BSD

REMOTE MONITORING BOX

TECHNICAL DOCUMENTATION

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July 25th 2012	**1.1**	**Digital input wiring information**	**MM**

You can download this documentation and the different documentation relating to the BSD / BSD Plus on our web site: http://www.cretechnology.com/ .

NOTE:

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Apply all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

Contact your CRE distributor for course training.

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Term	Extract	Description
TCP/IP	Transmission Control Protocol/ Internet Protocol	TCP (Transmission Control Protocol) is a set of rules used along with the Internet Protocol (IP) to send data in the form of message units between computers over the Internet.
HTTP	Hyper Text Transfer Protocol	HTTP is a set of rules for exchanging files (text, graphic images, sound, video, and other multimedia files) on the Web.
DHCP	Dynamic Host Configuration Protocol	DHCP is a standard protocol that automates the process of configuring network hosts by allowing hosts to obtain IP addresses and configuration parameters
Gateway		A device that makes it possible to transfer data between networks of different kind, e.g. Modbus/RTU and Modbus/TCP.
Template		Describes a Modbus slave device, as a collection of groups and parameters.
Device		A Modbus slave unit that is connected to the BSD.

Table 1 : Terminology

	This symbol indicates useful instructions on how to use the product.
	This symbol indicates important information about the product.

1 About the BSD

1.1 General

The BSD module acts as a bridge from Modbus TCP to Modbus RTU, making it possible for a Modbus TCP based controller to connect with Modbus RTU based devices. The BSD will also handle alarm management, data-logging as well as providing a web-based user interface for accessing data.

Some BSD features

- Graphical user interface that is easy to work with.
- Support for device templates to allow easy and flexible management of configurations
- Advanced modem handling, with support for GSM/GPRS modems as well as analogue (PSTN) modems.
- Improved alarm handling, now with alarm history and SNMP support.
- Language support.
- Support for sending log-files via email.
- Support for the NetBiter.net portal.
- Auto detection of attached Modbus slave devices.

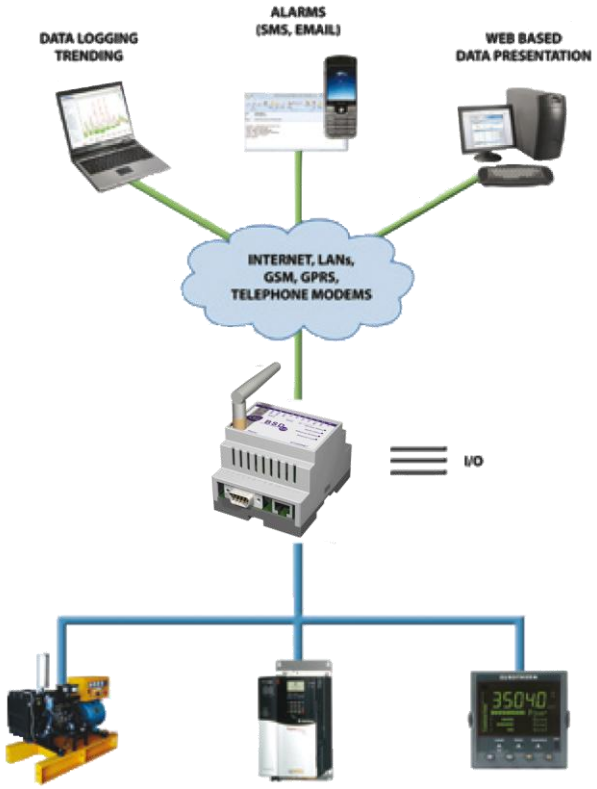


Figure 1 : Product features

BSD supports an RS-232 connection through a 9-pin DSUB or RS-485 (screw connection). It also supports 10/100Mbps Ethernet through a standard Ethernet connector (RJ-45).

It can be configured via a user-friendly web-interface or by using the BSD Config utility (available at http://www.cretechnology.com).

1.2 Mounting

A – Snap on **B – Snap off**

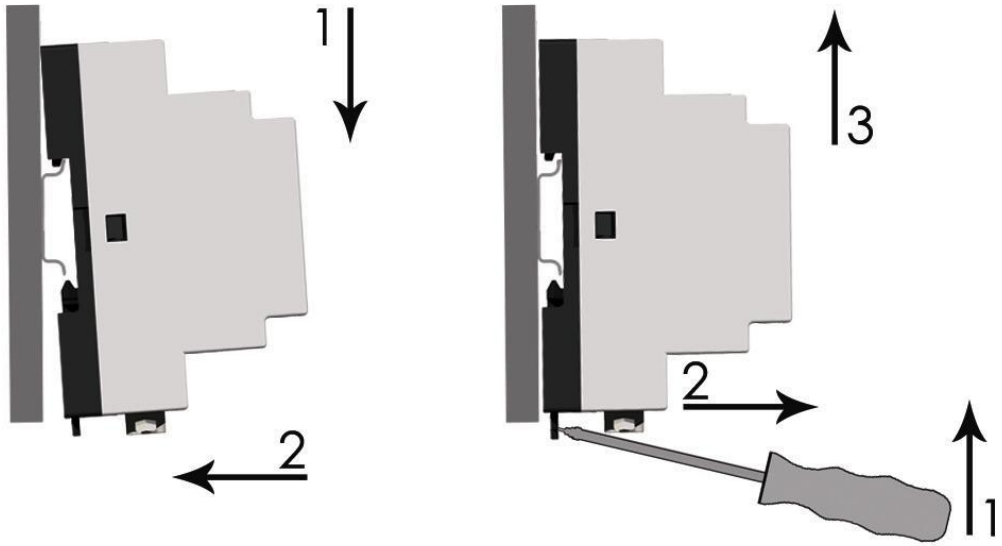


Figure 2 : Mounting

Snap the BSD on to the DIN-rail (as described on picture A above).

1.3 Bottom connectors

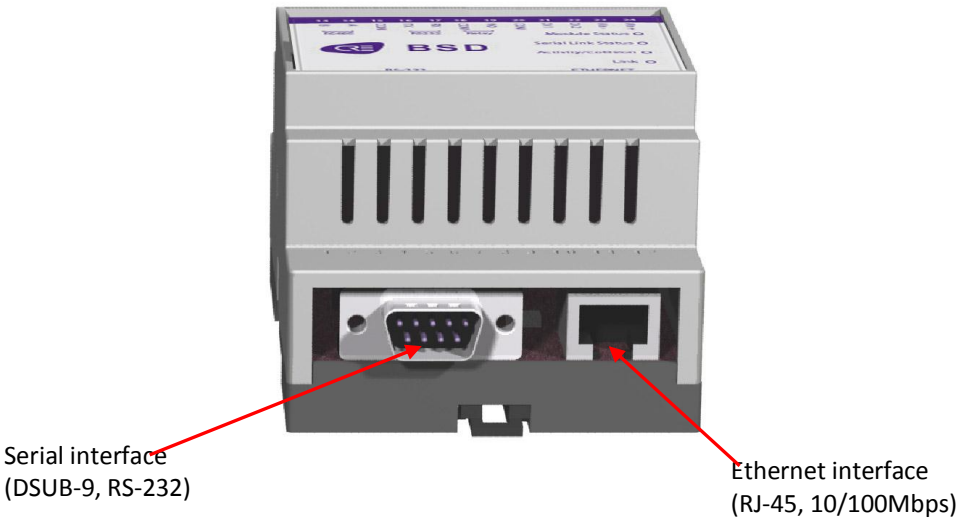


Figure 3 : DSUB-9, RS-232 and Ethernet Interfaces

1.3.1 Modbus RTU or Modem interface, RS-232

The 9-pole DSUB, male connector on the BSD module contains an RS-232 interface. This port can be used to connect any equipment with an RS-232 interface.

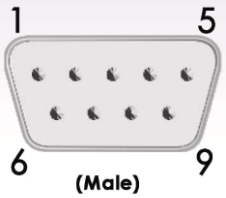


Figure 4 : RS-232 connector

Pin number	Function
1	CD (Carrier Detect)
2	Rx (Receive)
3	Tx (Transmit)
4	DTR (Data Terminal Ready)
5	GND
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	RI (Ring Indicator)

Table 2 : RS-232 connector pin functions

1.3.2 Ethernet interface

The Ethernet interface supports 10/100Mbps, using a standard RJ-45 connector.

