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1. General information

- Before checking and operation, it is mandatory to carefully read the subheading "Operator's manual" (7.5).
- All entries in the passport are made only with ink, distinctly and accurately. Erasures, blots, uncertified corrections are not allowed.

2. General product information

2.1. The "X Band Up/Downconverter" is designed for round-the-clock continuous operation mode (at least 20 hours and 4 hours break) in normal climatic conditions.

2.2. Supply of the "X Band Up/Downconverter" is carried out from the source of the single-phase alternating current with a voltage of 220V and a frequency of 50Hz.

2.3. The "X Band Up/Downconverter" consists of one unit (Fig. 1).

The unit on the front panel has four RF inputs and three RF outputs, 1 input for the unit control, indicators and a network switch. The back panel of the unit has a connector for the power supply, programming port and a grounding bolt.

2.4. "X Band Up/Downconverter" meets the safety requirements of Russian State Standard for electrical, mechanical, and fire safety - GOST R IEC 60950.

3. Purpose of the product

This X Band Up/Downconverter is specifically designed to operate in X Band. X Band Up/Downconverter is controlled using digital lines. When digital lines are used faster switching speed and more reliable control can be achieved.

4. Technical specifications

In the Table 1 are shown technical specifications of X Band Up/Downconverter.

Table 1

S.No.	Description	Specification
Downconverter Specifications		
1	Input Frequency	X - Band (8 - 12 GHz)
2	Output Frequency	Fixed at 1GHz or Variable in 1 - 5GHz

3	Bandwidth	200 MHz
4	Input Dynamic Range	50dB
5	Input Power	-50 dBm to +30 dBm
6	Amplitude Flatness	± 0.5 dB
7	Spurious in 200MHz BW	Better than 50dBc
8	Residual LO Power	< -55 dBm
9	VSWR	Better than 1.5:1
10	Noise Figure	10 dB
11	Impedance	50 Ohm
12	Attenuator	For Ref Level Adjustments with VST
13	Connectivity	RF IN & OUT: SMA (female)
Upconverter Specifications		
14	Input Frequency	Fixed at 1GHz or Variable in 1 - 5GHz
15	Output Frequency	8 - 12 GHz
16	Bandwidth	200 MHz
17	Output Power Control Range	100 dB
18	Input Power	-50 dBm to 0 dBm
19	Amplitude Flatness	± 0.5 dB
20	Spurious in 200MHz BW	Better than 50dBc
21	Residual LO Power	< -60 dBm
22	VSWR	Better than 1.5:1
23	Noise Figure	15 dB
24	Impedance	50 Ohm
25	Attenuation Range	100 dB
26	Connectivity	RF IN & OUT: SMA (female)
Common Specifications		
27	Gain/Attenuator	To compensate conversion loss/gain

28	LO	Common for X Band Up/Downconverters
29	Digital Interface	VHDCI Connector of VST to X Band Up/Downconverters
30	Power Supply	~ 220 V
31	Operating Temperature	0° - 55° C
32	Size	(482.6 X 369.7 X 88.1) mm
33	Weight	4 kg

