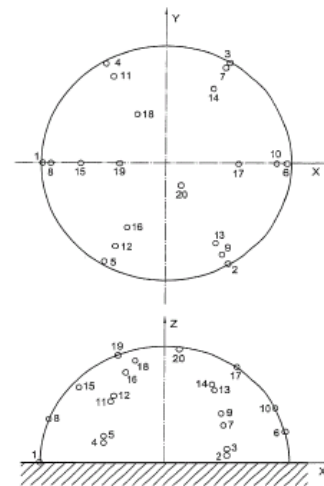
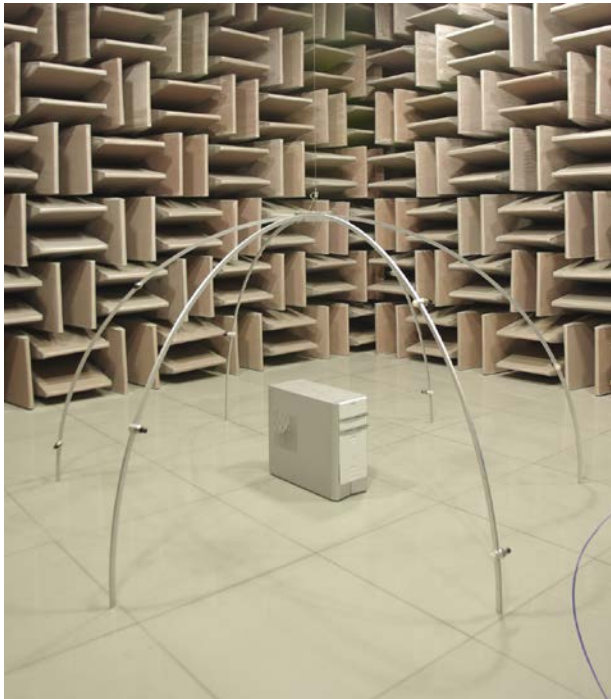


BSWA Sound Power Testing Solutions



Key
1 to 20 microphone positions

Figure D.1 — Microphone positions on the hemisphere

BSWA Company Introduction

Established in 1998, BSWA Technology Co., Ltd. is becoming the preferred supplier for acoustical measurements. With headquarter located in Beijing, BSWA currently employs 100 staffs with branch offices in Shanghai, Guangzhou, and Chengdu. BSWA's products are distributed in over 40 countries through our sales partners.

BSWA Products cover a full range of acoustic measurement devices. The products are sorted into easy-to-follow sections:

- Microphones
- Microphone Arrays
- Sound level meter
- Measuring systems
- Material testing
- Audio testing
- Outdoor monitoring systems
- Sound sources
- Cable and accessories

BSWA Sound Power Testing System Introduction

In the measurement of sound power level according to ISO 3745-2003, the 20 measurement positions are required on a spherical measurement surface enveloping a noise source in anechoic and hemi-anechoic room. However, it is difficult to mount 20 microphones on tripods in a spherical surface.

BSWA Sound Power Testing System Consists of



- Fixture and Microphones
- Data Acquisition Instrument (10-channel DAQ MC38102 OR 20-channel DAQ MC38200)
- Software (PC、 VA-Lab10 BASIC+VA-Lab10 Power OR PowerVA-Lab20 BASIC+VA-Lab20 Power)

BSWA Microphones

BSWA engineers have accumulated 30 years of experiences in making measurement microphones. Each microphone was handcrafted to exacting its high qualities, reliabilities, and extreme stabilities in all kinds of environments.

BSWA micorphones range from 1/1 inch to 1/4 inch in diameter. Among them the MPA231 (or MPA271 with TEDS) 1/2" ICCP(*ICCP = Integrated Constant Current Power*) microphone is for critical applications where high accuracy and low noise are required; The MPA 4*6 series 1/4" ICCP microphones are the most cost-effective models for array use. The phases of the microphones are matched according to the customer's specifications.

