SC310 INTEGRATING SOUND LEVEL METER
REAL TIME SPECTRUM ANALYSER
IN THIRD OCTAVE AND OCTAVE BAND

Applications:

- **Precision sound level measurements**
- **Measurement of parameters to guarantee the hearing protection, evaluate noise pollution levels, etc.**
- **Acoustic insulation in one third octave bands**
- **Frequency analysis of industrial and environmental noise**
- **Room background noise and HVAC noise analysis**
- **Detection and identification of sound sources**

User friendly:

- **Measures all parameters simultaneously with frequency weightings A, C and Z**
- **One single range 23 - 137dBA (no range setting)**
- **Back Light graphic screen and membrane keyboard for easy use.**

Features:

- **Integrating sound level meter type 1 according IEC and ANSI**
- **Real time spectrum analyser, octave band 31.5 Hz to 16 kHz and one third octave band 20 Hz to 10 kHz.**
- **Real time room noise evaluator by NC curves**
- **Impulsiveness measurement**
- **Mass storage of data in memory**
- **Direct printing**
- **Circular memory available**
- **Includes software and cable for real time retrieval of all measured and recorded data to a PC**
- **Detachable preamplifier, for use of the extension cables (CN-003, CN-010, CN-030) and the outdoor kit (TK-1000)**

The **SC310** is a powerful and easy to use instrument. It can work as integrating sound level meter type 1 according to IEC 60651, IEC 60804, IEC 61672, ANSI S1.4 and ANSI S1.43. It is also a real time spectrum analyser in one-third octave band and octave band, with type 1 filters according to IEC 61260 and EN 61260. The **SC310** also fullfils the standard ANSI S1.11 standard.

The **SC310** has a single range, there is no need to make any scale adjustments. It also measures all functions simultaneously. These functions are the ones needed to calculate the basic noise evaluation figures of most of the countries in the world: S, F and I functions, Equivalent continuous levels, Percentiles, Impulsiveness indexes, Peak levels, Sound exposure levels, Short functions, etc.

The **SC310**'s graphic screen provides graphical and numerical representation of the measured functions. The screen can be illuminated, allowing the user to work in low-light conditions.

The **SC310** has an extensive internal memory to record all the measured data. The amount of stored functions is configurable.

The **SC310** has two communications ports: RS-232 and USB. The USB port allows you to download quickly all the stored data and the RS-232 port allows you to configure communication ports through modem (BTN or mobile) or Bluetooth™ (wireless). A serial printer can be connected to the the RS-232 port to print in real time all functions measured by the **SC310**.

The preamplifier of the **SC310** is removable. It can therefore be uncoupled and moved away from the **SC310** by means of the extension cables (CN-003, CN-010 or CN-030). Also allows you to use the outdoor kit (TK-1000) for outdoor measurements.

The power and versatility of the SC310 and its user-friendly design defines it as the perfect hand held instrument for precission acoustic measurements.

Sound level meter mode functions (all functions are measured simultaneously)

