AKAI

COLOUR TV SET

Models:
LTA-15E302
LTA-20E302
LTA-20E303

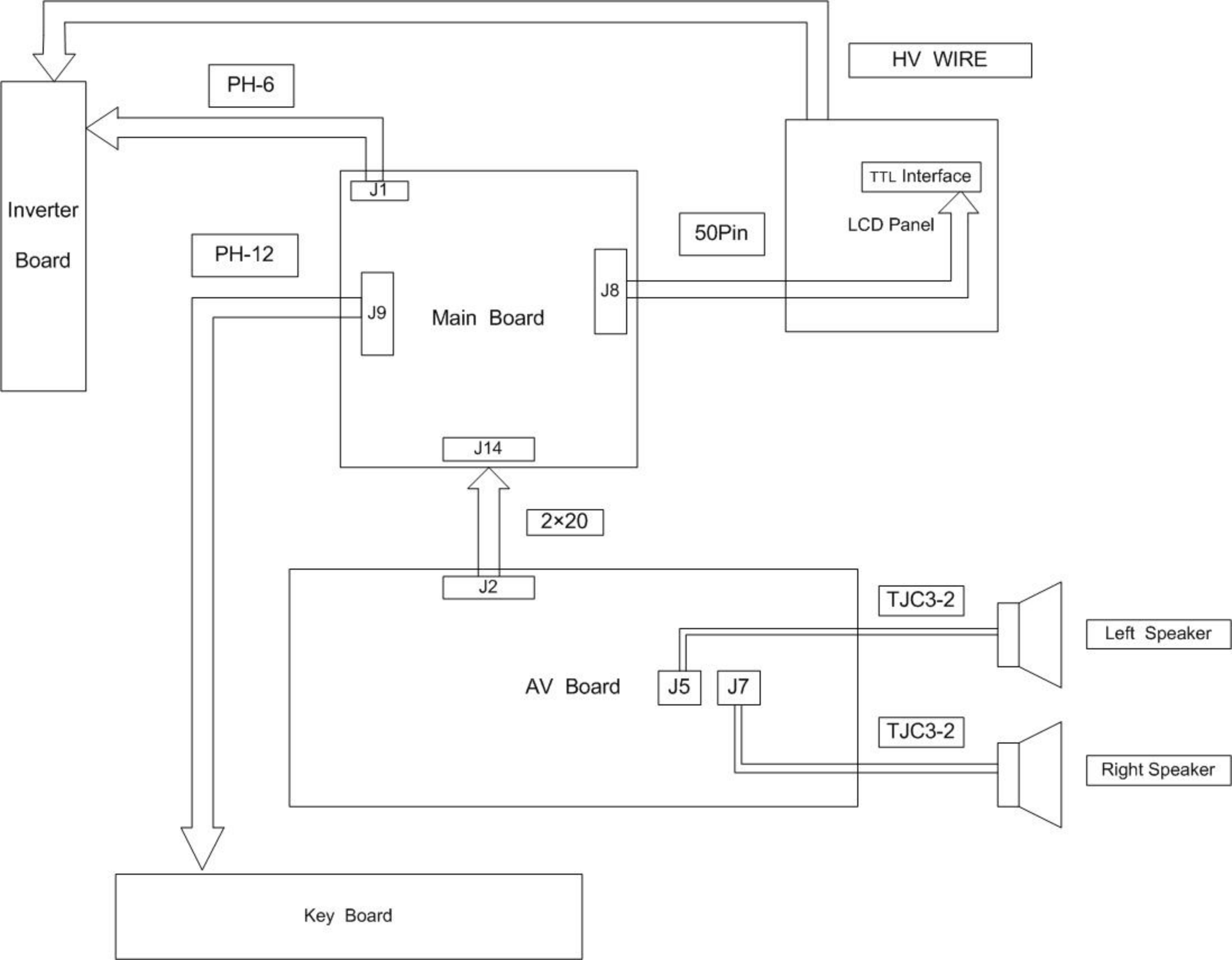
SERVICE MANUAL

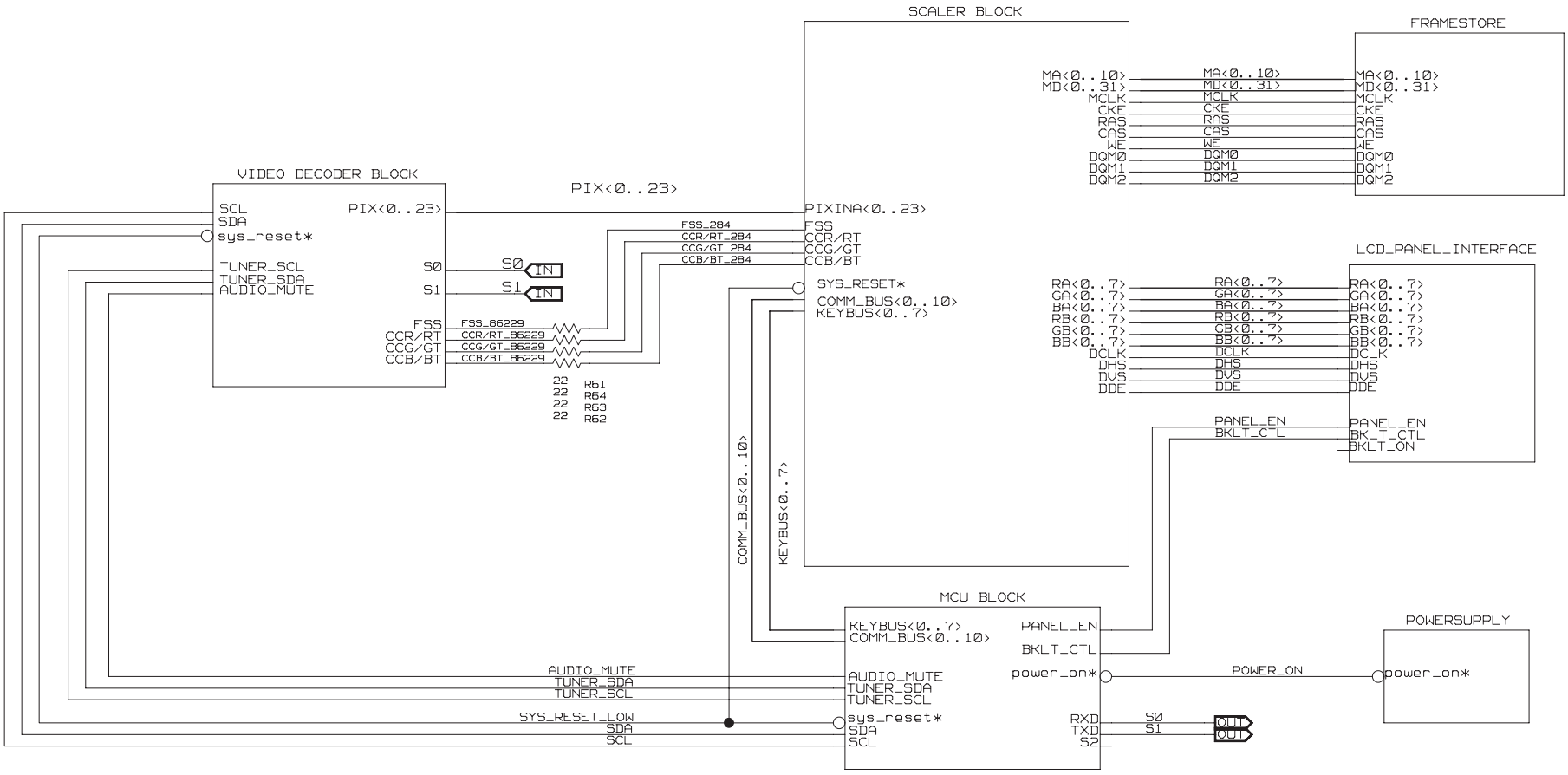
www.akai.ru

Akai LTA-15E302, LTA-20E302, LTA-20E303

LCD-TV Service Manual

1. The System Block Diagram&the Block’s Function Description
2. Schematic Circuit Diagram
3. Interconnection Diagram
4. Critical Connpoents List
5. IC Date Sheet&IC Description
6. Service Tools and Epuipment


HV WIRE
PH-6
Inverter
Board
J1
TTL Interface
LCD Panel
50Pin
PH-12
J8
J9
Main Board
J14
2×20
J2
TJC3-2
Left Speaker
AV Board
J5
J7
TJC3-2
Right Speaker
Key Board



