

TMS470 Microcontroller

A Complete 16-/32-Bit RISC Microcontroller
Family for Automotive Applications



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TMS470 16-/32-Bit RISC Microcontrollers for Automotive Applications

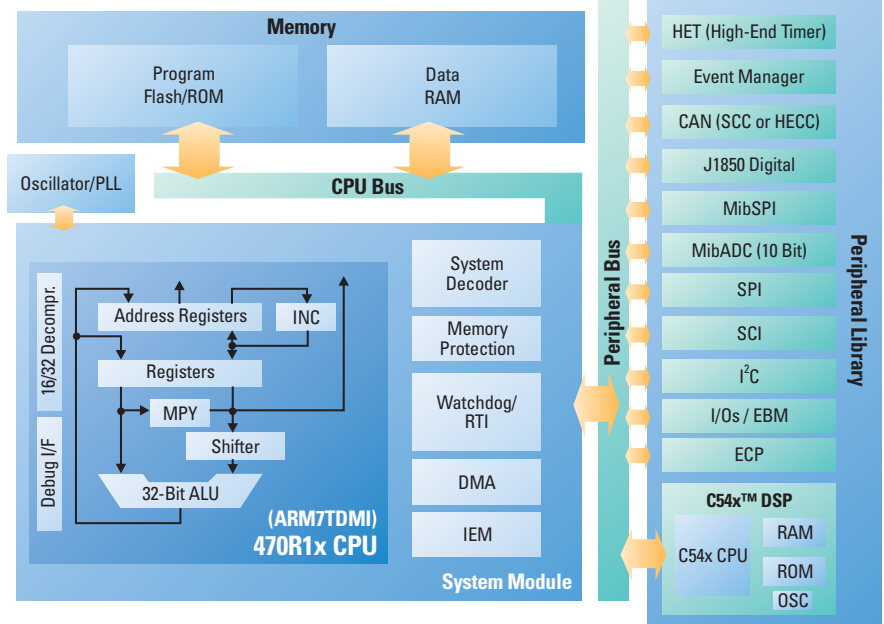
Building upon the success of TI's strong MCU history of products such as the TMS7000, TMS370 and PRISM TMS370C8/C16 families, the TMS470 family of microcontrollers was launched in 1995. Texas Instruments (TI) now offers the TMS470 family of microcontrollers, derived from the 16-/32-bit ARM7TDMI® (Thumb®), which is a core licensed by TI from Advanced RISC Machines (ARM®).

An industry standard, the ARM7TDMI design offers 16-bit code density, and excellent performance-to-power ratio. TMS470 microcontrollers are targeted for automotive applications requiring a balance of the high performance offered by a 32-bit RISC with 16-bit code density. Standard TMS470 products for the automotive industry currently are available and shipping in volume.

Highly Configurable for Fast Time-to-Market

The TMS470 microcontroller integrates Flash or read-only memory and intelligent peripherals for embedded systems, including timing coprocessors, analog-to-digital converters, multiplex

TMS470 DSP Block Diagram



The TMS470 family of products utilizes the ARM7TDMI core combined with intelligent peripherals and embedded memory to address a wide range of automotive application needs. TI offers a large selection of memory and peripheral configuration combinations which are available today and shipping in volume.

communication modules, watchdog and serial interfaces. In addition, the full suite of hardware and software development tools enables quick and easy integration into automotive applications.

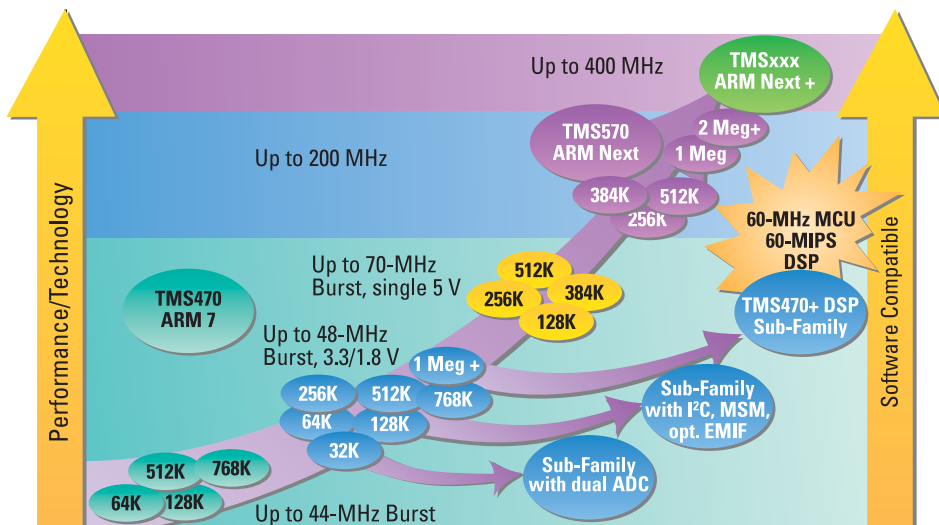
TMS470 Roadmap

The ever-expanding portfolio of the TMS470 family meets many application requirements for the automotive industry. TI's leading technology provides a configurable platform to develop the derivatives necessary to meet application and market needs.