FUNCTION	A	C	Z
Sound pressure level with fast time weighting (Fast)	L_{AF}	L_{CF}	L_{ZF}
Maximum value	L_{AFmax}	L_{CFmax}	L_{ZFmax}
Minimum value	L_{AFmin}	L_{CFmin}	L_{ZFmin}
Sound pressure level with slow time weighting (Slow)	L_{AS}	L_{CS}	L_{ZS}
Maximum value	L_{ASmax}	L_{CSmax}	L_{ZSmax}
Minimum value	L_{ASmin}	L_{CSmin}	L_{ZSmin}
Sound pressure level with impulse time weighting (Impulse)	L_{AI}	L_{CI}	L_{ZI}
Maximum value	L_{AImax}	L_{CImax}	L_{ZImax}
Minimum value	L_{AImin}	L_{CImin}	L_{ZImin}
Equivalent continuous sound pressure level with integration time T	L_{AT}	L_{CT}	L_{ZT}
Maxim value	L_{ATmax}	L_{CTmax}	L_{ZTmax}
Minimum value	L_{ATmin}	L_{CTmin}	L_{ZTmin}
Equivalent continuous sound pressure level of the entire measurement	L_{At}	L_{Ct}	L_{Zt}
Sound exposure level S.E.L.	L_{AE}	L_{CE}	L_{ZE}
Peak sound pressure level	L_{Apeak}	L_{Cpeak}	L_{Zpeak}
Equivalent continuous sound pressure level with impulse time weighting and integration time T	L_{AIT}	L_{CIT}	L_{ZIT}
Equivalent continuous sound pressure level of the entire measurement with impulse time weighting	L_{AIt}	L_{CIt}	L_{ZIt}
Dynamic subtraction of the equivalent continuous sound pressure level with impulse time weighting and the equivalent continuous sound pressure level, both with integration time T	L_{AIT}-L_{AT}	L_{CIT}-L_{CT}	L_{ZIT}-L_{ZT}
Dynamic subtraction of the equivalent continuous sound pressure level with impulse time weighting and the equivalent continuous sound pressure level, both with the integration time equal to the measurement time t	L_{AIt}-L_{At}	L_{CIt}-L_{Ct}	L_{ZIt}-L_{Zt}
Dynamic subtraction of the equivalent continuous sound pressure level with A and C frequency weighting and integration time T	L_{CT}-L_{AT}		
Dynamic subtraction of the equivalent continuous sound pressure level with A and C frequency weighting and integration time equal to the measurement time t	L_{Ct}-L_{At}		
Measurement time	t		
Integration time	T		
Percentile 1%	L_1		
Percentile 5%	L_5		
Percentile 10%	L_{10}		
Percentile 50%	L_{50}		
Percentile 90%	L_{90}		
Percentile 95%	L_{95}		
Percentile 99%	L_{99}		

Spectrum analyser 1/1 mode functions (all the functions are measured simultaneously)

Function	Freq. Weigh.	Name	TOTAL	31.5	63	125	250	500	1 k	2 k	4 k	8 k	16 k
Equivalent continuous sound pressure level with integration time T	-	L_T	-	X	X	X	X	X	X	X	X	X	X
Percentile 1%	A*	L_1	X*	X	X	X	X	X	X	X	X	X	X
Percentile 5%	A*	L_5	X*	X	X	X	X	X	X	X	X	X	X
Percentile 10%	A*	L_{10}	X*	X	X	X	X	X	X	X	X	X	X
Percentile 50%	A*	L_{50}	X*	X	X	X	X	X	X	X	X	X	X
Percentile 90%	A*	L_{90}	X*	X	X	X	X	X	X	X	X	X	X
Percentile 95%	A*	L_{95}	X*	X	X	X	X	X	X	X	X	X	X
Percentile 99%	A*	L_{99}	X*	X	X	X	X	X	X	X	X	X	X
Equivalent continuous sound pressure level with integration time T	A	L_{AT}	X	-	-	-	-	-	-	-	-	-	-
	C	L_{CT}	X	-	-	-	-	-	-	-	-	-	-
	Z	L_{ZT}	X	-	-	-	-	-	-	-	-	-	-
NC curves	Real time assessment of noise by the NC curves												

Spectrum analyser 1/3 mode functions (all the functions are measured simultaneously)

Function	Freq. Weigh	Nom	TOTAL	20	25	31.5	40	50	63	80	100	125	160
Equivalent continuous sound pressure level with integration time T	-	L_T	-	X	X	X	X	X	X	X	X	X	X
	200	**250**	**315**	**400**	**500**	**630**	**800**	**1000**	**1250**	**1600**	**2000**	**2500**	**3150**
	X	X	X	X	X	X	X	X	X	X	X	X	X
	X	X	X	X	X								

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Short functions (all the functions are measured simultaneously)

SHORT FUNCTIONS	L_F	L_S	L_I	L_{peak}	$L_{T=125ms}$	$L_{T=125ms,1/1\ oct}$	$L_{T=125ms,1/3\ oct}$
Sound level meter mode	X*	X*	X*	X*	X*		
Spectrum analyser 1/1 octave mode					X*	X+	
Spectrum analyser 1/3 octave mode							X+

* with frequency weighting A, C and Z
\+ with no frequency weighting

The **SC310** may store in its internal memory the values of the measured functions. When the unit is switched off, data do not get lost may be retrieved and displayed directly from the **SC310** or transferred to a PC. The memory may be erased directly from the **SC310**.

