NetUP.tv Streamer
Administrator’s Guide

NetUP.tv
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Introduction

Intended audience

This manual is intended for IPTV service providers using the NetUP.tv solution. An overall knowledge of TV broadcasting systems and IP networking is assumed. The document covers basic functionality of NetUP.tv, as well as the typical necessary actions during its startup, deployment, and operation.

Notation conventions

The following elements are emphasized in the text:

Terms (on first occurrence);

Interface strings;

Hyperlinks;

Inline code pieces and commands;

Code blocks;

Notes;

Warnings related to incomplete compatibility with older versions of NetUP.tv.

Generic warnings.

IPTV technology

As a rule, an IPTV solution includes components to execute the following tasks:

– Content receiving and processing;
– Content storage and delivery;
– Content encryption;
– Billing;
– System setting and management;
– Receiving and reproduction of the content at the client side.

The main advantages of IPTV include its interactivity and a number of additional services, such as: video on demand, time-shifted TV, network personal video recorder, electronic program guide, virtual cinema. IP protocol abilities allow to provide a number of interactive services besides just transmitting the video content.

NBS architecture

NBS (NetUP Business server) is a scalable platform for development of client-server applications used to build the NetUP.tv.

The components of the NBS platform interact via transactions using the application-level NXT (NetUP XML Transaction) protocol. Data encryption and personal authentication are performed via the SSL protocol methods.

When dealing with the TV set-top boxes, due to their limited resources, a binary version of the same protocol is used, called NBT (NetUP Binary Transaction). NBT also employs SSL for data encryption and personal authentication.

Each transaction may be addressed to one or several components of the system and may contain some events intended for the receiving component to proceed. An event consists of an event type identifier and the accompanying data. NBS guarantees the atomic processing of each transaction.
NetUP.tv overview

NBS means of clustering and group routing provide a way of easy and transparent scaling (say, an addition of a new VoD server) without stopping the production software.

NetUP.tv overview

NetUP.tv is a complete headend solution incorporating the following services:

- Satellite, terrestrial and cable TV channels (streaming);
- Video on Demand (VoD);
- Virtual Cinema (nVoD, near Video on Demand);
- Network Personal Video Recorder (nPVR);
- Time Shifted TV;
- Middleware & interactive user interface for IP set-top boxes.

NetUP.tv includes all necessary systems components to provide TV, radio or video over IP networks, all tightly integrated:

- Subscriber Management System;
- Billing System;
- Conditional Access System (CAS/DRM), protection against unauthorized access at different levels;
- Interactive graphic interface for IP set-top boxes (STB client + Middleware server);
- Content source and management (DVB to IP gateways, MPEG encoders, VoD/nVoD servers).

Scalability is assured as all NetUP.tv elements are connected in a cluster architecture. All software is developed on basis of NetUP Business Server (NBS), a robust development platform designed to support client-server applications of any complexity.

Interactions of the system’s main components are shown on the figure below.

Different protocols are denoted by links of different color. System servers mostly interact with each other via NXT protocol, and with client devices via NBT. Multimedia content is distributed using MPEG-TS protocol.

⚠️ All system servers must interact with the outside world solely through their eth0 network interfaces.
System Components

Bundling options

NetUP.tv may be supplied in the following configurations:

- **IPTV Combine** – is a 1U server containing Middleware, Billing, VoD, and streamer, and equipped with an LCD panel.

The corresponding firmware file is named `firmware-combine.<version number>.<build number>`.

IPTV Combine hardware configuration may include:

- two transponders, FTA channels only (deprecated option);
- one transponder with decoding support, i.e. having a CAM slot (deprecated option);
- two transponders, decoding supported (deprecated option);
- four transponders, decoding supported (deprecated option);
- eight transponders, decoding supported (IPTV Combine 8x, see figure below).

- **MW+Billing+VoD** (firmware file `firmware-complex.<version>.<build>`) – is a 1U server containing Middleware, Billing, and VoD.
- **MW+Billing** (firmware file `firmware-mw+billing.<version>.<build>`) – is a 1U server containing just Middleware and Billing.

Other firmware options include:

- **Combine+TVoD** – is a Combine enhanced with TVoD.
- **Combine-wo-VoD** – contains Middleware, Billing, and streamer.
- **Complex** – contains Middleware, Billing, and VoD.
- **Complex+TVoD** – is a Complex enhanced with TVoD.
- **Streamer** – is a dedicated streamer for use within multi-server solutions.
- **Streamer-standalone** – is a solution containing only the streamer and IPTV Core.
- **VoD** – is a dedicated VoD server for use within multi-server solutions.
- **TVoD** – is a dedicated TVoD server for use within multi-server solutions.
- **DRM** – is a dedicated encryption server for use within multi-server solutions.

The conditional access modules must be put upside-down, i.e. having the manufacturer logo on the bottom side into the slots on the right and, having the manufacturer logo on the top side, into the slots on the left. Note also that a pair of CAM slots is located in a single orifice.
**Streamer**

Here is the table that shows different firmware options and their components:

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<th>billing</th>
<th>vod_balancer</th>
<th>middleware</th>
<th>cdn</th>
<th>vod</th>
<th>tvod</th>
<th>cas</th>
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* the column names show different firmware types.

Each of the standalone options may be complemented with an arbitrary number of separate dedicated streamers, VoD, TVoD, and DRM servers.

Dedicated streamers are supplied in the following configuration: 1U server, 4 transponders, decoding supported.

For more details on VoD servers please see [Video on Demand](#) on page 9.

**Streamer**

NetUP’s Streamer receives live satellite, terrestrial channels, or cable TV (DVB-S/DVB-S2, DVB-T/DVB-T2, DVB-C, ATSC). It combines functions of a receiver and an IP streamer with single management interface. The device is equipped with an LCD panel.

For more info on configuring a streamer, see [Web interface](#) on page 13 and (whether applicable) [LCD panel](#) on page 11.

**Conditional Access System**

NetUP’s Conditional Access System (CAS) encrypts multimedia streams for transmission over unprotected channels. Only authorized users subscribed to the service can play these streams. CAS allows an IPTV service provider to strictly control access to the content and build financial relations with subscribers and content providers alike.

