Quantum XL Hardware and Reference Manual

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Prodys
PROCESAMIENTO DIGITAL Y SISTEMAS, S.L.

Quantum XL HW Manual

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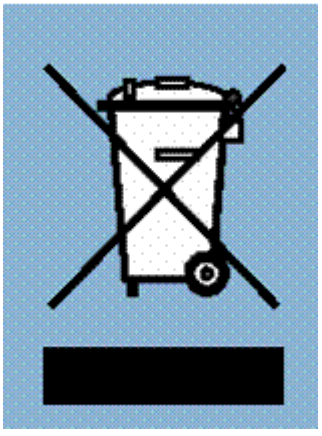
CE Declaration of Compliance

Procesamiento Digital y Sistemas S.L., hereby declares that Quantum XL bearing the CE168X parking are in compliance with Electromagnetic Compatibility Directive (2004/108/EEC), and the Low Voltage Directive (2006/95/EEC) of the European Union.

A "Declaration of conformity" for Quantum XL is available on file at Prodys offices in Spain. To obtain this information, contact with sales@prodys.net.

CAUTION

Quantum XL uses a Lithium battery.
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturers' instructions.



Your product is designed and manufactured with high quality materials and components, which can be recycled and reused.

When this crossed-out wheeled bin symbol with black bar underneath is attached to a product it means that product is covered by the European Directive 2002/96/EC.

Please, inform yourself about the local separate collection system for electrical and electronic products.

Please act according to your local rules and do not dispose of your old products with your normal household waste. The correct disposal of your old product will help prevent potential negative consequences for the environment and human health.

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Chapter I

INTRODUCTION

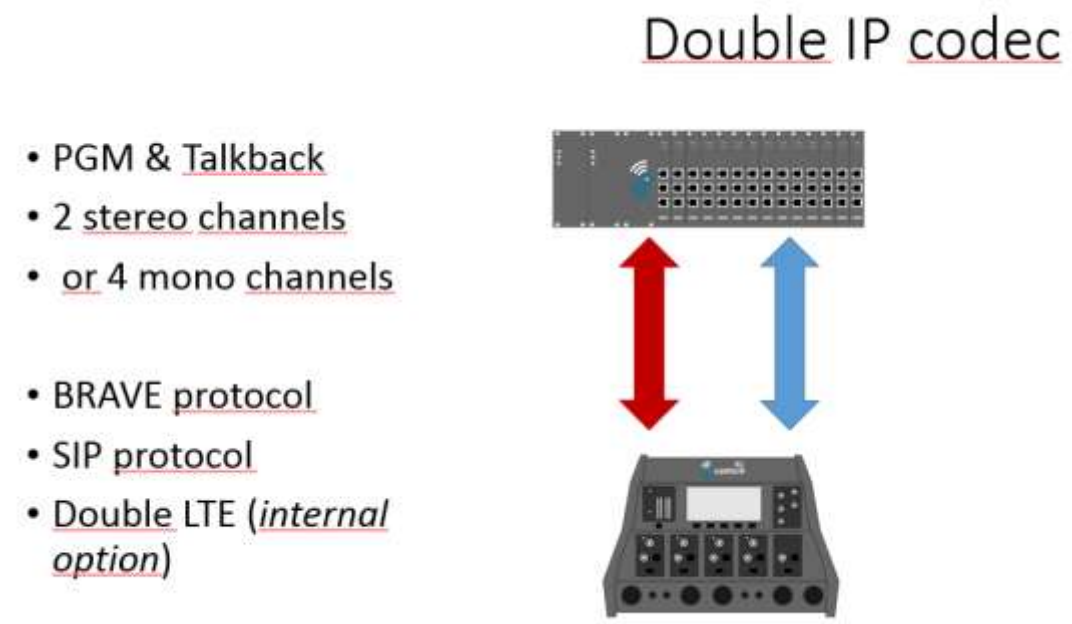
Quantum XL is a powerful portable IP audio codec and commentary position for maximum 4 audio reporters.

BRAVE protocol supports several IP links between the codecs assuring a highly reliable audio connection with the master control room.

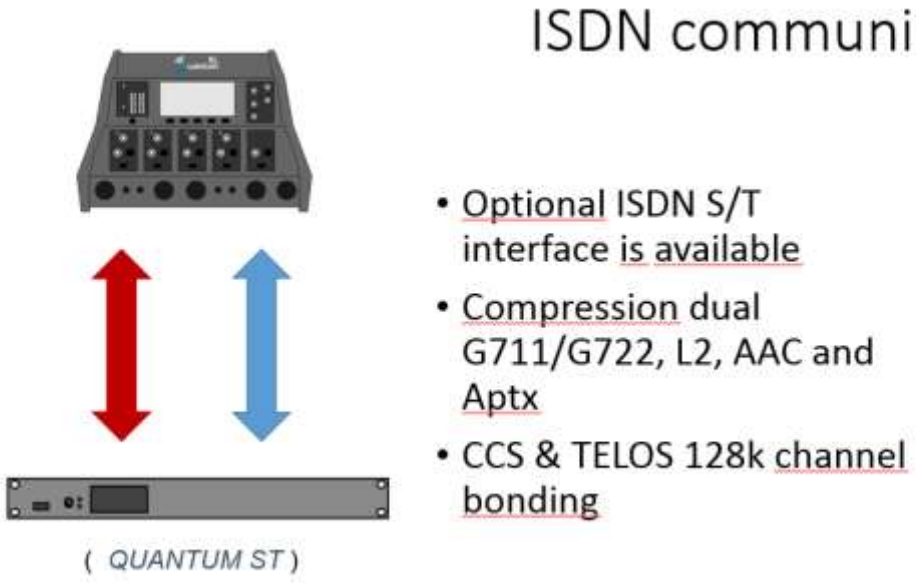
4x mic/line mono inputs +1 line/International Sound input + 1 Stereo USB input/output) are available to be mixed, encoded and streamed in Stereo mode.

Several application scenarios might be possible with Quantum XL:

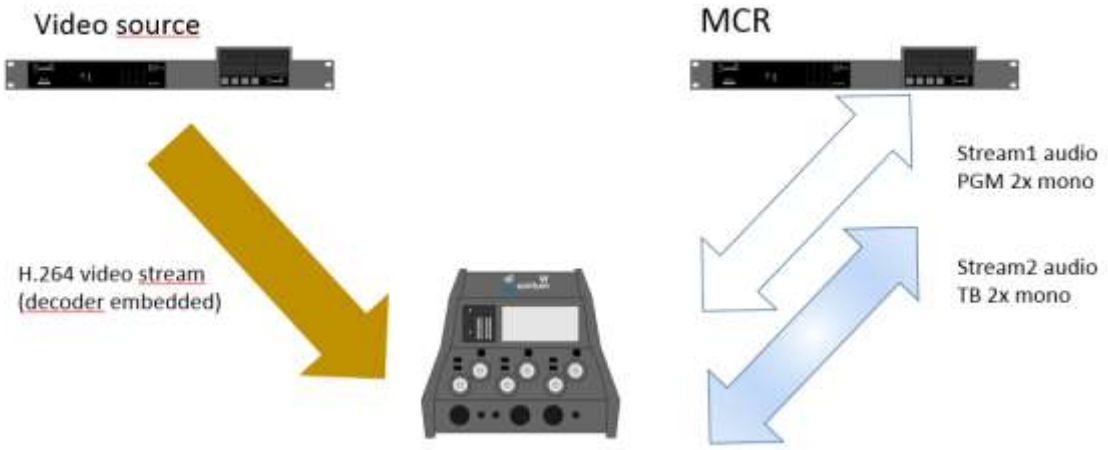
I.1 Double IP audio codec over SIP or BRAVE



