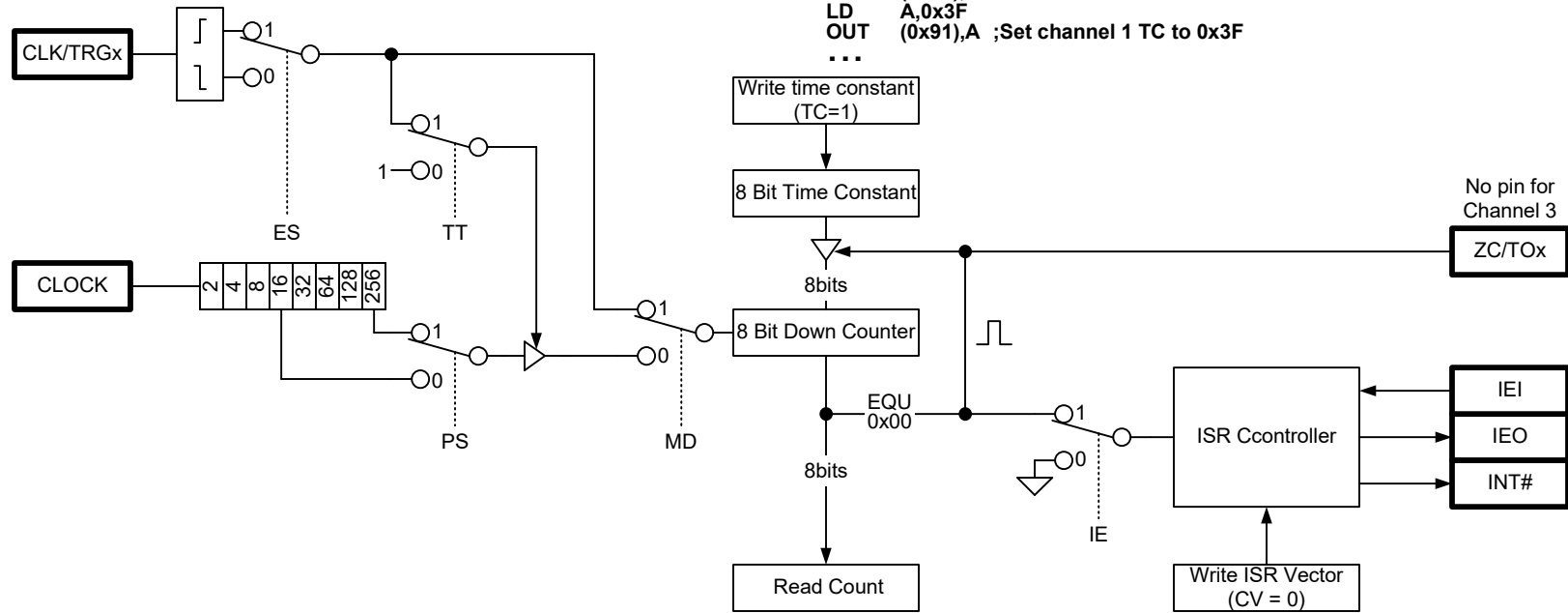


# Z80 CTC LOGIC AND PROGRAMMING



```

SETTC LD A,0x05 ;Next write is TC data
      OUT (0x90),A
      LD A,0x7F ;Set channel 0 TC to 0x7F
      OUT (0x90),A
      LD A,0x05 ;Next write is TC data
      OUT (0x91),A
      LD A,0x3F ;Set channel 1 TC to 0x3F
      OUT (0x91),A
      ...
  
```

```

READTC IN A,(0x90) ;Reads count
              ;for Channel 0
      ...
READTC IN A,(0x91) ; 1
      ...
READTC IN A,(0x92) ; 2
      ...
READTC IN A,(0x93) ; 3
  
```

```

INITISR LD A,0x19 ;Set vector upper 8 bits
        LD I,A
        IM 2      ;CTC uses int mode 2
        EI        ;Enable interrupts
        LD A,0x00 ;Set vector lower 8 bits
        OUT (0x90),A ;CTC Ch 0 is used to write
                    ;base addr for all channels
                    ;LSB always 0
  
```

```

      ...
      ORG 0x1900 ;Base address I+Vector
      DW CTC_0 ;Vector for channel 0
      DW CTC_1 ; 1
      DW CTC_2 ; 2
      DW CTC_3 ; 3
  
```

```

      ...
      ORG 0x1A00
      (Code for CTC channel 0)
      EI
      RETI
      (Code for CTC channel 1)
      EI
      RETI
      (Code for CTC channel 2)
      EI
      RETI
      (Code for CTC channel 3)
      EI
      RETI
  
```

## EXAMPLE CODE

1. Assume CTC address decodes to 0x90 to 0x93
2. For TC write, only TC and CV bits shown, set all other bits as needed

Channel Control Register

|   |                         |                            |
|---|-------------------------|----------------------------|
| 7 | IE Interrupt Enable     | 1 Enabled<br>0 Disabled    |
| 6 | MD Mode                 | 1 Counter<br>0 Timer       |
| 5 | PS Prescaler (Timer)    | 1 Clock/256<br>0 Clock/16  |
| 4 | ES Edge Select          | 1 Rising<br>0 Falling      |
| 3 | TT Time Trigger (Timer) | 1 Clk/Trg<br>0 Always on   |
| 2 | TC Time Constant        | 1 Write2=TC<br>0 No Write2 |
| 1 | RS Reset                | 1 SW Reset<br>0 Operate    |
| 0 | CV Control/Vector       | 1 Control<br>0 Vector      |

TC

|   |           |
|---|-----------|
| 7 | MSB       |
| 6 |           |
| 5 |           |
| 4 | 0x00-0xFF |
| 3 | 0x00=256  |
| 2 |           |
| 1 |           |
| 0 | LSB       |

Vector

|   |           |
|---|-----------|
| 7 | MSB       |
| 6 |           |
| 5 |           |
| 4 | 0x00-0xFE |
| 3 |           |
| 2 |           |
| 1 | LSB       |
| 0 | 0         |