1.4 Top terminal block

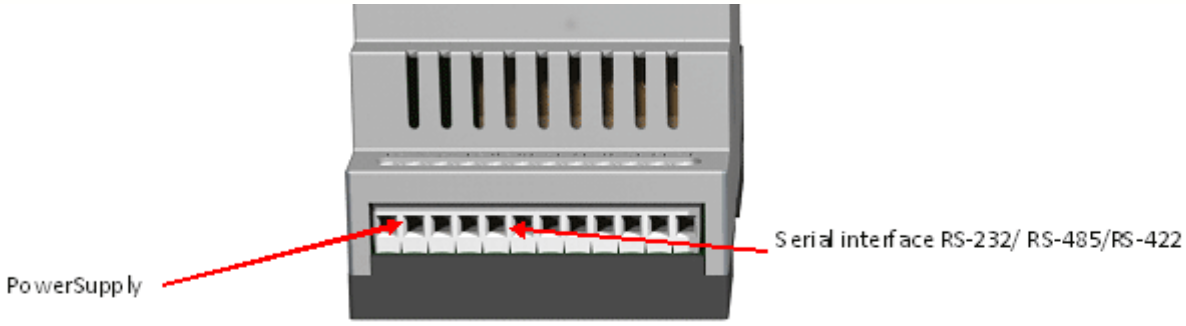


Figure 5 : Power Supply Connection

1.4.1 Power supply connection

The BSD can be powered by a 9-28VDC supply (Power requirement 2W).

The BSD with plastic housing can be powered by a 9-28VAC supply, and should be connected as shown below.

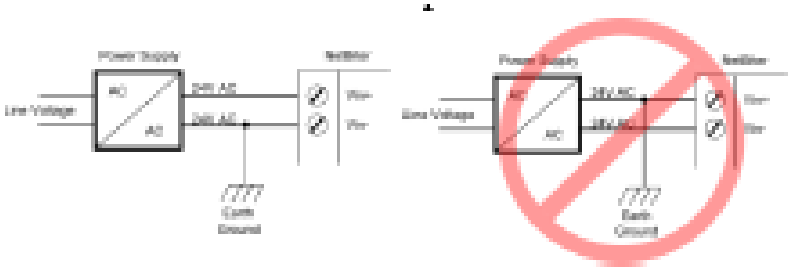


Figure 6 : Connecting AC power

For versions with metal housing, use only DC power supply.

The following pins on the top terminal block are used for the power supply:

Pin number	Description
23	V_{In} – (Ground connection)
24	V_{In} +

1.4.2 Digital inputs

The digital inputs are opto-isolated and are found at the top terminal block with the following pin numbers:

Pin number	Description
20	Digital input Common – Connect to $0V_{DC}$
21	Digital input 1+
22	Digital input 2+

The voltage levels for the logic states are:

Logic state	Voltage level (DC)
High	10…24 V_{DC} - Digital inputs are activated when connected to positive DC supply ($24V_{DC}$ or $12V_{DC}$).
Low	0…2 V_{DC}

1.4.3 RS-485 interface

The following pins on the top terminal block are used for the RS-485 interface:

Pin number	Description
13	RS-485 Line B
14	RS-485 Line A
15	Common

The RS-485 interface cannot be used at the same time as the terminal block interfaced RS-232.

1.4.4 RS-232 Interface

The following pins on the top terminal block are used for the RS-232 interface:

Pin number	Description
15	Common
16	RS-232 Transmit (Output)
17	RS-232 Receive (Input)

Table 3 : Terminal block pins

The RS-232 interface cannot be used at the same time as the RS-485 interface.

1.5 LED Indicators

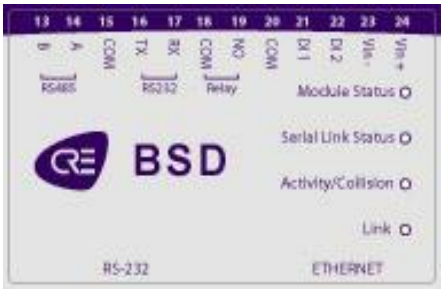


Figure 7 : LED Indicators

1.5.1 LED description

Name	Colour	Function
Module Status	OFF	No power
	Green	Module is running in normal mode
	Orange	During start-up
Serial link Status	Flashing Green	Serial Packet receive
	Flashing Red	Serial Packet transmit
	Orange	During start-up
Activity/collision	Flashing Green	Ethernet Packet, receiving
	Flashing Red	Ethernet collision detected
Link	OFF	No Ethernet Link detected
	Green	Ethernet network detected, 10Mbps
	Orange	Ethernet network detected, 100Mbps

Table 4 : LED Description

2 Getting started

2.1 Configure the BSD IP-address

2.1.1 About the BSD Config utility

The BSD Config utility is a PC-based configuration utility to set TCP/IP network settings in the BSD. This utility has the ability to scan the Ethernet network for connected BSD devices and let the user set IP address, net mask, gateway, DNS and hostname for each unit.

2.1.2 Installation

System Requirements

- Pentium 133 MHz or higher
- 5 Mb of free space on the hard drive
- Windows 98/ME/NT/2000/XP/Vista/7
- Network Interface Card (Ethernet)

Installation Procedure

Use the self-extracting installation package provided by CRE Technology and run it.

2.1.3 Scanning for connected devices

First ensure that you have connected the BSD units you want to install on the same Ethernet network as the PC. Use standard Ethernet cables, straight-through or crossover cable depending on how you connect to the device. See pictures below for details.

Connecting the BSD to a hub or Switch

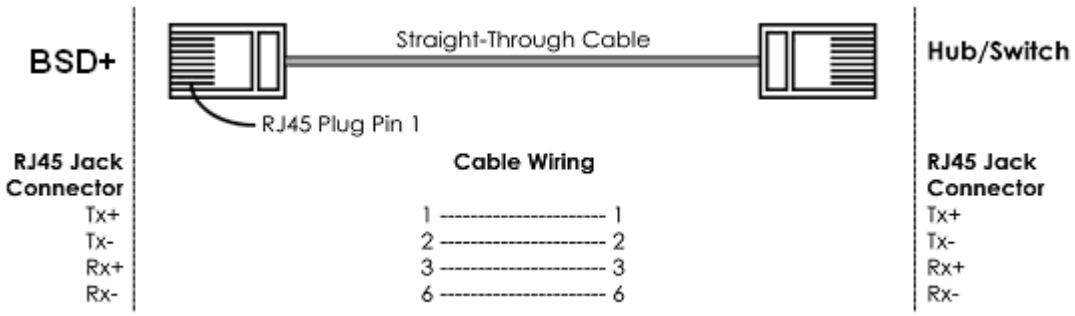


Figure 8 : Connecting the BSD to a hub or switch

Connecting the BSD directly to a PC

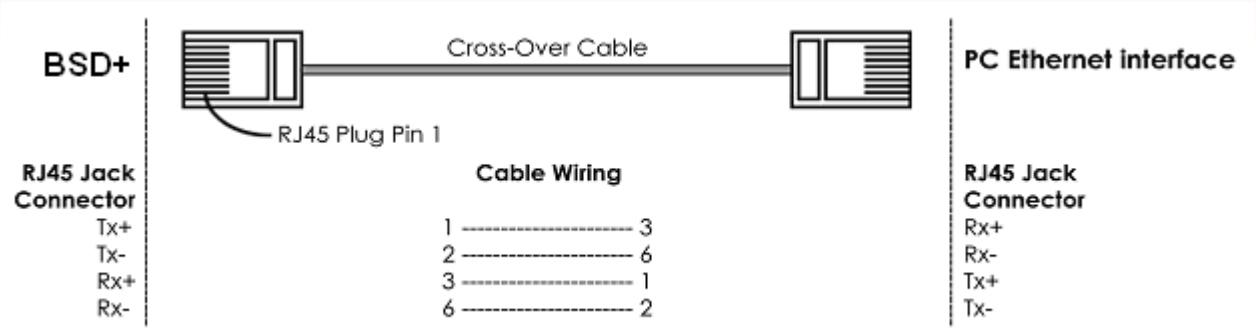


Figure 9 : Connecting the BSD directly to a PC

When the BSD Config utility is started, it will scan the Ethernet network for BSD devices. All detected devices will be presented in a list in the main window. If you want to force a new scan for devices, you can press the "Scan" button.

