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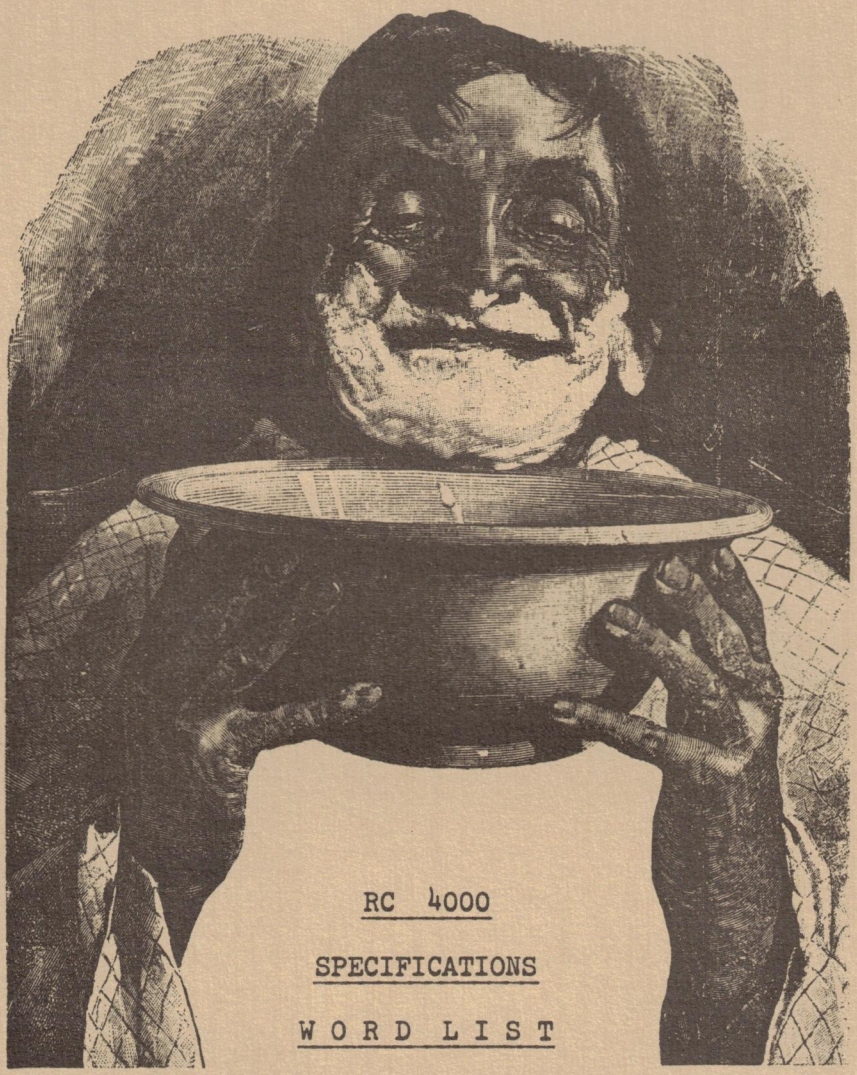

RC 4000

SPECIFICATIONS

W O R D L I S T

Abstract

The present list, put out at the request of the Sales Division for internal use, contains explanations of a number of words and expressions appearing in the specifications for the RC 4000 computer system.

INFORMATION DEPARTMENT

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RC 4000 SPECIFICATIONS WORD LIST

The present list, put out at the request of the Sales Division for internal use, contains explanations of a number of words and expressions appearing in the RC 4000 specifications.

The following recent additions to the specifications are not included, however:

0016 RC 4193 Drafting Machine Controller
0027 RC 328 Teletypewriter Terminal
0028 RC 4195 Graphic Display Terminal
0026 Diagnostic Programs
0037 Fortran
0051 RC 4000 Software (rev. Feb. 1970)
0052 RC 4000 Console
0053 RC 4064 I/O Controller Cabinet (rev. Feb. 1970)
0054 RC 430 Card Reader-Punch
0055 RC 804 Alphanumeric Display
0056 Algol 5 (rev. Feb. 1970)
0057 Pert

If it is found that these specifications as well contain words and expressions requiring explanation, a supplementary word list can be compiled and put out.

