

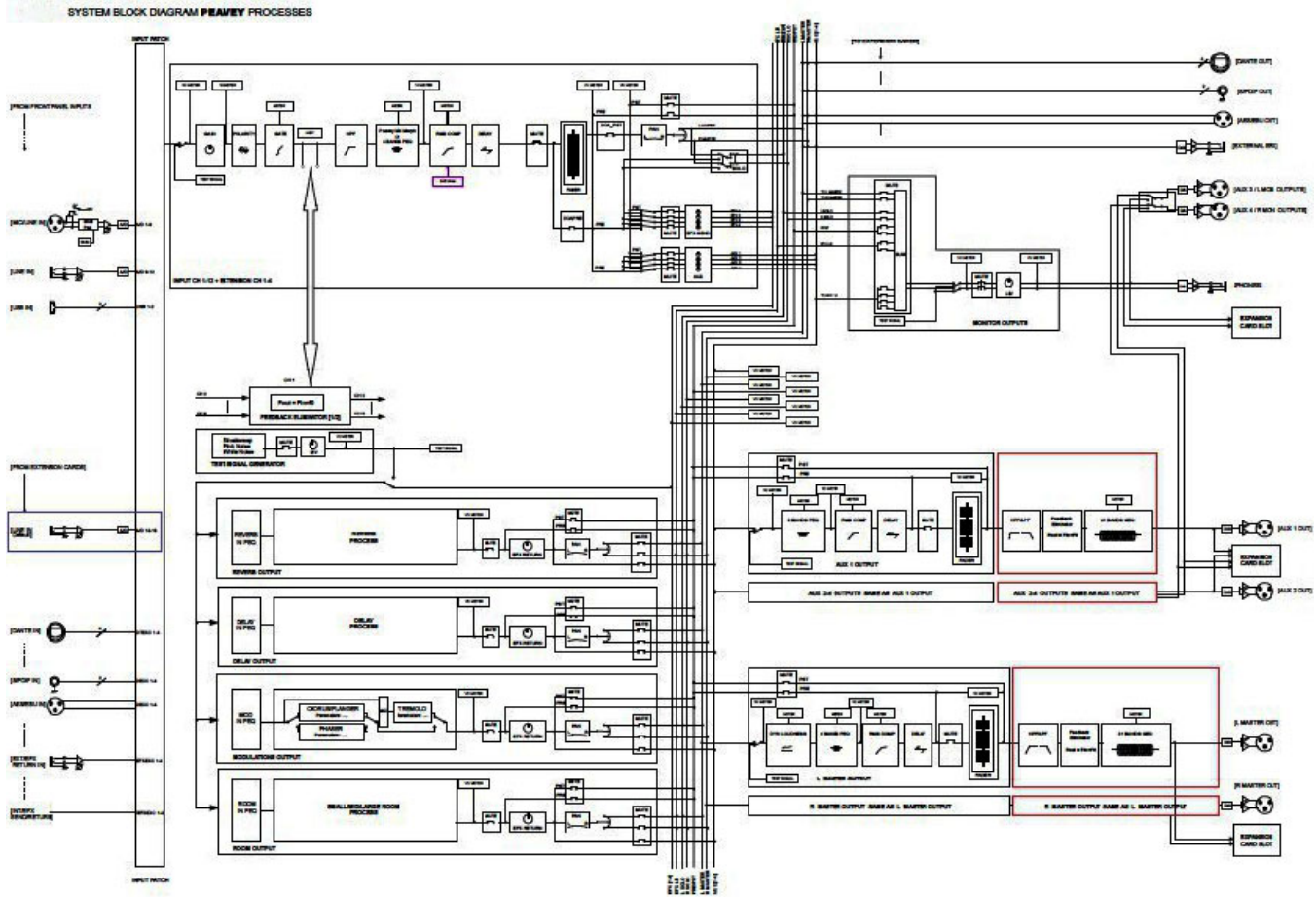


M16 MIXER

M16 MIXER – QUICK USER GUIDE

M16 Block Diagram

Here below the M16 Mixer Block Diagram showing the DSP processing and I/O routing.



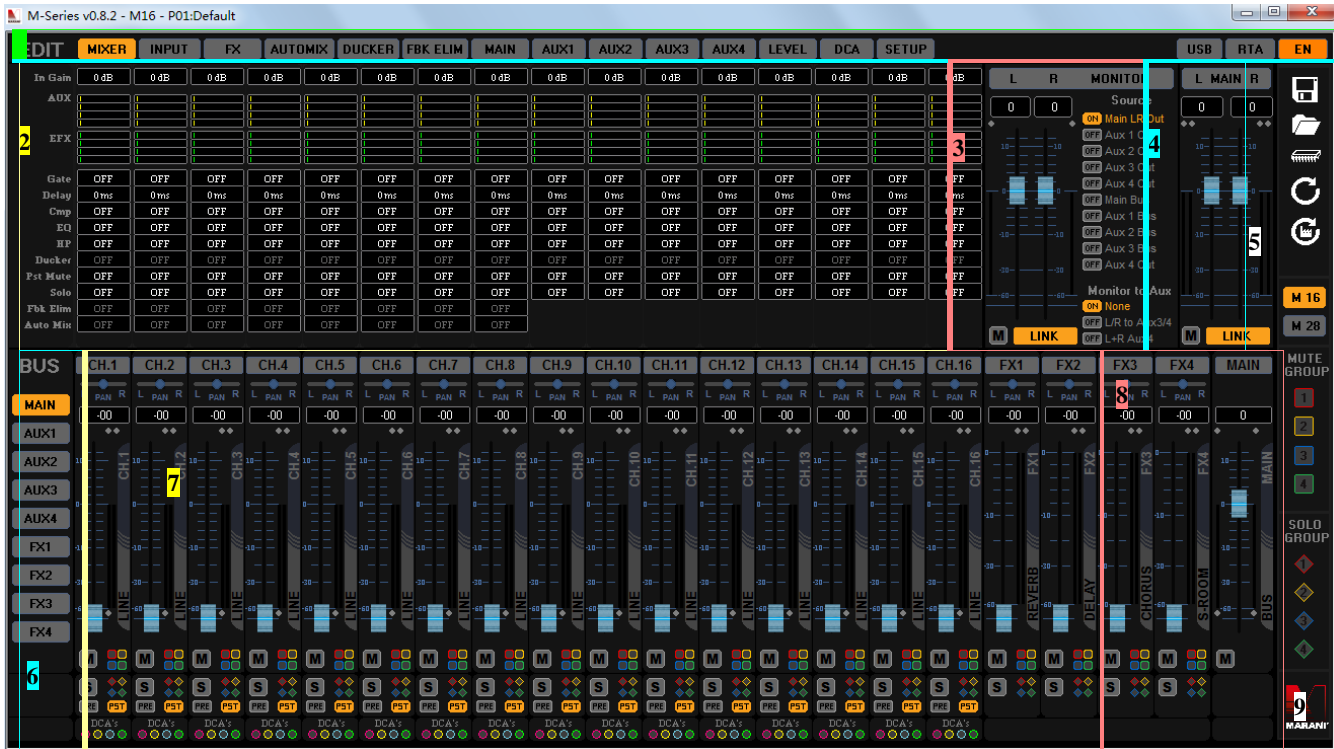
Remote Control Communication Protocol

The communication between the M16 and a remote controller is based on a standard client/server TCP protocol. The M16 is acting as a server both for ethernet and WiFi connections, while the remote controller is the client.

The TCP server that runs on the M16 is always listening on TCP Port 1001 and allows to connect up to 10 clients through the Ethernet port and up to 4 concurrent clients through the Built-in WiFi module.

M16 PC Overview

Here below the main view of the M16 PC control.



- (1) *EDIT Frame*: it allows to select the editing view (i.e. the mixer overview in the picture above) + special button to view the USB edit window (under construction), Refresh GUI “DEVICE-->GUI”, “RTA”, “Save”/“Load” the current configuration to/from PC and “Set default configuration”.
- (2) *EDIT Process Frame*: this frame changing with the current edit button selected (i.e. when the button “MIXER” is selected it shows an overview of the current settings of the input channels, the bus send gains, the active input processes, etc.)
- (3) *MONITOR Frame*: on this frame there are all information about the Monitor Status
- (4) *MAIN L/R Out Gain Frame*: it allows to control the level/mute of the Main L/R output.
- (5) *Controls Mute and Solo Group Frame + Info Device and Logo*
- (6) *BUS Frame*: it allows to select the bus (i.e. the Main bus in the picture).
- (7) *BUS Mixing Frame*: it allows to control the mixing of the selected Bus
- (8) *DCA1/2/3/4 Control Frame*: changing the Level/Mute/Solo of the parameter linked to the DCA1/2/3/4
- (9) *BUS Gain Frame*: it allows to control the level/mute of the selected Bus

(1) EDIT Frame

Click to show the monitor RTA channel window

Click to open a window with inside all information of the USB stick plugged and play/record the file wav found (under construction)



Select Setup frame

Select Aux 1/2/3/4 Edit frame

Select Main Edit frame

Select Feedback Eliminator frame

Select Ducker Edit frame

Select Effects Edit frame

Select Inputs Edit frame

Select Mixer Overview frame

(2) EDIT Process Frame

- MIXER OVERVIEW FRAME

After selected the “MIXER” button, the sw show the following frame

EDIT	MIXER	INPUT	EFX	DUCKER	FBK ELIM	MAIN	AUX1	AUX2	AUX3	AUX4	LEVEL	SETUP	
In Gain	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	0 dB	In Gain
AUX													AUX
EFX													EFX
Gate	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Gate
Delay	0ms	0ms	0ms	0ms	0ms	0ms	0ms	0ms	0ms	0ms	0ms	0ms	Delay
Cmp	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Cmp
EQ	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	EQ
HP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	HP
Ducker	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Ducker
Pst Mute	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Pst Mute
Solo	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Solo
Fbk Elim	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Fbk Elim

where the User can see the status of the Inputs parameter settings and the mix of the Bus AUX and Bus Effect.

