



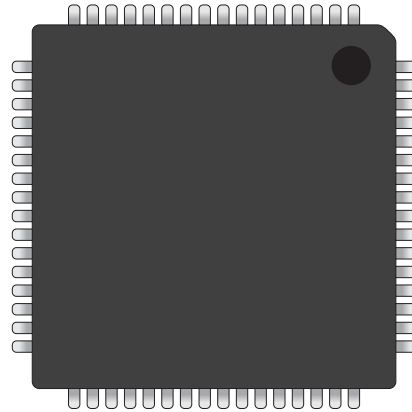
BASIC MICRO

TECHNOLOGY AT WORK

**B0261 - BasicATOM Pro 64 Pin TQFP Chip
Data Sheet**

Feature Overview:

- 56 KB of Program Space (FLASH)
- 4 KB of User Memory (RAM)
- 53 Input / Output Pins
- 8 Analog-to-Digital Capable Input Pins
- 2 Hardware Serial Port with Buffers
- 3 Hardware Timers
- 6 Hardware PWM I/O Pins
- 8 Capture / Compare Pins
- Hardware Interrupts
- 32 Bit Floating Point Math
- 32 Bit Integer Math
- 0.5us Timing Resolutions
- Over 120,000 BASIC Instructions Per Second

**Description**

The BasicATOM Pro 64 Pin TQFP Chip is the heart of the BasicATOM Pro modules. Its based on the Renesas HD64F3687GFPV processor which internally is a 16bit processor with 32bit registers including all math functions. The MCU operates at 20Mhz. The 64 pin TQFP chip is on average 20% faster than the standard 48 pin TQFP chip.

Operation

The BasicATOM Pro 64 Pin TQFP Chip is a fine pitch part at 0.5mm lead spacing. The pcb footprint must be accurate or a high rework rate will occur. The paste stencil should be 5mil in thickness to prevent bridging.

Power Filtering

There are several 0.1uf caps shown in the included schematic. Do not omit. All capacitors are required for proper operation.

Schematic

The schematic illustrates the basic circuit. The I2C and RESET Switch are optional. The reset circuit, NMI pull-up and power filter must be included for the MCU to function properly. A 20Mhz clock source must be used. It can be generated from a crystal or resonator.