Attention is also called to the vocabulary of monitor concepts appearing in the RCSL publication "RC 4000 Software / Multiprogramming System" (No: 55-D17, pp. 152-154).

A/S REGNECENTRALEN
Information Department

10 April 1970

0002
RC 4000 -
A General-Purpose
Computer of the
Third Generation

Under Data Formats: short and long precision for significance analysis.

Floating-point arithmetic is performed with short and long precision, i.e. with mantissas of 33 and 36 bits, precision referring to the number of significant digits. Short precision (33-bit mantissa) produces greater rounding errors, and significance analysis is used to determine the effect of such errors. This is done by making the same calculation with both precisions and comparing the results. The identical digits are significant, as they are not affected by the short precision, i.e. the greater rounding error.

Not mentioned under Technology, but worth noting: The RC 4000 core store is non-volatile.

This means that if power fails, for example, the contents of the internal store remain unaltered.

Under Operating Facilities: bootstrapping routine.

This routine provides successive input of the monitor program when the internal store is empty. The initial order, read in from the program tape by pressing the autoload button, causes the input of several additional orders, which in turn cause the monitor itself to be read in. Thus the program "pulls itself up by its own bootstraps" by loading itself automatically.

Under Optional Peripheral Devices: Set Point Station Controller.

A setpoint station is a mechanical device, which regulates the setpoint, or desired value, of a process variable within certain prescribed limits on a step-by-step basis. Such stations can be controlled by

operators from a central console. When the RC 4000 assumes this function directly in a closed-loop system (regulating control) as at Wloclawek, it controls the stations by means of a setpoint station controller. If the computer attempts to regulate beyond the prescribed limits, it is automatically disconnected and an alarm is indicated; the setpoints retain the values of the control signals, however, so that operators - in the event of computer or power failure - can continue regulation until the computer can assume control again.

0003
RC 4000 Software

Under Loader Program: binary segments.

Binary segments are translated Slang statements on paper tape, a segment being a piece of code construed as a whole.

Under Process Control System: flow integration program.

This program measures production and consumption in terms of flow rates over a certain period of time and provides the total figures for the period.

Under Process Control System: pulse count program.

This program can count pulses from, say, a kilowatt meter (amount of electricity consumed) or a photo-electric cell that senses sacks of ammonium nitrate as they pass (amount of end product).

Under Process Control System: off-line process description assembler.

This assembler enables engineers without special computer training to modify descriptions and control actions of process variables.

Under Development Plans: Imp macroassembler.

A macro is a piece of text, e.g. an Algol, Fortran, or Slang program, certain parts of which can be dynamically replaced by parameters. "Imp" is a macro language. A macro is identified by name just like a procedure; its task is to recognize the name of the macro and replace the call of the macro with the actual text. In other words, if you have the same piece of code, in Algol, Fortran, or Slang, but with different parameters, you can use a macro. It's a kind of shorthand for long pieces of text. A macro is similar to an editor, too, but it generates rather than alters text.

0004
RC 4000 Computer

Under Instruction Format: displacement.

Whereas an absolute address is that of a given location in the internal store, a displacement is an address relative to the value of an index register.

Under Central Processor: main frame.

The main frame corresponds to the central processor with a maximum capacity of 64 K (16 K core store + three 16 K core store modules).

Under Core Store Modules and Store Expansion Frame: store expansion frame.

This is a separate cabinet, one-fourth the size of the main frame; it can house an additional four 16 K core store modules to provide the maximum RC 4000 core store capacity of 128 K.

Under Interrupt Unit Expansion: response program.

This program inputs the contents of digital input registers. It responds to the peripheral device containing a digital input register, reads the contents,

analyzes which bits are set, and jumps to the program corresponding to these bits.

Under Characteristics - Digital Clock: Time resolution.

The least significant bit = 0.1 ms, the smallest time interval possible.

Under Characteristics - Digital Clock: Frequency stability.

The clock is controlled by an oscillator, which operates at a frequency that varies in a ratio of 1 to 10^6. This means that for every 10^6 seconds, the clock can be a maximum of 1 second wrong.

