

# 7880DM-LB Series User Manual

© Copyright 2017

**EVERTZ MICROSYSTEMS LTD.**

5292 John Lucas Drive,  
Burlington, Ontario,  
Canada L7L 5Z9

Phone:	+1 905-335-3700	
Sales:	<a href="mailto:sales@evertz.com">sales@evertz.com</a>	Fax: +1 905-335-3573
Tech Support:	<a href="mailto:service@evertz.com">service@evertz.com</a>	Fax: +1 905-335-7571
Web Page:	<a href="http://www.evertz.com">http://www.evertz.com</a>	

Version 1.0, January 2017

The material contained in this manual consists of information that is the property of Evertz Microsystems and is intended solely for the use of purchasers of 7880DM-LB. Evertz Microsystems expressly prohibits the use of this manual for any purpose other than the operation of the 7880DM-LB Series. Due to on going research and development, features and specifications in this manual are subject to change without notice.

All rights reserved. No part of this publication may be reproduced without the express written permission of Evertz Microsystems Ltd. Copies of this manual can be ordered from your Evertz dealer or from Evertz Microsystems.

*This page left intentionally blank*

## IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer’s instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

### **WARNING**

TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE

### **WARNING**

DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT

### **WARNING**

TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE

### **WARNING**

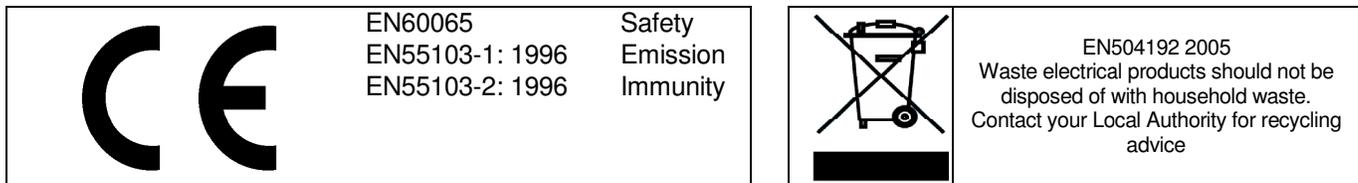
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

## INFORMATION TO USERS IN EUROPE

### NOTE

#### CISPR 22 CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



## INFORMATION TO USERS IN THE U.S.A.

### NOTE

#### FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

## TABLE OF CONTENTS

REVISION HISTORY.....	V
1. OVERVIEW .....	1
1.1. FEATURES AND BENEFITS.....	1
2. INSTALLATION.....	3
2.1. REAR PLATE DESCRIPTION .....	3
2.1.1. Connectors .....	3
2.1.2. Ethernet Connection .....	3
2.2. HARDWARE INSTALLATION .....	5
2.3. CONFIGURATION OF MANAGEMENT IP CONNECTION .....	5
2.4. HTTP BROWSER CONTROL.....	7
2.5. SETTING UP USER LOGIN CREDENTIALS AND CHANGES PRIVILEGES .....	8
3. SPECIFICATIONS.....	11
RF INPUTS.....	11
MODULATION SUPPORT: .....	11
ASI INPUTS/OUTPUTS.....	11
TSOIP INPUT/OUTPUT (–IP VERSION ONLY) .....	11
DVB COMMON INTERFACE DE-SCRAMBLING: ( WITH –CA2 VERSION).....	11
DVB-CI compatible CA Module with (when fitted).....	12
CONTROL.....	12
MONITORED PARAMETERS .....	12
ELECTRICAL .....	12
4. SYSTEM PAGE .....	13
4.1. SYSTEM .....	13
4.2. DATA PORT .....	14
4.3. PRESET.....	15
4.4. PRODUCT LICENSE .....	16
4.5. PRODUCT FEATURES SUPPORTED .....	16
5. INPUT SETTINGS .....	19
5.1. RF TUNE .....	19
6. TS INPUT MAPPING AND SOURCE SELECT .....	23
6.1 TS INPUT MAPPING CONTROL.....	25

---

6.2	ASI INPUT.....	25
6.3	IP INPUT .....	26
7.	OUTPUT SETTINGS.....	29
7.1.	IP OUTPUT .....	29
6.4	ASI OUTPUT.....	31
6.5	MONITOR ASI/IP OUTPUT.....	31
6.6	SERVICE/PROGRAM FILTERING ON ASI/IP OUTPUT.....	32
6.7	CHANGING THE OUTPUT BITRATE ON ASI/IP OUTPUT .....	34
8.	DESCRAMBLING.....	37
8.1.1.	CAM Control .....	37
8.1.2.	Descrambling Services .....	37
8.1.3.	Service Info .....	39
8.1.4.	CAM Health.....	41
8.2.	BISS DESCRAMBLING (+DBISS OPTION) .....	42
6.8	TS SERVICE TREE VIEW.....	45
7	UPGRADE PROCEDURES .....	49
7.1	UPGRADING USING WEBEASY.....	49
7.2	UPGRADING USING VLPRO .....	51
8	PRODUCT LICENSE UPGRADE .....	55
8.1	WEBEASY PRODUCT LICENSE INSTALLATION.....	55
8.2	VLPRO PRODUCT LICENSE INSTALLATION .....	56
9	MINIMUM ES/NO RATIO REQUIRED FOR EACH OF MODULATION & FEC SCHEMES .....	59

## Figures

Figure 1-1: 7880DM-LB Versions Block Diagram .....	2
Figure 2-1: 7880DM-LB Series Rear Plates .....	3
Figure 2-2: COM Port Settings .....	5
Figure 2-3: Main Menu Prompt.....	6
Figure 2-4: Network Setup Screen .....	6
Figure 2-5: FC Menu – WEBEASY Interface .....	8
Figure 4-1: System & Data Port – WebEASY Interface .....	13
Figure 4-2: System & Data Port – VLPRO Interface .....	13
Figure 4-3: Data Port - WEBEASY Interface.....	14
Figure 4-4: Data PORT- VLPRO Interface .....	15
Figure 4-5: Preset - WEBEASY Interface.....	15
Figure 4-6: Preset- VLPRO Interface .....	16
Figure 4-7: Preset, Product License & Product Features Supported – WebEASY Interface.....	18
Figure 4-8: Preset, Product License & Product Features Supported – VLPRO Interface .....	18
Figure 5-1: RF Tune Tab – WebEASY Interface.....	20
Figure 5-2: RF Tune Tab – VLPRO Interface.....	21
Figure 6-1: Input Source Diagram .....	23
Figure 6-2: TS Input Mapping & Status Tab – WebEASY Interface.....	24
Figure 6-3: TS Input Mapping & Status Tab – VLPRO Interface .....	24
Figure 6-4: ASI Configuration – WebEASY Interface.....	26
Figure 6-5: ASI Configuration – VLPRO Interface.....	26
Figure 6-6: ASI2 Configuration .....	26
Figure 6-7: IP Input Control – WebEASY Interface.....	27
Figure 6-8: IP Input Control Tab – VLPRO Interface.....	28
Figure 7-1: IP Output Control Tab – WebEASY Interface.....	29
Figure 7-2: IP Output Control Tab – VLPRO Interface.....	30
Figure 7-3: TS Output Status Tab – WebEASY Interface .....	31
Figure 7-4: TS Output Status Tab – VLPRO Interface .....	32
Figure 7-5: Program Filtering – WebEASY Interface .....	33
Figure 7-6: Program Filtering – VLPRO Interface .....	34
Figure 7-7: Bitrate Control– WebEASY Interface.....	35
Figure 8-1: CAM Control – WebEASY Interface .....	37
Figure 8-2: Descramble – CAM 1 – WebEASY Interface.....	38
Figure 8-3: Descramble – CAM 2 – WebEASY Interface.....	38
Figure 8-4: Descramble - CAM 1 & 2 - VLPRO Interface.....	39
Figure 8-5: : Service Info tab 1 – WebEASY Interface .....	40
Figure 8-6: Service Info tab 2 – WebEASY Interface .....	40
Figure 8-7: Service Info tab 1 – VLPRO Interface.....	41
Figure 8-8: Service Info choosing TS 2 – VLPRO Interface.....	41
Figure 8-9: Service Info TS2 – VLPRO Interface .....	41
Figure 8-10: CA Module Health – WEBEASY INTERFACE .....	42
Figure 8-11: CA Module Health – WEBEASY INTERFACE .....	42
Figure 8-12: BISS Descramble – Tab 1 – WEBEASY INTERFACE .....	43
Figure 8-13: BISS Descramble – Tab 2– WEBEASY INTERFACE .....	43
Figure 8-14: BISS Descramble – TS 1 – WEBEASY INTERFACE.....	44
Figure 8-15: BISS Descramble – choosing TS 2 – WEBEASY INTERFACE .....	44
Figure 8-16: BISS Descramble – TS 2 – WEBEASY INTERFACE.....	45
Figure 8-17: TS Tree View – Tab 1 .....	46
Figure 8-18: TS Tree View – Tab 2 .....	47
Figure 9-1: WebEASY Upgrade .....	49
Figure 9-2: WebEASY Upgrade – Selecting the 7880DM.....	50
Figure 9-3: WebEASY – Completion Indicator .....	50
Figure 9-4: WebEASY – Verifying Firmware Upgrade .....	51
Figure 9-5: VLPRO – Version Information.....	52

Figure 9-6: VLPRO – Upgrading Procedures ..... 52  
Figure 9-7: VLPRO – Browse for Firmware ..... 53  
Figure 9-8: VLPRO – Upgrade Firmware..... 53  
Figure 9-9: VLPRO – Upgrade Complete ..... 54  
Figure 10-1: WebEASY – License Key ..... 55  
Figure 10-2: WebEASY – Enabled Product Feature..... 56  
Figure 10-3: VLPRO – Set Up License Key..... 57  
Figure 10-4: VLPRO – Activating License Key ..... 58  
Figure 10-5: VLPRO – Enabled License Key..... 58

**Tables**

Table 3-1: Standard RJ-45 Wiring Colour Codes ..... 4

## REVISION HISTORY

<u>REVISION</u>	<u>DESCRIPTION</u>	<u>DATE</u>
1.0	First Release	January 2017

Information contained in this manual is believed to be accurate and reliable. However, Evertz assumes no responsibility for the use thereof nor for the rights of third parties, which may be affected in any way by the use thereof. Any representations in this document concerning performance of Evertz products are for informational use only and are not warranties of future performance, either expressed or implied. The only warranty offered by Evertz in relation to this product is the Evertz standard limited warranty, stated in the sales contract or order confirmation form.

Although every attempt has been made to accurately describe the features, installation and operation of this product in this manual, no warranty is granted nor liability assumed in relation to any errors or omissions unless specifically undertaken in the Evertz sales contract or order confirmation. Information contained in this manual is periodically updated and changes will be incorporated into subsequent editions. If you encounter an error, please notify Evertz Customer Service department. Evertz reserves the right, without notice or liability, to make changes in equipment design or specifications.

*This page left intentionally blank*

## 1. OVERVIEW

The 7880DM-LB series is a complete hardware based solution for demodulating digital DVB-S/S2 satellite signals. With a modular form-factor and available multiple inputs and multiple demodulators per card, the 7880DM-LB series represents one of the highest density and most flexible solutions in the industry.

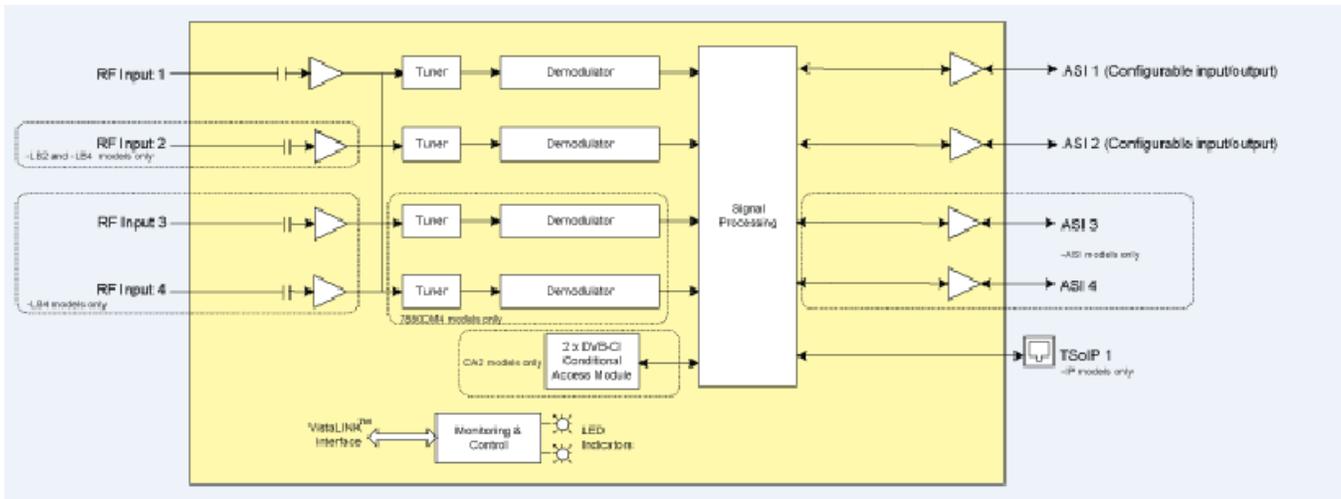
Applications include signal reception for cable, DTH and IPTV providers, or any other small to large head-end operators who need to receive and redistribute satellite content. The 7880DM-LB series provides ASI and IP outputs, ideal for turnaround, transcoding, monitoring or other applications where the received signal remains in the compressed domain. For baseband output, the demodulator may be coupled with an Evertz® decoder module, providing a full IRD solution.

Monitoring parameters such as Es/N0, demodulator lock, RF power and FEC activity provide extensive information on received signal quality and robustness. These parameters as well as full control of the demodulator are relayed over SNMP, for convenient remote access using Evertz®' own [VistaLINK®](#) PRO SNMP monitoring and control package.

For applications requiring decryption, the 7880DM2-LB2-CA2 provides dual slots for installation of customer supplied DVB-CI compliant conditional access modules.

### 1.1. FEATURES AND BENEFITS

- Modular design, allowing flexible configurations along with easy system reconfiguration and service
- Up to four units may be mounted in the 7801FR 1RU chassis, capable of receiving 16 signals in 1RU
- Up to fourteen units may be mounted in the 7800FR 3RU chassis, capable of receiving 56 signals in 3RU
- DVB-S and DVB-S2 capable
- Signal quality monitoring, including Es/N0, demodulator locking, RF power and FEC activity
- Outputs are selectable among internal demods
- Standard support for advanced transport stream processing including service filtering and output bitrate control
- Standard support for advanced modulation schemes, including DVB-S2 with 16APSK and 32APSK
- Local control panel option available in 1RU frame
- Remote control panel option available in 3RU frame
- SMPTE 2022-1 and -2 compliant multiple TSoIP outputs per tuner
- Straight pass through or PID/Service filtering and bandwidth control
- Control through web-browser or SNMP using third-party application or Evertz' own SNMP control and monitoring software
- Supports on-board Input auto-failover between various inputs including RF/ASI/ or IP inputs
- Optional IP FEC encoding in output streams (for –IP models)



**Figure 1-1: 7880DM-LB Versions Block Diagram**

## 2. INSTALLATION

### 2.1. REAR PLATE DESCRIPTION

Figure 2-1 provides an illustration of the 7880DM-LB series rear plates.

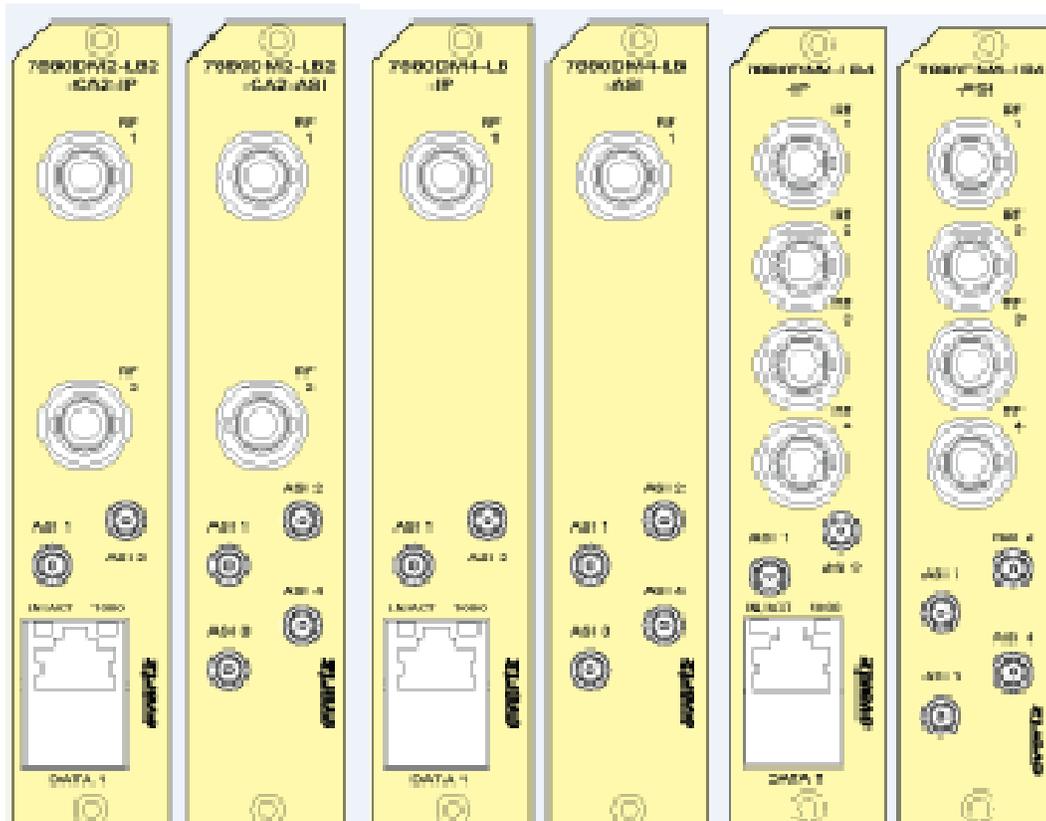


Figure 2-1: 7880DM-LB Series Rear Plates

#### 2.1.1. Connectors

**RF <1-4>:** Input F-type (optional BNC with +B75 option) connector for L-band output of a suitable digital cable network directly or via a suitable attenuator giving lightning and surge protection.

**ASI <1-4>:** Input/output DIN connectors.

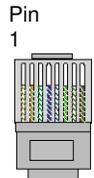
**Data <1>:** Data input/output connector.

#### 2.1.2. Ethernet Connection

The 7880DM-LB Series uses 10Base-T (10 Mbps), 100Base-TX (100 Mbps) or Gigabit (1 Gbps) twisted pair Ethernet cabling systems. When connecting for 10Base-T systems, category 3, 4, or 5 UTP cable as well as EIA/TIA – 568 100Ω STP cable may be used. When connecting for 100Base-TX systems, category 5 UTP cable is required. The cable must be “straight-through” with an RJ-45

connector at each end. Establish the network connection by plugging one end of the cable into the RJ-45 receptacle of the card and the other end into a port of the supporting hub.

