



# *User Manual*

Nov. 2014

Rev. 3.7

Last valid version: 3.4.3



## Index

<b>Index</b>	<b>2</b>
<b>Introduction</b>	<b>6</b>
I.1 About this manual.....	6
I.2 Contents .....	6
<b>What's Ikusnet</b>	<b>8</b>
II.1 Introduction .....	8
II.2 Ikusnet ENG .....	8
II.3 Ikusnet ENG Features .....	9
II.4 Ikusnet BP .....	12
II.5 Ikusnet ST.....	16
II.6 Ikusnet ST Decoder .....	17
II.7 Ikusnet Family modes of operation .....	17
II.8 Applications .....	20
<b>Getting started</b>	<b>22</b>
III.1 Turning on the units.....	23
III.2 Main menu .....	24
III.3 Web Control Interface .....	25
III.3.1 Accessing the web page at the remote codec.....	30
III.4 Connecting the video camera .....	32
III.4.1 Connecting the video camera to Ikusnet ST .....	32
III.4.2 Connecting the video camera to Ikusnet ENG .....	32
III.5 Setting the IP parameters .....	34
III.5.1 Wired IP connection (Ethernet) .....	34
III.5.2 Wireless IP connection (3G/4G) .....	36
III.6 Configuring video feeds and monitor screens .....	42
III.7 Configuring audio feeds.....	43

# ***KUSNET*** *User Manual*

III.8 Selecting the interface .....	44
III.9 Establishing the IP connection .....	47
III.9.1 Video Bit rate configuration .....	51
III.10 Monitoring the status of the connection .....	52
III.11 Finishing the connection .....	53
<b>Operation Guide</b> .....	<b>54</b>
IV.1 Communications .....	54
IV.2 Iksnet ENG VIDEO input /output menu tabs.....	55
IV.2.1 PROGRAM video input selector for Iksnet ENG unit.....	56
IV.2.2 Display 1 output selector.....	56
IV.2.3 Display 2 output selector.....	56
IV.3 Iksnet ENG AUDIO mixer input menu tab .....	57
IV.4 Iksnet ST VIDEO & AUDIO input /output menu tab .....	57
IV.5 File menu .....	59
IV.5.1 File recording menu.....	61
IV.5.2 File upload menu .....	63
IV.5.3 File player menu .....	65
IV.5.4 File editor .....	66
IV.5.5 File Monitor .....	67
IV.5.6 Network share .....	68
IV.6 Video options menu .....	72
IV.6.1 Video inputs configuration .....	73
IV.6.2 Video encoder H.264 configuration for Standard Definition Format (SD) .....	75
IV.6.3 Video encoder H.264 configuration for High Definition (HD) .....	76
IV.6.4 Video output configuration (Only Iksnet ST or Iksnet ST Decoder) .....	77
IV.6.5 Video test functions.....	78
IV.7 Audio options menu .....	79
IV.7.1 Mic /Line inputs configuration .....	80
IV.7.2 Audio headphone output configuration in Iksnet ENG.....	81
IV.7.2.1. Headphone L & R independent control .....	82
IV.7.2.2. Headphone panoramic control .....	83
IV.7.3 Audio output configuration in Iksnet ST and ST Decoder .....	85
IV.7.4 Audio encoders .....	85
IV.7.5 Audio test functions.....	86
IV.7.6 Audio Gain Level .....	87
IV.7.7 Misc Menu .....	88

# **KUSNET** *User Manual*

IV.8 Streaming options menu .....	90
IV.8.1 Network selection .....	90
IV.8.2 Connection options.....	92
IV.8.3 Streaming Protocol selection .....	93
IV.8.4 Streaming RX parameters .....	95
IV.8.5 Streaming TX parameters .....	96
IV.8.6 Communications Profiles .....	98
IV.8.7 Streaming Forwarding .....	100
IV.8.8 Call Log .....	101
IV.9 Interfaces options menu .....	102
IV.9.1 LAN1 configuration.....	102
IV.9.2 LAN2 configuration.....	103
IV.9.3 Wi-Fi configuration.....	104
IV.9.4 3G/4G network's configuration .....	109
IV.9.5 RS232 configuration .....	110
IV.9.6 GPIOs.....	111
IV.9.7 Data usage.....	113
IV.10 Book options menu .....	114
IV.11 User options menu .....	115
IV.12 System menu.....	117
IV.13 Preset menu.....	123
IV.14 Monitor menu .....	124
IV.14.1 Main monitor screen.....	124
IV.14.2 Audio monitor screen.....	125
IV.14.3 Video monitor screen.....	125
IV.14.4 Streaming monitor screen .....	126
IV.14.5 3G/4G monitor screen .....	130
IV.14.6 System monitor screen.....	131
IV.15 Alarm menu .....	132
<b>Technical Specifications</b> .....	<b>135</b>
V.1 supported video inputs formats .....	135
V.2 RS232 ports.....	136
<b>Updating the firmware</b> .....	<b>138</b>
<b>Detailed Ports Description</b> .....	<b>146</b>
VII.1 Management Ports .....	146



# ***KUSNET*** *User Manual*

VII.2 Streaming Ports .....	147
<b>Glossary</b>	<b>148</b>
<b>Picture index</b>	<b>152</b>

## Chapter I

### INTRODUCTION

---

Ikusnet is an HD/SD Mpeg4 [AVC/H.264](#) bidirectional IP video and audio codec system that can broadcast live everywhere 24/7, supporting ad-hoc bandwidth aggregation of up to 10 IP links selectable from 8 3G/4G links, 2 WAN/LAN interfaces and one Wi-Fi connection.

One of the members of this family, Ikusnet ENG, is the only portable video codec in the market supporting bidirectional live video and audio/talkback streams all in one compact unit, with 2 switchable video inputs (2 cameras) and 2 monitor screens that allow the user to monitor video inputs, video feedback (cue program) and the quality of locally encoded video.

These video screens allows the user to use them to do some basic video editing, like 'top and tail' of pre-recorded video files.

In this manual, all the aspects regarding the functions, configuration parameters and operation modes of the Ikusnet codecs are fully explained.

#### I.1 About this manual

The [User Manual](#) is applicable to most of the common features provided by the Ikusnet Family of codecs, as well as some other features that concern only to some of them. When one of this features is applicable only to some specific codecs, but not to all of them, it will be remarked.

#### I.2 Contents

The information of the [User Manual](#) is arranged in the following sections:

- **Chapter I – Introduction**

Contents of the Manual.

- **Chapter II – What's Ikusnet?**

This chapter is a brief summary of Ikusnet, its features and applications

# ***KUSNET*** *User Manual*

- **Chapter III – Quick Start**

This chapter is a quick guide aimed at the new users, so they can establish its first communications in a very simple way.

- **Chapter IV – Functional description**

Ikusnet can be controlled from a touch panel or from a Web Browser. This chapter describes, in a comprehensive way, how the unit can be configured using either controlling interface.

- **Chapter V – Technical specifications**

This appendix describes the technical specifications common to all devices of the Ikusnet Family.

- **Chapter VI – Updating the firmware**

This appendix describes how to update the Ikusnet codec firmware.

- **Chapter VII – Detailed port description**

- **Chapter VIII – Glossary**

This appendix provides definitions to some terminology that can be found along this User Manual.

## Chapter II

### WHAT'S IKUSNET

---

#### II.1 Introduction

Ikusnet family of codecs are based on FPGA/DSP platform, fully designed by Prodys to obtain the best possible quality of compression both for video and audio.

There are many applications where Ikusnet units can fit, being the most important the News Gathering one, where Ikusnet ENG and Ikusnet BP portable codecs can provide the customer with a fully functional Live Contribution System in a small, easy to use, lightweight and portable pack, that can broadcast live from anywhere at anytime.

Ikusnet family of codecs comprises the following devices:

- Ikusnet ENG
- Ikusnet BP
- Ikusnet ST
- Ikusnet ST Decoder

In the following sections we will take a look at them.

#### II.2 Ikusnet ENG

Ikusnet ENG is a HD/SD Mpeg4 [AVC/H.264](#) bidirectional portable IP video and audio codec that can broadcast live everywhere 24/7, supporting ad-hoc bandwidth aggregation of up to 10 IP links selectable from eight 3G/4G links, two WAN/LAN interfaces and one WIFI connection.



# ***KUSNET** User Manual*

Ikusnet ENG is the only portable video codec in the market supporting bidirectional live video and audio/talkback streams all in one compact unit, with 2 switchable video inputs (2 cameras) and 2 monitor screens that allow the user to monitor video inputs, video feedback (cue program) and the quality of locally encoded video.

These video screens allows the user to use them to do some basic video editing, like 'top and tail' of pre-recorded video files, making this unit even more unique in the ENG portable video codecs market.



**Picture 1. Ikusnet ENG codec.**

## **II.3 Ikusnet ENG Features**

Among Ikusnet ENG most remarkable features are:

- **H.264 video compression.** This advanced standard for video compression is widely used by broadcast services and internet sources. The Ikusnet implementation has been realized using a specifically designed Hardware platform to leverage real-time operation. Furthermore, the compression algorithms have been adjusted to obtain the best possible quality at any bit rates, focusing on low bit rates where compression quality is critical and makes the big difference between our codecs and the rest. This implementation has also reduced the coding delay to the minimum.
- **Video + Audio.** Ikusnet ENG is not just a video codec; it is also a powerful MPEG AAC audio codec and mixer that allows the user to add a stereo audio channel to the video stream, either for transmission or recording.

This audio channel may come from various sources:

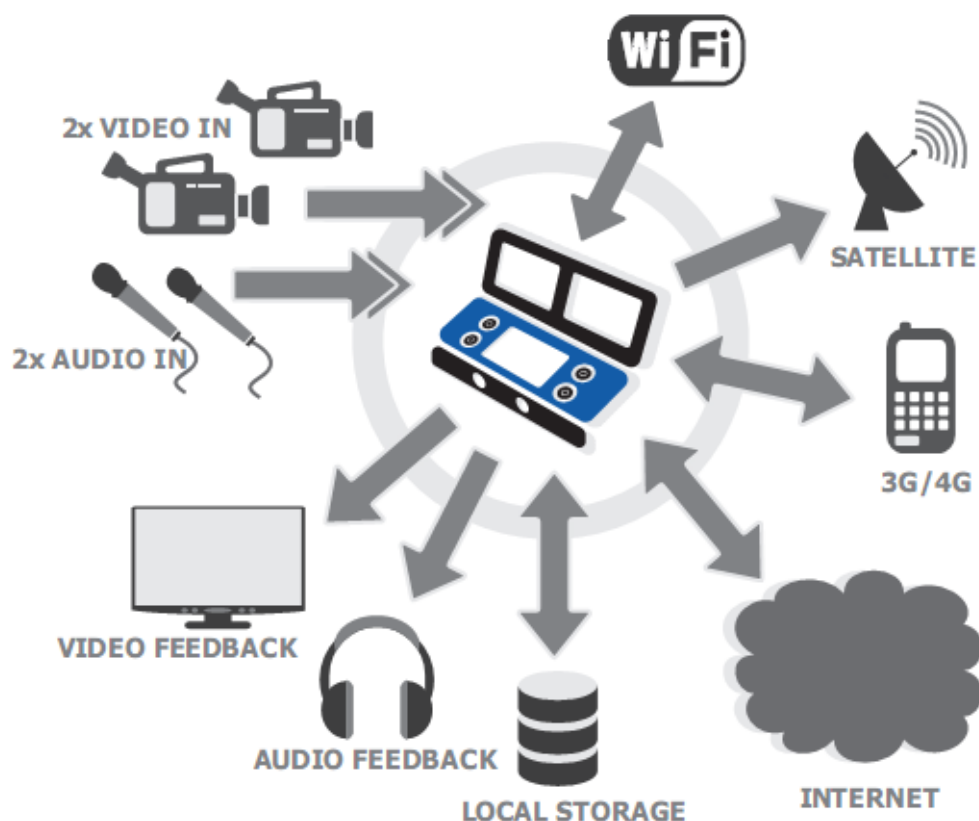
©Prodys S.L. Tel: +34 91 6896880 ☎ Fax: +34 91 6943777 ☎ Email: [sales@prodys.net](mailto:sales@prodys.net) ☎ Web: [www.prodys.com](http://www.prodys.com)

# **KUSNET** User Manual

- The audio embedded in the video inputs (first two embedded audio channels).
- Two independent mic/line inputs.

Ikusnet includes an audio mixer to compose the final audio stream based on those inputs.

- **2 HD or SD Video inputs.** Ikusnet ENG allows the user to select between two independent video inputs. This would allow the user, for example, to switch dynamically between two cameras during a real time contribution.



**Picture 2. Ikusnet input/output diagram.**

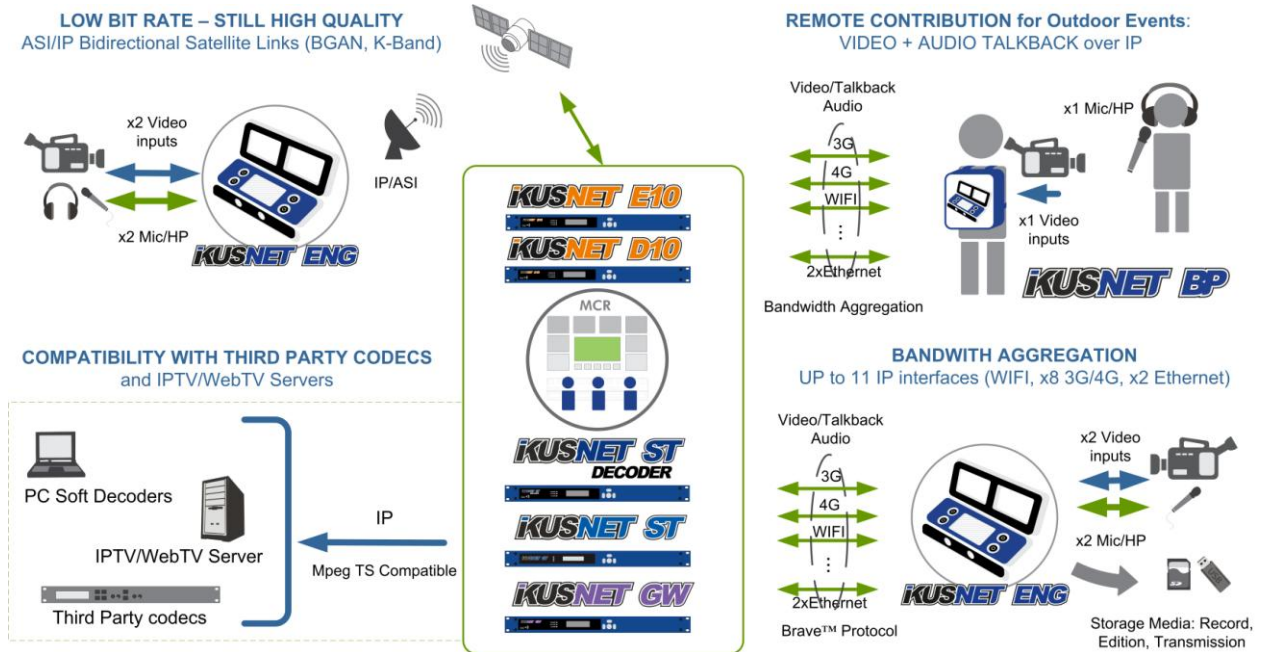
- **Bidirectional.** Ikusnet is not just an encoder, it's also a complete audio and video decoder that can simultaneously send and receive video and audio streams. This permits to establish bidirectional communications, opening the

# **KUSNET** *User Manual*

door to numerous and interesting applications such as video conferencing, video interviews, multisite news events, debates, etc.

- **2 Monitor Screens.** Its two monitor screens allow different visualization possibilities. These monitor screens can be configured to show the video input feed, the output of the encoder or the video signal returned from the remote end. These video screens allows the user to use them to do some basic video editing, like 'top and tail' of pre-recorded video files, making this unit even more unique in the video codecs market.
- **Talkback audio channel:** Besides the main program communication, with audio and video, there's a possibility of establishing a second MONO audio communication. This can be useful for coordination purposes or as a second independent audio channel. Both mic/line audio inputs can be switched to be mixed either on the main video stream (alone or mixed with the video input embedded audio), or to the Talkback audio channel.
- **LAN, 3G/4G, Wi-Fi:** Ikusnet ENG is an IP codec whose stream can be transmitted using a wired connection by means of one or two Ethernet ports or a wireless communication by means of bonding the bandwidth of several different 3G/4G mobile wireless data connections (up to 8) and one Wi-Fi link. The key point is that it is also possible to combine wired and wireless data lines to get a wider transmission bandwidth (bandwidth aggregation of up to 10 IP interfaces).
- **DVB/ASI:** The DVB/ASI interface allows Ikusnet ENG codec to connect to a DVB/ASI enabled satellite modem and thus to transmit MPEG4 compressed audio and video data over existing satellite link, offering another interface to stream the video and audio data.
- **Files:** Although Ikusnet is a device whose main applications are in the field of real-time transmissions, it also has the ability to record video files for later transmission, and to send/receive files via FTP. When sending files, the unit supports fast FTP by aggregating the bandwidth of up to 10 different IP interfaces, thus making the file transfer much faster than a regular FTP transmission.

# KUSNET User Manual



**Picture 3. Ikusnet Family connectivity diagram.**

## II.4 Ikusnet BP

Ikusnet BP is based on Ikusnet ENG platform sharing the same compression technology, but in a different format, smaller, lighter. This makes Ikusnet BP the perfect solution for a video contribution application where the camera man might carry both the camera and the video transmission unit (Ikusnet BP) in a backpack whilst operating both the unit and the camera.

For a better understanding of Ikusnet BP functions, we will just expose the differences between Ikusnet BP and Ikusnet ENG, as they share the same platform and technology for the compression and transmission:

-Ikusnet BP supports just one video input, whilst Ikusnet ENG supports two of them.

# ***KUSNET*** *User Manual*

-It does not support video monitors. This makes the unit smaller and lighter, so that it is better for a 'backpack' video contribution application (the camera man might carry both the camera and the transmission system).

-It is not a decoder, just an encoder. It is able to encode and transmit video in real time, but not to receive it from the studio site. However, Ikusnet BP is still able to establish a bidirectional talkback audio channel (bidirectional IFB channel).

-To end with, the touch panel is not built-in. It is detachable and it is connected to the unit via a USB cable. This touch panel allows the user to control and monitor the system whilst still carrying it in its backpack.



**Picture 4. Codec Ikusnet BP.**



# ***KUSNET*** *User Manual*

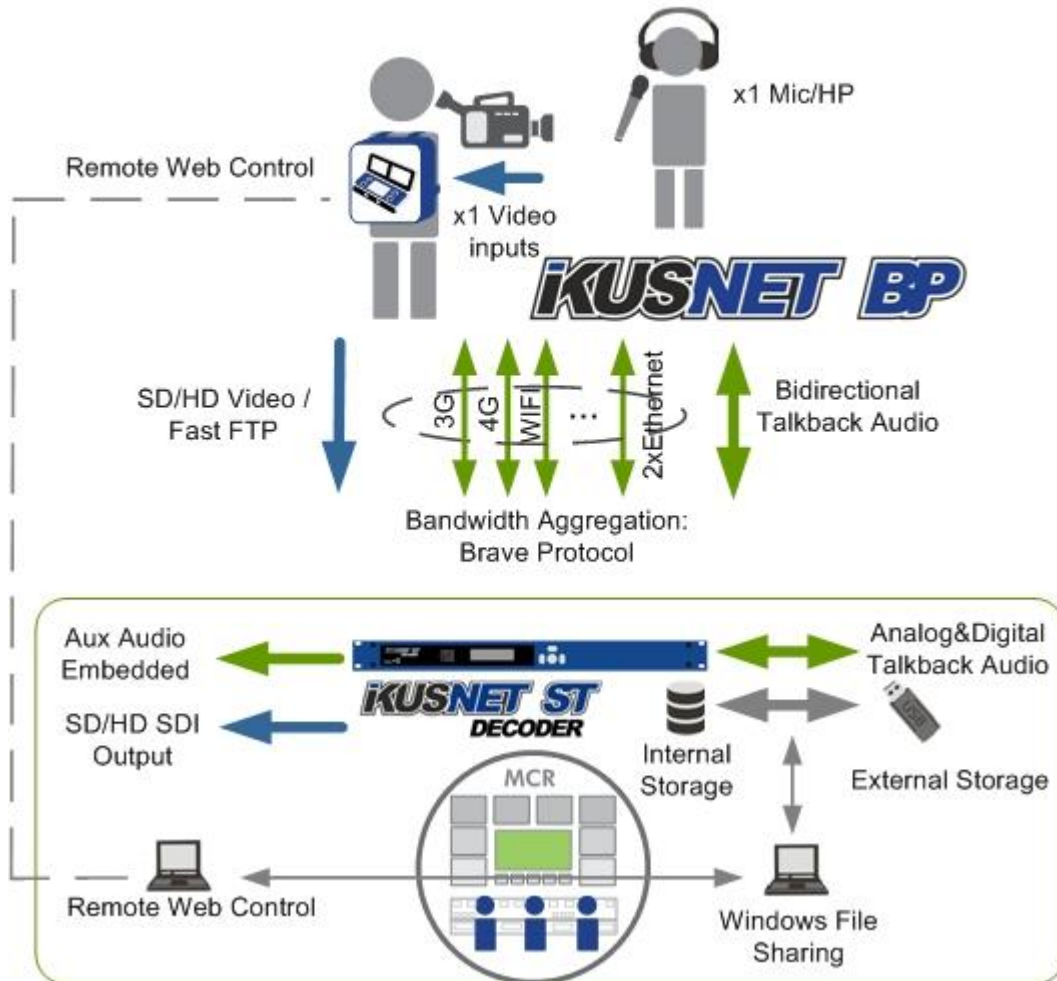


**Picture 5. Ikusnet BP video portable uplink application.**

Here follows a diagram with an example of connection between Ikusnet BP and Ikusnet ST Decoder:

# ***KUSNET*** User Manual

## REMOTE CONTRIBUTION for Outdoor Events: VIDEO + AUDIO TALKBACK over IP



**Picture 6. Ikusnet BP – Ikusnet ST Decoder connection diagram.**

# ***KUSNET** User Manual*

## **II.5 Ikusnet ST**



**Picture 7. Ikusnet ST codec.**

Besides the portable version of Ikusnet, there is a 1U rack mount model called **Ikusnet ST** whose main application is to receive, decode and store video streams from remote Ikusnet units. But Ikusnet ST is not just a decoder, it is also capable of encoding video back to the portable unit and provide some video feedback to the remote unit.

In addition to this, Ikusnet ST is also able to establish a talkback/coordination bidirectional audio channel between the studio site and a remote Ikusnet codec.

To end with, Ikusnet ST is able to receive up to 10 concurrent FTP streams (video file reception). That means that up to 10 remote units might be uploading files to one Ikusnet ST unit at the same time. Once Ikusnet ST unit receives a file from a remote Ikusnet codec, it is able to retransmit that file via standard FTP to any FTP server, acting like a kind of gateway for FTP file transmission. For this application the ST unit supports a high-capacity hard disk to store [H.264](#) encoded video.

This unit is controlled using a web graphical interface or its front panel display menu.



## **II.6 Ikusnet ST Decoder**



**Picture 8. Ikusnet ST Decoder front panel.**

Ikusnet ST Decoder is basically an Ikusnet ST unit without the ability to encode and transmit video. It just receives and decodes a video signal coming from a remote Ikusnet encoder.

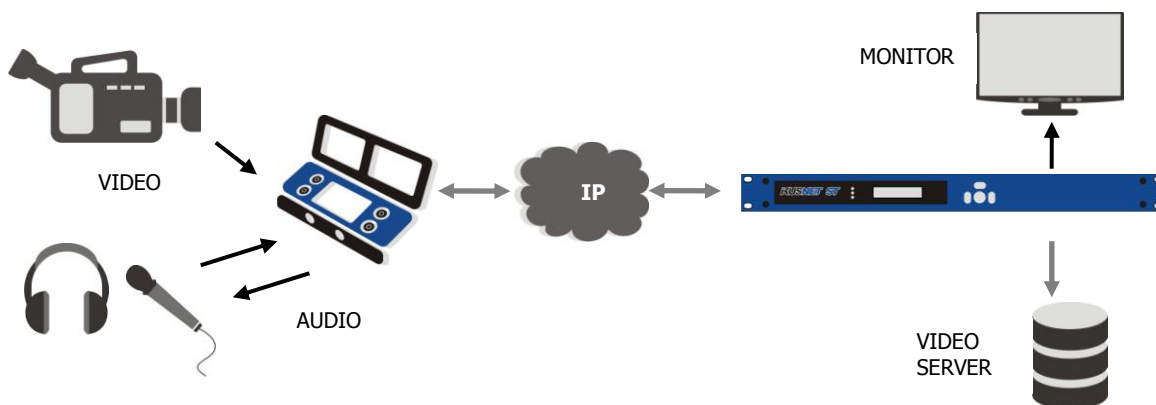
However, Ikusnet ST Decoder is still able to establish the bidirectional talkback/coordination (IFB) audio channel to the remote Ikusnet codec.

## **II.7 Ikusnet Family modes of operation**

These are Ikusnet's five main modes of operation:

- **Real Time Ethernet transmission.** When a wired IP connection is available via an Ethernet connector, a bidirectional audio and video communication can be established between two Ikusnet units using a wired IP link.

# ***KUSNET*** User Manual



**Picture 9. Real time Ethernet transmission.**

It is also possible to split up the bitstream into 2 bit-streams, to be transmitted through the 2 Ethernet ports available in the unit. Those 2 sub-streams will be multiplexed at the receiving end.

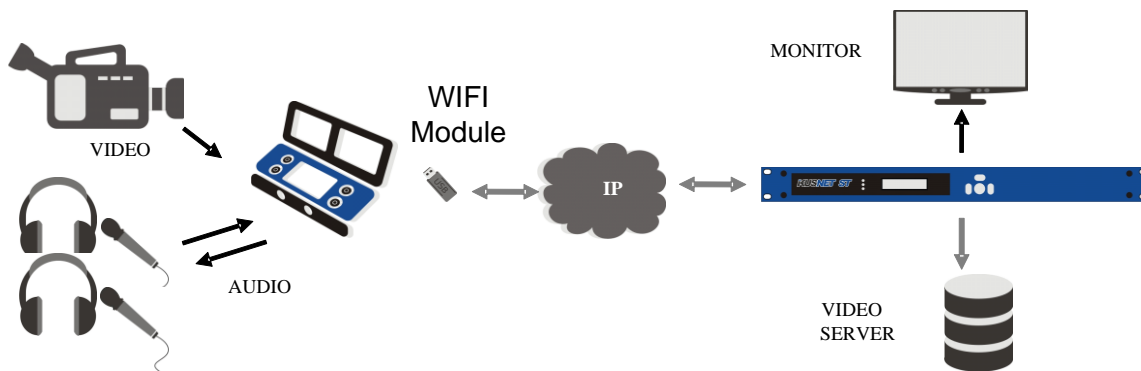
- **Real Time 3G/4G transmission.** When no wired IP connection is available, a bidirectional audio and video communication between an portable Ikusnet unit and an Ikusnet rack unit can still be established using the wireless 3G/4G communication module. Ikusnet is able to aggregate bandwidth from up to 8 3G/4G data links, dividing up (demux) the bitstream into N sub-streams that will be bonded (multiplexed) at Ikusnet rack unit. Using this technology, the bandwidth provided by the mobile network operators can be widely enlarged.



**Picture 10. Real Time 3G/4G Transmission over 8 3G/4G links.**

# **KUSNET** User Manual

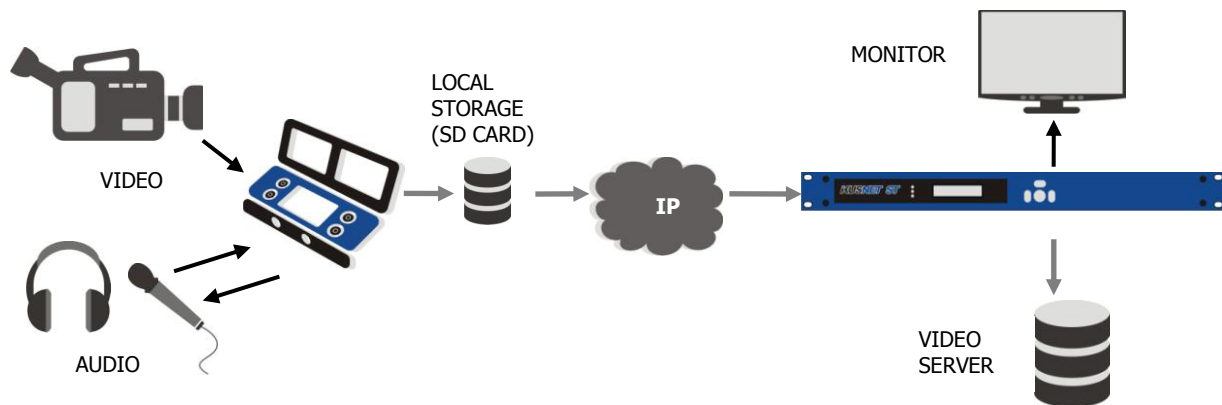
- **Wi-Fi connectivity:** When Wi-Fi networks are available, and the unit is equipped with the Wi-Fi module, one Wi-Fi network can be used for audio and video streaming. Take into account that the main purpose of the Wi-Fi link is not to act as a primary link, but to be bonded to the some other available links like 3G/4G or Ethernet interfaces to get as much bandwidth as possible available for the connection.



**Picture 11. Wi-Fi module transmission.**

- **Real Time Custom Bonding.** When Ethernet, 3G/4G and Wi-Fi connections are available, a combination of up to 10 different interfaces can be used to stream the audio and video as well as to upload pre-recorded files. This technology allows the user to get as much bandwidth as possible by aggregating the capacity of each of the available links. This is done by a proprietary statistical algorithm that evaluates in real time the capacity of each communication link and balance the bandwidth usage of each interface based on that information.
- **File Storage and Forward.** Even when no wired or wireless IP connections are available, Ikusnet allows the user to encode and store video and audio in a SD card (Ikusnet ENG), a hard disk (Ikusnet ST or ST Decoder) or USB device for a future transmission. The stored files can be edited and uploaded to Ikusnet ST or to an FTP server as soon as an IP connection is available.

# ***KUSNET*** User Manual



**Picture 12. File storage and forward.**

## **II.8 Applications**

There is a wide range of applications where Ikusnet can fit:

- **Real Time News Contribution:** this is the main application because the design of the codec has been optimized for that. A portable unit can encode an SD/HD video input together with an audio channel and send them with a minimum delay through any of the following means of signal transportation:
  - LAN
  - Wi-Fi
  - Internet
  - 3G/4G networks
  - Satellite
- **Bidirectional communications:** An Ikusnet unit can send and receive video simultaneously. This unique feature permits to use the codec in other applications different from news gathering, like programs with interviews, commentators, debates... all those where a video and audio feedback is desirable. In addition to this, encoder and decoder (both audio and video) are independent, meaning that the unit is able to send and receive video and audio with different qualities and at different rates.
- **Program + talkback:** the support of a second audio channel enables Ikusnet's users to establish a separate bidirectional audio communication



# ***KUSNET*** *User Manual*

apart from the audio being transmitted on the main video link. This second audio communication can be used for coordination or as a secondary audio feed to the studio (i.e. ambient sound).

- **News gathering** (store, editing and forward). Many times, an IP connection is not available to make a live contribution. Under those circumstances, the program can be recorded in a compressed file and stored in the SD memory card or USB device. Later on, when an IP connection is available, that file can be uploaded to a FTP server or to an Ikusnet ST unit, usually at the studio end.

## Chapter III

### GETTING STARTED

---

This chapter is aimed at describing to new users the basic operation to start a video and audio connection over IP between two Ikusnet codecs. The usual application would be the connection of one portable Ikusnet codec to one studio rack Ikusnet, but any combination is possible. The following chapter explains how to connect one Ikusnet ENG to an Ikusnet ST.

All screen shots in this chapter belong to the front touch panel menu of the Ikusnet ENG version, but they can be extended to the embedded web control page, given that the menu structure is exactly the same. This quick guide applies also to Ikusnet BP and Ikusnet ST Decoder, as they are based on Ikusnet ENG and Ikusnet ST respectively, just taking into account the differences outlined in chapters II.4 and II.6.



