

WiRe Link: RF506-900

Features:

- Compact design
- Lightweight
- Low power consumption
- I²C digital interface
- Programmable options
 - ◆ Tx or Rx mode
 - ◆ Auto or manual channel selection
 - ◆ Network ID assignment
 - ◆ Initiation group assignment by ID
- Discrete and coded outputs
- Device status indicator LED



RF506-900

Applications:

- Aerial Testing
 - ◆ Programmable parachute disreefing
 - ◆ Drogue or main parachute release
 - ◆ Multiple event sequencing
- Timing Synchronization
- Remote Switch



RF506-900 on EID1-TW-M/CB

General Description:

The **Wireless Reefing (WiRe)** Link is a radio communications node that creates a network between two or more host devices by transmitting and receiving data packets via radio frequency signals. The WiRe Link transmitter generates a personal area network with which receiver nodes automatically associate. The individually addressed radio nodes securely receive and send commands and supporting data across the network with the base transmitter. Paired with **Electronic Initiation Devices (EID)**, the WiRe Link radios enable wireless initiation triggers to command parachute disconnect and disreefing events from a payload-mounted transmitter.



SPECIFICATIONS:

ELECTRICAL

Power Supply:	3.6v - 6v DC, regulated on-board to 3.3v DC Reverse polarity protected 6.5 volt Absolute Maximum Rating
Enable/Stby:	< 0.6v for Standby state >1.8v to Enable output 6.5 volt Absolute Maximum Rating
Current Draw:	Standby: < 1 μ A nominal Running: 30 mA nominal average Indicating: LEDs upto 60 mA average
Output Switch:	Isolated contacts, normally open analog switch control Voltage maximum to follow power supply

ENVIRONMENTAL

Temperature:	-40°C to 85°C Operating -55°C to 150°C Storage
Humidity:	15 - 85% RH, non-condensing

MECHANICAL

Connectors:	Sullins: SBH21-NBPN-D05-RA-BK (10pin interface) Mates with SFH213-PPPN-D05-ID-BK Molex: 503471-0200 (output switch) Mates with 503473-0200
Dimensions:	Board only: 1.59" x .68" x .40" [40.4 mm x 17.3 mm x 10.1 mm] Enclosure: 2.08" x .84" x .52" [52.8 mm x 21.3 mm x 13.2 mm]
Weight:	< 1 oz. nominal (28 g), board only

OPERATIONAL

Wireless:	Paired transmitter and receiver(s) Range: $\geq$ 300 feet Typical actuation time <10 ms
Node Setup:	Transmitter or Receiver mode select Automatic or manual channel selection Network ID selection Initiation group assignment
Node Initiation:	Discrete logic level output signal I ² C encoded command
Initiation Data:	I ² C encoded data Node debug data EID or host data
Communication:	Serial data via header and TTL level adapter

PART NUMBER REFERENCE

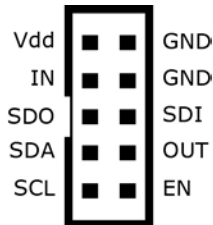


PIN CONFIGURATIONS:

Electrical interface header:

On-board connector, Sullins P/N: SBH21-NBPN-D05-RA-BK

Mating connector, Sullins P/N: SFH213-PPPN-D05-ID-BK



- 1.Vdd - Supply voltage, 5v typical, 10v maximum
- 2.GND - Common ground with supply voltage
- 3.IN - Buffered input 5.5v maximum
- 4.GND - Common ground with supply voltage
- 5.SDO - Serial data output, 3.3v levels
- 6.SDI - Serial data input, 3.3v levels
- 7.SDA - I²C data line, 5.5v maximum
- 8.OUT - Discrete output signal at Vdd voltage level
- 9.SCL - I²C clock line, 5.5v maximum
- 10.EN - Power supply enable/standby input at Vdd voltage level

Optional on-board locking connector, Harwin P/N: M80-8511045

Optional mating connector, Harwin P/N: M80-8881005

Switched contacts (n/o) connector:



On-board connector, Molex P/N: 503471-0200

Mating connector, Moles P/N: 503473-0200

- 1.CMN - Switch common node
- 2.NO - Switch wiper node, normally open

COMMUNICATION PROTOCOLS

2-wire Serial Interface Bus (TWI or I²C)

The 2 wire serial interface (I²C) is well suited for connecting the WiRe Link to other microcontroller devices. The standard I²C protocol allows the interconnect of up to 128 different devices. A WiRe Link device connected to the bus occupies three (3) slave device addresses and maintains compatibility with other devices on the bus, each with their unique address. Detailed technical data on the I²C protocol employed by the radio module OEM Atmel® (as TWI) can be reviewed in their document number 2549.

The WiRe Link device operates as a slave device with all I²C communications initiated by the master device. The WiRe Link device has three (3) data registers that utilize I²C addresses: Node Setup, Initiation, and Post-Initiation.

Node Setup Register

The Node Setup register is accessed via I²C at the slave address 0x7A (hex). Reading data from the Node Setup address will recall the most recently written values for verification. Writing data to the Node Setup address configures the operation of the device. An I²C write must begin within the first 100 ms after power-up in order to affect the node operation. Any data write occurring after 100 ms will be stored but will not go into effect until the next power cycle.

