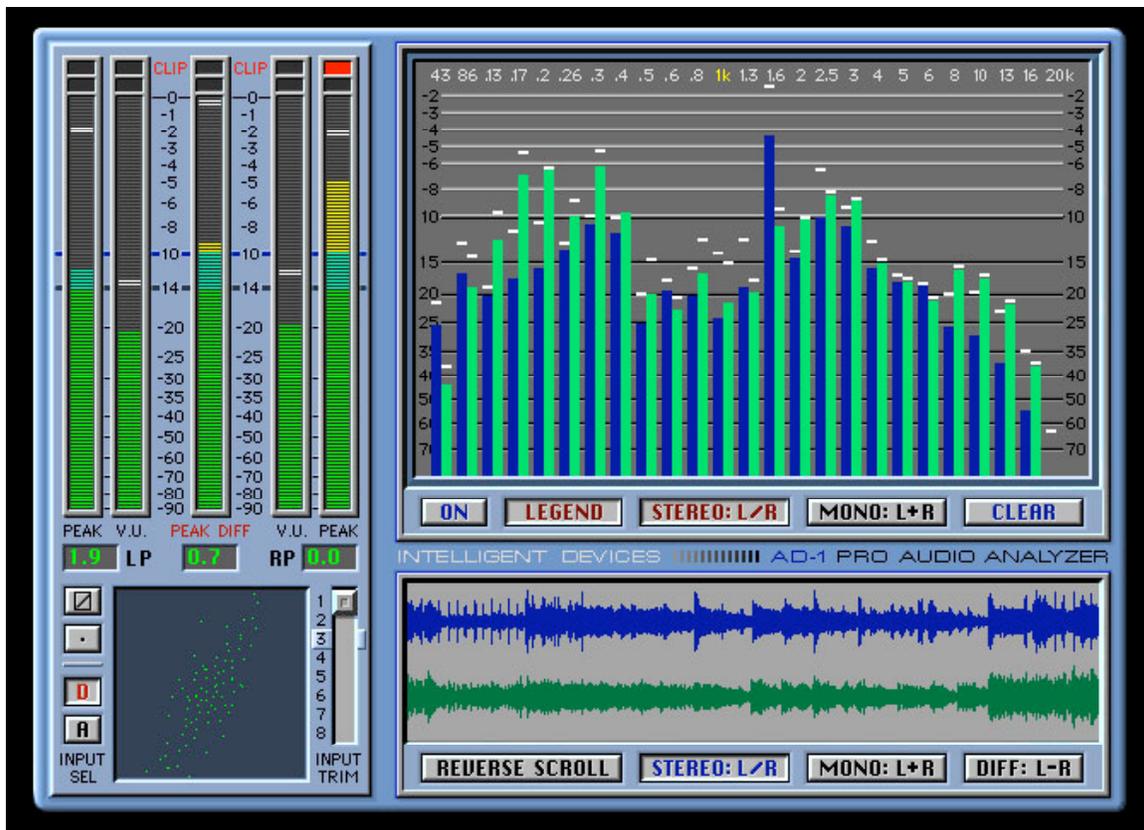


Intelligent Devices Pro Audio Analyzer

Intelligent Devices is now shipping the TDM version of its ultimate real time analogue/digital audio monitoring display system - the AD-1 Pro Audio Analyzer. Consisting of four real time modules - a Supermeter, Spectral Display, Phase Scope, and Waveform Monitor - the primary purpose of the Pro Audio Analyzer is to provide precise simultaneous stereo peak and average metering, clip indication, headroom margin indication, L/R sum and difference ratios, real time spectral analysis, phase metering, and waveform history display; assuring a perfect final digital master or CD. The AD-1 replaces over \$6000 worth of hardware, and provides simplicity, accuracy and functionality unavailable elsewhere at any cost. Applications include analogue and digital DAW mixing, mastering, radio broadcast, diagnostics, calibration, and even education.



INTELLIGENT DEVICES introduces the new AD-1 PRO AUDIO ANALYZER; the ultimate on-screen audio monitoring tool. The AD-1 runs on Digidesign® Audiomedia cards, as a TDM plugin, and requires no additional hardware when running on a PowerPC Macintosh.

For further information,
contact Stephen St.Croix at (410) 744-3044 • FAX (410) 788-6370 • AOL: IntDevices

The new AD-1 TDM plug-in allows the user to break apart the various modules, allowing display of only the desired functions. This provides a choice of the full function display array, or sub-displays, thereby minimizing screen space used for metering. New data management routines produce a smooth, fast, real time display that is truly unprecedented in TDM plug-ins. The AD-1's five 240 element

meters will show every peak, even if only one sample long. They feature stereo peak and average levels with centre, sum or difference, floating peak bars, clip indicators, and remaining headroom displays. The spectrum analyzer is the world's only true stereo realtime audio analyzer. It uses two 1024 point Fourier engines, with a unique 74 dB digital peak log display. The phase scope shows actual stereo imaging depth and L/R discorrelation. Ten presets store 24 separate user adjustable parameters, such as meter display emulations, meter and spectral ballistics, and special audio output functions.

Although Intelligent Devices, Inc. was initially formed to provide DSP solutions for scientific applications, the company has now started to develop digital audio products for Macintosh and Pro Tools systems. It turns out that most of the staff have solid backgrounds in Pro Audio, and they are now busy at work developing a whole suite of digital audio products, with the AD-1 Pro Audio Analyzer as their first offering. "The AD-1 is the first of our series of special purpose audio programs and real world tools", says Intelligent Devices president and graphics interface designer Stephen St.Croix. "We need something that shows us exactly what our DAWs are producing. You can't guess anymore with digital audio." The AD-1 is actually available as a TDM plug-in, as a stand-alone application on AudioMedia II, Sound Tools II (Sound Accelerator), and non-TDM Pro Tools cards, and runs with no hardware on any Power PC Macintosh, using the on-board 16 bit I/O ports or the new third party digital I/O nubus and PCI cards.