# ***KUSNET*** *User Manual*

## **III.1 Turning on the units**

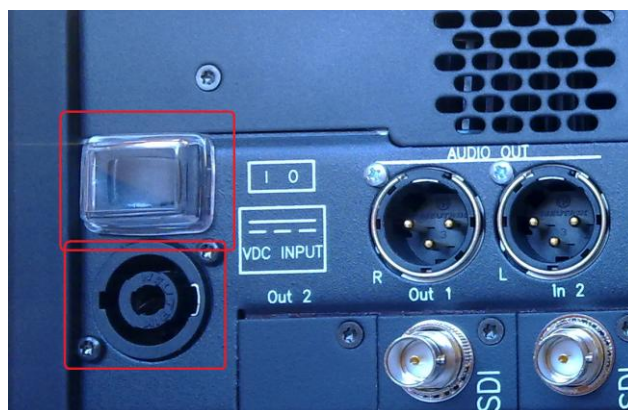
Ikusnet ENG can be powered by its auxiliary external battery, by a standard V-Lock or Gold Mount (Anton Bauer) battery, or can be connected to any standard 110/220VDC power supply with the external power adapter supplied with the unit. Ikusnet ST can be connected directly to any standard 110/220VDC power supply as it comes equipped with an internal Power Supply Unit (PSU).

To connect the external power adaptor to Ikusnet ENG and the power cable to the Ikusnet ST unit look for the power inlet on the rear panel (please refer to the pictures below).

To turn on either Ikusnet ENG or Ikusnet ST unit look for the power switch on the rear panel and switch it on.



**Picture 13. Ikusnet ST Power switch and power inlet**



**Picture 14. Ikusnet ENG Power switch and power inlet**

NOTE: Ikusnet BP has a yellow button that must be pressed for a few seconds for the unit to start. The same procedure must be followed to turn the unit off.

# ***KUSNET*** *User Manual*

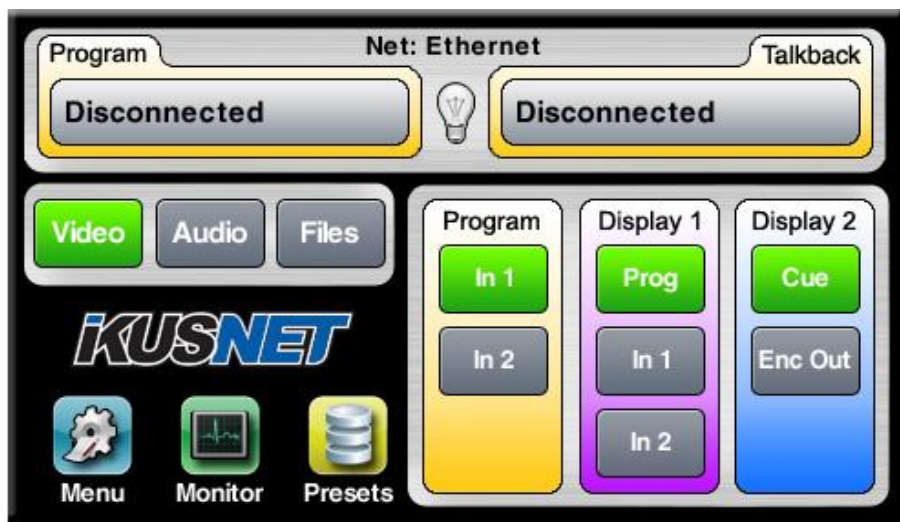
## **III.2 Main menu**

Once the units have been turned on, the booting sequence will start. In the Ikusnet ST the Power LED on the front panel will blink indicating that the booting sequence is taking place. Once the unit completes this sequence, both Power and System LEDs will light on Ikusnet ST, and the main menu will be accessible through the front panel keypad, just pressing the OK button.




**Picture 15. Ikusnet ST main menu.**

On Ikusnet ENG, the unit will show the main menu on the touch panel screen as shown in the picture below:



**Picture 16. Ikusnet ENG main menu.**

NOTE: Take into account that the web control menu of Ikusnet ENG codec is exactly the same as the touch panel menu, and the web interface on Ikusnet ST share most of the structure of Ikusnet ENG codec so, from now on, on this chapter, we are just showing the configuration for the Ikusnet ENG codec and, only in those cases where the configuration between Ikusnet ST and ENG codecs is different, we will notify this with the following picture: 



# ***KUSNET*** ***User Manual***

## **III.3 Web Control Interface**

Prodys Ikusnet codecs can be controlled remotely by using an Internet Explorer web browser. The computer can be locally connected directly via a crossover CAT-5 cable, sharing the same Ethernet switch with the codec's LAN interface or remotely via the Internet.

To access the Ikusnet codec from the browser, enter the IP address of the unit in the address bar of Internet Explorer.

Keep in mind that the Ikusnet factory default IP address is 192.168.100.100 and it could be necessary to modify the network configuration of the computer on which the web browser is running the first time.<sup>1</sup>

**IMPORTANT:** Please note that it is possible to enable a second LAN interface (optional). This interface will become the streaming interface while the first LAN interface (LAN1) will be the interface to control the unit.

**IMPORTANT:** The Web browser must be Microsoft Internet Explorer 5.0 or higher.

The first time the user accesses the Prodys IP Family codec web page, an OCX file has to be downloaded and installed on the computer. *Microsoft Internet Explorer can be configured to block OCX objects installation and/or execution.* So, depending on the configuration of the web browser, the following message can appear when first accessing the Prodys IP Family codec web page:

---

<sup>1</sup> Ikusnet codecs support a front panel menu that allows the user to check and configure the IP address without having to enter the web control page.

# **KUSNET** User Manual



**Picture 17. Internet Explorer Security Warning**

Go to Internet Options in IExplorer, click on 'Security' tab, and set 'prompt' when downloading ActiveX signed and unsigned controls at Local and Internet zones.



# **KUSNET** User Manual



**Picture 18. Internet Explorer's Security Settings**

**Windows Vista:** Should the user experience a problem when downloading the OCX file when first accessing the web page of the unit, *please disable UAC (User Access Control) on Windows Vista*. Once the OCX file has been installed in the computer, UAC can be enabled again.

Each firmware version might have a different OCX file, so the new OCX should be installed with the first access to the new web page version of the unit. When a unit is upgraded, depending on the 'cache' configuration of the Internet explorer, there might be problems when accessing the web page, given that the old web page might be offered by the browser instead of the real one, which should be installed to replace the old one. In this case, a message indicating '*Incorrect Versions*' will appear as soon as the user click on 'Control' or 'Monitor' on the Prodys login page. Click on F5 to skip the cache entries, and access to the 'real' web page. Even after pressing F5 and, depending on the IExplorer configuration and/or version, this situation might continue. *In that case, go to Internet Options in IExplorer, click on 'General' tab, and delete temporary files.*

To access the Prodys IP Family codec from the Internet Explorer enter the IP address of the unit in the address bar and the following window will appear:

# ***KUSNET*** User Manual



**Picture 19. Ikusnet Login Window**

The user has to enter the username and password settings to get access to the main web page. The factory default configuration defines one user whose name is 'Administrator' with no password associated and with full access to all configuration settings and menus.

**Web Ports:** Ikusnet listens to port TCP 80 to give access to the login web page, and once the customer enters the user and password, the unit communicates to the web browser via port TCP 50011 to transmit/receive real time information (it is a dynamic web page).

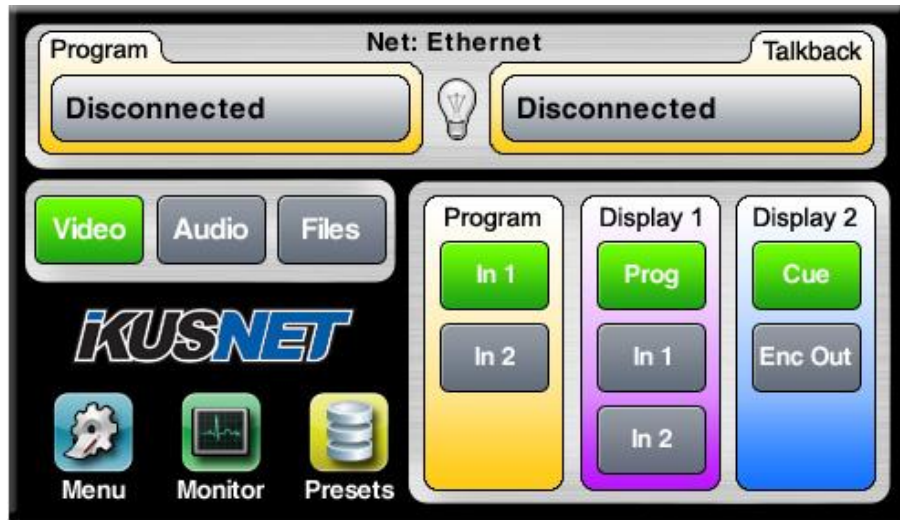
## **About Ports**

There are two different ports regarding the web access:

- **Web Server Port:** It is port TCP 80. This port is used to access to the login page.
- **Base Port:** Port TCP 50011. This is the port used by the Internet Explorer browser to send and receive real time information to/from the unit.

When the user enters the main web page by entering a user name and a password, the following window will appear:

# ***KUSNET*** User Manual



**Picture 20. Ikusnet Main Window**

Ikusnet Web page is arranged in three main areas:

- General Configuration area. ❶
- Control area. ❷
- Monitor area. ❸



**Picture 21. Ikusnet Main Window. 3 main areas**

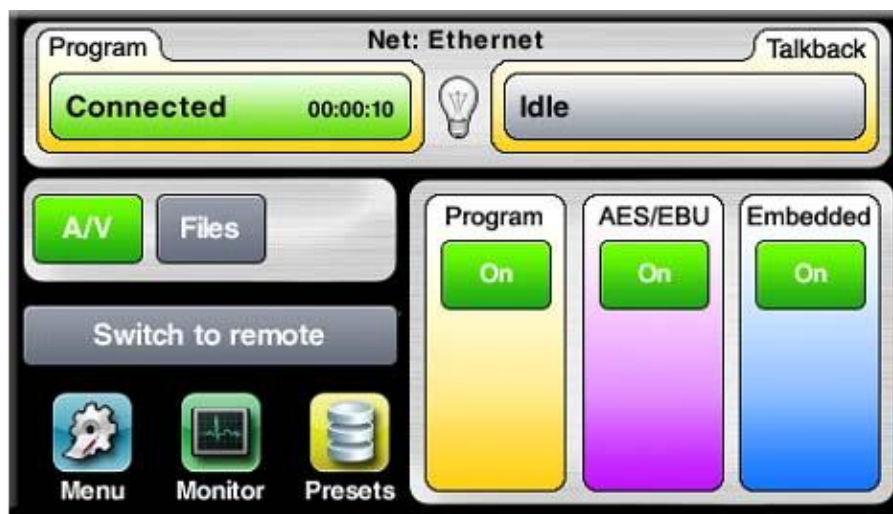


### **III.3.1 Accessing the web page at the remote codec**

Many times it is not possible to access the web page of a remote Ikusnet ENG codec because of firewalls. A typical scenario is one Ikusnet ENG codec connected to the Internet via a 3G/4G link. Even though the user might know the public IP address of that link, it is not possible to access the web page of the unit behind the 3G/4G connection because the 3G/4G network acts as a firewall for incoming connections.

Even in those cases, it is possible to access the web page of a remote Ikusnet ENG unit by accessing the local Studio codec, Ikusnet ST, and vice versa. If the main PROGRAM line (video streaming line) is connected from a remote Ikusnet codec, the user can access the remote web page by accessing the web page of the local unit. Take into account that it does not matter what type of codec is at the remote and local ends, as long as they both of the Ikusnet Family of codecs, but this chapter will show an example of controlling a remote Ikusnet ENG portable video codec from a local Ikusnet ST rack mount codec.

Please take a look at the image below:



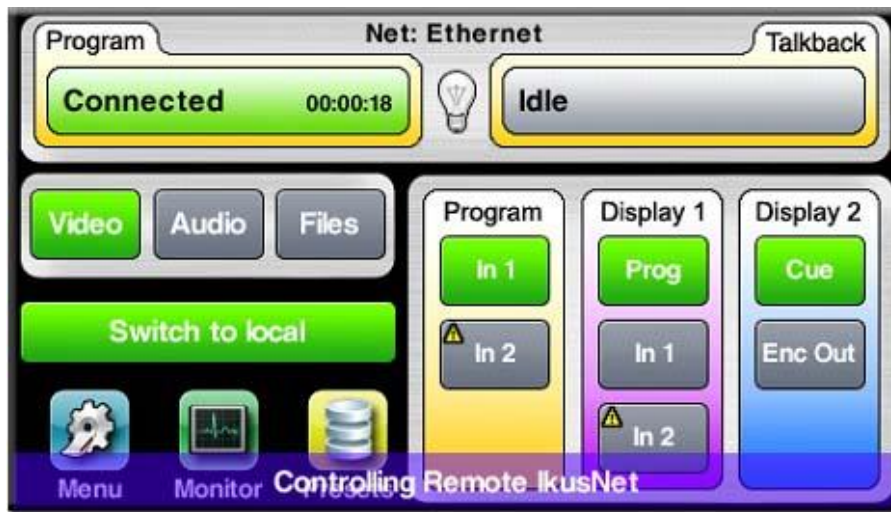
**Picture 22. Ikusnet ST Main Window**

The image above is the main web page of a local Ikusnet ST unit. As it can be seen, there is a connection in the main PROGRAM line. That connection allows

# ***KUSNET*** User Manual

the user to access the remote codec to which this Ikusnet ST codec is connected to, just by clicking on the 'Switch to remote' button.

Once the user click on that button, the web page will switch to the Ikusnet ENG main web page, and a warning message will appear at the bottom of the screen, as in the picture below:



**Picture 23. Ikusnet ENG being controlled remotely**

Please note that the button has changed to 'Switch to local' to allow the user to switch control back to Ikusnet ST again.

## **III.4 Connecting the video camera**

Ikusnet ENG supports two video inputs, whilst Ikusnet ST and Ikusnet BP supports only one<sup>2</sup>. In this chapter we will assume that these inputs are of the SDI type, but depending on the model and optionally they might be of some other types, like HDMI, for example.

### **III.4.1 Connecting the video camera to Ikusnet ST**

As it can be seen in the picture below, the video input on Ikusnet ST is located on the rear panel.



**Picture 24. Video Input 1 (SDI) in Ikusnet ST**

When only one video input is available on Ikusnet ST (standard configuration), it is not necessary to enable or select this input for it to be used as the main video feed. Just connect the camera SDI output to the Ikusnet SDI input and that video signal will be the main video feed for Ikusnet ST.

### **III.4.2 Connecting the video camera to Ikusnet ENG**

As it can be seen in the picture below, there are two video inputs on Ikusnet ENG and they are located on the rear panel.

<sup>2</sup> Ikusnet ST might be equipped with a second video input upon request.



# ***KUSNET*** *User Manual*



**Picture 25. Video inputs on the rear panel of Ikusnet ENG**

These video inputs can be of some different types. In the picture above, the unit comes equipped with one HDMI input (Video input 1) and one SDI input (Video input 2). To connect a video camera to any of these video inputs, just connect the corresponding video camera output to the video input on Ikusnet ENG codec with the corresponding cable depending on the connection type.

Given that Ikusnet ENG codec comes equipped with two video inputs, the user must select which one will be used for the streaming purposes. By default input #1 is always enabled to be the video feed for transmission. In case you are going to use the second video input or both, please refer to chapter III.6 for more information about how to switch from one input to another.

Take into account that Ikusnet ENG supports two monitor screens. The left hand monitor screen shows always a preview of the video feed corresponding to the video input currently selected.

## **III.5 Setting the IP parameters**

We will split this chapter in two different types of interfaces: Wired (Ethernet) and Wireless (3G/4G). Wi-Fi can also be used as a streaming interface but it will be described in a different chapter.

### **III.5.1 Wired IP connection (Ethernet)**

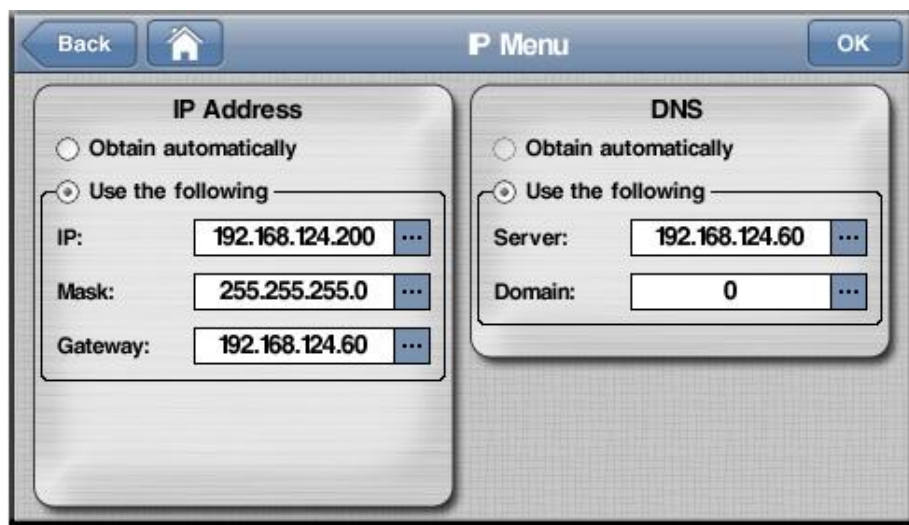
All Ikusnet units come equipped with two Ethernet interfaces. Each Ethernet interface is fully [TCP/UDP/IP](#) standard, and can be connected to any standard IP network, be it local or part of a wide network, such as the Internet.

First of all, the customer will have to set up all IP parameters. These settings will depend on the network topology. The assistance from the IT personnel might be necessary in some advanced networks.

To configure the IP parameters, click on the following icons of the front panel menu or the web page:



The following configuration window will appear:



**Picture 26. IP Menu.**

There are two different options: Either to get the IP address automatically from a DHCP server when available, or to set up these IP parameters manually. In the example above, we are configuring them manually. Optionally, the DNS protocol can be configured. It allows using domain names instead of IP addresses when establishing calls.

**NOTE:** When the unit is configured to get the IP address automatically from a DHCP server, if no DHCP server is available in the network, the unit will try for a while to get it, indicating the message 'Negotiating DHCP' on the Program and TalkBack connection bars on the main menu page and, after that, the default IP address and netmask will be assigned automatically: 192.168.100.100 / 255.255.255.0.

**LAN1:** RJ-45 connector on the rear side; 10/100/1000BT Ethernet interface. Default interface for streaming and remote control.

This interface is always enabled and it is used for transmission and reception of control data (Web and ProdysControlPlus), regardless of the settings for the Streaming Network option (be it WIFI, Ethernet, ASI, Custom Bonding...).

When 'Custom Bonding' is selected as the streaming network configuration menu, LAN1 can be selected as IP interface for bonding to other IP interfaces and thus to transmit and receive audio and video data. In this case, LAN1 will carrying both audio and video, and control data simultaneously.

When LAN2 interface is disabled and 'Ethernet' is selected as the streaming network configuration menu, LAN1 will transmit and receive all audio and video data for both the main program and the talkback audio streams.

But, when LAN2 is enabled, and 'Ethernet' is selected as the streaming network configuration menu, LAN1 interface will only transmit and control data (web control, ProdysControlPlus or any other IP data not related to the audio and video streaming).

**LAN2:** RJ-45 connector on the rear side; 10/100/1000BT Ethernet interface. It can be enabled or disabled by the user.

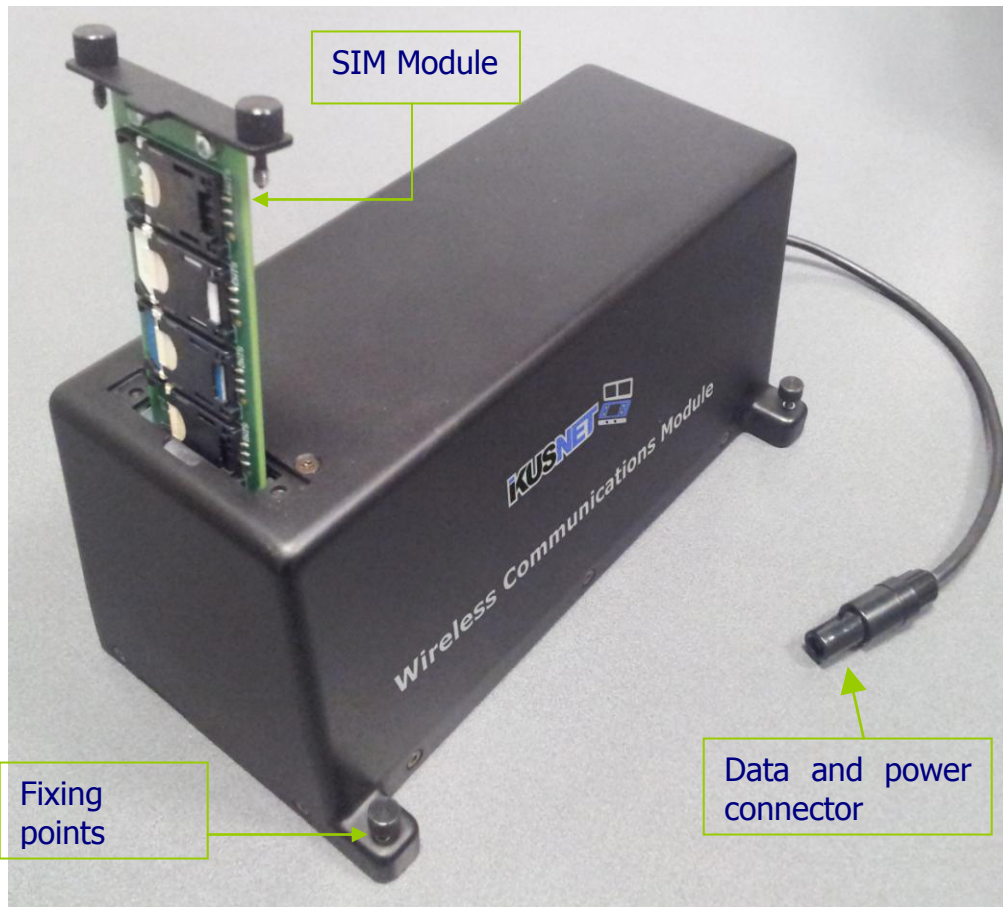
This interface will carry the streaming data (not control) if the LAN2 interface is enabled in the configuration. When enabled it is available for bonding with other IP interfaces to stream video and audio data.

### **III.5.2 Wireless IP connection (3G/4G)**

Ikusnet ENG can be equipped with a Wireless communications module supporting up to 8 internal SIM card slots with their corresponding 3G/4G modems and an internal antenna system specifically designed to improve signal reception. Ikusnet ENG or BP units will aggregate the bandwidth from the different available wireless connections. This technology allows the user to get as much bandwidth as possible by aggregating the capacity of each of the available links. This is done by a proprietary statistical algorithm that evaluates in real time the capacity of each communication link and balance the bandwidth usage of each interface based on that information.

Please find below a picture of the Ikusnet ENG 3G/4G Wireless Communications Module:

# ***KUSNET*** *User Manual*



**Picture 27. Ikusnet Wireless Communications Module.**

The wireless communications module is composed by the main box (it holds 8 3G/4G modems and the antenna system), the SIM module that holds 8 SIM card slots to insert the different SIM data cards, and the cable and connector that allows the user to hook this module up to the Ikusnet ENG unit or the Ikusnet BP unit. The connector for this module is on the rear panel of the Ikusnet ENG unit, and on the right panel of the Ikusnet BP unit. Please take a look at the picture below with the wireless module connector surrounded by a red line:

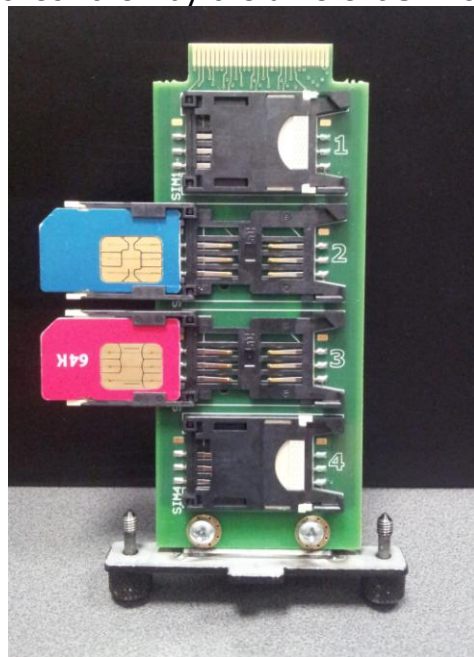


# ***KUSNET*** *User Manual*



**Picture 28. Ikusnet ENG Rear panel connector for the Wireless Communications Module.**

Before connecting the Wireless Communications module to the Ikusnet ENG or BP device, the user must insert those SIM cards available for data connections into the SIM module. The SIM module can be swapped out by unscrewing two bolts on the top cover over Wireless Communications Module. Please take a look at the picture below to check the way the different SIM cards are inserted:



**Picture 29. SIM Module.**

# **KUSNET** User Manual

*Please NOTE that the wireless communications module must be connected to the unit before switching on the unit, otherwise it will not be detected by the unit. SIM cards however can be hot-swapped.*

Each SIM slot in the SIM module has been assigned a number. That number must be taken into account when configuring each of the different 3G/4G data connections (APN, user and password) so that the SIM cards and the different configuration parameters match. Once the SIM cards have been inserted into the SIM module, the module is ready to be swapped into the Wireless Communications Module again, and then this module should be connected to the unit on its rear panel.

As soon as the user connects the module, the unit will detect it automatically and will ask for the PIN number of each of the available SIM cards, on either the web interface or the front panel menu. Once the PIN number is entered, it will be checked and kept in memory till the 3G/4G module is disconnected or the unit is restarted.

Once the internal modems are up and running and, in order for the 3G/4G data connection to be used by the unit, the [APN](#) (Access Point Name), user and password settings for each mobile network operator being used must be configured by the user. To do that, click on the following icons of the front panel menu or the web page:



The following configuration window will appear:

# ***KUSNET*** User Manual



**Picture 30. 3G/4G Menu.**

Just click on the corresponding icon to enter the [APN](#) configuration window:



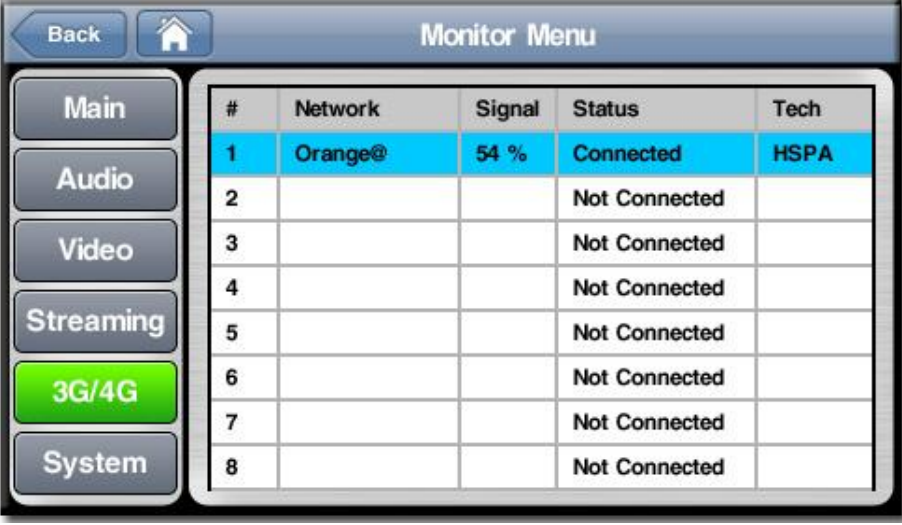
**Picture 31. 3G/4G Menu.**

In this configuration window the user has to set up the [APN](#) (Access Point Name) information, corresponding to the provider of the IP data connection for the 3G/4G modem under configuration. The [APN](#) settings are widely available on the Internet for each 3G/4G data provider.



# ***KUSNET*** User Manual

Take into account that the step above must be followed for all internal modems that have been provided with a SIM card in its corresponding SIM card slot. To get detailed information on the status of the different 3G/4G connections, please take a look at the 3G/4G section in the monitor menu:



The screenshot shows a web-based interface titled "Monitor Menu". On the left is a vertical sidebar with buttons: "Main", "Audio", "Video", "Streaming", "3G/4G" (highlighted in green), and "System". At the top of the sidebar are "Back" and "Home" icons. The main area contains a table with 5 columns: "#", "Network", "Signal", "Status", and "Tech". The first row is highlighted in blue and shows a connection to "Orange@" with 54% signal and HSPA technology. The remaining seven rows show "Not Connected" status.

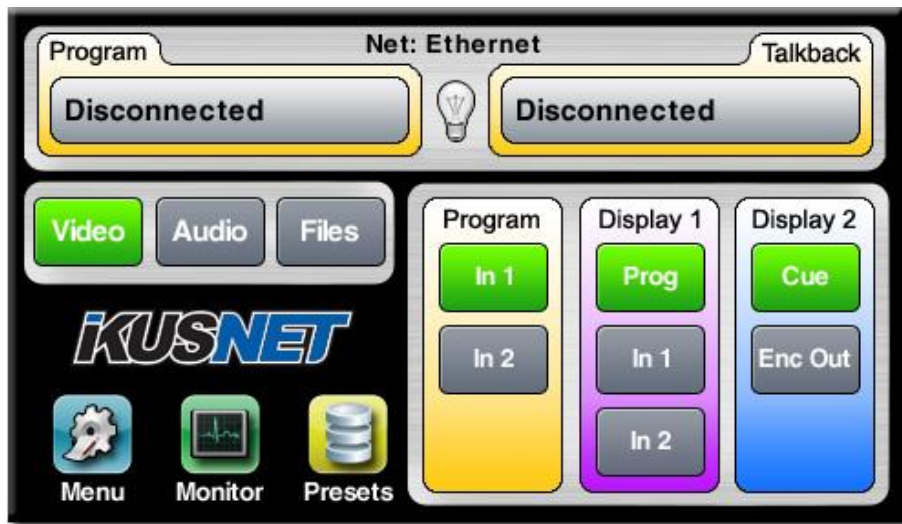
#	Network	Signal	Status	Tech
1	Orange@	54 %	Connected	HSPA
2			Not Connected	
3			Not Connected	
4			Not Connected	
5			Not Connected	
6			Not Connected	
7			Not Connected	
8			Not Connected	

**Picture 32. 3G/4G Monitor Menu.**

## **III.6** **Configuring video feeds and monitor screens<sup>3</sup>**

Before making the IP connection, the user has to configure the video inputs.

Go to the main menu page and click on the 'Video' button on the left. The main page will appear as follows:



**Picture 33. Configuring video feeds and monitor screens.**

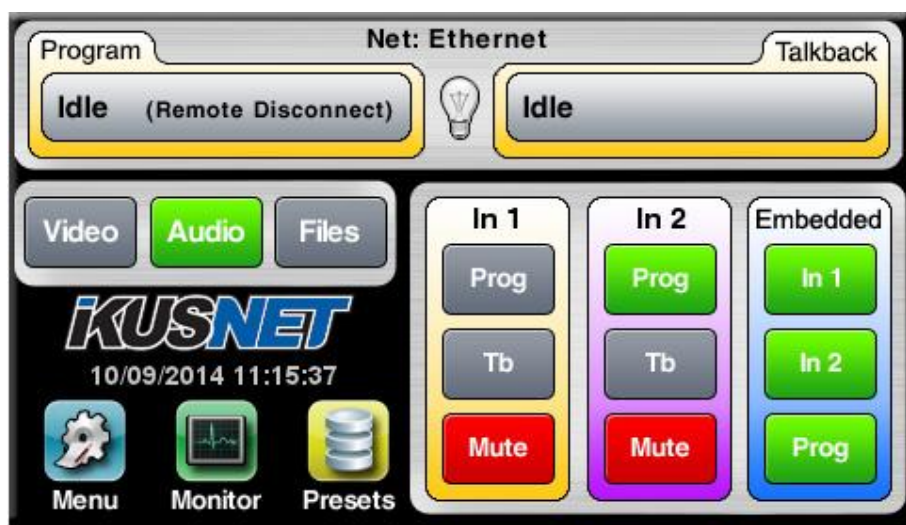
As can be seen in the picture above, the Video configuration button is enabled and the different video options are displayed on the right area of the screen. The Program column establishes which video input from the two available ones is being used as the main video feed. The other two columns set the video signal to be monitored on displays 1 and 2 respectively. In this example Display 1 will monitor the first video input feed and Display 2 the video signal returned from the far end (when the data connection is bidirectional).

<sup>3</sup> Neither Ikusnet ST nor Ikusnet BP are equipped with monitor screens, nor with two video inputs, so this configuration only applies to Ikusnet ENG Portable version.

# **KUSNET** User Manual

## III.7 Configuring audio feeds<sup>4</sup>

Click on the Audio button (between the Video and Files buttons) to set up the audio parameters. The following window will appear:



**Picture 34. Configuring audio feeds.**

The In 1 column sets the operation mode for the first audio input. This input can be routed to the Program line or to the Talkback line using the buttons Prog or Tb. The Mute button is used to mute Program and Talkback lines.

