

Basic Back-to-Back setup for a 925U-2.

This Application Note shows how to setup and configure two 925U-2 modules in a back-to-back “Base” & “Mesh Node” configuration. For other configuration options, please read the User manual.

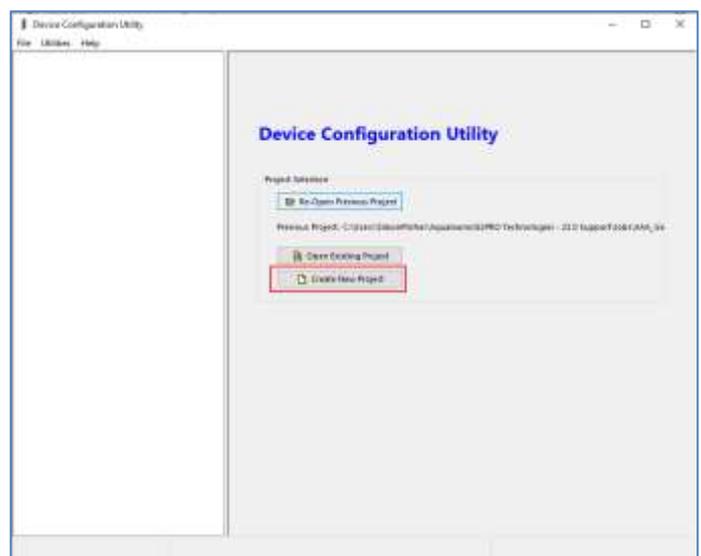
From the factory the 925U-2 will be defaulted to factory settings and will not have any “Locale” configuration (Specific frequency/ TX power based on locality) and therefore when powered it will have a solid red “PWR” led and have limited connectivity for configuration.

From Factory Default the Web page configuration is disabled for cyber security reasons so all configurations will need to be done via the USB port.

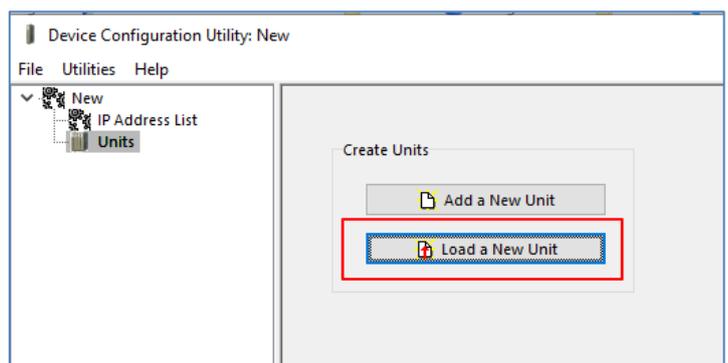
To perform a basic Back-to-Back configuration, you will need to have the C-Config configuration utility installed. It can be downloaded from our web site under “Resources – Configuration Software – 925U-2”. https://elprotech.com/wp-content/uploads/2024/07/ELPRO-SW_CConfig_2.1.0.72.exe_.zip

C-Config Configuration Procedure

1. First connect power to the radios as per the requirements in the User manual or Installation Guide and wait for the radio to finish booting. (Approx 1.5 minutes PWR led will stop flashing Green and Red and just go solid Red)
2. Open the C-Config Configuration Utility software.
3. From here select “Create New Project” and give it a name.



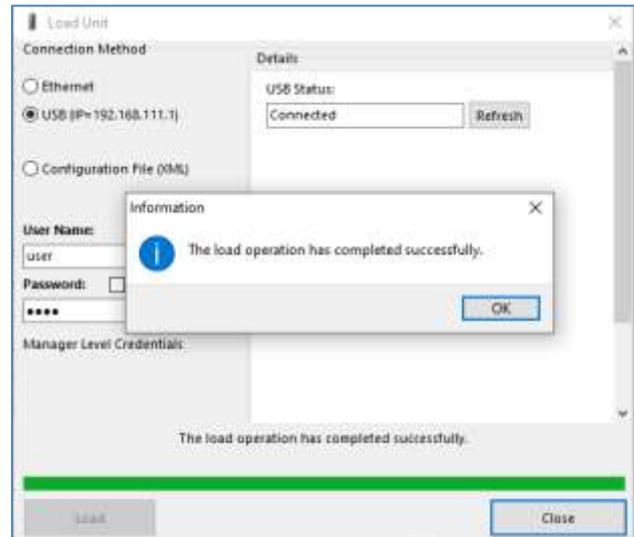
4. Connect to the Radio using the USB cable.
5. Select “Units” and then “Load a New Unit”.



