

## Embedded Success **dSPACE** MicroAutoBox II 規格表

Parameter		Specification
MicroautoBox II		1401/1511   1401/1511/1512
Processor		IBM PPC 750GL, 900 MHz (incl. 1 MB level 2 cache)
Memory		<ul style="list-style-type: none"> <li>⊗ 16 MB main memory</li> <li>⊗ 6 MB memory exclusively for communication between MicroAutoBox and PC/notebook</li> <li>⊗ 16 MB nonvolatile flash memory containing code section and flight recorder data</li> <li>⊗ Clock/calendar function for time-stamping flight recorder data</li> </ul>
Boot Time		<ul style="list-style-type: none"> <li>⊗ Depending on flash application size. Measurement examples: 1 MB application: 160 ms; 3 MB application: 340 ms</li> </ul>
Interfaces	Host interface	⊗ 10/100 Mbit/s Ethernet connection (TCP/IP)1). Fully compatible with standard network infrastructure. LEMO connector
	Real-time I/O interface	⊗ 100 Mbit/s Ethernet connection (UDP/IP). RTI Ethernet (UDP) Blockset (optional) for read/write access. LEMO connector.
	USB interface	⊗ USB 2.0 interface for long-term data acquisition with USB mass storage devices. LEMO connector
	CAN interface	⊗ Two dual CAN interfaces; 4 CAN channels in total
	Serial Interface (Base on CAN processor)	⊗ 2 x RS232 interface
		⊗ 2 x serial interface usable as K/L line or LIN interface
	Dual-port memory interface (ECU interface)	⊗ 2 x dual-port memory interface, 16 K x 16-bit DPRAM
FlexRay interface	2 slots for FlexRay modules (i.e. 4 FlexRay channels)	
Programmable FPGA		Xilinx Spartan -6
Analog input	Resolution	16* 16-bit channels
	Sampling	16 parallel channels with 1 MSPS conversion rate
	Input Voltage Range	0 ... 5 V
Analog Output	Resolution	4 12-bit channels
	Output voltage range	0 ... 4.5 V
	Output current	5 mA max. sink/source current
Digital I/O	General	<ul style="list-style-type: none"> <li>⊗ FPGA-based digital I/O</li> <li>⊗ RTI software support for bit I/O, frequency, and PWM generation/measurements</li> </ul>
	Bit I/O	⊗ 40 inputs

		<ul style="list-style-type: none"> <li>40 outputs, 5 mA output current</li> </ul>	
	PWM generation/ measurement	<ul style="list-style-type: none"> <li>All channels fully configurable as frequency or PWM inputs/outputs</li> <li>PWM frequency 0.0003 Hz ... 150 KHz, duty cycle 0 ... 100%, up to 21-bit resolution</li> </ul>	
Signal conditioning		<ul style="list-style-type: none"> <li>Signal conditioning for automotive signal levels, no power driver included</li> <li>Overvoltage protection</li> <li>Overcurrent and short circuit protection</li> </ul>	
Physical connections		<ul style="list-style-type: none"> <li>ZIF connector for I/O signals, mechanically secured, Sub-D connector for power supply</li> </ul>	
		<ul style="list-style-type: none"> <li>LEMO connectors for 2 ECU interfaces, Ethernet I/O interface, USB interface, and Ethernet host interface</li> </ul>	
		<ul style="list-style-type: none"> <li>Ethernet I/O interface for notebook/PC for program load, experiment configuration, signal monitoring and flight recorder read-out</li> </ul>	
Physical characteristics		Enclosure material	Cast aluminum box
		Enclosure size	Approx. 200 x 225 x 50 mm (7.9 x 8.9 x 2.0 in)   Approx. 200 x 225 x 95 mm (7.9 x 8.9 x 3.8 in)
		Temperature	<ul style="list-style-type: none"> <li>Operating (case) temperature: -40 ... +85 °C (-40 ... 185 °F)</li> <li>Storage temperature: -55 ... +125 °C (-67 ... +257 °F)</li> </ul>
		Power supply	6 ... 40 V input power supply, protected against overvoltage, and reverse polarity
		Power consumption	Max. 25 W   Max. 50 W


