

Keysight N1225A

Four-Channel High-Resolution Laser Axis Board

For high performance positioning system

The N1225A axis board is a VME64x "6U" size board that supports a three-axis laser measuring system. The N1225A features a 0.15 nm plane mirror resolution, a ± 10 m range, and a velocity limit of ± 2.29 m/s when used with a 15 MHz split frequency laser head. The board requires a single +5V power supply and includes four high sensitivity receivers.

To accommodate a greater number of axes, a digital reference can be passed between boards using Keysight-supplied Reference Passing patch cables.

Compatibility to 10897D and 10898D

The N1225A is compatible, with some limitations, with Keysight 10897/8 boards in the same backplane, and can provide most of their functions. It has five row connectors but can operate in three rows as well as five row VME64x backplanes. The P2 connector rows A and C have pin-for-pin compatibility with the 10898D, and limited compatibility with the 10897D.

The P2-D and -Z rows provide access to the additional features of the N1225A (comparator functions and simultaneous data output from all axes at 10 MHz). The N1225A also provides LAN connectivity along with triggered data recording.

Key features

- Four measurement channels per board
- Receiver sensitivity of 0.065 μ W
- Position resolution of 0.15 nm using plane mirror optics
- ± 2.29 m/s plane mirror stage velocity using 15 MHz split laser head
- Multiplexed 36 bits position output data rate at 10 MHz/number of axes
- Simultaneous 12 bits position output at 10 MHz
- Optional cyclic error compensation available
- Includes "oscilloscope like" data capture operated with standard web browsers.



Multiple axis measurement

Multiple N1225A boards can be linked together for up to 31 axes of position measurement.



Keysight Technologies N1225A Four-Channel High Resolution Laser Axis Board

General system specifications	
Maximum number of boards in system	Eight on reference chain
Measurement resolution	$\lambda/4096$ (0.15 nm) with double pass I/F Linear optics: 0.3 nm
Velocity range (using double pass I/F)	± 2.290 m/s with 15 MHz laser split frequency ± 1.580 m/s with 20 MHz laser split frequency ¹ ± 1.100 m/s with 7.5 MHz laser split frequency ± 1.028 m/s with 5517F laser head ± 0.870 m/s with 6 MHz laser split frequency ± 0.458 m/s with 5517D laser head ± 0.300 m/s with 5517C laser head ± 0.221 m/s with 5517B laser head ± 0.158 m/s with 5517A laser head
Maximum axis acceleration	400 g
Working range with plane mirror optics	± 10.3 m (37 bits in position register)
Fixed data age for P2 data	3.05 μ s, typical
Frequency and dynamic range dependent error	< 0.6 nm in plane mirror system (estimate)
Velocity resolution	94.3 nm/s
Velocity format	27 bits, 2's complement
Optical inputs	
Sensitivity	0.065 μ W @ 90% ac:dc ratio (estimated power level considered to be measured at input to E1706A connected to 2m long glass fiber)
Frequency range	500 kHz to 30 MHz
Maximum input levels	62.5 μ W AC power; 187 μ W DC power
Signal strength voltage (SSV) update rate (typical, refers to per channel value)	100 Hz
Number of optical channels	Four per board
Number of optical reference inputs	Two maximum for a single board system Three maximum for a two board system
Squelch setting when shipped	Preset to zero (inactive)

¹ Maximum velocity for 20 MHz split is reduced because of 30 MHz upper limit on receiver

Optical inputs	
Optical input connector	ST type
Dynamic range (optical ac power in)	1250:1 maximum (90% ac:dc ratio) 93.5:1 minimum (10% ac:dc ratio)
Reference inputs	One digital reference input One optical, using channel 4 ST connector 0.5–30 MHz nominal
Reference outputs	One digital reference output
Measure inputs	Four, if reference supplied by another board Three, if one channel is used for reference
Signal monitoring test points	Front panel scope probe socket for each channel
Status indication	Signal and error LED for each channel Status LED indicates bootup progress
Measurement resolution	4096 (0.15 nm) with double pass I/F Linear optics: 0.3 nm
Digital interface	
Position data output rate (over P2 bus)	Maximum 10 MHz/# of axes 36 bit, 2's complement or output 32 contiguous bits out of 37
High speed parallel output	10 bits/axis, 10 MHz simultaneous output 0.768 m/s maximum velocity
N1225A VME characteristics/operations ²	6U EIA module A16/A24 addressing, GAP D16/D32 data transfer cycles Responds to address modifier codes: \$29 Short non-privileged access (A16 only) \$2D Short supervisory access (A16 only) \$39 Standard non-privileged data access \$3A Non-privileged program access \$3D Standard supervisory data access \$3E Supervisory program access D08(O) Interrupt acknowledge cycles VME 64x (160 pin P1/P2) ANSI/VITA 1-1994 American National Standard for VME64 ANSI/VITA 1-1997 American National Standard for VME64
LAN	10/100 Base T LAN Connection

² Note: for A24 addressing, the N1225A waits for the VME bus master to release AS* before it releases DTACK*. For some bus controllers, this will cause the bus to hang. This issue will be corrected in a future firmware revision.

Digital interface	
	DHCP Enabled Built-in web page server
Power requirement	
Power requirements	+5 V (4.875 V – 5.25 V) @ 5.6 A maximum 120 mV _{pp} max. noise below 20 MHz 80 mV _{pp} max low frequency ripple, below 200 Hz
Environmental requirements	
Airflow requirements	400 ft/min, 40°C maximum inlet air temperature
Operating environment	The product is intended for use in an industrial or clean room environment. ³
Operating temperature range	0 to 40°C
Humidity	10 to 90% RH (non-condensing)
Board characteristics	
Bootup time	Less than 30 seconds
Data age variation over temperature	+15 ps/°C, estimated
Physical characteristics	
Weight	0.46 Kg (1 lb)
Packaged weight	0.77 Kg (1 lb, 11 oz)

³ Elma level 2 RFI shielding or equivalent may be required for VME card cage.

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