FORTEC
ELEKTRONIK AG

Datasheet

Distec

ARCB-II

Remote Control and Diagnostic Board

PA-18-000, PA-18-001

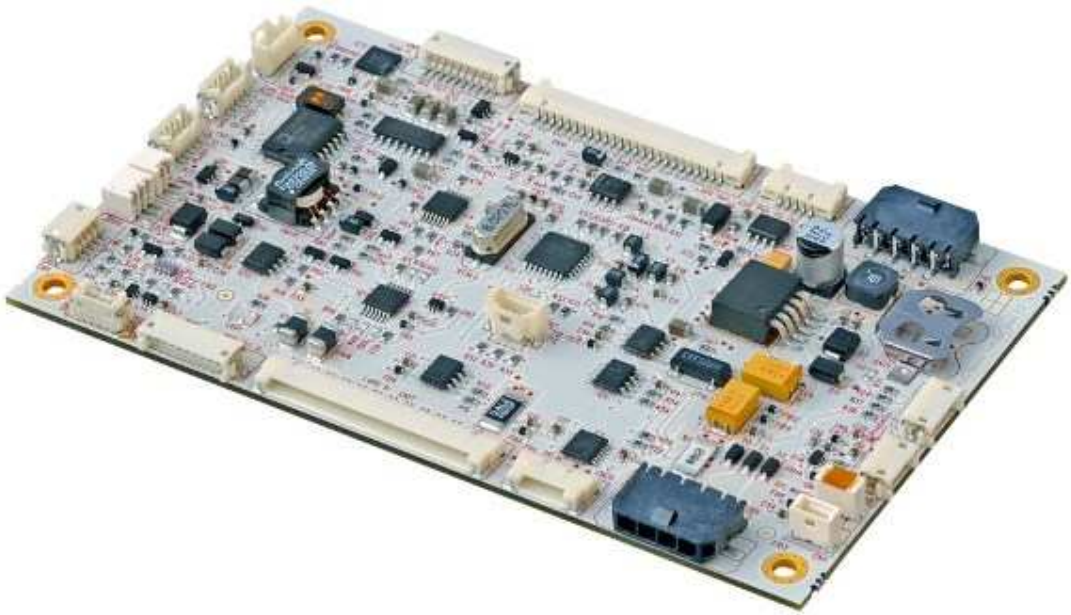


Table of Contents

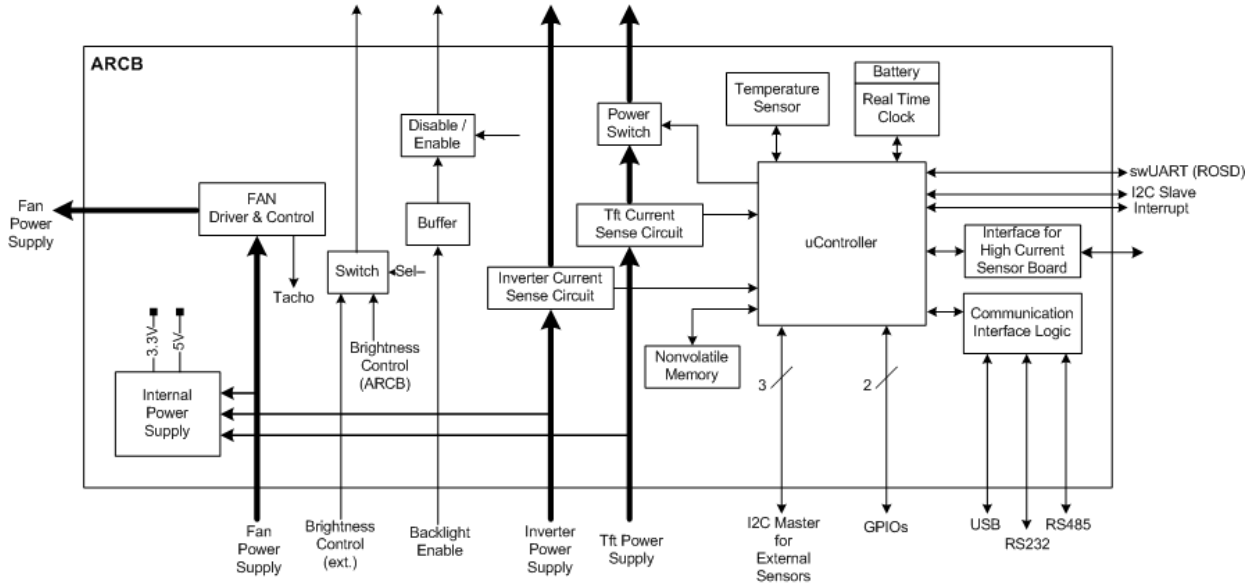
1 Revision History

Date	Description	Exp.
24.02.2010	Section 3 updated	
12.02.2010	External Sensor Board section added	
09.02.2010	Fan Control section updated	
04.01.2010	Fan Control section updated	
01.01.2010	Fan Control section updated	Page-9
11.11.2009	General document update	
22.10.2009	“Remote OSD Interface” added	
14.10.2009	Document modified for ARCBII and firmware version 3.x.x and upper	-

2 General Description

ARCB is designed to monitor the system condition of TFT systems. The following parameters can be monitored or controlled:

- Inverter and display current consumptions
- Temperatures
- Panel brightness
- Motion detection sensor connection (in preparation)
- Temperature controlled fan (in preparation)
- Recording of total healthy operational times
- Together with a Prisma-II VGA/DVI converter board: Panel on/off, brightness and contrast adjustment, input signal selection



ARCB has implemented the following interfaces for the communication with master systems (i.e. PC): USB, RS232, RS485 and TWI (Two Wire Interface). Via these interfaces, a master system has access to all actual operating parameters and settings

ARCB does not require a separate power supply. The power is provided from the inverter, panel or fan power supply lines.