The straight-through RJ-45 cable can be purchased or can be constructed using the pin-out information in Table 2-1. A colour coded wiring table is provided in Table 2-1 for the current RJ-45 standards (AT&T 258A or EIA/TIA 258B colour coding shown). Also refer to the notes following the table for additional wiring guide information.

	Pin #	Signal	EIA/TIA 568A	AT&T 258A or EIA/TIA 568B	10BaseT or 100BaseT	1000BaseT
	1	Transmit +	White/Green	White/Orange	Used	Used
	2	Transmit -	Green/White or White	Orange/White or Orange	Used	Used
	3	Receive +	White/Orange	White/Green	Used	Used
	4	Bi-dir +	Blue/White or Blue	Blue/White or Blue	--	Used
	5	Bi-dir -	White/Blue	White/Blue	--	Used
	6	Receive -	Orange/White or Orange	Green/White or Green	Used	Used
	7	Bi-dir +	White/Brown	White/Brown	--	Used
	8	Bi-dir -	Brown/White or Brown	Brown/White or Brown	--	Used

**Table 2-1: Standard RJ-45 Wiring Colour Codes**

Note the following cabling information for this wiring guide:

- Only two pairs of wires are used in the 8-pin RJ-45 connector to carry Ethernet signals for 10/100BaseT. Even though pins 4, 5, 7 and 8 are not used, it is mandatory that they be present in the cable.
- 10BaseT and 100BaseT use the same pins (a crossover cable made for one will also work with the other).
- 1000BASE-T requires at least Category 5 cable.
- 1000BASE-T requires all four pairs to be properly connected.
- Pairs may be solid colors and not have a stripe.
- Category 5 cable must use Category 5 rated connectors.

The maximum cable run between the router and the supporting hub is 300 ft (90 m). The maximum combined cable run between any two end points (i.e. router and PC/laptop via network hub) is 675 ft (205 m).

Devices on the Ethernet network continually monitor the receive data path for activity as a means of checking that the link is working correctly. When the network is idle, the devices also send a link test signal to one another to verify link integrity. The rear panel is fitting with two LEDs to monitor the Ethernet connection.

**LINK-UP (AMBER):** This LED is ON when the module has established a good link to its supporting hub. This provides a good indication whether the segment is wired correctly or not. The LED is OFF if there is no valid connection.

**ACTIVITY (GREEN):** This LED provides information on link traffic activity. It blinks when the module is transmitting or receiving packets. The blinking speed is relative to link activity. The more traffic there is on the link, the faster the LED blinks. The LED is OFF if there is no valid connection or no link activity.

To successfully install any of the 7880DM-LB series modules, user will need:

1. Unused IP address on the network or a DHCP server.
2. Evertz serial cable.
3. VLPRO Server IP address.



**The 7880DM-LB Series module is controlled directly via a 780x Frame controller.**

## 2.2. HARDWARE INSTALLATION

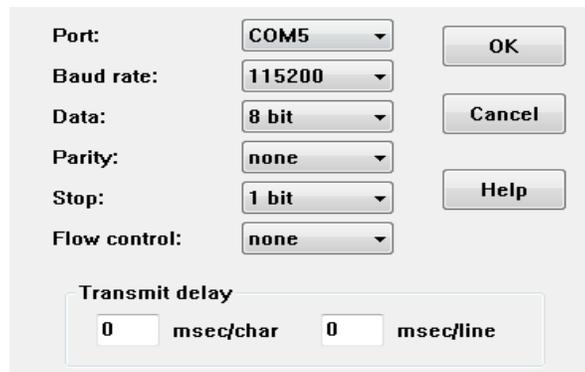
Before handling the card it is important to minimize the potential effects of static electricity. It is therefore recommended that an ESD strap be worn. Locate on the 7800 chassis two adjacent vacant slots. Unpack the 7880DM-LB and separate the rear panel from the main card. Locate on the rear of the rack an empty slot and remove the blanking panels. Insert the rear panel into the back of the chassis and secure using the screws provided.

Before inserting the front card, connect the serial cable provided to the board. Now insert the 7880DM-LB Series card into the corresponding front slots ensuring the card lines up with the slot runners on the bottom and the top of the chassis. Push the card into the slot ensuring that when it mates with the rear card that it has been firmly pushed into a seated position. This can be confirmed when the connectivity lights for the Ethernet port are illuminated. Do not connect any cables to the rear card until the initial configuration has been completed (failure to do this could cause unwanted network issues).

## 2.3. CONFIGURATION OF MANAGEMENT IP CONNECTION

The first step is to configure the management IP connection so that the customer can create management access to the unit via the user's Local Area Network. The user can change the management IP address from the serial port of the frame controller by following the steps below.

1. Remove the panel by unscrewing both knobs on the side.
2. Connect the serial upgrade cable (ribbon cable) provided by Evertz to the 2x3 header at the front edge of the 7801FC/7800FC.
3. Open a terminal program such as HyperTerminal. Setup the terminal program as shown in Figure 2-2.



**Figure 2-2: COM Port Settings**

4. Power on the unit and allow unit to boot up.



10. The frame controller can now be used with the new IP address.

#### **2.4. HTTP BROWSER CONTROL**

The user can control the 7880DM-LB using an HTTP browser by following these steps:

1. Connect a network cable (RJ-45) between the management connector labelled “ETHERNET” on the chassis and the LAN connector of the local PC or switch.
2. Open Firefox or Chrome browser (latest version recommended) and type in the Control Port IP Address from Section 2.3.



**Note: The PC used for management and administrative purposes must be in the same subnet to establish proper connection to the chassis. User may need to change the user's PC IP settings for DHCP to static during the management IP connection.**

3. Log in as: **root**, password: **evertz**



**Note: The default username and password is “root” and “evertz” respectively. This is for read/write privileges.**

**For read only privileges, the customer needs to access with username and password “customer” and “customer” respectively.**

4. The user will be directed to the FC Menu as shown in **Error! Reference source not found.** To access the 7880DM-LB (slot 6 in this example ) web controls, click on the link under the Name column on the Products section.

Slot	Name	Family	Alias	Version
1	FC	Frame Controller		
2	7880DM4-VSBQAM4-IP	7880DM-VSBQAM	A5	2.0.110
3	7880DM4-VSBQAM4-IP+SPTS+FEC	7880DM-VSBQAM	A4	2.0.110
4				
5	7880DM4-ISDBT4-IP+SPTS	7880DM-DVBT	1234	1.0.24
6	7880DM2-LB2-CA2+IP+DBISS	7781DM-LB	111144	2.0.98
7	7880DM8-FM4-IP	7880DM-FM	7880DMFM	0.0.152
8	7881IRD+8B422+10B422+AAC+DD+DBISS+SCTE104+IP+FSE+HDC	7881IRD	0123	1.2.560
9	7781DM-LB-SLAVE	7781DM-LB-SLAVE		1.0.170
10				
11				
12				
13				
14				
15				

Figure 2-5: FC Menu – WEBEASY Interface

## 2.5. SETTING UP USER LOGIN CREDENTIALS AND CHANGES PRIVILEGES

The user can change the roles of the user by following the steps below:

- Go to the FC webpage
- Click on any of the tabs on the left side, e.g. Hardware tab
- Login using login: **admin** password: **admin**
- Click the **Users** button on the lower right side
- Under the **Users** tab, click the **Modify** button for customer and change its role to RW
- Logout of the FC and login as **customer/customer**
- Re-login to the FC

The user needs to follow the same steps for the **DEMODULATOR**:

- User needs to login to the card directly with:  
http://<IP address>/slot/<Slot#>/htdocs/login.php

- Login using login: **admin** password: **admin**
- Click the **Users** button on lower right side
- Click the **Login** tab under the **Users** tab
- Click **Modify** button for customer and change its role to be RW
- Logout the DEMODULATOR and login as **customer/customer**

*This page left intentionally blank*

### 3. SPECIFICATIONS

#### RF INPUTS

7880DM2-LB2-CA2: 2  
7880DM4-LB: 1  
7880DM4-LB2: 2  
7880DM4-LB4: 4  
Connector: F-Type, 75Ω BNC (optional)  
Frequency: 950-2150 MHz  
Power: -20 to -60dBm

#### MODULATION SUPPORT:

Standard: DVB-S, DVB-S2  
Constellation: QPSK, 8PSK, 16APSK, 32APSK  
FEC (auto detected): All ratios compliant with DVB Standards  
Symbol Rate: Up to:  
8PSK: 67Msps  
16APSK: 50Msps  
32APSK: 40Msps

#### ASI INPUTS/OUTPUTS

**Connector:** Mini DIN 1.0/2.3  
**Number:** 2/4\* (4 for –ASI Model)  
**Type:** ASI per DVB TR101-891  
**Connector:** Mini DIN1.0/2.3 or 75Ω

\*Selectable between input or output

#### TSOIP INPUT/OUTPUT (–IP VERSION ONLY)

**Connector:** RJ45, 10/100/1000Mbps  
(with –IP version)  
**Number of streams:** 2 inputs/4 outputs (-IP Model)  
**Type:** SMPTE 2022-1, -2  
**FEC:** per SMPTE 2022 (output only) ( Optional with +FEC Option)

Optional SMPE2022-1 FEC encoding with L&D following range:

- $L \cdot D \leq 100$
- $1 \leq L \leq 20$
- $4 \leq D \leq 20$
- if  $L < 4$ , then  $D = 4$  always

#### DVB COMMON INTERFACE DE-SCRAMBLING: ( WITH –CA2 VERSION)

**Connector:** PCMCIA dual slots  
**Standard:** DVB\_CI EN50221  
**CA module:** PC-Card type II Hot Plug

DVB-CI compatible CA Module with (when fitted)

- Alphacrypt
- Aston Crypts
- Conax
- Cryptoworks
- Irdeto
- Nagravision
- Viaccess
- Video Guard

## **CONTROL**

SNMP over Ethernet via FC

Web browser via FC

## **MONITORED PARAMETERS**

Es/N0 ratio

Demodulator lock

RF power

FEC activity

Bit error rate

Full Ts input and output parameters such as sync loss, sync byte, and CC errors

## **ELECTRICAL**

**Voltage:** +12V DC

**Power:** <24W

**EMI/RFI:** Complies with FCC Part 15, Class A  
EU EMC Directive

### 4. SYSTEM PAGE

#### 4.1. SYSTEM

**Reboot & Factory Reset:** These parameters allow the user to reboot and reset the 7880DM-LB.

**Card Type:** This parameter displays the card's model number.

**Alias:** This parameter allows the user to set an Alias for the unit.

1. The user can create a demodulator Alias by entering a name in the **Alias** control field.
2. Hit **Apply** after entering a name and hit **Refresh** to ensure the name is applied and taken. Both commands can be found at the top of the web page

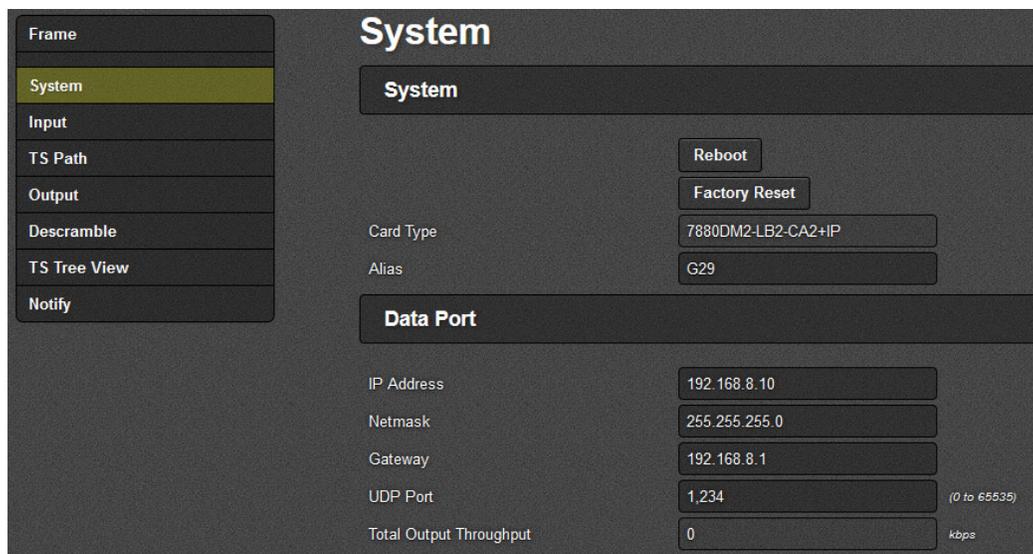


Figure 4-1: System & Data Port – WebEASY Interface

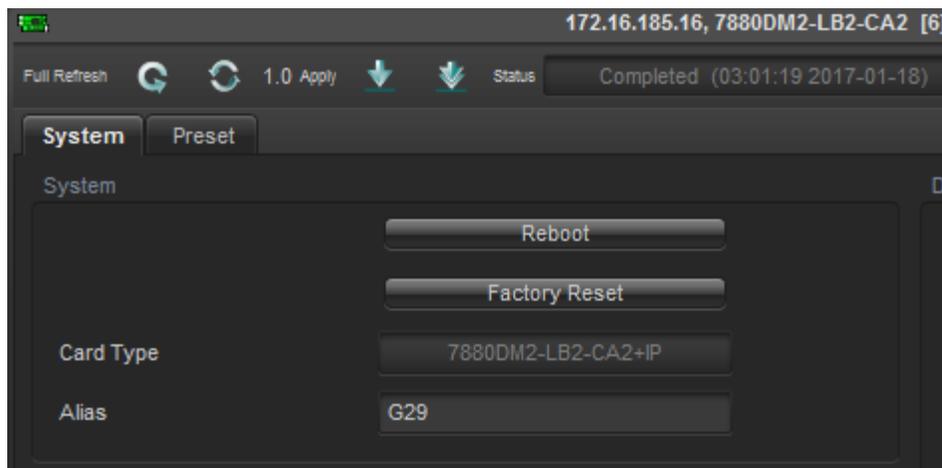


Figure 4-2: System & Data Port – VLPRO Interface

### 4.2. DATA PORT

1. Under the Data Port section, the user can set the physical data port **IP Address**, **Netmask**, **Gateway**, and **UDP Port**.
2. Hit **Apply** after entering a name and hit **Refresh** to ensure the name is applied and taken.

**IP Address:** This parameter allows the user to enter the source IP address. This address can be the physical IP address of the user's data port, or any other address the user may want to have encapsulated within the IP packets.

**Netmask:** This parameter allows the user to set the network mask address for the data port.

**Gateway:** This parameter allows the user to set the gateway address for the data port.

**UDP Port:** This parameter allows the user to enter the source port number for the IP address entered in the **IP Address** field.

**Total Output Throughput:** This parameter displays the total output bitrate of the data port.

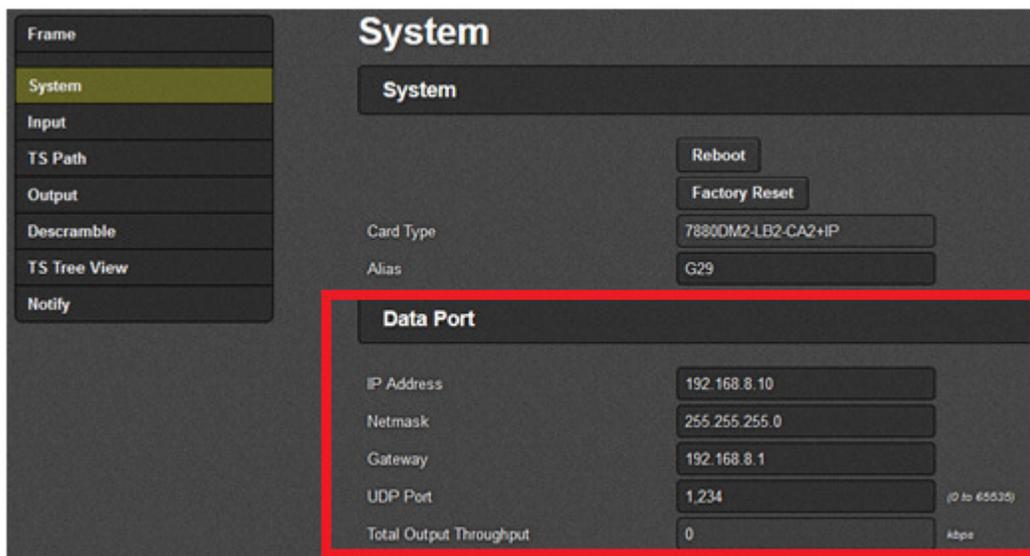


Figure 4-3: Data Port - WEBEASY Interface

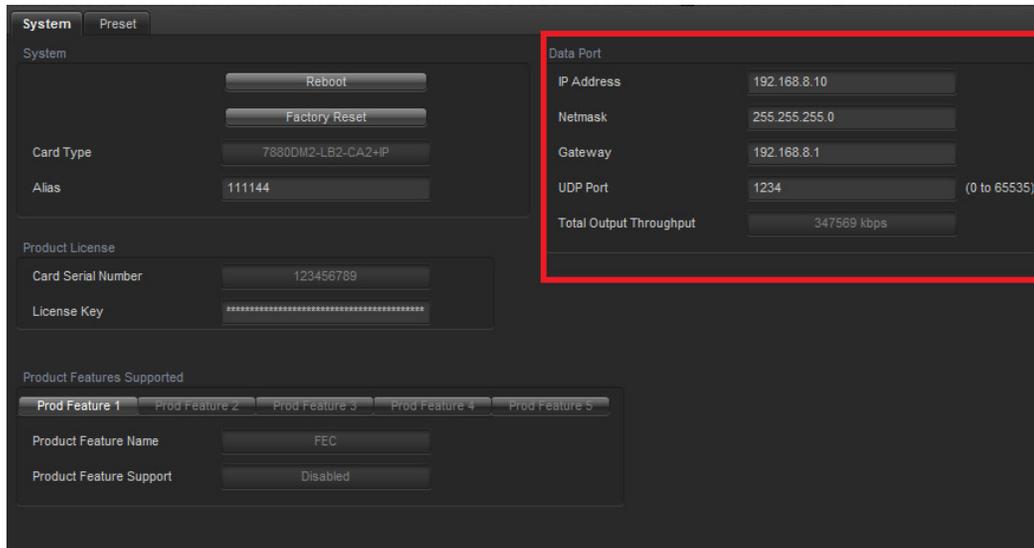


Figure 4-4: Data PORT- VLPRO Interface

### 4.3. PRESET

The Preset section allows the user to save profiles and recall them when needed.

#### Saving a Preset:

1. The user can select which preset to set by clicking on one of the numbered tabs. A maximum of 10 presets can be set.
2. Enter the name in the **Preset Name** field, and click **Apply**.
3. Click on the **Preset Store** button to create the saved preset.
4. Follow the above steps to create up to 10 presets.

#### Recalling a Preset:

1. The user can select which preset to recall by clicking on one of the numbered tabs.
2. Click on the **Preset Recall** button.

