



**PHALANX II**  
**Network Attached Storage**  
**User Manual**

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## **INTRODUCTION**

The Phalanx II Network Attached Storage (NAS) System is optimized for Size, Weight and Power (SWaP) in a small form factor (SFF) designed for rugged, industrial, military, and aerospace applications. It is fan-less design that is fully sealed for protection against dust and corrosive elements and is designed to meet rigorous military standards. The Phalanx II provides multiple protocols to present robust storage across Ethernet networks. An easy to use Graphic User Interface (GUI) is provided to allow for configuration and administration of its high performance data storage through commonly available Internet browsers.

This manual will provide an overview of the system and its configuration at an essential level. Tuning and configuring the system for specific environments and applications can be accomplished by working with Phoenix International's technical team, though a majority of requirements will be met by utilizing the information in this manual.

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### **SAFETY PRECAUTIONS**

Proper and safe operation of the unit requires proper transportation and storage, installation by qualified personnel, operation within design limits, and careful maintenance.

- The user is solely responsible for proper and safe operation.
- The user is responsible for:
  - Maintaining the system in proper condition.
  - Continuously monitoring the operation of the system.
  - Initiating and executing required maintenance and repair work immediately.
  - Being aware of and follow any required safety measures.

### **WARNINGS**

- Do not attempt to alter any part of the product.
- Do not allow the product to come into contact with water or any other liquids in a manner not in keeping with the design specifications. In the event that water or other liquids enter the interior of the system, immediately power down and unplug the product. Continued use of the product may result in fire or electrical shock.
- Do not handle the product with wet hands.
- Do not place the product near excessive heat sources or expose to direct flame.
- Ensure that the product is provided with a proper protective earth (PE) ground connection.
- Do not unmount, delete, or in any way modify `"/dev/nve0n1"`. This is the systems OS drive. Any changes to this system device can render the NAS inoperable.

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## **SPECIFICATIONS**

<b>Item</b>	<b>Data</b>
Processor Module	Processor: Intel E-2276ML 2.0GHz 25W RAM: 32GB
Operating System	Debian Linux
Storage	OS: 240GB M.2 SSD, Gen3 x4 Data: Two 2.5" form factor storage bays
I/O Interface	1x DVI 2x Gigabit Ethernet 2x 10Gbps Ethernet 2x USB 3.0 2x USB 2.0 1x Audio (Mic in & Line out) 2x SATA 1x M.2 4x GPIO's 4x Serial port (2x RS232, 2x RS422)
Input Voltage	+12-36VDC
Power Consumption	< 50W
Max Power supported by two 2.5" drives	Up to 25W
Operating Temperature	-40°C to +55°C
Size	179±0.5 (W)x 105±0.5(H)x229±0.5(D) without legs 209±0.5 (W)x 105±0.5(H)x229±0.5(D) with legs
Weight	4.2 Kg (w/o additionally integrated storage devices)
Sinusoidal Vibration	20-2000Hz, 6.064 G <sub>rms</sub>
Shock	20g ,11ms, Half Sine
Surface Finish	External Black Anodized and Internal Clear Chromated
Cooling Type	Conduction Cooled
Chassis Ground Point	M5 x 5mm (depth)

## **DEFAULT SYSTEM CONFIGURATION**

<b>Default Network Configuration</b>				
<b>Description</b>	<b>Physical Name</b>	<b>Connector</b>	<b>O/S Name</b>	<b>IP Address</b>
Management Port/GUI	Gigabit Ethernet #1	J1 (ETH1)	eno1	10.0.0.1
Network Data/Mgmt.	Gigabit Ethernet #2	J1 (ETH2)	enp3s0	10.0.1.1
Network Data	10Gb Ethernet #1	J2	enp1s0f0	10.0.2.1
Network Data	10Gb Ethernet #2	J3	enp1s0f1	10.0.3.1

<b>Default User Credentials</b>		
<b>Username</b>	<b>Password</b>	<b>Where Used</b>
root	password	Operating system 'root' user
admin	password	GUI administration login
user	password	Network share default credentials

The system is delivered with a pre-initialized RAID0 configuration that contains an EXT4 file system. This is to allow for rapid deployment of network storage after some basic configuration of protocols and network shares.

