

C-Nav[®]

C-NaviGator III Hardware Manual

Revision 3

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C-Nav[®] Positioning Solutions
730 E. Kaliste Saloom Road
Lafayette, LA 70508 U.S.A.
oceanengineering.com/cnav



Release Notice

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2	03/29/2018	Updated to new web domain	L. Cortes
1	03/21/2016	Initial document creation	C. Thompson
Revision	Date	Description	Author

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Table of Contents

C-NaviGator III Hardware Manual.....	1
Trademarks	3
Disclaimer of Warranty	3
Limitation of Liability	3
Table of Contents.....	4
Manual Organization	6
Related Documents.....	6
CNAV-MAN-054.4 (C-NaviGator III Software Manual)	6
Manual Conventions.....	7
Section 1 - Overview.....	8
Introduction to Hardware	8
A Computer and Display, All In One.....	8
Supplied Equipment	9
Optional Equipment.....	9
Section 2 - Installation.....	10
Installation and Mounting	10
General Mounting Instructions.....	11
Ergonomics	12
Cables	13
Maximum Cable Length.....	13
Configuring Housing Connectors.....	13
Section 3 - Physical Connections.....	15
COM Module RS-232 (COM3-COM6).....	15
VGA Connector	15
Network / LAN Input / Output (NET A / NET B)	16
Digital Input / Output (X1 DIG OUT / X1 DIG IN).....	16
Digital Output / Serial I/O (X1 DIG OUT / X7 SER I/O).....	16
USB Input / Output	17
Power Inputs	17
Grounding Screw.....	17
Section 4 - Operation.....	18
User Controls Overview	18
Power On / Off.....	18

Brightness Adjustment	19
Section 5 - Specifications.....	20
TFT Technology	20
TFT Characteristics	20
Computer Specifications	20
Power Specifications	21
Power Supply.....	21
Power Consumption	21
Physical Dimensions	21
User Controls	21
Behind Front Bezel - Glass Display Control™ (GDC) IP66	21
Environmental Considerations.....	22
Input / Output Connectors	22
Section 6 - Specifications of Accessories	23
USB Cable	23
Description.....	23
Specifications.....	23
External AC-DC Power Supply.....	24
RS-232 COM Module	25
Features	25
Specifications.....	25
Appendix A - Mechanical Drawings	27
Appendix B - Pin Assignments.....	28
Appendix C - Approvals & Certifications	31
IEC & IACS.....	31
Bureau Veritas (BV)	31
DET NORSE VERITAS (DNV).....	36
American Bureau of Shipping (ABS)	39
Germanischer Lloyd (GL)	41
Appendix D - Declaration of Conformity.....	43

Manual Organization

This manual describes how to install, configure, and operate the C-NaviGator III Control & Display unit from Oceaneering International, Inc. Sections are organized in a manner that facilitates quick operator orientation.

An overview of the hardware is in [Section 1 - Overview](#) (Page 8). [Section 2 - Installation](#) (Page 10) discusses how to properly mount and install the C-NaviGator III.

[Section 3 - Physical Connections](#) (Page 15) describes all of the connections to the C-NaviGator III. General operating procedures are discussed in [Section 4 - Operation](#) (Page 18).

Technical specifications of the C-NaviGator III and its accessories are detailed in [Section 5 - Specifications](#) (Page 20) and [Section 6 - Specifications of Accessories](#) (Page 23).

Related Documents

CNAV-MAN-054.4 (C-NaviGator III Software Manual)

Describes how to operate the C-NaviGator III Control & Display software. It is available on the C-Nav website at <https://www.oceaneering.com/C-Nav/Software/C-NaviGatorIII/PDFDownloads/CNAV-MAN-054.4%20%28C-NaviGator%20III%20Software%20Manual%29.pdf>.

Manual Conventions

Arial font is used for plain text in this document.

Arial italic font is used for settings names.

“Arial quoted” font is used for settings values.

Arial Bold font is used for button names.

Arial Bold Italic font is used for menu items.

[Arial Blue](#) font is used for cross-references.

[Arial Blue Underline](#) font is used for hyperlinks.

Arial red italic is used for typed commands.

Arial Bold font size 10 is used for captions.

ARIAL BLACK ALL-CAPS font is used for port connection names.



This symbol means Reader Be Careful. It indicates a caution, care, and/or safety situation. The user might do something that could result in equipment damage or loss of data.



This symbol means Danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical and RF circuitry and be familiar with standard practices for preventing accidents.

Important notes are displayed in shaded text boxes.

Please note:

Such note boxes display important information that should not be ignored.

Simple file content is displayed in Courier New Black font in a text box.

