Getting Started with Cinterion® TXx2-W

User Guide

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Confidential

Technical Documentation

Contents

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Table 1: Applicability table

Products
Cinterion® TX62-W
Cinterion® TX62-W-B
Cinterion® TX62-W-C
Cinterion® TX82-W

TXx2-W in this document refers to all of the above mentioned product variants. Where necessary a note is made to differentiate between these product variants.

2 Introduction

2.1 Scope

This document describes a ready-to-use development and test environment for the Cinterion® TXx2-W SMT modules.

The development and test environment comprises the following hardware components:

- TXx2-W evaluation module (for supported products, see Section 1)

  The TXx2-W evaluation module consists of the actual TXx2-W SMT module soldered onto a PCB with a board-to-board connector and U.FL antenna connectors. For TXx2-W evaluation module board schematics, see chapter 5.

- DSB75 Development Support Board

  The TXx2-W evaluation module needs to connect to an adequate host device such as the DSB75. A detailed DSB75 hardware interface description and operating instructions can be found in [3].

- DSB75 Adapter.

  The DSB75 Adapter is used to mount the TXx2-W evaluation module to the DSB75 (see Section 3.3).

The purpose of this document[1] is to guide you through the process of connecting the hardware, and getting started with TXx2-W.chapter 3 and chapter 4 provide detailed information explaining how to mount, connect and operate TXx2-W modules to DSB75, LGA Devkit and LGA Devkit Socket.

Listed below are the ordering numbers (more details can be found in [2]):

- DSB75 Evaluation Kit Ordering number: L36880-N8811-A100
- Cinterion® LGA DevKit T Base PCB:
  Ordering number: L30960-N0113-A100
- Cinterion® LGA DevKit Socket T:
  Ordering number: L30960-N0114-A100

Note: The hardware components listed above as part of a development and test environment are also mentioned in [2], as part of the comprehensive reference equipment used by Telit Cinterion for type approval. For general development and test purposes however, there are alternative equipments available: The DSB75 may be replaced by the DSB-Mini (for details, see [4]), the DSB75 Adapter by the LGA DevKit (see chapter 4), either plugged onto the DSB-Mini or as a stand-alone device.

2.2 Audience

This document is intended for system integrators that are using the Telit TXx2-W SMT modules in their products.

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

2.3 Contact Information, Support

For technical support and general questions, e-mail:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com
- TS-ONEEDGE@telit.com

Alternatively, use: https://www.telit.com/contact-us/

Product information and technical documents are accessible 24/7 on our website: https://www.telit.com

2.4 Conventions

Note: Provide advice and suggestions that may be useful when integrating the module.

Danger: This information MUST be followed, or catastrophic equipment failure or personal injury may occur.

ESD Risk: Notifies the user to take proper grounding precautions before handling the product.

Warning: Alerts the user on important steps about the module integration.

All dates are in ISO 8601 format, that is YYYY-MM-DD.

2.5 Related Documents

[1] TXx2-W AT Command Set
[2] TXx2-W Hardware Interface Description
[3] DSB75 Development Support Board Hardware Interface Description
[4] DSB-Mini User Guide
[5] LGA DevKit User Guide

2.6 Terms and Conditions

Refer to https://www.telit.com/hardware-terms-conditions/.

2.7 Disclaimer

THE MATERIAL IN THIS DOCUMENT IS FOR INFORMATIONAL PURPOSES ONLY. TELIT CINTERION RESERVES THE RIGHT TO MAKE CHANGES TO THE PRODUCTS DESCRIBED HEREIN. THE SPECIFICATIONS IN THIS DOCUMENT ARE SUBJECT TO CHANGE AT THE DISCRETION OF TELIT CINTERION WITHOUT PRIOR NOTICE. THIS DOCUMENT IS PROVIDED ON "AS IS" BASIS ONLY AND MAY CONTAIN DEFICIENCIES OR INADEQUACIES. TELIT CINTERION DOES NOT ASSUME ANY LIABILITY FOR INFORMATION PROVIDED IN THE DOCUMENT OR ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT DESCRIBED HEREIN.

3 Getting Started with TXx2-W on DSB75

3.1 Technical Requirements for Using TXx2-W Modules

- TXx2-W evaluation module[2]. For TXx2-W evaluation module schematics see chapter 5.
- Computer running Windows 7, Windows 8, or Windows 10
- Local administrator privileges on the particular Windows computer to install and uninstall the drivers
- DSB75 Development Support Board (for details see [3])
- DSB75 Adapter required for mounting the evaluation module to the DSB75. For more information about the DSB75 Adapter please refer to Section 3.3.
- Accessories:
  - Small 50 Ohms antenna adapter cables with SMT connectors to connect the U-FL connectors on the TXx2-W evaluation module to the U.FL connectors on DSB75 Adapter (e.g. a Hirose - Hirose cable such as delivered with each DSB75) - 1 for GSM/LTE main antenna connection, 1 for GNSS antenna connection.
  - External 50 Ohms RF antenna with SMA connector to connect the SMA connector on the DSB75 Adapter (e.g. a SMARTEQ MiniMag antenna such as delivered with each DSB75) - 1 for GSM/LTE main antenna connection, 1 for GNSS antenna connection.
  - 9 to 15 Volts power supply adapter applied at the DSB75 for powering up the DSB75 and the connected TXx2-W evaluation module (not supplied by Telit Cinterion)
  - RS-232 cables for the module's asynchronous serial interfaces ASC0 and ASC1 (not supplied by Telit Cinterion)
- Appropriate application for controlling the module from within a PC's operating system. For Windows, e.g. Windows Hyperterminal.
- (U)SIM from a GSM/LTE network provider.

2. For ordering information see [2].

3.2 Connecting the TXx2-W Evaluation Module to the DSB75

To properly connect the TXx2-W evaluation module and all accessories to the DSB75, complete the steps listed below. The complete setup, with the evaluation module mounted onto the DSB75 Adapter and the DSB75 Adapter connected to the DSB75, is shown in Figure 2.

