

Interfacing the MC34709 with an External Battery Charger

1 Purpose

This document shows an example implementation of an external battery charger solution for the MC34709 power management architecture for i.MX processors.

2 Scope

This document provides the design-in information (including schematic) for using an external charger with isolator charging path while interfacing with the MC34709 PMIC. It does not provide instruction on how to fully configure the MC34709 system along with an i.MX processor; however, it does refer to them in order to provide a clear idea on how the battery charger would interact in a full system environment.

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3 MC34709 Device Overview

The 34709 is a Power Management Integrated Circuit (PMIC) designed primarily for use with the Freescale i.MX50 and i.MX53 families. It offers a low-cost solution targeting embedded applications that do not require a battery charger. It supports both consumer and industrial applications with a single 130-pin, 8mm x 8mm, 0.5mm-pitch MAPBGA package that is easy to route in low cost board designs.

Features:

- Five buck converters—configurable to provide up to six independent outputs that directly supply the processor core, memory, and peripheral
- Boost regulator for USB PHY domain on i.MX processors
- Seven LDO regulators with internal and external pass devices for thermal budget optimization
- One low-current, high-accuracy voltage reference for DDR memory
- 10-bit ADC for monitoring battery and other inputs
- Real-time clock and crystal oscillator circuitry with a coin cell backup/charger
- SPI/I²C bus for control and register interface
- Four general purpose low-voltage I/Os with interrupt capability
- Two PWM outputs

The MC34709 can be easily combined with an external charger, allowing flexibility for either single or multi-cell Li-Ion battery configurations. This document presents the MAX8903 battery charger as an example of a battery charging solution for the MC34709 power management device. However, it is up to the customer, according to his system requirements, to select a proper charger device to be used in conjunction with the power management unit.

4 Interfacing with an External Battery Charger

The MC34709 power management device, is powered by a single input supply (BP) that provides full system power distribution. BP operating voltage range goes from 3.0 V to 4.5 V; therefore, the charger system voltage must be set within the operating range. One such example of a charger IC, the MAX8903 provides a typical $V_{SYS} = 4.325$ V, which makes it suitable to supply full system power to the MC34709. The MAX8903 supplies a 4.2 V battery regulation voltage suitable for standard 3.7 V Li-ion batteries, which are used in common portable applications.

[Figure 1](#) and [Figure 2](#) show the application schematic, including the external charger and how it connects to the MC34709.

Freescale does not assume liability, endorse, or warrant components from external manufacturers that are referenced in circuit drawings or tables. While Freescale offers component recommendations in this configuration, it is the customer's responsibility to validate their application.

