## **Interrupt Input Module**



#### **Overview**

The D4-INT is an 8-point interrupt module. This module is intended for applications that have a high-priority event that requires special operations to be performed. When this high priority event occurs, the interrupt module senses a DC level input signal. The module automatically informs the CPU to interrupt its present operation. The CPU immediately suspends its routine scan cycle and jumps to a subroutine identified with that particular interrupt input signal point. The CPU then executes the logic in the subroutine (subroutines can even use immediate I/O instructions to immediately read and write I/O points if a time-critical update is necessary). When the subroutine is complete, the CPU automatically resumes its routine scan cycle starting at the exact location where it was interrupted. The CPU continues the routine scan until another interrupt signal is sensed.

Module Specifications					
Modules per CPU	2 for D4-440, D4-450, and D4-454 (modules must be in 1st then 2nd slot of the CPU base)				
Input Points	8 (requires 16 points from I/O)				
Input Voltage Range	10.20-26.4VDC				
Maximum Input Current	10.0mA				
Impedance	~ 2.7K <b>Ω</b>				
Input Current	4.4mA at 12VDC, 9.0 mA at 24VDC				
ON Level Voltage	9.5VDC				
OFF Level Voltage	3.0VDC				
Maximum OFF Current	1.5mA				
Minimum ON Current	4.0mA				
OFF to ON Response	0.08 - 0.59ms or 0.88 - 6.47ms				
ON to OFF Response	0.15 - 0.89ms or 1.64 - 9.81ms				
Terminal Type	Removable connector				
Operating Environment	0°C to 60°C (32°F to 140°F), 5% to 95% humidity (non-condensing)				
Internal Power Consumption	100mA max				



Interrupt #1

#### Hardware

#### features

The D4-INT is designed to accept eight input signals. These inputs are labeled 0 through 7. If multiple inputs are received at the same time, they are prioritized by their respective label number, 0 being first and 7 being last. Input points not used as interrupt points can be used as normal DC input points. This is accomplished with an 8-bit dipswitch located on the back of the module.

Interrupt signals can be triggered with a rising or falling edge signal. This is selectable via a dipswitch.

Two ranges of input filtering for response times are available via a dipswitch.

### **Check the Power Budget**

### Verify your power budget requirements

Your I/O configuration choice can be affected by the power requirements of the I/O modules you choose. When determining the types and quantity of I/O modules you will be using, it is important to remember there is a limited amount of power available from the power supply.

The chart on the opposite page indicates the power supplied and used by each DL405 device. The adjacent chart shows an example of how to calculate the power used by your particular system. These two charts should make it easy for you to determine if the devices you have chosen fit within the power budget of your system configuration.

If the I/O you have chosen exceeds the maximum power available from the power supply, you can resolve the problem by shifting some of the modules to an expansion base or remote I/O base (if you are using remote I/O).

Warning: It is extremely important to calculate the power budget correctly. If you exceed the power budget, the system may operate in an unpredictable manner which may result in a risk of personal injury or equipment damage.

### Use *ZIP*Links to reduce power requirements

If your application requires a lot of relay outputs, consider using the ZipLink AC or DC relay output modules. These modules can switch high current (10A) loads without putting a load on your base power budget. Refer to Wiring System for DL405 PLCs later in this section for more information. This logo is placed next to I/O modules that are supported by the *ZIP*Link connection systems.

See the I/O module specifications at the end of this section.



# Calculating your power usage

The following example shows how to calculate the power budget for the DL405 system. The example is constructed around a single 8-slot base using the devices shown. It is recommended you construct a similar table for each base in your system.

A								
	Base Number O	Device Type	5 VDC (mA)	External 24 VDC Power (mA)				
B	CURRENT SUPPLIED							
	CPU/Expansion Unit /Remote Slave	D4-440 CPU	3700	400				
C	CURRENT REQUIRED							
	SLOT O	D4-16ND2	+150	+0				
	SLOT 1	D4-16ND2	+150	+0				
	SLOT 2	F4-04DA	+120	+100				
	SLOT 3	D4-08ND3S	+100	+0				
	SLOT 4	D4-08ND3S	+100	+0				
	SLOT 5	D4-16TD2	+100	+0				
	SLOT 6	D4-16TD2	+100	+0				
	SLOT 7	D4-16TR	+1000	+0				
D	OTHER							
	BASE	D4-08B-1	+80	+0				
	Handheld Programmer	D4-HPP-1	+320	+0				
E	Maximum Current Required		2820	100				
F	Remaining Current Available		3700-2820=880	400-100=300				
	1. Using a chart similar to the one above, fill in column 2.							

3. Using be that best on the opposite page, enter the current supplied and used by each device (columns 3 and 4). Pay special attention to the current supplied by the CPU, Expansion Unit, and Remote Slave since they differ. Devices which fall into the "Other" category (Row D) are devices such as the Base and the Handheld programmer, which also have power requirements, but do not plug directly into the base.
3. Add the current used by the system devices (columns 3 and 4) starting with Slot 0 and put the total in the row labeled "maximum current required" (Row E).