Parameter	Specification	
MicroautoBox II	1401/1501	1401/1504
Processor	IBM PPC 750GL, 900 MHz (incl. 1 MB level 2 cache)	
Memory	<ul style="list-style-type: none"> <li>16 MB main memory</li> <li>6 MB memory exclusively for communication between MicroAutoBox and PC/notebook</li> <li>16 MB nonvolatile flash memory containing code section and flight recorder data</li> <li>Clock/calendar function for time-stamping flight recorder data</li> </ul>	
Boot Time	<ul style="list-style-type: none"> <li>Depending on flash application size. Measurement examples: 1 MB application: 160 ms; 3 MB application: 340 ms</li> </ul>	
Interfaces	Host interface	<ul style="list-style-type: none"> <li>10/100 Mbit/s Ethernet connection (TCP/IP)1). Fully compatible with standard network infrastructure. LEMO connector</li> </ul>
	Real-time I/O interface	<ul style="list-style-type: none"> <li>100 Mbit/s Ethernet connection (UDP/IP). RTI Ethernet (UDP) Blockset (optional) for read/write access. LEMO connector.</li> </ul>
	USB interface	<ul style="list-style-type: none"> <li>USB 2.0 interface for long-term data acquisition with USB mass storage devices. LEMO connector</li> </ul>
	CAN interface	Dual CAN interface, 2 CAN channels in total

			in total
	Serial Interface (Base on CAN processor)	1 x RS232 interface	1 x RS232 interface
		1 x serial interface usable as K/L line or LIN interface	1 x serial interface usable as K/L line or LIN interface
	Dual-port memory interface (ECU interface)	3 x dual-port memory interface, 16 K x 16-bit DPRAM	2 x dual-port memory interface 16 K x 16-bit DPRAM
	FlexRay interface		
Analog input	Resolution	16* 12-bit channels	24 12-bit channels
	Sampling	<ul style="list-style-type: none"> <li>⊗ 4 to 1 multiplexed</li> <li>⊗ Simultaneous sample &amp; hold</li> </ul>	
	Input Voltage range	0 ... 5 V	
Analog Output	Resolution	8* 12-bit channels	
	Output voltage range	0 ... 4.5 V	
	Output current	5 mA max. sink/source current	
Digital I/O	General	<ul style="list-style-type: none"> <li>⊗ Digital I/O on 68336 slave processor, 20 MHz, with time processor unit (TPU)</li> <li>⊗ I/O software support for different applications</li> </ul>	
	Bit I/O	<ul style="list-style-type: none"> <li>⊗ 16 discrete inputs</li> <li>⊗ 10 discrete outputs, 5 mA output current</li> <li>⊗ 16 shared discrete inputs/outputs, bit-selectable</li> <li>⊗ 16 TPU channels</li> <li>⊗ Up to 16-bit resolution</li> </ul>	
	PWM generation/measurement	<ul style="list-style-type: none"> <li>⊗ 4 shared inputs for frequency or PWM</li> <li>⊗ 4 PWM outputs, PWM frequency 2.5 Hz ... 100 kHz, duty cycle 0 ... 100%</li> <li>⊗ Up to 16-bit resolution</li> </ul>	
Signal conditioning		<ul style="list-style-type: none"> <li>⊗ Signal conditioning for automotive signal levels, no power driver included</li> <li>⊗ Overvoltage protection</li> <li>⊗ Overcurrent and short circuit protection</li> </ul>	
Physical connections		<ul style="list-style-type: none"> <li>ZIF connector for I/O signals and power supply, mechanically secured</li> <li>⊗ LEMO connectors for 2 ECU interfaces, Ethernet I/O interface, USB interface, and Ethernet host interface</li> <li>⊗ Connection to a notebook/PC for program load, experiment configuration, signal monitoring and flight recorder read-out</li> <li>⊗ Additional 78-pin Sub-D connector with MicroAutoBox variants 1401/1505/1507 and 1401/1507</li> <li>⊗ Host interface: 10/100 Mbit/s Ethernet connection (TCP/IP)1, see "Interfaces"</li> </ul>	
Physical	Enclosure material	Cast aluminum box	


characteristics	Enclosure size	Approx. 200 x 225 x 50 mm (7.9 x 8.9 x 2.0 in)
	Temperature	<ul style="list-style-type: none"> <li>⊗ Operating (case) temperature: -40 ... +85 °C (-40 ... 185 °F)</li> <li>⊗ Storage temperature: -55 ... +125 °C (-67 ... +257 °F)</li> </ul>
	Power supply	6 ... 40 V input power supply, protected against overvoltage, and reverse polarity
	Power consumption	Max. 25 W

