

# *R&D*

## *Technical*

### *Documentation*


Revision	Modified		Checked		Module Name
	Date	By	Date	By	
A	April7-2015	GWH			IP-Bridge
					<b>Description</b>
					400 MHz / 2.4 GHz network bridge
					<b>Remarks</b>
					<b>Item Number</b>
					74023000

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## 2. PROJECT DESCRIPTION

The IP-Bridge is a communication module whose purpose is to forward and/or repeat wireless messages between control devices (referred to as endpoints). IP-Bridge can transmit and receive wireless messages on two 400 MHz on-board radios. It can also transmit and receive IP packets over an Ethernet port. The Ethernet port is intended to connect the IP-Bridge to a 2.4/5.8 GHz router which uses Wi-Fi to communicate with other router-connected IP-Bridges. The IP-Bridge's main function is to push messages received on the 400 MHz radio(s) to the Wi-Fi network via the Ethernet port, and push messages received from the Wi-Fi network to the 400 MHz radios. In this way it functions as a 'bridge' between the 400 MHz and 2.4/5.8 GHz wireless networks.

In addition to communicating with an off-board router, IP-Bridge can also power the connected router with a 12VDC regulated supply on connector X3. IP-Bridge is powered with +12VDC on connector X2. IP-Bridge can also connect to an off-board Hetronic GNSS board. IP-Bridge powers and communicates with the GNSS board over connector GPS. IP-Bridge's two 400 MHz on-board radios are designated RF1 and RF2, and communicate wirelessly via connector ANT1 and ANT2, respectively. RF1 and RF2 are functionally equivalent to the Hetronic CSM-400UE radio module. IP-Bridge also powers and controls optional external amplifiers for both RF1 and RF2 over connectors RF1SW and RF2SW. The external amplifier choices are restricted to Hetronic PA-1 or Hetronic HPA-1. Finally, IP-Bridge has a number of external LED indicators to display operation, Ethernet activity, 400 MHz RF activity, and error states. The external LED indicators are driven via connector X1. IP-Bridge has a USB connector for H-Link configuration and calibration.

There are no user-configurable options. All configuration is done by Hetronic at production time.

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### 3. TECHNICAL SPECIFICATION


Parameter	Specification
X2 Power Supply (VDC)	24V
Current Draw (mA)	70 - 100
Operating Temperature Min (°C)	-40
Operating Temperature Max (°C)	80
RF Output Power (dBm)	0-10, variable.
RF Receive Sensitivity (dBm)	-100 (without external amplifier).
Frequency (MHz)	410 – 475 MHz
RF Baudrate (kbps)	50 (120mW max, with external amplifier) TBD for higher power.
RF Protocol	ELP (Event Link Protocol)
X3 Output Voltage (VDC)	12
X3 Current Supply (mA)	0 - 3000

### 4. CONNECTION DIAGRAM

Refer to the internal IP-Bridge technical documentation for IO and power supply connections.

### 5. LABELING

Equipment containing this device shall be labeled externally, stating that it contains equipment with FCC ID and IC ID numbers pertaining to this device.

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## 6. COMPLIANCE STATEMENTS

### 6.1. FCC Interference Statement (Part 15.105 (b))

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### 6.2. FCC Part 15 Clause 15.21

“Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment”


### 6.3. FCC Part 15.19(a)

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.

### 6.4. ISED RSS-Gen Notice:

(1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

1) L'appareil ne doit pas produire de brouillage; 2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.”

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