

# FMJ

# Service Manual

Issue 1.0

# DV29 DVD Player



# DV29

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## FMJ Dv29 Circuit description.

### Overview

The **DV29** is effectively a no compromise version both electronically and mechanically of the **DV79**.

The player is based around acclaimed **Zoran Vaddis V** chipset coupled to high specification **Wolfson D to A** converters for all six audio output channels, also featured in this design is a **HDMI** transmitter with digital Video and a Audio output capable of Digital Surround.

The **DV29** and the **DV79** use the same main board and power supply stage but with many of the components either upgrade or replaced with different topologies, many of the critical audio/video components with 0.1% tolerance within the DV29 and we also have an extra toroid power supply for the Audio stages.

Both the HDMI chip and Video encoder are of a higher quality than those found inside the DV79.

### **Power supply board.**

#### Non-switching

Mains power arrives at IEC inlet socket SKT1 and is filtered by EMC choke LI and Y caps C3 and C4, mains switch SW2a/b switches both Negative and Live phases before the power reaches the mains select switch at location **SW1** the switch allows the primary windings of the transformer **TX1** to be wired in either Parallel or Series configuration.

The Bridge rectifying Diode package at location **D1** forms the basis of the conventional power stage and supplies a VN35V6 (-35.6v) to the Switch mode stage, transistor **TR1** is biased by 2v7 Zener diode **DZ1** and allows for the series Zener diodes **DZ2**, **DZ3**, **DZ3** to supply the VN13V5 and VN19V rails.

We will also see a simple **A.C present circuit** this is used for delayed output relay operation and fast relay closure under interrupted supply conditions thus preventing op-amp offsets from reaching the Audio output sockets.

#### Switch mode

The switch mode supply is formed around the Driver/Control chip **IC1** UC3843 (used in regulating mode). The chip is referenced the -36.5V supply line and the Digital ground DGND, the supply for the chip is formed by the 12v Zener at location **DZ6** and can be seen on Pin 7 as VCC. The power supply allows for the switch-mode to be tied the to Audio sampling frequency for any given compatible format **see Fig 1**.

**Fig 1 PSU clock control and IC305 line status**

<b>Fs</b> Frequency select	<b>PSUFS1</b> Pin 11 IC305a	<b>PSUFS0</b> Pin 12 IC305a	<b>PSUCLK</b> Output Pin 5 of IC305a
44.1 kHz	0	0	44.1 kHz
48 kHz	0	0	48 kHz
88.2 kHz	0	1	44.1kHz
96 kHz	0	1	48 kHz
176.4 kHz	1	0	44.1 kHz
192 kHz	1	0	48 kHz
Others	1	1	OFF

The **PSU sync signal** is driven into the power supply via Resistor R9 if no Sync is present the unit is set to free run at xxxx due to the RT/RC network attached to Pin 4.

**IC1** is running in regulated mode and monitors the voltage output on the +5V and +3V3 D.C lines, the two voltages are summed by **TR8** and Driven into the VFB and Comp inputs of IC1, the Voltage is then regulated by changing the time base of the PWM output at pin 6 (longer the time base the lower the voltage), the **PWM switching frequency** is driven into the switch-mode transformer by the high speed Nmos device at position **M1**, R5 is used to sense the Current across the gate of the Nmosfet and in the event of a short circuit will safely shut the power supply down. We derive the 12v Mech supply from the output of M1 using the Ultra-fast Diode at location D8 to rectify the PWM line.

The D.C outputs from the switch mode have extensive switch mode noise removing filters these are seen as 100n caps down to ground and Wire wound inductors in series with the supply rail.

#### Power supply main board

All the power supply rails are supplied to the main board via the 32 way FFC conector at location **CON1001**.

The **Digital** supplies from the switch mode stage of the power supply arrive as **3V3D**, **+5VD** and **+12VD** we also see the Display board power supplies arrive as **-19V**, **-9V** and **-13.5V** all of the supplies have a second stage of implemented on the board to remove all traces of ultra-sonic noise.

The 3V3D rail is the main 3V3 rail used to power the digital circuitry; +5VD is used for all 5v Digital/Video supplies the +12VD is used for Scart switching and to power the HDMI circuit (not DV78).

The 1V8 rail is derived from the 3V3 rail and is regulated by the adjustable regulator at location **REG1003**.

The DV29 uses a separate isolated Toroid transformer and Rectification stages based around Bridge rectifiers **DBR1000** and **DBR1001** and bulk smoothing caps C1048 and C1049 to supply the Analogue stages the smoothed D.C output from this stage is fed **L1013 (+)** and **L1015 (-)**.

Regulator **REG1001** is fed from the +15V3 rail and forms the Audio DAC supply.

The **Display board** requires several supply voltages these are simply passed through the main board, being filtered on the way to prevent transmission of noise through to the surrounding electronics. The display takes the +5V, -19V, -13V5 and -9V the -13V5 and -9V form a floating 4.5V supply biased relative to the -19V grid voltage.

### Display Board

The main component of the Display board is **IC1** this is a Vacuum Florescent Display driver with keyboard scan and a serial data in/out interface.

The Chip receives display drive serial data from the **Vaddis V** chip on the main board via Con1 on pins 12, 13 and 14 these will be seen a **DIN**, **STS** and **CLK** this data is used to drive the VFD a DOUT line interfaces with the VADDIS V and supplies Keyboard Scan information. The keyboard scan is a 6 x 4 matrix with the **Key Source** appearing at S3, S4, S5, S6 and the **Keyscan** data returns appearing at K2, K3 and K4.

**Please see:** above for **power supply** information.

The **Infra red** pick-up at location RX1 receives RC5 data and send the data to the Vaddis V on the main board via transistors TR2 and TR3, LED 2 is used to mix the rear panel RC5, this is covered in-depth within the Coms and Video output section of this guide.

## Main Board electronics

### Zoran Vaddis V.

The main processor/control chip on the main board is the Zoran Vaddis V at location **IC202**, this is the latest incarnation of the very popular Vaddis range of processors and allows for a much lower component count when compared to our earlier players as many of the playback functions have moved onto the Vaddis V silicon.

Below you will see the **major functions** of the Vaddis V

- **20 Bit digital video output for external Video DAC's and HDMI output stage.**
- **Decoded Analogue Video output (internal DAC) used on the DV78 only.**
- **Digital Audio output 3 data lines 6 channels for internal L + R DAC's and L + R + C + LS + RS for DV79 and DV29 also used for HDMI for the DV79 and DV29.**
- **SPDIF output.**
- **Internal display interface.**
- **Internal ATAPI interface.**
- **Internal IR interface.**
- **Serial in/out for RS232 DV79/DV29**

**A more detailed explanation of the Vaddis V and peripheral components follows.**

### **Vaddis Power**

The **Vaddis V** is powered by two separate supplies the Vaddis requires a 1.8v supply for the core, this is regulated from the 3.3v rail by **REG1003**, the 3.3v rail is used to supply power to the I/P – O/P ports of the chip.

### **ATAPI interface**

**CON203** is an ATAPI interface on a 40 way IDE connector. This is decoupled from the Drive via an array of decoupling resistors as required by the ATAPI spec.

## Display Board interface

The display board interface is on the 16 way FFC flexi foil connector at location **CON202**. Power for the display also travels on the connector. There are 4 – wires to interface with the VFD driver chip these are seen as.

- **XFPDIN - Data to the display board**
- **FPDOUT - Data from the display board**
- **XFPCLK - Clock**
- **XFPSEL - Chip select**

The above control lines are level shifted to 5v logic from 3.3v levels by **IC200** (74HCT125) these are the levels required by the VFD drive chip.

The IR output from the Display board arrives as **IRRCV** this is an open collector signal, which can be wire-Ord with the re-panel remote input.

## Digital Audio

The Digital audio leaves the chip 3 sets of data lines labelled as.

- **ADAT0 - Left and Right channel data**
- **ADAT1 - Left and Right surround**
- **ADAT2 - Centre and Sub**

Along with the ADAT line we will also see the **ABCLK** and **ALRCK** as required for IS2 data conversion.

The Vaddis V also supplies a direct SPDIF output for interfacing with ancillary processing equipment.

## Digital Video

The Digital Video output from the Vaddis V consists of the following signals:

- **VIDP0 to 19 - 20 Bit wide digital video data**
- **CLK\_27M - 27 Mhz Video clock**
- **VSYNC - Vertical sync**
- **HSYNC - Horizontal Sync**

The 20 bit wide bus **VIDP0 to 19** provides video data as follows.

**Interlaced video mode: VIDP0 to 7** provide multiplexed 8 bit Y, Cb and Cr data with VIDP0 being the lsb.

**Progressive scan video mode: VIDP0 to 9** provide 10 bit multiplexed Cb, Cr data with VIDP0 being the lsb. **VIDP10 to 19** provide 10 bit Y data with VIDP10 being the lsb.

## Flash/ SDRAM

**IC203** is a 64Mbit (32 bit x 2Meg) SDRAM. It runs at 135MHz

**IC205** is a 16Mbit (16 bit x 1Meg) intel type flash IC for program storage (Player software).

The flash interfaces to the Vaddis V using the SDRAM bus it may appear that the bus connects to the flash in a random manner, however this is simply because the Vaddis bus is multiplexed that way. The Flash will be accessed at power up and the contents are copied to the SDRAM the program will then be run from the SDRAM. Series resistors are employed to isolate the flash bus from the main SDRAM bus.

## EEPROM

**IC204** is a 8kBit (1K x 8) Serial EEPROM. This is used for storage of non-volatile storage of player settings, region settings and bookmark data.

## Clocks

**CLK27MV** is the 27Mhz clock for video. It is used to generate the 135Mhz clock for the Vaddis microprocessor and DSP. The **MCLKV** is the audio master clock for the Vaddis.

We run the Vaddis in **PLL bypass** mode and generate our own master clock (see main clock section of manual) for higher accuracy and improved performance across Audio and Video.

## RESET

**IC201** is a reset generator chip that monitors the **+3.3V** rail and ensures a reset signal **PWR\_ON\_RESET\*** is generated on power up, or if the mains power dips below an operational level.

This signal is used to reset the Vaddis V and Flash micro only. The Vaddis V line labelled as RESET\* resets the remaining circuitry of the player apart from the HDMI chip, this has it's own reset line labelled as HDMI\_RESET this is necessary if we require to reset the HDMI chip only (for example when the HDMI sink is connected and then disconnected).

## Serial Port

The VADDIS V can interface with the external world via the **RS232** connector at location **CON900** and the RS232 Transceiver at location **IC900**, the serial data lines are shown as SERIAL RX and SERIAL TX these lines allow for direct control over the unit via RS232.

**Fig 3. GPIO control signals from the Vaddis V**

Single Name	I/P-O/P	Function
PSUFSO-1	Output	Control PSU Clock divider
ENABLE_AV	Output	SCART control High in normal operation and low in standby
16/9	Output	Scart 16/9 anamorphic control line
9190INT*	Input	Interrupt signal from SII9190 HDMI transmitter
GAIN_SCALING	Output	High for HDCD gain scaling
ML_8740_0-2	Output	SPI load signal for Audio DACs 0,1 and 2 (see note 1)
MC	Output	SPI clock signal for DAC control
MD	Output	SPI data signal for DAC control
FSELE0-1	Output	Frequency select generator
MUTE*	Output	Active low audio mute signal
DDC_SDA,DDC,SCL	I/O	12C bus for DDC channel on HDMI interface
PROG_INT*	Output	High for Progscan mode, Low for interlaced mode. Controls Sii9130 data mux
HDMI_RESET*	Output	Reset signal for HDMI transmitter
RESET*	Output	System reset

### Clocks and SPDIF stage.

**IC300** is a **SM8707E** clock generator IC. This IC is sensitive to noise on its power supply, which causes clock jitter for this reason we have an independent Low dropout – low noise **+3v3** power supply for the chip based around the regulator at location **REG300**.

**X300** is a **27Mhz** crystal that **IC300** uses to generate all the video and audio clocks required by the system the crystal sits on the XTI and XTO pins of the chip, the 27Mhz output at Pin 4 (MO2) is used to drive the Vaddis chip directly bypassing the internal PLL.

The frequency of the audio master is dependent on the on the current audio sample rate (i.e the sample rate required by the format CD=44.1Khz and DVD=48khz etc) and this is set by the system micro via the **FSLO** and **FSEL1** this selects either the **22.5792Mhz** or **24.576Mhz** clock from frequency from IC300 this may then be divided by 2 by the clock divide chip at location IC306 depending on the status of FSEL1. Therefore 4 clock frequencies may be obtained to support all required audio samples rates.

**Nand gate** IC303 is used to gate FSEL1 with ENABLE\_AV (which is low in standby mode) as such when in standby mode the audio clock is disabled.

### **Clock Buffer**

**IC301** is used to buffer the audio master clock. The circuit is arranged so that each device that requires the audio master clock has its own driver these are seen as.

- **MCLK\_DAC0 - Pin 18**
- **MCLK\_DAC1 – Pin 16**
- **MCLK\_DAC2 – Pin 14**
- **MCLK\_VADDIS – Pin 3**
- **MCLK\_HDMI – Pin 9**

We also run the **Mute Line** from the Vaddis V **IC301** this can be seen on Pin 12 and drives transistor **TR401**, the transistor pulls the relays **RLY400**, **RLY500**, **RLY600** to ground and un-mutes the audio outputs.

### **IS2 Audio Data**

**IC302** and **IC309** are buffers for the 12S signals these ensure that the signals travelling to the DAC's are point to point. **IC302** deals with the **ALRCK** and **ABCLK** and **IC309** the **ADAT0,1,2** all signals are split into three separate lines for the three stereo DACS.

### **PSU Clock Divider**

**IC304** and **IC305** form a clock divide by 1, 2 or 4 to ensure the PSU clock is always either 44.1kHz or 48kHz (**See fig 1** within the power supply description section). This circuit will also switch the **PSUCLK** off when switching between sample rates (the PSU will free run when the PSUCLK is not present).

### **SPDIF Output**

The SPDIF output consists of **IC308** implemented as an inline buffer and parallel output buffer. Gate A buffers the signal so that the SPDIF line from the VADDIS sees fewer loads and forms a feed to the Optical output transmitter, gates B,C and D drive the SPDIF in parallel so that we can drive a 75ohm load adequately. The resistors at the output of IC308 are arranged so that the output will be **500mV pk-pk** when the output is terminated with a 75 ohm load at the same time the output impedance of the circuit is 75ohms as required by the Sony Philips Digital Interface specification, the transformer at location TX301 electrically isolates the SPDIF output.

## Left and Right channel D to A stages

The **Wolfson WM8740** stereo DAC requires +5V(A) and a +3V3 supply along with the Digital Audio data lines already described in this guide.

The Left channel output only will be described in this section as all audio output stages are the identical (all six channels of a DV79) apart from the HDCD gain switching for L + R only.

**IC400B** and associated components for a 2<sup>nd</sup> order Bessel filter with a differential input and a gain of 1 this follow by a output buffer **IC401B**, the gain of IC401B is control by the switching chip at location **IC402**, in normal use the Gain of IC401B is set to 1.1 but in **HDCD** mode the **IC402** switches a second 10k resistor in parallel with R413 and the gain is set to 2.2 allowing for the higher audio output required by the HDCD standard.

C436 is a A.C coupling capacitor used to remove the few mV of offset that the DAC produces, D400 provides protection against from ESD.

The all **output relays** are under control of the Vaddis V chip but will also mute the outputs instantly under mains failure conditions. Switching drive is provided by TR401 (MUTE\_BUF) and TR400 (AC\_PRES) the relays are in mute mode if either the input to TR401 is Low or if the input to TR400 is high.

**Please note:** The **Scart** left/right audio is fed from the outputs of the left/right audio stages.

## Video Encoder

The video encoder at location **IC703** is an Analogue devices **ADV7310** video encoder, supporting interlaced and progressive scan video. Please note the 0.1% tolerance components around this stage. IC703 runs on a 2.5V supply provided by **REG700** the voltage reference for the chip of 1.225V is provided by **REF700** and should be seen on **Pin 46**. C730-731 and R736 form an external PLL filter.

The Data lines into the encoder arrive as VIDP0 – 19 from the outputs of the VADDIS V chip.

The external current setting resistors for the internal DACS are seen as R721-R722 and R738-R739 these set the correct output level for the DACS.

The encoder gives out **6 video signals**, for composite, S-Video (Y and C) and shared YUV/RGB signals. The setting of the RGB or YUV mode is select with the Video settings page of the Setup menu.

The **six analogue output** signals are seen as.

- **DAC\_A = Composite**
- **DAC\_B = SVID Y**
- **DAC\_C = SVID C**
- **DAC\_D = Y or Green**
- **DAC\_E = U or Blue**
- **DAC\_F = V or Red**

**Please note:** When the player is in Progressive scan mode the composite and S-Video signals will be switched off.

The Video outputs from **IC703** are filtered by six identical filters. For instance if we look at the Composite stage we will see a very slow roll off filter comprising of C719, C721 with L701 and L703 the **-3dB** point of the filter stage is around **40Mhz**, resistors R700 and R702 form a load for the current output DAC and as such set the relative output level.

The outputs are driven by the Video op-amp at location **IC700A** this has a gain of **2.15** and is terminated by a 75ohm resistor, **D701** forms protection against ESD.

These signals now travel to the COMMS and Video extension card on Con 901.

## SCART Output

RGB and Composite video signals as well as left and right audio signals are all present on the SCART output socket. As the RGB and YUV signals share the same output port at the Vaddis V the player must be set to **RGB SCART** operation to have a RGB output on the SCART. **Please note:** When in RGB SCART mode the RGB does not contain a Sync signal and the sync must be taken from the Composite out (4 wire RGB).

Also present at the Scart are a number of control flags for the monitor these include 2 GPIO control lines direct from the Vaddis.

- **ENABLE\_AV**
- **16/9**

These are seen at the SCART output pins as.

- **0/6/12**
- **RGB STAT**

The 0/6/12 line (SCART pin 8) is used to inform the monitor of the screen format being sent by the player as set in the video set-up section of the software.

- **Standby = 0V**
- **16:9 aspect ratio = 6V**
- **4:3 aspect ration = 12V**

The RGB status line (SCART pin 16) will be seen as 0v = no RGB and >1v is RGB present.

## HDMI output stage

**Please note:** Due to the plug and play nature of the HDMI/DVI interface, if presented with a reported no HDMI problem it is worth checking all set-up parameters of both the DVD player and the Plasma/Projector in use before performing component level diagnostics on this section.

HDMI is a system that transmits uncompressed digital video and digital audio over a high speed encrypted interface.

**IC1102** is an **SII9030 HDMI transmitter** IC in essence the chip takes the Digital Video and Audio information and sends the Data out in HDMI format.

**REG1100** is used to generate a clean regulated 3V3 power supply to Pins 18 and 33 of the HDMI chip.

IC1100 –IC1101 are 3 state octal/line drivers these form a multiplex that switches between the 2 groups of signals for the video data input stage of the SII9190 the multiplexer is control by the Signal from the Vaddis V labelled as PROG/INT this will sit at logic 1 for Progressive scan and logic 0 for interlaced.

In **interlaced mode** the 8 bit Y/Cb/Cr video data on **VIDP7-0** are passed to input port pins **D15 – D8** of the SII9190.

In **Progressive scan mode** all 20 bits of the Video data bus are used and get mapped as follow.

**VIDP 19 -12 provide 8 msbits of Y data to pins D15-8**

**VIDP 11 -10 provide 2lsbits of Y data to pins D2-3**

**VIDP 9 - 2 provide 8 msbits of Cb/Cr data to pins D23 – 16**

**VIDP 1 – 0 provide 2 lsbits of Cb/Cr data to pins D7 - 6**

Along with the VIDP video data lines we must also see

**VSYNC – Vertical sync data**

**HSYNC – Horizontal sync**

**CLK27M\_VID – 27Mhz video clock.**

**SPDIF – Digital audio data (Full surround)**

**MCLK\_HDMI – Used to strobe HDMI dig audio**

At the **output** of the HDMI chip we will see the following signals at SKT100.

**TMDS** (Transistion Minimised Differential Signalling) this consists of a clock signal (TxC+/TxC-) and 3 data signals (**TX0+/TX0-, TX1+/TX1- and TX2+/TX2-**). All signals are differential and use current switching techniques therefore no signals will be observed unless the output is correctly terminated. In this application the clock signal will always be 27MHz and the data signals will be clock X10 so 270Mbit/s.

**DDC Channel** this is a 12C interface on DDC\_SCL and DDC\_SDA. These signals connect to the VADDIS V which is the I2C bus master, The DDC channel is used to read back information from the HDMI sync regarding it's Video and Audio capabilities and is also used for HDCP encryption authentication.

**+5V Power**, the HDMI interface requires a 5V supply capable of delivering around 50mA, the supply is provided by REG 1101 which delivers the required current and will shut down in the event of a short circuit.

**Hotplug.** The HDMI `Hot plug' signal HDPIN is a +5V to signal the presence of equipment being connected, this converted to 3v3 logic 1 as IC1100 is not +5V tolerant.

**CEC.** The CEC (Consumer Electronics Control) signal is a 1-wire bidirectional control signal. It connects to the Vaddis via an ESD protection circuit D1102 at the moment this line is not used at present and is an optional part of the HDMI specification.



## Comms and Final video output stage

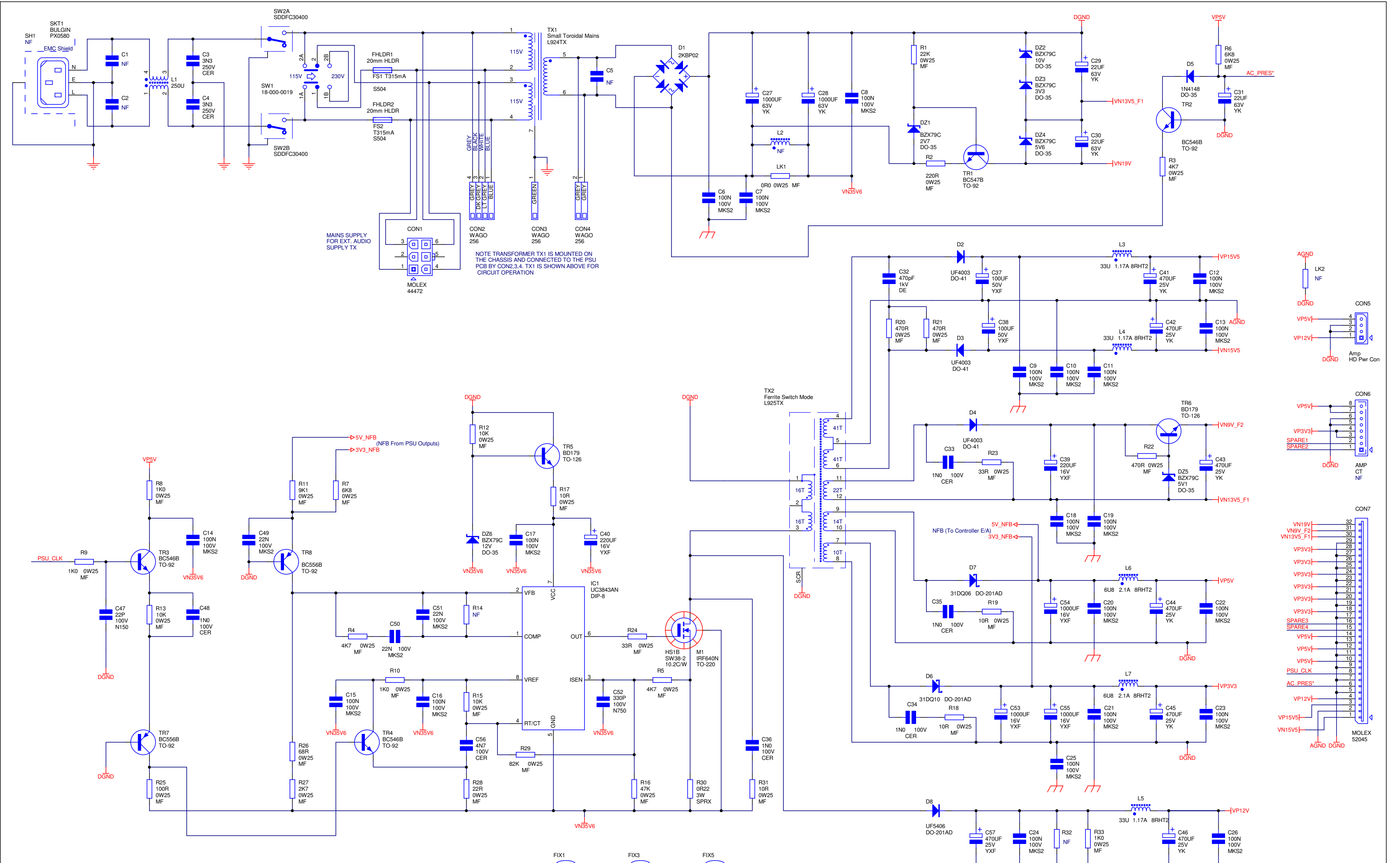
The signals from the main board travel up to the Comms board on connector **CON902**.

