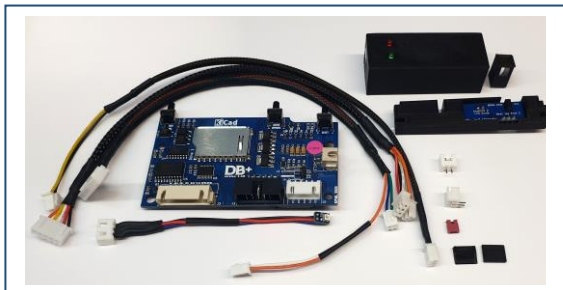


DB+ v1.19 User Guide v1.2 for the 'Full Monty' Beta Tester Kit



Thank you for buying the DB+ Full Monty Beta Tester Kit and joining in on the fun! This User Guide will help you get to grips with the current features of DB+. Over the coming months DB+ will be upgraded with additional features and the guide will be updated to reflect the changes and/or additions.

Why DB+?

As the Spectrum Next ships without any built in power switch, DB+ was initially created to help provide a solution in the form of a stealth power switch. This is accomplished by a microcontroller monitoring the Spectrum Next Reset, Drive & NMI Action Buttons which then performs a given function depending on buttons pressed. Many new features have been added in the 6 months that DB+ has been in R&D and there is also some expandability available for the future built-in as standard. So, at this point, think of the DB+ features as upgradable. <Insert your own marketing slogan here!>

Power Control

As the Next already uses multiple Action Button presses for its own features, the Reset button was appropriately chosen for DB+ to be the main button for controlling power control of your Next. Reset is always held down then an additional button is pressed, depending on the desired power control function. Both buttons are then released as the power control takes place.

The power down function also includes enough time to discharge all capacitors so that the Next is in a zero voltage state and cannot be powered up until this has been completed. This takes approximately 5 seconds for the whole process to complete and during this time the RGB LED will give a patterned flash to indicate that this is underway. This same process is also built into the Power Cycle function and the RGB LED again reflects that this is underway.

Action Button combos for Power Control

Next State	Desired Function	Hold Action button	Single press Action button
Off / Standby	Power Up	Reset	NMI
On	Power Down	Reset	NMI
On	Power Cycle*	Reset	Drive

*If the Next is Off and a Power Cycle attempted by using Reset & Drive, the Next will then perform a Card Swap. This is covered later in the guide.

Example

To Power-Up the Next, after plugging in the Wall Wart power supply, do the following;

Hold Down RESET, Press NMI once, then release both buttons when the RGB LED starts to flash.

SD drive 2

A feature in the Next that never made it through to the design of the case was the ability to use 2 SD cards. The TBBlue/Next board already included all the functionality in the Next FPGA core and Garry Lancaster kindly supported it in the firmware/NextZXOS. The only thing that was missing was the 2nd SD card connector. While it is possible to solder a µSD card connector onto the TBBlue/Next mainboard, it is neither practical nor easy for many people, even those with half decent soldering skills. For this reason the SD connector was included to be part of the DB+. This has the additional benefit of DB+ being able to monitor SD card access of both SD1 & SD2 drives to show the activity on the RGB LED. There are other additional features that we will cover later in the guide.

Accessing SD drive 2

After booting to NextZXOS, enter the browser and press the 'D' key. Each press of the 'D' key will cycle you to the Next available drive. You will find that you now have an additional drive labelled as drive 'D'. This new 'D' drive is the DB+ internal SD drive 2.

The 2nd SD drive is for internal use only as there is no practical way, without major modifications to the Spectrum Next case, to physically access the 2nd SD card from the outside of the case. At present, there are 3 options for transferring data to the internal SD drive.

Option 1: For initial setup or bulk transfers like the historic Spectrum Games archive, unscrew the back of the Next case and physically remove the card, update it and reinsert it.

Option 2: FlashAir or similar WiFi enabled SD cards. Transfer the data over WiFi.

Option3: NextSync utility by Jari Komppa <https://www.specnext.com/forum/viewtopic.php?f=17&t=1715>

The 2nd SD drive is a great place to keep your software library of games and utilities as well and backups of systems files and your own development work. It is also much easier to wipe the SD1 card for new distro installs without losing all your own files. In addition to being a repository for files, the DB+ can perform a rather handy and extremely useful trick ...

