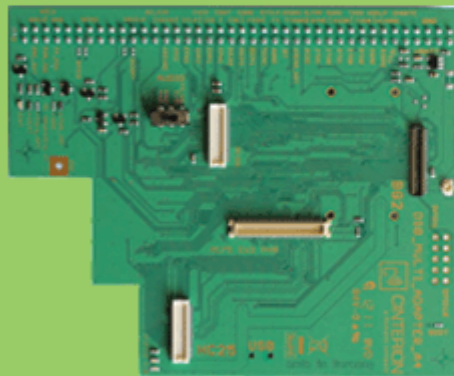




**CINTERION**  
a Gemalto company

# Multi-Adapter R1 User Guide

Version: 03  
DocId: Multi\_Adapter\_R1\_v03



# User Guide

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## 0 Document History

Preceding document: "Multi-Adapter R1 User Guide" Version 02

New document: "Multi-Adapter R1 User Guide" Version **03**

Chapter	What is new
<a href="#">1.1</a>	New section <a href="#">Regulatory Compliance Information</a> .

Preceding document: "Multi-Adapter R1 User Guide" Version 01

New document: "Multi-Adapter R1 User Guide" Version 02

Chapter	What is new
<a href="#">1</a>	Added note on Multi-Adapter R1 not being intended for use as reference environment for type approval.
<a href="#">1.4</a>	Added EHS5-E/EHS5-US as supported products.

New document: "Multi-Adapter R1 User Guide" Version 01

Chapter	What is new
---	Initial document setup.

# 1 Introduction

The Multi-Adapter R1 is a simple and easy-to-use universal DSB75 adapter board designed to quickly test and evaluate the functionality of the supported Cinterion (evaluation) products.

This document<sup>1</sup> guides you through the process of connecting the Multi-Adapter R1 correctly and getting started with the module evaluation.

## 1.1 Regulatory Compliance Information

The Multi-Adapter R1 is intended for use only in a laboratory test environment. All persons handling the Multi-Adapter R1 must be properly trained in electronics and observe good engineering practice standards.

The Multi-Adapter R1 is a test/development platform and has not been designed to be embedded into other products (referred as "final products").

The Multi-Adapter R1 is a universal DSB75 adapter designed for testing the basic functionality of a variety of Cinterion wireless modules. It is not intended for use as reference environment for type approval. For details on type approval please refer to [\[2\]](#).

## 1.2 Related Documents

- [1] AT Command Set for your product
- [2] Hardware Interface Description for your product
- [3] DSB75 Hardware Description, v14

## 1.3 Ordering Information

**Table 1:** Multi-Adapter R1 delivery package

Description	Supplier	Ordering information
Multi-Adapter R1	Cinterion	Order number: L30960-N0010-A100

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<sup>1</sup> The document is effective only if listed in the appropriate Release Notes as part of the technical documentation delivered with your Cinterion wireless module.

## 1.4 Supported Products

This User Guide applies to the following products:

Modules with board-to-board connector:

- PH8, PH8-P
- EU3-E, EU3-P
- MC55i, MC55i-W
- BG2-E, BG2-W
- HC25, HC28, HC28-J
- MC75i
- TC65i, TC65i-X
- TC63i

Evaluation modules for SMT modules

- EES3
- EGS5, EGS5-X
- EGS3
- BGS3
- BGS2-E, BGS2-W
- PHS8-P, PHS8-E, PHS8-US, PHS8-USA
- EHS5-E, EHS5-US

## 2 Product Concept

Figure 1 and Figure 2 show the various interfaces of the Multi-Adapter R1. Possible modules to be mounted onto the adapter are indicated with dotted lines. Table 2 describes these interfaces in more detail.

### Top view

2x40-pin header top (CON9 and CON10) for interface lines to DSB75  
 50-pin board-to-board connector 1 (MC55i, MC55i-W)  
 60-pin board-to-board connector (BG2, BGS2)

