

DUCM SEAbus

Installation and Programming Manual

This manual describes the DUCM application for interfacing Siemens SEAbus devices to Modbus/TCP networks.

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1 Introduction

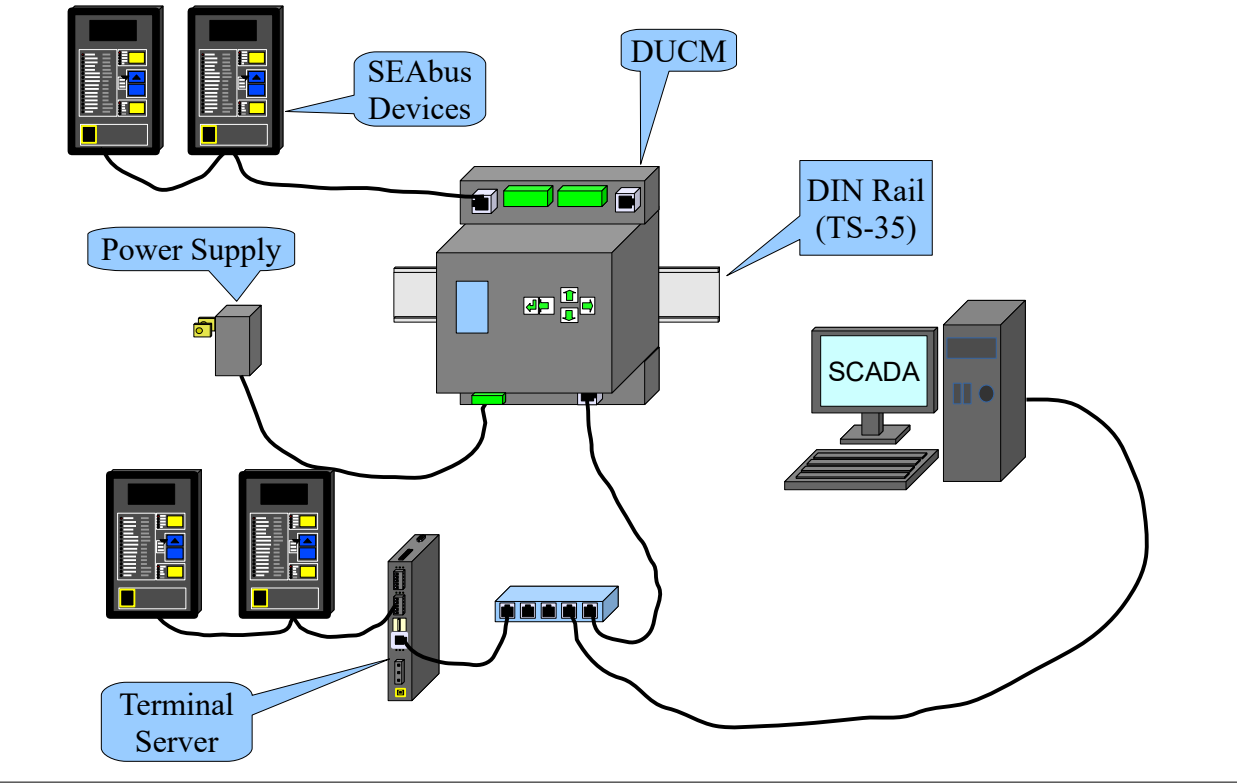
The Niobrara DUCM is a DIN rail mount device capable of running a custom application for performing communication translations between serial and/or Ethernet protocols. This document covers an application that places Siemens SEAbus™ and SEAbus Plus™ devices on a Modbus/TCP network.

Both serial ports may be configured to be a master to a daisy chain of SEAbus devices or Modbus RTU devices. They may also be configured to a Modbus RTU slave so that a Modbus serial master can poll the SEAbus network. Each serial port may be configured independently for baud rate, and each is isolated and capable of RS-232 or RS-485. When set for RS-485, the port may directly support the 2-wire daisy chain of SEAbus devices.

The Ethernet port is used to allow Modbus/TCP masters (HMI, PLC, SCADA, BMS) to access the data from the SEAbus network. Up to six Modbus/TCP masters may connect to the DUCM for polling. Optionally, the Ethernet port can poll SEAbus devices that are connected to ION meters or a terminal server. In total, the DUCM can support up to 200 SEAbus devices across all of its ports. The Ethernet port is also used to configure the DUCM. An XML file is exchanged between a PC and the DUCM that contains all the necessary configuration information.

The front panel may be used to monitor serial and Ethernet activity. The web pages are also used to more closely monitor Ethernet activity and troubleshoot the application, if necessary.

Figure 1.1: Typical Configuration



2 Installation

Installation of the DUCM should go quickly, with the necessary materials. The following items are necessary:

- DUCM
- Power source for DUCM (use NR&D part TR121ST or available power)
- Cabling between DUCM and Modbus/TCP Master is standard Ethernet cable
- Cabling between DUCM and equipment to be polled is twisted pair 2-wire RS-48 cable or standard Ethernet cable.
- DIN rail for mounting

Module Installation

1. Mount the DUCM on a DIN rail.
2. Supply power to the DUCM; The supplied NR&D's TR121ST may be used, or any available power source of minimum 6W 9-30 Volts DC.
3. Connect E1 to the Local Area Network, or directly to a PC, with a standard Ethernet cable.

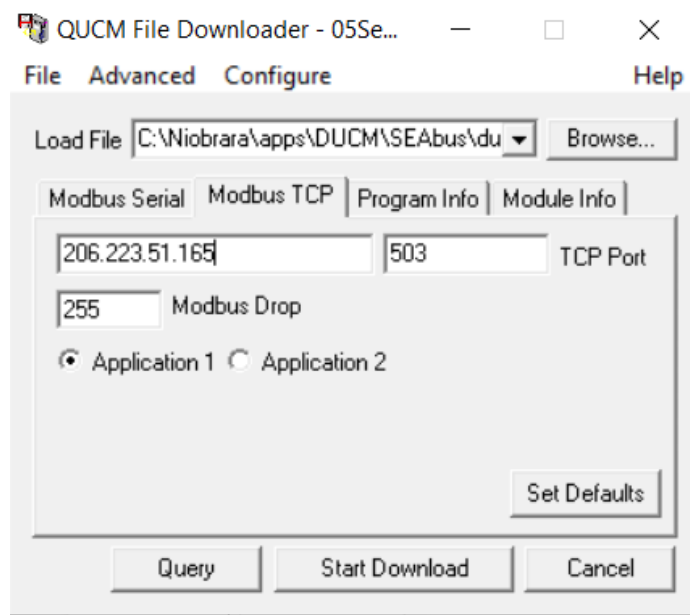
Application Installation

The DUCM has a default IP address of 10.10.10.10. The user may choose to add a 10.10.10.x IP address to their PC, or they may change the IP address of the DUCM using the front panel (see the chapter below on using the front panel). The below example shows the PC loading the application to 206.223.51.165.

If not already installed, the user should obtain the latest DUCM_SETUP.EXE from http://www.niobrara.com/programs/DUCM_SETUP.EXE. Once this program has been executed, the user may start QLOAD.EXE from Start > Programs > Niobrara > QLOAD.EXE. Browse to C:\Niobrara\apps\DUCM\SEAbus\ and choose DUCM_SEAbus.qcc. Fill in the rest of the information necessary to connect to the DUCM. Click "Start Download" to begin loading the application. QLOAD will check the firmware of the DUCM and a few other required metrics, so pay attention to any error

messages returned by QLOAD.

Figure 2.1: QLOAD application



Serial Connections to the DUCM

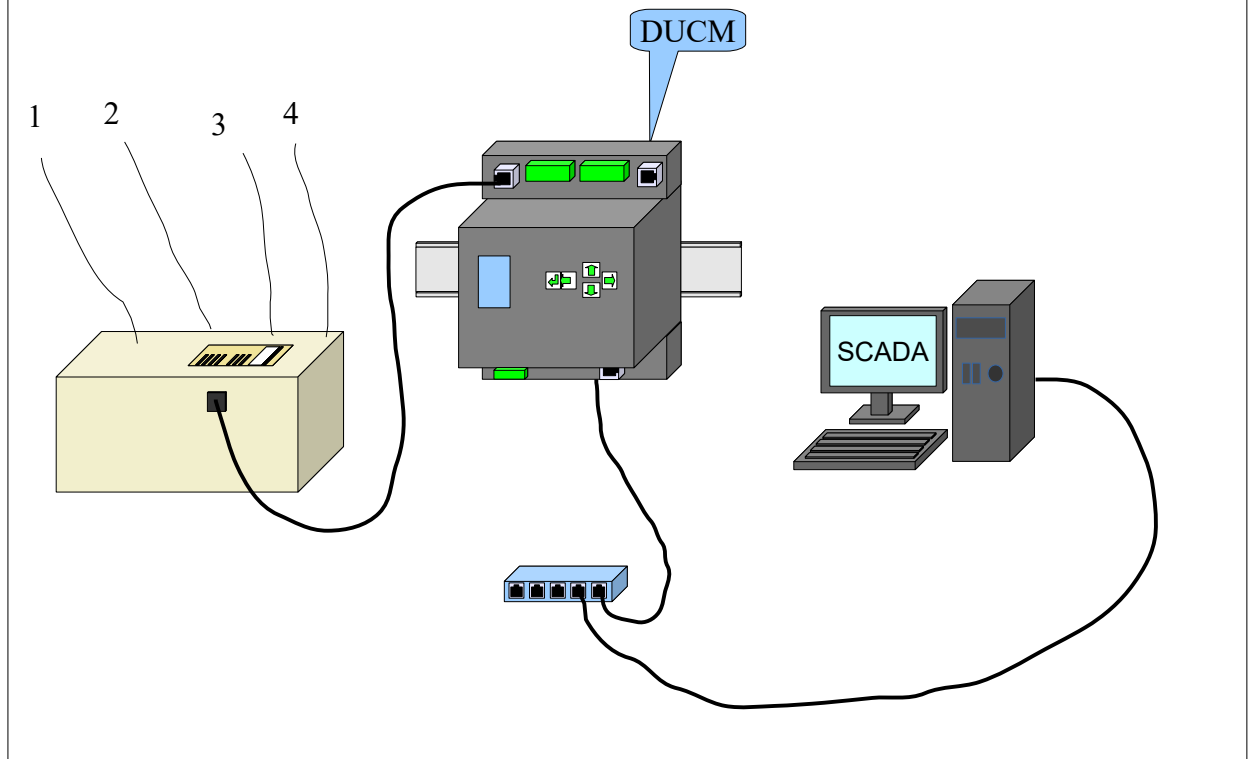
DUCM Port to SEAbus Daisy Chain

Both serial ports of the DUCM provide isolation on the RS-485 ports, and may be connected directly to the SEAbus Daisy Chain. Jumper the RX- and TX- of the port together, and connect them to the (-) connections of the SEAbus devices. Jumper the RX+ and TX+ of the port together, and connect them to the (+) connections of the SEAbus devices. Set the serial port of the DUCM to 2-wire 485.

DUCM Port to Isolated Multi-Drop Converter

The Siemens Isolated Multi-Drop™ Converter may be used to connect a large number of SEAbus devices to a single DUCM serial port. Set the DUCM serial port to RS-232. Set the converter's TX Control switches to RTS and MAN. Set the Baud Rate to match the connected devices. Use the Niobrara MM4 cable to connect the DUCM to the Converter.

Figure 2.2: Multi-Drop Layout



3 Configuration

Once the application is loaded, the DUCM must be configured for operation. The devices to be polled and the DUCM's other settings (serial port setting, IP settings, etc) are all managed by an XML file included in the SEABus setup program. Up to 200 different SEABus entries may be configured for the DUCM across all ports. Once the XML file is built, it is loaded into the DUCM via the web page. A skeleton XML file is shown below.

