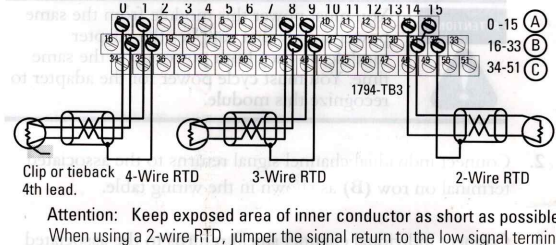
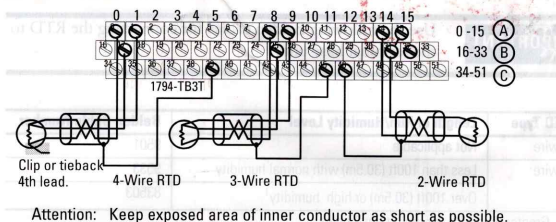


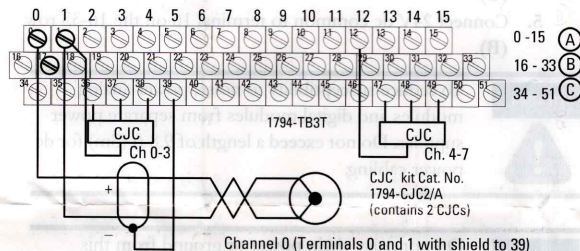
## Example of 2, 3 and 4-wire RTD Wiring to a 1794-TB3 Terminal Base Unit



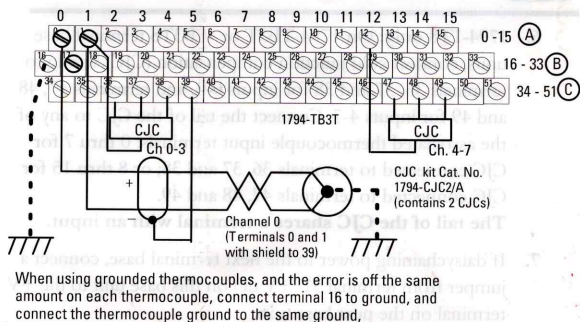
## Example of 2, 3 and 4-wire RTD Wiring to a 1794-TB3T Terminal Base Unit



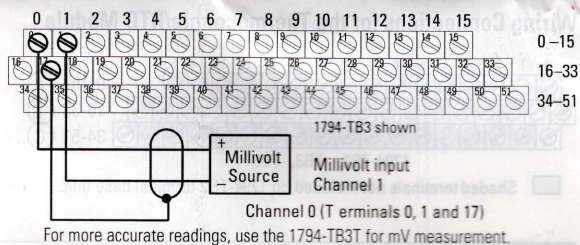
## Example of Thermocouple Wiring to a 1794-TB3T Terminal Base Unit



## Example of Grounded Thermocouple Wiring to a 1794-TB3T Terminal Base Unit



## Example of Millivolt Wiring to a 1794-TB3, -TB3S or -TB3T Terminal Base Unit



## Block Transfer Read and Write

The following block transfer read and write word bit information is presented for experienced users only. Refer to the user manuals (publication 1794-UM004 for the RTD or 1794-UM007 for TC/mV) for these products for complete information on programming and configuring your modules.

### Input Map (Read) for 1794-IR8 and 1794-IT8

Dec.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Oct.	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Word 0	Reserved															
1	Channel 0 Input Data															
2	Channel 1 Input Data															
3	Channel 2 Input Data															
4	Channel 3 Input Data															
5	Channel 4 Input Data															
6	Channel 5 Input Data															
7	Channel 6 Input Data															
8	Channel 7 Input Data															
9	Overrange Alarm Bits (channel 0 = bit 8, etc.)								Underrange Alarm Bits (channel 0 = bit 0, etc.)							
10 (-TB)	0	0	0	0	0	0	0	0	Bad Cal	Cal Done	Cal Ring	Cal Ring	Cal Ring	Cal Ring	CJC Under	CJC Under
10 (-IR8)	0	0	0	0	0	0	0	0	Bad Cal	Cal Done	Cal Ring	Cal Ring	Cal Ring	Cal Ring	Res.	0

Temperature and resistance data is returned with an implied decimal point. For example, a temperature data of 1779 is 177.9°. Resistance data of 2034 is 203.4Ω. mV data is returned with an implied decimal point of 2 decimal points. for example, 7500 is 75mV.

