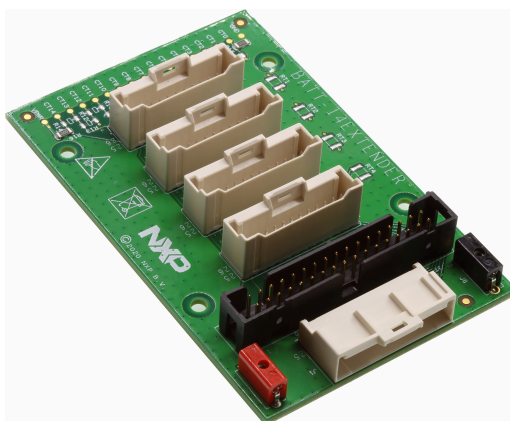


UM11484

Introduction to BATT-14EXTENDER 14-cell battery pack extender

Rev. 2 — 16 September 2021

User guide



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1 Overview of the BATT-14EXTENDER, 14-cell battery pack extender

NXP Semiconductors provides online resources for this evaluation board and its supported device(s) on <http://www.nxp.com>.

The information page for BATT-14EXTENDER, 14-cell battery pack extender is at <http://www.nxp.com/products/:BATT-14EXTENDER>. The information page provides overview information, documentation, software and tools, parametrics, ordering information and a Getting Started tab. The Getting Started tab provides quick-reference information applicable to using the BATT-14EXTENDER, 14-cell battery pack extender, including the downloadable assets referenced in this document.

CAUTION: This product has not undergone formal EMC assessment. It is the responsibility of the user to ensure that any finished assembly complies with applicable regulations on EMC interference. EMC testing, and other testing requirements for CE is the responsibility of the user.

2 Getting started

2.1 Kit contents

The BATT-14EXTENDER kit contents include:

- BATT-14EXTENDER, 14-cell battery pack extender board
- 26-conductor cell terminal cable

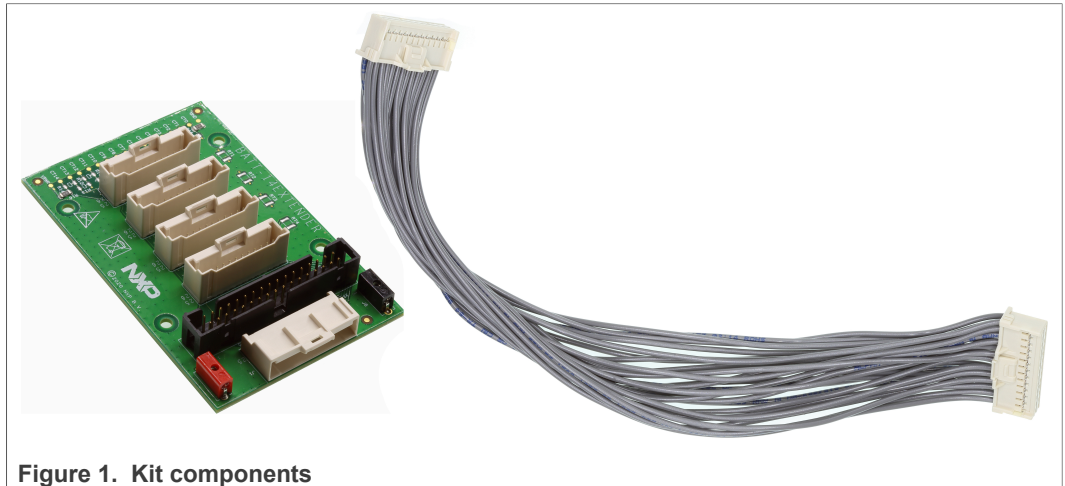


Figure 1. Kit components

Figure 1 - BATT-14EXTENDER Kit components

2.2 Required equipment

To use this kit, you will need:

- 14-cell battery pack or a battery pack emulator, such as BATT-14CEMULATOR, BATT-14EMULATOR or BATT-14AAAPACK
- External power supply 10 to 60 V – 0.5 A (optional)
- Up to four BCC Evaluation boards (EVBs)

3 Getting to know the hardware

3.1 Board features

The BATT-14EXTENDER board allows the user to connect up to four evaluation boards to a single battery pack or battery emulator.