NetUP’s Conditional Access System consists of two parts: the server and the client module.
Video on Demand

The client module is loaded into IP set-top boxes and decipheres the streams using the dedicated onboard hardware decoder. Encryption keys are periodically updated from the server.

⚠️ *The Amino AmiNET 125 STB does not support content decryption.*

The server encrypts and controls IP streams, creates encryption keys and manages subscriptions.

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**Video on Demand**

NetUP’s Video-on-Demand server supports over 100 concurrent non-encrypted streams (performance highly depends on the hardware) at typical MPEG-2 compression rate of 4 Mb/s per stream. Both unicast and multicast modes are supported.

Movies are stored in MPEG-2 or MPEG-4 AVC transport stream. Both SD and HD are supported. Video content can be loaded via ftp.

It is possible to connect VoD servers into a cluster. This allows our customers to achieve almost any performance and provide VoD in distributed networks.

The VoD server is capable of encrypting the streaming content on the fly in a manner similar to that of CAS.

Time Shifted TV, Network Personal Video Recorder, and TV on Demand are implemented as a separate server based on the same framework.
Middleware

User interface of the Middleware system supports the following services:

- TV channels;
- Radio;
- Video on Demand (VoD) with the functions of searching by name, filtering by genre, and viewing annotations;
- Virtual Cinema (nVoD);
- Television on Demand (TVoD);
- Time-Shifted TV;
- Network Personal Video Recorder (NPVR);
- Electronic Program Guide.

NetUP's Middleware supports world leading IP set-top boxes: Amino, Infomir, etc.

⚠️ For normal operation of the Middleware and billing server, it must be working on the round-the-clock basis. Turning it off at night would impede some low-priority service tasks which are scheduled for that time.

Billing

Billing system performs the following functions:

- subscriber database maintenance;
- rating of available services;
- creation and management of tariff plans;
- creation of accounting documents;
- access cards management;
- financial reporting.

Billing system can be integrated with any third-party system controlling services of other types, like Internet access, VoIP, etc.

For more info on billing system interface, see Manager's Web Interface on page 79.

STB Client

Graphical user STB interface of NetUP.tv is designed with the use of native API, which provides an advantage in performance as compared to the browser-based interfaces.

NetUP.tv is compatible with set-top boxes of the following vendors:

- Amino Technologies (www.aminocom.com) – recommended option;
- NetUP (www.netup.tv) – recommended option;
- Infomir (www.infomir.eu);
- Dune (www.dune.ru);

Support of set-top boxes of other vendors can be implemented on demand.
To set up the NetUP’s server equipped with LCD panel, do the following:
1. Plug the network and power cables into the device.
2. Switch power on. You shall see Starting... on the LCD panel.
3. Use the LCD manager for the initial setup of the system.

**LCD manager provides a convenient way to monitor the CPU and LAN interface load on the device front panel, as well as to assign IP addresses to network adapters.**

**Statistics screen**

Among other items, the LCD menu contains two statistics screens. The default screen displays the network adapters traffic transfer rate. Lower line of the screen presents the total rate of incoming and outgoing traffic separated by “/”.

Use Up and Down buttons to navigate through menu elements.

Press **Up** to switch to the CPU load screen. First number is the total CPU load. Three subsequent numbers give, correspondingly, the portions of CPU load related to user tasks (u), system tasks (s), and awaiting data from the peripherals (w). Press **Down** to return to the traffic statistics screen.

Press Down to navigate to the rest of the menu items:
- **Reboot system** – reboot the server
- **Shutdown system** – shutdown the server
- **Generate password** – reset administrator’s password and generate a new one

**New administrator’s password is displayed on the LCD until a key is pressed on the front panel**

**Network interfaces setup**

The LCD panel contains interface for setting up network parameters, i.e. IP address and subnet mask. To do that, press **Fn**, then **Enter** on any statistics screen. The network configuration screen will appear. By pressing **Up** and **Down** select the network interface to be set up.

After selecting the interface you want to set up, press **Enter**. Then you will be prompted to change current IP address for the selected interface.

Pressing **Fn**, then **Up** or **Down** selects the byte to change (at that, “>” points to the currently selected byte). Pressing **Up** and **Down**, correspondingly, increases and decreases the selected byte value by 1.

When you are done with the IP address, press **Enter**. Then you will be prompted to enter the subnet mask. It is entered by pressing **Up** or **Down**, which increases or decreases the number of bits in the mask determining the subnet address.

After entering the subnet mask, press **Enter**. Then you will be prompted to keep the changes just made or cancel them. Buttons **Up** and **Down** switch between **Yes** and **No**, with currently selected option emphasized with brackets. Select **Yes** to save the settings just made, or press **Enter** to proceed back to the network interface selection screen.

When the settings are done, set up your DNS server (via its config file) to associate the IP address just entered with mw.iptv domain name.
Generating new administrator’s password

Generating new administrator’s password

Should you require to generate a new administrator’s password, starting from the statistics screen, press **Up** or **Down**, until you see the *Generate Password* menu item. Press **Enter** to generate new password and apply it to all system components. Once generated, the password will be displayed on the LCD screen.
Web interface

Introduction

Web interface is intended for setting up various server parameters of NetUP.tv servers and STB clients. It is accessible by the address http://<Middleware IP>/.

Left pane of the web interface remains visible on every page and contains links to the following pages organized into groups:

1. DVB adapters group (present only on streamers):
   - DVB adapter (page 14) to control the streamer itself
     (this page exist in multiple instances by the number of adapters);
2. System status group:
   - About (page 17) showing version information;
   - Connections (page 17) showing connections between system components;
   - Storage (page 17) displaying disk space usage;
3. IPTV group (present only on streamers):
4. System administration group:
   - Files (page 22) for downloading the united control center, documentation, and miscellaneous STB-related files;
   - Power Management (page 22) for reboot and shutdown;
   - Update (page 22) for NetUP.tv firmware upgrade;
   - Status (page 23) shows the system status;
5. System configuration group:
   - Network (page 24) for network interfaces settings;
   - Routing (page 25) with routing table;
   - Security (page 26) for password management;
   - Services (page 26) for manual start and stop of services;

Starting web interface

To enter the web interface, type http://<server IP address or domain name> in your browser’s address field. An entrance page will appear. Logging in requires the server administrator’s password.

