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USER OPERATION AND MAINTENANCE MANUAL

**DOPPLER SENSOR 94GHz
Part No. DPR-94/100**



**1st Edition
November 2012**

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1. INTRODUCTION.

This instruction manual contains information on installation and operation of the Doppler sensor 94GHz.

1.1 General Description.

Doppler sensor DPR-94/100 is intended for measuring Doppler shift affect from different targets at 94GHz frequency. The system is completed Cassegrain antennas 200 and 600mm diameter.

2. SPECIFICATIONS.

2.1 Electrical Specifications.

Transmitter

1. Output Frequency	94 GHz
2. Frequency Stability	determined by reference
3. Output RF Power	100 mW
4. Output power regulation (VCVA)	0-60dB
5. Control current for VCVA	0-65mA
6. Input Reference Frequency	7.23GHz
7. Input power of reference Frequency	20mW
8. Waveguide	WR-10
9. Flange	UG-387/U
10. Reference Frequency connector	SMA (f)
11. Control input for attenuator connector	SMA(f)
12. Power connector	DB-9
13. DC Power	+12 VDC@390mA -12 VDC@10mA +24 VDC@310mA
14. AC power	100-240V AC (External unit)

Receiver

1. Input Frequency	94 GHz
2. LO frequency	87.77 GHz
3. Frequency Stability	1*10 ⁻⁶ 1/°C
4. Input RF Power (max)	0 dBm
5. Noise figure	7.6 dB
6. Total gain RF-IF	65 dB
7. IQ Phase balance	+/-1 deg
8. I and Q IF Frequency range	0 to 10kHz
9. Output Reference Frequency	7.23 GHz
10. Output power of reference Frequency	30 mW
11. Waveguide	WR-10
12. Flange	UG-387/U
13. Reference Frequency connector	SMA (f)
14. IQ connectors	SMA(f)
15. Power connector	DB-9
16. DC Power	+12 VDC@900mA -12 VDC@55mA +24 VDC@110mA +24 VDC@500mA (thermostat)
17. AC power	100-240V AC (External unit)

