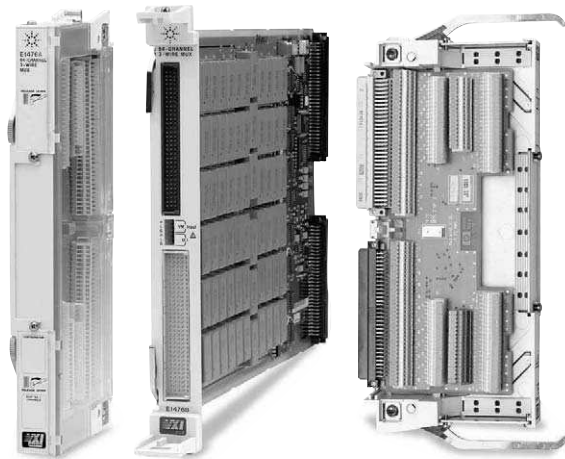


# Agilent E1476A 64-Channel 3-Wire T/C Relay Multiplexer

## Data Sheet

- 1-Slot, C-size, register based
- Low-thermal offset relay  $<2 \mu\text{V}$
- 64 channels of temperature with compensation
- 64 channels of voltage — 3-wire high, low, and guard
- 64 channels 2-wire and 32 channels 4-wire resistances
- Includes QUIC easy-to-use terminal block



Agilent E1476A

## Description

The Agilent E1476A High-Density Reed Relay Multiplexer is a **C-size, 1-slot, register-based VXI module**. This low-offset, thermocouple compensated multiplexer is dynamically configurable providing 64 channels of two-, three- or four-wire (32 channels) of switching. This multiplexer module consists of a component card with switches and a QUIC spring clamp terminal block that plugs onto the component card. The E1476A is ideal for applications needing a relay multiplexer that is dynamically configurable, and makes maximum high-quality, high-point count measurements.

High-integrity voltage measurements are possible with three-wire high, low, and guard switching. In addition to making two-wire resistance and precision four-wire resistance measurements, you can make up to 64 channels of thermocouple temperature measurements with automatic cold junction compensation.

Refer to the Agilent Technologies Website for instrument driver availability and downloading instructions, as well as for recent product updates, if applicable.

## Temperature Measurements

The reference thermistor is also accessible by both banks, each bank having a control switch allowing for either a two-wire or four-wire resistance measurement of the  $5000 \Omega$  reference thermistor mounted on the isothermal plane located in the terminal block. Using a scanning multimeter configuration, the channel relays and five control relays are programmed by SCPI commands or by register read/writes. SCPI command syntax to make a temperature scan of K type thermocouples is:

```
MEAS:TEMP? TC, K, (@100:163)
```

## Configuration

Each of the 64 channels provides separate high, low, and guard connections, all easily accessible via the quick connect screwless terminals on the companion terminal block. The multiplexer is organized in two banks of 32 with each bank having its own voltage sense control switch and one bank having a current source control switch. This dual bank configuration makes it possible to use half the channels as sense channels, while the other half are used as current source channels, thus obtaining 32 four-wire measurement channels, each with high, low, and guard connections.

One 6 cm (2.5-in) analog bus cable (E1400-61605) is shipped with each module to allow you to interconnect the E1411B 5.5-digit multimeter to one or more E1476A multiplexers via its front panel analog bus connector. For connection to an external voltmeter or other VXI multimeter with conventional front panel connectors, access to the analog bus lines is available in the terminal block. This allows you to connect the analog bus signal lines to the multimeter inputs using ordinary hookup wire.



## Product Specifications

### Input

**DC:**  
**Maximum voltage (any terminal to any other terminal or chassis):** 120 Vdc

**AC rms:**  
**Maximum voltage (any terminal to any other terminal or chassis):** 120 V rms  
**Maximum current (per channel common, non-inductive):** 35 mA  
**Maximum power per channel:** 4 VA

### DC

**Maximum thermal offset per channel, differential Hi-Lo:** <4  $\mu$ V, <2  $\mu$ V (10 samples averaged)  
**Closed channel resistance:** 100  $\Omega \pm 5 \Omega$   
**Insulation resistance (between any two points):** 10E9  $\Omega$ , 40 °C, 95% RH  
**Insulation resistance (Hi to Lo, power off):** n/a

### AC

**Minimum bandwidth (-3 dB, 50  $\Omega$  source/load):** 100 kHz  
**Crosstalk (channel-to-channel):**  
**100 kHz:** -70 dB  
**10 MHz:** -45 dB  
**Both:** n/a  
**Closed channel capacitance:** <175 pf H-L, <300 pf L-G, <1500 pf G-C

### General Characteristics

**Relays:** Reed relays  
 Break-before-make  
**Power down state:** Relays open on power down  
**Power up state:** Relays open on power up  
**Minimum relay life:**  
**No load:** 5x10E9 operations  
**Rated load:** 10E7 operations  
**Reference junction measurement accuracy (18 to 28 °C operating):** 0.38 °C  
**Strain gage excitation:** n/a  
**Screw terminal wire size:** 22 to 26 AWG (0.5, 0.75, 0.9 mm)  
**Scanning rate:** 333 channels/s typ.

## General Specifications

### VXI Characteristics

**VXI device type:** Register based, A16, slave only  
**Size:** C  
**Slots:** 1  
**Connectors:** P1/2  
**Shared memory:** None  
**VXI busses:** None  
**C-size compatibility:** n/a

### Instrument Drivers

See the *Agilent Technologies Website* ([http://www.agilent.com/find/inst\\_drivers](http://www.agilent.com/find/inst_drivers)) for driver availability and downloading.

