# Honeywell

# GCOS/BES2 Assembler

**SERIES 60 (LEVEL 6)**

The Level 6 GCOS/Basic Executive System 2 Assembler for Models 6/34 and 6/36 processes source statements written in symbolic language, translates them into object code, and produces a listing of the source program, along with its associated assembly information. The Assembler is a nonoverlaid, two-pass processor which operates in 16K words of main memory (up to 64K can be utilized) with a system console (KSR), one input device, and two output devices.

During the first pass, the Assembler constructs its symbol table in a core-resident table area. During the second pass, the object text and/or listing, as requested, are generated. The assembly listing reflects each source record, the generated machine code, and a maximum of four diagnostic flags per record.

## FORMAT

All Level 6 data elements are based on 16-bit memory words. The format of each memory word is defined from left to right with the first (most significant) bit numbered 0 and the last (least significant) numbered 15. With this arrangement, data can be accessed through an instruction at any of the following levels:

  Bit
  Byte (i.e., half-word) = 8 bits
  Multiword = 32/48/64/etc. bits

Level 6 provides for a maximum of 128K bytes, or 64K words, of addressable memory. Each word can be accessed through a 16-bit address pointer. When displayed or listed, each four bits of data are represented by a single hexadecimal value (0 through 9 and A through F).

## ADDRESSING TECHNIQUES

The Level 6 Assembler generates code by the following techniques:

- Direct addressing
- Indexed direct addressing
- Indirect addressing
- Indexed indirect addressing
- Program-counter-relative
- Indirect program-counter-relative
- Base-relative
- Indexed base-relative
- Indirect base-relative
- Indexed indirect base-relative

In addition, the data or main memory location can be contained in a register or supplied as an immediate value. To access information stored in a table or array, Level 6 offers a push/pop feature. The contents of a register can thereby be automatically incremented or decremented during each successive execution of an instruction, and the contents of a table or array can be searched.

## ASSEMBLY LANGUAGE ELEMENTS

The following language elements are combined to form the source program statements which represent machine instructions to be assembled:

- Mnemonic op codes
- Symbolic names
- Constants
- Expressions

## ASSEMBLY LANGUAGE FUNCTIONS

The Level 6 assembly language utilizes a comprehensive set of executable instructions for the following types of functions:

- Arithmetic
- Boolean
- Branch
- Compare
- Control
- Input/Output
- Load
- Modify
- Shift
- Store
- Swap

## PSEUDO INSTRUCTIONS

The Level 6 assembly language also provides a set of Assembler-related instructions that are not assembled into the object text but provide information for:

- Controlling the assembly of the program.
- Controlling the listing of assembly language statements.
- Defining main memory storage and/or work areas.
- Defining symbols.
- Linking assembly language programs.
- Conditionally assembling particular statements of a source program.

## SYSTEM REQUIREMENTS

Minimum equipment required:

- Level 6 CP with 16K words of main memory
- 2 diskette drives or cartridge disk
- System console (KSR teleprinter or equivalent)

Optional equipment:

- Up to 64K words of main memory
- Additional diskette or disk drives
- Serial or line printer

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Specifications may change as design improvements are introduced.

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