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GPS SiRFstarIV Evaluation Kit EVA2200-A

A Description of the Evaluation Board
for Maestro's GPS Receiver Module A2200-A

User's Manual

Version 1.0



Revision History

Rev.	Date	Description
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	Name	Date	Signature
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1 Introduction

1.1 Purpose

The GPS Evaluation Kit EVA2200-A allows an easy evaluation of Maestro's SiRF-starIV GPS receiver module A2200-A by offering quick access to the serial ports and the most important I/O lines of the module.

The EVA2200-A serves three major purposes:

- As a demonstration package of the module's capabilities
Powering the A2200-A GPS receiver module via the USB connector and connecting the GPS antenna with sufficient view to the sky will result in an NMEA output with position information.
- As an example how to integrate the module into a system
The schematic in chapter "9 Board Schematics" is a basic example of how to integrate the GPS module into an application or system.
- To support an easy temporary design in
The signals provided on the Evaluation Kit allow direct integration into a surrounding system making it an ideal development tool.

The EVA2200-A can especially demonstrate that an active GPS antenna connected to the Antenna Input will result in outstanding GPS performance.

1.2 Contents

The EVA2200-A includes the following components:

- Evaluation Board (labeled EVA2200-A) with one A2200-A GPS receiver
- Active GPS antenna
- USB cable to connect to your PC
- CD with complete documentation and Maestro's GPS Cockpit software

Please check your package for completeness and connect the components properly.



Figure 1: Evaluation board EVA2200-A



Figure 2: Active GPS antenna with SMA connectors



Figure 3: USB cable with A/B type connectors



Figure 4: CD

1.3 Ordering Information

The complete order number for the EVA2200-A is

EVA2200-A

The board will always be shipped with latest part number. Information on sales channels can be found on Maestro's web page.

1.4 Handling Precautions

The EVA2200-A contains components that are sensitive to electrostatic discharge (ESD). Please handle with appropriate care.

2 Quick Start

- (1) Connect the EVA2200-A with your PC using the included USB cable.
- (2) When the PC asks for drivers select the folder “Tools\Drivers” on the included CD ROM.

Note: Two drivers need to be installed, the [EVA2200-A FTDI driver](#) and the [USB serial driver](#).

Note: During the driver installation process your Windows system will probably notify you, that the driver did not pass Windows logo testing with a warning:

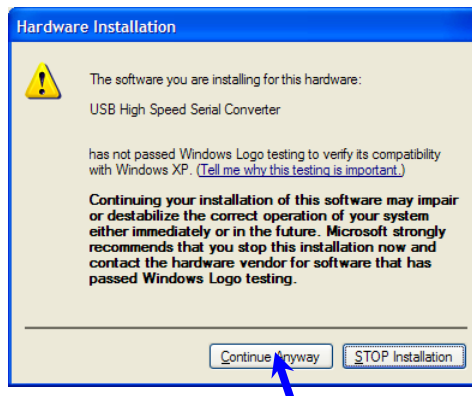
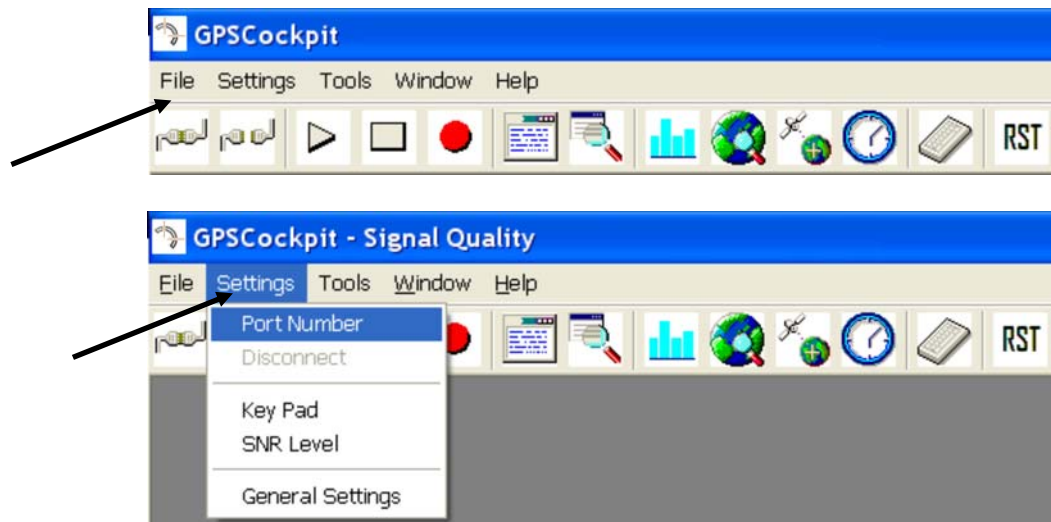


