

STM32 F3 series Cortex-M4 MCUs Releasing your creativity





STM32 F3 series

32-bit MCUs with DSP instructions and FPU plus optimum analog integration to complement STM32 F1 and F4 series

The STM32 F3 series of microcontrollers combines a 32-bit ARM® Cortex™-M4 core with DSP and FPU instructions running at 72 MHz with advanced analog peripherals for more flexibility at a competitive cost.

The STM32 F3 series innovates in embedded digital signal control (DSC) design by combining a Cortex-M4 core with fast 12-bit, 5 MSPS and precise 16-bit sigma-delta ADCs, programmable gain amplifiers, fast comparators and versatile time control units, giving optimum integration.

The STM32 F3 series supports the STM32 F1 series, keeping pinout compatibility, and enlarges the STM32's Cortex-M4 portfolio, which now offers both entry-level cost with the F3 series and highest performance with the F4 series. The full STM32 portfolio now covers more than 350 devices.

The STM32 F3 series includes devices with 64 to 256 Kbytes of on-chip Flash memory, and up to 48 Kbytes of SRAM. WLCSP66 (< 4.3 x 4.3 mm), LQFP48, LQFP64, LQFP100, UFBGA100 packages are available.

STM32 F3 PRODUCT LINES

Both product lines include:

2



Abbreviations:

FS:	full speed
AMC:	advanced motor control
SDIO:	secure digital input/output
FPU:	floating point unit

DSC:	digital signal controller
SAR:	successive approximation register
BOR:	brown-out reset
PVD:	power voltage detector

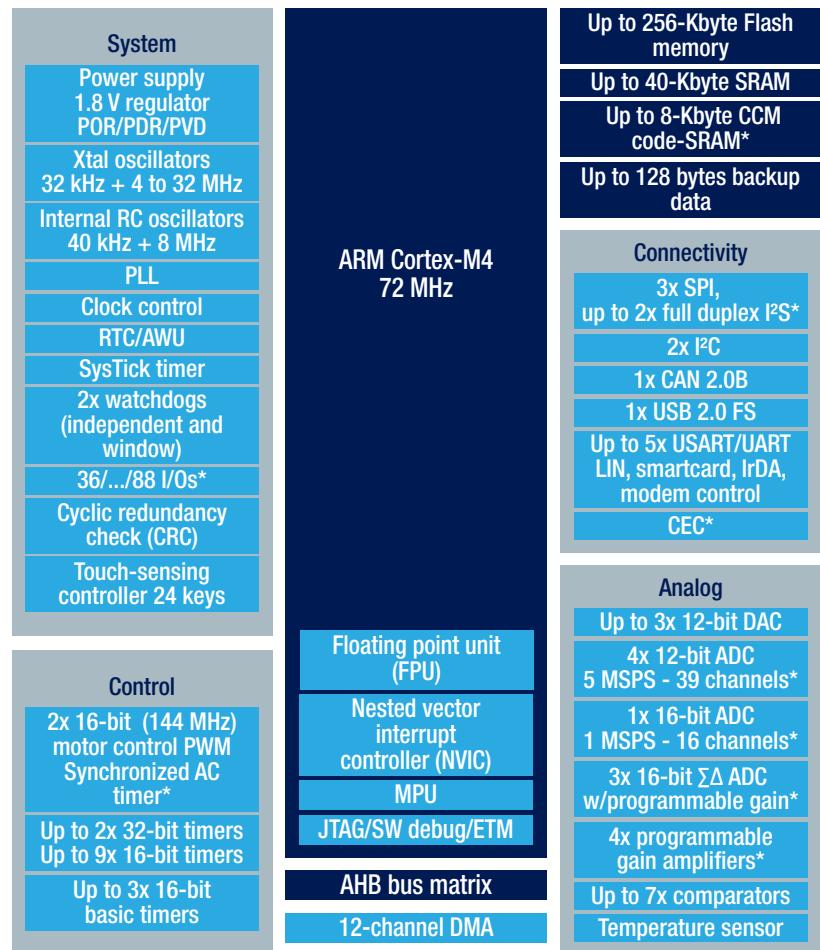
MPU:	memory protection unit
CEC:	consumer electronic control
ETM:	Embedded Trace Macrocell