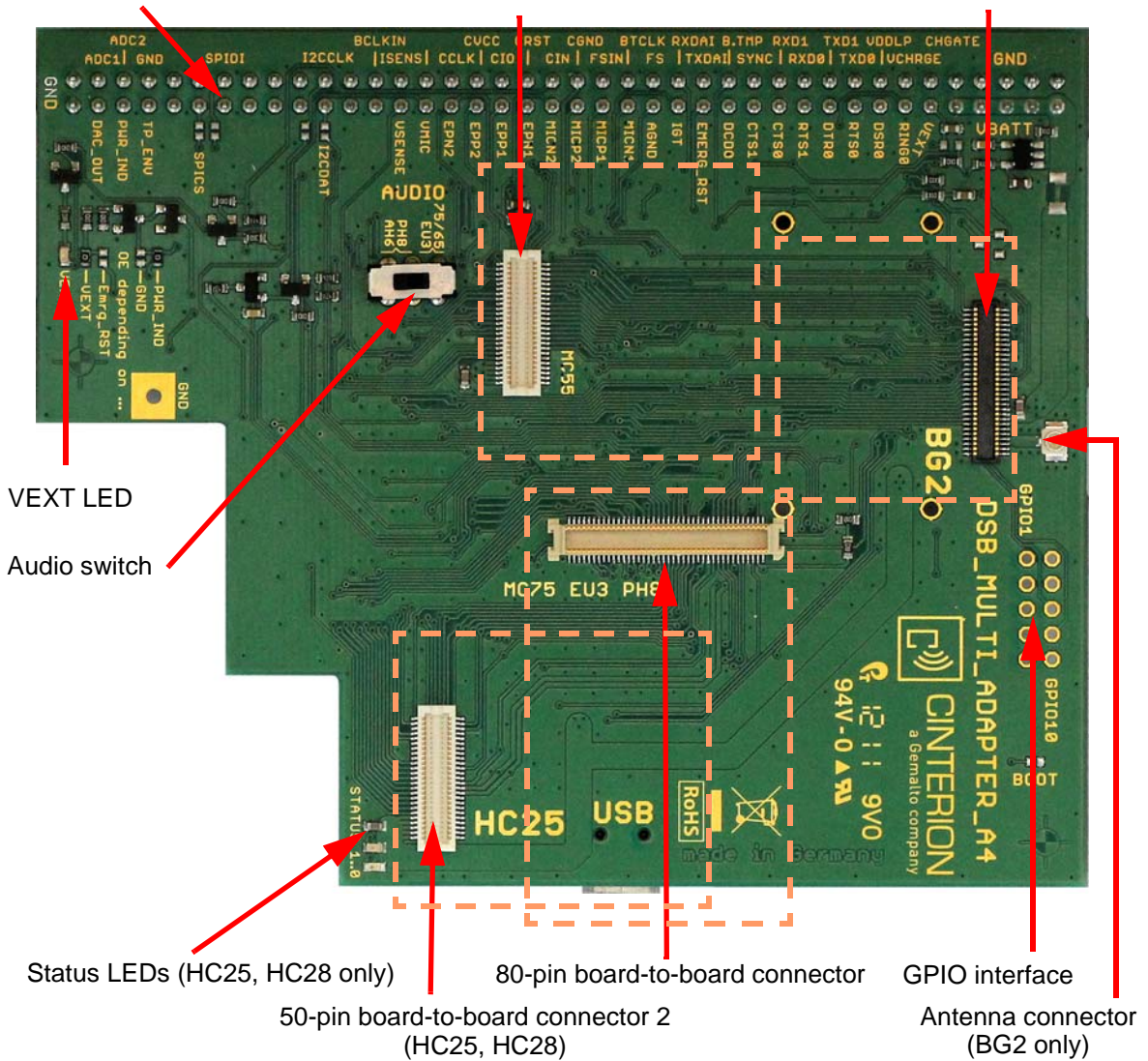
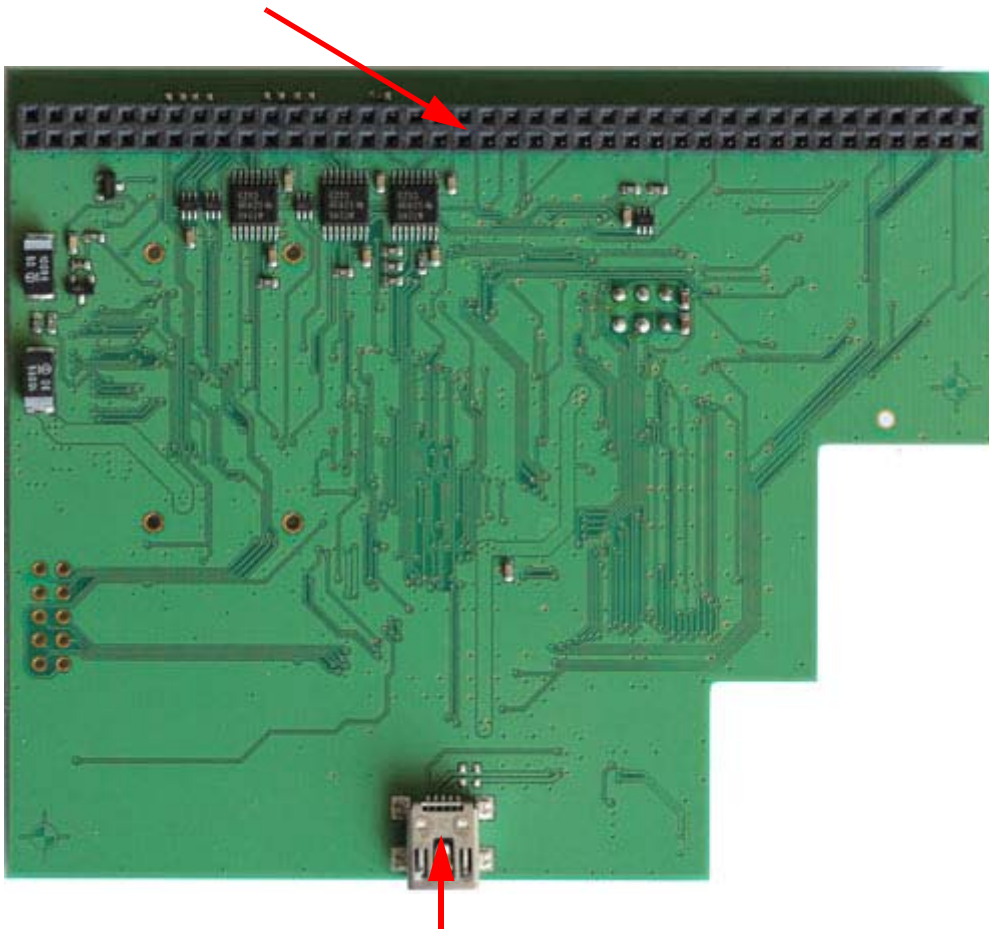