It is also possible to enable/disable the embedded audio. In this case, the audio embedded in the Video Input #1 will be mixed with the audio inputs enabled for the Program Line.

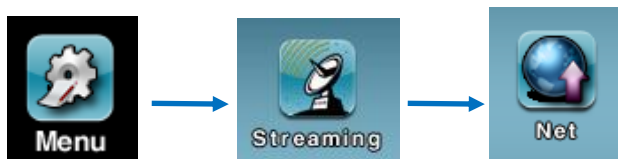
For more information on audio inputs configuration please refer to chapter IV.7.1

<sup>4</sup> Ikusnet ST does not support mic inputs, so this configuration only applies to Ikusnet ENG and Ikusnet BP.

## **III.8 Selecting the interface**

Ikusnet supports different data interfaces to transmit and receive audio and video. Before making the IP connection the user has to select what data interface will be used for the data connection: Ethernet (wired), 3G/4G (wireless), Wi-Fi (wireless) or custom (a combination of any). In this chapter we will only explain how to set the 3G/4G or the Ethernet interfaces to stream video and audio. For more information about Custom bonding, Ethernet or Wi-Fi interfaces, please refer to chapter 0.

To select 3G/4G as streaming interface, please click on the following icons on the main menu:



and check the desired interface:



**Picture 35. Streaming Net Menu.**

If the selected interface is 3G/4G, please take a look at the 3G/4G Monitor Screen to check how many 3G/4G connections have been detected and are properly configured. If the line corresponding to a SIM card does not show a blue colour, that connection will not be available for streaming. It is also

# ***KUSNET*** User Manual

important to note that the technology detected by the system for that link will determine the capacity of that connection.

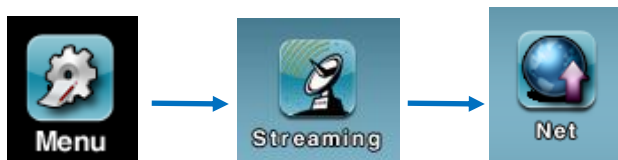


#	Network	Signal	Status	Tech
1			Registering...	
2	vodafone ES	100 %	Connected	HSPA
3			Registering...	
4			Registering...	
5	Movistar	87 %	Connected	HSPA+
6	movistar	90 %	Connected	HSPA+
7	Movistar	80 %	Connected	HSPA+
8	Movistar	87 %	Connected	HSPA+

**Picture 36. 3G/4G Monitor Menu.**

Take into account that when a row shows a red warning line, most likely the reason why it is not connected is because the APN, user and password settings has not been properly configured for that provider on that SIM card, or that SIM card has not been enabled with a proper data plan to access the internet.

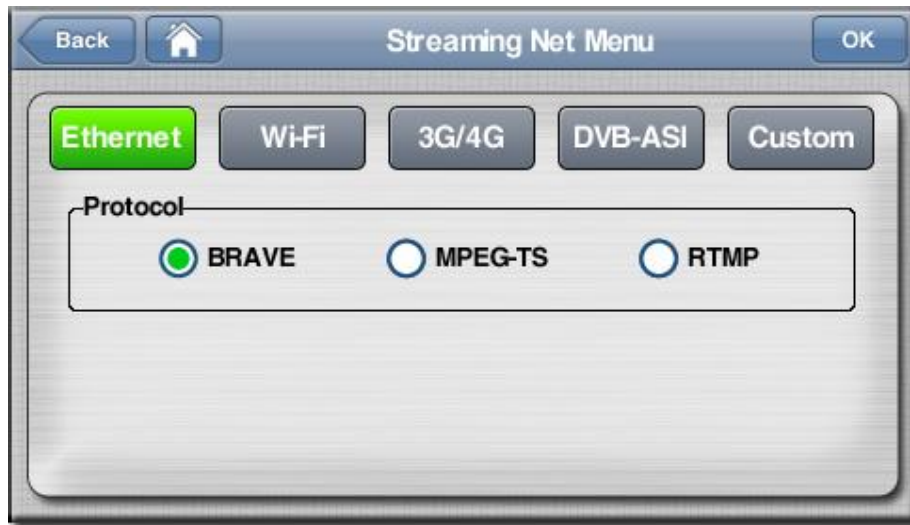
To select Ethernet as streaming interface, please click on the following icons on the main menu:



and check the desired interface:



# **KUSNET** *User Manual*



**Picture 37. Streaming Net Menu.**

The transmission protocol can be selected between BRAVE, Prodys proprietary protocol allowing bandwidth aggregation and error recovery, MPEG-TS or RTMP for compatibility with other manufacturer's codecs.

NOTE: When Ethernet is selected as streaming interface, the Ethernet port labelled as LAN1 will be used for control and management whilst the secondary Ethernet port labelled as LAN2 will be used for streaming of audio and video data.

## **III.9 Establishing the IP connection**

Once the IP settings, be it over Ethernet or over 3G/4G, has been properly configured, and the Program and TalkBack connection bars show the word 'IDLE', the unit is ready to establish a call.

*Please pay attention if LAN1 or LAN2 must be related to the proper Internet gateway according if LAN2 has been enabled. (please refer to IV.9.2 for details).*

In order for the user to be able to establish an IP connection, the Program and Talkback connection bars should show the word 'Idle', meaning that the streaming interface is ready to be used. Otherwise, the message 'Down' would appear in these bars:



**Picture 38. Program and TalkBack connection bars with NET=Ethernet.**

When working with 3G/4G as streaming network, or when bonding different interfaces, the information will be similar, but there will be some circles representing each of the different interfaces as in the picture below:



**Picture 39. Program and TalkBack connection bars with NET=3G/4G.**

One red circle means that the corresponding 3G/4G data link is not up and running. Grey means that the connection is fine. As long as one of them is up and running, the connection bars will show 'Idle', allowing the user to establish a connection. Otherwise, the connection bars will show the word 'Down' in a red background.

Using BRAVE transmission protocol Ikusnet can service two independent bidirectional communications:

# ***KUSNET*** *User Manual*

1. PROGRAM (video & audio)
2. TALKBACK (audio)

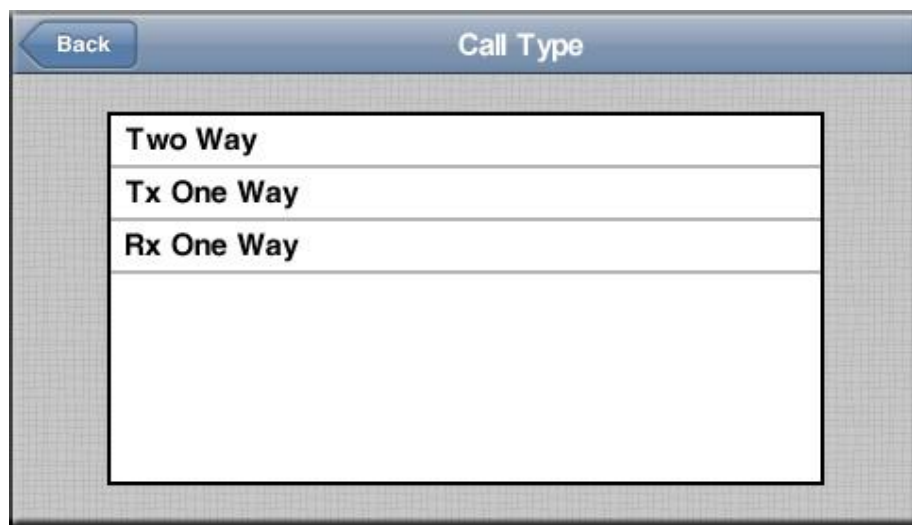
The PROGRAM communication includes compressed video as well as synchronous compressed audio contents. The TALKBACK communication provides only an audio communication between the parties.

To establish any of the two communications, just click on its connection bar. The dial window will appear as follows:



**Picture 40. TalkBack Dial Window**

Just enter the destination IP address, the type of call and the connection Profile and press the 'Call' button.



**Picture 41. Call type Window.**

The Call type option allows establishing three types of communication:

- Two way
- Transmission (Tx One Way)
- Reception (Rx One Way)

The connection Profiles can be configured by the user and they define, among other configurations, the buffer (i.e. the delay) at the receiving end. The longer the buffer the more protection against packet losses and jitter but the longer the delay. The shorter the buffer, the less protection but the shorter the delay. The key point in being able to adjust this parameter from the calling end is that most likely the user who really knows what the capacity for the current IP link being used for streaming is will be the user that is establishing the call. If no profiles are selected ("None" button), the buffer at the receiver end will keep its current configuration.

Prodys always recommends starting tests with different profiles before doing a live contribution when the capacity of the network is unknown or can vary depending on non managed external factors like the number of people sharing the same IP data connections at the same time.

The destination address can be dialed manually pressing the "keyboard" box or can be chosen from the phone book, from the recently dialed addresses or from

# ***KUSNET*** User Manual

those discovered in the same network. By pressing at the "Book" box in the Dial Window, the following dialing window will appear:



**Picture 42. Phone book Dial Window.**

We can either select one entry of the phone book or press on 'Recent' button to select the destination from a list of previous destinations.

We can select any of the favourites destinations or even click on 'Discover' to get a list of all compatible units detected in the local network.

Once the destination has been either manually entered or chosen from any of the available lists, just click on the 'OK' button and the 'Call' button at the main Dialing Window and the connection will be established.

If the connection gets through, the connection bar for the connected line will light on green and will show the word 'Connected' and the duration of the connection:



**Picture 43. Program and TalkBack connection bars when NET=Ethernet.**



# **KUSNET** *User Manual*

This indicates that the Program line has been established and it is connected to the far end.

When establishing a connection over one or several wireless connections, the unit will bond the bandwidth available from all available wireless data links automatically, meaning that the user does not have to make a call for each data link, but just only one for all of them. As it can be seen bellow, the connection bar will show with a small circle in green what 3G/4G connections are properly connected when it is on green color.



**Picture 44. Program and TalkBack connection bars when NET=3G/4G.**

If the user attempts to establish a call and it does not go through, a brief description of the reason will be shown on the connection bar:



**Picture 45. Cause of disconnection.**

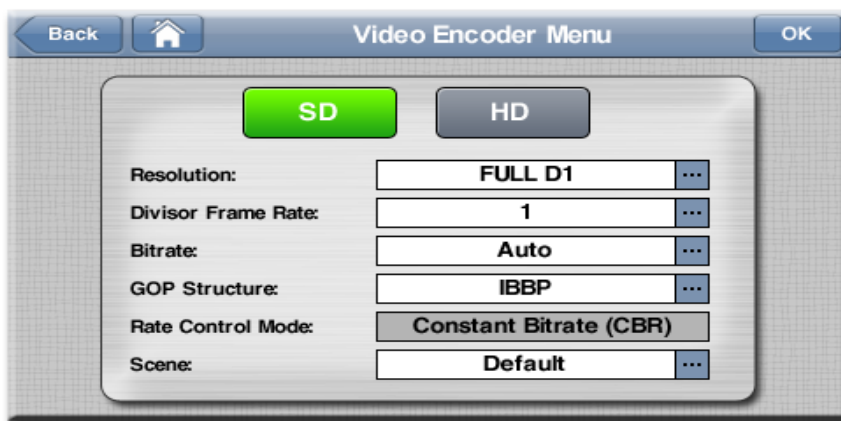
## **III.9.1 Video Bit rate configuration**

When establishing a connection over 3G/4G or bonding different IP interfaces, the unit will try to use as much bandwidth as possible. Once the connection is established, if one of the IP links becomes very unstable or unavailable for any reason, the unit will detect it and transmit all data on the rest of interfaces preventing data losses.

In networks like 3G/4G or XDSL lines where the capacity of the link is shared between different users and/or the quality of the connection might depend on many different factors that might make the capacity of network very unstable, one of the most important parameters to configure is the bit rate. The more bit rate the better the quality, but the more network capacity we need to transmit the same video contents.

# ***KUSNET*** User Manual

Prodys recommend users to use AUTO bit rate configuration when working with such type of IP links:



**Picture 46. Video Encoder Configuration.**

When the user selects AUTO in the bit rate configuration for video encoder settings, the unit will adapt automatically the bit rate depending on the quality of the network.

NOTE: When the video bit rate is set to AUTO, the audio bit rate for the audio compression will be set to AUTO as well by the system and will remain set to that value till the user change the bit rate configuration for the video compression to a fixed bit rate.

To get more information about the video encoder configuration please refer to chapter IV.6.2.

### **III.10 Monitoring the status of the connection**

Once the connection has been established successfully, the user can monitor the performance of the link by means of the Real Time Network Analyzer on the Streaming Tab of the Monitor Section:

# ***KUSNET*** User Manual

	Global	3G1	3G2	3G3	3G4
Lost	28	3	8	3	3
Recovered	3				
Obsolete	0	0	0	0	0
Jitter	512.28	340.89	35.89	33.77	321.88
Roundtrip	291.59	250.23	194.87	291.59	273.85
Tx Kbps	4722	456	658	548	939
Rx Kbps	550	154	55	36	67

**Picture 47. Monitor Menu.**

This screen allows the user to access in real time and during the connection to some crucial parameters of the IP network performance, such as lost, recovered and obsolete packets, jitter, roundtrip... This information is offered for each interface involved in the communication and for the local and the remote terminal, so the user can monitor the remote end reception as well.

### **III.11 Finishing the connection**

The communication might be stopped at any time by clicking the corresponding connection bar, either the Program or the Talkback bar.

## Chapter IV

### OPERATION GUIDE

---

#### IV.1 Communications

Thanks to BRAVE protocol, among other benefits, Ikusnet units can service two independent bidirectional communications:

1. PROGRAM (video & audio)<sup>5</sup>
2. TALKBACK (audio)<sup>6</sup>

The PROGRAM communication includes compressed video as well as synchronous compressed audio contents. The TALKBACK communication provides an only audio bidirectional communication between the parties.

Each communication is operated and displays its actual status by means of a touch button on the main screen.



**Picture 48. Connection bars.**

Possible communications statuses are:

- Disconnected *(channel idle; ready for next connection)*
- Connecting *(establishing the connection)*
- Connected *(streaming is ongoing)*
- Reconnecting *(resuming the connection)*

---

<sup>5</sup> Ikusnet ST Decoder is only able to receive PROGRAM signal, whilst Ikusnet BP is only able to transmit PROGRAM signal.

<sup>6</sup> Talkback Channel is not available when the transmission protocol is Transport Stream (TS)

# **KUSNET** User Manual


- Down *(Ethernet or 3G/4G modem not detected)*
- Negotiating DHCP *(acquiring IP address)*

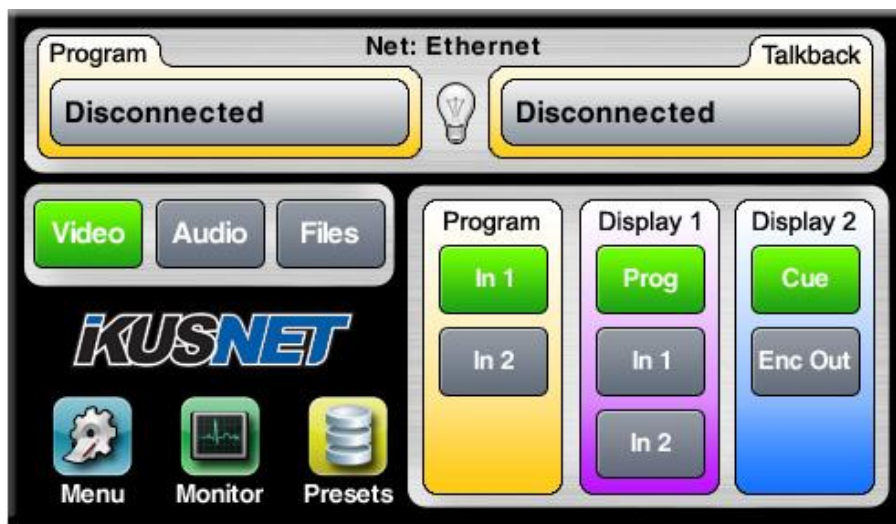
In 3G/4G mode or Custom mode, the communication bars show a series of points, one for each of the participant interfaces in the communication. These points are grey when the interface is detected but the link is disconnected; green when the link is active and red when the link is down. When a point blinks is because communication is being established in that interface



**Picture 49. Connection bars in 3G/4G and Custom mode.**

## **IV.2 Ikusnet ENG VIDEO input /output menu tabs**

 The left-hand <video> menu tab provides input and output options on the right hand menu for Program, Display 1 and Display 2.



**Picture 50. Main menu video configuration.**



# **KUSNET** User Manual

NOTE: If a yellow warning sign appears inside a button, it indicates that no physical video input or output has been detected by the codec.



## **IV.2.1 PROGRAM video input selector for Ikusnet ENG unit**



Two video sources might be connected to the Ikusnet ENG, Video In1 and Video In2. The user selects which input will be compressed and streamed out on the PROGRAM channel.

It is possible to switch from one input source to another during the connection. Best switching results are achieved if both video sources get synchronized externally.

NOTE: If the unit is equipped with the 'HD Video' option and the video input feed on Video Input #1 is of HD format, Video Input #2 format must be the same as in Video Input #1 in order for the unit to allow the user to switch between both video inputs.

## **IV.2.2 Display 1 output selector**



Three options are available for the left hand monitor.

- Video In1 *(Left display monitors permanently video input source 1 )*
- Video In2 *(Left display monitors permanently video input source 2 )*
- PROG *(Left display monitors the active streaming video source)*

## **IV.2.3 Display 2 output selector**

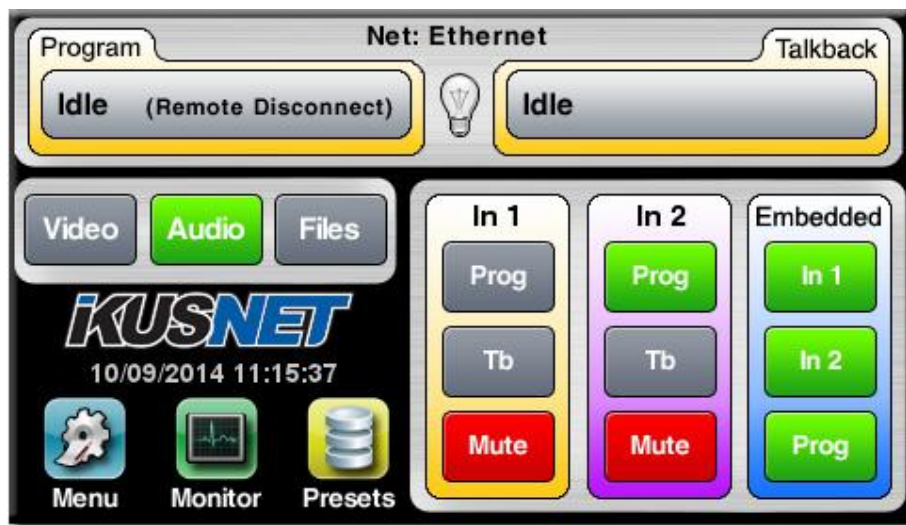


Two options are available for the right hand monitor.

- CUE  
*(Displays received video from the remote side if a bidirectional communication is active.)*
- ENC OUT  
*(Gives a local feedback of how the active video source after compression looks like.)*

## IV.3 Ikusnet ENG AUDIO mixer input menu tab

 The left-hand <audio> menu tab provides audio mixing options on the right hand menu for the PROGRAM and the TALKBACK channel.



**Picture 51. Main Menu audio configuration.**

In In1 and In2 columns, when <Prog> key is green, it assigns that input to the PROGRAM channel; when <Tb> key is green, it assigns that input to the TALKBACK channel. When <Mute> is red, it mutes that audio input both for PROGRAM and TALKBACK channels.

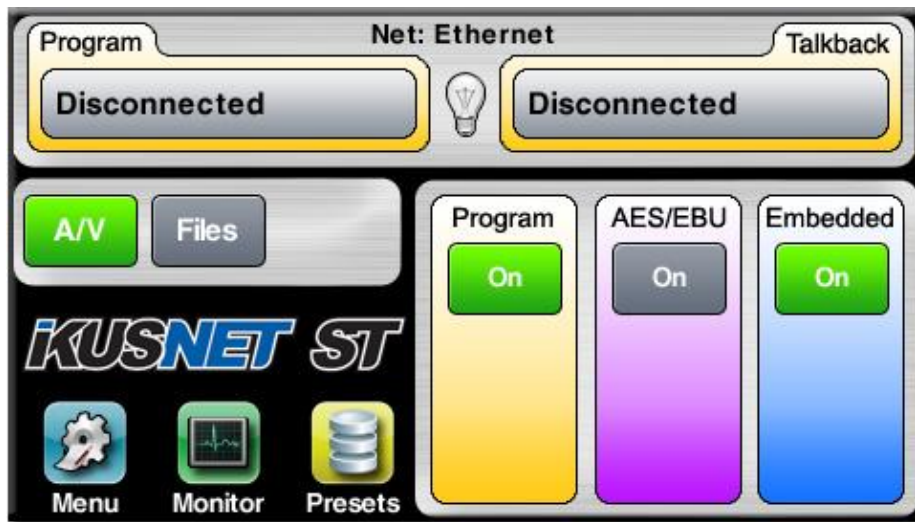
In the Embedded column, <In1> and/or <In2> simply enabled (green) mix the audio embedded in Video input #1 and/or Video Input #2 with the PROGRAM audio channel; <Prog> simply enabled (green) will take the audio from the selected video feed, following automatically any changes in the video input feed selection.

## IV.4 Ikusnet ST VIDEO & AUDIO input /output menu tab

The Ikusnet ST main menu supports less options than its counterpart Ikusnet ENG, given that it does not support mic/line audio inputs and monitor screens.

# ***KUSNET*** User Manual

To access the main audio/video input/output menu, just click on the <A/V> button on the left side of the main menu screen.



**Picture 52. Ikusnet ST Audio and Video Menu.**

Program enabled <ON> (green) enables the video and audio compression of the signal on the Video Input #1.

The AES/EBU-Program enabled <ON> (green) mixes this audio source together with the PROGRAM channel.

The Embedded Audio enabled <ON> (green) takes the embedded audio signal within the video feed and mixes it on the PROGRAM channel.

The AES/EBU-Talkback is automatically enabled if the TALKBACK channel is connected.

NOTE: If a yellow warning sign like the one below appears inside a button, it indicates that no physical video input or output has been detected by the codec.



*NOTE: Ikusnet ST Decoder does not support audio and video encoding and transmission for the main program line, so this menu is not available for the*

# ***KUSNET*** ***User Manual***

*Ikusnet ST Decoder. However, Ikusnet ST Decoder is able to transmit and receive audio on the coordination/talkback audio channel as we will see later on.*

## **IV.5 File menu**

All Ikusnet units share the same functionalities regarding file operation and they all will be described here, with only some minor differences that we will be mentioning along this chapter.

Ikusnet is a live contribution system, but the File menu adds further powerful capabilities to this product.

NOTE: When one action regarding files is taking place and, in order to warn the user about such activity, the FILE led on the front panel of Ikusnet ENG will blink and so will the FILE button on the web interface and on the front panel menu of the Ikusnet ENG.

Users might perform the following actions:


- Recording<sup>7</sup> of live events for later edition<sup>8</sup> and transmission. The user might switch between the two video inputs during the recording.
- Recording a backup file of important contributions while streaming the live event to the studio. In this mode the video quality (encoder configuration) will match for both output feeds: streaming and file recording.
- Uploading of recorded files via standard FTP to a file server or to another Ikusnet system. When sending files from Ikusnet ENG to Ikusnet ST (not to a standard FTP server), for example, bandwidth aggregation of up to 10 different IP interfaces is allowed, thus providing very fast file uploading. Once files reach Ikusnet ST at the remote end, the studio codec can be configured to upload any incoming files automatically to a FTP server that might be located in the same internal network, or can be read from a computer located in the same LAN. The maximum number of concurrent file reception operations is 10.

---

<sup>7</sup> Recording is not available on Ikusnet ST Decoder.

<sup>8</sup> File edition is only available with Ikusnet ENG model.

# ***IKUSNET*** *User Manual*

- File edition <sup>9</sup>: 'Top and tail' edition is available, allowing the user to select a piece of a file that was previously recorded in the unit. With the help of the right hand display the user can preview the selected frames to decide what should be let in the selection. That selection can be saved to a different file. This option is available only on Ikusnet ENG and only on the front panel interface, not on the web interface or ProdysControlPlus CMS software.
- Local play out of pre-recorded or edited files<sup>10</sup>. Take into account that the contents of the file can be played out and monitored on the right hand monitor screen, and this video signal will also be available on the video outputs, so that it can feed another external video device. When playing a file on the Ikusnet ST or Ikusnet ST Decoder, this video signal can be monitored on the video output available on the rear panel. This option is only available when the PROGRAM line is disconnected only.

The user has to take into account that the different Ikusnet models might have different media storage systems to allow the user to operate with files. For example, Ikusnet ENG unit supports an SD memory slot, allowing the user to insert and use a SD memory card (SDHC type) or an USB device (FAT or FAT32). Ikusnet ST, on the contrary, does not support any SD memory slots but it can optionally be equipped with an internal hard disk or can work with an external memory stick connected to one of its USB interfaces at the rear panel. Ikusnet BP can be equipped with an internal hard disk optionally.

---

<sup>9</sup> File edition is only available with Ikusnet ENG.

<sup>10</sup> Ikusnet BP does not support file play out.



# ***KUSNET*** User Manual



**Picture 53. Ikusnet Files Menu.**

## **IV.5.1 File recording menu<sup>11</sup>**

There are two different sources of recorded data:

- The PROGRAM channel content.
- The incoming stream from a remote codec.

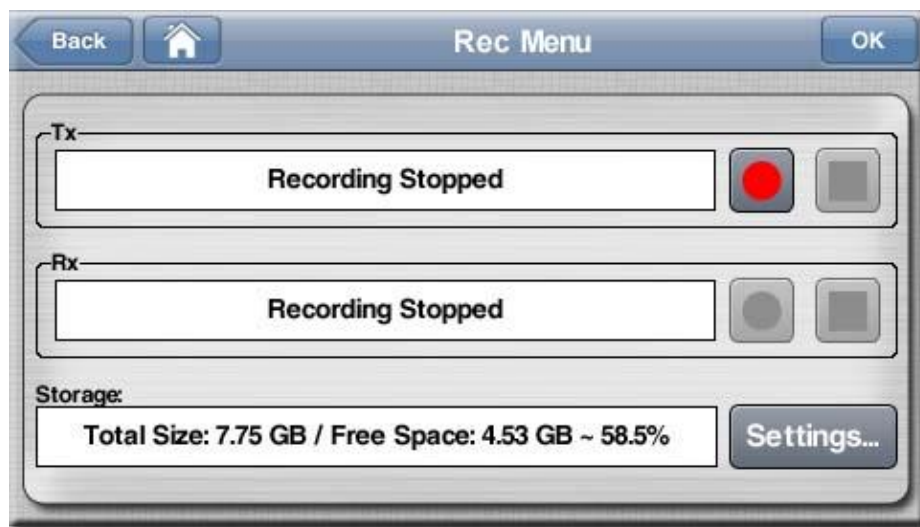
Both sources can be selected, even simultaneously, to create new recorded files.

Three actions might be controlled from this menu:

- To start the file recording in the available storage system, press on the button with the red circle. The file will get a name automatically, but that name can be edited later on by the user. The file format and extension is <>.mp4 compatible with most edition and media player software.
- Stopping the recording is performed by pressing the button with the grey square on it.

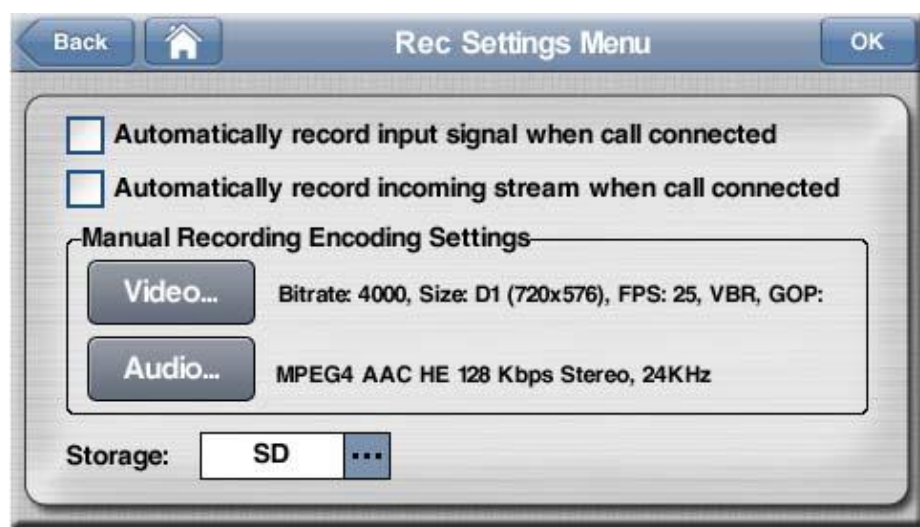
<sup>11</sup> This menu will not be available in Ikusnet ST Decoder.

# ***KUSNET*** User Manual



**Picture 54. File Recording Menu.**

- Set the storage device and the audio and video compression parameters to be used when recording while the main Program stream is not connected. The user has to press the 'Settings' button in the picture above and a new configuration window will appear where the user will be able to set the audio and video compression parameters for recording. Take into account that when the main Program Line is connected, the unit will use the same audio and video compression configuration as configured for the PROGRAM stream and these parameters will not be taken into account.



**Picture 55. Rec Settings Menu**

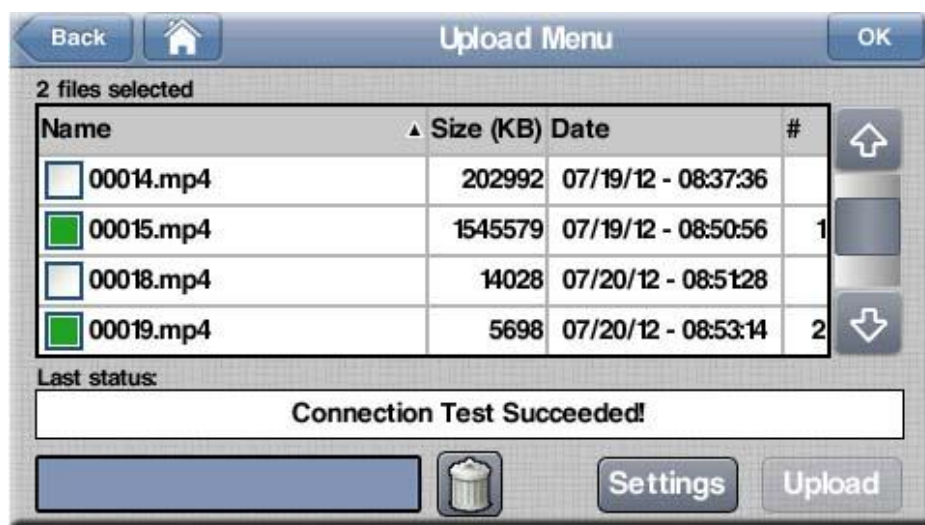
# **KUSNET** *User Manual*

It is also possible to enable the 'Automatically Record When Call Connected' option that sets the unit to record all audio and video contents being streamed on the main Program Line on a file. Take into account that the audio and video compression configuration taken for the file recording will be that of the audio and video streaming.

Finally, if 'Automatically record incoming stream when call connected' option is selected, the received stream will be automatically recorded in .mp4 file format.

## **IV.5.2 File upload menu**

This menu gives access to the embedded FTP client which can upload via FTP protocol one or several files. The order of the files in the list can also be configured.



**Picture 56. File Upload Menu.**

Any file accessible by the unit in any of its storage means might be uploaded to an FTP server or to the internal storage of an remote Ikusnet. This can be configured in the <Settings> submenu.

# ***KUSNET*** User Manual

The screenshot shows the 'Upload Settings' dialog box. It has a title bar with 'Back', a home icon, 'Upload Settings', and 'OK'. The main area has two radio buttons: 'To FTP Server' (selected) and 'To IkuNet'. Under 'To FTP Server', there are four text fields: 'Server:', 'User:', 'Password:', and 'Interface:' (containing 'LAN1'). Under 'To IkuNet', there is one text field: 'Address:'. Below these is a 'Storage:' dropdown (set to 'SD') and a checkbox 'Automatically Upload Recorded And Received Files'. A 'Test' button is at the bottom right.

**Picture 57. FTP Upload Settings Menu.**

In the <Settings> submenu the uploading destination can be chosen between an FTP server and a remote IkuNet.

If a FTP server is chosen, the FTP address and the user access rights must be filled in. Those are permanently valid unless modified by the user. It is also possible to specify which communication interface is going to be used: LAN1, LAN2 or 3G/4G. If 3G/4G is chosen, the transmission will be done through a single 3G/4G data wireless connection, the first available following an increasing order, as it is not possible to upload any files to an FTP server using 3G/4G 'bonding' (bandwidth aggregation).

