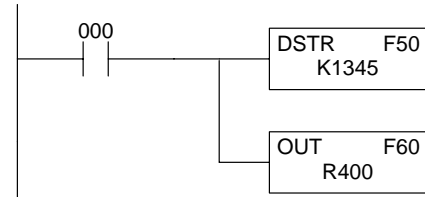


## Data Registers (R Data Type)

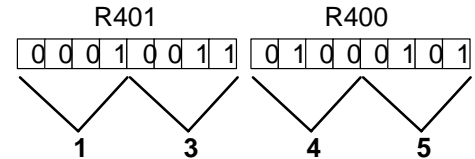
A word memory location is referred to as a Data Register, which is an 8-bit location normally used to manipulate data/numbers, store data/numbers, etc.

Some information is automatically stored in registers. For example, the timer current values are automatically stored in a register that corresponds to the timer or counter number being used.

The example shows how a four-digit BCD constant is loaded into the accumulator and then stored in a Register location. Notice two registers are required to hold the 4-digit number.



### Word Locations – 8 bits

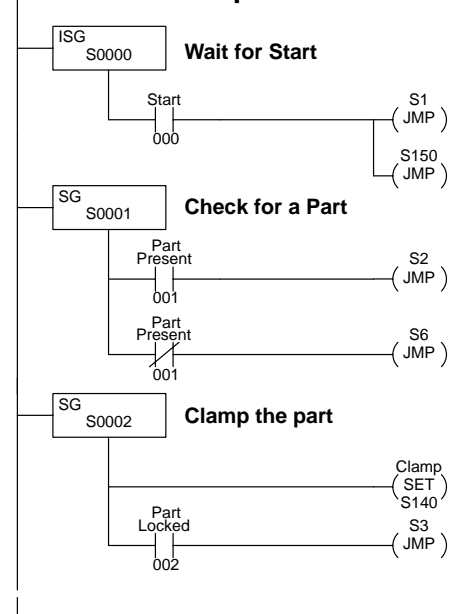


## Stages (S Data type)

Stages are used in RLL *PLUS* programs to create a structured program, similar to a flowchart. Each program stage denotes a program segment. When the program segment or stage, is active, the logic within that segment is executed. If the stage is off or inactive, the logic is not executed and the CPU skips to the next active stage. (See Chapter 10 for a more detailed description of RLL *PLUS* programming.)

Each stage also has a discrete status bit that can be used as an input to indicate whether the stage is active or inactive. If the stage is active, then the status bit is on. If the stage is inactive, then the status bit is off. This status bit can also be turned on or off by other instructions, such as the SET or RESET instructions. This allows you to easily control stages throughout the program.

### Ladder Representation

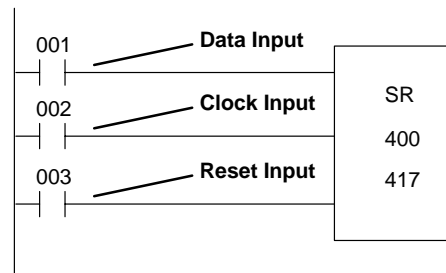


**Shift Registers**

There are 128 bits available for use in Shift Registers with the DL330 and DL340 CPUs. You can still use Shift Registers in the DL330P CPU, but a separate range of bits is not provided. You have to use the control relay points in the Shift Register instructions. These are numbered from 400 to 577. Your first reaction may be to think these are somehow related to the Data Registers with the same numbers. They are completely separate areas and *are not* related.

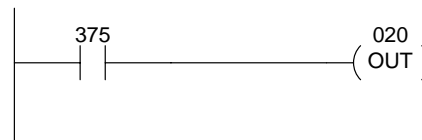
The number of Shift Register instructions that can be used depends on how many bits are used with each Shift Register. For example, if you have a DL330 and you use 16 bits in each Shift Register, you can have up to 8 Shift Registers. If you only used 8 bits in each one, then you could have up to 16 Shift Registers.

In the example shown, contact 001 represents the data value (0 or 1) that will be loaded into the shift register when the clock input (002) is active. Each time the clock input comes on, the data values are shifted through the bit positions from 400 to 417. Input 003 resets the shift register and sets all the bit positions back to zero. Chapter 11 provides detailed instructions on how to use shift registers.

**Special Relays**

Special relays are discrete memory locations with pre-defined functionality. There are many different types of special relays. For example, some aid in programming, others provide system operating status information, etc.

In this example, special relay 375 will energize for 50 ms and de-energize for 50 ms because relay 375 is a pre-defined relay that will be on for 50 ms and off for 50 ms.

**Special Registers (R Data Type)**

There are also a few special registers that store various types of system information. For example, the DL340 communication port parameters are set in special registers. The detailed memory maps at the end of this chapter show special register assignments for each CPU.