Figure 3.1: Application Configuration XML file

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<RestoreFile xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="Niobrara_UCM_Seabus.xml">
  <ApplicationName>UCM_SEABUS</ApplicationName>
  <SetupVersion>0</SetupVersion>
  <UCMconfig>
    <!-- Valid ePort = 1, 2 -->
    <!-- eIP/eSN/eDG must be in dotted decimal -->
    <!-- Valid eOspport = 502 or 503 -->
    <!-- Valid eMode for Enet port 2 are Independnt, Switch, Mirror -->
    <EthernetPort>
      <ePort>1</ePort>
      <eIP>206.223.51.165</eIP>
      <eSN>255.255.255.0</eSN>
      <eDG>206.223.51.1</eDG>
      <eOspport>503</eOspport>
    </EthernetPort>
    <!-- Valid sPort = 1, 2, 3, 4 -->
    <!-- Valid sMode = SEABus_Mst, PNIM+RTU, RTU_Slave, SEABus_Slv -->
    <!-- Valid sBaud = 2400, 4800, 9600, 19200 -->
    <!-- Valid sParity = None, Odd, Even -->
    <!-- Valid sDataBits = 7, 8 -->
    <!-- Valid sStopBits = 1, 2 -->
    <!-- Valid sDriver = RS-232, 2wire_485, 4wire_485 -->
    <!-- Valid sRetries = 0, 1, 2, 3 -->
    <!-- Valid sTimeout = 500, 1000, 1500, 2000, 3000 -->
    <SerialPort>
      <sPort>1</sPort>
      <sMode>SEABus_Mst</sMode>
      <sBaud>9600</sBaud>
      <sParity>None</sParity>
      <sDataBits>8</sDataBits>
      <sStopBits>1</sStopBits>
      <sDriver>RS-232</sDriver>
      <sRetries>1</sRetries>
      <sTimeout>1000</sTimeout>
    </SerialPort>
    <Admin>
      <webTitle>NR&D&#39;s SEABUS&#8482; Server</webTitle>
      <webHead>NR&D&#39;s SEABUS&#8482; Server</webHead>
      <webUserName>user</webUserName>
      <webAdminName>admin</webAdminName>
      <webUserPass>12DEA96FEC20593566AB75692C9949596833ADC9</webUserPass>
      <webAdminPass>4F26AEAFDB2367620A393C973EDD8E8F88846EBD</webAdminPass>
      <kpassword>B6589FC6AB0DC62CF12099D1C2D40AB994E8410C</kpassword>
    </Admin>
  </UCMconfig>
  <DeviceConfig>
    <!-- Valid dIndex = 1 to 200 -->
    <!-- Valid dPort = 1, 2, 3, 4, 11, 12, 13, 14 (>10 = Enet Socket Number) -->
    <!-- Valid dType = 4300_PM, 4700_PM, ISGS, SAMMS, STIII/CPNX, SB_Energy, 3720_PM, SB_MT, SAMMS_MT, 4720_PM, S7IO, Modbus, PNIM -->
    <!-- Valid dIPaddr = Must be in dotted decimal -->
    <!-- Valid dTCPport = Any valid TCP port (usually 7801) -->
    <!-- Valid dInService = Y, N -->
    <Device>
      <dIndex>1</dIndex>
      <dPort>11</dPort>
      <dType>S7IO</dType>
      <dSlave>1</dSlave>
      <dSubnet>0</dSubnet>
      <dName>Device_01</dName>
      <dInService>Y</dInService>
    </Device>
  </DeviceConfig>
</RestoreFile>
```

The first four lines are lines that the DUCM checks to make sure this is the right file that is being downloaded. These lines should not be changed.

The first set of comments describe the setup of the Ethernet port(s) The lines following are the actual configuration lines for Ethernet:

- *ePort* – The DUCM can have up to two Ethernet ports. Each port must be declared and referenced independently. This line tells the DUCM which port to configure.
- *eIP* – The IP address of the referenced port is given as a standard four octet string (xxx.xxx.xxx.xxx).
- *eSN* – This is the Ethernet port's subnet mask, in the same format as the IP address.
- *eDG* – The default gate for the Ethernet port, in the same format as the IP address.
- *eOSport* – The DUCM's operating system has a Modbus/TCP server for viewing internal registers and loading applications. It is generally recommended to set this TCP port to 503 rather than 502 so that the DUCM may be reloaded remotely without having to first halt the running application.

The second set of comments describes how to configure the serial ports. These settings are:

- *sPort* – The DUCM has two serial ports. This line tells the DUCM which port is being configured.
- *sMode* – Either port may be configured as a SEABus master, Modbus RTU master, Modbus RTU slave, or SEABus slave.
- *sBaud* – The DUCM serial port can operate at most standard serial baud rates. Current options for this setting are 2400, 4800, 9600, and 19200.
- *sParity* – The port may be set for even, odd, or no parity.
- *sDataBits* – The port may be set for 7 or 8 data bits. The user would nearly always want this to be set to 8.
- *sStopBits* – The port may be set for 1 or 2 stop bits.
- *sDriver* – The driver mode for the port may be set to RS-232, 2-wire RS-485, or 4-wire RS485. This setting should properly reflect the cabling to be used by the port.
- *sRetries* – As a SEABus or Modbus RTU master, the port may be set to do a number of transmit retries should it encounter a timeout.
- *sTimeout* – The timeout for a reply may be set to whatever the user deems appropriate. Legal values are listed in the XML file.

Immediately following the serial port settings are the web settings for the DUCM's web server. They are:

- *WebTitle* – This is the title of the web page that will be displayed at the top of each web page.
- *WebHead* – This is the title of the web page that will be displayed at the top of the browser tab.
- *WebUserName* – This is the user name for a non-administrator that wants to access the DUCM's web pages.
- *WebAdminName* – This is the user name for the administrator of the DUCM. This login must be used to change any setting in the DUCM.
- *WebUserPass* – This string is the SHA1 calculation of the password that will be used by a non-administrator user. Default password is "user."
- *WebAdminPass* – This string is the SHA1 calculation of the password used for the administrator. Default password is "master."
- *kpassword* – This string is the SHA1 calculation of the password that would be used to access the keypad. This feature is currently not implemented, and may be left out of any configuration file.

The last section of comments provide information on how to configure the SEAbus devices. The settings are:

- *dIndex* – This is the Modbus device ID that the Modbus master will use to reference the slave's information.
- *dPort* – This is the port that the SEAbus slave is connected to. Numbers 1 and 2 reference the serial ports, while 11-14 reference sockets the DUCM will open to access terminal servers on the Ethernet port.
- *dType* – Specifies the type of SEAbus device being polled. A list of possible devices is included in the comments.
- *dSlave* – This is the SEAbus device address the slave is set to.
- *dSubnet* – Siemens made a multiplexer that would support multiple daisy chains of SEAbus devices. If a multiplexer is used, this setting references the subnet address the slave is on.
- *dIPAddr* – If a terminal server is being used, this is the IP address of that server.
- *dTCPport* – Specifies the TCP port being used by the terminal server. In the case of an ION meter, the port is usually 7801.
- *dName* - A label may be assigned to each SEAbus device within the DUCM. This label is only visible when viewing the devices on the DUCM's web server.

- *dInService* – The user may choose to configure a SEABus device, but have it be offline. Setting this “N” will cause the DUCM to skip this device while polling the list of devices.

Once all the settings have been configured correctly, the XML file should be loaded into the DUCM via the web configuration.

Open a browser, and proceed to the IP address of the DUCM. Click on the “Configuration” link on the left side of the screen, and enter the administrator password (default is “master”). Then click the “Restore” option. Browse to the XML file, and load it into the DUCM.

Figure 3.2: Web Server Home Page

← → ↻ 🏠 ⓘ Not secure | 206.223.51.165

NR&D's SEABus™ Server

Status of Connected Devices

No Devices Configured (200 max)

Port 1 SEABus_Mst, 9600, None, 8, 1, RS-232, 1 retries, 1000 mS

Port 2 SEABus_Mst, 9600, None, 8, 1, RS-232, 1 retries, 1000 mS

Dest. Index	UCM Port	Name	Device Type	Slave Addr.	Status
NONE	NONE	NONE	NONE	NONE	NONE

[SEABus Data Summary Pages](#)
[UCM Configuration](#)
[UCM Statistics](#)
[Help](#)

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E1 IP Address = 206.223.51.165

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

UCM Clock
8:47:04
04/06/2019

Figure 3.3: Web Server Configuration Page

[Home](#)
[Summary](#)
[Configuration](#)
[Add Device](#)
[Serial Port](#)
[IP](#)
[Titles](#)
[Clock](#)
[Factory](#)
[Password](#)
[Backup](#)
[Restore](#)
[Statistics](#)
[Help](#)

NR&D's SEABus™ Server

Configuration Page

No Devices Configured (200 max)

Port 1 SEAbus_Mst, 9600, None, 8, 1, RS-232, 1 retries, 1000 mS

Port 2 SEAbus_Mst, 9600, None, 8, 1, RS-232, 1 retries, 1000 mS

Dest. Index	UCM Port	Name	Device Type	Slave Addr.	Modify
NONE	NONE	NONE	NONE	NONE	N/A

[Add Device](#)
[Serial Port Configuration](#)
[Change UCM E1 TCP/IP Address](#)
[Change UCM Titles](#)
[Set UCM Clock](#)
[Change Password](#)
[Factory Defaults](#)
[DUCM_SEABus_Backup_206_223_51_165.xml](#)
[Restore Backup](#)
[Home](#)

E1 IP Address = 206.223.51.165

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

UCM Clock
8:49:13
04/06/2019

Figure 3.4: Web Server Restore Page

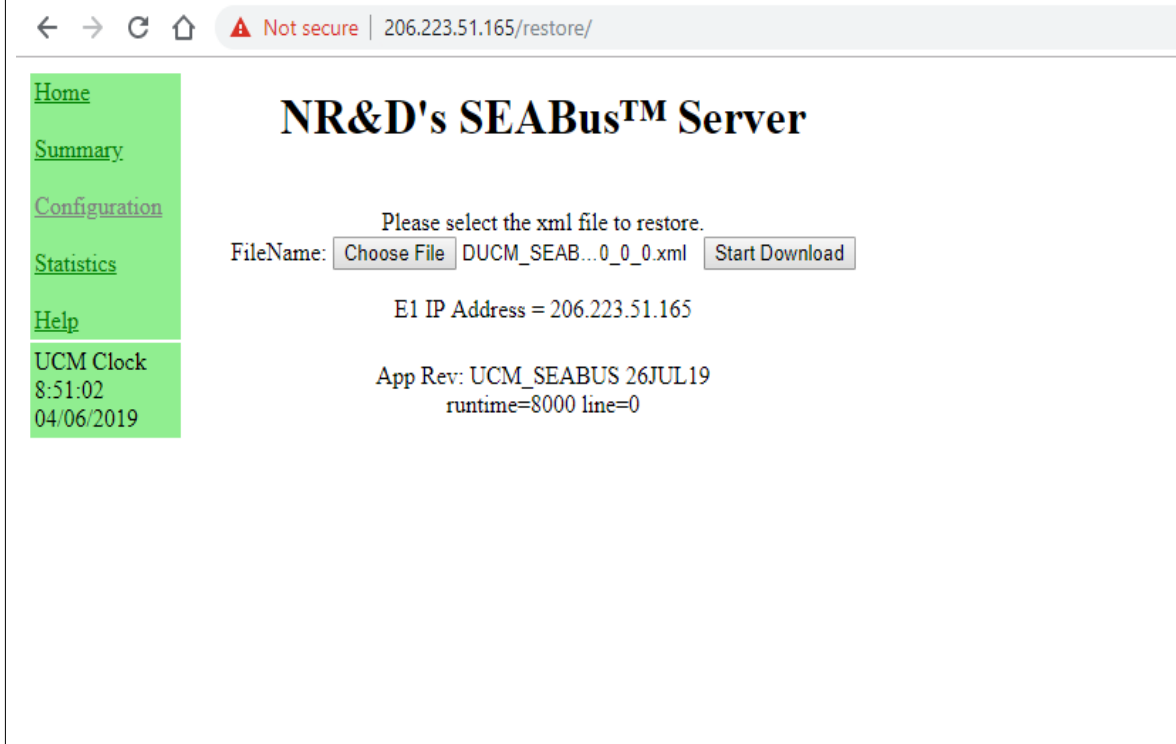


Figure 3.5: Web Server Poll Table Loaded

[Home](#)
[Summary](#)
[Configuration](#)
[Statistics](#)
[Help](#)

NR&D's SEABus™ Server

Receiving File.....

Verifying: DUCM_SEABus_Backup_10_10_10_43.xml

