SolidMON

User Reference Manual

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Image sticking: If the monitor is operated with static images (logo's etc) it will inevitably lead to images sticking on the display (like on old CRT's). This is not a permanently situation and can be removed by operating the monitor with a completely black screen.

FCC Warning

Computing devices and peripherals generate and radiate radio frequency energy, and if not installed and used in accordance with the instructions advised by ISIC A/S, it may cause interference to radio communication.

Designed in accordance to

MIL STD 810C/F
MIL STD 461E
MIL-E-5400T
IEC 60945
IEC529

For status of approvals please contact ISIC A/S.

ISIC A/S is complying with the WEEE directive within the European Union, stating that electronic and electric products must be collected separately.
Products are marked according to the directive.

ISIC PN: 04956-000 rev. A

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1 Features

Congratulations on your purchase of your SolidMON product. This short form manual is designed to get you started working with your new SolidMON.

The SolidMON series of monitors are designed extremely rugged for ultimate reliability.

The monitor comes with excellent brightness and contrast levels that, together with wide viewing angles, ensure a good readability thus making it very eye-friendly. For the best picture quality, always use a double shielded DVI cable with ferrites.

Direct dimming control (0-100%) from +/- buttons.
Full settings control via menu or serial link.
Anti-glare coated glass.
Direct bonding of panel glass and front glass for additional ruggedness and optimum viewing performance (optional).

Multiple connections to cover DVI-D and VGA signal sources.

Firmware update and remote control via RS232 (optional).

2 General considerations on Installation and Operation

The SolidMON is designed to work at rough conditions. However, keeping the temperature and vibration level at a minimum will extend the life time of the product. ISIC recommend operating this product at normal room temperature (20-25 °C), with the lowest level of vibration and humidity.

Installation of the SolidMON

In order to obtain the best possible operating conditions, please note the following precautions.

- Room for cooling.
  When designing the cabinet/console for the SolidMON, please ensure that air can flow freely around the cabinet, in order to avoid any unnecessary rise in temperature. If it is not possible to have an adequate natural airflow, use a fan to force the airflow to be higher.

- Mounting positions
  To obtain adequate cooling by convection ISIC recommends that the SolidMON is mounted at least 30 degrees from horizontal. If this is not possible, forced cooling must be applied directly to the unit in order not to overheat it.

- Sunlight
  If the unit can be exposed to direct sunlight, there is a potential risk that the unit can be overheated. Please take measures to prevent direct sunlight. Do also consider forced cooling on the back of the unit.

3 Backlight brightness adjust

To adjust the backlight brightness press either the <+> or <-> key to enter this feature and then press or hold down the <+> or <-> key again until the backlight brightness level is reached.
The pop-up menu will disappear automatically according to the settings in the OSD time out menu.

4 Advanced OSD navigate and functionality

With the Advanced OSD (On Screen Display) you can modify the settings and control the special features of the FPC board (Flat Panel Controller). The Advanced OSD uses a number of menus for making changes and turning the special features on and off. The configuration can be done via the user interface on the monitor front.

Navigate the Advanced OSD:

Enter Advanced OSD	Press <MENU> key
Enter a sub menu	Press <ENTER> key
Navigate the OSD	Press <+> or <-> key to navigate to the different folders
Select a specific parameter	Navigate to the specific parameter and press <ENTER>
Increment or decrement a parameter	Navigate to the specific parameter and press <+> or <-> key followed by <ENTER>
Leave a sub menu or the advanced OSD	Go to Exit Sign  or press <MENU> key

Advanced OSD functionality

	First folder gives the possibility to select between DVI or VGA input (when available).
	Second folder gives the options: • Brightness adjust • Contrast adjust • Backlight Brightness adjust

	Third folder gives the options: • Auto Color Adjust (VGA input only) • Set Color Temperature to predefined values or adjust RGB manually
	Fourth folder gives the options (only available in VGA): • Auto Image • Adjust image width • Adjust image phase • Adjust image horizontal position • Adjust image vertical position

	Fifth folder
	• OSD settings
	  ○ OSD Time Out
	  ○ OSD Horizontal Position
	  ○ OSD Vertical Position
	  ○ OSD Orientation
	  ▪ Horizontal Mirror
	  ▪ Rotate 90
	  ▪ Rotate 180
	  ▪ Rotate 270
	  ▪ Horizontal mirror
	  ○ OSD Language
	  ▪ English
	  ▪ Espanol
	  ▪ Deutsch
	  ▪ Francais
	  ▪ Italiano
	• Factory Reset NOTE: Reboot the monitor afterwards!
	• Factory Color Reset NOTE: Reboot the monitor afterwards!
	• Factory Position Reset NOTE: Reboot the monitor afterwards!
	• Sharpness
	• Overlapped Mode Select

	Exit Advanced OSD

5 Protocol

5.1 Command Format

The last field of every packet is the checksum field. The checksum is calculated as the sum of all bytes starting at byte 2 (Device ID) up to the last data byte modulo 256. Packets with a wrong checksum are ignored by the board.
16 Bit Integer values are sent MSB first (big endian).