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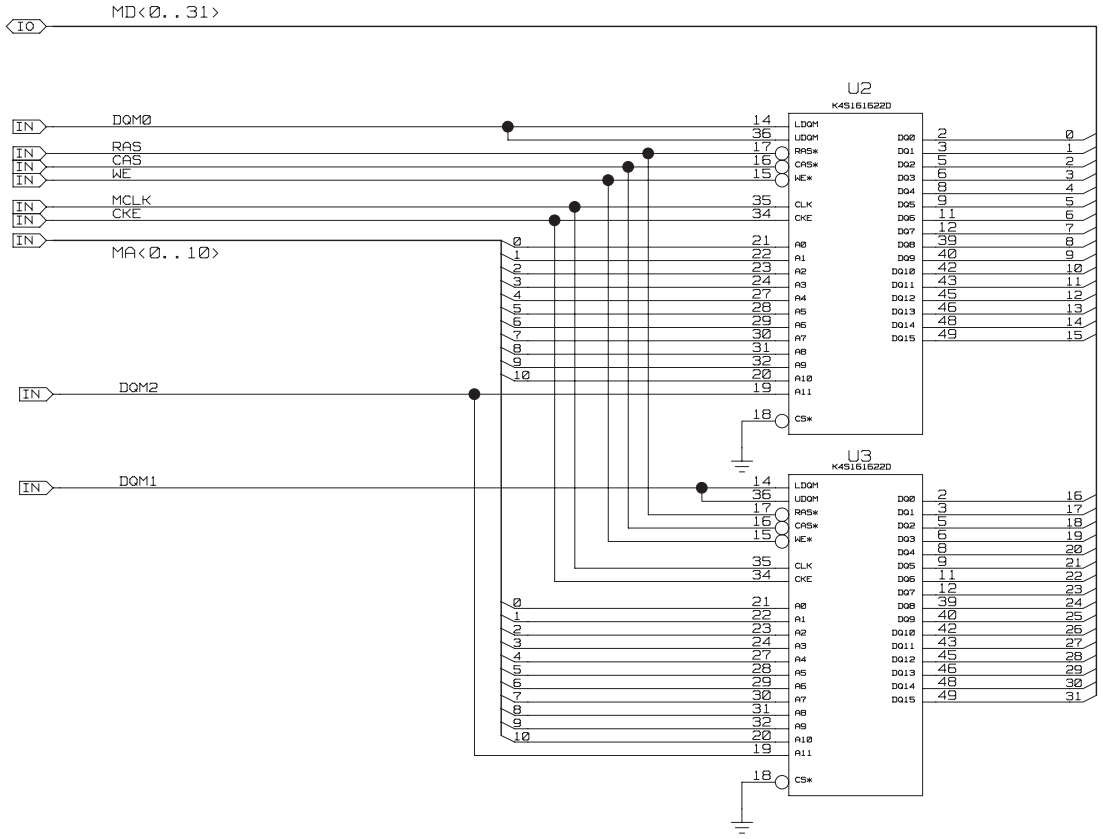
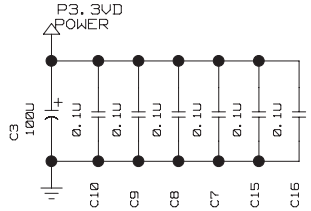
JUMP AT P1&P2 =4M BYTE SDRAM (32BIT MODE FOR 1024*768@85HZ MODE)
JUMP AT P2&P3 =2M BYTE SDRAM (16BIT MODE FOR 800*600@85HZ MODE)

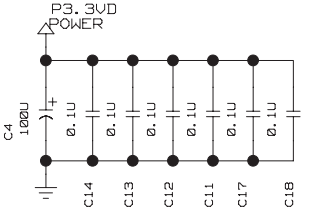


(P3.3VD: 1, 7, 13, 25, 38, 44; GND: 4, 10, 26, 41, 47, 50)



DECOUPLING FOR SDRAM

(P3.3VD: 1, 7, 13, 25, 38, 44; GND: 4, 10, 26, 41, 47, 50)



DECOUPLING FOR SDRAM

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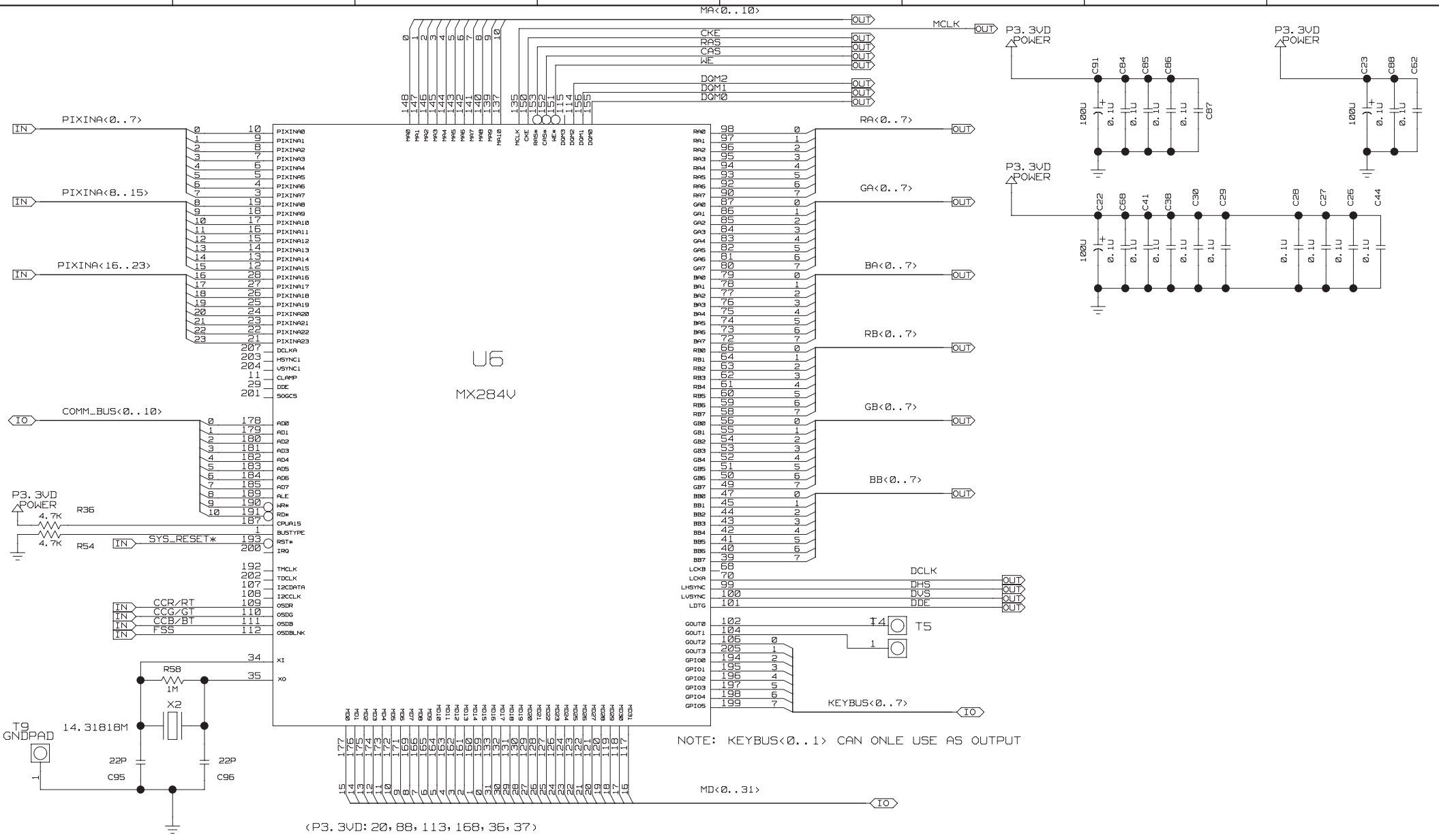

