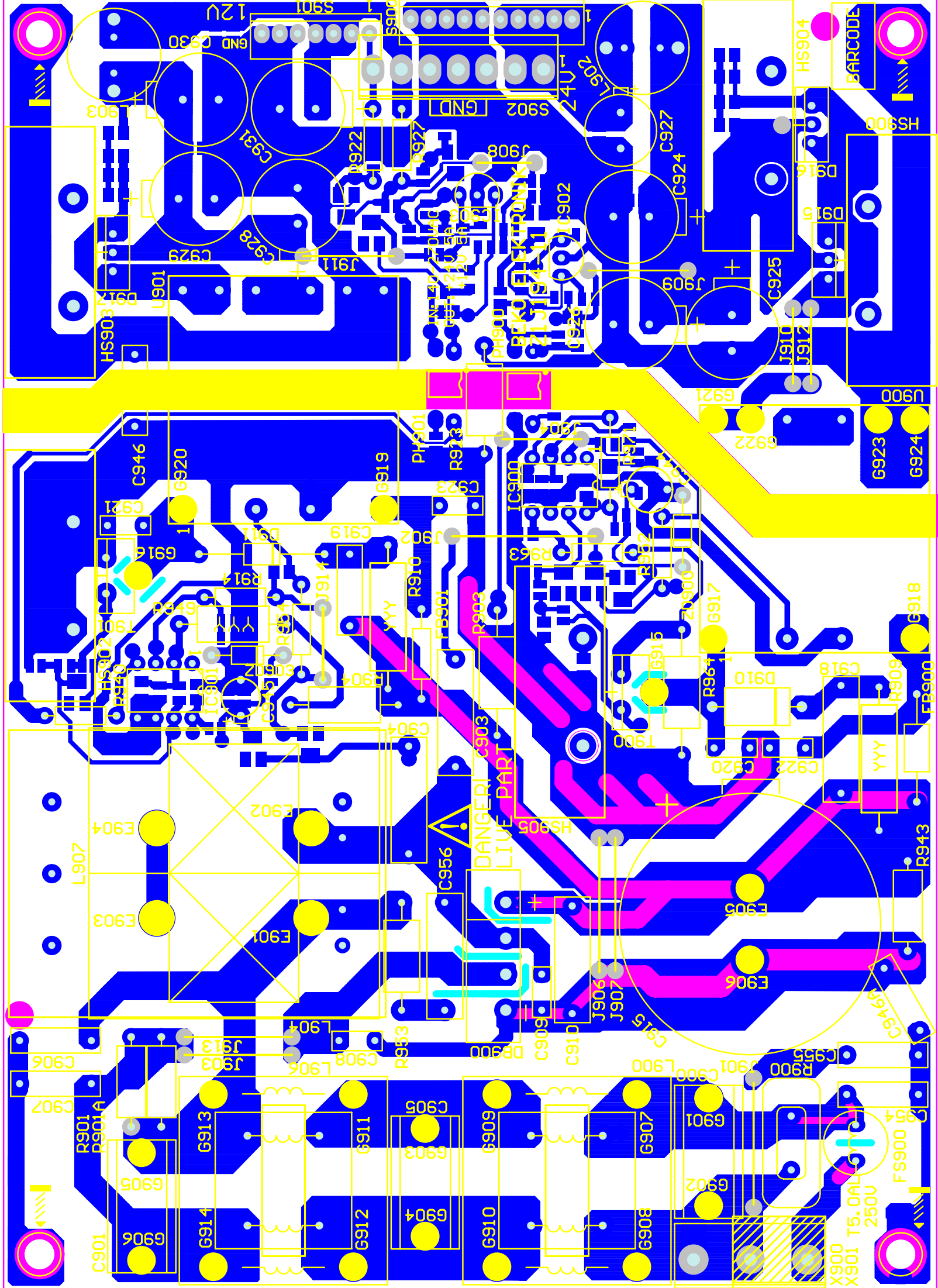
Picture 9 - LX Eeprom Tool Connected

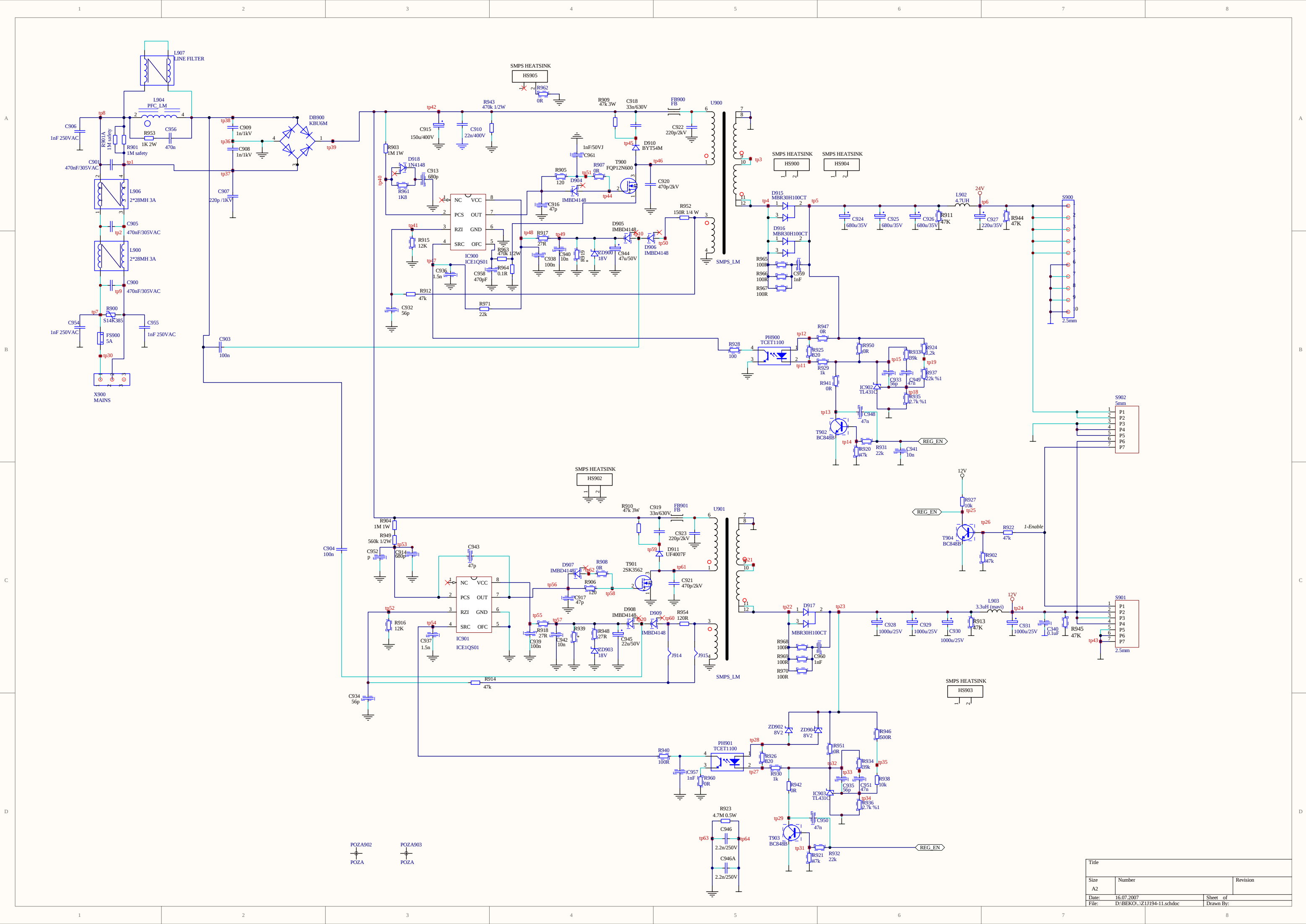
FIRMWARE LOADING PROCEDURE FOR MSTAR CONCEPT

Load the *.map file to the program by pressing “Load Map” button. Then start the downloading process by pressing “Write Eeprom” button. When the process completed a verification routine starts to work. If the written and read datas are the same, you will see “Verify successful” message.

