Chapter Four

Memory Organization

Objectives

- Identify the two broad categories of memory and describe the function of each
- Identify the types of information stored in each category of memory
- Define the term *byte*
- Define the acronym *bits*
- Define *holding registers*

Memory Words and Word Locations

- Binary signals have only two states
  - ON or OFF
  - 1 or 0
  - High or low
- Bit: binary digit
- Binary words can be 32, 16, or 8 bits in length

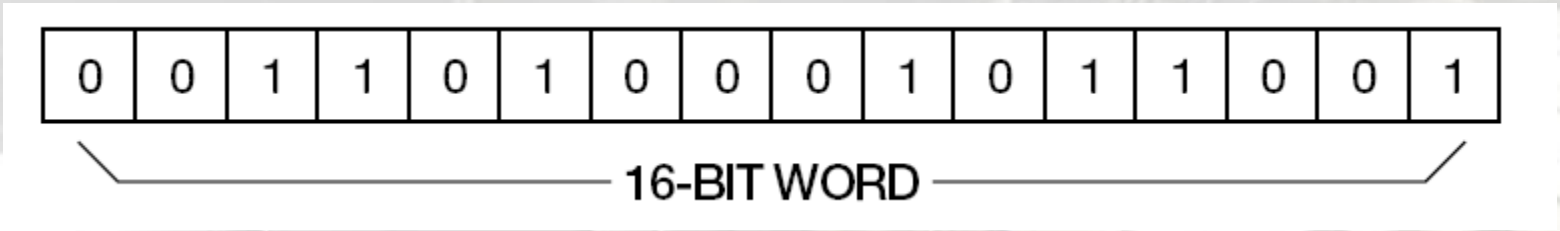

Figure 4-1 16-bit word

Memory Words and Word Locations (cont'd.)

- Byte: group of 8 bits
- Address: memory storage location
- Addressing scheme also identifies hardware location
  - Rack, module, terminal number