Figure 1: Multi-Adapter R1 top view

Bottom view

2x40-pin header (CON9 and CON10) to connect to DSB75



USB mini connector

Figure 2: Multi-Adapter R1 bottom view



**Table 2:** Multi-Adapter R1 interfaces

Interface	Description
50-pin board-to-board connector 1	To be used for MC55i and MC55i-W modules.
50-pin board-to-board connector 2	To be used for HC25, HC28, HC28-J modules.
60-pin board-to-board connector	To be used for BG2-E, BG2-W modules as well as BGS2-E Rel.1 and BGS2-W Rel.1 evaluation modules.
80-pin board-to-board connector	To be used for PH8, PH8-P, EU3-E, EU3-P, MC75i, TC65i, TC65i-X, TC63i modules as well as for BGS2-E Rel.2, BGS2-W Rel.2, EES3, EGS5, EGS5-X, EGS3, BGS3, EHS5-E, EHS5-US, PHS8-P, PHS8-E, PHS8-US and PHS8-USA evaluation modules.
VEXT LED	VEXT LED will be ON as long as VEXT (or an equivalent external supply voltage line such as VDD) is available and active.
Status LEDs	LED signals status for HC25, HC28, HC28-J modules only.
Audio switch	Selects the microphone bias voltage on the microphone inputs of the 80-pin board-to-board connector. <ul style="list-style-type: none"> <li>MC75i, TC65i, TC65i-X, TC63i, BGS3,... get the bias from the DSB</li> <li>EU3-E, EU3-P, PH8, PH8-P, PHS8-P,... use decoupling capacitors</li> </ul>
GPIO interface	GPIO1 ... GPIO10 lines. These lines can be configured by AT command and may be part of different voltage domains (1.8V / 3.0V) depending on product. The Multi-Adapter R1 does not route the module's GPIO lines to the DSB75.
Antenna connector	U.FL antenna connector for BG2-E, BG2-W only.
USB mini connector	USB Mini-B 5 interface. The Multi-Adapter R1 does not route the module's USB lines to the DSB75. Therefore, the DSB75's USB interface cannot be used for modules mounted onto the Multi-Adapter R1. The USB mini connector has to be used instead.
2x40-pin header (CON9 and CON10)	Connection to DSB75. Pin heads may be used as test points.

## 2.1 Multi-Adapter R1 Mounted on DSB75

The 2x40-pin header of the Multi-Adapter R1 can be attached to the 2x40-pin connector located on the DSB75 as shown in [Figure 3](#). An appropriate module can then be mounted onto the adapter. Please note that only one module can be mounted at the same time (and this includes the 80-pin board-to-board connector located on the DSB75).

The RF antenna U.FL connector of the module can be connected to the U.FL-to-SMA adapter of the DSB75.

