CUBE

Smart Noise Monitoring Terminal

CUBE – THE ULTIMATE NOISE MONITORING STATION

Designed For Monitoring

With CUBE, 01dB has extended its range of noise monitoring solutions. Designed to suit all types of applications, CUBE is the most versatile terminal on the market: mobile in a case, fixed in a cabinet, compatible with 01dB WebMonitoring solutions and suitable for easy integration with your applications. CUBE brings together the most innovative functions and is aimed at simplifying operations on every monitoring project.

Certified Class 1 solution according to IEC 61672, CUBE offers the highest standard in metrological quality for your data. As a multi-tasking device it gathers performance and simplicity within one single instrument.

CUBE is a new member within 01dB ecosystem focused on improving your productivity. You will appreciate its simplicity of use, its degree of remote controllability and the power of its related processing software.

Main Specifications

CUBE presents unique technical specifications:

- IEC 61672 Class 1
- Outdoor unit DMK01 included
- Pre-polarized weatherproof microphone type G.R.A.S.40CD
- Large dynamic range 118 dB
- Self-check system (CIC)
- Automatic calibrator detection
- High-definition color display
- All-in-one: Wi-Fi, 3G Modem, GPS...
- Remote control by web interface
- Parallel storage of all acoustic indicators
- Advanced triggers
- HTTP commands for integrators
- Push Data Mode
- Metrological and MP3 audio recording
- 24-hour battery lifetime
- Connectors for antennas (GPS, Wi-Fi, 3G)
- Multiple processing software packages (dBTrait, dBFa...)
- Compatible with 01dB WebMonitoring services
- Numerous accessories (all weather case DSC01, weather station...)

acoem

Main Applications

CUBE is the most advanced noise monitoring station including all functions aimed at maximizing your productivity. It can be used as a control instrument and offers evaluation, analysis and monitoring capabilities application to noise measurement in the following fields of activity:

— Construction site noise
— Industrial noise
— Transportation noise
— Windmill noise
— Recreational activities noise
— Aircraft noise
— Urban noise...

PERFORMANCE AND SIMPLICITY

The 01DB Ecosystem

CUBE is a member the new 01dB product range sharing with DUO and FUSION the same ecosystem focused on improving your productivity. Being familiar with one of them just means mastering the other ones. Same built-in screen, same web interface, same accessories, same software tools... everything is designed in order to optimize the time you need to use these instruments.

Is CUBE your first purchase from the 01dB range? You will appreciate its simplicity of use, its degree of remote controllability and the power of its processing software.

A Design Fit for Purpose

CUBE is a noise monitoring terminal that can fit into all forms of enclosure: all weather case, plastic or metal cabinet, etc. CUBE has been carefully designed to respond to all your needs. The cone typical of sound level meters has been eliminated to obtain a shape that can be easily integrated. Three ports are used to connect the antennas (Wi-Fi, 3G and GPS), each of which can be relocated outside the cabinet. The mounting profile can be attached to a DIN rail (typical for protection cabinets).

Simplified Ergonomics

CUBE can be used with its context keys and high-definition built-in colour screen. It is therefore possible to load a stored configuration, to start an acquisition, to mark an event and start an audio recording, to do a calibration and to access stored measurements ...

No more need for a computer keyboard to manage the whole set of measurement campaigns!

Remote Communication

Using a communicating tool (smartphone, tablet, laptop...) you can access CUBE using a simple internet browser. Thanks to the embedded webserver CUBE offers direct access to any of the available functions: configuration, coding, acoustic calibration and electrical check, real time display of instant values...) without the need of further specific applications.

Remote connection is possible using Ethernet, Wi-Fi or 3G integrated modem (option). Therefore remote access to CUBE is possible from wherever you are.

Optimized Power Consumption

Programmable stand-by mode allows for optimizing CUBE's power consumption when there is no mains power available on site. The operator can select date and time for stand-by and wake-up in web interface. He can also force a manual wake-up by sending an SMS or by pressing the power on button.

Moreover CUBE can send an SMS when the battery capacity becomes inferior to 10%.

When the battery capacity becomes less than 3%, CUBE automatically stops the acquisition, stores the data in the SD card and enters stand-by mode. As soon as the power supply is connected again, CUBE wakes up and retrieves the previous measurement mode.

GPS Location

The built-in GPS allows CUBE to get measurement data include GPS location for easy visualization of the measurement position in dBTrait post-processing software.
In case of an unexpected displacement of CUBE, a user defined movement detection function will warn the operator by sending an SMS with the new geographical coordinates and the distance from the previous location (Need 3G Option).

Advanced Analysis Based on Synchronized Levels Difference

Using several CUBE instruments synchronized on a single site allows for a detailed analysis of the recorded phenomena. It becomes possible to clearly identify a car and/or train pass-by, a building site noise, an industrial noise, using multiple coding. Analysis at the measurement point takes advantage of the information collected at the coding points (and thus validates that the incriminated sources are indeed active).

Moreover, data post-processing using dBTrait allows assigning markers from the coding points onto the measurement campaign collected at the measurement point.

Smart and Powerful

CUBE measures noise and vibrations perfectly. Its powerful functions contribute to optimizing your operational efficiency: continuous audio recording, innovative trigger threshold definition, advanced acoustic indicators, automatic calibrator detection, periodic electrical checks, remote setting changes, etc.

