WP2P Repeater

User Guide

WP2P Repeater

Version 1.5





QTECH DATA SYSTEMS

Contents

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Revision Details

1.1	February 2015	First Edition
1.2	May 2015	Minor error corrections
1.3	September 2019	Quick Start Guide updated to User Manual. First issue to support Rev E hardware.
1.4	January 2020	Minor error corrections
1.5	January 2024	Updated spec and minor corrections

About This User Guide

This document provides assistance with the installation and operation of the QTech Wireless Point to Point Repeater. Included in this document is:

- How to install the WP2P Repeater
- WP2P Repeater operation
- Device Configuration
- Device Specifications

Contact QTech for application notes, which can be obtained to provide guidance for specific configuration scenarios, detailing the configuration workflow steps.

Product overview

To increase the range and/or coverage an optional Repeater Module is available for the WP2P systems.
The Repeater module can be specified for use with any WP2P Digital system or WP2P Analogue & Digital I/O system but as there is configuration that needs to be performed by QTech to securely address the modules together, adding a Repeater to existing systems is not possible without returning those systems to QTech.

The Repeater module is in the same style case as the WP2P modules but is easily identified as it has no physical input/output (I/O) connectors.

Each WP2P Repeater is supplied with:

Qty 1	Repeater Module
Qty 1	Stub antenna
Qty 1	User Manual

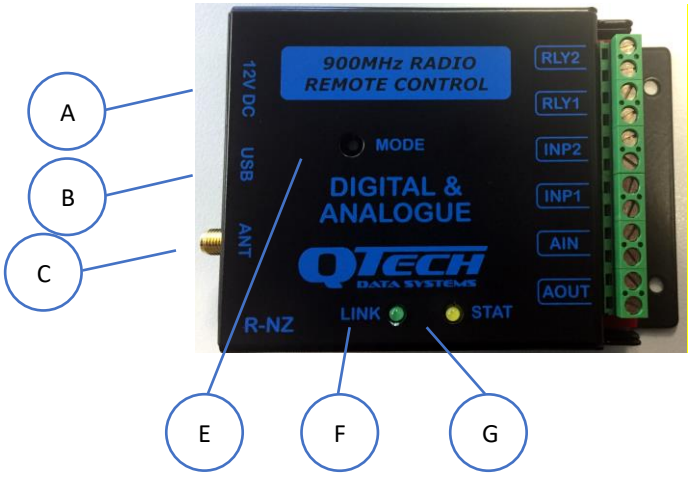
All power supplies are optional and need to be selected to suit the application.

When a pair of WP2P modules are configured for Repeater operation, each WP2P Module addresses its wireless packets/data to the repeater, not to the other WP2P module.
The repeater then re-transmits the wireless packets to the receiving WP2P module. The WP2P modules will only receive wireless packets from a repeater. This helps ensure the most reliable communication options and prevents a multi-packet reception issue.

Features

- 900 MHz (FSK modulation) short range radio up to approximately 400m for local network communications. Extensible up to 4000m with high gain antenna configurations.
- Supports use of a single repeater for difficult terrain or range extension
- Digital inputs can be configured as pulse counting inputs
- USB interface for diagnostics and firmware upgrades
- Solar power charging and battery operation (when supplied with QTech RSS01 Remote Solar Station enclosure
- Firmware is field upgradeable

Hardware



Feature	Function
A	Power Input (nominally 12V DC
B	USB Type Mini B for firmware upgrades and configuration
C	RF connector SMA
E	Mode pushbutton
F	LINK Indicator LED (device link communications state)
G	STAT Indicator LED (device status and power on indicator)

Installation Notes

To comply with the New Zealand and Australian wiring regulations the WP2P cannot be connected to any external Voltages exceeding 32 Volts AC or DC. To connect to or control higher Voltage equipment please consult a Registered Electrician.

Mounting

For indoor mounting, the device should be mounted onto a flat surface using the Qty 4x M4 fixing holes at ~103mm x 50mm centres. Where the device is to be operated outside or in other adverse site conditions, then, the device should be housed in an appropriate plastic enclosure.

For outdoor mounting, use the RSS01 solar charging environmental enclosure and follow the installation guide for those products. Alternatively use a minimum of IP65 rated enclosure to suit the device and any additional equipment to be housed, ensuring that all cables use suitable cable glands.

If the WP2P is to be enclosed in a metal cabinet, then an optional external antenna will be needed. Please contact your equipment supplier for alternative antenna details and advice.

Avoid mounting in locations that may be subject to shock or vibration or temperature extremes.

Antenna

The antenna selected for the Repeater will most likely be an "omni directional" whip type antenna.

We recommend QTech's part number 1-PD9241 (900MHz 3dB Vertical Fiberglass Whip antenna) or 1-PD9242 (900MHz 6dB Vertical Fiberglass Whip) as a suitable antenna for the repeater. These are external mounting, professional grade antenna with 5m of coax and a stainless mounting bracket.

Each Repeater module is supplied with the standard stub antenna which is perfect for system testing and short range applications.

The use of directional Yagi type antennas is unlikely to be a suitable solution for a Repeater. For best performance mount the antenna up high and away from large objects.

> ⚠ Warning – Do not operate the device without an antenna attached. Do not substitute antennas; use only those antennas recommended by your equipment supplier. Failing to comply with these requirements can damage the device.
>
> Never operate the devices in violation of RSM conditions. AS/NZS 4268:2008 specifies a maximum EIRP of 1 watt.

Power Supply Notes

Power Supply & Current Consumption

The WP2P can operate from a DC power supply of 6 – 24 Volts. Current consumption averages ~6mA independent of output relay state. The power connector is a 2.1mm DC Socket, centre pin positive. The supply Voltage should be clean, continuous and transient free with an output of 6 - 24 Volts DC. The WP2P incorporates reverse and over Voltage protection.