5.2 Commands

Adjuster read (Packet format)

1	2	3	4	5	6	7	8	9	10	11	12
Header	Device	Command	Data length	Data							Checksum
				ID	Min		Max		Current		
					Hi	Low	Hi	Low	Hi	Low	
0xBB	0x00	0x0A	0x07	ID	Hi	Low	Hi	Low	Hi	Low	Checksum

Get the minimum, maximum and current value of an adjuster

Adjuster set (Packet format)

1	2	3	4	5	6	7	8
Header	Device	Command	Data length	Data			Checksum
				ID	Value		
					Hi	Low	
0xBB	0x00	0x0B	0x03	ID	Hi	Low	Checksum

Set the current value of an adjuster

Adjuster ID's:

ID	Name	Range	Description
00	HorPos	Input Dependent	Horizontal Position
01	VerPos	Input Dependent	Vertical Position
02	Phase	Input Dependent	VGA Phase
03	HorTotal	Input Dependent	VGA Horizontal Total
04	Brightness	Input Dependent	Brightness
05	Backlight	0-255	Backlight Brightness
06	Contrast	28-228	Contrast
08	OsdXPos	0-255	OSD Horizontal Position
09	OsdYPos	0-255	OSD Vertical Position
10	OsdTimer	0-60	OSD Timeout in sec.
28	Input	0 = VGA 1 = DVI	Input channel source

Execute Action (Packet format)

1	2	3	4	5	6
Header	Device	Command	Data length	Action	Checksum
0xBB	0x00	0x16	0x01	ID	Checksum

Execute the action given by ID on the board.

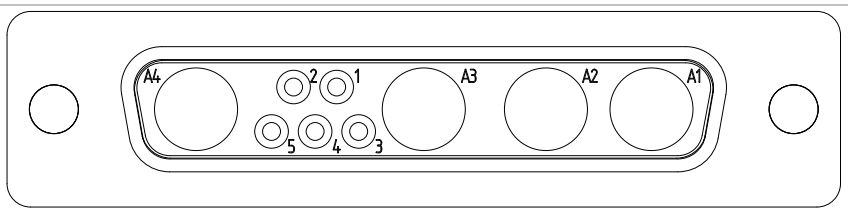
Action ID's:

ID	Name	Description
01	Auto Config	Perform Auto geometry and auto phase adjustment
02	Save Settings	Save current values to NVRAM
03	Factory Reset	Restore factory default settings
04	Select Analog Input	Set input channel source to RGB
05	Select Digital Input	Set input channel source to DVI
08	ToggleRgbDvi	Swap the input channel source

6 Connector and pin out

Power connector DC pin out (SUB-D 9W4 male)

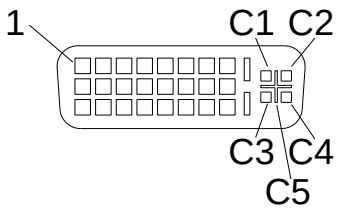
Pin #	Signal name
1	RTS (touch option)
2	TxD (touch option)
3	RxD (touch option)
4	CTS (touch option)
5	GND* (touch option)
A1	+24V DC
A2	NC
A3	GND*
A4	0V



* Must have the same GND

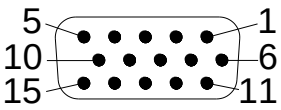
DVI-D pinout (standard DVI connector)

Pin #	Signal name	Pin #	Signal name	Pin #	Signal name
1	TMDS Data2-	9	TMDS Data1-	17	TMDS Data0-
2	TMDS Data2+	10	TMDS Data1+	18	TMDS Data0+
3	TMDS Data2/4 Shield	11	TMDS Data1/3 Shield	19	TMDS Data0/5 Shield
4	TMDS Data4-	12	TMDS Data3-	20	TMDS Data5-
5	TMDS Data4+	13	TMDS Data3+	21	TMDS Data5+
6	DDC Clock [SCL]	14	+5V Power	22	TMDS Clock Shield
7	DDC Data [SDA]	15	Ground (for +5V)	23	TMDS Clock +
8	Analog Vertical Sync	16	Hot Plug Detect	24	TMDS Clock -
C1	Analog Red				
C2	Anealog Green				
C3	Analog Blue				
C4	Analog Horizontal Sync				
C5	Analog GND Return (analog R,G,B)				



