MiniSonic MS10 - V2.8

MiniSonic - Precision Audio in Miniature

Firmware Upgrade   *(note that the PIC chip is copy protected)*   **July 2004**

MAJOR NEW FEATURES IN THIS AND RECENT VERSIONS

1   SWEEPS NOW PRODUCE A 64 POINT PLOT(was 32)
This gives greater precision, especially on loudspeaker plots which can give rapid peaks and dips.

2   SLOW SWEEPS NOW AVAILABLE (SEGs)
Ideal for steep cutoff filters, and for loudspeaker plots where room resonances take time to establish and decay

3   SEQUENCE RESULTS NOW STORED IN 16-BIT FORM
This allows results for noise and distortion to go very low, when previously there was a lower limit.

4   SELECTIVE TEXT ON RESULTS
Only the results that are valid are now shown. Note that some extra segments can be run after a sequence, such as the sweeps, slow sweep, headroom plot, or long noise plot, though these will replace any earlier graph. 'MasterSegments' n or m clear all results, ready for a fresh start, as well as normalising all subsequent results.

5   SEQUENCES NOW WORK WITH FSK   *(Introduced in V2.5)*
Test Segments now begin with different FSK (frequency shift keyed) characters which are decoded to control the logging of results as well as acting as the timing trigger. Any sequence that is played back from tape or received from a distant MS10 will be correctly responded to regardless of the segments received or the order of sending. Note that small characters rather than capitals are now used for segment designation, to distinguish MiniSonic segments from Lindos LA100 segments (which, with a few rare exceptions use capital letters). Although there is currently no compatibility between LA100 segments and MiniSonic segments, the possibility of some interworking on future units is not ruled out. The MiniSonic measures levels on both channels at once, permitting much faster sequences than for the LA100 which requires every segment to be sent twice.

5   SEQUENCE RESULTS ARE NOW NORMALISED (to L chan Test Level). (***Introduced in V2.5)***
Two five second 'Mastersegments' are now defined; SEGn and SEGm. Either of these first measures the level of a 1kHz tone at alignment level, and lists the result for each channel as 'Test Level Out'. Then it normalises, by saving the L channel as reference level and turning on relative reading, which is applied to all subsequent segments.   This ensures that meaningful results are obtained whatever the output level of the system under test. By setting the 'front-end gain' of the measuring set, it ensures that resolution is maintained even on low output systems (Walkmans, personal players, sound cards etc). Distortion segments measure relative distortion, in other words they measure the level of residue relative to the level of the tone being tested (-20, 0, +8dB etc). SEGn also measures WTD NOISE on both channels, relative to alignment level.

6   NEW 3-LEVEL DISTORTION RESIDUE SEGMENTS (SEGr Introduced in V2.5) (SEGq Introduced in V2.5)
These provide a most revealing test, which rapidly characterises a system in terms of both low and high level distortion. SEGr tests distortion at low level (-20dB relative to Alignment Level equivalent to -38dB FS on digital systems working to EBU recommended levels) as well as at AL and at AL+8dB (max broadcast studio level). SEGq adds three more levels to enable digital paths to be tested up to +18dBAL (EBU max level). The -20dB test can reveal crossover distortion on power amplifiers, and quantising distortion on digital systems.

7   NEW SEQUENCE ALLOCATIONS, with 11 sequences now available from key presses
See the attached sheet for full information on these.

SEGMENTS now avaliable in the MS10 are: ***(all can be run from Lin4Win *)***

Seg n	*1kHz 0dB - 2 secs*	*Mute - 3 secs*	*Test lev / Normalise / Noise (-72 to -40dB)*
Seg m	*1kHz 0dB - 2 secs*	*Mute - 3 secs (Optimised for Tape)*	*Test lev / Normalise / Noise (-62 to -30dB)*
Seg u	*20Hz - 20kHz sweep 5 secs 0dB*		*Sweep 0dB (for digital systems etc)*
Seg v	*20Hz - 20kHz sweep 5 secs -10dB*		*Sweep -10dB (for tape/FM broadcast)*
Seg s	*20Hz - 20kHz sweep 20 secs -10dB*		*Slow Sweep, for steep filters or speakers*
Seg r	*1kHz -20dB, 0dB, +8dB*	*Distortion Residue*	*Distortion test Within Broadcast limits*
Seg q	*1kHz 0dB, +12dB, +18dB*	*Distortion Residue*	*Distortion test to EBU max digital level*
Seg p	*Tone bursts 1, 1.5, 5, 10, 100ms (@+17.0,+9.0,+4.0,+2.0, 0.0dB)*		*'Inverse' Tone Burst Test for PPM (all should hit PPM4)*
Seg y	*Tone bursts 1, 1.5, 5, 10, 100ms*		*'Inverse' Tone Burst Test to ITU-468*
Seg i	*1kHz 0dB/-6dB alternating L chan*		*Channel Ident and line-up tone (1s repeat)*
Seg g	*1kHz -3dB with 1 notch L 2 notch R*		*BBC 'GLITS' line-up test*

