

4-bit Microcontrollers

■ KLCS-47E, 47, 470, 470A Series

■ Features

	47E Series	47 Series	470 Series	470A Series
Maximum ROM size	4K × 8		8K × 8	16K × 8
Maximum RAM size	256 × 4	768 × 4	1024 × 4	
Minimum instruction execution time	1.0μs (at 8MHz, V _{DD} =2.7V~5.5V) 1.3μs (at 8MHz, V _{DD} =4.5V~5.5V) 1.9μs (at 8MHz, V _{DD} =2.7V~5.5V) 3.2μs (at 8MHz, V _{DD} =2.7V~5.5V)	1.9μs (at 4.2MHz, V _{DD} =4.5V~6V)	1.3μs (at 6MHz, V _{DD} =4.5V~5.5V) 244μs (at 32.8MHz, V _{DD} =2.7V~5.5V)	
Number of instructions	90		92	105
Number of interrupts	5/6	6		
Packages	DIP16~20 SOP16~28 SDIP28~42 SSOP30 QFP44	SDIP30~42 QFP44~80	SDIP28~64 QFP44~100	SDIP42~64 QFP44~80

■ Basic functions

- Instructions: maximum 105, minimum instruction execution time: 1.0μs
- ROM table look-up instruction
- 5-bit to 8-bit data conversion instruction
- Subroutine nesting: maximum 15 levels
- Interrupt sources: 2 external, 4 internal
- Interval timer
- Serial interface

■ Additional functions

- VFT driver
- LCD driver
- LED driver
- Hold function (low power consumption mode)
- Multi-pin input/output
- D/A conversion (PWM) output
- A/D conversion input
- A/D converter input
- E²PROM
- 16-bit high-speed event counter
- On-screen display circuit
- DTMF generator
- DTMF receiver
- Watchdog timer
- Pulse generator
- Remote control pulse detector
- High-speed timer/counter
- Dual clock system
- One-time PROM

4-bit Microcontrollers

KLCS-470, 470A Series Selection Guide

ROM (byte)	RAM (nibbles)	Product No	Driver			SIO 8-bit	UART	A/D conversion input	A/D conversion input	Pulse output		Remote control pulse detector	Watchdog timer	High-speed timer/counter	DTMF Receiver Generator	OSD (character)	Dual clock	Hold function	Package		OTP type	Minimum operating voltage
			LED	LCD	VFT					Pulse	PPG								QFP(SSOP)	QFP(SOP)		
2k	128	KMP47C215N	1	23	1			4				●					●	●	42		●	
		KMP47C216F	1	24	1			4				●					●	●	44		●	
4k	256	KMP47C415N	1	23	1			4				●					●	●	42		●	
		KMP47C416F	1	24	1			4				●					●	●	44		●	
	768	KMP47C457N/F			1					1		●		●			●	●	42	44	●	●
6k	384	KMP47C620DF	8	32	1					1		●	2				●	●	80		●	
		KMP47C623F	4	24	1					1		●	1				●	●	64		●	
		KMP47C637N	8		1			4	8	1		●	●			●	●	●	42		●	
		KMP47C640N/F	8		1		8					●	●				●	●	42	44	●	●
		KMP47C647F	8	32	1		8			1		●					●	●	80		●	
		KMP47C660AN/AF	8		1		8					●	●				●	●	64	64	●	
		KMP47C662AN	4	27	1		8			2		●	●				●	●	64		●	
	KMP47C670N	8	28	1			4	1			●	●				●	●	64		●		
896	KMP47C655F		32	1					1		●		●			●	●	80		●	●	
8k	384	KMP47C837N	8		1			4	8	1	●	●				●	●	42		●		
	512	KMP47C800N/F	8		1							●					●	●	42	44	●	
		KMP47C820DF	8	32	1					1		●	2				●	●	80		●	
		KMP47C823F	4	24	1					1		●	1				●	●	64		●	
		KMP47C840N/F	8		1		8					●	●				●	●	42	44	●	
		KMP47C847F	8	32	1		8			1		●					●	●	80		●	
		KMP47C850N/F	16		1			4		2		●			●		●	●	64	64	●	
		KMP47C858F		44	1								●				●	●	100			●
		KMP47C860AN/AF	8		1		8					●	●				●	●	64	64	●	
		KMP47C862AN	4	27	1		8			2		●	●				●	●	64		●	
		KMP47C870N	8	28	1			4	1			●	●				●	●	64		●	
	* KMP47E885IF			1	●	8		2				●	1				●	●	44		●	
	* KMP47E885WF			1	●	8		2				●	1			●	●	44		●		
	1024	KMP47C853N/F			1					1		●		●			●	●	42	44	●	●
KMP47C855F			32	1					1		●		●			●	●	80		●	●	
KMP47C857N/F				1					1		●		●			●	●	42	44	●	●	
12k	512	KMP47C1237N	4		1			4	8	1	●	●				●	●	42		●		
		KMP47C1238AN	8		1			4	10	1	●	●				●	●	54		●		
	768	KMP47C1220F	8	32	1					1		●	2				●	●	80		●	
		KMP47C1260N/F	8		1		8					●	●				●	●	64	64	●	
		KMP47C1270AN	8	28	1			4	1			●	●				●	●	64		●	
16k	512	KMP47C1637N	4		1			4	8	1	●	●				●	●	42		●		
		KMP47C1638AN	8		1			4	10	1	●	●				●	●	54		●		
	768	KMP47C1620F	8	32	1					1		●	2				●	●	80		●	
		KMP47C1660N/F	8		1		8					●	●				●	●	64	64	●	
		KMP47C1670AN	8	28	1			4	1			●	●				●	●	64		●	