VGA pinout (Standard VGA connector – SUB-D 15 pole high density female)

Pin #	Signal name
1	Analog input red
2	Analog input green
3	Analog input blue
4	Nc
5	Analog Ground
6	Analog Ground red
7	Analog Ground green
8	Analog Ground blue
9	DDC power
10	Analog Ground
11	Nc
12	DDC serial data
13	Horizontal Sync input
14	Vertical Sync input
15	DDC serial clock



Serial connection pin-out (SUB-D 9 pol female) – optional interface

Pin #	Signal name
1	
2	TX
3	RX
4	
5	GND
6	
7	
8	
9	

The monitor supports a data rate of 57600 bits per second. Data shall be transmitted with no parity, one start bit, and one stop bit.

7 Technical specifications SolidMON

SolidMON 20”

Display size: **20” LCD (TFT)**

Display properties:

Size	Luminance	Contrast	Resolution
20”	>250 Cd/m^2	>500:1	1600 x 1200

View angle: **80° - 89° (L/R/T/B) (typical)**

Materials: **Front: Aluminium w. black power coating RAL 9005**

Rear: Aluminium w. black power coating RAL 9005

Window: **Anti Reflection coated front glass**

Protection: **IP65 front – IP54 rear**
Option IP67 with MIL connectors

Touch: **3M MicroTouch™ ClearTek™ II Capacitive (Optional extra)**

SolidMON I/O

Video inputs:

RGB : Analogue 0.7 Vpp positive at 75Ω,
Separate sync or sync on green
Generally all VESA compatible video modes are supported up to 165MHz (up to UXGA 60Hz and WUXGA 60Hz reduced blanking).
Horizontal sync: 15-100 kHz (automatic)
Vertical sync: 30-85 Hz up to 1280x1024
30-60 Hz up to 1920x1200

DVI: Generally all VESA compatible video modes are supported up to 160MHz (up to UXGA 60Hz and WUXGA 60Hz reduced blanking).
Special modes supported on request.

Control inputs: **1x RS232 – for remote control**
1x RS232 – for touch. (only if touch option is ordered)

Connectors: **DVI connector for DVI input**

D-SUB 15 High Density Connector for VGA

D-SUB 9 Connector for RS232
Optional MIL connector module available.