Seg h	1kHz 0dB to +18dB in 2dB steps	'Headroom' test shows compression or clipping on tape etc
Seg l	Mute 20 secs	'Long Noise Plot (wtd noise vs time) (for clicks on PC cards etc)
Seg J	0dB 1kHz 2secs both then +8dB Lchan 1 sec then +8dB both, 1 sec	'Lindos Channel Ident and lineup' L chan rises first, with +8

8   TEST SEQUENCES on the INTERNET

Various Test Sequences are being made available as downloads at WWW.lindos.co.uk These have been carefully digitised at the correct stated Alignment Level. Simply connect your MS10 input to the sound card output of your computer, press SEQ, and then play the sequence and watch the MS10 respond automatically under FSK control. Within 15 seconds you will have a complete two-channel sound quality assessment of your computer ready to print out! Files can be transferred to MP3 Jukebox players or to CD to enable these devices to be tested similarly. We plan to let users put their results on the Lindos website and build up a comprehensive collection of test results for audio equipment.

OPERATIONAL DIFFERENCES -   to be read in conjuction with THE MANUAL

The original manual is now due for a major update, as improvements and additions made possible by the new firmware require it to be read in conjunction with the following:

1   *NORMALISING* now makes three repeat attempts, within 0.5 seconds, so that an accurate reference level is usually stored without a second press even at extremes of level. Normalising now takes precedence over range selection, so that the unit never refuses to normalise.

2   *RELATIVE DISTORTION READINGS* are now standard. Pressing DIST runs normalising for a fraction of a second to establish the signal level, before displaying the distortion residue in dB below this level. Because normalisation adjusts the gain of the unit to accomodate the input signal before nulling, this makes for reliable readings at all levels, without danger of overloading the input. Relative distortion is also a more common and more useful measure. Note that the LED flashes to indicate a relative value - just press 'dBu/REL' after making a measurement if you want the absolute value. The ability to measure relative distortion on low level signals is extremely useful. On 16-bit audio, for example, a distortion residue measurement at -20dB AL (relative to alignment level) will produce a result of only about -46db, and any defects will be easily shown up as a worse result.

3   *RELATIVE NOISE READINGS* are now obtained if Noise is pressed after pressing Dist, because normalisation is not cancelled. Watch out for the flashing LED that indicates relative reading. Pressing LEV does cancel normalising, or of course just pressing the REL key permits toggling between relative and absolute at all times.

4   *MUTE KEY TOGGLES ON AND OFF* and now works on all functions, so, for example, you can toggle the oscillator back on after selecting NOISE (to check operation of the filter for example).

5   *RANGE +10/-10dB* is available on the unit itself in LEV, NOISE, and DIST functions. In NOISE for example hold the noise key and press and release the < key to increase gain by 10dB from standard (reads down to -80dB). Similarly the > key decreases gain from the set value by 10dB (reads up to -30dB). This is independant of the normalising facility which still allows any reference level to be set using the PPM key. Note that in DIST mode it is necessary to hold down the DIST key until normalisation has finished before pressing the < or > keys. In all cases, pressing the LEV, NOISE or DIST key on its own again restores the standard range setting for that function. With this facility available, it is no longer useful for the unit to start up with a ref level default of +10dB, and the default is now 0dB which is less confusing when setting gain in PPM mode.

6   *CHANGE of OPTION NUMBERS* Crosstalk is now selected by pressing NOISE and key2 (was key 4). Frequency display on the unit is selected by pressing LEV and key3 (easy to remember as this key is marked FREQ. A fast PPM option is available by pressing PPM and key2, which maintains the slow decay of the standard PPM while reducing the integration (attack) time by a factor of around ten (to under 1ms). This option gives a dual display of the L channel only, with standard PPM dynamics on the shadowbar, which is useful for comparing the true peak value of uncompressed audio with the displayed PPM peak (a difference of 5 to 15dB will be seen on percussive sounds by just plugging in the Lindos miniature microphone and trying out various sounds.)

7   *BATTERY CHECK* is now displayed by pressing key3 and key4 together (reset), as well as briefly during startup. It no longer appears when Keys1 and 2 are pressed together.

