

Specifications

Power	4.0-6.0VDC 100mA
Temperature	
Operation	-10 to +70 C
Storage	-20 to +80C
Humidity	85% RH
Communication	Simplex/semiduplex
Modulation	Direct Sequence Spread Spectrum Offset QPSK signal
Speed	Max. 250kbps
Range	800 meters line of sight
Transmit Output	Max 10mW
Com Freq.	2405 MHz to 2475 MHz (5MHz step, 15 channels)
Adjacent ch	-25 dB
Occupied Freq width	5 MHz max
Receive Sensitivity	-95 dBm or better
Spurious response	25 dB or better
Adjacent ch rej	20 dB or better
Carrier sense (RSSI)	-77dBm +/- 5dB

Interface	8 pin terminal block 24-16AWG
Communication	Semiduplex RS485 Standard
Speed	2.4k/4.8k/9.6k/19.2k/38.4 k /57.6k/115.2k kbps (19200 default)
Data length	1 to 256 bytes
Databit	8 bit, even parity, 1 start, 1 stop bit LSB first, no flow control
Wire cable length	30m max (using 16 AWG)
Indicating LED	Red, Green, Orange
Switches: Node	2 each 4bit (0-99)
Group ID	1 ea. 4 bit, 16 conditions
Channel	1 ea 4 bit, 15 ch (11-25)

Dimensions	55 X 75 X 20mm (with projections)
Weight	100g maximum

Note: Factory configured for 19,200 baud, 8 data bits, even parity, one stop bit unless otherwise specified

Model Number Key

WRT - R85 - 05D - C - 1 - M

Comm.:

- M Master
- S Slave

NETWORK ZONES (Master):

- 0: Slave node
- 1: 99 nodes, 1 input each
- 2: 2 nodes, 63 input each (99 max)
- 4: 4 nodes, 31 inputs each
- 7: 7 nodes, 15 inputs each
- 13: 13 nodes, 7 inputs each

HOUSING:

- C Common

POWER SUPPLY:

- 05D 5VDC (100mA minimum)

OUTPUT:

- R85 RS485 - Modbus RTU

SENSOR TYPE:

- WRT Wireless Radio Transmitter

Sensors and Transducers



Other NK Technologies Products Include:

- AC & DC Current Transducers
- AC & DC Current Operated Switches
- 1 ϕ & 3 ϕ Power Transducers
- Current & Potential Transformers (CTs&PTs)



NK Technologies

3511 Charter Park Drive, San Jose, CA 95136

800-959-4014 or +1-408-871-7510 Phone

+1-408-871-7515 FAX

sales@nktechnologies.com, www.nktechnologies.com



INSTRUCTIONS



WRT SERIES Radio Transmitter/Receiver

Quick "How To" Guide

1. Set the node ID (See zone table on Configuration page)
2. Use master receiver set to node 0
3. Set radio channel
4. Set power input switch to terminal
5. Set group ID if needed
6. Mount the transmitter
7. Connect power source
8. Connect RS485 cable to slave unit
9. Power up, confirm data reception

Description

The WRT is a Wireless data transmission device designed to receive and transmit RS485 data packets. The product is factory configured for Modbus RTU protocol. Each data producing point (slave) can be connected to one WRT device, and transmits the data to a second unit, which is connected to the network master. Several slave data producers can be connected together, to one WRT. Up to 99 slave units can transmit to one master, and the units can be configured so one network master can communicate with another network through a repeater (see network connection examples)

Installation

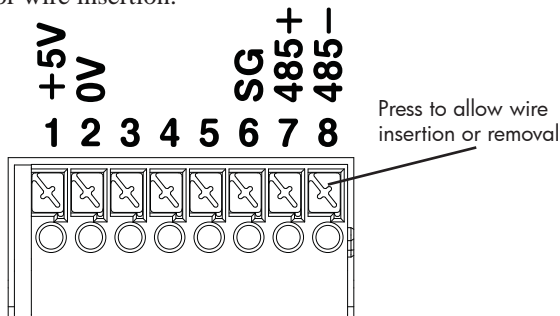
The WRT unit must be installed indoors or outdoors in a suitable non-metallic enclosure. Each unit requires a 5 VDC power supply, and will need to be configured for network address, channel frequency and group ID. The radio can be screwed to a back panel or hung on a wall with a nail or screw.

Power Wiring

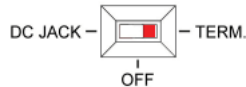
Connect external source 4.0 to 6.0 VDC to terminal block, or use 3.3 to 6.0 VDC produced by AC adaptor, remove supplied plug and strip wires to terminate onto the radio block.

