

MICROCONTROLLER SOLUTIONS FOR CAN NETWORKING

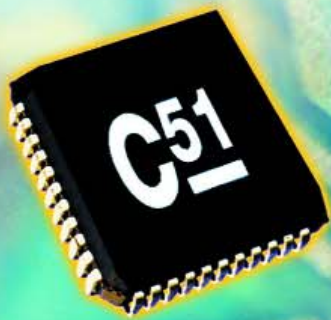
FOR COST-EFFECTIVE

& HIGH-END

INDUSTRIAL AND

AUTOMOTIVE

APPLICATIONS



Several times a day, most of us use embedded CAN applications without knowing it. The most

popular applications are in:

- **Automotive and Transportation Systems**
- **Medical and Agricultural Equipment**
- **Building Automation**
- **Household and Food Appliances**
- **Robotic and Factory Automation**



This wide-spread success is mainly due to the **high reliability** offered by the CAN protocol.

To satisfy the growing demand for embedded networks, the Atmel CAN family has been specially designed for all applications needing **easy and frequent code updates**.

The CAN family **extends its 8051 offering** with a **16 MIPS AVR® RISC** microcontroller with up to **128 Kbytes of Flash program memory**, providing customers with a large choice for their CAN systems.

Performance range

Based on either **8051** or **AVR** core, the **CAN 8-bit Flash microcontrollers** achieve **5 MIPS** or **16 MIPS** processing speed respectively.

Powerful On-chip CAN Controller

V2.0A/V2.0B compliant – Handles independent message objects programmable on-the-fly.

Easy Remote Programming and Field Upgrade

Highly flexible self-programming via CAN, UART, SPI, JTAG

Support Higher Layer Protocol Stacks

CANopen, DeviceNet™, J939 and OSEK™



Popular 8051 Architecture for Cost-effective Applications

- 5 MIPS at 30 MHz
- Up to 64 KB Flash Program Memory
- Flexible Self Programming at 3V and 5V via UART or CAN
- 6-clocks per cycle provides 1 Mbit/sec., using only 8 MHz crystal, thus reducing EMI



Powerful AVR Architecture to Tackle the Most Demanding High-end Applications

- 16 MIPS at 16 MHz
- Self Programming
- Hardware Multiplier
- Optimized for High-level C Language
- On-chip Debug Through JTAG Interface
- Up to 256 KB Addressing Capability

EFFICIENT & FLEXIBLE CAN CONTROLLER

Independent message objects can be dedicated dynamically, either in **2.0A** or in **2.0B mode**, to one of the following:

- Reception Channel
- Transmission Channel
- Receiver Buffer (multiple CAN frames buffer)

Each message object has its own masking and filtering registers, which significantly reduces the host processor load.

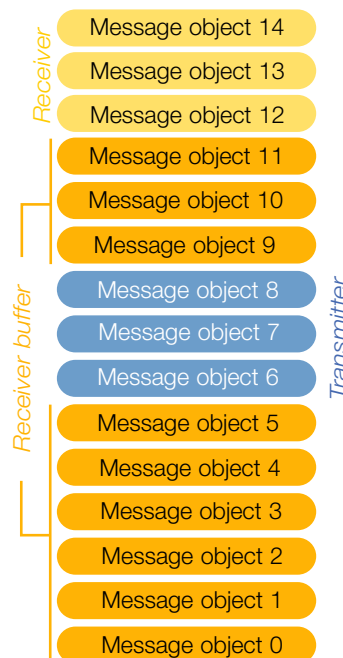
Indirect addressing allows easy access to all the Data & Control bytes of the CAN controller.

On the AT90CAN128/64/32, an interrupt accelerator engine informs the CPU of critical messages without running a software scan routine, minimizing the repercussions on real time event applications.

