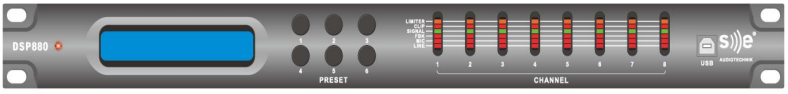
AUDIOTECHNIK

PROFESSIONAL

DIGITAL SOUND PROCESSORS

User's Manual



DPA880T

Automix Matrix

482mm 19"

DIGITAL

USB

AUDIOTECHNIK

DPA880T Digital 8x8 Conference System Matrix with Automixer Function

User Manual

For the microphone inputs, can be selected a Phantom power Supply.

Described below are the functions of the front panel control buttons for the DPA880T.

- **Overview**

The **DPA880T** on the front panel offers the possibility to select up to 6 presets, edited and uploaded on the unit through the Pc Sw, thanks to 6 push buttons.
Using the front panel's buttons it is also possible to access a “System Setup” Menu, allowing to set the communication parameters of the DPA880T and to configure the Output Switches, available on the unit's back panel.
The Name of the current preset is displayed on a wide 2x24charachters LCD and the main activities of the unit's channels are shown by 8 rows of 5 leds: Line, Microphone, Feedback, Signal/Clip, Limiter.

Anyone of the 6 available presets can even be recalled by a remote Wall Panel Control, allowing also the control of the Master Output Volume.
The Wall Remote Control, acting through a RS485 connection, and the Remote PC control, via USB or Tcp/Ip, can operate simultaneously.
When not used for the Wall Panel Remote Control, the RS485 connection can be used for the creation of a DPA880T network of up to 64 units, all controlled by the Pc Sw remote control.
A network of DPA880T can also be created and efficiently controlled by the Tcp/Ip interface.
The Tcp/Ip interface, particularly, has to be used for the DPA880T control operated by the DPA880T iPad available Sw.

An external router has to be used for the DPA880T iPad remote control: the DPA880T has to be in such case connected to the external router through its Tcp/Ip interface and the iPad remote control Sw, scanning the all set of Ip addresses, will automatically fin the all DPA880T in network, there where independent IP addresses are assigned to the all units of the network.
With the iPad Sw, so as with the Pc Sw, each DPA880T of the network can be independently controlled.

The DPA880T is a powerful Matrix, allowing to select as input, for any of the 8 input independently, a Line Level Input or a Microphone Input, where for the microphone input there is the possibility to provide a 48V Phantom Power supply.
When selected a microphone Input, the unit provide the possibility to activate a Feedback Eliminator based on a powerful “pitch shifting” algorithm, particularly effective for voice applications.
Each output has as first stage an 8x8 Matrix allowing the mix of the 8 inputs and processing the final mix with a 5 bands Eq, with filters assignable as Peaker or Hi/Low Shelving, able to range from -15dB up to +15dB gain; following the 5bands Eq, a Hp and a LP filters up to 24dB/Oct shape the output channel band's limits; a delay is also available for signal/speakers alignments.
The Dynamic process of each output channel is left to a powerful RMS Compressor, with variable Ratio and to a final Peak Limiter for the complete output peak control.

Master Input Gain and Master output Level controls are available for the simultaneous level control of the all inputs and outputs; four Switches, Sw controlled, are available for the On/Off control of remote devices.

The DPA880T is added of Classic Automixer Functions as the NOM and Gain Sharing.
For increasing the effectiveness of the Automixer functions, on each input is available a first order Low Pass filter, operating also when microphones are selected on inputs.
A Noise Gate fully editable and with the possibility to set the Gating Threshold to high levels, is also available and usable as Microphones' On/Off Auto Switch.
In order to help in tuning the Noise gates, on the Main Pc Sw interface of the DPA880T, leds notifying the On or Off status of the inputs are provided.

The DPA880T Ducker can assign priority to 1 up to 4 microphones/line inputs.
The all parameters for setting up the Ducking processes can be edited and set as desired by the User.

- **Getting Started**

The DPA880T can work as a stand alone unit [Stand Alone Mode], where up to 6 preset can be recalled by directly selecting them through the 6 “preset” buttons available on the front panel, or can work as completely remotely controlled unit [Remote Control Mode].

As soon as is turned ON the device will indicate the current Firmware version

and then will load the currently selected preset.
During the Preset Loading, the LCD screen will show the following:

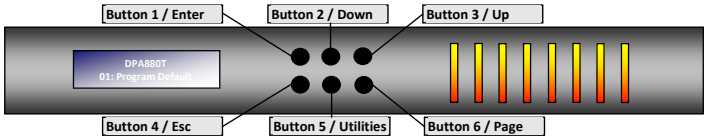
Here the unit is just checking if Presets are available on the Eeprom.
If not, the “Init” phase can last several seconds, and the Eeprom of the unit is initialized in order to guest later on the presets will be created by the user through the Pc Remote Control Sw.

If Presets are already available, then the “init” phase will be skipped and the currently selected preset will be loaded.
The preset loading can take approximately 14Seconds and will end with showing on the LCD the currently running preset's name:

- **Stand Alone Mode**

When the DPA880T is operating as stand alone unit, so running one of the 6 available presets, previously created and stored within the unit with the remote control Pc Sw, the only available control are the 6 “preset buttons”, allowing to select 1 of the 6 available presets previously stored through the Pc Sw Remote Control.
The name of the currently loaded/running preset is displayed on the LCD screen.

Using the buttons on the front panel, a particular function called System Setup, can be accessed.
For accessing the System Setup function, need to refer to the 6 available buttons on the front panel, as follow:



Referring to the Picture, in order to access the System Setup need to press the Button 5 / Utilities, for about 4 seconds,
The following window will appear:

As the picture shows, in the System Setup mode the buttons 1/2/3/4/6 are used as Enter/Down/Up/Esc/Page commands, used for scrolling, accessing and editing the following 5 Menus:

1. Tcp/Ip Setup
2. USB/RS485 Setup
3. ID RS485 Setup
4. Out Switch Setup
5. Output Switch Linked

From the first “Tcp/Ip Setup” Menu, just using the Up/Down buttons, the all other Menus can be accessed.

Tcp/Ip Setup

Within this Menu, the User can set the DPA880T IP Address
From the Tcp/Ip Setup, pressing the Button 1 / Enter, the following sub-menu is entered:

Here, the first digit of the IP will be blinking, which means the User can modify the digit's value using the Up/Down buttons.
Once assigned the desired value to the digit, confirm it pressing the Enter button.
After a while, the system will automatically go to the second digit of the IP address, which will start blinking.
With the Button Page, a digit can be skipped without being modified, so using Page is possible to scroll into the all 4 digits of the IP Address, without the necessity to modify them.
The first digit of the IP Address can range from 1 to 223, the second and third digits can range from 0 to 255 and the fourth digit from 1 to 254.
The system will automatically compute the right “Sub Net Mask” value to assign to the Unit, once defined the IP address.
The Sub Net Mask values are the following:

1. IP Address from IP=001.0.0.2 up to IP=126.255.255.254, SubNetMask = FF000000h (Class A)
2. IP Address from IP=127.0.0.2 up to IP=191.255.255.254, SubNetMask = FFFF0000h (Class B)
3. IP Address from IP=192.0.0.2 up to IP=223.255.255.254, SubNetMask = FFFFFF00h (Class C)

Once set properly the IP Address, the Tcp/Ip setup Menu can be left using the Esc button.

