



# **OEM MANUAL**

August 2013

**2.433-2.449 GHz Frequency Hopping Transceiver Module**


**Model: D-CCA-HPB-24G-1**

**FCC ID: R73HPB-24G-1**

**REV 1**

**OEM INTEGRATOR ATTESTATION**

- a. *This module is for OEM installation only.*
- b. *The OEM is responsible for ensuring that the end-user has no manual instructions to remove or install module.*
- c. *The module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).*
- d. *Separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations.*
- e. *This module may only be used with antennas with a maximum gain of 2.15 dBi, including any replacement antennas, to maintain compliance and satisfying RF exposure compliance.*
- f. *Labeling instructions of finished products must be in accordance with the requirements outlined in KDB784748 D01 v07, section 8. Page 6/7 last two paragraphs which include the required instructions; example: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1" and described herein.*
- g. *The instructions/statements required per Part 15.19 and 15.21 must be included in the host user's manual (i.e. end product).*

 8-22-'13  
Date

Robert A. Bongiorno  
Chief Engineer  
The Sapling Company  
[robertb@sapling-inc.com](mailto:robertb@sapling-inc.com)  
(215) 322 – 6063 x1114

## **Introduction**

*This module is only authorized to be installed in fixed mount installation and may not be installed in a mobile or portable device.*

The HPB-24G-1 module is to be used in Sapling Master Clocks such as the SMA-3000 or SMA Repeater and equivalent models.

The module is only to be connected to and installed in other Sapling products.

## **Specifications**

The antenna gain is +2.15dBi maximum.

The maximum output power will be 30 dBm.

The transmit cycle is a sequence of 80 data strings on 76 different frequencies, each transmitted for 3 msec.

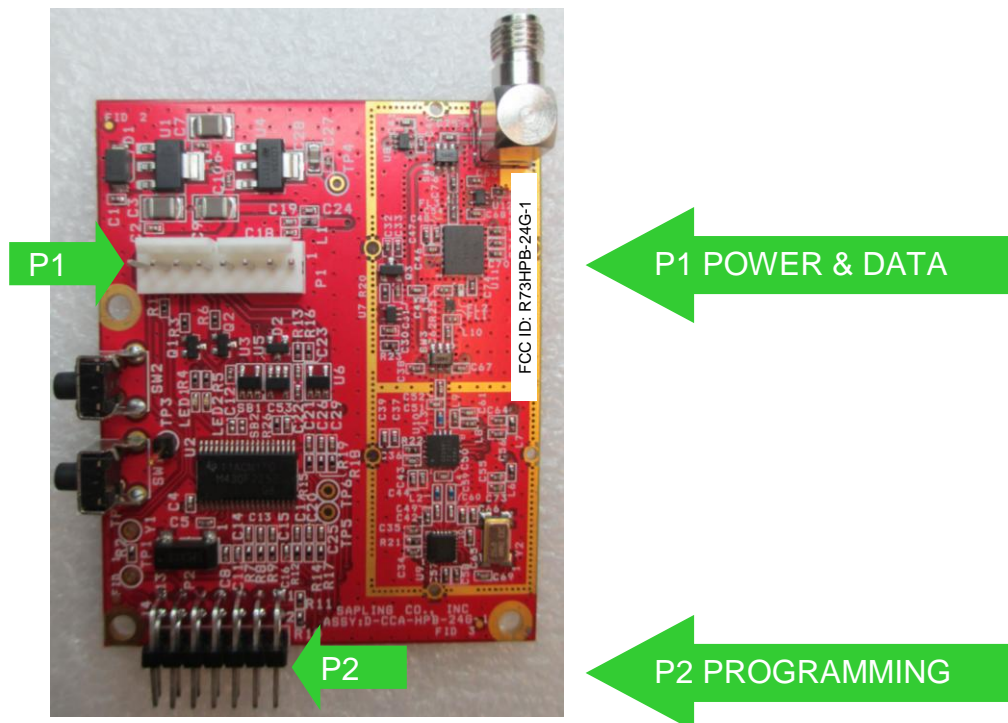
Every transmit cycle is 240 msec in duration (80 x 3ms).

The frequency hopping pattern is proprietary to Sapling and covers the range from 2.433 to 2.449 GHz.

## **Connections**

The picture shows the HPB-24G-1 RF module, connectors, and FCC ID label.