The **SC310** allows you to download the stored data simultaneously with the process of measurement and recording. This characteristic together with the possibility of configuring the free memory space as a circular memory, converts the **SC310** in the perfect platform for the permanent acoustic monitoring.

The following table shows the memory storage capacity of the different types of recordings corresponding to the sound level meter and spectrum analyser 1/1 and 1/3 modes.

F1, F2 and F3 are the acoustical functions selected by the user on the preferences screen. They may be any of the different functions the SC310 measures in sound level meter mode.

The F1, F2 and F3 (+) kind of recording stores each second: LCpeak each second, LAF sampled each 125 ms (8 values per second), LAT with integration time 125 ms (Short Leq) (8 values per second) and F1, F2 and F3 each second. This kind of recording is very interesting because it stores the basic function: Short Leq, Fast each 125 ms (to calculate statistical information), Peak level and three programmable functions.

STORAGE CAPACITY	
SOUND LEVEL METER mode	
Kind of recording	***Storage capacity***
Functions 1 s (82 functions each sec.)	4 days 16 hours
Functions 125 ms (15 functions each 125ms)	3 days 5 hours
L_T + L_{IT} and percentiles each T	T= 1 s ➔ 28 days 18 hours T= 1 min ➔ 4 years 9 months
F1 each second	8 months 14 days
F1, F2 and F3	3 months 19 days
F1, F2 and F3 (+)	18 days 22 hours
SPECTRUM ANALYSER Mode 1/1 octave	
Kind of recording	***Storage capacity***
Functions T	T= 1 s ➔ 4 days 6 hours T= 1 min ➔ 8 months 17 days
Functions 125 ms	3 days 5 hours
Functions t + 125 ms	T= 1 s ➔ 3 days 7 hours
L_T each T	T= 1 s ➔ 28 days 18 hours
SPECTRUM ANALYSER Mode 1/3 octave	
Kind of recording	***Storage capacity***
Functions T	T= 1 s ➔ 13 days 15 hours T= 1 min ➔ 2 years 3 months
Functions 125 ms	1 day 17 hours
Functions t + 125 ms	T= 1 s ➔ 19 hours 32 min

SUPPLIED ACCESSORIES

FNS030 Case
PVM05 Wind screen
SFT030 Software
CN1US Cable USB with connector mini-USB
2 Batteries of 1.5 V

OPTIONAL ACCESSORIES

CB-5 Sound calibrator
TR-40 Tripod
ML-50 Briefcase (49 x 36 x 14 cm)
ML-10 Briefcase (30 x 38 x 8 cm)
AM240 Main transformer 230 V 50 Hz to 4 V
AM140 Converter for battery 12 V to 4 V
TK-1000 Outdoor kit
CN-003 Extension cable 3 m
CN-010 Extension cable 10 m
CN-030 Extension cable 30 m
TR-001 Tripod adapter
CN1DA Audio cable
MA101 Adapter RS to modem
BT001 Bluetooth™ module

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Technical Specifications
SC310 INTEGRATING SOUND LEVEL METER
REAL TIME SPECTRUM ANALYSER
IN THIRD OCTAVE AND OCTAVE BAND

STANDARDS AND SPECIFICATIONS

Complies with the following standards:

- EN 60651:94 (A1:94) (A2 :01) type 1, EN 60804:00 type 1, EN 61260:95 (A1:01) type 1
- IEC 60651:01 type 1, IEC 60804:00 type1, IEC 61260:95 (A1:01) type1
- ANSI S1.4:83 (A1 :85) type 1, ANSI S1.43:97 type 1, ANSI S1.11:86
- CE mark. Complies with 73/23/CEE and CEM 89/336/CEE low-tension regulations, the latter amended by 93/68/CEE.