Pin Assignment Overview

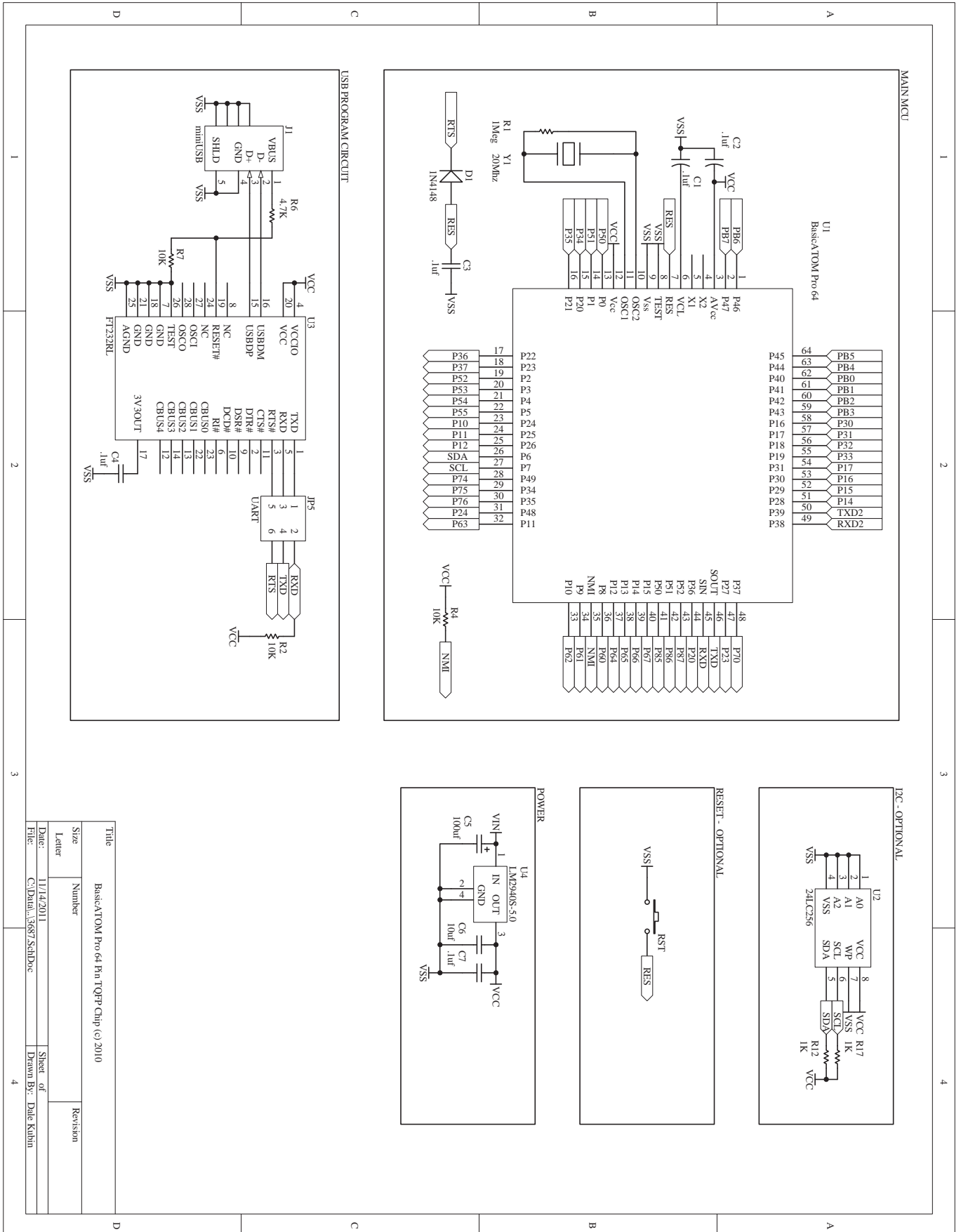
Label	Pin	Description
P0	13	<ul style="list-style-type: none"> General purpose I/O Pin. Interrupt input pin WKP0 (low enabled).
P1	14	<ul style="list-style-type: none"> General purpose I/O Pin. Interrupt input pin WKP1 (low enabled).
P2	19	<ul style="list-style-type: none"> General purpose I/O Pin. Interrupt input pin WKP2 (low enabled).
P3	20	<ul style="list-style-type: none"> General purpose I/O Pin. Interrupt input pin WKP3 (low enabled).
P4	21	<ul style="list-style-type: none"> General purpose Input / Output Pin. Interrupt input pin WKP4 (low enabled).
P5	22	<ul style="list-style-type: none"> General purpose I/O Pin. Interrupt input pin WKP5 (low enabled). Analog to Digital (A/D) Trigger input. Low enabled. ADTRH.
P6	26	<ul style="list-style-type: none"> General purpose I/O Pin. 3.3V Output only. 5V tolerant input. Hardware I2C Data input pin (SDA). Pull-up resistance is required when using I2C.
P7	27	<ul style="list-style-type: none"> General purpose I/O Pin. 3.3V Output only. 5V tolerant input. Hardware I2C Clock pin (SCL).
P8	36	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOA0: Capture Compare Pin. Timer Z
P9	34	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOB0: Capture Compare Pin. PWM Output, Timer Z
P10	33	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOC0: Capture Compare Pin. PWM Output, Timer Z
P11	32	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOD0: Capture Compare Pin. PWM Output, Timer Z
P12	37	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOA1: Capture Compare Pin. Timer Z
P13	38	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOB1: Capture Compare Pin. PWM Output, Timer Z, SCK3(2).

