PB68HC12A4 Controller Module

xiom
anufacturing

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PB68HC12A4 - I/O Connectors

The Motorola M68HC12 Microcontroller is attached to four dual row 14 pin connectors (28 pins each) which are configured as follows:

P1

Vss	1	1	2	2	Vdd
PJ0	3	3	4	4	PJ1
PJ2	5	5	6	6	PJ3
PJ4	7	7	8	8	PJ5
PJ6	9	9	10	10	PJ7
A16/PG0	11	11	12	12	PG1/A17
A18/PG2	13	13	14	14	Vdd
Vss	15	15	16	16	PG3/A19
A20/PG4	17	17	18	18	PG5/A21
BKGD	19	19	20	20	PD0/D0
D1/PD1	21	21	22	22	PD2/D2
D3/PD3	23	23	24	24	PD4/D4
D5/PD5	25	25	26	26	PD6/D6
D7/PD7	27	27	28	28	PC0/D8

P2

D9/PC1	29	1	2	30	PC2/D10
D11/PC3	31	3	4	32	PC4/D12
D13/PC5	33	5	6	34	PC6/D14
D15/PC7	35	7	8	36	PE0/XIRQ
IRQ/PE1	37	9	10	38	PE2/R/W
LSTR/PE3	39	11	12	40	/RESET
Vss	41	13	14	42	Vdd
Vddpll	43	15	16	44	XFC
Vsspll	45	17	18	46	EXTAL
XTAL	47	19	20	48	PE4/ECLK
MODA/PE5	49	21	22	50	PE6/MODB
ARST/PE7	51	23	24	52	PB0/A0
A1/PB1	53	25	26	54	PB2/A2
A3/PB3	55	27	28	56	PB4/A4

P3

A5/PB5	57	1	2	58	PB6/A6
A7/PB7	59	3	4	60	PA0/A8
A9/PA1	61	5	6	62	PA2/A10
A11/PA3	63	7	8	64	PA4/A12
A13/PA5	65	9	10	66	PA6/A14
A15/PA7	67	11	12	68	PF0/CS0
CS1/PF1	69	13	14	70	PF2/CS2
CS3/PF3	71	15	16	72	PF4/CSD
CSP0/PF5	73	17	18	74	PF6/CSP1
PH0	75	19	20	76	PH1
PH2	77	21	22	78	PH3
Vdd	79	23	24	80	Vss
PH4	81	25	26	82	PH5
PH6	83	27	28	84	PH7

P4

V_{RH}	85	1	2	86	V_{RL}
PAD0	87	3	4	88	PAD1
PAD2	89	5	6	90	PAD3
PAD4	91	7	8	92	PAD5
PAD6	93	9	10	94	PAD7
V_{DDA}	95	11	12	96	V_{SSA}
RxD0/PS0	97	13	14	98	PS1/TxD0
RxD1/PS2	99	15	16	100	PS3/TxD1
SDI/PS4	101	17	18	102	PS5/SDO
MOSI/PS6	103	19	20	104	PS7/SCK
PT0	105	21	22	106	PT1
PT2	107	23	24	108	PT3
PT4	109	25	26	110	PT5
PT6	111	27	28	112	PT7/PAI

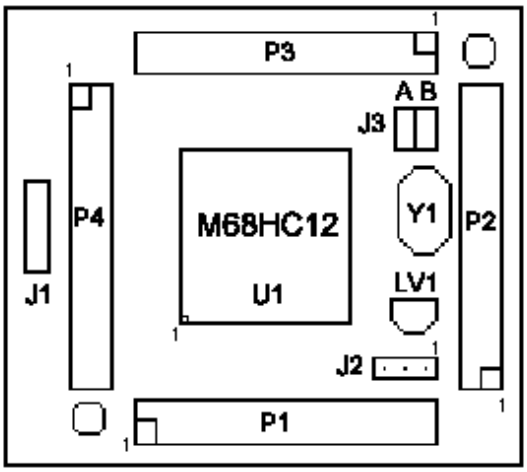
Note 1. Small number next to connector pin number is the MC68HC812A4 device pin number.
2. Designators next to pin numbers are MC68HC812A4 port designators.

J1 SCI0 Header SCI 0 Serial Port Header.
Provides connection for +Vdd, Vss, RXD0 and TXD0.

J2 Debug Header Debug and Reset pin Connections.

J3 HC12 Mode A = MODA and B=MODB

PB68HC12A4 - Jumper Options



J3 Mode Selection

Jumper J3 selects the M68HC12 operating mode as follows:

A	B	MODE
off	off	Expanded Wide Mode, 16 bit data bus
off	on	Expanded Narrow Mode, 8 bit data bus
on	off	Reserved, do not select.
on	on	Single Chip Mode, no external bus

J1 SCI0 Header

The J1 header provides a means of easily connecting external power and communication access to the PB68HC12A4 board. Axiom provides an RS232 converter accessory module that can provide +5V and a DB9 connector for connection to a PC. This allows the use of the AX12 utility program for programming the M68HC12. Following are the J1 connections:

Pin 1	HC12 TxD0
Pin 2	HC12 RxD0
Pin 3	+Vdd (5 volts)
Pin 4	Vss (Ground)

J2 Debug Header

The J2 header provides a means of easily connecting a background debug box. The header also provides for a means of applying RESET to the M68HC12 by jumpering pins 1 and 2 together. Following is the pinout of J2:

Pin 1	RESET active low
Pin 2	Vss Ground
Pin 3	BGND debug pin

PB68HC12A4 - Operation

Y1 Crystal Oscillator

Y1 is 16.00MHz standard. This provides a bus speed of 8mhz to the external system.

LV1 Reset Generator

LV1 is a voltage detector that will generate an active low RESET state if Vdd is below +4.4 VDC. If the PB68HC12A4 is to be operated at 3.3VDC then LV1 should be removed. Contact the factory about low voltage options.

HC12 Bootloader Firmware

The M68HC12 is pre-programmed with bootload firmware that operates in conjunction with the AX12 Utility software to provide a low cost debugging and programming environment for the M68HC12. The firmware is programmed into the second 64 byte block of the internal HC812A4 EEPROM and becomes operational when the HC812A4 is in Single Chip Mode.

Firmware Memory	
Single Chip Mode (normal)	$FF80 - $FFBF and $FFFE/FFFF = Reset Vector
Expanded Modes (default)	$1F80 - $1FBF and $1FFE/1FFF = $FF80

Caution should be used to assure the bootload firmware is not erased or corrupted by user software. The EEPROT Register ($00F1 default) bits 0 and 1 should be set high during the initialization sequence to protect the bootload firmware. If the bootloader firmware is erased or corrupted it can be re-installed with the Monitor/Debugger BUF12 operating in the M68HC812 external memory (expanded mode).

Troubleshooting

Checking to see if the PB68HC12A4 is functioning properly is very simple if the bootload firmware isn't erased or corrupted. An RS232 serial connection is required between the M68HC12 SCI0 port (J1 Header) and a PC or dumb terminal operating a serial COM port at 9600 baud, 8 data bits, 1 start, 1 stop, no parity.

1. Install J3 jumpers A and B to select M68HC12 Single Chip Mode.
2. Apply +5V DC to the PB68HC12A4 board (J1 pins 3 and 4).
3. Type characters on the PC operating a terminal program or dumb terminal keyboard.
4. If the bootloader firmware is operating, typed characters will echo back to the screen. Do not type over 500 characters.