It is strongly recommended to change the password immediately after logging in for the first time. This can be done via the Security page (see Security on page 26).

DVB adapters

This group contains pages for controlling DVB adapters, one for each adapter.

Adapters and CAM slots on the backplate of the actual NetUP streamer are numbered bottom-to-top, as shown below.
DVB adapters

DVB-S (or other) adapter

At the top line of the page there are signal level monitor and the five adapter state indicators:
- SIGNAL – denotes presence of the signal (red means no signal);
- CARRIER – denotes presence of the carrier frequency (red means no carrier);
- FEC – denotes error correction;
- SYNC – denotes synchronization with the signal;
- LOCK – means that the adapter has locked on the signal and is decoding it successfully;
- SNR – signal to noise ratio;
- BER – bit error rate.

If the system works correctly, all indicators show green lights. Red lights on some indicators mean that the signal is missing or corrupted.

Below follows the adapter parameters. These parameters may be changed only when the adapter is stopped.
- State (shown in the group header, repeated by the icon on the left pane) – may be either Active or Stopped.
- Standards – is the adapter type;
DVB adapters

- **Frequency** – is the incoming signal frequency in MHz;
- Type-specific parameters (see below).
- **Profile** – shows which of the saved profiles is currently applied.
- **Load** (active when the adapter is stopped) – loads another settings profile.
- **Start** (active when the adapter is stopped) – starts the adapter.
- **Stop** (active when the adapter is running) – stops the adapter.

<i>Note that stopping a service would stop transmitting video stream to network from this adapter.</i>

Press Switch mode to switch between the adapter’s modes. The list of available modes depends on the adapter type. E.g. NetUP Universal Dual DVB-CI supports the following modes: DVB-C, DVB-C2, DVB-T, DVB-T2, DVB-S and DVB-S2.

Parameters specific to the DVB-S/DVB-S2 adapters are:

- **Symbol Rate** – is the rate of symbol transfer;
- **Polarization** – is the polarization type;
- **LNB type** – selects LNB type from the predefined list. Once it is selected, the corresponding values of LNB parameters (LNB low frequency, LNB high frequency, and LNB switch frequency) appear in their fields.
- **LNB low frequency** – is the LO frequency for the low-frequency range of satellite signal. (See http://www.netup.tv/en-EN/articles/streamer-configuration-guide.php for the particular values.)
- **LNB high frequency** – is the LO frequency for the high-frequency range of satellite signal.
- **LNB switch frequency** – is the border between satellite signal frequency ranges.
- **Tone** – enables controlling the LNB by feeding a special 22 kHz tone to it;
- **Manage multiswitch** – enables the selection of:
  - **Ports group** – (a DiSEqC protocol parameter);
  - **Tone Burst** – (a Tone Burst parameter).

Parameters specific to the DVB-C adapters are:

- **Modulation** – (QAM_16, QAM_32, QAM_64, QAM_128, QAM_256, or auto);
- **Symbol Rate** – is the rate of symbol transfer.

Parameters specific to the DVB-T/DVB-T2 adapters are:

- **Modulation** – (QPSK, QAM_16, QAM_64, or auto);
- **Bandwidth** – (8MHz, 7MHz, or 6MHz);
- **Transmission mode** – selects the number of carriers (2K / 8K / auto);
- **Guard interval** – (1/32, 1/16, 1/8, 1/4, or auto selection);
- **Stream ID** – is actually a PLP ID (when using multiple PLP).

Parameters specific to the ATSC adapters are:

- **Modulation** – 8VSB.

CAM

- **CAM state** (shown in the group header) – is the state of the CAM (Active / Stopped).
- **Mode** – switches the encryption mode between Usual and DRE Crypt. The DRE Crypt mode is used with DRE Crypt CAM modules.
- **Supported CAS** – is the list of supported conditional access systems.

Menu button opens the CAM settings menu. Messages button opens CAM messages. In both cases the interaction with CAM is done via MMI.
DVB adapters

If there is no CAM on this adapter, the group header switches to “No CAM” and the group itself is empty.

Channels

This group contains the list of received programs. For each program it contains:

- **ID** – of the program;
- **Program** – name; by clicking the link program parameters are shown, including the ONID and channel name;
- **Media content** – related to this program, or <no content> link if there is none; by clicking the link a new media content may be created;
- **PIDs** – of audio, video, and auxiliary streams (the latter may carry EPG or some other kind of service information). Upon clicking the link a popup window shows up where individual streams may be switched on and off. This may be relevant for channels with multiple audio tracks;
- **Transmission** – state of the program (broadcast / no broadcast, scrambled / open content). Click on the outgoing stream state to start/stop the outgoing stream or to enter a BISS key. The BISS key is eight bytes long. Its 4th and 8th bytes are CRCs for 3 preceding bytes. They might change after you press OK, because the streamer recalculates them and replaces if the previous value is wrong;
- **Broadcasting IP** – of the program (or <no address> if there is none). Clicking the link opens a pop-up window where one can add, remove, or modify the IP addresses. Besides, one can appoint one of them as “Main IP”. This address will be communicated to the STBs wanting to receive this channel. And one can choose the protocol - UDP or RTP and the network interface.

STB messages

This page contains an interface for sending messages to NetUP IP STB users:

It also shows the list of sent messages.
System status

Press **New message** to send a new message to a customer or a group of customers:

Enter a customer’s name to send a message to a customer or enter a group’s name to send a message to a group of customers. Then enter the message text and press **OK** to send it.

System status

About

This page displays the version number of NetUP.tv and build numbers of individual systems. Besides that it contains information about license and about the server hardware (CPU, Memory, Storage devices and Network interfaces).

Connections

This page displays the addresses and status information for all systems of NetUP.tv (including individual STBs). For each one, it also lists the other systems with which this one interacts.