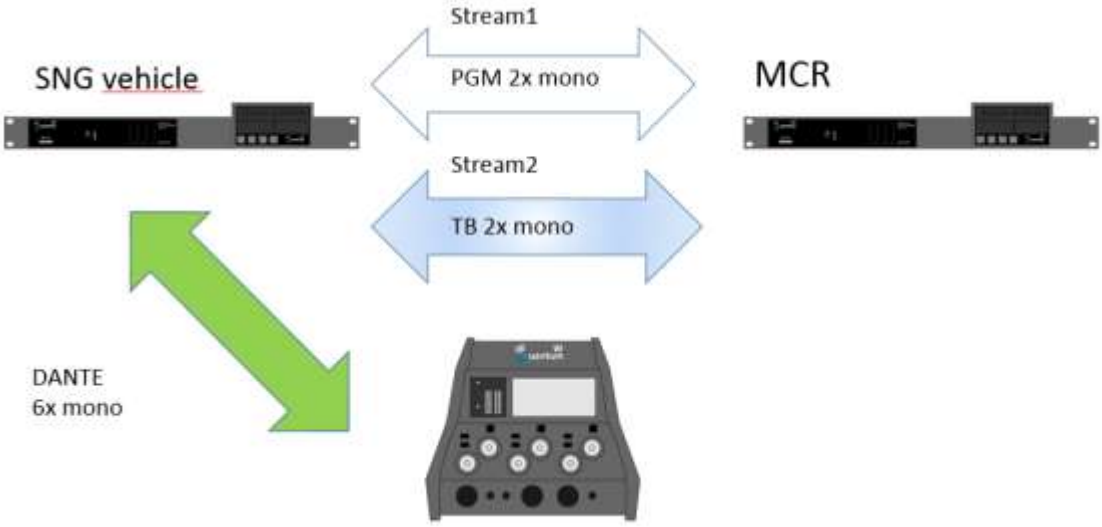
I.2 ISDN audio codec



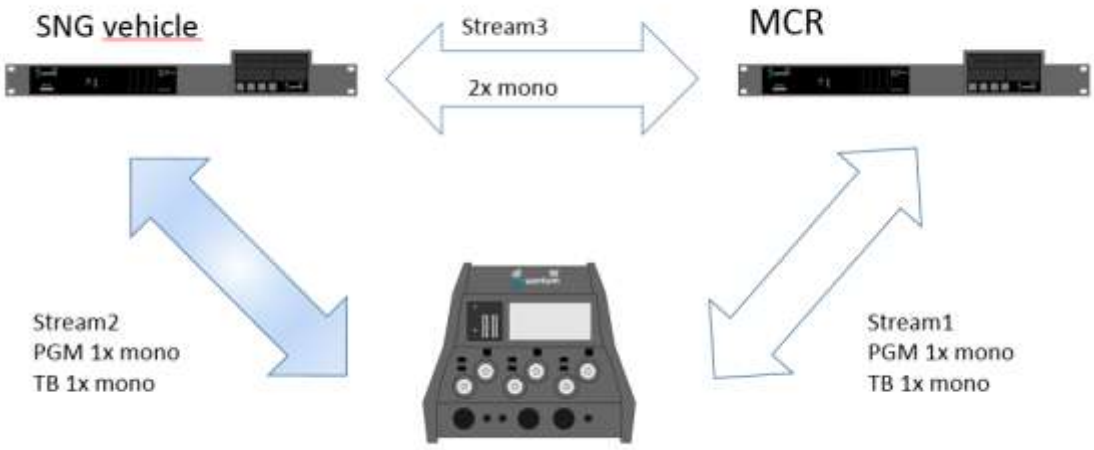
I.3 Double IP audio codec for video commentary



I.4 AES67 /DANTE remote audio commentary position



I.5 Multi site audio production



I.6 Common features

Common features are[1]:

- **Analog Audio:** Quantum XL provides audio mixer and routing matrix for any audio input. Three headphone outputs, one line stereo audio output and one USB audio input/output are available as well. Keyboard, knobs and touch panel enables quick and user friendly balance and routing control of the audio signals.

- **Compression algorithms:** Quantum XL is supports with full range of compression algorithms: G711, G722, PCM, MPEG1,2 Layer II, MPEG 4 AAC LC (opt), MPEG4 AAC LD (opt), ELD & HE (opt), OPUS and Enhanced apt-X.

- **Communications**: IP, 3G/4G, WIFI or AES67/DANTE connectivity. With Quantum XL it is possible to establish two independent connections, one for program and the other for coordination. Bonding

[1] ***Please review standard and optional features of this product at our web site***.

of up to 7 IP interfaces to get the maximum bandwidth and for secure audio streaming is also available.

- **Power supply**: AC/DC Power Converter and an optional battery which provides up to 3 hours of autonomy. The battery can be charged on the system and its status and level of charge can be monitored on the screen.

- **Auxiliary data**: the device includes a serial port (RS232) and a GPIO port with 2 inputs and 2 outputs. The auxiliary data can be sent/received along with the audio for remote control/signalling.

- **Control and monitoring**: The unit can be configured from its touch panel and from its embedded web server. The device is fully configurable via remote web browser. Support from the MCR for outside news teams is possible using **ProdysControlPlus**[2] product; *as long as the unit is connected to the Internet, and even when the unit is connected to the internet behind a firewall*.

- **Small and lightweight**: Dimensions are width 270mm, height 85mm and depth 235mm. Weight is about 2.6Kg (*without battery*).

I.7 The set of Manuals

The Quantum Family User Manual is applicable to most of the common features provided by the Quantum Family of codecs.

For some specific features or restrictions, the user is referred to the proper Hardware and Reference Manual applicable to the codec in use. Installation requirements, physical and electrical parameters are also included in this document.

If several different Quantum Family codecs are managed by means of the ProdysControlPlus application please refer to the ProdysControlPlus Manual as well.

[2] ProdysControlPlus is a software manger product. For more details about please contact sales@prodys.net

Prodys IP codecs provide the user with a control protocol which allows the user to develop customized management software. The control interface for this protocol is either the RS232 serial port or the Ethernet port. For detailed description please refer to the Quantum Family codec SDK User's Manual.

I.8 Application Notes

For specific subjects, Applications Notes and release update (What is new, ChangeLog …) the user is kindly referred to check our download area at www.prodys.net or contact support@prodys.net

I.9 Hardware and Reference Manuals

The information is arranged as follows:

- **Chapter I – Installation Guide.**
  This chapter provides hardware requirements and instructions for installing the Quantum XL unit.

- **Chapter II – Quantum Audio Inputs.**
  This chapter describes the different Quantum XL audio outputs and help the user understand the different configurations and applications.

- **Chapter III – Quantum Audio Outputs.**
  This chapter describes the different Quantum XL audio outputs and help the user understand the different configurations and applications.

- **Chapter IV –Technical Specifications.**
  Technical details are described in this chapter.

- **Chapter V – DIP Switches and Battery installation.**
  Access to the microswitches and battery installation is explained.

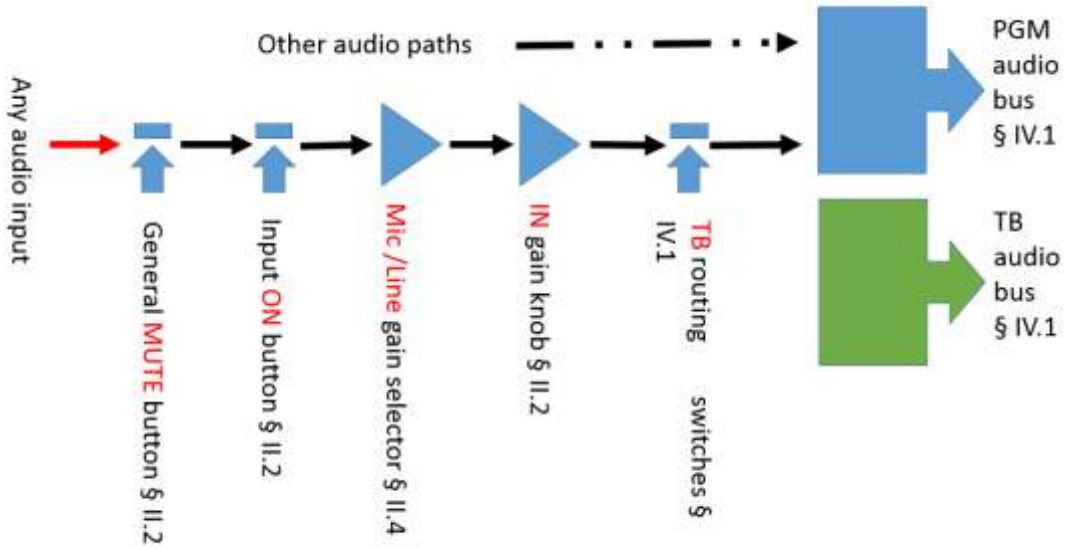
Chapter II

AUDIO CONTROLS

The Quantum XL offers an intuitive and complete control interface.

Before unpacking the unit, please check its packaging for any signs of damage or mishandling during transportation. Report any damage to the shipping company immediately. Unpack the unit carefully, if you find any damage or the unit does not work correctly, you should contact Prodys or its distributor as soon as possible.

II.1 Input audio path overview



Any input audio (e.g. XLR or USB audio) follows its processing path under User adjustments or PRESET selection[3].

Each input audio path (IN1 ..IN3, USB L, USB R) terminates at either the PGM, or TB bus. The PGM and the TB busses feed the PGM and Talkback encoders[4] respectively prior upstreaming.

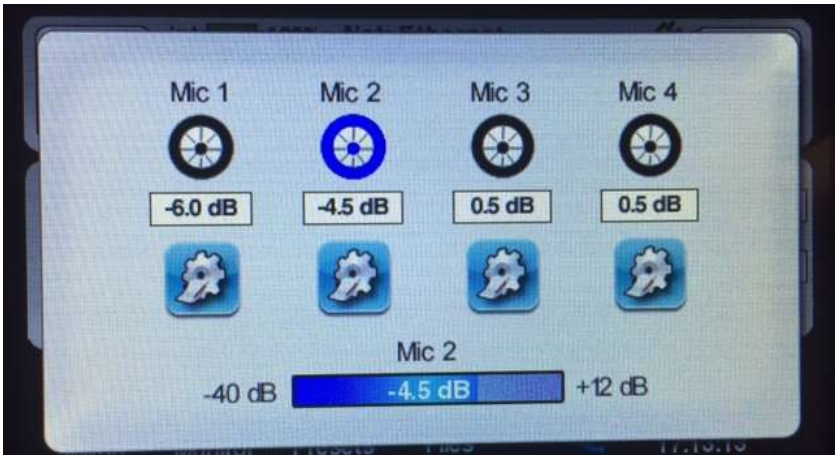
II.2 Gain controls for audio inputs

At the left hand side pressing the <**MUTE**> button will silence all audio inputs for the uplink as well as for the headphone and local XLR audience.
Each input is individually enabled with its <**ON**> button.

