



Technical Information

CV1-AMBIENT • Dual-Screen CPCI Graphics Adapter

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About this Manual

This manual is a short form description of the technical aspects of the CV1-AMBIENT, required for installation and system integration. It is intended for the very advanced user only.

Edition History

EKF Document	Ed.	Contents/Changes	Author	Date
Text # 2513 cv1tie.wpd	1	1. Edition Technical Information CV1-AMBIENT, English, preliminary edition, to be completed later on, valid for board revision 1	jj	9 November 2001

Nomenclature

Signal names used herein with an attached '#' designate active low lines.

Trade Marks

Some terms used herein are property of their respective owners, e.g.

Pentium, Celeron, Socket 370: ® Intel
CompactPCI: ® PICMG
 Windows 98, Windows NT, Windows 2000: ® Microsoft

EKF does not claim this list to be complete.

Legal Exclaimer - Liability Exclusion

This manual has been edited as carefully as possible. We apologize for any potential mistake. Information provided herein is designated exclusively to the proficient user (system integrator, engineer). EKF can accept no responsibility for any damage caused by the use of this manual.

CV1-AMBIENT Features

Short Description

The CV1-AMBIENT is a universal, dual-screen 3D graphics adapter for use within CompactPCI® systems. Housed on a 3U Eurocard, the CV1-AMBIENT is equipped with both, DVI and D-SUB connectors for simultaneous attachment of digital display units and analog monitors. The board is built upon a 128-bit drawing engine, resulting in superior performance (e.g. playing of DVD movies with full frame rate). Analog monitors with a resolution up to 1600x1200 and TFT flat-panel displays up to 1280x1024 pixels are supported by the hardware.

When operated under Windows™, the CV1-AMBIENT allows for simultaneous use of two screens. *Multi-Display* means applications available at the same time across multiple display devices, and *Dual View* is a synonym for displaying any rectangular portion of the primary display zoomed up on the secondary screen.

Drivers are provided for all Windows™ operating systems and Linux. The CV1-AMBIENT is available with 4..16MB video memory.



CV1-AMBIENT

The CV1-AMBIENT is based on the Lynx3DM (Silicon Motion), a low power high performance graphics controller chip. The video memory is integrated into the chip package (available as 4/8/16MB) and delivers up to 1.6GB/s bandwidth, resulting in fast 3D rendering, and real-time full frame video playback of MPEG2/DVD content without the need for additional hardware.

The CV1-AMBIENT is suitable for attachment to all popular video monitors. Displays provided with a *Digital Visual Interface* (typically flat panel TFT style screens) can be connected to the DVI receptacle (*Primary Display*). For all legacy monitors with analog inputs, the CV1-AMBIENT is provided with an additional D-SUB connector (*Secondary Display*). Both graphics outputs of the CV1-AMBIENT are independent from each other and can deliver different content, e.g. motion video, simultaneously to their respective screens.

The boards video capture feature processes incoming video data from the Zoom Video Port and sends the data to the local frame buffer. By using a flat ribbon cable, this interface can be directly connected to the CP2-HIPHOP (PC Card adapter) or CF4-HIHAT (IEEE 1394 FireWire host adapter).

Complete OS software support is available for Linux, Windows™ 98, ME, NT, 2000, and XP.

The CV1-AMBIENT is a 3U Eurocard. For use within 6U CPCI card cages, EKF offers the CR9-ADAPT, a mechanical kit for the front panel extension.



