

BELL SMP_QX Power Amplifier with Digital Audio Management



SAFETY INSTRUCTIONS

In order to avoid damage to hardware or electronic components, during unit use and/or maintenance, It is necessary to follow the safety instructions.

Prior to installing the unit, please read this manual carefully. Follow all instructions and keep it for further reference.

Manipulating or opening the unit may cause damage to people. -Place the unit in a location protected from weather and in a good distance from water and moisture. -Don't expose the unit to sources of heat, such as radiators, spotslamps, hot power amplifiers etc.. -Avoid any kind of liquid entering inside the unit. -Connect the unit to a power supply line able to support the units power consumption. The power supply line must be in good operating conditions. The power supply line must have an efficient ground line. -Disconnect the unit from a a.c. power socket during thunderstorm (lightning) or when out of use for long periods of time. Leave any servicing to qualified service personnel only. Servicing is required when the apparatus has been damaged in any way, such as: -Defective connectors -Liquid has spilled inside the unit. -The unit has been dropped or has been mechanically or electrically damaged or if the personal password of the user has been forgotten.

No user-serviceable parts inside. For service, refer to an authorized maintenance centre.

BELL SMP_QX power amplifiers comply with EMC Directive 89/336/CEE (Directive on approximation of member nation's ordinance concerning the electromagnetic compatibility) and following modifications 92/31/CEE and 93/68/CEE, as stated in EN 500821:1997, EN 55013:1990, EN 55020:1994 standards. These units comply to Low Voltage Directive 73/23/EEC (Directive on approximation of member nation's ordinance concerning electric equipment designed to be used within the specified voltage range), and following modifications 93/68/CEE, as stated in EN 60065:1998 standard. To avoid electric shock don't open this unit. To prevent risks of fire and/or electric shock, don't expose this unit to rain or moisture.

PACKAGING

This unit package has been submitted to ISTA 1A integrity tests. We suggest you check the unit immediately after unpacking it. If any damage is found, immediately inform the dealer. Keep all unit packaging parts to allow inspection. Our company is not liable for any damage that occurs during shipment.

SHIPMENT / TRANSPORT LOSS OR DAMAGE

Products are sold and shipped ex warehouse and the shipment is at charge and risk of the buyer. Possible damages to the unit should be immediately notified to the forwarder.

BELL®

BEA SMP_QX_E

WARRANTY AND PRODUCT RETURN

BELL Audio Systems warrants all materials, workmanship and proper operation of this product for a period of two years from the original date of purchase. If any defects are found in the materials or workmanship or if the product fails to function properly during the applicable warranty period, the owner should inform the dealer or the distributor, providing receipt or invoice of date of purchase and a detailed description of the defect(s). This warranty does not extend to damage resulting from improper installation, misuse, neglect or abuse. BELL will verify damage on returned units. If the unit has been properly used and warranty is still valid, the unit will be replaced or repaired. Our company is not responsible for any „direct damage“ or „indirect damage“ caused by any defective product.

INSTALLATION

Product should be installed and operated in a professional 19“ standard rack with adequate ventilation.

DISCLAIMER

BELL products have been expressly designed for audio application, with signals in audio range (20Hz to 20kHz). Our company is not liable for damages caused by lack of maintenance, modification, improper use or improper installation or by ignoring safety instructions.

BELL reserves the right to change technical specifications at any time without notice.

Getting started

- Make all necessary connections from amplifiers / mixer by using high quality balanced audio cables.
- Switch on MAINS (rear panel).
- After switching on the unit, all XLR outputs will be connected via relays (with short a short delay in order to avoid any harsh audio offset)
- After the switch on procedure, all last used parameters values will be loaded and **activated**.
- If activated, the fade in function will be executed. (horizontal bargraph in LCD display)
- Next, the Main LCD Menu will be shown:

LEVEL A: -90.0dB P:01
LEVEL B: -90.0dB P:01

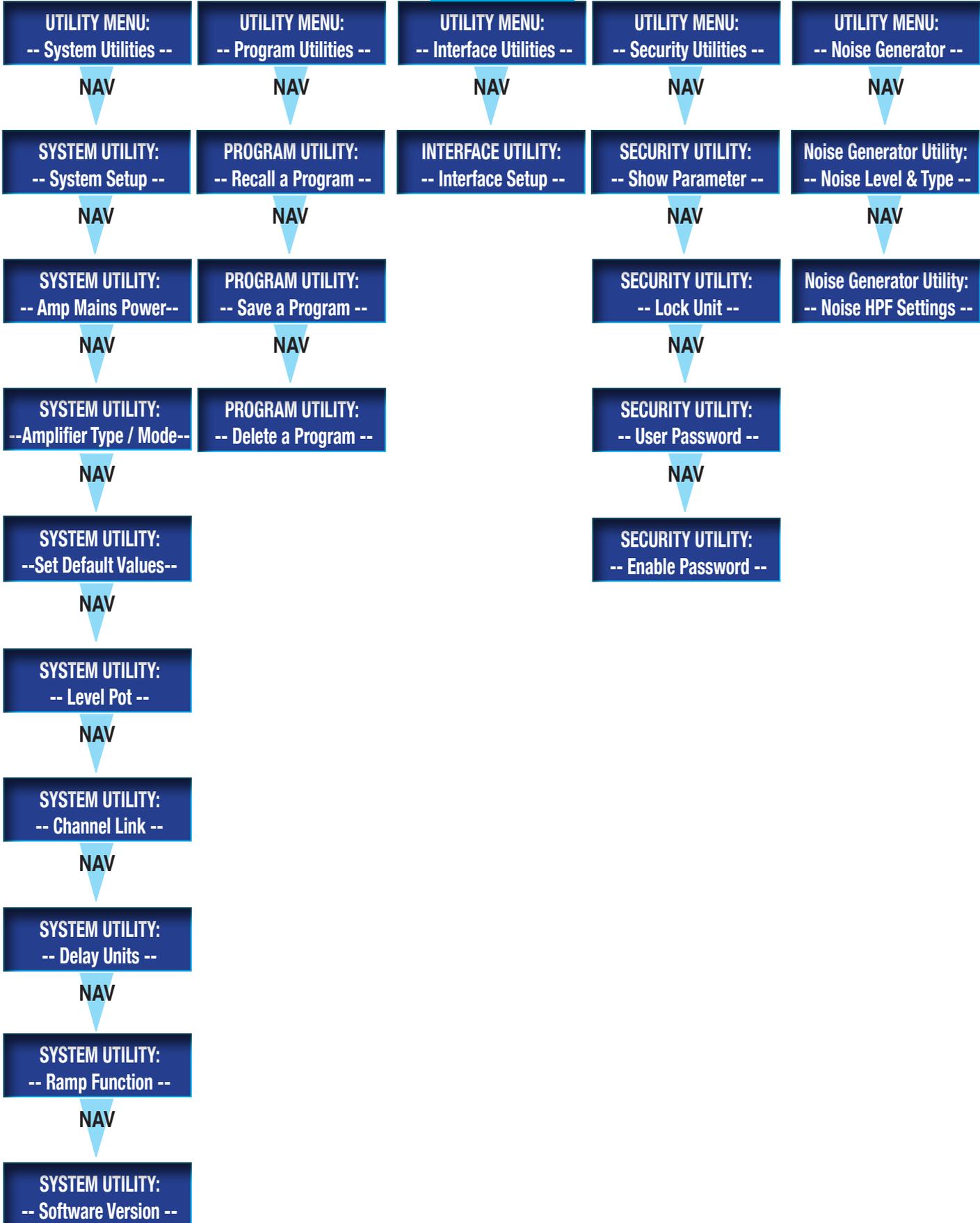


- PM1/NAV:** navigates within the various menus (Utility, Edit)
- PM1:** sets any selected parameter value
sets LEVEL of channel A, when function Level Pot in System Utility is active
- PM2:** sets selected parameter values
sets LEVEL of channel B, when function Level Pot in System Utility is active
- Enter button:** confirms any edited parameter
jumps to next higher sub menu
- ESC button:** quits any parameter
jumps to next lower sub menu
- Utility button:** interrupts any edit process
opens the Utility menu
- Edit button:** interrupts the UTILITY function. Activates EDIT CH. A (pushed once only)
Pushed again, Edit button activates EDIT CH.B
Pushed again, Edit button activates EDIT CH.A
- AMP Status LED:** Blue off: Stereo Mode (=normal) // Blue on: Bridge Mode
Yellow on: DSC active
Red on: Protect Mode
- Output LED meter** Displays Amp Output Level in reference to maximum Output
5 green LEDs, -20...0dB
- Limit LED:** Yellow LED shows, that RMS Limiter or Clip Limiter is active.
- CLIP LED:** Red LED shows, Clipping detected at input (post ADC) or at Output
In PC software, Input- / and Output Clipping are shown separately

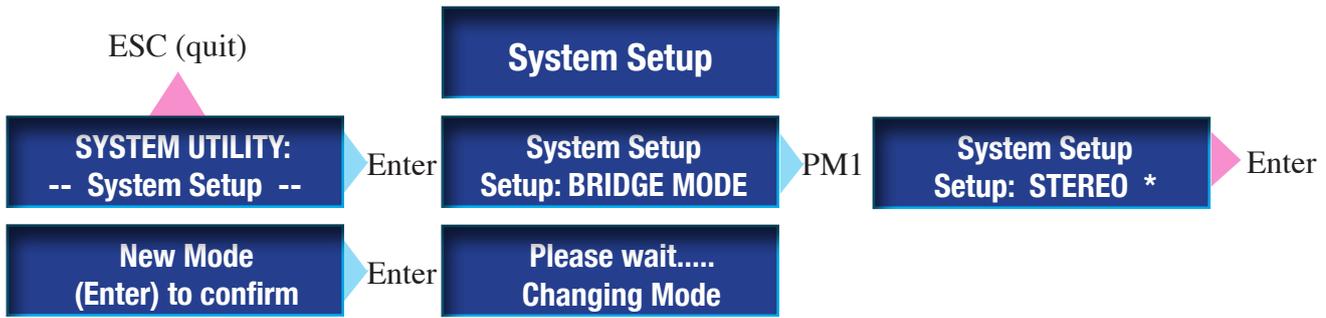
! In case of Input-Clipping, Level of input signal must be reduced (Risk of digital distortion)

! Output-Clipping may be caused by excessive internal signal processing, such as extreme EQ settings. Avoid / correct such settings.

TREE: UTILITY MENU
-- UTILITY BUTTON --



Sub Menu: System Utilities



Default Setting of System Setup ist STEREO

This parameter will be stored with command ,Save Program to PC and Save Program to Device‘

Default Setting of OUTPUT ROUTING

Setup: STEREO	CHANNEL A: IN A	CHANNEL B: IN B
Setup: BRIDGE	CHANNEL A: IN A	CHANNEL A: INVERSE

Amp Mains Power



Default setting of AMP MAINS POWER is POWER = ON

This parameter will not be stored with command ,Save Program to PC and Save Program to Device‘

Amplifier Type Mode



Example shows Display for SMP-3000QX in 2-OHM Mode

Set Default Values

ESC (quit)



Set Default Values = Parameter will reset to default setting (depending on System Setup).