[3] For details on PRESET configuration please refer to the QUANTUM USER MANUAL § IV.3

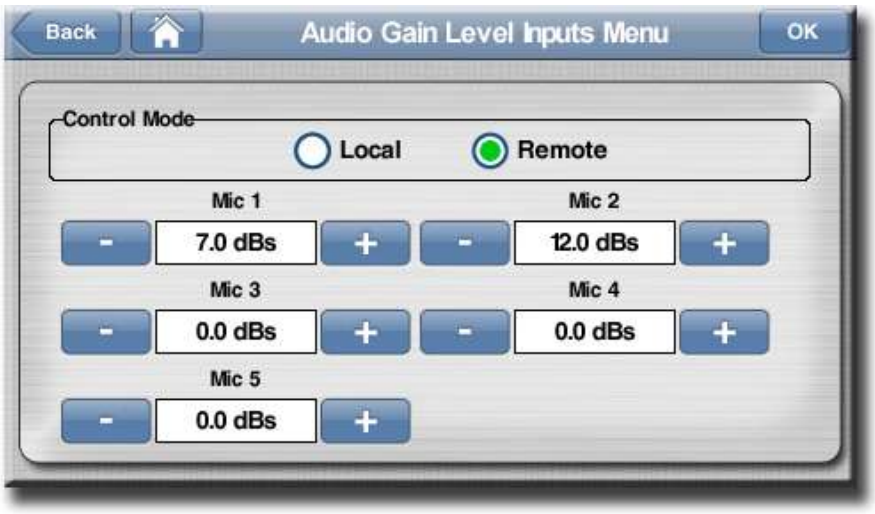
[4] SIP protocol does not enable an independent "Talkback encoder", but the operation of the TB switch can route this audio path into the L or R channel of a stereo upstreaming signal.

Any gain change gets a pop-up indication as this example



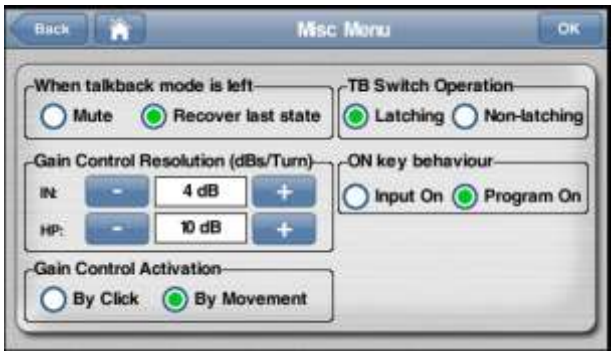
The audio level control can be made locally or remotely by using the Quantum XL web interface.

Remote input gain control might be possible getting into Menu /Audio /Gain Level:



II.2.1 Sensitivity of the audio gain knobs

It is possible to adjust sensitivity of the gain knobs for the audio inputs as well as for the headphone knobs at Menu /Audio /Misc (*Resolution dBs/Turn*).



II.3 Headphone controls

In order to prevent pain due excessive sound pressure on the ears it is strongly advised to handle with care the headphone level configuration.

It is safe to manage any new streaming connection or new signal matrix with the headphone off the head, but around the neck. Adjust with gentle turns the correct sound level for each headphone (left and right side).

Once the average sound level is set, the user might use the headphones in a safe way.

II.3.1 Headphone volume control

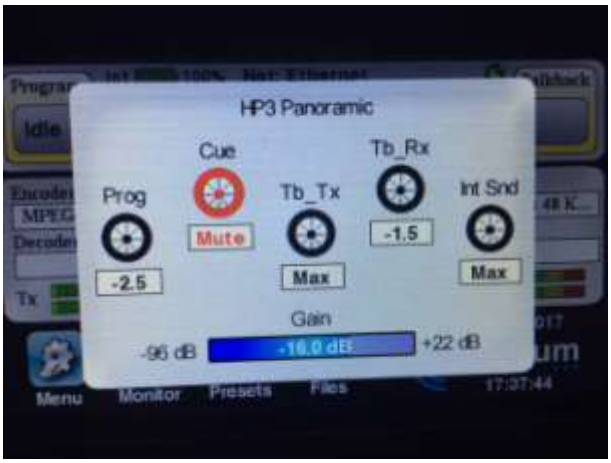
Those are the headphone gain controls. Any headphone gain change gets a pop-up with the dB indication. A *green LED* indicates that following trims affect only *this* headphone output (*please to the picture above*).

II.3.2 Headphone signal mix control

Upon the HP selection, (just pressing once or trimming the HP knobs 1 .. 4), the user gets access to the Headphone Signal Mix for *her/his feedback* using the right hand group of knobs labelled HP MATRIX.

Each signal might be enhanced or dimmed trimming the knobs. Furthermore pressing once the HP Matrix knob, mutes this signal component immediately for this headphone.

Please remind the HP MATRIX does not affect the encoded signal up or downstream, or other commentaries' headphones.



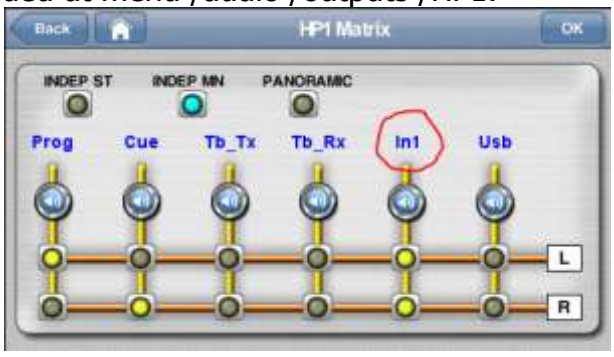
Each commentary can set (going thru the audio menu or just loading a PRESET) six audio components for her/his own headphone control. In this way each component might be enhanced or dimmed (or muted) for this headphone output.

The choice can be made from following signals:

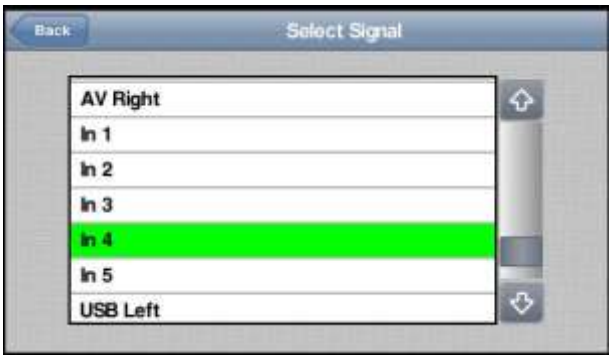
- Prog (program L&R or main transmitted audio)
- Prog L (program L or main transmitted audio)
- Prog R (program R or main transmitted audio)
- Cue (return L&R or main received audio); or *just L or R*
- Tb_Tx (talkback L&R or second transmitted audio); or *just L or R*
- Tb_Rx (talkback L&R or second received audio); or *just L or R*
- USB (input USB audio); or *just L or R*
- In1 (just input 1 audio)
- In2 (just input 2 audio); *and further on up to input 5*
- In3 …
- AES67_1 …
- IntS (input for the international sound bus; e.g. in1…in5)

EXAMPLE:
Reporter_1 wishes to enhance her/his own voice on her/his own headphone HP1 using <HP matrix knob 5> as pictured

The setting is provided at menu /audio /outputs /HP1.



If any other audio component should be assigned, just click on the blue text (e.g. IntS, Tb_Tx, USB, any of those) and choose the new headphone_1 audio component from the list



II.3.3 Headphone preferences

Other headphone preferences can be set as follows:

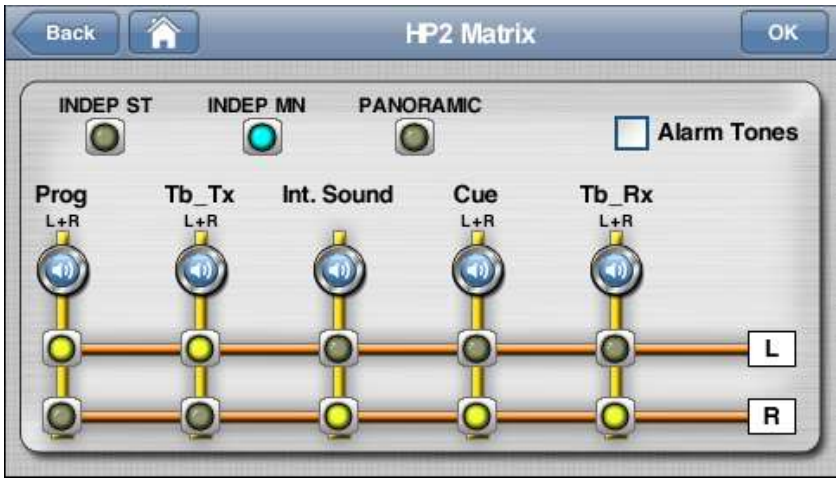
Adjustment and balance of each headphone may be set in three different flavors. These three flavors can be selected are set [Menu /Audio /Outputs ..]:

- Independent Stereo control
- Independent Mono control (L & R)
- Panoramic control (Tx /Rx balance)

II.3.3.1. Headphone L/R independent mono set up

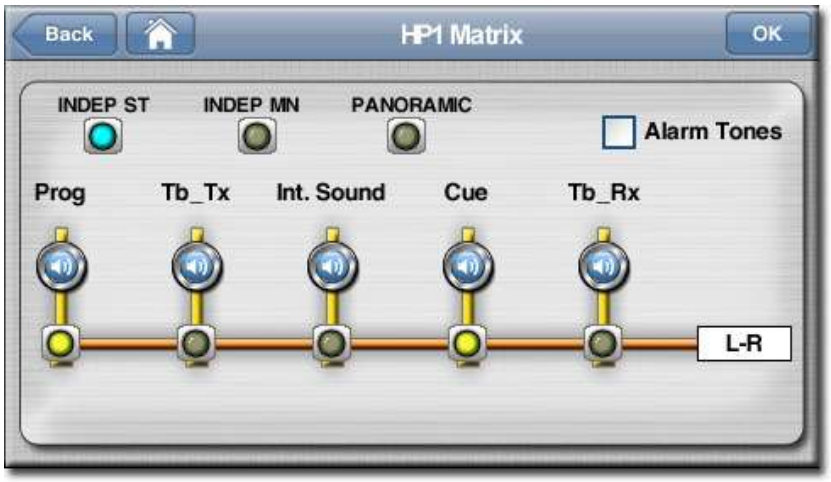
With the so-called Independent mono level control the headphone audio level can be adjusted independently for each ear. This mode is especially useful when L and R signals on the headphones are not related (binaural monitoring).

