T19

User Manual

(STRLNK2)

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1 Introduction

The Telematics Control Unit (TCU) integrates an on-board cellular communication module with a WiFi hotspot functionality and interacts with remote call/data centers to provide valuable services to the vehicle customer.

1.1 Purpose and Scope

This document aims to describe the device operating principles and provide installation instruction to OEM to insure safe use of the device.

1.2 Product Description

Subaru T19 TCU is a proprietary Telecommunication Unit (TCU) designed and manufactured by Continental Automotive. The TCU includes an integrated Network Access Device (NAD) that is also designed and produced by Continental.

The TCU will be installed as a vehicle mounted wireless devices into Subaru vehicles during the OEM's factory assembly process and will not be accessible without use of special tools.

The TCU functionalities are accomplished by 2G/3G/4G technologies (Voice & Data) and defined service feature.

The TCU comprises of the following subsystem components:

- Power supply
- Vehicle micro-controller (VuC)
- Network Access Device (NAD)
- Vehicle interface / communications
- Battery

1.3 Power and Grounding

The TCU is designed to operate via an unfiltered 5 A fused input from the vehicle battery: Vbatt

Ground return is through a single ground pin: GND

1.3.1 Power and Grounding

Operating voltage range is provided in the following table.

Table 3.1.1 TCU Operating Voltage Conditions

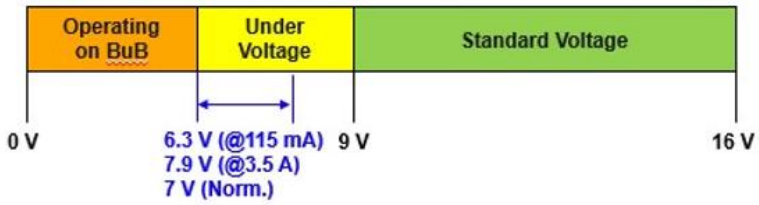
Voltage Range (Vdc)	Subsystem Operating Conditions
$9.0 < V_{BATT} < 16.0$	Normal operation. TCU is fully functional

The VBATT connection (pin 17) shall support up to 2.5A current draw with 4.5A peaks. Vehicle wire gauge must be chosen to support this current load with less than 0.5V drop between battery terminal and this pin.

1.3.1.1 VBatt values out of normal range

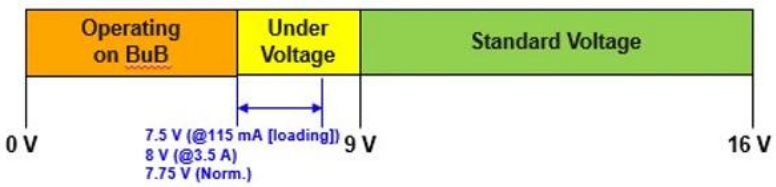
The threshold voltage transition from Vehicle Battery to Backup Battery:

If the VBATT voltage transitions downward from >8.6V to <7.3V and BUB voltage is >2.0V, the DCM shall begin using the BUB as a power source (i.e. switch to BUB), or, if no BUB is present, become UNPOWERED.



The threshold voltage transition from Backup Battery to Vehicle Battery:

If the VBATT voltage transitions upward from <7.7V to >9.0V AND BUB voltage > 2.0V, the DCM shall begin using the VBATT as a power source (i.e. switch to +B). The DCM shall continue to be OPERATING ON VBATT until the conditions of DCM_02552 or DCM_00031 are met.



1.3.2 Backup Battery (BUB)

BUB refers to the Back-up Battery installed in the DCM; the DCM is shipped to Subaru with a BUB installed. This battery can be used to power the DCM if the main vehicle battery is lost.

The BUB has no effect on DCM feature operation when DCM is running on MAIN BATTERY, i.e. when MAIN BATTERY is at least 7V.

The BUB used on the DCM has the following characteristics

Technology: LiFePO4 (Lithium-Iron)
Rated Capacity: 1100mAh
Nominal Voltage: 3.2V
Temperature: Charge 0 to 45C, Discharge -30 to 60C.
Charging Voltage (Max): 3.81V
Minimum End of Discharge Voltage: 2.0V
Protection Circuit Required : No

1.3.3 TCU Interface to External LTE/GSM Antennas

The TCU has FAKRA connectors to which external LTE/GSM antennas may be connected.

