



Precision Bulk Metal® Foil Bridge Completion Module All-In-One Design includes 120Ω, 350Ω, and 1KΩ values plus built-in shunts to mimic 1000 microstrains during calibration!

Precision Resistor Network and BCM for Strain/Stress Measurement Applications Ultra Low TCR; Ultra High Precision, Accuracy, and Stability

Resistors featuring Bulk Metal® Foil are renowned for their unique combination of unmatched performance in all major technical areas, including:

Temperature Coefficient of Resistance (TCR) **Voltage Coefficient of Resistance (VCR)** **Electrostatic Discharge (ESD)** **Thermal Stabilization** **Response Time**
Power Coefficient of Resistance (PCR) **Thermal Electromotive Force (EMF)** **Tolerance** **Load Life Stability** **Noise**

Strain gage instrumentation is available with built-in bridge completion resistors and “dummy” gages to accept quarter-bridge and half-bridge strain gage input circuits. However, if the instrumentation at hand does not have these components, or if the particular measurement application does not permit their use, or when accuracy can be improved by completing the bridge at the measurement site, an external bridge completion module must be provided. The TXBCM series of Bridge Completion Modules employ unique Bulk Metal® Foil resistance elements, bonded to a ceramic substrate, then sealed and packaged in an environmental protection system that ensures long-term stability and facilitates field use readiness (i.e. no supplementary environmental protection is required during most applications). TXBCM Bridge Completion Modules can be customized to meet any special circuit requirements - just contact our Applications Engineering Department about your specific needs.

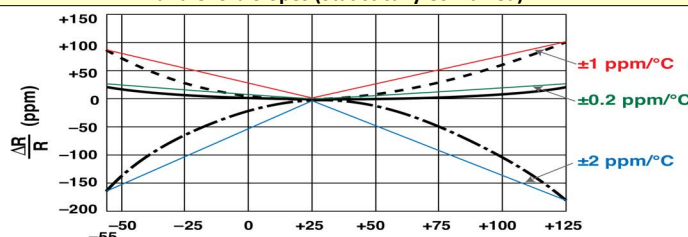
TXBCMSUPR FORM & FUNCTION

Provides a precision 1KΩ half bridge as well as a 120Ω, 350Ω, and 1KΩ quarter bridge together with built-in shunts (activated by push button) to simulate 1000 microstrains during calibration. The advantages of this module include:

- **Easy to use** (just insert leadwires, from 22-26 awg, into the spring loaded connectors).
- **Very rugged** (Encased and protected).
- **No calibration required** (Modules becomes more stable over time, unlike other resistor technologies).
- **Light, and very portable** (only 1.2” x 0.6” x 0.2”)

Bulk Metal® Foil technology outperforms all other resistor technologies today, making it the clear choice for applications that require high precision and high stability. This technology allows for the design and production of strain/stress measurement products and accessories that would not be possible otherwise. The TXBCM series of Bulk Metal® Foil based bridge completion modules offers ultra low TCR, excellent load life stability, tight tolerance, fast response time, low current noise, low thermal EMF, low power coefficient, and low voltage coefficient - all in a convenient, sealed design with easy, quick, push connections. The TXBCM series is virtually insensitive to common destabilizing factors that can completely undermine the accuracy and usefulness of other resistor types. The resistor element used is a solid alloy that is inherently ultra stable which, along with the many other additional Bulk Metal® Foil benefits, guarantees the highest degree of accuracy and stability in fixed-resistor applications. For questions, special applications and/or unique requirements, our Applications Engineering Department is on-site and available to help and advise.

**FIGURE 1 – NOMINAL RESISTANCE/TEMPERATURE CURVE(S)
and Chord Slopes (Statistically Combined)**



TXBCMSUPR FEATURES & SPECIFICATIONS

(R1, R2, and R3)