5. General view of “X Band Up/Downconverter”

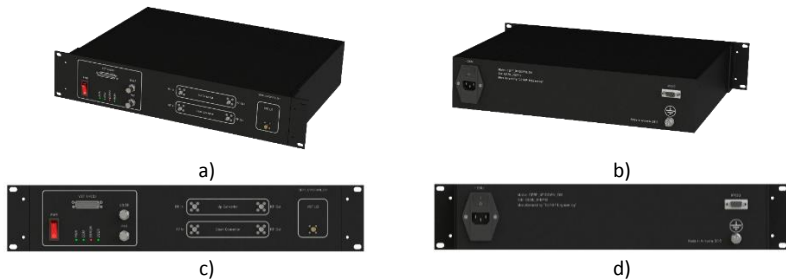
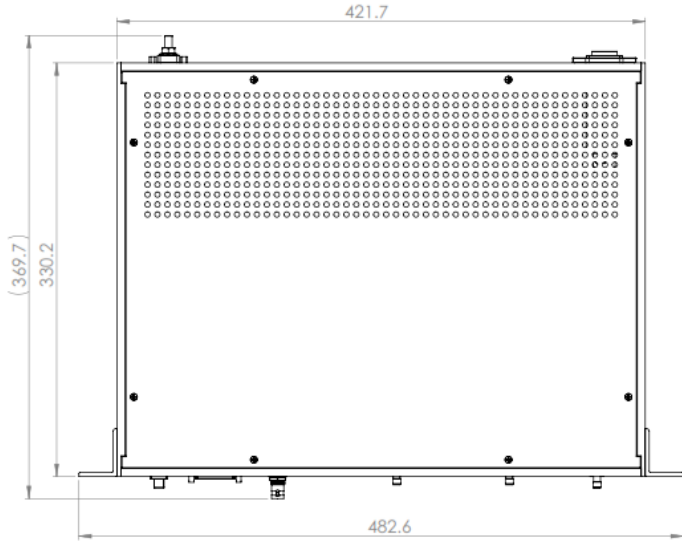


Fig. 1 General view of “X Band Up/Downconverter”

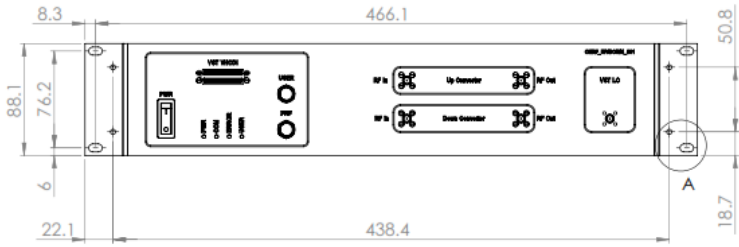
5.1. Dimensions

Dimensions of "X Band Up/Downconverter"

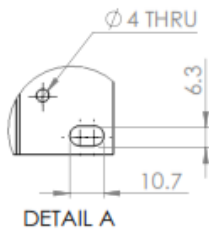
- Height 88.1 mm
- Length 482.6 mm
- Width 369.7 mm
- Weight of the product without packaging is not more 4 kg



a)



b)



c)

Fig. 2 Dimensions of "X Band Up/Downconverter"

6. Completeness

The package includes the product and the product documentation.

6.1. Product

- X Band Up/Downconverter 1 pc.
- Connectivity cable for the programming port (PROG) 1 pc.
- Power supply cable (~ 220 V) 1 pc.

6.2. Documentation

- Passport 1 pc.

7. Description and operation of the product

7.1 Composition of the product

- 1. X Band Up/Downconverter 1 pc.
- 2. Connectivity cable for the programmable port (PROG) 1 pc.
- 3. Power supply cable (~ 220 V) 1 pc.

7.3 Getting Started

It is necessary to do all connections as shown in the scheme. First of all you need to connect the grounding screw, and then do all connections, and in the end you need to connect the power cord.

7.4 The overall block diagram of the system is shown below.

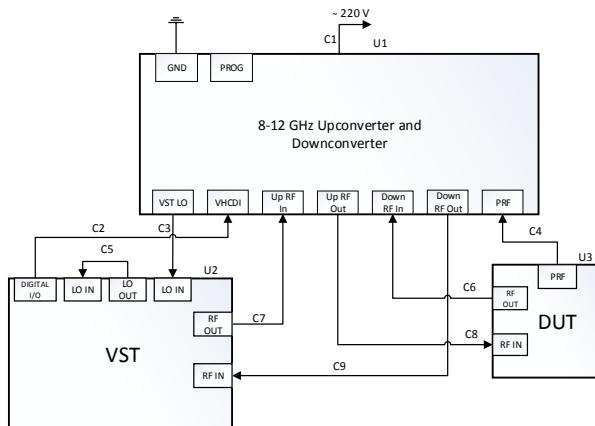


Fig. 3 Block diagram of the "X Band Up/Downconverter"