The default configuration of the two 10Gb Ethernet ports includes "Jumbo Frames" being enabled (MTU=9000).

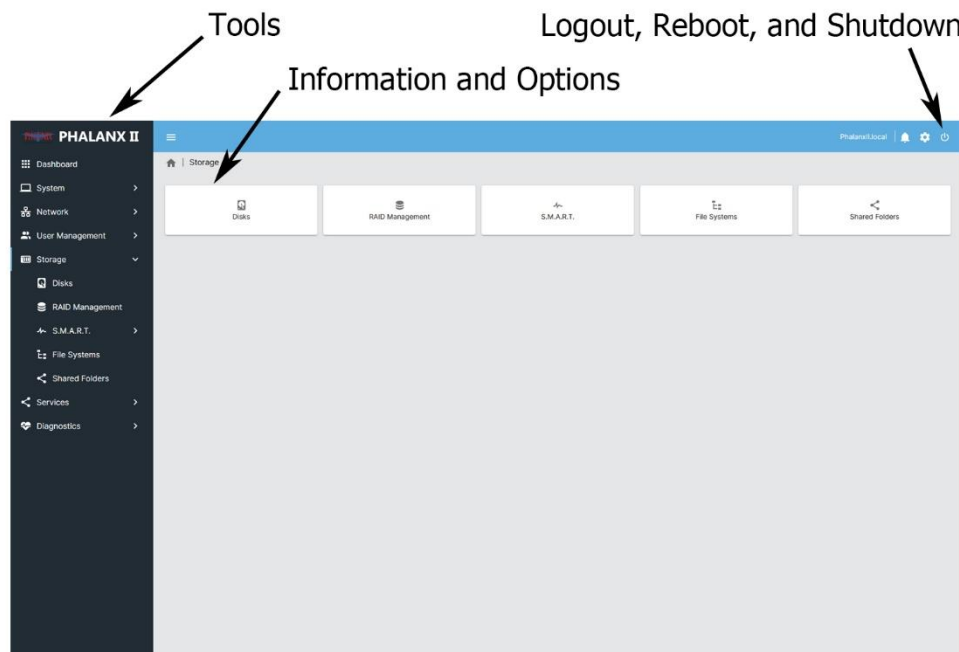
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## **NAS ADMINISTRATION**

Administration of the Phalanx II is done through a Graphical User Interface (GUI) that can be accessed with a standard Internet Browser (e.g. Firefox, Chrome, Explorer). Point the browser to the IP address of the GUI (default: 10.0.0.1), and log into the interface using the administration login credentials (default: admin, password).

Once logged in, there are two main sections to the GUI. On the left of the GUI window there is an array of Tools which can be selected to administer the NAS. On the right of the screen is the window that displays information and/or options for the items that are selected on the left. At the upper right of the window there are three buttons: a Bell, a Gear, and a Power symbol. When selected, the Bell displays system messages and notifications that have occurred during this session. The Gear displays interface options such as Dashboard options, interface language selection, and the current user's password administration. The Power symbol menu allows the user to shutdown or reboot the system, or logout of the Phalanx II GUI.



## Quick Start - Connecting storage to the network:

The following steps, explained below, will allow the sharing of the data drives that are installed in the Phalanx II via an Ethernet network. If a RAID set and File System have been pre-built on the system from the factory, skip to step 4.

1. Create RAID set.
2. Create a File System (FS) on the RAID set.
3. Mount the File System.
4. Create a Share (shared folder) on the FS.
5. Assign user permissions to the Share.
6. Enable a file transfer Network Protocol.
7. Assign the Share to a Network Protocol (NFS/CIFS).

**WARNING:** Do not unmount, delete, or in any way modify `"/dev/nvme0n1"`. This is the systems OS drive. Any changes to this system device can render the NAS inoperable.

