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YELLOW1210

Processor Board

Technical Reference Manual

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REVISION INFORMATION

DATE	REV	BY	CR	CHANGE
10/02/10	A00	PR	6877	This is the first version of this manual. It reflects the Rev A00 version of the PCB.

1 INTRODUCTION

The YELLOW1210, supporting components and software represent a powerful, easy to use embedded computing solution.

This document is the Hardware Technical Reference Manual for the YELLOW1210 product range including YELLOW1210 and REDCONN. It provides information on the board-level hardware and specifically includes:

- product specifications
- configuration information
- electrical characteristics
- interface pinouts
- details of EMC and ESD policies

Technical information on LaunchPad Application Development Kits for the YELLOW1210 is provided in separate documents. Details of hardware configuration and device driver implementations for a supported operating system can be found in the Platform Guide for that particular operating system. This Technical Reference Manual refers to the Platform Guide wherever hardware function is operating system dependent.

1.1 OVERVIEW

YELLOW1210 is a high performance credit card size single board computer optimized for use in embedded projects. YELLOW1210 combines the power of the RMI® Au1210™ processor with a carefully selected set of peripherals optimized for high functionality, low power and small form factor. DSP Design has engineered the high risk elements of the system. You receive a fully tested module.

The YELLOW1210 is a RoHS compliant board. Low power consumption in normal operation and during sleep modes make the YELLOW1210 ideal for battery operated systems.

The YELLOW1210 operates as a standalone module requiring only a single 5V input. Alternatively customers can add the REDCONN - a services board for the YELLOW1210 - or use YELLOW1210 as a “super component” in their systems.

A preconfigured Windows CE operating system is available for the YELLOW1210. Development is speeded by the availability of the LaunchPad Application Development Kit for YELLOW1210.

1.2 YELLOW1210 FEATURES

- The Au1210™ processor which uses the RMI® Alchemy™ micro-architecture and complies with the MIPSII instruction set.
- High performance at very low power consumption.
- 64Mbytes of DDR SDRAM soldered to the board.

- 128Mbytes of NAND Flash, typically for the operating system and file system.
- One MicroSD socket allowing a range of MicroSD cards to be used for memory expansion.
- Two serial ports. COM1 is limited (Tx & Rx only) function RS232, and COM2 is full function RS232 .
- 10/100 Base-T Ethernet port.
- One USB 1.1 host port.
- One USB 1.1 port configurable as host or client.
- 16-bit parallel display interface supporting a wide range of TFT LCDs at resolutions up to 1024 x 768.
- AC97 codec providing mono microphone input, stereo line input, stereo line output, mono speaker output and four-wire resistive touch screen controller.
- Battery backed Real Time Clock.
- One I^2C multi-master serial bus providing simple expansion.
- 16-bit bus providing flexible expansion.
- 17 general purpose I/O signals for user I/O.
- Watchdog Timer generating cold and warm resets.
- The YELLOW1210 consumes very little power from a single 5V power supply even when operating at full speed. The operating system may switch off unused circuitry for extremely low power consumption in power managed states.
- 85mm x 65mm form factor.
- 0 to +70 deg C operating temperature range.

1.3 REDCONN SERVICES BOARD

The REDCONN connector board makes many of the interfaces on YELLOW1210 easy to use by routing them to standard connectors. This means that you can connect your YELLOW1210 directly to a wide range of peripherals including a serial port, audio, Ethernet network and USB devices.

REDCONN is available in two variants, which allows different powering schemes:

- REDCDC is powered from DC brick power supplies.
- REDCPOE is powered via Power over Ethernet (IEEE802.3af). PoE technology allows IP telephones, wireless LAN Access Points, webcams and many other appliances to receive power as well as data over existing LAN cabling, without needing to modify the existing Ethernet infrastructure.

REDCONN is an example interface board for YELLOW1210. Many projects will engineer an application-specific interface board with I/O suitable for the product. DSP Design call these interfaces “services boards”. Services boards can be produced by DSP Design or by the customer with assistance from DSP Design.

1.4 LAUNCHPAD APPLICATION DEVELOPMENT KIT

DSP Design strongly recommends that you begin your development project by using the LaunchPad Application Development Kit for YELLOW1210. This is a complete ready to use embedded computer system that is waiting for your application to be placed into the solid-state disk. Figure 1 shows the LaunchPad hardware. Not shown are the complete set of software and accessories (mouse, keyboard, PSU and cables) that are included in the LaunchPad Application Development Kit for YELLOW1210. The LaunchPad hardware comprises the following items mounted on a laptop style stand:

- YELLOW1210 processor board.
- YELLOWDEBUG development board.
- REDCDC connector board.
- LCD and backlight inverter.
- Resistive touch-screen.

FIGURE 1 - THE LAUNCHPAD FOR YELLOW1210

Using the LaunchPad Application Development Kit for YELLOW1210 will greatly reduce your development time, so your product will get to market sooner, at a fraction of the engineering costs normally associated with product development.

We have two objectives as you begin to use your new LaunchPad Application Development Kit for YELLOW1210. Firstly, we expect that within an hour of receiving your

LaunchPad you will have set up the hardware, connected it to your LAN and run a simple demonstration. Secondly, we expect that within a day you will have installed the development tools, compiled a sample application, downloaded it to the target hardware, and experimented with debugging this application remotely from the host computer. So on the second day you can begin developing your real application.

For full details of the LaunchPad Application Development kits see our web site at www.dspdesign.com/launchpad.

2 YELLOW1210 HARDWARE

2.1 BLOCK DIAGRAM

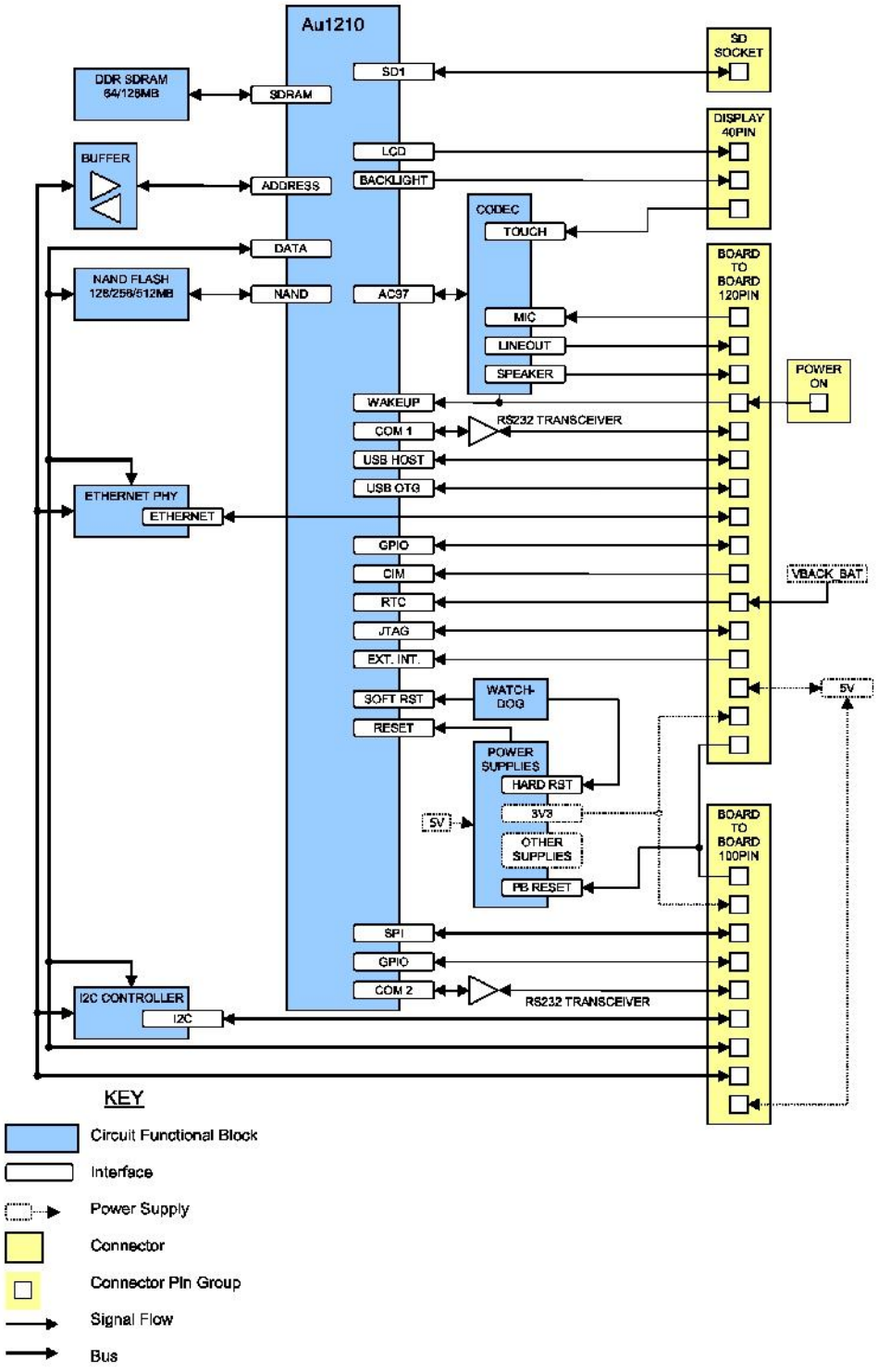

FIGURE 2 - YELLOW1210 BLOCK DIAGRAM

2.2 PROCESSOR AND MEMORY

2.2.1 Processor

The YELLOW1210 uses a Au1210™ processor, which implements the RMI® Alchemy™ micro-architecture and complies with the MIPSII instruction set. This is an integrated system-on-a-chip microprocessor for high performance, dynamic, low-power portable hand-held and hand-set devices as well as embedded platforms. The chip contains a wide range of peripherals.

The Au1210™ is available with clock rates of 333MHz and 400 MHz. By default the 333MHz processor is fitted, but the 400MHz part is available for volume applications. Contact DSP Design if you require the faster part.

2.2.2 SDRAM

The Au1210™ includes a 16-bit Double Data Rate (DDR) Synchronous Dynamic RAM (SDRAM) memory interface.

The YELLOW1210 provides 64Mbytes of DDR memory as standard, soldered to the PCB. For volume applications there is an option for 128Mbytes, please contact DSP Design if you wish to discuss this.

Some of the DDR SDRAM is allocated to the internal LCD controller.

2.2.3 Flash Memory

The YELLOW1210 provides 128Mbytes of NAND Flash as standard, soldered to the PCB. There are options for larger capacities for volume applications. Contact DSP Design if you wish to discuss these options. The NAND Flash is connected to the Au1210™ processor via the shared system bus.

The NAND Flash typically contains the bootloader, operating system and non-volatile storage. In the case of Windows CE the NAND flash contains the NK.bin operating system image and file storage.

2.3 MICRO SECURE DIGITAL SOCKET

The YELLOW1210 provides a Micro Secure Digital (SD) socket suitable for 3.3V memory cards, providing memory expansion. A MicroSD card can be fitted in the socket J1. The high-capacity SDHC cards are supported by the hardware controller. Please refer to the Platform Guide for the relevant operating system for further details.

Power switching circuitry is provided to power down the MicroSD card, to reduce system power consumption and provide hot swap capability.

The YELLOW1210 provides ESD protection on all MicroSD card signals. EMC filtering is

not required or provided as the connections to the MicroSD socket will remain within an enclosure. The metal parts of the MicroSD sockets connect to a separate CHASSIS ground, which also connects to the mounting hole closest to the socket.

2.4 DISPLAY

The YELLOW1210 provides a 16-bit TFT LCD interface. Table 1 lists the signals associated with the LCD interface. (Note that connector J2 also carries touch-screen signals. See section 2.5).

The LCD controller is implemented in the Au1210™ processor. It is capable of driving colour TFT LCD panels with resolutions up to 1024 x 768.

The parallel digital interface has been designed to be compatible with a range of interface boards from DSP Design, allowing connection to a variety of common displays. At present DSP Design offers three TFT LCD interface boards which can be used with the YELLOW1210. The TFTIF31, TFTIF41 and TFTIFKYV boards interface to TFT LCDs with conventional parallel interfaces (6 bits of red, green and blue, plus timing signals). Details of the interface boards are provided in Appendix D.

The YELLOW1210 produces 16 bits of display data, 5 bits of red, 6 bits of green and 5 bits of blue. Some displays will have 18, or sometimes more, data bits. In this case the display's least significant bits should be connected to GND.

Several TFT panels from different manufacturers have been successfully tested with the YELLOW1210. Please refer to the Platform Guide for the relevant operating system for further details.

Solder link LK1 is used to route either VCC_5V or LCD_ADJ to J2 pin 33. By default neither signal is connected as the YELLOW1210 does not currently support the PWM signal. Do not fit LK1 in either position.

This interface is intended to remain within an enclosure and not be accessible by the end user. EMC filtering and ESD protection is therefore not provided on the YELLOW1210, although series resistors are present on the LCD signals to reduce ringing. Connections to the LCD should be kept as short as possible to reduce electrical noise.

SIGNAL	J2 PIN	DESCRIPTION
BKL_EN	1	Backlight Enable
LCD_EN	2	LCD Power Enable
LCD_DCLK	4	Pixel Clock
LCD_HSYNC	6	Horizontal Sync
LCD_VSYNC	8	Vertical Sync
LCD_R0 (1)	-	Red Colour Bus
LCD_R1 (1)	-	
LCD_R2 (1)	-	
LCD_R3	12	
LCD_R4	14	
LCD_R5	15	
LCD_R6	16	
LCD_R7	18	
LCD_G0 (1)	-	Green Colour Bus
LCD_G1 (1)	-	
LCD_G2	22	
LCD_G3	23	
LCD_G4	24	
LCD_G5	26	
LCD_G6	27	
LCD_G7	28	
LCD_B0 (1)	-	Blue Colour Bus
LCD_B1 (1)	-	
LCD_B2 (1)	-	
LCD_B3	34	
LCD_B4	35	
LCD_B5	36	
LCD_B6	38	
LCD_B7	39	
LCD_DE	40	Data Enable
LCD_ADJ (2)	33	Backlight PWM Control

NOTES:

1) J2 supports a generic LCD interface used on all DSP Design processor boards, some of which support 18bpp. On the Au1210™ the R0, R1, R2, G0, G1, B0, B1 and B2 signals are connected to GND.
2) See note on solder link LK1.

TABLE 1 - YELLOW1210 LCD SIGNALS

Table 2 provides the electrical characteristics for the LCD interface signals.

SIGNAL	PARAMETER	CONDITION	LIMITS			UNITS
			Min	Typ	Max	
LCD_DCLK, LCD_HSYNC, LCD_VSYNC, LCD_DE LCD_R[7:3], LCD_G[7:2], LCD_B[7:3], BKL_EN, LCD_EN, LCD_ADJ	V_{OH}	I_{OH} = -1mA	0.9 * VCC_3V3	-	VCC_3V3	V
	V_{OL}	I_{OL} = 1mA	GND	-	0.1 * VCC_3V3	V

TABLE 2 - YELLOW1210 LCD INTERFACE ELECTRICAL CHARACTERISTICS

2.5 TOUCH-SCREEN

The YELLOW1210 provides a four-wire resistive touch-screen interface. Table 3 lists the signals associated with the touch-screen. (Note that connector J2 also carries LCD signals. See section 2.4).

SIGNAL	J9 PIN	DESCRIPTION
TSXP	9	Touch-screen top contact
TSXN	10	Touch-screen bottom contact
TSYP	31	Touch-screen right contact
TSYN	30	Touch-screen left contact

TABLE 3 - YELLOW1210 TOUCHSCREEN SIGNALS

When the processor is placed into sleep mode it is possible for a touch on the touch-screen to wake the processor. Please refer to the Platform Guide for the relevant operating system for further details.

Figure 3 shows the YELLOW1210 touch-screen controller interfacing to a four-wire resistive touch-screen. The touch-screen controller is implemented within the WM9713 audio codec which interfaces to the Au1210™ processor via the AC97 bus.

The touch screen signals are designed for connecting to a resistive four-wire touch screen only.

The YELLOW1210 provides EMC filtering and ESD protection on all touch-screen signals.

