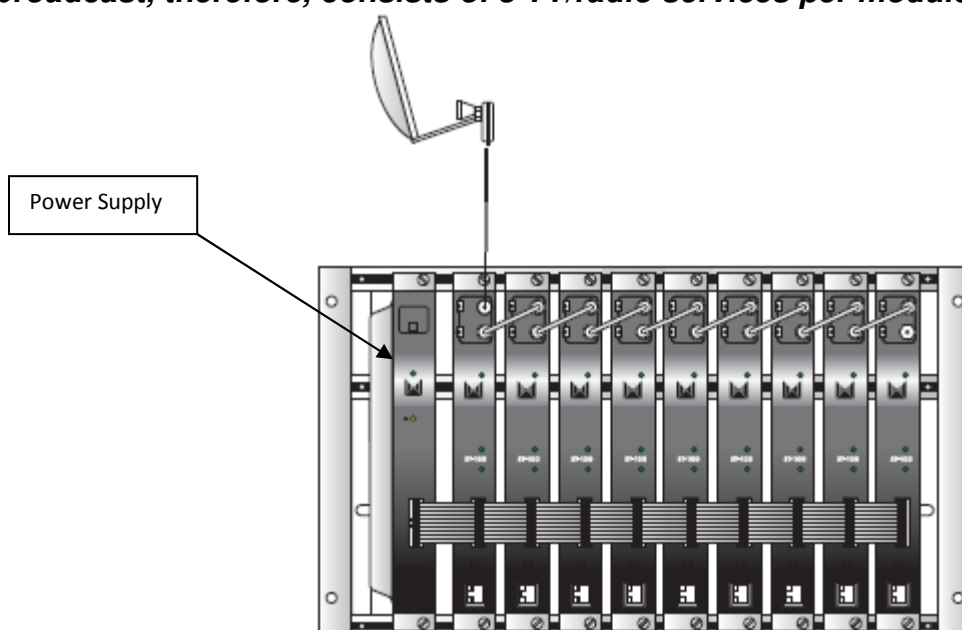


Technote 8: Setting up SS-100 Satellite IP Streamers

DVB-S to IP streaming equipment (915-SS) broadcasts multicast streams and TV/radio channels, selected from a DVB-S transponder (maximum 8), from digital satellite reception, over a TCP-IP network. TV services broadcast as IPTV streams can be viewed on an individual IPTV receiver or by using video reproduction software. The SS modules are configured via TCP/IP, using either the HTTP protocol (web browser) or TELNET (virtual terminal).

IMPORTANT: *It is possible to connect up to 9 SS-100 modules and 7 SS-110 modules per power supply unit. Each SS module can handle up to 8 MPEG streams; the IP broadcast, therefore, consists of 8 TV/radio services per module.*



IMPORTANT: Layout of the modules must be as shown above. Power Supply (FA-310/312) must be located on the far left hand side and Satellite IP streamer must be the next module in the chain. Please look at the above picture.

Ensure the following prior to programming:

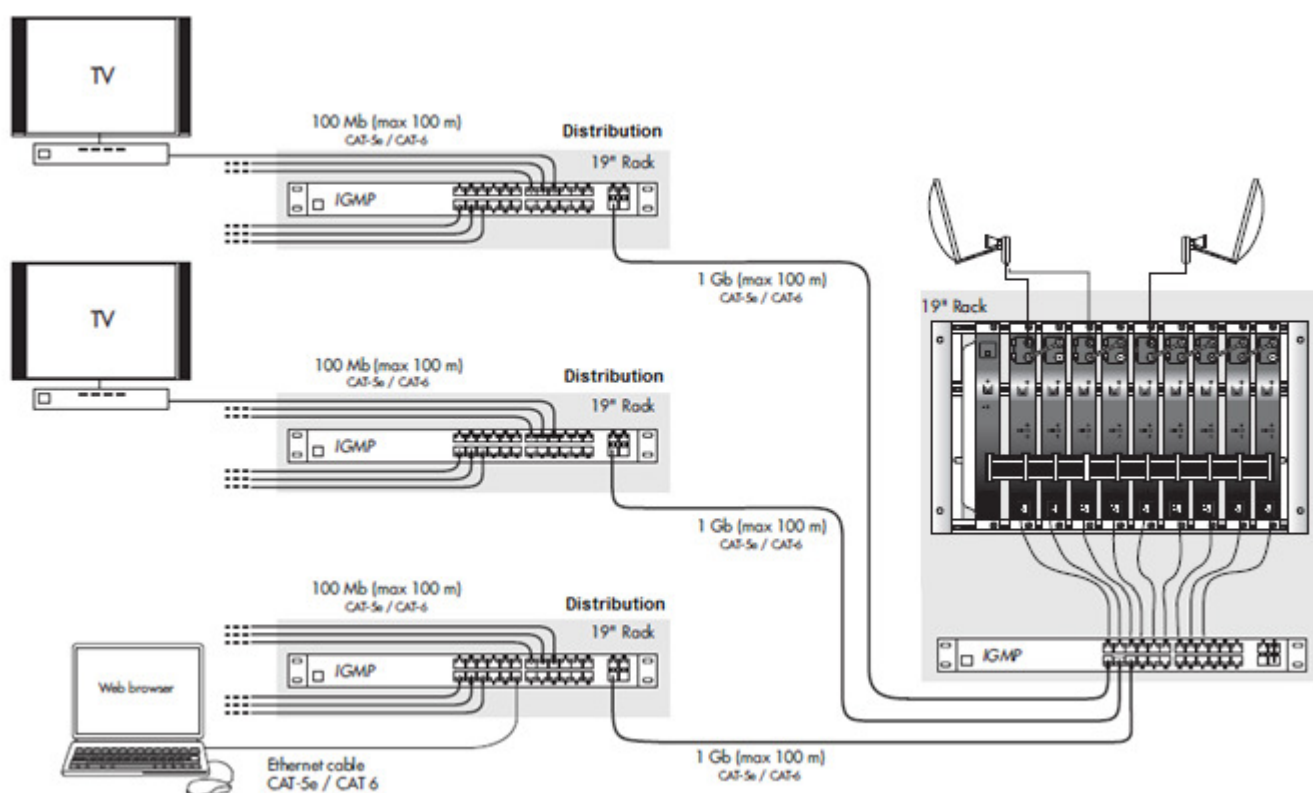
- It is necessary to connect all the modules to the support frame SP-226 (code 9120130) for the system to function.
- It is also recommended that you make the earth connection to the building using a cable with a section of at least 4 mm.
- Power supply/Control cable must be plugged into each module. **DO NOT ADD OR REMOVE** modules without disconnecting mains supply power from wall outlet. Always disconnect the equipment, and then reconnect it to the mains supply. Failure to do so can cause equipment to fail.

SPECIFICATIONS

Frequency range output of modulators
 Operating temperature of Modulators
 Output Level Adjustment
 Input Level
 Streaming Format
 Supported Protocols

46MHz --- 862MHz
 - 10°C --- +65°C
 15dB
 45 - 100dBμV
 Multicast UDP, RTP
 IPv4 UDP, RTP, ARP, ICMP, HTTP, TELNET

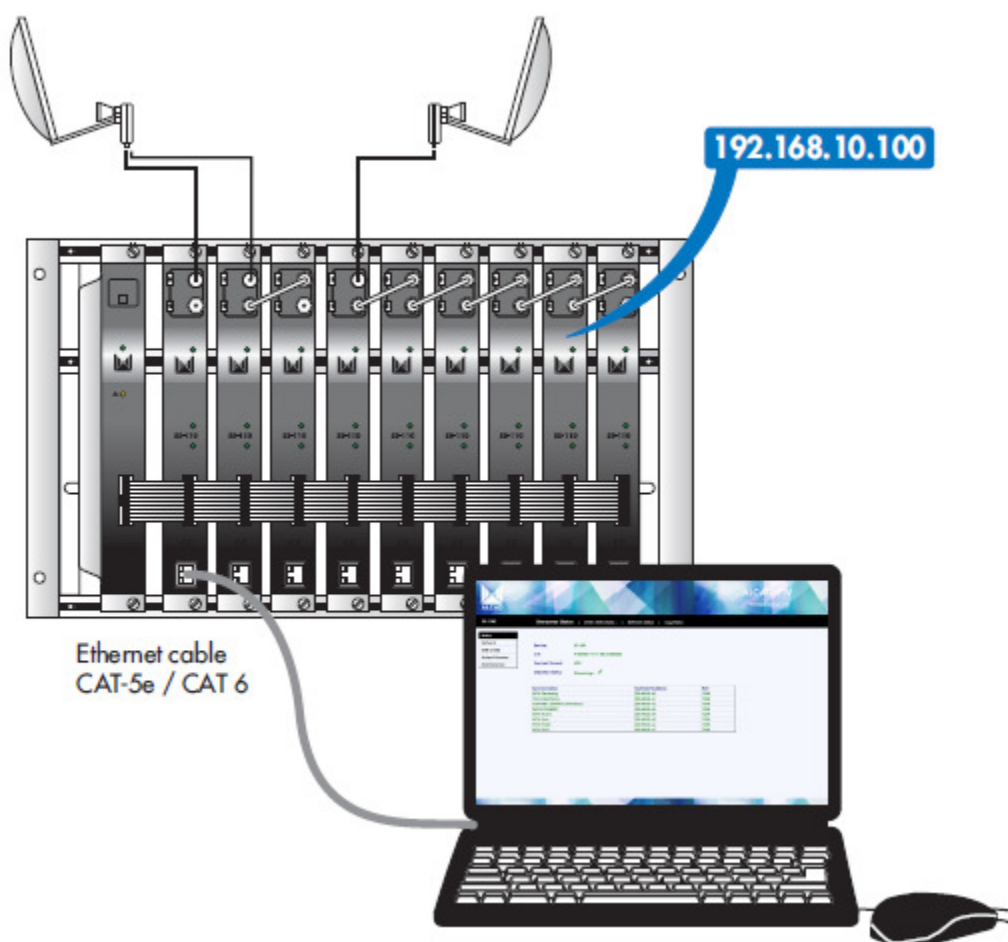
Typical layout of LAN



1.0 PROGRAMMING THE SS-xxx STREAMER

Once the QPSK to IP streaming equipment (SS-100/101) has been assembled, each SS module can be configured. All ST modules use a factory default *IP address: 192.168.10.100*.

