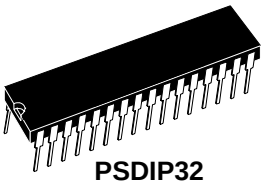
ST7263B

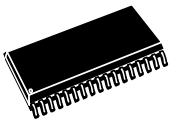
LOW SPEED USB 8-BIT MCU FAMILY WITH FLASH/ROM, UP TO 512 BYTES RAM, 8-BIT ADC, WDG, TIMER, SCI & I²C

DATA BRIEFING

- **Memories**
  - 4, 8 or 16 Kbytes Program Memory (Flash or ROM) with Readout and Write Protection
  - In-Application Programming (IAP) and In-Circuit programming (ICP) for Flash devices
  - 384 or 512 bytes RAM memory (128-byte stack)
- **Clock, Reset and Supply Management**
  - Run, Wait, Slow and Halt CPU modes
  - 12 or 24 MHz Oscillator
  - RAM Retention mode
  - Optional Low Voltage Detector (LVD)
- **USB (Universal Serial Bus) Interface**
  - DMA for low speed applications compliant with USB 1.5 Mbs (version 1.1) and HID specifications (version 1.0)
  - Integrated 3.3 V voltage regulator and transceivers
  - Suspend and Resume operations
  - 3 Endpoints with programmable In/Out configuration
- **31 I/O Ports**
  - 8 high sink I/Os (10 mA at 1.3 V)
  - 2 very high sink true open drain I/Os (25 mA at 1.5 V)
  - 8 lines individually programmable as interrupt inputs
- **2 Timers**
  - Programmable Watchdog
  - 16-bit Timer with 2 Input Captures, 2 Output Compares, PWM output and clock input
- **2 Communications Interfaces**
  - Asynchronous Serial Communications Interface (on K4 and K2 versions only)



PSDIP32



SO34 (Shrink)

  - I²C Multi Master Interface up to 400 kHz (on K4 versions only)
- **1 Analog Peripheral**
  - 8-bit A/D Converter (ADC) with 8 channels
- **Instruction Set**
  - 63 basic instructions
  - 17 main addressing modes
  - 8x8 unsigned multiply instruction
  - True bit manipulation
- **Development Tools**
  - Versatile Development Tools (under Windows) including assembler, linker, C-compiler, archiver, source level debugger, software library, hardware emulator, programming boards and gang programmers

Table 1. Device Summary

Features	ST72F63BK4	ST7263BK2	ST7263BK1
Program Memory -bytes-	16K (Flash)	8K (Flash or ROM)	4K (Flash or ROM)
RAM (stack) - bytes	512 (128)	384 (128)	
Peripherals	Watchdog timer, 16-bit timer, SCI, I²C, ADC, USB	Watchdog timer, 16-bit timer, SCI, ADC, USB	Watchdog, 16-bit timer, ADC, USB
Operating Supply	4.0 V to 5.5 V		
CPU frequency	8 MHz (with 24 MHz oscillator) or 4 MHz (with 12 MHz oscillator)		
Operating temperature	0 °C to +70 °C		
Packages	SO34/SDIP32		

