

XPRESSION FX

Micro Sweep

Modulator - Receiver

User guide



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Declaration of compliance

Manufacturers Name: Oz Inventions

Manufacturer's address: PO Box 86, Warrnambool, Victoria. 3280

Declares that the product

Product name: Xpression fX Micro Sweep (Modulator)

is compliant with the following standards regarding radiated and conductive emissions relevant to this product and Electro Magnetic compatibility.

- AS/NZS 4268
- AS/NZS CISPR 32

Should the equipment cause radio frequency interference (disturber) or be the victim of radio frequency interference, the following measures can be taken:

- Relocate the disturber and/or the victim by increasing separation and/or reorientating the device/s.
- Connect the disturber and victim on different power circuits
- Contact the manufacturer or other expert party

Introduction

Xpression fX Micro Sweep from Oz Inventions, is a wireless motion controlled audio effects controller. It is designed for use with effects units, keyboards and MIDI controllers that have an expression pedal socket, sometimes called a control socket.

The device is compatible with effect units, keyboards and MIDI controllers with expression sockets or with CV sockets.

- Correct polarity and/or resistance settings are important. Refer to the user manual for your effects unit / keyboard/ MIDI controller to determine the correct polarity and resistance.**

TRS polarity & 10Kohm resistance are common but not universal. The following settings have been found to work with the following products, though operation is not limited to these products.

Manufacturer	Polarity	Resistance	Manufacturer	Polarity	Resistance
Arturia®	CV	NA	Mooger Fooger®	CV	NA
Avid (Eleven rack)®	TRS	10 Kohm	Mooger Fooger®	TRS	50 Kohm
Behringer®	RTS	50 Kohm	MXR (Jim Dunlop)	TRS	10 Kohm
Boss®	TRS	10 Kohm	Pigtronix®	TRS	10 Kohm
Digitech®	RTS	10 Kohm	Ramble FX® (Kismet)	TRS	10 Kohm
Earthquaker®	TRS	50 Kohm	Ramble FX® (Kismet)	CV	NA
EHX®	TRS	10 Kohm	Red Panda®	TRS	10 Kohm
Ensoniq SQ1/SQ2®	CV	NA	Strymon®	TRS	50 Kohm
Fairfield Circuitry	TRS	10 Kohm	TC Electronic®	TRS	50 Kohm
Fractal Audio Systems®	TRS	10 Kohm	TC Helicon®	TRS	10 Kohm
Eventide®	TS	10 Kohm	Yamaha®	RTS	50 Kohm
Kemper®	TRS/ RTS	10 Kohm	Walrus Audio®	TRS	10 Kohm
Line 6®	TS	10 Kohm	Zoom®	RTS	50 Kohm
M-Audio®	TRS	10 Kohm			
Magnataone	TRS	50 Kohm			
Mooer®	TRS	10 Kohm			

Figure 1 – Common polarity settings

Provided items

- Receiver-Modulator
- Antenna (optional)
- DC 12 volt 150mA power supply (optional)
9 – 12 volt acceptable range
- one meter TRS cable (optional)
- Quick start manual (optional)

Safety and care

- Remove power from all devices to be connected before connecting or disconnecting
- Dismantling the device may damage the device. There are no user serviceable parts inside the device.
- Only use the provided AC to DC power adapter or other certified adapter. Only use the correct polarity of the provided reversible DC power adapter. Negative centre (tip) is the correct polarity. The power adapter is supplied in the correct configuration. Do not reverse the connection.
- Electromagnetic radiation is minimised by the aluminium enclosure and relevant internal components. However, should interference be experienced, position the device further away from the device that is interfering or being interfered with. Interference can also be limited by operating the device on different radio frequency channels.
- Due to the nature of modulation, some modulated parameters, particularly at the ends of modulation, can cause a loud and/or irritating audio noise. Permanent or temporary high volume audio signals can damage hearing and equipment.
- Should the device malfunction, a reboot or restore to default settings, may resolve the problem. Otherwise the manufacturer should be contacted. There are no user serviceable parts inside the device.
- Avoid contact with, and environments, known to cause adverse effects with electronics and small moving parts, such as liquids, dust, sand, high humidity, high temperature and vibrations.
- Avoid excessive force when operating controls and connecting cables
- Disconnect the device during lightning storms and /or times of power outages
- **This modulating device is designed to be connected to another device that outputs a DC voltage no greater than 5 volts. Damage can be caused to this modulating device if greater than 5 volts is applied to the expression socket. Consideration must be taken when connecting and using it.**

