

Be16 X Be1 SMS GATEWAY FOR GENERATOR MONITORING

SUITABLE FOR MODEMS F2103 / F1103

The information in this document is subject to change without notice. No part of this document may be copied or reproduced in any form or any means without the prior written consent of Bernini Design Company. Bernini Design assumes no responsibility for any errors which may appear in this instruction manual or in the wiring diagrams. Although Bernini Design has taken all possible steps to ensure that the User Manual is complete, bug free and up-to-date, we accept that errors may occur.

Customer Support : mobile: ++40 721241361 e-mail: bernini@bernini-design.com

Warranty

Bernini Design SRL (hereinafter "BD") warrants that Be16 shall be free from defect in material or workmanship for a period of 3 years from the BD delivery date. BD shall, at its option, repair or replace the product without charge. BD shall return the Be16 to the buyer with the default parameters with no charge. The buyer shall furnish sufficient information on any alleged defects in the product so as to enable BD to determine their cause and existence. If the Be16 is not defective, or the product is defective for a reason other than covered by this warranty, the buyer will be charged accordingly. This warranty shall not apply if the Be16 has not been used in accordance with the User Manual and other operating instruction, particularly if any defects are caused by misuse, improper repair attempts, negligence in use or handling. This purchase is non-refundable.

Be16 supports the F2103-F1103 modem only. Other modems may work, but full operation cannot be guaranteed. We recommend that you use the Be16 module to supply your modem. It provides all protections when the battery of the engine is the sole source that supplies the modem. Contact us for support at bernini@bernini-design.com



Be16XBe1 OEM's Manual - Table of Contents

Section	Description	Page
1.0	Setting up the Be16	2
2.0	Configuration via mobile Phone	2
3.0	Advanced configuration via computer	3
3.1	Editing the phonebook & factory settings	3
4.0	SMS syntax and instructions	3
4.1	Editing the Device Name	3
4.2	Examples of valid commands	4
4.3	Examples of not valid commands	4
4.4	Table of the Be1 commands	5
4.5	Remote START-STOP commands	6
5.0	Automatic notifications	7
6.0	Dimensions and Connections	8

Introduction

The Be16 is an optional module (see section 6.0) suitable for the Be1 generator controller. It features RS485 & RS232 serial interface. It includes a regulated power supply for the modem as well. You can connect the Be16 directly to the battery of the engine or to any DC supply in the range 8-30V. It stores up to 14-numbers in the Phone-book. The Be16 is basically a gateway that translates a Short Messages Service (SMS) into MOD-BUS compatible commands and vice versa. This module allows you to monitor & control a power generator using your mobile phone.

1.0 SETTING UP THE BE16

You can configure the Be16 module by using a mobile phone (see 2.0). You can configure advanced functions of [Node Address] and [Phone-book] by using the configuration software (see 3.0).

2.0 CONFIGURATION VIA MOBILE PHONE

The purpose of this procedure is to store your mobile phone number into Be16 phone-book. To set up the communication, follow the instructions.

- 1) Insert a SIM into modem. Make sure the SIM has the PIN disabled. If not, you need to disable it by using a mobile phone.
- 2) Connect the RS232 cable to the modem, connect the RS485 cable to the Be1, connect the modem supply cable to Be16. Finally, connect the Be16 & Be1 to a DC power supply (8-30V). The wiring diagram is printed on the Be16 plastic box.
- 3) The Be16 will turn on the power supply LED indicators [6] & [7] (see 6.0). The Be16 will intermittently illuminate the indicators [8] & [9] as well. In case an indicator does not work, you are required to check the wiring. If the indicator [7] continuously turns off and on you have to check the modem connection.
- 4) Wait five minutes to allow the modem to find the closest antenna tower or network.
- 5) Compose, with the correct syntax, on your mobile phone, the following message text

BE1 *PHONE NUMBER# (Example: Be1 *00123456789#)

NOTE Be16 is not case-sensitive: Be1 & be1 are the same. Put a space after 'be1'.
--

The phone number must include country and area codes.