In order to avoid conflicts with other IP addresses, it is necessary to perform an initial configuration in local mode. Subsequently, it will be possible to access the QPSK to IP streaming equipment via the local area network (LAN), either to re-programme it or to check its operating status.



The picture above shows local mode configuration accessing each streamer individually and assigning new IP addresses. This is strongly advised prior to LAN network connection.

The SS modules have a factory default TCP/IP configuration of:

IP address of the module: **192.168.10.100**
Subnet mask: **255.255.255.0**
Default Gateway: **192.168.10.1**

To access each SS module, use a PC/ MAC personal computer equipped with an Ethernet card and an RJ- 45 cable (CAT-5E or CAT-6).

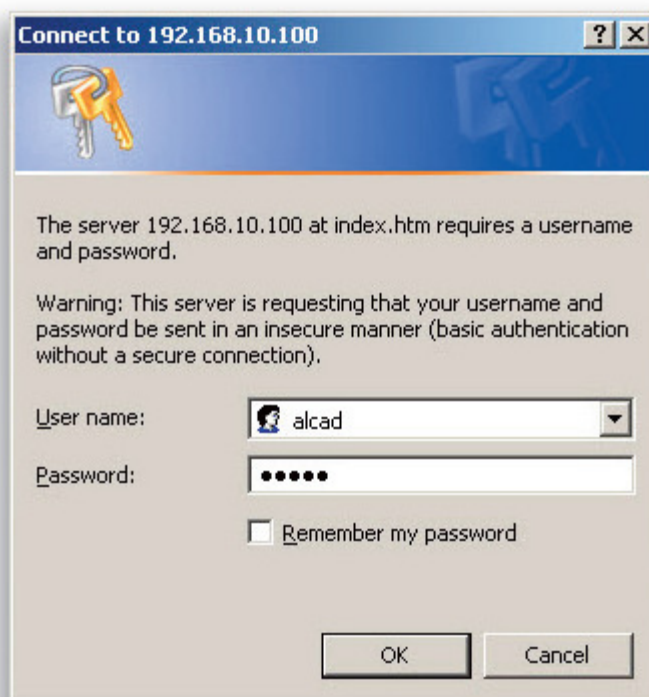
The IP address of the PC/MAC must be configured within the following range: 192.168.10.2 – 192.168.10.254 (do not use 192.168.10.100, since this is the IP address of the module to be configured).

To start the configuration of the SS module, open your web browser and type in the following direction: <http://192.168.10.100>



The first page of the ALCAD IPTV configuration program will appear on the screen. Access to the site is protected by username and password. Hence, once the default username and password have been changed, the only people who can enter the site will be those who have been provided with the new username and password. By default, the first time the module is accessed, the username and password is:

User name: ***alcad***
Password: ***alcad***

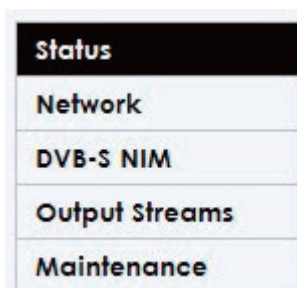


PLEASE NOTE: Web browser can be Internet Explorer, Mozilla, and Google Chrome

INTRODUCTION TO THE ALCAD IPTV WEB CONFIGURATOR

The SS-series streamers are configured using a graphical user interface displayed on a web page. Using the interface, you can move through the different configuration screens until all the parameters of the module have been set. Navigation between the different configuration screens is intuitive and very simple. On the following pages we explain how to access each screen.

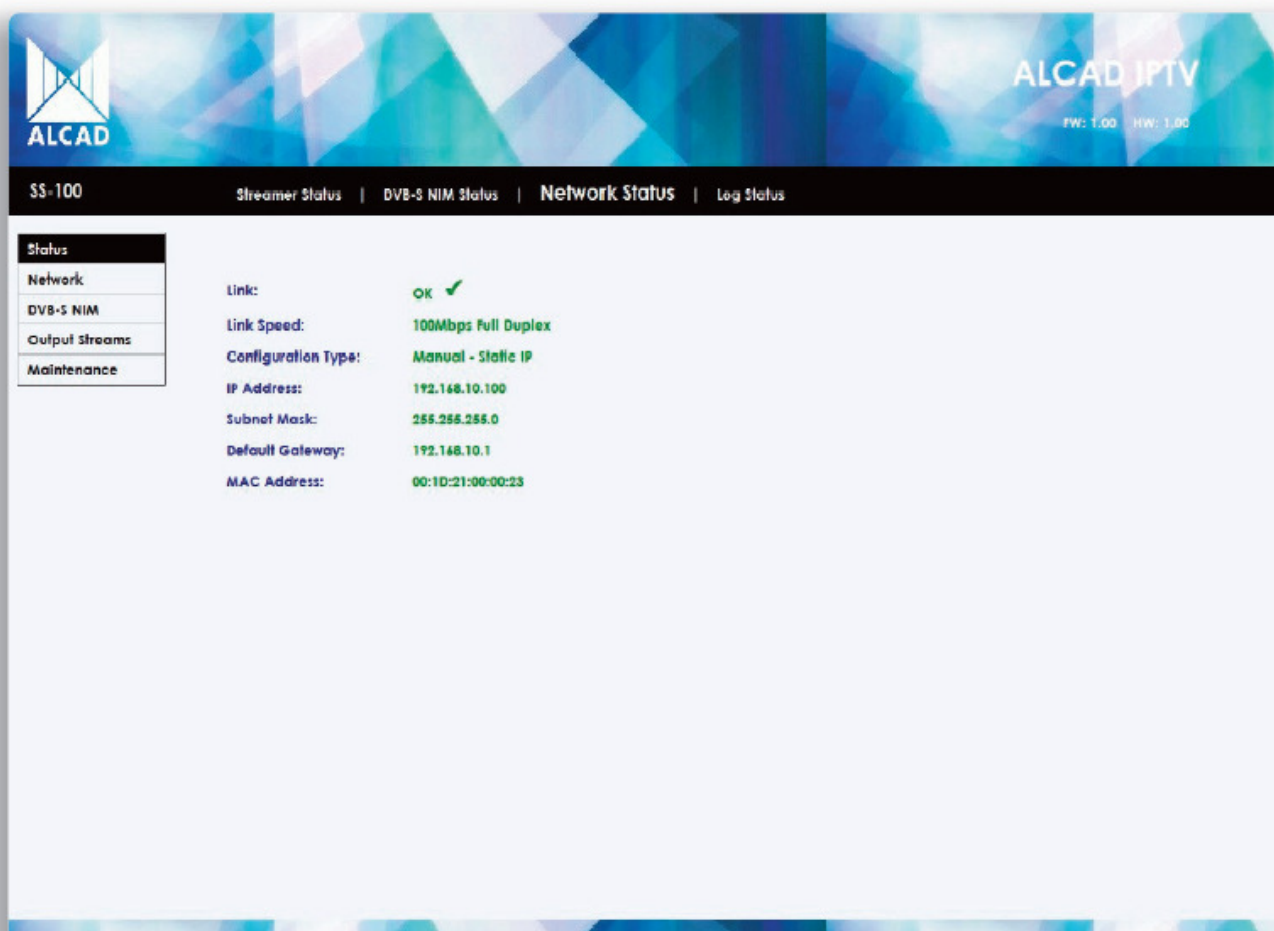
In the upper left-hand corner of each of the configuration screens, you will see the menu box which can be seen below.



Network status

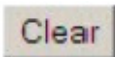
This shows the network data programmed in the SS module:

- Link: correct connection with the network.
- Link Speed: bit speed and Ethernet output.
- Configuration Type: fixed or random IP (*Static IP, Automatic DHCP*).
- IP address: IP address of the SS module (*Factory-set IP: 192.168.10.100*).
- Subnet mask: subnet mask
- Default Gateway: gateway for access to Internet, predetermined as 192.168.10.1
- MAC address: identifying address of each SS module (*00:1D:21:XX:XX:XX*).54

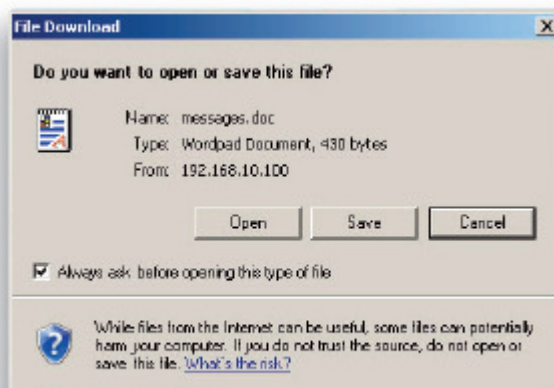


Log status

This enables you to see a list of the log messages of the SS module. The list contains each event that has occurred in the SS module, specifying date and time. If events are marked with an asterisk (*), it indicates that at the moment at which the event occurred, the date and time displayed were not synchronised. The list shows the last 10 events to have occurred.

