

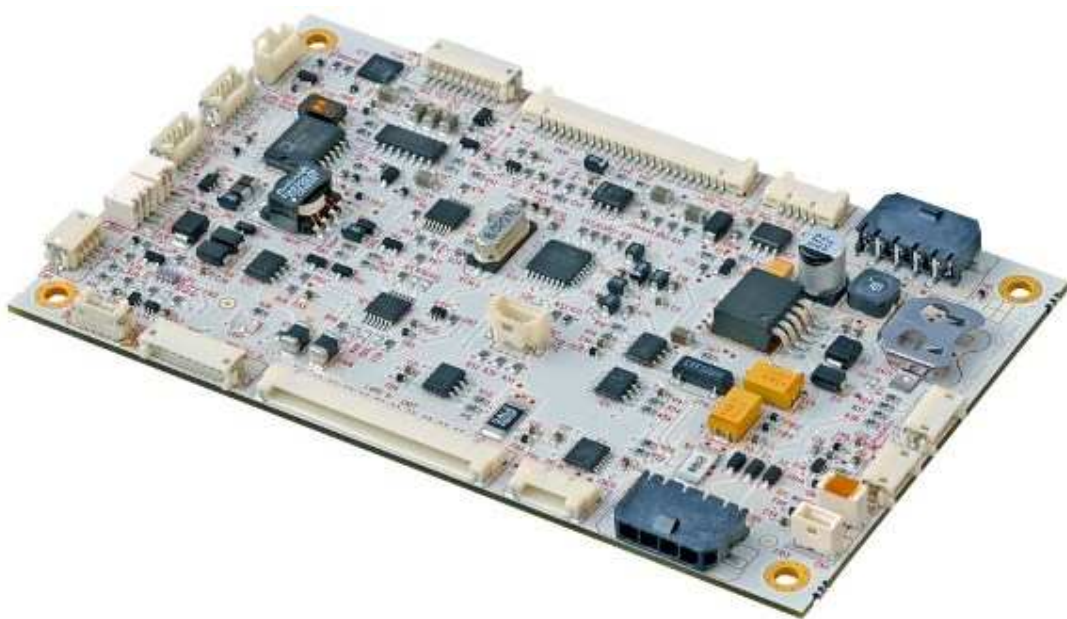
# Programmer's Manual

## Distec

### ARCB-II

#### Remote Control and Diagnostic Board

PA-18-000, PA-18-001



(For firmware version **3.1.x** or up )

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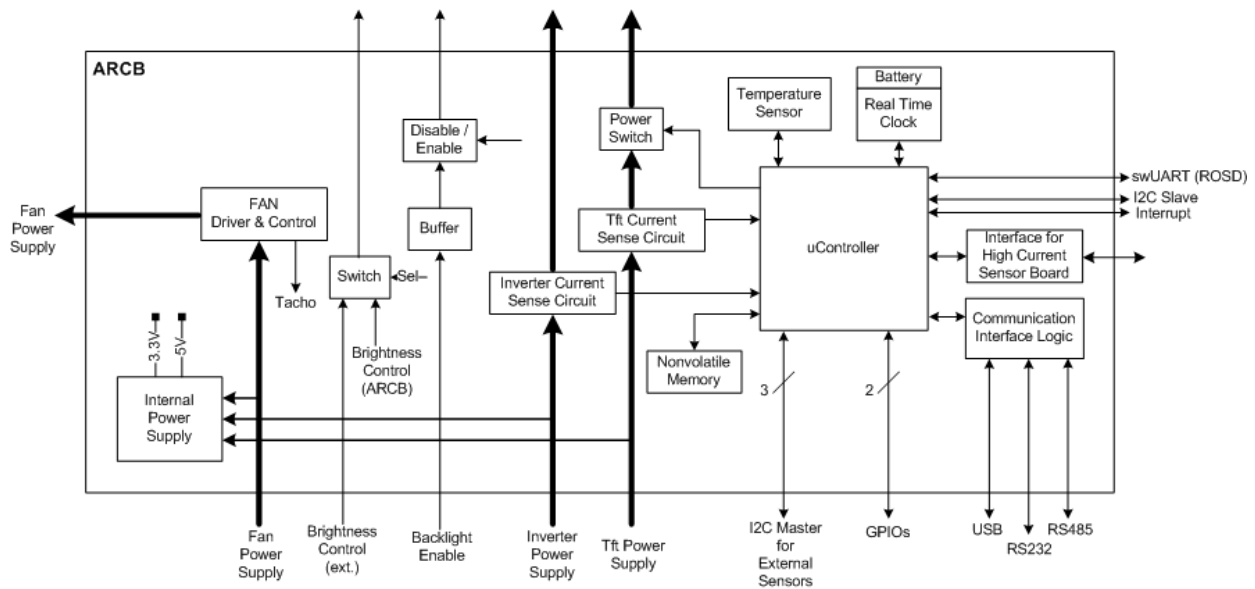
## 1 Revision History

Date	Description	Page
11/03/10	Supported fw release numbers added to 5.12	81-93
09/03/10	Section 5.12 added, 5.11 updated	
12/02/10	Wrong explanation in 5.11.1.4 is corrected. (To set/clr enable flag)	
09/02/10	Main state diagram and fan control sections are updated	
04/02/10	Section 5.11 updated	
01/02/10	Section 5.11 Fan Control added	75
06/11/09	Sections 5.6.4 added.	
26/10/09	Explanations added to Section 5.9	
16/10/09	Section 5.6.8 and 5.10 added	63-69
14/10/09	Section 5.8.2 corrected	47
09/10/2009	RTCLOWBAT flag added into board status register (5.7.1), 2.1, 2.2 updated	
08/10/2009	Minor changes	
09/09/2009	Initial release (For ARCB firmware version 3.1.x or upper)	

## 2 General Description

ARCB is designed to check and monitor the system conditions within external TFT systems. With ARCB, following control types can be applied on tft lcd system:

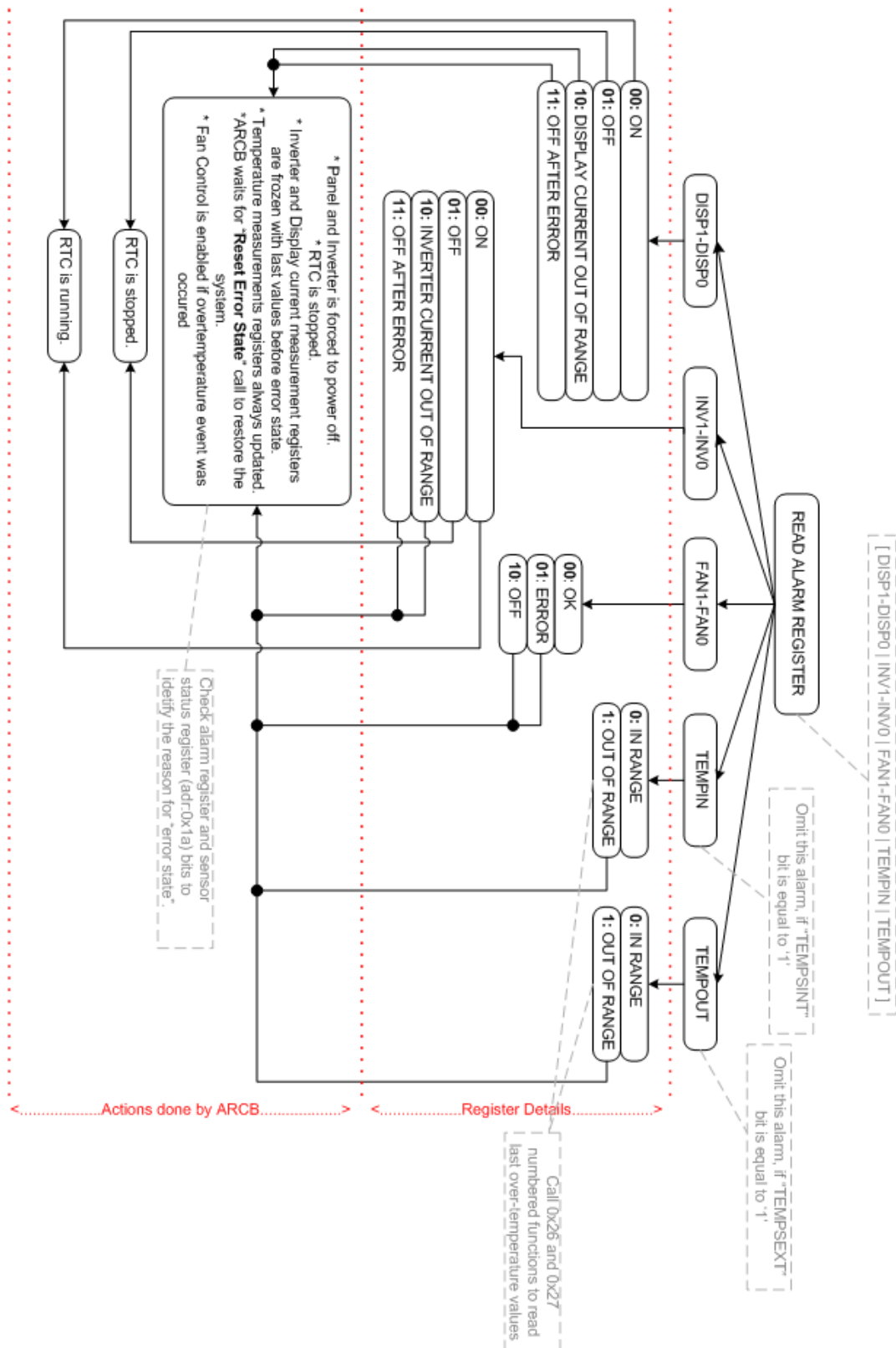
- Limitation for inverter and display current consumptions
- Limitation of operational temperatures
- Inverter (backlight intensity) control with ambient light sensor which enable the device to save power
- Motion detection sensor connection
- Cooling fan speed control with function of temperature
- Recording of total healthy operational times
- In future, basic remote OSD functions (e.g. brightness, contrast, video input selection ...) via remote connected PC.



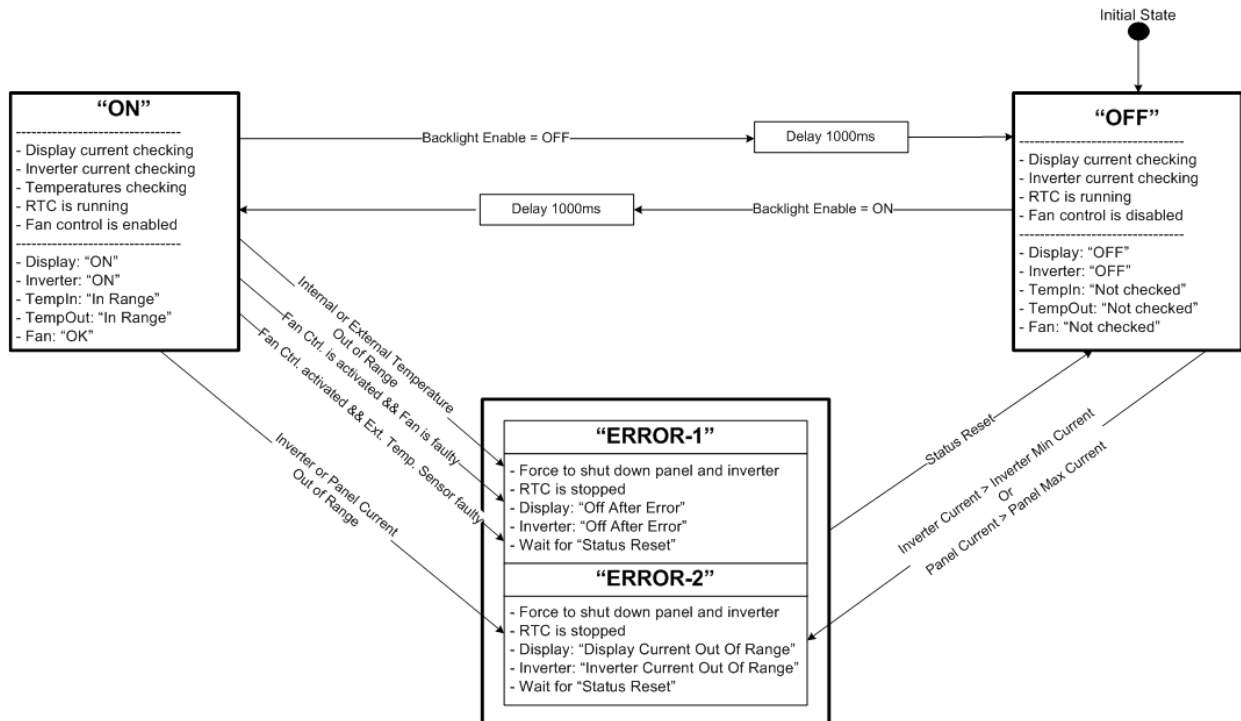
ARCB has implemented TWI (I<sup>2</sup>C), USB (available in hw rev1.4), RS232 and RS485 interfaces to communicate with master systems. Having one of these four interfaces enables the ARCB set-up and allows to get continuous information about the system condition.

