

## Execution of a Complete Instruction -

Instruction Add (R3), R1

- Action  $\Rightarrow$
- 1) Fetch the instruction
  - 2) Fetch the first Operand (the contents of memory location pointed by R3)
  - 3) Perform Addition
  - 4) Load Result into R1.

| <u>Step</u> | <u>Action</u>                          |
|-------------|--|
| 1           | PCout, MARin, Read, Select 4, Add, Zin |
| 2           | Zout, PCin, Yin, WMFC                  |
| 3           | MDRout, IRin                           |
| 4           | R3out, MARin, Read.                    |
| 5           | R1out, Yin, WMFC                       |
| 6           | MDRout, select Y, Add, Zin             |
| 7           | Zout R1in, End.                        |

Fig 7.6  
Control sequence for  
execution of instruction  
Add (R3), R1.

## Branch Instructions - (Branch > 0)

offset-field-of-IRout, Add, Zin, if N=0 then End

if N=0, return to step 1  
if N=1, load next value into PC

| <u>Step</u> | <u>Action</u>                          |
|-------------|--|
| 1           | PCout, MARin, Read, Select 4, Add, Zin |
| 2           | Zout, PCin, Yin, WMFC                  |
| 3           | MDRout, IRin                           |
| 4           | offset-field-of-IRout, Add, Zin        |
| 5           | Zout, PCin, End                        |

Fig 7.7 Ctrl sequence for an  
unconditional Branch Instruction