NXP AN11518 sensor Application note

http://www.manuallib.com/nxp/an11518-sensor-application-note.html

This document provides information regarding the migration from the EM773 to the EM783-SC version device. This document should be used in conjunction with both device datasheets. The following is a list of the differences between EM773 and EM783-SC.

• Pinning
• Working voltage
• Features change
• SDK features

AN11518

EM773 to EM783 migration guide

Rev. 1.0 — 7 March 2014 Application note

Document information

Info	Content
Keywords	EM783, EM773, Migration
Abstract	Design Migration guide from EM773 to EM783

Revision history

Rev	Date	Description
1.0	20140307	Initial version

Contact information

For more information, please visit: http://www.nxp.com

For sales office addresses, please send an email to: salesaddresses@nxp.com

1. Introduction

This document provides information regarding the migration from the EM773 to the EM783-SC version device. This document should be used in conjunction with both device datasheets. The following is a list of the differences between EM773 and EM783-SC.

- Pinning
- Working voltage
- Features change
- SDK features

2. Differences

2.1 Pinning

EM783-SC has 2 main differences in pin out when compared to EM773 for the metrology application. These differences are explained below and highlighted (bold) in the following table.

- VBIAS function (bias/reference voltage for metrology engine) on pins 14 and 23 added
- Voltage input in EM783 has to be connected to pin 28 in addition to pin 22. This additional pin is present for tracking the frequency of mains. This feature is not present in EM773.

In addition to above main changes, below list indicates some minor changes with regards to pin multiplexing.

- EM773 SPI, I2C, SWD and UART function pins are not changed in EM783. EM783 provides additional options for above interfaces.
- Additional pin functions are added on multiple pins.

Below table has list of pin changes between EM773 and EM783. Pins which are same in both EM773 and EM783 are not included here.

Table 1. EM773 to EM783 pin mapping

Pin	EM773 pin name	EM783 pin name
1	PIO2_0/DTR	P0_26/TXD/CT32B0_CAP2
3	PIO0_1/CLKOUT/CT32B0_MAT2	P0_1/RXD/CLKOUT/CT32B0_MAT2/SSEL0/CLKIN
7	PIO1_8	P0_24/SCL/CLKIN
8	PIO0_2/SSEL0/CT16B0_CAP0	P0_18/SSEL 0/CT16B0_CAP0
9	PIO0_3	P0_19/CLKIN/CLKOUT/MOSI0
10	PIO0_4/SCL	P0_2/SCL/SWCLK/CT16B0_CAP0
11	PIO0_5/SDA	P0_3/SDA/SWDIO
12	PIO1_9	P0_25/SDA
13	PIO3_4	P0_16/ATRG0/CT16B0_CAP1/SCL
14	**PIO3_5**	**VBIAS**

Pin	EM773 pin name	EM783 pin name
15	PIO0_6/SCK0	P0_20/SCK0
16	PIO0_7/CTS	P0_21/CTS/SCLK
17	PIO0_8/MISO0/CT16B0_MAT0	P0_22/MISO0
18	PIO0_9/MOSI0/CT16B0_MAT1	P0_4/AOUT/CT16B0_MAT1/MOSI0
19	SWCLK/PIO0_10/SCK0/CT16B0_MAT2	SWCLK/P0_5/CT16B0_MAT2/SCK0
23	**R/PIO1_1/CT32B1_MAT0**	**VBIAS/I7**
24	R/PIO1_2/CT32B1_MAT1	I2_L/I2/R/P0_9/CT16B0_MAT1/CTS
25	SWDIO/PIO1_3/CT32B1_MAT2	V2/I6/I2_H/SWDIO/P0_10/CT16B0_MAT2/RTS
26	PIO1_4/CT32B1_MAT3/WAKEUP	I3_L/I3/P0_11/SCLK/CT32B0_CAP0
27	PIO1_11	V3/I4/I3_H/P0_15/TXD/CT32B0_CAP2/SDA
28	**PIO3_2**	**V1_2**
30	PIO1_5/RTS/CT32B0_CAP0	P0_23/RTS/CT32B0_CAP0/SCLK
31	PIO1_6/RXD/CT32B0_MAT0	P0_12/RXD/CT32B0_MAT0/SCL/CLKIN
32	PIO1_7/TXD/CT32B0_MAT1	P0_13/TXD/CT32B0_MAT1/SDA

2.2 Working voltage

EM783 works from 2.6 V to 3.6 V for core and IO voltage where as EM773 can work from 1.8 V to 3.6 V.

2.3 Features change

EM783 has below changes in features when compared to EM773

- Additional pin functions are added on multiple pins.
- No. of GPIO's on EM783 are reduced to 22 from 25 in EM773 to facilitate additional analog pins for other variants of EM783.
- No. of general purpose counter/timers on EM783 is reduced to 2 from 3 in EM773.
- EM783 has built in temperature sensor for temperature compensation, an internal voltage reference and a 10 bit DAC.

2.4 SDK features

EM783 provides all features supported by EM773 and the below listed additional features.

- The number of mains periods used to integrate the samples for the computation is configurable.
- The offset error correction for each of the current and voltage channels can be configured into the metrology engine.
- EM783 metrology engine performs the mains frequency tracking and hence the computed results are more accurate than EM773.
- Die temperature measurement data is available in the metrology engine results. This can be used to perform temperature compensation by the application..

Below link to the API document gives complete SDK features of EM783.

Link: http://www.nxp.com/documents/user_manual/UM10753.pdf

The present SDK uses different pin multiplexing for SPI, SWD and I2C functions which needs to be changed to match EM773 as EM773 does not have additional pin multiplexing like EM783.

2.5 Support information

Please refer to the following link for additional information on EM783.

http://www.nxp.com/products/power_management/energy_measurement_ics/series/EM783.html

For further support on EM783, you can send an email to em7xx.support@nxp.com.

3. Legal information

3.1 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

3.2 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of NXP Semiconductors.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). NXP does not accept any liability in this respect.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Evaluation products — This product is provided on an "as is" and "with all faults" basis for evaluation purposes only. NXP Semiconductors, its affiliates and their suppliers expressly disclaim all warranties, whether express, implied or statutory, including but not limited to the implied warranties of non-infringement, merchantability and fitness for a particular purpose. The entire risk as to the quality, or arising out of the use or performance, of this product remains with customer.

In no event shall NXP Semiconductors, its affiliates or their suppliers be liable to customer for any special, indirect, consequential, punitive or incidental damages (including without limitation damages for loss of business, business interruption, loss of use, loss of data or information, and the like) arising out the use of or inability to use the product, whether or not based on tort (including negligence), strict liability, breach of contract, breach of warranty or any other theory, even if advised of the possibility of such damages.

Notwithstanding any damages that customer might incur for any reason whatsoever (including without limitation, all damages referenced above and all direct or general damages), the entire liability of NXP Semiconductors, its affiliates and their suppliers and customer's exclusive remedy for all of the foregoing shall be limited to actual damages incurred by customer based on reasonable reliance up to the greater of the amount actually paid by customer for the product or five dollars (US$5.00). The foregoing limitations, exclusions and disclaimers shall apply to the maximum extent permitted by applicable law, even if any remedy fails of its essential purpose.

4. Contents

For more information, visit: http://www.nxp.com
For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 7 March 2014
Document identifier: AN11518