Modular Computers ®

CP331

ESRC Flat-Panel
USXGA Graphic Controller

Manual ID 19947, Rev. Index 0200
Feb 00

The product described in this manual is in compliance with all applied CE standards.

Revision History

Manual/Product Title:	CP331		
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Rev. Index	**Brief Description of Changes**	**Board Index**	**Date of Issue**
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This manual was realized by: **TPD/Engineering, PEP Modular Computers GmbH**.

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Explanation of Symbols

CE Conformity

This symbol indicates that the product described in this manual is in compliance with all applied CE standards. Please refer also to the section “Applied Standards” in this manual.

Caution, Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.

Please refer also to the section “High Voltage Safety Instructions” on the following page.

Warning, ESD Sensitive Device!

This symbol and title inform that electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Please read also the section “Special Handling and Unpacking Instructions” on the following page.

Warning!

This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your material.

Note...

This symbol and title emphasize aspects the reader should read through carefully for his or her own advantage.

PEP Advantage

This symbol and title emphasize advantages or positive aspects of a product and/or procedure.

For Your safety

Your new *PEP* product was developed and tested carefully to provide all features necessary to ensure the renown electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interests of your own safety and of the correct operation of your new *PEP* product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

Warning!

All operations on this device must be carried out by sufficiently skilled personnel only.

Caution, Electric Shock!

However, serious electrical shock hazards exist during all installation, repair and maintenance operations with this product. Therefore, always unplug the power cable to avoid exposure to hazardous voltage.

Before installing your new *PEP* product into a system always ensure that your mains power is switched off. This applies also to the installation of piggybacks.

Special Handling and Unpacking Instructions

ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

- Do not handle this product out of its protective enclosure while it is not used for operational purposes, unless it is otherwise protected.
- Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where safe work stations are not guaranteed, it is important for the user to be electri-cally discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.
- It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory back-up, ensure that the board is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or tracks on the board.

General Instructions on Usage

- In order to maintain *PEP's* product warranty, this product must not be altered or modified in any way. Changes or modifications to the device, which are not explicitly approved by *PEP Modular Computers* and described in this manual or received from *PEP* Technical Support as a special handling instruction, will void your warranty.
- This device should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This applies also to the operational temperature range of the specific board version, which must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.
- In performing all necessary installation and application operations, please, follow only the instructions supplied by the present manual.
- Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the board please re-pack it as nearly as possible in the manner in which it was delivered.
- Special care is necessary when handling or unpacking the product. Please, consult the special handling and unpacking instruction on the following page of this manual.

Two Years Warranty

PEP Modular Computers grants the original purchaser of *PEP* products a ***TWO YEARS LIMITED HARDWARE WARRANTY*** as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of *PEP* are valid unless the consumer has the express written consent of *PEP Modular Computers*.

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If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation (see our safety instructions).

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Chapter 1

Introduction

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1. Introduction

1.1 System Overview

The *PEP Modular Computers* CompactPCI product described in this chapter operates with the PCI bus architecture to support additional I/O and memory-mapped devices as required by various industrial applications. For detailled information concerning the CompactPCI standard, please consult the complete Peripheral Component Interconnect (PCI) and CompactPCI Specifications. For further information regarding these standards and their use, visit the homepage of the *PCI Industrial Computer Manufacturers Group (PICMG): http://www.picmg.org*.

Many system-relevant CompactPCI features that are specific for *PEP Modular Computers* CompactPCI systems can be found in the *PEP* CompactPCI System Manual. Please refer to the section “Related Publications” of this chapter for the relevant ordering information.

The CompactPCI System Manual includes the following information:

- Common information that is applicable to all system components, such as safety information, warranty conditions, standard connector pinouts etc.
- All necessary information to combine *PEP Modular Computers* racks, boards, backplanes, power supply units and peripheral devices in a customized CompactPCI system, as well as configuration examples.
- Data on rack dimensions and configurations as well as information on mechanical and electrical rack characteristics.
- Information on the distinctive features of *PEP Modular Computers* CompactPCI boards, such as functionality, hot-swap capability. In addition, an overview is given for all existing *PEP Modular Computers* CompactPCI boards with links to the relating datasheets.
- Generic information on the *PEP Modular Computers* CompactPCI backplanes, such as the slot assignment, PCB form factor, distinctive features, clocks, power supply connectors and signalling environment, as well as an overview over the *PEP Modular Computers* CompactPCI standard backplane family.
- Generic information on the *PEP Modular Computers* CompactPCI power supply units, such as the input/output characteristics, redundant operation and distinctive features, as well as an overview over the *PEP Modular Computers* CompactPCI standard power supply unit family.

1.2 Board Overview

1.2.1 Board-Specific Information

Based around the Chips&Technologies 69000 or 69030 multi-media graphic controller chips, the CP331 is a CompactPCI enhanced speed, resolution, connectivity (ESRC) flat-panel USXGA graphics board built for use with all industrial standard displays. All variants of the CP331 are equipped with a CRT standard VGA interface. As an option, either an additional standard integrated LVDS interface or an additional PanelLink interface can be provided. The LVDS and PanelLink variants provide the user with the possibility of connecting all types of flatpanel displays with up to 24-bit resolution (16.7 million colors.)

