RGPSD012 GPS Evaluation Kit
User Guide

Table of Contents

1 INTRODUCTION - SYSTEM REQUIREMENTS

This kit is provided to demonstrate the performances of the Semtech XE1610-OEMPVT reference design, based on the XE1610 chipset. The kit includes:

- 2 active GPS antennas, including one with a 3-meter coax cable
- 2 GPS PVT GPS module based on Semtech XE1610-OEMPVT reference design
- an interface board, that includes a sub-board to convert serial UART signals to USB
- a USB cable
- a CD ROM that includes documentation, GPS Monitor software and USB drivers

To operate, the minimum system configuration requires a PC running under Windows 98/NT/2000/XP with 1 USB port available.

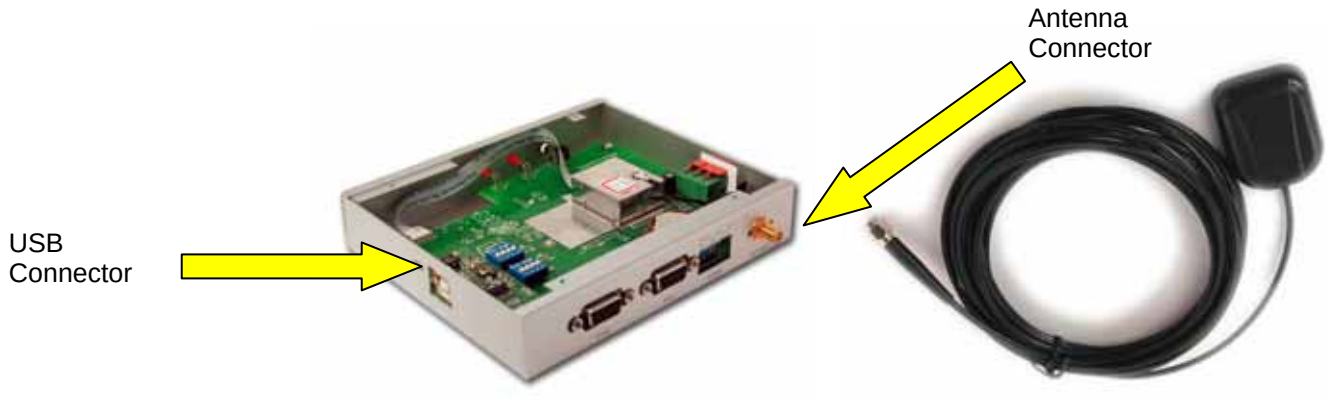
This basic configuration allows dialog between the PC and the evaluation kit using serial communication (COM port) and NMEA character strings provided by and to the PVT module. Based on that NMEA string the GPS Monitor can display position, time, speed, satellite information, position plot and sky plot.

It is also possible to operate the kit with commercial mapping software. The requirement is that it should accept NMEA data on a serial COM port as input, which most, if not all, do.

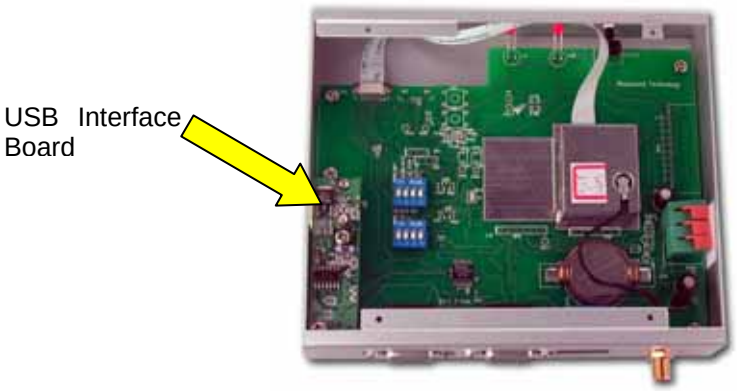
2 HARDWARE INSTALLATION

First, plug the packaged antenna coax cable in the SMA connector on the back panel (see the figure below).
To operate the RGPSD012 kit there is no need for an external power supply; since it is powered directly by the USB port. However, if you don't have a USB port available, please go to section 4.

