

LC864000 Series

Overview

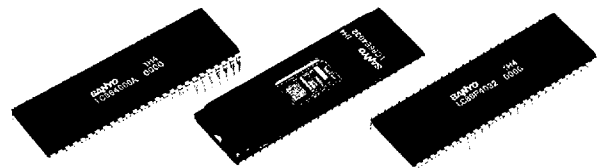
The LC864000 Series are high-speed, advanced-function CMOS 8-bit single-chip microcontrollers with an on-chip caption display function. When combined with a data slice front-end IC (LA7945), the previous products — the LC8640XX — could be used for TV sets with built-in closed-caption functions. In contrast to this, the newly developed LC8641XX has an on-chip data slice function that extracts caption data, making it possible to build TV sets with built-in closed captioning with just this single chip. What is more, OSD with an advanced-function version of the display RAM for full-screen support so well received in the LC8640XX is also on-chip, enabling support for EDS (Extended Data Service) as well. EPROM with window versions and one-time PROM versions have been incorporated into the series, allowing development time for the application system to be greatly reduced.

The LC8641XX integrates many powerful functions on a single chip. Centered around a CPU core that performs 8-bit processing in 1 μ s, the microcontroller includes 12K to 64K bytes of ROM, 256 or 384 bytes of RAM, and an OSD function for captions with 640 x 9bits of full-screen display RAM and character-generator ROM which generates 256 types of characters. Also included are a 16-bit timer/counter, a multiple-use PWM 16-bit timer, a 10-channel x 7-bit PWM, a 4-channel x 4-bit A/D converter, 8-bit synchronized serial I/O channels, a watchdog timer, a remote control signal receive circuit, I/O ports, numerous interrupts (12 sources and 10 vectors), and a standby function.

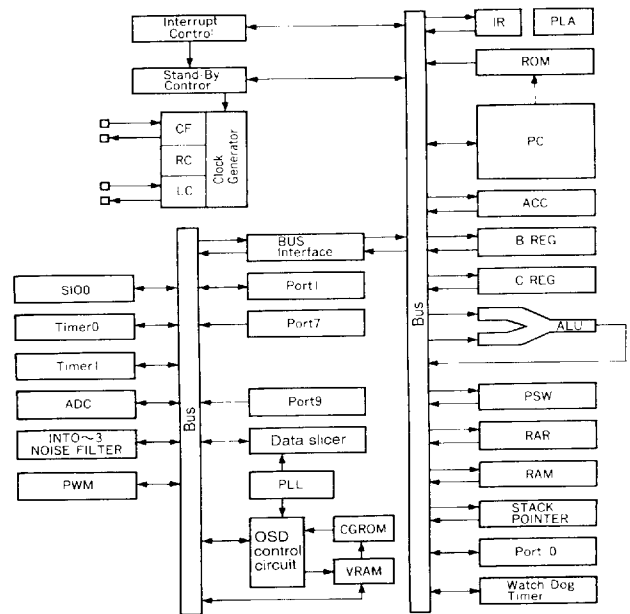
Features (LC8641XX is under development)

■ Features of the LC8641XX

- 12K to 64K bytes ROM
- 256 or 384 bytes RAM
- 640 x 9-bit full-screen display RAM
- 16-bit timer/counter
 - With 8-bit programmable prescaler
 - Can be split as two 8-bit timer/counters
- Multiple-use PWM 16-bit timer (with the following four modes)
 1. One 16-bit timer
 2. Two 8-bit timers
 3. 8-bit timer + 8-bit PWM
 4. 16-bit PWM
- Watchdog timer (with external RC)
- 8-bit serial I/O channels
 - Bus compatible
 - With baud rate generator
- Remote control signal receive circuit
- 10-channel x 7-bit PWM outputs
 - Withstands up to 15V
- 4-channel 4-bit A/D converter
- 16 I/O ports, 8 input-only ports, 11 output-only ports



LC864164 Block Diagram



- Numerous interrupt functions
 - 12 sources (6 external, 6 internal) and 10 vectors
 - Control function for 3 levels of overlapping interrupts
- Standby function (HALT/HOLD mode)
- High-speed operation
 - Minimum cycle time: 1 μ s (bus cycle: 0.5 μ s)
 - High-speed execution of register/RAM bit manipulation instructions: 1 μ s
- Symmetrical instruction set common with LC860000 Series
 - 68 instructions

- ✿ OSD function
 - 34 characters x 16 lines (display depends on hardware)
 - Number of characters — 256 types
 - 9 x 9 dots — 128 types
 - 12 x 18 dots — 128 types
 - Various settings of the line-by-line control
 - 1) Vertical and horizontal display position
 - 2) 8 types of character sizes (1.5X horizontal size available)
 - 3) Character pitch
 - 4) Display start and end lines (shutter function)
 - 16 colors each for characters color, background color, and border color can be specifications for each character

■ LC864000 Series

Type No.	ROM (bits)	RAM (bits)	Cycle time	OSD outputs	Ports	SI/O	Timer	A/D converter	Package	Evaluation chip	Notes	
LC864032A	32K×8	256×8 (data) 528×8 (display)	1μs bus cycle: 0.5μs	16 lines x 32 digits 128 characters (6 x 9 dots) Allows color characters, color backgrounds, and color borders	20 I/O 8 input 6 output	8 bits × 2	16 bits × 1 can be split into 8-bit timers + 14-bit base timer	4 bits × 4 ch	DIP-52S	LC86E4032	<ul style="list-style-type: none"> • Serial interface for I²C bus • 7-bit 10-channel PWM • Remote control signal receive circuit 	
LC864028A	28K×8											
LC864024A	24K×8											
LC864020A	20K×8											
LC864016B	16K×8											
LC864012B	12K×8											
LC864008B	8K×8											
LC86P4032	32K×8	384×8 (data) 640×9 (display)	1μs bus cycle: 0.5μs	16 lines x 34 digits 128 characters (9 x 9 dots) 128 characters (12 x 18 dots) 16 character colors, 16 background colors, and 16 border colors Line-by-line control possible - display position - character size (8 types) - scroll function - shutter function	16 I/O 8 input 11 output	8 bits × 1 (can be used for bus)	16 bits × 2 (can be split into 8-bit timers)	4 bits × 4 ch	DIP-52S	—	One-time PROM version of LC8640XX Series	
LC86E4032	32K×8								DIC-52S	—	EPROM with window version of LC8640XX Series	
*LC864164A	64K×8								256×8 (data) 640×9 (display)	DIP-52S	LC86E4164	<ul style="list-style-type: none"> • On-chip data slicer • 7 bit x 10 channel PWM • Remote control signal receive circuit
*LC864156A	56K×8											
*LC864148A	48K×8											
*LC864140A	40K×8											
*LC864132A	32K×8											
*LC864124A	24K×8											
*LC864120A	20K×8											
*LC864116A	16K×8											
*LC864112A	12K×8											
*LC86P4164	64K×8											
*LC86E4164	64K×8								DIC-52S	—	EPROM with window version of LC8641XX Series	

* : Under development

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