- Simultaneous display on a CRT monitor and a flatpanel display
- Possible flatpanel types: displays: EL monochrome, 24-bit TFT, 24-bit plasma, single-scan (SSTN) or dual-scan (DSTN) STN color
- Up to sixteen flatpanel types directly selectable by jumper setting
- Configuration utilities for adapting the BIOS of the graphic chip to almost any panel
- Up to 16.7 million colors
- VGA, SVGA, XGA, SXGA and USXGA resolutions
- Separation between external flatpanels and the graphics interface:
  - LVDS: ≤ 10m
  - PanelLink: ≤ 5m
  - TTL: ≤ 0.6m
- Low EMI emission
- Video memory:
  - C&T 69000: 2 MByte
  - C&T 69030: 4 MByte
- Hardware Windows accelerator with 64-bit graphics engine
- Various power-down and sleep modes
- Display centering/stretching for larger displays

1.2.2 Board Variants

Three different variants of the CP331 are available:

- CP331 (standard variant)
- CP331-PL
- CP331-LVDS

All board variants have in common a standard 15-pin VGA connector on the frontpanel. In addition, the various board variants are equipped with one or more of the following connectors:

- LVDS connector (26-pin miniature Delta Ribbon connector)
- PanelLink connector (20-pin miniature Delta Ribbon connector)
- Flatpanel adapter connector CON8 (64-pin on-board pin-row connector)
- Internal TTL flatpanel connector CON9 (on-board 40-pin on-board pin-row connector)
- General-purpose connector CON10 (8-pin on-board pin-row connector)

A complete list of the physical board interfaces of all board variants is given in the following table:

Table 1-1: Board Variants/Connectivity

Connectivity	CP331	CP331-PL	CP331-LVDS
Frontpanel Connectors	VGA	VGA	VGA
	—	—	LVDS
	—	PanelLink	—
On-board Connectors	CON8	CON8*	—
	CON9	CON9	—
	—	—	CON10

** Signals directed to PanelLink connector board.*

1.2.3 PanelLink Adapter Module

To the customizable 64-pin on-board connector CON8 of the standard board version a customer-specific flatpanel adapter can be connected. However, with the CP331 standard version no throughput of the signals to a frontpanel connecter is foreseen.

The board variant CP331-PL instead is provided with a plug-on module acting as an adapter between the 64-pin on-board connector CON8 and the 20-pin PanelLink connector on the frontpanel. Therefore, no other connection can be established to the connector CON8 when using the PanelLink adapter module.

1.2.4 System-Relevant Information

In the following information is supplied which must be taken into account before running or installing a CP331 board in your CompactPCI system.

Operating Systems

The CP331 can operate under the following operating systems:

- Windows 95
- Windows 98
- Windows NT
- Windows 2000

Note...

More than one CP331 board can be installed in a system under Windows 98 and Windows 2000. With earlier versions of the Windows operating system only one CP331 can operate in a system.

Display Drivers

Drivers are supplied for the C&T 69000 and the C&T 69030 graphic controller chips. Please note that the two graphic controller chips use different display drivers.

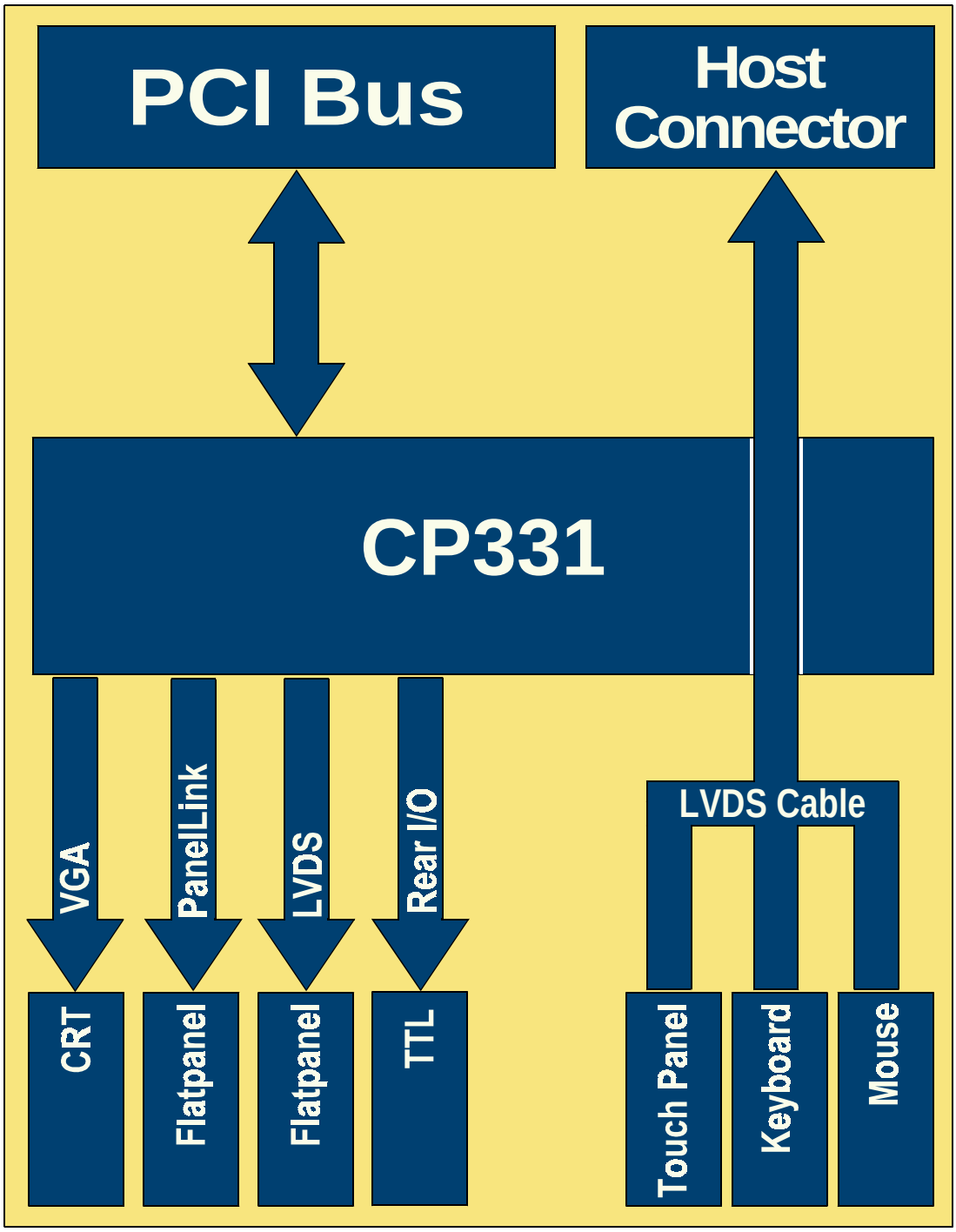
BIOS Adaptation

Up to sixteen flatpanel types can be selected directly by jumper setting after having entered the appropriate paramteres by means of one of the BIOS configuration utilities included in the supply. For configuration, please refer to the technical manual for the C&T 69000 or C&T 69030 graphic controller chips or consult *PEP Modular Computers*. However, a specific BIOS for almost any panel on the market can be created. The configuration can be carried out also by *PEP Modular Computers GmbH* or by one of their authorized partners at relatively short notice.