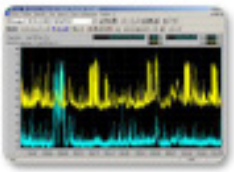
Wireless in Your Office

Direct access to CUBE is possible from your office Wi-Fi network without additional software. Any of your collaborators can thus have hands on one or several CUBE instruments using Wi-Fi access.

Measured data are collected at a glance and you can already schedule your next measurement campaign!

01DB Software: So Powerful

To cover each application, 01dB offers a complete range of software tools: dBTrait (processing of data such as LAeq...) or dBFa (advanced frequency analysis of measured data).



dBTrait is the most commonly used software program with the entire range of 01dB products. Initiated in the early 90's dBTrait was progressively improved over the years, taking also benefits from users feedback. It includes processing functions such as multiple indicators calculations, analysis results according to regulations as well as advanced coding capabilities which help identify noise sources.

To simplify your work, you can install 01dB software as many times as needed. Furthermore, there is no physical protection key to plug into your PC.

GENERAL OVERVIEW

01 - Connectors for external antennas
02 - Color display
03 - Keyboard
04 - Rail fastening

05 - Mini HDMI
06 - DC 8-28V power supply input
07 - RJ45 Network
08 - External microphone preamplifier input and analogue output
09 - Mini USB
10 - SIM card slot
11 - RS232 input
12 - TTL input/output
13 - SD card slot

ACCESSORIES: NOT ONLY SIMPLE ADD-ONS!

Outdoor Microphone Unit DMK01

CUBE is delivered with an outdoor microphone unit DMK01. This unit is composed of a stainless steel body, a dedicated PR22 preamplifier, a noise cone, a specific windscreen and a pre-polarized weatherproof microphone 40CD.

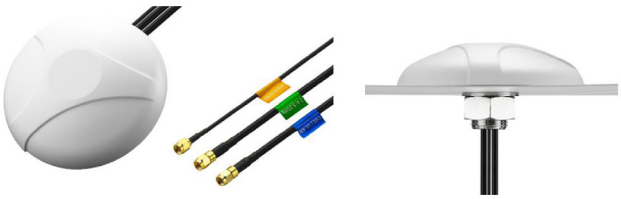
Specific electronic corrections are implemented within CUBE for the outdoor microphone unit DMK01 (embedded settings) in order to account for 0° and 90° reference directions.

Charge injection calibration check can also be operated from CUBE using a DMK01 unit.

Antennas

3 connectors are available on the top of CUBE. They allow the capability to connect 3 antennas for an optimal signal reception (Wi-Fi, 3G and GPS). These antennas are supplied in standard with CUBE. They can be typically used inside the outdoor case DSC01 or a plastic box.

As an option, CUBE can be delivered with 3in1 GPS, Cellular (2G and 3G) and Wi-Fi heavyduty IP67 antenna with high efficiency in a low profile compact format. This specific antenna screws down permanently onto a roof or metal panel.



NO COMPROMISE WITH METROLOGY

Acoustic Calibration Detection

In order to simplify the deployment of cube in the field, an automatic function for the detection of a sound level calibrator is used to launch the calibration procedure without any action required from the user, other than powering up the calibrator.

When CUBE detects a stable level around the predefined calibration level, it automatically starts the calibration procedure. At the end of this procedure, the instrument indicates the new calculated sensitivity and prompts the user for validation, repeat or rejection of the calibration. Information provided is stored and added up to the historical data of the instrument.

Multi-frequencies Charge Injection Check (CIC)

The built-in charge injection check allows testing the entire measurement chain, including the microphone of CUBE. It consists in injecting a sinusoidal charge (1 or 2 levels) into the microphone membrane, at the selected frequencies.

The principle is to collect reference levels (initialization stage) and to check over time that the maximum deviation between the reference values and the measured values does not exceed a user defined level.
The controlled frequencies are 1000, 2000, 4000 Hz and a two user-defined frequencies. A multiple-frequency check offers the advantage of a better assessment of a possible degradation of the microphone membrane. The process lasts from 10 to 30 seconds and occurs between two measurement campaigns, so as to make their validation easy.

0° AND 90° REFERENCE DIRECTIONS

90° Reference Direction

During unattended monitoring measurement, multiple sources are usually measured with a random position with respect to the measurement point. Noise generated by ground transportation, leisure activities, construction sites is coming from all directions, although mainly the horizontal direction.

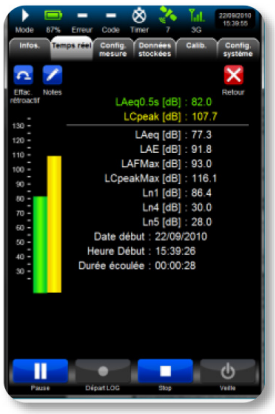
CUBE with the DMK01 perfectly meets the requirements of the IEC 61672 standard on sound level meters relative to noise incidence from the horizontal direction.

0° Reference Directions

Statutory aircraft noise measurements also require the 0° incidence configuration. CUBE with DMK01 can be setup with the 0° direction.