### Output Map (Write) for 1794-IR8 and 1794-IT8

Dec.	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
Oct.	17	16	15	14	13	12	11	10	7	6	5	4	3	2	1	0	
IR8 Word 0	8-Bit Calibration Mask								Cal Clk	Cal Hi/Lo	Filter Cutoff				FDF	MDT	
IR8 Word 0	8-Bit Calibration Mask								Cal Clk	Cal Hi/Lo	Filter Cutoff				Enh	MDT	
Word 1	Thermocouple or RTD Type Ch 3				Thermocouple or RTD Type Ch 2				Thermocouple or RTD Type Ch 1				Thermocouple or RTD Type Ch 0				
Word 2	Thermocouple or RTD Type Ch 7				Thermocouple or RTD Type Ch 6				Thermocouple or RTD Type Ch 5				Thermocouple or RTD Type Ch 4				
Word 3	Reserved																
Where:	FDF = Fixed digital filter (TC only) Enh = Enhanced mode (RTD only) MDT = Module Data Type																

Where: FDF = Fixed digital filter (ITC only)  
Enh = Enhanced mode (RTD only)  
MDT = Module Data Type

### Data Format for All Channels - Write Word 0

Bit	01	00	
0	0	0	°C
0	1	0	°F
1	0	0	Bipolar counts scaled between -32767 to +32767
1	1	0	Unipolar counts scaled between 0 and 65535
0101 thru 1111 not used			

### RTD Type - Write Word 1 and 2

RTD Type	Bit	03	02	01	00	Channel 0 (Write word 1)
	Bit	07	06	05	04	Channel 1 (Write word 1)
	Bit	11	10	09	08	Channel 2 (Write word 1)
	Bit	15	14	13	12	Channel 3 (Write word 1)
	Bit	03	02	01	00	Channel 4 (Write word 2)
	Bit	07	06	05	04	Channel 5 (Write word 2)
	Bit	11	10	09	08	Channel 6 (Write word 2)
	Bit	15	14	13	12	Channel 7 (Write word 2)
	0	0	0	0	0	Resistance (default = mV)
	0	0	0	1	0	No sensor connected - do not scan
	0	0	1	0	0	100Ω Pt α = 0.00395 Euro (-200 to +870°C)
	0	0	1	1	0	100Ω Pt α = 0.003916 U.S. (-200 to +630°C)
	0	1	0	0	0	200Ω Pt α = 0.00385 Euro (-200 to +630°C)
	0	1	0	1	0	500Ω Pt α = 0.00385 Euro (-200 to +630°C)
	0	1	1	0	0	Reserved
	0	1	1	1	0	100Ω Copper (-200 to +260°C)
	1	0	0	0	0	120Ω Nickel (-60 to +250°C)
	1	0	0	1	0	100Ω Nickel (-60 to +250°C)
	1	0	1	0	0	200Ω Nickel (-60 to +250°C)
	1	0	1	1	0	500Ω Nickel (-60 to +250°C)
	1	1	0	0	0	Reserved

### Thermocouple Type - Write Word 1 and 2

Thermocouple Type	Bit	03	02	01	00	Range
	Bit	07	06	05	04	Channel 0 (Write word 1)
	Bit	11	10	09	08	Channel 1 (Write word 1)
	Bit	15	14	13	12	Channel 2 (Write word 1)
	Bit	03	02	01	00	Channel 4 (Write word 2)
	Bit	07	06	05	04	Channel 5 (Write word 2)
	Bit	11	10	09	08	Channel 6 (Write word 2)
	Bit	15	14	13	12	Channel 7 (Write word 2)
	0	0	0	0	0	mV (default)
	0	0	0	1	0	B 300 to 1800°C (572 to 3272°F)
	0	0	1	0	0	E -270 to 1000°C (-454 to 1832°F)
	0	0	1	1	0	J -210 to 1200°C (-346 to 2192°F)
	0	1	0	0	0	K -270 to 1372°C (-454 to 2502°F)
	0	1	0	1	0	R -50 to 1768°C (-58 to 3214°F)
	0	1	1	0	0	S -50 to 1768°C (-58 to 3214°F)
	0	1	1	1	0	T -270 to 400°C (-454 to 752°F)
	1	0	0	0	0	C 0 to 2315°C (32 to 4199°F)
	1	0	0	1	0	N -270 to 1300°C (-450 to 2372°F)
	1	0	1	0	0	TXK/XXKL -200 to 800°C (-328 to 1472°F)
	1	0	1	1	0	Reserved
	1	1	0	0	0	Module reports cold junction sensor temperature for channels 00-03
	1	1	0	1	0	Module reports cold junction sensor temperature for channels 04-07
	1	1	1	0	0	Reserved
	1	1	1	1	0	No input device connected - do not scan