ARCB get its own required power from the inverter, panel or fan power supply lines which are already pass through its connectors.

## 2.1 Guide For Applications



## 2.2 State Diagram of ARCB



**ON:** Inverter and display are powered on. All system parameters are in range. All controls and measurements are performed.

**OFF:** Inverter and display are powered off (by graphic card). Only current consumption controls are performed. Temperature and Fan controls are not enabled.

**ERROR:** Inverter and display are forced to power down by ARCB. Fan control is performed if Error state is triggered by over temperature event. Some system parameters should be out of range to enter this state.

Conditions to cause to enter "ERROR" state:

- 1- Internal temperature is out of range
- 2- External temperature is out of range
- 3- Inverter current out of range
- 4- Display current out of range
- 5- Fan control is activated and external temperature sensor is at fault state or not connected
- 6- Fan control is activated and fan is not working with enough speed or halted.

To evaluate all the conditions alarm register (reg.adr: 0x0e) and sensor status (reg.adr: 0x1a) registers should be evaluated together.



### 3 Glossary

Also all numbers without a prefix are decimal e.g. "32"

Hexadecimal numbers are marked with the prefix "0x" e.g. "0xff"

**Timeout:** The minimum time period should be waited to get response from ARCB.

## 4 Communication Interface Descriptions

### 4.1 RS232 Interface

To read and write the ARCB registers, requests must be sent to the ARCB from the serial port of the PC. The ARCB firmware responds to the request after executing the function. The timeout is different for request types. Please refer call explanations for timeout reference.

The RS232 channel properties:

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

Figure1 shows the request and response structure.

Figure1:

1.byte	2.byte	3.byte	4.byte	5.byte	6.byte	7.byte
7	TID	Function Number	Ctrl Byte	Input-1	Input-2	Checksum

Byte Order	Explanation
1.byte	Length of the data, always 0x07
2.byte	Terminal ID, always "0x00" in RS232 networks and different numbers in RS485 networks.
3.byte	ARCB function number
4.byte	"0" for write operation, "1" for read operations
5.byte	Function Argument 1
6.byte	Function Argument 2
7.byte	Checksum

The calculation of checksum is as follows: Add the previous (first 6) bytes of the request, take the least significant 8 bits of this result, and find the 2's complement of this result.

### 4.2 RS485 Interface

ARCB uses same communication properties and protocol in RS232 and RS485 bus topologies. Only difference is "TID" byte and every ARCB has unique TID (Terminal ID) number in RS485 network. This numbers are given by "ARCS" or "ARCB Production and Verification Tool" software.

### 4.3 USB Interface

When computer's USB channel is connected to ARCB, virtual serial (RS232) comport is defined in operating system of computer. Select that com-port to communicate with ARCB via RS232 channel.

All of the communication features and commands are same with RS232 interface. Please refer section 4.1.

### 4.4 TWI (Two Wire) Interface

TWI interface is very similar interface with standard IIC (Inter Integrated Circuit) interface. Standard IIC byte level “read” and “write” operations can be applied without any change.

With TWI interface, master side can read / write ARCB registers at any time. By reading ARCB registers, master board can be informed about the system conditions. In alarm situations, ARCB is responsible from the generating hardware interrupt to the master system.

Property	Value	Notes
Two wire communication speed	Up to 400 kHz	-
ARCB Slave Address	0x7C	1 Byte
Voltage on the bus at idle state	3.3 V	-
Pull-up resistors	4k7 ohm	On board pull up resistor on ARCB.

ARCB operates as a slave device on the TWI serial bus. Access is obtained by implementing a start condition followed by the correct slave address.

During the data transfer, following conditions should be cared:

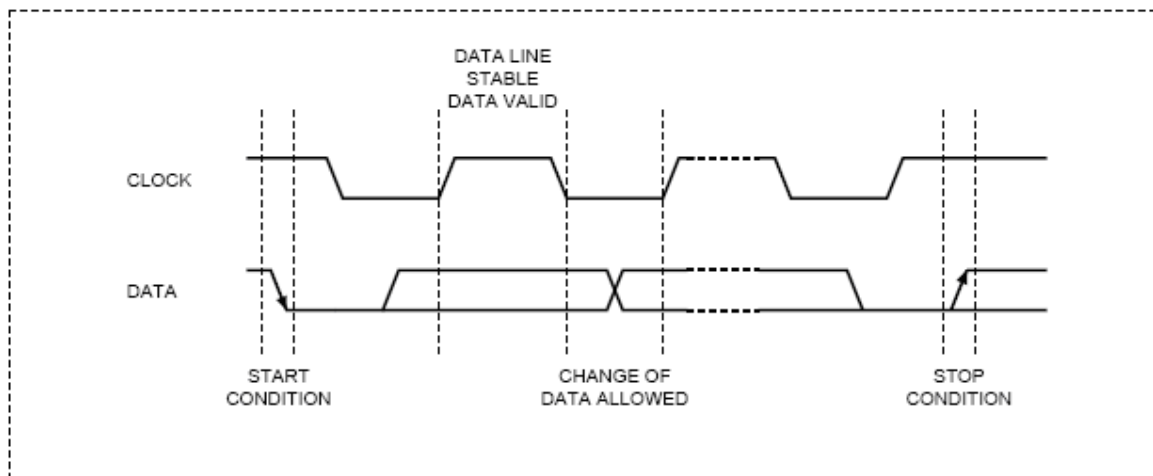
- Data transfer may be initiated only when the bus is not busy.
- During data transfer, the data line must remain stable whenever the clock line is high
- Changes in the data line, while the clock line is high, will be assumed as control signals.

#### 4.4.1 TWI Bus States

**Bus not busy:** Both data and clock lines remain High.

**Start data transfer:** A change in the state of the data line, from high to Low, while the clock is High, defines the START condition. (Figure 1)

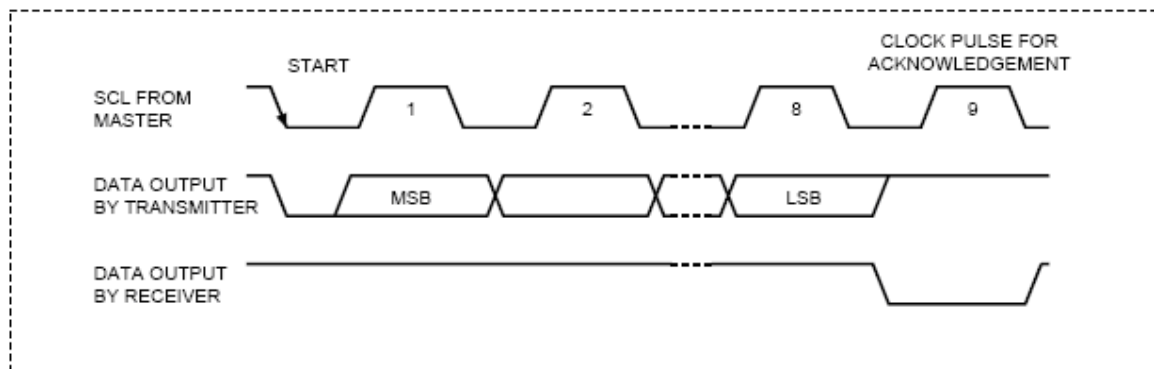
**Stop data transfer.** A change in the state of the data line, from Low to High, while the clock is High, defines the STOP condition. (Figure 1)



-Figure 1-

**Data Valid:** The state of the data line represents valid data when after a start condition, the data line is stable for the duration of the high period of the clock signal. The data on the line may be changed during the Low period of the clock signal. There is one clock pulse per bit of data. Each data transfer is initiated with a start condition and terminated with a stop condition. The number of data bytes transferred between the start and stop conditions is not limited. The information is transmitted byte-wide and each receiver acknowledges with a ninth bit. By definition a device that gives out a message is called "transmitter," the receiving device that gets the message is called "receiver." The device that controls the message is called "master." The devices that are controlled by the master are called "slaves."

**Acknowledge:** Each byte of eight bits is followed by one Acknowledge Bit. This Acknowledge Bit is a low level put on the bus by the receiver whereas the master generates an extra acknowledge related clock pulse. A slave receiver which is addressed is obliged to generate an acknowledge after the reception of each byte that has been clocked out of the slave transmitter. The device that acknowledges has to pull down the SDA line during the acknowledge clock pulse in such a way that the SDA line is a stable Low during the High period of the acknowledge related clock pulse. Of course, setup and hold times must be taken into account. A master receiver must signal an end of data to the slave transmitter by not generating an acknowledge on the last byte that has been clocked out of the slave. In this case the transmitter must leave the data line High to enable the master to generate the STOP condition. (Figure 2)



-Figure 2-

ARCB slave address (**0x7C**) is consist of one byte :