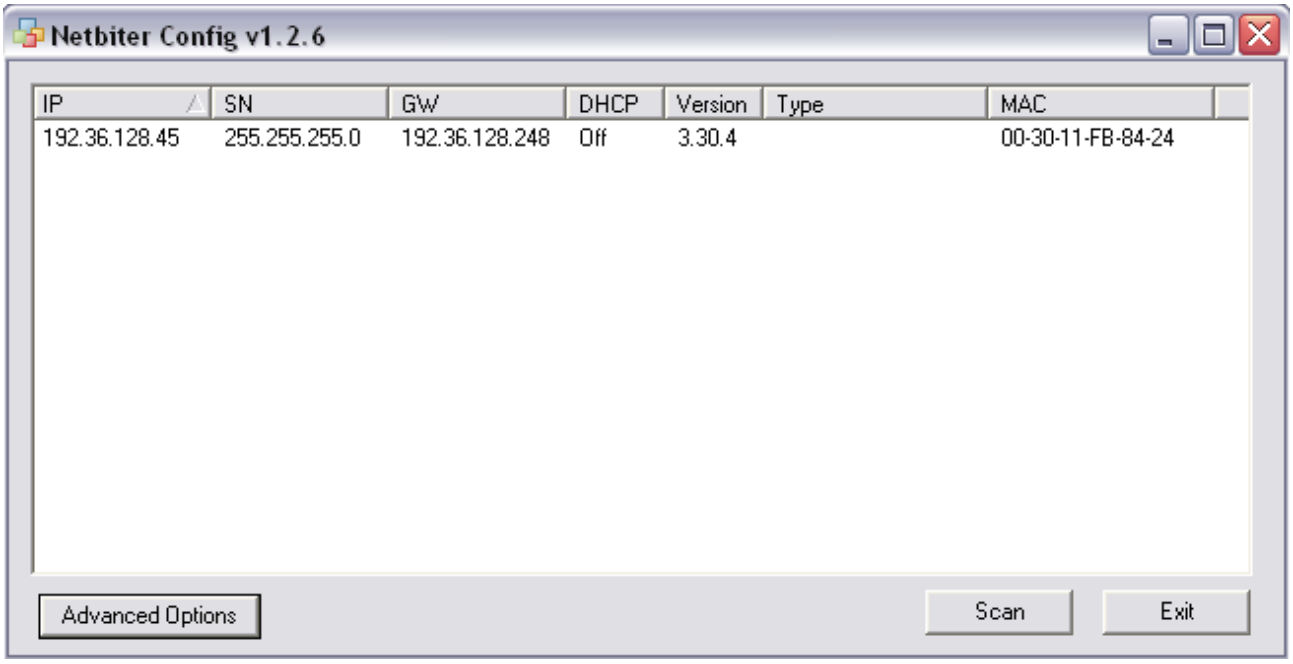


Figure 10 : BSD config utility

IP - The IP address of the BSD

SN - The subnet mask

GW - The default gateway

DHCP - Dynamically assigned IP address On/Off

Version - Firmware version

Type - Product type

MAC - The Ethernet MAC address

Use the "Advanced Options" button to enable the BSD Config DHCP Server. This is useful when you have set DHCP to "On" in the BSD, but don't have a DHCP-server available on the network.

2.1.4 Changing IP settings

To change the IP settings on a detected device, double-click on the device you want to configure in the list of devices. This will open up a dialog where you can enter the desired IP configuration.

To obtain the necessary information about IP address, subnet mask etc. please contact your network administrator.

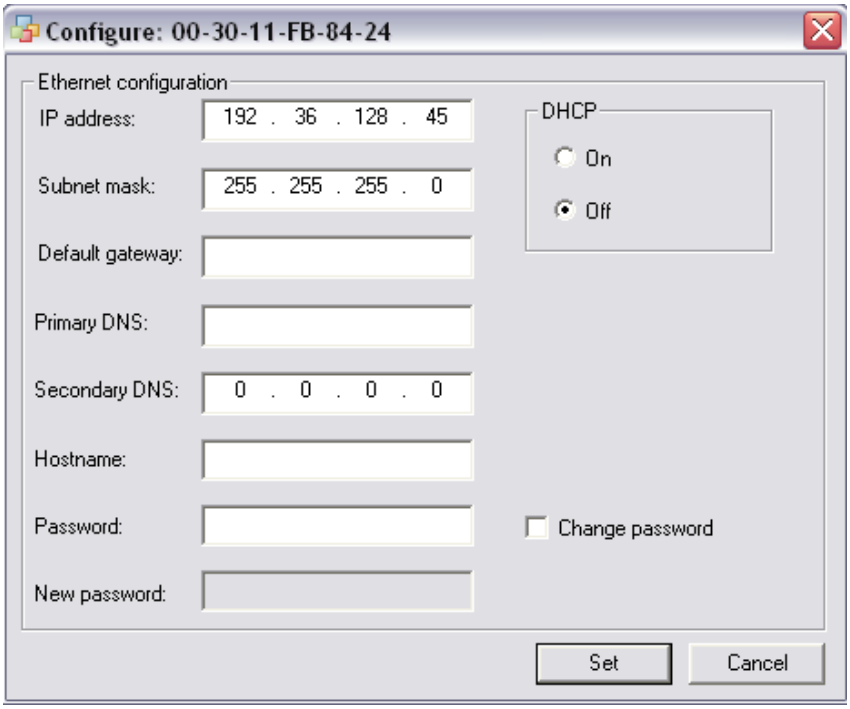


Figure 11 : Changing IP settings

DO NOT SET DHCP TO "ON" IF YOU DON'T HAVE A DHCP-SERVER AVAILABLE ON THE NETWORK.

Host Name - Here you can enter a hostname of your device **(optional)**.

IP Address - The IP address of the BSD.

Netmask - The subnet mask

Gateway - The default gateway

Primary DNS - The primary Domain Name Server **(optional)**

Secondary DNS - The secondary Domain Name Server **(optional)**

The default password for authentication of the new settings is **"admin"**.

Pressing **"Set"** will cause the BSD device to reboot and after that the new settings will be enabled.

You can test the new settings by opening a web-browser and entering the IP you assigned to the device. If you selected DHCP and want to know what IP your device have been assigned, you can do a new scan with the BSD Config utility to view the new network configuration.

If the IP address is not available on your network, please connect you PC directly to the BSD+ or contact support@cretechnology.com.

3 Web-page overview

3.1 Browser requirements

The web-pages are optimized for Internet Explorer version 6 or later and Mozilla Firefox version 2 or later. Other browsers can work as well, but the web-pages might appear differently and functionalities may be limited. The browser must be JAVA enabled, to use pages with JAVA content (like the graph page). If it is not, please visit www.java.com to download a JAVA plug-in for your browser.

4 Log in

Open a web browser (Internet Explorer for example) and enter the IP address you have set on the BSD unit with the BSD Config utility. For example, if you entered the address 10.10.10.35 then you should enter the text below in the address field of the browser and press enter.

http://10.10.10.35

Now you should see the login screen:

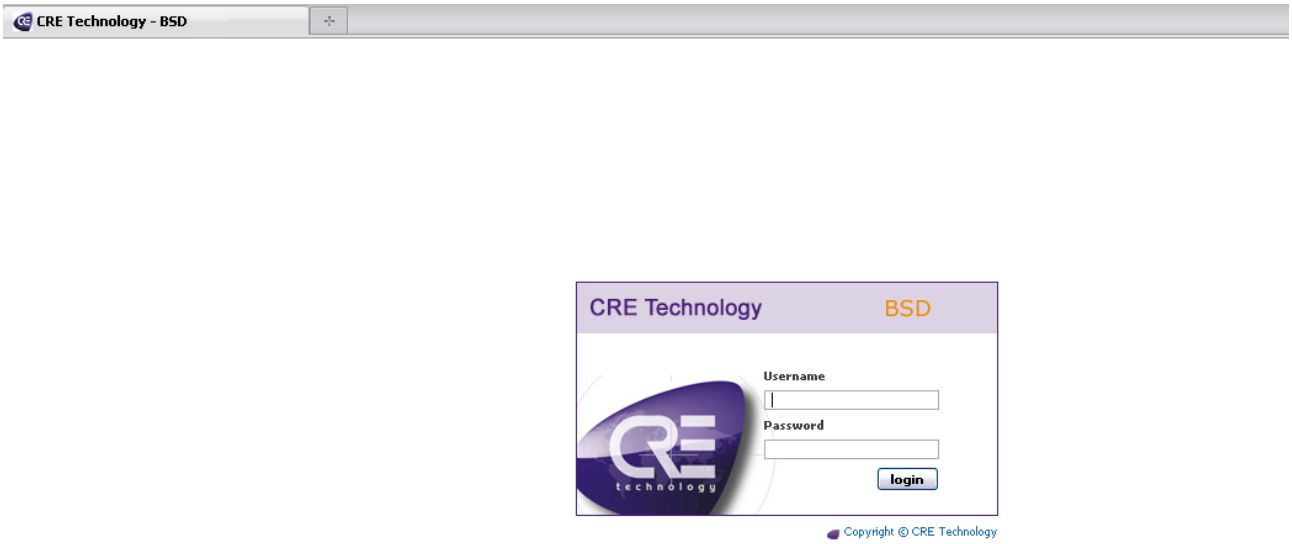


Figure 12 : Log in

To be able to configure the Gateway you should enter **“admin”** in the user-name box. The default password is **“admin”**.