Development Tools

The TMS470 family offers a wide range of hardware and software development tools from TI, including the award-winning Code Composer Studio™ (CCStudio) Development Tools. CCStudio Development Tools integrate a C/C++ compiler, assembler, debugger, linker and simulator all within a single development environment. Capabilities of the tools suite range from early evaluation with the simulator and low-cost evaluation modules for initial code development, up to and including full in-circuit emulation capabilities.

TMS470 Family Roadmap



The TMS470 family roadmap addresses most automotive application needs. The rich peripheral mix, embedded memory options and performance ranges up to 400 MHz offer a highly scalable roadmap, supporting a wide selection of price-performance points for your system optimization needs.

Third-Party Tools

As the TMS470 is based on the ARM7TDMI® core, there are many third parties currently supporting ARM7-based development tools including ARM® Ltd.

Operating Systems and CAN Management

There are several Real Time Operating Systems and CAN management software packages available today for the TMS470 and ARM7TDMI from Third Parties.

Texas Instruments is a member of the OSEK/VDX committee.

Operating Systems and CAN Management

Description
ERCOSEK from ETAS
ProOSEK® from 3Soft
OSEKturbo from Metrowerks
OSEK from Live Devices, RTA (Realogy Real-Time Architect)
CAN Network Management Software from Vector Informatik
osCAN from Vector Informatik

TI Development Tools

Description	Part Number
Software	
CCStudio Development Tools	TMDSCCS470-1
HET Assembler/Simulator	TMDX474H852-02
Hardware	
EVM	TMDX470R1052
In Circuit Emulator	TMDX470R1054
Target Cables	
80-Pin Cables	TMDX478R1080PN
100-Pin Cables	TMDX478R1100PZ
144-Pin Cables	TMDX478R1144PGE
176-Pin Cables	TMDX478R176PGF
XDS510PP-Plus JTAG Emulator	TMDSEMUPP
XDS510 USB JTAG/PC Emulator	TMDSEMUUSB

