



A DRO (Digital Read-Out) is a device that displays movements of (normally 3) axes on a mill or a lathe. It is used to ease work on conventional machines (non-CNC).

The YADRO-DRO consists of 2 parts:

An interface that connects to the digital scales that are fixed to a mill or a lathe or any other tool that is in need of precise and reproducible display of its axes.

A software that runs on an old laptop or PC.

### **The Interface**

The interface, called DRO:int4, is a handful of chips and other electronic parts that communicates with (up to 4) connected digital scales. The communication with the scales is two-way. So the DRO:int4 not just can read values from the scales, but also switch modes on them.

The main part of that interface is a micro-controller that understands the protocol of the scales and converts that bitstream into a more readable format for the PC.

The interface also is converting voltage-levels and supplies power to the scales, so you don't have to swap batteries every 6 months. The communication with the PC (see next chapter) is via a serial (RS-232) interface that is opto-isolated to avoid problems with ground-loops in electrically noisy shop.

### **The PC-Software**

Most of the work of displaying data is done on a PC. This approach is the big advantage of YADRO's DRO. You can use an old PC or laptop that is dedicated to your shop and is cheap. It is enough if that PC is running at 75 MHz (or more), has a serial connection (RS-232 aka V24) has a working hard-disk and a floppy-drive. No need for CD-ROM, USB etc. Often, you get good enough PCs or laptops for free or very little money. So why waste money for a good display that is often available for some bottles of beer?

That software receiving the data from the interface is very flexible. It is obvious to use all the processing power of a real PC, contrary to dedicated DRO-boxes that have only a simple and slow processor inside and are nearly fully occupied to the data and to display it on three lines of LEDs.

This processing power enables a completely different approach to solve the display task and to solve the calculations involved. DRO:ddisp (the part running on the PC) has its own programming language that you can extend by your own macros to solve special tasks.

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