2.2 Mechanical Specifications.

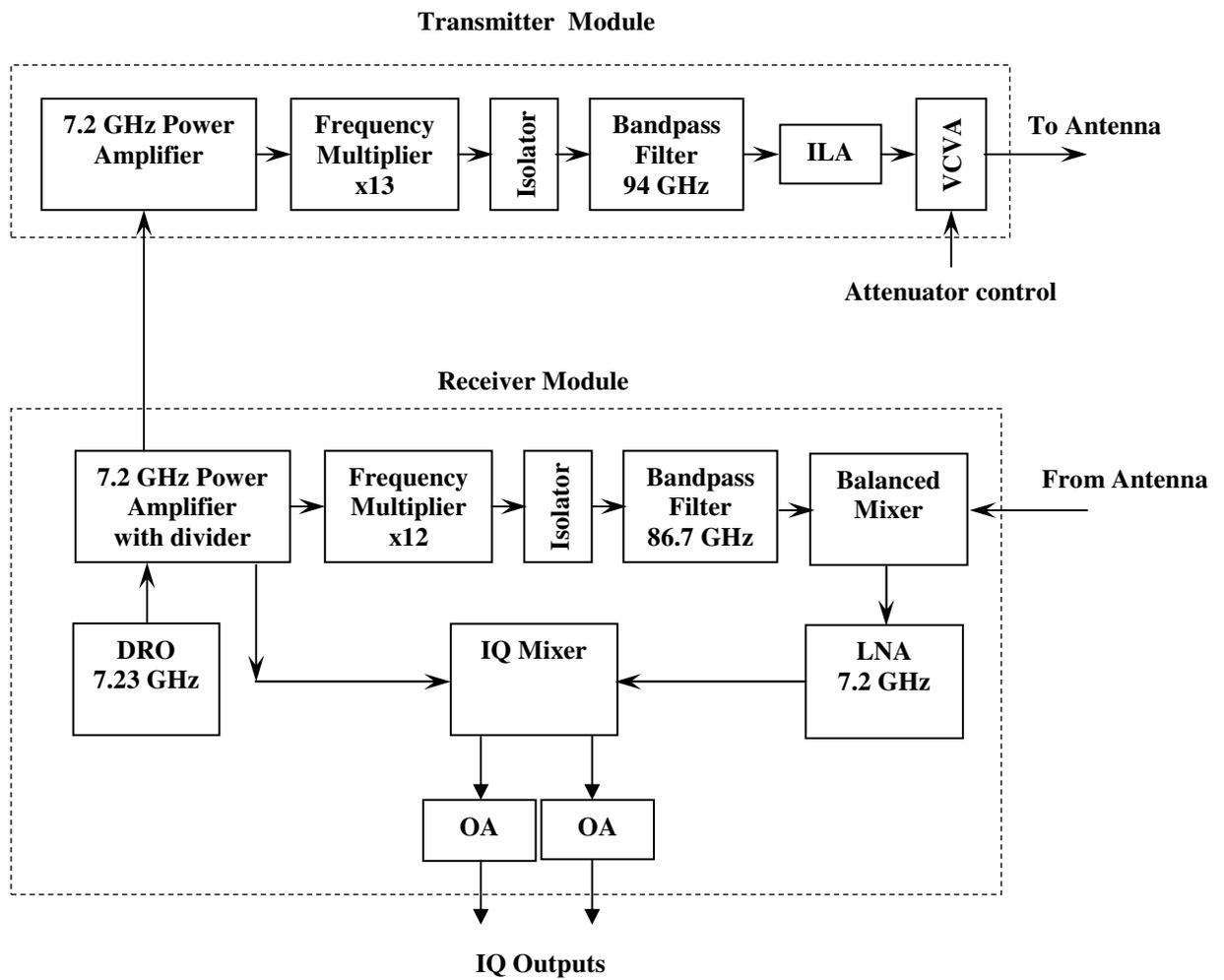
Transmitter

1. Size	70x145x205 mm;
2. Weight	1.9 kg.

Receiver

3. Size	70x185x360 mm;
4. Weight	4.1kg.

2.3 Block-diagram of the Doppler Sensor.



Picture No1. Block-Diagram of the Doppler sensor.

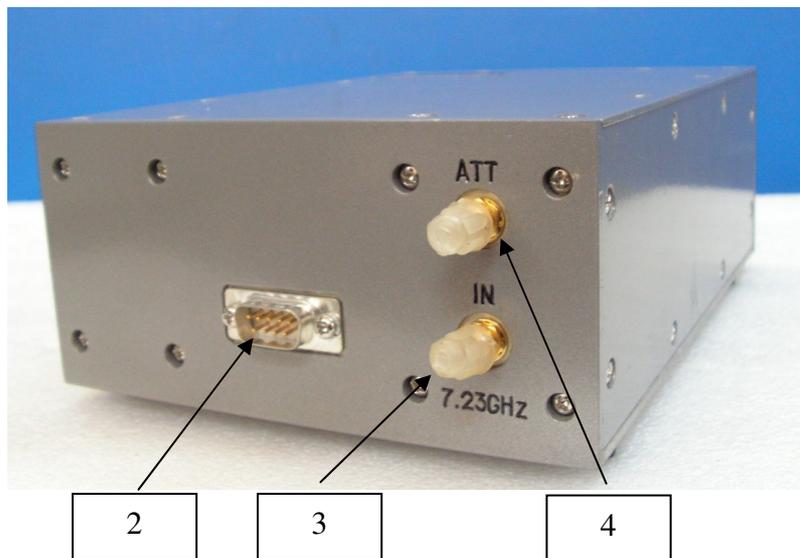
2. 4 Transmitter.

Disposition of the connectors on the front panel of the transmitter is the following:



Picture No2. Front panel of the Transmitter.