USB/RS485 Setup

Within this Menu, the User can chose between the USB or RS485 connection type to be used for a remote control.
From the USB/RS485 Setup page

pressing the Button 1 / Enter, the following sub-menu is entered:

Here, the communication interface to be used can be selected: USB/RS485/Automatic.
The Tcp/Ip connection is EVER available.
In the USB mode, the DPA880T can be controlled via USB interface or via Tcp/Ip connection.
If selected, the USB interface will be active as default when the DPA880T is turned ON.
In the RS485 mode, the DPA880T can be controlled via USB interface or via Tcp/Ip connection.
If selected, the RS485 interface will be active as default when the DPA880T is turned ON.
If selected the Automatic Mode, the unit will continuously “switch” between USB and RS485 (each about 100ms), looking for an available Remote Control on one of the 2 interfaces.
Once found an available one, the DPA880T will communicate vi the interface corresponding to the one found.
If selected, the Automatic interface will be active as default when the DPA880T is turned ON.
The currently active connection type, will be displayed on the extreme right of the LCD's top row, with the U/R/A symbols (USB/RS495/Automatic)

ID RS485 Setup

Within this Menu, the User can define the ID of the DPA880T when working with a remote control via RS485 interface.
From the ID RS485 Setup page

pressing the Button 1 / Enter, the following sub-menu is entered:

Here, the ID number of the DPA880T can be assigned.
The possible ID values range from 1 to 64.
The ID number can be selected using the Up/Down buttons.
The Enter button has to be used to SAVE the assigned ID number and exit the Menu.
The Esc button has to be used to exit the Menu WITHOUT SAVING the ID number.

Out Switch Setup and Output Switch Linked

The DPA880T has internally the possibility to store up to 10 Presets “Switch” (Only by Pc Sw) and on each one of these presets is contained the Status of the Output Switch lines (Output Ports S1/S2/S3/S4) available on the DPA880T back panel.
These 10 presets can be recalled in LINK with the corresponding “Audio”Preset, by pressing one of the 6 Presets Buttons of the front panel (or just loading the presets by Pc), once the Output Switch Link function is set as ON.
In this case, any time an Audio Preset is recalled by pressing one of the front panel's buttons, the equivalent Switch preset Is also loaded: it the Audio Preset N. 1 is recalled, the Switch preset N. 1 is recalled too.
In a such case, each recalled preset is a combination of an Audio and a Switch preset.
To get the above result, need therefore to enter the System Setup's Output Switch Linked page

And to set as On the Link

If the Output Switch Linked is not active and the Switch presets aren't linked to the Audio ones, they'll not be recalled once pressed any one of the Preset Buttons.
Therefore, the Switch Outputs status can be “manually” defined by the User who will be allowed to recall “manually” one of the 10 Switch preset and leave it active until a new “Manual” setting or a change of the Output Switch Linked Status.

If the Output Switch Linked mode is set with Link = OFF, the User can “Manually” Load one of the 10 switch Presets available and previously created using the Pc Sw.
This can be done from the Out Switch Setup Menu

Within this Menu, the User can select and Load one of the 10 available Switch Presets.
Pressing the Button 1 / Enter, the following sub-menu is entered:

Here, the user can recall one of the 10 available Switch Presets SP01-SP10, just selecting the desired one by the Up/Down buttons.
As said, in this way any action on the Preset Buttons, forcing the Load of the corresponding Audio Preset, will not affect the status of the Output Switches, which will depend from the Preset loaded “Manually” by the User within the Output Switch Setup, being the Output Switch Linked Status set as OFF.

In order to finally leave and exit the System Setup mode, so to get back to normal working mode, is is enough to get back to any one of the 5 System Setup Menus and there from press the ESC button.

NOTE: The All Settings done within the System Setup Function will be effective ONLY WHEN LEFT the System Setup Mode itself.
Within the System Setup Mode, the all communications with the remote control units are DISABLED, so as the some “Real Time” processes available in the DPA880T.

In Stand Alone Mode, the “Activity” of the DPA880T in terms of running processes and signal status, per each channel, can be checked thanks to the Vu-Metering features:

1 led for Microphone Phantom Power Supply Active

5 led for Outputs Activities:

Line	Line input Selected
Mic	Microphone input Selected
Feedback	Feedback Active (available ONLY if selected Mic Input)
Sign / Clip	Turning on Blue when present Signal on the channel and turning Red when the signal is clipping
Limit	Showing the RMS Compressor or the Peak Limiter activity

- **DPA880T** Main Features

Maximum Delay:	380.998ms by 21us increment/decrement step, on each Output
Parametric Equalization:	3 filters on each Input (when selected Line input or Mic without feedback eliminator active) assignable as Bell or Shelving, 5 filters on each Output assignable as Bell or Shelving
Filters:	Symmetrical Bell or High/Low Shelving up to second order
Filter gain:	for Bell and Shelving the gain is ranging from -15dBu up to +15dBu by 0.5dBu resolution steps
Center frequency:	selectable with a 1/24th of octave resolution steps from 20Hz up to 20kHz
Filter Q/BW:	Q/BW from 0.4/3.59 up to 10/0.0312 by 0.1 resolution steps (Q)

Each Filter of the Eq can be singularly “Bypassed” once set.

LPF/HPF on Inputs:	1st order Hp or Lp with Cutting Frequency from 20Hz up to 20kHz, 1/3Oct Steps
HPF on Outputs:	from 1st order (Butterworth -6dB/Oct) up to 4th Order (Butterworth, Linkwitz or Bessel -24dB/Oct)
LPF on Outputs:	from 1st order (Butterworth -6dB/Oct) up to 4th Order (Butterworth, Linkwitz or Bessel -24dB/Oct)
Output HP/LP Filter’s Cutting Frequency steps:	1/24th of octave

Processes on Inputs	
	Editable Noise Gates with Threshold up to 0dBu
	Frequency Shift Feedback Eliminator
	Balanced/Unbalanced Input and Polarity selection
RMS Compressor on Outputs	
Threshold:	from 18dBu up to -30dBu
Attack time:	Attack time from 5ms up to 200ms (1ms resolution up to 20ms, then 10ms resolution up to 100ms and 20ms res. up to 200ms)
Release time:	Release time from 0.1 sec up to 3 sec (0.1sec resolution)
Ratio:	1:1 (Bypass) up to 32:1 (Limiting), with Ratio Slope computed on Log Table with 0.1dB steps precision
Knee:	Soft/Hard
Peak Limiter on Outputs	
Threshold:	from 18dBu up to -30dBu
Attack time:	Attack time from 5ms up to 200ms (1ms resolution up to 20ms, then 10ms resolution up to 100ms and 20ms res. up to 200ms)
Release time:	Release time from 0.1 sec up to 3 sec (0.1sec resolution)
Special Processes and Automixer	
Ducking	Assignable Priority from 1 up to 4 microphones/lines
	Full editing of the Ducking Process Parameters
Automixer	NOM and Gain Sharing processes implemented

- **Remote Control Mode**

The DPA880T is mainly thought to operate with Remote Control Sw running on Pc.
Nevertheless, once created the desired presets for the defined applications, the unit can operate as a Stand Alone one, as seen before or as Wall Panel Remote Control working device.
The Remote control, when operated by the Wall Panel Remote control, is working on the base of the RS485 connector of the DPA880T
The Pc Sw remote control, can instead operate with USB, RS485 or Tcp/Ip connection.
When used the USB connection, the Pc Sw Remote Control can control/edit ONLY one unit per time.
When used the RS485 or Tcp/Ip connection, the Pc Sw Remote Control can control/edit MORE units at the same time, connected each others in net.
Particularly, with the Tcp/Ip connection and using an external standard router, the DPA880T can even be controlled through a complete iPad remote control Sw.

A particular way of "double" Remote Control is allowed, being possible to connect to the RS485 the Wall Panel Control and at the same time the Pc Sw Remote Control can be used if connecting the Pc on the USB connection.

Wall Panel Remote Control Operations

The DPA880T can be controlled by a Remote Wall Panel, allowing to load one of the first 4 available presets stored within the unit, or to increase/decrease the Main output Volume of the unit itself.

The Wall Panel Remote Control is looking as follow

The buttons "Preset 1" to "Preset 4" are used to load one of the first 4 presets stored within the DPA880T
Once selected the desired preset, the related led will turn ON.
The buttons "Up/Down" can be used to increase/decrease the DPA880T Output Level.

A "Lock" key is available in order to "lock/unlock" the Preset and Up/Down buttons, so to inhibit their use.
When the buttons are locked, the "unlocked" led will be Off.