Figure 5: Windows driver installation warning

- (3) Connect the included active GPS antenna to the antenna connector of the EVA2200-A; make sure that the antenna has a good view to the sky!
- (4) Make sure all DIP switches are in ON position except for the G_7 DIP switch which must be in OFF position.
- (5) To start the GPS Cockpit software which visualizes the NMEA output data coming from the GPS receiver, copy all files from the included CD ROM “Tools/GPS Cockpit” to a folder of your choice on your PC. Then double click the GPSC.exe file. The GPS cockpit software starts without additional software installation. A detailed description of the GPS Cockpit software is included on the CD ROM.

- (6) Activate the correct port within GPS Cockpit. You can do this by selecting the “COM port connection” icon (left-most icon) or by choosing “Port Number” in the “Settings” menu.



In both cases the following window will appear:

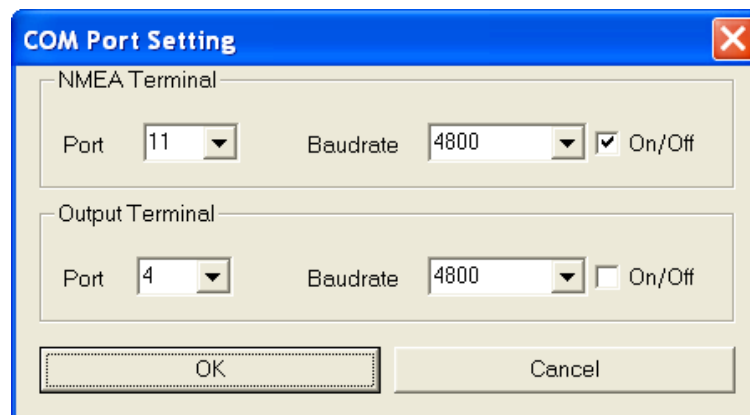
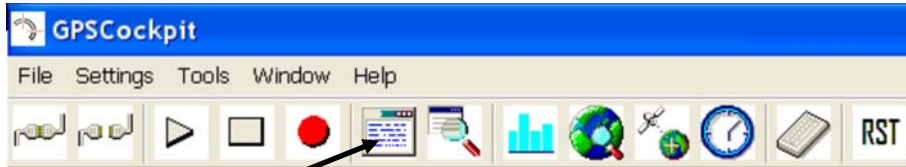


Figure 6: GPS Cockpit COM Port Setting window

Choose the COM port to which the GPS receiver is connected (verify in your system settings - device manager, which communication port is used for this USB serial connection), in our example COM11 at 4800 baud (default setting for the EVA2200-A), make sure that the On/Off box is checked, and click on “OK”:

- (7) Open the NMEA Terminal window to see NMEA sentences by using the “NMEA Terminal” window button. You will see no messages!



- (8) In order to start the module, you need to push the “ON” button of the evaluation board. Then only you will see messages like this:

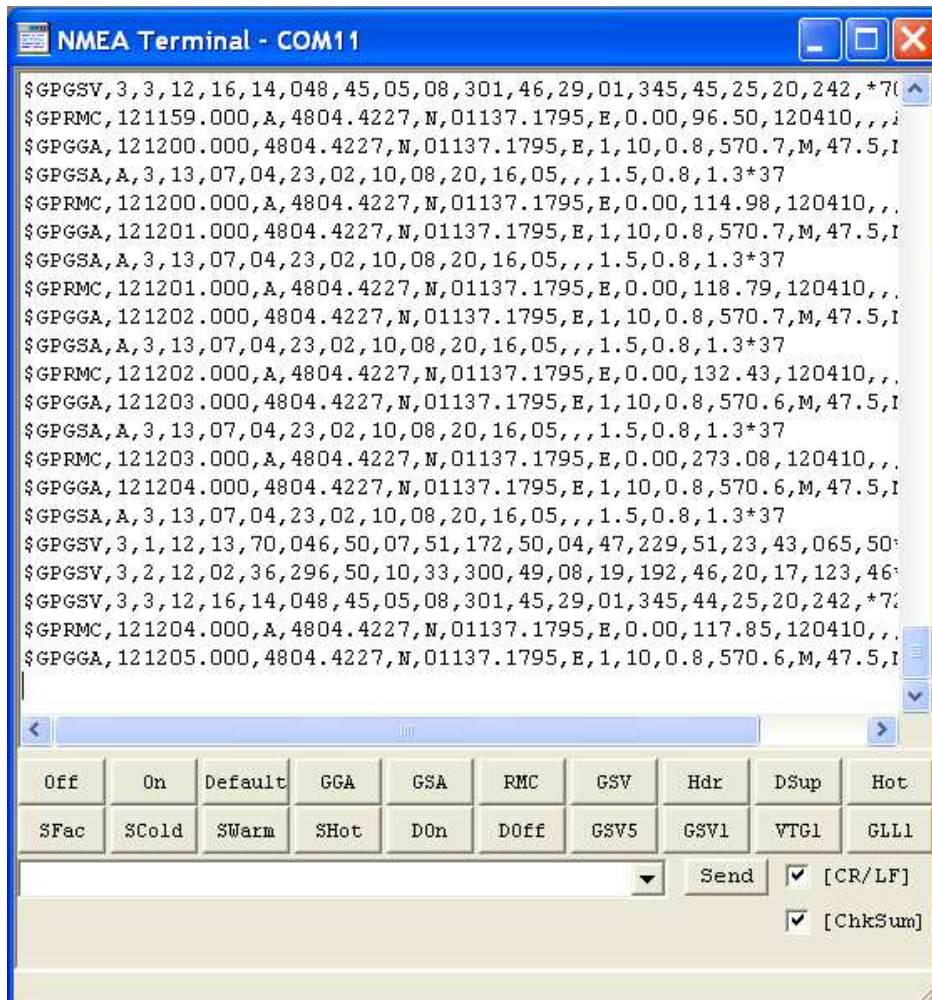


Figure 7: GPS Cockpit NMEA terminal with NMEA data

Now you can start using all the other windows and features of GPS Cockpit. Please refer also to the GPS Cockpit manual and the online help within GPS Cockpit.

3 Potential Problems with Windows

3.1 Ballpoint Mouse

After successful driver installation and after pushing the “ON” button of the EVA2200-A Windows might interpret the data coming over the serial interface as a serial ballpoint mouse! Your mouse pointer can start jumping around. To stop this, disable the according device using your device manager. Leave the EVA2200-A kit connected and push the nRST button once. The module will stop to transmit data. To fix the problem you will find the device under “Mice and other pointing devices”. Use a right click to open the sub-menu and disable the device.