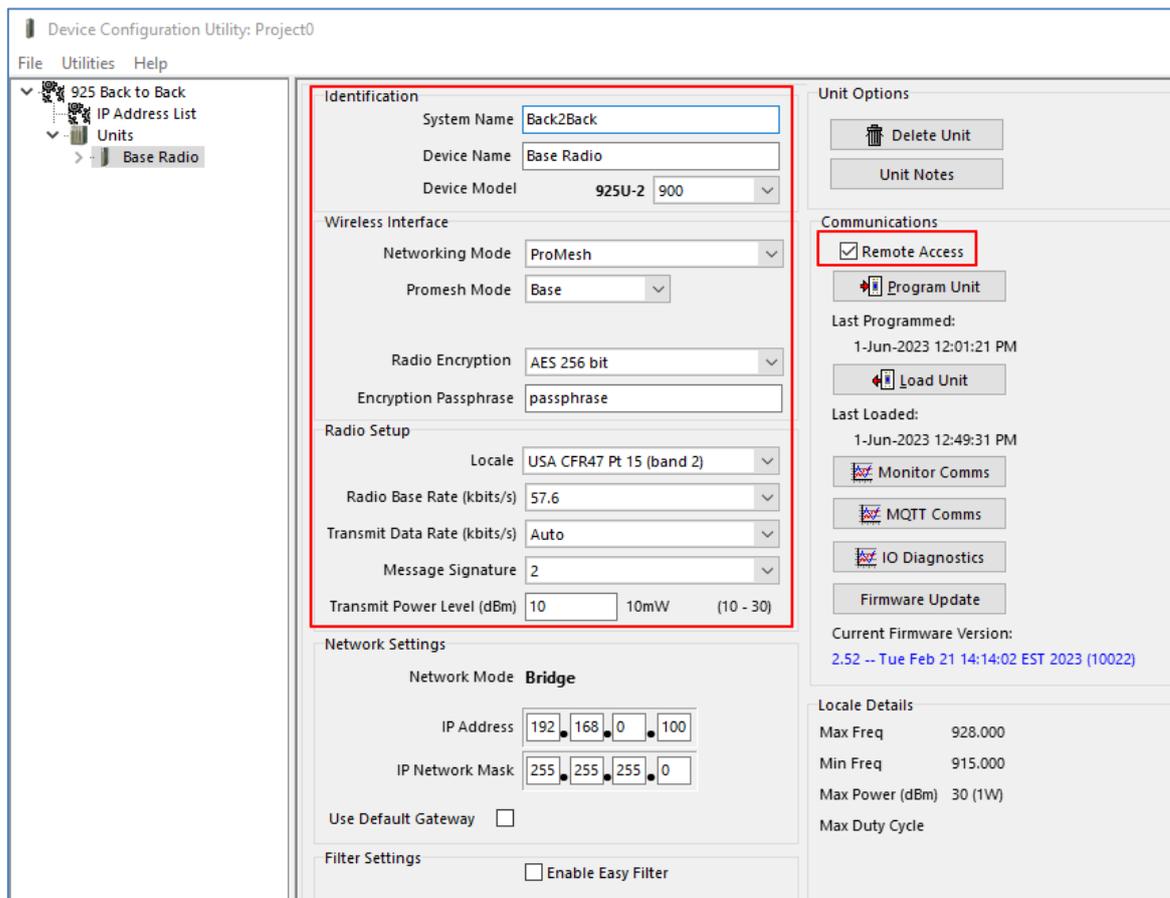
6. Select “USB” and make sure “Connected” is shown as the status, press “Refresh” in its not.