Disposition of connectors on the rear panel of the transmitter is the following:

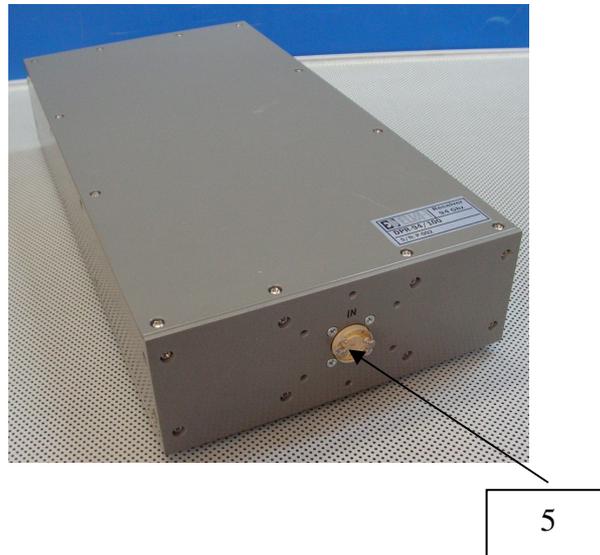


Picture No3. Rear panel of the Transmitter.

1. RF output, WR-10, UG-387/U-M;
2. Power connector, DB-9;
3. Input for reference frequency 7.23GHz@20mW from receiver unit, SMA(f)
4. Input control for attenuator, 0 ...+60mA, SMA(f);

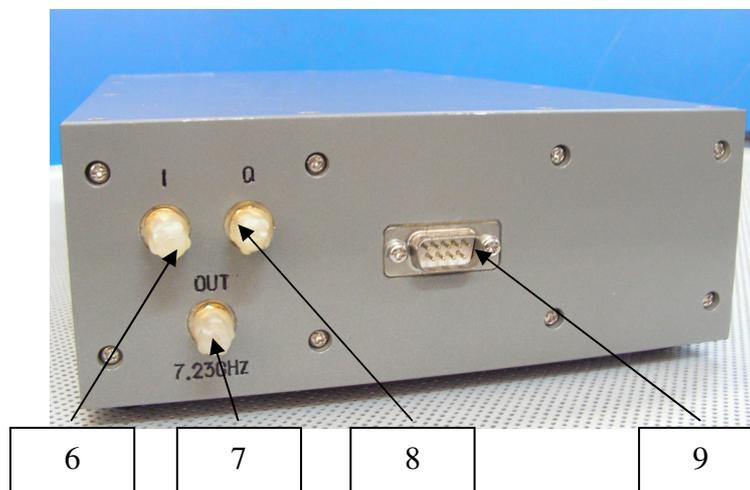
2.5 Receiver

Disposition of connectors on the front panel of the Receiver is the following:



Picture No4. Front panel of the Receiver.

Disposition of connectors on the rear panel of the Receiver is the following:

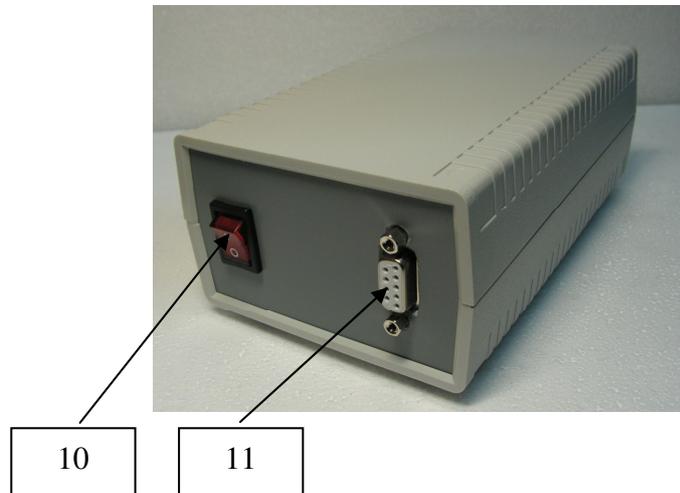


Picture No5. Rear panel of the Receiver.

