MLink Evaluation Kit
Instruction Guide

Rev 5

Apr 2018

106, 4715 - 13th St. NE, Calgary, Alberta, Canada, T2E 6M3
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Thank you for selecting the MLink evaluation kit!

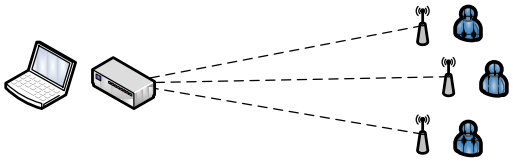
MLink is an energy-efficient, high range, scalable network solution.

The ***Getting Started*** section below will provide instruction to set up a link between a base and two endpoints. The ***Extending The Network*** section, beginning on page 7, will provide similar instructions for extending the network using the network extender.

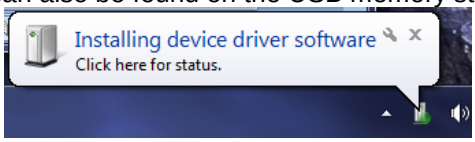
More features and functions can be found in the *MLink Modem Interface Control* document.

Getting Started

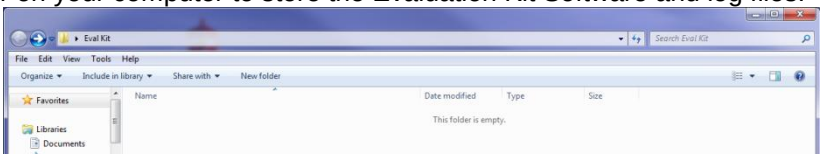
1. Verify you have:
   a. one base,
   b. two endpoints,
   c. spare batteries (AA and D),
   d. a USB serial cable, and
   e. a USB memory stick.



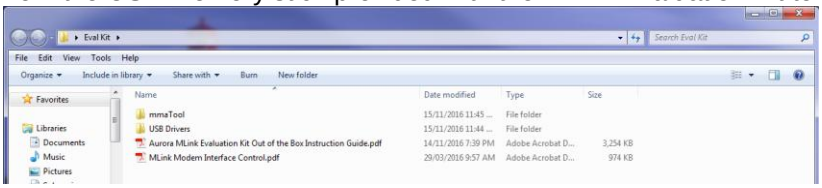
2. Plug in the USB cable between your computer and the base. If needed, follow the prompts to install the driver. Required drivers can also be found on the USB memory stick.



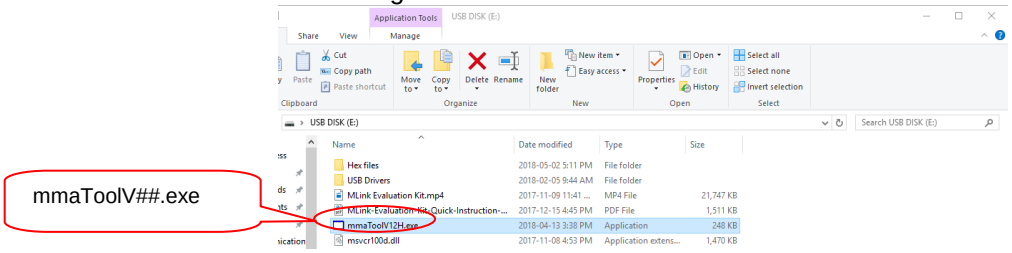
3. Create a folder on your computer to store the Evaluation Kit Software and log files.



4. Copy the files from the USB memory stick provided with the MLink Evaluation Kit to this directory.



5. Select and open the mmaTool directory where you will find the mmaToolV##.exe program which will be used to control and manage MLink.



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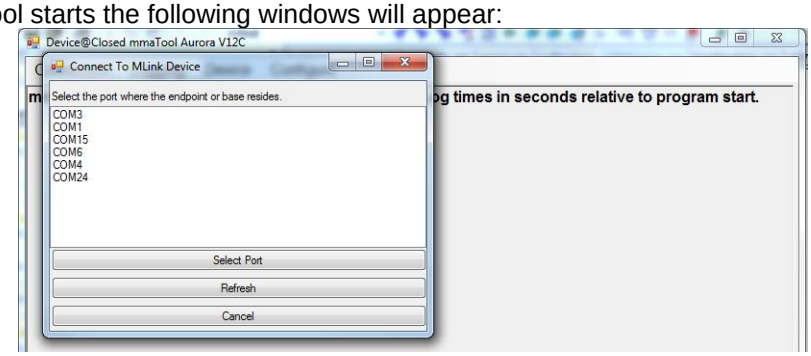
6. Select and run the mmaToolV##.exe program.

