

## MultiHop Switch Power

On MultiHop radios, switch power can be used in one of two modes:

- Associated to specific inputs, or
- Configured at the device level to supply continuous power to external devices.

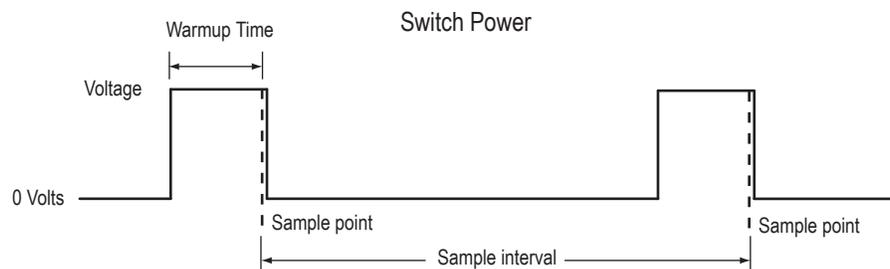
Only one mode can be used on each MultiHop radio.

To optimize the battery life and minimize power consumption, refer to the MultiHop Instruction Manual (p/n [151317](#)).

## Switch Power

Efficient power management technology enables some FlexPower devices to include an internal power supply, called switch power (SP), that briefly steps up to power sensors that require more than 3.6 V dc power, such as 4 to 20 mA loop-powered sensors. When the switch power output cycles on, the voltage is stepped up to power the sensor for a specific time. The warmup time denotes how long the sensor must be powered before a reliable reading can be taken. After the warmup time has passed, the input reads the sensor, then the switch power shuts off to prolong battery life. The switch power voltage, warm-up time, and sample interval are configurable parameters.

- To reduce power consumption and extend battery life, use slower sample and reporting rates. Faster sample and report rates can be configured, but decrease battery life. For details, refer to the DIP switch configurable parameters for your device.
- The FlexPower switched power management system can operate a radio and most sensing devices for up to five years on a single lithium D cell.



## Configuring the Switch Power Output

To operate the switch power (SP) terminals as switch power that cycles on for a specific length of time then cycles off to conserve power, enable the desired SP terminal and set the voltage and warm-up time for the specific input associated with the switch power. Follow these steps to associate SP3 to Analog IN 1.

The screenshot shows the configuration interface for Analog Input 1 and Switch Power Output 3. On the left, under 'Analog Input 1', the 'Enabled' checkbox is checked. Below it, the 'Analog Configuration' section includes 'Enable full scale' (checked), 'Maximum value' (20000), and 'Minimum value' (0). The 'Signal Conditioning' section has 'Threshold', 'Hysteresis', and 'Delta' all set to 0. The 'Switch Power Settings' section shows 'SP3' selected, 'Warm up' time of 00:00:00.12, and 'Voltage' set to 10V. At the bottom, 'Sample Out of Sync' is set to 'Continue sampling when out of sync'. On the right, 'Switch Power Output 3' is enabled. Its 'Output Configuration' section has 'Output operates when radio is out of sync' checked and 'Use flash pattern' set to 1. The 'Switch Power Options' section has 'On signal loss, output is active' checked and 'Voltage' set to 10V.

1. Go to the Analog IN 1 section of the **Configuration > Configure Device** screen and select the **Enabled** checkbox.
2. Select the **SP3** checkbox to enable switch power 3 to power analog IN 1.
3. Set the voltage and warm-up time according to the sensor's needs.
4. Use the **Switch Power Output 3** section to enable the switch power.
5. Set the appropriate Output Configuration and Switch Power Option.

## Configure Device-Level Switch Power

Use device-level switch power to configure voltage output through the switch power terminals. If switch power is defined for use in any input point, switch power cannot be defined for device-level use.

Device-level switch power is configured using the Outputs pane of the I/O parameters.