1.3 Board Diagrams

1.3.1 Functional Block Diagram

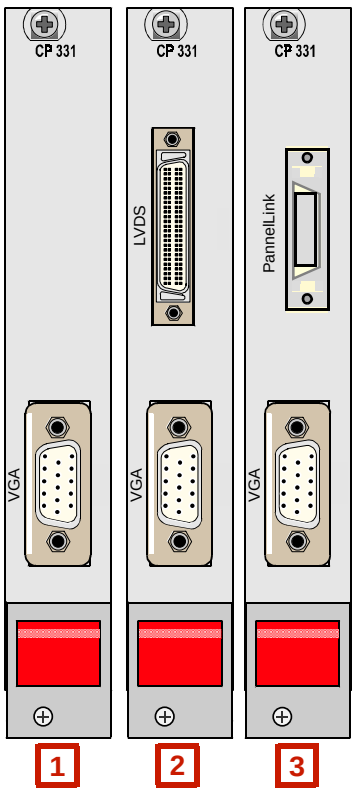
Figure 1-1: CP331 Functional Block Diagram



LVDS: CP331-LVDS only
PanelLink: CP331-PL only

1.3.2 Front Panels

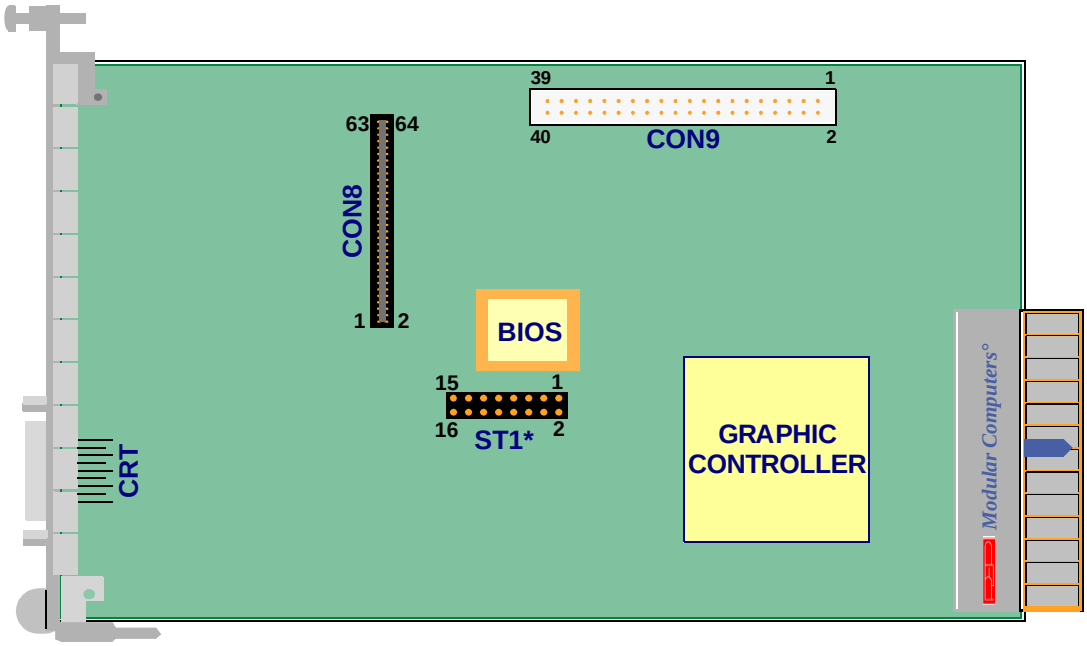
Figure 1-2: CP331 Front Panels



Board Variants:
1. CP331
2. CP331-LVDS
3. CP331-PL

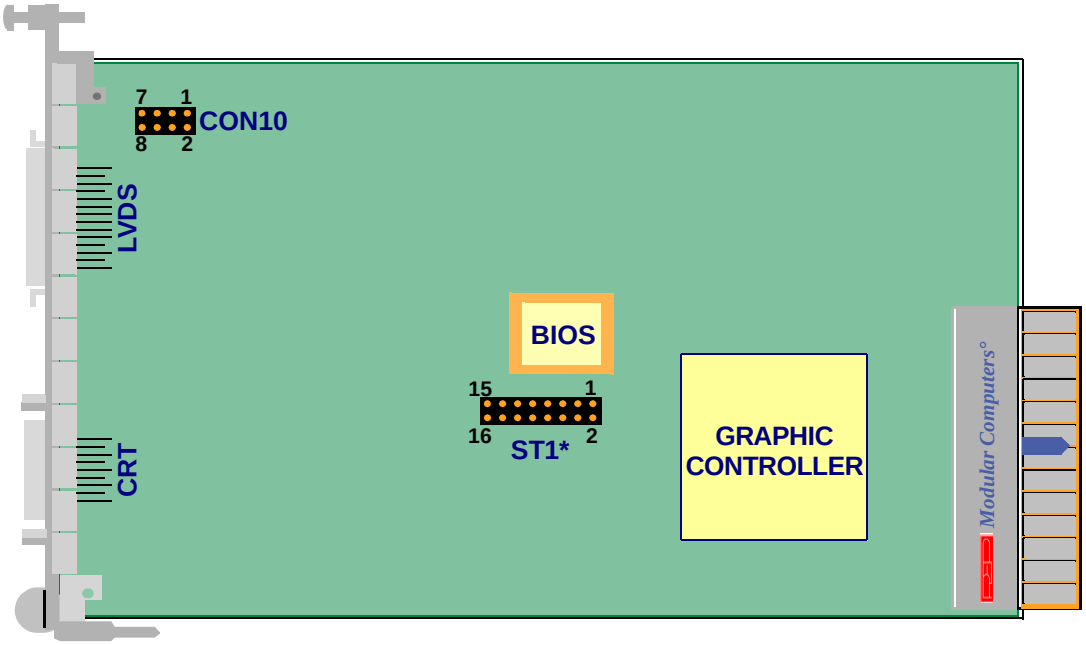
1.3.3 Board Layouts

Figure 1-3: CP331 Board Layout (Front)



