NCR C-315 ELECTRONIC DATA PROCESSING SYSTEM

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Summary

A.   Introduction

B.   Central Processor

1.   General Description

a.   Ability to handle both numeric and alphabetic data with variable length operands.

b.   12-bit word basic storage unit – – 3 numeric or 2 alphabetic characters.

1)   Complete flexibility in dealing with numeric or alphabetic characters.

2)   Preponderance of numerics in business data makes this flexibility important since it allows an efficient use of memory space.

3)   Choice of this word size incorporates the memory efficiency advantages of character addressing with the speed advantages of longer word lengths.

c.   Central Processor is completely transistorized. Core memory size can vary from 4000 to 80,000 characters. 80,000 characters can be construed as representing as many as 120,000 digits because of the various ways of representing data.

d.   Additional memory modules may be added.

e.   Read-write cycle time is 6 μs.

f.   Accumulator is variable in length from 1 to 8 words.

2. Registers

32 index and 32 jump registers are located in auxiliary memory. Some have special additional functions which for example:

a. Simplify jumps to and from subroutines,

b. Contain the current instruction address,

c. Store the address of the next word to be filled at the termination of filling from Paper Tape, Magnetic Card Random Access Memory, etc.,

d. Contain the address to which control is automatically transferred on detection of an error in the operation of peripheral equipment.

3. Internal Arithmetic Speed

a. Add - Adding a 6 digit number into the accumulator takes 48 μs. Each additional 3 digits requires an additional 6 μs.

b. Multiply - 6 digits times 6 digits takes 712 μs.

4. Command Structure

a. C-315 is a modified single address system.

b. Variable length commands. Simpler ones require 24 bits. More complex commands and input-output commands, in general, require 48 bits. The greater proportion of commands in a program require only the shorter 24 bit instruction, thus lessening program storage space needs.

c. Operand may be part of the instruction.

d. Complete automatic indexing with all commands facilitates relative addressing.

e. Full complement of arithmetic, logical and data manipulation instructions include commands which:

1) Edit a memory field according to an edit format,

2) Insert spaces in place of non-significant zeroes,

3) Search for a particular bit configuration or its relative magnitude, record location of the "hit", or branch if no "hit" and set a flag accordingly.

4) Augment an index register, compare it with memory, and set a flag accordingly,

5) Set and test program flags in main memory or allow indirect addressing.

5.   Automatic interrupt

a.   To aid in optimizing input-output time, the C-315 features automatic interrupt which permits a program in the Processor to be interrupted any time an off-line peripheral unit is ready or finished.

b.   May be inhibited entirely or selectively by unit.

6.   Debugging

a.   A flip-flop, which is under program control, can cause the Processor to branch after every instruction, greatly facilitating program tracing. The branch address is taken from a special register.

C.   External Storage

1.   Standard magnetic tape is available at speeds of 40 KC and 60 KC, and is compatible with other systems.

2.   The more interesting external storage device available to the C-315 system is the Magnetic Card Random Access Memory.

a.   This device can select any one of 256 magnetic cards from a chamber, read or write information on the selected card any number of times, and return it to the chamber.

b. Magnetic Card Memory offers both random access and sequential characteristics, thus satisfying the whole range of applications.

c. Capacity of 1 card is 22,000 characters; of one 256 card chamber is 5.5 million characters. The C-315 can have 16 of these units, or almost 90 million characters, available to it.

d. Instantaneous transfer rate is 100,000 6-bit characters per second.

e. Access time is about 200 ms

Average re-access time is 23 ms

D. Input-Output Equipment

1. Wide variety of input-output equipment makes for a balanced system tailored to the users needs.

2. Simultaneous input, output and computing is available with all peripherals.

3. The 120 column buffered line printer, which operates at 750-900 lpm, is available with a split platen. As many as 3 printing operations can proceed independently.

4. The C-315 also has available input from up to 4 fully-buffered Magnetic Ink Character Recognition Reader/Sorters. These units each operate at 750 documents, such as checks, per minute, regardless of document size. Central Processor may control pocket selection or the unit may be used off-line as a digit sorter.