If FTP upload to a remote IkuNet unit is chosen, it is sufficient to indicate the IP address of that codec. The communications interface will be the one being in use by the codec at the time, so this mode does allow the usage of 3G/4G bonding or even "custom" bonding, thus performing bandwidth aggregation and resulting in a much faster file transfer than with any conventional IP link.

Once the file is in the remote IkuNet unit, a second FTP upload can be configured to transfer automatically any incoming files to a FTP server automatically.

In fact, the option 'Automatically upload recorded and received files' enables the automatic transmission of any files that have been recorded or received from

# ***KUSNET*** User Manual

other ikusnet units. The file transmission will be performed according to the Upload Settings menu.

The storage device where the files are to be selected can be chosen also in this FTP Upload Settings menu.

NOTE: Ikusnet units are able to receive up to ten file uploads simultaneously.

## IV.5.3 File player menu<sup>12</sup>



**Picture 58. File Play Menu.**

To play a file and preview it on the right hand monitor screen of the Ikusnet ENG unit or on the SDI output of Ikusnet ENG, ST or ST Decoder, just select one the available files and use the play and stop buttons on the tool bar at the bottom to start and stop playing the file.


The play menu provides also some icons for renaming or dismissing the selected file. The storage device can also be selected.

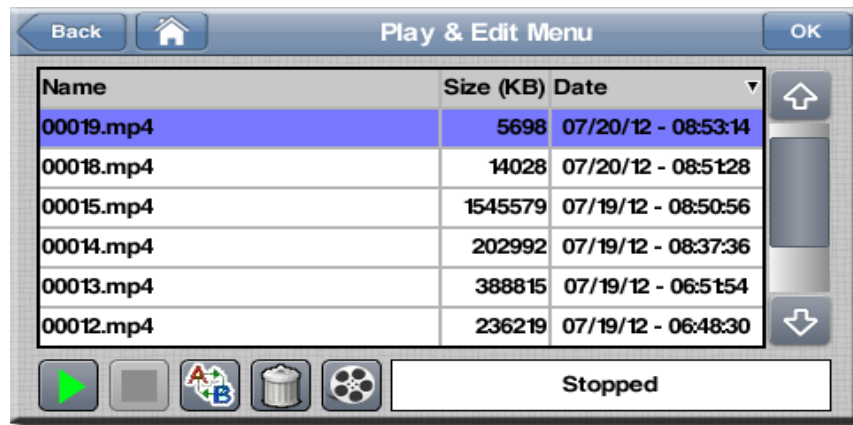
<sup>12</sup> This menu is not available in Ikusnet BP.



# ***KUSNET*** User Manual

## IV.5.4 File editor<sup>13</sup>

The file editor menu is only accessible via the front panel menu on Ikusnet ENG device. To enter the file editor, select one file press the  button:

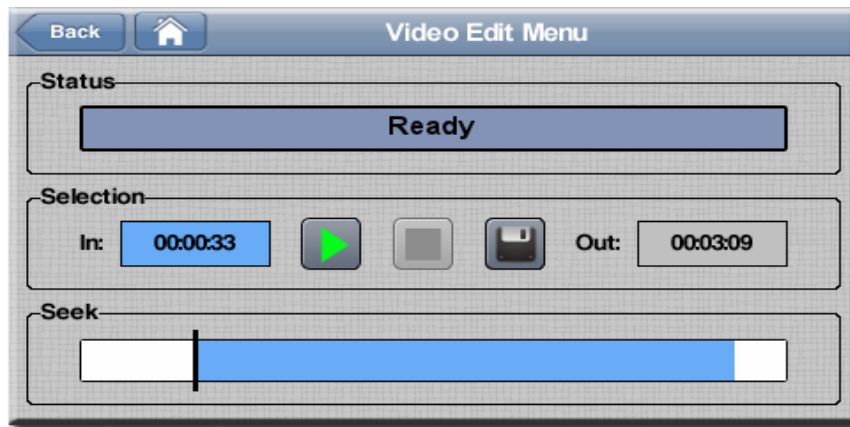


**Picture 59. File operations menu on the Ikusnet ENG front panel.**

Once the file editor is open, the user will be able to define a piece of the selected file by using the rotary controls at the right and left sides of the touch panel screen of the Ikusnet ENG unit, and by previewing the selected frames on the right hand monitor screen. These buttons will be enabled automatically to do so, and a blue led will light on to indicate it. By moving those rotary controls the user will be able to select the top and tail parts to remove from the original selection and with the help of the right hand monitor screen, the user can preview the selected parts of the video file that will be left out, and those that we remain in the selection. That selection can be saved to a file for a later edition or transmission.

<sup>13</sup> Only available on Ikusnet ENG.

# **KUSNET** User Manual



**Picture 60. File editor.**

When moving the left hand rotary control on the front panel, the left bar on the bar at the bottom will go back and forth selecting what part of the top of the file will be left out of the selection. The same will be done for the tail of the file when moving the right hand rotary control. The right hand monitor screen will show the frames corresponding with the part of the file being selected by the black vertical bar at the top or tail parts of the selection.

Once the selection is done, click on the play button to preview the selection on the right hand monitor screen or save the selection to a file.

## **IV.5.5 File Monitor**

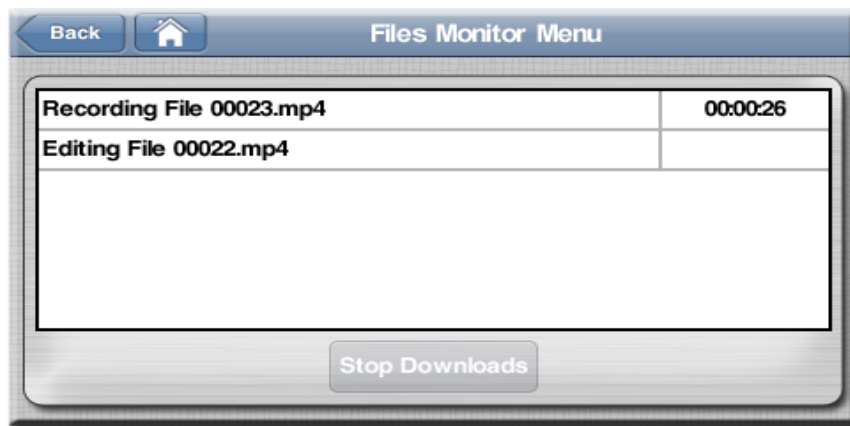
The File Monitor Windows allows the user to monitor any activity regarding files, like uploads, previews, transmission, reception or recording. To enter the File Monitor, click on the monitor icon in the File Menu:

# ***KUSNET*** User Manual



**Picture 61. Ikusnet Files Menu.**

The File Monitor window will show and describe the different operations carried out in real time regarding files. As an example, see below a screen shot of the Monitor File Window when one file is being recorded on the SD card of the Ikusnet ENG unit from the web interface and another file is being edited from the front panel menu.



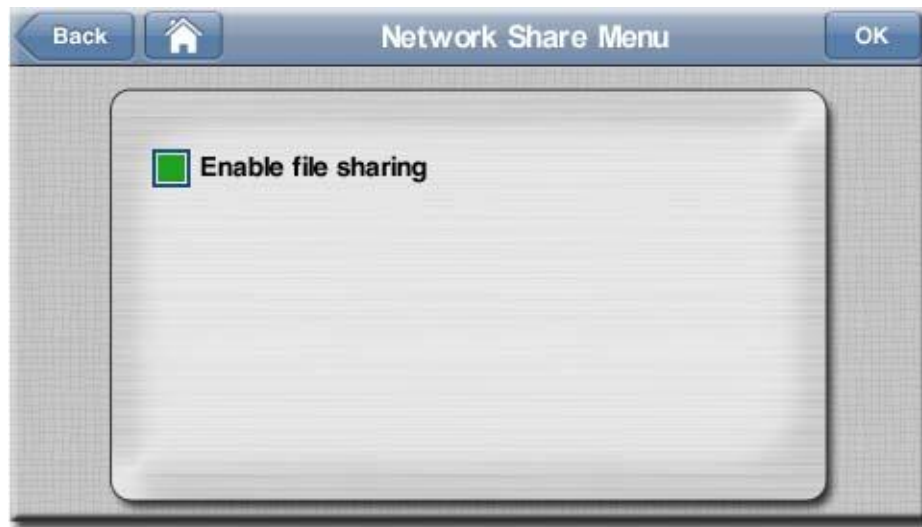
**Picture 62. File Monitor Window.**

## **IV.5.6 Network share**

It is possible to share files stored on an Ikusnet codec on a local network so they can be accessed from a Windows compatible computer for reading, deleting or copying. The different media storage systems available on the unit will be shared

# ***KUSNET*** *User Manual*

as a regular Windows network drive. To do this, you must enable the "Enable file sharing" option in Network Share menu.



**Picture 63. Enabling File Sharing**

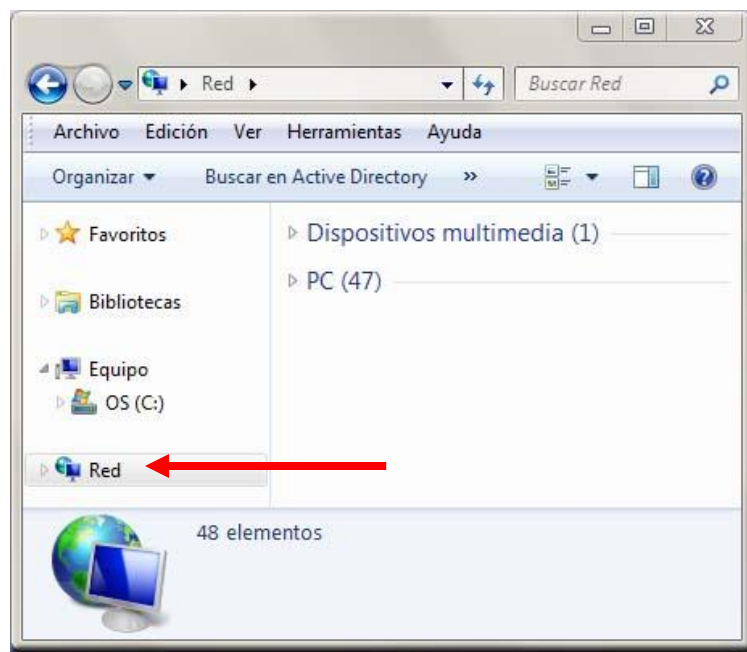
The procedure for accessing the Ikusnet storage unit from a computer running Windows connected to the same local network is:

1. Open a Windows Explorer application window:

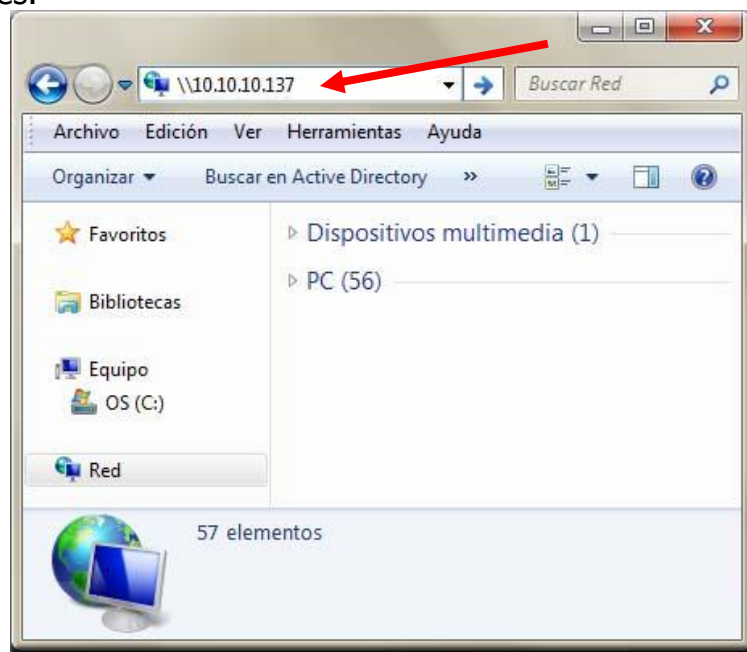


# **KUSNET** User Manual

2. Click on the Network area, on the window's left side:



3. Write the Ikusnet codec IP address on the dialog bar, preceded by two backslashes.





# ***KUSNET*** *User Manual*

4. The Storage folder will appear in the right area of the Windows Explorer window. From this moment on the contents of the external storage unit of the codec will be available from this application.



# ***KUSNET*** *User Manual*

## **IV.6 Video options menu**

Click on the following icons to enter the video configuration window:



**Picture 64. Video Menu.**

## IV.6.1 Video inputs configuration<sup>14</sup>

Click on the Inputs button in the main video menu to access the video inputs configuration window:



**Picture 65. Video inputs menu. Ikusnet ENG**

This menu is only available when Encoder Mode is SD and it defines the input aspect ratio (4:3; 16:9 or automatic).

Take into account that when the Encoder Mode is set to SD, and the video input feed is in Standard Definition, PAL and NTSC video format will be automatically detected by the unit.

**The user should check the current video input configuration if the "Invalid Video Input format" message is shown on the left screen on Ikusnet ENG, as well as to check on chapter V.1 the different supported video input formats.**

When it comes to a Ikusnet ST unit, in addition to showing the selection of the aspect ratio of the only video input (only in SD mode), you can also enable the deinterlacer present in the studio units.

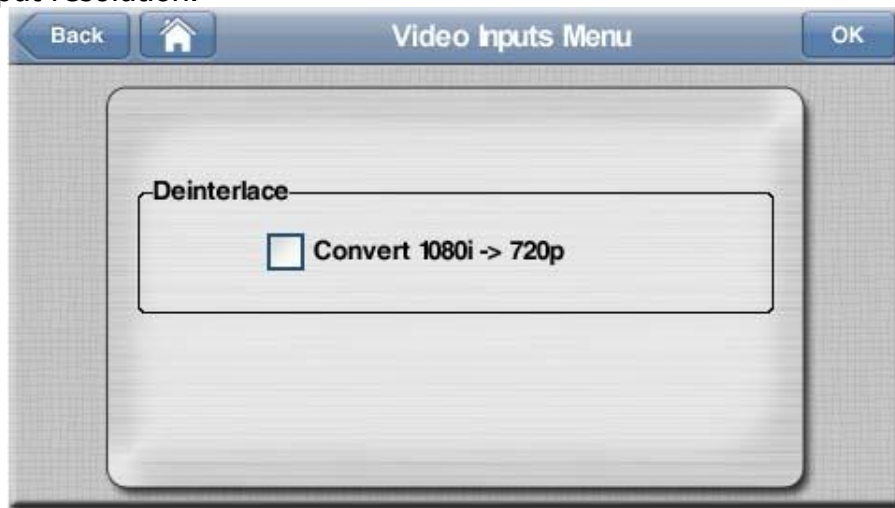
<sup>14</sup> Not available on Ikusnet ST Decoder

# **KUSNET** User Manual



**Picture 66. Configuration menu of the SD video inputs. Ikusnet ST**

Working with SD resolution, the deinterlacer transforms from 576i50 to 576p25 for PAL input or from 480i59 to 480p29 for NTSC. The deinterlacer ignores any other input resolution.

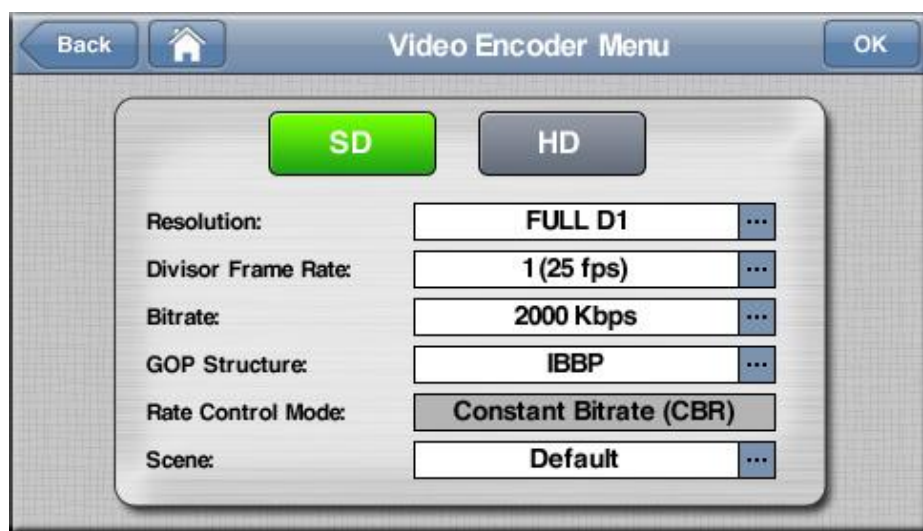


**Picture 67. Configuration menu of the HD video inputs. Ikusnet ST**

Working with HD resolution, the deinterlacer transforms from 1080i to 720p.

## IV.6.2 Video encoder H.264 configuration for Standard Definition Format (SD)

To choose SD encoder mode, click on the SD button. In this mode, the available [H.264](#) encoder parameters for SD are shown.



**Picture 68. Video Encoder Menu for SD.**

- Resolution (from [1/2 D-1](#) up to [D-1](#) image resolution <sup>15</sup>)

Full <a href="#">D-1</a> 720x576	Full <a href="#">D-1</a> 720x480
<a href="#">4CIF</a> 704x576	<a href="#">4SIF</a> 704x480
<a href="#">3/4 D-1</a> 544x576	<a href="#">3/4 D-1</a> 544x480
<a href="#">1/2 D-1</a> 352x576	<a href="#">1/2 D-1</a> 352x480

- Divisor Frame Rate (encoder frames per second selection)
- Bitrate (video payload bandwidth. From 128kbps until 5Mbps)
- [GOP](#) Structure (low delay or best efficiency GOP <sup>16</sup>)
- Rate control mode (Constant bit rate or Variable bit rate <sup>17</sup>)

<sup>15</sup> For very narrow streaming bandwidths, lowering the resolution improves sometimes the perceived moving picture quality.

<sup>16</sup> Best delay is achieved with IP GOP structure; while the best quality compression is achieved with IBBP GOP structure. Please check appendix A for further information.

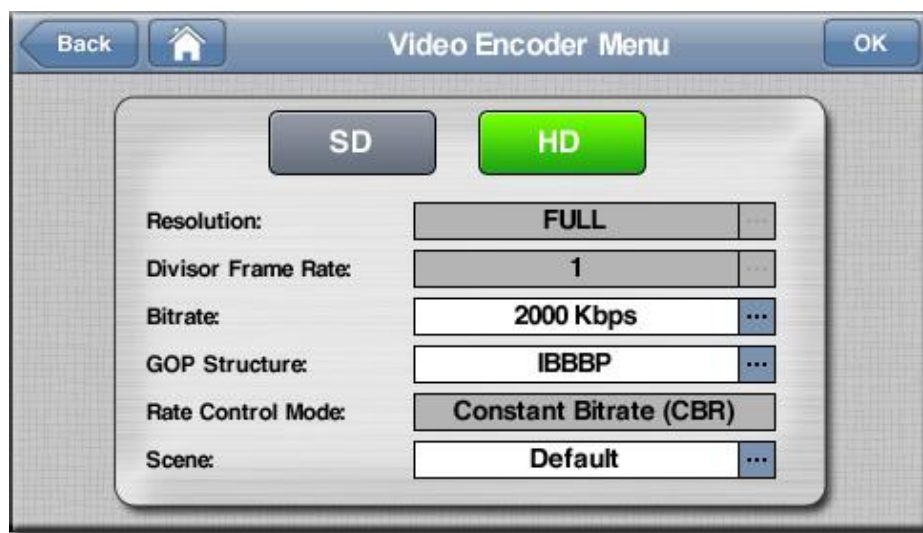


- Scene (Default, Talking Head, Sports and Action <sup>18</sup>)

**NOTE:** Take into account that the bit rate can also be configured as “auto” to perform automatic adjustment of the encoder bit rate depending on the performance of the network. *This automatic bit rate adaption is the recommended configuration in case the network performance is poor and there are some limitations, like lost packets, high jitter, etc. Please refer to chapter IV.8.5 for more information about the automatic bit rate adaption.*

### IV.6.3 Video encoder H.264 configuration for High Definition (HD)

To choose HD encoder mode, click on the HD button. In this mode, the available [H.264](#) encoder parameters for HD are shown.



**Picture 69. Video Encoder Menu for HD.**

<sup>17</sup> CBR or Constant Bit Rate is convenient for most transmissions mediums. VBR or Variable Bit Rate is convenient for file storage or if the streaming connection is allowed to overshoot 50% of the average bandwidth.

<sup>18</sup> This parameter optimizes the video compression for the scene involved. The “Sport” scene improves quick movements and homogenous backgrounds like tennis courts or football fields. The “Action” scene improves sudden light conditions of the scenes like camera flashing or quick movement.

# ***KUSNET User Manual***

- Resolution: *(video formats)*
- Bitrate *(video payload bandwidth. From 2Mbps to 20Mbps)*
- [GOP](#) Structure *(low delay or best efficiency GOP<sup>19</sup>)*
- Rate control mode *(Constant bit rate or Variable bit rate<sup>20</sup>)*
- Scene *(Default, Talking Head, Sports and Action<sup>21</sup>)*

**NOTE:** Take into account that the bit rate can also be configured as “auto” to perform automatic adjustment of the encoder bit rate depending on the performance of the network. *This automatic bit rate adaption is the recommended configuration in case the network performance is poor and there are some limitations, like lost packets, high jitter, etc. Please refer to chapter IV.8.5 for more information about the automatic bit rate adaption.*

## **IV.6.4 Video output configuration (Only Ikusnet ST or Ikusnet ST Decoder)**

From the video output configuration menu the user can activate the genlock. The activation of this option enables synchronization of the video outputs signals to an external Sync signal. This GenLock input on Ikusnet ST supports locking to a Black Burst synchronization type signal (for SD) or a Tri-level synchronization type signal (for HD). The user must take into account that when a SD PAL mode video signal is being decoded, it is not possible to lock the video outputs signals to a NTSC Black Burst synchronization signal and vice versa.

---

<sup>19</sup> Best delay is achieved with IP GOP structure; while the best quality compression is achieved with IBBBP GOP structure. Please check appendix A for further information.

<sup>20</sup> CBR or Constant Bit Rate is convenient for most transmissions mediums. VBR or Variable Bit Rate is convenient for file storage or if the streaming connection is allowed to overshoot 50% of the average bandwidth.

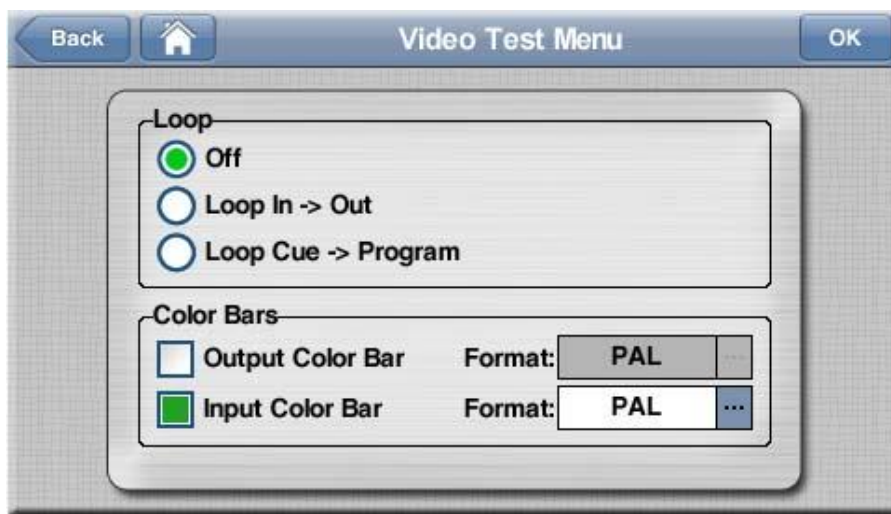
<sup>21</sup> This parameter optimizes the video compression for the scene involved. The “Sport” scene improves quick movements and homogenous backgrounds like tennis courts or football fields. The “Action” scene improves sudden light conditions of the scenes like camera flashing or quick movement.



**Picture 70. Video Outputs Menu.**

#### IV.6.5 Video test functions

This menu provides a set of tools for testing the video inputs and outputs.



**Picture 71. Video Test Menu.**

By enabling the Loop Video IN -> Video OUT, the unit will forward the video and audio signal on the Video input to the Video outputs, without any signal processing.

# ***KUSNET*** *User Manual*

In an Ikusnet ST it is also possible to enable a CUE->PROGRAM loop (incoming video streaming to outgoing video streaming). This option can be used to check from a remote Ikusnet that the video sent is reaching the studio unit, thus checking the integrity of the transmission path.

It is also possible to enable the input or output colour bar tests. When enabling the input colour bar test, the input will not take the video signal from the video inputs, but it will generate internally a colour bar test video signal.

Likewise, the unit can be configured to feed the video outputs with a colour bar test video signal, instead of taking the output of the video decoder.

These two test tools are very helpful to check that both video input and output interfaces are working properly, isolating these tests from any external factor related to the encoding/transport/decoding of the video and audio data. The colour bar signal can be generated in PAL or NTSC.

## **IV.7 Audio options menu**

Click on the following icons to enter the audio configuration window:



# ***KUSNET*** *User Manual*



**Picture 72. Audio Menu.**

## **IV.7.1 Mic /Line inputs configuration<sup>22</sup>**

This menu defines if the front XLR inputs are pre-amplified as microphone level inputs or as line level inputs. From this menu it also possible to enable phantom power (48V).



**Picture 73. Audio inputs menu for Ikusnet ENG.**

<sup>22</sup> Available on Ikusnet ENG and Ikusnet BP



# ***KUSNET*** *User Manual*

NOTE: In a Ikusnet ST, this menu allows the user to choose between the analogue and the AES/EBU digital input for the talkback signal.



**Picture 74. Audio inputs menu for Ikusnet ST.**

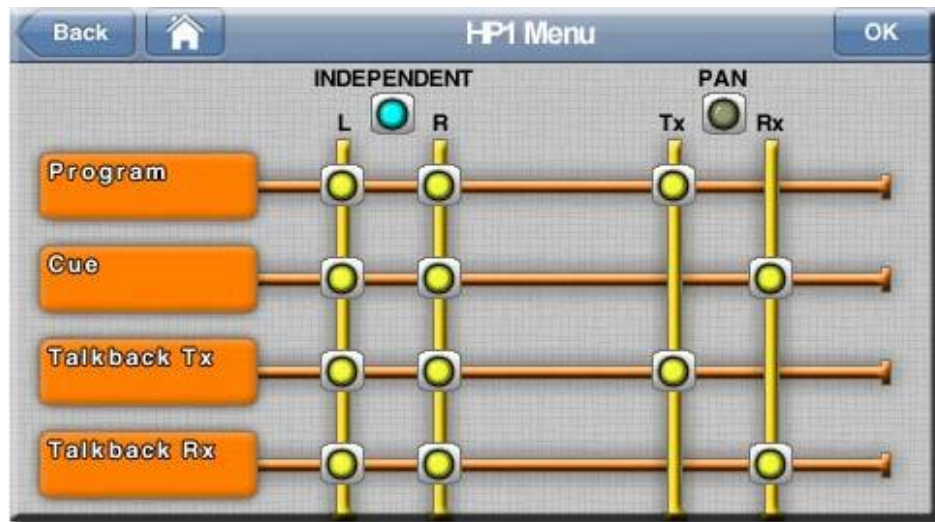
## **IV.7.2 Audio headphone output configuration in Ikusnet ENG**

This menu defines the Ikusnet ENG headphone configuration<sup>23</sup>.

---

<sup>23</sup> For the Studio Ikusnet the <Audio output> menu specifies parameters of the AES/EBU audio output interface instead of the headphone configuration.

# KUSNET User Manual



Picture 75. HP Menu.

This audio matrix allows the user to configure the signals to monitor on the headphones just by clicking on the corresponding cross points<sup>24</sup>:

- Program *(transmitted audio signal of the PROGRAM channel)*
- Cue *(received audio signal of the PROGRAM channel)*
- Talkback TX *(transmitted audio signal of the TALKBACK channel)*
- Talkback RX *(received audio signal of the TALKBACK channel)*

The user can choose first which mode, L & R <independent> or <PAN>, is preferred. The PAN mode enables modify the gain ratio between transmitted and received signal levels.

#### IV.7.2.1. Headphone L & R independent control

The headphone audio level can be adjusted independently for each ear. This mode is especially useful when L and R signals on the headphones are not related (binaural monitoring) and it is the more convenient configuration in most applications.

<sup>24</sup> Please remind PROGRAM and TALKBACK channels are bidirectional, but the selection matrix allows one-way monitoring.

# **KUSNET** User Manual

The Headphone level controls are locked to prevent from unwanted changes. To unlock it, press the button in the middle and the current level gain for the left ear will be displayed on the screen. In addition, the central button will be illuminated by a blue LED to indicate that the rotary control is unlocked. Click again to access the level control for the right ear. Pressing again will confirm any changes and close this configuration window. This level control will be locked again automatically after 3 seconds without touching the controls, or after pressing the button until the blue light switches off.



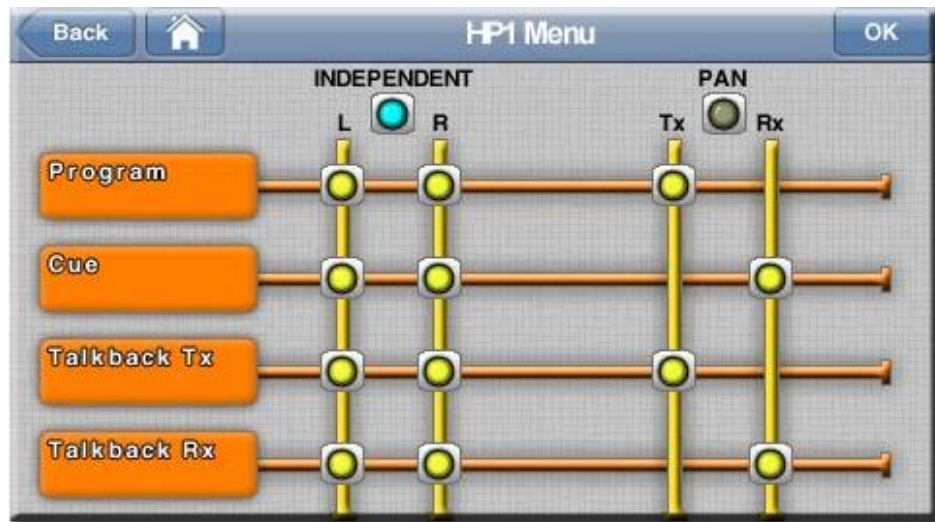
*Press softly on the round control and turn it to the left or to the right to decrease or increase the gain.*

## **IV.7.2.2. Headphone panoramic control**

This control is preferred for users uncomfortable with binaural monitoring that prefer to hear the same signal on the left and right ears.

This mode is useful if the user wishes to **balance the relative level between transmission and reception signals**. Firstly, the user should configure what signals take part on the transmission group and what signals take part on the reception. To do that, just click on the cross points at the right area of the following picture (PAN area) and select what signals will be added to TX and RX parts.

# KUSNET User Manual



Picture 76. HP Menu.

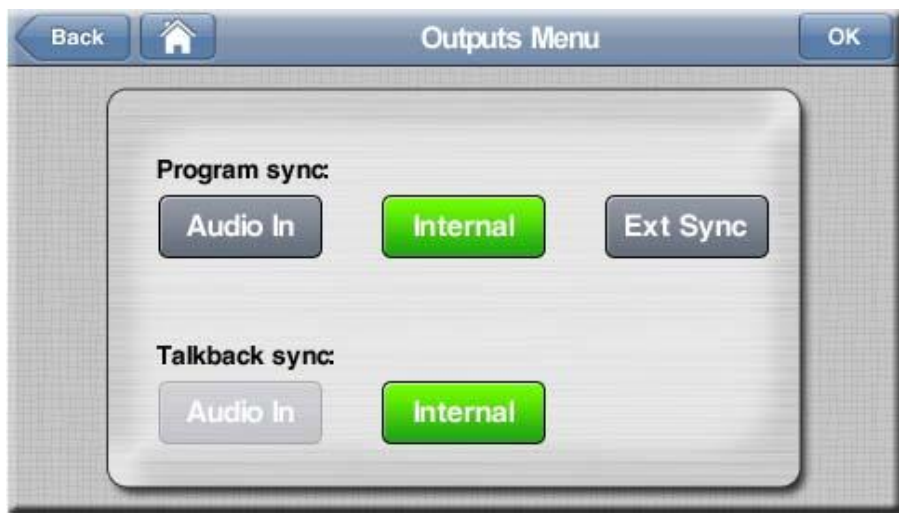
The Headphone level controls are locked to prevent from unwanted changes. To unlock it, press the button in the middle and the current level gain for both the left ear and the right ear will be displayed on the screen. In addition, a round led around the button will light on blue to indicate that the control is unlocked.