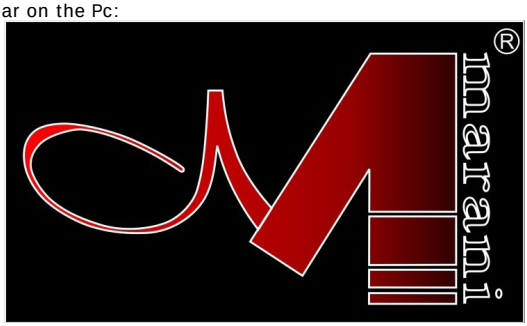
The Wall Panel Remote Control has to be connected to the RS485 connector of the DPA880T

PC Sw Remote Control Operations

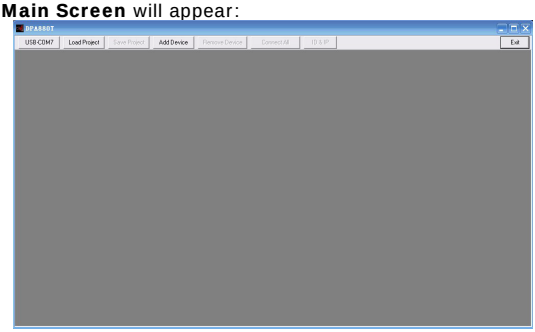
The DPA880T can be controlled by a Remote Control Sw running on Pc, allowing to fully edit the all processes available on each channel of the DPA880T.

More, once created the desired configurations and selected the desired processes, the complete channels' set up can be stored within the DPA880T and recalled later on as preset also when the unit is working in Stand Alone Mode or as Wall Control Panel operating unit.

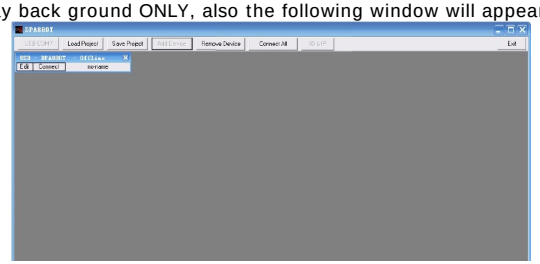
Once launched the Pc Sw Remote Control, previously installed on Pc (for the installation it is enough to run the "Installation Sw" and to install also the USB driver which installation instruction are on the CD containing the Remote Control Sw and coming with the DPA880T), the following screen shot will appear on the Pc:



And soon after, the **Main Screen** will appear:

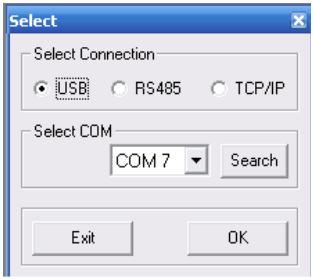


If instead of the Gray back ground ONLY, also the following window will appear



Before to proceed in order to select the desired interface type, need to close the connection windows clicking with the mouse on the "x" on the corner of the window itself.

Once in the Main Screen, need to select the desired interface for the Unit's remote connections.
For choosing the Communication interface, need to Click on the button on the extreme Left corner of the Main Screen frame, which will show the latest Communication interface selected and eventually the related Port/ID number (in the example, the latest chosen interface was the USB and the used port the number 7).
Clicked the button for the interface selection, the following editing window will appear



The screen above is allowing to select what kind of connection has to be used and to set the parameters for the selected connection.

USB: the USB connection has to be selected when the DPA880T is connected to the PC through the USB line.
In this case the DPA880T will be controlled as ONE ONLY unit, not being allowed the net control of more units when using the USB connection.
Nevertheless, when using the USB connection, the Pc Remote Control Sw can operate at the same time of the Wall Panel Remote Control, there where the Wall Panel Remote Control is connected to the RS485 connection.
In the USB mode (chosen by “checking” the USB button on the “Communication Port” frame), need to assign the proper “COM” port in order to match the COM port assigned by the Pc to the “USB to Serial Port” within the Device Manager window at the “Ports (COM&LPT)” directory.
A **Search** engine is available so to ask the Sw to find by itself the Communication Port Number, there where the information isn't in the hands of the User.

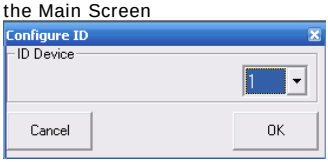
RS485: the RS485 connection has to be selected when the DPA880T is connected to the PC through the RS485 line.
In this case the DPA880T will be controlled as one of a NET of chained units, being allowed the net control of more units when using the RS485 connection.
When using the Rs485 connection, the Pc Remote Control Sw cannot operate at the same time of the Wall Panel Remote Control.
In the RS485 mode (chosen by “checking” the RS485 button on the “Communication Port” frame), need to assign the proper “COM” port in order to match the COM port assigned by the Pc to the “USB to Serial Port” within the Device Manager window at the “Ports (COM&LPT)” directory.
A **Search** engine is available so to ask the Sw to find by itself the Communication Port Number, there where the information isn't in the hands of the User.

Tcp/Ip: the Tcp/Ip connection has to be selected when the DPA880T is connected to the PC through Tcp/Ip Router.
In this case the DPA880T will be controlled as one of a NET of chained units, being allowed the net control of more units when using the Tcp/Ip connection.
In the Tcp/Ip connection mode, to the DPA880T has to be assigned an IP number.
This can be done once a device has been added to the list of the connected ones, through the ID/IP Menu accessed pressing the ID&IP button on the Menu Bar.

Once selected the Communication interface, in order to connect the unit or the Units, need to add it, or them, to the Main Screen.
This can be done pressing the **Add Device** button on the Menu bar.

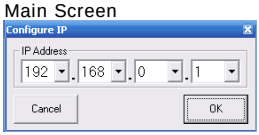
1. **USB** Interface Selected: once found the correct Port Number, adding a device will just bring to open on the Main Screen the connection window (see Later)

2. **RS485** Interface Selected: once found the correct Port number, adding a device will open the following window on the Main Screen



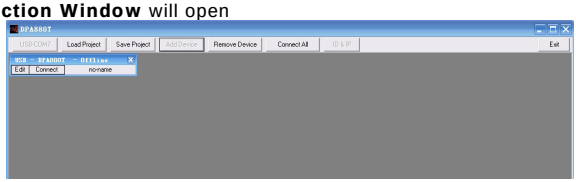
Here will be necessary to define the ID number of the added connected Unit.
Once assigned it, the connection window will appear (see Later)
When selected the RS485 connection, more DPA880T can be connected all together.
In order this to happen, need the all units (connected in net and up to 64) to be identified by DIFFERENT ID number.
In order the units to have a different ID, need to pre-assign to the all units used in net a specific ID number.
The ID number to the DPA880T unit can be assigned following the procedure explained in the System Setup mode, based on the use of the Front panel buttons.

3. **Tcp/Ip** Interface Selected: once found the correct Port number, adding a device will open the following window on the Main Screen



Here will be necessary to define the IP number of the added connected Unit.
Once assigned it, the connection window will appear (see Later)

As soon as the all parameters of the selected interface will be properly provided to the DPA880T Pc Sw, the **Connection Window** will open



Here a name can be assigned to the specific added unit, and the connection of the Pc Sw with the unit can be established pressing the Connect button.
A progressing bar will show the connection process and when the connection will be successfully established, the black “Connect” word will turn in the “Disconnect” RED one, to remind the user that now the Unit is connected and that a further use of the button will disconnect the unit itself.