After that close the program and reboot the tv set.

You have to be sure about the service menu settings after loading eeprom maps. Because the factory settings are stored in eeprom.





Title		
Size	Number	Revision
A2		
Date:	16.07.2007	Sheet of
File:	D:\BEKO\ZIJ1194-11.schdoc	Drawn By:

SPECIFICATION TABLE

LX and LX' PRODUCT SPECS (19"W - 42")		BEKO MODELS	
SCALER			
BACK CONNECTIONS			
Antenna (IEC 169-2, Female)		1	
Plug-in tuner		option for analog LX' LCDTV	
Scart		1 full default, 2 optional	
S-video In (DIN)		1 (if no Side AV)	
Video In (RCA)		1 (if no Side AV)	
Audio In (2 RCA)		1 (if no Side AV)	
Video Out (RCA)		NO	
Audio Out (2 RCA)		yes (If YPbPr Audio In is not available) table	
Progressive YPbPr In (3 RCA)		yes (If AV modul (SVHS, CVBS, AUDIOin L/R) is available) - -	
Progressive Audio In (2 RCA)		yes (If AV modul (SVHS, CVBS, AUDIOin L/R) is available)) - -	
DVI		NO	
HDMI 1.2		- -	
PC Audio (L, R)		1	
Subwoofer		NO	
D-Sub 15		D-SUB 15 available.	
SPDIF Coaxial		1 (IF Side/back av modul is available) --	
SPDIF Optic		NO	
RS232		NO	
Headphone		1 (on cabinet)	
FRONT/SIDE CONNECTIONS		Optional - detaily spec table	
S-video In (DIN) (Connector)		1	
Video In (RCA)		1	
Audio In (2 RCA)		1	
Headphone		1	
VIDEO & GRAPHICS IN/OUT			

CVBS In		1 through RCA, 2 through SCART	
RF In		1 through tuner	
Y/C In		1 through SVHS, 1 through SCART2	
RGB+FB In-Video		1 through SCART1	
RGB+HS, VS In - Graphics		1 through DSUB-15	
YPbPr In (Progressive)		1 through 3RCA --	
DVI In		No	
HDMI In		RGB, YPbPr (4:4:4-4:2:2) through HDMI	
CVBS Out		1 through SCART1, 1through SCART2	
RGB, FB Out		No	
HDMI out		No	
AUDIO IN/OUT			
Stereo L, R In		1 through 2RCA 2 through SCARTS	
Stereo L, R Out		1 through 2RCA (or 1 SPDIF RCA), 2through SCARTS - -	
Subwoofer Out		NO	
SPDIF In		No	
SPDIF Out coax		1 - -	
Subwoofer Out		NO	
Subwoofer Output Power		NO	
Audio Output Power		2*5(19"W-20") 2*7 (26"), 2*10 (32"-37"-42")	
Number of speakers		2 (L+R)	
Speaker Placement		Inside the cabinet	
ANALOG FRONT END			
Type		Conventional tuner +IF Demodulator (TDA9886)	
Receiving System			
Input Freq. Range (MHz)		VHF (48,25-463,25MHz) UHF (471,25-855,25MHz)	
Tune down to 45,25MHz Tune up to 863,25MHz		YES	
Input Connector		IEC 169-2, Female	
Aerial Input Impedance		75 Ohm (unbalanced)	
Tuning System		FST	
Tuning Control		PLL	
Channel Bandwidth		6\7\8 MHz Switchable	
VIDEO & GRAPHICS PROCESSING			
ADC (Video)	# of ADCs	5	

