Registered Scottish charity (SC053256)

Swift Caller

Quick User Guide

For Alpha 1.x Units

(Firmware V002)

www.draco.work/projects/swift-caller

Thank you for buying your Swift Caller from our Men's Shed

ABOUT US

Sanquhar & District Men's Shed is a not-for-profit group to support men's welfare and help increase social interaction. We provide a welcoming full woodworking workshop and Games & Recreation room for men aged 18+ to connect, share skills, and reduce social isolation. Whether you want to tackle a woodworking project, learn a new craft, enjoy a game of pool or darts, or just have a chat over a brew, the Shed is your space to make whatever you wish. As a registered Scottish charity (SC053256), our mission is to improve local men's mental health, Membership is completely free, and we offer both daytime and evening sessions to suit your schedule. Stop by during our opening hours to meet the team and get involved in our growing community across Upper Nithsdale.

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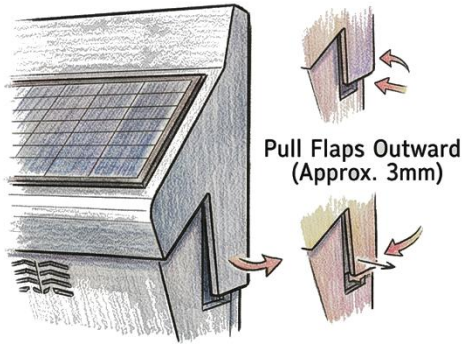
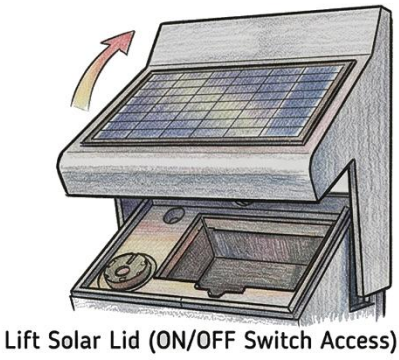
Quick Installation





To help you quickly set up your Swift Caller, we ship all our units with a fully charged battery, preloaded sounds, and a basic time configuration (6:00 AM – 9:00 AM and 6:00 PM – 9:00 PM, April – August). This means the unit is ready for installation in just a few simple steps:

- **Power On:** Open the top part of the unit to ensure it is powered on. To do this, simply pull out the flaps (Only a little, About 3mm) on the solar lid and pull upwards. This will reveal the power switch; turn it to the ON position.
- **Locate:** Find a suitable spot where the solar panel will receive adequate sunlight throughout the active months.
- **Mount:** Mount the bottom half of the unit to the wall by driving a screw through the top screw hole, followed by the bottom hole. screw Once it is fully secured, apply the bottom screw caps.
- **Close:** Slide the solar lid back securely into place Make sure the side flaps click into place.

Installation Essentials

To get the most out of your Swift Caller and successfully attract prospecting yearlings, keep these key placement rules in mind during installation:

- **Proximity to Nests:** Mount the Swift Caller as close to your swift nest boxes as possible. Swifts are colony nesters, and the goal is to make them believe other swifts are already living in those specific boxes.
- **Height:** Just like your nest boxes, the caller should be installed high up on a clear stretch of wall. Aim for a height of 3 to 5 meters (10–16 feet) above the ground.
- **Solar Positioning:** The caller is powered by an angled, integrated solar panel. While nest boxes should ideally face North or North-East to keep the chicks cool, you must ensure the caller is not placed in complete, deep shadow. It needs adequate ambient or direct sunlight during the day to keep the internal battery topped up.
- **Acoustic Clearance:** Ensure there is a clear, unobstructed path in front of the caller. Avoid placing it directly behind thick foliage, wires, or deep roof overhangs that could muffle the speaker or block the sound from projecting into the sky.
- **Secure Fixings:** Use weather-resistant screws (such as stainless steel or galvanized) to secure the unit to the wall. The caller is designed to be fully weatherproof, but mounting it tightly under the eaves or soffits provides excellent natural shelter from heavy rain.