Rev. 1.2

1 INTRODUCTION

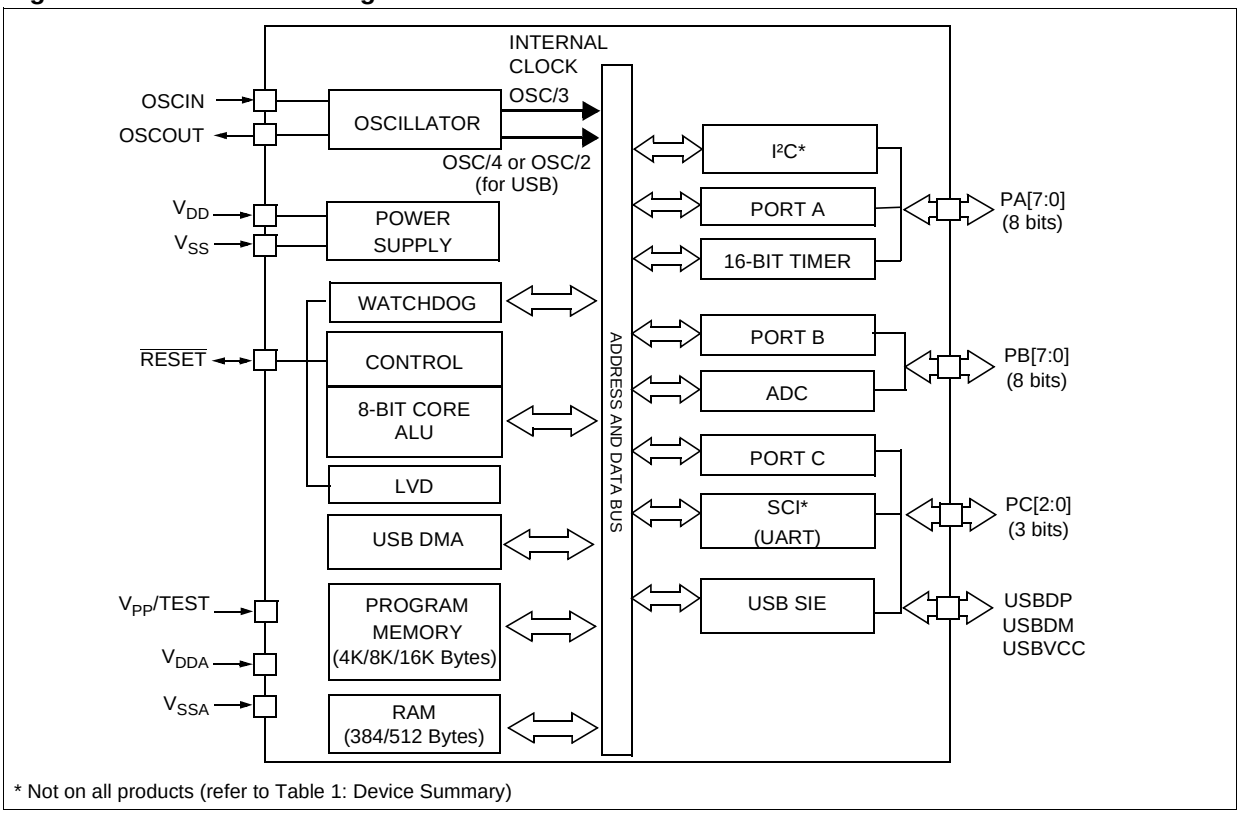
The ST7263B Microcontrollers form a sub-family of the ST7 MCUs dedicated to USB applications. The devices are based on an industry-standard 8-bit core and feature an enhanced instruction set. They operate at a 24 MHz or 12 MHz oscillator frequency. Under software control, the ST7263B MCUs may be placed in either Wait or Halt modes, thus reducing power consumption. The enhanced instruction set and addressing modes afford real programming potential. In addition to standard 8-bit data management, the ST7263B MCUs feature true bit manipulation, 8x8 unsigned multiplication and indirect addressing modes. The devices include an ST7 Core, up to 16 Kbytes of program memory, up to 512 bytes of RAM, 19 I/O lines and the following on-chip peripherals:

– USB low speed interface with 3 endpoints with programmable in/out configuration using the DMA architecture with embedded 3.3V voltage regulator and transceivers (no external components are needed).
– 8-bit Analog-to-Digital converter (ADC) with 8 multiplexed analog inputs
– Industry standard asynchronous SCI serial interface (not on all products - see Table 1 Device Summary)
– Watchdog
– 16-bit Timer featuring an External clock input, 2 Input Captures, 2 Output Compares with Pulse Generator capabilities
– Fast I²C Multi Master interface (not on all products - see device summary)
– Low voltage reset (LVD) ensuring proper power-on or power-off of the device

All ST7263B MCUs are available in ROM or Flash versions.

Flash devices support programming in IAP mode (In-application programming) via the on-chip USB interface.

