App Note: Connecting the ORB-X1 to a UDP server over WiFi.

This application note discusses the connection of a Senquip ORB-X1-W to a UDP server over Wi-Fi. It will describe connecting the ORB to a Wi-Fi network and the configuration of the ORB to send UDP data.

Hardware Interconnect

The ORB-X1-W only requires power to operate a UDP link. The Wi-Fi antenna is internal to the ORB.

Pins 1 and 2 of the ORB should be connected to power and ground. Power can be any voltage from 9V to 75V and can be permanent power or can be provided by a solar panel or AA batteries. It is recommended that a 1A fuse be inserted between the power source and power connection of the ORB. The fuse protects the power source in the event that the ORB fails of the positive wire comes loose.

ORB Configuration

If you are configuring the ORB for the first time, use a phone, tablet or laptop to access the ORB's integrated webserver. To activate the webserver, press the setup key on the ORB for 2 seconds and then connect to the ORB's Wi-Fi on your phone, tablet or laptop. Passwords for the ORB's Wi-Fi and webserver can be found on a tear-off sticker under the lid of the ORB. For further details on how to access the webserver, please see the "ORB-X1 User Guide". If the ORB is already available on the Senquip Portal, simply login to the Portal and make the required changes remotely.

In this application, we will use a UDP server called "Udp Client Server" by NSauditor. The client server has determined that it has an IP address of 192.168.1.49. We have specified the port as 11000. The IP address field should be used if you want to send packets to the ORB. It will not be used in this application.

Once you have entered your port number, press "Start Server" to begin.

Note that only settings used in connection of a Senquip ORB-X1-W to a UDP server over Wi-Fi are discussed in this application note.
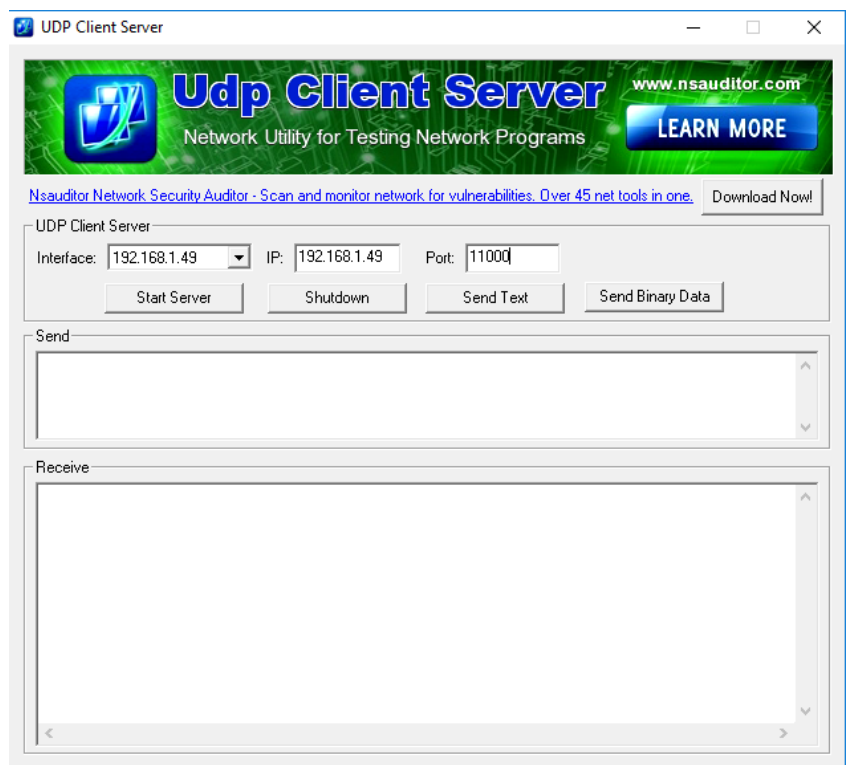
General Setup

For general setup, use the ***General*** tab on the ORB webserver. Remember to save when complete.

1. Give the ORB a name that is meaningful to the user, in this case, the vehicle registration, "CAT018."

2. In this application, we will forward data to the UDP server once every minute. There is no reason to wake up more regularly than this and so the base interval is set at 60 seconds.

