NEC Electronics America, Inc.

User's Manual

K0RE9418

EVALUATION PLATFORM FOR μPD78F9418 MICROCONTROLLER

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Contents

1. INTRODUCTION

To facilitate designing with the μPD78F9418 NEC Electronics flash microcontroller, the device, along with appropriate crystals and reset circuitry, is provided on a printed circuit board (K0RE9418-KB). All of the package pins are brought out to standard 0.1-inch headers that surround the microcontroller package on all four sides.

1.1 μPD789418 Features

- 32 KB flash memory
- Internal data memory
  - 512-byte high-speed RAM
  - 28 x 4-bit LCD display RAM
- Minimum instruction execution time can be changed from high-speed (0.4 μs at 5.0 MHz with main system clock) to ultra-low-speed (122 μs at 32.768 KHz with subsystem clock)
- I/O port: 43 pins
- Serial interface: 1 channel (3-wire serial I/O mode or UART mode selectable)
- Seven-channel A/D converter with 10-bit resolution
- Timer: 6 channels
  - One-channel, 16-bit timer
  - Two-channel, 8-bit timer/event counter
  - One-channel, 8-bit timer
  - One-channel watch timer
  - One-channel watchdog timer
- LCD Controller/Driver
  - Segment signals: 28 pins max.
  - Common signals: 4 pins max.
- Supply voltage: V_{DD} = 1.8 to 5.5V

Figure 1. Board Layout

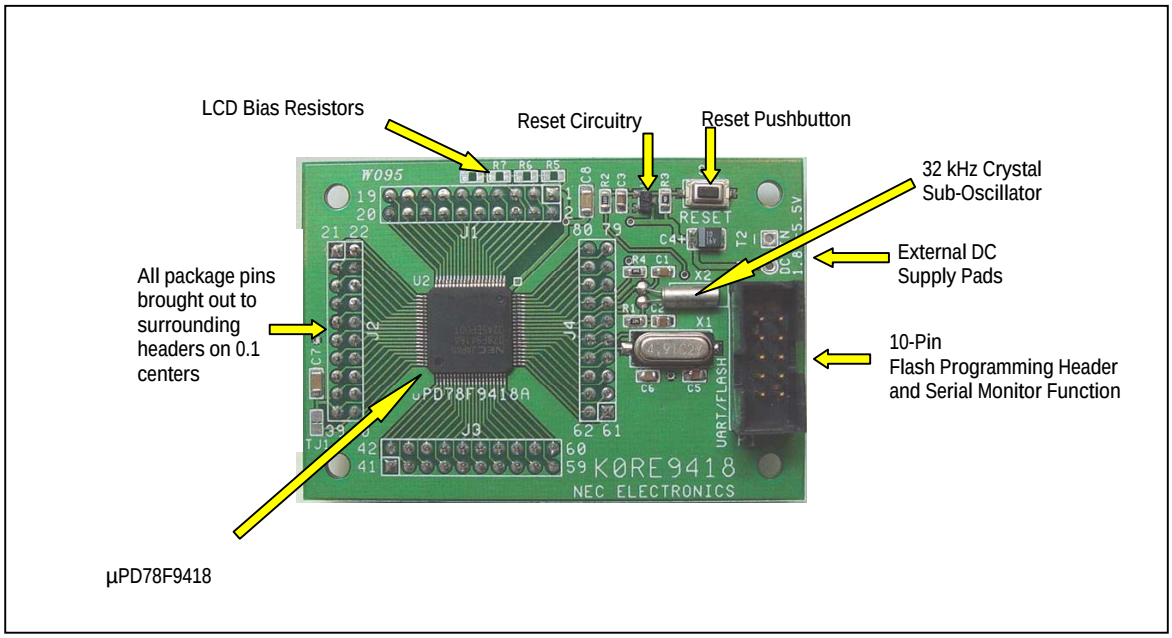


Table 1. K0RE9418-KB (μPD78F9418) Header to Pin Configuration

1	V_{DD1}		21	S10		41	P66/ANI6		61	P03
2	BIAS		22	S11		42	P65//ANI5		62	P02
3	V_{LC0}		23	S12		43	P64//ANI4		63	P01
4	V_{LC1}		24	S13		44	P63//ANI3		64	P00
5	V_{LC2}		25	S14		45	P62/ANI2		65	P47
6	V_{SS1}		26	S15		46	P61/ANI1		66	P46
7	COM_0		27	P93/S16		47	P60/ANI0/CMPIN0		67	/RESET
8	COM_1		28	P92/S17		48	AVSS		68	X2
9	COM_2		29	P91/S18		49	P27.INTP3/CPT5		69	X1
10	COM_3		30	P90S19		50	P26/INTP2/TO5		70	VSS0
11	S0		31	P87/S20		51	P25.INTP1/TI1		71	VDD0
12	S1		32	P86/S21		52	P24.INTP0/TI0		72	XT2
13	S2		33	P85/S22		53	P23/CMPTOUT0/TO2		73	XT1
14	S3		34	P84/S23		54	P22.SI/RxD		74	VPP
15	S4		35	P83/S24		55	P21/SO/TxD		75	P45/KR5
16	S5		36	P82/S25		56	P20//SCK/ASCK		76	P44/KR4
17	S6		37	P81/S26		57	P53		77	P43/KR3
18	S7		38	P80/S27		58	P52		78	P42/KR2
19	S8		39	AV_{DD}		59	P51		79	P41/KR1
20	S9		40	AV_{REF}		60	P50		80	P40/KR0

Note: Package pin numbers match the header pinout numbers.