- **Resistance range: 1Ω to 1MΩ** (Any resistance value is available to 7 characters or 6 significant digits). (Wider ranges are available.)
- **Accuracy:** Calibrated individual resistance tolerances to **± 0.01%** and matched pairs (R1 and R2) to **± 0.005%** (See Table 1).
- **Temperature Coefficient (TCR):** R1, R2, and R3 each individually **< ± 1 ppm/°C** ($\pm 0.28 \mu E / ^\circ F$) at . R1 & R2 (half bridge) matched to **< ± 0.5 ppm/°C** ($\pm 0.14 \mu E / ^\circ F$); (See Table 1.)
- **Continuous Operating Temperature range** (recommended): **-20°C to +70°C** (-4°F to +158°F); (wider ranges are available)
- **Rated power** (R1, R2, and/or R3): **0.6 W** across any/each resistor (at +70°C). (Drops linearly thereafter to 0 W at 175°C.)
- **Exceptional load life stability:** **± 0.005%** (< 50 ppm) at 2000 hours, 0.1 W and +70°C; **± 0.015%** (< 150 ppm) after 10,000 hours.
- **Power coefficient of (PCR)** or ΔR due to self heating (R1, R2, and/or R3): **< ± 5 ppm/watt** at rated power (0.6W).
- **Voltage coefficient of resistance (VCR)** (R1, R2, and/or R3): **< 0.1 ppm/V** (essentially zero)
- **Recommended working voltage:** **0.5V to 12V** (300V max but all always subject to $V \leq \sqrt{0.6 \times R}$ for each resistor.)
- **Electrostatic discharge protection (ESD)** (R1, R2, and/or R3): **> 25 kV**
- **Capacitance:** 0.5 pF typical; 1.0 pF max (non-capacitive design)
- **Inductance:** < 0.08 μH typical; 0.1 μH max; (non-inductive design)
- **Hot spot free design;**
- **Rise time:** 1.0 ns at 1kΩ (effectively no ringing)
- **Current noise:** 0.010 μV_{RMS}/Volt of Applied Voltage (< -40 dB)
- **Thermal EMF :** 0.05 μV/°C typical (0.10 μV/°C max) and 1 μV/W (μV/°C relates to EMF due to ΔT wrt to leads and μV/watt due to the applied power)
- **Total accumulated ΔR over life (EOL)** (R1, R2, and/or R3): to **± 0.05 %** (an order of magnitude better than any other resistor technology!) Pre & Post Manufacturing Operations are available to reduce this even further.
- **Lifetime warranty!** (excluding abuse or damage)
- **Made in the USA**



**Texas
Components
Corporation**

USA Manufacturer of Precision Test and Measurement Devices

TXBCMSUPR

Bulk Metal® Foil® Resistor Network
Super Bridge Completion Module
for **Strain/Stress Measurement Applications**



TABLE 1 – ACCURACY & TCR BY RESISTANCE RANGE (Z-Foil)
(Full temperature range of -55°C to +125°C, +25 °C Reference)

RESISTANCE VALUE (Ω)	CALIBRATED TOLERANCE (%)		TYPICAL TCR & MAX SPREAD (ppm/°C) (Special limits are available. R1 & R2 always matched to < 0.5 ppm/°C max @ > 25°C)	STRAIN ACCURACY GF = 2; $\mu\epsilon$ /°C	
	R1, R2 & R3	R1 & R2 Match		0°C to +60°C	-55°C to +125°C
≥ 350Ω	±0.01	±0.005	± 0.2 (± 1.8)	± 0.35	± 1.0
100Ω to < 350Ω	±0.02	±0.010	± 0.2 (± 1.8)	± 0.35	± 1.0
50Ω to < 100Ω	±0.05	±0.025	± 0.2 (± 2.8)	± 0.75	± 1.5
25Ω to < 50Ω	±0.01	±0.050	± 0.2 (± 3.8)	± 1.00	± 2.0
10Ω to < 25Ω	±0.25	±0.125	± 0.2 (± 3.8)	± 1.00	± 2.0
5Ω to < 10Ω	±0.50	±0.250	± 0.2 (± 7.8)	± 2.00	± 4.0

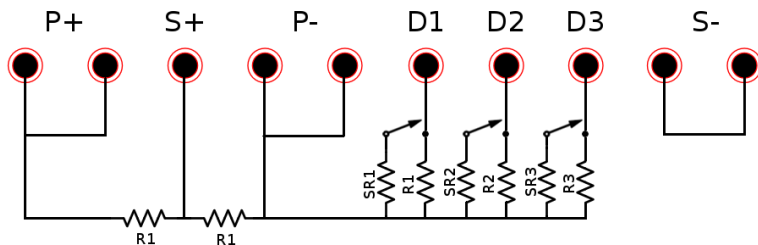
TABLE 2 – HOW TO ORDER THE CORRECT PART NUMBER

MODEL	RESISTANCE VALUE(S)	PRINT IMAGE
TXBCMSUPR	Standard = S Custom = C	Standard = S Alternative = B Custom = C
A module with standard resistor values (including 1000 microstrain shunts) and the standard image printing would be ordered as: TXBCMSUPR-S-S		
A module with custom resistor values and/or a custom image printing would be ordered as: TXBCMSUPR-C-C (for custom versions, a unique part number will be assigned for future ordering)		

FIGURE 2 – PICTURE



FIGURE 3 – SCHEMATIC



TBD

Alternative print scheme B is available.

For more information about this subject or this product line, please call us at (+1) 713-468-3882 or email us at txccsales@texascomponents.com.

You can also "Follow" Texas Components and Bulk Metal® Foil Resistors on Twitter [@TexasComponents](https://twitter.com/TexasComponents) and/or "Like" Texas Components on [Facebook](https://www.facebook.com/TexasComponents).

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Made in the USA

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