1.3.4 TCU Interface External Fault Detection

For vehicles that are configured to use External LTE/GSM Antennas, the TCU has the capability to determine if the External Antenna is connected and to log a fault if it determines that the External Antenna is not connected (circuit open fault). It is also preferred that the TCU detect and log if the External Antenna is shorted to ground.

1.4 WiFi

The TCU supports IEEE 802.11a/b/g/n/ac 2.4/5GHz WiFi.

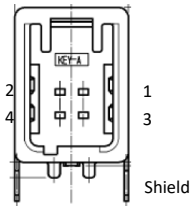
1.4.1 WiFi internal Antenna

The TCU contains integrated pcb type F dual band antenna with the following maximum gain

Frequency	MAX Gain
2442 MHz	3.38361 dBi
5220 MHz	6.6773 dBi
5785 MHz	6.6157 dBi

1.5 Connectors

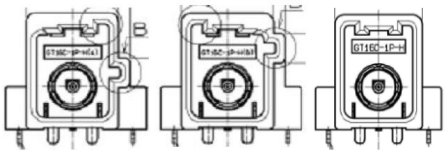
1.5.1 USB Connector



USB Connector – pin details
(View from mating side)

Pin No.	Terminal Name	Terminal Description	Input(I) / Output(O)
USB – pin 1	USB+	USB D+	I/O
USB – pin 2	USBS	USB Shield GND	GND
USB – pin 3	USBVCC	USB +5V Supply	PS
USB – pin 4	USB-	USB D-	I/O

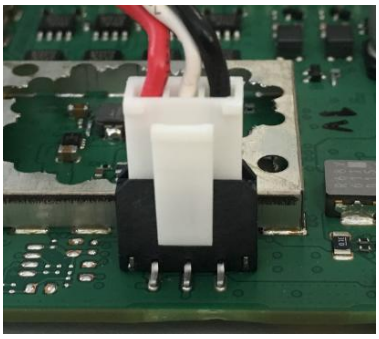
1.5.2 RF Connector



RF Connector – pin details
(View from mating side)

Terminal Name	Terminal Description	Input(I) / Output(O)
Primary	TEL MAIN antenna signal	I
	TEL MAIN antenna GND	GND
Secondary	TEL SUB antenna signal	I
	TEL SUB antenna GND	GND
GPS	GNSS antenna signal	I
	GNSS antenna GND	GND

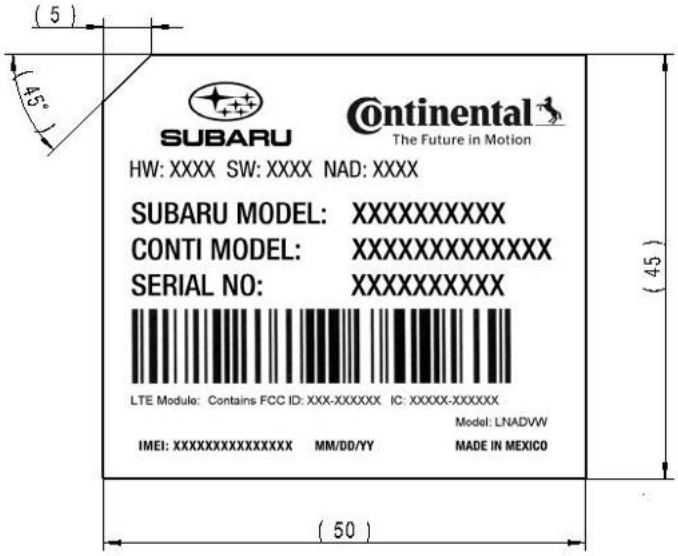
1.5.3 BUB Connector



CONNECTOR	PIN N° (New N proposal)	Signal Name
BUB connector Molex 43650-0323	1	VBUB
	2	BUB NTC
	3	GND
	M1	NC
	M2	NC

1.6 TCU Module Label

The TCU labeling shall comply with the regulatory homologation compliance mark(s) that are required by law in those countries. Art work for Subaru T19 is shown below:



Label Artwork (For Subaru Gen2)
Scale: 2:1

The module is marked with the Automotive OEM company trademark, engineering part number, and supplier code.

1.7 TCU Antenna Transmit Area

For TCU variants that utilize an internal antenna, the module housing shall not be made of a metal, nor contain a metal coating, that inhibits the transmission, or reception, of cellular signals in the areas specified in the diagrams below.

