DBK214   16-Connector BNC Interface Module

Includes P1/P2/P3/P4 compatibility for Analog I/O, Digital I/O, & Pulse/Frequency

DBK214 Front Panel
Upper Slot for Terminal Board Wiring Pass-Through
Lower section of 16 BNC Connectors

The DBK214 module is compatible with the following products:

- DaqBook/2000 Series • DaqBoard/2000 Series • DaqLab • DaqScan

Overview

The DBK214 module includes:

- o P1, male DB37 connector for Analog Input.
- o P2, male DB37 connector for Digital I/O.
- o P3, male DB37 connector for Pulse/Frequency (Digital and Counter/Timer) I/O, and Analog Output.
- o P4, 100-pin connector. Provides same signal connection as P1, P2, and P3 combined.
- o 14 on-board screw-terminal blocks (*accessible after removal of cover*)
- o The terminal blocks tie in to P1, P2, P3, and P4 and provide for easy signal connection.
- o 8 BNC connectors (BNC0 through BNC7) for Analog Input
- o 8 BNC connectors (BNCA through BNCH), custom configured by user for accessing Analog I/O, Digital I/O, or Counter/Timer signals.
- o On-board socket locations for custom RC Filter networks (*accessible after removal of cover*).

DBK214 Rear Panel
Upper section includes P2 and P3 DB37 connectors.
Lower section includes P1 DB37 connector and P4 100-pin connector.

The three DB37 connectors (P1, P2 and P3) can be used as direct connection points for I/O signals. Optionally, convenient removable DB37 connectors [provided] can be used. Often signals are connected to P1, P2, and/or P3 via cable and a DBK card or module.

The DBK214 provides BNC and screw-terminal access to all analog and digital I/O from the host data acquisition device. Related to the screw-terminals is a front panel slot for routing all I/O wiring.

DBK214 Block Diagram

* Accessory Kit p/n 1139-0800 includes jumper wires and a screw driver.

Connection Tips

<table>
<tr><td colspan="2" align="center">CAUTION</td></tr>
<tr>
<td></td>
<td>Turn off power to the host PC and externally connected equipment prior to connecting cables or signal lines to DBKs. Electric shock or damage to equipment can result even under low-voltage conditions.</td>
</tr>
<tr>
<td></td>
<td>Take ESD precautions (packaging, proper handling, grounded wrist strap, etc.)

Use care to avoid touching board surfaces and onboard components. Only handle boards by their edges (or ORBs, if applicable). Ensure boards do not come into contact with foreign elements such as oils, water, and industrial particulate.</td>
</tr>
<tr>
<td></td>
<td>Do not confuse connectors.   Ensure that you only connect P1 I/Os to P1, P2 I/Os to P2, and P3 I/Os to P3. Improper connection may result in equipment damage.</td>
</tr>
</table>

 When using P4, e.g., for a DaqBoard/2000, be sure to align the P4 orientation indicators [white arrows] prior to mating the P4 connectors.

1. Ensure power is removed from all device(s) to be connected.

2. As soon as the DBK214 cover is removed, verify that the Host Power LED is "Off." See figure at right for location.

3. Observe ESD precautions when handling the board and making connections.

Location of DBK214's Host Power LED

4. Do not make redundant connections. For example, for ANALOG IN you could use the P1 (DB37) connector, or Terminal Blocks TB9 through TB12, or BNC connectors. **Redundant connections must be avoided**.

5. You do not need to remove the cover unless you need to access a terminal block, customize an RC filter network, or set a BNC channel to Single-Ended mode or to Differential mode (via Jumpers J0 through J7). Information regarding these tasks follows shortly. **RC filter networks are not to be made or used in association with additional DBK expansion options**.

6. DBK214's 100-pin P4 typically connects to a DaqBoard/2000 Series board's P4 via a CA-195 one-hundred conductor ribbon cable.

 The DaqBoard/2000 Series boards communicate [external from the host PC] through a 100-pin P4 connector. The P1, P2, and P3 connectors discussed in association with these boards are subset connectors of the 100-pin P4 connector. The *System Connections and Pinouts* **chapters of the product hardware manuals include pinouts.**

7. Connections to the DB37 connectors are made via CA-37 cables or CA-255 cables:
    (a) P1 connects to an analog DBK card or module's P1 connector.
    (b) P2 connects to a Digital DBK card or module's P2 connector.
    (c) P3 connects to a Pulse/Frequency DBK card module's P3 connector.

