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ConBox 2020RD NA

User's manual Product Technical Description

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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 and 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

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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 +85°C

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Absolute Max. Temperature Range 125°C

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

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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.



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Model Name : ConBox 2020RD NA

#	Model Type	Description	eSIM	Special Features

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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, n78 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 B7, 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

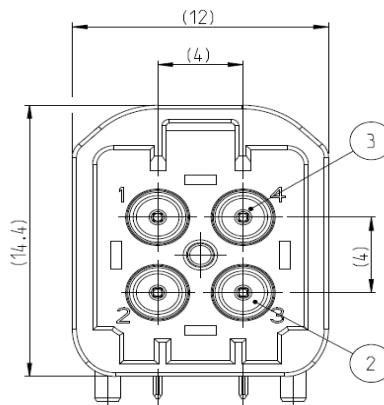
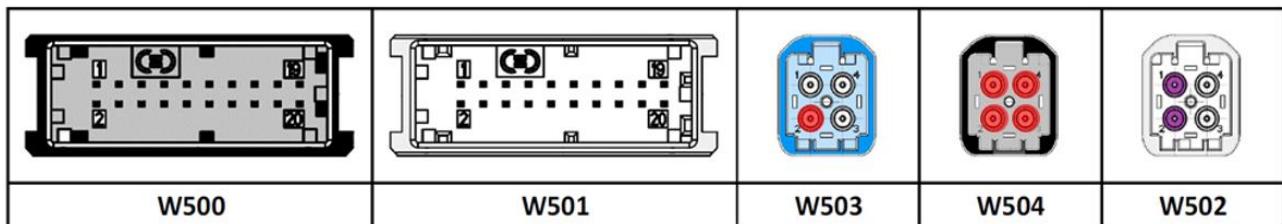
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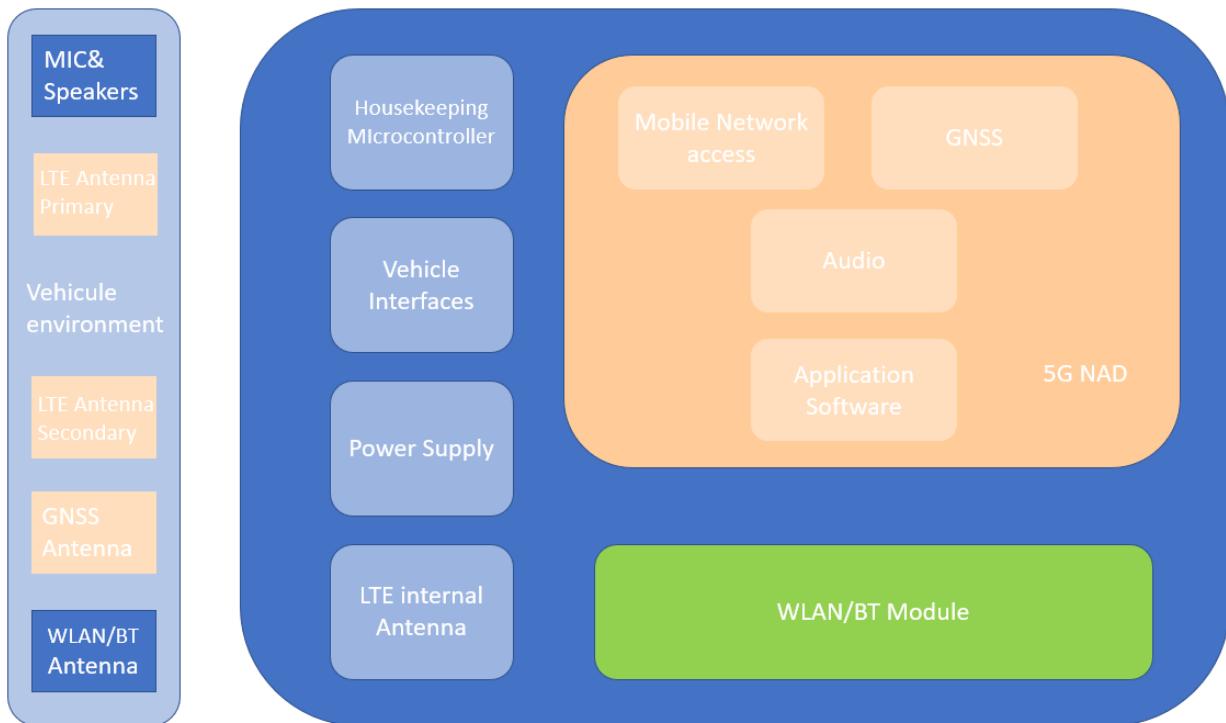


1. Main Connector #1	to Vehicle
2. Main Connector #2	to Vehicle
3. GNSS connector	to GNSS Antenna
4. Mobile network connector	to LTE external Antennas
5. WLAN/BT connector	to WLAN/BT antenna

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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:<20MHz)	--	--	-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

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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.

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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;

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ISED Caution:

- English:

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;

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- French:

Cet appareil est conforme aux normes RSS d'Industrie Canada en matière d'exemption de licence. Son fonctionnement est soumis aux deux conditions suivantes :

- (1) Cet appareil ne doit pas provoquer d'interférences, et
- (2) Cet appareil doit accepter toute interférence, y compris celles qui peuvent entraîner un fonctionnement indésirable de l'appareil.

Déclaration d'exposition aux RF :

Cet équipement est conforme aux limites d'exposition aux rayonnements de l'ISED définies pour un environnement non contrôlé. L'antenne BT&WIFI (PN : 4N0.035.500) doit être installée et utilisée à une distance minimale de 27 cm entre le radiateur et votre corps ; l'antenne WIFI (PN : 5B4.035.510) doit être installée et utilisée à une distance minimale de 14 cm entre le radiateur et votre corps ; l'antenne 2/3/4/5G (PN : 4K0.035.503.D) doit être installée et utilisée à une distance minimale de 25 cm entre le radiateur et votre corps ;

Types d'appareils : ConBox2020RD (IC : 33078-CB20RDNAR1) a également été testé par rapport à cette limite DAS. La valeur DAS la plus élevée signalée dans le cadre de cette norme lors de la certification du produit pour utilisation est de 0,015 W/kg. Pour maintenir la conformité avec les exigences d'exposition aux RF IC, la séparation minimale des antennes mentionnée ci-dessus doit être respectée.

Utilisez uniquement les antennes fournies ou approuvées.

Pour la bande 5 150-5 250 MHz, ISED étant limité aux appareils OEM uniquement, cet appareil doit être installé par les constructeurs automobiles ;