GPIO-MM-XT 64-line Digital I/O + 10 Counter/Timer PC/104 Module

FEATURES

- FPGA-based digital I/O module with reprogrammable feature sets: 64 digital I/O + 10 16-bit counter/timers , 96 digital I/O, and custom designs
- RAM-based field-reprogrammable FPGA with 200K gates
- 3 I/O connectors for a total of 100 I/O pins
- 2 programmable interrupts
- 8 diagnostic LEDs
- 40 MHz on-board clock to drive digital logic
- -40°C to +85°C operation
- FREE Universal Driver software included

Description

GPIO-MM is a PC/104 digital I/O module based on an FPGA, allowing multiple feature sets to be implemented on the same hardware platform. The FPGA is a Xilinx Spartan 2 RAM-based device with 200K gates (XC2S200). An on-board configuration flash memory device stores the FPGA code for automatic loading on power-up, and new code can be downloaded using a JTAG cable connected to a PC.

GPIO-MM-XT is available with 3 off-the-self "personalities" that define its functionality and connector pinouts:

Model	GPIO	Counter/Timers
GPIO-MM-XT	16 from counter/timer circuit 48 "ACB / DFE" port organization	10 16-bit based on AMD 9513 chip

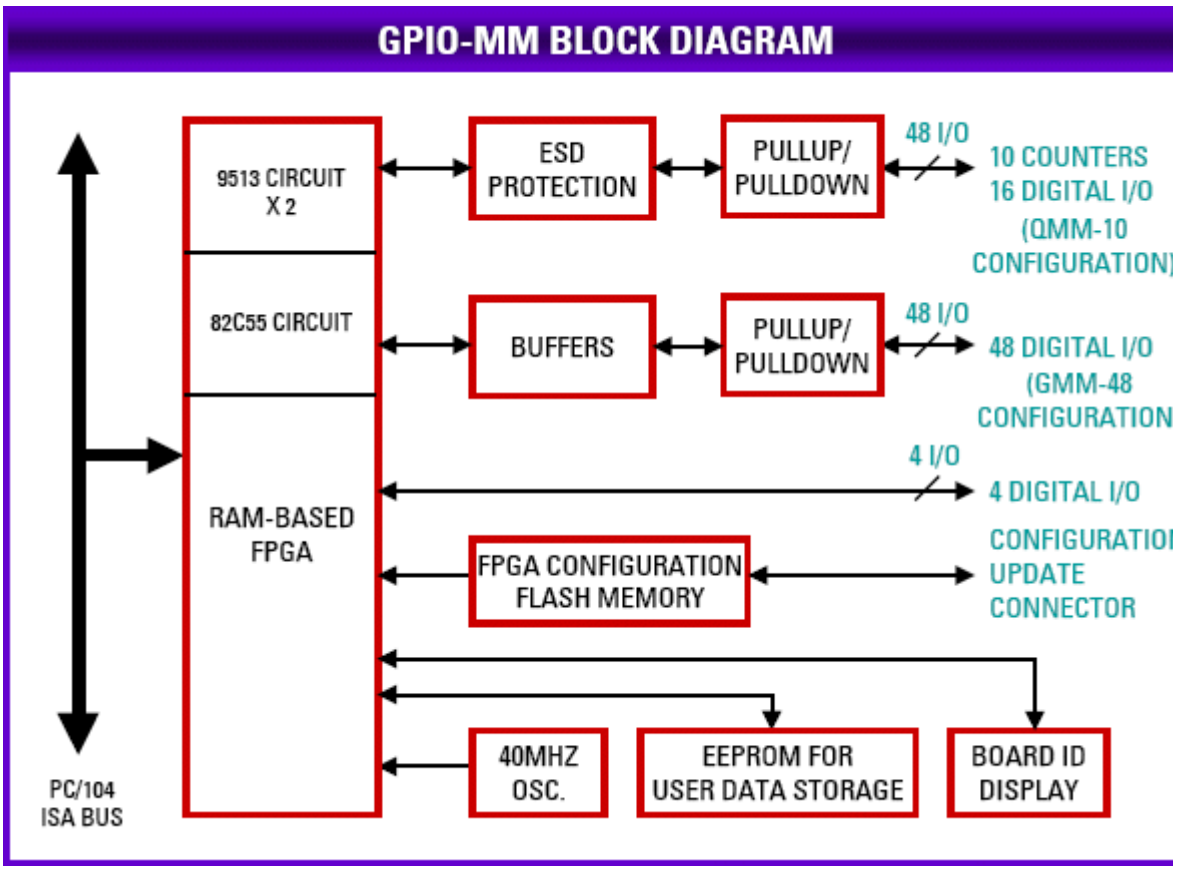
GPIO-MM-12-XT	16 from counter/timer circuit 48 “ABC / DEF” port organization	10 16-bit based on AMD 9513 chip
GPIO-MM-21-XT	96 “ABC / DEF” port organization (48 on each connector)	NA

The right side I/O connector includes ESD protection circuitry for increased reliability, while the left side I/O connector offers high-drive logic buffers for increased load compatibility, along with jumper-configured pull-up / pull-down resistors. All digital I/O pins are set to input on power-up to avoid conflicts with external circuitry.