Output Wiring

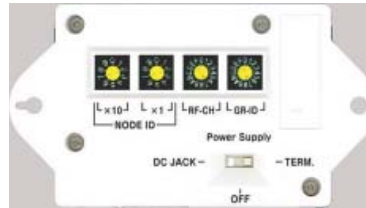
Connect control or monitoring wires to the sensor. Strip the insulation back approximately 3/8 inch (10mm). If solid wire, no tool is needed, just insert the wire into terminal 7 (+) or terminal 8 (-) and the signal ground (6). Terminals 3,4 and 5 are not used. Wire should be 24-16 AWG, 30 meters maximum. If using stranded wire, use a small screwdriver to release the terminal securing block by pressing down on the “x” of the rectangular button, allowing for wire insertion.



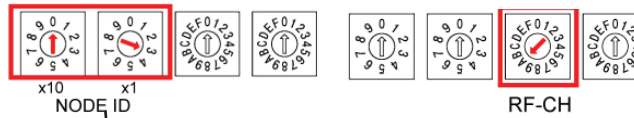
Configuration



Use 5VDC external power supply, and bond the Modbus equipment ground to the same ground as power supply. If using an AC wall-type adaptor, remove supplied cord end and strip the cord wires for termination on radio block. Set this switch to “TERM” position.

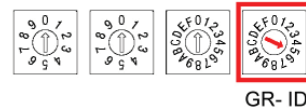


Back side of WRT



Node ID: Master is always set to ID “0”, slave units set to a value between 1 and 99. One transceiver must be set as the master and at least one as a slave to the master.

Unit Switch (RF-CH)	Radio Channel	Frequency
0	11 ch	2405 MHz
1	12 ch	2410 MHz
2	13 ch	2415 MHz
3	14 ch	2420 MHz
4	15 ch	2425 MHz
5	16 ch	2430 MHz
6	17 ch	2435 MHz
7	18 ch	2440 MHz
8	19 ch	2445 MHz
9	20 ch	2450 MHz
A	21 ch	2455 MHz
B	22 ch	2460 MHz
C	23 ch	2465 MHz
D	24 ch	2470 MHz
E*	25 ch	2475 MHz
F*	25 ch	2475 MHz



Group ID: Select the same group ID for all nodes on a network. Contact factory for other configurations.

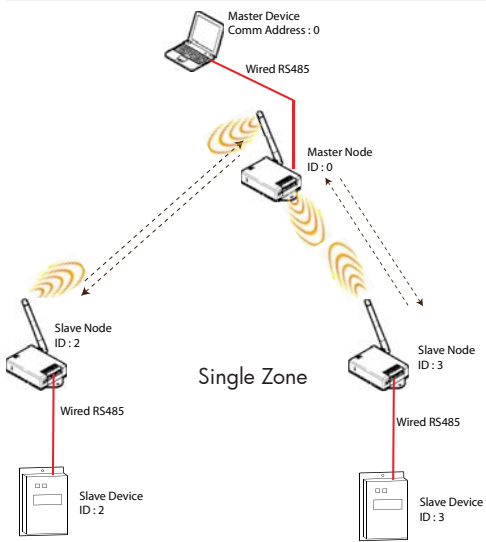
When installing one zone, set the node (radio) address to the same value as the data input device. The factory must configure the master for 2, 4, 7 and 13 zones. When installing more than one zone, set addresses to correspond with the following table:

Zone Count	Slave ID	Data Node Address
1	1-99	Matches slave ID
2	1	1-63
	2	64-99
4	1	1-31
	2	32-63
	3	64-95
	4	96-99
7	1	1-15
	2	16-31
	3	32-47
	4	48-63
	5	64-79
	6	80-95
	7	96-99
13	1	1-7
	2	8-15
	3	16-23
	4	24-31
	5	32-39
	6	40-47
	7	48-55
	8	56-63
	9	64-71
	10	72-79
	11	80-87
	12	88-95
	13	96-99

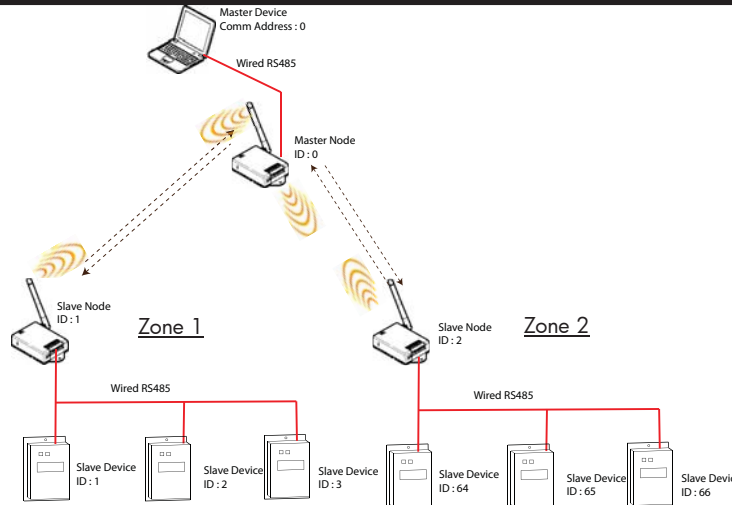
* Note both positions E and F set channel 25. Each node in a networks will use the same channel

