LEAR CB20RDNAR1 TCU Fitted on Several User Manual

Contents

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Product Information

Specifications

- Product Name: ConBox 2020RD NA
- Model: ConBox 2020RD NA
- Manufacturer: Lear Corporation Engineering GmbH
- Features: e-Call, WiFi, Bluetooth, GNSS
- Connectivity: CAN, Ethernet, A2B
- Antennas: Primary and secondary external LTE antennas, internal LTE antenna, external GNSS antenna
- Backup Battery: Included
- Variants: Multiple variants available based on accelerometer and backup battery size

Product Usage Instructions

Installation

1. Ensure the vehicle’s power is turned off before installation.
2. Locate a suitable location within the vehicle to mount the ConBox 2020RD NA.
3. Connect the necessary cables including CAN, Ethernet, and A2B to integrate with the vehicle’s systems.
4. Install the primary and secondary external LTE antennas, internal LTE antenna, and external GNSS antenna for optimal performance.
5. Power on the vehicle and verify the connectivity of the ConBox 2020RD NA.

Operation

1. After installation, power on the ConBox 2020RD NA by following the manufacturer’s instructions.
2. Ensure proper network connectivity and GPS signal reception for accurate functionality.
3. Utilize features such as e-Call, WiFi, Bluetooth, and GNSS as needed within the vehicle.

4. In case of emergency, rely on the backup battery and antennas for continued operation.

Maintenance

1. Regularly check the connectivity status of the ConBox 2020RD NA to ensure proper functioning.
2. Clean the external antennas periodically to maintain optimal signal reception.
3. Check the backup battery status and replace if necessary to ensure uninterrupted operation.

Frequently Asked Questions (FAQ)

- **Q: Can I use the ConBox 2020RD NA with any vehicle?**
  A: The ConBox 2020RD NA is designed for vehicles meeting AUDI/PORSCHE specifications. Compatibility with other vehicles may vary.
- **Q: What should I do if I encounter connectivity issues?**
  A: Check the antenna connections and network settings. Ensure proper installation and placement of antennas for optimal performance.
- **Q: How long does the backup battery last in case of emergency?**
  A: The backup battery is designed to provide power for a limited period. It is recommended to replace it promptly after use.

ConBox 2020RD NA
User's manual
Product Technical Description

Technical Contact : Francesco Cucinotta, **fcucinotta@lear.com**

Revision	Date	Author	Notes
1.0	8.13.2024	A. Hilal	First Release
2.0	8.22.2024	A. Hilal	Added Main DATA,Equipment Description and Intended Use,CE mark a nd the software version
3.0	09.05.2024	A.hilal	Update the software version
4.0	09.30.2024	A.hilal	Update the software version
5.0	10.11.2024	A.hilal	Add the caution of FCC and IC
6.0	10.11.2024	Shao Dongshan	Updated the ROW to NA and antenna gain for NA
7.0	10.18.2024	Shao Dongshan	Added warning sentence

Introduction

ConBox 2020RD NA is a TCU fitted on several . It is designed By Lear Corporation Engineering GmbH on AUDI/PORSCHE specification, and supplied alone, without any accessory, like antennas, that are separately procured by the OEM.

ConBox 2020RD NA. The showed label does not represent the final one

Main Data

- Rated Voltage 9 to 16 V
- Rated Current 2A

- Power Input 24W
- Internal Voltages 12V, 8V, 4.7V, 3.3V, 1.8V, 1.2V,
- Operating Temperature Range -40 to +85ºC
- Absolute Max. Temperature Range 125ºC

Equipment Description and Intended Use:

ConBox 2020RD NA a connectivity box for vehicles with features like e-Call, WiFi, Bluetooth, and GNSS. It includes a backup battery, and integrates with vehicle systems via CAN, Ethernet, and A2B.

Intended Use

- Emergency Calls: The e-Call functionality allows vehicles to automatically contact emergency services in the event of an accident, enhancing passenger safety..
- Wireless Communication: Supports WiFi and Bluetooth allowing for various wireless communication needs within the vehicle.
- Audio Communication: Manages voice calls with integrated microphones and speakers.
- GNSS Tracking: Provides real-time tracking of the vehicle’s location.