Plug the USB cable in the USB connector on the side panel (see the figure below).



Finally, when your computer is turned on and ready for operation, BUT NOT BEFORE, plug the other end of the USB cable into the computer USB port that is available. The first time you do so, the operating system will ask you to install the driver for the serial USB connection. Simply follow the instructions described in Section 5 "Software Installation – USB Serial Port Driver".



3 DIP SWITCHES CONFIGURATION

The kit has 2 sets of DIP switches to control various settings, the Front Panel DIP Switches and the Internal DIP Switches.

Internal Dip switches

Front Panel Dip switches

3.1 FRONT PANEL DIPSWITCHES

The Front Panel individual DIP switches are DIPESW2 to DIPESW6.

- DIPESW2 controls whether or not the RS232 interface is powered during operation.
- DIPESW3 selects between 2 possible sources of power supply, the USB port or an external power supply connected to the kit.
- DIPESW4 controls whether or not the LED connected to the ALMRDY pin of the GPS Module is enabled.
- DIPESW5 controls whether or not the LED connected to the STY1 pin of the GPS Module is enabled.
- DIPESW6 controls whether or not the backup battery on the kit board is connected to the VRTCBK pin of the GPS Module.

DIPESW2	DIPESW3	Function
OFF	OFF	External source powers the GPS Module
ON	OFF	External source powers the GPS Module and the RS232 interface
OFF	ON	Power comes from the USB port and supplies the GPS Module
ON	ON	Power comes from the USB port and supplies the GPS Module and the RS232 interface. This is the suggested Default Setting

DIPESW4	Function
OFF	Almanac LED disabled
ON	Almanac LED enabled. Default setting

DIPESW5	Function
OFF	STY1 LED disabled
ON	STY1 LED enabled. Default setting

DIPESW6	Function
OFF	Backup battery not connected
ON	Backup battery connected to the GPS Module. Default setting

3.2 INTERNAL DIPSWITCHES

There are 2 sets of DIP internal switches. The first set includes switches DIPISW1 to DIPISW3 that are connected to some I/O's of the GPS module, and DIPISW4 that selects between two possible sources for the signal on the RXA pin of the GPS module.

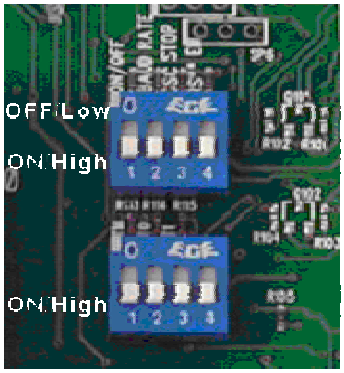
DIPISW1	Function
OFF	Pin ON/OFF set to "Low"
ON	Pin ON/OFF set to "High". Default setting

DIPISW2	Function
OFF	Pin USPED set to "Low"
ON	Pin USPED set to"High". Default setting

DIPISW3	Function
OFF	Pin STANDBYN set to “Low”
ON	Pin STANDBYN set to “High”. Default setting

DIPISW4	Function
OFF	Signal on pin RXA comes from the RS-232 interface
ON	Signal on pin RXA comes from the USB interface. Default setting

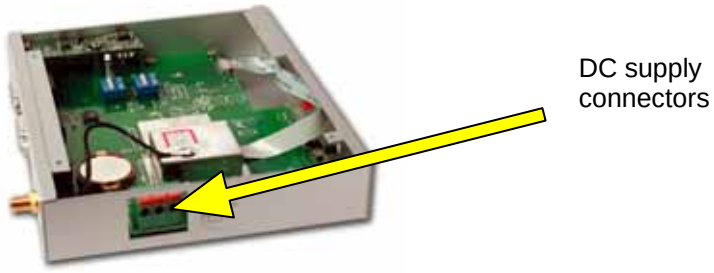
The second set of switches must remain ON, as set at the factory.