## Specifications

Specifications	1794-IT8	1794-IR8
Number of Inputs	8 channels	
Module Location	Cat. No. 1794-TB2, -TB3, -TB3S, -TB3T and -TB3TS Terminal Base Units	
Nominal Input Ranges	-76.5 to +76.5mV	1 to 433 ohms
Supported Thermocouple Types (1794-IT8 only)	<b>Type</b> B 300 to 1800°C (572 to 3272°F) C 0 to 2315°C (32 to 4199°F) E -270 to 1000°C (-454 to 1832°F) J -210 to 1200°C (-346 to 2192°F) K -270 to 1372°C (-454 to 2502°F) R -50 to 1768°C (-58 to 3214°F) S -50 to 1768°C (-58 to 3214°F) T -270 to 400°C (-454 to 752°F)	<b>Range °F</b> (572 to 3272°F) (32 to 4199°F) (-454 to 1832°F) (-346 to 2192°F) (-454 to 2502°F) (-58 to 3214°F) (-58 to 3214°F) (-58 to 3214°F) (-454 to 752°F)
Supported RTDs (1794-IR8 only)	<b>Resistance</b> 100Ω Pt α = 0.00385 Euro (-200 to +870°C) 100Ω Pt α = 0.003916 U.S. (-200 to +630°C) 200Ω Pt α = 0.00385 Euro (-200 to +630°C) 500Ω Pt α = 0.00385 Euro (-200 to +630°C) 100Ω Nickel α = 0.00618 (-60 to +250°C) 120Ω Nickel α = 0.00672 (-60 to +250°C) 200Ω Nickel α = 0.00618 (-60 to +250°C) 500Ω Nickel α = 0.00618 (-60 to +250°C) 10Ω Copper α = 0.00427 (-200 to +260°C)	
RTD Excitation Current	718.36μA	
Resolution	16 bits (2.384μV typical)	16 bits across 435 ohms
Accuracy	Refer to "Calculating the Accuracy" section in Appendix A of the user manual (1794-UM007)	Without calibration, at low humidity: Normal mode: 0.05% full scale (max) Enh. mode: 0.01% full scale (typical)
Common Mode Rejection	-115db @ 60Hz; -100db @ 50Hz	-120db @ 60Hz; -100db @ 50Hz with A/D filter cutoff @ 10Hz
Common Mode Input Range	+10V maximum	0V between channels (common return)
Isolation Voltage	Tested at 850V dc for 1s from inputs and user power to logic side	
Data Format	16-bit 2's complement or offset binary (unipolar)	

Normal Mode Noise Rejection	-60db @ 60Hz	-60db @ 60Hz for A/D filter cutoff @ 10Hz
Input Offset Drift w/Temperature	±6mV/°C maximum	1.5 milliohm/°C maximum
Gain Drift w/Temp.	10ppm/°C maximum	Normal mode: 20ppm/°C max. Enhanced mode: 10ppm/°C max.
Channel Bandwidth	0-2.62Hz (-3db)	
Settling time to 100% of final value	Available at system throughput rate	
System Throughput	325ms (1 channel scanned), programmable to 28ms 2.6s (8 channels scanned), programmable to 224ms	<b>Normal mode</b> - 325ms (1 channel scanned), programmable to 28ms 2.6s (8 channels scanned), programmable to 224ms <b>Enhanced mode</b> - programmable from 56 to 650ms/channel - 650ms (1 channel scanned), 2.925s (8 channels scanned)
Open TC/RTD Circuit Detection	Out of range reading (upscale)	
Open TC/RTD Detection Time	Available at system throughput rate	
Overvoltage Capability	35V dc, 25V ac continuous at 25°C	
Overall Drift with Temperature	50ppm/°C of span (maximum)	
Cold Junction Compensation	Range: 0 to 70°C A-B catalog number 1794-CJC2	
Channel to channel isolation	±10V	0V
Indicators	1 red/green power status indicator	
Flexbus Current	20mA	
Power Dissipation	3.0W maximum @ 31.2V dc	
Thermal Dissipation	Maximum 10.2 BTU/hr @ 31.2V dc	
Keyswitch Position	3	