If in doubt contact Oz inventions at contact@ozinventions.com

Warranty

The device is warranted for use in Australia.

If the product is defective as a result of faulty workmanship or materials, Oz Inventions will at their discretion repair or replace the product for a period of 12 months from purchase.

Proof of purchase is required and Oz Inventions at their discretion are required to inspect the product and reserve the right to update or improve the product including hardware and software during the period of inspection and /or repair.

The warranty is void if the product is opened or dismantled in any way

Warranty claims should be directed to contact@ozinventions.com

Power

The device requires a 9 – 12 volt DC power supply with a current capability of 0mA. The DC polarity is negative in the centre (tip). The supplied DC adapter is a reversible model. It is supplied with the correct polarity configuration. Do not reverse the connection.

Introduction

Xpression fX Micro Sweep from Oz Inventions, is a wireless motion controlled audio effects controller. It is designed for use with effects units, keyboards and MIDI controllers that have an expression pedal socket, sometimes called a control socket.

The device provides unique expression capability and functions as a -

- Freehand motion expression device creating modulation from the movements of tilt and rotation
- Motion controlled footswitch

The device is compatible with effect units, keyboards and MIDI controllers with expression sockets or with CV sockets. The modulator / receiver, provides the following features-

- TRS, RTS, TS polarity and CV output (0 – 4 volt, 2mA Control Voltage).
- 10Kohm and 50Kohm electrical resistance
- Two RF receiving channels (2.4GHz)
- Motion controlled expression via tilt and rotation
- Reverse and forward sweep
- Adjustable start and stop sweep positions
- Sensitivity control

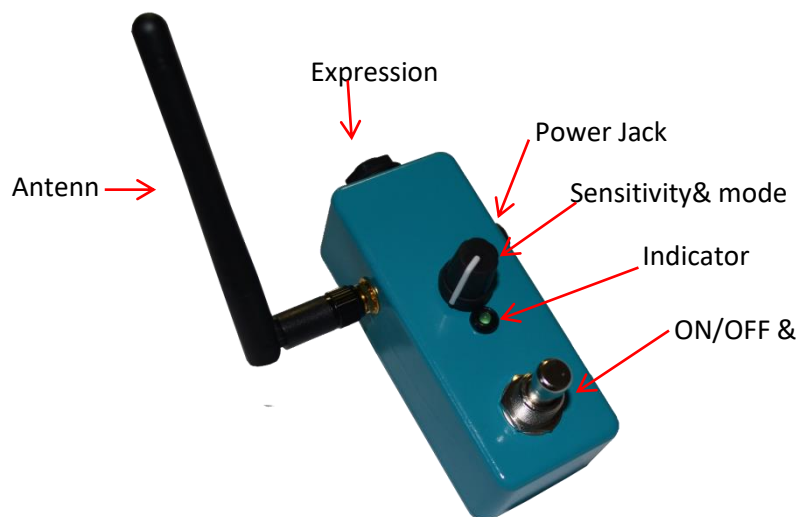


Figure 2 Top panel controls

- Expression jack – Tip, Ring, Sleeve type 6.35mm ($\frac{1}{4}$ ")socket
- Antenna – 2.4GHz vertical omni-directional 110mm antenna
- Sensitivity & mode select – sets sensitivity of and selects tilt & rotation modes
- ON/OFF & calibration - Turns modulation on & off; Calibrates the beginning and ending modulation sweep points
- ON/OFF/calibration/mode indicator – green
Illuminated = Modulation ON; Extinguished = Modulation OFF; Slow flashing = calibrating; Brief fast flashing = mode change
- DC power jack –2.1mm; 9 – 12V; 50mA; Negative centre