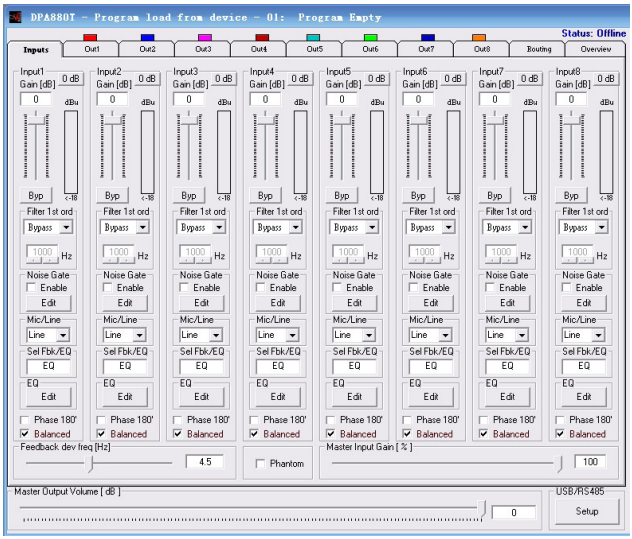
When the unit is connected, the DPA880T LCD will notify that the unit is controlled remotely:

If the DPA880T is operating through an USB connection, then on the left vertical bar will be displayed the only name of the connected unit.
If the DPA880T is operating through a RS485 connection, then on the left vertical bar will be listed the all names and Ids of the net connected units.

When the connection has been established, pressing the Edit Button, the “Edit” word will turn RED and the editing pages will open.

NOTE: for avoiding problems is highly suggested to work with COM ports number within the 10.
If the Pc will assign to the USB connection a COM port exceeding the number 10, please force to assign a port from 1 to 9.

Inputs Page



From the “Input” Page of the editing environment, on each input can be selected the source. This can be Microphone or Line.

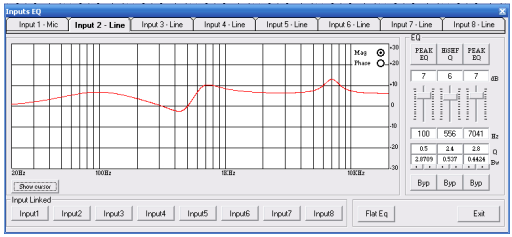
When the **Line Source** is selected, the Input Gain can be adjusted from -127dB up to +12dB.

A Bypass button is available for any channel, allowing to “Bypass” the channel's level setting and bringing it to 0dB.

A Master Gain can be used to Mute the all Inputs (0%) or to bring all of them to a level up to 0dB (100%): each time the Gain Slider is halved in percentage, the Level of each Input is decreased of -6dB.

For each input, is possible to set the signal Phase as “Direct” (unchecked box) or 180Deg. Reversed (box checked).

A 3 bands Equalizer is ever available and can be set pressing the “Edit” button.
In a such case, the following Eq editing window will open



EQ: from this sub-frame it is possible to set the Input Channels three available Peaker (Bell) or variable Q Shelving Filters.

The DPA880T allows the user to select either Bell or variable Q Shelving Parameters and assign them independently using the 3 available filters.
The selection can be done just pressing the “Peak Eq” button on top of the filters' gain sliders and selecting one of the 3 available filters' type: Peaker, variable Q high Shelving and variable Q low Shelving.

BELL Filter: here Center Frequency, Band Width (Q) and Gain can be adjusted.
“***Center Frequency***”: the selectable frequencies range is from 20Hz to 20kHz in steps of 1/24 of an Octave.
“***Bandwidth BW***”: the selectable BW range is from 0.0312 Octave (Q=10) up to 3.59 Octave (Q=0.4) in steps of 0.1 Q.
“***Gain***”: the selectable Gain range is from -12dB to +12dB in steps of 0.5 dB.

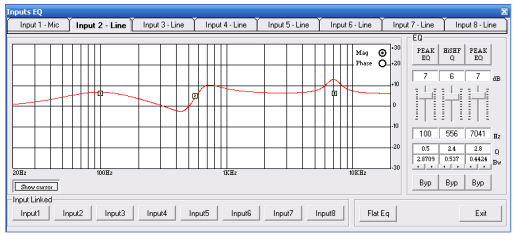
Variable Q Low Shelving Filter: here Center Frequency, Band Width (Q) (Slope) and Gain can be adjusted.
“***Center Frequency***”: the selectable frequencies range is from 20Hz to 20kHz in steps of 1/24 of an Octave.
“***Bandwidth BW (Slope)***”: the selectable BW range is from 0.0312 Octave (Q=10) up to 3.59 Octave (Q=0.4) in steps of 0.1 Q.
“***Gain***”: the selectable Gain range is from -12dB to +12dB in steps of 0.5 dB.

Variable Q High Shelving Filter: here Center Frequency, Band Width (Q) (Slope) and Gain can be adjusted.
“***Center Frequency***”: the selectable frequencies range is from 20Hz to 20kHz in steps of 1/24 of an Octave.
“***Bandwidth BW (Slope)***”: the selectable BW range is from 0.0312 Octave (Q=10) up to 3.59 Octave (Q=0.4) in steps of 0.1 Q.
“***Gain***”: the selectable Gain range is from -12dB to +12dB in steps of 0.5 dB.

Note: each single filter can be independently “bypassed” for an easy setting/use of them.
To “Bypass” the single filter, just press the “Bypass” button below the filter’s parameters.

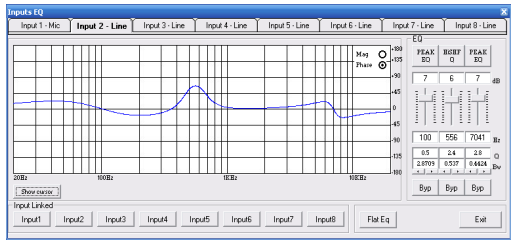
In order to set, if necessary, more Eq of the 8 input channels in the same way, “Input Linked” buttons are available and, when pressed, force the all channels corresponding to the pressed buttons to set the Eq in the same as as the one set for the currently edited channel (which has to be one of the linked ones)

The set up of the filters and specially their frequency placement can also be done with the use of the mouse, just activating the “Show Cursor” function, pressing the related button on the left bottom of the frequency response Graphic.

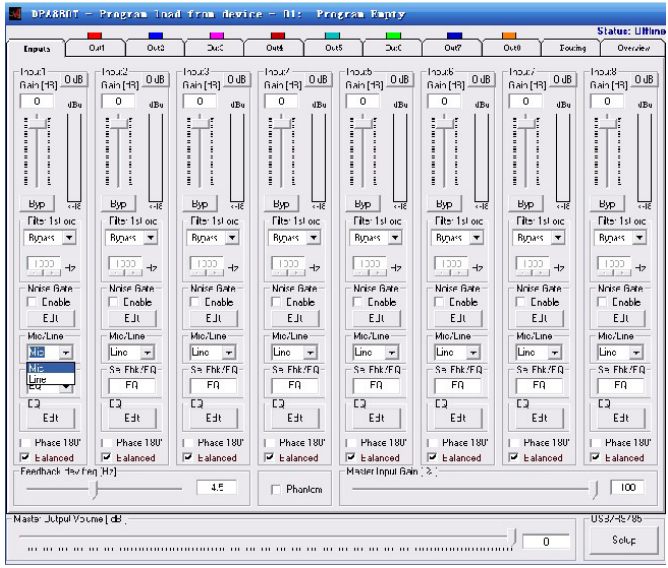


Once the all 3 available cursor are shown on the Frequency Response graphic, just selecting anyone of them with the mouse's arrow and maintaining the mouse's click pressed, it is possible to move and place the selected cursor on the desired frequency and with the desired gain.
For setting the filter's Q, still need to enter the desired value directly in the dedicated box in the filters' editing main sub-frame.

In order to see what's the “Phase” response of the channel once set up the all filters of the EQ, it is possible, selecting the Phase choice on the top right of the Graphic window, to turn the graphic in “Phase Response Graphic”:



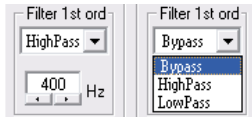
When the **Microphone** Source is selected, on the related channel is possible to adjust the Input level from -127dB up to 12dB.



When selected microphone as input, the user can chose to select on the input itself a 3bands Eq process on the Input signal, or a Feedback Eliminator.
When the 3 bands Eq is selected, the Equalizer can be edited in the same way shown for the Line Input case.