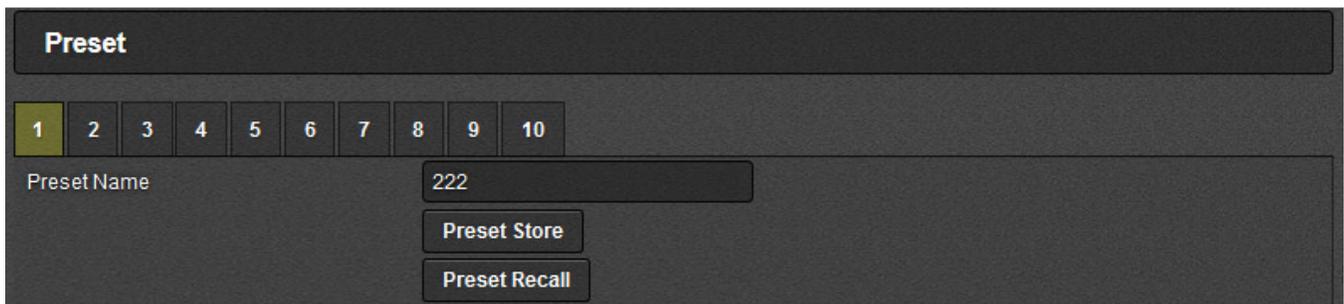


Figure 4-5: Preset - WEBEASY Interface

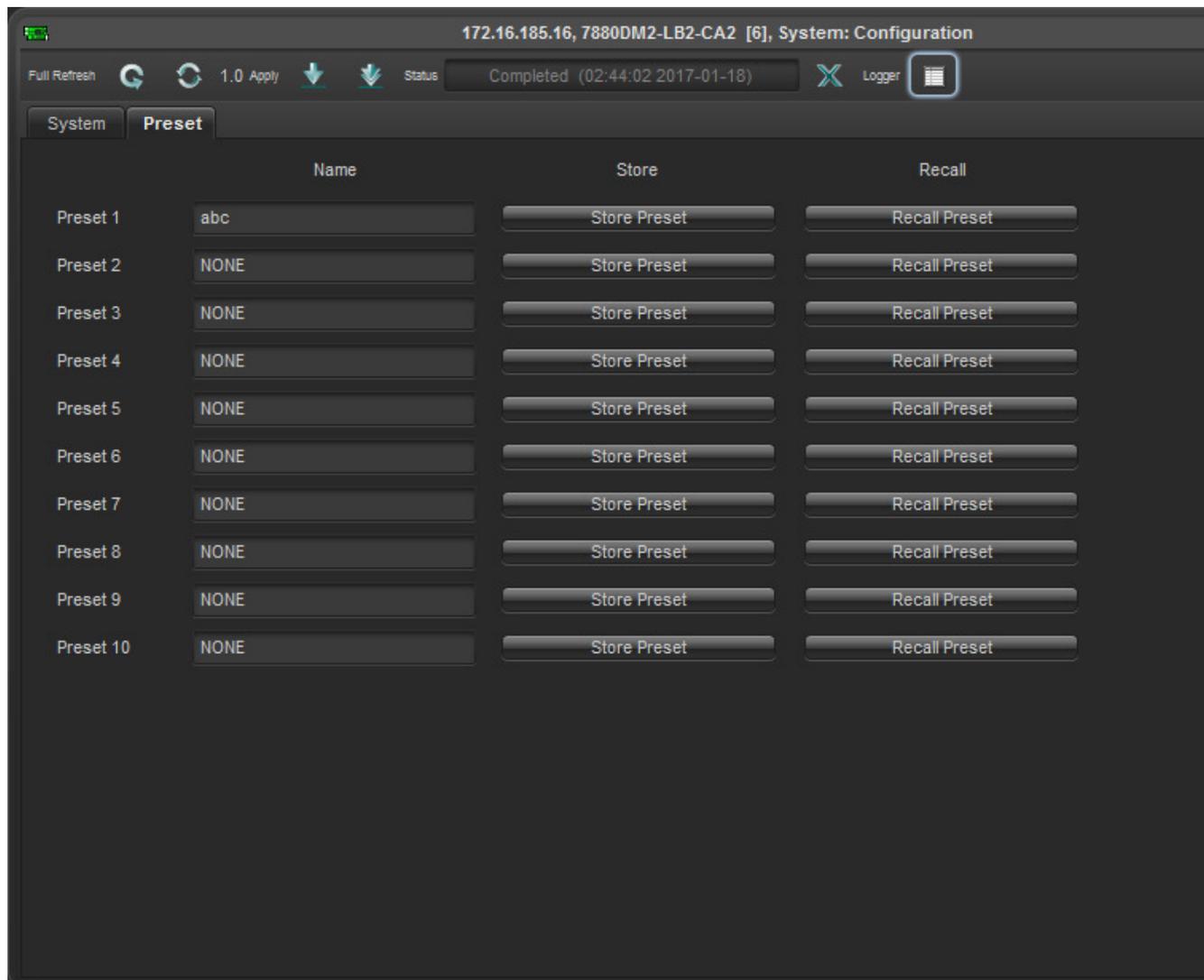


Figure 4-6: Preset- VLPRO Interface

#### 4.4. PRODUCT LICENSE

This section displays the **Product Serial Number** and allows the user to enter the **License Key** in the corresponding fields.

#### 4.5. PRODUCT FEATURES SUPPORTED

The 7880DM-LB has the ability to enable features by adding/updating applicable licenses. Please contact Evertz Microsystems for an additional license generation along with Product Serial Number.

**Product License:** This parameter displays the product license key loaded to the hardware. This parameter can also be used to apply the license keys that will enable product features. Please contact the factory if the product features need to be purchased.

**Product Serial Number:** This parameter displays the card serial number. This is required by Evertz when generating or updating license files on the 7880DM-LB

**Product Feature Name:** This parameter returns the product features supported on the card. It should display the following feature names: FEC, DBISS, and SPTS

**Product Features Supported:** This parameter displays whether the product feature is enabled or disabled on the card.

**DBISS Product feature:** with DBISS License key, the demod will provide BISS 1 and BISS E descrambling capability.

**FEC Product Feature:** with FEC License key, the demod will support Forward Error Correction on each TS output.

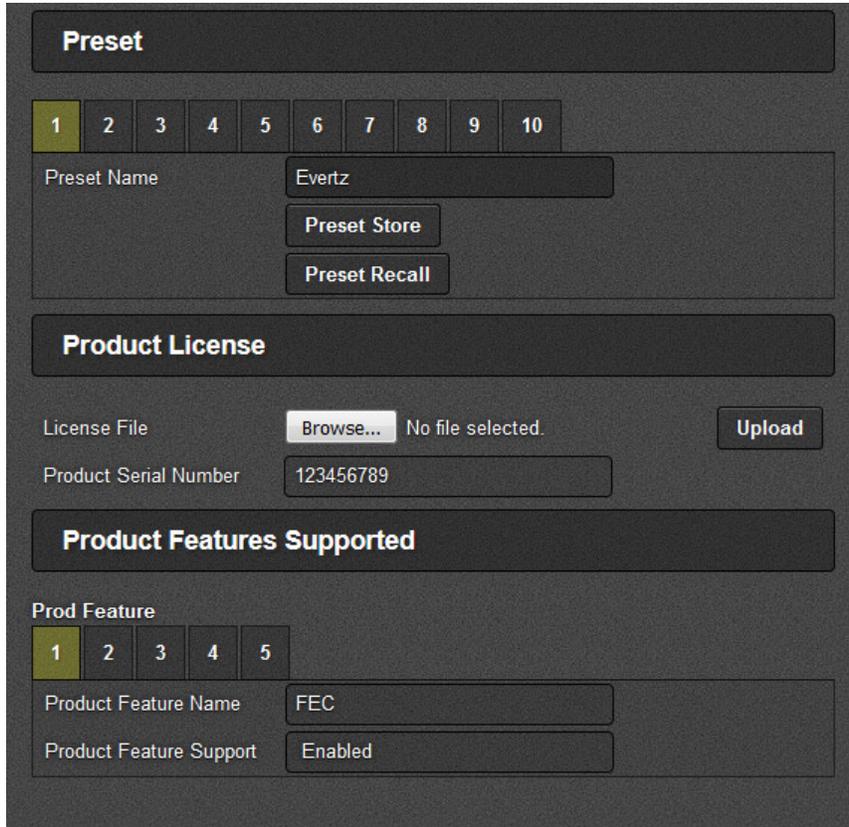
**SPTS Product Feature:** with SPTS License key, the demod will enable Single Program Transport Stream, which allow the user to have four individually configured output stream per TS, for total of 16 output streams for four TSs.



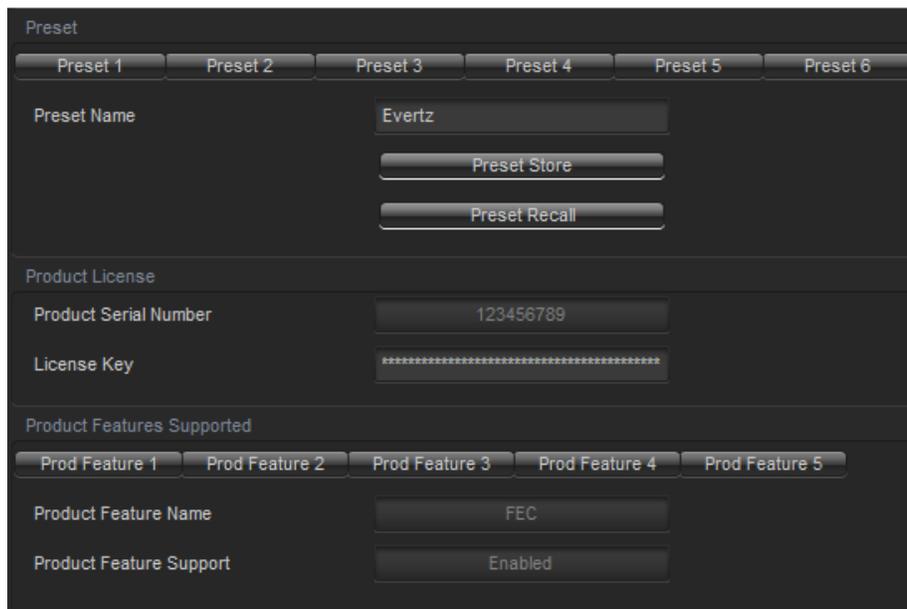
**Note: If Product Features Supported disabled, Contact Factory to provide license for upgrade. For Product License Upgrade procedure, refer to Section 0.**



**Note: Please contact factory to check for feature upgrade capabilities.**



**Figure 4-7: Preset, Product License & Product Features Supported – WebEASY Interface**



**Figure 4-8: Preset, Product License & Product Features Supported – VLPRO Interface**

## 5. INPUT SETTINGS

**Demod 1** through **Demod 4** selection tabs are used to tune each individual demodulator as well as monitor the health and status of the input signal. The 7880DM-LB series cards can contain up to four different demodulators on each module.

### 5.1. RF TUNE

Please note that there are up to four channels available on the demodulator. Since each channel has the same parameters, only Channel 1 will be described in this manual.

Assuming a valid RF input is connected to the rear plate of the demodulator, the user can tune to a certain frequency/ channel by following the steps below:

1. Navigate to the **RF Tune** section of the **Input** tab.
2. Select the demodulator channel to tune by selecting the corresponding numbered tab.
3. Enter the respective parameters for the RF feed.

*Note: User can enter Sat Freq and LNB Freq or only L-Band Freq in Sat Freq field.*

4. Hit "Apply" after changing the settings and hit "Refresh" to ensure the values are applied and taken. (located at top the page)
3. Hit **Apply** after changing the settings and hit **Refresh** to ensure the values are applied and taken. Both commands can be found at the top of the web page.
5. The **Lock Status** parameter should read **Lock** to confirm the signal is tuned and is able to check for other RF parameters on the same section.

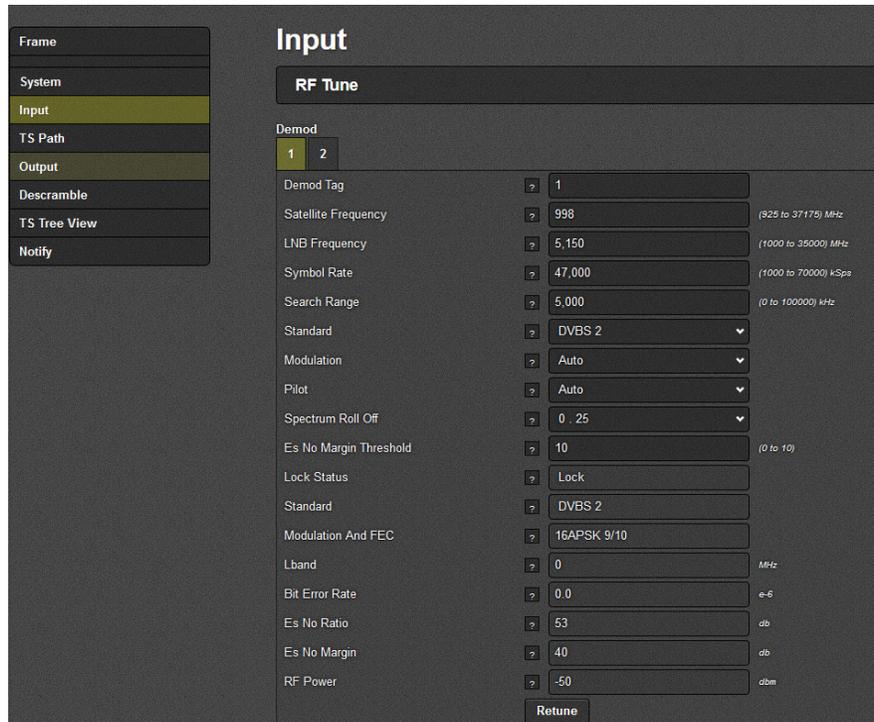


Figure 5-1: RF Tune Tab – WebEASY Interface

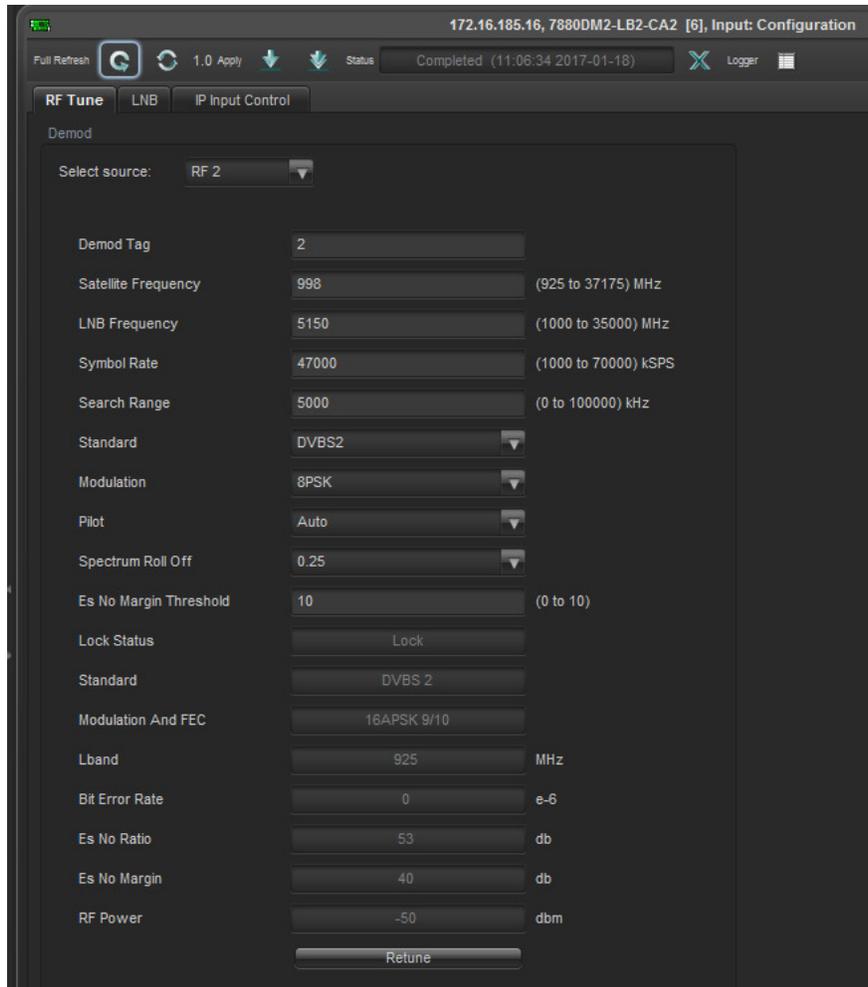


Figure 5-2: RF Tune Tab – VLPRO Interface

### 5.1.1 RF Tune Controls Parameters:

- **Satellite Frequency (MHz):** This field enables the user to enter the Satellite Frequency (MHz) value.
- **LNB Frequency (MHz):** This field enables the user to enter the standardized Local Oscillator Frequency (LO) value



**Note:**  $Lband\ Frequency = Satellite\ Frequency - LOF\ Frequency$  (for Ku)  
Standardized LOF is 5150 for C-Band and 10750 for Ku-band.  
When the LOF is C-band the formula is  
 $Lband\ Frequency = LOF\ Frequency - Satellite\ Frequency$

- **Symbol Rate (KSPs):** This field enables the user to enter a symbol rate in Ksymbols/s.
- **Standard:** Using the drop down menu, select the Modulation standard type (DVBS or DVBS2)
- **Frequency Search Range (KHz):** This field enables the user to set the maximum frequency offset which is covered by the carrier search (in KHz). The Frequency Search range is +/- 70MHz. (default is 5000kHz)



**Note: Satellite frequency, LNB Frequency, Symbol Rate and Standard are mandatory fields to get a Lock ON, Other parameters below are auto-detected by the demod chip**

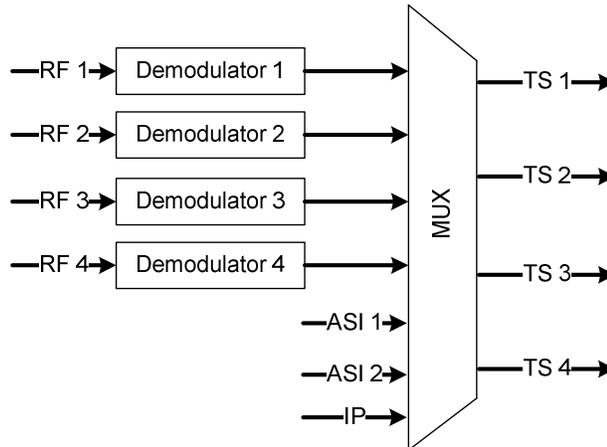
- **Modulation:** Using the drop down menu, select the Modulation type ( QPSK, 8PSK,16APSK,32APSK or default to Auto)
- **Pilot:** Use the drop down menu to enable or disable the pilot. The following options are available: **ON** or **OFF**. Select **ON** if the pilot tone is present, otherwise this option should be set to **OFF**.
- **Spectrum Roll-Off:** Use the drop down menu to select the transponder filter roll-off factors. The following options are available: 0.2, 0.25 and 0.35.
- **EsNo Margin Threshold:** This field enables the user to set the EsNo Margin Threshold and get trap real EsNo is less than the threshold.

