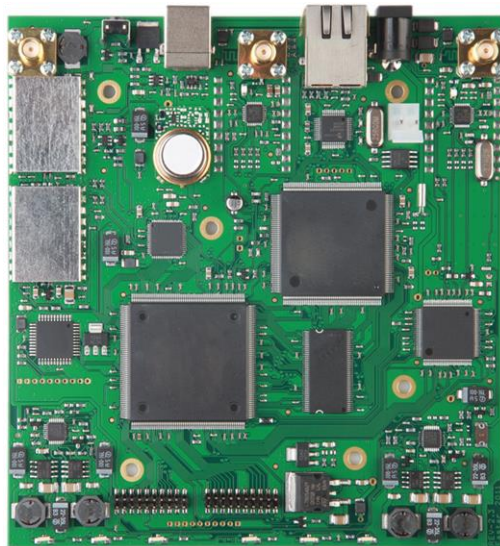




## SATELLITE ROUTER BOARD

# UHP-1100



## GENERAL DESCRIPTION AND INSTALLATION GUIDE

DOCUMENT RELEASE 3.2

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## ACRONYMS AND ABBREVIATIONS

|                         |   |
|-------------------------|---|
| <b>16APSK</b>           | 16 Amplitude and Phase-shift keying or Asymmetric Phase-shift keying, (APSK), is a digital modulation scheme that conveys data by changing, or modulating, both the amplitude and the phase of a reference signal (the carrier wave).   |
| <b>32APSK</b>           | 32 Amplitude and Phase-shift keying or Asymmetric Phase-shift keying, (APSK), is a digital modulation scheme that conveys data by changing, or modulating, both the amplitude and the phase of a reference signal (the carrier wave).   |
| <b>8PSK</b>             | Phase-shift keying (PSK) is a digital modulation scheme that conveys data by changing, or modulating, the phase of a reference signal (the carrier wave).   |
| <b>AGC</b>              | Automatic Gain Control  |
| <b>BCH</b>              | BCH code is a multilevel cyclic variable-length digital error-correcting code used for correcting multiple random error patterns. BCH codes may also be used with multilevel phase-shift keying whenever the number of levels is a prime number or a power of a prime number.   |
| <b>BUC</b>              | Block Up-Converter (BUC) is used in the transmission (uplink) of satellite signals. It converts a band (or "block") of frequencies from a lower frequency to a higher frequency.  |
| <b>C/N</b>              | Carrier-to-noise ratio, often written as CNR or C/N, is the signal-to-noise ratio (SNR) of a modulated signal.  |
| <b>CRTP</b>             | Compressing IP/UDP/RTP Headers for Low-Speed Serial Links   |
| <b>DAMA</b>             | Demand Assigned Multiple Access. Channel establishment on demand.   |
| <b>DSCP</b>             | Differentiated Services Code Point (DSCP) is a 6-bit field in the header of IP packets for packet classification purposes. DSCP replaces the outdated IP precedence, a 3-bit field in the Type of Service byte of the IP header originally used to classify and prioritize types of traffic   |
| <b>DVB</b>              | Digital Video Broadcasting (DVB) is a suite of internationally accepted open standards for digital television.  |
| <b>Eb/No</b>            | Eb/NO (the energy per bit to noise power spectral density ratio) is an important parameter in digital communication or data transmission. It is a normalized signal-to-noise ratio (SNR) measure, also known as the "SNR per bit". It is especially useful when comparing the bit error rate (BER) performance of different digital modulation schemes without taking bandwidth into account. |
| <b>EIRP</b>             | Effective Isotropically Radiated Power  |
| <b>ETSI</b>             | The European Telecommunications Standards Institute (ETSI) is an independent, non-profit, standardization organization in the telecommunications industry (equipment makers and network operators) in Europe, with worldwide projection.  |
| <b>FEC</b>              | In telecommunication and information theory, forward error correction (FEC) is a system of error control for data transmission, whereby the sender adds redundant data to its messages, also known as an error-correction code.   |
| <b>Frame</b>            | TDMA service packet describing which station should transmit in which time slot . Generated ~10 times per second.   |
| <b>Hard priority</b>    | Method of transmission queues handling when packets from lower priority queue are not transmitted until all packets from higher priority queue are transmitted.   |
| <b>HTTP</b>             | Hypertext Transfer Protocol (HTTP) is an application-level protocol for distributed, collaborative, hypermedia information systems.   |
| <b>HUB</b>              | Central Station of satellite network that is managing all the terminals and resources   |
| <b>Hubless</b>          | Special mode of operation when all stations are transmitting to one TDMA carrier and all receiving this carrier.  |
| <b>HW</b>               | Hardware  |
| <b>ICMP</b>             | The Internet Control Message Protocol (ICMP) is used by networked devices to send error messages—indicating, for instance, that a requested service is not available or that a host or router could not be reached.   |
| <b>IESS</b>             | Intelsat Earth Station Standards  |
| <b>IFL</b>              | Connection from the indoor equipment (modem/router) to the outdoor equipment at the antenna normally involves two inter-facility (IFL) cables.  |
| <b>IGMP</b>             | The Internet Group Management Protocol (IGMP) is a communications protocol used by hosts and adjacent routers on IP networks to establish multicast group memberships.  |
| <b>Inroute</b>          | Channel from stations to hub.   |
| <b>IP</b>               | IP is the usual abbreviation for Internet Protocol.   |
| <b>LDPC</b>             | Low-density parity-check (LDPC) code is a linear error correcting code, a method of transmitting a message over a noisy transmission channel, and is constructed using a sparse bipartite graph.  |
| <b>LNB</b>              | Low-noise block converter is the receiving converter installed at satellite antenna.  |
| <b>Local oscillator</b> | Oscillator built into RF block converter ( BUC or LNB ). Value of LO is usually written on block enclosure or in datasheet.   |
| <b>Long frames</b>      | DVB-S2 frames 64800 bits long (including FEC). Require slightly lower C/N than short frames.  |
| <b>Master</b>           | Main station of Hubless network. Master allocates bandwidth and performs stations acquisition.  |
| <b>MCPC</b>             | Multiple channels per carrier. All TDM carriers generated by UHP can be treated as MCPC. Even if they are called SCPC.  |
| <b>Mesh</b>             | Capability of station allowing to receive other stations via TDMA link.   |
| <b>MF-TDMA</b>          | TDMA working on several RF channels simultaneously. All MF channels work as one aggregate TDMA channel.   |
| <b>MODCOD</b>           | Modulation and coding mode.   |
| <b>NMS</b>              | Network Management System   |
| <b>Node Station</b>     | Terminal of satellite network which is able to receive information directly from other network terminals  |
| <b>ODU</b>              | Out-Door Unit   |
| <b>Outroute</b>         | Forward TDM channel (MCPC) from HUB to stations.  |
| <b>QPSK</b>             | Phase-shift keying (PSK) is a digital modulation scheme that conveys data by changing, or modulating, the phase of a reference signal (the carrier wave).   |
| <b>RF level</b>         | Absolute RF level of entire signal (carrier + adjacent carriers) expressed in dBm.  |
| <b>RSV</b>              | Reed–Solomon error correction is an error-correcting code that works by oversampling a polynomial constructed from the data.  |

