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FILE MEMORANDUM

SUBJECT: Comparative Facilities of 7090 and
7000S for Real-Time Applications

Listed below are some typical characteristics of real-time applications. The provisions for handling these situations with the 7090 system and the 7000S or 7000A systems are indicated.

Simultaneous Operation of Input-Output Units

A maximum of 8 units may be operated at once on the 7090 without using special equipment.

As many as 98 units can be operated in the 7000S, using all three exchanges.

Control of Input-Output operations

In the 7090, a specific test must be made for each possible condition of the input-output units. Repeated testing is required to determine the time at which an operation is completed. (An individual trapping mode for each data synchronizer channel is being proposed.)

In the 7000S, the main program is interrupted at the completion of an operation or if any unusual situation arises. Cause of the interruption is identified by indicator and channel address register. In addition, the state of a channel may be tested at any time.

Interruptions from External Source

As an extra feature, the 7090 provides an external signal trap. If interruption from more than one source is possible, the cause of an interruption must be determined by programmed tests.

In the 7000S, the Unit Signal provides a similar facility. Identification is provided by the channel address register.

Standby Operation

The SET AND WAIT operation of the 7000S allows it to be started from an idling condition by an external signal. Multiprogrammed operation is also possible to make use of the otherwise idle time.

The 7090 can not be similarly started from a stopped condition; the START key must be pressed by an operator. Alternatively, the machine may idle in a closed instruction loop until interrupted by an external signal.

Error Detection and Correction

No internal checking is provided in the 7090.

The 7000S is extensively checked. Many errors are automatically corrected. The interruption system facilitates handling most of the remainder.

Measurement of Time Intervals

An interval timer (elapsed time clock) is available on the 7090 on an RPQ basis.

A similar clock is standard equipment on the 7000S.

Time of Day

A real-time clock will probably be provided for the 7000S system as an optional input unit. This function may also be programmed using the elapsed time clock if high accuracy is not necessary.

A real-time clock is proposed for the 7090 system as a special feature in the BMEWS application (see companion memo). However, this operates through the real time channel, which is a very special purpose unit.

Human Monitoring of Operation

In the 7090 some monitoring is possible using the console. Additional operating positions are not easily provided. No inquiry stations are available as standard units.

The 7000S provides a flexible console and inquiry station. As many may be used as is desired.

Both systems provide cathode ray tube displays, although the 7090 is limited to one.

Connection to Other Computers

The 7000S makes provision for communication between several machines by means of interruption bits and common memory units.

Limited facilities for communicating with a second machine are proposed for the 7090 in the BMEWS system. Interruption of the other machine is not provided.

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Code Translation, Demultiplexing, and Similar Variable Field Length Operations

The 7000S provides a very flexible set of variable field length operations.

Similar manipulations on the 7090, although possible, are considerably more awkward. In some cases this could make the operation computer-limited.

Index Registers

Index registers are often used to keep track of the progress of a number of concurrent operations. Fifteen index registers are provided in the 7000S, and the RENAME operation aids in loading and storing them.

Only three index registers are provided in the 7090.

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