MEASUREMENT RANGE

L_F, L_S, L_I, L_T and L_t
Indicator limits: 0 – 157 dB

C-130 + PA-13

Primary range:	**A**	**C**	**Z**
Upper limit	120	120	120
Lower limit	30	32	38
Measurement range			
Upper limit	137	137	137
Crest factor 3:	130	130	130
Crest factor 5:	126	126	126
Crest factor 10:	120	120	120
Lower limit :	24	26	32

C-250 + PA-14

Primary range:	**A**	**C**	**Z**
Upper limit	120	120	120
Lower limit	28	28	34
Measurement range			
Upper limit	137	137	137
Crest factor 3:	130	130	130
Crest factor 5:	126	126	126
Crest factor 10:	120	120	120
Lower limit :	22	23	29

L_{peak}
Indicator limits: 0 – 160 dB

ELECTRICAL NOISE

C-130 + PA-13

Electrical noise:	**A**	**C**	**Z**
	13.4	15.8	20.0
Total noise (elec. + thermal of microphone)	17.6	19.0	22.0

C-250 + PA-14

Electrical noise:	**A**	**C**	**Z**
	9.4	10.5	16.3
Total Noise (elec. + thermal of microphone)	15.7	15.1	18.8

FREQUENCY WEIGHTING

Complies with the EN 60651 type 1 standard
Weightings A, C and Z

AC OUTPUT

Frequency weighting: linear
Sensitivity to 137 dB and 1 kHz (Gain = 0dB): 6.5 Vrms (max)
Upper limit: 8.1 Vrms (typical)
Output impedance: 100 Ω
Gain: 0 and 40 ± 0.2 dB

MEMORY

64 Mbytes

MICROPHONE

Model: CESVA C-130
Condenser microphone ½ ''
Polarized: 200 V
Nominal capacity: 22.5 pF
Nominal sensitivity: 17.5 mV/Pa in reference conditions.
Preamplifier: PA-13

Model: CESVA C-250
Condenser microphone ½ ''
Polarized: 0 V
Nominal capacity: 17.0 pF
Nominal sensitivity: 46.4 mV/Pa in reference conditions.
Preamplifier: PA-14

TIME WEIGHTING

L_F, L_S, L_I according to class 1 tolerances

PARAMETERS

See previous table| Resolution: 0.1dB

OCTAVE FILTERS

Type 1 according to IEC 61260:95/ A1:01
Nominal octave bands central freq.: 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000, 16000 Hz

THIRD OCTAVE FILTERS

Type 1 according to IEC 61260:95/ A1:01
Nominal third octave bands central freq.: 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000 Hz

INFLUENCE OF HUMIDITY

Operation range: 30 to 90 %
Maximum error at 30%<R.H.<90%, 40 ºC and 1 kHz: 0.5 dB
Storage without batteries: < 93 %

I EFFECTS OF MAGNETIC FIELDS

In an 80 A/m magnetic field (1 oersted) at 50 Hz, all gives a reading of less than 25 dB(A) is given.

INFLUENCE OF TEMPERATURE

Operation range: -10 to +50ºC
Maximum error (-10 to +50ºC): 0.5 dB
Storage without batteries: -20 to +60ºC

EFFECTS OF VIBRATIONS

For frequencies between 20 and 1000 Hz and 1 m/s^2: <75 dB(A)

BATTERY

Battery: 2 batteries 1.5 V size AA:
Battery life with continuous use:
Sound Level Meter mode : 15 h
Spectrum Analyzer mode 1/1: 13 h
Spectrum Analyzer mode 1/3: 11.5 h
Mains feeder: AM240 (EU) or AM241(USA)

DIMENSIONS and WEIGHT

Dimensions:
341 x 82 x 19 mm

Weight: with battery 550 g
without battery 500 g

CESVA *instruments, s.l.*
reserves the right to change specifications and accessories without notice.

