USER MANUAL

EtherMPX NG

DOCUMENT REVIEWS

Date	Version	Notes
01 Mar 2022	1.0	Initial release
01 May 2023	1.1	Additional features of DSP v3.73
01 Feb 2024	1.2	Additional features of DSP v3.76 and typo corrections

Dear customer,

After introducing our DDS-30 FM Exciter in 2010, the first in the world capable to accept Digital MPX (MPX over AES), it was time to solve another problem: there was no Digital MPX STL in the market! Also, the existing Analog MPX STLs could not meet our high standards in order to exploit the full capabilities of DDS-30.

That's why we decided to design a Digital MPX STL, which could transport Digital MPX, beside the classic analog MPX, analog L/R, and digital L/R (over AES) modes. Since we are big fans of the "everything IP" concept, we couldn't select something else than IP transmission!

In your hands, you have the EtherMPX IP STL NG (New Generation), which is the result of our constant research and development.

Always with professional high-end audio performance and minimal latency, we could compare the performance of EtherMPX to a cable! Even if EtherMPX is designed to be a perfect match with our DDS FM Exciter, you can use it to deliver analog MPX to any other exciter, and you will notice immediately the difference compared to any analog FM STL.

So, enjoy using your EtherMPX and thank you for selecting us for your business!
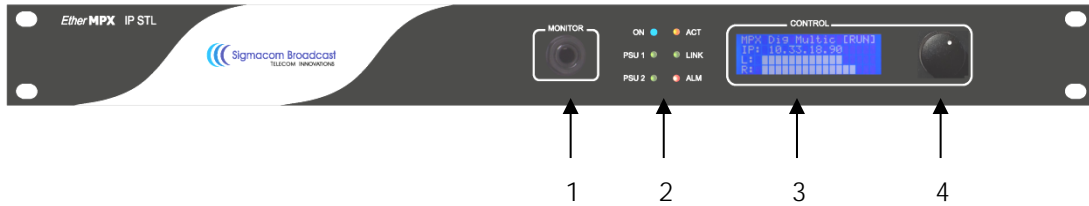
Sigmacom Broadcast
March 2022

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2. Status LEDs [ON, PSU1, PSU2, ACT, LINK, ALM]
3. LCD Display [20x4 characters]
4. Navigation knob [rotary & push]

The rear panel (Encoder):
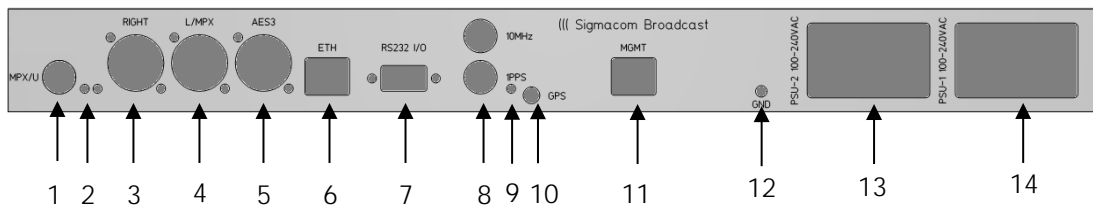
1. Unbalanced MPX input (BNC female)
2. Excessive input level alarm LEDs (L/R)
3. Right channel balanced input (XLR3 female)
4. Left channel / MPX balanced input (XLR3 female)
5. AES/EBU balanced input (XLR3 female)
6. 10/100 Ethernet port (RJ45 female) for audio payload
7. RS232 port for debugging (DB9 female)
8. 10MHz input or output (BNC female – SFN option #1)
9. GPS Status LED (GPSDO option #6)
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11. 10/100 Ethernet port (RJ45 female) for management (Option #4)
12. GND terminal
13. PSU2 100-240VAC power input connector w/switch & fuse (Option #7)
14. PSU1 100-240VAC power input connector w/switch & fuse

The rear panel (Decoder):
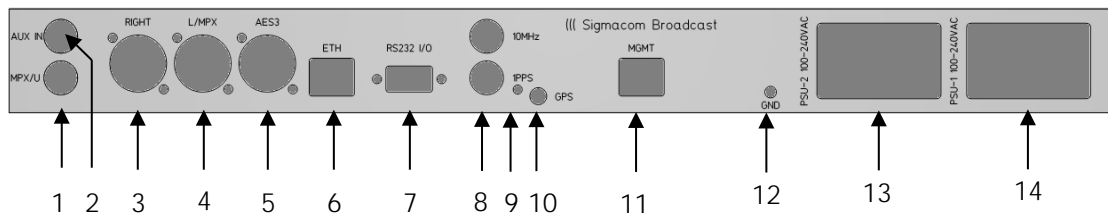
1. Unbalanced MPX output (BNC female)
2. Unbalanced AUX MPX input (BNC female)
3. Right channel balanced output (XLR3 male)
4. Left channel / MPX balanced output (XLR3 male)
5. AES/EBU balanced output (XLR3 male)
6. 10/100 Ethernet port (RJ45 female) for audio payload
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14. PSU1 100-240VAC power input connector w/switch & fuse

2. Basic installation instructions (Encoder & Decoder):

1. Install both Encoder & Decoder in a 19″ rack.
2. Connect power and Ethernet cables as shown below:
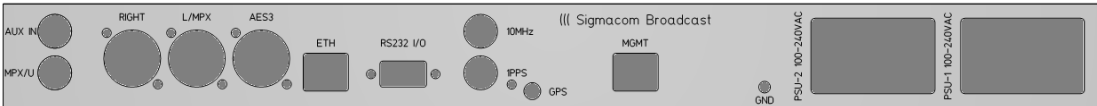
Basic Encoder connections

The dual PSU version is shown here. Your device may differ.

- Connect the MPX output of your audio processor / stereo encoder
- Connect the RJ45 LAN cable of your local network
- Connect a proper GROUND connection
- Connect the IEC power cable (100-240VAC, 50-60Hz) and turn the power switch on

Basic Decoder connections

The dual PSU version is shown here. Your device may differ.

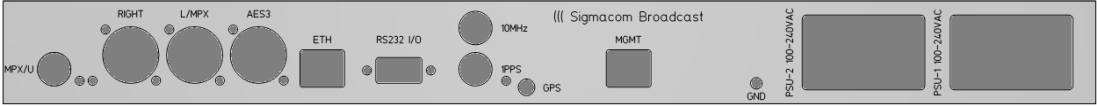- Connect the MPX output of the EtherMPX Decoder to your FM Exciter
- Connect your backup audio source to AUX IN
- Connect the RJ45 LAN cable of your local network
- Connect a proper GROUND connection
- Connect the IEC power cable (100-240VAC, 50-60Hz) and turn the power switch on

Audio levels adjustment at Encoder:

Analog audio input at Encoder should not exceed +6dBu (4.37Vpp). Suggested nominal range is 0dBu (2.19Vpp) to +4dBu (3.47Vpp). Exceeding those values, will lit the OVFL LEDs at the rear side of the Encoder, and could possibly damage the device. The Encoder has a DSP attenuator **after** the AES receiver and the ADC, therefore it cannot help if you overdrive the analog inputs. The attenuator is adjustable at steps of 0.5dB.

Audio levels adjustment at Decoder:

The audio outputs at the Decoder will provide the same audio level (1:1) as fed into the Encoder, when audio attenuator at Decoder is at -5.0dB (or 0.0dB since DSP 3.76). This is a DSP attenuator before the DAC, and therefore affects only the analog outputs. Analog and digital outputs of Decoder, are operating simultaneously.

Rear panel LED indications at Encoder:

- OVFL LEDs (two, one for each analog input): Indicates extremely audio level that needs immediate attention, otherwise damage may occur at analog input stages of the Encoder.

Front panel LED indications (Encoder & Decoder):

- **ON** (Blue): Indicates that device is turned on
- **PSU 1** (Green): Indicates that PSU 1 has power
- **PSU 2** (Green): Indicates that PSU 2 has power (Option #7)
- **ACT** (Amber): Indicates that audio transmission is active
- **LINK** (Green): Indicates that an Ethernet connection is present
- **ALM** (Red): Indicates an alarm condition:
    - For Encoder: No audio presence, or no IP config loaded
    - For Decoder: Silence Detector triggered, or no IP config loaded
    - With SFN Option is installed: When 1 PPS or 10MHz is missing, or faulty

Note: When Encoder is configured in "Unicast" mode and powered on, it searches for the Decoder (ACT LED is blinking every second). When a connection is established, ACT LED at Encoder & Decoder stay always on. If connection is lost, Encoder will cease transmission after 10 minutes and will start the search sequence each 17 seconds. When Encoder is configured in "Multicast" or any AES67 mode, transmission starts immediately and never stops.

Default settings:

- Encoder default ETH IP: 192.168.1.90 / 24
- Decoder default ETH IP: 192.168.1.91 / 24
- Encoder default MGMT IP (Option #4): 192.168.1.15 / 24
- Decoder default MGMT IP (Option #4): 192.168.1.16 / 24
- Factory setup: Analog, MPX Legacy, Unicast

Network considerations:

If you have multiple EtherMPX devices in the same network (like 1 Encoder and 2 or more Decoders), you MUST change the IP addresses of the devices accordingly to avoid IP conflicts (two devices with the same IP in the same network or VLAN, is **not allowed**).

If you have multiple networks or other traffic reaching the EtherMPX Encoder or Decoder, you **must filter it**. A recommended practice is to make network segmentation by using VLANs.