3 Electrical Specifications

OPERATIONAL CONDITIONS

Item	Symbol	Condition	Min	Typical	Max	Unit	Accuracy	Note
Supply Voltage	V_{ARCB}		7	12	24	V	-	(1)
Supply Current	I_{ARCB}	Board only	-	19	-	mA	-	(2)
Display Sense Current	I_{TFT}		0.2	-	4	A	± 10 %	
Inverter Sense Current	I_{INV}		0.3	-	9	A	± 5 %	(3)
Display Supply Voltage	V_{TFT}		3.3	-	12	V	-	
Inverter Supply Voltage	V_{INV}		0	-	24	V	-	
Fan Supply Voltage	V_{FAN}		5	-	20	V	-	
Fan Drive Current	I_{FAN}		0	-	3	A	-	
RTC Battery Lifetime	-	No external power supply	-	35000	-	hours	-	

(1) "V_{ARCB}" is derived from the already connected display, inverter or fan power lines.
(2) No display, inverter and external sensor boards attached.
(3) ARCB can measure the currents up to 45A with external high current board (HCB).
RTC : Real Time Clock

4 Environmental Specification

Temperature

Item	Symbol	Min	Typical	Max	Unit	Note
Operating	t_{OP}	-20	-	+50	°C	
Storage	t_{STR}	-20	-	+80	°C	

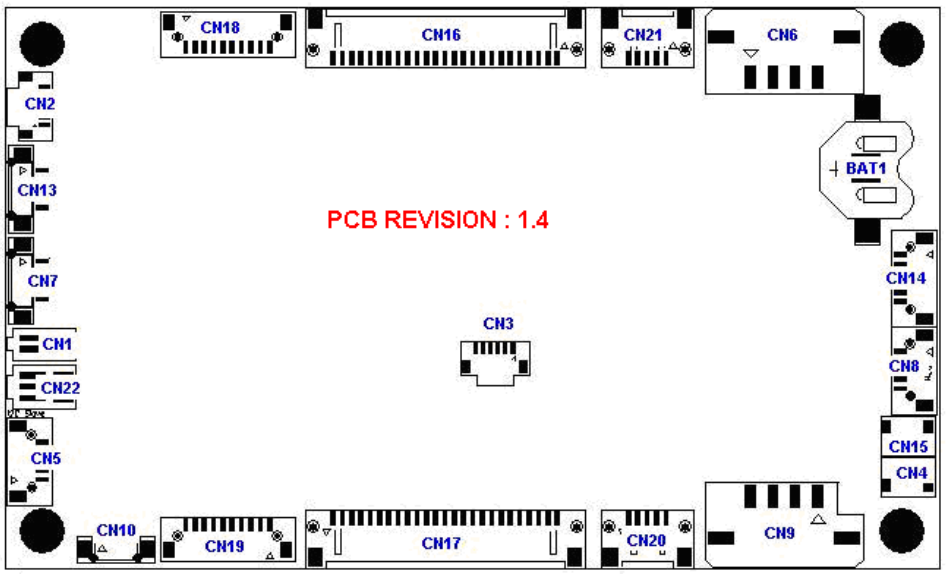
5 Interfaces

5.1 Connector Overview

Pcb Rev 1.4 :

No	Description	Type	Manufacturer	Notes
16	Lvds Out	DF14-25P-1.25H	Hirose	-
17	Lvds In	DF14-25P-1.25H	Hirose	-
18	Inverter Power Out-1	DF13-10P-1.25H	Hirose	For inverters current I_{INV} < = 3A
19	Inverter Power In- 1	DF13-10P-1.25H	Hirose	
20	Panel Power In	DF14-5P-1.25H	Hirose	Auxiliary connection for panel power
21	Panel Power Out	DF14-5P-1.25H	Hirose	“
6	Inverter Power Out- 2	43650-0414	Molex	For inverters current 3A < I_{INV} <= 9A
9	Inverter Power In- 2	43650-0414	Molex	
7	RS485	DF13-5P-1.25V20	Hirose	-
13	RS485	DF13-5P-1.25V20	Hirose	-
2	RS232	501331-0607	Molex	
10	USB	DF13- 4P-1.25V	Hirose	
5	TWI Slave / Rem.OSD	DF13-5P-1.25H	Hirose	-
8	HCB Interface	DF13-5P-1.25H	Hirose	High Current Board
22	Fan Control	87438-0343	Molex	-
1	Fan Power In	87438-0243	Molex	-
14	Motion Detection & Ambient-Light Sensors	DF13-6P-1.25H	Hirose	-
4	Ext. I2C Sensors	501331-0407	Molex	-
15	Ext. I2C Sensors	501331-0407	Molex	-
BAT1	Battery Holder			Cell Battery CR1220

5.2 Connector Positions



5.3 Interface Description

5.3.1 Display Power Supply and Control

Definition:
The display power supply and LVDS signals from the TFT controller (i.e. Prisma VGA/DVI converter) are connected to CN17, The panel is connected to CN16. A maximum of 2A display current can flow over CN17 and CN16.

CN20 and CN21 are auxiliary connectors for display power, if the panel draws more than 2A (maximum current for CN/16/CN17. Current rating is 1A per pin for CN20/CN21.

ARCB measures and monitors the total panel current which goes through CN16/CN17 and CN20/CN21.

Measurement:
Range: 0.2 – 4.0A
Accuracy: 2% (+/- 100mA)

Control Table:

Condition	System State	Action by ARCB
(I_{TFT} > I_{MAX}) OR (I_{TFT} < I_{MIN})	ERROR	Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Interrupt to master board. Keep system power status off. Wait for reset.
(I_{TFT} = 0) AND (E_{BKLT} = Enabled)	ERROR	Generate warning. Stop RTC. Interrupt to master board. Wait for reset.
(I_{TFT} = 0) AND (E_{BKLT} = Disabled)	OFF	Stop RTC.
(I_{TFT} < = I_{MAX}) OR (I_{TFT} >= I_{MIN})	ON	Enable RTC to count.

