

### FEATURES

- Low Supply Voltage Range: 1.8 V to 3.6 V
- Ultralow-Power Consumption:
  - Active Mode: 160 μA at 1 MHz, 2.2 V
  - Standby Mode: 0.9 μA
  - Off Mode (RAM Retention) : 0.1 µA
- Contains Frequency-Hopping Firmware for Dolphin Reference Design
- Firmware Resides in ROM-Based Program Memory and is Fixed
- Simple UART Interface to an External Host/System Microcontroller
- Pre-Defined Protocol for Communication with an External Host/System Microcontroller

- Five Power-Saving Modes
- Wake-Up From Standby Mode in less than 6 µs
- 16-Bit RISC Architecture, 125-ns Instruction Cycle Time
- Serial Communication Interface (USART), Software Selects Asynchronous UART or Synchronous SPI
- Available in 64-Pin Quad Flat Pack (QFP)
- For Complete Dolphin Product Description, See the Dolphin Frequency Hopping Spread Spectrum Evaluation Kit Hardware and Software User's Guide (SLLU090)

### DESCRIPTION

The DBB03 is a baseband ASIC for the "Dolphin" reference design. The firmware for the Dolphin reference design resides in the ROM-based program memory of the DBB03, and thus can be readily interfaced with a TRF6903 single-chip RF Transceiver to generate a frequency hopping wireless UART "Dolphin" reference design chipset. This is illustrated in Figure 1.

The DBB03 baseband ASIC in addition to being a RF baseband processor is also responsible for communications with an external host/system micrcontroller. In a typical end user application, the Dolphin chipset will be connected up to an external host/system microcontroller that will send configuration messages, RF transmission messages into the Dolphin chipset, or receive status, RF messages received from the Dolphin chipset.

Any catalog low-cost host/system microcontroller can be interfaced to the Dolphin chipset as long as the Dolphin host interface protocol for communication is adhered to. (See Application Note Dolphin - Frequency Hopping Spread Spectrum Chipset Host Interface Protocol TI Literature SWRA043) Texas Instruments recommends its ultra-low power MSP430 series of microcontrollers to interface with Dolphin.

The interface between the DBB03 baseband ASIC and an external host/system microcontroller is a simple UART consisting of RX and TX data lines. (See Application Note *Interfacing Dolphin to an External System Microcontroller*, TI Literature SWRA045).



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

SWRS027B-DECEMBER 2004-REVISED MARCH 2005



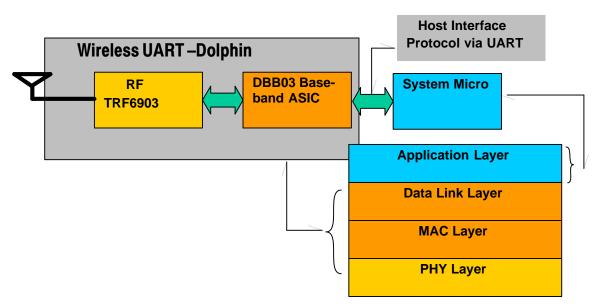


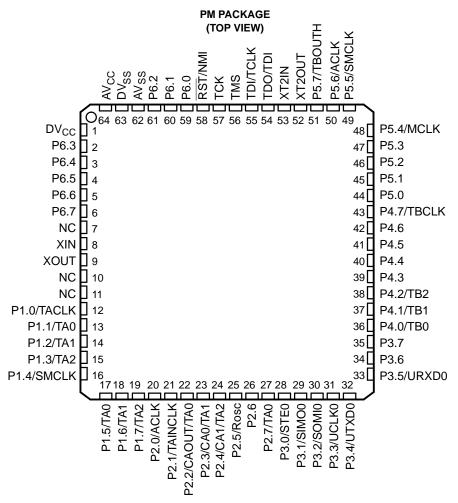
Figure 1. DBB03 - Baseband ASIC for the Dolphin Chipset

The Wireless UART Dolphin chipset is a true Data-In/RF-out and RF-in/Data-out solution with all aspects of data management and frequency hopping implemented in firmware residing on the DBB03. As illustrated in Figure 1, the DBB03 baseband ASIC contains the complete firmware for Dolphin (PHYsical, MAC and the Data Link layer), while the application layer protocol is handled by the external Host/System Microcontroller.