The **Video signals** simply travel via an A-C coupling net before exiting the player via the RCA-phono sockets at locations **SKT902** and **SKT903**.

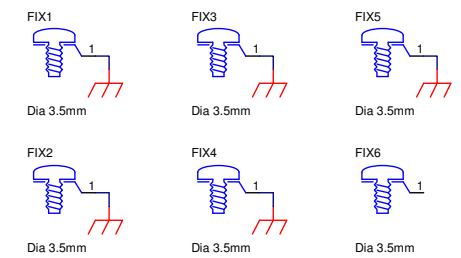
The **RS232** interface is on 9 way "D" type CON900, with IC900 providing the level translation and static protection between the RS232 levels and the **3.3V** CMOS levels required by the VADDIS V, **CON900** also supplies a **+5V** Status level when ever the unit is not in standby this generated from a buffered version of the **AV\_ENABLE** signal as used within the SCART output stage (0V in standby).

We have two remote input bus's on this board, the first can be seen to arrive at **SK901** on a 3.5mm mono jack signal received should be a **36Khz** modulated RC5 signal, the RC5 data then travels to the front panel and is fed to IR led that is sited just behind the front panel **IR Sensor**, we use the sensor to demodulate the and opto-isolate the signal due to the fact that the signal is floating up from ground.

The 3.5mm socket at location **SKT900** is used to receive un-modulated RC5 the 0V representing a space (equivalent to no-infra-red carrier), this input is effectively wire-Ord with the front panel IR receiver on **IRRCV** these take the form of a 5V/0V RC5 signal, with 5V representing a mark (equivalent to a burst of 36Khz carrier on infrared) and 0V representing a mark (space), the signal is simply inverted and wire-ord to the display board Infra-red led via **TR900**.



ITEM	QTY	PART No.	DESCRIPTION	NOTES
ITEM1	1	F006	Clip For SW Profile Heatsink	
ITEM2	1	F082	Sil Pad For TO-220 HS Insulator	
ITEM3	2	F022	Fuseholder Cover For 20mm Fuseholder	
ITEM4	1	L959PB	Blank PCB DV78 PSU	
ITEM6	1	F044	Cable Tie 100MM X 2.5MM	USED TO SECURE TRANSFORMER CABLES TO PCB NEAR CON1
ITEM5	1	8M101	Earth Lead Assy 75MM	SAFETY EARTH WIRE FROM IEC INLET SK1 TO METAL CHASSIS
ITEM7	2	HP007S	Rivet Copper	RIVETS TO SECURE IEC INLET TO PCB



- FD1 TOOL1
- FD2 TOOL2
- TOOL3
- TOOL4

**DRAWING TITLE**  
**DV78 SERIES PSU**

**ARCAM**  
 A & R Cambridge Ltd.  
 Pembroke Avenue  
 Waterbeach  
 Cambridge CB5 9PB

Filename: L959\_1.1.sch  
 Notes:  
 Contact Engineer: Kevin Lamb  
 Contact Tel: (01223) 203200

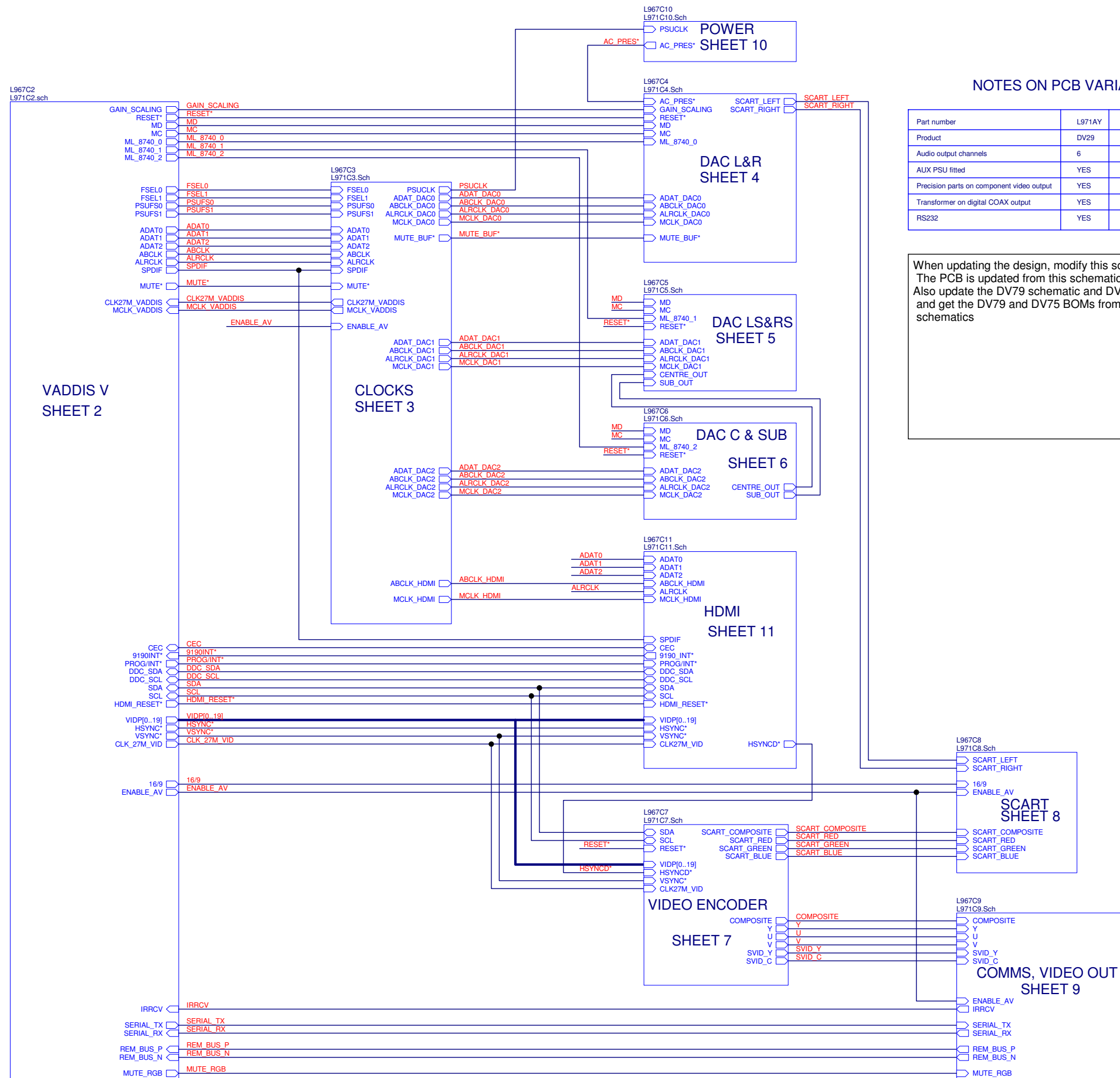
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE
04_E046	PG	22/04/04	Make CON1 fitted (used in DV29)	1.1
03_E195	KAL	02/07/03	Production release	1.0

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 Sheet 1 of 1  
 DRAWING NO. L959CT



**DV29 DVD player PSU board L959AY issue 1.1.1**

Designator	Part	Description
C1	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C2	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C3	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C4	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C5	2MA610	Capacitor Surface Mount Electrolytic 10UF 50V 6.3 X 4.5MM
C6	2MA610	Capacitor Surface Mount Electrolytic 10UF 50V 6.3 X 4.5MM
C7	2MA610	Capacitor Surface Mount Electrolytic 10UF 50V 6.3 X 4.5MM
C8	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C9	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C10	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C11	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
CON1	8K8616	Con 1.0MM Horiz FFC 16WAY 52807 Series
D1	3AS16W	Diode Surface Mount Small Signal BAS16W SOT-23 Package
D2	3AS16W	Diode Surface Mount Small Signal BAS16W SOT-23 Package
D3	3AS16W	Diode Surface Mount Small Signal BAS16W SOT-23 Package
D4	3AS16W	Diode Surface Mount Small Signal BAS16W SOT-23 Package
DISP1	B1014	Display DV88
IC1	5H6312	IC VFD Driver PT6312LQ SM LQFP-44 package
LED1	3D007	LED 3.1mm Green SLR-37MG3T
LED2	3D010	LED SM Red SML-010LT
LED3	3D007	LED 3.1mm Green SLR-37MG3T
LED5	3D006	LED 3mm Red/Green Tri-Colour L-93WEGW
R1	1M133	Resistor 0805 Surface Mount 0.125W 1% 330R
R2	1M133	Resistor 0805 Surface Mount 0.125W 1% 330R
R3	1M133	Resistor 0805 Surface Mount 0.125W 1% 330R
R4	1M122	Resistor 0805 Surface Mount 0.125W 1% 220R
R5	1M118	Resistor 0805 Surface Mount 0.125W 1% 180R
R6	1M139	Resistor 0805 Surface Mount 0.125W 1% 390R
R8	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R9	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R10	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R11	1M356	Resistor 0805 Surface Mount 0.125W 1% 56K
R13	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R14	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R15	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
RX1	B2109	IR Receiver Module Kodenshi KSM-902TM1N
SW1	A1511	Switch Tact Low Profile No Gnd Pin
SW2	A1511	Switch Tact Low Profile No Gnd Pin
SW3	A1511	Switch Tact Low Profile No Gnd Pin
SW4	A1511	Switch Tact Low Profile No Gnd Pin
SW5	A1511	Switch Tact Low Profile No Gnd Pin
SW6	A1511	Switch Tact Low Profile No Gnd Pin
SW7	A1511	Switch Tact Low Profile No Gnd Pin
SW8	A1511	Switch Tact Low Profile No Gnd Pin
SW9	A1511	Switch Tact Low Profile No Gnd Pin
TR2	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR3	4A849B	Transistor BC849B SOT23 Package
TR4	4A849B	Transistor BC849B SOT23 Package
TR5	4D10KP	Digital Transistor MMUN2211LT1 SOT23 Package



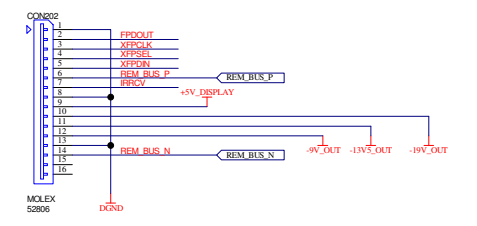
**NOTES ON PCB VARIANTS**

Part number	L971AY	L974AY	L973AY
Product	DV29	DV79	DV75
Audio output channels	6	6	2
AUX PSU fitted	YES	NO	NO
Precision parts on component video output	YES	NO	NO
Transformer on digital COAX output	YES	NO	NO
RS232	YES	YES	NO

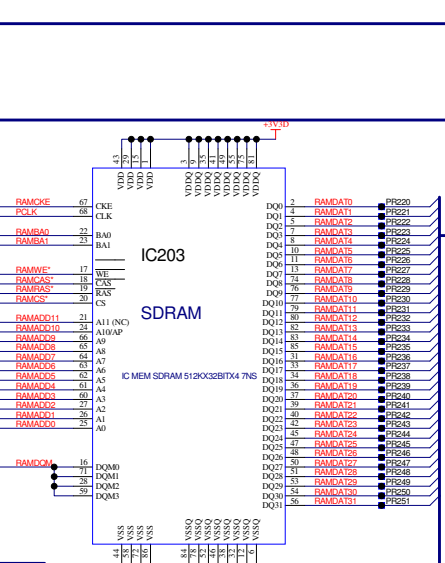
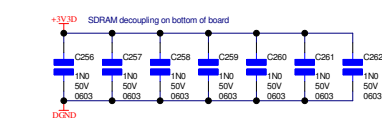
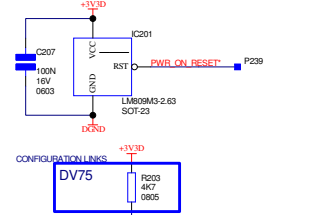
When updating the design, modify this schematic first. The PCB is updated from this schematic. Also update the DV79 schematic and DV75 schematic, and get the DV79 and DV75 BOMs from their own schematics

ITEM100	1	L971PB	Blank PCB DV29 Main Board	
<b>DRAWING TITLE</b>				
<b>DV29 MAIN BOARD TOP LEVEL</b>				
<b>ARCAM</b>		Filename: L971C1.Prj		
A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR		Notes:		
04_E121	PG	09-08-04	Production release	
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE
Contact Engineer: Peter Gaggas		Contact Tel: (01223) 203270		Printed: 24-Aug-2004
Sheet 1 of 11			A2	DRAWING NO. L971C1

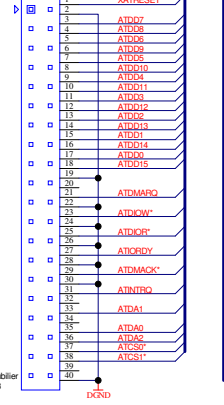
FRONT PANEL



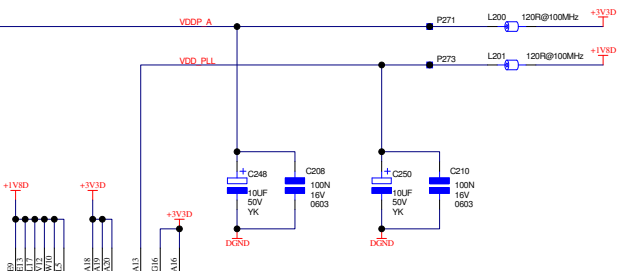
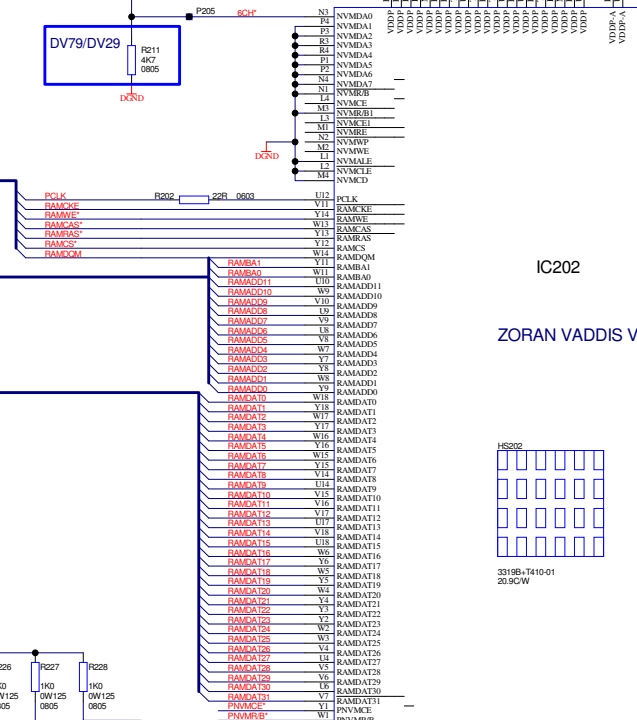
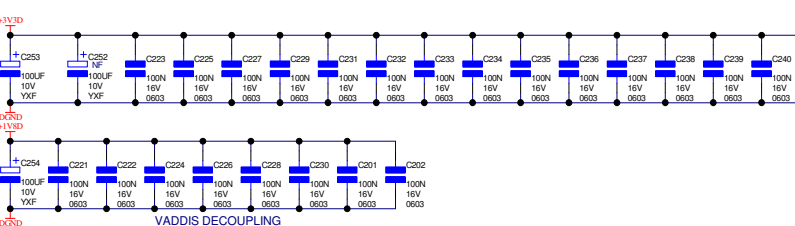
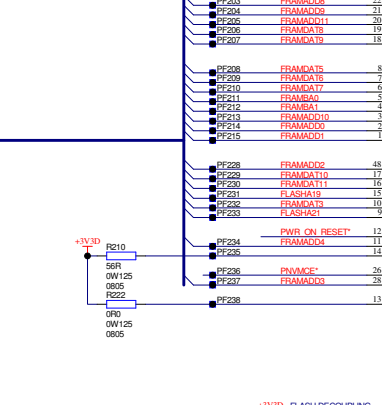
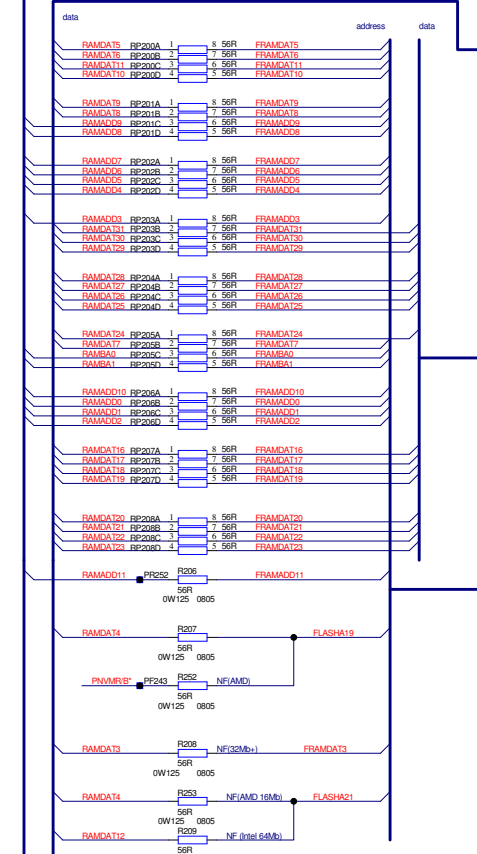
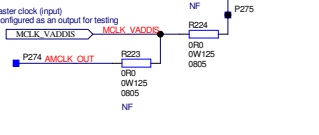
RESET



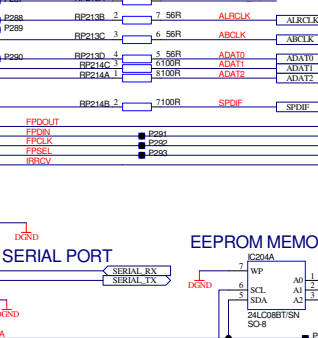
DRIVE



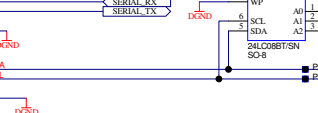
CLOCKS



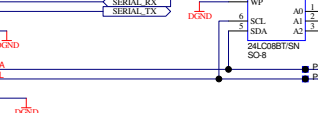
DIGITAL AUDIO



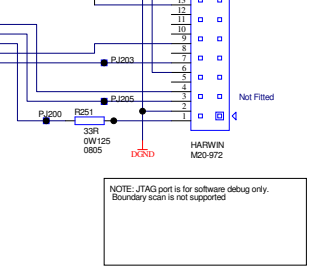
SERIAL PORT



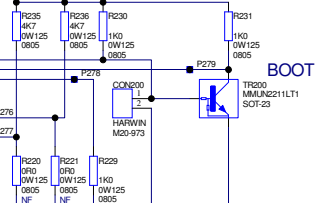
EEPROM MEMORY



EJTAG DEBUG



BOOT SELECT



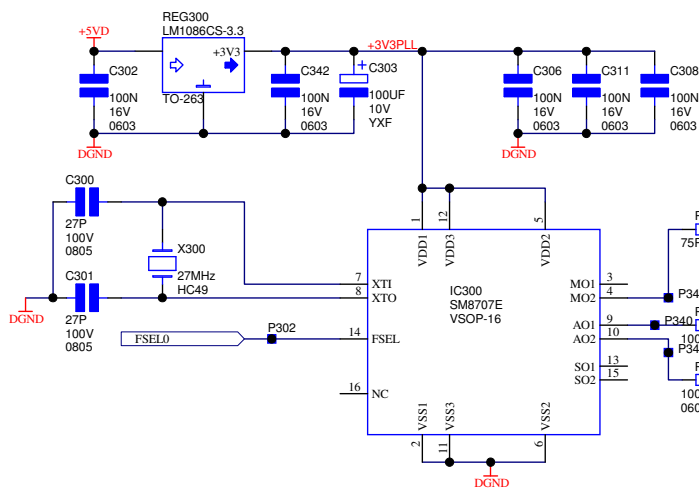
Use these resistors to configure for Intel/AMD 8Mbit, 16Mbit, 32Mbit or 64Mbit devices. Inter 32Mbit is used for DV79

To enable VADDS PLL for testing: Make PLLCFG low before AMCLK. Link CLK27M to CLK27M. Connect AMCLK\_OUT to AMCLK. AMCLK is now an output and the VADDS PLL is enabled.

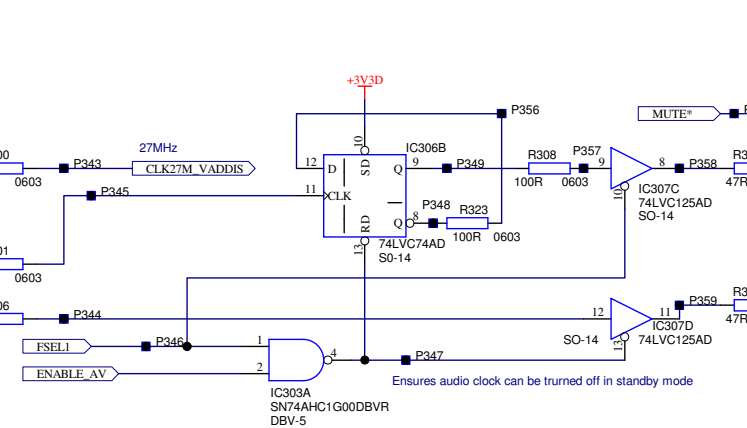
Design note: Some VADDS GPIOs initialise as op high, some as op low. MUTE must use one that initialises as op low. Currently on pin T2

Table with drawing title 'DV29 MAIN VADDS V', filename 'L971C2.sch', and other metadata including date, revision, and contact information.