- Ensure that all jumpers and slide switches on the DSB75 are set to their default positions as show in Figure 1 and in [3].
- Ensure that all jumpers on the DSB75 Adapter are set to their default positions as shown in Figure 3 and Figure 4. For more details, see Section 3.3.
- Attach the 80-pin header of the DSB75 Adapter to the 2x40-pin connector (X101/X202) located on the DSB75. Take gentle care that all pins are aligned correctly, then press down evenly on the adapter until it is firmly seated.
- Remove the knurled nuts from the DSB75 Adapter.
- Mount the TXx2-W evaluation module onto the 80-pin board-to-board connector X120 of the DSB75 Adapter.
- Fasten the knurled nuts to secure the module to the DSB75 Adapter.
- Use the small antenna cables to connect the GSM/LTE main antenna connector and the GNSS antenna connector on the TXx2-W evaluation module to the U.FL-R SMT connectors on the DSB75 Adapter:
  - for the GSM/LTE main antenna connect to X352
  - for the GNSS antenna connect to X350
- Screw the external antennas to the appropriate SMA connectors on the DSB75 Adapter:
  - GSM/LTE main antenna to X351
  - GNSS antenna connect to X353
- Insert the SIM card into the card reader located at the DSB75 Adapter.

  Note: Do not use the SIM card reader of the DSB75 Support Board.

- To employ the module's asynchronous serial interfaces ASC0 and/or ASC1, connect the 9-pin SubD connectors on the DSB75 to the PC's UART COM ports using the RS-232 cables. Use COM1 (X201) for the first serial interface ASC0 and/or COM2 (X202) for second serial interface ASC1.
- Make sure that the power supply adapter delivers a minimum of 12 Volts, and connects the power cables to the red (X400 = BATT+) and black (X401 = Ground) connectors of the DSB75 Support Board.

After connecting the TXx2-W evaluation module to the DSB75 and DSB75 Adapter, the module can be switched on. The initial startup is described in Section 3.4.

IMPORTANT: Do not remove the TXx2-W evaluation module from the DSB75 and DSB75 Adapter before module is switched off and all the cables are disconnected.