Press softly on the round control and turn it to the left or to the right to decrease or increase the gain. To balance the relative level of the Tx and Rx audio signals press again the middle button, the L and R' leds will start blinking, indicating that the current audio level configuration is to balance the relative levels of Tx and Rx signals.

## **IV.7.3 Audio output configuration in Ikusnet ST and ST Decoder**

The synchronization of the AES/EBU audio outputs in an Ikusnet ST or ST Decoder can be configured in the Outputs Menu.



**Picture 77. Audio Outputs Menu in Ikusnet ST**

Program Audio can be synchronized using three sources: the audio input, an external sync signal or and internally generated clock.

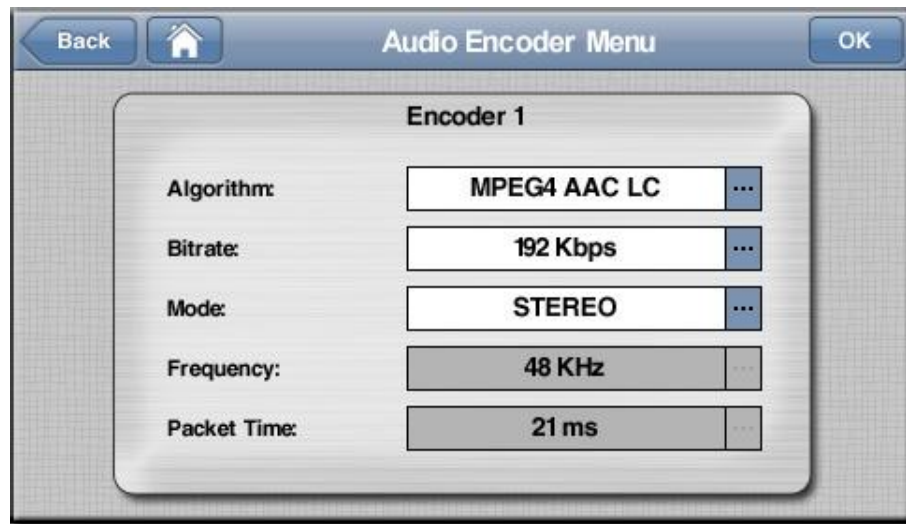
## **IV.7.4 Audio encoders**

This menu defines the compression parameters for the PROGRAM <encoder 1> and the TALKBACK <encoder 2> channels.

- Algorithm                    *(MPEG4 [HE AAC](#), [AAC ELD](#) or [AAC LC](#))*
- Mode                        *(Mono, Stereo or Joint Stereo <sup>25</sup>)*
- Bitrate                      *(audio payload bandwidth. From 24 until 384kbps)*
- Frequency                 *(audio sampling)*
- Packet Time                *(Duration of the IP packets)*

<sup>25</sup> The TALKBACK channel allows only MONO.





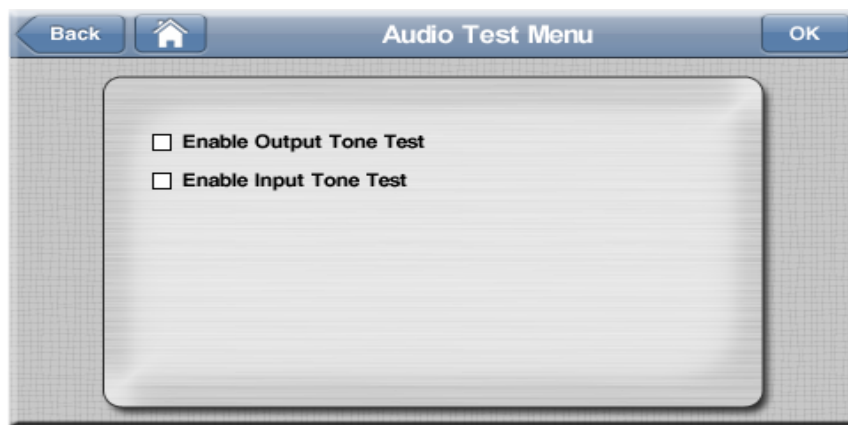
**Picture 78. Audio Encoding Menu**

***NOTE: When video bitrate is configured in auto mode, audio bitrate automatically changes to this mode.***

When Net mode is DVB-ASI, two embedded audio program channels can be configured, being their names Encoder 1 and Encoder 2.

#### **IV.7.5 Audio test functions**

This menu provides a set of test tones in order to check the audio inputs and outputs of the unit.



**Picture 79. Audio Test Menu.**

# ***KUSNET*** ***User Manual***

By enabling the output tone test, the user will generate and feed the audio outputs with an internally generated test tone signal instead of getting the audio from the decoder.

When the user enables the input tone test, the unit will use an internally generated test tone signal instead of getting the audio which comes embedded into the video signal.

## **IV.7.6 Audio Gain Level**

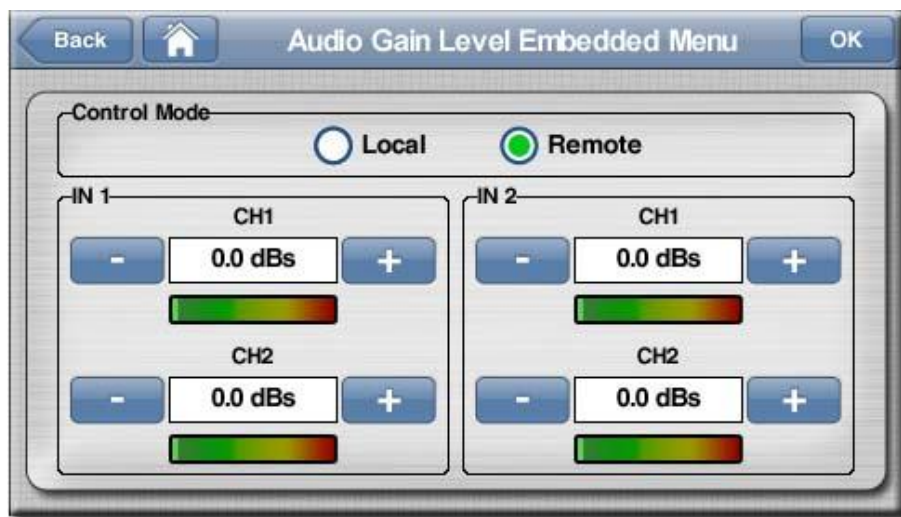
This menu provides the possibility of adjusting the audio gain of the different audio inputs and outputs available.



**Picture 80. Audio Gain Level Menu.**

The embedded audio option allows adjusting the two embedded audio channels in In1 and In2 inputs. The gain can be adjusted in steps of 0.5 dB. A VU-meter bar is also shown for each audio channel.

# ***KUSNET*** User Manual



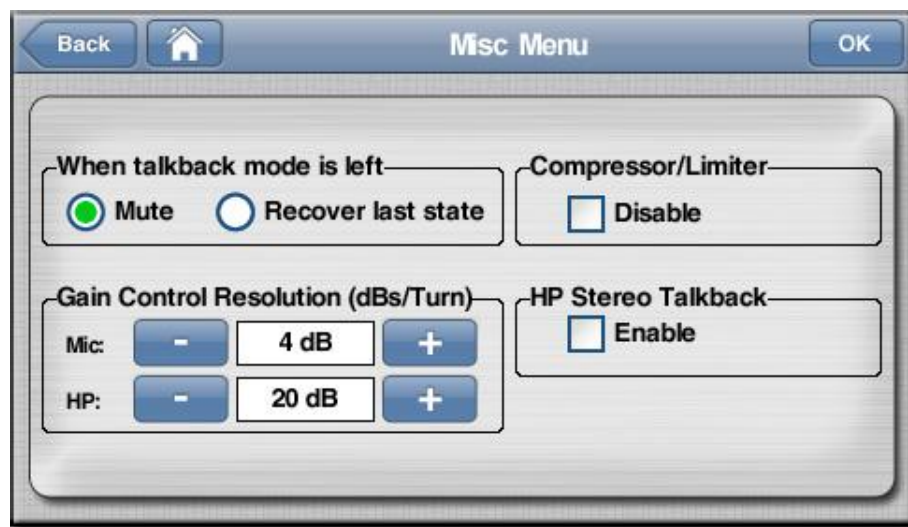
**Picture 81. Audio Embedded Menu.**

The control mode can be Local or Remote. When Local mode is chosen, the adjustment can only be made using the touch panel or the gain control knobs. When Remote is chosen, the possibility of changing the audio locally is disabled.

## **IV.7.7 Misc Menu** <sup>26</sup>

This menu allows the user to control several different parameters related the audio mixer of Ikusnet ENG or BP units.

<sup>26</sup> This menu is available on Ikusnet ENG or BP.



**Picture 82. Misc Menu.**

'When talkback mode is left': This option allows the user to define the behaviour of the MIC/Line level audio inputs of Ikusnet ENG unit when these audio inputs were assigned to the TalkBack audio channel and the user disable it by means of the TB button. At that time, the corresponding input can be either be muted, or recover the status it held before being mixed in the TalkBack audio channel.

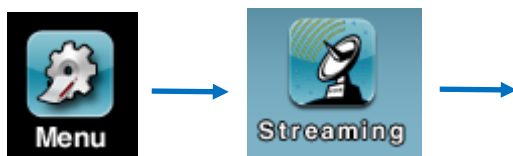
The compressor/limiter can be enabled/disabled. It is recommended to disable the compressor/limiter when the unit is compression the audio in Stereo mode.

The 'HP Stereo Talkback' option allows establishing a stereo or dual talkback channel. With this option it's possible to use 2 different mono audios in the same talkback channel.

To end with, the user can also define the accuracy of the rotary audio controls regarding the number of dBs per round.

## **IV.8 Streaming options menu**

Click the following icons on the main menu to enter the streaming configuration window:



The user switches the streaming network (3G/4G or Ethernet) thru this menu, as well as adapts some default parameters to specific network circumstances.



**Picture 83. Streaming Menu.**

### **IV.8.1 Network selection**

Within this menu the user chooses which communications interface to use: Ethernet, Wi-Fi, 3G/4G, DVB-ASI or Custom.



# ***KUSNET*** *User Manual*



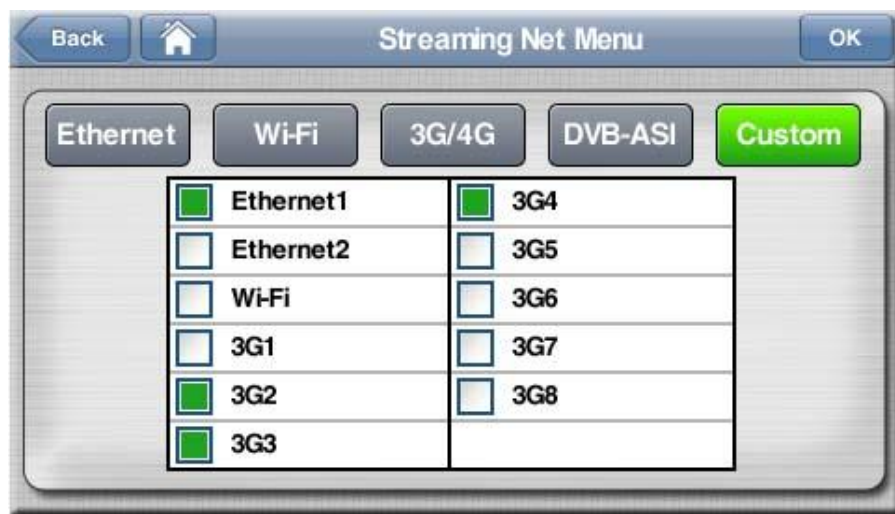
**Picture 84. Streaming Net Menu.**

In Ethernet, Wi-Fi and 3G/4G modes, this menu also permits the selection of the transmission protocol. It can be selected between BRAVE, Prodys Proprietary Protocol (allowing bandwidth aggregation and error recovery), RTMP and MPEG-TS for compatibility with other manufacturer's codecs.

RTMP and MPEG-TS modes can be used in 3G/4G mode when a single modem is used for the transmission, as those modes do not allow the bandwidth aggregation of several interfaces.

If Custom mode is selected, a new menu appears with all the available interfaces that can be chosen for the transmission.

# ***KUSNET*** *User Manual*

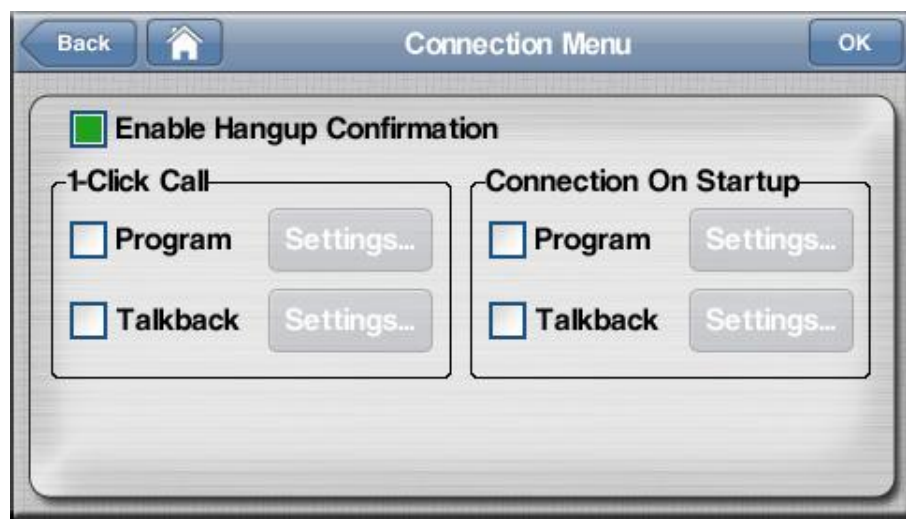


**Picture 85. Custom Interfaces Selection Menu in Ikusnet ENG**

The more links are selected, the more bandwidth the unit will be able to get for the video and audio streaming, and the more secure the connection. Up to 10 interfaces in the Ikusnet ENG and Ikusnet BP might be linked together (bonding) to get as much bandwidth as possible.

## **IV.8.2 Connection options**

This window permits the configuration of several parameters to control the way the calls are made:



**Picture 86. Connection Menu**

# **KUSNET** *User Manual*

- **Enable Hangup Confirmation.** When the box is ticked, if the user touches the connection bar to end a communication, the codec will require the user confirmation before finishing the connection. This is useful to avoid accidental hang-ups.
- **1-Click call.** This option can be set independently for Program and Talkback channels. When this option is chosen, the codec will make a call just by pressing the connection bar, without the need to introduce any destination address or phone book entry.
- **Connection On Startup.** This option can be set independently for Program and Talkback channels. When this option is chosen, the codec will make a call just by booting the codec, without the need to introduce any destination address or phone book entry.

To set up these two modes, an IP destination address has to be selected in the <Settings...> dialog.

These options are very useful to make it easier for some non-technical users to establish a connection.

## **IV.8.3 Streaming Protocol selection**

When BRAVE transmission protocol is selected, this menu is used to set IP port and protocol parameters. For most applications the default values are suitable.

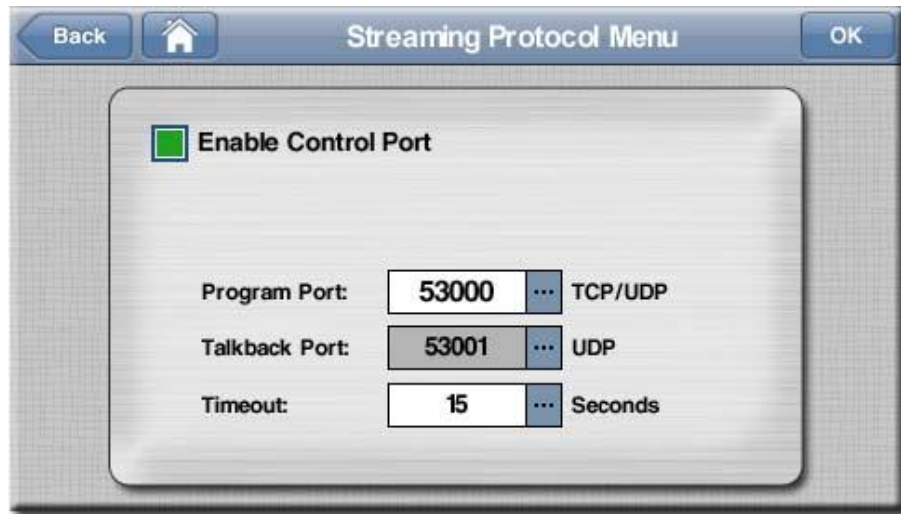
- Enable Control Port *(by default enabled<sup>27</sup>)*
- Program Port *(53000 by default for PROGRAM channel<sup>28</sup>)*
- Talkback Port *(53001 by default for TALKBACK channel<sup>29</sup>)*
- Timeout *(the connection timeout is 15s by default<sup>30</sup>)*

---

<sup>27</sup> Disabling the <Control Port>, means disabling the TCP protocol. Therefore any streaming connection should be request from both parties to meet the communication.

<sup>28</sup> Usually this number is more important for the receiving Iksnet since the local router must provide "port forward" on this port number for the Iksnet. This port must be "forwarded" for TCP & UDP. Please contact your IT specialist or network manager for details about this procedure.

<sup>29</sup> Preceding remark is applicable for the Talkback channel too.



**Picture 87. Streaming Protocol Menu. BRAVE**

When MPEG-TS protocol is selected (only in Ethernet or DVB-ASI modes), this menu is used to set some MPEG-TS parameters. These parameters are:

- Speed of the Transport Stream.
- Local port. Its default value is 1234.
- Transport Stream ID.
- PMT PID.
- Video PID.
- Audio1 PID.

<sup>30</sup> This parameter applies for the detection of interrupted streaming connections. After a streaming connection has been involuntary interrupted, Ikusnet retries indefinitely re-connections to the destination.

# **KUSNET** User Manual

The screenshot shows a window titled "Transport Stream Protocol Menu". At the top, there are buttons for "Back", a home icon, and "OK". The main content area is divided into two sections. The left section, "Speed Configuration", contains a minus button, a text box with "5000 Kbps", and a plus button. The right section, "Local Port", contains a text box with "1234" and a dropdown arrow. Below these sections is a table with two columns: "Parameter" and "Value".

Parameter	Value
TransportStream ID	1
PMT PID	4096
Video PID	256
Audio1 PID	257

Picture 88. Streaming Protocol Menu. TS

**NOTE:** *Ikusnet streams video and audio data encapsulated in MpegTS format over UDP protocol. Please check that the remote codec support MpegTS over UDP.*

## IV.8.4 Streaming RX parameters

This menu configures the jitter buffer. This configuration affects the overall communication delay. Independent configuration variables are available for PROGRAM and TALKBACK channel.

The screenshot shows a window titled "Streaming Rx Settings Menu". At the top, there are buttons for "Back", a home icon, and "OK". The main content area contains several settings. The first is a checked checkbox labeled "Symmetrical delay when calling" with a subtext "(If checked, the delay profile will also be applied to Rx at this end)". Below this is an unchecked checkbox labeled "Automatic buffer adjustment". Under "Automatic buffer adjustment", there are two groups of controls: "Min Delay" with a text box showing "1000 ms" and "Max Delay" with a text box showing "20000 ms". Below these is a checked checkbox labeled "Manual buffer adjustment". Under "Manual buffer adjustment", there is a "Delay:" label followed by a text box showing "2000 ms" and a dropdown arrow.



**Picture 89. Streaming Rx Settings Menu**

The maximum buffer size is 20 seconds. The minimum buffer size is 1 second. The user has to take into consideration that this size includes the codification/decodification delay, that is why the minimum possible configuration is 1 second.

As the value defined by the user includes the encoding/decoding delay, this would be the total delay for the communication if the network had zero delay.

The user should bear in mind that the longer the buffer, the longer the delay, but the more protection against jitter and the more robust the communication.

The buffer can be configured to work with a fixed size (Manual buffer adjustment) or variable (Automatic buffer adjustment). In this last case, the upper and lower limits of the buffer can be selected.

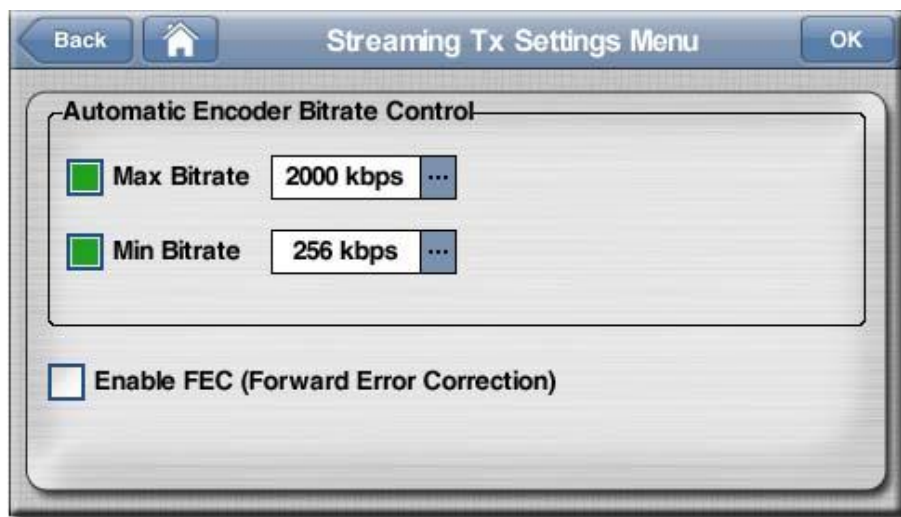
The 'symmetrical delay when calling' option is used to give to the local jitter buffer the same value of the call profile when calling to a remote codec.

***It is important to remark that this configuration are only taken into consideration when the received call does not include any buffer definition in its call profile.***

#### **IV.8.5 Streaming TX parameters**

This menu allows the user to configure some advanced functions related to the video and audio streaming.

# **KUSNET** User Manual



**Picture 90. Streaming TX Menu.**

When the AUTO option has been selected in the encoder configuration menu (see chapter **iError! No se encuentra el origen de la referencia.**), the bit rate of the video and audio encoders will adapt automatically to the network conditions, trying to use as much bit rate as possible to get the best possible quality. That is why this menu allows the user to configure a threshold or maximum bit rate. It is very useful to avoid problems when working with networks that have a well defined max capacity, like IP over satellite links, for example.

Likewise, this menu also permits to set a minimum bit rate value under which the quality obtained is considered unacceptable.

**NOTE:** When the user is using an IP link with a very narrow bandwidth, very close to the minimum bandwidth set in the configuration window above, it is not advisable to use automatic bit rate adaption. For example, when working in standard definition, and streaming over an IP over satellite connection like BGAN at 384kbps, it is recommended to set the bit rate of the video encoder to a fixed value, as well as the bit rate for the audio codification. The user should have to take into account that it is advisable to leave a 10% gap between the sum of the audio and video bit rate and the maximum capacity of the link, to leave some room to the overhead of the protocol.

The **Forward Error Correction (FEC)** function enables redundant information streaming. Therefore the steaming bandwidth actually increases but the reception at the remote Ikusnet is more reliable against packet losses. FEC

# ***KUSNET*** User Manual

increases the delay and bandwidth of the video and audio communication, but it makes the connection more reliable.

**This function is convenient when detecting some few random packets losses.** Typical application scenarios are public IP networks like Internet over ADSL or Wi-Fi access points.

## IV.8.6 Communications Profiles

This menu allows the user to define a set of parameters to be used when making a call. This set of parameters is called 'Profile'. Please take a look at the dial menu below:



**Picture 91. Program Dial Window.**

The connection Profiles can be configured by the user. Each profile can define the following types of parameters:

1. **Call** Parameters.
2. **Audio Encoder** Parameters.
3. **Video Encoder** Parameters.

# **KUSNET** User Manual

4. **Streaming Tx** Parameters.
5. **Streaming Rx** Parameters.

The option “**Profile Properties**” is used to define if the profile configures all or only part of the aforementioned parameters.



**Picture 92. Profile Properties Window.**



**Picture 93. Profile Configuration Window.**

In the Call option, the type of call can be selected between these three values:

# **KUSNET** User Manual

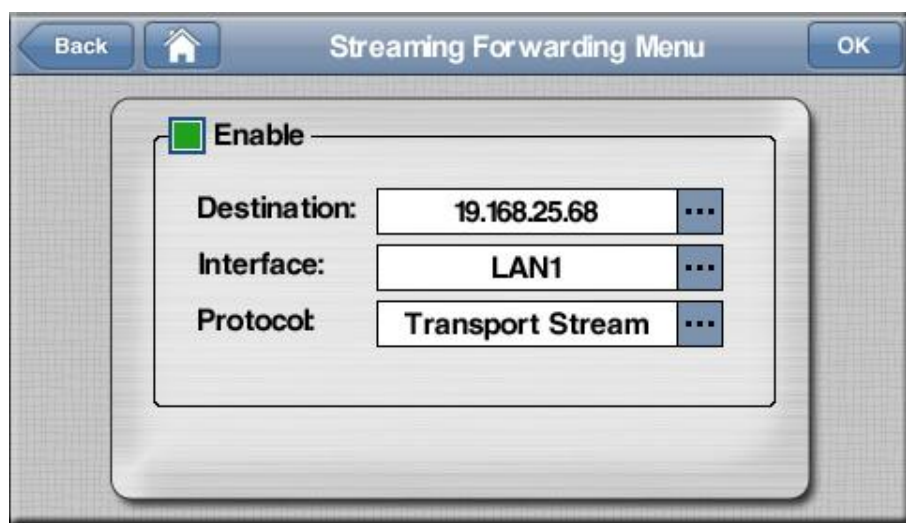
- **Video & Audio:** both video and audio are compressed in the same stream.
- **Video:** No audio is streamed. This option might be interesting when the audio is not relevant and the audio bandwidth can be used to enlarge the video bandwidth.
- **Audio:** Only audio is streamed. This option is useful when the bandwidth is too small to use it in a video transmission.

In the **Video Encoder** and **Audio Encoder** options, the parameters for the video and audio stream can be chosen.

The **Streaming Rx** and **Streaming Tx** parameters that can be set for the profile are those explained in IV.8.4 and IV.8.5 respectively.

## IV.8.7 Streaming Forwarding

When the Streaming Forwarding license is activated, it is possible to resend the incoming stream to another destination using MPEG-TS or RTMP protocol over UDP (port UDP 1234). The destination address and the Ethernet port involved (LAN1 or LAN2) can be selected.

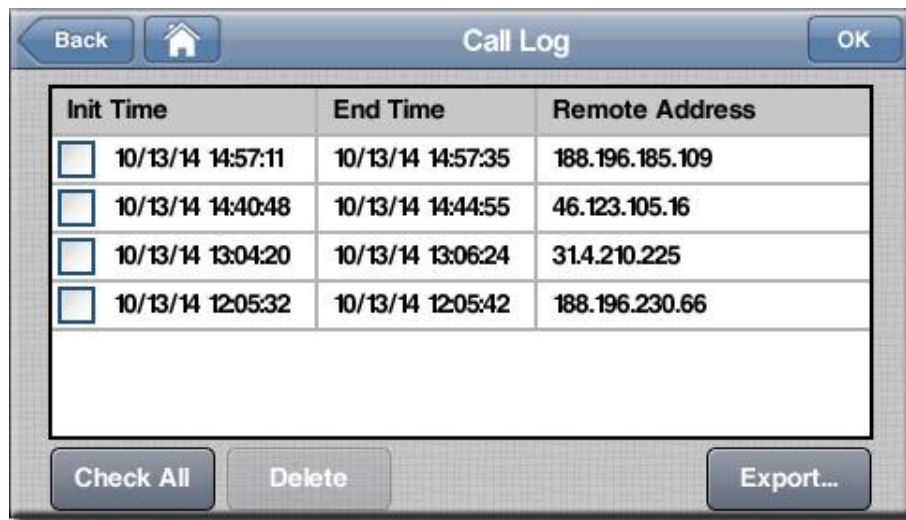


**Picture 94. Streaming Forwarding Menu.**



## IV.8.8 Call Log

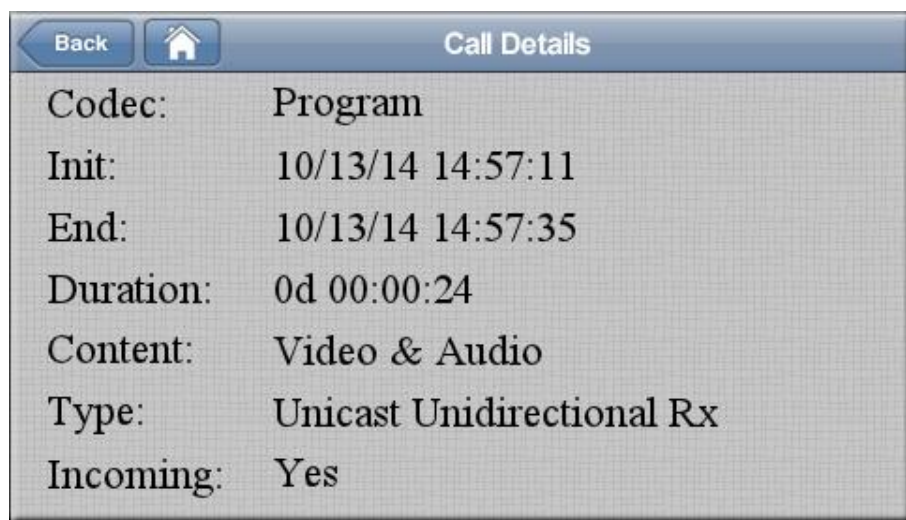
This functionality has been added to have a list of all the calls made and received in the codec, as well as its initial and end time.



	Init Time	End Time	Remote Address
<input type="checkbox"/>	10/13/14 14:57:11	10/13/14 14:57:35	188.196.185.109
<input type="checkbox"/>	10/13/14 14:40:48	10/13/14 14:44:55	46.123.105.16
<input type="checkbox"/>	10/13/14 13:04:20	10/13/14 13:06:24	314.210.225
<input type="checkbox"/>	10/13/14 12:05:32	10/13/14 12:05:42	188.196.230.66

**Picture 95. Call Log**

A new option to export the call log to an XML file has also been added. Extended information is shown when clicking on a call:



Codec:	Program
Init:	10/13/14 14:57:11
End:	10/13/14 14:57:35
Duration:	0d 00:00:24
Content:	Video & Audio
Type:	Unicast Unidirectional Rx
Incoming:	Yes

**Picture 96. Call Log Extended Information**

## **IV.9 Interfaces options menu**

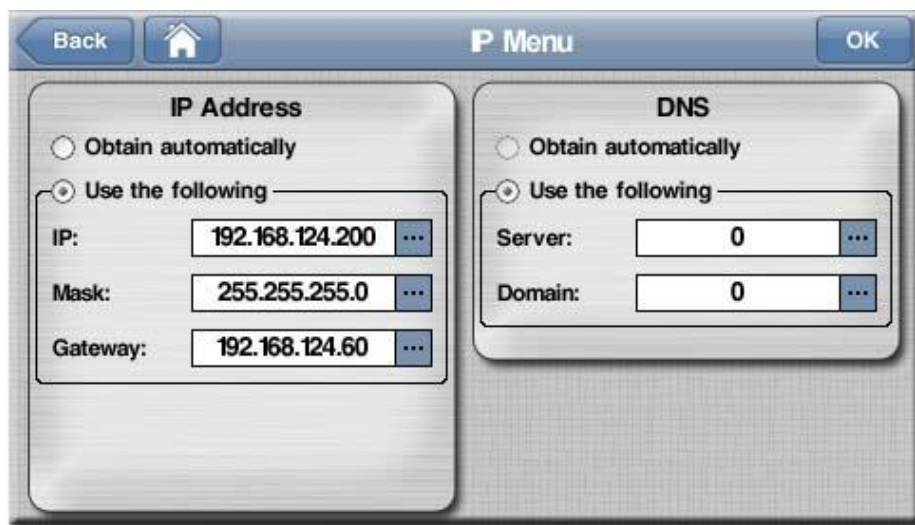
In this menu several communication interfaces can be configured: Ethernet, WIFI, 3G/4G services for video and audio communications, and RS232 and GPIO for the transmission of auxiliary data. The SIM cards' usage is also controlled from this menu.



