The GNS 3301 Starter Kit has been designed to support developers during design-in of the GNS 3301 GPS/GLONASS stand alone module solution.
The examples are shown as block diagrams to explain the approaches. Reference Layouts are included whenever needed at the GNS forum Link: www.forum.gns-gmbh.com .

GNS 3301 StarterKit   manual

Introduction

This manual shows, how to connect the GNS 3301 Starter Kit to a PC in order to verify GNS 3301 module performance and test supported features. Connected to a PC, all GPS/GLONASS data (NMEA) is routed to the miniUSB port. The specific documents and reference layout in Gerber-file format of the GNS 3301 StarterKit are available for download.
All documents which are highlighted in **bold** letters, are available for download at the GNS forum:
http://www.forum.gns-gmbh.com/

For technical module specification, please refer to the **GNS 3301 datasheet**.

For application information and GPS antenna layout implementation the "**GPS antenna connection" Design Guide** is available.

For receiver configuration programming via NMEA command interface and getting more informations about the command parameters, please refer to **GPS GLONASS NMEAcommandInterface manual**.

GNS 3301 Starter Kit Features

- On board USB2UART bridge for PC connection
- 5V DC input via mini USB
- SMA antenna connector for GPS RF In
- GPS/GLONASS active antenna, DC supply (3.0V)
- LED fix indicator

Index

confidential information   manual

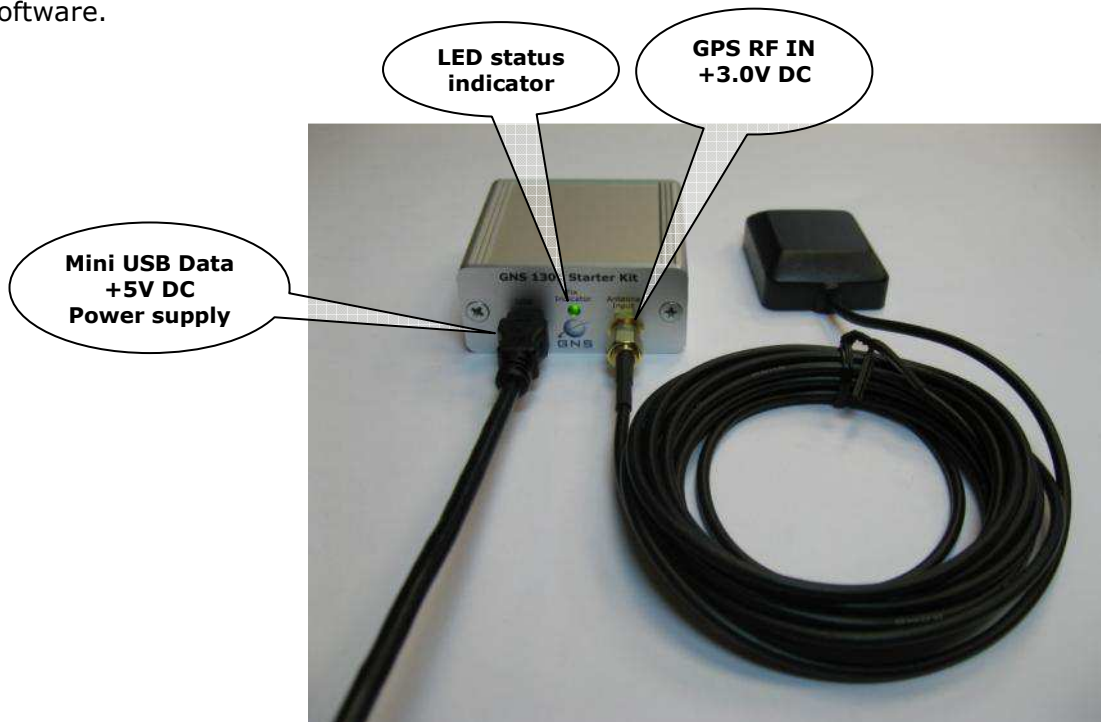## 1 Description of the GNS 3301 StarterKit Hardware

FEATURES

- Small evaluation board designed for verification of GNS 3301 module GPS performance parameters
- Small evaluation board designed for easy implementation to MCU controlled applications
- DC supply via SMA connector
- GPS/GLONASS-fix LED indicator
- PC connection via USB
- USB powered

The GNS 3301 Starter Kit is equipped to provide NMEA GPS data via USB or UART to the application software.

