

# 16-bit Microcontrollers

## KLCS-900/H Series

High-performance devices ideally suited to high-end office equipment

### Features

- **Successive KLCS-900 architecture**
  - : Instruction compatible with KLCS-900, 900/L series
  - : General purpose 32-bit register
  - : Register bank format
- **Increased instruction execution speed**
  - : 2 times the speed of KLCS-900, 900/L series
- **Simple bus interface**
  - : Separate bus
  - : Access time : 100nS (at 25MHz, 0 wait)
- **Minimum instruction execution time**
  - : 160nS (at 25MHz)
- **Large linear address**
  - : Program : 16M bytes
  - : Data : 16M bytes

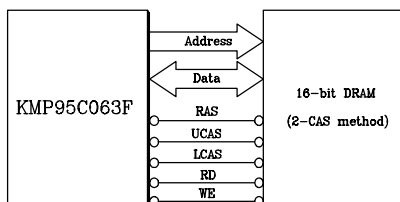
### Additional functions

- DRAM controller (direct interface enabled)
- High-speed macro DMA
- 10-bit A/D converter
- Interrupt controller
- General purpose serial interface
- Since memory is refreshed asynchronously with cpu operation, access to other resources is not degraded

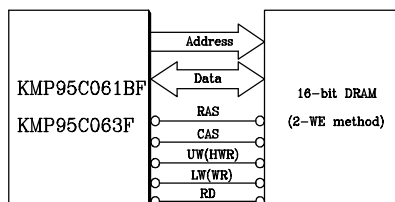
### Additional functions

- Serial printers
- CD-ROMs
- Electronic musical instruments
- HDDs

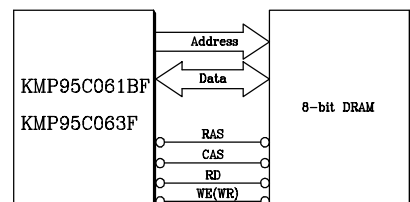
(a) 2-CAS method, 16-bit DRAM



(b) 2-WE method, 16-bit DRAM



(c) 8-bit DRAM



## KLCS-900/H2 Series

High-performance microcontrollers incorporating a 32-bit CPU core

### Full DRAM control functions

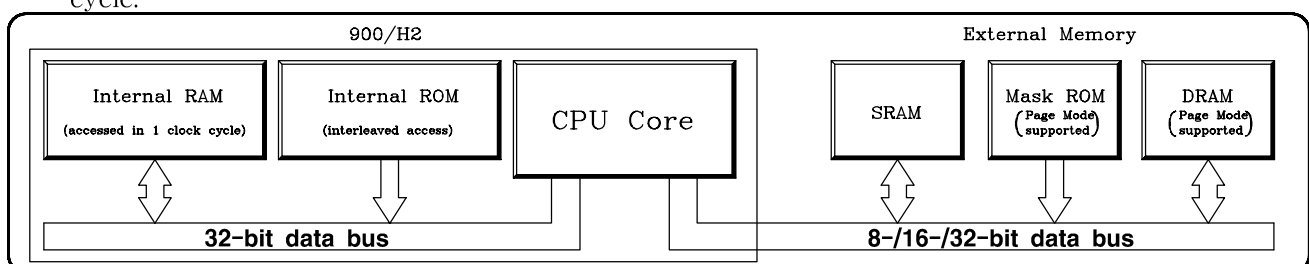
- Offers about 4times the processing performance of conventional products (900/H Series)
- Enhanced high-speed data transfer function (micro DMA)
  - : The 900/H2 Series microcontrollers com with a high-speed data transfer function, equivalent to that of a DMAC (direct memory access controller), as standard.

### Function and performance comparison

	900, 900/L Series	900/H, 900/L1 Series	900/H2 Series
Number of chennels	4 channels	4 channels	8 channels
Minimum transfer	1600ns/ 2byte	640ns/ 2bytes	250ns/ 4bytes
Initiated by	interrupt	interrupt and software trigger	interrupt and software trigger
Continuous Transfer Mode	NA	NA	Available

### Diverse memory types fully utilized

: The 900/H2 Series allows various kinds of external memory chip to be directly connected to the CPU core, without the need for an external circuit. Furthermore, the internal memory is connected to the CPU core via a 32-bit data bus and the internal RAM can be accessed in a single clock cycle.



