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Lewis Research Center



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A SYSTEM FOR AUTOMATIC ANALYSIS OF BLOOD PRESSURE DATA FOR DIGITAL COMPUTER ENTRY

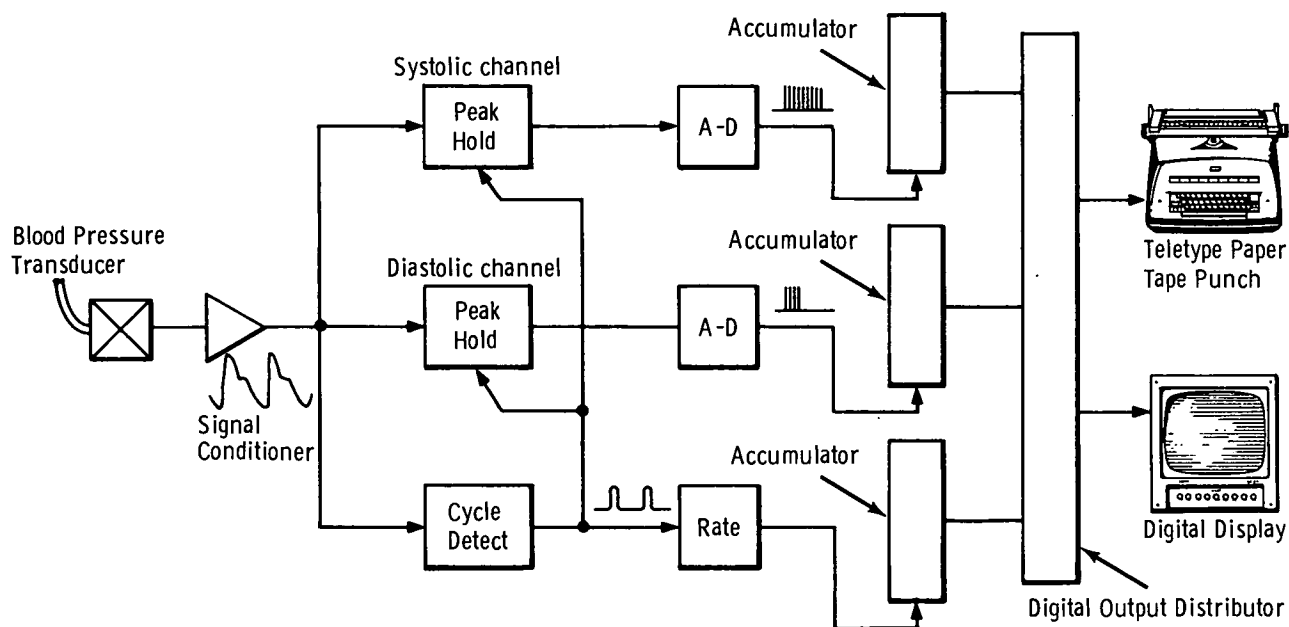


Figure 1. - Automatic Blood Pressure Data System.

A system that measures parameters of interest in the blood pressure analog waveform and prepares these for entry into a digital computer has been designed and a working model built. The parameters derived from the wave form are the averages of the peak diastolic and systolic pressures and average heart rate. The system prepares a punched paper tape for entry into a commercial time-shared digital computer. It also displays the digital numbers punched over the past several minutes on a television-type digital display tube.

The block diagram, Figure 1, shows how the analog blood pressure signal is analyzed by three separate circuits representing the three parameters of interest. Peak measurement and holding circuits in the systolic and diastolic channels measure and hold voltages proportional to each of these peaks on each heart cycle. The cycle detect circuit determines when each heart cycle is complete. Upon completion, this voltage is converted to a series of pulses, the number of which is proportional to the

measurement. These pulse "bursts" are accumulated in a counter over a pre-selected number of heart cycles, and then averaged. The result is punched into teletype tape and displayed on the cathode ray tube digital display (Figure 2).

This system was developed for use in hypertension research on trained animals instrumented for experiments. All data were recorded on analog magnetic tape prior to processing through this system.

NOTES:

1. The system as shown has been expanded by adding signals from blood flow transducers. Total cardiac output and peripheral resistance can then be automatically calculated and monitored. The system can be operated on-line as shown, or off-line by the incorporation of an analog magnetic tape recorder after the signal conditioner.

(continued overleaf)



Figure 2. - Automated System in Operation

2. The techniques employed in the design of this system could also be applied to live patient monitoring, as in intensive care wards. Multiple patient monitoring, including performance calculations and limit alarms in real-time by an on-line mini-computer, is a further extension of possible applications of this system.
3. The following documentation may be obtained from:
National Technical Information Service
Springfield, Virginia 22151
Single document price \$3.00
(or microfiche \$0.95)

Reference: NASA TM-X-2519 (N72-18111), Conversion of Cardiac Performance Data in Analog Form for Digital Computer Entry

4. Technical questions may be directed to:
Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B72-10632

PATENT STATUS:

NASA has decided not to apply for a patent.

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