DBK53 and DBK54 16-Channel Analog Input Multiplexing Modules

DBK53 – Low Gain Programmable Module
DBK54 – High Gain Programmable Module

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

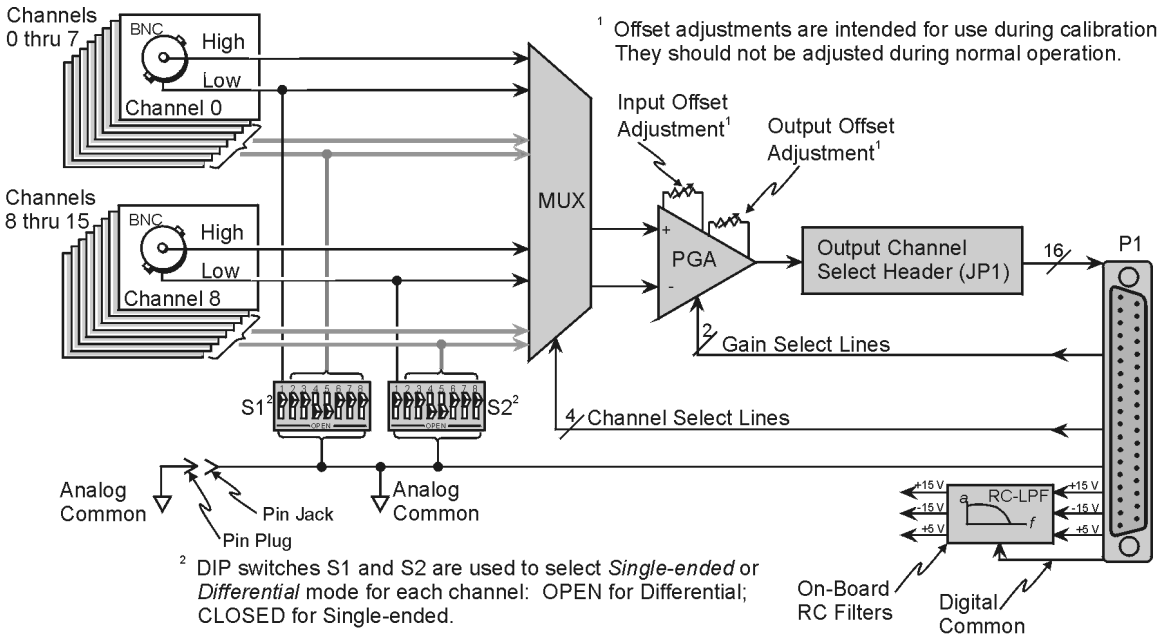
DaqView Users: When a DBK53 or DBK54 is used with a DaqBoard/2000 Series or a cPCI DaqBoard/2000c Series Board, the Internal Clock Speed should be set to 100 kHz as described in Chapter 4, *DBK Setup in DaqView*.

Except for their gain ranges, the DBK53 (low gain) and DBK54 (high gain) are similar. Both:

- Have 16 channels of differential or single-ended analog inputs. Up to 16 modules can attach to one LogBook or Daq Device for a maximum of 256 single-ended or differential inputs.
- Are based on the DBK12 and DBK13 multiplexer cards.
- Are fully enclosed modules with easy user connection using BNC-type connectors and an analog common pin jack.
- Use power via the P1 connection from the LogBook or Daq Device or expansion module/power supply.
- Use one of the LogBook's or Daq Device's 16 analog input channels via the P1 connection to measure the multiplexed output. Both modules receive channel-selection and gain-selection programming via digital signals via P1. The LogBook's/Daq Device's 512 location scan sequencer can directly program the expansion modules to scan external signals at the same 10 µs/channel rate as on-board channels. (The time skew between channels is constant.)

The amplification gains for each module are:

- The DBK53 has 4 gain ranges of ×1, ×2, ×4, and ×8 that are scan-programmable per channel. These gains can be combined with the standard gains of ×1, ×2, ×4, and ×8 for net gains of ×1, ×2, ×4, ×8, ×16, ×32, and ×64.
- The DBK54 has 4 gain ranges of ×1, ×10, ×100 and ×1000 that are scan-programmable per channel. These gains can be combined with the standard gains of ×1, ×2, ×4, and ×8 for net gains of ×1, ×2, ×4, ×10, ×20, ×40, ×80, ×100, ×200, ×400, ×800, ×1000, ×2000, ×4000, and ×8000.