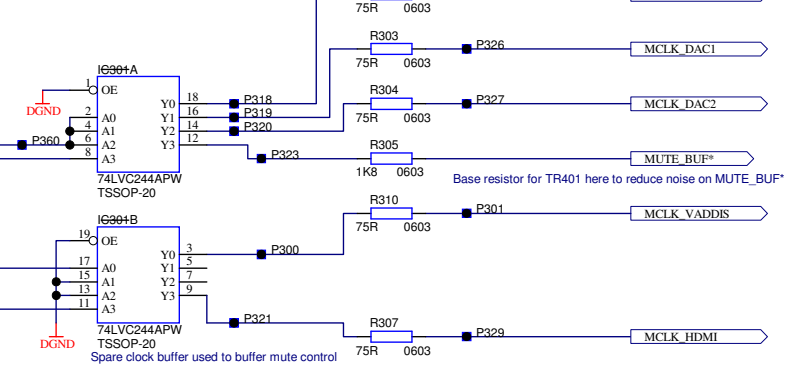
### CLOCK GENERATOR



### CLOCK DIVIDER

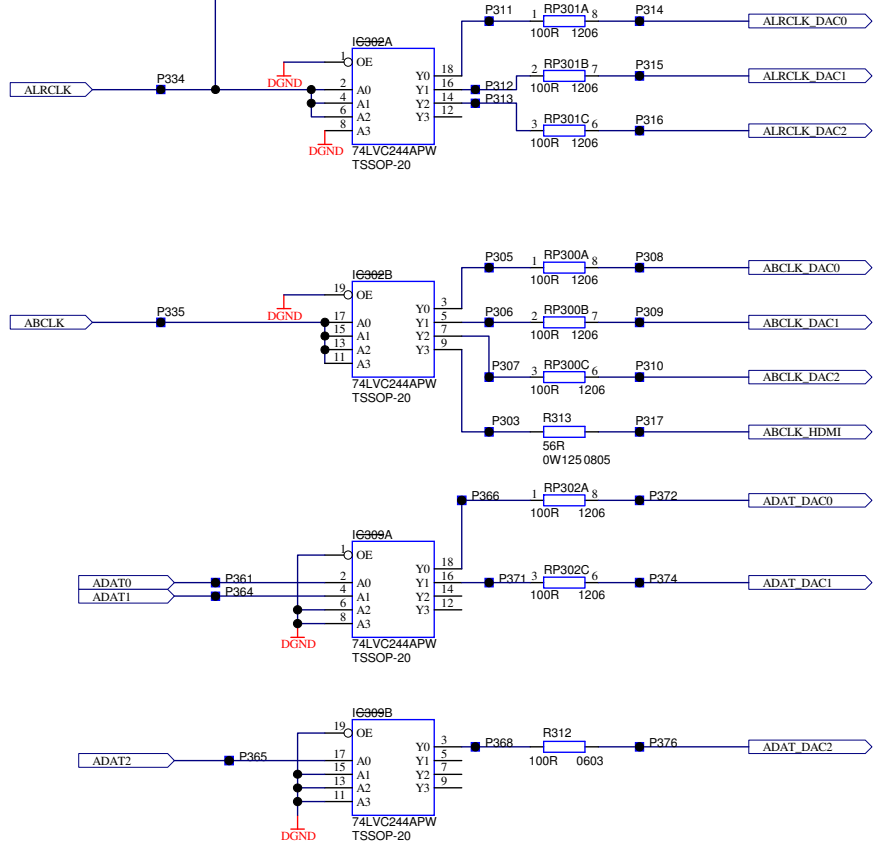


### AUDIO CLOCK BUFFER

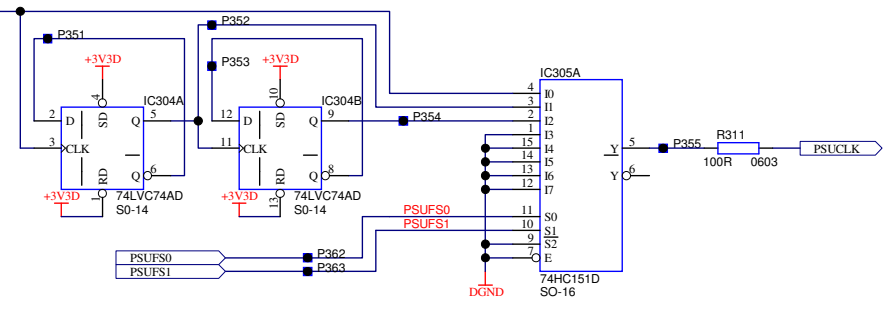


Fs	Master clock frequency	(256 x Fs)	
44.1kHz	11.2896MHz	(256 x Fs)	00
48kHz	12.288MHz	(256 x Fs)	01
88.2kHz	22.5792MHz	(256 x Fs)	10
96kHz	24.576MHz	(256 x Fs)	11
176.4kHz	22.5792MHz	(128 x Fs)	10
192kHz	24.576MHz	(128 x Fs)	11

### I2S BUFFER

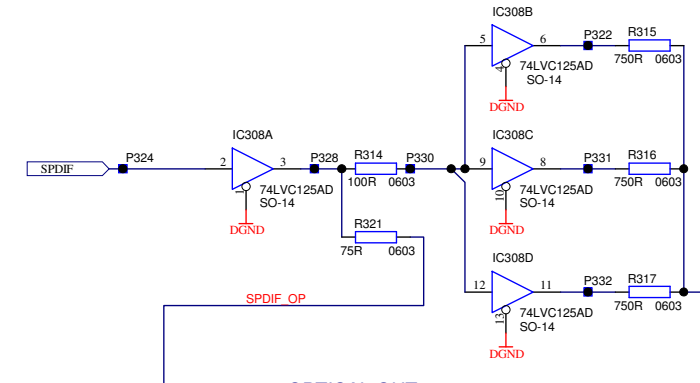


### PSU CLOCK DIVIDER

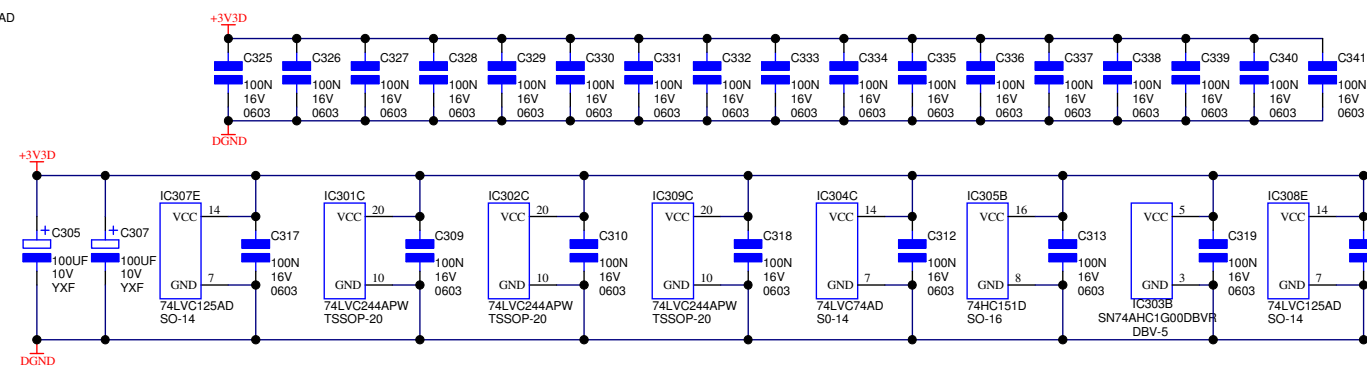
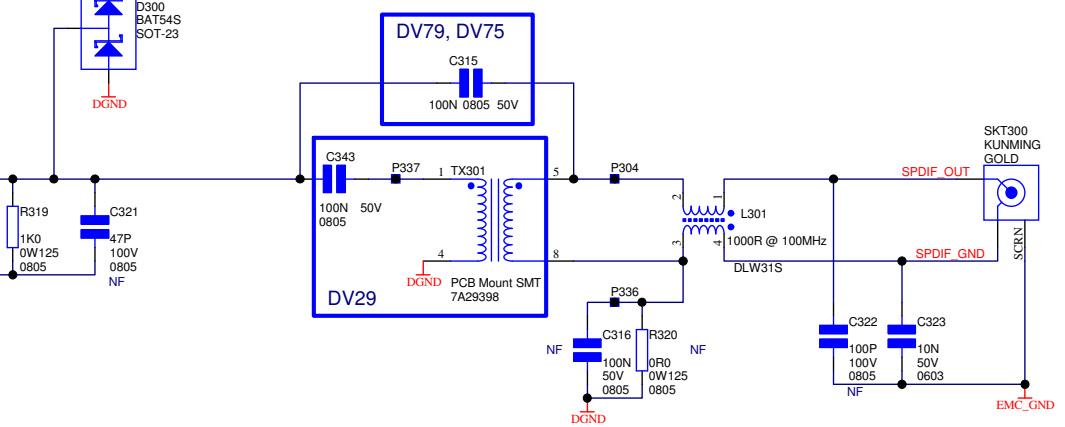
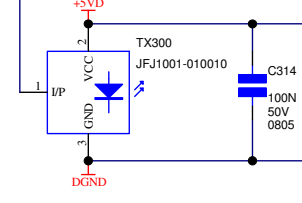


Fs	PSUFS1	PSUFS0	PSUCLK
44.1kHz	0	0	44.1kHz
48kHz	0	0	48kHz
88.2kHz	0	1	44.1kHz
96kHz	0	1	48kHz
176.4kHz	1	0	44.1kHz
192kHz	1	0	48kHz
others	1	1	OFF

### SPDIF COAX OUTPUT



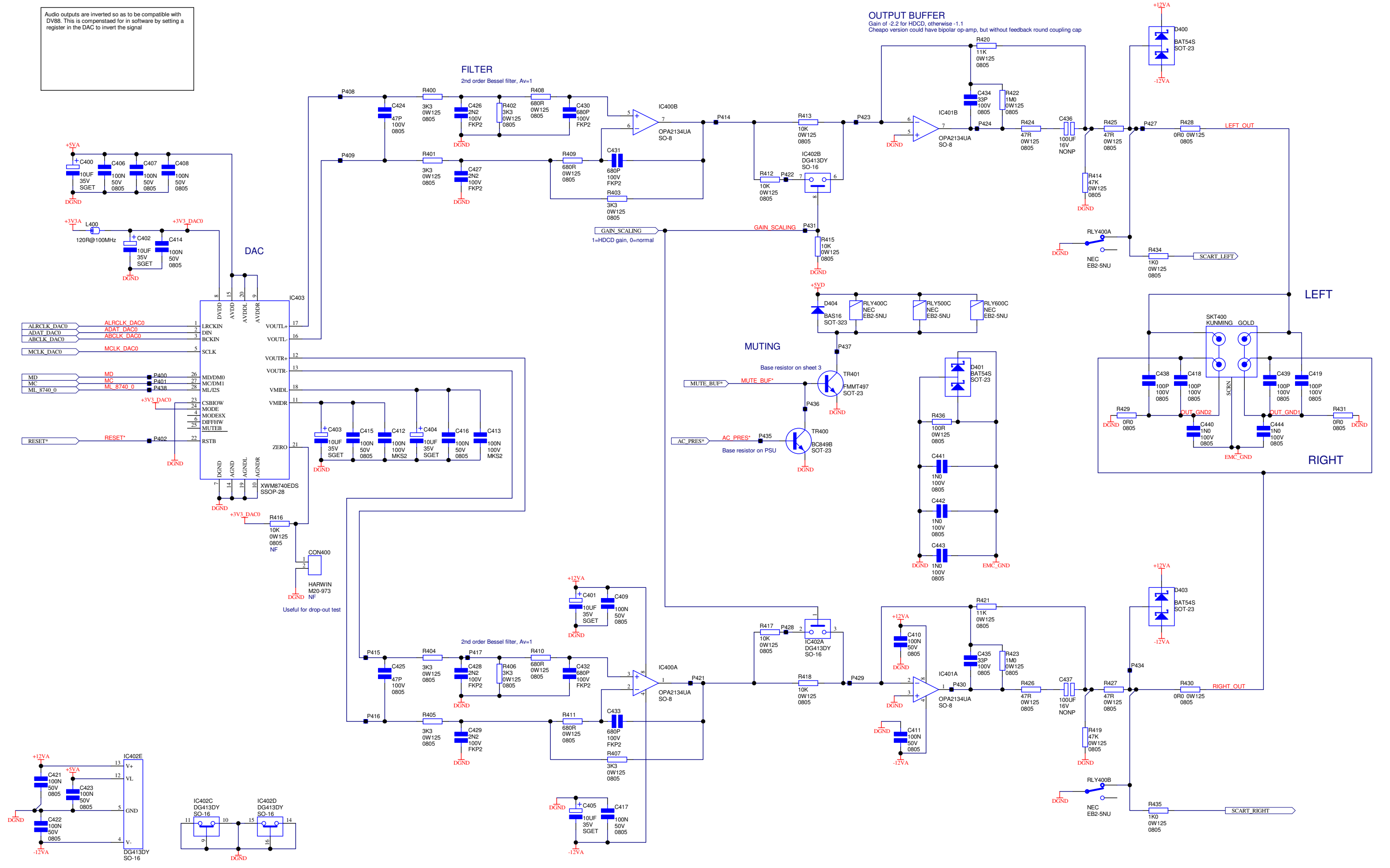
### OPTICAL OUT



ITEM300	1	E828AP	Pad Damping 7.5x6x3MM Rubber	Fit on one side of X300 (see assembly drawing)
<b>DRAWING TITLE</b>				
<b>DV29 MAIN CLOCKS &amp; SPDIF</b>				
<b>ARCAM</b>				
A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR				
File name: L971C3.Sch		Notes:		
04_E121	PG	09-08-04	Production release	1.0
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE
Contact Engineer: Peter Gags	Contact Tel: (01223) 203270	Printed: 24-Aug-2004	Sheet 3 of 11	A2 DRAWING NO. L971C3



Audio outputs are inverted so as to be compatible with DV88. This is compensated for in software by setting a register in the DAC to invert the signal

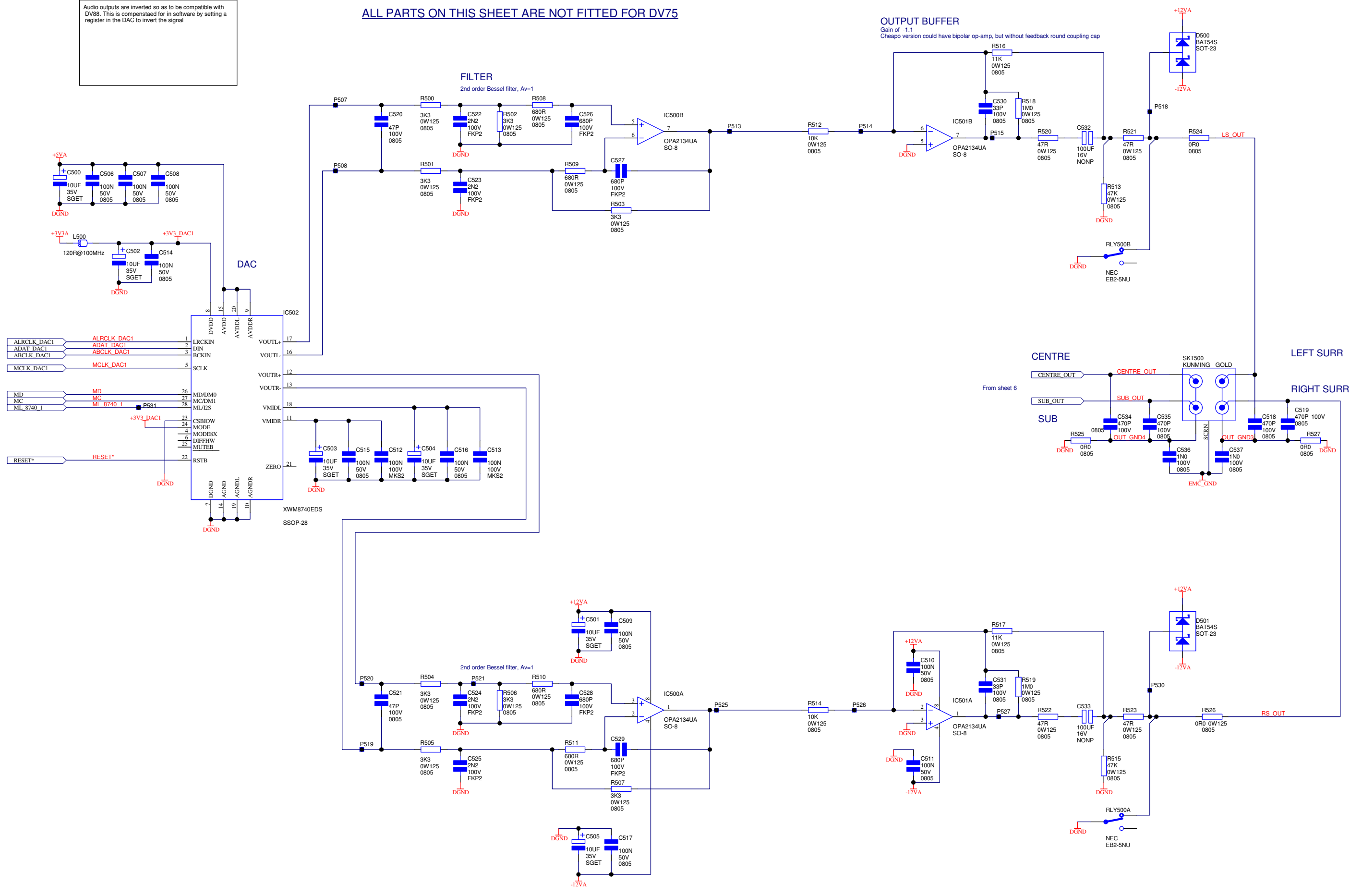


ITEM#00	1	E828AP	Pad Damping 7.5x6x3MM Rubber	Fit on top of RLY400
<b>DRAWING TITLE</b>				
<b>DV29 MAIN DAC L &amp; R AUDIO</b>				
<b>ARCAM</b>				
A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR				
File name:	L971C4.Sch			
Notes:				
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE
04_E121	PG	09-08-04	Production release	1.0
Contact Engineer: Peter Gagg		Contact Tel: (01223) 203270		Printed: 24-Aug-2004
		Sheet 4 of 11		A2 DRAWING NO. L971C4



Audio outputs are inverted so as to be compatible with DV88. This is compensated for in software by setting a register in the DAC to invert the signal

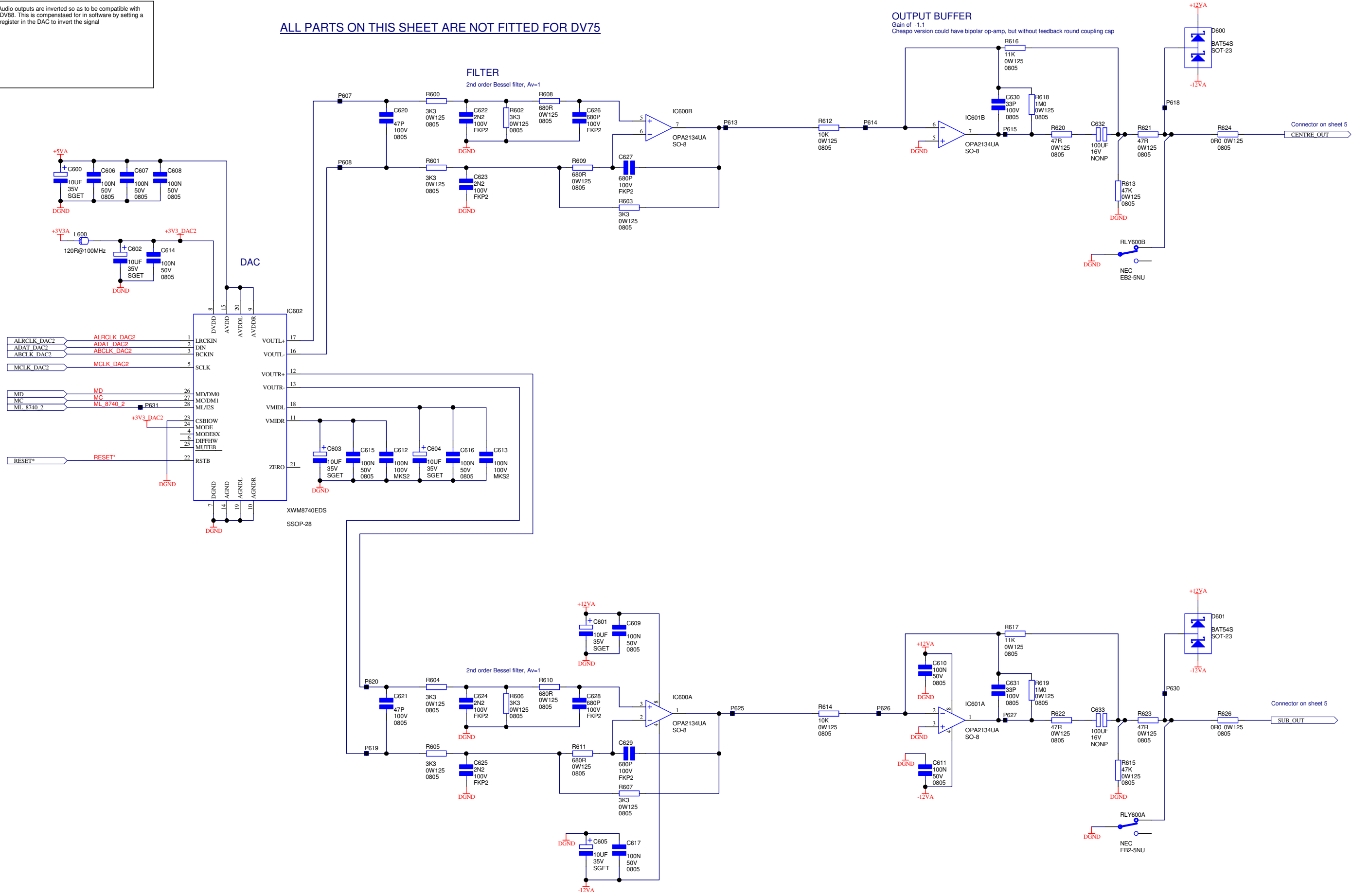
ALL PARTS ON THIS SHEET ARE NOT FITTED FOR DV75



ITEM500	1	E828AP	Pad Damping 7.5x6x3MM Rubber	Fit on top of RLY500
<b>DRAWING TITLE</b>				
<b>DV29 MAIN DAC LS &amp; RS AUDIO</b>				
<b>ARCAM</b>				
A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR				
Filename:	L971C5.Sch			
Notes:				
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE
		04_E121	PG 09-08-04	Production release
04_E121	PG	09-08-04	Production release	1.0
Printed:	24-Aug-2004	Sheet	5 of 11	A2 DRAWING NO. L971C5
Contact Engineer:	Peter Gaggs		Contact Tel: (01223) 203270	

Audio outputs are inverted so as to be compatible with DV88. This is compensated for in software by setting a register in the DAC to invert the signal

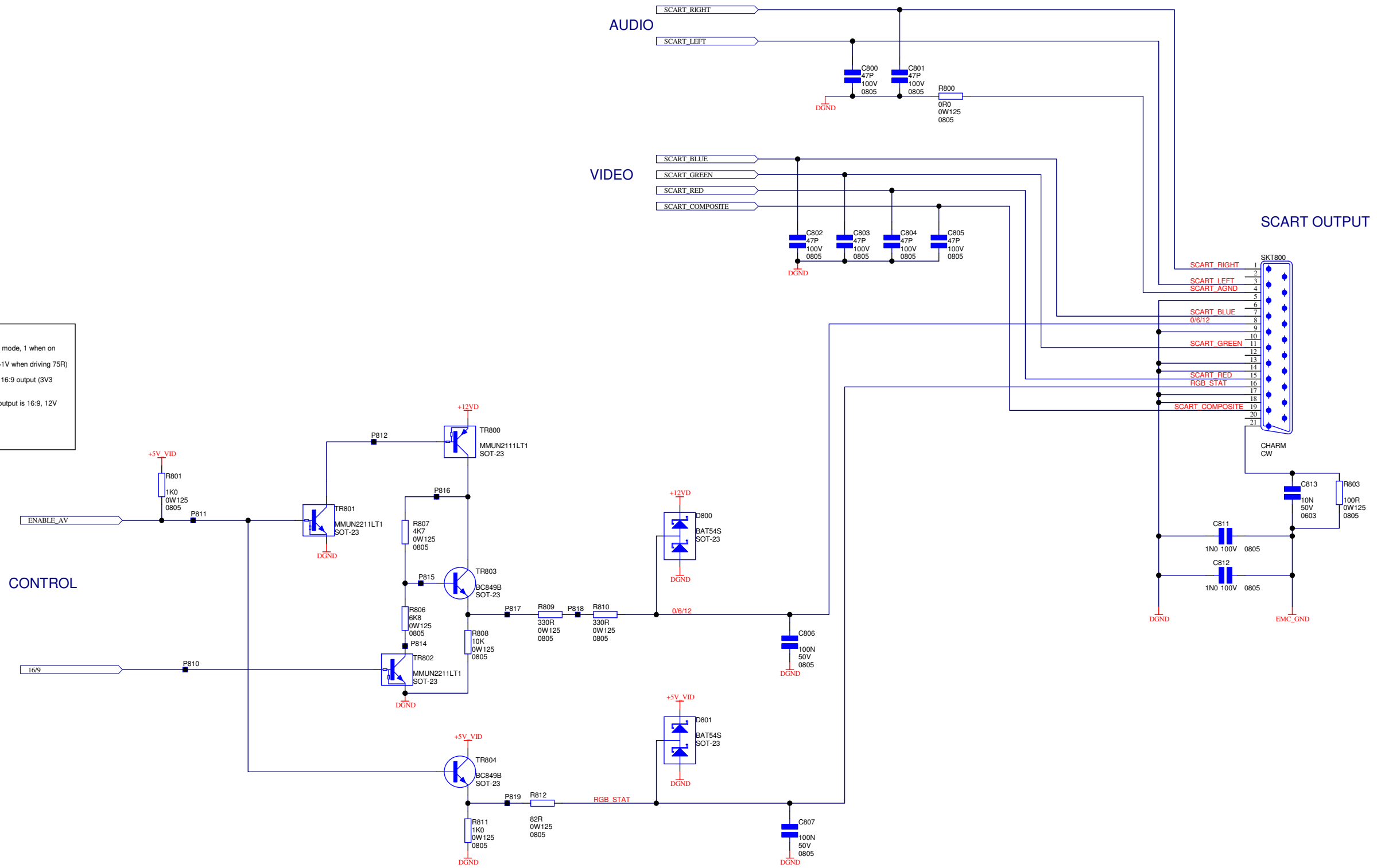
ALL PARTS ON THIS SHEET ARE NOT FITTED FOR DV75