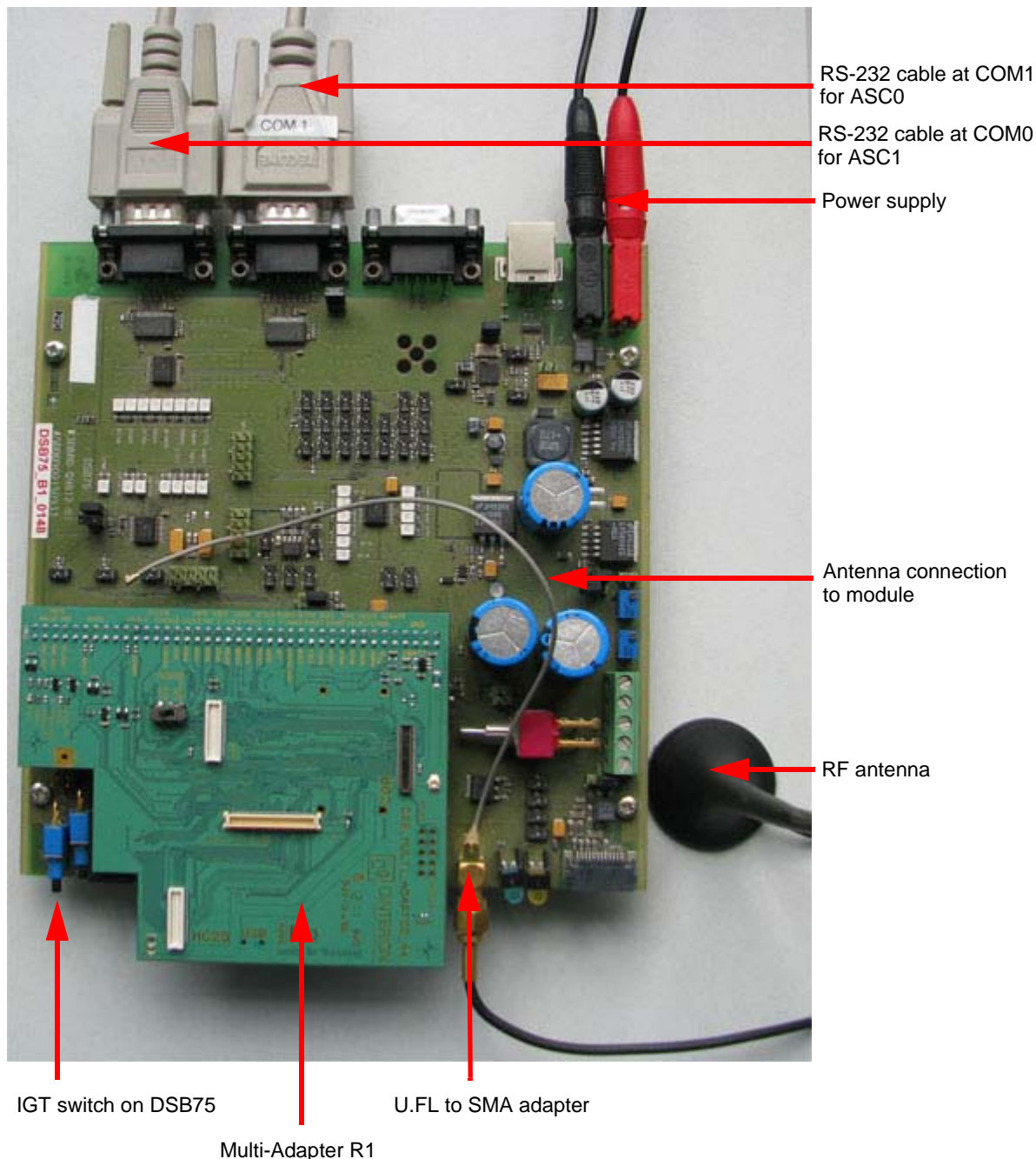


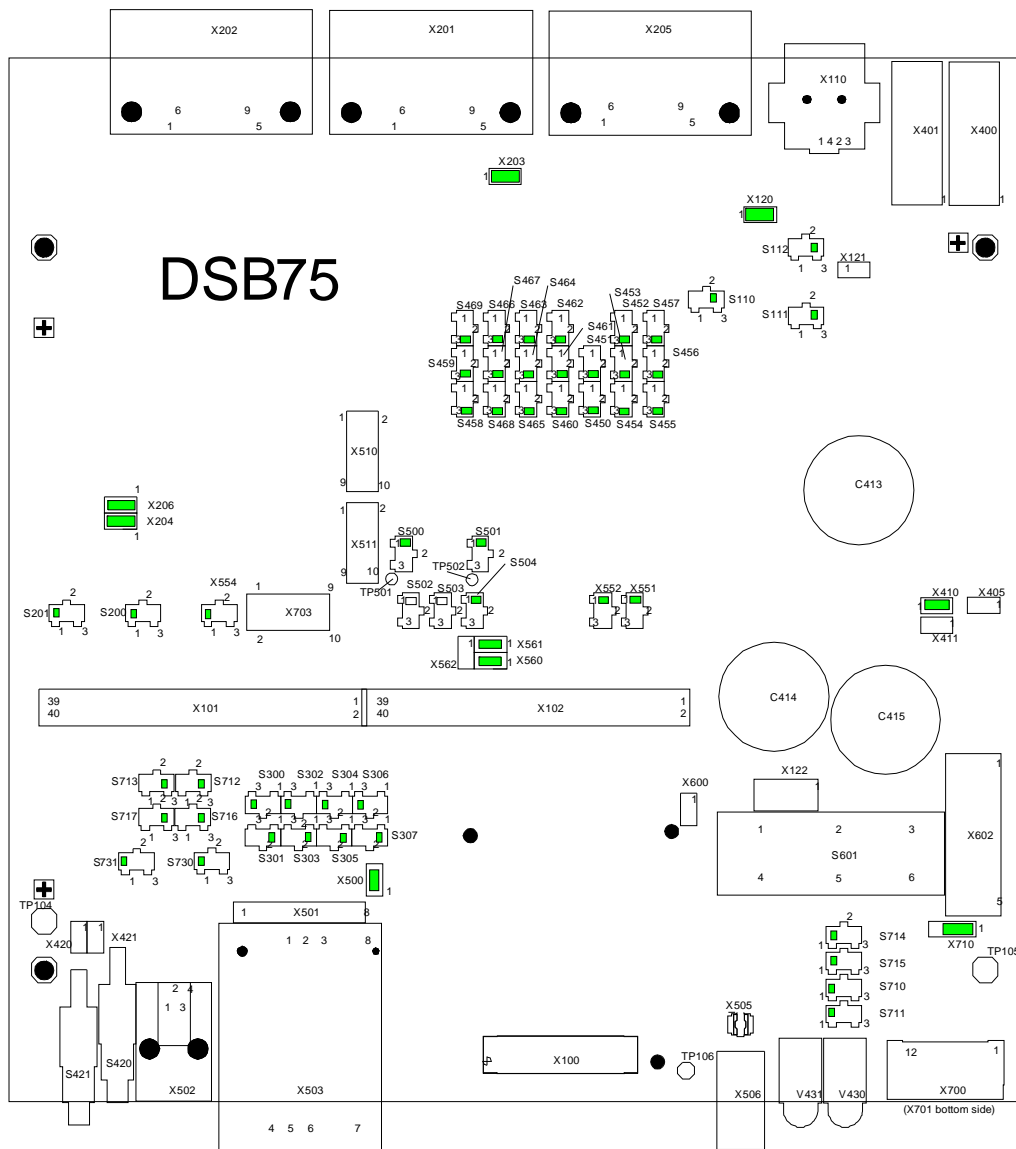
Figure 3: Multi-Adapter R1 mounted on DSB75

The DSB75 provides the functionality listed in [Table 3](#) to any module mounted onto the Multi-Adapter R1:

**Table 3:** Functionality used on DSB75

Functionality
SIM card holder
Analog audio connector
PCM interface (codec)
Power supply
Serial interfaces ASC0 and ASC1
Ignition and reset switches

**Figure 4** shows the default switch and jumper settings on the DSB75. These settings should be applied before the Multi-Adapter R1 is mounted.



**Figure 4:** Default DSB75 switch and jumper settings

## 2.2 Measuring Supply Current

The following procedure may be used to measure the supply current consumption:

- Cut the supply wire on the Multi-Adapter R1 as shown in [Figure 5](#) and instead solder a 100mOhm 0805 resistor onto the pads connected by this wire. Now, the board is prepared to measure currents (100 $\mu$ V per 1mA) across this resistor.

