

# Tarts Basic Control User's Guide

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# Introduction

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## Overview

Tarts Basic Control is a wireless node on the network that has the ability to act as a switch on a power circuit. It communicates directly to the gateway checking for instruction to change the switch's state. Such a command may be initiated when the temperature goes out of bounds, or when water is detected, or when motion is introduced into an environment. This creates a powerful interaction between the nodes and network because it allows the user to turn electrical equipment on or off automatically, based on the information gathered by the sensors in the wireless network.

## *How Does It Work*

By default, Tarts Basic Control polls the gateway on a user defined interval, checking for commands from the gateway. When such a command is received by the wireless device, it performs the action on the switch: OPEN the switch, CLOSE the switch, or TOGGLE the switch to the opposite state. When such an action is performed, Tarts Basic Control will report the new state to the gateway.

Be advised that the Tarts Basic Control consumes significantly more current than other Tarts devices. Please read technical specification and power mode options for more information, recommendations and tips.

## *Use It For*

- Activating a fan
- Turning on a pump
- Sounding an alarm
- Operating a garage door
- Turning on a light
- Controlling a motor

# Setup Procedure

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## **Setup the Hardware**

Follow the setup for the gateway shield, plate or cape before addressing Tarts Basic Control.

## **Create and Compile the Software**

Be sure to create and register the Basic Control object in your code file.

## **Begin Using**

Insert the batteries into Tarts Basic Control after your Gateway is online. The switch state will be reported with the data messages.

## **Community Forum**

Tarts provides access to the Tarts community with set up tips, support issues, and user applications. Please visit the forum at: [www.tartssensors.com/community](http://www.tartssensors.com/community)



## Power Profile

This device will need a more significant power source than a CR2032 battery, unlike other Tarts sensors. It is recommended, that at minimum, the device is powered with 2 AA batteries (in series), but other options include 2 C batteries in series or 2 D batteries in series. If you intend to have the device react immediately on a continual basis (Low Power Mode set to OFF), you will need to consider power the device with a 3.0 – 3.3 VDC power adapter.

To connect power leads to the unit, solder the ground wire to SP8 or SP4 and the power wire to SP10.

Please see the Expected Battery Life table.

## Serial Identification Numbers

Notice the serial identification number on the bar code sticker attached to the circuit board on each Tarts Basic Control. This is NOT the same as the UPC label on the packaging. It is on the face of the plate. You will need to know this identification number. The identification number is programmed into the unit at the time of manufacturing so it cannot be altered. Communications to and from the devices are identified by this number.