|                     |  |
|---------------------|--|
| <b>SCPC</b>         | Single Channel Per Carrier   |
| <b>Short frames</b> | DVB-S2 frames 16200 bits long (including FEC). Advisable to use at lower symbol rates. Produce less delay than Long frames.  |
| <b>SNMP</b>         | Simple Network Management Protocol   |
| <b>SNTP</b>         | Simple Network Time Protocol (SNTP) is a protocol and software implementation for synchronizing the clocks of computer systems over packet-switched, variable-latency data networks.   |
| <b>SNR</b>          | Signal-to-noise ratio is an electrical engineering measurement defined as the ratio of a signal power to the noise power corrupting the signal.  |
| <b>SR</b>           | Symbol Rate  |
| <b>Star</b>         | Type of network with one central station (hub) and several peripheral stations.  |
| <b>SW</b>           | Software   |
| <b>TDM</b>          | Time Division Multiplexing   |
| <b>TDMA</b>         | Time Division Multiple Access  |
| <b>Telnet</b>       | Telecommunication Network (Telnet) is a network protocol used on the Internet or local area networks to provide a bidirectional interactive communications facility. Typically, telnet provides access to a command-line interface on a remote host via a virtual terminal connection.   |
| <b>Terminal</b>     | Earth Stations (usually VSAT) operated under management of network HUB   |
| <b>TFTP</b>         | Trivial File Transfer Protocol (TFTP) is a file transfer protocol, with the functionality of a very basic form of File Transfer Protocol (FTP).  |
| <b>Timestamp</b>    | Time format used by UHP. Plus sign at the beginning (+HH:MM:SS or +NN d HH:MM:SS)denotes relative time from some event or UHP start-up. If UHP has time synchronized to hub or SNTP absolute time can be displayed. Time zone affects absolute time.   |
| <b>Time-slot</b>    | Time interval for station transmission.  |
| <b>UDP</b>          | The User Datagram Protocol (UDP) is the set of network protocols used for the Internet. With UDP, computer applications can send messages, in this case referred to as datagram, to other hosts on an Internet Protocol (IP) network without requiring prior communications to set up special transmission channels or data paths. |
| <b>USB</b>          | USB (Universal Serial Bus) is a specification to establish communication between devices and a host controller (usually personal computers).   |
| <b>VLAN</b>         | A virtual LAN, commonly known as a VLAN, is a group of hosts with a common set of requirements that communicate as if they were attached to the same broadcast domain, regardless of their physical location.  |
| <b>VoIP</b>         | Voice over Internet Protocol (VoIP) is a general term for a family of transmission technologies for delivery of voice communications over IP networks such as the Internet or other packet-switched networks.  |
| <b>VSAT</b>         | Very Small Aperture Terminal – satellite earth station with small-size antenna   |
| <b>WFQ</b>          | Weighted fair queuing. Method of proportional division of bandwidth between transmission queues.   |
| <b>X-modem</b>      | Simple file-transfer protocol  |

## INTRODUCTION

This document presents a general description of the UHP-1100 series satellite router boards and is intended for familiarization with the system capabilities and specifications. This manual is applicable to all the key modes of the router operations.

### Required level of qualification

This manual is intended for engineering personnel operating VSAT networks. Such specialists should have adequate educational credentials in the field of electronics and sufficient experience and skills in data networks administration and satellite systems.