8. Refer to the separate CE Cable Kit instructions that are included with the associated CE cable kit. Refer to the Declaration of Conformity in regard to meeting CE requirements.

System Examples

Example 1:

Front View

DBK214

Back View   DaqBoard/2000

DBK214

P2   P3

P1   P4

CA-195

DBK214 Connected to a DaqBoard/2000

Note regarding the above system example:

A CA-195 100-conductor ribbon cable connects the P4 connector of the DBK214 to the P4 connector of the DaqBoard/2000 (which is installed in the host PC).

Example 2:

DBK214 Connected to a DaqBook/2001

Notes regarding the above system example:

1) Either of two Ethernet cables can be used: CA-242 is a 1.5 ft cable; CA-242-7 is a 7 ft. cable.

2) A CA-255 [or CA-37] cable is being used to connect the DBK214's P1 connector to the P1 connector of the DaqBook/2001.

3) The DBK214's P1 connector [rear panel, lower-left] connects to the internal screw-terminal board to which analog I/O signals could be connected via wire. The wires would be routed out through the upper slots of the front panel. In addition, BNC connectors (for channels 0 through 7) connect [through the printed circuit board] to the P1 terminal blocks.

4) A CA-255 [or CA-37] cable is used to connect the DBK214's P2 connector to the DaqBook/2001 P2 connector.

5) The DBK214's P2 connector connects to the internal screw-terminal board, to which digital I/O signals could be connected via wire. The wires would be routed out through the upper slots of the front panel.

Using the Screw-Terminal Blocks

You must remove the DBK214 module's cover plate to access the screw terminal blocks.
This is described in steps 1 and 2 below.

1. Remove the top inward screws from each of the 4 mounting brackets. See following figure.

To remove the cover plate you must first remove the top inward screw from each of the 4 mounting brackets.

The Cover Plate is Secured by 4 Srews [2 Screws per-side]

2. After the 4 screws have been removed, carefully remove the cover plate.

3. As soon as the DBK214 cover is removed, verify that the Host Power LED is "Off." See following figure for location.

Host Power LED Location

4. Make the wiring connections to the terminals. Refer to the board's silkscreen and to the pin correlations on the next few pages.

5. Tighten the terminal block screws snug; but do not over-tighten.

6. After all terminal connections are made and verified correct, return the cover to the unit and secure in place with the 4 screws removed earlier. Tighten snug, but do not over-tighten.

In general, the following *terminal block-to-signal* relationships apply:

DBK214 Terminal Blocks	Used for . . .	Alternative
TB9 TB10	ANALOG INPUT	P1, P4* BNC 0 thru 7
TB11 TB12	ANALOG INPUT	P1, P4*
TB5 TB6 TB7 TB8	DIGITAL I/O	P2 or P4*
TB13** TB14**	ANALOG INPUT BNC Channels 0 thru 7**	P1, P4* TB9,TB10
TB15 TB16 (Note 1)	USER CONFIGURABLEB NC Channels A thru H	(See Note 1)
TB1 TB2 TB3 TB4	PULSE/ FREQUENCY/ DIGITAL I/O ANALOG OUTPUT	P3 or P4*

DBK214 Board

Notes: (1) The P2 and P3 DB37 Connectors and their associated "device-internal" cables are not shown.

(2) DBK214 does not make use of P5 [top center].

* P4 is used for connecting to DaqBoard/2000 Series devices.

** TB13 and TB14 are "virtual" terminal blocks which are routed in the printed circuit board to TB9 and TB10. The TB13 and TB14 silk-screened locations on the DBK214 board do not have physical screw terminal blocks.

Note 1: TB15 and TB16 are used for optional user-configured BNC connectors A through H. These connectors can be configured on a per-channel basis as Analog [Input or Output], Digital I/O, or Counter/Timer. When BNC A through H are used, the user must route wires from the "BNC routing terminal blocks" (TB15 and TB16) to the appropriate functional TB termination points.

Accessory Wire Kit, p/n 1139-0800 includes jumper wires and a screwdriver.

The following pages correlate the DBK214 terminal block connectors with the associated pins of the P1, P2, and P3 DB37 connectors. Note that chapter 2 of the DBK Options Manual (457-0905) contains additional pin-outs, and includes references to the 100-pin P4 connector. Also note that hardware manuals for the primary data acquisition devices include pinout chapters.