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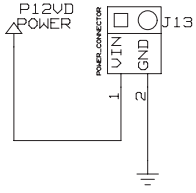
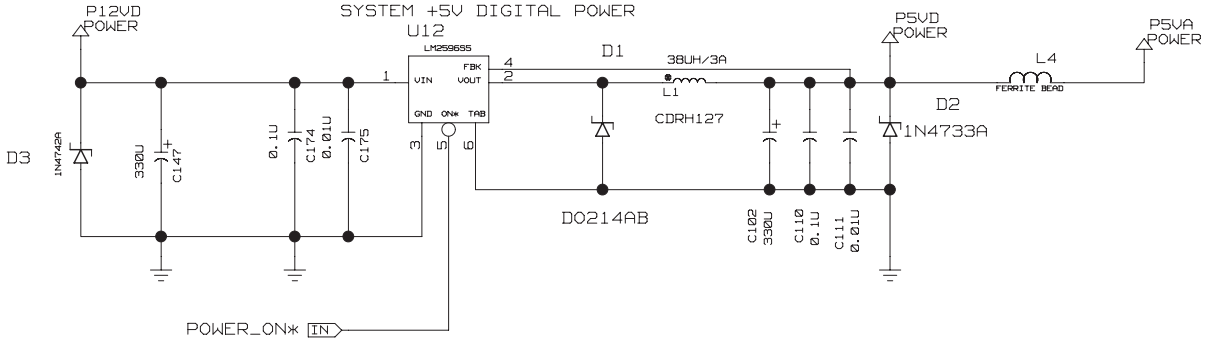
SYSTEM +12V DIGITAL POWER