To empty the list of messages, click on the  button

To save the list of events in a local file, click the  button.



Network

This enables you to configure the network parameters in the SS module. The network configuration can either have a fixed IP address (Static IP) or have one which is automatically assigned by a DHCP server (Automatic DHCP):

- Configuration Type: Static IP, Automatic DHCP
- IP address: IP address of the SS module (factory-set value of 192.168.10.100).
- *The range of configurable IP addresses is: 192.168.0.2 – 192.168.255.254*
- Subnet mask: factory-set value of 255.255.255.0
- *Configuration range: 0.0.0.0 – 255.255.255.0*
- Default Gateway: gateway for access to Internet (factory-set value of 192.168.10.1)
- *The range of configurable IP addresses is: 192.168.0.1 – 192.168.255.254*



When you have entered the data, click *Set IP*.

DVB-S NIM

This is used to configure the parameters corresponding to the input satellite transponder and to select the TV/radio services to be broadcast. Parameters of the input transponder and status, levels and quality of the SAT input signal. This information can be found in publications specialising in the field of satellite TV or on the website of the manufacturer of the desired satellite:

- LNB Supply: Used to activate the power supply to the LNB. The SS module feeds it with 12. In the case of the LNB Quattro, it is sufficient to activate the power supply of the LNB of the module which is connected directly to the polarity. (On, Off)
- Frequency: IF input frequency *The range of frequencies to be programmed is: 950 – 2150 MHz.*
- Symbol Rate: Symbol speed. You can select Auto or Manual. (The automatic search is slower. If you know the data, we recommend that you enter it manually).
- *The configuration range is: 1000 to 60000 baud.*
- FEC: Forward Correction Error
- *Configuration values: Auto, 1/2, 2/3, 3/4, 5/6, 7/8*



The screenshot shows the ALCAD IPTV web interface. The top header features the ALCAD logo on the left and 'ALCAD IPTV' on the right, with 'FW: 1.00 HW: 1.00' below it. A navigation menu on the left includes 'Status', 'Network', 'DVB-S NIM' (highlighted), 'Output Streams', and 'Maintenance'. The main content area is titled 'DVB-S NIM' and contains the following configuration fields:

- LNB Supply:** A dropdown menu set to 'Off'.
- Frequency (I.F.):** A text input field containing '1300' followed by 'MHz'.
- Symbol Rate:** A dropdown menu set to 'Manual' and a text input field containing '27500' followed by 'KSym/s'.
- FEC:** A dropdown menu set to 'Auto'.
- Status:** A text label displaying 'Not Locked!' in red.
- Tune:** A button located at the bottom of the configuration fields.

To confirm the parameters you have entered, click on the *Tune* button.

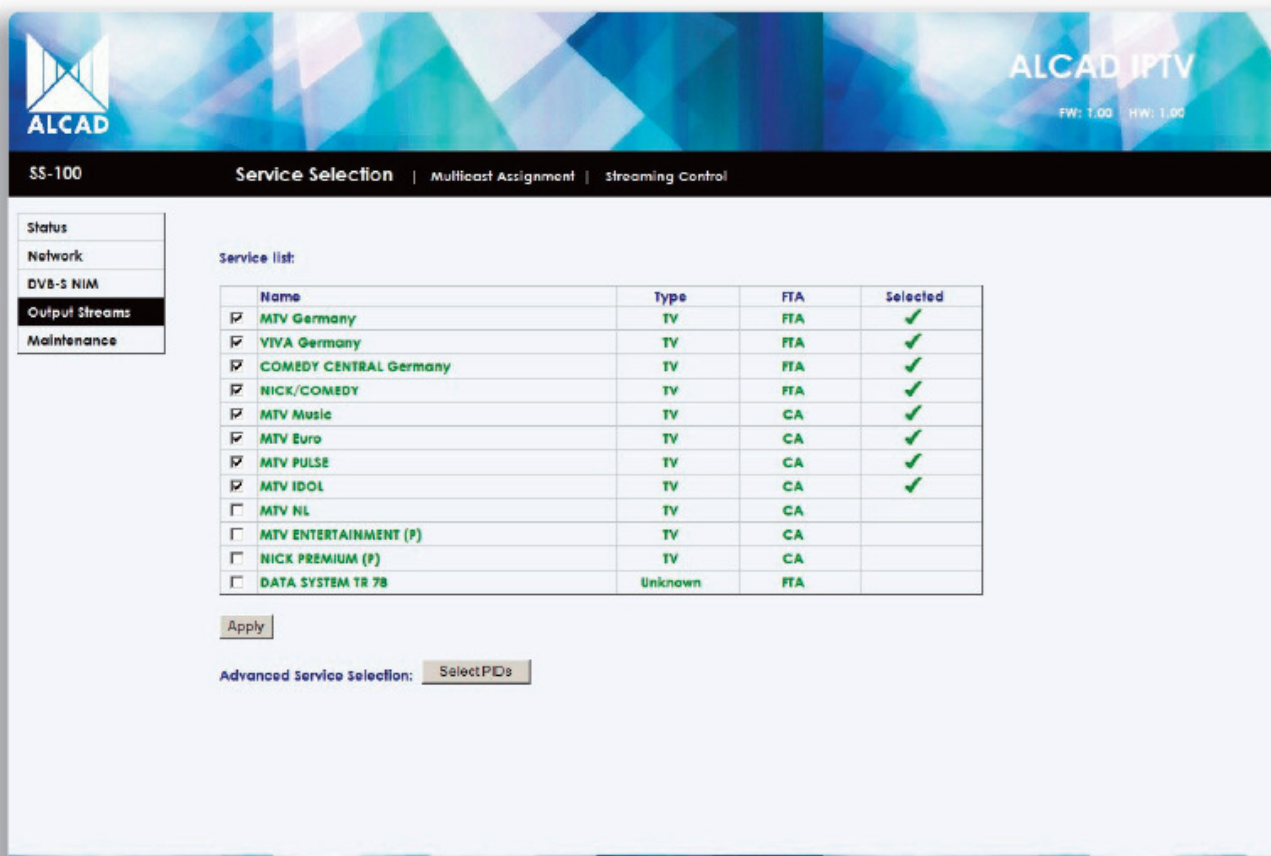
When the input data has been configured – provided that the programming has been done correctly – the SS module will connect to the selected transponder, and the following data will appear on the screen.

- Status: shows if the SS module has connected to the selected transponder (*Locked, Not Locked*).
- Detected FEC: shows the detected FEC of the transponder. The data will be detected when Auto has been selected.
- Detected SRATE: shows the SRATE detected. The data will be detected when Auto has been selected.
- Signal Level: shows the power measured at the input of the module.
- *Range of input signals: 40 – 95 dBμV.*
- BER: quality of the input signal (Bit Error Rate before Viterbi correction).



Output Stream

This enables you to select the TV/radio services to be broadcast by the TCP/IP network. Service selection. From the list of services (acquired from the previously-tuned SAT transponder) that appears in the screen, a maximum of 8 services can be selected.