Correlation to P1 – Pertains to Terminal Blocks TB9, TB10, TB11, and TB12 for Analog I/O.
Also see "Correlation to BNC Terminations (TB13 and TB14) on page DBK214-11."

TB9		P1 Pin Number and Description	
DIFF	SE		
0H	0	37	CH 0 IN (Single-Ended Mode) / CH 0 HI IN (Differential Mode)
0L	8	18	CH 8 IN (Single-Ended Mode) / CH 0 LO IN (Differential Mode)
1H	1	36	CH 1 IN (Single-Ended Mode) / CH 1 HI IN (Differential Mode)
1L	9	17	CH 9 IN (Single-Ended Mode) / CH 1 LO IN (Differential Mode)
2H	2	35	CH 2 IN (Single-Ended Mode) / CH 2 HI IN (Differential Mode)
2L	10	16	CH 10 IN (Single-Ended Mode) / CH 2 LO IN (Differential Mode)
3H	3	34	CH 3 IN (Single-Ended Mode) / CH 3 HI IN (Differential Mode)
3L	11	15	CH 11 IN (Single-Ended Mode) / CH 3 LO IN (Differential Mode)
FILT CAP LO	N/A		For RC filter networks install a wire jumper between the relevant FILT CAP LO and AGND. Note that there is no association between FILT CAP LO and P4.
SGND	19		Signal Ground, Sense Common; reference ground, not for general use.

P1 – TB9
(Note 2)

TB10		P1 Pin Number and Description	
DIFF	SE		
4H	4	33	CH 4 IN (Single-Ended Mode) / CH 4 HI IN (Differential Mode)
4L	12	14	CH 12 IN (Single-Ended Mode) / CH 4 LO IN (Differential Mode)
5H	5	32	CH 5 IN (Single-Ended Mode) / CH 5 HI IN (Differential Mode)
5L	13	13	CH 13 IN (Single-Ended Mode) / CH 5 LO IN (Differential Mode)
6H	6	31	CH 6 IN (Single-Ended Mode) / CH 6 HI IN (Differential Mode)
6L	14	12	CH 14 IN (Single-Ended Mode) / CH 6 LO IN (Differential Mode)
7H	7	30	CH 7 IN (Single-Ended Mode) / CH 7 HI IN (Differential Mode)
7L	15	11	CH 15 IN (Single-Ended Mode) / CH 7 LO IN (Differential Mode)
FILT CAP LO	N/A		For RC filter networks install a wire jumper between the relevant FILT CAP LO and AGND. Note that there is no association between FILT CAP LO and P4.
SGND	19		Signal Ground, Sense Common; reference ground, not for general use.

P1 – TB10
(Note 2)

TB11	P1 Pin Number and Description	
TTL TRIG	25	TTL Trigger, Digital IN, External TTL Trigger Input
A/I CLK	20	A/I Clock, External ADC Pacer Clock Input/ Internal ADC Pacer Clock Output
EXP 5	5	Expansion 5. Digital OUT, external GAIN select bit 1
EXP 6	6	Expansion 6. Digital OUT, external GAIN select bit 0
EXP 7	3	Expansion 7. Digital OUT, external ADDRESS, select bit 3
EXP 8	22	Expansion 8. Digital OUT, external ADDRESS, select bit 2
EXP 9	4	Expansion 9. Digital OUT, external ADDRESS, select bit 1
EXP 10	23	Expansion 10. Digital OUT, external ADDRESS, select bit 0
EXP 11	26	Expansion 11. Simultaneous Sample and Hold (SSH)
AGND	*	Analog Ground, Common

P1 – TB11

TB12	P1 Pin Number and Description	
AGND	*	Analog Ground, Common
AGND	*	Analog Ground, Common
AGND	*	Analog Ground, Common
AGND	*	Analog Ground, Common
AGND	*	Analog Ground, Common
AGND	*	Analog Ground, Common
+ 15 V	21	Expansion, +15 V Power
- 15 V	2	Expansion, -15 V Power
AGND	*	Common Ground
+ 5 V	1	Expansion, +5 V Power

P1 – TB12

*Refer to Ground Correlation Tables in the DBK Options Manual (457-0905), chapter 2, *System Connections and Pinouts*.