TMS470 Family Selection Guide

Part Number	Package	MEMORY			PERIPHERALS									
		ROM	Flash	RAM	HET [‡] Channels	A/D Channels	SPI	SCI/ LIN	Other	CAN [°]	Class II	Other	I/O 3.3 V ¹ 5.0 V ²	Max SysClk
3.3-V/1.8-V Sub-Family														
TMS470R1VC002	100 LQFP	32 KB		2.5 KB	16		1						44 ¹	20 MHz
TMS470R1VC012	48 LQFP	32 KB		10 KB		7	1			SCC			44	20 MHz
TMS470R1VF334A	80 LQFP		64 KB	4 KB	13	8	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VC334A	80 LQFP	64 KB		4 KB	13	8	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VF336A	100 LQFP		128 KB	8 KB	28	12	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VC336A	100 LQFP	128 KB		8 KB	28	12	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VF346A	100 LQFP		128 KB	8 KB	16	16	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VC346A	100 LQFP	128 KB		8 KB	16	16	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VF356	176 PBGA		128 KB	12 KB	32	16	2	1	MiBSPi*	HECC	1	DMA	144 ¹	60 MHz
TMS470R1VF338	100 LQFP		256 KB	10 KB	28	12	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VC338	100 LQFP	256 KB		10 KB	28	12	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VF348	100 LQFP		256 KB	10 KB	16	16	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VC348	100 LQFP	256 KB		10 KB	16	16	2	2		SCC	1		81 ¹	48 MHz
TMS470R1VF448	100/144 LQFP		256 KB	16 KB	32	16	1	2	MiBSPi	2 x SCC			81 ¹	64 MHz
TMS470R1VF478	176 PBGA		288 KB	16 KB	32	32	2	1	MiBSPi	1 x HECC 1 x SCC		DMA	144 ¹	60 MHz
TMS470R1VF288	100/144 LQFP		288 KB	16 KB	12	12	2	2	3 x I ² C	2 x SCC	1	DMA, EMIF	84 ¹	48 MHz
TMS470R1VF588	100 LQFP		288 KB	16 KB	12	12	2	2	3 x I ² C	2 x SCC 1 x HCC		DMA, EMIF	84 ¹	48 MHz
TMS470R1VF688	100/144 LQFP		256 KB	12 KB	12	12	2	2	3 x I ² C [†]	2 x SCC	1	DMA	84 ¹	48 MHz
TMS470R1VC688	100/144 LQFP	256 KB		12 KB	12	12	2	2	3 x I ² C	2 x SCC	1	DMA	84 ¹	48 MHz
TMS470R1VF689	100/144 LQFP		384 KB	32 KB	12	12	2	2	3 x I ² C	2 x SCC		DMA	84 ¹	48 MHz
TMS470R1VF45AA	144 LQFP		512 KB	32 KB	32	16	3	2		2 x HECC		DMA	118 ¹	60 MHz
TMS470R1VF67A	176 PBGA		512 KB	32 KB	32	32	2	1	MiBSPi	2 x HECC	1	DMA	144 ¹	60 MHz
TMS470R1VF45B	144 LQFP		768 KB	48 KB	32	16	3	2		2 x HECC		DMA	118 ¹	60 MHz
TMS470R1VF55BA	144 LQFP		768 KB	48 KB	32	16	5	2		3 x HECC		DMA	118 ¹	60 MHz
TMS470R1VF76B	176 PBGA		768 KB	48 KB	32	14	3	2		2 - HECC		DMA, EMIF C54x™ DSP [¶]	144 ¹	40 MHz 60 MHz
TMS470R1VF48C	100/144 LQFP		1 MB	64 KB	12	12	2	3	5 x I ² C	2 - HECC		DMA, EMIF		48 MHz
TMS470R1VF58C	100/144 LQFP		1 MB	64 KB	12	12	2	3	5 x I ² C	2 - HECC 1 x SCC		DMA, EMIF		48 MHz
TMS470R1VF7AC	324 PBGA		1.25 MB	80 KB	64 Evt Mgr	16	3	2	2 MiBSPi* 2 I ² C	3 - HECC		DMA, EMIF C54x DSP [¶]	234 ¹	60 MHz/ 60 MHz
5-V Sub-Family**														
TMS470PLF111	144 LQFP		128 KB	8 KB	29	16	1	2	1 x I ² C	1 x SCC	1		83	48 MHz
TMS470PLF211	144 LQFP		256 KB	12 KB	32	32	3	4	1 x I ² C	2 x SCC	1		40 (min)	48 MHz
TMS470PLF312	176 LQFP		384 KB	16 KB	32	32	3	4	1 x I ² C	2 x SCC	1		40 (min)	48 MHz
TMS470PLF512	176 LQFP		512 KB	24 KB	32	32	2	4	1 x I ² C MiBSPi	2 x SCC	1		40 (min)	48 MHz

Notes: [‡] The High-End Timer (HET) is a programmable timer co-processor with up to 32 associated timing output pins for timer functions such as capture, compare, pulse width measurement and general-purpose I/O channels.

[†] I²C (Inter-Integrated Circuit) module is a multi-master communication module.

[¶] Dual-processor products using both ARM7TDMI and TMS320C54x™ DSP cores.

* MiBSPi is a 16-bit configurable synchronous multi-buffer serial peripheral interface. The above configurations and availability are subject to change without notice. New TMS470 derivatives are in design. Please contact your local TI automotive sales representative for the most up to date information on the TMS470 family.

[°] CAN 2.0B Digital Controller. Standard CAN Controller (SCC) has 16 message mailboxes, High-End CAN Controller (HECC) has 32 message mailboxes.

** This family is currently under development, thus configurations are subject to change. Please contact your local sales representative for the most current configuration.

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Product Information Centers

Americas

Phone +1(972) 644-5580
Fax +1(972) 927-6377
Internet/Email support.ti.com/sc/pic/americas.htm

Europe, Middle East, and Africa

Phone
Belgium (English) +32 (0) 27 45 55 32
Finland (English) +358 (0) 9 25173948
France +33 (0) 1 30 70 11 64
Germany +49 (0) 8161 80 33 11
Israel (English) 1800 949 0107
Italy 800 79 11 37
Netherlands (English) +31 (0) 546 87 95 45
Russia +7 (0) 95 7850415
Spain +34 902 35 40 28
Sweden (English) +46 (0) 8587 555 22
United Kingdom +44 (0) 1604 66 33 99
Fax +(49) (0) 8161 80 2045
Internet support.ti.com/sc/pic/euro.htm

Japan

Fax International +81-3-3344-5317
Domestic 0120-81-0036
Internet/Email International support.ti.com/sc/pic/japan.htm
Domestic www.tij.co.jp/pic

Asia

Phone
International +886-2-23786800
Domestic Toll-Free Number
Australia 1-800-999-084
China 800-820-8682
Hong Kong 800-96-5941
Indonesia 001-803-8861-1006
Korea 080-551-2804
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Taiwan 0800-006800
Thailand 001-800-886-0010
Fax 886-2-2378-6808
Email tiasia@ti.com
ti-china@ti.com
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