Pin Assignment Overview

Label	Pin	Description
P14	39	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOC1: Capture Compare Pin. PWM Output, Timer Z, RXD(2).
P15	40	<ul style="list-style-type: none"> General purpose I/O Pin. FTIOD1: Capture Compare Pin. PWM Output, Timer Z, TXD(2).
P16	58	<ul style="list-style-type: none"> General purpose I/O Pin.
P17	57	<ul style="list-style-type: none"> General purpose I/O Pin.
P18	56	<ul style="list-style-type: none"> General purpose I/O Pin.
P19	55	<ul style="list-style-type: none"> General purpose I/O Pin.
P20	15	<ul style="list-style-type: none"> General purpose I/O Pin.
P21	16	<ul style="list-style-type: none"> General purpose I/O Pin.
P22	17	<ul style="list-style-type: none"> General purpose I/O Pin.
P23	18	<ul style="list-style-type: none"> General purpose I/O Pin.
P24	23	<ul style="list-style-type: none"> General purpose I/O Pin. TMOW
P25	24	<ul style="list-style-type: none"> General purpose I/O Pin. 14 Bit PWM Square Wave Pin.
P26	25	<ul style="list-style-type: none"> General purpose I/O Pin.
P27	47	<ul style="list-style-type: none"> General purpose I/O Pin.
P28	51	<ul style="list-style-type: none"> General purpose I/O Pin. IRQ0, Analog to Digital (A/D) AN7.
P29	52	<ul style="list-style-type: none"> General purpose I/O Pin. IRQ1, TMIB1, Analog to Digital (A/D) AN6.
P30	53	<ul style="list-style-type: none"> General purpose I/O Pin. IRQ2, Analog to Digital (A/D) AN5.
P31	54	<ul style="list-style-type: none"> General purpose I/O Pin. IRQ3, TRGV, Analog to Digital (A/D) AN4.
SOUT	46	<ul style="list-style-type: none"> Programming output pin. Connects to RS232 RX pin.
SIN	45	<ul style="list-style-type: none"> Programming input pin. Connects to RS232 TX pin.
VSS	9	<ul style="list-style-type: none"> Ground (GND / VSS).
VCC	12	<ul style="list-style-type: none"> Regulated power input 5VDC.
RES	7	<ul style="list-style-type: none"> Active-low reset pin. Requires an external pull up and drain diode.
AVCC	3	<ul style="list-style-type: none"> Analog power supply pin for the A/D converter.
X2	4	<ul style="list-style-type: none"> 32.768 kHz crystal for the subclock.
X1	5	<ul style="list-style-type: none"> 32.768 kHz crystal for the subclock.
VCL	6	<ul style="list-style-type: none"> Internal step-down power supply pin. Connect a 0.1 μF between this pin and Vss.

Pin Assignment Overview

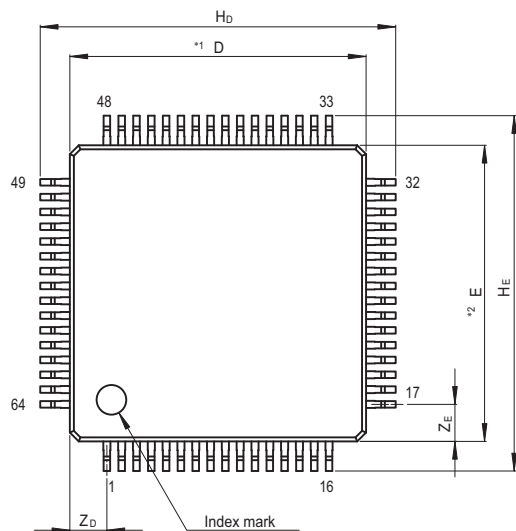
Label	Pin	Description
TEST	8	<ul style="list-style-type: none"> Connect pin to VSS.
OSC2	10	<ul style="list-style-type: none"> System Clock Connect to crystal or resonator.
OSC1	11	<ul style="list-style-type: none"> System Clock Connect to crystal or resonator.
NMI	35	<ul style="list-style-type: none"> Connect to VCC through 10K pull up resistor.
P34	29	<ul style="list-style-type: none"> TMCIV External event input pin.
P35	30	<ul style="list-style-type: none"> TMOV Pin for waveforms generated by the compare function.
P36	44	<ul style="list-style-type: none"> SCK3 Clock I/O pin.
P37	48	<ul style="list-style-type: none"> SCK3_2 Clock I/O pin.
P38	49	<ul style="list-style-type: none"> RXD2 Receive pin UART 2.
P39	50	<ul style="list-style-type: none"> TXD2 Transmit pin UART 2.
P40	62	<ul style="list-style-type: none"> AN0 - Analog pin. Input only pin.
P41	61	<ul style="list-style-type: none"> AN1 - Analog pin. Input only pin.
P42	60	<ul style="list-style-type: none"> AN2 - Analog pin. Input only pin.
P43	59	<ul style="list-style-type: none"> AN3 - Analog pin. Input only pin.
P44	63	<ul style="list-style-type: none"> AN4 - Analog pin. Input only pin.
P45	64	<ul style="list-style-type: none"> AN5 - Analog pin. Input only pin.
P46	1	<ul style="list-style-type: none"> AN6 - Analog pin. Input only pin.
P47	2	<ul style="list-style-type: none"> AN7 - Analog pin. Input only pin.
P48	31	<ul style="list-style-type: none"> General purpose I/O Pin.
P49	28	<ul style="list-style-type: none"> TMRIV General purpose I/O Pin.
P50	41	<ul style="list-style-type: none"> General purpose I/O Pin.
P51	42	<ul style="list-style-type: none"> General purpose I/O Pin.
P52	43	<ul style="list-style-type: none"> General purpose I/O Pin.



