LINX® TECHNOLOGIES
WIRELESS MADE SIMPLE®

MASTER EVALUATION/DEVELOPMENT SYSTEM

SR Series Master Development System User's Guide

ORDERING INFORMATION

PART #	DESCRIPTION
MDEV-GPS-SR	SR Series Master Development System

INTRODUCTION

The Linx SR Series RF modules offer a simple, efficient, and cost-effective method of adding GPS capabilities to any product. The Master Development System is intended to give a designer all the tools necessary to correctly incorporate the SR Series into an end product. The development boards themselves serve several important functions:

- Rapid Module Evaluation - The boards allow the performance of the Linx SR Series modules to be evaluated quickly in a user's environment.

- Design Benchmark - During the design process of your product, the boards provide a known benchmark against which the performance of your own design may be judged.

- Application Development - An on-board prototyping area is provided to allow a designer to develop applications directly on the development board. All signal lines are available on a header for easy connection to the designer's circuits.

The Master Development System includes 1 assembled development board, 2 SR Series receivers*, 4 AAA batteries, and full documentation.

*One part is soldered to the board, one extra is for use on your first prototype board.

Revised 07/20/10
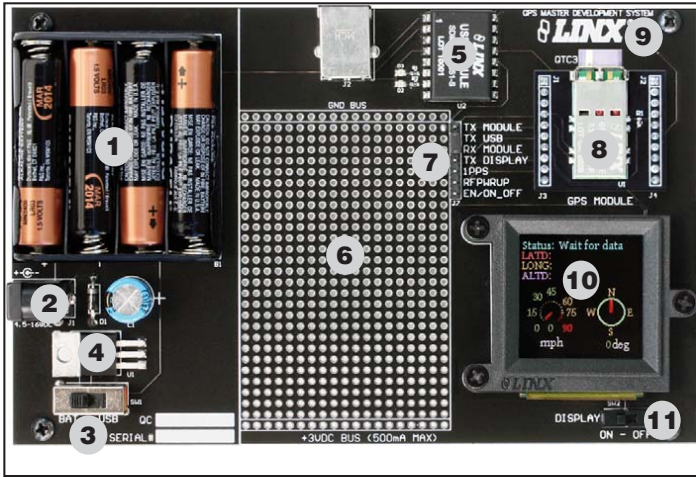
SR SERIES RECEIVER DEVELOPMENT BOARD

Figure 1: SR Series Receiver Development Board

1. Four AAA Batteries
2. DC Power Jack
3. Power Switch
4. Voltage Regulator
5. USB Interface Module
6. Prototype Area
7. Break-Out Header
8. SR Series Receiver Daughter Board
9. CR2032 Backup Battery (on the back)
10. OLED Display
11. OLED Display Power Switch

TROUBLESHOOTING

If the board fails to work out of the box, then try the following:

• Check the batteries to make sure they are not dead.
• Check to make sure that the power switch is in the correct position.
• Make sure that the jumper is set correctly.

If all of these appear to be in order, please call 800-736-6677 or e-mail techsupport@linxtechnologies.com for technical support.

INITIAL SETUP

Unpack the development system and install the AAA and coin-cell batteries. The power switch can select between the battery pack / DC power jack or USB if the board is plugged into a USB bus. To use the display, turn the OLED display power switch on. The development board is now ready for use. After turning on the power, the module will determine its current position. Please note, the time required for an initial fix or after long periods of storage will be considerably greater than in subsequent operation. Please refer to the module's data guide for complete information regarding time-to-first-fix (TTFF). To protect the display and extend its life, turn the display off before turning the board off.

THE PROTOTYPING AREA

In addition to its evaluation functions, the board may also be used for actual product development. It features a prototyping area to facilitate the addition of application-specific circuitry. The prototyping area contains a large area of plated through-holes so that external circuitry can be placed on the board. The holes are set at 0.100" on center with a 0.040" diameter, making it easy to add most industry-standard SIP and DIP packages to the board.

External circuitry can be easily interfaced with the SR receiver through the breakout header (J7) to the right of the prototyping area. A jumper shunt has been provided to control the routing of data into the GPS module. By default the jumper is set for operation with the on-board USB module. When communicating with the GPS module using your own components this jumper shunt should be removed. At the bottom of the prototyping area is a row connected to the 3V power supply and at the top is a row connected to ground.

