SureCross™ MultiHop Quick Start Guide

A set-up guide for the SureCross MultiHop wireless systems

Stop!

Read these instructions before using your SureCross MultiHop radios. Do not discard these instructions.

For more detailed information about installing and using your SureCross products, download and read the SureCross Wireless I/O Network Manual, p/n 151317.

Important: Never Operate 1 Watt Radios Without Antennas.

To avoid damaging the radio circuitry, never power up SureCross Performance or SureCross MultiHop (1 Watt) radios without an antenna.

⚠ **WARNING . . . Not To Be Used for Personnel Protection**

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

These devices do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A device failure or malfunction can cause either an energized or de-energized output condition. Consult your current Banner Safety Products catalog for safety products that meet OSHA, ANSI, and IEC standards for personnel protection.

Step 1: Select the Master, Repeater, and Slave Radios

Before beginning operation, you must select one radio to be the master radio. Set the other MultiHop radios to operate as either repeaters (default setting) or slaves.

1. Remove the top covers of the MultiHop radios.
2. Set one unit to be the master radio.
3. Set the other MultiHop radios to be repeaters or slaves.

4. Set additional DIP switches now. (See the DIP Switches section of the devices' datasheets for the positions and descriptions.)

	DIP Switches	
	7	8
Repeater	OFF	OFF
Master	OFF	ON
Slave	ON	OFF
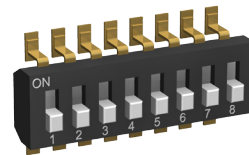
	DIP Switches					
Default configuration	1	2	3	4	5	6
Serial baud rate: 19.2k	OFF	OFF				
No parity			OFF	OFF		
1 Watt transmit mode (900 MHz only)					OFF	
Modbus application mode						OFF

Step 2: Apply Power

The FlexPower Multihop radios will operate when powered from the brown or gray wire. It is not necessary to supply power to both.

1. Apply power to the radios by connecting the cable as shown in the wiring diagram.

5-pin Euro-style connector	"C" model terminals	Pigtail wire color	10-30V dc powered radios*	Solar or battery-powered radios**
1	V+	Brown	+10–30V dc	
3	V-	Blue	dc common (GND)	dc common (GND)
5	B+	Gray		3.6–5.5V dc

* Only use pin 5 (gray wire) for radios capable of being powered by solar or battery modules.
** For solar and battery-powered radios, do not apply more than 5.5V dc to pin 5 or the B+ terminal.

For the communication pin configuration or more details, refer to your specific devices' datasheets.

Step 3: Bind the Radios to Form Networks

Binding MultiHop radios to the master radio ensures the MultiHop radios only exchange data within their wireless network. MultiHop radios will not communicate until they are bound. Bind the radios before installing them to their final locations.

On the Master radio

1. Triple click button 2 to enter binding mode. For models with only one button, triple click the button.

   For the two LED/button models, both LEDs flash red. For single LED/button models, the LED flashes alternatively red and green.

On the Repeater or Slave radios

2. Triple click button 2 on the slave/repeater radio. For models with only one button, triple click the button.

   The child radio enters binding mode and searches for any Master radio in binding mode. While searching for the Master radio, the two red LEDs flash alternately. After the child radio finds the Master radio and is bound, both red LEDs are solid for four seconds, then both red LEDs flash simultaneously four times.

3. Use both rotary dials to assign a decimal MultiHop Radio ID between 11 and 61. The left rotary dial represents the tens digit (1–6) and the right dial represents the ones digit (0–9) of the MultiHop Radio ID.

4. Repeat steps 2 and 3 for as many slave or repeater radios as are needed for your network.
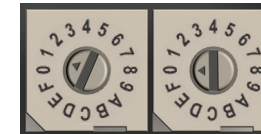
On the Master radio

5. After all MultiHop radios are bound, exit binding mode on the master by double-clicking button 2. All radio devices begin forming the network after the master data radio exits binding mode.

Step 4: Verify Communications

When testing the devices before installation, verify the radio devices are at least two meters apart or the communications may fail.

LED 1	LED 2	Status
● Green ON, then ☀ Green flashing		Slave/repeater: entering RUN mode
☀ Green flashing		Master: in RUN mode Slave/repeater: synchronized to the parent radio
● Red solid		Slave/repeater: detected parent radio and searching for other parents within range
☀ Red flashing		Slave/repeater: searching for a parent radio
	● Yellow solid	Slave/repeater: selects a suitable parent Master: power applied
	☀ Yellow flashing	Slave/repeater: serial data packets transmitting between radio and its parent Master: serial data packets trasmitting between master and its children
	● Red solid	Slave/repeater: synchronizing to selected parent radio
	☀ Red flashing	

Step 5: Conduct a Site Survey Using the Menu System

Perform the site survey before installing your network to pre-screen a site for its radio communication potential, compare link quality in different locations, or assist with final antenna placement and aiming.

Site surveys can be conducted from the master, repeater, or slave radios. For a more detailed description of the parent-child relationships, refer to the device data sheets.

Step 1. On a data radio device, press button 1 until the display reads *SITE.

Step 2. Single-click button 2 to enter the Site Survey menu.

Step 3. **From the master radio**: Single-click button 2 to display the child radio's device address. (A radio's device address is displayed under its *RUN menu). Single click button 1 to scroll between all the master radio's children. When you reach the child radio you want to run the Site Survey with, single-click button 2.