**Picture 97. Communication Interfaces Menu.**

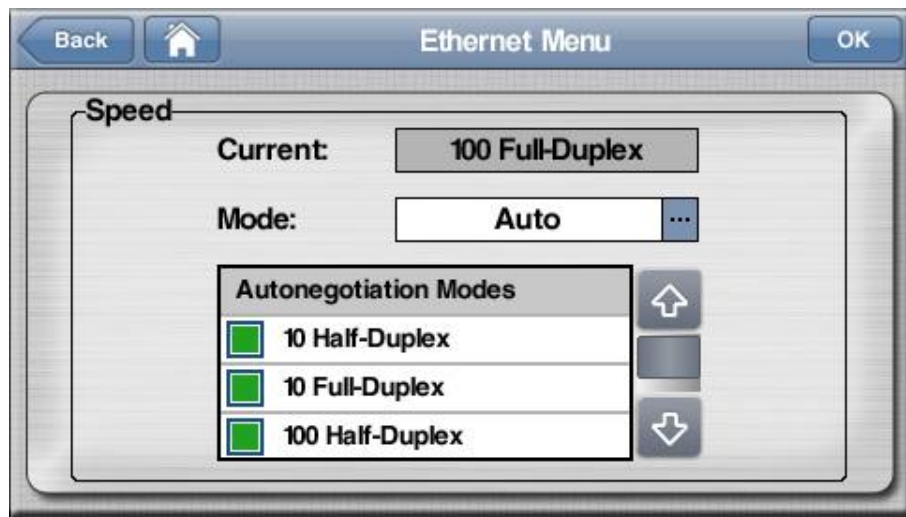
### **IV.9.1 LAN1 configuration**

All configuration parameters related to the Ethernet port will be established here: IP address, IP mask, IP gateway, DNS and DHCP servers. The LAN1 interface is used for all IP communications when the LAN2 interface is not enabled. Once LAN2 is enabled, LAN2 will carry all IP data related to the PROGRAM and TALKBACK streams, whilst the LAN1 interface will only carry control IP data, like the web control.



**Picture 98. IP Menu.**

It also possible to configure the Ethernet port and to choose the negotiation mode:



**Picture 99. Ethernet Menu**

## **IV.9.2 LAN2 configuration**

IP address, IP mask, IP gateway, DNS and DHCP parameters are defined here. This interface is restricted to the PROGRAM and TALKBACK streaming if this LAN2 has been enabled; keeping just the web control access on LAN1.

# ***KUSNET*** *User Manual*



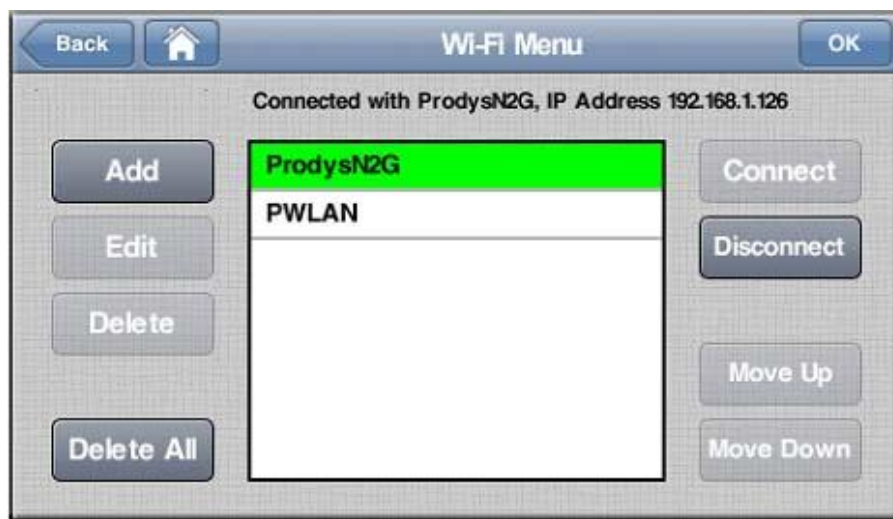
**Picture 100. Enabling independent control access /streaming.**

## **IV.9.3 Wi-Fi configuration**

Ikusnet units can be equipped with an external USB to Wi-Fi module. This chapter describes how to configure this interface. The user has to take into account that one thing is to configure this interface to connect to a Wi-Fi network, and another thing is how to use this interface in terms of video streaming. For example, this interface might be defined as the main and only IP interface to stream the video and audio or for file uploading, or it might be used together with other IP interfaces to get more bandwidth (bonding or bandwidth aggregation (see chapter III.8 for more information in this regard)).

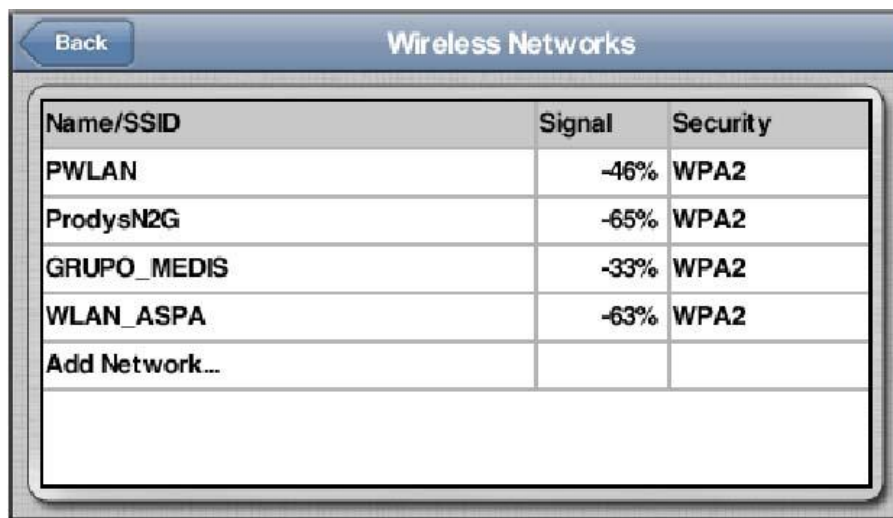
Please take a look at the picture below. It shows the main Wi-Fi configuration menu:

# ***KUSNET*** User Manual



**Picture 101. WIFI Menu.**

From this menu the user can select what Wi-Fi network will connect to. By pressing the Add button it is possible to access the Wireless Networks Menu where the different Wi-Fi networks automatically detected by the unit will appear, so that the user can just select any of them and add them to the list of Wi-Fi networks on the main Wi-Fi menu. The type of encryption and the quality of reception will be shown for each of the available networks.

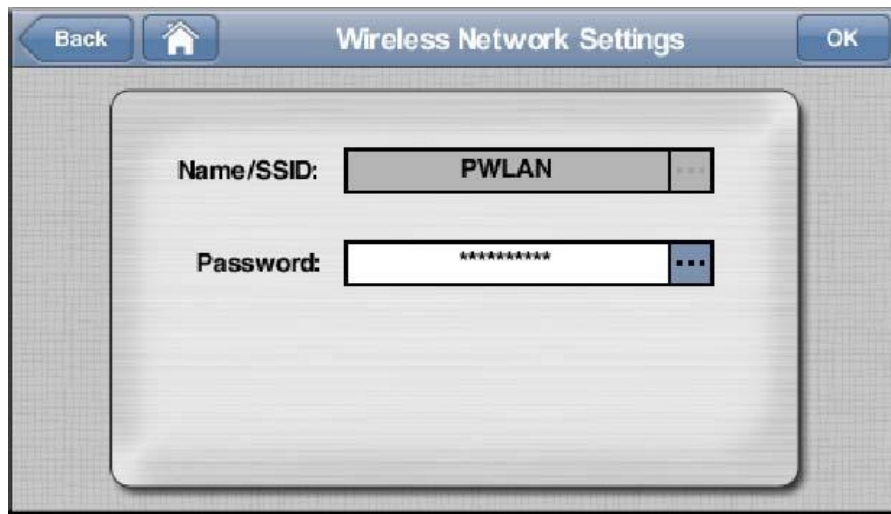


**Picture 102. Wi-Fi Add Menu.**



# ***KUSNET*** User Manual

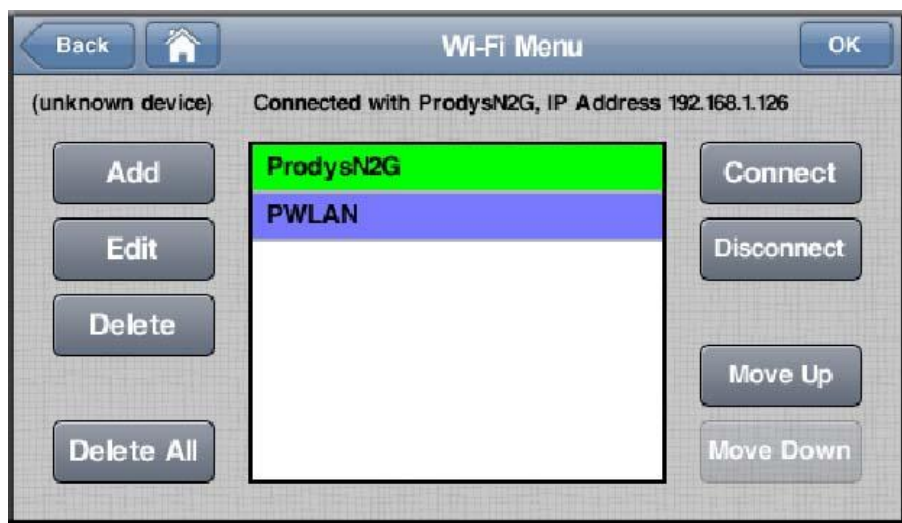
Once in the main Wi-Fi menu, just clicking on any of the WiFi networks available in the list, the user will edit the password settings for that specific network.



**Picture 103. Wi-Fi Network Settings Menu.**

Once all networks in the list have been configured with their corresponding security settings, in order for the unit to connect to any of those networks, the user has to click on the desired network and press the Connect button. The current Wi-Fi network in use will be shown on a green background colour, whilst the currently selected Wi-Fi network will be shown on a purple background colour.

# ***KUSNET*** User Manual



**Picture 104. Main Wi-Fi Menu.**

In the picture above, ProdysN2G is the current Wi-Fi network in use, whilst the PWLAN network is currently selected by the user. By clicking on the Disconnect button the user can disconnect the unit from the current Wi-Fi network.

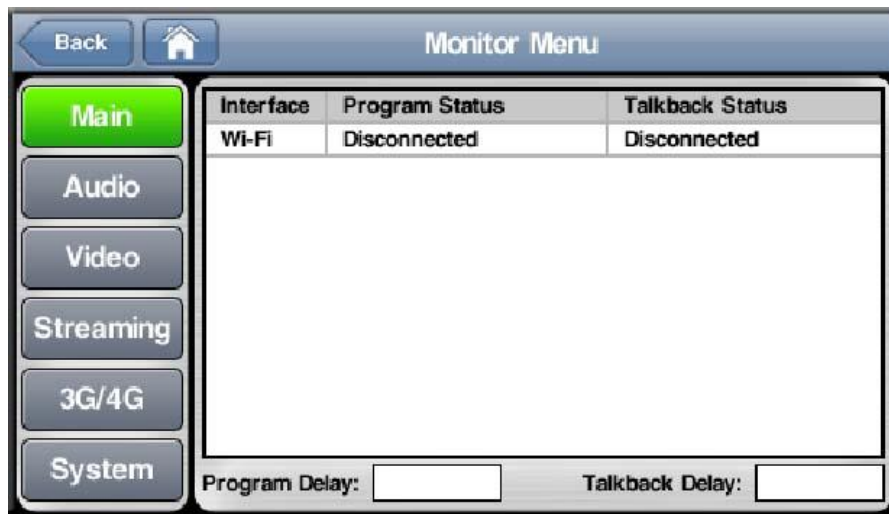
To delete a network, just select one network and press the Delete button. The system will ask for a confirmation.

To end with, it is also possible to define the priority of the Wi-Fi networks. The unit will try to connect first to the Wi-Fi network at the top of the list. The user can change the order of the different networks in the list by means of the Move Up and Move Down buttons.

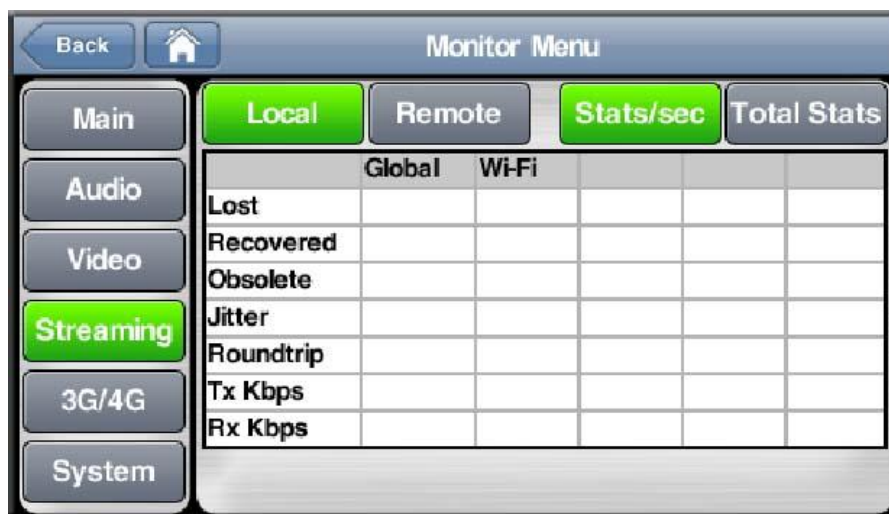
Once all networks in the main list have been defined (password configured), and the user has selected one of the available networks, just by pressing on the Connect button the unit will try to connect to that network. Once the unit is connected, a message like 'Connected to WIFix network' will appear at the top of the window.

If the Wi-Fi interface is used as the main streaming interface, both the Main monitoring Windows and the Streaming Monitoring Window will indicate this situation as in the pictures below:

# ***KUSNET*** User Manual



Picture 105. Main Monitor Window.



Picture 106. Streaming Monitor Window.

**NOTE:** In order for the user to configure the Wi-Fi interface, this interface must be configured as one of the IP interfaces to be used for the streaming, be it alone or along with others, like 3G/4G links for example (see chapter 0 for information about where to select the interfaces for the streaming).

## **IV.9.4 3G/4G network's configuration**

The portable codecs of the Ikusnet family can stream over a bundle of up to eight 3G/4G modems (8 internal SIM card slots).

Different service providers can be used for this purpose, so every 3G/4G module must be configured according to the data access settings for that specific provider.



**Picture 107. 3G/4G Menu.**

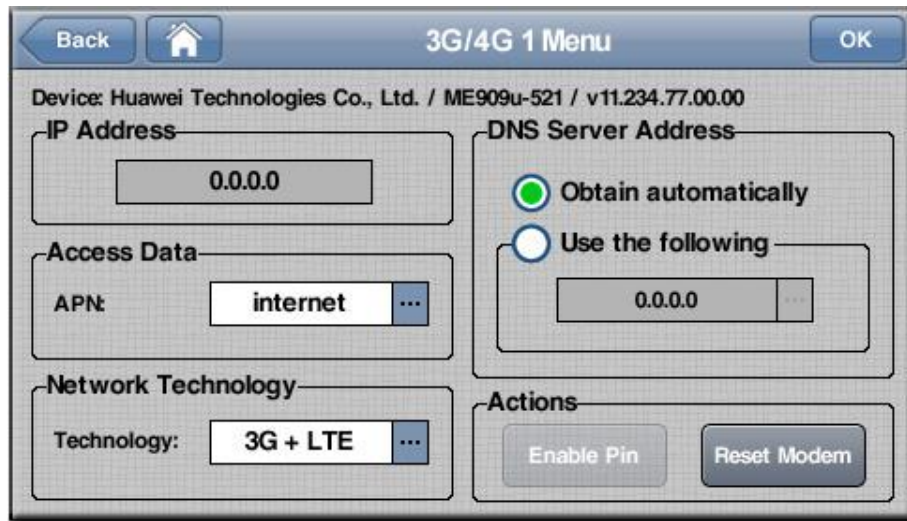
In order for each of the 3G/4G connections to work properly, the user has to enter the proper APN, User and password settings. These settings depend on the 3G/4G provider. Each provider has different settings for each country. There are many lists open to the public on the Internet with these settings per most of 3G/4G providers around the world.

It is also possible to choose the king of technology used in the telephone connections. The possible values are:

- 3G + LTE
- 3G only
- LTE only

It is convenient to leave the default values of any other parameters or IP address field is just informative.

# **KUSNET** User Manual



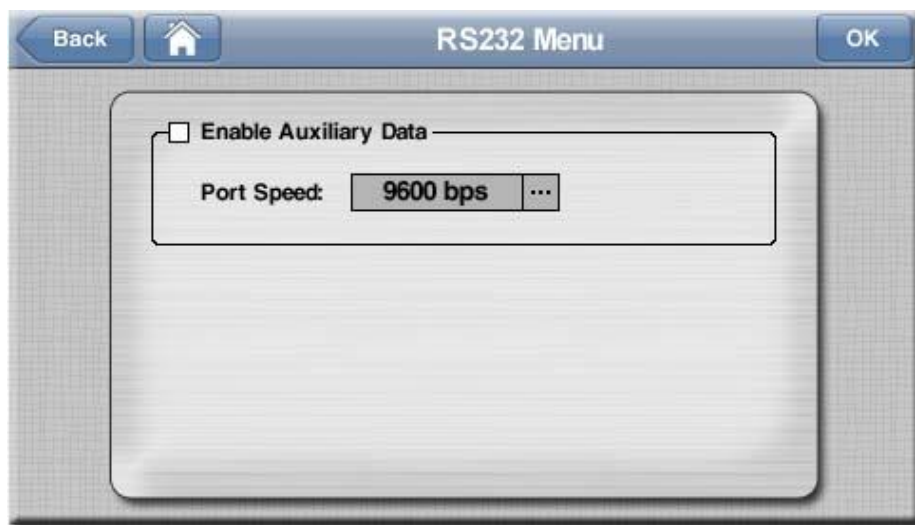
**Picture 108. 3G/4G Configuration Menu.**

Finally, it is also possible to enable or disable the SIM card's PIN number and to reset that 3G/4G modem pressing the Reset Modem button.

## **IV.9.5 RS232 configuration**

An auxiliary serial data channel can be established using the RS232 interface. The range of speeds varies between 300 bps to 9600 bps. When the serial interface is enabled, the user can embed auxiliary data coming from the serial interface (RS232) into the video and audio stream. This data will be available at the output of the serial port at the receiving end.

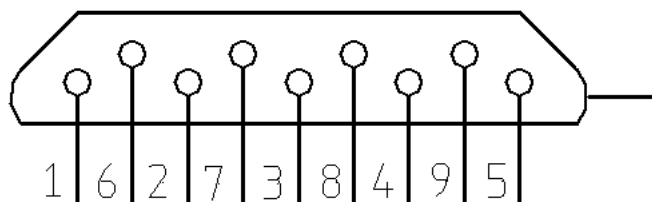




**Picture 109. RS232 Configuration Menu.**

## IV.9.6 GPIOs

There are two ground contact inputs and two relay outputs mounted on a DB9 female connector.



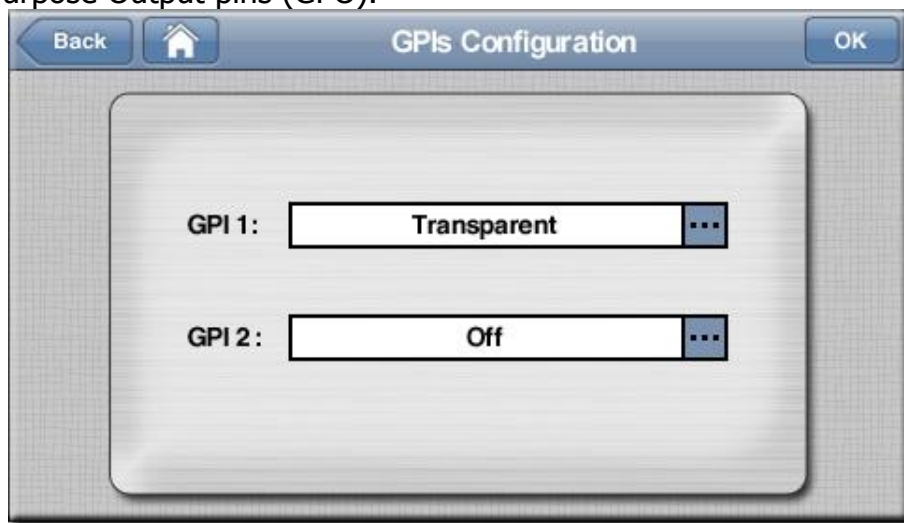
**Picture 110. GPIO Pinout**

Pin	Description	Pin	Description
Pin 1	Input 1		
		Pin 6	Input 2
Pin 2	GND		
		Pin 7	Normally Closed Relay 1
Pin 3	Common Relay 1		
		Pin 8	Normally Open Relay 1
Pin 4	Normally Closed Relay 2		
		Pin 9	Common Relay 2

# ***KUSNET*** User Manual

Pin 5	Normally Open Relay 2		
-------	-----------------------	--	--

The GPIO menu allows to configure two Global Purpose Input pins (GPI) and two Global Purpose Output pins (GPO).



**Picture 111. GPI menu.**

The GPI can be configured so, when an input level is detected in the pin, the following actions are realized:

- **Off:** No action.
- **Transparent:** the input status is replicated in the corresponding GPO in the Ikusnet connected at the other end of the communication.
- **Program Call/Hangup.**
- **Talkback Call/Hangup.**
- **Reboot.**

The GPO can be configured to show an output level at the occurrence of the following events:

- **Off:** No activated.
- **Transparent:** this output reflects the status of the GPI of the remote codec with which the call is established.
- **Alarm Active.**

## IV.9.7 Data usage

The option "Usage" allows the user to check in real-time the bit consumption (transmission and reception) in each network interface available in the codec.

Interface	Tx (KB)	Rx (KB)	Available
Ethernet1	546765	241299	-
Ethernet2	0	0	-
3G1	0	0	-
3G2	0	0	-
3G3	0	0	-
3G4	0	0	-

**Picture 112. Usage Menu.**

Clicking on any interface, a new configuration screen will be shown that permits to reset the interface statistics, to configure an autoreset option including the day of the month (useful for telephone providers) and other option to set a consumption limit (also useful for telephone providers). According to this limit an available percentage is shown in the screen above.

**Ethernet1 Usage Configuration**

☒ **Autoreset**

Day of month:

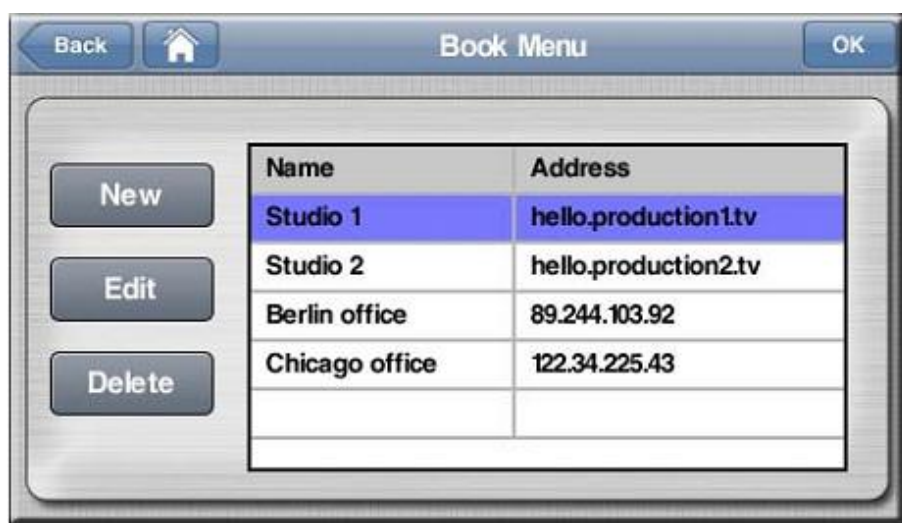
☐ **Usage Limit**

Maximum KB:

**Picture 113. Usage Configuration Menu.**

## **IV.10 Book options menu**

Favorite addresses to call can be stored thru this path. Then direct dialing is possible to any stored destination.



**Picture 114. Book Menu.**

# ***KUSNET*** *User Manual*

## **IV.11 User options menu**

This menu enables one<sup>31</sup> or more Ikusnet users with login name and password.



**Picture 115. User Configuration.**



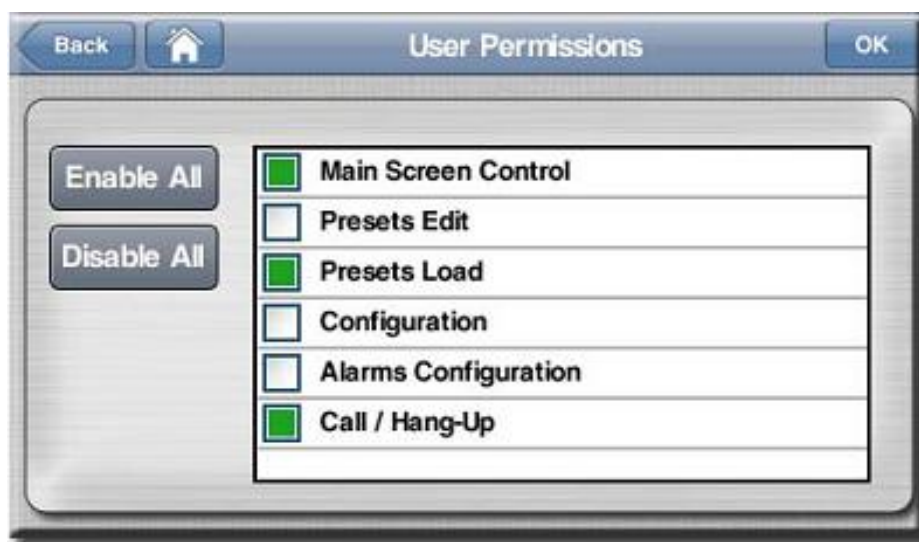
**Picture 116. Login Window.**

<sup>31</sup> By default the user Admin is enabled without password or operation restrictions.



# ***KUSNET*** *User Manual*

The <Permissions> button opens a dialog for operation's restriction for this user. Following example is a typical restrictive profile for basic users.



**Picture 117. User Permissions.**

## IV.12 System menu

The system menu screen offers a number of options for the codec maintenance. The following figure shows the system menu as it appears when viewed through a web browser. When accessed through the touch panel not all options are available.



# ***KUSNET*** User Manual

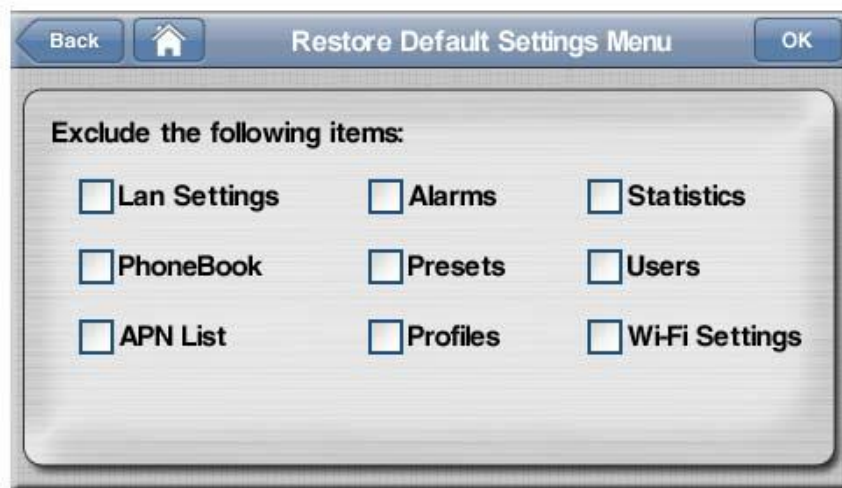


**Picture 118. System menu.**

The options available in this menu are:

- **Name:** Permits to assign a name to the codec.
- **Version:** Shows firmware versions of the codec processors.
- **Date/Time:** Date and time settings.
- **Default Configuration:** Restores the default equipment configuration. User can exclude from this restoration the following:
  - LAN Settings
  - Phone Book
  - APN list
  - Alarms
  - Presets
  - Profiles
  - Statistics
  - Users
  - Wi-Fi settings

# ***KUSNET*** User Manual



**Picture 119. Restore Default menu**

- **Licenses:** Licenses management. Accessing through the web browser, it's possible to upgrade the unit with new licenses. These licenses will be provided by Prodys as a file with extension ".hlf".

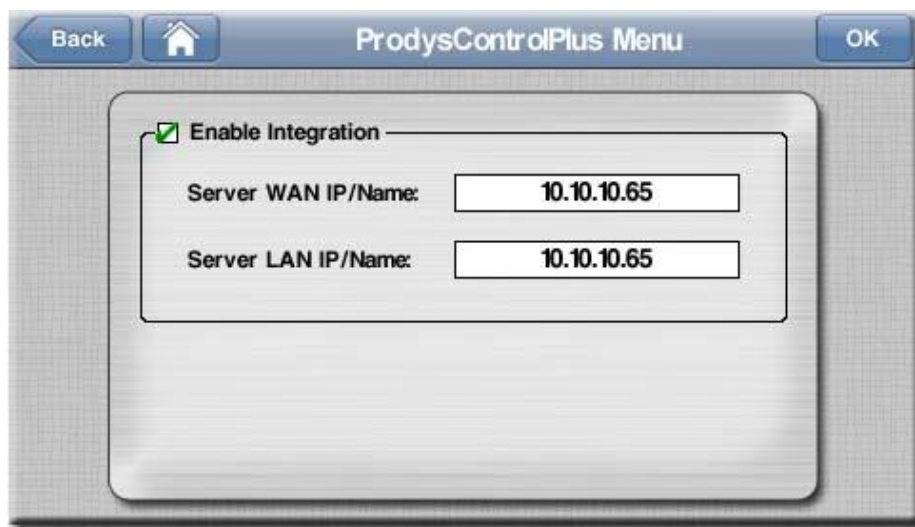
For more information about the different licenses available at any given moment please contact Prodys Sales Team at [sales@prodys.net](mailto:sales@prodys.net).



**Picture 120. Licenses Menu**

# **KUSNET** User Manual

- **Save Log.** This option is only available when controlling the unit via the web browser. The file generated by the system contains some information about the internal operation of the system that might help Prodys Support department to understand the scenario where the customer is using the unit.
- **Reboot:** To force a reboot of the codec.
- **Import/Export Configuration.** Only through web browser. Recording of a configuration file and loading of a configuration file.
- **Set Normal/Advanced Mode:** Advanced Mode permits to access all options in the Ikusnet menus. Normal Mode restricts access to some parts of the menu. Normal mode is designed for nontechnical users.
- **Enable Autologin:** to activate and deactivate the login screen for each user.
- **ProdysControlPlus:** Enables ProdysControlPlus software integration.



**Picture 121. ProdysControlPlus Menu**

***NOTE: This functionality allows the user to control the unit remotely, even though that unit being controlled is behind a firewall or even connected to the internet just via 3G or 4G. This establish a kind of NAT Traversal communication between the PC running the ProdysControlPlus application and the remote unit***



# **KUSNET** User Manual

*that allows that PC to access the unit remotely. If the unit is in the same network as the PC running the ProdysControlPlus Server, just enter the Server LAN IP address. If the PC running ProdysControlPlus Server is in another network across the Internet, just enter the public IP address of the router which that computer is connected to.*

*Take into account that the remote unit will traverse any NAT/Firewall so it will allow the remote PC to access and control it remotely, but the NAT/firewall at the PC side must be configured so that port TCP 54001 is opened and forwarded to the PC running ProdysControlPlus. However, this does not have to be done at the remote side, where it is much more difficult or even impossible (for example when connecting via 3G/4G) to access and control the firewall.*

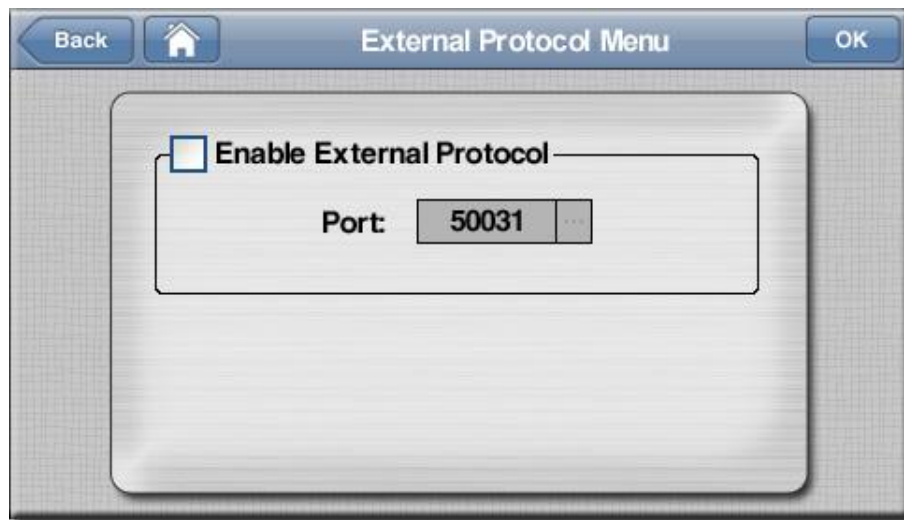
- **Advanced:** advanced configuration options.
- **Touchscreen:** This option is only available in those portable Ikusnet codecs with a touch panel screen. It allows the calibration of the touch screen.
- **SNMP:** SNMP V1 V2 & V3 trap support. Traps will be sent each time an alarm occurs. It is also possible to configure different destinations



**Picture 122. SNMP Traps Menu**

# ***KUSNET*** User Manual

- **External Protocol:** This option activates the possibility of controlling remotely the codec using the Ikusnet's SDK. It's also possible to choose the port.