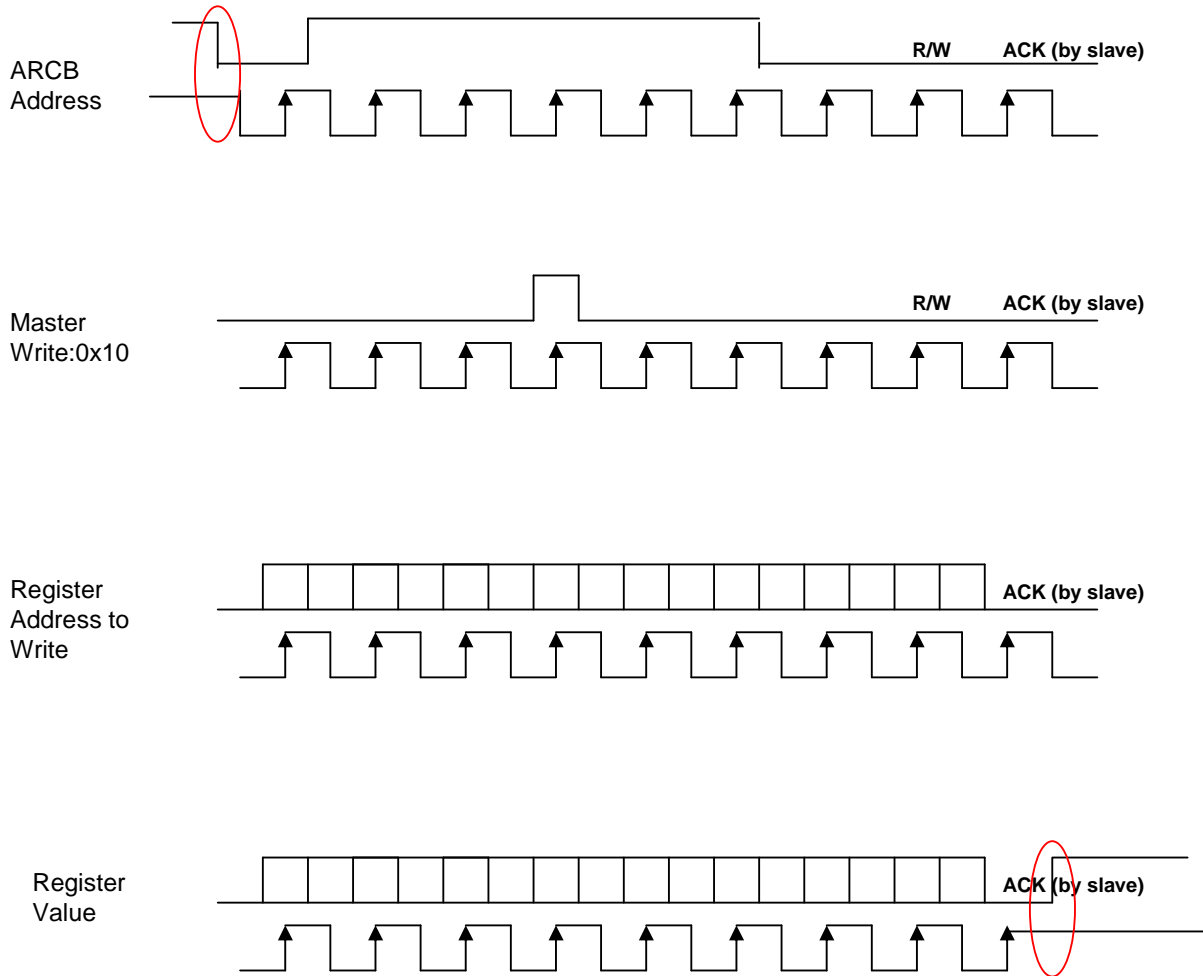
ADR7	ADR 6	ADR 5	ADR 4	ADR 3	ADR 2	ADR 1	R/W *
------	-------	-------	-------	-------	-------	-------	-------

(R/W : R=1, W=0)

**4.4.2 BYTE WRITE OPERATION:**

In write operation only one byte write is possible. First ARCB slave address and **MASTER WR (0x10)** command should be sent then Register address and desired Register value should be sent.

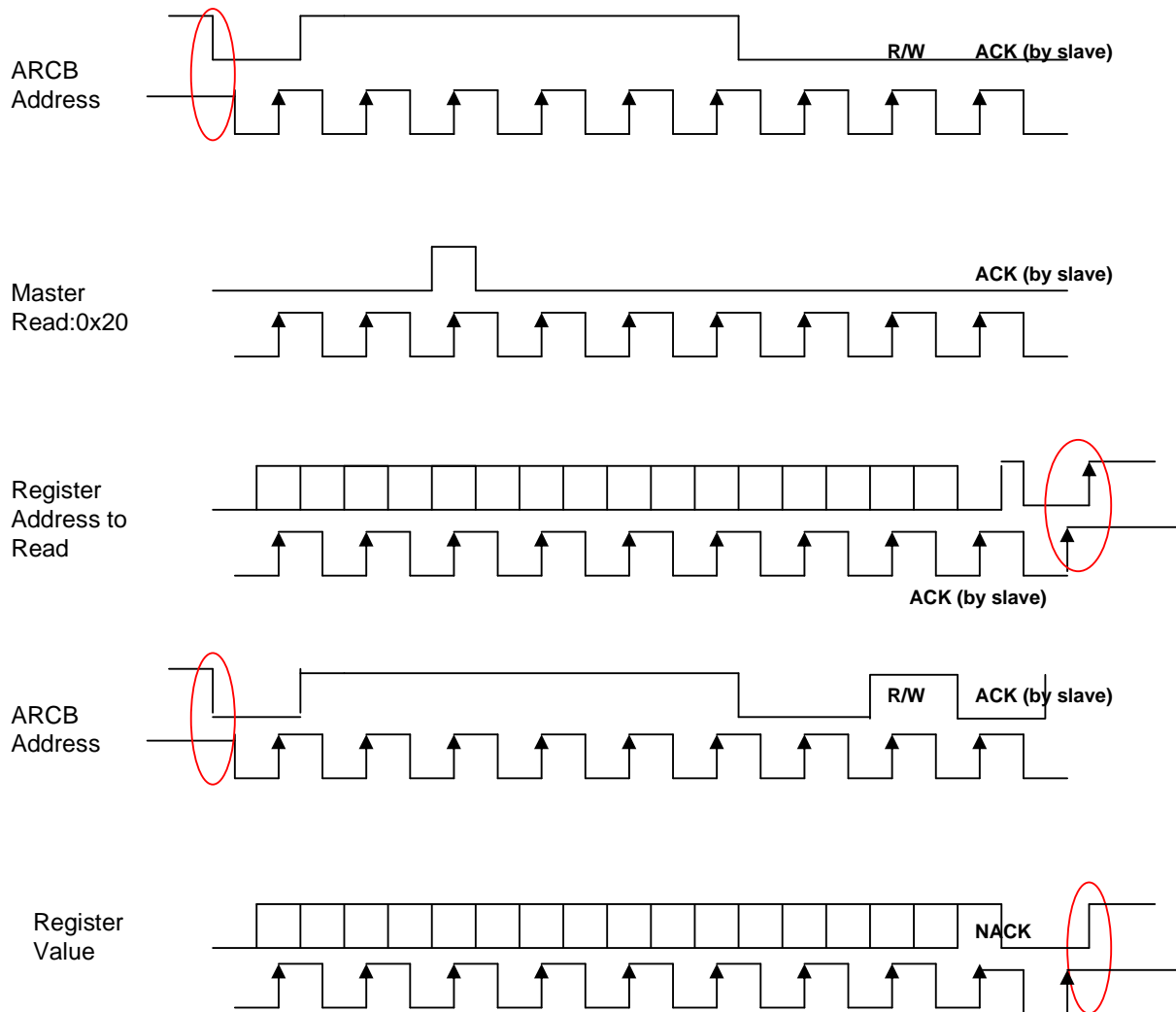
This sequence should be followed when master wants to write a byte to the ARCB registers:



4.4.3 BYTE READ OPERATION:

In read operation only one byte read is enabled. First ARCB slave address and **MASTER RD (0x20)** command should be sent then Register address should be sent. In next transaction, register value can be gotten by read request.

This sequence should be followed when master wants to read a byte from the ARCB registers:



## 5 Serial Interface Calls

All ARCB functional parameters are accessible by RS232, RS485, USB calls. TWI calls are limited partially.

### 5.1 Temperature Requests

#### 5.1.1 Set/Get Minimum Alarm Temperature for Internal Temperature Sensor

##### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x00</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 31msec

##### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x00</b>	Value	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x00</b>			0x7D	Value	

Register Type: Read / Write

Value type: Char

Value Unit: Celcius

Value Min: -20

Value Max: +70

### 5.1.2 Set/Get Maximum Alarm Temperature for Internal Temperature Sensor

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x01</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 31msec

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x01</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x01</b>			0x7D	Value	

Register Type: Read / Write

Value type: Char

Value Unit: Celcius

Value Min: -20

Value Max: +70



**5.1.3 Get Temperature from Internal Temperature Sensor**

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x02</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msec

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x02</b>			0x7D	Value	

Register Type: Read Only

Value type: Char

Value Unit: Celcius

Value Min: -30

Value Max: +110

**5.1.4 Set/Get Minimum Alarm Temperature for External Temperature Sensor**

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x03</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 31msec

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x03</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request					Response			
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x03</b>			0x7D	Value	

Register Type: Read / Write

Value type: Char

Value Unit: Celcius

Value Min: -30

Value Max: +110

### 5.1.5 Set/Get Maximum Alarm Temperature for External Temperature Sensor

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x04</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x04</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x04</b>			0x7D	Value	

Register Type: Read / Write

Value type: Char

Value Unit: Celcius

Value Min: -30

Value Max: +110

**5.1.6 Get Temperature from External Temperature Sensor**

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x05</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msec

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x05</b>			0x7D	Value	

Register Type: Read Only

Value type: Char

Value Unit: Celcius

Value Min: -30

Value Max: +110

**Register Explanation:**

Before evaluating this register check the status of "TEMPSEXT" (section 5.7.1). If external temperature sensor is not connected do not use the read response.

**5.1.7 Get Temperature of Internal Sensor Just Before Error State**

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x26</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msec

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x26</b>			0x7D	Value	

Register Type: Read Only

Value type: Char

Value Unit: Celcius

Value Min: -20

Value Max: +70

**Register Explanation:**

This register keeps the temperature information just before going to error state. This register is meaningful, if "TEMPIN" flag is set in "Alarm register".

### 5.1.8 Get Temperature of External Sensor Just Before Error State

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	0x27	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msec

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	0x27			0x7D	Value	

Register Type: Read Only

Value type: Char

Value Unit: Celcius

Value Min: -30

Value Max: +110

#### Register Explanation:

This register keeps the temperature information just before going to error state. This register is meaningful, if "TEMPOUT" flag is set in "Alarm register".

### 5.2 Power Control Requests

#### 5.2.1 Set/Get Minimum Display Current

##### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x06</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 47msec

Total current is integer (2-byte) and should be in terms of mA.

Example: For 3500mA → Value1=0x0D, Value2=0xAC

##### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x07</b>	Value1	
	0x7C	0x10	<b>0x06</b>	Value2	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x07</b>			0x7D	Value1	
	0x7C	0x20	<b>0x06</b>			0x7D	Value2	

Register Type: Read / Write

Value type: Unsigned Integer

Value Unit: mA

Value Min: 0mA

Value Max: 4000mA

### 5.2.2 Set/Get Maximum Display Current

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x08</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 47msec

Total current is integer (2-byte) and should be in terms of mA.

Example: For 3500mA → Value1=0x0D, Value2=0xAC

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x09</b>	Value1	
	0x7C	0x10	<b>0x08</b>	Value2	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x09</b>			0x7D	Value1	
	0x7C	0x20	<b>0x08</b>			0x7D	Value2	

Register Type: Read / Write

Value type: Unsigned Integer

Value Unit: mA

Value Min: 0mA

Value Max: 4000mA



### 5.2.3 Set/Get Minimum Inverter Current

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x0A</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 47msec

Total current is integer (2-byte) and should be in terms of mA.

Example: For 3500mA → Value1=0x0D, Value2=0xAC

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x0B</b>	Value1	
	0x7C	0x10	<b>0x0A</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x0B</b>			0x7D	Value1	
	0x7C	0x20	<b>0x0A</b>			0x7D	Value2	

Register Type: Read / Write

Value type: Unsigned Integer

Value Unit: mA

Value Min: 0mA

Value Max: 65000mA

### 5.2.4 Set/Get Maximum Inverter Current

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x0C</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 47msec

Total current is integer (2-byte) and should be in terms of mA.

Example: For 3500mA → Value1=0x0D, Value2=0xAC

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x0C</b>	Value1	
	0x7C	0x10	<b>0x0D</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x0D</b>			0x7D	Value1	
	0x7C	0x20	<b>0x0C</b>			0x7D	Value2	

Register Type: Read / Write

Value type: Unsigned Integer

Value Unit: mA

Value Min: 0mA

Value Max: 65000mA

### 5.2.5 Internal Use Only

### 5.2.6 Internal Use Only

### 5.2.7 Get Inverter Current Measurement Result

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x22</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 47msec

Total current is integer (2-byte) and should be in terms of mA.