Later, you can change the default password to something else (recommended).

This will be described in section 6.1.

If you have problems to log in and you are sure that your password is correct, make sure that “Caps Lock” is not enabled on your keyboard.

5 User interface

5.1 Menu overview

The menu items have a layout to help users get the most out of the BSD module. The main menu has two workflow directions, one for setting up the BSD module (from right to left), and one for using it as a SCADA interface (from left to right). When referring to a sub menu this document will use **/**, i.e. when referring to the sub menu **Users**, which is found under **Setup**, the following syntax will be used: **Setup/Users**.

Depending on the user level the menu items will be different, see section 5.3.

5.2 Where to start

5.2.1 Hardware and user setup

How to setup communication interfaces and users see section 6.

5.2.2 Present data and send logs/alarms

How to setup user interface for presenting data and configure alarms and logs see section 7.

5.2.3 Everyday use

How to monitor data, alarms and logs, see section 8.

5.3 User levels

The menu items are accessible depending to the current user's user level. The user level is set for each user that is setup for the BSD module.

User level	Menu items showing, typical use
Read	`Status, Devices, Alarm, Log, About:` used for users who need to monitor data.
Write	As for Read: Used for users who should be able to acknowledge alarms, clear logs, alarm history.
Admin	As for Write + `configuration:` Used for users that can alter the configuration, add and change templates, devices, pages, alarms, log and bindings.
Super admin	As for Admin + Setup: Used for users that set up communication interfaces such as modbus, modem, email server, SNMP, Ethernet and NetBiter.net. Can do backup and update firmware and install patches.

5.4 About

This menu item shows a window with information about the firmware revision and MAC address for the BSD module. More detailed information can be found under Setup/Firmware see section 6.9.

6 Setup

The setup menu item is used to setup hardware interfaces and communications, as well as users, webserver and NetBiter.net. All basic settings to get the BSD module run with attached devices.

Workflow for the sub menu is from left to right.

6.1 Users

At this sub menu item users can be added to the system. Users available can receive e-mail, SMS depending on the configuration for the user. To Edit a users option click on the users name and click save when ready.


Only the Super Admin level has access to add and edit users.

Option	Description
User-ID	The user's login name
Name	Full name of the user
E-mail	E-mail address for the user
Mobile	Mobile phone number. Is used to be able to send SMS to the user if SMS is enabled and the correct **Alarm Class** is set see section 7.5.5.
Alarm Class	When adding an alarm it is given an **Alarm Class**. If the user should get the alarm the alarm's corresponding **Alarm Class** has to be marked. A user can have several alarm classes, see section 7.5.5.
Receive log files via E-mail	If this option is enabled the user will get the log as an e-mail attachment if it is enabled at the log configuration, see section 7.6.1.
Language	Select the user interface language. There could be different languages set for different users.
Show Device browser in menu	Every parameter in of the templates uploaded to BSD can be viewed using the main menu option **Devices**. If the user with user level admin or write can change parameters, and read on see parameters.
User level	The menu items are accessible depending on the current user's user level, see section 5.3 for more information.
Password	User's password. Only has to be given when adding a new user or when changing the password, which is done by checking the box **Change password**.
Repeat Password	When adding a user the password has to be repeated, as well as when changing it

6.2 Modbus

Modbus - The default password for authentication of the new settings is **admin**.

6.2.1 Modbus RTU/Modbus ASCII settings

This sub menu item lets the user configure the Modbus communication interface. Make sure that the wiring is correct.

The status page gives information about the Modbus connection, and can be useful as a trouble shooting tool when setting up the Modbus interface. See section 8.2.

Option	Description
Transmission mode	Set Modbus RTU or Modbus ASCII transmission mode [Default RTU].
Slave Response Timeout	The time that the BSD module will wait for a response from a slave before Serial Timeout will occur [Default 1000]. Serial Timeout can be monitored at the Status page see section 8.2.
Physical interface	Electrical interface that is used. Make sure that the wiring is correct and connected to the interface: **RS-485, see** 1.4.3. **RS-232, see** 1.4.4.

	RS-232 (D-Sub), see 1.3.1. [Default RS-485]
Baudrate	Baud rate settings. Can be 300-115 200 bps. [Default 9600]
Character Format Parity	Parity settings; no, even or odd parity. [Default None]
Character format Stop Bit	Number of stop bits, 1or 2 stop bits (Default 1)
Extra delay between messages	Time to delay between Modbus messages in milliseconds. (Default 0)
Character delimiter	Number of milliseconds between characters in a Modbus frame. Set to 0 to use Modbus standard 3.5 characters. [Default 0]
Use function code 15 when writing single bits(coils)	If this option is Enabled, all writes to coils will be done with function code 15. (Useful if slaves do not support function code 05).
Use function code 16 when writing single registers	If this option is Enabled, all writes to registers will be done with function code 16. (Useful if slaves do not support function code 06).

6.2.2 Modbus TCP

Option	Description
Port number	The port to use for Modbus TCP communication. [Default 502]
Gateway Registers	If enabled the internal registers will be available at the slave address given in the **Address**-field. The internal registers are specified in appendix B. Some of the registers can be used for pages, alarms and logs using the **Internal Register** as device. The queries sent to this Modbus address will not be sent to the Modbus RTU network, BSD module will respond to these queries by itself.
Server Idle Timeout	If enabled the idle timeout in seconds for the Modbus TCP connection can be set. If there is no response within this time the connection will be closed. If disabled the connection will not timeout. [Default Enabled, 60]
IP Authentication	If enabled this feature makes it possible to configure the IP address that is allowed to connect to the gate way.

There cannot be two devices with the same Modbus address. If that is the case, the serial bus will not be able to communicate with all slaves present on the bus.

6.3 Modem

On this page the modem setup is done. An external modem, which is optional, can be either a GSM/GPRS or an analogue modem (PSTN) that is attached to the RS-232 9-pin DSUB interface, see 1.3.1.

On the status page the current status of the modem is displayed, see section 8.2.

6.3.1 Modem settings

Option	Description
Modem type	Type of modem
Baudrate	Baudrate used for the modem
Pin code	If SIM card has PIN code security activated the pin code should be entered here followed by clicking test **pin code**, to save the PIN code.
Modem info	A window with information about the connected modem will show. If GSM/GPRS it will give information about Manufacturer, IMEI-number, PIN status and signal strength. There is information about the SIM code, which could be ready, if OK, or SIMPIN or SIMPUK when demanding user action. The PIN or PUK code is entered at **Pin code** when necessary. The SIM card has to be registered on a network to be able to work which status can viewed on the line Network status.
Test SMS	If a GSM/GPRS modem is attached, enter a phone number to generate a test SMS to that number.

6.3.2 Dial up/GPRS setting

Settings used for BSD module to communicate with Internet using a modem. Is used to send e-mail, logs and alarms where there is no Ethernet connection available. If NetBiter.net is enabled and no Ethernet connection is available the "Connection trigger" has to be set to "Always connected".

Option	Description
Connexion trigger	Defines how the BSD module should connect to Internet. When set to Alarm/Event it will make a connection when needed to send e-mail, alarm, log or other information that requires an Internet connection.
Host to ping	An address to a host, IP address or server name, to send a ping packet which will keep the connection to Internet. This is used as a keep alive message.
Ping timer	Sets the interval for the keep-alive message. Should be as long as possible to avoid unnecessary GPRS data traffic.
Access Point Name (APN)	GPRS gateway that is given by the SIM card operator.
Phone number	Phone number to dial to the Internet Service Provider, ISP.
User name	User name assigned by the ISP.
Password	Password assigned by the ISP

6.3.3 Dial-in settings

This section handles a dial in connection, i.e. when the user should be able to call the BSD module using a modem.

A network connection has to be set up on a PC where the phone number is the number of the SIM card used in the BSD module. User name and password for the network connection should be those entered in this section.

Option	Description
Local IP address	The IP address assigned to the BSD module. This IP number should be entered in the web browser after a connection is established.
Remote IP address	The IP address that will be assigned to the calling computer, the remote client. Must be the same sub net as **Local IP number.**
User name	User name used to establish a connection. Is required on the PC when creating a network connection.
Password	Password used to establish a connection. Is required on the PC when creating a network connection.

6.4 Regional

The Regional page contains configuration for time and date, generic module information and also configuration for how the log file list separator and decimal symbol should be represented.