### **HPB-24G-1**



**HPB-24G-1 Connectors**

<b>P1 OPERATING CONNECTOR</b>	
PIN 1	5 VOLTS
PIN 2	GROUND
PIN 3	PPS OUT
PIN 4	TXD
PIN 5	RXD
PIN 6	MSTR/SLV
PIN 7	STBY
PIN 8	NO CONNECTION
* PIN 1 IS SQUARE PAD.	



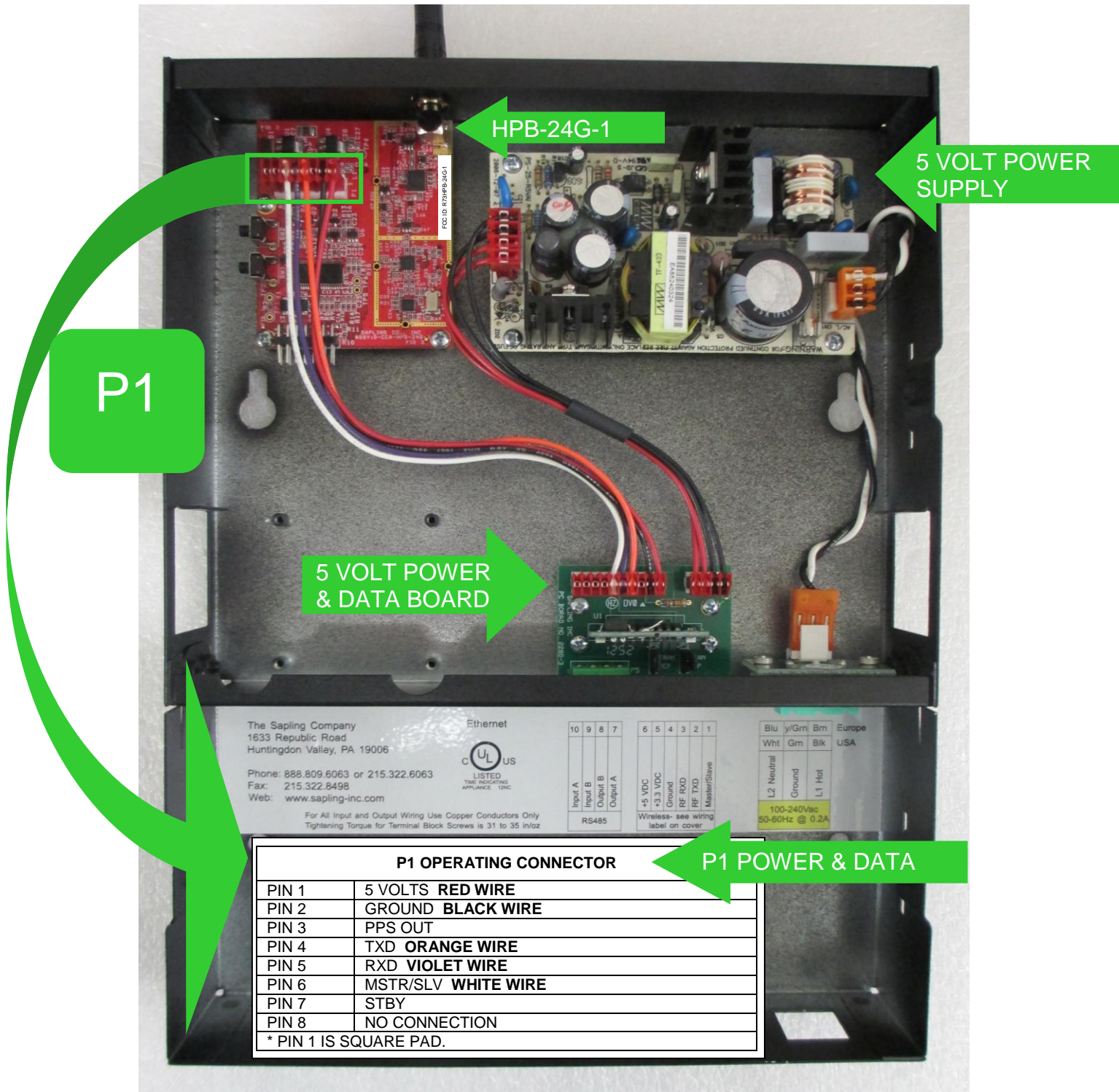
<b>P2 PROGRAMMING CONNECTOR</b>	
PIN 1	TDO/TDI
PIN 2	3.3 VOLTS
PIN 3	TDI
PIN 4	3.3 VOLTS
PIN 5	TMS
PIN 6	NO CONNECTION
PIN 7	TCLK
PIN 8	TEST
PIN 9	GROUND
PIN 10	NO CONNECTION
PIN 11	RST
PIN 12	TXD
PIN 13	SHIELD
PIN 14	RXD
* PIN 1 IS SQUARE PAD.	



