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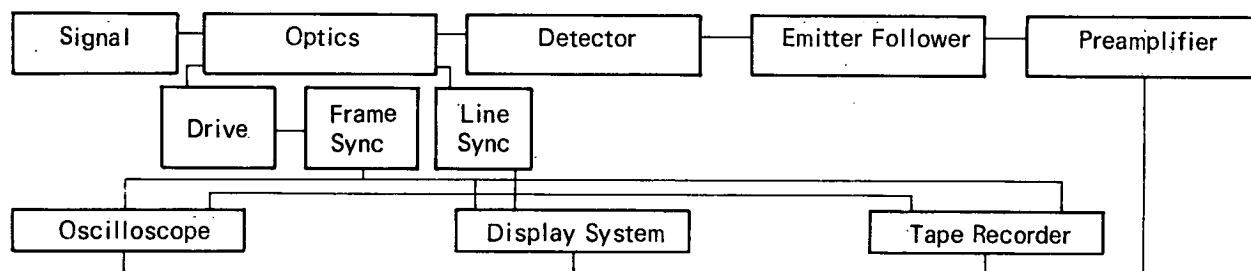


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Design and Development of a Fast Scan Infrared Detection and Measurement Instrument

A fast scan infrared microscope instrument measures and plots the infrared profile of semiconductor chips, transistors and integrated circuits. Infrared profile analyses yield important information on electrical and physical properties, enabling manufacturing

field of infrared microscopy, has been used in the performance of such functions as device evaluation, manufacturing process control, chip-to-header bond quality evaluation, second breakdown prediction, and failure detection and isolation.



Block Diagram of Fast Scan Infrared Microscope System

improvements in semiconductor performance and reliability.

The main sections of the instrument, shown in the block diagram, are the optics, the signal detector and amplifier, the scan mechanism, and the data storage and display subsystems. Operational performance can be described by the following requirements, as outlined in the original design specifications: (1) area of resolution is less than 10 microns; (2) thermal gradients of 274°K (1°C) at an ambient temperature of 298°K (25°C) can be detected; (3) target scan speeds range from 1 frame per minute to 10 frames per second; (4) scan area is 1 mm² with a raster pattern of 100 lines; (5) detector response is less than 1 μsec, and spectral sensitivity is from 2 to 15 microns; (6) magnet tape storage capability exists; and (7) optical system views devices as large as 2.54 × 2.54 cm (1.0 × 1.0 inches). The instrument, believed to be the most advanced in the

Note:

Requests for further information may be directed to:

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No patent action is contemplated by NASA.

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