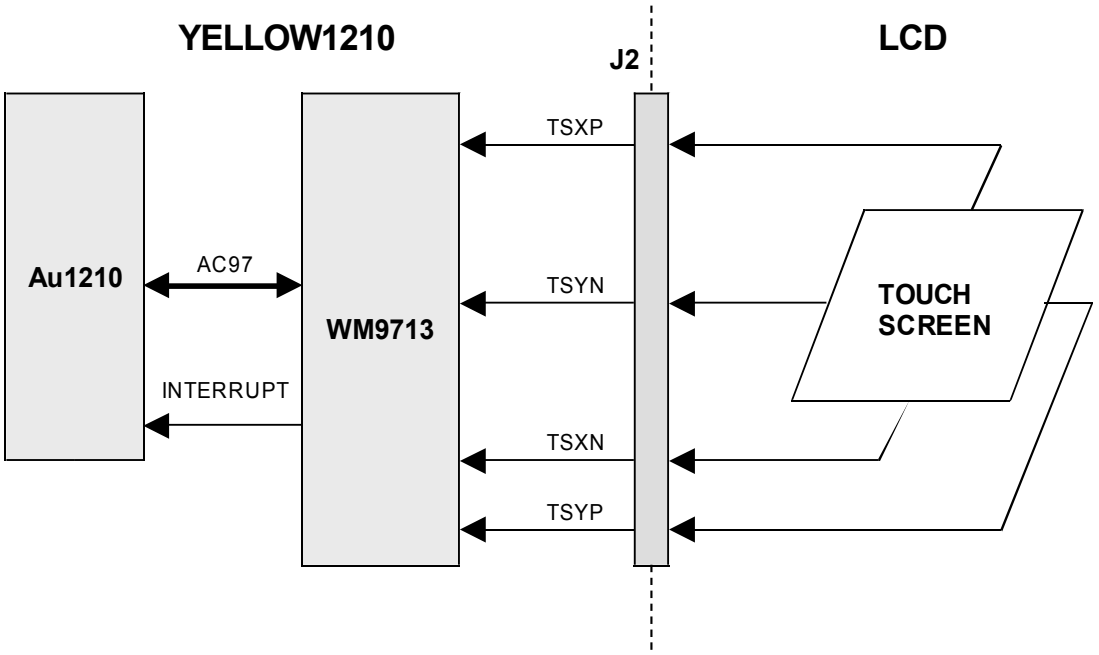

FIGURE 3 - YELLOW1210 TOUCH-SCREEN BLOCK DIAGRAM

2.6 SERIAL PORTS

The YELLOW1210 provides two RS232 serial ports labelled COM1 and COM2. Table 4 lists the signals associated with the two serial ports.

SIGNAL	CONNECTOR - PIN	DESCRIPTION
TXD1	J4-76	COM1 RS232 transmit data output
RXD1	J4-77	COM1 RS232 receive data input
DCD2	J3-1	COM2 RS232 carrier detect input
RXD2	J3-2	COM2 RS232 receive data input
TXD2	J3-3	COM2 RS232 transmit data output
DTR2	J3-4	COM2 RS232 data terminal ready output
DSR2	J3-61	COM2 RS232 data set ready input
RTS2	J3-62	COM2 RS232 request to send output
CTS2	J3-63	COM2 RS232 clear to send input

TABLE 4 - YELLOW1210 SERIAL PORT SIGNALS

Each UART is functionally compatible with the industry standard 16550A UART and can be independently configured for 5-8 data bits, 1-2 stop bits, even, odd or no parity and baud rates supported by the operating system. The maximum baud rate is 115.2k baud.

The serial ports are compliant with the EIA/TIA-232 and V.28/V.24 specifications. Typical voltage swings on the output signals are +/- 5V when loaded with 3kΩ to ground. Maximum short circuit output current is 60mA.

Damage may occur if voltages on input signals exceed +/-25V on input signals and +/-13V on output signals.

Each port uses ICL3243E transceivers, which provide ±15KV ESD protection (IEC61000-4-2 Air Gap and Human Body Model).

EMC filtering is not provided on these signals on the YELLOW1210. It is the user's responsibility to ensure that systems using the YELLOW1210 and a compatible services board are compliant with the appropriate EMC standards.

The REDCONN provides EMC filtering on all these signals.

2.7 ETHERNET

The YELLOW1210 provides a single IEEE 802.3/802.3u compliant 10/100-Base-TX Ethernet port. The Ethernet port is implemented in the LAN9215 Ethernet controller chip which has an integrated MAC and PHY.

Table 5 lists the signals associated with the Ethernet port.

SIGNAL	J3 PIN	DESCRIPTION
RDP	26	Differential pair receiving data positive
RDN	27	Differential pair receiving data negative
LAN_3V3A	86	3.3V power to centre-tap of receive transformer.
TDP	29	Differential pair transmitting data positive
TDN	30	Differential pair transmitting data negative
LINK#	89	Controls LINK status LED in the RJ45 connector.
10/100#	90	Controls LAN activity LED in the RJ45 connector.

TABLE 5 - YELLOW1210 ETHERNET SIGNALS

Figure 4 shows the YELLOW1210 Ethernet block diagram and a typical services board block diagram. The 16-bit LAN9215 Ethernet controller chip interfaces to the Au1210™ processor via the 16-bit shared system bus. The transmit and receive differential pairs interface directly to expansion connector J3, from where they travel to an isolation transformer and then the RJ45 Ethernet connector.

The REDCONN Services Board includes the transformer and RJ45 socket. The socket contains two LEDs. The LINK# signal drives the green LED and the 10/100# signal drives the yellow LED. The LINK# and 10/100# signals are designed to connect to LEDs through a 470R series resistor, with the LED connected to VCC_3V3.

Typically, the LINK# LED is on when a link is established and flashes as an activity

indicator, and the 10/100# LED is on when the operating speed is 100Mb/s, during auto-negotiation and when the cable is disconnected. Please refer to the Platform Guide for the relevant operating system for the exact details of operation.

Users who intend to design their own Ethernet interface should note that choice of transformer and tracking of the high-speed Ethernet signals are critical for reliable operation. The transformer must be positioned close to the RJ45 socket and must be compatible with the LAN9215. Please refer to the "Suggested Magnetics" application note available on the SMSC website.

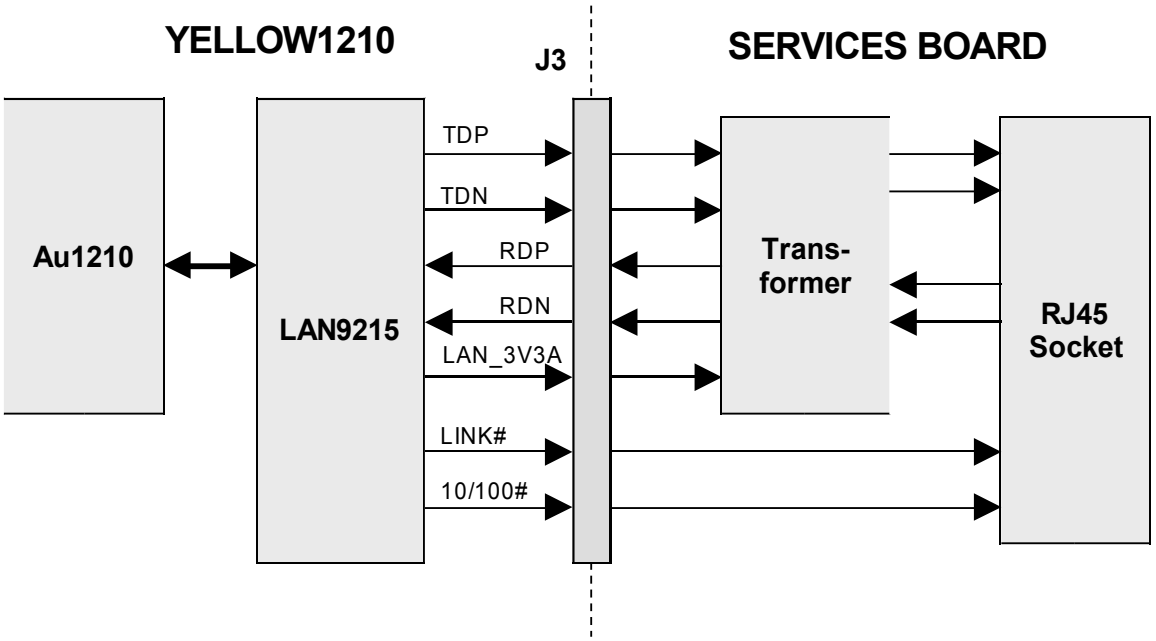

FIGURE 4 - YELLOW1210 AND SERVICES BOARD ETHERNET BLOCK DIAGRAM

The Ethernet signals must only be connected as described in the LAN9215 data sheet. Damage may occur if any of the signals is taken outside the range -0.3V to +5.5V.

EMC filtering and ESD protection is not provided on these signals on the YELLOW1210. It is the user's responsibility to ensure that systems using the YELLOW1210 and a compatible services board are compliant with the appropriate EMC and ESD standards.

The REDCONN provides EMC filtering and ESD protection on all these signals.

2.8 USB HOST PORT

The YELLOW1210 provides a single USB host port which is compliant with the USB1.1 specification. This port is suitable for connecting to a wide range of USB peripherals, and will transfer data at up to 12Mb/s.

TABLE 6 - YELLOW1210 USB HOST SIGNALS lists the signals associated with the USB host port.

SIGNAL	J3 PIN	DESCRIPTION
USB1H1PB	46	Port 1 USB positive signal
USB1H1NB	47	Port 1 USB negative signal
USB_PWR	106	Port 1 switched 220mA current limited +5V supply

TABLE 6 - YELLOW1210 USB HOST SIGNALS

Figure 5 shows the YELLOW1210 USB host block diagram and a typical services board block diagram.

The host controller is implemented in the Au1210™ processor. The USB1H1 signals connect directly to a differential port at the processor. This port can connect directly to USB ICs or to standard USB connectors on the services board.

The USB host port is compliant with the USB 1.1 specification. Please refer to the USB 1.1 specification for the electrical characteristics. Do not connect the signals to anything other than USB peripherals. Damage may occur if voltages exceed those given in Table 7.

USB_PWR is a 5V power supply controlled by a power distribution switch. The switch is controlled by the operating system and has a nominal current limit threshold of 220mA. Due to tolerances in the switch, the current limit threshold can vary from 154mA to 286mA over the full temperature range.

The YELLOW1210 provides EMC filtering on all USB signals including power and ground.

The YELLOW1210 provides ESD protection on all USB signals except ground. The USB data pairs have clamping diodes to VCC_3V3 and GND. The switched USB power rail has clamping diodes to VCC_5V and GND.

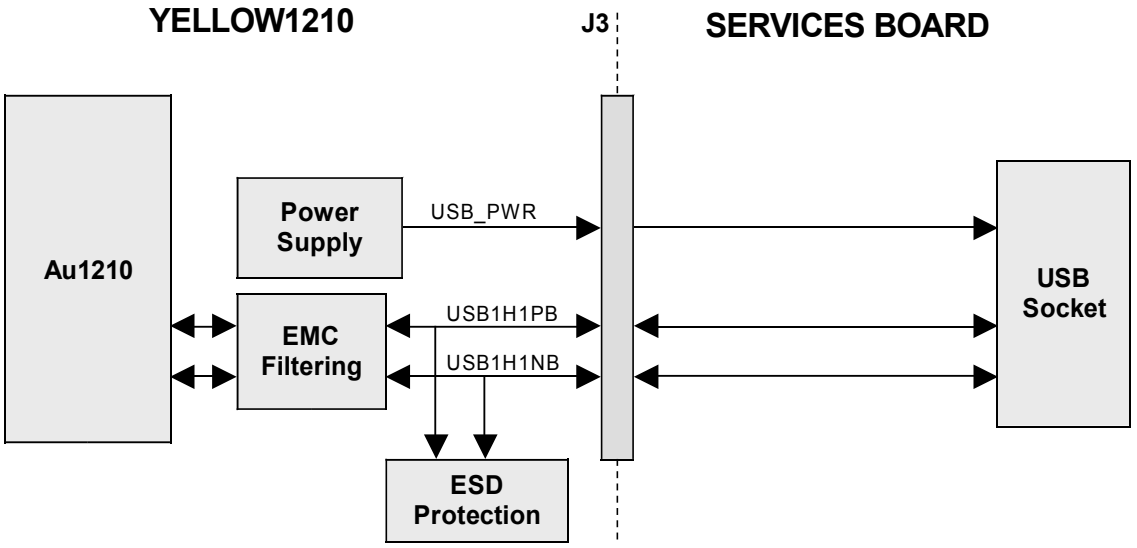

FIGURE 5 - YELLOW1210 AND SERVICES BOARD USB HOST BLOCK DIAGRAM

SIGNAL	ABSOLUTE MAX RATING (1)	
	MIN(2)	MAX(2)
USB1H1NB	-0.3V	+4.0V
USB1H1PB	-0.3V	+4.0V
USB_PWR	-0.3V	+6.0V

NOTES:

1) Exceeding the absolute max rating may damage the device.
2) These voltages are with respect to GND.

TABLE 7 - YELLOW1210 USB HOST PORT ABSOLUTE MAXIMUM RATINGS

2.9 USB HOST / CLIENT PORT

The YELLOW1210 has a second USB port that is configurable as either a USB Host or USB Client port. Whether configured as a host or client, the port is compliant with the USB1.1 specification. Configuration of this port is performed by software. Please refer to the Platform Guide for the relevant operating system for further details.

Table 8 lists the signals associated with the USB host / client port.

SIGNAL	J3 PIN	DESCRIPTION
USB1DP	43	USB client positive signal
USB1DN	44	USB client negative signal
USB_VBUS	45	+5V input from USB host
USB1DP	104	USB host positive signal
USB1DN	105	USB host negative signal
USB_PWR	106	Switched 220mA current limited +5V supply

TABLE 8 - YELLOW1210 USB HOST / CLIENT SIGNALS

The REDCONN provides both USB host and client connectors.

SIGNAL	ABSOLUTE MAX RATING (1)	
	MIN(2)	MAX(2)
USB_VBUS	-0.5V	+7.0V
USB1_DP	-0.3V	+4.0V
USB1_DN	-0.3V	+4.0V
USB_PWR	-0.3V	+6.0V(2)

NOTES:

1) Exceeding the absolute max rating may damage the device.
2) All voltages are with respect to GND.

TABLE 9 - YELLOW1210 USB HOST / CLIENT ABSOLUTE MAXIMUM RATINGS

2.9.1 USB HOST / CLIENT PORT – CLIENT OPERATION

By default, the host / client port is configured as a USB client port. If the VBUS signal is connected to the +5V power supply of a USB host, the voltage detector on the YELLOW1210 allows software to detect that the YELLOW1210 is connected to a USB host. The YELLOW1210 does not draw power from the VBUS signal.

Figure 6 shows the YELLOW1210 USB client port block diagram and a typical services board block diagram. The USB client controller is implemented in the Au1210™ processor and interfaces to expansion connector J3. The USB client can connect to a standard USB connector on the services board.