For this host’s system, the addresses of other connected systems are links to the interface by which they may be changed, either manually or by automatic address discovery.

Storage

This page summarizes the disk space usage info.
System status

Click on **details** to see the detailed S.M.A.R.T. or RAID condition report.

- **Access card** - the number of the access card used for connection

Content view rate

The bars show the channel view duration in relation to the most viewed channel. The number on the right shows the number of hours, the channel has been viewed by all the customers together.

*This statistics doesn’t include recorded TV channels (TVoD)*

Press **Time Range** to select the time range. Press **View** to select the sort type. Press **↓** to select between ascending and descending sort orders.

Press **Export raw data to CSV** to export all the available statistical data on the TV channels viewing duration to a *.csv* file.

Home page

The Home page contains an interface for editing the NetUP.tv Android client home page. It is based on the Tiny MCE editor and it lets one to add HTML widgets to the home page (AccuWeather, Twitter, etc.).

Press **Insert** to add a widget. Enter the widget’s name into the **widget name** field and paste the widget’s code to the **HTML content** field. Press **Insert** to insert the widget into the home page.

Settings

This page contains an interface for setting up the NetUP.tv client for Android. The interface allows one to setup the following:

- **Home page URL** – is an address of a web page, shown on the home page

- **Stop playback when idle** – set the flag if you want the TV channels playback to stop when a customer is idle for a certain amount of time. The time limit is set in the next field - **Idle time (minutes)**, which is enabled when the flag is set
**System status**

- **Start up mode** – allows one to setup the STB startup behavior. It can be set to *Regular startup*, *Resume TV playback*, which will make the STB start playing the last watched TV channel immediately after startup, and *Play by URL*, which makes the STB playback a stream by a certain URL immediately after startup.

- **Home page background** – allows one to select the home page background image. One can insert an image URL, or upload one.

- **Allow prepaid cards** – allows customers to use prepaid cards. If the flag is not set, using prepaid cards is forbidden.

- **Update URL** – an address where one can get the update file.

- **Request confirmation before installing updates** – prompt the customer for confirmation before installing updates.

- **Install updates when download finishes** – install updates immediately after download.

- **Install updates at next reboot** – install updates when the STB is rebooted.

- **Hide “Check for updates” item from the settings menu** – hide the item so that the customers can’t see it in the settings menu.

- **Download updates automatically** – download updates without prompt.

- **Use custom account replenishment notification** – one can create a custom message to notify the customer to replenish her account. The following substitutions are available for this message:
  - `{personal_account}` – is substituted with the personal account number.
  - `{access_card}` – is substituted with the access card number.
  - `{days_left}` – is substituted with the approximate number of days left before the account is blocked.

- **Use custom service plan expiration notification** – one can create a custom message to notify the customer about the service plan expiration. The following substitutions are available for this message:
  - `{personal_account}` – is substituted with the personal account number.
  - `{access_card}` – is substituted with the access card number.
  - `{days_left}` – is substituted with the approximate number of days left before the account is blocked.

At the bottom of the page there is an allowed applications panel.

Choose one of the options in the head of the panel:

- **All** – allows customers to launch all available applications.

- **List** – allows customers to launch only the applications present in the list. In the text field below list all the applications that you wish the customers to be able to launch, separated by commas.

- **Two lists** – is the same as *List* option, but allows one to make a separate list of applications allowed to launch for customers, who have their personal accounts blocked.

When finished editing, press **Submit** to submit the changes.
IPTV

Main menu

This page contains an interface for setting up the home page menu for NetUP.tv client for Android. All the menu items are shown as separate panels.

On this page:
- press **Add** in the upper-right of the page to add a new menu item
- press **Edit** on the right side of a panel to edit an item

When adding a new item, fill in the following:
- **Item type** – is the type of the item. Select what element should be launched when this menu item is selected
- **Item name, Page title** – name of the menu item and the title of the page that opens when the item is selected (for elements like Account, Movies, File manager, etc.)
- **Use custom icons** – is available for elements that have default icons. Set the flag and insert an URL to an icon or upload one (Large icon is the icon shown in the home page menu, Small icon is the icon shown on the page that opens when the menu item is selected)
- **Media group** – is only available for TV channels. Allows one to select a TV channels group. When this menu item is selected, only TV channels from that TV channels group will be available for playback
- **URL** – is only available for WebPortal. Insert an address of a web page that should be displayed when this menu item is selected
- **Package name** – is only available for External application. Fill in the package name that should be launched when this menu item is selected

When finished setting up a menu item, press **Save** to save the changes

IPTV

<table>
<thead>
<tr>
<th>Video Processing</th>
<th>Copy from DVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>encode_barn_after_reading.mpg</td>
<td>encode_3_10_to_yuma.mpg</td>
</tr>
<tr>
<td>encode_madagascar2.mpg</td>
<td>encode_cadie_de_deus.mpg</td>
</tr>
<tr>
<td>encode_cadie_de_deus.mpg</td>
<td>encode_dread_snow.mpg</td>
</tr>
</tbody>
</table>

SNMP agents

This page contains the list of communities entitled to make SNMP requests. For each community the corresponding view and IP address are provided. Communities may also be added or removed. A MIB file describing the available information can be downloaded on this page.
The NetUP’s MIB file contains a template for the variables which are listed below, with explanation.

- **netupCpuTable** – is a table containing information about every CPU (core) in the system. Every row of the table is described by the netupCpuEntry element, which in turn consists of the following elements:
  - **netupCpuIndex** – is the CPU number;
  - **netupCpuLoad** – is the CPU load level;
  - **netupCpuTemp** – is the CPU temperature.

- **netupStreamerTable** – is a table containing information about every streamer in the system. Every row of the table is described by the netupStreamerTableEntry element, which in turn consists of the following elements:
  - **adapterNumber** – is the adapter number;
  - **netupBER** – is the bit error rate;
  - **netupSNR** – is the signal to noise ratio;
  - **netupLOCK** – is the signal lock status.