FEATURES AND BENEFITS

Features	Benefits
Performance 72 MHz/62 DMIPS (from Flash) or 94 DMIPS (from CCM-SRAM*) Cortex-M4 with single cycle DSP MAC and floating point unit	<ul style="list-style-type: none"> Boosted execution of control algorithms More features possible for your applications Ease of use Better code efficiency Faster time to market Elimination of scaling and saturation Easier support for meta-language tools
Real-time performance <ul style="list-style-type: none"> CCM-SRAM* (core coupled memory): 8 Kbytes of SRAM mapped to the instruction bus; critical routines loaded in the 8-Kbyte CCM at startup can be completed at full speed with zero wait states, achieving 94 Dhrystone MIPS and CoreMark score 155 at 72 MHz SRAM and CCM-SRAM with parity bit 32-bit, AHB bus matrix DMA controllers Memory protection unit (MPU) 	More performance for critical routines with zero-wait state execution from safe CCM-SRAM
Outstanding power efficiency <ul style="list-style-type: none"> Stop mode down to 5.1 μA typ RTC down to 0.5 μA typ in V_{BAT} mode 2.0 to 3.6 V or 1.8 V +/-8% power supply range 	<ul style="list-style-type: none"> Flexibility to reduce power consumption for applications requiring advanced analog peripherals and low-power modes Running at low voltage or on a rechargeable battery
Maximum integration Up to 256 Kbytes of on-chip Flash memory, up to 48 Kbytes of SRAM, reset circuit, internal RCs, PLLs, WLCSP package available	More features in space-constrained applications
Superior and innovative peripherals <ul style="list-style-type: none"> Analog: 4x 12-bit ADC 5 MSPS* reaching 18 MSPS in interleaved mode, 3x 16-bit sigma-delta* ADC up to 50 KSPS, fast comparators* (50 ns), programmable gain amplifiers* (4 gains, 1% accuracy), 12-bit DACs Up to 17 timers: 16 and 32 bits running up to 144 MHz* Audio: simplex or full duplex I²S interfaces* Up to 12 communication interfaces including 5x USART (9 Mbit/s), 3x SPI/I²S (18 Mbit/s), 2x I²C (1 MHz fast mode plus), CAN (1 Mbit/s), USB full speed Consumer electronic control (CEC)* Cyclic redundancy check (CRC) RTC/AWU Capacitive touch sensing (24 keys) 	<ul style="list-style-type: none"> Full set of integration features on chip resulting in simplified board designs and fewer external components BOM cost reduced
STM32 Compatibility Pin compatibility and same API for peripherals as F1 series	<ul style="list-style-type: none"> More than 350 Cortex-M based compatible STM32 devices More than 70 Cortex-M4 based compatible STM32 devices Digital signal processing (DSP) capability at competitive price