Explanation for symbols:

I_{TFT}: Measured display current
I_{MIN}: Min. display current consumption according to display manufacturer's datasheet.
I_{MAX}: Max. display current consumption according to display manufacturer's datasheet.
E_{BKLT} : Backlight Enable Signal (coming from the video card)
RTC: Real Time Clock to count the total operational times

5.3.2 Backlight (Inverter) Power Supply and Control

Definition:
The inverter power supply and control signals from the TFT controller (i.e. Prisma VGA/DVI converter) are connected to CN19, the inverter is connected to CN18. Current rating is 1A per pin for these connectors.

CN19 and CN18 can carry a maximum of 3A. In case of bigger inverter currents CN6 and CN9 can be used up to 9A. Current rating is 5A per pin for CN6 and CN9 connectors.

In case of bigger inverter currents than 9A, the High Current board (HCB) board must be used to measure the currents. Please see section 5.3.5.3

ARCB measures the total inverter current which goes through CN18/CN19 and CN6/CN9.

Measurement:
Range: 0.3 – 9.0A
Accuracy: 3% (+/- 100mA)

Range (HCB): 1.5 – 45.0A
Accuracy (HCB): 3% (+/- 200mA)

Control Table:

Condition	System State	Action by ARCB
($I_{INV} > I_{MAX}$) OR ($I_{INV} < I_{MIN}$)	ERROR	Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Interrupt to master board. Keep system power status off. Wait for reset.
($I_{INV} = 0$) AND (E_{BKLT} = Enabled)	ERROR	Generate warning. Stop RTC. Interrupt to master board. Wait for reset.
($I_{INV} = 0$) AND (E_{BKLT} = Disabled)	OFF	Stop RTC.
($I_{INV} <= I_{MAX}$) OR ($I_{INV} >= I_{MIN}$)	ON	Enable RTC to count.

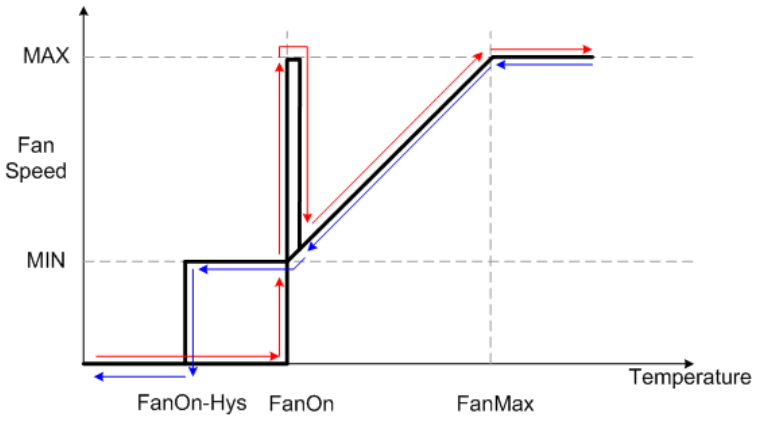
Explanation for symbols:

I_{INV}: Measured inverter current
I_{MAX}: Max. inverter current consumption according to manufacturer's datasheet.
E_{BKLT} : Backlight Enable Signal (coming from the video card)
RTC: Real Time Clock to count the secure operational times
HCB: High current board

5.3.3 Fan Power Supply and Control

ARCB supports to drive three pins, DC brushless fans with supply voltage range of 5V to 20V and up to 3A current consumption.

CN1 is the fan power supply connector. The fan power launched from the CN1 and applied to fan over the CN22 with pwm (pulse width) modulation. Fan rotation is monitored by the "tacho" feedback signal which is coming from the fan internal circuit.



Fan speed is the function of **external temperature sensor**. The relation between fan speed and external temperature can be seen in graphic above.

Property	**Value**		**Notes**
	Min	**Max**	
PWM frequency	30kHz		Pulse width modulation frequency
Min pwm duty cycle	35%		At lower temperatures
Max pwm duty cycle	100%		Al highest temperature
"Fan On" temperature	$0^{o}C$	$110^{o}C$	Fan starts to rotate with min speed
"Fan Max" temperature	$0^{o}C$	$120^{o}C$	Fan starts to rotate with max speed
Hysteresis	$1^{o}C$	$10^{o}C$	Hysteresis
Fan Power Supply	5V	20V	Input power supply to CN1
Fan Current	0A	3A	Fan current drive range
Min RPS	30 (Revolutions per second)		Threshold value for fan spins

Control Table:

Condition	**System State**	**Action by ARCB**
RPS < Min RPS value	ERROR	Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Interrupt to master board. Wait for reset.
RPS >= Min RPS value	No change	Continue to normal state functions.
(Fan Control Enabled) **AND** (Ext. Temp. Sensor is FAULT)	ERROR	Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Interrupt to master board. Wait for reset.

(RPS: Revolutions per Second)

Important: External temperature sensor is required for fan control.

5.3.4 On board Temperature Sensor and Power Control

ARCB has an on board temperature sensor for monitoring the board temperature. Sensor connection is being checked periodically.

Control Table:

Condition	System State	Action by ARCB
(T > Tmin) AND (T < Tmax)	ON	Enable RTC to count. Interrupt to master if state is new.
(T <= Tmin) OR (T >= Tmax)	ERROR	Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Interrupt to master board. Wait for reset.
Sensor FAULT	Deactivate temperature controls. System will run without these controls.	

