Wave XS Panel Computer

USER'S MANUAL

December 2024

Please note that the content of this document is subject to continuous revision.

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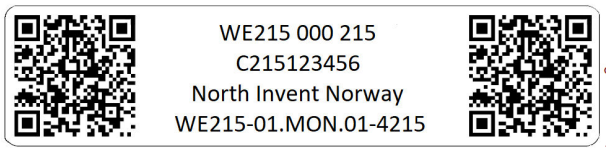
Foreword

Thank you for purchasing a North Invent Wave XS Monitor (Panel PC). Our series of rugged Monitors and Panel PCs are developed and built with the greatest care and state of the art electronic and software features. North Invent focuses its full expertise in offering dedicated display solutions, matching with your highest requirements and use.

Before starting to operate the Panel PC, we would like to suggest that you carefully read through the present document, as our aim with this User's Manuel is to give you the best experience in using your device.

May you have any suggestions for improvements, or any feedbacks about this manual, the Panel PC and/or its features, feel free to contact us. We will be pleased to oblige.

This User's Manual is for use only with our Wave XS Monitors (Panel PCs). To assess which series of Monitor or Panel Computer you are in possession of, please check the Service Tag label at the back of the monitor. The label must contain WExxx (see below). May you have a different series of Monitor, please contact us, so to have the proper manual sent to your attention.



1. Terms and Abbreviations

DIU	Display Unit
DP	DisplayPort
ELU	Electronics Unit
LCD	Liquid Crystal Display
LED	Light-Emitting Diode
OS	Operating System
PPC	Panel PC
RGB	Red-Green-Blue
SNMP	Simple Network Management Protocol

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2. Panel PC Description

The Wave XS Panel Computers are a series of rugged TFT LCD Display Panel PCs available in 10.1" and 13.3" display sizes and with 11th Generation Atom® x6000E Series Processors. All our Panel PCs are built following a modular approach and can be console mounted or equipped with a stand (hinge).

Each Panel PC is constituted by the following set of components:

Display Unit (DIU) - Front end of the Panel PC consisting of the glass (optionally: touch) and display panel in the aluminum frame.

Electronics Unit (ELU) - Back end of the Panel PC consisting mainly of power supply, motherboard, SSD, and memory.

DIU and ELU are modular and easily separable to ensure efficient configuration, maintenance, and repair.

Optional accessories are a hinge (tiltable stand) and panel mounting kits.

Each Panel PC presents the following materials and features:

The Front, Display Frame and Cover are made of Marine Grade Aluminum allowing to reduce weight while eliminating corrosion problems.

The electronics include a specifically designed Power Supply, a high-quality Display Controller, a Backlight LED driver, and a custom-made Interface Board.

The Panel PCs use identical Power Supply which can be supplied with 18-36 VDC.

Each Panel PC complies with the following international Standards and Requirements:

All our Panel PCs have been tested by international accredited testing labs and found to comply with the requirements of the International Association of Classification Societies (IACS) as well as the selected requirements of IEC 60945, IEC 60533, IEC 60529, and selected MIL standards.

All our Panel PCs are approved in compliance with the international standard IEC 60945:2002 (Clause 4.4 Equipment category b, protected from the weather (formerly class B)), Maritime navigation and radio communication equipment and systems - General Requirements - Methods of testing and required test results.

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3. Product Identification

On the backside there are one marking identifying the Panel PC.

Panel PC P/N and service tag number

Upon request we can assign an additional customer specific P/N.

Please see separate document for details about product numbering.

4. Packaging and Delivery

Please check the delivered goods immediately on receipt with respect to damages caused by transportation and inform the delivering freight carrier immediately, on site, about any visible transport damages. Additionally, inform us immediately in writing, at the latest within 5 workdays, about any visible transport damages. At reception, the delivery includes the following items:

Wave XS Monitor (Panel PC)
DC power plug (optional)
DP cable (optional)

5. Mechanical Dimensions

For panel cut out drawings and mechanical dimensions of Panel PCs see data sheets.