SolidMON Power Supply Options

Standard: **20-36Vdc Input**

Optional: **90-264Vac. 50-60Hz Input**

SolidMON Environmental Conditions

Operating Temperature: **-15 to 55 °C**

Storage Temperature: **-25 to 70 °C**

Relative Humidity: **max 95% @ 40 °C**

SolidMON Designed in accordance with

CE Mark: **EN61000-6-2 & EN61000-6-4**

Naval: **IEC 60945, MIL-STD-810G, MIL-STD-901D**

Army Ground: **MIL-STD 461F, MIL-STD-167 1A/2**

Airborne: **MIL E-5400T 2g Sweep according to Fig 2 curve IIa sheet 2 of 3**

Noise: **MIL-STD-740-1/2 (Below audible)**

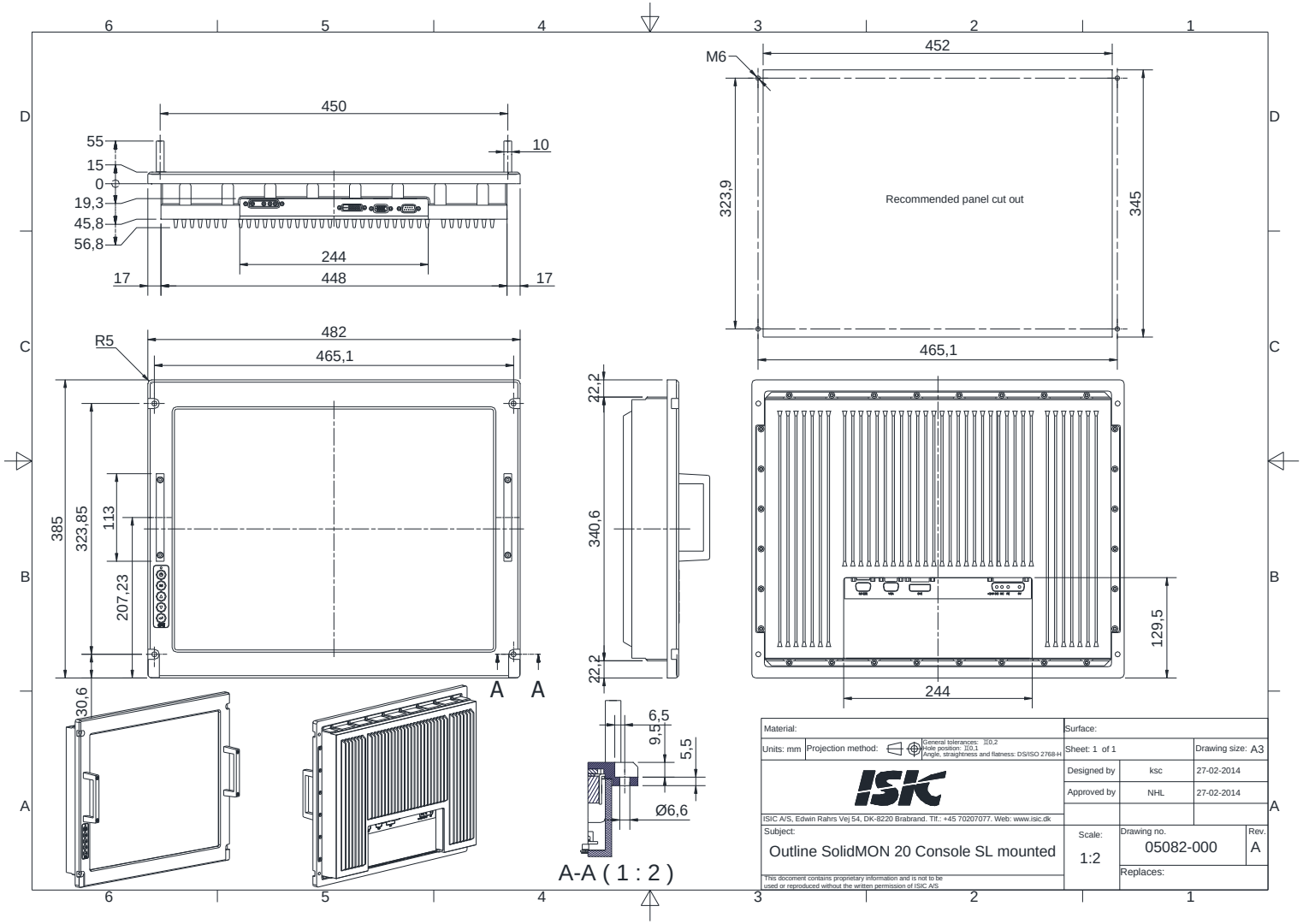
IEC529

SolidMON Physical dimensions

Console Mount: **385 mm (H) x 482 mm (W); Depth behind bezel: 57 mm**

Weight: **11,2 kg (excl. weight of options).**

8 Mechanical outline 19” console version 20.1”



9 Power Consumption

Test object / condition	Ptyp [W] @ backlight set to 100%	Pmax [W]] @ backlight set to 100%
SolidMON 20	50	60

In rush current DC: ~ [tbd] Amax @ 24V

In rush current ac: ~ 120 Amax @ 230VAC

10 Troubleshooting

Problem	Cause	Solutions
No picture on display	Backlight level set to minimum	Increase backlight
	Monitor turned off	Turn on the monitor
	No input signal present	Apply DVI or VGA signal
ON LED blinking	No input signal present	Apply DVI or VGA signal

11 ISIC info / Support

In case you have inquiries or problems with your DuraMON, you have a number of possibilities to get support.

Company name:	ISIC A/S
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Bank Address:	Nordea Bank Danmark A/S Erhvervsafdelingen Købanhavn Nord Nørgaardsvej 2 Dk – 2800 Kgs. Lyngby Denmark
Bank Code: Account number: IBAN: SWIFT:	2228 6877575320 DK36 2000 6877 5753 20 NDEADKKK
Contacts: RFQ's:	By fax to +45 70 20 79 76 By mail to sales@isic-systems.com
Orders:	By fax to +45 70 20 79 76 By mail to orders@isic-systems.com
Support:	Via homepage www.isic-systems.com under aftersales By mail to service@isic-systems.com During office-hours (Mo-Fr: CET 0800 - 1600) at +45 70 20 70 77
Service:	Before shipment for service request Return Material Authorisation number at homepage www.isic-systems.com under RMA By mail to service@isic-systems.com

12 Revision history

Rev 5	Nov 2012	Protocol included
Rev A	Nov 2014	Protocol updated. Mechanical outline updated. ac In rush current added.