```

<ApplicationName> = UCM_SEABUS
  <SetupVersion> = 0
    <ePort> = 1
      <eIP> = 10.10.10.43
        <eSN> = 255.0.0.0
          <eDG> = 0.0.0.0
            <eOSport> = 503
              <ePort> = 2
                <eMode> = Independnt
                  <eIP> = 126.109.247.231
                    <eSN> = 87.253.254.125
                      <eDG> = 230.77.98.173
                        <sPort> = 1
                          <sMode> = SEABus_Mst
                            <sBaud> = 9600
                              <sParity> = None
                                <sDataBits> = 8
                                  <sStopBits> = 1
                                    <sDriver> = RS-232
                                      <sRetries> = 1
                                        <sTimeout> = 1000
                                          <sPort> = 2
                                            <sMode> = SEABus_Mst
                                              <sBaud> = 9600
                                                <sParity> = None
                                                  <sDataBits> = 8
                                                    <sStopBits> = 1
                                                      <sDriver> = RS-232
                                                        <sRetries> = 1
                                                          <sTimeout> = 1000
                                                            <sPort> = 3
                                                              <sMode> = SEABus_Mst
                                                                <sBaud> = 9600
                                                                  <sParity> = None
                                                                    <sDataBits> = 8

```

4 Web Pages

The DUCM contains a built in web server that can be accessed over an Ethernet network using a web browser. By entering the IP Address of the device into the browser the home page of the server can be accessed as seen in Figure 4.1. The home page shows an overview of the devices that are being polled by the DUCM. From this page the user can follow links that allow for configuration of the DUCM's ports, configuration of connected slaves, and simple statistics about the DUCM. The user may also see the data from the connected slaves.

Figure 4.1: Web Server Home Page

[Home](#)
[Summary](#)
[Configuration](#)
[Statistics](#)
[Help](#)

NR&D's SEABus™ Server

Status of Connected Devices

10 Devices Configured (200 max)

Port 1 SEAbus_Mst, 9600, None, 8, 1, RS-232, 1 retries, 1000 mS

Port 2 SEAbus_Mst, 9600, None, 8, 1, RS-232, 1 retries, 1000 mS

Dest. Index	UCM Port	Name	Device Type	Slave Addr.	Status
1	Port 11	Device_01	STIII/CPNX	1	Online
2	Port 11	Device_02	STIII/CPNX	2	Online
3	Port 11	Device_03	STIII/CPNX	3	Online
4	Port 11	Device_04	STIII/CPNX	4	Online
5	Port 11	Device_05	STIII/CPNX	5	Online
6	Port 11	Device_06	STIII/CPNX	6	Online
7	Port 11	Device_07	STIII/CPNX	7	Online
8	Port 11	Device_08	STIII/CPNX	8	Online
9	Port 11	Device_09	STIII/CPNX	9	Online
10	Port 11	Device_10	STIII/CPNX	10	Online

[SEAbus Data Summary Pages](#)
[UCM Configuration](#)
[UCM Statistics](#)
[Help](#)

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E1 IP Address = 10.10.10.43

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

UCM Clock
9:08:01
04/06/2019

Before accessing any configuration information in the DUCM, a user must provide a password, as shown below. Once the user has provided the proper password, that user may access any page the DUCM provides. If the user does not click a link within three minutes, a timer expires, and the DUCM will once again require the password to be submitted before showing another page. The default password is “master.”

Figure 4.2: Password Page

← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/config/

[Home](#)
[Summary](#)
[Configuration](#)
[Statistics](#)
[Help](#)
UCM Clock
9:11:09
04/06/2019

NR&D's SEABus™ Server

Password Page

Enter Password:

[Home](#)

E1 IP Address = 10.10.10.43

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

Home Page

The Home menu in the top left corner of the page contains links to the:

- *Summary* page where the user can link to a current, voltage or energy summary of the connected devices, as shown in Figure 4.3.
- *Configuration* page where the user can change configuration of the DUCM or the connected devices, as shown in Figure 4.4
- *Statistics* page where the user can link to the statistics of the DUCM, the connected devices, or the serial ports, as shown in Figure 4.5

Figure 4.3: Summary Page

← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/summary/

NR&D's SEABus™ Server

Summary

[Current Summary](#)

[Voltage Summary](#)

[Energy Summary](#)

[Home](#)

E1 IP Address = 10.10.10.43

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

UCM Clock
9:19:16
04/06/2019

Figure 4.4: Configuration Page

← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/config/

NR&D's SEABus™ Server

Configuration Page

10 Devices Configured (200 max)

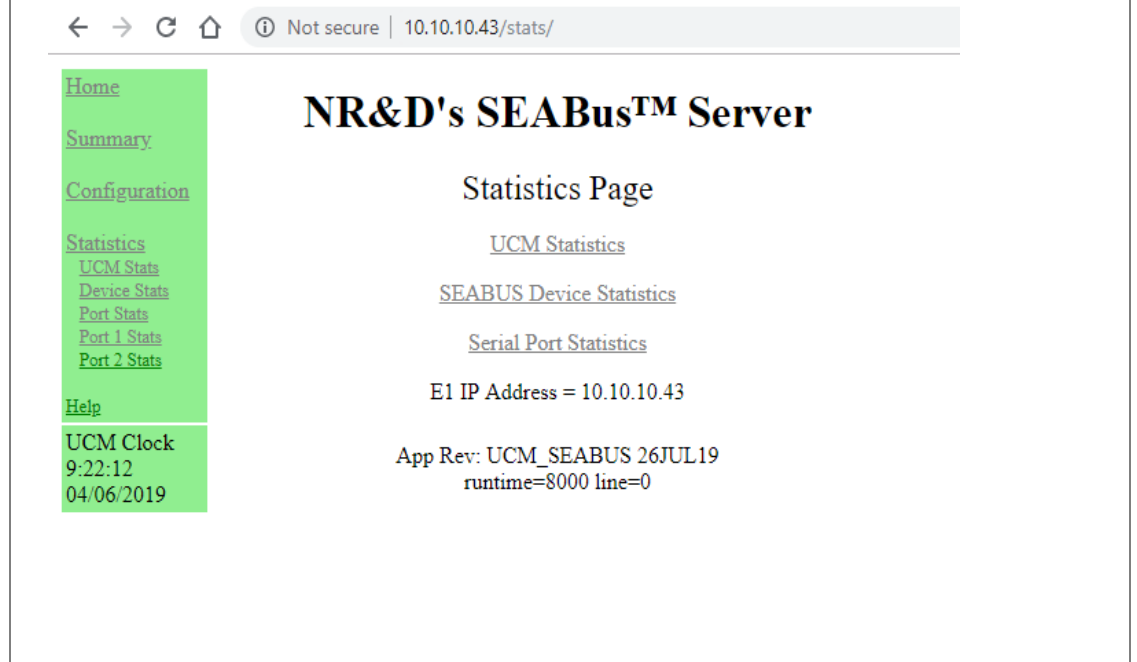
Port 1 SEABus_Mst, 9600, None, 8, 1, RS-232, 1 retries, 1000 mS

Port 2 SEABus_Mst, 9600, None, 8, 1, RS-232, 1 retries, 1000 mS

Dest. Index	UCM Port	Name	Device Type	Slave Addr.	Modify
1	Port 11	Device_01	STIII/CPNX	1	Edit Remove
2	Port 11	Device_02	STIII/CPNX	2	Edit Remove
3	Port 11	Device_03	STIII/CPNX	3	Edit Remove
4	Port 11	Device_04	STIII/CPNX	4	Edit Remove
5	Port 11	Device_05	STIII/CPNX	5	Edit Remove
6	Port 11	Device_06	STIII/CPNX	6	Edit Remove
7	Port 11	Device_07	STIII/CPNX	7	Edit Remove
8	Port 11	Device_08	STIII/CPNX	8	Edit Remove
9	Port 11	Device_09	STIII/CPNX	9	Edit Remove
10	Port 11	Device_10	STIII/CPNX	10	Edit Remove

[Add Device](#)

Figure 4.5: Statistics Page



Summary Page

The Summary page contains links to the:

- *Current Summary* page where the list of configured devices and all relevant current readings are listed, as shown in Figure 4.6
- *Voltage Summary* page where the list of configured devices and all relevant voltage readings are listed, as shown in Figure 4.7
- *Energy Summary* page where the list of configured devices and all relevant energy readings are listed, as shown in Figure 4.8

Figure 4.6: Current Summary Page

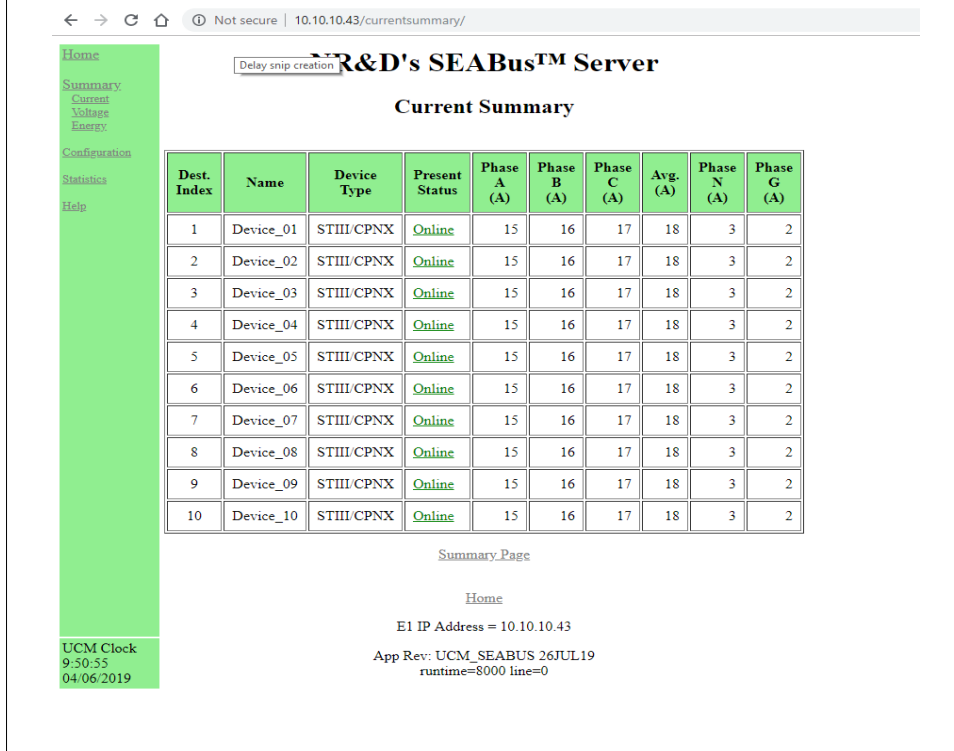


Figure 4.7: Voltage Summary Page

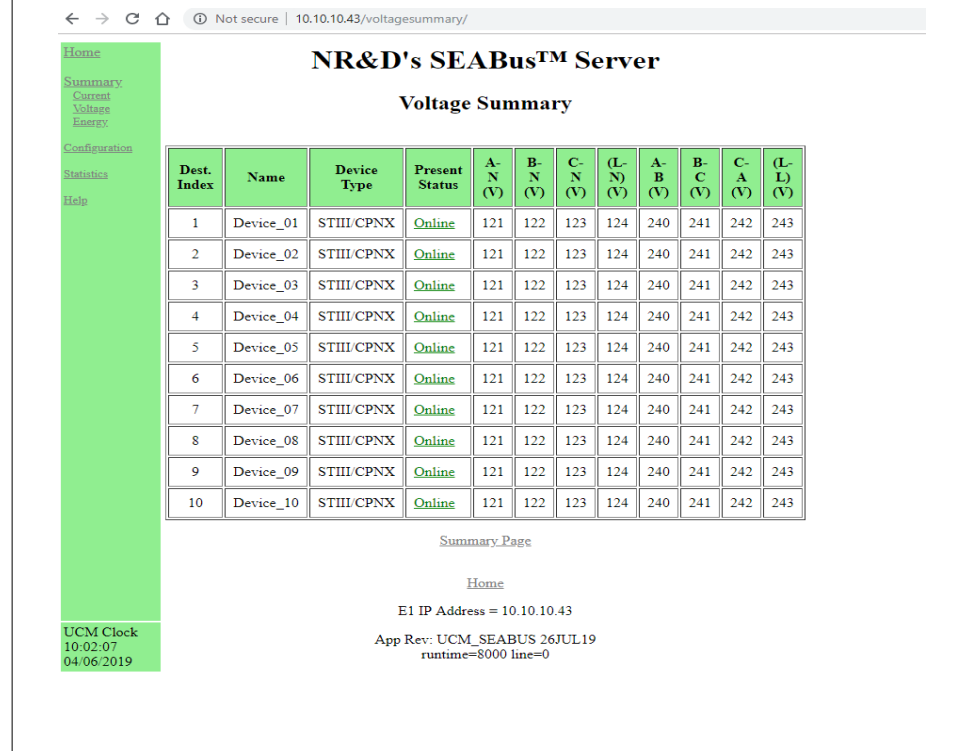
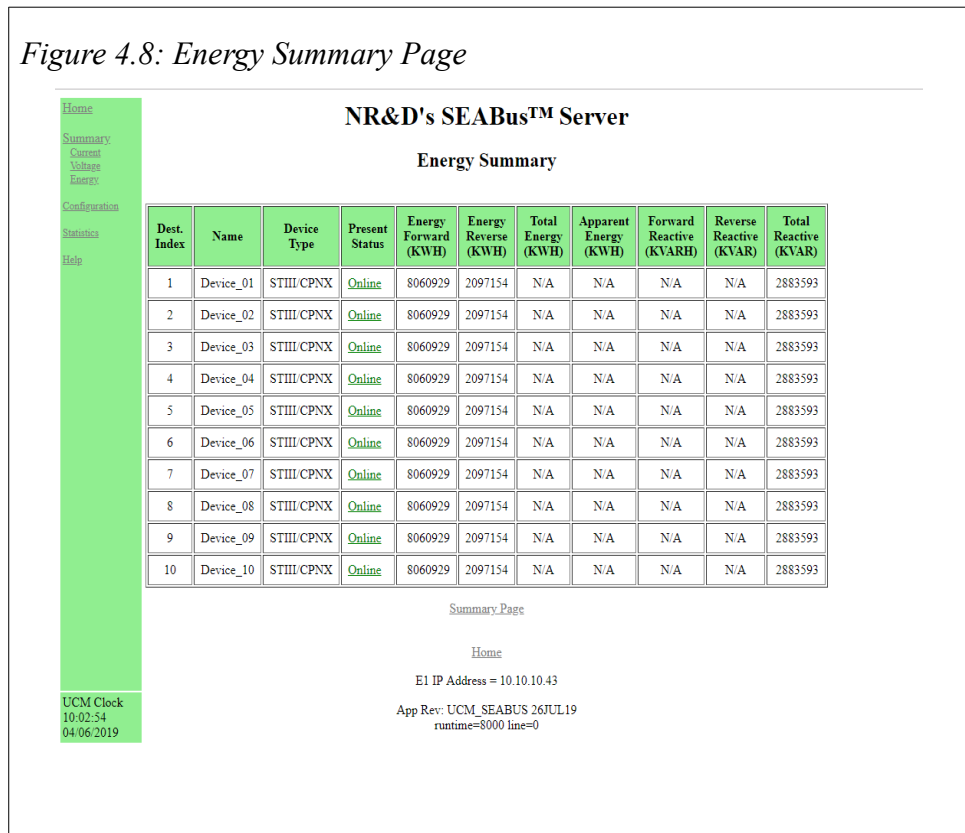


Figure 4.8: Energy Summary Page



Configuration Page

The Configuration page contains links to the:

- *Add Device* page where a user may add a single device to the SEABus network, as shown in Figure
- *Serial Port* page where a user may change the configuration of the DUCM's serial ports, as shown in Figure
- *Titles* page where the user may change the web page titles, as shown in Figure
- *Set Clock* page where the DUCM's real time clock can be changed, as shown in Figure
- *Factory* page where the user may choose to revert the DUCM back to factory default settings, as shown in Figure
- *Password* page where the password to access any web page in the DUCM may be changed, as shown in Figure
- *Backup* page where the user can download an XML file containing the

DUCM's current configuration, as shown in Figure

- *Restore* page where the user can upload the XML file that contains the DUCM's configuration, as shown in Figure

Figure 4.9: Add Device Page

← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/pass

NR&D's SEABus™ Server

Device Add Page

Parameter	Value
Destination Index:	11 ▾
UCM Port Number	1 ▾
Device Type	STIII/CPNX ▾
Slave Address	11 ▾
M/T Sub Address	0 ▾
Name	Device_12
In Service	☒

[Cancel Add Device](#)

[Home](#)

E1 IP Address = 10.10.10.43
App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

Home
Summary
Configuration
Add Device
Serial Port
IP
Titles
Clock
Factory
Password
Backup
Restore
Statistics
Help

UCM Clock
10:21:50
04/06/2019

Figure 4.10: Serial Port Page

← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/port/

[Home](#)
[Summary](#)
[Configuration](#)
[Add Device](#)
[Serial Port](#)
[IP](#)
[Titles](#)
[Clock](#)
[Factory](#)
[Password](#)
[Backup](#)
[Restore](#)
[Statistics](#)
[Help](#)

NR&D's SEABus™ Server

Serial Port Configuration

Parameter	Value
Port 1 Mode	SEAbus_Mst ▾
Port 1 Baud Rate	9600 ▾
Port 1 Parity	None ▾
Port 1 Data Bits	8 ▾
Port 1 Stop Bits	1 ▾
Port 1 Driver	RS-232 ▾
Port 1 Retries	1 ▾
Port 1 Timeout	1000 ▾
Port 2 Mode	SEAbus_Mst ▾
Port 2 Baud Rate	9600 ▾
Port 2 Parity	None ▾
Port 2 Data Bits	8 ▾
Port 2 Stop Bits	1 ▾
Port 2 Driver	RS-232 ▾
Port 2 Retries	1 ▾
Port 2 Timeout	1000 ▾

[Cancel Port Configuration](#)

[Home](#)

E1 IP Address = 10.10.10.43

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

UCM Clock

10:22:38

04/06/2019

Figure 4.11: Titles Page

← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/changeitle/

[Home](#)
[Summary](#)
[Configuration](#)
[Add Device](#)
[Serial Port](#)
[IP](#)
[Titles](#)
[Clock](#)
[Factory](#)
[Password](#)
[Backup](#)
[Restore](#)
[Statistics](#)
[Help](#)

NR&D's SEABus™ Server

Edit Title Page

Parameter	Value
Title	NR&D's SEABus™ Server
Head	NR&D's SEABus™ Server

[Cancel Edit Titles](#)

[Home](#)

E1 IP Address = 10.10.10.43

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

UCM Clock

10:23:37

04/06/2019

Figure 4.12: Clock Page

← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/clock/

[Home](#)
[Summary](#)
[Configuration](#)
[Add Device](#)
[Serial Port](#)
[IP](#)
[Titles](#)
[Clock](#)
[Factory](#)
[Password](#)
[Backup](#)
[Restore](#)

[Statistics](#)

[Help](#)

UCM Clock
10:24:30
04/06/2019

NR&D's SEABus™ Server

UCM Clock Configuration

Parameter	Value
Local Time HR/MN/SC	10 : 24 : 30
Date MM/DD/YYYY	04 / 06 / 2019

[Cancel Set CLock](#)

[Home](#)

E1 IP Address = 10.10.10.43

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

Figure 4.13: Factory Page

← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/factory/

[Home](#)
[Summary](#)
[Configuration](#)
[Add Device](#)
[Serial Port](#)
[IP](#)
[Titles](#)
[Clock](#)
[Factory](#)
[Password](#)
[Backup](#)
[Restore](#)

[Statistics](#)

[Help](#)

UCM Clock
10:26:29
04/06/2019

NR&D's SEABus™ Server

Restore to Factory Defaults Page

Enter the text 'Factory' to reset the module to defaults.

NOTE: the TCP/IP Settings will remain.

[Cancel Edit](#)

[Home](#)

E1 IP Address = 10.10.10.43

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

Figure 4.14: Password Page

← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/changepassword/

[Home](#)
[Summary](#)
[Configuration](#)
[Add Device](#)
[Serial Port](#)
[IP](#)
[Titles](#)
[Clock](#)
[Factory](#)
[Password](#)
[Backup](#)
[Restore](#)

[Statistics](#)

[Help](#)

UCM Clock
10:27:16
04/06/2019

NR&D's SEABus™ Server

Change Password

Enter Current Password:

Enter new Password:

Confirm new Password:

E1 IP Address = 10.10.10.43

App Rev: UCM_SEABUS 26JUL19
runtime=8000 line=0

Figure 4.15: Backup Page

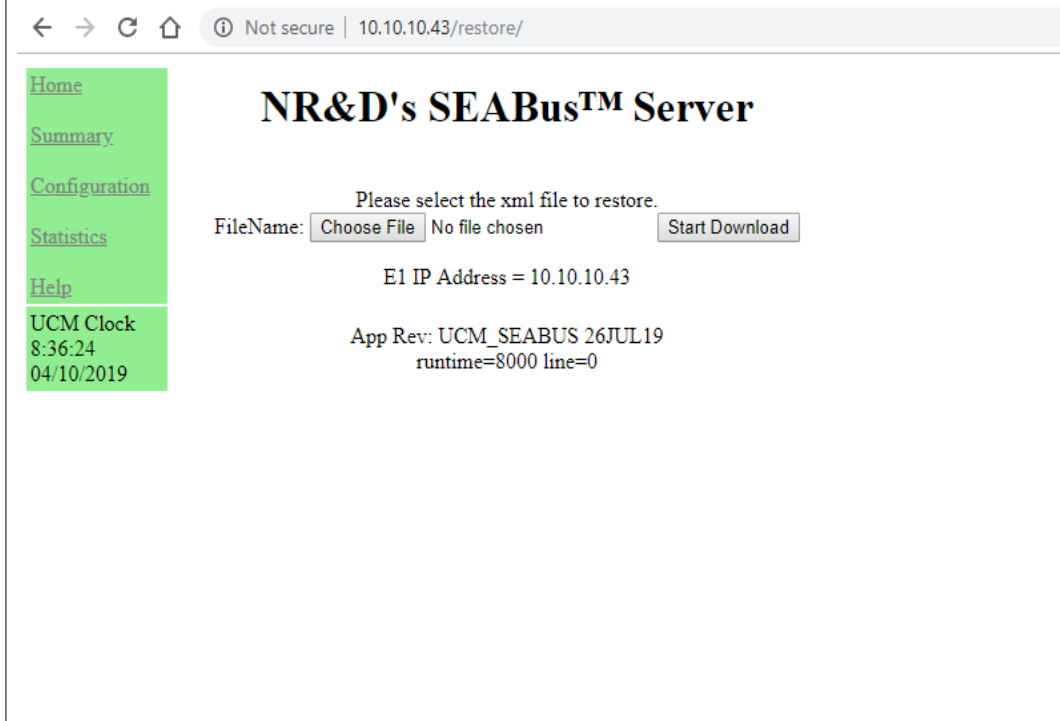
← → ↻ 🏠 ⓘ Not secure | 10.10.10.43/DUCM_SEABus_Backup_10_10_43.xml

This XML file does not appear to have any style information associated with it. The document tree is shown below.