- 6) Verify the syntax and send the message.
- 7) If everything is ok, after a few minutes, you will receive an SMS with the following content:

BE1 OK

- 8) We recommend that you remove the power supply from Be16 & Be1 for a few seconds. Connect the supply; within two minutes you should receive the following message:

The modem is online. BE16 for BE1 03.12

(The '03.12' is the Be16 software version. It may change based on new releases)

- 9) You can use the communication kit BE16-BE1 by typing the commands described in section 4.2. You must follow the instructions about SMS syntax in section 4.0. We recommend that you change the '**BE1**' name (so called 'device name') as described in section 4.1.

<p><u>NOTE</u> <u>If you keep the BE1 name, someone who knows the number of the SIM inside the modem can take control of your system.</u> <u>We recommend that you choose an other name.</u></p>

3.0 ADVANCED CONFIGURATION

Connect the Be16 to your computer via an RS232 to USB converter. Supply the Be16 (8-30VDC). Run the Be16 configuration software on the computer. Select the proper communication port of your computer. Click the [Connect] button. Click the [Read phone-book] button. Type the phone number in the box provided by the software. You can set up to 14 numbers. The phone-book will be automatically updated. You can change the NODE address of the Be16 by using the software. This is necessary only in case you have a network of MOD-BUS devices. Factory setting of Be16 node is '1'. You are not required to change it if there are no other devices connected.

3.1 EDITING PHONE-BOOK & RESTORE FACTORY SETTINGS

When you need to store a new number, or to change a number, simply type the number into a box. Click the [Write phone-book] button to transfer the phone numbers into Be16 non-volatile memory. To cancel the entire phone-book click the [Restore Factory Settings] button.

4.0 SMS SYNTAX AND INSTRUCTIONS

To send a valid SMS command, you are required to compose the SMS on your mobile phone following the correct syntax:

BE1 COMMAND (upper or lower case letters are treated the same)

'**BE1**': is the name of the generator controller. Default name is Be1. We recommend that you change it as soon as possible (see 4.1) in order to add security to your system. As a matter of fact, the Be16 will ignore all messages with a **NAME** different from **BE1**.

'**COMMAND**' is the text that defines the operation that you want to make. The table in section 4.4 describes all available commands.

In between the '**BE1**' and '**COMMAND**' you have to type a space. The Be16 treats uppercase letters and lowercase letters in the same way. So, you can use capital or lower case characters. For example, the Be16 enters the test mode when you type '**ENGINE TEST**' or '**engine test**'.

4.1 EDITING THE DEVICE NAME

We recommend that you change the device name BE1 (factory setting) immediately after you verified that the communication is working. Follow the instructions.

1) Type this message on your mobile phone:

BE1 (NEW DEVICE NAME)

You must include the new **NEW DEVICE NAME** in round brackets; you can use maximum 8 letters or numbers. In between the **BE1** and **(NEW DEVICE NAME)** you must type a space.

BE1 (mygen)

2) Send the message. After a few seconds you should receive the following message:

mygen OK

3) From now on, when you will edit an SMS, you have to type **mygen** instead of **BE1**.

You can also use the configuration software by following the steps:

- 1) Connect the Be16 to your computer via the RS232 or USB interface.
- 2) Supply the Be16 (8-30VDC).
- 3) Run the Be16 configuration software on your computer.
- 4) Select the proper communication port of your computer and click [Connect].
- 5) Using the cursor enter and click the box [DEVICE_ID] (default Be1).
- 6) Type a new [DEVICE_ID] (example 'mygen').
- 7) Click [WRITE].

After writing, we recommend that you remove the supply from Be16 for a few seconds. Connect the supply. Once the Be16 communicates with the software, click [READ]. Check if the DEVICE_ID is correct (in this example 'mygen').

4.2 EXAMPLE OF VALID COMMANDS

In this example we suppose you changed the name **BE1** into **MYGEN**.

MYGEN STATUS (or you can type: Mygen status)

The '**MYGEN**' is the name of device and "**STATUS**" defines the command. You have to type a space between **MYGEN** and **STATUS**. The **STATUS** command will work only if the **MYGEN** is correctly stored into Be16.