- **netupStorageTable** – is a table containing information about every hard drive in the system. Every row of the table is described by the netupStorageEntry element, which in turn consists of the following elements:
  - **netupStorageIndex** – is the storage number;
  - **netupStorageDevice** – is the path to the storage (for example, "/dev/sda1");
  - **netupStorageMountPoint** – is the mounting point of the storage (for example, "/mnt/hdd");
  - **netupStorageFilesystem** – is the file system of the storage;
  - **netupStorageBlockSize** – is the block size on the storage;
  - **netupStorageFragmentSize** – is the fragment size on the storage;
  - **netupStorageSize** – is the storage size;
  - **netupStorageFree** – is the free space on the storage.

For the system as a whole:

- **netupMemPhisTotal** – is the total memory size;
- **netupMemPhisFree** – is the free memory size;
- **netupMemPhisBuffers** – is the buffer size;
- **netupMemPhisCached** – is the cache memory size;
- **netupMemSwapTotal** – is the maximum size of the swap file;
- **netupMemSwapFree** – is the free space within the swap file;
- **netupStbClients** – is the number of connected STB clients;
- **netupPcClients** – is the number of connected PC clients;
- **netupTotalClients** – is the total number of connected clients.

To request all available parameters, download the MIB file, pass it to the SNMP daemon, and run the following command:

```
snmpwalk -v2c -c netuptest 10.1.0.77 NETUP-MIB::netup
```
System administration

Files

This page contains the download links for various auxiliary files, including:

- **Documentation** – in a single PDF file;
- **Administration interface** – AKA the united control center. Guidelines for starting the control center and further operations with it are listed in **Usage examples** (page 31).

⚠️ *Before downloading the united control center, you have to upload the security.tgz file obtained via the personal cabinet (see **License** on page 27).*

This page is present only on IPTV Core servers.

Power Management

This page contains **Reboot** and **Shutdown** buttons. Whenever the server needs to be reloaded or shut down, this should be done exclusively by means of these controls; abnormal termination may lead to system failure.

Update

This page lists the uploaded firmware files together with their uploading dates, build numbers, and possible actions.

This page allows to update the NetUP.tv firmware. To do that, upload the new firmware file to the server via FTP (login: `update`; password is similar to the server administrator password, see **Security** on page 26), refresh the page to reveal it in the list, and press **Install**.

*Firmware files of incompatible versions may be falsely interpreted as corrupted. In particular, this is the case for the firmware files of version 1.6 once the system has been upgraded to version 1.7.*
System administration

Status

This page includes:

- Time zone
- Licence (licence holder name and the licence number)
- Internet (internet connection status)
- Server password (password for SSH, FTP)
- Cluster password (a password for UCC)
- Adapter status
- System components status (NetUP IPTV Core, Middleware, Billing и Streamer)
- Connections between systems (status of connection between system components)

Collect diagnostic information button allows one to collect diagnostic information for one of the services for providing it later to technical support

Backup

This page provides control interface for system backups. Create button creates an archive in ".tar.bz2" format containing system settings; also, an automatic backup is made every day. Existing backup files together with their creation dates are listed in the table. This page is present only on IPTV Core servers.

<table>
<thead>
<tr>
<th>Backup</th>
<th>Created</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>backup_auto_1303995001.tar.bz2</td>
<td>11 11 2012 05:08</td>
<td>automatic</td>
</tr>
<tr>
<td>backup_1944020XO.tar.bz2</td>
<td>05 10 2012 11:27</td>
<td>manual</td>
</tr>
<tr>
<td>backup_124329802.tar.bz2</td>
<td>04 10 2012 11:01</td>
<td>manual</td>
</tr>
</tbody>
</table>

In order to manage a backup, left-click on it:

Choose one of the following actions in the pop-up window:

- press Delete to delete the selected backup
- press Download to download the backup
- press Restore Backup to restore from the selected backup
- press Close to close the popup window

More details on creation and usage of backups may be found at Backup copies on page 29.
System configuration

Network

The Add VLAN button opens a popup window of virtual adapters’ settings (see VLAN window on page 25).

The Change Core IP button is only present on the servers other than IPTV Core. It lets you enter the IPTV Core IP address. After that the server will connect to the IPTV Core and will appear in the IPTV Core’s web-interface on Connections page.

Network adapters management

Network page gives the full list of installed network adapters together with their state.

Network connectors on the front panel of NetUP streamer are marked as follows:

<table>
<thead>
<tr>
<th>On the panel</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the web interface</td>
<td>eth0</td>
<td>eth1</td>
<td>eth2</td>
<td>eth3</td>
</tr>
</tbody>
</table>

eth0 eth1 eth2 eth3
System configuration

For each adapter the following information is presented:
- Adapter name;
- Inet address (IP address) of the adapter;
- MAC address of the adapter;
- Adapter state (UP or DOWN);
- Aliases (alternative IP addresses) of the adapter;
- DHCP server IP range and state (UP or DOWN);

Following actions can be done with an adapter:
- Add alias button adds an alias IP address;
- Statistics button displays load statistics for the given adapter in graphic form;
- Inet address link provides the way of changing the IP address, or removing it altogether (unless it is unique);
- DHCP server link changes the IP address range served by this DHCP. It also allows one to add a static IP address linked to a MAC address.
- DHCP server status indicator (UP / DOWN) is also a switch that toggles this DHCP on and off.

ijkstra: The address assigned for the main interface is used for the component’s interaction (see Connections on page 17) and thus is absolutely crucial for the system’s operation. It can never be deleted. One can set the main interface in the interface’s IP address edit window.

VLAN window

To create new virtual LAN interface based on the selected physical interface, enter VLAN ID and press Add. A new VLAN with a name composed of the physical LAN’s name and the ID will be created.

To remove a VLAN, press Delete VLAN in the corresponding row.

Routing

This page features user routing rules and the system routing table.
System configuration

Press **Add rule** to add a user routing rule. Left-click **Default Gateway** to edit it. Left-click a user rule to edit or delete it. When you left-click a user rule, a **Change routing rule** window will appear. There you can set an IP address/mask, set a **Gateway** or choose a **Network interface**.