Package Content

- GNS 3301 Starter Kit
- USB to miniUSB cable
- Active GPS/GLONASS antenna (3V DC)
- CD with documentation & software

2 GNS 3301 StarterKit Board Layout

Description of LED status indicator:

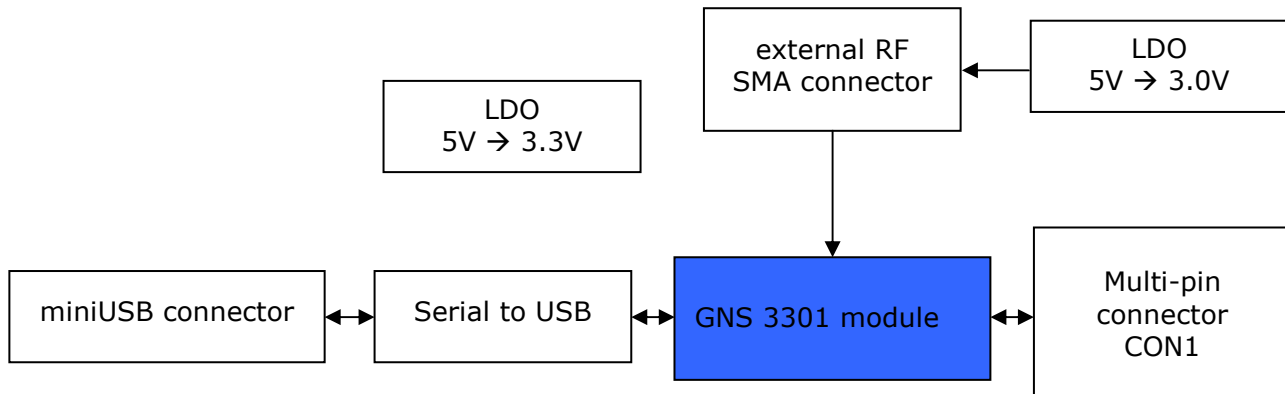| LED status indicator	Comment
