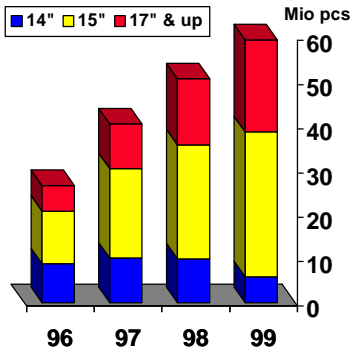




# TSC 8051C1 8-bit Microcontroller for Digital Computer Monitors

Digital Monitor Market



## Put a Brain Into your Monitors

The PC market is switching rapidly from analog to digital monitors. TEMIC Semiconductors support this move by introducing new microcontroller products.

The TSC 8051C1 is a low-cost dedicated microcontroller for all **multi-synch computer monitors**. Integration of specific monitor functions allows a system cost reduction while bringing more flexibility.

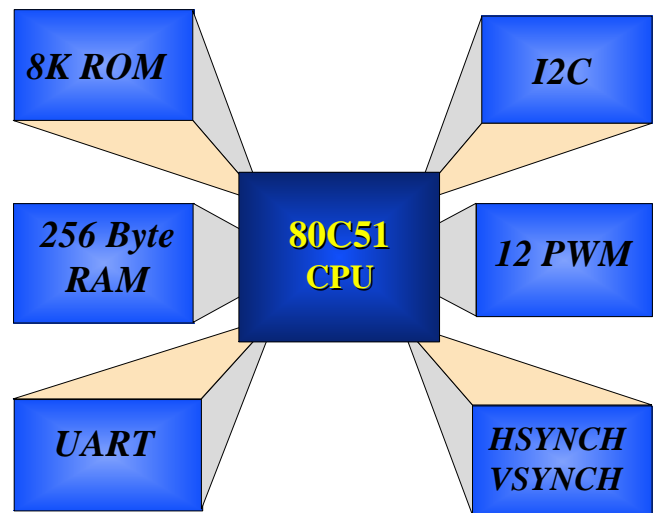
### Product Description

The TSC 8051C1 is a microcontroller derivative of the Intel architecture C51 product family .

It represents the first member of a complete family with a mid range position in order to start to design applications with the maximum synergy.

### Features

- 8 Kbytes of ROM, 256 bytes of RAM,
- 2x 16-bit Timer/Counters, Multimaster I2C interface and a UART, 12x Pulse Width Modulation (PWM), a Synch Processor, a watchdog and up to 32 I/Os,
- Idle and Power-down modes
- 5 Volt Supply, 20 MHz operating
- PDIL 40, PLCC 44 and PLCC 52 packages.



### Application Examples

- Automatical Multi-synch mode recognition (VGA/SVGA/EGA...)
- Stability of picture adjustment
- Simple user interface
- Reduction of external components
- Easy factory Alignments



The TSC 8051C1 with all different current consumption saving modes, Power-down and sleep, is offering the basic features to become EPA compatible at the system level.

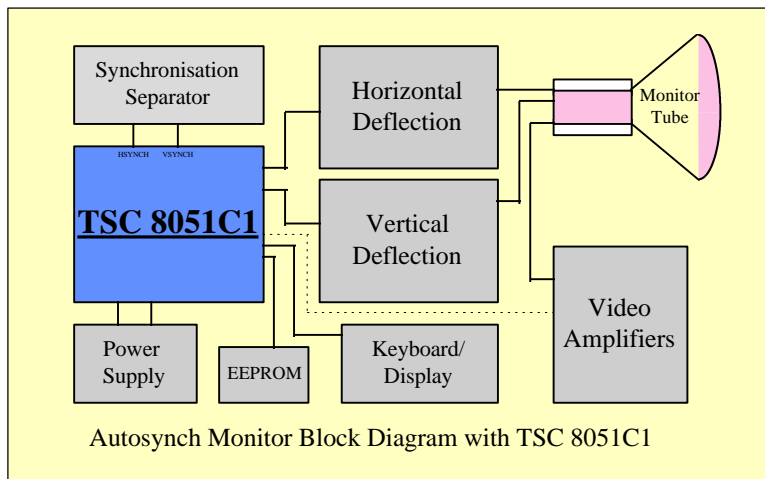
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# Benefits of Using the TSC 8051C1 in your Application

## Automatical Multi-synch mode recognition (VGA/SVGA/EGA...)

The TSC 8051C1 with the on-chip Synch Processor allows automatical video mode recognition by measuring the period, polarity of horizontal and vertical signals.

It consists of two dedicated Hsynch and Vsynch inputs/outputs using the interrupt and timer resources of the microcontroller.



The totally programmable registers can cover through a complete software approach all different signal frames, thus giving more flexibility for the design use.

Refer to Application Note : ANM059

## Simple user interface

Easy to realize all the monitor setup like brightness, contrast, horizontal and vertical hold positions, picture amplitude, degauss.

All these functions, managed by software, can be accessed through a simple keyboard interface coupled by a simple display done with Leds as the microcontroller can drive enough current.

## Stability of picture adjustment

This is one major feature improvement in digital monitors. The screen adapts and keeps its configuration for the chosen mode as all parameters can be saved after setup. In fact a research is made in the memory to recall all parameters of the mode from the memory.