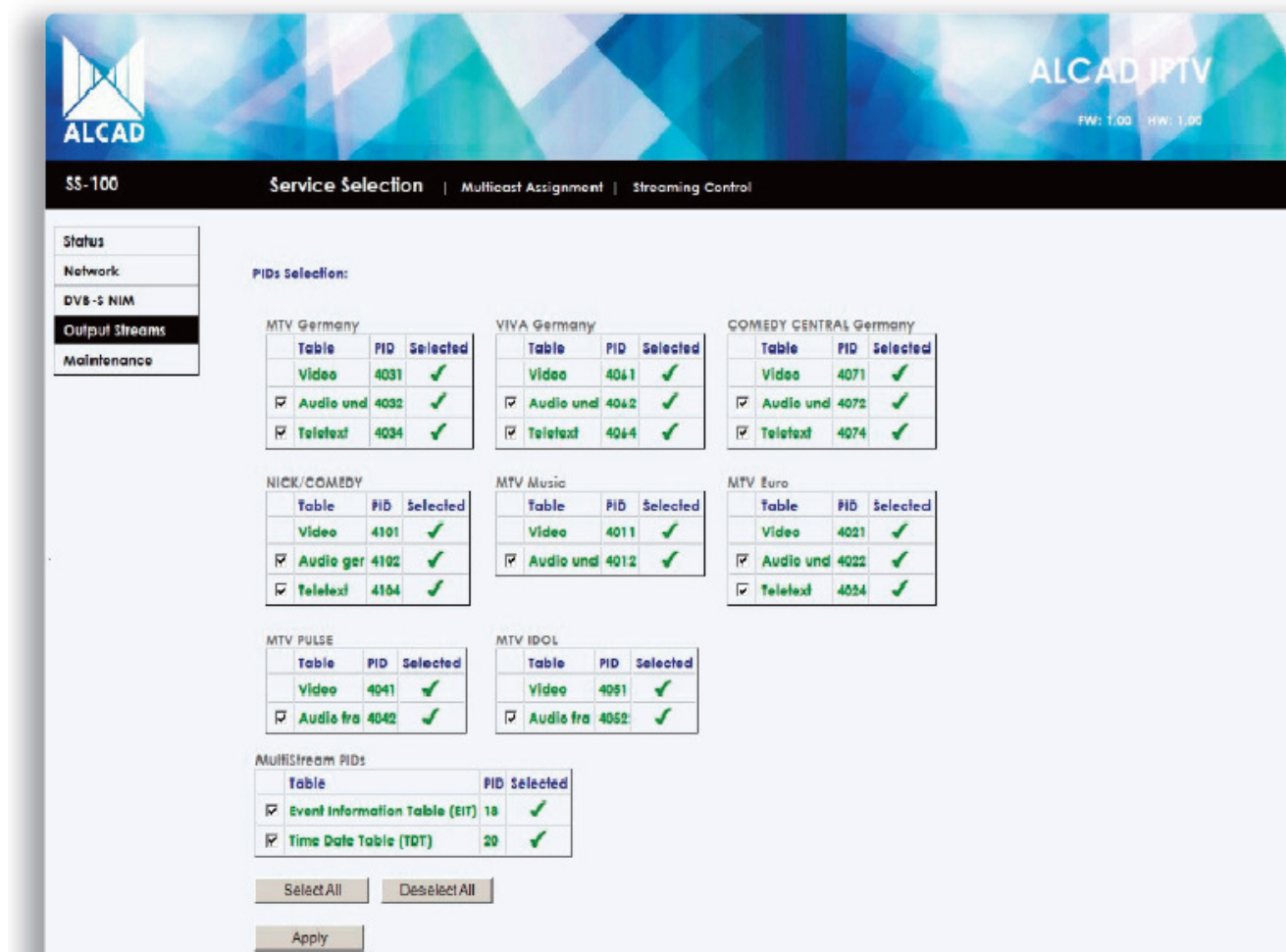


To confirm the selection, click on the *Apply* button.

For advanced users, the possibility exists of opening a menu with further configuration options related to the services to be broadcast. To open this menu, click on the Select PIDs button. Within this menu it is possible to select the PIDs to be broadcast for each service (the video PID cannot be disabled). It is also possible to select or deselect all the PIDs simultaneously by clicking on the Select All or Deselect All buttons. By default, all the PIDs are selected and remain so until this configuration is altered.

- PIDs Selection: enables you to select the PIDs associated with each service (*audio, teletext, subtitles*).

Please look on the next page for screenshot.



When you have made your selection, confirm it by clicking on the *Apply* button.

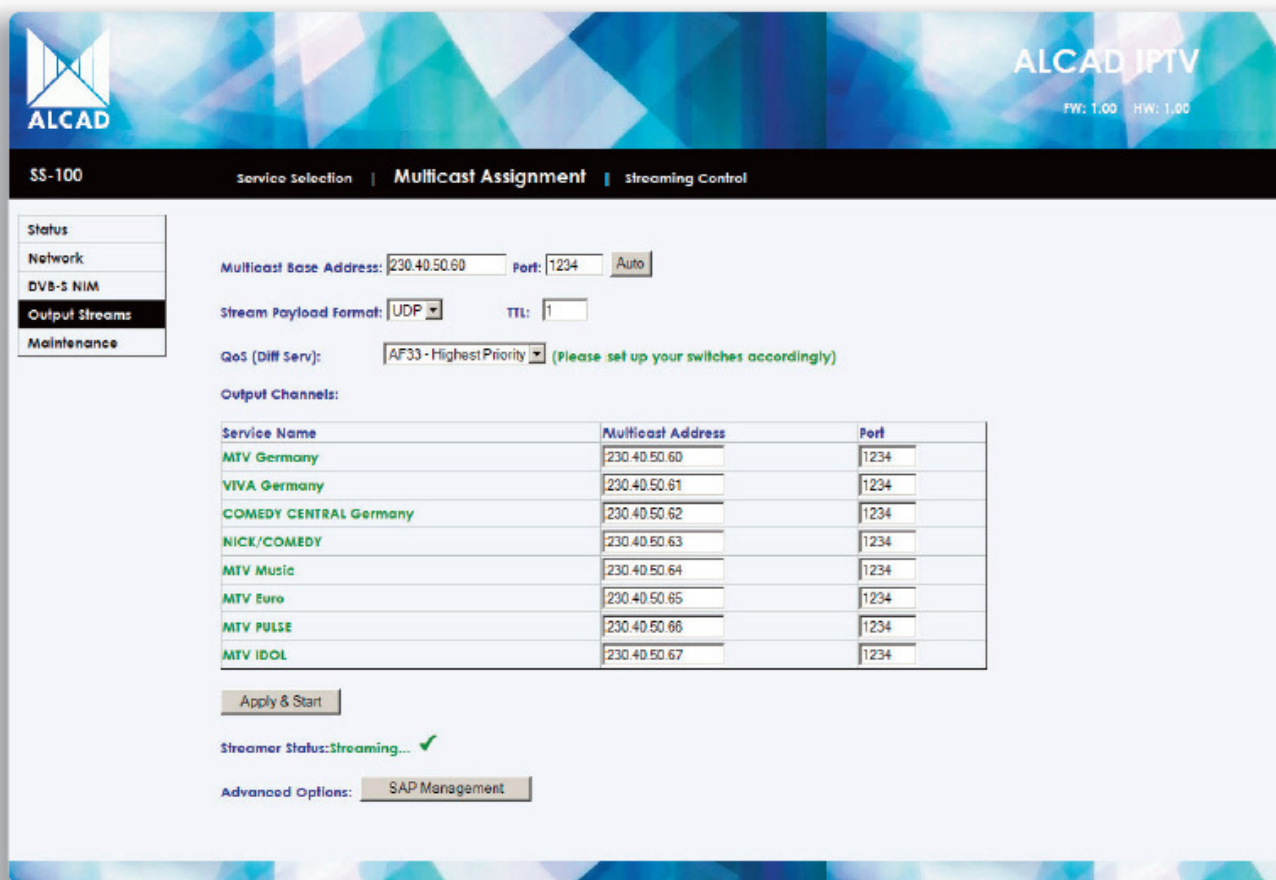
Multicast Assignment

This is used to configure the multicast addresses for the services to be broadcast.

- Multicast Base Address/Port: used to assign IP addresses and ports to each TV/radio channel automatically.
- *The configuration range is: 224.0.0.1 – 239.255.255.255 Port 0 – 65535*
- QoS (Diff Serv): assigns 4 possible levels of priority on the network stream (factory-set value: *AF33 - Highest Priority*).
AF33 - Highest Priority
AF32
AF31
CS3 - Lowest Priority

Bear in mind that the switches of the network must be configured with the same priority.
 Stream Payload Format: data format of the output streams (*UDP or RTP*).

- TTL: time to live of the packet measured in the number of networks crossed (*1 – 255*).
- Streamer Status: Indicator of operation of the module (*Streaming or Stopped*).



SS-100 Service Selection | **Multicast Assignment** | Streaming Control

FW: 1.00 HW: 1.00

Status
Network
DVB-S NIM
Output Streams
Maintenance

Multicast Base Address: Port:

Stream Payload Format: TTL:

QoS (Diff Serv): (Please set up your switches accordingly)

Output Channels:

Service Name	Multicast Address	Port
MTV Germany	230.40.50.60	1234
VIVA Germany	230.40.50.61	1234
COMEDY CENTRAL Germany	230.40.50.62	1234
NICK/COMEDY	230.40.50.63	1234
MTV Music	230.40.50.64	1234
MTV Euro	230.40.50.65	1234
MTV PULSE	230.40.50.66	1234
MTV IDOL	230.40.50.67	1234

