

# Device Guide

## Warning

This device is for experimental and off-road use. It is not intended for use on public roads, highways, or streets and is not certified for on-road or emissions-controlled vehicles. Use at your own risk. Do not attempt to calibrate in the vehicle.

By purchasing, installing, or using this device, you acknowledge and agree to the following terms:

### 1. Intended Use

This product is intended solely for: Off-road vehicles, Track or competition use, Bench testing, Diagnostic, research, or educational purposes.

Use of this device on vehicles operated on public roadways may violate local, state, or federal laws, including emissions, safety, and vehicle equipment regulations.

### 2. No Warranty of Compliance

This product is not tested, approved, or certified by: DOT (Department of Transportation), EPA (Environmental Protection Agency), CARB, SAE, OEM vehicle manufacturers

No representation is made that this device complies with any on-road vehicle regulations or standards.

### 3. Assumption of Risk

The user assumes all responsibility and risk associated with the installation and use of this device, including but not limited to: Vehicle damage, Electrical damage, Loss of vehicle functionality, Personal injury, Property damage, Legal or regulatory consequences

#### 4. Limitation of Liability

In no event shall the manufacturer, seller, or distributor be liable for: Direct or indirect damages, Incidental or consequential damages, Loss of use, data, or profits, Vehicle damage or failure, Injury or death

This limitation applies regardless of the cause, including negligence, misuse, improper installation, or modification.

#### 5. No Professional Advice

This product and any accompanying documentation are provided "as is", without warranty of any kind, express or implied. No technical, mechanical, or legal advice is provided. Installation and use should only be performed by individuals with appropriate technical knowledge and experience.

#### 6. Modification & User Responsibility

Any modification of vehicle wiring, electronics, or control systems is performed at the user's own risk. The manufacturer is not responsible for: Improper installation, Use outside the intended purpose, Use with incompatible vehicles or systems

#### 7. Acceptance of Terms

By purchasing, installing, or using this product, you acknowledge that you have read, understood, and agreed to this disclaimer in full. If you do not agree to these terms, do not install or use this device.

The manufacturer reserves the right to modify this disclaimer at any time without notice.

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# Device Calibration

## Description

This device can be calibrated in IPChammer V16.91 and up. The calibration factors are multiplied into ADC measurement. The default values are 1 for oil pressure and 5.6 for battery. They can be set to anything from 0.1 to 20.0.

Calibration in a vehicle is not recommended. These commands were not tested in a vehicle; it is not known whether they are safe.

For more detail see the Device commands section.

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# Device Commands

## Overview

This device supports a small command set for muting transmissions, unlocking calibration, and updating calibration values in RAM.

Calibration changes require:

1. A Mute command
2. A Magic Unlock command

This prevents accidental or unintended calibration changes during normal operation.

Do not attempt to do this in the vehicle! Not verified to be safe in the vehicle.

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## Byte Order & Data Types

- Multi-byte values use little-endian byte order
  - Calibration values are IEEE-754 32-bit floats
  - Valid calibration range: 0.1 to 20.0
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## Command Summary

Command	Purpose
MUTE	Temporarily mute normal operation
MAGIC UNLOCK	Unlock calibration writes
SET BATTCAL	Update battery calibration (RAM only)
SET OILCAL	Update oil calibration (RAM only)
SET OPTIONS	Update options (RAM only)
SAVE	Saves the RAM values to flash

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## MUTE COMMAND

### Purpose

Puts the device into a muted state, allowing configuration commands to be accepted.

### Payload

6C FE F0 28 00 F0

### Requirements

None

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## MAGIC UNLOCK COMMAND

### Purpose

Arm the device for calibration changes.

### Payload

99 01 43 41 4C 31

### Requirements

Mute command recommended (but not enforced)

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## SET BATTERY CALIBRATION

### Purpose

Updates the battery calibration factor in RAM.

#### Payload

99 02 <b0> <b1> <b2> <b3>

Where <b0..b3> is a little-endian IEEE-754 float.

#### Example

Set battcal = 5.0

99 02 00 00 A0 40

#### Requirements

- MUTE already sent
- MAGIC already sent
- Value must be between 0.1 and 20.0

#### Effect

- Updates battcal in RAM
- Clears muteFlag and magicFlag

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## SET OIL CALIBRATION

#### Purpose

Updates the oil calibration factor in RAM.

#### Payload

99 03 <b0> <b1> <b2> <b3>

Where <b0..b3> is a little-endian IEEE-754 float.

### Example

Set oilcal = 1.0

99 03 00 00 80 3F

### Requirements

- MUTE already sent
- MAGIC already sent
- Value must be between 0.1 and 20.0

### Effect

- Updates oilcal in RAM
- Clears muteFlag and magicFlag

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## SET OPTIONS

### Purpose

Updates the OPTIONS

### Payload

99 04 <b0> <b1> <b2> <b3>

Where <b0..b3> is a little-endian double word.

### Example

99 04 01 00 00 00

## Requirements

- MUTE already sent
- MAGIC already sent

## Effect

- Updates options in RAM
- Clears muteFlag and magicFlag

OPT\_AIRBAG (1U << 0) (Set to 1 for 1999)

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# SAVE TO FLASH OPTIONS

## Purpose

Writes the Options, Battery Calibration, and Oil Calibration from RAM to flash memory.

## Payload

99 99 43 41 4C 31

## Requirements

- MUTE already sent
- MAGIC already sent

## Effect

- Saves RAM to FLASH
- Clears muteFlag and magicFlag

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# Connector To Cluster Wiring

DB15-PIN	24-Way F Micro-Pack 100 Series
1-VBatt	B11
2-Ignition	B9
3-J1850VPW	A6
4-EngSpeed	A5
5-VehSpeed	A4
6-Reserved	NA
7-Lamp	A11
8-Lturn	B1
9-Wash	A3
10-GND	B12
11-GND	A12
12-Park	A10
13-NC	NA
14-Rturn	A8
15-MIL	A1

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## Troubleshooting Guide

D1 never lights up: Check that you have ~12 volts at VBATT and IGNITION. This can be checked at the d-sub connector using a DMM. D1 can be seen by removing the cover. If either of them is low, you likely have a wiring issue in the vehicle. They simply pass from J4 (24-pin connector on the board) to J1(Dsub15).

D1 stopped blinking: If it has received the mute command, it will stop blinking; cycling the key will resume normal operation. If the mute

command was not sent to U5, maybe defective.

D1 blinking more than once every 700ms: Communication issues between U6 and U5. This could be U6 is sending a NAK to U5. It could be that U6 is defective and does not acknowledge commands.

Battery gauge or oil pressure gauge readings are off: Adjust their calibration factors using the commands listed above.

The speedometer or tachometer is reading off. These are not controlled by this device. The calibration for those is done in PCM. The IPC also stores an adjustable offset. The only gauges this device supports are the battery gauge and the oil pressure gauge.