Connecting the expression jack

Connect the expression socket of the receiver to the expression socket of an effects unit, keyboard or MIDI controller, using a TRS cable. Regardless of whether TRS, RTS, TS or CV polarity is chosen, a TRS cable is required. The wiring configuration of the TRS cable is tip to tip; ring to ring; and shield to shield.

A TS (mono) cable can be used for switching only, if the effects unit/keyboard/MIDI controller provides that functionality and is compatible. See “Using the modulator as a footswitch”



Figure 3 – Connecting the expression jack

The plug/socket connection is firm and should click as it is made. The plug should be pushed in until all of the silver plating is inside the socket.

Connecting multiple receivers

Using multiple receivers provides the ability to control multiple units using different modulation modes. For example one receiver can be set to respond to tilt whilst another receiver can be set to respond to rotation.

The picture below shows two receivers being controlled by one sensor-transmitter. Both receivers are set to the same channel and can be set to the same or different modulation modes. There is no limit to the number of receivers that can be used with a single sensor-transmitter.

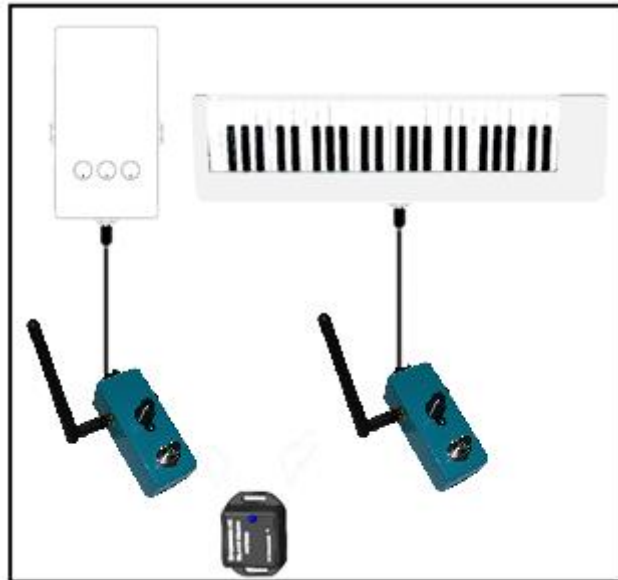


Figure 4 – Connecting multiple units

Setting multiple sensor-transmitters and receivers to different channels is also possible and offers many combinations and possibilities. The picture below shows two sensor-transmitters on different channels. Sensors can be attached to anything that moves. E.g. guitar, arm, leg, drummer, dancer etc