Streamer Status: Streaming... ✓

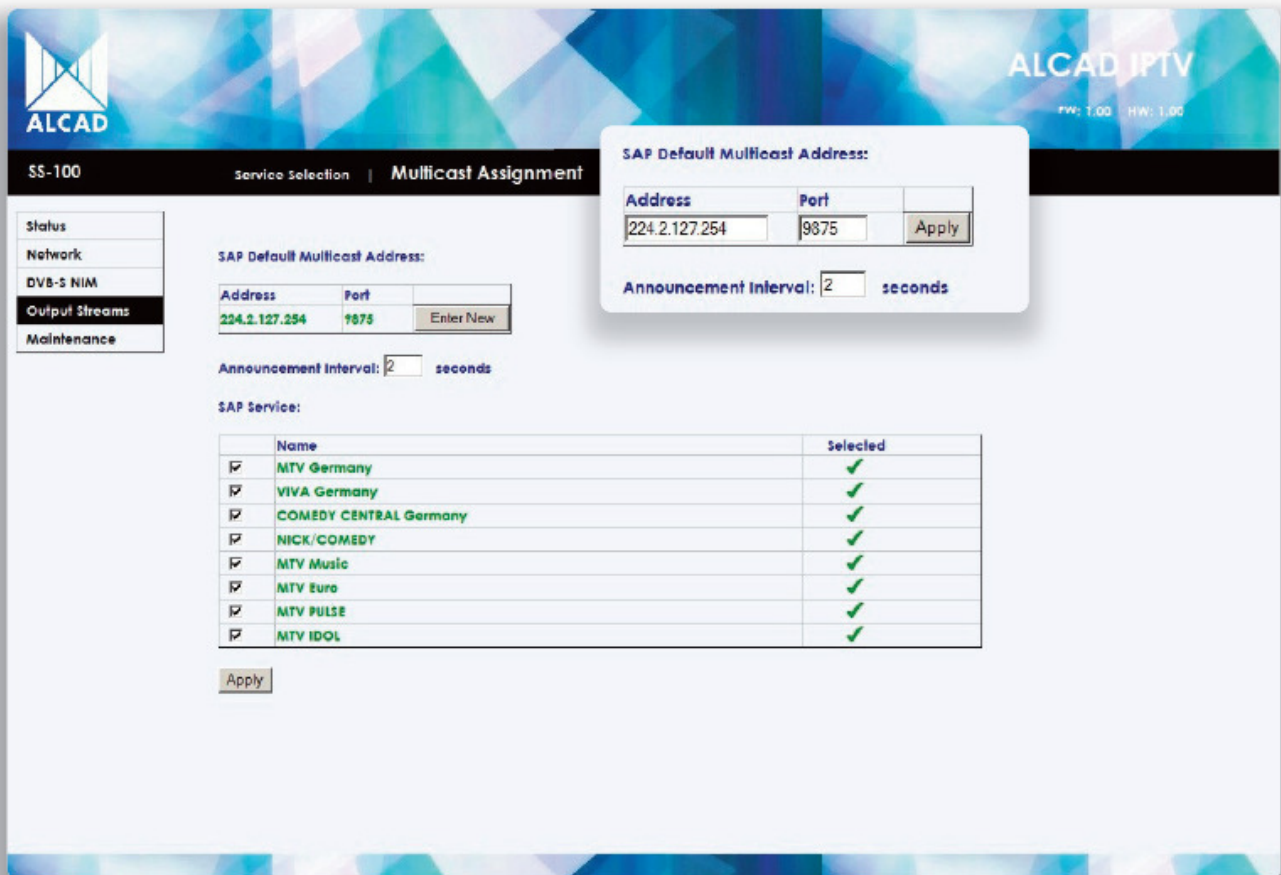
Advanced Options:

To confirm the configuration, click on the *Apply & Start* button.

Within the Multicast Assignment menu, advanced configuration options are available. These allow you to select the Service Announcement Protocol (SAP) data to be sent and the IP address they are to be sent to.

- SAP Default Multicast Address: sends the list of selected TV/radio services to the assigned address (224.2.127.254: 9875 is the default address of the IP receivers). This IP address can be configured by the user: to do this, click on the Enter New button, and enter the desired IP address and port in the appropriate fields.
- Announcement Interval: length of time between SAP announcements (by default, 2 seconds).
- SAP Service: List of services to be sent.

This can be seen on next page



ALCAD IPTV

FW: 1.00 HW: 1.00

SS-100 Service Selection | Multicast Assignment

Status
Network
DVB-S NIM
Output Streams
Maintenance

SAP Default Multicast Address:

Address	Port
224.2.127.254	9875

Enter New

Announcement Interval: 2 seconds

SAP Service:

Name	Selected
<input checked="" type="checkbox"/> MTV Germany	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> VIVA Germany	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> COMEDY CENTRAL Germany	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> NICK/COMEDY	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> MTV Music	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> MTV Euro	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> MTV PULSE	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> MTV IDOL	<input checked="" type="checkbox"/>

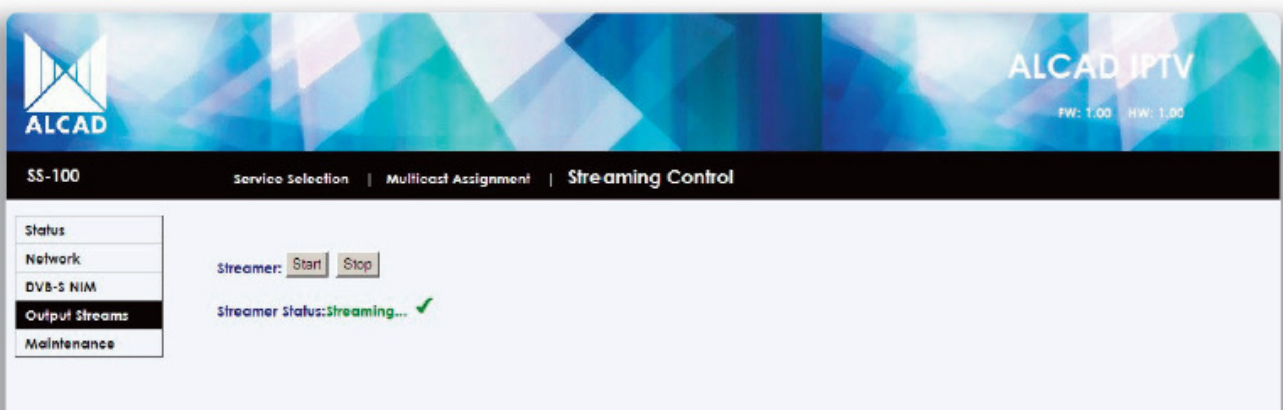
Apply

To confirm the selection, click on the *Apply* button.

Streaming Control

This is used to control the status of the SS module. There are two possible states: streaming, i.e. sending a stream of data; or stopped, i.e. sending no data through the RJ-45 output.

- Streamer: Start or stop the SS module by clicking on either Start or Stop.
- Streamer Status: shows whether the SS module is functioning or not (*Streaming, Stopped*).



ALCAD IPTV

FW: 1.00 HW: 1.00

SS-100 Service Selection | Multicast Assignment | Streaming Control

Status
Network
DVB-S NIM
Output Streams
Maintenance

Streamer: Start Stop

Streamer Status: Streaming... ✓

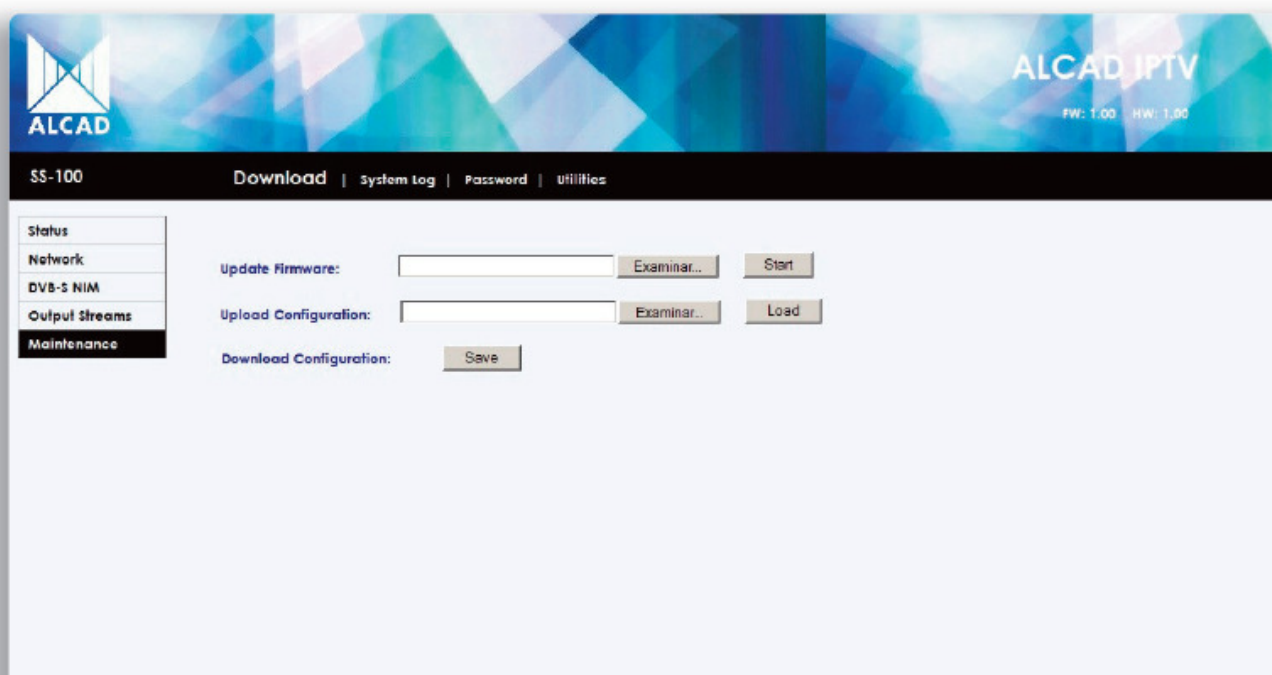
Maintenance

Maintenance and adjustment of the SS module.

Download

This is used for both the update of the firmware of the SS module and for remote configuration; and even for making backups of the configurations.