Now enter “user” for Username and “user” for Password and then select the “Load” button.

It should load the module configuration into the Software.



7. We will configure this Radio as the Base or end point radio and configure the following parameters, System Name, Device Name, Model, Networking Mode, Promesh Mode, Encryption, & password, Locale, Base Radio Rate, TX Data Rate, Message Signature and TX power, also make sure “Remote Access” is enabled so you can connect to the LAN port. The next few steps will explain what each parameter is and how it should be configured.

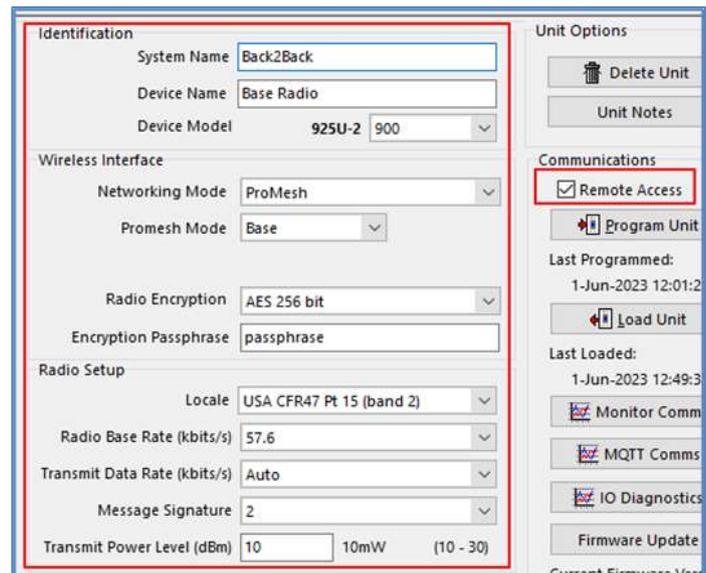


Doing this on the “Base” Radio will mean, all radios that are then added to the project will inherit the same configuration parameters, therefore making the process a lot simpler and user friendly.

8. In this example, I will use the Networking Mode “Promesh” for this Back-to-Back setup as it’s the easiest to setup and most common. For more connection options please consult the User Manual.
9. Select the radios unit name and then fill in the Key details outlined below and marked in the red rectangle (shown in previous screenshot).
10. “Remote Access”, this will need to be enabled if you want to connect to the radio via the Ethernet port (LAN), if this is not enabled then only USB configuration is possible.
11. Select Locale, this will need to comply with your locale regulation or licence, etc. For a 900 Model radio this will be either Australian, New Zealand and two separate bands in the US. If the Device Model is 869 you will have two EU High Power (500mW) or Low Power (5mW).
12. Next in the wireless interface, select Networking mode, for this example I will leave at “ProMesh”. For more information on the other modes see the User Manual.
13. Then change the Promesh Mode from “Mesh Node” to Base”.
14. You will notice the System Name will clear so enter what you would like to call the new system i.e. area location, job name, company, application, etc.
15. Configure a Device Name, I will call it Base as it will be the Base or End Point in the system.

16. Model will need to match you radio model, i.e., for the 925U-2 you have either 900 or 869 as the selection. 900 is the 900MHz FHSS bands used in US, AU and NZ and 869 is a fixed frequency 869MHZ mainly used in Europe. Radio side label will show what model it is.

17. By default, it will have “AES 256-bit Encryption” selected, which you can change to WPA2-PSK if you wish and then enter a Passphrase.