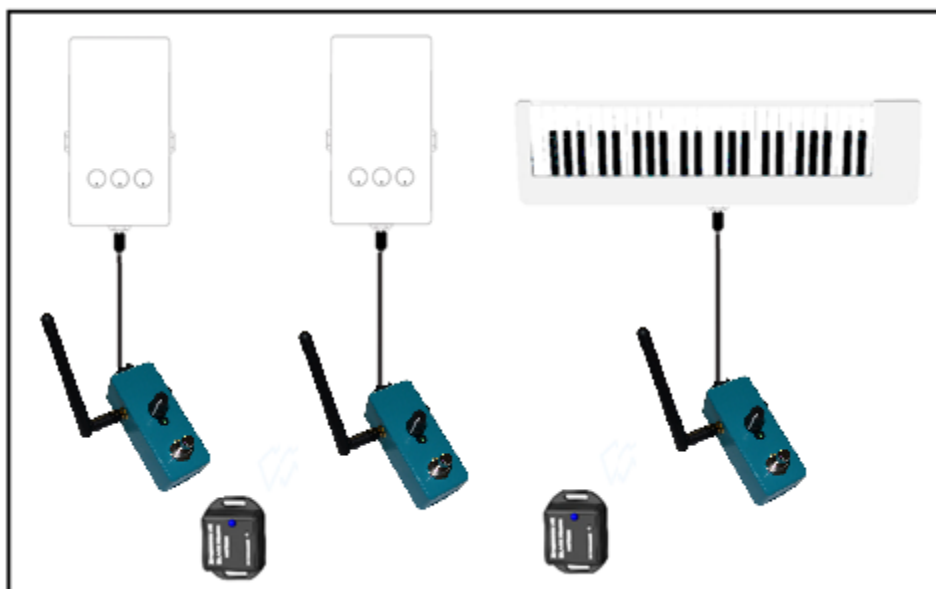


Figure 5 -- Many possibilities

Functions

Indicator light

- The indicator shows when modulation is on or off. When illuminated, modulation is on.
- The indicator also indicates when calibration is occurring via flashing.
- The indicator also indicates when the mode has been moved from tilt to rotate or rotate to tilt, by flashing.
- Two channels are provided to increase the systems capability by working with multiple sensor-transmitters and multiple modulator-receivers, and also to avoid or limit electrical interference.

ON/OFF & Calibration



- Press to turn modulation ON & OFF.
- Hold and wait for flash to set start of sweep, continue to hold and move sensor to end of sweep, release. See Calibration for details

Sensitivity and mode change

The modulation modes are tilt or rotate. They are selected by the control, & sensitivity is adjusted by the control.



- Turning the control clockwise past center, selects Tilt mode.
- Turning the control anticlockwise past center, selects Rotation Mode
- The indicator briefly flashes when the mode has changed.
- Modes are most sensitive when the control is at either extreme. The mode becomes less sensitive as the control is moved toward centre

Tilt

Default angle 0 – 90 degrees; Range 0 – 90 degrees;

Default orientation – Top; Range – Top, Bottom, Left, Right, Front & Rear

The sensitivity control adjusts how quickly the modulator responds to received data from a sensor, and how stable the modulated output is. The control is a compromise between response and stability. Great stability comes with a slow response time. Quick response times are less stable. Either condition is not a hindrance, but rather can be used to good effect. For example quick response and low stability enables quick movements to produce warbling effects, whilst slow response and high stability enables robust player movements so that modulation only occurs at specific points. A slow response can also be used to provide a delay which gives a pad type string effect as modulation slowly increases and decreases.

Rotation

Default 0 – 90 degrees; Range 0 – 36000 degrees;

This mode is designed for rotational movement such as side to side swaying or swinging, as maybe done when playing a guitar, dancing or other circular movement. Calibration is usually required before use. See *Rotation calibration process*

Internal switches (resistance, Channel & Polarity)

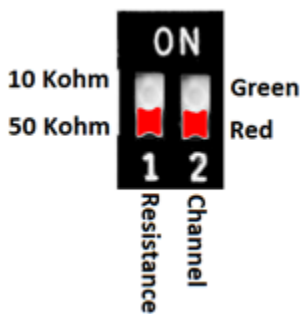
Resistance

Default 10 Kohm; Range 10 & 50 Kohm.

The device has two electrical resistances – 10Kohm & 50Kohm.

Most effect units/keyboards/MIDI controllers, will function with any of these resistances. However, some devices have specific requirements that must be adhered to for correct functioning. Refer to the effect unit/keyboard/MIDI controller manual for specific requirements and/or see the table in this manual.

An internal switch changes between 10 and 50 Kohm. To change the setting, first power the unit OFF, change the switches, power the unit ON.