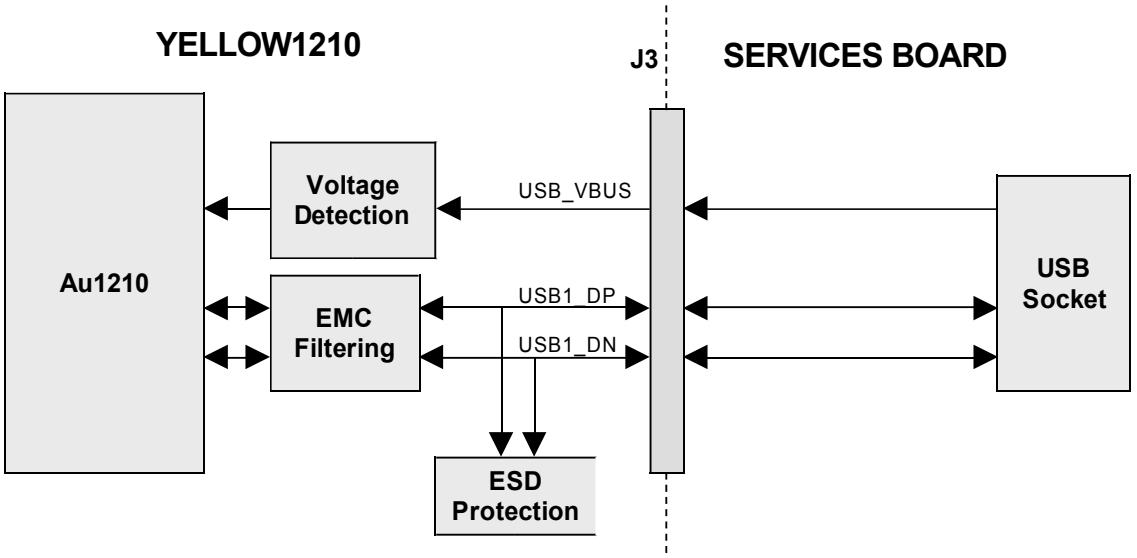

FIGURE 6 - YELLOW1210 AND SERVICES BOARD USB CLIENT BLOCK DIAGRAM

The USB device port is compliant with the USB 1.1 specification. Please refer to the USB 1.1 specification for the electrical characteristics. Do not connect the signals to anything other than a USB host port. Damage may occur is voltages exceed those given in Table 9.

The YELLOW1210 provides EMC filtering on all USB device signals including USB_VBUS and ground. The YELLOW1210 provides ESD protection on all USB device signals except ground. The USB data pairs have clamping diodes to VCC_3V3 and GND. The USB_VBUS input has clamping diodes to VCC_5V and GND.

2.9.2 USB HOST / CLIENT PORT – HOST OPERATION

When the USB host / client port is configured as a second USB host port, the port behaves as described in Section 2.8, above.

2.10 AUDIO

The YELLOW1210 provides an audio sub-system comprising a mono speaker output, mono microphone input, stereo line input and stereo line output. The audio sub-system is implemented in the WM9713 codec which interfaces to the Au1210™ processor via the AC97 bus. An amplifier drives a small loudspeaker from the codec's headphone left output.

Table 10 lists the signals associated with the audio sub-system.

SIGNAL	CONNECTOR - PIN	DESCRIPTION
LINEOUTR	J3-56	Right line output
LINEOUTL	J3-116	Left line output
LINEINR	J3-54	Right line input
LINEINL	J3-114	Left line input
SPKR1	J3-58	Mono speaker output
SPKR2	J3-118	Mono speaker output
MIC	J3-120	Microphone input
AGND	J3-57, J3-59, J3-60, J3-115, J3-117, J3-119	Analog GND, for referencing MIC and LINEOUT signals.

TABLE 10 - YELLOW1210 AUDIO SIGNALS

Figure 7 shows the YELLOW1210 audio block diagram and a typical services board block diagram.

The audio signals can connect to standard audio connectors on the services board.

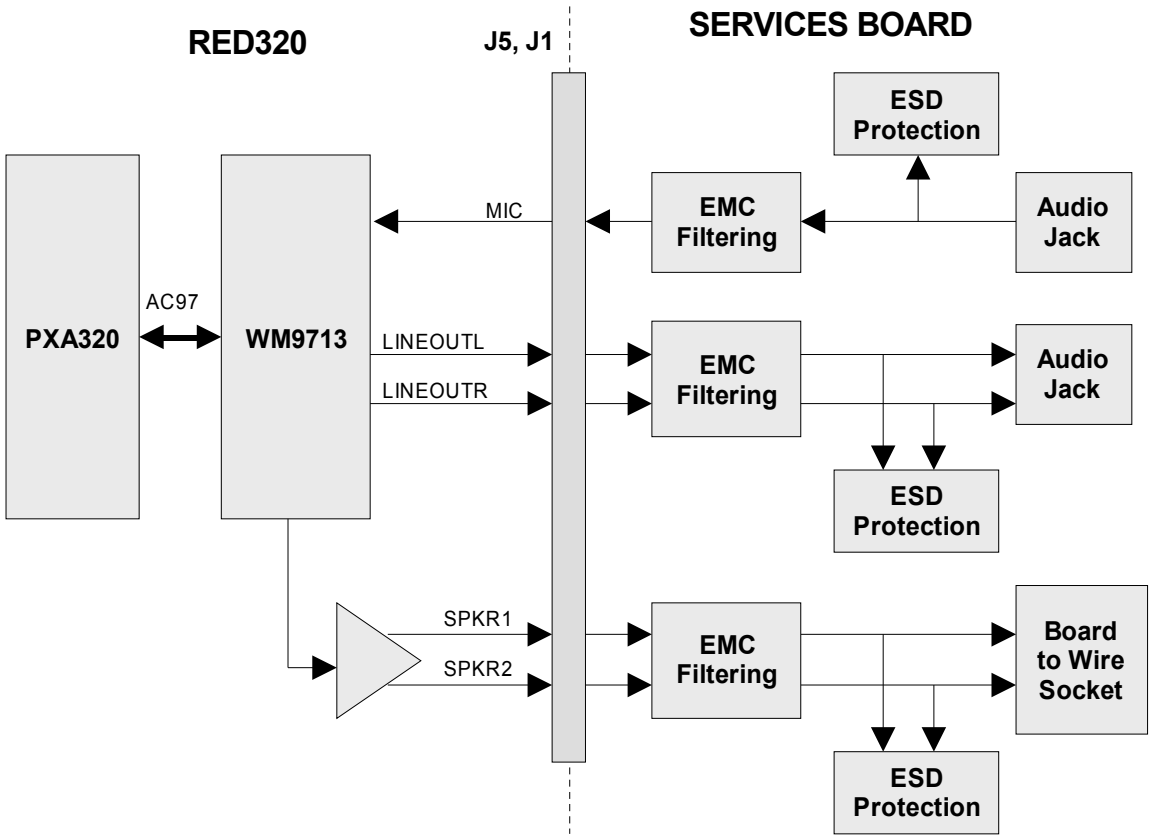

FIGURE 7 - YELLOW1210 AND SERVICES BOARD AUDIO BLOCK DIAGRAM

MIC is an input to the WM9713 audio codec. The WM9713 supports both self-powered and unpowered active microphones. Both types of microphone connect between MIC and AGND. Unpowered active microphones require a bias voltage on MIC, which is provided by the YELLOW1210 when LK2 is fitted. Self-powered active microphones containing an internal battery do not require a bias voltage. To prevent damage, ensure that LK2 is not fitted when using a self-powered microphone. By default LK2 is not fitted.

LINEOUTL and LINEOUTR are outputs of the WM9713 audio codec. These are line level outputs intended to drive high impedance loads. DC blocking capacitors are provided on the YELLOW1210.

LINEINL and LINEINR are inputs to the WM9713 audio codec and are designed to record line level signals.

SPKR1 and SPKR2 are outputs of an LM4871 power amplifier capable of driving a 4Ω or 8Ω mono speaker. The amplifier will drive up to 2.5W into a 4Ω speaker or 1.5W into an 8Ω speaker. Figure 8 shows the required configuration. Note that the speaker must be driven in this differential fashion and must not be connected to GND.

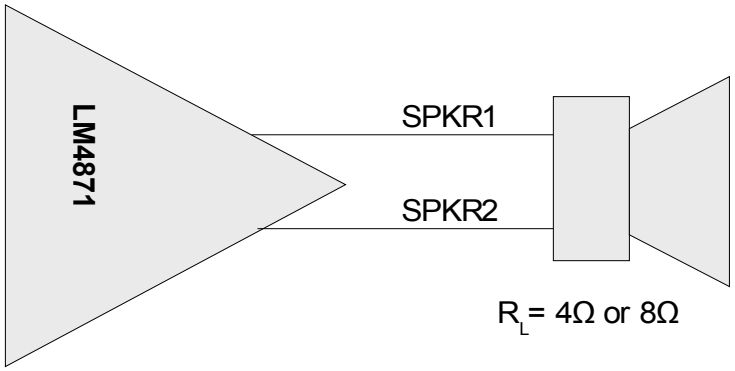

FIGURE 8 - MONO SPEAKER CONNECTION

The WM9713 codec also includes a 4-wire touch-screen controller. This is described in section 2.5.

Table 11 provides the electrical characteristics for the audio signals. The microphone and lineout signals are capacitively coupled.

EMC filtering and ESD protection are not provided on these signals on the YELLOW1210. It is the user's responsibility to ensure that systems using the YELLOW1210 and a compatible services board are compliant with the appropriate EMC and ESD standards.

The REDCONN provides EMC filtering and ESD protection on all these signals.

SIGNAL	PARAMETER	CONDITION	LIMITS (2)			UNITS
			Min	Typ	Max	
SPKR1, SPKR2	Output power	THD=1%, f=1kHz R_L = 4Ω R_L = 8Ω		 2 (1) 1.2 (1)		 W W
MIC	Full scale input voltage			1		Vrms
LINEINL, LINEINR				1		
LINEOUTL, LINEOUTR	Full scale output voltage	R_L = 10kΩ		1		Vrms

NOTES:

1) The maximum output power must be de-rated to 1W at T_A = 85°C. The power amplifier includes thermal shut down protection.
2) The limits apply to T_A = 25°C.

TABLE 11 - YELLOW1210 AUDIO ELECTRICAL CHARACTERISTICS

2.11 REAL TIME CLOCK

This YELLOW1210 feature is not currently supported.

2.12 WATCHDOG TIMER

The YELLOW1210 provides a watchdog timer implemented in hardware, this is currently sited on YELLOWDEBUG, a programming and debugging services board supplied with the LPYELLOW1210CE LaunchPad product. The watchdog timer will be incorporated into the main YELLOW1210 circuitry during the transition to Revision B hardware. The watchdog timer has a timeout period of 1.4s and can generate either warm or cold resets. The watchdog timer is disabled following power up or a cold reset and must be enabled by software. Please refer to the Platform Guide for the relevant operating system for further details.

2.13 GENERAL PURPOSE I/O

Seventeen general purpose I/O signals are available on two different expansion connectors. These pins can be programmed to be inputs or outputs and at reset they are all outputs. Three signals have pull-up resistors external to the Au1210™.

Please refer to the Platform Guide for the relevant operating system for further details.

Table 12 lists the signals associated with the GPIO interface.

SIGNAL	PXA320 PIN	CONNECTOR - PIN	PULL UP / PULL DOWN
UIO0	GPIO00	J3-12	–
UIO1	GPIO01	J3-13	–
UIO2	GPIO202	J3-14	–
UIO3	GPIO203	J3-15	–
UIO4	GPIO204	J3-16	–
UIO5	GPIO205	J3-17	–
UIO6	GPIO206	J3-18	–
UIO7	GPIO207	J3-19	–
UIO8	GPIO208	J3-20	–
UIO9	GPIO209	J3-21	–
UIO10	GPIO214	J3-22	–
UIO11	GPIO212	J3-23	–
UIO12	GPIO213	J3-24	–
UIO13	GPIO25	J4-38	–
UIO14	GPIO31	J4-39	PU 100 kΩ
UIO15	GPIO18	J4-40	PU 100 kΩ
UIO16	GPIO16	J4-41	PU 100 kΩ

TABLE 12 - YELLOW1210 GPIO SIGNALS

Table 13 provides the electrical characteristics for the GPIO signals. The drive strength of the UIO output pins can be set by software. Please refer to the Platform Guide for the relevant operating system for further details.

Damage may occur if the GPIO pins are connected to voltages outside the range -0.5V to +4V.

EMC filtering and ESD protection is not provided on these signals on the YELLOW1210. It is the user's responsibility to ensure that systems using the YELLOW1210 and a compatible services board are compliant with the appropriate EMC and ESD standards.

SIGNAL	PARAM-ETER	CONDITION	LIMITS			UNITS
			Min	Typ	Max	
UIO[16:0]	V_{OH}	I_{OH} = -1mA	0.9 * VCC_3V3	-	-	V
	V_{OL}	I_{OL} = 1mA	-	-	0.1 * VCC_3V3	V
	V_{IH}	-	0.8 * VCC_3V3	-	VCC_3V3 + 0.3	V
	V_{IL}	-	-0.3	-	0.2 * VCC_3V3	V

TABLE 13 - YELLOW1210 GPIO ELECTRICAL CHARACTERISTICS

2.14 I²C EXPANSION

The YELLOW1210 provides a two pin serial Inter-Integrated Circuit (I²C) expansion bus. The I²C bus interfaces to a large range of simple data acquisition/control devices available from a number of manufacturers.

Table 14 lists the signals associated with the I²C bus.

SIGNAL	CONNECTOR - PIN	DESCRIPTION
SCL	J4-83	I²C clock
SDA	J4-84	I²C data

TABLE 14 - YELLOW1210 I²C SIGNALS

The I²C bus controller is implemented in the dedicated IC on the YELLOW1210 and is compliant with the I²C Bus Specification Version 2.0, supporting both standard-speed and fast-mode operation. There are 4.7 kΩ pull-up resistors fitted on the SDA and SCL signals.

There are two I²C slave devices on the YELLOW1210, a power management IC and an IO expansion device. The addresses of these devices are summarised in Table 15, below.

PART	I2C SLAVE ADDRESS	DESCRIPTION
TPS65020	0x50	Power management
TCA9555	0x48	IO expansion

TABLE 15 - YELLOW1210 I²C SIGNALS

Damage may occur if the I²C pins are connected to voltages outside the range -0.3V to +4V.

Table 16 provides the electrical characteristics for the I²C signals. These are compliant with the I²C version 2.1 specification.

These signals are intended to remain within an enclosure and not accessible by the end user. EMC filtering and ESD protection is therefore not provided on the YELLOW1210.

SIGNAL	PARAM-ETER	CONDITION	LIMITS			UNITS
			Min	Typ	Max	
SDA, SCL	Vo_L	I_{OL} = 3mA	-	-	0.1 * VCC_3V3	V
SDA	V_{IH}	-	0.8 * VCC_3V3	-	VCC_3V3 + 0.3	V
	V_{IL}	-	-0.3	-	0.2 * VCC_3V3	V

TABLE 16 - YELLOW1210 I^2C ELECTRICAL CHARACTERISTICS

2.15 16-BIT EXPANSION BUS

The YELLOW1210 provides a 16-bit expansion bus. This can be used to interface to a wide range of 8 and 16-bit memory and I/O chips. DSP Design are happy to provide design services to help you use this bus.

Table 17 lists the signals associated with the 16-bit expansion bus.

SIGNAL	J4 PIN	DESCRIPTION	SIGNAL	J4 PIN	DESCRIPTION
AU_ADDR0	1	Address bus	AU_DATA0	51	Data bus
AU_ADDR1	2		AU_DATA1	52	
AU_ADDR2	3		AU_DATA2	53	
AU_ADDR3	4		AU_DATA3	54	
AU_ADDR4	5		AU_DATA4	55	
AU_ADDR5	6		AU_DATA5	56	
AU_ADDR6	7		AU_DATA6	57	
AU_ADDR7	8		AU_DATA7	58	
AU_ADDR8	9		AU_DATA8	59	
AU_ADDR9	10		AU_DATA9	60	
AU_ADDR10	11		AU_DATA10	61	
AU_ADDR11	12		AU_DATA11	62	
AU_ADDR12	13		AU_DATA12	63	
AU_ADDR13	14		AU_DATA13	64	
AU_ADDR14	15		AU_DATA14	65	
LA_ADDR15	16		AU_DATA15	66	
LA_ADDR16	17		AU_ALE	67	Address Latch enable
LA_ADDR17	18				
LA_ADDR18	19		BOOT0	68	Boot source
LA_ADDR19	20		AU_OE#	70	Output enable
LA_ADDR20	21		AU_WE#	71	Write enable
LA_ADDR21	22		AU_CS#3	72	Chip select output for expansion channel 1
LA_ADDR22	23				
LA_ADDR23	24				
AU_EWAIT#	25	Stretches bus access time	EXPINT1#	73	Interrupt input for expansion channel 1
EXPRST#	26	Reset output for expansion channel	EXPINT2#	74	Interrupt input for expansion channel 2
EXPRST#	27	Reset output for expansion channel	AU_CS#0	75	Boot source chip select
AU_CS#1	28	Chip select output for expansion channel 2			

TABLE 17 - YELLOW1210 EXPANSION BUS SIGNALS

Table 18 provides the electrical characteristics for the 16-bit expansion bus signals. The YELLOW1210 may be damaged if voltages outside the range -0.3V – 4V are applied to any of these signals.