The first column is refer to the Input CH.1 and the 16th column is refer to the input CH.16.

The User can also change the value of the parameter shown using the Mouse.

I.e:

- to modify the In Gain the User must click and hold the Left button of the mouse on the text-box of the InGain and move the mouse up/down to increase or decrease the value of the InGain (same for the Delay text-box)
- to modify the Mix Level of the Aux or Efx the User must click and hold the Left button of the mouse on the bar-graph of the AUX or EFX wanted and move the mouse Left/Right to decrease or increase the value of the Level
- to modify the other parameter (On/Off) the User must click one time to switch it from OFF to ON or ON to OFF. When the parameter is shown in “Gray-dark” color then the parameter is disabled and the user must go on the correct edit page to enable it (i.e Ducker, Fbk Elim)

- INPUT FRAME

After selected the “INPUT” button, the sw show the following frame

The screenshot shows the INPUT frame of a software interface. At the top, there are tabs for EDIT, MIXER, INPUT (selected), EFX, DUCKER, FBK ELIM, MAIN, AUX1, AUX2, AUX3, AUX4, LEVEL, and SETUP. The main area is divided into several sections:

- PHANTOM:** +48V button.
- POLARITY:** INV button.
- LINK:** LINK button.
- SOURCE:** LINE and MIC buttons.
- GAIN [dB]:** 0 dB.
- DELAY [ms]:** 0 ms.
- GATE:** OFF, THR (dBfs) -80, REL (ms) 200, ATK (ms) 200, HOLD (ms) 50.
- CMP:** ON, THR (dBfs) -10, RTO (I/O) 32.1, KNEE (%) 0, REL (sec) 0.3, ATK (ms) 50.
- EQ:** EQ 1, EQ 2, EQ 3, EQ 4, all ON. EQ 1: Peak 200, 7, 3.4. EQ 2: Peak 500, -8, 1.7. EQ 3: Peak 3000, -7, 2.1. EQ 4: Lo-Shv 200, 6.5, 1.
- HP Filter:** 100, ON.
- FBK ELIM:** 1, 2 buttons.
- PST MUTE:** M button.
- Graphic EQ filter and HP Filter:** A graph showing frequency response with a red curve and a yellow peak. A green circle highlights a point on the curve.
- Activity of the Compressor (yellow line):** A yellow line on the graph.
- Vu-Meter before the process (green line):** A green line on the graph.
- Vu-Meter After the process (green line):** A green line on the graph.
- LED Clip indicators:** Two yellow LEDs at the top.
- BUS:** CH.1 to CH.16 buttons, all set to LINE.
- MAIN:** MAIN button.
- AUX1:** AUX1 button.

Annotations with lines pointing to specific elements:

- Two "Led Clip indicator" labels pointing to the yellow LEDs at the top.
- "Led Signal presence indicator" pointing to the yellow LEDs.
- "Activity of the Compressor (yellow line)" pointing to the yellow line on the graph.
- "Vu-Meter before the process (green line)" pointing to the green line on the graph.
- "Vu-Meter After the process (green line)" pointing to the green line on the graph.
- "Graphic EQ filter and HP Filter" pointing to the graph area.
- "Cursor to modify the filter Freq, Gain with Mouse" pointing to the green circle on the graph.
- "Button to select CH.X" pointing to the CH.1 button in the BUS section.
- "Current input channel selected" pointing to the CH.1 button in the BUS section.

where the User can edit the Input CH.X (X=1,...,16) parameters. To select the CH.X the User must click on the button present in the input Bus frame.

The parameters of each channel are:

- PHANTOM: this is available only when the source select is “MIC”
- POLARITY: Direct/Invers. When the button is on (Orange color) the the polarity is set to 180°
- LINK: when activated (Orange color) the channel Left parameters will be copied to channel Right and after that, all parameter edit will be modified also on the channel linked. The Link working on two channel, the channel are:
 - CH1&CH2 (CH1 is the Left and Ch2 is the Right)
 - CH3&CH4 (CH3 is the Left and CH4 is the Right)
 - CH5&CH6 (CH5 is the Left and CH6 is the Right)
 - CH7&CH8 (CH7 is the Left and CH8 is the Right)
 - CH9&CH10 (CH9 is the Left and CH10 is the Right)
 - CH11&CH12 (CH11 is the Left and CH12 is the Right)
 - CH13&CH14 (CH13 is the Left and CH14 is the Right)
 - CH15&CH16 (CH15 is the Left and CH16 is the Right)
- SOURCE: from CH1 to CH8 the user can select between LINE and MIC

from CH9 to CH12 the source is fixed to LINE

from CH13 to CH16 the user can select between LINE and USB if the HW extension is ANALOG, select between DANTE and USB if the HW extension is DANTE

- GAIN: if the Source is LINE the gain range is ± 18 dB, if the Source is MIC the gain range is from +10dB to +46dB, step 0.5dB. The gain can be changed in three different way
 - a. input the value on the text-box and press Enter
 - b. click with the mouse on the Up/Down button
 - c. click and hold the Left button of the mouse on the text-box of the InGain and move the mouse up/down to increase or decrease the value
- DELAY: from 0ms to 15ms step 0.05ms, to edit the value use the same procedure used on the In Gain
- GATE: To use this function the User must enable the relative button (set to ON, orange color) the parameters of the Gate are Threshold (from -80dBfs to -50dBfs, step 5dB), Release Time (from 1ms to 1sec, step not linear), Attack Time (from 1ms to 1sec, step not linear) and Hold Time (from 0ms to 10sec, step 50ms). To edit the value use the same procedure used on the In Gain.
- CMP: Compressor, to use this function the User must enable the relative button (set to ON, orange color) the parameters of the compressor are Threshold (from -30dBfs to 0dBfs, step 0.2dB), RATIO (from In 1:Out 1 to In 32:Out 1), Knee (from 0% Hard Knee to 100% Soft Knee), RELEASE-TIME (from 1ms to 1sec, step not linear), Attack (from 1ms to 1sec, step not linear). To edit the value use the same procedure used on the In Gain.
- HP Filter: The input High Pass is a 2nd order Butterworth filter where the user can enable or disable using the relative button ON/OFF (set to ON, orange color). When enabled then the user can input the frequency value (range from 20Hz to 20kHz, step 1Hz). To edit the value use the same procedure used on the In Gain.
- PST MUTE: mute post fader (OFF/ON, when ON the button is red)
- FBK ELIM.: feedback eliminator, the system offer 2 feedback eliminator for the first 8 channel. When the FBK Elim are used on two channel the other 6 channels can't use the Fbk Elim, i.e if the FBK Elim1 is used on CH.3 and FBK Elim2 is used n CH.4 then if the User try to set the Fbk Elim1 on CH.1 then the system show a pop-up with the following message:
“Feedback Eliminator 1 already assigned to Input CH.3”
On this frame the user can only assigned the Feedback eliminator to the CH but to enable or disable the “Engine” the Use must go on the Edit of the FBK ELIM.
- EQ Enable: when disabled (button gray color) the EQ is bypassed and the filter can not edit
- 4 EQ Filter: the Eq filters are operative only when the EQ Enable is ON (button orange color). The single filter can also enable or disable using the relative button ON/OFF. Each filter can be set as “BELL” or “Hi-Shelving” or “Lo-Shelving”, the frequency can be set on the range 20Hz-20kHz step 1Hz, the Gain of the filter can be change on the range ± 12 dB and the Q factor of the filter can be changed from 0.3 to 20. Each filter is shown on the graphic and when the filter is enabled the User can modify the frequency and Gain using the mouse directly on the graphic. Click and hold the left button of

the mouse on the squared picture colored on the graphic (one color for one filter) and move the mouse up/down to change the gain and Left/Right to change the frequency.

- EQ Morph: when disabled (button gray color, OFF) the 4 EQ filter working as standard EQ, when enabled (button orange color, ON) then the EQ working as an classic EQ morphing



where the Frequency, Type and Q are fixed and the User can change only the Gain

- EFX FRAME

After selected the “EFX” button, the sw show the following frame



Here the User can edit all effect parameters.

To edit the value use the same procedure used on the In Gain.

