Description

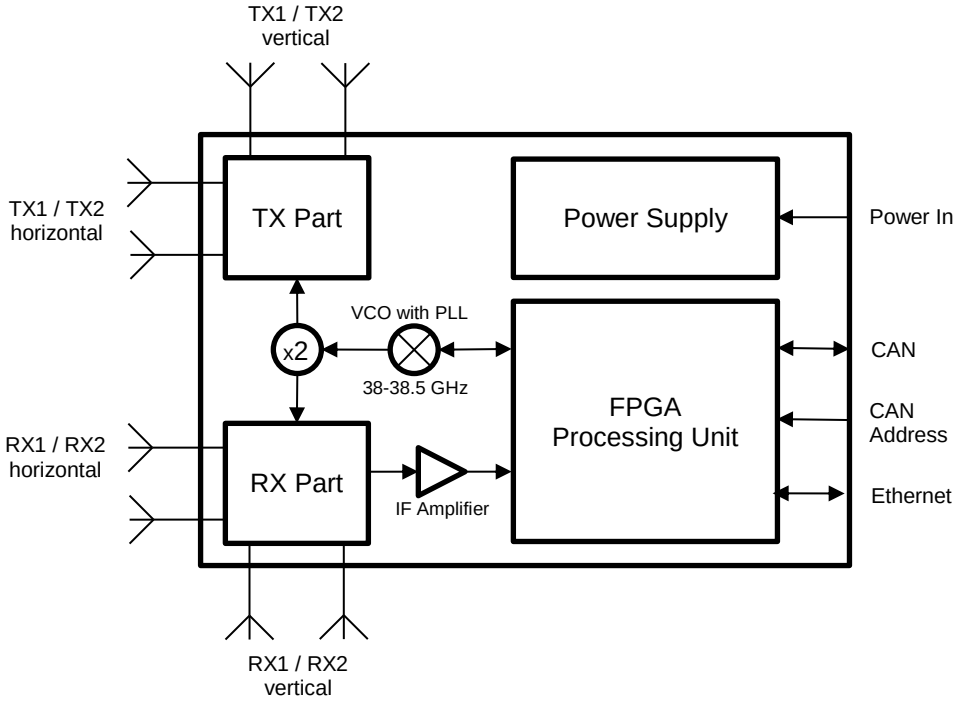
The WDR77-VES is a digital radar that works in the E-band. The sensor measures the distance and the angle of objects in the front of it and sends the measured data over CAN or Ethernet to the host.

It is mounted on an airplane deicing truck and used to measure the distance to the airplane wing.

It features 2 transmit and 2 receiver channels with a horizontal polarisation and also 2 transmit and 2 receiver channels in the vertical polarisation. The transmitter antenna beam is different for the 2 antennas and can be switched over the CAN interface.

The sensor uses a range Doppler processing to measure the distance of static and moving objects. The 2 receiving channels are used to measure the angle of the objects.