SYSTEM POWER SUPPLY INPUT

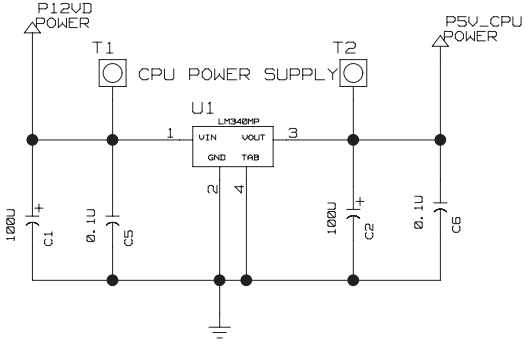


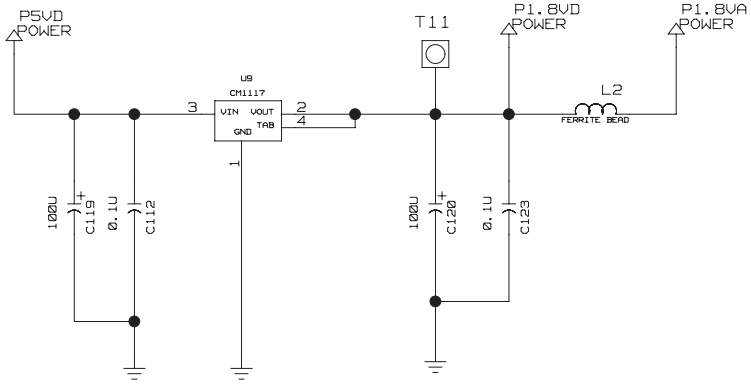
SYSTEM +5V DIGITAL POWER



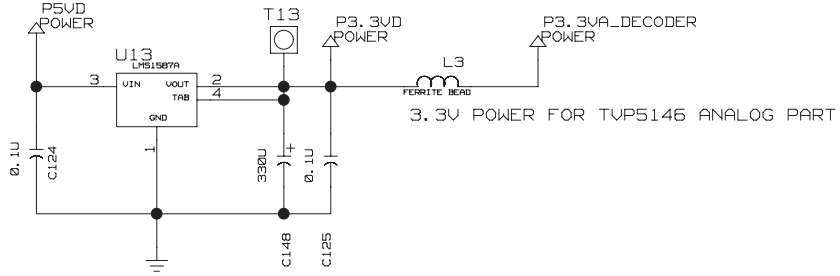
SYSTEM POWER ON/OFF

SYSTEM 1.8V DIGITAL POWER 1.8D FOR TVP5146
1.8VA FOR TVP5146

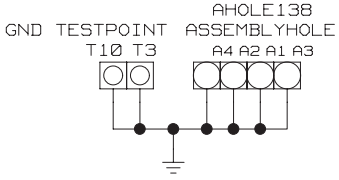




SYSTEM +3.3V DIGITAL POWER



3.3V POWER FOR TVP5146 ANALOG PART



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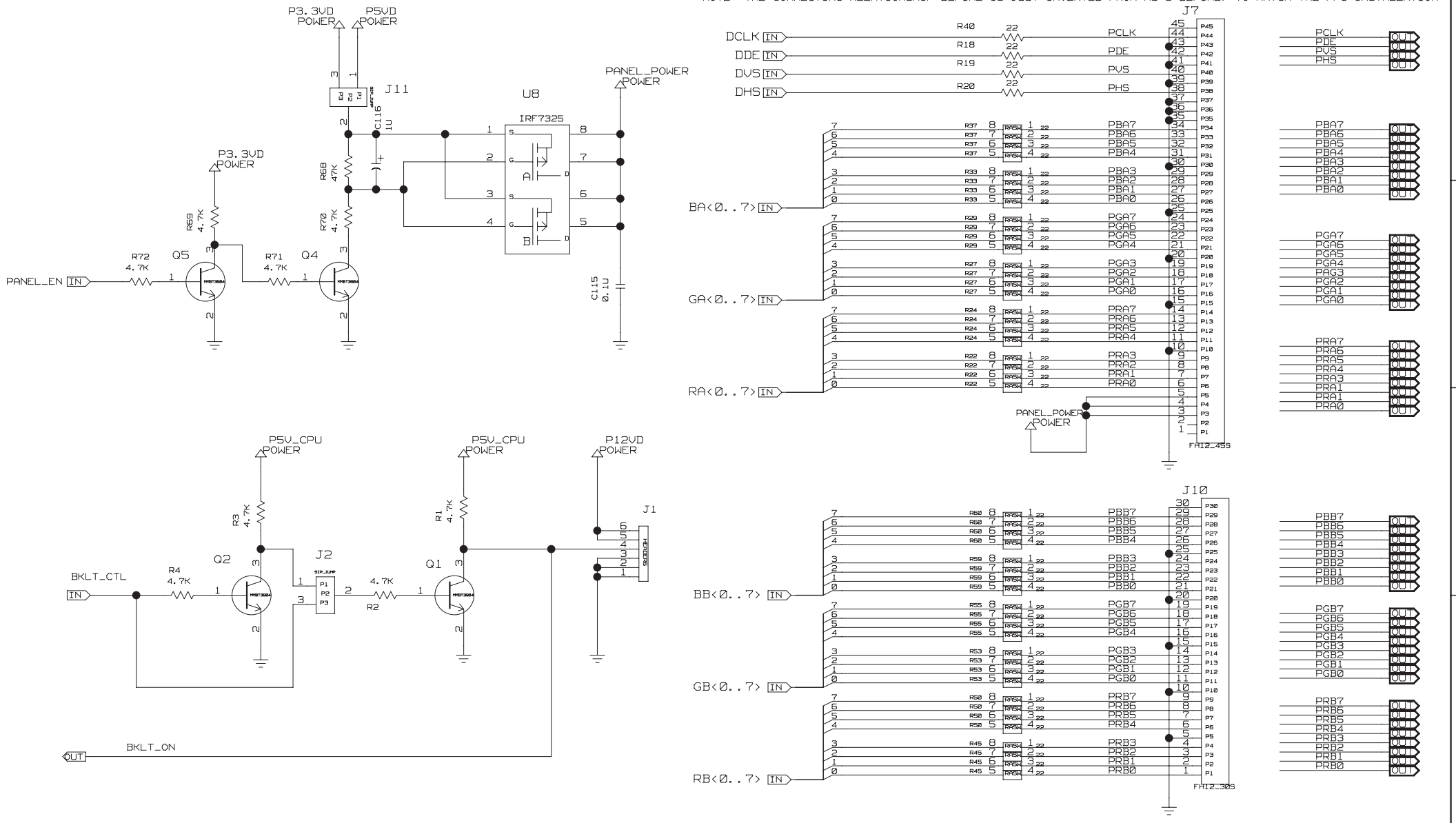
NOTE: THE CONNECTING RELATIONSHIP DEFINE IS JUST INVERTED FROM AU'S DEFINE, TO MATCH THE FPC INSTALLATION
P3.3VD POWER
P5VD POWER
J11
C116 1U
U8
IRF7325
PANEL_POWER POWER
R68 47K
R70 4.7K
R69 4.7K
R72 4.7K
R71 4.7K
Q5
Q4
PANEL_EN IN
C115 0.1U
P5V_CPU POWER
P12VD POWER
R3 4.7K
R1 4.7K
Q2
Q1
J2
J1
BKLT_CTL
R4 4.7K
R2 4.7K
BKLT_ON OUT
J7
DCLK IN
DDE IN
DVS IN
DHS IN
R40 22
R18 22
R19 22
R20 22
PCLK
PDE
PVS
PHS
BA<0..7> IN
GA<0..7> IN
RA<0..7> IN
PBA7
PBA6
PBA5
PBA4
PBA3
PBA2
PBA1
PBA0
PGA7
PGA6
PGA5
PGA4
PGA3
PGA2
PGA1
PGA0
PRA7
PRA6
PRA5
PRA4
PRA3
PRA2
PRA1
PRA0
PANEL_POWER POWER
FH12_45S
J10
BB<0..7> IN
GB<0..7> IN
RB<0..7> IN
PBB7
PBB6
PBB5
PBB4
PBB3
PBB2
PBB1
PBB0
PGB7
PGB6
PGB5
PGB4
PGB3
PGB2
PGB1
PGB0
PRB7
PRB6
PRB5
PRB4
PRB3
PRB2
PRB1
PRB0
FH12_30S
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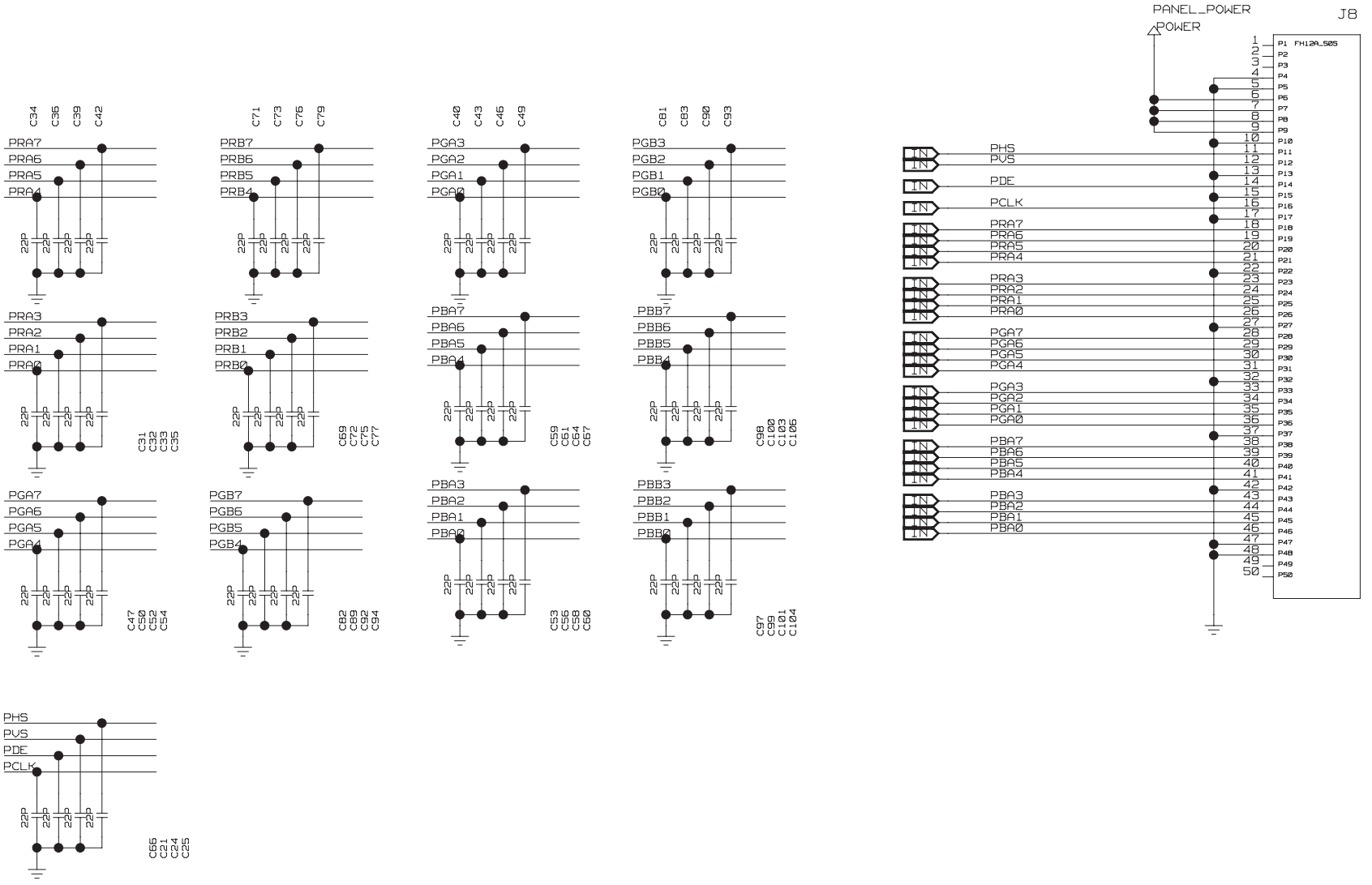