```

▼<RestoreFile xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="Niobrara_UCM_Seabus.xml">
  <ApplicationName>UCM_SEABUS</ApplicationName>
  <SetupVersion>0</SetupVersion>
  ▼<UCMConfig>
    <!-- Valid ePort = 1, 2 -->
    <!-- eIP/eSN/eDG must be in dotted decimal -->
    <!-- Valid e0Sport = 502 or 503 -->
    ▼<!--
      Valid eMode for Enet port 2 are Independnt, Switch, Mirror
    -->
    ▼<EthernetPort>
      <ePort1</ePort>
      <eIP>10.10.10.43</eIP>
      <eSN>255.0.0.0</eSN>
      <eDG>0.0.0.0</eDG>
      <e0Sport>503</e0Sport>
    </EthernetPort>
    ▼<EthernetPort>
      <ePort2</ePort>
      <eMode>Independnt</eMode>
      <eIP>126.109.247.231</eIP>
      <eSN>87.253.254.125</eSN>
      <eDG>230.77.98.173</eDG>
    </EthernetPort>
    <!-- Valid sPort = 1, 2, 3, 4 -->
    ▼<!--
      Valid sMode = SEABus_Mst, PNIMHRTU, RTU_Slave, SEABus_Slv
    -->
    <!-- Valid sBaud = 2400, 4800, 9600, 19200 -->
    <!-- Valid sParity = None, Odd, Even -->
    <!-- Valid sDataBits = 7, 8 -->
    <!-- Valid sStopBits = 1, 2 -->
    <!-- Valid sDriver = RS-232, 2wire_485, 4wire_485 -->
    <!-- Valid sRetries = 0, 1, 2, 3 -->
    <!-- Valid sTimeout = 500, 1000, 1500, 2000, 3000 -->
    ▼<SerialPort>
      <sPort1</sPort>
    