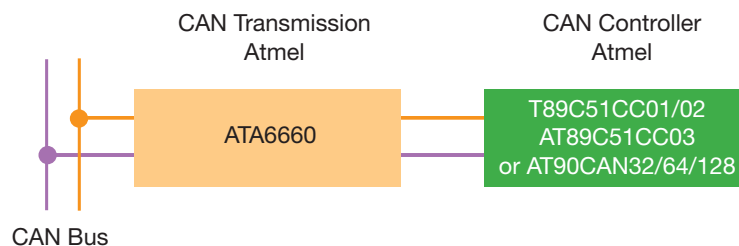
Also supported:

- Autobaud and Listening Modes
- Readable Error Counter
- Error Capture with Interrupt
- Time Triggered Communication & Time Stamp

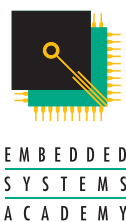
Example of
T89C51CC01,
AT89C51CC03
or
AT90CAN32,
AT90CAN64,
AT90CAN128
CAN Buffer
Configuration



TYPICAL CAN APPLICATION: A COMPLETE SOLUTION



HIGH LEVEL PROTOCOL PARTNERS



CAN & CANopen
www.esacademy.com

CANopen & DeviceNet™
www.ixxat.de

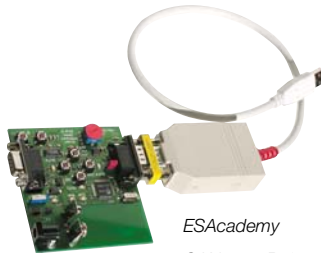
CANopen
www.port.de

CANopen, DeviceNet & OSEK™
www.vector-informatik.de

TOOLS FOR 8051 MICROCONTROLLERS



Atmel Starter Kit



ESAcademy

CANopen Reference Design

Development Tools & Support

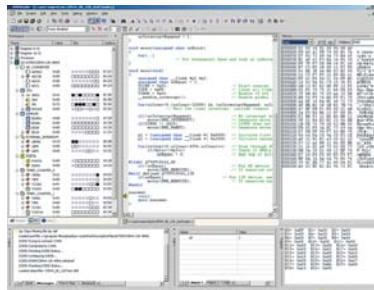
<i>Starter Kits</i>	Atmel
<i>Reference Design</i>	ESAcademy® (CANopen)
<i>Compilers</i>	Crossware®, Hi-Tech, IAR™, Keil™, Raisonance, SDCC, Tasking®
<i>Emulators</i>	Ceibo, Hitex, Metalink®, Nohau, Signum Phytion™
<i>In-system Programming</i>	Atmel: PC-based Pilot FLIP, ESAcademy CANopen compliant
<i>Flash device programmers</i>	Advantech®, BP Microsystems, Data I/O® Dataman, Hi-Lo Systems® ICE Technology™, Eltec®, etc.

TOOLS FOR AVR MICROCONTROLLERS



Integrated Development Environment for AVR

(Includes Atmel Macro Assembler)



- Front End for Atmel Starter Kits, Programmers, and Emulators
- C and Assembly Source Level Debugging
- Supports Third Party Compilers
- Maintains Project Information
- Freely Available from <http://www.atmel.com>

Development Tools & Support

<i>Development Kit</i>	Atmel	ATDVK90CAN1
<i>Starter Kits</i>	Atmel	STK500 + STK501 + CAN transceiver with ATADAPCAN01
<i>Compilers</i>	CodeVision, GCC-AVR, IAR™, ImageCraft	
<i>Emulators Platforms</i>	Atmel	ICE 50, JTAGICE JTAGICE mkII
<i>In-system Programming</i>	Atmel	AVRISP, JTAGICE JTAGICE mkII STK500 + STK501