**Picture 123. External Protocol Menu**

- **Web Server:** This option allows disabling the web server that controls the codec through IE and changing the TCP port.

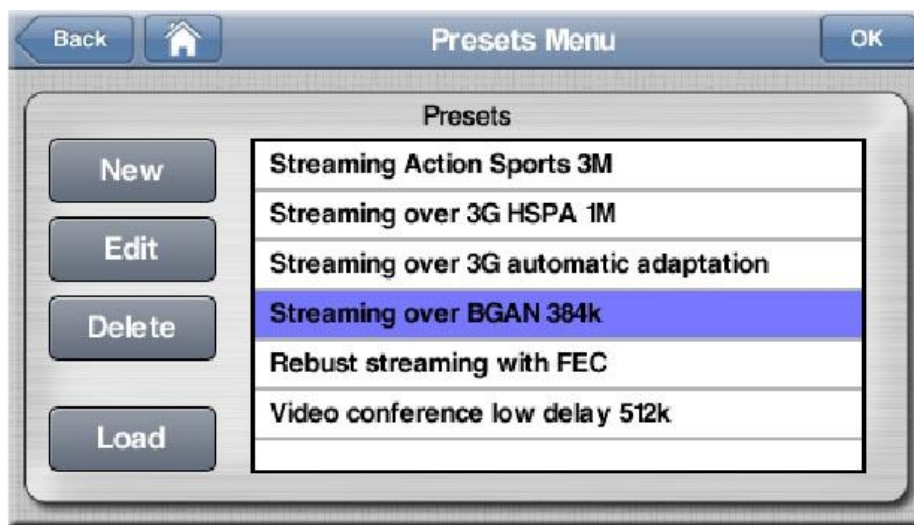


**Picture 1244. Web Server Menu**

## IV.13 Preset menu

From the main screen the <Presets> menu gives access for its administration. Presets are customer configurations for the video and audio encoders which can be turned active with a simple click.

Not only the encoder parameters can be configured; also streaming specific parameters like 3G/4G or Ethernet, bit rate automatic adaption or FEC can be defined in advance. For this reason, this is a very convenient configuration option for non-technical users.



**Picture 125. Presets Menu.**

- New                    *(Create a new preset)*
- Edit                   *(Edit an existing preset)*
- Delete                *(Delete an existing preset)*
- Load                 *(Loading a preset means turning this configuration active)*

## IV.14 Monitor menu

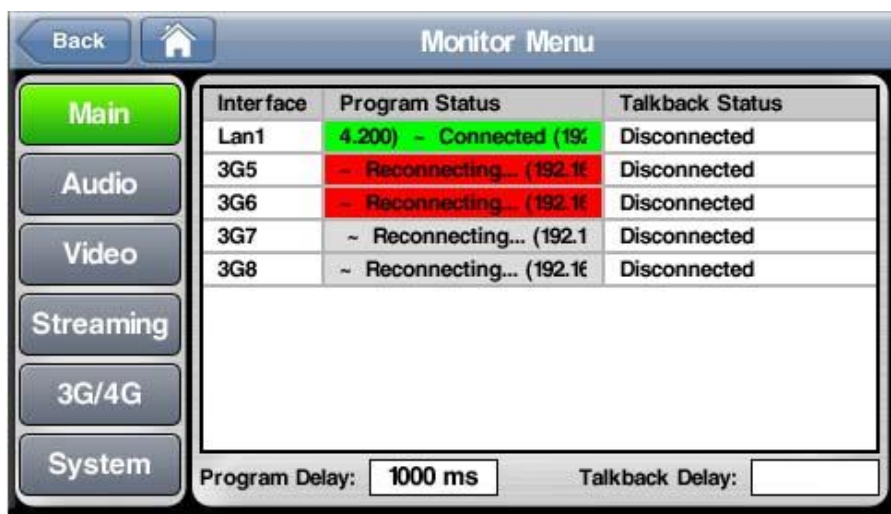
The user can check in real time many different parameters regarding the streaming operation and network performance thru the monitor menu.

The monitor menu is divided into six sections for specific information:

- Main *(Line Status, buffers)*
- Audio *(TX /RX VU-meters, audio compression status)*
- Video *(Input 1/2 info, video compression status)*
- Streaming *(Complete statistics of the transmission)*
- 3G/4G *(Availability and strength of 3G/4G networks)*
- System *(local IP address, temperatures, feeding voltage)*

### IV.14.1 Main monitor screen

This screen shows the status of the lines contributing to the PROGRAM and TALKBACK communications. This status may be *Connected / Reconnecting / Disconnected / No physical line*.

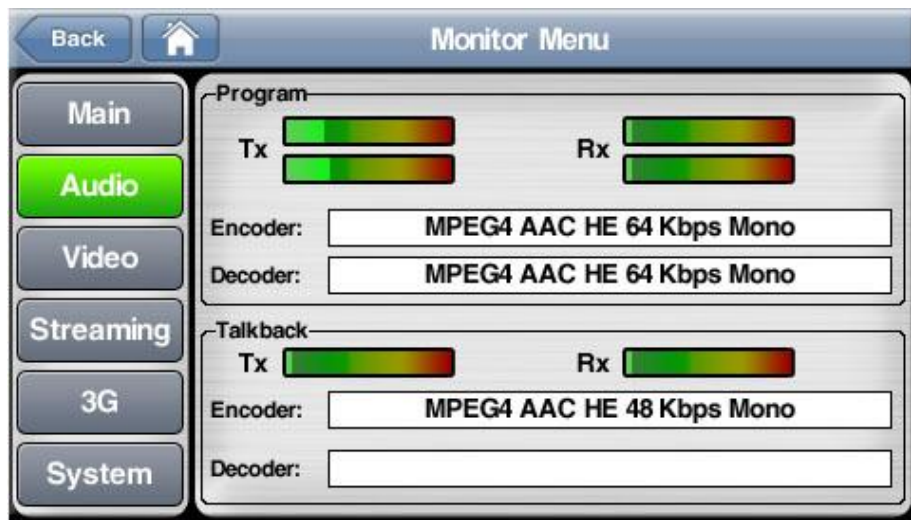


**Picture 126. Monitoring Main Screen.**

This screen also shows the delays of Program and Talkback communications.

## IV.14.2 Audio monitor screen

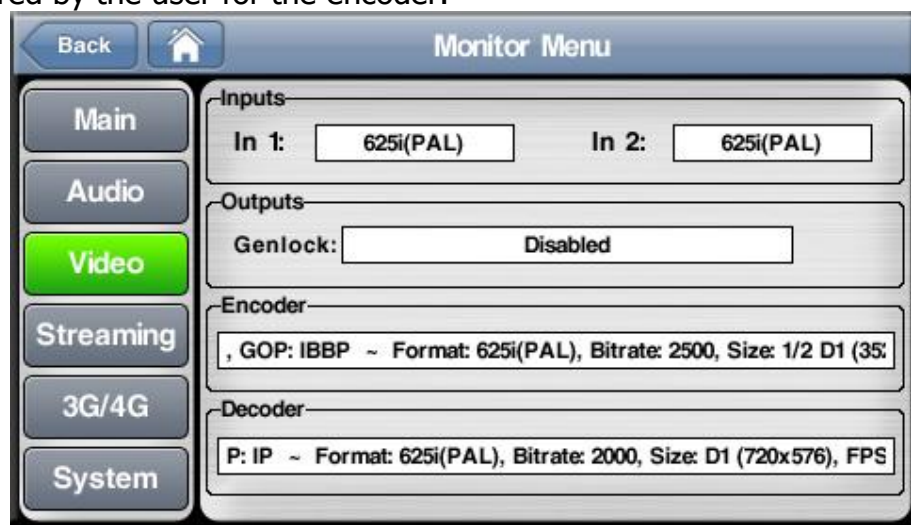
L & R audio VU-meters for the PROGRAM channel and the mono VU-meter of the talkback channel give indication of the transmitted and the received audio level.



**Picture 127. Audio Monitor Menu.**

## IV.14.3 Video monitor screen

This menu gives information about the video signal format for both video inputs, as well as the video compression parameters detected in the Decoder and configured by the user for the encoder.



**Picture 128. Video Monitor Menu.**



## IV.14.4 Streaming monitor screen

The <Streaming> monitor displays the foregoing performance indications for both communication parties. This is the **<Local>** field indicates the performance of the incoming stream, while the **<Remote>** field indicates the measured performance at the remote destination. Therefore the local user gets a valuable feedback about the reception quality at the destination.

	Global	Lan1		
Lost	0	1		
Recovered	1			
Obsolete	0	0		
Jitter	2046.99	2046.99		
Roundtrip	86.70	86.70		
Tx Kbps	80	80		
Rx Kbps	431	431		

**Picture 129. Monitor Menu.**

The statistic data can be offered in two different ways:

- If the **<Stats/sec>** button is selected, the data appearing on the screen are an average value measured every second.
- If the **<Total Stats>** button is selected, the data shown are the accumulated values from the beginning of the communication.

The statistical data is presented for the whole communication ("Global" column) but also for each interface through which the communication is done in case 3G/4G or Custom bonding is used.

The **<Lost>** field accounts every streaming IP packet which does not arrived to the receiver. A large account will lead to a poor picture & audio quality. The first countermeasures should be:

# **KUSNET** User Manual

1. Check your network performance. Is the expected bandwidth available?
2. Increase (for example) 100% the depth of the reception buffer (please refer to section IV.8.4 Streaming RX parameters).
3. Lower the encoder bandwidth for video and/or audio (please refer to section IV.6.2 Video encoder [H.264](#) configuration. You can use Preset for a quick bandwidth adaption).

The **<Recovered>** packets field gives some feedback about the number of packets that the codec is able to recover.

The **<Obsolete>** packets field accounts every streaming IP packet which does not arrived to the receiver on time. It gives an indication that our RX buffer is not big enough.

The **<Jitter>** field indicates the highest jitter peak measured for this connection; it is a network impairment indication. Jitter is a time measurement in milliseconds and gives indication about instant changes of the streaming delay; low jitter usually indicates an optimal network performance.

Ikusnet's streaming buffer takes care about this network impairment automatically.

*Some remarks about jitter:*

1. Some milliseconds of jitter are unavoidable for any streaming network.
2. Large jitter peaks over >200ms could mean a poor network performance, depending of the type of connection.
3. The jitter peak adds additional delay to the video streaming delay.<sup>32</sup>

The **<Roundtrip>** field shows the time, in milliseconds, that a packet takes to go from the transmitter to the receiver, and back.

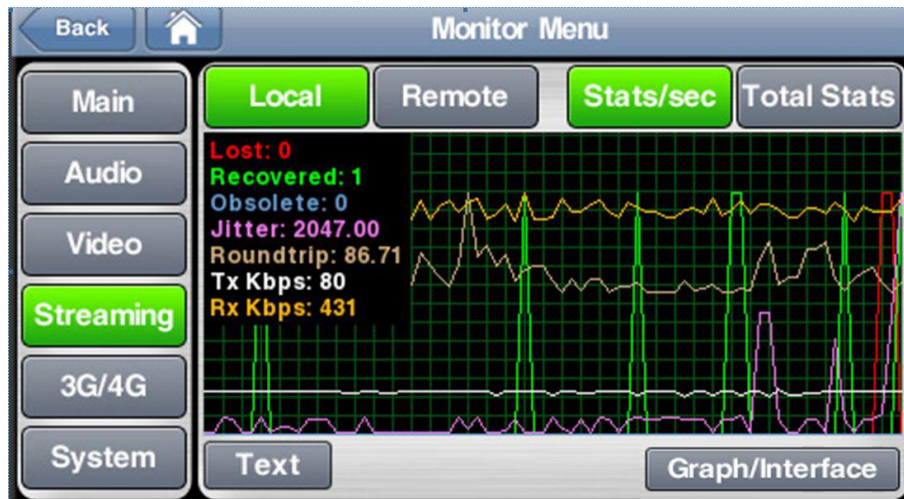
**<Tx Kbps>** and **<Rx Kbps>** show the bit rate of the transmitted and received streams. These values are interesting in the 3G/4G and Custom communications to know how the stream is divided into the several interfaces.

---

<sup>32</sup> The overall communication delay, encoder→decoder, is build up by the encoding delay plus the buffer depth. The buffer depth in turn is related to the maximum jitter.

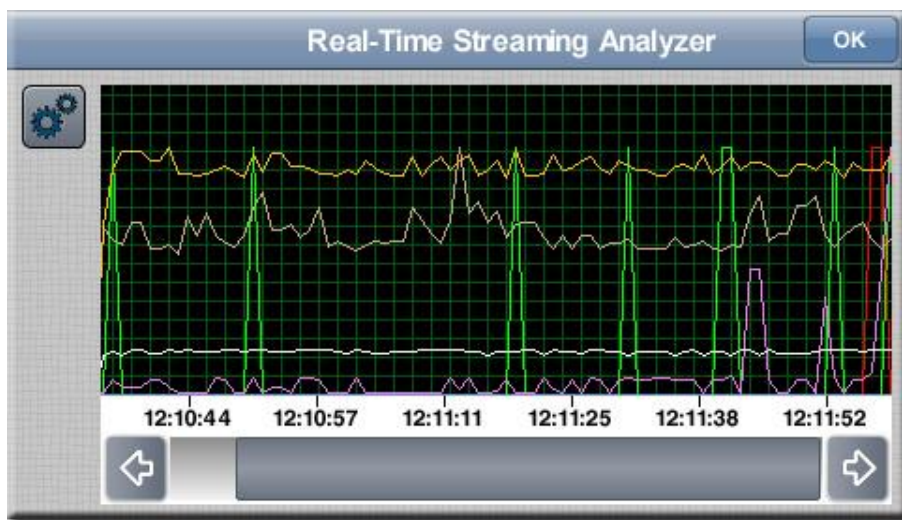
# ***KUSNET*** User Manual

It is also possible to get a graphical view of the key performance parameters clicking on the “graph” button on the down-left corner of the window.



**Picture 130. Monitoring Graphical View.**

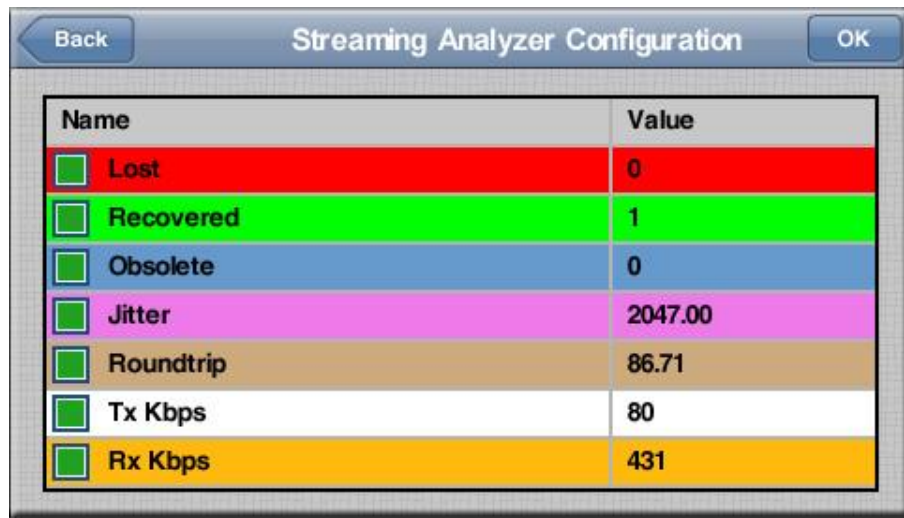
Clicking on the graph a maximized view can be obtained.



**Picture 131. Maximized Graphical View.**

It is also possible to define what key performance indexes are going to be shown in the display clicking on the button on the upper-left side of the window.

# ***KUSNET*** User Manual

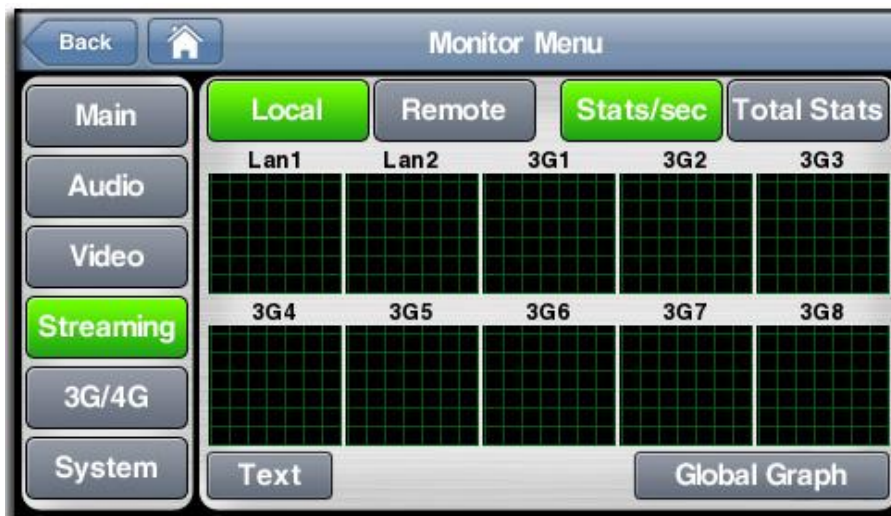


The image shows a software window titled "Streaming Analyzer Configuration". It has a "Back" button on the left and an "OK" button on the right. The main area contains a table with two columns: "Name" and "Value". Each row in the table has a small green square icon to the left of the "Name" column. The rows are: "Lost" (red background, value 0), "Recovered" (green background, value 1), "Obsolete" (blue background, value 0), "Jitter" (pink background, value 2047.00), "Roundtrip" (tan background, value 86.71), "Tx Kbps" (white background, value 80), and "Rx Kbps" (yellow background, value 431).

Name	Value
Lost	0
Recovered	1
Obsolete	0
Jitter	2047.00
Roundtrip	86.71
Tx Kbps	80
Rx Kbps	431

**Picture 132. Graphical View Configuration**

Clicking on the "Graph/Interface" button a new graphic is shown. In this graphic it is possible to visualize the transmission bitrate of each interface individually. This option allows a more clear comprehension of the performance of each transmission interface.



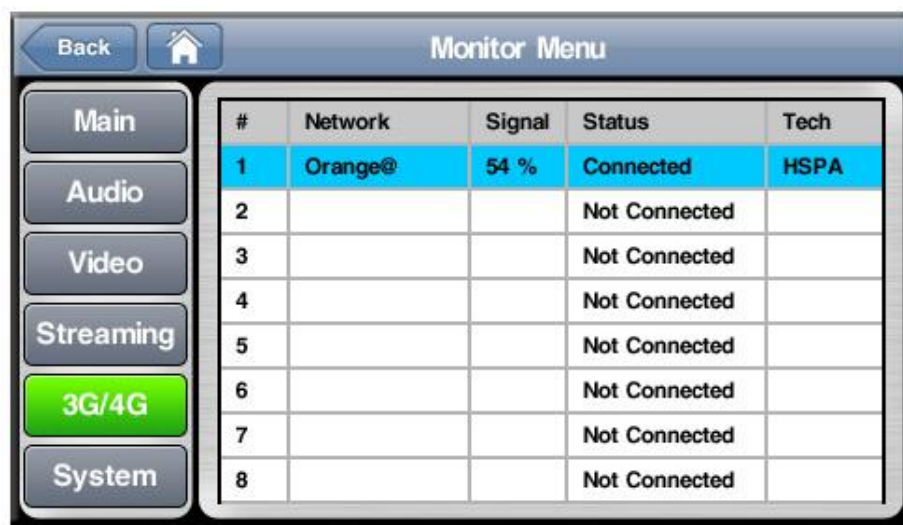
**Picture 133. Graphical View per Interface**



## IV.14.5 3G/4G monitor screen

This monitor screen shows information about the 3G/4G connections available on the unit:

- Network Provider
- Percentage of signal strength. This information is useful to estimate the quality of the link
- Status of the connection
- 3G/4G Technology detected. This connection will only be used for the streaming purposes if the detected technology is 3G/4G or higher.



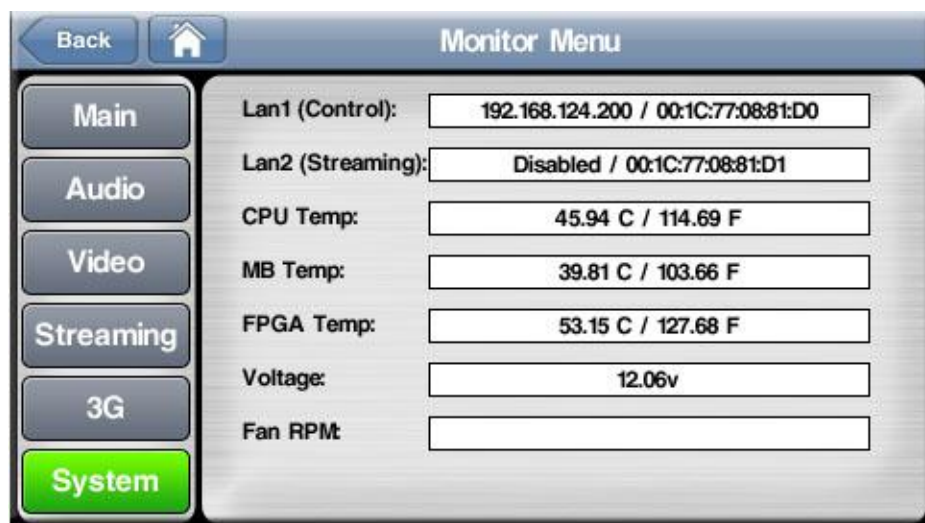
#	Network	Signal	Status	Tech
1	Orange@	54 %	Connected	HSPA
2			Not Connected	
3			Not Connected	
4			Not Connected	
5			Not Connected	
6			Not Connected	
7			Not Connected	
8			Not Connected	

**Picture 134. 3G/4G Monitor Menu**



# ***KUSNET*** *User Manual*

## IV.14.6 System monitor screen

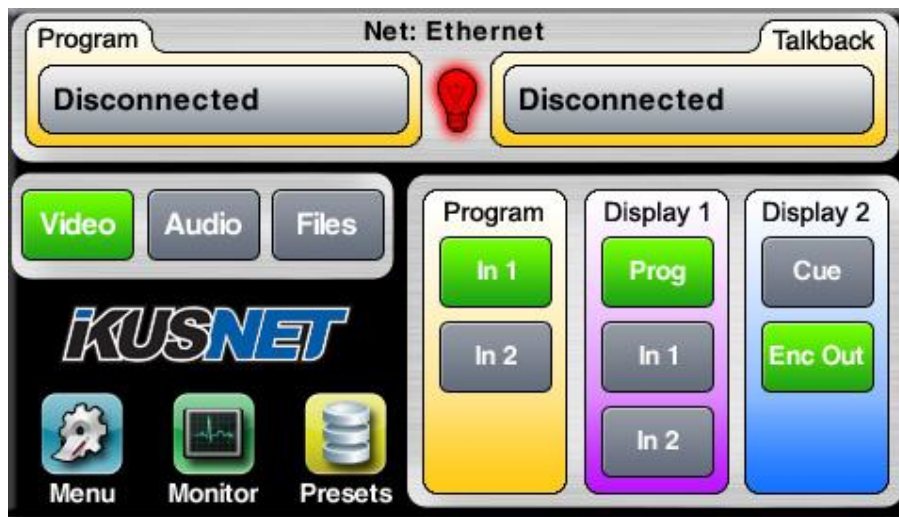


**Picture 135. System Monitor Menu**

# ***KUSNET*** User Manual

## IV.15 Alarm menu

Ikusnet is able to check and notify some alarm events. By means on a red lamp Ikusnet warns the user about the occurrence of one of these alarm events.

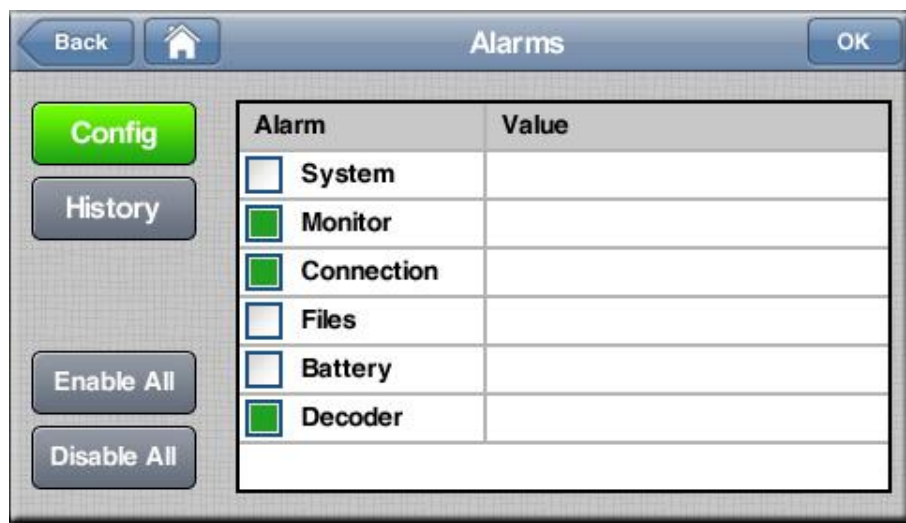


**Picture 136. Main Menu with alarm indication.**



**Picture 137. Options Menu with alarm indication.**

The alarm menu is opened clicking the red lamp from the main menu.



**Picture 138. Alarms Menu**

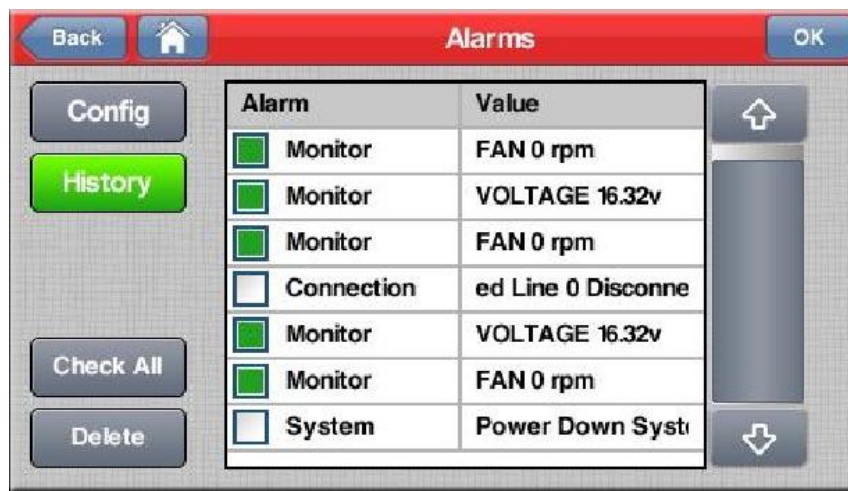
Six subsystems might be enabled or disabled individually for alarm notifications.

- **System:** power down or reset
- **Monitor:** hardware diagnostic parameters are out of range. The conditions that trigger the alarms are the following:
  - CPU Temperature > 60°C.
  - Motherboard Temperature > 60°C.
  - Fan Velocity < 3000 rpm
  - Main Voltage (12 VDC) lower than 11 VDC or higher than 12,5 VDC.
- **Connection:**
  - Streaming connection has been interrupted.
  - Interface at 5% of its maximal usage.
- **Files:**
  - Low free space. Only 10% of the memory capacity is left.
  - Failed upload.
  - Auto-Record Tx Failed
  - Auto-Record Rx Failed
- **Battery:**
  - External battery running out.

# **KUSNET** User Manual

- Internal battery running out.
- **Decoder:**
  - Program Video Decoder Not Framed
  - Program Audio Decoder Not Framed
  - Talkback Audio Decoder Not Framed

The alarm history submenu displays the alarm log as they happened.



**Picture 139. Alarms History Menu**

## Chapter V

### TECHNICAL SPECIFICATIONS

#### V.1 SUPPORTED VIDEO INPUTS FORMATS

The following video input formats are supported depending on the Encoder Mode:

Encoder SD	Input format	Resolution	Frames per second	Fields per second	Connector	Downscale to
	NTSC (480i59)	720x480	29,97	59,94	SDI, HDMI,CVBS	NTSC (480i59)
	PAL (576i50)	720x576	25	50	SDI, HDMI,CVBS	PAL (576i50)
	720p25	1280x720	25		SDI, HDMI	PAL (576i50)
	720p29	1280x720	29,97		SDI, HDMI	NTSC (480i59)
	720p30	1280x720	30		SDI, HDMI	NTSC (480i59)
	720p50	1280x720	50		SDI, HDMI	PAL (576i50)
	720p59	1280x720	59,94		SDI, HDMI	NTSC (480i59)
	720p60	1280x720	60		SDI, HDMI	NTSC (480i59)
	1080i50	1920x1080	25	50	SDI, HDMI	PAL (576i50)
	1080i59	1920x1080	29,97	59,94	SDI, HDMI	NTSC (480i59)
	1080i60	1920x1080	30	60	SDI, HDMI	NTSC (480i59)
	1080p25	1920x1080	25		SDI, HDMI	PAL (576i50)
	1080p29	1920x1080	29,97		SDI, HDMI	NTSC (480i59)
	1080p30	1920x1080	30		SDI, HDMI	NTSC (480i59)



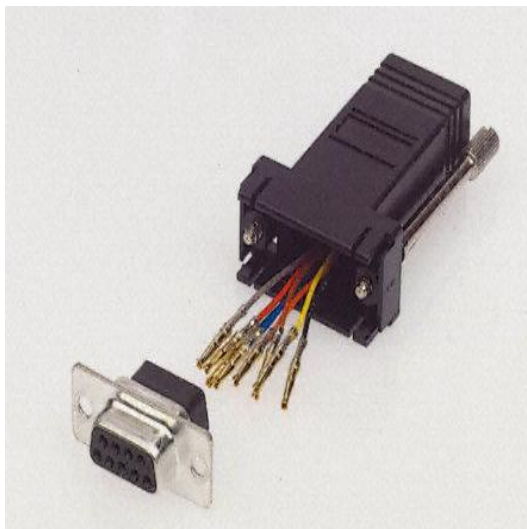
# KUSNET User Manual

NOTE: Take into account that when the compression format is configured to work as Standard Definition (SD), 720 and 1080 resolutions (HD) will be downscaled to SD.

Encoder HD	Input format	Resolution	Frames second	per	Fields second	per	Connector
	720p50	1280x720	50				SDI, HDMI
	720p59	1280x720	59,94				SDI, HDMI
	720p60	1280x720	60				SDI, HDMI
	1080i50	1920x1080	25		50		SDI, HDMI
	1080i59	1920x1080	29,97		59,94		SDI, HDMI
	1080i60	1920x1080	30		60		SDI, HDMI
	1080p25	1920x1080	25				SDI, HDMI
	1080p29	1920x1080	29,97				SDI, HDMI
	1080p30	1920x1080	30				SDI, HDMI

## V.2 RS232 PORTS

The RS232 port allows the transmission and reception of data along with encoded video and audio. Note that these sockets are RJ45 connections, as opposed to the typical 9-pin sub-D connections. To make the conversion between RJ45 and RS232 there are modular connectors available that should be wired as follows:



RJ45 Connector	9-pin female D-sub Connector
1 (NC)	1
2 (Rx)	3
3 (GND)	5
4 (NC)	4
5 (NC)	6
6 (GND)	7
7 (Tx)	2
8 (NC)	8

1,4,5,8 must be unconnected



# ***KUSNET*** *User Manual*

The ports are always set to 8 DATA bits, NO parity, 1 START bit and 1 STOP bit.  
The bit rate can be adjusted to between 300 and 9600 bps via software.