> ⚠ **Warning – Do NOT use Switch Mode Power Supplies (SMPS) with this product. The DC power supply used for this product MUST have a grounded negative or be a "linear" transformer-based plug pack. The reason is that the antenna, programming port and external connections can provide exposed earth points and the SMPS can impose an AC voltage on the DC ground, which can lead to damage. Suitable cost-effective plug packs are available from QTech P/N PD5412, PD5413 & PD5414.**

The WP2P Repeater is over Voltage protected to 30 Volt. Voltages greater than 28 Volts DC will blow the internal 500mA fast blow fuse. Any solar/battery design needs to take this into account.

Internal Fuse

The device is protected by a 20mm x 5mm 500mA fast blow fuse. This is located on the internal circuit board. To access the fuse, remove the top cover by carefully prizing it off its retaining dimples. Only replace the fuse with an identical type, do not use alternatives. This fuse will blow if the power supply maximum voltage is exceeded.

Radio Address (RA)

All WP2P systems have a unique *Radio Address* which is programmed into WP2P modules during manufacture as security measure to prevent unauthorised access. The Radio Address is printed on the WP2P case represented in the following format "192.168.0.0".

***Note* - All WP2P modules in a given system must have the same first three numbers in their Radio Address. The 4th number must be a sequential pair starting from the even number e.g. 0.1.1.40 & 0.1.1.41.**

The Radio Address must be stated for purchasing for WP2P module replacement.

Using Multiple WP2P Systems in the same area

There are ten individual frequency bands referred to as *Channel Numbers* allowing up to ten WP2P systems to be used in the same area. The Channel Number is identified by the "#" on the packaging label; this example is "Channel #1".

Warning – Do not use the same channel for adjacent systems. For example, if you currently use "#1" ensure that the adjacent system is "#3" etc.

Operation Notes

How the modules communicate

The WP2P modules use an event driven approach to communications. When the WP2P modules detect a change of their input state, they will immediately transmit a message to the other module. There is however, a very small chance that another radio device on that channel wanted to send a message at exactly the same time. This will result in a "collision", but the WP2P modules can detect this and use a collision avoidance scheme to retransmit their messages.

STAT Indicator

The STAT indicator (marked as "OKAY" on the PCB internally) indicates the current operational status of the device. It provides a heartbeat indication that the device is operating ok or it displays a coded error indication for faults.

Faults may be latched so that the device remains indicating an error condition even if the fault has been removed. In this way the device can be reviewed at a later time to show that a problem had occurred.

Pressing the mode switch briefly will clear the error condition indication on the STAT LED. If the fault is still present then the STAT LED will redisplay the error condition.

Code	Meaning
1 short flash, 2s interval	Normal operating mode, processor running, no active errors
2 short flashes, 2s interval	Unspecified intermittent communications fault. A communications failure as occurred recently.
~4 Short flashes on power up	Indicates the device booting after power up or watchdog reset. LED should usually then display normal operating mode indication.

Link Status Indicator

WP2P modules have a Link Status LED which is located next to the power connector.

This is to assist with site diagnostics and checking by indicating the state of the communications link between pairs of WP2P modules.

The Link light functions as follows:

- OFF – Module failure, no power, fuse blown, circuit failure, etc.
- SLOW FLASH – Module functioning but no communication with its partner module.
- ON – Healthy wireless communications. The LED will briefly flicker each time it receives messages from the other WP2P module.

Link Status indicator is based on the "keep-alive" message the WP2P modules send if it has been longer than 30 seconds since they last sent a message. Therefore, if one of the modules is turned off, it will take no longer than 30 seconds for the other module to detect that the link is down and begin flashing the Link Status LED. If the connected I/O is changing more frequently than once every 30 seconds, then they don't need to send keep-alive messages.

MODE Pushbutton Switch

Pressing the mode switch briefly will clear the error condition indication on the STAT LED. If the fault is still present then the STAT LED will redisplay the error condition.

Technical Specifications

Note. Specifications are subject to change without notice.

Item	Parameter	Specification
General		
	Dimensions	112 x 75 x 26 mm Mounting holes 4 x M4
	Weight	250 g
	Temperature	Operating: 0-70 degrees C Storage 0-70 degrees C
	Humidity	0-90% non-condensing
	Ingress Protection	IP20 Water contact must be avoided.
	Power	Input voltage: 6 – 24V DC (Max 28V DC) Current: 6mA nominal. Internal 500mA fast blow fuse
	Indicators	STAT – operational status and power LINK – communications link activity
	Pushbutton	Operating Mode switch
Radio	Regulatory	ISM band, AS/NZS 4268
	Antenna	Detachable SMA
	Operating Frequency	917 – 927 MHz
	Output power	20 dBm max. →100mW
	Modulation	GFSK
Communications		
	USB	USB 2.00, type Mini-B connector Interface (configuration and firmware upgrades)

Warranty

The hardware and software for this product is covered by the QTech Limited Warranty Agreement and software End User License Agreement, respectively.

Please refer to the QTech Limited Product Warranty Agreement, which may be downloaded from the QTech website: www.qtech.co.nz

QTech Data Systems Limited does not warrant the suitability of this product for any particular application as the conditions in which it is used are beyond our control. This is not withstanding warranty of merchantability.

Additional Information and Support

If you have problems try the following:

- Visit the QTech web site for application notes and guides
- Refer to the troubleshooting section if one is present in this document
- Contact the support desk at support@qtech.co.nz
- Phone the support desk, contact details at beginning of this document