Pressing several times the HP gain knob, the user might trim the global L+R, L or R headphone.



II.3.3.2. Headphone independent stereo set up

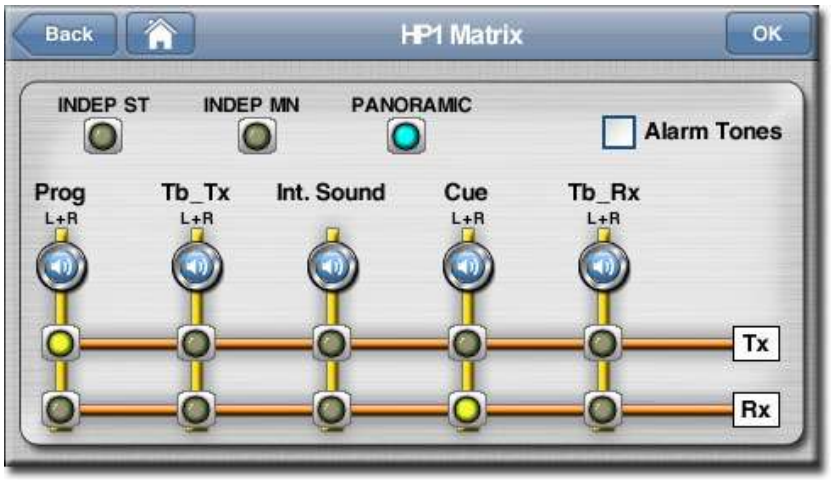
This control mode works in a similar way to the independent mono control, but keeping the left and right channels of the audio sources always coupled.

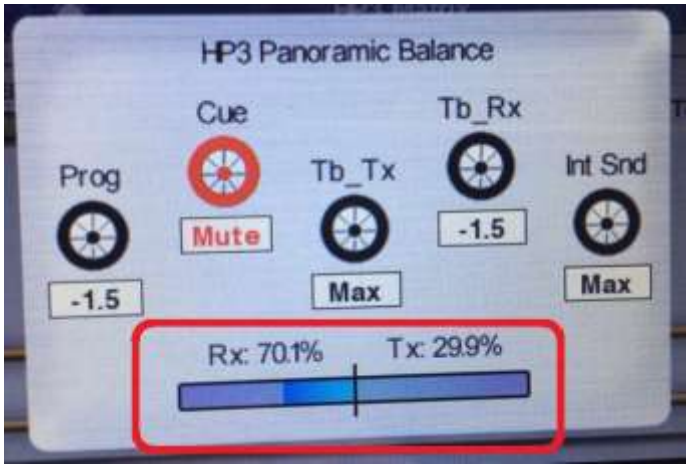


II.3.3.3. Headphone panoramic set up

This control is preferred by users uncomfortable with binaural monitoring; such prefer hearing the same audio composition on the left and right ear.

This mode is allows enhancing either the ***local*** *(Tx)* or the ***far-end*** *(Rx)* encoded sound on the headphones.





II.4 Analogue audio input arrangements

In the front panel there are two types of connectors: Jack connectors for the headphone outputs (4), and XLR connectors for analogue inputs (5):

There are three MIC/LINE XLR connectors and additionally one LINE level audio input. This menu is available at Menu /Audio /Inputs

The other parameters that can be set up per audio input:

- Compressor/Limiter (input overdriving protection)
- Automatic Gain Control (input overdriving protection)
- High Pass Filter (Hum suppressor)
- Gain pad (pre-amp -18dB or 0dB)
- Gang input (IN2/IN3 and IN4/IN5 as stereo inputs)

If audio inputs are set up as MIC level inputs, sensibility range is –60dBu to –20dBu.

When phantom power is enabled, the whole gain is decreased by 15 dB to compensate for the higher output of condenser MICs. Thus, the gain range will go from –45 to –5dBu.

When the inputs are configured as LINE level inputs, the maximum input level will be +20dBu.

The audio level control can be achieved locally or remotely by using the Quantum XL web interface.

II.5 Digital audio input (USB) arrangements

The codec might intake mono & stereo digital signals over the USB-AUDIO interface (rear side). This signal might be mixed and routed as any other input audio. Please refer to § for detailed information about the audio routing matrix.

Optionally the user might assign /map gain knobs IN3 and IN4 to the digital audio input control. Please follow the procedure:

1. access Menu /Next /Next /Function Keys
2. assign button F4 to *USB Audio Control*
3. upon any F4 activation[5] IN3 and IN4 gain knobs affects L & R of the digital audio input signal (USB-AUDIO)

Quantum XL USB-AUDIO interface is using 48kHz linear sampling. Please remind changing any USB device or laptop to the matching sampling frequency

[5] Following activation of the F4 button returns the control of the IN3 and IN4 gain knobs to the XLR analogue inputs

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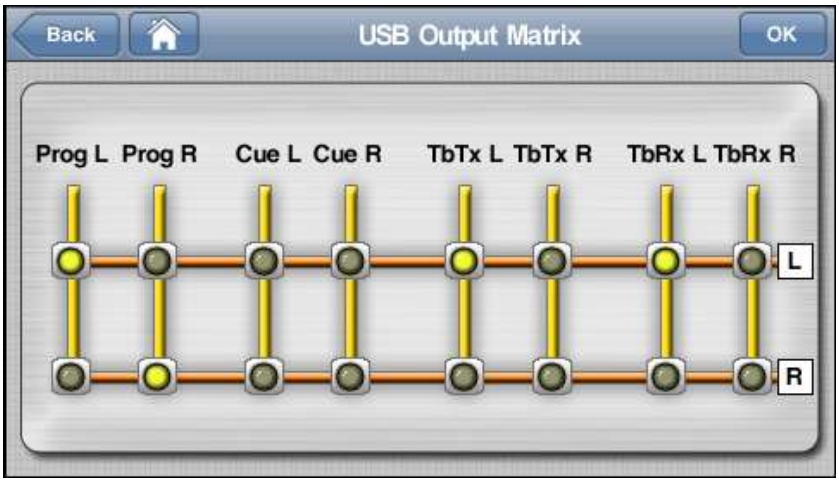
Chapter III

AUDIO OUTPUTS

III.1 Digital audio output (USB-AUDIO)

The digital audio output is the reverse input path. Only the rear side USB-AUDIO connector supports this function. Possible audio signals or combination of any mixed signal are: Program Left, Program Right, TalkBack Left and TalkBack Right.
The USB output matrix configuration is available at Menu /Audio /Outputs /USB.



III.2 Digital audio input/output (AES67 / DANTE)

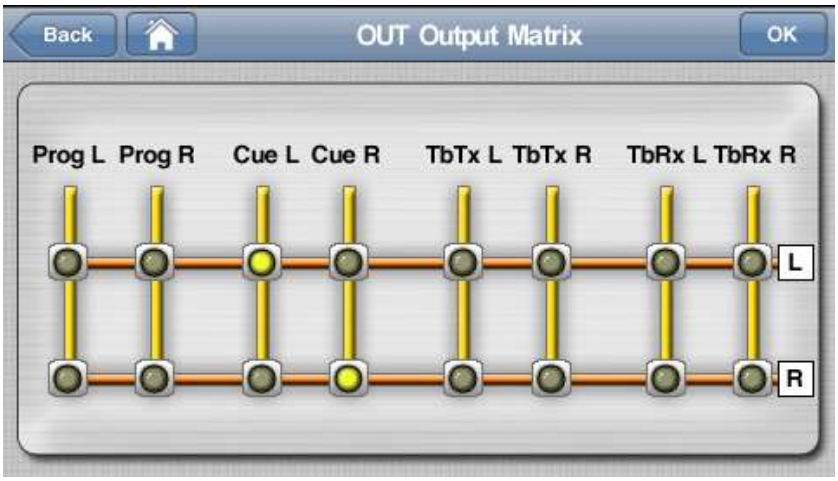
The AES67 /DANTE input & output configuration[6] is set up using the DANTE Controller software provided by Audinate company. This Controller software must share the AES67 /DANTE local area network with the Quantum

For computer requirements for using DANTE Controller software please refer to Audinate at http://audinate.com

III.3 Analogue audio output (rear XLR)

The analogue audio output is available at the rear side XLR connectors upon the proper output matrix configuration. Possible audio signals or combination of any mixed signal are: Program Left, Program Right, TalkBack Left and TalkBack Right.
The XLR output matrix configuration is available at Menu /Audio /Outputs /OUT.

Please remind the AES67/DANTE interface is not available for the audio uplink application as described for § IV.2



This configuration example proposes getting the sound of the audio signal available at the rear side XLR connectors.

Chapter IV

OPERATION

This chapter introduces operations

IV.1 Default Audio input routing matrix

Quantum XL provides three internal audio busses: PROGRAM bus (PGM), TALKBACK bus (TB) and INTERNATIONAL SOUND bus (IntS).

Please notice the activation of any routing button <ON> or <TB> routes its audio input to the proper internal audio bus (PGM or TB); detaching the signal from original signal bus.

For this method please use configuration as[7]

PGM and TB combine their own mix of audio inputs and feed their respective encoders.

Details the encoder configurations are available at the Quantum User Manual.

Please notice the encoder setting influences the audio quality and delay.

[7] Please verify Menu /Audio /Misc

On the other hand the International Sound bus is available *locally* for headphones only. Any input assigned to the IntS bus is not available for any encoder and upstream purpose.

