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Reference Notes:

- Refer to [Chapter 2, Power Management](#), in regard to calculating system power requirements.
- [Chapter 3, System Connections and Pinouts](#), includes pinouts for P1, P2, P3, and P4. Refer to the pinouts that are applicable to your system, as needed.

Overview

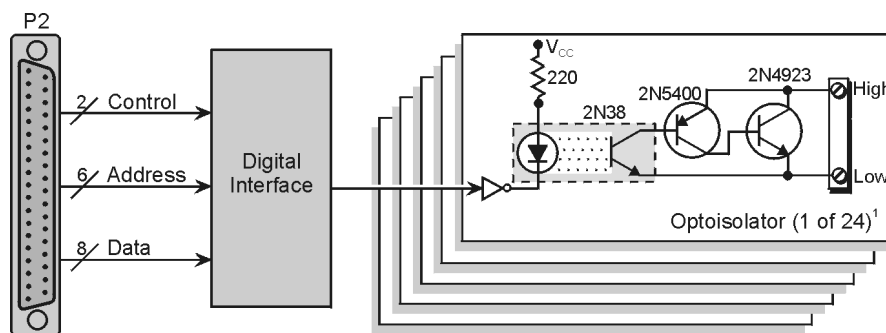
The DBK24 is a 3×8-channel digital output chassis that connects to the LogBook’s, DaqBook’s, or DaqBoard’s [ISA type] P2 Digital I/O Port or, for a DaqBoard/2000 Series board [except DaqBoard/2003] to an appropriate P4 adapter. These adapters are discussed in the DBK200 Series document modules.

The DBK24 provides 500 V isolation from the system and from channel-to-channel. Up to 8 DBK24s can attach to the LogBook, DaqBook, or DaqBoard (not the Daq PC-Card), offering up to 192 bits of isolated digital output.

The DBK24 provides screw-terminal access to each of its 24 isolated outputs. A slide-out PCB allows easy access to the controls and connectors. The output circuitry allows output voltages as high as 60 V at currents up to 1 A.



The local digital I/O cannot be used while any DBK24s are attached.



The optoisolator illustrated is typical of the remaining 23 optoisolators.


DBK24 Block Diagram

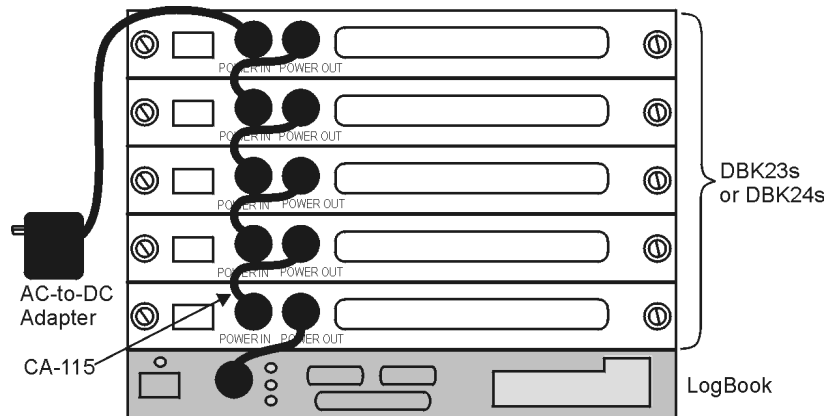
Power Requirements

The DBK24 can be powered by an included AC adapter, a standard 12-V car battery, or an optional rechargeable nickel-cadmium battery module (DBK30A). This power flexibility makes the DBK24 ideal for field and remote data acquisition applications.

Power supplied to the DBK24 powers the on-board regulator. Connect the power supply (AC adapter) to the 5-pin DIN (labeled POWER IN) located on the front panel of the DBK24 chassis. Note the two power indicators on the rear panel of the DBK24. Check that both SYSTEM and LOCAL power LEDs are on at all times during operation. The second 5-pin DIN connector (labeled POWER OUT) can be cascaded to another accessory. A single power source can supply multiple DBK24 units.

CAUTION

 **Excessive power consumption can cause equipment damage. Calculate system power requirements prior to daisy-chaining. Refer to chapter 2, [Power Management](#), for calculation tables.**

