

## Class1 Sound Level Meter with 1/3 OCT Band Analyzer

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# **ST-15D**

- IEC-61672-2002 Class 1
- 1/3 octave band filter
- 10 Hz...20 kHz frequency range

- 20 dB...142 dB measurement range
- Modularize design provides 4 sub models

## Meter vs. Analyzer

A sound level meter is a device that allows you to determine the acoustic intensity and to measure the sound pressure level, but does not necessarily determine levels of sound in relation to tolerance of the human ear. Scarlet Tech ScarletSound<sup>™</sup> sound level meters are suitable for professional application, including measurement of sound at work and environmental sound measurement.

Sounds analyzers provide octave bands analysis to help Safety Manger identify exactly noise sources easily by looking into the most relevant frequency components. The frequency domain information is based on DSP technology. ScarletSound™ ST-15D is the one you need.

## Octave analysis

- Real time & 1/3 octave spectral analysis of noise
- Parallel A/C/Z weighting
- Analysis is realized by digital filter (G = 2)
- Noise exposure measurement range 0...65.535 Pa2h

## **Modularization**

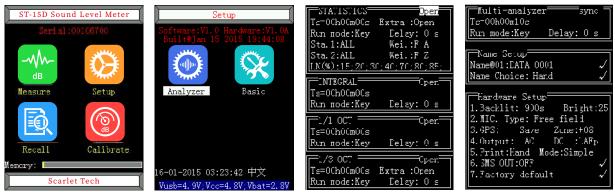
ST-15D series is designed by dividing major functions into modules. By installing different modules, ScarletSound™ provides experts the most flexibility to choose the functions they really need.

- 1/3 octave band module
- Statistic analysis module
- Data logger module



# **Main Function List**

#### Menu Interface



#### 2. Statistical Analysis Function

1) Main Function: The statistical analysis, 24 hours noise monitor automatically.

2) Mainly Measure Index:  $L_{xyp'}$   $L_{xeq,0.5s'}$   $L_{xeq,T'}$   $L_{xymax}$ ,  $L_{xymin'}$ ,  $L_{xyeqT}$ , SEL, Ln as minimum: 1, 5, 10, 50, 90 with 0.1 dB resolution, SD

Note: x is A,C,Z y is F,S,I n is 1~99

24h measures index:  $L_{d}$ ,  $L_{n}$ ,  $L_{dn}$ .

3) Up to 28 statistical Ln % values, two statistical analyzers each has 7 preset to L1, L5, L10, L50, L90, L95 & L99 and 7 user defined Ln values. Two statistical analyzers with independent time and frequency weight.

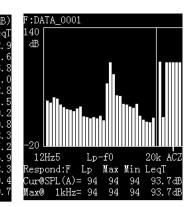
F:DATA_0001 Sta.1: A F	F:DATA_0001 Sta.1: A F
L 1 = 83.0 dB	Linst= 82.1dB
L15 = 82.8 dB	Leq, T= 82.2dB
L20 = 82.8 dB	-/
L30 = 82.8 dB	Lmax = 83.0 dB
L40 = 82.4 dB	L10 = 83.0 dB
L70 = 81.8 dB	20 00.0
L80 = 81.4 dB	L50 = 82.2 dB
L85 = 81.4 dB	L90 = $81.4$ dB
L99 = 81.3 dB	

### 3. Real-time 1/3 OCT Spectrum Function

1) Filter type: Parallel (simultaneous) 1/3 octave band filter,  $G_{10}$ =10<sup>3/10</sup>

- 2) Fulfills standards: IEC 61260: 1995 Class 1
- 3) Frequency bands: 33 Octave bands 12.5Hz-20kHz
- 4) Real-time Analysis Speed: 50 times/s
- 5) Measuring Interface: List interface and graph interface
- 6) Measuring Parameters:  $L_{xyp},\,L_{xeq,0.5s},\,L_{xeq,T'}$  ,  $L_{xymax},\,L_{xymin},\,Tm$
- 7) Frequency Weighting: A, C, Z can

F:DATA_	0001			(d
Respond	:F Lp	Max	Min	Le
SPL(Z)	93.3	94.0	88.5	92
SPL(C)	92.0	92.7	87.2	91
SPL (A)	64.1	64.8	59.4	63
20kHz	31.0	31.4	30.4	31
16kHz	42.9	43.3	40.9	42
12k5Hz	51.7	52.0	49.6	51
10kHz	29.5	29.7	28.3	29
8kHz	30.1	30.6	28.4	29
6k3Hz	28.3	29.0	27.5	28
5kHz	27.0	28.0	26.1	27
4kHz	27.0	28.0	25.3	26
3k15Hz	28.9	29.8	25.9	28
2k5Hz	29.6	30.7	26.4	29
2kHz	31.5	32.8	27.3	30