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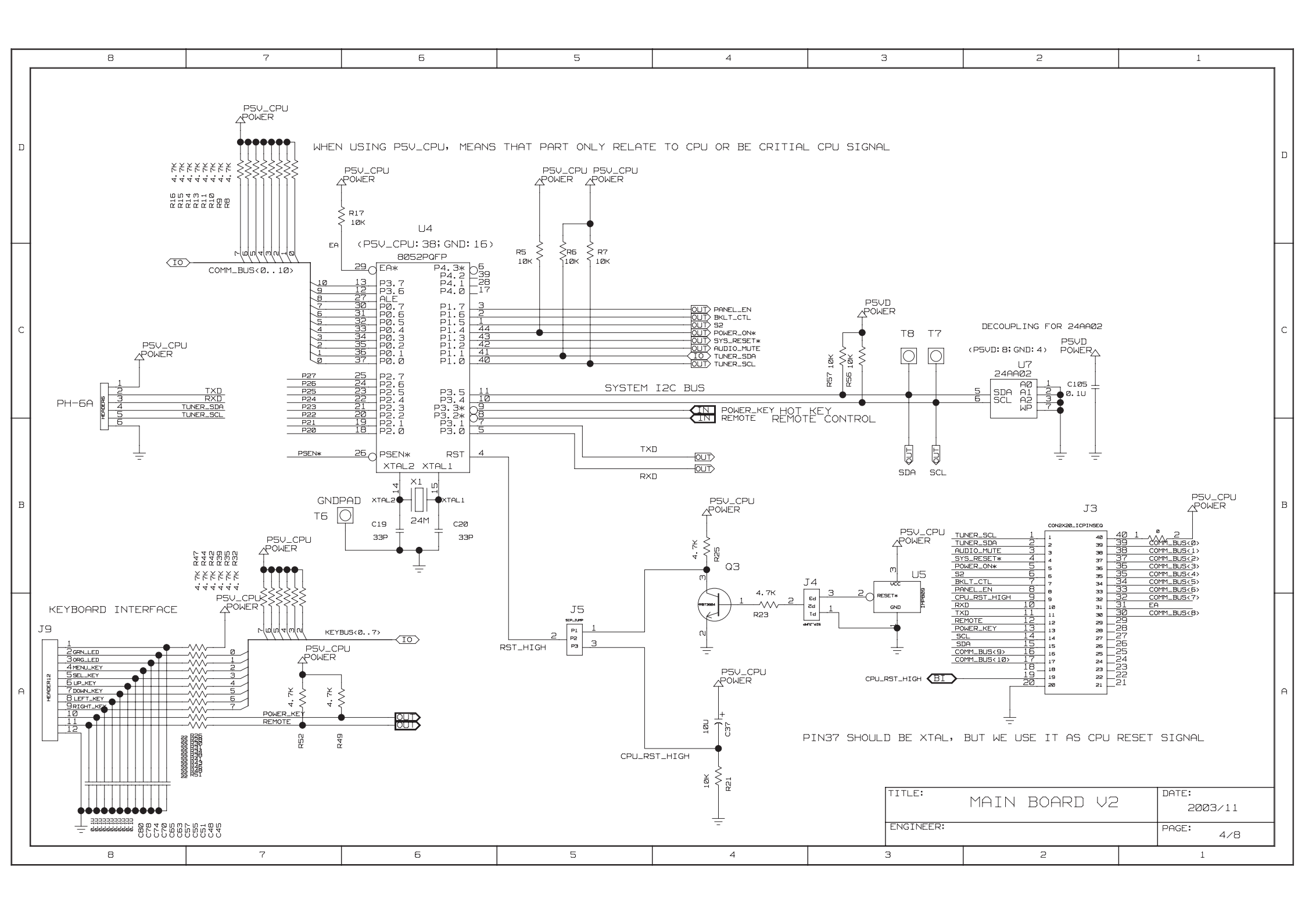
WHEN USING P5V_CPU, MEANS THAT PART ONLY RELATE TO CPU OR BE CRITIAL CPU SIGNAL
U4
(P5V_CPU: 38; GND: 16)
8052PQFP
SYSTEM I2C BUS
REMOTE CONTROL
DECOUPLING FOR 24AA02
(P5VD: 8; GND: 4)
KEYBOARD INTERFACE
PIN37 SHOULD BE XTAL, BUT WE USE IT AS CPU RESET SIGNAL
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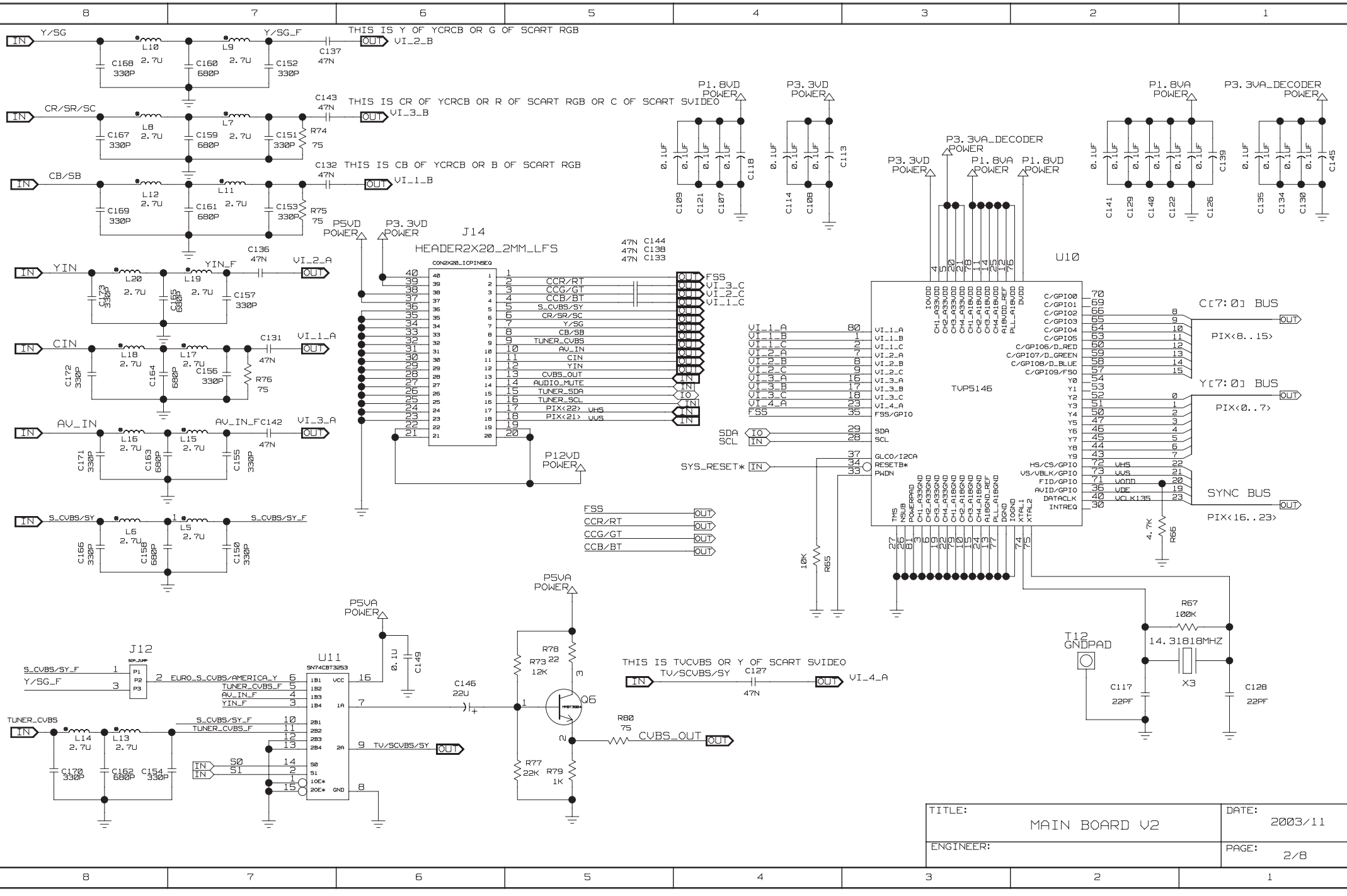
Y/SG
Y/SG_F
THIS IS Y OF YCRCB OR G OF SCART RGB
VI_2_B
CR/SR/SC
THIS IS CR OF YCRCB OR R OF SCART RGB OR C OF SCART SVIDEO
VI_3_B
CB/SB
THIS IS CB OF YCRCB OR B OF SCART RGB
VI_1_B
YIN
YIN_F
VI_2_A
CIN
VI_1_A
AV_IN
AV_IN_F
VI_3_A
S_CVBS/SY
S_CVBS/SY_F
P5VD POWER
P3.3VD POWER
P1.8VD POWER
P3.3VA_DECODER POWER
P1.8VA POWER
P5VA POWER
P12VD POWER
J14
HEADER2X20_2MM_LFS
CCR/RT
CCG/GT
CCB/BT
S_CVBS/SY
CR/SR/SC
Y/SG
CB/SB
TUNER_CVBS
AV_IN
CIN
YIN
CVBS_OUT
AUDIO_MUTE
TUNER_SDA
TUNER_SCL
PIX<22>
PIX<21>
VHS
VVS
FSS
VI_3_C
VI_2_C
VI_1_C
U10
TVP5146
SDA
SCL
SYS_RESET*
C[7:0] BUS
PIX<8..15>
Y[7:0] BUS
PIX<0..7>
SYNC BUS
PIX<16..23>
HS/CS/GPIO
VS/VBLK/GPIO
FID/GPIO
AVID/GPIO
DATACLK
INTREQ
VDD
VDE
VCLK135
J12
EURO_S_CVBS/AMERICA_Y
TUNER_CVBS_F
AV_IN_F
YIN_F
U11
SN74CBT3253
TV/SCVBS/SY
S0
S1
THIS IS TVCVBS OR Y OF SCART SVIDEO
TV/SCVBS/SY
VI_4_A
Q5
CVBS_OUT
T12
GNDPAD
14.31818MHZ
X3
R67
100K
R65
10K
R66
4.7K
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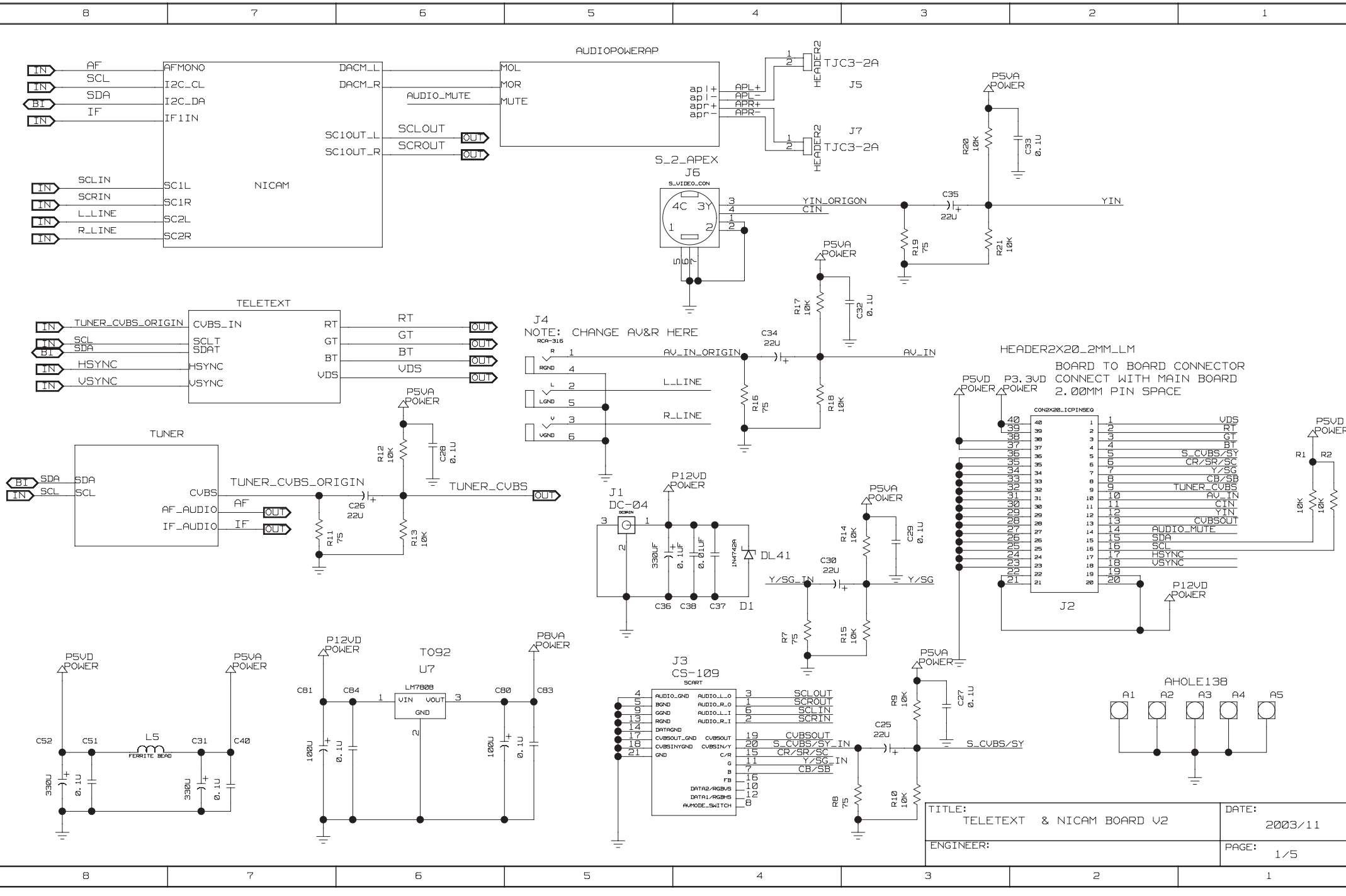
AUDIOPOWERAP
AF
SCL
SDA
IF
AFMONO
I2C_CL
I2C_DA
IF1IN
DACM_L
DACM_R
AUDIO_MUTE
MOL
MOR
MUTE
SC1OUT_L
SC1OUT_R
SCLOUT
SCROUT
SCLIN
SCRIN
L_LINE
R_LINE
SC1L
SC1R
SC2L
SC2R
NICAM
HEADER2
TJC3-2A
J5
J7
P5VA POWER
R20 10K
C33 0.1U
S_2_APEX
J6
S_VIDEO_CON
YIN_ORIGON
CIN
YIN
C35 22U
R19 75
R21 10K
TELETEXT
TUNER_CVBS_ORIGIN
CVBS_IN
SCLT
SDAT
HSYNC
VSYNC
RT
GT
BT
VDS
R17 10K
C32 0.1U
J4
NOTE: CHANGE AV&R HERE
RCA-316
AV_IN_ORIGIN
AV_IN
C34 22U
R16 75
R18 10K
TUNER
TUNER_CVBS_ORIGIN
TUNER_CVBS
AF_AUDIO
IF_AUDIO
R12 10K
C28 0.1U
C26 22U
R11 75
R13 10K
J1
DC-04
P12VD POWER
330UF
0.1UF
0.01UF
1N4742A
DL41
C36
C38
C37
D1
R14 10K
C29 0.1U
C30 22U
Y/SG_IN
Y/SG
R7 75
R15 10K
HEADER2X20_2MM_LM
BOARD TO BOARD CONNECTOR
CONNECT WITH MAIN BOARD
2.00MM PIN SPACE
P5VD POWER
P3.3VD POWER
CON2X20_ICPINSEQ
J2
R1
R2
10K
AUDIO_MUTE
SDA
SCL
HSYNC
VSYNC
CVBSOUT
P5VD POWER
P5VA POWER
C52
C51
L5
FERRITE BEAD
C31
C40
330U
0.1U
P12VD POWER
T092
U7
P8VA POWER
C81
C84
LM7808
VIN
VOUT
GND
C80
C83
100U
J3
CS-109
SCART
AUDIO_GND
BGND
GGND
RGND
DATAGND
CVBSOUT_GND
CVBSINYGND
GND
AUDIO_L_O
AUDIO_R_O
AUDIO_L_I
AUDIO_R_I
CVBSOUT
CVBSIN/Y
C/R
G
B
FB
DATA2/RGBVS
DATA1/RGBHS
AVMODE_SWITCH
SCLOUT
SCROUT
SCLIN
SCRIN
S_CVBS/SY_IN
CR/SR/SC
Y/SG_IN
CB/SB
R9 10K
C27 0.1U
C25 22U
S_CVBS/SY
R8 75
R10 10K
AHOLE138
A1
A2
A3
A4
A5
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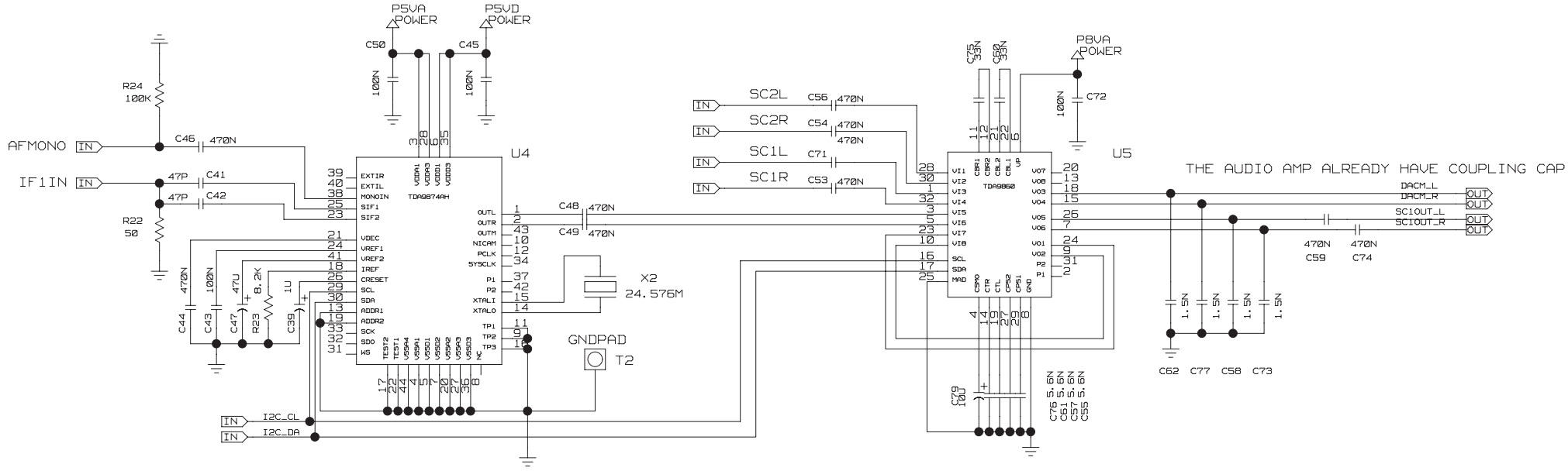