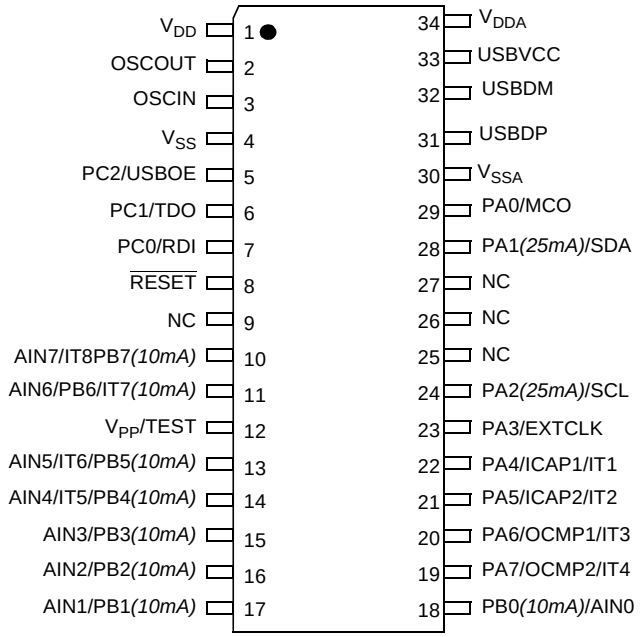
Figure 1. General Block Diagram



* Not on all products (refer to Table 1: Device Summary)

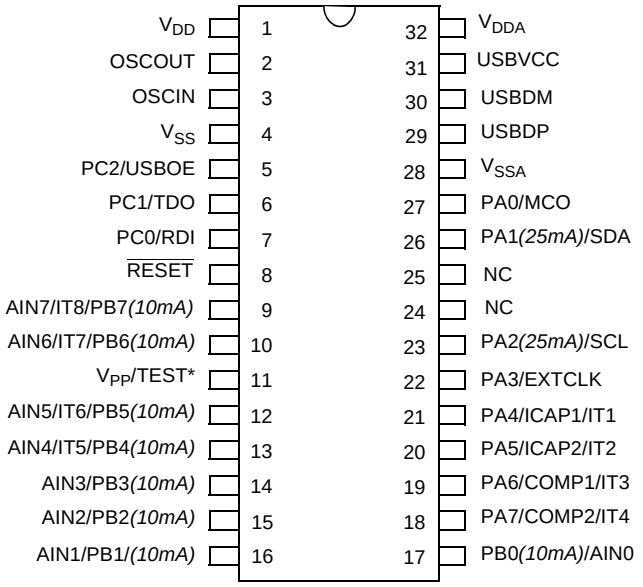
2 PIN DESCRIPTION

Figure 2. 34-Pin SO Package Pinout



* V_{PP} on Flash versions only

Figure 3. 32-Pin SDIP Package Pinout



* V_{PP} on Flash versions only

PIN DESCRIPTION (Cont'd)

$\overline{\text{RESET}}$ (see Note 1): Bidirectional. This active low signal forces the initialization of the MCU. This event is the top priority non maskable interrupt. This pin is switched low when the Watchdog is triggered or the V_{DD} is low. It can be used to reset external peripherals.

OSCIN/OSCOUT: Input/Output Oscillator pin. These pins connect a parallel-resonant crystal, or an external source, to the on-chip oscillator.

V_{DD}/V_{SS} (see Note 2): Main Power Supply and Ground voltages.

V_{DDA}/V_{SSA} (see Note 2): Power Supply and Ground voltages for analog peripherals.

Alternate Functions: Several pins of the I/O ports assume software programmable alternate functions as shown in the pin description.

Note 1: Adding two 100 nF decoupling capacitors on the Reset pin (respectively connected to V_{DD} and V_{SS}) will significantly improve product electromagnetic susceptibility performance.

Note 2: To enhance the reliability of operation, it is recommended that V_{DDA} and V_{DD} be connected together on the application board. This also applies to V_{SSA} and V_{SS}.