**Note:** After each configuration change, apply the changes via the yellow banner at the top of the information window before making further modifications.

### 1. Create a RAID Set

A RAID set is a group of disk drives that are logically connected together to allow for greater capacity and/or redundancy than an individual disk drive. The Phalanx II supports two levels of RAID:

- Stripe (RAID0) - Combines the capacity of two disk drives together to create one, larger, disk. Provides a fast storage pool by striping data to both disks, but is not redundant. If one disk fails, all data is lost.
- Mirror (RAID1)– Mirrors two disks so that if one disk fails, all data is still persevered. Only has the capacity of one of the two disks. Enhanced read performance to multiple clients.

To create a RAID set with the two data drives installed in the Phalanx II, select the "RAID Management" tool under "Storage" on the left side of the GUI.

- Once in the RAID Management window, select the "Create" button (a small blue button with a plus, located in the upper left of the Information window). This will open a new window that will allow the user to assign a name to the RAID set, select the RAID level, and assign the storage devices to be used.
- Assign a name to the RAID set.
- Select the RAID level from the pull down menu. Select either Stripe (RAID0) or Mirror (RAID1). Other RAID levels are either not supported



due to the number of drives installed in the Phalanx II, or are not recommended.

- Select the checkboxes next to the two drives (/dev/sda and /dev/sdb) that are displayed to use the drives in the RAID set.
- Select "Create" and wait for RAID set to complete building before continuing on to creating a file system on the RAID set. When the RAID set is done building, a new storage device will be presented to the NAS called /dev/md0, this is the new RAID set that the File System will be built on in the next step.
- Apply the changes via the yellow banner at the top of the information window before making further modifications.

## 2. Create a File System on the RAID set

**WARNING:** Do not unmount, delete, or in any way modify "/dev/nvme0n1". This is the systems OS drive. Any changes to this system device can render the NAS inoperable.

To create a File System on the RAID set, select the "File Systems" tool under "Storage" on the left side of the GUI.

- Once in the File Systems window, select the "Create" button. This will open a new window that will allow the user to assign a label to the File System, select the File System type, and assign the RAID set (Device) the File System will be written to.
- Select the Device from the pull-down menu (/dev/md0).
- Assign a "Label" to the File System.
- Select the File System type from the pull-down menu. EXT4 is recommended for most applications.
- Select the "OK" button and wait for the file system to complete building. This can take a very long time depending on the RAID level and capacity of the storage devices.

## 3. Mount the File System

After the File System creation has completed successfully, select "/dev/md0" from the File System list and select the "Mount" button.

Apply the changes via the yellow banner at the top of the information window before making further modifications.

**Caution:** When mounting a file system, only press the "Mount" button once. It may take several minutes for the system to react to the mount request. Clicking on the Mount button more than once at this stage will cause OS errors.

#### 4. Create a Share (shared folder) on the FS

The next step is to create a Shared Folder on the Files System/RAID set. To create a Shared Folder on the File System, select the "Shared Folders" tool under "Storage" on the left side of the GUI.

- Select the "Add" button in the upper left of the Information window. This will pull up a window that allow the user to configure the Shared Folder.
- Enter a name for the new Shared Folder in the "Name" field. This will automatically populate the "Path" field in the same window. This "Path" name is the name of the folder on the RAID set that is being shared, and is the name used when connecting to the share when using SMB/CIFS.
- Select the device the new Shared Folder will be created on. This will be the name of the File System that was just created.
- Assign the desired permission levels from the "Permissions" pull-down menu. The default setting is sufficient in most applications.
- Select the "Save" button at the bottom of the "Add shared folder" window and apply the changes via the yellow banner at the top of the information window before making further modifications.

#### 5. Assign user permissions to the Share

After adding the Shared Folder, select the folder just created and then select the "privileges" button above it.

- Select the "Read/Write" box next to the default "user" account and then select the "Save" button. This will assign read/write access to the newly created share for the username "user" (default password = password).
- Apply the changes via the yellow banner at the top of the information window before making further modifications.