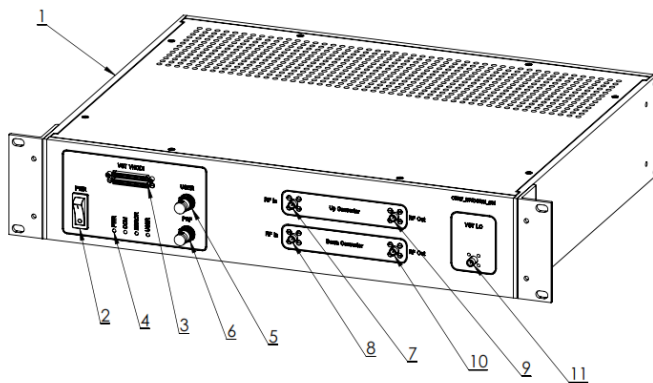
In the Table 2 are shown cable types.

Table 2

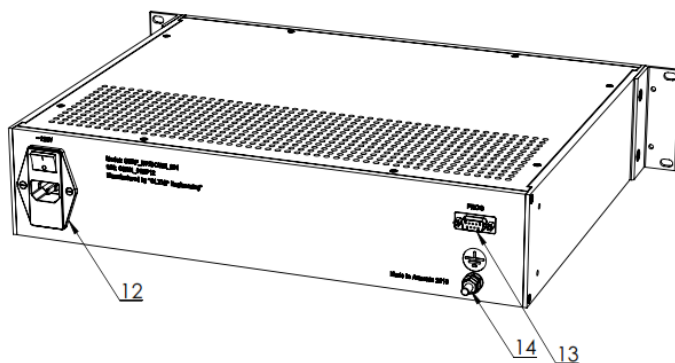
Cable	Type of cable
C1	Power cable
C2	VHCDI Male to VHCDI Female cable
C3	SMA Male to SMA Male cable
C4	BNC Male to BNC Male cable
C5	SMA Male to SMA Male cable
C6	SMA Male to SMA Male cable
C7	SMA Male to SMA Male cable
C8	SMA Male to SMA Male cable
C9	SMA Male to SMA Male cable

7.5 Operator's manual

1. First of all connect the ground cable to the GND connector (M6 screw),
2. Connect the DIGITAL I/O connector to the VST VHCDI connector with the cable C2,
3. Connect the VST LO connector of the "X Band Up/Downconverter" to the LO IN connector of VST RF OUT 0 with the cable C3,
4. Connect the PRF connector of DUT to the PRF connector of "X Band Up/Downconverter" with the cable C4,
5. Connect the LO OUT connector of VST RF OUT 0 to the LO IN connector of VST RF IN 0 with the cable C5,
6. Connect the RF OUT connector of DUT to the DOWN RF In connector of the "X Band Up/Downconverter" with the cable C6,
7. Connect the RF OUT connector of the VST RF OUT 0 to the Up RF Out of the "X Band Up/Downconverter" connector with the cable C7,
8. Connect the Up RF Out connector of the "X Band Up/Downconverter" to the Up RF IN of the DUT connector with the cable C8,
9. Connect the Down RF Out connector of the "X Band Up/Downconverter" to the Up RF IN of the VST RF IN 0 connector with the cable C9,
10. In the end connect the -220 V power in connector to the power supply,
11. Turn on the power switch.



a)



b)

Fig. 4 Connectors of “X Band Up/Downconverter”

In the Table 3 are shown the “X Band Up/Downconverter” components.

Table 3

No.		Type of the connector
X Band Up/Downconverter		
1	Case of the product	
2	Power switch	
3	VST VHCDI connector	VHCDI

4	LED indicators	
5	USER connector	BNC Female
6	PRF connector	BNC Female
7	RF In "Up Converter" connector	SMA Female
8	RF In "Down Converter" connector	SMA Female
9	RF Out "Up Converter" connector	SMA Female
10	RF Out "Down Converter" connector	SMA Female
11	VST LO connector	SMA Female
12	~220 V power in connector	
13	PROG connector	D-Sub-9, (Comport)
14	GND	M6 screw

In the Table 4 are shown VST connector types.