Parameter		Specification		
MicroautoBox II		1401/1505/1507	1401/1507	
Processor		IBM PPC 750GL, 900 MHz (incl. 1 MB level 2 cache)		
Memory		<ul style="list-style-type: none"> <li>⊗ 16 MB main memory</li> <li>⊗ 6 MB memory exclusively for communication between MicroAutoBox and PC/notebook</li> <li>⊗ 16 MB nonvolatile flash memory containing code section and flight recorder data</li> <li>⊗ Clock/calendar function for time-stamping flight recorder data</li> </ul>		
Boot Time		<ul style="list-style-type: none"> <li>⊗ Depending on flash application size. Measurement examples: 1 MB application: 160 ms; 3 MB application: 340 ms</li> </ul>		
Interfaces	Host interface	⊗ 10/100 Mbit/s Ethernet connection (TCP/IP)1). Fully compatible with standard network infrastructure. LEMO connector		
	Real-time I/O interface	⊗ 100 Mbit/s Ethernet connection (UDP/IP). RTI Ethernet (UDP) Blockset (optional) for read/write access. LEMO connector.		
	USB interface	⊗ USB 2.0 interface for long-term data acquisition with USB mass storage devices. LEMO connector		
	CAN interface	Two dual CAN interfaces, 4 CAN channels in total	Two dual CAN interfaces, 4 CAN channels in total	
	Serial Interface (Base on CAN processor)	1 x RS232 interface		1 x RS232 interface
		1 x serial interface usable as K/L line or LIN interface		1 x serial interface usable as K/L line or LIN interface
	Dual-port memory interface (ECU interface)	4 x dual-port memory interface, 16 K x 16-bit DPRAM	3 x dual-port memory interface 16 K x 16-bit DPRAM	
FlexRay interface	2 slots <sup>2</sup> for FlexRay modules (i.e. 4 FlexRay channels)	2 slots <sup>2</sup> for FlexRay modules (i.e. 4 FlexRay channels)		
Analog input	Resolution	16* 12-bit channels		
	Sampling	4 to 1 multiplexed ⊗ Simultaneous sample & hold		
	Input Voltage range	0 ... 5 V		


Analog Output	Resolution	8 12-bit channels	
	Output voltage range	0 ... 4.5 V	
	Output current	5 mA max. sink/source current	
Digital I/O	General	<ul style="list-style-type: none"> <li>⊗ Digital I/O on 68336 slave processor, 20 MHz, with time processor unit (TPU)</li> <li>⊗ I/O software support for different applications</li> </ul>	
	Bit I/O	<ul style="list-style-type: none"> <li>⊗ 16 discrete inputs</li> <li>⊗ 10 discrete outputs, 5 mA output current</li> <li>⊗ 16 shared discrete inputs/outputs, bit-selectable</li> <li>⊗ 16 TPU channels</li> <li>n Up to 16-bit resolution</li> </ul>	
	PWM generation/ measurement	<ul style="list-style-type: none"> <li>⊗ 4 shared inputs for frequency or PWM</li> <li>⊗ 4 PWM outputs, PWM frequency 2.5 Hz ... 100 kHz, duty cycle 0 ... 100%</li> <li>⊗ Up to 16-bit resolution</li> </ul>	
Signal conditioning		<ul style="list-style-type: none"> <li>⊗ Signal conditioning for automotive signal levels, no power driver included</li> <li>⊗ Overvoltage protection</li> <li>⊗ Overcurrent and short circuit protection</li> </ul>	
Physical connections		ZIF connector for I/O signals and power supply, mechanically secured	Sub-D connectors for bus interfaces and power supply
		<ul style="list-style-type: none"> <li>⊗ LEMO connectors for 2 ECU interfaces, Ethernet I/O interface, USB interface, and Ethernet host interface</li> <li>⊗ Connection to a notebook/PC for program load, experiment configuration, signal monitoring and flight recorder read-out</li> </ul>	
		<ul style="list-style-type: none"> <li>⊗ Additional 78-pin Sub-D connector with MicroAutoBox variants 1401/1505/1507 and 1401/1507</li> <li>⊗ Host interface: 10/100 Mbit/s Ethernet connection (TCP/IP)1, see "Interfaces"</li> </ul>	
Physical characteristics	Enclosure material	Cast aluminum box	
	Enclosure size	Approx. 200 x 225 x 95 mm (7.9 x 8.9 x 3.8 in)	Approx. 200 x 225 x 50 mm (7.9 x 8.9 x 2.0 in)
	Temperature	<ul style="list-style-type: none"> <li>⊗ Operating (case) temperature: -40 ... +85 °C (-40 ... 185 °F)</li> <li>⊗ Storage temperature: -55 ... +125 °C (-67 ... +257 °F)</li> </ul>	
	Power supply	6 ... 40 V input power supply, protected against overvoltage, and reverse polarity	
	Power consumption	Max. 25 W	