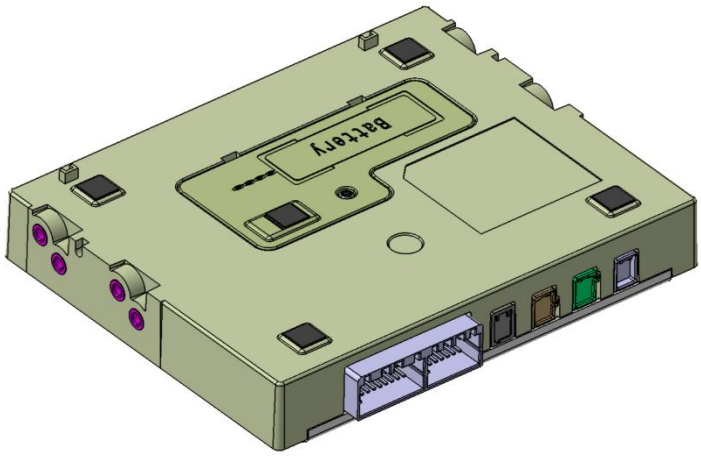
Wi-Fi Antenna

The TCU is designed to allow the Wi-Fi antenna signal to propagate out of the top, bottom, and sides of the module.

2 Vehicle Installation Guidelines

Normal operating conditions are between -30°C to +85°C.

The sheet metal cover is designed to be a heat sink. A gap between the heat sink and the mounting surface is recommended to facilitate heat transfer out of the module. Exceptions can be made if the module is mounted to a surface that can help facilitate heat transfer such as a large aluminum body panel.



The device does not have sealed connectors.

It is designed to meet Class I water intrusion conditions (no drip test required), so it should not be placed in area that can get wet.

Continental recommends that the automotive OEM uses the mating harness supplier's recommendations for the keep out zone around the connectors to ensure proper mating of each connector.

Changes or modifications to this system by other than a facility authorized by Continental could void authorization to use this equipment.

The device and its antennas must be installed to provide a separation distance of at least 25 cm from all persons and must not be co-located or operate in conjunction with any other antenna or transmitter.

3 Regulatory Compliance Notes

FCC:

This device complies with Part 15, Part 22(H), Part 24(E) and Part 27 of the FCC Rules. The FCC ID for this device is LHJ-LNADVW. Operation is subject to the following two conditions:
1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Industry of Canada:

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

This device may not cause interference; and

This device must accept any interference, including interference that may cause undesired operation of the device."

There has not been any module design changes, the module will be installed on host device to be able to operate.

« Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisee aux deux conditions suivantes :

l'appareil ne doit pas produire de brouillage, et

l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage est susceptible d'en compromettre le fonctionnement. »

This radio transmitter (2807E-LNADVW) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

« Le present emetteur radio (2807E-LNADVW) a ete approuve par Industrie Canada pour fonctionner avec les types d'antenne enumeres ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est superieur au gain maximal indique, sont strictement interdits pour l'exploitation de l'emetteur.»

4 External Antenna Requirements for use with T19 Device

The T19 device is for use with external antennas ONLY, except for Wi-Fi which uses an internal antenna.

For all LTE/WCDMA/GSM operating bands the maximum antenna gain including cable loss shall not exceed the following values:

CDMA Band 2: 7.5 dBi
WCDMA Band 5: 5.5 dBi
LTE Band 2: 7.5 dBi
LTE Band 4: 5.0 dBi
LTE Band 5: 5.5 dBi
LTE Band 17: 5.5 dBi

5 Instructions to OEMS

Continental must instruct the automotive OEM and provide them to include the following information into the car user's manual (i.e. for the TCU):

1. End-users must be provided with transmitter/antenna installation requirements and operating conditions for satisfying RF exposure compliance:
2. A separate section should clearly state "FCC RF Exposure requirements:"
3. Required operating conditions for end users.
4. The antenna used with this device must be installed to provide a separation distance of at least 20cm from all persons, and must not transmit simultaneously with any other transmitter, except in accordance with FCC multi-transmitter product procedures.
5. The Maximum ERP/EIRP and maximum antenna gain required for compliance with Parts 15, 22H, 24E, and 27.
6. Clear instructions describing the other party's responsibility to obtain station licensing.