```

Figure 4.16: Restore Page



Statistics Page

The Statistics page contains links to the:

- *UCM Statistics* page where the user can see important firmware and software information, as shown in Figure 4.17
- *SEABUS Device Stats* page where the user can see information about the communication statistics of SEAbus slaves attached to the DUCM, as shown in Figure 4.18
- *Port Stats* page where the user can see important statistics about each serial port, as shown in Figure 4.19

Figure 4.17: UCM Stats Page

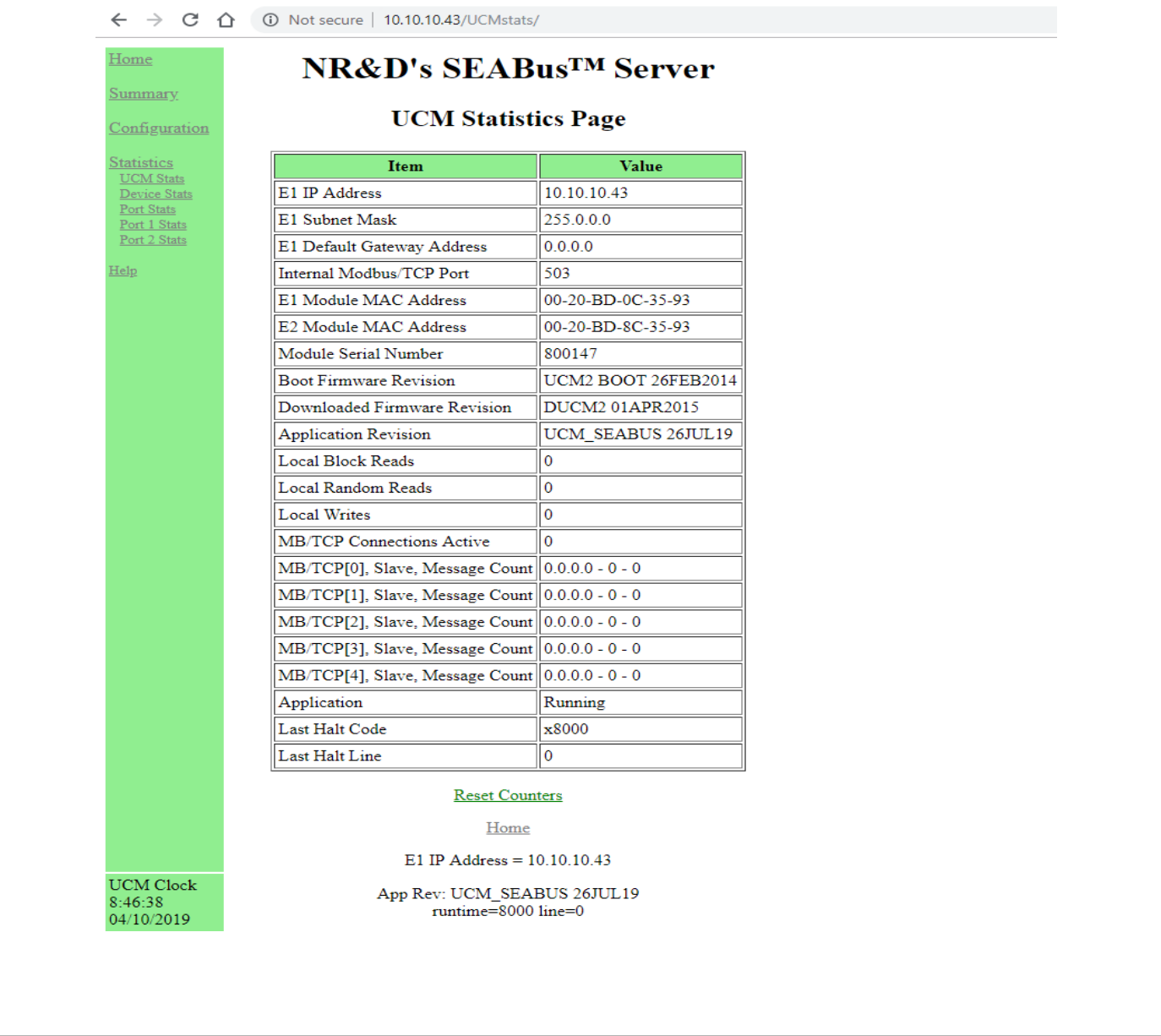


Figure 4.18: MB Server Stats Page

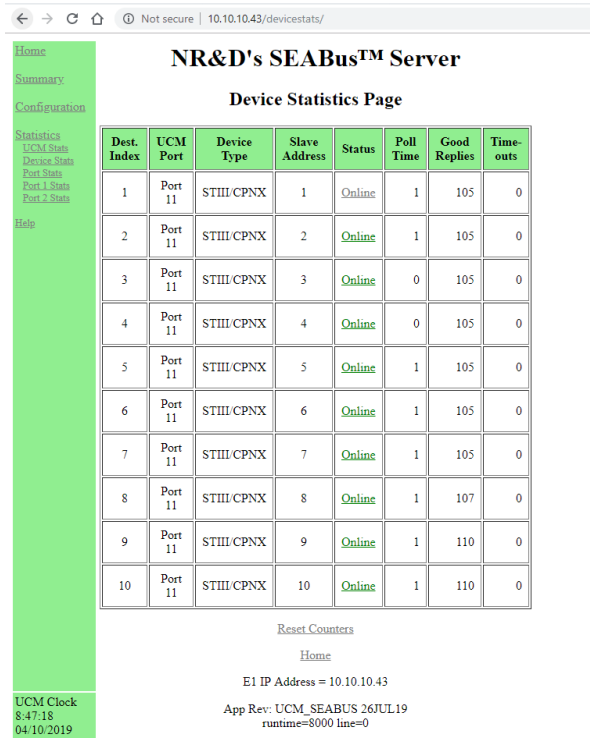
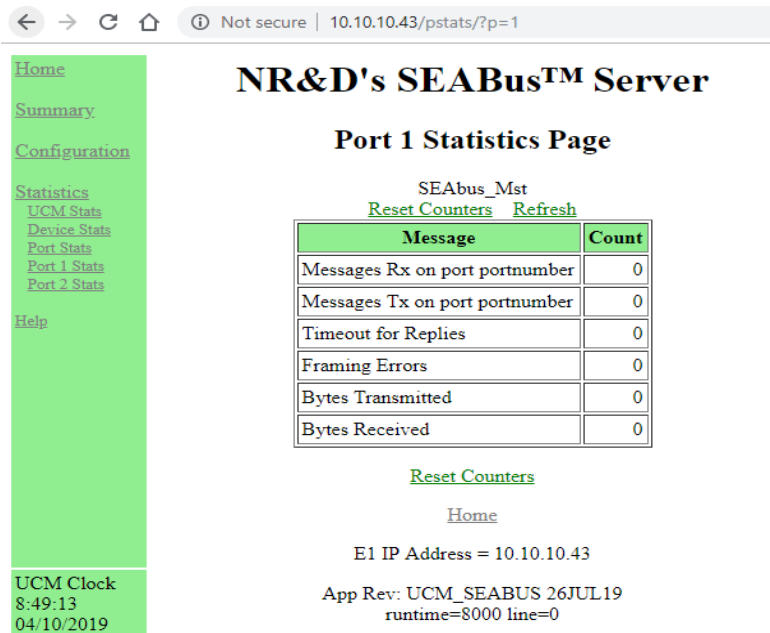


Figure 4.19: Port Stats Page



5 Front Panel Operation

Keypad Buttons

The front panel includes five push buttons.

- ➡ The RIGHT arrow advances to the next screen or field. In many cases, it has the same behavior as the ↵ ENTER key.
- ⬅ The LEFT arrow escapes to the previous screen or field. Changes are saved when the left arrow is pressed.
- ⬆ The UP arrow moves up in a list or increments a selection.
- ⬇ The DOWN arrow moves down in a list or decrements a selection.
- ↵ The ENTER key accepts the values on a screen and exits to a previous screen.

LCD Screen

The DUCM includes a high resolution LCD screen to assist the user in configuring and troubleshooting the device. Serial port parameters may be observed and modified. Statistical information is also provided through the front panel interface.

Backlight

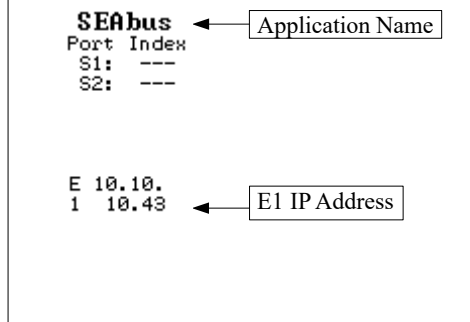
The LCD backlight will illuminate on any button press. The timeout for the backlight is set for 30 seconds.

Operating Screens

Splash Screen

The main page shows the application name, last index accessed by each serial port, and the IP addresses of E1 and E2.

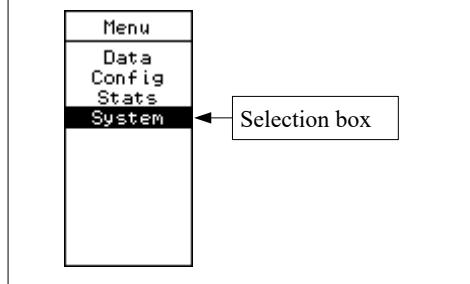
Figure 5.1: Splash screen



Main Menu Screen

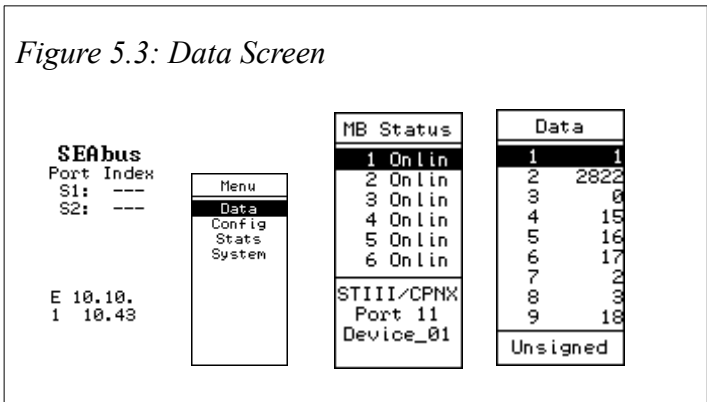
Pressing a key while the splash screen is displayed will move to the Main menu page. A selection box indicates the sub-menu to be chosen. Pressing the UP or DOWN arrows will move the selection box to the next choice. Pressing the RIGHT arrow or ENTER buttons will select the sub-menu. Pressing the LEFT arrow will return to the splash screen page.

Figure 5.2: Main Menu screen



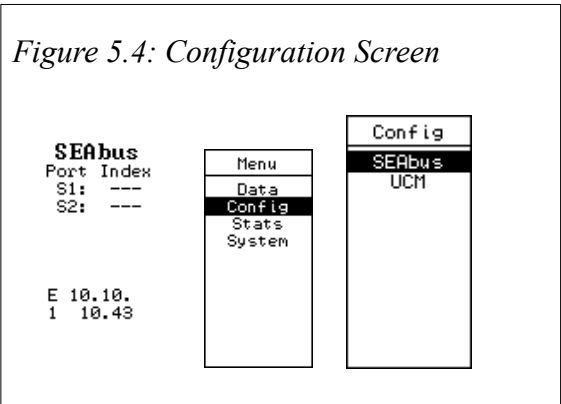
Data

Menu used to view information about the configured devices. While looking at the list of devices, the user can see the online status of up to six devices. The highlighted device will show the device type, port number, and device label in the lower portion of the screen. While viewing the individual device page, the user can see the register values for that particular device. Use the up and down arrows to change what registers are being viewed, the right arrow to change the radix of the values being displayed, and the left arrow to escape from the data page.



Config Menu

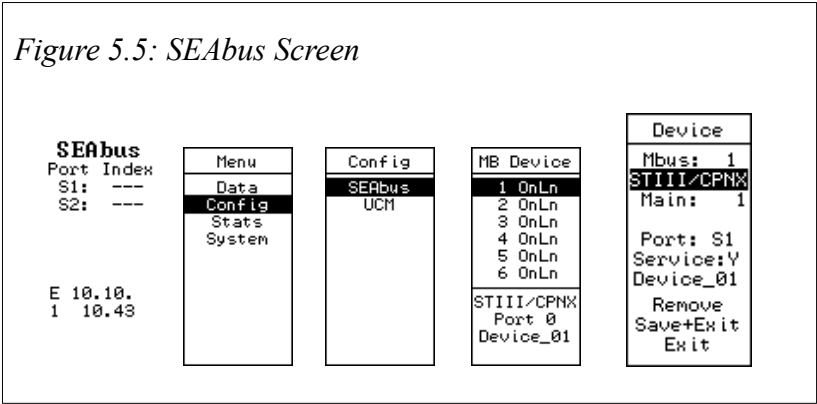
The Config menu may be used to configure the SEAbus devices and the DUCM's serial port settings and IP addresses.



SEAbus

The SEAbus screen is used to configure the configured SEAbus Devices. The user may add or remove devices, and configure the Modbus Slave ID, device type, SEAbus Slave ID, connected port, device label, and whether the device is in service.

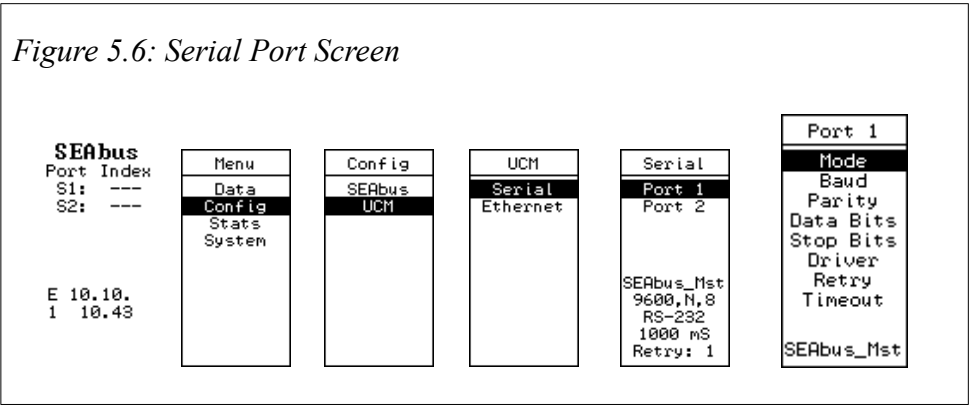
Figure 5.5: SEAbus Screen



Serial Ports

The Serial Port screen is used to configure the configured serial ports of the DUCM. The user may set the mode of the serial ports, the baud rate, parity, data bits, stop bits, driver mode, number of retries, and serial timeout.

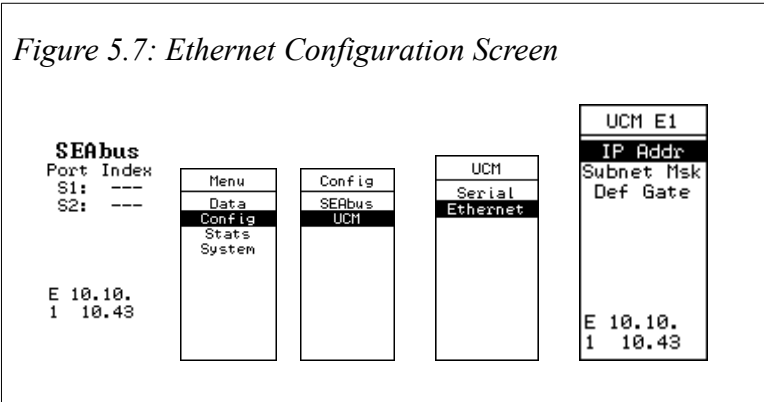
Figure 5.6: Serial Port Screen



Ethernet Config Menu

The Ethernet configuration menu is used to set the operating parameters of both Ethernet ports. The user may configure the DUCM OS TCP port, and E1 and E2 IP address, subnet mask, and default gate. The user may also view the entries in the ACL.

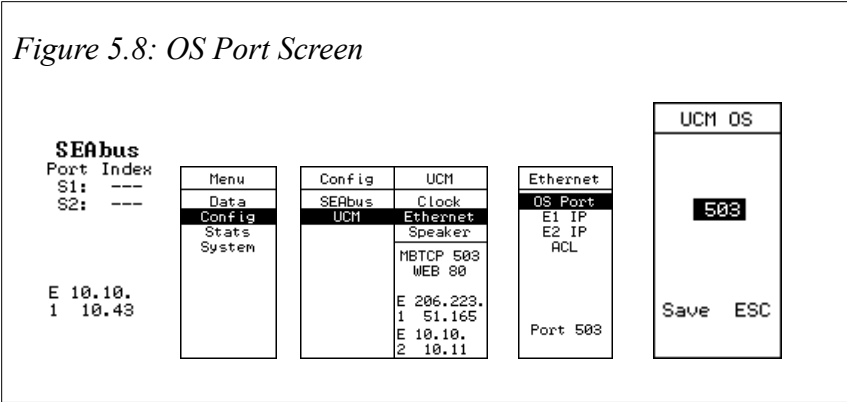
Figure 5.7: Ethernet Configuration Screen



OS Port

The DUCM’s OS TCP port is set to 503 by default. This can be changed if the user desires.

Figure 5.8: OS Port Screen



E1 IP Configuration Menu

The Ethernet port may have its IP address, subnet mask, and default gate edited by the user from these screens.

Figure 5.9: IP Configuration Menu Screen

SEAbus		Config	UCM	Ethernet	UCM E1
Port Index	Menu	SEAbus	Serial	OS Port	IP Addr
S1: ---	Data	UCM	Ethernet	E1 IP	Subnet Msk
S2: ---	Config				Def Gate
	Stats				
	System				
E 10.10.				E 10.10.	E 10.10.
1 10.43				1 10.43	1 10.43

E1 IP Address

The Ethernet port may have its IP address edited by the user from this screen. Use the Left and Right arrows to navigate between the sections of the screen. The Up and Down arrows will increment and decrement the numbers displayed. Highlighting the 192... or 10... sections and pressing Enter will cause the DUCM to changed the IP address of the port to 192.168.0.x or 10.10.10.x addresses. Highlight Save and press Enter to accept the changes, or highlight ESC and press Enter to discard the changes and return to the previous menu.

Figure 5.10: IP Address Screen

SEAbus		Config	UCM	Ethernet	UCM E1	E1 IP Addr
Port Index	Menu	SEAbus	Serial	OS Port	IP Addr	
S1: ---	Data	UCM	Ethernet	E1 IP	Subnet Msk	
S2: ---	Config				Def Gate	
	Stats					
	System					
E 10.10.				E 10.10.	E 10.10.	10. 10.
1 10.43				1 10.43	1 10.43	10. 43
						192...
						10...
						Save ESC

E1 Subnet Mask

The Ethernet port may have its subnet mask edited by the user from this screen. Use the Left and Right arrows to navigate between the sections of the screen. The Up and Down arrows will increment and decrement the number of bits set in the mask. Highlight Save and press Enter to accept the changes, or highlight ESC and press Enter to discard the changes and return to the previous menu.

Figure 5.11: Subnet Mask Screen

SEAbus Port Index Menu S1: --- S2: --- Data Config Stats System E 10.10. 1 10.43		Config SEAbus UCM	UCM Serial Ethernet	Ethernet OS Port E1 IP E 10.10. 1 10.43	UCM E1 IP Addr Subnet Mask Def Gate E 255.0. 1 0.0	E1 SnetMsk 255. 0. 0. 0 (/8) Save ESC
---	--	-------------------------	---------------------------	---	---	--

E1 Default Gate

The Ethernet port may have its default gate edited by the user from this screen. Use the Left and Right arrows to navigate between the sections of the screen. The Up and Down arrows will increment and decrement the numbers in the IP address. Selecting “Apply SM” and pressing Enter will cause the DUCM to logically AND that Ethernet port’s IP address and subnet mask, and put the result in the default gate. Selecting “Zero” and pressing Enter will put all zeroes in the default gate. Highlight Save and press Enter to accept the changes, or highlight ESC and press Enter to discard the changes and return to the previous menu.

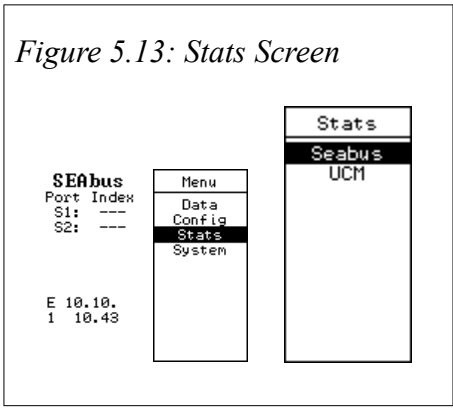
Figure 5.12: Default Gate Screen

SEAbus Port Index Menu S1: --- S2: --- Data Config Stats System E 10.10. 1 10.43		Config SEAbus UCM	UCM Serial Ethernet	Ethernet OS Port E1 IP E 10.10. 1 10.43	UCM E1 IP Addr Subnet Mask Def Gate E 0.0. 1 0.0	E1 DefGate 0. 0. 0. 0 Apply SM Zero Save ESC
---	--	-------------------------	---------------------------	---	---	--

Stats Menu

The Stats Menu give the user information about the DUCM and the MBPoller application.

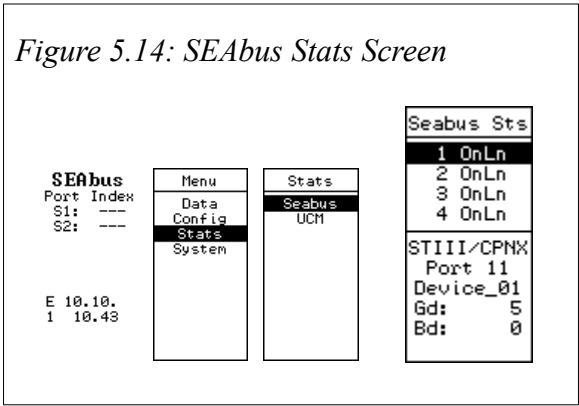
Figure 5.13: Stats Screen



Seabus Statistics Menu

The SEAbus Stats menu allows the user to see online/offline status of devices. Moving up and down the list will show the device type, port number, device label, and the number of good or bad reads for the selected device.

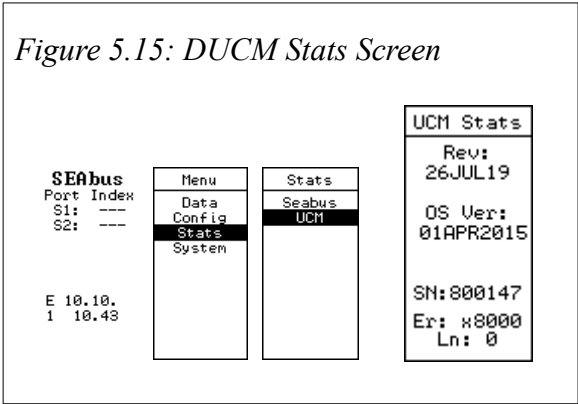
Figure 5.14: SEAbus Stats Screen



UCM Statistics Menu

The UCM Stats menu allows the user to select information about the software and hardware in the DUCM.

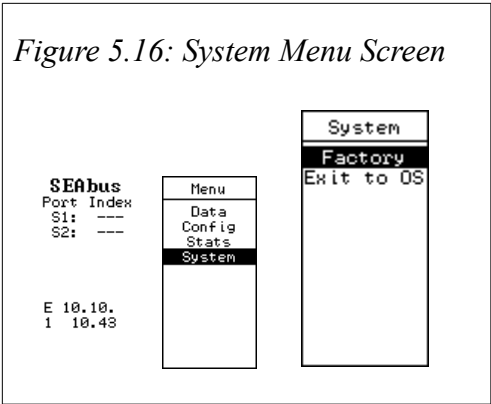
Figure 5.15: DUCM Stats Screen



System Menu

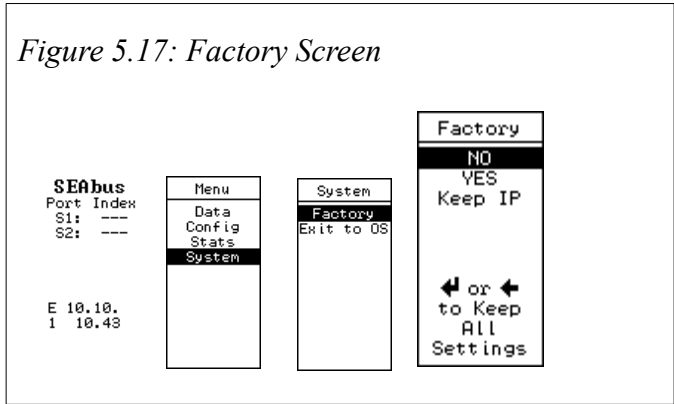
The System Menu provides access to the OS, and the ability to reset settings to factory defaults.

Figure 5.16: System Menu Screen



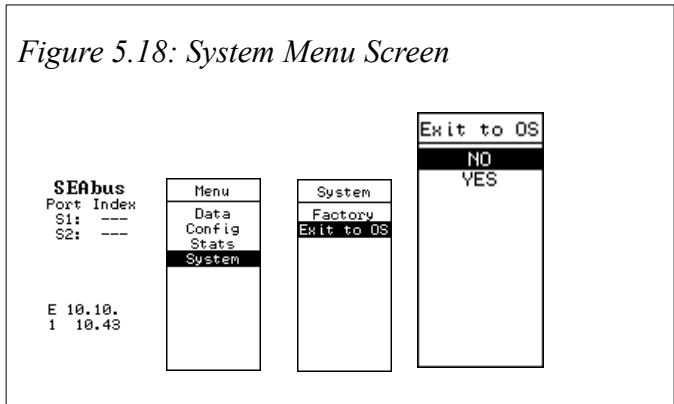
Factory Screen

The Factory screen provides the ability to reset settings to factory defaults. Using the arrow keys, the user may choose to escape from this screen, completely wipe the user settings from the DUCM, or erase everything except the IP settings.



Exit to OS Screen

The Exit to OS screen provides the ability to leave the SEAbus application, and return to the underlying DUCM operating system. This is useful if the user should ever need to update firmware or the SEAbus application.



6 Register Lists

