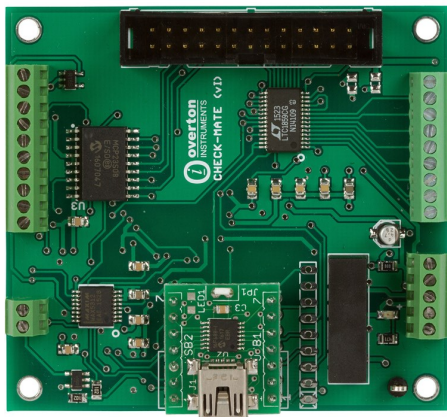


## CHECK-MATE<sup>(vi)</sup> Multifunction DAQ Module



### SPECIAL FEATURES

- 8-CH, 12-bit A/D with 500ksps sample rate, programmable inputs (8) single-ended or (4) differential
- 1-CH, 12-bit D/A (unipolar/bipolar modes), ±30mA output drive
- 8 digital input/output lines, independently programmable
- Embedded control or optional USB interface
- Compact size & Low cost

### DESCRIPTION

The CHECK-MATE<sup>(vi)</sup> is an embedded instrument module that offers 3 essential test & measurement functions (i.e., Analog Input, Analog Output and Digital I/O), which are designed to support the development of **Smart Test Fixtures**.

In normal operation, the CHECK-MATE<sup>(vi)</sup> is commanded by an external Host PC to either read a DUT output voltage (or stimulate it with an input voltage), or use the digital logic to control the DUT (i.e., hold the reset line low). Likewise, those same test functions can also be used to control various aspects of the test fixture itself (such as, control status LED's and relays, or read analog sensors and input switches).

With the CHECK-MATE<sup>(vi)</sup> no external power source is required, since power is supplied through the USB interface. Easy access to the instrument hardware is made available through a convenient collection of screw terminal connectors and mass IDC header. Try combining the CHECK-MATE<sup>(vi)</sup> with other OI test instruments (such as the DUT-MATE<sup>(vi)</sup> 'power sequence module', or the SWICH-MATE<sup>(vi)</sup> 'load switching module' and others). Use our ETS Series' products to build unlimited test solutions quickly, reliably and affordably.

### SPECIFICATIONS

Analog Inputs	
Number of inputs	8 SE, 4 Differential programmable
Input Ranges	0-10V, ±2.5V, ±5V, ±10V, prog.
Resolution / Sample Rate	12-bit, 500ksps
Nonlinearity	±1LSB, no missing codes
Analog Output	
Resolution	12-bit
Range	0-5V, 0-10V, ±5V ±10V programmable
Current Drive	±30mA max
Settling Time	4µS max to ±1/2 LSB
Relative Accuracy	±1 LSB
Digital I/O	
Number of lines	8 bits, bidirectional programmable
Logic Levels / Current	TTL level / ±25mA source/sink
Input Control	
Embedded	Oi_Bus interface
USB Interface	Optional USB module
General	
Power Supply	+5VDC±10%@30mA
Operating Temp	0-50°C
Dimensions	2.50" x 2.75"

### APPLICATIONS

The application possibilities for the are enormous. The CHECK-MATE<sup>(vi)</sup> finds a solution anywhere hardware verification & validation is required. In addition, the module brings new and exciting capabilities to the control of test fixtures.

- Build Smart Test Fixtures
- Custom Desktop Test Equipment
- PCB Functional Test
- Pre-Production/NPI
- Burn-In & Stress Screening
- Engineering Design Verification
- Field Service/Depot Repair

### ORDER INFORMATION

Part Number	Description
ETS-2010-00	CHECK-MATE <sup>(vi)</sup> , Multifunction DAQ Module
ETS-2011-00	CHECK-MATE <sup>(vi)</sup> with USB-MATE, USB Interface Module



"The Future of Electronics Test"

# SMART TEST FIXTURES

In this Application Brief, the CHECK-MATE<sup>(vi)</sup> is highlighted, and is used to support a PCB Functional Test scenario. The DUT (device-under-test), is a ECU, Electronic Control Unit that is typically found in many automobiles built today. The test system is a complete, fully automated and self-contained solution designed by Overton Instruments (OI). The goal of the test process is to verify the DUT can be successfully powered, and then the Production Code can be uploaded. Lastly, the DUT UART and CAN interfaces are verified.

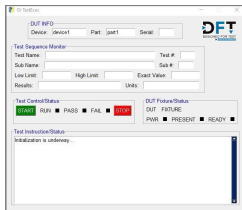
All of the OI test instruments (and related interface devices), are mounted inside the test system, and are wired to the bed-of-nails (spring probes). In addition, the test instruments are controlled by the

UP-MATE (Embedded Test Controller), via the 7-port USB Hub Module (the UHM-MATE). To start the test sequence the Operator is prompted to press the START button (which is located on the front panel), and then scan the DUT serial number. Next, the UP-MATE polls the User Interface Module (the UIM-MATE), to confirm the DUT\_Present & Fixture\_Ready, I/O status bits are active.

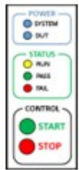
Before DUT power is applied, the digital I/O bits on the CHECK-MATE<sup>(vi)</sup> are configured by the UP-MATE to hold the DUT in reset. Next, the DUT Power Module (the DPM-MATE), is commanded to switch +5 Volts to the DUT. The UP-MATE can now poll the DPM-MATE to verify the current breaker is not set. Now, the CHECK-MATE<sup>(vi)</sup> can be commanded to release

the reset line, and then take "key" voltage measurements on several test points on the DUT. If successful, the Production Code can be up-loaded via the Flash Programmer (and if successful), a check-sum is generated and verified. If the check-sum is correct, then the CAN interface is tested by issuing a pre-set data sequence (via the CAN adaptor), and verifying the correct response.

If the CAN response is correct, then the DUT UART Interface is tested by sending a command (to the COM-MATE, DUT Interface Module), to request a special ID from the DUT. If the ID response is correct, then the test sequence is complete, DUT power is removed and the UP-MATE commands the UIM-MATE to activate the PASS LED.



Control Panel



DEVICE-UNDER-TEST