The following parameters will not be reset to their Default Values :

Power, Password, Channel Link, Show Parameter, Delay Units, Level Pot, Ramp Function

Level Pot

ESC (quit)



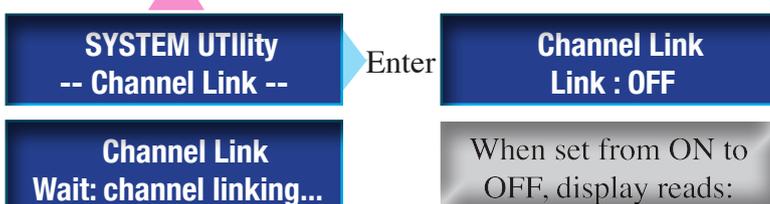
When switching on the SMP_QX Power Amp, LEVEL POT is enabled (in function)

This parameter will be stored with command ,Save Program to PC und Save Program to Device‘

When Level Pot is enabled, wheels ,LEVEL A‘ and ,LEVEL B‘ operate as Level Potentiometers.

Channel Link

ESC (quit)



Default setting of Channel Link is OFF

This parameter will be stored with command ,Save Program to PC und Save Program to Device‘

In the given example, Channel Link was changed to ,ON‘, using the PM1 encoder.

Alternative settings of Channel Link: ON / OFF

Channel-Link function may only be used, when System Setup is set to ,STEREO‘

When Channel Link is changed from OFF to ON, all Channel A parameters will be copied to Channel B. (This includes Status Locked / Unlocked Preset)

Parameters ,Name‘ and ,Input Source‘ Routing will not be copied.

When Input Edit Button is pushed in Channel Link Mode, Display will show, that Channels A and B are linked. In this case, any change of parameter for channel A will also be true for channel B.

In Channel Link Mode, display will read: IN : A + B instead of In : A und In : B
EQ-1 will be shown als EQ-1(s).

Channel Link



Default setting of Channel Link is OFF.

This parameter will be stored with command ,Save Program to PC und Save Program to Device‘

In the given example, Channel Link was changed to ,ON‘, using the PM1 encoder.

Alternative settings of Channel Link: ON / OFF

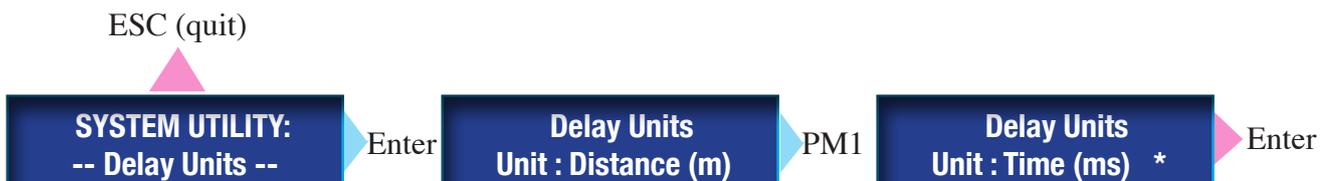
Channel-Link function may only be used, when System Setup is set to ,STEREO‘

When Channel Link is changed from OFF to ON, all Channel A parameters will be copied to Channel B. (This includes the Status Locked / Unlocked Preset)
Parameters ,Name‘ and ,Input Source‘ Routing will not be copied.

When Input Edit Button is pushed in Channel Link Mode, Display will show, that Channels A and B are linked. Any change of parameter for channel A will also be true for channel B.

In Channel Link Mode, display will read: IN : A + B instead of In : A and In : B
EQ-1 will be shown als EQ-1(s).

Delay Units



Default setting for Delay Units is Distance (m).

This parameter will not be stored with command ,Save Program to PC und Save Program to Device‘

In the given example, Delay Units are changed to Time (ms), using the PM1 encoder.

Possible settings of Delay Units: Distance (m) or Time (ms)

Ramp Function

ESC (quit)



Default setting of RAMP Function is Disable.

This parameter will not be stored with command ,Save Program to PC und Save Program to Device‘

In the given example, Ramp Function was changed via PM1 encoder from Disable to Enable.

Possible settings for Ramp Function: Disable / Enable.

! The ramp function will help to avoid any harsh audible offset whenever any extreme change of parameter is executed in one single step via the PC software. (Such abrupt changes are not possible when using the unit’s encoder on the front panel)

Example: EQ Gain is changed from +15dB to -15dB (extreme setting...)

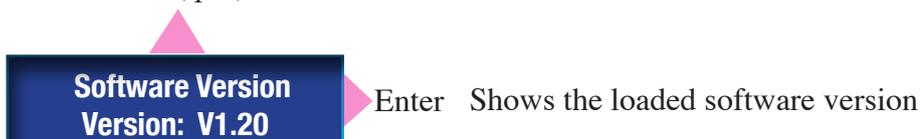
The procedure string of the ramp function is:

- 1) fade out of input signal
- 2) modification of parameter value
- 3) fade in of the input signal

Due to the fade-in / fade-out process, the ramp function should likely not be used during life performance.

Software Version

ESC (quit)



Sub Menu: Program Utilities

Recall a Program

ESC (quit)



Selecting ,Recall a Program', the SMP_QX will suggest the previously used program.

In the given example, it is program Nr.01

Should you want to use this program, confirm by ,Enter'

Recall a Program

ESC (quit)



Selecting ,Recall a Program', the SMP_QX will suggest to use the previously used program.

In the given example, this is program Nr.01. Should you want to use a different program, select this via PM1 encoder.

In the given example, programm Nr. 12 (Theater Hamburg) was selected.

Selecting a previously stored program will load all of its parameters.

Any previously active parameters will be replaced by those of the last loaded program.

Save a Program

ESC (quit)



When selecting ,Save a Program', the SMP_QX will suggest to use the previously used program name and number.

In the given example, it is program Nr.01. Should you want to use this program, confirm by Enter.

In order to change the program name, use PM1 (cursor) and PM2 (sign)

In the given example, the new name is Open Air Cologne

Save a Program



Selecting ‚Save a Program‘, the SMP_QX will suggest the previously used program name and number. In the given example, it is program Nr. 01 (Arena Vienna)

To change the program number, use PM1 encoder. In the given example, number 14 was selected. The original name (King Albert Hall) is shown. The program will be confirmed by Enter..

In order to change the program name, use PM1 (cursor) and PM2 (sign)

In the given example, the new name is Open Air Cologne

! All parameters except: EQ Bypass, Power, Noise Generator Parameter (all), Delay Units, Ramp Function, Noise Generator ON / OFF will be stored. **SMP_QX amps comes with 53 storage banks.**

Delete a Program



Selecting ‚Delete a Program‘, the SMP_QX will suggest to delete the first program in list. In the given example, it is program Nr. 01 (Arena Vienna)

In order to delete a different program, select it by PM1 encoder. In the given example, programm Nr.14 was selected to be deleted. The original name (King Albert Hall) is shown in the Display. The command ‚Delete‘ is executed by Enter.

! A program may not be deleted while in use.

Sub Menu: Interface Utilities

Interface Utilities

ESC (quit)



PM1 sets an individual ID number for each SMP_QX amplifier.



When a quantity of SMP_QX amps is working in the same system (interfaced via RS485) each one must be given a different ID number in order to avoid any data crash.

In the given example, ID number for RS485 ID was changed from 02 to 01, using the PM1 encoder.

A total of up to 32 units SMP_QX power amplifiers may be linked and controlled by PC (software) via RS485 Interface.

Sub Menu: Security Utilities

Show Parameter

ESC (quit)



The default setting for ,SHOW PARAMETER' is: ,will be shown'

This parameter will be stored with command ,Save Program to PC und Save Program to Device'

In the given example ,Show Parameter' was changed to ,will not be shown' via PM1.

Possible modes: ,will be shown' or ,will not be shown'

1) When ,parameter will be shown' is active and Utility Procedures ,Lock Unit' and ,Enable Password' are also active, all parameters und values will be shown in the Menu Edit and Utility menus.

2) When ,parameter will **not** be shown' is active, and when at the same time Utility Procedures ,Lock Unit' and ,Enable Password', are active, no parameters will be shown in the menu Edit and Utility.

If 2) is true, and if Lock Unit or Enable Password are active, all operating features except the Utility button will be deactivated. Pushing the Utility button will open the ,Lock Unit' menu. or ,Enable Password' depending on which one of these procedures has been activated.

Lock Unit

ESC (quit)



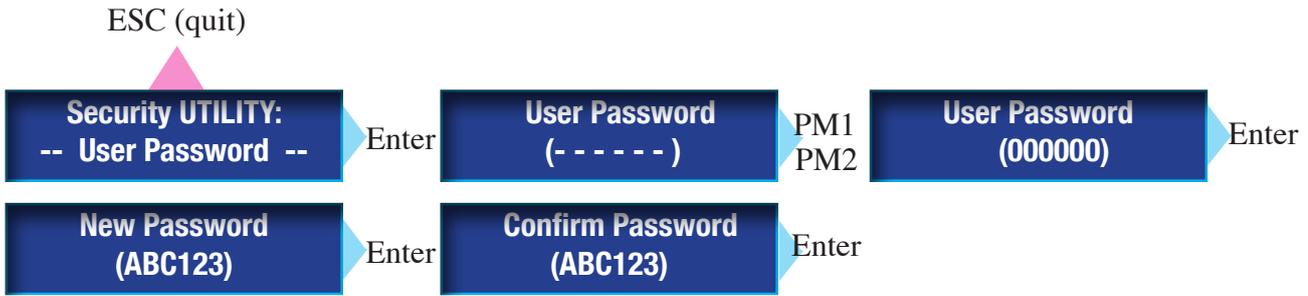
This parameter will be stored with command ,Save Program to PC und Save Program to Device'

The default setting for ,Lock Unit' is ,Off' (= unlocked)

In the given example the status of ,Lock Unit' has been changed from ,Off' to ,On' via PM1 encoder.

Possible selection: Lock Unit: OFF / ON

User Password



This parameter will not be stored with command ,Save Program to PC und Save Program to Device‘

Default setting for USER PASSWORD is ,000000‘

To call up User Password, make the following entries:

- Enter OLD password
(a wrong password will interrupt this routine)
- Enter NEW password
- Confirm NEW password
(entry of a wrong password will interrupt this routine)

In the given example, the old password is ,000000‘. It is being changed to ,ABC123‘.

PM1 and PM2 move the cursor and select characters and numbers.

After confirmation via enter, the new password can be written via PM1 and PM2.



In order to activate ,Enable Password‘ you must enter the current password

Personal Password



Your personal, 6-digit password is the key to the SMP_QX amplifier.



Should the password be forgotten, the unit may only be unlocked by BELL

This parameter will not be stored with command ,Save Program to PC und Save Program to Device‘

Default setting for ,Enable Password‘ ist ,Disable‘. In order to change the status to ,Enable Password‘ the User-Password must be entered. In the given example ,Enable Password‘ was changed from ,Disable‘ to ,Enable‘ (via PM1 Encoder).

- 1) If ,will be shown‘ has been activated in the Show Parameter Menu, and if ,enable password‘ has been set to ,Disable‘ , all parameters and their values will be shown in the menus ,Edit‘ and ,Utility‘.
- 2) If ,will not be shown‘ has been activated in the Show Parameter Menu, and if ,Enable Password‘ has been set to ,Disable‘ , the parameters and their values will **not** be shown in the menus ,Edit‘ and ,Utility‘.

If 2) is true, and if Enable Password‘ is active, all operating elements except for the Utility button are locked. Die Utility button will automatically open the ,Enable Password‘ menu.

Sub Menu: Noise Generator Utilities

Noise Level & Type



These parameters will not be stored with command ,Save Program to PC und Save Program to Device‘

Default setting for ,Noise Level & Type‘ is: -40dBu / Pink

In the above example ,Level‘ was changed via PM1 from -40dBu to -10dBu. ,Type‘ was changed via PM2 from Pink (Noise) to White (Noise).