#### 5.1.2 RF Tune Monitor Parameters:

- **Lock Status:** This field allows the user to monitor the demodulator lock status (Idle, Locked).
- **Standard:** This field allows the user to monitor the Standard of Locked channel ( DVBS/DVBS2)
- **Modulation and FEC:** This field allows the user to monitor the Modulation parameters and FEC for locked channel).
- **L-Band Frequency:** This field displays the Lband frequency calculated from the difference between the RF frequency and the LNB frequency.
- **Bit Error Rate:** This field displays the demodulator Bit error rate
- **Es/No ratio:** This field displays the ratio between the average energy per transmitted symbol and single sided noise power spectral density. For a summary of performance requirements at QEF over AWGN, please refer to Section 10 of this manual for minimum EsNo ratio required for any given modulation schemes and FEC.
- **Es/No Margin:** This field displays EsNo Margin in dB which indicate how much dB left before losing the lock.
- **RF Power Level:** This field measures the input power level. The input power level is range is from -60dBm to -20dBm

## 6. TS INPUT MAPPING AND SOURCE SELECT

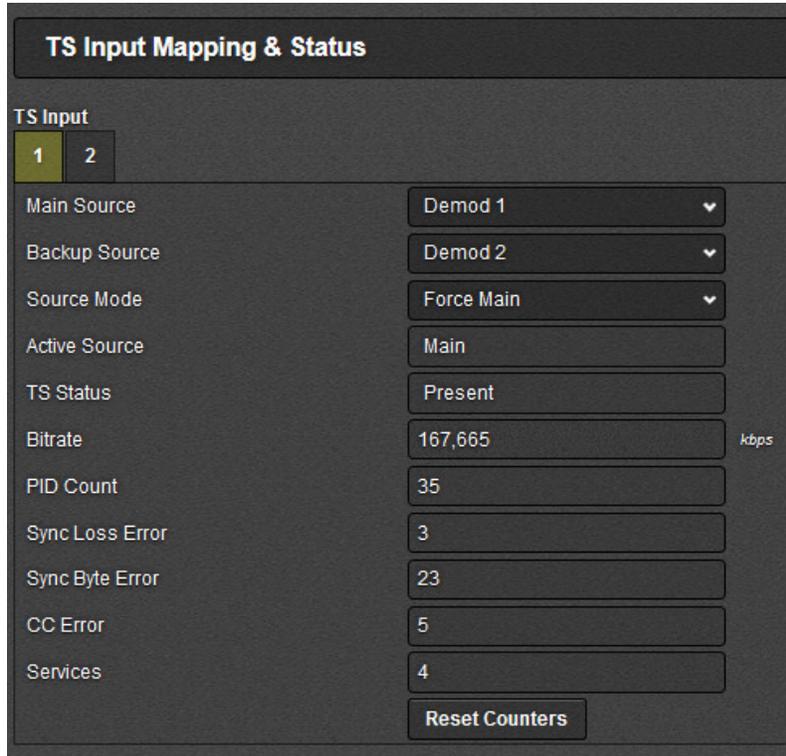
The 7880DM-LB allows the user to choose the input source from a selection of seven different inputs. The user has options of choosing one of the four RF inputs as its source, one of two ASIs, or the IP, as shown in Figure 6-1: Input Source Diagram



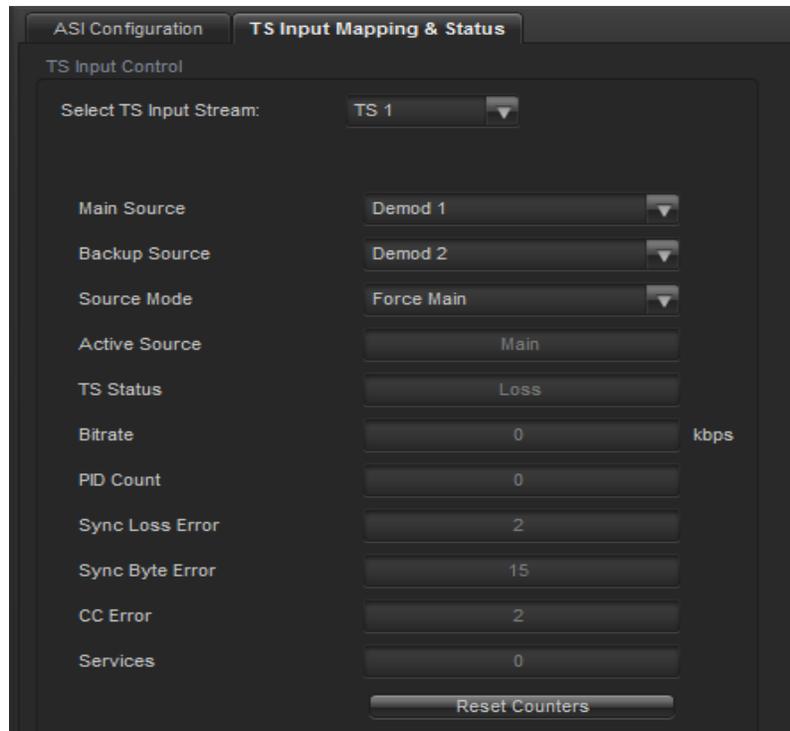
**Figure 6-1: Input Source Diagram**

To choose the input to the demodulator, follow the steps below:

1. Navigate to the TS Path page under the TS Input Mapping and Status section and select Main Source as RF1-4, ASI1, ASI2 or IP.
2. If redundancy is not required, set **Source Mode** to **Force Main**.
3. Hit **Apply** after changing the settings and hit **Refresh** to ensure the values are applied and taken. Both commands can be found at the top of the web page.



**Figure 6-2: TS Input Mapping & Status Tab – WebEASY Interface**



**Figure 6-3: TS Input Mapping & Status Tab – VLPRO Interface**

## 6.1 TS INPUT MAPPING CONTROL

**Main Source:** This parameter sets the main input source. Depending on the user's connection, RF's 1-4, ASI1-2, or IP are viable.

**Backup Source:** This parameter sets the backup input source to take control if the main source fails.

**Source Mode:** This parameter sets the input source select mode. These options allow the user to either force the source or failover to back source when needed. The user can select **Force Main** (forces main source to run), **Force Backup** (forces backup source to run), and **Auto** (if the main source fails, then the demodulator will switch to backup source).

**Active Source:** This parameter displays the input source in use.

**TS Status:** This parameter retrieves the input ASI present state.

**Bitrate:** This parameter retrieves the input TS bitrate in kbps.

**PID Count:** This parameter retrieves the number of PIDs in the input transport stream.

**Sync Loss Error:** This parameter retrieves the sync loss error count in the input transport stream.

**Sync Byte Error:** This parameter retrieves the sync byte error count in the input transport stream.

**CC Error:** This parameter retrieves the continuity count error count in the input transport stream.

**Services:** This parameter displays the number of programs in the input transport stream.

**Reset Counters:** This parameter clears the TS input status.



**Note:** Generally 7880DM2 model has two TS paths whereas 7880DM4 models have four TS paths. The user can select any tuned channel to any path. The selection is made under the TS path menu. By default each input is mapped to its respective path, for example RF 1 is mapped to TS Path 1, RF 2 to TS Path 2 and so on.

## 6.2 ASI INPUT

If the sources to the demodulator are ASI streams over coaxial cable, it is assumed that a valid source is connected to the ASI INPUT port on the rear plate of the unit. To select ASI1 as a source to the demodulator, follow the steps below:

1. For ASI1, set **ASI Direction** to **Input**, and then hit **Apply**.
2. **ASI Input Present** status should confirm a valid ASI source.
3. Select **ASI1** as **Main Source** under the **TS Input Mapping & Status** section of the **TS Path** tab.
4. The **Input Bitrate** parameter should reflect a valid bitrate confirming the ASI input is present.
5. For in depth monitoring of the input press **Reset Counter** and then **Refresh** to get an accurate reading.

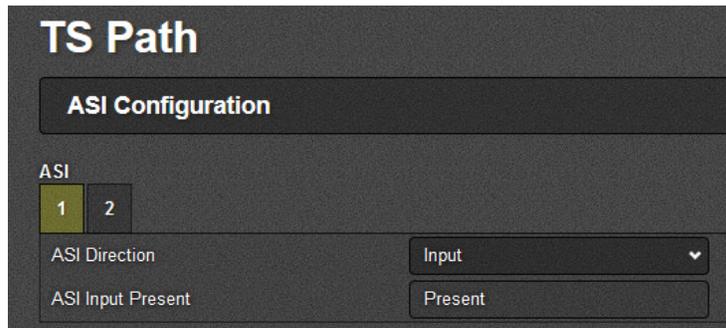


Figure 6-4: ASI Configuration – WebEASY Interface

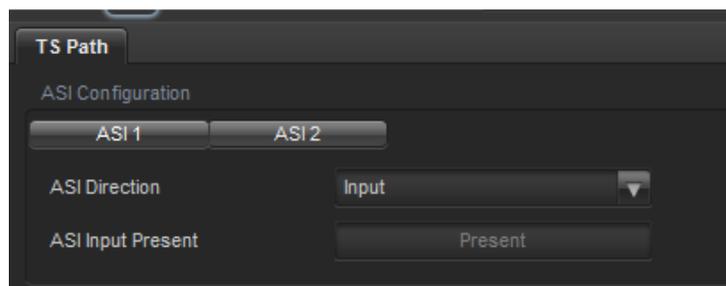


Figure 6-5: ASI Configuration – VLPRO Interface

**ASI Direction:** This parameter sets the ASI port as input or output.

**ASI Input Present:** This parameter displays the status for ASI presence.

To select ASI2 as the source, click on the second tab set for ASI2, as shown in Figure 6-6 and follow the steps above.

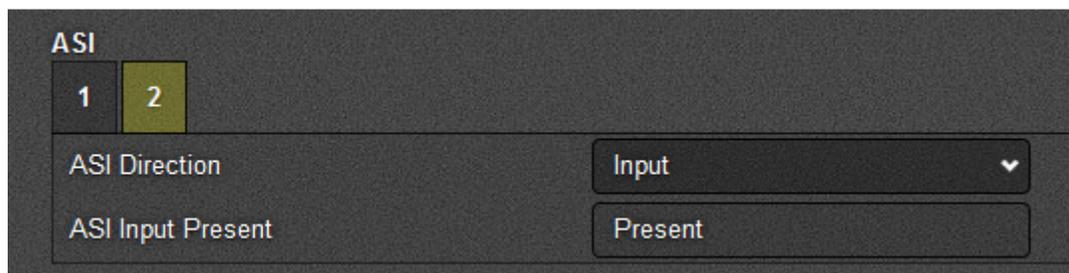


Figure 6-6: ASI2 Configuration



**Note:** Both ASI ports can be configured to be either input or output. If the source is configured to be either ASI 1 or 2, the “ASI Direction” control needs to be set as input.

### 6.3 IP INPUT

The IP input can be selected as a source to the 7880DM-LB. It is assumed that an RJ-45 Ethernet cable with a valid TSolP stream is connected to the SFP connector labelled as “MPEG IP” on the rear

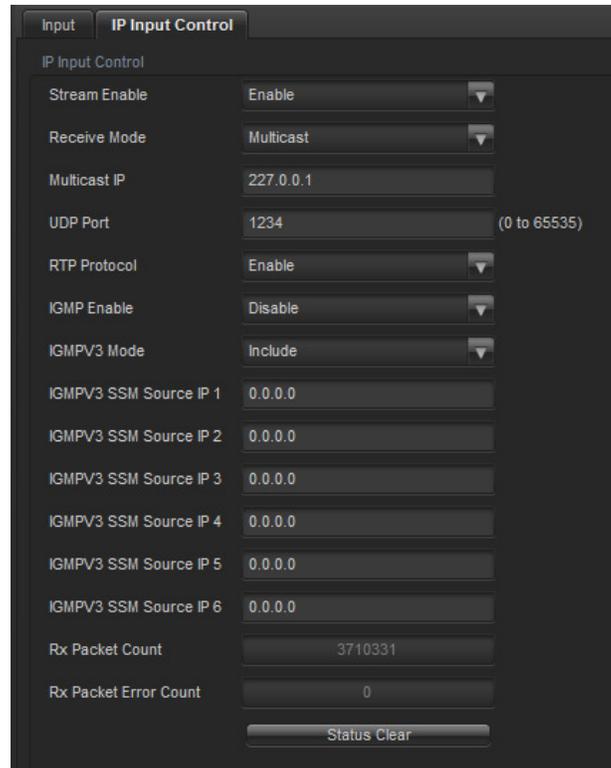
plate of the 7880DM-LB. To select the IP Input as the source and configure IP settings, follow the steps below:

1. Select **IP** as the Main Source under the **TS Input Mapping & Status** section of the **TS Path** tab.
2. Navigate to the **IP Input Control** section of the **Input** tab.
3. Enable IP input from the **Stream Enable** control.
4. Set the Receive mode as multicast or unicast.
  - Multicast: Enter a valid multicast/unicast IP address and UDP port in the respective fields.
  - Unicast: Enter the UDP port only.
5. If IGMPv3 protocol is not in place ignore the rest of the IP controls.
6. Hit **Apply** after entering the values and hit **Refresh** to ensure the values are applied and taken. Both commands are located at the top of the web page.
7. The **Rx Packet Count** should start reflecting that packets are coming; if the user keeps refreshing the page, the packet counts will keep increasing.
8. The **Input Bitrate** field under **TS Input Mapping & Status** should have a valid bitrate present confirming the IP input is valid.
9. For in depth monitoring of the input, press **Status Clear** and then **Refresh** to get an accurate reading.

The screenshot displays the 'IP Input Control' web interface. It features a dark-themed layout with the following elements:

- Stream Enable:** A dropdown menu set to 'Enable'.
- Receive Mode:** A dropdown menu set to 'MultiCast'.
- MultiCast IP:** A text input field containing '227.0.0.1'.
- UDP Port:** A text input field containing '1,234', with a range indicator '(0 to 65535)' to its right.
- RTP Protocol:** A dropdown menu set to 'On'.
- IGMP Enable:** A dropdown menu set to 'Disable'.
- IGMPV3 Mode:** A dropdown menu set to 'Include'.
- IGMPV3 SSM Source IP 1-6:** Six text input fields, each containing '0.0.0.0'.
- Rx Packet Count:** A text input field displaying '3,343,738'.
- Rx Packet Error Count:** A text input field displaying '0'.
- Status Clear:** A button located at the bottom of the form.

Figure 6-7: IP Input Control – WebEASY Interface



**Figure 6-8: IP Input Control Tab – VLPRO Interface**

**Stream Enable:** This parameter enables the IP input stream.

**Receive Mode:** This parameter enables receiving the input stream using multicast or unicast.

**Multicast IP:** This parameter sets the multicast IP address. The user should disable the control if IP Rx Multicast is set to unicast.

**UDP Port:** This parameter sets the UDP port number for the output stream.

**RTP Protocol:** This parameter enables RTP.

**IGMP Enable:** This parameter enables IGMP.

**IGMPV3 Mode:** This parameter sets the multicast source filtering mode.

**IGMPV3 SSM Source IP <1-6>:** This parameter sets the IP address for multicast source filtering.

**Rx Packet Count:** This parameter displays the received packet counter.

**Rx Packet Count Error:** This parameter displays the received error packet counter.

**Status Clear:** This parameter clears the IP receive stream status.

## 7. OUTPUT SETTINGS

### 7.1. IP OUTPUT

When the -IP version card is present, the user can configure unicast or multicast streams of the incoming demodulated Transport Streams. The user can follow the steps below to configure the IP output settings. It is assumed that an RJ-45 Ethernet cable is connected between the data port on the back of the rear plate and the IP analyzer/switch.



**Note:** The data port IP address may need to be changed in some cases if the IP stream is originating from a layer III network switch. The data port configuration controls are present under the IP tab. Device reboot is NOT required to take the new data port IP address.

1. Navigate to the **Output** tab.
2. Enable the **Stream Control**.
3. Enter a valid **Destination IP Address** and **Destination UDP Port**.
4. The RTP Protocol control can also be turned off using the RTP Control. By default the RTP Protocol is turned on.
5. Hit **Apply** after entering the values and hit **Refresh** to ensure the values are applied and taken. Both commands can be found at the top of the web page.
6. **FEC** controls will only be enabled if the Product Features is supported.

Stream Control	Enable	
Destination IP Address	227.0.0.2	
Destination UDP Port	1,234	(0 to 65535)
TS Packet Number	7	(1 to 7)
FEC Enable	Disable	
FEC Column	4	(1 to 20), $L * D \leq 100$
FEC Row	4	(4 to 20), $L * D \leq 100$ , if L < 4, D = 4
TTL	128	(0 to 255)

Figure 7-1: IP Output Control Tab – WebEASY Interface

Stream Control	Enable	
Destination IP Address	227.0.0.2	
Destination UDP Port	1234	(0 to 65535)
TS Packet Number	7	(1 to 7)
FEC Enable	Disable	
FEC Matrix L	1	
FEC Matrix D	1	
TTL	1	(0 to 255)

Figure 7-2: IP Output Control Tab – VLPRO Interface

- **Stream Control:** This parameter enables the IP output stream.
- **Destination IP Address:** This field enables the user to enter the unicast or a multicast IP address. Multicast addresses should be in the range of 224.0.0.0 through 239.255.255.255.
- **Destination UDP Port:** This field enables the user to enter the destination UDP port for the MPEG over IP stream for the IP address entered above.
- **TS Packet Number:** This field enables the user to enter the number of MPEG packets to be encapsulated per IP packet. The range of MPEG packets per IP packet is from 1 to 7. Long-length packets are undesirable due to the excessive impact from losing each IP packet. Short packets cause a high overhead so a value chosen will be a compromise between these two factors.
- **TTL:** This field enables the user to enter the TTL (Time to Live) value. Using the multicast IP protocol, the TTL value indicates the scope or range in which a packet may be forwarded. (the default value is 128)
- **RTP Protocol:** This selection allows the user to select whether they wish to use RTP over UDP or UDP only by turning the RTP layer on or off.
- **FEC Enable:** This field allows the user to add FEC to the stream following the PROMPEG Forum standard COP3. This field allows the user to select from the following options: **Disable** **1 dimension FEC** or **2 dimensions FEC**. Note that the use of FEC will help prevent drop packets in a poor network but will add significant overhead and delay in the signal processing. **The user must check for +FEC option to enable this control.**
- **FEC Column:** This field enables the user to enter the number of packets per column to be associated with an FEC packet. **The user must check for +FEC option to enable this control.**
- **FEC Row:** This field enables the user to enter the number of packets per row to be associated with an FEC packet. **The user must check for +FEC option to enable this control.**

### 6.4 ASI OUTPUT

When a valid input source is present, by default the **7880DM-LB** should have a valid ASI output present. It is assumed that a cable is connected between the ASI output connector and the ASI analyzer.

