



USER MANUAL

SW1800A

active subwoofer

KEY FEATURES

- High Output
- Class D amplifier module with SMPS
- Manifoldd Band Pass configuration for fast transient response
- 96KHz / 40 bit floating point CORE processing with PRONET remote control

INTRODUCTION

The SW1800A subwoofer is designed to deliver high quality low frequency reproduction where very high output is a key requirement, together with well defined deep bass and fast transient response, making it suitable for several different uses, ranging from touring applications to fixed installations and high-level dance clubs.

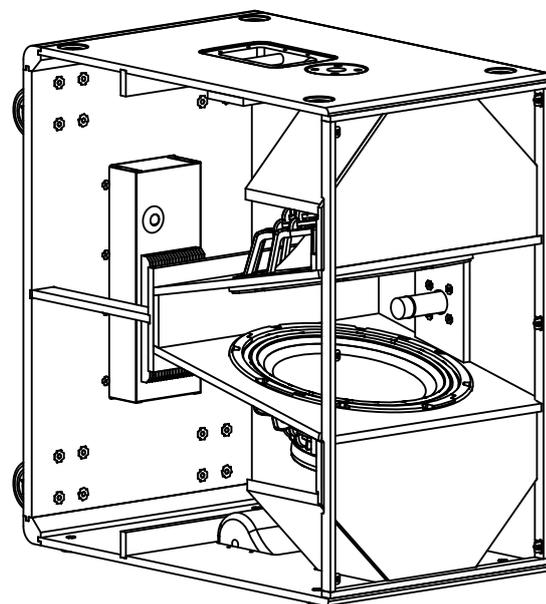
The SW1800A is a very high quality powered subwoofer system featuring some of the most advanced technologies for low frequency reproduction. Its unique and innovative design is based on a configuration that can be defined as Manifoldd Band Pass.

It uses manifolding of the front side of the cones to maximize the mutual coupling between the two drivers, while loading the back of the cone with a large-size volume that has the function to create a path from the back of the transducers to the front.

The SW1800A subwoofer system is equipped with two high power 18" (462mm) transducers capable of long excursion (up to 22mm peak-to-peak), controlled suspension and cloth surround with DAR (double asymmetric rolls) technology.

The robust copper 75mm (3") voice coil is wound around an aluminium support improving the long term thermal capacity of the loudspeaker. Cones are made of very high-stiffness reinforced paper, featuring also an advanced Autoclave waterproof cone treatment.

The SW1800A is processed by 40bit, 96kHz floating point CORE DSP and powered by DA SERIES digital power modules, a new generation of CLASS D power amplifier with digitally-controlled SMPS. The DA module employed for powering the SW1800A delivers in an ultra-compact package a maximum power of 2000W.



TECHNICAL SPECIFICATION

SYSTEM

System's Acoustic Principle	Manifoldd Band Pass
Frequency response (± 3 dB)	36 Hz – 100 Hz (Processed)
Maximum Peak SPL @ 1m	139 dB