Configure your caller

To start configuring your Swift Caller for the first time, make sure **DIP Switch 1 is set to ON** (Program Mode). Next, connect your smartphone or computer to the caller's Wi-Fi network: (**default Name:** SwiftCallerAP **Password:** swift123) Open a web browser and go to **192.168.4.1**. Once connected, you will see the Swift Caller Device Management Portal. From this dashboard, you can manage all the device settings across three main categories:

1. Audio Management

- **Upload Audio:** Add new calls by uploading **.wav** (PCM 16-bit, Mono/Stereo) or **.raw** (16-bit Little-Endian Mono @ 16000 Hz) audio files. The dashboard will display your remaining storage space.
- **Stored Files:** View a list of all saved sound files. You can click "Play" to test a sound immediately through the speaker, or "Delete" to remove old files.
- **Digital Volume Control:** Fine-tune your caller's output using the new digital volume slider directly from the web portal. (Note: DIP Switch 6 still acts as a hardware maximum limit).

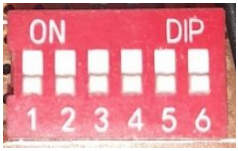
2. Playback & Scheduling

- **Delay Between Calls:** Set a minimum and maximum delay (in seconds). To mimic natural behaviour, the caller will pick a random wait time within this range before playing the next sound.
- **Active Season:** Set the Start Month and End Month (e.g., Month 5 to Month 8). The device will only play sounds during this breeding season.
- **Daily Active Hours:** Set up to two active playback windows per day (a Morning Session and an Evening Session). The caller will remain completely silent outside of these hours to save battery and avoid noise complaints.

3. System Maintenance

Hardware Clock (RTC): Sync the internal hardware clock with your current local date and time.
Network Security: Change the default Wi-Fi name and password. This is highly recommended if you are installing multiple Swift Callers in the same neighbourhood so you can easily identify your specific unit.
Scheduled Service Mode (SW2): Set a daily time window (e.g., 06:00 to 07:00). If you leave Switch 2 in the ON position, the Wi-Fi portal will automatically wake up during this specific hour every day so you can connect and change settings without climbing a ladder.
Live System Health & Hardware Status: Check the real-time device uptime, dynamic CPU scaling status, and the physical position of the 5 internal DIP switches right from your screen.
Firmware Update: Wirelessly flash new .bin software updates to the caller.
Reboot Device: Remotely restart the caller to apply new settings without needing to access the physical power switch.

DIP switch functions



Your caller features a red block of 6 DIP switches. Switches 1 through 5 control the internal software, while Switch 6 controls the physical hardware amplifier volume.

[SW 1] Software Mode (Master Override)

ON (Program Mode): *Mutes all bird calls and forces the Wi-Fi portal (SwiftCallerAP) to remain permanently active. Use this for your initial kitchen-table setup.*
OFF (Normal Mode): *Standard daily operation. The Wi-Fi turns off to save battery, and bird calls will play according to your set schedule.*

[SW 2] Scheduled Service Mode

ON (Scheduled Wake): *The Wi-Fi portal will automatically turn itself on every day during your pre-set "Service Window" (e.g., 06:00 to 07:00). This allows you to connect and change settings while the unit is mounted high on a wall, without needing a ladder.*
OFF (Disabled): *The portal remains off during Normal Mode (maximum battery savings).*

[SW 3] Factory Reset

ON (Wipe Memory): *To reset all schedules and settings to factory defaults: Power the unit OFF Flip SW3 to ON, Power ON and wait 5 seconds Power OFF Flip SW3 back to OFF Power back ON*
OFF: *Normal boot.*

[SW 4] Optional Diagnostic Screen

ON (Display Active): If you have temporarily connected an optional OLED diagnostic screen to the internal pins for maintenance, this switch wakes it up to display live field diagnostics (RTC time, software mode, Wi-Fi status, and next call countdown).
OFF (Default): Standard operating position. Leave this OFF if no screen is attached, or to save battery when deployed in the field.