### Document version and applicability

UHP VSAT platform is based on the universal satellite router UHP, which is available in different fully-compatible hardware modifications. UHP satellite router is a basic element of any network architecture and can be used in any combinations and at any hierarchy level. Router functional capabilities and its operating modes are determined by the installed software and its configuration.

This manual is applicable to all UHP-1100 series satellite routers with software release 3.2 or higher. When ordering this document, please specify its ID: [UHP.1C32.EN].

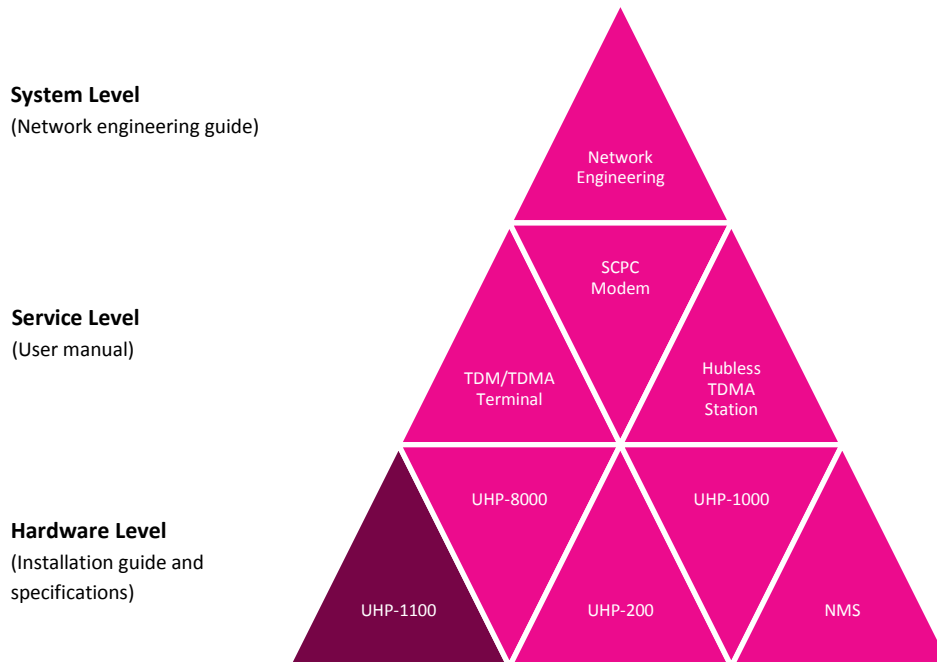


Figure 1 Structure of UHP Manuals

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## 1. GENERAL DESCRIPTION

### 1.1 System overview

UHP satellite routers are essentially a universal solution for geographically distributed VSAT-class satellite communication networks. UHP routers can be used to organize simple point-to-point channels, “star”- and “mesh”-topology networks with several hierarchy levels and bandwidth-on-demand capabilities.

UHP VSAT platform is based on many innovation technologies. It was developed using long-term experience in satellite service provisioning. Nowadays electronics achievements made it possible to make VSAT platform compact and assure its efficiency and reach functionality.