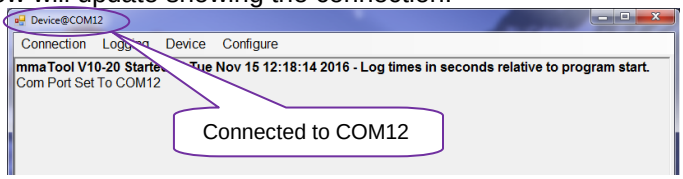
7. When mmaTool starts the following windows will appear:



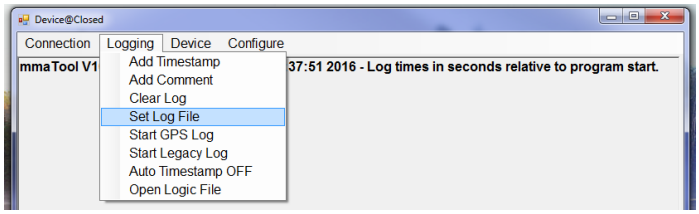
Tip: You can get to this screen again by clicking: *Connection > New*.

8. Select the COM port where MLink is connected. To determine the correct port, unplug the MLink USB cable and click Refresh. Then plug the cable back in and hit Refresh again. The correct COM port will disappear and reappear on the list. Once you have selected the correct COM port, click Select Port.

9. The mmaTool window will update showing the connection.

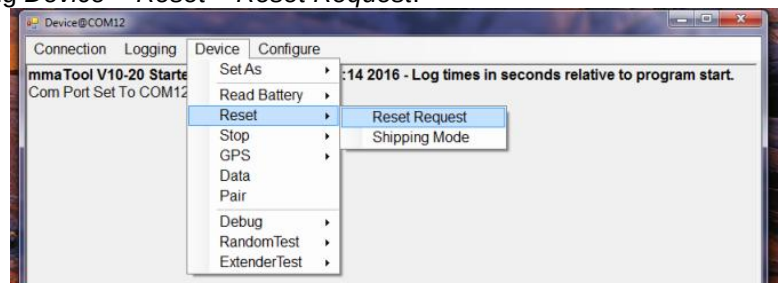


10. [Optional] A log file can be created by clicking *Logging > Set Log File*.

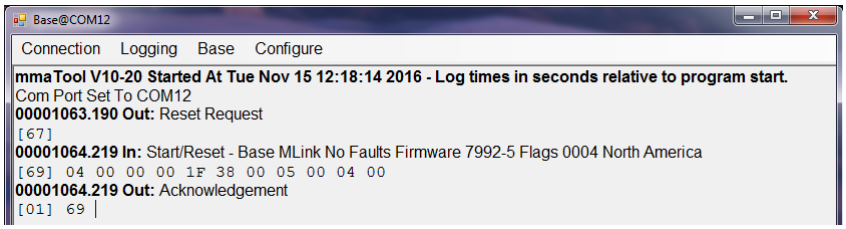


Type a filename for the log file. Once set up, the log file will update automatically as you interact with MLink. You can open it in any text editor to get your full history.

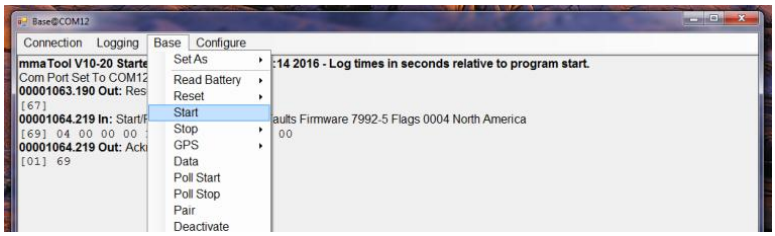
11. Reset the unit by either:
    a. pressing the *Reset* button on the MLink hardware, or
    b. selecting *Device > Reset > Reset Request*.



If everything is set up properly, you will see a *Start/Reset* message appear and the *Device* menu will change to *Base*. The *Start/Reset* message comes from MLink any time the unit starts or restarts. The *MLink Modem Interface Control* document has a full list of information included in this message.

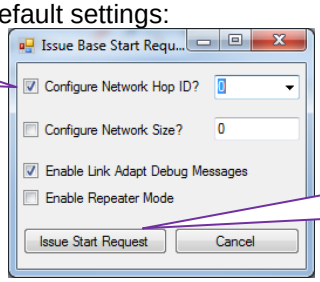


12. Use *Base* > *Start* to start the MLink base.



A pop up window will appear with default settings:

Hop ID 0 and default Network Size are the recommended settings.

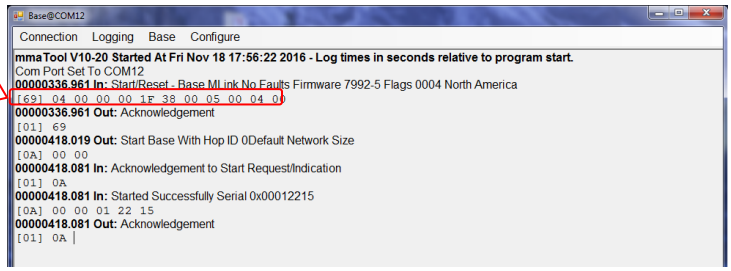


Press the *Issue Start Request* button to start the Base.