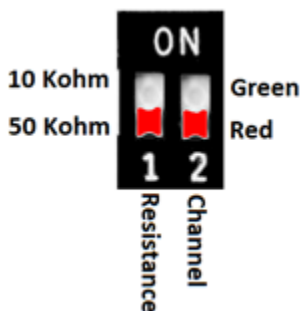


Channel (Ch)

Default red; Range – red & green

The device has two receiving channels that correspond to transmitting channels from the sensor-transmitter. The two channels are called Red and green. The sensor-transmitter and the modulator-receiver must be set to the same channel or there will be no motion activated modulation.

An internal switch changes between red & green channels. To change the setting, first power the unit OFF, change the switch, power the unit ON.



Polarity & control voltage

Default – TRS; Range TRS, RTS, TS, CV

Many effects units/ keyboards/MIDI controllers use the TRS setting. However, some do not. . If this setting is not set correctly the results can vary from no modulation to intermittent modulation. Refer to the effect unit/keyboard/MIDI controller manual for specific requirements and/or see the table in this manual.

An internal bank of switches changes the polarity. The unit should be powered OFF before changing switches



TRS

Tip, Ring, Sleeve. A constant voltage is applied to the ring and sleeve from the effect unit/keyboard/MIDI controller. A varying voltage returns from the tip.

RTS

Ring, Tip, Sleeve. A constant voltage is applied to the tip and sleeve from the effect unit/keyboard/MIDI controller. A varying voltage returns from the ring.

TS

Tip, Sleeve. The ring is disconnected. A varying voltage comes through the tip. Depending on the effects unit/keyboard/MIDI controller, TS polarity may enable the modulator to function as a foot switch

CV

Control Voltage. The ring is disconnected. A varying voltage is generated by this device and returns through the tip. The voltage is 0 – 4 volts DC. This is suitable for many CV devices. Some devices may require 10 volts, and so this modulator will have a limited range, though still a significant effect with 10 volt synthesizers.

***Warning – Supplying a voltage to an incompatible external device can damage the modulator and the incompatible device. CV mode is designed for connection to devices such as analog synthesizers that require a varying 0 – 5v input. Current is limited to 2 milliamperes. Ensure the other devices instruction manual and/or the manufacturer is consulted before connecting the modulator to another device.**

System reset

System reset is actuated by holding the modulation mode switch down, whilst applying power, and then releasing the switch. The device will be reset to factory default settings.

Calibration

General calibration process

Tilt mode should be calibrated for best operation. The calibration operation means to set the angle over which modulation occurs. The angle can be narrow or wide. Modulation begins at minimum at the start of calibration and finishes at maximum at the end of calibration.