Level Range: -40dBu + 6dBu

Noise Types: White, Pink

The noise generator may be activated separately for channel A and channel B.

Noise HPF Settings



These parameters will not be stored with command ,Save Program to PC und Save Program to Device‘

Default setting of ,Frequency & Slope is: 20Hz / Bw / -6dBu

In the given example ,Frequency‘ was changed via PM1 from 20Hz to 90Hz.

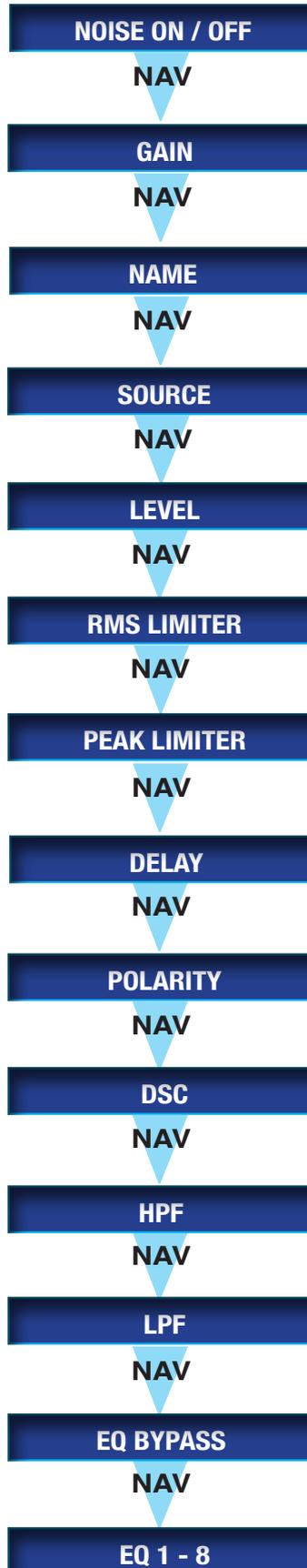
,Slope‘ was changed via PM2 from Bw / -6 to Bw / -24.

Frequency Range HPF setting: from 15Hz.... 150Hz

HPF Slope: -6...-24 (Bw)

! The High Pass Filter (HPF) protects loudspeaker systems from extreme signal offsets in sublow frequencies.

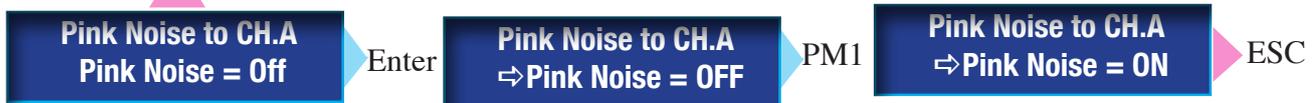
STARTING SCREEN
-- EDIT Channel A & Channel B --



EDIT PARAMETERS CHANNEL A & CHANNEL B

Pink Noise to Channel A

ESC (quit)



Default setting of Noise Generator ist ,off‘.

In the given example, the noise generator (CH A) was activated with the default setting in the Utility Menu.

! When the noise generator is active, it will automatically cut any incoming audiosignal on the same channel.

Gain

ESC (quit)



The default setting for GAIN ist 0.0dB .

In the given example, GAIN was changed from -5,0dB to 0,0dB using the PM1 decoder.

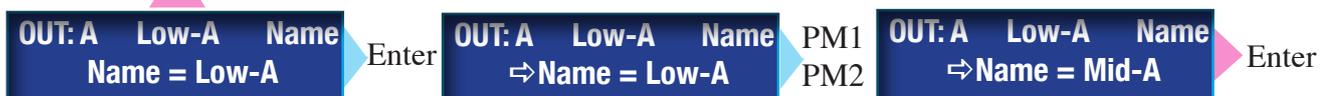
GAIN (Range): -12dB...+3dB

Position of GAIN = pre EQ

Any increase of GAIN will also cause a proportionate level increase of amplification noise.

Name

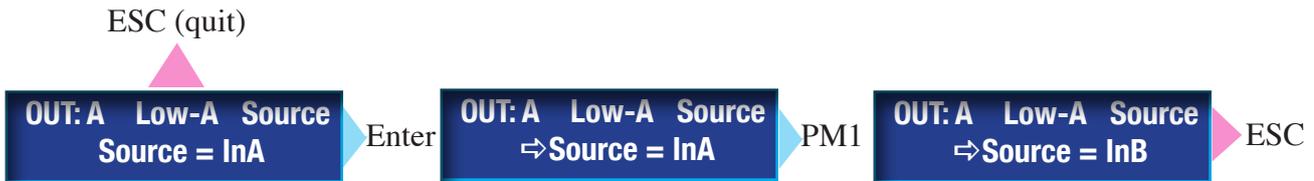
ESC (quit)



The default setting for Name is ,CH.A‘ .

In the given example, Name was changed from ,Low-A‘ to ,Mid-A‘ geändert. Encoder: PM1 and PM2. (PM1 moves the cursor. PM2 selects the sign)

Source



Default setting for SOURCE is ,InA' .

In the given example, Source for CHANNEL A was changed from InA to InB - using the PM1 encoder.

CHANNEL A was linked with Input A

Possible Source Routing for Channel A and Channel B: InA, InB, InA+InB



If Source Routing InA + InB has been selected, the summing Output Level is 0dB (not +6dB)

Default settings for SOURCE (Signalquelle)

Setup: STEREO

CHANNEL A: IN A

CHANNEL B: IN B

Setup: BRIDGE

CHANNEL A: IN A

CHANNEL B: IN A (INVERSE)

Level



Default setting for LEVEL is 0.0dB. Range = -90dB....0dB.

In the given example, LEVEL of CHANNEL A was changed from 0.0dB to -6dB, using PM1.

LEVEL position is: post EQ - pre DSC - pre Limiter.

Level



Default setting for LEVEL is 0.0dB. Range = -90dB...0dB.

In the given example, LEVEL of CHANNEL A was changed from 0.0dB to -6dB, using PM1.
LEVEL position is: post EQ - pre DSC - pre Limiter.

RMS Limiter



Default setting for the RMS Limiter is: Threshold = OFF / Ratio = 100:1

In the given example, Threshold of CHANNEL A was changed from OFF to 2.7dBu (via PM1)
Ratio was changed from 99:1 to 2:1 (via PM2)
Threshold Range is: -18dBu...2.7dBu, OFF
Ratio Range is: 2:1...100:1

! Threshold

Sets the level in dBu above which the limiter begins to attenuate the input signal. As soon as the limiter is ,active‘, this will be indicated by the yellow LED.

Ratio: (Example) : Threshold Level = 0dBu , Input Level = 4dBu, Ratio = 2:1

In this example, the calculation is: ((Input Level - Threshold Level) : Ratio) + Threshold Level
= ((+ 4dBu - 0.0dBu) : 2) + 0.0dBu = 2dBu + 0.0dBu = +2dBu

This means, that at an input level of +4dBu, and output level of +2dBu is to be expected.

The performance of the RMS limiter is best shown in the PC software.

RMS Limiter



The default value of the RMS Limiter is: Attack = 60ms / Release = 2.5s

In the given example, attack time of CHANNEL A was changed from 60ms to 10ms.
Release Time was changed from 2.5s in 5s. Command via PM1 and PM2.

Attack Time Range: 5ms200ms

Release Time Range: 0.1s5.0s

Attack Time

Attack is defined as the time it takes the limiter to attenuate the signal gain by a defined value.
Release Time. Normally, this value will be defined at 20dB.

Release time

is defined as the time it takes the limiter to increase the signal gain by a defined value. Normally, this value will be defined at 20dB.



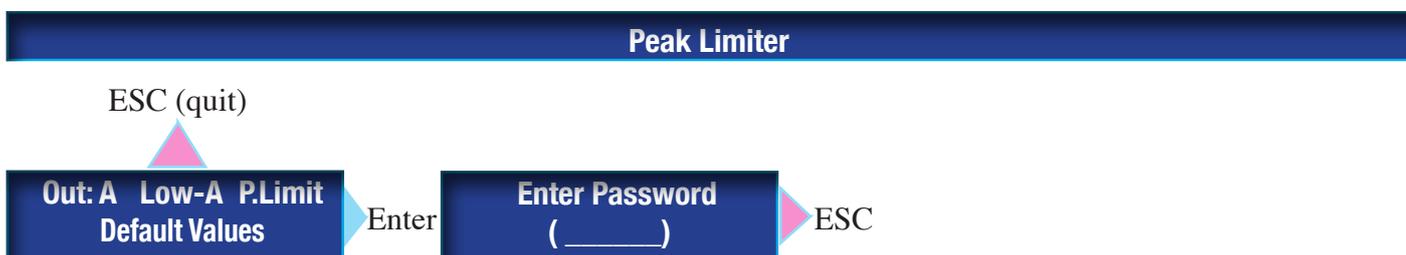
Since the SMP_QX Power Amplifiers feature 2 separate limiters (RMS Limiter plus Peak Limiter), there will be an interference (in dynamics), when both limiters work on the same threshold level. Such extreme settings should only be chosen to fully avoid any peaks from exceeding a certain threshold level.

Since the RMS Limiter be fully configured by the user, it may serve to determine maximum output levels of sound systems.

Examples:

Protection of loudspeaker systems

To keep within certain sound pressure levels in discotheques etc.



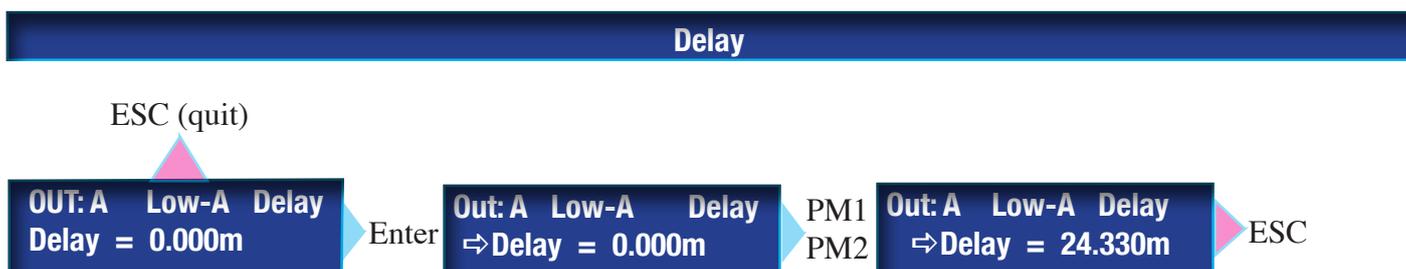
The Peak - Limiter works against a fixed threshold-level, attack- and release time.

These levels may not be manipulated by the user.

The peak limiter will protect the power amplifier from distortion (Clipping)

The threshold level of the peak limiters is set at 2,7dBu in relation to the peak signal level.

The maximum output level of the power amp will be reached at an input level of 2,7dBu (rms).



Default value of delay is 0.000m.

In the given example, Delay was changed to 24.330m, using PM1 and PM2.

PM1 will alter the value in large steps. PM2 will alter the value in small steps.

Delay units may be read (set) to distance (m) or time (ms).

Delay range is: 0....288meters.

