

coverdrive™



00 – Introduction
Version 1.00

“Frequency is the Master”



Welcome to Coverdrive

coverdrive™ is a professional magnetic loop antenna controller designed to automate one of the most demanding aspects of operating a small transmitting loop antenna—maintaining resonance accurately, reliably, and with minimal operator intervention.

Magnetic loop antennas are highly efficient in electrically noisy environments and are ideal where full-size antennas are impractical. Their narrow resonant bandwidth, however, requires frequent retuning as operating frequency changes.

coverdrive was created to eliminate that burden. Rather than treating antenna tuning as an isolated event, it uses radio frequency as the master reference. Every operating frequency corresponds to a calculated capacitor position, allowing the controller to follow the radio naturally as the VFO is adjusted.

More Than a Motor Controller

coverdrive was never intended to be just another motor driver. Its Frequency Master architecture makes operating frequency the primary reference, with mechanical movement becoming the result of frequency. This provides predictable, repeatable antenna positioning.

Intelligent Operator Calibration

Using SAVE POS, the operator stores improved resonant positions at specific frequencies. coverdrive builds an RC2 calibration map over time and interpolates between stored points, improving accuracy naturally without repeated full-band recalibration.

Reliability Through Data Integrity

RC2 calibration tables are protected using CRC validation, while Data Integrity Lockdown (DIL) verifies that new calibration points remain logically consistent before they are accepted.

Designed for Real Amateur Radio Operation

Coverdrive was developed and refined under real amateur radio operating conditions using an Icom IC-7610, with resonance observed on the panadapter while monitoring SWR through normal operating scenarios.

A Modular Architecture

The software is organized into independent subsystems responsible for motion control, frequency management, calibration, EEPROM storage, user interface, antenna protection, startup recovery, and radio communications.

The Philosophy Behind Coverdrive

Throughout development, experimental features were evaluated and only those that demonstrated measurable value remained. The guiding principles are simple: frequency is the master, the controller follows automatically, the operator refines only when necessary, calibration improves with use, and reliability always takes priority over unnecessary complexity.

Designed for the Amateur Radio Community

coverdrive was developed with the amateur radio experimenter in mind. Rather than relying on specialized hardware or proprietary equipment, the controller is built around readily available components and a custom printed circuit board that can be manufactured by widely available PCB fabrication services.

The goal was never to produce an expensive commercial product. Instead, the objective was to create a practical, reliable controller that any amateur radio operator with basic construction skills could build, understand, maintain, and enjoy.

By making the design accessible, builders experience one of the most rewarding aspects of amateur radio—constructing their own equipment, learning from the process, and putting something on the air that they built themselves.

It is hoped that coverdrive will encourage more operators to discover, or rediscover, the enjoyment of magnetic loop antennas. Their outstanding performance, compact size, and excellent noise characteristics make them ideal for many modern operating environments where larger antennas are simply not practical.

Like amateur radio itself, coverdrive was built on experimentation, continuous improvement, and the willingness to share knowledge with others. If this project helps even a small number of fellow operators enjoy their magnetic loop antennas a little more, then it has achieved one of its most important goals.

Welcome Aboard

Whether operating from an apartment, balcony, portable location, or permanent amateur radio station, Coverdrive was created to make magnetic loop operation easier and more enjoyable. The HOWTO documents that follow explain installation, configuration, operation, and maintenance one topic at a time.



coverdrive Magnetic Loop Antenna Controller

Document: coverdrive

Purpose: *Welcome to coverdrive*