NOTE: *The on-board 3-volt regulator has approximately 300mA of headroom available for additional circuitry. If added circuitry requires a higher current, the user must add an additional regulator to the prototype area or power the board from an external supply.*
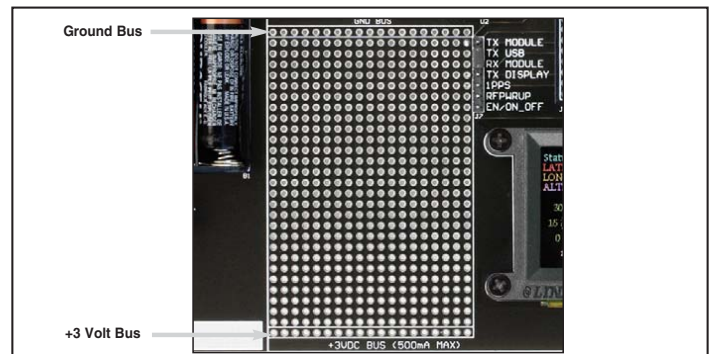

Figure 2: The Development Board Prototyping Area

THE GPS RECEIVER SECTION

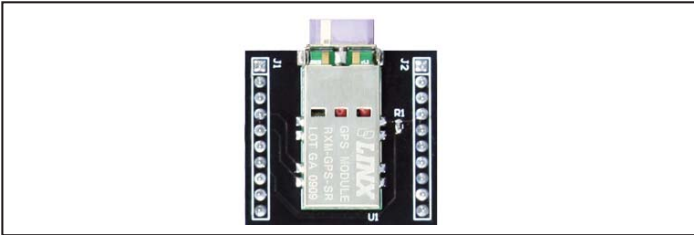The receiver module is mounted on a daughter board which plugs into headers on the main development board.

Figure 3: The Development Board GPS Receiver Section

On the bottom of the main board is a CR2032 coin cell battery that provides power to the RTC and SRAM when the receiver is powered down. This allows the receiver to start up and obtain a position fix faster. This cell will provide about two years of operation.

THE USB SECTION

The development board features a Linx QS Series USB module for interface to a PC. This allows the board to be used with the supplied development software or with custom software developed by the user.

Drivers for the USB module are included on the software CD in the kit or may be downloaded from www.linxtechnologies.com. Additional information on using the QS Series USB module can also be found on the website.

The USB connection also allows the board to be powered by the USB bus instead of batteries. This can be convenient during development to eliminate the need for frequent battery replacement.

Figure 4: The USB Section

Output data from the GPS module is connected directly to the USB module, but data into the GPS module is split. This is to prevent data collisions between the USB module and any circuitry added to the prototyping area. To route serial data from the USB module to the serial data receive line on the GPS module, use the supplied jumper to connect the TX USB and RX MODULE lines on the breakout header as shown in the adjoining diagram. Remove this jumper for use with external circuitry. The pin marked TX DISPLAY is for Linx use and should be left unconnected.
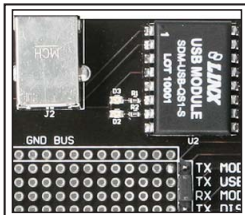

TX MODULE
TX USB
RX MODULE
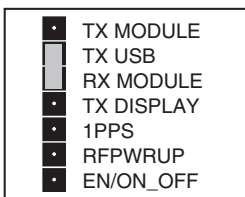TX DISPLAY
1PPS
RFPWRUP
EN/ON_OFF

Figure 5: Jumper Configuration

THE DISPLAY SECTION

The SR Series Master Development System features an OLED screen that displays the navigation information from the GPS module. This allows the development board to act as a stand-alone evaluation system without the need for any additional software.

Figure 6: The Development Board Display Section

The display is driven by an on-board microcontroller located under the display. Data from the GPS module is connected directly to this microcontroller. The microcontroller receives data at the receiver's default 9,600bps. **If the receiver's baud rate is changed, it will not be able to communicate with the microcontroller.**

The display and microcontroller pull about 100mA when fully powered, so a power switch is supplied to deactivate the display area when not in use, saving battery life. To protect the display and extend its life, be sure to turn the display section off before turning off the main power to the board.

MASTER DEVELOPMENT SOFTWARE

The development system is supplied with Windows-based software that communicates with the development board through the USB module. This software displays the information from the GPS module in the different NMEA formats and the satellite information, signal strength, and positions are displayed graphically. If the PC is connected to the internet, the software plots the current location on Google Maps. Full details are in the software's User's Guide.