Hardware configuration options include jumper-selectable base address and DMA level, plus a 10-position jumper lock for user-definable field configurability when used with custom designs. A 256-byte EEPROM provides convenient non-volatile storage for user-defined functionality. The board also includes the layout for an optional RS-232/422/485 serial port, so that a multi-protocol serial port can be integrated into custom designs.

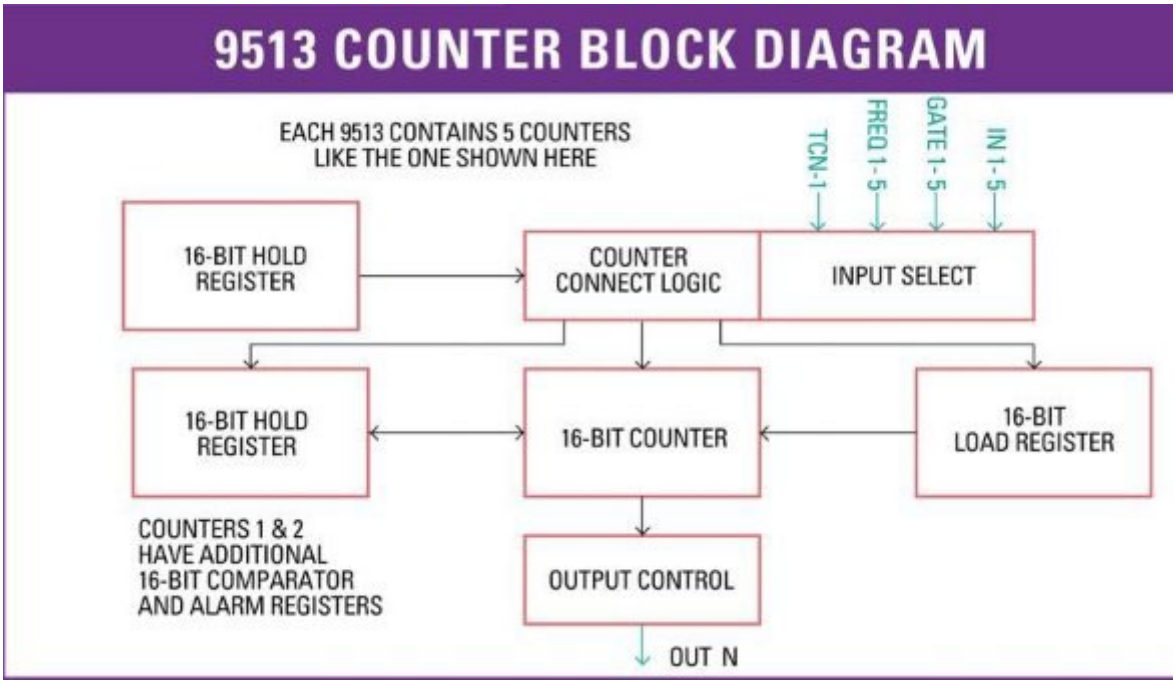
GPIO-MM contains 8 diagnostic LEDs located in the lower left corner. Off-the-shelf configurations use these LEDs to identify the personality programmed onto the board, while custom designs can use them for any purpose. An additional programmable LED in the lower right corner offers a simple way to verify successful FPGA programming.

Block Diagram



9513 Counter/Timers

The GPIO-MM code includes two 9513 counter/timer cores, each containing 5 16-bit counters. This core is based on the popular high performance AMD9513 counter/timer IC. These counters offer extreme flexibility, with programmable input sources, programmable output waveforms, programmable up / down count, one-shot vs. continuous counting, PWM function, and more. Counters can be cascaded together to form 32-bit, 48-bit, etc. wide counters. An input clock of 40MHz provides fine resolution for timing applications.