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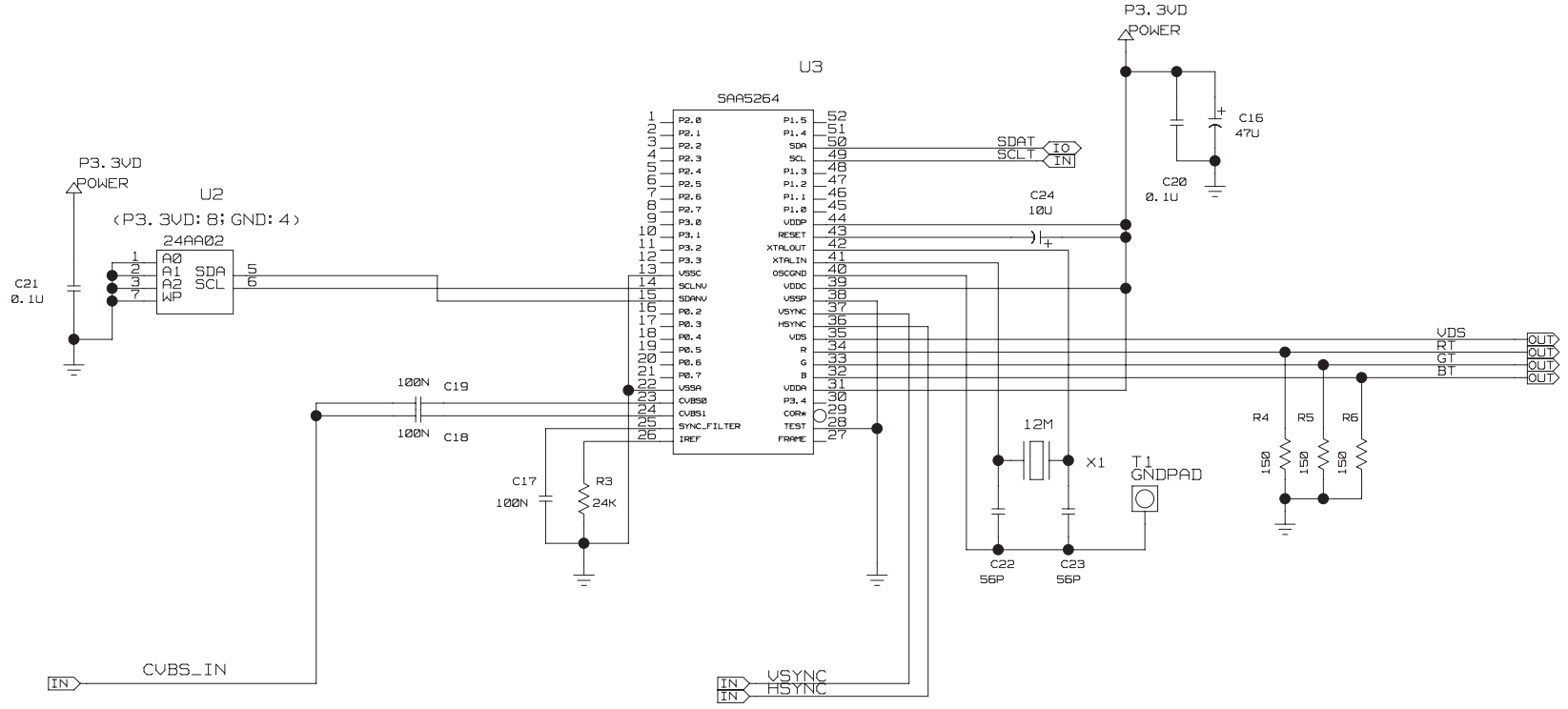

