

# Omega Mixed Signal Test System

The Omega from MiNT System is a full featured Mixed Signal Test System. Omega features a highly modular architecture that permits the user to configure the system for specific test applications and easily expand the system to meet future testing needs. Omega is designed to provide a high speed test capability for a wide variety of analog and mixed signal semiconductor components. Instrument modules are designed for automotive, industrial, consumer, power, communication and computer device testing Omega is optimized for use in engineering as well as production test facilities with handler and prober interfaces. The small footprint and low power consumption makes Omega the right choice for the economy minded test manager. The highly accurate and reliable Omega system is easy to operate, program and maintain. The system features easy to learn programming techniques using data sheet and parameter tables to speed new test program development. When accuracy in mixed signal testing and low cost-of-test are important, Omega is the solution.



- Dual V/I Sources to 50V at 300mA
- Quad Voltage Sources to 50V at 200mA
- DC Voltmeter
- Counter/Timer/Phasemeter
- Audio Voltmeter
- Arbitrary Waveform Generator
- Arbitrary Waveform Digitizer
- Function Generator
- Matrix Modules up to 8 x 32
- Static Digital Drivers & Receivers
- Easy-to-Learn Graphical User Interface
- High Level Software using Microsoft C+
- Simplified Test Programming
- Windows® Software Environment

## Hardware Features

The Omega supports up to 29 instruments in the mainframe and additional modules inside the test head enclosure. Pico ammeter and Time Measurement modules are available for load board mounting.

The system bus structure features an Opto-Isolated System Data Bus and separate Calibration and Instrument Bus structures.

Multiple instruments may be installed in the Omega for larger and more complex test applications.

Additional instrument functions may be added using the IEEE-488 interface. Interfacing to the application load board is simplified by using load fixture relays and the system control bits.

The Omega system features automatic calibration hardware and software that ensures the test accuracy is maintained. The calibration module is removable for easy re-calibration to NIST standards.

Diagnostic programs rapidly pinpoint system faults and helps to minimize repair times.

The remote test head is easily moved and docked to most handlers and prober systems.

## Software Environment

Test Programs are developed in Microsoft® C+ operating in the Windows98® environment. Device parameters are entered using a datasheet format for quick and easy program development and editing.

The Test Program Debug Facility speeds the testing and debug of new test programs lowering development costs.

Most software and hardware functions are controlled through the use of Graphical User Interface (GUI) using multiple windows.

Test Programs are compiled for faster execution and less test time.

High Speed Communications with System Instruments and Modules is accomplished using the dedicated instrument bus system.

Off-Line Test Program Development is accomplished on any PC based computer system capable of supporting Windows 98.

Data analysis is enhanced using the software link to Excel® spreadsheets and graphical analysis tools.

Test Program Set-Up files are used for added security and error proof operations.

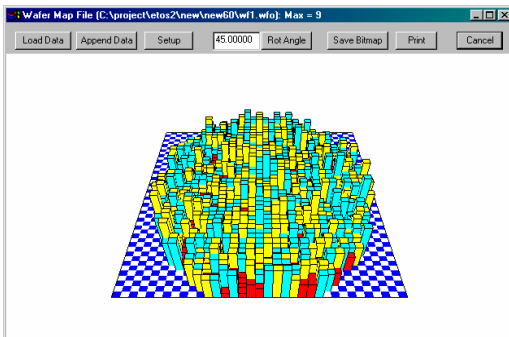
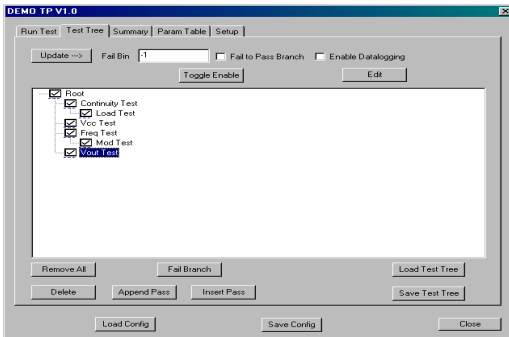
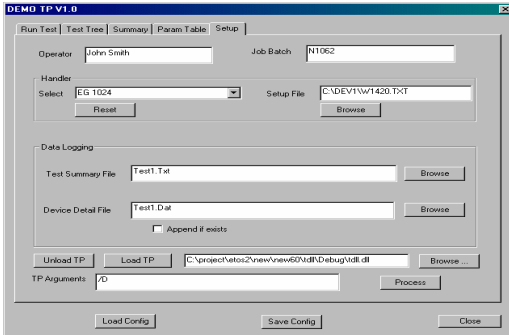
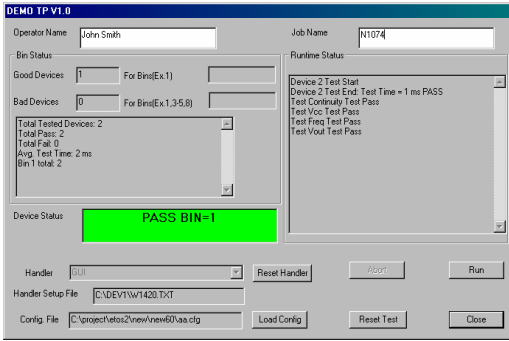
**MiNT Systems®**

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*Your Roadmap to the Future in Converging Technologies*

# Omega: "a total mixed signal test solution"



## Operation

Operating the Omega Mixed Signal Test System is easy to learn and easy to use. The Windows® platform provides the control for system operation, test program development and data collection and analysis. The Operating System (SYSOP) provides the highest speed control of the system instrument set and for high speed data collection. Separate control windows are available for Operators, Administrative and Engineering personnel, providing test floor control and security. Simple setup files speeds the change-over of the Omega from product to product.