Architecture



Architecture

		T89C51CC02	T89C51CC01	AT89C51CC03	AT90CAN32	AT90CAN64	AT90CAN128
Processing Speed	MIPS	up to 5	up to 5	up to 5	up to 16	up to 16	up to 16
	Memory						
Memory	Flash Program/Boot	16 KB/2 KB	32 KB/2 KB ⁽¹⁾	64 KB/2 KB	32 KB/up to 8 KB	64 KB/up to 8 KB	128 KB/up to 8 KB
	EEPROM	2 KB	2 KB	2 KB	1 KB	2 KB	4 KB
	RAM	0.5 KB	1.2 KB	2.2 KB	2 KB	4 KB	4 KB
CAN Controller	Prog. Mess. Objects	4	15	15	15	15	15
Self-programming Capability	CAN	Yes	Yes	Yes	Yes ⁽²⁾	Yes ⁽²⁾	Yes ⁽²⁾
	UART	Yes	Yes	Yes	Yes ⁽²⁾	Yes ⁽²⁾	Yes ⁽²⁾
	SPI	–	–	Yes	Yes	Yes	Yes
	JTAG	–	–	–	Yes	Yes	Yes
Power Management	Power Fail Detect	–	–	Yes	Yes	Yes	Yes
	On-chip Peripherals						
On-chip Peripherals	16-bit Timers	0/1/2	0/1/2	0/1/2	0/1/2/3	0/1/2/3	0/1/2/3
	PCA Channels	2	5	5	–	–	–
	Pulse Width Modulation	2	5	5	8	8	8
	10-bit ADC	8 channels	8 channels	8 channels	8 channels	8 channels	8 channels
	21-bit Watchdog	Yes	Yes	Yes	Yes	Yes	Yes
	UART	1	1	1	2	2	2
	SPI	–	–	Yes	Yes	Yes	Yes
	Two-wire Interface	–	–	–	Yes	Yes	Yes
Available Versions	Ports	0/1/2/3	0/1/2/3	0/1/2/3	A/B/C/D/E/F/G	A/B/C/D/E/F/G	A/B/C/D/E/F/G
	Max. Frequency	60 MHz	60 MHz	60 MHz	16 MHz	16 MHz	16 MHz
	Power Supply (V)	3 - 5.5	3 - 5.5	3 - 5.5	2.7 - 5.5	2.7 - 5.5	2.7 - 5.5
	Temperature (°C)	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85
	Automotive Graded Parts			-40 to +125	-40 to +125	-40 to +125	-40 to +125
	Packages	SOIC24 SOIC28 PLCC28 TQFP32	TQFP44 PLCC44 BGA64	TQFP44 PLCC44 BGA64 TQFP64 PLCC52	TQFP64 QFN64 BGA64 ⁽³⁾	TQFP64a QFN64 BGA64 ⁽³⁾	TQFP64 QFN64 BGA64 ⁽³⁾
	Availability	Now	Now	Now	1Q/06	4Q/05	Now

(1) ROM version available

(2) Using custom bootloader

(3) Check for availability

notes: Software Master/Slave (M/S) LIN drivers available.

All products compatible with AT6660 Transceiver.

**Atmel Corporation**

2325 Orchard Parkway
San Jose, CA 95131
USA
TEL.: 1 (408) 441-0311
FAX.: 1 (408) 487-2600

Regional Headquarters**Europe**

Atmel Sarl
Route des Arsenaux 41
Case Postale 80
CH-1705 Fribourg
Switzerland
TEL.: (41) 26-426-5555
FAX.: (41) 26-426-5500

Asia

Room 1219
Chinachem Golden Plaza
77 Mody Road Tsimshatsui
East Kowloon
Hong Kong
TEL.: (852) 2721-9778
FAX.: (852) 2722-1369

Japan

9F, Tonetsu Shinkawa Bldg.
1-24-8 Shinkawa
Chuo-ku, Tokyo 104-0033
Japan
TEL.: (81) 3-3523-3551
FAX.: (81) 3-3523-7581

Product Contact

La Chantretrie
BP 70602
44306 Nantes Cedex 3
France
TEL.: (33) 2 40 18 18 18
FAX.: (33) 2 40 18 19 60

Web Site

<http://www.atmel.com>

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