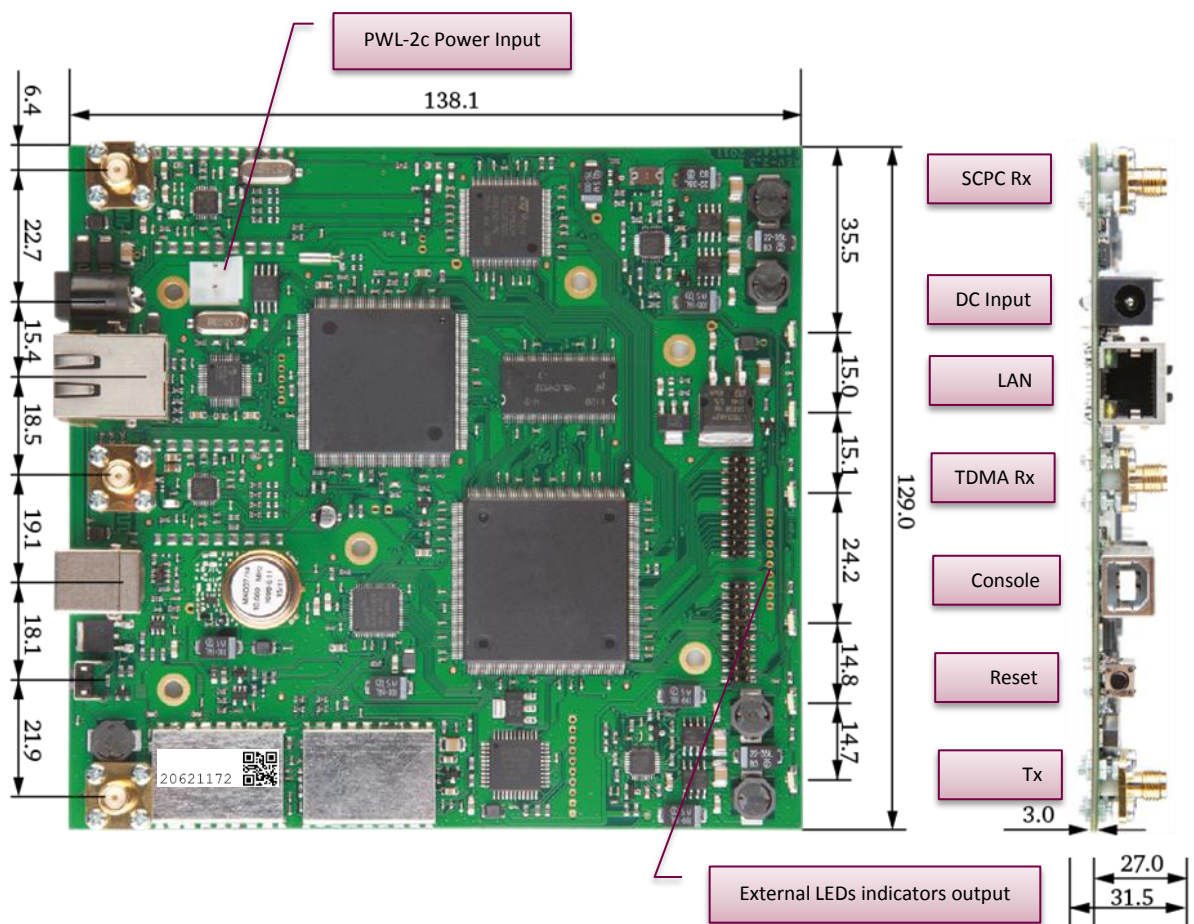


Figure 2 UHP-1100 Satellite Router Board

Technical characteristics are given in the appropriate product specification sheets. The UHP-1100 board is fully compatible with other UHP-1000 routers.

### 1.2 Measurement equipment, tools and accessories

Standard computer (notebook) is required to configure and monitor status of UHP-1100 satellite router. The computer must be equipped with a LAN interface and USB, and also have the following software installed:

- Internet browser (WEB browser)
- Telnet Client
- The Terminal (e.g.: Hyperterminal, included in the OS Windows) (optional)

The router can be accessed via LAN or USB ports. Standard USB AM/BM cable (not supplied) is required for connection to USB “Console” port of the satellite router.

Connection of a computer to the router via LAN interface is implemented through the Ethernet switch or hub via a standard network cable with RJ-45 connectors (not supplied).

### **1.3 Labeling and sealing**

The product is marked with the unique Serial Number, as well as Part Number on the metal shield of the modulator.

### **1.4 Description and principles of operation**

#### **1.4.1 Overview**

Each module of UHP-1100 satellite router board has its own interface to external devices. All the interfaces are located on the rear panel of the board. The indicators are located on the front panel. LAN Indicators are integrated into the LAN connector on the back of the board.

#### **1.4.2 Router composition**

UHP-1100 router consists of:

1. High-speed SCPC/MCPC demodulator
2. Burst demodulator
3. Universal modulator
4. Router
5. Controller

#### **1.4.3 Power connector (DC IN)**

UHP-1100 router board is powered with 24 VDC. AC Power supply adaptor is not supplied. The router can be powered from a DC power source (batteries, DC-DC converter), but the specific power supply mode should be agreed upon with the Manufacturer. There are two power inputs (parallel connectivity):

1. DS-210 connector features dimensions 5.5 / 2.1 mm (outer and inner diameters); positive is on the central contact;
2. PWL-2c connector with 3.96 mm step on the board.

#### **1.4.4 LAN interface connector**

LAN connector is purposed for connecting to Ethernet switch using a straight cable. Bit rate 10 or 100 and duplex mode are software selectable. Indicators built into the connector mean the following: left one (green) – connection (Link) and data transmission (Activity), the right one –yellow) – activation of half-duplex mode.

#### **1.4.5 USB CONSOLE**

The console port provides local control of the device.

#### **1.4.6 RESET button**

Router reset is provided using this button. Also, using special combination of pressings this button allows router reset to factory settings.

#### **1.4.7 High-speed demodulator IF input (SCPC RX)**

SCPC-RX is one of the two signal inputs to receive signals from the satellite (LNB). This input is designed to receive continuous (SCPC/MCPC) carriers in DVB-S and DVB-S2 formats from the satellite. The input, on the router side, can be fed with 18 VDC power supply. Whether power source is on or off, the input can withstand external voltage up to 50 VDC (power supply circuit is provided with a diode). Power supply circuit is protected with a thermal fuse operating in case of short circuiting. After short circuiting is removed it may be required to disconnect load from Rx inputs for several seconds so as to allow the fuse to return to its initial state.



Cable length and cable quality (losses level) can affect the quality and possibility of receiving signals.

#### 1.4.8 Burst demodulator IF input (TDMA RX)

TDMA-RX is the second input for the signal from the satellite (LNB). This input is designed to receive bursts (TDMA) in UHP proprietary format. The input can also provide, from the router side, supply voltage 13 or 18 V, similar voltages being simultaneously fed to both inputs. The router can feed this input with a reference signal for using PLL LNB requiring external reference signal. When reference signal is switched off the router will not distort reference signal arriving at the input from outside. The rest conditions are similar to those across SCPC RX.

THE TOTAL CURRENT CONSUMED BY EXTERNAL EQUIPMENT THROUGH BOTH RX INPUTS SHOULD NOT BE IN EXCESS OF 750 MA. NORMALLY, CURRENT CONSUMPTION BY DRO LNB - 150 MA, PLL LNB - 500 MA.