From the repeater radio: Single-click button 1 to cycle between PARENT and CHLDRN. Single-click button 2 to select PARENT or CHLDRN. If conducting the Site Survey with one of the repeater's children, single-click button 1 to scroll among a repeater's children radios. (Each data radio's device address is displayed under its *RUN menu.) Single-click button 2 at the device address screen to select the child or parent and begin the Site Survey.

From the slave radio: Single-click button 2 to display PARENT. Single-click button 2 to begin the Site Survey.

Step 4. The site survey begins. LED 2 on both the parent and child radios flash for every received RF packet. To indicate the parent is in site survey mode, LED 1 is a solid green. The radio analyzes the quality of the signal between the parent and child by counting the number of data packets received and measuring the signal strength (green, yellow, and red).

Step 5. Examine reception readings (G, Y, R, M) of the devices at various locations. M displays the percent of missed packets while G, Y, and R display the percent of received packets at those signal strengths.

GRN = GREEN excellent signal strength; YEL = YELLOW good signal strength; RED = RED marginal signal strength; MIS = Percentage of missed packets.

Step 6. During a site survey, single-click button 2 to pause/resume autoscrolling the results. While paused, button 1 advances through the four signal strength categories. Double-click button 2 to exit the results display.

Step 7. Double-click button 2 on either the child or the parent device to exit site survey. The devices automatically resume operation.

Step 6: Installing Your SureCross Radios

For most outdoor applications, we recommend installing your SureCross devices inside a secondary enclosure. If not using an enclosure, mount the radios where rain or snow will drain away from the unit.

To minimize the damaging effects of ultra-violet radiation, avoid mounting the radios facing intense direct sunlight.

MultiHop Configuration Tool (MHCT)

Banner's MultiHop Configuration Tool offers an easy way to configure and view your MultiHop radio network.

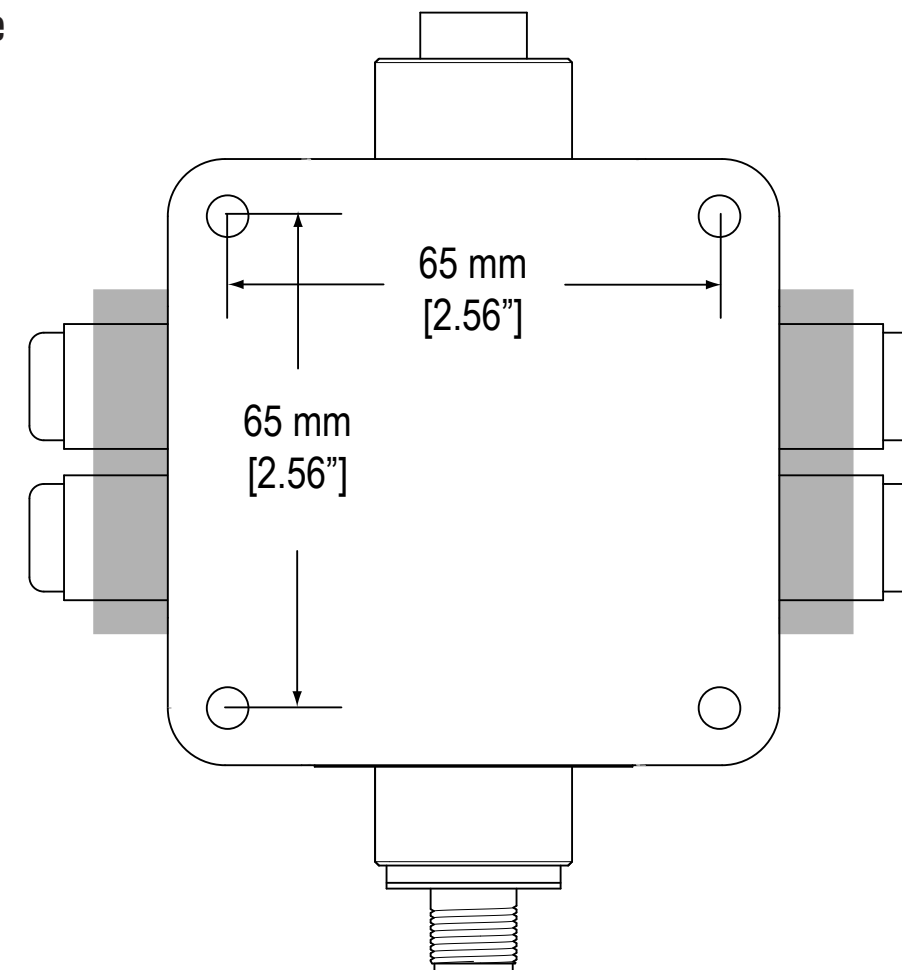The MultiHop Configuration Tool requires the USB to RS-485 converter cable, BWA-UCT- 900.

MultiHop Radio Mounting Template

The gray-shaded section represents the DX80...C housings' removable terminal headers.

Only if you are using the printed copy provided by Banner can this be used as a mounting template.

65 mm [2.56"]

65 mm [2.56"]

For additional information, including installation and setup, weatherproofing, device menu maps, troubleshooting, and a list of accessories, please refer to the SureCross™ MultiHop product manual, Banner p/n 151317.