Note: x is A,C,Z,B,D, F0i y is F,S

20 27

29

16kH-2k510

	F1c3H+	39-1	36.9	36.2	37.3	38 14B
15	51.11:	42.0	39 9	41. :	40.0	<1.01D
05000375	41։н-	44 9	42 R	44 N	43 3	43-94B
OlCOnOOs WeilZ	G1.151[.:	47.7	<5 G	40.9	45.0	40.01B
ori al 112345678	S145H+	51.7	48.7	49.9	43.7	49.84B
) DC (9 57.57 Lx- 30 91I	2131:	53.7	51 7	52.9	52.3	52.01B
	1k6H+	53.6	54.6	55 8	55.5	55 74B
n L3na. 13nin Ley,T	112516	59.5	57 7	56.0	53.3	50.71D
5 131 9 131 9 191 9 <del>1</del> 8	1	62 B	60 B	61.8	61.3	F1 74B
2 110.6 115.5 116.5 IB	0001[:	65.5	63 6	64.0	64.5	(4.G1D
2 82 3 82 1 82 2 HB	£30H+	63.4	66 7	67.8	67 3	67 74B
7 99.7 93.5 99.01D	2001[1	71.4	69 7	70.7	70.5	70.61B
6 102 0 102 9 103 0 łB	4008-	74 4	<sup>-</sup> 2 7	72 5	73 5	73 6 IB
7 01.: 01.1 (1.11D	C15H:	77.2	<b>5</b> 0	70.6	75.5	76.61B
N 124 5 124 4 194 5 B	2508+	81.3	<b>5</b> 8 8	79 5	79.5	79 6 IB
7 20.0 27.7 27.91B	2001[:	03.2	01 9	02. 1	02.5	(2.61D
7 29 0 23 7 28 84B	1608-	85.3	85.2	85 ß	85-7	85 7 iB
5 30.7 30.5 00.610	12516	00.0	07 7	OC. 3	63.2	(0.31B
8 32 1 32 3 32 94B	1008-	93 N	92.2	92-6	92.5	92 6 IB
3 05.6 05.3 (5.41B	G01[±	94.5	94 O	94.0	94.2	94.31B

#### 4. GPS Positioning Function

Measure longitude, latitude, altitude, movement speed which can be recorded together with the noise measu rement result.

F:DATA_0001 Zonc:108						
GPS R1	GPS RTC: 2015-C1-26 080002.00					
		Start	E	nd		
Lat.	30.2	17349N	30.21	7343N		
Lon.	119.	958456E	11.9, 99	58458E		
Alt.	6.3	m	7.1	m		
Dista Dir.: Cali.@			: 0.39	Mum=07 ∂3 km/h :52:01		

# Optional Upgrade Function List

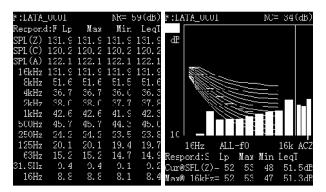
#### **Integrating Function**

Measuring Interface: Lxyi, Lxyp, Lxeq,t, Lxeq,T, Lxmax, Lxmin, Lxpeak LAE, LC-A, SEL Note: x is A,C,Z, y is F,S,I
Integrating time: 1s~99h59m59s, set in random

3) Measuring Interface: Simple, List, Huge, Big interface

#### Real-time 1/1 Oct Spectrum Function

- 1) Filter type: Parallel octave band filter, G10=103/10
- 2) Fulfills standards: IEC 61260: 1995 Class 1
- 3) Frequency bands: 11 Octave bands 16Hz-16kHz
- 4) Frequency Weighting: A, C, Z can be chosen
- 5) Center Frequency: 16 Hz, 31.5 Hz, 63 Hz,125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz
- 6) Measuring Interface: List i and graph interface
- 7) Measuring Parameters: Lxyp, Lxeq,0.5s, Lxeq,T, , Lxymax, Lxymin, Tm, NR Note: x is A,C, Z,F0i y is F,S
- 8) Display content: Real-time display NR & NC values and curves in the process of measuring NR according to ISO 1996:1971 NC according to ANSI S2.12-2008
- 9) Real-time Analysis Speed: 50 times/s
- 10) Level linear range: above 110dB



### **Real-time FFT Analysis Function**

- 1) Line Number: 2048lines
- 2) Sampling Freq: 48 kHz, 24 kHz, 12 kHz, 6 kHz, 3 kHz
- 3) Measuring Parameters: MAX, MIN, LeqT
- 4) Window Functions: hanning, brinell, flat, rectangular

