# 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 |

## *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, 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
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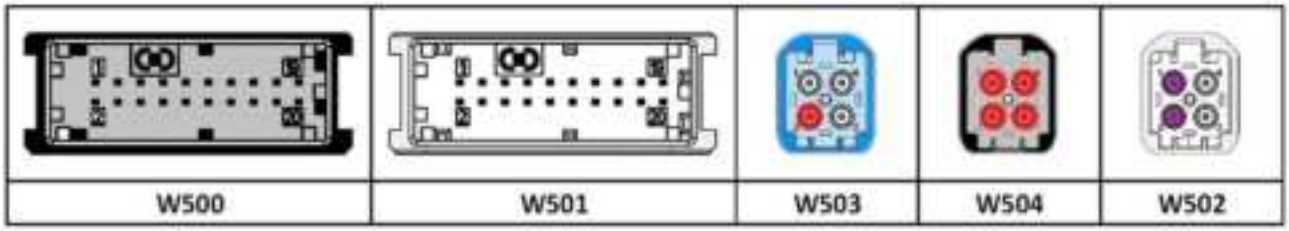
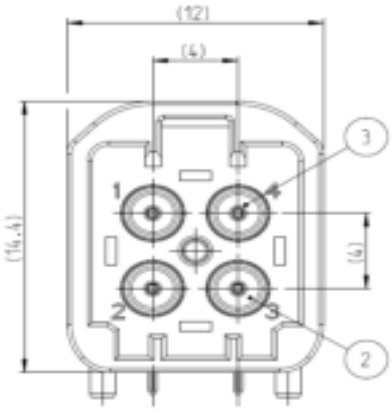
## *Supported GNSS*

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

## *Connectors*

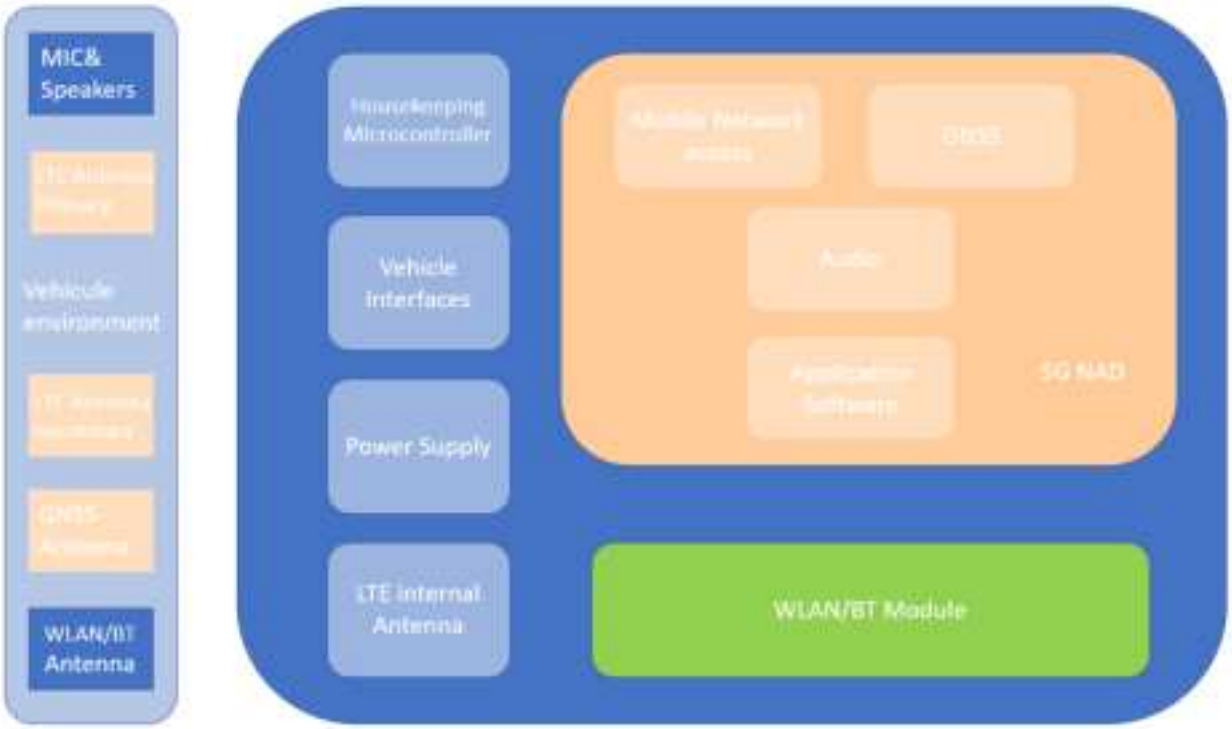




1. Main Connector #1 to Vehicle
2. Main Connector #2 to Vehicle
3. GNSS connector to GNSS Antenna
4. Mobile network connector to LTE external Antennas
5. WLAN/BT connector to WLAN/BT antenna

## *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:<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

**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:**

- 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;

- 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 ;