

## Application Note DQ1571-01

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### Serial Communications Options for PodWare

#### Scope

This application note describes the various ways of connecting a computer running the PodWare application to one or more devices.

#### Serial Communication

There are currently two different types of communications interface, one or both of which may be fitted on a Linea Research product:

- RS-232
- BvNet

##### RS-232

Devices with RS-232 interfaces typically have a 9-pin female D connector. A PC with a native RS-232 com port would have a 9-pin male D connector. Simply connect the two together using an RS-232 extension cable (female to male).

If your computer does not have a native RS-232 port, then you can use one of the recommended USB/Serial converters (see below).

##### BvNET

The BvNET Interface with Cat 5 cabling should be used for a network of BvNet devices. The User Guide for the BvNET accessories details how to connect such a system.

If you are in a fix and have no BvNet Interface, it is possible to use one of the recommended RS-232/RS-485 adapters (with one of the recommended USB/Serial adapters if your computer does not have a native RS-232 port) (see below).

Please note however that using an RS-485 adapter rather than the BvNet Adapter will not achieve full system performance because:

- **Distance** - The Automatic Direction control scheme employed in these adapters does not drive the network lines with low impedance for both positive and negative excursions, so the network performance reduces as the network length is increased (the total network length, not just the length to the first device).
- **Performance** - The adapter has no knowledge of the low-level operation of the BvNet network protocol, and cannot orchestrate message passing in a controlled manner, leading to excessive packet collisions and thus reduced communications performance/speed.
- **Connectors** - Suitable cables to connect the RS-485 adapter to the network cannot be obtained off-the-shelf.
- **Compatibility** – We know that the BvNET Interface works with our products, so we can give 100% support, whereas trouble shooting any other 3<sup>rd</sup> party devices would be more difficult.
- **Features** – The BvNET Interface will support some advanced features which may appear at some point. These features will not work with 3<sup>rd</sup> party interfaces.

The BvNet interface has the required intimate knowledge of the BvNet protocol, and will drive the network at all times with low impedance, so a long network may be employed with no loss of performance. However, RS-485 adapters will work just fine if the network is reasonably short and there are only a small number of devices in the system.

#### BvNet on Multicore

Although we do not necessarily recommend this, it is possible to route BvNET down a multicore.

We suggest the following pin-out:

**RJ45 Colour**

**Multicore**

**Signal**

1	White/orange	Red (XLR pin 2)	B+
2	Orange	Black (XLR pin 3)	A-
5	White/blue	Shield (XLR pin 1)	GND

The maximum length of the multicore will depend on the characteristics of the cable used, but a BvNET signal will typically survive a multicore length of several hundred metres without issue.

You should be aware of the following potential drawbacks however:

- There could be problems with audio channels picking up noise from the BvNET signals.
- It is difficult to give definitive maximum cable lengths
- Some of the more advanced BvNET features (such as powering from the network) will not be supported

## Recommended Adapters

Not all adapters can be assumed to work since their designs do vary, and some have been found not to work reliably with PodWare. We have tested the following adapters and can recommend them for use with PodWare:

### USB/RS-232

Easysync USB-COM-PL <http://www.easysync.co.uk/>

### RS-232/RS-485

There appears to be no universal standard on how these adapters pin-out the RS-485 port, so we cannot include general connection details. We have tested and can recommend the following:

B&B Electronics 485SD9R – see <http://www.bb-europe.com> or <http://www.bb-elec.com>

You will need a special cable for connecting the RS-485 port of the adapter to a BvNet device.

The 485SD9R has a female D9 connector on the RS-485 side.

It is recommended that you get the RJ45 end by cutting one end off a standard Ethernet PC to hub (patch) cable, and attach a MALE D9 to the cut end.

The only connections you need are:

RJ45	Colour	D9M	Signal
1	White/orange	3	B+
2	Orange	2	A-
5	White/blue	4	GND

Please note the potential performance limitations of this approach rather than using the Linea Research BvNet Adapter as discussed above.

### Ethernet/Serial

PodWare should operate with most Ethernet-to-serial adapters which use a "Virtual Com Port".

However, we have only tested the following adapter, and is therefore the only one we can recommend:

Moxa NPort Express DE-311 from B&B Electronics - see [www.bb-europe.com](http://www.bb-europe.com) or <http://www.bb-elec.com>

Follow the installation instructions supplied with the adapter, and map it to an unused COM port (COM port 3 and upwards are often available for use).