Card Swap

While developing the DB+ 2nd SD drive, a new feature came to mind. 'What if I could boot from the 2nd SD card'? 'What if I could control the boot order of the SD drives with the Action buttons'? It took a few iterations in design but Card Swap was born, albeit kicking and screaming!

Action Button combos for Card Swap

Next State	Desired Function	Hold Action button	Single press Action button
Off*	Card Swap	Reset	Drive

*Using this same Action button combination when the Next is already powered up or 'On' will perform a Power Cycle, as mentioned in the *Action Button combos for Power Control* section.

The Card Swap feature is transparent and independent of the operating system. When using the System Browser in NextZXOS, the normal external SD1 drive is always labelled as drive 'C' and the 2nd internal SD2 drive will be drive 'D'. After a Card Swap, the Internal SD2 drive will be drive 'C' and the external SD1 drive will be drive 'D'. They effectively swap places or *Card Swap*.

Developers The Card Swap feature is extremely useful for developers who wish to use a standard NextZXOS distro on their SD1 drive and have the 2nd SD2 drive dedicated to a development build that auto starts using the autoexec.bas file.

Alt cores Card Swap is also very useful for those of us that are partial to running alternate cores on our Next. Checkout the Facebook page for more about the alternate cores <https://www.facebook.com/groups/203350050750409/> One of the downsides to alternate cores is that many times they require a lot of files in the root of the filesystem/SD card. While this is not a major problem it does make your SD1 card very messy and you will have to spend time rebuilding your software if you regularly wipe your SD1 card each time a new distro of NextZXOS is released. The solution is to use SD2 as your boot drive for your alternate cores and just Card Swap to boot SD2.

RGB LED

While I searched for many weeks to find an RGB LED small enough to work in the confined spaces of the Spectrum Next, it was alas in vain and it went on the back burner. Sometime later, in a chat session with Dean Woodyatt, he showed me his latest upgrades to his fantastic *Blinkenator 2000* project. It happened to have the exact RGB LEDs that I needed. We traded secrets for a supplier that he needed and the DB+ could finally could get its RGB LED!

It is worth mentioning here that Dean and I have worked quite closely since then to make sure our projects can co-exist and provide connectivity for others that come after us. I will also be working on interfacing DB+ to *Blinkenator 2000* in the near future so keep an eye out for that update in the Spectrum Next Projects group. Fun for all!

The RGB LED has colours dedicated to a function. In everyday usage the LED will be white which indicates that the machine is Powered Up. Various other colours and flashing patterns are described below.

RGB LED colours and flash patterns

Function/Action	LED colour	Static or flashing
Power Up	Next logo colours – Red to Yellow to Green to Blue to White	Breathing pulse
Power Down	White	Fast flash
Card Swap	White	Slow Flash
SD1 card access	Green	Pulse with access
SD2 card access	Yellow	Pulse with access
Bluetooth activity*	Blue	Pulse with access

*Not yet implemented or tested to evaluate usefulness.

While the RBG LED is only currently used to indicate hardware 'states', I plan to make it available to developers through the use of a driver/dot command. This will be investigated at some point in the future.

Bluetooth

Many developers test their Spectrum Next software builds on an emulator like CSpec and the Spectrum Next hardware. While they are able to wirelessly transfer their latest build iteration to the Next via NextSync or FlashAir, they still need to manually reboot/reset the Next. While this may seem rather trivial, over time it becomes a chore.

The Bluetooth interface provides a way to remotely talk to DB+ without the need of additional cables. Its primary function is to provide developers a way to Power Cycle and Card Swap the Spectrum Next from their development PCs after they have transferred their latest builds to test on the real hardware. This is done via a standard Bluetooth virtual serial port and is presented as a mini API like *Command Console*.

Bluetooth connection details

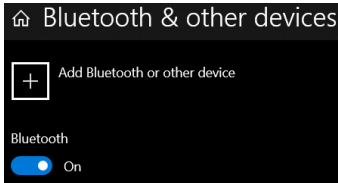
Device name: DB+ Spectrum Next

PIN: 1792

Idiots guide to Windows 10 Bluetooth connections

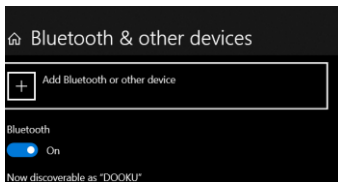
Ensure your Windows 10 machine has Bluetooth v2.0 capabilities. Your Spectrum Next must be plugged in but does not have to be powered-up. Standby is fine.