(T: Measured On-board Temperature)

Properties Table:

Property	Value	Notes
Temperature measurement range	-55°C to +125°C	-
Measurement Accuracy	±1 °C	-
Tmin	-20°C to +70°C	Adjustable with "ARCS"
Tmax	-20°C to +70°C	Adjustable with "ARCS"

5.3.5 External (1-wire) Temperature Sensor and Power Control

ARCB has a connector for an external temperature sensor to measure ambient temperature within a TFT system. Sensor connection is being checked periodically.

Control Table:

Condition	System State	Action by ARCB
(T > Tmin) AND (T < Tmax)	ON	Enable RTC to count. Interrupt to master if state is new.
ELSE	ERROR	Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Interrupt to master board. Wait for reset.
Sensor FAULT	Deactivate temperature controls. System will run without these controls.	
(Sensor FAULT) **AND** (Fan Control is activated)	ERROR	Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Interrupt to master board. Wait for reset.

(T: Measured External Temperature)

Properties Table:

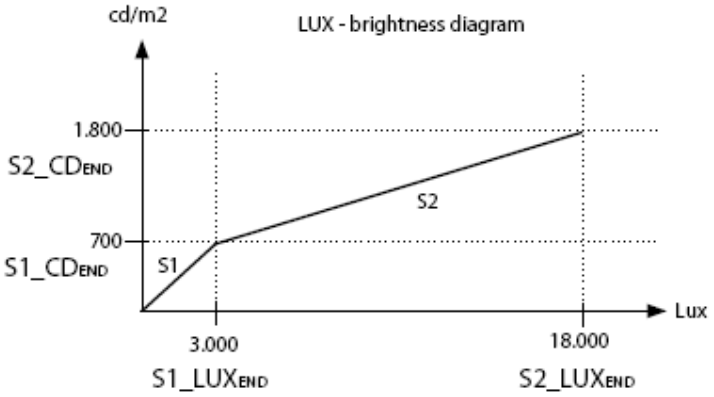
Property	Value	Notes
Temperature measurement range	-55°C to +125°C	-
Measurement Accuracy	±1 °C	-
Tmin	-30°C to +110°C	Adjustable with "ARCS"
Tmax	-30°C to +110°C	Adjustable with "ARCS"
Sensor communication interface	1-wire	
Sensor Type	Maxim, DS18S20	DS1820 is also supported
Max Cable Length	3.2 m	Tested with cat-5 cable. Higher distances not tested.

5.3.6 Additional I/O Interfaces

5.3.6.1 Ambient Light Sensor Interface

Ambient light intensity (lux) can be used to control the backlight brightness (cd/m^2) of the panel. If a brightness sensor is connected, the panel brightness is adjusted to the ambient light to improve readability and to save power of display system. Sensor connection is being checked periodically.

Below graphic is used to calculate the optimal panel brightness (cd/m^2) according to ambient light condition (lux).



Digital ambient light sensor is connected to CN4 or CN15.

Property	Value	Notes
Lux measurement range	20000 lux	-
Measurement Accuracy	± 4 lux	-
Sensor communication interface	I2C (IIC)	*Inter-Integrated* Circuit Standard
Sensor Type	Intersil, ISL29010	-

Control Table:

Condition	System State	Action by ARCB
Sensor FAULT	No Change	Automatic backlight control is deactivated.

5.3.6.2 High Current Board Interface

Inverter currents < 9A can go directly through the ARCB. The bigger currents up to 45A require an external High Current Board (HCB). Board connection is being checked periodically.

The High Current board is connected to CN8 on ARCB.

Please refer section 5.3.2 for inverter control details.

5.3.6.3 Two Wire Serial Communication Interface

Two wire serial (TWI) communications between ARCB and master video/graphic card can be established via CN5. ARCB is slave device in this communication type. TWI interface is very similar interface with standard IIC (Inter Integrated Circuit) interface.

With TWI interface, master card can read / write ARCB registers at any time and get all information about the actual system conditions. In case of an error, the ARCB can generate an interrupt signal to immediately forward the error to the master board.

Property	Value	Notes
Two wire communication speed	Up to 400 kHz	-
Voltage on the bus at idle state	3.3 V	-
Pull-up resistors	47k ohm	On board pull up resistor on ARCB.

5.3.6.4 Remote OSD Interface

With remote OSD interface, it is possible to control the OSD menu of the Prisma derivative boards from the remote PC. ARCB receives the commands via USB, RS232 or RS485 interface and sends them to the Prisma controller. Following basic functions of OSD are supported via this interface:

- Brightness control
- Contrast control
- Video input selection
- Power ON/OFF

Besides, generic rosd command is added. By means of this command all remote osd commands for all Prisma derivative boards are implemented.

Property	Value
Bits per second	115200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None
Voltage on the bus at idle state	3.3V

CN5 is the remote OSD interface connector.

5.3.6.5 RS232 Interface

All ARCB functions and functional parameters mentioned in this document are accessible by RS232 interface. CN2 is the connector for the serial interface.

Property	Value
Bits per second	38400
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

5.3.6.6 USB Interface

All ARCB functions and functional parameters mentioned in this document are accessible by USB interface.
A virtual serial (RS232) comport is defined in the operating system of the computer when a USB cable is plugged to the ARCB. This enables existing application software which is designed for RS232 communication to communicate through the USB interface.

CN10 is the connector for the USB interface.

USB connection features:

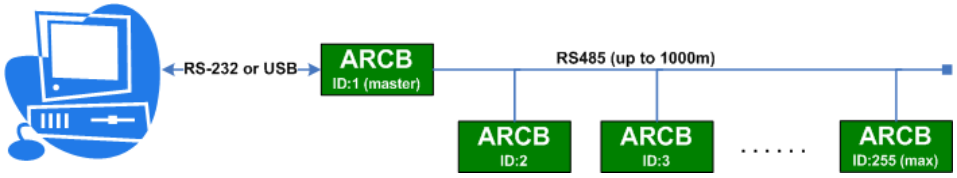
Property	**Value**
Channel speed	USB2.0, Full speed (12Mbps)
Supported Data bits	5,6,7 and 8
Supported Stop bits	1, 1.5 and 2
Supported Baud rates	300 bps to 1 Mbits
Supported OS	Windows Vista/XP/Server2003/2000
	Mac OS-X / OS-9
	Linux

Virtual RS232 comport settings:

Property	**Value**
Bits per second	38400
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

5.3.6.7 RS485 Interface

Via the RS485 interface, up to 255 ARCB boards can be connected to a PC. CN7 and CN13 are used to create a RS485 bus.