4.3 EXAMPLE OF NOT VALID COMMANDS

In this example we suppose you changed the device name BE1 into MYGEN.

MYGENENGINE TEST (wrong!)

(there is no space between **MYGEN** and **ENGINE TEST**)

BE1 ENGINE TEST (wrong!)

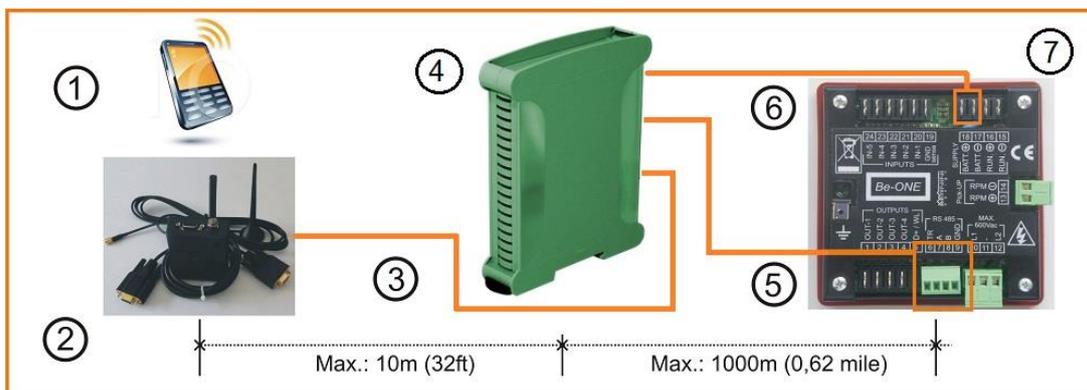
(the new name is **MYGEN**, it is not **BE1**)

4.4 TABLE OF THE BE1 COMMANDS

The list of the commands is indicated below along with a short description. In typing a command, any uppercase or lowercase character can be entered. If the Be1 is in Manual mode of operation, or the Be1 controller is password protected, the commands (*) will be ignored.

AUTO	It sends a request to enter the AUTO mode of operation. The command is ignored in case if the Be1 controller is in MANUAL or TEST mode of operation.
STATUS	It sends a request to read the status of the engine, mode of operation and to read the power supply of the Be16 module.
ALARM	It sends a request to get information about active alarms. In case of no alarms, the Be16 will return the message ' NO ALARMS '.
GENV	It sends a request to read voltage and frequency of the generator.
ENGINE	It sends a request to read Battery Voltage, Speed, Oil Pressure, Fuel %, Temperature and h-meter.
OFF (*)	It commands the BE1 to shut down the engine by entering the OFF mode of operation. This commands works if the Be1 controller is in AUTO mode of operation (it does not work in TEST & MANUAL mode of operation).
START (*)	It makes starting the engine (only if Be1 is in AUTO mode of operation). <u>When you use this function you must disable the option [12] on the digital input.</u>
STOP (*)	It stops the engine after a start made upon a START request via SMS. This command is ignored if the Be1 features an input programmed for remote start (option [12]). In this case, to stop the engine, you have to use the OFF command. <u>When you use this function you must disable the option [12] on the input.</u>

In the following picture you can see the system. [1] mobile phone. [2] Modem with antenna. [3] RS232 cable. [4] BE16 module. [5] RS485 cable. [6] Dc supply cable. [7] Be1 controller. You can place the BE16 as far as 1000 meters far away. You must use a twisted pair shielded cable. Connectors are supplied as spare parts together with the Be1 & Be16 controllers.



4.5 REMOTE START AND REMOTE STOP

We describe in the following table the commands to start and stop the generator from a remote location using the mobile phone.

START (*)	<p>It makes the Be1 starting the engine (only if Be1 is in AUTO mode of operation). This command is ignored in MANUAL mode of operation.</p> <p style="text-align: center;"><u>When you use this function you must disable the option [12] on the input.</u></p>
STOP (*)	<p>It stops the engine after a start made upon a START request via SMS. This command is ignored if the engine is running because an input, programmed for remote start, has been activated. You can not stop the engine by using a 'STOP' SMS command, but you can use the OFF command.</p> <p style="text-align: center;"><u>When you use this function you must disable the option [12] on the input.</u></p>

The BE1 will start the engine only if the controller is placed in AUTO mode

Please note that in case you protect the Be1 by password, the Be16 will not be able to activate the commands for start and stop. In case you need both features (password protection and remote commands, we recommend that you use the more advanced Be124 generator controller).