Note 2: For TB9 and TB10, the filter network portion of the silkscreen is not shown. Instead, the DIFF and SE channel identifiers have been moved next to the screws for ease in identification.

Correlation to P2 – Pertains to Terminal Blocks TB5, TB6, TB7, and TB8 for Digital I/O.

TB5	P2 Pin Number and Description	
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common
A7	30	Digital I/O: P2, Digital Port A, Bit 7; or P2 Expansion Data Bit 15
A6	31	Digital I/O: P2, Digital Port A, Bit 6; or P2 Expansion Data Bit 14
A5	32	Digital I/O: P2, Digital Port A, Bit 5; or P2 Expansion Data Bit 13
A4	33	Digital I/O: P2, Digital Port A, Bit 4; or P2 Expansion Data Bit 12
A3	34	Digital I/O: P2, Digital Port A, Bit 3; or P2 Expansion Data Bit 11
A2	35	Digital I/O: P2, Digital Port A, Bit 2; or P2 Expansion Data Bit 10
A1	36	Digital I/O: P2, Digital Port A, Bit 1; or P2 Expansion Data Bit 9
A0	37	Digital I/O: P2, Digital Port A, Bit 0; or P2 Expansion Data Bit 8

P2 – TB5

TB6	P2 Pin Number and Description	
+5 V	18	Expansion +5 V Power
+5 V	20	Expansion +5 V Power
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common

P2 – TB6

TB7	P2 Pin Number and Description	
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common
C7	22	Digital I/O: P2, Digital Port C, Bit 7; or P2 Expansion Data Bit 7
C6	23	Digital I/O: P2, Digital Port C, Bit 6; or P2 Expansion Data Bit 6
C5	24	Digital I/O: P2, Digital Port C, Bit 5; or P2 Expansion Data Bit 5
C4	25	Digital I/O: P2, Digital Port C, Bit 4; or P2 Expansion Data Bit 4
C3	26	Digital I/O: P2, Digital Port C, Bit 3; or P2 Expansion Data Bit 3
C2	27	Digital I/O: P2, Digital Port C, Bit 2; or P2 Expansion Data Bit 2
C1	28	Digital I/O: P2, Digital Port C, Bit 1; or P2 Expansion Data Bit 1
C0	29	Digital I/O: P2, Digital Port C, Bit 0; or P2 Expansion Data Bit 0

P2 – TB7

TB8	P2 Pin Number and Description	
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common
B0	10	Digital I/O: P2, Digital Port B, Bit 0; or P2 Expansion READ Output
B1	9	Digital I/O: P2, Digital Port B, Bit 1; or P2 Expansion WRITE Output
B2	8	Digital I/O: P2, Digital Port B, Bit 2; or P2 Expansion RESET Output
B3	7	Digital I/O: P2, Digital Port B, Bit 3; or P2 Expansion Address Bit 4 Out
B4	6	Digital I/O: P2, Digital Port B, Bit 4; or P2 Expansion Address Bit 3 Out
B5	5	Digital I/O: P2, Digital Port B, Bit 5; or P2 Expansion Address Bit 2 Out
B6	4	Digital I/O: P2, Digital Port B, Bit 6; or P2 Expansion Address Bit 1 Out
B7	3	Digital I/O: P2, Digital Port B, Bit 7; or P2 Expansion Address Bit 0 Out

P2 – TB8

*Refer to Ground Correlation Tables in the DBK Options Manual (457-0905), chapter 2, *System Connections and Pinouts*.

Correlation to P3 – Pertains to Terminal Blocks TB1, TB2, TB3, and TB4 for Pulse/Frequency/Digital I/O.

TB1	P3 Pin Number and Description	
D0	10	P3 Digital Port Bit 0
D1	9	P3 Digital Port Bit 1
D2	8	P3 Digital Port Bit 2
D3	7	P3 Digital Port Bit 3
D4	6	P3 Digital Port Bit 4
D5	5	P3 Digital Port Bit 5
D6	4	P3 Digital Port Bit 6
D7	3	P3 Digital Port Bit 7
DGND	*	Digital Ground, Common
+5V	20	Expansion, +5 Volt Power

P3 – TB1

TB2	P3 Pin Number and Description	
D8	29	P3 Digital Port Bit 8
D9	28	P3 Digital Port Bit 9
D10	27	P3 Digital Port Bit 10
D11	26	P3 Digital Port Bit 11
D12	25	P3 Digital Port Bit 12
D13	24	P3 Digital Port Bit 13
D14	23	P3 Digital Port Bit 14
D15	22	P3 Digital Port Bit 15
DGND	*	Digital Ground, Common
DGND	*	Digital Ground, Common