	Resolution	10in/10pro/8out	
	Analog BW	27Mhz	
	ADC Clk. Freq.	27Mhz	
Chroma Decoding	Analog\Digitized	Digitized	
	Standart	PAL, SECAM, NTSC	
Comb Filter		2D /3D - -	
LTI, CTI Filters		YES	
Sync On Green (SOG) support on graphics		YES	
De-Interlacer		2D/3D-DI (- -	
Resolution up to...		- -	
PAT		- -	
Gamma Correction		yes	
PIP\PAPI		- -	
OSD		font based	
Saturation		yes	
Tint		yes	
Noise reduction		3D NR	
AUDIO PROCESSING			
Virtual Dolby		option - -	
NICAM		YES	
Subwoofer		NO	
Effect\Spatial		YES	
Dynamic Bass		no	
VBI DATA PROCESSING			
Teletext		YES	
Fast text		optional in service menu	
Top text		optional in service menu	
page		10p /250pg in service menu	
WSS		YES	
VPS\PDC\ICNI		YES	
ATS		optional in service menu	
Closed Caption		NO	
SUPPORTED OUTPUTS FOR DISPLAYS			
Single TTL support	24-bit	YES	
Dual TTL support	48-bit	NO	
Single 10-bit TTL support	30-bit	NO	
Dual 10-bit TTL support	60-bit	NO	
Single LVDS support (8-bit)		YES	
Dual LVDS support (8-bit)		YES	
Timing Control Support		NO	

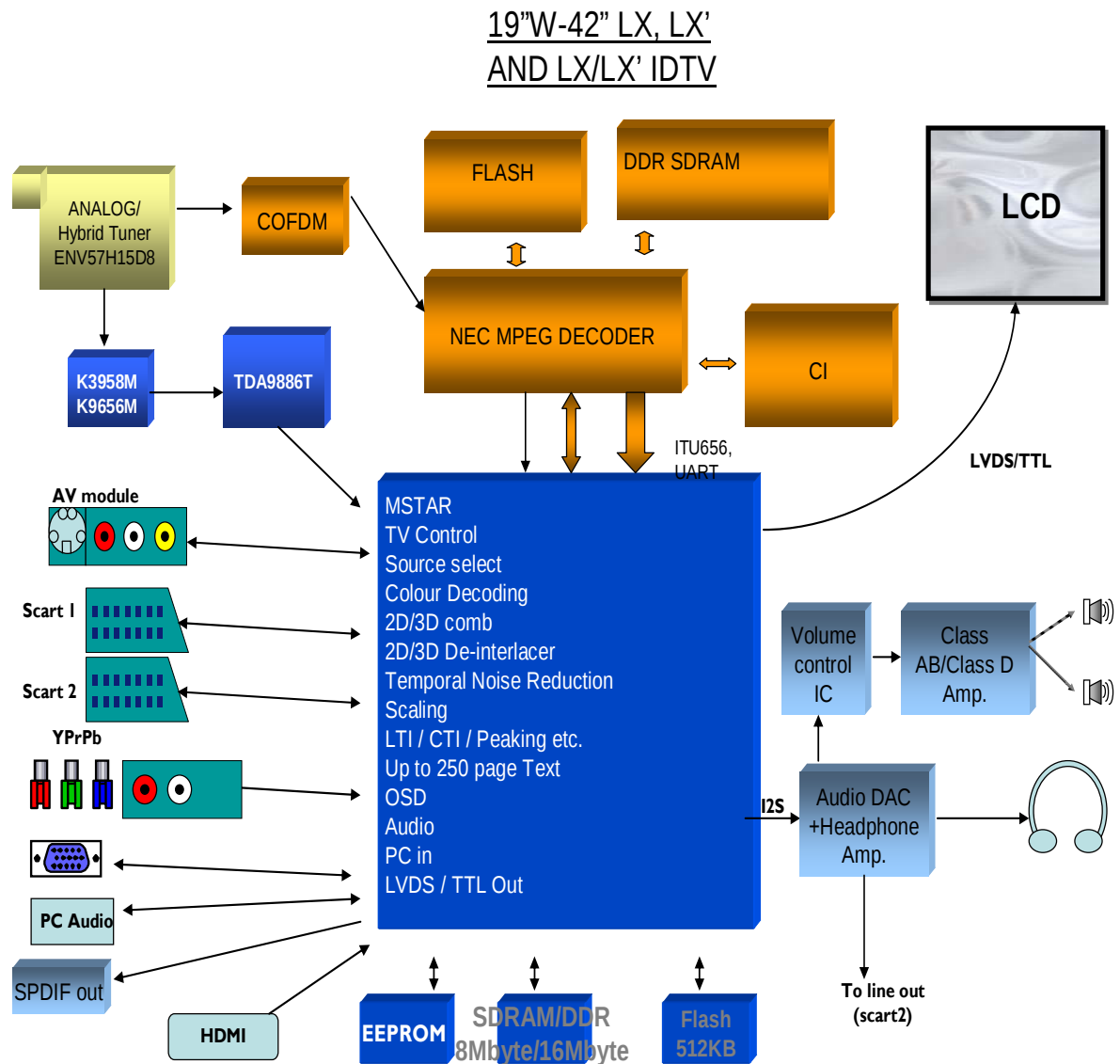
Supported Output		-	
MULTI WINDOW		only in PIP models - -	
Type		1 Tuner	
Content		only AV PIP - detailed PIP table	
Number of Windows		1	
PIP Window Audio Support		no	
