

MiniSonic MS10 - V2.4

Firmware Upgrade

(note that the PIC chip is copy protected)

May 2004

MAJOR NEW FEATURES IN THIS VERSION:

1 SEQUENCES NOW WORK WITH FSK segs u,v,r,o,n,p available

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.

2 NEW 3-LEVEL DISTORTION RESIDUE SEGMENT

This is a most revealing test, which rapidly characterises a system in terms of both low and high level distortion. On digital systems and power amplifiers it critically tests distortion at low level (-20dB relative to Alignment Level equivalent to -38dB FS on digital systems working to EBU recommended levels). A Segment to test up to +18dB is planned.

SEQUENCES now available on the MS10:

SEQ1	<i>runs segment u</i>	<i>Sweep Only - 5 secs</i>
SEQ2	<i>runs segments n,u,r</i>	<i>Standard 'Digital' Test Seq - 15 secs</i>
SEQ3	<i>runs segments m,v,o</i>	<i>'Tape' Test Seq - 15 secs</i>
SEQ4	<i>runs segment p</i>	<i>PPM tone burst test</i>

SEGMENTS now available in the MS10 are:

*(all can be run from Lin4Win *)*

<i>Seg n</i>	<i>1kHz 0dB - 2 secs</i>	<i>Mute - 3 secs</i>	<i>Test lev / Normalise / Noise (-72 to -40dB)</i>
<i>Seg m</i>	<i>1kHz 0dB - 2 secs</i>	<i>Mute - 3 secs</i>	<i>Test lev / Normalise / Noise (-62 to -30dB)</i>
<i>Seg u</i>	<i>20Hz - 20kHz sweep 5 secs</i>	<i>0dB</i>	<i>Sweep 0dB (for digital systems etc)</i>
<i>Seg v</i>	<i>20Hz - 20kHz sweep 5 secs</i>	<i>-10dB</i>	<i>Sweep -10dB (for tape/FM broadcast)</i>
<i>Seg r</i>	<i>1kHz -20dB, 0dB, +8dB</i>	<i>Distortion Residue (-72 to -40dB)</i>	
<i>Seg o</i>	<i>1kHz -20dB, 0dB, +8dB</i>	<i>Distortion Residue (-52 to -20dB for tape)</i>	
<i>Seg p</i>	<i>Tone bursts 1, 1.5, 5, 10, 100ms (@+17.0,+9.0,+4.0,+2.0, 0.0dB)</i>		<i>'Inverse' Tone Burst Test for PPM (all should hit PPM4)</i>
<i>Seg y</i>	<i>Tone bursts 1, 1.5, 5, 10, 100ms</i>		<i>'Inverse' Tone Burst Test to ITU-468</i>
<i>Seg i</i>	<i>1kHz 0dB/-6dB alternating L chan</i>		<i>Channel Ident and line-up tone (1s repeat)</i>

Seq2 has been optimised for Digital and most other purposes, while Seq3 uses range settings to suit the higher levels of distortion and noise encountered on analogue cassette and open reel tape. It also runs the sweep at -10dB, necessary to avoid the high-frequency saturation and 'bias beats' encountered with analogue tape. * Note that only four segments can be run together, with certain combinations possible, eg only one sweep.

3 SEQUENCE RESULTS ARE NOW NORMALISED (to L chan Test Level).

This is achieved by including Segment n (or m) which first measures the level of a 1kHz 0dB tone on both channels to save as the Test Level result, before normalising to the L channel and going on to measure noise. Whenever Seg n or m is included in a sequence, normalisation is maintained throughout the Sequence so that all other segments read relative to Test Level (L chan). This ensures that high resolution is maintained on all results even on low output systems (Walkmans, personal players 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).

4 TEST SEQUENCES on the INTERNET

Various Test Sequences are now 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.

OPERATIONAL DIFFERENCES - to be read in conjunction 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 accommodate 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 independent 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 **Lin4Win SUPPORT SOFTWARE** (formerly 'Octolin') now works reliably under all conditions, and earlier comments regarding limitations on autoranging, normalising and settling can now be ignored. Autoranging is fast and free from hunting, and normalising works rapidly down to very low levels. Sequence setup from Lin4Win now works, though this does not work in the earlier 'OctoLin' software. Clicking RUN in OctoLin will run the sequence currently stored in the unit, (which may be chan ident tones) so just press SEQ and key1 to key3 to set up a sequence on the unit before clicking RUN.

MINOR CHANGES and KNOWN BUGS

- 1 **Sequence Results Text is Fixed Format** Although correct when the main sequence is run (by pressing SEQ and then key2) some of the text is not appropriate when running the Tape Test Sequence (SEQ and key3) in that it should really show segments v,o,m and indicate that the sweep was run at -10dB. Actual results are of course correct, though it should also be noted that results are overwritten and not cleared, so if just a sweep is run, the previous results for noise and distortion will remain showing (until power-down). No indication of 'over' or 'under' is given, so it is necessary to be aware of the measurement limits of the noise and distortion segments (if in doubt, do a manual test to confirm readings). It is hoped that future versions will selectively display appropriate text according to segments received.
- 2 **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.
- 3 **Octolin occasionally crashes.** 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'.

All feedback will be welcomed, as firmware development is ongoing - PJS