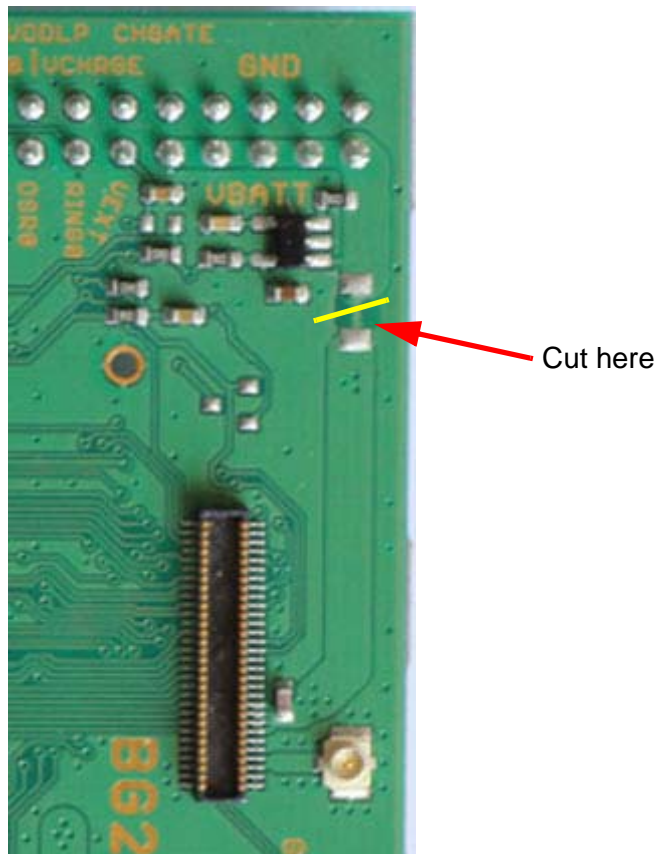


Figure 5: Measuring supply current

## 2.3 Limitations of Multi-Adapter R1

Please note the following limitations of the Multi-Adapter R1:

- The Multi-Adapter R1 fully supports the Cinterion modules mentioned in [Section 1.4](#). However, an AH3 module may also be mounted, if an RF connection is not required.
- Some of the more specialized module interfaces are not routed/connected by the adapter to the DSB75. This means that the corresponding interface features are not available on the DSB75. Some of them are accessible via the Multi-Adapter R1 only. For details see [Table 4](#).

**Table 4:** Interface lines not routed to DSB75ed by the Multi-Adapter R1

Interface	Implementation
GPIO interface: GPIO1 ... GPIO 10	Accessible through separate header on adapter board.
USB interface: VUSB_IN, USB_DN, USB_DP	Accessible via USB Mini-B 5 interface on adapter board.
SPI interface: SPIDI, SPIDO, SPICLK, SPICS	Dedicated lines by default not available. Can be accessed through solder jumpers.
I2C interface: I2CDAT, I2CCLK	Dedicated lines by default not available. Can be accessed through solder jumpers.
Charging interface: VCHARGE, BATT-TEMP, ISENSE, VSENSE, CHARGE_GATE	Charging lines are only supported for the following products: MC75i, TC65i, TC65i-X, TC63i, EES3, EGS5, EGS5-X, EGS3 and BGS3

- Except for BG2 modules there are no RF antenna connectors on the Multi-Adapter R1. The mounted module's antenna connections will have to be provided for externally. The DSB75 provides only one UFL-to-SMA adapter. As an alternative or if further RF connections are required Cinterion recommends an U.FL-to-SMA adapter cable (e.g., [Digi Key SMA tail](#))