BSWA Microphones Specifications

Model	MPA201	MPA231
Photos		
Diameter	1/2"	1/2"
Standards (IEC61672)	Class I	Class I
Microphone Capsules	MP201	MP231
Optimized	Free Field	Free Field
Preamplifiers	MA231 (TEDS optional)	MA231 (TEDS optional)
Frequency Response (Hz)	20 ~ 20k	20 ~ 20k
Open-circuit Sensitivity (mV/Pa) (± 2 dB)	45	40
Output Impedance (Ω)	< 50	< 50
Dynamic Range (dBA)	16 ~ 134	17 ~ 136
Inherent Noise (dBA)	< 16	< 17
Operating Temperature Range ($^{\circ}\text{C}$)	-30 ~ 80	-30 ~ 80
Operating Humidity Range (RH)	0 ~ 95%	0 ~ 95%
Temperature Coefficient (dB/ $^{\circ}\text{C}$)	0.005	0.005
Humidity Coefficient (dB/%RH)	0.003	0.003
Pressure Coefficient (250 Hz) (dB/kPa)	-0.004	-0.004
Length (mm)	91	91
Input Connector	BNC	BNC
Corresponding Model when used with TEDS preamplifier	MPA261	MPA271

BSWA Microphone Spherical Surface Fixture for Sound Power Testing MF710/MF720

BSWA MF720 is designed according to ISO 3745-2003 to mount 20 microphones over the spherical surface; MF710 is a 10 positions version according to ISO3745; ISO7779 and GB6882.

MF720/ MF710 main features

- 20 / 10 microphone positions
- The position and orientation of each microphone can be adjusted to fit the amendment of the ISO standards
- Portable with light weight and the parts can be disassembled for easy transportation



MF720/ MF710 Specifications

Microphone Spherical Surface Fixture for Sound Power Testing		
Model	MF720	MF710
No. of Microphone Positions	20	10
Standards	ISO3745-2003	ISO7779, GB6882-88; ISO3475-1982
Radius (microphone positions) (m)	1.0	1.0
Microphone Size to be Fixed on (inch)	1/2	1/2
Carrying Case (mm)	1500 × 350 × 200	1500 × 350 × 200
Weights(kg)	11	10
Optional Items		
MPA231 1/2" ICP Microphones	20	10
CBB 020 20 m BNC cables	20	10

Data Acquisition Instrument

MC38102

BSWA 10-channel data acquisition instrument MC38102 is with 10-channel inputs and 2-channel outputs. It is based on USD NI PXI system. The instrument includes an NI PXI1033 Chassis, 2 PXI 4462 cards, and 1 PXI4461

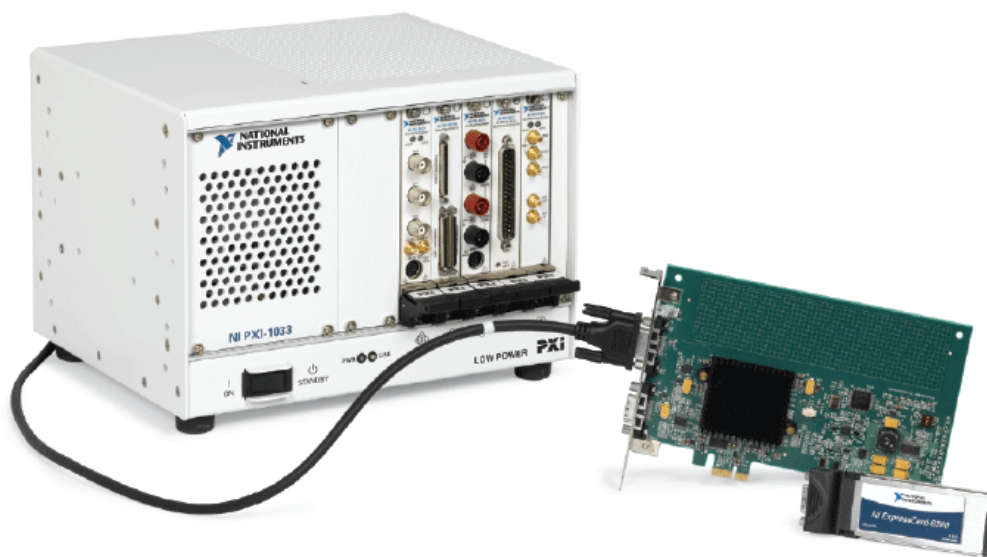
card.