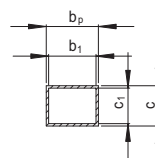
Title		BasicATOM Pro 64 Pin TQFP Chip (c) 2010	
Size	Number	Revision	
Later			
Date:	11/14/2011	Sheet of	
File:	C:\Data\136875\SDoc	Drawn By:	Dale Kibin

Mechanical Overview:

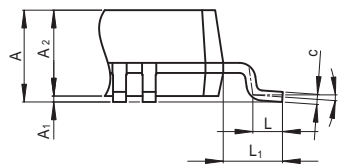
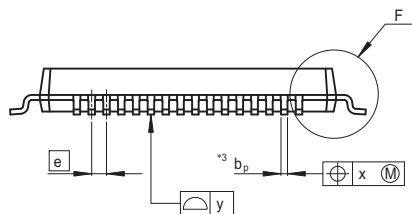
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-LQFP64-10x10-0.50	PLQP0064KC-A	FP-64E/FP-64EV	0.4g



NOTE)
 1. DIMENSIONS**1*AND**2*
 DO NOT INCLUDE MOLD FLASH
 2. DIMENSION**3*DOES NOT
 INCLUDE TRIM OFFSET.



Terminal cross section



Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	10	—
E	—	10	—
A ₂	—	1.45	—
H _D	11.8	12.0	12.2
H _E	11.8	12.0	12.2
A	—	—	1.70
A ₁	0.00	0.10	0.20
b _p	0.17	0.22	0.27
b ₁	—	0.20	—
c	0.12	0.17	0.22
c ₁	—	0.15	—
θ	0°	—	8°
e	—	0.5	—
x	—	—	0.08
y	—	—	0.10
Z _D	—	1.25	—
Z _E	—	1.25	—
L	0.3	0.5	0.7
L ₁	—	1.0	—

Electrical Characteristics

Characteristic	Units	Min	Max
VCC Range	VDC	3.3	5
Current Draw (Sleep mode)	mA		10
Current Draw (Idle)	mA		20
Current Draw (maximum)	mA		50
I/O Voltages	VDC	0	5
I/O Logic	TTL		
Individual I/O Sink / Source	mA		3
Total I/O Sink / Source	mA		45
Temperature Range	C	-20	+75

Warranty

Basic Micro warrants its products against defects in material and workmanship for a period of 90 days. If a defect is discovered, Basic Micro will, at our discretion, repair, replace, or refund the purchase price of the product in question. Contact us at support@basicmicro.com. No returns will be accepted without the proper authorization.

Copyrights and Trademarks

Copyright© 2010 by Basic Micro, Inc. All rights reserved. PICmicro® is a trademark of Microchip Technology, Inc. The Basic Atom and Basic Micro are registered trademarks of Basic Micro Inc. Other trademarks mentioned are registered trademarks of their respective holders.

Disclaimer

Basic Micro cannot be held responsible for any incidental, or consequential damages resulting from use of products manufactured or sold by Basic Micro or its distributors. No products from Basic Micro should be used in any medical devices and/or medical situations. No product should be used in a life support situation.

Contacts

Email: sales@basicmicro.com
Tech support: support@basicmicro.com
Web: <http://www.basicmicro.com>

Discussion List

A web based discussion board is maintained at <http://www.basicmicro.com>.

Technical Support

Technical support is made available by sending an email to support@basicmicro.com. All email will be answered within 48 hours. All general syntax and programming questions, unless deemed to be a software issue, will be referred to the on-line discussion forums.