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This product is not used for LogBook applications.



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

DBK5 can control four 4 to 20 mA current loops. DBK5 connects to the Daq Device’s P1 port and uses one of the Daq Device’s 16 base channels. Up to 4 DBK5s can share a single base channel for a maximum of 256 channels. DBK5 neither sources nor sinks current; instead, it modulates current in an externally powered loop. In this way, DBK5 acts as a current-loop transmitter. DBK5 is compatible with both regulated and unregulated loop supplies, providing these supplies are within the range of 12 to 45 V and have a loop resistance that does not exceed 1.95 kΩ, according to the following relationship:

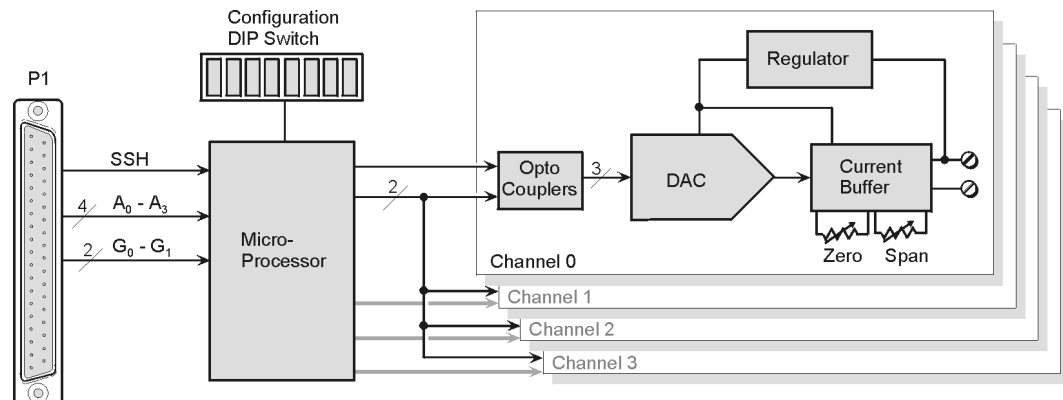
$$V_{SUPPLY} = V_{TRANSMITTER} + (I_{LOOP} * R_{LOOP})$$

where: $V_{TRANSMITTER} = 6\text{ V}$, and $I_{LOOP} = 20\text{ mA max}$

DAC	mA
0	4
...	...
1000	7.9
...	...
4095	20

The DBK5 provides loop-current control through 12-bit digital-to-analog converters (DACs). The 12-bit range of 0 to 4095 corresponds with 0 to 100% of full-span and an output of 4 to 20 mA. As shown in the table, the current output $I_{OUT} = 4\text{ mA} + (DAC/4095 \times 16\text{ mA})$. Thus, the DAC values for currents between 4 and 20 mA is equal to $255.94 \times (I_{OUT} - 4\text{ mA})$.

The 4 channels are optically isolated from the Daq Device and from each other. Isolation allows the loop voltages to float beyond the Daq Device’s common mode range. An externally powered loop allows the DBK5 to continue to modulate the loop current in the event of a fault or power loss in the Daq Device. If the loop is powered-up before the Daq Device, the DBK5 will maintain the loop current at 4 mA. After a fault, the DBK5 will maintain the loop current at the last level set.



SSH is simultaneous sample and hold.
 A₀ - A₃ are address lines 0 through 3.
 G₀ - G₁ are gain adjust lines 0 and 1.

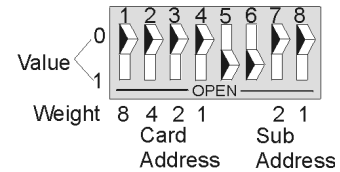
Circuits for Channels 1, 2, and 3 are the same as shown for Channel 0.

DBK5 Block Diagram

Hardware Setup

Card Configuration

Up to four DBK5s can use a single Daq Device channel. With 4 inputs on a card and 16 main channels, a maximum of 256 inputs are possible. Note that each card must appear unique to the Daq Device. An onboard DIP switch is used to set the card and sub address. Micro-switches 1 through 4 set 1 of 16 main Daq Device channels (any card address in the range of 0 to 15 is valid.). Micro-switches 7 and 8 set the sub address.