0005
RC 315
Input/Output
Typewriter

Pin-feed platen.

The typewriter platen has a wheel at either end with pins that secure and advance the paper (which is furnished with corresponding feed holes on each side).

0006
RC 150
Paper Tape Punch

Operate synchronously.

This means that electronic and mechanical operations take place in a definite rhythm, set by the machanism. Thus punching can only occur when the machanism is in a certain position, the punching hammers then being activated by a synchronization signal from the motor.

Brake plate and feed rod.

The tape is advanced in small steps, being first pressed by the one arm of a rocker down over a feed rod (which pulls the tape forward one step) and then pressed by the other arm down against a brake plate (which checks its advance).

Intercharacter space amplitude.

The feed rod vibrates back and forth with intercharacter space amplitude, i.e. the longitudinal distance between two characters on tape, or one step.

Incremental tape advance.

This means step-by-step feeding.

0008
RC 4060
Input/Output
Controller
Cabinet

Under Construction and Technology: sub-frame.

The controller cabinet, a separate cabinet the same size as the main frame, houses I/O device controllers in the form of circuit card modules mounted on sub-frames. A single module sub-frame contains one row of cards (26 card positions).

0009
RC 4320
Magnetic
Drum Store

Flying-head device.

During operation, the read/write head rides on a layer of air produced by the revolution of the drum. When the drum stops, a spring prevents the head from dropping to the drum surface. When the drum is started, a solenoid presses the head down toward the drum, but not enough to cause the head to touch the surface.

RC 4321 head bar modules.

The surface of the drum has a potential capacity of 512 K. Each read/write head (head bar module) can create tracks = 64 K. Drum capacity is increased by adding these 64 K modules until the track potential (= 512 K) is exhausted.

Cycle stealing.

If the internal store is not being used, one can enter it and "steal" a cycle. High-speed peripherals, such as the drum store, disc store, and tape station, employ the

high-speed data channel; data is transferred here in blocks of 24-bit words directly between the internal store and the buffer registers of such devices, the program initiating the transfer of an entire block. The internal store and the data channel are engaged for about 2 microseconds during the transfer of the individual words and can attend to other devices in between. This mode of operation is called cycle stealing. The capacity of the high-speed data channel is limited by the cycle time of the internal store and the transmission speed of the cables to 500,000 words a second.

Read/write selection electronics.

"Electronics" refers to the read/write amplifiers, "selection" to that between reading and writing.

0011
RC 707
Magnetic
Tape Station

Dual-stack read/write head.

The tape station employs a head consisting of two units placed side by side. The first unit writes tapes, while the second reads them after 6.67 milliseconds (at 45 ips), thus providing a true read-after-write check.

Under Data Format: longitudinal redundancy check character.

This character provides an even parity check on each track in a block. It is redundant, as it is added to the data generated by the program.

0012
RC 709
Magnetic
Tape Station

Under Data Format: cyclic redundancy check.

This character provides an extra check, which enables error detection in 9-track tapes.

0014
RC 405
Punched
Card Reader

Asynchronous card feed.

This means that cards are fed as fast as they can be read, the one right after the other without special periodicity being required.

Pre-read check.

This means that the light/dark level of each card is checked before reading to determine when the card can be read.

0020
RC 4000's
Dynamic Operating
System Concept

On the first diagram: round-robin.

This means cyclical time-sharing. Programs C, D, and E here are being executed in a time-sharing scheme. Each program in turn is allotted 20 milliseconds of computing time. They go round in a ring. When C has had its 20 ms, it goes to the read of the queue, whereupon D gets 20 ms and then takes its place behind C, whereupon E gets 20 ms and then takes its place behind D, whereupon C...

0022
Algol 5

Under Source Language: the case concept.

The conditional statement in Algol 60 only provides a choice between two possibilities, true and false:

```
if a = 1 then
begin ----- end else
if a = 2 then
begin ----- end else
if a = 3 then
begin ----- endcetera
```

The case statement, which is not standard Algol 60, provides a choice between n possibilities:

```
case a of
begin ----- end
begin ----- end
```