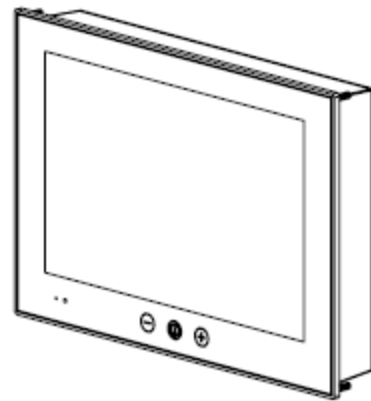
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#Sample File  
Version 0.1
```

Section 1 - Overview

Introduction to Hardware

The C-NaviGator III offers the ultimate in performance, convenience, state of the art design, and enduring quality for our customers. The C-NaviGator III offers a range of feature sets optimized for varying requirements and applications.

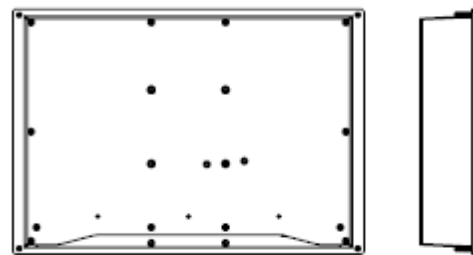
The C-NaviGator III is a flexible all-in-one monitor and PC solution, designed and type approved for the professional marine segment, where reliability and long life time are key prerequisites for the industry. The product range combines state of the art display and computer technology with innovative features and options, making it all that the integrator needs for top class type approved marine systems.



The C-NaviGator III is delivered with a factory-mounted Projected Capacitive Touch Screen (Multi-touch, USB interface) and features HATTELAND[®] Glass Display Control[™], LED backlight technology, and full dimming.

A Computer and Display, All In One...

- Multi-touch
- Type Approved
- IP22 rear / IP66 front
- Superior Bonding Technology
- Module based, tailor-made systems made easy
- GLASS DISPLAY CONTROL[™] (GDC), Solid State Menu System



Supplied Equipment

The C-NaviGator III CDU Bundle (P/N BUNDLE_C-NAVIG_III) consists of the following items:

- C-NaviGator III Display Unit with External USB cable (P/N CNVC-NAVIGATORIIIA)
- C-NaviGator III Power Supply Unit (PSU) with US, UK and EU line cords (P/N CNVHT00255-OPT-A1)
- USB Thumb Drive (P/N 7CNG002-0)

Optional Equipment

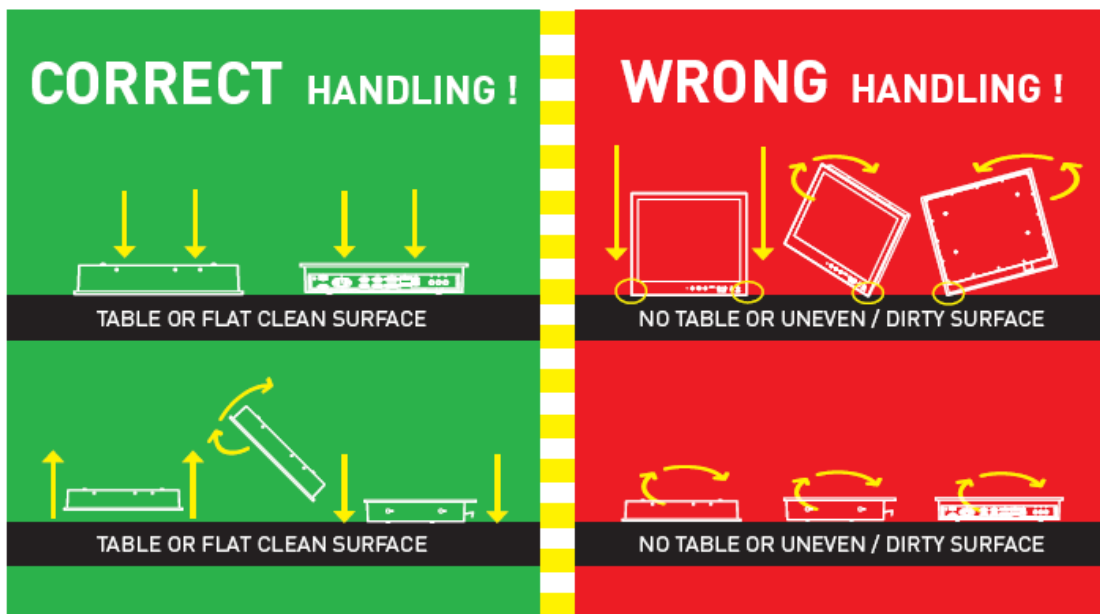
The C-NaviGator III also consists of the following items used for mounting or for transporting the C-NaviGator III:

- C-NaviGator III Rugged Case (P/N CNV3GTR005-0)
- C-NaviGator III 19" Rack Mounting Plate (P/N CNVJH 13TAP STD-A1)
- Flat Screen Table Stand (P/N CNVCHIFSB018BLK)

Section 2 - Installation

Attention:

To prevent damage to chassis corners and / or breaking the front glass, please review the illustrations below before handling the units!



Installation and Mounting

1. Most of our products are intended for various methods of installation or mounting (panel mounting, bracket mounting, ceiling/wall, console mounting etc.); for details, please see the relevant mechanical drawings.
2. Adequate ventilation is a necessary prerequisite for the life of the product. The air inlet and outlet openings must definitely be kept clear; coverings which restrict ventilation are not permissible.
3. Generally, do not install the unit in a horizontal position (lying down), as this will cause heat to build up inside the unit which will damage the LCD Panel. To prevent this problem we recommend installing the unit in a vertical position (± 30 degrees) to improve the airflow through the unit.
4. To further improve the cooling of the unit we recommend installing Cooling Fans underneath blowing upwards into the unit air inlet. This may be

- required in high temperature applications and also when there is reason to expect temperature problems due to a non-optimal way of mounting.
5. Exposure to extreme direct sunlight can cause a considerable increase in the temperature of the unit and might under certain circumstances lead to over-heating. This point should already be taken into consideration when the bridge equipment is being planned (sun shades, distance from the windows, ventilation, etc.)
 6. Space necessary for ventilation, for cable inlets, for the operating procedures and for maintenance, must be provided.
 7. If the push buttons of the product are not illuminated, an external, dimmable illumination (IEC 60945 Ed. 4, 4.2.2.3, e.g. Goose neck light) is required for navigational use. The illumination shall be dazzle-free and adjustable to extinction.
 8. Information about necessary pull-relievers for cables is indicated in the Physical Connection section of this manual. Attention must be paid to this information so that cable breaks will not occur, e.g. during service work.
 9. Do not paint the product. The surface treatment influences on the excess heat transfer. Painting, labels, or other surface treatments that differ from the factory default might cause overheating.
 10. Expose to heavy vibration and acoustic noise might under certain circumstances affect functionality and expected lifetime. This must be considered during system assembly and installation. Mounting position must carefully be selected to avoid any exposure of amplified vibration.

General Mounting Instructions

1. The useful life of the C-NaviGator III generally decreases with increasing ambient temperature; it is therefore advisable to install such units in air-conditioned rooms. If there are no such facilities these rooms must at least be dry, adequately ventilated, and kept at a suitable temperature in order to prevent the formation of condensation inside the display unit.
2. Cooling of the C-NaviGator III takes place via the surface of the casing. The cooling must not be impaired by partial covering of the unit or by installation of the unit in a confined cabinet.
3. In the area of the wheel house, the distance of the C-NaviGator III from the magnetic standard compass or the magnetic steering compass must not be less than the permitted magnetic protection distance. This distance is measured from the center of the magnetic system of the compass to the nearest point on the C-NaviGator III. The compass safe distance of the C-NaviGator III is at least 80cm (31.5") from a standard compass; at least 45cm (18") from a steering compass.
4. When selecting the site of a display unit, the maximum cable lengths have to be considered.

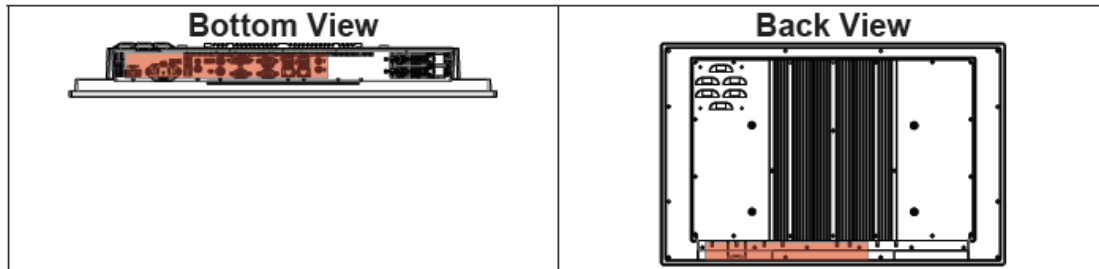
5. When a product is being installed, the surface base or bulkhead must be checked to ensure that it is flat in order to avoid twisting of the unit when the fixing screws are tightened, because such twisting would impair mechanical functions. Any unevenness should be compensated for by means of spacing-washers.
6. The grounding screws of the units must be connected to the body of the ship (ground); the wire used should have a cross sectional area of at least 6 mm² (10AWG).
7. Transportation damage, even if apparently insignificant at first glance, must immediately be examined and be reported to the freight carrier. The moment of setting-to-work of the equipment is too late, not only for reporting the damage but also for the supply of replacements.