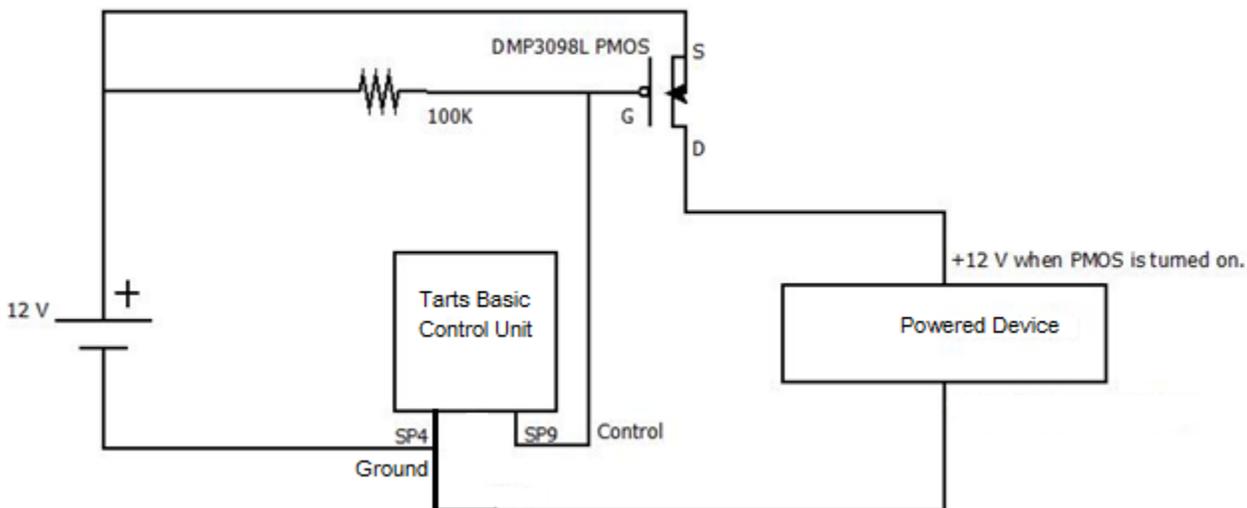
## Antenna Orientation

Before proceeding further, take the time to straighten the antennas on your Basic Control unit. It will perform better if it is not curled up, but rather straight and vertical. For more antenna suggestions, see the RF Considerations section in the User's Guide.

## Light Indicators

Tarts Basic Control comes equipped with an LED light. If power consumption on the device is an issue, the light can be disabled so that it no longer consumes power. Other options include having the LED go on and off with the relay, or only flashing when Tarts Basic Control is polling the gateway for command updates.

## High Current Application Example



# Software

## Basic Control as a Sensor

Tarts Basic Control is treated by the software as another sensor object; even though it is not technically a sensor, it is another wireless device on the network and behaves like a sensor. Therefore, all features in Report Interval, Link Interval, Retry, and Recovery are also valid for this device. Therefore, it defines its own sensor type.

Tarts Basic Control can be used to activate a switch (open it or close it), or you can create an application such that the unit reacts to other sensor types, such as temperature (ie, if a temperature sensor reports above 30°C, Basic Control will turn on a fan).

## Basic Control-specific Properties and Methods

To manipulate these features, use these functions:

Type	Function Call	Parameters	Default State
void	setDefaultSwitchClosed(bool value)	OPEN=TRUE, CLOSE=FALSE	TRUE
void	setUseLowPower(bool value)	TRUE, FALSE	TRUE
void	setLedMode(TartsBasic Control::ledOptions value)	enum{ALWAYS_OFF= 0, ALWAYS_ON=1, FLASH_WITH_POLL=2}	ALWAYS_OFF
void	setPollRate(uint16_t value)	0-65535 seconds	60
bool	getDefaultSwitchClosed()	OPEN=1, CLOSE=0	
bool	getUseLowPower()	TRUE=1, FALSE=0	
TartsBasic Control::ledOptions	getLedMode()	enum{ALWAYS_OFF= 0, ALWAYS_ON=1, FLASH_WITH_POLL=2}	
uint16_t	getPollRate()	0-65535 seconds	
void	sendControl(TartsBasic Control::switchOptions option)	enum{OPEN = 1, CLOSE=2, TOGGLE=3}	
void	sendControl(TartsBasic Control::switchOptions option, uint16_t commandDuration)	enum{OPEN=1, CLOSE=2, TOGGLE=3}, 0-65535 seconds	

**Tip:** When you are sending configuration settings to Tarts Basic Control using the ‘set’ methods, the program will revert to default configurations for parameters that are either not set and stored in global variables in the code file, or not stored in persistent memory. This can be a cause for confusion. Also, when Tarts Basic Control is power cycled, it will revert to the defaultSwitchClosed state, regardless of what state it was in prior to that.

**Default Switch Closed:** This defines what the default state of the switch is when the device enters its application mode, such as on power up.

**Low Power Mode:** This mode selection allows the user to select if the device will be in a low power mode or a high power mode.

When this property is TRUE, the device turns off the radio receiver in between poll intervals to save power. Therefore, the selection of the poll interval is critical. In essence, the larger the poll interval, the longer the battery life. If an application does not require immediate reaction, power consumption can further be reduced by setting long poll intervals. See “Poll interval” property for details below.

When this property is FALSE, the device will listen for commands continuously, consuming power constantly. If an application is such that it needs Tarts Basic Control to react immediately to things, use this mode. However, you will need to power the Basic Control unit with a 3.0 – 3.3 VDC power adapter.