5. RF input, WR-10, UG-387/U-M
6. Output "I", SMA(f);
7. Output reference frequency 7.23GHz@30mW, SMA(f);
8. Output "Q" SMA(f);
9. Power connector, DB-9;

2. 6 Power supply 220V AC => DC

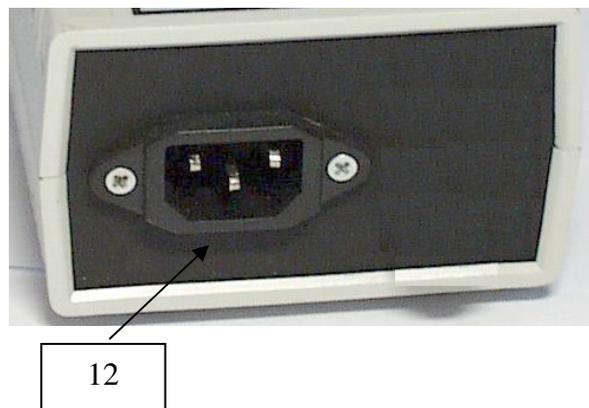
Disposition of knobs and connectors on the front panel of power supply is the following:



Picture No6. Front panel of power supply.

- 10. Power switch;
- 11. Power lines connector, DB-9.

Disposition of plugs and connectors on the rear panel of power supply is the following:



Picture No7. Rear panel of power supply.

- 12. Power plug. 100-240V AC;

Disposition of voltages into power connector DB-9 is the following:

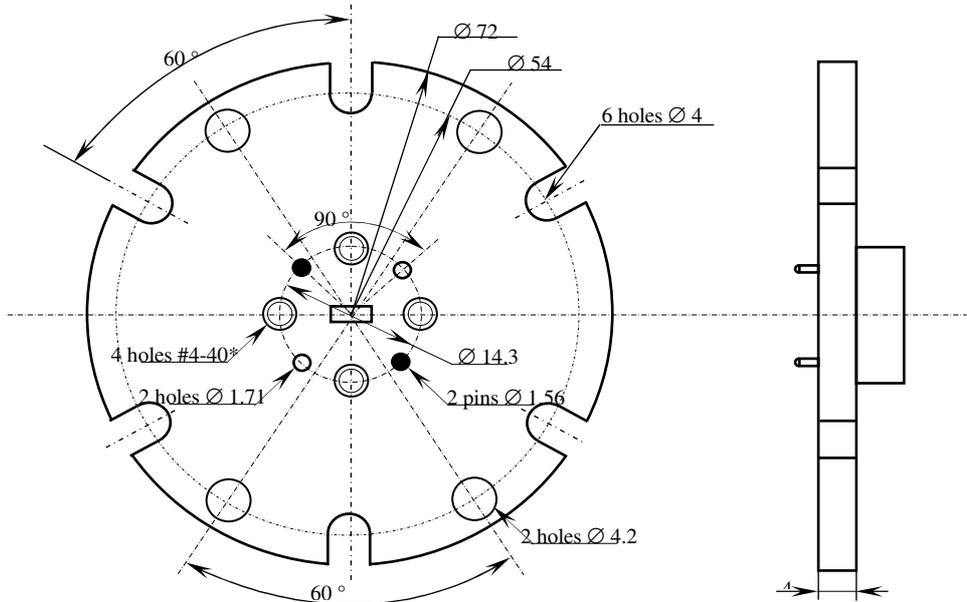
1	2	3	4	5	6	7	8	9
-12V	+12V	NC	+24V	GND	NC	NC	GND(T)	+24V(T)