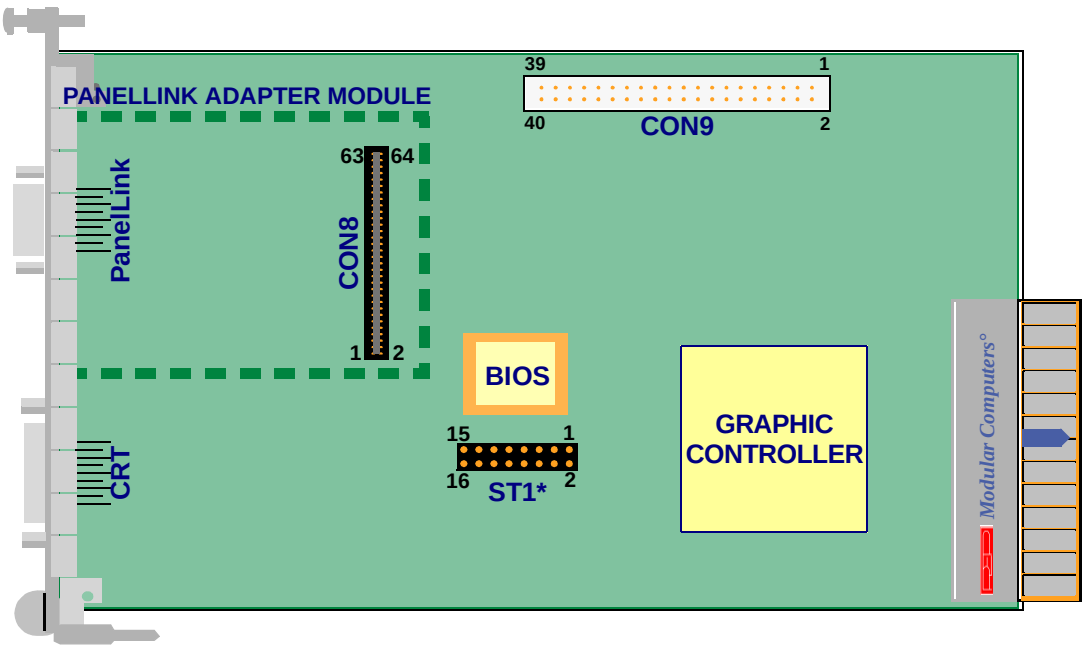
*** Only pins 7..14 are customer-relevant.**

Figure 1-4: CP331-LVDS Board Layout (Front)



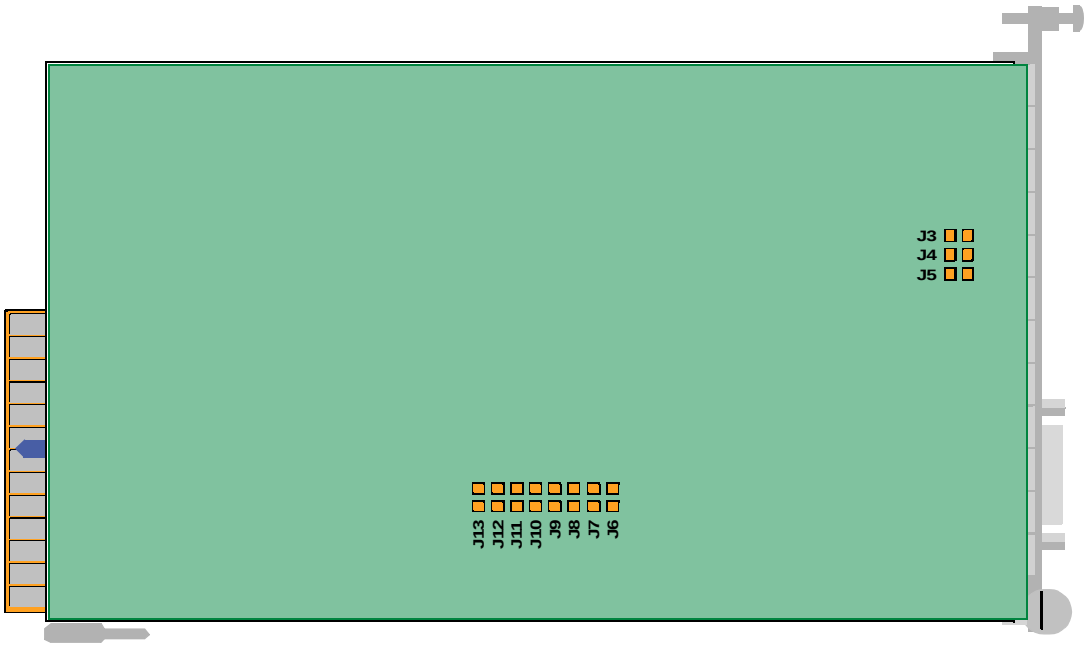
* Only pins 7..14 are customer-relevant.

Figure 1-5: CP331-PL Board Layout (Front)



* Only pins 7..14 are customer-relevant.