The System have 4 effect where

EFX1: REVERB

- Density: from 0% to 100%
- Decay: from 0.5sec to 8sec step 0.05sec
- PreDelay: from 0% to 100%
- HP Filter: Bypass, 1st and 2nd order Butterworth type; frequency fro 20Hz to 20kHz step1Hz
- 4 EQ Filter: the EQ filters are operative only when the EQ Enable is ON (button orange color). The single filter can also enable or disable using the relative button ON/OFF. The filter type is “BELL”, the frequency can be set on the range 20Hz-20kHz step 1Hz, the Gain of the filter can be change on the range +/-12dB and the Q factor of the filter can changed from 0.3 to 20.
- EQ Enable: when disabled (button gray color) the EQ is bypassed and the filter can not edit

EFX2: DELAY

- Delay: from 0 to 680ms
is possible change the Delay value also using the BPM-Tool (after click on the button BPM) **Beats Per Minute (BPM) to Delay [ms]**. The delay value can be derived from the BPM using the following formula: $Delay[ms] = (60000 / BPM) * K$ (where K depends on the “Note” value as shown in the picture). The BPM range is limited to the following values:
 - 89 <= BPM <= 180 if “Note” is equal to 1/4
 - 133 <= BPM <= 180 if “Note” is equal to 1/4D
 - 60 <= BPM <= 180 if “Note” is not equal to 1/4 or to 1/4D



here, after select the value of the note, select the BPM wanted and the tool calculate the value of the delay, if the value calculate is different from the current delay set to

device then the button with the value of the Delay is blinking (i.e. on the image the button have the value "500" ms), the User must click on the button in order to send the new value to device. Click on the X to close the window

- Feedback: from 0% to 100%
- HP/LP Filter: Bypass, 1st and 2nd order Butterworth type; frequency fro 20Hz to 20kHz step 1Hz
- EQ Filter: the single filter can be enabled or disabled using the relative button ON/OFF. The filter type is "BELL", the frequency can be set on the range 20Hz-20kHz step 1Hz, the Gain of the filter can be change on the range +/-12dB and the Q factor of the filter can changed from 0.3 to 20.

EFX3: the user can choice one from:

- CHORUS
 - Oscillator Type: Sine or Look-up Table
 - Rate: from 0.01Hz to 8Hz step 0.01Hz
- FLANGER
 - Oscillator Type: Sine or Look-up Table
 - Rate: from 0.01Hz to 8Hz step 0.01Hz
 - Feedback: from 0% to 100%
- PHASER
 - Oscillator Type: Sine or Look-up Table
 - Rate: from 0.01Hz to 8Hz step 0.01Hz
- TREMOLO
 - Mod Amp: amplitude modulation : from 0% to 100%
 - Rate: from 0.01Hz to 8Hz step 0.01Hz
- CHORUS+TREMOLO
the same parameter using on Chorus and Tremolo
- FLANGER+TREMOLO
the same parameter using on Flanger and Tremolo
- PHASER+TREMOLO
the same parameter using on Phaser and Tremolo

there are also the following parameters common for each effect type

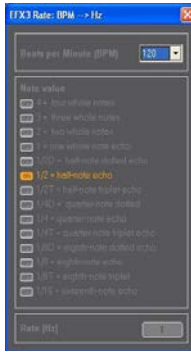
- HP/LP Filter: Bypass, 1st and 2nd order Butterworth type; frequency fro 20Hz to 20kHz step 1Hz
- EQ Filter: the single filter can be enabled or disabled using the relative button ON/OFF. The filter type is "BELL", the frequency can be set on the range 20Hz-20kHz step 1Hz, the Gain of the filter can be change on the range +/-12dB and the Q factor of the filter can changed from 0.3 to 20.

To change the Rate vale is possible also using the BPM-Tool (after click on the button BPM) **Beats Per Minute (BPM) to Frequency (Rate) [Hz]**. The modulation frequency (rate) value can be derived from the BPM using the following formula:

$Freq[Hz] = BPM / (60 * K)$ (where K depends on the "Note" value as shown in the picture).

The BPM range is limited to the following values:

- 15 <= BPM <= 120 if "Note" is equal to 1/16
- 15 <= BPM <= 160 if "Note" is equal to 1/8T
- 15 <= BPM <= 180 if "Note" is not equal to 1/16 or to 1/8



here, after select the value of the note, select the BPM wanted and the tool calculate the value of the Rate, if the value calculate is different from the current Rate set to device then the button with the value of the Rate is blinking (i.e. on the image the button have the value "1" Hz), the User must click on the button in order to send the new value to device. Click on the X to close the window

EFX4: ROOM

- Room Type: Small Rom, Mid Room, Large Room
- Decay: for each room type there are different range of the decay value
from 0.7sec to 1.5sec with Small Room
from 0.7sec to 2.5sec with Mid Room
from 1.4sec to 3.2sec with Large Room

- DUCKER FRAME

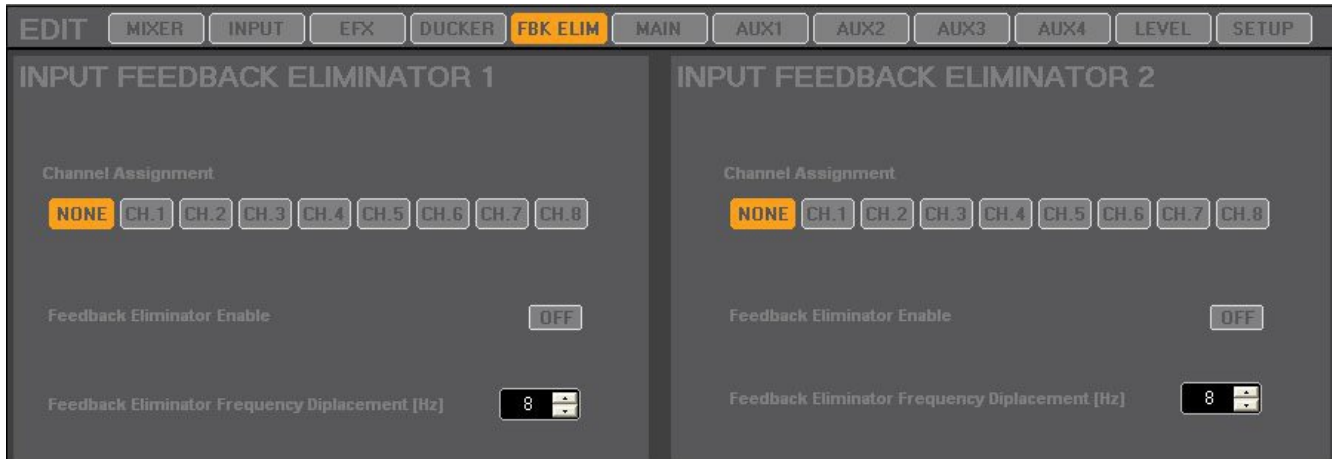
After selected the “DUCKER” button, the sw show the following frame



To use the Ducker the User must enable the DUCKER (Button orange color, ON) after that, the User must decide the priority channel (on the picture the input CH.1 and CH.2 have priority and the others have not priority). To set a channel with priority the user must click on the Priority button and set it to ON (button orange color, ON) in that case all other channel without priority will be attenuate up to the value set on the text-box “Att[dB]” when there is signal on the channel with priority (on the picture the input CH.3 will be attenuate up to -52dB, the CH.4 to -50dB and the other without priority to -80dB). The attenuation can be set to each channel without priority and the range is from -80dB to 0dB step 1dB. More channel can be set as priority. The engine of the Ducker use the following parameters: Threshold (from -56dBfs to -12dBfs, step 1dB), Release Time (from 1ms to 1sec, step not linear), Attack Time (from 1ms to 1sec, step not linear) and Hold Time (from 10ms to 1sec, step 10ms). To edit the value use the same procedure used on the In Gain.

- FEEDBACK ELIMINATOR FRAME

After selected the “FBK ELIM” button, the sw show the following frame



the system offer 2 feedback eliminator for the first 8 input channel. Is not possible to assign the two fbk elim to the same channel. The engine of the Feedback Eliminator remove the Larsen effect only if the relative button Enable is set to ON. The user can also set the Frequency Displacement on each Feedback Elim, the frequency is on the range from 2Hz to 8Hz. It is suggest to use low frequency

DESCRIVERE IL FUNZIONAMENTO DEL PARAMETRO Frequency Displacement

the assignment of the channel will be update also on the relative input channel frame and on the Mixer overview frame .

- MAIN FRAME

After selected the “MAIN” button, the sw show the following frame

Vu-Meter Left/Right after the process

The screenshot displays a software interface with several sections:

- Top Navigation:** Buttons for EDIT, MIXER, INPUT, EFX, DUCKER, FBK ELIM, MAIN (highlighted), AUX1, AUX2, AUX3, AUX4, LEVEL, and SETUP.
- Left Panel:** Controls for POLARITY (INV), DELAY [ms], DYN FILTER (Lo-Boost % and Hi-Boost %), CMP (ON/OFF), THR (dBfs), RTO (f:O), KNEE (%), REL (sec), and ATK (ms). Each parameter has a numerical input and a 'Peak' indicator.
- EQ Section:** Eight parametric EQ filters (EQ 1 to EQ 8) with adjustable Peak, Q, and Gain.
- Graphic EQ:** A frequency response graph with a red line and a green cursor. Below it are controls for HP Filter and LP Filter (Freq [Hz], Slope/Type).
- Bottom Right:** FBK ELIMINATOR (ON/OFF) and Freq Disp [Hz] control.