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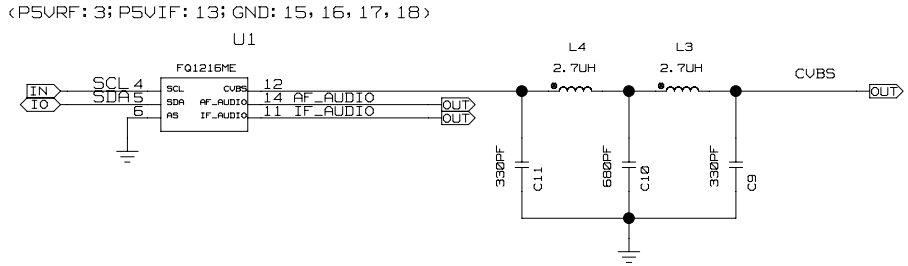

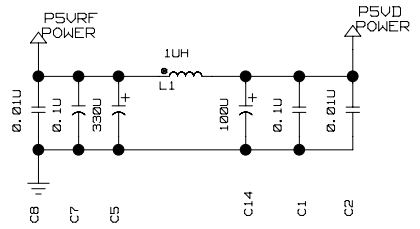

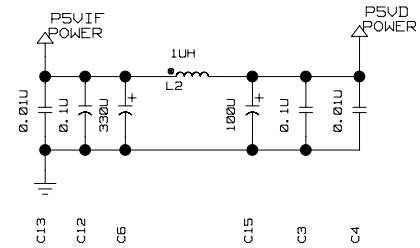

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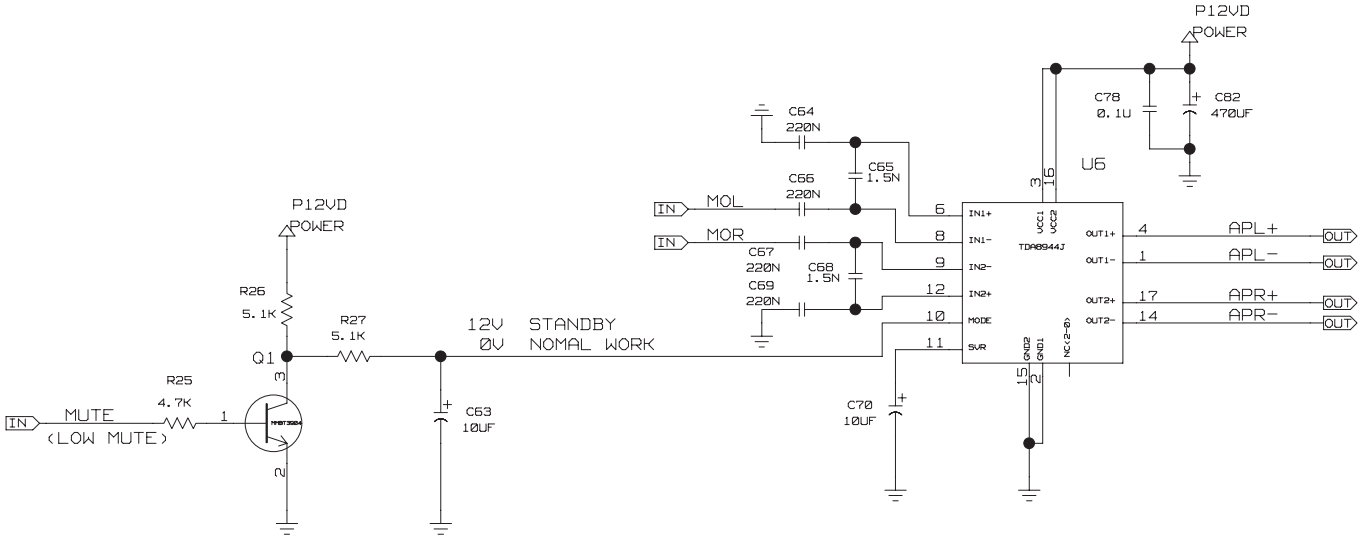