6.4.1 Time and date

Option	Description
Date	Current date. Stored to a clock that will be battery backup up for maximum a week.
Time	Current time. Enter the actual time. Daylight saving and time zone are set separately. Stored to a clock that will be battery backup up for maximum a week.
Time zone	The time zone that is used. For time zones marked with * daylight saving will be used. Then time entered should be actual current time. The BSD module will change time automatically.
Network time protocol	Network time protocol, NTP, is a server from where data can be read and used to set time and date. Requires an Internet connection
NTP server	A server that support and can deliver NTP information. Could be an IP address or domain name
Update interval	Interval of how often the time and date should be synchronized with data from the server. When using GSM/GPRS the amount of data for every synchronization should be considered.

6.4.2 Decimal separator

Option	Description
Decimal separator and log file value separator	Sets the decimal separator and the separator character used for the csv-logfile. [Default Dot (.) and Comma(,)]

6.4.3 Module information

Option	Description
Site name	A name for this BSD module that is used when sending test SMS and test e-mail to identify which module that sent the message. The site name is shown left to the log out button in the user interface header.
More information	Notes for this BSD module. This information will be shown here only.

6.5 E-mail

Option	Description
SMTP server	Server that is used for sending e-mail. Could be entered as IP address or domain name.
Port number	This is an SMTP server setting, and should be given by the Internet Service Provider, ISP. The port number is set to 25 by default for custom server. When using NetBiter.net services it is set to 2525. [default 25]
SMTP Authentication	If the server requires a login the type of method it set here. [default disabled]
User name	User name for the SMTP server
Password	Password for the SMTP server
Sender	This is what will be shown in the FROM field of a the mail sent from the BSD module.
Reply path	The reply e-mail address
Send test E-mail	This feature is used to test the SMTP settings. Enter an e-mail address and click **send**. A test mail will be sent to the address. Some e-mail servers may consider this test mail as 'junk'.

6.6 SNMP

More information about sending SNMP trap functionality see appendix C.

Option	Description
SNMP manager	IP address or name of the SNMP manager which should receive SNMP traps.
Port	Port number that the SNMP manager will listen to (to detect SNMP traps).

If domain name is used make sure that the DNS setting for the Ethernet connection is correct.

6.7 Web server

The web server settings refer to the internal web server of the BSD.

Option	Description
Extra web server port	To connect to the Extra web server port the URL should have a colon **:** followed by the new port number, i.e. **http://10.10.10.30:8080** where **10.10.10.30** is the IP number or DNS address to the BSD module and **:8080** the new port.
Compression on web pages	This feature is only used for the extra web server port. When set to **enable** the BSD module check if the browser support compressed pages, and if that is the case it will send compressed pages. This feature will increase the workload of the BSD module, why it is not enabled as default. There is an option to **disable** compression and the pages will be sent as normal web pages, which always is the case for the standard web server port 80. If it is set to **force** web pages will always send compressed regardless the support of the web browser. The information that a web-browser supports compressed data could sometimes be removed when passing some firewall or proxy servers. This is true for the default setting for port 80 in Microsoft ISA servers. To ensure that compressed web pages are sent anyway the option **force** should be set. Most web-browsers support compressed data.
Auto update value and status	This feature is only used for the extra webserver port. To limit the amount of data transferred and increase speed when using low bandwith, i.e. modem connection, the data and values could be set to be updated by clicking the refresh button only. This button will show at the upper right corner of the user interface.
Automatic logout time	Defines the time for how long a user can be inactive before the user is logged out due to session time out.

If domain name is used make sure that the DNS setting for the Ethernet connection is correct.

The web server will always listen to port 80. When using modem connection, compression on web pages will always be enabled and Auto update will always be disabled to improve response time, and the refresh button has to be clicked to update values and status.

6.8 Ethernet (TCP/IP network settings)

The settings are the same as configured with BSD Config utility.

Option	Description
DHCP	If enabled the BSD module will be assigned an IP address from the DHCP server on the net if there is one. See note below.
Host name	A host name for the BSD module.
IP Address	IP address for BSD module.
Subnet mask	A subnet mask, which should be identical to the subnet of the network.
Gateway	Network gateway
Primary DNS	Domain name server to be able to access servers by domain
Secondary DNS	Domain name server to be able to access servers by domain

Do not select the DHCP option unless you have a DHCP server available on the network.

6.9 System

6.9.1 Backup settings

Option	Description
Backup Settings To Local Hard Drive	All configurations except Ethernet settings will be backed up. A file with the extensions nbb, short for NetBiter Backup, will be created that can be saved on the local hard drive.
Restore module from backup	A file of nbb, NetBiter Backup file, can be used to restore the setup and configuration for the BSD module.

6.9.2 Firmware

This information is helpful when contacting CRE Support.

Option	Description
Select an update file	This is used to update firmware, files with extension nbu, or install patch, files with extension nbp, for the BSD module. Make sure to make a backup before starting to update the firmware. Latest firmware can be found on the CRE website. When clicking update the BSD module will start updating. Sometimes the web browser will not be able to display web pages. Just wait for some minutes and try to view the page again. The communication configuration for Ethernet, modem and NetBiter.net will not be affected which makes it possible to update firmware remotely.
MAC address	MAC address of the BSD module Ethernet interface.
Kernel version	Kernel version used in the BSD module.
Application version	Application version of the BSD module.
Patches	If there are patches installed in the system they will be displayed here with version and information about the patch.

The latest firmware and kernel version can be found on the CRE Technology website.

6.9.3 Tools

Option	Description
Get all log files	Put all log files and system information in a tar-archive.
Restart module	By clicking the reboot button the module will restart.
Reset To Factory Default Setting	By clicking this button the BSD module will remove all settings and configurations and has to be setup and configured as a brand new BSD module.

BSD with patches installed should be set to factory default using NetBiter Update to upload firmware.

6.9.4 NetBiter.net

NetBiter.net is a solution for remote management of NetBiter devices. The BSD is preconfigured to be able to use these services.

More information about the NetBiter.net remote management service can be found at http://www.netbiter.net

Option	Description
NetBiter.net service	Enables the NetBiter.net remote management services.
Device ID	This is the BSD device ID
Activation code	Code to activate the BSD as valid device at NetBiter.net. The code entered by default.
Send Alarms	Enable alarms to be sent to NetBiter.net.
Send log files	Enable log files to be sent to NetBiter.net.

When NetBiter.net is enabled the SMTP server will automatically be set to NetBiter.net with correct user name and password. The NetBiter.net services uses port 5222 for communication to the server.

7 Configuration

The configuration menu item is used to configure the BSD module to display data and log data as well as send alarm messages.

Before any data can be read from a Modbus device and be used for presenting, alarms and logs the communication interface has to be setup, see section 6.3.

7.1 Work flow

Every Modbus device must have a Template. Every Modbus device has to be configured as a Device with a Modbus address. The device has to be assigned to a template. When a Modbus device has been configured it can be used for data presentation, alarms and logs.

7.2 Template

A template describes what registers can be used and what type the register is. It also contains information about how presentation should be shown such as scaling, enumeration and read/write access for the user interface.

There are ready to use templates for Modbus devices that can be requested to support@cretechnology.com.

7.2.1 Add, upload and edit template

To administrate templates there are some buttons for this in the user interface.

Button	Edit template
Edit	Edit template
Restore	Used the over write a template with a template file that is uploaded.
Backup	To download a template file that could be locally stored and uploaded to restore or add a template.
Delete	Remove a template from the BSD module.
Upload template	Upload a template file and add it as a new device template.
Add template	Adds a new empty template that has to be configured, which is done by clicking Edit after the template has been assigned a name.

7.2.2 Edit

A template is structured into groups of parameter to gain simplicity when building pages, adding alarms and logs.

A parameter is a Modbus register with information about presentation, type etc. Several parameters can be grouped into one group.

A template can be renamed using the button rename at the same row as the current template name.

7.2.3 Template – Group

To add a new group click add group. There has to be at least one group in a template. The group can be renamed by clicking rename, and erased by clicking delete.

7.2.4 Parameters

When adding a new parameter by clicking Add parameter an Edit parameter window will be open.

For more detailed information click the question mark at upper right corner of the Edit parameter window.

Option	Description
Name	The name of the parameter
Type	Modbus register type
Address	Modbus register address
Datatype	Type of the data read. If it is signed, byte length and order.
Scaling	Scale the register value
Offset	Offset the register value
Mask	Mask a register value
Presentation	The register value can be shown as read only, read/write and write only.
Enumeration	Values can be enumerated, i.e 0=off;1=on, to show values as text.
Number of decimals	Number of decimals that should be shown.
Valid range	Use to prevent user from writing a value outside a valid range.