4 ALTERNATIVE HARDWARE INSTALLATION WITH THE RS232 CABLE

The DB9 connector labeled P101 gives you access to the GPS module.

To use the RS232 connector instead of the USB connection you have to do the following setup:
1. Connect an external 3.3V power supply to the external power connector.



2. Change DIPESW3 to “OFF” in order to take the power from external connector.
3. Change DIPESW2 to “ON” to ensure that the RS232 converter is “ON”.
4. Change the internal DIPISW4 labeled “RS””EN” to “OFF” to connect the PC COM Port to the GPS module RXA pin through the RS-232 interface.

Tip:
When using the RGPSD012 with USB you can still use the RS232 to have two RX lines (i.e. one to connect a GPS analyzer that is able to send commands and one to connect mapping software that only needs to listen the NEMA flow).

You can now skip section 5 and go directly to section 6.

5 SOFTWARE INSTALLATION – THE USB DRIVERS

The USB board uses the FT8U232AM USB UART chip from FTDI. The associated Virtual COM Port (VCP) drivers appear to the system as an extra COM Port (in addition to any existing hardware COM Ports). Application software accesses the USB device in the same way as it would access a standard Windows COM Port. Drivers for Win'98/ME/2000/XP (with Plug&Play support) are on the CD ROM supplied with the kit. You may also find the latest revisions of the driver on the FTDI web site at http://www.ftdichip.com/FTDriver.htm

Follow the instructions to install the USB UART driver. First set the wizard to search for a suitable driver for the newly found device. Then, when it tries to locate the driver files, select the ”CD-ROM drives” (if you use the supplied CD ROM) or the “Specify a location” (if you downloaded the driver from the FTDI website indicated above) search options. Then, the system will install the USB Serial Port device. Here too, follow the instructions on screen.

Upon completion, a new USB driver and a new COM port will be available. In the Start menu check in Settings -> Control Panel and then System Properties -> Hardware -> Device Manager under Ports to see which COM port number is assigned to the USB Serial Port. You need to check this only upon successful set up. After that, the COM port number is stored in your computer. This information is necessary to set up the GPS Monitor software.

6 SOFTWARE INSTALLATION – THE GPS MONITOR SOFTWARE

The GPS Monitor executable that is provided on the CD-Rom runs on a Windows 9x or NT/2000/XP platform. To install this GPS Monitor, double-click on this .exe file to start the installation procedure and follow instructions.

The GPS Monitor directly interfaces with the interface board through the virtual serial COM port.