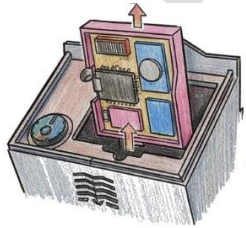
[SW 5] Expansion Slot

Currently unused. Reserved for future firmware updates. Leave in the OFF position.

[SW 6] Hardware Sound Gain (Volume)

ON: *9dB (Lower Volume).*
OFF: *15dB (Maximum Volume).*

Note: For standard daily operation, ensure Switch 1 is set to the OFF position.



Having issues reading the dip switches?

You can slide the whole MPU out of the unit. Just be careful with pulling the wires..

How to Update the Firmware

Your Swift Caller supports wireless Over-The-Air (OTA) software updates, meaning you never have to take it down from the wall to upgrade it.

Step 1: Get the Update File

On your phone or computer, go to **https://www.draco.work/projects/swift-caller** and navigate to the **Resources & Downloads** section. Download the latest firmware .bin file to your device.

Step 2: Flash the Caller

1. Connect to the caller's Wi-Fi and open the dashboard at **192.168.4.1**.
2. Scroll down to the **System Maintenance** card and find **Firmware Update**.
3. Tap "Choose File" and select the .bin file you just downloaded.
4. Tap **Flash Firmware**. The unit will install the update wirelessly and reboot itself automatically!
5. Reconnect to the dashboard

Troubleshooting / FAQ

Wi-Fi & Connection Issues

Q: I cannot find the SwiftCallerAP Wi-Fi network on my phone.
A: The Wi-Fi network is intentionally turned off during normal operation to save battery. To access it, you must either:

1. Slide the unit out and flip **Switch 1 to ON** (forces Program Mode).
2. Flip **Switch 2 to ON** and wait for your daily programmed "Service Window" time. *(Note: If the battery is completely dead, the unit will need time to charge via the solar panel before the Wi-Fi can broadcast).*

Q: I am connected to the Wi-Fi, but 192.168.4.1 refuses to load.
A: Modern smartphones try to be "smart" and will route web traffic away from Wi-Fi networks that do not have active internet access. **The Fix:**

- **Disable VPNs:** If you use a VPN app (like NordVPN, ExpressVPN, or Apple's iCloud Private Relay), you **must completely turn it off**. VPNs block access to local offline addresses like the Swift Caller portal.
- **Turn off Mobile Data:** Temporarily turn off your mobile data (4G/5G/LTE) in your phone's settings to force the browser to use the Wi-Fi.
- **Stay Connected:** If your phone pops up a warning asking if you want to "Stay Connected without internet," always tap **Yes** or **Keep Trying**.

Q: I changed the Wi-Fi name/password and locked myself out. How do I get back in?
A: If you have forgotten your custom Wi-Fi password or network name, you will need to perform a hardware Factory Reset. This will wipe the internal memory and restore the default network credentials (SwiftCallerAP / swift123):

1. Turn the caller's main power switch **OFF**.
2. Open the unit and flip **Switch 3 to ON**.
3. Turn the power **ON** and wait for 5 seconds.
4. Turn the power **OFF** again.
5. Flip **Switch 3 back to OFF**.
6. Turn the power back **ON**. The Wi-Fi network and all internal schedules are now completely reset to factory defaults.

Audio & Playback Issues

Q: The unit is powered on, but it is not making any bird calls.
A: There are three common reasons for a silent caller:
Switch 1 is ON: When Program Mode is active, the caller mutes all bird sounds so you can configure it in peace. Flip Switch 1 to OFF.
Out of Season/Hours: Connect to the portal and check your "Active Season" and "Daily Active Hours." The unit will remain completely silent outside of these scheduled times.
Empty Storage: Ensure you have actually uploaded .wav or .raw files via the web dashboard.

Q: I uploaded a new sound, but it sounds like demonic static or skips.
A: The hardware amplifier requires a very specific audio format to play correctly. Standard MP3s or high-res audio will not work.
The Fix: Run your audio through a free program like Audacity and export it strictly as a .wav (16-bit PCM, Mono or Stereo). If using .raw, it must be exactly 16,000 Hz, 16-bit Little-Endian, Mono.