7.3 Devices

Every Modbus slave that is connected has to be added with a unique Modbus address. Every device has to be assigned a device template.

Autodetect can be used to add devices. Every Modbus address will be scanned with the Modbus communication interface settings. Every Modbus device connected has to have a unique address set before starting the auto detection. The scanning will scan one Modbus address after another, which could take some time to perform. The scanning will be displayed in the progress bar.

If the templates uploaded support identification for Modbus devices the correct template will be assigned. If not the devices will be added and the user has to be assigned a template manually.

By clicking **add device** the device can be manually setup.

7.3.1 Add/edit device settings

Option	Description
Name	The name of the device.
Template	The template that should be used for this device.
Modbus/TCP server IP address	The IP address for the Modbus/TCP server. If it is a Modbus/RTU device It should be left blank.
Modbus/TCP server port	The port to connect to the Modbus/TCP server. Modbus default is 502. [Default 502]
Modbus slave address	The unique Modbus Address.

7.3.2 Device specific alarms

If a template supports device specific alarms, preconfigured alarms can be added. The alarm condition is set in the template and cannot be changed. The **set** button is used to set all alarms for the complete alarm list or an alarm group. The set a single alarm the check box can be used. The **clear** button is used to clear all alarms for the device specific alarm list or for an alarm group.

The drop down box to set alarm class can be used to set the same class for a group, or different alarm class for a single alarm, see section 7.5.5 on page 28 for more information about **Alarm class**.

7.4 Alarm

7.4.1 Alarm settings

Option	Description
SMS Alarm	Enable SMS alarm if a modem is configured, see section 6.3. Users with correct alarm class and a mobile phone number will receive a SMS, see section 6.1
Email Alarm	Enable e-mail alarm if an SMTP server is configured, see section 6.5. Users with correct alarm class and an e-mail address will receive an e-mail, see section 6.1
SNMP Alarm	Enable SNMP trap alarms if a SNMP manager is configured, see section 6.6
Manual alarm acknowledge	If disabled all alarms have to be acknowledge. When an alarm condition is fulfilled it sends an alarm message. After the condition has been back to normal and is fulfilled again a new alarm message will be sent. If enabled the user has to acknowledge the alarm before a new alarm message is sent. Alarms can be acknowledged from NetBiter.net user interface if these services are enabled, see section 6.9

7.4.2 Alarm configuration

The alarm configuration section contains a list of all configured alarm parameters. The alarms can be reconfigured by clicking edit and the alarm parameter page with all options will be displayed. The delete button will remove the alarm parameter. To create a new alarm parameter click add alarm parameter. There can be a maximum of 64 alarm parameters configured.

7.4.3 Parameter set

Option	Description
Device	Select the device that has the parameter to be used for the alarm
Group	Select the group that contains the parameter.
Parameter	Select the parameter that will be used for the alarm be presented

7.4.4 Alarm trigger operation

Option	Description
Trig on	The trig condition, can be set as: For values: ☐ Greater than ☐ Less than ☐ Equal to ☐ Not equal to ☐ Change For Bit operations: ☐ Any ☐ Neither ☐ All For the device: ☐ No response Where the value is number of consecutive time outs.
Value/Bit	Select if the value or bit representation field should be used to enter condition If scaling is set in the template, the value will be compared to the scaled value.
Value	Enter a decimal value
Bit presentation	Use the checkbox to mark what bit that should be used. Marked checkbox represent a bit=1.

7.4.5 Alarm properties

Option	Description
Alarm Class	The alarm class is used to sort which alarm to send to which user. The user can have one or more alarm class configured. If an alarm will be trigged an alarm message will be sent to all user that has the alarm class configured.
Severity	The alarm's severity. Used to describe how critical the alarm is. For SNMP there is a severity class called Clear, which will be sent for an alarm that enters normal alarm condition.
Description	Text that is displayed in the alarm list view and alarm history, and is sent to the SNMP manager.
Subject	The subject for alarm message sent by e-mail and/or SMS.
Message	The message body of the alarm message sent by e-mail and/or SMS. The message length is limited to 70 characters for a SMS, why it could be a good practice to keep it to that length.

7.5 Log

The log can have 64 log parameters configured and will save samples to a CSV file. This file can be viewed in the built in trend graph page or downloaded to be analyzed, in e.g. Microsoft Excel or OpenOffice Calc.

See section 8.4 for more information concerning CSV files (view/Download).

7.5.1 Log configuration

Option	Description
Estimated log time	Gives estimation about the time before the log file is full. This is an estimation, and will depend on the configuration, i.e. number of pages and parameters configured. The number and size of pictures for the pages will also affect the log file size. If the log interval is set to a predefined time, this will show as the estimated log time.
Log interval	Defines the time interval for between the samples that is saved to the log file.
Log type	The log could be circular, which will fill the log with data. When full it can be sent. A new file will be created and the old one is deleted.
Maximum send log interval	This will set the time when a log should be sent. If a time period is selected the log will be sent with this interval, e.g. at the same minute for every hour when **At least every hour** is chosen. The minute is different for each BSD module to spread load of Ethernet traffic and server load.
Send log files as E-mail attachment	If a Send log interval is specified the log file is sent as an e-mail attachment to user that has configured this option, see section 6.1

7.5.2 Log parameters

The Log parameter section contains a list of all configured log parameters. The log parameter can be reconfigured by clicking edit and the Edit log entry page with all options will be displayed.

The delete button will remove the log parameter. To create a new alarm parameter click add log parameter.

There can be a maximum of 64 log parameters configured.

7.5.3 Log – Edit log parameters

<table>
<tr><th>Option</th><th>Description</th></tr>
<tr><td>Device</td><td>Select the device that has the parameter that will be logged.</td></tr>
<tr><td>Group</td><td>Select the group that contains the parameter.</td></tr>
<tr><td>Parameter</td><td>Select the parameter that will be logged.</td></tr>
<tr><td>Delta logging</td><td>Stores the difference between the two last samples. As an example; a pulse counter is used. This counter increase the value for each received pulse. For delta logging this will result in:
<table>
<tr><th>Counter</th><th>Logged value</th></tr>
<tr><td>5</td><td>5</td></tr>
<tr><td>20</td><td>15</td></tr>
<tr><td>32</td><td>12</td></tr>
</table>
</td></tr>
<tr><td>Description</td><td>Description that is used on the trend graph page, see section 8.5.1 and in the csv-file that can be downloaded.</td></tr>
</table>

7.5.4 Bindings

With bindings a Modbus register can be copied to another.

7.5.5 Bindings – Add data binding

Option	Description
Source Device	Select the device that has the parameter that will be copied.
Source Group	Select the group that contains the parameter.
Source Parameter	Select the parameter that will be copied.
Destination Device	Select the device that has the parameter that will be copied to.
Destination Group	Select the group that contains the parameter.
Destination Parameter	Select the parameter that will be copied to.
Copy interval	The interval for each copy

8 Everyday use

When a BSD module has been setup and configured it is ready for everyday use, to monitor data, send logs and alarms.

8.1 View page

To view a page that has been configured use the dropdown box at the upper left corner of the user interface, select the page to display.

8.2 Devices

The Devices menu item is a browser that can browse all parameter in a template for a device and show current values.

The page will show a list of all available Modbus devices. A tree with all groups will show when expanding the tree. Open a group by clicking on the group name to see values for each parameter.

The Internal Registers will also be available to browse.

8.3 Alarm

The alarm menu item keeps track of the alarm parameter configured, and is used to see current state of all alarms as well as an alarm history, where the alarm parameter condition changes can be monitored, and if alarm message has been sent correctly.

8.3.1 Alarm status

This is a list of all alarms. The status of the alarm can be **`Ok`** or **`Present`**. If the acknowledge is required the **`Acknowledge`** button will be active for alarms where the condition has been fulfilled. If all the alarm that have been present and need to be acknowledge at the same time click the button **`Acknowledge all`** at the bottom of the list. The lists default view is to show all present and not acknowledged alarms. To view all alarms click **`Show all`**. To show only present alarm again click **`Show active`**.

8.3.2 Alarm history

Every change for an alarm parameter is logged in Alarm history, with information of the value for the parameter that trigged the alarm and information about messages sent from the BSD module. There can be 100 entries in the alarm history list. If the list is full and a new alarm occurs the oldest alarm history entry will be deleted. If the **`Show occurrence`** button is clicked only the entries with type **`Occurred`** will show, which could be useful when analyzing alarms. The **`Clear History`** button will clear all alarm history.