IV.1.1 Rearranged audio input routing matrix

The audio input routing matrix might be redefined together with the <ON> and <TB1> operation. For this flavor please set the option of Menu /Audio /Misc as[8]

> *For the sake of matching labels & function of external buttons with the configuration menu following equivalences are applicable:*
>
> *PGM bus ←→ "TB switch Off"*
>
> *TB bus ← → "TB switch On"*

8

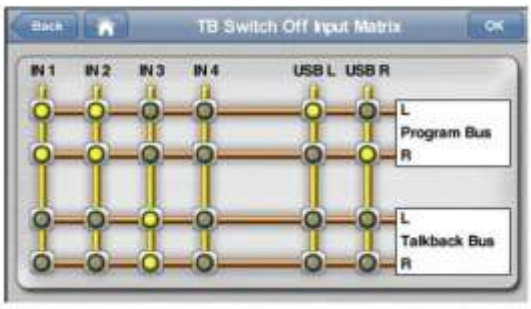
Walking thru Menu /Audio /Input Matrix leads to configuration of each internal bus.

IV.1.2 One example of input matrix layout

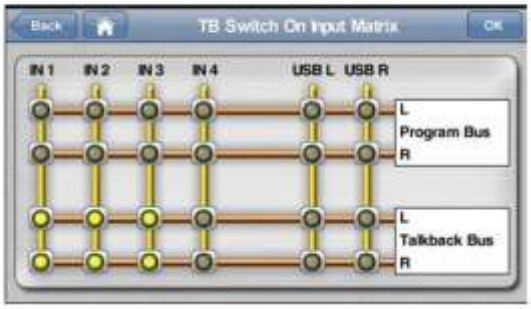
The PGM matrix /mix is available at Menu /Audio /Input Matrix /'TB Switch **OFF'**.
Let us provide following example PGM configuration as the left hand matrix.

The Talkback matrix /mix is available at Menu /Audio /Input Matrix /'TB Switch **ON'**.
Let us provide following example talkback configuration as the right hand matrix.

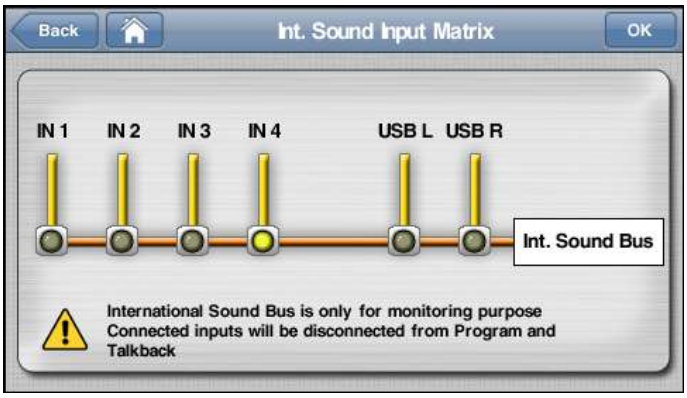
PGM or TB1 is *OFF*



Talkback or TB1 is *ON*



The example for the International sound bus is arranged as following picture



With this matrix layout example following routes are provided:

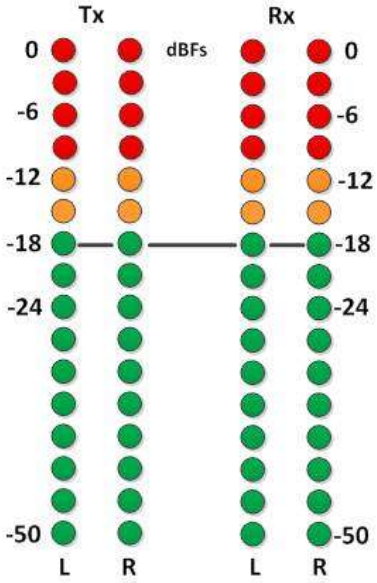
- IN3 is always and only available for the Talkback bus.
- IN1 and IN2 are mixed together on the PGM bus if *their* TB button remains deactivated (*dark*).
- IN1 and IN2 are mixed together on the Talkback bus if *their* TB button is active.
- USB L is available only for L channel of the PGM signal. Therefore the USB audio is never available on the talkback bus.
- USB R is available only for R channel of the PGM signal. Therefore the USB audio is never available on the talkback bus.
- IN4 is always and only available *locally* for International Sound monitoring.

Chapter IV

OTHER INTERFACES

V.1 Vu-meter indication

Instant Vu-meter indication is provided on four vertical LED bars. It lights green while the input signal matches the proper **dynamic range** (from -50 to -18 dBFs). When the signal surpasses -18 dBFs the lights turn orange. From -12 to 0 dBFs the lights turn red.



The two LED bars on the left monitor the audio for the program audio input mix.

The two LED bars on the right monitor the audio channel of the incoming PROGRAM stream.

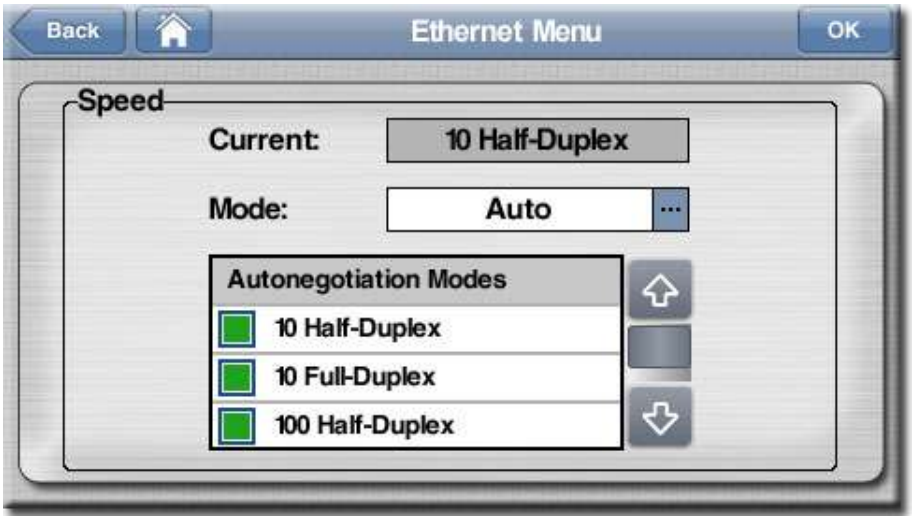
V.2 Ethernet ports – the LAN1 and LAN2 Connector

The two LAN sockets are standard 1000Base-TX (10/100/1000Mbps) Ethernet connections on a RJ45 plug. For more information about these two ports, please refer to the Quantum Family User Manual.

In the socket there are two leds to indicate different states for the connection and these are very useful in problem-solving situations.

- Green LED → LINK STATUS: ON = Connected
- Orange LED → RECEIVE STATUS: On = Receiving Data.

From the web interface and the touch panel menu it is possible to set the speed and duplex configuration to the following values: AUTO, 10HD, 10FD, 100HD, 100FD. Click on 'Menu', then 'Interfaces', then 'LAN', then 'Ethernet'.



V.3 USB Port for Wi-Fi

A USB Wi-Fi modem can be supplied optionally with the unit. This Wi-Fi connection can be used for streaming or for bonding to other IP interfaces to stream audio data.

Wi-Fi standards: 802.11b, 802.11g, 802.11n
Security protocols: 128-bit WEP, 64-bit WEP, WPA, WPA2.

V.4 3G/4G Connector

This connector allows the user to plug the external Wireless Communications Module. This module will provide the unit with up to four 3G/4G modems and high gain antennas, to connect to mobile data networks. For more information about the configuration and usage of the 3G/4G connections please refer to the Quantum User Manual.

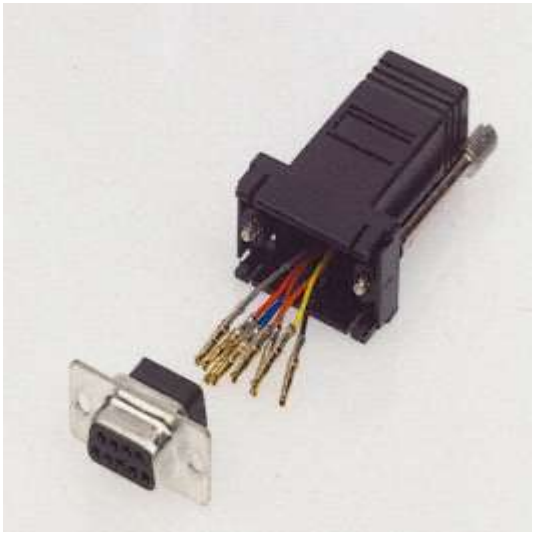
Supported technologies and frequencies:
LTE (FDD) B1/B2/B3/B5/B7/B8/B20 (2100/1900/1800/850/2600/900/800)
DC-HSPA+/HSPA+/HSPA/UMTS dual-band B1/B2/B5/B8 (2100/1900/850/900)
EDGE/ GPRS/ GSM quad-band 850/900/1800/1900 MHz
LTE 700 (B17) / AWS (1700 uplink; 2100 downlink) (USA AT&T, T-Mobile)

V.4.1 Internal LTE modems

Optionally the Quantum XL codec can be purchased with two internal modems. On the rear side are allocated two SIM sockets and external passive antennas.
The operation, supported networks and frequencies matches the external option.

V.5 RS232 port

The RS232 port is for use as auxiliary data port. This port allows the transmission and reception of data along with encoded audio. Note that this socket is RJ45 connector, as opposed to the typical Sub-D 9 ways connector. To make the conversion between RJ45 and RS232 Sub-D connector 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

The port is 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.