PIP Size Change Support		yes	
PIP Position Change Support		yes	
APPLICATIONS			
Menu System		Beko GUI / GRUNDIG OSD	
Remote Control		Beko RC	
Supported Analog Menu Languages		26 languages A/ B GROUP English, Germany, France, Italian, Spanish, Dutch, Greek, Danish, Swedish, Finnish, Norwegian, Turkish, Russian, Croatian, Slovenian, Czech, Bulgarian, Albanian, Hungarian, Romanian, Slovak, Polish, Macedonian, Portuguese, Serbian (A group), Hebrew (A group), Arabic (B group), Persian (B group)	
Picture Formats (Auto, 4:3, 16:9, 14:9, Zoom, LetterBox, Subtitle)		for 4:3 models 16:9, 4:3, 14:9 and Auto , 16:9 models; auto; 16:9, 4:3, 14:9, Letterbox, Subtitle, Panaroma (in service menu, default on)	
WSS (Wide Screen Signalling)		YES	
ATS (Automatic Logical Tuning System)		optional In Service Menu	
Black Line Detection		no	
Manual Search		channel search	
AFC (Auto Frequency Correction)		YES	
Number of Program Storage	Analog	100	
Off Timer for no signal		YES	
Picture Freeze		yes	
Equalizer		YES 5band	
AVL (Automatic Volume Level)		YES	
Optic sensor		no	
Sound Status Memory		YES	
Picture Status Memory		YES	
Zapping/Swap		OPT. In Service Menu Default: Swap	
Child Lock		YES	
panel Lock		yes	
Picture Format Switching		YES	

