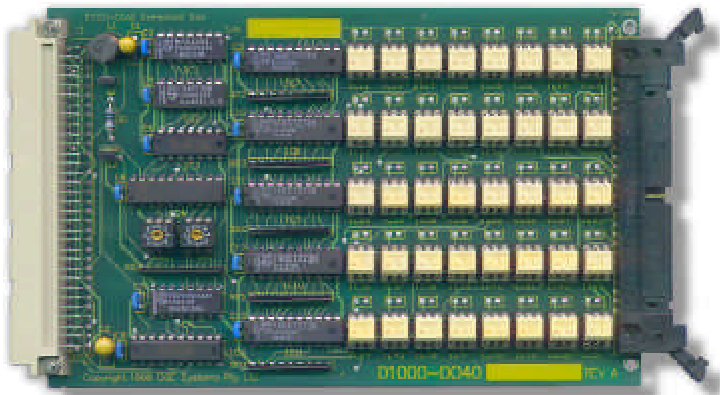


**D1000-DO40****40 Line Opto-Isolated Digital Output Card  
for  
IEEE1000 based Eurocard Systems****Rev A**  
**8th April 1999**

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## Introduction

The D1000-DO40 provides 40 lines of opto-isolated digital output for Eurocard systems based on the IEEE1000 format. With on-board electrical isolation, the D1000-DO40 provides a direct "Bus to Output" functionality eliminating the need for external signal isolation and conditioning.

Capabilities of the D1000-DO40 include the switching of AC and DC loads. This allows loads to be connected to either the "hot" side as in conventional open collector NPN transistor stages, or for loads to be connected to a common line which may be grounded.

Outputs are five groups of eight lines with each group independently configurable for voltage rail and common rail connection. The D1000-DO40 design allows the user to fit a component in parallel with each load, this may be a diode for inductive flyback control or a light emitting diode for visual status indication.

A feature of the D1000-DO40 is the linear characteristic of the control elements which is suitable for switching analog signals, the very small leakage current of the switching elements means high impedance loads can be controlled.

Card configuration is provided by numbered rotary hex encoding switches, simply 'dial' the card's I/O address. This is particularly useful for systems with multiple I/O cards.

Targetted for industrial applications, the D1000-DO40 has CMOS logic devices and MOSFET buffers rated for operation over an extended temperature range.

For complete digital control, the companion D1000-DI40 offers 40 lines of opto-isolated input. When this two card set is combined with the EC586, a compatible IEEE1000 processor card, powerful and reliable Eurocard packaged solutions are realised. Systems with large I/O counts are possible with multi-slot backplanes.

Features of the D1000-DO40 include:

- **40 opto-isolated digital output**
- **AC and DC switching**
- **Grounded load switching**
- **60V/300mA continuous switching**
- **Provision for clamping components**
- **2,500Vac optical isolation**
- **Low off-state leakage current**
- **Analog signal switching capability**
- **Low power CMOS construction**
- **Single +5V supply**
- **Compact Eurocard format**

## Bus Interface

The card is configured as five groups of eight lines. Each group has a data latch which is written to on an I/O output access. A logic 1 will cause the output switching element to conduct. On power up or reset the latches are forced to logic 0. This puts the D1000-DO40 into a known state on initialisation.

## Output Stage

Each of the five groups is electrically independent allowing loads of differing voltage requirements to be controlled. In addition the output elements are capable of switching AC and DC loads providing the user with a number of options for field device connection.

Figure 1 shows one group of output lines. Each line has an on-board site for a component which can be a pull-up resistor, a flyback diode for inductive loads, or a light emitting diode.

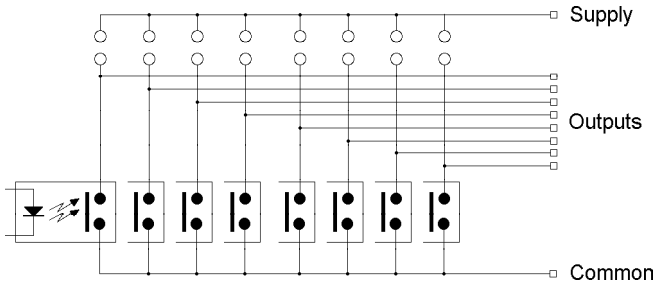


Figure 1: Output Stage for a Group

Figure 2 illustrates the alternate polarity and grounding possibilities. In particular note the loads may be commoned and grounded on either the positive or negative side of the voltage supply.