硬體		
品名	dSPACE DS1103 PPC (PowerPC) Controller Board	
圖片		
處理器	IBM PPC 750GX@1GHz 32 KB L1 instruction cache 32KB L1 Data Cache 1 MB L2 Cache Bus Frequency 133 MHz	
插槽界面	Requires a full-size 16-bit ISA slot	
記憶體	Local memory : 32 MB application SDRAM as program memory, cached Global memory : 96 MB communication SDRAM as data storage and data exchange with host	
品項	物理特性	外觀尺寸 約 340*125*45 (mm)
	物理特性	環境溫度 0~50°C
	物理特性	冷卻 被動式散熱片冷卻
通訊介面	CAN	<ul style="list-style-type: none"> <li>⊗ 1 channel based on SAB 80C164 microcontroller</li> <li>⊗ ISO DIS 11898-2 CAN high-speed standard</li> <li>⊗ Max Baud rate 1Mbit/s</li> </ul>
	Analog Input	<ul style="list-style-type: none"> <li>⊗ 16 multiplexed channels equipped with 4 sample &amp; hold A/D converters</li> <li>⊗ 4 parallel channels each equipped with one sample &amp; hold A/D converter</li> <li>⊗ Note: 8 A/D converter channels (4 multiplexed and 4 parallel) can be sampled simultaneously.</li> </ul> Overvoltage protection ±15V Input Voltage ±10 V 16 Bit resolution
	Analog Output	8x 16bit D/A channels Output voltage range ±10 V Output current range max ±5 mA
	Digital I/O	<ul style="list-style-type: none"> <li>⊗ 32-bit parallel I/O</li> <li>⊗ Organized in four 8-bit groups</li> </ul>

		<ul style="list-style-type: none"> <li>⊗ Each 8-bit group can be set to input or output (programmable by software)</li> <li>⊗ TTL input/output levels</li> </ul> <p>Output current range max <math>\pm 10</math> mA</p>
	Digital incremental encoder interface	<p>6 independent channels</p> <p>Position counter offers 24-bit resolution, 1.65MHz input frequency, Counter reset or reload via software</p> <p>Encoder supply voltage 5V/15A, shared with analog incremental interface</p>
	Analog incremental encoder interface	<p>1 Channel</p> <p>Sinusoidal signals: 1 Vpp differential or 11 <math>\mu</math>App differential (software programmable)</p> <p>A/D converter: 6-bit resolution, 10 MSPS</p> <p>Encoder supply voltage 5 V/1.5 A</p> <p>Position Counter: &lt; 5° resolution; Max. 0.6 MHz input frequency, fourfold pulse count up to 2.4 MHz</p>
	Serial Interface	<p>TL6C550C single UART with FIFO, Compatible with RS232/RS422</p> <p>Baud rate: RS232 Up to 115.2 kBd; RS422 Up to 1MBd</p>
附屬 DSP 處理 器	型號	Texas Instruments TMS320F240
	時脈	20MHz
	規格	<ul style="list-style-type: none"> <li>⊗ 64Kx16 external code memory</li> <li>⊗ 28Kx16 external data memory</li> <li>⊗ 4Kx16 dual-port memory for communication</li> <li>⊗ 32KB flash memory</li> <li>⊗ 16 A/D converter inputs</li> <li>⊗ 10 PWM outputs</li> <li>⊗ 4 capture inputs</li> <li>⊗ 2 serial ports</li> <li>⊗ Input A/D converter inputs: 0 ... 5 V</li> <li>⊗ Output Current: Max. <math>\pm 13</math> mA</li> </ul>

硬體			
品項	品名	dSPACE DS1103 PPC (PowerPC) Controller Board 400Mhz version	
	圖片		
	處理器	PowerPC 604e / 400 MHz 10.1 SPECfp95, 15.9 SPECint95 3 integer units, 1 floating-point unit 2 on-chip timer units 32 KByte instruction cache, 32 KByte data cache	
	插槽界面	Requires a full-size 16-bit ISA slot	
	記憶體	2 MB SRAM 128 MB data logging memory	
	物理特性	外觀尺寸	約 340*125*45 (mm)
		環境溫度	0~50°C
		冷卻	被動式散熱片冷卻
	通訊介面	CAN	<ul style="list-style-type: none"> <li>⊗ 1 channel based on SAB 80C164 microcontroller</li> <li>⊗ ISO DIS 11898-2 CAN high-speed standard</li> <li>⊗ Max Baud rate 1Mbit/s</li> </ul>
		Analog Input	<ul style="list-style-type: none"> <li>⊗ 4 ADC units 16-bit, multiplexed (4 channels each), sample &amp; hold, 4 μs sampling time (for 1 channel)</li> <li>⊗ 4 channels 12-bit, sample &amp; hold, 800 ns sampling time</li> </ul>
			Overvoltage protection ±15V
			Input Voltage ±10 V
		Analog Output	8 channels 14-bit
			Output voltage range ±10 V
	Output current range max ±5 mA		
Digital I/O	<ul style="list-style-type: none"> <li>⊗ 32-bit parallel I/O</li> <li>⊗ Organized in four 8-bit groups</li> <li>⊗ Each 8-bit group can be set to input or output (programmable by software)</li> <li>⊗ TTL input/output levels</li> </ul>		
Digital incremental encoder	6 independent channels		