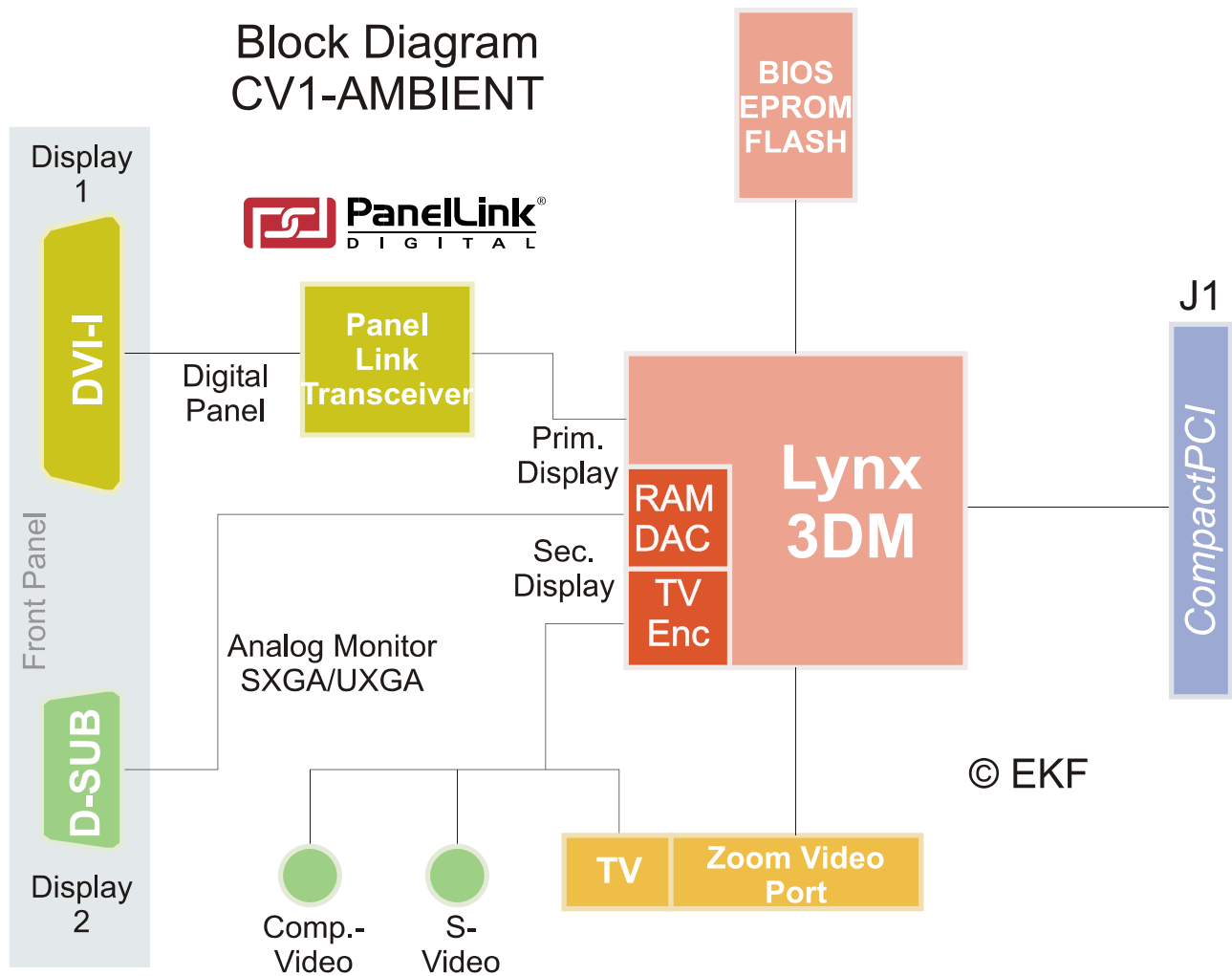
CR9-ADAPT

Feature Summary

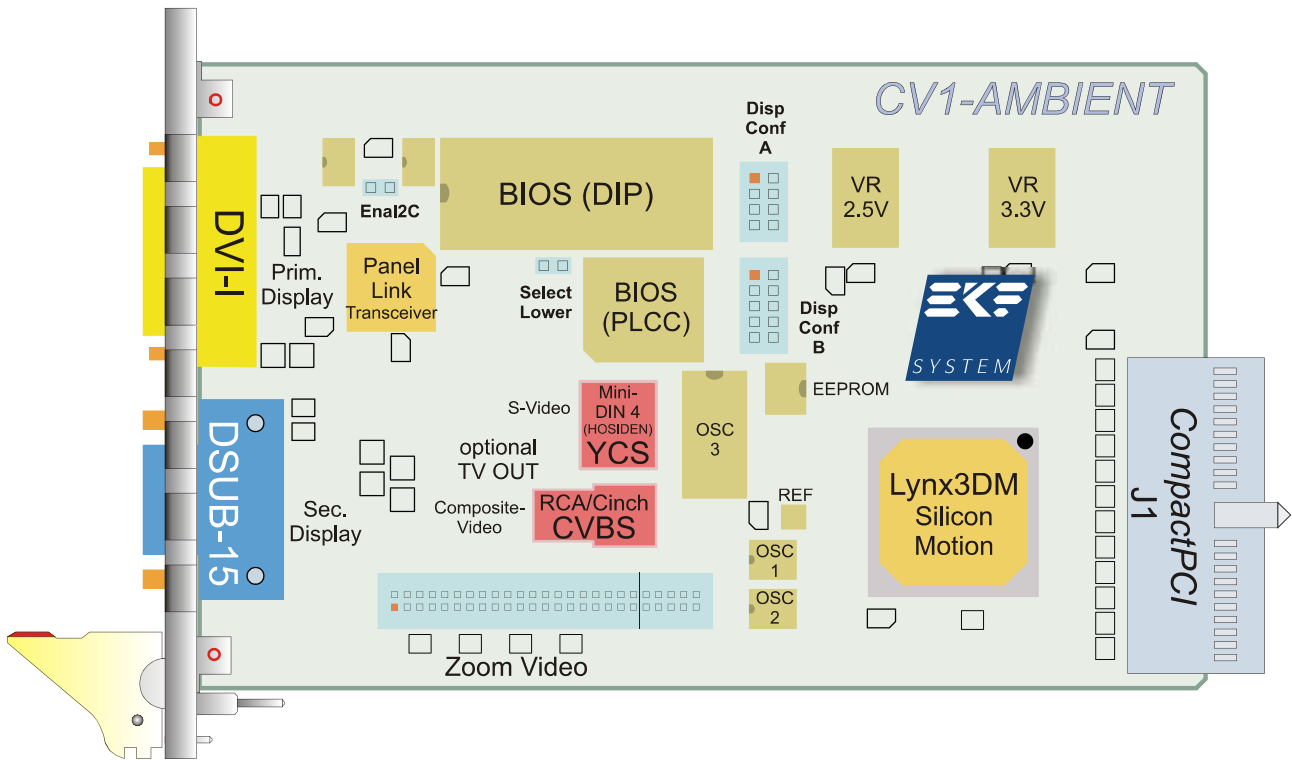
Technical Specifications		
Printed Circuit Board	Dimensions	3U Eurocard (100x160mm ²), front panel 4HP (20.2mm) EMV shielded, ejection lever
Graphics	Primary Display Port Digital Display Connector DVI	Supports digital monitors, e.g. TFT flat panel displays, DVI-I ¹ receptacle mounted into the boards front panel, up to 1280x1024 pixel, 16M colors, 85Hz refresh rate, interface electronics based on PanelLink Digital Technology (Silicon Image), Hot Plug Detection, immunity against noise by differential signaling according to TMDS (Transition Minimized Differential Signaling), Single Link. ¹ Though DVI-I preserves some pins for analog signals, these pins are NC on the CV1-AMBIENT, resulting in a functionality identical to DVI-D (D = digital). The DVI-I (I = integrated analog and digital) receptacle however allows use of both, DVI-I and DVI-D cables and accessories at your convenience.
	Secondary Display Port Analog Monitor Connector D-SUB15	Supports analog monitors, e.g. multi-sync displays, SXGA/UXGA compatible, Mini D-SUB 15-pos. socket mounted into the boards front panel, up to 1600x1200 pixel ² , 16M colors, 85Hz refresh rate, RAMDAC 200MHz ² Currently available Windows™ drivers unfortunately do not support the maximum resolution