### 3 Appendix: Schematics

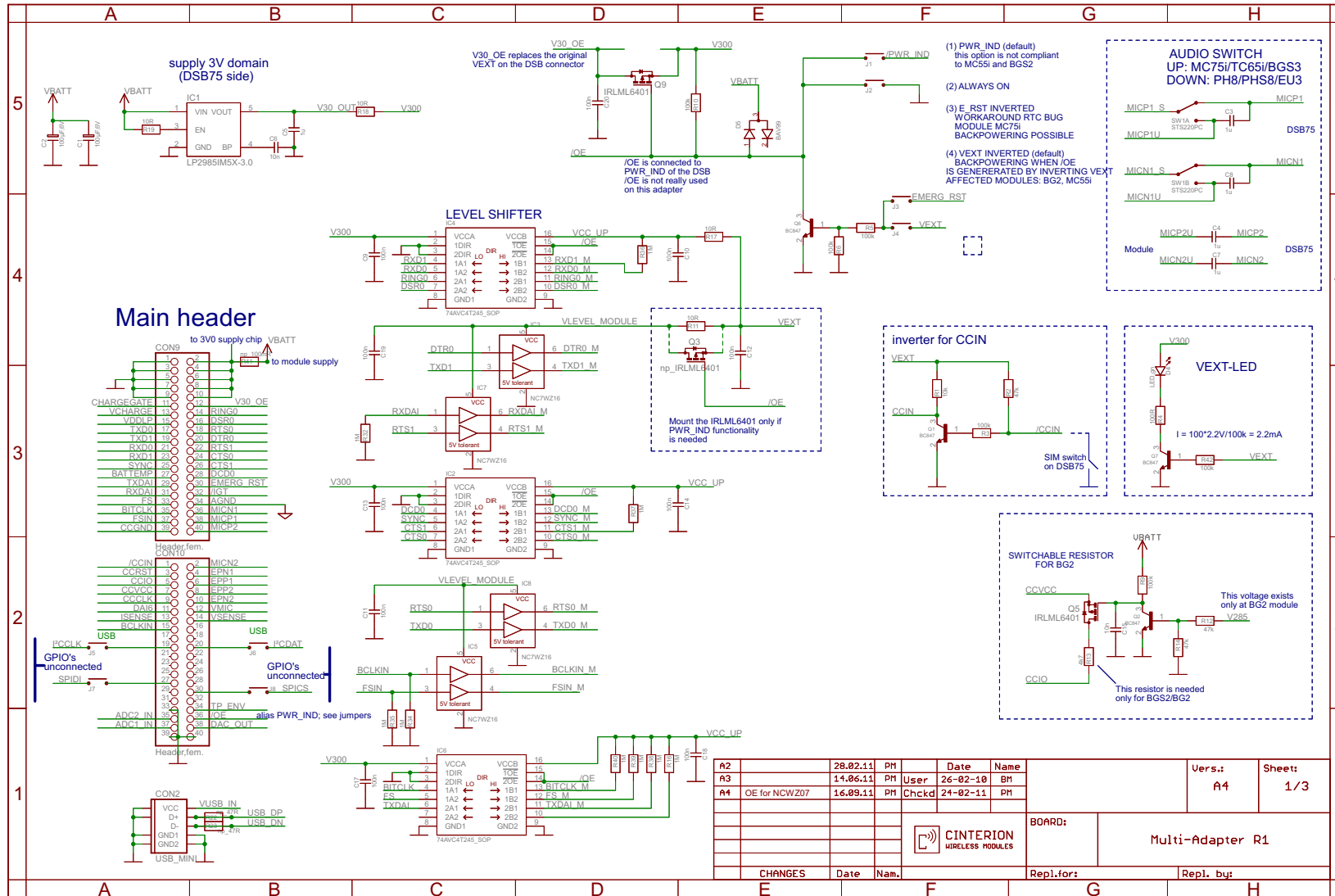


Figure 6: Schematics, Page 1

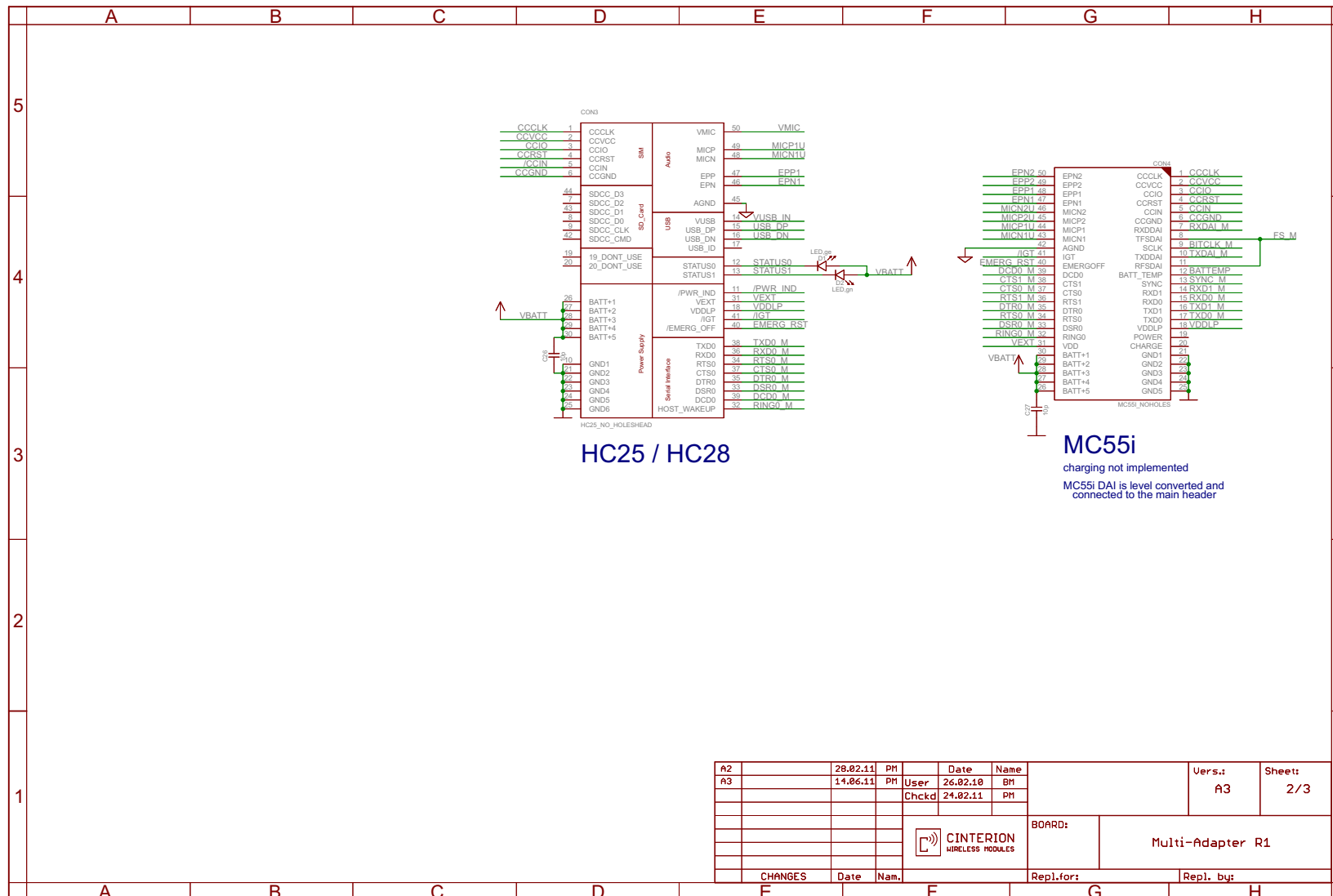