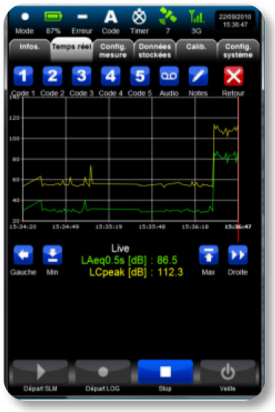
TWO MEASUREMENT MODE

SLM Mode (Integrating Sound Level Meter)



The integrating sound level meter mode allows for a simple but complete noise assessment over a period that includes overall global and spectral data as well as statistics. In case of an unexpected event (dog barking, police or ambulance siren) during a measurement a back erase function will reject the last 5 or 10 seconds of measurement

LOG Mode (Integrating Logging Sound Level Meter)

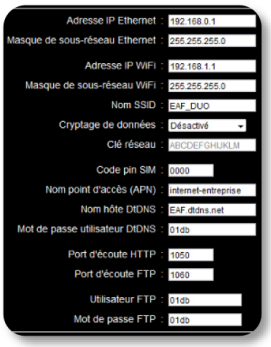


CUBE in LOG mode includes the storage of time histories. It is designed for experts familiar with the short term Leq method. Instantaneous values and spectra are stored at every Iogging period T.

When the trigger option is active, up to 5 different markers can be entered manually. In addition an event detector can be defined with limits based on 24 possible consecutive periods of the day. CUBE can record a (non-compressed) metrological audio signal simultaneously with the events. When an event occurs, a fast logging period set by the user becomes active. Finally, during acquisition, written time-stamped comments can be recorded in the measurement campaign.

MULTI-COMMUNICATION

Communication Modules

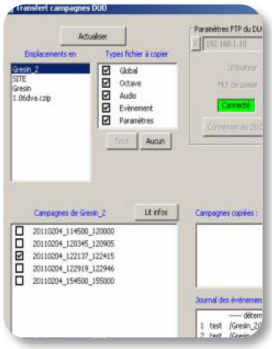


The integration of communication modules in CUBE allows communicating with the instrument using in 4 different ways:

- USB storage
- Ethernet network (RJ45)
- Point-to-point Wi-Fi network
- Infrastructure Wi-Fi network
- 3G communication using the built-in modem (Modem option needs to be active; SIM card and subscription are not included).

All connection parameters are accessible from the web interface.

LOG Mode (Integrating Logging Sound Level Meter)



Access to stored data and data transfer can be obtained in different ways using:

- FTP client as for instance Filezilla®
- dBFileManager software (included with CUBE) for manual downloads on demand
- dBDataCollector software (option) for automatic downloads
- USB mass storage (SD card access)
- SD card removed and an external memory card reader.

Structure of Stored Data

The structure of the measurement files allows the user selecting the types and dates of the data to transfer. This flexibility is particularly interesting in case of 3G communication where the cost of data transfer usually depends on the quantity of data to upload.

It is thus possible to transfer first all instantaneous values stored at each logging period. Then, and after preliminary analysis, time slots and additional data (spectra, markers and events at fast IT, audio files, provided all relevant options are active) can be selected to complement the transferred measurement campaign.

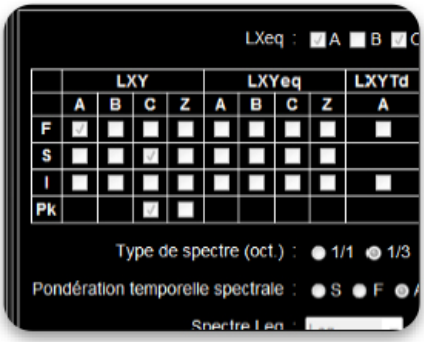
The corresponding file format (*.cmg) is compatible with all 01dB software.

DETAILS OF WEB INTERFACE

Statuts Bar

Always on display, the status bar can be used to rapidly check the operating of the main functions of CUBE: current acquisition mode, battery status, detection of an error (overload, electrical check), possible marker(s) in progress, activation of a timer or not, number of GPS satellites picked up, type of connection and 3G signal strength.

Measurement Configuration



A measurement configuration for CUBE can be set using ergonomic sub-menus. It is then possible to remotely configure the parameters to store, the automatic trigger thresholds, the logging period and delayed starts.

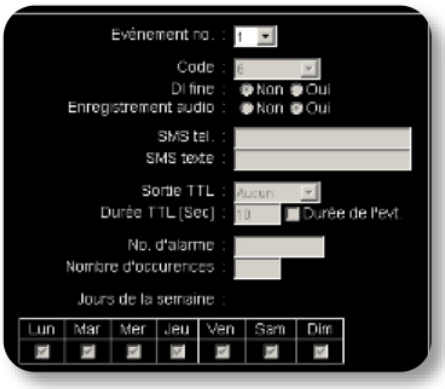
Configuration management allows rapidly loading a predefined configuration.

Data Access

Data stored in the instrument's memory can be viewed using the web interface: the user can visualise the different measurement campaigns stored in the instrument, without disturbing the measurement in progress. Additionally an automatic function can be activated in order to remove data older than a predefined number of days.

POWERFUL DATA ACQUISITION

Unique Event Detection Filters



In order to efficiently detect noise events (upon noise threshold or noise source recognition conditions), CUBE has a unique system of filters.