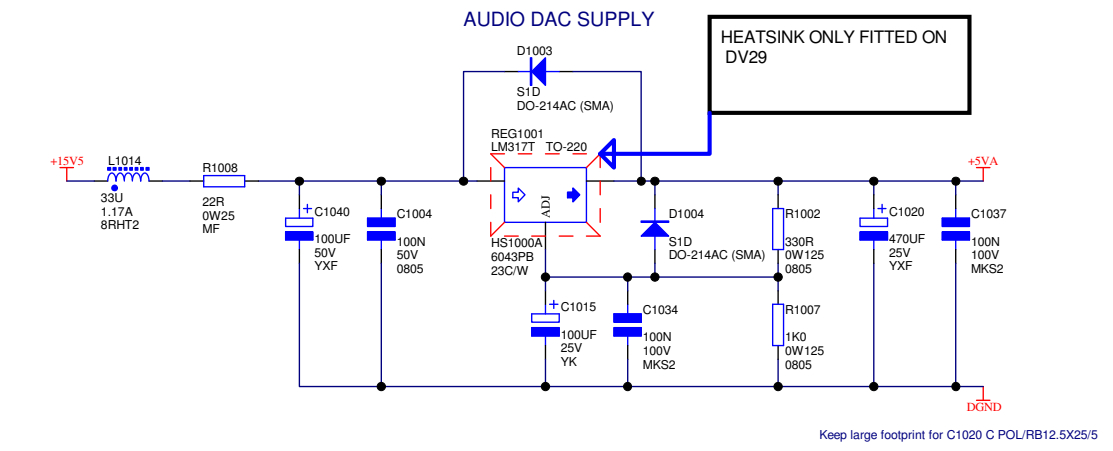
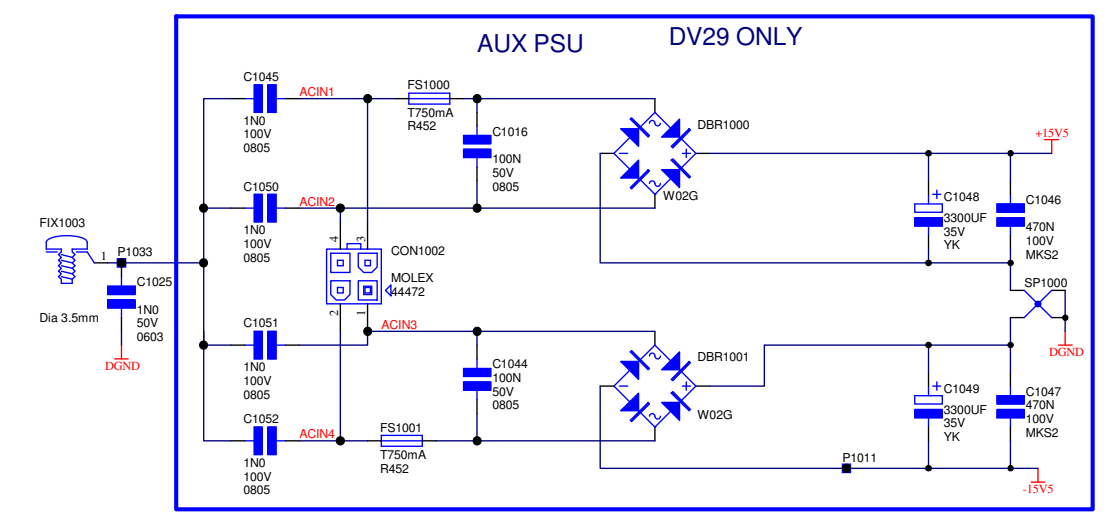
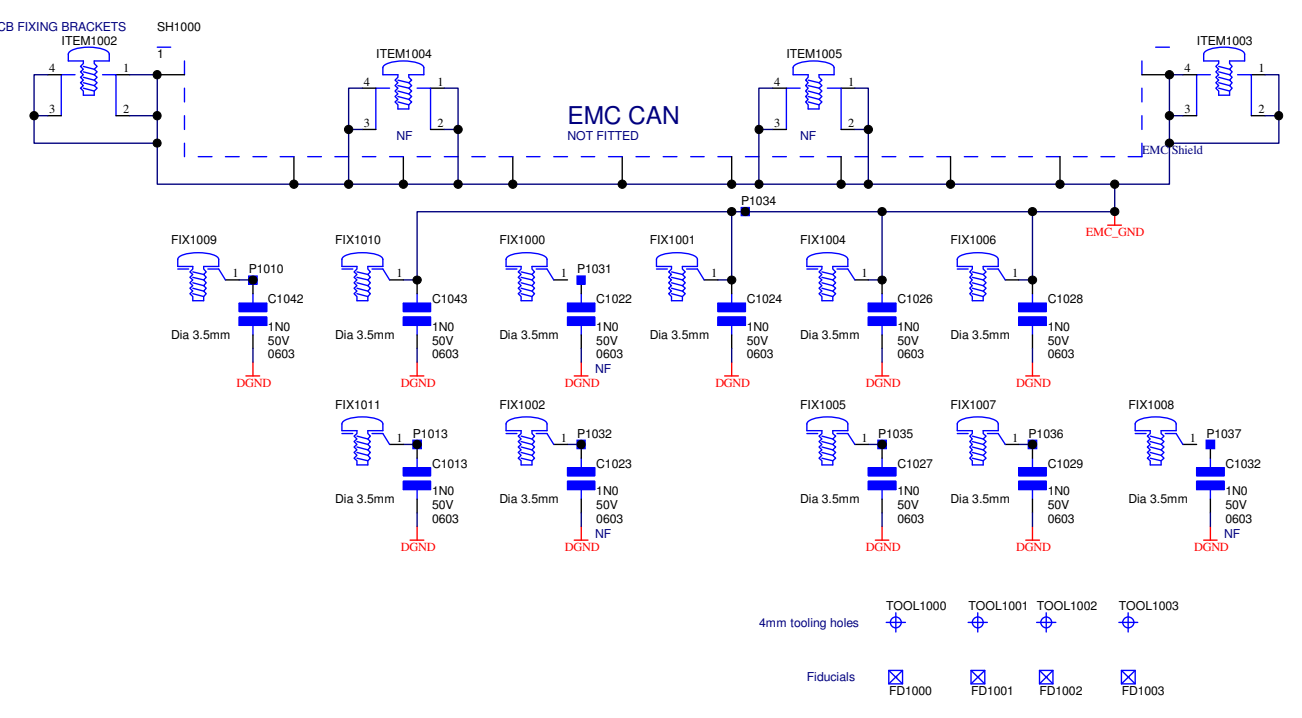
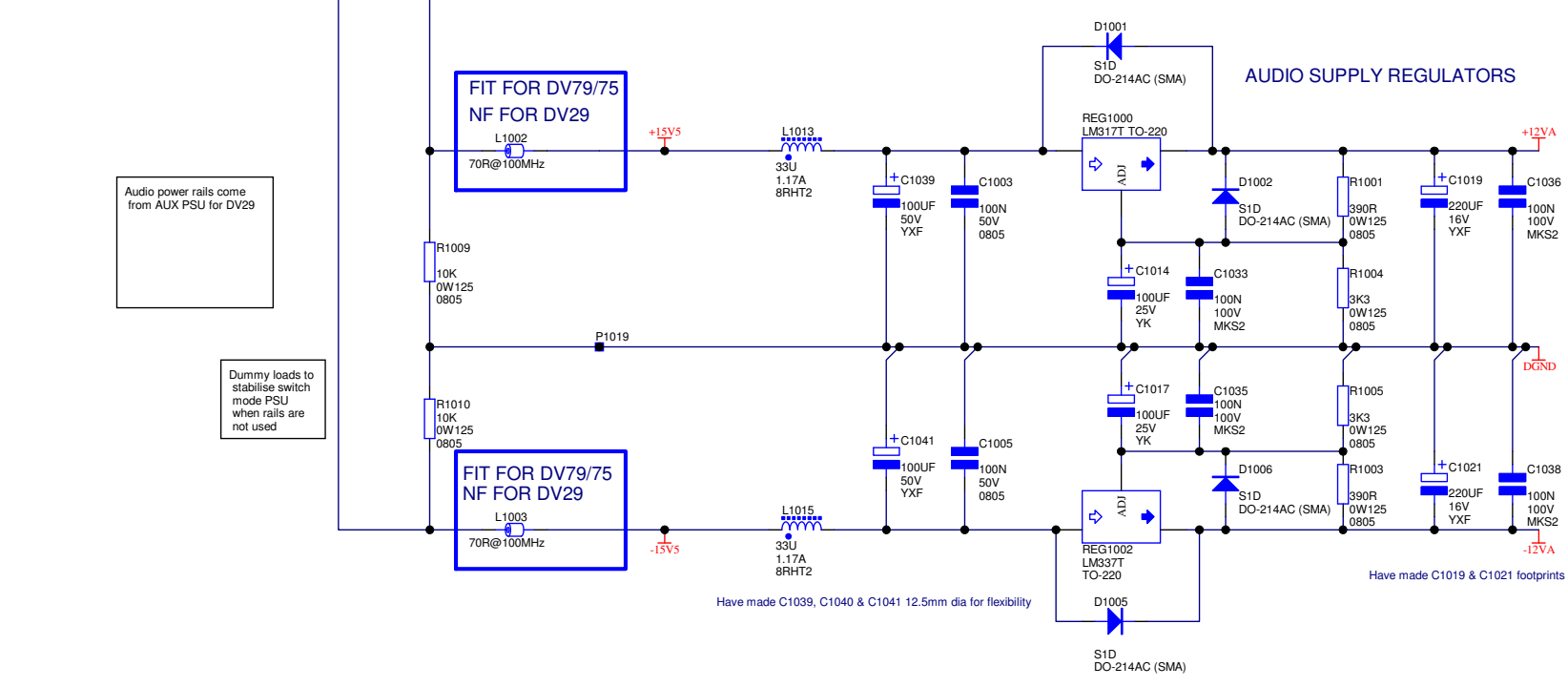
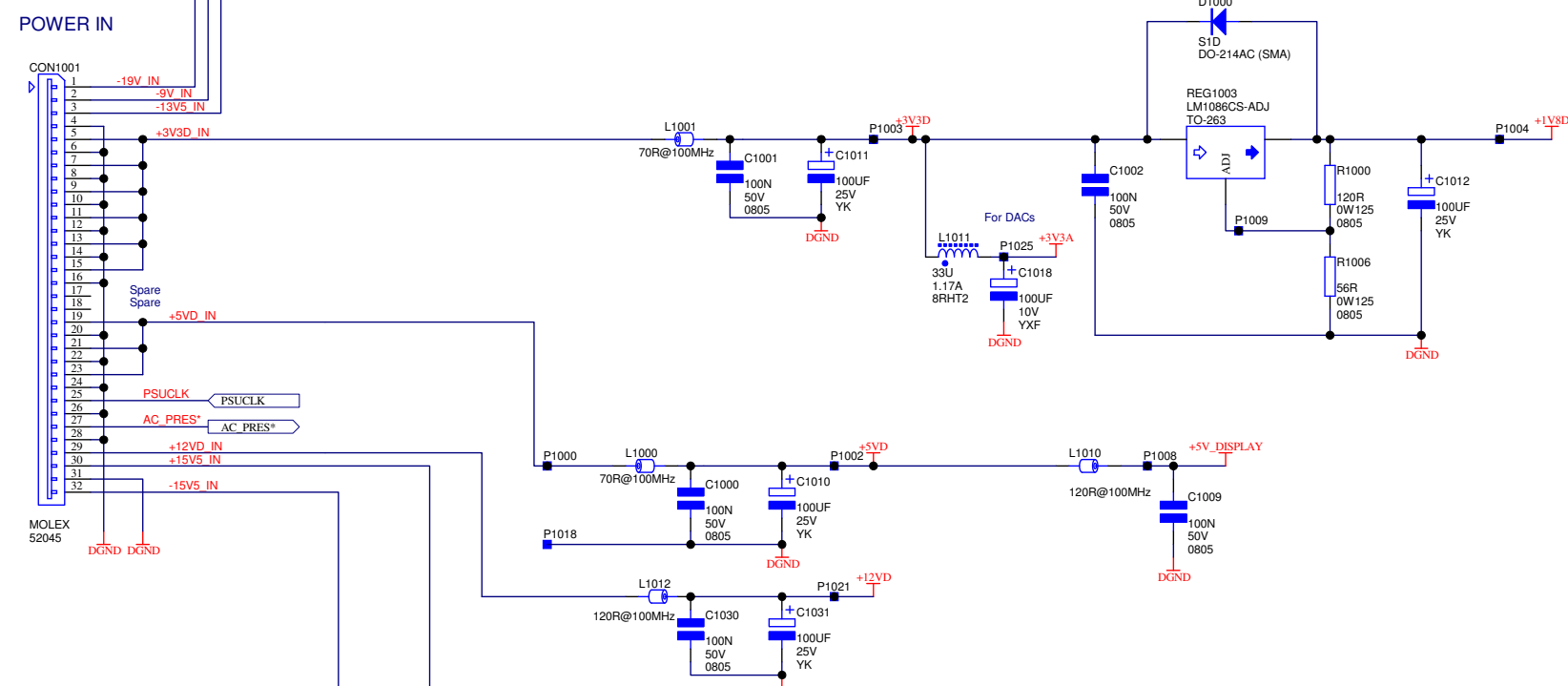
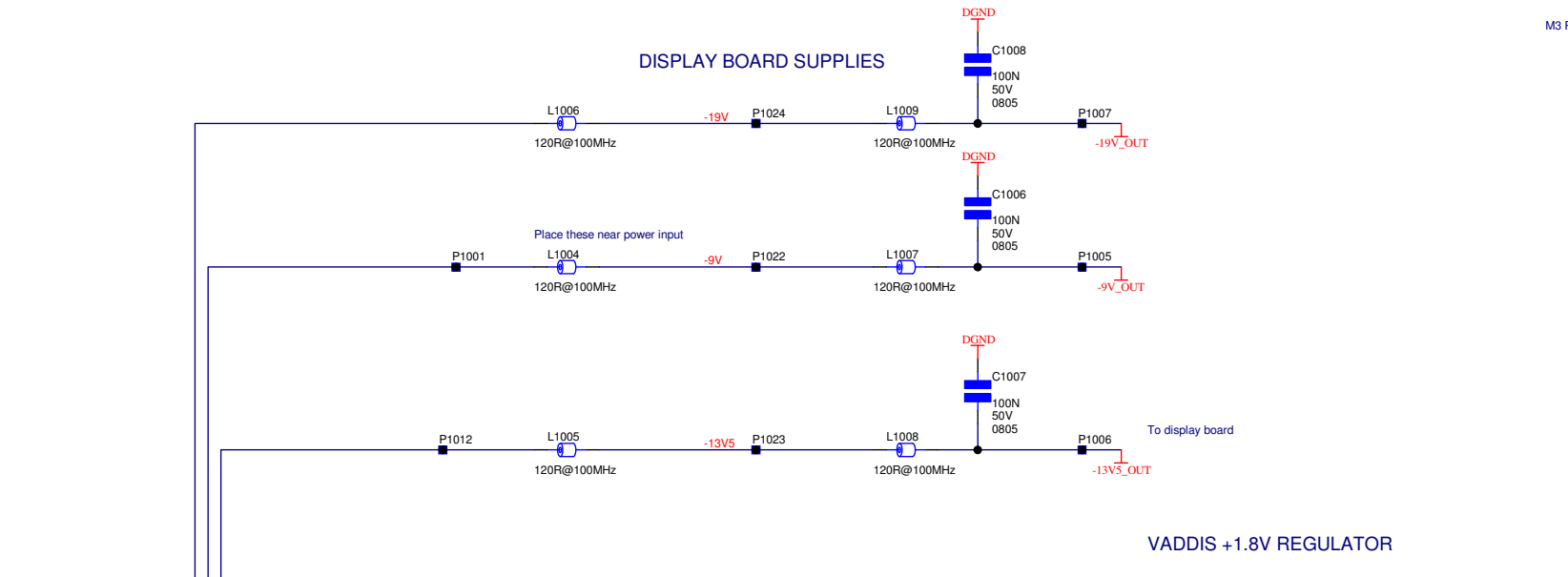
**OUTPUT BUFFER**  
Gain of -1.1  
Cheapo version could have bipolar op-amp, but without feedback round coupling cap

ITEM600	1	E828AP	Pad Damping 7.5x6x3MM Rubber	Fit on top of RLY600
<b>DRAWING TITLE</b>				
<b>DV29 MAIN DAC CENTRE &amp; SUB</b>				
<b>ARCAM</b>		Filename:	L971C6.Sch	
A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR		Notes:		
04_E121	PG	09-08-04	Production release	
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE
		Printed: 24-Aug-2004	Sheet 6 of 11	A2 DRAWING NO. L971C6
Contact Engineer: Peter Gaggs		Contact Tel: (01223) 203270		

SCART control signals  
 ENABLE\_AV: 0 in when standby mode, 1 when on (3V3 levels)  
 (RGB\_STAT is supposed to be >1V when driving 75R)  
 16/9: 0 when 4:3 output, 1 when 16:9 output (3V3 levels)  
 0/6/12: 0V in standby, 6V when output is 16:9, 12V when output is 4:3



DRAWING TITLE		DV29 MAIN SCART OUTPUT					
ARCAM		Filename:	L971C8.Sch				
A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR		Notes:					
		04_E121	PG	09-08-04	Production release		1.0
		ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE		ISSUE
Contact Engineer:	Peter Gaggas	Contact Tel:	(01223) 203270	Printed:	24-Aug-2004	Sheet 8 of 11	A2 DRAWING NO. L971C8



DRAWING TITLE		DV29 MAIN Power	
Filename:		L971C10.Sch	
Notes:			
04_E121	PG	09-08-04	Production release
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE
		24-Aug-2004	Sheet 10 of 11
Contact Engineer: Peter Gags		Contact Tel: (01223) 203270	Printed: 24-Aug-2004
A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR		DRAWING NO. L971C10	

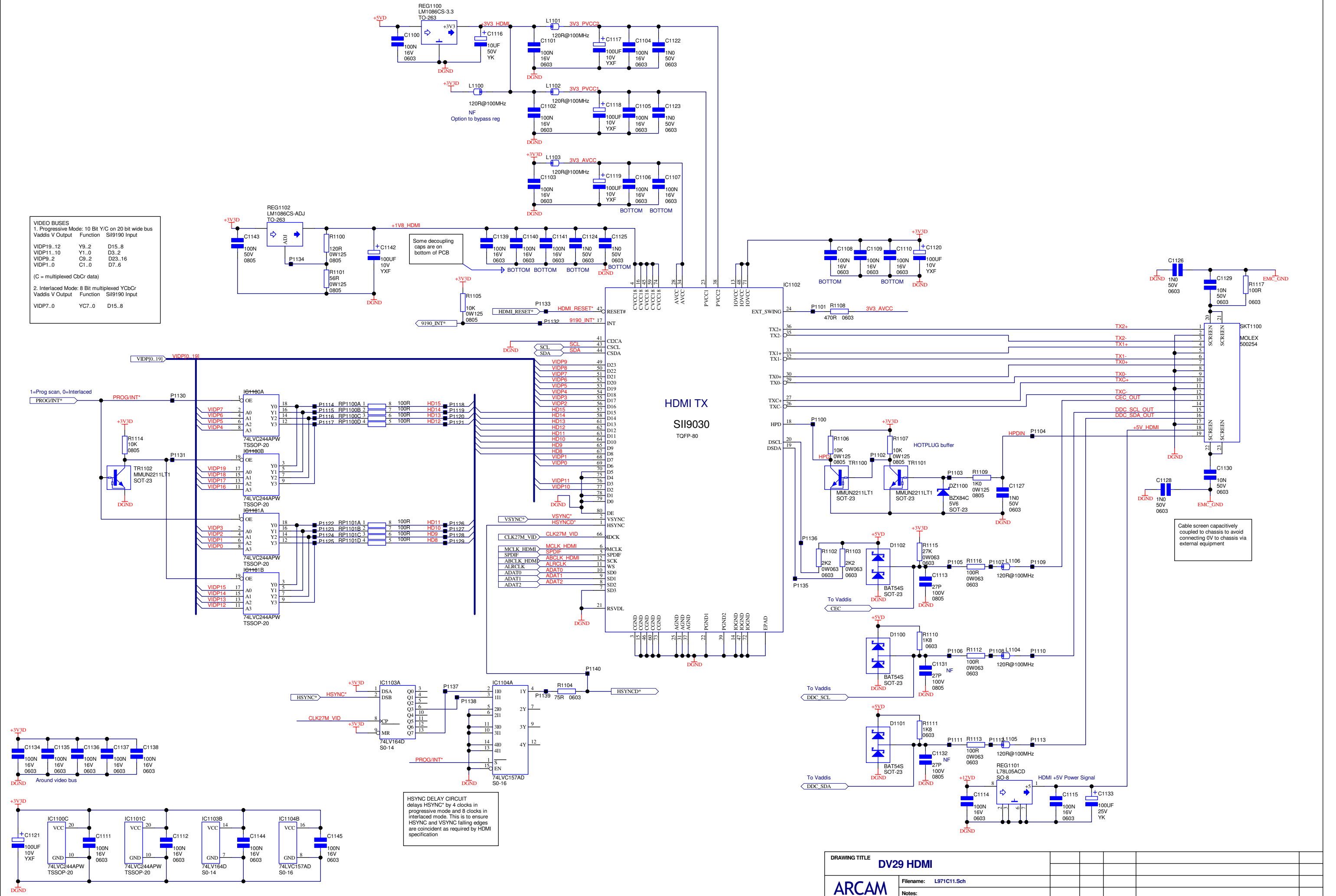
**VIDEO BUSES**  
 1. Progressive Mode: 10 Bit Y/C on 20 bit wide bus  
 Vaddis V Output Function SII9190 Input

VIDP19..12	Y9..2	D15..8
VIDP11..10	Y1..0	D3..2
VIDP9..2	C9..2	D23..16
VIDP1..0	C1..0	D7..6

(C = multiplexed CbCr data)

2. Interlaced Mode: 8 Bit multiplexed YCbCr  
 Vaddis V Output Function SII9190 Input

VIDP7..0	YC7..0	D15..8
----------	--------	--------

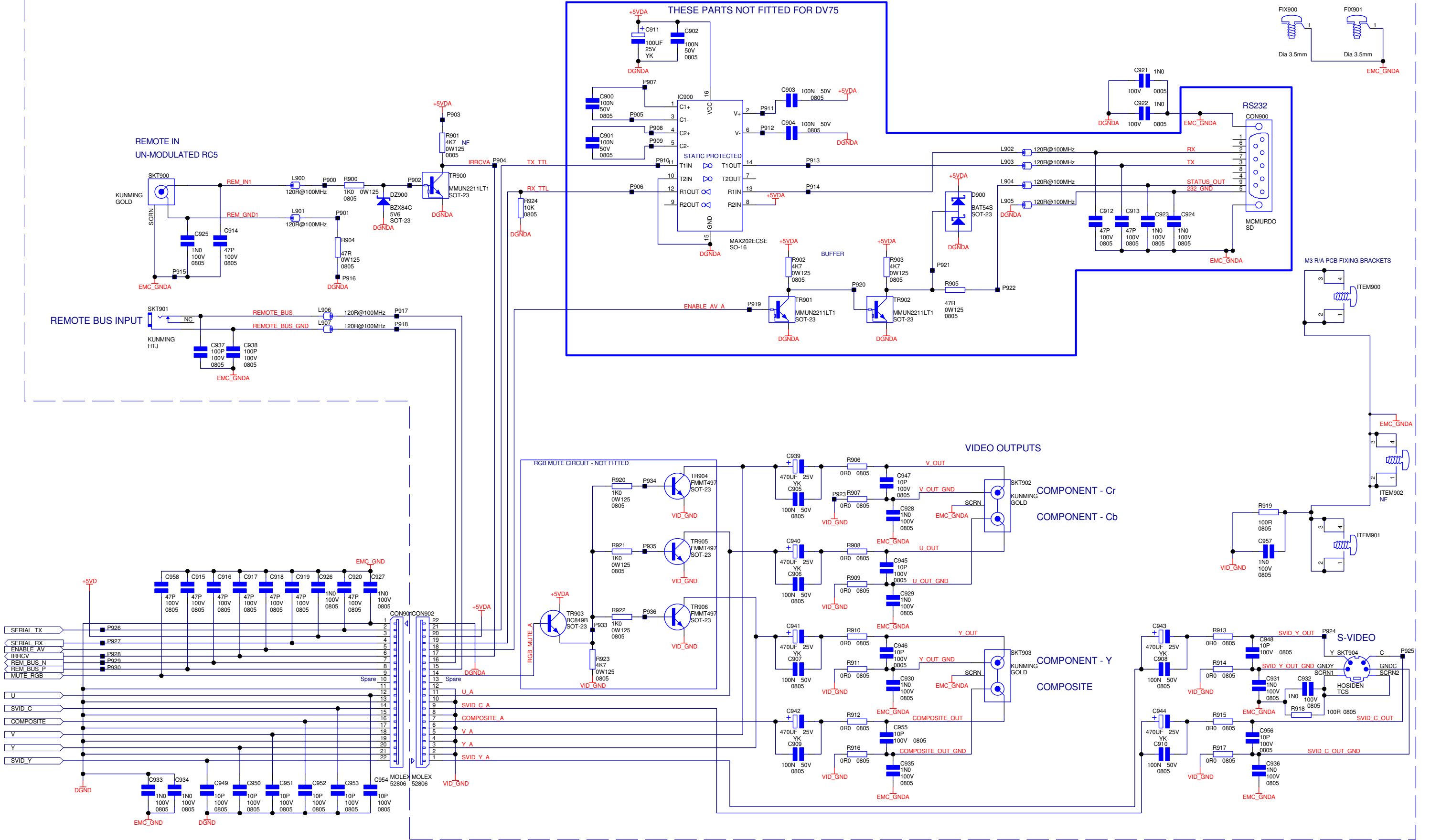


**HSYNC DELAY CIRCUIT**  
 delays HSYNCD by 4 clocks in progressive mode and 8 clocks in interlaced mode. This is to ensure HSYNCD and VSXNC falling edges are coincident as required by HDMI specification

