BrickElectric Ethernet I/O

BEM11000

Excellent network building block

CE

Features

- **WEB control**
- **Modbus-TCP**
- **X-Connect**
- **Hardware Reset**
- **IEEE 802.3at / 802.3af POE Compatible**
- **EasyBus - simple solution**
- **Windows Desktop App**
- **LAN mode**
- **DHCP / DNS**
- **Password Protection**
- **2 CH Relay Outputs**
- **SNMP V1 / V2C**

Introduction

BEM11000 is POE Supply Input, Ethernet Remote I/O Module, with 2 output Relays channels remote control module. Its Ethernet connector provides 10/100baseT interface.

It supports EasyBus – simple solution, HTTP, SNMP, Auto ping and Modbus-TCP control protocols, suitable for being used with servers, computers, mobiles, routers, etc., to provide remote control and monitor.

With DHCP / DNS functions, it can be configured together with servers very flexible.

BEM11000 is a new generation product with more functions and higher stability.

Table of Contents

1. Device Overview

1.1 General Ratings

Power Consumption   3W max.

Operation Temperature   -30℃   to   +85℃

Module Size   91mm x 53mm x 18mm

Weight   -

1.2 Connection Diagram

Fig. 1.1

2. Specifications

2.1 Recommended Operating Conditions

Parameters	Symbol	Values			Unit
At T = 25℃, unless otherwise specified.		Min.	Typ.	Max.	
POE Supply Voltage (IEEE 802.3af/at)	V_s	44	48	57	V
Relay Rating	-	250VAC/10A			-
		125VAC/10A			
		24VDC/10A			
		12VDC/10A			

2.2 Default Software Settings

Default Settings

- **IP Setting:**
  IP address: 192.168.1.105
  Subnet Mask: 255.255.255.0
  Gateway: 192.168.1.1
  DHCP: disable
- **HTTP function**
  State: Enable
  Port: 80

- **Latest Firmware Version**
  V100.0-02
  You can download latest firmware for free.

- **TCP function**
  State: Enable
  Port: 5000

3. Easy Start

A Practical step-by-step operation guide for starters

This part is a step-by-step tutorial explaining how to start with BEM11000. We'll not discuss too much details here. The only idea here is to make it work by minimum steps. For more information, please refer to later chapters.

3.1 HTTP Mode

1. Connect BEM11000 with your routers or computer via a standard Ethernet POE cable. (see **fig.1.1 at page 2**)

2. Open any Browser, for example Chrome is used here as demonstration. Please enter URL: http://192.168.1.105/setpara[45]=2. Relay channel 1 will be toggled, and a message will be returned to your browser. Congratulations!

3.2 LAN Mode

1. Connect BEM module with your routers or computer by Ethernet POE cable. (see **fig.1.1 at page 2**)

2. Open any TCP test tool (if you don't have any, or you don't know what a TCP test tool is, you can use **BE-Manager**, it is within our software package). Open it and see the following **Fig.1.2**:
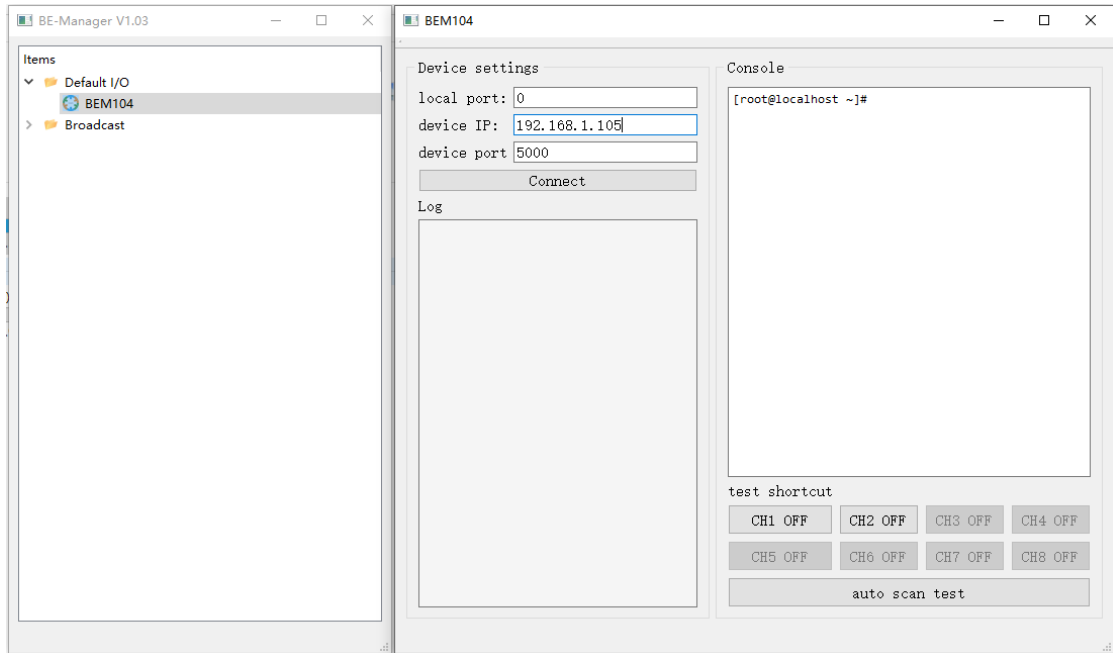