Each Quantum XL acts as a DCE device, therefore the connection to each of the RS232 ports is wired in the following way:

Quantum XL – Pin 7 connector RJ45.....Pin 2 PC

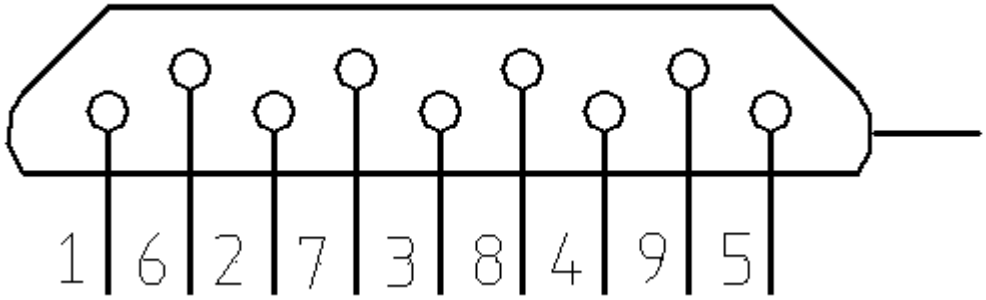
Quantum XL – Pin 2 connector RJ45.....Pin 3 PC

Quantum XL – Pin 3, 6 connector RJ45.....Pin 5 PC

Hardware handshaking signals are ignored.

V.6 GPIO port

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



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
Pin 5	Normally Open Relay 2		

V.7 Power supply

Quantum XL comes supplied with an AC/DC converter (19 volts output) to be connected to the power connector (Neutrik) located at the rear panel. The power converter works with an AC input range of 100 to 240 VAC, 50 to 60 Hz.

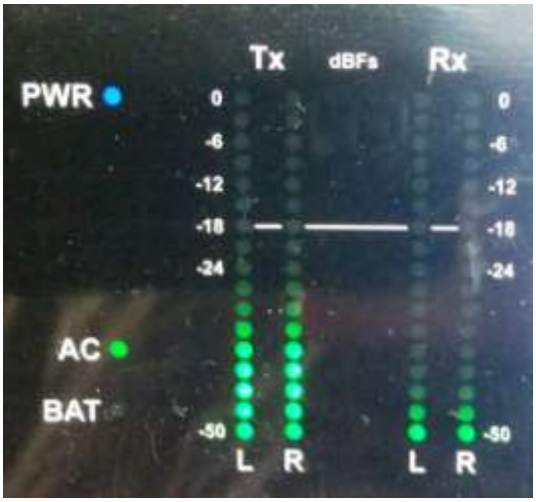
The power on/off button is located by the left side of the power connector. In order to switch on or switch off the unit, this red button must be pressed for longer than 5 seconds.

In addition, an optional battery pack is also available. When the external power converter is connected, the power is supplied from it, and the battery will be charged if necessary. When the external power converter is unplugged from the unit, the battery will take over.

The PWR and BAT leds on the LED information panel will inform the user about the connection of the external power adaptor and the battery.

V.7.1 Power and battery status

The following table describes the **PWR** (Power)**, AC** and **BAT** (Battery) LEDs.

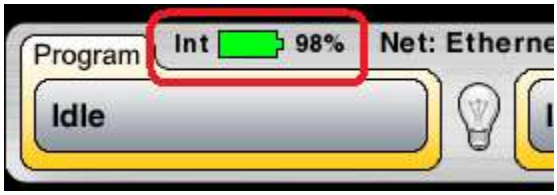


- PWR (Power) LED: This LED will light on when the unit is started.
- AC LED: This LED will light on when the external power adapter is connected to the unit, even if the unit has been switched off.
- BAT: This LED will light on when a battery is connected to the unit.

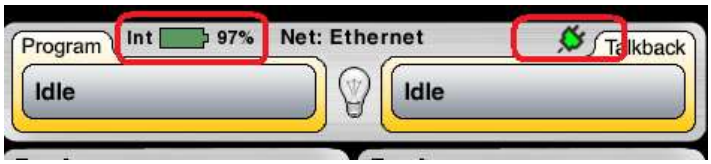
The unit can be powered from either the external power adapter, or from a battery. When the external power converter is connected, the power is supplied

from it, and the battery will be charged if necessary. When the external power converter is unplugged from the unit, the battery will take over.

There are some icons to indicate if the unit is being powered from the external power adapter or from battery:

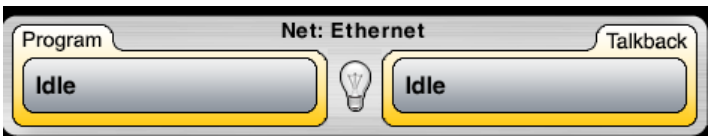


This icon indicates that the unit is being powered from the battery, and the external power adapter is not connected to the unit



The external power adapter is connected to the unit and the battery is charging.

When there is no battery connected to the unit, these icons will not be shown in the user interface.



V.8 ISDN interface & operation

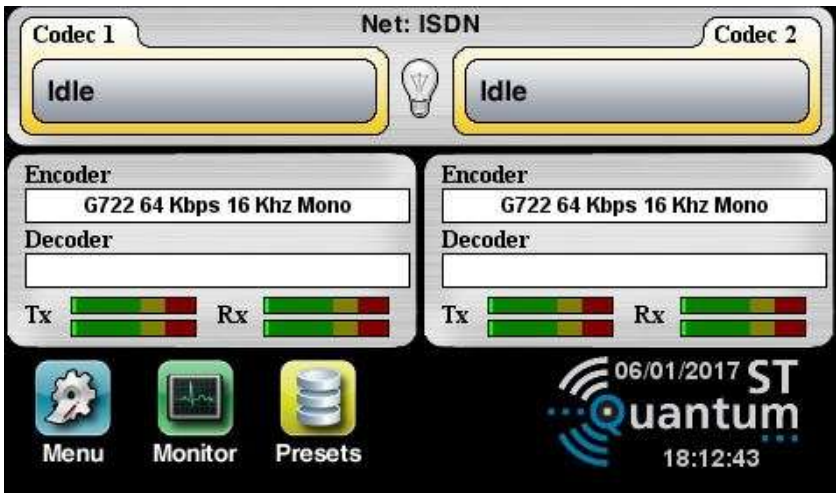
Quantum XL might be purchased with ISDN option. The ST interface is provided.

Please verify if ISDN license is available for your device at Menu >System >Licenses as the picture indicates.

Picture 1. ISDN License

V.8.1 Basic operation

The Quantum must be set for ISDN operation prior getting any ISDN call or dialling your ISDN destination. Please select ISDN at the Menu >Streaming >Net dialog (or just press the most upper line of the main menu, a shortcut will lead you to the proper network selection)

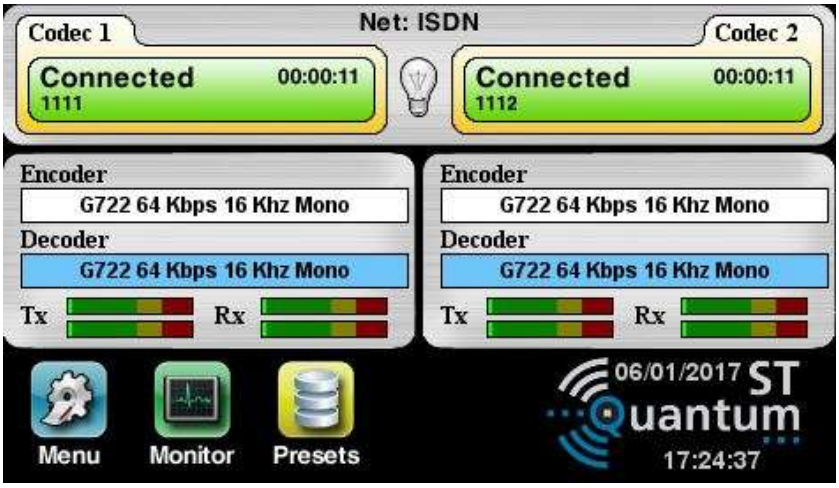


Picture 2. Main menu with ISDN Network

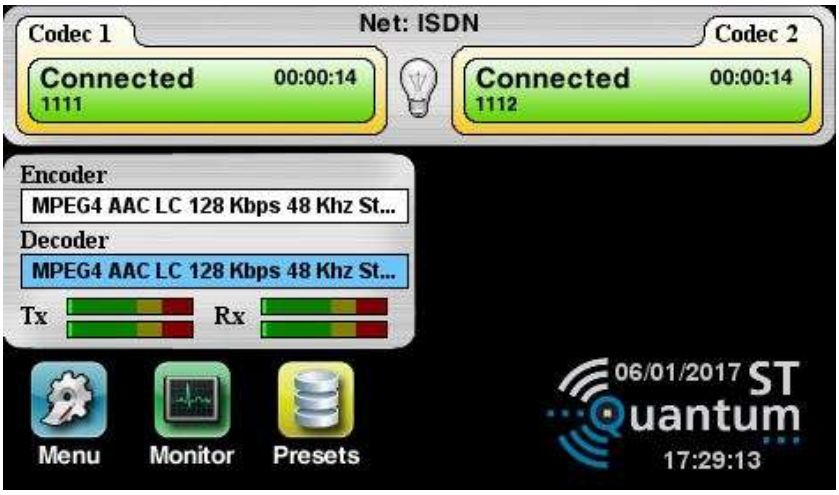
Incoming calls are taken automatically if not prevented by any blacklist definition (please refer to "advanced operation" for details about CALL filtering)

Outgoing calls are dialled pressing the <Idle> controls for Codec1 or Codec2.