Figure 7: Master Development Software

RECEIVER SECTION

J3
HEADER 10

GND
TXM
RXM
1PPS
LED
RFPWRUP
EN/ON_OFF
GND

J4
HEADER 10

GND
VCC
VBACKUP
GND

VBACKUP
B2
BATHLD-001
GND

HEADER SECTION

J7
HEADER 7

TXM
TXUSB
RXM
TXDISP
1PPS
RFPWRUP
EN/ON_OFF

USB SECTION

J2
USB-B

GSHD
GSHD
GND
DAT+
DAT -
5V
GND
GND

U2
SDM-USB-QS

USBDP
USBDM
GND
VCC
SUSP IND
RX IND
TX IND
485 TX

RI
DCD
DSR
DATA IN
DATA OUT
RTS
CTS
DTR

TXM
TXUSB

R1 220
R2 220
VCCU
D3
D2

POWER SUPPLY SECTION

J1
PWRJACK
VCCU
SW1
POWER SWITCH

D1
DIODE400
B1
BAT-AA-4
GND
GND

U1
VREG-3V
Vin
Vout
GND
VCC
C1 220uF
GND
GND
GND

VCC
C9 10uF
GND

DISPLAY SECTION

GND
C8 10uF
VCC

U4
PIC24F128GA006

D5
D6
D7
PMD5/RE5
PMD6/RE6
PMD7/RE7
PMA5/SCK2/CN8/RG6
PMA4/SDI2/CN9/RG7
PMA3/SDO2/CN10/RG8
MCLR VPP
PMA2/SS2/CN11/RG9
VSS GND
VDD VCC
C1IN+/AN5/CN7/RB5
C1IN-/AN4/CN6/RB4
C2IN+/AN3/CN5/RB3
C2IN-/AN2/SS1/CN4/RB2
PGC1/EMUC1/VREF-/AN1/CN3/RB1 PGC
PGD1/EMUD1/PMA6/VREF+/AN0/CN2/RB0 PGD

SOSC0/T1CK/CN0/RC14
SOSCI/CN1/RC13
OC1/RD0 SW3
IC4/PMCS1/INT4/RD11
IC3/PMCS2/INT3/RD10
IC2/U1CTS/INT2/RD9 SW2 POWER SWITCH
IC1/RTCC/INT1/RD8
VSS
OSC2/CLKO/RC15
OSC1/CLKI/RC12
VDD VCC
SCL1/RG2 RES#
SDA1/RG3 CS#
U1RTS/BCLK1/SCK1/INT0/RF6
U1RX/SDI1/RF2 TXM
U1TX/SDO1/RF3 TXDISP

PMD4/RE4
PMD3/RE3
PMD2/RE2
PMD1/RE1
PMD0/RE0
RF1
RF0
EN/VREG
VCAP/VDDCORE
CN16/RD7
CN15/RD6
PMRD/CN14/RD5
PMWR/OC5/IC5/CN13/RD4
PMBE/OC4/RD3
OC3/RD2
OC2/RD1

PGC2/EMUC2/AN6/OCFA/RB6
PGD2/EMUD2/AN7/RB7
AVDD
AVSS
U2CTS/C1OUT/AN8/RB8
PMA7/C2OUT/AN9/RB9
TMS/PMA13/CVREF/AN10/RB10
TDO/PMA12/AN11/RB11
VSS
VDD
TCK/PMA11/AN12/RB12
TDI/PMA10/AN13/RB13
PMA1/U2RTS/BCLK2/AN14/RB14
PMA0/AN15/OC4/CN12/RB15
PMA9/U2RX/SDA2/CN17/RF4
PMA8/U2TX/SCL2/CN18/RF5

VCC GND
GND VCC
DC#

Display regulator

VCC13
D4
L1 10uH
VCC

R3 47.5k
U3 MIC2288
SW VIN
GND
FB EN

C2 2.2uF
GND
GND
EN

C4 0.1uF
C3 10uF
R4 5k
GND

C5 4.7uF
VCC13
GND
VCC

D5
D6
R6 50
GND

R5 560k
GND

C6 1uF
GND
VCC
GND

C7 0.1uF
GND

J5
HEADER 30

GND
VCC
VCOMH
VDDIO
VSL
D7
D6
D5
D4
D3
D2
D1
D0
E/RD#
R/W#
BS0
BS1
CS#
D/C#
RES#
IREF
GPIO1
GPIO0
VDD
VCI
VSS
GND

GND
VCC
GND

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