It is strongly recommended to use Layer2 transparent bridge Ethernet links with sufficient bandwidth and low jitter in order for the EtherMPX system to operate normally. The latency, high jitter and fragmentation caused by routing, **can cause serious problems** to real-time traffic such as EtherMPX produces.

The required bandwidth for each mode is described below (in Mbps):

	Legacy	HD	SD	LD	LLD	AES67
L/R	2.37 M	2.37 M	1.60 M	1.22 M	0.84 M	2.39 M
L/R LL	2.44 M	2.44 M	1.68 M	1.29 M	0.91 M	N/A
L/R NB	1.58 M	1.58 M	1.07 M	0.81 M	0.56 M	N/A
MPX	4.74 M	4.75 M	3.21 M	2.44 M	1.68 M	3.18 M
MPX LL	4.88 M	4.89 M	3.35 M	2.58 M	1.82 M	N/A
MPX NB	3.15 M	3.16 M	2.14 M	1.62 M	1.11 M	N/A

Table 1: Operational modes and required bandwidth

The audio buffer size at the decoder side depends on the network jitter you have in your transmission network. Select an appropriate buffer size to compensate the instability of your transmission network - otherwise you will experience audible audio artifacts ("clicks" and "pops") due to packet loss or drops.

Always consider that an increased buffer size results into additional latency to the audio delivered.

3. LCD menus:

From the LCD menus the user can view or modify some basic parameters (described below). To control all system parameters, you have to use the EtherMPX NMS (Network Management System) software.

To navigate through the menus:
Turn clockwise / counterclockwise the rotary knob on the front panel, to navigate through the User Interface menus displayed in the LCD.
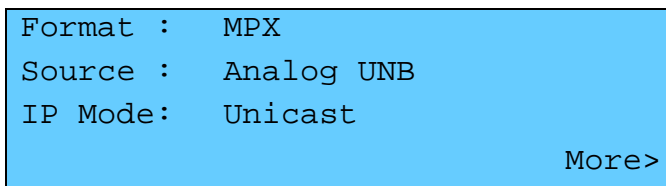
To modify a parameter:
Push once the rotary knob and a blinking cursor should appear in the screen. Turn clockwise / counterclockwise the rotary knob, to move the cursor over the parameter you want to modify. When you set the cursor over the desired parameter, push once again the rotary knob. Now you can turn clockwise / counterclockwise the rotary knob again, but to modify the parameter you selected.

When done, push the rotary knob again. A confirmation menu appears "SAVE? Y/N" where you can select "Y" if you want to apply and save the new settings, or "N" to discard any changes you made.
If you don't push any button within 30 seconds, the system discards any changes and returns to the main menu.

1. **Menu: Operational mode**

```
Format :    MPX
Source :    Analog UNB
IP Mode:    Unicast
                         More>
```

Format:
Enc & Dec: Select the audio format you need to transport through EtherMPX. You can select between the modes described in Table 1 (operational modes and bandwidth requirement).

Source:
Enc: Select the source port of the Encoder. You can select between "Analog UNB" (for MPX unbalanced BNC input), "Analog BAL" (for MPX balanced XLR input), or "Digital" (for AES/EBU balanced XLR input).
Dec: Shows / controls the embedded Silence Detector mode. You can select between AUTO, Force ETH and Force AUX.

IP Mode:
Enc only: Select the transmission mode. If you want to feed only one EtherMPX Decoder in your network, select "Unicast". If you need to feed more than one EtherMPX Decoders simultaneously, select "Multicast". To define the destination Multicast IP, you have to use the NMS software.

2. Menu: Audio level

```
Input                      dBFS
A  ■  ■  ■  ■  ■  ■        -10.3
B  -
<Back          !LowAud!     More>
```
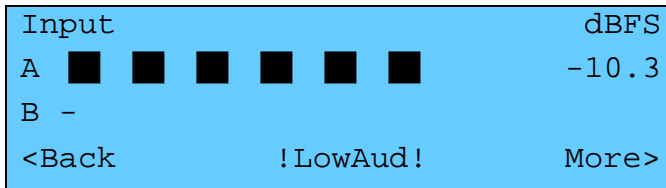
A: In MPX modes: Displays the RMS level of MPX signal
B: In L/R modes: Displays the RMS level of each (L & R) channel
!LowAud!: Indication of low audio level (ALM LED turns on as well)

Audio levels are displayed as a bar graph (VU meter) and as numerical value in dBFS. Please note that this is a display only menu. You cannot modify any parameter.

3. Menu: Network settings (Encoder)
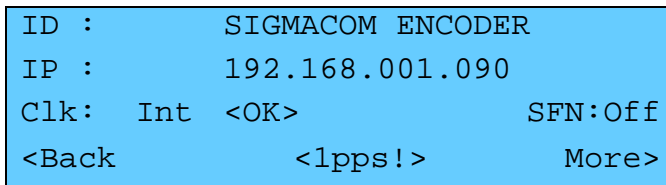
```
ID :        SIGMACOM ENCODER
IP :        192.168.001.090
Clk:  Int  <OK>          SFN:Off
<Back          <1pps!>      More>
```

ID:
Displays the device name. You cannot modify this parameter from the LCD menu, you have to use the EtherMPX NMS software.

IP:
Displays the device IP address. You can modify this parameter within the range of 1.0.0.1 to 254.255.255.254.

Clk:
Selects the reference clock source "Int" or "Ext". You cannot modify this parameter from NMS to avoid loss of communication. Only local modification is allowed. When selecting "Int", the Encoder uses the internal 10MHz TCXO reference. When selecting "Ext" switched to an external 10MHz reference connected at the rear "10MHz INPUT" female BNC connector. If that signal is present, an "<OK>" indication appears. If the external 10MHz reference is missing, an "<?>" indication appears, the ALM LED turns on, and the system switches to internal 10MHz reference.

SFN:
Displays the operational status of the SFN option (if installed). The "Off" status disables the Master Clock. When "On" the Master Clock is enabled. If the external 1PPS signal is missing, an "<1pps!>" indication appears, the ALM LED turns on, and the system switches to internal 1PPS source.

Menu: Network settings (Decoder)

```
ID :        SIGMACOM DECODER
IP :        192.168.001.091
Att:  0.0            <OK> SFN:Off
<Back           <1pps!>       More>
```

ID:
Displays the device name. You cannot modify this parameter from the LCD menu, you have to use the EtherMPX NMS software.

IP:
Displays the device IP address. You can modify this parameter within the range of 1.0.0.1 to 254.255.255.254.

Att:
Displays the analog output attenuation setting. A value of 0dB means no attenuation. You can modify this parameter in steps of 0.5dB within the range 0.0dB to Mute.

SFN:
Displays the operational status of the SFN option (if installed). The "Off" status means that the device is running on the internal clock. When "On" the device is synchronized to an external 10MHz source, or internal GPSDO if Option #6 is installed. If that signal is present, an "<OK>" indication appears. If the external 10MHz reference is missing, an "<?>" indication appears, the ALM LED turns on, and the system switches to internal 10MHz reference.
Also, if the external 1PPS signal is missing, an "<1pps!>" indication appears, the ALM LED turns on, and the system switches to internal 1PPS source.

4. **Menu: System information**

```
        Sigmacom EtherMPX NG
DSP=        V4.00
CPU =       V4.00
<Back
```

DSP:
Enc & Dec: Displays the firmware version running in the main processor. You cannot modify this parameter.

CPU:
Enc & Dec: Displays the firmware version running in the O&M (Operation & Maintenance) processor. You cannot modify this parameter.

4. NMS NG Software description
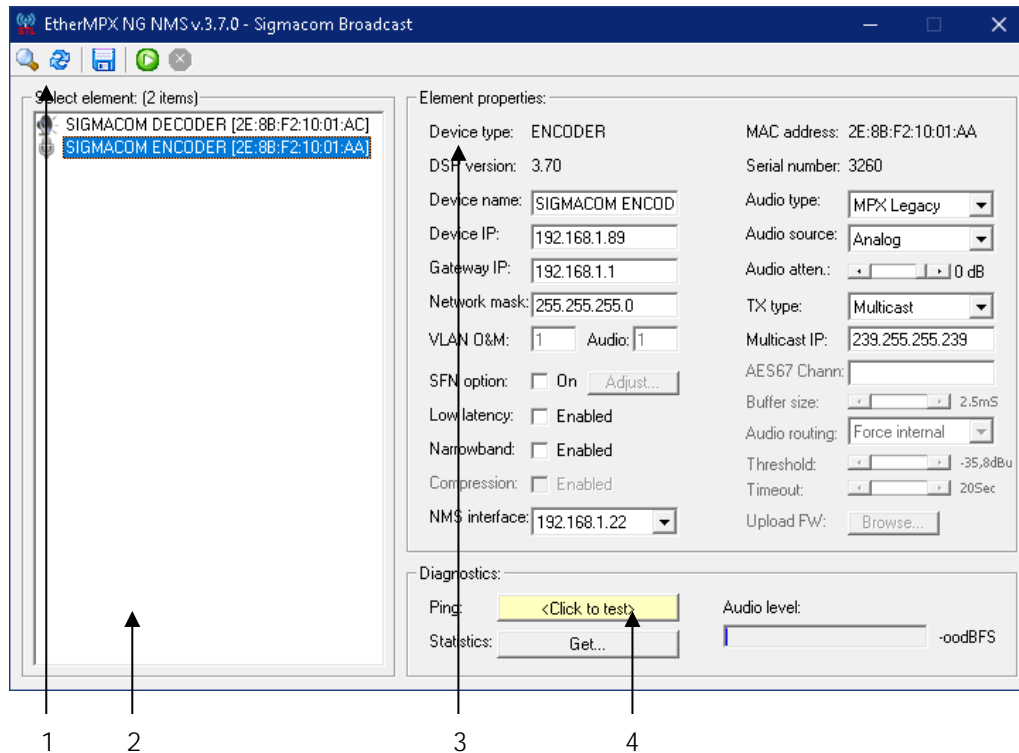
1. Command buttons

🔍 **Discovery**
Use this command to auto detect all EtherMPX devices in your network. Your computer must be in the same subnet as your devices are.