F:DATA_0	001		F	s=48kHz	F:DATA_0001	Fs=48kH
Win:RECT	LFp	Max	Min	LeqT01	140	
Total:	94.9	94.9	94.9	94.9dB	dB	
23. 4Hz	54.8	55.0	52.9	54.1dB		
46.9Hz	54.8	55.1	53.0	54.1dB		
70. 3Hz	54.8	55.1	53.0	54.2dB		
93.8Hz	53.1	55.1	53.1	54.2dB		
117.2Hz	53.2	55.2	53.2	54.3dB		
140.6Hz	53.3	55.3	53.2	54.4dB		
164.1Hz	53.4	55.3	53.4	54.5dB		
187.5Hz	53.5	55.4	53.5	54.6dB		
210.9Hz	53.7	55.5	53.6	54.7dB		
234.4Hz	53.8	55.7	53.8	54.8dB	-20	
257.8Hz	54.0	55.8	54.0	55.04B	0Hz ALL-f0	21000Hz
281.3Hz	54.2	55.9	54.2	55.1 dB		Max Min LegT
304. 7Hz	55.5	56.1	54.4	55.34B		-
328.1Hz	55.7	56.3	54.6	55.5dB		80 21 74 d
351.6Hz	55.9	56.5	54.9	55.7dB	Max@ 7992Hz= 70 1	30 70 124 d

#### SD Card & Sound Recording Function

1) The SD card can be used as a memory card after installing the program. Saved files can be opened in the EXCEL directly

2) When connected to the computer via USB interface, it

changes SD card into U disk

3) Record Format: 8000 samples/s@8bit,

48000 samples/s@32bit

- 4) File Format: 'WAV' including calibration information
- 5) Record Time: fs=48k, record time less than 1h per file

fs=8k, record time less than 12h per file

6) Replay: by the meter or computer Data is captured to the SD memory card inserted in the sound level meter

#### **Dosimeter Function**

- 1) Exchange rates: Q3, Q 4,Q 5,Q 6
- 2) Fulfills standard: IEC 61252: 2002
- 3) Selectable Thresholds: 40-90dB
- 4) Selectable Criterion: 70-90dB
- 5) Lock and with limited access
- 6) Noise dose: 0.01%-999.99%
- 7) Measuring Parameters: LAsp, LASMAX, LASMIN, TWA, LEX 8h, LCpeak, LZpeak, LAeq,T, LAVG, DOSE
- 8) Logging interval: 1min
- 9) Logging content: LAVG1m LAeq1m LCpeak LZpeak LASmax LASmin

#### **Technical Specification**

Fulfills Standards	IEC 61672 Class 1			
	IEC 61260 Class 1			
	IEC61252:2002			
	IEC 60651:2001 Type 1			
	IEC 60804: 2000 Type 1			
	ANSI S1.4: 1983 Type 1			
	ANSI S1.4A:1985 Type 1			
	ANSI S1.43:1997 Type 1			
	ANSI S1.25:1991			
Microphone	1/2" pre-polarized condenser microphone removable preamplifier			
+Preamplifier	(Sensitivity Level: -28dB)			
Correction Function	Diffusion field correction in order to comply with standards ANSI S1.4			
Frequency Range	$10 \text{ Hz} \sim 20 \text{ kHz} \pm 1 \text{ dB}$ (not including microphone)			
Total Measurement Range	20dB-142dB (145dB Peak)			
Accuracy	±0.7 dB			
Self-generated Noise	<12 dB(A), 17 dB(C), 22 dB(Z)			
Frequency Weighting	Parallel (simultaneous) A, C, Z, B, D and user1&2-defined weighting			
Time Weighting	Parallel (simultaneous) F, S, I, Peak			
A/D Bits:	24 bits			
Sampling Frequency	48 kHz			
Delay Time	The meter can delay 0~99s after pressing start measuring button			
Back Erase Function	Elimination of undesired noise; example barking dogs, cars, doors			
Display	240×320 color screen, adjustable brightness, backlight can be closed			
Display Resolution	0.1 dB			
Low battery indication	Symbol indicate low battery			
Data Storage	3328 groups of integrating measuring results only			
(32 Mb FLASH RAM.	3328 groups of statistical results only ('statistical 1' and 'statistical 2' analysis index are same.)			
SD memory card is optional)	2663 groups of statistical results only ('statistical 1' and 'statistical 2' analysis index are			
SD memory card is optional,	different.)			
Internal Clock	Error less than 1 min/month			
Output Interface	AC Output (full scale): 1.0V AC RMS; Output Impedance: 1k ; Connector: 3.5 mm stereo plug			
	DC Output: 20mV/dB; Output Impedance: 1k ; Connector: DB-9 plug			
	"RS232 Interface: To computer for output some measurement results instantaneous values ,			
	also to mini-printer for printing			
	Transmission speed: 4800, 9600,115200 bps			
	USB Interface: available and no need device drive			
	Allow USB to be controlled via communication commands			
Power Supply	4×LR6 alkaline battery or rechargeable batteries			
i offer coppey	5 V external power supply			
Battery Life	Longest time of 30 hours continuously with 4×LR6 alkaline battery			
Dimensions	260 (H) x 80 (W) x 30 (D) mm			
Weight	0.35 kg (include batteries)			
EMC	Type X			
Environment	Working Temperature: -10 ~ 50°C			
	Storing Temperature: -20 ~ 70°C			
	Relative Humidity: 25 ~ 90 %			
Bluetooth Module	Wireless printing and can communicate with smart phone and realize wireless control sound			
	level meter			
GPS	Included			
Printer	Optional			
Class 1 calibrator	Optional			
	Uptional			



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