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AiM Infotech

BMW F series

(1-2-3-4-5er) MINI F56

OBDII and ECU connections

Release 1.00

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ECU



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# 1

## Supported years and models

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This document explains how to connect AiM devices to the vehicle's engine control unit (ECU) data bus.

Supported years and models are:

- |                              |             |
|------------------------------|-------------|
| • BMW 1 Series (F20/F21)     | 2011 - 2019 |
| • BMW 2 Series (F22/F23/F87) | from 2014   |
| • BMW 3 Series (F30/F80)     | 2012 - 2019 |
| • BMW 4 Series (F32/F82)     | from 2014   |
| • BMW 5 Series (F10)         | 2010 - 2017 |
| • MINI F56                   | from 2014   |

# 2

## Connection and configuration

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AiM devices can be connected to these models in two different ways:

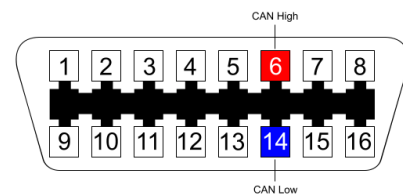
- through the OBD II plug, using a standard OBD II protocol (easy connection, basic parameters)
- through a direct connection to the ECU CAN wires, using a specific BMW CAN protocol.

## 2.1 OBDII Connection

These models feature a standard diagnostic protocol based on CAN, accessible on the OBD II plug placed on the driver side, in the footrest area. For this installation refer to the following pinout of the car's plug (vehicle side – front view) and connection table:



OBDII Pin	Pin function	AiM cable
6	CAN High	CAN+
14	CAN Low	CAN-



## 2.2 OBDII - Race Studio configuration

Before connecting the AiM device to the OBD II plug, set all functions using AiM software Race Studio. The parameters to set in the device configuration are:

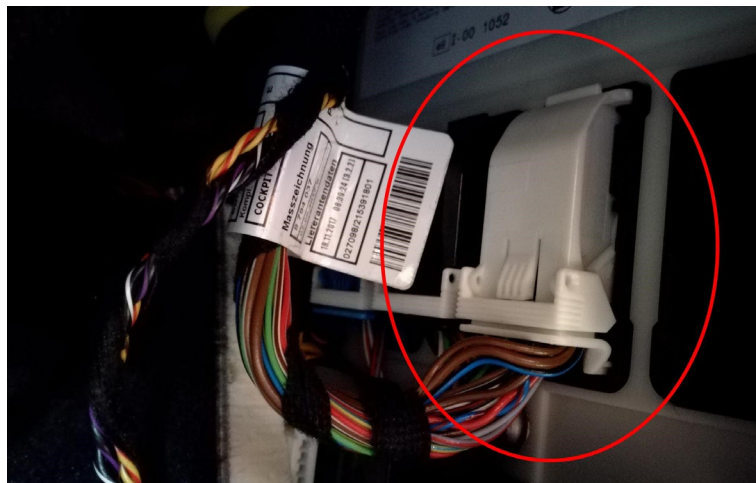
- ECU manufacturer: **OBD\_II**
- ECU Model: **CAN**

## 2.3

## ECU CAN Connection

These models feature a "CAN powertrain" data bus accessible in different locations (i.e. under the gearbox lever, close to the steering column, in the wall on the right side of the car - footrest area - see following picture). It is strongly recommended to refer to a skilled technician to perform this kind of installation. Wire colours are standardized as indicated here below, and are always twisted together:

Pin function	BMW ECU cable colour	AiM cable label
CAN High	Blue/Red	CAN+
CAN Low	Red	CAN-



An alternative colour code is the one here following.

Pin function	BMW ECU cable colour	AiM cable label
CAN High	Black	CAN+
CAN Low	Yellow	CAN-

## 2.4

# ECU CAN – Race Studio configuration

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Before connecting the AiM device to the ECU, set all functions using AiM software Race Studio. The parameters to set in the device configuration are:

- ECU manufacturer: **BMW**
- ECU Model: **F\_Series** (RS3 only)  
**F\_21** (RS2 only)

## 3

# Protocols

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Channels received by AiM devices change according to the selected protocol.

## 3.1 "OBDII – CAN" protocol

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Channels received by AiM devices configured with "OBDII – CAN" protocol are:

<b>CHANNEL NAME</b>	<b>FUNCTION</b>
OBDII RPM	RPM
OBDII SPEED	Speed
OBDII ECT	Engine coolant temperature
OBDII TPS	Throttle position sensor
OBDII IAT	Intake air temperature
OBDII MAP	Manifold air pressure
OBDII MAF	Manifold air flow
OBDII FUEL LEV	Fuel level
OBDII PPS	Pedal position sensor

**Please note:** channels listed above are those polled by AiM devices. They may or may not come across in the data stream depending on models. RPM, TPS, ECT and speed are generally available.

## 3.2 "BMW – F\_Series" protocol

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Channels received by AiM devices configured with "BMW - F\_Series" protocol are:

<b>CHANNEL NAME</b>	<b>FUNCTION</b>
RPM	RPM
Gear	Gear
Speed	Vehicle speed
Wheel Speed RL	Wheel speed rear left
Wheel Speed RR	Wheel speed rear right
Wheel Speed FL	Wheel speed front left
Wheel Speed FR	Wheel speed front right
Long Acc	Inline acceleration
Lat Acc	Lateral acceleration
Yaw Rate	Yaw rate
Eng T	Water temperature
Oil T	Oil temperature
Amb T	Ambient temperature
Gear T	Gearbox temperature
EGT	Exhaust gas temperature
Brake P F	Front brake pressure
Brake P R	Rear brake pressure
Ambient P	Barometric pressure
RailP	Rail pressure
Steering Angle	Steering angle
Throttle	Throttle position
Pedal Pos	Throttle pedal position
Eng Load	Engine load
Odometer	Odometer
Fuel km	Fuel distance



Battery Volt	Battery voltage
Fuel used	Fuel level
Gbx Torque	Gearbox torque
Eng Torque	Engine torque
Current IBS	Battery current
ABS	Function ABS
ASC	Function ASC
Brake	Number
Fuel Raw ul	Fuel used per cylinder
Indicator lights	Direction lights
Fuel Lamp	Fuel reserve lamp
Hi Beam	Hi beam lamp
Eng Mode	Engine mode
DSC	DSC setting
Clutch Sw	Clutch switch
Rpm MAX	Max RPM
Eng Heat St	Engine heat status

**Technical note:** not all data channels outlined in the ECU template are validated for each manufacturer's model or variant; some of the outlined channels are model and year specific, and therefore may not be applicable.



## 3.3

### "BMW – F\_21" protocol

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Channels received by AiM devices configured with "BMW - F\_21" protocol are:

<b>CHANNEL NAME</b>	<b>FUNCTION</b>
ECU RPM	RPM
ECU AIR PRESS	Intake air pressure
ECU PEDAL POS	Throttle pedal position
ECU WDKBA	Reference throttle valve position
ECU WHS RL	Wheel speed rear left
ECU WHS RR	Wheel speed rear right
ECU WHS FL	Wheel speed front left
ECU WHS FR	Wheel speed front right
ECU GEAR	Gear
ECU THROTTLE	Throttle position
ECU STEER ANG	Steering angle
ECUVEH SPEED	Vehicle speed
ECU BRK STATE	Brake switch state

**Technical note:** not all data channels outlined in the ECU template are validated for each manufacturer's model or variant; some of the outlined channels are model and year specific, and therefore may not be applicable.