Callouts from the image:

- Led Clip Left/Right indicator
- Activity Compressor Left/Right
- Vu-Meter Left/Right before the process
- Vu-Meter Left/Right after the process
- Graphic PEQ filter, Hp, Lp filter and GEQ view
- Cursor to modify the PEQ filter Freq, Gain with mouse

The Main working with all parameter Left/Right always linked, so on the interface is visible only one channel (same parameter for left and right)

On The main process the User can edit the following parameters:

- POLARITY: Direct/Invers. When the button is ON (Orange color) the polarity is set to 180°
- DELAY: from 0ms to 150ms step 0.05ms, to edit the value use the same procedure used on the In Gain
- CMP: RMS Compressor, to use this function the User must enable the relative button (set to ON, orange color) the parameters of the compressor are Threshold (from -30dBfs to 0dBfs, step 0.2dB), RATIO (from In 1:Out 1 to In 32:Out 1), Knee (from 0% Hard Knee to 100% Soft Knee), RELEASE-TIME (from 1ms to 1sec, step not linear), Attack (from 1ms to 1sec, step not linear). To edit the value use the same procedure used on the In Gain.
- HP/LP Filter: Bypass, 1st, 2nd, 3th, 4thorder Butterworth/Linkwitz type; frequency fro 20Hz to 20kHz step1Hz
- FEEDBACK ELIMINATOR: independent from the input channel. The engine of the Feedback Eliminator remove the Larsen effect only if the relative button is set to ON. The user can also set the Frequency Displacement (range from 2Hz to 8Hz)
- DYN FILTER: the dynamic filter is a loudness Eq where the low and high frequency will be increased more or less dependent from the level of the signal. The user can decide the amount of the boost on the low and high frequency (the amount is from 0% (no boost) to 100% max boost). The Filter is working only if the User enable it using the relative button ON/OFF (when enabled the button is orange color, ON)
- 8 EQ Filter: the parametric Eq filters are operative only when the EQ Enable is ON (button orange color). The single filter can also enable or disable using the relative button ON/OFF. Each filter can be set as “BELL” or “Hi-Shelving” or “Lo-Shelving”, the frequency can be set on the range 20Hz-20kHz step 1Hz, the Gain of the filter can be change on the range +/-12dB

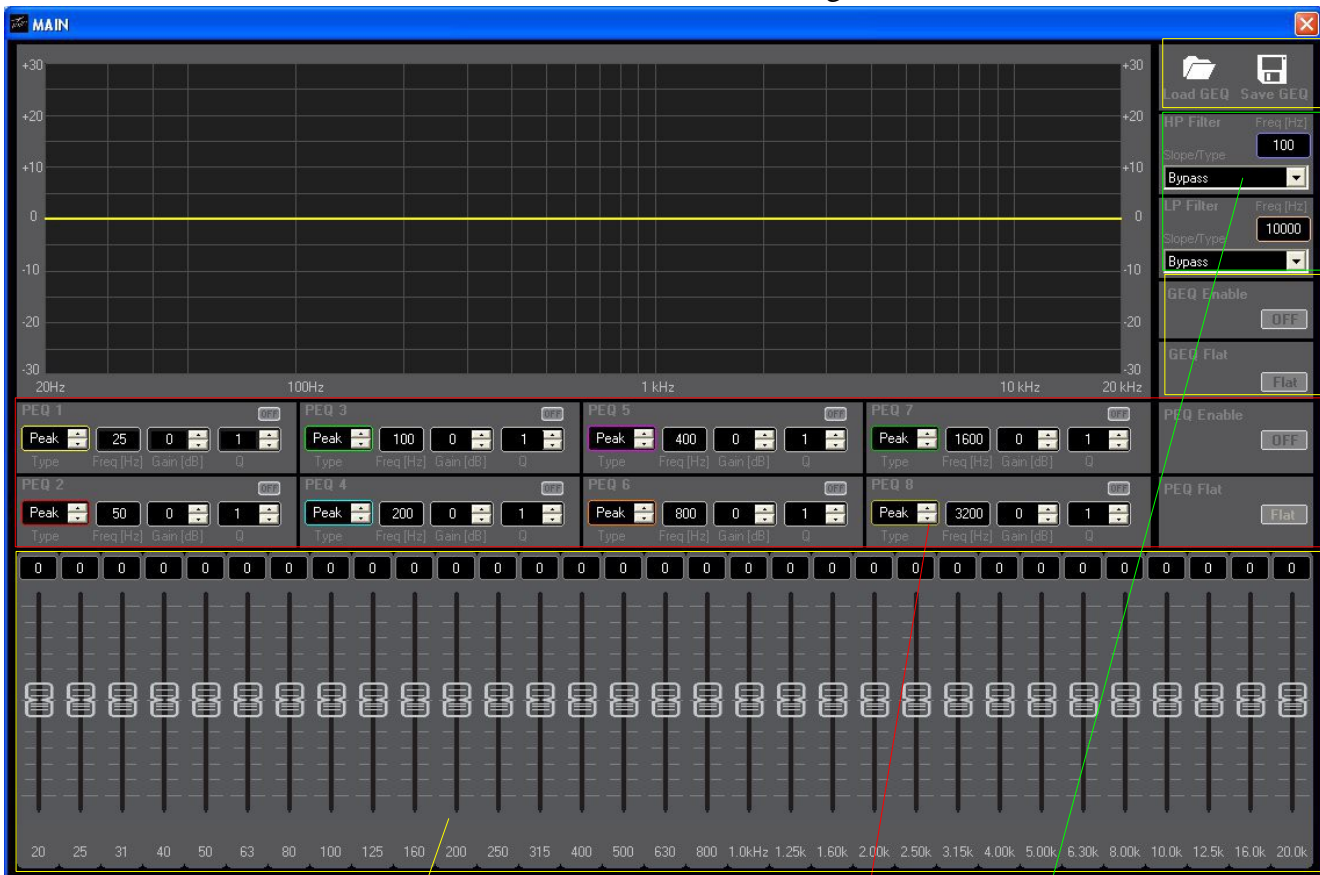
and the Q factor of the filter can be changed from 0.3 to 20.

Each filter is shown on the graphic and when the filter is enabled the User can modify the frequency and Gain using the mouse directly on the graphic. Click and hold the left button of the mouse on the squared picture colored on the graphic (one color for one filter) and move the mouse up/down to change the gain and Left/Right to change the frequency. On the graphic it is also possible to see the HP/LP Filter and the 31 Graphic EQ filter.

– 31 GEQ FILTER: on the main there is also a 31 band of the Graphic EQ, on this frame the user can :

- Enable/Disable the GEQ using the button ON/OFF on the small frame “Graphic EQ”
- Enable/Disable the “View” on the graphic
- click the button “Edit” to open a new window where it is possible to edit the 31GEQ, 8PEQ and HP/LP filter.

After clicking on the button “Edit” the software shows the following window:



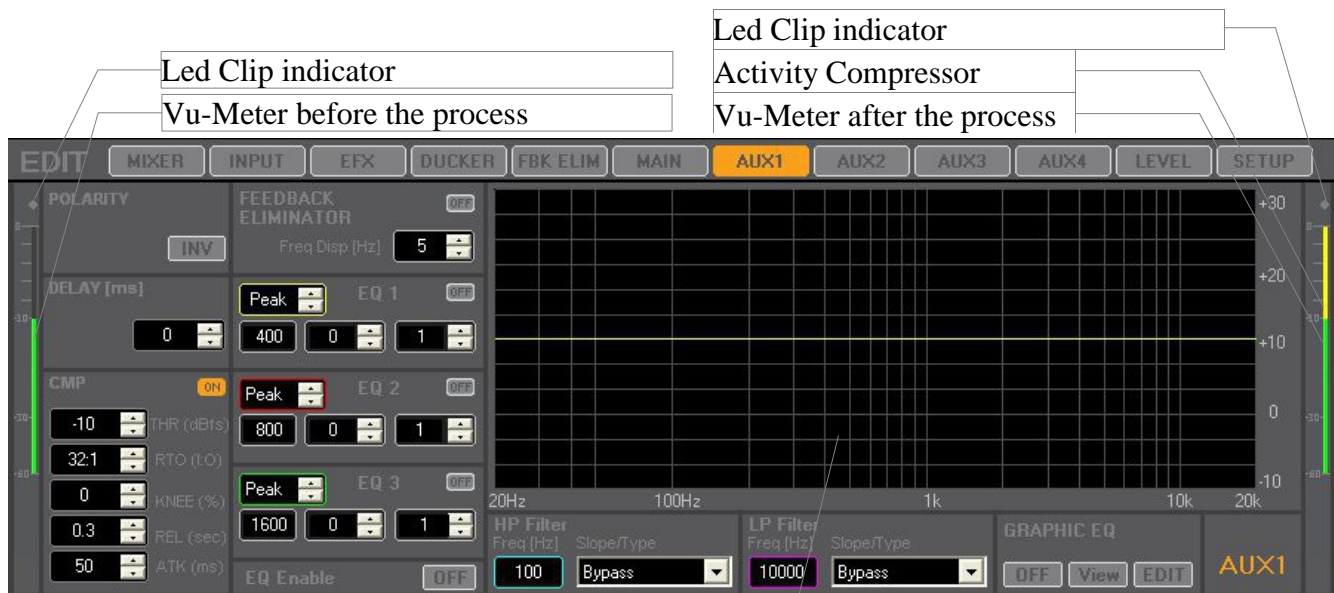
Graphic EQ section

Parametric EQ section, same filter used on the Main frame

HP/LP section, same filter used on the Main frame

- AUX1/2/3/4 FRAME

After selected the “AUX1/2/3/4” button, the sw show the following frame



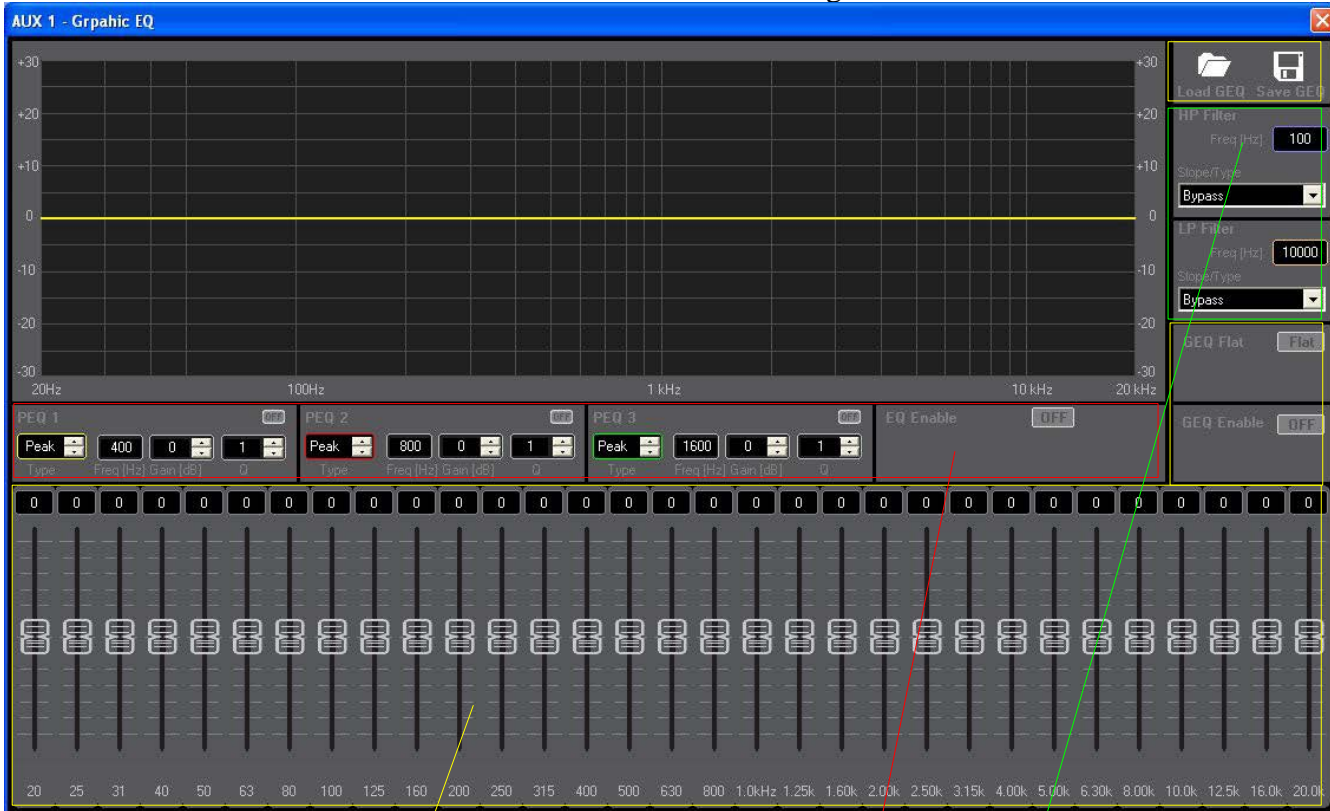
Graphic PEQ filter, Hp, Lp filter and GEQ view

On the AUX process the User can edit the following parameters:

- POLARITY: Direct/Invers. When the button is ON (Orange color) the polarity is set to 180°
- DELAY: from 0ms to 150ms step 0.05ms, to edit the value use the same procedure used on the In Gain
- CMP: RMS Compressor, to use this function the User must enable the relative button (set to ON, orange color) the parameters of the compressor are Threshold (from -30dBfs to 0dBfs, step 0.2dB), RATIO (from In 1:Out 1 to In 32:Out 1), Knee (from 0% Hard Knee to 100% Soft Knee), RELEASE-TIME (from 1ms to 1sec, step not linear), ATTACK TIME (from 1ms to 1sec, step not linear). To edit the value use the same procedure used on the In Gain.
- HP/LP Filter: Bypass, 1st, 2nd, 3rd, 4th order Butterworth/Linkwitz type; frequency from 20Hz to 20kHz step 1Hz
- FEEDBACK ELIMINATOR: independent from the input channel and Main. The engine of the Feedback Eliminator remove the Larsen effect only if the relative button is set to ON. The user can also set the Frequency Displacement (range from 2Hz to 8Hz)
- 3 EQ Filter: the parametric Eq filters are operative only when the EQ Enable is ON (button orange color). The single filter can also enable or disable using the relative button ON/OFF. Each filter can be set as “BELL” or “Hi-Shelving” or “Lo-Shelving”, the frequency can be set on the range 20Hz-20kHz step 1Hz, the Gain of the filter can be change on the range +/-12dB and the Q factor of the filter can be changed from 0.3 to 20. Each filter is shown on the graphic and when the filter is enabled the User can modify the frequency and Gain using the mouse directly on the graphic. Click and hold the left button of the mouse on the squared picture colored on the graphic (one color for one filter) and move the mouse up/down to change the gain and Left/Right to change the frequency. On the graphic is also possible see the Hp/Lp Filter and the 31 Graphic EQ filter.
- 31 GEQ FILTER: on the AUX channel there is also a 31 band of the Graphic EQ, on this frame the user can :
 - Enable/Disable the GEQ using the button ON/OFF on the small frame “Graphic EQ”
 - Enable/Disable the “View” on the graphic

- Click the button "Edit" to open a new window where is possible edit the 31GEQ,3PEQ and HP/LP filter.

After click on the button "Edit" the sw show the following window:



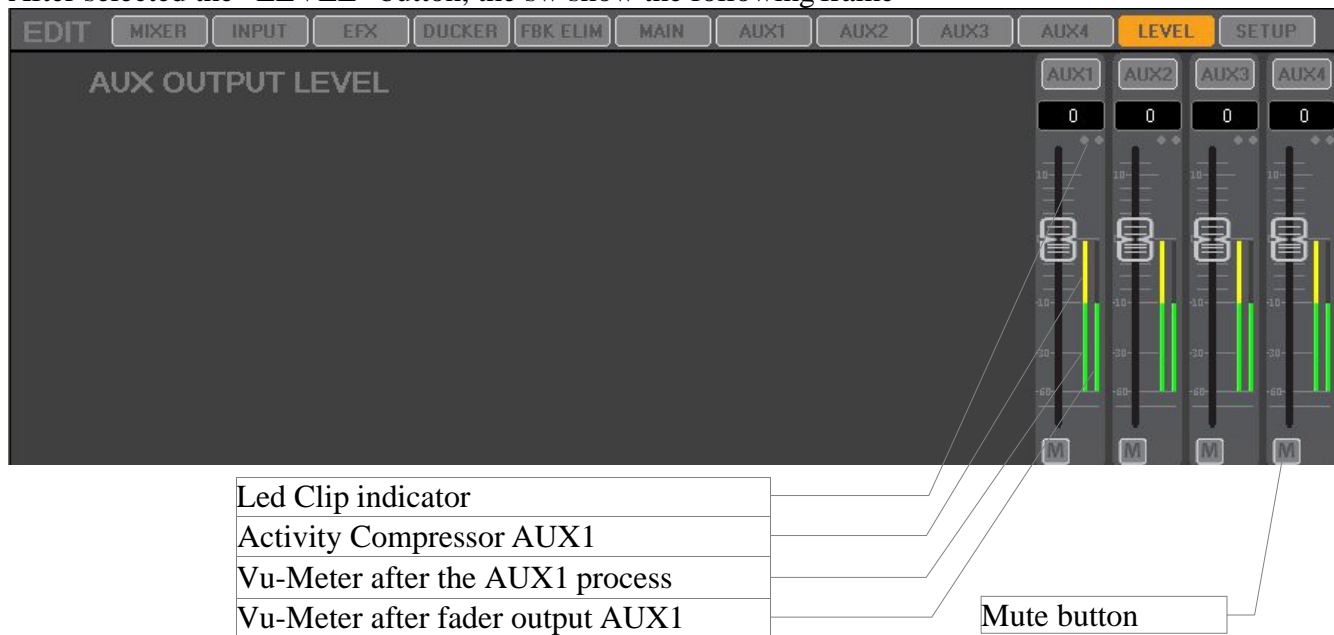
Graphic EQ section

Parametric EQ section, same filter used on the AUX frame

HP/LP section, same filter used on the AUX frame

- LEVEL FRAME

After selected the "LEVEL" button, the sw show the following frame



On this frame the User can adjust the Level of the output Aux1/2/3/4 (range from -inf to 12dB), when the user do a double click on the cup of the feder then the level go to 0dB, to change the value of the level the User can also input the value on the text box and press Enter. Here is possible also set the output AUX1/2/3/4 in Mute or not