If other usernames are needed for access to the share, select the "Users" tool under "User Management" on the left side of the GUI. This will allow you to create and/or modify User information. Group permissions can also be managed from this menu group. After creating a new user, permissions have to be granted to a share before that user can access the share.

#### 6. Enable a file transfer Network Protocol

Under the "Services" tool on the left side of the screen, select the Protocol in the Information window that the Shared Folder will be shared across the network with (e.g. SMB/CIFS, NFS, or FTP), then select the settings option. For SMB/CIFS or FTP, the default setting will be sufficient for most applications.

- Ensure the "Enabled" checkbox in the upper left of the Information window is selected and then select "Save" to enable and start the service/protocol. Apply the changes via the yellow banner at the top of the information window before making further modifications.

### 7. Assign the Share to the Network Protocol

The final step is to assign a share to the protocol/service that was just started.

- Under the "Services" tool on the left side of the screen, beneath the protocol you have already selected, select "Shares".
- In the "Shares" window, select the "Create" button.
- Select a Shared Folder to share from the "Shared folder" pull-down menu.
- For SMB/CIFS, the default settings are sufficient for most applications and the "Save" button can be selected at this point. Apply the changes via the yellow banner at the top of the information window before making further modifications.
- For NFS, assign an IP address or IP range to the protocol "Client" field to allow clients at those addresses to access the share.
  - If only one client is desired, input the IP address for that client.
  - If multiple clients are to be allowed access, assign the range to allow. (e.g. "10.0.2.0/24" will allow clients with an IP address from 10.0.2.1 to 10.0.2.254 to access the share).
- For NFS, select the desired privileges from the "Privilege" pull-down menu and then select the "Save" button. Apply the changes via the yellow banner at the top of the information window before making further modifications.

### Client Access:

Users can access these share by pointing the client to the IP address and directory of the share.

For SMB/CIFS through a Windows client:

- In Windows explorer select "Map network drive..."
- Assign/select a drive letter from the pull-down menu.
- Enter the IP address and folder of the share in the "Folder" field (e.g. \\10.0.2.1\sharename where sharename is the name of the shared folder created earlier).
- Select "Connect using different credentials" if the credentials assigned to the share are different than the credentials used to sign into the client that is trying to attach to the share.

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- Select "Finish" and the share will be attached to the client, or, if different credentials was selected, enter the user credentials that were assigned to the share.

For NFS:

Consult the documentation of the host operating system for the specifics of connecting that specific OS to NFS shares (they vary depending on the OS).

## **PERIODIC MAINTENANCE**

It is recommended to replace the clock battery in the Phalanx II every two years to ensure the date and time of the system are always accurate. To replace the battery (CR1225, Li-Ion) follow these steps:

- Remove four (4) M2.5x6 Socket cap screws, using an Allen wrench, from the battery cover.
- Using tweezers, carefully remove the battery cover and battery from the chassis.
- Install the new battery (CR1225) into the battery slot in the same orientation as the battery that was just removed.
- Re-install the battery cover and secure with hardware previously removed. Use Service removable thread locking compound (Loctite 222 or equivalent). Do not overtighten.



### **Frequently Asked Questions**

Q: Is the unit configurable through the 10GbE interface?

A: Yes. The Gb Ethernet management interface is provided to allow for management of the system without consuming bandwidth on the primary data interfaces. Utilizing the 10Gb interface for management, while recording high speed data across the same interface, could impact performance. If this performance impact is not a concern, accessing the GUI via the 10Gb interfaces is possible.

Q: What purpose do the DVI and serial and audio cables on the development cable set serve?

A: The serial and audio cable, as provided with the optional development cable bundles, are provided to bring out all available connections for development purposes. With regard to the NAS, these serve no purpose currently. The DVI connection can be utilized when connecting directly to the SBC for manufacturing, development, or troubleshooting the system.