Cable screen capacitively coupled to chassis to avoid connecting 0V to chassis via external equipment

<b>DRAWING TITLE</b>		<b>DV29 HDMI</b>	
<b>Filename:</b>		L971C11.Sch	
<b>Notes:</b>			
<b>ECO No.</b>		04_E121	PG
<b>INITIALS</b>		09-08-04	Production release
<b>DATE</b>			
<b>DESCRIPTION OF CHANGE</b>			
<b>ISSUE</b>			1.0
<b>Contact Engineer:</b>	Peter Gagg	<b>Contact Tel:</b>	(01223) 203270
<b>Printed:</b>	24-Aug-2004	<b>Sheet</b>	11 of 11
<b>A2</b>	<b>DRAWING NO.</b>	L971C11	

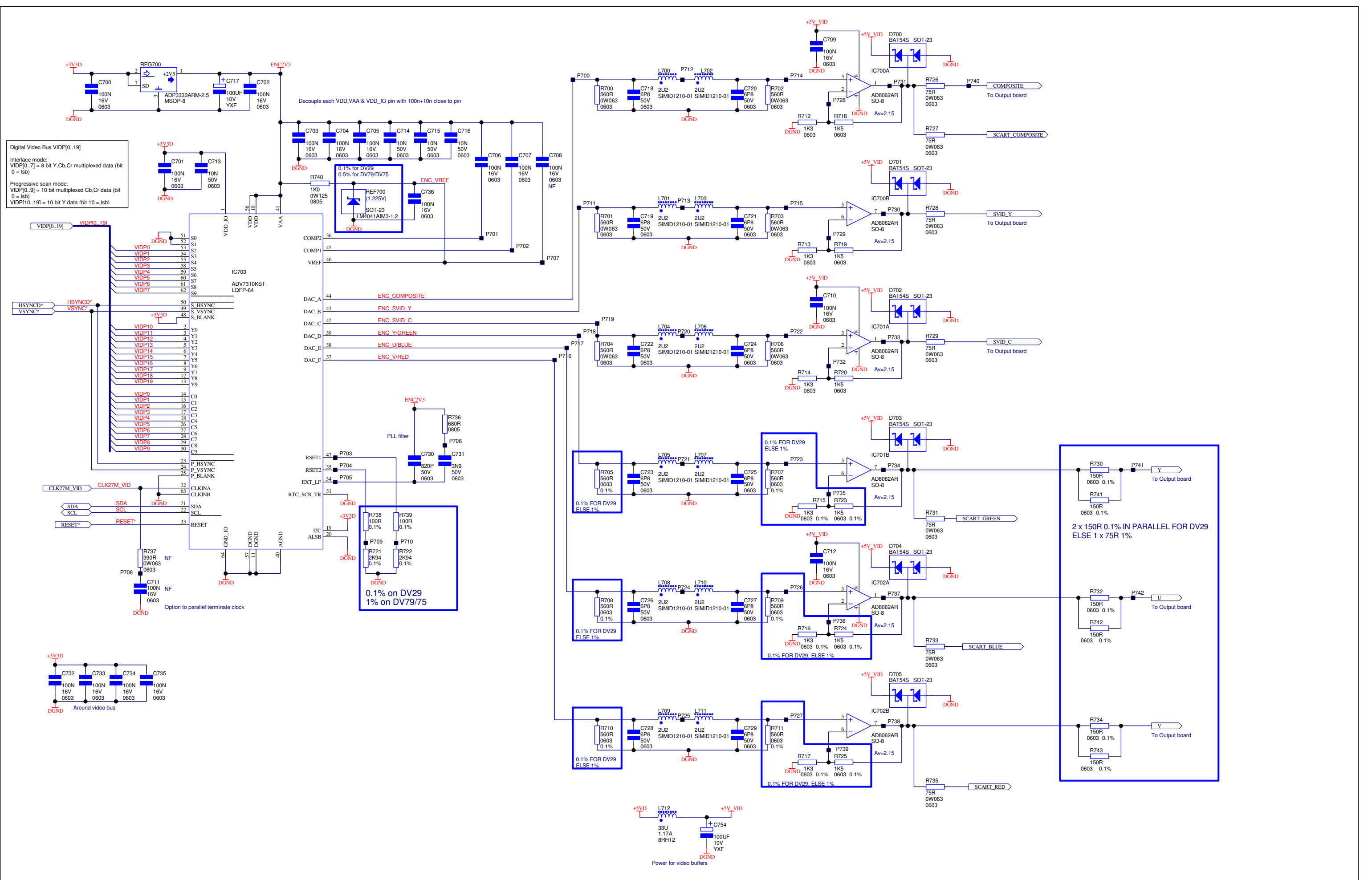
ON SNAP-OFF PCB



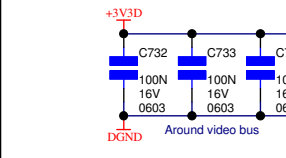
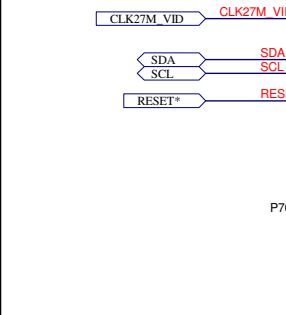
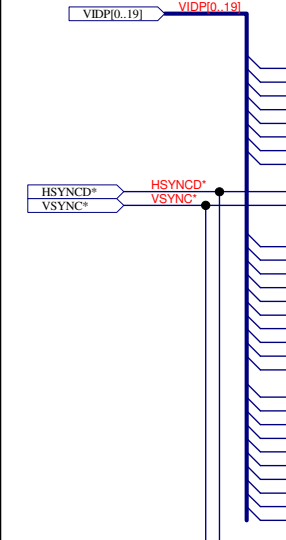
DRAWING TITLE		DV29 COMMS & VIDEO SNAP-OFF			
File name:		L971C9.Sch			
Notes:					
04_E121	PG	09-08-04	Production release		1.0
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE		ISSUE
		24-Aug-2004	Sheet 9 of 11	A2	DRAWING NO. L971C9

**ARCAM**  
 A & R Cambridge Ltd.  
 Pembroke Avenue  
 Waterbeach  
 Cambridge CB5 9QR

Contact Engineer: Peter Gaggis      Contact Tel: (01223) 203270      Printed: 24-Aug-2004



Digital Video Bus VIDP[0..19]  
 Interface mode:  
 VIDP[0..7] = 8 bit Y,Cb,Cr multiplexed data (bit 0 = Isb)  
 Progressive scan mode:  
 VIDP[0..9] = 10 bit multiplexed Cb,Cr data (bit 0 = Isb)  
 VIDP[10..19] = 10 bit Y data (bit 10 = Isb)



DRAWING TITLE		DV29 VIDEO ENCODER					
ARCAM		Filename:	L971C7.Sch				
A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9PB		Notes:					
04_E121	PG	09-08-04	Production release				1.0
ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE				ISSUE
		Printed: 24-Aug-2004	Sheet 7 of 11	DRAWING NO.	L971C7		
Contact Engineer: Peter Gaggas		Contact Tel: (01223) 203270					







**DV29 DVD player Main board L971AY issue 1.0.2**

<b>Designator</b>	<b>Part</b>	<b>Description</b>
C200	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C201	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C202	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C203	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C204	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C205	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C206	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C207	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C208	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C209	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C210	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C211	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C212	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C213	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C214	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C215	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C216	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C217	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C218	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C219	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C220	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C221	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C222	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C223	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C224	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C225	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C226	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C227	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C228	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C229	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C230	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C231	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C232	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C233	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C234	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C235	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C236	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C237	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C238	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C239	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C240	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C241	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C242	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C243	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C244	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C245	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C246	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C247	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C248	2N610	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 10UF 50V
C249	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C250	2N610	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 10UF 50V
C251	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C252	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C253	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C254	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C255	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C256	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C257	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C258	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C259	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C260	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C261	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0

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<b>Designator</b>	<b>Part</b>	<b>Description</b>
C262	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C263	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C264	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C300	2L027	Capacitor SM 0805 NPO Ceramic 5% 100V 27P
C301	2L027	Capacitor SM 0805 NPO Ceramic 5% 100V 27P
C302	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C303	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C304	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C305	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C306	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C307	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C308	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C309	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C310	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C311	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C312	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C313	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C314	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C315	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C316	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C317	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C318	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C319	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C320	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C321	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C322	2L110	Capacitor SM 0805 NPO Ceramic 5% 100V 100P
C323	2JC310	Capacitor SM 0603 X7R Ceramic 10% 50V 10N
C324	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C325	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C326	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C327	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C328	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C329	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C330	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C331	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C332	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C333	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C334	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C335	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C336	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C337	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C338	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C339	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C340	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C341	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C342	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C343	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C400	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C401	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C402	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C403	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C404	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C405	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C406	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C407	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C408	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C409	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C410	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C411	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C412	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C413	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C414	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N

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<b>Designator</b>	<b>Part</b>	<b>Description</b>
C415	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C416	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C417	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C418	2L110	Capacitor SM 0805 NPO Ceramic 5% 100V 100P
C419	2L110	Capacitor SM 0805 NPO Ceramic 5% 100V 100P
C421	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C422	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C423	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C424	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C425	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C426	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C427	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C428	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C429	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C430	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C431	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C432	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C433	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C434	2L033	Capacitor SM 0805 NPO Ceramic 5% 100V 33P
C435	2L033	Capacitor SM 0805 NPO Ceramic 5% 100V 33P
C436	2V710	Capacitor Non-Polar Radial Electrolytic 100UF 16V
C437	2V710	Capacitor Non-Polar Radial Electrolytic 100UF 16V
C438	2L110	Capacitor SM 0805 NPO Ceramic 5% 100V 100P
C439	2L110	Capacitor SM 0805 NPO Ceramic 5% 100V 100P
C440	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C441	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C442	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C443	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C444	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C500	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C501	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C502	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C503	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C504	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C505	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C506	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C507	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C508	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C509	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C510	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C511	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C512	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C513	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C514	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C515	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C516	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C517	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C518	2L147	Capacitor SM 0805 NPO Ceramic 5% 100V 470P
C519	2L147	Capacitor SM 0805 NPO Ceramic 5% 100V 470P
C520	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C521	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C522	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C523	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C524	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C525	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C526	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C527	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C528	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C529	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C530	2L033	Capacitor SM 0805 NPO Ceramic 5% 100V 33P
C531	2L033	Capacitor SM 0805 NPO Ceramic 5% 100V 33P
C532	2V710	Capacitor Non-Polar Radial Electrolytic 100UF 16V

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Designator	Part	Description
C533	2V710	Capacitor Non-Polar Radial Electrolytic 100UF 16V
C534	2L147	Capacitor SM 0805 NPO Ceramic 5% 100V 470P
C535	2L147	Capacitor SM 0805 NPO Ceramic 5% 100V 470P
C536	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C537	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C600	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C601	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C602	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C603	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C604	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C605	2P610	Capacitor Radial Electrolytic Elna ROD 10UF 35V
C606	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C607	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C608	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C609	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C610	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C611	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C612	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C613	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C614	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C615	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C616	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C617	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C620	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C621	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C622	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C623	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C624	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C625	2DA222	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 2N2
C626	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C627	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C628	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C629	2DA168	Capacitor Boxed Polypropylene 5mm Pitch 100V 5% 680P
C630	2L033	Capacitor SM 0805 NPO Ceramic 5% 100V 33P
C631	2L033	Capacitor SM 0805 NPO Ceramic 5% 100V 33P
C632	2V710	Capacitor Non-Polar Radial Electrolytic 100UF 16V
C633	2V710	Capacitor Non-Polar Radial Electrolytic 100UF 16V
C700	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C701	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C702	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C703	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C704	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C705	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C706	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C707	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C708	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C709	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C710	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C711	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C712	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C713	2JC310	Capacitor SM 0603 X7R Ceramic 10% 50V 10N
C714	2JC310	Capacitor SM 0603 X7R Ceramic 10% 50V 10N
C715	2JC310	Capacitor SM 0603 X7R Ceramic 10% 50V 10N
C716	2JC310	Capacitor SM 0603 X7R Ceramic 10% 50V 10N
C717	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C718	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C719	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C720	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C721	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C722	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C723	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C724	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8

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<b>Designator</b>	<b>Part</b>	<b>Description</b>
C725	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C726	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C727	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C728	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C729	2LA868	Capacitor SM 0603 NPO Ceramic 5% 50V 6P8
C730	2JC182	Capacitor SM 0603 X7R Ceramic 10% 50V 820P
C731	2JC239	Capacitor SM 0603 X7R Ceramic 10% 50V 3N9
C732	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C733	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C734	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C735	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C736	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C754	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C800	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C801	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C802	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C803	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C804	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C805	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C806	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C807	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C811	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C812	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C813	2JC310	Capacitor SM 0603 X7R Ceramic 10% 50V 10N
C900	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C901	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C902	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C903	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C904	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C905	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C906	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C907	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C908	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C909	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C910	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C911	2N710	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V
C912	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C913	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C914	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C915	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C916	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C917	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C918	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C919	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C920	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C921	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C922	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C923	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C924	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C925	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C926	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C927	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C928	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C929	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C930	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C931	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C932	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C933	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C934	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C935	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C936	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C937	2L110	Capacitor SM 0805 NPO Ceramic 5% 100V 100P

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<b>Designator</b>	<b>Part</b>	<b>Description</b>
C938	2L110	Capacitor SM 0805 NPO Ceramic 5% 100V 100P
C939	2N747	Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 470UF 25V
C940	2N747	Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 470UF 25V
C941	2N747	Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 470UF 25V
C942	2N747	Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 470UF 25V
C943	2N747	Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 470UF 25V
C944	2N747	Capacitor Radial Electrolytic Dia 10mm Pitch 5mm 470UF 25V
C945	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C946	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C947	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C948	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C949	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C950	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C951	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C952	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C953	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C954	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C955	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C956	2L010	Capacitor SM 0805 NPO Ceramic 5% 100V 10P
C957	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C958	2L047	Capacitor SM 0805 NPO Ceramic 5% 100V 47P
C1000	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1001	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1002	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1003	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1004	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1005	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1006	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1007	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1008	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1009	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1010	2N710	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V
C1011	2N710	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V
C1012	2N710	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V
C1013	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1014	2N710	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V
C1015	2N710	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V
C1016	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1017	2N710	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V
C1018	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C1019	2Z722A	Capacitor Low Impedance Radial Electrolytic Dia 8mm Pitch 5mm 220UF 16V
C1020	2Z747B	Capacitor Low Impedance Radial Electrolytic Dia 10mm Pitch 5mm 470UF 25V
C1021	2Z722A	Capacitor Low Impedance Radial Electrolytic Dia 8mm Pitch 5mm 220UF 16V
C1022	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1023	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1024	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1025	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1026	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1027	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1028	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1029	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1030	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1031	2N710	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V
C1032	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1033	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C1034	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C1035	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C1036	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C1037	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C1038	2KA410	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 100N
C1039	2Z710D	Capacitor Low Impedance Radial Electrolytic Dia 8mm Pitch 5mm 100UF 50V
C1040	2Z710D	Capacitor Low Impedance Radial Electrolytic Dia 8mm Pitch 5mm 100UF 50V

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Designator	Part	Description
C1041	2Z710D	Capacitor Low Impedance Radial Electrolytic Dia 8mm Pitch 5mm 100UF 50V
C1042	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1043	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1044	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1045	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C1046	2KA447	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 470N
C1047	2KA447	Capacitor Boxed Polyester 5mm Pitch 5% 100VDC 470N
C1048	2N833A	Capacitor Radial Electrolytic Dia 16mm Pitch 7.5mm 3300UF 35V
C1049	2N833A	Capacitor Radial Electrolytic Dia 16mm Pitch 7.5mm 3300UF 35V
C1050	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C1051	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C1052	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C1100	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1101	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1102	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1103	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1104	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1105	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1106	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1107	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1108	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1109	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1110	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1111	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1112	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1113	2L027	Capacitor SM 0805 NPO Ceramic 5% 100V 27P
C1114	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1115	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1116	2N610	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 10UF 50V
C1117	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C1118	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C1119	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C1120	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C1121	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C1122	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1123	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1124	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1125	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1126	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1127	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1128	2JC210	Capacitor SM 0603 X7R Ceramic 10% 50V 1N0
C1129	2JC310	Capacitor SM 0603 X7R Ceramic 10% 50V 10N
C1130	2JC310	Capacitor SM 0603 X7R Ceramic 10% 50V 10N
C1131	2L027	Capacitor SM 0805 NPO Ceramic 5% 100V 27P
C1132	2L027	Capacitor SM 0805 NPO Ceramic 5% 100V 27P
C1133	2N710	Capacitor Radial Electrolytic Dia 5mm Pitch 5mm 100UF 25V
C1134	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1135	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1136	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1137	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1138	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1139	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1140	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1141	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1142	2Z710B	Capacitor Low Impedance Radial Electrolytic Dia 5mm Pitch 5mm 100UF 10V
C1143	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C1144	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
C1145	2JD410	Capacitor SM 0603 X7R Ceramic 10% 16V 100N
CON200	8K6201	Con Single ROW Hdr 0.1IN Vertical 2WAY
CON201	8K6316	Con Hdr Dual ROW 0.1IN Vertical 16WAY
CON202	8K8516	Con 1.00MM Vertical FFC 16WAY 52806 Series
CON203	8KB40	Con Boxed Header 0.1IN Dual ROW 40WAY

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Designator	Part	Description
CON400	8K6201	Con Single ROW Hdr 0.1IN Vertical 2WAY
CON900	8K9009M	Con Dtype Horiz 9WAY Male With Boardlock
CON901	8K8022B	Con 1.00MM Vertical FFC 22WAY 52806 Series
CON902	8K8022B	Con 1.00MM Vertical FFC 22WAY 52806 Series
CON1001	8K8032	Con 1.25MM Vertical FFC 32WAY
CON1002	8K2304	Con Minifit HCS 4WAY
D300	3F54S	Diode Schottky BAT54S SOT-23 Package
D400	3F54S	Diode Schottky BAT54S SOT-23 Package
D401	3F54S	Diode Schottky BAT54S SOT-23 Package
D403	3F54S	Diode Schottky BAT54S SOT-23 Package
D404	3AS16W	Diode Surface Mount Small Signal BAS16W SOT-23 Package
D500	3F54S	Diode Schottky BAT54S SOT-23 Package
D501	3F54S	Diode Schottky BAT54S SOT-23 Package
D600	3F54S	Diode Schottky BAT54S SOT-23 Package
D601	3F54S	Diode Schottky BAT54S SOT-23 Package
D700	3F54S	Diode Schottky BAT54S SOT-23 Package
D701	3F54S	Diode Schottky BAT54S SOT-23 Package
D702	3F54S	Diode Schottky BAT54S SOT-23 Package
D703	3F54S	Diode Schottky BAT54S SOT-23 Package
D704	3F54S	Diode Schottky BAT54S SOT-23 Package
D705	3F54S	Diode Schottky BAT54S SOT-23 Package
D800	3F54S	Diode Schottky BAT54S SOT-23 Package
D801	3F54S	Diode Schottky BAT54S SOT-23 Package
D900	3F54S	Diode Schottky BAT54S SOT-23 Package
D1000	3BS1D	Diode Surface Mount S1D
D1001	3BS1D	Diode Surface Mount S1D
D1002	3BS1D	Diode Surface Mount S1D
D1003	3BS1D	Diode Surface Mount S1D
D1004	3BS1D	Diode Surface Mount S1D
D1005	3BS1D	Diode Surface Mount S1D
D1006	3BS1D	Diode Surface Mount S1D
D1100	3F54S	Diode Schottky BAT54S SOT-23 Package
D1101	3F54S	Diode Schottky BAT54S SOT-23 Package
D1102	3F54S	Diode Schottky BAT54S SOT-23 Package
DBR1000	3BW02	Diode Bridge Rectifier W02G Plastic Package
DBR1001	3BW02	Diode Bridge Rectifier W02G Plastic Package
DZ900	3CW35V6	Zener Diode 0.25W Surface Mount BZX84C5V6 SOT-23 Package
DZ1100	3CW35V6	Zener Diode 0.25W Surface Mount BZX84C5V6 SOT-23 Package
FS1000	C3751	Fuse Littelfuse T750mA SM
FS1001	C3751	Fuse Littelfuse T750mA SM
HS202	F013	Heatsink BGA 3319 20.9 Deg C/W
HS1000	F007	Heatsink TO-220 6043PB 23 Degc/W Clip ON
IC200	5K74125T	IC Quad Buffer 74HCT125D SMT
IC201	5H809263	IC Micro Reset LM809M3-2.63 SOT-23
IC202	5L36750	IC Vaddis V DVD ZR36750 BGA-316 Package
IC203	5H6432-7	IC SDRAM 64Mbit K4S643232F-TC70
IC204	5G24LC08	IC Eeprom 24LC08BT/SN 8K SO-8 Package
IC205	L029AY	Programmed Flash 28F160 For DV29 DVD Player
IC300	5A8707E	IC Clock Generator SM8707E VSOP-16 Package
IC301	5KLVC244APW	IC Octal 3 State Buffer74LVC244A TSSOP PHILIPS ONLY
IC302	5KLVC244APW	IC Octal 3 State Buffer74LVC244A TSSOP PHILIPS ONLY
IC303	5KA100	IC Single 2-INPUT Nand GATESN74AHC1G00DBVR DBV
IC304	5K74LVC74	IC Dual Flip-Flop 74LVC74AD SMT
IC305	5K151	IC 8-INPUT Mux 74HC151D SMT
IC306	5K74LVC74	IC Dual Flip-Flop 74LVC74AD SMT
IC307	5KLVC125	IC Quad Buffer 5V Tol 74LVC125AD SMT
IC308	5KLVC125	IC Quad Buffer 5V Tol 74LVC125AD SMT
IC309	5KLVC244APW	IC Octal 3 State Buffer74LVC244A TSSOP PHILIPS ONLY
IC400	5B2134	Opamp OPA2134UA SO-8 Package
IC401	5B2134	Opamp OPA2134UA SO-8 Package
IC402	5S413DY	IC Quad Analogue Switch DG413DY SO-16 Package
IC403	5A8740	IC Audio DAC XWM8740EDS SSOP-28 Package