P3 – TB2

TB3	P3 Pin Number and Description	
CH0 (DAC0)	34	Analog Out; Analog DAC 0 Output
AGND	*	Analog Ground, Common; intended for use with DACs
EXP 0 (DAC2)	32	Analog Out; Analog DAC 2 Output
AGND	*	Analog Ground, Common; intended for use with DACs
CH1 (DAC1)	33	Analog Out; Analog DAC 1 Output
A/O CLK	21	Analog Out Clock; External DAC Pacer Clock Input/ Internal DAC Pacer Clock Output
EXP 1 (DAC3)	31	Analog Out; Analog DAC 3 Output
DGND	*	Digital Ground, Common
+15 V	19	Expansion, + 15 VDC
-15 V	37	Expansion, -15 VDC

P3 – TB3

TB4	P3 Pin Number and Description	
EXP 2	12	Reserved
EXP 3	13	Reserved
EXP 4	14	Reserved
TMR 0	15	P3 Timer 0 Output
TMR 1	16	P3, Timer 1 Output
CNT 3	35	P3 Counter 3 Input
CNT 2	17	P3 Counter 2 Input
CNT 1	36	P3 Counter 1 Input
CNT0	18	P3 Counter 0 Input
DGND	*	Digital Ground, Common

P3 – TB4

*Refer to Ground Correlation Tables in the DBK Options Manual (457-0905), chapter 2, *System Connections and Pinouts.*

P1 Correlation to Analog Input BNC Terminations – BNC Ch 0 through BNC Ch 7

"Virtual" Terminal Blocks TB13 and TB14 for ANALOG INPUT connect to TB9 and TB10 through the printed circuit board.

TB13 ("Virtual" Terminal Block)			P1 Pin Number and Description		
BNC CH	DIFF	SE	Pin	SE = Single Ended ; DIFF = Differential	Jumper Used
BNC0+	0H	0	37	CH 0 IN (SE) / CH 0 HI IN (DIFF)	J0
BNC0-	0L	8	18	CH 8 IN (SE) / CH 0 LO IN (DIFF)	J0
BNC1+	1H	1	36	CH 1 IN (SE) / CH 1 HI IN (DIFF)	J1
BNC1-	1L	9	17	CH 9 IN (SE) / CH 1 LO IN (DIFF)	J1
BNC2+	2H	2	35	CH 2 IN (SE) / CH 2 HI IN (DIFF)	J2
BNC2-	2L	10	16	CH 10 IN (SE) / CH 2 LO IN (DIFF)	J2
BNC3+	3H	3	34	CH 3 IN (SE) / CH 3 HI IN (DIFF)	J3
BNC0+	3L	11	15	CH 11 IN (SE) / CH 3 LO IN (D DIFF)	J3
AGND	N/A	N/A	*	Analog Ground	N/A
AGND	N/A	N/A	*	Analog Ground	N/A

TB13 does not physically exist on DBK214. A silkscreen of TB13 is present as a visual aid to signal routing and configuration.

A header located beneath TB14 and TB16 is used to set the BNC channels to Single-Ended or to Differential. Simply place channel's 2-pin jumper in the appropriate position (SE or DIFF).

TB14 ("Virtual" Terminal Block)			P1 Pin Number and Description		
BNC CH	DIFF	SE	Pin	SE = Single Ended ; DIFF = Differential	Jumper Used
BNC4+	4H	4	33	CH 4 IN (SE) / CH 4 HI IN (DIFF)	J4
BNC4-	4L	12	14	CH 12 IN (SE) / CH 4 LO IN (DIFF)	J4
BNC5+	5H	5	32	CH 5 IN (SE) / CH 5 HI IN (DIFF)	J5
BNC5-	5L	13	13	CH 13 IN (SE) / CH 5 LO IN (DIFF)	J5
BNC6+	6H	6	31	CH 6 IN (SE) / CH 6 HI IN (DIFF)	J6
BNC6-	6L	14	12	CH 14 IN (SE) / CH 6 LO IN (DIFF)	J6
BNC7+	7H	7	30	CH 7 IN (SE) / CH 7 HI IN (DIFF)	J7
BNC7+	7L	15	11	CH 15 IN (SE) / CH 7 LO IN (DIFF)	J7
AGND	N/A	N/A	*	Analog Ground	N/A
AGND	N/A	N/A	*	Analog Ground	N/A

TB14 does not physically exist on DBK214. A silkscreen of TB14 is present as a visual aid to signal routing and configuration.