🔄 **Refresh**
Use this command to discard any changes made, and reload the last saved configuration stored in your computer.

💾 **Save**
Use this command to save locally in your computer any changes made, and simultaneously send them to the selected device (Encoder or Decoder).

▶ **Play**
This command is available only when the selected device is an Encoder device. Use this command to start audio level capture and display it in real time at the VU meter located at the down right corner of the "Diagnostics" area.

❌ **Stop**
This command is available only when the VU meter is running. Use it to stop audio level capture from Encoder.

2. Devices list

In this area will be displayed all the devices discovered in your network after you used the "Discovery" command button.

- 🎤 icon: Indicates an Encoder device
- 🎤 icon: Indicates a Decoder device

Next to each icon, the device name and MAC address is displayed.

3. Device properties

When you click on a device in the "Devices list" area, its properties and parameters are displayed here.

- **Device type:** ENCODER or DECODER (non modifiable)
- **DSP version:** The firmware version running in the main processor of the selected device (non modifiable)
- **MAC address:** The MAC address of the network interface of the selected device (non modifiable)
- **Serial number:** The production serial number of the selected device (non modifiable)
- **Device name:** View or modify the human friendly name of the selected device. Highly recommended if you have more than one Encoder or more than one Decoder in your network. This helps you to identify the proper device to manage.
- **Device IP:** View or modify the IP address of the selected device.
- **Gateway IP:** View or modify the network gateway IP address of the selected device.
- **Network mask:** View or modify the network mask of the selected device.
- **VLAN:** Reserved for future releases. User cannot modify this.
- **SFN option:** Enable or Disable SFN operation. Available only when SFN option #1 is installed in the selected device.
- **SFN Adjust:** View or modify the SFN tuning parameters. Available only when SFN option #1 is installed in the selected device.
- **Low Latency:** Enable or disable the Low Latency Option. Available only when Low Latency option #2 is installed in the selected device.
- **Narrowband:** Enable or disable the Narrowband mode. You should enable this if you don't have RDS2 or SCA.
- **Compression:** Enable or disable lossless compression. Reserved for future releases. User cannot modify this.
- **NMS interface:** If your computer has multiple IP addresses, select the appropriate one to be used by the NMS software.
- **Audio type:** View or modify the audio format of the selected device. Use the dropdown menu to select between the modes described in Table 1 (operational modes and bandwidth requirement).
- **Audio source:** This is an Encoder only functionality. View or modify the input source of the Encoder. Use the dropdown menu to select between "Analog BAL", Analog UNB", or "Digital" (AES/EBU) inputs.
- **Audio atten:** View or modify the audio level attenuation in steps of 0.5dB. This is a digital control, and takes action AFTER the AES3 receiver or the ADC in Encoder (and BEFORE the DAC at Decoder). The "Audio atten" function, will not help you if

you overdrive the analog inputs of Encoder, so take care to be within specification limits and also watch the OVFL LEDs at the rear side of the Encoder. For Decoder, the "Audio atten" functionality, affects only the analog outputs.

- **TX type:** This is an Encoder only functionality. View or modify the audio over IP transmission mode at the Encoder. Use the dropdown menu to select between "Unicast" (one Encoder to one Decoder) or "Multicast" (one Encoder to many Decoders). When in "Multicast" packets sent from Encoder, will have destination IP as defined in the "Multicast IP" field box (see below). When in AES67 mode, you must define "AES67 channel" instead of a multicast IP.
- **Decoder / Multicast IP:** This field has a double purpose. In Encoder with TX Type = Unicast, you type the IP address of the target Decoder to transmit to. In Encoder with TX Type = Multicast you type the destination Multicast IP address in the range of 239.0.0.1 to 239.255.255.254. The Decoders participating in this group, must be also configured to "listen" to the same multicast IP address. In AES67 mode it is disabled, and you must define an AES67 channel instead.
- **AES67 Chann:** If any AES67 mode is selected, you must define here the AES67 channel (valid values: 1-65535). Simultaneously you can see the corresponding multicast IP address in the "Multicast IP" field above.
- **Buffer size:** This is a Decoder only functionality. View or modify the audio buffer size of the selected Decoder. Please refer to "Network considerations" section above.
- **Audio routing:** This is a Decoder only functionality. View or modify the audio route of the selected Decoder. Use the dropdown menu to select between the available options:
  - o Force external: Route the audio from AUX IN to the MPX OUT
  - o Force internal: Route the audio from Ethernet to the MPX OUT
  - o Auto detect: Enables the Silence Detector (see below).
- **Threshold:** This is a Decoder only functionality and it is enabled only when "Auto detect" audio routing is selected. This is a parameter of the integrated Silence Detector in the Decoder, and defines the audio level threshold to start a countdown timer before it bridges the AUX IN to the MPX OUT connector (assuming that the audio over IP is lost).
- **Timeout:** This is a Decoder only functionality and it is enabled only when "Auto detect" audio routing is selected. This is a parameter of the integrated Silence Detector in the Decoder, and defines the initial value of the countdown timer.

Silence Detector example: Threshold = -18dBu, Timeout = 20 sec.
If the audio level coming from the EtherMPX encoder is below -18dBu for 20 consecutive seconds, the Silence Detector will assume that the audio over IP is lost, and will route the audio from the AUX IN connector to the MPX OUT connector. The ALM LED on the front panel is also lit, and an SNMP trap message will be sent to the predefined receiver (option #4 with 2nd ETH port must be installed for the SNMP management & functionalities).

When the audio level is restored above -18dBu for 5 consecutive seconds, the Silence Detector assumes that the audio over IP is OK and routes the audio from Ethernet to the MPX OUT connector. The ALM LED on the front panel is also turned off, and an SNMP trap message will be sent to the predefined receiver (option #4 with 2nd ETH port must be installed for the SNMP management & functionalities).

If your program has long periods of silence, or long pauses between songs and talent, it is recommended to set the audio routing of the Decoder to "Force internal".

Note: The 5 seconds restoration timer is hardcoded and cannot be modified by the user.

4. **Diagnostics**

When you have selected a device in the "Devices list" area, you can use the following tools:

- **Ping response:** Click with your mouse this button, to perform an ICMP ping towards to the IP address of the selected device. The ping is originating from your computer IP address, so it must be in the same subnet as the device is.

  o If there is a ping response, the button turns in green color and the response time is displayed.
  o If there is no response within a second, the button turns into red color with a "Failure" caption.

- **Statistics:** Every EtherMPX device keeps statistical counters about Ethernet packets being transmitted or received. If the SFN option is installed, statistical counters about the synchronization performance are displayed. Click on the "Get" button, and a new window will appear (see below):
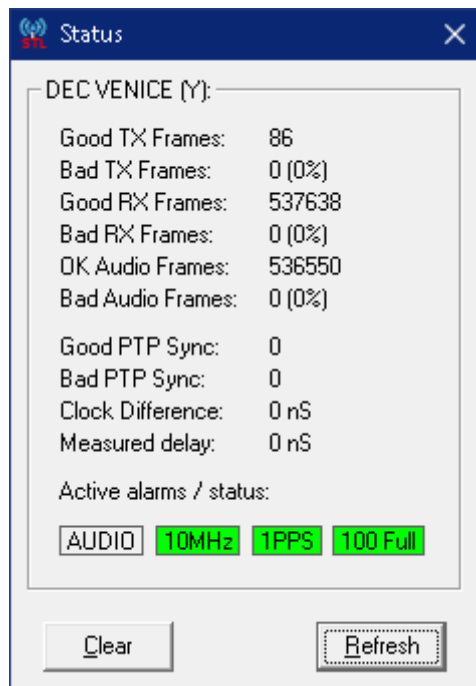
- **Good TX Frames**: Ethernet frames transmitted OK from the device (no internal underruns / overruns, network collisions).
- **Bad TX Frames:** Ethernet frames that failed to be transmitted from the device (possible causes: internal underrun /overrun, or network collisions). The error percentage is shown inside the parenthesis.
- **Good RX Frames**: Ethernet frames received OK from the device (no CRC errors, no underruns / overruns, no network collisions).