**APPENDIX A: CONNECTOR DETAIL**

Connector Name	PCB mount connector	Mating connector on cables	OEM	Qty/ Unit
J0	D38999/24FA35PN	D38999/26FA35SN	AMPHENOL / SOURAIU	1
J1	D38999/24FE35SN	D38999/26FE35PN	AMPHENOL / SOURAIU	1
J2 & J3	2102351-1	2102353-1	TYCO ELECTRONICS	2
J4	MR11WS08 0019 AN1 E1AP	MP11ZS08 0019 AN1 Z1AS	FISCHER	1
J5 & J6	MR11WS08 0009 AN1 E1AP	CA MP11ZS08 2007 AN1 Z1AS	FISCHER	2

Chassis I/O and Mating Connectors

**Note:** Pin-outs are for cables that are terminated in commercial connectors. For point to point connections, verify correct polarity/connection to external devices.

**J0 - POWER CONNECTOR PIN-OUT DETAIL**

Pin Number	Signal Name
J0.1	I/P 12V-36VDC
J0.2	I/P 12V-36VDC
J0.3	GND_RET
J0.4	GND
J0.5	PWRBTN#
J0.6	GND_RET

J0 (P0, BRKG M) - Power Connector

**J1 - SBC IO CONNECTOR PIN-OUT DETAIL**

Pin Number	Signal Name	ETH1
J1.32	GBE0_MDI0_P_CON	1
J1.25	GBE0_MDI0_N_CON	2
J1.33	GBE0_MDI1_P_CON	3
J1.41	GBE0_MDI2_P_CON	4
J1.47	GBE0_MDI2_N_CON	5
J1.40	GBE0_MDI1_N_CON	6
J1.42	GBE0_MDI3_P_CON	7
J1.48	GBE0_MDI3_N_CON	8

J1 (P1, ETH 1) - Gigabit Ethernet Port 1

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Pin Number	Signal Name	ETH2
J1.44	GBE1_MDI0_P_CON	1
J1.51	GBE1_MDI0_N_CON	2
J1.55	GBE1_MDI1_P_CON	3
J1.50	GBE1_MDI2_P_CON	4
J1.43	GBE1_MDI2_N_CON	5
J1.54	GBE1_MDI1_N_CON	6
J1.53	GBE1_MDI3_P_CON	7
J1.49	GBE1_MDI3_N_CON	8

J1 (P1, ETH 2) - Gigabit Ethernet Port 2

Pin Number	Signal Name	S0
J1.30	SER0_RX_RS232	2
J1.36	SER0_TX_RS232	3
J1.35	GND	5

J1 (P1, S0) - RS232 Serial

Pin Number	Signal Name	S1
J1.38	SER1_RX_RS232	2
J1.37	SER1_TX_RS232	3
J1.35	GND	5

J1 (P1, S1) - RS232 Serial

Pin Number	Signal Name	XR5
J1.23	DCD5/T5_O/P	1
J1.22	RXD5/T5_O/P+	2
J1.16	TXD5/R5_I/P+	3
J1.15	DT5/R5_I/P	4
J1.45	GND	5

J1 (P1, XR5) - RS422 Serial

Pin Number	Signal Name	XR6
J1.21	DCD6/T6_O/P	1
J1.14	RXD6/T6_O/P+	2
J1.20	TXD6/R6_I/P+	3
J1.13	DT6/R6_I/P	4
J1.45	GND	5

J1 (P1, XR6) - RS422 Serial

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Pin Number	Signal Name	USB2.0 P4
J1.5	VCC_USB2.0_4	1
J1.3	USB4_N_CON	2
J1.7	USB4_P_CON	3
J1.4	GND_USB2.0_4	4

J1 (P1, USB2.0 P4) – USB 2.0

Pin Number	Signal Name	USB2.0 P5
J1.2	VCC_USB2.0_5	1
J1.9	USB5_N_CON	2
J1.8	USB5_P_CON	3
J1.1	GND_USB2.0_5	4

