

# Super-Low-Power, Low-Noise Microcomputers H8/3827, H8/3847 Series

**M**ain Uses: NCUs (network control units), various kinds of meters, pagers, health-related devices (sphygmomanometers, etc.), safety equipment (smoke detectors, etc.)

With recent advances in telecommunications technology, products such as remote-controlled metering devices remain maintenance-free for years or decades after installation, and batteries are not replaced once the device starts operating. Portable battery-operated devices such as pagers also require as long a battery life as possible. It is also essential that peripheral devices should not be affected by electromagnetic interference due to emitted noise. In response to these needs,

- Providing the low power consumption required for metering devices and portable products
- Super-low power and low noise
- Small, thin, space-saving package

Hitachi developed the H8/3867 and H8/3887 Series 8-bit microcomputers with power consumption and noise cut by approximately 50 percent (Hitachi comparison), and these models have been well received in the market. The H8/3827 and H8/3847 Series have now been developed as low-priced versions, which do not include the on-chip constant-voltage step-up power supply for LCD drive provided in the H8/3867 and H8/3887 Series.

### Features

Figure 1 shows an example of a gas-metering system—a typical application in the field of remote control systems, which also includes home security and

vending machine systems. Information on gas quantity, leakage, incomplete combustion, and so on, is sent from the meter to the central monitoring center via an NCU system. The H8/3827 and H8/3847, with no LCD drive constant-voltage step-up power supply, are ideal for use in NCU systems, in which LCD displays are not an important factor.

### ■ Super-low power consumption

New technologies have been employed to achieve super-low power consumption (table 1).

- Low-power-consumption cells
  - A new cell series is used that allows current dissipation to be minimized without reducing operating speed.
- Internal step-down system
  - The internal operating voltage is stepped down to approximately 2.0 V, for lower power consumption.
- Module standby function
  - Supply or stoppage of clocks to on-chip supporting functions can easily be

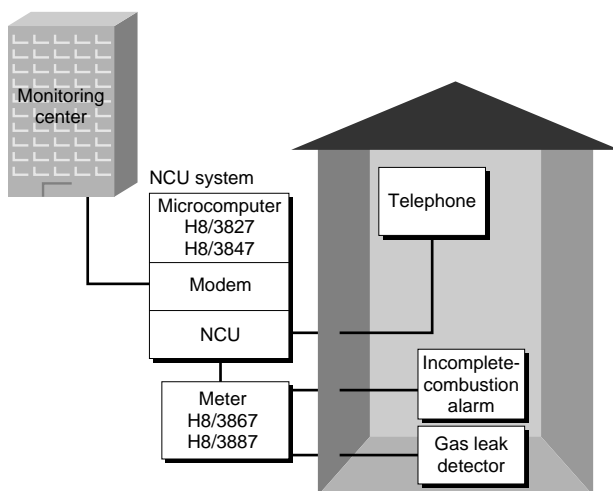


Fig. 1 Example of Remote-Controlled Gas-Metering System

Table 1 Approach to Super-Low-Power Design

	New Design Item	Super-Low-Power Technology
1	Cell design	Low-power cell development
2	Power supply circuit	Power supply voltage internal step-down circuit
3	Operating mode	Module standby mode
4	Oscillator	Shorter oscillation settling time

controlled by software.

- Shorter oscillation settling time

The previous oscillation settling time of approximately 10 ms has been reduced to approximately 20 μs, reducing wasteful power consumption during this period.

■ **Low noise**

- Noise canceler circuits are built into the reset pin, oscillation circuit, and I/O pins

- Internal step-down circuit
- Efficient pin arrangement

■ **High performance**

- Low-voltage operation (1.8 V)
- On-chip LCD controller/driver
- Variety of timers (6 kinds)
- 14-bit PWM
- Serial interface (1 synchronous channel, 2 asynchronous channels) 3847 Series
- 10-bit-resolution A/D converter (12 channels) 3847 Series

■ **Ease of use**

- Low power consumption, low noise
- Small, thin package lineup

■ **Development environment**

- Internal emulator
- E6000 emulator
- Cross software

- C compiler: compliant with ANSI standard
- Assembler
- Realtime OS: compliant with μITRON specifications<sup>1</sup>
- Version with on-chip EPROM (ZTAT<sup>®2</sup>) available

\*1: μITRON: Micro Industrial TRON. These products were developed on the basis of the TRON specifications.

\*2: ZTAT (Zero Turn-Around Time) is a trademark of Hitachi, Ltd.

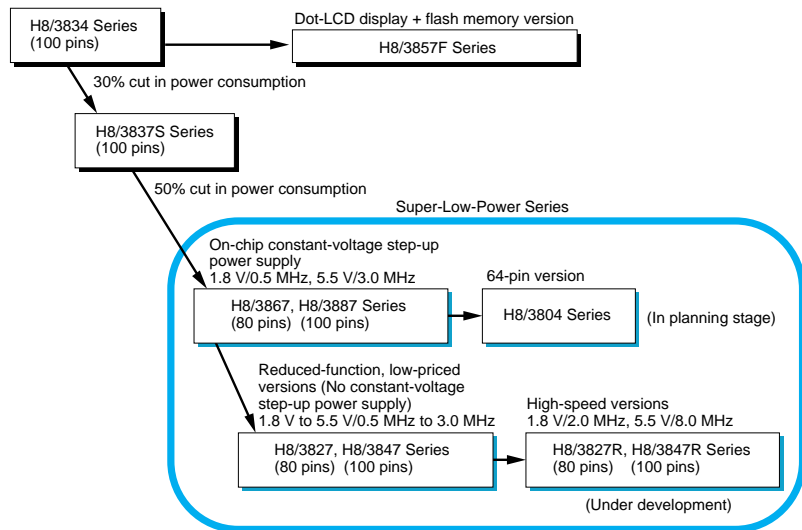


Fig. 2 Super-Low-Power Series Evolution

Table 2 Summary of Super-Low-Power Series Specifications

Item		H8/3867 Series	H8/3827 Series	H8/3887 Series	H8/3847 Series
ROM/RAM		16 k/1 k, 24 k/1 k, 32 k/2 k, 40 k/2 k, 48 k/2 k, 60 k/2 k			
Operating voltage/internal maximum operating frequency		1.8–5.5 V/0.5 MHz, 2.2–5.5 V/1.0 MHz, 2.6–5.5 V/1.6 MHz, 3.0–5.5 V/2.0 MHz, 4.5–5.5 V/3.0 MHz			
Subclock		Yes			
A/D		10 bits × 8 channels		10 bits × 12 channels	
SCI	Synchronous	—		1	
	Asynchronous	2 (synchronous operation also possible)		2 (synchronous operation also possible)	
LCD driver		32 SEG × 4 com		40 SEG × 4 com	
Step-up constant-voltage power supply		On-chip	None	On-chip	None
Timer		6 channels			
Watchdog timer		Yes			
Power-down modes		7 modes			
Module standby		Yes			
I/O		64		84	
Packages		<ul style="list-style-type: none"> <li>• FP-80A (14 × 14, 0.65 pitch)</li> <li>• FP-80B (14 × 20, 0.80 pitch)</li> <li>• TFP-80C (12 × 12, 0.50 pitch)</li> </ul>		<ul style="list-style-type: none"> <li>• FP-100A (14 × 20, 0.65 pitch)</li> <li>• FP-100B (14 × 14, 0.50 pitch)</li> <li>• TFP-100B (14 × 14, 0.50 pitch thin-type 1.2)</li> <li>• TFP-100G (12 × 12, 0.40 pitch thin-type 1.2)</li> </ul>	