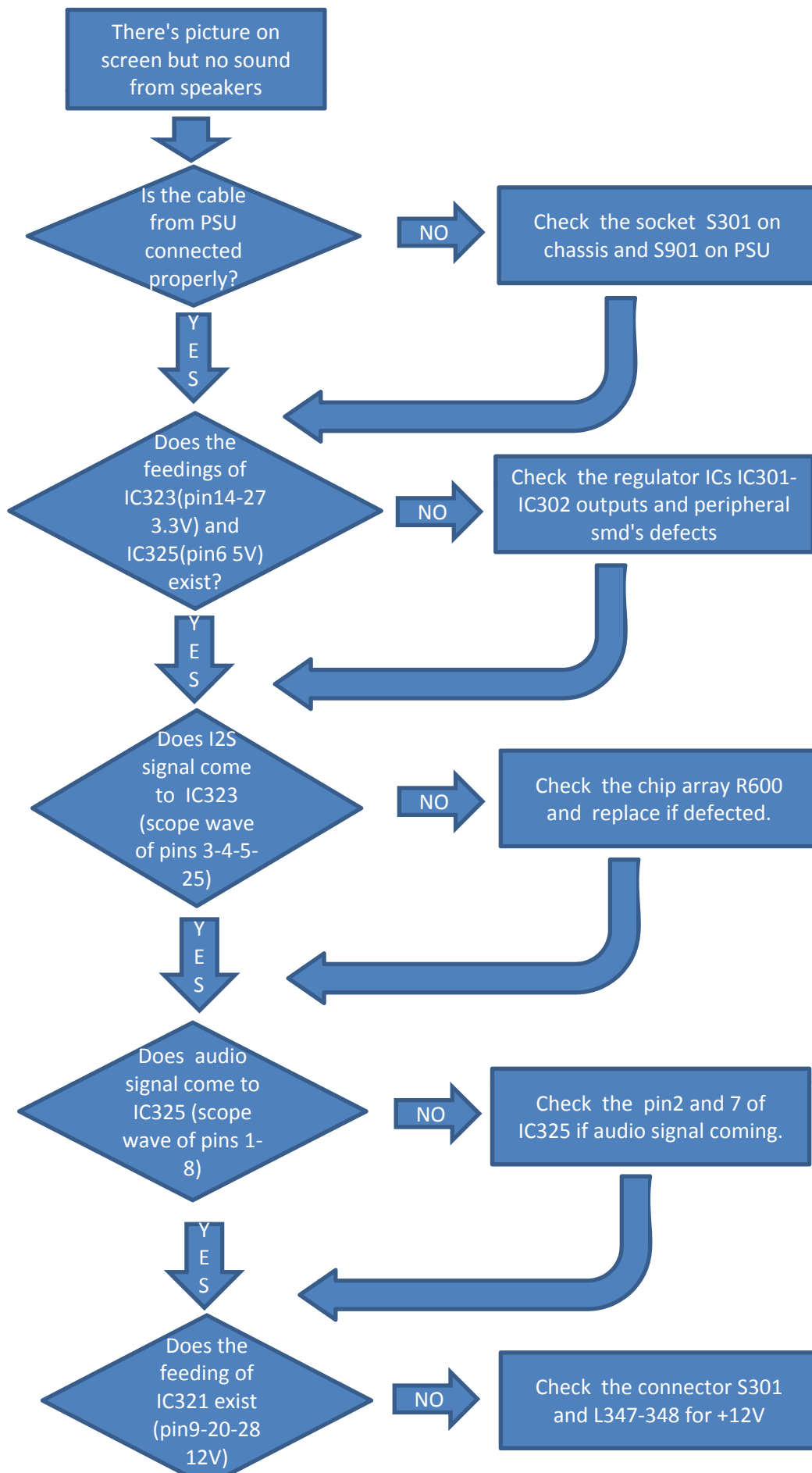
Through Scart 1 and Scart2 (Pin 8)			
Auto RGB Detect Through only Scart1 (Pin 16)		YES	
DDC Support		YES	
Timer	on/off	Yes(on timer; time (hr+min) and program are entered, off timer; time (hr+min) are entered	
Picture Smart Modes		YES -detailed smart mode table	
Sound Smart Modes		YES -detailed smart mode table	
Wake Up in PC	Stby to On in PC mode when last watched is PC	yes	
	Stby to On automatically when PC signal is available	yes	
SW update	from VGA	YES	
POWER SUPPLY			
PSU Type		- -	
Input Range		140V-265V, 50, 60Hz	
Groundless AC Plug		depends on test	
St-By Power Consumption		<2W	
REGULATIONS			
EMC		Yes see; international standarts 5.2	
SAFETY		Yes see; international standarts 5.2	
CABINET			
Keyboard	tact switch	Yes (some first mp cabinest will have on/off switch until tact switch is ready)	
	Volume Up	YES	
	Volume Down	YES	
	Program Up	YES	
	Program Down	YES	
	Menu	YES	
	Source	YES (depends on cabinet)	
led	Single Color /Double Intensity	Yes Red ; standby Weak Red; TV on	
led	multicolour	Yes LX' PVR Yellow; on timer Red ; standby Weak Red; TV on Green ; record	
Simple Hotel Mode		Yes see; detailed hotel mode spec	
Thief Proof Code		no	