Network Connection Examples

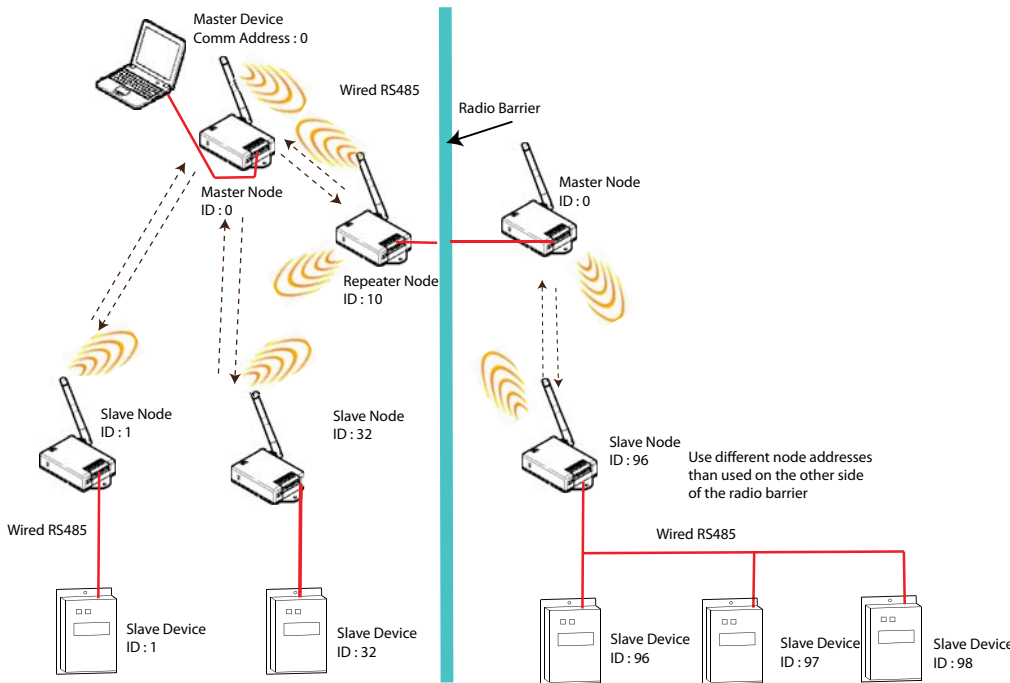
Trouble Shooting



One Master, Multiple Slave Nodes, One Input per Node
This is the default set up



One Master, Multiple Slave Nodes, Multiple Inputs per Slave Node
When ordering, specify the number of zones per master: 2 zones, 63 devices each; 4 zones, 31 devices each; 7 zones, 15 devices each; 13 zones, 7 devices each. 99 devices total



One Master, Multiple Slave Nodes, Multiple Inputs per Node w/repeater

1. No network communication

- Check for node power. Confirm that the LEDs are on: Green, Red, Orange. Check power source switch position on the back of the node.
- Cycle the power to clear from stand-by condition.
- Check network wire connections, reverse + and-
- Possible signal is blocked. Add another node or change node location.
- Be sure that Node ID, channel selection and group ID switch settings are correct. Each node must be unique to the network and the same as user equipment address. Master ID must be 0.
- Check to be sure node and user equipment are set for the same protocol (Modbus RTU).

LED display of node

- There are 2 other Units or more in the same network group with the signal strength of better than -65dBm communicating with the Unit. (*-65dBm is generally adequate strength of radio signal)
- There is 1 Unit in the same network group with the signal strength of better than -65dBm nearby.
- There is no Unit with better than -65dBm in the network group, although weaker signals from other Units are heard.
- The Unit has not joined the network and no signals are heard.
- A message has been exchanged with another Unit
- A message has been exchanged with user equipment

Interference with WiFi (IEEE802.11)

Other devices will on rare occasion create a disturbance with the WRT channel frequency. Use WRT channel 15 (2425MHz), channel 20 (2450MHz) or channel 25 (2475MHz) to reduce the chance of communication conflicts. If Wi-Fi interference is suspected there are devices on the market which will detect networks and the frequencies they are using in a given area. Contact MetaGeek (www.metageek.net) for the Wi-Spy 2.4x spectrum analyzer. This device will help you to select the clearest communication channel available.

Precautions on Time-Out

There is longer communication duration time with wireless vs. wired networks. It is recommended that the baud rate between slave-node and slave be as high as possible. A wired system "time-out" (duration of time at master between 6th character of query and 1st character of response) is 10ms. Using a routing node between one slave node and a master node at 9600 baud increases this duration to 192ms. The time-out of the master should be adjusted accordingly.