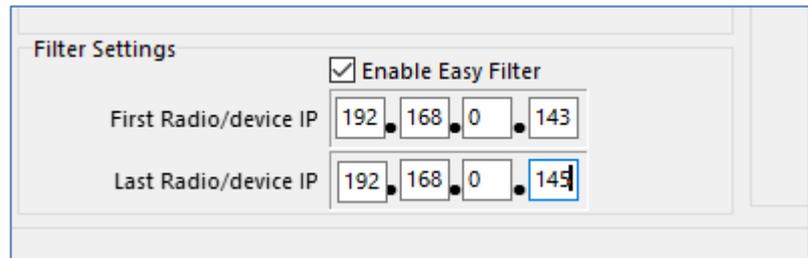
18. Next enter the radio parameters, i.e. Base radio data rate I would start with 57.6 kbits/s and then the TX data rate leave in Auto rather than fixing to a particular rate. These rates can be changed but I would wait till you have the radios communicating first before making modifications.

19. Message Signature I would leave at the default 2. This is different from the standard 915U-2 default of 1 and is changed so that there is less chance of the two types of systems affecting each other.

20. Set the TX power level, and again this will need to match the radio licence which is 1 Watt but if need be, it can be reduced if your radio paths are very close, etc.

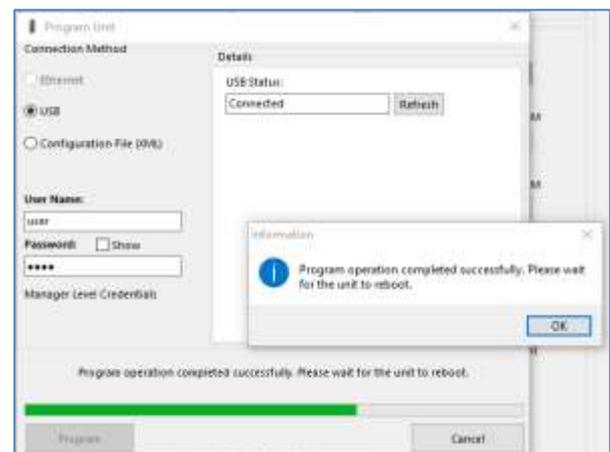
21. Lastly configure the IP address to match what is required, i.e. if the Base is connecting to an Ethernet device, i.e. DCS, Scada, PLC, etc then it may need to be an IP Address or in a particular subnet. If this is not required then it is good practice to make it the radio default IP address which you will find on the label on the side of the radio, i.e. it will be in the range 192.168.0.1 to 192.168.0.256.

22. It may be necessary to enable “Easy filter” on the Base radio if the LAN is connected to a switch with other Ethernet Devices, i.e. PLC, Computer, Company network, etc. “Easy Filter”



allows you to filter so only the IP address that you need to go over the radio will do. If enabled make sure you filter only the Remote radios IP addresses and any devices that you may wish to connect to on the Remote radio, e.g. other PLC’s, HMI’s, etc.

23. When complete, press the “Program Unit” button and again make sure “USB” is selected and you have a “Connected” in the USB Status box, if you do not see this, press “Refresh” then press then “Program” button and wait for the “Successful” confirmation.



You may see some message boxes asking about setting the module time, select Yes if you are using time critical features like DNP3 or MQTT otherwise select no.

24. You can now connect the USB Cable to the second radio like we did way back at the start (Step 4). Make sure it is powered up and finished booting (solid Red Led).

25. Now select the “Units” in the main tree of the software and again “Load new unit”, same as steps 5 & 6.

26. On this second unit all we should need to do is select the “System Name” which will be the “Base” radio you configured previously and all of the other system connection parameters should be inherited.

27. Make sure the “Remote Access” is also enabled for future Ethernet (LAN) access if this is required.

28. If you wish, change the Device Name to the name of the location or just leave it is if it is a simple back-to-back. (Renaming is useful if you have many remote mesh nodes)

29. Now select the Program Unit button and save config into the second radio (Same as step #23 above)

Wait for the radio to restart and you should have two radio that are communicating.

You will see the “RF” Led will go solid green and flash with transmissions. This is a good indication that you have a connection.