Note: *Product dependent

STM32 F3 BLOCK DIAGRAM



Note: *Product dependent



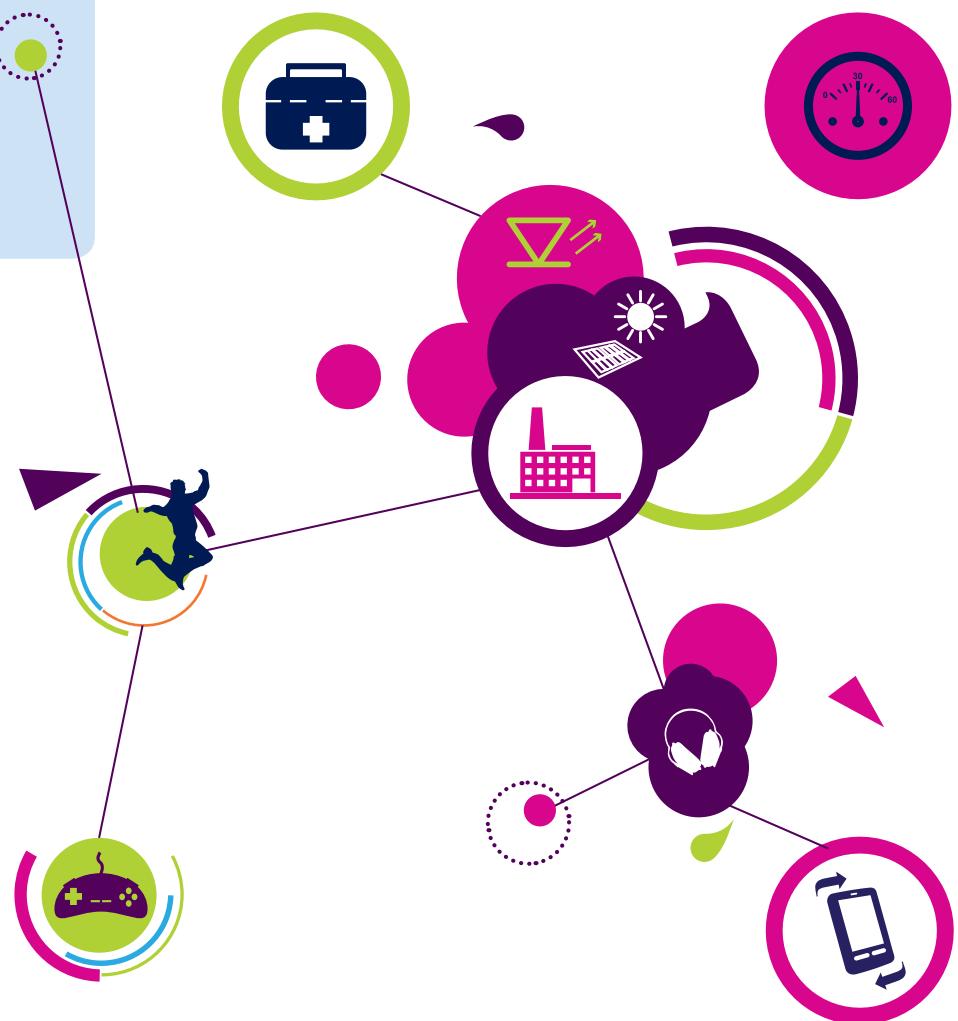


STM32 F3 applications

KEY FOCUS AREAS

- Digital signal control
- Home appliances
 - Dual/single advanced motor control
- Medical
 - Portable devices
- Consumer
 - Gaming
 - Entry level audio
 - Biometric sensors
 - Portable fitness
- Industrial
 - Metering
 - Solar microinverter
- Digital power conversion
 - Entry-level digital power supplies (DSMPS)
- LED lighting