- **Bad RX Frames**: Ethernet frames received, but dropped by the device (possible causes: CRC errors, internal underrun / overrun, network collisions). The error percentage is shown in the parenthesis.
- **OK Audio Frames:** Ethernet frames with audio payload that transmitted or received OK.
- **Bad Audio Frames:** Ethernet frames with audio payload, but dropped by the device (possible causes: CRC errors, internal underrun / overrun, network collisions). The error percentage is shown in the parenthesis.
- **Good PTP Sync**: (Only available if SFN option is installed and enabled). Number of SYNC messages received OK and took into account by the EtherMPX algorithms to calculate and calibrate on-the-fly the sync parameters.
- **Bad PTP Sync**: (Only available if SFN option is installed and enabled). Number of PTP SYNC messages received, but rejected by the EtherMPX algorithms. Possible causes: glitching Master Clock, heavy loaded network, many irrelevant Ethernet packets that must be filtered out.
- **Clock difference**: (Only available if SFN option #1 and GPSDO option #6 are installed and enabled). The measured mismatch between the Master Clock and the local clock, expressed in nanoseconds (nS). This value must be as low as possible to indicate that there is a good sync with the Master Clock. Cases of >12nS difference, indicate a GPSDO signal reception problem.
- **Measured delay**: (Only available if SFN option #1 and GPSDO option #6 are installed and enabled). The network latency as measured between local device and Master Clock device.
- **Active alarms / status**: (Only available on DSP v3.73 and later).
  - **AUDIO:** Status of silence detector when is set to "Auto routing"
    - **Grey:** Unknown state
    - **Green:** Silence detector is not triggered
    - **Red:** Silence detector is triggered
  - **10MHz:** Status of the incoming 10MHz signal
    - **Grey:** Unknown state
    - **Green:** 10MHz signal is present and usable
    - **Red:** 10MHz signal is missing, or usable. See error code.
  - **1PPS:** Status of the incoming 1PPS signal
    - **Grey:** Unknown state
    - **Green:** 1PPS signal is present and usable
    - **Red:** 1PPS signal is missing.
  - **ETH:** Ethernet port status
    - **Grey:** Unknown state
    - **Green:** Ethernet cable is connected as:
      - 10MBps Half Duplex
      - 10Mbps Full Duplex
      - 100Mbps Half Duplex
      - 100Mbps Full Duplex
    - **Red:** Ethernet cable is disconnected
- **Clear Button**: Click this button to reset all displayed counters to zero. A confirmation dialog appears to verify this operation.
- **Refresh Button**: Click this button to update the counters (fetch the latest values from the EtherMPX device).

- **Audio level:** This is an Encoder only functionality. This is a real time VU meter, which displays the audio level of the selected Encoder. To start monitoring the audio level, select the Encoder device you want, and click the "Play" button on the top strip. To stop the audio monitoring, just click the "Stop" button next, or select some

other device from the "Devices list". Keep in mind that audio monitoring causes reverse direction IP traffic of about 100-200kbit/s.

⚠ If you are working with analog audio, a good practice is to keep the Encoder input level in the range between -6.0 to -8.0dBFS.
When utilizing the digital input, a good practice is to keep the audio input level up to -2.0dBFS.

5. SFN Option (#1)

This section refers to the SFN Option, wherever available and enabled.

- **Operation principals:**
  The purpose of this option, is to make EtherMPX Encoder(s) and Decoder(s) deliver synced audio to a cluster of transmitter sites.
  With SFN Option #1, the EtherMPX devices accept 10MHz & 1PPS signals from an external source, and syncs on that.

  Inside an overlapping area with ≤10dB wanted/unwanted signal, the required accuracy is <5uS. Therefore, the better the stability & accuracy of your equipment, the better is the result on the field.
  EtherMPX SFN functionality ensures you that you will have the exact same audio (by terms of amplitude, phase, group delay etc), at the exact same time, +/- 35nS.

- **Encoder:**
  To turn on the SFN operation, switch the "SFN" parameter to "On" (this can be modified from the front panel menu or the NMS, see previous sections).

  Also, you must set the "CLK" parameter to "EXT" from the front panel menu (LCD display and rotary knob).

  When switching from "Int" to "Ext" and vice versa, user must perform a full power reset of the Encoder, in order to trigger a re-sync command to all Decoders participating in the network.

  ⚠ **Important:**

  - The same re-sync command is also sent by the Encoder every time you save any parameter modification.
  - When a Decoder receives the re-sync command, the output audio is muted for a few mS.

  The rear female BNC connector marked as "10MHz", accepts 10MHz from 0.5…3.3Vpp sine or square wave (50Ohms, AC coupled input).
  The rear female BNC connector marked as "1PPS", accepts 1PPS of 3.3Vpp or 5Vpp square wave (10kOhms, DC coupled input).

  ⚠ When GPSDO (Option #6) is installed, those ports become outputs and provide 10MHz & 1PPS signals for your FM exciter (see next chapter).

- **Decoder:** To turn on the SFN operation, switch the "SFN" selection to "On" (this can be modified from the front panel menu or the NMS - see previous sections).

6. GPSDO Option (#6)

This section refers to the GPSDO Option, wherever available and enabled.

- **Operation principals:**
  The purpose of this option is to provide the necessary 10MHz and 1PPS synced signals for the SFN Option to work. Those signals are internally generated from a high-end GNSS receiver, with high stability and accuracy, and 24h holdover functionality.

  When GPSDO Option is installed, the BNC connectors marked as "10MHz" and "1PPS" at the rear side of the device, are acting **as outputs** to drive your FM exciter, or any other device you need.
  Also the SFN adjustments are enabled (see below).

  The GPSDO LED at the rear side of the device, shows the status of the GNSS receiver.
  - LED blinks 25% on, 75% off = GNSS signal OK
  - LED blinks 75% off, 25% on = Acquiring GNSS signal, or no signal at all
  - LED is constantly on or off = GNSS fault

- **SFN Adjustments**

"SFN Adjustments" allow manual control on some SFN parameters. When the SFN Option is enabled, you can access the "SFN Adjustments" menu by clicking the "Adjust…" button, next to SFN "On/Off" checkbox.

From this menu, the user can get information about the latency measurements performed by each Decoder (measurement period: 30 seconds), and adjust manually the compensation.

"Measurements" section

- o **Network latency (MIN):** The minimum latency measured ("lucky packet") since last counter reset.
- o **Network latency (MAX):** The highest latency measured since last counter reset.
- o **Network latency (AVG):** A 2-samples rolling average value, since last counter reset.
- o **MAC interface latency:** A constant value displaying the latency by the MAC interface.
- o **Audio interface latency:** A constant value displaying the latency caused by the ADC and DAC circuitry.
- o **Latency summary (MIN):** The minimum sum of all above values.
- o **Latency summary (MAX):** The maximum sum of all above values,
- o **Latency summary (AVG):** The average sum of all above values,
- o **Clear button:** Perform a reset to zero for all statistical & SFN counters. A confirmation dialog box appears to verify this action.
- o **Auto:** Check this box to begin auto refresh displayed values. The auto refresh function stops if the user clicks on any other control (scroll bar, checkboxes).
- o **Refresh button:** Click this button to manually refresh the displayed values.

"Adjustments" section

- o **Latency compensation:** Use the scroll bar to set the desired latency compensation and then click the "Set" button to send this value to the selected Decoder device.
  Range: 0 – 2.5mS in 100nS steps.
- o **Set button:** Click this button to send the displayed values to the selected Decoder device. There is no prior confirmation dialog box.
- o **Auto clear counters:** Check this box to perform counters reset after every time you send a new parameter.

Any changes made at "SFN Adjustments" menu, are **not** automatically saved at the remote Decoder device and **will be lost** at next reboot.

After exiting the "SFN Adjustments" menu, a notification will be displayed to remind the user for unsaved parameters:
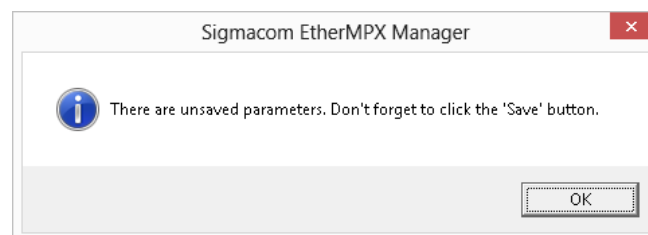
After sending a new parameter or saving previous changes, the user must wait until the system is stabilized for a short (30 seconds) to a medium (90 seconds) period of time (averaging errors are minimized), before evaluating the effect of the changes.

After 5 minutes of the last modification of the SFN parameters, the system performs a last calibration, and a small pause to audio may occur.

The following screenshot demonstrates the synced MPX output of 2 Decoders (Decoder 1: Yellow, Decoder 2: Blue) without "Auto" or "Manual" delay compensation. The test signal is a frequency sweep of 1-50kHz:
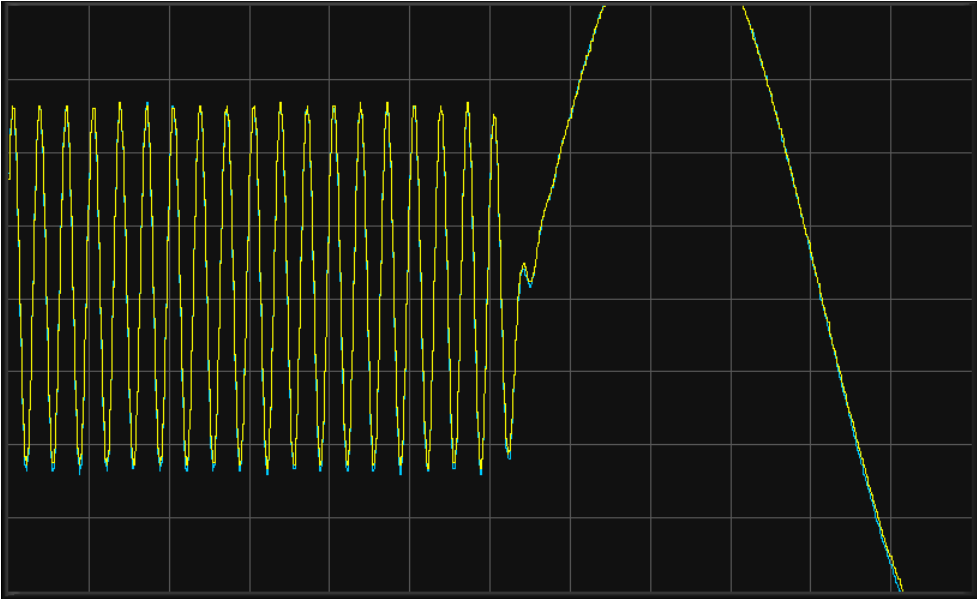
7. Low Latency Option (#7)

This section refers to the Low Latency Option, wherever available and enabled.