8. The classification is only valid for approved mounting brackets provided by C-Nav[®]. The unit shall be mounted stand-alone without any devices or loose parts placed at or nearby the unit. Any other type of mounting might require test and re-classification.

Ergonomics

1. Adjust the unit height so that the top of the screen is at or below eye level. Your eyes should look slightly downwards when viewing the middle of the screen.
2. Adjust screen inclination to remain gaze angle to the center of the screen approximately perpendicular to the line of gaze.
3. When products are to be operated both from a sitting position and from a standing position, a screen inclination of about 30° to 40° (from a vertical plane) has turned out to be favorable.
4. The brightness of displays is limited. Sunlight passing directly through the bridge windows - or its reflection - which falls upon the screen workplaces must be reduced by suitable means (negatively inclined window surfaces, venetian blinds, distance from the windows, dark coloring of the deckhead). However, units can be offered with optical enhanced technology to reduce reflections and are viewable in direct sun light; but as a general rule it is recommended to install or mount the units at the bridge wing area by suitable alignment or bulkhead / deckhead mounting in such a way that reflections of light from the front pane of the display are not directed into the observer's viewing direction.
5. The use of ordinary commercial filter plates or filter films is not permitted for items of equipment that require approval (by optical effects, "aids" of that kind can suppress small radar targets, for example).

Cables

Use only high quality shielded signal cables.



Cable Entries & Connectors (Marked area) - Illustration only

Maximum Cable Length

Any cable should generally be kept as short as possible to provide a high quality input / output. The maximum signal cable length will depend on the signal resolution and frequency.

Configuring Housing Connectors

Housing connectors are available in different sizes (2-pin, 4-pin or 5-pin) which plugs into the connector area of the unit. These housing connectors are by factory default mounted on the unit. Below is a brief illustration that might be useful during configuration and installation of such connectors. You will need suitable pre-configured cable(s) and tools to configure the connector(s) and cable(s) that are present in your installation environment. Below is a sample for a 2-pin DC power connector. The procedure is the same for other connectors of this type.

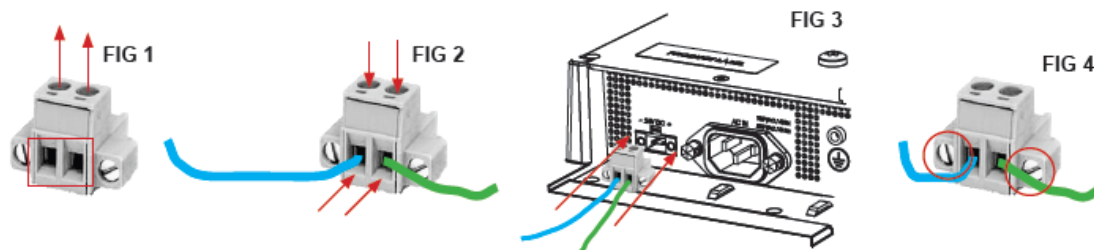


FIG 1: Unscrew (from top) or make sure that the screw terminals (square area) are fully open, so you can secure the inserted cables correctly to the loose

housing connector (it may already be plugged into the unit as per factory installation).

FIG 2: Insert cables* (from front) and screw / secure the cables by turning the screw on top of the housing to secure the cables properly. Check that the cables are firmly in place and do not appear loose or fall out when pulling gently.

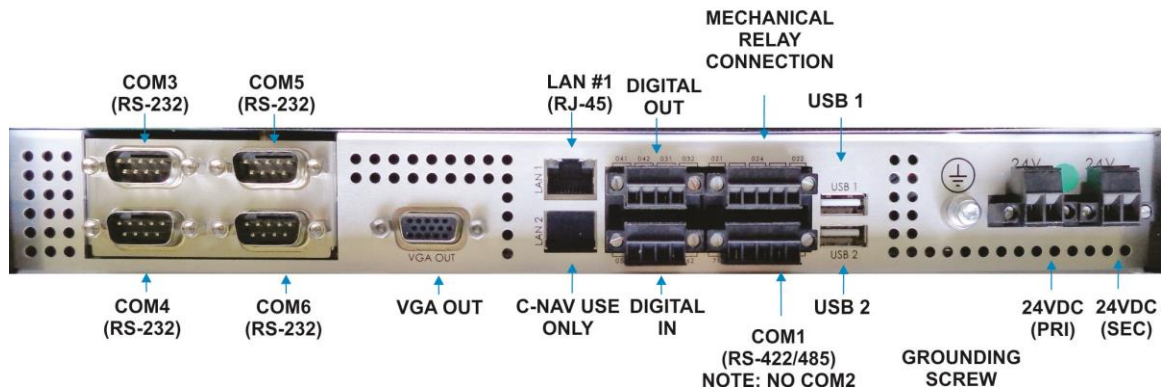
Note:

Required polarization verification (for instance -/+ for DC power input) should conform to the markings on the connector area of the unit. Ignoring the markings on the unit or its add-on modules might damage the unit and / or external equipment in which end, warranty will be void.

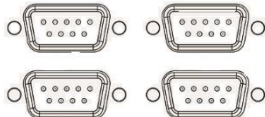
FIG 3: Plug the housing into the appropriate connector area of the unit and check again that the cables secured conform to the markings on the connector area of the unit. Finalize the installation by fastening the screws located in front on each side of the housing connector (**FIG 4**).

Section 3 - Physical Connections

C-NaviGator III Connections

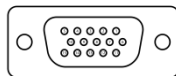


COM Module RS-232 (COM3-COM6)



The COM modules provide the system with quad independent COM channels. The module is attached to the motherboard via standard USB interface. Application software accesses the COM channels as standard COM devices, i.e. in the normal case if there are no requirements for additional software development. This module will mainly be integrated, electrical and mechanical, in the C-NaviGator III.

VGA Connector



The VGA Connector provides the system with a video. The module is attached to the motherboard via a standard USB interface. The remote display monitor needs to support the native resolution of the C-NaviGator III (1280 x 800).

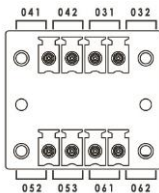
Network / LAN Input / Output (NET A / NET B)



Supports 10/100/1000Mbps Ethernet (LAN). Suitable for twisted pair cables CAT 5E. Make sure the network cable connector “clicks” into the RJ-45 connector. Only one RJ-45 port is available; the other RJ-45 port is unused and is

blocked off.

Digital Input / Output (X1 DIG OUT / X1 DIG IN)

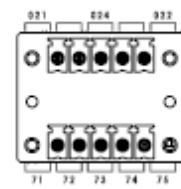


A majority of your inputs / outputs for your applications will be through the COM, USB, and LAN ports. However, a mechanical and digitally driven “Solid State Relay” (NO/NC/COM/24VDC) (over current protection) connector block, which allows the user via software to control external equipment that requires or are compatible with the

specifications, is attached to the C-NaviGator III Display Unit. Connect and fasten your cables from your compatible external equipment to the SCD 90F connector block.

Digital Output / Serial I/O (X1 DIG OUT / X7 SER I/O)

It is a two-function connector. First, a COM port (isolated RS-422/485) functionality to communicate with serial based equipment is available on the “X7 SER I/O” this connector. This is known as COM1. Please note that there is no COM2.



Furthermore, if required, a mechanical and digitally driven relay “X1 DIG OUT, Mechanical Relay” (NO/NC/COM) which allows the user via software to control external equipment that require or are compatible with the specifications. If relay is off, PIN1 and PIN5 are connected. When relay is on, PIN1 and PIN3 are connected.

Connect and fasten your cables from your compatible external equipment to the SC 90F connector block.

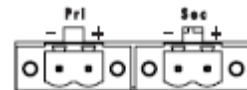
USB Input / Output

This supports any USB1.1 (12Mbps) and USB2.0 (480Mbps) compliant peripherals. Drivers for most USB devices are usually included in operating system or on separate installation DVD's delivered with Third Party products. USB 1.1 devices will operate in USB 1.1 mode (12 Mbps). USB1.1 is suitable for cable distances above 10 meter / 32.8 feet, whereas USB2.0 is suitable from less than 10 meter / 32.8 feet distances. 2 ports are available. As an option, the user can connect the external USB cable (provided with the bundle) to one of the two USB ports.