6. Compass Safe-distance:

Every panel PC is tested in order to determine the minimum safe distances at which it should be installed from both the steering and the standard magnetic compasses, so not to significantly affect the accuracy of these compasses. A safe distance takes into account both the constant effect on a magnetic compass by the presence of magnetic material, but also any variable effect due e.g., electrical circuits or the opening/closing of drawers or panels. Thus, provided that a Panel PC is not placed in a position nearer to the center of the magnetic compass than the recommended safe distance, the Panel PC may be installed or removed without any need for adjustment of that compass.

The following tables provide the safe compass distances for the **WAVE XS** under various conditions:

WE101

Condition	Standard Compass	Steering Compass
Non-energized	45 cm	25 cm
Energized and operating	45 cm	25 cm
Non-energized after magnetization	50 cm	40 cm

WE131

Condition	Standard Compass	Steering Compass
Non-energized	40 cm	20 cm
Energized and operating	40 cm	20 cm
Non-energized after magnetization	60 cm	40 cm

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7. Electrical Installation

All electrical connections are to be found on the lower backside of the Panel PC. The connectors are clearly labelled on the Terminal Plate at the bottom of the Panel PC's backside.

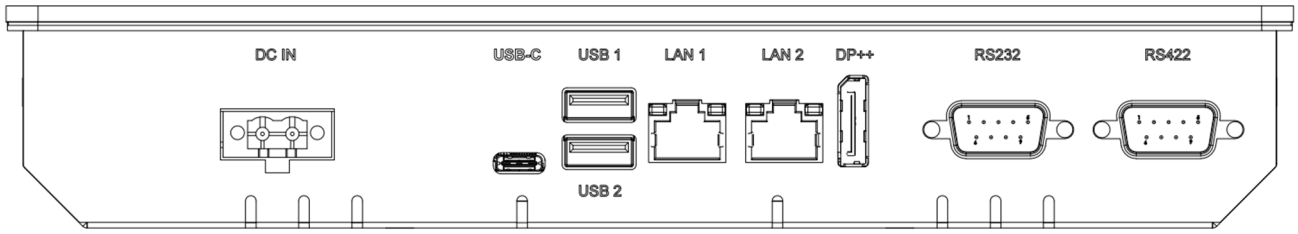
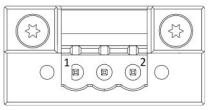


Figure: *Terminal Plate for a Panel PC with DC power input and two serial ports.*

7.1. Pin-Assignments

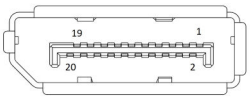
DC Power



Pin	Description	Pin	Description	Pin	Description
1	Supply voltage, positive 18-36V	2	NC	3	Supply voltage negative

The Panel PC is connected to DC voltage by means of the DC power plug included in the delivery and wires suitable for up to 8 A continuous load. The Panel PC will not be damaged by reversed polarity; may it occur. The DC current to the Panel PC is limited by a 10 A internal fuse.

Displayport



Pin	Description	Pin	Description	Pin	Description
1	ML_3LN (Lane 3-)	8	GND	15	AUXP (Auxiliary Channel+)
2	GND	9	ML_LN1P (Lane 1+)	16	GND
3	ML_L3P (Lane 3+)	10	ML_LN0N (Lane 0-)	17	AUXN (Auxiliary Channel-)
4	ML_L2N (Lane 2-)	11	GND	18	Hot Plug Detect
5	GND	12	ML_LN0P (Lane 0+)	19	POR (Return for Power)
6	ML_L2P (Lane 2+)	13	Config1 (connected to GND)	20	PO (Power 3.3V / 500mA)
7	ML_L1N (Lane 1-)	14	Config2 (connected to GND)		

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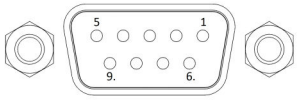
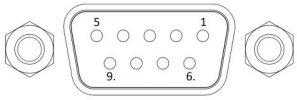
RS232 – DB9 Plug



Pin	Description	Pin	Description	Pin	Description
1	Not connected	4	Not connected	7	RST#
2	RxD (Receive Data)	5	GND	8	CTS#
3	TxD (Transmit Data)	6	Not connected	9	Not connected

The Panel PC is equipped with two standard 9-pin D-SUB male connectors for RS232 serial ports.