5



STM32 F3 SERIES - ARM CORTEX™-M4 MIXED-SIGNAL MCUS WITH DSP AND FPU

Part number	Flash size (Kbytes)	Internal RAM size (Kbytes)	Package	Timer functions			ADC 16-bit/ 12-bit	DAC	I/Os	Serial interface	Supply voltage (V)	Supply current (I _{cc})		Operating temperature (°C)	
				16-bit timers	32-bit timers	Others						Lowest power mode (µA)	Run mode (per MHz) (µA)		
STM32F302/303/313 line – 72 MHz with 8-Kbyte CCM-SRAM and 12-bit ADC (5 MSPS)															
STM32F302GB	128	32	LQFP48	8x16-bit	1x32-bit		SysTick, 2 x WDG, RTC	9x12-bit	1x12-bit	37	3xSPI, 2xI ² C, 5xUSART (IrDA, ISO 7816), 1xUSB, 1xCAN	2.0 to 3.6	1.1	416	-40 to +85 or -40 to +105
STM32F302RB	128	32	LQFP64	8x16-bit	1x32-bit			16x12-bit	1x12-bit	53		2.0 to 3.6			
STM32F302VB	128	32	LQFP100	8x16-bit	1x32-bit			17x12-bit	1x12-bit	88		2.0 to 3.6			
STM32F303CB	128	40	LQFP48	9x16-bit	1x32-bit			15x12-bit	2x12-bit	37		2.0 to 3.6			
STM32F303RB	128	40	LQFP64	9x16-bit	1x32-bit			22x12-bit	2x12-bit	53		2.0 to 3.6			
STM32F303VB	128	40	LQFP100	9x16-bit	1x32-bit			39x12-bit	2x12-bit	88		2.0 to 3.6			
STM32F302CC	256	40	LQFP48	8x16-bit	1x32-bit			9x12-bit	1x12-bit	37		2.0 to 3.6			
STM32F302RC	256	40	LQFP64	8x16-bit	1x32-bit			16x12-bit	1x12-bit	53		2.0 to 3.6			
STM32F302VC	256	40	LQFP100	8x16-bit	1x32-bit			17x12-bit	1x12-bit	88		2.0 to 3.6			
STM32F303CC	256	48	LQFP48	9x16-bit	1x32-bit			15x12-bit	2x12-bit	37		2.0 to 3.6			
STM32F303RC	256	48	LQFP64	9x16-bit	1x32-bit			22x12-bit	2x12-bit	53		2.0 to 3.6			
STM32F303VC	256	48	LQFP100	9x16-bit	1x32-bit			39x12-bit	2x12-bit	88		2.0 to 3.6			
STM32F313CC	256	48	LQFP48	9x16-bit	1x32-bit			15x12-bit	2x12-bit	37		1.65 to 1.95	5.1	399	-40 to +85 or -40 to +105
STM32F313RC	256	48	LQFP64	9x16-bit	1x32-bit			22x12-bit	2x12-bit	53		1.65 to 1.95			
STM32F313VC	256	48	LQFP100	9x16-bit	1x32-bit			39x12-bit	2x12-bit	88		1.65 to 1.95			
STM32F372/373/383 line – 72 MHz with 16-bit ΣΔ ADC															
STM32F372C8	64	16	LQFP48	9x16-bit	2x32-bit		SysTick, 2 x WDG, RTC	5x16-bit/ 9x12-bit	1x12-bit	36	2xSPI, 2xI ² C, 3xUSART (IrDA, ISO 7816), 1xUSB, 1xCAN	2.0 to 3.6	1.2	430	-40 to +85 or -40 to +105
STM32F372R8	64	16	LQFP64	9x16-bit	2x32-bit			5x16-bit/ 16x12-bit	1x12-bit	52		2.0 to 3.6			
STM32F372V8	64	16	LQFP100	9x16-bit	2x32-bit			9x16-bit/ 16x12-bit	1x12-bit	84		2.0 to 3.6			
STM32F373C8	64	16	LQFP48	9x16-bit	2x32-bit			8x16-bit/ 9x12-bit	3x12-bit	36		2.0 to 3.6			
STM32F373R8	64	16	LQFP64	9x16-bit	2x32-bit			8x16-bit/ 16x12-bit	3x12-bit	52		2.0 to 3.6			
STM32F373V8	64	16	LQFP100	9x16-bit	2x32-bit			21x16-bit/ 16x12-bit	3x12-bit	84		2.0 to 3.6			
STM32F372CB	128	24	LQFP48	9x16-bit	2x32-bit			5x16-bit/ 9x12-bit	1x12-bit	36		2.0 to 3.6			
STM32F372RB	128	24	LQFP64	9x16-bit	2x32-bit			5x16-bit/ 16x12-bit	1x12-bit	52		2.0 to 3.6			
STM32F372VB	128	24	LQFP100	9x16-bit	2x32-bit			9x16-bit/ 16x12-bit	1x12-bit	84		2.0 to 3.6	6.0	400	-40 to +85 or -40 to +105
STM32F373CB	128	24	LQFP48	9x16-bit	2x32-bit			8x16-bit/ 9x12-bit	3x12-bit	36		2.0 to 3.6			
STM32F373RB	128	24	LQFP64	9x16-bit	2x32-bit			8x16-bit/ 16x12-bit	3x12-bit	52		2.0 to 3.6			
STM32F373VB	128	24	LQFP100	9x16-bit	2x32-bit			21x16-bit/ 16x12-bit	3x12-bit	84		2.0 to 3.6			
STM32F373VC	128	24	LQFP100	9x16-bit	2x32-bit			5x16-bit/ 9x12-bit	3x12-bit	36		2.0 to 3.6	6.0	400	-40 to +85 or -40 to +105
STM32F372CC	256	32	LQFP48	9x16-bit	2x32-bit			5x16-bit/ 16x12-bit	1x12-bit	36		2.0 to 3.6			
STM32F372RC	256	32	LQFP64	9x16-bit	2x32-bit			5x16-bit/ 16x12-bit	1x12-bit	52		2.0 to 3.6			
STM32F372VC	256	32	LQFP100	9x16-bit	2x32-bit			9x16-bit/ 16x12-bit	1x12-bit	84		2.0 to 3.6			
STM32F373CC	256	32	LQFP48	9x16-bit	2x32-bit			8x16-bit/ 9x12-bit	3x12-bit	36		2.0 to 3.6	6.0	400	-40 to +85 or -40 to +105
STM32F373RC	256	32	LQFP64	9x16-bit	2x32-bit			8x16-bit/ 16x12-bit	3x12-bit	52		2.0 to 3.6			
STM32F373VC	256	32	LQFP100	9x16-bit	2x32-bit			21x16-bit/ 16x12-bit	3x12-bit	84		2.0 to 3.6			
STM32F383CC	256	32	LQFP48	9x16-bit	2x32-bit		2xSPI, 2xI ² C, 3xUSART (IrDA, ISO 7816), 1xCAN	8x16-bit/ 9x12-bit	3x12-bit	36	2xSPI, 2xI ² C, 3xUSART (IrDA, ISO 7816), 1xCAN	1.65 to 1.95	6.0	400	-40 to +85 or -40 to +105
STM32F383RC	256	32	LQFP64	9x16-bit	2x32-bit			8x16-bit/ 16x12-bit	3x12-bit	52		1.65 to 1.95			
STM32F383VC	256	32	LQFP100	9x16-bit	2x32-bit			21x16-bit/ 16x12-bit	3x12-bit	84		1.65 to 1.95			