A full range of stimulus and measurement instruments are available for the Omega system. Digital Voltmeters, Voltage and Current Supplies, Voltage Reference Supplies, Function Generators, Counter, Timer, Phasemeter, Audio Voltmeter, Arbitrary Waveform Generators and Digitizers, and up to 16 channels of digital pin electronics for mixed signal control and measurements.

## Programming

Ease of test program development and test program control is a standard feature of the Omega Test System. Programming may be performed on the test system or on any PC computer capable of supporting the Windows 98® and the Microsoft C/C++® program development environment.

The programmer enters device test parameters into easy to read and understand "tables" and "spec sheets". Instrumentation controls are easy to understand and easy to write using the Microsoft C® with spec sheet functions. Cut and paste of functions allows the programmer to create new test programs easily using standard test routines.

The "Test Tree" graphic user interface allows quick selection of desired tests and changes to test flow. Quick editing of values is accomplished through Parameter Tables.

## Data Analysis

The collection and display of data is simplified through the use of a tool set designed as an integral part of the operating system. Data collected during test execution are available in several forms and are easily analyzed on or off-line. Data files can be down-loaded to other network computers where data analysis may be performed. On-line tools includes a histogram, wafer map, and 3D composite wafer map. Analysis tools are easy to setup and use since most functions are already programmed and ready to use for the most common data display formats. Microsoft Excel® software is included with the operating system for off-line custom data analysis.

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# Omega Mixed Signal Test System Specifications

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## **System Software**

The software features High Level Language Instrument Control, Auto Test System Calibration, Test System Diagnostics, Data Logging, Statistical Analysis, Application Debugger, Menu Driven Tester Operating System, and Data Sheet Test Programming Utilities.

## **Automatic Calibration Resource (CAL)**

Oven mounted NIST traceable signal sources used to calibrate the system instruments.

Voltages	18, 8, 4, 2, 1, 0.5, 0.25v, Stability 3PPM/degree C
Resistance (current)	50, 500, 5K, 50K, 500K 5M Ohm, Stability 10PPM/deg. C
Frequency	250KHz, Stability 0.1PPM/degree C.
Calibration Frequency	recommended 6-month interval

## **DC Voltmeter (DVM)**

A differential voltmeter with 16-bit resolution used for all DC voltage and current measurements with accuracy of 0.02% of full-scale  $\pm 100\mu\text{V}$ . Fully software programmable including bipolar range selections of 100V, 30V, 10V and 1V. Measurement averaging and autoranging are standard features.

## **Dual Voltage-Current Source (DVI)**

The DVI is a Kelvin connected four quadrant supply suitable for voltage reference applications and device power supplies with 16 bit resolution and 0.03% voltage accuracy. Voltage ranges include 50V and 10V. Current accuracy is 0.1% of full scale and ranges are from 300nA to 300mA. Up to three DVI instruments may be installed in each Omega system providing up to six voltage-current sources.

## **Quad Voltage Source (QVS)**

The QVS contains four 16 bit programmable voltage sources with 0.03% (of full scale) accuracy and makes the QVS suitable for voltage reference and device power supply applications. Ranges include 50V and 10V with a maximum current of 200mA. Up to two QVS instruments may be installed in the Omega system for a total of eight voltage sources.

## **Matrix Module (MAT)**

The Omega Matrix Module provides fully programmable high quality connections between the tester instrumentation and the device under test. The 8 X 32 Matrix Module interconnects the DVI, QVS, Function Generator, DC Voltmeter, Audio Voltmeter, Arbitrary Waveform Generator and Waveform Digitizer to the Test Head connectors. The Matrix Modules feature up to 200mA current switching and 600mA steady state connections.

## **Counter/Timer/Phasemeter (CTP)**

The CTP module is a flexible measurement instrument featuring count rates up to 50MHz with a maximum count of 32 bits; 0V to 10V Digital Inputs; >300mV RMS Sine Wave Analog Inputs with >20Hz and >200Hz selectable analog input frequencies.

## **Audio Voltmeter (AVM)**

The AVM is a differential input, high speed, general-purpose instrument used to measure AC signals for amplitude, distortion and noise. The AVM features an absolute accuracy of 0.5%  $\pm 2\text{mV}$ , relative accuracy of 0.2%, max amplitude of 20V p-p, and measurement modes of RMS or average. The AVM provides input and output gain ranges from 1 to 200, a selectable frequency response of 300Hz (Gain=1) and 20KHz (Gain=100).