All functions of the ARCB can be performed by RS485 networks. The communication parameters are the same in section “RS232 Interface”.

Max. Number of Devices	255
Max. Line Distance	1000m.
Cable Type	Standard CAT-5 twisted pair cable
Communication Type	Full Duplex

Connection between ARCB boards on RS485 bus should be done with 1-to-1 pin out cabling:

ARCB (n. device on the bus)		**ARCB (n+1. device on the bus)**
CN13.1 (pair-1)	→	CN7.1 (pair-1)
CN13.2 (pair-1)		CN7.2 (pair-1)
CN13.3 (pair-2)		CN7.3 (pair-2)
CN13.4 (pair-2)		CN7.4 (pair-2)

Termination resistor settings on ARCB board should be done manually for physically first and last device on the bus.

SW1 jumper setting for fisrt device:

SW1 jumper setting for last device:

5.3.7 External Sensor Board Interface (Not Ready!)

This interface is designed to provide more external sensor connections to ARCB main board.

Board Name: IF377 – ARCB Sensor and Fan Driver Board
Board SAP Code: ZU-02-377
Connector on ARCB: CN14
Interface Cable Name: TBD

5.3.7.1 External Sensor Board - G Sensor (Not Ready!)

G sensor is used to detect vandalism that applied to whole device in XYZ dimensions. Sensor and ARCB communication is performed via I2C bus to display the current acceleration of the system. Sensor connection is being checked periodically and acceleration measurement registers are updated. Since the sensor updates its' internal registers with 100Hz/400Hz rate, to catch any over threshold acceleration, interrupt register of sensor is being used by ARCB.

Control Table:

Condition	System State	Action by ARCB
Sensor acceleration >= Threshold	ERROR	Set vandalism alarm. Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Wait for reset.
Sensor acceleration < Threshold	No Change	Periodically read XYZ registers and check interrupt register in sensor.
No Sensor	No Change	Deactivate G sensor controls
Activation of G sensor controls	Manual by ARCS	

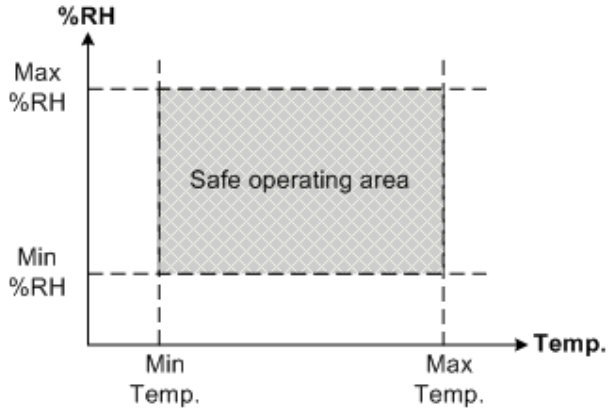
Properties Table:

Property	Sensor
Supported G Sensor	ST - LIS302DL
Comm. Interface	I2C – Two wire

See IF377 datasheet for other technical details about sensor.

5.3.7.2 External Sensor Board - Humidity Sensor (Not Ready!)

Relative humidity level (RH%) of air limits the safe operating area of lcd displays. Temperature and humidity sensors evaluated together to define safe operational ambient conditions. The graphic below represents the area:



ARCB needs to know the coordinates of lower left and upper right corner of the graphic. These values can be set by ARCS software.

Control Table:

Condition	**System State**	**Action by ARCB**
(%RH >= Max RH) AND (Temp. > Max Temp) OR (%RH <= Min RH) AND (Temp. < Min Temp)	ERROR	Set humidity alarm. Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Wait for reset.
ELSE	No Change	Periodically check humidity and temperature levels.
No Sensor	No Change	Deactivate Humidity controls
Activation of Humidity sensor controls	Manual by ARCS	

(%RH: Relative humidity level of air)

Properties Table:

Property	**Sensor**
Supported Humidity Sensor	Honeywell - HIH-4030-003
Comm. Interface	Analog signal

See IF377 datasheet for other technical details about sensor.

5.3.7.3 External Sensor Board - Proximity Sensor (Not Ready!)

The connector (CN2) for proximity sensor is existed on IF377 external sensor board. The purpose is to count peoples that passing in front of the device and to adjust maximum display brightness level. Proximity sensor controls has relation with ambient light sensor controls. If there is a proximity sensor in system, it's responsible to set maximum brightness level of automatic brightness control.

Object counter registers are read only and able to be reset.

Control Table:

Condition	**System State**	**Action by ARCB**
No object detection during timeout	No Change	Minimize the brightness control range of light sensor control algorithm
Object detection with time threshold	No Change	Maximize the brightness control range of light sensor control algorithm. Increment object counter
No Sensor	No Change	Deactivate proximity controls and halt object

		counter
Activation of Proximity sensor controls	Manual by ARCS	

Properties Table:

Property	**Sensor**
Supported Proximity Sensor	Panasonic - AMB345915
Comm. Interface	Digital (Interrupt: High to Low transition)

See IF377 datasheet for other technical details about sensor.

5.3.7.4 External Sensor Board - Temperature Sensor (Not Ready!)

Due to single external sensor (1-wire) and external sensor board uses same connector on ARCB, both of them cannot be connected to ARCB at the same time, so that the temperature sensor on sensor board is used to measure ambient temperature.

