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MicroAutoBox III

Variants

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MicroAutoBox III – Multi I/O Variants

	1403/1511	1403/1511B1	1403/1513	1403/1511/1514	1403/1511B1/1514	1403/1513/1514
Real-time processor	Texas Intruments AM5K2E04 processor (1.4 GHz)					
	Four ARM® Cortex®-A15 processor cores					
	64 MB flash memory (for the real-time application and/or custom libraries)					
Host communication coprocessor	ARM® Cortex®-A9 (dual core)					
Boot options	Automatic flash-boot and fast boot option					
	Fast boot with prestart feature: starting a real-time application in < 250 ms					
	Start without prestart: 2-3 s					
Functional safety concept	Three-level functional safety concept[1]					
Interfaces						
Host interface	1 standard Ethernet port					
	10/100/1000 Mbit/s Ethernet connection					
	Supported standards: 10BASE-T[2], 100BASE-TX[2], 1000BASE-T[2]					
	WLAN Optional					
Ethernet real-time I/O interface	2 standard Ethernet ports					
	10/100/1000 Mbit/s Ethernet connection					
	Supported standards: 10BASE-T[2], 100BASE-TX[2], 1000BASE-T[2]					
Automotive Ethernet real-time I/O interface	2 automotive Ethernet ports					
	100/1000 Mbit/s Ethernet connection					
	Supported standards: 100BASE-T1[2], 1000BASE-T1[2]					
Supported Ethernet protocols (general)	Network protocols: IPv4, IPv6					
	Transport protocols: UDP, TCP					
	Service-Oriented Communication: SOME-IP					
	Measurement and application protocol: XCP for bypassing					
USB interface	2 USB 2.0 ports					
	1 port usable as a mass storage interface for data logging[3]					
	1 port for future use					
CAN/CAN FD Interface	4 CAN channels	4 CAN channels	6 CAN channels	4 CAN channels Up to 4 CAN FD channels via DS4342 CAN FD Interface Module (shared slots with DS4340 FlexRay Interface Module)		6 CAN channels Up to 4 CAN FD channels via DS4342 CAN FD Interface Module (shared slots with DS4340 FlexRay Interface Module)
FlexRay interface	(-)	(-)	(-)	Up to 2 FlexRay channels (A + B) via DS4340 FlexRay Interface Module (shared slots with DS4342 CAN FD Interface Module)		
LIN interface	2 LIN channels	2 LIN channels	3 LIN channels	2 LIN channels	2 LIN channels	3 LIN channels
UART interface	2 RS232 channels	2 RS232 channels	3 RS232 channels	2 RS232 channels	2 RS232 channels	3 RS232 channels
Programmable FPGA	(-)	(-)	(-)	Xilinx Kintex®-7 XC7K325T		
I/O module slot for programmable FPGA	(-)	(-)	(-)	1 x I/O module slots (for DS1552 Multi-I/O Module, DS1553 AC Motor Control Module, DS1554 Engine Control I/O Module)		
Real-time clock	Battery-backed real-time clock					
Power control	Remote control input to switch on/off MicroAutoBox III, i.e., with ingnition switch (terminal 15)					
	Prestart input to switch on the MicroAutoBox III without starting the real-time application to ensure very fast boot times					

[1] For more information on availability for users and for more details, please contact dSPACE.
[2] Copyright IEEE 2018. All rights reserved.
[3] Coming soon