1 SYSTEM SETTINGS > DEVICES > BLUETOOTH & OTHER DEVICES ...

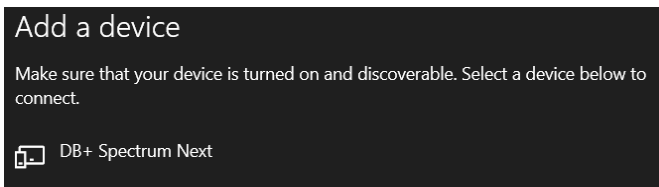


Make sure Bluetooth is turned **On**.

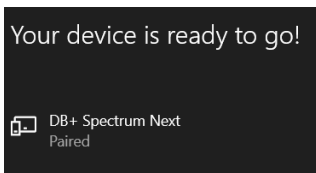
2 SYSTEM SETTINGS > DEVICES > BLUETOOTH & OTHER DEVICES > ADD BLUETOOTH OR OTHER DEVICE



3 The search should find and display the *DB+ Spectrum Next* as a Bluetooth Device in the dialogue.

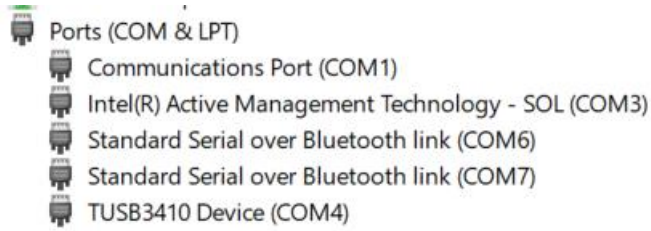


Click on the *DB+ Spectrum Next* and enter the PIN *1792*



... and your new Bluetooth connection should now show as *Paired*.

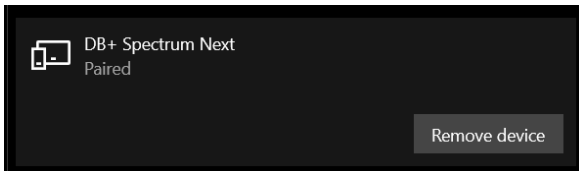
4 CONTROL PANEL > DEVICE MANAGER



You should now see your 2 new serial ports labelled as 'Standard Serial over Bluetooth link (COMx)'.

Sometimes Windows 10 pairs the *DB+ Spectrum Next* as a Bluetooth device successfully but does not allocate new serial ports.

If this happens, find DB+ in the Bluetooth device list and remove it. Then start again from step 2.