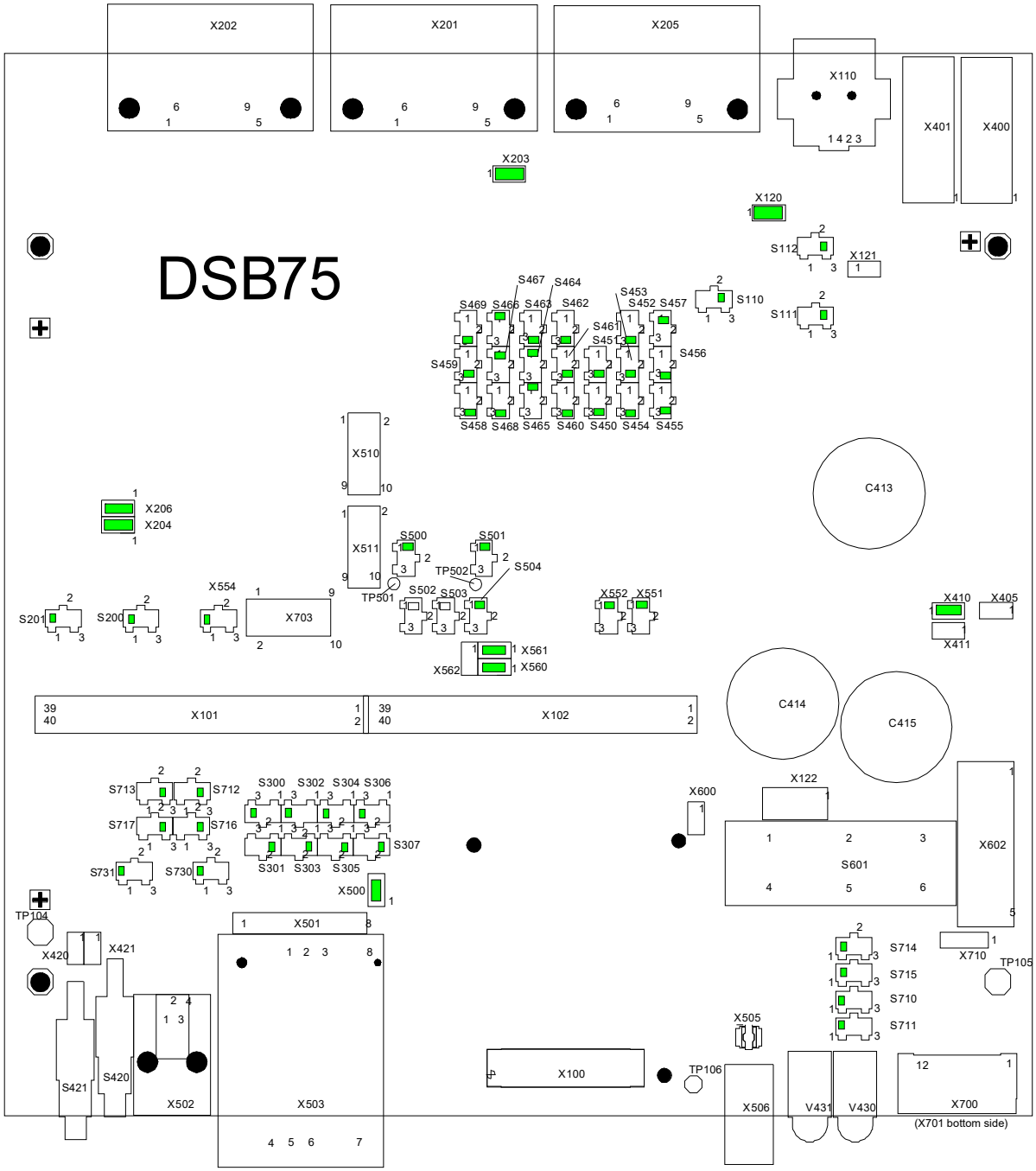


Figure 1: **DSB75 configuration**

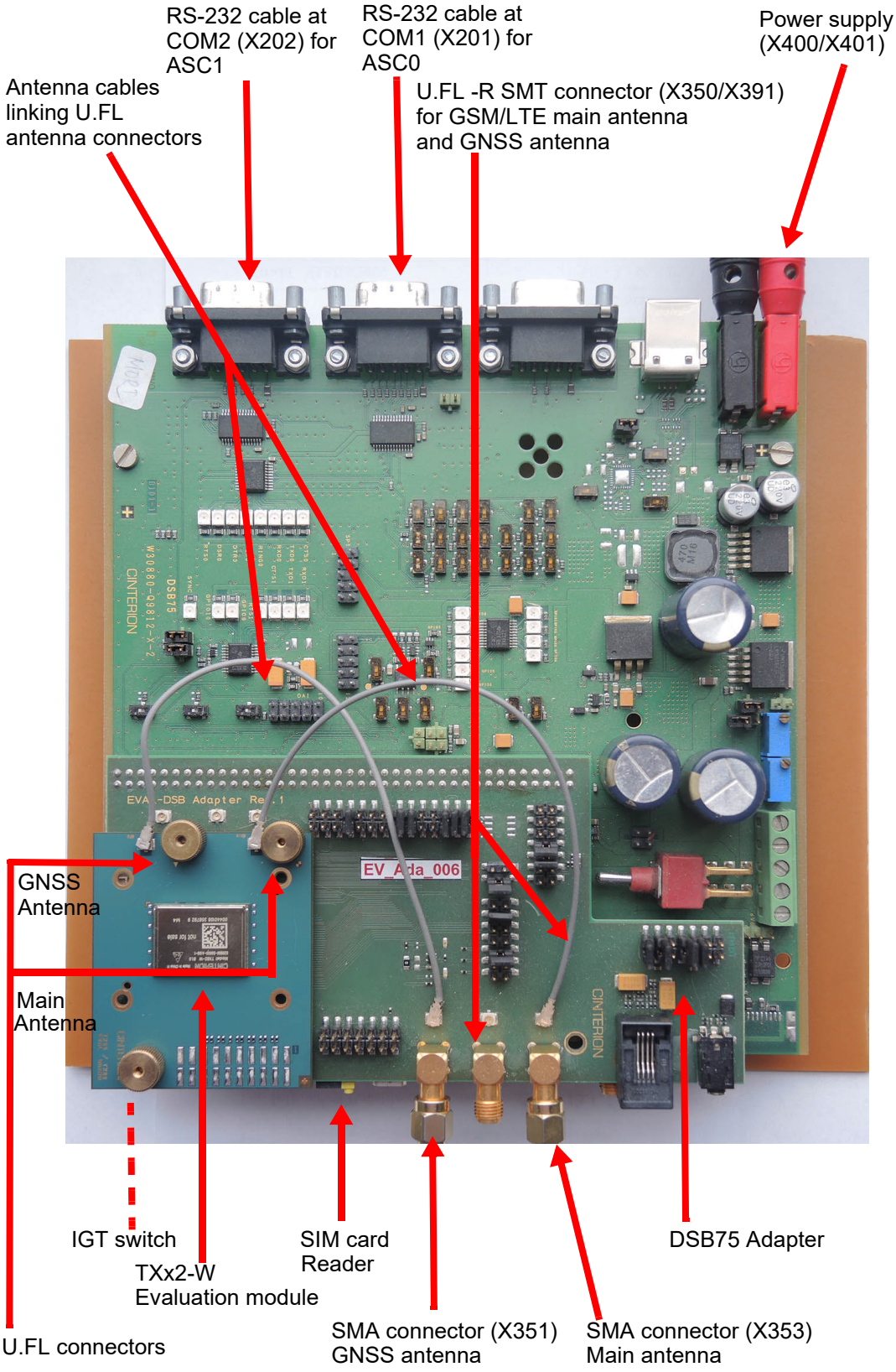


Figure 2: Module mounted onto DSB75 Adapter and connected to DSB75

3.3 DSB75 Adapter

The TXx2-W Evaluation Module connects to the 80-pin board-to-board connector X120 on top of the DSB75 Adapter. The 2x40-pin header X101/X102 of the DSB75 Support Board connects to the 80-pin female connector X135 located on the back of the DSB75 Adapter.

By default, when shipped from factory, all jumpers on the DSB75 Adapter are set for use with TXx2-W, even though not all of them are required - see Figure 4.

The adapter is illustrated in Figure 3 and Figure 4.