- click **Save** to save the changes
- click **Cancel** to cancel the changes
- click **Delete** to delete the user routing rule

The system routing table is needed for correct system operation and can’t be edited. **Show/Hide** shows/hides the system routing table.

Security

This page contains interface for changing the access passwords, namely the server admin password and the cluster admin password. To do so, type the current password in the **Current password** field and the new password twice in the **New Password** and **Repeat Password** fields of the corresponding form and press **Save**.

*Server admin password is used for SSH and FTP access (see Update on page 22 and Creating VoD or nVoD content on page 34). Cluster admin password is used by the web interface*

Services

This page lists existing system components (**Middleware, Billing, etc**).

It also provides an interface for the following services:
1. **Multicast Router** acting as an IGMP querier;
2. **Virtual Tunnel** – a tunneling connection to the server.

- **Status** column displays current status of services (**Started** / **Stopped**).

You can change the status of a component to the opposite by left-clicking the component name (if it’s status is “started”, it will change to “stopped” and vice versa).

A virtual tunnel is a technology that may be used by the NetUP technical support team to remotely control your server. To set up a virtual tunnel, you have to send the **etc/vtund.conf** file to NetUP.
**Date and time**

Date and time page contains the time zone setting interface.

In the **NTP servers** section one may add or remove the NTP servers to synchronize with. New items get added to the end of the list.

The **Status** column lists the current status of the servers:
- Failed – if the last sync attempt has failed;
- Sync – if the sync has been performed successfully;
- Reserved – if this time server has not been used yet.

Synchronization occurs once per hour. The servers are tried in presented order till the first success.

This page is present only on IPTV Core servers.

> Correct time zone must be set up prior to the license uploading (see **License** on page 27), otherwise the system may work incorrectly.

**License**

This page contains interface for uploading the *security.tgz* file (so-called license archive), which is required for working with STBs and the admin interface. This file has to be downloaded from the client's personal cabinet on [www.netup.tv](http://www.netup.tv) after installation of the system (unless preinstalled as factory default) and afterwards downloaded anew upon each update of the system's components.

> The license archive must be uploaded after setting the time zone (see **Date and time** on page 27) and prior to the downloading of the united control center (see **Files** on page 22)

> When uploading the new license, make sure it is compatible with the old one

Once the license archive is uploaded, this page displays detailed license information, including the date of validity, list of optional components, and the limitations thereof.

**Systems**

**Billing**

This page contains the list of groups of system users with the interface for addition, editing and other operations.

<table>
<thead>
<tr>
<th>&quot;Billing&quot; system</th>
<th>New group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrators</td>
<td>Rename</td>
</tr>
<tr>
<td>Super user</td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td>Rename</td>
</tr>
<tr>
<td>Danil Koby</td>
<td></td>
</tr>
</tbody>
</table>

Groups determine the access of system users to various parts of the system’s functionality. When a system user (AKA staff) belongs to a certain group, he is entitled to perform all actions which are listed as allowed for that group.

Clicking the link **New group** at top of the page creates a new group.

Every group is associated with the following interface elements:
- **Rename** – renames the group;
Systems

– **Java interface** – opens the page of this group’s privileges, where all possible system actions are listed. Each action may be marked as either allowed or disallowed for the particular group;

<table>
<thead>
<tr>
<th>System &quot;Billing&quot;</th>
<th>Privileges for the &quot;Administrators&quot; group</th>
<th>Save</th>
</tr>
</thead>
</table>

- **Customers**
  - Personal data
  - Passport data, addresses, bank details, contact info
  - Personal accounts
  - Bank accounts
  - Technical parameters
  - Technical parameters of connections (VPN authorization login and password, etc.)
- **Tariff plans**
  - Manage
  - Connected tariff plans and services included therein
- **Additional tariffs**
  - Manage
  - Included additional tariffs

– **Add** – creates a new system user and adds him to the group.
Every group contains the list of system users belonging to it. Clicking on the user names opens popup windows where you may remove the system users or change their names and/or passwords.

Payment systems
System maintenance

Backup copies

Automatic backup copies are created daily. Besides, a backup may be created at any time via web interface (see Backup on page 23).

To roll forward an older backup copy, first create a current backup, and then stop all NetUP.tv systems. Backup tables should be rolled forward manually one by one via the SQL client. Changed config files should be copied over the current ones. Extreme caution must be taken, since wrong action sequence may lead to loss of data.

To set up daily automatic download of the backup files, set up the download program (for example, wget) to get the data from the URL containing the authentication data:

http://login:password@10.1.0.102/page/backup/download_backup.php?file=backup_current.tar.bz2

Network troubleshooting

If an STB does not play streaming video, this may be due to network errors. To rule out possible communication problems, plug the STB and the streamer into the same switch. If the streaming video still would not show up, attach a PC instead of the STB and check that the media is actually streamed to the specified multicast address, and that no extraneous signal is streamed together with it. The VLC media player (http://www.videolan.org/vlc/) may be used to view the video stream on PC (select Media – Open Network Stream in the menu).

NetUP server troubleshooting

When a network connection to the NetUP server is impossible, use the debugging cable supplied with the server. Connect the port on the server’s front panel to the COM port on any PC and open a terminal program. Use the following connection parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed (bit/s)</td>
<td>19200</td>
</tr>
<tr>
<td>Data bits</td>
<td>8</td>
</tr>
<tr>
<td>Parity</td>
<td>None</td>
</tr>
<tr>
<td>Stop bits</td>
<td>1</td>
</tr>
<tr>
<td>Flow control</td>
<td>None</td>
</tr>
</tbody>
</table>

A Linux console will show up in the terminal window.

NetUP server factory reset

If your NetUP server needs a factory reset, please contact NetUP technical support.

