# NTI MR-PRO Minirator

***Terry Nelson MIBS reviews the latest version of the NTI Minirator test signal generator.***


The MR-PRO is the latest version of NTI's clever analogue signal generator aimed at professional applications for testing and aligning analogue equipment. It looks similar to the less expensive MR2, but offers considerably more functionality. The MR-PRO is a nice, chunky piece of equipment that sits comfortably in the palm of the hand and is supplied with a plastic rubber shock jacket and hand strap. The unit is powered by three AA-sized batteries that fit into an easily accessible battery compartment, and for those situations where *in situ* operation is required, an optional mains power supply is available; the manufacturer's model is recommended for maximum efficiency and isolation.

The top face of the MR-PRO generator features a large LCD screen plus a control area consisting of a sizeable rotary wheel (with central Enter button) for navigation, flanked by two pushbuttons on either side (Esc and Level to the left, with Wave and Freq to the right). Three more pushbuttons arranged in an arc below switch sensitivity, power and mute the output. Turning the wheel clockwise scrolls through the menu screens from top to bottom and left to right, and *vice versa.*

Connections to the MR-PRO consist of outputs on XLR-3M and RCA connectors at the bottom, with a USB connector on the left side and the DC power socket on the right. An XLR-3F at the front of the case is provided for cable testing.

## Generation

The Minirator is more than just a signal generator providing a very useful range of reference signals for testing and troubleshooting audio systems. It also serves as a test instrument, with functions for testing cables, phantom power and impedance. The output connectors provide what NTI call 'True Level' balanced signals, where the output corresponds to the set source voltage over a wide range of loads.

The unit is switched on via the On/Off button, and once the unit is powered up a short press on this button will toggle the display backlighting. Most of the time the unlit display will be clear enough to read under ambient lighting, and this will conserve the batteries, of course. A low battery condition is indicated by a battery icon appearing at the top right of the LCD display.

The screen display is clearly laid out and informative and is divided into three sections: the menu bar, the test signals, and the measurement values. The menu bar is divided in two with the left side selecting the signal generator, cable tester and system functions, while the right side sets the configuration and provides access to ten memory locations for storing or recalling user-settings.

With the Generator mode selected, pressing the Wave button brings up a sub-menu with eight test signals – more on that in a moment. The Cable Test mode puts the MR-PRO into measurement mode, while the System mode calls up the settings for the power save and backlight functions, as well as displaying the current firmware version and unit serial number.

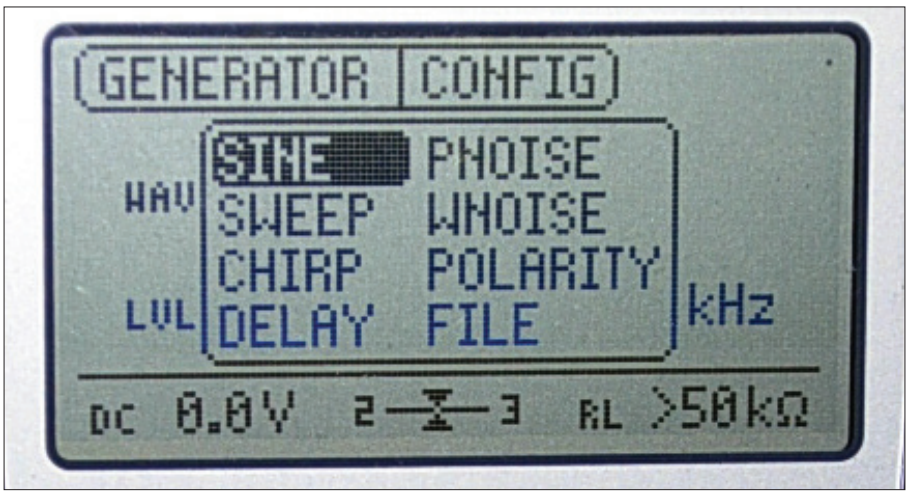
**"The Minirator is more than just a signal generator"**

The test signal window features 'lvl' (for output level) and 'f' (frequency) readouts. These are selected either via the navigation wheel or directly via the Level and Freq buttons, which then highlight the chosen parameter. The values are set by turning the rotary wheel. The Sens (sensitivity) button displays the increments available which can be selected by turning the rotary wheel while holding down the Sens button. The increments vary with different test signals, and taking the first test signal (sine wave) as an example the frequency can be varied in third, sixth or twelfth octave steps or in 1Hz increments. Personally, I find the term 'sensitivity' a misnomer here; 'resolution' would be clearer.