Power Inputs

Connect your DC power cables to the SL-SMT 90F connector block. The internal DC power module supports 24VDC. The unit offers both primary (Pri) and secondary (Sec) power inputs for secure operation of the unit as well as galvanic isolation and automatic switching between power sources. An external AC- DC Power Supply Unit (PSU) is provided with the C-NaviGator III bundle.



Grounding Screw

DC models are required / recommended to be properly grounded via the screw located on both the Display Unit and the Power Supply Unit.




Section 4 - Operation

User Controls Overview

The C-NaviGator III units are designed by using HATTELAND[®] Glass Display Control[™] (GDC) touch technology to allow interactivity, adjusting brilliance (brightness), and control power on / off with the use of illuminated symbols. Note that these symbols are only visible (backlight illuminated) when suitable power is connected. There are no physical moving knobs, potentiometers, wheels, or push buttons available as everything is touch surface controlled, which allows a human finger (including several types of gloves) to control the unit.



Power On / Off

 Touching this symbol will either turn the C-NaviGator III Display Unit On or Off. The Power Indicator LED is lit when power is supplied.

Brightness Adjustment

⊖ ⊕ Brilliance / brightness adjustment of the displayed image is adjusted by touching the (-) or (+) illuminated symbols. Both symbols are visible as long as the unit is powered.

Section 5 - Specifications

TFT Technology

- 13.3 inch TFT Liquid Crystal Display module
- Widescreen, Aspect Ratio 16:10
- a-si TFT Active Matrix
- CCFL Backlight

TFT Characteristics

Native Resolution	1280 x 800 (WXGA)
Pixel Pitch (RGB)	0.2235 (H) x 0.2235 (V) mm
Response Time	6/10ms (typical) (Tr/Tf)
Contrast Ratio	800:1 (typical)
Light Intensity	400 cd/m ² (typical)
Viewable Angle	70 deg (H) 60 deg (V) (typical)
Active Display Area	286.08 (H) x 178.8 (V) mm
Max Colors	262000

Computer Specifications

Installed OS	Linux Based OS
CPU/Processor	1 x Intel® Atom™ N450, 1.66GHz, 512KB L2 Cache
Installed Storage	1 x 8GB 2.5" SATA SSD
Installed Memory	1 x 1GB 200-pin DDR2 667MHz
System Chipset	Intel® NM10 / ICH8M
Graphics Chipset	Intel® GMA 3150
BIOS	AMIBIOS
Speaker	None
Buzzer	Yes (according to EN60945)
Power Manager	ACPI

HW Status Monitor	Temperatures, voltages, & cooling fan status
Resolution Range	From 640 x 480 to 1280 x 800
Sync. Range	Horizontal: 24 kHz to 81 kHz, Vertical: 50 Hz to 75 Hz*

Power Specifications

Power Supply

2 x 24VDC	Model HD 13T21 MMC-Exx-xxxx
-----------	-----------------------------

Dual input, galvanic isolated, automatic switch between power sources

Power Consumption

Operating	20W (typ) - 30W (max)
-----------	-----------------------

Physical Dimensions

- 355.00 (W) x 248.50 (H) x 58.00 (D) mm
- 13.98" (W) x 9.78" (H) x 2.28" (D)
- 4 x M4 VESA mounting 75x75mm, Max 8mm deep
- Built-in Console mounting 4 x M5x15mm screws
- Weight: 4.4kg / 9.7lbs

User Controls

Behind Front Bezel - Glass Display Control™ (GDC) IP66

- Power On / Off, Brightness Control (- / +), Light Sensor (not visible)
- Programmable Alarm LED, Buzzer (not visible)

Environmental Considerations

Operating	Temperature -15 deg. C to +55 deg. C, Humidity up to 95%
Storage	Temperature -20 deg. C to +60 deg. C, Humidity up to 95%
IP-Rating	Protection: IP66 front - IP22 rear (EN60529)

Safety Considerations:

Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Input / Output Connectors

Connector	Rear
Primary Power 24VDC	1 x SL-SMT 90F (1 x 2 pole)
Secondary Power 24VDC	1 x SL-SMT 90F (1 x 2 pole)
LAN	1 x RJ45 (For customer)
LAN	1 x RJ45 (Unused)
USB2.0 (<10m)	2 x Type A
Solid State Relay (NO) (over current protection)	2 x SCD 90F (2 x 2 pole) (IEC 60950 Compliant, 48VDC)
Mechanical Relay (NO/NC)	1 x SC 90F connector (1x3 pole)
COM RS-422/485 (isolated, NMEA Compliant)	1 x SC 90F connector (1 x 5 pole)
COM RS-232 (non-isolated module)	4 x 9P D-SUB Connectors

Section 6 - Specifications of Accessories

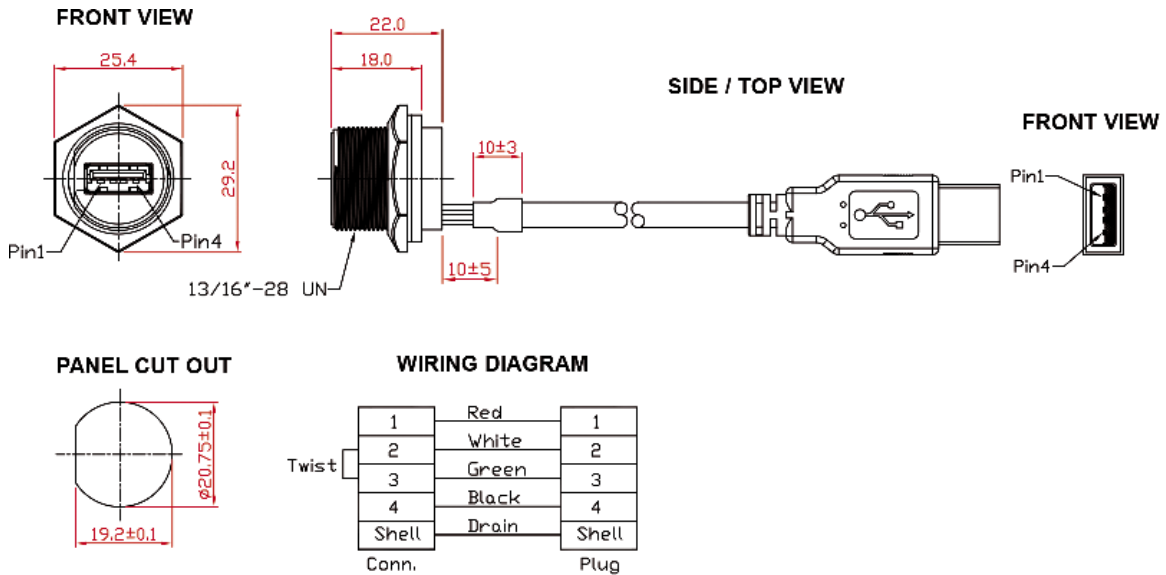
USB Cable

Description

USB Cable (Type A plug to Chassis mount Type A receptacle) suitable for installations that feature a secure fastening connection from external equipment with standard Type A ports to the C-NaviGator III standard USB Type A ports. The USB Thumb Drive, provided with the bundle, can be connected to the front panel side for saving snapshots and other data. It is in RoHS Compliance.

Specifications

Waterproof Rate	IP67
Recommended Panel Thickness	0.8 to 6.0 mm
Recommended Torque	6~7 Kgf-cm
Mating Cap P/N	GT1C533122
Over Mold	Black color PVC
USB Type A Plug	Thermal plastic, black color housing
Cable	Copper Alloy contacts with Silver plated finish Cold Roll Steel shell with Nickel plated finish 1m, UL2725 1P x 28AWG + 2C x 24AWG+Al/My+D+B, 5.0mm thickness, black color
Shrink Tube	L=10mm, Black color
Receptacle Connector	USB-A Plastic C3 Panel Jack screw with pig tail
Type Approval / Testing	Not tested, IEC60945 and IACS E10 pending



External AC-DC Power Supply

The External AC-DC Power Supply allows AC input voltages of 115VAC to 230VAC, 50-60Hz. US, UK, and EU style line cords are provided with the C-NaviGator III bundle.



AC Input Connection

There is a 24VDC output on the other side of this power supply. The 24VDC output is then connected to the Primary (Pri) input on the C-NaviGator III. A DC power cable is provided.



DC Output Connection

RS-232 COM Module

Features

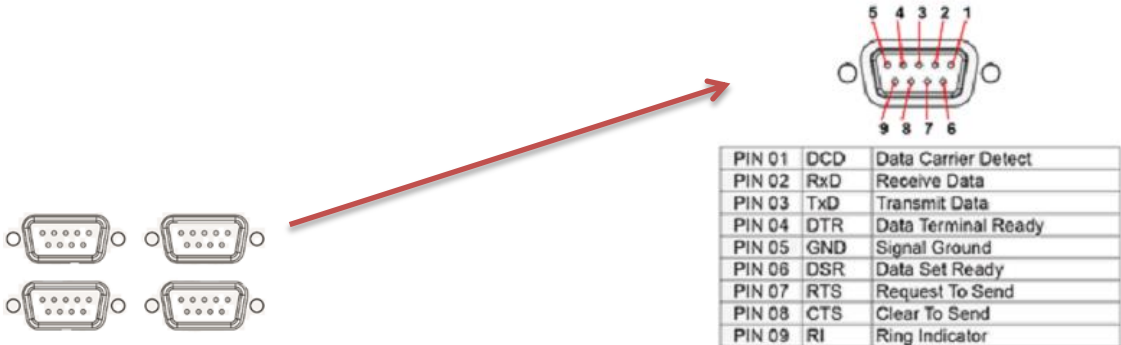
- 4 independent channels (If a card is replaced most operating systems will not change COM port number)
- Outputs are short circuit protected

Specifications

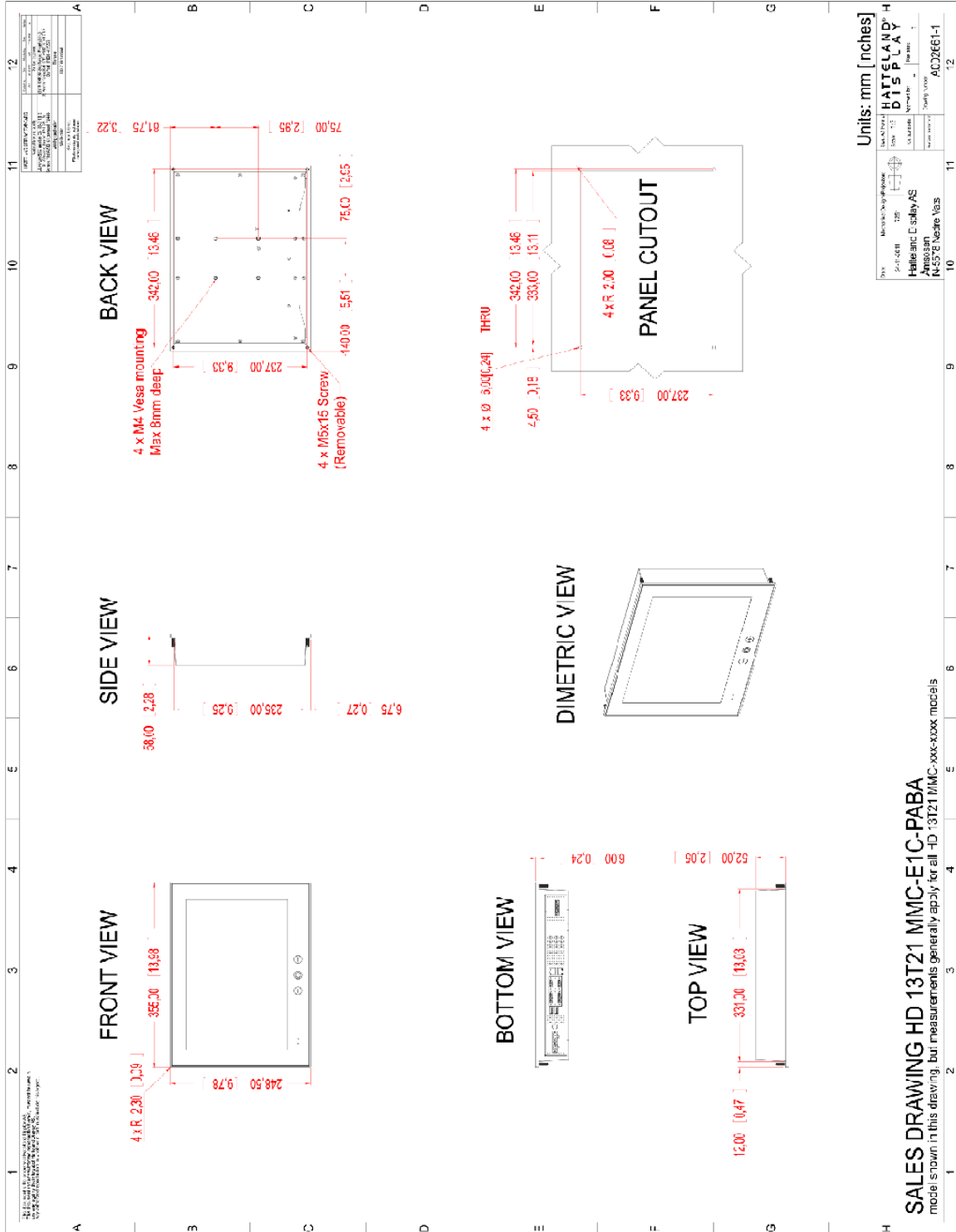
Internal USB to 4 channel x RS-232 non isolated

Features	All channels have support for all RS-232 DB-9 signals
Connector	Standard RS-232 DB-9 male housing and pinning
Data Rate	230kbps
ESD Rating (IEC 1000-4-2 Air) (RS-232 I/Os)	±15 kV
ESD Rating (IEC 1000-4-2 Contact) (RS-232 I/Os)	±8 kV

9 pin DSUB Serial COM RS-232 non-isolated

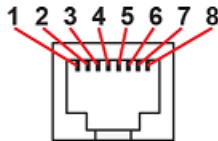


Appendix A - Mechanical Drawings



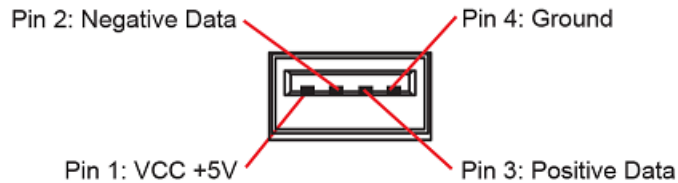
Appendix B - Pin Assignments

8 pin RJ45 10/100/1000Mbps LAN/Ethernet

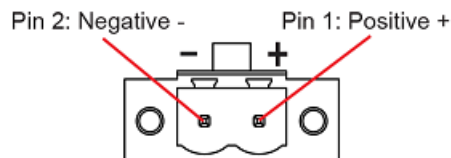


