



# Applied Test Resources

## QOAL400 Quad Op-Amp Loop

The QOAL400 module is a precision instrument capable of measuring all common parameters of an Op Amp, including AC as well as DC parameters. The QOAL400 has four completely independent channels, which allow a quad device to be tested in a minimum amount of time. Each channel has a full set of resources to measure all common parameters. Parameters such as  $A_v$ ,  $V_{os}$ ,  $I_b$ ,  $I_{os}$ , GBW, Slew Rate, Rise Time, Supply Current, PSRR, CMRR,  $V_{out}$ ,  $I_{out}$ , etc. may all be measured with this card. This is the only card necessary for the MTS-2010 to fully test a quad Op Amp IC.

The QOAL400 uses an onboard controller, which relieves the system CPU of performing many functions necessary for the module operation. The result is higher efficiency of the CPU and faster execution of the module commands. All measurements use the "Zero Time Average" (ZTA) circuit (patent pending) that allows for a measurement time of less than 250 us to the full 16-bit resolution. ZTA enables the QOAL400 to obtain the repeatability of using 20 to 50 measurements and averaging the results, with a single measurement.

### SPECIFICATIONS

DUT Supply Voltage A/B	$\pm 20V$ ; 1A; Force Voltage, Measure Voltage/Current Voltage Accuracy $\pm 0.05\%$ , Current $\pm 0.5\%$
Load Resistors	1 K Ohms; 10 K Ohms; 100 Ohms; 1% - User on DUT Board
Op Amp Test Loop	
$V_{os}$	2 Ranges: 100 mV - $\pm 0.5$ mV/10 mV $\pm 0.05$ mV
$I_{os}/I_b$	3 Ranges: 10 $\mu A$ $\pm 50$ nA/ $\mu A \pm 5$ nA/100 nA $\pm 0.5$ nA
$A_v$	100 dB $\pm 1$ dB
Common Mode Range	$\pm 15$ V
Sine Wave Generator	
Frequency	1 Hz - 1 MHz
Amplitude	1 mV; 10 mV; 100 mV; 1 V RMS
Pulse Generator	
Rise Time	20 nS
Fall Time	20 nS
Amplitude	100 mVp-p; 200 mVp-p; 1Vp-p; 2Vp-p
Period	1 S - 1 $\mu S$
Pulse Width	$\frac{1}{2}$ Period
RMS-DC Converter	
Ranges	1 mV; 10 mV; 100 mV; 1 V
Accuracy	0.25% of Range @ $F \geq 10$ KHz
Max Frequency	1 MHz
Min Frequency	100 Hz

\*All specifications are subject to change without notice.  
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