- SETUP FRAME

After selected the “SETUP” button, the sw show the following frame



Host Address IP

Device List info

Search all devices connect on the network

On this frame the User can select the following pages:

- CONNECT
- ACCESS POINT setup (see the appendix 2)
- WLAN setup (see the appendix 2)
- LAN setup (see the appendix 2)
- Firmware Update
- Name Edit

CONNECT:

on this page there are shown all device(s) added by User or automatic recognize by remote control.

When the user add one device to the “Device List” the item “MODE”, “MODEL”, “Unique ID” are empty and should be refill when the device is connected with the sw.

On the item MODE there is the information of the interface “LAN”, “WLAN”

On the item MODEL there is the information of the extension mounted “analog extension → M16A” “DANTE extension → M16D”, “Digital SPDIF extension → M16E”

On the item UNIQUE ID there is a string of 16 characters to identify the device

On the item IP Address there is the IP of the device

On the item NAME there is the name of the device, max 16 characters (this name can be changed with the “Name Edit” function)

On the item STATUS there is the status of the device: On-line/Off-line

If the User click on the left button of the mouse on the row of the Device List then the sw show a menu with the following item:

1. Add new (is enabled if the row is empty)
2. Delete IP (is enabled if the row is not empty)
3. Connect IP (is enabled if the row is not empty, the User can connect On-line only one device per time.)
4. Disconnect IP (is enabled if the device selected is already connected)

Automatic device announcement: Each device (when are in power-on) sends a periodic UDP broadcast message on port 1002 to announce itself in the network. The UDP message is sent every 5sec both through the WiFi and Ethernet interfaces. The remote controller run a background UDP server listening on port 1002 and waiting for UDP broadcast messages. Once a UDP message is received, the remote controller can retrieve the remote IP address from the UDP stack and the M16 device info from the UDP message data fields. The remote controller send a “ping” to the remote IP address to verify that the local host is able to reach the device in the network, since the reception of the UDP broadcast message cannot ensure that the M16 is reachable through TCP (due to a mismatch in the network settings).

In example:

- Remote controller
 - IP address = 192.168.1.100
 - Netmask = 255.255.255.0
 - Gateway = 192.168.1.1
- M16
 - IP address = 192.168.0.101
 - Netmask = 255.255.255.0
 - Gateway = 192.168.0.1

In the case above the remote controller will receive the M16 UDP message, but it won't be able to connect (or ping) the device.

When a device insert on the network is not automatically recognized, the User can use the “Search” function in order to search a M16 device in the network, After clicked on the button “Search” the sw start to scan a set of IP addresses inserted by User.

ACCESS POINT, WLAN, LAN: please see the appendix 2

FW UPDATE:

when a new firmware is released then the User can download it from the website and update the device via remote control.

After click on the “FW UPDATE” button then the sw show the following window



after selected the IP address of the device to update, will be show the following window



Insert the new firmware .sfu file and press the icon Update. When all is finish the sw show a message “Firmware successfully loaded!”.

NAME EDIT:

After click on the “NAME EDIT” button then the sw show the following window



Here is possible to change the label of the Input CH, AUX, DCA, EFX and device name. After inserted the name click on the button “Update” to store the new name to device.

RTA Button:

After click on the “RTA” button then the sw show the following window

Close window

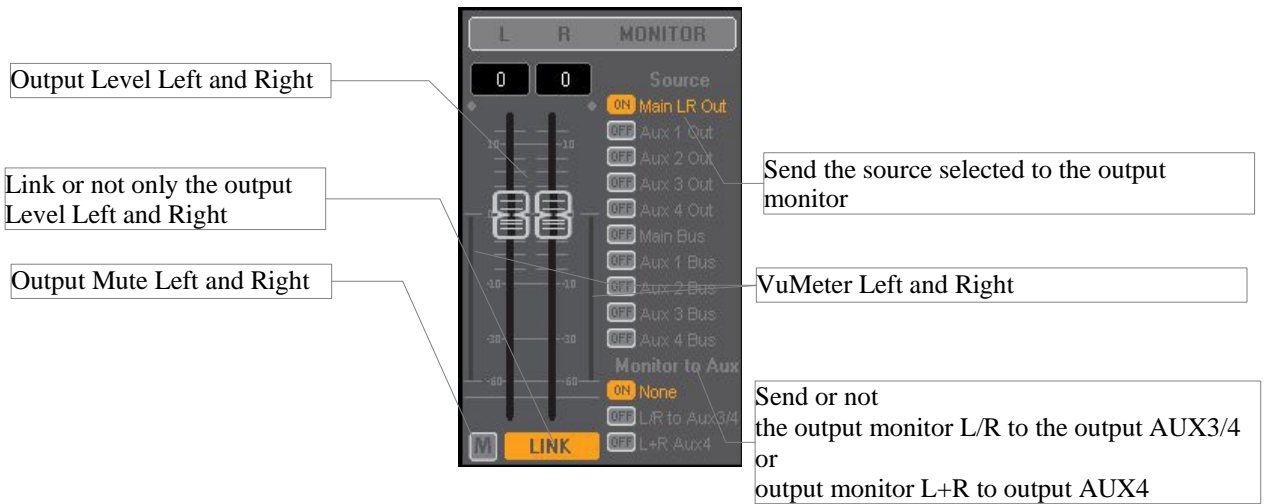
Select channel to see the RTA:
 Monitor Left
 Monitor Right
 Monitor L+R
 Main Left
 Main Right
 Main L+R
 AUX1
 AUX2
 AUX3
 AUX4

Set number of the samples:
 2048
 4096
 8192
 16384
 32768

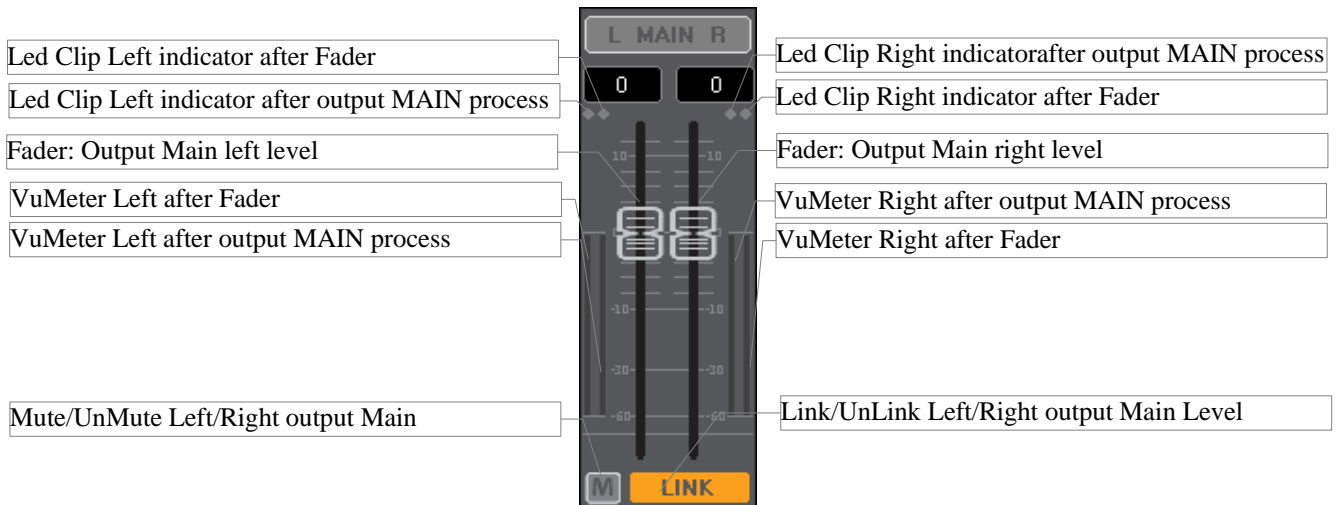
DEVICE--> GUI Button:

when more remote controllers are connected to one M16 device at the same time, is possible that one remote controll change some parameters and in that case the M16 inform all other remote controll that some parameters are changed so the button start to blinking, if the User want can update the interface with the new value after click on this button.