TRANSDUCERS

LF	Two 18" (460mm), 3" (75mm) VC, 8 Ω each
Cone	High stiffness, water repellent

ELECTRICAL

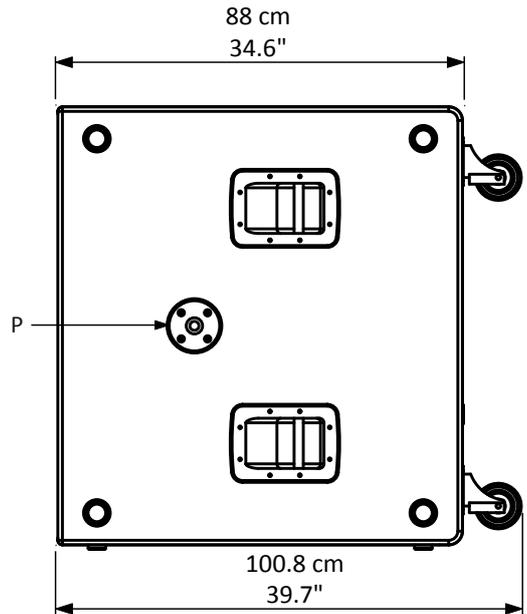
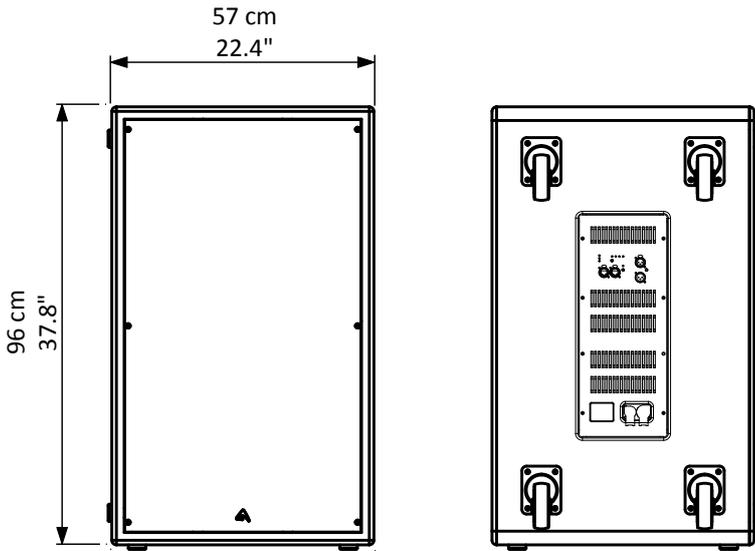
Input Impedance	20 k Ω balanced
Input Sensitivity	+4 dBu / 1.25 V
Signal Processing	CORE processing, 96kHz / 40bit floating point SHARC DSP, 24 bit AD/DA converters
Direct access Controls	4 Presets: Standard, InfraSub, Cardioid, User. Network Termination, GND Link
Remote Controls	PRONET control software
Network protocol	CANBUS
Amplifier Type	Class D with SMPS, variable Switching Frequency
Output Power	1000W + 1000W

* Nominal consumption is measured with pink noise with a crest factor of 12 dB, this can be considered a standard music program.

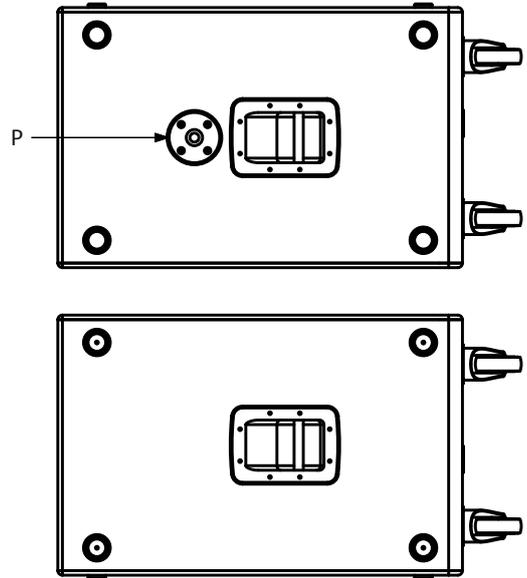
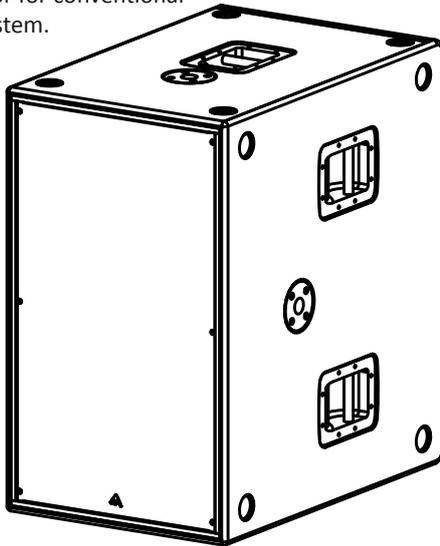
Mains Voltage Range (Vac)	230 V \sim $\pm 15\%$ or 115 V \sim $\pm 15\%$ 50/60 Hz
Consumption*	700 W (nominal) 1700 W (max)
IN / OUT Connectors	Neutrik XLR-M / XLR-F
IN / OUT Network Connectors	ETHERCON [®] (NE8FAV)
Mains Connector	PowerCon [®] TRUE1 - NAC3PX (In/Out)
Cooling	Variable speed DC fan
ENCLOSURE & CONSTRUCTION	
Dimensions (W x H x D)	570mm (22.4") x 960mm (37.8") x 880mm (34.6")
Depth Including Wheels	1008 mm (39.7")
Enclosure Material	15mm reinforced phenolic birch plywood
Enclosure Finish	High resistance water based black textured paint
Transport	4 x heavy duty 100mm (4") castors, 6 handles
Net Weight	70 Kg (154 lbs)



MECHANICAL DRAWING



P = M20 insert for DHSS10M20 pole adaptor for conventional SUB-SAT system.