Figure 1-6: CP331 Board Layout (Reverse, all variants)



1.4 Technical Specifications

Table 1-2: Technical Specifications (Sheet 1 of 2)

CP331	Specification	
CompactPCI Interface	• PICMG 2.0 Rev. 2.1 compliant September 2, 1997, connected to J1 • 32 bit bus address/data / 33MHz • CompactPCI data burst rate approximately 132 MByte/s • Universal signaling voltage (3.3V, to fit in 3.3V or 5V bus)	
VGA Resoutions	• C&T 69000+C&T 69030	1280 x 1024 x 8 at 60, 75, 85 Hz (85Hz interlaced)
	• C&T 69000+C&T 69030	1024 x 768 x 16 at 60, 75, 85 Hz (85Hz interlaced)
	• C&T 69000+C&T 69030	800 x 600 x 24 at 60, 75, 85 Hz (85Hz interlaced)
	• C&T 69000+C&T 69030	640 x 480 x 24 at 60, 75, 85 Hz (85Hz interlaced)
	• C&T 69030	1600 x 1200 x 16 at 60 Hz
Flatpanel Types	TFT, DSTN, SSTN, EL, Plasma	
Connectors	• CRT front-end connector (15-pin VGA)	all board variants
	• LVDS connector (26-pin miniature Delta Ribbon)	CP331-LVDS
	• PanelLink connector (20-pin miniature Delta Ribbon)	CP331-PL
	• Flatpanel adapter connector CON8 (64-pin on-board pin-row connector)	CP331, CP331-PL
	• Internal TTL flatpanel connector CON9 (on-board 40-pin on-board pin-row connector)	CP331, CP331-PL
	• General-purpose connector CON10 (8-pin on-board pin-row connector)	CP331-LVDS
	• CompactPCI bus connector J1	all board variants
	• CompactPCI rear I/O connector J2	on request
Video Memory	• C&T 69000: 2MB • C&T 69030: 4MB	
BIOS Memory	64kB for Video BIOS	
Driver Support	Windows NT 4.0, Windows 2000	
Mechanical Compliance	IEEE 1101.10	

Table 1-2: Technical Specifications (Sheet 2 of 2)

CP331	Specification
Power Supply	3.3 V/5V compliant. Coding according to CompactPCI Specification • Used: 3.3V and 5V • Not used: +12V and –12V
Power Consumption	CP331: 0.06A / 0.3W at 5V; 0.03A / 0.07W at 3.3V CP331-LVDS: 0.06A / 0.3W at 5V; 0.02A / 0.07W at 3.3V CP331-PL: 0.06A / 0.3W at 5V; 0.03A / 0.10W at 3.3V
Temperature Range	Operating: 0°C ... +55°C Storage: -55°C ... +125°C
Humidity	0 ... 95% non condensing
Dimensions	160 mm x 100 mm single height Eurocard
Weight	110g

1.5 Applied Standards

1.5.1 CE Compliance

The *PEP Modular Computers'* CompactPCI systems comply with the requirements of the following CE-relevant standards:

- Emission EN50081-1
- Immission EN50082-2
- Electrical Safety EN60950

1.5.2 Mechanical Compliance

- Mechanical Dimensions IEEE 1101.10

1.5.3 Environmental Tests

- Vibration IEC68-2-6
  Random Vibration, Broadband IEC68-2-64 (3U boards)
- Permanent Shock IEC68-2-29
- Single Shock IEC68-2-27

1.6 Related Publications

1.6.1 CompactPCI Systems/Boards

- CompactPCI Specification, V. 2.0, Rev. 2.1
- Digital Flat-Panel Part (DFP) Specification, Version 1.12, Aug. 98
- *PEP Modular Computers* CompactPCI System Manual, ID 19953

Chapter 2

Functional Description

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2. Functional Description

2.1 General Information

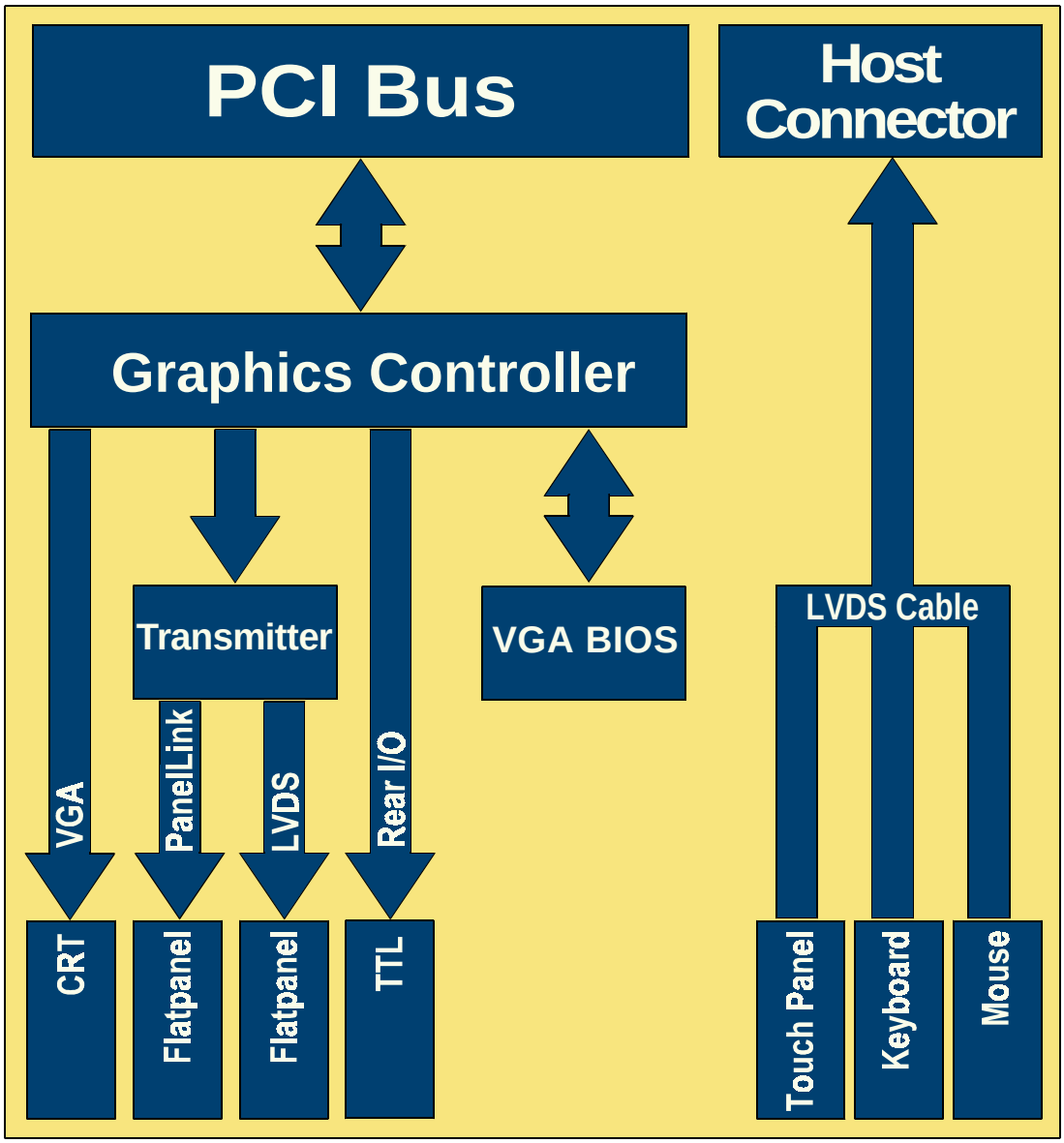
The CP331 is a CompactPCI graphics adapter board for the use in industrial environments. It has the possibility of connecting both a VGA monitor via a CRT interface and a digital flatpanels via an internal TTL level connector or an external LVDS connector. The Flat Panel TTL signals are routed also to the J2 connector to provide rear-I/O connectivity. In addition, with the CP331-PL variant there is the possibility to connect to an external PanelLink interface via a special mezzanine board called PanelLink Adapter Module.