The data from the SEAbus devices is presented as Modbus Holding Registers (4x). Modbus function codes 03, 100, 06, and 16 are supported for reading and writing this data. Register 3 is the only register that may be written and it is a bitmap for clearing accumulated counters.

Most data is presented as signed 16-bit integers. Values with two holding registers are 32-bit integers where the first register is bits 015 and the second register is bits 16-31.

Power Factor is stored in standard POWERLOGIC format with an implied 3 decimal places and the sign bit signaling the leading/lagging.

Model 4300 Power Meter

Table 6.1: Model 4300 Power Meter Registers

Modbus/TCP Register	Description	Notes
1	SEAbus Device Type	1 = 4300 Power Meter
2	SEAbus Plus Address	
3	Reset KWH, Max Demand	bit 0 = reset KW hours bit 1 = reset Max Demand
4	Power Factor	POWERLOGIC standard format
5,6	Voltage A-N	
7,8	Voltage B-N	
9,10	Voltage C-N	
11,12	Avg. L-N Voltage	
13,14	Voltage A-B	
15,16	Voltage B-C	
17,18	Voltage C-A	
19,20	Avg. L-L Voltage	
21,22	KW	
23,24	KW Demand	
25,26	Max. KW Demand	
27,28	KW hours	
29	Current A	

Modbus/TCP Register	Description	Notes
30	Current B	
31	Current C	
32	Avg. Current	
33	Frequency	Times 10
34,35	KVA	
36,37	KVAR	

Model 4700 Power Meter

Table 6.2: Model 4700 Power Meter Registers

Modbus/TCP Register	Description	Notes
1	SEAbus Device Type	2 = 4700 Power Meter
2	SEAbus Address	
3	Reset KWH, Max Demand	bit 0 = reset KW hours bit 1 = reset Max Demand
4,5	Voltage A-N	
6,7	Voltage B-N	
8,9	Voltage C-N	
10,11	Avg. Voltage L-N	
12,13	Voltage A-B	
14,15	Voltage B-C	
16,17	Voltage C-A	
18,19	Avg. Voltage L-L	
20	Current A	
21	Current B	
22	Current C	
23	Avg. Current	
24	Current Input	
25,26	KW A-B	
27,28	KW B-C	

Modbus/TCP Register	Description	Notes
29,30	KW C-A	
31,32	KW Total	
33,34	KVA A-B	
35,36	KVA B-C	
37,38	KVA C-A	
39,40	KVA Total	
41,42	KVAR A-B	
43,44	KVAR B-C	
45,46	KVAR C-A	
47,48	KVAR Total	
49,50	KW Demand	
51	Power Factor	POWERLOGIC Format
52	Frequency	Times 10
53,54	Aux. Voltage	
55	Current Demand	
56,57	KW Hours Forward	
58,59	KW Hours Reverse	
60,61	KVAR Hours Forward	
62,63	Alarm Status Bits	
64	Alarm Event Counter	
65,66,67,68	Alarm Discrete Input Counter	
67,70	KVAR Hours Reverse	

Table 6.3: Model 4700 Power Meter Minimum Values

Modbus/TCP Register	Description	Notes
71,72	Min. Voltage A-N	
73,74	Min. Voltage B-N	
75,76	Min. Voltage C-N	
77,78	Min. Avg. Voltage L-N	
79,80	Min. Voltage A-B	

Modbus/TCP Register	Description	Notes
81,82	Min. Voltage B-C	
83,84	Min. Voltage C-A	
85,86	Min. Avg. Voltage L-L	
87	Min. Current A	
88	Min. Current B	
89	Min. Current C	
90	Min. Avg. Current	
91,92	Min. KW Total	
93,94	Min. KVA Total	
95,96	Min. KVAR Total	
97,98	Min. KW Demand	
99	Min. Power Factor	POWERLOGIC standard format
100	Min. Frequency	Times 10
101,102	Min. Aux. Voltage	
103	Min. Current Demand	
104	Min. Current Input	

Table 6.4: Model 4700 Power Meter Maximum Values

Modbus/TCP Register	Description	Notes
105,106	Max. Voltage A-N	
107,108	Max. Voltage B-N	
109,110	Max. Voltage C-N	
111,112	Max. Avg. Voltage L-N	
113,114	Max. Voltage A-B	
115,116	Max. Voltage B-C	
117,118	Max. Voltage C-A	
119,120	Max. Avg. Voltage L-L	
121	Max. Current A	
122	Max. Current B	

Modbus/TCP Register	Description	Notes
123	Max. Current C	
124	Max. Avg. Current	
125,126	Max. KW Total	
127,128	Max. KVA Total	
129,130	Max. KVAR Total	
131,132	Max. KW Demand	
133	Max. Power Factor	POWERLOGIC standard format
134	Max. Frequency	Times 10
135,136	Max. Aux. Voltage	
137	Max. Current Demand	
138	Max. Current Input	

Model 4720 Power Meter

Table 6.5: Model 4720 Power Meter Registers

Modbus/TCP Register	Description	Notes
1	SEAbus Device Type	8 = 4720 Power Meter
2	SEAbus Address	
3	Reset KWH, Max Demand	bit 0 = reset KW hours bit 1 = reset Min/Max & Demand
4,5	Average Voltage L-N	
6,7	Voltage A-N	
8,9	Voltage B-N	
10,11	Voltage C-N	
12,13	Average Voltage L-L	
14,15	Voltage A-B	
16,17	Voltage B-C	
18,19	Voltage C-A	
20,21	Average Current	

Modbus/TCP Register	Description	Notes
22,23	Current A	
24,25	Current B	
26,27	Current C	
28,29	Current N	
30,31	kW Demand	
32,33	kW Total	
34,35	kW A	
36,37	kW B	
38,39	kW C	
40,41	kVAR Total	
42,43	kVAR A	
44,45	kVAR B	
46,47	kVAR C	
48,49	kVA Total	
50,51	kVA A	
52,53	kVA B	
54,55	kVA C	
56	Power Factor Total	POWERLOGIC standard format
57	Power Factor A	POWERLOGIC standard format
58	Power Factor B	POWERLOGIC standard format
59	Power Factor C	POWERLOGIC standard format
60	Frequency	Times 10
61,62	kW Hours	
63,64	kVAR Hours	
65,66	kVA Hours	

Table 6.6: Model 4720 Power Meter Minimum Values

Modbus/TCP Register	Description	Notes
71,72	Min. Voltage AN	

Modbus/TCP Register	Description	Notes
73,74	Min. Voltage BN	
75,76	Min. Voltage CN	
77,78	Min. Voltage AB	
79,80	Min. Voltage BC	
81,82	Min. Voltage CA	
83,84	Min. Current A	
85,86	Min. Current B	
87,88	Min. Current C	
89,90	Min. Current N	
91,92	Min. kW Demand	
93,94	Min. kW Total	
95,96	Min. kVAR Total	
97,98	Min. kVA Total	
99	Min. Power Factor Total	POWERLOGIC standard format
100	Min. Frequency	Times 10

Table 6.7: Model 4720 Power Meter Maximum Values

Modbus/TCP Register	Description	Notes
101,102	Min. Voltage AN	
103,104	Min. Voltage BN	
105,106	Min. Voltage CN	
107,108	Min. Voltage AB	
109,110	Min. Voltage BC	
111,112	Min. Voltage CA	
113,114	Min. Current A	
115,116	Min. Current B	
117,118	Min. Current C	
119,120	Min. Current N	
121,122	Min. kW Demand	

Modbus/TCP Register	Description	Notes
123,124	Min. kW Total	
125,126	Min. kVAR Total	
127,128	Min. kVA Total	
129	Min. Power Factor Total	POWERLOGIC standard format
130	Min. Frequency	Times 10
131,132	RTC UNIX Time	
133,134	VAUX	
135,136	Min. VAUX	
137,138	Max. VAUX	

ISGS

Table 6.8: ISGS Register List

Modbus/TCP Register	Description	Notes
1	SEAbus Device Type	3 = ISGS
2	SEAbus Slave Address	
3	Reset KW, Min/Max	
4	Input Status	bit 0, breaker position: 0=closed, 1=open bit 1, trip solenoid status: 0=ok, 1=error bit 2, trip source impedance: 0=ok, 1=error bit 3, breaker position error: 0=ok, 1=error bit 4, BI1 status: 0=inactive, 1=active bit 5, BI2 status: 0=inactive, 1=active bit 6, BI3 status: 0=inactive, 1=active bit 7, BI4 status: 0=inactive, 1=active

Modbus/TCP Register	Description	Notes
5	Output Status	bit 0, relay fail asserted: 0=no, 1=yes bit 1, device in pickup: 0=no, 1=yes bit 2, relay trip LED: 0=ok, 1=error bit 3, TRIP 1 status: 0=inactive 1=active bit 4, TRIP 2 status: 0=inactive, 1=active bit 5, TRIP 3 Status: 0=inactive, 1=active bit 6, BO1 status: 0=inactive, 1=active bit 7, BO2 status: 0=inactive, 1=active
6	Log Status	bit 0, max log changed since last check: 0=no, 1=yes bit 1, min log changed since last check: 0=no, 1=yes bit 2, events in event log: 0=no, 1=yes
7	Current A	
8	Current B	
9	Current C	
10	Current N	
11	Avg. Current	
12	Demand Current A	
13	Demand Current B	
14	Demand Current C	
15	Avg. Demand Current	
16	Reserved	
17,18	Voltage AN	
19,20	Voltage BN	
21,22	Voltage CN	
23,24	Avg. Voltage LN	

Modbus/TCP Register	Description	Notes
25,26	Voltage AB	
27,28	Voltage BC	
29,30	Voltage CA	
31,32	Avg. Voltage LL	
33,34	KVA	
35,36	KW	
37,38	KW Demand	
39,40	KW hours	
41,42	KVAR	
43,44	KVAR Hours	
45	Power Factor	POWERLOGIC Format
46	Frequency	Times 10
47	Voltage THD	Times 100
48	Current THD	Times 100

Table 6.9: ISGS Minimum Values Register List

Modbus/TCP Register	Description	Notes
49	Min. Current A	
50	Min. Current B	
51	Min. Current C	
52	Min. Current N	
53	Min. Avg. Current	
54	Min. Demand Current A	
55	Min. Demand Current B	
56	Min. Demand Current C	
57	Min. Avg. Demand Current	
58,59	Min. Voltage AN	
60,61	Min. Voltage BN	

Modbus/TCP Register	Description	Notes
62,63	Min. Voltage CN	
64,65	Min. Avg. Voltage LN	
66,67	Min. Voltage AB	
68,69	Min. Voltage BC	
70,71	Min. Voltage CA	
72,73	Min. Avg. Voltage LL	
74,75	Min. KVA	
76,77	Min. KW	
78,79	Min KW Demand	
80,81	Min. KVAR	
82	Min. Power Factor	POWERLOGIC Format
83	Min. Frequency	Times 10
84	Min. Voltage THD	Times 100
85	Min. Current THD	Times 100

Table 6.10: ISGS Maximum Values Register List

Modbus/TCP Register	Description	Notes
86	Max.Current A	
87	Max.Current B	
88	Max.Current C	
89	Max.Current N	
90	Max.Avg. Current	
91	Max.Demand Current A	
92	Max.Demand Current B	
93	Max.Demand Current C	
94	Max.Avg. Demand Current	
95,96	Max.Voltage AN	
97,98	Max.Voltage BN	

Modbus/TCP Register	Description	Notes
99,100	Max.Voltage CN	
101,102	Max.Avg. Voltage LN	
103,104	Max.Voltage AB	
105,106	Max.Voltage BC	
107,108	Max.Voltage CA	
109,110	Max.Avg. Voltage LL	
111,112	Max.KVA	
113,114	Max.KW	
115,116	Min KW Demand	
117,118	Max.KVAR	
119	Max.Power Factor	POWERLOGIC Format
120	Max.Frequency	Times 10
121	Max.Voltage THD	Times 100
122	Max.Current THD	Times 100

SAMMS

Table 6.11: SAMMS Register List

Modbus/TCP Register	Description	Notes
1	SEAbus Device Type	4 = SAMMS
2	SEAbus Slave Address	
3	Reset KW, Min/Max	
4,5	Last Trip Current	