OPTIONAL ACCESSORIES

NAC3FXW	Neutrik Powercon® TRUE1 (for power in)*	AX800A	Active vertical array loudspeaker
NAC3MXW	Neutrik Powercon® TRUE1 (for power out)*	USB2CAN	PRONET network converter
HTAC	Hand tool for tightening powerCON TRUE1*	USB2CAND	Dual Port PRONET network converter
NE8MCB	Neutrik Ethercon PLUG	DHSS10M20	Sub-Speaker ø35mm Pole with M20 screw
NC3MXXBAG	Neutrik XLR-M	RAINCOV215	Rain cover for input sockets
NC3FXXBAG	Neutrik XLR-F	COVERSW1800	Cover for SW1800

see <http://www.axiomproaudio.com/> for detailed description and other available accessories.

*Note: See assembly instruction downloadable from NEUTRIK WEB site at: <http://www.neutrik.com/>

SPARE PARTS

AC103GS	100 mm Swivel castor without brake
AC115DN	Black steel handle
98AXM218SW8	18" woofer - 3" VC - 8 ohm
NAC3PX	Neutrik Powercon® TRUE1 Appliance inlet-outlet combination
SCNACPX	Neutrik Rubber Sealing for NAC3PX
91AMD5W1800	Amplifier module assembly





I/O AND CONTROL OPERATIONS

MAINS~ IN - Powercon® NAC3PX power inlet connector. To switch the amplifier on, insert the Powercon® connector and turn it clockwise into the ON position. To switch the amplifier off, pull back the switch on the connector and turn it counter-clockwise into the POWER OFF position.

MAINS~ OUT - Powercon® NAC3PX power outlet connector. This is connected in parallel with the MAINS~ IN.



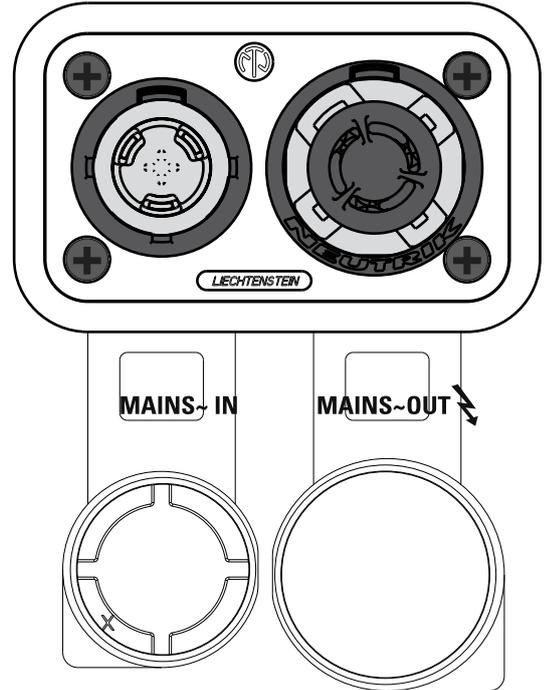
WARNING! Connect no more than one subwoofer unit to the MAINS~ OUT connector.

WARNING! If you use the MAINS~ OUT turn on each subwoofer unit one a time.

WARNING! In the case of product failure or fuse replacement, disconnect the unit completely from the mains power.

WARNING! Use a suitable power cable and mains plug to build the power cable, it must only be connected to a socket corresponding to the specifications indicated on the amplifier unit.

See assembly instruction downloadable from NEUTRIK WEB site at: <http://www.neutrik.com/>



ON - This LED indicates power on status.

PROT - This red LED lights when the amplifier module is in protect mode for an internal fault and, consequently, the amplifier is muted.

SIGN LIMIT - This LED lights in green to indicate the presence of the signal and lights in red when an internal limiter reduces the input level.

INPUT - Audio signal input with locking XLR connector. It has a fully electronically balanced circuitry including AD conversion for the best S/N ratio and input headroom.

LINK - A direct connection from the input connector to link other speakers with same audio signal.

GND LIFT - This switch lift the ground of the balanced audio inputs from the earth-ground of the amplifier module.

