



# MICRO-BOX

MICRO-BOX x86 BASED

- Intel® Celeron® M **1G**Hz
- 256** MB RAM
- 64** MB Compact flash
- PC/104** PCI
- Fanless**
- Portable**

*Creating Innovative Solution*

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# MICRO-BOX

## MathWorks® xPC Enabled Real-Time System

### Features

SOLUTIONS  
4



### MICRO-BOX

- \* Rugged, high-performance industrial PC
  - Fanless, low-power consumption design 22W(Typical)
  - Support all standard PC peripherals
  - Sturdiness, compact size
- \* I/O-expandability, equipped with AD/DA, Encoder, CAN, Counter ( PWM ) and DI/O modules
- \* Two suite offering
  - Micro-Box 1000 ( PC/104 interface )
  - Micro-Box 3000 ( PCI interface )
- \* Onboard Celeron® M 1GHz/256 MB DDR RAM, 64MB compact flash (expandable to 1G)
- \* External floppy, power supply input Min. 48 W. (9~36 VDC, e.g+24V@2A)
- \* Stand-alone ability, xPC self-installed software tools (xPC Target Embedded Option) are able to run on stand-alone mode. Users can burn the pre-set simulink model to CF card without connecting through internet

Micro-Box is an excellent multi-function platform for rapid control prototyping which powered by TeraSoft Inc, a leading professional engineering solutions provider based in Taipei, Taiwan. Micro-Box works seamlessly with the MathWorks® product family, MATLAB®, Simulink®, xPC Target and Real-Time Workshop ( RTW ) enables engineers to modeling physical systems and execute in real-time under harsh environments.

Micro-Box is a rugged, high-performance industrial PC with no moving parts inside. It supports all standard PC peripherals such as video, mouse, and keyboard. For engineers who have real-time analysis and control systems testing needs, Micro-Box offers an excellent mix of performance, compact size, sturdiness, and I/O expandability. It is available with several different I/O selections, supporting SCI, TCP/IP, various PC/104 or PCI based AD/DA, DI/O and Counter (PWM) modules that address numerous prototyping requirements. User uses Micro-Box integrating with MATLAB/Simulink and related control modules could run real-time modeling and simulation of control systems, rapid prototyping, and hardware-in-the-loop testing. And these tasks don't need manual code generation and complicated debug process. The result benefits users saving much of costs and developing time.

### Micro-Box for Rapid Prototyping

The configuration for rapid prototyping uses the host machine, hosts the standard MathWorks tools such as MATLAB Simulink, xPC Target and Stateflow(optional) and the Windows operating system, which runs in non real-time. The Micro-Box is a second target PC on which we run the customer application and a real-time kernel and runs the real-time multi-tasking operation system.

On the host PC, users build applications using Simulink modeling simulation and xPC Target provides various I/O blocks. RTW helps to generate C-code modules, compiles the generated C-code and other static C-modules and links them to Dynamic Linked Library (DLL). xPC Target transforms DLL to xPC kernel specific target application and download of target application onto target.

Depending on configuration, this can be used for functional rapid prototyping, on-target rapid prototyping, or hardware-in-the-loop testing.

### Micro-Box Specification

● Micro-Box is available for 2 suite options :

Micro-Box 1000 (PC/104 interface)	Micro-Box 3000 (PCI interface)
- Celeron® M 1GHz	- Celeron® M 1GHz
- 256MB DDR DRAM	- 256MB DDR DRAM
- 64MB Compact Flash card (expandable to 1G)	- 64MB Compact Flash card (expandable to 1G)
- I/O-expandability provided through standard PC/104 expansion bus	- I/O-expandability provided through standard PCI expansion bus
- Support 6 different I/O modules including of AD · DA · Encoder · CAN · Counter and DI/O	- 4 slots/2 slots
- 255(W) x 152(D) x 82(H) mm, 2.0 kg	- Customized I/O cards(optional)
- 9~36 Volts, Min. 50 W	- 180(W) x 237(D) x 177(H) mm, 5.0 kg
	- 20~36 Volts, Min. 96 W



● External power for 110 to 220VAC, 50Hz to 60Hz environment, output voltage of 24V/2.3A.