PIN 01	D0P	Differential Pair 0 (Positive)
PIN 02	D0N	Differential Pair 0 (Negative)
PIN 03	D1P	Differential Pair 1 (Positive)
PIN 04	D2P	Differential Pair 2 (Positive)
PIN 05	D2N	Differential Pair 2 (Negative)
PIN 06	D1N	Differential Pair 1 (Negative)
PIN 07	D3N	Differential Pair 3 (Positive)
PIN 08	D3N	Differential Pair 3 (Negative)

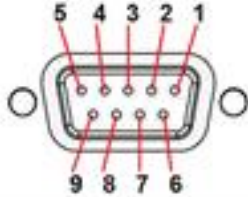
4 pin USB TYPE A



2 pin DC Power Input, Phoenix



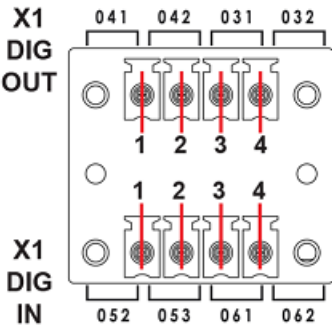
9 pin DSUB Serial COM RS-232 non-isolated



PIN 01	DCD	Data Carrier Detect
PIN 02	RxD	Receive Data
PIN 03	TxD	Transmit Data
PIN 04	DTR	Data Terminal Ready
PIN 05	GND	Signal Ground
PIN 06	DSR	Data Set Ready
PIN 07	RTS	Request To Send
PIN 08	CTS	Clear To Send
PIN 09	RI	Ring Indicator

8 pin Digital Output / Input Module

“Solid State Relay”

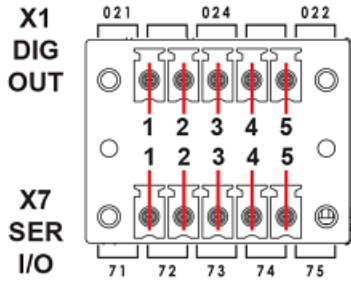


Pin 1	X1 - Out: 41	Out +
Pin 2	X1 - Out: 42	Out -
Pin 3	X1 - Out: 31	COM (Common Center Terminal) *
Pin 4	X1 - Out: 32	NC (Normally Closed)*

* IEC 60950 Compliant, 48VDC

Pin 1	X1 - In: 52	+24VDC
Pin 2	X1 - In: 53	GND (Ground)
Pin 3	X1 - In: 61	+24VDC
Pin 4	X1 - In: 62	+Input

10 pin Digital Output / Input & Serial Module
 “Mechanical Relay & COM (isolated RS-422/485)”



PIN 1	X1 - Out: 21	COM (Common Center Terminal)
PIN 2	X1 - N/C	<i>Not Connected / Not used</i>
PIN 3	X1 - Out: 24	NO (Normally Open)
PIN 4	X1 - N/C	<i>Not Connected / Not used</i>
PIN 5	X1 - Out: 22	NC (Normally Closed)

PIN 1	X7 - In: 71	Rx+ (Receive Data +)
PIN 2	X7 - In: 72	Rx- (Receive Data -)
PIN 3	X7 - Out: 73	Tx+ (Transmit Data +)
PIN 4	X7 - Out: 74	Tx- (Transmit Data -)
PIN 5	X7 - GND: 75	SGnd (Signal Ground)

Appendix C - Approvals & Certifications

IEC & IACS

IEC 60945 4th (EN 60945:2002)

IACS E10

Bureau Veritas (BV)



MARINE DIVISION

Certificate number: 29687/A0 BV

File number: AP 4316

Product code: 4484H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

www.veristar.com

TYPE APPROVAL CERTIFICATE

This certificate is issued to

Hatteland Display AS
Nedra Vats - NORWAY

for the type of product

MARITIME DEDICATED COMPUTERS

Series X - Maritime Multi Computers (MMC)

HD 08T21, HD 13T21, HD 12T21, HD 15T21, HD 17T21, HD 19T21, HD 24T21 and HD 28T21

Requirements:
BUREAU VERITAS Rules for the Classification of Steel Ships
IEC 60945:2002 (4th Ed.)

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 13 Jul 2017

For BUREAU VERITAS,
At BV OSLO, on 13 Jul 2012,
Rune MARSTEIN

Rune Marstein



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) issued to be re-approved prior to their being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine Division, available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgment, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

BV Mod. Ad E 530 May 2009

This certificate consists of 4 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

The Series X - Maritime Multi Computers (MMC) comprises the following models (divided in 2 groups):

HD 08T21 MMC-Exz-qrBx - 8.0" LCD

HD 13T21 MMC-Exz-qrBx - 13.3" LCD

and

HD 12T21 MMC-zA1-pqrs - 12.1" LCD

HD 15T21 MMC-zA1-pqrs - 15.0" LCD

HD 17T21 MMC-zA1-pqrs - 17.0" LCD

HD 19T21 MMC-zA1-pqrs - 19.0" LCD

HD 24T21 MMC-zA1-pqrs - 24.0" LCD

HD 26T21 MMC-zA1-pqrs - 26.0" LCD

1.1 - Common characteristics:

LCD Type:	Colour TFT LED Backlight
Processor: (Depending on the Model / Version)	Intel® Atom™ N450 - 1.66 GHz Intel® Core™ 2 Duo P8400 - 2.26 GHz Intel® Celeron P4505 - 1.86 GHz
Memory: (Depending on the Model)	DDR2 or DDR3
Storage: (Depending on the Model / Version)	2.5" SATA Solid State Disk (SSD) HDD (see § 1.3 below for supported Models)
I/O Ports: (Depending on the Model / Version)	Ethernet GigaBit LANs - RJ45 COM (RS-232, RS-422/485) USB 2.0 - Type A DVI-I RGB IN / RGB OUT Keyboard / Mouse
Power Supply: (Depending on the Model)	DC Power IN - 2x24 VDC HD 08T21 & HD 13T21, Type: AADLB4003W - 60W DC/AC Power IN - 115/230 VAC - 50/60 Hz Type: PBNO0918 used on Models 12" to 17" (except above 13") and 26" Type: L-SYS-0904-659-V1-0 used on Models 19" to 24" and 26"
Ingress Protection Index:	IP 66/22 (Front/Rear)
Operating System:	MS® Windows XP Pro, Server, 7 Pro

1.2 - Specific characteristics of LCD Displays

	Native Resolution	Response Time (ms)	Contrast Ratio	Light Intensity (cd/m ²)
HD 08T21 MMC	800x480 (WVGA)	5/11	600:1	600
HD 13T21 MMC	1280x800 (WXGA)	6/10	800:1	400
HD 12T21 MMC	1024x768 (XGA)	35 Std	700:1 Std	500 Std
HD 15T21 MMC	1024x768 (XGA)	8 Std	700:1 Std	400 Std
HD 17T21 MMC	1280x1024 (SXGA)	5	1000:1	350
HD 19T21 MMC	1280x1024 (SXGA)	20	1000:1	300
HD 24T21 MMC	1920x1080 (FHD)	25	3000:1	250
HD 26T21 MMC	1920x1200 (WUXGA)	8	1500:1	350

1.3 - SSD and HDD:

Manufacturer	Type	Description	Size
Toshiba	MK2565GSX	Standard 2.5" HDD	250 GB
Fujitsu	MHW2080BH	Standard 2.5" HDD	80 GB
Fujitsu	MHZ2120BH	Standard 2.5" HDD	120 GB
PQI	SSM PQI S982-II	SSD Module	64 GB
Transcend	TS16GSSD25S	SSD 2.5"	16 GB
Transcend	TS32GSSD25S-M	SSD 2.5"	32 GB
Transcend	TS128GSSD25S-M	SSD 2.5"	128 GB

1.4 - Accessories for Series X MMC:

Product	Description
IIT 00254 OPT-A1	USB to CAN
PCA100293	USB to RS422 485
PCA100294	USB to RS232

1.5 - BIOS / Firmware Versions:

	Mainboard	Watchdog	Touch
IID 08T21 MMC	V0.6	110114R0V01	MILDEX_8p0_17x27_72E1v1005_f02_nsnpsab
HD 13T21 MMC	V0.6	100909R0V01	MILDEX_13_4_28x48_72E2v1005_f02_npdpsab
HD 12T21 MMC	C051Z120.ROM	GDC_120110_0xAF41.hex	N/A
IID 15T21 MMC			
HD 17T21 MMC			
HD 19T21 MMC			
IID 24T21 MMC			
HD 26T21 MMC			

2. DOCUMENTS AND DRAWINGS:

HATTELAND:

User Manual, Series X - Maritime Multi Computers Models, Doc. INB100485 1 (Rev. 4), dated 14 Mar. 2012.
 User Manual, Series X - Maritime Multi Computers Models, Doc. INB100485-2 (Rev. 2), dated 14 Mar. 2012.

Data Sheets:

HD 08T21 MMC xxx-xxxx, Doc Rev. 03 dated 02 Mar. 2012
 HD 13T21 MMC-xxx-xxxx (2 Models), Doc Rev. 03 dated 01 Mar. 2012 and Doc. Rev. 02 dated 02 Mar. 2012
 HD 12T21 MMC xxx-xxxx, Doc Rev. 03 dated 01 Mar. 2012
 HD 15T21 MMC-xxx-xxxx, Doc Rev. 03 dated 01 Mar. 2012
 HD 17T21 MxC xxx-xxxx, Doc Rev. 03 dated 01 Mar. 2012
 HD 19T21 MxC-xxx-xxxx, Doc Rev. 03 dated 01 Mar. 2012
 HD 24T21 MxC-xxx-xxxx (2 Models), Doc Rev. 02 dated 07 Dec. 2011 and Doc. Rev. 05 dated 20 Mar. 2012
 HD 26T21 MxC-xxx-xxxx, Doc Rev. 04 dated 07 Jun. 2012
 Series x Panel Computers - Type Number Overview, Doc. IND100780-4-Rev 04 dated 02 Mar. 2012
 CAN Module with CO-Processor, Doc Rev. 02 dated 23 May 2011
 COM Module RS-422 / RS-485, Doc Rev. 04 dated 14 Mar. 2012.

Letter LET_BV20120524AK dated 24.05.2012, Type Approval request for Maritime stand-alone Computers, Displays and Panel Computers.