PRESET BUTTON - This button has two function:

1) Pressing it while powering on the unit:

ID ASSIGN the internal DSP assigns a new ID to the unit for the PRONET remote control operation. Each loudspeaker must have a unique ID to be visible in the PRONET network. When you assign a new ID, all the other loudspeakers with the ID already assigned must be ON and connected to the network.

2) Pressing it with the unit ON you can select the DSP PRESET. The selected PRESET is indicated by the corresponding LED:

STANDARD This PRESET is suitable for any application where low frequency reinforcement is required. It features a 90Hz cut off frequency and it can be used in almost any environment in combination with any vertical arrays.

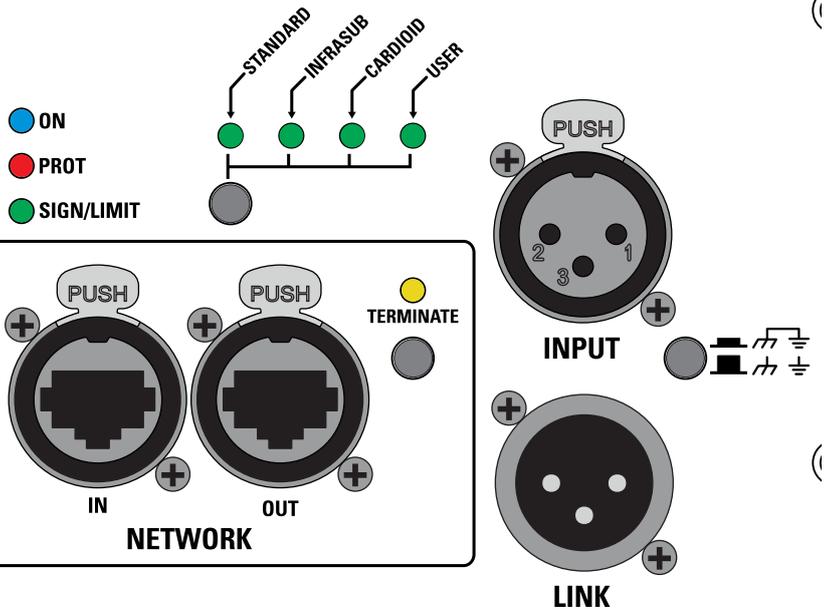
INFRA This PRESET can be used when a deeper bass response is required (Note that when this preset is used the sound pressure level of the system is slightly reduced). NOTE: INFRA and STANDARD PRESET must NOT be used together in close units.

CARDIOID This special PRESET, combined with the STANDARD PRESET, gives the advantage to reduce the low frequencies at the back of an array of three subs, in order to obtain a more comfortable level for the performers on the stage without losing level for the the audience in front of the array. The cardioid configuration is also useful in situation where you want to reduce the bass frequency feedback due to many microphones on stage, for example for acoustic and jazz ensemble, classic orchestra, musicals. Further in this manual you can find some example how to set up a cardioid array.

USER This LED lights when the USER PRESET is loaded. This preset corresponds to USER MEMORY no. 1 of the DSP and, as a factory setting, it's the same to STANDARD. If you want to modify it, you have to connect the unit to a PC, edit the parameters with PRONET software and save the PRESET into USER MEMORY no. 1.

NETWORK IN/OUT - These are a standard RJ45 CAT5 connectors (with optional NEUTRIK NE8MC RJ45 cable connector carrier), used for PRONET network transmission of remote control data over long distance or multiple unit applications.

TERMINATE - In a PRONET network the last loudspeaker device must be terminated (with an inner load resistance) especially in a long run cabling: press this switch if you want to terminate the unit.





POWER AMPLIFIERS

The SW1800A is powered by DA SERIES digital power modules, a new generation of CLASS D power amplifier with digitally-controlled SMPS. The innovative technology used for these amplifiers (including also the use of a variable switching frequency) offers performances at the top of the range, such as a superior sound definition at any audio frequency, very high dynamics also for low level signals and very low distortion even at the maximum power. The superior sound quality can be compared with top-of-the-range AB-class analog systems, while the DA modules feature a higher dynamics, very compact size and light weight and efficiency above 90%. The DA module employed for powering the SW1800A deliver in an ultra-compact package a maximum power of 2000W.

