

**B & C INSTRUMENTS, Inc.**  
**DATA SHEET**

ISO 9001  
CALIBRATION

**B & C**  
**INSTRUMENTS**

CO #: 191907

Date: 7/2/2009

By: # 5

| Function<br>Range                                 | Input          | Tolerance (±) | Readings   |            |
|---|----------------|---------------|------------|------------|
|   |                |               | As-Found   | Final      |
| NOTE: Perform AUTO CAL before the following tests |                |               |            |            |
| OFFSET TEST                                       |                |               |            |            |
| 30 mV DC  | SHORT          | .00385 mV     | 0.00060 mV | 0.0006 mV  |
| 300   | SHORT          | .0040         | 0.001      | 0.001      |
| 3 V   | SHORT          | .000007 V     | 0.000001 V | 0.000001 V |
| 30  | SHORT          | .00020        | -0.00001   | -0.00001   |
| 300   | SHORT          | .0007         | 0.0000     | 0.0000     |
| GAIN & LINEARITY TEST                             |                |               |            |            |
| 30 mV DC  | 30 mV DC       | .00505 mV     | 30.0008 mV | 30.0003 mV |
| 300   | 300            | .0115         | 300.0011   | 300.0002   |
| 3 V   | 3 V            | .000058 V     | 3.000003 V | 2.999999 V |
|   | -3             | .000058       | -3.000007  | -3.000003  |
|   | 2              | .000041       | 2.000003   | 1.999999   |
|   | -2             | .000041       | -2.000000  | -1.999999  |
|   | 1              | .000041       | 1.000002   | 1.000001   |
|   | -1             | .000041       | -0.999999  | -0.999998  |
| 30  | 30             | .00125        | 29.99963   | 30.00000   |
| 300   | 300            | .0157         | 299.9958   | 300.0001   |
| AC VOLTS TEST (AC BAND >400)                      |                |               |            |            |
| 30 mV AC  | 30 mV, 1 KHz   | .05020 mV     | 30.0153 mV | 30.0153 mV |
| 300   | 30             | .1510         | 30.0621    | 30.0621    |
|   | 300            | .5020         | 300.000    | 300.000    |
| 3 V   | .3 V           | .00151 V      | 0.30012 V  | 0.30012    |
|   | 1              | .00242        | 0.99973    | 0.99973    |
|   | 2              | .00372        | 1.99934    | 1.99934    |
|   | 3              | .00510        | 2.99898    | 2.99898    |
| 30  | 3              | .0151         | 3.0009     | 3.0009     |
|   | 30             | .0502         | 29.9956    | 29.9956    |
| 300   | 30             | .1690         | 30.008     | 30.008     |
|   | 300            | .6820         | 299.943    | 299.943    |
| FREQUENCY RESPONSE (AC BAND >400)                 |                |               |            |            |
| 300 mV AC   | 30 mV, 400 Hz  | .151 mV       | 30.058 mV  | 30.058 mV  |
|   | 6.5 kHz        | .151          | 30.061     | 30.061     |
|   | 20             | .151          | 30.062     | 30.062     |
|   | 100            | .408          | 29.964     | 29.964     |
|   | 300            | 1.918         | 29.632     | 29.632     |
|   | 1 MHz          | 9.688         | 29.775     | 29.775     |
|   | 300 mV, 400 Hz | .532          | 299.972    | 299.972    |
|   | 6.5 kHz        | .532          | 299.997    | 299.997    |
|   | 20             | .532          | 300.040    | 300.04     |
|   | 100            | 2.190         | 299.300    | 299.3      |
|   | 300            | 10.450        | 297.260    | 297.26     |
|   | 1 MHz          | 37.120        | 310.003    | 310.003    |