Polarity

ESC (quit)

Out:A Low-A Polarity
Polarity = Normal

Enter

Out:A Low-A Polarity
⇒ Polarity = Normal

PM1

Out:A Low-A Polarity
⇒ Polarity = Invert

The default setting of polarity is normal (in phase)

In the given example, polarity was changed to INVERT (out of Phase).

DSC

ESC (quit)

Out:A Low-A DSC
DSC = Off

Enter

Out:A Low-A DSC
⇒ DSC = Off

The default setting of DSC (DYNAMIC SIGNAL CONTROL) is Off (not active)

In the given example, DSC was changed to ,On' (active), using PM1.

DSC Processor: will boost the overall dynamics of sound

DSC means extended dynamics, fundametal dry subs and transparent, crystal clear treble.

HPF

ESC (quit)

Out:A Low-A HPF
20.0 Hz No Cut-Off

Enter

Out:A Low-A HPF
⇒ 20.0 Hz No Cut-Off

PM1

PM2

Out:A Low-A HPF
⇒ 50.0 Hz Butwrth 6dB

ESC

Default setting of HPF (High Pass Filter) is: cut off frequency: 20.0Hz

Slope: no cut-off (not active).

In the given example, HPF Cut off frequency is changed to 50.0Hz, and HPF Slope is changed to butterworth 6dB.

LPF

ESC (quit)

Out:A Low-A LPF
16.0 kHz No Cut-Off

Enter

Out:A Low-A LPF
⇒ 16.0 kHz No Cut-Off

Default setting for LPF (Low Pass Filter) is: Cut off frequency: 16.0kHz

Slope: No Cut-Off (not active).

In the given example, LPF Cut off frequency is changed to 10.0kHz, and HPF Slope is changed to Butterworth 6dB.

Low Pass filter cutoff frequency Range: 20Hz-16KHz.

LPF slopes: Butterworth (1st, 2nd, 3rd, 4th oder)
Linkwitz Riley (2nd and 4th. order)
Bessel (2nd and 4th. order)

EQ Bypass



Default setting of EQ Bypass is: Off (Equalizer is active)

In the given example, EQ Bypass is set to ,On‘ (Equalizer =bypass =not active).

When EQ Bypass is set to ,ON‘, all 8 EQ Gain faders will be set to 0dB (in steps of 1dB)

This Fade Out Process is automatically executed.

When EQ Bypass is set to ,OFF‘, all 8 EQ Gain faders will be reset (in steps of 1 dB) to the previously selected values. This Fade IN Process is automatically executed.

Refer to: SYSTEM UTILITIES / CHANNEL LINK:

When Channel Link = ,ON‘ all EQ Bypass functions will simultaneously work for channel A and B.

EQ 1...EQ8



Default setting of EQ Type is BELL EQ. The default setting of EQ Frequency is 1.00kHz

In the given example, EQ Type is changed to High Shelving Filter (1st. order) and Shelving EQ frequency is changed to 3.06kHz.



Default setting of EQ GAIN is 0.0dB. This is only true for EQ Types with a variable EQ Gain control.

In the given example, EQ GAIN has been changed to +6.0dB, using the PM1 encoder.

When a different filter type is selected, EQ Gain will automatically be set to 0.0dB

Available filter types:

AllPass 1.st order,	frequency Range 20Hz...16kHz	Gain: ---
AllPass 2nd order,	frequency Range 20Hz...6.93kHz	Gain: ---
BELL EQ,	frequency Range 20Hz...16kHz	Gain: +- 15dB BW: 0.05....3.0
HISHelf 1.st	frequency Range 20Hz...16kHz	Gain: +- 15dB
HISHelf 2nd	frequency Range 20Hz...16kHz	Gain: +- 15dB
HISHelf vari.Q	frequency Range 20Hz...16kHz	Gain: +- 15dB Q: 0.3....1.5
LOSHELF 1.st	frequency Range 20Hz...16kHz	Gain: +- 15dB
LOSHELF 2nd	frequency Range 20Hz...16kHz	Gain: +- 15dB
LOSHELF vari.Q	frequency Range 20Hz...16kHz	Gain: +- 15dB Q: 0.3....1.5

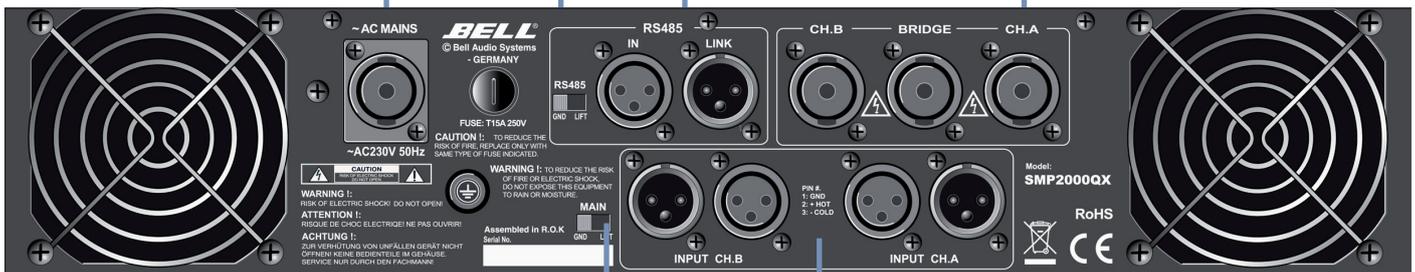
SMP_QX rear panel features

RS485 Ground Lift
cuts the pcb GND
from PIN1 of the
XLR(f) socket.
PIN1 of the XLR(m)
Link socket is not
connected to PIN1 of
the XLR(f) socket.

Speaker Output
CHANNEL A
CHANNEL B
BRIDGE
For Speakon Type
Connectors
Pin code:
1+ = +
1- = -

Mains Power
Socket for
Mains Cable

RS485 interface /
link
for remote control
of up to 32 units
SMP_QX via PC
software



MAINS Ground Lift
Cuts mains GND
from PCB GND

Input sockets,
Input / Link
CH.A, CH.B, balanced

XLR pin connection
PIN1 = Ground
PIN2 = Hot (+)
PIN3=Cold (-)

Impedance Selector
(SMP-3000QX only)
2-OHM Mode (Yellow LED on)
4-OHM Mode (Yellow LED off)

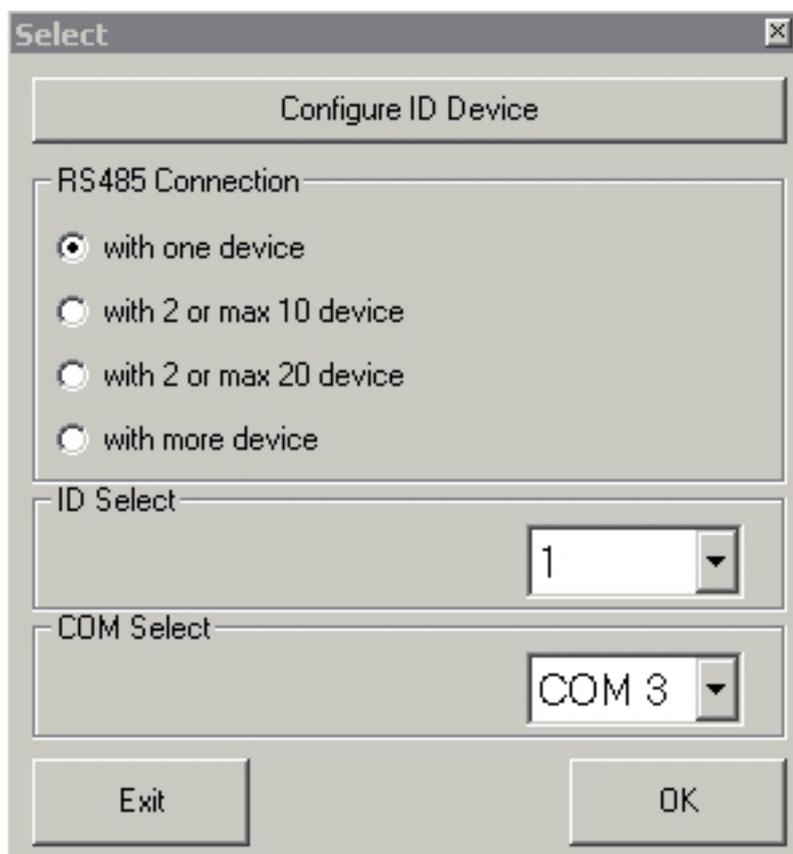
SMP_QX PC Software

In order to operate and remote control a number of SMP_QX amplifiers, the following steps must be executed:

- Install the supplied SMP_QX operating software to your PC
- The communication between PC and SMP_QX device is done via RS485 interface
- Since a PC will not provide an RS485 interface, an optional USB-to-RS485 interface will be necessary.
- This DSM-RS interface may be obtained from BELL.
- Connect the interface to any free USB port of your PC
- The RS485 side of the interface (XLR m) will be connected to the RS485 socket on the rear side of the SMP_QX amp (device).
- Should you need to bridge a long distance from PC to SMP_QX amp, use a high quality balanced line XLR / XLR mic cable.
- In order to connect a any larger number of devices (up to 32 pcs), connect the RS485 Link socket of the 1.st device with the RS485 input socket of the 2.nd. device.... and so on.
- Please note, that the GND of the RS485 input socket (PIN1) is not connected to PIN1 of the XLR-Link socket in order to avoid eventual ground loops (audible hum noise).
- If for reasons of poor communication a continuous connection of all RS485 GNDs should be necessary, the RS485 GND switch of all linked devices must be switched to ,ON‘

Each one of the linked units must be given a separate ID number (Please refer to the Interface Utility Menu (page 11)).

Starting the PC Software



Select

Configure ID Device

RS485 Connection

with one device

with 2 or max 10 device

with 2 or max 20 device

with more device

ID Select

1

COM Select

COM 3

Exit OK

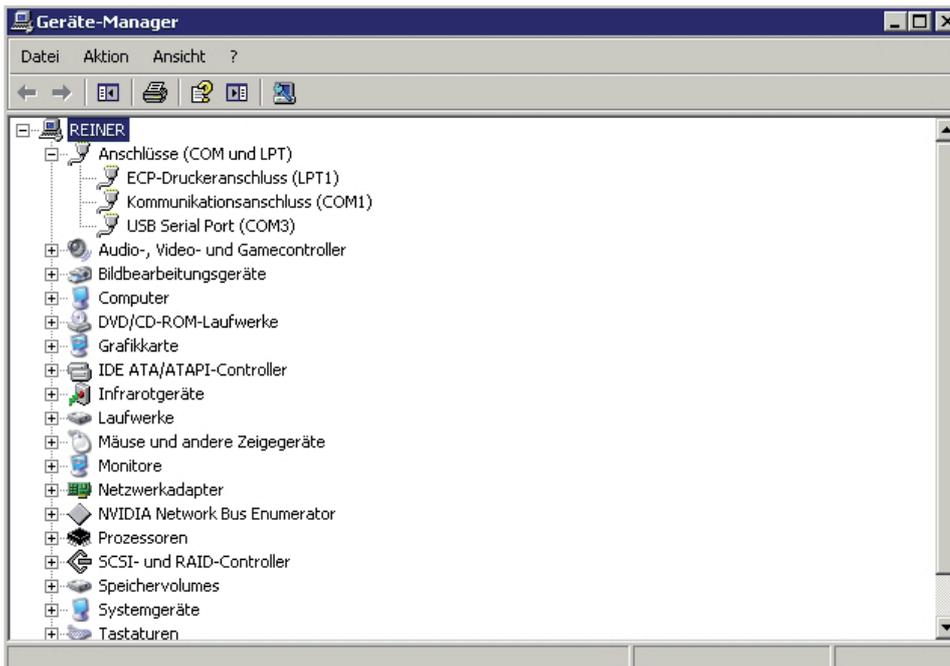
Starting the PC software, your computer will require the COM Port, the ID number (if only one device is connected) and the total number of connected devices.