8   *Check the WEB at lindos.co.uk for new 'Lin4Win' software (free download for Minisonic soon)*

MINOR CHANGES and KNOWN BUGS

1   *False sequence triggering*, which was a problem on noisy cassette without Dolby, is no longer a problem, but an occasional problem with sequences being cut short has been noticed, usually after a premature ending.   Ending a segment by pressing LEV in Lin4Win for example, can result in the next run being cut short, and the problem seems to arise from interaction between Lin4Win and the unit. Just let the false results come up and then try again.

2   *Octolin occasionally locks up after sitting idle.* Press Cntrl-Alt-Delete together, as usual, to exit and reload the program. Octolin can also confuse by restoring the unit to a frequency other than 1kHz if this has been left set. Just click 'reset'. Both problems are being worked on.
                    All feedback will be welcomed, as firmware development is ongoing - PJS

FULL SEQUENCE LIST and SEGMENT definitions

A sequence consists of four segments, each of which can be chosen from several alternatives, or can be a 'null' segment. The current sequence is defined in the SEGS register in the MS10. Nine sequences are predefined in the unit. SE0 runs by default at switch-on. SEQ1 - 4 are run by pressing KEY1 to KEY4 after pressing SEQ. SEQ5 - SEQ8 are run by holding down SEQ while pressing 1 - 4. A sequence can also be set up remotely by sending a series of SG commands. SG0, which clears the SEGS register should normally be sent first. Then a series of SGx commands should be sent, each one setting a single segment. The order of sending makes no difference, as the MS10 knows which of the four positions a segment belongs to. Segments not defined by an SGx command remain 'null' segments, nothing being sent for that position in the sequence. Sending the SQ command runs the sequence that was last set up, whether by pressing a key or by SGx commands. SEGn and SEGm are 'Mastersegs' which normalise all segments that follow and also determine the ranges used, SEGm providing for the higher levels of dist and noise on tape. Press SEQ on the unit, or in Lin4win at any time while a sequence is running to abort ready for a new selection. Hold SEQ and press NOISE for SEQ10. SEQ and PPM for SEQ12.

START	*Line-up tone - the default at switch-on*			*binary* 00000011
	segs2	g	'GLITS' line-up sequence	
SEQ1	*Sweep only*			*binary* 00000001
	segs1	null		
	segs2	u	Sweep 20-20kHz 0dB 5 secs	
	segs3	null		
	segs4	null		
SEQ2	*'Standard' test sequence - suitable for high perfomance systems*			*binary* 01010001
	segs1	n	Normalise, Test levels and Noise 'digital' range	
	segs2	u	Sweep 20-20kHz 0dB 5 secs	
	segs3	r	Distortion Residue @ -20, 0, +8dB 'digital' range	
	segs4	null		
SEQ3	*'Tape' test sequence - suitable for systems with high noise and dist*			*binary* 10010101
	segs1	m	Normalise, Test levels and Noise 'tape' range	
	segs2	v	Sweep 20-20kHz @ -10dB 5 secs	
	segs3	r	Distortion Residue @ -20, 0, +8dB 'tape' range	
	segs4	null		
SEQ4	*'Headroom' test segment*	*(can also be pressed to add onto existing results)*		*binary* 00001111
	segs1	null		
	segs2	h		
	segs3	null		
	segs4	null		
SEQ5	*Slow Sweep only*	*(can also be pressed to add onto existing results)*		*binary* 00000010
	segs1	null		
	segs2	s	Slow sweep 20 - 20kHz 20 secs	
	segs3	null		
	segs4	null		
SEQ6	*'Digital' test sequence with +18dB test - suitable for high perfomance systems*			*binary* 01011001
	segs1	n	Normalise, Test levels and Noise 'digital' range	
	segs2	u	Sweep 20-20kHz 0dB 5 secs	
	segs3	r	Distortion Residue @ -20, 0, +8dB 'digital' range	
	segs4	q	Distortion Residue @ +12, +15, +18dB 'digital' range	
SEQ7	*Lindos line-up and channe ident*			*binary* 11000000
	segs1	j	Lindos line-up 0dB both, 0dB both, +8dB/0dB, +8dB/+8dB - 4 secs	
	segs2	null		
	segs3	null		
	segs4	null		
SEQ8	*'GLITS' line-up, phase and channel test (BBC)*			*binary* 00000011
	segs1	null		
	segs2	g	'Glits' 4 secs 1kHz @ -3dB one notch in L two notches in R (3 mono)	
	segs3	null		
	segs4	null		
SEQ8	*'GLITS' line-up, phase and channel test (BBC)*			
SEQ10	*LONG NOISE PLOT - suitable for checking computer sound cards for occasional clicks*			
	seg l		20 sec plot of ITU468 wtd NOISE versus time over 20 secs	
SEQ12	seg p		PPM type II 0dB - Inverse Tone Bursts 0dB	