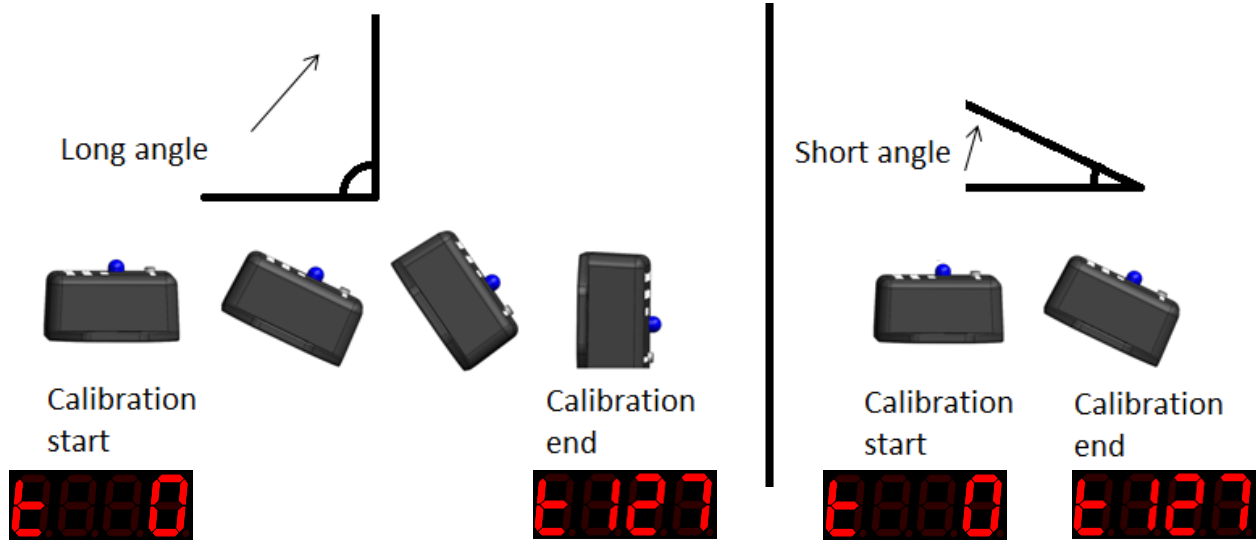





Figure 6 – Long and short angle Calibrations

Calibration steps

1. Hold the sensor-transmitter at the required starting position 
2. Press and hold the calibration button on the modulator-receiver. The ON indicator will start to flash, signalling the start of the angle has been set and that a modulation output of zero will be at that point. 
3. Continue to hold the button and move the sensor-transmitter to the finishing position 
4. Release the button. The angle end has now been set and modulation will be at maximum at that point.

Tilt calibration process

1. Hold the sensor-transmitter steady, on a vertical or horizontal plane with the ground in one of the six best orientations. *See Orientations*
2. Hold the calibration button on the receiver-modulator
3. When the indicator starts to flash, the starting position has been set. Do not release the calibration button
4. Tilt the sensor-transmitter no more than 90 degrees, in the required direction
5. Release the calibration button. The finish position has now been set.
6. The receiver is now calibrated for a 0 – 127 point sweep over the calibrated angle.

After calibration, tilting the sensor-transmitter further than the calibrated range will have no effect upon the display or modulation, unless the start and finishing points are significantly past after which the output will become erratic.

The sensor-transmitter has six best starting orientations. Top; bottom; left; right; front and rear. If during calibration the starting orientation is different from the finishing orientation, unexpected results can occur, dependent on how far into the finishing orientation, calibration completes.

Best results are obtained by starting on a vertical or horizontal plane with the ground and tilting no further than 90 degrees. However good results can often be obtained when started on an angle, depending on how steep that angle is, and good results can be obtained when tilting further than 90 degrees.

Starting on a vertical or horizontal plane and tilting no further than 90 degrees is a failsafe method.

Before calibrating it is important to ensure the sensitivity control is at its most sensitive. The sensitivity control holds the signal tight or loose as required. If it is held too tight during calibration the modulation output may not change quickly enough, with the result being a very short calibration angle.

Rotation calibration process

1. Hold the sensor-transmitter steady, on a vertical or horizontal plane with the ground
2. Hold the calibration button on the receiver-modulator
3. When the indicator starts to flash, the starting position has been set. Do not release the calibration button
4. Rotate the sensor-transmitter either clockwise or anti-clockwise.
5. Release the calibration button. The finish position has now been set.
6. The receiver is now calibrated for a sweep over the calibrated rotational angle. The Maximum rotation angle is 36000 degrees (100 circles).

To best understand this modes operation, initially calibrating over a small (45 degree angle) is recommended.

When the starting position is exceeded the modulation will remain at 0. When the direction is changed back toward the finishing direction, the modulation will soon start to increase. The same occurs in the opposite direction. After calibration, exceeding the calibrated range will have no effect upon the display or modulation, unless the start and finishing points are significantly past, after which erratic readings will occur.

Best operation is obtained when the sensor is held on the plane on which it started, though good results can still be obtained should the sensor tilt during operation.