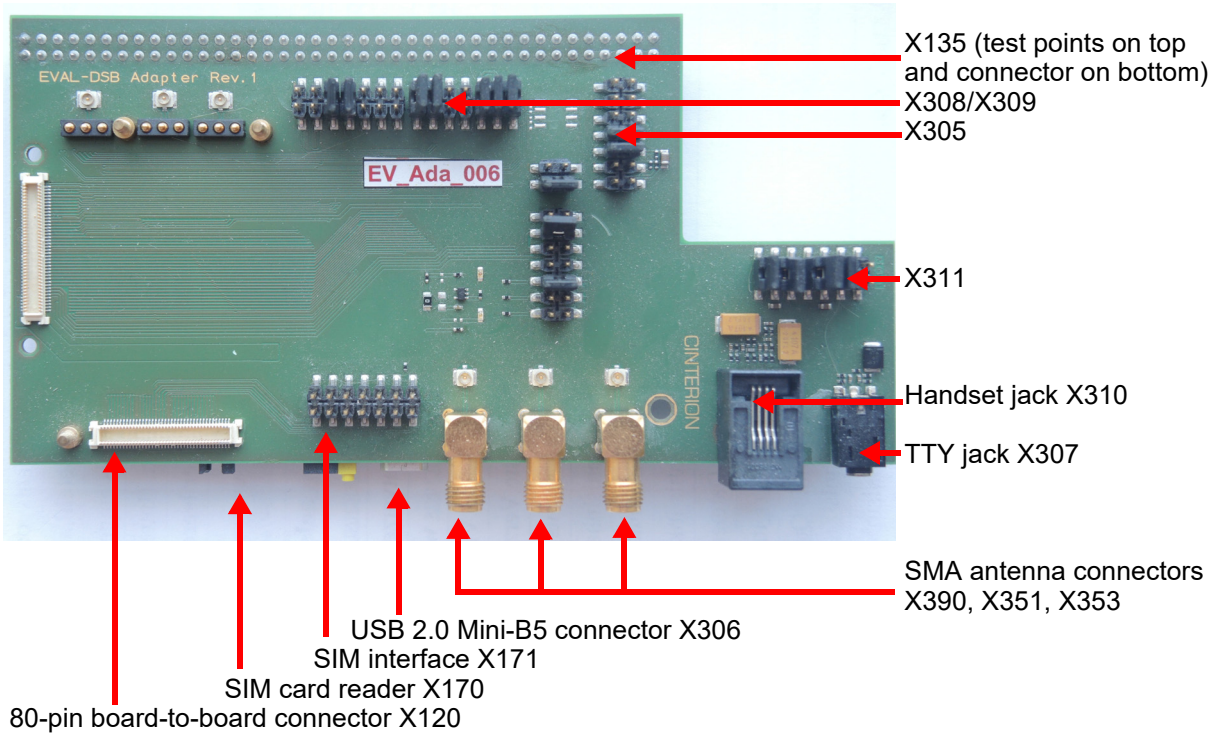
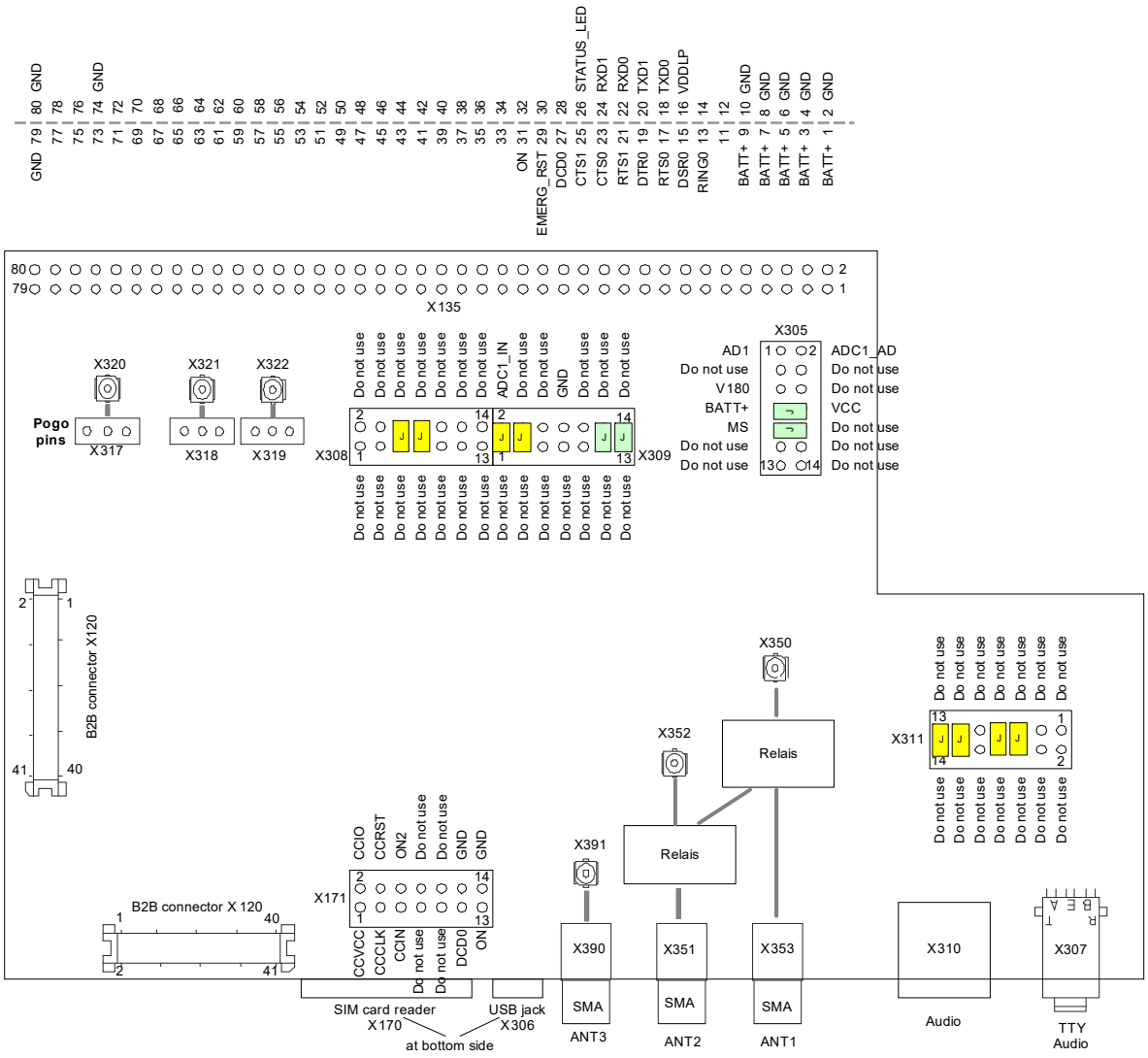


Figure 3: DSB75 Adapter with default jumper positions



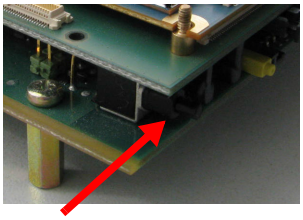
Note: Default jumpers marked yellow at X308/X309/X311 are not required for TXx2-W.

Figure 4: **DSB75 Adapter - connectors, jumpers**

3.4 Start Up the Module

After connecting the TXx2-W evaluation module to the DSB75 Adapter and DSB75 as described in Section 3.2, the module can be switched on.