\* = Out of Tolerance

HP 3457A

CO #: 191907

| Function   |                |                     |                    | Readings     |              |              |              |
|--|----------------|---------------------|--------------------|--------------|--------------|--------------|--------------|
| Range  | Input          | Tolerance ( $\pm$ ) |                    | As-Found     |              | Final        |              |
| <b>FREQUENCY RESPONSE (AC BAND &gt;400)</b>      |                |                     |                    |              |              |              |              |
| 3 V AC   | 0.3 V, 400 Hz  | .00150 V            |                    | 0.30007      |              | 0.30007      |              |
|  | 6.5 kHz        | .00150              |                    | 0.30011      |              | 0.30011      |              |
|  | 20             | .00150              |                    | 0.30006      |              | 0.30006      |              |
|  | 100            | .00408              |                    | 0.29870      |              | 0.29870      |              |
|  | 300            | .01918              |                    | 0.29413      |              | 0.29413      |              |
|  | 1 MHz          | .09688              |                    | 0.28467      |              | 0.28467      |              |
|  | 3 V, 400 Hz    | .00532              |                    | 2.99856      |              | 2.99856      |              |
|  | 6.5 kHz        | .00532              |                    | 2.99894      |              | 2.99894      |              |
|  | 20             | .00532              |                    | 2.99871      |              | 2.99871      |              |
|  | 100            | .02190              |                    | 2.98730      |              | 2.9873       |              |
|  | 300            | .1045               |                    | 2.95460      |              | 2.9546       |              |
|  | 1 MHz          | .3712               |                    | 2.97530      |              | 2.9753       |              |
| <b>LOW FREQUENCY RESPONSE (AC BAND &lt; 400)</b> |                |                     |                    |              |              |              |              |
| 3 V, AC Slow                                     | 3 V, 100 Hz    | .0088 V             |                    | 2.9982       |              | 2.9982       |              |
|  | 45 Hz          | .0268               |                    | 2.9968       |              | 2.9968       |              |
|  | 20             | .0268               |                    | 2.9903       |              | 2.9903       |              |
|  | 300 mV         |                     |                    | 299.930      |              | 299.93       |              |
|  | 45             | 2.680               |                    | 299.796      |              | 299.796      |              |
|  | 20             | 2.680               |                    | 299.236      |              | 299.236      |              |
| <b>FREQUENCY</b>                                 |                |                     |                    |              |              |              |              |
| 3 V AC   | 1 V, 20 Hz     | .01 Hz              |                    | 19.9995      |              | 19.9995      |              |
|  | 1 MHz          | .00010 MHz          |                    | 1.000002     |              | 1.000002     |              |
| <b>CURRENT GAIN</b>                              |                |                     |                    |              |              |              |              |
| ALL DC RANGES                                    | OFFSET TEST    | PASS/FAIL           |                    | Pass         |              | Pass         |              |
| 300 $\mu$ A DC                                   | 300 $\mu$ A    | .0704 $\mu$ A       |                    | 300.042      |              | 300.042      |              |
| 3 mA   | 3 mA           | .000704 mA          |                    | 3.000580     |              | 3.00058      |              |
| 30   | 30             | .00704              |                    | 30.0053      |              | 30.0053      |              |
| 300  | 300            | .2304               |                    | 299.937      |              | 299.937      |              |
| 1 A  | 1 A            | .001304 A           |                    | 1.000990     |              | 1.00099      |              |
| 30 mA AC   | 30 mA, 100 Hz  | .1030 mA            |                    | 29.9986      |              | 29.9986      |              |
| 300  | 300            | 1.030               |                    | 299.879      |              | 299.879      |              |
| 1 A  | 1 A            | .0053 A             |                    | 1.00096      |              | 1.00096      |              |
| <b>RESISTANCE</b>                                |                |                     |                    |              |              |              |              |
|  | NOMINAL        | ACTUAL              | #                  | 2-W $\Omega$ | 4-W $\Omega$ | 2-W $\Omega$ | 4-W $\Omega$ |
| 30 $\Omega$                                      | SHORT          | Short (2-W)         | 0.20335            | 0.0016       | ////////     | -0.0002      | ////////     |
| 30   | SHORT          | Short (4-W)         | 0.00335            | ////////     | 0.0001       | ////////     | 0.0001       |
| 30   | 19 $\Omega$    | 18.99906            | .00438 $\Omega$    | 18.9838      | 18.99950     | 18.9995      | 18.9993      |
| 300  | 190            | 189.98638           | 0.0119             | 189.9825     | 189.98440    | 189.9860     | 189.9844     |
| 3 k $\Omega$                                     | 1.9 k $\Omega$ | 1.8998426           | .000111 k $\Omega$ | 1.899912     | 1.89982      | 1.899829     | 1.899824     |
| 30   | 19             | 18.998552           | 0.00111            | 18.99899     | 18.99796     | 18.99858     | 18.99856     |
| 300  | 190            | 189.99813           | 0.0083             | 190.0010     | 189.99160    | 190.0010     | 189.9990     |
| 3 M $\Omega$                                     | 1.9 M $\Omega$ | 1.8999647           | .000116 M $\Omega$ | 1.89991      | 1.89991      | 1.89991      | 1.899912     |
| 30   | 19             | 18.998543           | 0.005550           | 18.9981      | 18.99900     | 18.9981      | 18.999       |

\* Out of tolerance

HP 3457A