These controls are below need this temperature sensor to be active:

- Humidity Control
- Fan control via external sensor board

Control Table:

Condition	**System State**	**Action by ARCB**
(No Temp. Sensor) AND (Hum. Control is Activated)	ERROR	Set sensor fault flag. Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Wait for reset.
(No Temp. Sensor) AND (Fan Control is Activated)	ERROR	Set sensor fault flag. Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Wait for reset.
Activation of sensor controls	Manual by ARCS	

Properties Table:

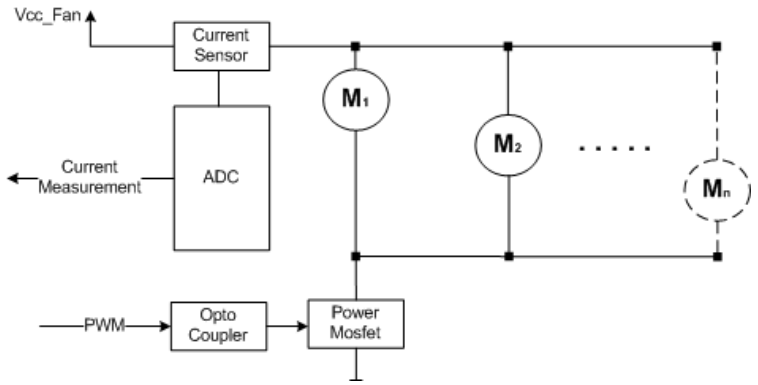
Property	**Sensor**
Supported Temperature Sensor	Maxim - DS1631Z+
Comm. Interface	I2C

See IF377 datasheet for other technical details about sensor.

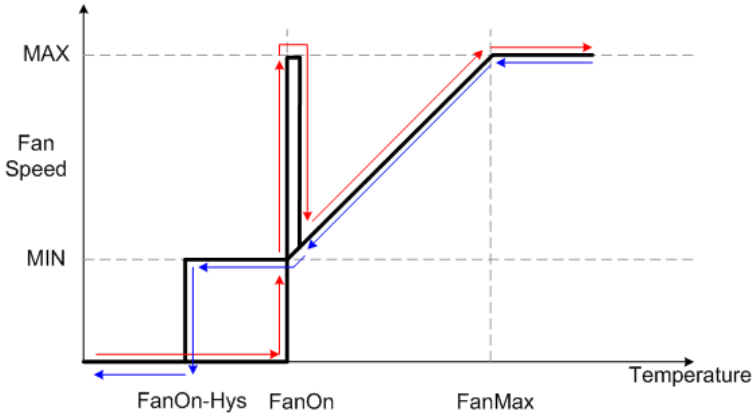
5.3.7.5 External Sensor Board - Fan Control (Not Ready!)

Parallel connected, two wire fan (Vcc, Gnd) groups can be driven by ARCB via external sensor board. Fan control needs on board external temperature sensor to be enabled.

CN4 and CN5 connectors on sensor board are placed separately to allow easy physical connections. Fan power driver circuit has separated ground area from the sensor board ground. Besides, opto-coupler based driving system helps to reduce noise injection to video board from fan power circuit. The block diagram of fan driver circuit can be seen below:



All fans connected as parallel are driven same speed with pulse width modulation. Fan speed is changing with ambient temperature. The temperature sensor that placed on external sensor board is used to calculate ambient temperature. The control graphic is represented as below (same control graph as in 5.3.3):



Fan rotation control is performed by total fan current measurement. The total current consumption of the all parallel fans should be entered to ARCB by ARCS. The current consumption of fan group is always being monitored. Required fan current at the specific fan speed is calculated with (pwm) modulation ratio and max fan current information.

Property	**Value**		**Notes**
	Min	**Max**	
PWM frequency	30kHz		Pulse width modulation frequency
Min pwm duty cycle	35%		At lower temperatures
Max pwm duty cycle	100%		Al highest temperature
“Fan On” temperature	0°C	110°C	Fan starts to rotate with min speed
“Fan Max” temperature	0°C	120°C	Fan starts to rotate with max speed
Hysteresis	1°C	10°C	Hysteresis
Fan Power Supply	5V	20V	Input power supply to CN1
Fan Drive Current	0A	5A	Fan current drive range
Activation of fan control	Manual by ARCS		

Features below are observed on fans:

- Total current consumption of fans getting higher, if there is an obstacle on rotor to prevent to turn easily
- Current consumption of fans equal to zero if internal windings of stator is burned out

According to these observations the control table below represents the controls:

Control Table:

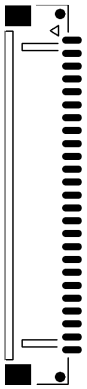
Condition	System State	Action by ARCB
I-Fan-Measured < I-Fan-Calculated	ERROR	Set fan fault flag. Cut off panel power supply. Set inverter control signal to disable level. Stop RTC. Wait for reset.
I-Fan-Measured > I-Fan-Calculated	ERROR	
(No Temp. Sensor) AND (Fan Control is Activated)	ERROR	

(I-Fan-Measured: Measured fan current, I-Fan-Calculated: Fan Current that should be)

5.4 Pin Assignments

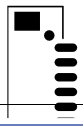
CN16 – LVDS OUTPUT CONNECTOR
Supported ARCB hw: 1.4

Pin	Signal	Description
1	VCC panel power	3.3V to 12V
2	VCC panel power	3.3V to 12V
3	Ground	
4	Ground	
5	LVDS pair1	LVDS pairs
6	LVDS pair1	
7	LVDS pair2	
8	LVDS pair2	
9	LVDS pair3	
10	LVDS pair3	
11	LVDS pair4	
12	LVDS pair4	
13	LVDS pair5	
14	LVDS pair5	
15	LVDS pair6	
16	LVDS pair6	
17	LVDS pair7	
18	LVDS pair7	
19	LVDS pair8	
20	LVDS pair8	
21	LVDS pair9	
22	LVDS pair9	
23	LVDS pair10	
24	LVDS pair10	
25	Backlight Control	Pulled down to GND with 10kohm