SETUP ADDR	PAN ID	NODE TYPE	NODE CTRL	INITIATION CODE	# RCVR GROUPS	RCVR QTY#1	RCVR QTY#2	...	I ² C STOP
Byte 0	Byte 1-2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8		

- Byte 0 SETUP ADDR: slave address for node setup data register
0x7A (hex)
- Byte 1-2 PAN ID: personal area network identifier, 16 bit value
Any 16 bit value, must match for transmitter and their intended receivers
- Byte 3 NODE TYPE: node function set as transmitter or receiver with I²C status, 8 bit value
0x00 (hex) = Transmitter (legacy mode, I²C disabled)
0x08 (hex) = Transmitter (I²C enabled)
0x01 (hex) = Receiver (legacy mode, I²C disabled)
0x09 (hex) = Receiver (I²C enabled)
- Byte 4 NODE CTRL: node channel selection, 8 bit value
0x00 (hex) = use previous/current channel
0x01 through 0x0A (hex) = use corresponding channel number
0x0B through 0x1F (hex) = scan for and use quietest or transmitter chosen channel
- Byte 5 INITIATION CODE: checksum with host for I²C enabled nodes, 8 bit value
Any 8 bit value, should match for transmitter and their intended receivers
- Byte 6 # RCVR GROUP: receiver group quantity or identity, 8 bit value
Transmitters: the quantity number of groups of receiver nodes
Receivers: the group ID number of the particular receiver node
- Byte 7 RCVR QTY#1: receiver node quantity, 8 bit value
Transmitters: the quantity of receiver nodes contained in group ID #1

	Receivers: not used
Byte 8	RCVR QTY#2: receiver node quantity, 8 bit value Transmitters: the quantity of receiver nodes contained in group ID #2 Receivers: not used
Byte 9+	RCVR QTY NXT: receiver node quantity of next (3rd, 4th,...) group, if present, 8 bit value Transmitters: the quantity of receiver nodes contained in group ID # Receivers: not used

Initiation Register

The Initiation register is accessed via I²C at the slave address 0x7C (hex). Writing data to the Initiation Data register of a transmitter node commences wireless transmission of the initiation command to all receiver nodes associated with the specified group ID. Reading data from the Initiation Data register of a receiver node indicates if it has been triggered by the wirelessly transmitted initiation command. The data in the register remains blank until after being triggered by an initiation command, which also asserts the node trigger signal labeled OUT.

INIT ADDR	INITIATION CODE	# RCVR GROUP	QTY IN GROUP	PAN ID	FUTURE USE	FUTURE USE	FUTURE USE	I ² C STOP
Byte 0	Byte 1	Byte 2	Byte 3	Byte 4-5	Byte 6	Byte 7	Byte 8	

Byte 0	INIT ADDR: slave address for node initiation data register 0x7C (hex)
Byte 1	INITIATION CODE: checksum with host for I ² C enabled nodes, 8 bit value Any 8 bit value, should match for transmitter and their intended receivers
Byte 2	# RCVR GROUP: initiation receiver group identity, 8 bit value The group ID number of the particular receiver group being commanded/initiated
Byte 3	RCVR QTY#1: receiver node quantity, 8 bit value The quantity of receiver nodes contained in group being commanded/initiated
Byte 4-5	PAN ID: personal area network identifier, 16 bit value Any 16 bit value, must match for transmitter and their intended receivers
Byte 6-8	FUTURE USE: reserved for future use, 8 bit values Three 8 bit values

Post-Initiation Register

The Post-Initiation register is accessed via I²C at the slave address 0x7E (hex). Reading this data recalls the stored performance parameters from the devices of the previous initiation command. The dataset is 128 bytes per radio node and host pair, 64 bytes each. The local radio and host data are always stored in the first register location of the Post-Initiation Data. Remote radio and host data are located in each subsequent 128 byte block of data, up to 15 devices maximum.

POST-INIT DATA ADDR	LOCAL NODE DATA 64B	LOCAL HOST DATA 64B	REMOTE NODE #1 DATA 64B	REMOTE HOST #1 DATA 64B	REMOTE NODE #2 DATA 64B	REMOTE HOST #2 DATA 64B	...	I ² C STOP
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OPERATIONAL DESCRIPTION