- Start the Windows PC.
- Press the ignition switch S421 on the DSB75. The ignition switch is located on the component side of the DSB75 as shown in Figure 2.


IGT switch

- To connect to the TXx2-W evaluation module via asynchronous serial interface, for example ASC0, check for the port that is connected to the DSB75's COM1 X201 via RS-232 cable, call a terminal program on the PC and connect to the TXx2-W evaluation module using the following initial settings:
  - Bits per seconds: 115200
  - Data bits: 8
  - Parity: None
  - Stop bits:1
  - Flow control: Hardware
- Type the AT command ATI to display module identification information.

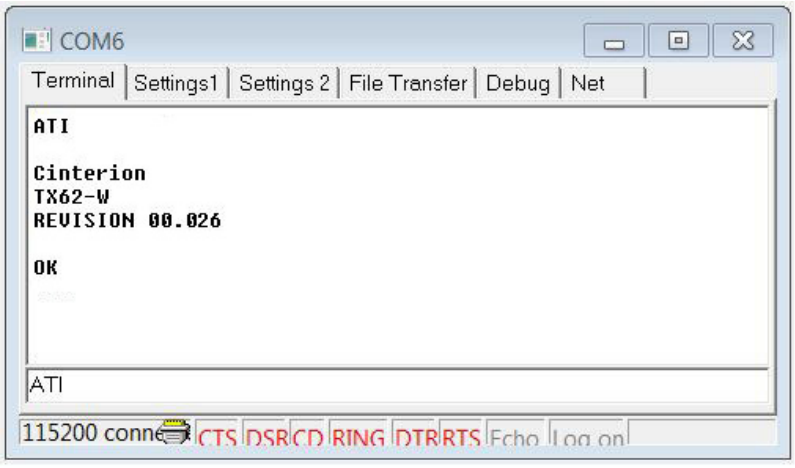


Figure 5: Connection via ASC0 interface

For a complete AT Command Set description see [1]. This includes AT commands to configure the communication interfaces.

For steps about how to register to network, see chapter 5.

4 Getting Started with TXx2-W on LGA DevKit

4.1 Technical Requirements for Using TXx2-W Modules

- TXx2-W module[3]
- LGA DevKit package, including:
  - Cinterion® LGA DevKit Base PCB for the IoT platform (Things) modules.
  - Cinterion® LGA DevKit Socket T (including screws, fixing frames, retention lid)
  - USB cable for the module's asynchronous serial interfaces ASC0 and power supply

  For more information about LGA DevKit package, see [5].
- Computer running Windows 10, USB 2.0 High Speed compatible[4]
- Local administrator privileges on the particular Windows computer to install and uninstall the drivers
- Accessories:
  - External 50 Ohms RF antenna with SMA connector, for GSM/LTE main antenna connection
  - External 50 Ohms GNSS antenna, for GNSS antenna connection
  - Small 50 Ohms antenna adapter cable with U.FL connector, to connect the GNSS antenna to the U.FL connector on the LGA DevKit, for GNSS antenna connection (not supplied by Telit Cinterion)
- Appropriate application for controlling the module from within a PC's operating system. For Windows, e.g. Windows Hyperterminal.
- (U)SIM from a GSM/LTE network provider.

3. For ordering information see [2].
4. TXx2-W supports a USB 2.0 High Speed (480Mbit/s) device interface that is Full Speed (12Mbit/s) compliant. Note: The USB interface is intended for use as a trace interface only.

4.2 Connecting the TXx2-W Evaluation Module to LGA DevKit

To properly connect TXx2-W and all accessories to the LGA DevKit, follow the steps listed below. The complete setup with the module connected the LGA DevKit is shown in Figure 7.

- Ensure that all jumpers and slide switches on the LGA DevKit are set to their default positions as show in Figure 6 and in [5].
- Mount the LGA DevKit socket onto the LGA DevKit.
- Mount the module: Insert the fixing frame and then the module into the socket, and close the retention lid by pressing it down and turning it clockwise.
- Connect the RF antenna to the SMA connector named "MAIN".
- Connect the GNSS antenna to the antenna adapter cable, and then to the U.FL connector named "GPS" (near the lower right corner of the socket).
- Insert the (U)SIM card into the SIM card reader.
- Connect your host PC to the USB connector named "ASC0 USB". Now, the green "PWR" LED lights up.

After connecting the TXx2-W module to the LGA DevKit, the module can be switched on. The initial startup is described in Section 4.3.

IMPORTANT: Do not remove the TXx2-W module from the LGA DevKit, before module is switched off and all the cables are disconnected.