DBK5 Configuration Settings

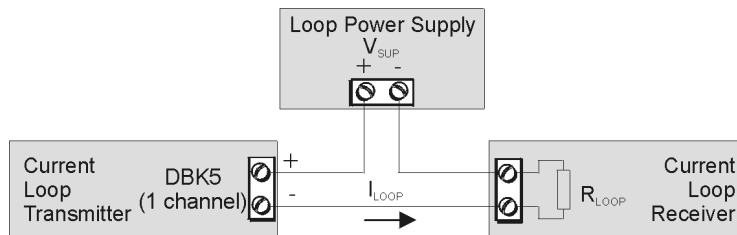
The sub address distinguishes each of four DBK5s on a single channel (any sub address in the range of 0 to 3 is valid). The card and sub address selection DIP switches form a set of binary-weighted values. To select the desired address, set the corresponding switches to the proper binary settings. For example, if the desired card address is 11 then switches 1, 3, & 4 should be set to 1. To set a switch to a value, depress the corresponding side of the rocker-arm switch. (Switch positions 5 and 6 are not used.)

Card Connection

Current-loop connections are provided via dual screw terminal connections. The + and - loop connections are shown in the figure. Once all connections are in place, secure wires to the board at captive areas at the end of the board. Nylon tie wraps (not included) work well for this purpose.



- (1) An external loop-voltage supply must be provided.
- (2) To meet CE safety specifications, an edge guard (kit p/n 232-0806) must be attached to the DBK5 card before insertion into a DBK41 expansion chassis. This guard helps prevent accidental access to high-voltage circuits.



DBK5 Current Loop Configuration

CE Compliance



Reference Notes:

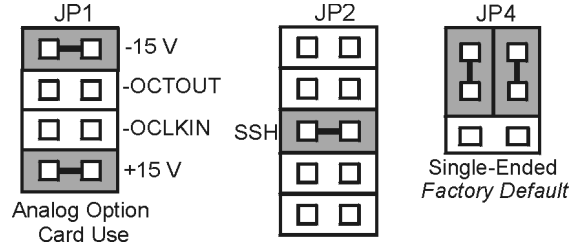
Should your data acquisition system need to comply with CE standards, refer to the [CE Compliance](#) section of Chapter 1.



DaqBook and DaqBoard [ISA type] Configuration

Use of the DBK5 requires setting jumpers in DaqBooks and DaqBoards [ISA type].

1. **If not using auxiliary power**, place the **JP1** jumper in the expanded analog (Analog Option Card Use) mode. In this mode JP1 jumpers are positioned in the -15 V and +15 V positions.



Jumper Configurations in DaqBooks and DaqBoards

Note: The JP1 default position, indicated above, is necessary to power the interface circuitry of the DBK5 via the internal ± 15 VDC power supply. If using auxiliary power cards DBK32A or DBK33 you must remove both JP1 jumpers. Refer to Chapter 2, [Power Management](#) and to the DBK32A and DBK33 document modules.

CAUTION



When using the SSH output, do not use an external voltage reference for DAC1.

Applying an external voltage reference for DAC1, when using the SSH output, will result in equipment damage due to a conflict on P1, pin #26.

2. Place the **JP2** jumper in the *SSH* position (see above CAUTION).
3. For **DaqBook/100, DaqBook/112 and DaqBook/120 only**, place the **JP4** jumper in *single-ended mode*.

Software Setup



Reference Notes:

- **DaqView users** - Refer to [Chapter 4, DBK Setup in DaqView](#).
- **LogView users** - Not Applicable.

DBK5 – Specifications

Name/Function: 4-Channel 4-20 mA Current Output Card

Connectors: DB37 male, mates with P1. Screw terminals for signal output.

Accuracy/Linearity: 0.1% FS

Resolution: 4 • A / LSB, monotonic

Hysteresis: 0.02% FS

Regulation: 0.05% FS

Compliance: $R_{LOOP} = (V_{SUPPLY} - 6) / 0.020$ max

Isolation: 500 V