These signals are intended to remain within an enclosure and not accessible by the end user. EMC filtering and ESD protection is therefore not provided on the YELLOW1210.

SIGNAL	PARAM-ETER	CONDITION	LIMITS			UNITS
			Min	Typ	Max	
EXPINT1# EXPINT2#	V_{IH}	-	0.8 * VCC_3V3	-	VCC_3V3 + 0.3	V
	V_{IL}	-	-0.3	-	0.2 * VCC_3V3	V
AU_DATA[15:0] AU_EWAIT#	V_{IH}	-	2	-	3.9	V
	V_{IL}	-	-0.3	-	0.8	V
AU_ADDR[14:0] LA_ADDR[23:15] AU_DATA[15:0] EXPRST# AU_CS#3 AU_CS#1 AU_CS#0 AU_ALE BOOT0 AU_OE# AU_WE#	V_{OH}	I_{OH} = -8mA	VCC_3V3 - 0.4	-	-	V
		I_{OH} = -0.1mA	VCC_3V3 - 0.2	-	-	V
	V_{OL}	I_{OL} = 8mA	-	-	0.4	V
		I_{OL} = 0.1mA	-	-	0.2	V

TABLE 18 - YELLOW1210 16-BIT EXPANSION BUS ELECTRICAL CHARACTERISTICS

3 POWER SUPPLIES, POWER MANAGEMENT AND RESET

3.1 POWER INPUT

The YELLOW1210 operates from a single +5V input and generates all other supplies internally. Power can be applied to the YELLOW1210 by either J3 or J4. To minimise voltage drop between the power supply and the YELLOW1210, power should be applied through short, low-resistance wires or PCB traces. If possible all VCC_5V and GND pins of both connectors should be connected to the PCB power traces, which are preferably implemented as power planes on a multi-layer PCB.

The voltage supplied to the YELLOW1210 should be 5V +/-5%. The YELLOW1210 may be damaged in the voltage on the VCC_5V line is outside the range -0.3V to +6V.

Table 19 lists all the connector pins that can be used to supply power to the YELLOW1210.

SIGNAL	CONNECTOR - PIN
VCC_5V	J3-6 through J3-9, J3-76 through J3-85, J4-29, J4-30, J4-49, J4-50
GND	J3-5, J3-10, J3-11, J3-25, J3-28, J3-31 through J3-40, J3-42, J3-48 through J3-53, J3-65, J4-79 through J4-82, J4-92 through J4-96, J4-99, J4-100

TABLE 19 - YELLOW1210 POWER INPUT

3.2 POWER CONSUMPTION

The YELLOW1210 power consumption depends on what it is doing, as power management software can reduce power consumption when the processor is not required. Thus when executing an operating system such as Windows CE, the operating system will reduce clock speed or execute halt instructions when there is reduced user or application activity. On the other hand, power consumption will increase if processor-intensive operations, such as playing videos, are being performed. The YELLOW1210 can also enter a sleep state, where peripherals are powered down and the processor clock turned off.

In practical applications that use LCD panels, system power consumption will be influenced by the power taken by the display, in particular by the display's backlight.

Table 20 provides some typical figures for power consumption for the YELLOW1210.

CONFIGURATION	TYPICAL POWER CONSUMPTION	
	mA @ 5V	W
Standalone YELLOW1210 and REDCDC with no peripherals connected – operating system running	195	0.98
YELLOW1210 and REDCDC connected to a VGA display and CFL backlight.	1422	7.11

TABLE 20 - YELLOW1210 CURRENT CONSUMPTION

3.3 POWER OUTPUT

The YELLOW1210 generates +3.3V on-board, and is able to supply up to 100mA from this 3.3V rail to external peripherals such as LCDs. Users must ensure that this current is not exceeded. Note that this limit applies to the peak current, and not the average current.

VCC_3V3 is output from YELLOW1210 on either J3 or J4.

To minimise voltage drop between the YELLOW1210 and the peripheral, power should be applied through short, low-resistance wires or PCB traces. All VCC_3V3 and GND pins of both connectors should be connected to the PCB power traces, which are preferably implemented as power planes on a multi-layer PCB.

Table 21 lists all the connector pins that can be used to supply external peripherals. Table 20 lists the GND pins.

SIGNAL	PIN
VCC_3V3	J3-68, J3-69, J3-70, J4-31, J4-32, J4-98

TABLE 21 - YELLOW1210 POWER OUTPUT

3.4 RESET INPUT AND OUTPUT

The YELLOW1210 can be reset by pulling the RESET_SW# signal low. In this way a system reset can be generated by an external IC or switch. RESET_SW# is an open-drain signal with a 100k pull-up resistor. It must be driven by an open drain driver or a switch to GND. The YELLOW1210 many be damaged if the voltage on this pin is outside the range -0.3V to 6.5V.

RESET_SW# connects to a power management IC which generates a power-on reset to the processor, which in turn asserts the main board reset to all other peripherals during the power-up sequence and hardware reset events under operating system control.

Table 22 lists the connector pins the RESET_SW# signal is available on.

SIGNAL	CONNECTOR - PIN	DESCRIPTION
RESET_SW#	J3-71, J4-69	Open drain reset input

TABLE 22 - YELLOW1210 RESET INPUT

The RST_OUT# output from the processor is used to reset several peripherals, including the I2C controller and ethernet controller. EXPRST# is available as part of the 16-bit expansion bus and is intended to reset external peripherals on the 16-bit expansion bus.

3.5 POWER MANAGEMENT

The YELLOW1210 provides a very low power sleep mode and a number of wakeup options. Please refer to the Platform Guide for power management implementation details for supported operating systems.

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APPENDIX A - MECHANICAL, ENVIRONMENTAL, HANDLING

A.1 DIMENSIONS

- PCB dimensions are 85mm x 65mm.
- PCB thickness is 1.6mm.
- Maximum component height above the PCB is PCB 4.9mm.
- Maximum component height below the PCB is PCB 2.5mm.
- When mounted on a PCB using connectors J3 and J4 there is 4mm between the PCBs.

A.2 WEIGHT

32g.

A.3 OPERATING TEMPERATURE RANGE

-20°C to +85°C.

A.4 HUMIDITY

10% - 90%, non-condensing.

A.5 ELECTRO-STATIC SENSITIVE DEVICE (ESD)

The YELLOW1210 and REDCONN contain CMOS devices which can be damaged by static electricity discharging through the device. Please observe anti-static handling precautions when handling the YELLOW1210 and REDCONN or when adding or removing connectors.

For ESD protection to be effective any ESD protection components should be placed close to connectors or interfaces that are accessible by the end user. ESD protection is therefore best implemented on a services board where all the end-user accessible connectors are mounted. For that reason the YELLOW1210 lacks ESD protection components on many of its signals. Conversely, the REDCONN does include ESD protection components on most connectors. The nature of any ESD protection is noted elsewhere in this manual.

Although the YELLOW1210 and REDCONN utilise ESD protection techniques, it is the user's responsibility to ensure that systems using the YELLOW1210, REDCONN and any other sub-assemblies are compliant with the appropriate ESD standards and provide adequate protection for the application.

A.6 ELECTROMAGNETIC COMPATIBILITY (EMC)

Most finished products that use the YELLOW1210 will be subject to EMC regulations, such as those required by the EU's EMC Directive. Finished products may require EMC tests, and in order to pass these tests the product may need to be enclosed in a Faraday cage formed by the enclosure, and may need to have EMC filtering on conductors that pass through the enclosure.

User accessible connectors (such as Ethernet and USB) and interfaces (touch-screen) must pass through the Faraday cage. For EMC filtering to be effective, any EMC filters must be placed close to these connectors and interfaces. EMC filtering is therefore best implemented on a services board where all the end user accessible connectors are mounted. For that reason the YELLOW1210 lacks filter components on many of its signals. Conversely, the REDCONN does include EMC filtering on most connectors. The nature of any EMC filtering is noted elsewhere in this manual.

Although the YELLOW1210 and REDCONN utilise EMC filtering techniques, it is the user's responsibility to ensure that systems using the YELLOW1210, REDCONN and any other sub-assemblies are compliant with the appropriate EMC standards.

A.7 CHASSIS

The YELLOW1210 provides four mounting holes. One is connected to a CHASSIS plane and three are isolated from all signals and planes. The metal parts of connector J1 is connected to the CHASSIS plane.

The mounting hole connected to CHASSIS is the mounting holes closest to J1.

No connections are made between the CHASSIS plane and the GND plane on the YELLOW1210. EMC performance may be improved by ensuring a low impedance bond between the pad of the CHASSIS mounting hole and the conductive enclosure, and by connecting CHASSIS to GND at a single star point. REDCONN provides a single point connection between CHASSIS and GND using a single ferrite bead.

A.8 RoHS COMPLIANCE

The YELLOW1210 and REDCONN are only available as fully RoHS compliant products and do not exceed the limits of the six banned substances specified in the RoHS Directive 2002/95/EC.

APPENDIX B - YELLOW1210 DRAWINGS

This appendix provides component placement diagrams and mechanical drawings for the YELLOW1210.

B.1 COMPONENT PLACEMENT

Figures B1 and B2 show the component placement for the top and bottom sides of the YELLOW1210 respectively. A high resolution PDF is available as a download on the DSP Design website.

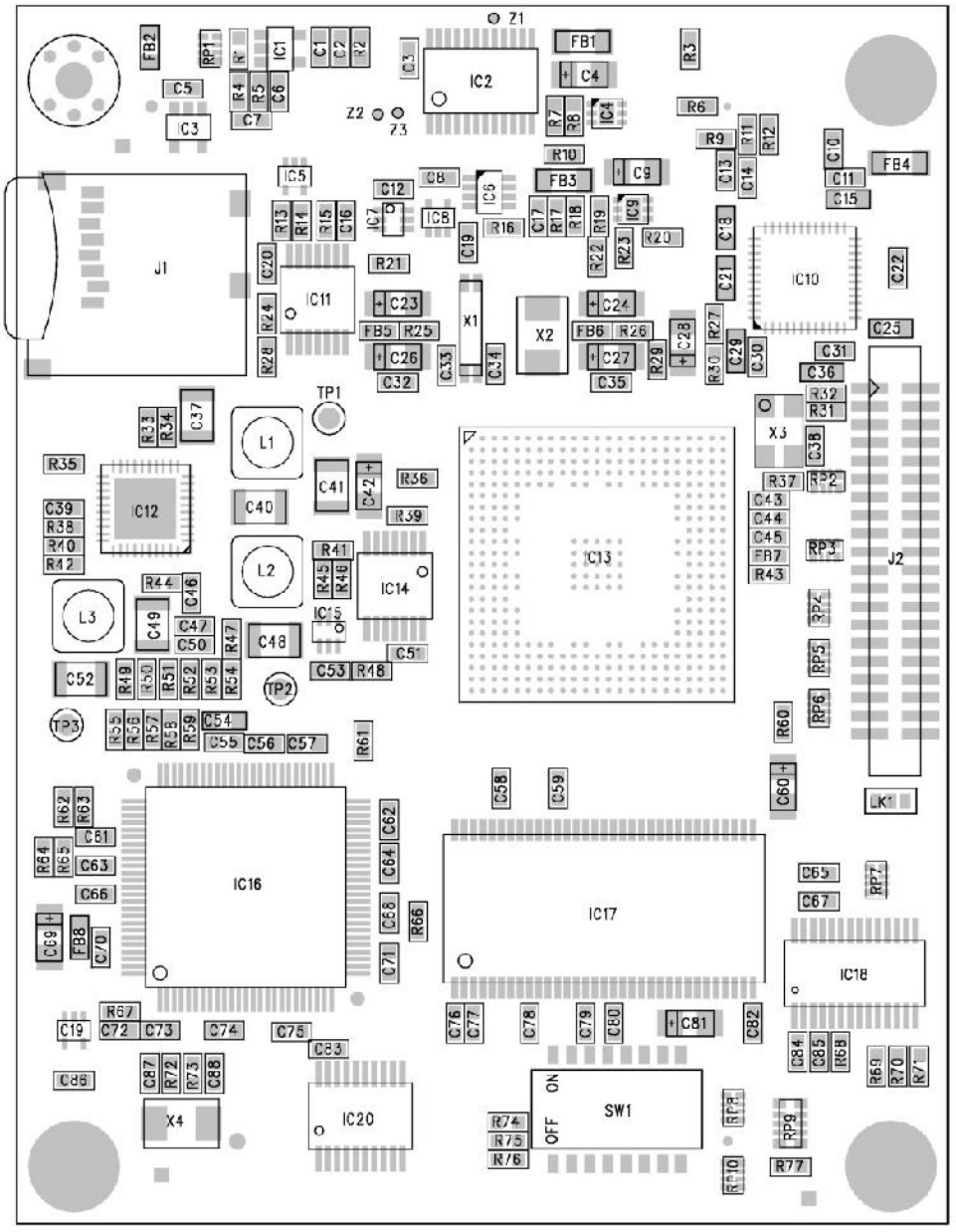

FIGURE B1 - YELLOW1210 COMPONENT PLACEMENT DIAGRAM – TOP

SIDE

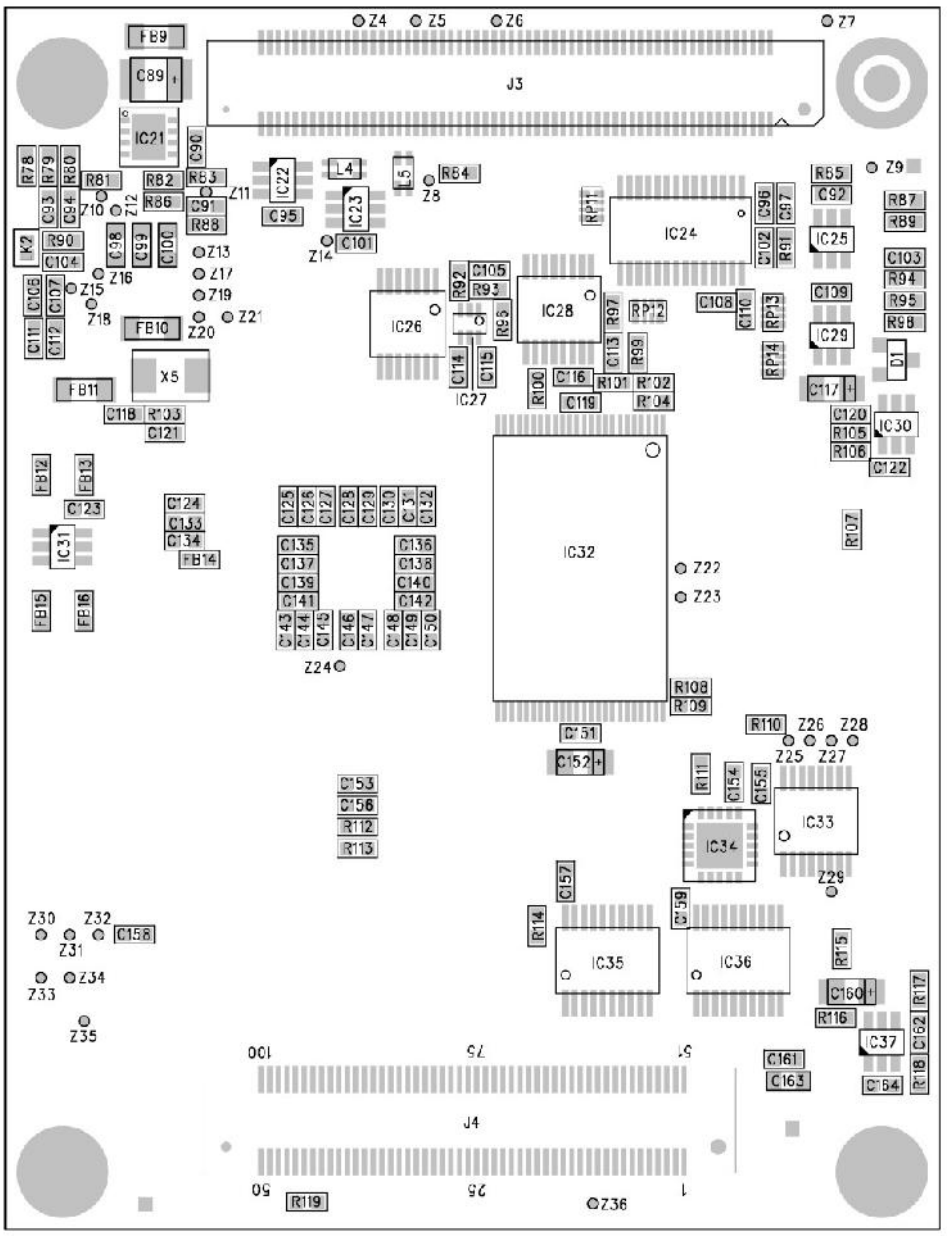

FIGURE B2 - YELLOW1210 COMPONENT PLACEMENT DIAGRAM – BOTTOM SIDE

B.2 MECHANICAL DIMENSIONS

Connector positions and mechanical dimensions are shown in Figures B3 and B4. All dimensions are to pad or hole centres. The four mounting holes are 3.2mm diameter. Board profile tolerance is +/- 0.5mm.