Selecting a COM Port

the required COM Port to be used will be displayed in your Windows System Control.

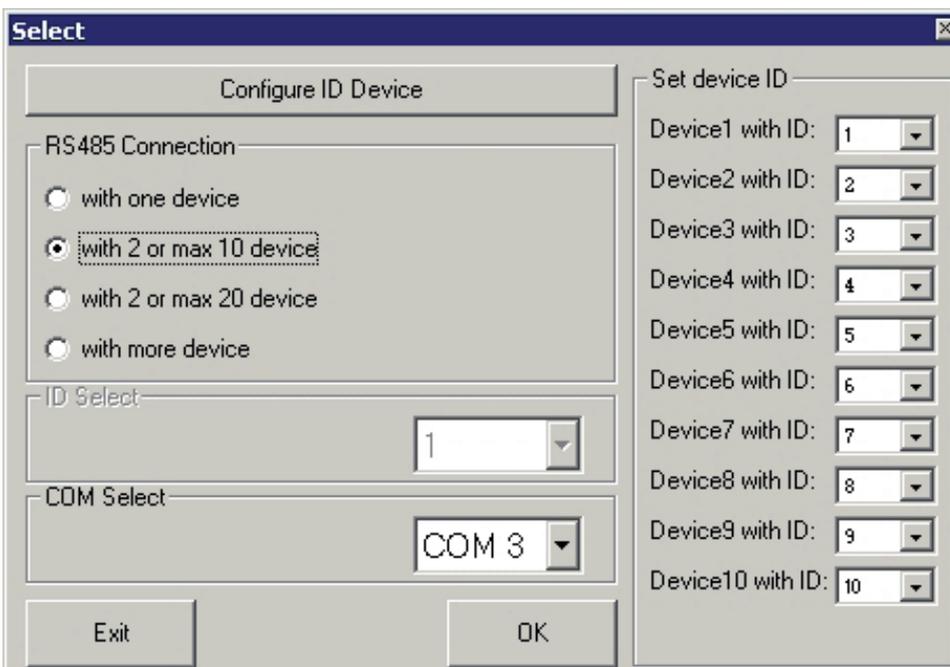
The following steps have to be made:

- Open the System Control Menu in your PC
- System
- Hardware
- Device Manager
- Interface (COM and LPT)
- The required COM Port number will be indicated under USB Serial Port
In the given example it is COM3



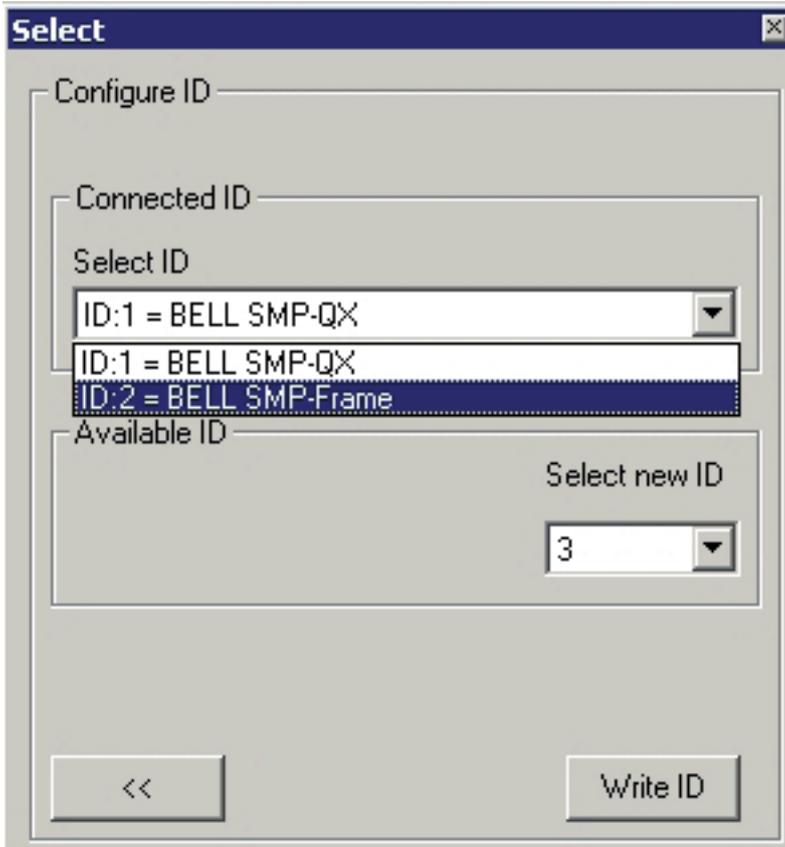
In order to control only 1 device, the matching ID number must be entered in the ID select box.

If the click box 2...10 devices is selected, and additional window will open



In this window, you may select the ID numbers for up to 10 devices which you intend to control.

If any change of ID number is required, use the button ,Configure ID Device‘



All devices which are connected within the system are filed in the Select ID list.

In order to change its ID number, you may select any device from the Select ID list.

The new ID number must be chosen from the Select New ID Box.

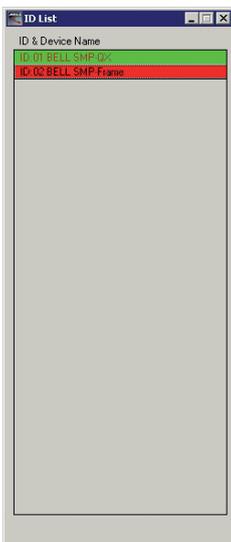
Write ID button will overwrite the old device ID with the new one.

OK Button will start the main program

The ID list will show all devices connected to the system

The ID list will show ID number and device name

The background color of the individual devices is green - with black script - as long as the main window of the devices are closed.



As soon as the Main window of any device is opened by double click on the ID position, the ID number and the device name will show in red color.

Pushing the STOP button (in main command menu) will set the device ,offline‘. In the ID List it show in red background color.

When the main window is closed by the (X) button (right upper corner), the device is still online. In the ID List that device will show with green background and black script.

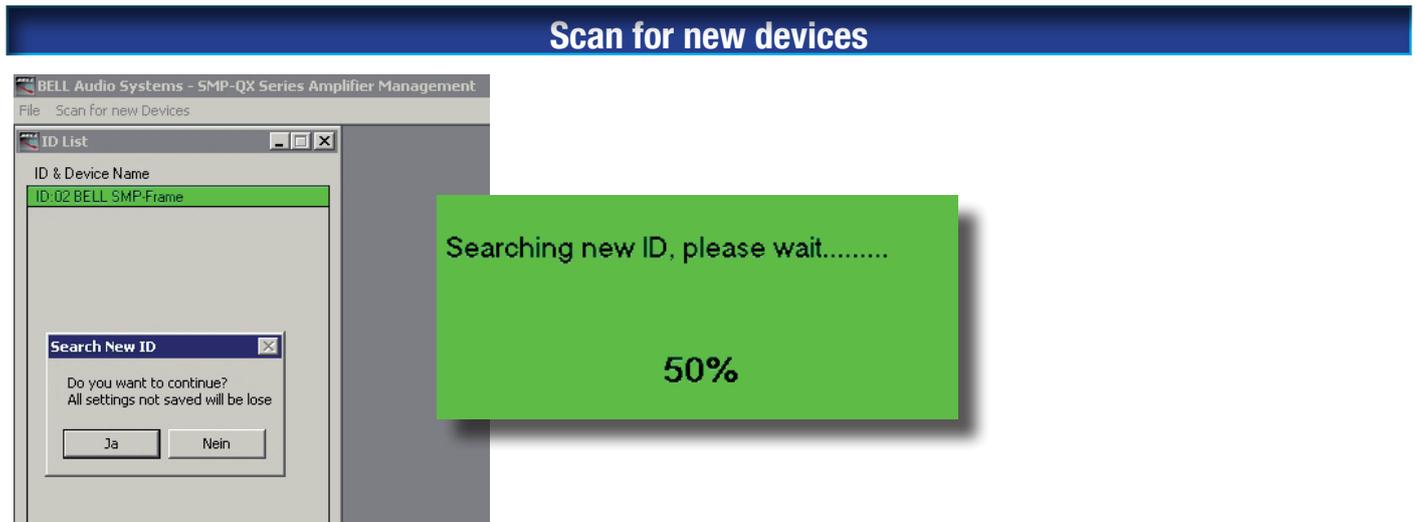
In case of any interrupted communication between PC and devices (PC failure) or Device main Window has been closed (ID list shows black script on green background), the Device(s) may still be set to offline (after approx. 20sec.) by the following procedure:

Press the device Utility button for more than 3seconds

The following LCD screen will be shown:



The Status may be changed from Online to Offline via the PM1 encoder.
 Confirm by Enter
 The device will show the standard main lcd window

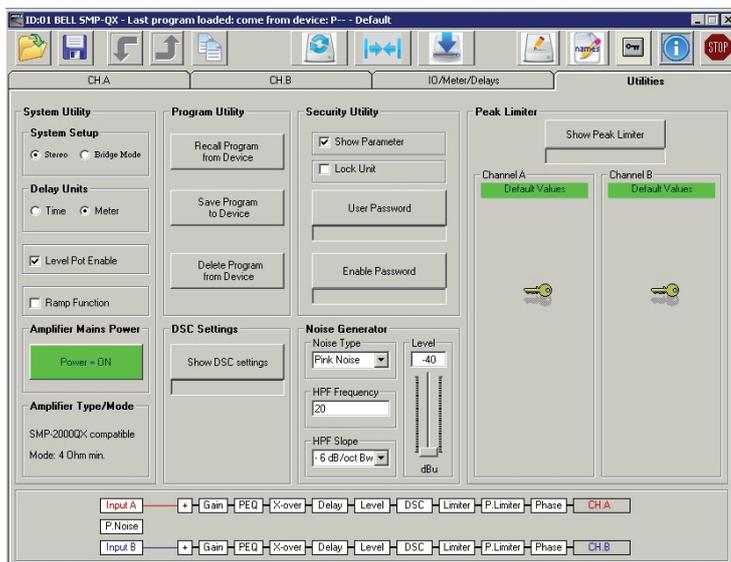


The Scan for New devices command is only available, when all active device windows are closed. In this case, the devices in the ID list will be shown with black writing on green background. This command will scan the entire network for connected devices. Devices found will be listed in the ID List (black script / green background)

A double clic on any listed device (ID list) will activate the connection between device and PC. The selected device (in example device Nr.1) will answer with the following LCD screen:



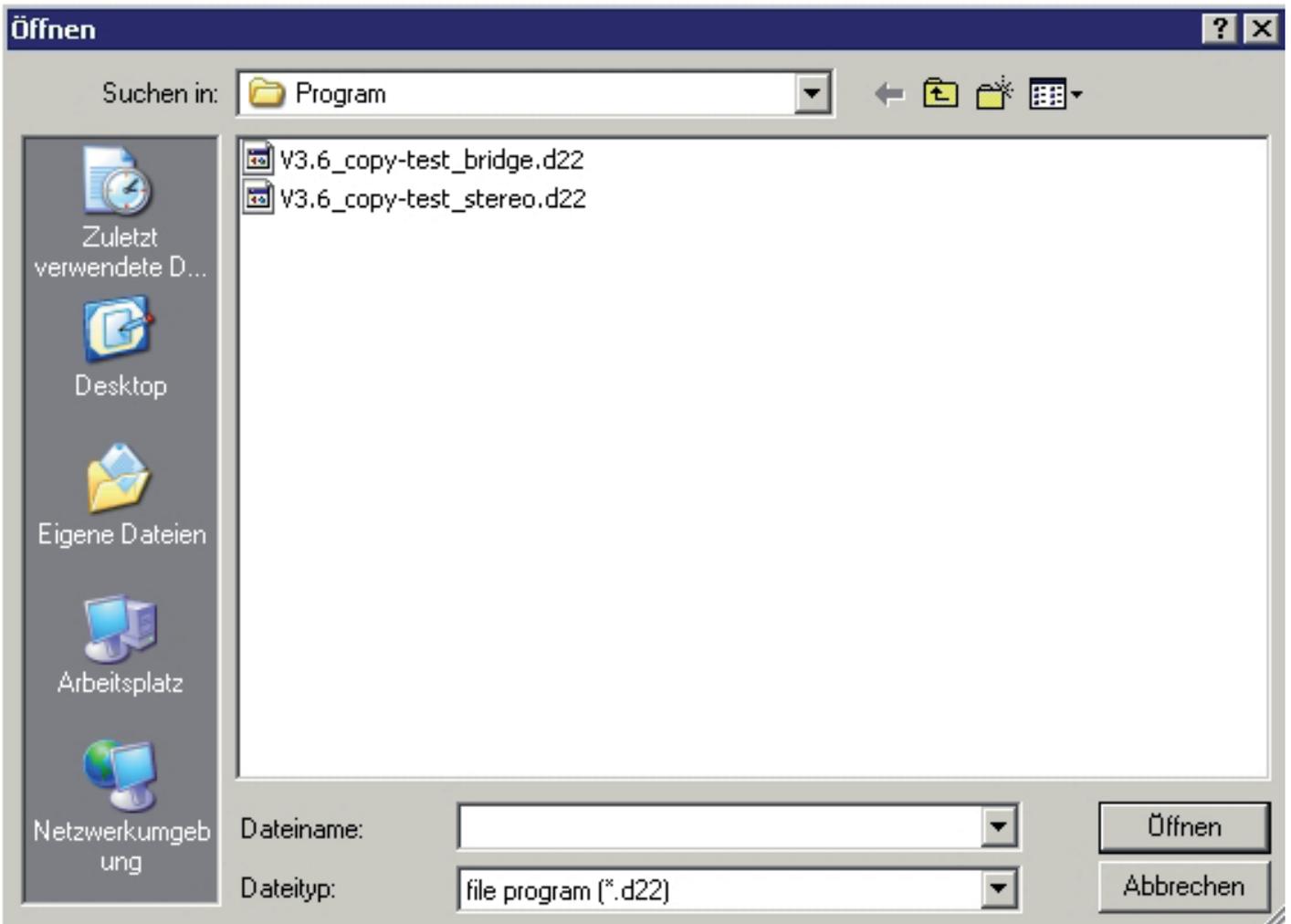
The PC will reply by opening the main window + the utility window.



Commands (exclusive to PC software only)



Load Program to PC



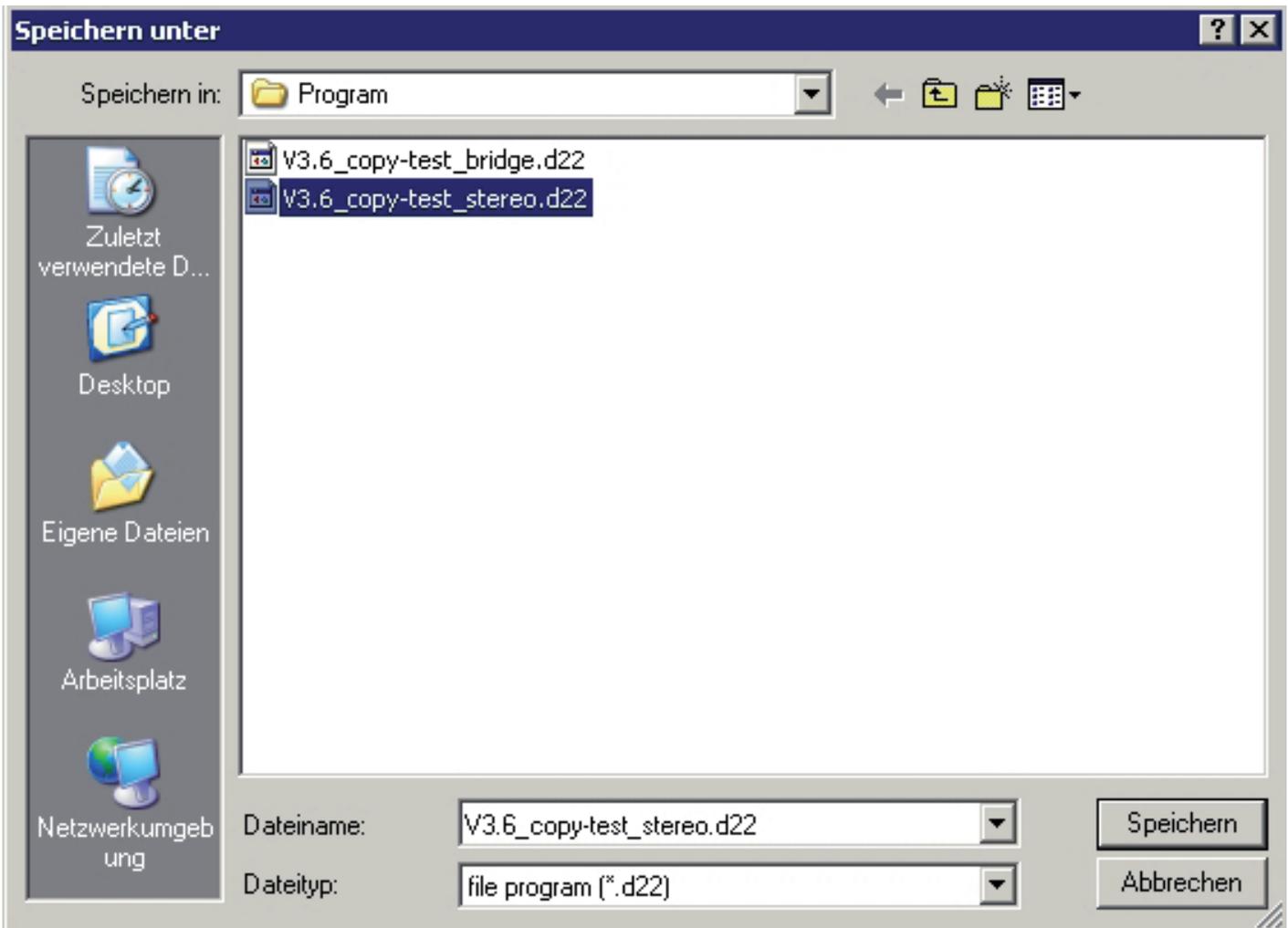
Load Program from PC

Load program from PC will load a complete program including all parameters from the PC into the active device window. This command will overwrite the current program setting. All parameters loaded will be transferred to the device and will be activated.

A program will include all parameters with the exception of:

- Noise generator on / off
- EQ bypass (after loading the program, EQ bypass will be reset to OFF (EQ=active))
- Power
- Noise generator settings
- Delay units
- Ramp function

Save a Program to PC

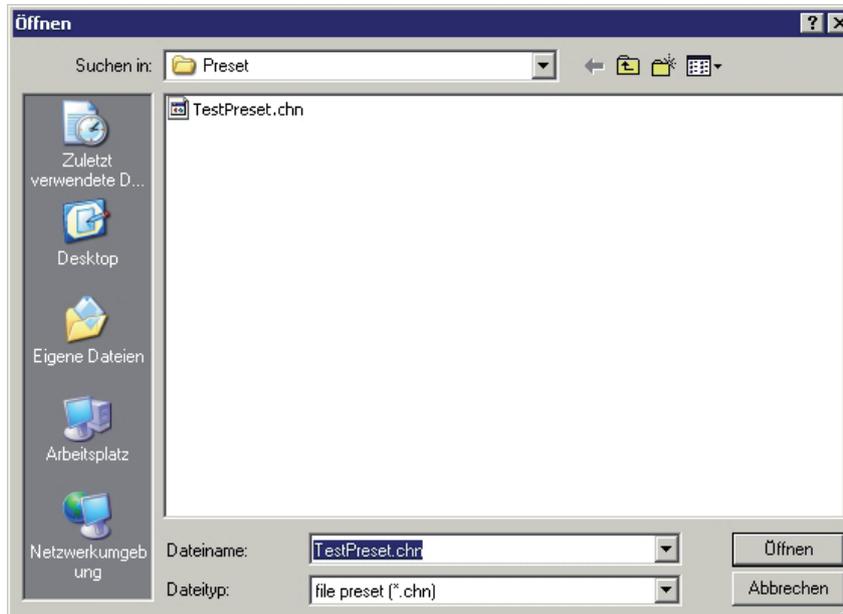


Save a program to PC will store all parameters shown in the active device window.

A program will include all parameters with the exception of:

- Noise generator on / off
- EQ bypass (after loading the program, EQ bypass will be reset to OFF (EQ=active))
- Power
- Noise generator settings
- Delay units
- Ramp function

Load Preset from PC (to current output)



Load preset from PC will load an output channel preset from the PC into the active output channel. This command will overwrite the current channel setting. All parameters loaded to the Output channel and will be activated.

A preset will include all parameters with the exception of:

- Noise generator on / off
- EQ bypass (after loading the program, EQ bypass will be reset to OFF (EQ=active))
- Routing

Program versus Channel Preset

A program contains all parameters for the complete device (SMP_QX Power Amplifier). For example: Channel A, Channel B, Utilities etc...

This program may have been composed as the setting for a specific Hall etc..

A Preset will only contain the parameters of a single amp channel (No utility settings).

Likewise, the Preset will take the part of so called 'System Control Cards' which were common with earlier System Power Amplifiers.

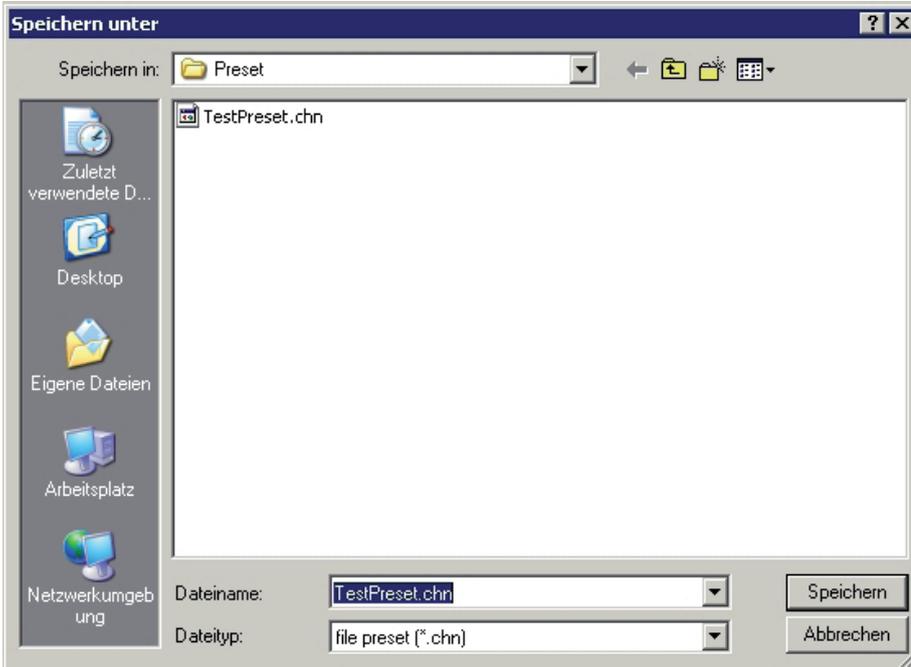
Normally, a Preset will contain the settings for a specific loudspeaker system.