Fig.1.2

3. Click "*Connect*" button, and wait for module connected. Then, it is able control the relay module. Click "*CH1 OFF*" button, and the relay channel 1 will be switched on. See **Fig.1.3**
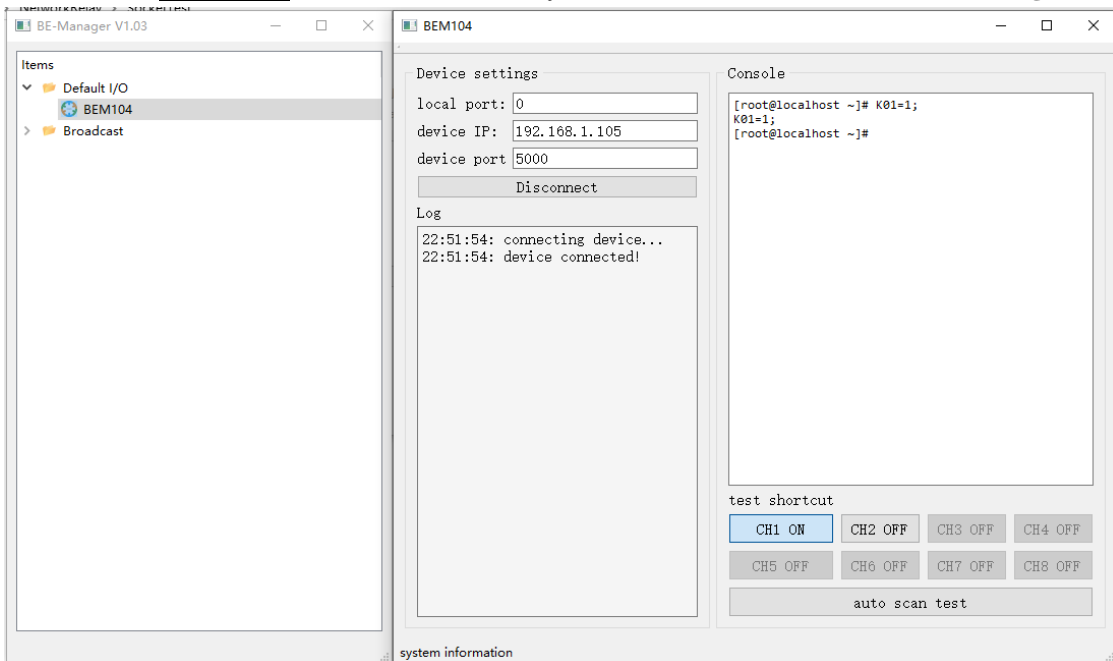

Fig.1.3

4. General Functionality

4.1 Basic Network Communications

The main method of communication to BEM11000 is a standard Ethernet communication. This communication protocol makes use of Network Sockets or HTTP protocol to create point to point tunnels that data can flow through bi-directionally. In this way, the computer that is controlling the relay can send commands and shortly thereafter receive the response through the same Socket/Web Page.

Communications

In most programming languages, all you need to do to open a socket is to import the appropriate plug-in, build the socket object, and connect the socket using the IP Address and Port Number of the target device.

MAC Address

You can find the MAC Address of the module at the simple start manual delivered together with module package. You can also change the MAC address to use your own MAC address.

4.2 Save Parameters

After power cycle, BEM11000 will lose its parameter modifications if you don't actively require it to save modified parameters into internal nonvolatile memory. For examples, IP Address, Gateway address and Net mask.

Assuming module current IP Address is 192.168.1.105 for all the following commands.

Save parameters
To save parameters:
Web access URL:
http://192.168.1.105/setpara[28]=1
Socket command text:
setpara[28]=1;

4.3 Reboot

Send the module a restart signal so it will restart itself. **Some parameters modifications are only effective after a reboot or power cycle.** Parameters modifications will be lost if you don't save them before reboot or power cycle operation.

Assuming module current IP Address is 192.168.1.105 for all the following commands.

Reboot
To reboot device:

Web access URL:

http://192.168.1.105/setpara[61]=1

Socket command text:

setpara[61]=1;

4.3 DHCP Function

BEM11000 supports both DHCP and static IP Addressing. For communication reliability, we recommend using a Static IP Address when you feel comfortable doing so. This will ensure that the device will always be where you expect it to be, when you try to connect to it.

DHCP stands for Dynamic Host Configuration Protocol and basically means that your router will assign the first available IP Address in the list of IP Addresses Range to your device. This technology makes network devices very easy to use, but it is not as reliable because in certain circumstances it will cause the IP Address it assigns to change. DHCP mode is recommended when you only use Internet control, or your local software is able to detect module IP changes.

Assuming module current IP Address is 192.168.1.105 for all the following commands.

Enable/Disable DHCP

Note: modification only effective after parameter saving and module reboot.

To Enable DHCP:

Web access URL:

http://192.168.1.105/setpara[0]=1

Socket command text:

setpara[0]=1;

To Disable DHCP and use static IP:

Web access URL:

http://192.168.1.105/setpara[0]=0

Socket command text:

setpara[0]=0;

4.4 Static IP Address

This technology is the antithesis of DHCP in that it is manually set IP address and does not dynamically change without direct action. The disadvantage of this method is that, if done incorrectly, can make the module unreachable through any standard means. This usually happens when an IP Address is statically set to an IP Address outside of the range of the router, or another device on the network obtains this IP address via DHCP. If this happens, see the section of this guide titled "Reset Function". This method is the preferred and more reliable way to handle network IP Address allocation. For improved reliability, the IP Address assigned to this Module should be reserved on your router.

To work correctly in static IP address mode, you need to set correct IP address, gateway address and subnet mask. The following content describes how to modify each of them.

If module is currently in DHCP mode, to set a new static IP address you need to disable DHCP mode at first. After settings are done, please save parameters and reboot the device to make it effective.

Assuming module current IP Address is 192.168.1.105 for all the following commands.

Set static IP Address
Note: modification only effective after parameter saving and module reboot.
To set static IP Address to 192.168.2.100:
Web access URL:
http://192.168.1.105/setpara[1]=192
http://192.168.1.105/setpara[2]=168
http://192.168.1.105/setpara[3]=2
http://192.168.1.105/setpara[4]=100
Socket command text:
setpara[1]=192;setpara[2]=168;setpara[3]=2;setpara[4]=100;

Set static Gateway Address
Note: modification only effective after parameter saving and module reboot.
To set static Gateway Address to 192.168.2.1:
Web access URL:
http://192.168.1.105/setpara[5]=192
http://192.168.1.105/setpara[6]=168
http://192.168.1.105/setpara[7]=2
http://192.168.1.105/setpara[8]=1
Socket command text:
setpara[5]=192;setpara[6]=168;setpara[7]=2;setpara[8]=1;

Set static Net Mask
Note: modification only effective after parameter saving and module reboot.
To set static net mask to 255.255.255.0
Web access URL:
http://192.168.1.105/setpara[9]=255
http://192.168.1.105/setpara[10]=255
http://192.168.1.105/setpara[11]=255
http://192.168.1.105/setpara[12]=0
Socket command text:
setpara[9]=255;setpara[10]=255;setpara[11]=255;setpara[12]=0;

4.5 Relay outputs control

In the following contents, assuming current IP Address is 192.168.1.105. If you need to

switch different channels please replace parameter index to the value you need. For example, if you want control ch2, you may replace "setpara[45]" with "setpara[46]".