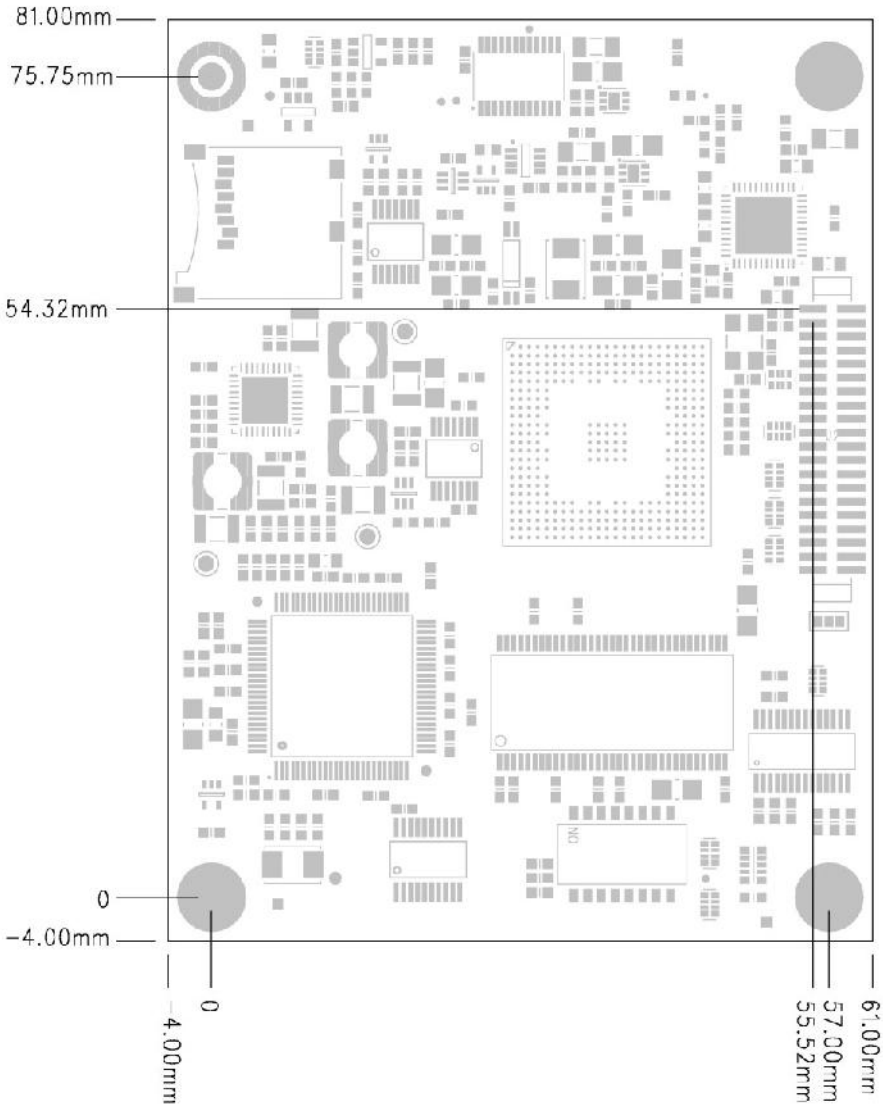

FIGURE B3 - TOP SIDE CONNECTOR POSITIONS

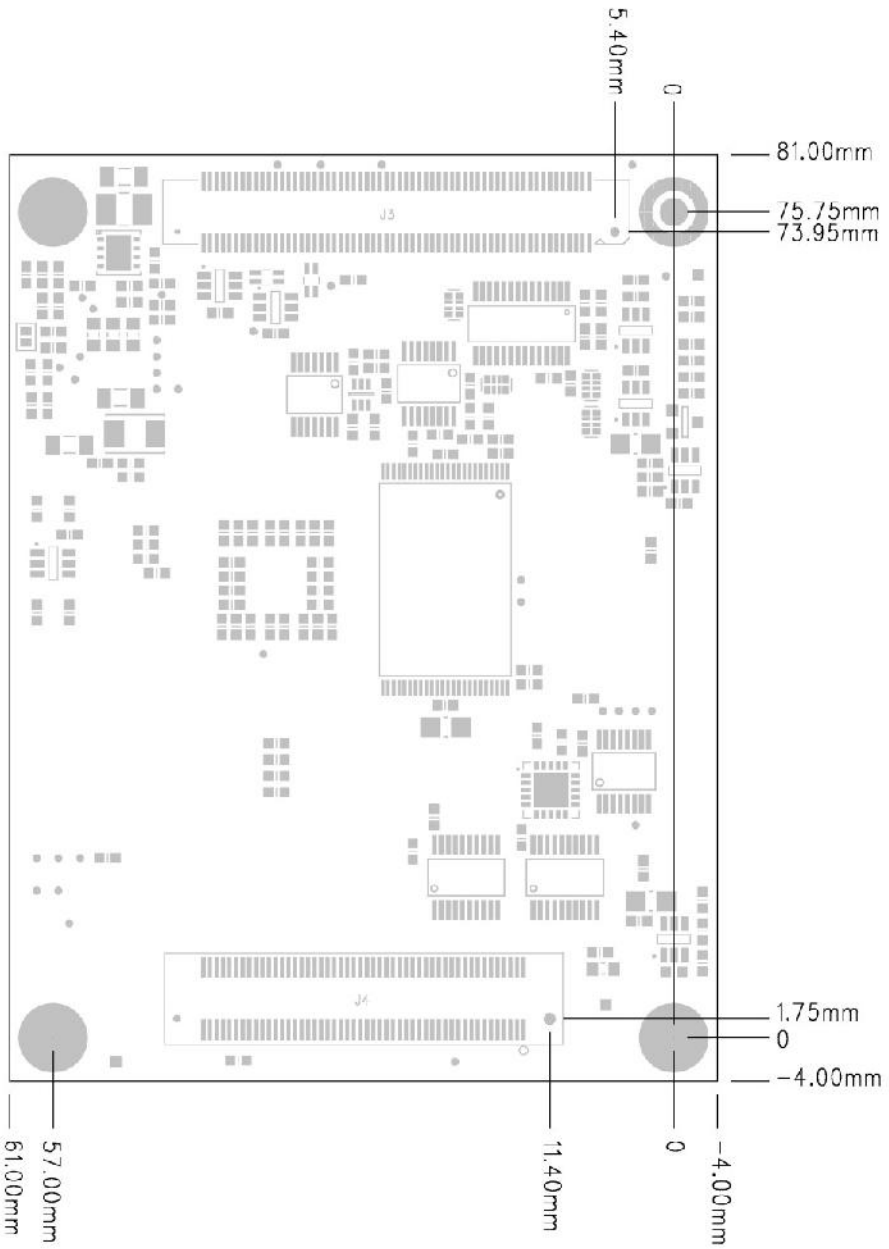

FIGURE B4 - BOTTOM SIDE CONNECTOR POSITIONS

APPENDIX C - OPTIONS AND ORDERING INFORMATION

This appendix lists the range of products available from DSP Design related to the YELLOW1210. Order codes prefixed with “DSP-” indicate the items are RoHS compliant.

Additional products are added all the time, please visit our website for up-to-date details.

C.1 PROCESSOR MODULES

Table C1 contains the order codes for the YELLOW1210 processor.

ITEM	DESCRIPTION
DSP-YELLOW1210CE	YELLOW1210 333MHz processor module with Windows Embedded CE 6.0

TABLE C1 - PROCESSOR MODULES

C.2 LAUNCHPAD APPLICATION DEVELOPMENT KITS

Table C2 contains the order codes for the LaunchPad Application Development Kit for YELLOW1210.

ITEM	DESCRIPTION
DSP-LPYELLOW1210CE	Windows Embedded CE 6.0 LaunchPad Application Development Kit for the YELLOW1210

TABLE C2 - LAUNCHPAD APPLICATION DEVELOPMENT KITS

C.3 DISPLAY ACCESSORIES

Table C3 contains the order codes for the cables and display interface boards for the YELLOW1210.

ITEM	DESCRIPTION
DSP-TFTIF-CAB7	40 way cable assembly for DSP-TFTIF31, DSP-TFTIF41 and DSP-TFTIFKYV boards, connectors at both ends, length 7 inches
DSP-TFTIF-CAB11	40 way cable assembly for DSP-TFTIF31, DSP-TFTIF41 and DSP-TFTIFKYV boards, connectors at both ends, length 11 inches
DSP-TFTIF31M	Display interface adapter. Connects 40-way ribbon cable to LCDs which use the 31-pin Hirose DF9 connector.
DSP-TFTIF41	Display interface adapter. Connects 40-way ribbon cable to LCDs which use the 41-pin Hirose DF9 connector.
DSP-TFTIFKYV	Display interface adapter. Connects 40-way ribbon cable to Kyocera LCDs.
TRM-TFTIFKYV	Printed and bound Technical Reference Manual for the TFTFIFKYV.
DSP-TFTKYV75	A Kyocera V-series 640 X 480 7.5” TFT display.
DSP-TFTKYV75-KIT	A display kit, comprising the TFTKYV75, TFTIFKYV, backlight inverter and cables.
DSP-AAVGA	Display interface adapter for VGA CRTs. Connects 40-way ribbon cable to a video D/A converter and 15-pin D-type connector.

TABLE C3 - DISPLAY ACCESSORIES

C.4 OTHER ACCESSORIES

Table C4 contains the order codes for miscellaneous accessories for the YELLOW1210.

ITEM	DESCRIPTION
DSP-TCONN-PSU	20W 5V 4A AC-DC PSU for the REDCDC.
DSP-YELLOWDEBUG	Debug breakout board for the YELLOW1210.
DSP-REDCDC	Connector breakout board for the YELLOW1210 with DC input power jack.
DSP-REDCPOE	Connector breakout board for the YELLOW1210 with PoE capability.
DSP-MSD4G	4 Gbyte MicroSD card.

TABLE C4 - OTHER ACCESSORIES

APPENDIX D - TFTIF LCD INTERFACE BOARDS

This appendix describes some options for connecting LCDs to the YELLOW1210.

D.1 INTRODUCTION

DSP Design provides four LCD interface boards which are compatible with the YELLOW1210:

- TFTIF31
- TFTIF41
- TFTIFKYV
- AAVGA (generates analog RGB signals on a 15-way VGA connector)

The LCD interface boards connect to the 40-way parallel digital interface connector J9 on the YELLOW1210. These LCD interface boards allow a wide variety of LCDs and monitors to be interfaced with YELLOW1210. Please refer to the Platform Guide for the relevant operating system for a full list of supported LCDs.

Each interface board uses a slightly different set of signals on the YELLOW1210 LCD connector J9. Table D1 lists the signals used by each interface board and how they map onto the YELLOW1210.

NOTES FOR TABLE D1 (overleaf):

1) The YELLOW1210 has a 16-bit colour bus interface in a 5-6-5 format. The R0 and B0 bits are not used and therefore are connected to GND.
2) The YELLOW1210 can be configured to supply either VCC_5V or LCD_ADJ to the LCD interface board. Setting LK1 on the YELLOW1210 to position 1-2 configures J2 pin 33 to VCC_5V. Setting LK1 to 2-3 configures J2 pin 33 to LCD_ADJ. By default neither option is selected – this feature is not currently supported.
3) The TFTIF31 and TFTIF41 support LCDs with either 3.3V or 5V power requirements. This pin is used to supply 5V to the LCD from the YELLOW1210. Configure LK1 on the YELLOW1210 to position 1-2 for TFTIF31 and TFTIF41.
4) Ensure LK1 on the YELLOW1210 is not fitted.

J2 PIN	YELLOW1210	TFTIF31/TFT41 (J1)	TFTIFKYV (J4)	AAVGA (J2)
1	BKL_EN	BKL_EN	BKL_EN	NC
2	LCD_EN	LCD_EN	LCD_EN	NC
3	GND	GND	GND	GND
4	LCD_DCLK	LCD_DCLK	LCD_DCLK	LCD_DCLK
5	GND	GND	GND	GND
6	LCD_HSYNC	LCD_HSYNC	LCD_HSYNC	LCD_HSYNC
7	GND	GND	GND	GND
8	LCD_VSYNC	LCD_VSYNC	LCD_VSYNC	LCD_VSYNC
9	TSXP	NC	TSXP	NC
10	TSXN	NC	TSXN	NC
11	GND (1)	LCD_R0	LCD_R0	GND
12	LCD_R3	LCD_R1	LCD_R1	LCD_R1
13	GND	GND	GND	GND
14	LCD_R4	LCD_R2	LCD_R2	LCD_R2
15	LCD_R5	LCD_R3	LCD_R3	LCD_R3
16	LCD_R6	LCD_R4	LCD_R4	LCD_R4
17	GND	GND	GND	GND
18	LCD_R7	LCD_R5	LCD_R5	LCD_R5
19	NC	NC	NC	NC
20	NC	NC	NC	NC
21	GND	GND	GND	GND
22	LCD_G2	LCD_G0	LCD_G0	LCD_G0
23	LCD_G3	LCD_G1	LCD_G1	LCD_G1
24	LCD_G4	LCD_G2	LCD_G2	LCD_G2
25	VCC_3V3	VCC_3V3	VCC_3V3	VCC_3V3
26	LCD_G5	LCD_G3	LCD_G3	LCD_G3
27	LCD_G6	LCD_G4	LCD_G4	LCD_G4
28	LCD_G7	LCD_G5	LCD_G5	LCD_G5
29	VCC_3V3	VCC_3V3	VCC_3V3	VCC_3V3
30	TSYN	NC	TSYN	NC
31	TSYP	NC	TSYP	NC
32	GND (1)	LCD_B0	LCD_B0	GND
33	VCC_5V / LCD_ADJ (2)	VCC_5V (3)	LCD_ADJ (4)	NC
34	LCD_B3	LCD_B1	LCD_B1	LCD_B1
35	LCD_B4	LCD_B2	LCD_B2	LCD_B2
36	LCD_B5	LCD_B3	LCD_B3	LCD_B3
37	VCC_5V	VCC_5V	NC	NC
38	LCD_B6	LCD_B4	LCD_B4	LCD_B4
39	LCD_B7	LCD_B5	LCD_B5	LCD_B5
40	LCD_DE	LCD_DE	LCD_DE	LCD_DE

TABLE D1 - LCD INTERFACE BOARD SIGNAL COMPARISON

D.2 TFTIF31

The TFTIF31 is designed to interface with a number of TFT LCDs, from Sharp and other manufacturers that use a 31-way Hirose DF9 connector.

The TFTIF31 plugs into J2 on the YELLOW1210 using a ribbon cable, the TFTIF-CAB7 or TFTIF-CAB11 available from DSP Design.

This section describes the TFTIF31, listing the display pin assignments and the solder link settings.

D.2.1 31-pin Connector Pin Assignments

Table D2 shows the pin assignments for the TFTIF31 display connector. Note that this connector supports 18-bit LCDs (displays with six bits each of red, green and blue data). The YELLOW1210 generates only 16 bits of RGB data: five bits each of red and blue and six bits of green. Thus the LCD_R0 and LCD_B0 signals in the TFTIF31 connector are connected to GND at the YELLOW1210 J2.