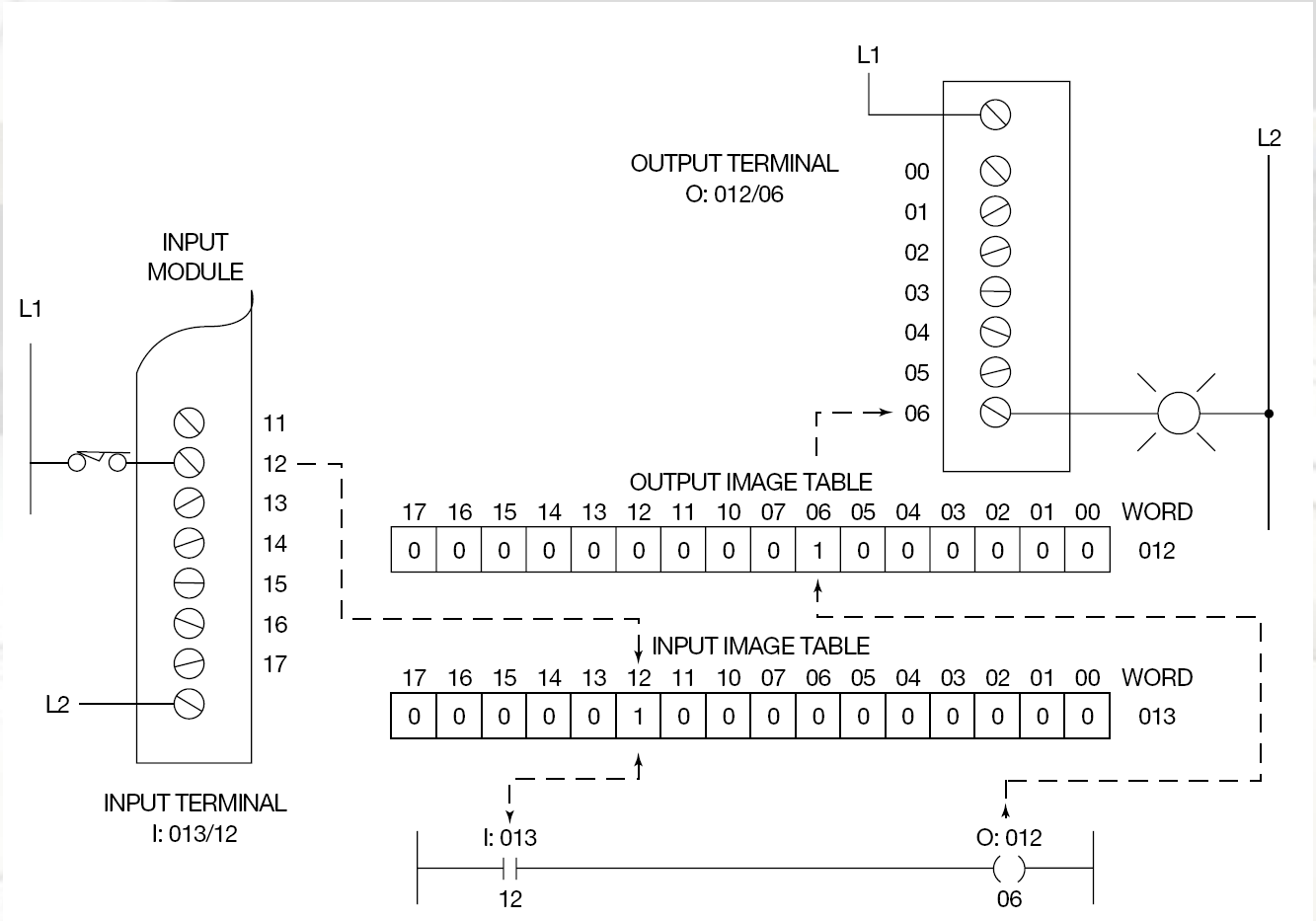

Figure 4-2 Relationship of bit address to input and output devices

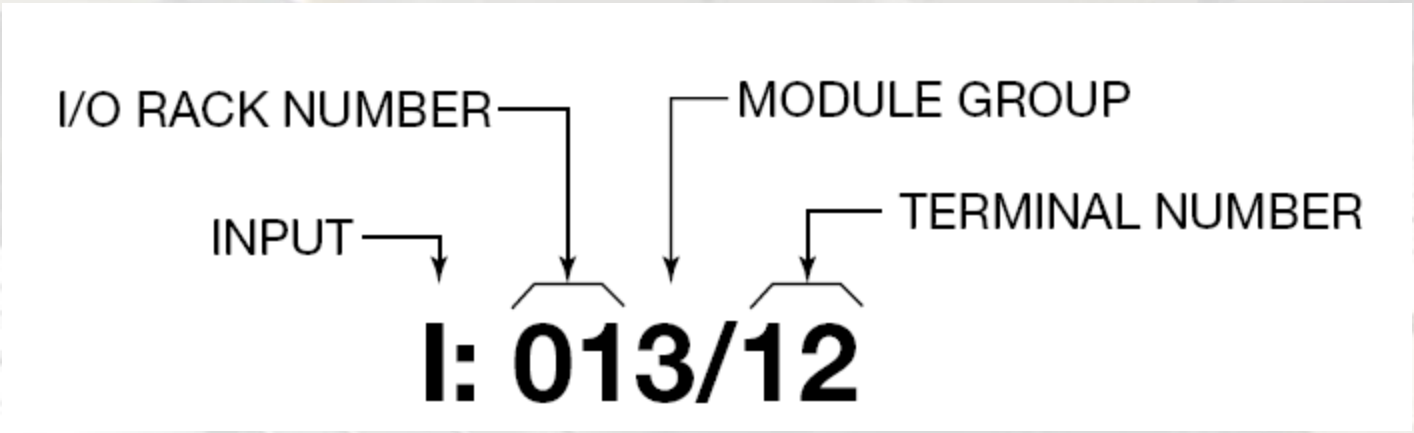

Figure 4-4 Limit switch address I:013/12

SLC 500 and MicroLogix Addressing Scheme

- Letter I used for input addresses
- Letter O used for output addresses

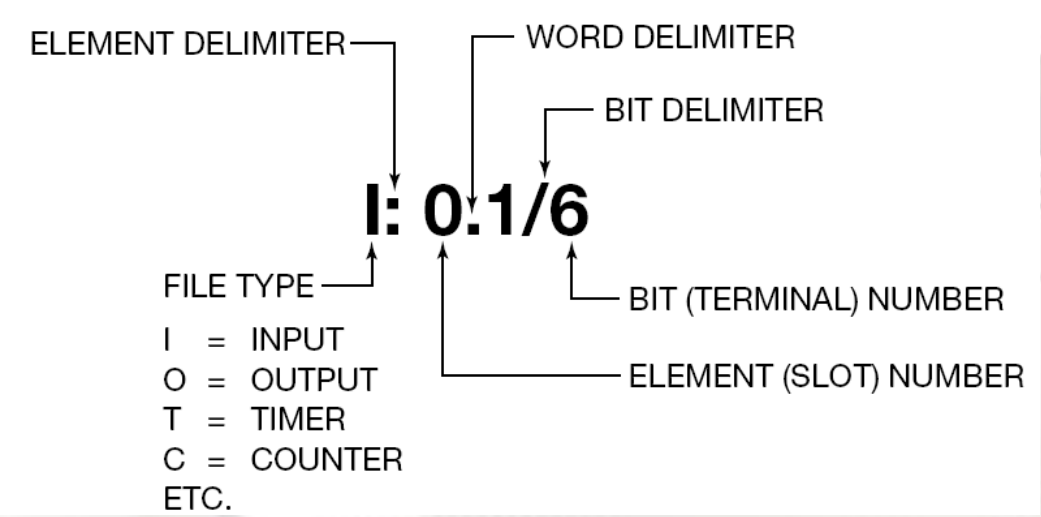

Figure 4-7 Allen-Bradley SLC 500 and MicroLogix addressing scheme

Memory Organization

- Storage memory
  - Entire storage memory called data table or register table
  - Data can be stored in a variety of numbering systems
- User memory
  - Holding registers store temporary data needed by the processor