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## 900 series Selection Guide

ROM (byte)	RAM (byte)	Product No.	Minimum Instruction Execution Time (μs)		SIO/UART	Synchronous SIO	I <sup>2</sup> C Bus/SIO	DRAM Controller	A/D Converter	10-bit Channels	8-bit Channels	6-bit Channels	8-bit DA Converter	VFL Driver	LCD Driver	Timer/Counter	16-bit Channels	8-bit Channels	Clock Timer	Time Base Counter	Pattern Generator	Stepping Motor Controller	8-bit PWM Timer	14-bit PWM Timer	CS/Wait Controller	VCR Servo Controller	Watchdog Timer	Dual Clock	Clock Gear	I/O Port	Operating Temperature (°C)	Built-in OTP	Package
			5V±10%	3V±10%																													

### 900 Series

NA	NA	KMP96C041BF	Note2	200	-	2	-	-	-	-	4	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	47	-	QFP80 (14×20mm)
		KMP96C031ZF																																	
	1K	KMP96C141BF	2	-	-	-	-	-	-	-	4	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	47	-	QFP80 (14×20mm)	
32K		KMP96CM40F	2	-	-	-	-	-	-	-	4	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	65	-	KMP96PM40F		

### 900/L Series

NA	2K	*KMP93CS41F/DF	200	320	-	2	-	-	-	-	8	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	61	-	QFP100 (14×14mm)	
		KMP93CS45F																																			2
	4K	KMP93CW41DF	2	-	-	-	-	-	-	-	8	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	61	-	QFP100 (14×14mm)		
	8K	KMP93C071F	-	1	2	1	-	-	-	-	10	-	-	-	●	1	5	-	-	●	-	-	-	-	-	-	-	-	-	-	-	-	69	-	QFP120 (28×28mm)		
8K	1K	*KMP93C852F	320	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	88	-	QFP160 (28×28mm)		
32K	2K	KMP93CM40F	400	2	-	-	-	-	-	-	8	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	79	-	KMP93PS40F/DF QFP100 (14×14mm)		
64K	2K	*KMP93CS20F	320	2	-	1	-	-	-	-	8	-	-	-	●	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88	-	*KMP93PW20F QFP144 (16×16mm)		
		KMP93CS32F		2	1	-	-	-	-	-	-	6	-	-	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49	-	KMP93PW32F QFP64 (14×14mm)		
		KMP93CS40F/DF		2	-	-	-	-	-	-	-	8	-	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	79	-	KMP93PS40F/DF QFP100 (14×14mm)	
		KMP93CS42AF		2	-	-	-	-	-	-	-	5	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80	-	KMP93PS42AF QFP100 (14×14mm)	
		KMP93CS44F	2	-	1	-	-	-	-	8	-	-	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62	-	KMP93PS44F QFP80 (12×12mm)			
72K	1.8K	KMP93CT75F	250	-	-	1	1	-	-	-	10	-	-	-	●	1	5	-	-	●	-	-	-	-	-	-	-	-	-	-	-	-	85	-	KMP93PT75F QFP100 (14×20mm)		
128K	4K	KMP93CW40DF	200	320	2	1	-	1	-	-	8	-	-	-	-	2	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	79	-	KMP93PW40DF QFP100 (14×14mm)	
		KMP93CW46AF			5	-	-	-	-	-	-	8	-	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79	-	KMP93PW46AF QFP100 (14×14mm)
		*KMP93CW44DF			2	-	1	-	-	-	-	-	8	-	-	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	62	-	*KMP93PW44DF QFP80 (14×20mm)

### 900/H Series

NA	NA	KMP95C001F	160	320	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	0	-	QFP64 (14×14mm)
		KMP95C061BF																																	
		KMP95C063F	2	-	2	-	-	-	-	8	2	-	-	-	8	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	91	-	QFP144 (20×20mm)
	2K	KMP95C265F	400	3	-	-	-	-	-	8	2	-	-	-	8	2	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	55	-	QFP100 (14×14mm)
64K		KMP95CS64F		3	-	-	-	-	-	-	8	2	-	-	-	8	2	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	81	-	
Note3 128K		*KMP95FW86F	200	-	3	-	-	-	-	12	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	77	-	QFP100 (22×22mm)
128K		*KMP95CW64F	160	400	3	-	-	-	-	8	2	-	-	-	8	2	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	81	-	KMP95PW64F
Note3 128K		*KMP95FW64F		-	3	-	-	-	-	-	8	2	-	-	-	8	2	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	81	-

### 900/L1 Series

96K	3K	KMP91CU10F	-	250	3	-	-	-	-	8	-	-	-	8	2	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	80	-40~85	KMP91PW10F KMP91PW11F *KMP91CW12F	QFP100 (14×14mm)	
128K	4K	KMP91CW11F	160	320	3	2	1	-	-	8	-	-	-	-	2	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	79	-				QFP100 (14×14mm)
		*KMP91CW12F	-	250	2	-	1	-	-	8	-	-	-	-	8	2	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	81	-				

### 900/H2 Series

NA	2K	KMP94C241F	50	-	2	-	2	-	-	8	2	-	-	4	4	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	64	-20~70	-	QFP160 (28×28mm)
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\*: Under development      ★: Samples available

Note 1: The suffix F in a product number denotes a quade flat package(QFP)

Note 2: Guaranteed minimum instruction execution time is 200ns when operating at temperatures of -20°C to 70°C, or 250ns when operating at temperatures of -40°C to 85°C.

Note 3: Flash E<sup>2</sup>PROM(USP 4,382,279 owned by BULL CP8)