	Video Outputs	S-Video socket Mini-DIN/Hosiden 4-pos. (S-VHS, Hi-8) ³ Composite Video jack Cinch/RCA (CVBS, FBAS) ³ ³ Due to lack of free space in the cards front panel, the video connectors are mounted in the middle of the board, thus suitable for internal wiring or open experimental card frames. Functionally, these outputs are dedicated to the Secondary Display Port.
	Zoom Video Port	40/50-pos. pin header, metric 2mm, compatible to EKF boards providing Zoom Video Port e.g. CP2-HIPHOP (PC Card adapter) and CF4-HIHAT (IEEE 1394 controller)
	Graphics Controller Chip	Low power high performance controller Lynx3DM, 2D, 3D and DVD motion display, 128-bit drawing engine, integrated video memory 4/8/16MB, Dual-View and Multi-Display support under Microsoft Windows™, Zoom Video Port
CompactPCI® Bus	Connector J1	32-Bit, 33MHz (133MB/s) 32-Bit DMA bus master (133MB/s) 3.3V or 5V interface
Power Consumption	Connector J1	+5V ±5% 0.1A max. +3.3V ±0.3V 0.3A max.
Temperature Humidity	Commercial Grade Version	Operation temperature 0-70°C (industrial grade temperature range available on special request) Relative humidity 5-90% non condensing
Software	Drivers, API, Tools	Linux (Xfree86), Microsoft Windows™ 98, ME, NT 4.0, 2000, XP, VxWorks (planned 1.Q. 2002), BIOS, Windows™ Control Panel, Windows™ API

