ANALOGUE COMPUTER

PEAC

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THE PEAC basic equipment has now been dealt with and this month we commence a detailed description of the chief ancillary unit. Subsequent articles will cover the remaining two ancillary units.

Perhaps it should be repeated at this stage that the three ancillary units are purely optional add-on items. The additional facilities they each provide, are indicated in the PEAC Specification (January 1968, page 38).

PEAC UNIT "B"

UNIT "B" reinforces the facilities of UNIT "A", but does not introduce new computing circuit elements. A master potentiometer and a suitably scaled readout meter improve the accuracy and ease of handling of UNIT "A", while the integrator mode switching circuit opens up further possibilities in the solution of Calculus problems.

UNIT "B" FRONT PANEL

It may not be necessary to use hardboard for the front panel if a thick grade of plastic laminate is used, since the wooden surround in the box front gives plenty of support.

Prepare a $17\frac{3}{4}$in × $8\frac{3}{4}$in white laminate panel and establish hole centres with a sharp spike, from the drawings Fig. 6.1 and Fig. 6.2. Next, drill only the holes for all sockets, S7, S8, the meter mounting studs, and cut out a hole for the meter body with a fretsaw.

Beginning with the master potentiometer dial, draw a 300 degree arc of radius $2\frac{11}{16}$in with a pencil compass (refer to Fig. 6.2). Divide the arc into 3-degree divisions with protractor and pencil. The accuracy of the master potentiometer will benefit from careful preparation of the dial. Draw in the dial arc and divisions with Indian ink.

Rub-on transfers are suitable for the dials of VR18 and VR19, and will save time, but make sure that the transfer gives main divisions spaced at 30-degree intervals, for a 1–10 calibration.

When dials are complete, drill holes to take the spindles of VR18–VR20, S9 and S10. Draw in all ink lines, add transfer numerals, and varnish.

BOX CONSTRUCTION

Commence building the UNIT "B" box by cutting out two side panels from hardboard; they are shown in Fig 6.3. Fix $\frac{1}{2}$in square softwood lengths *A*, *B*, *C*, and *D* to the inside of the side panels. Join the side panels together by means of horizontal lengths *E*, and *F*, using countersunk woodscrews and glue. Square up with the assembly placed on a flat surface.

Cover the box framework with hardboard top, bottom, and front strip panels, and, when firm, reduce overlapping edges with a rasp and sandpaper. Finish off the box with a layer of white plastic laminate, and paint exposed hardboard edges to match the UNIT "B" box.

MASTER POTENTIOMETER AND NULL METER

A d.c. voltmeter connected to the slider of a computing potentiometer will impose a small load, and when the voltmeter is removed the measured coefficient will increase slightly, to the extent of about $1\frac{1}{2}$ per cent in the case of a 10V 20,000 ohms/volt meter, and a 10 kilohm potentiometer set with its slider near mid-track. One way of avoiding the error is to leave the voltmeter connected to the potentiometer after a coefficient reading has been taken, but this is seldom convenient.

Ideally, the instrument used to measure coefficients or computer voltages should impose no load at all, and this condition can be satisfied fairly easily by employing an accurately calibrated master potentiometer.

In Fig 6.4, a permanent load is placed on the coefficient potentiometer CP by the computing resistor R_{in}, thus causing a significant dial setting error. To find the true coefficient of CP, both potentiometers are supplied with a reference voltage of + 10V, so that potentiometer coefficients of 0–1 will be multiplied by 10 to conform to a 0–10 dial calibration. When