Note) * : Under Development

4-bit Microcontrollers

■ KLCS-470 Series

Product No	Function		ROM (bytes)	RAM (nibbles)	I/O port	Minimum instruction execution time (μs)	Power Supply Voltage (V)	Package	Built-in OTP
KMP47C800N/F	Standard (LED driver)		8k	512	36	1.3 (244)	4.5 to 6.0	SDIP42 QFP44	KMP47P800N/F
KMP47C620DF	LCD driver (32×4), high speed timer/counter		6k	384				QFP80	KMP47P820VDF
KMP47C820DF			8k	512					
KMP47C640N/F	A/D converter (8bits×8ch), Remote control pulse detector, LED driver		6k	384	34	1.3 (244)	2.7 to 5.5	SDIP42 QFP44	KMP47P840VN/VF
KMP47C840N/F			8k	512					
KMP47C647F	A/D converter (8bits×8ch), LCD driver (32×4)		6k	384	35	1.3 (244)	4.5 to 6.0	QFP80	KMP47P847VF
KMP47C847F			8k	512					
KMP47C850N/F	DTMF receiver, 4-bit A/D conversion input		8k	512	52	2.23 (244)	4.5 to 5.5	SDIP64 QFP64	KMP47P850VN/VF
KMP47C655F	LCD driver (32×4), DTMF generator		6k	896	36	8.3 (244)	2.2 to 6.0	QFP80	KMP47P855VF
KMP47C855F			8k	1024					
KMP47C858F	LCD driver (44×10), DTMF generator		8k	512				2.7 to 6.0	QFP100
KMP47C660AN/AF	A/D converter (8bits×8ch), Remote control pulse detector, LED driver		6k	384	56	1.3 (244)	4.5 to 5.5	SDIP64 QFP64	KMP47P860N/DF
KMP47C860AN/AF			8k	512					
KMP47C662AN		Pulse generator, VFT driver (16×11)	6k	384	55	1.3 (244)	4.5 to 6.0	SDIP64	KMP47P862VN
KMP47C862AN			8k	512					
KMP47C215N	VFT driver, 4-bit A/D conversion input		2k	128	36	1.0 (244)	4.5 to 5.5	SDIP42	KMP47P415VN
KMP47C415N			4k	256					
KMP47C216F			2k	128	38			QFP44	KMP47P416VF
KMP47C416F			4k	256					
KMP47C670N	VFT driver (16×12 to 12×16), D/A conversion (PWM) input, 4-bit A/D conversion input, Remote control pulse detector		6k	384	53	1.3 (244)	4.5 to 6.0	SDIP64	KMP47P870N
KMP47C870N			8k	512					

Note : () ; the minimum instruction execution time when low-frequency clock is used.