8.4 Log

The log menu item is used for analyzing logged parameters. The log could be viewed in a trend graph and be downloaded as a CSV file.

8.4.1 View trend graph

This feature requires that the user has JAVA Virtual Machine installed. By using a left click on the mouse, keep the button down and release it at the diagonal corner of a box the graph will zoom to that size. By right clicking and keeping the button down the graph can be moved by moving the mouse.

Button	Description
	Scroll graph up
	Scroll graph down
	Scroll graph right
	Scroll graph left
	Reset view, view all
	Zoom in
	Zoom out

The first three (3) parameters will automatically be displayed in the graph by default. Parameters can be shown or hidden by clicking the box in front of the parameter name. When a parameter is shown the line color will have the same color as the box. To hide a line click the box and it will be grey.

8.4.2 Log

Option	Description
Download Log To Local Hard Drive	Download the log from the BSD module to a local computer as a CSV file that can be analyzed in software like Microsoft Excel or OpenOffice Calc. The CSV delimiter character can be set in the Regional page, see section 6.4
Clear Log File	Will delete the log from the BSD module.

9 Appendices

9.1 APPENDIX A: Specifications

Ethernet connection

10Base-T or 100Base-TX (IEEE 802.3) RJ45 connector

Serial interface

RS-232 with full modem control (RTS, CTS, DCD, DTR, DSR, RI)

300-115.200bps

9-pin DSUB connector

RS-485

300-115.200bps

screw connector

Power Supply

Plastic housing:

9…28V_{AC} (2W)

9…28V_{DC} (2W)

Metal housing:

9…28V_{DC} (2W)

Temperature range

Operating: -40 … 85°C

Storage: -40 … 85°C

Humidity range

5-93% RH, non-condensing

Cover material for plastic housing

LEXAN 940, self-extinguishing acc. to UL94-V0

Mounting option

Plastic housing: DIN rail (EN 50022) Metal housing: Screw mounting (DIN rail optional)

CE certification

According to EN 61000-6-2:2005 and EN 61000-6-4:2001

9.2 APPENDIX B: Internal registers

Holding register	Name	Values	Options	Comment
1	Digital input 1 status	0 or 1		Read only
2	Digital input 2 status	0 or 1		Read only
3	Number Active Connections MB/TCP	0-10		Read only
4	Number Active Internal Connections	0-10		Read only
	Serial Status (Modbus/TCP)			See section (3.3)
5	Valid responses	0-65535		Can be cleared
6	Serial timeouts	0-65535		Can be cleared
7	CRC errors	0-65535		Can be cleared
8	Input Buffer overruns	0-65535		Can be cleared
9	Frame errors	0-65535		Can be cleared
10	Exception responses	0-65535		Can be cleared
	Serial Status (Buffered messages)			
11	Valid responses	0-65535		Can be cleared
12	Serial timeouts	0-65535		Can be cleared
13	CRC errors	0-65535		Can be cleared
14	Input Buffer overruns	0-65535		Can be cleared
15	Frame errors	0-65535		Can be cleared
16	Exception responses	0-65535		Can be cleared
	Serial Status (Internal requests and Webpages)			
17	Valid responses	0-65535		Can be cleared
18	Serial timeouts	0-65535		Can be cleared
19	CRC errors	0-65535		Can be cleared
20	Input Buffer overruns	0-65535		Can be cleared
21	Frame errors	0-65535		Can be cleared
22	Exception responses	0-65535		Can be cleared
	Configuration Registers			
23	Modbus/TCP Port	1-65535		Default port number is 502
24	Gateway Modbus address	(-1)-255		
		-1	Disabled	Default
		0 - 255	Enabled	
25	Modbus/TCP idle timeout	0-65535 (seconds)		Default 60 seconds
		0	Disabled	

Holding register	Name	Values	Options	Comment
		1 - 65525	Enabled	
26	Baudrate			
		2400	2400 bps.	
		4800	4800 bps.	
		9600	9600 bps.	Default value
		19200	19200 bps.	
		38400	38400 bps.	
		57600	57600 bps.	
		115200	115200 bps.	
27	Parity	0-2		
		0	No parity	Default
		1	Even parity	
		2	Odd parity	
28	Number of Stop bits	1-2		Default 1 stop bit
29	Slave timeout time	25-65535 (milliseconds)		Default 1000 ms.
30	Physical interface	0-2		
		0	RS-485 (RJ12)	Default
		1	RS-232 (DSUB)	
		2	RS-232 (RJ12)	
	Authentication			
31	Valid IP address 1	0-255		First byte of IP address
		0	Disabled	IP address auth disabled
		1-255	Enabled	
32	Valid IP address 2	0-255	Enabled	Second byte of IP address
33	Valid IP address 3	0-255	Enabled	Third byte of IP address
34	Valid IP address 4	0-255	Enabled	Fourth byte of IP address
35	Mask for Valid IP address 1	0-255	Enabled	First byte of mask
36	Mask for Valid IP address 2	0-255	Enabled	Second byte of mask
37	Mask for Valid IP address 3	0-255	Enabled	Third byte of mask
38	Mask for Valid IP address 4	0-255	Enabled	Fourth byte of mask

Table 5: Internet registers

9.3 APPENDIX C: SNMP

If SNMP Alarms is enabled, see 7.5.1, all alarms will be sent as SNMP traps to the host specified on the SNMP page, see section 6.6.

The OID is sent in the following format in numbers:

.1.3.6.1.4.1.23312.1.1.2 [IP address][event]

.1.3.6.1.4.1.23312.1.1.[trap_id][trap_data]

Where:

23312 is CRE Technology enterprise ID

1.1 is BSD product

And where event:

1 = Alarm set

2 = Alarm cleared

A trap id is divided into five messages with following trap data:

#1	Alarm ID
#2	Alarm description
#3	Class ID (1-10)
#4	Class description
#5	Alarm severity,

Where:

0 = indeterminate

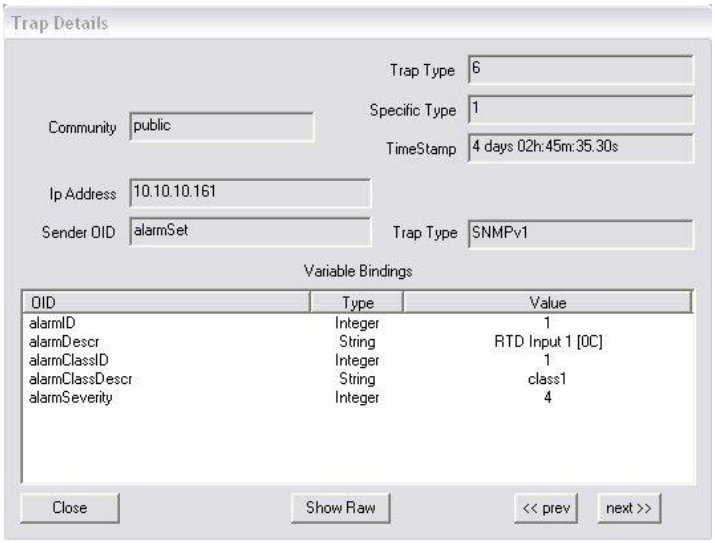
1 = critical

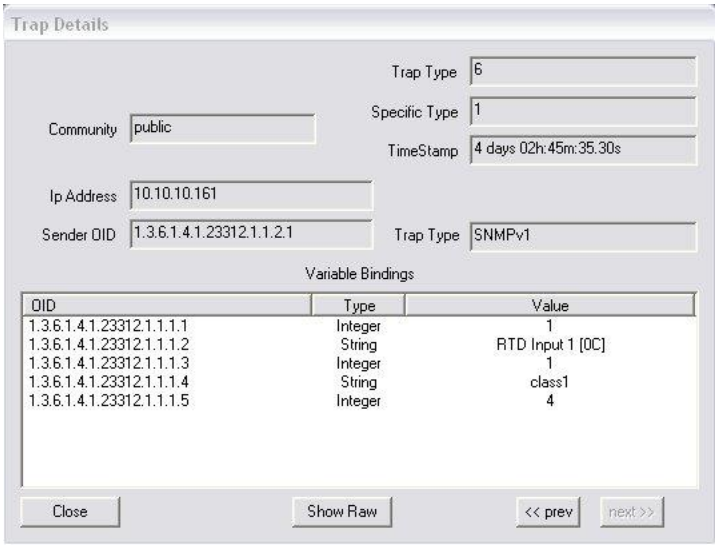
2 = major

3 = minor

4 = warning

5 = cleared





See the pictures for example of SNMP trap sent an alarm to warning of high temperature from a BSD.