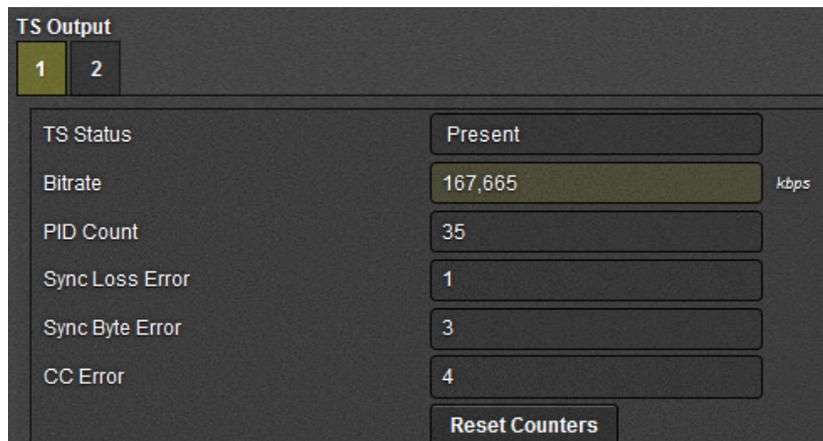


**Note:** “ASI direction” control needs to be set as an output under the TS path tab.

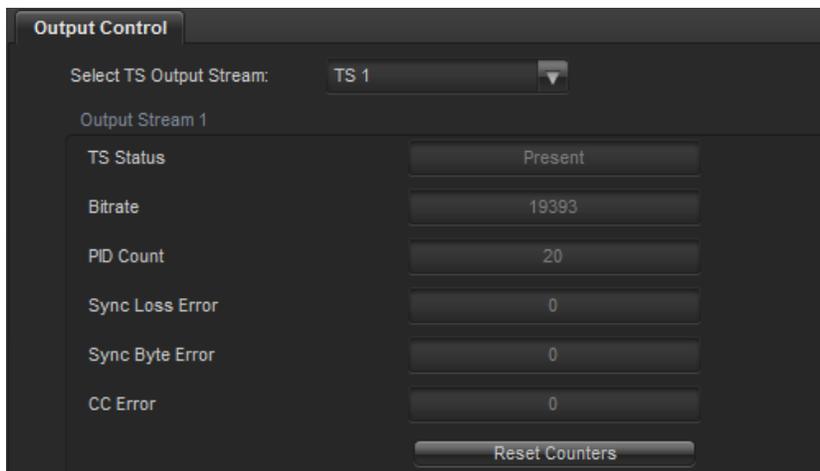
### 6.5 MONITOR ASI/IP OUTPUT

To monitor the ASI output and change the ASI output settings, follow the steps below:

1. Click on the **Output** tab.
2. Navigate to the **TS Output** tab, then the **Output Stream** tab to monitor the ASI/IP output.
3. Press **Reset Counter** and then **Refresh** to get an accurate reading.
4. Under the same tab, the user can check the status of the TS path, such as bitrate, any sync loss, sync byte, CC errors as well as a number of services.
5. To navigate between different TS, click on tabs one to four.



**Figure 7-3: TS Output Status Tab – WebEASY Interface**



**Figure 7-4: TS Output Status Tab – VLPRO Interface**

**TS Status:** This parameter retrieves the output ASI present state.

**Bitrate:** This parameter retrieves the output TS bitrate in kbps.

**PID Count:** This parameter retrieves the number of PIDs in the output transport stream.

**Sync Loss Error:** This parameter retrieves the sync loss error count in the output transport stream.

**Sync Byte Error:** This parameter retrieves the sync byte error count in the output transport stream.

**CC Error:** This parameter retrieves the continuity count error count in the output transport stream.

**Reset Counters:** This parameter clears the TS output status.

## 6.6 SERVICE/PROGRAM FILTERING ON ASI/IP OUTPUT

1. Navigate to the **Output** tab to control the ASI/IP output.
2. Enable the **Output Service Filter** control and hit **Apply**.
3. Choose between Inclusive/Exclusive filter modes.
  - Inclusive: Include the selected programs to be passed to the output.
  - Exclusive: Drop the selected programs from the output.
  - By default all services will be allowed to pass if it is in *Exclusive* mode.

*Note: Press **Apply** after selecting for each Service or use **Dynamic Apply**.*

4. The user has the ability to drop up to 16 programs from the stream.
5. Select the service to be passed/dropped from the drop down menu.
6. Do the same for every TS path.
7. To navigate between different TS, click on tabs one to four.

Stream Control	Enable	▼
Destination IP Address	227.0.0.0	
Destination UDP Port	1,000	(0 to 65535)
TS Packet Number	7	(1 to 7)
TTL	64	(0 to 255)
RTP Protocol	Off	▼
Output Service Filter	Disable	▼
Output Bitrate Control	Disable	▼
Output Bitrate	40,000	(0 to 256000) kbps
Output Service Filter Mode	Exclusive	▼
Program Select 1	2. RajaRani	▼
Program Select 2	None	▼
Program Select 3	2. RajaRani	▼
Program Select 4	3. Evertz main	▼
Program Select 5	4. Evertz backup	▼
Program Select 6	None	▼
Program Select 7	None	▼
Program Select 8	None	▼
Program Select 9	None	▼
Program Select 10	None	▼
Program Select 11	None	▼
Program Select 12	None	▼
Program Select 13	None	▼
Program Select 14	None	▼
Program Select 15	None	▼
Program Select 16	None	▼
Drop PID Select 1	0	(0 to 8192)
Drop PID Select 2	0	(0 to 8192)
Drop PID Select 3	0	(0 to 8192)

Figure 7-5: Program Filtering – WebEASY Interface

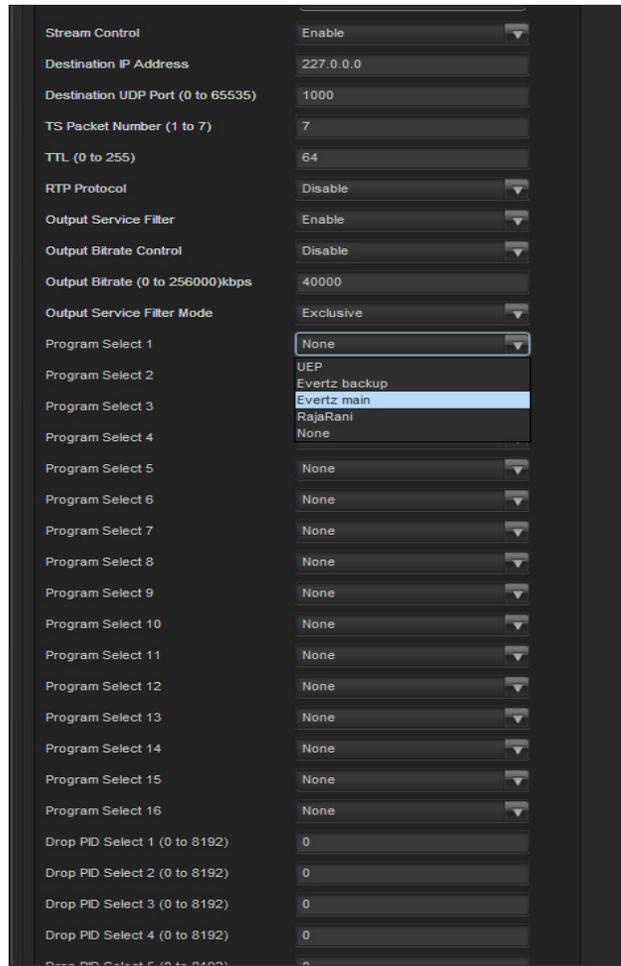


Figure 7-6: Program Filtering – VLPRO Interface

### 6.7 CHANGING THE OUTPUT BITRATE ON ASI/IP OUTPUT

The user can manually lower the ASI/IP bitrate after filtering services to maintain CBR and remove unnecessary null packets while saving bandwidth. To do so, follow the steps below:

- Click on the **Output** tab.
- Enable the **Output Bitrate Control**.
- Set the desired output bitrate in the **Output Bitrate** field. Unit is in kbps.
- Hit **Apply** after entering the values and hit **Refresh** to ensure the values are applied and taken. Both commands are located at the top of the web page.
- Reset the counter and hit **Refresh** to make sure there are no CC errors present.



**Note: Bitrate control is contingent on the service filter.**



**Note:** The user needs to set the bitrate 3-4 Mbps higher than the actual payload in order to accommodate for bitrate fluctuations.

Output Service Filter	Disable	▼
Output Bitrate Control	Disable	▼
Output Bitrate	40,000	(0 to 256000) kbps
Output Service Filter Mode	Exclusive	▼
Program Select 1	2. RajaRani	▼
Program Select 2	None	▼
Program Select 3	None	▼
Program Select 4	None	▼

**Figure 7-7: Bitrate Control– WebEASY Interface**

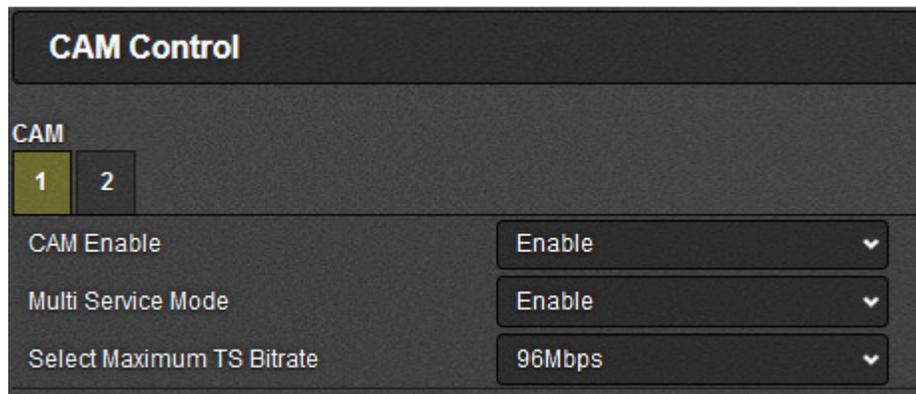
*This page left intentionally blank*

## 8. DESCRAMBLING

### 8.1 CA Descrambling

#### 8.1.1. CAM Control

When user uses descrambling by DVB-CI cam, the user needs to set some initial settings under system page to control the CAM, user need to set the parameters below under system tab



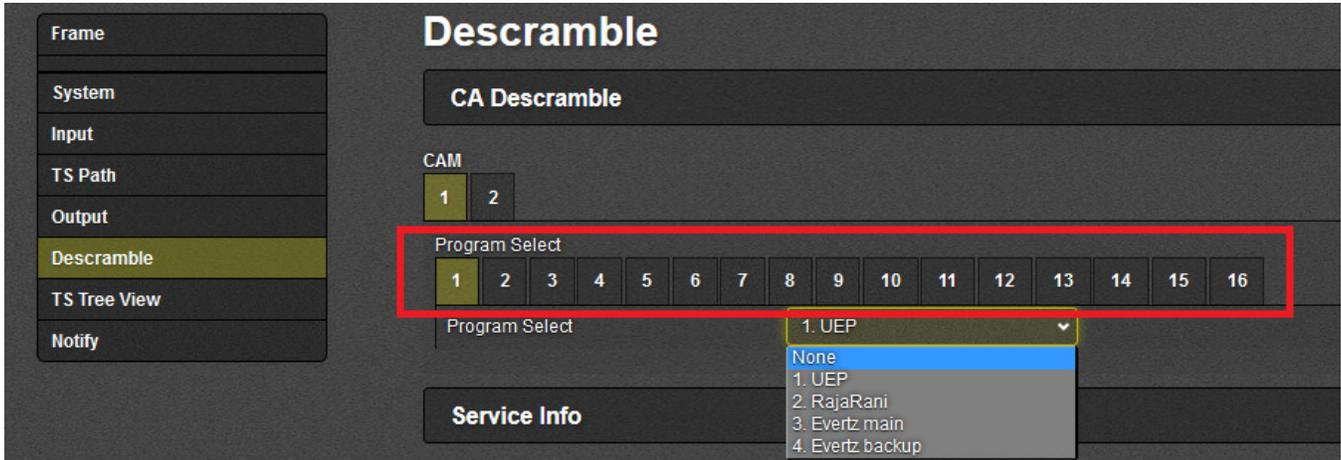
**Figure 8-1: CAM Control – WebEASY Interface**

- **CAM Enable:** This field let the user to enable and disable CAM module
- **Multi Service Mode:** This field let the user to choose the CAM type if it is single service CAM (off) or multi service CAM (On).
- **Select Maximum TS Bitrate:** This field let the user to define the max TS bitrate the CAM can handle, each CAM has different clock rate. This control will allow the right clock to the right TS bitrate and CAM capability.

#### 8.1.2. Descrambling Services

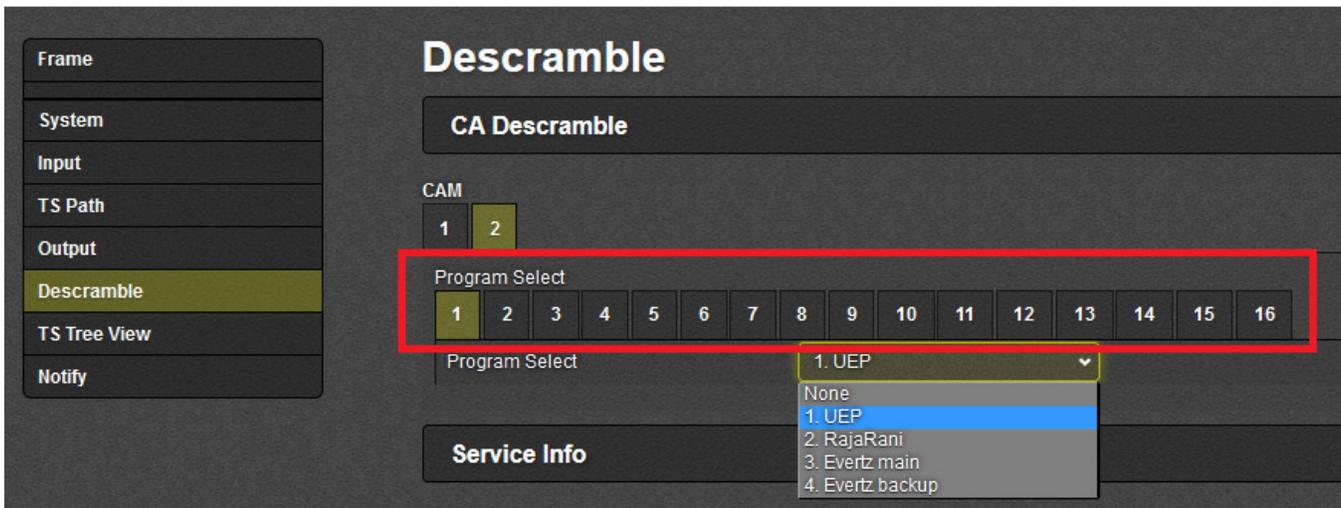
After the initial setup of the CAM in previous section, user can move to descramble page and follow below steps:

- Select a specific service user wants to descramble from a drop down menu under “program select” control. By default all service will be scrambled.
- Hit “Apply” after entering the values and hit “Refresh” to ensure the values are applied and taken. (located at top the page)
- Under “Service info” tab, “Output Encryption” of this service should change from Scrambled to Free. Hit refresh to see the changes
- User can descramble up to 16 programs in each CAM, if CAM module supports it.



**Figure 8-2: Descramble – CAM 1 – WebEASY Interface**

The same controls are available for the second CAM, use the second tab to access them.



**Figure 8-3: Descramble – CAM 2 – WebEASY Interface**

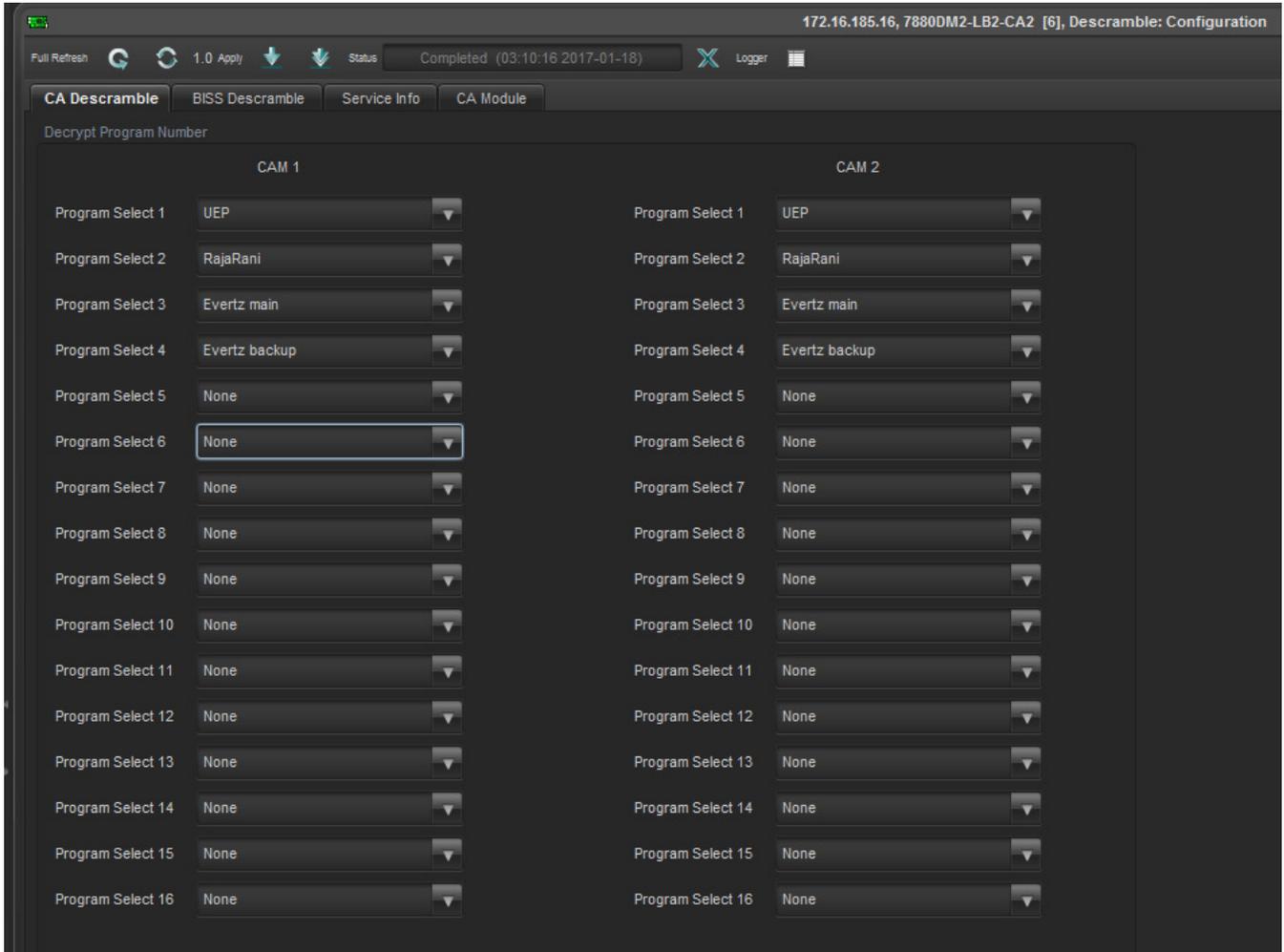


Figure 8-4: Descramble - CAM 1 & 2 - VLPRO Interface

### 8.1.3. Service Info

This section provide information about services in the TS

**Service ID:** Retrieve service ID of each program in received transport stream.

**Service Name:** Retrieve name of each program in received transport stream.

**PMT ID:** Retrieve PMT ID of each program in received transport stream.

**Service Provide:** Retrieve service provider name of each program in received transport stream.

**Input CA Encryption:** Retrieve the CA encryption state of each program in received transport stream

**Input BISS Encryption:** Retrieve the BISS encryption state of each program in received transport stream.

**Output Encryption:** Retrieve the output encryption status.

**Service Info**

TS Input

1 2

Program

1 2 3 4 5 6 7 goto tab

Service ID	1
Service Name	UEP
PMT ID	100
Service Provider	Evertz
Input CA Encrytion	Encrypt
Input BISS Encrytion	Free
Output Encrytion	Encrypt