3. TEST REPORTS:

DNV Technical Reports:

EMC & Environmental Testing - HD 13T21 STD, Report No. 2011-3497 Rev. 01, dated 2011.11.28
 EMC & Environmental Testing - HD 08T21 MMC, Report No. 2011-3496 Rev. 01, dated 2011.11.29
 EMC & Environmental Testing - IID 15T21 STD, Report No. 2012-3081 Rev. 01, dated 2012.02.29
 EMC & Environmental Testing - HD 17T21 STD, Report No. 2011-3545 Rev. 01, dated 2012.02.24
 EMC & Environmental Testing - IID 19T21 MMD, Report No. 2011-3438 Rev. 01, dated 2012.02.14
 EMC & Environmental Testing - IID 23T14 MMD, Report No. 2010-3124 Rev. 03, dated 2010.04.20
 EMC & Environmental Testing - HD 24T21 MMD, Report No. 2011-3481 Rev. 01, dated 2012.04.11
 EMC & Environmental Testing - IID 24T21 MMC, Report No. 2011-3475 Rev. 01, dated 2011.11.24
 EMC & Environmental Testing - IID 26T11 MMD, Report No. 2011-3396 Rev. 01, dated 2011.09.29
 EMC & Environmental Testing - HT C01 STD, Report No. 2011-3165 Rev. 01, dated 2011.06.11
 EMC Testing - IIT B21EA STC, Report No. 2012-3095 Rev. 01, dated 2012.05.09
 EMC & Environmental Testing of Maritime Computer - HT B18, Report No. 2009-3601 Rev. 5, dated 2010.03.11
 EMC Testing of HT B08CD, Report No. 2008-3319 Rev. 1, dated 2008.06.23
 Vibration Testing - IIT 15T17 MMC, Report No. 2011-3430 Rev. 01, dated 2011.10.18.

Nemko:

EMC Test Report - IIT B21EA STC, Report No. E11201.01, dated 2012.01.03.

Note: Above equipment was tested and Approved according to IEC 60945 4th edition (except Salt-Mist Test not carried out).

4. APPLICATION / LIMITATION:

4.1 - BUREAU VERITAS Rules for the Classification of Steel Ships and IEC 60945.

4.2 - Approval valid for ships intended to be granted with the following additional class notations: AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.

4.3 - BUREAU VERITAS Environmental Category, EC Code: 21

4.4 - The equipment fulfils the EMC requirements for installation on the Bridge and Deck Zone.

4.5 - To be flush mounted.

4.6 - Only Hardware and Firmware successfully tested together in compliance with the regulations as referred to in page one, according to the declaration of the manufacturer are covered by this certificate.

4.7 - The Panel Computers intended for the presentation of navigation-related information on the bridge of a ship shall be tested according to the requirements of IEC 62288.

5. PRODUCTION SURVEY REQUIREMENTS:

5.1 - The **Series X - Maritime Multi Computers MMC** are to be manufactured, examined and tested by **Hatteland Display AS** in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships.

5.2 - Production sites are to be recognized by Bureau Veritas as per NR320 for IIBV products. To this end **Hatteland Display AS** has to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites.

5.3 - **Hatteland Display AS** has declared to Bureau Veritas that the type of product described in this certificate are manufactured at the following production site:

Hatteland Display AS
Åmsosen
N-5578 Nedre Vats
NORWAY

6. MARKING OF PRODUCT:


According to IEC 60945.

7. OTHERS:

This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the units at any time, and that **Hatteland Display AS, Åmsosen, N-5578 Nedre Vats, NORWAY** will accept full responsibility for informing shipbuilders, shipowners or their sub-contractors of the proper methods of use and general maintenance of the units and the conditions of this approval.

*** END OF CERTIFICATE ***

DET NORSKE VERITAS (DNV)



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. **A-12838**

This is to certify that the
Personal Computer

with type designation(s)
Maritime Multi Computer - Series X

Manufactured by
Hatteland Display AS
NEDRE VATS, Norway

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application
Location classes:


Temperature	A*
Humidity	B
Vibration	A
EMC	B
Enclosure	A / IP22, B / IP66**

* Low temperature tested at -15 °C
** IP66 when sealed to console

Høvik, 2012-07-13
for Det Norske Veritas AS




Odd Magne Nesvåg
Head of Section



DNV local office:
Haugesund

This Certificate is valid until
2016-12-31



Ståle Sneen
Surveyor *Makr*

This Certificate is subject to terms and conditions over-leaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.
If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

DET NORSKE VERITAS AS, Veritasveien 1, NO-1322 Høvik, Norway, Tel.: +47 67 57 99 00, Fax: +47 67 57 99 11, Org.No. NO 916 748 931 MVA www.dnv.com
Form No.: TA 1411a Issue: October 2009 Page 1 of 3



Certificate No.: A-12838
 File No.: 899.30
 Job Id.: 262.1-013612-1

Product description

Maritime Multi Computer – Series X, comprising the following models:

Type	Description	Power supply options	Standard compass safe distance	Steering compass safe distance
HD 08T21 MMC	MMC Series X Compact	24VDC	45 cm	25 cm
HD 13T21 MMC	MMC Series X Compact	24VDC	80 cm	45 cm
HD 12T21 MMC	MMC Series X	115/230VAC – 50/60Hz + 24VDC	40 cm	20 cm
HD 15T21 MMC	MMC Series X	115/230VAC – 50/60Hz + 24VDC	55 cm	40 cm
HD 17T21 MMC	MMC Series X	115/230VAC – 50/60Hz + 24VDC	115 cm	70 cm
HD 19T21 MMC	MMC Series X	115/230VAC – 50/60Hz + 24VDC	70 cm	45 cm
HD 24T21 MMC	MMC Series X	115/230VAC – 50/60Hz + 24VDC	115 cm	70 cm
HD 26T21 MMC	MMC Series X	115/230VAC – 50/60Hz + 24VDC	125 cm	80 cm

Accessories:

Product name	Description	Test report reference
IIT 00254 OPT-A1	USB to CAN	2011-3496, E11201.01
PCA100293	USB to RS422/485 Module	2011-3475

SSD and HDD:

Manufacturer	Type	Description	Size
Toshiba	MK2565GSX	Standard 2.5" HDD	250 GB
Fujitsu	MHW2080BH	Standard 2.5" HDD	80 GB
Fujitsu	MHZ2120BH	Standard 2.5" HDD	120 GB
PQI	SSM PQI S982-II	Disk On Chip Module	64 GB
Transcend	TS16GSSD25S	SSD 2.5"	16 GB
Transcend	TS32GSSD25S-M	SSD 2.5"	32 GB
Transcend	TS128GSSD25S-M	SSD 2.5"	128 GB

The type approved configurations are described by the respective data sheets.

Place of manufacture

Hatteland Display
 5578 Nedre Vats, Norway

Application/Limitation

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV Rules for Ships Pt.4 Ch.9 Control and Monitoring Systems.

Product certificate

Each delivery of the application system is to be certified according to Pt.4 Ch.9 Sec.1. The certification test is to be performed at the manufacturer of the application system according to an approved test program before the system is shipped to the yard. After the certification the clause for application software control will be put into force.

Clause for application software control


