



PEAC

ANALOGUE COMPUTER

By **D. BOLLEN**

BEFORE embarking on constructional details, a few words must be said concerning measuring and test equipment required.

VOLTAGE STANDARD

It is necessary, at an early stage of computer construction, to establish a voltage standard for setting up the PEAC circuits.

Since *relative* voltage levels are more important than *absolute* levels, one particular voltmeter of proven reliability can serve as a voltage standard, and this might well be a reputable testmeter which has a large scale conveniently calibrated in terms of 0-10 volts, with a d.c. sensitivity of not less than 20,000 ohms per volt. Even if the testmeter has an error of 2 per cent of the indicated reading on d.c. ranges, it should be capable of reproducing a given reading, from day to day under similar room temperature conditions, with much greater accuracy.

In addition to use as a voltage standard, the testmeter can, of course, be employed for setting up problems, answer readout, comparative resistance checks, and for general testing of all circuits. There is nothing to prevent re-calibration of the computer to laboratory voltage standards at a later date, and this has been allowed for in the overall design of PEAC.

COMPUTER INSTRUMENTATION

Analogue computer instrumentation has much in common with electronic workshop equipment. Among those instruments likely to be of use to the computer operator are: an oscilloscope, a small collection of d.c. voltmeters, an audio oscillator, an a.c. voltmeter, and a component measuring bridge.

The oscilloscope need not conform to a modern specification, and could be a government surplus item. However, it is often an advantage to have a large screen area, and redundant television sets can be converted for computer readout purposes with excellent results. The limited bandwidth of magnetic deflection is no disadvantage at normal computer operating speeds.

D.C. voltmeters with centre zero scales are very useful for rough checks on the terms of a computer equation, where, for example, the wish is to see how y varies in relation to x when manipulating a simultaneous equation.

A sine wave oscillator, with attendant a.c. voltmeter, will often be employed for work on transfer functions, and for general electronic circuit simulation.

Finally, the component bridge is a help when making-up plug-in computing components, and for locating possible sources of error.

It is assumed that special classes of equipment, such as the XY plotter, will not be available to the amateur, and they are therefore excluded from further mention.

UNIT "A" CONSTRUCTION

The general form of construction adopted for PEAC is based on a series of boxes made with laminates of white Armaboard or Formica and hardboard. The resulting box is rigid and durable, with a surface which easily takes panel transfers and lines drawn in Indian ink. With such a construction, it is possible to achieve a professional appearance using only simple woodworking tools.

It is advisable to start with the UNIT "A" front panel and case. This slightly unusual procedure, of building the box before starting on internal circuits,