

Host Interface

3.0 Introduction

The DC104 drive communicates with PC104 compatible host computers through 8 bit I/O ports selected by the user. The contiguous address range used by the DC104 drive is 256 bytes. All of the drive's parameters, both status and control, are available within the 256 byte range. I/O offset assignments are chosen by DIP switch selection detailed later in this section. Once an appropriate I/O base address is selected, the user is free to implement either an interrupt or polling strategy depending on the requirements of the application and/or host computer.

3.1 I/O Registers

The DC104 drive registers are mapped according to the memory offset diagram shown in Table 3-1. The DC104 drive can map anywhere in the 16-bit I/O space. However, care should be taken to ensure that the 256 byte I/O address range does not conflict with other bus resources. A base address selection of 0x00 will likely cause conflicts with the host computer and its peripherals. The factory default I/O base address is 0xFF00. The base offset address is selected with the DIP switch assembly labeled SW1. The location of SW1 is shown in Figure 3.

Warning! Placing all DIP switches in the off position selects I/O base address 0x00. This will likely interfere with host computer operation and is not recommended.

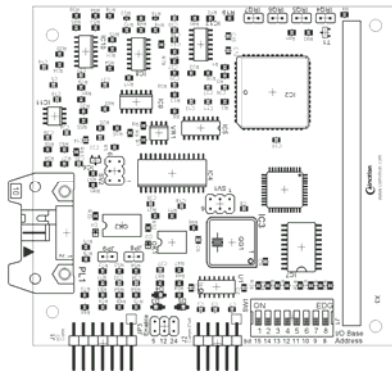


Figure 1

Settings	Hex offset address
00000001	0x100
00000010	0x200
00000011	0x300
...	...
10010011	0x9300
10010100	0x9400
10010101	0x9500
10010110	0x9600
...	...
11111110	0xFE
11111111	0xFF

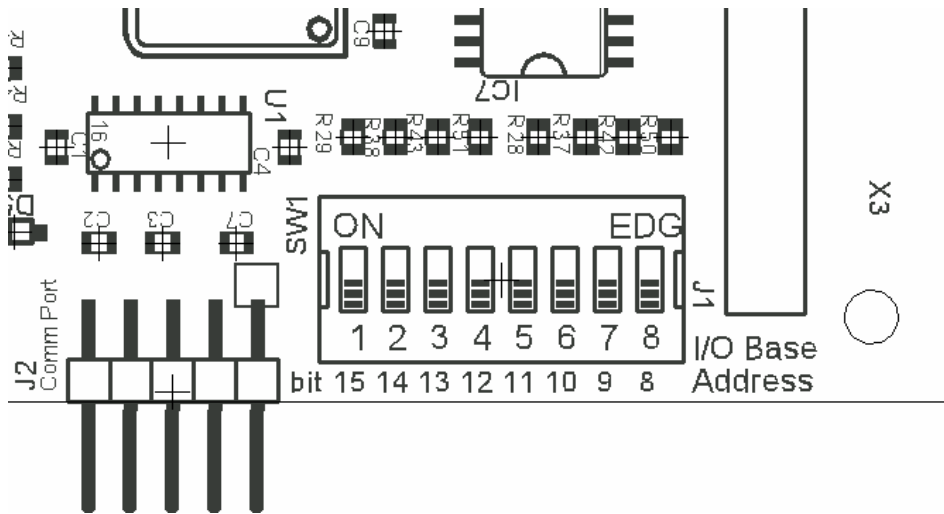


Figure 2 Exploded view of offset address dip switch selector

1.2 Communication

All of the drive's parameters are accessed using a hardware handshaking protocol. The registers provide read and write capability of all the drive's parameters. The DC104 drive uses parameter, data, checksum, command, and status registers in order to update or obtain parameter values as required by the host controller. The DC104 drive uses a total of 6 bytes whose I/O base address is switch selectable by the user. The user is free to choose polling, interrupts or a combination of the two to read/write drive parameter values. A more detailed description of read and write operations are outlined following this section.