All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV for evaluation and approval. Major changes in the software are to be approved before being installed in the computer.

Type Approval documentation


Typenumber Overview: IND100780-4 Rev.04, dated 2012-03-02 – (Series X Panel Computers)

User manuals:
 INB100485-1 Rev.1, dated 2012-03-14 – (MMC Series X)
 INB100485-2 Rev.2, dated 2012-03-14 – (MMC Series X Compact)

Data sheets:
 DS HD 08T21 MMC-xxx-xxxx Rev.03, dated 2012-03-02
 DS HD 12T21 MMC-xxx-xxxx Rev.03, dated 2012-03-01
 DS HD 13T21 MMC-xxx-xxxx_atom-n450 Rev.03, dated 2012-03-02
 DS HD 13T21 MMC-xxx-xxxx_core-p8400 Rev.03, dated 2012-03-01

		Certificate No.: A-12838 File No.: 899.30 Job Id.: 262.1-013612-1
Sales drawings:	DS HD 15T21 MMC-xxx-xxxx Rev.03, dated 2012-03-01 DS HD 17T21 MxC-xxx-xxxx Rev.03, dated 2012-03-01 DS HD 19T21 MxC-xxx-xxxx Rev.03, dated 2012-03-01 DS HD 21T21 MxC-xxx-xxxx Rev.05, dated 2012-03-20 DS HD 20T21 MxC-xxx-xxxx Rev.05 preliminary, dated 2012-07-03 DS CAN Module with CO-Processor Rev.02, dated 2011-05-23 DS COM Module BS-4?? / BS-485 (PGA100263-1) Rev.04, dated 2012-03-14 A002418-1 Rev.1, dated 2011-07-06 – (HD 24T21 MMC-M1D-AABA) A002661-1 Rev.1, dated 2011-12-01 – (HD 19T21 MMC-MX1-OABA) A002645-1 Rev.1, dated 2011-11-24 – (HD 08T21 MMC-E1C-PABA) A002654-1 Rev.1, dated 2011-12-01 – (HD 12T21 MMC-MJF-AABA) A002661-1 Rev.1, dated 2011-11-24 – (HD 13T21 MMC-E1C-PABA) A002667-1 Rev.1, dated 2012-03-01 – (HD 13T21 MMC-E3A-PABA) A002671-1 Rev.1, dated 2011-11-30 – (HD 15T21 MMC-MJF-MABA) A002680-1 Rev.1, dated 2011-12-02 – (HD 17T21 MMC-MJD-MABA) A002755-1 Rev.1 preliminary, dated 2012-03-04 – (HD 26T21 MMC-MJD-AABA)	
Test reports:	Technical report 2010-3124, Rev.03, dated 2011-02-22 – (JH 23T14 MMD-MA1-Axxx) Technical report 2011-3395, Rev.02, dated 2012-07-11 – (JH 26T11 MMD-MA1-A05C) Technical report 2011-3418, Rev.01, dated 2011-10-14 – (HD 13T21 KMD-DR1-CORP) Technical report 2011-3475, Rev.01, dated 2011-11-24 – (HD 24T21 MMC-MJD-AAB2) Technical report 2011-3481, Rev.01, dated 2012-04-11 – (HD 24T21 MMD-MA1-FAGA) Technical report 2011-3495, Rev.03, dated 2012-07-11 – (HD 08T21 MMC-E1C-PABA) Technical report 2011-3497, Rev.02, dated 2012-07-10 – (HD 13T21 STD-FA1-FAGP) Technical report E11201.01, Rev.01, dated 2012-01-03 – (H1 B21EA SIC-A33-E100) Technical report 2011-3545, Rev.01, dated 2012-02-24 – (HD 17T21 STD-MA1-FAGA) Technical report 2012-3081, Rev.01, dated 2012-02-29 – (HD 15T21 STD-MA1-FAGA) Technical report E12080.01, Rev.01, dated 2012-06-15 – (HD 12T21 MMC-MWF-AABA) Technical report 2012-3302, Rev.02, dated 2012-07-13 – (HD 19T21 MMD-MA1-FAGA)	
Tests carried out Applicable tests according to Standard for Certification No. 2.4, April 2006. Applicable tests for protected equipment according to IEC 60945, 4 th edition (2002).		
Certificate Retention Survey The scope of the retention/renewal survey is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.		
The main elements of the survey are: <ul style="list-style-type: none"> • Ensure that type approved documentation is available • Inspection of factory samples, selected at random from the production line (where practicable) • Review of production and inspection routines, including test records from product sample tests and control routines • Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications • Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given • Ensuring traceability between manufacturer's product type marking and the type approval certificate Retention survey is to be performed at least every second year and at renewal of this certificate.		
END OF CERTIFICATE		
DNV NORSK VERITAS AS, Veritasveien 1, NO-1322 Hovik, Norway, Tel: +47 67 57 99 00, Fax: +47 67 57 99 11, Org. No. NO 945 748 901 MVA, www.dnv.com Form No.: TA 1411a Issue: October 2009 Page 3 of 8		

American Bureau of Shipping (ABS)

Certificate Number: 12-LD908273-1-PDA	
	
Confirmation of Product Type Approval 30/AUG/2012	
Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this product.	
This is to certify that, pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed product held a valid Manufacturing Assessment (MA) with expiration date of 28/AUG/2013. The continued validity of the Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS Rules.	
And; a Product Design Assessment (PDA) valid until 11/JUL/2017 subject to continued compliance with the Rules or standards used in the evaluation of the product.	
The above entitle the product to be called Product Type Approved.	
The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.	
ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs or facilities built after the date of the ABS Rules used for this evaluation.	
Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is part of our contract that, whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility for continued compliance with the standard.	
HATTELAND DISPLAY AS	
Model Name(s): Series X Maritime Multi Computers, Model Numbers: HD 08T21 MMC, HD 12T21 MMC, HD 13T21 MMC, HD 15T21 MMC, HD 17T21 MMC, HD 19T21 MMC, HD 24T21 MMC, HD 26T21 MMC	
Presented to:	HATTELAND DISPLAY AS AMSOSEN NEDRE VATS Norway
Intended Service:	Panel Computer for Marine applications.
Description:	Panel Computer with AC&DC power Input and with a choice of Intel Celeron P4505, Atom N450, Intel i7-620LE or C2D 2.26 GHz processor. Accessories: HT 00254 OPT-A1 (USB to CAN), PCA100293 (RS422-485 Module), PCA100294 (USB to RS232 Module)
Ratings:	Operating Temp: -15C to +55C IP Rating: IP66 (front) - IP22 (rear) Models HD 08T21 MMC and HD 13T21 MMC: +24VDC All other models: +24V DC / 115V/230V AC
Service Restrictions:	The computer units will require Unit Certification if intended for use in any machinery monitoring and directional functions onboard an ABS classed vessel, MODU or facility. Unit certification could be performed individually or as an Integrated system.
Comments:	Not Applicable
Notes / Documentation:	This Product Design Assessment (PDA) is valid only for products intended for use on ABS classed vessels, MODUs or facilities which are in existence or under contract for construction on the date of the ABS Rules used to evaluate the Product.
Term of Validity:	This Product Design Assessment (PDA) Certificate 12-LD908273-1-PDA, dated

08/30/2012 8:36:34 AM


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Page 1 of 2

Certificate Number: 12-LD908273-1-PDA