Table 4

VST	
RF IN	SMA Female
RF OUT	SMA Female
LO IN	SMA Female
LO OUT	SMA Female
LO IN	SMA Female
DIGITAL I/O	VHCDI

7.6 Operating procedure

The first step of the operation is to turn on the PXI System with VST, and then the VST transceiver and the DUT. After that, pressing the "PWR" button, turn on the X Band Up/Downconverter.

8. Safety requirements

Turn on the X Band Up/Downconverter device to the network in accordance with required voltage, according to the enclosed instructions to the device.

Safety requirements before the operation

- Check the operability of flexible power cord, plugs, connecting cables.
- Clean the device from the dust with a dry, clean cloth.
- Check the operability of electrical socket.

Safety requirements during the operation

- Load the device in accordance with the requirements of the instructions.
- Do not allow a work with the electrical appliances by unauthorized persons.

Safety requirements in emergency situations

- In case of fire, short circuit, turn off the electrical appliances from the network with dry hands; inform the administration, office manager and electrician.
- In case of fire inform the administration and the fire service, take action to extinguish it.

Safety requirements at the end of the operation

- Unplug the device from the network; do not pull the power cord over.
- Prevent the impact of hot liquids on cables, power cords, and the drop of heavy objects on them.
- Do not clean with sharp objects.

9. Technical service

9.1 General instructions

For the technical service:

The warranty period for repaired electrical appliance is calculated from the date of issuance of the repaired electrical appliance to the customer, and is considered valid in compliance with the rules of operation of the electrical appliance by the customer.

During the warranty period, established by the repair company, repeated repair of the electrical appliance is carried out by the repair company, except the costs of assembly units and parts paid by the customer, which are not replaced during the previous repair.

When a repeat repair is necessary during the warranty period, established by the repair company, the warranty period is extended for the period from the date of appeal to the repair company to the date of acceptance of the work - issuance of electrical appliance.

10. Environment

Normal climate conditions

- Temperature $25\pm 10^{\circ}\text{C}$;
- Relative air humidity 45-50%;
- Atmosphere pressure 84.0-106.7 kPa (630-800 mm Hg).

11. Manufacturer's warranty

11.1. The warranty period of operation is 12 months. In case of product breakage due to manufacturing defects or substandard production, supplier guarantees free repair or replacement of equipment or part of it during the warranty period. All costs related to troubleshooting, including business trips, air travel in both directions, residence and other expenses of professionals' stay pays the customer.

11.2. In case of product breakage due to violation of rules of operation described in the User's Guide by a customer, supplier repairs or replaces the equipment or part of it at the expense of the customer, which will pay all costs related to troubleshooting, including business trips, air travel in both directions, residence and other expenses of professionals' stay, etc.

12. Transport and Storage

Transport and storage terms of "X Band Up/Downconverter" correspond to:

1. Terms of transportation in the part of impact:

Motor transportation with a total amount of overloads no more than four:

- on roads with asphalt and concrete covering a distance of 200 to 1000 km;
- the cobblestone and earth roads a distance of 50 to 250 km at a speed of 40 km/h.

Different modes of transportation:

- with air transport, rail transport, combined them with each other, with road transport with a total amount of overloads of 3 to 4, by water (except the sea), together with the total amount of overloads no more than four.

For macroclimatic region with a dry tropical climate.

For use in areas with climate control, for example in the enclosed heated or cooled and ventilated industrial areas and others, including well-ventilated underground premises (no impact of direct

sunlight, precipitation, wind, sand and dust of the outside air, lack of or a significant decrease of the impact of diffused solar radiation and moisture condensation).

2. Terms of storage in the part of impact of climatic factors:

- heated and ventilated storehouses with air conditioning, located in any macroclimatic regions
- warehouse with humidity control;
- warehouse with temperature and humidity control.