- **Operation principals:**
  The purpose of EtherMPX Low Latency option is to deliver audio with much lower latency than Basic version (50% latency reduction).

  ⚠️ **Important:**

  The Low Latency option must be enabled in both Encoder and Decoder(s), otherwise it will result in cropped audio.

  In Basic version, the Encoder collects audio samples until a total buffer of 2.5mS (for MPX mode) or 5mS (for L/R mode) before sending this audio frame to the network. Additionally, each Decoder is keeping a buffer of incoming audio frames (see previous section "Network considerations").

  When Low Latency option is installed and enabled, the Encoder collects audio samples up to 1.25mS (for MPX mode) or 2.5mS (for L/R mode) before sending the audio frame to the network. The Decoder minimum buffer size is also 1 frame, resulting into 1.25mS (for MPX mode) or 2.5mS (for L/R mode) additional latency.

  - Therefore, in Basic version, the end-to-end latency is:
    2.5mS latency introduced by the Encoder, plus 2.5mS latency introduced by the Decoder (when in minimum buffer size) = 5.0mS in total for MPX mode.
  - With Low Latency option, these values become:
    1.25mS latency introduced by the Encoder, plus 1.25mS latency introduced by the Decoder (when in minimum buffer size) = 2.5mS in total for MPX mode.

  Without Low Latency option, the Decoder buffer size is adjustable between 2.5 to 60.0mS in 2.5mS steps, while with Low Latency option is adjustable between 1.25 to 60.0mS in 1.25mS steps.

  ⚠️ **Important:**

  The Low Latency Option is very sensitive to network packet loss or jitter, therefore avoid using over unreliable transmission networks.

8. Implementation examples
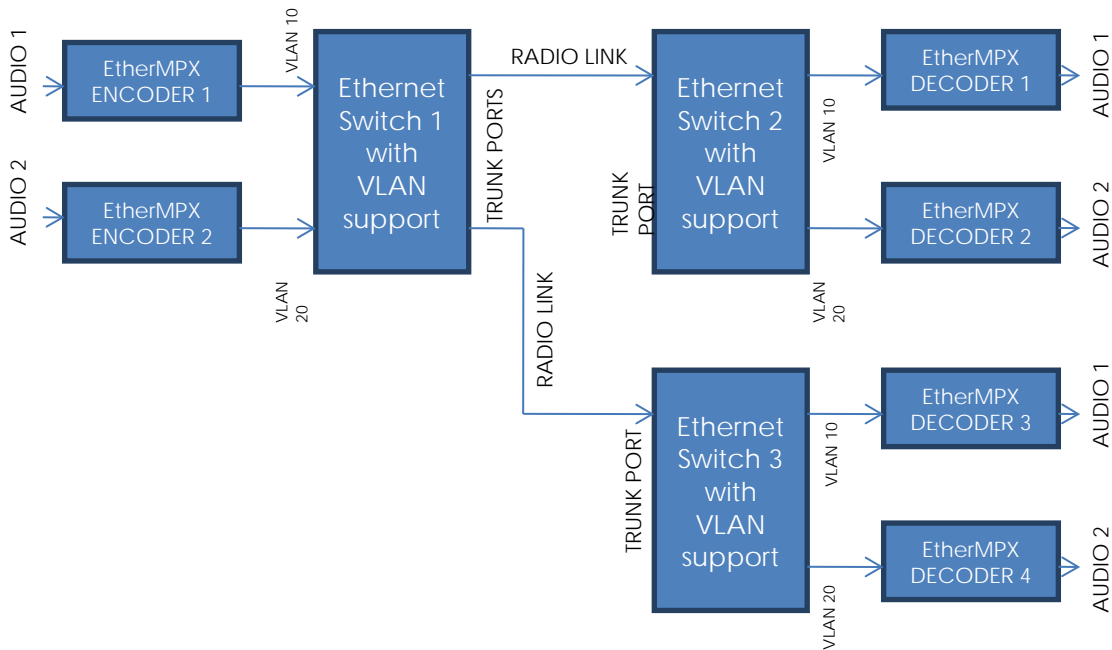
Example 1: Multicast with VLANs

Two different radio programs must be transported to two different TX sites over single IP radio links. We need both programs at each TX site.

Because two Encoders are operating in "Multicast" mode (this is needed in order to feed more than one Decoder), these two streams must be logically separated inside the network.

To achieve this, you need Ethernet switches that support VLANs.

You will need to define separate VLANs - one for each radio program (VLAN 10 for radio program 1, and VLAN 20 for radio program 2 in our example). Even if you have isolated network segments, you should define unique IP addresses to each device.

Note that the ports connected to IP radio links, must be configured as trunk ports to allow all VLANs to pass through. The ports connected to Encoders & Decoders, must add the appropriate VLAN tags to ingress traffic, and discard VLAN tags on egress traffic.

AUDIO 1 → EtherMPX ENCODER →

AUDIO 2 → EtherMPX ENCODER →

Ethernet Switch 1

RADIO LINK

Ethernet Switch 2

→ EtherMPX DECODER → AUDIO 1

RADIO LINK

Ethernet Switch 3

→ EtherMPX DECODER → AUDIO 2
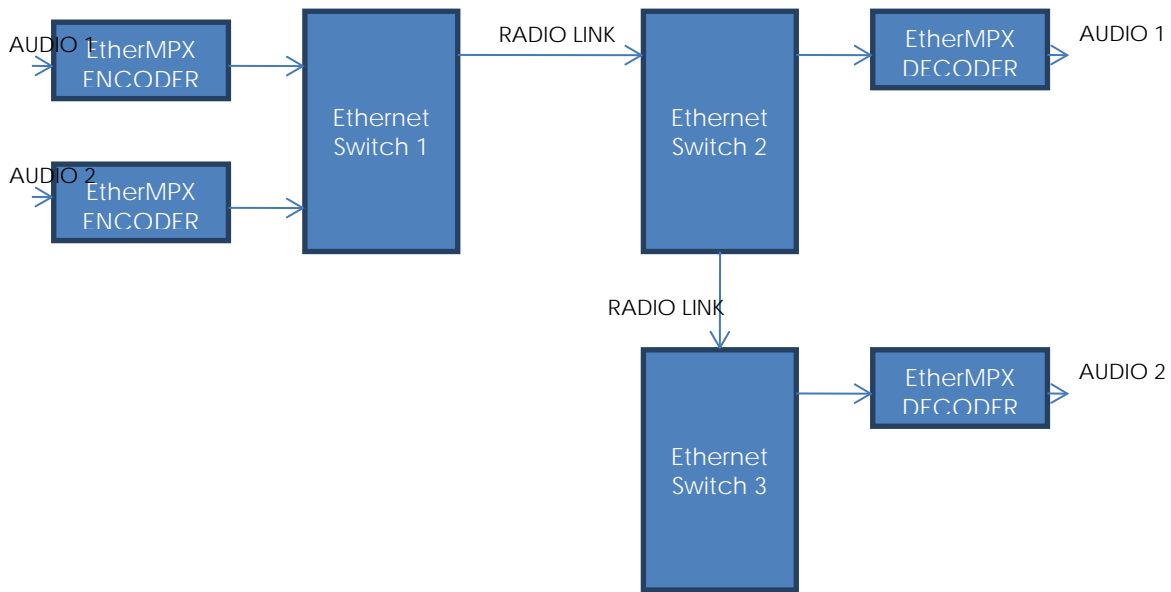
Example 2: Unicast

Two different radio programs must be transported to two different TX sites over single IP radio links. We need only one program at each TX site.

To achieve this, you can use simple, ordinary Ethernet switches (no need for VLAN support in this setup).

Because two Encoders are operating in "Unicast" mode (each one is paired to only one Decoder), they can co-exist in the same network without the need of VLANs. Of course each device must also have a unique IP address.

Note:

These are only two mere examples. The flexibility and the possibilities of using EtherMPX over an IP network are endless.
If you need any assistance on designing your own transmission network, please do not hesitate to consult us!

9. 2nd ETH (Option #4) for SNMP management

EtherMPX devices with option #4, provide a separate RJ45 connector at the rear side, marked as "MGMT". This is an Ethernet interface dedicated for management purposes over SNMP protocol. At the moment it utilizes only SNMP v1, but this will be enriched in future versions / upgrades.

The supported SNMP PDUs are shown below:

- GetRequest
- SetRequest
- GetNextRequest
- Response
- Trap

The EtherMPX MIB file is the same for Encoder and Decoder. The file contains 50 variables, which some are specific for Encoder devices, some are specific for Decoder devices, and some are valid for both device types.

If you try to issue an SNMP command that is not supported from the specific device type, you will get an error response.

