This is a Quick Start Guide only. For comprehensive instructions, please read the DopplerFXReferenceManual.pdf document in the Manuals-Instructions folder on the microSD Card that is in the sound module. Insert the microSD Card into the included USB microSD card reader and insert that into one of your computer's USB ports.

For the ShockWave 3 Reference manual, please refer to the ShockWave3HWReferenceManual.pdf also located in the Manuals-Instructions folder on the microSD card.

CHAPTER 1 - MOUNTING THE DOPPLERFX ACCESSORY BOARD

The DopplerFX board is shipped mounted inside its plastic case with the 4-wire cable connected as shown here. The lid will already be installed.

Figure 1 - DopplerFX Accessory Board In its Plastic Case
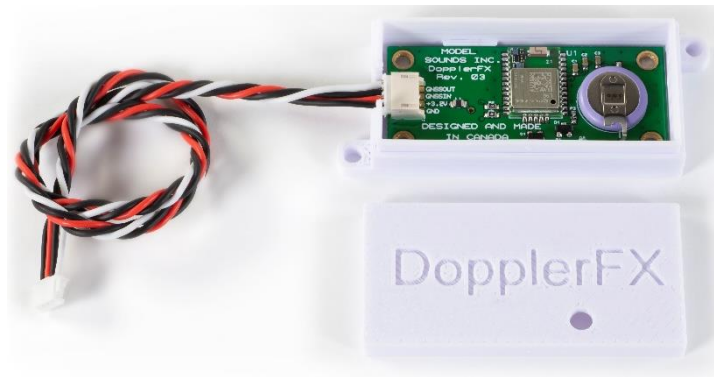
If the cable should become loose, the lid must be removed in order to push the connector fully home.

If you need to adjust the cable connector, remove the lid by gripping the case sides (not the lid sides), pushing them in slightly and lifting off the lid. With the lid off it is much easier to fully insert the cable plug into its connector on the board.

Then, replace the lid on top with the LED hole above the LED. Press the lid firmly home so that its retention indents lock into the corresponding bumps on the case.

Use the supplied hook and loop fastener patch to attach the case, with the lid uppermost, to the inside top of your fuselage. Additional glue may be required to attach the hook and loop fastener securely to your fuselage especially when it is left out in the sun and heats up. For foam aircraft, the use of Beacon Adhesives Inc. Foam-Tac glue is recommended.

In this way the GNSS antenna will be facing upwards and towards the sky when the model is flying level the right way up.

Keep the **DopplerFX** Accessory board as far away as possible from all other electronics and metal or carbon fibre structures as they can interfere with the very weak GNSS satellite signals.

MODEL SOUNDS INC.

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CHAPTER 2 - POWERING THE DOPPLERFX ACCESSORY BOARD

The **DopplerFX** accessory board requires +3.3Volts power which is drawn from the **ShockWave 3** sound module through the provided four-wire accessory cable. This same power provides charging current for the on-board re-chargeable coin-cell backup battery.

When it is first received, it is advisable to power up the DopplerFX board from the ShockWave 3 board and its receiver battery for a period of 24 hours to charge up its rechargeable coin-cell backup battery.

CHAPTER 3 – HOW TO OPERATE YOUR DOPPLERFX ACCESSORY BOARD

The **ShockWave 3** sound module has **SOUND3** RC input pins on its HEADER1 (at the bottom left-hand side of the board). Refer to the printed quick-start guide that came with the sound module.

Pins 1, 2, 3 on that HEADER1 is configured by default to support an optional input from a spare RC receiver channel to control the **DopplerFX** feature. This input can be used to both reset the Observer Position and to remotely enable and disable the **DopplerFX** feature.

Pin 1 is system GND, **or battery –ve**, **pin 2 is receiver power**, **pin 3 carries the DopplerFX RC receiver signal from the radio receiver into the ShockWave 3 board**.

To use this input effectively, it should be used with a **three-position switch** on your radio with the centre position being the **OFF** position. One direction is used to reset the **Observer Position** and the other direction is used to remotely enable and disable the DopplerFX feature.

Other than this, operation of the DopplerFX board is completely automatic and it will use settings contained in the **DopplerFXSettings.txt** file on the microSD card.

SETTING THE OBSERVER POSITION

The only thing you may want to change during operation is the **Observer Position**. This position is the refence location that the **ShockWave 3** sound module uses to determine if the model is approaching towards or receding away from that position. And this position is the point at which maximum change in Doppler Frequency shift will be heard as the model flies by.

This position is ordinarily set at the location of the model when it acquires a satellite fix and therefore has a known position. For maximum Doppler Shift effect, the pilot may wish to reset the **Observer Position** to a point on the flight line that is close to his/her own position. Or in a scale model competition, the pilot may wish to reset the **Observer Position** to near the judge's station so they can hear the maximum effect.

This resetting of the **Observer Position** can be done remotely using a 3-position switch on a spare radio channel whose receiver output is connected to the SOUND3 input of the **ShockWave 3** sound module.

CHAPTER 4 - HOW DO I KNOW WHEN I HAVE A SATELLITE **FIX?**

When first powered up or when powered up a long distance from when it was previously powered, the "satellites in view" may be different and the time to get the first position fix may be as long as 1 minute or so. This time is called the Time To First Fix (**TTFF**). Under these circumstances it is called a "cold start".

Subsequently, as long as the backup battery is charged, and if you power-up the **ShockWave 3** and **DopplerFX** board in roughly the same location as last time, this time will be much less – just a few seconds. This is called a "hot-start". Please be patient during this time as it is important this time be allowed for the **Observer Position** to be obtained.

THE DOPPLERFX LED INDICATOR

The **DopplerFX** Accessory board has a dual-purpose Green LED. The Green LED will light whenever power is applied to the board. Once a satellite fix is obtained it will flash on and off once per second as a satellite fix acquired indicator.

However, since the DopplerFX board is installed inside the model, this LED is of little use to the user, so there needs to be an external mechanism to indicate when a satellite fix has been obtained.

USING SYSTEM SOUNDS FOR DOPPLERFX EVENT NOTIFICATIONS

The **ShockWave 3** module can make system sound announcements to notify you of events such as **Satellite Fix Acquired or Lost**, **Observer Position Set** and some others. These system sound announcements can be turned on and off by the user using text entries in a **DopplerFXSettings.txt** file on the microSD card. They can also be changed in the **ShockWave 3 PC software Control Panel->DopplerFX Tab.**

This **DopplerFXSettings.txt** file is mandatory, and if it is not present, the **ShockWave 3** module will create one with default values when it is powered up.

When a GNSS receiver is first powered up it does a "Cold Start". This means that it searches for available satellites and builds a small database of available start-up information and other essential data. If there is a backup battery present, this start-up information is stored in volatile memory (RAM) that would otherwise be lost when its main power is removed, as when the electric power system in the model is switched off.

Since a cold start can take up to a minute or more to perform, by storing the information in backup memory, it can perform a "Hot Start" next time which usually takes less than 10 seconds. The current drain when in backup mode is only about 7uA and the 3V coin-cell will last about 2430 hours (about 101 days) without being recharged. It will likely run down during the winter months when the plane is not in use and will start-up again in Cold Start mode the first time it is powered up in the next flying season.

It is recommended to charge up the battery at least twice during the winter months. The battery gets charged automatically when the main +3.3V power from the **ShockWave 3** sound module is applied.

Care should be taken to **NOT** short circuit the small coin backup battery with stray tools or wires.