PIN	LCD SIGNAL	PIN	LCD SIGNAL
1	GND	2	LCD_DCLK
3	LCD_HSYNC	4	LCD_VSYNC
5	GND	6	LCD_R0
7	LCD_R1	8	LCD_R2
9	LCD_R3	10	LCD_R4
11	LCD_R5	12	GND
13	LCD_G0	14	LCD_G1
15	LCD_G2	16	LCD_G3
17	LCD_G4	18	LCD_G5
19	GND	20	LCD_B0
21	LCD_B1	22	LCD_B2
23	LCD_B3	24	LCD_B4
25	LCD_B5	26	GND
27	LCD_DE	28	LCDVCC
29	LCDVCC	30	LEFT/RIGHT
31	UP/DOWN	-	-

TABLE D2 - TFTIF31 DISPLAY PIN ASSIGNMENTS

D.2.2 Power Supply Selection: LK1

The TFTIF31 accepts VCC_3V3 and VCC_5V from the YELLOW1210. One or other of these voltages is selected by solder link LK1 and routed to the LCD. This supply voltage is intended to power the LCD electronics, but not the backlight inverter.

From LK1 the selected voltage is then routed to a transistor switch, which turns on the power to the LCD (LCDVCC) under control of the YELLOW1210 LCD_EN signal. LK1 can be set to one of two positions. The position marked "5" is for 5V LCDs. The position marked "3.3" is for 3.3V LCDs. You may need to change the solder link to match your display.

D.2.3 Pin 30 and 31 Configuration: LK2 and LK3

LK2 and LK3 are connected to the 31-way connector pins 30 and 31 respectively. The links can be used to change the display orientation, at least on some Sharp displays. For a normal image both should be left open, or linked in the 2-3 position. For an upside-down image both should be linked in the 1-2 position. Some other LCDs use pins 30 and 31 for other purposes, such as additional power supply pins. LK2 and LK3 should therefore be linked to match the requirement of each display.

Table D3 shows the connections of the LK2 and LK3 pins, thus allowing suitable connections to be made.

LK2 PIN	LK2 CONNECTION	LK3 PIN	LK3 CONNECTION
1	GND	1	GND
2	PIN 30	2	PIN 31
3	LCDVCC	3	LCDVCC

TABLE D3 - TFTIF31 PIN 30 AND PIN 31 CONNECTIONS

LCDVCC is the LCD display voltage selected by LK1, as described in the previous section.

D.2.4 Backlight Enable Signal

The YELLOW1210 generates a logic-level signal intended to turn on and off the backlight inverter. This signal is called BKL_EN, and is 0V low for “off” and 3.3V for “on”. The BKL_EN signal can be taken to a backlight inverter from the TFTIF31 connector J3. J3 is a Molex 53261-0390 connector. Pin assignments are given in Table D4. Note that some backlight inverters specify a 5V signal to turn on the backlight, so BKL_EN may not work with all inverters.

J3 PIN	SIGNAL
1	VCC_5V
2	BKL_EN
3	GND

TABLE D4 - TFTIF31 J3 PIN ASSIGNMENTS

D.3 TFTIF41

The TFTIF41 is designed to interface with a small number of TFT LCDs, principally from Sharp, that use a 41-way Hirose DF9 connector.

The TFTIF41 plugs into J2 on the YELLOW1210 using a ribbon cable, the TFTIF-CAB7 or TFTIF-CAB11 available from DSP Design.

This section describes the TFTIF41, listing the display pin assignments and the solder link settings.

D.3.1 41-pin Connector Pin Assignments

Table D5 shows the pin assignments for the TFTIF41 display connector. Note that this connector supports 18-bit LCDs (displays with six bits each of red, green and blue data). The YELLOW1210 generates only 16 bits of RGB data: five bits each of red and blue and six bits of green. Thus the LCD_R0 and LCD_B0 signals in the TFTIF41 connector are connected to GND at the YELLOW1210 J2.

PIN	LCD SIGNAL	PIN	LCD SIGNAL
1	GND	2	LCD_DCLK
3	GND	4	LCD_HSYNC
5	LCD_VSYNC	6	GND
7	GND	8	GND
9	LCD_R0	10	LCD_R1
11	LCD_R2	12	GND
13	LCD_R3	14	LCD_R4
15	LCD_R5	16	GND
17	GND	18	GND
19	LCD_G0	20	LCD_G1
21	LCD_G2	22	GND
23	LCD_G3	24	LCD_G4
25	LCD_G5	26	GND
27	GND	28	GND
29	LCD_B0	30	LCD_B1
31	LCD_B2	32	GND
33	LCD_B3	34	LCD_B4
35	LCD_B5	36	GND
37	ENABLE	38	LEFT/RIGHT
39	LCDVCC	40	LCDVCC
41	UP/DOWN	-	-

TABLE D5 - TFTIF41 DISPLAY PIN ASSIGNMENTS

D.3.2 Power Supply Selection: LK1

The TFTIF41 accepts VCC_3V3 and VCC_5V from the YELLOW1210. One or other of these voltages is selected by solder link LK1 and routed to the LCD. This supply voltage is intended to power the LCD electronics, but not the backlight inverter.

From LK1 the selected voltage is then routed to a transistor switch, which turns on the

power to the LCD (LCDVCC) under control of the YELLOW1210 LCD_EN signal. LK1 can be set to one of two positions. The position marked "5" is for 5V LCDs. The position marked "3.3" is for 3.3V LCDs. You may need to change the solder link to match your display.

D.3.3 Pin 41 and 38 Configuration: LK2 and LK3

LK2 and LK3 are connected to the 41-way connector pins 41 and 38 respectively. The links can be used to change the display orientation, at least on some Sharp displays. For a normal image both should be left open, or linked in the 2-3 position.

For an upside-down image both should be linked in the 1-2 position. Some other LCDs may use pins 41 and 38 for other purposes, such as additional power supply pins. LK2 and LK3 should therefore be linked to match the requirement of each display. Table D6 lists the connections of the LK2 and LK3 pins, thus allowing suitable connections to be made.

LK2 PIN	LK2 CONNECTION	LK3 PIN	LK3 CONNECTION
1	GND	1	GND
2	PIN 41	2	PIN 38
3	LCDVCC	3	LCDVCC

TABLE D6 - TFTIF41 PIN 41 AND PIN 38 CONNECTIONS

LCDVCC is the LCD display voltage selected by LK1, as described in the previous section.

D.3.4 Backlight Enable Signal

The YELLOW1210 generates a logic-level signal intended to turn on and off the backlight inverter. This signal is called BKL_EN, and is 0V low for “off” and 3.3V for “on”. The BKL_EN signal can be taken to a backlight inverter from the TFTIF41 connector J3. J3 is a Molex 53261-0390 connector. Pin assignments are given in Table D7. Note that some backlight inverters specify a 5V signal to turn on the backlight, so BKL_EN may not work with all inverters.

J3 PIN	SIGNAL
1	VCC_5V
2	BKL_EN
3	GND

TABLE D7 - TFTIF41 J3 PIN ASSIGNMENTS

D.4 TFTIFKYV

The TFTIFKYV is designed to interface with a small number of LCDs, principally from Kyocera, that use a 33-way Molex connector.

The TFTIFKYV plugs into J2 on the YELLOW1210 using a ribbon cable, the TFTIF-CAB7 or TFTIF-CAB11 available from DSP Design.

The YELLOW1210's four touch-screen signals are routed from the TFTIFKYV main connector J4, to two touch-screen connectors J2 and J5 via four solder links, LK4-7. J2 is FFC connector and J5 is a board to wire connector. LK4-7 need to be fitted for the touch-screen interface to be enabled.

The TFTIFKYV interfaces to Microsemi backlight inverters, which have an input to control the backlight brightness. The Microsemi brightness input can be controlled by either a potentiometer or a PWM signal from the processor board. The YELLOW1210 does not currently support PWM backlight dimming so LK1 is not fitted by default.

To configure the TFTIFKYV for use with YELLOW1210:

- set LK1 on the TFTIFKYV to position 2-3.
- ensure LK1 on the YELLOW1210 is not fitted.

The TFTIFKYV has its own Technical Reference Manual, which provides more information on this product, including further solder link options.

D.5 AAVGA CRT / VGA INTERFACE BOARD

A VGA CRT or LCD monitor can be driven with the addition of the AAVGA adapter board. The AAVGA plugs directly into J2 on the YELLOW1210 and provides a standard 15-way D-type VGA connector. The AAVGA converts the parallel data from the YELLOW1210 to analog RGB signals displaying up to 64k colours.

APPENDIX E - YELLOW1210 CONNECTOR PIN ASSIGNMENTS

E.1 YELLOW1210 CONNECTOR SUMMARY

Table E1 provides a summary of the connectors used on the YELLOW1210. Note that the mating connector for the 100-way and 120-way connectors are the Hirose FX8-100P-SV1 and FX8-120P-SV1.

NAME	FUNCTION	TYPE	MANUFACTURER / PART NUMBER
J1	MicroSD	MicroSD socket with push/push mechanism	ETC TFCMF-20801BOT0
J2	Display and touch screen	2 x 20 way 1.27mm pitch pin header	ETC SS2-040-H70/0-55/11A
J3	Inter-board	120 way board to board	Hirose FX8-120S-SV
J4	Inter-board	100 way board to board	Hirose FX8-100S-SV

TABLE E1 - YELLOW1210 CONNECTOR SUMMARY

Figures E1 and E2 show the connector positions on the YELLOW1210.

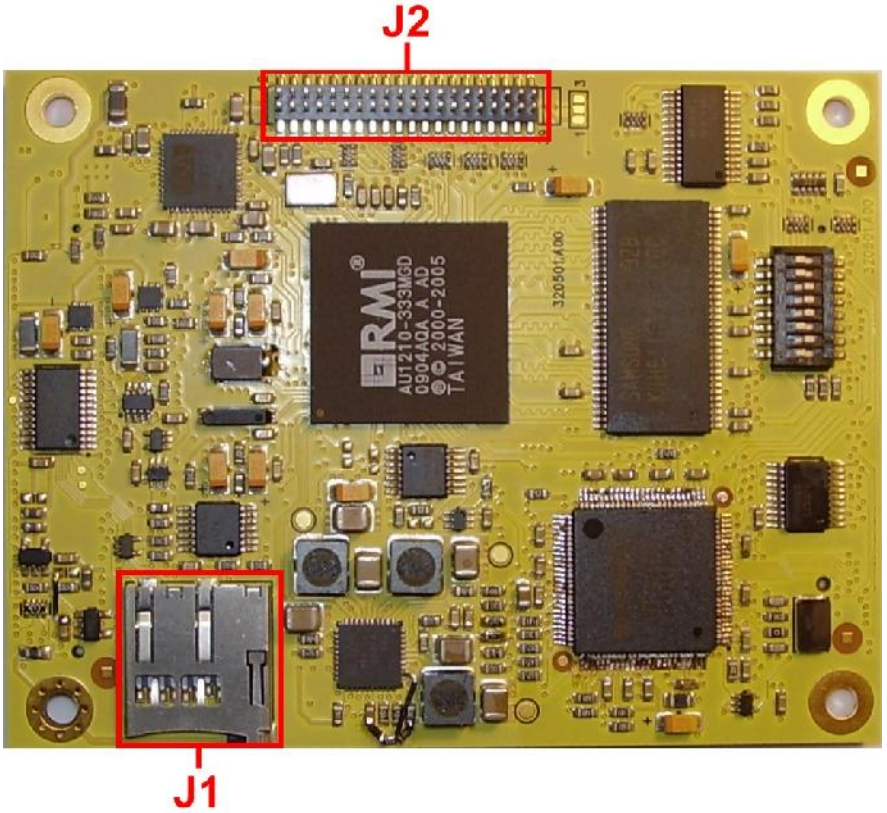

FIGURE E1 - YELLOW1210 CONNECTOR POSITIONS – TOP SIDE

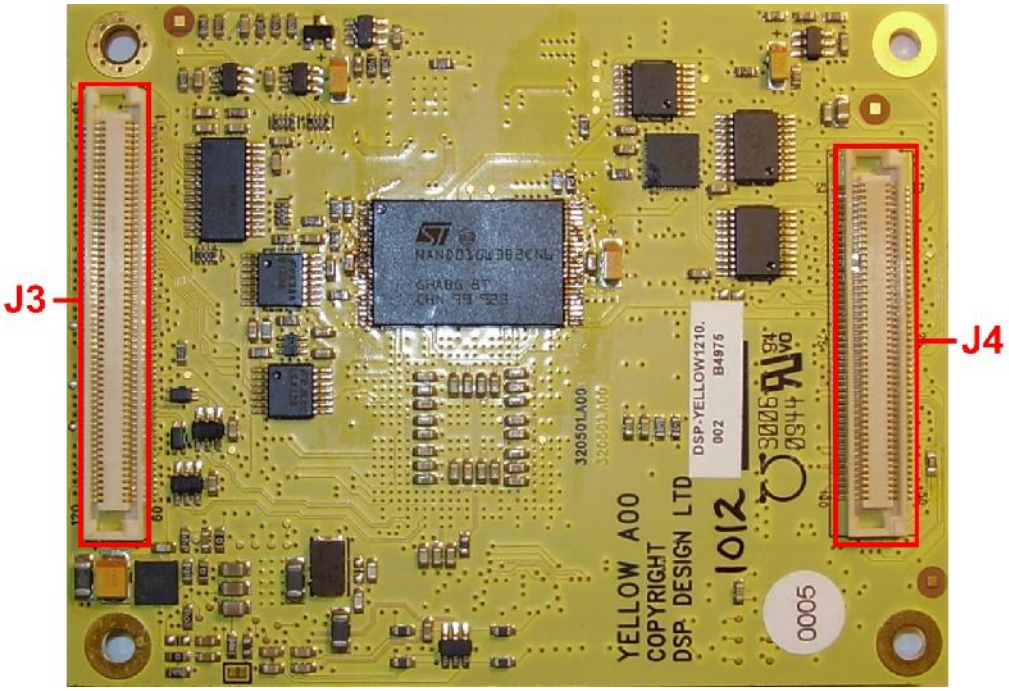

FIGURE E2 - YELLOW1210 CONNECTOR POSITIONS – BOTTOM SIDE

E.2 DISPLAY CONNECTOR J2

Connector J2 is for connection to an LCD. As well as the LCD signals it carries signals for a touchscreen and backlight inverter control.

To connect to J2 use 0.025-inch pitch ribbon cable and a 2 x 20 way 1.27mm (0.05-inch) pitch ribbon cable connector. Pin 1 is identified in Figure B1 in Appendix B by a triangle.

Some pins are reserved for future use. Do not make any connection to these pins.

PIN	SIGNAL	PIN	SIGNAL
1	BKL_EN	2	LCD_EN
3	GND	4	LCD_DCLK
5	GND	6	LCD_HSYNC
7	GND	8	LCD_VSYNC
9	TSXP	10	TSXN
11	GND (1)	12	LCD_R3
13	GND	14	LCD_R4
15	LCD_R5	16	LCD_R5
17	GND	18	LCD_R6
19	Reserved	20	Reserved
21	GND	22	LCD_G2
23	LCD_G3	24	LCD_G4
25	VCC_3V3	26	LCD_G5
27	LCD_G6	28	LCD_G7
29	LCD_3V3	30	TSYN
31	TSYP	32	GND(1)
33	VCC_5V / LCD_ADJ (2)	34	LCD_B3
35	LCD_B4	36	LCD_B5
37	VCC_5V	38	LCD_B6
39	LCD_B7	40	LCD_DE

NOTES:

1) The YELLOW1210 provides a 16-bit colour bus. Some LCD interface boards available from DSP Design support an 18-bit colour bus. The unused pins on YELLOW1210 (R2 and B2) are connected to GND.
2) This is floating by default, but can be changed at LK1.

TABLE E2 - J2 DISPLAY CONNECTOR PIN ASSIGNMENTS

E.3 INTER-BOARD CONNECTORS J3 AND J4

Connectors J3 and J4 enable the YELLOW1210 to plug onto another PCB. Do not connect to the “Reserved” pins.