Example: For 3500mA → Value1=0x0D, Value2=0xAC

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
<b>TWI Start</b>	0x7C	0x10	<b>0x23</b>	Value1	
	0x7C	0x10	<b>0x22</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP		4.Byte ARCB Address	5.byte Register Value	TWI STOP
<b>TWI Start</b>	0x7C	0x20	<b>0x23</b>		<b>TWI Start</b>	0x7D	Value1	
	0x7C	0x20	<b>0x22</b>			0x7D	Value2	

Register Type: Read / Write

Value type: Unsigned Integer

Value Unit: mA

Value Min: 0mA

Value Max: 65000mA

### 5.2.8 Get Display Current Measurement Result

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x24</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 47msec

Total current is integer (2-byte) and should be in terms of mA.

Example: For 3500mA → Value1=0x0D, Value2=0xAC

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x25</b>	Value1	
	0x7C	0x10	<b>0x24</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x25</b>			0x7D	Value1	
	0x7C	0x20	<b>0x24</b>			0x7D	Value2	

Register Type: Read / Write

Value type: Unsigned Integer

Value Unit: mA

Value Min: 0mA

Value Max: 4000mA

## 5.3 System Status Requests

### 5.3.1 Get Alarm Register

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x0E</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x0E</b>			0x7D	Value	

Register Type: Read Only  
Value type: Unsigned Char  
Value Unit: -  
Value Min: 0  
Value Max: 255

#### Register Explanation:

DISP1	DISP0	INV1	INV0	FAN1	FAN0	TEMPIN	TEMPOUT
-------	-------	------	------	------	------	--------	---------

#### DISP1-DISP0 :

00: ON  
01: OFF (NORMAL STATE)  
10: DISPLAY CURRENT OUT OF RANGE  
11: OFF AFTER ERROR

#### INV1-INV0 :

00: ON  
01: OFF (NORMAL STATE)  
10: INVERTER CURRENT OUT OF RANGE  
11: OFF AFTER ERROR

#### FAN1-FAN0 :

00: OK  
01: ERROR  
10: OFF

Fan is at "OK" state, if fan is rotating in normal speed conditions.  
Fan is at "ERROR" state, if fan speed is too low (below 30RPS) or totally halted.  
Fan is at "OFF" state, if there is an external temperature sensor error. In this state, fan is stopped.

**TEMPIN:** Internal temperature alarm bit (1=Temp. out of Range, 0=Temp in range)

**TEMPOUT:** External temperature alarm bit (1=Temp. out of Range, 0=Temp in range)

(Read "On Board ICs Status Register" before evaluating "TEMPOUT" bit to be sure if external temperature sensor board is connected to the ARCB)

## 5.4 Firmware Update Requests

### 5.4.1 Run Boot Loader after Reset

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x0f</b>	0x00	0x00	0x01	Checksum
<b>Response</b>	0x07	TID		0x00	0x00	0x01	Checksum

Timeout for Request: 2280msecond

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x0f</b>	0x01	
ARCB should return ACK as a response in every end of byte.					

Register Type: Read / Write

Value type: Unsigned Char

Value Unit: -

Value Min: -

Value Max: -

**Register Explanation:**

After executing this call, ARCB uses watchdog timer to reset itself and jump to boot loader address.

Required ARCB application firmware should be installed with boot-loader to get a response from this command.

The answer of ARCB is sent in boot loader firmware. The answer is: "BOOT1.0" and not a standard ARCB response.

Please refer "ARCB FIRMWARE UPLOAD GUIDE \_RS232\_.pdf" to upload firmware into ARCB via RS232.

**Note:** Firmware update mode uses RS232 channel. TWI request is just used for to get ARCB into boot loader mode. Firmware update via TWI interface is not supported.

## 5.5 Operation Time Counter Requests

### 5.5.1 Get Second Counter

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x10</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msecond

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x10</b>			0x7D	Value	

Register Type: Read Only  
Value type: Unsigned Char  
Value Unit: Second (as BCD)  
Value Min: 0  
Value Max: 59

**Register Explanation:**

This register keeps the “seconds” of operation time counter.

ARCB uses on board real time clock (RTC) to count healthy operation durations. RTC is stopped when one of these alarm situations is occurred:

- Over temperature alarm
- Inverter or display: over current alarm
- Inverter or display: power cable detached alarm
- Normal power off state

**5.5.2 Get Minute Counter**

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x11</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msecond

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x11</b>			0x7D	Value	

Register Type: Read Only

Value type: Unsigned Char

Value Unit: Minute (as BCD)

Value Min: 0

Value Max: 59

**Register Explanation:**

This register keeps the “minutes” of operation time counter.

ARCB uses on board real time clock (RTC) to count healthy operation durations. RTC is stopped when one of these alarm situations is occurred:

- Over temperature alarm
- Inverter or display: over current alarm
- Inverter or display: power cable detached alarm
- Normal power off state



**5.5.3 Get Hours Counter**

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x12</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msecond

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x12</b>			0x7D	Value	

Register Type: Read Only  
Value type: Unsigned Char  
Value Unit: Hour (as BCD)  
Value Min: 0  
Value Max: 23

**Register Explanation:**

This register keeps the “hours” of operation time counter.

ARCB uses on board real time clock (RTC) to count healthy operation durations. RTC is stopped when one of these alarm situations is occurred:

- Over temperature alarm
- Inverter or display: over current alarm
- Inverter or display: power cable detached alarm
- Normal power off state

### 5.5.4 Get Days Counter

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x13</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msecond

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x13</b>			0x7D	Value	

Register Type: Read Only

Value type: Unsigned Char

Value Unit: Day (as BCD)

Value Min: 0

Value Max: 31

#### Register Explanation:

This register keeps the "days" of operation time counter.

ARCB uses on board real time clock (RTC) to count healthy operation durations. RTC is stopped when one of these alarm situations is occurred:

- Over temperature alarm
- Inverter or display: over current alarm
- Inverter or display: power cable detached alarm
- Normal power off state

### 5.5.5 Get Month Counter

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x14</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msecond

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x14</b>			0x7D	Value	

Register Type: Read Only

Value type: Unsigned Char

Value Unit: Month (as BCD)

Value Min: 0

Value Max: 12

**Register Explanation:**

This register keeps the “month” of operation time counter.

ARCB uses on board real time clock (RTC) to count healthy operation durations. RTC is stopped when one of these alarm situations is occurred:

- Over temperature alarm
- Inverter or display: over current alarm
- Inverter or display: power cable detached alarm
- Normal power off state

### 5.5.6 Get Years Counter

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x15</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msecond

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x15</b>			0x7D	Value	

Register Type: Read Only

Value type: Unsigned Char

Value Unit: Year (as BCD)

Value Min: 0

Value Max: 99

**Register Explanation:**

This register keeps the “year” of operation time counter.

ARCB uses on board real time clock (RTC) to count healthy operation durations. RTC is stopped when one of these alarm situations is occurred:

- Over temperature alarm
- Inverter or display: over current alarm
- Inverter or display: power cable detached alarm
- Normal power off state

### 5.5.7 Clear Operation Time Registers

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x1D</b>	0x00	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x00	0x00	0x00	Checksum

Timeout for Request: 175msecond

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x1D</b>	0x00	
ARCB should return ACK as a response in every end of byte.					

Value type: Unsigned Char

Register Type: Write / Read

**Register Explanation:**

This register call performs the clear operation on all operation time registers placed in RAM and system E2PROM.

## 5.6 Product Identification Requests

### 5.6.1 Get ARCB Firmware Major and Minor Numbers

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x1E</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	Value1	Value2	Checksum

Timeout for Request: 16msecond

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x1F</b>			0x7D	Value1	
	0x7C	0x20	<b>0x1E</b>			0x7D	Value2	

**Value1** type: Unsigned Char  
Register Type: Read Only  
Value1 Unit: -  
Value1 Min: 0  
Value1 Max: 255

**Value2** type: Unsigned Char  
Register Type: Read Only  
Value2 Unit: -  
Value2 Min: 0  
Value2 Max: 255

**Register Explanation:**

Value1 : ARCB Firmware Major number  
Value2 : ARCB Firmware Minor number

Example: "3.1"

**5.6.2 Get ARCB Firmware Micro Number**

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.5 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x43</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msecond

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.5 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x43</b>			0x7D	Value	

Value type: Unsigned Char

Register Type: Read Only

**Register Explanation:**

Value : ARCB Firmware Micro number

Example: x.y.Value

### 5.6.3 Set / Get ARCB Hardware Version

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x20</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x01	Set: Value2 Get: 0x01	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 47msec

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x21</b>	Value1	
	0x7C	0x10	<b>0x20</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x21</b>			0x7D	Value1	
	0x7C	0x20	<b>0x20</b>			0x7D	Value2	

**Value1** type: Unsigned Char

Register Type: Write / Read

Value1 Unit: -

Value1 Min: 0

Value1 Max: 255

**Value2** type: Unsigned Char

Register Type: Write / Read

Value2 Unit: -

Value2 Min: 0

Value2 Max: 255

#### Register Explanation:

Value1: ARCB Hardware Major number

Value2: ARCB Hardware Minor number

Example: "1.4"



### 5.6.4 Set / Get ARCB Bom File Version Numbers

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.12 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x44</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.12 or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x44</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request					Response			
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x44</b>			0x7D	Value	

**Value** type: Unsigned Char

Register Type: Write / Read

Value1 Unit: -

Value1 Min: 0

Value1 Max: 255

#### Register Explanation:

Value: ARCB Bom file version number

Example: "7"

**5.6.5 Get Product ID**

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x1C</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	0x7C	Checksum

Timeout for Request: 16msecond

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request					Response			
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x1C</b>			0x7D	0x7C	

Value type: Unsigned Char

Register Type: Read Only

Value Unit: -

Value Min: 0

Value Max: 255

**Register Explanation:**

TBD (ARCB will have different product IDs for different boards)

### 5.6.6 Set / Get Board Configuration Status

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x19</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x19</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request					Response			
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x19</b>			0x7D	Value	

Value type: Unsigned Char

Register Type: Write / Read

Value Unit: -

Value Min: 0

Value Max: 1

#### Register Explanation:

This call returns the ARCB configuration status.

If Value is equal to "1", ARCB is preconfigured for specific display and inverter set.

If Value is equal to "0", no configuration done for panel or inverter parameters. ARCB will not start controls and wait for settings to be done.

This flag should be set to connect ARCB to display and inverter electrically.

### 5.6.7 Set / Get Terminal Identification Number (TID)

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x1B</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x1B</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request					Response			
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x1B</b>			0x7D	Value	

Value type: Unsigned Char

Register Type: Write / Read

Value Unit: -

Value Min: 0

Value Max: 255

#### Register Explanation:

This call returns the terminal identification number (TID) of ARCB on the RS485 bus. These are the key points:

- In RS232 networks, TID can be set to "0x00".
- All ARCB boards can respond the commands, if TID is own ID or equal to "0x00". This is general call for all boards.
- In RS485 networks, TID cannot be "0x00".

### 5.6.8 Set/Get RS485 Master/Slave Status

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.6 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x18</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.6 or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x18</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x18</b>			0x7D	Value	

Value type: Unsigned Char

Register Type: Write / Read

Value Unit: Enable / Disable

#### Register Explanation:

To set the firmware as **RS485 bus master**:

Read register → logical OR the response with "0x80" → Write into same register

To set the firmware as **RS485 slave**:

Read register → logical AND the response with "0x7F" → Write into same register

### 5.6.9 Set/Get Remote OSD or Artista I2C Interface

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.8 or uppers

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x18</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.8 or uppers

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x18</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x18</b>			0x7D	Value	

Value type: Unsigned Char

Register Type: Write / Read

Value Unit: Enable / Disable

#### Register Explanation:

ARCB uses same GPIO pins for Remote OSD (Prisma interface) and Artista I2C interface. So the functionality of ARCB should be selected for application type. 1<sup>st</sup> bit of this register decide the ARCB operation mode.

To set the firmware functionality as **Remote OSD** for Prisma Boards:

Read register → logical OR the response with "0x02" → Write into same register

To set the firmware functionality as **Artista I2C Slave**:

Read register → logical AND the response with "0xFD" → Write into same register

## 5.7 Sensor Status Requests

The connection status of sensors that connected to ARCB are being checked periodically.