RS422 / RS485 - DB9 Plug



Pin	Description	Pin	Description	Pin	Description
1	TxD- (Transmit Data)	4	RxD+ (Receive Data)	7	Not connected
2	TxD+ (Transmit Data)	5	GND	8	Not connected
3	RxD- (Receive Data)	6	Not connected	9	Not connected

The Panel PC is equipped with an additional standard 9-pin D-SUB male connectors for either RS422 or RS485 serial ports. The RS422/485 ports are configurable in the BIOS. For RS485 mode TX and RX signals must be coupled externally.

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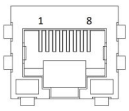
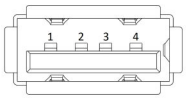
LAN (RJ45)



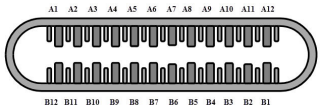
Pin	Description	Pin	Description
1	DA+	5	DC-
2	DA-	6	DB-
3	DB+	7	DD+
4	DC+	8	DD-

USB A



Pin	Description	Pin	Description
1	GND	3	Data +
2	Data -	4	V_{cc}

USB C



Pin	Description	Pin	Description
A1	GND	B1	GND
A2	TX1+	B2	TX1+
A3	TX1-	B3	TX1-
A4	VBUS	B4	VBUS
A5	CC1	B5	CC2
A6	D-	B6	D-
A7	D+	B7	D+
A8	SBU1, SBU2	B8	SBU1, SBU2
A9	VBUS	B9	VBUS
A10	RX2-	B10	RX2-
A11	RX2+	B11	RX2+
A12	GND	B12	GND

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8. Operating System (OS)

The Panel PC can be delivered with or without an installed OS. Currently Windows and Linux OS are supported.
Screen brightness can be adjusted using the Windows Display Settings.
The following chapters assume that Windows 10 OS has been installed.

9. Simple Network Management Protocol (SNMP)

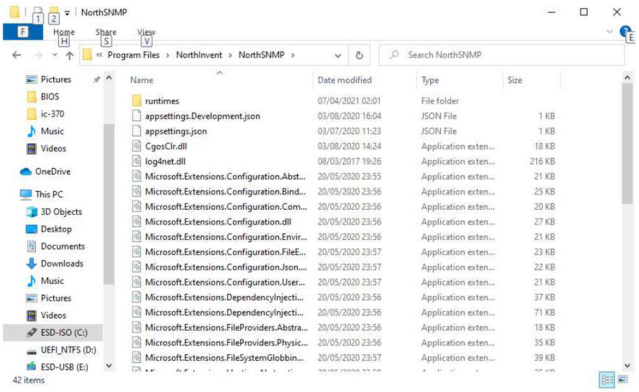
It is possible to control the Panel PC backlight (brightness) and buzzer via Ethernet using SNMP.

An SNMP agent must be installed using the following procedure:

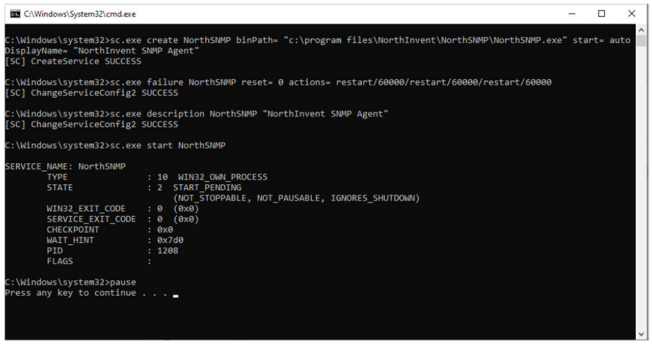
Microsoft .Net Core 3.1 is required to run the NorthSNMP agent. Make sure it is installed or install from this link:
https://dotnet.microsoft.com/download/dotnet-core/thank-you/runtime-desktop-3.1.6-windows-x64-installer

Download and install the SNMP agent according to the procedure below:

1. Create folder "c:\program files\NorthInvent\NorthSNMP" and copy files from NorthSNMP.zip to the folder.



2. Run the install.bat found in NorthSNMP.zip to install the service.



Then open Windows firewall on UDP port 161 either by running the below commands in PowerShell or by using the Windows Defender graphical interface.

```
New-NetFirewallRule -DisplayName "UPD161 SNMP IN" -Direction Inbound -Protocol UDP -LocalPort 161 -Action Allow -Profile Any
New-NetFirewallRule -DisplayName "UPD161 SNMP OUT" -Direction Outbound -Protocol UDP -LocalPort 161 -Action Allow -Profile Any
```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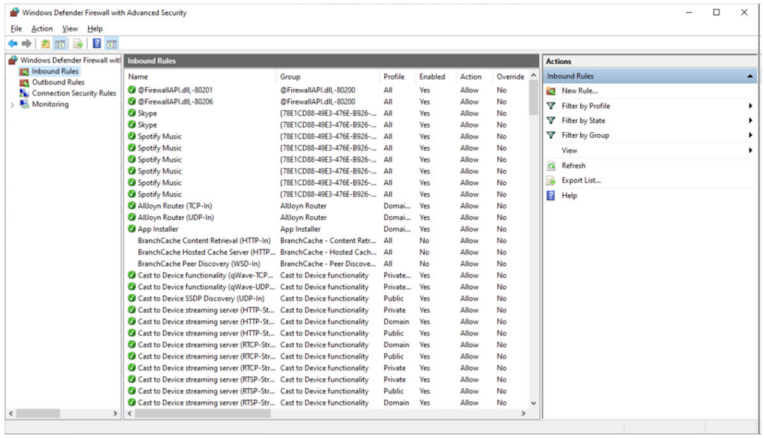
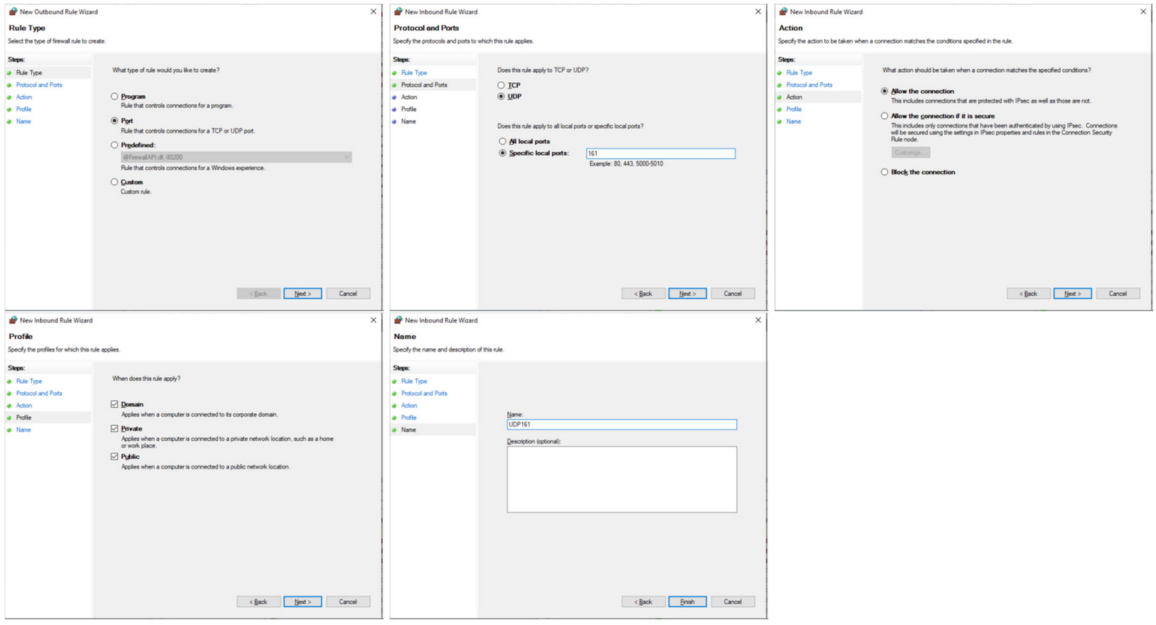
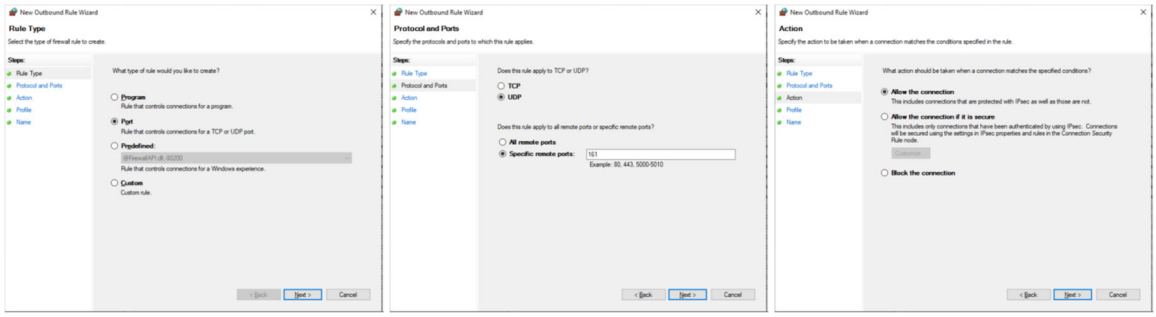
1. Press Windows key and type wf.msc to open the firewall control panel