## Chapter VI

### UPDATING THE FIRMWARE

---

To update the firmware of an Ikusnet unit follow these steps:

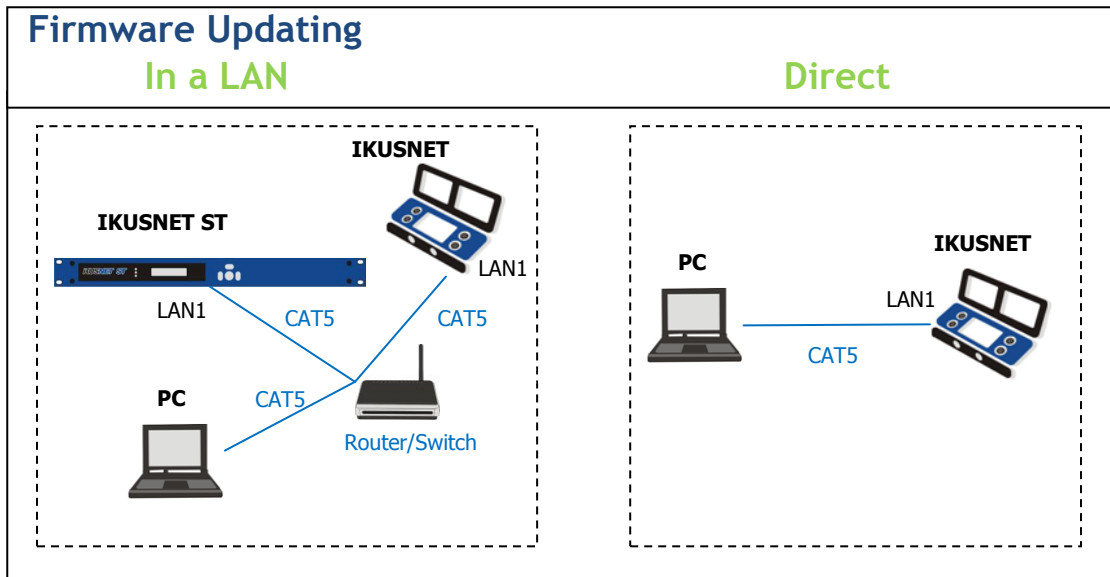
1. Make sure your Ikusnet and the computer to be used for the update are connected to the same LAN. Of the two Ethernet interfaces available in Ikusnet, the update operation is always done through the labeled LAN1



**Picture 140. Ikusnet back panel.**

2. If you do not have a LAN, it is also possible to connect the computer and the Ikusnet LAN1 port directly through a standard or crossover CAT-5 cable. The Ethernet port on the computer automatically adjusts to the type of cable.

# ***IKUSNET*** *User Manual*

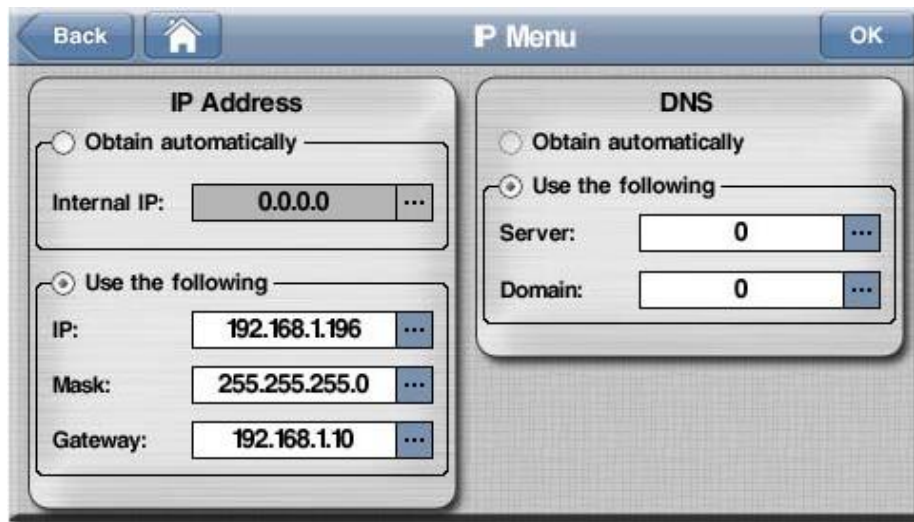


**Picture 141. Ikusnet firmware updating.**

3. Make sure the Ikusnet LAN1's (Control) and the PC's IP addresses belong to the same subnet. If this is not the case and you need to modify Ikusnet's IP address, follow these steps:
  - a. Enter the IP menu by clicking the following icons on the touch screen menu or web page:

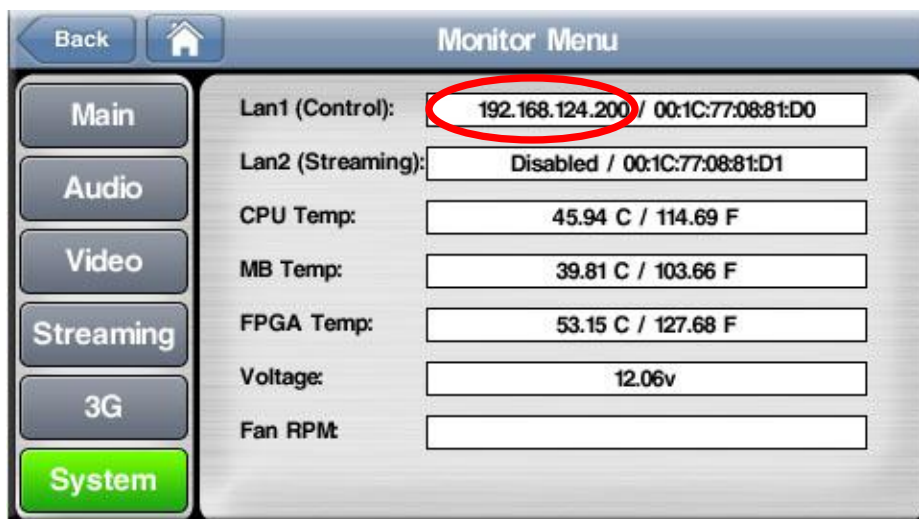


- b. The codec's IP address can be entered manually or can be obtained automatically:



**Picture 142. IP Menu.**

- i. If automatic IP address is chosen, a DHCP server will provide Ikusnet with an appropriate IP address value for the subnet where it is connected. To know the value of the address assigned, the monitoring system screen can be consulted:

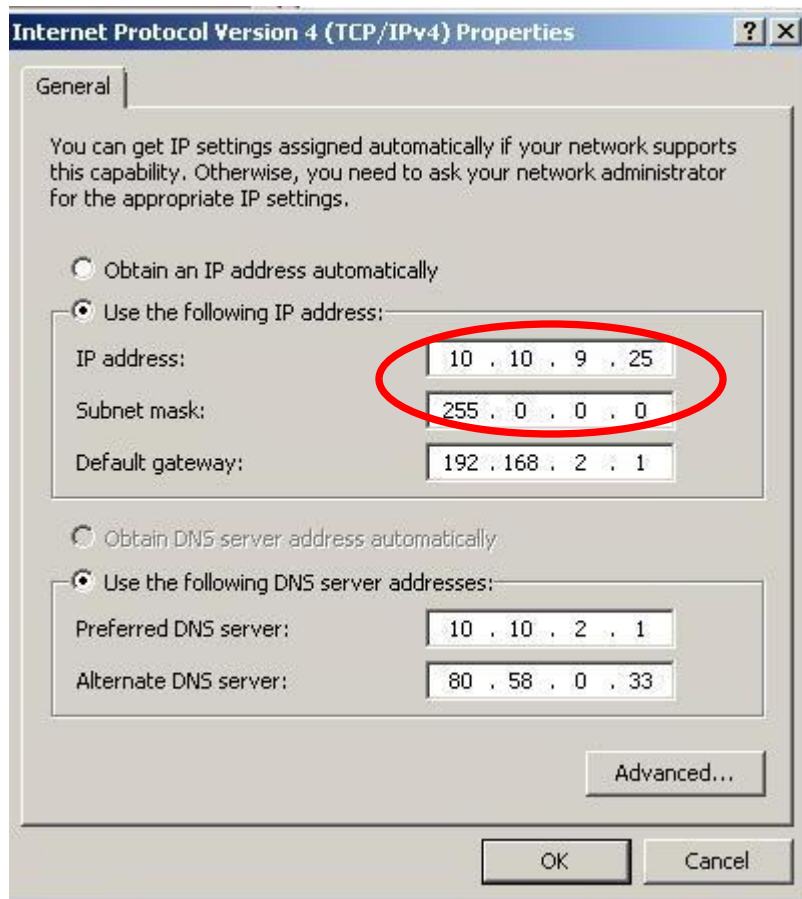


**Picture 143. System Monitor Menu.**



# ***KUSNET*** *User Manual*

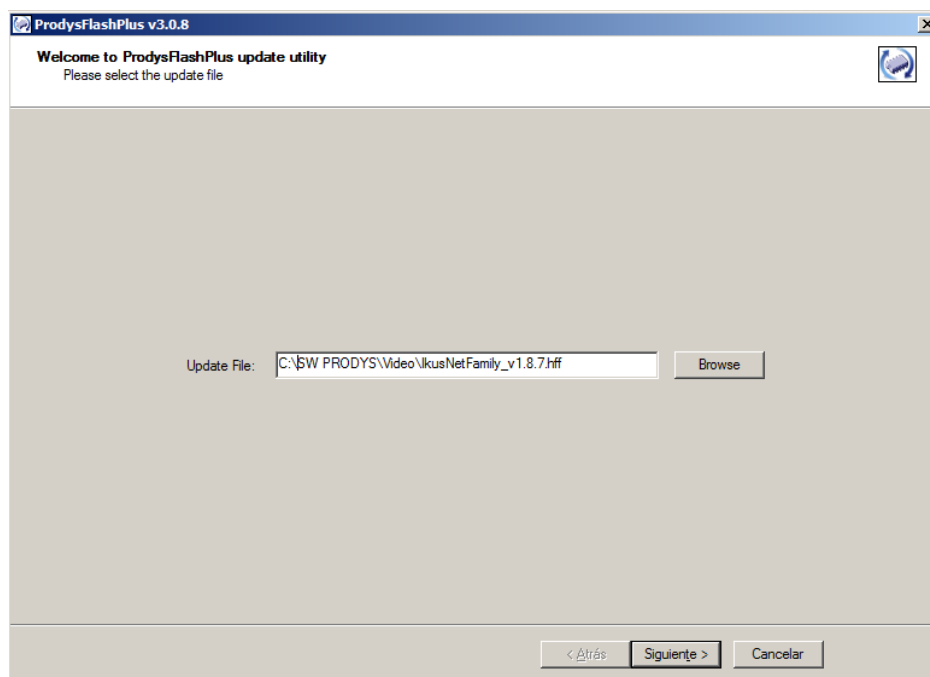
- ii. If the manual option is chosen, you must enter values for IP address and mask consistent with the subnet where the PC is.
- c. If you upgrade an Ikusnet ST and your PC is not in the same subnet, you must change the IP address and mask of the PC to match that of Ikusnet ST. To do this make sure what is the Ikusnet ST's subnet checking its values in the front display and then change the IP address and mask of the PC in the next configuration window:



**Picture 144. IP address configuration.**

# **KUSNET** User Manual

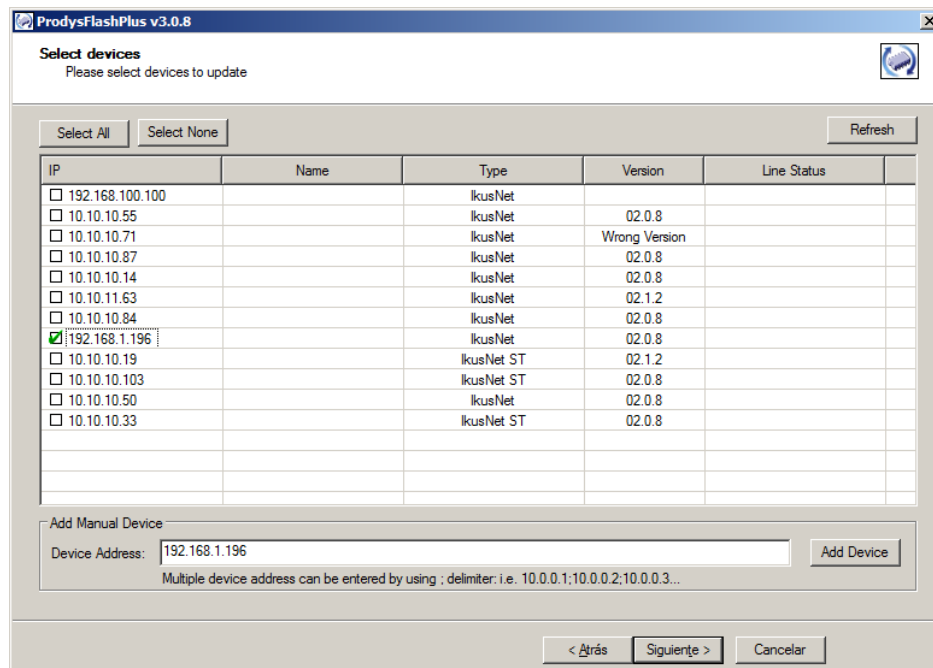
4. Ensure that the PC is able to access the codec opening the control page from the Internet Explorer by entering the LAN1 IP address in the address bar.
5. Start up the ProdysFlashPlus application.
6. Click on browse and select the file with the new firmware version.



**Picture 145. Choosing file in ProdysFlashPlus.**

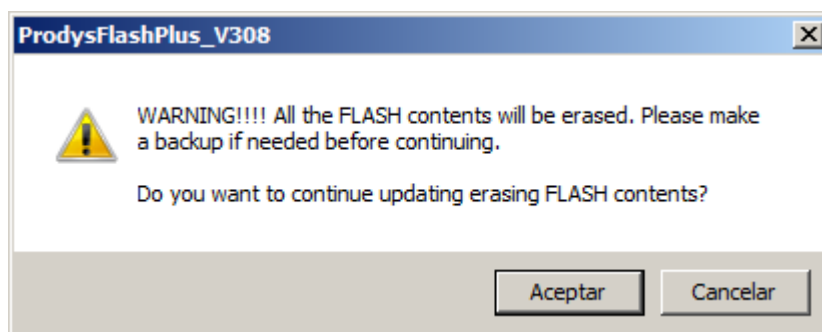
7. All the units connected to the computer's network will be detected automatically. Look in the first column the IP address configured on the unit's LAN1. Select the codec checking the box. If you are upgrading more than one codec, select all the boxes for the codecs you want to upgrade.

# ***KUSNET*** User Manual



**Picture 146. Choosing device in ProdysFlashPlus.**

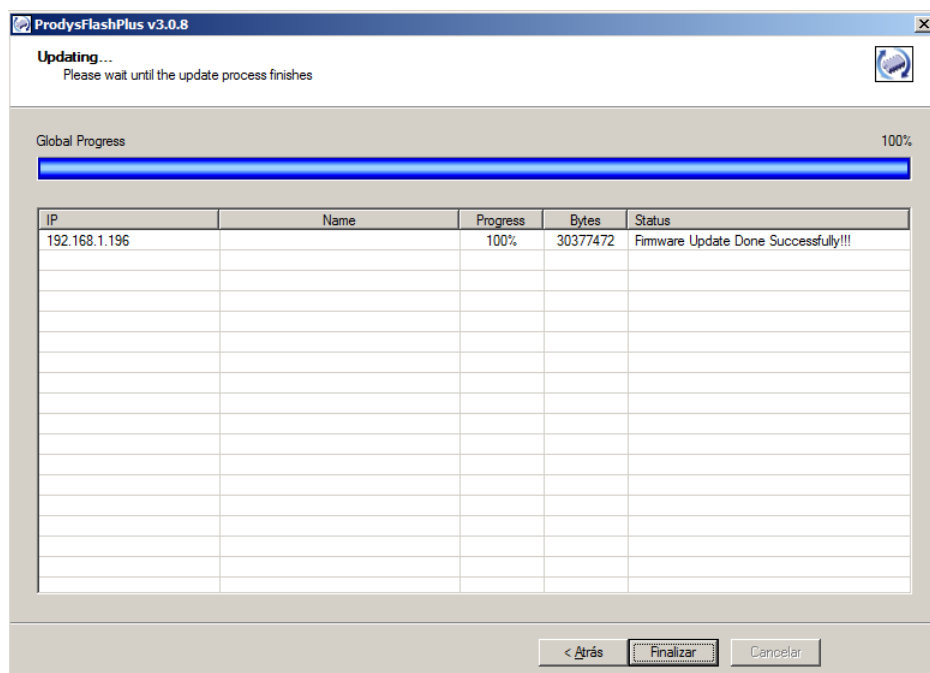
- Press next to start the update process. You will see a warning message telling you that all the contents of the Flash will be erased and that you must back-up this data BEFORE updating the device.



**Picture 147. Warning message in ProdysFlashPlus.**

- By clicking on next, the upgrading process will start.

[illegible]



**Picture 149. End of recording in ProdysFlashPlus.**



### DETAILED PORTS DESCRIPTION

---

There are two main groups of ports: Management and Streaming ports:

#### VII.1 Management Ports

##### **ProdysFlashPlus**

**UDP 50013:** This port is used by the ProdysFlashPlus upgrading application to allow the communication with Prodys IP units.

In case of remote upgrading, if a firewall is in between, these ports should be opened/forwarded to the corresponding IP codec.

##### **ProdysControlPlus**

**TCP 54001:** This port is used for accessing the codec through the ProdysControlPlus Management Software. For more information about this please refer to chapter IV.12, integration with ProdysControlPlus.

##### **Web Page**

**TCP 80:** This port is used for the access to the web login page via HTTP (Internet Explorer). Once logged in, the OCX control web takes over and manages the connection.

**TCP 50011:** Dynamic Web Page (OCX). This is the port used in the communication between the PC running Internet Explorer and the IP codec, once the user has logged into the control web page.

In case of remote controlling the unit, if a firewall is in between the IP codec and the PC, these ports should be opened/forwarded.

## VII.2 Streaming Ports

**TCP 53000:** P-RTCP (Control): This port is used to control any IP streaming communication. This port can be disabled. In this case, there will be a lack of control in the status of the connection at the far end, and both ends will have to initiate the connection.

**UDP 53000:** P-RTP Unicast PROGRAM channel Audio, Auxiliary and Video Data: This port is used to carry the audio, auxiliary and video data over IP for unicast communications on the PROGRAM line.

**UDP 53001:** P-RTP Unicast TALKBACK audio channel: This port is used to carry the audio data over IP for unicast communications on the talkback channel.

**UDP 1234:** This port is used by the Streaming Forwarding application. This port has been elected to ensure compatibility with VLC media player.

Ports	DEFAULT PORTS		
Management Ports	<b><u>Web Page</u></b> TCP 80 TCP 50011	<b><u>Prodys Control Plus</u></b> TCP:54001	<b><u>Prodys Flash Plus</u></b> UDP:50013
Streaming <sup>33</sup> Ports	TCP 53000 UDP 53000 UDP 53001		

<sup>33</sup> Default streaming ports: They can be changed by the user.

### GLOSSARY

---

**AAC:** Advanced Audio Coding is a standardized, lossy compression and encoding scheme for digital audio. Designed to be the successor of the MP3 format, AAC generally achieves better sound quality than MP3 at similar bit rates.

AAC has been standardized by ISO and IEC, as part of the MPEG-2 and MPEG-4 specifications. Some parts/profiles of the AAC are High-Efficiency Advanced Audio Coding ([HE-AAC](#)) and [LC-AAC](#) Low Complexity Advance Audio coding.

**AAC ELD:** Advanced Audio Coding, Enhanced Low Delay. AAC ELD achieves the lowest compression delay of all AAC audio compression profiles but still keeps a high ratio quality/compression. This ratio would be lower than AAC LC or AAC HE but with a much lower delay than these ones.

**AAC LC:** Advanced Audio Coding, Low Complexity. It is a compression algorithm for digital audio. AAC has been standardized by ISO and IEC, as part of the MPEG-2 and MPEG-4 specifications. AAC generally achieves better sound quality than mp2 and mp3 at similar or lower bit rates.

**APN:** Access Point Name. It is a configurable network identifier that allows a user's device to access the Internet using the mobile phone network.

**CIF:** Common Intermediate Format. It is a standard for the resolution of PAL video sequences in pixels. CIF defines a video sequence with a resolution of 352 × 288 pixels. **4CIF** multiplies the CIF resolution 4 times, providing 704 × 576 pixels.

**D-1:** is an SMPTE digital video standard and was the first major professional digital video format. D-1 resolution is 720 × 486 for NTSC systems and 720 × 576 for PAL systems; these resolutions come from Rec. 601 and are also used in DVD-Video and Standard-definition television.

# **KUSNET** *User Manual*

**DVB-ASI:** **A**synchronous **S**erial **I**nterface used in the DVB (**D**igital **V**ideo **B**roadcasting) suite of internationally accepted open standards for digital television. All data is transmitted through this interface in MPEG [transport streams](#).

**GOP:** **G**roup **O**f **P**ictures. It is a group of successive pictures within a coded video stream that specifies the order in which intra- and inter-frames are arranged. Each coded video stream consists of successive GOPs.

**H.264:** is a standard for video compression, and is currently one of the most commonly used formats for the recording, compression, and distribution of high definition video.

H.264/MPEG-4 AVC is a block-oriented motion-compensation-based codec standard developed by the ITU-T Video Coding Experts Group (VCEG) together with the ISO/IEC Moving Picture Experts Group (MPEG). It was the product of a partnership effort known as the Joint Video Team (JVT). The ITU-T H.264 standard and the ISO/IEC MPEG-4 AVC standard are jointly maintained so that they have identical technical content.

**HE-AAC:** **H**igh-**E**fficiency **A**dvanced **A**udio **C**oding. It is an evolution of the [AAC LC](#) compression algorithm for digital audio. It includes Spectral Band Replication techniques and Parametric Stereo. It is especially suitable for low bitrates.

**HSPA:** **H**igh **S**peed **P**acket **A**ccess. It is a 3<sup>rd</sup> generation (**3G**) mobile telephony protocol, supporting high data rates, reaching till peak values of up to 14 Mbit/s in the downlink and 5.8 Mbit/s in the uplink.

**Interlaced Video:** is a technique of doubling the perceived frame rate of a video signal without consuming extra bandwidth. Since the interlaced signal contains the two fields of a video frame shot at two different times, it enhances motion perception to the viewer and reduces flicker by taking advantage of the persistence of vision effect.

**Letterbox:** Effect that occurs when transferring video in a widescreen aspect ratio to a standard-width video format using mattes (black bars) above and below the image.

**MPEG 4 AVC:** MPEG 4 **A**dvanced **V**ideo **C**oding. See [H.264](#).

# **KUSNET** *User Manual*

**Pillarbox:** Effect that occurs when transferring video in a standard-width aspect ratio to a widescreen video format using mattes (black bars) on the sides of the image.

**Progressive Video:** It is a way of displaying, storing, or transmitting moving images in which all the lines of each frame are drawn in sequence. This is in contrast to the interlacing used in traditional television systems where only the odd lines, then the even lines of each frame (each image called a field) are drawn alternately.

**SDI:** **S**erial **D**igital **I**nterface. It is a video interface standardized by SMPTE. This standard is used for transmission of uncompressed, unencrypted digital video signals (optionally including embedded Audio and/or Time Code) within television facilities.

**SIF:** NTSC version of **CIF**. It is a standard for the resolution of NTSC video sequences in pixels. SIF defines a video sequence with a resolution of 352 × 240 pixels. **4SIF** multiplies the SIF resolution 4 times, providing 704 x 480 pixels.

**SMPTE 259M-C:** it is a standard which describes a 10-bit serial digital interface operating at 270 Mb/s with a D-1 video resolution. This standard defines a Serial Digital Interface or **SD-SDI** based on a coax cable.

**SMPTE 292M:** it is a standard which expands upon SMPTE 259M allowing for bit-rates of 1.485 Gbit/s. These bit-rates are sufficient for and often used to transfer uncompressed High Definition video. This standard is usually referred to as **HD-SDI**.

**TCP:** **T**ransmission **C**ontrol **P**rotocol. It is one of the two original protocols of the Internet Protocol Suite complementing the Internet Protocol (IP). TCP provides reliable, ordered delivery of a stream of bytes from a program on one device to another program on another device. TCP is the protocol that major Internet applications rely on.

**Transport Stream:** it is the standard format for transmission and storage of audio, video, and data used in DVB broadcast system. Transport Stream is specified in MPEG-2 Part 1, Systems (formally known as ISO/IEC standard 13818-1 or ITU-T Rec. H.222.0). Transport stream specifies a container format encapsulating packetized elementary streams, with error correction and stream synchronization features for maintaining transmission integrity when the signal is degraded.





# ***KUSNET*** *User Manual*

**UDP:** **U**ser **D**atagram **P**rotocol. It is one of the core members of the Internet Protocol Suite. With UDP, computer applications can send messages to other hosts on an IP network without requiring prior communications to set up special transmission channels or data paths. Thus, UDP provides an unreliable service and messages may arrive out of order, appear duplicated, or go missing without notice.

## **PICTURE INDEX**

---

Picture 1. Ikusnet ENG codec. ....	9
Picture 2. Ikusnet input/output diagram. ....	10
Picture 3. Ikusnet Family connectivity diagram. ....	12
Picture 4. Codec Ikusnet BP. ....	13
Picture 5. Ikusnet BP video portable uplink application. ....	14
Picture 6. Ikusnet BP – Ikusnet ST Decoder connection diagram.....	15
Picture 7. Ikusnet ST codec. ....	16
Picture 8. Ikusnet ST Decoder front panel. ....	17
Picture 9. Real time Ethernet transmission. ....	18
Picture 10. Real Time 3G/4G Transmission over 8 3G/4G links.....	18
Picture 11. Wi-Fi module transmission.....	19
Picture 12. File storage and forward. ....	20
Picture 13. Ikusnet ST Power switch and power inlet .....	23
Picture 14. Ikusnet ENG Power switch and power inlet.....	23
Picture 15. Ikusnet ST main menu. ....	24
Picture 16. Ikusnet ENG main menu.....	24
Picture 17. Internet Explorer Security Warning .....	26
Picture 18. Internet Explorer's Security Settings.....	27
Picture 19. Ikusnet Login Window.....	28
Picture 20. Ikusnet Main Window.....	29
Picture 21. Ikusnet Main Window. 3 main areas.....	29
Picture 22. Ikusnet ST Main Window .....	30
Picture 23. Ikusnet ENG being controlled remotely.....	31
Picture 24. Video Input 1 (SDI) in Ikusnet ST .....	32
Picture 25. Video inputs on the rear panel of Ikusnet ENG.....	33
Picture 26. IP Menu. ....	35
Picture 27. Ikusnet Wireless Communications Module. ....	37
Picture 28. Ikusnet ENG Rear panel connector for the Wireless Communications Module.....	38
Picture 29. SIM Module. ....	38
Picture 30. 3G/4G Menu. ....	40
Picture 31. 3G/4G Menu. ....	40

# ***KUSNET*** ***User Manual***

Picture 32. 3G/4G Monitor Menu.....	41
Picture 33. Configuring video feeds and monitor screens.....	42
Picture 34. Configuring audio feeds.....	43
Picture 35. Streaming Net Menu. ....	44
Picture 36. 3G/4G Monitor Menu.....	45
Picture 37. Streaming Net Menu. ....	46
Picture 38. Program and TalkBack connection bars with NET=Ethernet. ....	47
Picture 39. Program and TalkBack connection bars with NET=3G/4G. ....	47
Picture 40. TalkBack Dial Window .....	48
Picture 41. Call type Window. ....	49
Picture 42. Phone book Dial Window.....	50
Picture 43. Program and TalkBack connection bars when NET=Ethernet. ....	50
Picture 44. Program and TalkBack connection bars when NET=3G/4G. ....	51
Picture 45. Cause of disconnection.....	51
Picture 46. Video Encoder Configuration.....	52
Picture 47. Monitor Menu. ....	53
Picture 48. Connection bars.....	54
Picture 49. Connection bars in 3G/4G and Custom mode.....	55
Picture 50. Main menu video configuration. ....	55
Picture 51. Main Menu audio configuration. ....	57
Picture 52. Ikusnet ST Audio and Video Menu. ....	58
Picture 53. Ikusnet Files Menu.....	61
Picture 54. File Recording Menu.....	62
Picture 55. Rec Settings Menu .....	62
Picture 56. File Upload Menu. ....	63
Picture 57. FTP Upload Settings Menu.....	64
Picture 58. File Play Menu. ....	65
Picture 59. File operations menu on the Ikusnet ENG front panel.....	66
Picture 60. File editor.....	67
Picture 61. Ikusnet Files Menu.....	68
Picture 62. File Monitor Window. ....	68
Picture 63. Enabling File Sharing.....	69
Picture 64. Video Menu. ....	72
Picture 65. Video inputs menu. Ikusnet ENG.....	73
Picture 66. Configuration menu of the SD video inputs. Ikusnet ST.....	74
Picture 67. Configuration menu of the HD video inputs. Ikusnet ST .....	74
Picture 68. Video Encoder Menu for SD. ....	75
Picture 69. Video Encoder Menu for HD.....	76
Picture 70. Video Outputs Menu. ....	78
Picture 71. Video Test Menu.....	78
Picture 72. Audio Menu. ....	80

# ***KUSNET*** ***User Manual***

Picture 73. Audio inputs menu for Ikusnet ENG. ....	80
Picture 74. Audio inputs menu for Ikusnet ST.....	81
Picture 75. HP Menu. ....	82
Picture 76. HP Menu. ....	84
Picture 77. Audio Outputs Menu in Ikusnet ST.....	85
Picture 78. Audio Encoding Menu.....	86
Picture 79. Audio Test Menu.....	86
Picture 80. Audio Gain Level Menu.....	87
Picture 81. Audio Embedded Menu. ....	88
Picture 82. Misc Menu. ....	89
Picture 83. Streaming Menu. ....	90
Picture 84. Streaming Net Menu. ....	91
Picture 85. Custom Interfaces Selection Menu in Ikusnet ENG .....	92
Picture 86. Connection Menu.....	92
Picture 87. Streaming Protocol Menu. BRAVE.....	94
Picture 88. Streaming Protocol Menu. TS.....	95
Picture 89. Streaming Rx Settings Menu.....	96
Picture 90. Streaming TX Menu. ....	97
Picture 91. Program Dial Window.....	98
Picture 92. Profile Properties Window.....	99
Picture 93. Profile Configuration Window.....	99
Picture 94. Streaming Forwarding Menu.....	100
Picture 95. Call Log.....	101
Picture 96. Call Log Extended Information.....	101
Picture 97. Communication Interfaces Menu.....	102
Picture 98. IP Menu. ....	103
Picture 99. Ethernet Menu.....	103
Picture 100. Enabling independent control access /streaming. ....	104
Picture 101. WIFI Menu. ....	105
Picture 102. Wi-Fi Add Menu. ....	105
Picture 103. Wi-Fi Network Settings Menu.....	106
Picture 104. Main Wi-Fi Menu. ....	107
Picture 105. Main Monitor Window.....	108
Picture 106. Streaming Monitor Window.....	108
Picture 107. 3G/4G Menu. ....	109
Picture 108. 3G/4G Configuration Menu. ....	110
Picture 109. RS232 Configuration Menu. ....	111
Picture 110. GPIO Pinout.....	111
Picture 111. GPI menu. ....	112
Picture 112. Usage Menu. ....	113
Picture 113. Usage Configuration Menu.....	113

# ***KUSNET*** ***User Manual***

Picture 114. Book Menu. ....	114
Picture 115. User Configuration. ....	115
Picture 116. Login Window. ....	115
Picture 117. User Permissions.....	116
Picture 118. System menu.....	118
Picture 119. Restore Default menu.....	119
Picture 120. Licenses Menu .....	119
Picture 121. ProdysControlPlus Menu .....	120
Picture 122. SNMP Traps Menu.....	121
Picture 123. External Protocol Menu.....	122
Picture 124. Web Server Menu .....	122
Picture 125. Presets Menu.....	123
Picture 126. Monitoring Main Screen. ....	124
Picture 127. Audio Monitor Menu. ....	125
Picture 128. Video Monitor Menu. ....	125
Picture 129. Monitor Menu. ....	126
Picture 130. Monitoring Graphical View. ....	128
Picture 131. Maximized Graphical View. ....	128
Picture 132. Graphical View Configuration .....	129
Picture 133. Graphical View per Interface.....	129
Picture 134. 3G/4G Monitor Menu .....	130
Picture 135. System Monitor Menu.....	131
Picture 136. Main Menu with alarm indication.....	132
Picture 137. Options Menu with alarm indication.....	132
Picture 138. Alarms Menu .....	133
Picture 139. Alarms History Menu .....	134
Picture 140. Ikusnet back panel.....	138
Picture 141. Ikusnet firmware updating.....	139
Picture 142. IP Menu. ....	140
Picture 143. System Monitor Menu.....	140
Picture 144. IP address configuration.....	141
Picture 145. Choosing file in ProdysFlashPlus.....	142
Picture 146. Choosing device in ProdysFlashPlus.....	143
Picture 147. Warning message in ProdysFlashPlus. ....	143
Picture 148. Update process in ProdysFlashPlus.....	144
Picture 149. End of recording in ProdysFlashPlus. ....	145