### 5.7.1 Get On Board and External Sensor Communication Status

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x1A</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msecond

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x1A</b>			0x7D	Value	

Value type: Unsigned Char

Register Type: Read Only

Value Unit: -

Value Min: 0

Value Max: 31

#### Register Explanation:

0	RTCLOWBAT	HCBFAIL	ABRFAIL	RTCFAIL	TEMPSINT	TEMPSEXT	E2FAIL
---	-----------	---------	---------	---------	----------	----------	--------

**HCBFAIL:** High Current Board

**0:** HCB is detected

**1:** Not detected.

**RTCFAIL:** RTC (Real Time Clock)

**0:** Normal Operation

**1:** Failed, No Communication

**TEMPSEXT:** External temp. sensor

**0:** Normal Operation

**1:** Failed, No Communication

**ABRFAIL:** Ambient Brightness Sensor

**0:** Normal Operation

**1:** Failed, No Communication

**TEMPSINT:** Internal temp. sensor

**0:** Normal Operation

**1:** Failed, No Communication

**E2FAIL:** EEPROM memory

**0:** Normal Operation

**1:** Failed, No Communication

**RTCLOWBAT:** RTC Battery Low Flag

**0:** Normal Voltage Level

**1:** RTC Battery Depleted

(RTCLOWBAT flag is updated by ARCB on every power-up and every 24-hour operation of display system)

## 5.8 Reset and Test Function Requests

### 5.8.1 Reset the ARCB

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x28</b>	0x00	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x00	0x00	0x00	Checksum

Timeout for Request: 16msecond. (Return from Reset takes 2315mseconds)

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x28</b>	0x00	
ARCB should return ACK as a response in every end of byte.					

Register Type: Write / Read

**Register Explanation:**

This register call performs the reset operation. ARCB backs after 2315mseconds.



**5.8.2 Reset Error State**

**RS232 / RS485 / USB (Virtual RS232) Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x38</b>	0x00	0x00	0x01	Checksum
<b>Response</b>	0x07	TID		0x00	0x00	0x01	Checksum

Timeout for Request: 16msecond. (Return from Reset takes 2315mseconds)

**TWI Interface Call:**

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x38</b>	0x01	

ARCB should return ACK as a response in every end of byte.

Register Type: Write / Read

**Register Explanation:**

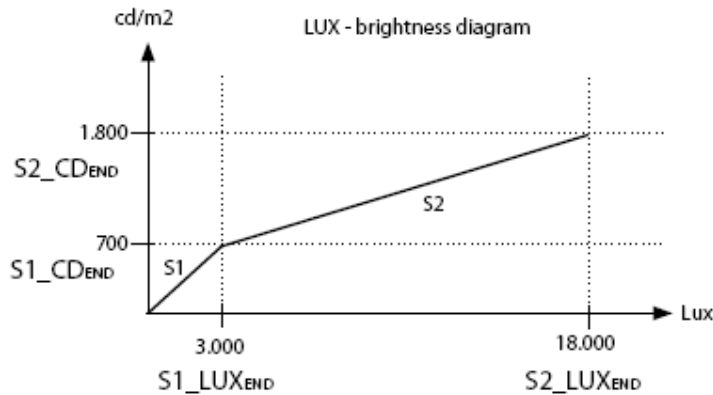
Call this request under user control when any of alarm condition below is occurred:

- Display Current Out Of Range
- Inverter Current Out Of Range
- Display Off After Error
- Inverter Off After Error
- Internal Temperature Out Of Range
- External Temperature Out Of Range

This register call performs the main state machine reset of ARCB. Display and Inverter states will go to "OFF" state after reset.

### 5.9 Automatic Brightness Control Requests

Below graphic is used in ARCB control algorithms to calculate the optimal panel brightness ( $\text{cd/m}^2$ ) according to ambient light intensity (lux) measurements. When an optimal brightness value is calculated for display, ARCB adjusts the inverter control voltage to correct voltage value and also update the brightness control register (TftCalBrg). This section describes how to set the parameters of control graphic:



#### Required input parameters:

$LUX_{AVG}$  = measured average ambient light value [LUX]  
 $S1\_LUX_{END}$  = Endpoint Curve S1 [LUX]  
 $S1\_CD_{END}$  = Endpoint Curve S1 [ $\text{cd/m}^2$ ]  
 $S2\_LUX_{END}$  = Endpoint Curve S2 [LUX]  
 $S2\_CD_{END}$  = Endpoint Curve S2 [ $\text{cd/m}^2$ ]  
 $Panel_{MIN}$  = Panel measured minimum brightness [ $\text{cd/m}^2$ ]  
 $Panel_{MAX}$  = Panel measured maximum brightness [ $\text{cd/m}^2$ ]

#### Calculations done outside ARCB:

$S1\_Gradient = S1\_CD_{END} / S1\_LUX_{END}$  ;  
 $S2\_Gradient = (S2\_CD_{END} - S1\_CD_{END}) / (S2\_LUX_{END} - S1\_LUX_{END})$  ;  
 $S2\_Offset = (- S1\_LUX_{END} * S2\_Gradient) + S1\_CD_{END}$  ;  
 $INV\_BIT = (Panel_{MAX} - Panel_{MIN}) / 255$  ;

#### Calculations done in ARCB:

LUX in range S1:  $InverterControlByte = ((LUX_{AVG} * S1\_Gradient) - Panel_{MIN}) / INV\_BIT$  ;  
 LUX in Range S2:  $InverterControlByte = ((LUX_{AVG} * S2\_Gradient) + S2\_Offset - Panel_{MIN}) / INV\_BIT$  ;

### Effect Of Proximity (Motion) Sensor

Proximity sensor has an effect on automatic brightness control.

If there is no object detection during proximity timeout (section 5.12.12), the maximum brightness control voltage value (section 5.2.6) of inverter is set to minimum value (section 5.2.5). By this way, the control range of automatic backlight algorithm is restricted. This changes is not performed on non-volatile memory and lost its effect in next power up or next object detection event.

### 5.9.1 Set / Get "Refresh Time" (RfsTime)

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x2A</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x2A</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x2A</b>			0x7D	Value	

Value type: Unsigned Char  
Register Type: Write / Read  
Value Unit: second  
Value Min: 1  
Value Max: 255

#### Register Explanation:

The "RfsTime" is a main period of automatic brightness control algorithm. Every this period ARCB gets the measurement of ambient light sensor and set the backlight control voltage to optimum value.

### 5.9.2 Set / Get Light Pipe Coefficient (LPCoeff)

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x2B</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x2B</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x2B</b>			0x7D	Value	

Value type: Unsigned Char  
Register Type: Write / Read  
Value Unit: % percent  
Value Min: 10  
Value Max: 200

#### Register Explanation:

The "LPCoeff" describes the Light Pipe Coefficient to eliminate the effect of light pipe used in measurement system. This coefficient directly has an effect on measured ambient light intensity.

Examples:

Sensor reading: 1000lux

If "LPCoeff" is equal to 50, ARCB will assume that ambient light intensity is  $0,5 \cdot 1000 = 500$ lux.

If "LPCoeff" is equal to 160, ARCB will assume that ambient light intensity is  $1,60 \cdot 1000 = 1600$ lux.

**5.9.3 Get Inverter Control Value (TftCalBrg)**

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x29</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: 16msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.x or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	0x29			0x7D	Value	

Value type: Unsigned Char  
Register Type: Read Only  
Value Unit: -  
Value Min: 0  
Value Max: 255

**Register Explanation:**

Inverter Control byte (TftCalBrg) value is a final output of the automatic brightness control algorithm. Inverter control value should be set to this value by video/graphic card for optimal brightness according to ambient light intensity.

Example:

If Value = 0, Brightness should be minimum  
If Value = 150, Brightness should be 59% of maximum

## 5.9.4 Enable / Disable Automatic Brightness Function

### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x18</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x18</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x18</b>			0x7D	Value	

Value type: Unsigned Char

Register Type: Write / Read

Value Unit: Enable / Disable

### Register Explanation:

Before enable the automatic brightness control check the status of “**ABRFAIL**” (section 5.10.1). If ambient light sensor is not connected do not enable this algorithm. In addition, firmware will automatically disable this functionality if light sensor is not detected.

To **enable** the automatic brightness control:

Read register → logical OR the response with “0x01” → Write into same register

To **disable** the automatic brightness control:

Read register → logical AND the response with “0xFE” → Write into same register

### 5.9.5 Set / Get S1\_Gradient

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x2C</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x2C</b>	Value	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x2C</b>			0x7D	Value	

Value type: Unsigned Char  
Register Type: Write / Read  
Value Unit: cd/(lux\*m<sup>2</sup>)  
Value Min: 0  
Value Max: 255

#### Register Explanation:

This register keeps the first slope of graphical brightness control algorithm.  
0 ≤ S1\_Gradient ≤ 2.55

#### Example:

Gradient = 0.23  
Value = 0.23x100 = 23 (Always multiply with 100)

## 5.9.6 Set / Get S2\_Gradient

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x2D</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x2D</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x2D</b>			0x7D	Value	

Value type: Unsigned Char  
Register Type: Write / Read  
Value Unit: cd/(lux\*m<sup>2</sup>)  
Value Min: 0  
Value Max: 255

### Register Explanation:

This register keeps the second slope of graphical brightness control algorithm.  
0 ≤ S2\_Gradient ≤ 0.255

### Example:

Gradient = 0.073  
Value = 0.073x1000 = 73 (Always multiply with 1000)



### 5.9.7 Set / Get S2\_Offset

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x2E</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 47msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	
<b>TWI Start</b>	0x7C	0x10	<b>0x2F</b>	Value1	<b>TWI STOP</b>
	0x7C	0x10	<b>0x2E</b>	Value2	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
	1.byte ARCB Address	2.byte Master Read	3.byte Register Address		4.Byte ARCB Address	5.byte Register Value		
<b>TWI Start</b>	0x7C	0x20	<b>0x2F</b>	<b>TWI STOP</b>	<b>TWI Start</b>	0x7D	Value1	<b>TWI STOP</b>
	0x7C	0x20	<b>0x2E</b>			0x7D	Value2	

#### Register Explanation:

This register keeps the offset of the second slope of graphical brightness control algorithm.

Value type: Integer

Register Type: Write / Read

Value Unit: cd/m<sup>2</sup>

Value Min: -32768

Value Max: +32767

#### Example:

S2\_Offset = 481

Value1 = 0x01

Value2 = 0xE1

### 5.9.8 Set / Get Inverter Bit

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x30</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	
<b>TWI Start</b>	0x7C	0x10	<b>0x31</b>	Value1	<b>TWI STOP</b>
	0x7C	0x10	<b>0x30</b>	Value2	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
	1.byte ARCB Address	2.byte Master Read	3.byte Register Address		4.Byte ARCB Address	5.byte Register Value		
<b>TWI Start</b>	0x7C	0x20	<b>0x31</b>	<b>TWI STOP</b>	<b>TWI Start</b>	0x7D	Value1	<b>TWI STOP</b>
	0x7C	0x20	<b>0x30</b>			0x7D	Value2	

#### Register Explanation:

This register keeps the "inverter bit" parameter of graphical brightness control algorithm.

Value type: Unsigned Integer

Register Type: Write / Read

Value Unit: cd/m<sup>2</sup>

Value Min: 0

Value Max: 65535

#### Example:

Inverter Bit = 2.69

Multiply with 100 → Inverter Bit = 269

Value1 = 0x01

Value2 = 0x0D

### 5.9.9 Set / Get S1\_Lux\_End

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x32</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	
<b>TWI Start</b>	0x7C	0x10	<b>0x33</b>	Value1	<b>TWI STOP</b>
	0x7C	0x10	<b>0x32</b>	Value2	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
	1.byte ARCB Address	2.byte Master Read	3.byte Register Address		4.Byte ARCB Address	5.byte Register Value		
<b>TWI Start</b>	0x7C	0x20	<b>0x33</b>	<b>TWI STOP</b>	<b>TWI Start</b>	0x7D	Value1	<b>TWI STOP</b>
	0x7C	0x20	<b>0x32</b>			0x7D	Value2	

#### Register Explanation:

This register keeps the "S1\_Lux\_End" parameter of graphical brightness control algorithm.