MC38102 is of 24 bit accuracy; 204.8 kHz sampling rate; BNC connector; inner noises below 20dBA.

User needs to inform the computer type in advance, to decide the connector from the instrument to PC or to Laptop.

MC38200

BSWA 20-channel instrument MC38200 is with 5 PCI slots and contains bus controller and power adapter; It is with cooling fan system of low background noise; Express Card 8360 interface is used to connect to the laptop; with NI 4498 and 4462 card.

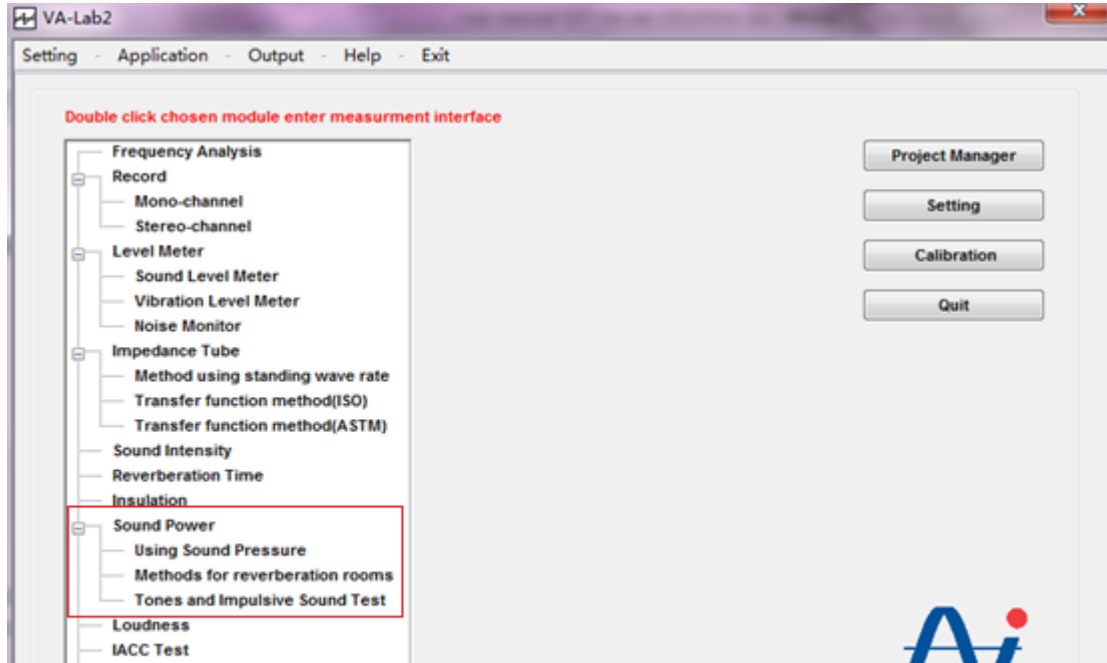


VA-Lab Software

VA-Lab is acoustical measurement software developed by BSWA. VA-Lab takes the advantage of computer power and performs all signal analysis within the computer. With BSWA Data Acquisition Hardware and Microphones, VA-Lab represents the most cost-effective solution for all your needs in acoustic measurement and analysis.