To try out the SNMP functionality the software Trap Receiver could be used. This program can be found at http://www.trapreceiver.com. Please, check the license for the software. It could be used to examine a trap sent to a PC to better understand the SNMP functionality of the BSD.

9.4 APPENDIX D: NetBiter.net

The web site www.NetBiter.net collects and stores data from remote equipment. Through the central server an authorized user can access the information at any time and from any location.

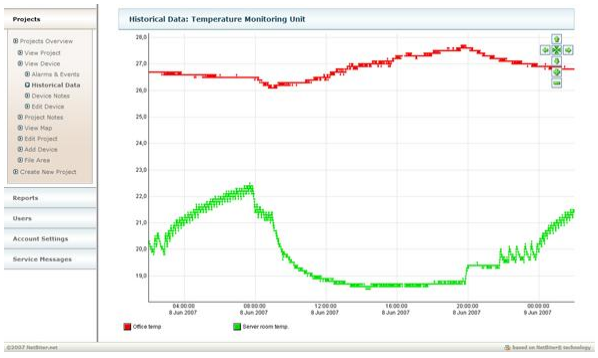
The BSD devices connect to the central server to submit critical equipment data, such as logged parameter data and alarms. At the server an authorized user can view and manage this information. The only tool the user needs is a standard web browser. The use of one central location for all remote equipment simplifies the work for anyone dealing with remote installations.

The NetBiter.net service provides the following functions:

- Administrate and maintain users, projects, remote field units and data.
- Storage of log files produced and sent by the BSD field units.
- View logged data as trend graphs.
- Management of active alarms and alarm history (alarm notifications updates automatically on the server).
- View the physical location of remote equipment on a map.
- Etc

This service from CRE Technology is free!

NetBiter.net features

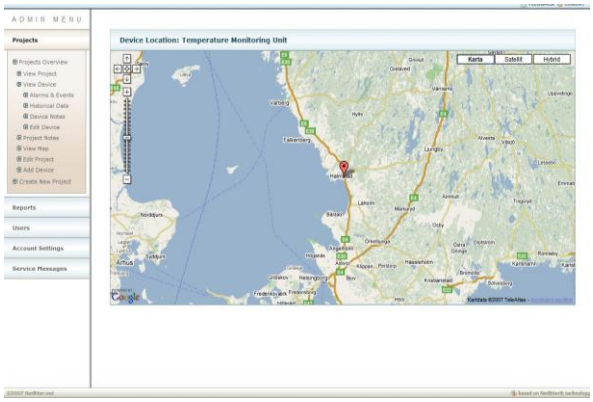


Trending

Store data log files at Netbiter.net and view trend graphs of selected parameter data.

Analyze trends to detect early warning of malfunctioning equipment.

To be proactive to problems saves time and money immediately as travels to sites can be dramatically reduced.

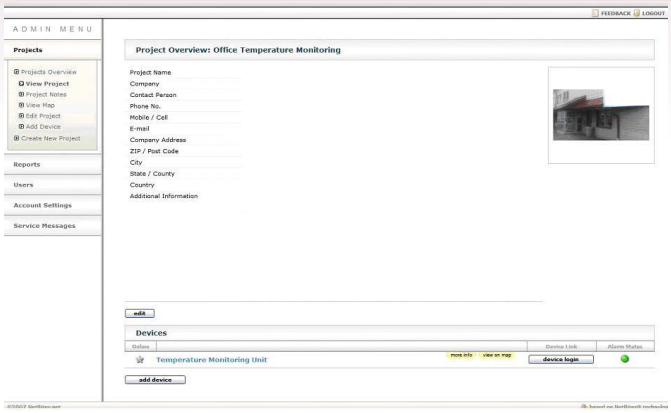


Positioning

View the location of remote equipment on a map.

Easy and improved planning of service routes saves time for any service organization.

When an alarm occurs in equipment, that unit in the map will automatically be marked in red colour.



Management of users, projects…

One central place for management of users, remote equipment and critical information.

Store important blue prints, pictures, templates and more.

Getting Started

To get started with NetBiter.net you need to have a BSD with NetBiter.net Device ID, which is found in the package.

Setup the BSD device as it is described in section 7.

Continue with creating an account on the NetBiter.net server by following these steps:

1. Go to www.netbiter.net
2. If you do not have an account for NetBiter.net you have to create one, otherwise go to step 6.
3. At the lower left corner at the login screen click **“create account”.**
4. Enter registration data and read the terms and condition. Click register when ready
5. The e-mail address entered in the registration process will get an e-mail with activation key. Just click the URL to activate you NetBiter.net account.
6. Go to www.netbiter.net and login using the user name and login.
7. Click Projects and create new project. Enter required information. Click **“next”** when ready
8. Enter the Device ID and password that was sipped with the device, and select a name for the device. Enter additional information, when ready click **“save”**.

Now the system is up and running.

10 Company Information

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☎ Technical Support: +33 (0)4 92 38 86 86 (office hours: 8.30AM-12AM / 2PM-6PM)

Mail: support@cretechnology.com

SKYPE: support-cretechnology.com

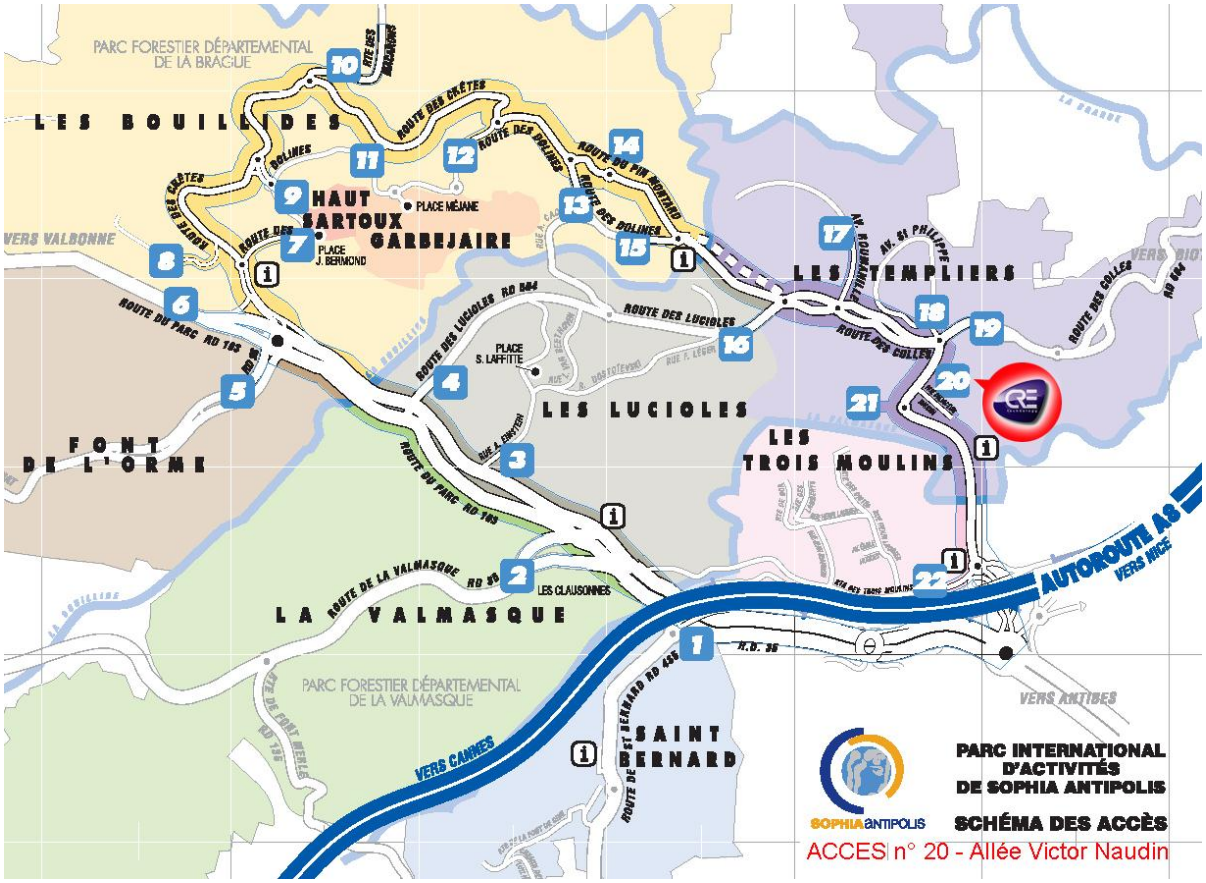

Figure 13 - Access to CRE Technology in Sophia Antipolis.

You can find a full list of our worldwide distributors on our Web site www.cretechnology.com tab “DISTRIBUTORS”.