User's Manual

K0RE81

Evaluation Platform for μPD78F9882 Microcontroller

Contents

1. INTRODUCTION

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

The K0RE81 board employs the μPD78F9882 flash microcontroller, which is identical to the μPD789881 mask ROM version, except that it does not exhibit the same ultra-low-power performance. A design therefore would be implemented in the K0RE81 board via the μPD78F9882, and the code and operation thoroughly debugged before committing to mask ROM release.

Table 1.   μPD789881/ μPD78F9882 Comparison

μPD789881	μPD78F9882
Ultra-low power operation, I_{DD4} <0.9 μa typ.	Ultra-low-power operation not available
16 KB mask ROM	32 KB flash memory
26 x 4 LCD controller	26 x 4 LCD controller
Four timer channels	Four timer channels
One serial UART channel	One serial UART channel
28 I/O ports (four N-channel open drain)	28 I/O ports (four N-channel open drain)
Pull-up resistors on open-drain port (mask option)	No pull-up resistors on open-drain port
On-chip multiplier: 8 x 8 = 16 bits	On-chip multiplier: 8 x 8 = 16 bits
On-chip voltage divider and regulator	On-chip voltage divider and regulator

Figure 1. Board Layout
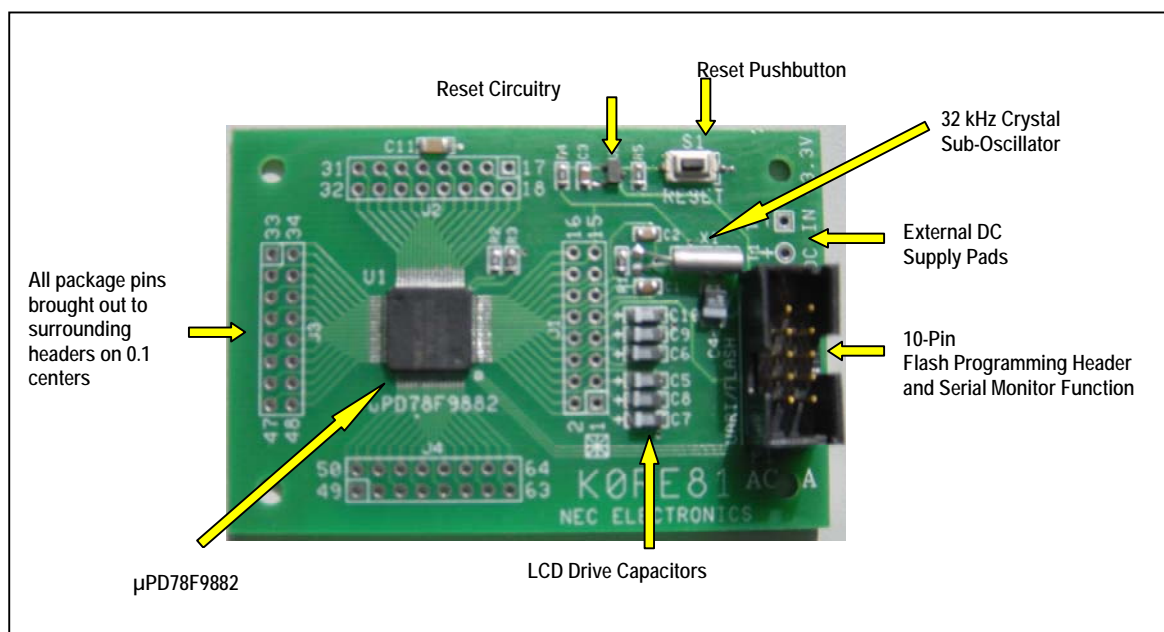

Table 2. K0RE81 (µPD78F9882) Pin Configuration

1	VLC2	17	P01	33	P11	49	S11
2	VLC1	18	P02	34	P10	50	S10
3	CAPH2	19	P03	35	P95/S25	51	S9
4	CAPL2	20	P50	36	P94/S24	52	S8
5	CAPL1	21	P51	37	P93/S23	53	S7
6	CAPH1	22	P52	38	P92/S22	54	S6
7	HV_{DD}	23	P53	39	P91/S21	55	S5