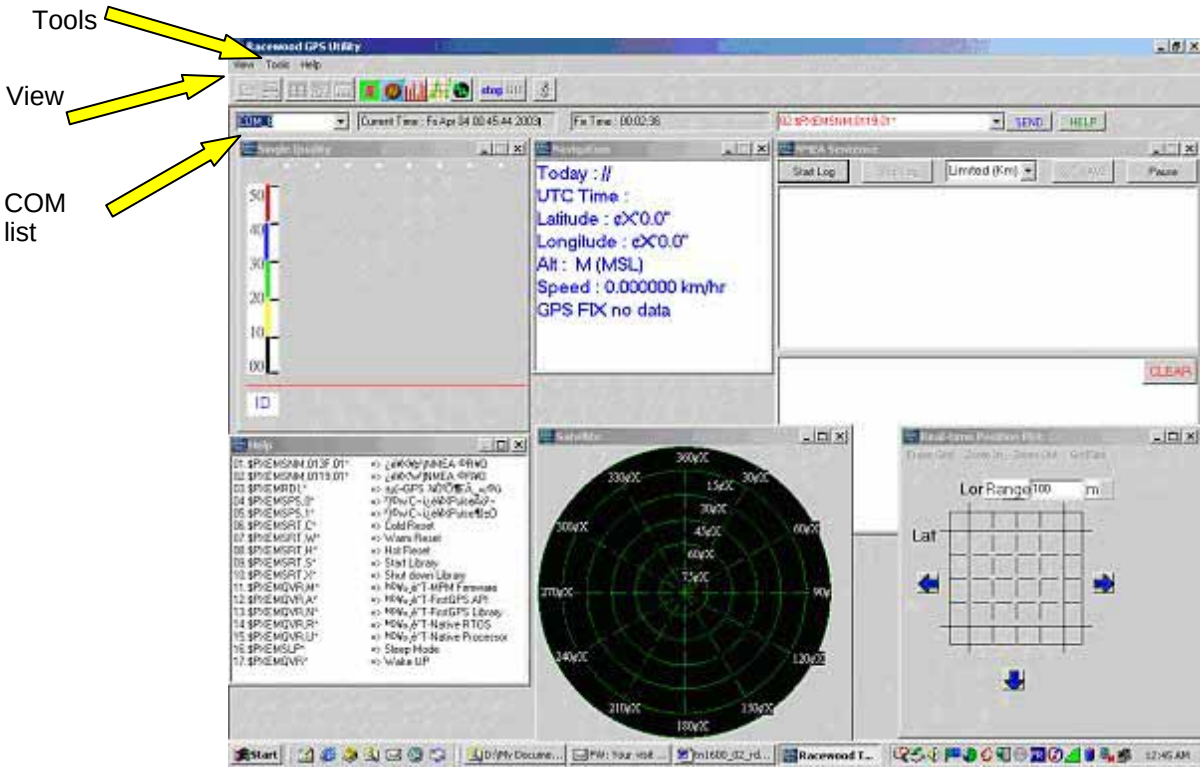
7 GETTING STARTED

This first example displays satellite data, position, time, speed, and various other GPS information. It also plots a sky map where the different satellite position, status, and signal strength are shown. It's also possible to plot the receiver position in a 2D latitude-longitude grid. Follow the steps below for setting up the basic demonstration:

a) Make sure the hardware is installed as described above and power is turned on.

b) In the device manager of your PC (W2000: Start menu, then Setting → Control Panel → System → Hardware → Device Manager), verify that the COM port used to connect the Demo kit is set as 9600 or 4800 Bd, no parity, 1 stop bit, 8 bit, no flow control.

c) Double-click on the GPS Monitor icon to launch the monitor program. Here are the key settings you need to run it successfully:



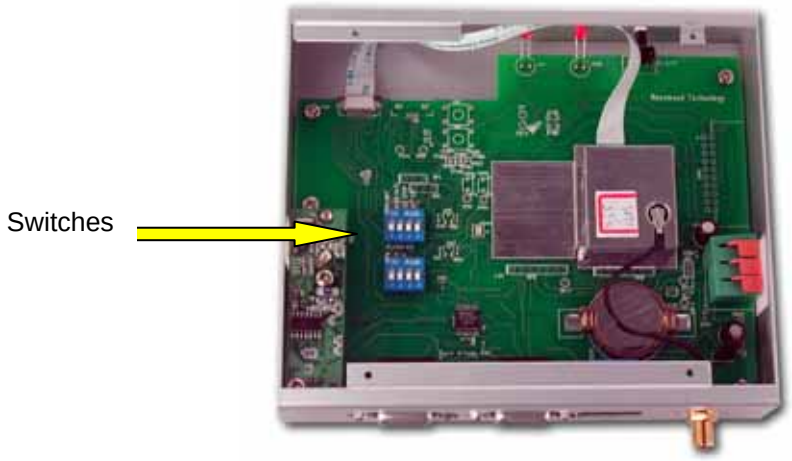
GPS Monitor

a) In the COM pick list (upper left) select the appropriate COM port, to which the kit is connected (see section "USB driver" above).

b) In the Tools → Baudrate menu set the Baud Rate to 9600 or 4800 Bd.