13 Appendix A: Pixel policy

ISO 9241-307:2008 guidelines for LCD pixel defects

Introduction

TFT displays consist of a set number of pixels. Each pixel consists of 3 sub-pixels also called dots (one red, one blue and one green). Every sub-pixel is addressed by its own transistor. As a result, the manufacturing of glass substrate is very complex.
Due to the nature of this manufacturing process, occasional defects can occur. Pixel defects or failures cannot be fixed or repaired and may occur at any stage during the service life of the TFT display.
To regulate the acceptability of defects and protect the end user, ISIC A/S complies with the ISO 9241-307:2008 standard. This standard recommends how many defects are considered acceptable in a display, before it should be replaced within the terms of the warranty.

Monitor classification

ISO 9241-307:2008

Allowed defects per type per million pixels						
Defect classes	**Pixel defects**			**Cluster defect**		
	Type 1	**Type 2**	**Type 3 total** ($2xN_{3a} + N_{3b}$)	**Type 1**	**Type 2**	**Type 3**
Class: 0	0	0	0	0	0	0
Class: I	1	1	5	0	0	0
Class: II	2	2	10	0	0	1
Class: III	5	15	100	0	0	5

ISIC TFT monitors comply with ISO 9241-307:2008 Class II.
Special agreements about other classifications can be made between ISIC A/S and the customer.

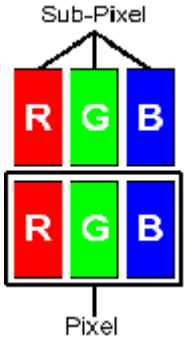
Measurement method/monitoring conditions for pixel defects

In compliance with the ISO-9241-307:2008 standard, the following conditions are observed:

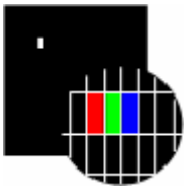
- Final check for pixel fault undertaken right after burn-in, i.e. with pre-heating of the display.
- Surrounding temperature 25ºC ± 5ºC
- Relative air humidity 40–70%

Pixel definition

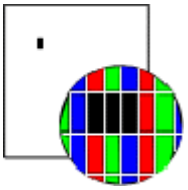
Every pixel consists of three sub-pixels/dots (red, blue, green).
Every sub-pixel has its own transistor.
The three sub-pixels/dots must be considered as one unit.



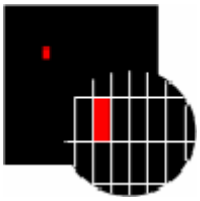
Pixel



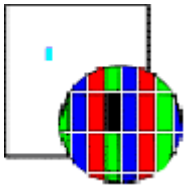
Pixel defect type 1 Pixel constantly lit



Pixel defect type 2 Pixel constantly dark



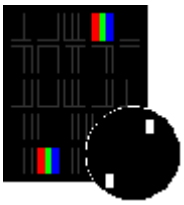
Pixel defect type 3a
Sub-pixel/dot (red, blue, green) constantly lit



Pixel defect type 3b
Sub-pixel/dot (red, blue, green) constantly dark

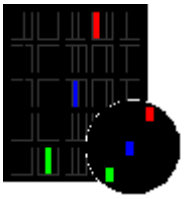
Cluster

A cluster consists of 5 x 5 pixels.

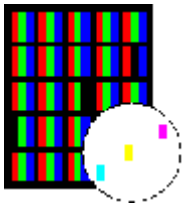


Cluster pixel defect type 1
Pixels in a cluster area constantly lit

Cluster pixel defect type 2
Pixels in a cluster area constantly dark



Cluster pixel defect type 3a
Sub-pixels/dots in a cluster area constantly lit



Cluster pixel defect type 3b
Sub-pixels/dots in a cluster area constantly dark

Pixel faults accepted by ISIC A/S

The maximum number of pixel faults that is considered acceptable at different screen resolutions is shown in the table below.

This is the native resolution and not the resolution as adjusted by user.

Class II

Allowable number of pixel faults in monitor applications							
Screen type	**Native resolution**	**Number of pixels**	**Pixel defect type 1**	**Pixel defect type 2**	**Pixel defect Type 3 total** ($2xN_{3a} + N_{3b}$)	**Cluster defect type 1 and 2**	**Cluster defect type 3**
XGA	**1024x768**	**768,432**	**1**	**1**	**7**	**0**	**0**
SXGA	**1280x1024**	**1,310,720**	**2**	**2**	**13**	**0**	**1**
UXGA	**1600x1200**	**1,920,000**	**3**	**3**	**19**	**0**	**1**
FHD	**1920x1080**	**2,073,600**	**4**	**4**	**20**	**0**	**2**
WUXGA	**1920x1200**	**2,304,000**	**4**	**4**	**23**	**0**	**2**

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