6	Motor Elapsed Running Time	
7	Number of Motor Starts	
8	Number of Overload Trips	
9	Time to Restart	
10	Thermal Memory	
11	Flashing LED Status	bit 1 Ground fault LED: 0=off, 1=flashing bit 3 External trip LED: 0=off, 1=flashing bit 4 Phase unbalance LED: 0=off, 1=flashing bit 5 Overload trip LED: 0=off, 1=flashing bit 7 Impending trip LED: 0=off, 1=flashing

Modbus/TCP Register	Description	Notes
12	LED and Contactor Status	bit 0 Contactor 3: 0=off, 1=on bit 1 Ground fault LED: 0=off, 1=on bit 2 CPU fault LED: 0=off, 1=on bit 3 External trip LED: 0=off, 1=on bit 4 Phase unbalance LED: 0=off, 1=on bit 5 Overload trip LED: 0=off, 1=on bit 6 Imcomplete sequence LED: 0=off, 1=on bit 7 Impending trip LED: 0=off, 1=on bit 8 Contactor 2: 0=off, 1=on bit 9 Contactor 1: 0=off, 1=on bit 10 Auto LED: 0=off, 1=on bit 11 Off LED: 0=off, 1=on bit 12 Hand LED: 0=off, 1=on bit 13 Reverse/High/Left LED: 0=off, 1=on bit 14 Forward/Low/Right/Run/On: 0=off, 1=on bit 15 Stop/Off LED: 0=off, 1=on
13	NEMA size in effect	low voltage: 1=1A, 2=1B, 3=1C, 4=2A, 5=2B, 6=3, 7=4, 8=5, 9=6 medium voltage: 1=H3A, 2=H3B, 3=H3C, 4=H6
14,15	Current A	
16,17	Current B	

Modbus/TCP Register	Description	Notes
18,19	Current C	
20,21	Current G	
22	Phase Unbalance	
23	Input Status	bit 2 Remote Input 4: 0=off, 1=on bit 3 Remote Input 3: 0=off, 1=on bit 4 Remote Input 2: 0=off, 1=on bit 5 Remote Input 1: 0=off, 1=on
24	5A Current Transformer Ratio for OLR1	
25	5A Current Transformer Ratio for OLR2	
26	Device Type	
27	NEMA Size for OLR1	
28	NEMA Size for OLR2	
29	Fullload Current Setting for OLR1	
30	Fullload Current Setting for OLR2	
31	Programmable Timer 1 Setting	
32	Programmable Timer 2 Setting	
33	Process Current Setting	
34	Input Status 1&2	
35	Timer Active and Timeout Status	

SB Energy-Comm

Table 6.12: SB Energy-Comm Register List

Modbus/TCP Register	Description	Notes
1	SEAbus Device Type	7 = SB Energy-Comm
2	SEAbus Slave Address	
3	Reset Min/Max, KWH	
4	Current A	
5	Current B	
6	Current C	
7	Avg. Current	
8	Current G	
9	Current N	
10	Voltage AN	
11	Voltage BN	
12	Voltage CN	
13	Avg. Voltage LN	
14	Voltage AB	
15	Voltage BC	
16	Voltage CA	
17	Avg. Voltage LL	
18	Crest Factor A	
19	Crest Factor B	
20	Crest Factor C	
21	Power Factor A	POWERLOGIC standard format
22	Reserved	
23	Power Factor B	POWERLOGIC standard format
24	Reserved	
25	Power Factor C	POWERLOGIC standard format

Modbus/TCP Register	Description	Notes
26	Reserved	
27	Frequency	Times 10
28	Demand Current	
29,30	Demand W	
31	Demand W Unit	
32	Demand W Direction	
33	Minutes Remaining in Demand Period	
34	Seconds Remaining in Demand Period	
35,36	W	
37	W Units	
38	W Direction	
39,40	VAR	
41	VAR Units	
42	VAR Direction	
43,44	VA	
44	VA Units	
46,47	Forward Watt Hours	
48	Forward Watt Hours Unit	
49,50	Reverse Watt Hours	
51	Reverse Watt Hours Unit	
52,53	Forward VAR Hours	
54	Forward VAR Units	
55,56	Reverse VAR Hours	
57	Reverse VAR Units	
58	Current Balance A	
59	Current Balance B	
60	Current Balance C	
61	Voltage Balance A	
62	Voltage Balance B	

Modbus/TCP Register	Description	Notes
63	Voltage Balance C	
117	Breaker Position	0=open, 1=closed
118	Alarm Function Status	Bit 0 Over Current Alarm Bit 1 Ground Over Current Alarm Bit 2 Over Amp Demand Alarm Bit 3 Over KW Alarm Bit 4 Over KW Demand Alarm Bit 5 Over KVA Alarm Bit 6 Over KVAR Alarm Bit 7 Over PF Leading Alarm Bit 8 Over PF Lagging Alarm Bit 9 Harmonic Distortion Alarm
119	Protective Relay Function Alarm Status	Bit 0 Neutral Overcurrent Alarm Bit 1 Current Unbalance Alarm Bit 2 Undervoltage Alarm Bit 3 Voltage Unbalance Alarm Bit 4 Overvoltage Alarm Bit 5 Reverse Power Alarm Bit 6 Over Frequency Alarm Bit 7 Under Frequency Alarm
120	System Error Flags	0 = No errors 1= EEPROM write error 2 = status update error 3 = clear Trip Log error 4 = new Trip Log entry error 5 = breaker test error 6 = trip error

Table 6.13: SB Energy-Comm Max. Values Register List

Modbus/TCP Register	Description	Notes
64	Max. Crest Factor A	
65	Max. Crest Factor B	
66	Max. Crest Factor C	
67	Max. Voltage A-N	
68	Max. Voltage B-N	
69	Max. Voltage C-N	
70	Max. Avg. Voltage L-N	
71	Max. Voltage A-B	
72	Max. Voltage B-C	
73	Max. Voltage C-A	
74	Max. Avg. Voltage L-L	
75	Max. Frequency	Times 10
76	Max. Current A	
77	Max. Current B	
78	Max. Current C	
79	Max. Avg. Current	
80	Max. Current N	
81	Max. Current G	
82,83	Max. Forward Watts	
84,85	Max. Reverse Watts	
86,87	Max. Forward VAR	
88,89	Max. Reverse VAR	
90,91	Max. Apparent Power	
92,93	Max. Forward Demand Watts	
94,95	Max. Reverse Demand Watts	
96	Max. Demand Current	

Table 6.14: SB Energy-Comm Min. Values Register List

Modbus/TCP Register	Description	Notes
97	Min. Crest Factor A	
98	Min. Crest Factor B	
99	Min. Crest Factor C	
100	Min. Voltage AN	
101	Min. Voltage BN	
102	Min. Voltage CN	
103	Min. Avg. Voltage LN	
104	Min. Voltage AB	
105	Min. Voltage BC	
106	Min. Voltage CA	
107	Min. Avg. Voltage LL	
108	Min. Frequency	Times 10
109	Min. Leading Power Factor A	
110	Min. Leading Power Factor B	
111	Min. Leading Power Factor C	
112	Min. Avg. Leading Power Factor	
113	Min. Lagging Power Factor A	
114	Min. Lagging Power Factor B	
115	Min. Lagging Power Factor C	
116	Min. Avg .Lagging Power Factor	

SCOR

Table 6.15: SCOR Register List

Modbus/TCP Register	Description	Notes
1	SEAbus Device Type	5 = SCOR
2	SEAbus Slave Address	
3	Reset KW, Min/Max	

Modbus/TCP Register	Description	Notes
4	Phase CT Primary Ratio	
5	Phase CT Secondary Ratio	
6	Ground CT Primary Ratio	
7	Ground CT Secondary Ratio	
8,9	Current A	
10,11	Current B	
12,13	Current C	
14,15	Current N	
16,17	Avg. Current	
18,19	Demand 1 Current A	
20,21	Demand 1 Current B	
22,23	Demand 1 Current C	
24,25,26	Demand 1 Time	POWERLOGIC 3 Register Format
27,28	Demand 2 Current A	
39,30	Demand 2 Current B	
31,32	Demand 2 Current C	
33,34,35	Demand 2 Time	POWERLOGIC 3 Register Format
36,37	Demand 3 Current A	
38,39	Demand 3 Current B	
40,41	Demand 3 Current C	
42,43,44	Demand 3 Time	POWERLOGIC 3 Register Format
45,46	Demand 4 Current A	
47,48	Demand 4 Current B	
49,50	Demand 4 Current C	
51,52,53	Demand 4 Time	POWERLOGIC 3 Register Format
54	Demand Period	
55,56,57	Date/Time	

Modbus/TCP Register	Description	Notes
58,59,60	Outage Date/Time	POWERLOGIC 3 Register Format
61	Breaker Position/Status	Bit 0 Breaker Status: 0=closed, 1=open Bit 1 Hardware Write Failure Bit 2 Hardware Read Failure Bit 3 Software Failure Bit 4 EEPROM Failure Bit 5 RAM Failure Bit 6 A/D Failure Bit 7 RMS Calculation Overflow Bit 8 CAL Calculation Overflow Bit 9 Burdon Resistor Calculation Overflow Bit 10 FP CAL constant conversion overflow Bit 11 bad sytle number Bit 12 Instantaneous Relay 1 ON Bit 13 Instantaneous Relay 2 ON Bit 14 Timed Trip Relay 2 ON Bit 15 Breaker Failure

Modbus/TCP Register	Description	Notes
62	Target/LED Status	Bit 0 Reserved Bit 1 INST 2 Target Bit 2 INST 1 Target Bit 3 Timed Trip Target Bit 4 Phase A Target Bit 5 Phase B Target Bit 6 Phase C Target Bit 7 N Target Bit 8 Phase A timing LED Bit 9 Phase B timing LED Bit 10 Phase C timing LED Bit 11 Phase A inhibit Bit 12 Phase B inhibit Bit 13 Phase C inhibit Bit 14 N timing Bit 15 Status

Table 6.16: SCOR Min-Max Values Register List

Modbus/TCP Register	Description	Notes
63,64	Max. Current A	
65,66	Max. Current B	
67,68	Max. Current C	
69,70	Max. Current N	
71,72	Min. Current A	
73,74	Min. Current B	
75,76	Min. Current C	
77,78	Min. Current N	
79,80,81	Max. Current A Time/Date	POWERLOGIC 3 Register Format
82,83,84	Max. Current B Time/Date	POWERLOGIC 3 Register Format

Modbus/TCP Register	Description	Notes
85,86,87	Max. Current C Time/Date	POWERLOGIC 3 Register Format
88,89,90	Max. Current N Time/Date	POWERLOGIC 3 Register Format
91,92,93	Min. Current A Time/Date	POWERLOGIC 3 Register Format
94,95,96	Min. Current B Time/Date	POWERLOGIC 3 Register Format
97,98,99	Min. Current C Time/Date	POWERLOGIC 3 Register Format
100,101,102	Min. Current N Time/Date	POWERLOGIC 3 Register Format
103,104	Max Current Demand Phase A	
105,106	Max Current Demand Phase B	
107,108	Max Current Demand Phase C	
109,110	Min Current Demand Phase A	
111,112	Min Current Demand Phase B	
113,114	Min Current Demand Phase C	
115-117	Max Current Phase A Demand Time Stamp	POWERLOGIC 3 Register Format
118-120	Max Current Phase B Demand Time Stamp	POWERLOGIC 3 Register Format
121-123	Max Current Phase C Demand Time Stamp	POWERLOGIC 3 Register Format
124-126	Min Current Phase A Demand Time Stamp	POWERLOGIC 3 Register Format
127-129	Min Current Phase B Demand Time Stamp	POWERLOGIC 3 Register Format
130-132	Min Current Phase C Demand Time Stamp	POWERLOGIC 3 Register Format

Static Trip III/CPNX

Table 6.17: Static Trip III Register List

Modbus/TCP Register	Description	Notes
1	SEAbus Device Type	6 = Static Trip III/CPNX
2	SEAbus Slave Address	