subject to change without further notice

Block Diagram



Component Assembly



Installing and Replacing Components

Before You Begin

Warnings

The procedures in this chapter assume familiarity with the general terminology associated with industrial electronics and with safety practices and regulatory compliance required for using and modifying electronic equipment. Disconnect the system from its power source and from any telecommunication links, networks or modems before performing any of the procedures described in this chapter. Failure to disconnect power, or telecommunication links before you open the system or perform any procedures can result in personal injury or equipment damage. Some parts of the system can continue to operate even though the power switch is in its off state.



Caution

Electrostatic discharge (ESD) can damage components. Perform the procedures described in this chapter only at an ESD workstation. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis or board front panel. Store the board only in its original ESD protected packaging. Retain the original packaging (antistatic bag and antistatic box) in case of returning the board to EKF for repair.



Installing the Board

Warning

This procedure should be done only by qualified technical personnel. Disconnect the system from its power source before doing the procedures described here. Failure to disconnect power, or telecommunication links before you open the system or perform any procedures can result in personal injury or equipment damage.

Typically you will perform the following steps:

- Switch off the system, remove the AC power cord
- Attach your antistatic wrist strap to a metallic part of the system
- Remove the board packaging, be sure to touch the board only at the front panel
- Identify the related CompactPCI slot (peripheral slot for I/O boards, system slot for CPU boards, with the system slot typically most right or most left to the backplane)
- Insert card carefully (be sure not to damage components mounted on the bottom side of the board by scratching neighbored front panels)
- A card with onboard connectors requires attachment of associated cabling now
- Lock the ejector lever, fix screws at the front panel (top/bottom)
- Retain original packaging in case of return



Removing the Board

Warning

This procedure should be done only by qualified technical personnel. Disconnect the system from its power source before doing the procedures described here. Failure to disconnect power, or telecommunication links before you open the system or perform any procedures can result in personal injury or equipment damage.

Typically you will perform the following steps:

- Switch off the system, remove the AC power cord
- Attach your antistatic wrist strap to a metallic part of the system
- Identify the board, be sure to touch the board only at the front panel
- unfasten both front panel screws (top/bottom), unlock the ejector lever
- Remove any onboard cabling assembly
- Activate the ejector lever
- Remove the card carefully (be sure not to damage components mounted on the bottom side of the board by scratching neighboured front panels)
- Store board in the original packaging, do not touch any components, hold the board at the front panel only



Warning

Do not expose the card to fire. Battery cells and other components could explode and cause personal injury.



EMC Recommendations



In order to comply with the CE regulations for EMC, it is mandatory to observe the following rules:

- The chassis or rack including other boards in use must comply entirely with CE
- Close all board slots not in use with a blind front panel
- Front panels must be fastened by built-in screws
- Cover any unused front panel mounted connector with a shielding cap
- External communications cable assemblies must be shielded (shield connected only at one end of the cable)
- Use ferrite beads for cabling wherever appropriate
- Some connectors may require additional isolating parts (e.g. 10Base-2 BNC T-connector)

Recommended Accessories

Blind CPCI Front Panels	EKF Elektronik	Widths currently available (1HP=5.08mm): with handle 4HP/8HP without handle 2HP/4HP/8HP/10HP/12HP
Ferrit Bead Filters	ARP Datacom, 63115 Dietzenbach	Ordering No. 102 820 (cable diameter 6.5mm) 102 821 (cable diameter 10.0mm) 102 822 (cable diameter 13.0mm)
Isolating Elements	ARP Datacom, 63115 Dietzenbach	Ordering No. 182 068 (Cheapernet T-connector)
Metal Shielding Caps	Conec-Polytronic, 59557 Lippstadt	Ordering No. CDFA 09 165 X 13129 X (DB9) CDSFA 15 165 X 12979 X (DB15) CDSFA 25 165 X 12989 X (DB25)

Technical Reference - Jumper Fields and Connectors

Caution

Some of the connectors provide operating voltage (e.g. 5V and 12V) to devices inside the system chassis, such as fans and internal peripherals. Not all of these connectors are overcurrent protected. Do not use these connectors for powering devices external to the computer chassis. A fault in the load presented by the external devices can cause damage to the board, the interconnecting cable and the external devices themselves.