It is recommended to leave all settings as default.

A message will appear to indicate that the base radio has started up.

Note: Raw message bytes (in hexadecimal) are provided. The number in square brackets is the message ID. A full description of all the messages can be found in the *MLink Modem Interface Control* document.



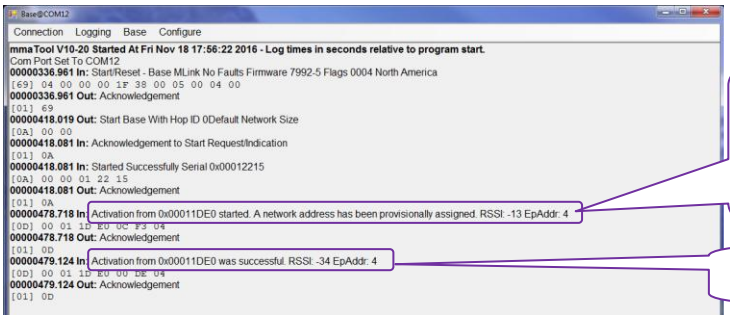
Note:
The Green LED will blink when the Base is turned on or reset.

The Red LED blinks each time Base transmits.

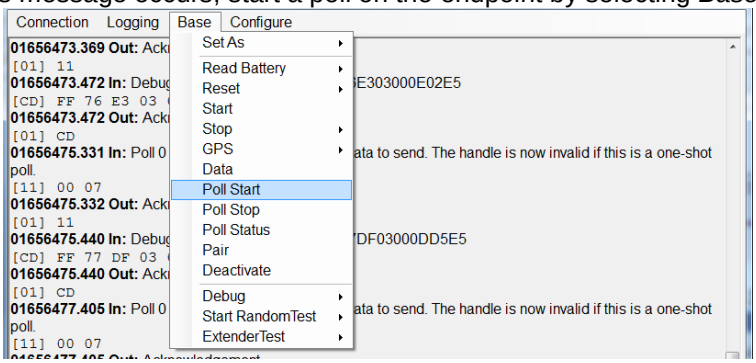
13. Turn on the endpoint. If the unit has not been recently run, it may take 10 to 20 seconds to charge up. The Red LED should flash rapidly for a few seconds as the endpoint and base synchronize. A few attempts may be required. Once successful synchronized, a message will appear to indicate that the endpoint has joined.

Note:
The red LED blinks each time the endpoint transmits.

On the Endpoint, the green LED goes on for 1 second when a poll message is received.



14. Once the success message occurs, start a poll on the endpoint by selecting *Base* > *Poll Start*.

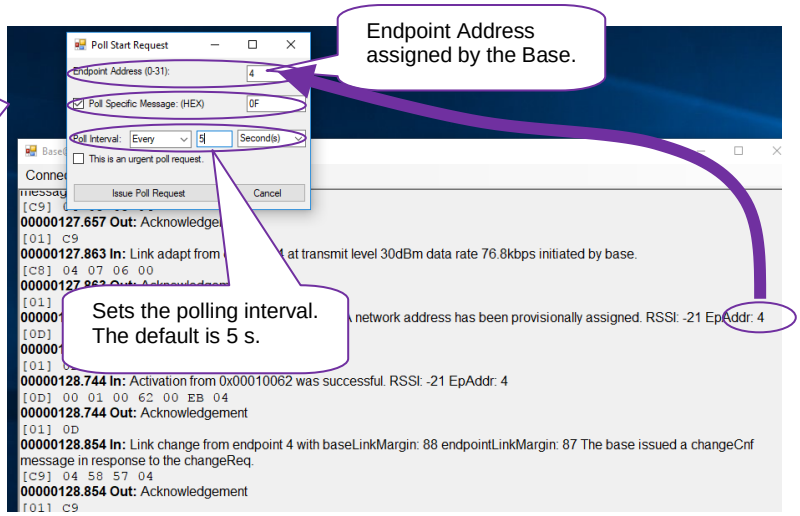


A pop up window will appear.

