

Newtec EL940 DVB Receiver EUMETCast Setup Guide

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v1C	18 December 2014		Added Windows Routing & Firewall Configuration, Removed DVB-S Ku Band Configuration
v1D	26 May 2015		New Device Software, New RF Frequency
v1E	15 February 2016		DVB-S2 PIDs configuration changed (§4.2, p9)

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1 INTRODUCTION

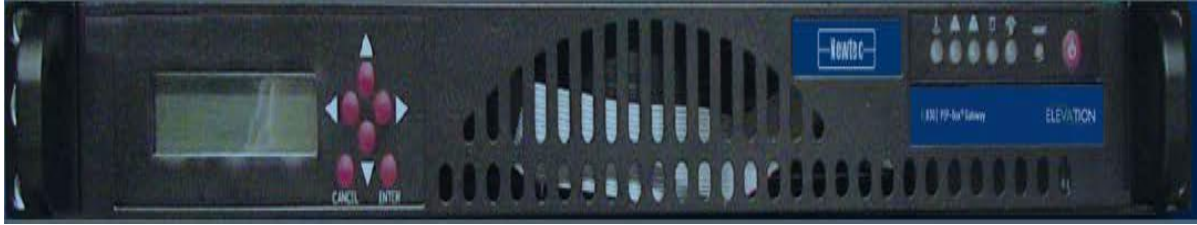


Figure 1 EL940 front Panel

The purpose of this manual is to guide a user through the minimum necessary steps to allow the reception of EUMETCast data (DVB) on the **Newtec EL940 IP satellite receiver**.

Please refer also to Newtec's "User Manual for EL 940 IP Receiver" for more details, it is provided in a hard copy with the receiver.

2 PREREQUISITES AND DEVICE VERSIONS

Before performing the configuration please ensure the following steps have been addressed:

- A PC with 10/100/1000 base-T Ethernet LAN port is available for configuring the receiver;
- Internet explorer 7 and higher or Firefox 3 and higher or other compatible browser like Google Chrome, Safari...
- Administrator or Root access to the reception host system is available;
- The EUMETCast antenna pointing has been performed correctly to EUTELSAT 10A for DVB-S2 reception. (For DVB-S2 reception the antenna pointing and LNB quality is crucial);
- An EKU has been obtained from the EUMETSAT user help desk;
- The reception host has the latest EUMETCast reception software installed;
- The NTC/6375 Receiver software version **8.0.30** or later installed on EL940.

3 PHYSICAL CONNECTIONS

3.1 Physical Connections

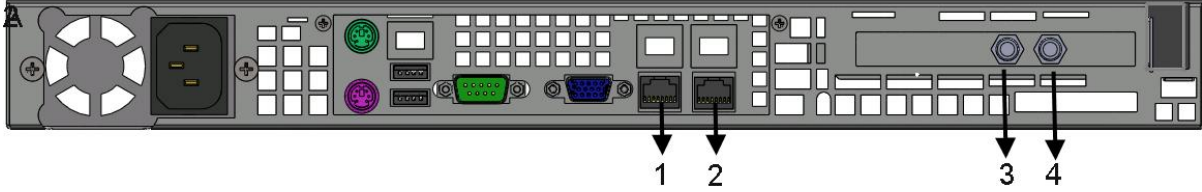


Figure 2 **Back Panel Connectors**

The back panel consists out of the following general connectors: USB, VGA, PS2, serial interface. These are used to connect peripheral devices.

The connectors used in the EL940 device configuration are described in the following table:

Number	Connector	Function
1	Management LAN	10/100/1000 base-T Ethernet LAN
2	Traffic LAN	10/100/1000 base-T Ethernet LAN
3	Input A	F-connector (male) 75 Ohm
4	Input B	F-connector (male) 75 Ohm

- Connect the EL940 to the power (see Figure 2 and the table above);
- Connect the network cable from the EUMETCast reception station network interface to the receiver port **1**;
- Connect the antenna cable to the connector **3**.