The sine wave signal output can be adjusted over a wide range of static levels and frequencies, while the sweep mode provides a stepped frequency sequence spanning a selectable range with a resolution of up to 1/12$^{th}$ octave. The frequency start/end points can be adjusted between 10Hz and 20kHz, and the duration of each step can also be set between 0.5 and five seconds. Sweeps may be once-only or continuous, with the time of the trigger between sweeps also being adjustable up to ten seconds. The sweep tone starts with a 1kHz signal that then drops to the starting frequency of the sweep, and ends with a drop back to the starting frequency.

The Chirp function provides a continuously variable signal used for frequency response measurements, impulse responses and the acoustic assessment of rooms. Linear and logarithmic options are provided and the frequency and timing parameters are fully adjustable. A variation of the Chirp signal is the Delay Test mode which is intended for use with NTI's 'Acoustilyzer' measurement unit, and allows delay times to be measured.

The Pink Noise function provides noise with a 20kHz bandwidth which can be switched to run continuously or




intermittently (with adjustable cycle times). A White Noise function is also provided for use with FFT measurements. The Polarity test signal is a sawtooth waveform for checking the polarity of equipment and loudspeakers in conjunction with the 'Minilyzer' or 'Acoustilyzer' devices.

Unusually, there is also a File mode which allows the user to select test sequences in Wave file format. NTI provides a selection of demo files including messages and musical excerpts, and these can be replaced via the USB link to a computer. The MR-PRO's memory capacity is 32MB. Various alternative files are available on the NTI website, one of the most useful being pink noise in separate third octave bands.

## Measuring

In Sinewave mode, the MR-PRO will also measure input impedances and the balance (or imbalance! ) within a system. I tested the three microphone inputs on my DJ mixer that I use at home and found to my great surprise that these are unbalanced! This is a pitfall that is more common than one thinks; an XLR connector doesn't always mean 'balanced'. The display at the bottom of the screen shows the balance situation between pins 2 and 3 both graphically and numerically. Operationally, a minimum signal level is required for this function and I found that -10dBu was about as low as you would want to go. This facility is excellent for testing for faults such as short circuits, defective cabling and continuity in presumed balanced systems.

The same screen also shows the phantom power voltage (or DC 0.0V when no phantom power is present). Connecting the MD-PRO to an input with phantom power, the DC voltage is displayed, and if there are unequal voltages on each pin the DC icon will blink. Selecting the icon with the Enter button will show the faulty voltage source.

Most of us have cable testers but NTI takes this one step further, the test being based on impedance measurements with dissimilar load impedances to ground from each leg (1k ohm for pin 2 and 2k ohm for pin 3.) This arrangement enables the unit to work out the nature of any faulty cable. To test cables, you select Cable Test from the menu and plug the cable under investigation into the XLR sockets on the unit. If the cable is open circuit the screen displays 'No XLR Cable.' If the cable is defective in some way the screen displays 'Defective' and indicates the impedances present on pins 2 and 3 for easy identification. If the cable is good, the screen displays 'OK XLR connected 1:1.' Testing loose cables is no problem but what about long and/or installed systems? The answer here is to get the optional 'Cable Test Plug' from NTI and plug it in at the far end of the cable under test. Works a treat!

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The USB connection provides an easy way to get firmware updates for the MR-PRO and to load and unload Wave files (mono and stereo). However, it only works on Microsoft operating systems (Windows 2000 and later).

## Conclusion

The NTI Minirator MR-PRO proved itself extremely useful in the field, and a detailed investigation has shown that it has a lot of possibilities. On that basis, I would recommend it as a 'must have' item for your test kit. Used in conjunction with the other NTI instruments, the scope for measurement widens considerably, but as a stand-alone unit it remains a vital ingredient. Highly recommended.

*ibs*


**NTI MR-PRO**
Price: £246.94

Cable Test Plug: £19.59

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