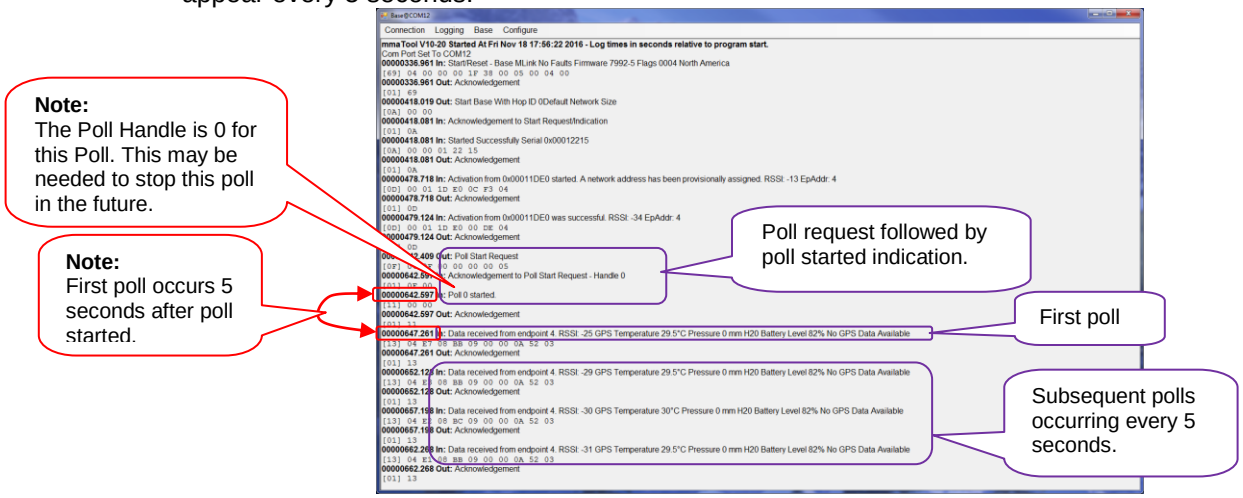
To poll for all fields, enter "0F". You can also enter another hexadecimal number to poll for some fields and not others.

- temperature
- pressure
- battery level
- GPS location
- unused[3]
- reserved (must be zero)

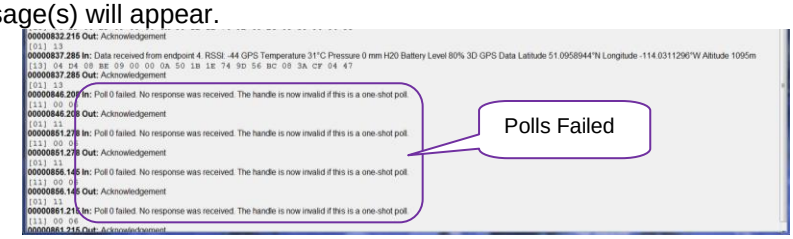
For example, "05" will poll for battery level and temperature.



15. The mmaTool will update indicating that the poll has been started. Poll response messages will then appear every 5 seconds.



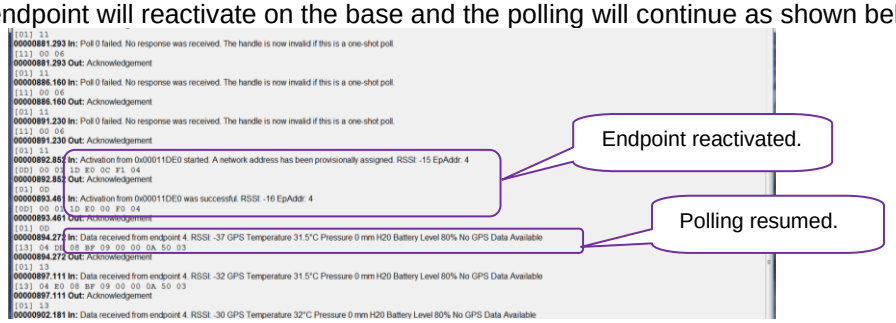
When data is not received from the endpoint (i.e. the endpoint is out of range or turned off) the following message(s) will appear.



Successful polling will typically continue when the endpoint is again within range, unless:

- the endpoint is out of range for more than 10 minutes,
- the endpoint is turned off, or
- the endpoint is reset.

In that case, the endpoint will reactivate on the base and the polling will continue as shown below.



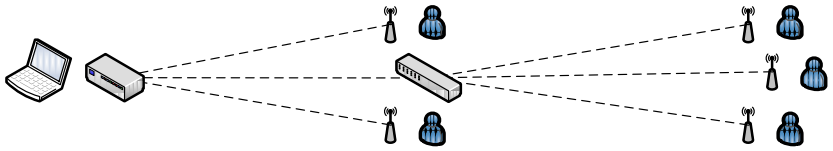
16. To connect the second endpoint, repeat steps 14 to 16.

Congratulations! You have mastered the basics of MLink.

There is lots more that you can do. See the *MLink Modem Interface Control* document for a full list of functions and features.

Adding the Network Extender

The MLink network extender allows you to expand the range as well as the supported number of endpoints in the network.



Network extenders function as both a base and an endpoint, and transmit signals to and from connected endpoints at a greater distance.

1. Set up the base as per steps 1 to 12 in the *Getting Started* section. If the base is already running you can instead set up the base by selecting *Base* > *Reset* > *Reset Request* then *Base* > *Start*. Power off any endpoints.

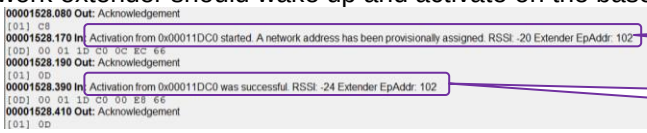
2. The MLink network extender is shipped in *Shipping Mode*. To activate the network extender, the solar panel has to be connected. You may also need to shine a light on the solar panel.