CN18 – Inverter Power Output- 1
Supported ARCB hw: 1.4

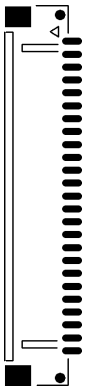
Pin	Signal	Description
1	VCC-1	3.3V to 24V inverter power supply
2	GND	
3	BKLT ENABLE	3.3V or 5V level enable signal



4	BKLT ADJUST	Up to 5V analog control signal	
5	N.C.		
6	N.C.		
7	VCC-1	3.3V to 24V inverter power supply	
8	VCC-1	3.3V to 24V inverter power supply	
9	GND		
10	GND		

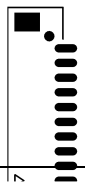
CN17 – LVDS INPUT CONNECTOR
Supported ARCB hw: 1.4

Pin	Signal	Description	
1	Backlight Control	Pulled down to GND with 10kohm	
2	LVDS pair10	LVDS pairs	
3	LVDS pair10		
4	LVDS pair9		
5	LVDS pair9		
6	LVDS pair8		
7	LVDS pair8		
8	LVDS pair7		
9	LVDS pair7		
10	LVDS pair6		
11	LVDS pair6		
12	LVDS pair5		
13	LVDS pair5		
14	LVDS pair4		
15	LVDS pair4		
16	LVDS pair3		
17	LVDS pair3		
18	LVDS pair2		
19	LVDS pair2		
20	LVDS pair1		
21	LVDS pair1		
22	Ground		
23	Ground		
24	VCC panel power	3.3V to 12V	
25	VCC panel power	3.3V to 12V	



CN19 – Inverter Power Input- 1
Supported ARCB hw: 1.4

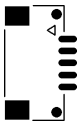
Pin	Signal	Description	
1	GND		
2	GND		
3	VCC-1	3.3V to 24V inverter power supply	
4	VCC-1	3.3V to 24V inverter power supply	
5	N.C.		



6	N.C.		
7	BKLT ADJUST	Up to 5V analog control signal	
8	BKLT ENABLE	3.3V or 5V level enable signal	
9	GND		
10	VCC-1	3.3V to 24V inverter power supply	

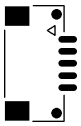
CN20: Extra Panel Power Input
Supported ARCB hw: 1.4

Pin	Signal	Description
1	GND	
2	GND	
3	VCC	3.3V to 12V aux. panel supply
4	VCC	3.3V to 12V aux. panel supply
5	Signal	LVDS Option



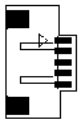
CN21: Extra Panel Power Output
Supported ARCB hw: 1.4

Pin	Signal	Description
1	Signal	LVDS Option
2	VCC	3.3V to 12V aux. panel supply
3	VCC	3.3V to 12V aux. panel supply
4	GND	
5	GND	



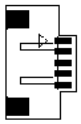
CN6: Inverter Power Output- 2
Supported ARCB hw: 1.4

Pin	Signal	Description
1	VCC	3.3V to 24V inverter pow. supply
2	VCC	3.3V to 24V inverter pow. supply
3	GND	
4	GND	



CN9: Inverter Power Intput- 2
Supported ARCB hw: 1.4

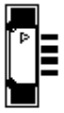
Pin	Signal	Description
1	GND	
2	GND	
3	VCC	3.3V to 24V inverter pow. supply
4	VCC	3.3V to 24V inverter pow. supply

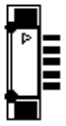


CN2: RS232
Supported ARCB hw: 1.4

Pin	Signal	Description
1	PC_TX	TX output of PC
2	PC_RX	RX input of PC
3	PC_RX_D	RX input of PC with diode

		(for RX232 chain)	
4	PC_RX_D	RX input of PC with diode (for RX232 chain)	
5	PC_TX	TX output of PC (for RX232 chain)	
6	GND		

CN10: USB **Supported ARCB hw: 1.4**			
Pin	**Signal**	**Description**	
1	USB_D+	D+	
2	USB_D-	D-	
3	VUSB	+5V	
4	GND		

CN7 and CN13: RS485 **Supported ARCB hw: 1.4**			
Pin	**Signal**	**Description**	
1	INPUT PAIR A	Input Differential Pair	
2	INPUT PAIR B		
3	OUTPUT PAIR Y	Output Differential Pair	
4	OUTPUT PAIR Z		
5	GND_485		

CN5 : TWI Slave / Rem.OSD **Supported ARCB hw: 1.4**			
Pin	**Signal**	**Description**	
1	SCL	Serial clock	
2	SDA	Serial Data	
3	INTERRUPT OUT.		
4	VCC	3.3V	
5	GND		

CN22 : FAN Control **Supported ARCB hw: 1.4**			
Pin	**Signal**	**Description**	
1	TACHO INPUT	Rotation feedback from fan (Pulled up to 3.3V)	
2	FAN VCC OUTPUT	Up to 28V, 3A	
3	GND		

CN1 : FAN Power Input **Supported ARCB hw: 1.4**			
Pin	**Signal**	**Description**	
1	VCC_FAN INPUT	Up to 28V, 3A	
2	GND		

CN4: External I2C Sensors **Supported ARCB hw: 1.4**			
Pin	**Signal**	**Description**	
1	VCC (+3.3V)	3.3V	
2	GND		
3	SCL	pulled up to +3.3V	
4	SDA	pulled up to +3.3V	