MicroAutoBox III – Bus and Network Variants

	1403/1521	1403/1521/1521	1403/1511/1521	1403/1511B1/1521	1403/1513/1521	1403/1511/ 1514/1521	1403/1511B1/ 1514/1521	1403/1513/ 1514/1521
Real-time processor	Texas Intruments AM5K2E04 processor (1.4 GHz)							
	Four ARM® Cortex®-A15 processor cores							
	64 MB flash memory (for the real-time application and/or custom libraries)							
Host communication coprocessor	ARM® Cortex®-A9 (dual core)							
Boot options	Automatic flash-boot and fast boot option							
	Fast boot with prestart feature: starting a real-time application in < 250 ms							
	Start without prestart: 2-3 s							
Functional safety concept	Three-level functional safety concept[1]							
Interfaces								
Host interface	1 standard Ethernet port							
	10/100/1000 Mbit/s Ethernet connection							
	Supported standards: 10BASE-T[2], 100BASE-TX[2], 1000BASE-T[2]							
	WLAN Optional							
Ethernet real-time I/O interface	2 standard Ethernet ports							
	10/100/1000 Mbit/s Ethernet connection							
	Supported standards: 10BASE-T[2], 100BASE-TX[2], 1000BASE-T[2]							
Automotive Ethernet real-time I/O interface	5 automotive Ethernet ports	8 automotive Ethernet ports	5 automotive Ethernet ports					
	100/1000 Mbit/s Ethernet connection							
	Supported standards: 100BASE-T1[2], 1000BASE-T1[2]							
Supported Ethernet protocols (general)	Network protocols: IPv4, IPv6							
	Transport protocols: UDP, TCP							
	Service-Oriented Communication: SOME-IP							
	Measurement and application protocol: XCP for bypassing							
USB interface	2 USB 2.0 ports							
	1 port usable as a mass storage interface for data logging[3]							
	1 port for future use							
CAN/CAN FD interface	8 CAN FD channels	16 CAN FD channels	4 CAN channels 8 CAN FD channels		6 CAN channels 8 CAN FD channels	4 CAN channels 8 CAN FD channels Up to 4 CAN FD channels via DS4342 CAN FD Interface Module (shared slots with DS4340 FlexRay Interface Module)		6 CAN channels 8 CAN FD channels Up to 4 CAN FD channels via DS4342 CAN FD Interface Module (shared slots with DS4340 FlexRay Interface Module)
FlexRay interface	2 FlexRay channels (A + B)	4 FlexRay channels (A + B)	2 FlexRay channels (A + B)		2 FlexRay channels (A + B)	2 FlexRay channels (A + B) Up to 2 FlexRay channels (A + B) via DS4340 FlexRay Interface Module (shared slots with DS4342 CAN FD Interface Module)		
LIN interface	3 LIN channels	6 LIN channels	5 LIN channels		6 LIN channels	5 LIN channels		6 LIN channels
UART interface	1 RS232/422/485 channel	2 RS232/422/485 channels	1 RS232/422/485 channel 2 RS232 channels		1 RS232/422/485 channel 3 RS232 channels	1 RS232/422/485 channel 2 RS232 channels		1 RS232/422/485 channel 3 RS232 channels
Programmable FPGA	(-)	(-)	(-)		(-)	Xilinx Kintex®-7 XC7K325T		
I/O module slot for programmable FPGA	(-)	(-)	(-)		(-)	1 x I/O module slots (for DS1552 Multi-I/O Module, DS1553 AC Motor Control Module, DS1554 Engine Control I/O Module)		
Real-time clock	Battery-backed real-time clock							
Power control	Remote control input to switch on/off MicroAutoBox III, i.e., with ingnition switch (terminal 15)							
	Prestart input to switch on the MicroAutoBox III without starting the real-time application to ensure very fast boot times							

[1] For more information on availability for users and for more details, please contact dSPACE.
[2] Copyright IEEE 2018. All rights reserved.
[3] Coming soon