When the Feedback Eliminator is selected, it can be activated or not, and when active, its speed can be set.
The Feedback Eliminator is working on the base of a frequency shift process avoiding the feedback to raise up.
The speed of the feedback elimination process it is just defining the amount of frequency shift is added to the input signal.
Higher speed means higher immunity to feedback.
Independently from the Input selected (microphone or line), on the Inputs are ever available a first order Low Pass filter and a Noise Gate.

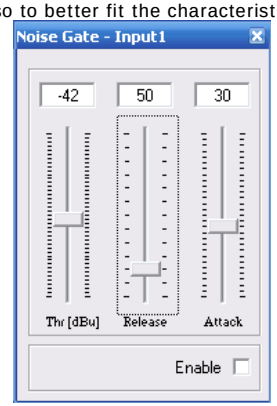
First Order Low or High Pass Filter: this filter is a first order Filter selectaable as Low Pass or High Pass, with a 3dB/Oct Slope.
The filter's cut of frequency is ranging from 20Hz up to 20kHz by steps of 1/3 of Octave.
The filter can be made active or not (bypassed), just selecting it or leaving it in Bypass:



Once active, the smooth first order LP/HP filter is intended to be mainly used with the microphone's input selected, in order to reduce the amount of high or low frequencies without affecting significantly the voice quality, nevertheless increasing the immunity to the Feedback there where an excess of brightness or “booming” resonances are rising up in the environment.

Noise Gate: the particular DPA880T Noise Gate can be selected or bypassed checking or unchecking the "Enable" check box:

This Noise Gate has been thought as Noise Gate for the Line inputs, but also as Auto Switch On/Off when operating with the microphone inputs.
From this point of view, the range of a standard Noise gate have been extended, and particularly the one of the Gating Threshold, so to better fit the characteristics of the voice signal



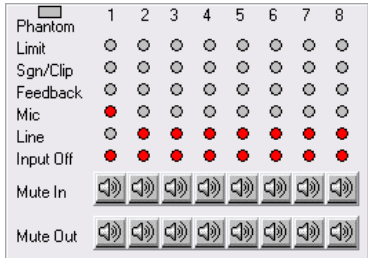
Gating Threshold: the gating threshold is ranging from -80dB up to 0dBu.
This threshold is allowing to set a gating level for the microphones, pretty high, allowing in this way to open or close at level far from the common noise floor, so to open or close when a hi level signal, as the voice, is detected at the microphone's input or not.
Attack Time: it is ranging from 1ms up to 1 second and represent the speed of the Noise Gate in "closing" the input level once a signal in input is detected to be below the Gating Threshold.
Release Time: t is ranging from 10ms up to 1 second and represent the speed of the Noise Gate in "opening" the input level once a signal in input is detected to be above the Gating Threshold.

A **Phantom** power supply can be activated if microphones using a such power supply are chosen.

Note: at the bottom of the Meter Bar aside the level slider, both when Line or Microphone Input are selected, there is an indicator indicating in real time and precisely what's the current Input signal level in dBu

Note1: a "Balance" check box is also available.
When a Balanced Input is used, it has to be checked, so to get the proper input level adjustment.
If a Not Balanced Input is used, the box has to be left unchecked and the input level is automatically adjusted at +6dBu.

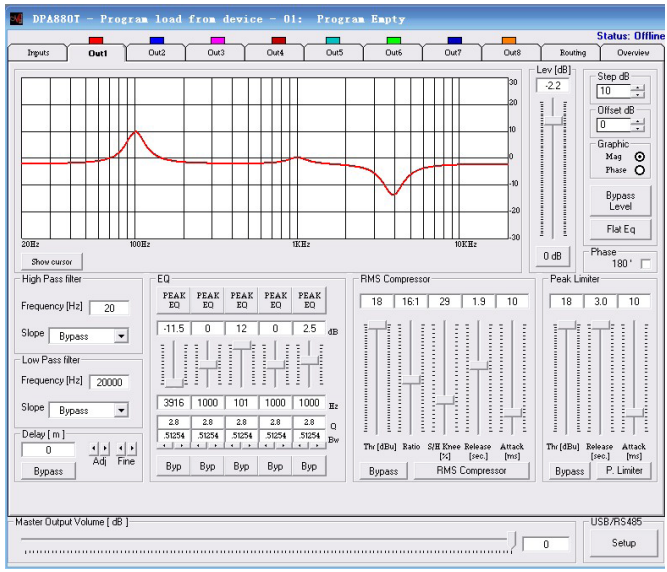
Note2: In order to help tuning properly the Noise Gate when used as Microphone Input On/Off Switch, 8 Leds indicating the Inputs status is available in the Led meters interface:



The line of "Input Off" leds is indicating when an Input is Off or Muted by the Noise Gate.
In that case the related Led is turned RED.
Once set the microphone inputs configurations, if used the Noise Gate as microphone On/Off Switch, the Noise Gate parameters and mainly the Gating Threshold can be tuned checking when the corresponding Input will be muted without any direct source in input but the noise floor.

Outputs Pages

From this windows is possible to access and edit the most significant signal processes of the 8 output channels.



High Pass Filter: from this sub-frame it is possible to set the Output Channels High Pass Filter (HPF).

"***Frequency***": (Low Cut frequency) the selectable frequencies range is from 20Hz to 20kHz in steps of 1/24 of an Octave.
"***Slope***": allows you to select the X-Over's High Pass Filter Shape and Order.

The available shapes and orders for the High Pass Filter are listed below:

- Bypass (High Pass Filter Bypassed)
- Buttw 6dB (Butterworth Filter 6dB/Oct Slope)
- Buttw 12dB (Butterworth Filter 12dB/Oct Slope)
- LRiley 12dB (Linkwitz/Riley Filter 12dB/Oct Slope)
- Bessel 12dB (Bessel Filter 12dB/Oct Slope)
- Buttw 18dB (Butterworth Filter 18dB/Oct Slope)
- Buttw 24dB (Butterworth Filter 24dB/Oct Slope)
- LRiley 24dB (Linkwitz/Riley Filter 24dB/Oct Slope)
- Bessel 24dB (Bessel Filter 24dB/Oct Slope)

Low Pass Filter: from this sub-frame it is possible to set the Output Channels Low Pass Filter (LPF).
"***Frequency***": (High Cut frequency) the selectable frequencies range is from 20Hz to 20kHz in steps of 1/24 of an Octave.
"***Slope***": allows you to select the X-Over's Low Pass Filter Shape and Order.

The available shapes and orders for the Low Pass Filter are listed below:

- Bypass (High Pass Filter Bypassed)
- Buttw 6dB (Butterworth Filter 6dB/Oct Slope)
- Buttw 12dB (Butterworth Filter 12dB/Oct Slope)
- LRiley 12dB (Linkwitz/Riley Filter 12dB/Oct Slope)
- Bessel 12dB (Bessel Filter 12dB/Oct Slope)
- Buttw 18dB (Butterworth Filter 18dB/Oct Slope)
- Buttw 24dB (Butterworth Filter 24dB/Oct Slope)
- LRiley 24dB (Linkwitz/Riley Filter 24dB/Oct Slope)
- Bessel 24dB (Bessel Filter 24dB/Oct Slope)

EQ: from this sub-frame it is possible to set the Output Channels five available Peaker (Bell) or variable Q Shelving Filters.
The DPA880T allows the user to select either Bell or variable Q Shelving Parameters and assign them independently using the 5 available filters.
The selection can be done just pressing the "Peak Eq" button on top of the filters' gain sliders and selecting one of the 3 available filters' type: Peaker, variable Q high Shelving and variable Q low Shelving.

BELL Filter: here Center Frequency, Band Width (Q) and Gain can be adjusted.
"***Center Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1/24 of an Octave.
"***Bandwidth BW***": the selectable BW range is from 0.0312 Octave (Q=10) up to 3.59 Octave (Q=0.4) in steps of 0.1 Q.
"***Gain***": the selectable Gain range is from -12dB to +12dB in steps of 0.5 dB.