3.2 Status Indicators

The control panel located on the front panel of the device has five LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

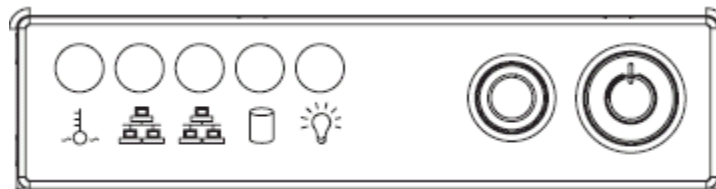



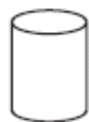



Figure 3 **Control Panel Buttons and LEDs**

LED					
Indication	<ul style="list-style-type: none"> •Flashes: indicates a fan failure. •Continuously on: indicates an overheat condition. This LED remains flashing or on as long as the overheat condition exists. 	Network activity on the management LAN when flashing	Network activity on the traffic LAN when flashing.	Storage activity when flashing.	Power is being supplied to the system's power supply units.

4 CONFIGURATION

4.1 Management IP and Access to the Receiver

In order to configure the EL940 a graphical user interface (GUI) is used to access to the device.

Proceed as follows to open the GUI for your device on your computer:

1. Open a web browser on your computer;
2. Type the management IP address of your device in the address bar of the browser then enter;
3. Login as **root** (the default password is **root**).

Notes:

- You can find the Mgmt IP address of your device via the front panel in the following menu: **Elevation > Unit > Setup > Ethernet settings**. By default, the IP address is 192.168.0.1;
- The management and traffic IP address, netmask and gateway (can be set from the front panel);
- You must ensure that the network settings of the EL940 make it accessible from management PC. The mgmt IP address of the receiver and the IP address of the station must reside on the same subnet, or there must be a route that connects both of them through a router. You will need to change the IP address of your management PC to be on the same subnet as the receiver (in this case, change your PC IP address to: 192.168.0.x, where **x** is not equal to "1" and is different from the traffic IP if it's on the same subnet);
- The receiver Ethernet can be configured from the GUI;
- You **MUST** be logged onto the system as Administrator, for the network settings function to work properly.