Normal ON/OFF/TOGGLE

Normal on/off/toggle operation changes the relay output status immediately after receiving commands. No timing features included.

Switches
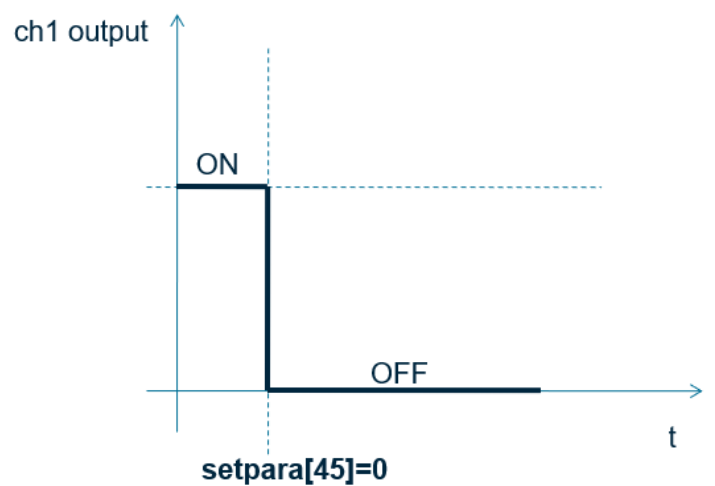
To **switch off** ch1 output:

Web access URL:

http://192.168.1.105/setpara[45]=0

Socket command text:

setpara[45]=0;

To **switch on** ch1 output:

Web access URL:

http://192.168.1.105/setpara[45]=1

Socket command text:

setpara[46]=1;
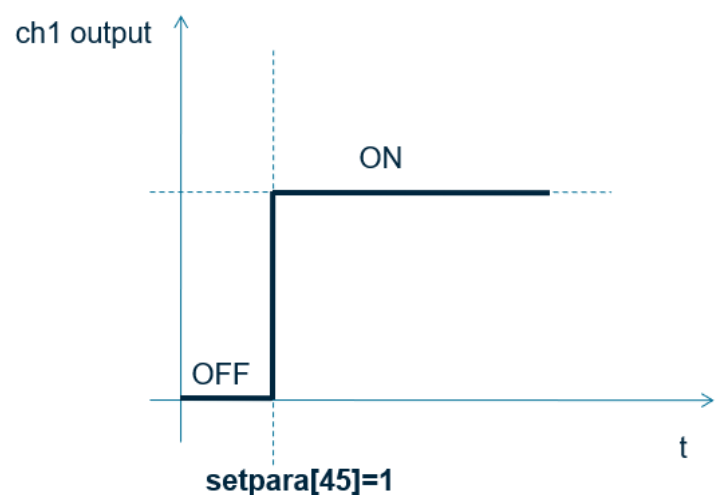
To **toggle** (opposite to previous status) ch1 output:
Web access URL:
http://192.168.1.105/setpara[45]=2
Socket command text:
setpara[45]=2;
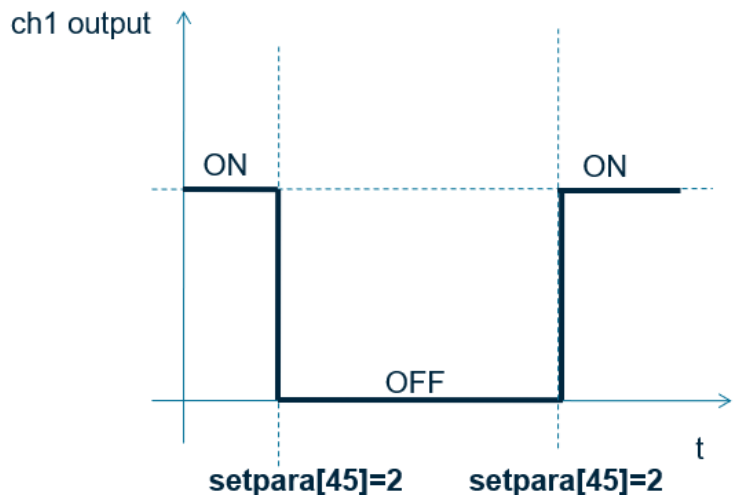
Read Switch Mode

Read current relay output status for feedback control. Module will return the current status in web content or socket text, depending on how do you send the command.

To read relay ch1 current status:
Web access URL:
http://192.168.1.105/getpara[45]=1
Socket command text:
getpara[45]=1;

4.7 Http port setting

In default conditions, HTTP port is always 80 if you enter directly in web browser a URL without any additional parameters. But in some applications different port number is needed for port forwarding or any other reasons. For example, you can force your web browser to access http content at port 8080, to do so you need to enter http://url:8080.

This module is able to customize http access port to realize such functions. In the following contents, assuming current IP Address is 192.168.1.105.

Change Http Port
To change http port to 8080:
Web access URL:

http://192.168.1.105/ webport=8080

Socket command text:

webport=8080;

4.8 Hardware reset button

Hardware reset button is used for situations when you want to reset the device to factory settings. For example, if you set incorrect IP Address and the device is no longer detectable in your network. Two different level of reset are provided in this module. Level-1 only reset parameters, i.e. network settings, time settings and so on, while Level-2 will reset on-chip app, i.e. for firmware updating/reload.

Hardware reset Level-1 (Parameter reset)

To reset parameters, press the hardware reset button in above pictures until green and red LEDs are both on, then release the button. Module will set all parameters to their default values.

Hardware reset Level-2 (Firmware update/reload)

To update firmware, press the hardware reset button in above pictures until green and red LEDs are both on, then continue to press the button for 10 seconds. Module will erase its firmware and try to download latest firmware from Internet. Please connect to internet when you do this operation.

4.9 Identification & customized information

When more than one module is installed in the field, it is necessary to be able to read the identification information from module, for example serial number. Except for several pre-defined parameters in system, additionally a device name which can be set by user is supported.

Read serial number

You can read serial number by reading the sticker on the device, but you can also read device serial number by communication.

To read device serial number:

Web access URL:

http://192.168.1.105/ getpara[19]=1;

Socket command text:

getpara[19]=1;

Customized device name

In some applications, customer may want to set up their own name for better identification of the device. For this purpose, device name can be customized, with a maximum length of 15 letters.