1. In the MultiHop Configuration Tool, go to the **Configuration > Configure Device** screen.
2. Enter the **Device ID** and **Device type**.
3. Click **GET all parameters and I/O** to retrieve the configuration parameters from the device.
4. On the Output side of the screen, click the arrow next to the **Switch Power Output** to display the parameters.
5. Enable the switch power.
6. Define the **Voltage** and select a flash pattern if applicable.
7. Click **SEND** to send the settings to the radio.
8. After sending any changes to the radio, cycle the power to activate the changes.

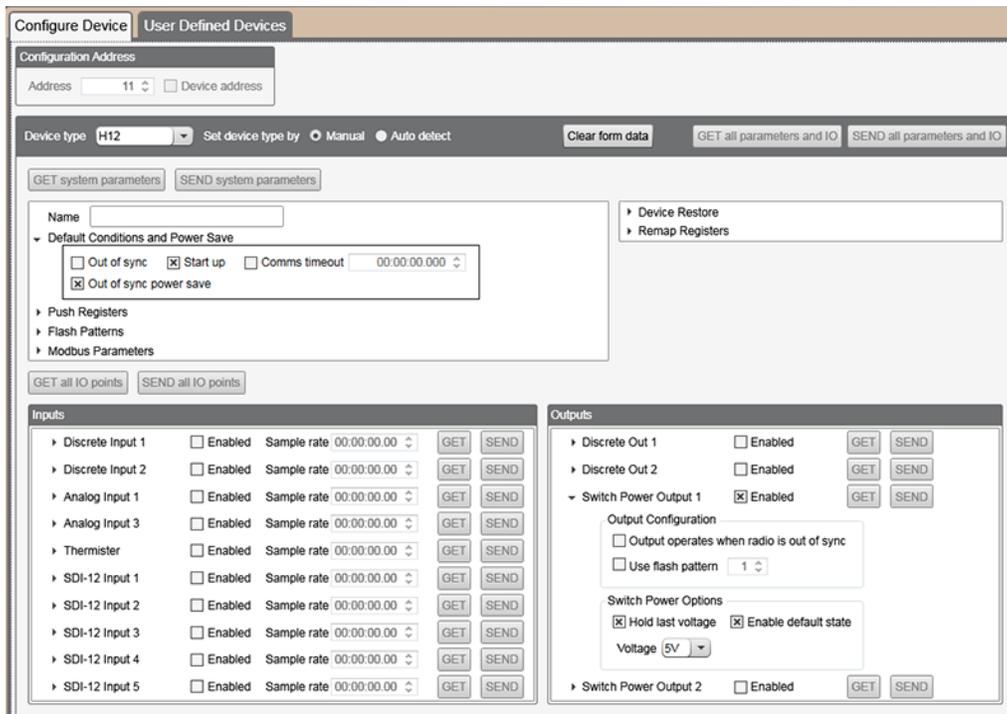
This screenshot shows a close-up of the 'Switch Power Output 3' configuration pane. The 'Enabled' checkbox is checked. Under 'Output Configuration', 'Use flash pattern' is set to 1. Under 'Switch Power Options', 'Enable default state' is checked, and 'Hold last voltage' is unchecked. The 'Voltage' is set to 12.

## Configure Switch Power for Continuous Voltage

To configure the Switch Power output to supply continuous voltage to a sensor using the MultiHop Configuration Tool, follow these steps.

On your computer, launch the MultiHop Radio Configuration tool. Select the appropriate COM connection to the computer.

This example sets up switch power 1 to supply continuous power. Note that only one switch power output can be configured to supply continuous power, and no input can be defined to use switch power.



1. On the **Configuration > Configure Device** screen, enter the ID of the MultiHop radio that will be assigned a continuous power output and click **GET all parameters and I/O**.  
The configuration of that MultiHop radio is read from the radio and displayed on the screen.
2. Select the **Switch Power Output** and enable it.
3. Select **Enable default state**.
4. Use the drop-down list and select a value for the **Voltage**.
5. Click **SEND**.
6. Under the **Default Conditions and Power Save** settings, select **Start Up**.  
This configures the enabled and configured Switch Power terminal to output continuous voltage as soon as the radio powers up.
7. Click **SEND system parameters** or **SEND all parameters and IO** to send the new settings to the wireless network device.
8. Cycle power to the radio.  
This continuous switch power configuration will activate after the power is cycled.