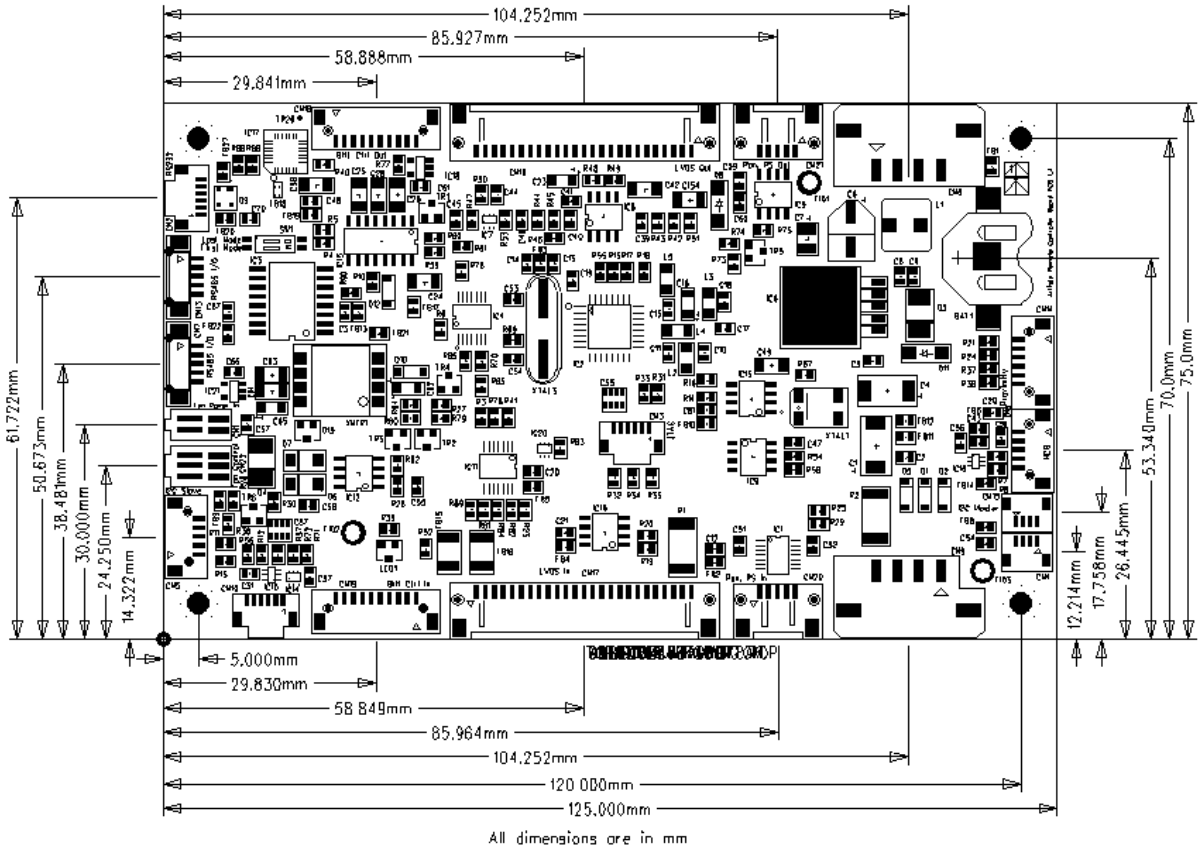
CN15 : External I2C Sensors Supported ARCB hw: 1.4			
Pin	**Signal**	**Description**	
1	VCC (+3.3V)	3.3V	
2	GND		
3	SCL	pulled up to +3.3V	
4	SDA	pulled up to +3.3V	

CN8 : High Current Board (HCB Interface) Supported ARCB hw: 1.4			
Pin	**Signal**	**Description**	
1	VCC	3.3V	
2	GND		
3	BOARD DEDECTION INPUT		
4	SENSOR READ INPUT		
5	EXTERNAL INV VOLTAGE SAMPLE INPUT		

CN14: Motion Detection and Ambient Light Sensors Supported ARCB hw: 1.4			
Pin	**Signal**	**Description**	
1	PROX. CONTROL		
2	PROX. INPUT	pulled up to +3.3V	
3	SCL	pulled up to +3.3V	
4	SDA	pulled up to +3.3V	
5	GND		
6	VCC	3.3V	

6 Mechanical Dimensions

6.1 Hardware (PCB) revision 1.4



- Maximum board thickness: 9.6 mm
- No component at bottom side.

Our company network supports you worldwide with offices in Germany, Austria, Switzerland, Great Britain and the USA. For more information please contact:

Headquarters

Germany

FORTEC Elektronik AG
Lechwiesenstr. 9
86899 Landsberg am Lech

Phone: +49 8191 91172-0
E-Mail: sales@fortecag.de
Internet: www.fortecag.de

Fortec Group Members

Austria

FORTEC Elektronik AG
Office Vienna
Nuschinggasse 12
1230 Wien

Phone: +43 1 8673492-0
E-Mail: office@fortec.at
Internet: www.fortec.at

Germany

Distec GmbH
Augsburger Str. 2b
82110 Germering

Phone: +49 89 894363-0
E-Mail: info@distec.de
Internet: www.distec.de

Switzerland

ALTRAC AG
Bahnhofstraße 3
5436 Würenlos

Phone: +41 44 7446111
E-Mail: info@altrac.ch
Internet: www.altrac.ch

United Kingdom

Display Technology Ltd.
5 The Oaks Business Village
Revenge Road, Lordswood
Chatham, Kent, ME5 8LF

Phone: +44 1634 672755
E-Mail: info@displaytechnology.co.uk
Internet: www. displaytechnology.co.uk

USA

Apollo Display Technologies, Corp.
87 Raynor Avenue,
Unit 1Ronkonkoma,
NY 11779

Phone: +1 631 5804360
E-Mail: info@apollodisplays.com
Internet: www.apollodisplays.com