Further down on the document, the whole structure of the MIB file is explained. Since there are no tables in the MIB file, multi-variable commands are not supported; i.e. you cannot issue a GetRequest with 2 (or more) variables in the same request. Instead, a series of GetRequest or GetNextRequest commands can be issued.

SNMP TRAP

EtherMPX issues a TRAP PDU every time the Silence Detector is activated or deactivated.

- **Defaults & Limitations:**

  - The default read-only community string is **sigmacom**
    The default read-write community string is **ethermpx**

    ⚠️ **CAUTION!** You can change the community strings to your choice but they must be of fixed length 8 characters (no more & no less).

  - Default IP address of the MGMT port is 192.168.1.15/24 for Encoder and 192.168.1.16/24 for Decoder. On versions earlier than 3.5.0 and 4.2.0 the default IP is 192.168.1.16/24 for both devices (Encoder & Decoder).
  - Variable "sysDeviceName" is used for the unique name you give to the device and it must be of fixed length 16 characters (no more & no less).
    This name is displayed in the LCD screen of the device.

- **SNMP integration:**

There are 2 ways of integrating an EtherMPX device in your third party SNMP management software. Either load the MIB file that came along with this documentation, or configure the

OIDs manually like the example below. If you are configuring the OIDs manually, you can copy-paste them from MIB file but **don't forget to add .0** at the end of each one.

⚠️ **Example:**
MIB file: **1.3.6.1.4.1.44467.1.4**
Custom OID: **1.3.6.1.4.1.44467.1.4.0**

To prevent misconfiguration of MGMT network settings, and hence loosing contact with the device, a 2 step process has been implemented.

Variables **snmpAgentMask, snmpAgentGW, snmpAgentIP, snmpAgentDNS** are read-only. If you need to change them, you must first change variables **snmpNewAgentMask**, **snmpNewAgentGW**, **snmpNewAgentIP**, and **snmpNewAgentDNS**. After you verify that everything is correct, then you must set the **snmpSetSettings** variable to **1**.

This will cause active variables to be overwritten with the **"new"** values and the MGMT engine of EtherMPX will reset for 25 seconds. This will not affect the audio part. After 25 sec you can connect to the new MGMT IP.

