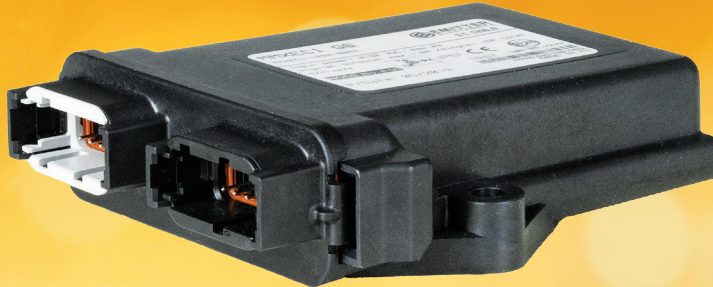




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MMX EC1 G6 CONTROLLER



Features and Benefits

- 1 **16 Universal Pins**
- 2 **Digital, Analog, Resistance Or Frequency Inputs**
- 3 **High Side, Low Side Or PWM Outputs**
- 4 **Data Logger**
- 5 **3-axis Accelerometer**
- 6 **I/O Status LEDs**
- 7 **Extension Options: H-Bridge, IMU, DAC, RS232/485, Etc.**

The MMX EC1 is a highly configurable controller which is designed for use in various automotive and industrial applications. It provides smart solutions for special vehicles, machinery, industrial automation and enables simple connectivity for sensors, switches, actuators and different CAN devices.

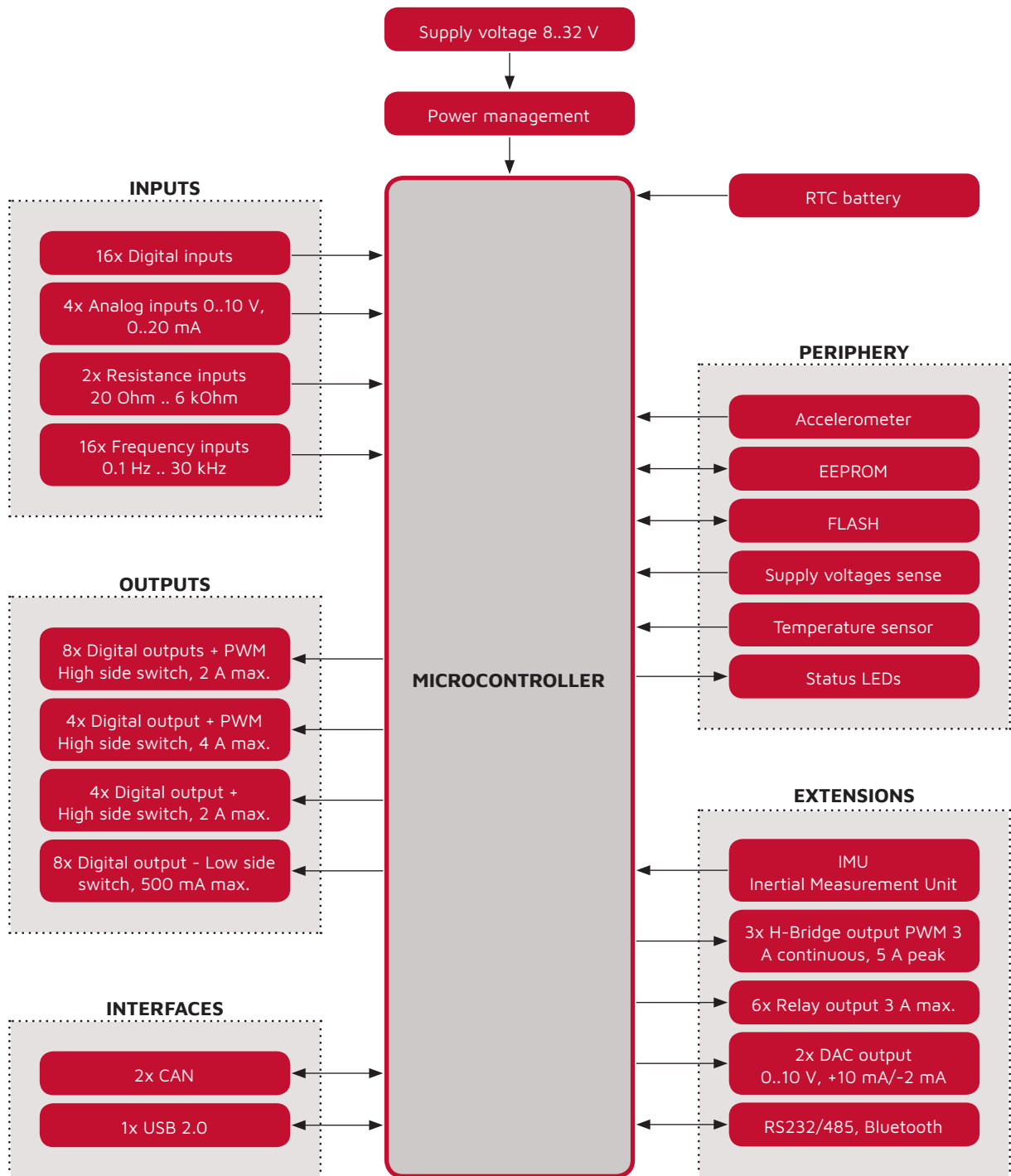
MMX EC1 is a part of Emitter Electronics MMX family products and can be used with other MMX family devices such as LCDs, keypads, pump governors, tank level indicators, etc. For applications requiring high I/O count, several MMX EC1 controllers can be connected over Can bus, CAN SAE J1939, CAN open or free protocol. MMX EC1 controllers are programmable in C/C++ language.

