

## 200 MHz, 1 ns Universal Counter (VMIP™)

### Overview

The VM2164 is a high-performance system level universal counter, designed to outperform traditional rack-and-stack and other C-size VXIbus counters, but with a considerably smaller footprint. Being part of the VMIP™ family, the VM2164 can be combined with up to two other high-performance instruments on a single C-Size card.

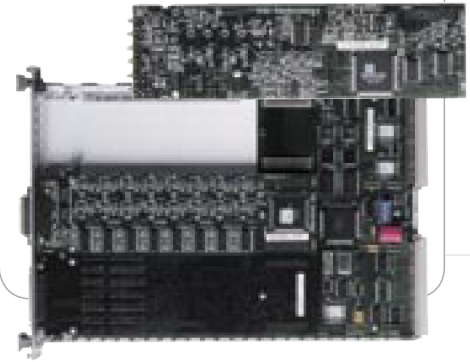
A powerful combination for any automated test set is our single VXIbus module, VT2000, combining a 6.5 digit system DMM (VM2710A), 1 ns universal counter (VM2164), and a 50 MSa/s arbitrary waveform/function generator (VM3640A).

### Performance

For ATE applications, making high-speed precise measurements and passing these measurements back to the host controller is critical. The VM2164 allows over 200 readings per second over the backplane, while providing extensive arming and triggering capability, allowing the VM2164 to be easily synchronized to external events, or other measurement devices. Add a built-in TCXO or OCXO time base option for improved measurement stability.

### Features

<b>Frequency:</b>	Frequency Frequency ratio Freq in Burst Burst Rep Rate
<b>Period and Time:</b>	Period [Single] Period [Average] Positive Pulse Width Negative Pulse Width Rise Time Fall Time Time Interval Time Interval Avg
<b>Phase:</b>	Phase
<b>Voltage:</b>	Vdc Vp Vmax Vmin
<b>Totalize [Counts]</b>	2nd Ch Start/Stop 2nd Ch Gate Gated by Time Ext Arm Start/Stop Ext Arm Gate TTLT Start/Stop TTLT Gate
<b>Positive Duty Cycle</b>	
<b>Negative Duty Cycle</b>	



## Features

200 MHz Frequency Range for both A and B Channels

1 ns Time Interval Resolution (100 ps with Averaging)

9-digit Resolution in 1 Second Gate Time

Greater than 200 Readings/second Over the VXIbus

Up to 32,000 On-board Readings with Direct Register Access for Fast Data Throughput

Part of the VMIP™ Family, Combine With up to two other Instruments on a Single C-size Card (i.e. DMM/AWG)

Built-in DVM, for Simple Voltage Measurement

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### Built-in Software Functions

Auto-Set, Auto-level, Pulse Characterization, Period, Frequency, Pos Pulse Width, Neg Pulse Width, Pos Duty Cycle, Rise Time, Fall Time, Burst Characterization, Burst Frequency, Burst Rep Rate, Math [slope,  $a=mx+b$ ], RPM [Revolutions per Minute], BIT [Built In Test], Clock Out On/Off – IN/OUT

### Measurement Storage

#### [On Board]

**1k Measurements**                      Standard

### Arming

Trigger Source:                      ChA, ChB, Ext, VXI TTLT  
 Trigger Slope:                      Positive, Negative  
 Trigger Level:                      TTL  
 Arming Start Delay:                Events/Timed  
 Hold Off:                              Timed  
 Burst Sync Delay:                  Timed

### Oscillator Options

No Oscillator                      Use VXI 10 MHz  
 TCXO                                  High Performance  
     Aging:                               $\pm 1 \times 10^{-9}$ /year  
     Temp Stability:                   $\pm 1 \times 10^{-6}$  (0 °C to 50 °C)  
     Adj Range:                         $\pm 3 \times 10^{-6}$  min.

OcXO                                  Ultra High Perf  
     Aging:                               $\pm 1 \times 10^{-7}$ /year  
     $\pm 1 \times 10^{-9}$ /day  
     Temp Stability:                   $\pm 1 \times 10^{-7}$  (0 °C to 50 °C)  
     Adj Range:                         $\pm 4 \times 10^{-7}$  min.  
     Warm up time:                  <3 min.