J1 (P1, USB2.0 P5) – USB 2.0

Function	Pin Number	Signal Name	MIC-IN SPEAKER OUT
Audio-IN	J1.31	LINEIN_L	1
	J1.24	LINEIN_R	2
	J1.52	AGND	3
Audio-OUT	J1.46	LINEOUT_L	1
	J1.39	LINEOUT_R	2
	J1.52	AGND	3

J1 (P1, MIC-IN, SPEAKER OUT) - Audio-IN & OUT

Pin Number	Signal Name	GPIO
J1.27	GPIO#	1
J1.28	GPI1#	2
J1.29	GPO#0	3
J1.19	GPO#1	4

J1 (P1, GPIO) – General Purpose IO



**J2 & J3 - 10GBE CONNECTOR PIN-OUT DETAILS**

<b>Pin Number</b>	<b>Signal Name</b>	<b>10G ETH CABLE1</b>
J2.1	PORT1_MDI0+	1
J2.2	PORT1_MDI0-	2
J2.3	PORT1_MDI1+	3
J2.5	PORT1_MDI2+	4
J2.6	PORT1_MDI2-	5
J2.4	PORT1_MDI1-	6
J2.7	PORT1_MDI3+	7
J2.8	PORT1_MDI3-	8

J2 (P2, 10G ETH CABLE1) - 10Gigabit Ethernet Port 1

<b>Pin Number</b>	<b>Signal Name</b>	<b>10G ETH2 CABLE</b>
J3.1	PORT2_MDI0+	1
J3.2	PORT2_MDI0-	2
J3.3	PORT2_MDI1+	3
J3.5	PORT2_MDI2+	4
J3.6	PORT2_MDI2-	5
J3.4	PORT2_MDI1-	6
J3.7	PORT2_MDI3+	7
J3.8	PORT2_MDI3-	8

J3 (P3, 10G ETH CABLE2) - 10Gigabit Ethernet Port 2

**J4 - DVI CONNECTOR PIN-OUT DETAILS**

<b>Pin Number</b>	<b>Signal Name</b>	<b>DVI-1</b>
J4.14	DPA_TMDS_D2_N	1
J4.15	DPA_TMDS_D2_P	2
J4.2	GND	3
J4.6	DPA_DDC_CLK	6
J4.5	DPA_DDC_DATA	7
J4.11	DPA_TMDS_D1_N	9
J4.12	DPA_TMDS_D1_P	10
J4.4	GND	11
J4.1	DPA_TMDS_PWR	14
J4.10	GND	15
J4.7	DPA_TMDS_HPD	16
J4.8	DPA_TMDS_D0_N	17
J4.9	DPA_TMDS_D0_P	18
J4.13	GND	19
J4.16	GND	22
J4.18	DPA_TMDS_CLK_P	23
J4.17	DPA_TMDS_CLK_N	24

J4 (P4, DVI-1) - DVI port 1

**J5 - USB3.0 P1 pin detail**

<b>Pin Number</b>	<b>Signal Name</b>	<b>USB3.0 P1</b>
4	VCC_USB3.0_0_CON	1
1	USB0_CON_N	2
3	USB0_CON_P	3
9	GND_USB3.0_0_CON	4
8	USB0_SSRX_CON_N	5
7	USB0_SSRX_CON_P	6
2	GND_USB3.0_0_CON	7
6	USB0_SSTX_CON_N	8
5	USB0_SSTX_CON_P	9

J5 (P5, USB3.0 P1) – USB 3.0

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**J6 - USB3.0 P2 pin detail**

<b>Pin Number</b>	<b>Signal Name</b>	<b>USB3.0 P2</b>
4	VCC_USB3.0_1_CON	1
1	USB1_CON_N	2
3	USB1_CON_P	3
9	GND_USB3.0_1_CON	4
8	USB1_SSRX_CON_N	5
7	USB1_SSRX_CON_P	6
2	GND_USB3.0_1_CON	7
6	USB1_SSTX_CON_N	8
5	USB1_SSTX_CON_P	9

J6 (P6, USB3.0 P2) – USB 3.0