blinking	GPS/GLONASS engine is in acquisition mode. Almanac- and Ephemeris-data will be received. User position will be calculated.
off	User position is calculated (position fix)
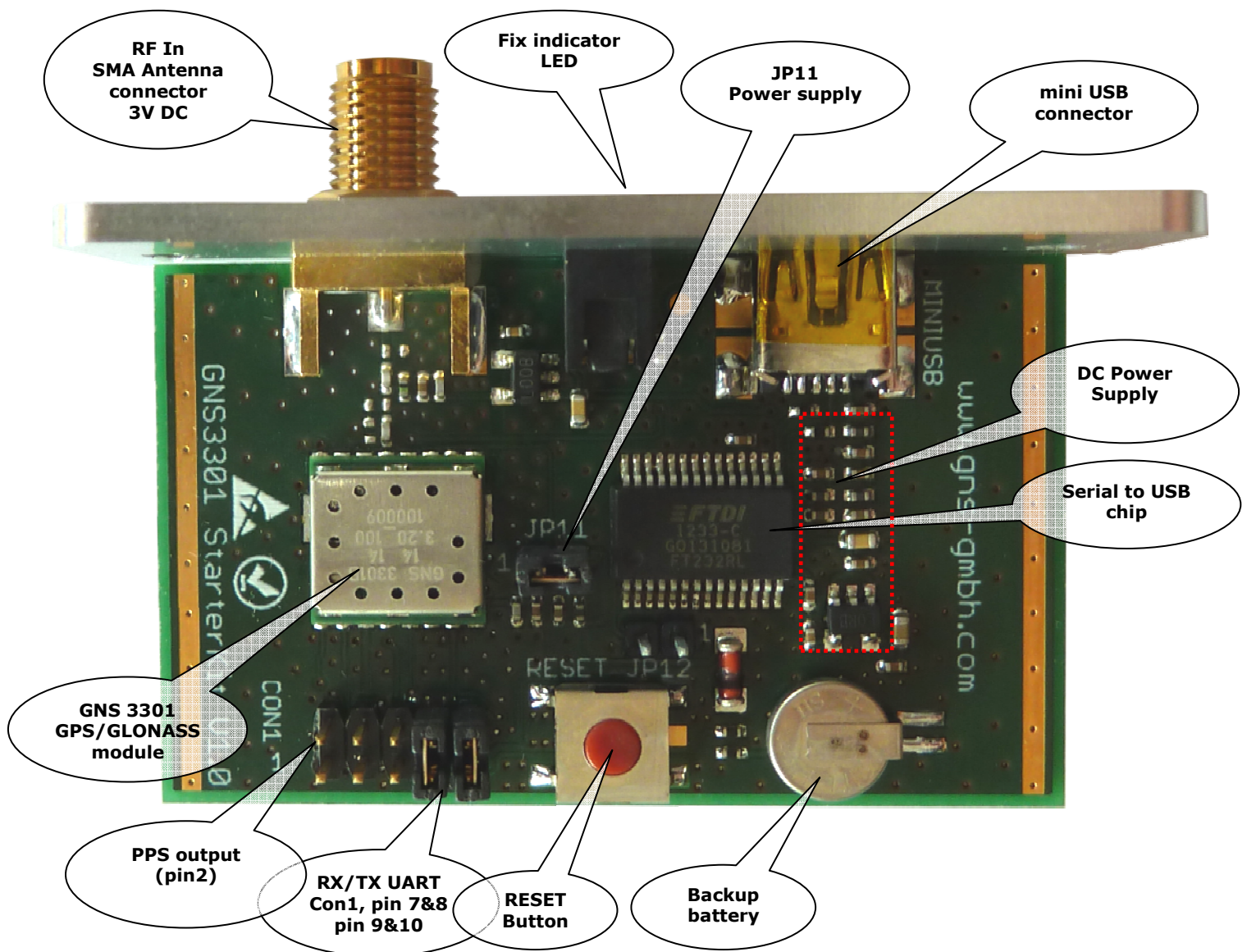
JUMPER AND CONNECTOR DESCRIPTION