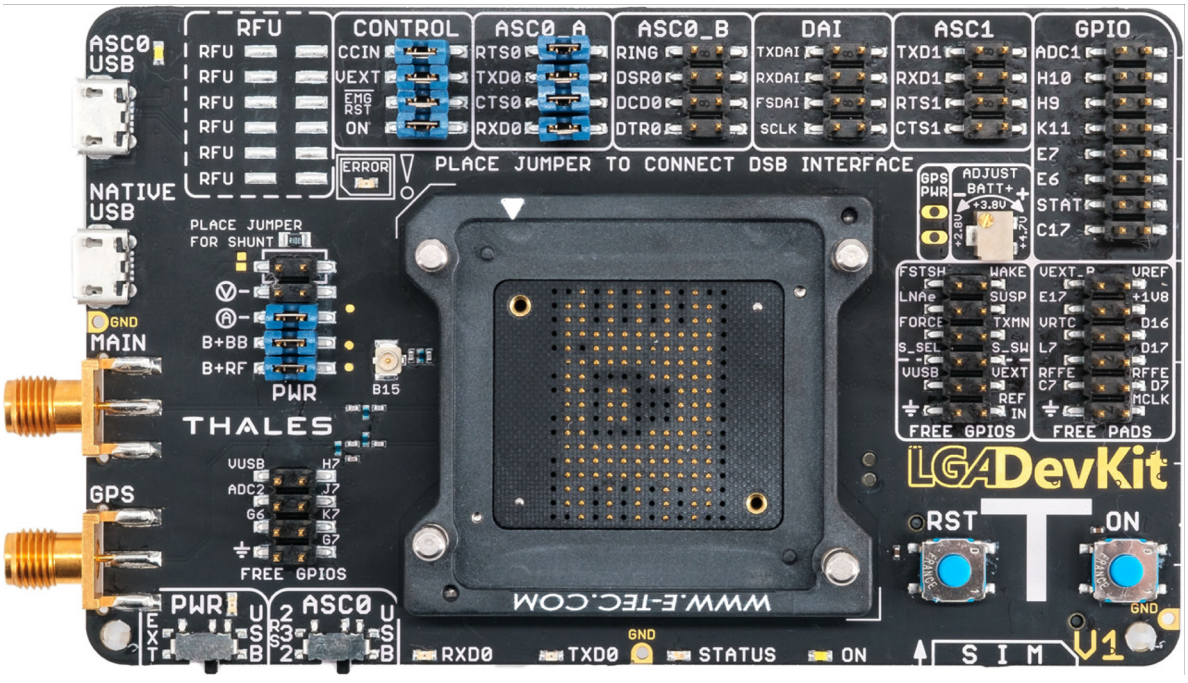


Figure 6: Default jumper and switch configuration

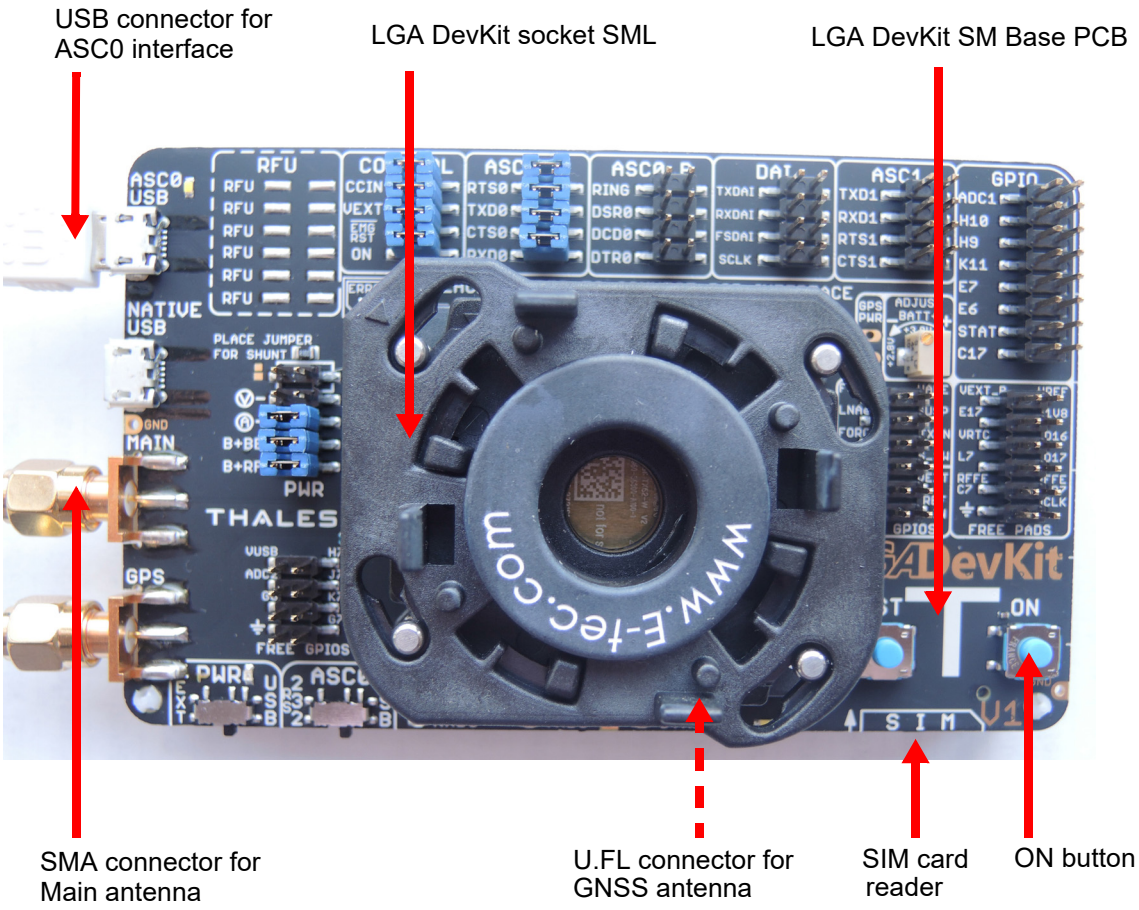


Figure 7: Module connected to LGA DevKit

4.3 Start Up the Module

After connecting the TXx2-W module to the LGA DevKit as described in Section 4.2, the module can be switched on.

- Shortly press the “ON” button to switch on the module. Now, the white "ON" LED lights up.
- To connect to the TXx2-W module via asynchronous serial interface ASC0, check for the port that is connected to the LGA DevKit’s USB connector, call a terminal program on the PC, and connect to the TXx2-W module using the following initial settings:
  - Bits per seconds: 115200
  - Data bits: 8
  - Parity: None
  - Stop bits:1
  - Flow control: Hardware
- Type the AT command ATI to display module identification information.