2.2 Specifics

The CP331 is delivered with either a C&T 69000 or a C&T 69030 graphic controller. The C&T 69000 controller chip is provided with 2MB of internal memory. It supports resolutions of up to 1280 x 1024 x 16 at frequencies of 60, 75 or 85 Hz. The C&T 69030 graphic controller chip is instead provided with 4MB internal memory and a RAMDAC with 170 MHz allowing resolutions of up to 1600 x 1200 x 16 at 60Hz or of 1280 x 1024 x 24 at 60, 75 or 85 Hz (85Hz interlaced).

2.3 Functional Block Diagram

Figure 2-1: CP331 Functional Block Diagram



LVDS: CP331-LVDS only
LVDS Cable: CP331-LVDS only (via general-purpose connector CON10)
PanelLink: CP331-PL only (on PanelLink Adapter Module)

2.4 Board Interfaces

2.4.1 Embedded-Memory Interface

The memory interface can be devided into two parts, the video memory interface and the VGA BIOS interface. The CP331 is provided with up to 4MB of embedded video memory with the C&T 69030 graphic controller chip or, respectively, 2MB with the C&T 69000 controller chip. The installed SGRAM provides the maximum resolution at the highest controller refresh rate. A 64kB ob-board Flash memory is designed to contain the VGA BIOS.

2.4.2 CRT Interface

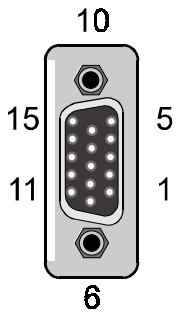


Figure 2-2: Orientation of CRT Interface

The CRT interface is a standard VGA interface for connecting CRT monitors. It is implemented by a 3-row 15-pin DSUB connector.

The pinouts of the VGA connector are shown in the following table.

Table 2-1: VGA Connector Pinouts

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	6	Analog GND	11	N/C
2	Green	7	Analog GND	12	DDAT
3	Blue	8	Analog GND	13	Hsync
4	N/C	9	VCC	14	Vsync
5	GND	10	GND	15	DCLK

N/C = Non connected.

2.4.3 Front-End TTL Interfaces

LVDS Interface

The LVDS interface of the board variant CP331-LVDS is the standard interface for remote digital flatpanel connections (up to 10m distance), with resolutions up to USXGA quality (1280 x 1024). Due to its universal use, it is routed directly on-board. The installed transmitter chips are the National Semiconductor DS90C5(3)83 or Texas Instruments SN75LVDS83.

Note...

Dual-scan flat-panels cannot use this interface due to inconsistent clock requirements.

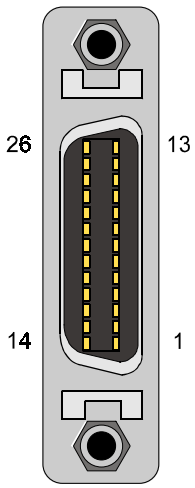


Figure 2-3: Orientation of LVDS Connector

The front-end connector is a 26-pin Mini-Delta Ribbon (MDR) connector which provides all required signals including the 5V and 12V supplies and several control signals used by external keyboards, touch screens or similar peripheral devices.

Embedded within the LVDS cable are the +5V DC, +12V DC and control lines required for remote display connection together with additional (general purpose) lines provided for touch panel displays, keyboards, mouse, etc.

The pinouts of the LVDS connector is compliant with Apllication Note AN-1085 FPD-Link by National Semiconductors as shown in the below table.