CONNECTOR	PIN	SIGNAL	DESCRIPTION
JP11	**1&2**	VBat	This jumper must be connected to DC supply GNS 3301.
JP12	**1&2**	GND	Resets UART2USB bridge
CON1	**1**	GND	Ground
	2	1PPS	1PPS Time Mark Output
	3&5	NC	Not connected
	4	RXDB	Serial Data Input for DGPS RTCM data streaming This pin receives DGPS data of RTCM protocol (TTL level), if not used keep floating.
	6	TXDB	Serial Data Output This is the UART-B transmitter of the module. It is used for customization by firmware. If not used, keep floating.
	7	GPS_TX	UART2USB bridge transmitter Connect pin 7&8 to route TDXA to UART2USB bridge
	8	TXDA	Serial Data Output A for NMEA output (TTL) This is the UART-A transmitter of the module. It outputs GPS information for application.
	9	GPS_RX	UART2USB bridge receiver Connect pin 9&10 to route RDXA to UART2USB bridge
	10	RXDA	Serial Data Input A for Firmware update (TTL) This is the UART-A receiver of the module. It is used to receive commands from system.

3 GNS 3301 StarterKit Board Block Diagram

```
                           ┌──────────────┐         ┌──────────────┐
                           │ external RF  │◄────────│     LDO      │
                           │ SMA connector│         │  5V → 3.0V   │
                           └──────────────┘         └──────────────┘
        ┌──────────────┐          │
        │     LDO      │          │
        │  5V → 3.3V   │          ▼
        └──────────────┘   ┌──────────────┐         ┌──────────────┐
                           │              │         │  Multi-pin   │
┌──────────────┐ ┌──────────────┐         │◄───────►│  connector   │
│ miniUSB      │◄──►│ Serial to USB │◄──►│ GNS 3301 module│       │     CON1     │
│ connector    │ └──────────────┘         │         │              │
└──────────────┘                   └──────────────┘         └──────────────┘
```
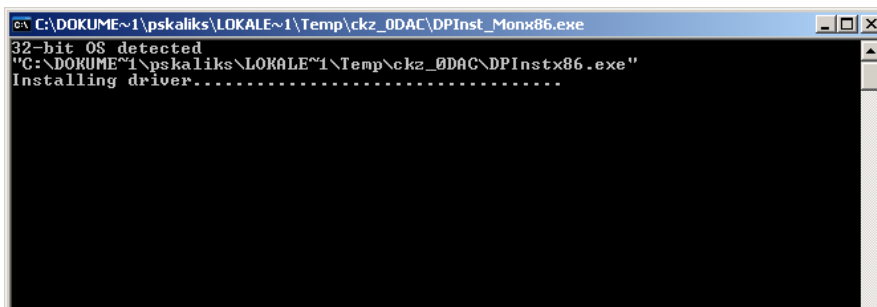
4 Getting started ....

1. Connect the active GPS/GLONASS antenna to the GNS 3301 Starter Kit.
2. Insert the included CD into your CD Rom Drive. Change to \Driver folder.
3. Copy the two files from the \Driver folder to a PC folder of your choice.
4. GNS 3301 Starter Kit will be connected to the PC via a virtual COM-Port with USB.
   This conversion is performed by an onboard chip.
   Do not connect the USB cable now!
   First, please install the FTDI VCP (Virtual Com Port) driver by invoking USB-Driver-CDM20600.exe.
   A DOS window will open and close again after a few seconds when finished.

```
C:\DOKUME~1\pskaliks\LOKALE~1\Temp\ckz_0DAC\DPInst_Monx86.exe
32-bit OS detected
"C:\DOKUME~1\pskaliks\LOKALE~1\Temp\ckz_0DAC\DPInstx86.exe"
Installing driver.................................
```

5. The VCP USB driver is now ready to use.
6. Connect the Starter Kit to your PC by using the USB- to miniUSB cable. This will power up the Starter Kit (shown by the blinking green LED fix indicator) and establish the active state.
7. You should see a hint on the right lower corner of your PC screen, that a new hardware has been found and is ready to use.

8. The USB connection will create a new virtual COM Port on your system. To locate this COM port number (to find out which COM port has been assigned automatically), please open the device manager:

    a. Press the start button
    b. Type "device manager" or the appropriate name in your language (for example in Deutsch : "Geräte-Manager"). Windows will provide a direct link to open the device manager
    c. Alternatively, you find the device manager by pressing the "Windows"-key together with "pause". This opens the system overview:
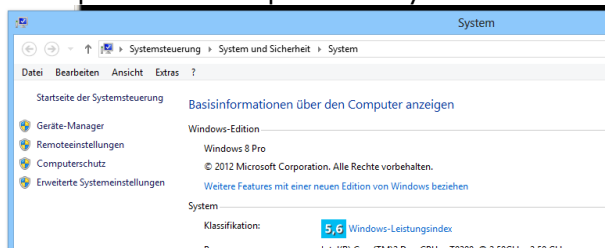
    d. On the left side selection menu, please select device manager. (german: "Geräte-Manager")The list of Assign the virtual COM-Port number by executing "Windows Start Button" and select "Control panel".