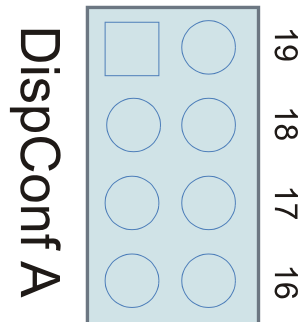
Jumper Fields

Jumper Fields DispConfA and DispConfB

The jumper fields DispConfA and DispConfB can be used to pass over configuration settings of the primary display port to the BIOS firmware. With future releases of the BIOS, settings described here could change.

DispConfA

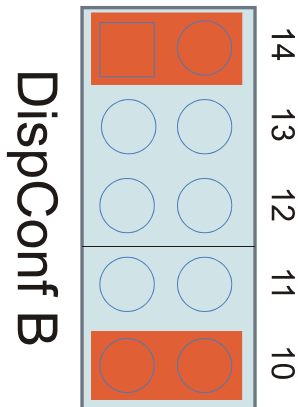
DispConfA is intended to allow configuring of the resolution of the graphics controller to match an attached TFT-display. Currently it is not in use. Therefore *factory default is all jumpers removed* - do not change this setting unless a newer BIOS explicitly allows differing configuration.



All jumpers removed from DispConfA enables DispConfB (see next page)

DispConfB

The jumper field DispConfB is provided to match closely the properties of an attached TFT-display. Please note: DispConfB settings are entirely ignored if any jumper is set to DispConfA. The factory default setting is described below (positions marked red = jumper set, all others removed).



DispConfB factory default (requires all jumpers removed from DispConfA)

DispConfB 14:12			O = Jumper Set	G = Jumper Removed
Enable DVI	DVI Brightness		TFT Properties	
	14	13		12
O	O	O	9-bit, 3-bit per R, G, B	
O	O	G	12-bit, 4-bit per R, G, B	
O	G	O	18-bit, 6-bit per R, G, B	
O	G	G	24-bit, 8-bit per R, G, B	
G	O	O	24-bit, 12 + 12-bit, 2 pixels/clock	
G	O	G	Analog TFT with analog R, G, B I/F	
G	G	O	36-bit, 18 + 18-bit, 2 pixels/clock	
G	G	G	unused, reserved	

DispConfB 14:12 factory default (highlighted red). Use of the DVI interface requires Jumper 14 to be set. Jumpers 12, 13 control the brightness of the DVI port. Jumper 14:12 settings can be entirely ignored if only the secondary display port (VGA HD-DSUB15 outlet) is in use.

The Jumpers 11:10 of DispConfB define the screen resolution delivered by the CV1-AMBIENT. Do not confuse the settings described in the jumper table below with the screen resolution selected from your operating system.

DispConfB 11:10 O = Jumper Set G = Jumper Removed						
11	10	CV1 Selected Resolution	OS (Windows) Selected Resolution (◆ Indicates Match)			
			640 x 480	800 x 600	1024 x 768	1280 x 1024
O	O	640 x 480	◆	panning	panning	panning
O	G	800 x 600	center	◆	panning	panning
G	O	1024 x 768	center	center	◆	panning
G	G	1280 x 1024	center	center	center	◆

DispConfB 11:10 factory default is highlighted red. As could be seen, a perfect match requires the settings of the CV1-AMBIENT being identical compared to the operating systems selected resolution.

Jumper Enal²C

The jumper ENI²C, when set, enables the programming of the PanelLink transmitter by the System Management Bus (requires I²C controlling software drivers or firmware). As factory default, this jumper is removed for hard wired configuring of the transmitter. The PanelLink transmitter is responsible for the encoding and generating of the differential signals of the DVI interface (*Primary Display Port*).



Enal²C

Jumper Select Lower

The jumper Select Lower allows to select one of two BIOS memory blocks (A16 EPROM/Flash Low/High). This assumes sufficient memory capacity (twice as required for normal operation). The feature could be interesting for developers, who want to select between two BIOS versions, or need to restore to an older version. As factory default, this jumper is removed.