To read device name:

Web access URL:

http://192.168.1.105/ getpara[25]=1;

Socket command text:

getpara[25]=1;

To change device name to "MYDEVICE":

Web access URL:

http://192.168.1.105/ setpara[25]=MYDEVICE

Socket command text:

setpara[25]=MYDEVICE;

Read device type

you can read device type by communication, for the purpose of better identification the device.

To read device type:

Web access URL:

http://192.168.1.105/ getpara[22]=1;

Socket command text:

getpara[22]=1;

Read device firmware version

you can read device firmware version by communication, for the purpose of better identification the device, or diagnosis.

To read device firmware version:

Web access URL:

http://192.168.1.105/ getpara[24]=1;

Socket command text:

getpara[24]=1;

4.10 Easybus Server/Client Mode

EasyBus supports both TCP Server and TCP Client mode, both mode has its application advantage. Additionally, one configurable communication watchdog can be setup to monitor the connection between Ethernet relay module and its server/client.

EasyBus Server Mode

By default, relay modules are setup in **EasyBus Server Mode**. Which means relay module listens to its port 5000(by default) and by actively connecting to module ip / port number you can create a TCP connection between your software and relay module. Unlike http interface, each module supports only one TCP channel at the same time. If you want to connect to the module by another software, the previous TCP connection has to be disconnected at first. If you wish to connect multiple software to relay module at the same time, please reference to HTTP access mode, which allows multiple software connection at the same time.

To read relay module EasyBus mode:

Web access URL:

http://192.168.1.105/ getpara[132]=1;
Socket command text:
getpara[132]=1;
Tips:
Response 0 means: TCP Server Mode
Response 1 means: TCP Client Mode
Response 2 means: UDP mode

To set relay module to TCP Server Mode:
Web access URL:
http://192.168.1.105/ setpara[132]=0;
Socket command text:
setpara[132]=0;

EasyBus Server Local Port Number

This parameters setup the local listening port number at relay module. To read relay module EasyBus Server Local Port Number:
Web access URL:
http://192.168.1.105/ getpara[131]=1;
Socket command text:
getpara[131]=1;

To set relay module EasyBus Server Local Port Number, for example to 5000:
Web access URL:
http://192.168.1.105/ setpara[131]=5000;
Socket command text:
setpara[131]=5000;

EasyBus Client Mode

For applications, it is better to listen at the server and let the relay module be the TCP client and actively connecting to one server (for example, if DHCP mode is activated). Each relay module supports only one TCP connection to server, that means only one server can be connected in the same time.

To set relay module to TCP Client Mode:
Web access URL:
http://192.168.1.105/ setpara[132]=1;
Socket command text:
setpara[132]=1;

EasyBus Client Remote IP address

This parameter setup the remote server IP address for relay module to connect. To read relay module EasyBus Client Remote IP address:
Web access URL:
http://192.168.1.105/ getpara[117]=1& getpara[118]=1& getpara[119]=1& getpara[120]=1;

Socket command text:

getpara[117]=1; getpara[118]=1; getpara[119]=1; getpara[120]=1;

To set relay module EasyBus Client Remote IP address, for example to 192.168.1.100:
Web access URL:

http://192.168.1.105/
setpara[117]=192&setpara[118]=168&setpara[119]=1&setpara[120]=100;
Socket command text:

setpara[117]=192; setpara[118]=168; setpara[119]=1; setpara[120]=100;

EasyBus Client Remote Port Number

This parameter setup the remote server port number for relay module to connect. To read relay module EasyBus Client Remote Port Number:
Web access URL:

http://192.168.1.105/ getpara[130]=1;
Socket command text:

getpara[130]=1;

To set relay module EasyBus Client Remote Port Number, for example to 5000:
Web access URL:

http://192.168.1.105/ setpara[130]=5000;
Socket command text:

setpara[130]=5000;

EasyBus Client DNS Enable

For some applications, the remote server IP address is assigned by DHCP, so to get the actual address of server, DNS host name is used and in this case a properly setup DNS service must be provided to locate at the server. An enable bit is necessary to enable this DNS function, by default this function is disabled. To read relay module EasyBus Client DNS Enable:
Web access URL:

http://192.168.1.105/ getpara[129]=1;
Socket command text:

getpara[129]=1;

To set relay module EasyBus Client DNS Enable to be enabled:
Web access URL:

http://192.168.1.105/ setpara[129]=1;
Socket command text:

setpara[129]=1;

EasyBus Client Remote Host Name

For some applications, the remote server IP address is assigned by DHCP, so to get the actual address of server, DNS host name is used and in this case a properly setup DNS

service must be provided to locate at the server. To read relay module EasyBus Client Remote Host Name:

Web access URL:

http://192.168.1.105/ getpara[128]=1;

Socket command text:

getpara[128]=1;

To set relay module EasyBus Client Remote Host Name, for example to BrickElectric.com:

Web access URL:

http://192.168.1.105/ setpara[128]=BrickElectric.com;

Socket command text:

setpara[128]=BrickElectric.com;

EasyBus Client Watchdog

In most of networks, router will kill a TCP connection if it is unused for some time period, an practical time will be 120 seconds. This behavior saves resource for the entire network but if you really want to keep a long connection between relay module and server, this behavior will create troubles. Another problem is when the connection is accidently broken, or the server is unreachable or rebooted at certain moment, the TCP connection will be lost. You can actively access http interface to reboot the relay module, so it will try to connect to server again, but you can also use the additional watchdog provided by relay module, so it will automatically reconnect to the server when no response is received after some time. The length of this waiting time is also configurable.

If this watchdog is enabled, it is important that your server continuously send message to the module, otherwise it will automatically disconnect and reconnect again.

To read relay module EasyBus Client Watchdog:

Web access URL:

http://192.168.1.105/ getpara[127]=1;

Socket command text:

getpara[127]=1;

To set relay module EasyBus Client Watchdog to enable:

Web access URL:

http://192.168.1.105/ setpara[127]=1;

Socket command text:

setpara[127]=1;

Tips:

The higher the value of this parameters, the longer the server un-response time will be allowed. In good network environment this is recommended so it will save the traffic in total. For example, setpara[127] = 2, or setpara[127] = 3, 4 … 9999.

5. Auto ping and reboot mode

Auto ping is an automatic system for rebooting IP equipment without human intervention. Auto ping works by running a pre-set commands sequence when a device becomes unresponsive to IP pings. You can input customized pre-set commands sequence to realize flexible action according to your requirement, like power cycling or specific timing functions.