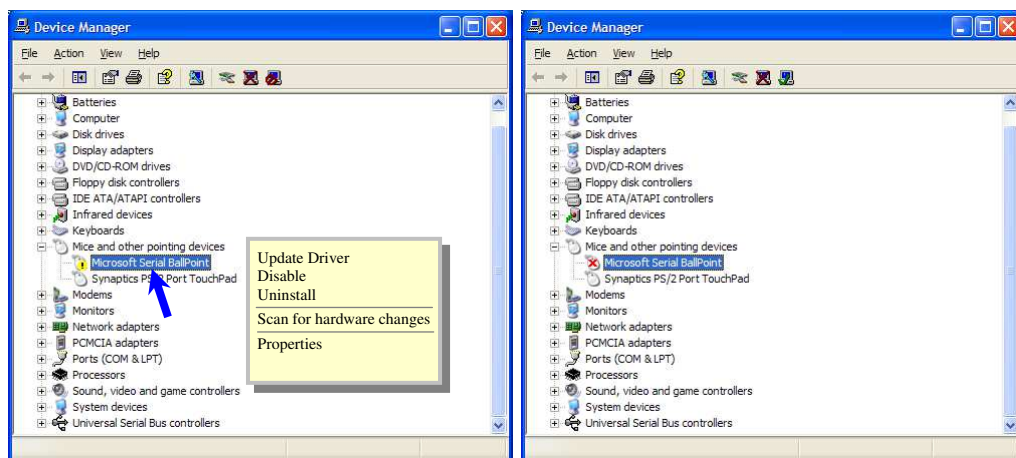


Figure 8: Disabling of Microsoft Serial BallPoint

Afterwards you will be able to continue in a normal way. Don't forget to push the “ON” button again to receive NMEA data.

3.2 Missing Graphics

In case you can see only textual information within GPS Cockpit and no graphics, you need to change the “Color quality” within the “Display Properties” under tab “Settings”.

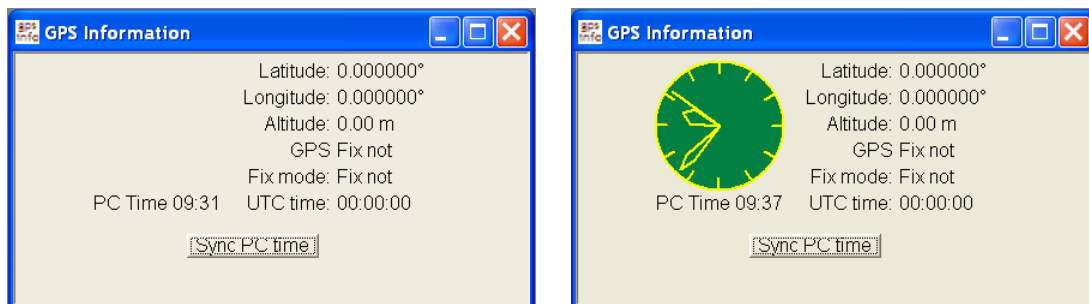


Figure 9: GPS Information window without and with clock

So please make sure that the “Color quality” within the “Display Properties” is set to “Highest (32 bit)”. “Display Properties” can be invoked by a right click on your desktop and selecting “Properties”.

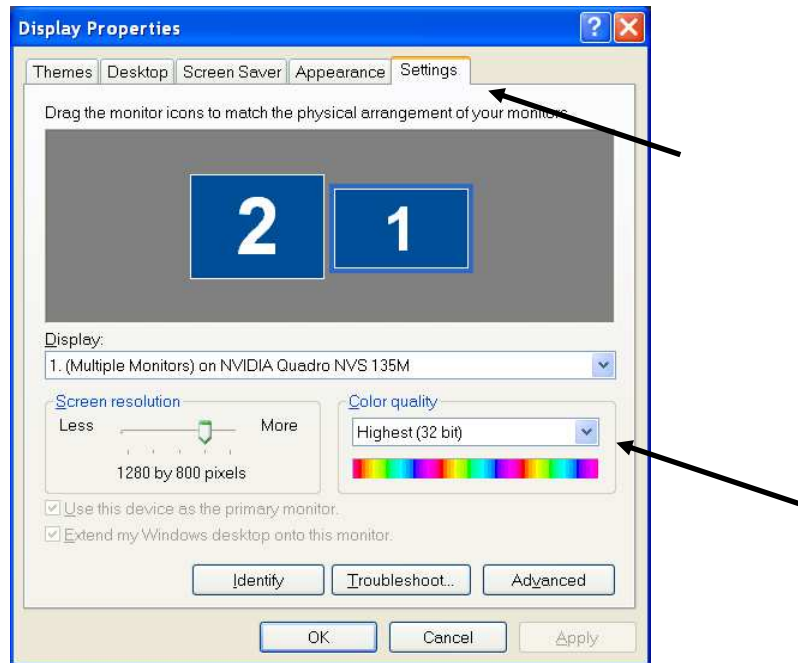


Figure 10: “Color quality” within “Display Properties”

4 Board Overview

The following picture shall give an overview on the complete evaluation board EVA2200-A. It explains the most important components and can be used as a reference for the next paragraphs.

