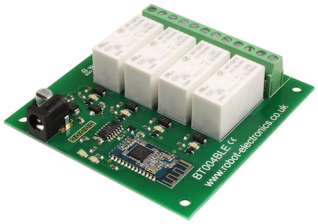
BT004BLE - 4 relay outputs at 16A

Technical Documentation



Overview

The BT004BLE provides four volt free contact relay outputs with a current rating of up to 16Amp each controlled over a HM10 Bluetooth serial port. The module is powered from a 12vdc supply which can be regulated or unregulated. The DC input jack is 2.1mm with positive core polarity, DC supplies are required to supply at least 500mA at 12vdc. The relays are SPCO (Single Pole Change Over) types. The normally open, normally closed and common pins are all available on the screw terminals.

LED Indication

The BT004BLE provides a red LED mounted immediately next to each relay to indicate whether it is in a powered state (LED on), there are also two LED's near the power connector, one indicates power and the other will flash when the board is waiting for a connection and remain lit when a connection is present.

Module name and password

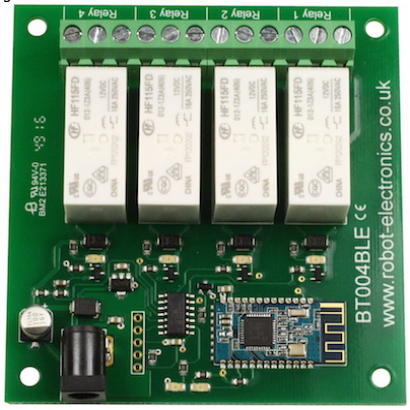
By default the module name will be "BT004BLE" and the password will be "password" These can be changed by using our android or IOS applications "IO BluetoothLE" which can be downloaded from Google play or iTunes. If you forget the password there is a factory reset that will change both the name and password back to the default setting.

Factory Reset

If you forget your password and are unable to control the device, then you can perform a factory reset to change the modules name and password back to the default of "BT004BLE" and "password". To do this first power the module down completely. Next connect together the top 2 contacts (nearest the relays) of the 5 holes next to the dc power connector and apply power. Keep these pins shorted until the red power LED starts blinking. Once the power LED stays on constantly the module is ready to use at its default settings.

Connections

16A VFC (Volt Free Contacts)
NC = normally connected, C = common, NO = normally open

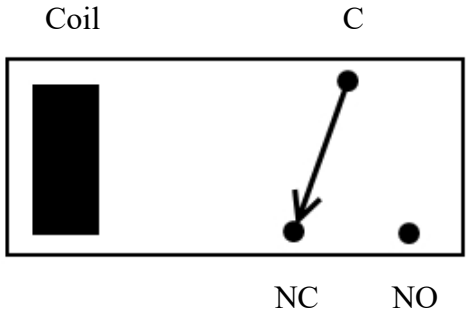


12v dc 2.1mm jack
(+ve core)

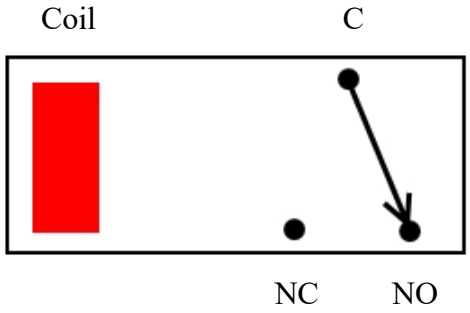
Power relays

Four 16A volt free contact relays are provided for switching a common input between a normally closed output and a normally open output. The relay coil is powered by the 12vdc incoming supply on user command.

Relay in passive state



Relay in powered state

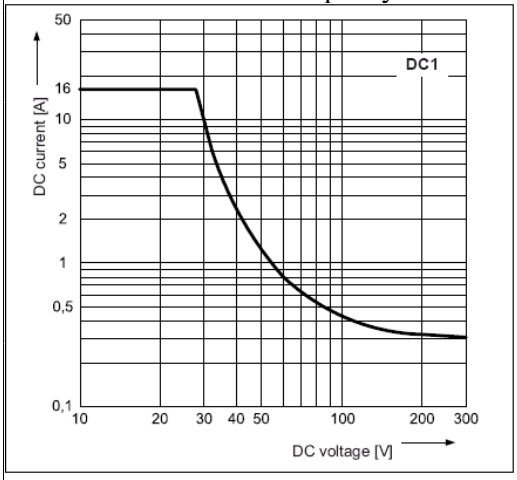


Relay Power Rating

If the contact load voltage and current of the relay are in the region enclosed by the solid and dotted lines in the figure below, the relay can perform stable switching operation. If the relay is used at a voltage or current exceeding this region, the life of the contacts may be significantly shortened.