Output L/R MONITOR

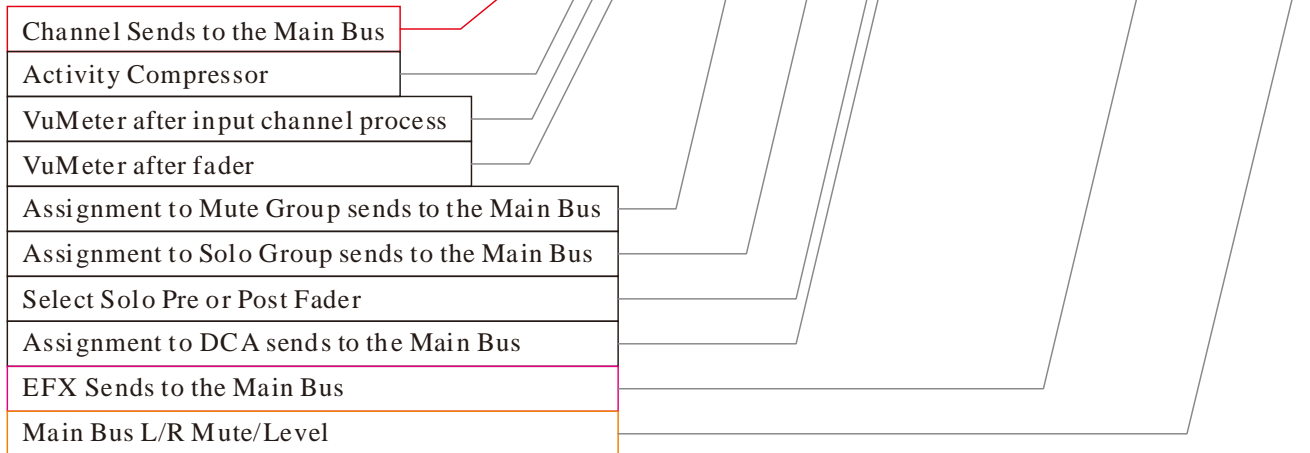


Output L/R MAIN



MAIN BUS SENDS

To control the MAIN L/R bus mixing click the MAIN button in the BUS frame.



AUX1/2/3/4 BUS SENDS

To control the AUX1-4 bus mixing click the AUX1-4 button in the BUS frame.



PRE/PST selection for the Aux Bus Send

Channel Sends to the selected Bus

Selected Bus Mute/Level

FX1/2/3/4 BUS SENDS

To control the EFX1-4 bus mixing click the EFX1-4 button in the BUS frame.

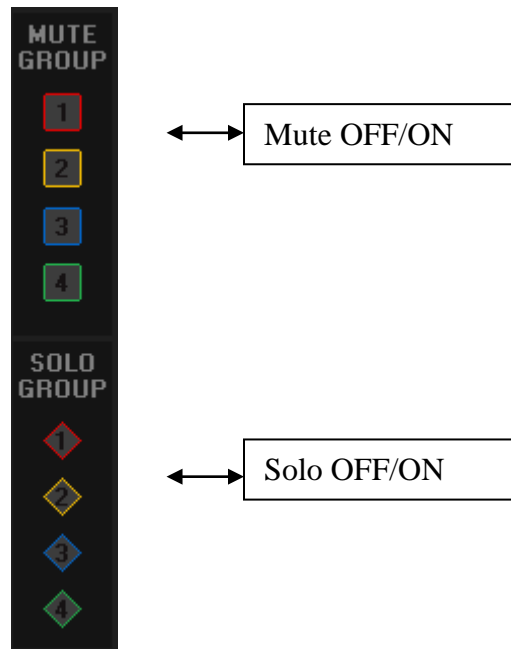


PRE/PST selection for the EFX Bus Send

Channel Sends to the selected Bus

Selected Bus Mute/Level/Solo

MUTE / SOLO GROUP

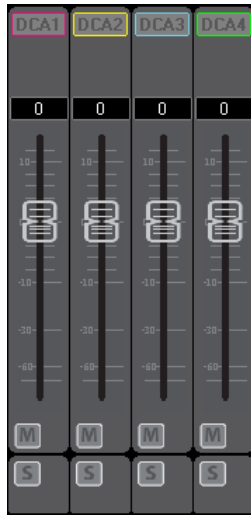


the remote controll can management up to 4 MUTE Group and up to 4 SOLO Group

When the User change the status (OFF/ON) on the Mute group frame, the status of the Mute on all channel linked to this group will be OFF/ON.

When the User change the status (OFF/ON) on the Solo group frame, the status of the Solo on all channel linked to this group will be set OFF/ON

DCA GROUP



the remote control can management up to 4 DCA Group, each channel can be assigned to one DCA (i.e: if the CH.1 mixer bus is assigned to DCA1 then the same channel can not be assigned also to DCA2 or DCA3 or DCA4)

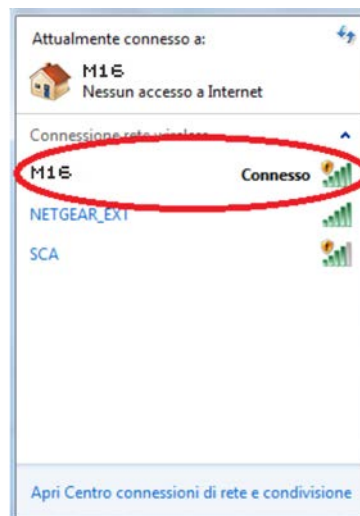
When the User change the Level/Mute/Solo on the DCA group frame, on all channel linked to this group will be added the modification.

On the DCA group is possible link only the Input mixer bus Main

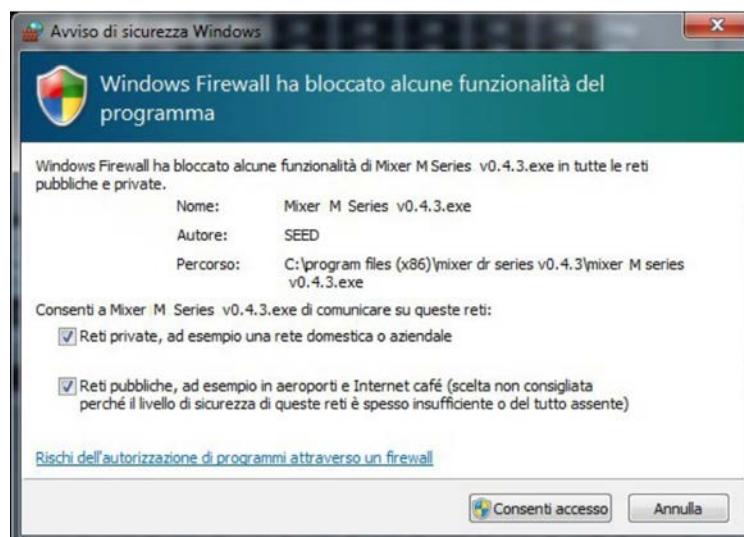
Appendix 1

M16 Mixer - How to connect WiFi Module

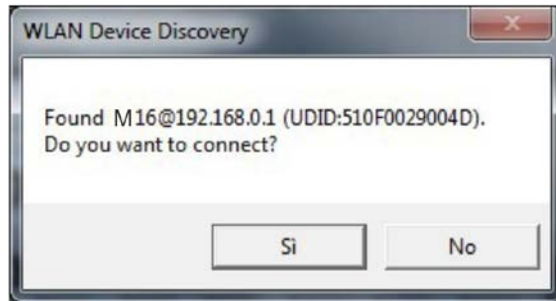
- 1) Install the “Mixer M Series v0.5.7” PC sw on your PC. (before to install the setup make sure that on the PC is already installed the NET Framework 4.0)
- 2) Turn on the M16 Mixer and connect the “M16” WiFi network on your PC.