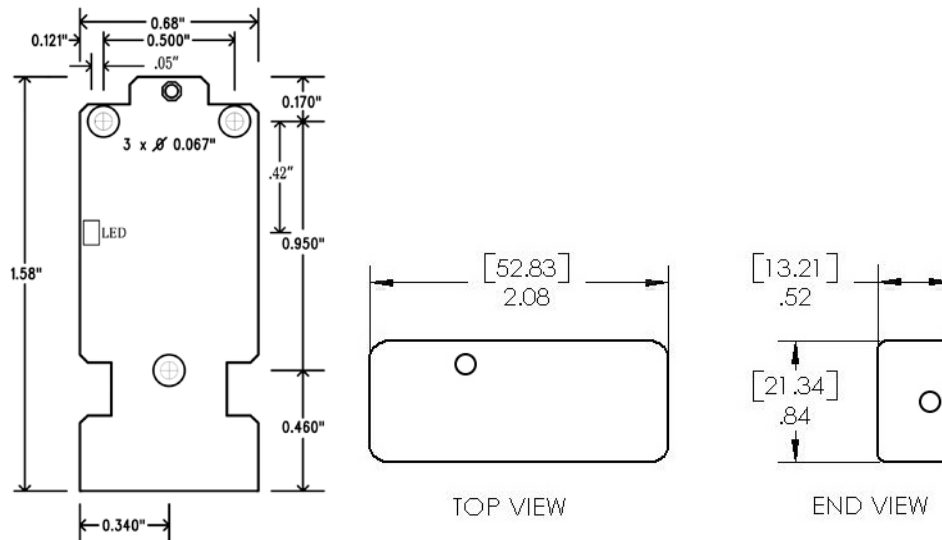
Operational Flow

- Power-up
- Programming period - 100 millisecond wait
 - If no data received - no change to data stored in register
 - If new [Node Setup](#) data received via I²C - overwrite previous data stored in register
- Node operation begins - based on data stored in Node Setup register
 - Transmitters begin broadcast - discoverable by scanning receivers
 - Receivers begin scan for broadcasting transmitters
- Automatic association between transmitters and receivers
 - Only between radio nodes with matching PAN ID
 - Periodic status pings to maintain link or begin re-association
 - LED flash indicates successful echo of status ping
- Initiation command
 - Host device triggers transmitter node via discreet buffered input signal and I²C
 - I²C write data to [Initiation register](#)
 - Initiation register data validated by comparison to Node Setup register data
 - Command repeated wirelessly to associated receiver nodes (of first receiver group)
 - Receiver nodes reply to transmitter with acknowledgement of command
 - LED steady flashing indicates successful receipt of initiation command
 - Receiver nodes trigger host device via discrete output signal and I²C
 - Output signal assertion indicates to host device to perform I²C read
 - I²C read data from Initiation register
 - Initiation register data validated by comparison to Node Setup register data
 - Receiver node accepts post-initiation data from host device via I²C
 - Host device performs I²C write to [Post-Initiation register](#)
- Subsequent Initiation command
 - Only if multiple receiver groups exist, transmitter node triggered via I²C
 - I²C write data to Initiation register
 - Initiation register data validated by comparison to Node Setup register data
 - Command repeated wirelessly to associated receiver nodes of specified group
 - Receiver nodes reply to transmitter with acknowledgement of command
 - Receiver nodes trigger host device via discrete output signal and I²C
 - Output signal assertion indicates to host device to perform I²C read
 - I²C read data from Initiation register
 - Initiation register data validated by comparison to Node Setup register data
 - Receiver node accepts post-initiation data from host device via I²C
 - Host device performs I²C write to Post-Initiation register
- Data retrieval
 - Receiver node post-initiation data wirelessly transferred to transmitter node for storage
 - Host device accepts post-initiation data from transmitter node via I²C
 - Host device performs I²C read from Post-Initiation register
- Power-down

DEVICE DESCRIPTIONS: Dimensions in inches [millimeters] unless otherwise noted.

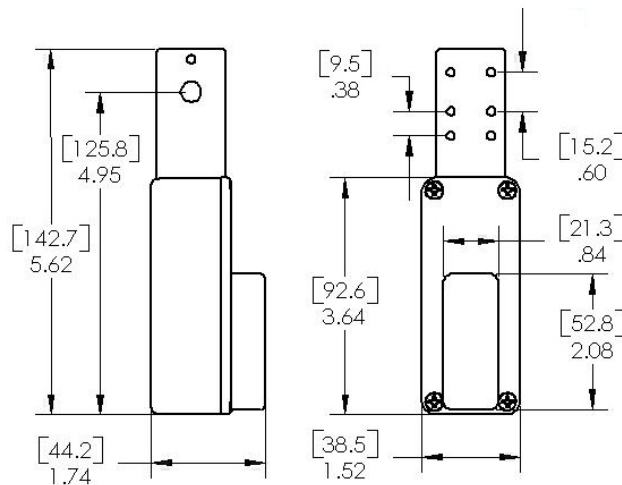
Circuit board and enclosure for attachment to EID1 (for reference only)

RF506-900 outline & mounting holes; Enclosure p/n: RFLC1



Example of RF506-900 attached to EID1 enclosure (for reference only)

Model EID1-xW-M/CB (CB2-RRLG4 @ L1, RFLC1 on lid)



NOTES:

FCC Compliance Statement

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in Part 15 of FCC rules. Changes or modifications to this product not authorized by ALD Systems Inc. could void the authority to operate the product.

This equipment must be installed such that the FCC ID label is visible, or if the label is not visible when installed inside another device then the outside of the device must also display a label referring to the enclosed equipment stating "Contains FCC ID: QXK506900" or any similar wording that expresses the same meaning.

FCC RF Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

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