A header located beneath TB14 and TB16 is used to set the BNC channels to Single-Ended or to Differential. Simply place channel's 2-pin jumper in the appropriate position (SE or DIFF).

Correlation to Custom BNC Terminations – BNC Ch A through BNC Ch H

Pertains to Terminal Blocks TB15 and TB16 for Custom Configuration on a per-channel basis.

TB15 ("Routing" Terminal Block)	
BNC CH	Description
BNCA+	
BNCA-	
BNCB+	BNC channels A through D are configured on a per-channel basis by the user. TB15 is a routing terminal block used to connect BNCs (A thru D) to the desired signals, which are selected via a second DBK214 terminal block. For example: a user could run a wire from BNCA+ to TB4 screw terminal "TMR0" and BNCA- to TB4 DGND to create a BNC timer connection.
BNCB-	
BNCC+	
BNCC-	
BNCD+	Accessory Wire Kit, p/n 1139-0800 includes jumper wires and a screwdriver.
BNCD+	
AGND	Analog Ground *
AGND	Analog Ground *

TB15

TB16 ("Routing" Terminal Block)	
BNC CH	Description
BNCA+	
BNCA-	BNC channels E through H are configured on a per-channel basis by the user. TB16 is a routing terminal block used to connect BNCs (E thru H) to the desired signals, which are selected via a second DBK214 terminal block.
BNCB+	
BNCB-	
BNCC+	Customizing is as described for BNCA through BNCD above.
BNCC-	
BNCD+	Accessory Wire Kit, p/n 1139-0800 includes jumper wires and a screwdriver.
BNCD+	
AGND	Analog Ground *
AGND	Analog Ground *

TB16

Adding Resistor/Capacitor Filter Networks

<table>
<tr><td colspan="2" style="background:red;color:white;text-align:center">WARNING</td></tr>
<tr><td>⚠️</td><td>Disconnect the DBK214 from power and signal sources prior to installing capacitors or resistors.</td></tr>
</table>

<table>
<tr><td colspan="2" style="background:yellow;text-align:center">CAUTION</td></tr>
<tr><td>⚠️</td><td>
Ensure wire strands do not short power supply connections (+15 V, -15 V, +5 V, etc.) to any terminal potential. Failure to do so could result in damage to DaqBook/2000 Series devices or DaqBoard/2000 Series boards.

Do not exceed maximum allowable inputs (as listed in product specifications). There should never be more than 30 V with reference to analog ground (AGND) or earth ground.

You must provide strain-relief (lead slack) to all leads leaving the module. Use tie-wraps [not included] to secure strain-relief.

Always connect the CHASSIS terminal to earth ground. This will maximize static protection.
</td></tr>
</table>

If a channel is not associated with a DBK expansion option you can install a customized RC filter network to improve the signal-to noise ratio, assuming that an unacceptable level of noise exists. DBK214's internal board includes silk-screened sockets for installing RC filter networks. The following table contains values that are typical for RC filter network components.

<table>
<tr><th colspan="4">Typical One-Pole Low Pass Filter Values
for DBK214</th></tr>
<tr><th>R</th><th>C</th><th>f</th><th>f</th></tr>
<tr><th>Ohms</th><th>μF</th><th>Hertz
(-3dB)</th><th>kHz
(-3dB)</th></tr>
<tr><td>510</td><td>1</td><td>312</td><td>0.31</td></tr>
<tr><td>510</td><td>0.47</td><td>664</td><td>0.66</td></tr>
<tr><td>510</td><td>0.22</td><td>1419</td><td>1.42</td></tr>
<tr><td>510</td><td>0.1</td><td>3122</td><td>3.12</td></tr>
<tr><td>510</td><td>0.047</td><td>6643</td><td>6.64</td></tr>
<tr><td>510</td><td>0.022</td><td>14192</td><td>14.19</td></tr>
<tr><td>510</td><td>0.01</td><td>31223</td><td>31.22</td></tr>
<tr><td>510</td><td>0.0047</td><td>66431</td><td>66.43</td></tr>
<tr><td>470</td><td>0.0033</td><td>102666</td><td>102.67</td></tr>
</table>

Do not use RC filters in conjunction with additional DBK expansion accessories.