## Configure Switch Power for Continuous Voltage by Writing to Registers

To configure one of the switch power outputs to supply continuous power, follow these steps. This example sets up switch power 3 to supply continuous power. Note that only one switch power output can be configured to supply continuous power, and no input can be defined to use switch power.

1. Enable switch power 3 by writing a 1 to register 42201.
2. Write the desired output voltage value to register 43641. See the data sheet for your radio to determine the specific value to write.  
This assigns a specific supply voltage to SP3.
3. Write 0x01 to register 43642.  
This sets SP3 to supply continuous voltage by setting the default output state to ON.
4. Write 0x01 to register 42954 to enable the selected default output state when the radio is powered up.
5. Verify none of the inputs are using switch power by writing 0x00 to registers 41004 (input 1), 41054 (input 2), 41104 (input 3), et cetera.  
The factory default value for these registers is 0x00.
6. Cycle power to the radio to activate your changes.

## Switch Power Output

When linking a switch power output to a specific input, select the **Enable** checkbox and set the **Enable default state** to OFF. Use the settings for the specific input to link the switch power output and set the voltage and warm-up time.

For continuous switch power, set the voltage on this screen and set the default state to ON. Verify the default "start-up" conditions are set in the device parameters screens.

### Enable default state

When enabled, this switch power output remains on during the selected default condition (e.g. out of sync, communication timeout, start up). When disabled, the switch power cycles off during the selected default condition.

### Hold Last Voltage

When set, the switch power output retains its last value during the selected default condition (e.g. out of sync, communication timeout, start up).

### Use Flash Pattern

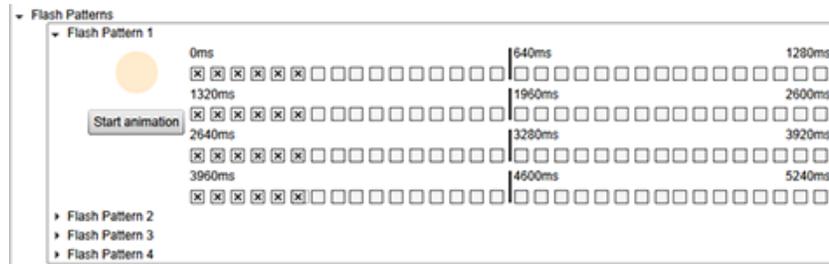
To use a programmed flash pattern, set the Enable Flash Pattern to ON, then select the appropriate flash pattern from the drop-down list. The flash patterns are defined in the Device Parameters section of this screen. Select from one of the four user-defined flash patterns. Set the flash patterns in the Device Parameters section of this screen.

### Voltage

To set a voltage for the switch power output, select a value. When configured for continuous voltage output, this switch power output no longer cycles on, warms up the sensors, then cycles back down. Because the output voltage remains constant, continuous voltage is typically used with solar power installations.

## Flash Patterns

Setting the flash pattern establishes an on and off pattern that can be used for a discrete output or switch power.



Define **Flash Patterns** by selecting specific timeslots to turn the output on or off. While originally the flash pattern was designed to turn on and off an indicator light, the flash pattern can be set for any discrete output or switch power. Each slot represents one frame size, which may vary from radio to radio. The default frame is 40 milliseconds. Users may configure up to four different flash patterns per radio device.

In the example shown, Flash Pattern 1 is configured to turn on the EZ-LIGHT for 240 milliseconds, then turn off the light for 1040 milliseconds. To preview the flash pattern, click on the **Start Animation** button. The EZ-LIGHT graphic flashes on and off in the programmed flash pattern.

After making any changes, click **SEND parameters** to write the changes. The status bar at the bottom of the screen indicates the status of the process. Green (Communication Status Ready) indicates the process is complete. Red (error) indicates an error. Yellow (Getting Data) indicates the network is retrieving the requested data.