

Fleet Edge User Guide – Covered under NDA

Fleet Edge Compute Module Description & User Guide

Rivian Installations, V1.0, September 2021

Purpose

This document covers the Amazon Fleet Edge compute Module as installed in a Rivian vehicle.

Fleet Edge Overview

Fleet Edge is an edge compute system for deployment on Amazon delivery vehicles. It provides an in-vehicle platform for video and position data acquisition and onboard analysis. The system is designed as a flexible edge-compute platform, and can run various programs. The system has LTE and Wi-Fi connections for over the air updates and data offload, Bluetooth for connection to local mobile devices, and GPS for location measurement. 5 cameras are connected to the compute system: a Forward facing camera, a driver facing camera, a cargo facing camera, and two exterior side cameras.

This system is made of multiple hardware modules which are installed during the production of the vehicle. It is not directly accessible by the vehicle operator, and has no direct user interface. The primary function is on vehicle data acquisition, data processing for privacy and bandwidth reduction and automated uploading of this data to cloud storage.

Hardware Overview

The installation consists of a compute module, a camera processor module, a Wi-Fi/LTE antenna, a GPS splitter to share GPS signals with the host vehicle antenna, and at five cameras.

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Compute Module



The primary computer for the Fleet Edge system. Includes compute, disk storage, a GPS receiver, LTE, WiFi, and Bluetooth modems, as well as Ethernet, CAN, USB and HDMI connections. Not all interfaces are used in standard installations. In Rivian installations, data connection is made to the vehicle via the dual wire automotive Ethernet connection.

Powered directly from the 12V vehicle system, this module is connected to both permanent power and a switched ignition circuit. The device powers on with ignition, and remains on for some time after ignition power is removed, in order to enable continuity between deliveries and for a controlled shut down.

Includes a simple LED screen with two 7 segment displays to show high level status, which is used for basic troubleshooting.

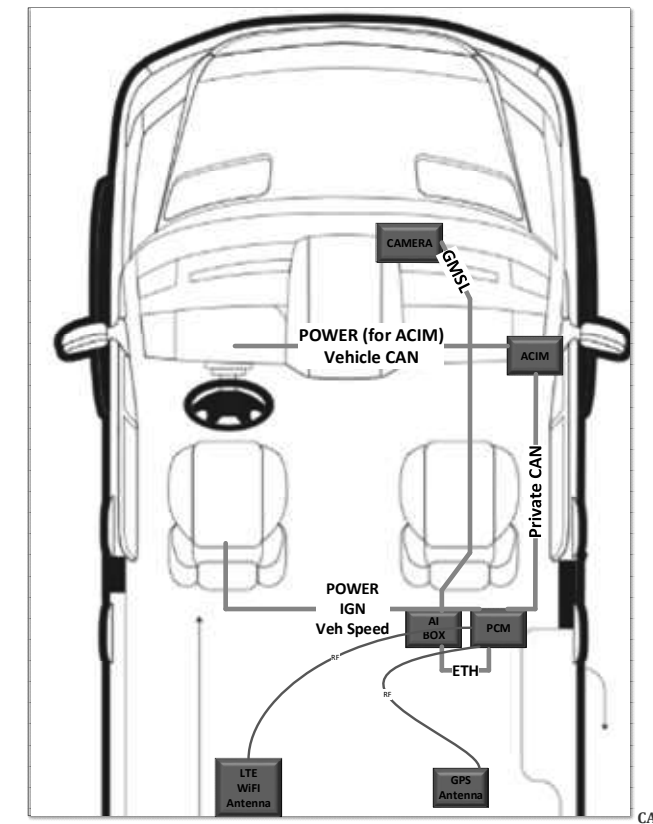
The system is mounted with the connectors down in order to limit liquids or other objects from entering the enclosure. A plastic cap on the side opposite from connectors also limits intrusions from above when installed.

This module is a component in the system, installed during the production of the vehicle. For primary functionality, connections to other devices is required.

