P89C51Rx2 Microcontroller

P89C51RB2, P89C51RC2, P89C51RD2

The P89C51Rx2 family is available in 40-pin PDIP and 44-pin PLCC and PQFP package types

- **2X the Speed of the Conventional 80C51**
- **Flash In-System Programmable**
- **Flash In-Application Programmable**
- **Programmable Counter Array**
- **Watchdog Timer**
- **Low EMI and Low Power Capability**

P89C51Rx2 Product Family

Device	Flash Program Memory	RAM
P89C51RB2	16K bytes	512 bytes
P89C51RC2	32K bytes	512 bytes
P89C51RD2	64K bytes	1024 bytes

The P89C51Rx2 is an 80C51 microcontroller with up to 64 Kbytes of Flash program memory and 1024 bytes of data RAM.

A key feature of the P89C51Rx2 is its 2X mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the 2X mode to achieve a 2x throughput improvement with the same clock frequency (six clocks per machine cycle). Another way to benefit from this feature is to keep the same throughput by reducing the clock frequency in half, thus dramatically reducing the EMI. So, a 20MHz P89C51Rx2 becomes a 40MHz equivalent.

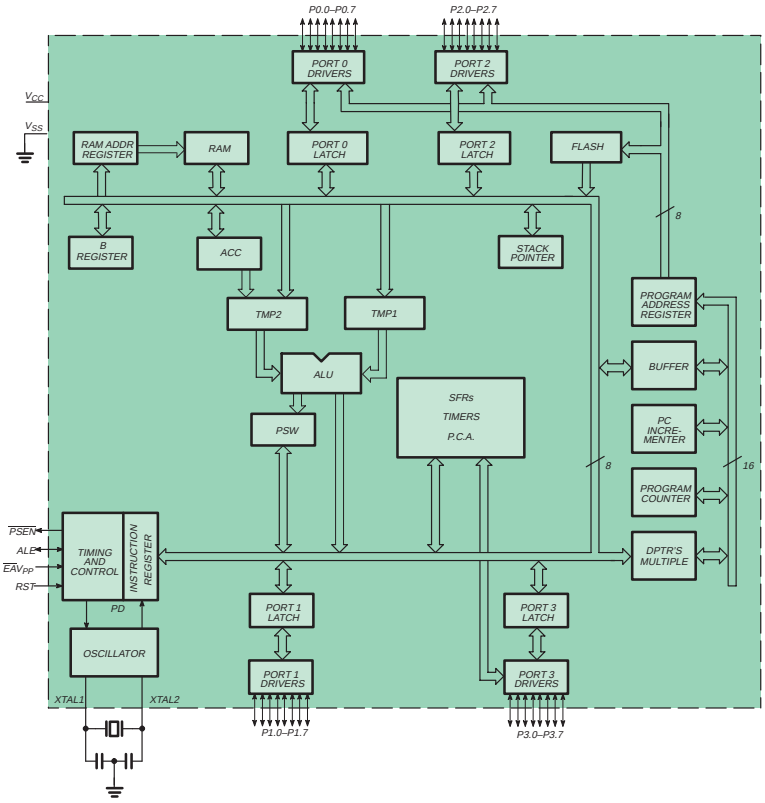
The Rx2 Flash program memory supports both parallel programming and 5V serial In-System Programming (ISP). Parallel programming means that the devices can be gang-programmed at high speed, thus reducing programming costs and time to market. ISP allows a device's program memory to be altered in the actual end product under software control. The capability to field-update the application firmware makes a wide range of applications possible.

The P89C51Rx2 family is also In-Application Programmable (IAP). Because the Rx2 contains a boot ROM, the Flash program memory can be reconfigured even while the application is running. A default serial loader (boot loader) program in ROM allows serial ISP of the Flash memory without the need for a loader in the Flash code. User programs may erase and reprogram the Flash memory at will through the use of standard routines contained in ROM. With IAP, the application can be updated remotely in the field with changes or enhancements, even while the application is running, so there is no downtime or interruption of service.