2. Select ”Inbound rules” and click “add rule”



3. Select ”Outbound rules” and click “add rule”.



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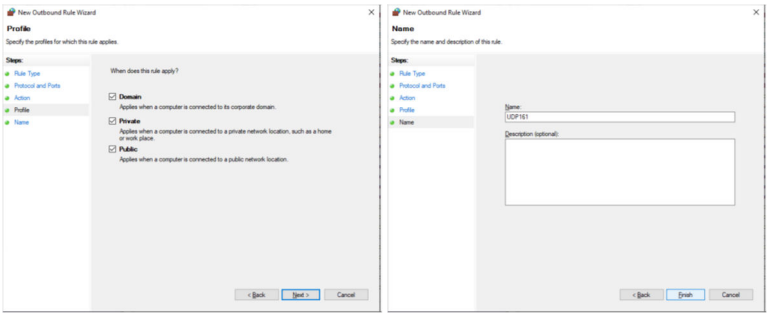

With the SNMP agent installed you can control the device by SNMP commands either through your dedicated application or by using one of the publicly available applications like NetSNMP (http://www.net-snmp.org/).

The following examples presumes that NetSNMP is installed in the local machine:

Control	Command
Get backlight value	snmpget -v2c -cpublic localhost 1.3.6.1.4.1.30329.1.1.3.2.0
Set backlight 55%	snmpset -v2c -cpublic localhost 1.3.6.1.4.1.30329.1.1.3.2.0 i 55
Turn on buzzer	snmpset -v2c -cpublic localhost 1.3.6.1.4.1.30329.1.1.5.24.0 i 1
Turn off buzzer	snmpset -v2c -cpublic localhost 1.3.6.1.4.1.30329.1.1.5.24.0 i 0

The backlight setting interval is 0-100% where 100% is max brightness.

10. System Utility and API

The Panel PC uses an Pico-ITX motherboard manufactured by Congatec and a System Utility tool and an API are available from the Congatec Product page: https://www.congatec.com/en/products/pico-itx/conga-pa7/

11. Technical Specifications

Please refer to the relevant datasheet with the technical specifications for your type of Panel PC.

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12. Troubleshooting

If you encounter any trouble with your Panel computer, please check if your problem is listed below and follow the given instructions.

If the problem persists, please contact North Invent for service instructions.

Problem	Instructions
No power on	Check if the DC voltage supplied to the Panel PC is within the specification (18-36 VDC).
No picture displayed	Check if the brightness is set to 100%.
Picture is too dark	Increase the brightness using the Windows Display Settings.
OS is not loading	Check if an OS was included in your purchase/delivery.

13. Cleaning

Dust and dirt which typically accumulates on the front of the Panel PC, can easily be removed using a soft cloth moistened with hot water.

A solvent can also be used but never use any kind of abrasive compound.

Oil and grease can be removed using pure alcohol.

The front glass can be cleaned with any solvent suitable for glass.

14. Maintenance and Service

The Panel PCs are developed to be almost maintenance free.

If the Panel PC malfunctions, please check if the problem can be solved with *troubleshooting*.

If the problem persists, please contact North Invent for service instructions.

Allow app. 1 hour stabilization time before measuring luminance and colors.

15. Update

The technical documentation is subject to change. For an updated version please visit our website www.northinvent.com.

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