3	Reset Min/Max, KWH	bit 0 = reset KW hours bit 1 = reset Min/Max & Demand bit 6 = trip breaker bit 7 = close breaker bit 8 = open AUX relay bit 9 = close AUX relay bit 10 = trip breaker manual enable bit 11 = trip breaker manual disable bit 12 = close breaker manual enable bit 13 = close breaker manual disable bit 14 = AUX relay manual enable bit 15 = AUX relay manual disable
4	Current A	
5	Current B	
6	Current C	
7	Current G	
8	Current N	
9	Avg. Current	

Modbus/TCP Register	Description	Notes
10	COM Board Status	Bit 0 Breaker Position: 0=open, 1=closed Bit 1 CP Configuration Changed: 0=inactive, 1=active Bit 2 COMM Powerup Reset: 0=inactive, 1=active Bit 3 COMM Close breaker status: 0=inactive, 1=active Bit 4 COMM Phase Unbalance: 0=inactive, 1=active Bit 5 Current Unbalance Pickup: 0=inactive, 1=active Bit 6 COMM Trip: 0=inactive, 1=active Bit 7 Trip Fail: 0=inactive, 1=active Bit 8 Min/Max since reset: 0=inactive, 1=active Bit 9 Remote Trip: 0=inactive, 1=active Bit 10 Voltage Unbalance Pickup: 0=inactive, 1=active Bit 11 Under Voltage Pickup: 0=inactive, 1=active Bit 12 Over Voltage Pickup: 0=inactive, 1=active Bit 13 Under Frequency Pickup: 0=inactive, 1=active Bit 14 Over Frequency Pickup: 0=inactive, 1=active Bit 15 Reverse Power Pickup: 0=inactive, 1=active

Modbus/TCP Register	Description	Notes
11	Breaker Status	Bit 0 LongTime Pickup: 0=inactive, 1=active Bit 1 Current Unbalance Target: 0=inactive, 1=active Bit 2 Zone Interlock OUT: 0=inactive, 1=active Bit 3 Voltage Unbalance Target: 0=inactive, 1=active Bit 4 Ground Fault: 0=inactive, 1=active Bit 5 Short Circuit Target: 0=inactive, 1=active Bit 6 Longtime Overload Target: 0=inactive, 1=active Bit 7 Watchdog Target: 0=inactive, 1=active Bit 8 Static Trip Reset: 0=Not Reset, 1=Reset Bit 9 Local Trip: 0=inactive, 1=active Bit 10 Instantaneous bypass Trip: 0=inactive, 1=active Bit 11 Under Voltage Target: 0=inactive, 1=active Bit 12 Over Voltage Target: 0=inactive, 1=active Bit 13 Under Frequency Target: 0=inactive, 1=active Bit 14 Over Frequency Target: 0=inactive, 1=active Bit 15 Reverse Power Target: 0=inactive, 1=active

Modbus/TCP Register	Description	Notes
12	Extra Status	bit 0 aux. relay closed: 1=closed bit 1 overcurrent setpoint: 1=enabled bit 2 ground overcurrent setpoint: 1=enabled bit 3 neutral overcurrent setpoint: 1=enabled bit 4 current unbalance setpoint: 1=enabled bit 5 undervoltage setpoint: 1=enabled bit 6 voltage unbalance setpoint: 1=enabled bit 7 overvoltage setpoint: 1=enabled bit 8 over kW setpoint: 1=enabled bit 9 reverse over kW setpoint: 1=enabled bit 10 over kW demand setpoint: 1=enabled bit 11 over kVAR setpoint: 1=enabled bit 12 over kVA setpoint: 1=enabled bit 13 overfrequency setpoint: 1=enabled bit 14 underfrequency setpoint: 1=enabled bit 15 power factor setpoint: 1=enabled
13	Alarm Status	bit 0 calibration (checksum) error: 1=yes bit 1 function range error at setup: 1=yes bit 2 Checksum error (EEPROM data corruption): 1=yes bit 3 energy overflow (kWhr, kVARhr, kW demand, or kWhr): 1=yes bit 4...6 processor error (bad RAM, ROM, or EEPROM): 1=yes bit 7 new alarm log data: 1=yes bits 8...15 event log counter
14	Voltage AN	
15	Voltage BN	
16	Voltage CN	
17	Avg. Voltage LN	
18	Voltage AB	

Modbus/TCP Register	Description	Notes
19	Voltage BC	
20	Voltage CA	
21	Avg. Voltage LL	
22	KVA	
23	KW	
24	KW Demand	
25,26	KW Hours	
27,28	KW Hours Reverse	
29	KVAR	
30,31	KVAR Hours	
32	Power Factor	POWERLOGIC standard format
33	Frequency	Times 10
74	Trip Amps A	
75	Trip Amps B	
76	Trip Amps C	
77	Trip Amps G	
78	Trip Amps N	
79	Trip Volts A-B	
80	Trip Volts B-C	
81	Trip Volts C-A	
82	Trip Volts LL Avg	
83	Trip KVA	
84	Trip KW	
85	Trip KVAR	
86	Trip Frequency	
87	Trip COMM Status	Bits explained above
88	Trip Breaker Status	Bits explained above
89-91	Trip Date/Time	POWERLOGIC Time format
92	Baud Rate	
93	Phase Sensor Rating	

Modbus/TCP Register	Description	Notes
94	Ground Sensor Rating	
95	Voltage Scale	
96	Product Code Number	Bit 0: Phase Inversion 0=normal, 1=inverted Bit 1: Phase Rotation 0=ABC, 1=ACB Bit 2: Wire Mode 0=3-wire delta, 1=4-wire wye Bit 3: Remote AUX Contact 1=enabled Bit 4: Remote Trip 1=enabled Bit 5: Remote Close 1=enabled Bits 6...8:Reserved Bit 9: Ground CT 1=yes Bit 10: Auto-emulate 1=yes Bit 11: Extended Relaying Functions 1=yes Bit 12: Neutral Metering Functions 1=yes Bit 13: Power Metering Functions 1=yes Bit 14: Instantaneous Trip Function 0=clear Ipeak only, 1=trip detectable Bit 15: "newer" STIII 1=yes
97	Current Year	
98	Current Month	
99	Current Day	
100	Current Seconds	
101	Current Minutes	
102	Current Hour	
103	Breaker Operations Count	
197,198	Last Update Unix Time	
199	Number of seconds for poll	

Table 6.18: Static Trip III Minimum Values

Modbus/TCP Register	Description	Notes
34	Min. Current A	
35	Min. Current B	
36	Min. Current C	
37	Min. Current G	
38	Min. Current N	
39	Min. Avg. Current	
40	Min. Voltage AN	
41	Min. Voltage BN	
42	Min. Voltage CN	
43	Min. Avg. Voltage LN	
44	Min. Voltage AB	
45	Min. Voltage BC	
46	Min. Voltage CA	
47	Min. Avg. Voltage LL	
48	Min. KVA Total	
49	Min. KW	
50	Min. KW Demand	
51	Min. KVAR	
52	Min. Power Factor	POWERLOGIC standard format
53	Min. Frequency	Times 10

Table 6.19: Static Trip III Minimum Values

Modbus/TCP Register	Description	Notes
54	Max.Current A	
55	Max.Current B	
56	Max.Current C	
57	Max.Current G	
58	Max.Current N	

Modbus/TCP Register	Description	Notes
59	Max.Avg. Current	
60	Max.Voltage AN	
61	Max.Voltage BN	
62	Max.Voltage CN	
63	Max.Avg. Voltage LN	
64	Max.Voltage AB	
65	Max.Voltage BC	
66	Max.Voltage CA	
67	Max.Avg. Voltage LL	
68	Max.KVA Total	
69	Max.KW	
70	Max.KW Demand	
71	Max.KVAR	
72	Max.Power Factor	POWERLOGIC standard format
73	Max.Frequency	Times 10

S7-I/O

Table 6.20: S7-I/O Register List

Modbus/TCP Register	Description	Notes
1	SEAbus Device Type	14 = S7-I/O
2	SEAbus Slave Address	
3	Event Counter	
4	Power Up Flag	0=ok, 1=powered up
5	Data Loss	0=ok, 1=loss
6	Scan Time	milliseconds
7	Min Scan Time	milliseconds
8	Max Scan Time	milliseconds

Modbus/TCP Register	Description	Notes
9	CPU ID	Bits 0...1: 0=no outputs, 2=10 discrete Bits 2...3: 0=no inputs, 2=14 discrete Bit 4: 0=discrete Bits 5...7: CPU number, 1=214
10	CPU Error	Bit 0: terminal block loose Bit 1: blown fuse Bit 2: no user power Bit 3: out of range Bit 7: config error
11	Expansion Module 0 ID	Bits 0...1: 0=no outputs, 1=1analog/8 discrete Bits 2...3: 0=no inputs, 1=8 discrete, 2=3 analog Bit 4: 0=discrete, 1=analog Bits 5...6: 0=non-intell. I/O module, 2=non I/O module Bit 7: 1=module present
12	Expansion Module 0 Error	Errors described above
13	Expansion Module 1 ID	ID bits described above
14	Expansion Module 1 Error	Errors described above
15	Expansion Module 2 ID	ID bits described above
16	Expansion Module 2 Error	Errors described above
17	Expansion Module 3 ID	ID bits described above
18	Expansion Module 3 Error	Errors described

Modbus/TCP Register	Description	Notes
		above
19	Expansion Module 4 ID	ID bits described above
20	Expansion Module 4 Error	Errors described above
21	Expansion Module 5 ID	ID bits described above
22	Expansion Module 5 Error	Errors described above
23	Expansion Module 6 ID	ID bits described above
24	Expansion Module 6 Error	Errors described above
25	Input 1 Counter	
26	Input 2 Counter	
27	Input 3 Counter	
28	Input 4 Counter	
29	Input 5 Counter	
30	Input 6 Counter	
31	Input 7 Counter	
32	Input 8 Counter	
33	Outputs 1-16	
34	Outputs 17-32	
35	Outputs 33-48	
36	Outputs 49-50	
37	Analog Input 1	
38	Analog Input 2	
39	Analog Input 3	
40	Analog Input 4	
41	Analog Input 5	
42	Analog Input 6	
43	Analog Input 7	

Modbus/TCP Register	Description	Notes
44	Analog Input 8	
45	Analog Input 9	
46	Analog Input 10	
47	Analog Input 11	
48	Analog Input 12	
49	Input Event 0 Year	
50	Input Event 0 Month	
51	Input Event 0 Day	
52	Input Event 0 Hour	
53	Input Event 0 Minute	
54	Input Event 0 Second	
55	Inputs 1-14	
56	Inputs 15-30	
57	Inputs 31-46	
58	Inputs 47-54	
59	Input Event 1 Year	
60	Input Event 1 Month	
61	Input Event 1 Day	
62	Input Event 1 Hour	
63	Input Event 1 Minute	
64	Input Event 1 Second	
65	Inputs 1-14	
66	Inputs 15-30	
67	Inputs 31-46	
68	Inputs 47-54	
69	Input Event 2 Year	
70	Input Event 2 Month	
71	Input Event 2 Day	
72	Input Event 2 Hour	
73	Input Event 2 Minute	

Modbus/TCP Register	Description	Notes
74	Input Event 2 Second	
75	Inputs 1-14	
76	Inputs 15-30	
77	Inputs 31-46	
78	Inputs 47-54	
79	Input Event 3 Year	
80	Input Event 3 Month	
81	Input Event 3 Day	
82	Input Event 3 Hour	
83	Input Event 3 Minute	
84	Input Event 3 Second	
85	Inputs 1-14	
86	Inputs 15-30	
87	Inputs 31-46	
88	Inputs 47-54	
89	Input Event 4 Year	
90	Input Event 4 Month	
91	Input Event 4 Day	
92	Input Event 4 Hour	
93	Input Event 4 Minute	
94	Input Event 4 Second	
95	Inputs 1-14	
96	Inputs 15-30	
97	Inputs 31-46	
98	Inputs 47-54	
197,198	Last Update Unix Time	
199	Number of seconds for poll	