#### 1.4.9 Modulator output (TX OUT)

TX OUT OUTPUT CAN FEATURE 24 VDC WITH A HIGH SHORT-CIRCUIT CURRENT. SHORT CIRCUITING CAN CAUSE SPARKLE SPREAD AND BURNS. THIS VOLTAGE CAN DAMAGE MEASUREMENT EQUIPMENT IF IT IS NOT PROTECTED AT ITS INPUTS. SUPPLYING EXTERNAL VOLTAGE TO THIS CONNECTOR IS OBJECTIONABLE AND SUPPLYING MORE THAN 24 V IS PROHIBITED.

UHP-1100 modulator is compatible with most satellite transmitters/converters (BUC). Those incompatible are only transmitters that require to explicit "TX On" FSK command but such transmitters are extremely rare and are not widely employed.

Modulator is connected directly to the transmitter IF connector. Router provides 24 VDC power supply to the transmitter and 10 MHz reference signal. UHP-1100 is not provided with a separate protection on the transmitter power supply circuitry. Use is made of current protection for the power supply adapter. In case of a short circuit the router is de-energized and then gets restarted. If power supply is switched on in the configuration, restarts continue at 5 seconds interval until short circuiting is removed.

ANY OPERATIONS WITH IF TX CABLE SHOULD BE PERFORMED WITH 24 V SUPPLY VOLTAGE TURNED OFF. OTHERWISE, SELF-INDUCTION ACROSS A LONG CABLE CAN DAMAGE THE TRANSMITTER AND/OR ROUTER.

#### 1.4.10 "ERROR" Indicator

"ERROR" red indicator makes it possible to infer about problems in the router functioning. The type of the generated problem can be judged by the number of indicator flashes:

- 1 – Demodulator cannot receive MCPC channel from the Hub (other Terminal). Please check AGC value in the demodulator statistics to determine whether there is a signal from antenna (see description of reception problems) to separate LNB and cable faults.
- 2 – Router cannot receive TDMA configuration from the HUB (TDM/TDMA network mode). The reason can be in the non-availability of receive channel from the HUB, CRC errors during reception, wrong configuration of the Terminal.
- 3 - Router cannot calculate time shift with respect to the HUB. The reason can be in the non-availability of reception or a large number of CRC errors during reception.
- 4 – HUB cannot receive signal from this terminal. Please check transmit signal level of the terminal, whether power supply and the reference signal for the transmitter are switched on (or off if required), whether DTTS or geographical coordinates are set correctly in the TDMA settings.
- 5 - Unit is in Backup state of Redundancy mode. Not an error.

Continuous signal means that the router has hardware or configuration errors. If ERROR indicator is continuously lit upon power on it means hardware failure of UHP occurred which prevents software from starting. Try to power it off and power on again or press RESET button on rear panel.

#### **1.4.11 “STATUS” Indicator**

“STATUS” green indicator indicates the router operation mode. This indicator is always flashing. If it does not flash it means that the router is not functioning (please check power supply). Slow flashing (once every second) means router normal operation. Faster flashing (3 times every second) means that a Telnet remote control session is established (in this case USB console does not operate until session is over).

Fast (6 times every second), simultaneous flashing of “ERROR” and “STATUS” indicators means that the router is functioning with the factory default configuration. Access to the router in this mode is possible either via USB or via IP-address 192.168.222.222 (mask 255.255.255.248 or /29).

#### **1.4.12 “LOCK” Indicator**

“LOCK” green indicator indicates whether the router receives a channel from the central station. If there are CRC errors during reception of information from the channel (e.g. with weak signal from the antenna), the indicator extinguishes for a fraction of a second at every error. If there are too many errors the indicator may not glow at all in spite of the fact that the router receives the channel (in this case please check the router demodulator statistics).

#### **1.4.13 “TDMA” Indicator**

“TDMA” yellow indicator flashes every time a data packet is received via TDMA RX interface.

#### **1.4.14 “SCPC” Indicator**

“SCPC” yellow indicator flashes every time a data packet is received via SCPC RX interface.

#### **1.4.15 “TX” Indicator**

“TX” yellow indicator flashes every time a data packet is transmitted in the MCPC mode, and also a blank packet – in the TDMA mode (if no data is available for transmission).

## 2. OPERATIONS

### 2.1 Operational limits

*Table 1 Operational limits*

| # | Parameter  | Limits  |                                  |
|---|--|---------|----------------------------------|
|   |  | Minimum | Maximum                          |
| 1 | Router DC Input voltage  | 23 VDC  | 25 VDC                           |
| 2 | Output current at Tx Out interface (F-connectors)  | -       | 2 A                              |
| 3 | Input voltage on the Tx Out interface  | -       | 24 V                             |
| 4 | Output current at Rx SCPC or RX TDMA   | -       | 0,75 A                           |
| 5 | Input voltage on other interfaces  |         | 18 V                             |
| 6 | Operational temperature  | 0 C     | +40 °C                           |
| 7 | Relative humidity (@ 25°C)   | 0%      | 90%                              |
| 8 | Atmospheric pressure (mm Hg)   | 720     | 770                              |
| 9 | Mechanical impacts (acceleration with an amplitude not exceeding 1,25 mm):<br>- in a range 0,5 – 15 Hz:<br>- in a range 15-40 Hz:<br>- in a range 40-300 Hz: |         | 2,45 m/s<br>5,88 m/s<br>14,7 m/s |

### 2.2 Preparation for use

#### 2.2.1 Unpacking

Before opening the packaging please check a safety of transport container. If there is any visible damage of packaging you should keep it as long as the delivered equipment will be properly tested.