SIGNAL PROCESSING

The system processing is based on the CORE DSP platform, which has been designed by the PROEL R&D Laboratories using one of the most advanced SHARC DSP for audio application. It features 40bit, 96kHz floating point resolution and high quality 24bit AD/DA converters, for a perfect signal integrity, a dynamic range in excess of 110dB and a superior sonic performance. Thanks to its massive processing power, the CORE platform is capable of providing the most sophisticated algorithms for speaker processing, together with remote control and networking capability. The PRONET control software, working on a solid and reliable CANBUS based network protocol, provides an intuitive interface for the remote control of the whole system, with the possibility of eqing, delaying, increasing the protections and monitoring the status of the amplifier.

PRONET

PRONET software has been developed in collaboration with sound engineers and sound designers, in order to offer an “easy-to-use” tool to setup and manage your audio system. With PRONET you can visualize signal levels, monitor internal status and edit all the parameters of each connected device.

Download the PRONET app from the AXIOM website at <http://www.axiomproaudio.com/> clicking on downloads section of the product.

The SW1800A loudspeaker devices can be connected using the network connection, in this case the PROEL USB2CAN converter optional accessory is needed. The first time you connect a device with the USB2CAN converter, Windows O.S. will ask you to install the driver files, which you can find in the Driver folder within the Pronet application folder (by default is C:\Program Files\Proel\Pronet\Driver, or if you changed it <your path>\Driver). Please refer also to “Installation” and “Drivers” paragraphs in the Pronet documentation.

The PRONET NETWORK is based on a robust, reliable and fast communication protocol called CANBUS. The devices in a PRONET NETWORK are connected together with a “linear bus topology”. The USB2CAN converter must be connected to the network input of the first device, the network output of the first device is connected to the input of the second and so on. For the network connections simple RJ45 cat.5 or cat.6 ethernet cables can be used (please don’t confuse a ethernet network with a PRONET network these are completely different and must be fully separated also both use the same kind of cable).

The beginning and the end of a PRONET NETWORK must be terminated. One side is terminated by the USB2CAN converter, the other side must be terminated pressing the TERMINATE switch on the last device. All devices between these two points must have the TERMINATE switch lifted.

Assign the ID number

To work properly in a PRONET network each connected device must have a unique identifier number, called ID. By default the USB2CAN PC controller has ID=0 and there can be only one PC controller. Every other device connected must have its own unique ID equal or greater than 1: in the network cannot exist two devices with the same ID.

An ID number is assigned automatically to each devices when they are turned on for the first time connected to a network.

In order to correctly assign a new available ID to each device for working properly in a Pronet network, follow these instructions:

1. Switch off all the devices.
2. Connect them correctly to the network cables.
3. “TERMINATE” the latest device in the network connection.
4. Switch on the first device keep pressed “PRESET” button on the control panel.
5. Leaving the previous device switched on, repeat the previous operation on the next device, until the latest device is turned on.

The “Assign ID” procedure for a device makes the internal network controller to perform two operations: reset the current ID; search the first free ID in the network, starting from ID=1. If no other devices are connected (and powered on), the controller assume ID=1, that is the first free ID, otherwise it searches the next one left free.