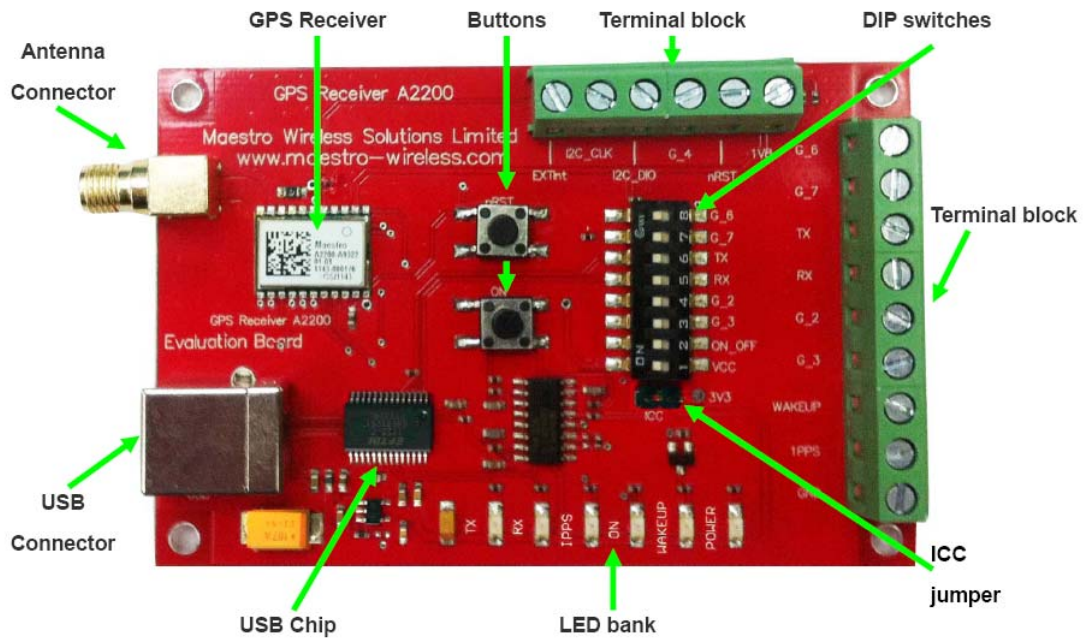


Figure 11: Board overview

5 On-Board Peripherals

5.1 ON and RESET Push-Button

The EVA2200-A has two push-buttons:

- ON (ON / OFF functionality)
- nRST (RESET functionality)

After power on pushing the “ON” button will start the A2200-A module. This is absolutely necessary to get the module going. The “ON” button must be used as well in other cases, e.g. in order to request a position when in SiRFaware™ state or to go to hibernate mode and wake up again.

The “nRST” button is used to get a full reset of the GPS module. All parameters are stored in non-volatile memory. After pushing this button the module starts again from the beginning.

5.2 Antenna Connector

The A2200-A supports one antenna input. Both active and passive GPS antennas can be connected to GPS input as below. Only active GPS antenna was equipped inside evaluation kit.



Figure 12: Antenna connector

5.3 LEDs

There are 6 LEDs on the EVA2200-A that indicate different signals from the GPS receiver (order of LED's on EVA2200-A from left to right):

LED	Name	Function	Description
D3	TX	Transmit	Serial data traffic (from GPS receiver)
D2	RX	Receive	Serial data traffic (into GPS receiver)
D6	1PPS	Timing	1PPS signal at rising edge (1 pulse per second, duration 500 ms typ.)
D5	ON	ON	ON after Reset, position request during PTF cycle and in SiRFaware mode (the LED visualizes the ON pulse)
D1	WAKEUP	Operational state	HIGH: Full operation LOW: Module in a low power mode
D4	POWER	Power/Vcc	Power on LED

Table 1: LEDs function and description



Figure 13: EVA2200-A LEDs

6 Design-in Support

The EVA2200-A Evaluation board offers the possibility to implement the A2200-A GPS receiver module temporarily into your design by using the terminal block with 15 connections. To operate the EVA2200-A via this terminal block, please check “Table 3: Switch settings”.