BEM11000 has a **2 independent auto ping channels watchdog** which can monitor 2 external servers/controllers on network at the same time. Auto ping monitor channels are completely independent from relay channels, you can map either one or both relay channel to each auto ping channel freely.

To use auto ping function, you need to follow these steps:
(1). Assign auto ping mode select, default is fixed IP mode.
(2). Configure Fixed IP or Domain Name, default is your gateway IP.
(3). Configure programmable reboot sequence, default is no action.
(4). Set time between pings, default is 5 seconds.
(5). Set max ping failures before reboot, default is 3 failures.
(6). Set delay time after reboot actions, default is 20 seconds.
(7). Start auto ping function, default is not start.

(1). Auto ping mode select
Two modes are available for auto ping function:
> **1.Fixed IP Mode(mode 0).**
> In Fixed IP Mode you can set fixed IP address for auto ping.

> **2.Name Server Mode(mode 1).**
> In Name Server Mode you can set a domain name for auto ping, and auto ping function will get actual IP address from your DNS server.

Change mode to Fixed IP Mode(mode 0) for auto ping:
Auto Ping Channel 1:
Web access URL:
http://192.168.1.105/setpara[149]=0
Socket command text:
setpara[149]=0;
Auto Ping Channel 2:
Web access URL:
http://192.168.1.105/setpara[150]=0
Socket command text:
setpara[150]=0;

Change mode to Name Server Mode(mode 1) for auto ping:
Auto Ping Channel 1:
Web access URL:
http://192.168.1.105/setpara[149]=1
Socket command text:
setpara[149]=1;
Auto Ping Channel 2:
Web access URL:
http://192.168.1.105/setpara[150]=1
Socket command text:
setpara[150]=1;

(2.a) Configure auto ping monitor target IP

If Fixed IP Mode is selected, auto ping target IP(external device's IP) address should be assigned manually before start auto ping.

Change monitor target IP address to 192.168.1.100.
Auto Ping Channel 1:
Web access URL:
Write:
http://192.168.1.105/setpara[101]=192&setpara[102]=168&setpara[103]=1&setpara[104]=100
Read:
http://192.168.1.105/getpara[101]=192&getpara[102]=168&getpara[103]=1&getpara[104]=100
Socket command text:
Write: setpara[101]=192;setpara[102]=168;setpara[103]=1;setpara[104]=100;
Read: getpara[101]=192;getpara[102]=168;getpara[103]=1;getpara[104]=100;
Auto Ping Channel 2:
Web access URL:
Write:
http://192.168.1.105/setpara[105]=192&setpara[106]=168&setpara[107]=1&setpara[108]=100
Read:
http://192.168.1.105/getpara[105]=192&getpara[106]=168&getpara[107]=1&getpara[108]=100
Socket command text:
Write: setpara[105]=192;setpara[106]=168;setpara[107]=1;setpara[108]=100;
Read: getpara[105]=192;getpara[106]=168;getpara[107]=1;getpara[108]=100;

(2.b) Configure auto ping monitor target domain name

If Name Server Mode is selected, auto ping monitor target IP will be assigned by your DNS server. The target domain name should be set manually before start auto ping.

Change domain name to "www.example.com"

Auto Ping Channel 1:

Web access URL:

Write: http://192.168.1.105/setpara[133]=www.example.com

Read: http://192.168.1.105/getpara[133]=any.input.here

Socket command text:

Write: setpara[133]= www.example.com;

Read: getpara[133]= any.input.here;

Auto Ping Channel 2:

Web access URL:

Write: http://192.168.1.105/setpara[134]=www.example.com

Read: http://192.168.1.105/getpara[134]=any.input.here

Socket command text:

Write: setpara[134]= www.example.com;

Read: getpara[134]= any.input.here;

(3) Configure auto ping programmable reboot sequence

In case of remote IP device becomes unresponsive, auto ping function will run a pre-set reboot sequence to make a customized reboot action according to your application.

For this function, the following commands are supported to generate a reboot sequence:

1. Programmable mark, for example:

　　Start program input : program = 1;

　　Stop program input : program = 0;

2. All switch relay output commands, for example:

　　Switch on relay channel 1 : k01 = 1;

　　Switch off relay channel 1 : k01 = 0;

　　Toggle relay channel 2 : k02 = 2;

　　And so on...

3. Timing commands, waitms and wait, for example

　　Wait 10 seconds : wait = 10;

　　Wait 500 milliseconds : waitms = 500;

For example, in my application I need auto ping to power off the device, and then wait for 5 seconds, and then power it on again. I'm using k01 to supply power to my device, so my reboot sequence is: k01=0;wait=5;k01=1; and plus the programmable mark(if you don't insert programmable mark, your sequence will be running immediately rather than saving into preset program and wait to be triggered)

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Auto Ping Channel 1:

Web access URL:

Write: http://192.168.1.105/program=1&k01=1&wait=5&k01=0&program=0

Read: http://192.168.1.105/getpara[141]=1

Socket command text:

Write: program=1;k01=1;wait=5;k01=0;program=0;

Read: getpara[141]=1;

Auto Ping Channel 2:

Web access URL:

Write: http://192.168.1.105/program=2&k01=1&wait=5&k01=0&program=0

Read: http://192.168.1.105/getpara[142]=1

Socket command text:

Write: program=2;k01=1;wait=5;k01=0;program=0;

Read: getpara[142]=1;

(4) Set time between pings

This is the time between each "ping" check of the IP address. Auto ping function waits this amount of time for a valid ICMP response and then send next ICMP message. Available options are from 1 millisecond to 65535 seconds. Normally 60 seconds should be useful for most applications.

To setup time you need to set 2 parameters, time unit and time.