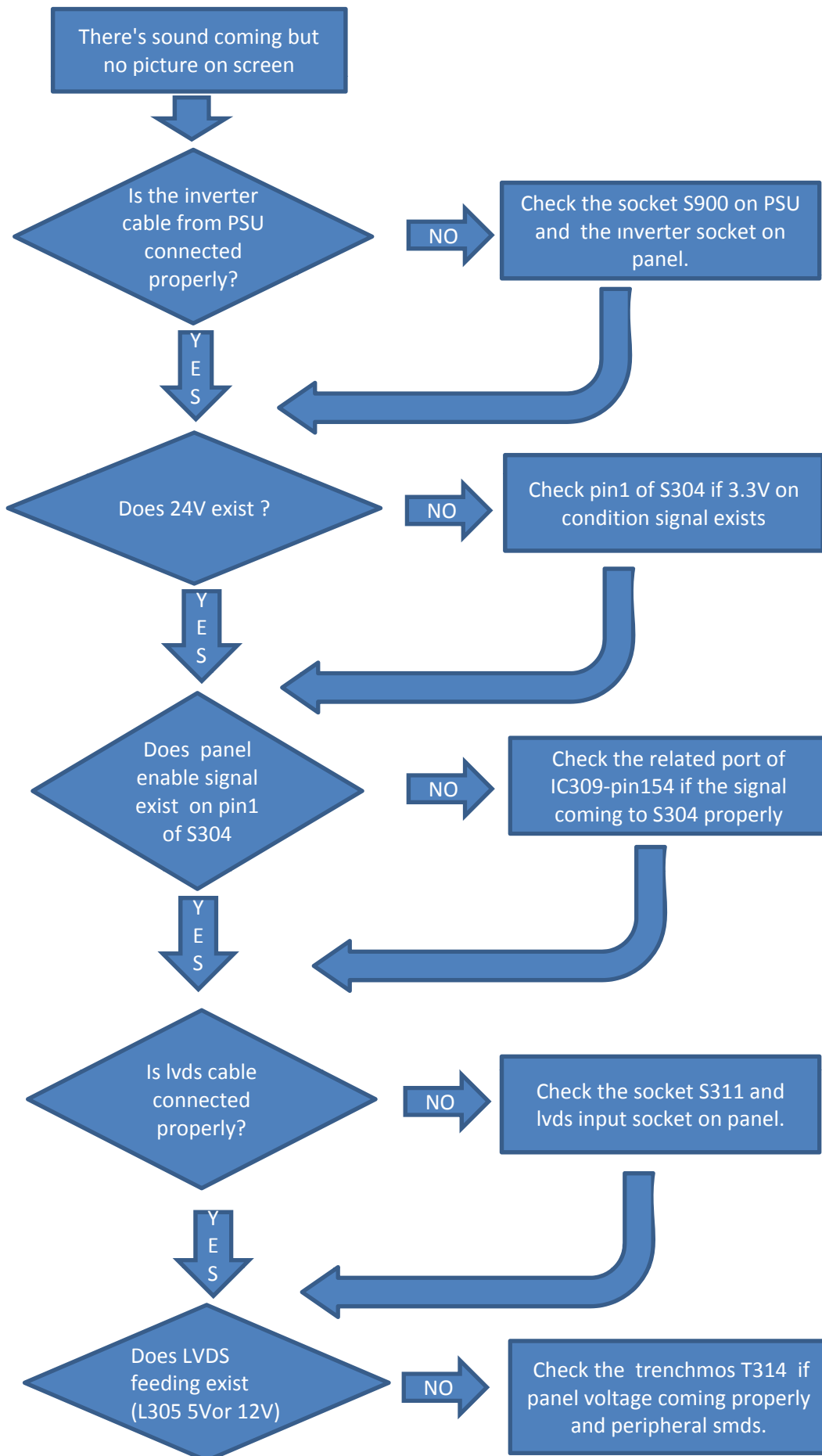
19"W-42" LX and BASIC IDTV HARDWARE BLOCK SCHEMATICS