There are two options to supply the EVBs:

- Battery or battery emulator such as BATT-14CEMULATOR, BATT-14EMULATOR or BATT-14AAAPACK
- External power supply provided some additional components are added to BATT-14EXTENDER board

The following EVBs are compatible with the BATT-14EXTENDER board:

- RD33771CDSTEVB
- FRDM33771CSPEVB
- XRD33775ADSTEVB

3.2 Board description

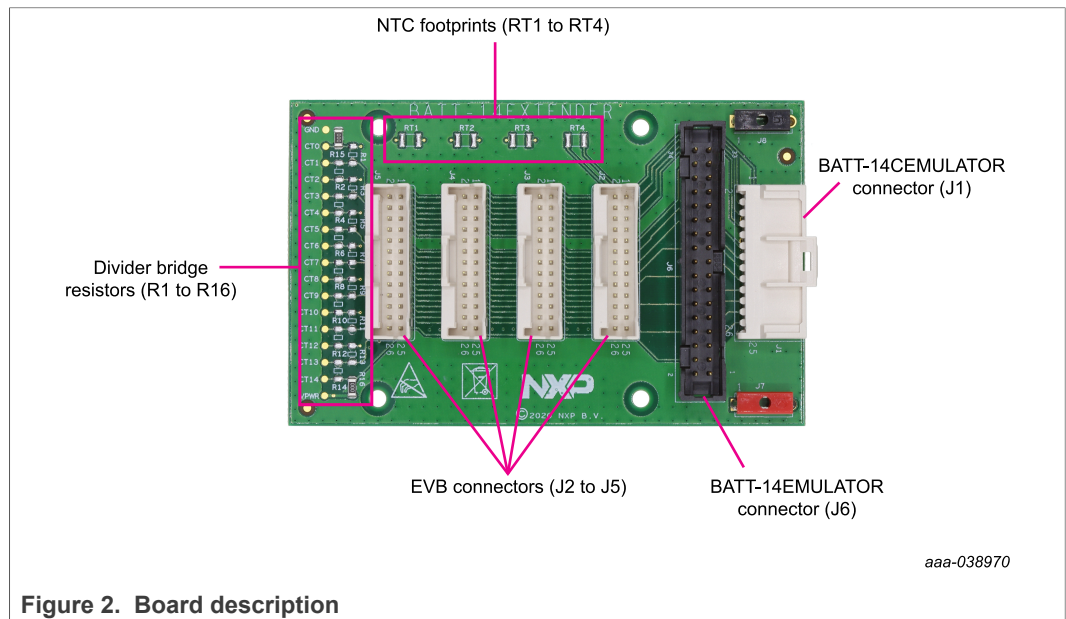


Figure 2. Board description

3.3 Connectors

The J1 connector is typically connected to a battery pack or to BATT-14CEMULATOR battery emulator. When connecting to a 14-cell battery pack, the user can use the cable provided in the kit by cutting out one of the connectors and making the appropriate connections to the battery pack.

The EVBs are connected, from J2 to J5.

The J1-J5 connectors are from Molex, series 501876. These connectors share the same pinout described in [Table 1](#). The mate connector reference is 501646-2600 from Molex.

Table 1. J1-J5 connectors pinouts

Pin	Connection	Description
1	NTC3_GND	NTC connection (-)
2	NTC3	NTC connection (+)
3	NTC2_GND	NTC connection (-)
4	NTC2	NTC connection (+)
5	NTC1_GND	NTC connection (-)
6	NTC1	NTC connection (+)
7	NTC0_GND	NTC connection (-)
8	NTC0	NTC connection (+)
9	GND	negative battery
10	GND	negative battery
11	CT1	Battery cell1P connection
12	CT0	Battery cell1M connection
13	CT3	Battery cell3P connection
14	CT2	Battery cell2P connection
15	CT5	Battery cell5P connection
16	CT4	Battery cell4P connection
17	CT7	Battery cell7P connection
18	CT6	Battery cell6P connection
19	CT9	Battery cell9P connection
20	CT8	Battery cell8P connection
21	CT11	Battery cell11P connection
22	CT10	Battery cell10P connection
23	CT13	Battery cell13P connection
24	CT12	Battery cell12P connection
25	VBAT	positive battery
26	CT14	Battery cell14P connection

The J6 connector can be used to supply the EVBs from BATT-14EMULATOR or BATT-14AAAPACK. The pinout of the J6 connector is described in [Table 2](#).