The P89C51Rx2 is suitable for a wide variety of applications that benefit from low EMI and the flexibility of Flash ISP and IAP.

P89C51Rx2 Microcontroller P89C51RB2, P89C51RC2, P89C51RD2

P89C51Rx2 Block Diagram



Ordering Information

All devices operate at 40MHz equivalent (20MHz with six clocks) and 4.5V to 5.5V

Worldwide Part Number	North American Part Number	Memory Flash/Ram	Temperature	Package
P89C51RB2HBP	P89C51RB2BN	16KB/512B	Commercial	40 PDIP
P89C51RB2HBA	P89C51RB2BA	16KB/512B	Commercial	44 PLCC
P89C51RB2HBB	P89C51RB2BB	16KB/512B	Commercial	44 PQFP
P89C51RB2HFP	P89C51RB2FN	16KB/512B	Industrial	40 PDIP
P89C51RB2HFA	P89C51RB2FA	16KB/512B	Industrial	44 PLCC
P89C51RB2HFB	P89C51RB2FB	16KB/512B	Industrial	44 PQFP
P89C51RC2HBP	P89C51RC2BN	32KB/512B	Commercial	40 PDIP
P89C51RC2HBA	P89C51RC2BA	32KB/512B	Commercial	44 PLCC
P89C51RC2HBB	P89C51RC2BB	32KB/512B	Commercial	44 PQFP
P89C51RC2HFP	P89C51RC2FN	32KB/512B	Industrial	40 PDIP
P89C51RC2HFA	P89C51RC2FA	32KB/512B	Industrial	44 PLCC
P89C51RC2HFB	P89C51RC2FB	32KB/512B	Industrial	44 PQFP
P89C51RD2HBP	P89C51RD2BN	64KB/1KB	Commercial	40 PDIP
P89C51RD2HBA	P89C51RD2BA	64KB/1KB	Commercial	44 PLCC
P89C51RD2HBB	P89C51RD2BB	64KB/1KB	Commercial	44 PQFP
P89C51RD2HFP	P89C51RD2FN	64KB/1KB	Industrial	40 PDIP
P89C51RD2HFA	P89C51RD2FA	64KB/1KB	Industrial	44 PLCC
P89C51RD2HFB	P89C51RD2FB	64KB/1KB	Industrial	44 PQFP

Commmercial = 0° to +70°C
Industrial = - 40° to +85°C

Features

- Familiar, industry-standard 80C51 architecture
- On-chip 5V Flash program memory
  - In-System Programming (ISP)
  - In-Application Programming (IAP)
    - Boot ROM enables application to control programming
    - Block programmable – an application runs in one block while another is being reprogrammed
- Fast execution
  - 2X mode - six clocks per machine cycle
    - 20MHz (40MHz 80C51-equivalent throughput)
  - Conventional mode - 12 clocks per machine cycle
    - 33MHz
- 4.5V to 5.5V operating range
- Four 8-bit I/O ports
- Three 16-bit timer/counters
- RAM-expandable externally to 64KB
- Dual data pointer
- Full-duplex enhanced UART
- Interrupts
  - Seven interrupt sources
  - Four-level priority interrupt
- Programmable clock out
- Programmable Counter Array (PCA)
  - High-speed output
  - Capture and compare
  - Pulse Width Modulator (PWM)
  - Watchdog timer option
- Hardware watchdog timer (one-time enabled with reset-out)
- Power control modes
  - Fully static operation
  - Idle mode
  - Power down mode
- Low EMI (inhibit ALE)
- Industrial and commercial temperature grades
- 40-pin PDIP, 44-pin PLCC and PQFP

For more information, contact your Philips Semiconductors distributor or www.semiconductors.philips.com

North America
Tel: 1 800 234-7381
Internet:
www.semiconductors.philips.com

Europe
Fax: +31 79 3685126

Asia
Fax: 886 2 2134-2941

Japan/Korea
Fax: +81-3-3740-5057
Internet (in Japanese):
www.philips.co.jp/semicon/

Internet: http://www.semiconductors.philips.com

Printed in the USA

271607/10K/FP/2pp/999

9397-750-06397