Modulation modes

There are two motion modulation modes

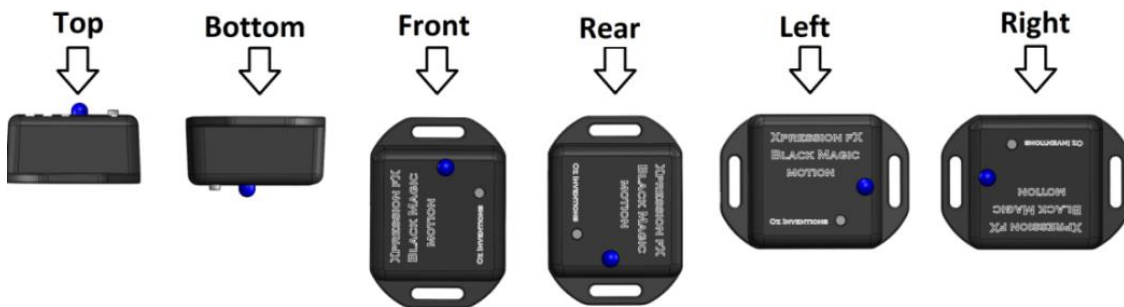
1. Tilt (Measures how far the sensor has tilted in a single direction)
2. Rotation (measures rotational distance on a single plane)

Understanding tilt mode

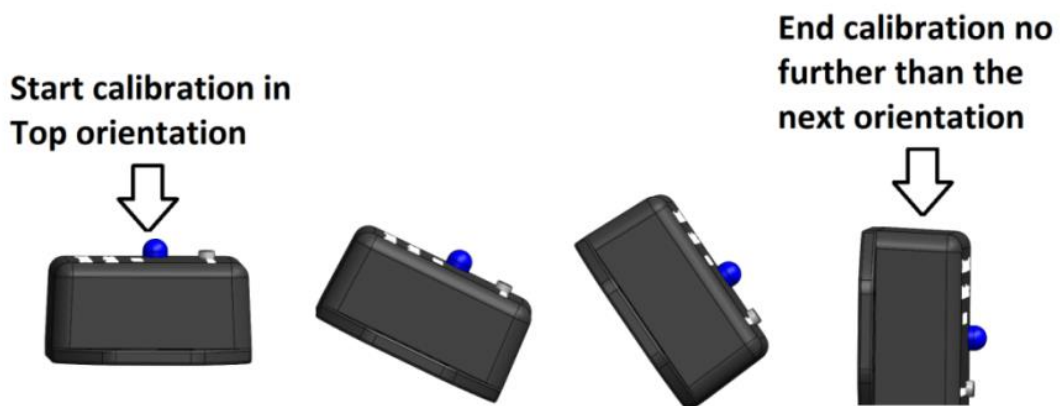
The tilt sensor measures tilt angle in any direction. Tilt mode should be calibrated before it is used and calibration should begin in one of six ideal orientations.

Orientations

- There are six best orientations that tilt calibration can begin from.



- Calibration begins in one orientation, and ends no further than the beginning of another orientation.



- Calibration does not need to cover the full 90 degrees



Best results are obtained when calibration begins in one of these orientations and ends before entering another orientation. However, greater than 90 degrees can be calibrated and the calibration does not need to begin or end in the ideal orientations, rather these are ideal orientations that will provide best results.

Testing tilt mode

1. Change the polarity and resistance to those required by the device to be modulated
2. Connect the modulator
3. Power ON the device with the default settings. *See **Error! Reference source not found.*** Hold the ensor in the palm of your hand, with the LED facing up toward the sky. The edge nearest the LED should be further from you compared to the other edge, and the strap holders should be running along the axis from your fingers to your wrist.



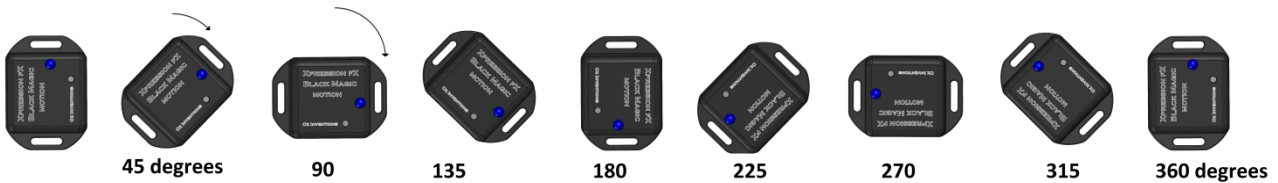
Tilt your hand toward you and modulation will increase. The default settings are zero when the device is horizontal with the ground and maximum when it is tilted 90 degrees. The angle can be changed by calibrating.