- Update Firmware: updates the firmware of the SS module. *The extension used is: *.axf*
- Upload Configuration: allows you to automatically upload the configuration parameters of an SS module after they have been saved. *The extension used is: *.scn*
- Download Configuration: saves the configuration of the SS module in a file. *The extension used is: *.scn*

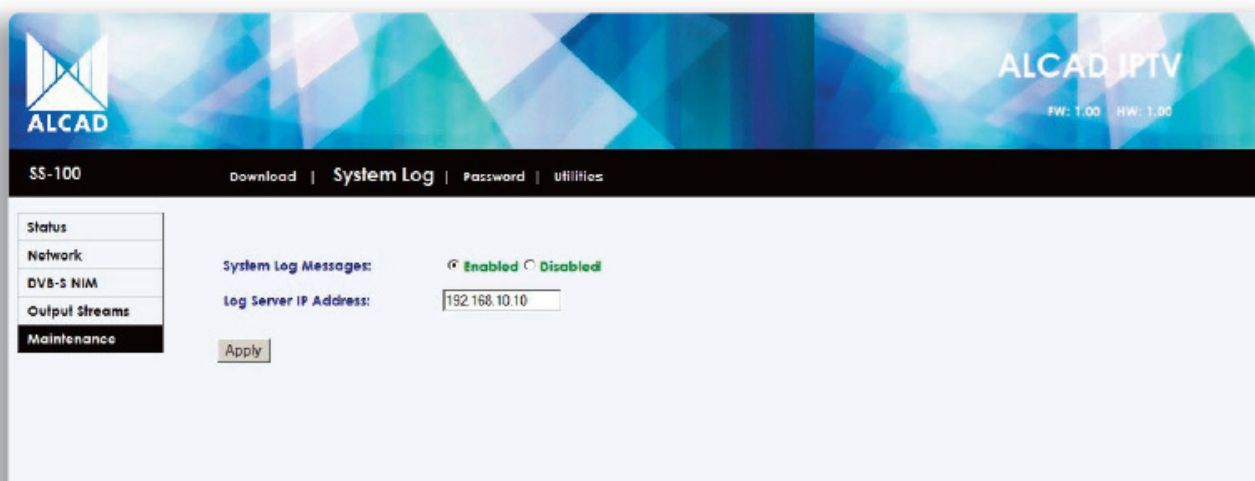


The screenshot shows the ALCAD IPTV web interface. The top header features the ALCAD logo on the left and 'ALCAD IPTV' with 'FW: 1.00 HW: 1.00' on the right. Below the header is a navigation bar with 'SS-100', 'Download', 'System Log', 'Password', and 'Utilities'. The left sidebar contains a menu with 'Status', 'Network', 'DVB-S NIM', 'Output Streams', and 'Maintenance' (which is highlighted). The main content area is titled 'Download' and contains three sections: 'Update Firmware:' with a text input field, an 'Examinar...' button, and a 'Start' button; 'Upload Configuration:' with a text input field, an 'Examinar...' button, and a 'Load' button; and 'Download Configuration:' with a 'Save' button.

System Log

This sends incident messages generated in the SS module to a syslog server on the network.

- System Log Messages: enables or disables the error-forwarding feature *Enabled, Disabled*.
- Log Server IP Address: IP address of the syslog server to which data concerning incidents will be sent. *The range of possible addresses is 192.168.0.2 – 192.168.255.254.*



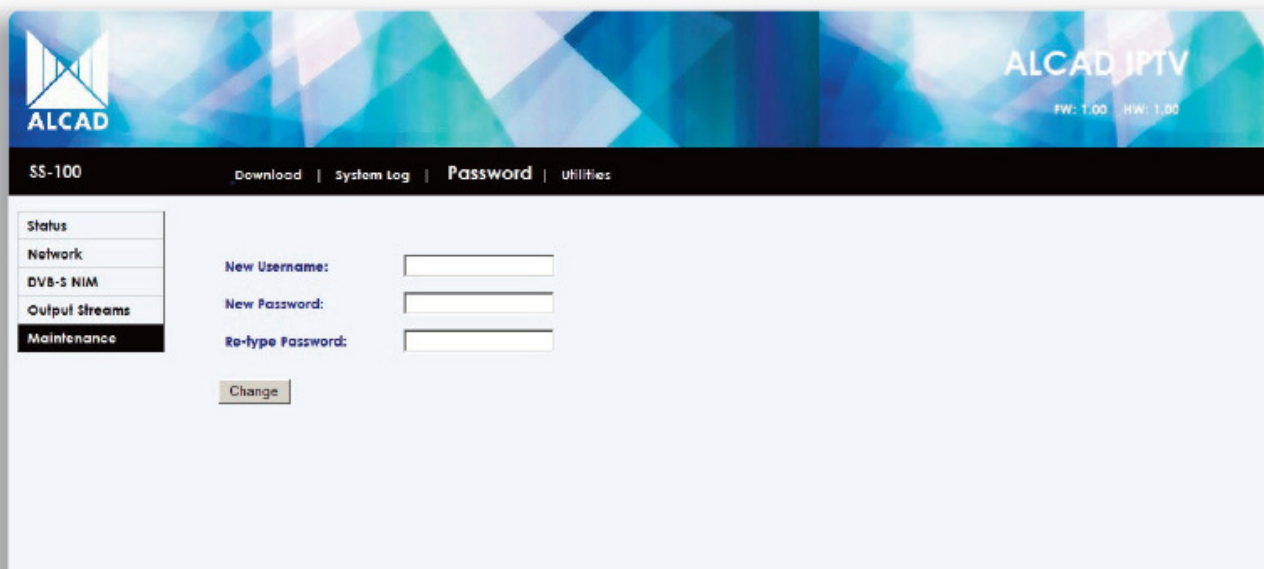
The screenshot shows the ALCAD IPTV web interface with the 'System Log' section selected in the navigation bar. The left sidebar is the same as the previous screenshot. The main content area is titled 'System Log' and contains two sections: 'System Log Messages:' with radio buttons for 'Enabled' (which is selected) and 'Disabled'; and 'Log Server IP Address:' with a text input field containing '192.168.10.10' and an 'Apply' button below it.

To confirm the configuration, click on the *Apply* button.

Password

This menu item allows you to change the username and password.

- New Username: enter the new username in this field.
- New Password: enter the new password in this field.
- Re-type Password: confirm the new password by re-typing it in this field.

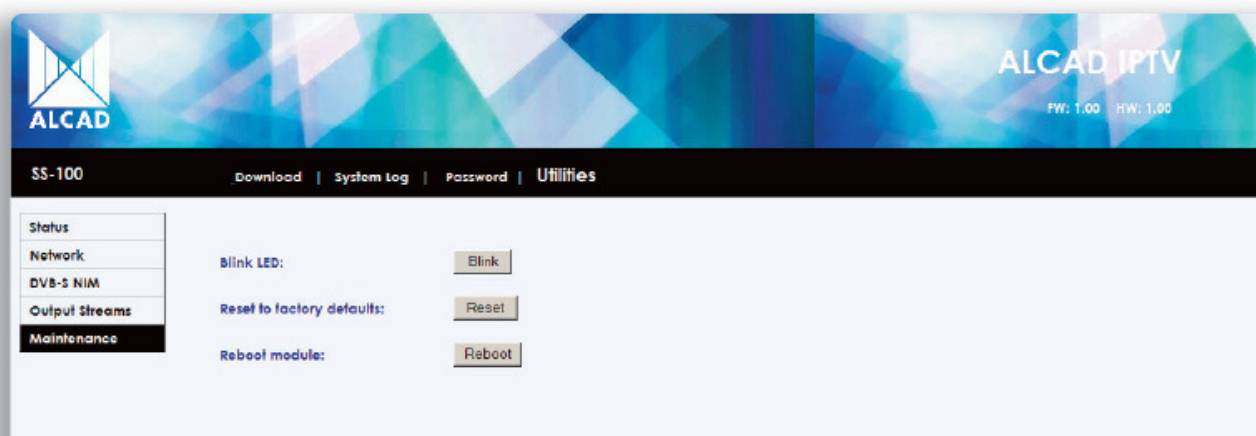


The change of username and password will not take effect until you press the *Change* button.

Utilities

Menu with several utilities for the operation of the SS module:

- Blink LED: Clicking on the Blink button will cause the TSP indicator of the SS module to flash for several seconds. This option can be used to physically identify, on the headend, the module which is being programmed.
- Reset to factory defaults: Clicking on the Reset button resets the configuration of the SS module to the factory default values.
- Reboot module: Clicking on the Reboot button causes the SS module to restart.



EXAMPLE OF IP CONFIGURATION AND OPERATION

Once the equipment has been connected, the SS modules must be programmed on-line using the graphical environment we have just described. So far, we have explained all the possible configuration options. Now let's take a specific example: the programming of equipment consisting of 9 SS-xxx series modules.