3. Set the Transmit Interval to 1 so that a UDP packet will be sent each time the ORB wakes to take measurements.

4. There are no warnings or alarms used in this application that require faster updates be sent and so the Exception Interval is set to be the same as the transit interval.

5. By turning on Device Always On and Web Server Always On, the ORB will remain awake and the webserver will be accessible on the local WiFi network at all times.

General

Device ID	4299A5340
Device Model	X1-W
Firmware Version	2018090411
Device Name	CAT018
Base Interval	60 Seconds
Transmit Interval	1
Exception Interval	1
Device Always On	☑ Enabled
Web Server Always On	☐ Enabled

Power Input

Power Loss Alert	☐ Enabled
Threshold	10 Volts

AA Battery

AA Battery Low Alert	☐ Enabled
Threshold	4.8 Volts

Lipo Battery

Lipo Battery Low Alert	☐ Enabled
Threshold	3.4 Volts

www.senquip.com

Network Setup

The ORB is to be connected to a Wi-Fi network. To configure and connect the ORB to the WiFi network, use the **Network** tab on the ORB webpage.

1. Press the Scan for Wi-Fi Networks tab to search for your network.
2. When found, press the network name to auto-populate the SSID field. If the SSID is hidden, enter it directly.
3. Enter the WiFi password.
4. Save and re-boot the ORB. If the SSID and password are correct, the ORB will attach to the WiFi network.
5. To check if the ORB has successfully connected, re-enter setup mode and select the Network tab. At the top of the page, the connection status and IP address on the Wi-Fi network are given. This IP address can be used to access the ORB webserver from this point on.

⑤ Connected to At The Beach 2 with IP: **192.168.1.196**

① Scan for Wifi Networks

② At The Beach 2	-65 dBm	WPA WPA2 PSK
BelongCE7062	-79 dBm	WPA2 PSK
Fon WiFi	-80 dBm	Open
DODO-467C	-81 dBm	WPA WPA2 PSK
OPTUS_F2EAA6	-83 dBm	WPA2 PSK
Telstra114F69	-84 dBm	WPA2 PSK
Telstra Air	-84 dBm	Open
OPTUS_FF6AEB	-87 dBm	WPA WPA2 PSK
OPTUS_85AF75	-88 dBm	WPA WPA2 PSK

Wifi

SSID   ② SSID

Password   ③ Password

Advanced

Save Settings

Save settings and reboot the device:

④ Save Settings

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Endpoint Setup

To setup the server to which the data is to be sent, in this case a UDP server with address 192.168.49 and port 11000, use the *Endpoint* tab on the ORB webpage.
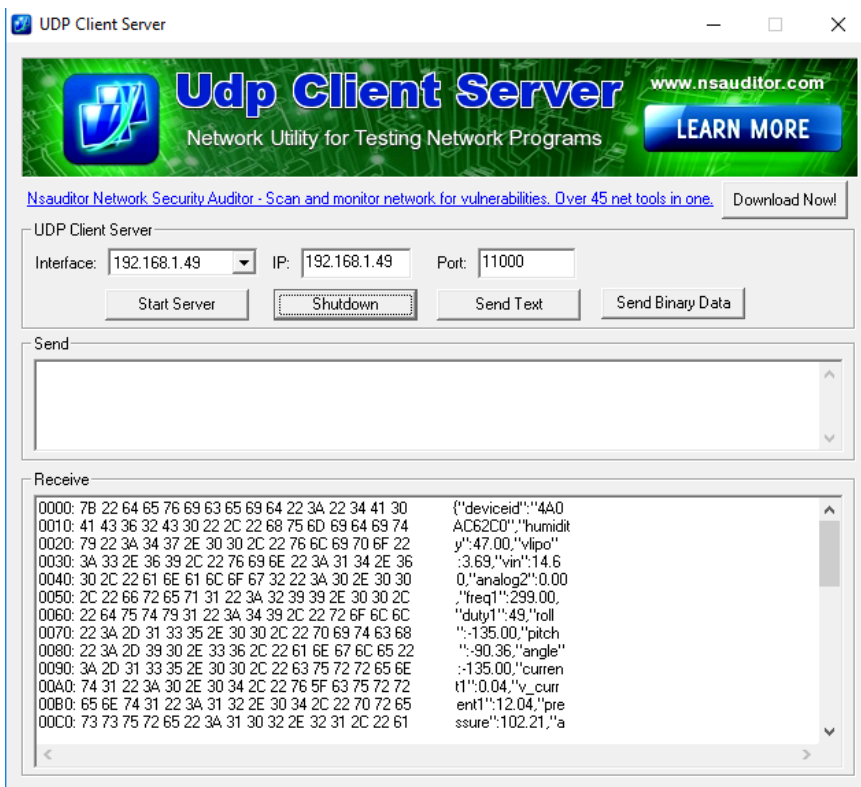
1. If data is to be sent to the Senquip Portal, enable this option.
2. In this application, data is to be sent to a UDP server, so UDP needs to be enabled.
3. Enter the IP address of the UDP server followed by a colon and the port.
4. If you would like a readable timestamp on each message, tick this box.
5. I you would like to report network information like your IP address on the local port, select this box.