### Front Panel Connectors

Channel A Input, Channel B Input  
 Ext Arm Input, Gate/Edge  
 Ext Clock Input/Output

### Specifications

**Frequency**  
 Input A & B:                      500  $\mu$ Hz to 200 MHz  
    20 Hz to 200 MHz (ac)  
 Resolution:                        9 digits/s measuring time,  
    max. 10 digits resolution

**Period**  
 Input A & B:                      5 ns to 2000 s  
 Resolution:                        1 ns [single]  
    9 digits/s measuring time,  
    max. 10 digits resolution  
    [averaged]

**Frequency Ratio**  
 A/B & B/A:                      500  $\mu$ Hz to 200 MHz

**Time Interval**  
 Range:                              2 ns to 1e6 s  
 Resolution:                        1 ns

**Positive/Negative Pulse Width**  
 Range:                              5 ns to 20 ms  
 Resolution:                        1 ns

**Rise/Fall Time**  
 Range:                              10 ns to 1000 s  
 Resolution:                        1 ns

**Phase**  
 Range:                              0.00 ° to +360.00 °

**Totalize**  
 Range:                              0 to 10<sup>10</sup> counts

**Peak Voltage**  
 Voltage:                            5.00 V, 50.0 V  
 Resolution:                        10 mV, 100 mV

**DC Voltage**  
 Voltage:                            5.00 V, 50.0 V  
 Resolution:                        10 mV, 100 mV

**Coupling:**                        dc or ac

**Signal Operating Range:** +50 V (1 M $\Omega$ , w/attn),  
 +5 V (50  $\Omega$ )

**Trigger Level Range:** +50 V, +5.0 V,

**Resolution:**                      25 mV, 2.5 mV

**Trigger Sensitivity**  
 +50 V Range:                      200 mV rms Sine wave (up to  
    50 MHz) 400 mV rms sine wave  
    (50 MHz to 200 MHz)

+5.0 V Range:                      20 mV rms (up to Range 50 MHz)  
    40 mV rms (50 MHz to 200 MHz)

**Auto Trigger Level:**            Automatically set at 50% of the  
    input signal's Vp value. 10% to  
    90% is used if measuring rise and  
    fall times.

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<b>Impedance:</b>	50 Ω 1 MΩ/20 pf 1 MΩ x10/20 pf
<b>Low Pass Filter:</b>	<50 kHz
<b>Maximum Input Voltage:</b>	
1 MΩ input	
<2 kHz:	240 V rms (dc + ac rms), decreasing linearly to +5 V at 1 kHz
>100 kHz:	+5 V to 200 MHz 1 MΩ input x10 attn
50 Ω input:	5.0 Vrms (dc + ac)
<b>Crosstalk:</b>	
100 MHz @ 50 Ω:	<36 dB channel separation
<b>External Arm Input Coupling:</b>	dc only
<b>Pulse Width:</b>	>50 ns
<b>Transition Time:</b>	<250 ns
<b>Voltage Range:</b>	TTL or ECL
<b>Impedance:</b>	Approx. 1 kΩ

<b>TTL Trigger Bus Arming Input:</b>	Any TTLT may be selected for arming, by edge or level (polarity is also programmable)
<b>Output:</b>	Any TTLT may be selected to follow the measurement gate signal (polarity is programmable)
<b>External Reference Input Coupling:</b>	ac only
<b>Frequency Range:</b>	10 MHz
<b>Voltage Range:</b>	500 mV rms to 12 V rms
<b>Impedance External Reference:</b>	Approx. 1 kΩ ac only
<b>Output Coupling Frequency Range:</b>	10 MHz
<b>Voltage Range:</b>	TTL/CMOS
<b>Impedance:</b>	Approx. 50 Ω
<b>Gate Time:</b>	Programmable from 200 μs to 99.999 s

Note: The gate time may be extended by one period of the input signal on frequency A or B and Ratio A/B, B/A.

### Ordering Information

VM2164

<b>VM2164</b>	200 MHz Universal Timer/Counter
<b>Option 15</b>	TCXO Oscillator
<b>Option 16</b>	OCXO Oscillator