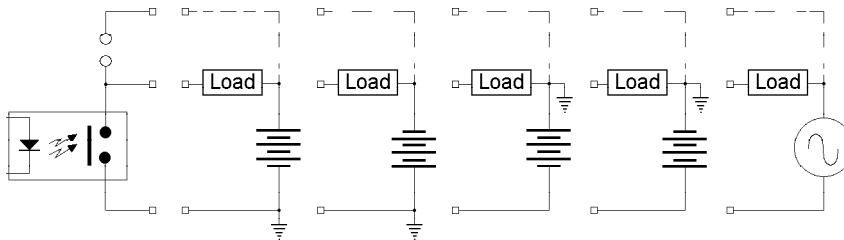


Figure 2: Field Device Connections

## Alternate Output Switching Devices

Output devices on the standard product are rated at 60V, 300mA maximum which is a continuous rating at 25°C. Each switch dissipates approximately 180mW and derating is required at higher operating temperatures. Figure 3 shows the derating curves. Users are cautioned to consider good thermal management if the D1000-DO40 is to control full capacity loads at elevated temperatures.

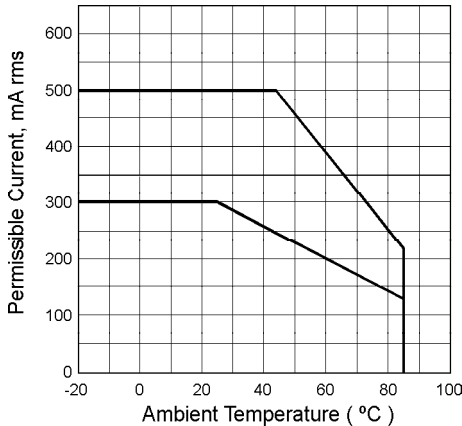


Figure 3: Output Device Derating Curve

Derating curves for 300mA (standard) and 500mA (optional) devices.

The D1000-DO40 is fitted with 60V/300mA devices as standard. Subject to minimum order quantities, the card can be supplied with alternate devices offering different switching characteristics. Table 1 lists the options. Please contact our sales office for details.

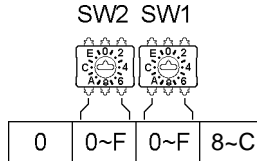
Part Number	Output Rating
D1000-DO40	60V/300mA standard product
D1000-DO40-2	350V/120mA
D1000-DO40-X	60V/500mA
D1000-DO40-4	350V/150mA

Output voltage is DC or AC peak, current is continuous

Table 1: Alternate Output Switch Device Ratings

**Setting the I/O Address**

The D1000-DO40 is a polled, write-only, peripheral card occupying eight locations in the I/O address space of which five are used. The card's base address is set by two hex-encoded rotary switches. The base address can be in the range 0000h to 0FF0h on a 16-byte boundary. The table below shows the association between the digital output card and the digital input card.



Base	Port	Card
+0	A data	D1000-DI40 Input Card
+1	B data	
+2	C data	
+3	D data	
+4	E data	
+5		
+6		
+7		
+8	A data	D1000-DO40 Output Card
+9	B data	
+A	C data	
+B	D data	
+C	E data	
+D		
+E		
+F		

Table 2: I/O Address Map

Note that while the card has 12-bit address decoding some processor cards, particularly PC compatible types, may have 10-bit I/O addressing. This limits the highest base address to 3F0h. Under these circumstances aliasing of the base address occurs. ie address 3F0h will also be seen at BF0h and FF0h.