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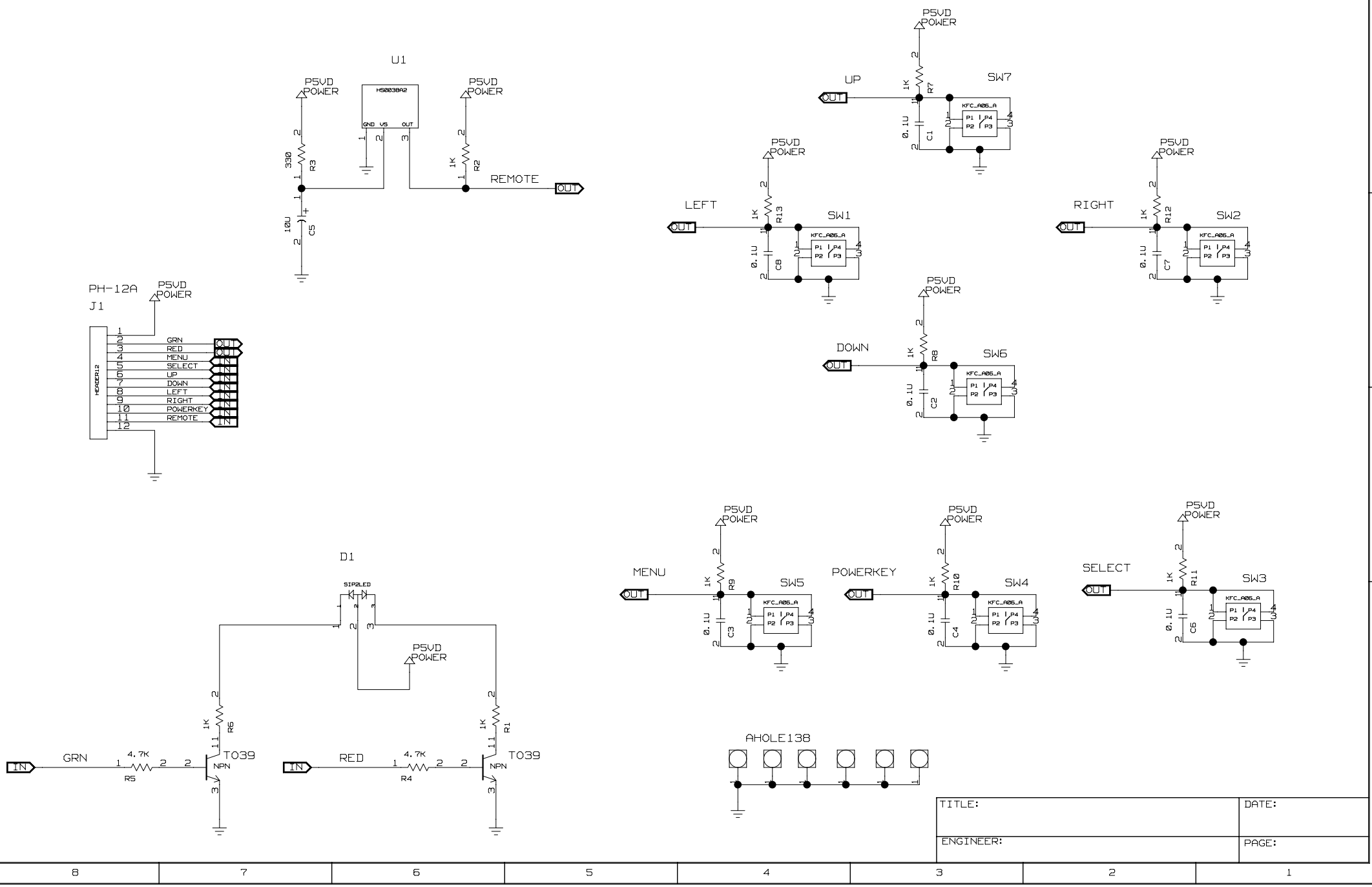
U1
HS003BA2
GND VS OUT
P5VD
POWER
330
R3
10U
C5
1K
R2
REMOTE
OUT
PH-12A
J1
HEADER12
GRN
RED
MENU
SELECT
UP
DOWN
LEFT
RIGHT
POWERKEY
REMOTE
IN
UP
SW7
R7
C1
0.1U
KFC_A05_A
LEFT
SW1
R13
C8
RIGHT
SW2
R12
C7
DOWN
SW6
R8
C2
MENU
SW5
R9
C3
POWERKEY
SW4
R10
C4
SELECT
SW3
R11
C6
D1
SIP2LED
R6
R1
4.7K
R5
R4
T039
NPN
AHOLE138
TITLE:
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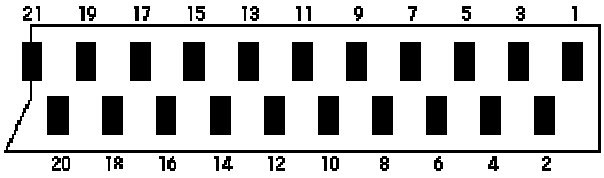
The SCART Interface

The Scart (Syndicat des Constructeurs d'Appareils Radiorécepteurs et Téléviseurs) connector is used for combined audio and video connections.

The connector is also known as Pertitel connector or Euroconnector.



Male front view

The Scart is a twenty one pin connector plug developed by the European community and found on the back of most European televisions and video players. It is used in most of the consumer video equipments like VCRs, TVs and DVD players to hand the audio and video connections all using some connector. SCART connector supports stereo audio, composite video, S-video, RGB and some control signals. SCART connector can use to carry many signal formats, but it can't carry all of them at the same time. Note that not all SCART connections in all equipment are equivalent, connectors on other equipments might support more signal format than others. Composite video and audio are practically always supported, but there are lots of equipments that do not support RGB or S-video. For example some TVs support RGB on one SCART and S-video on other SCART (in addition to standard composite video format). The supported RGB signal format is RGBS (R, G, B and composite sync).

Arrangement 1 was the original and allows for composite video input/output, RGB inputs and stereo audio.

Arrangement 2 was added to take S-Video (S-VHS and Hi-8) inputs. This made pin 15 chrominance and pin 20 luminance.

A recent addition is a ternary level on pin 8 to signal a VCR in wide-screen mode.

Most new TV sets have 2 SCART sockets on their rear. One is usually to arrangement 1 and the other to arrangement 2, but with pin 20 switchable from composite to S-Video luminance. The first can switch from a composite input to RGB input. The second can switch from a composite input to an S-Video input, pin 20 being either composite in or luminance in. Usually the second socket outputs a selectable composite signal on pin 19. That is selectable from off-air, SCART 1, and if they exist front mounted input sockets for a camcorder.

SCART arrangement 1			
Pin	**Signal**	**Signal level**	**Impedance**
1	Audio output B (Right)	0.5V rms	<1kohm
2	Audio input B (Right)	0.5V rms	>10kohm
3	Audio output A (Left)	0.5V rms	<1kohm
4	Ground (Audio)		
5	Ground (blue)		
6	Audio input A (Left)	0.5V rms	>10kohm
7	Blue input/output	0.7V	75ohms
8	Function select (AV control)	High (9.5-12V) - AV mode Mid (5-8V) - Wide-screen Low (0-2V) - TV mode	>10kohm
9	Ground (green)		
10	Comms data 2		
11	Green input/output	0.7V	75ohms
12	Comms data 1		
13	Ground (red)		
14	Ground (blanking)		
15	Red input/output	0.7V	75ohms
16	Fast Blanking	High (1-3V) - RGB Low (0-0.4V) - Composite	75ohms
17	Ground (video output)		
18	Ground (video Input)		
19	Video output (composite)	1V including sync	75ohms
20	Video input (composite)	1V including sync	75ohms
21	Common ground (shield)		

SCART arrangement 2			
Pin	**Signal**	**Signal level**	**Impedance**
1	Audio output B (Right)	0.5V rms	<1kohm
2	Audio input B (Right)	0.5V rms	>10kohm
3	Audio output A (Left)	0.5V rms	<1kohm
4	Ground (Audio)		
5	Ground		
6	Audio input A (Left)	0.5V rms	>10kohm
7			
8	Function select (AV control)	High (9.5-12V) - AV mode Mid (5-8V) - Wide-screen Low (0-2V) - TV mode	>10kohm
9	Ground		
10	Comms data 2		
11			
12	Comms data 1		
13	Ground		
14	Ground (blanking)		
15	Chrominance input	0.3V	75ohms
16			
17	Ground (Luminance Output)		
18	Ground (Luminance input)		
19	Luminance Output	1V including sync	75ohms
20	Luminance input	1V including sync	75ohms
21	Common ground (shield)		

RGB Connection

Output Connector		Input Connector	
Pin	**Signal**	**Pin**	**Signal**
1	Audio output B (Right)	2	Audio input B (Right)
3	Audio output A (Left)	6	Audio input A (Left)
4	Ground (Audio)	4	Ground (Audio)
7	Blue Output	7	Blue input
5	Ground (blue)	5	Ground (blue)
11	Green Output	11	Green Input
9	Ground (Green)	9	Ground (Green)
15	Red Output	15	Red Input
13	Ground (Red)	13	Ground (Red)
16	RGB Status out	16	RGB Status in
14	Ground (RGB Status)	14	Ground (RGB Status)
19	Sync out	20	Sync in
17	Ground	18	Ground
21	Shield	21	Shield

Composite Video Connection

Output Connector		Input Connector	
Pin	**Signal**	**Pin**	**Signal**
1	Audio output B (Right)	2	Audio input B (Right)
3	Audio output A (Left)	6	Audio input A (Left)
4	Ground (Audio)	4	Ground (Audio)
8	Video status out	8	Video status in
19	Composite video out	20	Composite video in
17	Ground	18	Ground
21	Shield	21	Shield

Critical Components List

Components	Designator	Function
MX88L284	U8	SCALER
SM5964C40Q	U4	MCU
TVP5146PFP	U15	Video Decoder
TDA9874	U19	Nicam&A2
TDA9860	U12	Audio Processor
TDA8944	U14	Audio Amplifier
IS42S16100A1-7T	U5,U9	SDRAM
LM2596	U1	Switch Power
LM1084	U6	LDO
SN74CBT3253PWR	U21	Switch
SN74CBT3253	U20	Switch
DS90C383	U2	LVDS
FDS4953	U3、U7	MOS
BM1117-1.8V	U18	dropout voltage regulators

Service Tools and Equipment

Application	Name
General	DVD testing disk
	General tools(screwdriver ect.)
	AV Cable
	S-Video Cable
	Scart Cable
Confirm	SVCD testing disk
	DVD player
	TV set
Special	Signal Generator
	Oscillograph
	Probe
Antistatic	Antistatic Electric Iron
	Antistatic Wrist Strap
Atraumatic	Sponge Underlay