8	VR_{OUT}	24	V_{SS0}	40	P90/S20	56	S4
9	V_{DD1}	25	V_{DD0}	41	P84/S19	57	S3
10	V_{SS1}	26	P30/INTP0/TO0/T100	42	P83/S18	58	S2
11	XT1	27	P31/INTP1/TI51	43	P82/S17	59	S1
12	XT2	28	P32/INTP2/TO50/TI50	44	P81/S16	60	S0
13	ICO (V_{PP})	29	P33/INTP3/TI51	45	P80/S15	61	COM3
14	ICO (FPCLK)	30	P20/TO51	46	S14	62	COM2
15	/Reset	31	P21/TxD0	47	S13	63	COM1
16	P00	32	P22/RxD0	48	S12	64	COM0

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 J2 10-pin stackable header. Figure 2 shows the board's orientation for stacking.

Figure 2. Stacked Connection

RS-232 Connector

Stacking Socket
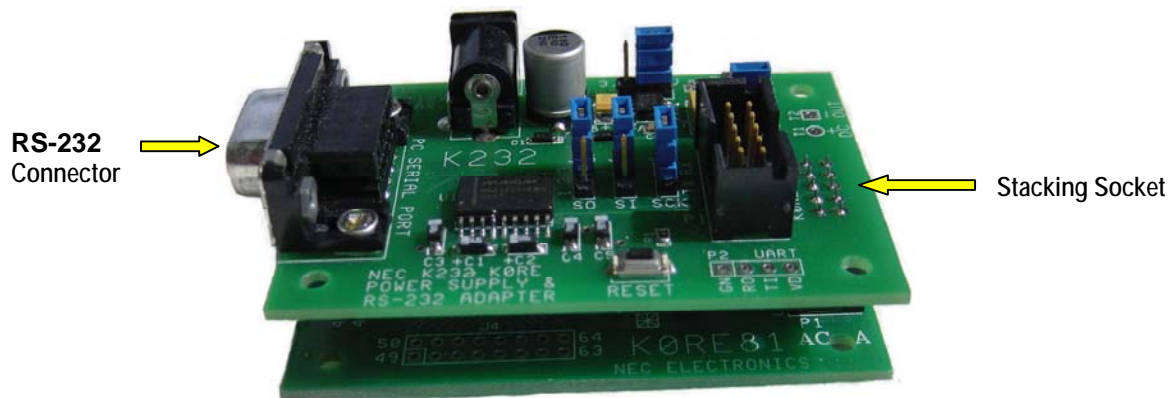
The second is with an extension ribbon cable supplied with the K232 that plugs onto the P1 10-pin header on the circuit side of the K232. The other side plugs into the flash programmer header on the K0RE81. These connections use keyed headers and can only be plugged in one way. See Figure 3.

Figure 3. Ribbon Cable Connection

3.   K232 JUMPER SETTINGS FOR THE K0RE81

1.   Connect jumper JP1 if you want the K0RE81 to derive power from the K232 adapter.

2.   Set jumper JP2 for 3.3-volt operation.

3.   Set JP3 jumper on TX (pins 1–2)

4.   Set JP4 jumper on RX (pins 2–3.

5.   JP5 requires no jumper.

4.   PRE-FLASHED FIRMWARE

The K0RE81 was flashed in manufacturing with the K0SM9882 mini-monitor program for testing and diagnostics. The K232 will work with the K0RE81 right out of the box. Check the *K232 User's Manual* for communication port settings.