An Example of Customer-Installed Capacitors and Filters for RC Networks

In this example Channels 0 and 8 are shown as *Single-Ended*. Channel 1 is *Differential*, i.e., using 1H and 1L (channel High and Low).

The following three notes pertain to the above figure.

Note 1: The 3 horizontal capacitors [as oriented in the illustration] are optional filter capacitors.

Note 2: The vertical capacitor [as oriented in the illustration] is an optional isolation capacitor used for the reduction of *Differential* noise. Such capacitor placement is not used in *Single-Ended* applications.

Note 3: If installing filter resistors, carefully drill out the indicated centers with a 1/16 inch drill-bit. Otherwise the resistor will be short-circuited.

🔍 **Prior to installing RC components, review the previous Warning and Caution statements, then read over the following information regarding resistors and capacitors.**

Note!

- Do not use RC filters in conjunction with additional DBK expansion accessories.

- Prior to installing a resistor to the filter network you must drill a 1/16" hole through the center pinhole [beneath the board's silkscreen resistor symbol] as indicated in the preceding figure. Failure to do so will short-circuit the resistor.

- Do not drill holes on the board for channels, unless those channels are to receive a filter network (see preceding statement).

- Resistors should be ¼ watt, film-type with up to 5% tolerance. Do not use wire-wound resistor types.

- A resistor value of 510 Ω is recommended. Do not exceed 510 Ω.

- Capacitors used are to be of the film dielectric type (e.g., polycarbonate or NPO ceramic), above 0.001 µF.

- RECOMMENDED: For reduction of both *Common Mode Noise* and *Differential Mode Noise*, use one capacitor between Channel High and AGND; and use a second capacitor between Channel Low and AGND.

- For reduction of *Differential Noise* [when no reduction of *Common Mode Noise* is needed] position a capacitor across the respective Channel High and Channel Low.

- When in Differential Mode, using capacitors between Channel High, Channel Low, and AGND may cause a slight degradation of *wideband Common Mode rejection*.

- When making a RC filter network, always install a wire jumper between the relevant FILT CAP LO and AGND. FILT CAP LO terminals are located on TB9 and TB10.

Specifications for DBK214

Operating Environment:
    Temperature: -30°C to 70°C
    Relative Humidity: 95% RH, non-condensing

Connectors:

    P1: male DB37 connector for analog expansion or connection to primary acquisition device*

    P2: male DB37 connector for digital expansion or connection to primary acquisition device*

    P3: male DB37 connector for pulse/frequency/digital I/O, analog output, or connection to primary acquisition device*

    P4: 100-pin connector for connection to a /2000 Series device that includes a P4 connector; e.g., DaqBoard/2000.

    Screw Terminals: 14 banks of 10-connector blocks
                                 Wire Size: 12 to 28 AWG

Dimensions:
    285 mm W x 220 mm D x 45 mm H   (11" x 8.5" x 2.7")

Weight:
    1.36 kg (3 lbs)

Cables and Accessories:

Item Description	Part Number
Rack Mount Kit, p/n	RackDBK4
100-conductor expansion cables; mate with P4 connectors:	
3 ft., non-CE Compliant	CA-195
3 ft., CE Compliant	CA-209
6 ft., non-CE Compliant	CA-195-6
37-conductor cables; mate with DB37 connectors:	
2 in., shielded T-cable	CA-255-2T
4 in., shielded T cable	CA-255-4T
8 in., shielded T cable	CA-255-8T
37-conductor ribbon cable	CA-37-X
Accessory Wire Kit	1139-0800
Includes jumper wires and a screwdriver.	

*DaqBook/2000 Series, DaqLab/2000 Series, DaqScan/2000 Series

Specifications subject to change without notice.

Reference Notes:

- In regard to calculating system power requirements refer to the *DBK Basics* section.

- Chapter 2 of the DBK Options Manual includes pinouts for P1, P2, P3, and P4. Refer to pinouts applicable to your system, as needed.

- For a quick comparison of all DBK200 Series boards, refer to the *DBK200 Series Matrix*. The matrix is located just before the DBK200 section of this manual.

- Refer to the user manual for the primary data acquisition device as needed. The user's manuals include device specific pinouts.

Notes