Connect the solar panel

to the network extender.

Solar panel connected to network extender.

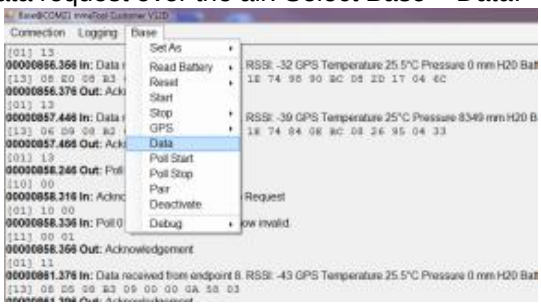
3. The network extender should wake up and activate on the base.



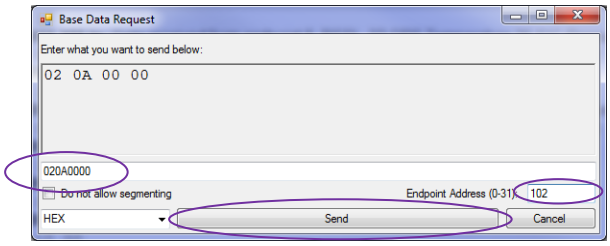
Activation started. Note the provided address.

Activation was successful.

4. Just like the base, the network extender has to be started before endpoints will be able to join it. We will do this by sending a data request over the air. Select *Base* > *Data*.



A pop up window will open that will allow you to send data to the network extender.

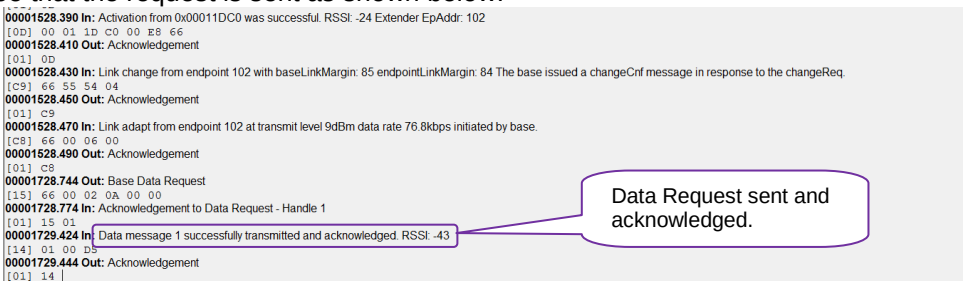


Verify that you have entered the correct network extender address, as provided when the network extender activated on the base (step 3 above). Enter the following start command:

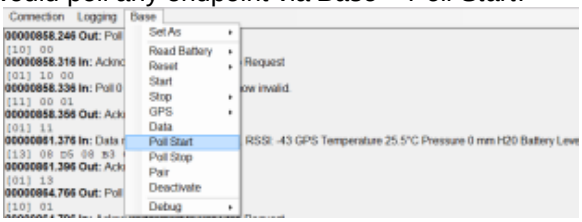
020A0000

More detail about the commands can be found in the *MLink Modem Interface Control* document.

You will see that the request is sent as shown below.

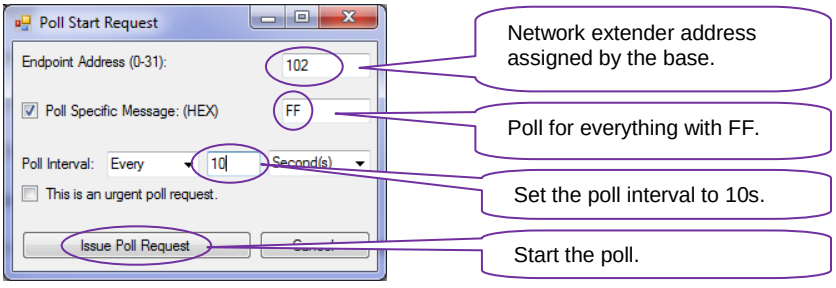


5. We also need to set up a poll so we can get data back from the network extender. This can be done in the same way as we would poll any endpoint via *Base* > *Poll Start*.

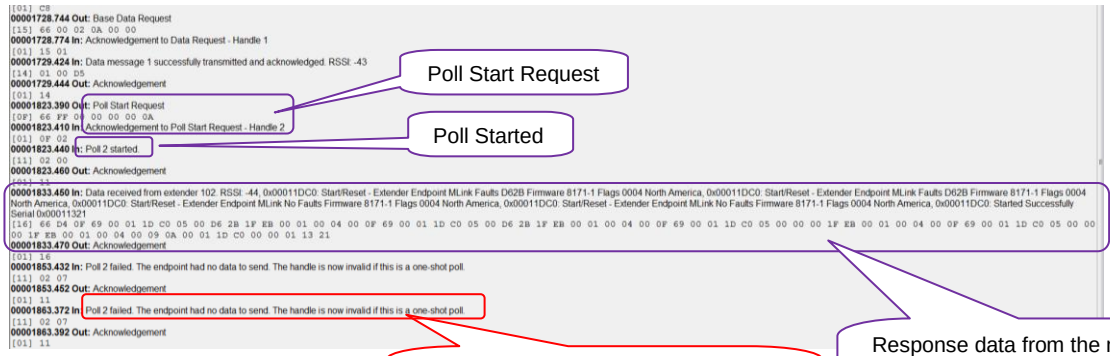


Verify the following in the Poll Start Request dialog:

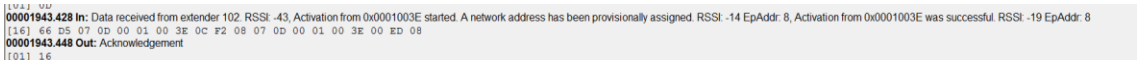
- The network extender address is correct from the activation.
- The 'Poll Specific Message' checkbox is checked and FF is entered in the textbox. FF is used for a wildcard poll to retrieve any data.
- The poll interval is set to a reasonable value such as 10 seconds.



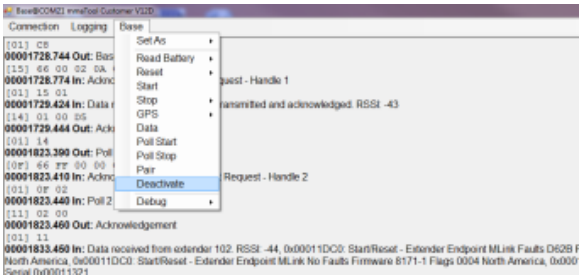
In the main mmaTool window, you will see the poll being started. 10 seconds later the network extender will respond. Responses will be decoded by the mmaTool.



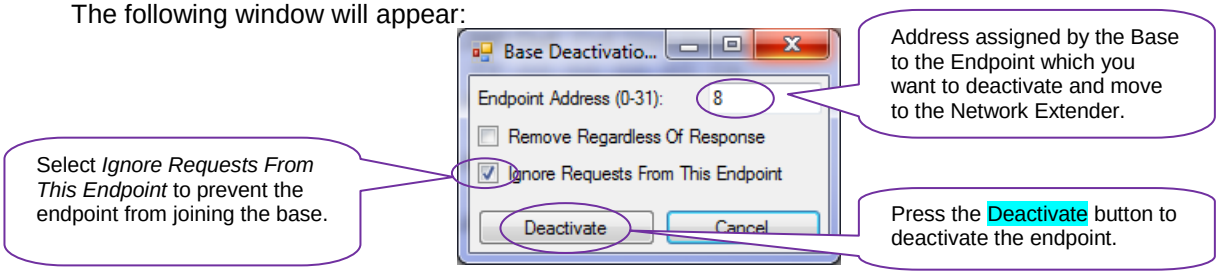
6. Turn on one of the endpoints. You should see a flashing light, followed by an activation message. The endpoint may either activate on the base or the network extender. If the endpoint activates on the network extender, you will see a message similar to the following and can skip step 7.



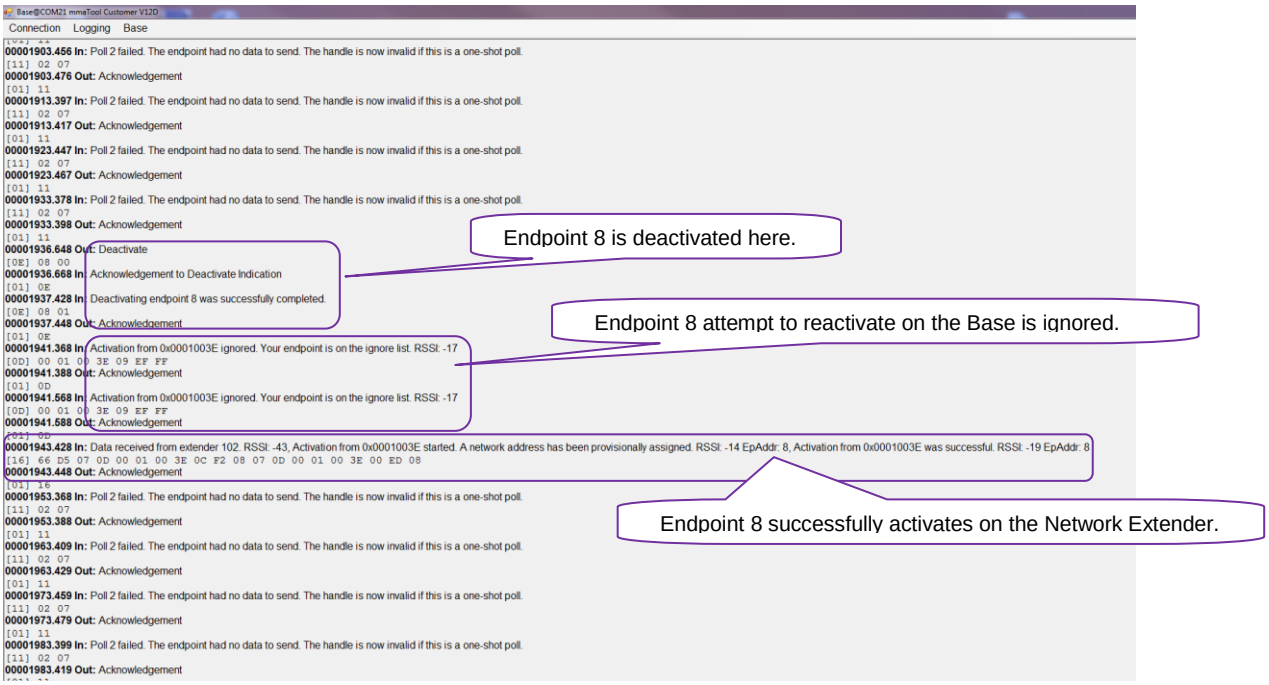
7. If the endpoint activates directly on the base, you can move it to the network extender by deactivating it. Select *Base* > *Deactivate*.