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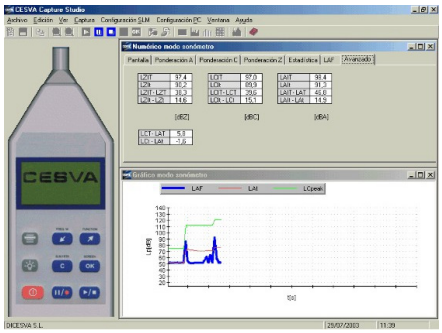
Software Windows® 9x/Me/2000/NT/XP
CAPTURE Studio for SC310

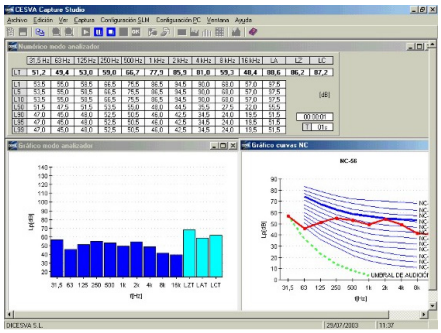
The **SC310** is supplied with the software application CAPTURE Studio that allows you to:

- Configure the SC310 with only one key stroke
- Retrieve data from the SC310 in real time.
- Download registers from the SC310 memory to a PC.
- Configure the SC310 memory.
- Display graphically and numerically the data files and convert them into different formats (.txt, .xls, .mdb)
- System of encrypted file. The files are saved in a *.ccf own format and cannot be changed. This guarantees the total integrity of the data.

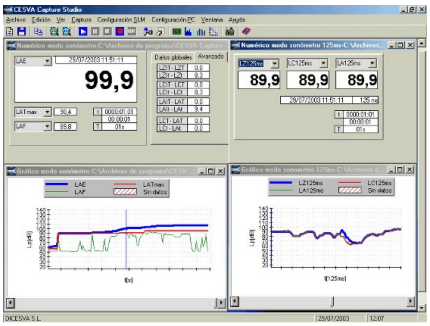
CAPTURE Studio provides you with a convenient, easy-to-use environment for obtaining, in digital format, data acquired by the SC310.



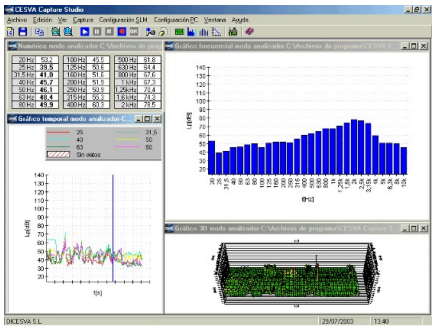
Real time data acquisition, S.L.M. mode



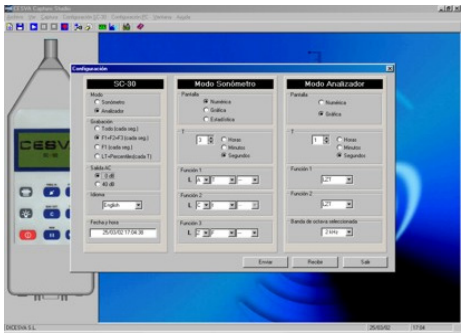
Room Noise Evaluation (NC curves))



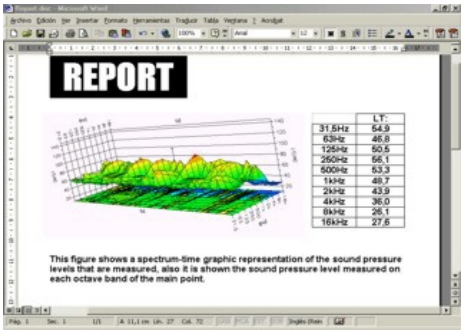
Graphical display of data 1s and 125ms



Graphical display of data (1/3 oct.)



SC310 configuration



Data exportation to other applications

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