Pin 1 is identified in Figure B2 in Appendix B by a triangle or a “1”. J3 pins are numbered 1-60 on one row and 61-120 on the other, with pins 1 and 61 opposite each other. J4 pins are numbered 1-50 on one row and 51-100 on the other.

PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	DCD2	31	GND	61	DSR2	91	Reserved
2	RXD2	32	GND	62	RTS2	92	Reserved
3	TXD2	33	GND	63	CTS2	93	Reserved
4	DTR2	34	GND	64	Reserved	94	Reserved
5	GND	35	GND	65	GND	95	Reserved
6	VCC_5V	36	GND	66	VBACK_BAT	96	VCC_EXP
7	VCC_5V	37	GND	67	VBACK_BAT	97	Reserved
8	VCC_5V	38	GND	68	VCC_3V3	98	Reserved
9	VCC_5V	39	GND	69	VCC_3V3	99	Reserved
10	GND	40	GND	70	VCC_3V3	100	Reserved
11	GND	41	AU_USB_ID	71	RESET_SW#	101	Reserved
12	UIO0	42	GND	72	Reserved	102	Reserved
13	UIO1	43	USB1DP	73	Reserved	103	Reserved
14	UIO2	44	USB1DN	74	Reserved	104	USB1DP
15	UIO3	45	USB_VBUS	75	Reserved	105	USB1DN
16	UIO4	46	USB1H1PB	76	VCC_5V	106	USB_PWR
17	UIO5	47	USB1H1NB	77	VCC_5V	107	Reserved
18	UIO6	48	GND	78	VCC_5V	108	Reserved
19	UIO7	49	GND	79	VCC_5V	109	Reserved
20	UIO8	50	GND	80	VCC_5V	110	Reserved
21	UIO9	51	GND	81	VCC_5V	111	Reserved
22	UIO10	52	GND	82	VCC_5V	112	Reserved
23	UIO11	53	GND	83	VCC_5V	113	Reserved
24	UIO12	54	LINEINR	84	VCC_5V	114	LINEINL
25	GND	55	Reserved	85	VCC_5V	115	AGND
26	RDP	56	LINEOUTR	86	LAN_3V3A	116	LINEOUTL
27	RDN	57	AGND	87	Reserved	117	AGND
28	GND	58	SPKR1	88	Reserved	118	SPKR2
29	TDP	59	AGND	89	LINK#	119	AGND
30	TDN	60	AGND	90	10/100#	120	MIC

TABLE E3 - J3 INTER-BOARD CONNECTOR PIN ASSIGNMENTS

PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	AU_ADDR0	26	EXPRST#	51	AU_DATA0	76	TXD1
2	AU_ADDR1	27	EXPRST#	52	AU_DATA1	77	RXD1
3	AU_ADDR2	28	AU_CS#1	53	AU_DATA2	78	VCC_EXP
4	AU_ADDR3	29	VCC_5V	54	AU_DATA3	79	GND
5	AU_ADDR4	30	VCC_5V	55	AU_DATA4	80	GND
6	AU_ADDR5	31	VCC_3V3	56	AU_DATA5	81	GND
7	AU_ADDR6	32	VCC_3V3	57	AU_DATA6	82	GND
8	AU_ADDR7	33	TRST#	58	AU_DATA7	83	SCL
9	AU_ADDR8	34	TDI	59	AU_DATA8	84	SDA
10	AU_ADDR9	35	TDO	60	AU_DATA9	85	Reserved
11	AU_ADDR10	36	TMS	61	AU_DATA10	86	Reserved
12	AU_ADDR11	37	TCK	62	AU_DATA11	87	Reserved
13	AU_ADDR12	38	SPI_SCLK / UIO13	63	AU_DATA12	88	Reserved
14	AU_ADDR13	39	SPI_SO / UIO14	64	AU_DATA13	89	Reserved
15	AU_ADDR14	40	SPI_SI / UIO15	65	AU_DATA14	90	Reserved
16	LA_ADDR15	41	SPI_SYNC1 / UIO16	66	AU_DATA15	91	Reserved
17	LA_ADDR16	42	Reserved	67	AU_ALE	92	GND
18	LA_ADDR17	43	Reserved	68	BOOT0	93	GND
19	LA_ADDR18	44	PB#	69	RESET_SW#	94	GND
20	LA_ADDR19	45	Reserved	70	AU_OE#	95	GND
21	LA_ADDR20	46	Reserved	71	AU_WE#	96	GND
22	LA_ADDR21	47	LA_ADDR24	72	AU_CS#3	97	Reserved
23	LA_ADDR22	48	Reserved	73	EXPINT1#	98	VCC_3V3
24	LA_ADDR23	49	VCC_5V	74	EXPINT2#	99	GND
25	AU_EWAIT#	50	VCC_5V	75	AU_CS#0	100	GND

TABLE E4 - J4 INTER-BOARD CONNECTOR PIN ASSIGNMENTS

APPENDIX F - REDCONN SERVICES BOARD FOR THE YELLOW1210

F.1 INTRODUCTION

The REDCONN is a services board for the YELLOW1210 processor board. It breaks out the interfaces from YELLOW1210 to standard connectors.

The REDCONN provides the following standard PC connectors mounted along two edges of the board for easy mounting in an enclosure:

- One RJ45 Ethernet socket.
- Two USB host Type-A connectors in a single stacked package.
- One USB device Mini-AB connector.
- One 9-way male D-type connector.
- Two 3.5mm audio jacks for line-out (green) and microphone (pink).
- One 2mm power jack.

The REDCONN also provides two board-to-wire connectors for interfacing to a speaker and backlight inverter within an enclosure.

There are two variants of the REDCONN available:

- The REDCPOE includes PoE capability and excludes the DC input power jack.
- The REDCDC includes the DC input power jack and excludes PoE capability.

The differences are described in more detail in section F.6. Unless otherwise described in the following sections, the two variants will be referred to as the REDCONN.

F.2 BLOCK DIAGRAM

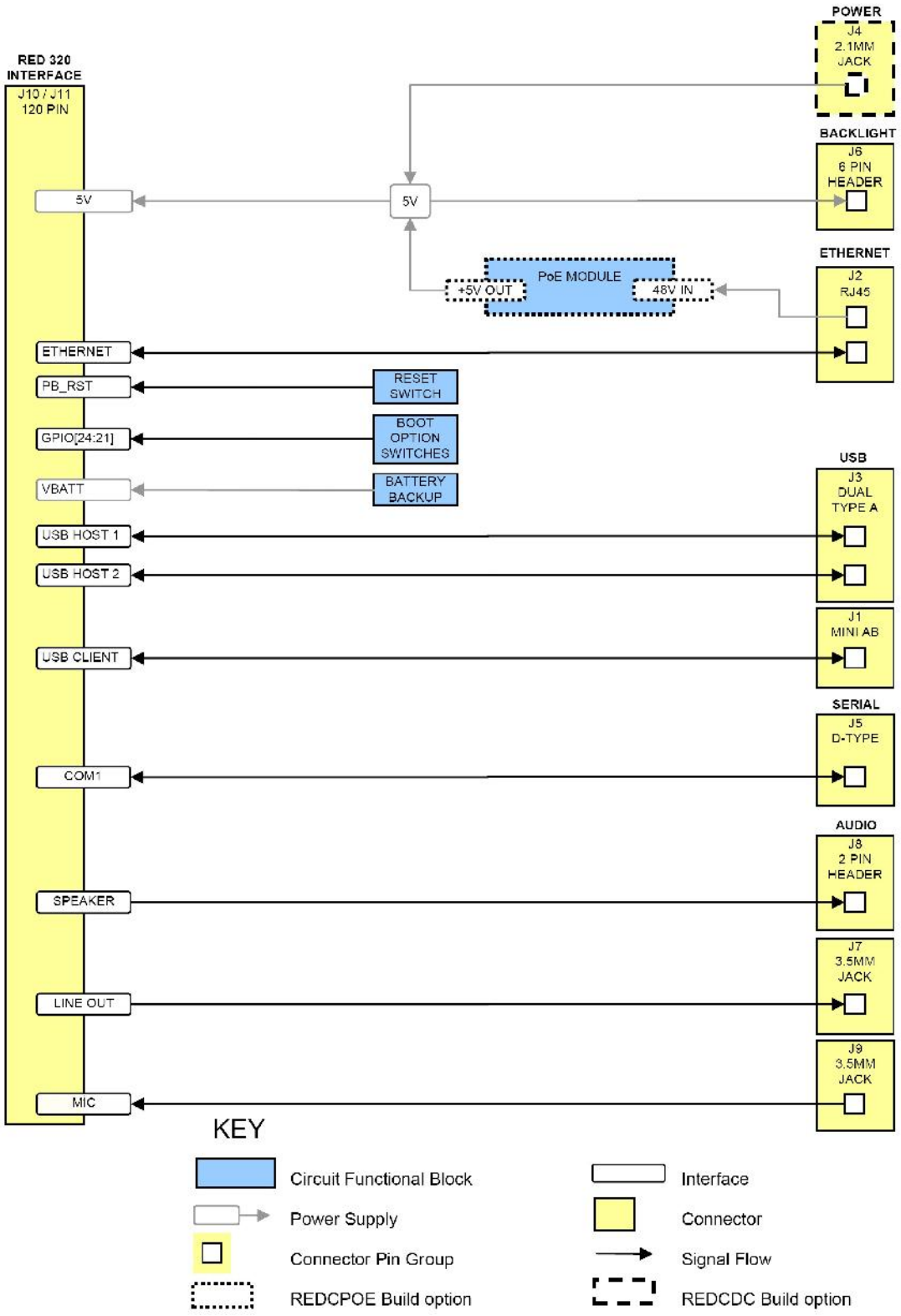

FIGURE F1 - REDCONN BLOCK DIAGRAM

F.3 INTERFACING REDCONN TO YELLOW1210

The YELLOW1210 connects to the REDCONN through the 120-way connectors. If the REDCONN is to be fitted end to end with the YELLOW1210 then connector J3 of the YELLOW1210 mounts with J10 of the REDCONN as shown in Figure F2. If the REDCONN is to be fitted underneath the YELLOW1210 then connector J3 of the YELLOW1210 mounts with J11 of the REDCONN as shown in Figure F3.

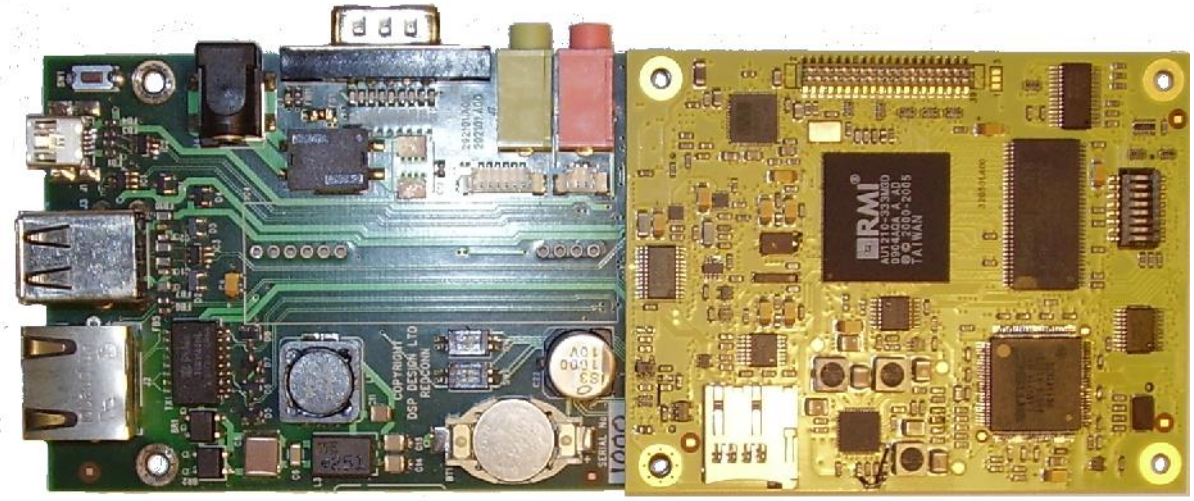

FIGURE F2 - YELLOW1210 AND REDCONN CONNECD END-TO-END

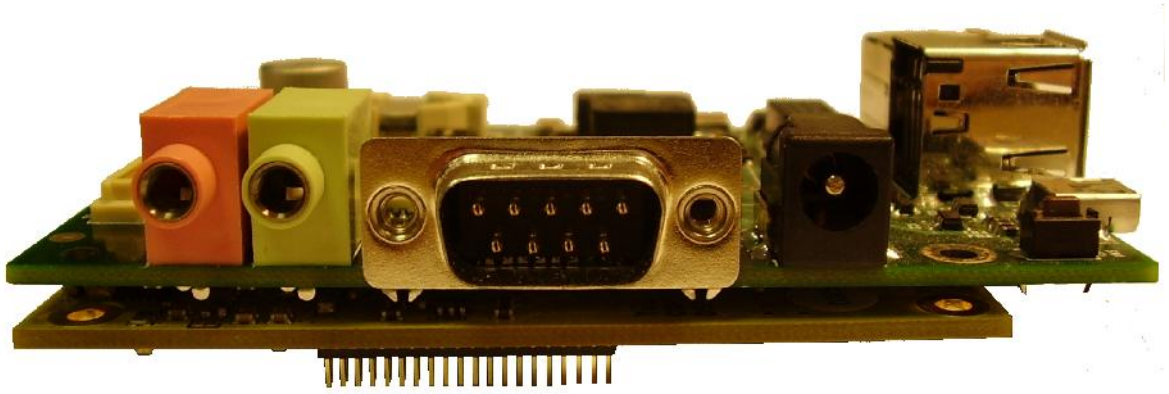

FIGURE F3 - YELLOW1210 AND REDCONN CONNECTED BACK-TO-BACK

F.4 REDCONN CONNECTOR SUMMARY

Table F1 provides a summary of the connectors on the REDCONN. Figures F4 and F5 show their positions.

The function and pin assignment for the backlight connector J6 and speaker connector J8

are detailed in subsequent sections of this appendix. The function and pin assignment for connectors J10 and J11 are identical to that given in Appendix F for the YELLOW1210 connector J3. The remaining connectors use standard pin allocations and are not detailed in this document.