NetUP Dual DVB-S2-CI

Overview

The NetUP Dual DVB-S2-CI is a professional DVB-S/DVB-S2 PCI-e card designed for high-density appliances such as DVB-IP gateways, home theaters, satellite Internet systems, etc. In contrast to standard DVB-S cards NetUP's Dual DVB-S2-CI provides fourfold density - two DVB-S/S2 receivers and two Common Interface (CI) slots occupy only one PCI-e slot. The high density allows saving space on installation and using the card for satellite signal reception in confined environments. For example, a standard 1U rack-mount server with two PCI-e slots can receive and fully decode 4 satellite transponders, such as NetUP's IPTV Combine 4x or DVB-IP gateway 4x.
NetUP Dual DVB-S2-CI

Features

– two DVB-S/DVB-S2 inputs for simultaneous reception of two DVB-S/DVB-S2 transponders;
– two CI slots for independent descrambling of two transponders;
– support of any professional CA modules (e.g., PowerCAM Pro, Aston Pro Solutions, etc.);
– PCE-e x1;
– DiSEqC 2.x;
– drivers for Linux OS.

Supported Operating Systems

– Linux;
– Windows XP (x86 & amd64);
– Windows Vista (x86 & amd64);
– Windows 7 (x86 & amd64).

Driver installation

The newest driver for Linux can be installed by the following commands:

```
hg clone http://linuxtv.org/hg/v4l-dvb/
cd v4l-dvb
make && make install
```

The Windows driver is currently available as a beta version.

Download the build folder with the driver from the following URL:


The system will automatically detect the appropriate driver version during the installation.

Choose the **Install from specified folder** option and then confirm the installation of an unsigned driver.

Startup notes

To make the Dual DVB-S2-CI card work properly, the following option need to be enabled while configuring Linux kernel:

**Symbol: VIDEO_CX23885 [=m]**
NetUP Dual DVB-S2-CI

Technical data

Supported Modulation Types
- Legacy DVB-S QPSK;
- DVB-S2 QPSK and 8PSK;
- Optional: 16APSK and 32APSK.

Symbol rates
- QPSK DVB-S – 1 to 47 Msymb/s;
- 8PSK DVB-S2 – 1 to 31.5 Msymb/s (in single mode up to 63 Msymb/s).
When using CAM, bit rate is limited to 72 Mbit/s.

FEC
- QPSK DVB-S – 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10;
- 8PSK DVB-S2 – 3/5, 2/3, 3/4, 5/6, 8/9, 9/10.

Output signals
Output voltage: 13/18V.
Output current: not to exceed for an extended period a total of current of 1 A from both port (IOUT_A + IOUT_B < 1 A) in order to avoid triggering the overheating protection.

Mechanical data
Operating temperature -10..+70° C.
Weight: 150 g.
Dimensions: 180x130x20 mm.

CNR
DVB-S(QPSK), BER < 1e-10

<table>
<thead>
<tr>
<th>30Msps, CNR dB</th>
<th>1/2</th>
<th>2/3</th>
<th>3/4</th>
<th>5/6</th>
<th>7/8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>2.8</td>
<td>4.6</td>
<td>5.5</td>
<td>6.7</td>
<td>7.2</td>
</tr>
</tbody>
</table>

Location:
- Device Drivers
- Multimedia support (MEDIA_SUPPORT [=y])
- Video capture adapters (VIDEO_CAPTURE_DRIVERS [=y])
Debugging board for SMiT CAM modules

DVB-S2(8PSK), BER < 1e-10

<table>
<thead>
<tr>
<th>Mode</th>
<th>30Msps, CNR dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/5</td>
<td>6.5</td>
</tr>
<tr>
<td>2/3</td>
<td>7.6</td>
</tr>
<tr>
<td>3/4</td>
<td>8.9</td>
</tr>
<tr>
<td>5/6</td>
<td>10.5</td>
</tr>
<tr>
<td>8/9</td>
<td>11.1</td>
</tr>
<tr>
<td>9/10</td>
<td>11.4</td>
</tr>
</tbody>
</table>

16APSK, PER =10e-7

<table>
<thead>
<tr>
<th>Mode</th>
<th>30Msps, CNR dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/3</td>
<td>9.8</td>
</tr>
<tr>
<td>3/4</td>
<td>11</td>
</tr>
<tr>
<td>4/5</td>
<td>11.8</td>
</tr>
<tr>
<td>5/6</td>
<td>12.4</td>
</tr>
</tbody>
</table>

Debugging board for SMiT CAM modules

SMiT provides a debugging board for its CAMs.

Connect the CAM to the debugging board as shown on the photo. Insert the operator’s smart card in a usual way. The debugging board works transparently, so the CAM is unaffected by it.

Connect the board to a PC using two cables, namely COM and USB. Open a terminal program. Use the following connection parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed (bit/s)</td>
<td>115200</td>
</tr>
<tr>
<td>Data bits</td>
<td>8</td>
</tr>
<tr>
<td>Parity</td>
<td>None</td>
</tr>
<tr>
<td>Stop bits</td>
<td>1</td>
</tr>
<tr>
<td>Flow control</td>
<td>None</td>
</tr>
</tbody>
</table>
Debugging board for SMiT CAM modules

As the CAM starts, the following loading messages come up in the terminal window:

Platform: CAM (ARM7TDMI)
GCC: 3.0.3

Loader Version: SMIT-Loader v4.0.0
Bstrap SW v4.0.0 build on Nov 16 2007, 13:26:59
sm_trace_set_level() - set_trace, mod=16, level=8
[FLASH]INFO:Thumb copy
[FLASH] Set to IRQ mode
[FLASH]INFO:Flash Lib version 0x10303 build at Nov 9 2007, 13:36:21

To refresh the CAM firmware, use the temu.exe utility supplied by the manufacturer. Start the utility, select the new firmware file, then unplug the USB cable from the board and plug it again.

![Debugging cable connection (Amino 140).](image)

---

**Image Caption:** Debugging cable connection (Amino 140).
Debugging board for SMiT CAM modules
GLOSSARY

Below is a list of terms used in the description of IPTV system.