MicroAutoBox III – Multi I/O Variants

	1403/1511	1403/1511B1	1403/1513	1403/1511/1514	1403/1511B1/1514	1403/1513/1514
Analog input						
Channels	16 (16x Analog In 7)	16 (16x Analog In 8)	32 (16x Analog In 8 and 16x Analog In 9)	16 (16x Analog In 7)	16 (16x Analog In 8)	32 (16x Analog In 8 and 16x Analog In 9)
Resolution	16 bits					
Supported function blocks	Analog In 7: Voltage In, Voltage Signal Capture (ADC Type 4)	Analog In 8: Voltage In, Voltage Signal Capture (ADC Type 4)	Analog In 8: Voltage In, Voltage Signal Capture (ADC Type 4) Analog In 9: Voltage In	Analog In 7: Voltage In, Voltage Signal Capture (ADC Type 4)	Analog In 8: Voltage In, Voltage Signal Capture (ADC Type 4)	Analog In 8: Voltage In, Voltage Signal Capture (ADC Type 4) Analog In 9: Voltage In
Sample rate	Analog In 7: Max. 1 MS/s	Analog In 8: Max. 1 MS/s	Analog In 8: Max. 1 MS/s Analog In 9: Max. 200 kS/s	Analog In 7: Max. 1 MS/s	Analog In 8: Max. 1 MS/s	Analog In 8: Max. 1 MS/s Analog In 9: Max. 200 kS/s
Input voltage range	Analog In 7: 0 ... 5 V	Analog In 8: -10 V ... +10 V	Analog In 8: -10 V ... +10 V Analog In 9: -10 V ... +10 V	Analog In 7: 0 ... 5 V	Analog In 8: -10 V ... +10 V	Analog In 8: -10 V ... +10 V Analog In 9: -10 V ... +10 V
Trigger input channels	4 (trigger rate max. 1 MHz), for triggering the analog measurement					
Analog output						
Channels	4x Analog Out 11	4x Analog Out 11	8x Analog Out 12	4x Analog Out 11	4x Analog Out 11	8x Analog Out 12
Resolution	12 bits	12 bits	16 bits	12 bits	12 bits	16 bits
Supported function blocks	Voltage Out					
Output voltage range	0 ... 4.5 V	0 ... 4.5 V	-10 V ... +10 V	0 ... 4.5 V	0 ... 4.5 V	-10 V ... +10 V
Output current	-5 mA ... +5 mA	-5 mA ... +5 mA	-8 mA ... +8 mA	-5 mA ... +5 mA	-5 mA ... +5 mA	-8 mA ... +8 mA
Digital input						
Channels	40, divided into 3 channel sets	40, divided into 3 channel sets	24, divided into 2 channel sets	40, divided into 3 channel sets	40, divided into 3 channel sets	24, divided into 2 channel sets
Supported I/O functions	Multi Bit In					
	PWM/PFM In					
	Digital Pulse In					
	Digital Incremental Encoder In					
	SENT In					
	SPI Master					