REGISTER	
Reserved for future use	I/O Base Address (0x00 - 0xF9)
Parameter	I/O Base Address + 0xFA
Data Low	“ “ + 0xFB
Data High	“ “ + 0xFC
Block Check Sum	“ “ + 0xFD
Command	“ “ + 0xFE
Status	“ “ + 0xFF

Write a parameter value

The first step in the write parameter sequence is to clear the status register. The low byte and high byte of data are then loaded into their respective register locations. The parameter number should then be loaded to the parameter register. A block check sum must be calculated and then placed in the bcc register. The block checksum consists of the parameter, low byte and high byte. Finally, a write request (**0x55**) is sent to the command register. The actual order of loading the above data is not important as long as it has all been completed prior to issuing the write request. Writing to the command register generates an interrupt to the DC104 drive. If a valid check sum and write request exist in the command register, the DC104 drive will update the data values assuming it falls within the min/max value range. The DC104 drive will acknowledge a successful write with an ACK/0x06 in the status register. The user is free to poll the status register for a non-zero value or use an interrupt if enabled. If an out of range parameter value is attempted or a valid bcc is not received, the DC104 will respond with a NAK/0x15 in the status register and ignore the write request. The DC104 will also respond with a NAK/0x15 if a non-valid command is received.

Read a parameter value

Reading parameters involves loading the parameter register with the parameter number desired and then issuing a read request (**0xAA**) to the command register. The DC104 drive will respond by clearing the command register. An ACK/0x06 in the status register indicates that the routine is complete. An ACK/0x06 indicates that the bcc and data have been placed in their respective register locations and are ready to be read. As in the case of the write routine, the host can poll the DC104 status register for a non-

zero value or use an interrupt if enabled. The host controller should verify the validity of the block checksum prior to using the data in the data registers. If the host controller requests a read for a parameter that does not exist, the DC104 drive will respond with a NAK/0x15 in the status register. The DC104 will also respond with a NAK/0x15 if a non-valid command is received.

Write Routine

Ex: Change acceleration time (P7) to 60.0 seconds, base I/O 0x0800

1. Write 0 to I/O address 0x08FF to clear the status register.
2. Write 0x07 to the parameter register at 0x08FA
3. Load data low value of 0x58 to I/O address 0x08FB
4. Write Load data high value of 0x02 to I/O address 0x08FC.
5. Write a bcc of 0x61 to the check sum register at 0x08FD.
(high byte + low byte + parameter number = 0x02 + 0x58 + 0x07 = 0x61)
6. Issue a write request (0x55/write command) to the command register, I/O address 0x08FE

If polling:

7. Poll the status register, I/O address 0x08FF, for a non-zero value. (0x06/ACK) indicates a successful write.

If using interrupts:

7. A hardware interrupt will be generated upon completion of the write request. The particular interrupt will be dependent on the settings of the IRQ jumpers. Read I/O address 0x08FF. The act of reading the status register clears the hardware interrupt. A value of (0x06/ACK) in the status register 0x08FF indicates a successful write to acceleration time.

Read Routine

Ex: read bus voltage (P22), base I/O 0x0800

1. Write a value of 0 to 0x08FF to clear the status register.
2. Write parameter number (0x16/decimal 22) to the parameter register at 0x08FA
3. Issue a read request (0xAA/read command) to the command register 0x08FE

If polling:

4. Poll offset address 0x08FF for a non-zero value. A value of (0x06/ACK) indicates the data registers have been updated. For additional verification, the checksum value at 0x08FD should be

used prior to using the data. Assuming the bus voltage at the time was 165 volts, the bcc register would contain 0xBB.

Checksum = parameter number + high byte + low byte = 0x16 + 0x00 + 0xA5 = 0xBB.

If using interrupts:

4. A hardware interrupt will be generated upon completion of the read request. The particular interrupt will be dependent on the settings of the IRQ jumpers on the DC104 drive. Read I/O address 0x08FF. The act of reading the status register clears the hardware interrupt. An ACK/0x06 value indicates that the data requested is ready, for additional verification the checksum value at 0x08FD should be verified prior to using the data. Assuming the bus voltage at the time was 165 volts, the bcc register would contain 0xBB.
Checksum = parameter number + high byte + low byte = 0x16 + 0x00 + 0xA5 = 0xBB.