PICO-MATE™
Embedded Test Controller

DESCRIPTION
The Pico-MATE™ is the first in a line of innovative, Embedded Test Controllers from (Oi). Engineers use it to reduce the high-cost of building custom “automated” test equipment. The Pico-MATE™ is designed for embedded operation which includes direct installation into Mechanical Test Fixtures, custom test instruments or to support larger ATE test systems. The application possibilities are enormous, use the Pico-MATE™ to satisfy a wide range of test solutions (including Semiconductors and PCB’s, to full Systems).

The Pico-MATE™ comes loaded with a high-performance Atmel AVR processor, 2K of SRAM and 32K of Flash ROM, 65K EEPROM, 25 Digital I/O lines, a high-speed serial RS232 communications port and a flexible USB interface. Two (Oi) instrument ports are provided to allow access to all (Oi) Test Instrument Modules (i.e., Check-MATE™, DUT-MATE™, Relay-MATE™ and all others). In addition, all Pico-MATE™ I/O lines are consolidated into a single header, which is used for external access and circuit expansion.

Programming the Pico-MATE™ is both simple and fast. Low-cost compilers are available in ‘C’ and BASIC, and both are supported by TES-MATE™ (Test Executive Suite). TES-MATE™ is a comprehensive library of software routines, support utilities and (Oi) instrument drivers that allow the programmer to take full control over all of the hardware resources the Pico-MATE™ has to offer.

APPLICATIONS
- Test Digital, Analog, RF, Microwave & High Voltage circuits
- Include semiconductors, hybrid modules, PCB’s, panels or box-level units
- In-Circuit Test
- Functional Test
- ESS & Burn-In
- Incoming QA/QC inspection
- Manufacturing
- Engineering

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Pico-MATE™</th>
<th>Processor: ATmega32U4, 16Mhz</th>
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<tbody>
<tr>
<td>Memory</td>
<td>2K SRAM, 32K Flash, 65K EEPROM</td>
</tr>
<tr>
<td>Input/Output</td>
<td>25 Bits DIO, 12 AI, 7 PWM</td>
</tr>
<tr>
<td>Serial Ports</td>
<td>RS-232, USB, UART, IC2, SPI</td>
</tr>
<tr>
<td>Real Time Clock</td>
<td>1</td>
</tr>
<tr>
<td>Instrument Ports</td>
<td>2</td>
</tr>
<tr>
<td>Expansion Port</td>
<td>1</td>
</tr>
<tr>
<td>Software Compilers</td>
<td>MikroElektronika AVR ‘C’ &amp; BASIC</td>
</tr>
<tr>
<td>Power Supply</td>
<td>+12VDC±10%@100mA</td>
</tr>
<tr>
<td>Operating Temp</td>
<td>0-50ºC</td>
</tr>
<tr>
<td>Dimensions</td>
<td>2.50” x 2.75”</td>
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OVERTON INSTRUMENTS (Oi), 4306 Pinell St Sacramento, CA 95838 www.microATE.net (916) 333-2499
PICO-MATE™
Embedded Test Controller

Program Development

Code Compilers

USB

Power Supply

External Instruments

RS232

(Oi) Test Instrument Modules

OI-BUS Interface

EXPANSION INTERFACE

PICO-MATE™
EMBEDDED TEST CONTROLLER™

USB PORT

ANALOG INPUTS

DIGITAL I/O

SPI BUS

PCI BUS

RS232 INTERFACE

REAL-TIME CLOCK

8-BIT SERIAL EEPROM

5V
3.3V

VRE0

12V INPUT

SYSTEM COM PORT

EXPANSION INTERFACE

OPERATOR INTERFACE

(OI) INSTRUMENT INTERFACE

(OI) INSTRUMENT INTERFACE
PICO-MATE™
Embedded Test Controller

The PICO-MATE is Oi’s entry-level test & measurement controller. The diagram below illustrates the ease and flexibility of building custom “automated” test solutions using the PICO-MATE. The DUT (device-under-test), is a “thick-film module” that includes both analog and digital circuitry. The overall test process is designed to provide a quick Go/NoGo test sequence.

Before DUT power is applied, the DMM is commanded to perform a series of ICT-like measurements (i.e., resistance, capacitance, continuity and diode checks). This is accomplished by scanning related test points with the MUX-MATE (signal multiplexer). The DUT-MATE switches power safely to the DUT, as well as measures DUT current & voltage, and provides a over-current circuit breaker. After power is applied, the PICO-MATE can use its Digital I/O and serial interfaces to condition and configure the DUT.

Once the configuration is set, the DMM can then be commanded to take a variety of Functional Test measurements (including dc & ac voltages, frequency and period).

You can freely customize the User Interface with a simple combination of input switches and LED indicators. The Operator simply presses the ‘START’ button, and waits for a green or red LED (to indicate Pass or Fail).

Programming the PICO-MATE is both quick and easy. Oi supplies a set of PC-based compilers for BASIC and ‘C’. Programming is further accelerated with TES-MATE, Test Executive Suite. TES-MATE is a comprehensive library of standard software routines, utilities and Oi instrument drivers.

In the example below, the PICO-MATE, MUX-MATE, DUT-MATE and the custom Operator Interface are all integrated inside a low-cost instrument enclosure. The hardware cost for the total solution is less than $500 (DMM not included).

Product Features

- 16MHz Atmel Processor
- 32K/2K, Program & Data Memory
- 64K EEPROM, Store P/F Limits & Test Results
- 25 Digital I/O, Analog In, Timing, Interrupt & Control Lines
- Serial Interfaces - SPI, I2C, RS232 & USB
- Real Time Clock
- Expansion Bus, User I/O Bus & Oi-Bus Interfaces
- Compact Size, 2.50” x 2.75”
- Low Cost, just $99

Typical Applications

- Digital, Analog, RF, Microwave & High Voltage
- In-Circuit Test, Functional Test, ESS & Burn-In
- Semiconductors
- Flex Circuits
- Printed Circuit Boards
- Panelized PCB’s