SIGMACOM-ETHERMPX NG file

```
--- © 2022 Sigmacom Broadcast - www.sigmacom.gr - info@sigmacom.gr
--- MIB structure 2023
--- SNMP V1


        SIGMACOM-ETHERMPX-NG DEFINITIONS ::= BEGIN

                IMPORTS
                        OBJECT-TYPE
                                FROM RFC-1212
                        TRAP-TYPE
                                FROM RFC-1215
                        enterprises, IpAddress, Gauge
                                FROM RFC1155-SMI;


--
-- Node definitions
--

                -- 1.3.6.1.4.1.44467
                sigmacom OBJECT IDENTIFIER ::= { enterprises 44467 }


                -- 1.3.6.1.4.1.44467.1
                etherMPX OBJECT IDENTIFIER ::= { sigmacom 1 }


                -- 1.3.6.1.4.1.44467.1.1
                sysAudioAttenuation OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-write
                        STATUS mandatory
                        DESCRIPTION
                "Analog output attenuation. Range=255-14, step=1, attenuation(dB)=255-(value*0,5)."
                        ::= { etherMPX 1 }


                -- 1.3.6.1.4.1.44467.1.2
                sysAudioBufferSize OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-write
                        STATUS mandatory
                        DESCRIPTION
                "Decoder audio buffer. Range=1-23, step=1, latency(mS)=value*2,5. If
LowLatencyOption, Range=1-56, step=1, latency(mS)=value*1,25"
                        ::= { etherMPX 2 }


                -- 1.3.6.1.4.1.44467.1.3
                sysAudioFramesRxErr OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-only
                        STATUS mandatory
                        DESCRIPTION
                "Ethernet frames with audio payload, but dropped by the device (possible causes: CRC
errors, internal underrun / overrun, network collisions). Auto reset to zero when reaches
value=268.435.456."
                        ::= { etherMPX 3 }


                -- 1.3.6.1.4.1.44467.1.4
                sysAudioFramesRxOk OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-only
                        STATUS mandatory
                        DESCRIPTION
                "Ethernet frames with audio payload that received OK. Auto reset to zero when reaches
value=268.435.456."
                        ::= { etherMPX 4 }


                -- 1.3.6.1.4.1.44467.1.5
```

```
sysAudioFramesTxErr OBJECT-TYPE
        SYNTAX Gauge
        ACCESS read-only
        STATUS mandatory
        DESCRIPTION
"Ethernet frames with audio payload, but dropped by the device (possible causes: CRC
errors, internal underrun / overrun, network collisions). Auto reset to zero when reaches
value=268.435.456."
        ::= { etherMPX 5 }


-- 1.3.6.1.4.1.44467.1.6
sysAudioFramesTxOk OBJECT-TYPE
        SYNTAX Gauge
        ACCESS read-only
        STATUS mandatory
        DESCRIPTION
"Ethernet frames with audio payload that transmitted OK. Auto reset to zero when
reaches value=268.435.456."
        ::= { etherMPX 6 }


-- 1.3.6.1.4.1.44467.1.7
sysAudioInputPort OBJECT-TYPE
        SYNTAX Gauge
        ACCESS read-write
        STATUS mandatory
        DESCRIPTION
"Audio input interface of Encoder. Value=0(Digital), Value=1(Analog)."
        ::= { etherMPX 7 }


-- 1.3.6.1.4.1.44467.1.8
sysAudioInputType OBJECT-TYPE
        SYNTAX Gauge
        ACCESS read-write
        STATUS mandatory
        DESCRIPTION
"Audio type to be transmitted. Must be the same in both Encoder and Decoder. See
manual for possible values."
        ::= { etherMPX 8 }


-- 1.3.6.1.4.1.44467.1.9
sysLowLatencyOptionEnabled OBJECT-TYPE
        SYNTAX Gauge
        ACCESS read-write
        STATUS mandatory
        DESCRIPTION
"Enable or disable Low Latency Option. Must be the same in both Encoder and Decoder.
Value=0(Disable), Value=1(Enable)."
        ::= { etherMPX 9 }

-- 1.3.6.1.4.1.44467.1.10
sysMulticastIp OBJECT-TYPE
        SYNTAX IpAddress
        ACCESS read-write
        STATUS mandatory
        DESCRIPTION
"Definition of multicast IP for audio packets. Must be the same in both Encoder and
Decoder."
        ::= { etherMPX 10 }

-- 1.3.6.1.4.1.44467.1.11
sysRemoteIp OBJECT-TYPE
        SYNTAX IpAddress
        ACCESS read-write
        STATUS mandatory
        DESCRIPTION
"Define the remote IP address."
        ::= { etherMPX 11 }


-- 1.3.6.1.4.1.44467.1.12
sysStreamingType OBJECT-TYPE
        SYNTAX Gauge
        ACCESS read-write
```

```
                      STATUS mandatory
                      DESCRIPTION
            "Define in Encoder the transmission type. Value=0(Unicast), value=1(Multicast)."
                      ::= { etherMPX 12 }


            -- 1.3.6.1.4.1.44467.1.13
            sysGateway OBJECT-TYPE
                      SYNTAX IpAddress
                      ACCESS read-write
                      STATUS mandatory
                      DESCRIPTION
            "Define the IP gateway of the Audio_ETH interface."
                      ::= { etherMPX 13 }


            -- 1.3.6.1.4.1.44467.1.14
            sysIpAddress OBJECT-TYPE
                      SYNTAX IpAddress
                      ACCESS read-write
                      STATUS mandatory
                      DESCRIPTION
            "Define the IP address of the Audio_ETH interface."
                      ::= { etherMPX 14 }



            -- 1.3.6.1.4.1.44467.1.15
            sysMacAddress OBJECT-TYPE
                      SYNTAX OCTET STRING
                      ACCESS read-only
                      STATUS mandatory
                      DESCRIPTION
            "Display the MAC address of the Audio_ETH interface."
                      ::= { etherMPX 15 }


            -- 1.3.6.1.4.1.44467.1.16
            sysRxFramesErr OBJECT-TYPE
                      SYNTAX Gauge
                      ACCESS read-only
                      STATUS mandatory
                      DESCRIPTION
            "Ethernet frames received, but dropped by the device (possible causes: CRC errors,
internal underrun / overrun, network collisions). Auto reset to zero when reaches
value=268.435.456."
                      ::= { etherMPX 16 }



            -- 1.3.6.1.4.1.44467.1.17
            sysRxFramesOk OBJECT-TYPE
                      SYNTAX Gauge
                      ACCESS read-only
                      STATUS mandatory
                      DESCRIPTION
            "Ethernet frames received OK from the device (no CRC errors, no underruns / overruns,
no network collisions). Auto reset to zero when reaches value=268.435.456."
                      ::= { etherMPX 17 }



            -- 1.3.6.1.4.1.44467.1.18
            sysSubnetMask OBJECT-TYPE
                      SYNTAX IpAddress
                      ACCESS read-write
                      STATUS mandatory
                      DESCRIPTION
            "Define the IP subnet mask of the Audio_ETH interface."
                      ::= { etherMPX 18 }



            -- 1.3.6.1.4.1.44467.1.19
            sysTxFramesErr OBJECT-TYPE
                      SYNTAX Gauge
                      ACCESS read-only
                      STATUS mandatory
                      DESCRIPTION
            "Ethernet frames that failed to be transmitted from the device (possible causes:
internal underrun / overrun, or network collisions). Auto reset to zero when reaches
value=268.435.456."
                      ::= { etherMPX 19 }
```

```
               -- 1.3.6.1.4.1.44467.1.20
           sysTxFramesOk OBJECT-TYPE
                   SYNTAX Gauge
                   ACCESS read-only
                   STATUS mandatory
                   DESCRIPTION
           "Ethernet frames transmitted OK from the device (no internal underruns / overruns,
network collisions). Auto reset to zero when reaches value=268.435.456."
                   ::= { etherMPX 20 }


               -- 1.3.6.1.4.1.44467.1.21
           sfnFramesErr OBJECT-TYPE
                   SYNTAX Gauge
                   ACCESS read-only
                   STATUS mandatory
                   DESCRIPTION
           "Decoder only: number of PTP SYNC messages received, but rejected by the EtherMPX
algorithms. Possible causes: glitching Master Clock, heavy loaded network, many irrelevant Ethernet
packets that must be filtered out. Auto reset to zero when reaches value=268.435.456."
                   ::= { etherMPX 21 }


               -- 1.3.6.1.4.1.44467.1.22
           sfnFramesMismatch OBJECT-TYPE
                   SYNTAX INTEGER
                   ACCESS read-only
                   STATUS mandatory
                   DESCRIPTION
           "Decoder only: the measured mismatch between the Master Clock and the local clock,
expressed in nanoseconds (nS). This value must be as low as possible to indicate that there is a
good sync with the Master Clock."
                   ::= { etherMPX 22 }


               -- 1.3.6.1.4.1.44467.1.23
           sfnFramesOk OBJECT-TYPE
                   SYNTAX Gauge
                   ACCESS read-only
                   STATUS mandatory
                   DESCRIPTION
           "Decoder only: number of SYNC messages received OK and took into account by the
EtherMPX algorithms to calculate and calibrate on-the-fly the sync parameters. Auto reset to zero
when reaches value=268.435.456."
                   ::= { etherMPX 23 }


               -- 1.3.6.1.4.1.44467.1.24
           sfnLatencyAvg OBJECT-TYPE
                   SYNTAX INTEGER
                   ACCESS read-only
                   STATUS mandatory
                   DESCRIPTION
           "Decoder only: a 2-samples rolling average value of the measured latency towards the
Encoder, since last counter reset."
                   ::= { etherMPX 24 }

               -- 1.3.6.1.4.1.44467.1.25
           sfnLatencyMax OBJECT-TYPE
                   SYNTAX INTEGER
                   ACCESS read-only
                   STATUS mandatory
                   DESCRIPTION
           "Decoder only: The highest measured latency towards the Encoder, since last counter
reset."
                   ::= { etherMPX 25 }

               -- 1.3.6.1.4.1.44467.1.26
           sfnLatencyMin OBJECT-TYPE
                   SYNTAX INTEGER
                   ACCESS read-only
                   STATUS mandatory
                   DESCRIPTION
           "Decoder only: The lowest measured latency towards the Encoder, since last counter
reset."
                   ::= { etherMPX 26 }
```

```
            -- 1.3.6.1.4.1.44467.1.27
        sfnLatencyNow OBJECT-TYPE
                SYNTAX INTEGER
                ACCESS read-only
                STATUS mandatory
                DESCRIPTION
        "Decoder only: The network latency as measured between local device and Master Clock
device. Updated every 30 sec."
                ::= { etherMPX 27 }


            -- 1.3.6.1.4.1.44467.1.28
        sfnAutoLatency OBJECT-TYPE
                SYNTAX Gauge
                ACCESS read-write
                STATUS mandatory
                DESCRIPTION
        "Decoder only: Auto compensate measured latency. Not recommended without PTP-aware
network elements. Value=0(Disable), value=1(Enable)."
                ::= { etherMPX 28 }


            -- 1.3.6.1.4.1.44467.1.29
        sfnClockSelection OBJECT-TYPE
                SYNTAX Gauge
                ACCESS read-write
                STATUS mandatory
                DESCRIPTION
        "Encoder only: Select internal TCXO or external 10MHz clock source. Use with extreme
caution, see User Manual. Value=0(Internal), value=1(External)."
                ::= { etherMPX 29 }


            -- 1.3.6.1.4.1.44467.1.30
        sfnOptionEnabled OBJECT-TYPE
                SYNTAX Gauge
                ACCESS read-write
                STATUS mandatory
                DESCRIPTION
        "Enable or disable SFN Option. Must be the same in both Encoder and Decoder.
Value=0(Disable), Value=1(Enable)."
                ::= { etherMPX 30 }


            -- 1.3.6.1.4.1.44467.1.31
        sfnUserLatency OBJECT-TYPE
                SYNTAX Gauge
                ACCESS read-write
                STATUS mandatory
                DESCRIPTION
        "Decoder only: user defined latency compensation in 100nS steps. Range 0-2500000,
step=1, additional latency(nS)=value"
                ::= { etherMPX 31 }


            -- 1.3.6.1.4.1.44467.1.32
        sysSilenceDetectorMode OBJECT-TYPE
                SYNTAX Gauge
                ACCESS read-write
                STATUS mandatory
                DESCRIPTION
        "Operational mode of Silence Detector engine in Decoder. Value=0(Auto detect),
value=1(Force internal), value=2(Force external)."
                ::= { etherMPX 32 }


            -- 1.3.6.1.4.1.44467.1.33
        sysSilenceDetectorThreshold OBJECT-TYPE
                SYNTAX Gauge
                ACCESS read-write
                STATUS mandatory
                DESCRIPTION
        "Lowest audio level threshold that triggers countdown timer. Range=1-154, step=1,
level(dBu)=56-(Log10(value*2.0487)*20))."
                ::= { etherMPX 33 }
```

```
                -- 1.3.6.1.4.1.44467.1.34
                sysSilenceDetectorTimeout OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-write
                        STATUS mandatory
                        DESCRIPTION
                "Initial value of countdown timer in Decoder, before switching to AUX input. Range=1-
220, step=1, time(Sec)=value*0,455."
                        ::= { etherMPX 34 }


                -- 1.3.6.1.4.1.44467.1.35
                sysDeviceName OBJECT-TYPE
                        SYNTAX OCTET STRING
                        ACCESS read-write
                        STATUS mandatory
                        DESCRIPTION
                "Device name. Fixed number of 16 characters (no more or less than 16)."
                        ::= { etherMPX 35 }


                -- 1.3.6.1.4.1.44467.1.36
                sysDspVersionMajor OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-only
                        STATUS mandatory
                        DESCRIPTION
                "Display major version of DSP software."
                        ::= { etherMPX 36 }


                -- 1.3.6.1.4.1.44467.1.37
                sysDspVersionRevision OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-only
                        STATUS mandatory
                        DESCRIPTION
                "Display revision of DSP software."
                        ::= { etherMPX 37 }


                -- 1.3.6.1.4.1.44467.1.38
                sysSerialNumber OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-only
                        STATUS mandatory
                        DESCRIPTION
                "Device serial number."
                        ::= { etherMPX 38 }


                -- 1.3.6.1.4.1.44467.1.39
                sysAudioQual OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-write
                        STATUS mandatory
                        DESCRIPTION
                "Possible values: 8, 12, 16 or 24"
                        ::= { etherMPX 39 }


                -- 1.3.6.1.4.1.44467.1.40
                sysEthStatus OBJECT-TYPE
                        SYNTAX Gauge
                        ACCESS read-only
                        STATUS mandatory
                        DESCRIPTION
                "0=Not connected / 1=100Mbit_Half /  3=10Mbit_Half /  5=100Mbit_Full /
7=10Mbit_Full"
                        ::= { etherMPX 40 }


                -- 1.3.6.1.4.1.44467.1.41
                sysAlarmsList OBJECT-TYPE
                        SYNTAX Gauge
```

```
                    ACCESS read-only
                    STATUS mandatory
                    DESCRIPTION
            "0=NO Alarms,  1=Low audio level, 2=Ethernet not initialized, 4=External clock is
missing, 8=External clock is faulty, 16=Internal clock is missing, 32=Internal clock is unlocked,
64=Internal clock is faulty, 128=External 1 PPS is missing"
                    ::= { etherMPX 41 }



            -- 1.3.6.1.4.1.44467.1.42
            sysAudioNarrowBand OBJECT-TYPE
                    SYNTAX Gauge
                    ACCESS read-write
                    STATUS mandatory
                    DESCRIPTION
            "Set sysAudioNarrowBand 0=No, 1=YES"
                    ::= { etherMPX 42 }



            -- 1.3.6.1.4.1.44467.1.43
            sysSetSettings OBJECT-TYPE
                    SYNTAX Gauge
                    ACCESS read-write
                    STATUS mandatory
                    DESCRIPTION
            "Set to 1 to aplly all 'sys' parameters that you changed and force a restart of the
board with the new parameters"
                    ::= { etherMPX 43 }



            -- 1.3.6.1.4.1.44467.1.44
            sysUpTime OBJECT-TYPE
                    SYNTAX OCTET STRING
                    ACCESS read-only
                    STATUS mandatory
                    DESCRIPTION
            "The date/time the system booted "
                    ::= { etherMPX 44 }




            -- 1.3.6.1.4.1.44467.1.45
            snmpManagerIP OBJECT-TYPE
                    SYNTAX IpAddress
                    ACCESS read-write
                    STATUS mandatory
                    DESCRIPTION
            "IP address of the SNMP manager that receives SNMP traps."
                    ::= { etherMPX 45 }


            -- 1.3.6.1.4.1.44467.1.46
            snmpReadOnlyComString OBJECT-TYPE
                    SYNTAX OCTET STRING
                    ACCESS read-write
                    STATUS mandatory
                    DESCRIPTION
            "Read-Only Community String. Default is 'public'. Fixed number of 6 characters (no
more or less than 6)"
                    ::= { etherMPX 46 }

            -- 1.3.6.1.4.1.44467.1.47
            snmpReadWriteComString OBJECT-TYPE
                    SYNTAX OCTET STRING
                    ACCESS read-write
                    STATUS mandatory
                    DESCRIPTION
            "Read-Write Community String. Default is 'public'. Fixed number of 6 characters (no
more or less than 6)"
                    ::= { etherMPX 47 }


            -- 1.3.6.1.4.1.44467.1.48
            snmpAgentMask OBJECT-TYPE
```

```
        SYNTAX IpAddress
        ACCESS read-only
        STATUS mandatory
        DESCRIPTION
"IP subnet mask of the Management_ETH interface."
        ::= { etherMPX 48 }


-- 1.3.6.1.4.1.44467.1.49
snmpAgentGW OBJECT-TYPE
        SYNTAX IpAddress
        ACCESS read-only
        STATUS mandatory
        DESCRIPTION
"IP gateway of the Management_ETH interface."
        ::= { etherMPX 49 }


-- 1.3.6.1.4.1.44467.1.50
snmpAgentIP OBJECT-TYPE
        SYNTAX IpAddress
        ACCESS read-only
        STATUS mandatory
        DESCRIPTION
"IP address of the Management_ETH interface."
        ::= { etherMPX 50 }


-- 1.3.6.1.4.1.44467.1.51
snmpAgentDNS OBJECT-TYPE
        SYNTAX IpAddress
        ACCESS read-only
        STATUS mandatory
        DESCRIPTION
"DNS server for the Management_ETH interface."
        ::= { etherMPX 51 }



-- 1.3.6.1.4.1.44467.1.52
snmpNewAgentMask OBJECT-TYPE
        SYNTAX IpAddress
        ACCESS read-write
        STATUS mandatory
        DESCRIPTION
"New IP subnet mask of the Management_ETH interface."
        ::= { etherMPX 52 }


-- 1.3.6.1.4.1.44467.1.53
snmpNewAgentGW OBJECT-TYPE
        SYNTAX IpAddress
        ACCESS read-write
        STATUS mandatory
        DESCRIPTION
"New IP gateway of the Management_ETH interface."
        ::= { etherMPX 53 }


-- 1.3.6.1.4.1.44467.1.54
snmpNewAgentIP OBJECT-TYPE
        SYNTAX IpAddress
        ACCESS read-write
        STATUS mandatory
        DESCRIPTION
"New IP address of the Management_ETH interface."
        ::= { etherMPX 54}


-- 1.3.6.1.4.1.44467.1.55
snmpNewAgentDNS OBJECT-TYPE
        SYNTAX IpAddress
        ACCESS read-write
        STATUS mandatory
        DESCRIPTION
"New DNS server for the Management_ETH interface."
        ::= { etherMPX 55 }



-- 1.3.6.1.4.1.44467.1.56
snmpSetSettings OBJECT-TYPE
        SYNTAX Gauge
        ACCESS read-write
        STATUS mandatory
```

```
                DESCRIPTION
          "Set this parameter to 1 to apply permanently the changes you made to NEWxxx objects.
WARNING: you have to put values in all 4 objects
snmpNewAgentMask,snmpNewAgentGW,snmpNewAgentIP,snmpNewAgentDNS even if you want to change one of
them"
                ::= { etherMPX 56 }




        END
```