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Designator	Part	Description
IC500	5B2134	Opamp OPA2134UA SO-8 Package
IC501	5B2134	Opamp OPA2134UA SO-8 Package
IC502	5A8740	IC Audio DAC XWM8740EDS SSOP-28 Package
IC600	5B2134	Opamp OPA2134UA SO-8 Package
IC601	5B2134	Opamp OPA2134UA SO-8 Package
IC602	5A8740	IC Audio DAC XWM8740EDS SSOP-28 Package
IC700	5B8062	Opamp AD8062AR SO-8 Package
IC701	5B8062	Opamp AD8062AR SO-8 Package
IC702	5B8062	Opamp AD8062AR SO-8 Package
IC703	5V7310	IC Video Encoder ADV7310KST LQFP-64 Package
IC900	5N202E	IC RS232 Charge Pump Driver MAX202ECSE Static Protected
IC1100	5KLVC244APW	IC Octal 3 State Buffer74LVC244A TSSOP PHILIPS ONLY
IC1101	5KLVC244APW	IC Octal 3 State Buffer74LVC244A TSSOP PHILIPS ONLY
IC1102	5V9030	IC HDMI Transmitter Sil9030
IC1103	5KLV164	IC Shift Register 74LV164 SMT
IC1104	5KLV157A	IC Quad 2 Input Multiplexer 74LVC157A SMT
L200	7F007	Ferrite Bead SM0805 120R@100MHz
L201	7F007	Ferrite Bead SM0805 120R@100MHz
L301	7E101	Common Mode Choke 1000R@100MHz
L400	7F007	Ferrite Bead SM0805 120R@100MHz
L500	7F007	Ferrite Bead SM0805 120R@100MHz
L600	7F007	Ferrite Bead SM0805 120R@100MHz
L700	7BA822	Inductor SM SIMID1210 2U2
L701	7BA822	Inductor SM SIMID1210 2U2
L702	7BA822	Inductor SM SIMID1210 2U2
L703	7BA822	Inductor SM SIMID1210 2U2
L704	7BA822	Inductor SM SIMID1210 2U2
L705	7BA822	Inductor SM SIMID1210 2U2
L706	7BA822	Inductor SM SIMID1210 2U2
L707	7BA822	Inductor SM SIMID1210 2U2
L708	7BA822	Inductor SM SIMID1210 2U2
L709	7BA822	Inductor SM SIMID1210 2U2
L710	7BA822	Inductor SM SIMID1210 2U2
L711	7BA822	Inductor SM SIMID1210 2U2
L712	7C033B	Inductor 33UH 10% 1.17A A823LY-330K=R
L900	7F007	Ferrite Bead SM0805 120R@100MHz
L901	7F007	Ferrite Bead SM0805 120R@100MHz
L902	7F007	Ferrite Bead SM0805 120R@100MHz
L903	7F007	Ferrite Bead SM0805 120R@100MHz
L904	7F007	Ferrite Bead SM0805 120R@100MHz
L905	7F007	Ferrite Bead SM0805 120R@100MHz
L906	7F007	Ferrite Bead SM0805 120R@100MHz
L907	7F007	Ferrite Bead SM0805 120R@100MHz
L1000	7F003	Ferrite Bead Axial 100MHz/20 Degree C
L1001	7F003	Ferrite Bead Axial 100MHz/20 Degree C
L1002	7F003	Ferrite Bead Axial 100MHz/20 Degree C
L1003	7F003	Ferrite Bead Axial 100MHz/20 Degree C
L1004	7F007	Ferrite Bead SM0805 120R@100MHz
L1005	7F007	Ferrite Bead SM0805 120R@100MHz
L1006	7F007	Ferrite Bead SM0805 120R@100MHz
L1007	7F007	Ferrite Bead SM0805 120R@100MHz
L1008	7F007	Ferrite Bead SM0805 120R@100MHz
L1009	7F007	Ferrite Bead SM0805 120R@100MHz
L1010	7F007	Ferrite Bead SM0805 120R@100MHz
L1011	7C033B	Inductor 33UH 10% 1.17A A823LY-330K=R
L1012	7F007	Ferrite Bead SM0805 120R@100MHz
L1013	7C033B	Inductor 33UH 10% 1.17A A823LY-330K=R
L1014	7C033B	Inductor 33UH 10% 1.17A A823LY-330K=R
L1015	7C033B	Inductor 33UH 10% 1.17A A823LY-330K=R
L1100	7F007	Ferrite Bead SM0805 120R@100MHz
L1101	7F007	Ferrite Bead SM0805 120R@100MHz
L1102	7F007	Ferrite Bead SM0805 120R@100MHz

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Designator	Part	Description
L1103	7F007	Ferrite Bead SM0805 120R@100MHz
L1104	7F007	Ferrite Bead SM0805 120R@100MHz
L1105	7F007	Ferrite Bead SM0805 120R@100MHz
L1106	7F007	Ferrite Bead SM0805 120R@100MHz
R200	1M033	Resistor 0805 Surface Mount 0.125W 1% 33R
R201	1M110	Resistor 0805 Surface Mount 0.125W 1% 100R
R202	1N022	Resistor 0603 Surface Mount 0.063W 1% 22R
R203	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R204	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R205	1M110	Resistor 0805 Surface Mount 0.125W 1% 100R
R206	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R207	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R208	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R209	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R210	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R211	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R218	1M110	Resistor 0805 Surface Mount 0.125W 1% 100R
R219	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R220	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R221	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R222	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R223	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R224	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R225	1N210	Resistor 0603 Surface Mount 0.063W 1% 1K0
R226	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R227	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R228	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R229	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R230	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R231	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R232	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R233	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R234	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R235	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R236	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R237	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R238	1M082	Resistor 0805 Surface Mount 0.125W 1% 82R
R239	1M082	Resistor 0805 Surface Mount 0.125W 1% 82R
R240	1M082	Resistor 0805 Surface Mount 0.125W 1% 82R
R241	1M022	Resistor 0805 Surface Mount 0.125W 1% 22R
R242	1M022	Resistor 0805 Surface Mount 0.125W 1% 22R
R243	1M022	Resistor 0805 Surface Mount 0.125W 1% 22R
R244	1M033	Resistor 0805 Surface Mount 0.125W 1% 33R
R245	1M033	Resistor 0805 Surface Mount 0.125W 1% 33R
R246	1M033	Resistor 0805 Surface Mount 0.125W 1% 33R
R247	1M033	Resistor 0805 Surface Mount 0.125W 1% 33R
R248	1M033	Resistor 0805 Surface Mount 0.125W 1% 33R
R249	1M033	Resistor 0805 Surface Mount 0.125W 1% 33R
R250	1M256	Resistor 0805 Surface Mount 0.125W 1% 5K6
R251	1M033	Resistor 0805 Surface Mount 0.125W 1% 33R
R252	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R253	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R254	1M110	Resistor 0805 Surface Mount 0.125W 1% 100R
R255	1M110	Resistor 0805 Surface Mount 0.125W 1% 100R
R300	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R301	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R302	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R303	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R304	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R305	1N218	Resistor 0603 Surface Mount 0.063W 1% 1K8
R306	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R307	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R

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Designator	Part	Description
R308	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R309	1N047	Resistor 0603 Surface Mount 0.063W 1% 47R
R310	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R311	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R312	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R313	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R314	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R315	1N175	Resistor 0603 Surface Mount 0.063W 1% 750R
R316	1N175	Resistor 0603 Surface Mount 0.063W 1% 750R
R317	1N175	Resistor 0603 Surface Mount 0.063W 1% 750R
R318	1M112	Resistor 0805 Surface Mount 0.125W 1% 120R
R319	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R320	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R321	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R322	1N047	Resistor 0603 Surface Mount 0.063W 1% 47R
R323	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R400	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R401	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R402	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R403	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R404	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R405	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R406	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R407	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R408	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R409	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R410	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R411	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R412	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R413	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R414	1M347	Resistor 0805 Surface Mount 0.125W 1% 47K
R415	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R416	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R417	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R418	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R419	1M347	Resistor 0805 Surface Mount 0.125W 1% 47K
R420	1M311	Resistor 0805 Surface Mount 0.125W 1% 11K
R421	1M311	Resistor 0805 Surface Mount 0.125W 1% 11K
R422	1M510	Resistor 0805 Surface Mount 0.125W 1% 1M0
R423	1M510	Resistor 0805 Surface Mount 0.125W 1% 1M0
R424	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R425	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R426	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R427	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R428	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R429	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R430	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R431	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R434	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R435	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R436	1M110	Resistor 0805 Surface Mount 0.125W 1% 100R
R500	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R501	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R502	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R503	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R504	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R505	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R506	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R507	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R508	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R509	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R510	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R

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Designator	Part	Description
R511	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R512	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R513	1M347	Resistor 0805 Surface Mount 0.125W 1% 47K
R514	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R515	1M347	Resistor 0805 Surface Mount 0.125W 1% 47K
R516	1M311	Resistor 0805 Surface Mount 0.125W 1% 11K
R517	1M311	Resistor 0805 Surface Mount 0.125W 1% 11K
R518	1M510	Resistor 0805 Surface Mount 0.125W 1% 1M0
R519	1M510	Resistor 0805 Surface Mount 0.125W 1% 1M0
R520	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R521	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R522	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R523	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R524	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R525	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R526	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R527	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R600	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R601	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R602	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R603	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R604	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R605	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R606	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R607	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R608	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R609	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R610	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R611	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R612	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R613	1M347	Resistor 0805 Surface Mount 0.125W 1% 47K
R614	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R615	1M347	Resistor 0805 Surface Mount 0.125W 1% 47K
R616	1M311	Resistor 0805 Surface Mount 0.125W 1% 11K
R617	1M311	Resistor 0805 Surface Mount 0.125W 1% 11K
R618	1M510	Resistor 0805 Surface Mount 0.125W 1% 1M0
R619	1M510	Resistor 0805 Surface Mount 0.125W 1% 1M0
R620	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R621	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R622	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R623	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R624	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R626	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R700	1N156	Resistor 0603 Surface Mount 0.063W 1% 560R
R701	1N156	Resistor 0603 Surface Mount 0.063W 1% 560R
R702	1N156	Resistor 0603 Surface Mount 0.063W 1% 560R
R703	1N156	Resistor 0603 Surface Mount 0.063W 1% 560R
R704	1N156	Resistor 0603 Surface Mount 0.063W 1% 560R
R705	1NA156	Resistor 0603 Surface Mount 0.032W 0.1% 560R
R706	1N156	Resistor 0603 Surface Mount 0.063W 1% 560R
R707	1NA156	Resistor 0603 Surface Mount 0.032W 0.1% 560R
R708	1NA156	Resistor 0603 Surface Mount 0.032W 0.1% 560R
R709	1NA156	Resistor 0603 Surface Mount 0.032W 0.1% 560R
R710	1NA156	Resistor 0603 Surface Mount 0.032W 0.1% 560R
R711	1NA156	Resistor 0603 Surface Mount 0.032W 0.1% 560R
R712	1N213	Resistor 0603 Surface Mount 0.063W 1% 1K3
R713	1N213	Resistor 0603 Surface Mount 0.063W 1% 1K3
R714	1N213	Resistor 0603 Surface Mount 0.063W 1% 1K3
R715	1NA213	Resistor 0603 Surface Mount 0.032W 0.1% 1K3
R716	1NA213	Resistor 0603 Surface Mount 0.032W 0.1% 1K3
R717	1NA213	Resistor 0603 Surface Mount 0.032W 0.1% 1K3
R718	1N215	Resistor 0603 Surface Mount 0.063W 1% 1K5

**DV29 DVD player Main board L971AY issue 1.0.2**

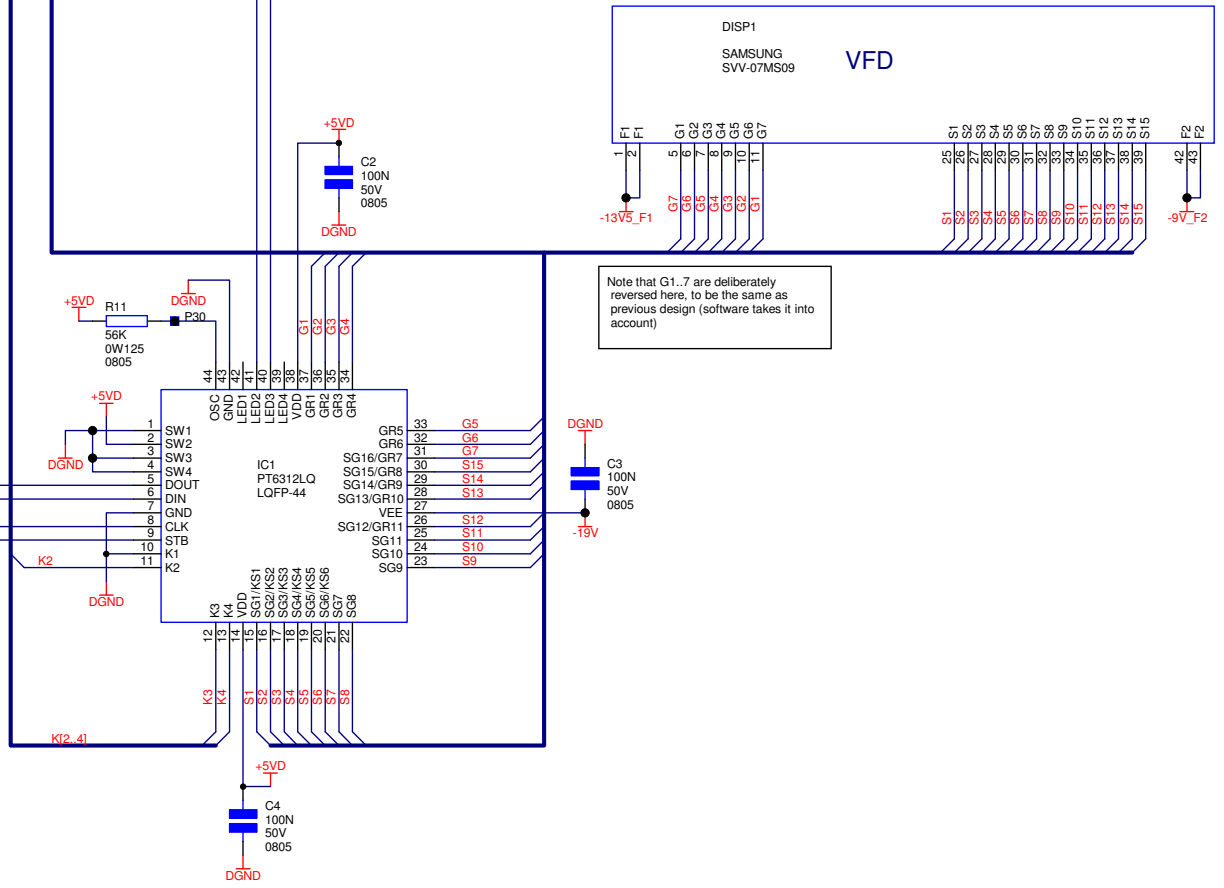
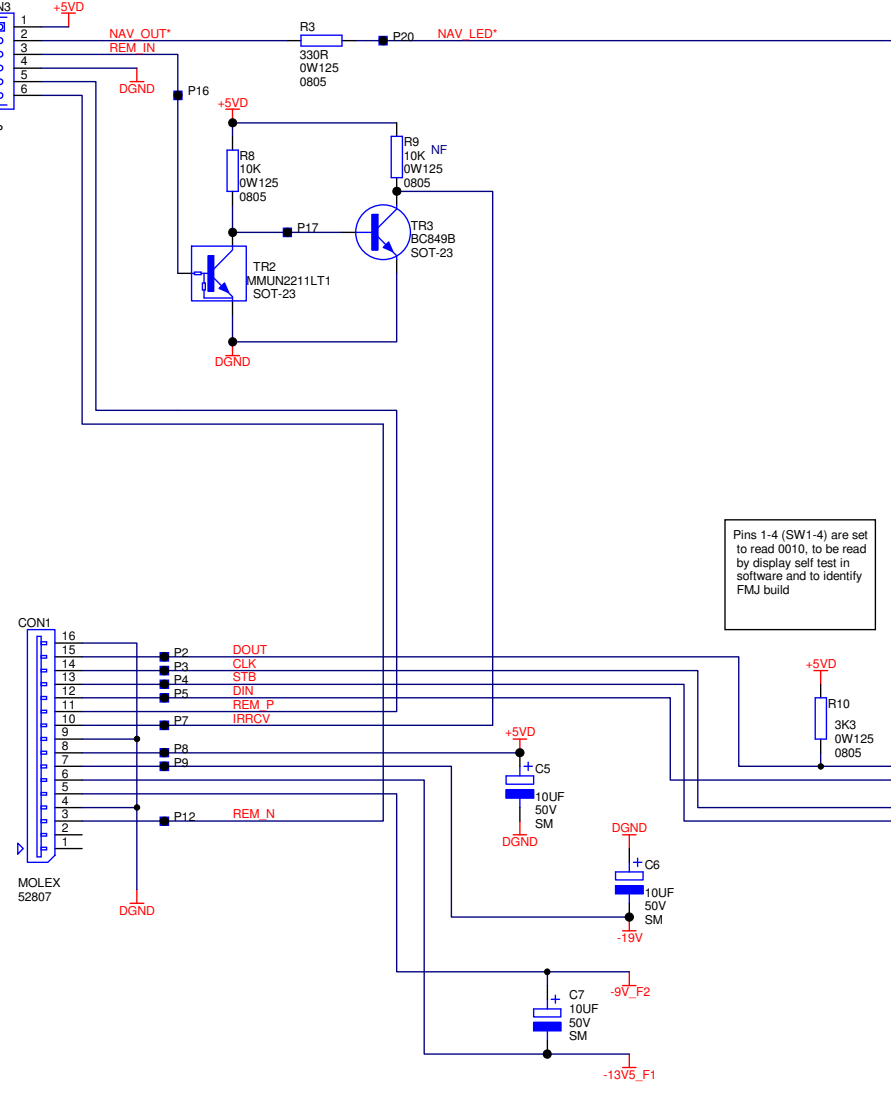
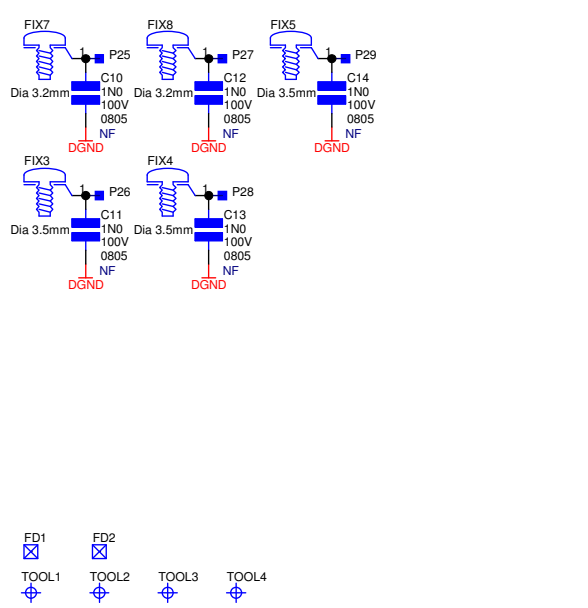
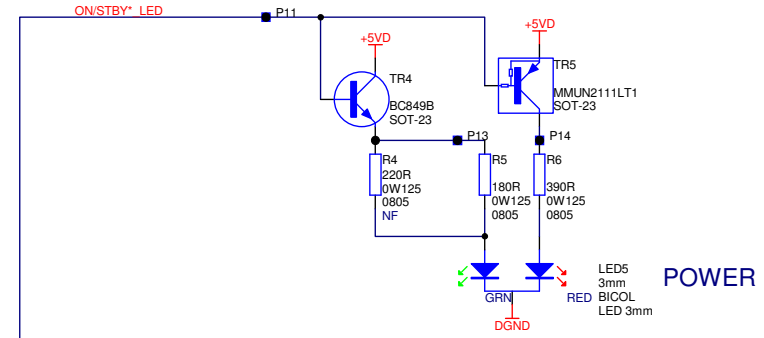
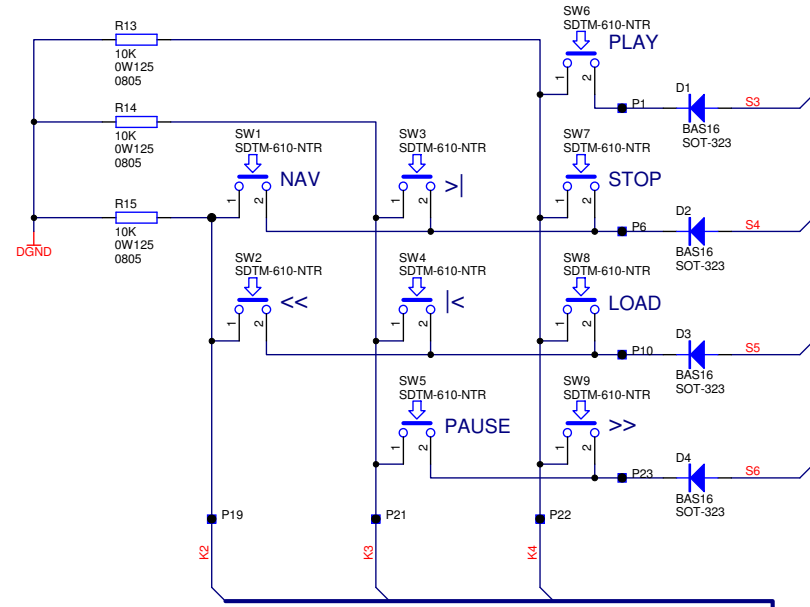
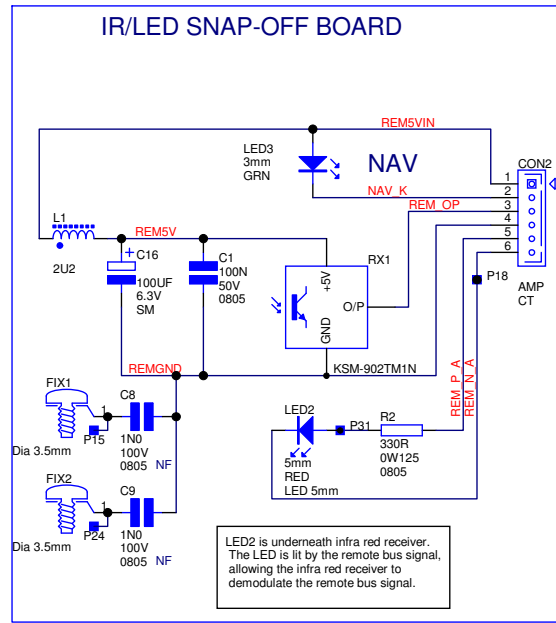
<b>Designator</b>	<b>Part</b>	<b>Description</b>
R719	1N215	Resistor 0603 Surface Mount 0.063W 1% 1K5
R720	1N215	Resistor 0603 Surface Mount 0.063W 1% 1K5
R721	1NA1294	Resistor 0603 Surface Mount 0.032W 0.1% 2K94
R722	1NA1294	Resistor 0603 Surface Mount 0.032W 0.1% 2K94
R723	1NA215	Resistor 0603 Surface Mount 0.032W 0.1% 1K5
R724	1NA215	Resistor 0603 Surface Mount 0.032W 0.1% 1K5
R725	1NA215	Resistor 0603 Surface Mount 0.032W 0.1% 1K5
R726	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R727	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R728	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R729	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R730	1NA115	Resistor 0603 Surface Mount 0.032W 0.1% 150R
R731	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R732	1NA115	Resistor 0603 Surface Mount 0.032W 0.1% 150R
R733	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R734	1NA115	Resistor 0603 Surface Mount 0.032W 0.1% 150R
R735	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R736	1M168	Resistor 0805 Surface Mount 0.125W 1% 680R
R737	1N139	Resistor 0603 Surface Mount 0.063W 1% 390R
R738	1NA110	Resistor 0603 Surface Mount 0.032W 0.1% 100R
R739	1NA110	Resistor 0603 Surface Mount 0.032W 0.1% 100R
R740	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R741	1NA115	Resistor 0603 Surface Mount 0.032W 0.1% 150R
R742	1NA115	Resistor 0603 Surface Mount 0.032W 0.1% 150R
R743	1NA115	Resistor 0603 Surface Mount 0.032W 0.1% 150R
R800	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R801	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R803	1M110	Resistor 0805 Surface Mount 0.125W 1% 100R
R806	1M268	Resistor 0805 Surface Mount 0.125W 1% 6K8
R807	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R808	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R809	1M133	Resistor 0805 Surface Mount 0.125W 1% 330R
R810	1M133	Resistor 0805 Surface Mount 0.125W 1% 330R
R811	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R812	1M082	Resistor 0805 Surface Mount 0.125W 1% 82R
R900	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R901	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R902	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R903	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R904	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R905	1M047	Resistor 0805 Surface Mount 0.125W 1% 47R
R906	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R907	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R908	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R909	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R910	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R911	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R912	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R913	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R914	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R915	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R916	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R917	1M000	Resistor 0805 Surface Mount 0.125W 1% 0R0
R918	1M110	Resistor 0805 Surface Mount 0.125W 1% 100R
R919	1M110	Resistor 0805 Surface Mount 0.125W 1% 100R
R920	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R921	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R922	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R923	1M247	Resistor 0805 Surface Mount 0.125W 1% 4K7
R924	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R1000	1M112	Resistor 0805 Surface Mount 0.125W 1% 120R
R1001	1M139	Resistor 0805 Surface Mount 0.125W 1% 390R