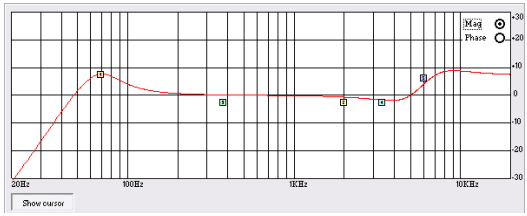
Variable Q Low Shelving Filter: here Center Frequency, Band Width (Q) (Slope) and Gain can be adjusted.
"***Center Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1/24 of an Octave.

"***Bandwidth BW (Slope)***": the selectable BW range is from 0.0312 Octave (Q=10) up to 3.59 Octave (Q=0.4) in steps of 0.1 Q.
"***Gain***": the selectable Gain range is from -12dB to +12dB in steps of 0.5 dB.

Variable Q High Shelving Filter: here Center Frequency, Band Width (Q) (Slope) and Gain can be adjusted.
"***Center Frequency***": the selectable frequencies range is from 20Hz to 20kHz in steps of 1/24 of an Octave.
"***Bandwidth BW (Slope)***": the selectable BW range is from 0.0312 Octave (Q=10) up to 3.59 Octave (Q=0.4) in steps of 0.1 Q.
"***Gain***": the selectable Gain range is from -12dB to +12dB in steps of 0.5 dB.

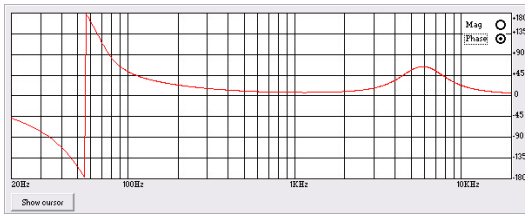
Note: each single filter can be independently "bypassed" for an easy setting/use of them.
To "Bypass" the single filter, just press the "Bypass" button below the filter's parameters.

The set up of the filters and specially their frequency placement can also be done with the use of the mouse, just activating the “Show Cursor” function, pressing the related button on the left bottom of the frequency response Graphic.



Once the all 5 available cursor are shown on the Frequency Response graphic, just selecting anyone of them with the mouse's arrow and maintaining the mouse's click pressed, it is possible to move and place the selected cursor on the desired frequency and with the desired gain.
For setting the filter's Q, still need to enter the desired value directly in the dedicated box in the filters' editing main sub-frame.

In order to see what's the “Phase” response of the channel once set up the all filters of the EQ, it is possible, selecting the Phase choice on the top right of the Graphic window, to turn the graphic in “Phase Response Graphic”:



Step dB – this simple function is allowing to set the resolution in dB of the Grid Lines of the Graphic displaying the Magnitude response of the equalization.
The resolution can be set in a range from 5dB up to 50dB, by steps of 5dB.

Offset dB – here can be set an “offset” in dB in visualizing the Magnitude response of the equalization.
Once added a positive offset, more space is given in the graphic to the visualization above the 0dB, when a negative offset is added, more space is given to the visualization below the 0dB.
The offset can be set in a range from 10dB up to -120dB, by steps of 10dB.

Level [dB] – from this sub-frame it is possible to set the Output Channels Level from -127dB up to +18dB.
Pressing the “Bypass” button at the bottom of the Level slider, the currently set level will be skipped and the output level will be set to 0dB.

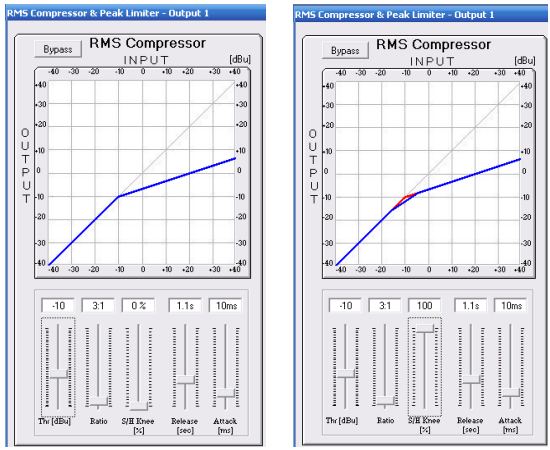
Phase – when this check box is “unchecked” the processed signal is left with its original phase.
When the check box is “checked”, then the original phase of the signal is inverted of 180Deg.

Delay – from this sub-frame it is possible to set the Output Channels Delay Time from 000.0000mS (0 meters) up to 380.998mS (129.53932 Meters), by steps of 1mS (Adj arrows) or 20.8uS (Fine arrows).

On each Output channel is available a powerful RMS compressor for improving the sound quality, followed by a Peak limiter useful for limiting the output signal before to enter the amplification system.
Each, RMS Compressor and Peak Limiter, can be independently set.
The editable parameters can be accessed directly from the RMS Compressor and Peak Limiter sub-frames, or entering a dedicated window accessible from both the sub-frames pressing the buttons “RMS Compressor” or “P. Limiter”.

Both RMS Compressor and Peak limiter can be quickly skipped and re-activated by pressing the “Bypass” button within the respective sub-frames.

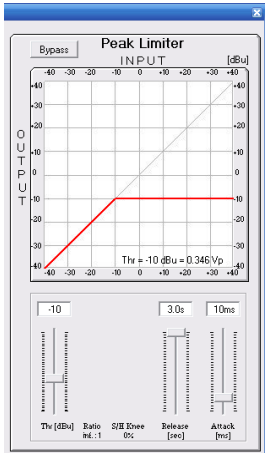
RMS Compressor – from this sub-frame it is possible to set the Threshold, Ratio, Attack Time, Release Time and “Knee” type of the Output Channels' RMS Compressor.



“***Threshold***”: the selectable range of the RMS Compressor's Threshold is from +18dBu (OFF) to -30dBu in steps of 0.2dBu
“***Ratio***”: the selectable range of the RMS Compressor's Ratio is from 1:1 (Off) up to 32:1 (Lim) in steps of 1.
“**Hard / Soft Knee*”***: the selectable range of the RMS Compressor's Knee type is from 000% (Hard) up to 100% (Soft).
“***Release Time***”: the selectable range of the RMS Compressor's Release Time is from 0.1s to 3s in steps of 0.1s.
“***Attack Time***”: the selectable range of the RMS Compressor's Attack Time is from 5ms to 200ms in steps of 1ms - from 5ms to 20ms then 5ms - from 20ms to 30ms then 10ms - from 30ms to 100ms and 20ms - from 100ms to 200ms.

Note: The RMS Compressor Threshold is defined in dBu, due to the fact that with both, Sinusoid and Squared wave testing signals, the DPA880T compressed output dBu (RMS) Level is the same and matching the selected one.

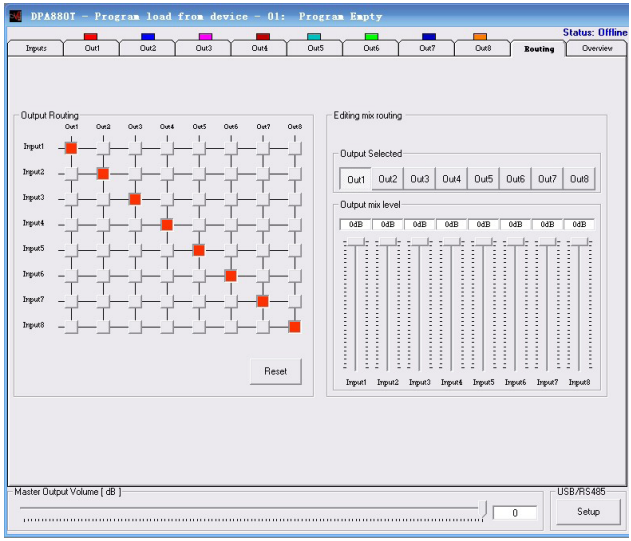
Peak Limiter – from this sub-frame it is possible to set the Threshold, Attack Time and Release Time of the Output Channels' Peak Limiter.