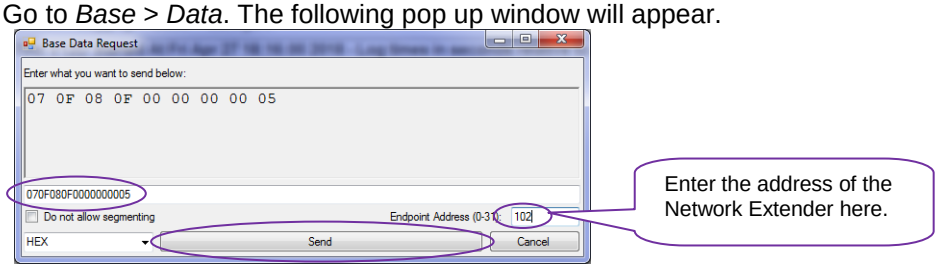
The following window will appear:



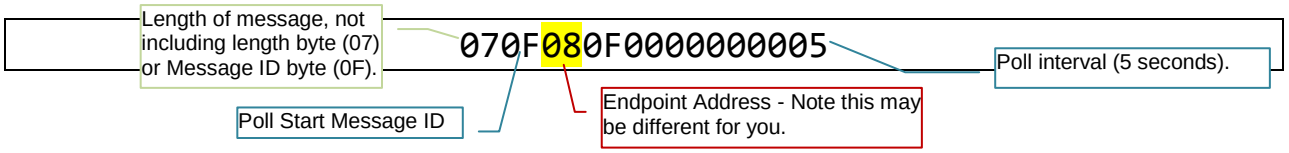
8. The deactivated endpoint will reactivate on the network extender with an activation message similar to the following. Note the endpoint address, you will need this to set up a new poll to it.



9. Now we need to start a poll to the endpoint. Since the endpoint is on the network extender, we will send the request there. Go to *Base* > *Data*. The following pop up window will appear.



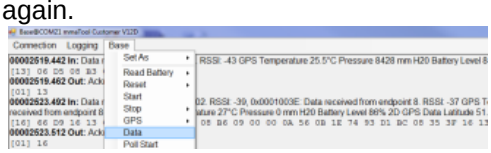
The request to start a poll is as follows. The highlighted endpoint address needs to be updated to match the endpoint address provided in step 8. For more information on this message see the *MLink Modem Interface Control* document.



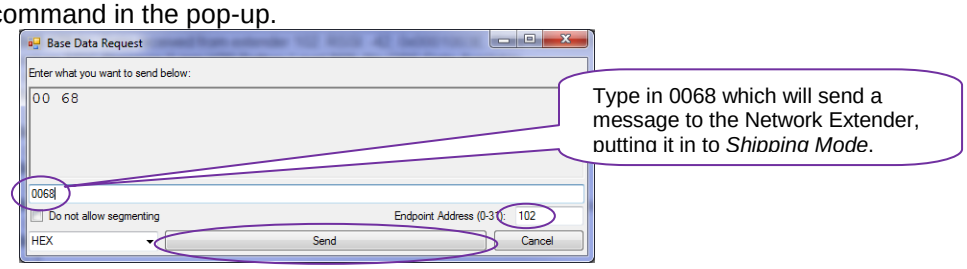
If successful, the mmaTool will update indicating the data request has been sent and polls will start to appear as shown below.

10. At this point, the endpoint is functionally connected to the network extender.

11. The network extender does not have any ON/OFF switch, so if left without a base the battery will drain. You can turn the network extender off by putting it in shipping mode again. This is done over the air by pressing *Base* > *Data* again.



Enter the shipping mode command in the pop-up.