Auto Ping Channel 1:

1. To set time unit to millisecond : setpara[45]=0;

2. To set time unit to second : setpara[45]=1;

3. To set time value to 60: setpara[81]=60;

I want to setup time between pings to 60 seconds, for example:

Web access URL:

Write: http://192.168.1.105/setpara[45]=1&setpara[81]=60

Read: http://192.168.1.105/getpara[45]=1&getpara[81]=1

Socket command text:

Write: setpara[45]=1;setpara[81]=60;

Read: getpara[45]=1;getpara[81]=1;

Auto Ping Channel 2:

1. To set time unit to millisecond : setpara[46]=0;

2. To set time unit to second : setpara[46]=1;

3. To set time value to 60: setpara[82]=60;

I want to setup time between pings to 60 seconds, for example:

Web access URL:

Write: http://192.168.1.105/setpara[46]=1&setpara[82]=60

Read: http://192.168.1.105/getpara[46]=1&getpara[82]=1

Socket command text:

Write: setpara[46]=1;setpara[82]=60;
Read: getpara[46]=1;getpara[82]=1;

(5) Ping failures before reboot

This function sets the number of failed communications attempts that must be sequentially detected before a system is rebooted. For example, when set to 5, the target system must fail to respond 5 times in a row before it is rebooted. Since occasional network overloads and missed packets can occur during normal network operation, a number between 5 and 10 pings is recommended.

To change to ping failures to 5, for example:

Auto Ping Channel 1:

Web access URL:

Write: http://192.168.1.105/setpara[157]=5
Read: http://192.168.1.105/getpara[157]=1

Socket command text:

Write: setpara[157]= 5;
Read: getpara[157]=1;

Auto Ping Channel 2:

Web access URL:

Write: http://192.168.1.105/setpara[158]=5
Read: http://192.168.1.105/getpara[158]=1

Socket command text:

Write: setpara[158]= 5;
Read: getpara[158]=1;

(6) Delay time after reboot

After auto ping detected an external controller unresponsive failure and running a reboot sequence, it is naturally necessary that the external controller need some time for reboot itself and finish some I/O commands. This time is decided by external controllers and could be longer than some minutes(for example if you have an server with operating system). To preventing auto ping reboot the controller again during this time, after reboot delay time can be set to wait for external controlling finish its start.

To setup time you need to set 2 parameters, time unit and time.

Auto Ping Channel 1:

1. To set time unit to millisecond: setpara[173]=0;
2. To set time unit to second: setpara[173]=1;
3. To set time value to 60: setpara[165]=60;

I want to setup after reboot delay time to 300 seconds, for example:

Web access URL:

Write: http://192.168.1.105/setpara[173]=1&setpara[165]=300
Read: http://192.168.1.105/getpara[173]=1&getpara[165]=1

Socket command text:

Write: setpara[173]=1;setpara[165]=60;

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Read: getpara[173]=1;getpara[165]=1;

Auto Ping Channel 2:

1. To set time unit to millisecond: setpara[174]=0;

2. To set time unit to second: setpara[174]=1;

3. To set time value to 60: setpara[166]=60;

I want to setup after reboot delay time to 300 seconds, for example:

Web access URL:

Write: http://192.168.1.105/setpara[174]=1&setpara[166]=300

Read: http://192.168.1.105/getpara[174]=1&getpara[166]=1

Socket command text:

Write: setpara[174]=1;setpara[166]=300;

Read: getpara[174]=1;getpara[166]=1;

(7) Start auto ping function

To start auto ping function, please make sure your every other setting is finished so it can work correctly. If you save settings after auto ping start, when power on the device, auto ping will automatically start again with the parameters of last time.

Auto Ping Channel 1:

To start auto ping:

Web access URL:

Write: http://192.168.1.105/setpara[181]=1

Socket command text:

Write: setpara[181]=1;

To stop auto ping:

Web access URL:

Write: http://192.168.1.105/setpara[181]=0

Socket command text:

Write: setpara[181]=0;

Auto Ping Channel 2:

To start auto ping:

Web access URL:

Write: http://192.168.1.105/setpara[182]=1

Socket command text:

Write: setpara[182]=1;

To stop auto ping:

Web access URL:

Write: http://192.168.1.105/setpara[182]=0

Socket command text:

Write: setpara[182]=0;

6. X-Connect

With X-Connect functionality, multiple BEM Series modules can be logically connected to each other without using a central controller (for example, a PC or a server). You can directly map any input channel of BEM Series I/O module to another output channel BEM Series I/O module.

For example, if you have one BEM108 which have 8 inputs and four BEM11000 which each have 2 outputs and in total 8 outputs. In such a case you can map each input of BEM108 to the eight outputs of 4 BEM11000 without central controller. Also, if you have 8 BEM107 which each have one input and in total 8 inputs, you can also map each of the input bit to one or more output modules. This mapping is totally free, you can map the same one input channel to 1 ~ 10 output channels at one output module or multiple output module.

When one input is mapped to one or more outputs, then if this input is triggered, all the outputs that it mapped will also be triggered immediately.

6.1 X-Connect Map Setting

Each BEM Series module can support at max 10 I/O mapping. Each I/O mapping is independent with each other. Each I/O mapping channel need to setup:
(1) Which input channel you want to map;
(2) Which module you want to map, that means IP address of the target module;
(3) Which output channel of target module you want to map;

For example, to setup BEM108 (IP: 192.168.1.105) input channel 1 to BEM11000(IP: 192.168.1.106) output channel 1, all setting needed to be done at BEM108:
(1) Select input channel one in BEM108 by:
   Web access URL:
   http://192.168.1.105/ setpara[102]=1;
   Or Socket command text:
   setpara[102]=1;

(2) Select the module you want to map at 192.168.1.106 by:
   Web access URL:
   http://192.168.1.105/ setpara[133]=192;
   Or Socket command text:
   setpara[133]=192;

   Web access URL:
   http://192.168.1.105/ setpara[134]=168;
   Or Socket command text:

setpara[134]=168;

Web access URL:
http://192.168.1.105/ setpara[135]=1;
Or Socket command text:
setpara[135]=1;

Web access URL:
http://192.168.1.105/ setpara[136]=106;
Or Socket command text:
setpara[136]=106;

(3) Select output channel one of target BEM11000 by:
Web access URL:
http://192.168.1.105/ setpara[173]=1;
Or Socket command text:
setpara[173]=1;

6.2 X-Connect Map Parameter List

All eight X-Connect channels can be setup by the following parameter list:

Parameter Nr.	X-Connect Channel	Para Name	Description	Range
102	1	VWSL1	X-Connect CH1 input select	1 ~ 8
103	2	VWSL2	X-Connect CH2 input select	1 ~ 8
104	3	VWSL3	X-Connect CH3 input select	1 ~ 8
105	4	VWSL4	X-Connect CH4 input select	1 ~ 8
106	5	VWSL5	X-Connect CH5 input select	1 ~ 8
107	6	VWSL6	X-Connect CH6 input select	1 ~ 8
108	7	VWSL7	X-Connect CH7 input select	1 ~ 8
109	8	VWSL8	X-Connect CH8 input select	1 ~ 8
110	9	VWSL9	X-Connect CH9 input select	1 ~ 8
111	10	VWSL10	X-Connect CH10 input select	1 ~ 8
133	1	VWSIP11	X-Connect CH1 target IP 1	0 ~ 255
134	1	VWSIP12	X-Connect CH1 target IP 2	0 ~ 255
135	1	VWSIP13	X-Connect CH1 target IP 3	0 ~ 255
136	1	VWSIP14	X-Connect CH1 target IP 4	0 ~ 255
137	2	VWSIP21	X-Connect CH2 target IP 1	0 ~ 255
138	2	VWSIP22	X-Connect CH2 target IP 2	0 ~ 255
139	2	VWSIP23	X-Connect CH2 target IP 3	0 ~ 255
140	2	VWSIP24	X-Connect CH2 target IP 4	0 ~ 255
141	3	VWSIP31	X-Connect CH3 target IP 1	0 ~ 255
142	3	VWSIP32	X-Connect CH3 target IP 2	0 ~ 255

143	3	VWSIP33	X-Connect CH3 target IP 3	0 ~ 255
144	3	VWSIP34	X-Connect CH3 target IP 4	0 ~ 255
145	4	VWSIP41	X-Connect CH4 target IP 1	0 ~ 255
146	4	VWSIP42	X-Connect CH4 target IP 2	0 ~ 255
147	4	VWSIP43	X-Connect CH4 target IP 3	0 ~ 255
148	4	VWSIP44	X-Connect CH4 target IP 4	0 ~ 255
149	5	VWSIP51	X-Connect CH5 target IP 1	0 ~ 255
150	5	VWSIP52	X-Connect CH5 target IP 2	0 ~ 255
151	5	VWSIP53	X-Connect CH5 target IP 3	0 ~ 255
152	5	VWSIP54	X-Connect CH5 target IP 4	0 ~ 255
153	6	VWSIP61	X-Connect CH6 target IP 1	0 ~ 255
154	6	VWSIP62	X-Connect CH6 target IP 2	0 ~ 255
155	6	VWSIP63	X-Connect CH6 target IP 3	0 ~ 255
156	6	VWSIP64	X-Connect CH6 target IP 4	0 ~ 255
157	7	VWSIP71	X-Connect CH7 target IP 1	0 ~ 255
158	7	VWSIP72	X-Connect CH7 target IP 2	0 ~ 255
159	7	VWSIP73	X-Connect CH7 target IP 3	0 ~ 255
160	7	VWSIP74	X-Connect CH7 target IP 4	0 ~ 255
161	8	VWSIP81	X-Connect CH8 target IP 1	0 ~ 255
162	8	VWSIP82	X-Connect CH8 target IP 2	0 ~ 255
163	8	VWSIP83	X-Connect CH8 target IP 3	0 ~ 255
164	8	VWSIP84	X-Connect CH8 target IP 4	0 ~ 255
165	9	VWSIP91	X-Connect CH9 target IP 1	0 ~ 255
166	9	VWSIP92	X-Connect CH9 target IP 2	0 ~ 255
167	9	VWSIP93	X-Connect CH9 target IP 3	0 ~ 255
168	9	VWSIP94	X-Connect CH9 target IP 4	0 ~ 255
169	10	VWSIP101	X-Connect CH10 target IP 1	0 ~ 255
170	10	VWSIP102	X-Connect CH10 target IP 2	0 ~ 255
171	10	VWSIP103	X-Connect CH10 target IP 3	0 ~ 255
172	10	VWSIP104	X-Connect CH10 target IP 4	0 ~ 255
173	1	VWSR1	X-Connect CH1 output select	1 ~ 8
174	2	VWSR2	X-Connect CH2 output select	1 ~ 8
175	3	VWSR3	X-Connect CH3 output select	1 ~ 8
176	4	VWSR4	X-Connect CH4 output select	1 ~ 8
177	5	VWSR5	X-Connect CH5 output select	1 ~ 8
178	6	VWSR6	X-Connect CH6 output select	1 ~ 8
179	7	VWSR7	X-Connect CH7 output select	1 ~ 8
180	8	VWSR8	X-Connect CH8 output select	1 ~ 8
181	9	VWSR9	X-Connect CH9 output select	1 ~ 8
182	10	VWSR10	X-Connect CH10 output select	1 ~ 8

7. Modbus-TCP

Modbus-TCP is supported by relay module. Standard Modbus-TCP is implemented at port number 502. The Modbus-TCP address table is as following:

Address	Ch	Function Code	Description	Access
00000	1	05	Relay 1 output control	Write/Read
00001	2	05	Relay 2 output control	Write/Read

To look into Modbus-TCP frame structure or create your own Modbus-TCP program, here are the detailed message frame for each command:

To switch on relay channel 1 output
Ethernet frame: 0x05 0x00 0x00 0xFF 0x00

To switch off relay channel 1 output
Ethernet frame: 0x05 0x00 0x00 0x00 0x00

To switch on relay channel 2 output
Ethernet frame: 0x05 0x00 0x01 0xFF 0x00

To switch off relay channel 2 output
Ethernet frame: 0x05 0x00 0x01 0x00 0x00

8. SNMP

Simple Network Management Protocol (SNMP) is a part of the Internet Protocol Suite. SNMP is used in network management systems to monitor status of devices and also spot problems. It consists of a set of standards for network management, including an Application Layer protocol, a database schema, and a set of data objects.

BEM11000 supports SNMP V1 / V2C.

Most parameters are mapped under OID .1.3.6.1.4.1.55333.1.1. For example, relay control parameters 45 ~ 52, are mapped from .1.3.6.1.4.1.55333.1.1.45 to .1.3.6.1.4.1.55333.1.1.52.