### **AVAILABLE OPTIONS**

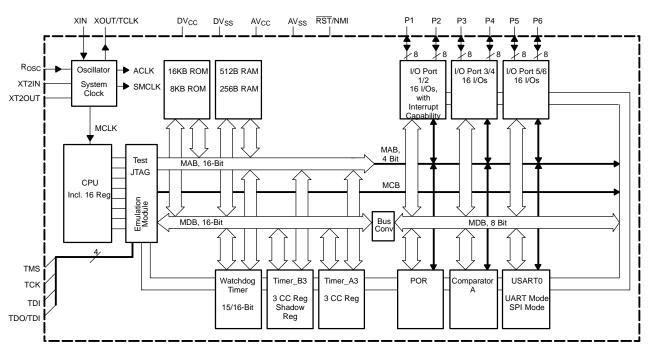
T <sub>A</sub>	PACKAGE	ORDER NUMBER
-40°C to 85°C	Plastic 64-pin QFP (PM)	DBB03 IPM





NC – No internal connection

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### FUNCTIONAL BLOCK DIAGRAMS: DBB03

### **DEVICE INFORMATION**

### **TERMINAL FUNCTIONS**

TERMINAL							
NAME	NO.	I/O	DESCRIPTION				
AV <sub>CC</sub>	64		Supply voltage, positive terminal. AV <sub>CC</sub> and DV <sub>CC</sub> are internally connected together.				
AV <sub>SS</sub>	64		Supply voltage, negative terminal. $AV_{SS}$ and $DV_{SS}$ are internally connected together.				
DV <sub>CC</sub>	1		Supply voltage, positive terminal. AV <sub>CC</sub> and DV <sub>CC</sub> are internally connected together.				
DV <sub>SS</sub>	63		Supply voltage, negative terminal. $AV_{SS}$ and $DV_{SS}$ are internally connected together.				
P1.0/TACLK	12	I/O	General-purpose digital I/O pin/Timer_A, clock signal TACLK input				
P1.1/TA0	13	I/O	General-purpose digital I/O pin/Timer_A, capture: CCI0A input, compare: Out0 output				
P1.2/TA1	14	I/O	General-purpose digital I/O pin/Timer_A, capture: CCI1A input, compare: Out1 output				
P1.3/TA2	15	I/O	General-purpose digital I/O pin/Timer_A, capture: CCI2A input, compare: Out2 output				
P1.4/SMCLK	16	I/O	General-purpose digital I/O pin/SMCLK signal output				
P1.5/TA0	17	I/O	General-purpose digital I/O pin/Timer_A, compare: Out0 output				
P1.6/TA1	18	I/O	General-purpose digital I/O pin/Timer_A, compare: Out1 output				
P1.7/TA2	19	I/O	General-purpose digital I/O pin/Timer_A, compare: Out2 output				
P2.0/ACLK	20	I/O	General-purpose digital I/O pin/ACLK output				
P2.1/TAINCL K	21	I/O	General-purpose digital I/O pin/Timer_A, clock signal at INCLK				
P2.2/CAOUT/ TA0	22	I/O	General-purpose digital I/O pin/Timer_A, capture: CCI0B input/Comparator_A output				
P2.3/CA0/TA 1	23	I/O	General-purpose digital I/O pin/Timer_A, compare: Out1 output/Comparator_A input				
P2.4/CA1/TA 2	24	I/O	General-purpose digital I/O pin/Timer_A, compare: Out2 output/Comparator_A input				
P2.5/R <sub>OSC</sub>	25	I/O	General-purpose digital I/O pin/input for external resistor defining the DCO nominal frequency				
P2.6	26	I/O	General-purpose digital I/O pin				