Picture 3. Direct number dialling; default encoder setting



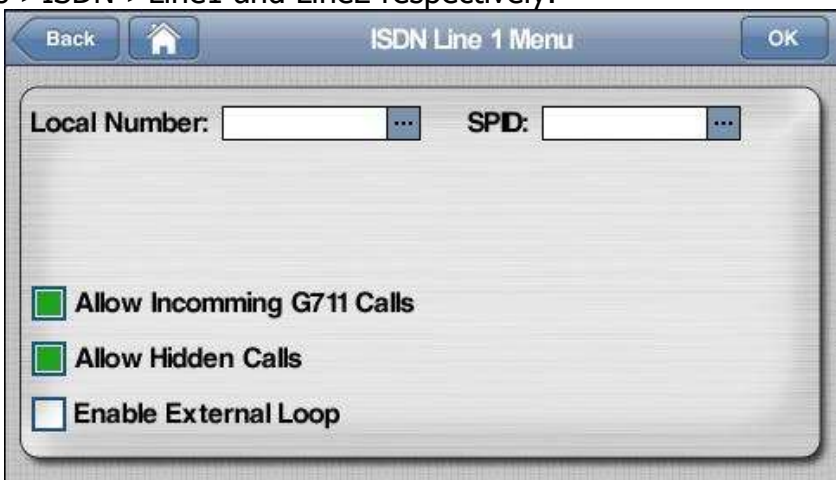
Picture 4. Double codec G722 connections



Picture 5. 128k bonded stereo connections

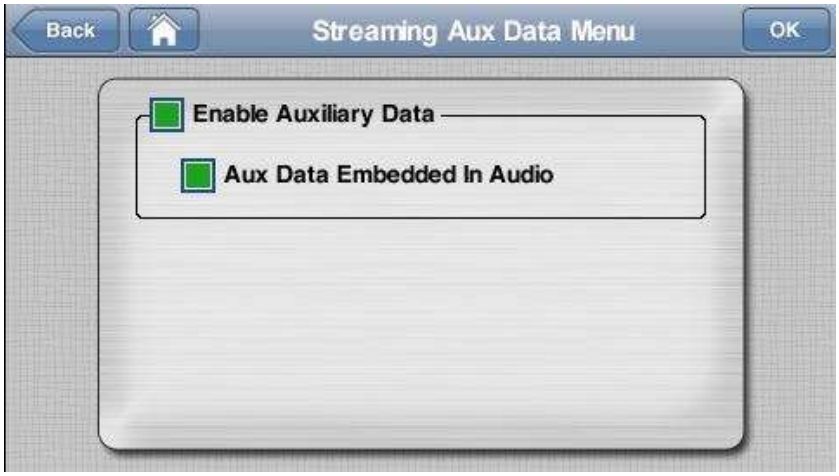
V.8.2 Advanced settings and operation

SPID or local number definition for North America users is done at Menu >Interfaces >ISDN >Line1 and Line2 respectively.



Picture 6. ISDN Line menu

Embedded auxiliary serial date might be transmitted within some compression methods. For this feature both sides (caller and callee codecs) must match their configuration as depicted. Please provide the setting at Menu >Streaming >AuxData

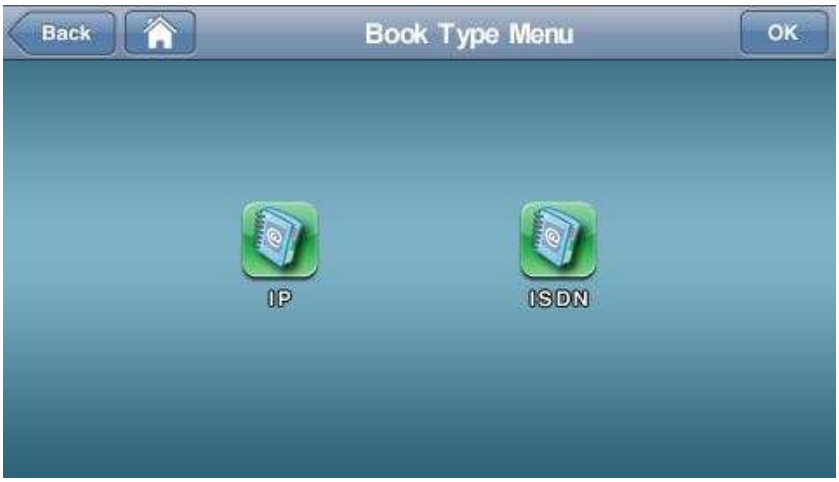


Picture 7. Streaming Aux Data Menu

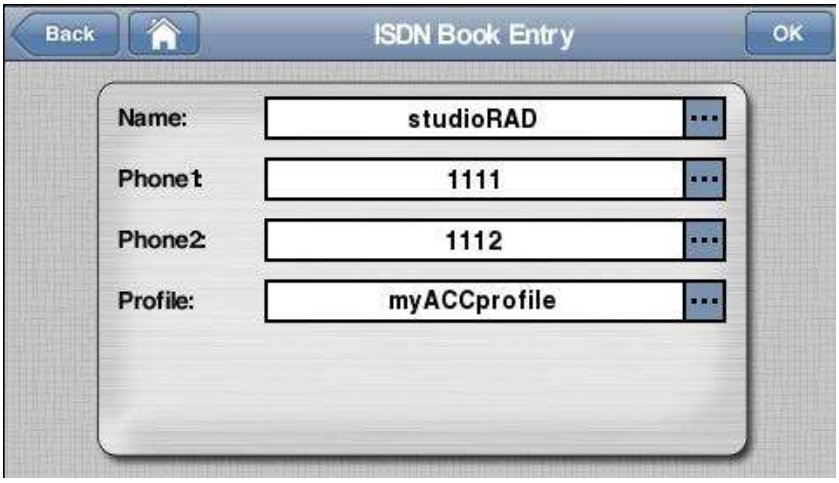
Policies for incoming calls might be defined at Menu >Streaming >CallFilters. Either BlackList or WhiteList might be used.

Picture 8. Call filters menu

The ISDN dial function might be simplified defining destinations for the ISDN Phone BOOK as well calling ISDN profiles (audio quality or compression algorithm)



Picture 9. Book type menu



Picture 10. ISDN Book Entry

V.8.3 Encoder /Decoder modes and dependencies

Following modes are provided:

	G711	G722	LII	AAC LC	AAC LD	AAC HE	Apt ENH 16
Bit rate	64	64	64/128	64/128	64/128	64/128	64

Audio mode	A / Mu Law	MN	MN/ST/ JOINT/DUAL	MN/ST/ JOINT/DUAL	MN	MN/	7,5MN
Freq (KHz)	8	24	32/48	24/32/48	24/32/48	32/48	16/32
Aux Data			X	X	X	X	X
CRC			X	X	X	X	

Quantum ST ISDN encoders are byte aligned; therefore Musicam Prima CDQ interoperation is not supported.

Following encoder /decoder dependencies must be observed:

- For incoming G722, MPL2, AAC LC or AAC LD calls the local encoder might be set to any compression mode, but not to Aptx or AAC HE. (Otherwise the local decoder indicates "STOP")

V.9 Video Decoder operation

The commentary unit might be enabled for video decoder support. (Please verify your current license set-up)

The commentary can decode either MPEG TS/UDP[9] (H.264) video streams or BRAVE H.264 video streams.

[9] MPEG TS/RTP/UDP streams are not accepted for this function.

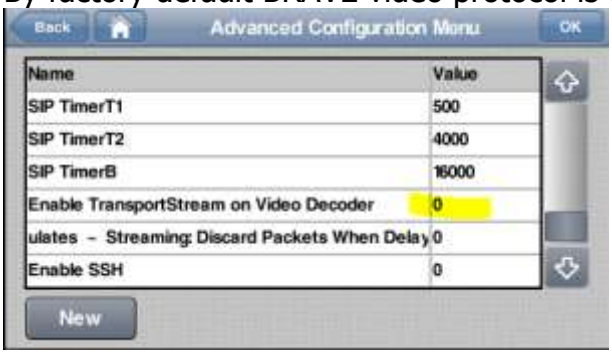
For this application a compatible video encoder should send its video stream to the IP address of the commentary unit (using the default protocol ports)

The Quantum XL user must connect manually to the video stream by pressing the video connection control. Then appear the proper dialog, as the example below. The profile proposes the receiver buffer size (low, medium or long delay) according the expected jitter.

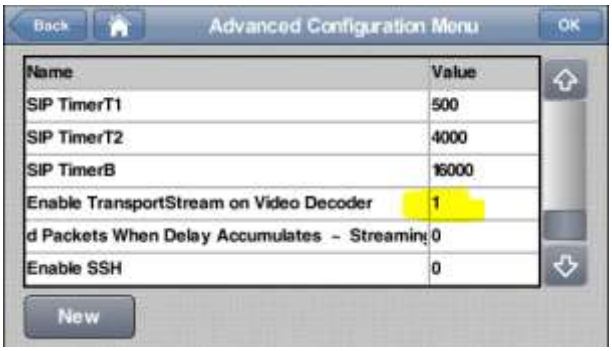
V.9.1 Video stream protocol selection

The matching video stream protocol is set at the advance configuration menu (Menu /System /Next /Advanced).

By factory default BRAVE video protocol is enabled as



Alternatively MPEG TS/UDP protocol is enabled using



(Notice just clicking the "0" value of the parameter and placing "1" instead.

V.9.2 Video Decoder output

The digital video output is available on the codec left side as DVI connector. Please notice that you might use DVI/HDMI connector if you prefer a HDMI display for visualization of the content.

Please notice DVI interface does not support audio signals, but the audio information is available as <CUE> signal on the routing matrix for headphones or for rear side XLR connectors.

Chapter V

TECHNICAL SPECIFICATIONS[10]

VI.1 Audio Interfaces

VI.1.1 IN1 – IN4 inputs in MIC MODE

Feature	Value	Requirements
Max. Input Level	-46 dBu	• knob to 0 dB Gain, no compressor enabled. • 150Ω microphone. • The max input level is for 0 dBFs.
Input stage gain tolerance	±0.5 dB	
Frequency response	-0.3dB	• 20Hz-20 kHz
Phase difference	<±3º	• 20Hz-20 kHz • Input 2 to input 3 and input 4 to input 5 • -47 dBu 997Hz test signal
Crosstalk	>80 dB	
Max Input referred noise	<-116 dBqps	• knob to 0 dB Gain, no compressor enabled. • 200Ω microphone. • Measured 22Hz to 20 kHz
THD+N Ratio	> 75 dB < 0.02%	• knob to 0 dB Gain, no compressor enabled. • 150Ω microphone. • Measured 22Hz to 20 kHz. • -47 dBu 997Hz test signal
THD	< 0.01%	• Measured with Tektronix AM700. • Excludes noise contribution
Max input impedance	2 kΩ	• differential
Phantom Power	+48V	• switchable
Compressor ratio	1:3	•
Compressor Knee	-7.5 dBFs	• hard knee
THD+N Ratio	<0.1%	• 150Ω microphone. • Measured 22Hz to 20 kHz • From knee to clipping

- XLR connectors.
- Maximum levels:
  - LINE levels: +20dBu.

