Repeater
Point-to-Point Wireless Repeater

General information

The Point-to-Point **Repeater** is the perfect addition to a **Twin Link** system where the **Input** and **Output** nodes are out of range, or a line of sight connection is interrupted by buildings or hilly terrain.

The **Repeater** It works by retransmitting incoming signals from other nodes in the network, enabling you to boost your range and navigate around obstacles.

A **Repeater** will extend the range of your **Twin Link** by up to 1.5km (0.9mi) LOS using the supplied antenna. Add up to 15 repeaters in a single Point-to-Point system, and that's a wireless transmission distance of up to 24km (14.9mi).

FCC ID 2ACTT-1409   CE   **R-NZ** E2180

IMPORTANT:
Please refer to your 'Twin Link' manual for full setup instructions.

Full details on how to set up your Repeater node can be found in Section 11 of your Twin Link manual. The information provided in the remainder of this document is intended as a brief guide and should not replace the full document.

The Twin Link manual can be downloaded from: **defineinstruments.com/twin-link-manual**

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SAFETY NOTICES

For your safety and the prevention of damage to your Repeater, as well as other equipment affected by its operation, **please read and carefully observe all safety regulations and instructions**. Use of this instrument in a manner not specified by the manufacturer may compromise the protection provided by the instrument.

Define Instruments has not approved any change or modification to this device by users. Any modification or change could void users' authority to operate this equipment. Please refer to CFR 47, Section 15.21.

The Twin Link system should not be used to directly drive valves, motors, or other actuators, unless equipped with appropriate safeguards. It is the responsibility of the user to identify potential hazards that may arise in the event of a fault to the Repeater unit, and implement safeguards for the prevention of harm to persons or equipment.

CAUTION
Risk of electric shock

CAUTION
Risk of danger
For your safety, please read complete instructions prior to installation and operation of a P2P node. In particular, consult the 'Twin Link' manual in all cases where hazard symbols are marked on your P2P-I, P2P-O or P2P-R units, in order to understand and avoid potential hazards. The safety of any system incorporating these units is the responsibility of the assembler of the system.

CAUTION
Observe minimum safe distance
Define Instruments P2P units comply with CFR 47, Section 1.1307(b)(1). For your safety, please observe a minimum safe distance of 20cm (7.87").

1   SETUP

In the majority of cases, the Repeater requires no setup. Simply install the unit in a suitable location and supply power, and it will automatically be included in your P2P network.

When the two 'NTWRK STATUS' LED's on the Repeater start toggling, a connection has been established you are ready to start transmitting data.

Connections between the Twin Link nodes and any Repeaters are established using a **Mesh ID** code (printed in large type on the unit label).

Provided that all the **Mesh ID's** in your network match, and all wireless nodes are **powered up** and **within range** of one another, any Repeaters that you add will be included in the network automatically.

You will only need to connect the Repeater to ToolBox for programming IF:

›   The **Mesh ID** on the Repeater label differs from the **Mesh ID** printed on your Twin Link units (see 11.3 in the Twin Link manual) **OR**

›   You need to change the *Wireless Transmit Power* to comply with local regulations (see 6.5 in the Twin Link manual)

To troubleshoot connectivity issues, please see 12.2 in the Twin Link manual.

2   SPECIFICATIONS

2.1 - Ordering codes

P2P Nodes

P2P-R	Point-to-Point Repeater Node (up to 15/network)
P2P-TWIN-LINK	Point-to-Point paired I/O units (P2P-I + P2P-O)

Accessories

WG-3DBI	Included	3DBi Monopole antenna (Range= 1.5km [0.9mi] LOS)
WG-8DBI*	Sold Separately	8DBi Monopole antenna (Range= 2.7km [1.7mi] LOS)
WG-AEC*	Sold Separately	Antenna extension cable, 30cm (0.98ft)
BRIDGE-KEY*	Sold Separately	USB Bridge Key for software programming

***** *Starred accessories are not FCC approved.*

2.2 - General specifications

Transmission

RF data rate 250Kb/s

RF frequency range 2405-2475MHz

RF transmission power +20dBm
(10dBm selectable in software for regions with transmission power restrictions)

Transmission range Up to 1.5km (0.9mi) LOS with supplied antenna (WG-3DBI).
All nodes must be set to full power [+20dBm] for max range.