Table 2. Device Pin Description

Pin n°		Pin Name	Type	Level		Port / Control						Main Function (after reset)	Alternate Function
						Input				Output			
SDIP32	SO34			Input	Output	float	wpu	int	ana	OD	PP		
1	1	V_{DD}	S									Power supply voltage (4V - 5.5V)	
2	2	OSCOUT	O									Oscillator output	
3	3	OSCIN	I									Oscillator input	
4	4	V_{SS}	S									Digital ground	
5	5	PC2/USBOE	I/O	C_T			**X**				X	**Port C2**	USB Output Enable
6	6	PC1/TDO	I/O	C_T			**X**				X	**Port C1**	SCI Transmit Data Output*
7	7	PC0/RDI	I/O	C_T			**X**				X	**Port C0**	SCI Receive Data Input*
8	8	RESET	I/O				**X**			X		Reset	
--	9	NC	--									Not connected	
9	10	PB7/AIN7/IT8	I/O	C_T	10mA	**X**		X	X		X	**Port B7**	ADC analog input 7
10	11	PB6/AIN6/IT7	I/O	C_T	10mA	**X**		X	X		X	**Port B6**	ADC analog input 6
11	12	V_{PP}/TEST	S									Programming supply	
12	13	PB5/AIN5/IT6	I/O	C_T	10mA	**X**		X	X		X	**Port B5**	ADC analog input 5
13	14	PB4/AIN4/IT5	I/O	C_T	10mA	**X**		X	X		X	**Port B4**	ADC analog input 4
14	15	PB3/AIN3	I/O	C_T	10mA	**X**			X		X	**Port B3**	ADC analog input 3
15	16	PB2/AIN2	I/O	C_T	10mA	**X**			X		X	**Port B2**	ADC analog input 2
16	17	PB1/AIN1	I/O	C_T	10mA	**X**			X		X	**Port B1**	ADC analog input 1
17	18	PB0/AIN0	I/O	C_T	10mA	**X**			X		X	**Port B0**	ADC Analog Input 0
18	19	PA7/OCMP2/IT4	I/O	C_T			**X**	X			X	**Port A7**	Timer Output Compare 2
19	20	PA6/OCMP1/IT3	I/O	C_T			**X**	X			X	**Port A6**	Timer Output Compare 1
20	21	PA5/ICAP2/IT2	I/O	C_T			**X**	X			X	**Port A5**	Timer Input Capture 2
21	22	PA4/ICAP1/IT1	I/O	C_T			**X**	X			X	**Port A4**	Timer Input Capture 1

Pin n°		Pin Name	Type	Level		Port / Control						Main Function (after reset)	Alternate Function
						Input				Output			
SDIP32	SO34			Input	Output	float	wpu	int	ana	OD	PP		
22	23	PA3/EXTCLK	I/O	C_T			**X**				X	**Port A3**	Timer External Clock
23	24	PA2/SCL	I/O	C_T	25mA	**X**				T		**Port A2**	I²C serial clock*
--	25	NC	--									Not connected	
24	26	NC	--									Not connected	
25	27	NC	--									Not connected	
26	28	PA1/SDA	I/O	C_T	25mA	**X**				T		**Port A1**	I²C serial data*
27	29	PA0/MCO	I/O	C_T				X			X	**Port A0**	Main Clock Output
28	30	V_{SSA}	S									Analog ground	
29	31	USBDP	I/O									USB bidirectional data (data +)	
30	32	USBDM	I/O									USB bidirectional data (data -)	
31	33	USBVCC	O									USB power supply	
32	34	V_{DDA}	S									Analog supply voltage	

Note (*): if the peripheral is present on the device (see Table 1, "Device Summary")

Legend / Abbreviations for Table 2**:**

Type: I = input, O = output, S = supply

In/Output level: C_T = CMOS $0.3V_{DD}/0.7V_{DD}$ with input trigger

Output level: 10mA = 10mA high sink (on N-buffer only)

25mA = 25mA very high sink (on N-buffer only)

Port and control configuration:

– Input: float = floating, wpu = weak pull-up, int = interrupt, ana = analog

– Output: OD = open drain, PP = push-pull, T = True open drain

The RESET configuration of each pin is shown in **bold**. This configuration is kept as long as the device is under reset state.

Notes:

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