Table 2. J6 connector pinouts

Pin	Connection	Description
1	VBAT	positive battery
2	VBAT	positive battery
3	CT14	Battery cell14P connection
4	CT14	Battery cell14P connection
5	CT13	Battery cell13P connection
6	CT13	Battery cell13P connection

Table 2. J6 connector pinouts...continued

Pin	Connection	Description
7	CT12	Battery cell12P connection
8	CT12	Battery cell12P connection
9	CT11	Battery cell11P connection
10	CT11	Battery cell11P connection
11	CT10	Battery cell10P connection
12	CT10	Battery cell10P connection
13	CT9	Battery cell9P connection
14	CT9	Battery cell9P connection
15	CT8	Battery cell8P connection
16	CT8	Battery cell8P connection
17	CT7	Battery cell8P connection
18	CT7	Battery cell8P connection
19	CT6	Battery cell8P connection
20	CT6	Battery cell8P connection
21	CT5	Battery cell8P connection
22	CT5	Battery cell8P connection
23	CT4	Battery cell8P connection
24	CT4	Battery cell8P connection
25	CT3	Battery cell8P connection
26	CT3	Battery cell8P connection
27	CT2	Battery cell8P connection
28	CT2	Battery cell8P connection
29	CT1	Battery cell8P connection
30	CT1	Battery cell8P connection
31	NC	Not connected
32	NC	Not connected
33	CT0	Battery cell1M connection
34	GND	negative battery

3.4 Changing the board to the divider bridge option

The BATT-14EXTENDER board offers the option to use an external power supply to power-up the EVBs. In this case, the user will have to populate the divider bridge with the appropriate resistors:

- R1 to R14: 1 K recommended with a (1206) footprint
- R15 to R16: 0 R with a (1206) footprint

The user will also have to populate the temperature sensor footprint RT1-RT4 with a (1206) NTC. For example, NC20K00103JBA from AVX.

4 Possible use cases

4.1 Use case 1

In this use case, the BATT-14EXTENDER is powered up by a BATT-14CEMULATOR. Up to four EVBs can be connected to the BATT-14EXTENDER. No additional components need to be populated. The board is delivered by default for this use case.

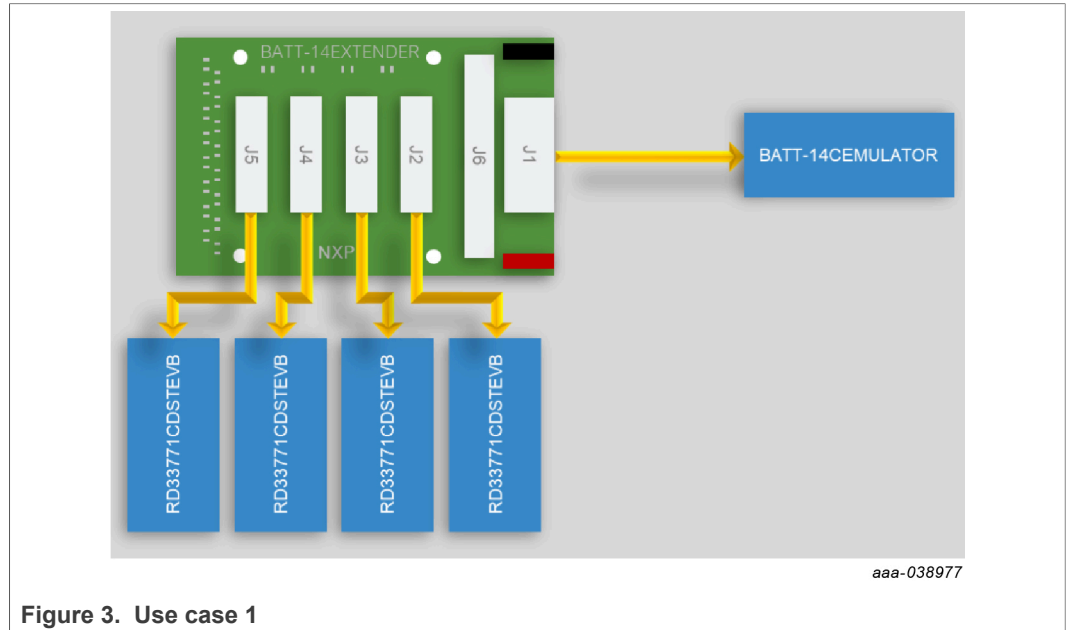


Figure 3. Use case 1

4.2 Use case 2

In this use case, the BATT-14EXTENDER is powered up by a BATT-14EMULATOR and up to four EVB can be connected to the board. BATT-14EMULATOR doesn't have an NTC emulation. In order to allow the EVBs to have an NTC emulation, it is recommended to populate RT1-RT4 footprints with NTCs.