Stephen St Croix explained: "The Analyzer shows you exactly what you are going to send to your CD or DAT from your final mix. It is much more accurate than anything 'out there' - including Apogee MasterTools. The meters show you truly what is going on- down to a single clip in a single sample. Nothing else will show you this. So, for instance, we will disagree with the meters on a Panasonic 3700 DAT or a Sony 1630. DAT players typically need between 6 and 14 consecutive full-scale samples, (a word of all F's), before the clipping light shows. For instance, if you put a 12 kHz sine into a DAT and push the level up to clipping the meters will not display any clipping - as there are never going to be enough consecutive clipped samples at this high frequency! The original concept with digital equipment was to set up the metering to be similar to metering used on analogue gear, so the design engineers arbitrarily decided to choose how many clips to ignore before displaying clipped signals. So, for instance, some guy just decides he cannot hear less than ten clipped samples in a row and sets up the metering accordingly. Today we have equipment which will deal with these situations - such as the Waves L1 Ultramaximiser which is such a fast and precise compressor/limiter that it lets you fix even these single sample clips. So that is what you should ideally be using! Version 2.0 of our Analyzer has a choice of peak or averaging spectral analysis and you get more data on screen without loss of resolution at the amplitude peaks - which is where it matters. The resolution is one tenth of a dB which is what a logarithmic analyser offers. With a linear analyser, you would get maybe 30 dB on screen whereas we have 70 dB, so we can show you the low level info without the peaks going off the top of the screen. There are several parameters you can set to configure the meters for different applications and you can easily set up custom configurations including

the meter speeds, the release speeds and the screen configuration and then call these up at the stroke of a key. The phase meters are also good for looking at drum mixes to check if you have a good stereo spread and for looking at reverb to make sure that the information is not imaged in a way which would muddy up the vocal. The display should show the vocal as a clump in the middle with the reverb showing as miscellaneous patterns on either side of the middle. You can listen to the original vocal plus the reverb and you will be able to see what is going on this way, as well as hear the result. You can even check the whole mix in this way rather than just the vocal and reverb returns."

Conclusion

There is some similarity of functionality between the Intelligent Devices software and Apogee's MasterTools, but there are several differences which mean that professional users will probably want to have both of these available.

MasterTools is only available for TDM systems, for instance, while the Pro Audio Analyzer works on a much wider range of platforms. I believe that the metering is more accurate on the Pro Audio Analyzer and I found it very useful to have an oscilloscope-type display for phase. On the other hand, MasterTools has other neat features, such as the DC Offset removal, and also lets you log digital 'Overs' against timecode so you can accurately identify where the trouble spots are in your mixes - before remixing to correct these. Whether they own MasterTools or not, I believe that professional users of Digidesign systems will find the Pro Audio Analyzer simply indispensable!

The Oscilloscope Phase Display

An oscilloscope is an analogue audio test instrument with a cathode ray tube display. Normally it is used to display waveforms, but it can be configured to view two input signals simultaneously by displaying one via the horizontal input and one via the vertical input. The patterns which you can then observe on the display are known as Lissajous figures - after the scientist who first observed these. These Lissajous figures can be used to monitor phase and coherency information of stereo analogue audio signals.

If a sine wave is applied to the scope's Y-axis input you will see a vertical line, while if you apply this signal to the X-axis you will see a horizontal line. In both cases, the length of the line is an indication of the amplitude of the applied signal. If the sine wave is applied in phase to both inputs simultaneously, you will see a diagonal line, and the angle of this line will indicate the relative amplitudes of the signal at the inputs. With equal amplitudes you will get an angle of 45 degrees, while if the amplitudes are unequal, the angle will be greater or less than this - depending on which amplitude is greatest. Most importantly, if the signals are electrically out of phase the slope of the diagonal line will be reversed - giving you a clear and unambiguous indication of any phase reversal - and if equal inputs with a 90 degree phase shift between them are applied to the two inputs you will see a perfect circle.

Now let's consider the situation with a complex waveform applied to both inputs. In this case, the in-phase components will tend to produce a diagonal display in the in-phase direction (running from bottom-left to top-right), while the out-of-phase components will tend to produce an out-of-phase display (running from top-right to bottom-left). Again, the diagonal orientation of the display indicates the amount of phase-coherency.

Most stereo programs do, in fact, contain plenty of signal components common to both left and right - the centre channel information which is heard equally from both speakers - and, in practice, this results in a cluster of lines occupying a roughly circular area in the centre of the display. Depending on the relative level of the centre channel information, the pattern will often appear more like an elongated oval shape angled with the in-phase orientation (running from bottom-left to top-right) rather than as a perfect circle. Again, if the signals are out of phase, the general orientation of the display will be reversed to indicate this - thus warning the engineer that there is a problem which needs to be corrected.

You can get accidental phase reversals if a cable is inadvertently wired the wrong way, or even with particular acoustic conditions in the studio - and these can be difficult or impossible to detect using your ears alone. Worse still, phase reversals can sometimes even enhance the sound, making it sound more spacious, for instance, until you sum the left and right signals back to mono for a radio broadcast, for example, in which case they may cancel out almost completely!

This is a very powerful argument for the use of an oscilloscope display, and they have certainly seen popularity over the years in recording studios for this reason. However, in recent times they have not been as popular in music recording studios, especially as the recording engineers tend to be creative rather than technical engineers, and especially with newer generations of engineers who may not be as familiar with analogue audio tools such as the oscilloscope.

Mike Collins © 1996