Networking

- **DNS** – (Domain Name Service) is a distributed hierarchical system that stores IP addresses, domain names and various information associated with them.
- **TCP/IP** – (Transmission Control Protocol / Internet Protocol) is a stack of communication protocols used in computer networks.
- **FTP** – (File Transfer Protocol) is an application level network protocol for file transfer.
- **HTTP** – (Hypertext Transport Protocol) is an application level network protocol for data transfer.
- **RTSP** – (Real-time Streaming Protocol) is an application level network protocol that serves for signalling during the multimedia data transfer.
- **RTP** – (Real-time Protocol) is a transport level network protocol for delivering real-time traffic over IP networks.
- **UDP** – (User Datagram Protocol) is a simple transport level network protocol for data transfer.
- **TCP** – (Transmission Control Protocol) is a transport level network protocol for data transfer with guaranteed delivery.
- **DHCP** – (Dynamic Host Configuration Protocol) is a network protocol for obtaining IP addresses and other auxiliary information in TCP/IP networks.
- **IGMP** – (Internet Group Management Protocol) is a network protocol that manages group routing.
- **NTP** – (Network Time Protocol) is a network protocol for synchronizing the internal clocks of computer systems.
- **MAC** – (Media Access Control) is a sub-layer of OSI model that provides addressing and channel access control mechanisms.
- **MAC address** – is a unique identifier assigned to a device in a network.
- **LAN** – is the Local area network.
- **VLAN** – is the Virtual Local area network, standard 802.1q.
- **NFS** – (Network File System) is a file system distributed among multiple machines.
- **SSL** – (Secure Socket Layer) is a cryptographic protocol for communications over TCP/IP networks.
- **Commutator (switch)** – is a device joining several nodes within a network.
- **Unicast** – is a transmission of information packets to a single destination.
- **Broadcast** – is a transmission of information packets to all devices in a network.
- **Multicast** – is a transmission of information packets to a certain group of destinations.
- **Multicast group** – is a group of destinations in a multicast transmission.
- **Multicast router** – is a router capable of routing multicast streams.

Television

- **Polarization** – is a characteristic of the satellite signal (may be vertical, horizontal, circular left, or circular right).
- **Symbol rate** – is the number of transmitted symbols per second.
- **Transponder** – is an automatic device that may receive and retransmit a signal.
- **LNB converter** – (Low-Noise Block converter) is a device that converts a satellite signal for transmission over a coaxial cable.
- **Receiver** – is a device that receives a converted satellite signal and transforms it into a form usable for the consumer.
– **DiSEqC** – (Digital Satellite Equipment Control) is a special communication protocol for use between a satellite receiver and other devices.

– **Multiswitch** – is a device for connecting several receivers to the same satellite dish.

– **FTA** – (Free-to-air) refers to a non-encoded stream.

– **CSA** – (Common Scrambling Algorithm) is an encryption algorithm used in DVB.

– **Codec** – is a device or computer program capable of encoding and/or decoding a digital data stream.

– **MPEG** – is a suite of data compression standards used for digital multimedia.

– **MPEG TS** – (MPEG transport stream) is a container format used for transmission of multimedia data over networks.

– **MPEG PS** – (MPEG program stream) is a container format used for storage of multimedia data.

– **Audio PID** – in a MPEG-encoded file or stream is an identifier of audio data.

– **Video PID** – in a MPEG-encoded file or stream is an identifier of video data.

– **H.264** – is a standard for video compression (subset of MPEG-4).

– **SD** – (Standard Definition) is the resolution of 720x480 or 720x576.

– **HD** – (High Definition) is the resolution of 1280x720 or 1920x1080.

– **HDTV** – (High Definition Television) is a standard for high-resolution digital TV broadcasting.

– **DVB** – (Digital Video Broadcast) is a suite of standards for digital television. Includes the following subsets:
  – DVB-S for satellite broadcasting;
  – DVB-S2 for high definition satellite broadcasting;
  – DVB-C for cable broadcasting;
  – DVB-T for terrestrial on-air broadcasting;
  – DVB-T2 for terrestrial on-air broadcasting.

– **RF** – is a format of analog video signal for on-air transmission.

– **RCA (AV)** – is a format of analog audio and video signal for short-range cable transmission.

– **S-Video** – is a format of analog video signal for short-range cable transmission that carries the luminance and color signals separately.

– **PAL** – is a color-encoding system for analog TV accepted in Europe.

– **SECAM** – is a color-encoding system for analog TV accepted in France, Russia and some other countries.

– **NTSC** – is a color-encoding system for analog TV accepted in USA.

## IPTV

– **Streamer** – is a device that receives an on-air or other signal and transmits it over an IP network. Particular varieties include DVB-to-IP gateway and MPEG encoder.

– **Middleware** – is a set of software that controls the interaction between the components of an IPTV solution (streamer, VoD servers, CAS, and user STBs).

– **CAM** – (Conditional Access Module) is a module that provides restricted access to the broadcast media data.

– **MMI** – (Machine-Machine Interface) is an interface used for interaction between CI and CAM.

– **EMM** – (Entitlement Management Message) is an encrypted message stating the user’s right of access to multimedia data.

– **CI** – (Common Interface) is an interface of interaction with CAM (standard EN 50221).

– **CAID** – is the Conditional Access system ID.

– **VoD** – is the Video on demand.

– **TVoD** – is the Television on demand.
– nVoD – is the Near Video on demand (also known as "virtual cinema").
–nPVR – is the Network Personal Video Recorder.
– EPG – is the Electronic Program Guide.
– PPV – (Pay-per-view) is a system in which TV viewers can purchase events to be seen on TV.
– CAS – (Conditional Access System) is a system that protects the content from unauthorized access.
– SMS – is the Subscriber Management System.
– Time-Shifted TV – is a sort of TV with pause and rewind options.
– STB – is the TV set-top box.

Other terms

– XML – (eXtensible Markup Language) is a markup language for storing structured data.
– RAID – (Redundant Array of Independent Disks) is a fault-tolerant array of hard disks.
– Database – is a structured collection of data records stored in a computer system.
– Cluster – is a group of linked computers used as a single hardware resource.
– DRM – (Digital Rights Management) is the aggregate of access control technologies used to prevent unauthorized usage of digital media or devices.
– Billing – is a system that collects information about services that are going to be billed to the subscriber.
– Firmware – is a fixed program that internally controls some electronic device.
– ISO – is the International Organization for Standardization.
– ANSI – is the American National Standards Institute.