# NCR NEAT

**for National's Electronic Autocoding Technique**

**NCR language similar to Autocoder, used extensively in banking systems, approaching near 4gl status by the mid-1970s.**

```
PROGRAMMING AND NUMERICAL SYSTEM
    Internal number system        Binary Coded Decimal
    Alphanum char/word            10
    Alphanum char/word             5 - 60
    Words/instruction            1/2 - 6
    Instructions decoded          83 one address
                                  37 three address w/variations
    Arithmetic system             Floating point
     MICROFLOW provides exponents in range of -50 to
     + 49 and automatic normalizing of result
                                  Fixed point
     Automatic alignment takes place
    Instruction typeOne address (MICROFLOW)
     (Scientific-type)
                                 Three address (Multi-address)
     (Business-type)
    Number range- (1 - 10-10) to + (1 - 10-10)
```

Instruction word format

The command structure of the 304 system is unique in a number of aspects. The instructions are basically 3 address plus a number of other functions or capabilities that are built into the execution of the instruction. The basic instruction word format for arithmetical operations such as add, subtract, etc., is illustrated:

```
  9     8     7     6     5     4     3     2     1     0
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|  Op |         A       |        B        |        C        |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
|  V  |  M  |  S  |  R  | A1  |  Ar |  Bl |  Br |  Cl |  Cr |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
```

```
 Op    = Operation Code
 A     =Address of Operand
 B     =Address of Operand
 C     = Putaway or Jump Address
 V     = Variation.& Self-Linking designator
 M     =Auto-monitor level
 S     =Combinations of A, B, or C to be relative to
          Index Register
 R = Index Register
 A1, Ar = left and right field of A Address
 B1, Br = left and right field of B Address
```

C1, Cr = left and right field of C Address

The programmer in translating procedures for the 304 System will use the NEAT (National"s Electronic Autocoding Technique) format. The programmer might write the following to add the Old Quantity on Hand to the Number Received to arrive at the New Quantity on Hand:

ADD (V) (R) OQOH QREC NQOH

The NEAT assembly process will translate the NEAT format into the necessary absolute machine language. It could be considered that all instructions in the basic 304 Command List are automatic built-in subroutines. There are a number of operation codes that were designed specifically for business data processing such as Edit, Merge, Move, Sift (or table look-up), and Summarize that are powerful instructions and in some cases are self-incrementing.

As an example, the Merge instruction will serve to illustrate the nature of these business-type operations. Specified in NEAT format would be the following mnemonic designators and parameters:

Designate first word, first item, each string Number of items in each string Relative position of Major Key (if any), within item Relative position of Minor Key within item Number of keys (1 or 2) for the Merge Length of each item Specify three exits (Cutoff Merge only) NEAT (National’s Electronic Autocoding Technique) was in operation before the first deliveries of the National 304 System. This system enables systematic organization in the approach to a problem, an assembly compiler and a complete library of generators, service programs, and subroutines. COBOL or COBOL-like language will become part of the system in a reasonable time.

Each instruction may be relative to one of 10 Relative Index Registers. The particular Index Register and the portions of the instruction which are to be relative are specified within the instruction.

***Weik, Martin H. "A Third Survey of Domestic Electronic Digital Computing Systems" Rpt 1115, BRL, Maryland, 1961.***

Other:

- **NEAT COBOL** - NCR's COBOL which translated to NEAT/NEATA for the National 304.
- **NEAT IV** - NCR Autocoder.
- **NEAT V** - NCR Autocoder version 5.
- **NEAT/3** - Advanced version of the NCR Autocoder, featuring more data declarations like COBOL and event-oriented code (end of page, end of line, end of run) like PL/I.
- **NEATVE** - Advanced version of NEAT, running on the NCR VRX/E OS.
- **NEATVS** - Advanced version of NEAT.