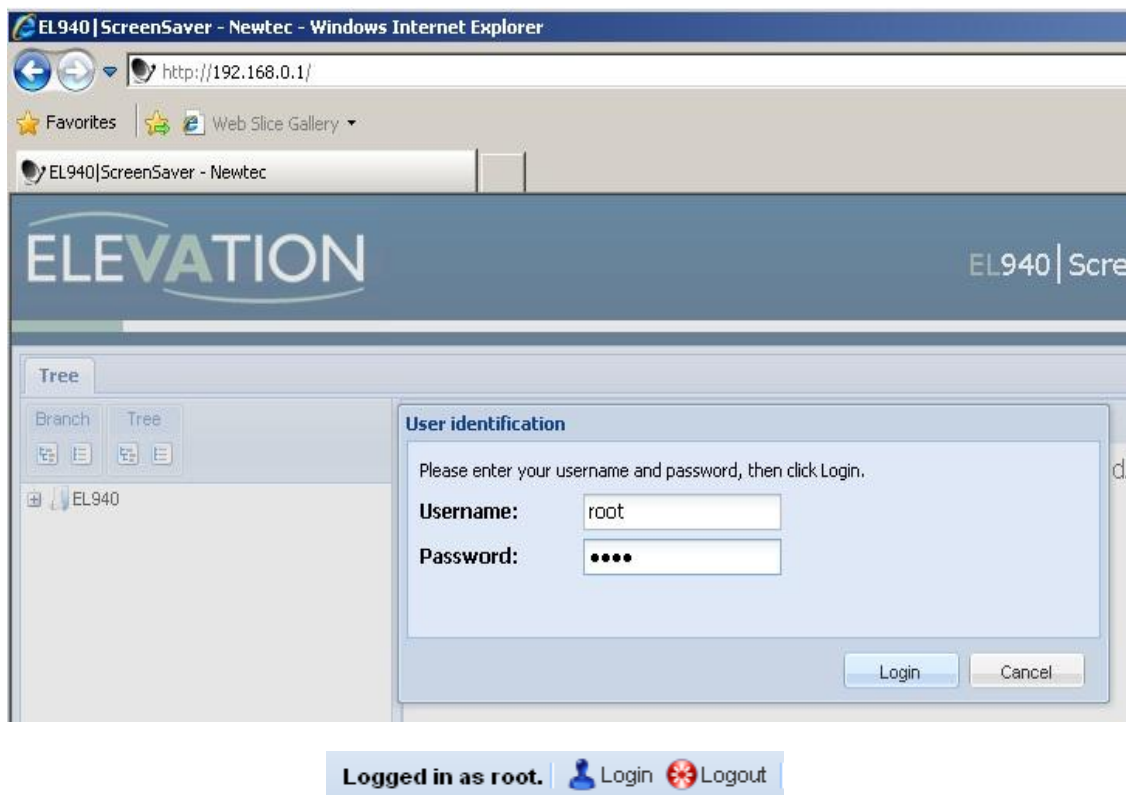


Figure 3 Login as root

Now you are logged into the receiver and made it to the GUI main screen!

4.2 Receiver Configuration

1. Go to **EL940 > Demodulator > Control > Demodulation** menu and enter the RF parameters, the parameters should be as follow:

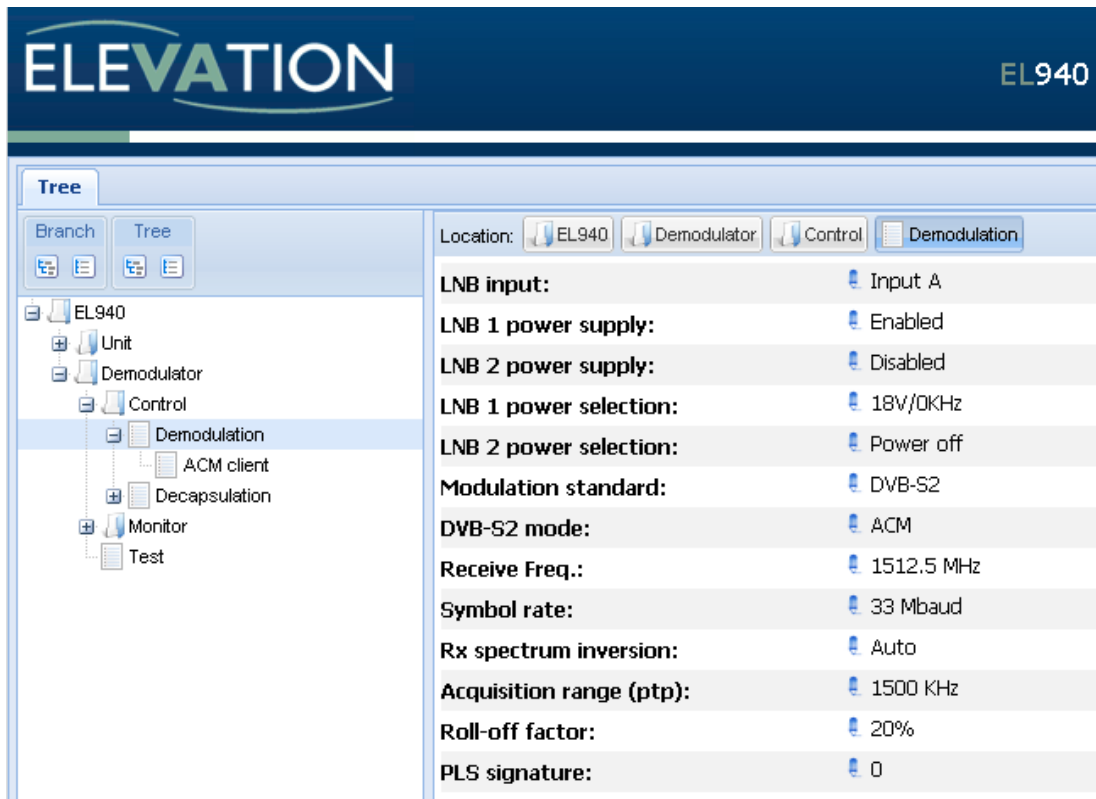


Figure 5 RF parameters for DVB-S2 reception

2. Go to **EL940 > Demodulator > Control > Decapsulation** menu. Set encapsulation protocol to MPE, AirMAC mode to Disabled, CRC to Enabled and IGMP daemon to Disabled:

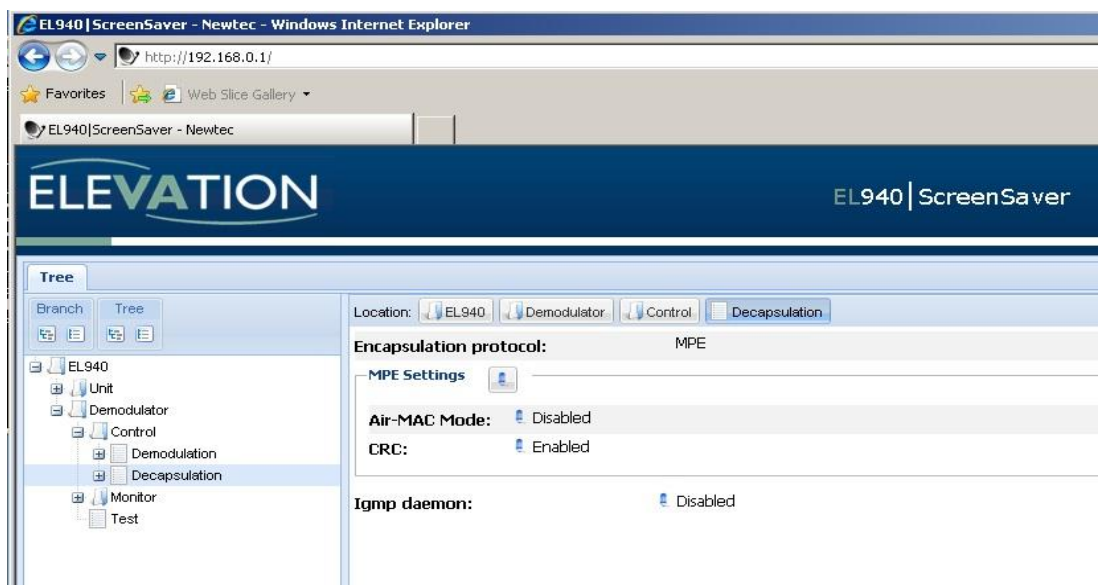


Figure 6 Decapsulation Configuration

3. Go to the **EL940 > Demodulator > Control > Decapsulation > Demod Rx routes** menu. Enable the

PIDs:

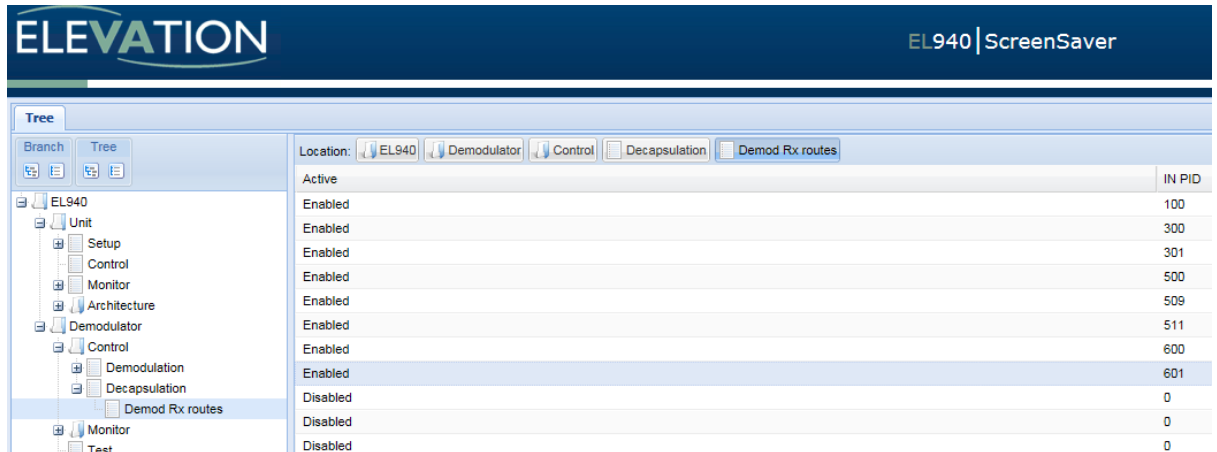


Figure 7 PIDs Configuration for DVB-S2 reception

- To change the receiver’s Ethernet setup go to **EL940 > Unit > Setup > Ethernet**:

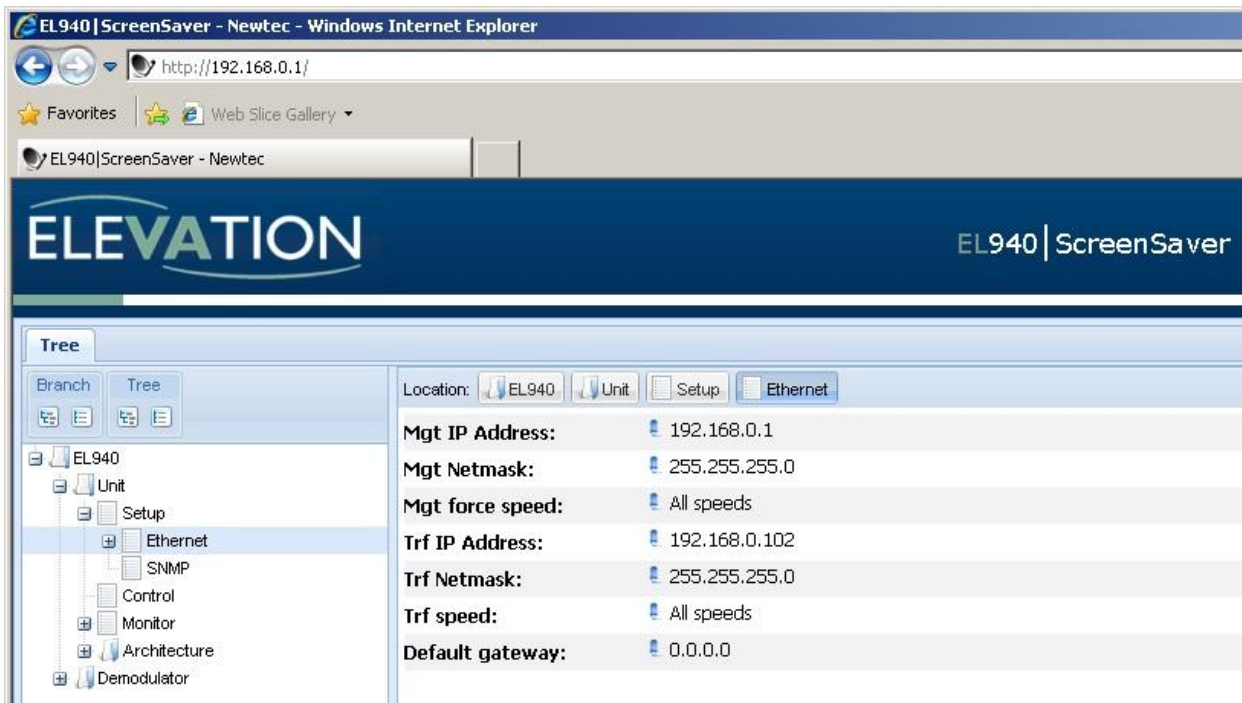


Figure 8 Ethernet Configuration

4.3 Verify Signal and Connection

Now and after making sure that:

- The antenna pointing has been performed correctly to EUTELSAT 10A for DVB-S2 reception (for DVB-S2 reception the antenna pointing and LNB quality is crucial);
- The antenna cable is connected to the receiver;

The receiver is connected via the Ethernet port to the EUMETCast reception host (see 3.1); The status can be checked from the status bar in the main menu left bottom, “Demod Lock” and “Data Out” indicators must be **green**:

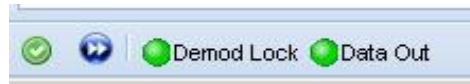
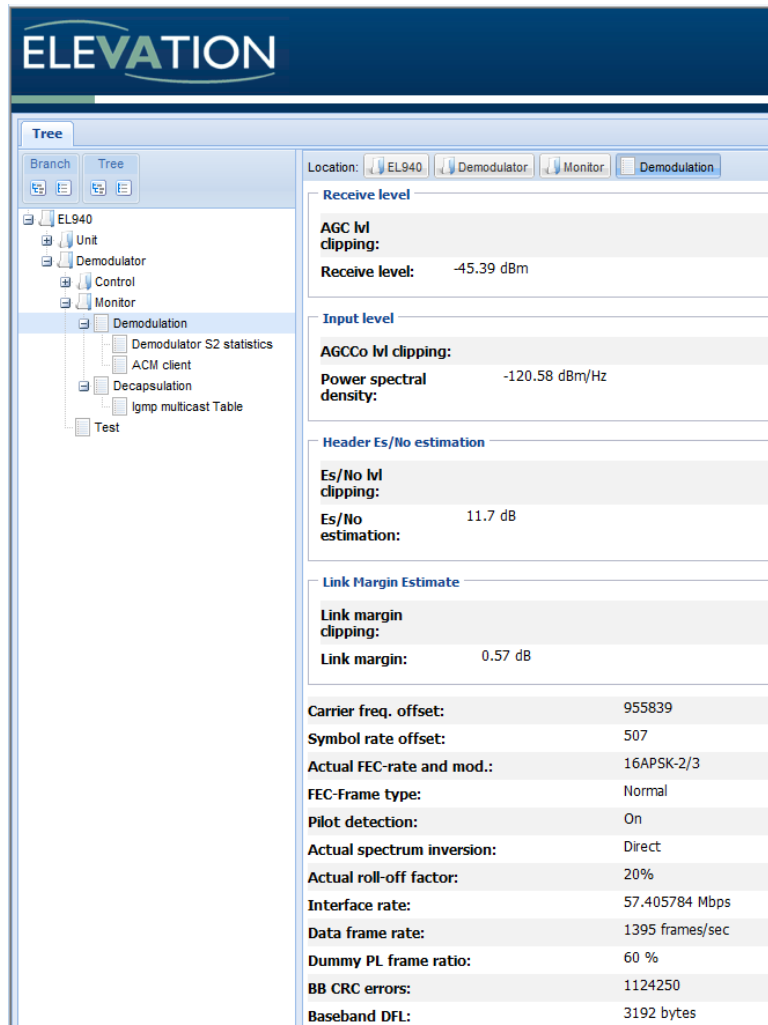


Figure 9 Status

The Demodulation parameters can be checked from the left tree EL940 → Demodulator → Monitor → Demodulation



The screenshot shows the ELEVATION software interface. On the left is a tree view with the following structure:

- EL940
 - Unit
 - Demodulator
 - Control
 - Monitor
 - Demodulation
 - Demodulator S2 statistics
 - ACM client
 - Decapsulation
 - Igmp multicast Table
 - Test

The main panel displays the following parameters for the selected path (Location: EL940 → Demodulator → Monitor → Demodulation):

Receive level	
AGC lvl clipping:	
Receive level:	-45.39 dBm

Input level	
AGCo lvl clipping:	
Power spectral density:	-120.58 dBm/Hz

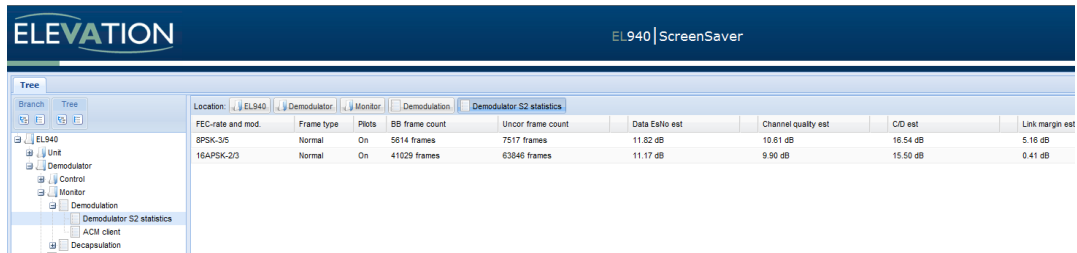
Header Es/No estimation	
Es/No lvl clipping:	
Es/No estimation:	11.7 dB

Link Margin Estimate	
Link margin clipping:	
Link margin:	0.57 dB

Carrier freq. offset:	955839
Symbol rate offset:	507
Actual FEC-rate and mod.:	16APSK-2/3
FEC-Frame type:	Normal
Pilot detection:	On
Actual spectrum inversion:	Direct
Actual roll-off factor:	20%
Interface rate:	57.405784 Mbps
Data frame rate:	1395 frames/sec
Dummy PL frame ratio:	60 %
BB CRC errors:	1124250
Baseband DFL:	3192 bytes