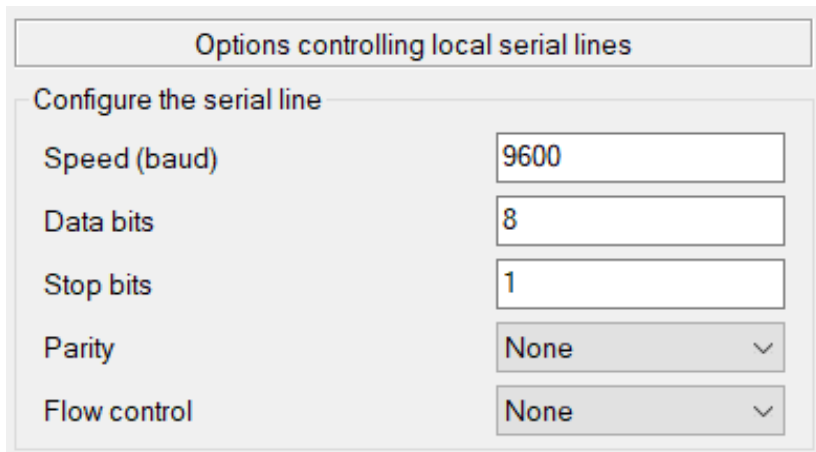


Connecting to the DB+ via the Bluetooth serial port

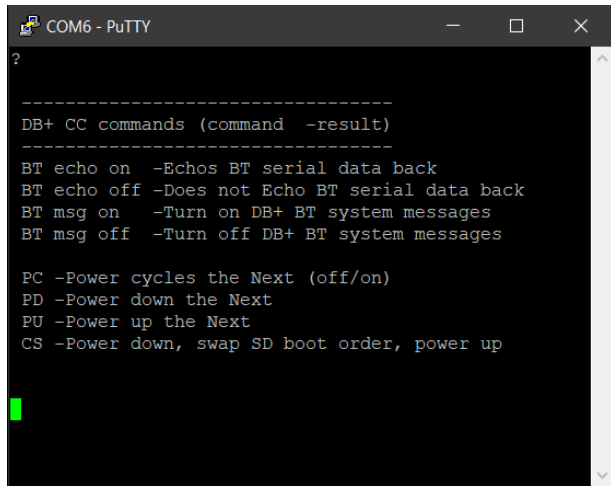
At the moment Bluetooth has only been tested using the PuTTY Windows application and the Arduino IDE serial terminal. It will need to be tested with various other command line applications to enable easy integration of the development software iteration process so hopefully that will be done in the near future.

When you connect your Bluetooth serial terminal to DB+, you have a choice of 2 of the new *Standard Serial over Bluetooth link* ports. In my experience, it seems to be random which one of the two port is 'live' and connected to DB+. It is a matter of trial and error to find out which one is correct and maybe the Beta Testers will shine some light on why this is so.

The following is an example of PuTTY serial port settings;



Sending a ? <CR> (aka question mark and hitting enter) should show you the *DB+ Command Console*.



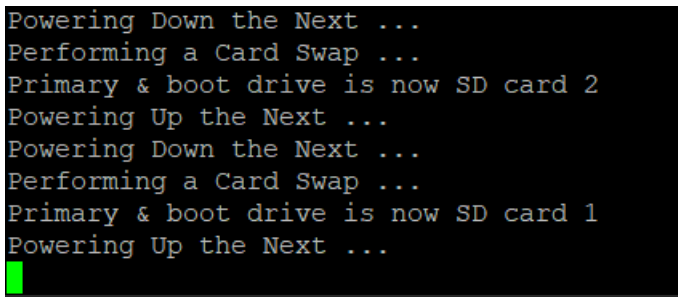
```
COM6 - PuTTY
?
-----
DB+ CC commands (command -result)
-----
BT echo on -Echos BT serial data back
BT echo off -Does not Echo BT serial data back
BT msg on -Turn on DB+ BT system messages
BT msg off -Turn off DB+ BT system messages

PC -Power cycles the Next (off/on)
PD -Power down the Next
PU -Power up the Next
CS -Power down, swap SD boot order, power up

█
```

Example: Typing *PC* then hitting *Enter* will Power Cycle your Spectrum Next and you will see a message to reflect what function the DB+ is carrying out.

Here are a few example messages after performing a few commands.



```
Powering Down the Next ...
Performing a Card Swap ...
Primary & boot drive is now SD card 2
Powering Up the Next ...
Powering Down the Next ...
Performing a Card Swap ...
Primary & boot drive is now SD card 1
Powering Up the Next ...

█
```

Problems with Bluetooth?

Sometimes Windows will not give you serial ports or allow a connection to DB+ over serial. I have found that it at least seems to be consistent in that Windows has not released the serial port correctly, or that it thinks it is already being used. Generally a retry or a reboot fixes any problems that I may have had. The beta test will hopefully help to identify this in a little more detail and create a more fool proof process.

It is also worth mentioning that the current HC05 Bluetooth module does not have to be the final choice for the DB+. There are many reasons why the HC05 has been chosen but this can easily be replaced with a different module if there is benefit in doing so.

Other uses for Bluetooth?

It may or may not be useful to use the DB+ to send files from the PC to the Next instead of the FlashAir cards or the Next Sync utility. This will be investigated in the future along with some other ideas. It may also be possible to use the Bluetooth as a debug interface to step through code in place of the physical serial cable currently used by some people. I have also thought if it would be useful to be able interrogate the Next itself to read or set registers for example from the DB+ Command Console. These are just a few example ideas. Feel free to talk or help implement more useful ideas.

Bluetooth AT mode via Joystick 2

This section will be added to the guide in the next few days.

Have Fun!