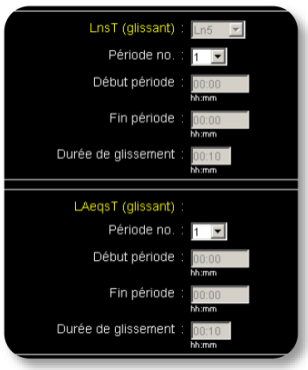
All instantaneous data measured at logging period rate can be used as criteria for triggers, including advanced indicators, frequency bands and weather data.

Each trigger is defined by 7 different parameters (start/stop noise levels, pre-/post-trigger duration...). Furthermore, it can be typically setup on an hourly basis, which allows creating up to 24 different triggers in a day.

With the Advanced Trigger option, up to 5 triggers can be combined with logical operators ("AND"/ "OR") to define an event. Up to 5 different events can be created, and then activated according user-selected days in a week (for instance: only Saturday and Sunday).

An event can generate several actions: personalised SMS, audio recording, parallel measurement with fast logging period, TTL output ...

Innovative Acoustic Indicators

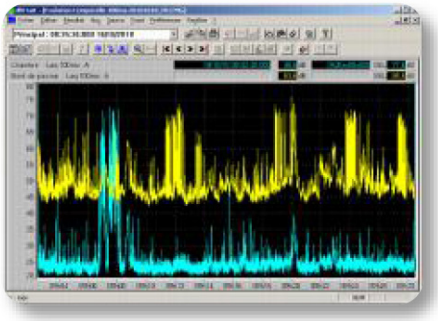


On top of usual instantaneous data measured and stored (Leq, spectra, ...), CUBE allows for acquiring advanced indicators at logging period rate on user defined periods:

- Sliding LAeq with two user defined sliding period,
- Sliding Ln with user defined sliding period,
- Exposure level with predefined background noise,
- PNL and PNLT indicators for aircraft measurement

ADVANCED DATA POST-PROCESSING

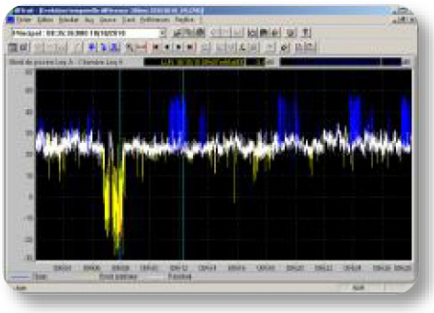
Markers Between Cubes



Using several CUBE instruments synchronized by GPS on a single site allows for a detailed analysis of the recorded phenomena. It then becomes possible to clearly identify a car and/or train pass-by, a building site noise, an industrial noise, using multiple markers.

Analysis at the measurement point takes advantage of the information collected at the coding points (and thus validates that the incriminated sources are indeed active). Moreover, data post-processing using dBTrait will allow assigning markers from the coding points onto the measurement campaign collected at the measurement point.

Synchronized Levels Difference Markers



Analysis in dBTrait allows first to calculate the time history of the difference between the measurement point and the coding point.

The time history of such difference is then analysed and automatically marked in order to detect events during which the disturbing source(s) emerge(s) from the sum of all other noises sources.

The example besides illustrates an analysis of the time difference between measurement and coding points. Results in blue (positive difference: noise levels at the measurement point higher than at the coding point) indicate some non-significant noise at the measurement point, whereas results in yellow show a negative difference which highlight some significant noise at the coding point.

AND EVEN MORE

Import and Export of Configuration Files

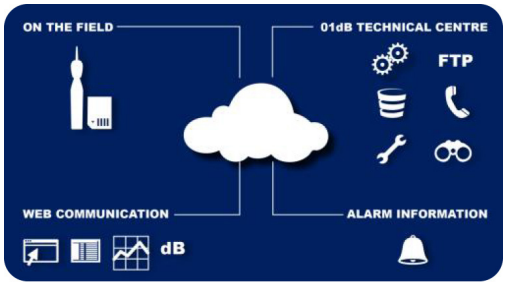
Measurement configurations can be stored, exported and imported for the benefit of the user: it becomes therefore possible to load measurement configurations from a CUBE instrument onto several ones, and thus run measurement campaigns relying on the same parameter settings for all instruments. This feature is also of temporary use to replace a CUBE while performing a periodic test at a laboratory.

The 01dB WebMonitoring OFFER

CUBE is designed for monitoring. Each user can integrate CUBE in his/her own system but he/she may want to spend less time on practical issues related to deploying and setting-up a noise monitoring project (network deployment, computer management, on-site maintenance). In addition trying to lower the overall operating expenses also comes into the play!

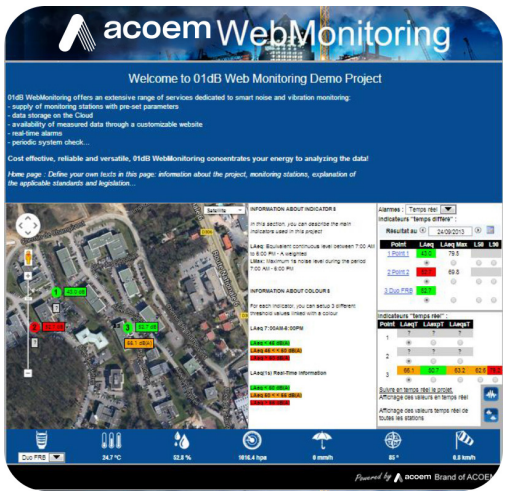
For such reasons, 01dB offers web services suited to the requirements of each type of noise and vibration monitoring activity: 01dB WebMonitoring.