## **DEVICE INFORMATION (continued)**

## **TERMINAL FUNCTIONS (continued)**

TERMINAL NAME NO.			DECODIDATION			
		I/O	DESCRIPTION			
P2.7/TA0	27	I/O	General-purpose digital I/O pin/Timer_A, compare: Out0 output			
P3.0/STE0	28	I/O	General-purpose digital I/O pin/slave transmit enable - USART0/SPI mode			
P3.1/SIMO0	29	I/O	General-purpose digital I/O pin/slave in/master out of USART0/SPI mode			
P3.2/SOMI0	30	I/O	General-purpose digital I/O pin/slave out/master in of USART0/SPI mode			
P3.3/UCLK0	31	I/O	General-purpose digital I/O pin/external clock input - USART0/UART or SPI mode, clock output - USART0/SPI mode			
P3.4/UTXD0	32	I/O	General-purpose digital I/O pin/transmit data out - USART0/UART mode			
P3.5/URXD0	33	I/O	General-purpose digital I/O pin/receive data in - USART0/UART mode			
P3.6	34	I/O	General-purpose digital I/O pin			
P3.7	35	I/O	General-purpose digital I/O pin			
P4.0/TB0	36	I/O	General-purpose digital I/O pin/Timer_B, capture: CCI0A/B input, compare: Out0 output			
P4.1/TB1	37	I/O	General-purpose digital I/O pin/Timer_B, capture: CCI1A/B input, compare: Out1 output			
P4.2/TB2	38	I/O	General-purpose digital I/O pin/Timer_B, capture: CCI2A/B input, compare: Out2 output			
P4.3	39	I/O	General-purpose digital I/O pin			
P4.4	40	I/O	General-purpose digital I/O pin			
P4.5	41	I/O	General-purpose digital I/O pin			
P4.6	42	I/O	General-purpose digital I/O pin			
P4.7/TBCLK	43	I/O	General-purpose digital I/O pin/Timer_B, clock signal TBCLK input			
P5.0	44	I/O	General-purpose digital I/O pin			
P5.1	45	I/O	General-purpose digital I/O pin			
P5.2	46	I/O	General-purpose digital I/O pin			
P5.3	47	I/O	General-purpose digital I/O pin			
P5.4/MCLK	48	I/O	General-purpose digital I/O pin/main system clock MCLK output			
P5.5/SMCLK	49	I/O	General-purpose digital I/O pin/submain system clock SMCLK output			
P5.6/ACLK	50	I/O	General-purpose digital I/O pin/auxiliary clock ACLK output			
P5.7/TBOUT H	51	I/O	General-purpose digital I/O pin/switch all PWM digital output ports to high impedance - Timer_B7 TB0 to TB2			
P6.0	59	I/O	General-purpose digital I/O pin			
P6.1	60	I/O	General-purpose digital I/O pin			
P6.2	61	I/O	General-purpose digital I/O pin			
P6.3	2	I/O	General-purpose digital I/O pin			
P6.4	3	I/O	General-purpose digital I/O pin			
P6.5	4	I/O	General-purpose digital I/O pin			
P6.6	5	I/O	General-purpose digital I/O pin			
P6.7	6	I/O	General-purpose digital I/O pin			
RST/NMI	58	I	Reset input, nonmaskable interrupt input port			
тск	57	I	Test clock. TCK is the clock input port for device programming test.			
TDI/TCLK	55	I	Test data input or test clock input. TDI is used as a data input port. The device protection fuse is connected to TDI.			
TDO/TDI	54	I/O	Test data output port. TDO/TDI data output			
TMS	56	I	Test mode select. TMS is used as an input port for device test.			
NC	7, 10, 11		No internal connection			
XIN	8	I	Input port for crystal oscillator XT1. Standard or watch crystals can be connected.			
XOUT	9	0	Output terminal of crystal oscillator XT1			
XT2IN	53	I	Input port for crystal oscillator XT2. Only standard crystals can be connected.			
XT2OUT	52	0	Output terminal of crystal oscillator XT2			





11-Apr-2013

## PACKAGING INFORMATION

Orderable Device	Status	Package Type	e Package	Pins	Package	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
	(1)		Drawing		Qty	(2)		(3)		(4)	
DBB03IPM	NRND	LQFP	PM	64		TBD	Call TI	Call TI	-40 to 85	DBB03	
DBB03IPMR	NRND	LQFP	PM	64		TBD	Call TI	Call TI	-40 to 85		

<sup>(1)</sup> The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes. **Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between

the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) Multiple Top-Side Markings will be inside parentheses. Only one Top-Side Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Top-Side Marking for that device.

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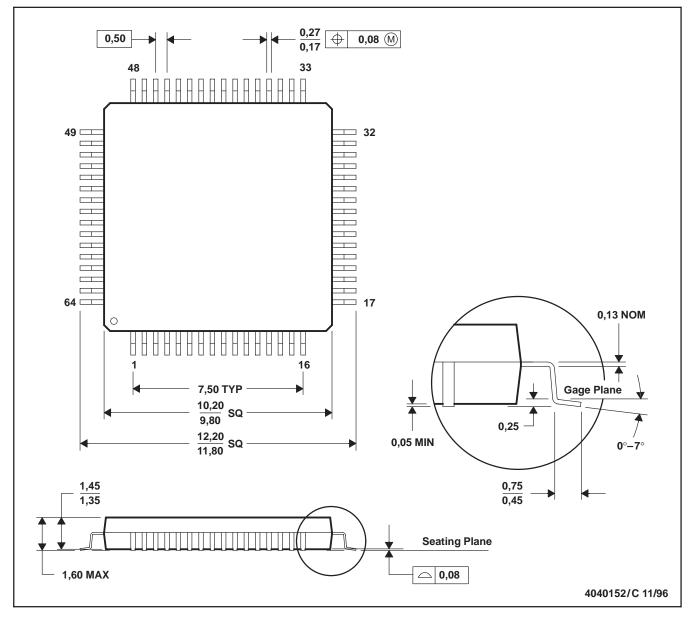
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# **MECHANICAL DATA**

MTQF008A - JANUARY 1995 - REVISED DECEMBER 1996

### PM (S-PQFP-G64)

#### PLASTIC QUAD FLATPACK



NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Falls within JEDEC MS-026
- D. May also be thermally enhanced plastic with leads connected to the die pads.



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