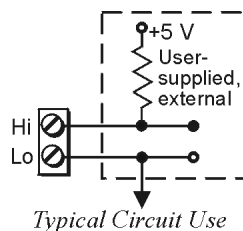


Power Daisy-Chain

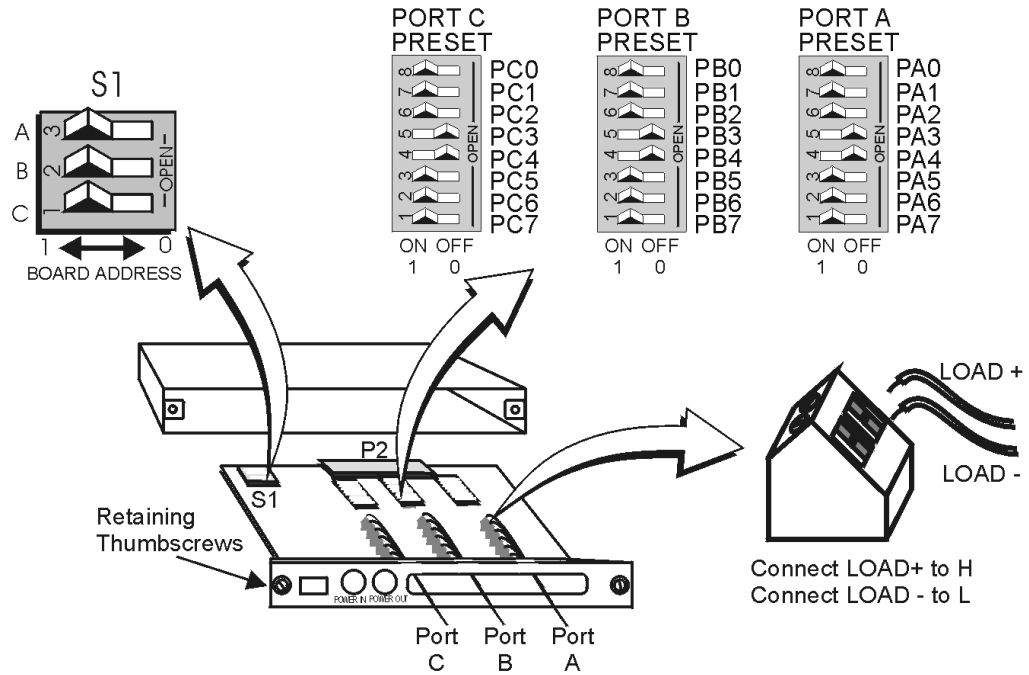
Hardware Setup

Card Connection

Open the DBK24 case by loosening the two retaining screws on the chassis front panel. Slide out the DBK24 board in order to connect wires to terminal blocks. Each input channel (or bit) is equipped with a discrete two-pole screw terminal block for isolated HI and LOW termination. The terminals accept 12 to 22 AWG wire. Insulated wire types selected should meet or exceed 500 V isolation specifications.



Typical Circuit Use



DBK24 simplified Component Layout

Strip some insulation from the ends of the wires (no more than 1/4"). Insert wire into the screw terminal receptacle so that only the bare portion of wire extends into the opening. Bare wire should not extend more than 1/16" beyond the receptacle. These steps are essential to maintaining proper voltage isolation. After the wire ends are in place, turn the slot-head screw at the top of the block until the receptacle grips the wire firmly. Do not over tighten. Captive holes have been placed in appropriate locations to secure groups of wires to the board. Nylon lock ties (not included) work well for this purpose.

Card Configuration

Factory Default: Power-up output state – Hi (ON)

Presetting the Outputs

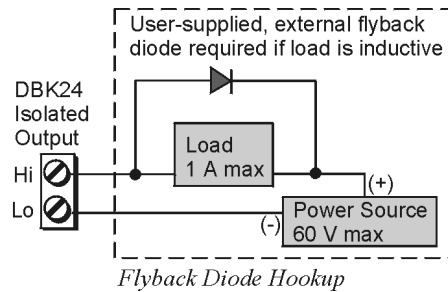
Each of the 24 outputs of the DBK24 can be configured to be ON or OFF at system power-on time. Each port has an 8-pole DIP switch (Port A Preset, Port B Preset, and Port C Preset). Before applying power to the LogBook, DaqBook/DaqBoard, or the DBK24:

1. Locate the DIP switch (Port A Preset, Port B Preset, or Port C Preset) for the bit you wish to preset.
2. Move the applicable micro-switch to the desired state [ON or OFF] for the output.
3. First power on the DBK24, then the primary acquisition device, i.e., the LogBook, DaqBook, or DaqBoard. All outputs will be operating in accordance with their corresponding DIP switch.

Note: The first write command received by the DBK24 will override the switch settings until the unit is again power-cycled. Subsequently, until the first write command is received, the switches may also be used to control the outputs.

User Output Configuration

The outputs of the DBK24 are designed to switch levels as high as 60 V at 1 A. The next figure shows a typical output hookup with a protective flyback diode in parallel with the load. When driving inductive loads without built-in flyback protection, you must provide this diode.



CAUTION



Failure to provide adequate flyback protection may result in damage to DBK24's output stage.

Each unit is configured via the on-board DIP switch (S1) for its unique base address. No more than one unit in a common chain may have the same S1 setting. Below is a table of possible switch settings and addresses.