"***Threshold"***: the selectable range of the Peak Limiter's Threshold is from +18dB (Limiter not active) to -30.0dB in steps of 0.2 dB.
"***Release Time***": the selectable range of the Peak Limiter's Release Time is from 0.1s to 3s in steps of 0.1s.
"***Attack Time***": the selectable range of the Peak Limiter's Attack Time is from 5ms to 200ms in steps of 1ms - from 5ms to 20ms then 5ms - from 20ms to 30ms then 10ms - from 30ms to 100ms and 20ms - from 100ms to 200ms.

Note: The Peak limiter Threshold is defined in Vp, due to the fact that with both, Sinusoid and Squared wave testing signals, the DPA880T Peak Limited output Vp (Peak-Peak) Level is the same and matching the selected one.

Routing Page

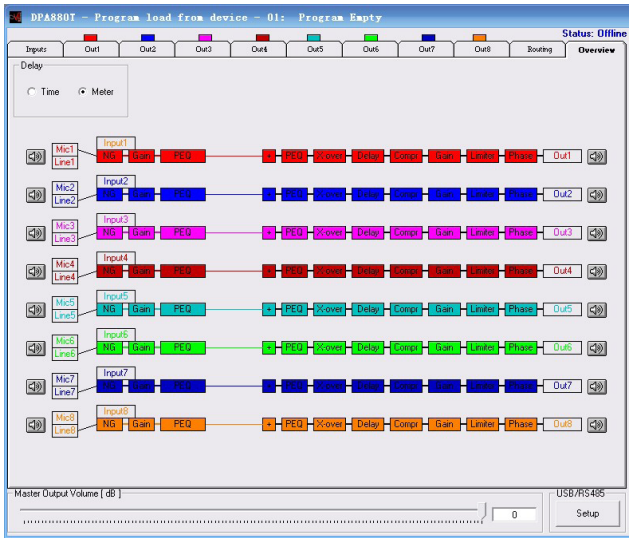


The routing Page is allowing to set the Matrix Structure of the DPA880T and to assign to each Output the desired Inputs.
On the “Output Routing” Matrix block activating the desired “node” will connect the Input and the Output related to the Node.

On the “Editing mix routing”, it is possible to adjust the Level of each input assigned to the Output selected by the related button.
So, selecting any one of the available 8 buttons, the related Output will be “formed” by the addition of the all inputs (assigned by the “Output Routing” Matrix Block, with the Level percentage defined by the “Output mix level” sliders.

The Levels of the “mixed inputs” to the selected outputs, can range from -30dB up to 0dB.

Overview Page



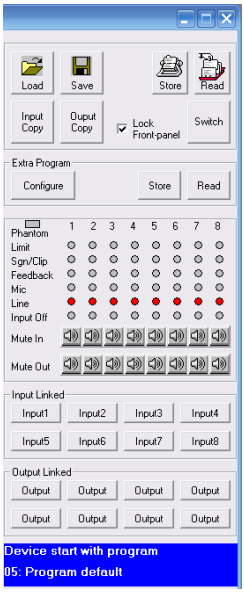
Within the Overview Page, can be checked the all channels inputs selection (between Microphone and Line), so as any of the available processes can be accessed double clicking on its name in the processes' block diagram.
Particularly, in this page is also resumed the current selections operated for the Inputs in terms of available Eq or Feedback Eliminator processes, when Microphone Input is selected.

Here also can be selected the “Unit” for defining the amount of delay available on each output.
The Delay can be actually set in “meters” or “milliseconds”.

The DPA880T is running 2 Classic Automixer processes, the **NOM** (Number of Opened Microphones) and the **Gain Sharing**.
These 2 processes are used with microphones in Conference Systems for Voice quality improvement and Feedback effect reduction.

Has to be noticed here that the DPA880T can run together with the Classic NOM and Gain Sharing processes, also the First order Low Pass filter and mainly the Frequency shift Feedback Eliminator.
This is providing a very strong Anti Feedback characteristic to the unit, which can let the NOM and Gain Sharing processes act mainly in terms of Voice quality and intelligibility improvement.

Pages' Background Utilities Screen



In this background screen, ever present together with the other editing pages, is displayed the channels' status.
Here are mainly reported the all activities of the DPA880T front panel's leds.
Each Input/Output channel can be muted so as input channels and output channels can be "linked" together so to report on the all linked channels the same parameters adjustments.
To link 2 or more channels, it is enough to press the related buttons within the "Input Linked" and "Output Linked" frames.
The Main output Level can also be adjusted from this Utilities window.

This is the same Level control used by the Wall Panel Remote Control.
Through the "Setup" button a selection window can be accessed allowing to set the DPA880T in Manual Mode, choosing the USB or RS485 interface, or in Automatic mode.

From the Utilities Window, can be accessed also the all processes for Saving/Recalling presets to/from Pc and to/From the DPA880T and for configuring Special Processes activated by the External Switch Input Ports.

Particularly:

Load: allows to load on the Pc Remote Control a configuration previously saved on Pc

Save: allows to save on Pc the current editing session

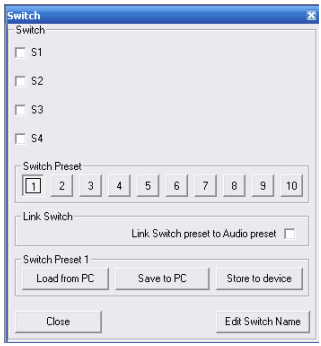
Store: allows to store on the DPA880T, in one of the 6 available location, the current editing session

Read: allows to read from the DPA880T, one of the 6 stored presets and to display it on the current editing session

Input Copy: allows to copy the setting of one Input channel on an other one

Output Copy: allows to copy the setting of one Output channel on an other one

Switch: this particular button is allowing to enter e window where from up 4 lines (switches) can be set as 0 (boxes unchecked) or 5V (boxes checked).



The switches controlled by this window actually set as 0V or 5V the physical 4 output “switch” lines available on the DPA880T back panel and useful for controlling remote devices.
From this editing window, up to 10 different presets can be created, where a specific Switches configuration is assigned.
In order to create the presets, need first to press one of the 10 “Switch Preset” buttons
Once the specific button is presses, to that button will be assigned the current status of the 4 S1/S2/S3/S4 switches.
To any button, a different S(x) configuration can be assigned.
The different configuration will be maintained until the Pc Sw is open.
On the Pc can be saved ONLY a Configuration a time, the Pc will not store the configurations of the 10 buttons.
Therefore, on Pc will be saved any time the current configuration of the Switches S1/S2/S3/S4.
The several configurations can be then recalled and they'll be assigned to the currently pressed “Switch Preset” button.

In example, creating the following configuration

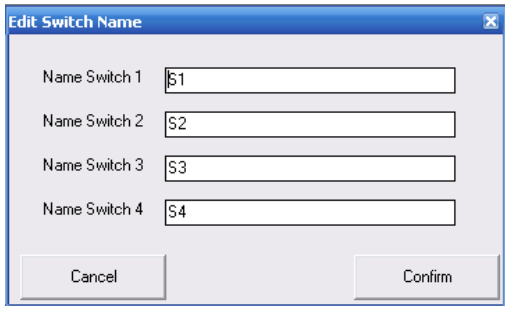
S1 = checked
S2 = unchecked
S3 = unchecked
S4 = unchecked

The configuration can be saved on Pc as “S1_On”.
If recalled, when the Switch Preset button ONE is pressed, then to the Switch Preset Button 1 will be associated the above configuration of the switches.
Different S(x) configurations can be saved with different names and be associated to different Switch Preset buttons.
Once assigned different S(x) configurations to different Switch Preset buttons, the user can recall the several configurations from Pc Sw just pressing the several Switch Preset buttons.

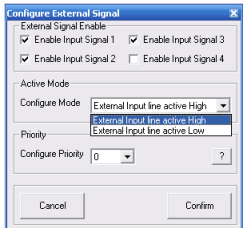
In order to store the 10 Preset configurations within the DPA880T, so to be able to recall them by DPA880T front panel or together with the “Audio Presets” if active the “link” function (see later), it is enough to press any Switch Preset button in order to make it active and press the “Store to Device” button.
The preset related to the currently active Switch Preset button, will be stored in the equivalent preset location within the DPA880T.
In order to store the all 10 presets, need to make active one by one the all Switch Preset buttons and for anyone of them press the “Store to Device” button.