Connection

Black Connector: Pin Description					
PIN	TYPE	OPTION 1	OPTION 2	OPTION 3	OPTION 4
1	FIXED	BATTERY +	-	-	-
2	FIXED	BATTERY +	-	-	-
3	FIXED	CAN LOW 1	-	-	-
4	CONFIGURABLE	CAN LOW 2 (J1939)	CAN LOW 1	-	-
5	CONFIGURABLE	ANALOG INPUT	DIGITAL INPUT +/-	DIGITAL OUTPUT+	-
6	CONFIGURABLE	ANALOG INPUT	DIGITAL INPUT +/-	DIGITAL OUTPUT+	-
7	CONFIGURABLE	ANALOG INPUT	DIGITAL INPUT +/-	DIGITAL OUTPUT+	RESISTANCE INPUT
8	CONFIGURABLE	ANALOG INPUT	DIGITAL INPUT +/-	DIGITAL OUTPUT+	-
9	CONFIGURABLE	CAN HIGH 2 (J1939)	CAN HIGH 1	-	-
10	FIXED	CAN HIGH 1	-	-	-
11	FIXED	BATTERY -	ANALOG GND	-	-
12	FIXED	BATTERY -	-	-	-

Grey Connector: Pin Description						
PIN	TYPE	OPTION 1	OPTION 2	OPTION 3	OPTION 4	EXTENSION BOARD
1	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM	-	-	-
2	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM	-	-	-
3	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM	-	-	-
4	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM	-	-	-
5	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM	DIGITAL OUTPUT -	-	EXTENSION A
6	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM	DIGITAL OUTPUT -	-	EXTENSION A
7	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM	DIGITAL OUTPUT -	-	EXTENSION B
8	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM	DIGITAL OUTPUT -	RESISTANCE INPUT	EXTENSION B
9	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM*	DIGITAL OUTPUT -	-	EXTENSION C
10	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM*	DIGITAL OUTPUT -	-	EXTENSION C
11	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM*	DIGITAL OUTPUT -	-	-
12	CONFIGURABLE	DIGITAL INPUT +/-	DIGITAL OUTPUT + PWM*	DIGITAL OUTPUT -	-	-

Block Diagram



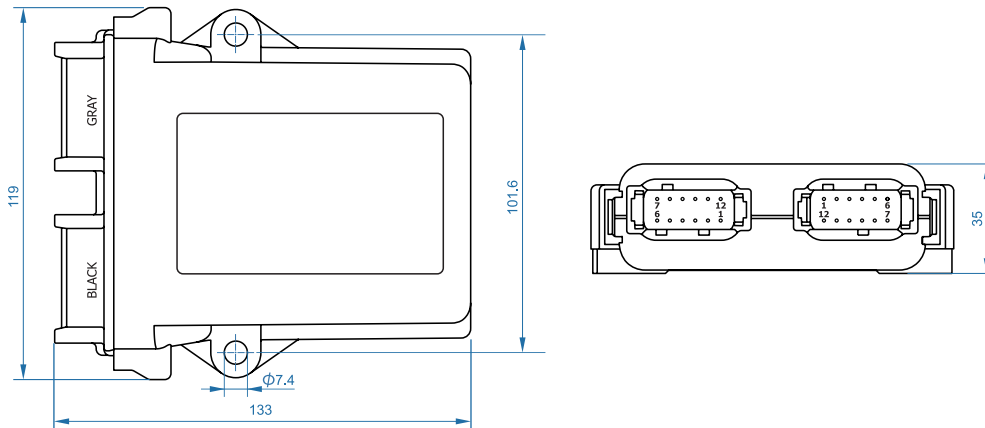
NOTE: Block diagram shows all available MMX EC1 G6 controller inputs and outputs - 16 of them can be used simultaneously (MMX EC1 G6 controller has 16 configurable IO pins).