Unpack the router in the following order:

1. Extract from a cardboard box the router, power supply, power cord and a CD with documentation.
2. Store all packing materials for further storage or shipment of equipment.
3. Check equipment for the presence of any possible damage resulting from transportation.
4. Check the completeness of supply in accordance with the packing slip.

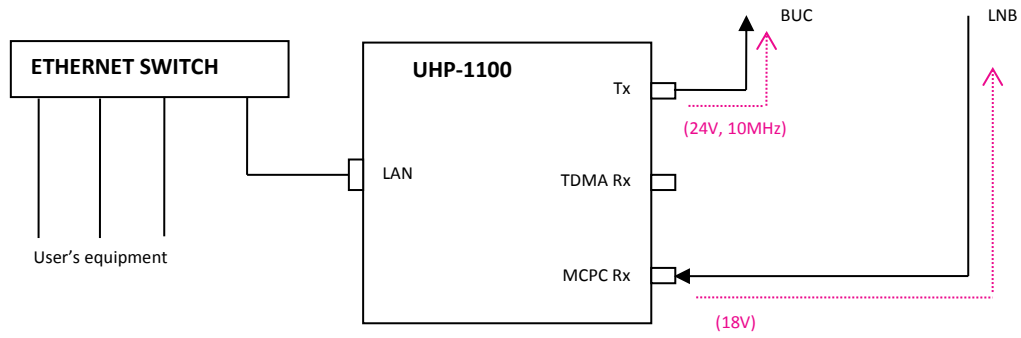
#### 2.2.2 Installation

UHP-1100 Router board is designed for integration into customer's housing that should ensure proper heat dissipation, shielding and mechanical protection. The board should be secured to the housing with all the holes provided, as they are designed for heat dissipation.

#### 2.2.3 Connecting to external devices

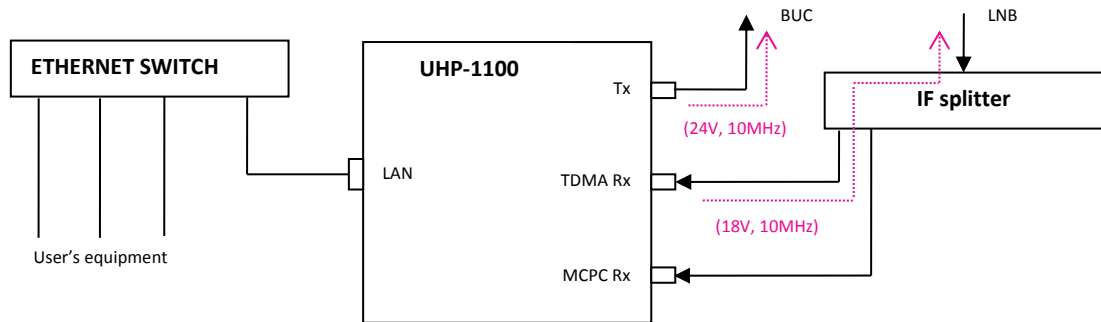
All wire connections must be performed before powering up the router. IF cable connectors should be screwed to the router without use of any mechanical instruments. Please, avoid excessive force when connecting IF cables.

**WARNING! DO NOT CONNECT OR DISCONNECT ANY CONNECTING CABLES TO THE ROUTER WITH THE POWER ON. THIS CAN LEAD TO A FAILURE OF THE ROUTER AND CONNECTED DEVICES.**



*Figure 3 Example of router's connection in SCPC or TDM/TDMA terminal modes*

Typically, the router is connected to individual RF frequency equipment (ODU). In such configuration the IF output of the modulator is connected to the power amplifier BUC, and the input of high-speed demodulator to LNB. The router will supply the BUC with 24V power and 10MHz reference signal. Also, the router may provide LNB with 18V DC power. The user's equipment should be connected to the router via Ethernet switch or hub, if you plan to connect only one device, it can be connected directly with Ethernet cross-over cable.



*Figure 4 Example of router's connection in TDM/TDMA MESH mode*

In the TDM/TDMA MESH mode the inputs of high-speed and burst demodulators should be connected to LNB via IF splitter (Figure 4). Such splitter has to ensure by-pass of DC for powering of the LNB and 10 MHz reference signal (required for PLL LNB normally used with Mesh terminals or Hubless Stations).

#### 2.2.4 Powering on

In a few seconds after powering the router it is ready for use. Readiness of the router will be confirmed by "STATUS" LED indicator (blinking with a period of 1 second), as well as by single flashes of "ERROR" indicator, meaning a lack of reception of the receiving carrier.

With factory setting the router is configured as TDM/TDMA terminal. The router requires change of mode of operation (if necessary) and/or configuration of respective network parameters before login into satellite networks.

The easiest way to configure the router is using its HTTP access via its LAN port.