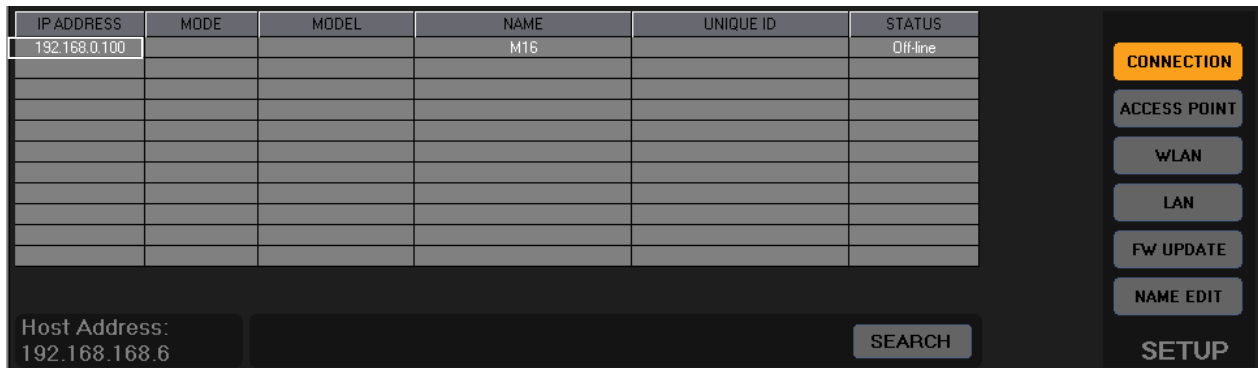
- 3) Run the PC sw. A firewall message may appear asking to add the sw to the firewall exclusion list as shown below



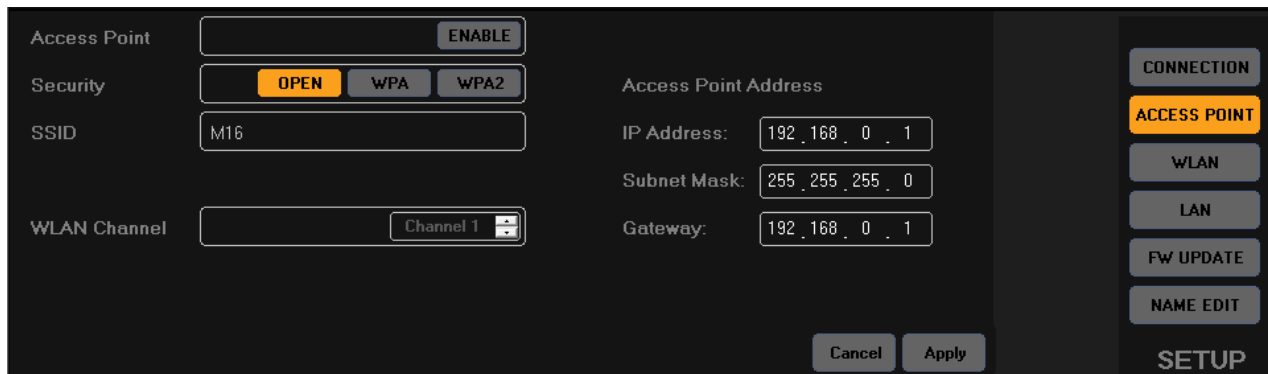
3a) Wait for the following popup and connect the M16 Mixer



3b) If the Device Discovery message doesn't appear, go to the "Setup" page on the PC sw and manually connect the M16 mixer @182.168.0.1 address as shown below:



4) Go to the "Setup" → "Access Point" page on the PC sw to control the WiFi module settings



Appendix 2

Ethernet Connection

The M16 integrates a 100Mbit/s Ethernet port allowing a full real-time remote control and monitor of the mixer processing functions.

A remote controller (e.g. a laptop) can connect the M16 in two different modes:

1) Point-To-Point mode

In Point-to-Point mode the remote controller directly connects the mixer through a standard ethernet cable, without any external router as shown below.



In this mode Static IP addressing should be used since the M16 Ethernet controller has no DHCP server capability.

Connection Parameters (M16):

- IP Addressing: Static
- IP Address: 192.168.0.100 (Default)
- Net Mask: 255.255.255.0 (Default)
- Gateway: 192.168.0.1 (Default)

Connection Parameters (Remote Controller):

- IP Addressing: Static
- IP Address: 192.168.0.xxx , where xxx is in the range [1,254] (and not equals to 100)
- Net Mask: 255.255.255.0

- Gateway: 192.168.0.1

EDIT MIXER INPUT EFX DUCKER FBK ELIM MAIN AUX1 AUX2 AUX3 AUX4 LEVEL SETUP

LAN

Mode STATIC IP DHCP

LAN Address

IP Address: 0 . 0 . 0 . 0

Subnet Mask: 0 . 0 . 0 . 0

Gateway: 0 . 0 . 0 . 0

CONNECTION

ACCESS POINT

WLAN

LAN

FW UPDATE

NAME EDIT

SETUP

Cancel Apply

2) LAN mode

In LAN mode both the M16 and the remote controller should be connected to an external router as shown below.



In this mode both Static and Dynamic IP addressing can be used since the M16 ethernet controller has DHCP client capability. Up to 10 remote controllers can connect the M16 at the same time.

Connection Parameters (M16):

- IP Addressing: Dynamic (DHCP Client)
- IP Address: 192.168.0.100
- Net Mask: 255.255.255.0
- Gateway: 192.168.0.1

Note: IP Address, Net Mask and Gateway are automatically assigned by the DHCP server (i.e. the router). The default parameters above will be used only if the DHCP fails to assign the IP address.

Connection Parameters (Remote Controller):

- IP Addressing: Dynamic (DHCP Client)

Note: IP Address, Net Mask and Gateway are automatically assigned by the DHCP server (i.e. the router)

WiFi Connection

The M16 integrates a WiFi module for a full real-time remote control and monitor of the mixer processing functions.

The WiFi module can operate in two different modes:

1) Access Point mode

In Access Point mode the module acts as a WiFi router allowing to directly connect up to 4 clients (e.g. laptop, iPad, etc). The module includes a DHCP server to automatically assign the clients' IP addresses. This way, the remote control devices can easily connect the M16 mixer without any external WiFi router as shown below.



Connection Parameters (M16):

- IP Addressing: Dynamic (DHCP Server)
- IP Address: 192.168.0.1 (Default)
- Net Mask: 255.255.255.0 (Default)
- Gateway: 192.168.0.1 (Default)
- SSID: M16 (Default). WiFi network name
- Security: OPEN (Default). WPA/WPA2 supported
- Key: "0123456789" (Default). Used only with WPA/WPA2 encryption
- WiFi Channel: 6 (Default). WiFi radio channel.

Connection Parameters (Remote Controller):

- IP Addressing: Dynamic (DHCP Client)

Note: IP Address, Net Mask and Gateway are automatically assigned by the DHCP server (i.e. the M16 WiFi module)

EDIT	MIXER	INPUT	EFX	DUCKER	FBK ELIM	MAIN	AUX1	AUX2	AUX3	AUX4	LEVEL	SETUP
Access Point	<input type="text"/> <input type="button" value="ENABLE"/>											
Security	<input type="button" value="OPEN"/> <input type="button" value="WPA"/> <input type="button" value="WPA2"/>		Access Point Address									<input type="button" value="CONNECTION"/>
SSID	<input type="text" value="M16"/>		IP Address:			<input type="text" value="192_168_0_1"/>			<input type="button" value="ACCESS POINT"/>			
WLAN Channel	<input type="text" value="Channel 5"/>		Subnet Mask:			<input type="text" value="255_255_255_0"/>			<input type="button" value="WLAN"/>			
			Gateway:			<input type="text" value="192_168_0_1"/>			<input type="button" value="LAN"/>			
												<input type="button" value="FW UPDATE"/>
												<input type="button" value="NAME EDIT"/>
												<input type="button" value="SETUP"/>
												<input type="button" value="Cancel"/> <input type="button" value="Apply"/>

2) WiFi Client (Station) mode

In WiFi Client mode the module connects to a WiFi network and supports DHCP client or static IP addressing. This way, both the M16 mixer and the remote control devices should be connected to an external WiFi router as shown below.



WiFi Client mode may be used to extend the WiFi range of the M16 mixer.

Connection Parameters (M16):

- IP Addressing: Dynamic (DHCP Client) or Static
- IP Address: 192.168.0.110 (Default). Used with Static IP addressing only
- Net Mask: 255.255.255.0 (Default). Used with Static IP addressing only
- Gateway: 192.168.0.1 (Default). Used with Static IP addressing only

Note: IP Address, Net Mask and Gateway are automatically assigned by the DHCP server (i.e. the WiFi router) if the Dynamic IP addressing is selected.

Connection Parameters (WiFi Router):

- SSID: WiFi Router network name
- Security: OPEN, WEP, WPA or WPA2

- Key: xxxxxxxx. Password of the WiFi

router network Connection Parameters

(Remote Controller):

- IP Addressing: Dynamic (DHCP Client)

Note: IP Address, Net Mask and Gateway are automatically assigned by the DHCP server (i.e. the WiFi router)

The screenshot shows a network configuration interface for a WiFi router. The interface is divided into several sections:

- WLAN:** A toggle switch is set to **ENABLE**.
- Security:** A dropdown menu is set to **OPEN**. Other options include WPE, WPA, and WPA2.
- SSID:** The text field contains **WiFiNet**.
- Mode:** A dropdown menu is set to **DHCP**. Other options include **STATIC IP**.
- WLAN Address:** IP Address: 192.168.0.100, Subnet Mask: 255.255.255.0, Gateway: 192.168.0.1.
- Buttons:** **Cancel** and **Apply** buttons are at the bottom right. A vertical sidebar on the right contains buttons for **CONNECTION**, **ACCESS POINT**, **WLAN** (highlighted), **LAN**, **FW UPDATE**, **NAME EDIT**, and **SETUP**.

Mixed Ethernet / WiFi Connection Examples

1) *WiFi Remote Controllers using M16 Ethernet Port*



2) *Mixed WiFi/Ethernet Remote Controllers using M16 Ethernet Port and WiFi Module*