Specifications

KERNEL	
Processor	32-bit ARM Cortex-M4, 168 MHz
Processor flash	1 MByte
Processor RAM	192 kByte
External EEPROM	2 kByte
External flash	64 MByte
I/O PINS	
Total	16x universal pins, individually configurable via software, all I/O pins are protected against short circuit to GND and BAT +, each I/O pin is diagnosable via status LEDs
INPUTS	
Digital input	16x total, configurable integrated pull-up/down resistor and active low/high levels via software, protected
Analog input	4x total, 12-bit resolution, configurable voltage/current input via software, 4 .. 20 mA, 0 .. 10 V, out-of-range detection, protected
Resistance input	2x total, 12-bit resolution, 20 Ohm .. 6 kOhm, Pt1000, Pt100, KTY support, protected
Frequency input	16x total, ≤ 30 kHz, incremental encoder A/B - 8x total, protected
OUTPUTS	
Digital output + PWM	8x total, high side switch, 2 A max., 0 .. 100 %, overload/short circuit protection, overtemperature protection, open load detection
Digital output + PWM (high current)	4x total, high side switch, 4 A max., 0 .. 100 %, overload/short circuit protection, overtemperature protection, open load detection
Digital output +	4x total, high side switch, 2 A max., overload/short circuit protection, overtemperature protection, open load detection
Digital output -	8x total, low side switch, 500 mA max., overload/short circuit protection, overtemperature protection, open load detection
DAC output	2x total, 12-bit resolution, 0 .. 10 V, +/- 10 mA, protected, available via extension board
INTERFACES	
CAN	2x CAN, ISO 11898 2.0 A/B up to 1 Mbps, protocols SAE J1939, CANopen, free, etc.
CAN Link	1x T-connection, configurable termination 120 ohm via DIP switch, node ID definition via software
USB	1x USB 2.0, for firmware update
RS232/485, Bluetooth, ...	available via extension boards

OTHER FEATURES	
Accelerometer	integrated 3-axis, MEMS, 12-bit digital accelerometer, +/-2, +/-4, +/-8 g, for inclination/acceleration sensing
IMU	3-axis accelerometer 12-bit, measurement ranges ±2 g, ±4 g, ±8 g, ±16 g, resolution 0.98 mg, 3-axis gyroscope 16-bit, ±125 °/s, ±250 °/s, ±500 °/s, ±1000 °/s, ±2000 °/s, resolution 0.004 °/s, 3-axis magnetometer 16-bit, ±1300 μT (x,y), ±2500 μT (z), resolution 0.3 μT, available via extension board
Data logger	system information/data logging, optional RTC logging with dedicated 1000 mAh onboard battery
Monitoring	internal monitoring of power supply voltage, RTC battery voltage, CPU core temperature and board temperature, over/under supply voltage detection, watchdog functionality
LED diagnostics	dedicated on board status LEDs for I/O pin diagnostics and error indication
Protections	overvoltage, transients, load dump protection, reverse polarity protection by external fuse
ELECTRICAL & ENVIRONMENTAL REQUIREMENTS	
Supply voltage	8 .. 32 V
Peak supply voltage	≤ 36 V for ≤ 5 min, ≤ 40 V for ≤ 2 s
Idle current	30 mA @ 24 V
Max total current	15 A
RTC battery life	min. 10 years
Operating temperature	-40 .. +85 °C (with full load)
ENCLOSURE	
Connector	2x 12 pin Deutch DTM connector, waterproof
Ingress Protection	EN 60529 IP67
Housing material	Nylon 6/6 black glass fibre reinforced, silicone rubber
Housing dimensions	133 x 119 x 35 mm
Weight	250 g
SOFTWARE	
Programming environment	C/C++, high level API-library included
STANDARDS	
CE-Mark	2014/30/EU
E-Mark	ECE R10.5, noise immunity with 100 V/m
EMC	EN 61000-6-2, noise immunity EN 61000-6-4, radiation of interference
Electrical	ISO 7637-2, pulse immunity, load dump

Dimensions



Product Codes

Product Code	Total IO	OUT+	OUT+*	OUT-	IN+	IN-	AIN	RIN	F	B	CAN Configuration	EXT1	EXT2	EXT3	Type	Status
MMXEC1-0000-xxxx	16	0	0	0	16	16	4	2	-	-	DIP Switch	-	-	-	TBD	Preview
MMXEC1-0400-xxxx	16	4	0	0	16	12	4	2	-	-	DIP Switch	-	-	-	TBD	Preview
MMXEC1-0500-0001	16	5	2	0	16	11	4	2	-	-	Link Resistors 1,2**	-	-	-	Special	Active
MMXEC1-0600-0002	16	6	2	0	16	10	4	2	-	-	DIP Switch	-	-	-	Standard	Active
MMXEC1-0800-xxxx	16	8	4	0	16	8	4	2	-	-	DIP Switch	-	-	-	TBD	Preview
MMXEC1-1000-xxxx	16	10	2	0	16	6	4	1	-	-	DIP Switch	-	-	-	TBD	Preview
MMXEC1-1200-0003	16	12	4	0	16	4	4	1	-	-	DIP Switch	-	-	-	Standard	Active
MMXEC1-1600-xxxx	16	16	4	0	16	0	0	0	-	-	DIP Switch	-	-	-	TBD	Preview
MMXEC1-1200-0004	16	6	2	6	10	10	4	1	-	-	DIP Switch	-	-	-	Special	Active

*High current outputs
 **CAN1 and CAN2 120Ω termination resistors are connected by zero-ohm resistors

OUT - Output, IN - Input, AIN - Analog input, RIN - Resistance input, F - Flash, B - Battery, EXT1 - Extension 1, EXT2 - Extension 2, EXT3 - Extension 3

For other possible IO configurations please contact the supplier.