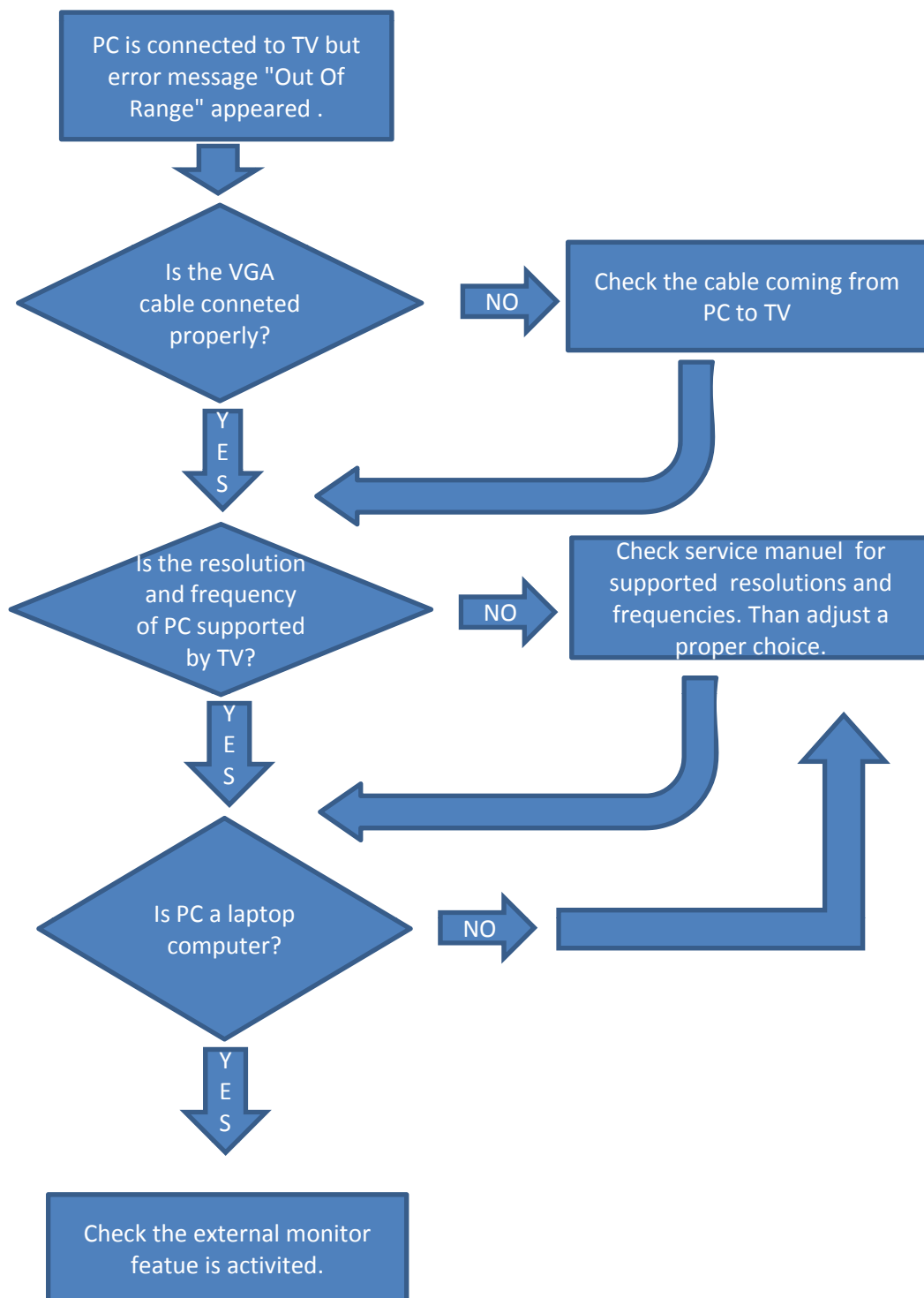
Orange : IDTV modules

Others : Analog LCDTV chassis









[illegible]