Please note:

- VCC power input is **not** protected against reversed polarity
- External supply has to be within the range of 3.3 to 3.6 VDC

6.1 Terminal Block

The terminal block offers direct access to the A2200-A GPS receiver pins.

Pin	1	2	3	3	5	6
Port	EXTInt (ExtInt2/gpio8)	I2C_CLK	I2C_DIO	G_4 (EXTInt)	nRst (reset)	1V8 (out)

Pin	7	8	9	10	11	12	13	14	15
Port	G_6 (gpio6)	G_7 (gpio7)	TX	RX	G_2 (gpio2)	G_3 (gpio3)	WAKEUP (operational mode)	1PPS (Pulse Per Second)	GND

Table 2: Terminal block description

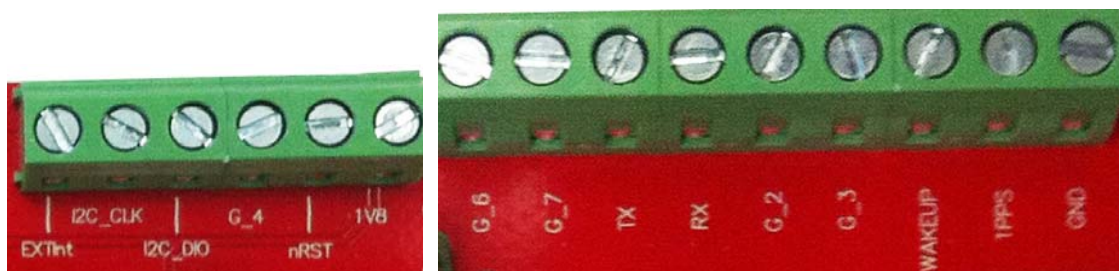


Figure 14: Terminal block

6.2 DIP Switch Settings

The following picture shows the DIP switches of the EVA2200-A.

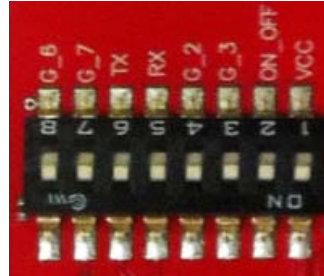


Figure 15: DIP switches (picture turned by 90° ccw)

Switch	Function	Operation via USB connector (default settings)	Operation via terminal block
S1	VCC	ON	OFF
S2	ON_OFF	ON	ON
S3	G_3	ON	OFF
S4	G_2	ON	OFF
S5	RX	ON	OFF
S6	TX	ON	OFF
S7	G_7	OFF	OFF
S8	G_6	ON	OFF

Table 3: Switch settings

6.3 ICC Jumper



Figure 16: ICC jumper

As long as the VCC DIP switch is “ON” the ICC jumper is bridged. By putting the VCC DIP switch to the OFF position the current draw of the A2200-A GPS receiver can be measured directly by connecting a low resistance measurement device to the ICC jumper.

The low resistance measurement device should be connected before VCC is switched off!

7 NMEA Port

- Default setting: 4800 baud, 8 data bits, no parity, 1 stop bit, no flow control!
- Standard NMEA-0183 output on NMEA, baud rate selectable.
- Standard USB connectors

8 Shutdown Sequence

Care must be taken to implement an orderly shutdown sequence along with supplying power for a certain period of time after initiating the shutdown sequence. Abrupt removal or drop of power while the module is running has risks ranging from minor impact on TTFF to fatal, permanent corruption of flash memory code area!

The shutdown sequence can either be initiated by a command (NMEA or binary) or by toggling the ON_OFF pin. It is strongly recommended to press the “ON” button before removing power from the evaluation board!

The shutdown is completed after maximum 1s. Therefore the module should be at least supplied with voltage for that time after the shutdown sequence was initiated. In case the voltage supply will be available then continuously, it is necessary to wake up the GPS module again by toggling the ON_OFF pin.