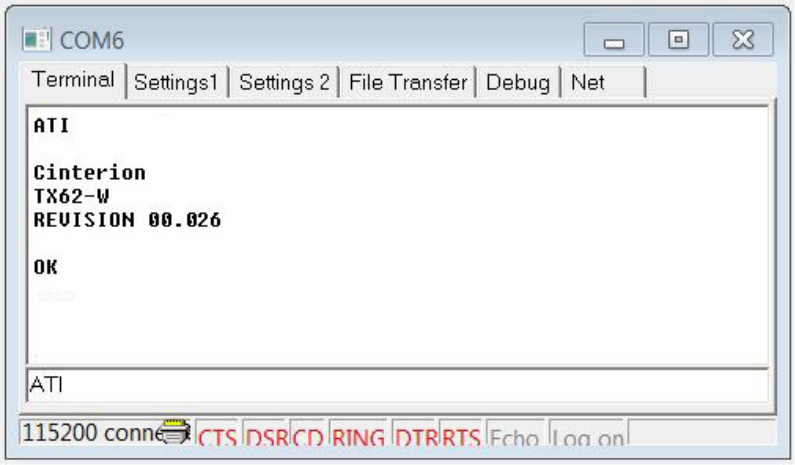


Figure 8: Connection via ASC0 interface

For a complete AT Command Set description see [1]. This includes AT commands to configure the communication interfaces.

For steps about how to register to network, see chapter 5.

5 Configure TXx2-W for Network Registration

After the module is switched on, follow the steps below to register to network.

- Check the module is in the Normal Functionality Mode by AT+CFUN.
- Enable only the necessary 2G, Cat. M, or Cat. NB radio bands, by AT^SCFG commands.
  - AT^SCFG="Radio/Band/2G"
  - AT^SCFG="Radio/Band/CatM"
  - AT^SCFG="Radio/Band/CatNB"
- Specify the RAT by AT^SXRAT.
- Configure and check the APN settings for certain network operator, by AT+CGDCONT.
- Enter SIM PIN by AT+CPIN.
- Configure automatic or manual operator selection by AT+COPS.

The module then forces an attempt to select and register to the network operator.

For a complete AT Command Set description see [1].

5.1 Examples

The following example shows how to register to network in the automatic mode.

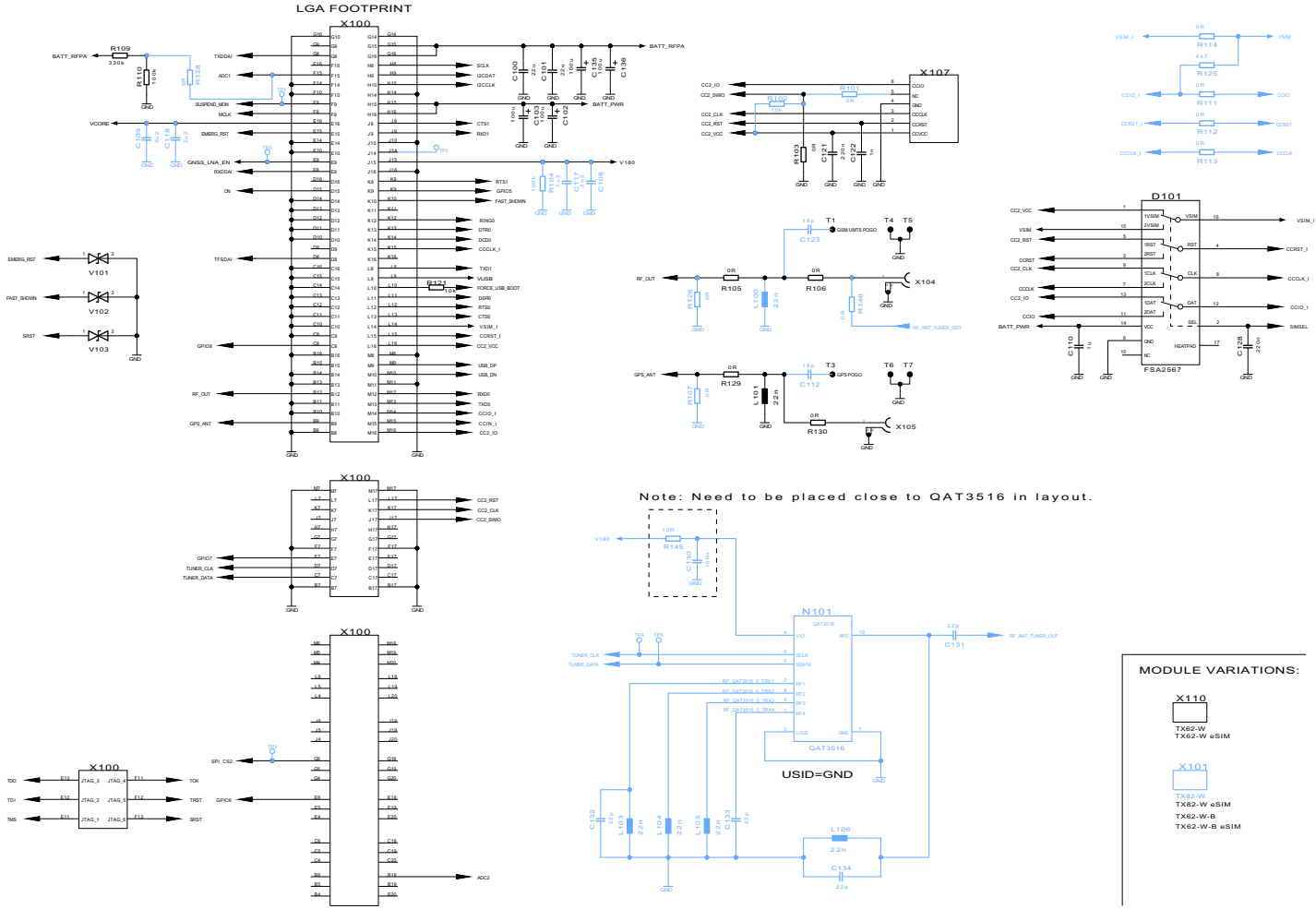
```
AT+CFUN?                                          \\ Check module is in the Normal Functionality Mode.

+CFUN: 1

OK

AT^SCFG="Radio/Band/2G","0000000f"                \\ Enable 2G radio bands.

^SCFG: "Radio/Band/2G","0000000f"

OK

AT^SCFG ="Radio/Band/CatM","0f0e189f"             \\ Enable Cat. M radio bands.

^SCFG: "Radio/Band/CatM","0f0e189f"

OK

AT^SCFG="Radio/Band/CatNB","0b0e189f"             \\ Enable Cat. NB radio bands.

^SCFG: "Radio/Band/CatNB","0b0e189f"

OK
```

```
AT^SXRAT=12                                          \\ Specify RAT.

OK

AT+CGDCONT=1,"IPV4V6","INTERNET"                     \\ Configure the APN settings.

OK

AT+CGDCONT?                                          \\ Check the APN settings.

+CGDCONT:
1,"IPV4V6","INTER-
NET","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0
+CGDCONT:
2,"IPV4V6","att-
m2mglobal","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0
+CGDCONT:
3,"IPV4V6","m2m.com.attz","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0
.0.0",0,0

OK

AT+CPIN="1111"                                       \\ Enter the SIM PIN.

OK

AT+COPS=0                                            \\ Start the automatic mode to
                                                     search and register to a network
OK                                                   operator.

AT+COPS?

+COPS: 0,0,"SmarTone HK",7

OK
```