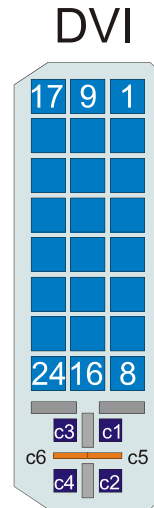


Select Lower

Primary Display Port - DVI-I Receptacle

Though DVI-I preserves some pins for analog signals, these pins are NC on the CV1-AMBIENT, resulting in a functionality identical to DVI-D (D = digital). The DVI-I (I = integrated analog and digital) receptacle however allows use of both, DVI-I and DVI-D cables and accessories at your convenience.

DVI					
17	tx0-	9	tx1-	1	tx2-
18	tx0+	10	tx1+	2	tx2+
19	GND	11	GND	3	GND
20	nc	12	nc	4	nc
21	nc	13	nc	5	nc
22	GND	14	ddc_pow	6	ddc_clk
23	txc+	15	GND	7	ddc_dat
24	txc-	16	dvi_hp	8	nc
	c3	nc	c1	nc	
	c6	GND	c5	GND	
	c4	nc	c2	nc	



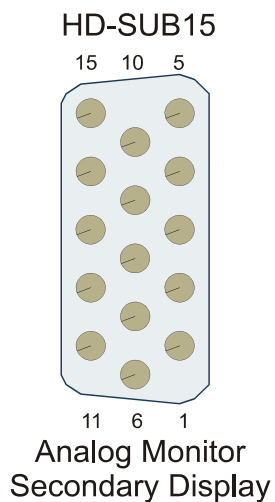
tx0-	tx1-	tx2-
tx0+	tx1+	tx2+
GND	GND	GND
nc	nc	nc
nc	nc	nc
GND	ddc_pow	ddc_clk
txc+	GND	ddc_data
txc-	dvi_hp	nc
nc	nc	
GND	GND	
nc	nc	

CV1-AMBIENT DVI Connector
Digital Panel - Primary Display

TX0..2 = Blue/Green/Red (Single Link) DDC = Display Data Channel DVI-HP = DVI Hot Plug

Please note: The DVI hot plug capability requires initialization of the Panellink transmitter accordingly (by I²C).

Secondary Display Port - D-SUB 15-Pos. Connector

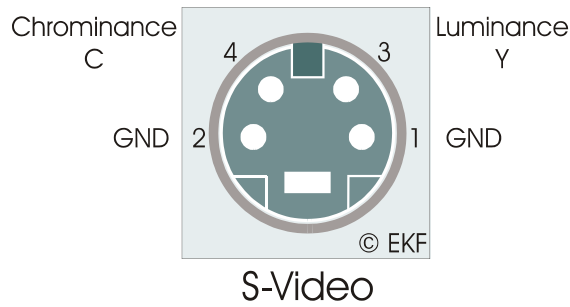


1	red
2	green
3	blue
4	nc
5	GND
6	GND
7	GND
8	GND
9	+5V (PolySwitch 1.5A) DDC Power
10	GND
11	nc
12	DDC Data
13	Hsync
14	Vsync
15	DDC Clock

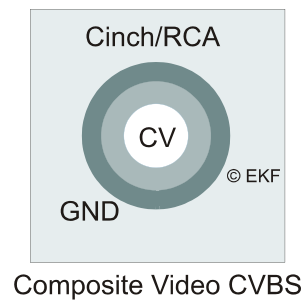
Video Outputs

Due to lack of free space in the cards front panel, the video connectors are mounted in the middle of the board, thus suitable for internal wiring or open experimental card frames. Functionally, these outputs are dedicated to the Secondary Display Port.

