X. ELECTRONIC INSTRUMENTATION*

Academic and Research Staff

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RESEARCH OBJECTIVES

The research objectives of the Electronic Instrumentation Group include developing new, highly specialized instrumentation for scientific research.

During the coming year, we shall continue research and development of special electronics devices for the Mattauch-Herzog double-focusing mass spectrometer and for p-n junction measurement and evaluation. Further developments in instrumentation for making precision measurements of component and system nonlinearities will also continue.

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A. STATUS OF RESEARCH

Work is nearly complete on two diode display units that are intended for use in the microwave and instrumentation laboratories in our group. All circuitry will be on 3 printed-circuit boards that have been finished. Remaining work includes cutting and etching the front panel, and mechanical work. The finished units will produce an oscilloscope display of the Log I vs V characteristic of diodes, and indicate the three diode parameters I_{sat}, $\frac{q}{nkt}$, and series R on calibrated dials. This swept measurement will greatly facilitate diode testing (now on a point-by-point basis). Many diodes are tested for high-frequency mixers.

A circuit has been designed and built for the mass spectrometer in the Department of Chemistry, M. I. T. This circuit operates on the outputs of 2 phototubes, or to select the channel with lowest absolute voltage. This "minimizing" operation isolates the computer input from erroneous signals and simplifies programming in the study of mass spectrographs.

Work is now being concentrated on the design for the temperature controller on a desorption spectrometer for chemical engineering. The project should be finished by mid-December.

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*This work is supported in part by the National Institutes of Health, and in part by the National Aeronautics and Space Administration (Grant NGL 22-009-163).

†Professor K. Biemann, of the Department of Chemistry, M. I. T., is collaborating with the Electronic Instrumentation Group of the Research Laboratory of Electronics in research under NIH Grant RR-00317.