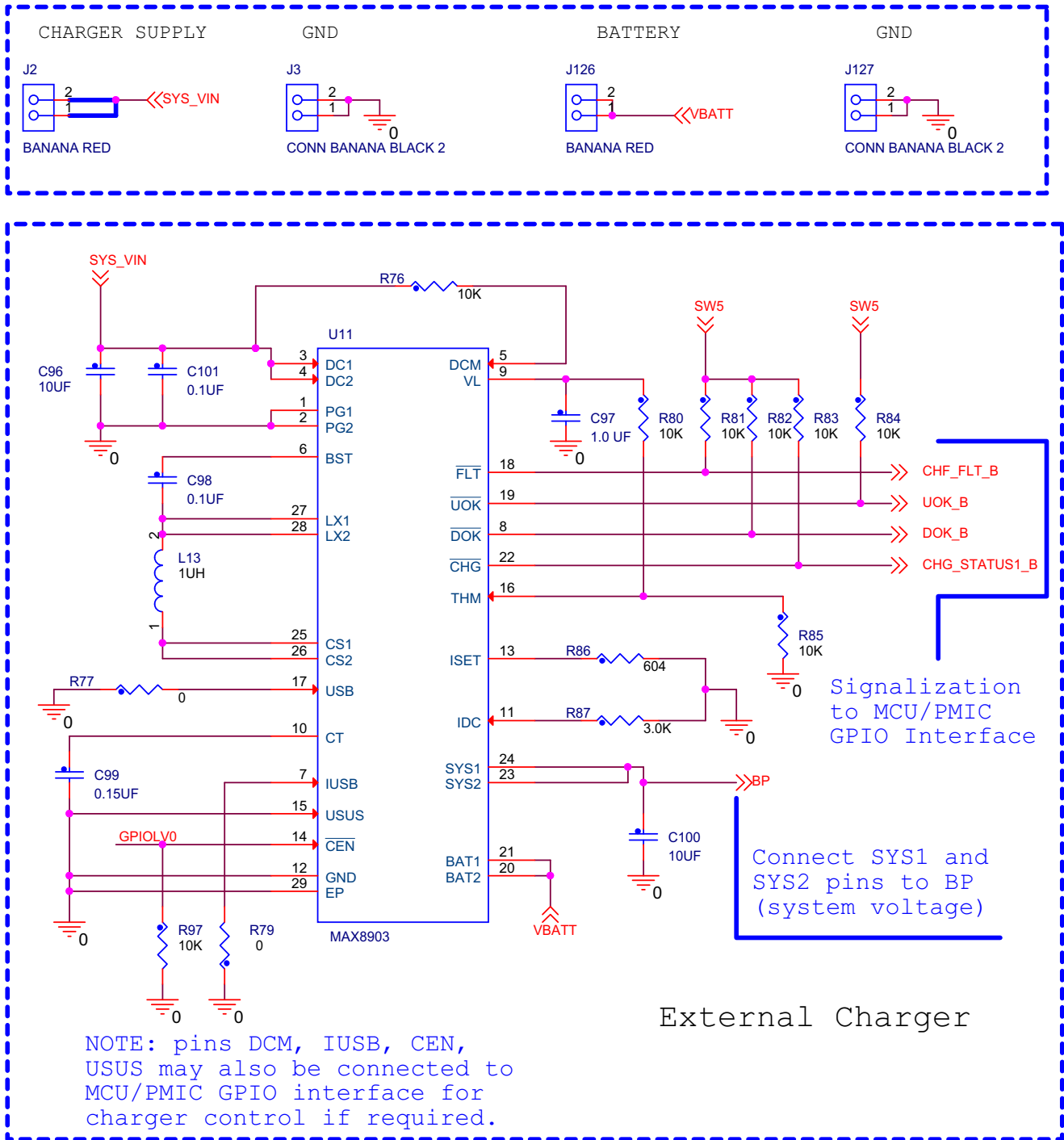


Figure 1. External Charger Connection Diagram

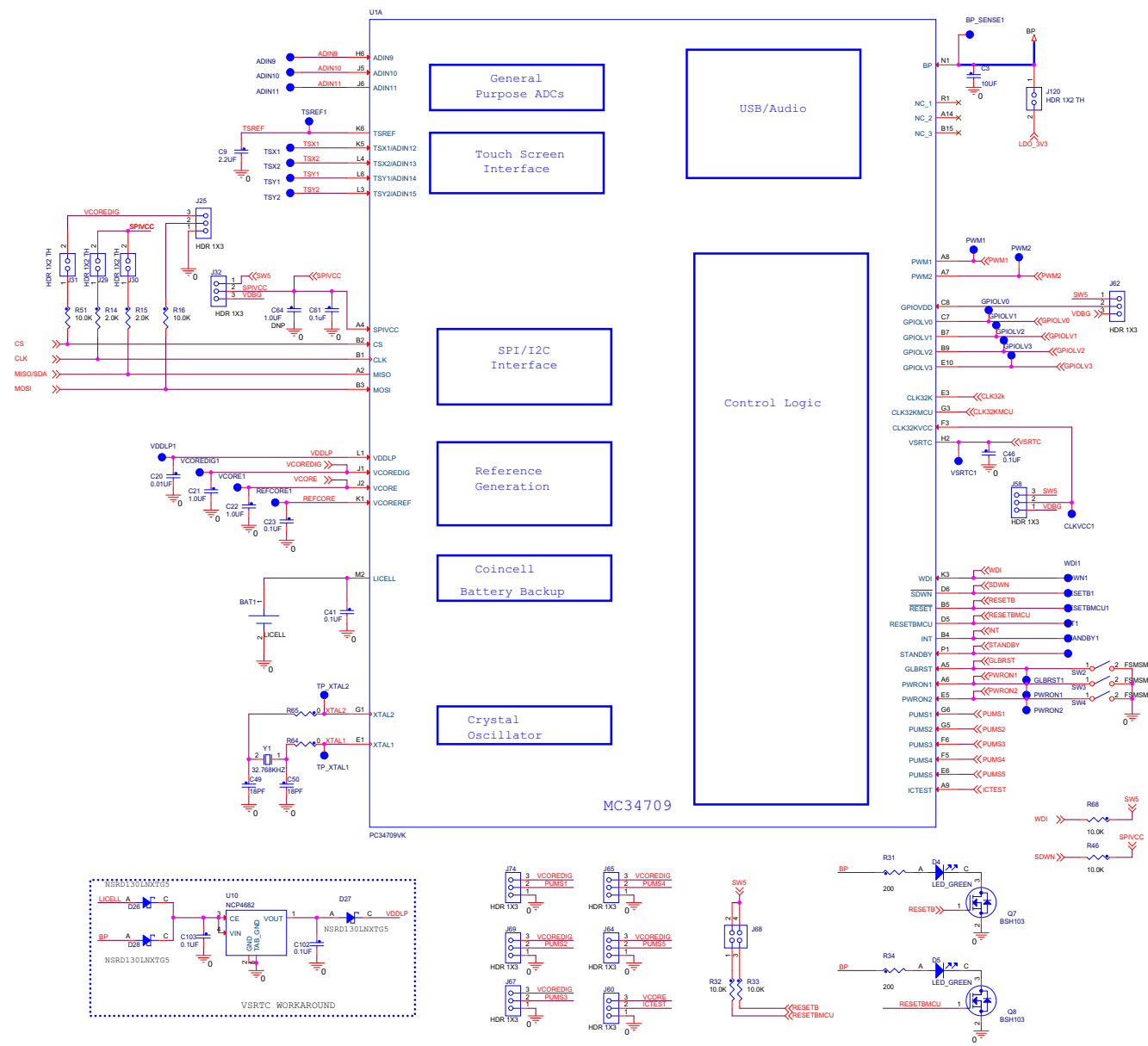


Figure 2. MC34709 Connection Diagram

4.1 Control Interface Signals

Since the external charger provides an isolated charging path with internal charging logic, the battery charging process is fully transparent to the MC34709 and the system itself. However, depending on the external charger IC selected by the customer, parallel control and signaling pins may be required to interact with GPIO signals from either the MCU or the MC34709, thereby providing full charging control and signaling to/from the system controller.

For further information on the external charger component selection, please refer to the vendor datasheet.

5 References

Document Number	Description	URL
MC34709	Data sheet	http://cache.freescale.com/files/analog/doc/data_sheet/MC34709.pdf
MC34709ER	Errata	http://cache.freescale.com/files/analog/doc/errata/MC34709ER.pdf
MC34709FS	Fact Sheet	http://cache.freescale.com/files/analog/doc/fact_sheet/MC34709FS.pdf
	Product Summary Page	http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=MC34709
	Power Management Home Page	www.freescale.com/PMIC
	Analog Home Page	www.freescale.com/analog

6 Revision History

Revision	Date	Description of Changes
1.0	11/2012	<ul style="list-style-type: none">Initial release

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