Notes:

- Supply voltage 2.0 to 3.6 V for all devices or 1.8 V +/-8% dedicated sales type
- WLCSP6 package available in 1.8 V +/-8% dedicated sales type only



Development tools

A complete offer of development tools is available, including the following kits and evaluation boards:

- Low-cost STM32F3-Discovery kit featuring an STM32F30x MCU, ST's MEMS 3-axis digital output gyroscope and e-compass (3D digital linear accelerometer and 3D digital magnetic sensor).
- Two full-featured boards for demonstration and evaluation purposes:
 - STM32F303 line: STM32F303VCT6 MCU with two inductor-motor-control 34-pin connectors, a humidity sensor, 1-Mbit SPI, serial Flash (order code: STM32F303C-EVAL*)
 - STM32F373 line: STM32F373VCT6 MCU with ECG (electrocardiogram) sensor, pressure sensor and PT100 temperature sensor connected to the 3 16-bit sigma-delta ADCs, a touch slider, HDMI connectors (CEC and DDC), light dependent resistor (LDR) (order code: STM32373C-EVAL)

Both boards feature standard peripherals such as 240x320 TFT color LCD, 2 Gbyte or more byte microSD card (SPI interface), I²C compatible temperature sensor, EEPROM and RF Dual Interface EEPROM (I²C and RF), RS-232 communication and IrDA transceiver, USB FS connector, CAN 2.0A/B compliant connection, potentiometer, JTAG/SWD and ETM connectors, and an embedded ST-LINK/V2 for easy debugging and programming.

Note: * Available in Q4/2012

7



STM32F3DISCOVERY



STM32373C-EVAL

life.augmented



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