01dB WebMonitoring offers unrivalled service quality that guarantees reliable data to the customer without compromise on metrology. This is a sound basis for automatic calculations and/or expert analysis achieved by an acoustic consultant



01dB WebMonitoring overview

With 01dB WebMonitoring, 01dB offers a simple and performing Web interface accessible to the different persons involved in a monitoring project. From any terminal (computer, tablet, smartphone, etc.) connected to the Internet, you can view all the information available, offline and real-time.



"Site" page on the Web interface

Available in 8 languages, the 01dB WebMonitoring interface is accessible upon customer's choice in private mode (which requires a user ID and a password) or in public mode.

In standard mode, a first level of customisation allows inserting a corporate logo and all information relative to the project (description, pictures of measurement points, hardware used, etc.).

Note: See the 01dB WebMonitoring data sheet for more information.

OPTIONNAL ACCESSORIES

Weather Stations

A weather station can be interfaced to CUBE so as to be able to simultaneously measure and store noise and weather data.

It is possible to select between 2 VAISALA weather stations: WXT532 type (2 parameters) or WXT536 type (6 parameters). These two weather stations have the particularity of transducers without any moving parts to avoid any breakdown in case of harsh weather conditions.

The same mains power is used for DUO and for the weather station; the 10 meters unique cable between the station and DUO offers a good flexibility and ease of installation. The weather data logging period is defined as a multiple of the noise logging period.

	WXT532	WXT536
Wind speed	●	●
Wind direction	●	●
Air temperature	○	●
Relative humidity	○	●
Rain intensity	○	●
Barometric pressure	○	●

All Weather Case DSC01

For mid- and long-term environmental noise and vibration measurements CUBE can be inserted into a DSC01 weather protected case. This case will provide complete protection against bad weather conditions and also deals as a protection against theft or vandalism. The 3 delivered antennas (GPS, Wi-Fi, 3G) perfectly fit with the foam inside the DSC01 case.

This case can incorporate one or two DEB01 high capacity batteries providing an average battery life of up to 10 to 20 days.

The DSC01 case also includes several glands which allow you to use different cables (microphone extension cable, cable link with a weather station...) ensuring perfect sealing properties...

AVALAIBLE OPTIONS

CUB2002000 - Multispectra Options

Activates multi-spectra measurement and storage:
- Type of spectrum: 1/1 or 1/3 octave
- Time weighting: Fast or Slow or none
- Simultaneous measurement and storage of two types of spectra (Leq and time weighting)

Stores spectral data at the logging period rate

If Trigger option (FSN2004000) or Advanced Trigger option (CUB2007000) activated:
- Possibility to store spectra at a faster logging period during events (down to 20 msec)

CUB2003000 - Audio Recording Option

Activates metrological audio recording:
- Selectable frequency sampling
- Manual trigger for recording start and stop directly from CUBE or remotely from the web interface
- User defined timer (periods and duration)

If Trigger option (FSN2004000) or Advanced Trigger option (CUB2007000) is activated
- Automatic audio recording during an event
- Synchronized audio recording simultaneously with manual markers

CUB2004000 - Trigger Option (Included in All Cube Kits)

Activates single trigger:
- Days of the week condition for event detection activation
- One of the instantaneous values (broadband or frequency bands) measured can be selected (including weather data) for each period; event detection is defined by;
  - User defined start trigger and end trigger levels
  - User defined pre-trigger
  - User defined post-trigger
  - Minimum time duration
- Up to 24 user defined periods within a day

Additional actions triggered during an event:
- SMS generation (with 3G Modem Option CUB2006000)
- TTL output (event or user defined duration)
- Audio recording (with Audio recording option CUB2003000
- Fast logging parallel measurement

CUB2005000 - Advanced Indicators Option (Included in All Cube Kits)

Measurement and storage of the following instantaneous indicators:
- Sliding LAeq (start time and end time, sliding duration)
- Sliding Ln (start time and end time, sliding duration)
- Exposure Level (start time and end time, predefined background noise level)

CUB2006000 - 3G Modem Activation Option

Activates 3G modem for internet connection using 3G/ GPRS/EDGE and UMTS/HSDPA networks:

- Full remote control and access with a smartphone, an internet tablet or a standard computer (Windows, Ios, MAC)
- FTP server for data transfer
- Automatic SMS notification on event detection (with Trigger option CUB2004000)
- Support of DTDNS dynamic IP address server
- SMS alarm on low battery (10%)
- SMS alarm on movement detected from initial location

CUB2007000 - Advanced Triggers Option

Activates advanced trigger:

- 5 days of the week condition for event detection activation
- 5 of the instantaneous values (broadband or frequency bands) measured can be selected (including weather data) for each period; event detection is defined by;
  - User defined start trigger and end trigger levels
  - User defined pre-trigger
  - User defined post-trigger
  - Minimum time duration
- Up to 24 user defined periods within a day

Additional actions triggered during an event:

- SMS generation (with 3G Modem Option CUB2006000)
- TTL output (event or user defined duration)
- Audio recording (with Audio recording option CUB2003000
- Fast logging parallel measurement

CUB2008000 - PNL-PNLT Option (Included in All Cube Kits)

Measurement and storage of PNL (Perceived Noise Level) or PNLT (Perceived Noise Level Tone corrected) for aircraft or helicopter

CUB2009000 - Push Data Option (Included in All Cube Kits)

Activates Automatic data transfer in push mode (from the instrument to one or two server)
The following parameters allows for selecting the types of data o upload:

- Instant values
- Sliding and exposure values
- Instant spectrum values
- Instant weather values
- Overall values
- Events
- Signal(s)

CUB2010000 - HTTP Commands Option

Activates integrators HTTP commands mode

The «integrators commands» allow retrieval of information in real time. The operator has the possibility to query CUBE by a simple HTTP request, and CUBE responds with the corresponding real time values.

CUB2011000 - Weather Option

Measurement and storage of weather data acquired by VAISALA weather stations types WXT536 (6 transducers) or WXT532 (2 transducers):

- User defined selection of parameters
- Altitude correction for barometric pressure
- User defined Logging period (as a multiple of the noise logging period)
- Real time display of weather information with the web interface (wind rose for wind direction, time history for wind speed, instantaneous values for the other weather parameters)

PACKAGES

Overall Specifications

All CUBE packages contain the minimum following specifications:

- Point to point Wi-Fi connection
- Ethernet connection
- Wi-Fi data transfer
- Ethernet data transfer
- GPS location
- GPS or NTP time synchronization
- Periodic electrical check (multi CIC 5 frequencies, 2 levels)
- USB connection(mass storage)
- SD card reader
- 0°/90° reference direction with DMK01
- Web interface for remote control
- Automatic data transfer in push mode
- dBFileManager software for manual data transfer
- SLM mode (Start/Stop)
- LOG mode (time history)
- Instantaneous values (up to 44 values in parallel)
- Global values
- Global statistical values (7 Ln values)
- PNL/PNLT indicators
- Sliding LAeq, sliding Ln and exposure level
- Back erase (mode SLM)
- Timer functions : immediate, delayed, daily periodic
- 1 user-definable events

Available Packages

It is possible to order separately one or several options (for the delivery or as evolutions).

	CUB2001000 Logger	CUB2002000 Multipectra	CUB2003000 Audio Recording	CUB2004000 Triggers	CUB2005000 Advanced indicators	CUB2006000 3G Modem	CUB2007000 Advanced Triggers	CUB2008000 Aircraft Indicators	CUB2009000 http commands	CUB2010000 Push Data	CUB2011000 Weather
CUB3015000Logger Wi-Fi	●	○	○	●	●	○	○	●	○	●	○
CUB3016000 Analyzer Wi-Fi	●	●	○	●	●	○	○	●	○	●	○
CUB3017000 Expert Wi-Fi	●	●	●	●	●	○	●	●	○	●	○
CUB3018000 Logger Wi-Fi /3G	●	○	○	●	●	●	○	●	○	●	○
CUB3019000 Analyser Wi-Fi/3G	●	●	○	●	●	●	○	●	○	●	○
CUB3020000 Expert Wi-Fi /3G	●	●	●	●	●	●	●	●	○	●	○

● Included ○ Option

TECHNICAL SPECIFICATIONS

IEC class:
IEC 61672-1 ed. 2.0 (2013) (0° and 90° reference direction)
IEC 61620 (1995) NF EN 61260/A1 (2002)
Sound Level Meter, Integrating Sound Level Meter with storage, group X.

Type approval
LNE (soon available)
PTB (soon available)

Dynamic range
21-138 dB (A, B), 26-138 dB (C), 31-138 dB (Z), 1 single range for a rated sensitivity of 50 mV/Pa

Linear operating range for A weighting (5 frequencies)

	Reference direction 90°	Reference direction 0°
31,5 Hz :	25-97 dB	24-97 dB
1 kHz :	25-137 dB	24-137dB
4 kHz :	26-137 dB	24-137dB
8 kHz :	26-133 dB	25-132dB
12,5 kHz :	26-130 dB	25-129dB

Dynamic range Peak
61-140 dBC, 1 single range

Time weightings
Slow, Fast, Impulse, Peak

Frequency weightings
X=A, B, C, Z; Y=S, F, I for LXeq and LXY
X=A; Y=S, F, I for LXYTd
X=C, Z for LXpk

Instantaneous broadband values stored

	LXY				LXYeq				LXYTd	LXYMinMax			
	A	B	C	Z	A	B	C	Z	A	A	B	C	Z
F	X	X	X	X	X	X	X	X	X	X	X	X	X
S	X	X	X	X	X	X	X	X	X	X	X	X	X
I	X	X	X	X	X	X	X	X	X	X	X	X	X
Pk			X	X									

LnsT (sliding Ln)
LAeqsT (sliding LAeq)
LAexPT (exposure level)
PNL and PNLT (Perceived noise level)

Instantaneous weather data stored
Wind speed [m/s]
Wind direction [°]
Rain intensity [mm/h]
Barometric pressure [hPa]
Air temperature [°C]
Humidity [%HR]