## **Function Generator (FG)**

The Function Generator (FG) generates arbitrary functions, storing them in 256 by 14 bit words in RAM. A 16-bit clock generator is programmable from 100Hz to 2MHz in 65,535 steps. The FG features amplitudes of 0V to 6V RMS in 4096 steps with 1% full scale accuracy. Any function may be programmed using a max of 256 samples. Distortion is -75dB and frequency accuracy is 0.1%. Includes a 20KHz and 128KHz selectable Low Pass Filter.

### ***Arbitrary Waveform Generator (AWG)***

The Waveform Generator (AWG) is used to generate true arbitrary waveforms up to 64K words in length and can be synchronized with other clocked instruments. The AWG features sample rates of 10Hz to 10MHz using a waveform memory of 64K to 256K word lengths. Output amplitude is  $\pm 10V$  with a level adjust resolution of 16 bits. Amplitude accuracy is 0.1%, distortion of -85dB, frequency accuracy of 0.05%, selectable filters including 3KHz, 20KHz and 100KHz. The AWG may be clocked either internally or from an external source through a clock divider programmable from 1 to 255. Outputs are selectable and include 0, 50 and 600 Ohm connections. All functions of the AWG are programmable and include single sweep or loop addressing and start-stop.

### ***Arbitrary Waveform Digitizer (AWD)***

The Waveform Digitizer (AWD) is used to measure arbitrary waveforms. This instrument is the heart of the Omega mixed signal test system allowing the user to measure non-reoccurring waveforms with frequency accuracy of 0.05% and resolution of 16 bits. The 64K capture memory may be expanded to 256K. The 16-bit analog to digital converter provides 0.02% $\pm 100uV$  accuracy and 0.003% linearity. Input impedance is 100M $\Omega$  and 1 to 256 binary input ranges are provided. 20Hz and 200Hz High Pass filters are selectable and well as Low Pass filters of 3.5KHz and 200KHz. Sample Rates of 10Hz to 300KHz are programmable. Synchronization is either internal or external.

### ***Programmable Clock Generator (PCG)***

The programmable clock generator finds application as a sample rate generator for sampled measurements or as a bit rate generator for digital chips. The clock rate generator has a frequency range of 10Hz to 10MHz in 16 ranges. The amplitude is programmable over a  $\pm 10V$  range and in 256 steps. The frequency accuracy is 0.01%.

### ***Static Digital Driver-Receiver (SDR)***

The Static Digital Driver-Receiver module consists of 16 read-write lines that may be used to send or receive digital signals to and from the device under test or load board circuitry. The module provides for 16 signal lines that may be programmed to  $\pm 10V$  input and output levels at a test rate of 0 to 250K Vectors/Sec. Input and Output levels are programmable in 8 bit increments and features single pin read/write and tri-state controls. Voltage resolution is 16 bits.

### ***Dynamic Digital Resource (DDR)***

The dynamic digital resource is a high performance digital sub-system consisting of up to 64 digital pins in 16 pin increments, operating at up to 20MHz data rate and 40MHz clocks. The digital resource is contained in a set of modular options that consist of a Sequencer module, Pin Function modules, and Pin Electronics modules. Software control is provided via a high-level C language commands and menu drive GUI data sheet programming. Per pin architecture provides many advantages including simplified test program generation, high speed testing and flexible formatting. Features include a Timing Generator with edge placement accuracy of  $\pm 500pSec$ , overall accuracy  $\pm 2nSec$ , full featured Formatter, 8 vector selectable timing sets, Pin drivers with -2V to +7V range plus 0V to +12V Vhh capability. DC subsystem includes DPS power supplies and PMU high-speed measurement unit. The Digital resource is designed for digital testing and advanced mixed signal testing of MCU controlled analog components and modules.

### ***High Speed Timing Measurement Module (TMM)***

The High Speed Timing Measurement Module is a loadboard mounted module used for the measurement of edge to edge pulse timing from 20nSec to 20uSec. Resolution is 16 bits (15pSec in the 1uSec Range), and accuracy is 1% of range. Enhanced accuracy of 0.1% is achieved through the use of software calibration techniques. Pulses as low as 1nSec can be measured by an external timing offset. The instrument has A and B inputs and timing can be from leading to leading, leading to trailing, trailing to leading, and trailing to trailing edges. Each input features a separate threshold adjustment of  $\pm 10V$  with 16-bit voltage resolution.

### ***Pico Ammeter (PAM)***

The Pico Ammeter is a test head module used for extremely low current measurements. The Quad Pico Ammeter is available in both the OP AMP and ANALOG SWITCH test applications.

### ***Power VI Subsystem (PVI)***

The Power Voltage-Current subsystem features a user specified power range, two/four quadrant, Kelvin connected supply, capable of being floated to  $\pm 500V$ . It features programmable clamps, an external modulation input, programmable pulsing capability with 10uSec resolution, software and hardware gating for synchronization, and on-board ADC. Fully calibrated using system software.

### ***System Dimensions & Weight***

22" (559 mm) Wide x 30" (762 mm) Deep x 50" (1270 mm) High, approximately 200 pounds (91kg). System power: 120VAC at 10A, 50/60 Hz.