Backward Compatibility

Customers of Diamond's older generation products will appreciate the backward compatibility option of GPIO-MM. The base model GPIO-MM-XT includes all the features of the QMM-5 / QMM-10 board plus the GMM-48 board on one board, with identical register maps. the right side connector duplicates the I/O connector of QMM-10, while the left side connector combines all 48 digital I/O of GMM-48 on a single connector for higher integration and greater compactness. Software applications using previous versions of our Universal Driver software will work on the GPIO-MM-XT without any changes.

I/O Headers

In the standard configurations, the main I/O connectors have the following pinouts. Custom configurations can define any pinout for these connectors. All pinout information is included in the downloadable **GPIO-MM Personality Guide.** The base model GPIO-MM-XT pinout is shown here.

J3 Counter/Timer I/O

In 1	**1**	**2**	In 2
Gate 1	**3**	**4**	Gate 2
Out 1	**5**	**6**	Out 2
In 3	**7**	**8**	In 4

J4 Digital I/O

Port1 7	**1**	**2**	Port4 7
Port1 6	**3**	**4**	Port4 6
Port1 5	**5**	**6**	Port4 5
Port1 4	**7**	**8**	Port4 4

Gate 3	**9**	**10**	Gate 4
Out 3	**11**	**12**	Out 4
In 5	**13**	**14**	Out 5
Gate 5	**15**	**16**	FOUT
In 6	**17**	**18**	In 7
Gate 6	**19**	**20**	Gate 7
Out 6	**21**	**22**	Out 7
In 8	**23**	**24**	In 9
Gate 8	**25**	**26**	Gate 9
Out 8	**27**	**28**	Out 9
In 10	**29**	**30**	Out 10
Gate 10	**31**	**32**	Interrupt Input
Dout 7	**33**	**34**	Din 7
Dout 6	**35**	**36**	Din 6
Dout 5	**37**	**38**	Din 5
Dout 4	**39**	**40**	Din 4
Dout 3	**41**	**42**	Din 3
Dout 2	**43**	**44**	Din 2
Dout 1	**45**	**46**	Din 1
Dout 0	**47**	**48**	Din 0
+5V	**49**	**50**	Ground

Port1 3	**9**	**10**	Port4 3
Port1 2	**11**	**12**	Port4 2
Port1 1	**13**	**14**	Port4 1
Port1 0	**15**	**16**	Port4 0
Port3 7	**17**	**18**	Port6 7
Port3 6	**19**	**20**	Port6 6
Port3 5	**21**	**22**	Port6 5
Port3 4	**23**	**24**	Port6 4
Port3 3	**25**	**26**	Port6 3
Port3 2	**27**	**28**	Port6 2
Port3 1	**29**	**30**	Port6 1
Port3 0	**31**	**32**	Port6 0
Port2 7	**33**	**34**	Port5 7
Port2 6	**35**	**36**	Port5 6
Port2 5	**37**	**38**	Port5 5
Port2 4	**39**	**40**	Port5 4
Port2 3	**41**	**42**	Port5 3
Port2 2	**43**	**44**	Port5 2
Port2 1	**45**	**46**	Port5 1
Port2 0	**47**	**48**	Port5 0
+5V	**49**	**50**	Ground

Specifications

Base FPGA	Xilinx Spartan II, 200,000 gates, 40K RAM bits
Input clock	40MHz
FPGA code storage	Flash memory, field upgradeable via JTAG
ID indicator	8-bit LED display indicates FPGA code personality
No. of I/O pins	100 pins (48 buffered)
Programmable Digital I/O	48 using 8255 cores
Fixed Direction I/O	8 fixed inputs and 8 fixed outputs
Counter/timers	10 16-bit, using 9513 cores
Max counting freq	40MHz
Counter modes	Counter, rate/square-wave generator, programmable one-shot, hardware/software triggered strobe
Output current, buffered I/O	Logic 0: 64mA max per line
Ouptut current, fixed I/O and fixed counter/timers	±24mA max
Dimensions	3.55" x 3.775", PC/104 form factor
PC/104 bus	16-bit stackthrough ISA bus
Power supply	+5VDC ±5%
Operating temperature	-40°C to +85°C standard, all versions
RoHS	Compliant

Models and Accessories

GPIO-MM-XT		
available models:		
GPIO-MM-XT	64 GPIO "ACBDFE" Configuration + 10 Counter/Timers PC/104 Module	Available
GPIO-MM-12-XT	64 GPIO "ABCDEF" Configuration + 10 Counter/Timers PC/104 Module	Available
GPIO-MM-21-XT	96 GPIO "ABCDEF" Configuration PC/104 Module	Available
Please login or signup for an online quote request.		