FACTORY NETWORK CONFIGURATION OF THE MODULES

Configuration type: Static IP
IP address: 192.168.10.100
Subnet mask: 255.255.255.0
Default Gateway: 192.168.10.1

DESIRED NETWORK CONFIGURATION

Configuration type: Static IP
IP address: 192.168.23.2 – 192.168.23.10
Subnet mask: 255.255.255.0
Default Gateway: 192.168.23.1

MULTICAST CONFIGURATION

Multicast Base Address: 230.40.50.60 Port 1234
Differentiated Service: AF33-Highest Priority
Stream Payload Format: UDP TTL: 1

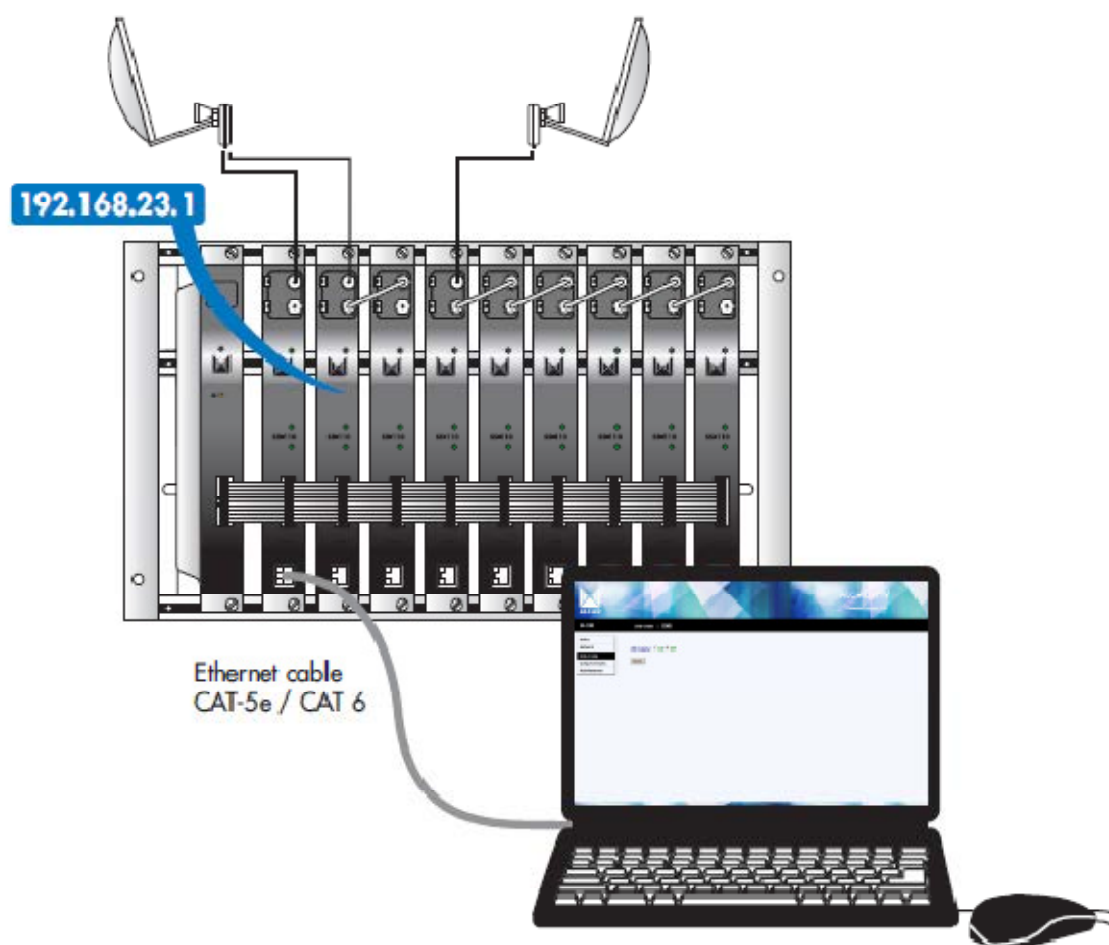
1

First we must configure the network of our PC/MAC within the same range that we receive the SS modules configured in the factory (192.168.10.100).

We will enter the address: 192.168.10.254.

2

All SS modules leave the factory with the same IP address: 192.168.10.100. This is why, to avoid conflicts with other IP addresses, we must initially configure the IP address for each module in local mode. Subsequently, we will access the DVB-S IP (SS-xxx) headend via the local area network (LAN) in order to configure the modules one by one. Use an RJ-45 cable to connect the PC/MAC locally to the headend module to be programmed.

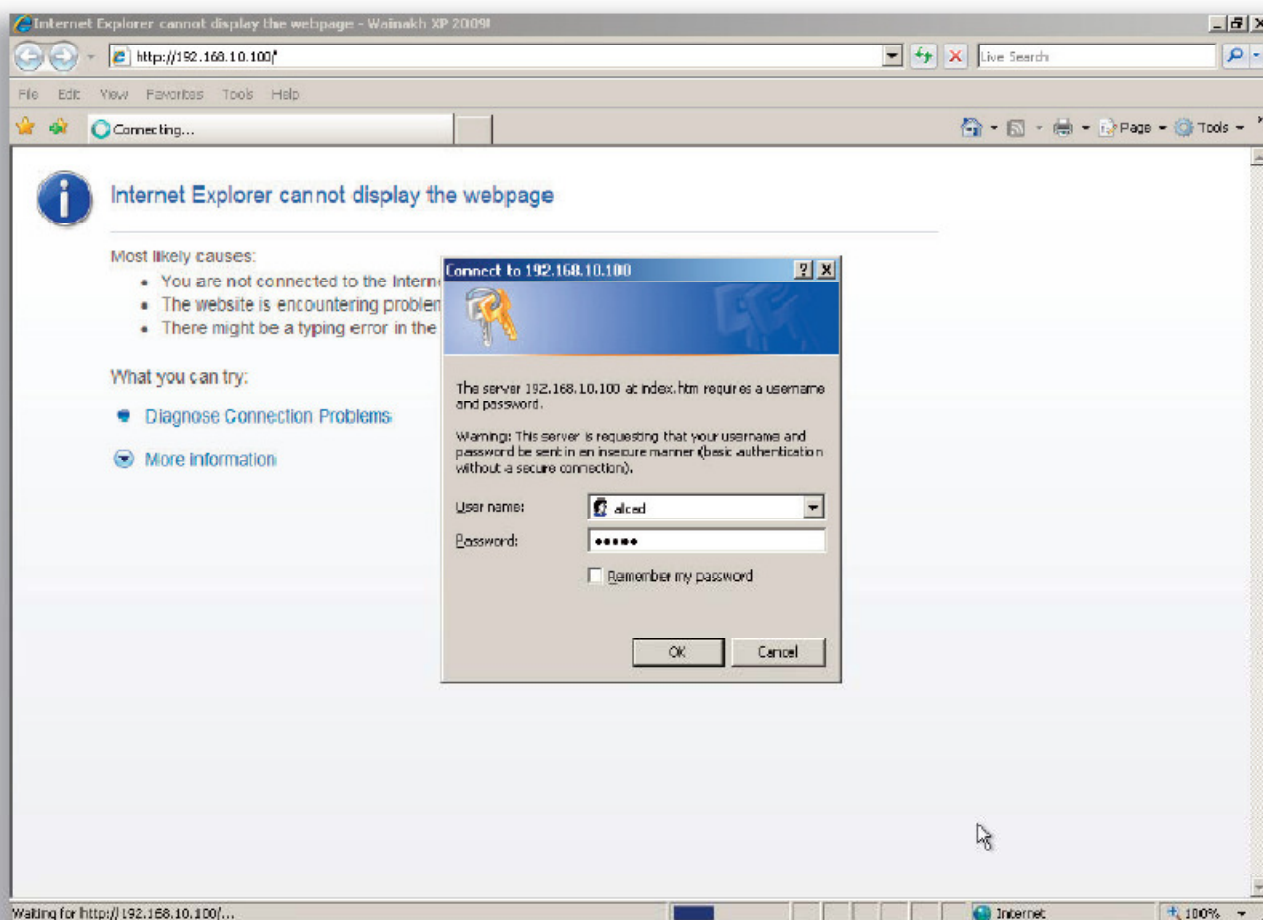


3

Open your web browser and enter the IP address of the module – 192.168.10.100 (default value) – in the address bar.

The first page of the ALCAD IPTV configuration program will appear on the screen. Access to the site is protected by username and password. Hence, once the default key has been changed, the only people who can enter the site will be those who have been provided with a permanent key by the installation company. By default, the first time the module is accessed, the key is:

User name: ***alcad***
Password: ***alcad***



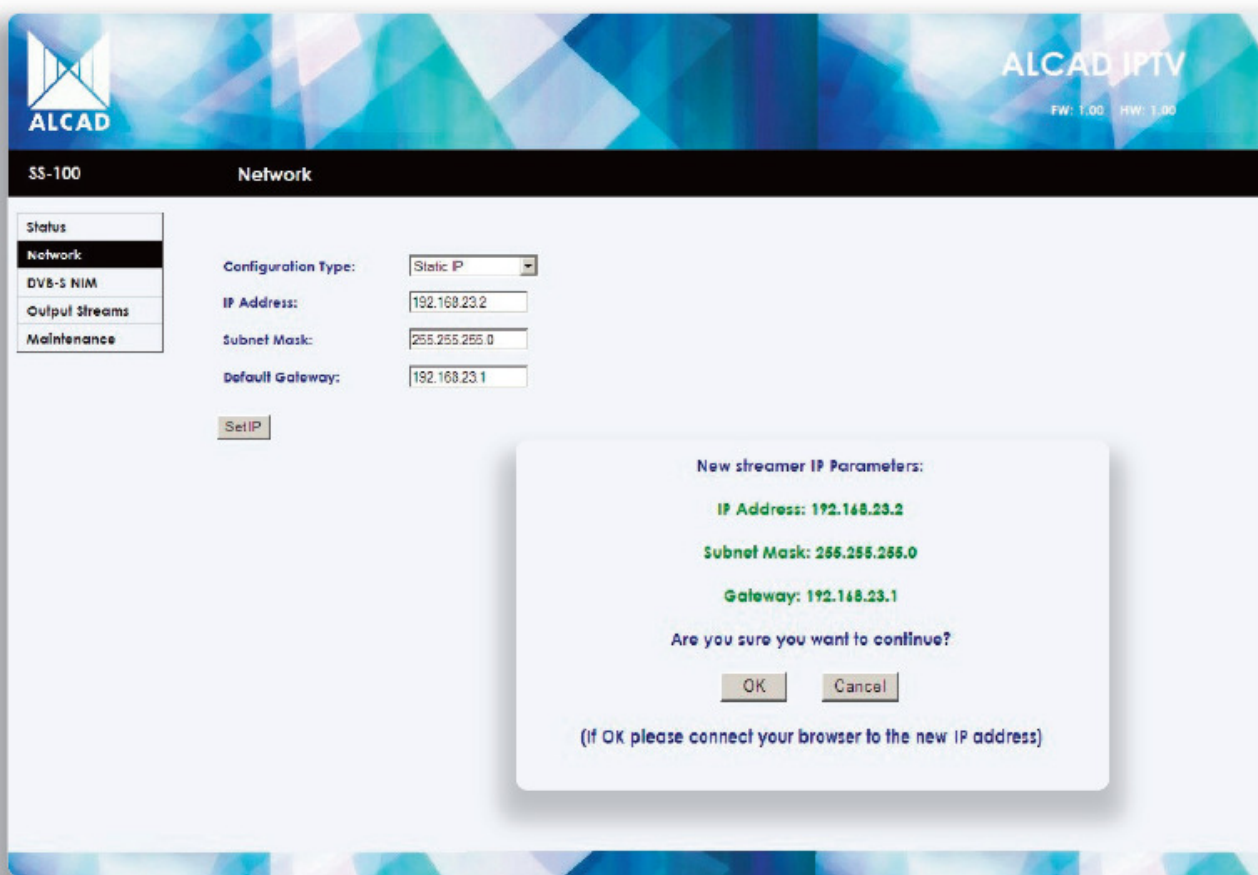
4

Once the correct key and password have been entered, we have access to all the menus for the configuration of the module. The first step will be to assign to the SS module the IP address we want it to work with on the network. In this example, we shall configure the equipment on the network 192.168.23.XXX, and we will assign a correlative IP address to each module, from 2 to 10 (since our example is for a headend with 9 modules).

To do this, we go to the Network menu and configure the SS module as follows:

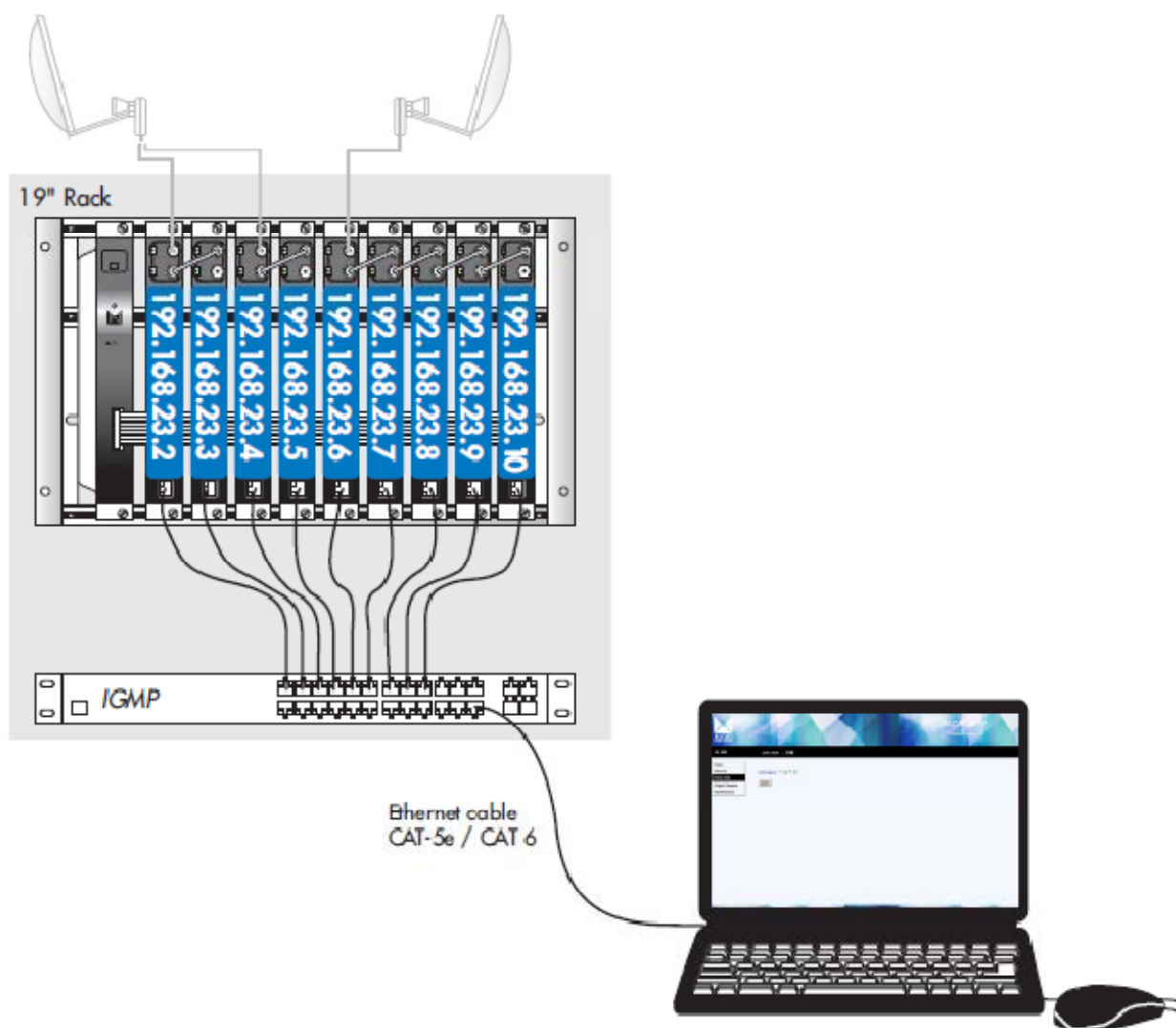
- Configuration Type: **Static IP**
- IP address: **192.168.23.2**
- Subnet mask: **255.255.255.0**
- Default Gateway: **192.168.23.1**

To apply this configuration, click on the *Set IP* button.



5

When you do this, a confirmation box will pop up. We must bear in mind that when we confirm this step, the navigator will suddenly stop displaying this screen, since we are navigating with the default IP address (192.168.10.100). By confirming, we change the IP address of the module, so that there is no longer any communication between the browser and the module.



6

We can now connect all the SS modules to the switch without any problems being caused by IP address conflicts. We shall now connect the PC/MAC to the switch, configuring it on the same network as the modules and the switch itself, but with a different IP address. We configure the IP of the PC/MAC with the following data:

- IP address: **192.168.23.254**
- Subnet mask: **255.255.255.0**
- Default gateway: **192.168.23.1**

At this point, we can now configure the parameters of all the SS modules simply by entering the IP address of one module after another in the address bar of the browser.

ACRONYMS

ARP - Address Resolution Protocol is a telecommunications protocol used for resolution of network layer addresses into link layer addresses, a critical function in multiple-access networks. ARP has been implemented in many combinations of network and overlaying internetwork technologies, such as IPv4

HTTP - Hypertext Transfer Protocol is a networking protocol for distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web HTTP functions as a request-response protocol in the client-server computing model. In HTTP, a web browser, for example, acts as a *client*, while an application running on a computer hosting a web site functions as a *server*. The client submits an HTTP *request* message to the server. The server, which stores content, or provides *resources*, such as HTML files, or performs other functions on behalf of the client, returns a response message to the client. A response contains completion status information about the request and may contain any content requested by the client in its message body. A web browser (or client) is often referred to as a *user agent* (UA). Other user agents can include the indexing software used by search providers, known as web crawlers, or variations of the web browser such as voice browsers, which present an interactive voice user interface. The HTTP protocol is designed to permit intermediate network elements to improve or enable communications between clients and servers.

ICMP - Internet Control Message Protocol is one of the core protocols of the Internet Protocol Suite. It is chiefly used by the operating systems of networked computers to send error messages indicating, for example, that a requested service is not available or that a host or router could not be reached. ICMP can also be used to relay query messages. ICMP differs from transport protocols such as TCP and UDP in that it is not typically used to exchange data between systems, nor is it regularly employed by end-user network applications (with the exception of some diagnostic tools like ping and traceroute).

IPv4 - Internet Protocol version 4 is a connectionless protocol for use on packet-switched Link Layer networks (e.g., Ethernet). It operates on a best effort delivery model; in that it does not guarantee delivery, nor does it assure proper sequencing or avoidance of duplicate delivery. These aspects, including data integrity, are addressed by an upper layer transport protocol, such as the Transmission Control Protocol (TCP)

UDP - User Datagram Protocol uses a simple transmission model without implicit handshaking dialogues for providing reliability, ordering, or data integrity. UDP assumes that error checking and correction is either not necessary or performed in the application, avoiding the overhead of such processing at the network interface level. Time-sensitive applications often use UDP because dropping packets is preferable to waiting for delayed packets, which may not be an option in a real-time system.

Real-time Transport Protocol (RTP) defines a standardized packet format for delivering audio and video over IP networks. RTP is used extensively in communication and entertainment systems that involve streaming media, such as telephony, video teleconference applications and web-based push-to-talk features. RTP is used in conjunction with the RTP Control Protocol (RTCP). While RTP carries the media streams (e.g., audio and video), RTCP is used to monitor transmission statistics and '*quality of service*' (QoS) and aids synchronization of multiple streams. When both protocols are used in conjunction, RTP is originated and received on even port numbers and the associated RTCP communication uses the next higher odd port number.