The NPort express device may be used in one of three ways with PodWare:

1. RS-232 directly to the device  
This is used for 1:1 connection to a single device which has an RS-232 port.  
On the Moxa NPort adapter, set the switches to SW1=off, SW2=off, SW3=off, to select RS-232 mode.  
Because the pin-out of the RS-232 connector on the adapter is for "Data Communications Equipment" (DCE) rather than for "Data Terminal Equipment" (DTE), it is necessary to connect the adapter to the device via a Null Modem cable, or use a male-male Null Modem converter to correct the connectivity. The latter is supplied with a Moxa NPort adapter.
2. RS-232 to the Linea Research BvNet Adapter.  
Used for controlling a network of devices on a BvNet network.  
Set the adapter up the same as for direct RS-232 mode above.  
Connect the RS-232 port of the Moxa unit to the RS-232 port of the BvNet adapter.  
Again, you will usually need to use a Null Modem cable or a Null Modem converter.
3. RS-485 directly to the BvNet port of a device

Whilst this method of connection can be made to work, it is not recommended for the reasons discussed above.

On the Moxa NPort adapter, set the switches to SW1=off, SW2=on, SW3=on, to select RS-485 mode with automatic direction control.

To make a cable to connect the adapter to a BvNet device, it is suggested that you cut one of the RJ45 connectors off a standard Ethernet patch lead (PC to hub cable), and attach a female D9 to the cut end.

The pin wiring for the Moxa NPort device (do NOT use a Null Modem converter) is as follows:

<b>RJ45</b>	<b>Colour</b>	<b>D9F</b>	<b>Signal</b>
1	White/orange	3	B+
2	Orange	4	A-
5	White/blue	5	GND

Note that there can sometimes be issues with firewall programs. If it is impractical to shut the firewall down, then it is often possible to specify the IP address of the adapter as a 'trusted site' in the firewall program.

## Wireless/Serial

Several wireless systems are available which allow a serial connection (such as RS232) to be plugged into a wireless adapter, which can then be controlled via WLAN from a PC. In order to do this, a Virtual Com Port (VCP) is created in the computer which will operate in the same way as a Com port, to which the PodWare application can connect.

The only wireless serial product we have tested and can therefore recommend is:

Moxa NPort W2150 – see [http://www.moxa.com/product/NPort\\_W22502150.htm](http://www.moxa.com/product/NPort_W22502150.htm) . Available from <http://www.bb-europe.com> or <http://www.bb-elec.com>

Although this product has an RS-232 port on a non-standard RJ45 connector, the product is supplied with an adapter cable which allows it to be plugged into a standard RS-232 9-pin D connector on a device, or on the BvNET Interface for use in a network of BvNET devices.

Follow the installation guide supplied with the product, which essentially consists of:

- Using the supplied RJ45 cable, connect the W2150 directly to the Ethernet port of your computer
- Plug power into the W2150 (powering up with Ethernet connected tells it to use Ethernet rather than wireless)
- Select the Install Utility from the CD-ROM, which installs NPortSearch. Run this, Click Search, right-click on the line and select Console. This will connect your browser to the W2150.
- In Network Settings>WLAN Configurations>WLAN, set the IP address for WLAN operation. If this is to become part of an office WLAN and your wireless router uses DHCP, you can just set the device to DHCP. However, it is possible that changes in the WLAN system (for example adding more equipment) could cause the IP addresses to change. It is probably safer to use a fixed IP address if your router allows you to do this.
- Also set the Mode, SSID and channel of your wireless system. You would normally select Infrastructure mode.
- Click Submit (note that if you select a different page, the settings you have just made will be lost unless you first click submit).
- Click Back. In WLAN Configurations>Security, enter your other wireless details
- Click Submit
- Click Save/Restart
- Now unplug the Ethernet cable from the W2150, and give it a power cycle.
- From the supplied CD-ROM, select INSTALL COM Driver, and allow the Windows Driver Manager to be launched. Note that it is important to run this utility whilst the wireless connection is active since it would otherwise map the COM port to the IP address of the cable connection. Note that there may be problems with older drivers. We would recommend updating to V1.6 or later from here: [http://web4.moxa.com/support/download.asp#4\\_drvmgr\\_setup\\_Ver1.6\\_Build\\_07082417\\_WHQL.zip](http://web4.moxa.com/support/download.asp#4_drvmgr_setup_Ver1.6_Build_07082417_WHQL.zip)
- Click the Add tool button on the Windows Driver Manager dialog, then click the Rescan button on the Add Nport dialog.
- Your NPort device should then be shown in the list. Click OK
- You will then be asked if you wish to activate the Com port – click Yes (note that you can change which Com port is used by clicking on the line and selecting Setting).
- Plug the RS-232 port of the W2150 into an RS-232 device (or into a BvNET Interface) using the supplied cable.
- You should find that after selecting the appropriate com port in PodWare, you can control the connected device(s).