RF receiver sensitivity -110dBm

Number of RF channels 15

Number of wireless nodes Up to 17 nodes per mesh (1x P2P-I, 1x P2P-O, 15x P2P-R)

Spreading method Direct sequence

Modulation O-QPSK

USB programming

Simple software programming
USB programming using Define ToolBox, via the *Twin Link Input Node.* Bridge Key required (sold separately)

Power

Power supply 9–36V DC, 2.5VA max

Construction

35mm DIN rail mount casing
IP20 rated - Install in a protective enclosure. Installation Category II; Pollution Degree 2; Flame resistant

Dimensions (H x W x D)
101 x 23 x 120mm (3.98 x 0.91 x 4.72")

Dimensions (H x W x D, with antenna)
150 x 23 x 146mm (5.91 x 0.91 x 5.75")

Single unit weight 113g (4oz), includes antenna and plugs

Environmental conditions

Operating temp -20 to 55°C (-4 to 131°F)

Storage temp -20 to 65°C (-4 to 149°F)

Operating humidity 0–85% non-condensing

Altitude 2000m (6561ft)

Compliances

IP20 enclosure rating

FCC ID: 2ACTT-1409
47 Code of Federal Regulations; Part 15 - Radio Frequency Devices; Subpart C - Intentional Radiators, including Section 15.247 - Operation in the band 2400 –2483.5MHz

AS/ANS 4268:2012
Radio equipment and systems - Short range devices - Limits and methods of measurement

ETSI EN 300 440-2, V1.4.1, 2010
Electromagnetic compatibility and Radio spectrum matters (ERM); Short Range Devices (SRD); Radio equipment to be used in the 1GHz to 40GHz frequency range; Part 2: Harmonised EN under article 3.23 of the R&TTE Directive
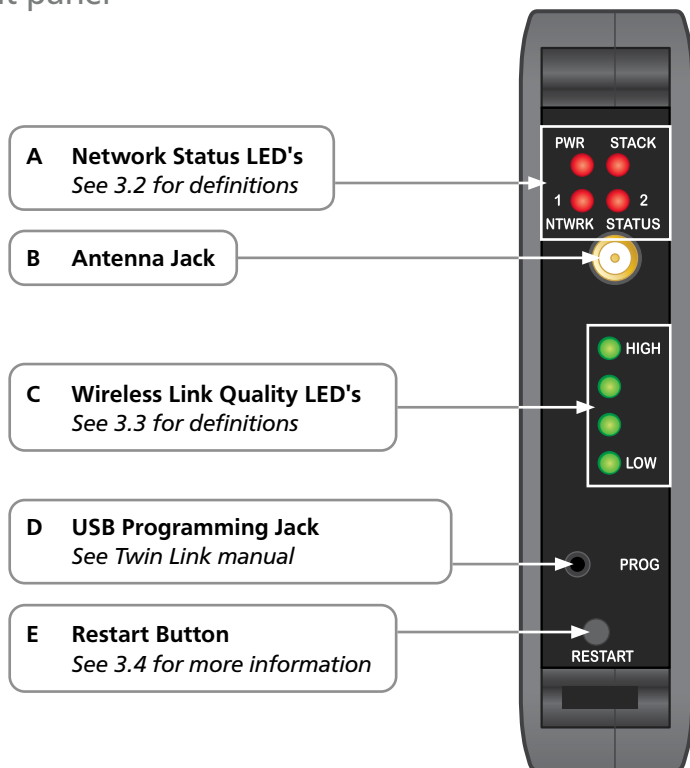
EN 301 489-3, V1.6.1, 2013
Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short Range Devices (SRD) operating on frequencies between 9kHz and 40GHz

