back of your seat? This is permitted, I suppose.

I think it is time to stop all this recording fuss and learn to be ladies and gentlemen and extend to *every* patron of a theatre organ concert the courtesy to which we are *all* entitled.

Yours truly,
Lyman Nellis

Dear Mr. Gilbert:

The beautiful article by Lloyd Klos which you published about my Dan was a joy; it brought me many smiles and several tears. I only wish all those beautiful things could be said to Dan himself. If he could see what you published that others have said, he would be as proud as I am. I hope you understand how much this means to me.

Through the Letters to the Editor column, I would like to publicly thank all those who spoke so nicely. Of course my first thanks are to Mr. Klos who did all the compiling, interviewing and writing, but I also wish to include my deep thanks to Don Baker, Clealan Blakely, Mike Coup, Bill Floyd, Dick Loderhose, Bob Mack and Billy Nalle. I have known all these wonderful people for many years.

Since I live in Wichita now, I am once more near what I privately think of as Dan's organ, and I hear it quite a bit. The Wichita Theatre Organ people shower me with their wonderful warm feelings, and made me a part of their "family." I go to all the concerts, hear all the beautiful music, and talk to old friends of the Paramount when they come here. I am comfortable in a nice apartment, my doctor just gave me a clean bill of health, and I am doing the best I can.

Sincerely yours,
Theresa Papp □

THE ACOUSTICAL CONSULTANT

Limitations of Sound Level Meters and the Accurate Measurement of Transients

by R.J. Weisenberger

As any audiophile knows, any amplifier can be driven into clipping (peak overload distortion) long before delivering its rated continuous rms power. This is understandable from the fact that rms measurements are based on the continuous flow of power to a load, such as obtained when using pure sine-wave test tones from an audio generator.

In a well-designed amplifier, the peak-to-peak output voltage capability into a given load should not vary significantly regardless of the waveform, provided there are equal amounts of positive and negative components in the waveform. Thus, signals of an instantaneous nature, known as transients, will yield very low readings when measured by the continuous power method, even if their peak-to-peak values are measured as identical.

Standard AC voltmeters respond to average or rms values, and even so-called peak-reading meters (such as the standard VU meter) cannot respond fast enough to accurately measure the transient levels often found in musical material.

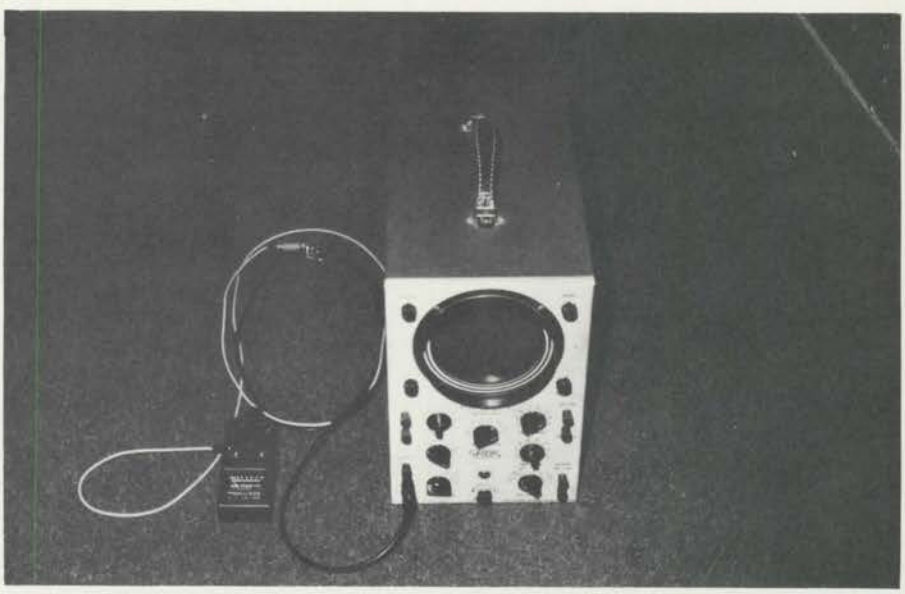
The importance of achieving greater accuracy in the measurement of transient levels, as well as continuous levels, has resulted in several well-known amplifier manufacturers developing LED (light-emitting diode) and fluorescent VU meters and power indicator displays.

Such displays, lacking the ballistic limitations of conventional meter movements, can respond instantly to all types of signals, whether of a continuous or transient nature, their resolution being limited only by the number of segments per display.

Amplifiers equipped with such monitoring devices can produce clean, high-level sound without clipping, because the levels of even the briefest transients can be monitored and the gain can be set so that such levels are still below the clipping point. *How does this apply to the pipe organ?*

When measuring sound levels produced by musical instruments, particularly those of percussions, a sound level meter in itself will prove inadequate, for it can measure only sustained sound levels of a fairly simple nature, not those produced in a theatre pipe organ by the striking of wood blocks, metal bars, etc. However, most sound level meters are equipped with an output jack, allowing the meter to be patched into other test equipment for further analysis.

By feeding the output of a sound level meter into a properly calibrated oscilloscope, one can accurately measure transient levels, and with the use of a storage 'scope the tran-



A simple sound level meter/oscilloscope combination — the least equipment necessary for basic audio research. Those involved in the design and voicing of organ pipes should familiarize themselves with the operation and use of such equipment.

sient waveform can be held on the screen for further study.

For the complete timbre analysis of the sound of any pipe, the output of a sound level meter can be fed into an audio spectrum analyzer which will graphically display the relative strength of each harmonic (in db) with respect to the fundamental frequency. Such aspects as harmonic development in pipes with respect to pressure, scaling, and cut-up can thus be studied in detail in a completely objective manner, not left to subjective interpretation.

Electronic organ manufacturers are beginning to use such methods in order to copy the pipe sound ever more closely. Pipe organ manufacturers should likewise use such methods to learn the facts concerning sound production in their instruments. No one can gain new knowledge by simply *copying* former designs.

P.S. Those who believe the "trained ear" of a voicer should be the sole judge in determining the tonal balance in pipe organ ranks are entitled to their opinion. However, for the sake of the future of the profession, they should also keep open minds to newer and more efficient proven methods.

It has been suggested that if a pipe organ installation should prove acoustically inadequate, electronic amplification would be preferable to the use of higher pressures and cut-ups. But the setup required for amplifying a pipe organ would produce more problems than it would solve. For one thing, the close miking necessary to avoid feedback would result in improper balance between ranks, not to mention what would happen to spacial imaging. Also, this would defeat the very purpose of pipe-produced sound. The real answers lie in learning more about sound production in the pipes themselves, not in resorting to amplification.

When organ builders begin to realize that familiar scales of pipes *can* be built over a wide range of pressures and outputs without harming their tonal quality, and also realize that it *is* possible to achieve good tonal balance at high sound levels, an acoustically inadequate pipe organ installation would not exist in the first place. There are those who would condemn modern methods simply because they believe them to be untraditional, when in reality such methods could be used to keep a tradition alive and growing. The research being done today in the organ building industry is all well and good. However, most of it is concerned with providing more efficient methods of keying and switching, using today's digital technology. Little research has gone into the study of pipe acoustics, other than in analyzing *existing* pipe designs, the results of which are enabling the electronic organ manufacturers to produce products that are a far closer approach to the pipe sound than were earlier electronic instruments. My research has all gone toward finding out how and why different design factors relate to actual *measurable* performance specifications.

Readers may send questions to Mr. Weisenberger in care of THEATRE ORGAN. *Mail should be addressed to 3448 Cowper Court, Palo Alto, California 94306. Enclose a self-addressed stamped envelope.* □