Noise logging period T
Mini 20ms - maxi 3600s, 5 ms steps
Short logging period: mini 20ms - max standard T, 5 ms steps.
Short logging period applicable during events
Short logging period must be a divisor of T

Weather logging period
Weather logging period is a multiple of T with a minimum of 1 second

Spectral analysis
Parallel measurement and storage of Leq and LY (Y=F, S, I)

Filters
1/1 (8Hz-16kHz) et 1/3 (6.3Hz-20kHz)

Statistics
7 selectable Ln in parallel from L1 to L99, 1 dB class
Samples for calculation: T if Leq or 20 ms if LXY, 0.1 dB resolution

Back erase
0, 5s or 10s, SLM mode only

Input high pass filter
0,3 Hz / 10 Hz

Reference directions
0° on internal input
0° and 90°, selectable built-in correction on external input (with a DMK01 external microphone)

Reference point for microphone
Centre of the protection grid (with or without nose cone)

Reference level
94 dB

Starting point for linearity tests
Reference level, i.e. 94 dB

Data storage modes
SLM (hand-held sound level meter) and LOG (logging sound level meter)

Audio recording
Uncompressed metrological signal, Fs = 51200 Hz
Sampling frequencies: 51200, 25600, 12800, 6400, 3200, 1600 Hz
Pre-trigger = 10s at Fs=51200 Hz
LEMO output connector

Audio recording triggers
Simultaneously with events and manual (using CUBE integrated key and web interface for remote control)

Events (automatic coding)
5 user-definable events: codes 6 to 10
24 user-definable time periods

Triggers (5 different per event)
Settings for pre-trigger, post-trigger, minimum time, end time
Types: on instant acoustic and weather values (except wind direction), instant spectral values, TTL input

Manual markers
On the instrument: 1 code “code 1”
On web interface: 5 codes: “codes 1 to 5”

Timers
Immediate, differed, daily periodic
Audio: periodic

Preamplifier
External type PRE22 (included in DMK01) on external input (standard 10 m lemo extension cable)

Electric background noise
The microphone is replaced by a ADP12 adaptor, and the input is short-circuit
Measurement is performed with 30 sec averaging

Typical background noise
Microphone (thermal noise): 14.5 dBA, 15.0 dBC, 15.3 dBZ

	[dB]	L_A	L_C	L_Z
Acoustic	Typical	16,1	16,8	20,2
	maximum	20,0	21,0	24,0
Electric	typical	11,0	12,5	18,5
	maximum	16,0	17,0	21,0

The background noise specific to the instrument results from the implementation of the standard microphone and is independent of the selected configuration (e.g., the configuration used for power supply, Wi-Fi, GPS, screen).

Integrated keys
4 silent keys: on/stand-by/off and 3 multi-functions keys

Status indicators
LED red (overload)
LED blue (Wi-Fi connection)
LED green (power ON, blinking on on-going measurement, charge ON)

Display
High contrast colour screen 38*50mm resolution 320*240 pixels
3 sets of colours (day, contrast, night)
Display rate: 0.1s, Display resolution: 0.1dB

USB connection
Type 2.0; mass storage mode, charge on USB

Ethernet connection
Connector RJ45, Speed: 100 MB/s
DHCP mode

Wi-Fi Connection:
IEEE 801.11b, g
Point-to-point connection and infrastructure mode

Cellular network connection
Embedded modem 3.5G compatible with 4-band GSM/GPRS/EDGE and 3-band UMTS/HSDPA

Data connectivity
Integrated Network protected http server for web interface
Integrated FTP server for data access

SMS alarms
- On event: SMS text with CUBE serial #, location, date and time, user defined text, IP address:http port
- On low battery (10%): SMS text with CUBE serial #, location, date and time, % remaining battery
- On movement: SMS text with CUBE serial #, location, date and time, GPS coordinates, distance from previous location, IP address:http port (the alarm trigs if CUBE has moved more than the user defined distance)
- On CIC error (electrical check)

Automatic SMS actions
Sending “IP” by SMS to instrument makes it reply by sending an SMS with instrument serial #, location, date and time, IP:port address and automatically sends a new SMS at every new IP address in case of floating IP

Actions on SMS sent to the instrument
- On SMS sent “IP”, the instrument replies by sending an SMS with the instrument serial #, location, date and time, IP:port address
- On SMS sent “stop”, the instrument stops replying new SMS if IP has changed
- On SMS “reboot”, the instrument reboots to establish a new connection and replies with an SMS with instrument serial #, location, date and time, IP :port address

Web interface refresh rate webpages
Standard: twice per second
Mobile: once per second

Analogue output
Audio output A, B, C or Z (+/-10Vpp R=2000hms)
Adjustable gain: 0, 10, 20, 30, 40, 50 dB

Electrical check
Programmable periodicity: 1, 2 or 4 times per day (0h,0h-12h, 0h, 6h, 12h, 18h)
3 pre-set frequencies (1000 Hz, 2000 Hz, and 4000 Hz) and 2 user-defined frequencies (between 10 Hz and 20 kHz)
2 user-defined excitation levels, maximum level 5 V (100%)

External microphone input
For DMK01, PRE22 (R = 560k0ms / 22Vpp (+/- 11V)

TTL output
R = 100 0hms / 0 / 5V

TTL input
R = 100 k0hms / 0...1V = «0» 1.8...5V =»1»