Figure 8-5: : Service Info tab 1 – WebEASY Interface

**Service Info**

TS Input

1 2

Program

1 2 3 4 5 6 7 goto tab

Service ID	? 1
Service Name	? UEP
PMT ID	? 100
Service Provider	? Evertz
Input CA Encrytion	? Encrypt
Input BISS Encrytion	? Free
Output Encrytion	? Encrypt

Figure 8-6: Service Info tab 2 – WebEASY Interface

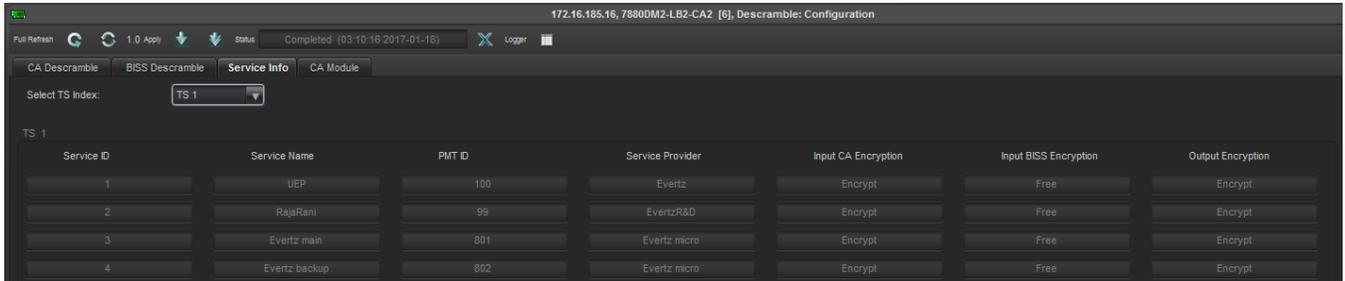


Figure 8-7: Service Info tab 1 – VLPRO Interface

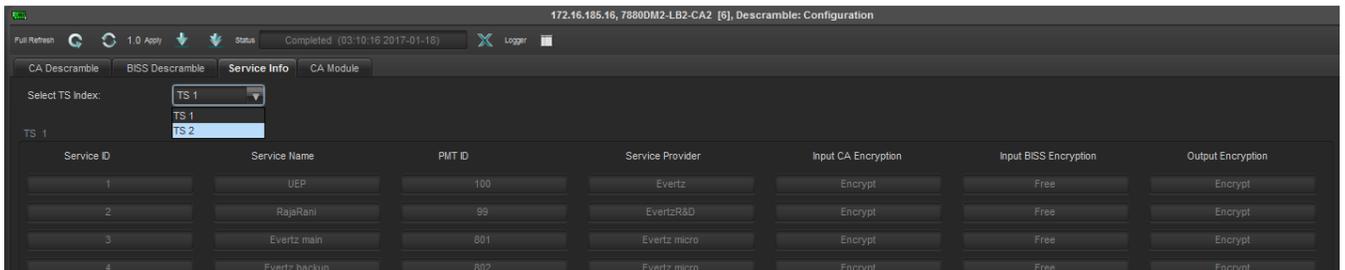


Figure 8-8: Service Info choosing TS 2 – VLPRO Interface

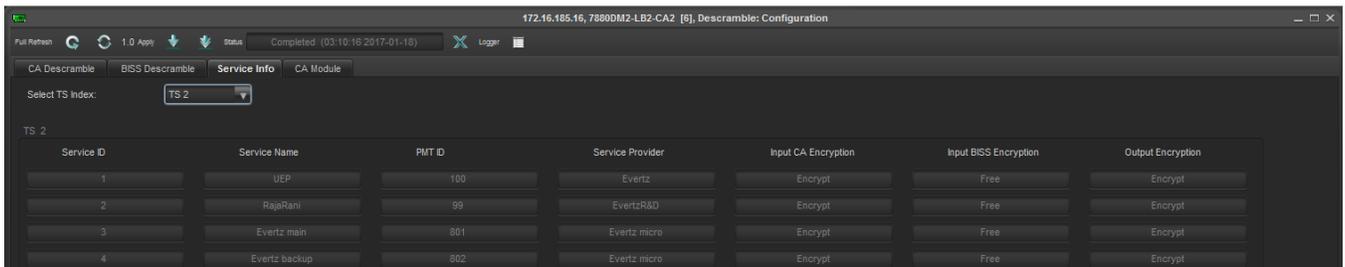


Figure 8-9: Service Info TS2 – VLPRO Interface

#### 8.1.4. CAM Health

To Check for CAM health status:

- User needs to navigate to “Descramble” page
- Navigate to “CA Module” tab
- To navigate between different CAM module, click on tabs one and two for CAM one and two.

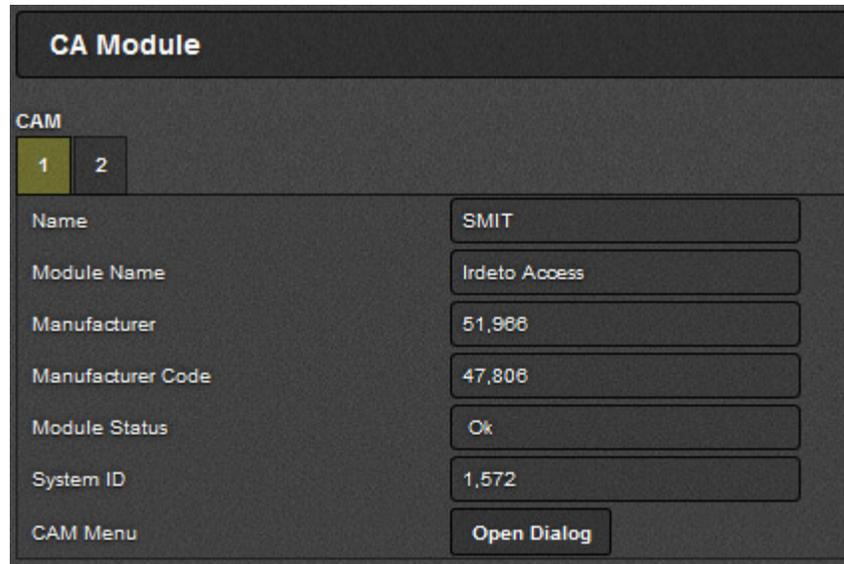


Figure 8-10: CA Module Health – WEBEASY INTERFACE

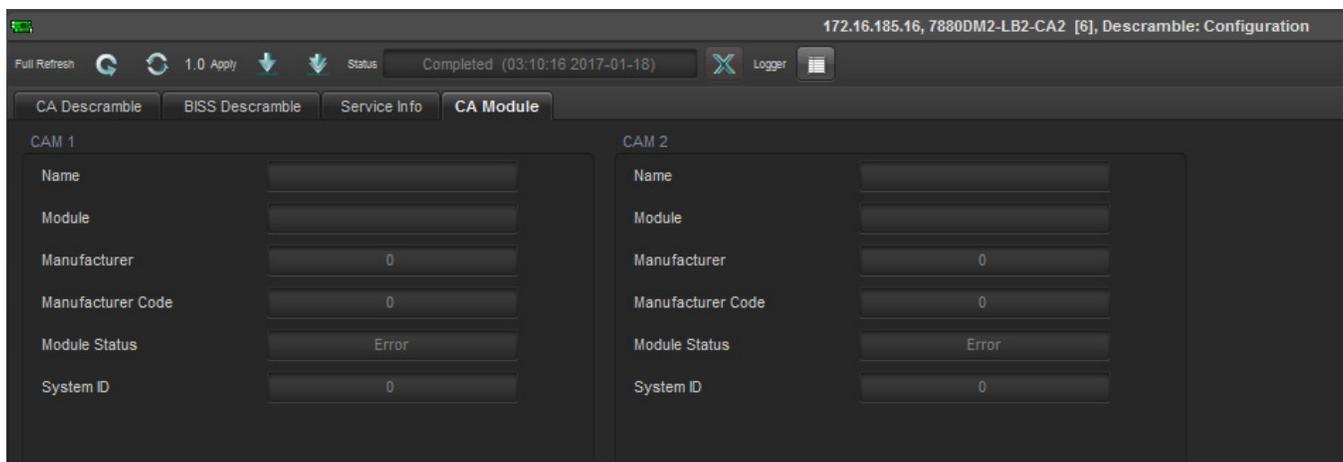


Figure 8-11: CA Module Health – WEBEASY INTERFACE

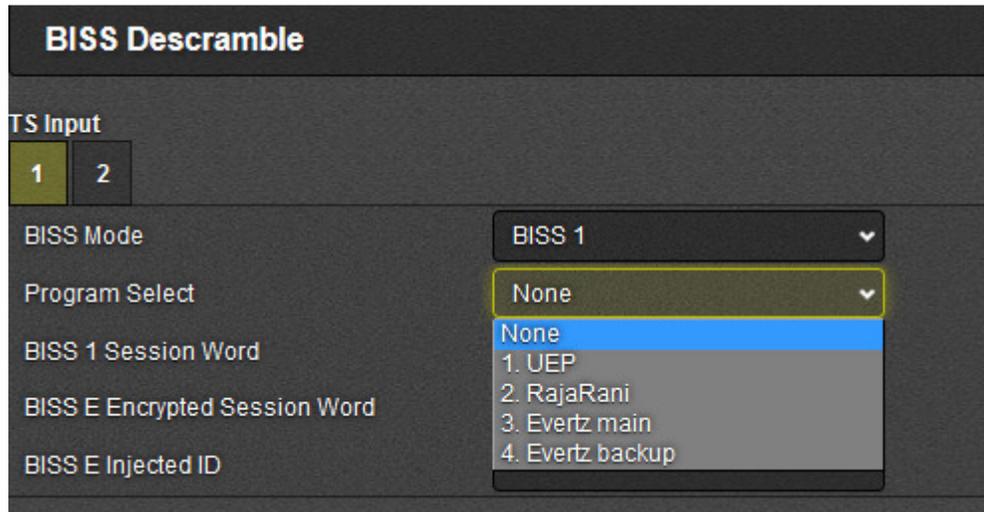
## 8.2. BISS DESCRAMBLING (+DBISS OPTION)

When DBISS option is enabled, the demodulator will provide BISS 1 and BISS E descrambling capabilities.

User can manually choose which service in each of the TS to descramble by follow the below steps:

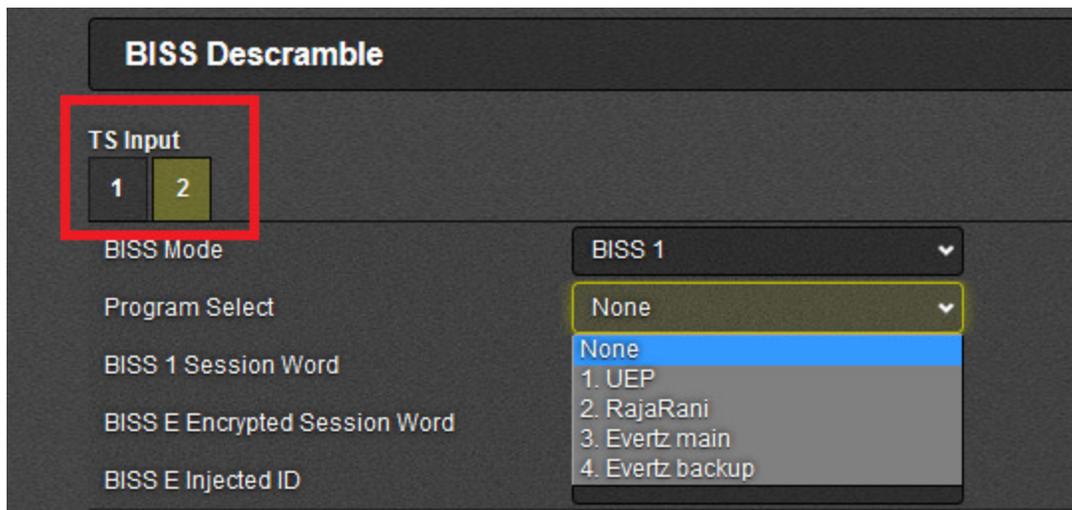
- Click on “Descramble” page
- Scroll down to “ BISS Descramble “
- Enable “BISS Mode” to BISS 1 or BISS-E
- Select a program from drop down list to be descrambled
  - When BISS 1 is enabled, enter password in “BISS 1 Session Word” control

- When BISS E is enabled, enter password in “BISS E Encrypted Session Word” control and also enter ”BISS E Injected ID “control
- Hit “Apply” after entering the values and hit “Refresh” to ensure the values are applied and taken. (located at top the page)



**Figure 8-12: BISS Descramble – Tab 1 – WEBEASY INTERFACE**

- User can choose one program per TS to be descrambled
- To navigate between different TS, click on tabs 1-4