### General Specifications

External dc Power Supply	<b>Voltage Range</b> 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 19.2 to 31.2V dc for ambient temperatures ≤ 40°C 24V dc maximum for ambient temperatures = 55°C See derating curve <b>Supply Current</b> 150mA @ 24V dc	
Dimensions (with module installed)	31.8H x 3.7W x 2.1D inches 45.7H x 9.4W x 53.3D mm	
Environmental Conditions	<b>Operating Temperature</b> IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): 0 to 55°C (32 to 131°F) <b>Storage Temperature</b> IEC 60068-2-1 (Test Ab, Un-packaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Un-packaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Un-packaged Non-operating Thermal Shock): -40 to 85°C (-40 to 185°F) <b>Relative Humidity</b> IEC 60068-2-30 (Test Db, Un-packaged Non-operating Damp Heat): 5 to 95% non-condensing <b>Vibration</b> IEC 60068-2-6 (Test Fc, Operating): 5g @ 10-500Hz <b>Shock</b> IEC 60068-2-27 (Test Ea, Unpackaged shock): Operating 30g Non-operating 50g <b>Emissions</b> CISPR 11: Group 1, Class A (with appropriate enclosure) <b>ESD Immunity</b> IEC 61000-4-2: 4kV contact discharges 8kV air discharges <b>Radiated RF Immunity</b> IEC 61000-4-3: 10V/m with 1kHz sine-wave 80%AM from 30MHz to 1000MHz <b>EFT/B Immunity</b> IEC 61000-4-4: ±2kV at 5kHz on signal ports <b>Surge Transient Immunity</b> IEC 61000-4-5: ±2kV line-earth(CM) on shielded ports <b>Conducted RF Immunity</b> IEC 61000-4-6: 10Vrms with 1kHz sine-wave 80%AM from 150kHz to 30MHz	
Enclosure Type Rating	None (open-style)	
Signal Conductors Thermocouple	Thermocouple - Use appropriate shielded thermocouple wire	2-wire -Belden 9501 3-wire, less than 100ft with normal humidity -Belden 9533
Millivolt Category <sup>2</sup>	Belden 8761 2	3-wire, greater than 100ft or normal humidity (>55°C for > 8 hrs) -Belden 83503
Power Conductors Wire Size	12AWG (4mm <sup>2</sup> ) stranded copper wire rated at 75°C or higher 3/64 inch (1.2mm) insulation maximum	
Category <sup>2</sup>	2	
Certifications (when product is marked) <sup>3</sup>	<b>UL</b> UL Listed Industrial Control Equipment <b>c-UL-us</b> UL Listed Industrial Control Equipment, certified for US and Canada (1794-IT8) <b>c-UL-us</b> UL listed for Class I, Division 2, Groups A, B, C and D Hazardous locations, certified for US and Canada (1794-IT8) <b>CSA</b> CSA certified Process Control Equipment <b>CSA</b> CSA certified for Class I, Division 2, Groups A, B, C and D Hazardous locations <b>EEC<sup>3</sup></b> European Union 94/9/EEC ATEX Directive, compliant with: EN 50021; Potentially Explosive Atmospheres. Protection "n" (Zone 2) <b>CE<sup>3</sup></b> European Union 89/336/EEC EMC Directive, compliant with: EN 61000-6-4; Industrial Emissions EN 60082-2; Industrial Immunity EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity <b>C-Tick<sup>3</sup></b> Australian Radiocommunications Act compliant with AS/NZS CISPR 11, Industrial Emissions	

1 Refer to thermocouple manufacturer for proper thermocouple extension.  
2 You use this category information for planning conductor routing as described in Allen-Bradley publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines.  
3 For the latest up-to-date information, see the Product Certification link at