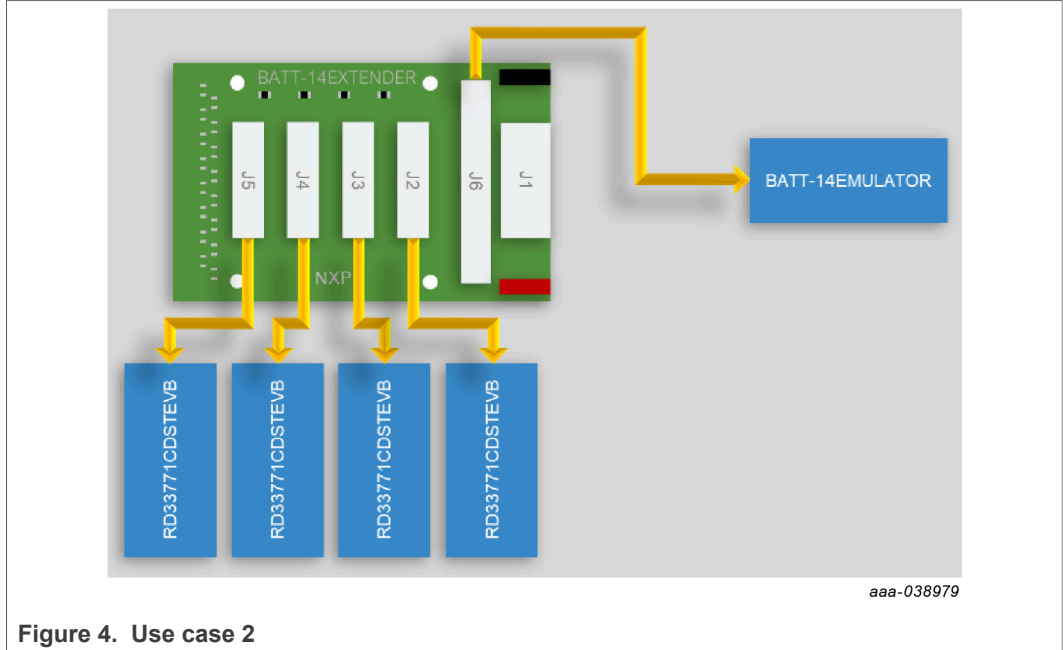


Figure 4. Use case 2

4.3 Use case 3

In this use case, the BATT-14EXTENDER is powered up by an external power supply. The positive terminal of the power supply is connected to J7 and the negative to J8. J7 and J8 are 2 mm banana plugs.

Divider bridge resistors as well as NTCs must be populated to be able to use the board with that option. See [Section 3.4](#).