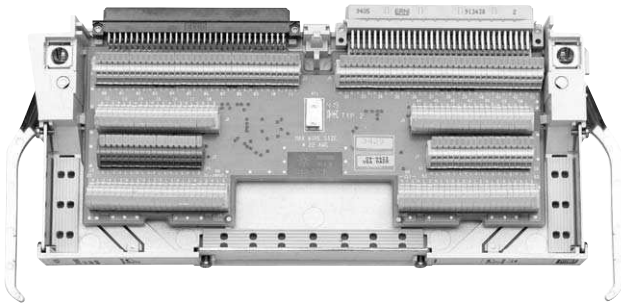
**Command module firmware:** Downloadable  
**Command module firmware rev:** A.06  
**I-SCPI Win 3.1:** Yes  
**I-SCPI Series 700:** Yes  
**C-SCPI LynxOS:** Yes  
**C-SCPI Series 700:** Yes  
**Panel Drivers:** Yes  
**VXIplug&play Win Framework:** Yes  
**VXIplug&play Win 95/NT Framework:** Yes  
**VXIplug&play HP-UX Framework:** No

### Module Current

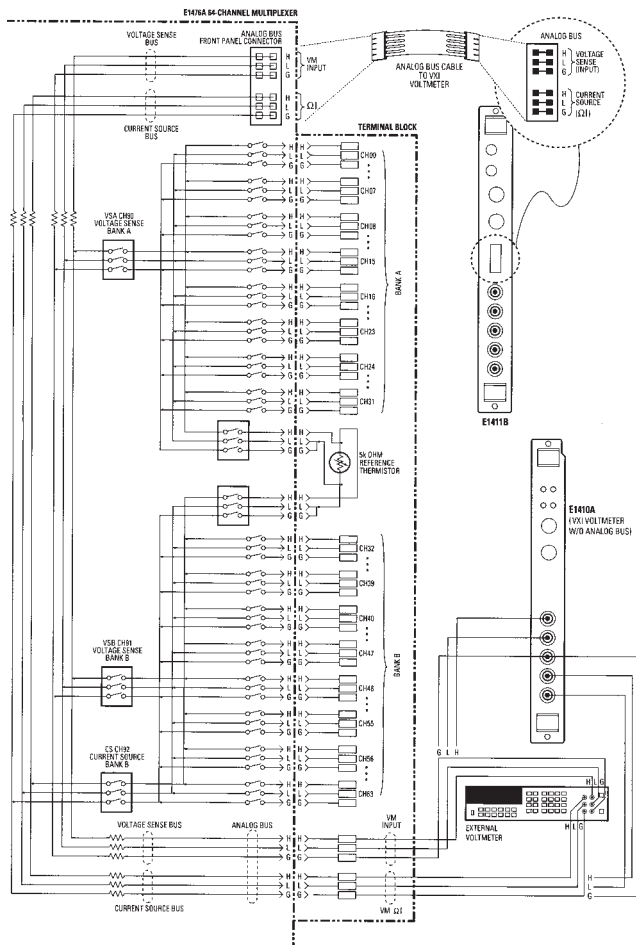
	I <sub>PM</sub>	I <sub>DM</sub>
+5 V:	0.1	0.1
+12 V:	0	0
-12 V:	0	0
+24 V:	0	0
-24 V:	0	0
-5.2 V:	0	0
-2 V:	0	0

### Cooling/Slot

Watts/slot: 4.00  
 $\Delta P$  mm H<sub>2</sub>O: 0.10  
 Air Flow liter/s: 0.30



Agilent E1476A Terminal Block



Agilent E1476A Circuit Diagram

### Ordering Information

Description	Product No.
64-Channel 3-Wire T/C Relay Multiplexer	E1476A
Pre-QUIC-type Terminal Block	E1476A 106
Crimp-and-Insert Terminal Block**	E1476A A3E**
Service Manual	E1476A 0B3
Extra Pre-QUIC-type Terminal Block (if ordered separately)	E1476-80000
Extra QUIC-type Terminal Block (if ordered separately)	E1476-80010
Extra Crimp-and-Insert Terminal Block (if ordered separately) **	E1476-80011 **

\*\* Crimp-and-Insert Contacts are not included. See the Interconnect and Wiring section for information on ordering Crimp-and-Insert Contacts.

## **Agilent Technologies' Test and Measurement Support, Services, and Assistance**

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

### **Our Promise**

Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you receive your new Agilent equipment, we can help verify that it works properly, and help with initial product operation.

### **Your Advantage**

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and onsite education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.



### **Agilent Email Updates**

[www.agilent.com/find/emailupdates](http://www.agilent.com/find/emailupdates)

Get the latest information on the products and applications you select.

### **Agilent T&M Software and Connectivity**

Agilent's Test and Measurement software and connectivity products, solutions and developer network allows you to take time out of connecting your instruments to your computer with tools based on PC standards, so you can focus on your tasks, not on your connections.

Visit [www.agilent.com/find/connectivity](http://www.agilent.com/find/connectivity) for more information.

For more assistance with all your test and measurement needs or to find your local Agilent office go to [www.agilent.com/find/assist](http://www.agilent.com/find/assist)

Product specifications and descriptions in this document subject to change without notice.

© Agilent Technologies, Inc. 2005  
Printed in the USA May 1, 2005  
5965-5607E



**Agilent Technologies**