*Led Mode:* The LED (light) indicates if the switch is closed (ON) or open (OFF). Since the LED will burn power, the user has the following mode options. ALWAYS\_OFF, ALWAYS\_ON, FLASH\_WITH\_POLL

*Poll interval:* the poll interval defines how often the unit checks with the gateway for urgent controls commands (such as opening or closing its switch). This interval is typically less than the report interval, but never greater than it. The report interval is critical in the amount of delay that is acceptable for the unit reacting to a command to go open or closed, when the device is in *Low Power Mode*. It is ignored when the device is not in Low Power Mode.

*Send Control:* When sending the command, the user can tell the switch to go open, go closed or toggle (switch to the opposite state). The user can optionally set a time-duration in seconds for how long this condition should be applied, or the user can send a zero (0) for the change to remain indefinitely (until another command is sent or until the device is power cycled).

### Datum Object

Examples of the data in for Basic Control below:

Sensor Type	Name	Value	FormattedValue
Basic Control	SWITCH	0	OPEN

### Tech specs for this device:

Radio Bands available:	900 MHz, 868 MHz, 433 MHz (exclusive on each device)
Tarts Battery Voltage (HIGH)	3.6 VDC
Tarts Battery Voltage (LOW)	2.0 VDC
High Power Mode Current:	25 mA
Low Power Mode Current (switch closed):	300 uA
Low Power Mode Current (switch open):	0.7 uA
Switching Time:	<100 ns
Switch Voltage:	Up to 40 VDC
Switch Current:	Up to 30 mA

### Expected Battery Life (Poll interval set at 60 seconds):

Battery Type	Low Power Mode OFF	Low Power w/ Switch Primarily Closed	Low Power w/ Switch Primarily Open
CR2032	~4 hours	11 days	2 months
AA x 2	2.5 days	5 months	1.5 years
C x 2	13 days	1.5 years	3+ years
D x 2	26 days	2+ years	3.5 years

## Warranty Information

(a) Tarts Sensors (Tarts) warrants that products will be free from defects in materials and workmanship for a period of one (1) year from the date of. Tarts will have no warranty obligation with respect to products subjected to abuse, misuse, negligence or accident. If any device firmware fails to conform to the warranty set forth in this section, Tarts shall provide a bug fix or firmware patch correcting such non-conformance within a reasonable period after Tarts receives from customer (i) notice of such non-conformance, and (ii) sufficient information regarding such non-conformance so as to permit Tarts to create such bug fix or software patch. If any hardware component of any product fails to conform to the warranty in this section, Tarts shall, at its option, refund the purchase price less any discounts, or repair or replace non-conforming products with conforming products or products having substantially identical form, fit, and function and deliver the repaired or replacement product to a carrier for land shipment to customer within a reasonable period after Tarts receives from customer (i) notice of such non-conformance, and (ii) the non-conforming product provided; however, if, in its opinion, Tarts cannot repair or replace on commercially reasonable terms it may choose to refund the purchase price. Repair parts and replacement products may be reconditioned or new. All replacement products and parts become the property of Tarts. Repaired or replacement products shall be subject to the warranty, if any remains, originally applicable to the product repaired or replaced. Customer must obtain from Tarts a Return material authorization number (RMA) prior to returning any products to Tarts. Products returned under this Warranty must be unmodified.

Customer may return all products for repair or replacement due to defects in original materials and workmanship if Tarts is notified within ninety (90) days of customer's receipt of the product. Tarts reserves the right to repair or replace products at its own and complete discretion. Customer must obtain from Tarts a Return material authorization number (RMA) prior to returning any products to Tarts. Products returned under this Warranty must be unmodified and in original packaging. Tarts reserves the right to refuse warranty repairs or replacements for any products that are damaged or not in original form. For products outside the ninety-day warranty period repair services are available at Tarts at standard labor rates for a period of one year from the customer's original date of receipt.