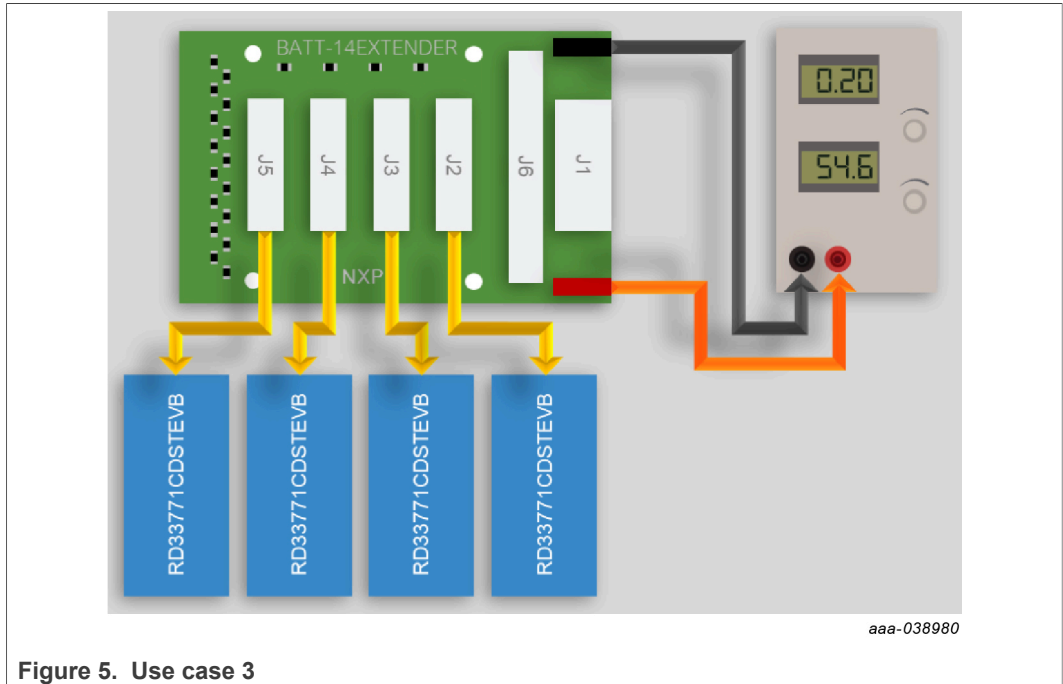


Figure 5. Use case 3

5 Schematics

The schematics of the BATT-14EXTENDER board is attached to this pdf document. To open it, please open the attachment tab on the left panel in Acrobat Reader and double-click on the file name.

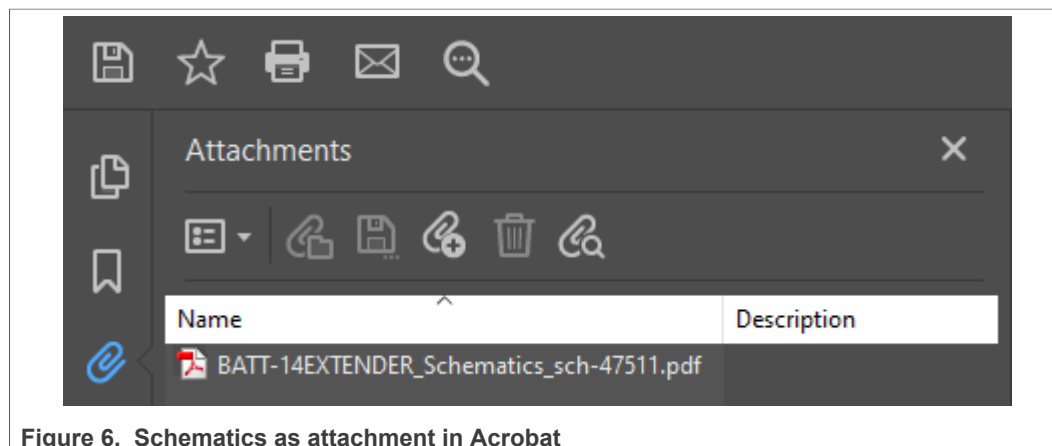


Figure 6. Schematics as attachment in Acrobat

6 References

The following are URLs where the user can obtain information on related NXP products and application solutions.

Table 3.

Item	Description	Link
MC33771/MC33772	Battery Cell Controllers page	http://www.nxp.com/Battery-Cell-Controllers
RD33771CDSTEVB	MC33771C Evaluation Board	https://www.nxp.com/design/development-boards/analog-toolbox/evaluation-board-for-mc33771c-bcc-with-isolated-daisy-chain-communication:RD33771CDSTEVB
FRDM33771CSPEVB	MC33771C Evaluation Board	https://www.nxp.com/design/development-boards/analog-toolbox/evaluation-board-for-mc33771c-with-spi-communication:FRDM33771CSPEVB
XRD33775ADSTEVB	MC33775A Evaluation Board	Contact your sales representative or FAE
BATT-14CEMULATOR	Battery emulator	https://www.nxp.com/design/development-boards/analog-toolbox/14-cell-battery-pack-emulator-to-supply-mc33771c-bcc-evbs:BATT-14CEMULATOR
BATT-14EMULATOR	Battery emulator	https://www.nxp.com/products/power-management/battery-management/14-cell-battery-pack-to-supply-mc33771-evbs:BATT-14EMULATOR
BATT-14AAPACK	Configurable Battery Pack to supply the MC33771/MC33772 EVB's	https://www.nxp.com/products/power-management/battery-management/battery-cell-controllers/configurable-battery-pack-to-supply-the-mc33771-mc33772-evbs:BATT-14AAPACK

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