10. Technical specifications

GENERAL	
Model name	EtherMPX NG
Dimensions	19" 1U chassis
Power supply	230VAC 50Hz, 12W per device
Operating temp	-20 to +60 Celsius
Transport protocol	Proprietary UDP Unicast or Multicast based on RFC2365 and IGMPv2 (RFC2236). AES67 compatible in specific modes.
QoS management	IETF RFC2474 compliant
Audio compression	None (Linear PCM) in Legacy, HD or AES67 Proprietary lossless / lossy in other modes
Audio sample rate	8 – 192kHz input for Digital L/R input 48kHz internal for Analog L/R input 128–192kHz input for Digital MPX input 192kHz internal for Analog MPX input
Audio latency	L/R mode: 10.0–125.0mS, user adjustable MPX mode: 5.0–62.5mS, user adjustable Low Latency Option: Down to 5.0mS (for L/R), 2.5mS (for MPX)
Network usage	L/R mode: 0.59 - 2.44 Mbit/s selectable MPX mode: 1.11 - 4.89 Mbit/s selectable
Audio monitor	Stereo ¼" Female jack in front panel
User interface / control	Locally: Front panel UI (LCD + rotary knob) Remotely: EtherMPX NMS NG Software
Input SYNC for SFN (Option #1)	10MHz sine or square, 0dBm typical, and 1PPS square TTL 3.3V 10kOhm typical
Output SYNC for SFN (Option #1 with #6)	10MHz TTL 3.3V, +14dBm @ 50Ohm, and 1 PPS TTL 3.3V @ 50 Ohm
GPS RF In (Option #6)	-165dBm for 30sec to lock GPS + GLONASS <100ppb holdover for 12 hours
ETH port (for audio)	RJ45 female, IEEE802.3, 10/100Mbps MDIX

DECODER	
Output name	Port A
Output type	Digital electrical interface
Connector	XLR-3 male
Impedance	110 Ohm balanced - transformer isolated
Supported formats	AES3, IEC60958, S/PDIF
Audio sample rate	32 – 192 kHz (128 –192kHz for D-MPX)
Audio sample resolution	Up to 24 bit

Output name	Port B
Output type	Analog electrical interface - 2 outputs, 1 input
Connectors	2 x XLR-3 male (balanced R, L/MPX) output 1 x BNC female (unbalanced MPX only) output 1 x BNC female (unbalanced MPX only) AUX in **XLR is DC coupled, BNCs are AC coupled
Impedance	100 Ohm
DAC resolution	24 bit
DAC sample rate	48kHz for L/R input, 192kHz for A-MPX
DAC THD+N	-108dB (0.0004%) at 48kHz L/R output -96dB (0.0015% at 192kHz MPX output
DAC Dynamic range	Max 129 dB (A-weighting) at 48 or 192kHz
Channel separation	124 dB typical
Reference output	4.37Vpp (+6dBu) for 0 dBFS
Input BW @ 48kHz SR	-0.1dB @ 21.8 kHz
Input BW @ 192kHz SR	-0.1dB @ 87.2 kHz

ENCODER	
Input name	Port A
Input type	Digital electrical interface
Connector	XLR-3 female
Impedance	110 Ohm balanced - transformer isolated
Supported formats	AES3, IEC60958, S/PDIF
Maximum data rate	12.3 Mbit/s typical
Audio sample rate	32 – 192 kHz (174–192kHz for D-MPX)
Audio resolution	Up to 24 bit

Input name	Port B
Input type	Analog electrical interface - 3 inputs
Connectors	2 x XLR-3 female (balanced R, L/MPX) input 1 x BNC female (unbalanced MPX only) input **XLR is DC coupled, BNC is AC coupled
Impedance	1 kOhm
ADC resolution	24 bit
ADC sample rate	48kHz for L/R input, 192kHz for A-MPX
ADC THD+N	-106dB (0.0005%)
ADC Dynamic range	121 dB (no weighting)
Channel separation	135 dB typical
Reference input	3.47Vpp (+4dBu) for 0 dBFS
Input BW @ 48kHz SR	-0.1dB @ 20 kHz
Input BW @ 192kHz SR	-0.1dB @ 80 kHz

HARDWARE OPTIONS	
Input SYNC for SFN (Option #1)	10MHz sine or square, 0dBm typical, and 1PPS square TTL 3.3V 10kOhm typical
Output SYNC for SFN (Option #1 with #6)	10MHz sine or square, +15dBm @ 50Ohm, and 1 PPS TTL 3.3V @ 50 Ohm
GPS RF In (Option #6)	-165dBm for 30sec to lock GPS + GLONASS <100ppb holdover for 12 hours
2nd ETH port for MGMT (Option #4)	RJ45 female, IEEE802.3, 10/100Mbps MDIX SNMPv1 for Management
Dual Power Supply (Option #7)	Additional 3W consumption for each device

Operational modes and required bandwidth (in Mbps):

	Legacy	HD	SD	LD	LLD	AES67
L/R	2.37 M	2.37 M	1.60 M	1.22 M	0.84 M	2.39 M
L/R LL	2.44 M	2.44 M	1.68 M	1.29 M	0.91 M	N/A
L/R NB	1.58 M	1.58 M	1.07 M	0.81 M	0.56 M	N/A
MPX	4.74 M	4.75 M	3.21 M	2.44 M	1.68 M	3.18 M
MPX LL	4.88 M	4.89 M	3.35 M	2.58 M	1.82 M	N/A
MPX NB	3.15 M	3.16 M	2.14 M	1.62 M	1.11 M	N/A

CE FC RoHS

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: Technical specifications are subject to change without notice. Please contact us if you have questions, or to get latest information and updates.

Sigmacom Broadcast
TELECOM INNOVATIONS

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