Approximate dimensions are 353mm x 273mm x 93mm and weight is 7kg.

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General Component Locations



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Built in Diagnostics

The Compute Module includes a built-in screen that indicates the state of the software and hardware, and is the initial troubleshooting step. This is a 7-segment green LED display, with two digits. It is important to read this in the correct orientation in order to not mistake the code being displayed.

Early in boot immediately after power application, the display shows low level boot debugging information. This is not covered here. Wait for a code to be stable before using the table below. After the ignition signal is removed, the system begins a countdown timer. This is indicated on the display as well, as a hex number that changes once a second and counts up.

As this device is installed an enclosed space in the Rivian vehicle, observing this display requires removal of access panels, and a mirror or other observation techniques may be required.

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Code Table

Status Code	System(s)	Description	Troubleshooting Action(s)
P0	-	Success – No Failure.	None
L1	Camera	Could not detect camera system.	Check Ethernet connection to VPU-system.
L2	Camera	Front view camera not found.	Check camera coax connection.
L3	Camera	Camera 2 not functional.	System Mis-Configured.
L4	Camera	Camera 3 not functional.	System Mis-Configured.
L5	Camera	Front view camera not functional.	Replace camera.
L6	Camera	Camera 2 not functional.	System Mis-Configured.
L7	Camera	Camera 3 not functional.	System Mis-Configured.
H1	GNSS	GNSS device not accessible.	Replace Fleet Edge computer.
H2	GNSS	GNSS hardware not present.	Replace Fleet Edge computer.
H3	GNSS	GNSS hardware read failure.	Replace Fleet Edge computer.
H4	LTE	Modem device not accessible.	Replace Fleet Edge computer.
H5	LTE	SIM not found.	Add or replace with activated SIM.
H6	LTE	SIM not activated.	Add activated SIM.
H7	LTE	No internet access.	Check LTE antenna connection and LTE coverage.
H8	LTE	No SSH access (internal use).	Check LTE antenna connection and LTE coverage.
H9	Security	TPM device not properly configured.	Replace Fleet Edge computer.
HA	Wi-Fi	Wi-Fi component not detected.	Replace Fleet Edge computer.
HB	Wi-Fi	Wi-Fi component not functional.	Replace Fleet Edge computer.
HC	VPU	Vision Processor not detected.	Replace Fleet Edge computer.
HD	Ignition	Ignition signal not detected.	Check ignition connection and voltage.
U1	Provisioning	Software provisioning process failures. Contact Fleet Edge engineering for further details.	Reboot device. Check for stable LTE access. Replace Fleet Edge computer.
U2			
U3			
U4			
U5			
U8			
U9	Vehicle	VIN acquisition failure.	Check CAN connection to vehicle. –
UC	Activation	Software activation and cloud registration failures. Contact Fleet Edge engineering for further details.	Reboot device. Check for stable LTE access. Replace Fleet Edge computer.
UE			
UF			
BLANK	Power	No power or ignition signal	Check voltages on power, ignition, and ground wires as well as main fuse

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Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

(If device is outdoor AP, please delete it. If device is indoor AP, need to add it.)

This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

警告使用者

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

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105.00 mm

105.00 mm

105.00 mm

148.00 mm

Professional installation instruction

1. Installation personal

This product is designed for specific application and needs to be installed by a qualified personal who has RF and related rule knowledge. The general user shall not attempt to install or change the setting.

2. Installation location

The product shall be installed at a location where the radiating antenna can be kept 20cm from nearby person in normal operation condition to meet regulatory RF exposure requirement.

3. External antenna

Use only the antennas which have been approved by the applicant. The non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power which may lead to the violation of FCC limit and is prohibited.

4. Installation procedure

Please refer to user's manual for the detail.

5. Warning

Please carefully select the installation position and make sure that the final output power does not exceed the limit set force in relevant rules. The violation of the rule could lead to serious federal penalty.