

DIGITAL VS. ANALOG

"I prefer digital readout"

By

Richard J Westerfield

The debate over "analog" vs. "digital" display has been raging since the dawn of the electronic age. The common assertion is that analog is "more natural" or easier but "digital is now". There is a significant difference between analog and digital clocks. The difference is simple: digital clocks display the time that is, while analog permits you a view of one time relative to another. Digital clocks let you know it's 7:18, or 12:39. However analog clocks allow you an incremental view of your time in terms of fractions (half past seven, or a quarter to one). While digital may seem more accurate (11:38 digital time is "about twenty to twelve" analog time), analog clocks let you see at-a-glance how far you've already traveled, or how much farther you still have to go. If all this doesn't seem relevant, try using a digital clock to explain time to a child. If you can't tell time using analog clocks, you simply don't have a sense of past, present and future.

Digital watches are called **digital** because they go from one value to the next without displaying all intermediate values. Consequently, they can display only a finite number of times of the day. In contrast, watches with hands are **analog**, because the hands move continuously around the clock face. As the minute hand goes around, it not only touches the numbers 1 through 12, but also the infinite number of points in between.

"I prefer digital readout", even though they are harder to read at a glance. This argument has been kicked around and in most instances has been decided in favor of analog displays, augmented by digital readout of essentially numerical information. Then consider the purpose of the information to the user. Some things are useful primarily as status indications, i.e. things are OK or they are not. One does not have to know temperature to the degree F, or pressure to the psi, or voltage to the millivolt, or flow to the gallon. A brief glance at the instrument panel should be all that is necessary to tell you that you are in the proper range. For this purpose analog instruments are far better than digital. I'm sure you drive thousands of miles a year in automobiles where analog instruments, or even indicator lights, provide all the necessary status information.

When considering instrumentation, you need to consider return on investment (ROI) and the instrument requirement; "What do you want the meter to do?" Consider how we, as humans, experience the world. Vision, for example, is an analog experience, because we perceive infinitely smooth order of shapes and colors. "Don't discount analog instrumentation when metering is required", consider the following: analog is lower cost, lower impedance (ammeters), and easier to read.

Many power and process functions are better performed with analog type displays these include tank levels, line/process pressures, furnace temperatures, flow rates, power levels, volts, amps, power factor, and many others. Quick reference is a must when checking key processes at a glance.

Keep in mind that the purpose of an instrument display is to let you build an image of the process from an abstract output. People are best at dealing with pictographic information. Numerical outputs have to be mentally translated into appropriate visual representation. As an exercise, try describing a process in numerical form (or without using schematic/drawing). Wouldn't a simple graphic display be easier?

Of course some analog displays are better than others. Style is often the enemy of good information transfer. My recommendation is that if the instruments work and you know

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how to use them, keep them. You will gain little except aggravation from switching to digital readout.

"I prefer digital readout", even though they are harder to read at a glance? Consider analog when considering maintenance monitoring, process control or power monitoring. If time is money, then every second wasted trying to read a digital readout **cost you money.**

Other Analog benefits:

- a) Consumes less power
- b) Can be self powered down to zero input.
- c) Generates no electronic emissions or heat.
- d) Better viewing angle

Process this: Digital or Analog??

According to a research at Cambridge University, it doesn't matter in what order the letters in a word are, the only important thing is that the first and last letter be at the right place.

The rest can be a total mess and you can still read it without problem.

This is because the human mind does not read every letter by itself, but the word as a whole.

amazing huh?



MLA – Analog Loop Indicator



MLD – Digital Loop Indicator