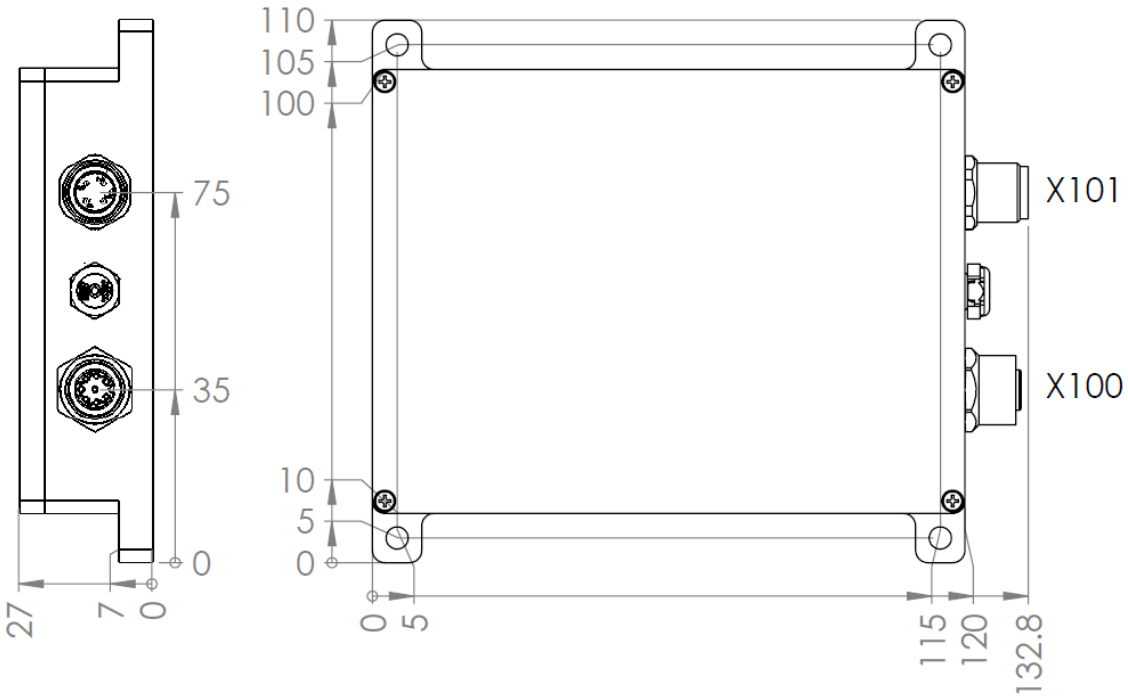
Block Diagram



Characteristics

Parameter	Conditions / Notes	Symbol	Min	Typ	Max	Unit
Operating conditions						
Supply voltage		V_{cc}	9.5	12	14.5	V
Supply current		I_{cc}				mA
Operating temperature		T_{op}	-40		+85	°C
Transmitter						
Transmitter frequency		f_{TX}	76		77	GHz
Output power	EIRP	P_{TX}		+30		dBm
Modulation type				FMCW		
Sweep Bandwidth				660		MHz
Antenna						
TX1 antenna gain	f_{TX} = 76.5 GHz	G_{antTX1}		11.0		dBi
TX1 horizontal -3dB beamwidth	E-Plane	$W_{\varphi TX1}$		11		°
TX1 vertical -3dB beamwidth	H-Plane	$W_{\vartheta TX1}$		66		°
TX2 antenna gain	f_{TX} = 76.5 GHz	G_{antTX2}		13.5		dBi
TX2 horizontal -3dB beamwidth	E-Plane	$W_{\varphi TX2}$		11		°
TX2 vertical -3dB beamwidth	H-Plane	$W_{\vartheta TX2}$		45		°
RX antenna gain	f_{TX} = 76.5 GHz	G_{antRX}		11.0		dBi
RX horizontal -3dB beamwidth	E-Plane	$W_{\varphi RX}$		11		°
RX vertical -3dB beamwidth	H-Plane	$W_{\vartheta RX}$		66		°
Body						
Outline Dimensions				132.8x110x27		mm^3
Weight				420		g

Mechanical Drawing



Connector Pinout

Connector X100

- Female M12 connector, 8-pin, A-coded
- CAN address and Ethernet

Pinning:

1. CAN address 0
2. CAN address 1
3. CAN address 2
4. VCC 3.3V output
5. 100BASE-TX TX+
6. 100BASE-TX TX-
7. 100BASE-TX RX+
8. 100BASE-TX RX-

Connector X101

- Male M12 connector, 4-pin, A-coded
- CAN interface and power supply

Pinning:

1. Power Supply Input (+12V)
2. CAN-
3. GND
4. CAN+

Radiofrequency radiation exposure Information

This equipment complies with FCC and IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.
Ce transmetteur ne doit pas etre place au meme endroit ou utilise simultanement avec un autre transmetteur ou antenne.

FCC / ISED Statement

This device with the FCC ID: 2ASYV-WDR77-VES and the IC ID: 24358-WDR77VES complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s).
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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

NOTE:
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING:
Changes or modifications made to this equipment not expressly approved by RFbeam Microwave GmbH may void the FCC authorization to operate this equipment.

Document History

Author: Ueli Giger, RFbeam Microwave GmbH, CH-9016 St. Gallen
Date: May 24th 2019
Version: 1.0
Changes: Initial Version

Author: Ueli Giger, RFbeam Microwave GmbH, CH-9016 St. Gallen
Date: July 30th 2019
Version: 1.1
Changes: - changed description of the sensor

Author: Ueli Giger, RFbeam Microwave GmbH, CH-9016 St. Gallen
Date: August 6th 2019
Version: 1.2
Changes: - added chapter Radiofrequency radiation exposure information
- changed the FCC / ISED statement