## Reduction of external components

Due to the high integration of this microcontroller, many external components needed with general purpose devices are no more necessary and thus bring significant system cost reduction and allows also to save place on the PCB.

All the parameters adjustments driven by PWM (Pulse Width Modulation) are already in this product. The TSC 8051C1 includes also a UART, the synch Processor and on top a watchdog timer for safety reasons.

## Easy factory Alignments

A special mode, the free running generation, can be programmed by software using the on-chip synch Processor to perform end-of-line programming and automatical internal setup.

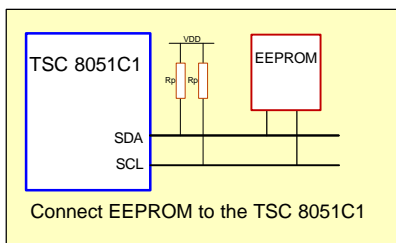
During manufacturing setup and burn-in, monitors are powered but no video source is connected. Thanks to free running Hsynch and Vsynch outputs, deflection stage can be activated.

This requires only few software resources to provide, for example, a video signal of 60.1 Hz vertical negative polarity with 66µs pulses and 41.7 KHz Horizontal negative polarity with 2µs pulses.

## I2C Serial Interface

The TSC 8051C1 with on-chip I2C (Inter-Integrated Circuit) logic provides a serial interface that meets the full I2C bus specification, and supports all transfer modes from and to the I2C bus with the following features :

- Autonomously bytes transfer handling master/slave transmitter/receiver
- Four special function registers available : status, control, data, slave address
- ACCESS.bus™ support : it is a system for connecting up to 125 of relatively low-speed I/O devices to a host computer for a plug-and-play application.
- DDC2B interface

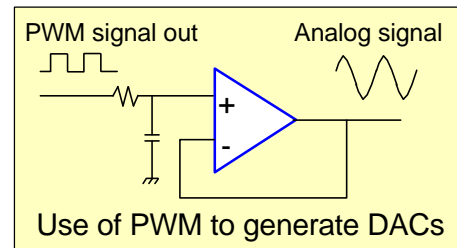


Typical use of this I2C interface is for connecting a serial EEPROM in order to store all the parameters of the factory and user setup as shown in the drawing here under. This uses only 2 wires with Data (SDA) & clock (SCL) signals.

Refer to Application Note : ANM057

## Pulse Width Modulation (PWM)

The TSC 8051C1 integrates 12 PWM (Pulse Width Modulation) channels with 8-Bit resolution specially designed for DACs functions (see below) to controls all functions of the monitor. The output pulse results from a variable duty cycle programmable between 0% and 100% and the period can vary modulo 255 or 254.



The PWM can also be used to drive **step motors** and address some industrial applications.

# Design your application around the TSC 8051C1

TEMIC offers a complete set of development tools designed to get your application to market faster. These include C-compiler, assembler, instruction simulator and in-circuit emulator.

Working with leading partners in development tools will help you to get the best support during your design phase.

The in-circuit emulator is available from **Metalink** with the iceMASTER offering the following features :

- PC-hosted via RS-232 serial link
- Efficient, powerful, easy to learn
- Supports third party Assembler & Compiler
- Full symbolic & Source-Level debug.

TEMIC can also provide a complete development kit including emulator, simulation board, software package.

You can contact your TEMIC sales office to get more information.



# Product Advantages



## Complete Family

The TSC 8051C1 is the first product of the Cx family and next derivatives will complete the family to serve monitor applications from low-end with a very low cost solution up to the high-end including A/D converter more ROM capacity and on top the Universal Serial Bus (USB) interface.



Furthermore, by bringing OTP/EPROM versions shortly, TEMIC is maintaining his best service to simplify all the development and production phases in a very flexible way.

## Short Leadtimes

6 weeks for all quantities starting from 2K units only.



## Samples Service

10 samples for final check in **3 weeks without extra costs.**



## No mask charge

TEMIC will offer you the mask charge on this product.



ORDERING INFORMATION		
Part Number	Description	Availability
TSC8051C1-12CA	ROMless, 12MHz, PDIL 40, 0 to 70°C	Now
TSC8051C1-12CB	ROMless, 12MHz, PLCC 44, 0 to 70°C	Now
TSC8051C1-12CC	ROMless, 12MHz, PLCC 52, 0 to 70°C	Now
TSC51C1XXX-12CA	Mask ROM, 12MHz, PDIL 40, 0 to 70°C	Now
TSC51C1XXX-12CB	Mask ROM, 12MHz, PLCC 44, 0 to 70°C	Now
TSC8751C1-12CA	OTP, 12MHz, PDIL 40, 0 to 70°C	Q1/97
TSC8751C1-12CB	OTP, 12MHz, PLCC 44, 0 to 70°C	Q1/97

For other requests and pricing information, please contact your sales office.

## On-line Support



- C51 family E-mail: c51@temic.fr
- World Wide Web ( <http://...> ):  
TEMIC: [www.temic.de](http://www.temic.de)  
Keil: [www.keil.com](http://www.keil.com)  
Tasking: [www.tasking.com](http://www.tasking.com)

## Available Documentation



- TSC 8051C1 Datasheet
- Application Notes:  
ANM057 : "The I2C serial ports of the TSC 8051C1 and its interrupt service routines"  
ANM059 : "How to recognize video mode and generate free running synchronization signals using TSC 8051C1 microcontroller"

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