3   FRONT PANEL & LED'S

3.1 - Front panel

A   **Network Status LED's**
See 3.2 for definitions

B   **Antenna Jack**

C   **Wireless Link Quality LED's**
See 3.3 for definitions

D   **USB Programming Jack**
See Twin Link manual

E   **Restart Button**
See 3.4 for more information

3.2 - Network status LED's

| LED	State	Definition
PWR	On	Power supplied
STACK	Flashing	Node is transmitting or receiving
NTWRK STATUS 1&2	Both Flashing	Cannot connect to the network
	Toggling	Wireless network successfully established - ready to transmit or receive

3.3 - Wireless link quality LED's

The green **Wireless Link Quality** LED's are used to indicate the quality of the wireless connection between nodes.

HIGH indicates 100% link quality, while **LOW** indicates approximately 80% link quality (i.e. 80% of the receiving packet intact.) For the most stable and reliable wireless connection, the link quality should be at **HIGH**, or as close to it as possible.

In a network with one or more **Repeaters**, each node indicates the link quality between itself, and the nearest node that it can reach in the direction of the **Output** node.

For example, in the network below:

› **The Input node** indicates quality of link C
› **Repeater 2** indicates the quality of link B
› **Repeater 1** indicates the quality of link A
› **The Output node** indicates the quality of link A
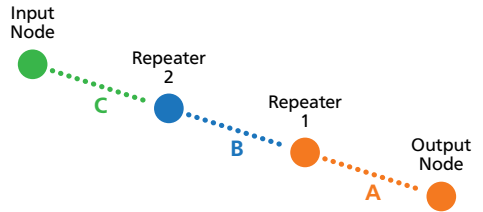
3.4 - Restart button

The **Restart** button can be used to reboot the node in the event of a malfunction. (This action is the same as turning the power on and off again - all user settings will be retained.)

To prevent accidental use, the **Restart** button is inset and can only be pressed with a fine-tipped, blunt instrument, such as a pen or small screwdriver.

For further details on your Repeater, including wiring, installation and case diagrams, please see the Twin Link manual.
The Twin Link manual can be downloaded from: **defineinstruments.com/twin-link-manual**

A   APPENDIX A - WARRANTY & USER'S RESPONSIBILITY

A.1 - Warranty

Define Instruments warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from date of shipment.

Define Instruments's obligations under this warranty are limited to replacement or repair, at its option, at its factory, of any of the products which shall, within the applicable period after shipment, be returned to Define Instruments's facility, transportation charges pre-paid, and which are, after examination, disclosed to the satisfaction of Define Instruments to be thus defective.

The warranty shall not apply to any equipment which shall have been repaired or altered, except by Define Instruments, or which shall have been subjected to misuse, negligence or accident.

In no case shall Define Instruments's liability exceed the original purchase price. The aforementioned provisions do not extend the original warranty period of any product which has been either repaired or replaced by Define Instruments.

A.2 - User's Responsibility

We are pleased to offer suggestions on the use of our various products, by way of printed matter, on our website, or through direct contact with our sales/application engineering staff.

However, since we have no control over the use of our products once they are shipped, NO WARRANTY, WHETHER OF MERCHANTABILITY, FITNESS FOR PURPOSE OR OTHERWISE is made beyond repair, replacement, or refund of purchase price at the sole discretion of Define Instruments.

Users shall determine the suitability of the product for the intended application before

using, and the users assume all risk and liability whatsoever in connection therewith, regardless of any of our suggestions or statements as to application or construction.

In no event shall Define Instruments's liability, in law or otherwise, be in excess of the purchase price of the product.

Define Instruments cannot assume responsibility for any circuitry described. No circuit patent or software licenses are implied. Define Instruments reserves the right to change circuitry, operating software, specifications, and prices without notice at any time.

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Define Instruments

New Zealand (Head Office)

📍 10B Vega Place, Rosedale,
   Auckland 0632, New Zealand

   PO Box 245 Westpark Village,
   Auckland 0661, New Zealand

Ph: +64 (9) 835 1550
Fax: +64 (9) 835 1250

✉ sales@defineinstruments.com

www.defineinstruments.com