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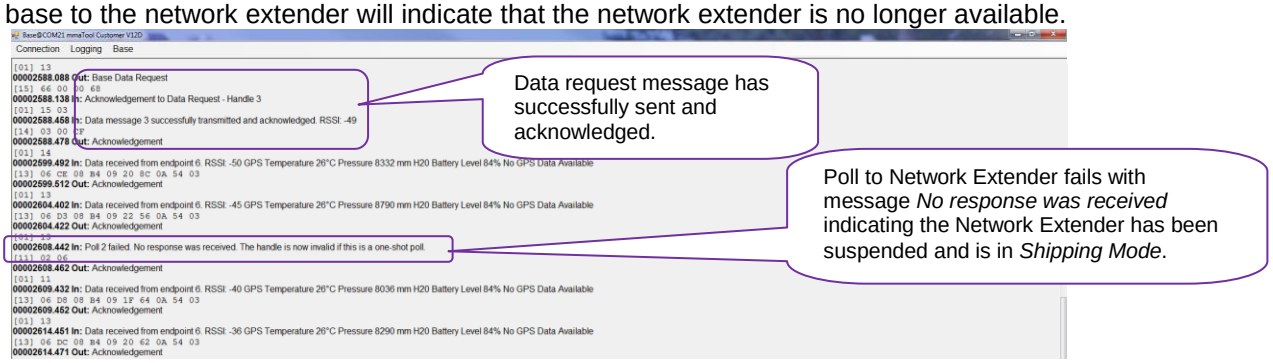
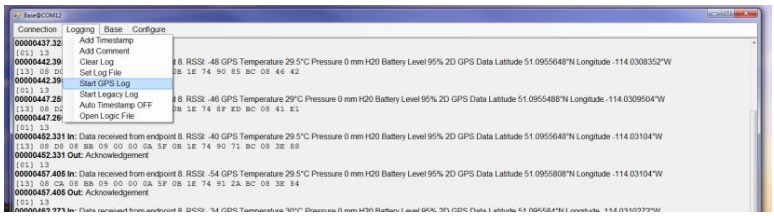
The mmaTool will update indicating that the message was sent and acknowledged. Future polls from the base to the network extender will indicate that the network extender is no longer available.



Additional Notes

- The log file created in step 10 above is a text file which can be readily opened in spreadsheet programs such as Excel, parsed and post processed. For example, to separate out and convert the polled data from the endpoint in to appropriate units.
- [Optional] A GPS log file can be created by selecting *Logging* > *Start GPS Log*.



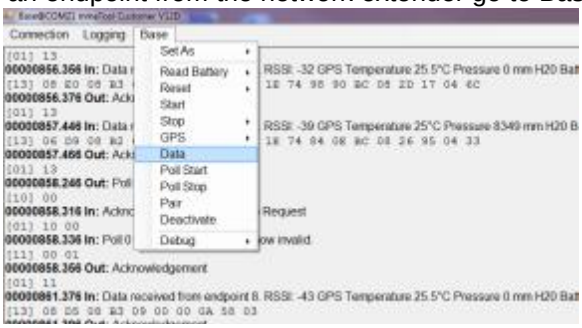
A pop up window will appear for you to save the file.

- The Raw Hex Data can also be processed if desired. An example is illustrated below:

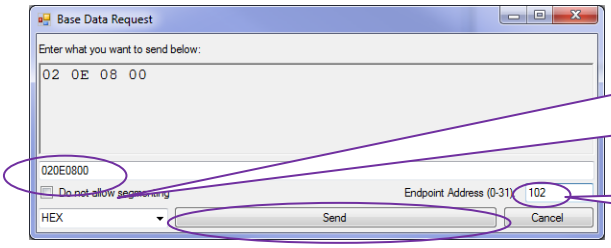
For the polls, the Raw Hex Data can be translated as following. See the MLink Modem Interface Control document for additional information.

[13]	Message ID
08	Endpoint Address 8
CC	RSSI CC (Hex) -> 204 (Dec) -> 204 - 256 = -52 dBm
08	Tag: Temperature data available
B4	Temperature: B4 (Hex) -> 180 (Dec) -> 180/2-64 = 26 C
09	Tag: Pressure data available
0000	Pressure: 0000 (Hex) -> 0 (Dec) mm H20
0A	Tag: Battery Level data available
64	Battery Level: 64 (Hex) -> 100 (Dec) -> 100 %
1B	Tag: GPS data available
1E74933A	1E74933A (Hex) -> 510956346 (Dec) -> 51.0956346 N
BC0822D8	BC0822D8 (Hex) -> -1140317480 (Dec) -> 114.0317480 W
042D	042D (Hex) -> 1069 (dec) -> 1069 m

If you want to deactivate an endpoint from the network extender go to Base > Data.



The Base Data Request window will pop up. Enter the following command to deactivate the endpoint on the network extender.



Type in the first entry bar "020EXX00". Where XX is the Endpoint address assigned by the Network Extender and is 08 in this example.

Enter the address of the Network Extender here.

020E0800

Contact Information

- Phone Number: (403)-777-9988
- Email: support@aurorawirelessnetworks.com