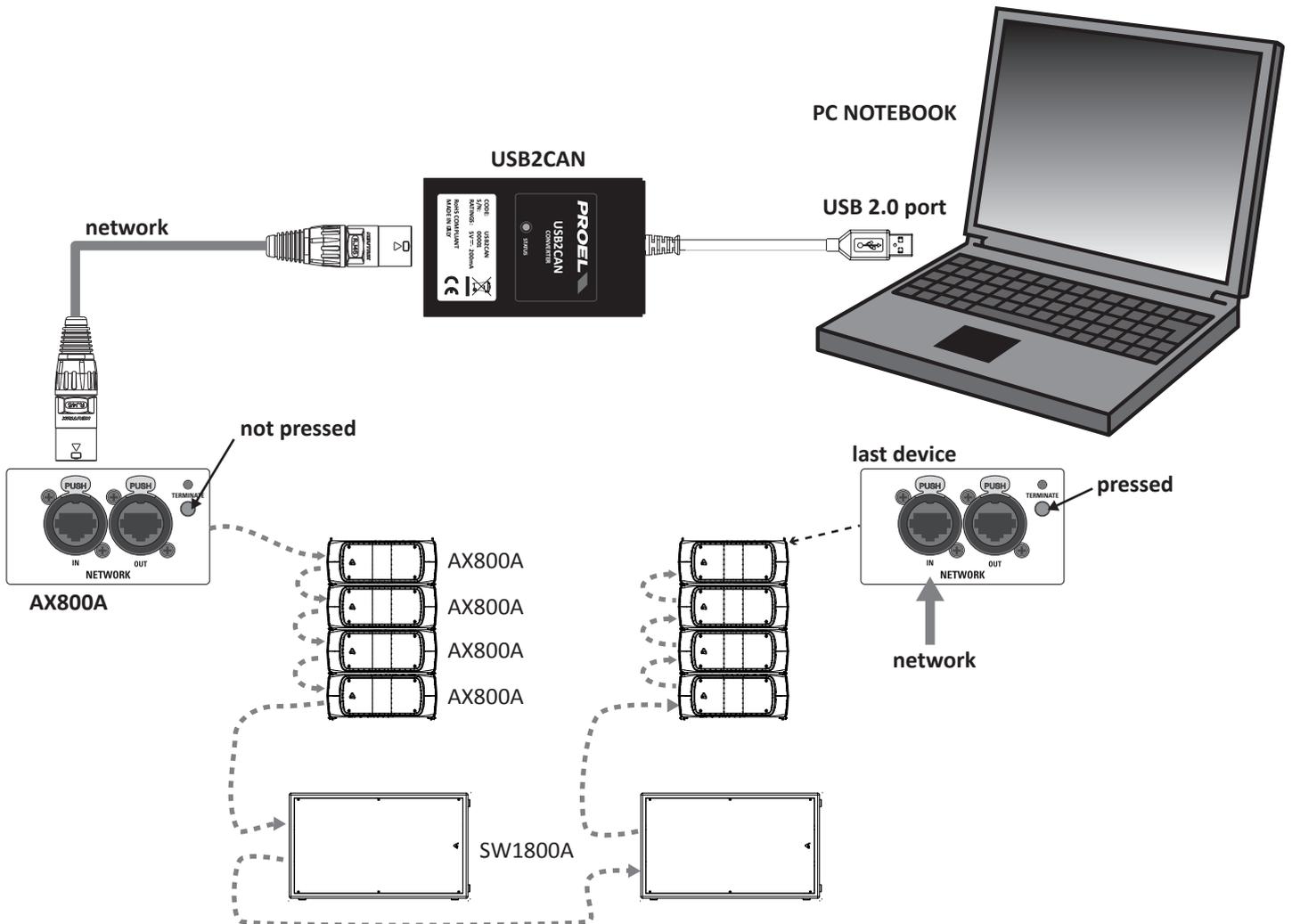
These operations ensure that every device has its own unique ID, if you need to add a new device to the network you simply repeat the operation of step 4. Every device maintains its ID also when it is turned-off, because the identifier is stored in the internal memory and it is cleared only by another “Assign ID” step, as explained above. This means that if your network is made always of the same devices the assigning ID procedure must be executed only the first time the system is turned on.

For more detailed instruction about PRONET see the PRONET USER’S MANUAL included with the software.





EXAMPLE OF PRONET NETWORK WITH AX800A AND SW1800A



Useful tools to set up properly a vertical array system using the SW1800A subwoofer

This is a list of tools that can be very useful to set properly a vertical array system with the SW1800A active subwoofers.



CABLE TESTER

It is a good practice to check all cables before each installation, because even one faulty cable can compromise heavily the system performance.



INCLINOMETER WITH LEVER

This tool can be used to verify the vertical array angle. It can be used at the top or at the bottom of the array. In this case you have to sum all splay angles, so the maximum precision is needed for aiming the vertical array, particularly for long throw applications.



LASER DISTANCE METER

This instrument can be useful to measure the height of the vertical array and to know the distance between FOH-Subs and FOH-Array for setting the delay time.



SMART or similar acoustic measurement system

These are useful to measure delays, phase and response of the system.