Allen-Bradley PLC-5 File Structure

- Allen-Bradley PLC-5 processors
  - Programmed with a PC and PLC-5 specific software
- Files
  - Areas of memory
- Memory section 0: output image file
- File 1: input image file

Allen-Bradley PLC-5 File Structure (cont'd.)

- File 2: status file
- File 3: bit file
- File 4: timer file
- File 5: counter file
- File 6: control file
- File 7: integer file
  - Stores whole numbers

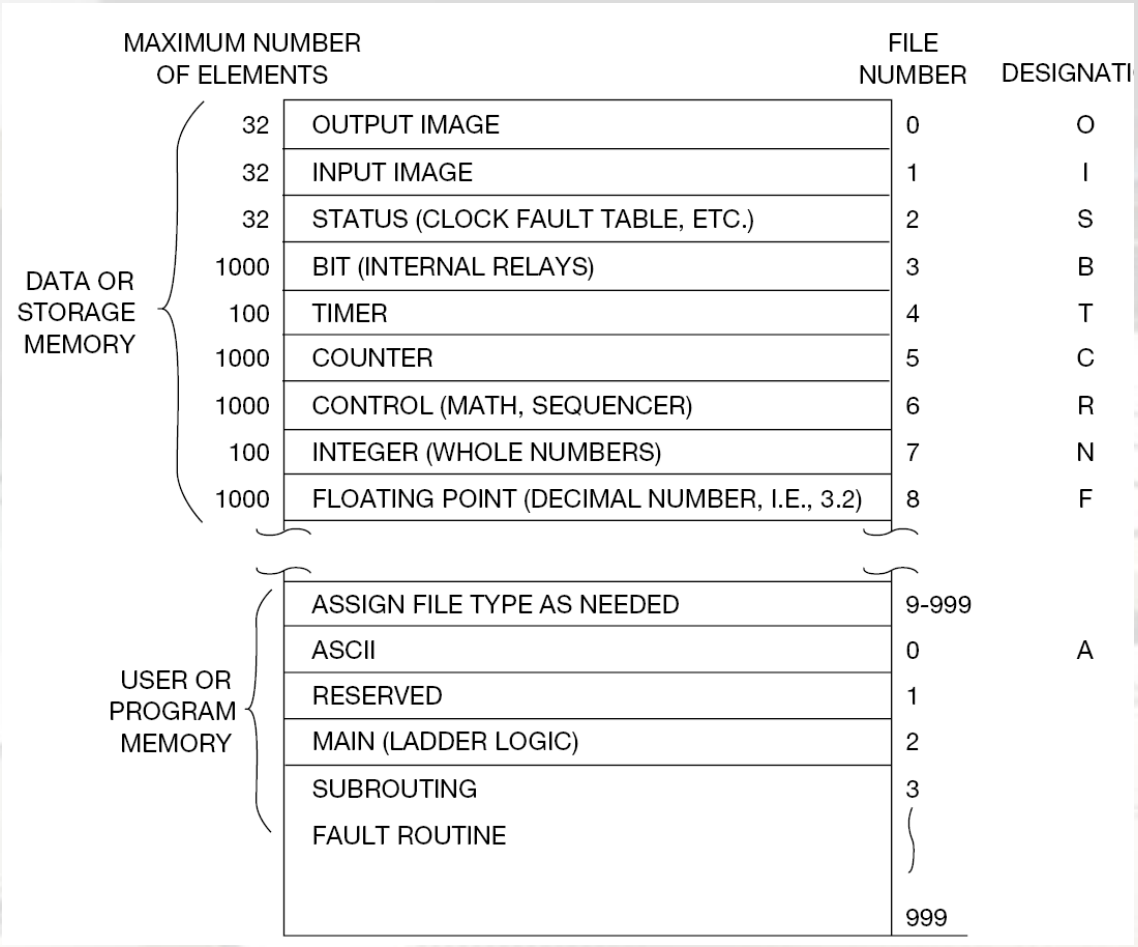

Figure 4-16 PLC-5 file structure

SLC 500 and MicroLogix File Structure

- Program files (user)
  - Contain controller information, programs, and subroutines
- Data files (storage)
  - Contain various types of data for use with the program

Summary

- All PLC data is stored in binary form
  - Allows rapid scanning and executing the user program
- I/O addresses
  - Identify word and bit associated with I/O
  - Indicate the hardware location
- Memory section names vary by PLC manufacturer, but work similarly