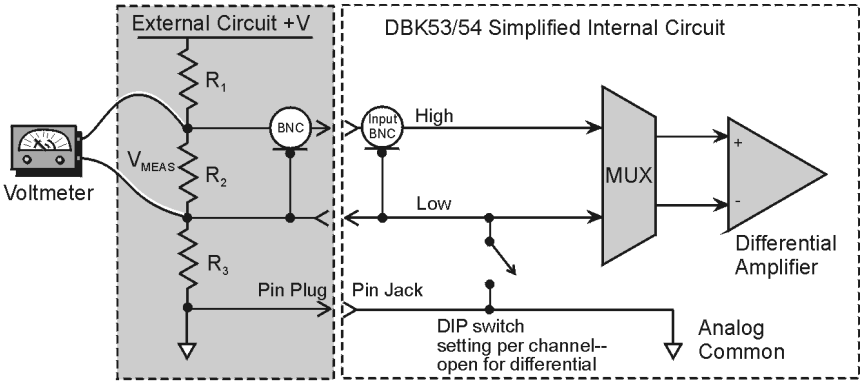


DBK53/54 Block Diagram

Hardware Setup

Differential Mode

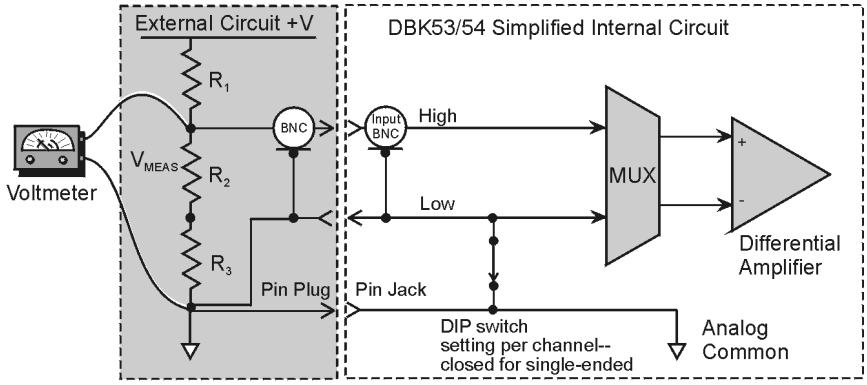
The DBK53 and DBK54 are designed for floating-type differential measurements. Neither the high nor the low of the analog input has an inherent bias current return path to the analog common on the module. An external common pin jack is provided on the outside panel for this bias-current return path. The following figure shows a typical differential connection.



Differential Input Mode

Single-Ended Mode

Ground referencing must also be observed with single-ended measurements. The following figure shows a typical single-ended hookup.



Single-Ended Input Mode

Module Connection

When connecting analog inputs, carefully consider the requirements for signal connection and ground referencing. Use BNC-terminated cables (test leads) to interface with the channel inputs. Be sure to provide the necessary analog common connection.

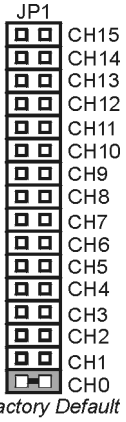
Module Configuration

Factory Default: Input mode – Single-ended

Up to 16 DBK53s [or DBK54s] may be connected to a primary data acquisition device such as LogBook, DaqBook, and DaqBoard. As a daisy-chain interface, each module must appear unique; and therefore uses a different analog input channel identification.

To configure the module:

1. Assign a channel number to the module. This number must not be used by any other DBK card or module.
2. On the DBK53 [or DBK54], locate the 16×2-pin header (JP1).
3. Place the jumper on the channel you wish to use. The 16 jumper locations on the JP1 header are labeled CH0 through CH15. Only 1 jumper setting is used on a single module; no other module in the system can use the same setting.

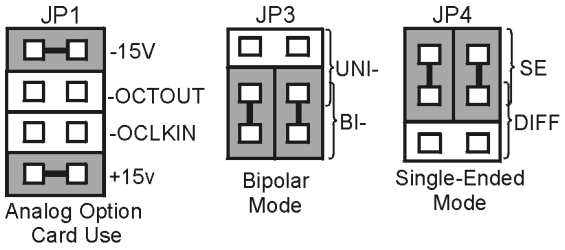


Factory Default Channel Configuration

DaqBook and DaqBoard [ISA type] Configuration

Three setup steps and needed to configure DaqBooks and ISA-type DaqBoards for a DBK53 [or DBK54].

1. If not using auxiliary power, set JP1 for **Analog Option Card Use**, also referred to as the *expanded analog mode*.



DaqBook/DaqBoard Jumpers for the DBK53/54

To power the interface circuitry of the DBK53 or DBK54 via the internal ±15 VDC power supply, JP1 must be set to "Analog Option Card Use." However, if using auxiliary power, e.g., the DBK32A or the DBK33, you must remove both JP1 jumpers. Refer to chapter 2, *Power Management* and to the DBK32A and DBK33 document modules for additional information, if needed.

2. For DaqBook/100, DaqBook/112, and DaqBook/120 *only*, place the JP3 jumper in *bipolar mode*.
3. For DaqBook/100, DaqBook/112, and DaqBook/120 *only*, place the JP4 jumper in *single-ended mode*.

Note: The 200-series DaqBooks and DaqBoards [ISA type] do not have a JP4; the single-ended or differential choice is made via software configuration commands.

Software Setup

Reference Notes:

- **DaqView users** - Refer to Chapter 4, *DBK Setup in DaqView*.
- **LogView users** - Refer to Chapter 5, *DBK Setup in LogView*.

DaqView Users: When a DBK53 or DBK54 is used with a DaqBoard/2000 Series or a cPCI DaqBoard/2000c Series Board, the Internal Clock Speed should be set to 100 kHz as described in Chapter 4, *DBK Setup in DaqView*.

DBK53 and DBK54 – Specifications

Name/Function:
DBK53 16-Channel Low-Gain Analog Multiplexing Module
DBK54 16-Channel High-Gain Analog Multiplexing Module

Output Connector: DB37 male, mates with P1

Input Connector: BNC - DIFF. Inputs; Pin Jack - Analog Common

Gain Ranges:
DBK53: ×1, ×2, ×4, ×8
DBK54: ×1, ×10, ×100, ×1000

Inputs: 16 differential or single-ended jumper selectable as a group)

Voltage Range: 0 to ±5 VDC bipolar; 0 to 10 V unipolar

Input Impedance: 100 MΩ (in parallel with switched 150 pF)

Gain Accuracy: 0.05% typ, 0.25% max

Maximum Input Voltage: 35 VDC

Slew Rate: 20 V/s typ, 10 V/s min

Settling Time: 2 s to 0.01%

CMRR: 80 dB min

Non-Linearity: 0.002% typ, 0.015% max

Bias Current: 150 pA, 0.2 A max

Offset Voltage:
±(0.5 + 5/G) V/°C typ
±(2.0 + 24/G) mV max

Offset Drift:
±(3 + 50/G) V/°C typ
±(2.0 + 24/G) V/°C max


Notes