Data Endpoints

Senquip Portal	**1**	☑ Enabled
Offline Buffer		☐ Enabled
UDP	**2**	☑ Enabled
UDP Address	**3**	192.168.1.49:11000
HTTP POST		☐ Enabled
HTTP Address		example.com/api:80
Add Formatted Time	**4**	☐ Enabled
Report Network Info	**5**	☑ Enabled

Save your settings and re-boot the ORB to apply your setup.

Once the ORB has re-booted and connected to your Wi-Fi network, data will begin to arrive on the remote UDP client server. Note that the format of the data is JSON; further detail on the format of the transmitted data can be found in the "ORB-X1 User Guide".

UDP Client Server

Udp Client Server
www.nsauditor.com
Network Utility for Testing Network Programs
LEARN MORE

Nsauditor Network Security Auditor - Scan and monitor network for vulnerabilities. Over 45 net tools in one.   Download Now!

UDP Client Server
Interface: 192.168.1.49   IP: 192.168.1.49   Port: 11000
Start Server   Shutdown   Send Text   Send Binary Data

Send

Receive

```
0000: 7B 22 64 65 76 69 63 65 69 64 22 3A 22 34 41 30    {"deviceid":"4A0
0010: 41 43 36 32 43 30 22 2C 22 68 75 6D 69 64 69 74    AC62C0","humidit
0020: 79 22 3A 34 37 2E 30 30 2C 22 76 6C 69 70 6F 22    y":47.00,"vlipo"
0030: 3A 33 2E 36 39 2C 22 76 69 6E 22 3A 31 34 2E 36    :3.69,"vin":14.6
0040: 30 2C 22 61 6E 61 6C 6F 67 32 22 3A 30 2E 30 30    0,"analog2":0.00
0050: 2C 22 66 72 65 71 31 22 3A 32 39 39 2E 30 30 2C    ,"freq1":299.00,
0060: 22 64 75 74 79 31 22 3A 34 39 2C 22 72 6F 6C 6C    "duty1":49,"roll
0070: 22 3A 2D 31 33 35 2E 30 30 2C 22 70 69 74 63 68    ":-135.00,"pitch
0080: 22 3A 2D 39 30 2E 33 36 2C 22 61 6E 67 6C 65 22    ":-90.36,"angle"
0090: 3A 2D 31 33 35 2E 30 30 2C 22 63 75 72 72 65 6E    :-135.00,"curren
00A0: 74 31 22 3A 30 2E 30 34 2C 22 76 5F 63 75 72 72    t1":0.04,"v_curr
00B0: 65 6E 74 31 22 3A 31 32 2E 30 34 2C 22 70 72 65    ent1":12.04,"pre
00C0: 73 73 75 72 65 22 3A 31 30 32 2E 32 31 2C 22 61    ssure":102.21,"a
```

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Senquip Portal

In this application, data is being sent to a UPD server every 1 minute. The Senquip Portal was however also selected as an endpoint and so the data will be available online on the Portal.

To view the data on the Senquip portal, go to: https://portal.senquip.com and create an account. Add the ORB to your account using the id and password under the lid. You can now view your data anywhere in the world, real-time.

Conclusion

Connecting an ORB to a Wi-Fi network is quick and easy. When using the ORB, you can forward your data to any server via UDP, HTTP or MQTT. Use of the Senquip Portal is optional but is recommended in order to be able to do remote settings changes and firmware updates.