[10] Ratings might be changed without any prior communication.

  - MIC levels: -46dBu (without compressor).
  - MIC levels: -33dBu (with compressor).
- Input impedance:
  - LINE mode = 24Kohm.
  - MIC mode = 4Kohm.
- Mic input sensitivity adjustable from -25 to -65 dBu.
- THD+N < 0.02% (MIC mode), 0.005% (LINE mode). @ 1kHz.
- SNR > 75dB (MIC mode), 95dB (LINE mode).
- Phantom power (48 Volts).

VI.1.2 IN1 – IN5 inputs in LINE MODE

Feature	Value	Requirements
Max. Input Level	+20 dBu	• knob to 0 dB Gain, no compressor enabled. • 40Ω line driver. • Measured 22Hz to 20 kHz
Input stage gain tolerance	±0.5 dB	
Frequency response	-0.3dB	• 20Hz-20 kHz
Phase difference	<±3º	• 20Hz-20 kHz • Input 2 to input 3 and input 4 to input 5 • -47 dBu 997Hz test signal
Crosstalk	>90 dB	
Noise Level	<-94 dBFs	• knob to 0 dB Gain, no compressor enabled. • 40Ω line driver. • Measured 22Hz to 20 kHz
THD+N Ratio	> 93 dB < 0.005%	• knob to 0 dB Gain, no compressor enabled. • 40Ω line driver. • Measured 22Hz to 20 kHz. • 19 dBu 997Hz test signal
Max input impedance	24 kΩ	• differential
Phantom Power	+48V	• switchable
Compressor ratio	1:3	
Compressor Knee	-7.5 dBFs	• hard knee
THD+N Ratio	<0.1%	• 200Ω microphone. • Measured 22Hz to 20 kHz • From knee to clipping

VI.2 Headphone 1 - 4 outputs

Feature	Value	Requirements
Max. Output Level	+12.2 dBu	• 0dBFs, Zload 100 kΩ, knob to 0 dB gain, 0dBFs
	+11.6 dBu	• 0dBFs, Zload 300 Ω, knob to 0 dB gain, 0dBFs
Output level tolerance	±0.3 dB	
Max. Output Power	90mWrms	• 75 Ω load, clipping 997Hz test signal
Frequency response	-0.3 dB	• 20Hz-20 kHz, 300Ω load
Phase difference	<±3º	• 20Hz-20 kHz • -1 dBFs 997Hz test signal • Zload 300 Ω
Crosstalk	>90 dB	
Noise Level	<-90 dBu	• Measured 22Hz to 20 kHz, knob to 0 dB gain
THD+N Ratio	> 93 dB < 0.005%	• Measured 22Hz to 20 kHz, knob to 0 dB gain • -1 dBFs 997Hz test signal. • Zload 300 Ω.
Output impedance	24Ω	

- 6.3mm Jack connector
- Headphone impedance range: 300 – 2K ohms.
- Output Impedance < 25 ohms.
- Bandwidth 20Hz-20kHz (1dB).
- Maximum output level: 12dBu on 300 ohms.
- THD+N < 0.01% @ 1kHz.
- SNR > 92 dB.
- Independent audio sources (local o return) for left and right.
- Independent level adjustment for each output.

VI.3 AUX output

Feature	Value	Requirements
Max. Output Level	+12.2 dBu	• 0dBFs, Zload 100 kΩ, knob to 0 dB gain, 0dBFs
	+11.6 dBu	• 0dBFs, Zload 300 Ω, knob to 0 dB gain, 0dBFs
Output level tolerance	±0.3 dB	
Max. Output Power	90mWrms	• 75 Ω load, clipping 997Hz test signal
Frequency response	-0.3 dB	• 20Hz-20 kHz, 300Ω load
Phase difference	<±3º	• 20Hz-20 kHz • -1 dBFs 997Hz test signal • Zload 300 Ω
Crosstalk	>90 dB	
Noise Level	<-90 dBu	• Measured 22Hz to 20 kHz, knob to 0 dB gain
THD+N Ratio	> 93 dB < 0.005%	• Measured 22Hz to 20 kHz, knob to 0 dB gain • -1 dBFs 997Hz test signal. • Zload 300 Ω.
Output impedance	24Ω	

VI.4 USB Audio interface

- USB 2.0 Audio Interface.

VI.5 Compression[11]

- G722.
- G711 A/μ Law.
- MPEG 1,2 layer II (ISO/IEC 11172-3 /13818-3).
- MPEG 2 AAC LC (ISO/IEC 13818-7).
- MPEG 4 AAC LC, LD, ELD & HE (ISO/IEC 14496-3).
- Enhanced aptX™.

VI.6 Communication ports

VI.6.1 LAN port

- 10/100/1000 Base-TX Ethernet with auto-negotiation.
- RJ-45 connector.

[11] Some compression modes are available as an option. Please contact sales@prodys.net for more information.

VI.6.2 GPIO port

- DB9F connector.
- 2 ground contact inputs.
- 2 NA/NC relay outputs.
  -Max voltage: 125VAC (0.5A), 110VDC (0.3A), 30VDC (1A).
  -Max. current: 2A.

VI.6.3 RS232 port

- RJ45 connector.

VI.7 Power supply.

- Universal Input Range.
- AC input range: 100-240 V.
- Frequency range: 50-60 Hz.
- Output Power: 30W (with battery in charge status).
- Li-Pol battery pack (optional). Max. autonomy: 4 hours.

VI.8 Weight and dimensions

- Height: 70 mm; Width: 280mm, height 75mm and depth 205mm.
- Weight: 2.29 Kg.

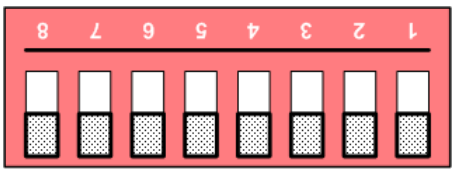
Chapter VI

DIP SWITCHES AND BATTERY INSTALLATION

VII.1 Restore factory default setting (microswitches)

There are 8 microswitches on the bottom side of Quantum XL which are reserved for special functions. The microswitches are protected with a removable cover. The cover must be removed with a Torx-10 tool if access to the switches is required or the optional battery is fixed on the bottom side.

By default all the switches must be in OFF position according the picture. The inverted view is according the codec position on the previous picture.



Switch number 7 will restore the default factory configuration if set ON before a power cycle.

The IP address is changed to a DHCP IP configuration. In case a DHCP server is not available on the network the address is set to 192.168.100.100 and the net mask to 255.255.255.0.

After the factory default setting the switch number 7 must return to the OFF position for usual operation.

VII.2 Optional battery installation

An optional battery can be attached to the V-Quantum. The battery not only allows independence for portable applications, but also redundancy if the main power cannot avoid large voltage dips; since the codec operates continuously without care of those impairments.

The battery is attached on the bottom side of the Quantum XL unit. Following procedure is indicated for installation:

1. Switch OFF the unit.
2. Look for the battery connector at the bottom panel of the unit (Picture 3).
3. Place the battery, checking that no room is between codec and battery surfaces. The battery has to dock on the proper bottom connector. (Picture 3)
4. Fix the battery on each corner with the screws supplied with the battery.
5. Switch ON the unit. The unit should be able to boot without the main power cord connected.

VII.3 Battery maintenance and precautions

To ensure your battery maintains its maximum capacity, operate the Quantum XL codec on battery power at least once a month. The Lithium-Ion battery has no memory effect so it is not necessary to let the battery fully discharge each time. **However, for a better accuracy of the battery meter, it is helpful to fully discharge periodically.** If the Quantum unit is continuously operated on AC power only for an extended period, the battery may fail to retain charge. This may shorten the life of the battery and may cause the meter to be inaccurate. Eventually the Quantum unit will show the message **<Battery Not Present>.**

If the Quantum unit with a battery pack is kept on a long time storage, it is mandatory to charge the battery each 3 months up to 50% of the capacity.

However, for a better accuracy of the battery meter, it is helpful to fully discharge before recharging to the 50%.

The battery internal charging temperature range allowed is 0º to 45ºC (or 32º to 113ºF). Keep in mind that the battery is charging if the AC main power is available to the codec!

VII.3.1 Battery precautions

- Avoid humidity.
- If the battery is removed from the unit, avoid short circuits among the copper terminals of the battery interface, metal surfaces, etc.
- Keep the battery away from fire and excessive temperatures.
- The battery **internal charging temperature range allowed is 0º to 45ºC** (or 32º to **113ºF**). Special consideration is required for the upper limit, since the desktop surface under the Quantum XL unit may heat the battery up over this limit (eg. dark desktops under sunlight, electronic

equipments underneath the unit, etc.). **Keep in mind that the battery is charging if the AC main power is available to the codec!**

- The battery internal **discharging temperature range** allowed meets Quantum's ambient operating temperature range of 0º to 45ºC.

- Remove a defective battery immediately if you detect unusual chemical smell or some trace of substances spilling out. **Avoid contacting the chemicals.**

- Remove the battery if the unit is indicating **<Battery Not Present>** and contact support@prodys.net for further instructions.