S-Video Output



Composite Video Output



Zoom Video Port

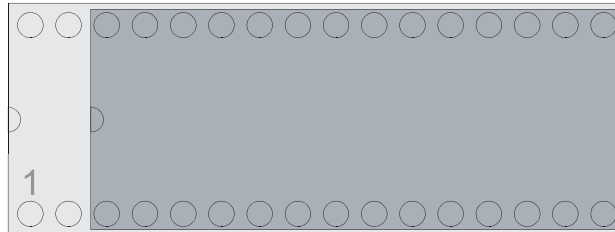
ZV Y0	1	2	GND
ZV Y1	3	4	GND
ZV Y2	5	6	GND
ZV Y3	7	8	GND
ZV Y4	9	10	GND
ZV Y5	11	12	GND
ZV Y6	13	14	GND
ZV Y7	15	16	GND
ZV UV0	17	18	GND
ZV UV1	19	20	GND
ZV UV2	21	22	GND
ZV UV3	23	24	GND
ZV UV4	25	26	GND
ZV UV5	27	28	GND
ZV UV6	29	30	GND
ZV UV7	31	32	GND
ZV HREF	33	34	GND
ZV VSYNC	35	36	GND
ZV PixCLK	37	38	GND
NC	39	40	NC
I ² C Clock	41	42	GND
I ² C Data	43	44	GND
Composite Video CVBS	45	46	GND
S-Video Luminance	47	48	GND
S-Video Chrominance	49	50	GND

Y(0..7)	Luminance
UV(0..7)	Chrominance
HREF	Horizontal Sync
VSYNC	Vertical Sync
PixCLK	Video Clock

Pin Pos. 41...50 are intended for future use together with an add-on module to the CV1-AMBIENT

BIOS Socket

There are several packaging options for the integrated video BIOS. If contained in a Flash EEPROM, the BIOS is soldered directly to the board and cannot be removed and changed without appropriate desoldering equipment. Provided as an alternate footprint, a DIP-32 socket allows for inserting of an EPROM (either 28 or 32-pin Jedec style, e.g. 27C010). When using a 28-pin EEPROM, the most left positions of the socket must remain free (pin 1 orientation of the socket and the EPROM is marked by a notch).



This manual does not provide information about the BIOS firmware itself. Latest releases of the firmware can be downloaded from the EKF website at <http://www.ekf.de/c/cgxa/cv1/cv1.html>. You would have to use an ordinary programmer (e.g. Data I/O) in order to program the BIOS binary image into the EPROM or Flash EEPROM.

CompactPCI Connector J1

Pin No.	A	B	C	D	E
25	5V	<i>REQ64#</i>	<i>ENUM#</i>	3.3V	5V
24	AD1	5V	VI/O	AD0	<i>ACK64#</i>
23	3.3V	AD4	AD3	5V	AD2
22	AD7	GND	3.3V	AD6	AD5
21	3.3V	AD9	AD8	M66EN (GND)	C/BE0#
20	AD12	GND	VI/O	AD11	AD10
19	3.3V	AD15	AD14	GND	AD13
18	SERR#	GND	3.3V	PAR	C/BE1#
17	3.3V	<i>IPMB SCL</i>	<i>IPMB SDA</i>	GND	PERR#
16	DEVSEL#	GND	VI/O	STOP#	<i>LOCK#</i>
15	3.3V	FRAME#	IRDY#	BD SEL	TRDY#
14	key area - no key				
13					
12					
11	AD18	AD17	AD16	GND	C/BE2#
10	AD21	GND	3.3V	AD20	AD19
9	C/BE3#	IDSEL	AD23	GND	AD22
8	AD26	GND	VI/O	AD25	AD24
7	AD30	AD29	AD28	GND	AD27
6	REQ#	GND	3.3V	CLK	AD31
5	<i>BRSVP1A5</i>	<i>BRSVP1B5</i>	RST#	GND	GNT#
4	<i>IPMB PWR</i>	GND	VI/O	<i>INTP</i>	<i>INTS</i>
3	INTA#	<i>INTB#</i>	<i>INTC#</i>	5V	<i>INTD#</i>
2	<i>TCK</i>	5V	<i>TMS</i>	<i>TDO</i>	<i>TDI</i>
1	5V	-12V	<i>TRST#</i>	+12V	5V

pin positions printed italic/coloured: not connected

Board Identification

The board designation is provided on a label, attached to the CPCI connector J1, including the boards serial number. Please do not remove this label, it is required for warranty and repair.

Ordering Information		
Alias	Ordering No.	Description
<i>AMBIENT</i>	<i>CV1-1-AMBIENT</i>	<i>3U CompactPCI graphics controller, 4MB (please mail to sales@ekf.de for availability)</i>
AMBIENT	CV1-2-AMBIENT	3U <i>CompactPCI</i> graphics controller, 8MB
<i>AMBIENT</i>	<i>CV1-3-AMBIENT</i>	<i>3U CompactPCI graphics controller, 16MB (please mail to sales@ekf.de for availability)</i>
	CR9-1-ADAPT	Mechanical kit, extends front panel to 6U

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