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# NASA TECH BRIEF



## Man-Machine Interactive System Simplifies Computer-Aided Circuit Design

A man-machine interactive display system facilitates better communication between an electronic circuits designer and a computer. The Langley Interactive Computerized Circuit Analysis capability (LICCA) enables a designer to "draw" electronic circuit diagrams on a cathode ray tube screen. This information is then submitted as input to a user-selected electronic circuit analysis program.

A primary advantage of LICCA is that it enables the electronic circuit designer to visualize his design concept while following familiar design procedures. Online man-machine interaction, vital to iterative circuit design technique, is provided, without the requirement for a detailed knowledge of computer programming language.

LICCA can accommodate circuits composed of binary logic devices or of discrete component parts, such as resistors and transistors. Logic circuits receive user-drawn pulse wavetrains and the computer results are output wavetrain pulses. Circuits with discrete component parts can be drawn, together with all the data necessary to perform a circuit analysis. These data are then submitted to a circuit analysis program such as SCEPTRE (System for Circuit Evaluation and Prediction of Radiation Effects).

During the drawing process, messages appear on the screen to give additional guidance. LICCA also monitors the operator's instructions to detect errors. Upon sensing an error, LICCA will inform the designer of the problem via a displayed message. The designer can correct the error immediately and continue the analysis.

The circuit screen image displays all the information about the circuit design, including the input and the computer-generated output waveforms. A permanent record of the design may be recorded on hard copies which provide a traceable record of design changes.

### Note:

Inquiries regarding this system may be directed to:
Technology Utilization Officer
Langley Research Center
Hampton, Virginia 23365
Reference: B70-10660

### Patent status:

No patent action is contemplated by NASA.

Source: Salvatore J. Bavuso
Langley Research Center
(LAR-10711)

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