Table 2-2: LVDS Connector Pinouts (Transmitter Side)

Pin	Signal	Pin	Signal
1	VEESAFE	14	TxOut0-
2	TxOut0GND	15	TxOut0+
3	VDDSAFE	16	12VSAFE
4	TxOut1-	17	TxOut1GND
5	TxOut1+	18	General Purpose 2
6	TxOut2-	19	TxOut2GND
7	TxOut2+	20	General Purpose 3
8	GND	21	General Purpose 4
9	General Purpose 0	22	TxCLKOut-
10	TxCLKOutGND	23	TxCLKOut+
11	General Purpose 1	24	General Purpose 5
12	TxOut3-	25	TxOut3Gnd
13	TxOut3+	26	General Purpose 6

PanelLink Interface

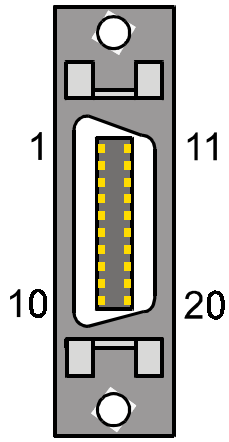


Figure 2-4: Orientation of PanelLink Connector

Another possibility for remote flatpanel connections (up to 5m distance) is the PanelLink interface of the board variant CP331-PL. A small transition board, the so-called PanelLink Adapter Module, is equipped with a PanelLink transmitter to provide this feature. The transition board is be plugged into the internal TTL flatpanel connector CON8. Resolutions up to SXGA quality (1280 x 1024) are possible. The installed PanelLink transmitter is the Silicon Image SiI150.

The front-end connector is a 20-pin Mini-Delta Ribbon (MDR) connector which provides all required signals including the 5V power supply line for flat-panels.

The pinouts of the PanelLink connector are shown in the following table.

Table 2-3: PanelLink Connector Pinouts (Transmitter Side)

Pin	Signal	Pin	Signal
1	TX1+	11	TX2+
2	TX1-	12	TX2-
3	SHLD1	13	SHLD2
4	SHLDC	14	SHLD0
5	TXC+	15	TX0+
6	TXC-	16	TX0-
7	GND	17	N/C
8	5Vt	18	N/C
9	N/C	19	DDDAT0
10	N/C	20	DDCLK0

N/C = Non connected.

2.4.4 Internal Flatpanel Interfaces

Flatpanel Adapter Interface

The on-board 64-pin row flatpanel adapter connector CON8 is placed on the standard version of the CP331 and on the board variant CP331-PL to provide connectivity for any type of flatpanel via a suitable adapter.

Note...

On the CP331-PL a PanelLink Adapter Module provided with a PanelLink connector to the frontpanel is connected to the flatpanel adapter connector CON8. Therefore, no other internal connection to this connector is possible on the CP331-PL.

Table 2-4: CON 8 Pinouts

Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	3	VDDSAFE
4	VDDSAFE	5	VEESAFE	6	VEESAFE
7	12VSAFE	8	12VSAFE	9	P0
10	P1	11	P2	12	P3
13	P4	14	P5	15	+3.3V
16	+3.3V	17	P6	18	P7
19	P8	20	P9	21	P10
22	P11	23	GND	24	GND
25	P12	26	P13	27	P14
28	P15	29	P16	30	P17
31	VCC	32	VCC	33	P18
34	P19	35	P20	36	P21
37	P22	38	P23	39	GND
40	GND	41	P24	42	P25
43	P26	44	P27	45	P28
46	P29	47	+3.3V	48	+3.3V
49	P30	50	P31	51	P32
52	P33	53	P34	54	P35
55	VCC	56	VCC	57	LP
58	FLM	59	M	60	SHFCLK
61	DDCLK0	62	DDDAT0	63	GND
64	GND				

Internal TTL Flatpanel Interface

The on-board 40-pin row internal TTL flatpanel connector CON9 is placed on the standard version of the CP331 and on the board variant CP331-PL to provide the possibility of a direct on-board connection of one of the following flatpanel types:

- NEC NL8060 AC31-12 Panel
- SHARP LQ121 S1 DG11

Table 2-5: CON 9 Pinouts

Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	SHFCLK	3	GND
4	LP	5	FLM	6	GND
7	GND	8	GND	9	P18
10	P19	11	P20	12	GND
13	P21	14	P22	15	P23
16	GND	17	GND	18	GND
19	P10	20	P11	21	P12
22	GND	23	P13	24	P14
25	P15	26	GND	27	GND
28	GND	29	P2	30	P3
31	P4	32	GND	33	P5
34	P6	35	P7	36	GND
37	M	38	VDDSAFE	39	VDDSAFE
40	VDDSAFE				

General-Purpose Interface

The 8-pin row connector CON 10 provides access to the general-purpose signals of the LVDS cable, such as touch screen I/O, mouse, keyboard etc. This connector is available on the CP331-LVDS variant only.

Table 2-6: CON 10 Pinouts

CON 10	LVDS	Signal	CON 10	LVDS	Signal
1	8	GND	2	20	GP0
3	18	GP1	4	21	GP2
5	11	GP3	6	24	GP4
7	9	GP5	8	26	GP6

2.4.5 PCI Interface

All variants of the CP331 are equipped with the standard PCI interface J1. For its pinouts please refer to the *PEP Modular Computers* CompactPCI System Manual or to the CompactPCI Specification.

2.4.6 Rear-I/O TTL Interface

All signals from the TTL flatpanel interface are routed to the rear-I/O connector J2.

2.5 Video Resolutions

The CP331 supports different video resolutions to produce different display parameters. A complete list of possible video resolutions and the relating display parameters is shown in the following table.

Table 2-7: Video Resolutions and Display Parameters

Resolution	Color Depth		Refresh Rate	Comments
	Bits per Pixel	Colors Total		
640 x 480	24	16.7 M	60, 75, 85	True-Color
800 x 600	24	16.7 M	60, 75, 85	True-Color
1024 x 768	24	16.7 M	60, 75, 85	True-Color
1280 x 1024	24	16.7 M	60, 75, 85	True-Color
1600 x 1200	16	65 536	60	High-Color

Note...

Due to differences in the video drivers, the video resolutions resulting after connection and configuration of your device may vary from those in the table, if operating systems other than those specified in the Introduction chapter of this manual are used.

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Chapter 3

Installation

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3. Installation

3.1 Hardware Installation

The CP331 board can be installed in any CompactPCI compatible computer with a free slot (bus master or non bus master). The frontpanel of the board should be safely secured by screws to the chassis to avoid lossening of the board through vibration and to ensure correct earth connection.

Caution!

If your board type is not specifically qualified as hot-swap capable, please switch off the CompactPCI system before installing the board in a free CompactPCI slot. Failure to do so could endanger your life/health and may damage your board or system.