MicroAutoBox III – Bus and Network Variants

	1403/1521	1403/1521/1521	1403/1511/1521	1403/1511B1/1521	1403/1513/1521	1403/1511/ 1514/1521	1403/1511B1/ 1514/1521	1403/1513/ 1514/1521
Analog input								
Channels	4 (4x Analog In 17)	8 (8x Analog In 17)	20 (16x Analog In 7 and 4x Analog In 17)	1403/1511B1/1521 20 (16x Analog In 8 and 4x Analog In 17)	36 (16x Analog In 8, 16x Analog In 9, and 4x Analog In 17)	20 (16x Analog In 7 and 4x Analog In 17)	1403/1511B1/1521 20 (16x Analog In 8 and 4x Analog In 17)	36 (16x Analog In 8, 16x Analog In 9 and 4x Analog In 17)
Resolution	16 bits							
Supported function blocks	Analog In 17: Voltage In		Analog In 17: Voltage In Analog In 7: Voltage In, Voltage Signal Capture (ADC Type 4)		Analog In 9 & 17: Voltage In Analog In 8: Voltage In, Voltage Signal Capture (ADC Type 4)	Analog In 17: Voltage In Analog In 7: Voltage In, Voltage Signal Capture (ADC Type 4)		Analog In 9 & 17: Voltage In Analog In 8: Voltage In, Voltage Signal Capture (ADC Type 4)
Sample rate	Analog In 17: 333 kS/s		Analog In 17: 333 kS/s Analog In 7: Max. 1 MS/s Analog In 8: Max. 1 MS/s		Analog In 9: 200 kS/s Analog In 17: 333 kS/s Analog In 8: Max. 1 MS/s	Analog In 17: 333 kS/s Analog In 7: Max. 1 MS/s Analog In 8: Max. 1 MS/s		Analog In 9: 200 kS/s Analog In 17: 333 kS/s Analog In 8: Max. 1 MS/s
Input voltage range	Analog In 17: -10 V ... +10 V		Analog In 17: -10 V ... +10 V Analog In 7: 0 ... 5 V	Analog In 17: -10 V ... +10 V Analog In 8: -10 V ... +10 V	Analog In 8, 9 & 17: -10 V ... +10 V	Analog In 17: -10 V ... +10 V Analog In 7: 0 ... 5 V	Analog In 17: -10 V ... +10 V Analog In 8: -10 V ... +10 V	Analog In 8, 9 & 17: -10 V ... +10 V
Trigger input channels	(-)		4 (trigger rate max. 1 MHz) For triggering the analog measurement					
Analog output								
Channels	(-)		4x Analog Out 11		8x Analog Out 12	4x Analog Out 11		8x Analog Out 12
Resolution	(-)		12 bits		16 bits	12 bits		16 bits
Supported function blocks	(-)		Voltage Out					
Output voltage range	(-)		0 ... 4.5 V		-10 V ... +10 V	0 ... 4.5 V		-10 V ... +10 V
Output current	(-)		-5 mA ... +5 mA		-8 mA ... +8 mA	-5 mA ... +5 mA		-8 mA ... +8 mA
Digital input								
Channels	6 Digital In / Out	12 Digital In / Out	6 Digital In / Out 40, divided into 3 channel sets		6 Digital In / Out 24, divided into 2 channel sets	6 Digital In / Out 40, divided into 3 channel sets		6 Digital In / Out 24, divided into 2 channel sets
Supported function blocks	Multi Bit In							
	PWM/PFM In							
	Digital Pulse Capture		Digital Pulse Capture/Digital Incremental Encoder In/SENT In/SPI Master					

MicroAutoBox III – Multi I/O Variants

	1403/1511	1403/1511B1	1403/1513	1403/1511/1514	1403/1511B1/1514	1403/1513/1514
Digital output						
Channels	40, divided into 3 channel sets	40, divided into 3 channel sets	24, divided into 2 channel sets	40, divided into 3 channel sets	40, divided into 3 channel sets	24, divided into 2 channel sets
Supported I/O functions	Multi Bit Out					
	Digital Pulse Out					
	PWM/PFM Out					
	Multi-Channel PWM Out					
	SPI Master					
Signal conditioning	Signal conditioning for automotive signal levels, no power driver included					
	Overvoltage protection; overcurrent and short circuit protection					
Physical connections						
LEMO connectors	1 x USB (2 USB ports: 1 port usable as a mass storage interface for data logging, 1 port usable as a mass storage interface accessible from the model					
	1 x AETH (2 automotive Ethernet ports)					
	2 x ETH (2 standard Ethernet ports)					
	1 x HOST (1 standard Ethernet port)					
Additional connectors	ZIF I/O connector					
	IOCNET for future use					
	Power input (7-pin, male)					
Physical characteristics						
Size	Approx. 200 mm (7.87 in) x 259 mm (10.18 in) x 60 mm (2.36 in)			Approx. 200 mm (7.87 in) x 259 mm (10.18 in) x 100 mm (3.94 in.)		
Temperature	Standard operating temperature with four processor cores activated: -40°C up to 70°C (-40 up to 158 °F), passive cooling					
	Operating temperature no more than two processor cores activated: -40°C up to 80°C (-40°F up to 176°F), passive cooling					
	Operating temperature with cooling unit and with all processor cores activated: -40°C up to 80°C (-40 up to 176 °F), active cooling					
	With optional WLAN: lower operating temperature					
EMC, shock, and vibration tested	Electromagnetic Compatibility (EMC): EN 61326-1 Table 2 CISPR 11, EN 55011 Group 1, Class A					
	Vibration: ISO 16750-3:2007 / 4.1.2.4 Test IV DO-160F.8 / B1 Test Conditions EN 60068-2-6					
	Shock: ISO 16750-3:2007 / 4.2.2. RTCA / DO-160F Section 7 Test 7.2 Category D Test type R					
Power supply	Operating voltage range for start-up (VBATstart): 6 V DC ... 54 V DC +/-10%					
	Operating voltage range VBAToperate: 10 V DC ... 54 V DC +/-10%					
	Protected reverse voltage VBATprot: Up to -60 V					
Power consumption[1)]	Typically 50 W			Typically 75 W with installed I/O modules		