9. Open the section ports ("Anschlüsse").
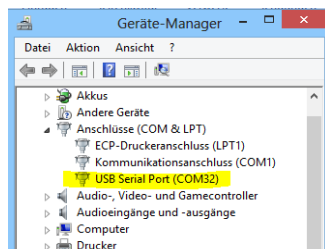
    The new COM port is listed as an USB Serial Port.
    Remember the displayed COM port number.

10. Use a GPS viewer of your choice to visualize the received NMEA data. We recommend to use VisualGPSView freeware for quick testing. Setting should be made as follows:
    - UART Comport number : as indicated above in the device manager
    - UART baud rate : 9600
    - UART format (should be already default) 8N1, no handshake

    For deeper testing, a special tool from mediatek is available under NDA.

5 GNS 3301 configuration

In all cases, where a UART or USB connection to a PC is available, the **GNS 3301** offers a comfortable way to reprogram the firmware options or settings using the bidirectional NMEA command interface.

> **Note:**
> **Removing the power of the GPS device will effect that any modified setting will be lost and reset to factory default settings. If the module has backup power supply through VBACKUP or coin battery, it will be able to keep the modified setting until the backup power is exhausted.**

After selecting the preferred settings or features at the **NMEA_Interface_manual_MTK_Vx** document, first the checksum has to be calculated for this command, refer to chapter 5.1 *Checksum Calculation*. To execute the $PMTK commands, use a terminal program of your choice (for example HyperTerminal, HTerm, TerraTerm,… available as part of your WindowsOS or as freeware).

Use the COMport setting as explained under 3.1.

Use the PMTK-Commands attaching the calculated checksum (see 5.1) and the Carriage Return sequence at the end of each command line. Most terminal programs offer the option to attach Carriage-Return (use option *add CR-LF* or similar).

5.1   checksum Calculation

To execute the a $PMTK command it is required to terminate the command by *<chksum>and a <CR><LF>. The checksum calculation is simple, just XOR all the bytes between the $ and the * (not including the delimiters themselves). Then use the hexadecimal ASCII format.
Or use the checksum tool at the \Software\Checksum tool folder, which is available on Starter Kit CD or at the GNS forum: www.forum.gns-gmbh.com.

Example: $PMTK226,3,30*4<CR><LF>

6 GNS 3301 StarterKit Hardware

6.1   **Assembly Drawing Top Side**

www.gns-gmbh.com

GNS3301 StarterKit V1.1

6.2   **GNS 3301 StarterKit Schematic page1/2**

TITLE: GNS_EVLB_GNS3301_cr

Document Number: REV:

Date: 08.04.2014 08:35:32   Sheet: 1/2

6.3   GNS 3301 StarterKit   Schematic page2/2

TITLE: GNS_EVLB_GNS3301_cr

Document Number:

REV:

Date: 08.04.2014 08:35:32   Sheet: 2/2

6.4   PCB Layout TOP/BOTTOM Layer

TOP Layer   BOTTOM Layer

7 ORDERING INFORMATION

Ordering information			
Type	**Part#**		**Description**
GNS 3301_StarterKit	4037735105195		GNS 3301 Evaluation Board
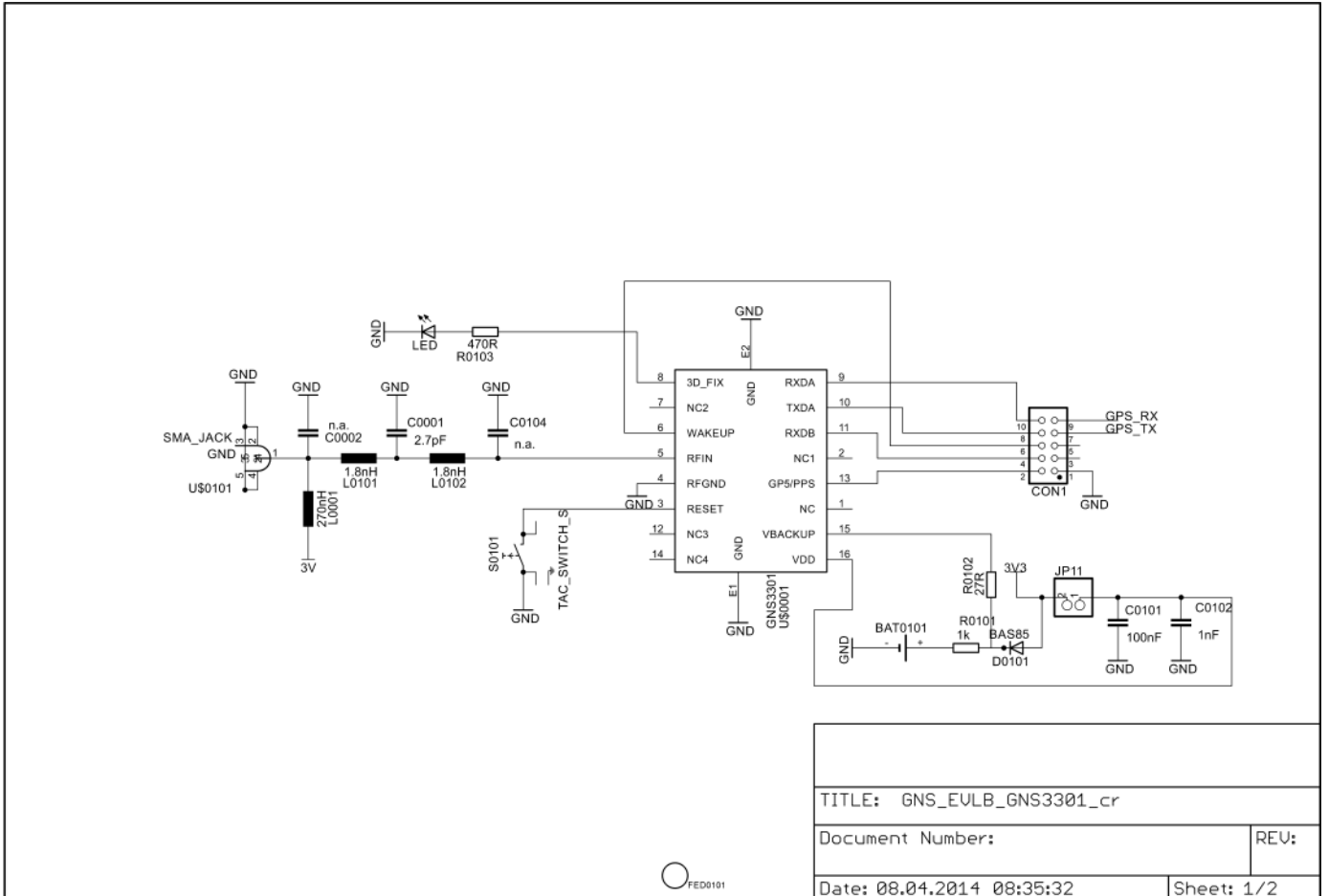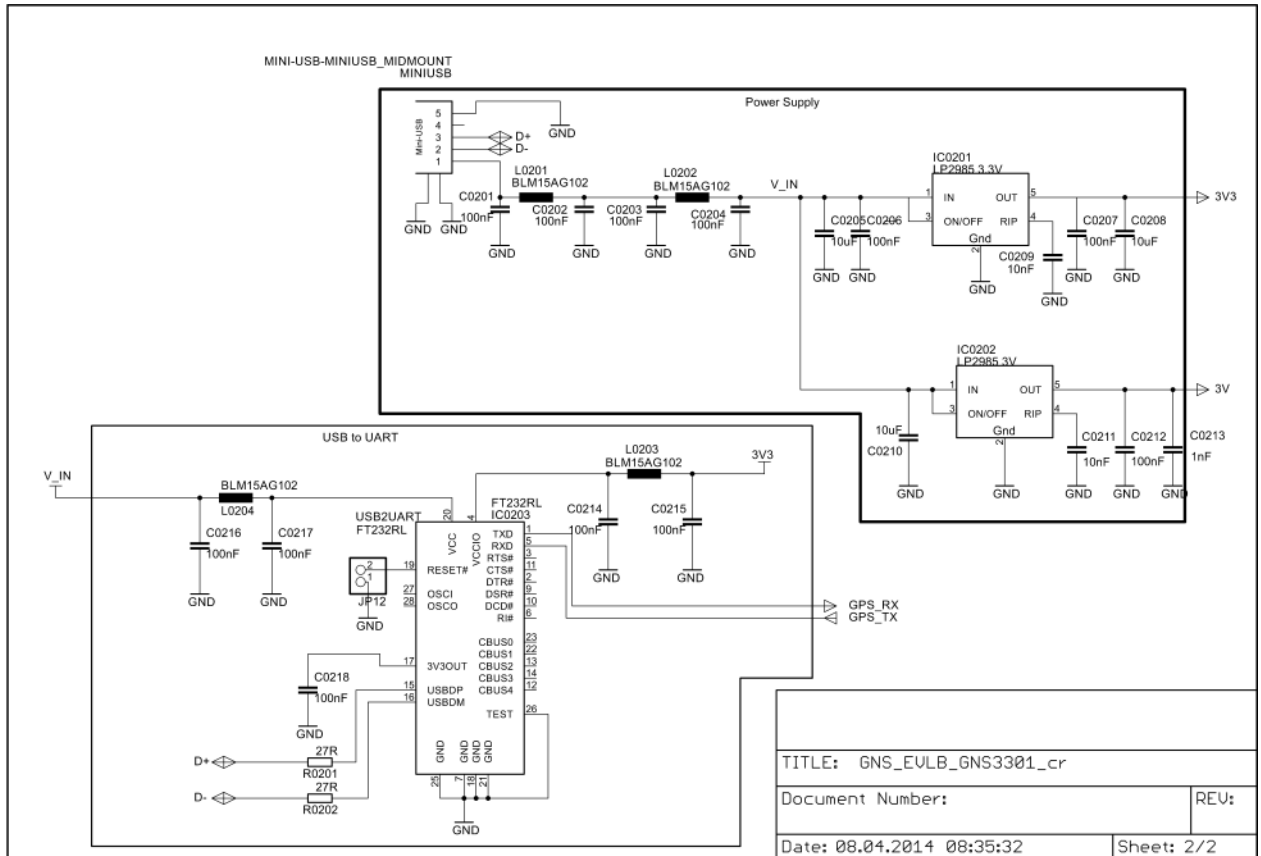
8 ENVIRONMENTAL INFORMATION

This product is free of environmental hazardous substances and complies to 2002/95/EC. (RoHS directive).

9 RELATED DOCUMENTS

Type	description	Available from
GNS 3301 data sheet	Data sheet for GNS 3301 module	http://www.forum.gns-gmbh.com
GPS Antenna Connection Design Guide	Design Guide to implement an GPS antenna to an application PCB	http://www.forum.gns-gmbh.com
NMEA_Interface_manual_MTK_ Vx	Detailed description of NMEA protocol & commands	http://www.forum.gns-gmbh.com

10 DOCUMENT REVISION HISTORY

V1.0	03/17/2014	M.Reiff	initial document
V1.1	10/16/2014	Skaliks	General review
V1.2	6/12/2015	O. Diegel	Corrected part#