8.1 SNMP commands example

SNMP walk command (view all SNMP entry)
snmpwalk -v 1 -c public 192.168.1.105 .1.3.6

SNMP get command (read a SNMP entry), for example to read relay channel 1.
snmpget -v 1 -c public 192.168.1.105 .1.3.6.1.4.1.55333.1.1.45

SNMP get command (read a SNMP entry), for example to read relay channel 2.
snmpget -v 1 -c public 192.168.1.105 .1.3.6.1.4.1.55333.1.1.46

SNMP set command (write a SNMP entry), for example to set relay channel 1.
snmpset -v 1 -c public 192.168.1.105 .1.3.6.1.4.1.55333.1.1.45 i 1

SNMP set command (write a SNMP entry), for example to set relay channel 2.
snmpset -v 1 -c public 192.168.1.105 .1.3.6.1.4.1.55333.1.1.46 i 1

SNMP set command (write a SNMP entry), for example to reset relay channel 1.
snmpset -v 1 -c public 192.168.1.105 .1.3.6.1.4.1.55333.1.1.45 i 0

SNMP set command (write a SNMP entry), for example to reset relay channel 2.
snmpset -v 1 -c public 192.168.1.105 .1.3.6.1.4.1.55333.1.1.46 i 0

9. Program Reference

9.1 Easybus Specifications

EasyBus use more friendly language to control the relay module. With "easy to understand" grammar and similarity to OS command lines, it's extremely easy to work with it. Read the following materials and you will be ready to go with every detail in 10 minutes.

Not like any other field bus, you don't need to be an expert of automation or learn programming to use it. This saves time for many people who wants to focus on more creative works, and they can start to create application with BEM105 immediately, rather than spend lots of time on learning the old-fashioned and very detailed industry automation communication protocol before they can really start to do anything.

How to send a correct switch command?
Example – set parameter 45, to value 1:
setpara[45] = 1;
Example – read parameter 45 (value will be returned in response):
getpara[45] = 1;

Parameter list

In BEM11000, there are many parameters for controlling the behavior of module. The following table is the general description of all parameters available and their functionality:

No.	Name	Functionality
000	DHCP	DHCP enable default value: 0 range: 0 – 1
001	SIP1	IP address 1 default value: 192 range: 0 – 255
002	SIP2	IP address 2 default value: 168 range: 0 – 255
003	SIP3	IP address 3 default value: 1 range: 0 – 255
004	SIP4	IP address 4 default value: 105 range: 0 – 255
005	GIP1	gate way address 1 default value: 192

		range: 0 – 255
006	GIP2	gate way address 2 default value: 168 range: 0 – 255
007	GIP3	gate way address 3 default value: 1 range: 0 – 255
008	GIP4	gate way address 4 default value: 1 range: 0 – 255
009	SNMK1	subnet mask 1 default value: 255 range: 0 – 255
010	SNMK2	subnet mask 2 default value: 255 range: 0 – 255
011	SNMK3	subnet mask 3 default value: 255 range: 0 – 255
012	SNMK4	subnet mask 4 default value: 0 range: 0 – 255
013	MAC1	MAC address 1 default value: XX (unique by every device) range: 0 – 255
014	MAC2	MAC address 2 default value: XX (unique by every device) range: 0 – 255
015	MAC3	MAC address 3 default value: XX (unique by every device) range: 0 – 255
016	MAC4	MAC address 4 default value: XX (unique by every device) range: 0 – 255
017	MAC5	MAC address 5 default value: XX (unique by every device) range: 0 – 255
018	MAC6	MAC address 6 default value: XX (unique by every device) range: 0 – 255
019	SN	serial number default value: XXXXXXX (unique by every device) range: -
020	-	reserved parameter

		default value: -
		range: -
021	DVID	device type id
		default value: 11000
		range: -
022	DVNAME	device name
		default value: BEM11000
		range: -
023	VENDOR	device vendor
		default value: BrickElectric.com
		range: max 48 chars
024	SWVER	firmware version
		default value: V1.00-02
		range: -
025	CNAME	device name alias
		default value: MYDEVICE
		range: max 48 chars
026	TIMEOP	total operation time in seconds
		default value: -
		range: -
027	TSYSON	operation time in seconds after power on, reset to 0 after each reboot
		default value: -
		range: -
028	SAVE	save parameter settings, set it to 1 for save parameter changes
		default value: 0
		range: 0 – 1
029	-	reserved parameter
		default value: -
		range: -
030	-	reserved parameter
		default value: -
		range: -
031	-	reserved parameter
		default value: -
		range: -
032	-	reserved parameter
		default value: -
		range: -
033	-	reserved parameter
		default value: -
		range: -
034	-	reserved parameter
		default value: -
		range: -

035	-	reserved parameter
		default value: -
		range: -
036	-	reserved parameter
		default value: -
		range: -
037	-	reserved parameter
		default value: -
		range: -
038	-	reserved parameter
		default value: -
		range: -
039	-	reserved parameter
		default value: -
		range: -
040	-	reserved parameter
		default value: -
		range: -
041	-	reserved parameter
		default value: -
		range: -
042	-	reserved parameter
		default value: -
		range: -
043	-	reserved parameter
		default value: -
		range: -
044	-	reserved parameter
		default value: -
		range: -
045	IOVAL01	I/O value channel 1, 0 = off, 1 = on
		default value: -
		range: -
046	IOVAL02	I/O value channel 2, 0 = off, 1 = on
		default value: -
		range: -
047	IOVAL03	I/O value channel 3, 0 = off, 1 = on
		default value: -
		range: -
048	IOVAL04	I/O value channel 4, 0 = off, 1 = on
		default value: -
		range: -
049	IOVAL05	I/O value channel 5, 0 = off, 1 = on
		default value: -

		range: -
050	IOVAL06	I/O value channel 6, 0 = off, 1 = on default value: - range: -
051	IOVAL07	I/O value channel 7, 0 = off, 1 = on default value: - range: -
052	IOVAL08	I/O value channel 8, 0 = off, 1 = on default value: - range: -
053	IOVAL09	I/O value channel 9, 0 = off, 1 = on default value: - range: -
054	IOVAL10	I/O value channel 10, 0 = off, 1 = on default value: - range: -
055	IOVAL11	I/O value channel 11, 0 = off, 1 = on default value: - range: -
056	IOVAL12	I/O value channel 12, 0 = off, 1 = on default value: - range: -
057	IOVAL13	I/O value channel 13, 0 = off, 1 = on default value: - range: -
058	IOVAL14	I/O value channel 14, 0 = off, 1 = on default value: - range: -
059	IOVAL15	I/O value channel 15, 0 = off, 1 = on default value: - range: -
060	IOVAL16	I/O value channel 16, 0 = off, 1 = on default value: - range: -
061	RST	reboot device, 1 = start reboot default value: 0 range 0 – 1

10. Support & Contact us

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