**Figure 8-13: BISS Descramble – Tab 2– WEBEASY INTERFACE**

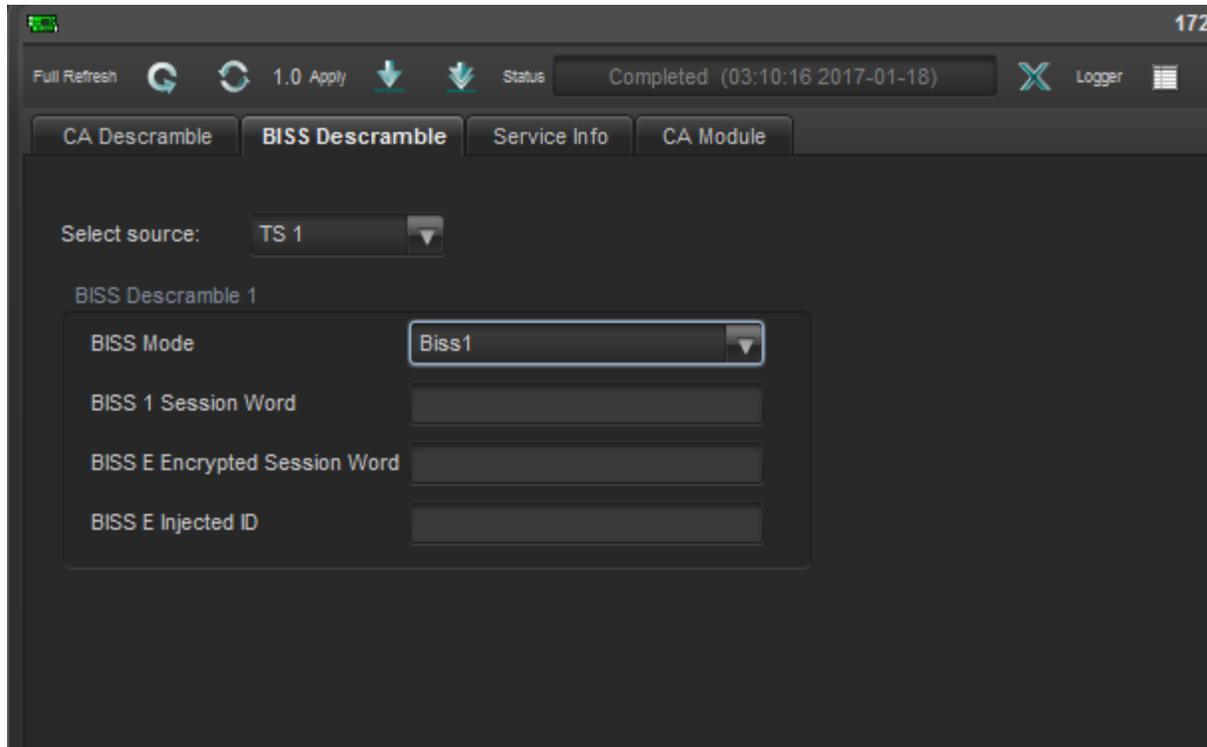


Figure 8-14: BISS Descramble – TS 1 – WEBEASY INTERFACE

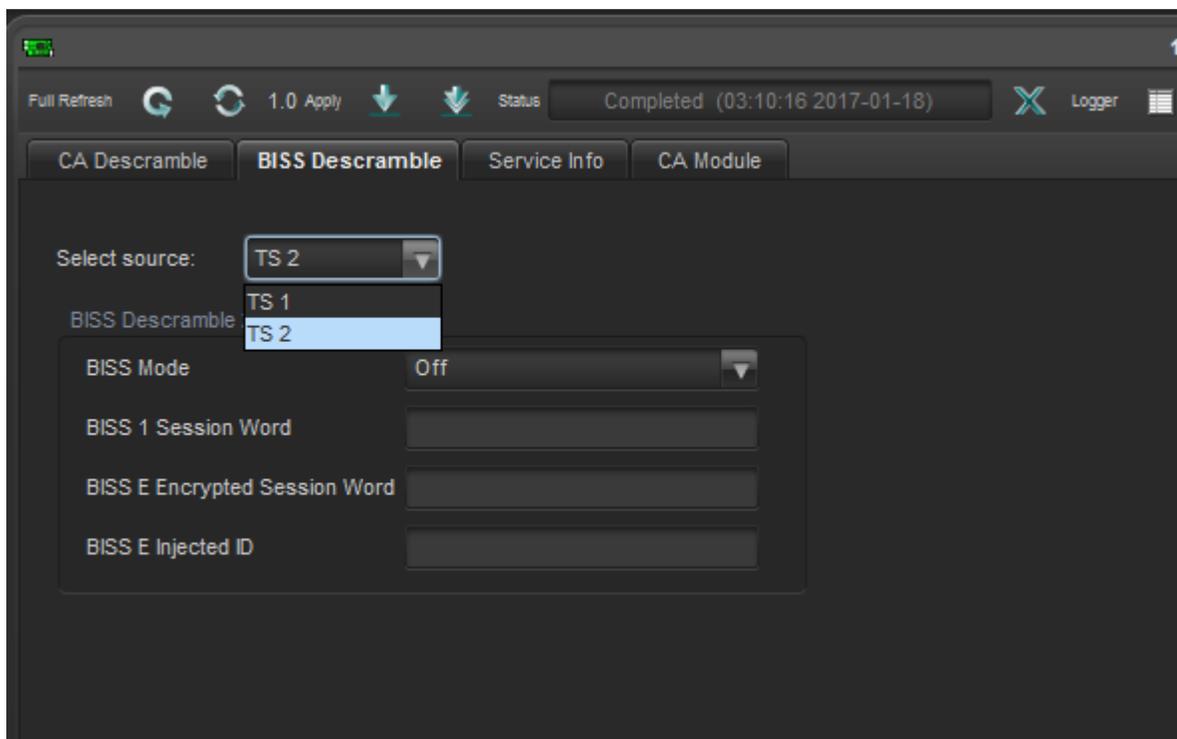


Figure 8-15: BISS Descramble – choosing TS 2 – WEBEASY INTERFACE

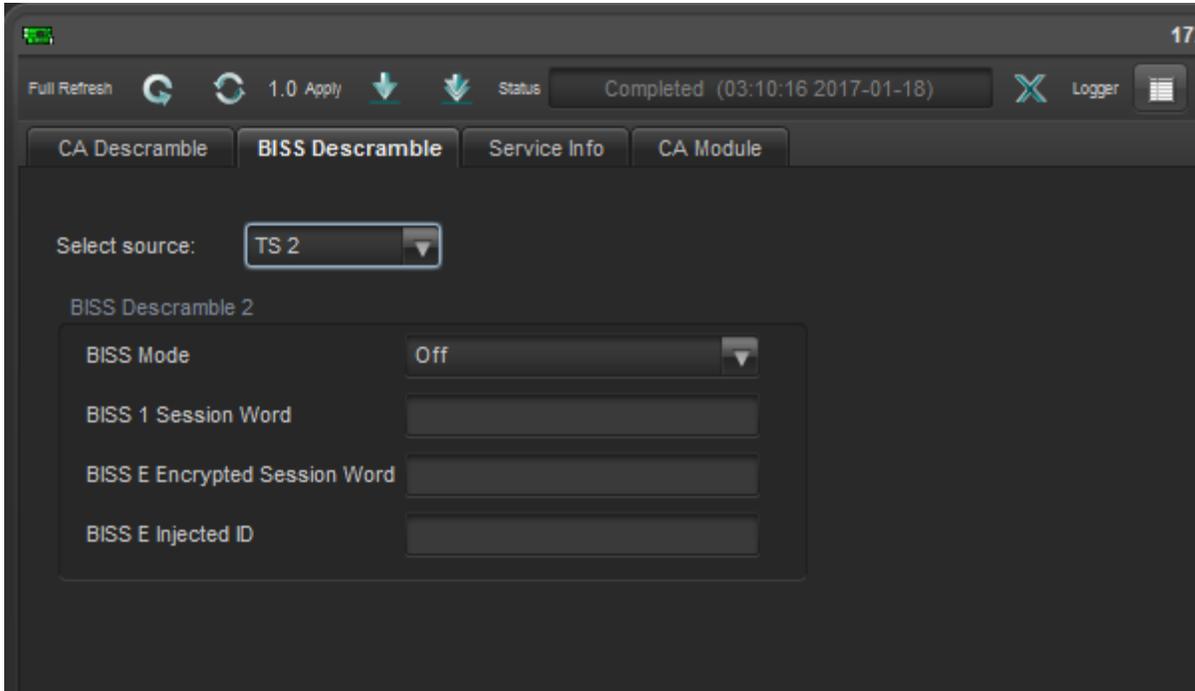


Figure 8-16: BISS Descramble – TS 2 – WEBEASY INTERFACE



**Control Hints:** Control hits are available for every control. Press the “?” button at the bottom right corner of every page to enable control hits for parameters on that page. When “?” is pressed another “?” will appear beside every control. Just hover over the “?” and user can read the description of that control.

## 6.8 TS SERVICE TREE VIEW

When a valid input is present, the user can navigate to the **Services** tab to view the incoming programs on the source TS.

The user can view the **TS Service Tree** by following the steps below:

1. Navigate to the **TS Tree View** tab.
2. Click on the service names to get a tree view of all the elementary components and PID values.
3. To navigate between different TS, click on tabs one to four.



Figure 8-17: TS Tree View – Tab 1

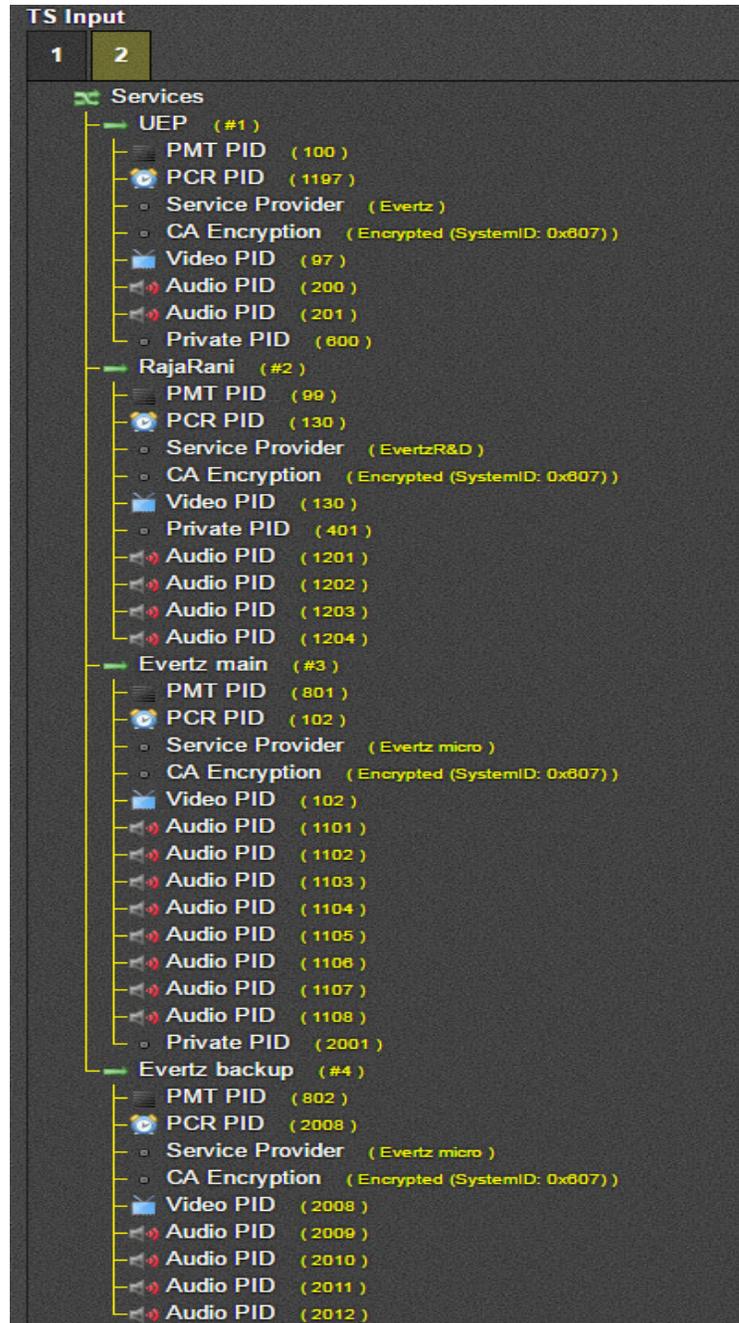


Figure 8-18: TS Tree View – Tab 2



Note: The TS Treeview feature is not available in VLPRO.

*This page left intentionally blank*

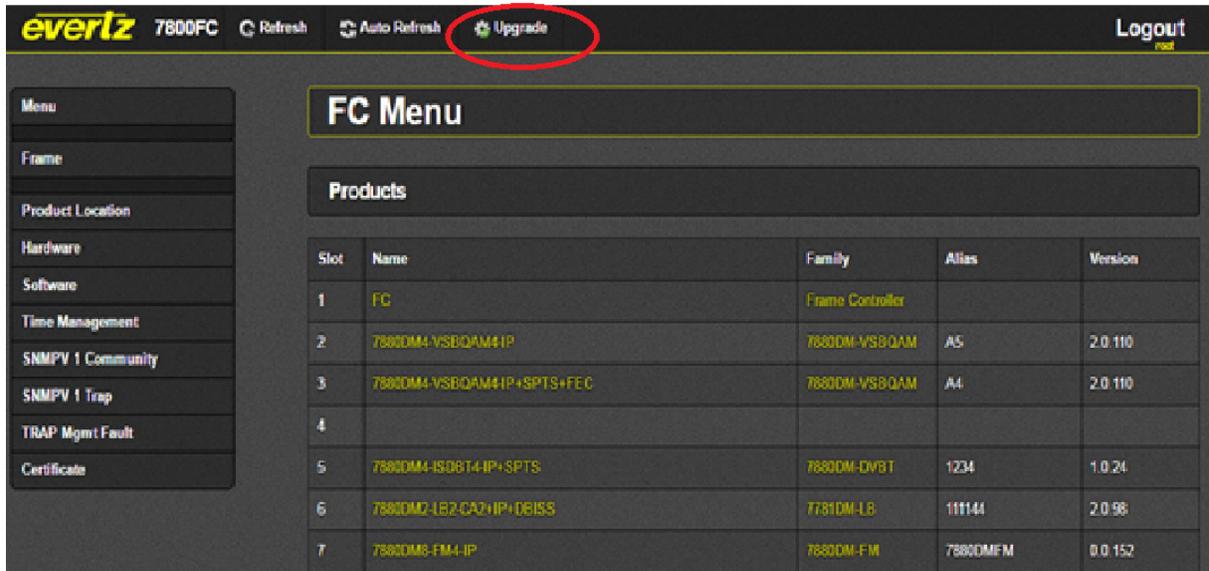
## 7 UPGRADE PROCEDURES

### 7.1 UPGRADING USING WEBEASY



**Note:** The instructions below show how to upgrade only one 7880DM installed in slot 6 of a 3RU chassis.

1. Click on the Upgrade button, shown in red in Figure 7-1.



**Figure 7-1: WebEASY Upgrade**

2. Mark the check box beside the 7880DM, marked as A in Figure 7-2.
3. Click **Browse**, marked as B in Figure 7-2, to find the image needed for the upgrade. The suffix should be in this format: "\*\*\*\*\*.tar.gz".
4. Click Upgrade, marked as C in Figure 7-2.

Slot	Upgrade	Name	Alias	Current Version	Progress
1	Upgrade	Frame Controller			
2	<input type="checkbox"/>	7880DM4-VSBQAM4-IP	A5	2.0.110	<input type="text"/>
3	<input type="checkbox"/>	7880DM4-VSBQAM4-IP+SPTS+FEC	A4	2.0.110	<input type="text"/>
4		Not Available		0.0.0	<input type="text"/>
5	<input type="checkbox"/>	7880DM4-ISDBT4-IP+SPTS	1234	1.0.24	<input type="text"/>
6	<input checked="" type="checkbox"/>	7880DM2-LB2-CA2+IP+DBISS	111144	2.0.98	<input type="text"/>
7	<input type="checkbox"/>	7880DM8-FM4-IP	7880DMFM	0.0.152	<input type="text"/>
8	<input type="checkbox"/>	7881IRD+88422+10B422+AAC+DD+DBISS+SCTE104+IP+FSE+HDC	0123	1.2.560	<input type="text"/>
9		7781DM-LB-SLAVE		1.0.170	<input type="text"/>
10		Not Available		0.0.0	<input type="text"/>
11		Not Available		0.0.0	<input type="text"/>
12		Not Available		0.0.0	<input type="text"/>
13		Not Available		0.0.0	<input type="text"/>
14		Not Available		0.0.0	<input type="text"/>
15		Not Available		0.0.0	<input type="text"/>

Firmware  781DM-LB-...407.tar.gz

Figure 7-2: WebEASY Upgrade – Selecting the 7880DM

6	<input checked="" type="checkbox"/>	7880DM2-LB2-CA2+IP+DBISS	111144	2.0.98	<input type="button" value="Completed"/>
---	-------------------------------------	--------------------------	--------	--------	--

Figure 7-3: WebEASY – Completion Indicator

- The unit will reboot itself once the upgrade is finished.



**Note: Wait for the unit to reboot and show up in the tree. Hitting Refresh will display the latest status.**

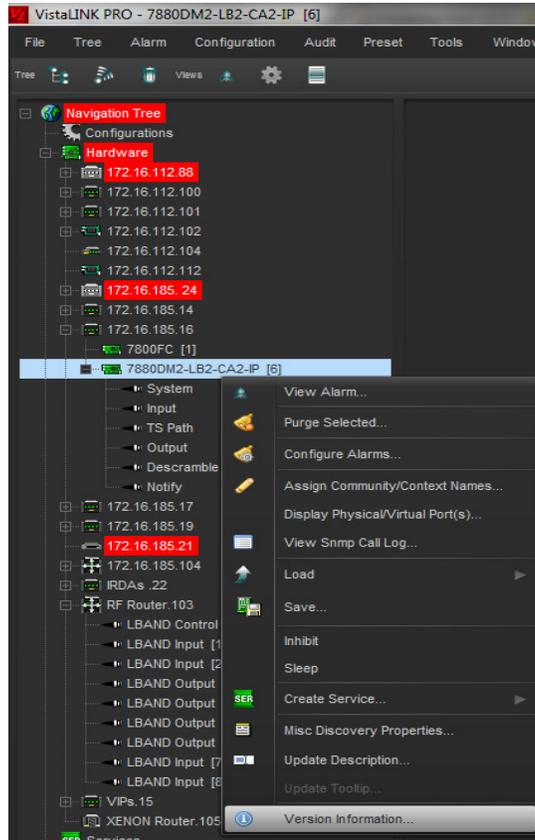
- To verify the update and ensure the versions are applied, the user can check the Frame page, as shown in Figure 7-4.

Menu		FC Menu				
Frame		Products				
Product Location		Slot	Name	Family	Alias	Version
Hardware		1	FC	Frame Controller		
Software		2	7880DM4-VSBQAM4-IP	7880DM-VSBQAM	A5	2.0.110
Time Management		3	7880DM4-VSBQAM4-IP+SPTS+FEC	7880DM-VSBQAM	A4	2.0.110
SNMPV 1 Community		4				
SNMPV 1 Trap		5	7880DM4-ISDBT4-IP+SPTS	7880DM-DVBT	1234	1.0.24
TRAP Mgmt Fault		6	7880DM2-LB2-CA2-IP+RF2+LNB2+HP1+ASI2	7781DM-LB		1.0.78
Certificate		7	7880DM8-FM4-IP	7880DM-FM	7880DMFM	0.0.152
		8	7881IRD+8B422+10B422+AAC+DD+DBISS+SCTE 104+IP+FSE+HDC	7881IRD	0123	1.2.560
		9	7781DM-LB-SLAVE	7781DM-LB-SLAVE		1.0.170
		10				
		11				
		12				
		13				
		14				
		15				

Figure 7-4: WebEASY – Verifying Firmware Upgrade

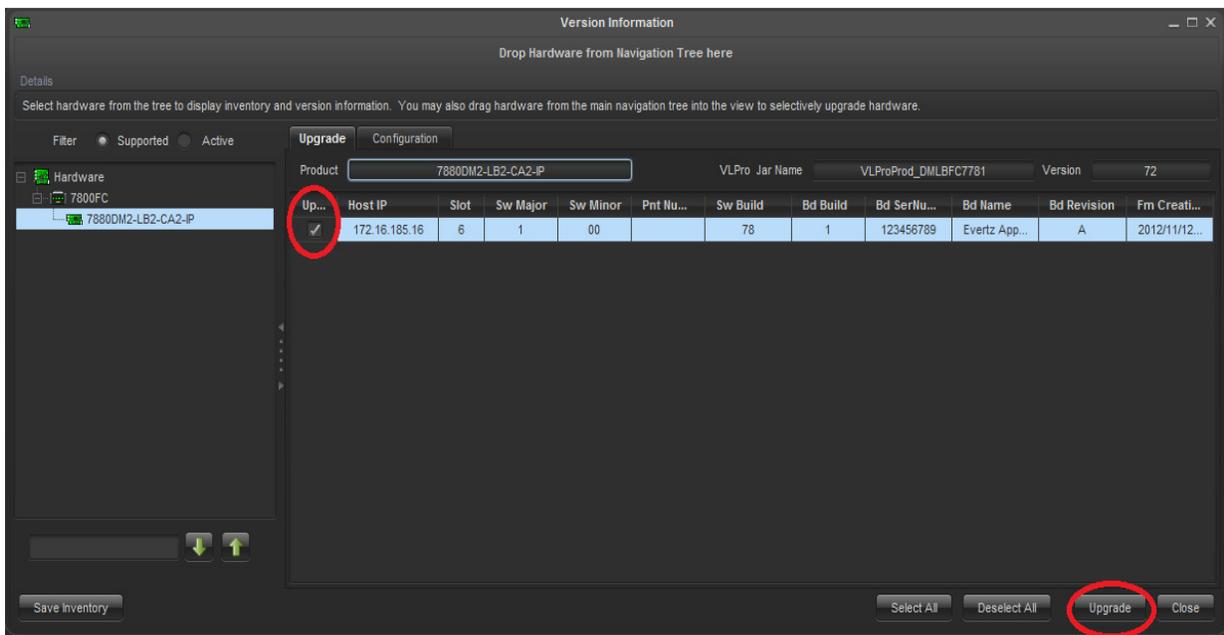
## 7.2 UPGRADING USING VLPRO

1. Begin with selecting the **Hardware** tab. Select the local network being used with the demodulator. Right click on the demodulator and select **Version Information**.