SW1800A - PRESET RESPONSE

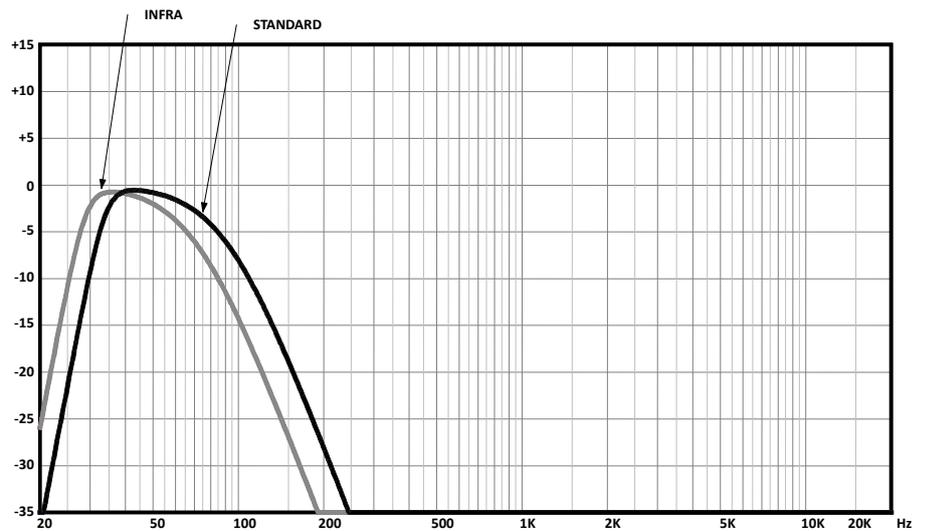
PRESET

The SW1800A has three factory presets already stored inside the CORE DSP, these preset are ready to use the sub in combination with AX800A vertical array loudspeaker or any other professional audio system:

STANDARD PRESET: the response starts at 45Hz and the cutoff is at 100Hz with LR 24dB/oct., use this preset for almost any application at ground stack.

INFRASUB PRESET: the response starts at 30Hz and the cutoff is at 60Hz with LR 24dB/oct., use this preset when a very deep bass response is required, it must be used at ground stack only, alone or in combination with some other boxes set as STANDARD, absolutely do not use it in combination of CARDIOD preset. NOTE: INFRA and STANDARD PRESET must NOT be used together in close units.

CARDIOD PRESET: the response of this preset is the same of STANDARD preset but when combined together as described further the sub stack is capable to cancel the bass in the backwards, absolutely it must be used in combination of other two boxes and at ground stack.



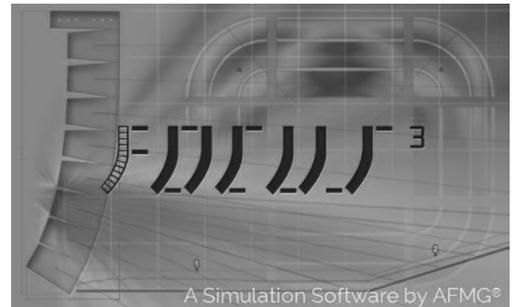
PREDICTION: EASE Focus 3

To aim correctly a complete system we suggests to use always the Aiming Software - EASE Focus 3:

The EASE Focus 3 Aiming Software is a 3D Acoustic Modelling Software that serves for the configuration and modelling of Line Arrays and conventional speakers close to reality. It only considers the direct field, created by the complex addition of the sound contributions of the individual loudspeakers or array components.

The design of EASE Focus is targeted at the end user. It allows the easy and quick prediction of the array performance in a given venue. The scientific base of EASE Focus stems from EASE, the professional electro- and room acoustic simulation software developed by AFMG Technologies GmbH. It is based on the EASE GLL loudspeaker data file required for its use:

AXIOM_SW1800_v1_0.GLL, please note that the version must be 1.0 or more. The GLL file contains the data that defines the Line Array with regard to its possible configurations as well as to its geometrical and acoustical properties.



Download the EASE Focus 3 app from the AXIOM website at <http://www.axiomproaudio.com/> clicking on downloads section of the product.

Use the menu option **Edit / Import System Definition File** to import the file **AXIOM_SW1800_v1_0.GLL** from the installation Data folder, the detailed instructions to use the program are located in the menu option **Help / User's Guide**.

Note: Some windows system can require the **.NET Framework 4** that can be download from microsoft website at <http://www.microsoft.com/en-us/download/default.aspx>.



WARNING! CAREFULLY READ THE FOLLOWING INSTRUCTIONS AND CONDITION OF USE:

- **SW1800A is NOT designed to be suspended**, use it in ground stack only.
- This loudspeaker is designed exclusively for Professional audio applications. The product must be installed by qualified personal only.
- Proel do not accept any liability for damage caused to third parties due to improper installation, lack of maintenance, tampering or improper use of this product, including disregard of acceptable and applicable safety standards.

