

# Project Raspberry Pi with BD-4000-U and ECHO protocol

## Test it with Windows PC

Requirements:

- MDB interface BD-4000-U setup with APP #4 ECHO protocol.
- Interface cable BD-4100.
- A real Vending Machine controller.
- PC application software ECHOCTRL.EXE

This will allow you to test the configuration by a Windows PC. Choose the correct COM port in ECHOCTRL.EXE. The COM port can be found with the device manager of Windows.

The ECHOCTRL.EXE is available here:

[http://www.bonusdata.net/mdb\\_interface/downloads/EchoCtrl.zip](http://www.bonusdata.net/mdb_interface/downloads/EchoCtrl.zip)  
[http://www.bonusdata.net/mdb\\_interface/downloads/Manual%20of%20the%20applications%2012.pdf](http://www.bonusdata.net/mdb_interface/downloads/Manual%20of%20the%20applications%2012.pdf)

The technical manual of the BD-4000-U is available here:

[http://www.bonusdata.net/mdb\\_interface/downloads/Technical%20Manual%20for%20the%20MDB%20Interfaces%201\\_06.pdf](http://www.bonusdata.net/mdb_interface/downloads/Technical%20Manual%20for%20the%20MDB%20Interfaces%201_06.pdf)

## Test it with a Raspberry Pi

Requirements to emulate a cashless card reader:

- MDB interface BD-4000-U setup with APP #4 ECHO protocol.
- Interface cable BD-4100.
- A real Vending Machine controller.
- Raspberry Pi 3 Model B

Requirements to emulate a VMC:

- MDB interface BD-4000-U setup with APP #4 ECHO protocol.
- Interface cable BD-4101.
- A real cashless card reader.
- Raspberry Pi 3 Model B

This will allow you to emulate a cashless reader with a real vending machine controller (VMC) or a VMC with a real cashless card reader. Coin Acceptor and Bill Validator are not part of the APP #4 with ECHO protocol.

The manual for the ECHO protocol is here:

[http://www.bonusdata.net/mdb\\_interface/downloads/Manual%20of%20the%20applications%2012.pdf](http://www.bonusdata.net/mdb_interface/downloads/Manual%20of%20the%20applications%2012.pdf)

## Configuration of the Raspberry Pi

We used the following setup of the Raspberry Pi for testing the ECHO protocol.

- Raspberry Pi 3 Model B
- Image 2017-01-11-raspbian-jessie
- C/C++ Compiler: Geany part of this Image

- Debugger: `sudo apt-get install geany-plugin-debugger`

The Jessie image is placed on a 16 GB micro SD card.

The ECHO protocol project is located in folder: `ls -l /home/pi/Projekte/ECHO`

Following files are implemented by BonusData AG:

- `ascii.h`
- `crc16.h`
- `crc16.c`
- `defines.h`
- `echo.h`
- `echo.c`
- `main.c`
- `makefile`
- `timer.h`
- `timer.c`
- `uart.h`
- `uart.c`

Where the `main.c` is intended as test and not as a real application.

The BD-4000-U is recognized in `/dev` folder as `ttyACM0`.

The Raspberry Pi Image Jessie can be downloaded here:

Note: It will take time to download it, size 16 GB! `Win32DiskImager.exe` has also some problems while checking the number of sectors against the image and the micro SD cards seems to have different numbers of sectors. Maybe there is workaround that problem, please let me know.

### [Sequence to make a transaction](#)

To send a command:

```
int error_code = echo_command(ECHO_MDB_READER,TRUE,string);
```

Where:

`error_code` = Result of the call. (OKAY, ERROR, VALIED)

`echo_command` = call to transmit.

`ECHO_MDB_READER` = Device addressed.

`TRUE` = A response is expected.

`string` = Contains the command with parameter according ECHO protocol specification.

If there is a response expected, `string` also contains the response data.

Sample commands:

“S” = Send a status request.

“A,1,0” = Activate the device to communicate.

“V,1000,123456” Execute a vend with Euro 10.00 & Card Number 123456.

For details see the “Programming Manual for the BD-4000 Applications.

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