Load type	Typical Applications	Rating
AC1	1 Non inductive or slightly inductive loads	16A @ 250V AC
AC15	Control of electromagnetic load (>72VA)	3A @ 120V AC 1.5A @ 240V AC
AC3	Control of motor	750W
DC1	Non inductive or slightly inductive loads	16A @ 24V DC
DC13	Control of electromagnetic loads	0.22A @ 120V DC 0.1A @ 250V DC

Max DC load Capacity



A full datasheet for the relays used on the BT004BLE is here: HF115FD datasheet

Binary command set

Commands are sent to the BT004BLE using its HM10 Bluetooth serial port.

Command		Description
Dec	Hex	
16	10	Get Module Info, returns 3 bytes. Module ID (27 for BT004BLE), Hardware version, Firmware version.
32	20	Digital active - follow with 1-4 to set relay on, then a time for pulsed output from 1-255 (100ms resolution) or 0 for permanent Board will return 0 for success, 1 for failure
33	21	Digital inactive - follow with 1-4 to turn relay off, then a time for pulsed output from 1-255 (100ms resolution) or 0 for permanent Board will return 0 for success, 1 for failure
35	23	Digital set outputs - the next single byte will set all relays states, All on = 255 (xxxxxx11) All off = 0 Board will return 0 for success, 1 for failure
36	24	Digital get outputs - sends a single byte back to the controller, bit high meaning the corresponding relay is powered
120	78	Get Volts - returns module supply voltage as byte, 125 being 12.5V DC
121	79	Password entry - Board will return 0 for success, 1 for failure

Digital Active/Inactive
This is a 3 byte command:
The first byte is the command, 32 (active means on) or 33 (inactive).
Second byte is the relay number (1-2).
Third byte is the on time. Set this to zero for un-timed operation, or 1-255 for a pulse in 100mS intervals (100mS to 25.5 seconds).
For example:
0x20 - turn the relay on command
0x02 - relay 2
0x32 (50) - 5 seconds (50 * 100ms)
Board will return 0 for success, 1 for failure.

Password Entry
Before you can control the BT004BLEBLE you must send the module a password. To do this send the Password entry command (0x79) followed by the password ending with a carriage return byte (0x0D).
For example to send the password 'password' you would send:
0x79 – Password entry Command
0x70 – 'p'
0x61 – 'a'
0x73 – 's'
0x73 – 's'
0x77 – 'w'
0x6F – 'o'
0x72 – 'r'
0x64 – 'd'
0x0D - '\r' Carriage return

ASCII Command Set

All ASCII Commands begin with a colon (":") with any data needed separated by commas (",") and end with a carriage return ("\r").

Command	Description
Enter Password (PWD)	":PWD,password\r" Send the password to the BT004BLE, the password must be sent before you can control the board. Returns "OK\r" for success and "NAK\r"
Get Module Info (GMI)	":GMI\r" returns a string with the module ID, software version and hardware version separated by commas and ending with a carriage return e.g. "27,1,1\r"
Digital Output Active (DOA)	":DOA,3,0\r" Make digital output 3 active, returns "OK\r" for success and "NAK\r" for failure ":DOA,1,5\r" Make digital output 1 active for 500mS, returns "OK\r" for success and "NAK" for failure
Digital Output Inactive (DOI)	":DOI,2,0\r" Make digital output 2 inactive, returns "OK\r" for success and "NAK\r" for failure ":DOI,4,10\r" Make output 4 inactive for 1 second, returns "OK\r" for success and "NAK\r" for failure
Get Digital Output (GDO)	":GDO,1\r" Gets the state of output 1, returns "ACTIVE\r" or "INACTIVE\r"
Get Supply Voltage (GSV)	":GSV\r" returns module supply voltage as string ending with a carriage return, 125 being 12.5V DC e.g. "125\r"

Android and IOS Apps

We provide an Android app "IOBluetoothLE" for controlling the BT004BLE which can be downloaded from the Google play store. It allows you to name the digital outputs and set the pulse times for each of them. Using this app you can also update the modules name, password and set a name and pulse time for each relay.