Figure 7: Schematics, Page 2

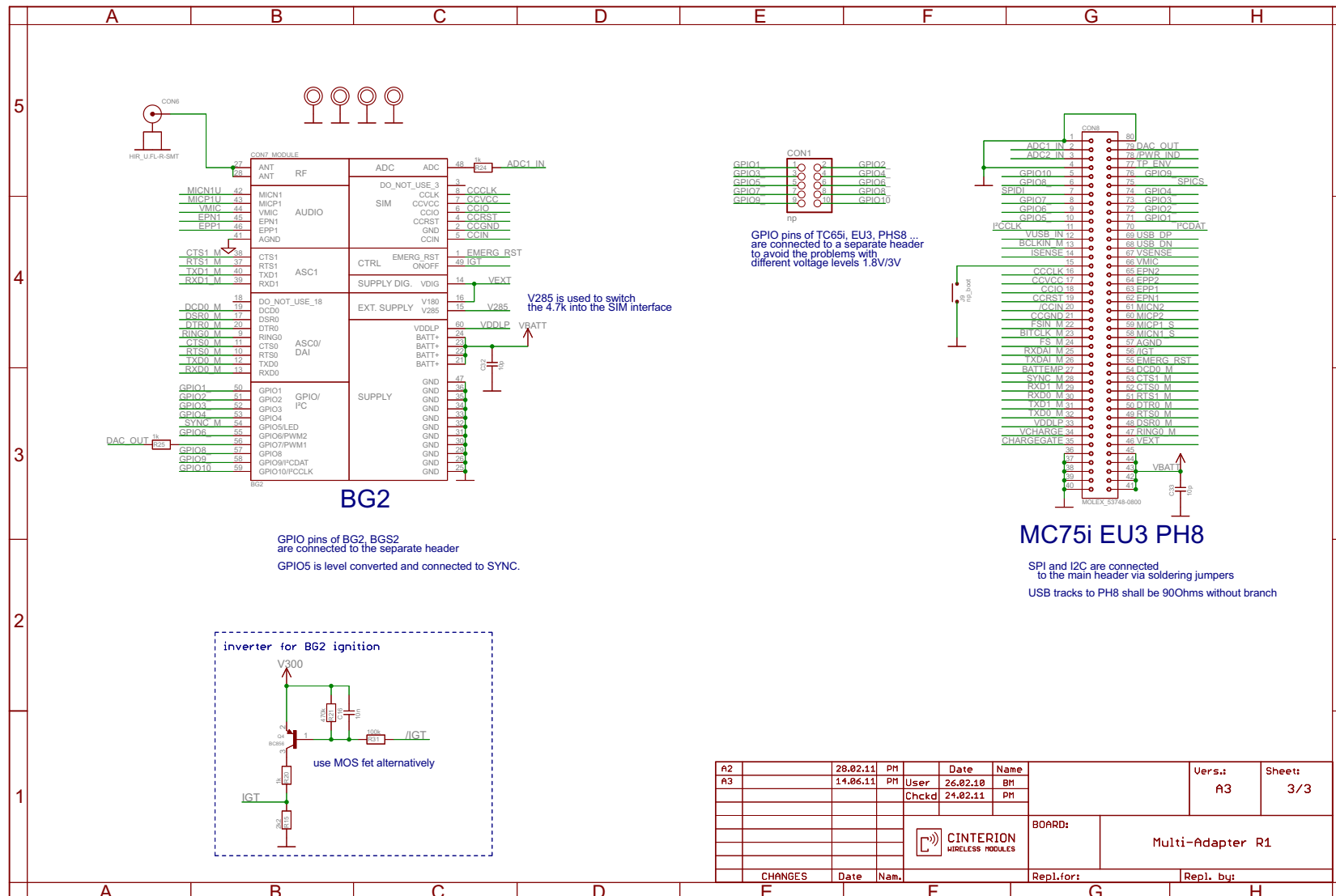


Figure 8: Schematics, Page 3