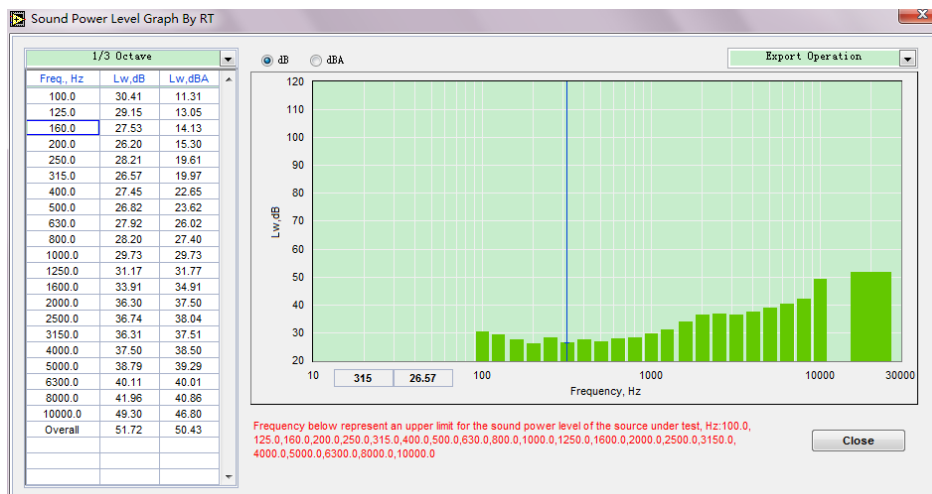
VA-Lab is developed based on the international standards and BSWA's

experiences in acoustics. These experiences cover environmental, architectural, material and industrial measurements. VA-Lab has module design with special applications according to ISO standard requirements, such as Sound Power, Sound Insulation, and Impedance Measurements.



VA-Lab Sound Power Module

In order to determine the sound power level produced by the noise source, one method is to measure the sound pressure level on the measurement surface enveloping a noise source. VA-Lab Power module is specially designed to satisfy sound power level test according to ISO3745. With NI Compact DAQ and BSWA microphones, the noise level can be tested simultaneously in 10 channels; the sound power level is calculated automatically based on the measurement surface area. With microphone conditioning unit MC104 (MC1010 is 10 channel version), the background noise can be below 20 dBA for some critical measurements.



Typical Complete Setup for Measurement of Sound Power

10-Channel Sound Power Testing System			
ITEM	TYPE NAME	DESCRIPTION	#
1	VA-Lab10 BASIC	10-channel VA-Lab base module.	1
2	VA-Lab10 Power	10-channel VA-Lab module for sound power test	1
3	MF710	Microphone Fixtures for Sound Power Measurement (10 microphone fixture)	1
4	CBS010	10m BNC-SMB cable	10
5	MC38102	Data acquisition instrument with 10-channel inputs and 2-channel outputs.	1
6	MPA201	MP201+MA231, 1/2" microphone with ICP Preamp., IEC61672 Class 1, BNC connector	10
7	CA111	1000Hz, 94dB and 114dB calibrator, Type 1, with adaptor for 1",1/2", and 1/4" microphones	1

20-Channel Sound Power Testing System			
ITEM	TYPE NAME	DESCRIPTION	#
1	VA-Lab20 BASIC	20-channel sound power testing software module, including FFT and octave analysis	1
2	VA-Lab20 Power	20-channel sound power testing software	1
3	MF720	Microphone Fixtures for Sound Power Measurement (20 microphone fixture)	1
4	CBS010	10m BNC-SMB cable	20
5	MC38200	BSWA 20-channel instrument with 5 PCI slots.	1
6	MPA201	MP201+MA231, 1/2" microphone with ICP Preamp., IEC61672 Class 1, BNC connector	20
7	CA111	1000Hz, 94dB and 114dB calibrator, Type 1, with adaptor for 1",1/2", and 1/4" microphones	1