#### 2.2.5 Local access to router via HTTP interface

HTTP (WWW) interface allows configuration key parameters and monitoring its actual status of the router. Local Web page of the router can be accessed from any Internet browser.

By default, UHP-1100 router is configured with IP-address 192.168.222.222 with mask 255.255.255.248 (/29). Respectively, the computer should be configured with an address, e.g. 192.168.222.217 with the same mask.

In case the satellite routers have been preconfigured at the factory on customer's request such routers may have different default IP address. In such case the respective IP addresses will be listed in the passport of the router. If it's impossible connecting the router with any of specified addressed please reset the router to factory settings.

### **2.2.6 Local access via USB**

When router is connected to a computer via a USB cable the computer creates a serial COM port. The port number can be found in the Device Manager. To access the port use can be made of either the OS-integrated terminal (Hyperterminal) or third-party terminal programs.

With the first connection of UHP-1100 Router to PC the system will request the device driver. UHP.INF driver is available on CD with documentation or can be downloaded from our web site. In response to the request for driver you should refuse from search in Internet and select setting from the specified place where UHP.INF is saved.

The system will request confirmation for using a non-certified driver. Ignore any system warnings and proceed with installation. When finished, please check whether a COM port appeared in the Device Manager. If it appeared you can start working with the router.

When working with the port from the terminal program the data rate and control parameters can be set to any value since they are ignored.

**WITH USB OC PROTOCOL STACK – THERE IS A PECULIARITY WHICH LEADS TO “HANGING” OF THE USB-PORT IF IT CARRIED AN ACTIVE SESSION AND THE CONNECTED DEVICE (ROUTER) AT THIS MOMENT WAS REBOOTED. IN THIS CASE YOU HAVE TO LOG OUT FROM THE TERMINAL PROGRAM AND LOG IN AGAIN. YOU CAN AVOID THIS BY CUTTING OFF THE SESSION BY “HANG-UP” COMMAND AND ONLY THEN RESTART THE ROUTER USING RESET BUTTON OR VIA POWER SUPPLY CIRCUIT.**

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### **2.2.7 Remote Telnet access**

Remote access to the configuration can be performed using Telnet protocol. The connection can be provided to any of IP addresses that are set on the router. UHP-1100 supports simultaneously only one Telnet session. In order the hang session does not block access to the device forever in case on non-activity (pressing ENTER key), the router auto-terminates the session after a certain time of inactivity. The time can be set in the configuration, and by default it is 10 minutes.

### **2.2.8 Command Interface**

Please refer to the Command Interface manual applicable for the respective version of SW and activated mode of operation of the UHP router. The Command Interface manuals are available for download and online use on Romantis website: <http://www.uhp.net/en/support/docs>.

### **3. OPERATIONS**

UHP Routers belong to the class of unattended equipment and during its operation does not require any special staff exploitation. When operated as SCPC station or TDM/TDMA terminal the satellite router does not require any changes of settings or it is configured remotely from the Hub. The tasks of operational staff are limited to the following:

- Monitoring of climatic environment of operation, ensuring the absence of dust, preventing the ingress of moisture on the surface of the device. Should provide unrestricted air access to router for cooling.
- Cables connected to the device must not suffer any significant impact on the connections of the router. All connectors must be properly attached and secured.

#### **3.1 Software updates**

One of the key advantages of UHP satellite routers is the ability to extend the functionality by updating the software. Software updates also include fixes for known bugs and improving the algorithms of the system.

#### **3.2 Powering off**

To power the router off the Power Supply should be disconnected from AC power. If the device is powered by a low-voltage DC source, it can be powered off by disconnecting the DC cord from DC IN connector of the router.

#### **3.3 Safety instructions for operations**

- ☞ Connect and disconnect any cables only when router is powers off;
- ☞ Do not try to repair the router and not use it for other purposes;

#### **3.4 Actions in case of fire**

In case of fire or any smoke of the router please immediately power off the device and if necessary, use extinguishing tools that are intended for electrical circuits.

## 4. TROUBLESHOOTING

*Table 2 Troubleshooting guide*

| Symptoms   | Possible reasons  | Actions  |
|--|---|--|
| Router doesn't work  | DC power beyond the limits of allowed values              | Check DC power voltage   |
|  | Power cord is broken                                      | Check PSU cables and output voltage of PSU.<br>Replace a cable.  |
|  | Power Supply failure                                      | Check PSU cables.<br>Verify if output DC Voltage is in nominal range.<br>Replace PSU module  |
|  | Router Failure  | Check PSU cables.<br>Contact your nearest dealer or service center for advanced support.   |
| ERROR indicator lights constantly after power on.  | Router can't start the software                           | Press RESET button on the rear panel of the router.<br>Contact your nearest dealer or service center for advanced support.   |
| Router restarts every 3-5 seconds.   | Short-circuit in transmit cable                           | Disconnect and check Tx cable  |
|  | Software failure  | Reset software to factory defaults   |
| No reception from the satellite (indicator LOCK is off, single flashes of ERROR indicator) | Incorrect configuration                                   | Check Rx frequency and symbol rate.  |
|  | IF cable failure  | Check Rx cable and make sure that its connectors are properly connected to the LNB and the router.   |
|  | LNB is not powered  | Check if LNB power is switched on<br>Disconnect Rx IF cable from LNB and make sure that 12-18 VDC is available on the connector.<br>Check Rx level in the statistic of the demodulator.  |
|  | No carrier on the satellite or its level is insufficient. | Verify availability of the carrier and its level with spectrum analyzer.<br>Contact Hub administrator and investigate if the carrier is properly transmitting and local weather conditions not attenuate the signal.   |
|  | Low Rx carrier level                                      | Measure carrier signal to noise level with a spectrum analyzer.<br>Verify if antenna is properly pointed to the satellite and there no obstacles in the direction to the satellite.<br>Check the integrity of the film of antenna's feed horn and absence of moisture in it. |
|  | LNB failure   | Replace LNB to the spare one   |
| High rate of errors of Rx path (LOCK indicator is not lighting constantly)                 | Bad weather conditions                                    | The quality of reception may temporary decrease during intensive rainfall, for, thunderstorm cloudiness.<br>Check if there is no snow or ice on the antenna surface and on the feed horn.  |