Figure 16 –First direction

Understanding rotation mode

Rotation mode senses the distance moved in a circle (rotational angle).

The starting orientation for the rotation sensor is not important. However, when calibrating and using it, the start orientation and the end Orientations should be similar. Regardless of the orientation of the sensor the motion must be parallel with the ground (horizontal).



Calibration for rotation mode can begin at any orientation and at any rotational angle and stop at any rotational angle up to a maximum of 36000 degrees (100 full circles). The ending orientation should be the same as the starting orientation.

Testing rotation mode

1. Change the polarity and resistance to those required by the device to be modulated.
2. Connect the device
3. Start the device with the default settings. *See **Error! Reference source not found.*** Hold the sensor in the palm of your hand, with the LED facing up toward the sky.



4. Hold your arm out straight, parallel with the ground
5. Rotate your arm around your body
6. The modulation will increase from zero to maximum as you move in a clock wise direction, and decrease when moved in the other direction



Figure 7 – A 45 degree calibration

Using the modulator as a foot switch

Some effects units/keyboards/MIDI controllers, have sustain sockets, footswitch sockets or expression sockets that have foot switch functionality. The function of the switch, as well as the type of footswitch required, is dependent on the brand and model. Footswitches may be momentary or latched, footswitch devices may contain a single footswitch or two or three switches. The function of a footswitch may be to change presets, change banks, start and stop loopers and select other built-in functions. The specific devices user manual will need to be referenced. There are many types and this modulator will not function as a footswitch with all of them.

As an example, Zoom® effect products often have an expression socket that also accepts a footswitch. The footswitch required is a momentary switch connected to a TS (mono) cable. To use this modulator as a footswitch with these products set the polarity to TS and use a TS (mono) cable.

- Press the ON/OFF button to turn the indicator ON. Tilt or rotate the sensor and the unit will switch

There are many devices available that have footswitches that interface in different ways and so the devices user manual needs to be referenced to setup the function of the footswitches and also the type (momentary / latched).

Default settings

The following switch settings are the default at the factory

Function	Default parameter
Resistance	10 Kohm
Polarity	TRS
Channel	Red

The following parameters are found after a factory reset.

Tilt mode	
Orientation	Top
Minimum depth	0 degrees
Maximum depth	90 degrees
Rotate	
Minimum depth	0 degrees
Maximum depth	90 degrees

The default settings can be restored by using the system reset function

Trouble shooting

Problem	Resolution
Modulation does not change or is erratic	<ul style="list-style-type: none">• Check sensitivity control• Check polarity• Check resistance• Recalibrate
Modulation is slow to change in tilt mode	Increase sensitivity control
Modulation is too sensitive	Reduce sensitivity control
Modulation is not smooth or jumps large steps	Check polarity setting and/or resistance settings
The angle over which modulation occurs is too large or too small	Re-calibrate
Rotation mode not working when moved up and down	Normal operation. Rotation mode only works on a horizontal plane
Everything has been tried, but it won't work, or it seems stuck	<ul style="list-style-type: none">• Turn power off and on• Load default settings (system reset)• Contact Oz Inventions

Modulator-Receiver specifications

- 9 – 12 volt; Negative centre (tip)
- Current draw 50mA
- Expression connection electrical resistance 10 Kohm and 50 Kohm
- Expression jack type- ¼" (6.35mm) stereo
- Polarity - TRS, RTS, TS or CV (0 – 4v; 2mA maximum)
- 2.4GHz receiver
- Dimensions - Lmm x Wmm x Hmm
- Weight - 0. Kg (grams)

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