Main Capabilities

- LTE Connectivity
- GNSS (GPS, Glonass, Beidu)
- Pan-European ECALL
- TPS ECALL
- ERA GLONASS Emergency Call
- Vehicle Tracking for Antitheft function
- Bluetooth
- WI-FI

ConBox2020RD NA is enabling the vehicle to have Mobile Network connectivity, and self-localization capability, that enable in turn several services, like emergency call (pan European, Private, Russian one), vehicle tracking for antitheft function.
ConBox2020RD NA is relying on a primary and a secondary external LTE antennas, plus an internal one, and external GNSS antenna. This architecture allows to have the best RF performances, with the possibility to rely on a backup solution, when, in case of emergency, external antennas are not any more available.

Conbox 2020RD NA systems

- Hardware version : H04
- Software version : 0340

Product Variants

The ConBox 2020RD NA has several variants to cover all necessary markets. The differences rely on three essential parameters:

- The type of NAD (European, North American, or Rest of the World)
- The embedded SIM card
- The presence of the VTS (Vehicle Tracking System) function, which requires an accelerometer and a larger backup battery on board.

Model Name : ConBox 2020RD NA

#	Model Type	Description	eSIM	Special Features

Antenna specification

		Partnumber	Antenna Parameters (max. Antenna Gain, efficiency, ...)
ANT_WLAN_BT_1	Innenraum Cockpit 1 (BLUETOOTH)	4N0.035.500	Max Gain: 2.4GHz = +0.11dBi
			Max Gain: 5GHz = +2.38dBi
		5B4.035.510	Max Gain: 2.4GHz = +3.00dBi
			Max Gain: 5GHz = +5.00dBi
		4K0.035.503.D	Max Gain: 617 MHz– 698 MHz (n71) = +2,8 dBi
			Max Gain: 698 MHz – 960 MHz (n20 n28 n8) = +4,9dBi
			Max Gain: 1427,9 MHz – 1510,9 MHz = +5,3dBi
			Max Gain: 1710 MHz – 1990 MHz (n3 n2) = +6,0dBi
			Max Gain: 1990 MHz – 2170 MHz (n1) = +6,9dBi
			Max Gain: 2300 MHz – 2690 MHz (n40 n41)= +7,8dBi
			Max Gain: 3300 MHz – 4200 MHz (n77) = +8,2dBi
			Max Gain: 4400 MHz – 5000 MHz (n78 n79) = +8,5_dBi
ANT_LTE_2	LTE/5G Stoßfänger hinten rechts	4M0.035.507.A	Max Gain: 617 MHz– 698 MHz (n71) = 4.3dBi
			Max Gain: 698 MHz – 960 MHz (n20 n28 n8) = 4.5dBi
			Max Gain: 1427,9 MHz – 1510,9 MHz = 5.1dBi
			Max Gain: 1710 MHz – 1990 MHz (n3 n2) = 6.5dBi
			Max Gain: 1990 MHz – 2170 MHz (n1) = 6.9dBi
			Max Gain: 2300 MHz – 2690 MHz (n40 n41) = 8.6dBi
			Max Gain: 3300 MHz – 4200 MHz (n77) = 7.3dBi
			Max Gain: 4400 MHz – 5000 MHz (n78 n79) = 7.0dBi
ANT_LTE_3	LTE Innenraum	4M0.035.504.A	Max Gain: 617 MHz– 698 MHz (n71) = -1.72dBi
			Max Gain: 698 MHz – 960 MHz (n20 n28 n8) = 0.46dBi
			Max Gain: 1427,9 MHz – 1510,9 MHz = 1.59dBi
			Max Gain: 1710 MHz – 1990 MHz (n3 n2) = 1.36dBi
			Max Gain: 1990 MHz – 2170 MHz (n1) = 1.27dBi
			Max Gain: 2300 MHz – 2690 MHz (n40 n41) = 2.48dBi
			Max Max Gain: 3300 MHz – 4200 MHz (n77) = 3.67dBi
			Max Max Gain: 4400 MHz – 5000 MHz (n78 n79) = 3.36dBi
ANT_LTE_4	LTE/5G Stoßfänger hinten links	4M0.035.507.A	Max Gain: 617 MHz– 698 MHz (n71) = 4.3dBi
			Max Gain: 698 MHz – 960 MHz (n20 n28 n8) = 4.5dBi
			Max Gain: 1427,9 MHz – 1510,9 MHz = 5.1dBi
			Max Gain: 1710 MHz – 1990 MHz (n3 n2) = 6.5dBi
			Max Gain: 1990 MHz – 2170 MHz (n1) = 6.9dBi
			Max Gain: 2300 MHz – 2690 MHz (n40 n41) = 8.6dBi
			Max Gain: 3300 MHz – 4200 MHz (n77) = 7.3dBi
			Max Gain: 4400 MHz – 5000 MHz (n78 n79) = 7.0dBi
Backup	CONBOX2020RD_ROW internal	WAG-M-LTE10-00-007-B	Max Gain: 704 MHz– 960 MHz = -0.7dBi
			Max Gain: 1710 MHz – 2690 MHz = 5.5dBi