Value type: Unsigned Integer

Register Type: Write / Read

Value Unit: Lux

Value Min: 0

Value Max: 65535

#### Example:

S1\_Lux\_End = 3000

Value1 = 0x0B

Value2 = 0xB8

### 5.9.10 Set / Get S2\_Lux\_End

Supported since firmware versions:  
ARCB: 3.1.3 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x3F</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x40</b>	Value1	
	0x7C	0x10	<b>0x3F</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x40</b>			0x7D	Value1	
	0x7C	0x20	<b>0x3F</b>			0x7D	Value2	

#### Register Explanation:

This register keeps the "S2\_Lux\_End" parameter of graphical brightness control algorithm.

Value type: Unsigned Integer

Register Type: Write / Read

Value Unit: Lux

Value Min: 0

Value Max: 65535

#### Example:

S2\_Lux\_End = 3000

Value1 = 0x0B

Value2 = 0xB8

### 5.9.11 Set / Get Panel Minimum Brightness

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x34</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x35</b>	Value1	
	0x7C	0x10	<b>0x34</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x35</b>			0x7D	Value1	
	0x7C	0x20	<b>0x34</b>			0x7D	Value2	

#### Register Explanation:

This register keeps the "Panel\_Min" parameter of graphical brightness control algorithm.

Value type: Unsigned Integer

Register Type: Write / Read

Value Unit: cd/m<sup>2</sup>

Value Min: 0

Value Max: 65535

#### Example:

Panel Min = 136

Value1 = 0x00

Value2 = 0x88

**5.9.12 Set / Get Panel Maximum Brightness**

Supported since firmware versions:  
ARCB: 3.1.3 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x41</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.3 or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x42</b>	Value1	
	0x7C	0x10	<b>0x41</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x42</b>			0x7D	Value1	
	0x7C	0x20	<b>0x41</b>			0x7D	Value2	

**Register Explanation:**

This register keeps the "Panel\_Max" parameter of graphical brightness control algorithm.

Value type: Unsigned Integer  
Register Type: Write / Read  
Value Unit: cd/m<sup>2</sup>  
Value Min: 0  
Value Max: 65535

**Example:**

Panel Max = 136  
Value1 = 0x00  
Value2 = 0x88

### 5.9.13 Set / Get Brightness Offset

Supported since firmware versions:  
ARCB: 3.1.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x36</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x37</b>	Value1	
	0x7C	0x10	<b>0x36</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x37</b>			0x7D	Value1	
	0x7C	0x20	<b>0x36</b>			0x7D	Value2	

#### Register Explanation:

This register keeps the "Brightness Offset" parameter of graphical brightness control algorithm.

Value type: Integer

Register Type: Write / Read

Value Unit: no unit

Value Min: -255

Value Max: +255

#### Examples:

Brightness Offset = -200

Value1 = 0xFF

Value2 = 0x38

Brightness Offset = 120

Value1 = 0x00

Value2 = 0x78

**5.9.14 Get Average Lux Measurement**

Supported since firmware versions:  
ARCB: 3.1.3 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x39</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.1.3 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	0x3A			0x7D	Value1	
	0x7C	0x20	0x39			0x7D	Value2	

Supported since firmware versions:  
ARCB: 3.1.3 or upper

**Register Explanation:**

This register keeps the average ambient brightness value.

Value type: Integer : Value1(msb), Value2(lsb) combination of both

Register Type: Write / Read

Value Unit: Lux

Value Min: 0

Value Max: 20000



### 5.9.15 Set / Get S1CDend

Supported since firmware versions:  
ARCB: 3.1.3 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x3B</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.3 or upper

Set Operation:

Request					
	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	
<b>TWI Start</b>	0x7C	0x10	<b>0x3C</b>	Value1	<b>TWI STOP</b>
	0x7C	0x10	<b>0x3B</b>	Value2	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
	1.byte ARCB Address	2.byte Master Read	3.byte Register Address		4.Byte ARCB Address	5.byte Register Value		
<b>TWI Start</b>	0x7C	0x20	<b>0x3C</b>	<b>TWI STOP</b>	<b>TWI Start</b>	0x7D	Value1	<b>TWI STOP</b>
	0x7C	0x20	<b>0x3B</b>			0x7D	Value2	

#### Register Explanation:

This register keeps the "S1CDend" parameter of graphical brightness control algorithm.

Value type: Integer : Value1(msb), Value2(lsb) combination of both

Register Type: Write / Read

Value Unit: cd/m<sup>2</sup>

Value Min: 0

Value Max: 65535

### 5.9.16 Set / Get S2CDend

Supported since firmware versions:  
ARCB: 3.1.3 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x3D</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.1.3 or upper

Set Operation:

Request					
	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
<b>TWI Start</b>	0x7C	0x10	<b>0x3E</b>	Value1	
	0x7C	0x10	<b>0x3D</b>	Value2	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP		4.Byte ARCB Address	5.byte Register Value	TWI STOP
<b>TWI Start</b>	0x7C	0x20	<b>0x3E</b>		<b>TWI Start</b>	0x7D	Value1	
	0x7C	0x20	<b>0x3D</b>			0x7D	Value2	

#### Register Explanation:

This register keeps the "S2CDend" parameter of graphical brightness control algorithm.

Value type: Integer : Value1(msb), Value2(lsb) combination of both

Register Type: Write / Read

Value Unit: cd/m<sup>2</sup>

Value Min: 0

Value Max: 65535

### 5.10 Remote OSD Requests

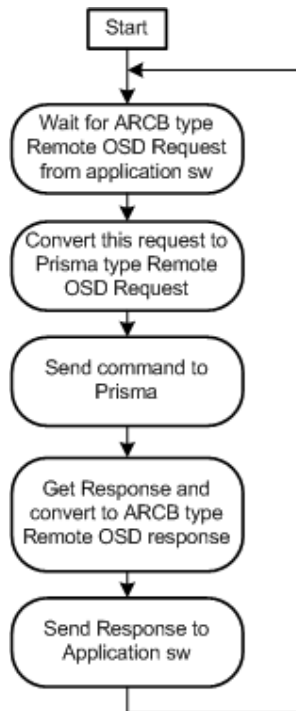
Remote OSD requests enable ARCB to talk with external Graphic board (e.g. Prisma-2) via TTL level RS232 serial interface.



The OSD functions that can be performed on main source inputs are:

- Set / Get Video input
- Set / Get Brightness
- Set / Get Contrast
- Power ON
- Power OFF
- Connection Check with the Graphic Card (Not an OSD function)

The function of ARCB is to convert its specific remote OSD commands to graphic card specific commands. The algorithm of this function in ARCB firmware is summarized below:



**Note:** TWI and Remote OSD functions use same GPIO pins of ARCB. TWI and Remote OSD features cannot be used in same application.

## 5.10.1 Prisma Remote OSD Operations

At least one valid video signal should be connected to inputs of Prisma for reliable communication.

### 5.10.1.1 Connection Check

Supported firmware versions:  
ARCB: 3.18 or uppers

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x4B</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	Value1	Value2	Checksum

Timeout for Request: (See table below)

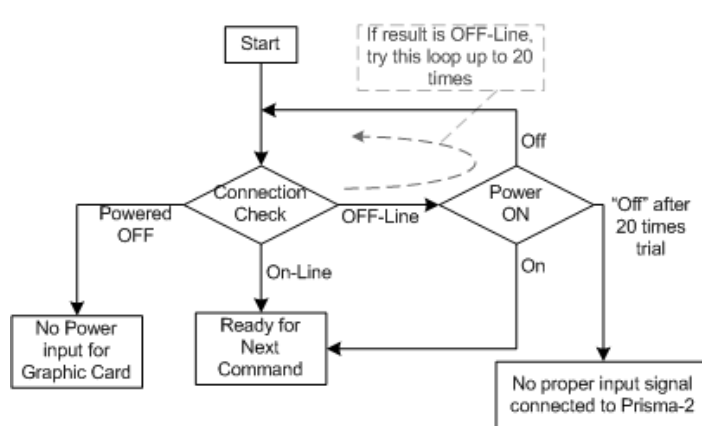
#### TWI Interface Call:

Not supported.

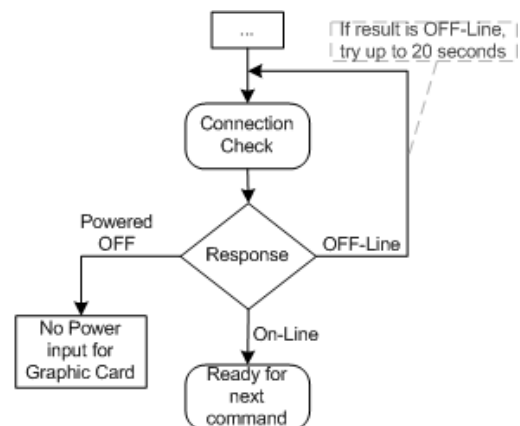
#### Register Explanation:

The "Connection Check" is used to check the communication status of Graphic card. Connection check returns immediate value in 16msecond, if valid input signal is connected to Prisma-2 boards.

Value1	Value2	Graphic Card Status	Timeout	Explanation
0x00	0x01	On-Line	16~80msec	Ready for next command.
0x00	0x00	Powered OFF	1600msec	None of OSD functions can be available. Graphic card has no power input.
0xFF	0xFF	OFF-Line (BUSY)	1500msec	If this state get just after any other OSD command → Keep performing "connection check" for 20 seconds or until getting "On-Line" response. If "connection check" is the first command → Try "POWER ON <sup>(1)</sup> " command to power up the board.



Connection Check is first command



Connection Check is executed after other OSD commands

<sup>(1)</sup>: Refer next section for power on / off operations.

**Note:** This command is only supported in Prisma II.

### 5.10.1.2 Set / Get Power Status

Supported firmware versions:  
ARCB: 3.18 or uppers

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x4A</b>	Set: 0x00 Get: 0x01	<b>0x42</b>	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	<b>0x42</b>	Value	Checksum

Timeout for Request: 16msecond (1500msecond if Prisma-2 is busy/off-line)

#### TWI Interface Call:

Not supported.

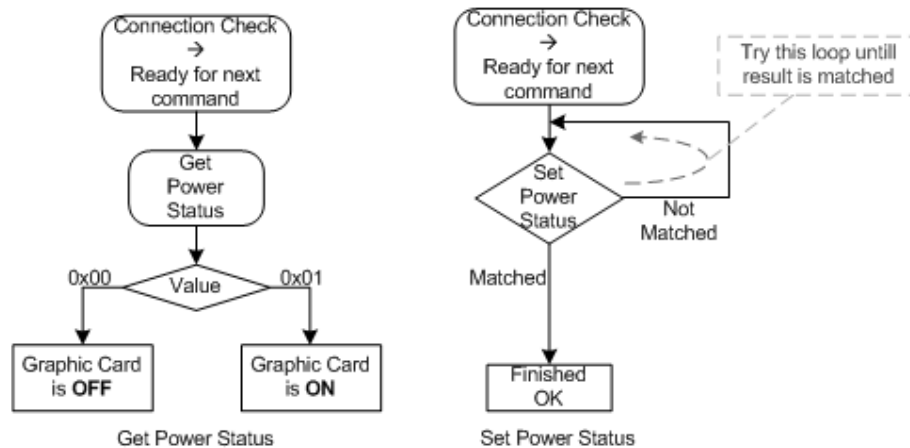
Value type: Unsigned Char  
Register Type: Write / Read  
Value Unit: -  
Value Min: 0  
Value Max: 1

Value	Function
0	Power OFF
1	Power ON

#### Register Explanation:

This call performs the power on /off functions on Graphic card.