Figure 10 Demodulation Parameters

The Demodulator Statistics can be checked from the left tree EL940 → Demodulator → Monitor → Demodulation → Demodulator Statistics



ELEVATION										
EL940 ScreenSaver										
Location: EL940 → Demodulator → Monitor → Demodulation → Demodulator S2 statistics										
FEC-rate and mod.	Frame type	Pilots	BB frame count	Uncor frame count	Data Es/no est	Channel quality est	CD est	Link margin est		
8PSK-3/5	Normal	On	5614 frames	7517 frames	11.82 dB	10.61 dB	16.54 dB	5.16 dB		
16APSK-2/3	Normal	On	41029 frames	63846 frames	11.17 dB	9.90 dB	15.50 dB	0.41 dB		

Figure 11 Demodulator Statistics

4.4 Configuration Control

When you power up the device the boot configuration (the first configuration, in the example below it was renamed to *EUMETCast DVB-S2*) is used.

With the controls on the Configuration tab you can manage the configurations:

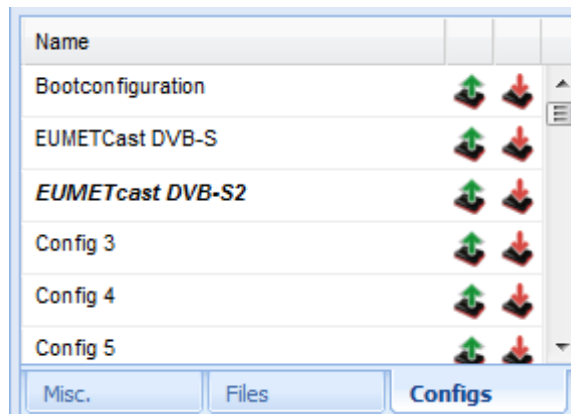



Figure 12 Configuration Function Controls Tab

Save the current configuration to persistent memory  .

If a configuration is not saved to persistent memory it will be lost when the device powers down.

5 TELICAST AND SYSTEM CONFIGURATION SETUP

5.1 Tellicast Setup

After the steps above have been completed, the Tellicast application must be given the fixed IP from which the data can be taken:

Into the configuration file `recv.ini` the “*interface_address*” must be set to the reception host local IP Address:

```
interface_address=192.168.10.<nnn>
```

e.g.

```
interface_address=192.168.10.103
```

N-B: The `interface_address` parameter can be commented or deleted from `recv.ini` and the Tellicast application will search the multicast data on all the interfaces available on the host; that is not recommended when the reception host is used to receive another data flow, the Tellicast client application is not able to distinguish between the flows a priori!

5.2 Firewall

Make sure the firewall allows traffic from the interface address in 5.1!

5.3 Windows Routing Table

If the TelliCast fails to work, being either stuck in the yellow T-icon state or, if the network cable is connected after the system was working, the icon alternates between the "pink" and "red" states.

This may be related to the default multicast entries in the TCP/IP routing table.

To solve this problem, you need to tell Windows that the addresses handled by Tellicast must always be reached through the `interface_address` which you set up in `recv.ini` file (192.168.10.nnn).

In the Start menu, All Programs, Accessories menu, you will find an item named Command Prompt.

Right-click on this item, and select Run as administrator. Enter the following command (replace `IP_address` with the local IP address of 5.1) :

```
route delete 224.0.0.0  
route -p ADD 224.0.0.0 mask 240.0.0.0 IP_address metric 1
```

e.g., if `IP_address` = 192.168.10.103

```
route delete 224.0.0.0  
route -p ADD 224.0.0.0 mask 240.0.0.0 192.168.10.103 metric 1
```

Then restart the computer

5.4 System Configuration Setup under Linux

In order to allow unrestricted multicast from network interfaces under **Linux reception host**, login as **root** and update (if needed) the *sysctl* parameters as follow:

```
# vi /etc/sysctl.conf

net.ipv4.conf.default.rp_filter = 0
net.ipv4.conf.all.rp_filter = 0
net.ipv4.ip_forward = 1
net.core.rmem_max = 5500000
net.core.wmem_max = 5500000
```

```
Then run :
# sysctl -p /etc/sysctl.conf
```

to refresh with the new configuration.