☆ : These package types will be delivered in the short lead length package.

4-bit Microcontrollers

■ KLCS-470A Series

Product No	Function	ROM (bytes)	RAM (nibbles)	I/O port	Minimum instruction execution time (μs)	Power Supply Voltage (V)	Package	Built-in One-time PROM product
KMP47C623F	LCD driver (24 to 20×4), High-speed event counter	6k	384	32 to 28	1.3 (244)	4.5 to 6.0	QFP64	KMP47P823VF
KMP47C823F		8k	512					
KMP47C1220F	LCD driver (32×4), High-speed timer/counter	12k	768	36			SDIP42	KMP47P1620VF
KMP47C1620F		16k						
KMP47C637N	6k	384	32	SDIP54				
KMP47C837N	8k							
KMP47C1237N	12k	512	41					
KMP47C1637N	16k							
KMP47C1238AN	12k							
KMP47C1638AN	16k	1024	35	56			8.3 (244)	2.2 to 6.0
KMP47C853N/F	8k				1024			
KMP47C457N/F	4k				768	2.1 (244)		
KMP47C857N/F	8k	1024						
KMP47C1260N/F	A/D converter (8bits×8ch), Remote control pulse detector, LED driver	12k	768	53	1.3 (244)	4.5 to 6.0	SDIP64	KMP47P1670VN
KMP47C1660N/F		16k						
KMP47C1270AN	VFT driver (16×18 to 13×16), D/A conversion (PWM) output, 4-bit A/D conversion input, Remote control pulse detector	12k	768	53	1.3 (244)	4.5 to 6.0	SDIP64	KMP47P1670VN
KMP47C1670AN		16k						

note : () : the minimum instruction execution time when low-frequency clock is used.

Type N : Plastic shrink dual in-line package (SDIP) E : Ceramic shrink dual in-line package (SDIC)

F : Plastic flat package (QFP)

G : Ceramic standard flat package (QFC)

■ KLCS-47E, 47, 470 series (Wide-temperature range/High-quality products)

Product No	Function	ROM (bytes)	RAM (nibbles)	I/O port	Minimum instruction execution time (μs)	Power Supply Voltage (V)	Operating temperature (°C)	Package	Built-in One-time PROM product (note 2)
* KMP47C101WP	LED driver	1k	64	11	1.3	2.2 to 5.5 (note 3)	-40 to 110	DIP16 SOP16	KMP47P201VP
* KMP47C201WP		2k	128				-40 to 110		
† KMP47E186M	E ² PROM (16 bytes), SPI	1k	64	(note 4)		-40 to 85	SOP16	KMP47P186M (note 5)	
KMP47E187M	E ² PROM (16 bytes), SPI	1k	64	(note 4)		-40 to 85	SOP16	KMP47P187M	
KMP47C241IN/IM	A/D converter LED driver	2k	128	21		2.7 to 6.0	-40 to 85	SDIP28 SOP28	KMP47P241VN/VM KMP47P241VN
KMP47C241WM					-40 to 110				
† KMP47E885IF	E ² PROM (64 bytes), PWM, UART A/D converter 16-bit timer/counter Input Capture, Output compare	8k	512	36	4.5 to 5.5	-40 to 85	QFP44	KMP47P885F	
† KMP47E885WF						-40 to 110			

* : Under development

† : USP4, 382, 279 owned by BULL CP8

Type suffix

P : Plastic dual in-line package (DIP)

M : Plastic small outline package (SOP)

N : Plastic shrink dual in-line package (SDIP)

F : Plastic flat package (QFP)

note 1 : If there is any further information you require when considering I/W version products, please contact our sales representative.

note 2 : OTP built-in type is under consideration for high-temperature range/high-quality applications.

note 3 : During CR oscillation (2.7 to 5.5V when oscillator is connected).

note 4 : 2.7 to 5.5V when oscillator is connected, 2.0 to 3.4V during CR oscillation.

note 5 : KMP47P186M (CR oscillation), KMP47P187M (oscillator version)