**Installed**

The picture on the next page shows the HPB-24G-1 RF module in a repeater. It shows the SMA-1SR-G0000-1 and the connectors to the rest of the Sapling Wireless Clock System.

**SMA-1SR-G000-1**



**HPB-24G-1**

**5 VOLT POWER SUPPLY**

**P1**

**5 VOLT POWER & DATA BOARD**

**P1 POWER & DATA**

The Sapling Company  
1633 Republic Road  
Huntingdon Valley, PA 19006  
Phone: 888.809.6063 or 215.322.6063  
Fax: 215.322.8498  
Web: www.sapling-inc.com

Ethernet  
UL US LISTED TIME INDICATING APPLIANCE 120C

For All Input and Output Wiring Use Copper Conductors Only  
Tightening Torque for Terminal Block Screws is 31 to 35 in/oz

10	9	8	7	6	5	4	3	2	1
Input A	Input B	Output B	Output A	+5 VDC	+3.3 VDC	Ground	RF PxD	RF TXD	Master/Slave

Blu	yl/Gm	Bm	Europe
Wht	Gm	Bik	USA
L2 Neutral	Ground	L1 Hot	

100-240V<sub>ac</sub>  
50-60Hz @ 0.2A

P1 OPERATING CONNECTOR	
PIN 1	5 VOLTS <b>RED WIRE</b>
PIN 2	GROUND <b>BLACK WIRE</b>
PIN 3	PPS OUT
PIN 4	TXD <b>ORANGE WIRE</b>
PIN 5	RXD <b>VIOLET WIRE</b>
PIN 6	MSTR/SLV <b>WHITE WIRE</b>
PIN 7	STBY
PIN 8	NO CONNECTION
* PIN 1 IS SQUARE PAD.	

The picture below shows the top of the SMA-1SR-G000-1 with HPB-24G-1 RF module antenna connector and the FCC ID and the Compliance Label.

### SMA-1SR-G000-1



### SMA-1SR-G000-1 Label

The label below is an example of the FCC ID and the Compliance Label.

June 18, 2013  
The Sapling Company, Inc.  
1633 Republic Road  
Huntingdon Valley, PA 19006  
(215) 322-6063  
www.sapling-inc.com