Hardware & Maintenance

Q: How do I completely Factory Reset the device?
A: If you messed up the delay settings or locked yourself out of a schedule, you can wipe the internal memory:

1. Turn the main power switch **OFF**.
2. Flip **Switch 3 to ON**.
3. Turn the main power switch **ON** and wait 5 seconds.
4. Turn the power **OFF** again, flip **Switch 3 to OFF**, and turn the power back on. The device is now back to factory defaults.

Q: Will the unit break if the internal clock battery dies?
A: No. The Swift Caller is built with a fail-safe. If the internal RTC (Real-Time Clock) module fails or its coin-cell battery dies, the unit will automatically default to playing sounds 24/7 (with your programmed delays) to ensure you don't miss a nesting season. However, this battery is easily replaceable. You can simply swap it out with a standard **CR2032** coin-cell battery to restore full scheduling functionality.

Power & Battery Issues

Q: The unit is completely dead, and leaving it in the sun isn't working.
A: If the 18650 lithium-ion battery has been deeply discharged (which often happens if the unit is left running in the dark or after a long winter), the solar panel might not provide enough of a "jump start" to wake it up.

- **The Fix:** Turn the main switch OFF, carefully remove the 18650 battery, and charge it using a standard 18650 wall charger. Once fully charged, reinstall it and turn the unit back on.

Q: The caller works perfectly during sunny days but dies immediately at night.
A: This usually means the 18650 battery has reached the end of its lifespan and is no longer holding a charge.

- **The Fix:** Ensure the power is OFF, open the casing, and replace the old battery with a fresh, high-quality 3.7V 18650 battery. Pay very close attention to the positive (+) and negative (-) markings on the battery holder when installing the new one.

Q: How long should the main battery last?
A: A standard 18650 battery paired with the solar panel should easily last 2 to 3 breeding seasons.

- **Winter Storage Tip:** If you take the caller down at the end of the breeding season to store it in a shed or garage, **remove the 18650 battery**. Leaving it installed in a dark room for 6 months will permanently damage the battery cell.

Q: What do the little coloured lights inside the unit mean?
A: If you look inside the casing while the solar panel is in the sun (or plugged into USB), you will see the charging indicator lights on the main board:

- **Solid Red Light:** The 18650 battery is currently charging.
- **Solid Blue/Green Light:** The battery is fully charged.

Q: Will the new firmware actually help my battery last longer?
A: Yes! As of Firmware V002, the caller utilizes **Light Sleep Hibernation** and **Dynamic CPU Scaling**. This means at sunset, the caller shuts down almost all internal functions and takes "micro-naps" between daytime calls, heavily reducing the strain on the 18650 battery.

This project was created by Draco Barnett.

Discover more about the development, updates, and tech specs at:
https://draco.work/projects/swift-caller

A Big Thank You To:

- **Andrew:** Our resident swift enthusiast, for the invaluable conservation guidance and hands-on practical experience.
- **Will:** For 3D printing the very first V1 prototype case when I was just getting started with this project.
- **Neil:** For the donation of 18650 batteries, proofreading the documentation, and vital project support.
- **Alex:** My loving partner, for being a constant source of motivation throughout this entire journey.
- **Andy:** For sparking the original idea and leading the construction of the nesting boxes.
- **The Sanquhar & District Men's Shed:** For the funding, the endless cups of tea, and the unwavering support that brought this to life.

Finally, thank you for taking an interest in this project!
If you have any questions, ideas, or feedback, please feel free to email me at:
draco@draco.work

Get more Information on Swifts In Dumfries and Galloway

Search for "**D&G Swift Network"**

Help track local populations by recording your sightings and active nest boxes. This data is vital for national conservation efforts and helps protect swift colonies for the future.

The Swift Mapper

www.swiftmapper.org.uk

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With special thanks to Andrew Turney

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