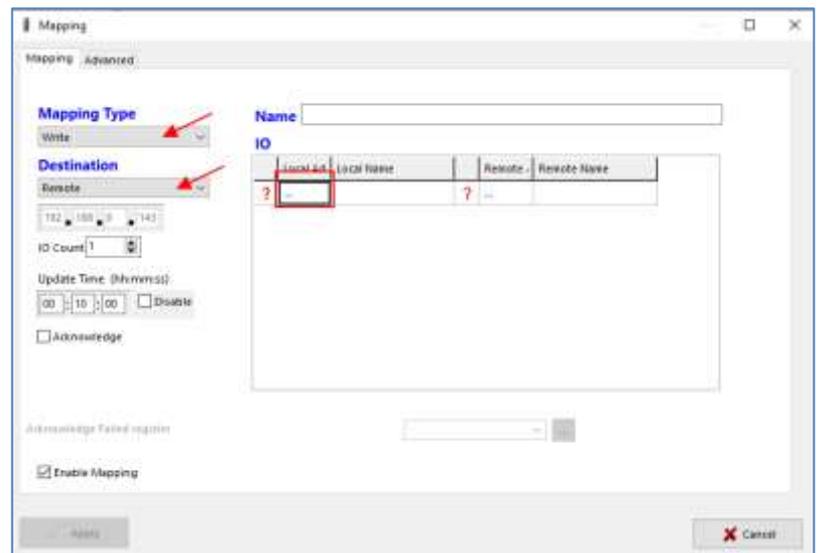
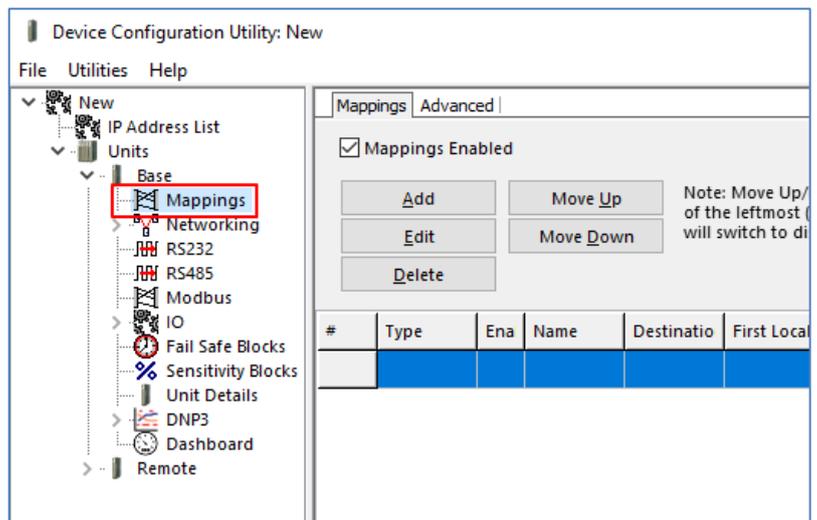
If you wish, plug the USB cable back into one of the radios and connect to the IP address (192.168.111.1) using a Web browser and check the “Connectivity” link to see the connection as shown here.

Connectivity							
Connected Wireless Devices:							
Device Name	IP Address	Interface	Tx Rate	RSSI	Compress	Link Uptime	Link Count
Pump1	192.168.0.101	radio0	115.2k	-72dBm	Yes	0000:00:38:39	1