4. Subtract the row labeled "Maximum current required" (Row E), from the row labeled "Current Supplied" (Row B). Place the difference in the row labeled "Remaining Current Available" (Row F).
5. If "Maximum Current Required" is greater than "Current Supplied" in either column 3 or 4, the power budget will be exceeded. It will be

5. If "Maximum Current Required" is greater than "Current Supplied" in either column 3 or 4, the power budget will be exceeded. It will be unsafe to use this configuration and you will need to restructure your I/O configuration. Note the auxiliary 24 VDC power supply does not need to supply all the external power. If you need more than the 400mA supplied, you can add an external 24VDC power supply. This will help keep you within your power budget for external power.

#### DL405 CPU power supply specifications and power requirements

Specification	AC Powered Units 24 VDC Powered Units		125 VDC Powered Units		
Part Numbers	D4-454, D4-450, D4-440, D4-EX (expansion base unit), D4-RS (remote slave unit)	D4-454DC-1, D4-440DC-1, D4-EXDC (expansion base unit), D4-RSDC (remote slave unit)	D4-450DC-2		
Voltage Withstand (dielectric)	1 minute @ 1,500 VAC between primary, secondary, field ground, and run relay				
Insulation Resistance	> 10MΩ at 500VDC				
Input Voltage Range	85-132 VAC (110 range) 170-264 VAC (220 range	20-28 VDC (24 VDC) with less than 10% ripple	90-146 VDC (125 VDC) with less than 10% ripple		
Maximum Inrush Current	20 A	20 A	20 A		
Maximum Power	50 VA	38 W	30 W		

### **Power Requirements**

Power Supplied							
CPUs/Remote Units/ Expansion Units	5 VDC Current Supplied in mA	24V Aux Power Supplied in mA	CPUs/Remote Units/ Expansion Units	5V Current Supplied in mA	24V Aux Power Supplied in mA		
D4-440 CPU D4-440DC-1 CPU D4-450 CPU D4-454 CPU D4-450DC-2 CPU D4-450DC-2 CPU D4-450DC-1	3700 3700 3700 3100 3100 3100 3100	400 NONE 400 NONE NONE	D4-EX D4-EXDC D4-RS D4-RSDC H4-EBC H4-EBC-F	4000 4000 3700 3700 3470 3300	400 NONE 400 NONE 400 400		
	÷	Power C	onsumed				
Power-consuming Device	5V Current Consumed	External 24VDC Current Required	Power-consuming Device	5V Current Consumed	External 24VDC Current Required		
I/O Bases			Analog Modules (continued)				
D4-04B-1 D4-06B-1 D4-08B-1 <b>DC Input Modules</b> D4-08ND3S D4-16ND2	80 80 80	NONE NONE NONE NONE NONE NONE	F4-16AD-1 F4-16AD-2 F4-04DA-1 F4-04DA-2 F4-04DAS-1 F4-04DAS-2 F4-04DAS-2 F4-08DA-2 F4-16DA-1 F4-16DA-1 F4-16DA-2 F4-16DA-2 F4-08RTD	75 75 70 90 60 60 90 80 80 80 80	100 100 75+20per circuit 90 60 per circuit 60 per circuit 100+20 per circuit 150 100+20 per circuit 25 max. NONE		
D4-32ND3-1	150	NONE	F4-08THM-n F4-08THM	120	50 60		
D4-64ND2	300 max.		Remote I/O				
AC Input Modules			H4_EBM100	320(300)	NONE		
D4-08NA D4-16NA	100 150	NONE NONE	H4-ERM-F D4-RM	450 300	NONE		
AC/DC Input Modules							
D4-16NE3 F4-08NE3S	150 90	NONE NONE	Communications and Ne	tworking			
DC Output Modules			H4-ECOM100	300	NONE		
F4-08TD1S D4-16TD1 D4-16TD2 D4-20TD1	295 200 400	NONE 125 NONE	F4-MAS-MB FA-UNICON	235 NONE	NONE 65		
D4-321D1 250 D4-32TD1-1 250		140 140 (15V)	CoProcessors				
D4-321D2	350	120 (4A max including loads)	E4 CD100 1	205			
D4-64TD1	800	NONE	F4-CP128-T	350	NONE		
		Snacialty Modules					
D4-081A D4-16TA	450	NONE					
Relav Output Modules		H4-CTRIO D4-INT	400 100	NONE			
D4-08TR F4-08TRS-1 F4-08TRS-2 D4-16TR	550 575 575 1000	NONE NONE NONE NONE	F4-16PID F4-8MPI D4-16SIM F4-4LTC	160 225 150 280	NONE 170 NONE 75		
Analog Modules		Programming					
			D4-HPP-1 (Handheld Prog.)	320	NONE		
F4-04AD150		100	Operator Interface	1			
F4-04ADS F4-08AD	370 75	120 90	DV-1000	150	NONE		
			C-more Micro-Graphic	210	NONE		