To register to network in the manual mode, the only difference is to change the AT+COPS configurations for the manual mode.

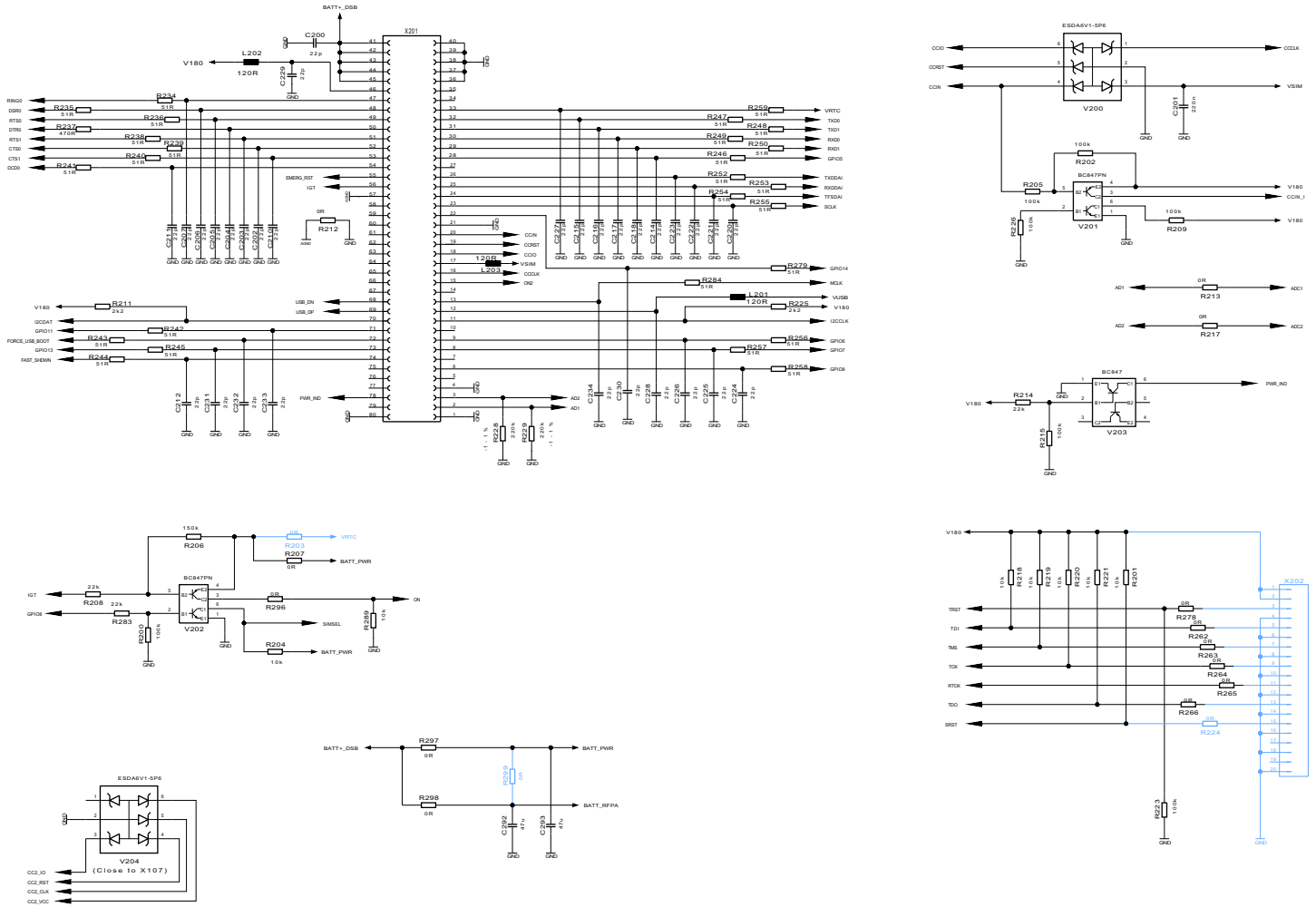
```
AT+COPS=1,2,"45406",7                                \\ Start the manual operator
                                                     selection for a desired network
OK                                                   operator.
```

6 Appendix: Circuit Diagrams for Evaluation Module Board



Note: Circuit elements marked blue are not (yet) populated on the TXx2-W evaluation module boards, and thus reserved for future use.

Figure 9: Schematic sheet 1



Note: Circuit elements marked blue are not (yet) populated on the TXx2-W evaluation module boards, and thus reserved for future use.

Figure 10: **Schematic sheet 2**

7 Document History

Preceding document: "Getting Started with Cinterion® TXx2-W" Version 02

New document: "Getting Started with Cinterion® TXx2-W" Version 03

Chapter	What is new
1	TX62-W-C added to supported products

Preceding document: "Getting Started with Cinterion® TXx2-W" Version 01

New document: "Getting Started with Cinterion® TXx2-W" Version 02

Chapter	What is new
2.1	Description updated, ordering numbers added.
Throughout document	References to Starter Kit B80 removed.

New document: "Getting Started with Cinterion® TXx2-W" Version 01

Chapter	What is new
---	Initial document setup.