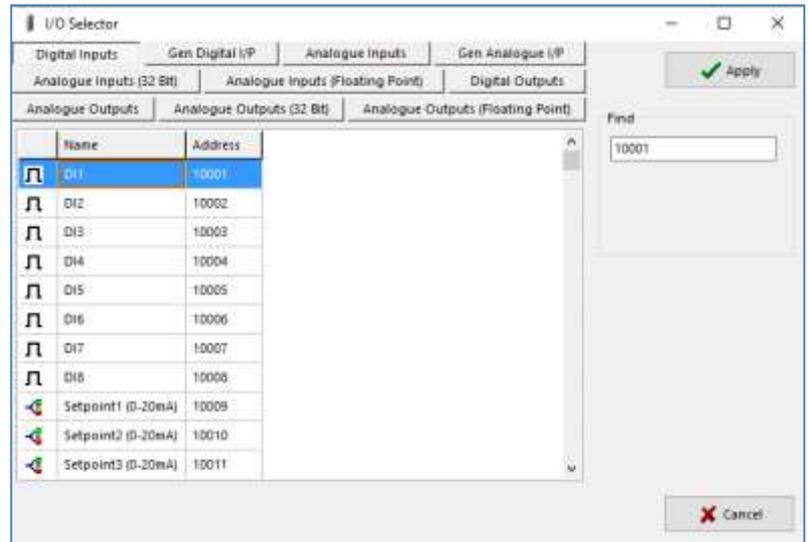
Setting up mappings

Now you can configure the Mappings (inputs to outputs I/O reflection configuration). Below is a basic step by step guide for mapping a couple of I/O. For more information please review the User manual.

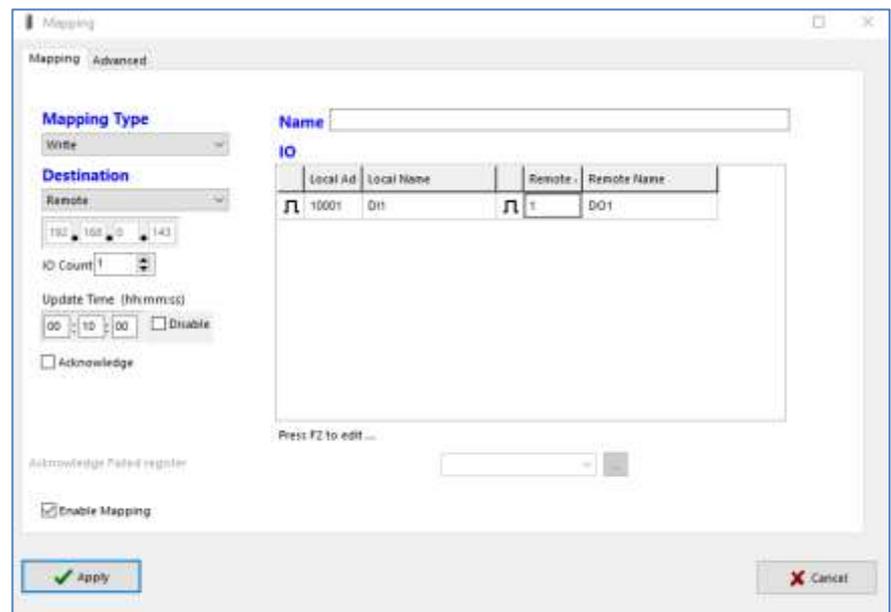
1. To setup a basic mapping from radio to radio select the Radio you wish to add the mapping to in the configuration software and then select the “Mappings” menu branch.
2. Next select “Add” to add a new mapping.
3. There are three types of mappings, select either “Write” or Gather/Scatter” from the list and select a “Destination” (other radio) then select the “...” under Local Address in the “IO” table to pick the input register.



- This will open the I/O selector and allow you to select an input location. You can select the different tabs for Digital, Analogues, Floating Points, etc and then select an input register in the tab or by entering an address into the “find” location. Press “Apply” and do the same for the “...” under Remote Address in the “IO” table (Destination output register).



- Set the Update time appropriately for the application, remembering the “Update Time” is more of a check signal as the default communication will send the value immediately when it changes. The Update is more of a regular check signal that will be sent even if the state has not changed, and its default time is 10 minutes. It is best left at this for the moment, if needed it can be adjusted later, after you have established that it works.
- Select “Apply” and then you will need to reprogram each radio again and test the I/O mapping is sent as per your configuration.



Amendment Register:

Issue No.	Date	Details of Amendment
1.0	29/04/21	Draft Issue
1.1	1/06/23	Refined configuration process