

Rapidlogger Systems

Troubleshooting Intermittent or Dropped WiFi Connections

This tech note describes the process to diagnose a WiFi connection between a Rapidlogger System and the RapidVu computer that worked at setup but now drops or is intermittent. It includes a small logging program that records the WiFi signal and the connection to the Rapidlogger together. For the initial setup of the WiFi hardware see Tech Note #49 (EnGenius), Tech Note #65 (TP-Link nano router) or Tech Note #66 (Ubiquiti Bullet AC bridge).

How the WiFi Link Is Arranged

The Rapidlogger unit itself has no radio. It is connected by an Ethernet cable to a WiFi access point built in to the antenna on top of the Rapidlogger, and the access point carries the radio link. In the standard setup the access point is at 192.168.0.1, the Rapidlogger is at 192.168.0.5 and the computer running RapidVu joins the 'Rapidlogger' wireless network (Tech Notes #5, #6 and #9). There are three access point products in use:

- All Rapidlogger units built after 2021: TP-Link TL-WR802N nano router (Tech Note #65), either as the Rapidlogger access point or in Client mode where it joins the customer's own WiFi network.
- Older Rapidlogger units built before 2021: EnGenius ENS202EXT outdoor access point (Tech Note #49), powered through a PoE injector.
- All high powered wireless systems: Ubiquiti BulletAC-IP67 pair in bridge mode (Tech Note #66) for a long distance point-to-point link.

A dropped connection can therefore be a radio problem (the link between the computer and the access point, or between the two bridge radios), a network problem (IP addresses), or a power problem at the access point. The steps below separate these.

Likely Causes

- Distance or obstruction: the computer or the access point has moved, or a metal structure (tank, pump truck cab, container) now stands between them. Metal blocks

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WiFi almost completely. On a bridge link (Tech Note #66) an antenna knocked out of alignment during transport has the same effect.

- **Interference:** the TP-Link and EnGenius units operate on the crowded 2.4 GHz band. Other access points, phone hotspots and radios on location can take the channel.
- **Computer WiFi behaviour:** Windows may switch the computer to another saved network that offers internet access, because the Rapidlogger network has none. Windows power management can also switch the WiFi adapter off to save power.
- **IP address conflict:** another device on the network has taken 192.168.0.5 or the computer's address.
- **Access point power:** the TP-Link runs from a 5 V USB supply and the EnGenius and Bullet from PoE injectors. A loose plug or a brownout on the truck's supply restarts the access point, and the link drops for about a minute each time.
- **Ethernet cable:** the cable between the access point and the Rapidlogger has worked loose or is damaged. This looks like a WiFi drop but the WiFi signal stays strong.

Measuring the Signal

The access points do not all report signal strength. The TP-Link nano router shows only the MAC address and packet counts of connected computers on its Wireless Statistics page; it has no signal reading. The EnGenius and Ubiquiti web pages do show signal in dBm for each connected device. In every case, however, the signal as seen by the computer is the reading that matters for RapidVu, and Windows reports it directly. Open a command prompt (Start, type cmd) and enter:

```
netsh wlan show interfaces
```

The 'Signal' line shows the strength of the computer's link to the access point as a percentage. 100% is next to the access point. Readings of 70% or more are good. Below about 40% expect slow updates and drops. The 'SSID' line confirms the computer is on the Rapidlogger network and not on another one.

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Logging the Signal and the Connection

An intermittent drop is easiest to diagnose with a log that shows the signal and the connection together. Open Notepad, copy and paste or type in the nine lines below exactly as shown, and save the file as wifilog.bat (choose 'All Files' as the file type). Double-click the file to start logging.

```
@echo off
:loop
echo %time% >now.txt
netsh wlan show interfaces | findstr "Signal disconnected" >>now.txt
ping -n 1 -w 1000 192.168.0.5 | findstr "Reply out fail" >>now.txt
type now.txt
type now.txt >>wifilog.txt
ping -n 6 127.0.0.1 >nul
goto loop
```

Line 3 writes the time. Line 4 picks the Signal line out of the Windows WiFi report. Line 5 pings the Rapidlogger and keeps the answer. Lines 6 and 7 show the sample on the screen and add it to the log file. Line 8 waits five seconds and line 9 repeats. Every six seconds the program prints three lines on the screen, for example:

```
9:41:10.49
Signal                      : 86%
Reply from 192.168.0.5: bytes=32 time=3ms TTL=64
9:41:16.50
Signal                      : 31%
Request timed out.
```

The same lines are added to the file wifilog.txt in the same folder, which can be opened in Notepad after the job. Close the window to stop. If the Rapidlogger is not at 192.168.0.5, change the address on line 5. If the computer has left the WiFi network the Signal line is replaced by 'State : disconnected'.

NOTE: The file must be saved with the .bat extension, not .txt, or Windows will open it in Notepad instead of running it.

Leave the log running on the RapidVu computer during a job, or walk the computer around the unit while watching the screen. Read the result as follows:

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Log pattern	Meaning	Action
Signal falls, then 'Request timed out'	Radio range or obstruction	Move the computer or the access point, raise the access point, clear the line of sight
Signal steady and high, 'Request timed out'	Not a radio problem	Check the IP addresses, the Ethernet cable and the access point power
'State : disconnected' or 'transmit failed'	Computer has left the WiFi network	Check which network Windows connected to; stop Windows switching networks or turning the adapter off
Signal good, 'Request timed out' for about one minute at intervals	Access point restarting	Check the access point power supply and plug
Signal varies widely while standing still	Interference	Change the WiFi channel

Diagnostic Steps

1. Check the signal with netsh or the log above. If it is low, move the computer closer to the access point and confirm the drops stop. Then fix the placement: mount the access point as high as practical, away from tanks and steel, with a clear view of where the computer is used.
2. Confirm the computer is on the Rapidlogger network. In Windows WiFi settings open the Rapidlogger network and tick 'Connect automatically'. Remove or untick other saved networks that are in range at the job site so Windows does not switch to them.
3. Stop Windows switching the WiFi adapter off. In Device Manager open the WiFi adapter, Power Management tab, and untick 'Allow the computer to turn off this device to

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save power'. Set the Windows power plan so that the computer does not sleep while RapidVu runs.

4. Check the IP addresses. From the command prompt enter 'ipconfig' and confirm the computer is on 192.168.0.x. Enter 'ping 192.168.0.1' (the access point) and 'ping 192.168.0.5' (the Rapidlogger). If the access point answers and the Rapidlogger does not, the problem is on the Ethernet side: re-seat the cable between the access point and the Rapidlogger and check that no other device has been given 192.168.0.5.
5. Check the access point power.
6. Change the WiFi channel if interference is suspected. A WiFi analyzer app on a phone shows which channels are busy. Log in to the access point and set the channel to the least used of 1, 6 or 11, then reconnect the computer.
7. Power cycle the access point and the Rapidlogger together, then run the log again for the length of a job.

If the Problem Persists

Send the following to support@rapidlogger.com: the wifilog.txt file, the access point model, the distance and any obstructions between the computer and the access point, the Rapidlogger serial number (Tech Note #2) and the RapidVu version. The log shows whether the signal was lost before the connection dropped, which is the key fact for diagnosis.