



## **User's Manual**

### FCC warning:

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.

### Canada (IC) warning:

Canada Low-power license-exempt radio communication devices (RSS-247)

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(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

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

### RF Exposure and Separation Distance:

For safe operation, the minimum separation distance should be 20cm.

Pour un fonctionnement en toute sécurité, la distance de séparation minimale doit être de 20 cm.



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*Note: The Silver Glade hardware is part of a service package sold by Everactive and is not for sale as an individual standalone product and as such is not open for end customers to program or configure. The following User's Guide is an instruction set used to program and control Boomerang to prepare it for integration with Everactive's service, or test and debug.*

## **Hardware setup for test mode**

Hardware needs:

1. SVG Prog 2.0 Programming board
2. Silver Glade Hardware
3. Everactive USB-C attachment cable

Note: for programming and SW control, harvesting mode is bypassed, eliminating the need for the energy harvesting puck. Later sections will describe the install of a Silver Glade unit onto a motor.

Connect SVG Prog. 2.0 into a USB 3.0 input on a computer or USB Hub. Then connect the Everactive USB C attachment cable from the IO 'MAIN USB-C' to the USB C input on Silver Glade (see Figure below).



Figure 1: Silver Glade connected to programming device



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## Software control for running tests and performing debug

Unzip the following package to your computer: `svg_fcc_scripts_b7cb02ed.zip`

Go to the unzipped folder and run program Silver Glade using the `fcc.py` python script.  
`python fcc.py --h` % view all available configuration options

```
usage: fcc.py [-h] [--serport SERPORT] [--passive] [--cw] [--pn9] [--freq_hop]
             [--tx_packet] [--payload PAYLOAD] [--channels CHANNELS]
             [--rate RATE] [--logging] [--power POWER] [--mode MODE]

optional arguments:
  -h, --help                show this help message and exit
  --serport SERPORT         Serial port to use (e.g. COM4, /dev/ttyACM0)
  --passive                 Receive only mode
  --cw                     Send a CW waveform
  --pn9                     Send a continuous PN9 sequence
  --freq_hop                Frequency hop packets
  --tx_packet               Send a packet
  --payload PAYLOAD         A string representing the payload to transmit in packet
                           mode, default 512 byte random packet
  --channels CHANNELS       A list of channels to swap between "0, 10, 20, 49"
  --rate RATE               Fixed point value of send rate between devices
  --logging                 Enable logging
  --power POWER             Select tx power
  --mode MODE               Select the radio mode
```

*Figure 2: Options for programming Silver Glade for wireless communication*

For conducted wireless tests the top cap of Silver Glade can be unscrewed and the cap plus antenna removed. This will allow a conducted connection to a spectrum analyzer or network analyzer (see Figure X). Otherwise, leaving the cap and antenna connected will leave Silver Glade ready for over the air testing (see Figure X).



*Figure 3: Silver Glade with cap and antenna removed for conducted wireless testing*

In order to run SW tests on a PC confirm which COM port the Silver Glade HW is assigned to. Go to the device manager. One 'USB Serial Port' is for SVG Prog 2.0 and one is for Silver Glade.

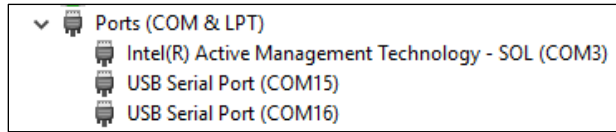


Figure 4: Identify the USB Serial Port

In our examples, the COM port for Silver Glade is COM15. Knowing that a user can configure Silver Glade to perform wireless tests using the options above.

Examples:

Measure transmitted output power on various channels:

```
python fcc.py --serport COM15 --cw --channels "0, 16, 32, 48, 63" --power 10
```

Run in frequency hopping mode:

```
python fcc.py --serport COM15 --freq_hop --power 10
```

## Installation on a motor

Installation on a motor is designed to be fast and easy. On any motor that has sufficient heat differential between the motor body to ambient room, meeting product specifications, a Silver Glade unit can be adhered to the motor, either through its magnetic base or attached with an epoxy or glue. Attaching the energy harvesting puck to Silver Glade using the USB-C port and required cable will be sufficient to power the Silver Glade unit. The Silver Glade unit can then be paired via the Evergateway.



Figure 5: Silver Glade unit paired with both PV and TEG energy harvesting modules