NAME	FUNCTION	TYPE	MANUFACTURER / PART NUMBER
J1	USB Device	Mini AB USB socket	Samtec MUSB-05-S-AB-SM-A
J2	Ethernet	RJ45 socket	Kycon KYC-GWLX-S9-88-G/Y
J3	USB Host	Dual (stacked) USB Type A socket	AMP 5787617-1
J4	Power	2mm power jack (REDCDC only)	Kycon KLDX-SMT2-0202-A
J5	COM1 serial port	9 way male D-type	ETC-SDM-009-US91-95/N
J6	LCD backlight	6 way 1.25mm pitch pin header	Molex 53398-0671
J7	Audio line out	3.5mm audio jack (3-terminal, green)	Connect-Tech CTP-322-1-LG
J8	Speaker	2 way 1.25mm pitch pin header	Molex 53398-0271
J9	Microphone	3.5mm audio jack (3-terminal, pink)	Connect-Tech CTP-322-1-PK
J10	YELLOW1210 interface	120-way board to board	Hirose FX8-120P-SV1
J11	YELLOW1210 interface	120-way board to board	Hirose FX8-120P-SV1

TABLE F1 - RECONN CONNECTOR SUMMARY

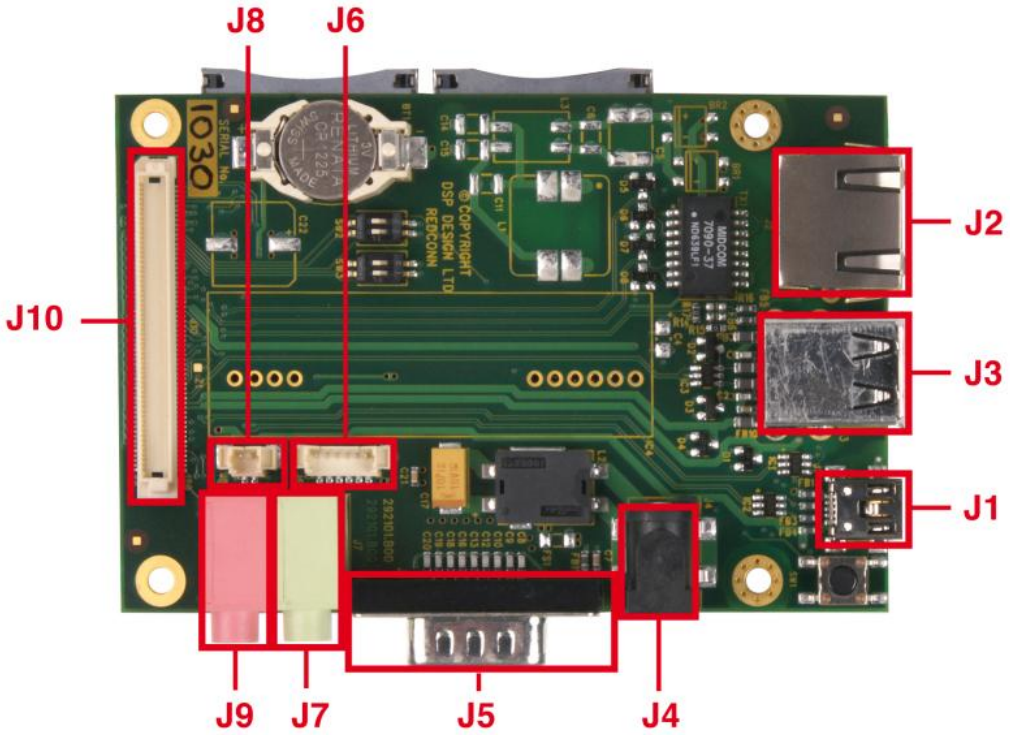

FIGURE F4 - REDCONN CONNECTOR LOCATIONS – TOP SIDE

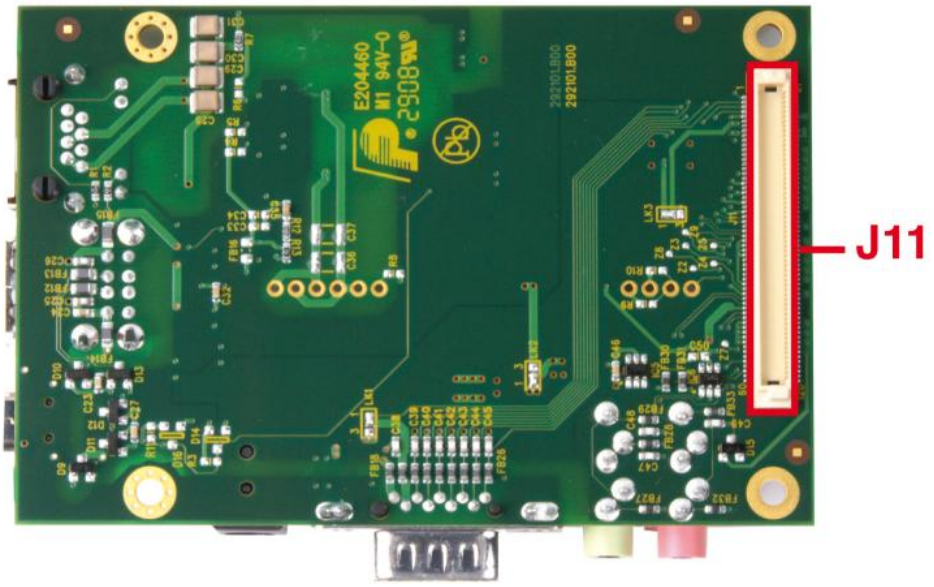

FIGURE F5 - REDCONN CONNECTOR LOCATIONS – BOTTOM SIDE

F.5 COM1 SERIAL PORT

The REDCONN provides a full function 9-pin D-type socket J5 for COM1.

The REDCONN provides EMC filtering on all pins of J5. The REDCONN does not provide ESD protection on any of the COM1 signals. However the ICL3243E transceiver on the YELLOW1210 provides ESD protection. See section 2.6 for more details.

There is a solder link option to connect pin 9 of this connector to VCC_5V through a fuse. Contact DSP Design if you have a volume requirement for this feature.

F.6 ETHERNET AND POWER

The REDCONN provides an RJ45 socket J2 for Ethernet. This includes two LEDs that indicate LAN activity. The RJ45 socket connects to the YELLOW1210 via one of the board-to-board connectors J10 or J11 and an isolation transformer and the necessary passive components.

The REDCONN provides EMC filtering and ESD protection on all pins of J2.

The REDCDC variant provides a DC jack, J4, for connecting to standard brick power supplies, such as the TCONN-PSU available from DSP Design. In this case the Ethernet interface is a conventional type. Figure F6 shows a block diagram of the REDCDC Ethernet circuit and its interface with the YELLOW1210. The REDCDC provides EMC filtering on the DC jack input. The REDCDC does not provide ESD protection on the DC jack input.

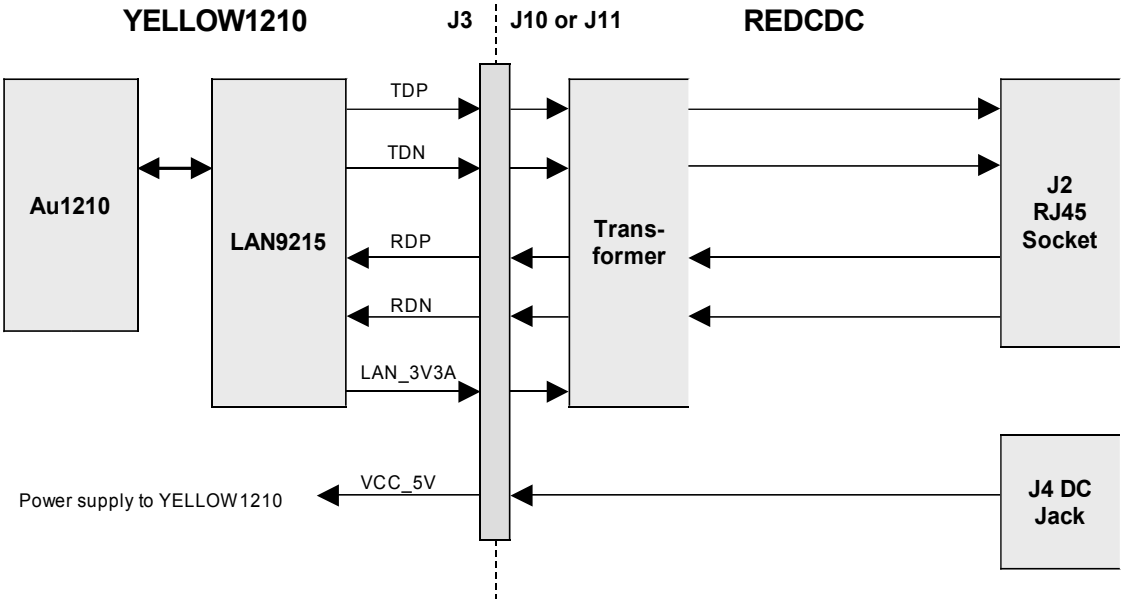

FIGURE F6 - REDCDC ETHERNET BLOCK DIAGRAM

The REDCPOE variant allows power to be sourced using IEEE802.3af Power Over Ethernet technology. This technology superimposes a 48V DC voltage on the Ethernet cable. Components on the REDCPOE feed this 48V through an isolated power supply and

provide a regulated 5V for the YELLOW1210. Figure F7 shows a block diagram of the REDCPOE Ethernet circuit and its interface with the YELLOW1210. Note that power is derived from the centre-taps of the TX and RX transformers, and may also be supplied on the spare pairs.

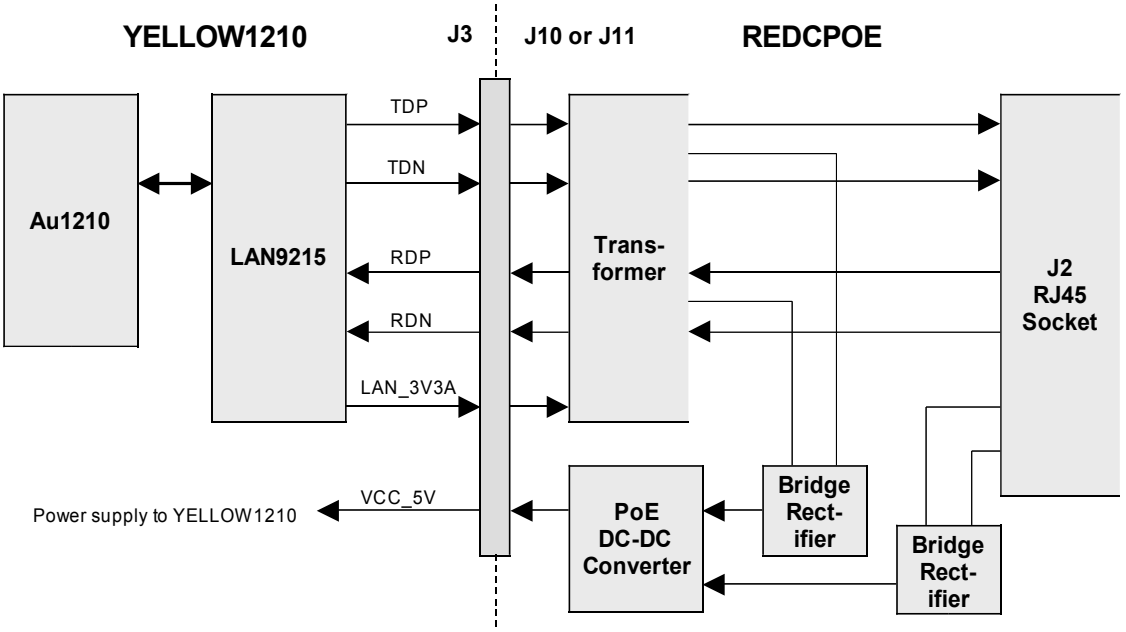

FIGURE F7 - REDCPOE ETHERNET AND POE BLOCK DIAGRAM

F.7 USB HOST

The REDCONN provides two Type-A USB host ports in a single socket J3. The bottom socket corresponds to the USB Host signals, and the top socket to the USB Host / Client signals.

The REDCONN provides EMC filtering on all pins of J3 including power and ground.

The REDCONN provides ESD protection on all pins of J3 except ground. The USB data pairs have clamping diodes to VCC_3V3 and GND. The switched USB power rail has clamping diodes to VCC_5V and GND.

F.8 USB DEVICE

The REDCONN provides a USB device port socket J1.

The REDCONN provides EMC filtering on all pins of J1 including VBUS and ground. The REDCONN provides ESD protection on all pins of J1 except ground. The USB data pairs have clamping diodes to VCC_3V3 and GND. The VBUS input has clamping diodes to VCC_5V and GND.

F.9 AUDIO

The REDCONN provides two 3.5mm audio jacks J7 and J9 and a speaker connection J8.

J7 provides stereo line output and uses the standard green identification. J9 provides mono microphone input and uses the standard pink identification.

The REDCONN provides a two pin board to wire connector J8 which allows for direct connection to a 4Ω or 8Ω mono speaker.

The REDCONN provides EMC filtering on all pins of J7, J8 and J9 including ground.

The REDCONN provides ESD protection on all signals connected to J7, J8 and J9. The microphone and line out signals have clamping diodes to VCC_3V3 and GND. The mono speaker outputs have clamping diodes to VCC_5V and GND.

F.10 SWITCHES

The REDCONN provides four DIL switches. These switches are not used by the YELLOW1210

F.11 RESET

The REDCONN provides a push button reset switch SW1. The switch connects to the RESET_SW# input on the YELLOW1210. When pressed, the switch will force a cold reset on the YELLOW1210.

F.12 RTC BATTERY

The REDCONN provides a 3.0V lithium CR1225 battery in a battery holder BT1. The battery connects to the VBACK_BAT input on the YELLOW1210 via one of the board-to-board connectors J10 or J11. The battery provides backup for the RTC when power is removed from the YELLOW1210.

The REDCONN provides a solder link, LK3, which provides the following options:

- Fitted 1-2, battery connected to VBACK_BAT. This is the default setting
- Fitted 2-3, battery isolated, VBACK_BAT connected to GND.
- Not fitted, battery isolated, VBACK_BAT not connected on the REDCONN.

All links are located on the bottom side of the REDCONN, and are clearly marked - pin 1 and pin 3 are identified on the silkscreen for each link.

If short circuited may explode or leak, causing injury or damage to the equipment. To prevent short circuits, observe the following guidelines:

- Remove the battery when changing the setting of LK3.

- Use insulated tools when removing the battery from the holder.
- Ensure the battery is not placed on a conductive surface.
- After changing the setting of LK3 and before reinstalling the battery ensure all three pads are not connected together.

F.13 BACKLIGHT POWER

The REDCONN provides a six pin board to wire connector J6. The connector provides either 5V or 3.3V to backlight inverters. Table F2 lists connector J6 pin allocations.

SIGNAL	J6 PIN	DESCRIPTION
VCC_5V or VCC_3V3	4, 5, 6	5V or 3.3V selected by solder link LK2
GND	1, 2, 3	Ground

TABLE F2 - BACKLIGHT CONNECTOR J6 PIN ASSIGNMENTS

The REDCONN provides a solder link, LK2, which provides the following options:

- Fitted 1-2: J6 is connected to VCC_5V. This is the default setting.
- Fitted 2-3: J6 is connected to VCC_3V3.
- Not fitted: J6 pins 3, 4 and 5 are not connected on the REDCONN.

All links are located on the bottom side of the REDCONN, and are clearly marked - pin 1 and pin 3 are identified on the silkscreen for each link.

After changing the setting of LK2 ensure all three pads are not connected together.

F.14 CHASSIS

The REDCONN provides four mounting holes. Two are connected to a CHASSIS plane and two are isolated from all signals and planes. The metal parts of connectors J1, J2, J3 and J5 are connected to the CHASSIS plane.

The two mounting holes connected to CHASSIS are the mounting holes closest to the USB and RJ45 sockets.

The CHASSIS plane connects to the GND plane via a single ferrite bead.

F.15 ASSEMBLY AND MECHANICAL DRAWINGS

High resolution REDCONN assembly and mechanical drawings are available on the DSP

Design website.

F.16 REDCONN DIMENSIONS

- PCB dimensions are 97.5mm x 65.0mm.
- PCB thickness is 1.6mm.
- Maximum component height above the PCB is 16.20mm.
- Maximum component height below the PCB is 2.5mm.

F.17 WEIGHT

- DSP-REDCDC 48g.
- DSP-REDCPOE 64g.

F.18 OPERATING TEMPERATURE RANGE

0°C to +70°C.

F.19 HUMIDITY

10% - 90% non-condensing.

APPENDIX G - FAULT REPORTING

DSP Design makes every effort to ship products and documentation that are completely free from faults, design errors and inconsistencies. Sometimes, however, problems do show up in the field. To help us put these right as quickly and efficiently as possible, we need as much information as possible from you, the user.

For this reason we have included here a “Product Fault Report” form. If you ever have cause to return a board for repair, or if you detect an error in the documentation, we would appreciate it if you could fill in the form on the next page, or a copy of it, and return the form to DSP Design with the faulty product.

Prior to returning a faulty product, please check the following:

1) The board has been correctly configured for the intended application (see earlier appendix for board installation details).
2) The power supplies are providing correct voltage levels.
3) Cabling to the board is sound and connected correctly.
4) Other cards in the system are known to be correctly configured and functioning.
5) PLEASE RETURN THE BOARD TO US IN EXACTLY THE SAME CONFIGURATION AS IT FAILED IN.

Your help with this will enable us to sort out your problem more quickly. Thank you.

PRODUCT FAULT REPORT			
CUSTOMER INFORMATION:		**PRODUCT INFORMATION:**	
Company Name:		Product Name:	
Contact Name:		Serial No.:	
Phone No:		Date of return:	
SYMPTOMS OBSERVED:			
SYSTEM CONFIGURATION (e.g. other boards present, operating system and software):			
For DSP Design Use:			
Product Test Report:			
Date of Receipt:		Repaired by:	
Charges to be invoiced:			
Date of Return:		Returned by:	

TABLE G1 - PRODUCT FAULT REPORT FORM

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