#### Flow Diagram:



The transitions between the power statuses return non standard response at the first few tries. This is originated from the closed source of Prisma-2 firmware and cannot be prevented. In this case omit this response and repeat "set" operation again until desired response is gotten.

**Note:** This command is only supported in Prisma II.

### 5.10.1.3 Set / Get Video Input Type

Supported firmware versions:  
ARCB: 3.18 or uppers

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x47</b>	Set: 0x00 Get: 0x01	<b>0x19</b>	Set: (see table below) Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	<b>0x19</b>	Value	Checksum

**Timeout for Request:** 2.5second to 20second

**TWI Interface Call:**

Not supported.

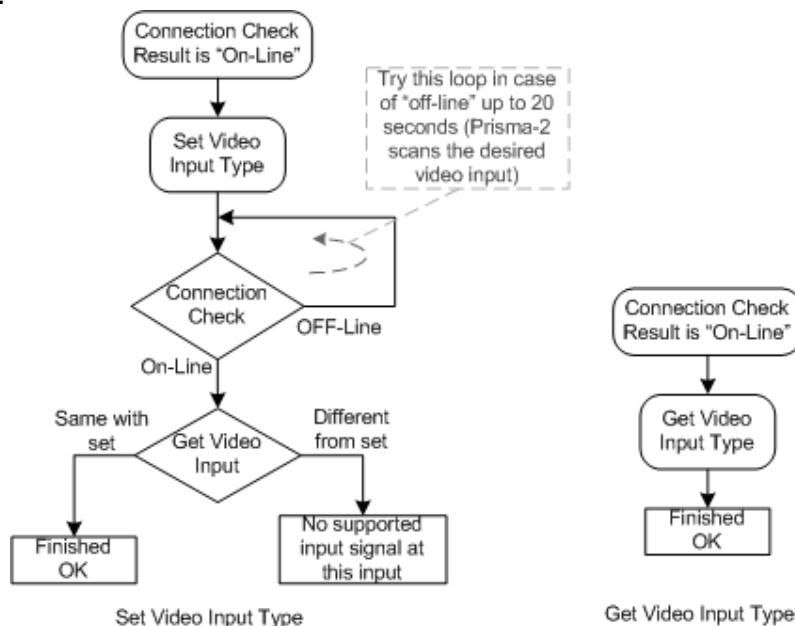
Value type: Unsigned Char  
Register Type: Write / Read  
Value Unit: -  
Value Min: 0  
Value Max: 5

Value	Video Source
0	RGB(VGA)
1	DVI
2	YPbPr
3	S-Video
4	CVBS
5	RGB+Cs

**Register Explanation:** This call performs to set/get the main video input channel of Graphic card. Prisma-2 can set the desired video input if there is a valid signal on selected input connector (e.g. resolution should be in supported range). If there is no input on desired channel, Prisma-2 board will scan all possible inputs (this may require 20second for all inputs) and set input channel to first one which is connected and has proper features. Because of this, after completion of command, result should be checked by reading the input type. See flow diagram.

Brightness and Contrast values are specific for input types. If input type is changed, brightness and contrast values should be read to know the latest values.

**Flow Diagram:**



**Note1:** Update Brightness and Contrast values after successful input change.

**Note2:** This command is only supported in Prisma II.

**5.10.1.4 Set / Get TFT Brightness**

Supported firmware versions:  
ARCB: 3.18 or uppers

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x48</b>	Set: 0x00 Get: 0x01	<b>0x01</b>	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	<b>0x01</b>	Value	Checksum

Timeout for Request: Get → 16msec, Set → 100msec

**TWI Interface Call:**

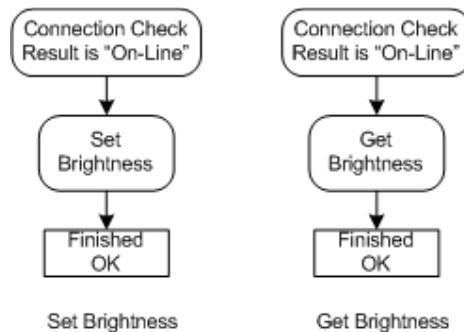
Not supported.

Value type: Unsigned Char  
Register Type: Write / Read  
Value Unit: -  
Value Min: 0 (Minimum Brightness 0%)  
Value Max: 255 (Maximum Brightness 100%)

**Register Explanation:**

This call performs to set/get the brightness of the display from the Graphic card.

**Flow Diagram:**



**Note:** This command is only supported in Prisma II

**5.10.1.5 Set / Get TFT Contrast**

Supported firmware versions:  
ARCB: 3.18 or uppers

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x49</b>	Set: 0x00 Get: 0x01	<b>0x02</b>	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	<b>0x02</b>	Value	Checksum

Timeout for Request: Get → 16msec, Set → 50msec

**TWI Interface Call:**

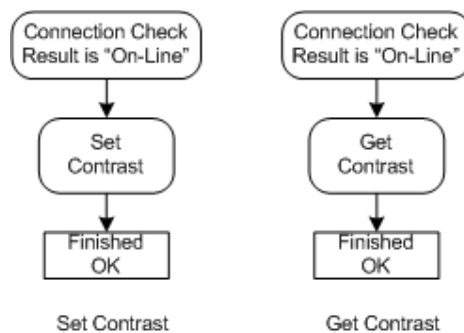
Not supported.

Value type: Unsigned Char  
Register Type: Write / Read  
Value Unit: -  
Value Min: 28 (Minimum Contrast 0%)  
Value Max: 228 (Maximum Contrast 100%)

**Register Explanation:**

This call performs to set/get the contrast of the display from the Graphic card.

**Flow Diagram:**



**Note:** This command is only supported in Prisma II.



### 5.10.1.6 Generic ROSD Command

Supported firmware versions:  
ARCB: 3.6.0 or uppers

	1.byte Packet Type Indicator	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x08	TID	Function number of ROSD command	Set: 0x00 Get: 0x01	Value 1	Set: Value 2 Get: Value 2	Checksum
<b>Response</b>	0x08	TID		Set: 0x00 Get: 0x01	Value 1	Value	Checksum

Timeout for Request: Refer to related Prisma ROSD documents.

**Value 1:** Function argument of ROSD command (MSB)

**Value 2:** Function argument of ROSD command (LSB)

**TWI Interface Call:**

Not supported.

Value 1/2 type: Char

Register Type: Write / Read

Value Unit: -

Value Min: Refer to related Prisma ROSD documents

Value Max: Refer to related Prisma ROSD documents

**Register Explanation:**

This call performs to set/get the remote osd commands for all Prisma derivative boards. The ROSD commands which require file operations can not be supported.

**Ex: How to change "Color Temperature" on different Prisma boards?**

**Common format:**

0x08 – TID – Function number of ROSD command – WR – ROSD\_Function\_Arg\_MSB – ROSD\_Function\_Arg\_LSB – Checksum

Let assume TID: 05,

**Prisma II**

0x08 – 0x05 – 0x07 – 0x00 – ColorTempValue(MSB) – ColorTempValue(LSB) – Checksum

**Prisma III**

0x08 – 0x05 – 0x08 – 0x00 – ColorTempValue(MSB) – ColorTempValue(LSB) – Checksum

**Prisma Media II**

0x08 – 0x05 – 0x08 – 0x00 – ColorTempValue(MSB) – ColorTempValue(LSB) – Checksum

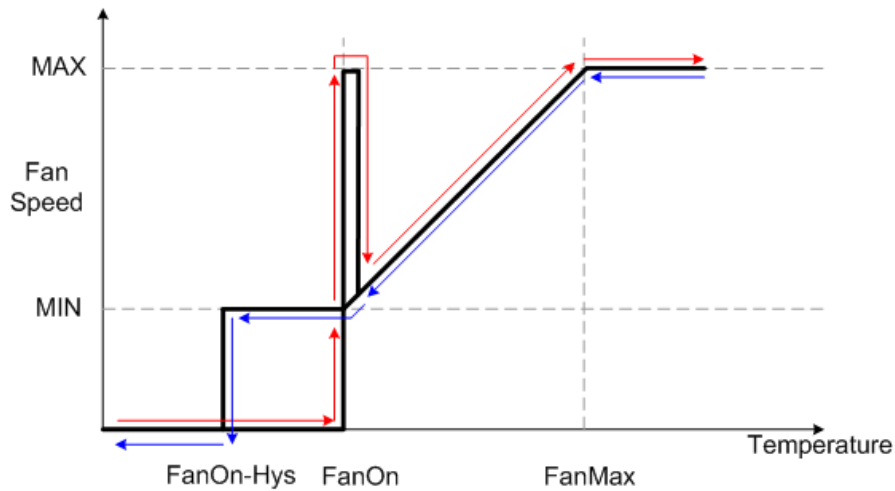
**Note:** This command is supported in Prisma II, Prisma III and Prisma Media II.

### 5.11 Fan Control Requests

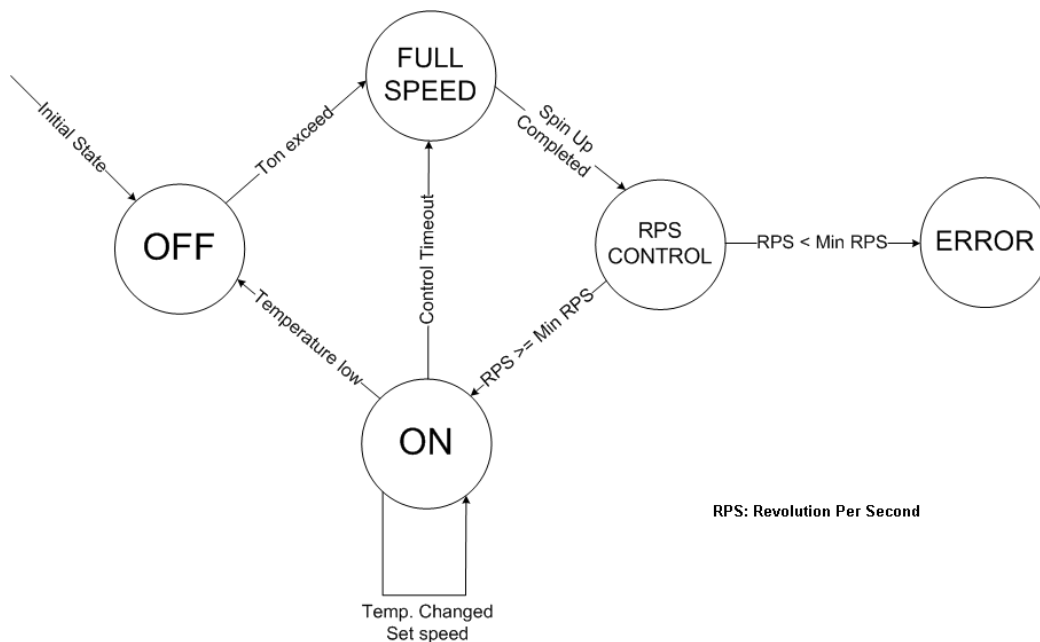
ARCB can control and drive 3-pin fans with ambient temperature. Fan control needs external temperature sensor to be connected. If there is no external temperature sensor, control algorithm is always keep fan status in OFF state.

Fan control registers are common for on board and external sensor board fan control circuits. Both controls uses same register sets.

The graphic of fan control algorithm is represented as below:



The state diagram of fan control algorithm is as below:



**5.11.1 Set/Get Fan On Temperature (On Board and External Sensor Board)**

Supported since firmware versions:  
ARCB: 3.4.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x5C</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.4.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x5C</b>	Value	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x5C</b>			0x7D	Value	

**Register Explanation:**

This register keeps the "Fan ON Temperature" parameter of fan control algorithm. Fan starts to run at this temperature.