9 Board Schematics

The following shows the schematics of the EVA2200-A. For best readability the picture was enlarged to cover the complete page.

Please note that the design is done in a way that it reflects the Minimum Configuration as outlined in the GPS Receiver Manual A2200! These are especially:

- The A2200-A needs an external pull-up resistor to be configured for UART operation. Please consider the pull-up resistor in your design or pull the GPIO up right after reset by other means.
- The ON_OFF input of the A2200-A needs to be connected to a push-pull output of a microprocessor. For a wake-up, including the initial one after power on, a LOW-HIGH transmission is mandatory.
- The nRST pin of the A2200-A needs to be connected to an open collector / open drain output of a microprocessor! This is necessary to work with SiRFaware™. Pulling nRST low and afterwards toggling of ON_OFF will get the module to report a position fix when in SiRFaware™ mode.

The following picture shows the minimum configuration for using the A2200-A in UART mode with a passive antenna. In addition VANT are supported on the evaluation board!

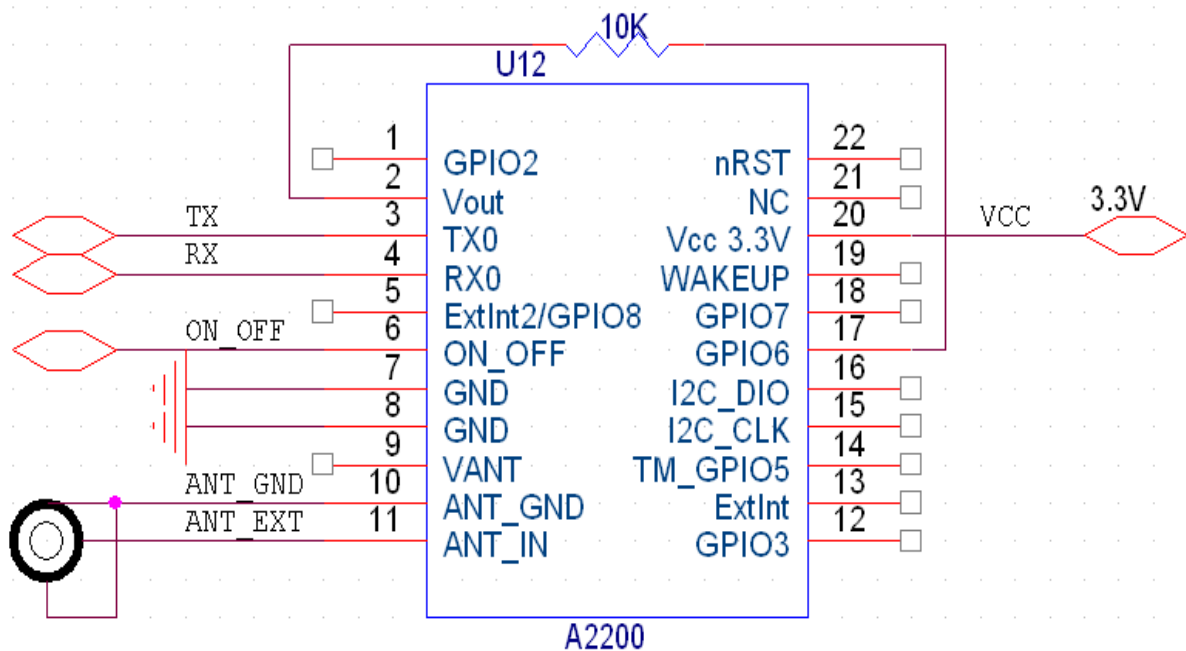


Figure 17: Minimum configuration A2200-A

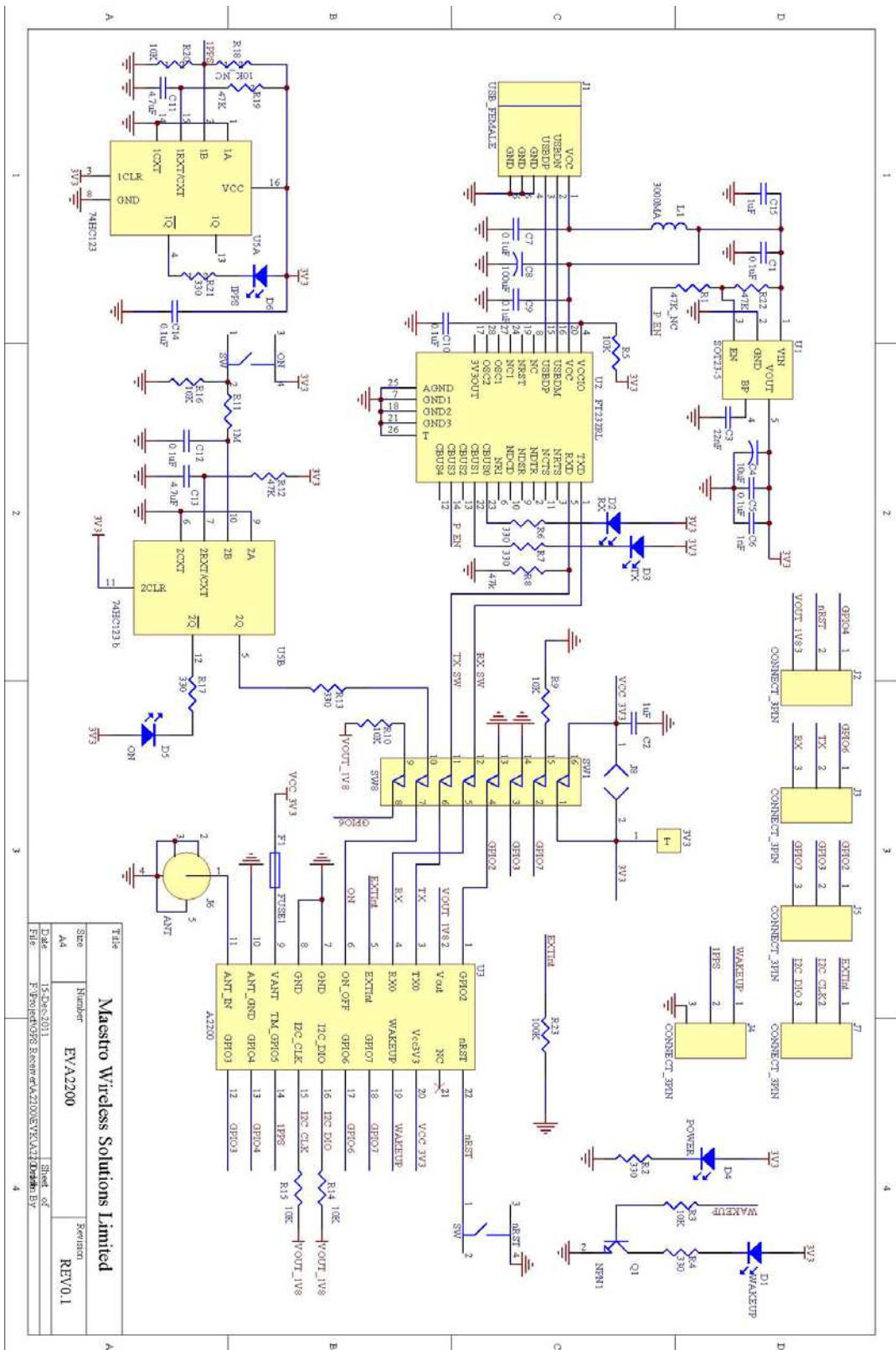


Figure 18: EVA2200-A board schematics

10 Related Information

10.1 Contact

This manual is created with due diligence. We hope that it will be helpful to the user to get the most out of the GPS module.

Inputs regarding errors or mistaken verbalizations and comments or proposals to Maestro, Hongkong, for further improvements are highly appreciated.

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10.2 Related Documents

- GPS Receiver A2200 (Maestro)
- SiRF_NEMA_Reference_Manual (SiRF)
- SiRF_OSP_Reference_Manual (SiRF)

10.3 Related Tools

- GPS Cockpit (Maestro)
- SiRFLive (SiRF)

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