[1)] A value of 10 W is included for the cooling unit. Without the cooling unit, the value is reduced by 10 W.

MicroAutoBox III – Bus and Network Variants

	1403/1521	1403/1521/1521	1403/1511/1521	1403/1511B1/1521	1403/1513/1521	1403/1511/ 1514/1521	1403/1511B1/ 1514/1521	1403/1513/ 1514/1521
Digital output								
Channels	6 Digital In / Out	12 Digital In / Out	6 Digital In / Out 40, divided into 3 channel sets		6 Digital In / Out 24, divided into 2 channel sets	6 Digital In / Out 40, divided into 3 channel sets		6 Digital In / Out 24, divided into 2 channel sets
Supported function blocks	Multi Bit Out							
	(-)		Digital Pulse Out					
	PWM/PFM Out	PWM/PFM Out	PWM/PFM / Out Multi-Channel / PWM Out SPI Master					
Signal conditioning	Signal conditioning for automotive signal levels, no power driver included							
	Overvoltage protection; overcurrent and short circuit protection							
Physical connections								
LEMO connectors	1 x USB (2 USB ports: 1 port usable as a mass storage interface for data logging, 1 port for future use)							
	3 x AETH (5 automotive Ethernet ports)	5 x AETH (8 automotive Ethernet ports)	3 x AETH (5 automotive Ethernet ports)					
	2 x ETH (2 standard Ethernet ports)							
	1 x HOST (1 standard Ethernet port)							
Additional connectors	Sub-D connectors		ZIF I/O connector and Sub-D connectors					
Physical characteristics								
Size	Approx. 200 mm (7.87 in) x 259 mm (10.18 in) x 60 mm (2.36 in)	Approx. 200 mm (7.87 in) x 259 mm (10.18 in) x 100 mm (3.94 in)				Approx. 200 mm (7.87 in) x 259 mm (10.18 in) x 140 mm (5.51 in)		
Temperature	Standard operating temperature with passive cooling: -40°C up to 70°C (-40 up to 158 °F)							
	Standard operating temperature with active cooling: -40°C up to 80°C (-40 up to 176 °F)							
	With optional WLAN: lower operating temperature							
EMC, shock, and vibration tested	Electromagnetic Compatibility (EMC): EN 61326-1 Table 2 CISPR 11, EN 55011 Group 1, Class A							
	Vibration: ISO 16750-3:2007 / 4.1.2.4 Test IV DO-160F.8 / B1 Test Conditions EN 60068-2-6							
	Shock: ISO 16750-3:2007 / 4.2.2. RTCA / DO-160F Section 7 Test 7.2 Category D Test type R							
Power supply	Operating voltage range for start-up (VBATstart): 6 V DC ... 54 V DC +/-10%							
	Operating voltage range VBAToperate: 10 V DC …54 V DC +/-10%							
	Protected reverse voltage VBATprot: up to -60V							
Power consumption[1)]	Typically 70 W	Typically 95 W	Typically 75 W			Typically 100 W		

[1)] *A value of 10 W is included for the cooling unit. Without the cooling unit, the value is reduced by 10 W.*

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