**Figure 7-5: VLPRO – Version Information**

2. Mark the box beside the demodulator and click the **Upgrade** button.



**Figure 7-6: VLPRO – Upgrading Procedures**

3. Click on the **Browse** button to select the required firmware.

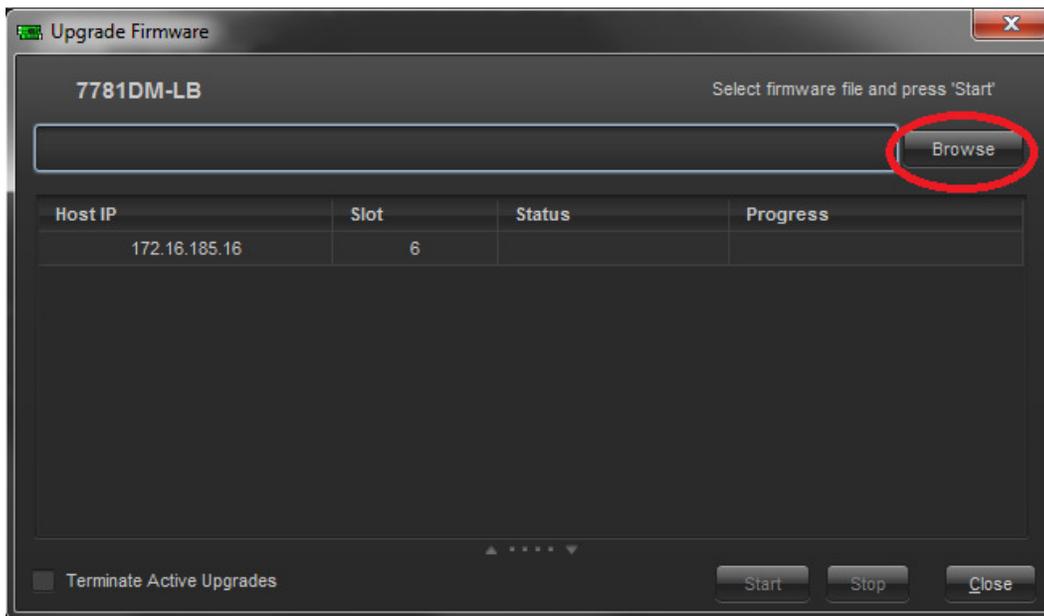


Figure 7-7: VLPRO – Browse for Firmware

4. When the firmware is chosen, click the **Start** button to begin the upgrade.

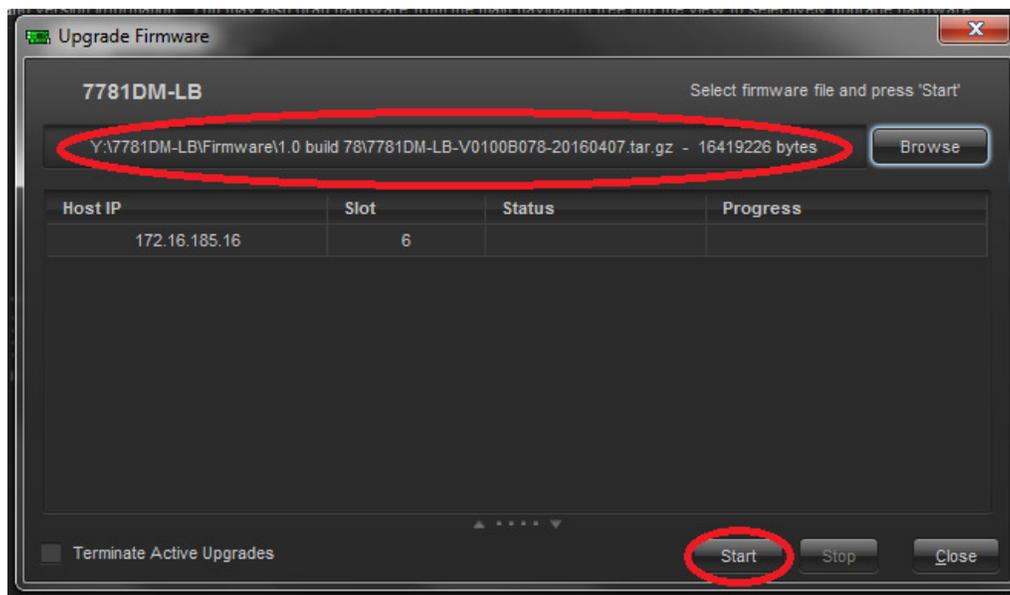
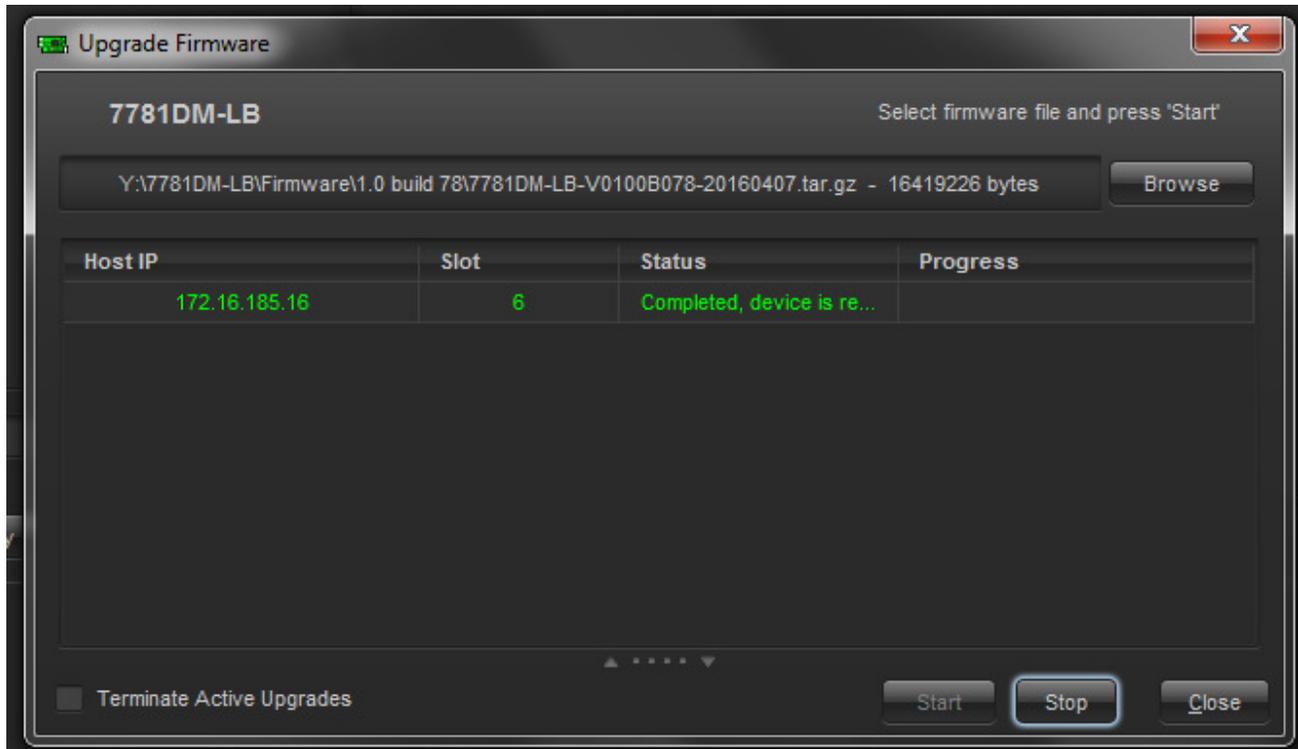


Figure 7-8: VLPRO – Upgrade Firmware

5. Once the upgrade is complete, the window will appear similar to Figure 7-9. Hit the **Stop** and then **Close** button. Repeat Step 1 to ensure the upgrade is successful.



**Figure 7-9: VLPRO – Upgrade Complete**

### 8 PRODUCT LICENSE UPGRADE

#### 8.1 WEBEASY PRODUCT LICENSE INSTALLATION

To add a License Key to the product using WebEASY, follow the steps below:

1. In the System tab, scroll down to **Product License**.
2. Check the **Product Serial Number** on the webpage to see if it matches the file name of the license, as shown in the example below.

“ABC\_**123456789**-7880DM-21-06-2016-12-05-55-small.key”

The screenshot shows the 'System' configuration page in WebEASY. The 'Product License' section is highlighted, showing a 'License File' field with a 'Choose File' button and 'No file chosen' text, and an 'Upload' button. The 'Product Serial Number' field contains the value '123456789', which is circled in red. Other sections visible include 'System' (with 'Reboot' and 'Factory Reset' buttons), 'Data Port' (with IP Address, Netmask, Gateway, UDP Port, and Total Output Throughput fields), 'CAM Control' (with 'CAM' tabs and 'CAM Enable', 'Multi Service Mode', and 'Select Maximum TS Bitrate' dropdowns), and 'Preset' (with 'Preset Name' field and 'Preset Store'/'Preset Recall' buttons). The 'Product Features Supported' section shows 'Prod Feature' tabs and 'Product Feature Name'/'Product Feature Support' fields.

Figure 8-1: WebEASY – License Key

3. Click **Browse** to locate the license file, and hit **Upload**.
4. Change between pages and return to the **System** page. Check under the Product Features Supported section to see if the license has been enabled.

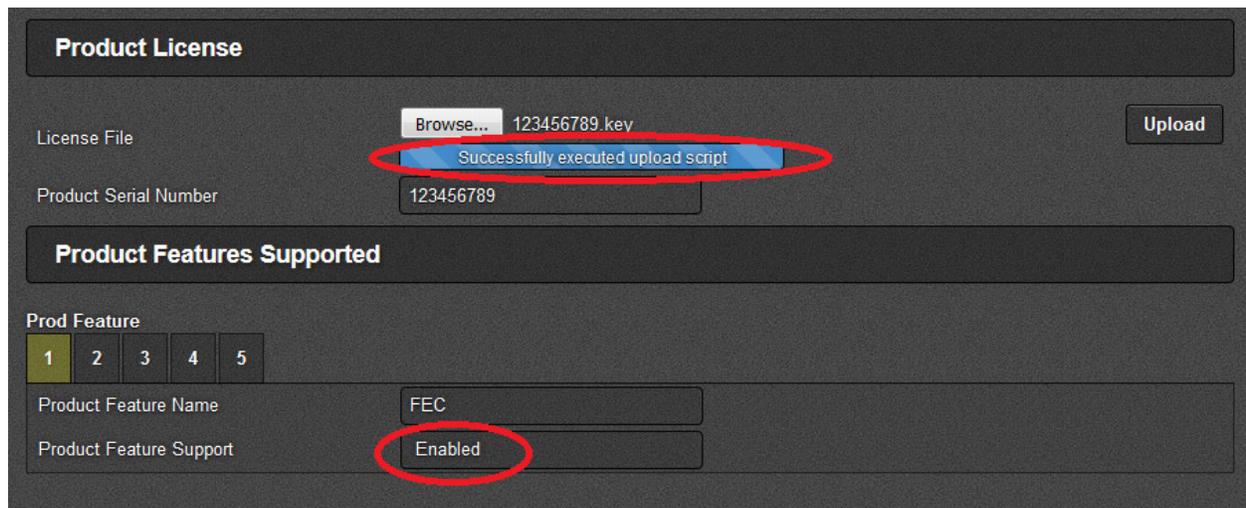


Figure 8-2: WebEASY – Enabled Product Feature

## 8.2 VLPRO PRODUCT LICENSE INSTALLATION

To add a License Key to the product using VLPRO, follow the steps below:

1. Open the 7880DM configuration and right on the **System** tab. Hit **View Configuration**.

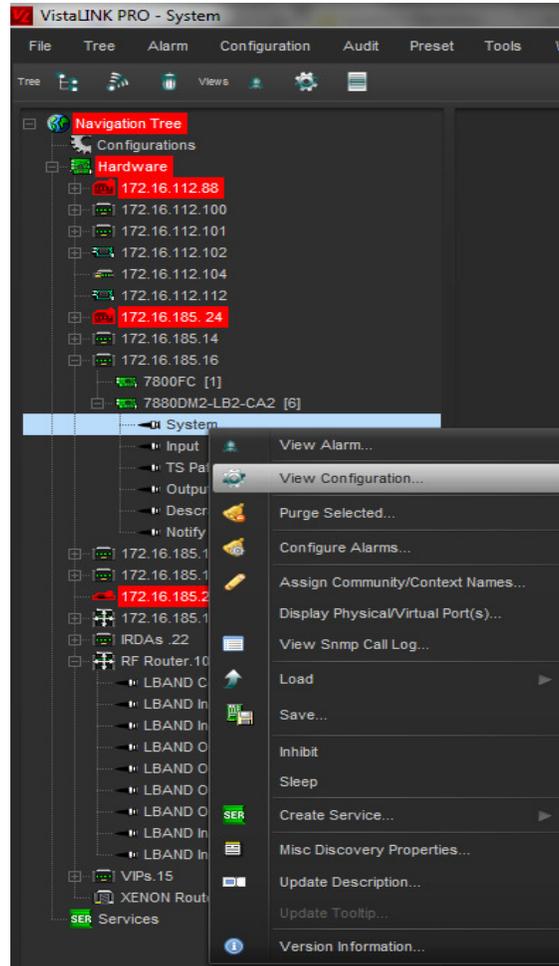
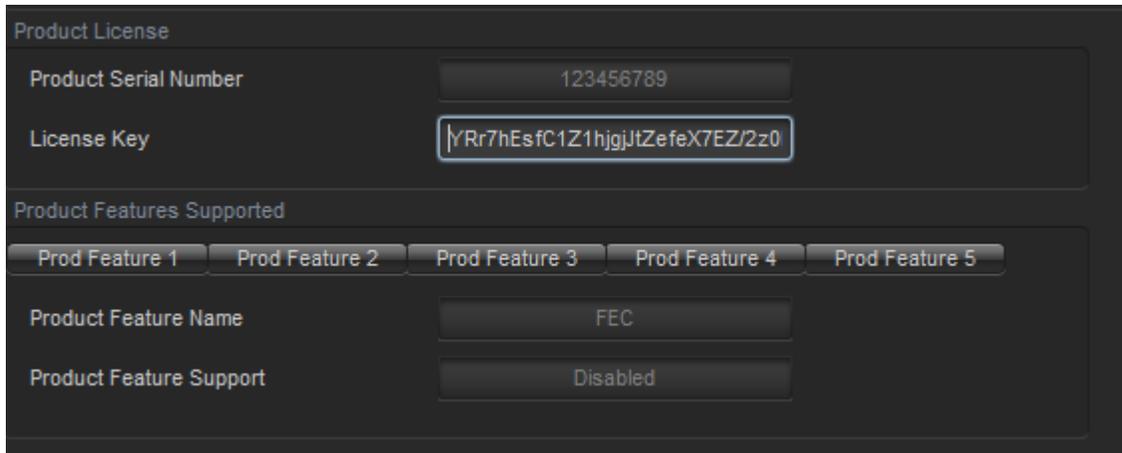


Figure 8-3: VLPRO – Set Up License Key

2. In the **Product License** tab, copy and paste the license in the **License Key** field.
3. The user **MUST** only copy the characters/letters inside the quotations of the license. (Shown in red).

```
{"license": "YRr7hEsfC1Z1hjgJtZefeX7EZ/2z0Kdn0UaPt/PNaGDcx0gvm9zQkslksYcq9QGZ0uA89t  
GOsbxquoqqBBci9YVMUXtFIJsX/lxJCLh2KEjsW1JjBZYTP2AZHAIQIC"}
```



Product License

Product Serial Number: 123456789

License Key: YRr7hEsfc1Z1hjgjJtZefeX7EZ/2z0

Product Features Supported

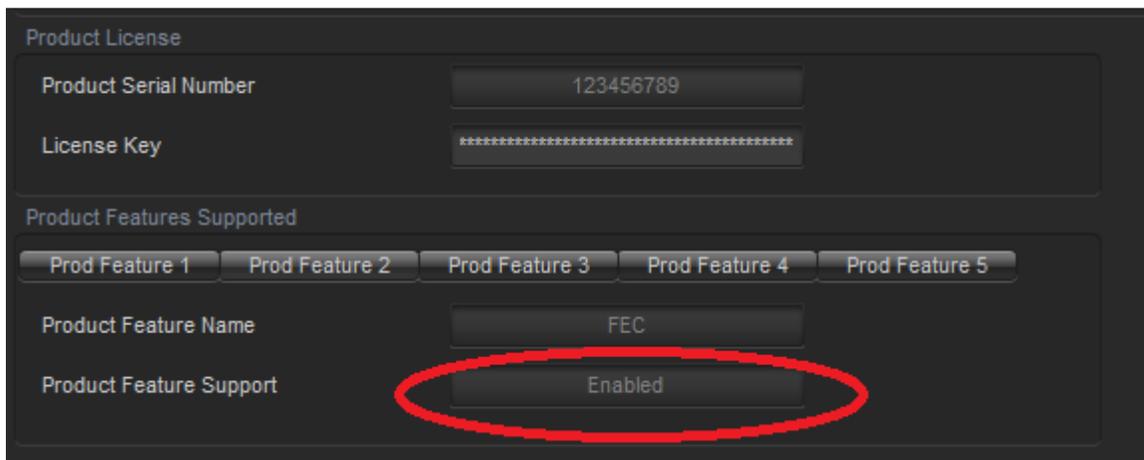
Prod Feature 1 | Prod Feature 2 | Prod Feature 3 | Prod Feature 4 | Prod Feature 5

Product Feature Name: FEC

Product Feature Support: Disabled

**Figure 8-4: VLPRO – Activating License Key**

4. Hit **Apply** and **Refresh**. The **Product Feature Support** should now be enabled.



Product License

Product Serial Number: 123456789

License Key: \*\*\*\*\*

Product Features Supported

Prod Feature 1 | Prod Feature 2 | Prod Feature 3 | Prod Feature 4 | Prod Feature 5

Product Feature Name: FEC

Product Feature Support: Enabled

**Figure 8-5: VLPRO – Enabled License Key**

## 9 MINIMUM ES/NO RATIO REQUIRED FOR EACH OF MODULATION & FEC SCHEMES

Table below summarizes performance requirements at QEF over AWGN ( $E_s$ = average energy per transmitted symbol). Ideal  $E_s/N_0$  (dB) is the figure achieved by computer simulation, 50 LDPC fixed point decoding iterations (see annex G), perfect carrier and synchronization recovery, no phase noise, AWGN channel. For short FECFRAMEs an additional degradation of 0.2 dB to 0.3 dB has to be taken into account. For calculating link budgets, specific satellite channel impairments should be taken into account.

PER is the ratio between the useful transport stream packets (188 bytes) correctly received and affected by errors, after forward error correction.

Mode	Spectral efficiency	Ideal $E_s/N_0$ (dB) for FECFRAME length = 64 800
QPSK 1/4	0,490243	-2,35
QPSK 1/3	0,656448	-1,24
QPSK 2/5	0,789412	-0,30
QPSK 1/2	0,988858	1,00
QPSK 3/5	1,188304	2,23
QPSK 2/3	1,322253	3,10
QPSK 3/4	1,487473	4,03
QPSK 4/5	1,587196	4,68
QPSK 5/6	1,654663	5,18
QPSK 8/9	1,766451	6,20
QPSK 9/10	1,788612	6,42
8PSK 3/5	1,779991	5,50
8PSK 2/3	1,980636	6,62
8PSK 3/4	2,228124	7,91
8PSK 5/6	2,478562	9,35
8PSK 8/9	2,646012	10,69
8PSK 9/10	2,679207	10,98
16APSK 2/3	2,637201	8,97
16APSK 3/4	2,966728	10,21
16APSK 4/5	3,165623	11,03
16APSK 5/6	3,300184	11,61
16APSK 8/9	3,523143	12,89
16APSK 9/10	3,567342	13,13
32APSK 3/4	3,703295	12,73
32APSK 4/5	3,951571	13,64
32APSK 5/6	4,119540	14,28
32APSK 8/9	4,397854	15,69
32APSK 9/10	4,453027	16,05
NOTE: Given the system spectral efficiency $\eta_{tot}$ the ratio between the energy per information bit and single sided noise power spectral density $E_b/N_0 = E_s/N_0 - 10\log_{10}(\eta_{tot})$		

**Table 13: Es/No performance at Quasi Error Free PER = 10<sup>-7</sup>(AWGN channel)**

Spectral efficiencies (per unit symbol rate) are computed for normal FECFRAME length and no pilots.



**Note: this section is reference from Table 13 in ETSI EN 302 307 v1.1.1 (2005-03)**