Once stored within the DPA880T, the 10 presets controlling the S(x) switches status can be recalled manually and independently from the “Audio” Presets, from the unit's front panel.
If the User want to recall the Switch Presets together with the Audio Presets, which would mean that together with the Audio preset number 1, the user want to be recalled also the Switch Preset number 1 (the Audio preset and Switch Preset numbers have to match...), then is necessary to LINK the Audio Presets and the Switch Presets.
This can be done checking the “Link Switch preset to Audio preset” check box within the Link Switch frame of the Switch Editing window.

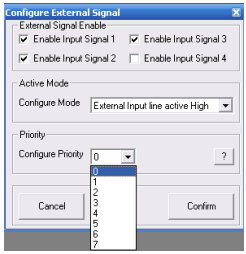
To the Switches can also be assigned a NAME, just pressing the “Edit Switch Name” button and entering the Edit Switch Name window



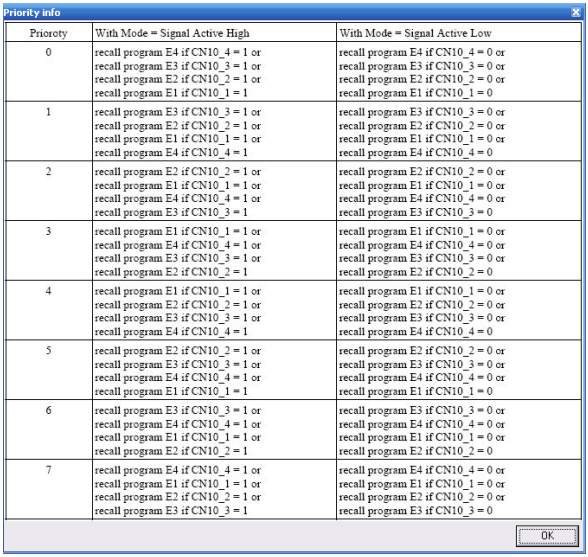
Extra Program: the External Program section is allowing the user to set as active or not active anyone of the 4 available Input Switches.
When set as active one or more of them, it is also possible to define with the “Configure Mode” option, if the Input Switch signal has to be considered active on its High or Low level detected.



Furthermore, it is also possible, in case more Events related to the Input Switches are occurring at the same time, so activating at the same time more than one Switch, to assign a Priority in “serving” the events related to the active Switches (see below).



The desired Priority can be set selecting one of the 8 options available, corresponding to the following Priority Table (accessible pressing the "?" button aside the "Configure Priority" selection box):

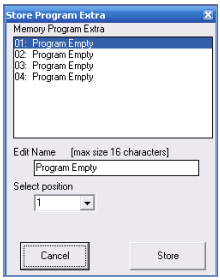


Prioroty	With Mode = Signal Active High	With Mode = Signal Active Low
0	recall program E4 if CN10_4 = 1 or recall program E3 if CN10_3 = 1 or recall program E2 if CN10_2 = 1 or recall program E1 if CN10_1 = 1	recall program E4 if CN10_4 = 0 or recall program E3 if CN10_3 = 0 or recall program E2 if CN10_2 = 0 or recall program E1 if CN10_1 = 0
1	recall program E3 if CN10_3 = 1 or recall program E2 if CN10_2 = 1 or recall program E1 if CN10_1 = 1 or recall program E4 if CN10_4 = 1	recall program E3 if CN10_3 = 0 or recall program E2 if CN10_2 = 0 or recall program E1 if CN10_1 = 0 or recall program E4 if CN10_4 = 0
2	recall program E2 if CN10_2 = 1 or recall program E1 if CN10_1 = 1 or recall program E4 if CN10_4 = 1 or recall program E3 if CN10_3 = 1	recall program E2 if CN10_2 = 0 or recall program E1 if CN10_1 = 0 or recall program E4 if CN10_4 = 0 or recall program E3 if CN10_3 = 0
3	recall program E1 if CN10_1 = 1 or recall program E4 if CN10_4 = 1 or recall program E3 if CN10_3 = 1 or recall program E2 if CN10_2 = 1	recall program E1 if CN10_1 = 0 or recall program E4 if CN10_4 = 0 or recall program E3 if CN10_3 = 0 or recall program E2 if CN10_2 = 0
4	recall program E1 if CN10_1 = 1 or recall program E2 if CN10_2 = 1 or recall program E3 if CN10_3 = 1 or recall program E4 if CN10_4 = 1	recall program E1 if CN10_1 = 0 or recall program E2 if CN10_2 = 0 or recall program E3 if CN10_3 = 0 or recall program E4 if CN10_4 = 0
5	recall program E2 if CN10_2 = 1 or recall program E3 if CN10_3 = 1 or recall program E4 if CN10_4 = 1 or recall program E1 if CN10_1 = 1	recall program E2 if CN10_2 = 0 or recall program E3 if CN10_3 = 0 or recall program E4 if CN10_4 = 0 or recall program E1 if CN10_1 = 0
6	recall program E3 if CN10_3 = 1 or recall program E4 if CN10_4 = 1 or recall program E1 if CN10_1 = 1 or recall program E2 if CN10_2 = 1	recall program E3 if CN10_3 = 0 or recall program E4 if CN10_4 = 0 or recall program E1 if CN10_1 = 0 or recall program E2 if CN10_2 = 0
7	recall program E4 if CN10_4 = 1 or recall program E1 if CN10_1 = 1 or recall program E2 if CN10_2 = 1 or recall program E3 if CN10_3 = 1	recall program E4 if CN10_4 = 0 or recall program E1 if CN10_1 = 0 or recall program E2 if CN10_2 = 0 or recall program E3 if CN10_3 = 0

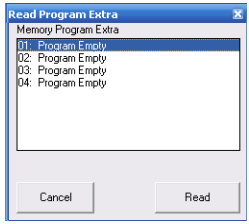
Once operated the all desired selections, need to "Confirm" them before to exit the "Configure External Signal" Page.

To anyone of the 4 External Switches (Events) can be related a specific process.
This process is corresponding to a Input/Output specific Configuration (Preset), that has to be recalled ONLY if the related Event (Switch Active) is occurring.
So, 4 Extra Presets other than the 6 available for the normal operations, can be created and stored, so to be recalled ONLY when the related event is occurring.

Once create the 4 Extra Presets, they can be stored within the DPA880T Through the Button "Store":



The Extra Presets can be saved in 4 available locations where the location number is corresponding to the related Switch Input Event.
To anyone of the 4 Extra Preset can be assigned a specific name.
Once saved the Extra Presets, they can be anytime recalled for check using the “Read” button.



For Leaving the Remote control Sw, it is enough to click “Exit” on the “file” option on the top left corner of the Main Editing Environment.

Once left the Pc Sw Remote Control, the DPA880T will go back to the Stand Alone Mode and the LCD will display the currently running preset:

- **DPA880T Technical Specifications**

The DPA880T Digital Speaker Processor is based on a powerful analog and digital DSP platforms having the following specifications

Input/Output Stages

Maximum Input Level:	+18 dBu
Maximum Output Level Low:	+18 dBu

DSP Processing

Digital Processing (DSP):	Dream SAM3716, 24bit (data) x 96 bit (coeff.), Sw Enhanced Precision
Sampling Frequency:	48kHz
Converters	4xAK5385 Codecs, 24bit D/A

General Data

S/N:	> 98dBu A-weighted [Microphone] >104dBu A-weighted [Line]
THD+N:	0.005%
Frequency Response (Bypass):	20Hz – 20kHz (+- 1 dB)
Input Channels:	8, balanced
Output Channels:	8, balanced
Input Switches 0-5V	4 (TTL Level)
Output Switches 0-5V	4 (TTL Level)
Display:	Graphic, 2x24 characters
Power Supply:	110-220V
Remote Control:	RS485, USB, Wall Panel
Size:	19” (1xRU)

- **DPA880T Processes Block Scheme**