Value type: Unsigned char  
Register Type: Write / Read  
Value Unit: °C  
Value Min: 0  
Value Max: 110

**5.11.2 Set/Get Fan Max Temperature (On Board and External Sensor Board)**

Supported since firmware versions:  
ARCB: 3.4.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x5D</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.4.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x5D</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x5D</b>			0x7D	Value	

**Register Explanation:**

This register keeps the “Fan Max Temperature” parameter of fan control algorithm. Fan is driven with maximum speed (100% pwm) at this temperature.

Value type: Unsigned char  
Register Type: Write / Read  
Value Unit: °C  
Value Min: 0  
Value Max: 120

**5.11.3 Set/Get Fan Hysteresis (On Board and External Sensor Board)**

Supported since firmware versions:  
ARCB: 3.4.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x5E</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.4.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x5E</b>	Value	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x5E</b>			0x7D	Value	

**Register Explanation:**

This register keeps the “Fan Hysteresis” parameter of fan control algorithm. Hysteresis is applied to lower temperature points around Fan ON temperature.

Value type: Unsigned char  
Register Type: Write / Read  
Value Unit: °C  
Value Min: 1  
Value Max: 10

**5.11.4 Set/Get Fan Control Enable Flag (On Board and External Sensor Board)**

Supported since firmware versions:  
ARCB: 3.4.x or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x18</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.4.x or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x18</b>	Value	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request					Response			
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x18</b>			0x7D	Value	

**Register Explanation:**

Second bit in this register keeps the “Fan Control Enable” flag of fan control algorithm. This flag enable/disable whole fan control algorithm. Fan control algorithm is performed with external temperature sensor. If this sensor is fault and fan control is activated, then system will go to error state and shut down.

To **enable** Fan Control:

Read register → logical OR the response with “0x04” → Write into same register

To **disable** Fan Control:

Read register → logical AND the response with “0xFB” → Write into same register

Value type: Unsigned char

Register Type: Write / Read

Value Unit: Enable / Disable

### 5.11.5 Set/Get Maximum Fan Current (Only for External Sensor Board)

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x5F</b>	Set: 0x00 Get: 0x01	Set: Value1 Get: 0x00	Set: Value2 Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	Value1	Value2	Checksum

Timeout for Request: Get → 16msec, Set → 47msec

Total current is integer (2-byte) and should be in terms of mA.

Example: For 3500mA → Value1=0x0D, Value2=0xAC

#### TWI Interface Call:

Supported since firmware versions:

ARCB: TBD

Set Operation:

Request					
	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	
<b>TWI Start</b>	0x7C	0x10	<b>0x60</b>	Value1	<b>TWI STOP</b>
	0x7C	0x10	<b>0x5F</b>	Value2	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
	1.byte ARCB Address	2.byte Master Read	3.byte Register Address		4.Byte ARCB Address	5.byte Register Value		
<b>TWI Start</b>	0x7C	0x20	<b>0x60</b>	<b>TWI STOP</b>	<b>TWI Start</b>	0x7D	Value1	<b>TWI STOP</b>
	0x7C	0x20	<b>0x5F</b>			0x7D	Value2	

This register call is only used for fan control that performed over external sensor board. ARCB on board fan control uses tachometer signal output of fans.

Register Type: Read / Write

Value type: Unsigned Integer

Value Unit: mA

Value Min: 0mA

Value Max: 5000mA

## 5.12 External Sensor Board Requests

### 5.12.1 Get External Sensor Board - Alarm Register

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x4C</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x4C</b>			0x7D	Value	

#### Register Explanation:

This register keeps the alarm status of external sensor board components. Each bit of register is a flag of sensor status:

0	0	0	Fan1	Fan0	Proximity	Humidity	Vandalism
---	---	---	------	------	-----------	----------	-----------

**Fan1-Fan0:** **00:** OK, **01:** ERROR, **10:** OFF, **11:** -

**Proximity:** **1:** Object detected, **0:** No object

**Humidity:** **1:** Humidity Range Exceeded, **0:** In range

**Vandalism:** **1:** Vandalism Detected, **0:** No Vandalism

Value type: Unsigned char

Register Type: Read only

Value Unit: -



### 5.12.2 Set/Get External Sensor Board - Sensor Enable/Disable Status

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x61</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x61</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x61</b>			0x7D	Value	

#### Register Explanation:

This register keeps the enable/disable status of external sensor board components. Each bit of register is a flag of sensor control status:

0	0	0	0	Fan-Ext	Proximity	Humidity	Vandalism
---	---	---	---	---------	-----------	----------	-----------

**Fan-Ext:** 1: Enabled, 0: Disabled  
**Proximity:** 1: Enabled, 0: Disabled  
**Humidity:** 1: Enabled, 0: Disabled  
**Vandalism:** 1: Enabled, 0: Disabled

Value type: Unsigned char  
 Register Type: Write / Read  
 Value Unit: -

**5.12.3 Get External Sensor Board – Sensor Status**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x4D</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x4D</b>			0x7D	Value	

**Register Explanation:**

This register keeps the communication status of sensors on external sensor board. Each bit of register is a flag of sensor status:

0	0	0	0	0	0	Humidity	Vandalism
---	---	---	---	---	---	----------	-----------

**Humidity:** 1: No communication, 0: Sensor exist

**Vandalism:** 1: No communication, 0: Sensor exist

Value type: Unsigned char

Register Type: Read only

Value Unit: -

**5.12.4 Get External Sensor Board – G-Sensor X axis acceleration**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x4E</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x4E</b>			0x7D	Value	

**Register Explanation:**

This register keeps the current acceleration of device in X-axis direction. Use following formula for real value:

$$\text{Acc-X} = 76 * \text{Value}$$

Value type: signed char

Register Type: Read only

Value Unit: mG (m-gravity)

Value Min: -128

Value Max: +127

**5.12.5 Get External Sensor Board – G-Sensor Y axis acceleration**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x4F</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x4F</b>			0x7D	Value	

**Register Explanation:**

This register keeps the current acceleration of device in Y-axis direction. Use following formula for real value:

$$\text{Acc-Y} = 76 * \text{Value}$$

Value type: signed char

Register Type: Read only

Value Unit: mG (m-gravity)

Value Min: -128

Value Max: +127

**5.12.6 Get External Sensor Board – G-Sensor Z axis acceleration**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x50</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x50</b>			0x7D	Value	

**Register Explanation:**

This register keeps the current acceleration of device in Z-axis direction. Use following formula for real value:

$$\text{Acc-X} = 76 * \text{Value}$$

Value type: signed char

Register Type: Read only

Value Unit: mG (m-gravity)

Value Min: -128

Value Max: +127

### 5.12.7 Set/Get External Sensor Board – Vandalism (Acceleration) Threshold

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x51</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

#### TWI Interface Call:

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x51</b>	Value	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x51</b>			0x7D	Value	

#### Register Explanation:

This register keeps the vandalism alarm threshold of board for all X-Y-Z directions. Vandalism alarm flag will be set, if any measured acceleration (abs value) is bigger than this register value.

Use following formula to set this register:

Value = (Vandalism threshold / 76), (Vandalism threshold is in terms of mG)

Value type: Unsigned char

Register Type: Write / Read

Value Unit: mg/76

Value Min: 0

Value Max: 128

**5.12.8 Get External Sensor Board – Relative Humidity Level**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x52</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x52</b>			0x7D	Value	

**Register Explanation:**

This register keeps the relative humidity (%RH) of air.

Value type: Unsigned char

Register Type: Read only

Value Unit: %RH

Value Min: 0

Value Max: 100

**5.12.9 Get External Sensor Board – Relative Humidity Level at Alarm**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x53</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x53</b>			0x7D	Value	

**Register Explanation:**

This register keeps the relative humidity (%RH) of air just before last alarm condition is occurred.

Value type: Unsigned char

Register Type: Read only

Value Unit: %RH

Value Min: 0

Value Max: 100



**5.12.10 Set/Get External Sensor Board – Humidity Threshold Minimum**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x54</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x54</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x54</b>			0x7D	Value	

**Register Explanation:**

This register keeps the minimum relative humidity threshold value for alarm condition.

Value type: Unsigned char  
Register Type: Read only  
Value Unit: %RH  
Value Min: 0  
Value Max: 100

**5.12.11 Set/Get External Sensor Board – Humidity Threshold Maximum**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x55</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x55</b>	Value	

ARCB should return ACK as a response in every end of byte.

Get Operation:

Request					Response			
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x55</b>			0x7D	Value	

**Register Explanation:**

This register keeps the maximum relative humidity threshold value for alarm condition.

Value type: Unsigned char  
Register Type: Read only  
Value Unit: %RH  
Value Min: 0  
Value Max: 100

**5.12.12 Set/Get External Sensor Board – Proximity Timeout**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x56</b>	Set: 0x00 Get: 0x01	0x00	Set: Value Get: 0x00	Checksum
<b>Response</b>	0x07	TID		Set: 0x00 Get: 0x01	0x00	Value	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x56</b>	Value	
ARCB should return ACK as a response in every end of byte.					

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x56</b>			0x7D	Value	

**Register Explanation:**

This register keeps the proximity timeout period in terms of seconds. After this timeout period, it's assumed that there is an object and proximity alarm flag is set.

Value type: Unsigned char  
Register Type: Write / Read  
Value Unit: second  
Value Min: 0  
Value Max: 255

**Note:** Proximity sensor has an effect on automatic brightness control algorithm. Refer section 5.9 for further information.

### 5.12.13 Set/Get External Sensor Board – Proximity Counter

#### RS232 / RS485 / USB (Virtual RS232) Interface Call:

Supported since firmware versions:

ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x57</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	Value1	Value2	Checksum
	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x59</b>	0x01	0x00	0x00	Checksum
<b>Response</b>	0x07	TID		0x01	Value3	Value4	Checksum

Timeout for Request: Get → 16msec each. Two separated read operations needed.

#### TWI Interface Call:

Supported since firmware versions:

ARCB: 3.6.0 or upper

Get Operation:

Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x58</b>			0x7D	Value1	
	0x7C	0x20	<b>0x57</b>			0x7D	Value2	
Request				Response				
TWI Start	1.byte ARCB Address	2.byte Master Read	3.byte Register Address	TWI STOP	TWI Start	4.Byte ARCB Address	5.byte Register Value	TWI STOP
	0x7C	0x20	<b>0x59</b>			0x7D	Value4	
	0x7C	0x20	<b>0x5A</b>			0x7D	Value3	

**Object Counter Value:** Value3-Value4-Value1-Value2 (msb to lsb)

Value type: Unsigned Long Integer

Register Type: Read only

Value Unit: counts of object

Value Min: 0

Value Max: 4294967295

**5.12.14 Set External Sensor Board – Proximity Counter Clear**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

	1.byte Length	2.byte Terminal ID	3.byte Function No	4.byte Rd / Wr	5.byte Arg-1	6.byte Arg-2	7.byte CRC
<b>Request</b>	0x07	TID	<b>0x5B</b>	0x00	0x00	0x01	Checksum
<b>Response</b>	0x07	TID		0x00	0x00	0x00	Checksum

Timeout for Request: Get → 16msec, Set → 32msec

**TWI Interface Call:**

Supported since firmware versions:  
ARCB: 3.6.0 or upper

Set Operation:

Request					
TWI Start	1.byte ARCB Address	2.byte Master Write	3.byte Register Address	4.byte Register Value	TWI STOP
	0x7C	0x10	<b>0x5B</b>	0x01	
ARCB should return ACK as a response in every end of byte.					

**Register Explanation:**

This request set the “Proximity Counter” register to zero.

### **5.13 Problems in Remote OSD Communication with Prisma-2**

If you cannot communicate with Graphic/Video board the possible reasons are:

- The cables are not connected properly.
- There is no valid input applied.
- Baud rate may be not set to correct value.

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