Such presets may be composed by the user - or in case of BELL speaker systems - they may be obtained from the manufacturer.

Presets will be loaded separately into each Amp channel A or B.

In case of 'Channel Link = active' both channels will simultaneously load the same preset

Save Preset to PC (from current output)



Save preset to PC will store an output channel preset from the active output channel to the PC.

A preset will include all parameters with the exception of:

- Noise generator on / off
- EQ bypass (after loading the program, EQ bypass will be reset to OFF (EQ=active))
- Routing



The Copy Data command will copy all data (except device name and password) of the active device to the selected units.

The COPY DATA window will show name and ID of the device (Source).

In order to Copy DATA from the Source device to any one of the connected, devices, these have to be selected as destination devices by ticking the click boxes.

To copy the output name, tick the box ,Include output name‘

The copy process will be started by the ,Copy program to selected devices‘ button.

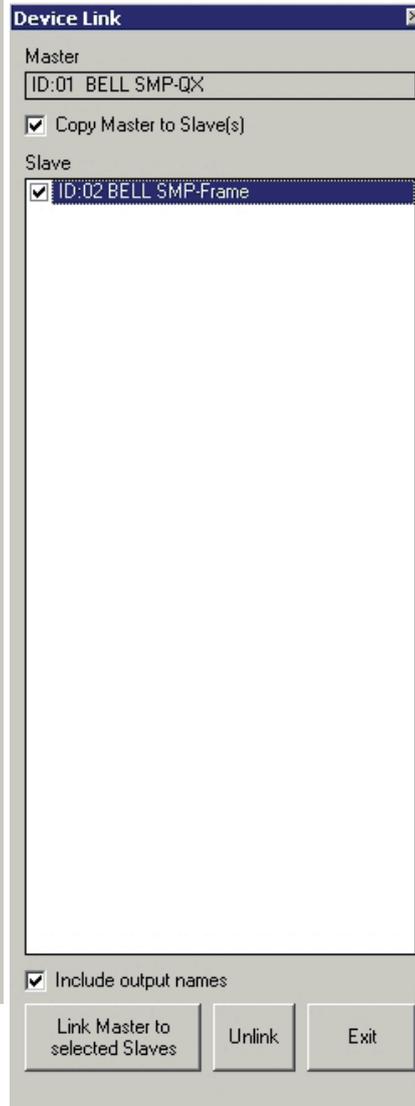
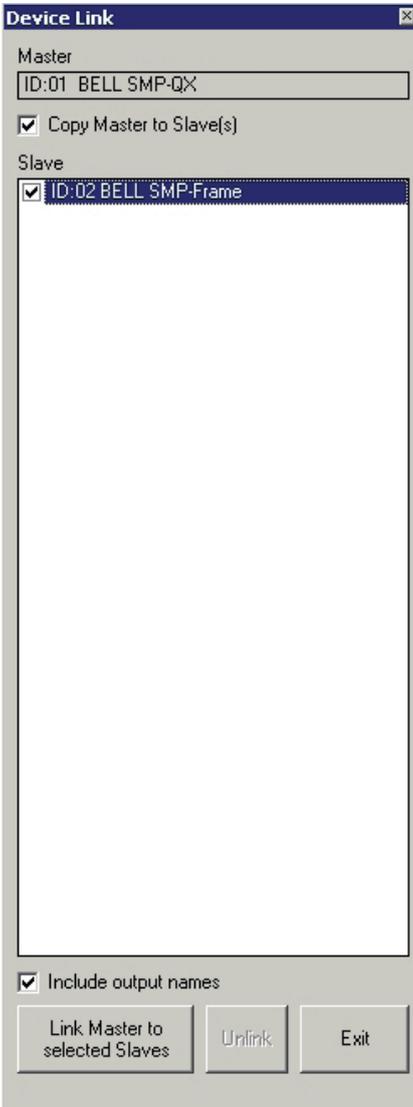
While copying, all active destination windows will be closed.

Data received by the device will overwrite the current setting and will be immediately activated.

The incoming data will not manipulate any program stored in the device.

The Clear button will remove all selections (ticks) from the device list

Device LINK



The device link function will define the active window as MASTER.

Any device which is selected as SLAVE will automatically execute all functions of the Master.

It is possible to define a multiple number of MASTERS.

Of course, each Slave (ID) may only be controlled by one Master.

Defining Master and Slave

In the active Window, select the Device Link button. The ID (active window) will be defined as Master. The device-Link button will later show the Master / ID on green background.

The Device-Link main window will open Master - ID and device name will be shown The ,Copy Master to Slave' click box is always activated.

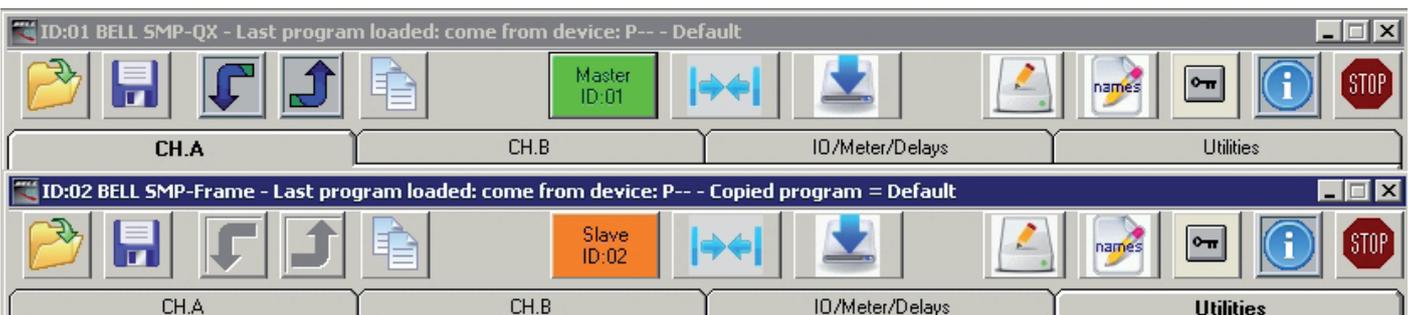
To copy the output name, tick the box ,Include output name'

This means, that first off all data of Master will be copied to the slaves, so that both will become identical.

This copy function works in the same way as the Copy Data Procedure.

The ,Slace List' shows all ,free' devices with ID and name. These do so far not operate as Master or Slave.

From this list, the user may select any device to work with the given Master. (In the given example, ID1 is Master and ID2 is Slave.



The button ,Link Master to Slave' will activate this procedure and close the device link window. All slave windows will automatically be closed. The Device Link button will be shows as Master / ID button (green). The Device Link button of the slaves will show Slave / ID (orange).

Following this procedure, any change to the Master(s) will also be true of the Slave(s). Depending on the quantity of connected slaves and different software functions, this procedure may take some time.

Any change to the Master will automatically close any open Slave window.

Selecting the green Master button will open the Device Link Window with Active ,Unlink' Button

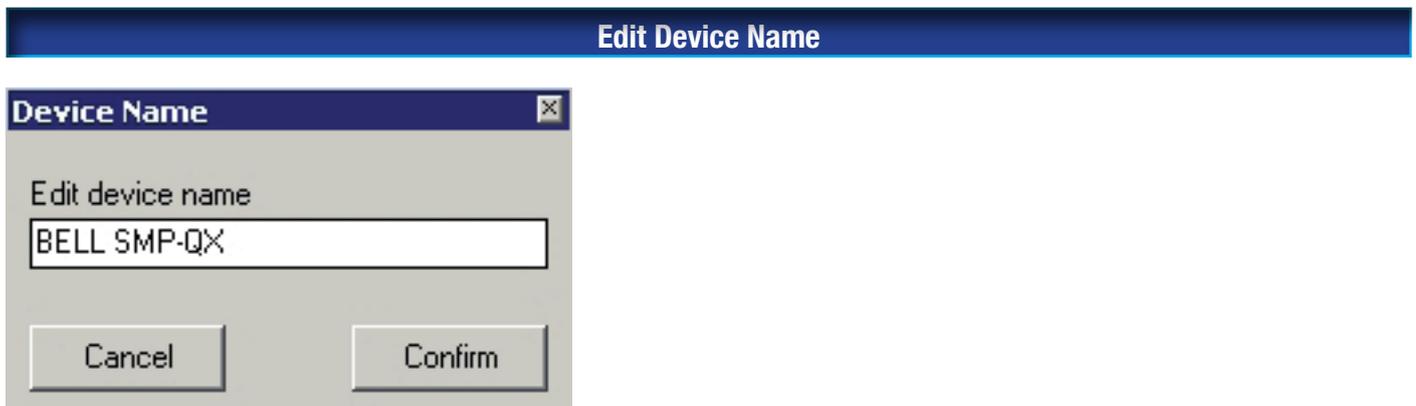
This window now allows the user to select or cancel any Master to Slave Link

The button ,Link Master to Slave' will execute this procedure

The button ,Unlink' will cancel all Master to Slave relations and the Device Link window will be closed.

The ,Exit'

button will close the Device Link window without any changes.



Edit Device Name enables the user to enter any name for the active device (ID) This name will be shown in the ID list and on the lcd screen when the device is online.



The ,Stop' button will disconnect the device from the PC.

The ID list will show the disconnected device on red background.

Output Channel window

View RMS Limiter

Graphic shows the function of a limiter with parameters threshold and ratio.



In the PC software, both EQ parameters BW and Q will be shown. Q will not be shown in the device display.

Example refers to activated window (CH.A)

Show Cursor will issue a cursor for each EQ 1...8 in the frequency response graphic moving this handle will change frequency and amplitude

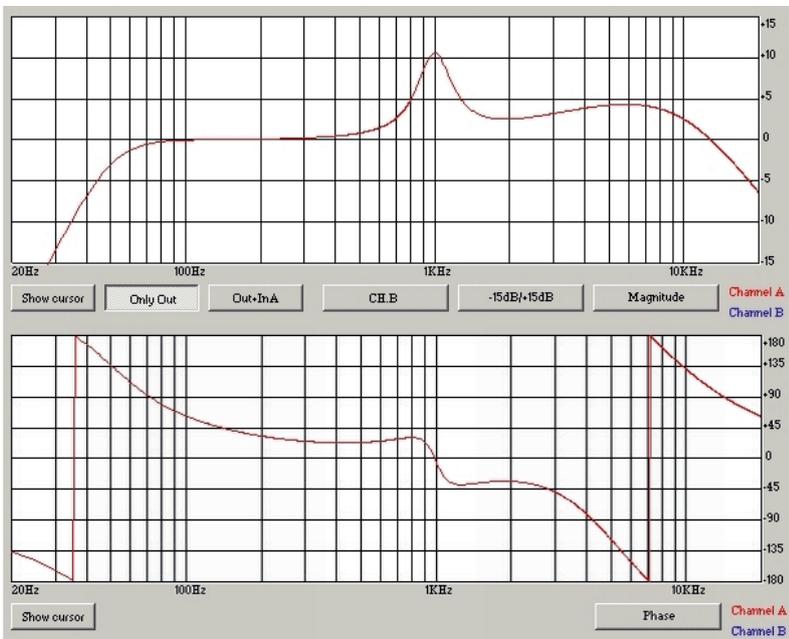
ONLY OUT will show the frequency response graph of the selected output only

Out + InA shows the graph of the mathematical addition of Input Gain CH.A + the frequency response of the Output (CH.A)

CH.B shows additionally the frequency response of the Output (CH.B), respectively, when set, the Channel B Output + Channel B Input Gain.