CARDIOID SET UP

The cardioid preset must be used in a sub array of three SW1800A. Two box must be oriented towards the audience and one must be turned in the opposite direction (typically the box in the centre of the array). The bottom and the top boxes must have the STANDARD PRESET, the box in the middle must have the CARDIOID PRESET. The audio signal sent to all boxes is the same.

The CARDIOID PRESET has the same response of the STANDARD PRESET, but to obtain the maximum cancellation on the back side of the array it has the phase inverted and a proper level and delay setting.

The following figures show two typical displacement of the array. The first with all the boxes in horizontal position for a total height of 1710 mm and a width of 960 mm. The second one with all the boxes in vertical position for a total height of 960 mm and a width of 1710 mm.

NOTES:

When placing the cardioid array keep a distance to walls or other obstacles of at least 80 cm (2.6 ft) in order not to affect the radiation of the reversed cabinet.

When placing multiple vertical cardioid arrays keep a distance between them of at least 110 cm (3.6 ft) in order not to maximize the combined radiation of whole arrays.

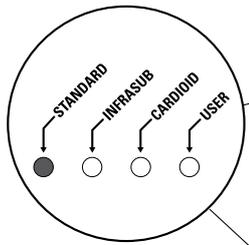
When placing multiple horizontal cardioid arrays keep a distance between them of at least 80 cm (2.6 ft) in order not to maximize the combined radiation of whole arrays.



bass cancellation direction

stage

wall or other big obstacle



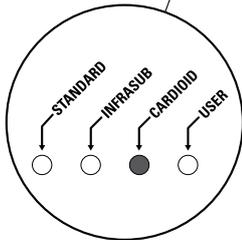
80 cm min.
2.7 ft min.

110 cm min.
3.6 ft min.

80 cm min.
2.7 ft min.

audience floor

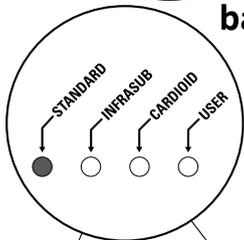
bass sum direction



bass cancellation direction

stage

wall or other big obstacle



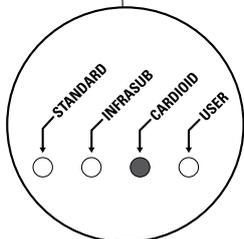
80 cm min.
2.7 ft min.

80 cm min.
2.7 ft min.

80 cm min.
2.7 ft min.

audience floor

bass sum direction





LIMITED WARRANTY

Proel 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 about these defects the dealer or the distributor, providing receipt or invoice of date of purchase and defect detailed description. This warranty does not extend to damage resulting from improper installation, misuse, neglect or abuse. Proel S.p.A. will verify damage on returned units, and when the unit has been properly used and warranty is still valid, then the unit will be replaced or repaired. Proel S.p.A. is not responsible for any "direct damage" or "indirect damage" caused by product defectiveness.

- This unit package has been submitted to ISTA 1A integrity tests. We suggest you control the unit conditions immediately after unpacking it.
- If any damage is found, immediately advise the dealer. Keep all unit packaging parts to allow inspection.
- Proel is not responsible for any damage that occurs during shipment.
- Products are sold "delivered ex warehouse" and shipment is at charge and risk of the buyer.
- Possible damages to unit should be immediately notified to forwarder. Each complaint for package tampered with should be done within eight days from product receipt.

SAFETY INSTRUCTIONS

- To reduce the risk, close supervision is necessary when the product is used near children.
- Protect the apparatus from atmospheric agents and keep it away from water, rain and high humidity places.
- This product should be site away from heat sources such as radiators, lamps and any other device that generate heat.
- This product should be located so that its location or position does not interfere with its proper ventilation and heating dissipation.
- Care should be taken so that objects and liquids do not go inside the product.
- The product should be connected to a power supply mains line only of the type described on the operating instructions or as marked on the product. Connect the apparatus to a power supply using only power cord included making always sure it is in good conditions.
- **WARNING:** The mains plug is used as disconnect device, the disconnect device shall remain readily operable.
- Do not cancel the safety feature assured by means of a polarized line plug (one blade wider than the other) or with a earth connection.
- Make sure that power supply mains line has a proper earth connection.
- Power supply cord should be unplugged from the outlet during strong thunderstorm or when left unused for a long period of time.

CE CONFORMITY

Proel products comply with directive 2014/30/UE (EMC), as stated in EN 55103-1 and EN 55103-2 standards and with directive 2014/35/UE (LVD), as stated in EN 60065 standard.

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