<p>ABS Rules:</p> <p>National Standards:</p> <p>International Standards:</p> <p>Government Authority:</p> <p>EUMED:</p> <p>Others:</p>	<p>17/Aug/2012 remains valid until 11/Jul/2017 or until the Rules or specifications used in the assessment are revised (whichever occurs first). This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product. Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA. Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.</p> <p>The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product. The Rules applicable to this assessment are: ABS Rules for Building and Classing Steel Vessels (2012) 1-1-4/7.7, 4-9-7/13.1, 4-9-7/Tables 9 & 10</p> <p>IACS UR E10 2008 Rev.5, IEC/EN 60945, EN 55022 2006+A1 2007, EN 55024, EN 61000-3-2 2006+A1:2009+A2:2009, EN 61000-3-3 2008</p>								
<table border="1"> <thead> <tr> <th>Model Certificate</th> <th>Model Certificate No</th> <th>Issue Date</th> <th>Expiry Date</th> </tr> </thead> <tbody> <tr> <td>PDA</td> <td>12-LD908273-1-PDA</td> <td>17/AUG/2012</td> <td>11/JUL/2017</td> </tr> </tbody> </table>	Model Certificate	Model Certificate No	Issue Date	Expiry Date	PDA	12-LD908273-1-PDA	17/AUG/2012	11/JUL/2017	<p style="text-align: right;"><i>Robert J. Vennema</i></p> <p style="text-align: right;">ABS Programs</p> <p>ABS has used due diligence in the preparation of this certificate and it represents the information on the product in the ABS Records as of the date and time the certificate was printed. Type Approval requires Drawing Assessment, Prototype Testing and assessment of the manufacturer's quality assurance and quality control arrangements. Limited circumstances may allow only Prototype Testing to satisfy Type Approval. The approvals of Drawings and Products remain valid as long as the ABS Rules, to which they were assessed, remain valid. ABS cautions manufacturers to review and maintain compliance with all other specifications to which the product may have been assessed. Further, unless it is specifically indicated in the description of the product, Type Approval does not necessarily waive witnessed inspection or survey procedures (where otherwise required) for products to be used in a vessel, MODU or facility intended to be ABS classed or that is presently in class with ABS. Questions regarding the validity of ABS Rules or the need for supplemental testing or inspection of such products should, in all cases, be addressed to ABS.</p>
Model Certificate	Model Certificate No	Issue Date	Expiry Date						
PDA	12-LD908273-1-PDA	17/AUG/2012	11/JUL/2017						



Germanischer Lloyd (GL)

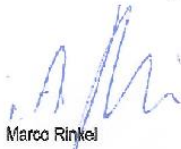



Type Approval Certificate

This is to certify that the undamoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No	47 036 - 12 HH
Company	Hatteland Display AS Amcosen 8573 Nedre Vats, NORWAY
Product Description	Maritime Multi Computer Serie 1 Modelle and Serie X Models
Type	HD.T. MMC
Environmental Category	C; EMC1
Technical Data / Range of Application:	<p>Series 1 Models JH 15T17 MMC +24V DC or 115V/230V AC</p> <p>Series X Models HD 08T21 MMC +24V DC HD 12T21 MMC +24V DC / 115V/230V AC HD 13T21 MMC +24V DC HD 15T21 MMC +24V DC / 115V/230V AC HD 17T21 MMC +24V DC / 115V/230V AC HD 19T21 MMC +24V DC / 115V/230V AC HD 24T21 MMC +24V DC / 115V/230V AC HD 26T21 MMC +24V DC / 115V/230V AC</p> <p>Accessories for Series X Maritime Multi Computers HT 00254 OPT-A1 CAN Module PCA100293 USB to RS422-485 Module</p>
Test Standard	Guidelines for the Performance of Type Approvals VI-7-2 Edition 2003 Regulations for the Use of Computers and Computer Systems
Documents	Test reports and Documentation in Reference List LET_GL20110523AK.DOC- rev1 dated 23-05-2012
Remarks	None
Valid until	2017-09-19
Page	1 of 2
File No.	1 B-03
Hamburg,	2012-11-02

Type Approval Symbol  


 Marco Rinkel


 Andrea Grün

This certificate is issued on the basis of 'Guidelines for the Performance of Type Approvals Part 1, Procedure'.

Type Approval Certificate



This is to certify that the undemoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No. 47 036 - 12 HH

Company **Hatteland Display AS**
Amsosen
5573 Nedra Vats, NORWAY

Product Description **Maritime Multi Computer**
Series 1 Models and Series X Models

Type **HD..T.. MMC**

Environmental Category **C; EMC1**

Technical Data /
 Range of Application

Series 1 Models	
JH 15T17 MMC	+24V DC or 115V/230V AC
Series X Models	
HD 08T21 MMC	+24V DC
HD 12T21 MMC	+24V DC / 115V/230V AC
HD 13T21 MMC	+24V DC
HD 15T21 MMC	+24V DC / 115V/230V AC
HD 17T21 MMC	+24V DC / 115V/230V AC
HD 19T21 MMC	+24V DC / 115V/230V AC
HD 24T21 MMC	+24V DC / 115V/230V AC
HD 26T21 MMC	+24V DC / 115V/230V AC

Accessories for Series X Maritime Multi Computers
 HT 00254 OPT-A1 CAN Module
 PCA100293 USB to RS422-485 Module

Test Standard **Guidelines for the Performance of Type Approvals VI-7-2 Edition 2005**
Regulations for the Use of Computers and Computer Systems

Documents **Test reports and Documentation in Reference List**
LET_GL20110523AK.DOC- rev1 dated 23-05-2012

Remarks **None**

Valid until 2017-09-19

Page 1 of 2

File No. 1 B-03

Hamburg, 2012-11-02

Type Approval Symbol



Germanischer Lloyd

M. Rinkel
 Marco Rinkel

A. Grün
 Andrea Grün

This certificate is issued on the basis of 'Guidelines for the Performance of Type Approvals Part 1, Procedure'.

Appendix D - Declaration of Conformity

**HATTELAND®
DISPLAY**

Declaration of Conformity

We, manufacturer, **Hatteland Display AS**
Åmsosen, N 5578 Nedre Vats, Norway

declare under our sole responsibility that the
JH MMD, JH MMC, JH STD, JH MIL, HM NMD, HM MIL, HM CMD, HT STD, HD MMD, HM MMD, HT MMC
and HD MMC product ranges is in conformity with the following standards in accordance with the EMC Directive.

Low Voltage Directive 2006/95/EC
EN 60950

EMC Directive 2004/108/EC
EN 55022, Class A
EN 55024

Signature: .....
Frode Grindheim
Vice President Product Management
Nedre Vats, Norway

Signature: .....
Arne Kristiansen
Site Manager - Test & Commission Division
Oslo, Norway

CE

CE MARK FIRST AFFIXED DATE: (11 March 2010)

**HATTELAND®
DISPLAY**


Declaration of Conformity

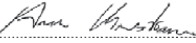
We, manufacturer, **Hatteland Display AS**
Åmsosen, N-5578 Nedre Vats, Norway

declare under our sole responsibility that the products listed below comply with
FCC 47 CFR Part 15, Subpart B, Class A:

JH MMD, JH MMC, JH STD, JH MIL, HM NMD, HM MIL, HM CMD,
HT STD, HD MMD, HM MMD, HT MMC and HD MMC product ranges.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Signature: .....
Frode Grindheim
Vice President Product Management
Nedre Vats, Norway

Signature: .....
Arne Kristiansen
Site Manager - Test & Commission Division
Oslo, Norway

FCC

FCC MARK FIRST AFFIXED DATE: (16 February 2012)