

Northern Lights 2026 CAN Dropout Case Report

CAN Dropout After Autonomous – Root Cause, Fix, and Updated Wiring

Summary: During matches, the robot experienced complete loss of CAN device responsiveness right at the end of the autonomous period. Practice sessions (including >150 A current spikes) did not reproduce the failure. Investigation showed the radio experienced brief power interruptions coincident with a network traffic surge (field game data broadcast + multiple Driver Station command streams) at the auto→teleop transition. The radio power dip starved the roboRIO of DS packets, which halted CAN heartbeats and made all motor controllers appear to ‘drop off CAN.’

Event Timing & Trigger

- Consistent trigger at the end of autonomous (auto→teleop enable).
- Field sends game-specific messages; multiple DS command streams resume; overall network chatter increases.
- Radio current draw and link processing spike; with marginal power redundancy, the radio experiences a millisecond-level brownout.

Observed Symptoms

- All CAN devices simultaneously stop responding.
- Driver control lost for a brief period; sometimes DS shows packet loss/no comms spikes.
- No full roboRIO brownout/reboot messages.
- Static checks show ~60 Ω termination at any point on the bus (correct).
- >150 A practice driving did not reproduce the fault.

Technical Explanation (Why CAN Looked ‘Dead’)

The radio is not on the CAN bus, but it is upstream in the control chain: Driver Station → Radio → roboRIO → CAN devices. When the radio momentarily browns out during the network surge at the end of autonomous, Driver Station packets stop reaching the roboRIO. The roboRIO then disables outputs and stops sending periodic CAN command/heartbeat frames. All motor controllers time out simultaneously, appearing as a CAN-wide failure even though the physical bus is intact.

Confirmed Root Cause

- Radio micro-power interruptions coincident with increased processing/traffic load at the auto→teleop transition.
- Insufficient power redundancy to the radio allowed millisecond-level dips to reset/disable the link.

Fix Implemented (Behavioral)

- Provide redundant radio power so a momentary interruption on one feed cannot drop the link.
- Strain-relieve both power connectors and the Ethernet cable; rigidly mount radio to prevent bounce.

Correct Radio Wiring per 2026 Game Manual R616

- VH-109 radio (standard events): Power must be sourced from the Power Distribution (PD: PDH/PDP) using either or both of: (a) 12 V PoE injected into the radio's 'RIO' port using a passive injector/modified Ethernet cable connected directly to a PD protected output, and/or (b) direct 12 V barrel from a PD protected output. VRM is not listed as an allowed source for VH-109.
- OM5P radio (China events only): Power must be from only one of: (a) the VRM 12 V/2 A output (must be the only load on that terminal), or (b) a REV Radio Power Module (RPM) PoE connection into the radio's 18–24 V PoE port.

Step-by-Step for VH-109 (Recommended Redundant Setup)

- From the PDH, dedicate a protected output to a passive PoE injector that supplies 12 V to the Ethernet going to the radio's 'RIO' port.
- From a separate PDH protected output, wire 12 V barrel directly to the radio's 12 V input (observe polarity; 18 AWG or larger).
- Secure and strain-relieve both power paths and the Ethernet cable; use a short, flexible cable to minimize intermittent disconnects.

Results

- Post-fix, no further CAN dropouts observed under full match conditions.
- End-of-auto transition is now stable; DS comms remain continuous; CAN heartbeats persist.