附屬 DSP 處理 器 規格	interface	Max. 1.65 MHz input frequency, i.e. fourfold pulse counts up to 6.6 MHz
	Analog incremental encoder	1 Channel
	interface	Analog input with TC 3005H controller
	Serial Interface	RS232 and RS422 transceiver support
	型號	Texas Instruments TMS320F240
	時脈	20MHz
	<ul style="list-style-type: none"> <li>⊗ 64Kx16 external code memory</li> <li>⊗ 28Kx16 external data memory</li> <li>⊗ 4Kx16 dual-port memory for communication</li> <li>⊗ 32KB flash memory</li> <li>⊗ 16 A/D converter inputs</li> <li>⊗ 10 PWM outputs</li> <li>⊗ 4 capture inputs</li> <li>⊗ 2 serial ports</li> <li>⊗ Input A/D converter inputs: 0 ... 5 V</li> <li>⊗ Output Current: Max. ±13 mA</li> </ul>	

硬體		
品項	品名	dSPACE DS1104 R&D controller Board
	圖片	
	處理器	MPC8240 processor with PPC 603e core, 64-bit floating-point processor CPU clock 250 MHz 2 x 16 KB cache, on-chip On-chip PCI bridge (33 MHz)
	插槽界面	Requires a 33 MHz / 32-bit 5-V PCI slot
	記憶體	32 MB SDRAM 8 MB Flash Memory

物理 特性	外觀尺寸	約 185 x 107 mm (mm)
	環境溫度	0~55°C
	冷卻	主動式風扇冷卻
	Analog Input	<ul style="list-style-type: none"> <li>⊗ 4 multiplexed channels with one sample &amp; hold A/D converter (1x16-bit)</li> <li>⊗ 4 parallel channels each with one sample &amp; hold A/D converter (4x12-bit)</li> <li>⊗ 5 A/D converter channels (1x16-bit and 4x12-bit) can be sampled simultaneously</li> </ul>
		Resolution: Multiplexed channels@ 2 μs; Parallel channels@ 800 ns
		Input Voltage ±10 V
	Analog Output	8 channels 16-bit
		Output voltage range ±10 V
		Output current range max ±5 mA
	Digital I/O	<ul style="list-style-type: none"> <li>⊗ 32-bit parallel I/O</li> <li>⊗ Organized in four 8-bit groups</li> <li>⊗ Each 8-bit group can be set to input or output (programmable by software)</li> <li>⊗ TTL input/output levels</li> </ul>
Digital incremental encoder interface	2 independent channels	
	<ul style="list-style-type: none"> <li>⊗ Max. 1.65 MHz input frequency, i.e. fourfold pulse counts up to 6.6 MHz</li> <li>⊗ 24-bit resolution</li> <li>⊗ Selectable single-ended (TTL) or differential (RS422) input</li> </ul>	
Serial Interface	<ul style="list-style-type: none"> <li>⊗ Single UART (universal asynchronous receiver and transmitter) with FIFO</li> <li>⊗ RS232/RS422/RS485 compatibility</li> </ul>	
	<ul style="list-style-type: none"> <li>⊗ Up to 115.2 kBd (RS232)</li> <li>⊗ Up to 1 MBd (RS422/RS485)</li> </ul>	
附屬 DSP 處理 器	型號	Texas Instruments TMS320F240
	時脈	20MHz
	規格	<ul style="list-style-type: none"> <li>⊗ 64Kx16 external code memory</li> <li>⊗ 28Kx16 external data memory</li> <li>⊗ 4Kx16 dual-port memory for communication</li> <li>⊗ 32KB flash memory</li> <li>⊗ 16 A/D converter inputs</li> <li>⊗ 10 PWM outputs</li> <li>⊗ 4 capture inputs</li> <li>⊗ 2 serial ports</li> <li>⊗ Input A/D converter inputs: 0 ... 5 V</li> </ul>

			⊗ Output Current: Max. $\pm 13$ mA
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