ESD Equipment!

Your CompactPCI board contains electrostatically sensitive devices. Please observe the necessary precautions to avoid damage to your board:

- Discharge your clothing before touching the assembly. Tools must be discharged before use.
- Do not touch components, connector-pins or traces.
- If working at an anti-static workbench with professional discharging equipment, please do not omit to use it.

3.1.1 Supported Monitors

The board can drive regular CRT monitors using the 15-pin VGA connector on the frontpanel. Flat-panels are usually addressed by the CP331 either via LVDS or PanelLink, which become a necessary requirement if the flat-panel is located at a distance greater than 60 cm from the CP331 board.

3.2 Software Installation

3.2.1 Driver Installation

Drivers for Windows NT and other supported operating systems are provided with the CP331 driver kit. Exact guidelines can be found in the readme file which should be followed before starting the installation procedure. Please follow also the interactive instructions of the installation program and enter specific data when prompted.

Note...

Please ensure that the connected monitor or display supports the selected resolution. Otherwise damage may result due to incorrect operating frequency parameters.

3.2.2 BIOS Configuration

Up to sixteen flatpanel types can be made jumper-selectable by entering the appropriate paramteres with the help of one of the BIOS configuration utilities included in the supply.

A specific BIOS for almost any panel on the market can be created. For configuration, please refer to the technical manual for the C&T 69000 or C&T 69030 graphic controller chip or consult *PEP Modular Computers*.

Configuration Utilities

The BIOS configuration utilities included in the supply are required only in case a customer is interested in creating a jumper-selectable panel setting. The utilities can be installed from the supplied floppy disks which include also files containing all necessary instructions for the installation and use of the configuration utlities.

The utility files are contained by the floppy disks as spanned disk files. Therefore, you should use a recent version of the WinZip or PKUnZip utilities to unpack the files.

Reference is made by the utilities to the C&T 69555 graphic controller chip. However, they can be used indifferently for the C&T 69000 and the C&T 69030 installed on the CP331 boards.

Warning!

Wrong configuration can cause damage to your flatpanel equipment. Therefore, we recommend that the configuration is carried out by *PEP Modular Computers* or by one of their authorized partners.

Chapter 4

Configuration

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4. Configuration

4.1 LVDS Supply Voltage

By setting the solder jumpers J3 to J5 accordingly, which are placed on the reverse side of the board, the source of the supply voltage of the LVDS connector can be set either to external or internal. The possible jumper settings and default values as well as the routing to the LVDS connector of the voltages passing solder jumpers J3..J5 are shown in the following table.

Table 4-1: LVDS Supply Voltage Setting

Jumper	LVDS Connector Pin	Closed	Open
J3	16	12V supplied by the CP331	*External 12V supplied*
J4	3	VDD supplied by CP331	*External VDD supplied*
J5	1	VEE supplied by CP331	*External VEE supplied*

Default settings are in italics.

4.2 BIOS Configuration

In total, up to sixteen flatpanel types can be made jumper-selectable by entering the appropriate paramteres with the help of one of the BIOS configuration utilities included in the supply. For configuration, please refer to the technical manual for the C&T 69000 or C&T 69030 graphic controller chip or consult *PEP Modular Computers*.

A specific BIOS for almost any panel on the market can be created. The configuration can be carried out by *PEP Modular Computers* or by one of their authorized partners at relatively short notice. A general listing of customer-relevant jumper settings for panel selection are described in the following table:

Note...

The wire jumpers 1-2..15-16 that are part of connector ST1 and the solder jumpers J13..J6 on the reverse side of the board are connected in parallel. Therefore, when opening a jumper, please make sure the corresponding jumper on the other side of the board is open, too.

Table 4-2: ST1/J6..J13 Jumper Settings

ST1 Pins	Function	Alternative Solder Jumper
7 - 8	Panel type bit 0	J10
9 -10	Panel type bit 1	J9
11 - 12	Panel type bit 2	J8
13 - 14	Panel type bit 3	J7

4.3 Panel Selection

Two following display type (panel) configurations are supplied by default. They can be selected directly by setting the wire jumpers that are part of connector ST1 or, alternatively, the solder jumpers J7 through J10 on the board reverse side:

- NEC NL 8060AC31-12
- SHARP LQ 150X1DG11

The jumper settings necessary to select one of these panels are shown in the following.

Table 4-3: Display Type Selection

N°	Panel Parameters/Type	ST1 13-14 J7	ST1 11-12 J8	ST1 9-10 J9	ST1 7-8 J10
1	1024 x 768 DSTN Color	Closed	Closed	Closed	Closed
2	1280 x 1024 TFT Color	Closed	Closed	Closed	Open
3	640 x 480 DSTN Color	Closed	Closed	Open	Closed
4	800 x 600 DSTN Color	Closed	Closed	Open	Open
5	640 x 480 SHARP TFT Color	Closed	Open	Closed	Closed
6	640 x 480 TFT Color 18-bit	Closed	Open	Closed	Open
7	**SHARP LQ 150X1DG11** 1024 x 768 TFT LCD	Closed	Open	Open	Closed
8	*NEC NL 8060AC31-12* *800 x 600 TFT LCD*	*Closed*	*Open*	*Open*	*Open*
9	800 x 600 TFT Color	Open	Closed	Closed	Closed
10	800 x 600 TFT Color	Open	Closed	Closed	Open
11	800 x 600 DSTN Color	Open	Closed	Open	Closed
12	800 x 600 DSTN Color	Open	Closed	Open	Open
13	1024 x 768 TFT Color	Open	Open	Closed	Closed
14	1280 x 1024 DSTN Color	Open	Open	Closed	Open
15	1024 x 600 DSTN Color	Open	Open	Open	Closed
16	1024 x 600 TFT Color	Open	Open	Open	Open

Note: The logical panel code values are inverted, i.e. "closed" is equal to 0, "open" to 1.

Panel numbers refer to BIOS panel numbering. Panel numbers 7 and 8 correspond to preset panel types. Default settings are in italics.