**Patent Pending** **Made in U.S.A.**



Part#: SMA-1SR-G000-1  
A/SMA-1SR-G000-1/1/130618/F0002120

Qty: 1

*The Sapling Company, Inc.*

WHERE TIMING & TECHNOLOGY MEET

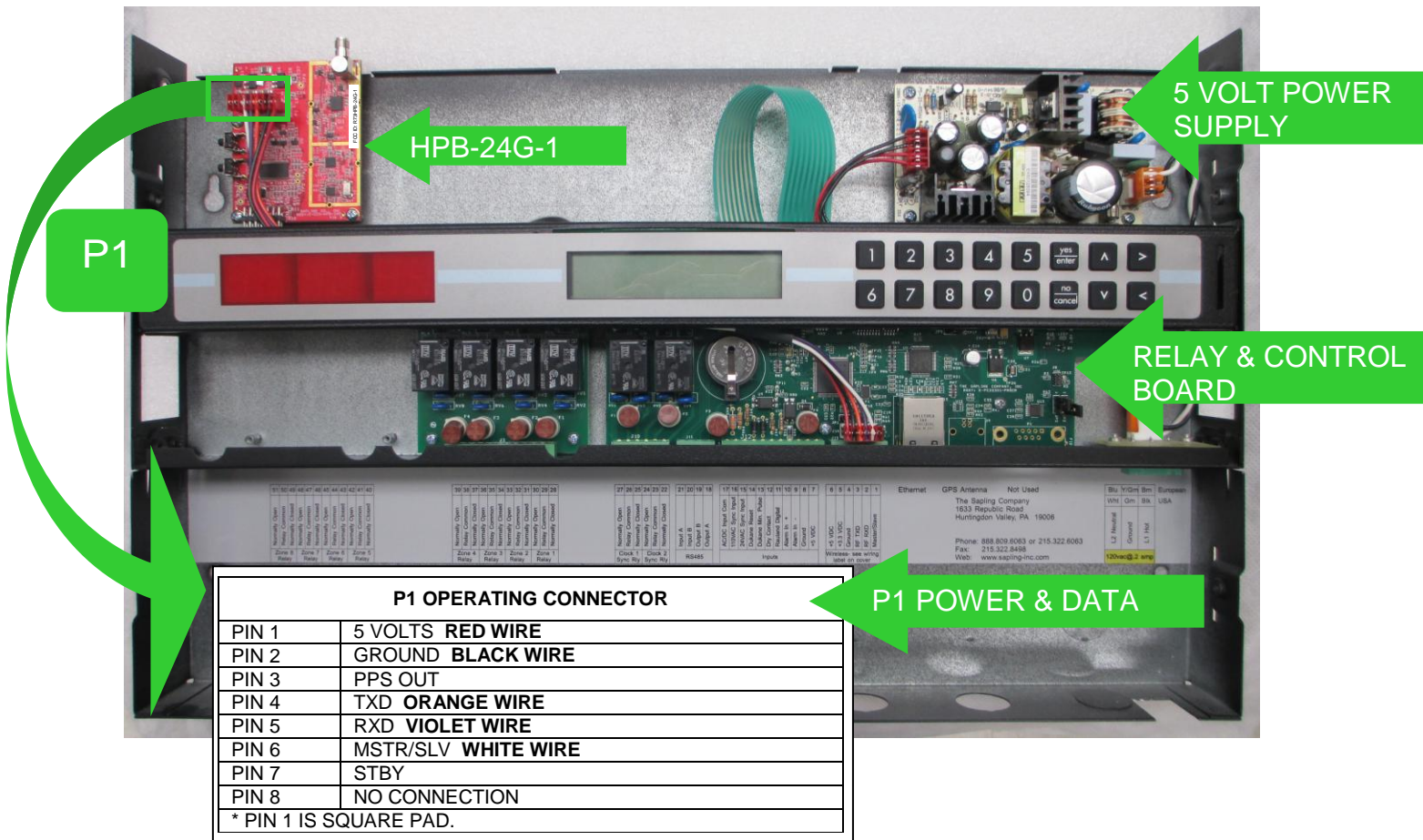
**Contains FCC ID: R73HPB-24G-1**  
**Model: D-CCA-HPB-24G-1**

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.

**Installed**

The picture below shows the HPB-24G-1 RF module in a master clock. It shows the SMA-3S0-G008-1 and the connectors to the rest of the Sapling Wireless Clock System.

**SMA-3S0-G008-1**



The picture below shows the top of the SMA-3S0-G008-1 with HPB-24G-1 RF module antenna connector and the FCC ID and the Compliance Label.

**SMA-3S0-G008-1**



### SMA-3S0-G008-1 Label

The label below is an example of the FCC ID and the Compliance Label.

Date: June 18, 2013  
Contains FCC ID: R73HPB-24G-1  
Model: D-CCA-HPB-24G-1  
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.



The Sapling Company, Inc.  
1633 Republic Road  
Huntingdon Valley, PA 19006  
(215) 322-6063  
www.sapling-inc.com

*The Sapling Company, Inc.*

Part#: SMA-3S0-G008-1  
Quantity: 1  
A/SMA-3S0-G008-1/1/130618/F0009562

Made in U.S.A.

### Operation

1. The HPB-24G-1 RF module, as a repeater transceiver, will receive time from another transmitter or clock and re-transmit the time.
2. The HPB-24G-1 RF module, as a master clock transceiver, will transmit the time for 240 msec and receive the time for up to 20 seconds once a minute.

### FCC 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.

**NOTE: THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY RADIO OR TV INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT.**

**“Changes Or Modifications Not Expressly Approved By The Party Responsible For Compliance Could Void The User's Authority To Operate The Equipment.”**