(b) As a condition to Tarts's obligations under the immediately preceding paragraphs, customer shall return products to be examined and replaced to Tarts's facilities, in shipping cartons which clearly display a valid RMA number provided by Tarts. Customer acknowledges that replacement products may be repaired, refurbished or tested and found to be complying. Customer shall bear the risk of loss for such return shipment and shall bear all shipping costs. Tarts shall deliver replacements for products determined by Tarts to be properly returned, shall bear the risk of loss and such costs of shipment of repaired products or replacements, and shall credit customer's reasonable costs of shipping such returned products against future purchases.

(c) Tarts's sole obligation under the warranty described or set forth here shall be to repair or replace non-conforming products as set forth in the immediately preceding paragraph, or to refund the documented purchase price for non-conforming products to customer. Tarts' warranty obligations shall run solely to customer, and Tarts shall have no obligation to customers of customer or other users of the products.

## Limitation of Warranty and Remedies.

THE WARRANTY SET FORTH HEREIN IS THE ONLY WARRANTY APPLICABLE TO PRODUCTS PURCHASED BY CUSTOMER. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. TARTS' LIABILITY WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE OR OTHERWISE SHALL NOT EXCEED THE PURCHASE PRICE PAID BY CUSTOMER FOR THE PRODUCT. UNDER NO CIRCUMSTANCES SHALL TARTS BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES. THE PRICE STATED FOR THE PRODUCTS IS A CONSIDERATION IN LIMITING TARTS' LIABILITY. NO ACTION, REGARDLESS OF FORM, ARISING OUT OF THIS AGREEMENT MAY BE BROUGHT BY CUSTOMER MORE THAN ONE YEAR AFTER THE CAUSE OF ACTION HAS ACCRUED.

IN ADDITION TO THE WARRANTIES DISCLAIMED ABOVE, TARTS SPECIFICALLY DISCLAIMS ANY AND ALL LIABILITY AND WARRANTIES, IMPLIED OR EXPRESSED, FOR USES REQUIRING FAIL-SAFE PERFORMANCE IN WHICH FAILURE OF A PRODUCT COULD LEAD TO DEATH, SERIOUS PERSONAL INJURY, OR SEVERE PHYSICAL OR ENVIRONMENTAL DAMAGE SUCH AS, BUT NOT LIMITED TO, LIFE SUPPORT OR MEDICAL DEVICES OR NUCLEAR APPLICATIONS. PRODUCTS ARE NOT DESIGNED FOR AND SHOULD NOT BE USED IN ANY OF THESE APPLICATIONS.

## Certifications

### United States FCC

*This equipment has been tested and found to comply with the limits for a Class B digital devices, 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 instruction manual, 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 more 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.*

**Warning:** *Changes or modifications not expressly approved by Tarts could void the user's authority to operate the equipment.*

### RF Exposure



**WARNING:** To satisfy FCC RF exposure requirements for mobile transmitting devices, the antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

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### **Tarts Wireless Devices Contain:**

#### **FCC ID: ZTL-RFSC1**

*This device has been designed to operate with an approved antenna listed below, and having a maximum gain of 5.1 dBi. Antennas not included in this list or having a gain greater than 5.1 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.*

*To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.*

#### **Approved Antennas**

The following antennas are approved for use with Tarts devices.

- *Hyperlink HG905RD-RSP (5.1 dBi Rubber Duck)*
- *Pulse W1063 (3.0 dBi Rubber Duck)*
- *ChangHong GSM-09 (2.0 dBi Rubber Duck)*
- *Specialized Manufacturing MC-ANT-20/4.0C (4" whip)*

## Certifications Continued

### Canada (IC)

#### *English*

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

The radio transmitter (IC: 9794A-RFSC1) has been approved by Industry Canada to operate with the antenna types listed on previous page with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (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.

#### *French*

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio (IC: 9794A-RFSC1) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne figurant sur la page précédente et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### Additional Information and Support

For additional information or more detailed instructions on how to use Tarts Wireless Sensors for Raspberry Pi, please visit us on the web at <http://www.tartssensors.com>.



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