-30dB/+30dB Will change the scaling of the graphic between +-15dB and +-30dB

Magnitude / Phase



Switches Graphic between Phase Frequency Response and Amplitude Frequency Response

EQ FLAT Will reset all EQ Faders to linear (0 dB)

Lock Preset

The screenshot shows the 'Lock Preset' software interface. The window title is 'ID:01 BELL SMP-QX - Last program loaded: come from device: P-- - Default'. The interface is divided into several sections: CH.A, CH.B, IO/Meter/Delays, and Utilities. The main display is a frequency response graph with a red horizontal line at 0dB. Below the graph are buttons for 'Show cursor', 'Only Out', 'Out+InA', 'CH.B', '-30dB/+30dB', and 'Magnitude'. The 'Utilities' section includes a 'True RMS Limiter' with a slider and three key icons, and a 'View RMS Limiter' button. The 'Input A' section has a 'Gain' slider. The 'Routing' section has a dropdown menu set to 'InA'. The 'Noise Generator' section has a 'Pink Noise' button. The 'High Pass filter' and 'Low Pass filter' sections each have a key icon. The 'Output EQ' section has five 'BELL EQ' sliders, each with a key icon, and a table of parameters: 1000 Hz, 0.30 Bw, and 3.704 Q. The 'Level' section has a slider. The 'Polarity' section has a checkbox for '180°'. The 'Delay' section has a '0 m' field and 'Adj' and 'Fine' buttons. The 'EQ Flat' section has a button. The 'DSC' section has a checkbox.

Lock Preset will lock some parameters of an output channel (preset), in order to avoid manipulation. This function may only be activated / deactivated by the manufacturer. Locked parameters will not be displayed in the freq. resp. graphic.

IO / Meter / Delays Window

Utility Window



SMP QX.series

DSP controlled power amplifiers

SMP QX.serie

Die aktuelle BELL SMP.QX Serie kombiniert die bewährte SMP Endstufentechnologie mit den Vorteilen des neu entwickelten QX Amplifier Management Systems.

Digitales Amplifier Management

Das DSP Management beinhaltet u.a.: **Level, Delay, DSC, Polarität, High-Pass Filter, Low-Pass Filter, White- u. Pink Noise Generator, 8-Band EQ, Peak- u. RMS Limiter.**

Sämtliche Parameter werden direkt oder mittels BELL QX Audio Remote Control Software editiert und gespeichert.

RS485 Remote Control & Software

Über die RS485 Schnittstelle und die mitgelieferte QX Software werden bis zu 32 SMP-QX Endstufen angewählt und gesteuert.

Switch mode power supply

Während das Gewicht einer herkömmlichen 2000W Endstufe kaum weniger als 30kg beträgt, liegt das einer SMP2000QX mit SMPS Netzteil bei lediglich 12,5kg.

Digital DSC Prozessor on board

Durch den pro Kanal zuschaltbaren digitalen DSC Prozessor erfährt die erlebte Dynamik der SMP.QX Endstufen eine geradezu dramatische Aufwertung.

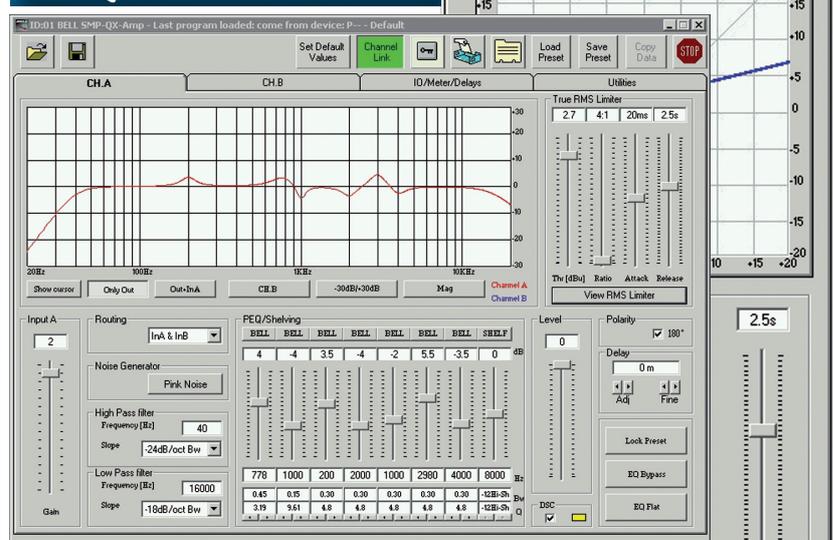
Digital DSC steht für schnelle, trockene Bässe und transparente, kristallklare Höhen.

DSP controlled switch mode power amplifiers.

SMP.QX models come with an on-board digital amplifier management including filter networks to compose and recall settings matching any kind of mobile or installed PA system.

Essential parameters - such as Level, Delay, Polarity, HP Filter, LP Filter, 8-Band Equalizer, Peak and RMS Limiter, EQ-Bypass, Pink- and White Noise generator may be configured 'on board' or via remote Computer

SMP QX.series software



BELL SMP-QX Rear Panel Layout



Temperaturgeregeltes Kühlsystem
Automatic force cooling system

Symmetrische XLR Ein- und Ausgänge
XLR balanced input & output section

QX Audio Management. PC control of up to
32 units via RS485 Digital Remote Control Port

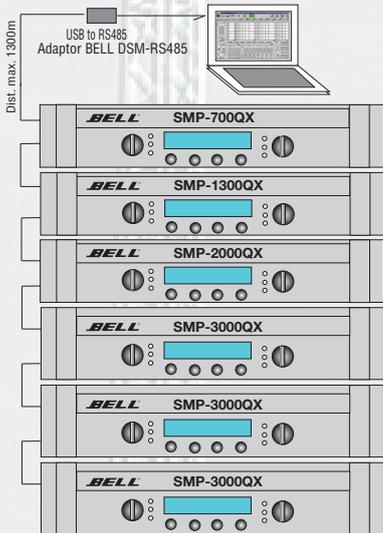
Switch mode power supply

SMP.QX amplifiers combine the well proven BELL Class H technology with today's most advanced SMPS switch-mode power supply.

Digital DSC Processor on board

The Digital DSC processor is designed to create a superb, extremely natural sound quality with tighter bass and crisp transparent highs.

QX.series DSP control



Long distance PC remote setting and supervision of up to 32 units SMP-QX power amplifiers

Reduced Weight

While any common linear power amplifier with an output of 1500+1500 Watts will likely account for as much as 30kg, BELL SMPS technology greatly reduces shipping weight to as little as 12,5kg (SMP2000QX)

Front Panel SMP.QX Series

- Input-Level Control (Ch. A&B) Level-Regler (Kanal A&B)
- Mains switch Netzschalter
- LED indicators Level -20,-10,-6,-3,0dB Bridge Mode, DSC, Protect, Limit, Clip

Digital Controls

- Enter - Escape
- Utility - Edit
- Dual Level Navigation Wheels

Rear Panel Features

- Input / Link: XLR (m), XLR (f)
- RS485 / Link: XLR (m), XLR (f)
- Speaker-Output Channel A&B
- Speaker-Output Bridge

- RS485 Ground Lift
- Main Ground Lift

Specifications DSP

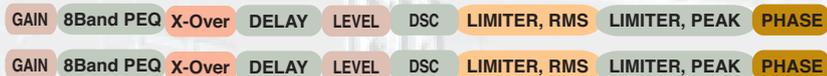
- Latency delay AD-DSP-DA 0.6ms
- Rotary encoders speed sensitive
- Qty of programs 60
- Mains Power ON with Fade in
- Interface RS485
- Pink/White Noise Gen. (HPF variable)

System Utilities

- System Setup (Stereo / Bridge)
- Standby Mode (Main power on/off)
- Level Potentiometer / Amp Type / Mode
- DSC (Dynamic Signal Control)

- Channel Link / Set default value
- Delay Units
- Ramp Function
- Software Version

DSP Amplifier Management Block Diagram



Program Utilities

- Program Recall
- Program Save
- Program Delete

Interface Utilities

- Interface Setup

Noise Generator

- Noise Type / Level
- HPF Frequency / Slope

Security Utilities

- Show Parameters
- Lock Unit
- User Password
- Enable Password

Channel A/B Inputs & Outputs

- Inputs XLR balanced
- Input Level max. 12dBu
- Output Level meter LED
- Noise Generator ON / OFF
- Input Gain -12..+3dB
- Limiter RMS / PEAK
- Delay Time (max) 288 meters
- DSC (Dynamic Signal Control) ON/OFF
- EQ, parametric 8 variable filters
- Output Level -90...0dB

- Filter types
 - LoShelf 1st order LoShelf 2nd order
 - HiShelf 1st order HiShelf 2nd order
- BELL Filter
- All pass 1st. order All pass 2nd order
- Shelving filter w/variable Q
- Filter Gain +/-15dB
- Frequency Scale 20Hz - 16kHz
- Bandwidth Bell filter 0.05 - 3.0

Features Power Amplifier

- SMPS power supply network
- inrush current limiter
- limiter RMS, limiter PEAK
- loudspeaker protection
- DC protection
- Over current protection
- Thermal protection network

Technical Specifications

	SMP700QX	SMP1300QX	SMP2000QX	SMP3000QX
Power-Output /Ausgangsleistung	350+350W / 4Ω 175+175W / 8Ω	650+650W / 4Ω 325+325W / 8Ω	1000+1000W / 4Ω 500+500W / 8Ω	1500+1500W / 4Ω 1500+1500W / 2Ω
Power-Output (Mono/BRIDGE)	700W / 8Ω	1300W / 8Ω	2000W / 8Ω	750+750W / 8Ω 3000W / 8Ω
Power Bandwith / Leistungsbandbreite	10Hz-30kHz / 8Ω	10Hz-30kHz / 8Ω	10Hz-30kHz / 8Ω	10Hz-30kHz / 8Ω
Frequency Response (10Vrms)	10Hz-40kHz / 8Ω	10Hz-40kHz / 8Ω	10Hz-40kHz / 8Ω	10Hz-40kHz / 8Ω
Signal to Noise Ratio (SNR)	110dB	110dB	110dB	110dB
THD+N	< 0,05%	< 0,05%	< 0,05%	< 0,05%
Input Sensitivity / Eingangsempf.	1,06Vrms /2,7dBu	1,06Vrms /2,7dBu	1,06Vrms /2,7dBu	1,06Vrms /2,7dBu
Cooling Control System / Kühlung	Automatic Fan	Automatic Fan	Automatic Fan	Automatic Fan
Size wxhxd (mm) / weight (kg)	482x88x445 9,5kg	482x88x445 11,5kg	482x88x445 12,5kg	482x132x445 19kg

BELL®