## Component Placement

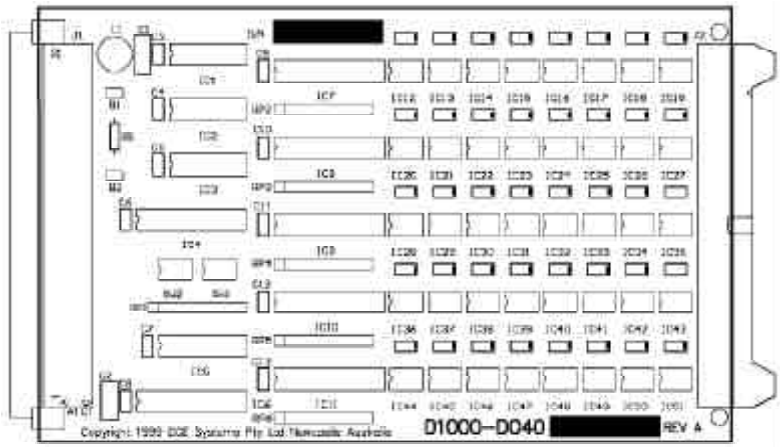


Figure 4: Component Placement Diagram

Each output switch has a corresponding component site which is in parallel with the load. The supply side of the component site is marked with a bar.

## Output Connector Pin Assignments

Table 3 shows output connector J2 pinout and associated register bits. J2 is a 50 pin IDC header with ejector/latch. The pin mapping is similar to the D1000-D140 digital input card.

Base	Bit	Signal	Pin	Pin	Signal	Bit	Base
+8	0	PA0	1	2	PA1	1	+8
	2	PA2	3	4	PA3	3	
	4	PA4	5	6	PA5	5	
	6	PA6	7	8	PA7	7	
		SUPPLY A	9	10	COMMON A		
+9	0	PB0	11	12	PB1	0	+9
	2	PB2	13	14	PB3	2	
	4	PB4	15	16	PB5	4	
	6	PB6	17	18	PB7	6	
		SUPPLY B	19	20	COMMON B		
+A	0	PC0	21	22	PC1	0	+A
	2	PC2	23	24	PC3	2	
	4	PC4	25	26	PC5	4	
	6	PC6	27	28	PC7	6	
		SUPPLY C	29	30	COMMON C		
+B	0	PD0	31	32	PD1	0	+B
	2	PD2	33	34	PD3	2	
	4	PD4	35	36	PD5	4	
	6	PD6	37	38	PD7	6	
		SUPPLY D	39	40	COMMON D		
+C	0	PE0	41	42	PE1	0	+C
	2	PE2	43	44	PE3	2	
	4	PE4	45	46	PE5	4	
	6	PE6	47	48	PE7	6	
		SUPPLY E	49	50	COMMON E		

Table 3: Connector J2 Pinout

## Specifications

Specifications	
Bus Interface:	8 bit, IEEE1000 compliant.
I/O Space:	Occupies 8 I/O locations within 16-byte boundary, write only.
Output:	60V ac or dc, 300mA max continuous at 25°C. Other ratings available.
Output Leakage Current:	1µA.
Optical Isolation:	2,500Vrms for 1 minute.
Switching Time:	Measured with 200R load, 20V supply.
Turn On:	1mSec.
Turn Off:	1mSec.
Power Requirements:	+5Vdc
All Output Off:	3mA
All Output On:	190mA
Temperature:	
Operating:	-20 to +70°C. *
Storage:	-55 to +100°C.
Humidity:	5% to 95% non condensing.
Dimensions:	180 x 100 x 12mm (7.1 x 4 x 0.5") overall.
Weight:	135g approx.

*\* Absolute Maximum Rating in free air. Caution is advised when extended temperature operation is considered. Thermal management strategies must ensure semiconductor components are not exposed to conditions beyond their capability. Product reliability may be compromised.*

## Ordering Information

Part Number	Output Rating
D1000-DO40	40 Line Opto-Isolated Output Card - 60V ac/dc, 300mA
D1000-DO40-2	40 Line Opto-Isolated Output Card - 350V ac/dc, 120mA
D1000-DO40-X	40 Line Opto-Isolated Output Card - 60V ac/dc, 500mA
D1000-DO40-4	40 Line Opto-Isolated Output Card - 350V ac/dc, 150mA
D1000-DO40-TM	Technical Manual