Battery
Type lithium polymer
Voltage 3.7V
Capacity 6750 mAh
Non removable, charging time approximately 3 hours

Typical power consumption
Without communication (screen switch off): < 1200 mW
+ Wi-Fi & screen switch on: < 1800 mW
+ Modem: <3800 mW

Operating lifetime
24 hours without Wi-Fi connection
20 hours with Wi-Fi connection (during 10% of measurement time)
15 hours with active 3G connection (during 10% of measurement time)
(for temperatures ranging from 10°C to 50°C, in LOG mode with IT = 1 s, fine IT 100 ms, 1/3 octave and audio recording on threshold during 10% of the measurement time)

External power supply
DC 8 to 28 V on charge input
DC 5 V on USB input (slow charge)

Memory
SD, SDHC or SDXC card, 2 GB or higher (2GB standard delivery) for measured data and signals. Minimum recommended requirement: ≥ class 10. Please note only SD cards provided by 01dB should be used.
01dB cannot be held responsible for data loss if the SD card used is not delivered by 01dB.
Measured data stored on the SD card every 10 seconds.
Non-volatile memory for configurations, system log (500), calibration data (500) and electrical checks (500)

Clock
GPS PPS, error < 50 milliseconds
Internal clock, error < 0.5 s/24 hours

Localization
Automatic with integrated GPS
Information stored with measurement campaigns

Warm-up time
From power off: < 25 seconds

Operating temperature:
-10°C to +50°C

Humidity
IEC 60068-2-78: damp heat: 90% HR (non condensing at 40°C)

Electromagnetic compatibility
According to Directive 2004/108/EC
NF EN 61000-6-1 NF EN 61000-6-2 NF EN 61000-6-3 NF EN 61000-6-4 (2001)
ETSI EN 300 328 V1.5.1 (2004)

Protection
IP40 in standard use

Influence of vibration

Use with no outdoor microphone:

— For mechanical vibration of an acceleration level of 1 m/s² perpendicular to the microphone diaphragm, at frequencies 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 630 Hz, 800 Hz and 1000 Hz: the lower limit of the linear operating domain for A-weighting becomes 80 dB.

— For mechanical vibration of an acceleration level of 1 m/s² parallel to the microphone diaphragm, at frequencies microphone diaphragm, at frequencies 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 630 Hz, 800 Hz and 1000 Hz: the lower limit of the linear operating domain for A-weighting becomes 60 dB.

Use with outdoor microphone unit DMK01:

— For mechanical vibration of an acceleration level of 1 m/s² perpendicular to the microphone diaphragm, at frequencies microphone diaphragm, at frequencies 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 630 Hz, 800 Hz and 1000 Hz: the lower limit of the linear operating domain for A-weighting becomes 75 dB.

Weight and dimensions

775 g

H x L x P: 300 x70 x 52 mm

Standard Accessories

— External charger AC Adapter Model ZDA 120150EU Input AC 100-240V 0.8A Output 12V 1500mA)

— Outdoor microphone unit type DMK01 including preamplifier type PRE22, 10 m cable and nose cone. The use of RAL135 10 m cable does not need any particular correction.

Optional Accessories

— Weather station VAISALA type WXT532 specific for the instrument (2 parameters: wind speed and direction)

— Weather station VAISALA type WXT536 (6 parameters: wind speed and direction, rain intensity, relative humidity, air temperature, barometric pressure,

— Connection cable between weather station and CUBE, for powering simultaneously CUBE and the weather station

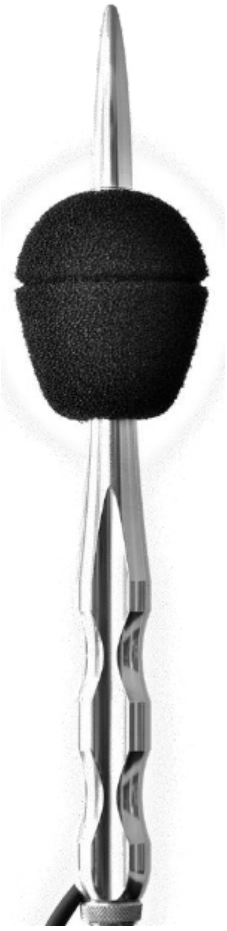
— All weather case DSC01 with option 1 battery (10-days) or 2 batteries (20-days)

Connecting these accessories has no influence on measurements

DELIVERABLE AND ACCESSORIES

The standard package (CUB1001000) of CUBE includes the following items:

CUBE station



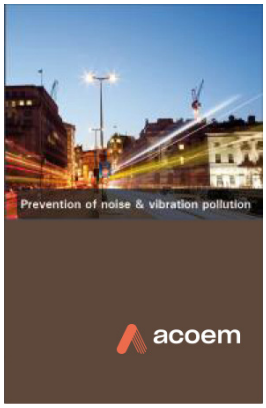
Outdoor unit DMK01 with
PRE22 preamplifier 40CD microphone
Nose cone Windshield
(Extension cable in option)

AC Power supply

USB cable

SD card 2Go

CUBE station



Metrological
documentations

CD-ROM with
User manual

Packaging

DOCUMENTREFERENCEHERE

acoem
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acoem.com