**DV29 DVD player Main board L971AY issue 1.0.2**

<b>Designator</b>	<b>Part</b>	<b>Description</b>
R1002	1M133	Resistor 0805 Surface Mount 0.125W 1% 330R
R1003	1M139	Resistor 0805 Surface Mount 0.125W 1% 390R
R1004	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R1005	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R1006	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R1007	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R1008	1H022	Resistor Metal Film 0.25W 1% 22R
R1009	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R1010	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R1100	1M112	Resistor 0805 Surface Mount 0.125W 1% 120R
R1101	1M056	Resistor 0805 Surface Mount 0.125W 1% 56R
R1102	1N222	Resistor 0603 Surface Mount 0.063W 1% 2K2
R1103	1N222	Resistor 0603 Surface Mount 0.063W 1% 2K2
R1104	1N075	Resistor 0603 Surface Mount 0.063W 1% 75R
R1105	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R1106	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R1107	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R1108	1N147	Resistor 0603 Surface Mount 0.063W 1% 470R
R1109	1M210	Resistor 0805 Surface Mount 0.125W 1% 1K0
R1110	1N218	Resistor 0603 Surface Mount 0.063W 1% 1K8
R1111	1N218	Resistor 0603 Surface Mount 0.063W 1% 1K8
R1112	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R1113	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R1114	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R1115	1N327	Resistor 0603 Surface Mount 0.063W 1% 27K
R1116	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
R1117	1N110	Resistor 0603 Surface Mount 0.063W 1% 100R
REF700	5D40411V2A	Voltage Reference 1.225V 0.1% LM4041AIM3-1.2 SOT-23 Package
REG300	5D10863S	IC Voltage Regulator +3.3V LM1086CS-3.3 TO-263 Package
REG700	5D33332V5	IC Voltage Regulator +2.5V ADP3333ARM-2.5 MSOP-8 Package
REG1000	5D317T	IC Voltage Regulator ADJ LM317T TO-220 Package
REG1001	5D317T	IC Voltage Regulator ADJ LM317T TO-220 Package
REG1002	5D337	IC Voltage Regulator Neg ADJ LM337T TO-220 Package
REG1100	5D10863S	IC Voltage Regulator +3.3V LM1086CS-3.3 TO-263 Package
REG1101	5D78L05S	IC Voltage Regulator +5V L78L05ACD SO-8 Package
REG1102	5D1086AS	IC Voltage Regulator Adjustable LM1086CS-ADJ TO-263 Package
REG1003	5D1086AS	IC Voltage Regulator Adjustable LM1086CS-ADJ TO-263 Package
RLY600	A216	Relay 2P2T 5V SM
RLY400	A216	Relay 2P2T 5V SM
RLY500	A216	Relay 2P2T 5V SM
RP200	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP201	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP202	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP203	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP204	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP205	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP206	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP207	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP208	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP209	1V033B	Resistor Pack Surface Mount 4 Isolated Resistors 33R
RP210	1V033B	Resistor Pack Surface Mount 4 Isolated Resistors 33R
RP211	1V033B	Resistor Pack Surface Mount 4 Isolated Resistors 33R
RP212	1V033B	Resistor Pack Surface Mount 4 Isolated Resistors 33R
RP213	1V056B	Resistor Pack Surface Mount 4 Isolated Resistors 56R
RP214	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
RP215	1V247B	Resistor Pack Surface Mount 4 Isolated Resistors 4K7
RP216	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
RP217	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
RP218	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
RP219	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
RP220	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
RP300	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R

## DV29 DVD player Main board L971AY issue 1.0.2

Designator	Part	Description
RP301	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
RP302	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
RP1100	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
RP1101	1V110B	Resistor Pack Surface Mount 4 Isolated Resistors 100R
SH1000	E971MC	Shield EMC DiVA DV79 Main PCB
SKT300	8D221	Phono Skt Single Gold
SKT400	8D225	Phono Skt 4-WAY Gold
SKT500	8D225	Phono Skt 4-WAY Gold
SKT800	8D300	Scart Socket PCB Horizontal
SKT900	8D221	Phono Skt Single Gold
SKT901	8D228	Con Jack 3.5mm Mono
SKT902	8D230	Phono Skt 2-WAY Horiz Gold
SKT903	8D230	Phono Skt 2-WAY Horiz Gold
SKT904	8D2272	Con Svhs Mini DIN Unscreened
SKT1100	8D500	HDMI PCB Header R/A SM
TR200	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR400	4A849B	Transistor BC849B SOT23 Package
TR401	4AFMMT497	Transistor FMMT497 SOT23 Package
TR800	4D10KP	Digital Transistor MMUN2111LT1 SOT23 Package
TR801	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR802	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR803	4A849B	Transistor BC849B SOT23 Package
TR804	4A849B	Transistor BC849B SOT23 Package
TR900	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR901	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR902	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR903	4A849B	Transistor BC849B SOT23 Package
TR904	4AFMMT497	Transistor FMMT497 SOT23 Package
TR905	4AFMMT497	Transistor FMMT497 SOT23 Package
TR906	4AFMMT497	Transistor FMMT497 SOT23 Package
TR1100	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR1101	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR1102	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TX300	5T1001	SPDIF Optical TX Toslink JFJ1001
TX301	7A29398	Transformer Digital Audio TX 37211
X300	7X046	Crystal 27MHz HC49

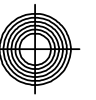


**NOTE TO ENGINEERS:**  
When creating BOM, import CSV into database then manually change quantity to 0.14 for ITEM4 (F238 tape)  
This is the only way to ensure it appears as 0.14m on the BOM report

ITEMS	QTY	REF	DESCRIPTION	REMARKS
ITEM5	1	E822AP	PAD ADHESIVE SPACING - DIVA REMOTE SENSOR	Cut in half & fit both pieces under RX1 as shown on assembly diagram
ITEM1	1	L972PB	BLANK PCB DV29 DISPLAY BOARD	
ITEM2	1	F231	VFD CORNER LOCATOR	NOT FITTED
ITEM3	1	F231	VFD CORNER LOCATOR	NOT FITTED
ITEM4	1	F238	Foam D/S ADH BK 3MM Thk 10MM Wide RA106 10M Reel	70mm x 2 layers of 10mm wide double sided tape under VFD

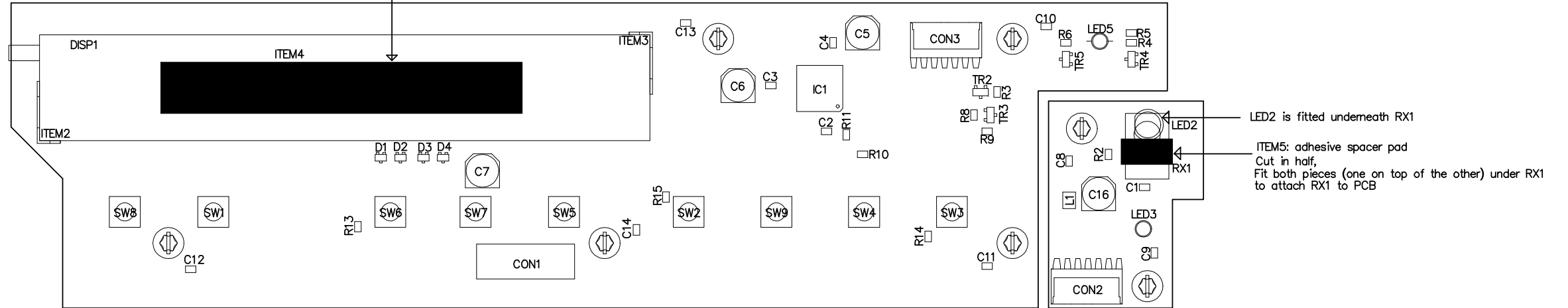
DRAWING TITLE		FILENAME		DATE		DESCRIPTION OF CHANGE		ISSUE	
DV29 DISPLAY BOARD		L972_1.1.Sch		17-09-04		Change RX1 to KSM-902TM1N for better performance		1.1	
ARCAM		Notes:		11-08-04		Production release		1.0	
A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR		Contact Engineer: Peter Gaggas		Contact Tel: (01223) 203270		Printed: 17-Sep-2004		Sheet 1 of 1	
						DRAWING NO. L972			





### L972AY ASSEMBLY GUIDE

Place ITEM4 approx as shown under VFD.  
 Double sided foam tape is used to secure position of VFD prior to soldering  
 Use 2 layers of tape to space display 6mm from PCB  
 Ensure VFD display is fitted straight  
 Crop VFD pins to <3mm of PCB



MECHANICAL DATA	
L972PB_1.GM1	Assembly Drawing
LAYER STACKUP	

MATERIAL	FR4 1.6MM THICK	NOTES:- 1/ Manufacture in accordance with IPC-A-600F Class 1. 2/ Always use NC drill file as reference. NO undersized finished holes. 3/ Routed slots are denoted thus:  slot width denoted by line width 4/ Component pad slot width and plating requirements are indicated by hole size and plating specification of pad in centre of slot. 5/ Mark month/year of manufacture on ident layer. 6/ Scoring denoted by >>> on drill drawing.
COPPER WEIGHT	1oz	
HOLE SIZES	FINISHED (SEE NOTE 2)	
ROUTING	SEE NOTE 3	
COPPER LAYERS	TWO	
MINIMUM WIDTH	10 ML	
MINIMUM GAP	10 ML	GENERAL TOLERANCES PCB Dims. +/- 0.2mm Routing +/- 0.1mm All holes +0.1/-0mm ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE STATED
RESIST	GREEN	
IDENT	WHITE	
VENDOR CODES	SEE NOTE 5	
FINISH	SILVER	
SCORING	SEE NOTE 6	

DRAWING TITLE		---	---	---	---	---
DV29 DISPLAY PCB		---	---	---	---	---
Mechanical1		---	---	---	---	---
<b>ARCAM</b> A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR	Filename: L972PB_1.PCB	04_E123	PG	11/08/04	PRODUCTION RELEASE	1
	DRAWING NO.	04_E091	PG	30/06/04	2ND PROTOTYPE	B
	L972PB	04_E042	PG	06/04/04	PROTOTYPE	A
	Contact Engineer: PETER GAGGS	E.C.O. No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE
Contact Tel: +44 (0) 1223 203270		Printed: 24-Aug-2004		Sheet 8 of 10		

**DV29 DVD player Display board L972AY issue 1.1.0**

Designator	Part	Description
C1	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C2	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C3	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C4	2J410	Capacitor SM 0805 X7R Ceramic 10% 50V 100N
C5	2MA610	Capacitor Surface Mount Electrolytic 10UF 50V 6.3 X 4.5MM
C6	2MA610	Capacitor Surface Mount Electrolytic 10UF 50V 6.3 X 4.5MM
C7	2MA610	Capacitor Surface Mount Electrolytic 10UF 50V 6.3 X 4.5MM
C8	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C9	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C10	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C11	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C12	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C13	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C14	2L210	Capacitor SM 0805 NPO Ceramic 5% 100V 1N0
C16	2MA710	Capacitor Surface Mount Electrolytic 100UF 6.3V 6.3 X 4.5MM
CON1	8K8616	Con 1.0MM Horiz FFC 16WAY 52807 Series
CON2	8K2506	Con CT Series Horiz 6WAY
CON3	8K2506	Con CT Series Horiz 6WAY
D1	3AS16W	Diode Surface Mount Small Signal BAS16W SOT-23 Package
D2	3AS16W	Diode Surface Mount Small Signal BAS16W SOT-23 Package
D3	3AS16W	Diode Surface Mount Small Signal BAS16W SOT-23 Package
D4	3AS16W	Diode Surface Mount Small Signal BAS16W SOT-23 Package
DISP1	B1014	Display DV88
IC1	5H6312	IC VFD Driver PT6312LQ SM LQFP-44 package
L1	7B822	Inductor Surface Mount 2U2
LED2	3D013	LED 5mm Red SLA-560LTT
LED3	3D007	LED 3.1mm Green SLR-37MG3T
LED5	3D006	LED 3mm Red/Green Tri-Colour L-93WEGW
R2	1M133	Resistor 0805 Surface Mount 0.125W 1% 330R
R3	1M133	Resistor 0805 Surface Mount 0.125W 1% 330R
R4	1M122	Resistor 0805 Surface Mount 0.125W 1% 220R
R5	1M118	Resistor 0805 Surface Mount 0.125W 1% 180R
R6	1M139	Resistor 0805 Surface Mount 0.125W 1% 390R
R8	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R9	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R10	1M233	Resistor 0805 Surface Mount 0.125W 1% 3K3
R11	1M356	Resistor 0805 Surface Mount 0.125W 1% 56K
R13	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R14	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
R15	1M310	Resistor 0805 Surface Mount 0.125W 1% 10K
RX1	B2109	IR Receiver Module Kodenshi KSM-902TM1N
SW1	A1505	Switch Tact SM
SW2	A1505	Switch Tact SM
SW3	A1505	Switch Tact SM
SW4	A1505	Switch Tact SM
SW5	A1505	Switch Tact SM
SW6	A1505	Switch Tact SM
SW7	A1505	Switch Tact SM
SW8	A1505	Switch Tact SM
SW9	A1505	Switch Tact SM
TR2	4D10KN	Digital Transistor MMUN2211LT1 SOT23 Package
TR3	4A849B	Transistor BC849B SOT23 Package
TR4	4A849B	Transistor BC849B SOT23 Package
TR5	4D10KP	Digital Transistor MMUN2111LT1 SOT23 Package

Transformer Specification for 115/230V 50/60Hz mains transformer.

Arcam Part Number L924TX

The transformer is extremely cost sensitive. It is to employ the most cost effective techniques to achieve the specification.  
The transformer output voltage will be regulated by a switch mode power supply.

The only essential specification is the fact that it must produce no acoustic noise either internally or by induced eddy currents in steel chassis etc..

All other specifications are negotiable in the interest of allowing cost reduction. Even the use of a frame TX rather than a toroid is negotiable providing it is silent.

1. The transformer MUST be silent when loaded to  $P_o + 10\%$  and when supplied from  $V_{in} = 270V$  r.m.s.

General Safety specification.

2. To standards BS415 / EN60065 - Class I / EN60742

3. Transformer to be used in equipment which will be sold worldwide and certified to CE, CB, UL and CSA Standards. All materials etc to be adequate for worldwide safety approvals.

Material Safety Specification

4. Winding Wire to be Grade 2 (130°C rating) to BS 60317-4 1995

5. Mylar Polyester Insulator Rated to 130°C

Electrical Specification

6. Transformer to have dual 115V primaries to allow parallel operation for 115V input and series operation with 230V input.

7. Transformer is required to provide a mains isolation barrier and provide a single secondary winding.

8. The secondary winding is to be full wave rectified and smoothed as shown in the below diagram.

9. The DC voltage so provided will be followed by a switch mode power supply which will provide a constant power load. (i.e. the current drawn by the load will increase as the DC output voltage falls- hence the capacitor ripple voltage will be higher at low input voltage)

10. The power drawn by the load has a maximum continuous rating ( $P_o$ ) of 22W.

11. Transformer input voltage range as follows:

115V (85V to 132.5V) windings in parallel  
230V (170V to 265V) windings in series

Note. Extended input voltage range 85V to 265V

12. At minimum input voltage (170V AC) the minimum voltage on the capacitor must be  $> 22.5V$  with  $P_o = 22W$

13. At maximum input voltage and minimum load of 6W the max voltage on output capacitor must be  $< 63V$ .

14. The secondary voltages and r.m.s currents have been calculated and are tabulated against input voltage. The model assumes the transformer regulation is made as poor as possible while meeting spec. The equivalent series resistance of the windings transformed to the secondary is 7ohms under this condition. Rms figures for voltages and currents are true rms figures measured with the specified bridge rectifier, Capacitor and load resistor connected to the transformer secondary.  
In the case of the load regulation for lowest cost transformer being better than the worst case specification then the transformer voltages shall be modified so that the minimum 22.5V spec is met at 170V input and the output voltages at 230V and 265V input voltage are lower than the specified voltages.

15. Temperature rise to be such that transformer is safe when operated in an enclosure with 50C maximum internal temperature.

16. Toroid to be fitted with interwinding screen.

Mechanical Specification

17. Primary wires self-ended and individually sleeved for colour coding, then sleeved together.

18. Secondary wires self-ended and individually sleeved, then sleeved together.

19. Wire type used on the terminations must be such that the wire may be bent with a minimum bend radius of 10mm through an angle of 90degrees 10times without the wire fracturing. This will allow the wires to be dressed in production without risk of damage to terminations.

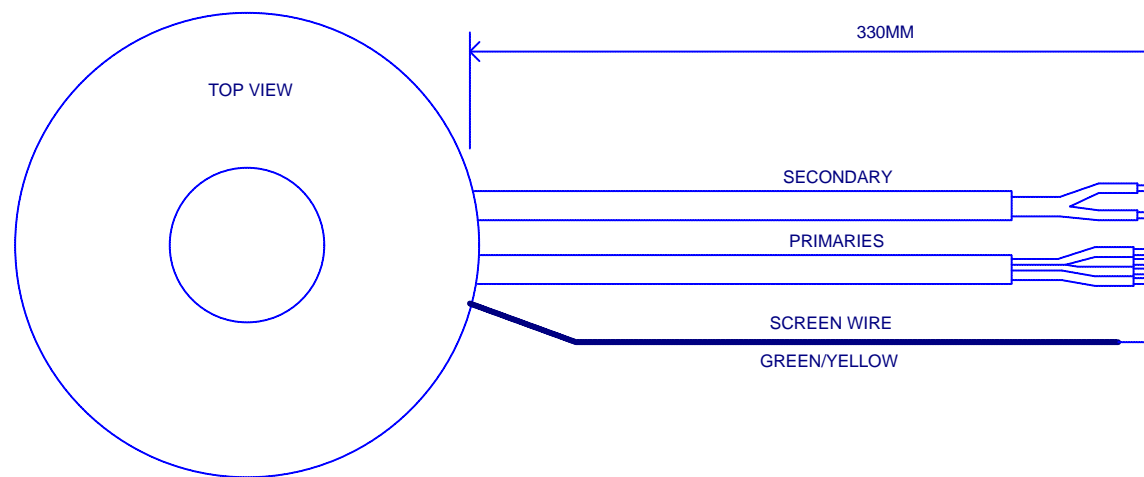
20. All wire lengths are  $\pm 20, -0$  mm. All wires stripped 8  $\pm 2$ mm and tinned.

21. Transformer to be marked with part number and issue number.

22. Toroidal transformer will be attached to the chassis by a dished washer and bolt (no potting required).

23. A frame transformer meeting the above spec will be chassis mounted with flying leads and should have clamp fitted to allow it to be screwed to chassis.

24. Toroidal transformer to be supplied with mounting kit consisting of metal dished washer and 2 neoprene or similar washers.



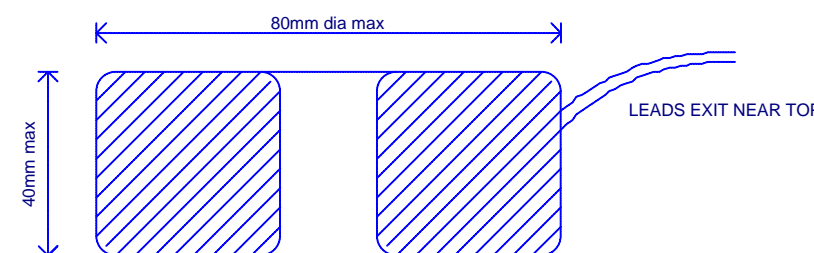
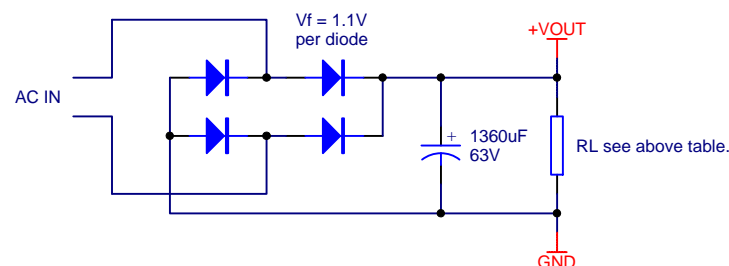
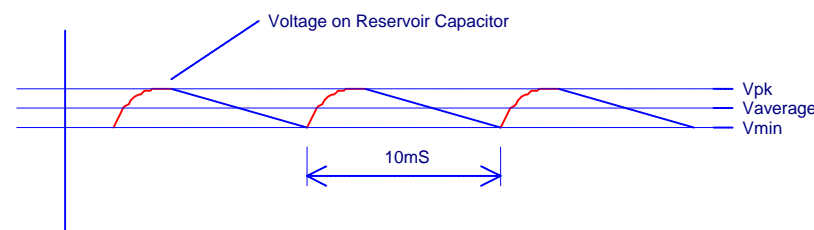
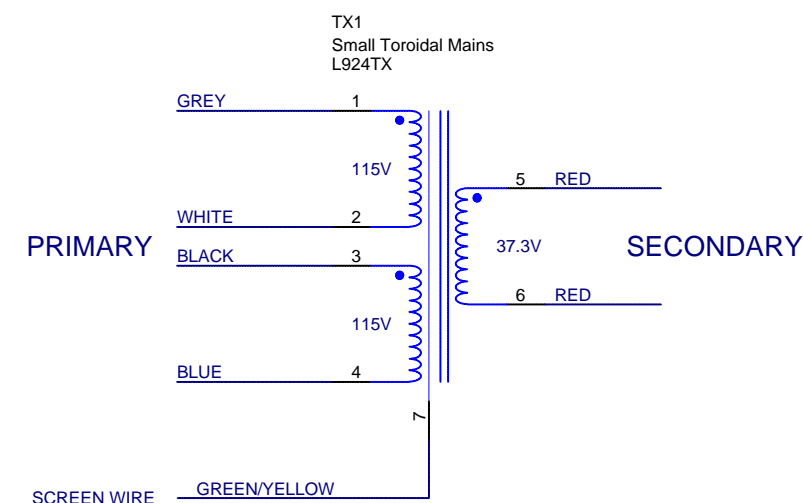
### Secondary Winding Voltage and Current Specs

assuming  $C=1360\mu F$ ,  $f= 50Hz$  for  $P_o = 22W$

Bridge Rectifier  $V_f$  diode = 1.1V per leg = 2.2V Total

Ideal TX assumed with 70ohm series resistor in secondary to simulate regulation.

AC Supply Voltage Pri in Series (V r.m.s.)	Loaded Secondary Voltage (V r.m.s.)	Capacitor Peak Voltage Vpk (Volt)	Capacitor Min Voltage Vmin (Volt)	Capacitor Average Voltage (Volt)	Load Resistor to simulate Load RL (Ohm)	Secondary Winding r.m.s. Current (A r.m.s.)
170	23.2	26.9	23.7	25.3	28	1.3
230	37.3	46.0	43.7	44.8	88	0.86
265	44.4	55.7	53.8	54.8	130	0.75

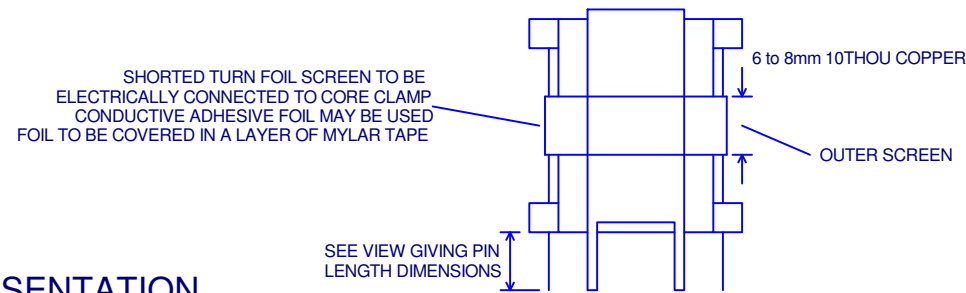


DRAWING TITLE		DV78 TRANSFORMER 115/230V					
<b>ARCAM</b> A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9PB	Filename:	L924TX_1.0.sch	03_E195	KAL	02-07-2003	Production Release	1.0
	Notes:		03_E086	KAL	21-03-2003	Corrected Wire Colours added notes re Clamp	B.0
			03_E042	KAL	4-02-2003	Reduced Power Output Spec, Reduced Load Regulation Spec	A.1
			02_E336	KAL	4-12-2003	Prototype Release	A.0
	ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE		ISSUE	
Contact Engineer:	Kevin Lamb	Contact Tel:	(01223) 203243	Printed:	7-Jul-2003	Sheet 1 of 1	A3 DRAWING NO. L924TX

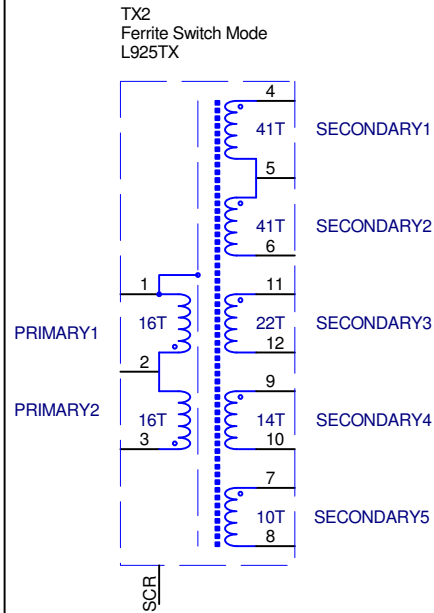
## NOTE.