To enable the remote command using the SMS you must disable the REMOTE COMMAND switch connected to BE1 and turn to 'OFF' the option [12].

To do this, follow the instructions:

- Enter the BE1 programming mode as described in section 6.0 of the BE1 controller manual.
- Disable the option [12] for the "input 4" as indicated in table 7.07A by programming, for example, an other option or by programming [OFF]. This option totally disables the remote input on the input number '4' (that is the terminal '23').
- Save the settings by following the programming instructions.

After disabling the remote start, the Be16 SMS decoder will enable the remote start and stop via SMS.

THE BE1 CONTROLLER, WHEN ENABLED FOR REMOTE START-STOP VIA PROGRAMMABLE INPUT (OPTION [12]) WILL IGNORE REMOTE START-STOP VIA SMS

NOTE: IN CASE YOU NEED TO START AND STOP THE ENGINE VIA SMS AND VIA LOCAL SWITCH, WE RECOMMEND THAT YOU USE THE BE124 CONTROLLER. THIS CONTROLLER FEATURES MULTI-TASKING REMOTE CONTROL

5.0 AUTOMATIC NOTIFICATIONS

1) The Be16 is able to send notifications about particular events. You will receive an SMS in case of alarm, warning, shutdown or when you change a mode of operation. The full list of alarms is explained in the section ‘alarms’ in the Be1 user manual.

2) In case you use a separate power supply for the Be16 you will receive a warning when the battery drops below 10.0 Volt. You will get, for example, the following SMS:

BE16 POWER SUPPLY 9.9 V

3) In the same way, you will receive a notification when the battery rises above 10.5 Volt. You will get, for example, the following SMS:

BE16 POWER SUPPLY 12,1V

4) When you connect a fuel level sensor, you will get automatic notification about a fuel level variation.

The Be16 will send an SMS each time there is at least a 10% variation in the Fuel Level. Example of a message:

BE1: FUEL LEVEL 63%

5) When there is a failure of the MODBUS connection between the Be1 controller and the Be16 module, the Modem will send you this SMS

MODBUS Communication failure

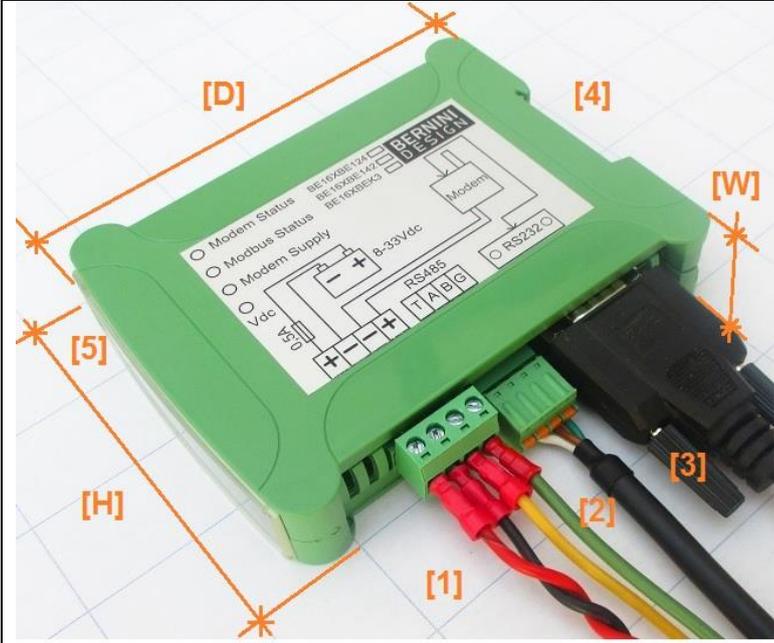
5) In addition, the Be16 can send the following miscellaneous messages:

MODE TEST	The Be1 is placed in TEST mode of operation.
MODE OFF	The Be1 is placed in OFF mode of operation.
MODE AUTO	The Be1 is placed in AUTO mode of operation.
MODE MANUAL	The Be1 is placed in MANUAL mode of operation.
ENGINE OFF	The engine is totally stopped.
ENGINE STARTING	The Be1 is starting the engine.
ENGINE RUNNING	The engine is running.
ENGINE STOPPING	The Be1 is stopping the engine

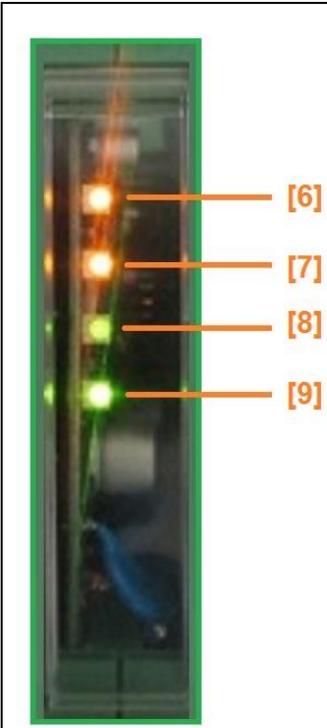
6) Due to the continuous product improvement you can find additional messages not reported in this user manual. Contact us for information bernini@bernini-design.com

5.0 DIMENSIONS & CONNECTIONS

Despite the fact that the Be16 is designed for DIN rail, you can use the module in any position. The maximum distance is limited by the RS485 specifications: about 1000 meters. The Be16 is supplied with one-meter RS485 cable suitable for BE1 generator controller. If you purchase the modem you will get the one-meter long RS232 cable.



1	Supply plug connector (pitch 5mm) +V Battery 8-30VDC input. - V Battery 0VDC input. - Modem supply output (0VDC) + Modem supply output (11V- 400mA)	
2	RS485 plug connector (pitch 3.81mm) Termination / A / B / Ground. Use twisted cable (max length 1000 meters).	
3	RS232 connector, 9 poles male sub-D. 2=RX 3=TX 4=DTR 6=DSR 7=RTS 5=GND. Use a modem cable with maximum length of about nine meters.	
4	Fixings are provided for DIN rail mounting.	
5	Transparent window; the Be16 features LED indicators described below. - Modem status: yellow LED. - Modbus status: yellow LED. - Supply for modem: green LED. - Be16 power supply presence: green LED.	
D	Depth 125 mm	Total weight 120gr.
H	Height 100 mm	
W	Width 25 mm	



LED INDICATORS	
6	MODEM status (yellow). It blinks once a second indicating that the modem is online. It illuminates continuously for about three seconds when it sends an SMS. It blinks fast when it receives an SMS.
7	MODBUS status (yellow). It blinks once a second to indicate that the Be1 is connected. It is totally off when the RS485 is not connected or the Be1 is not working.
8	MODEM supply (green). It turns on when the modem supply is normal. It turns off and on when the Be16 tries to initialize the modem.
9	SUPPLY (green). It indicates the DC power supply presence. When the voltage drops below 10.0 VDC, the Be16 sends a warning message. We recommend protecting the connectoins with 0.5 Amp fuse.
TROUBLESHOOTING	
<p>A) The indicator [9] is always off: there is no power supply. Check polarity of the connection. Voltage must be within 8-30VDC (max internal consumption 300mA).</p> <p>B) The indicator [8] repeatedly turns off and on: there is no communication with the modem; the Be16 continuously tries to power on-off the modem.</p> <p>C) The indicator [7] (or [6]) is always OFF. This is a typical case of wrong connections of the cables or severe hardware problem.</p> <p>D) All indicators are ok, but the SMS communication does not take place: - check the SIM inside; you must remove the PIN; - check the syntax when typing an SMS; - you are required to set up your mobile phone into Be16 in the first place (see 2.0); - you are required to include the name of the device (BE1) in each SMS (see 4.1)</p>	
for additional information contact bernini@bernini-design.com	