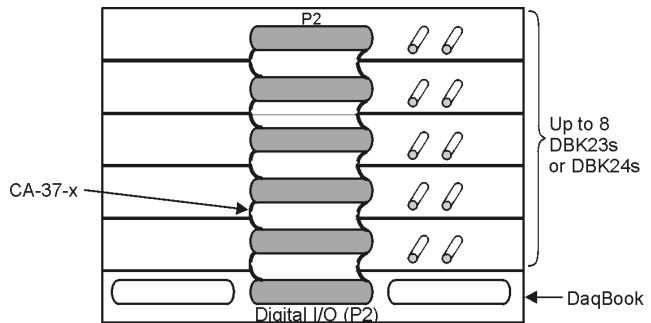
Bank	Card No.	S1 Configuration			Address Value (Hex)		
		C	B	A	Port C	Port B	Port A
0	0	0	0	0	0x62	0x61	0x60
	1	0	0	1	0x66	0x65	0x64
1	2	0	1	0	0x6A	0x69	0x68
	3	0	1	1	0x6E	0x6D	0x6C
2	4	1	0	0	0x72	0x71	0x70
	5	1	0	1	0x76	0x75	0x74
3	6	1	1	0	0x7A	0x79	0x78
	7	1	1	1	0x7E	0x7D	0x7C



Software constants have been predefined in the DaqBook/DaqBoard driver language interface files for all languages as follows: DdpExpnA, DdpExpnB, DdpExpnC; where "n" is replaced by the card number in the address table; and A, B, or C is the port for that card.

DaqBook and DaqBoard Connection

Connect the P2 digital I/O port of the DaqBook or DaqBoard [ISA type] or, for a DaqBoard/2000 Series board [except DaqBoard/2003] to an appropriate P4 adapter, to the P2 connector of the DBK24 using an accessory cable (with -x indicating the number of expansion units to be connected). Select up to 8 positions for a total of 192 programmable isolated inputs.



Connecting Multiple DBK23/24s

DaqBoard/2000 Series Board Connection

Use a 37 pin accessory cable to connect the P2 digital I/O port of the DaqBoard/2000 Series P4 adapter to the P2 connector of the DBK24 using an accessory cable (with -x indicating the number of expansion units to be connected). Select up to 8 positions for a total of 192 programmable isolated inputs.

P4 adapters are discussed in the DBK200 document modules.



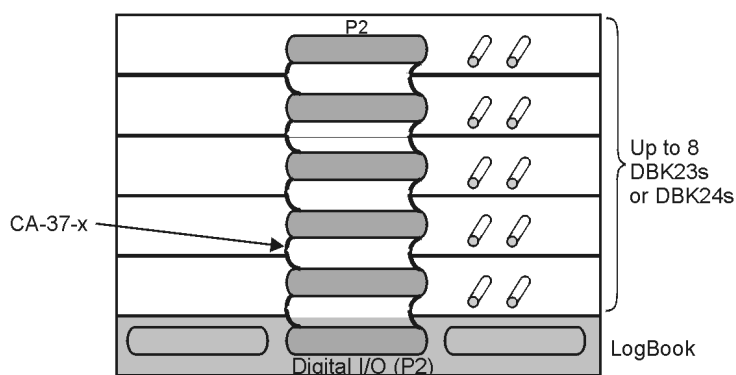
P2 expansion cables must be kept short for proper operation. Do not exceed 14' per attached DBK card.

DaqBook and DaqBoard Configuration

The DBK24 requires no hardware configuration setups internal to the DaqBook or DaqBoard.

LogBook Connection

Connect the P2 digital I/O port of the LogBook to the P2 connector of the DBK24 using an accessory cable (with -x indicating the number of expansion units to be connected). Select up to 8 positions for a total of 192 programmable isolated inputs.



Connecting Multiple DBK23 or DBK24s

Software Setup

Reference Notes:



- **DaqView users** - Refer to [Chapter 4, DBK Setup in DaqView](#).
- **LogView users** - Refer to [Chapter 5, DBK Setup in LogView](#).

Note: Refer to the full-page table on the next page for valid hex codes.

DBK24 - Specifications

Name/Function: General Purpose Optically Isolated Digital Output Module

Channels: 24 I/O channels

Connector: Screw terminals for signal outputs

Output Channel Ratings:

Maximum current/channel: 1 A

Voltage drop @ 1 A and 25°C: 1 V

Maximum open circuit voltage: 60 VDC

Off-state leakage: 10 μ A

Module Power Requirements: 1.5 W

120 VAC Adapter Supplied: 15 VDC @ 0.9 A

Isolation Voltage:

Channel-to-channel: 500 V

Channel-to-system: 500 V

Channel Address: Set by DIP switch

Maximum Module Power Dissipation:

@ 25°C 12 W

@ 50°C 6 W