Supported bands and GNSS

RAT/Variant	NA	ROW	EU
NSA/SA NR	n5 and n71 n2 and n66; n7 and n41 n77 and n78	n28 n1 and n3; n41 n77, n 78 and n79	n5, n8 and n28 n1 and n3; n7 n77 and n78
LTE	B26(5), 12(17), 13, 14, 29 and 71 B1, 25(2), 3 and 66(4) B7, 30 and 41	B26(5/18/19), 8, 20 and 28 B1, 25(2), 3(9), 4, 34 and 39; B32 B 7, 40 and 41(38)	B5, 8, 20 and 28 B1 and 3; B32 B7, 38 and 40
WCDMA	B1, 2, 3, 4 and 5	B1, 3(9), 5(6/19) and 8	B1, 3, 5 and 8
GSM/GPRS/EDGE	850, 900, 1800 and 1900	850, 900, 1800 and 1900	900 and 1800

Supported SBAS

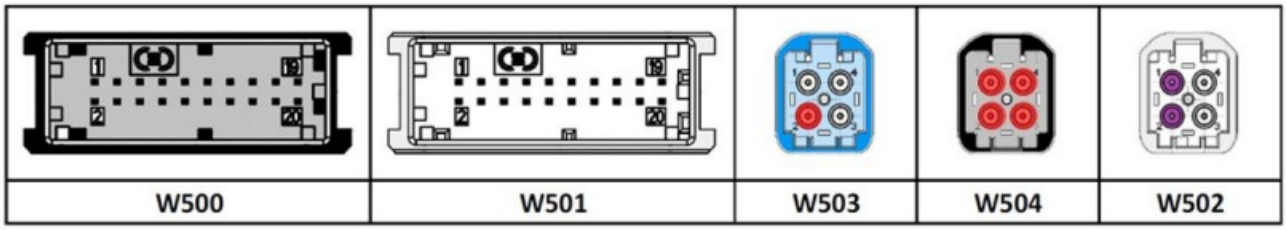
- Europe/RoW and Russia EGNOS
- North America WAAS
- Japan MSAS / QZSS