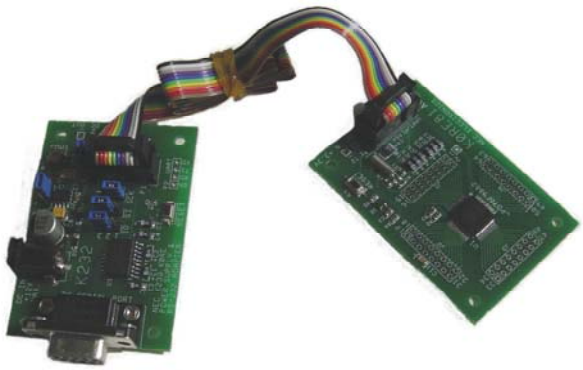
2. CONNECTING TO THE K232 SERIAL ADAPTER

There are two ways to connect to the K232. The first is via the 10-pin stackable J2 header. Figure 2 shows the board's orientation for stacking.

Figure 2. Stacked Connection

The second is with an extension ribbon cable supplied with the K232 that plugs onto the P1 10-pin header on the circuit side of the K232. The other side plugs into the flash programmer header on the K0RE9418. These connections use keyed headers and can only be plugged in one way (Figure 3).

Figure 3. Ribbon Cable Connection



3. K232 JUMPER SETTINGS FOR THE K0RE9418

1. Set a jumper to JP1 if you want the K0RE9418 to derive power from the K232 adapter.
2. Set a jumper to JP2 for 3.3-volt operation.
3. JP3 does not require a jumper.
4. Set JP4 jumper 2 to 3.
5. Set JP5 jumper 1 to 2.

4. PRE-FLASHED SOFTWARE

The K0RE9418 was flash-programmed in manufacturing with the K0S mini-monitor program for testing and diagnostics. The K232 will work with the K0RE9418 right out of the box. Check the *K232 User's Manual* for communication port settings.

Table 2. Bill of Materials

Item	Part Name	Description	Value	Digi-Key Part No.	Quantity
1	R2	RES, SMT, 0805, 10k OHM, 5%	1.0k	P1.0KACT-ND	5
2	R3	RES, SMT, 0805, 100k OHM,5 %	3.3k	P3.3KACT-ND	1
3	R4	RES, SMT, 0805, 3.3k OHM, 5%	10k	P10KACT-ND	3
4	R5,R6,R7,R8	RES, SMT, 0805, Value	Defined by User		4
5	R1	RES, SMT, 0805, 220k OHM, 5%	220k	P220KACT-ND	1
6	C1, C2	CAP, MLC, C0G, SMT, 0805, 33 pF, 50V, 5%	33 pF	PCC330CGCT-ND	2
7	C3	CAP, MLC, C0G, SMT, 0805, 470 pF, 50V, 5%	470 pF	PCC471CGCT-ND	1
8	C4	10uF, 16V, TAN CAP, TANT, SMT, 3528	10 µF, 16V, 10%	PCS3106CT-ND	1
9	C5,C6	CAP, MLC, C0G, SMT, 0805, 22pF, 50V, 5%	33 pF	PCC220CGCT-ND	
10	C7,C8	CAP, MLC, X7R, SMT, 1206, 100 nF, 50V, 10%	100 nF	PCC104BCT-ND	1
11	X1	XTAL, 4.9152MHz, 8.2 mm,	4.9152MHz		1
12	X2	XTAL, 32 kHz, 8.2 mm, ECS-3X8	32 kHz	X801-ND	1
13	U2	IC, LIN, VOLTAGE DETECTOR, 2.7V (SOT-23)	TC54VN2702	TC54V2702ECB71CT	1
14	U1	IC, MCU, SMT, FLASH, NEC µPD78F9418	µPD78F9418	Available from NEC	1
15	P1	HDR, TWO-ROW, VERT, SHRD, 0.100”, 10-Pin	HDR, 10-Pin	A26267-ND	1
16	S1	SWITCH, PUSHBUTTON, SPST, 6 mm x 3.5 mm, SMT	SW, EVQPP	P8086SCT-ND	1
17	T1, T2	Terminal	TERM	N/A	2
18	PCB	Printed Circuit Board	PCB	N/A	1

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