Table 3. Bill of Materials

Item	Part Name	Description	Value	Digi-Key Part No.	Quantity
1	R2	RES, SMT, 0805, 1.0k OHM, 5%	1.0k	P1.0KACT-ND	5
2	R3	RES, SMT, 0805, 3.3k OHM,5 %	3.3k	P3.3KACT-ND	1
3	R4	RES, SMT, 0805, 10k OHM, 5%	10k	P10KACT-ND	3
4	R5	RES, SMT, 0805,100k OHM, 5%	100k	P100KACT-ND	1
5	R1	RES, SMT, 0805, 220k OHM, 5%	220k	P220KACT-ND	1
6	C5, C6, C7, C8, C9, C10	0.47µF, 25V, TAN CAP, TANT, SMT, 3216	0.47µF, 25V, 10%	PCS5474CT-ND	6
7	C4	10uF, 16V, TAN CAP, TANT, SMT, 3528	10 µF, 16V, 10%	PCS3106CT-ND	1
8	C1, C2	CAP, MLC, C0G, SMT, 0805, 33 pF, 50V, 5%	33 pF	PCC330CGCT-ND	2
9	C3	CAP, MLC, C0G, SMT, 0805, 470 pF, 50V, 5%	470 pF	PCC471CGCT-ND	1
10	C11	CAP, MLC, X7R, SMT, 1206, 100 nF, 50V, 10%	100 nF	PCC104BCT-ND	1
11	X1	XTAL, 32 kHz, 8.2 mm, ECS-3X8	32 kHz	X801-ND	1
12	U2	IC, LIN, VOLTAGE DETECTOR, 2.7V (SOT-23)	TC54VN2702	TC54V2702ECB71CT	1
13	U1	IC, MCU, SMT, FLASH, NEC µPD78F9882	µPD78F9882	Available from NEC	1
14	P1	HDR, TWO-ROW, VERT, SHRD, 0.100", 10-Pin	HDR, 10-Pin	A26267-ND	1
15	S1	SWITCH, PUSHBUTTON, SPST, 6 mm x 3.5 mm, SMT	SW, EVQPP	P8086SCT-ND	1
16	P2	HDR, TWO-ROW, VERT, SHRD, 0.100", 10-Pin	HDR, 10-PIN	A26267-ND	1
17	J1, J2, J3, J4	SKT, 16-Pin		N/A	(4)
18	T1, T2	Terminal	TERM	N/A	2
23	PCB	Printed Circuit Board	PCB	N/A	1

The information in this document is current as of April 2003. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets or data books, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.

No part of this document may be copied or reproduced in any form or by any means without prior written consent of NEC Electronics. NEC Electronics assumes no responsibility for any errors that may appear in this document.

NEC Electronics does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of NEC Electronics products listed in this document or any other liability arising from the use of such NEC Electronics products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Electronics or others.

Descriptions of circuits, software and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software and information in the design of customer's equipment shall be done under the full responsibility of customer. NEC Electronics no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.

While NEC Electronics endeavors to enhance the quality, reliability and safety of NEC Electronics products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. To minimize risks of damage to property or injury (including death) to persons arising from defects in NEC Electronics products, customers must incorporate sufficient safety measures in their design, such as redundancy, fire-containment and anti-failure features.

NEC Electronics products are classified into the following three quality grades: "Standard", "Special" and "Specific".

The "Specific" quality grade applies only to NEC Electronics products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of NEC Electronics product depend on its quality grade, as indicated below. Customers must check the quality grade of each NEC Electronics product before using it in a particular application.

"Standard": Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots.

"Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support).

"Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.

The quality grade of NEC Electronics products is "Standard" unless otherwise expressly specified in NEC Electronics data sheets or data books, etc. If customers wish to use NEC Electronics products in applications not intended by NEC Electronics, they must contact NEC Electronics sales representative in advance to determine NEC Electronics 's willingness to support a given application.

(Notes)

(1) " NEC Electronics" as used in this statement means NEC Electronics Corporation and also includes its majority-owned subsidiaries.

(2) " NEC Electronics products" means any product developed or manufactured by or for NEC Electronics (as defined above).