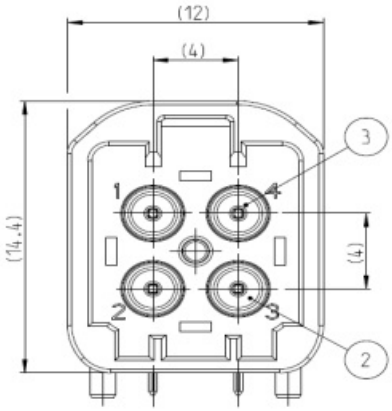
Supported GNSS

- Europe/RoW and Russia GALILEO / GLONASS
- North America GPS
- Japan QZSS

Connectors

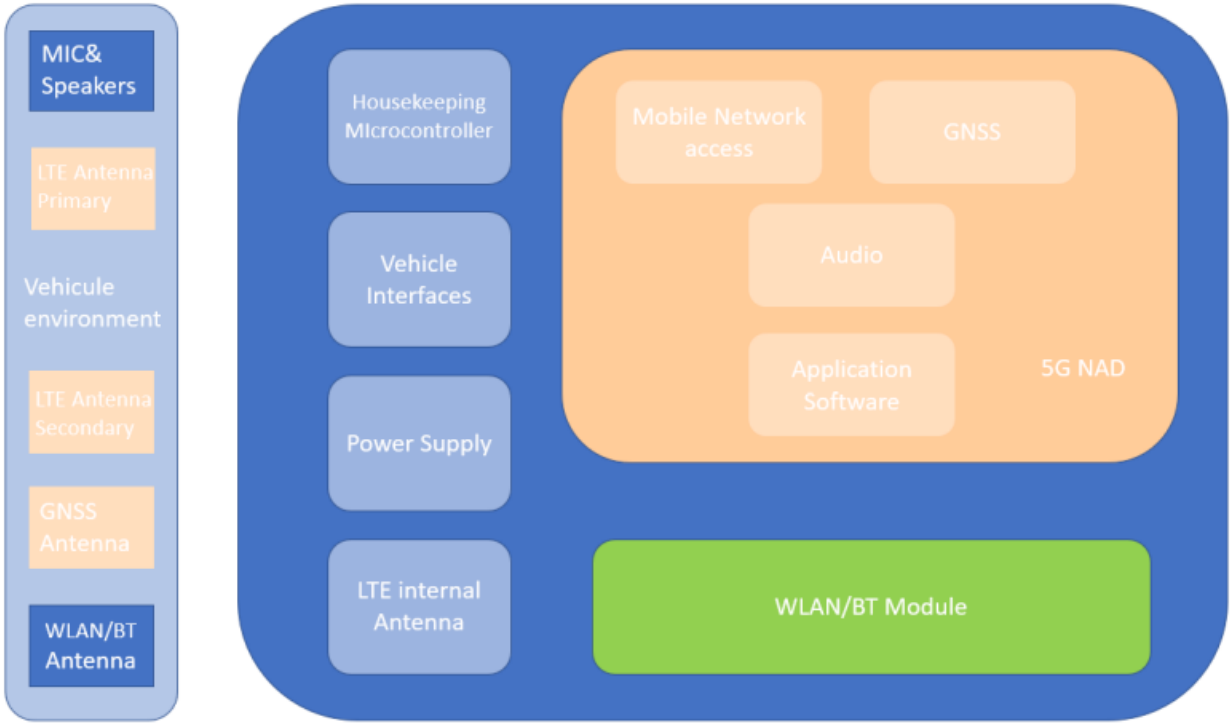
1. Main Connector #1 to Vehicle
2. Main Connector #2 to Vehicle
3. GNSS connector to GNSS Antenna
4. Mobile network connector to LTE external Antennas
5. WLAN/BT connector to WLAN/BT antenna





Architecture

The Conbox 2020RD NA architecture is based on an Open NAD (Network Access Device). It provides Mobile Network Access, GNSS capability, Audio management, and a Linux environment that hosts the application software. Additionally, the TCU contains a
WLAN/BT Module, Bluetooth Low Energy, and a housekeeping microcontroller.



Frequency Bands and Output Power

Mode	Bands	Minimum	Typical	Maximum	Unit
Maximum Output Power					
5G NR	FR1 Sub-6G bands	21	23	25	dBm
5G NR HPUE	n41/n77	24	26	28	dBm
LTE	All bands	21	23	25	dBm
WCDMA	All bands	21	24	25	dBm
GSM	850 900	31	33	35	dBm
GSM	1800 1900	28	30	32	dBm
Minimum Output Power					
5G NR	FR1 Sub-6G bands (BW:<20 MHz)	—	—	-40	dBm
LTE	All bands	—	—	-40	dBm
WCDMA	All bands	—	—	-50	dBm

Manufacturer Contact:
Lear Corporation Engineering GmbH
Industriestraße 48 Kronach Germany 96317
Tel. +49 9261 5000

FCC Caution

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.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: 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 or more 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.

RF exposure statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The BT&WIFI Antenna(PN#: 4N0.035.500) should be installed and operated with minimum distance 27cm between the radiator & your body; The WIFI Antenna(PN#: 5B4.035.510) should be installed and operated with minimum distance 14 cm between the radiator & your body; 2/3/4/5G Antenna(PN#: 4K0.035.503.D) should be installed and operated with minimum distance 25cm between the radiator & your body;

ISED Caution:
This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

RF exposure statement
This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. The BT&WIFI Antenna(PN#: 4N0.035.500) should be installed and operated with minimum distance 27cm between the radiator & your body; The WIFI Antenna(PN#: 5B4.035.510) should be installed and operated with minimum distance 14 cm between the radiator & your body; 2/3/4/5G Antenna(PN#: 4K0.035.503.D) should be installed and operated with minimum distance 25cm between the radiator & your body;
Device types: ConBox2020RD (IC: 33078-CB20RDNAR1) has also been tested against this SAR limit. The highest SAR value reported under this standard during product certification for use is 0.015W/kg. To maintain compliance with IC RF exposure requirements, minimum antenna separation mentioned above should be followed.
Use only the supplied or approved antennas.
For band 5150-5250 MHz, ISED restricted to OEM devices only, this device must be installed by the vehicle manufacturers;

Documents / Resources

	LEAR CB20RDNAR1 TCU Fitted on Several [pdf] User Manual CB20RDNAR1 TCU Fitted on Several, CB20RDNAR1, TCU Fitted on Several, Fitted on Several, on Several, Several

References

- User Manual