| Symptoms   | Possible reasons  | Actions   |
|--|---|---|
|  | Low signal to noise level   | Check C/N in demodulator's statistics.<br>Verify if antenna is properly pointed to the satellite and there no obstacles in the direction to the satellite.<br>Check the integrity of the film of antenna's feed horn and absence of moisture in it. |
|  | Low Rx carrier level<br>Interferences   | Check Eb/No in demodulator's statistics.<br>Contact Hub administrator and investigate if the carrier is properly transmitting and local weather conditions not attenuate the signal   |
| Station is not transmitting<br>(Reception is normal: LOCK indicator is lighting, but TX indicator is off)  | Wrong network setting   | Check Tx frequency and symbol rate of the modulator. Make sure that transmission is enabled   |
|  | Transmission of the terminal is not allowed by Hub (only for TDM/TDMA terminal) | Contact Hub administrator   |
| Station is not transmitting<br>(Reception is normal: LOCK indicator is lighting, TX indicator is blinking, but transmission is not received by Hub/opposite station) | IF Tx cable failure   | Check Tx cable and make sure that its connectors are properly connected to the BUC and the router.  |
|  | BUC is not powered  | Check if BUC power is switched on<br>Disconnect Tx IF cable from BUC and make sure that 24 VDC is available on the connector.   |
|  | BUC failure   | Replace the BUC on the spare one  |
| Other symptoms   | Other reasons   | Contact your dealer or service center   |

In many cases, reinstalling system software allows to restore a satellite router functionality, which may need reset to the factory default configuration.

If the recovery of software cannot be implemented successfully, or if this operation does not eliminate the defect, it is necessary to illuminate the faulty device and replace it by new device.

## 4.1 Replacement of modules

### 4.1.1 Common recommendations

Repair of satellite router is carried out by replacing defective units (PSU or a router) or the whole product.

Replacement must be carried out only on original and compatible units, supplied by the manufacturer. After replacing the power supply the router is immediately ready for further operation. In case of a satellite router replacement it has to be reconfigured to the network parameters in accordance with Section 2.2.

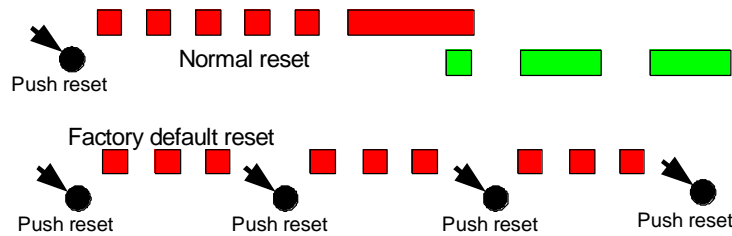
### 4.1.2 Safety instructions

Repair by replacing blocks of satellite router must be carried out by qualified personnel only and with powered off device only.

## 4.2 Resetting to default settings

To reset user settings you can make use of a special restart procedure. Press RESET button four times with 2 seconds intervals.





*Figure 5 Router resetting to default procedure*

Successful reset will be evidenced by fast and simultaneously flashing indicators ERROR and STATUS.

By default, UHP-1100 router is provided with IP-address 192.168.222.222 with mask 255.255.255.248 (/29). Respectively, the computer should be provided with an address, e.g. 192.168.222.217 with the same mask.

The default address is not shown in the route Table. And what is more, it disappears after the first saving of the configuration. Thus the first thing to do, with the Telnet access, is to set a new IP-address (it may be similar to the default address when required), exit the session, and connect to the new address and only then save the configuration.

After the first saving of the configuration the ERROR and STATUS indicators stop flashing simultaneously.

## 5. STORAGE, TRANSPORTATION AND DISPOSAL

Storage and transportation of satellite routers must be performed in original packaging. Storage and transportation should comply with the following conditions:

- - humidity is not more than  $(80 \pm 3)\%$  at a temperature  $(25 \pm 2)^\circ\text{C}$ ;
- - limiting low temperature of storage (minus  $40 \pm 2)^\circ\text{C}$ ;
- - limiting high temperature of storage  $(50 \pm 2)^\circ\text{C}$ .
- - atmospheric pressure  $720 \div 770$  mm. Hg.

Utilization of satellite routers must be in accordance with the rules for disposal of industrial or consumer electronics in accordance with applicable law.