TRANSFORMER IS TO BE USED ON SECONDARY SIDE OF MAINS ISOLATION BARRIER (I.E. THIS TRANSFORMER IS NOT REQUIRED TO PROVIDE MAINS ISOLATION BARRIER)  
 MAXIMUM VOLTAGE BETWEEN WINDINGS <60V

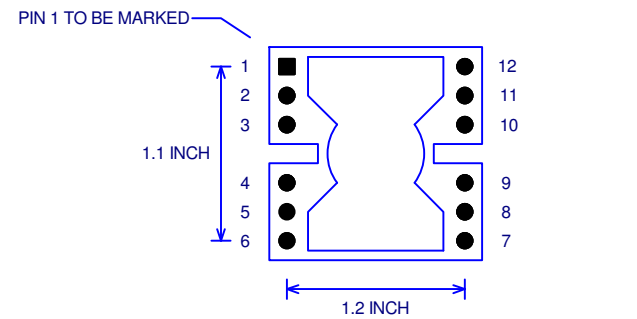
### VIEW FROM SIDE OF PART SHOWING OUTER FOIL SCREEN



## ELECTRICAL REPRESENTATION

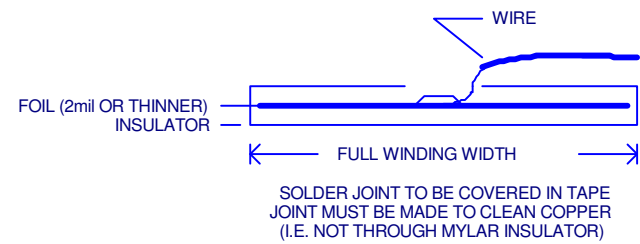


### VIEW FROM TOP OF PART WITH PART INSTALLED IN PCB

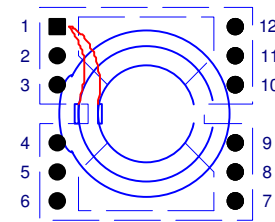


NOTE PIN NUMBERING CONVENTION

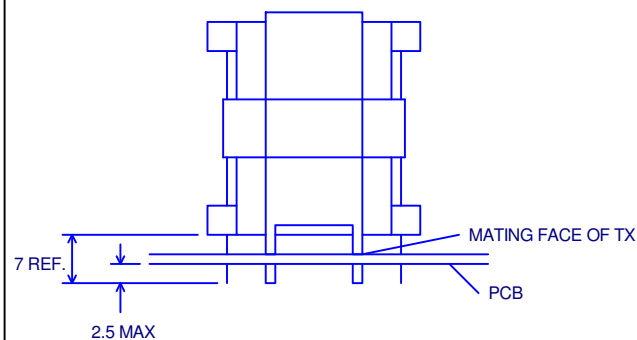
### ARRANGEMENT OF INTERNAL FOIL SCREENS



- 1 BUMP FROM SCREEN JOINT TO BE ADJACENT TO CORE WINDOW TO MINIMISE LOSS OF WINDING HEIGHT
- 2 MAXIMUM OVERLAP ON ENDS OF SCREENS TO BE LESS THAN 1mm TO MINIMISE CAPACITIVE COUPLING WHICH WOULD PRODUCE SHORTED TURN FOR HIGH FREQUENCY CURRENTS
- 3 SOLDER JOINTS TO BE MADE HALF WAY ALONG LENGTH OF FOIL FOR REDUCED LOSSES



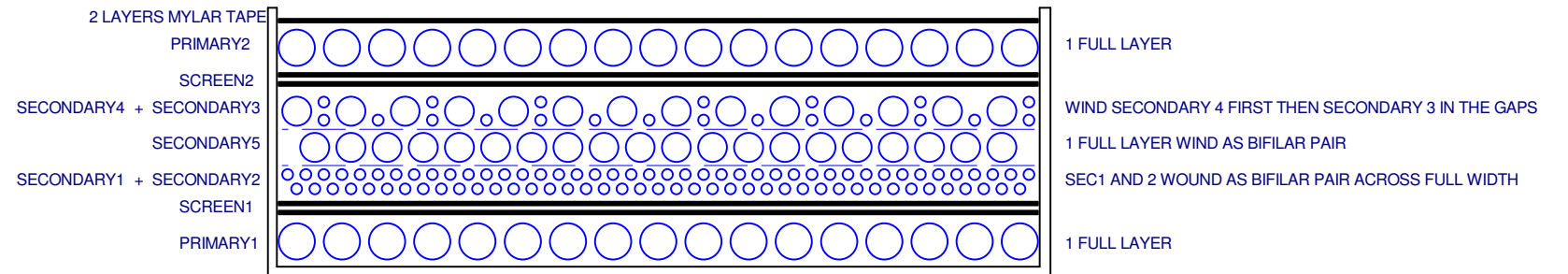
### VIEW FROM SIDE OF PART SHOWING PIN LENGTH DIMENSIONS



## WINDING DETAILS

WINDING	TURNS	WIRE DETAILS	No PER CABLE	ID	OD	START PIN #	END PIN #	NOTES
PRIMARY2	16	ENAMELLED COPPER WIRE	1	0.8mm	0.86mm	3	2	SPACE WINDING ACROSS WHOLE BOBBIN WIDTH
SCREEN 2		INSULATED 2mil COPPER FOIL				1		SCREEN TO HAVE NO OVERLAP AT ENDS
SECONDARY3	22	ENAMELLED COPPER WIRE	1	0.25mm	0.3mm	11	12	WIND ACROSS WHOLE BOBBIN WIDTH BETWEEN GAPS IN SEC4
SECONDARY4	14	ENAMELLED COPPER WIRE	1	0.66mm	0.72mm	9	10	SPACE WINDING ACROSS WHOLE BOBBIN WIDTH
SECONDARY5	10	ENAMELLED COPPER WIRE (BIFILAR)	2	0.66mm	0.72mm	7	8	WIND AS A BIFILAR PAIR ACROSS WHOLE BOBBIN WIDTH
SECONDARY1	41	ENAMELLED COPPER WIRE	1	0.25mm	0.3mm	4	5	WIND SEC1 AND SEC2 AS A BIFILAR PAIR ACROSS WHOLE BOBBIN WIDTH
SECONDARY2	41	ENAMELLED COPPER WIRE	1	0.25mm	0.3mm	5	6	
SCREEN 1		INSULATED 2mil COPPER FOIL				1		SCREEN TO HAVE NO OVERLAP AT ENDS
PRIMARY1	16	ENAMELLED COPPER WIRE	1	0.8mm	0.86mm	2	1	SPACE WINDING ACROSS WHOLE BOBBIN WIDTH

## WINDING ARRANGEMENT ON BOBBIN



## MATERIALS

- CORE** PQ32/30 in PC44 MATERIAL (OR EQUIVALENT)  
 CORE TO BE GAPPED IN CENTRE LEG TO GIVE REQUIRED  $L_{pri}$  (GAP APPROX 0.4mm)  
 $(L_{pri} = 450\mu H \pm 10\% \text{ PRIMARY INDUCTANCE MEASURED FROM PIN 1 TO 3})$   
 PART NUMBER TDK PC44PQ32/30Z-12 (OR EQUIVALENT)
- BOBBIN CLAMP** PART NUMBER TDK BPQ32/30-1112CP (OR EQUIVALENT)  
 PART NUMBER TDK FPQ32/30-A (OR EQUIVALENT)

## ASSEMBLY DETAILS

- 1 PART TO BE MARKED WITH PART NUMBER / ISSUE NUMBER
- 2 INTERNAL SCREENS TO BE FULL WIDTH. CONNECTION TO SCREEN VIA SOLDER JOINT TO COPPER (SEE DIAGRAM)  
 SOLDER JOINT TO BE ARRANGED TO PRODUCE A LUMP IN THE CORE WINDOW  
 SOLDER JOINT TO BE MADE TO CLEAN COPPER AND JOINT TO BE TAPED.  
 SOLDER JOINT TO BE MADE HALF WAY ALONG LENGTH OF THE FOIL  
 SCREEN TO BE HIGHEST POSSIBLE RESISTANCE FOIL FOR LOWEST LOSSES. (I.E. FOIL AS THIN AS POSSIBLE)  
 SCREEN TO BE MADE FROM MAXIMUM 0.05mm (2MIL) FOIL
- 3 WINDINGS WILL BE A TIGHT FIT ON BOBBIN. NOTES AND WINDING ARRANGEMENT SPECIFIED TO BE ADOPTED.
- 4 TRANSFORMER TO BE FITTED WITH AN OUTER COPPER SCREEN WRAPPED AROUND THE OUTSIDE OF THE OF THE TRANSFORMER CORE AND CONTACTING THE METAL CORE CLAMP THUS FORMING A SHORTED TURN TO LEAKAGE FLUX. SEE DIAGRAM  
 SCREEN TO BE 10THOU COPPER STRIP 6 to 8mm WIDE AND FITTED OVER THE JOIN OF THE CORE HALVES.  
 SCREEN TO BE COVERED IN A LAYER OF TAPE.
- 5 PIN 1 ON BOBBIN TO BE MARKED WITH WHITE PAINT (OR OTHERWISE)  
 THIS MARKING TO BE USED TO ORIENTATE TX DURING WINDING PHASE TEST
- 6 100% PHASE TEST AND ISOLATION TEST TO BE CARRIED OUT ON ALL WINDINGS.

DRAWING TITLE							
DV78 450uH FLYBACK TX		03_E290	SLS	06-10-03	'VIEW FROM SIDE OF PART SHOWING PIN LENGTH DIMS' added.	1.1	
Filename: L925TX_1.1.Sch		02_E195	KAL	02-07-03	Production Release	1.0	
Notes:		02_E086	KAL	21-03-03	Changed Pri1,2 and Sec1,2 turns, Lpri & gap, Added outer screen	B.0	
		02_E336	KAL	20-11-02	Prototype Release	A.0	
Contact Engineer: Kevin Lamb		ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE	
Contact Tel: (01223) 203200		Printed: 8-Oct-2003		Sheet 1 of 1	DRAWING NO. L925TX		

**ARCAM**

A & R Cambridge Ltd.  
 Pembroke Avenue  
 Waterbeach  
 Cambridge CB5 9PB

Transformer Specification for 100/115/230V 50/60Hz mains transformer (for audio)

Arcam Part Number L931TX

General Safety specification.

- To standards BS415 / EN60065 - Class 1 / EN60742
- Transformer to be used in equipment which will be sold worldwide and certified to CE, CB, UL and CSA Standards. All materials etc to be adequate for worldwide safety approvals.

Material Safety Specification

- Winding Wire to be Grade 2 (130°C rating) to BS 60317-4 1995
- Mylar Polyester Insulator Rated to 130 °C

Electrical Specification

- Transformer to have dual 115V primaries to allow parallel operation for 100/115V input and series operation with 230V input.
- Transformer to have 2 secondary windings as shown in the adjacent diagram.
- The output from the secondary windings are to be full wave rectified and smoothed as shown in the 'test circuit' diagram.
- Transformer input voltage range as follows:  
115V: (85V to 132.5V) windings in parallel  
230V: (170V to 265V) windings in series

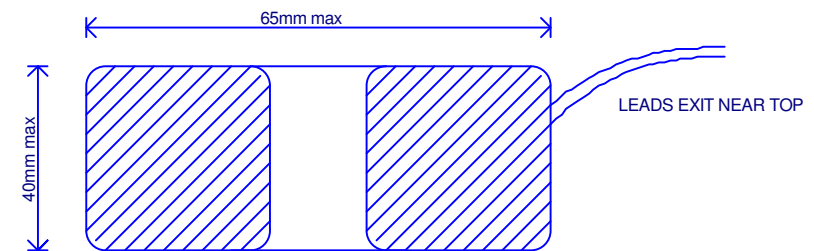
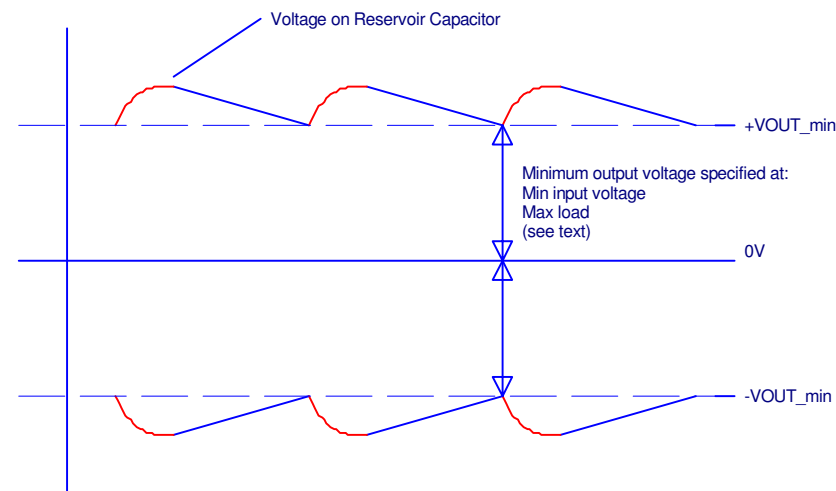
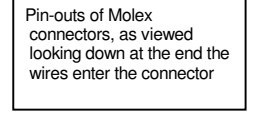
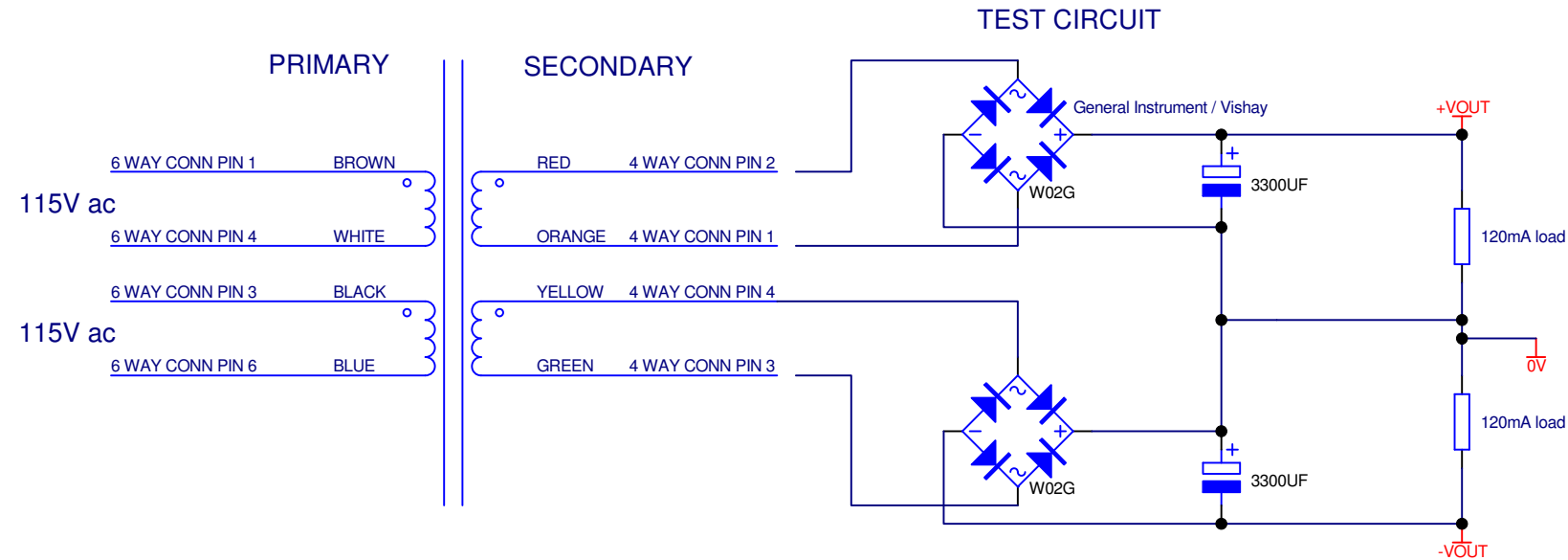
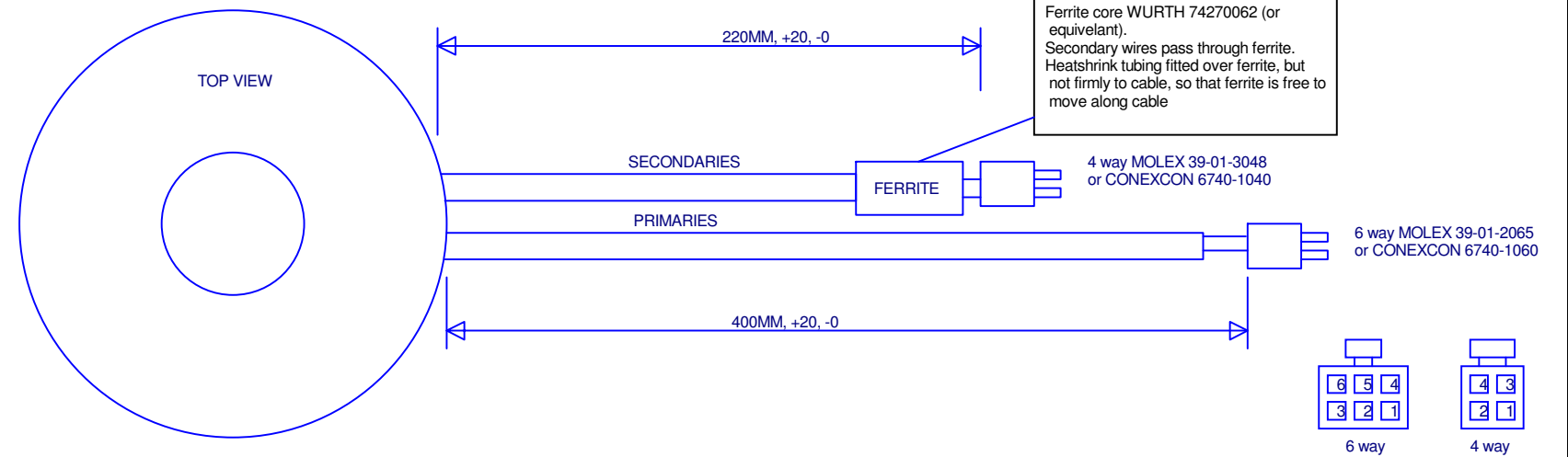
Note. Extended input voltage range 85V to 265V

- At minimum input voltage (170V AC with primaries in series) and maximum load of 120mA the minimum voltage on the capacitor must be = (or >) 13.5V.

- Temperature rise to be such that transformer is safe when operated in an enclosure with 50C maximum internal temperature.

Mechanical Specification

- Primary windings connect to 6 way MOLEX connector 39-01-2065. Secondary windings connect to 4 way molex connector 39-01-3048. CONEXCON alternatives are allowed. Use MOLEX pin 44476-3112. MOLEX connectors have pin numbers indicated on them.
- Use 24 AWG wire with colours as shown. Primary wires are enclosed in a common sleeve. Secondary wires are enclosed in a common sleeve. Use PVC sleeving.
- Transformer to be marked with Arcam part number and issue number.
- Transformer is for Hi-Fi audio; Acoustic noise must be inaudible.
- Transformer to be supplied with mounting kit consisting of metal dished washer and 2 neoprene or similar washers.



DRAWING TITLE		DV29 AUDIO TRANSFORMER				
<b>ARCAM</b> A & R Cambridge Ltd. Pembroke Avenue Waterbeach Cambridge CB5 9QR	Filename: L931TX_1.1.sch	04_E107	PG	21-07-04	Add 20mm to all lead lengths, ferrite free to move on cable	1.1
	Notes:	04_E087	PG	28-06-04	Production release. Add ferrite core to secondary cable	1.0
		04_E048	PG	27-04-04	Reduce specified output voltage to 13.5V at 120mA	A.1
		04_E034	PG	26-03-04	Prototype Release	A.0
		ECO No.	INITIALS	DATE	DESCRIPTION OF CHANGE	ISSUE
Contact Engineer: Peter Gaggs	Contact Tel: (01223) 203270	Printed: 21-Jul-2004	Sheet 1 of 1	A3	DRAWING NO. L931TX	

## DV29 Mechanical and packing parts list

Designator	Part	Description
	E879SL	Label Mod State
	HA3V10A	M Screw Torx M3x10MM ST ZP
	E894SL	Label DVD Licensing
	HE6V06B	Screw Sftp Torx No.6x6MM BLK
	H033	M3X18MM Brass N/Plted Hex Pillar FEMALE/FEMALE)
	F241	Ferrite for Flexfoil
	F242	Ferrite Plate
	E829AP	Adhesive Pad 50mm X 30mm 51587
	HL4SB	Washer M4 Int Shakeproof BLK
	HF4V09B	Screw Self-Tapping-Sems NO.4 X 9MM Pan Torx-Slot Steel Zinc-Plate BLK
	HA4A12B	M Screw Pan Supa M4x12MM ST BLK
	E217AY	Rear Panel Assembly DiVA DV79
	L959AY	DV78 DVD Power Supply PCB
	HL6CA	Bright Washer M6 (Form C) to BS 4320
	SL158	SL158 Earth Symbol Label
	L924TX	Transformer Toroid DV78 115/230V
	L961CA	Cable FFC 1.25mm 32 Way 65mm
	L962CA	Cable FFC 1mm 16 Way 165mm
	L963CA	DVD Drive Cable 40 Way IDC 160mm
	E822PM1	Foot Black Alpha
	F226	EMC Gasket (7.0mm x 3.0mm rectangular cross section)
	L857CA	DVD Cable Ass DSP TO Prog Scan
	B2014	DVD Drive Atapi DVS DSL-710A LT74
	E919PM	Extended Button Adaptor Diva Power
	HA3V10B	M/C Torx M3X10 Black (500)
	E953MC	Adhesive Backed Foam Pad For Underneath And ON Top OF DV88 Mech
	F044	Cable Tie 100MM X 2.5MM
	HJ4A00A	Nut M4 Full ST ZP
	HA6K45A	Bolt Hex HD M6x45MM Mczp
	F243	Ferrite Disk
	L972AY	DV29 Display Board PCB Assembly
	L964CA	DVD Drive Power Cable 4 Way 275mm
	L971AY	DV29 Main Board PCB Assembly
	L931TX	Transformer Toroid DV29 Audio Supply 115/230V
	HA6K40A	Bolt M6x40 HX Dhzp (250)
	HA3V06A	M Screw Torx P/H M3x6MM ST ZP
	E236AY	Chassis Assembly FMJ DV29
	L928CA	6 Way Amp CT 600MM
	E984SL	Green Blue Red Label
	HA3A16A	M Screw Torx M3x16MM ST ZP
	F235	Cable Tie 4.8mm Wide 171.5mm Long 5.3mm Fixing Hole Dia
	HL3AB	Washer M3 Plain ST BLK
Designator	Part	Silver Parts
	E850PM	Button Silver FMJ Mains
	HA4V06S	M Screw Torx M4x6MM Stainless Steel
	E233AY	FMJ Silver DV29 Drawer Front Assy
	E234AY	Cover Assembly Silver FMJ DV29
	E238AY	Fascia Assembly FMJ DV29 Silver
Designator	Part	Black Parts
	E850PMB	Button Black FMJ Mains
	HA4V06B	M Screw Torx M4x6MM ST BLK
	E233AYB	FMJ Black DV29 Drawer Front Assy
	E234AYB	Cover Assembly Black FMJ DV29
	E238AYB	Fascia Assembly FMJ DV29 Black

## DV29 Mechanical and packing parts list

Designator	Part	Packing Accessories
	E822PK	Poly Sheet 915x900MM 350 Gauge
	SM632	Clear Box Sealing Tape 3703 - 50MM X 66M
	L415RC	DVD Remote Control CR415
	P3020	Poly Bag 10x14 Grippa Seal Clear
	SH000	Product Registration Card
	SH000A	Envelope For Registration Card
	E905PK	Plain Outer Carton FMJ AV8
	E906PK	Internal Printed Carton FMJ AV8
	E983SL	Carton Label FMJ DV29
	SH148	Handbook FMJ DV29 DVD Player Multi
	E978SL	Intertek Listing Label (printed in-house)
	E851PK	PAIR OF END CAPS for FMJ DV29

# ARCAM

All parts can be ordered via [spares@arcam.co.uk](mailto:spares@arcam.co.uk)

Pembroke Ave, Waterbeach, Cambridge, CB5 9PB, ENGLAND  
TEL: +44(0) 1223 203 200    FAX: +44(0) 1223 863 384