6 NETWORK SCENARIOS

In order to allow the Tellicast client application to receive the data packets from EL940, the Traffic port of EL940 must be connected to the reception host, this connection can be direct (by connecting the reception host to the receiver using a LAN cable) or indirect (using a switch, router, joining a multicasting network...), this leads to different network scenarios that can be adopted, the reception host network interface and Tellicast's *recv.ini* must be correctly configured, in the section below the most common network scenarios with the related needed configurations are described.

Please be informed that we cannot describe all the possible scenarios and that some scenarios may be very complex which require that you contact a networking expert to assist you to operate the receiver.

6.1 One EUMETCast reception terminal

In this scenario one reception host is connected directly to the receiver:

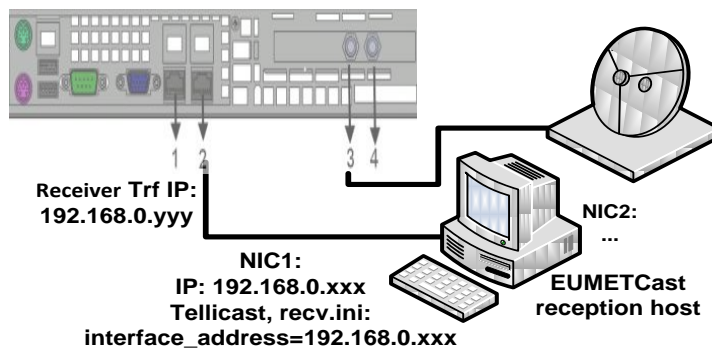


Figure 13 One reception host

Notes:

- In case the host is used for other purposes and a connection to internet or public IPs is needed, another network interface (NIC2) can be installed on the host and the first NIC remain dedicated to EUMETCast packets reception;
- If the host network interface is configured to automatically obtain the IP and the “interface_address” into *recv.ini* is not specified (dropped or commented), the Tellicast will look for all the available network interfaces on the host and catch the multicast data, but that is not recommended in case the host is receiving another data stream since the Tellicast application is not able to determine the EUMETCast flow a priori.

6.2 Multiple EUMETCast reception terminals

- In this scenario more than one reception host are connected to the receiver;
- All the EUMETCast reception hosts and the receiver reside on the same subnet.

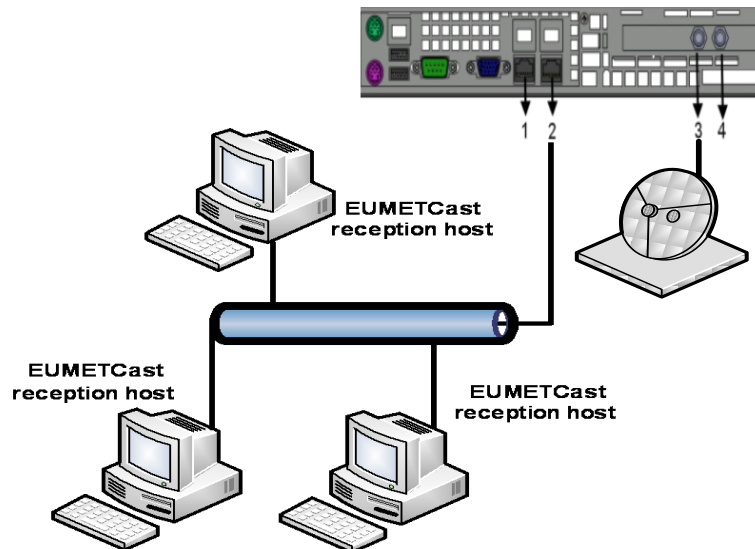


Figure 14 Multiple reception hosts

Note: the EUMETCast reception hosts may also belong to different LAN/Net reachable from the receiver through the configured gateway (see Figure 8).

7 ACRONYMS

BS	Basic Service
DVB-S, DVB-S2	Digital Video Broadcast, a broadcast standard
CCM	Constant Coding and Modulation
CMCS	Central Management and Control Software
EUMETCast	EUMETSAT multicast based broadcast system
EUMETSAT	European Meteorological Satellite Organisation
HVS	High Volume Service
ISI	Input Stream Identifier
LNB	low-noise block downconverter
MODCOD	Modulation & Coding
PID	Packet IDentification
VCM	Variable Coding and Modulation