Pin No9 – power line for thermostat in power supply for receiver only

3. INSTALLATION.

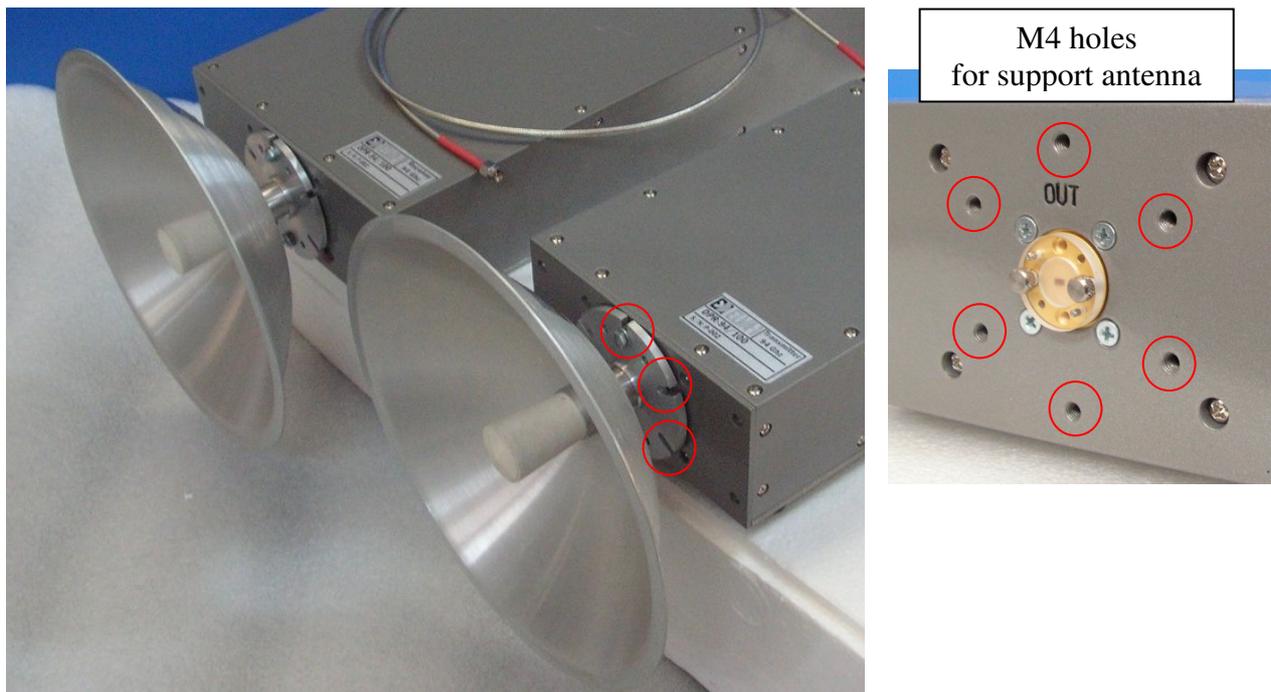
3.1 Assembly procedure and put into operation.

The Doppler Sensor is completed with Cassegrain antennas. Drawing of connection flange is presented below.



Picture No8. Antenna flange.

Install antennas on Transmitter and Receiver. For support use opposite holes M4 on modules and bolts M4, as it is shown on picture below



Picture No9. Antenna installation.

After installation of antennas connect output reference frequency 7.23GHz (7) with input reference frequency on the Transmitter (3) by SMA-SMA coaxial cable. Cable is applied.

Connect power supplies with modules according to marking:



ATTENTION!

DO NOT USE TRANSMITTER POWER SUPPLY WITH RECEIVER MODULE!

Power cables DB-9 – DB-9 are applied.

Connect power supplies to primary line 100-240V AC.

Connect IQ outputs to data acquisition system.

Switch ON power supplies by power switch (10).

The Doppler sensor is ready for operation.

3. 2 Output power control.

There is built-in Voltage Controlled Variable Attenuator (VCVA). It is controlled by bias current. If user wants to use voltage supply, protection resistor must be installed. An example of switching is presented below:

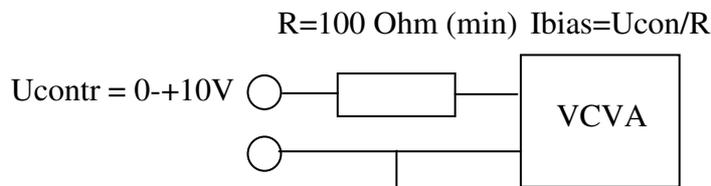


Table attenuation vs bias is presented below

Attenuation, dB	-3	-6	-10	-20	-30	-40	-50	-60
Bias, mA	1,42	3,03	5,50	12,95	23,6	33,5	45,5	63,1

ATTENTION!

DO NOT APPLY DIRECTLY VOLTAGE SUPPLY DIRECTLY TO CONTROL INPUT FOR VCVA!