- Hardware accessory(for Micro-Box 1000)
  - Packing case
  - Micro-Box 1000(includes Micro-Box 3712 and 3718 I/O cards)
  - 3.5" Floppy disk (USB)
  - Cable x 3 ( DB-25, shielded Cable, 100cm)
  - Terminal board x 3 (DB-25, DIN-rail mount)
  - Power supply (110~220 Voltage)
  - User manual and tutorial CD

- Software
  - xPC blocksets for I/O, 3718/ 3712/ 3724/ 3240/ 3680/ 3780
  - Inverted pendulum control demonstration Simulink model
  - DC motor position/speed control demonstration Simulink model
- Operating Temperature, -10 ° C ~50° C @ 5~85% RH.
- Humidity 95% @ 40° C (non-condensing)
- Shock Protection IEC 68 2-27, Compact Flash: 50 G @ wall mount, half sine, 11 ms
- Vibration Protection IEC 68 2-64 (Random 1 Oct./min, 1hr/axis.)
- Compact Flash: 2 Grms @ 5 ~ 500 Hz

**Micro-Box Support I/O**

Micro-Box 1000 supports Micro-Box 3712 · 3718 · 3724 · 3240 · 3680 and 3780 I/O boards



I/O Board	Support I/O Module	Support I/O Module
Micro-Box 3718	AD	16 single-ended or 8 differential analog input channels (12-Bit ADC , -10 ~ 10 V )
	DI/O	16 digital Inputs and digital outputs line
Micro-Box 3712	DA	2 output channels (12-Bit DAC, -10~10V)
Micro-Box 3724	D/I/O	48 DI/O lines
Micro-Box 3240	Encoder	4 channels & 32bits encoder, max. input frequency 1MHz
Micro-Box 3680	CAN	2 ports, high speed transmission up to 1Mbps
Micro-Box 3780	Counter	2 independent 16-bit counters max input frequency 20 MHz
	D/I/O	24 DI/O lines



► Micro-box 3000

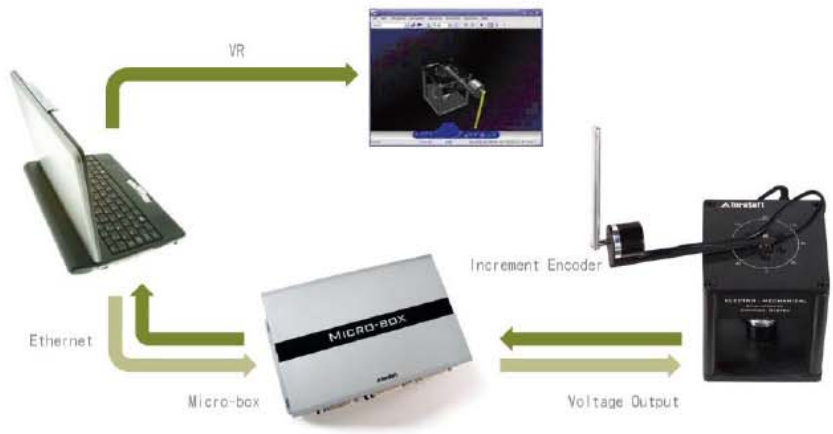
**Micro-Box Applications**

- Real-Time Control
- Controller Rapid Prototyping
- Motor Control
- Data Recorder

**Demonstration example**

**Demo 1 Inverted Pendulum Control**

- System requirement
  - MATLAB, Simulink, VR toolbox, RTW, xPC target and Micro-Box xPC driver
  - Micro-Box 1000
  - I/O 3712(DA) and I/O 3240 (encoder)
  - DC motor driver circuit and control plant\* (EMECS)
- EMECS: Electro-Mechanical Engineering Control System, is created by TeraSoft Inc.



**Demo 2 CAN-Bus linkage to automotive network system to expedite developing auto related peripheral system or crucial component modules**



Micro-Box could also provide a Real-Time control platform for Central Information System Control Unit (CCU), to help control engineers implement various control design, amend control theory and motion behaviors, simulate and calibrate systems design.

# Solutions4U

Solutions 4U Sdn Bhd (706527-A)

36-1, Plaza Puchong, Jalan Puchong Mesra 1,  
58200 Kuala Lumpur, Malaysia

Tel : +603-8071 1300 Fax : +603-8071 1400

Solutions 4U Pte Ltd

259 Onan Road, Singapore 424651

Tel : +65 6468 3325 Fax : +65 6764 5646

[www.solutions4u-asia.com](http://www.solutions4u-asia.com)

[enquiry@solutions4u-asia.com](mailto:enquiry@solutions4u-asia.com)

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