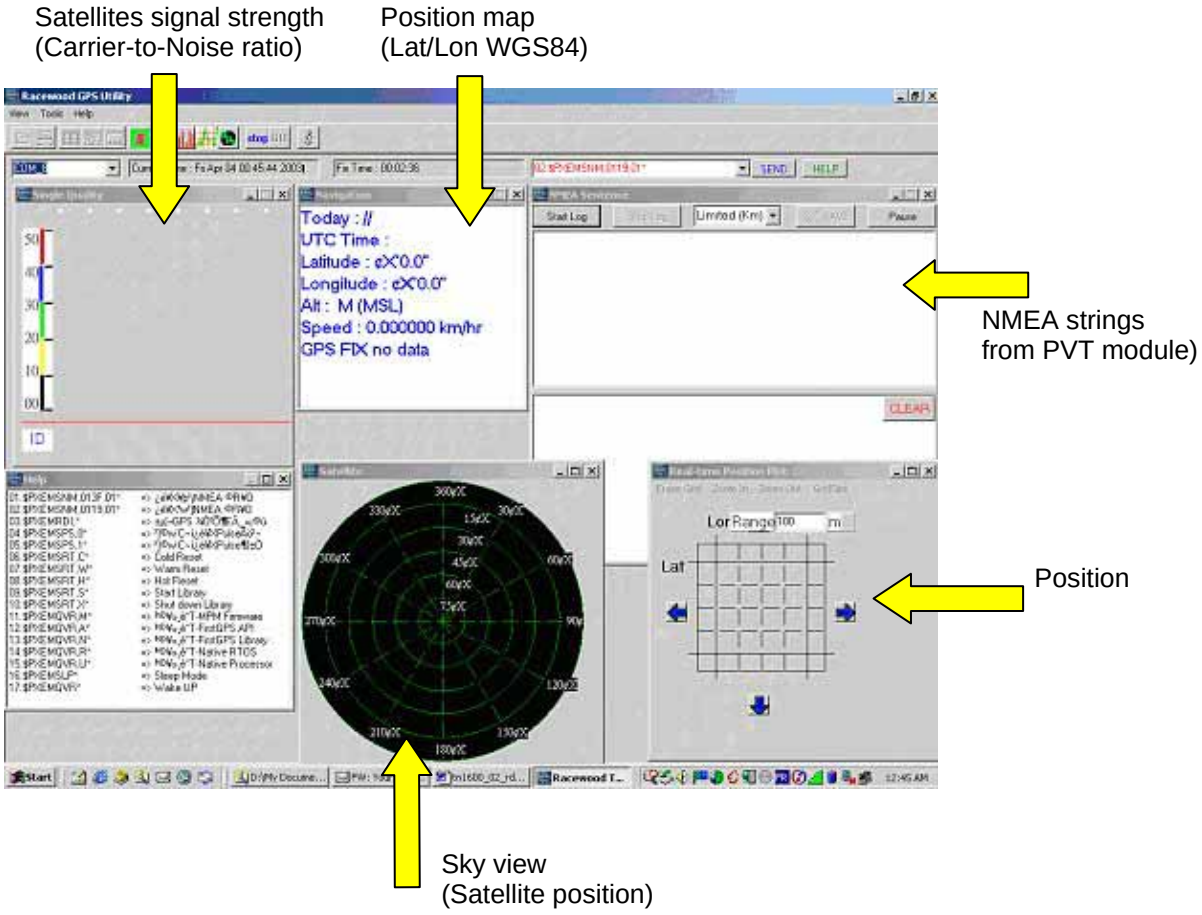
c) in the View menu, click on Signal Quality, NMEA, Navigation, Satellite, and Help to open the corresponding windows.

d) Make sure the switches 1 and 3 on the interface board are on the lower position (that is "ON") when the board is placed as indicated below.



You should now see incoming character strings in the NMEA Window of the GPS Monitor program. To have a clean initial reset, you may have to manually reset the receiver with the Reset button on the front panel. If you still don't see the NMEA character string, you may have selected the wrong bitrate (9600 or 4800 Bd).

e) Make sure the antenna is outdoors, with a sky view. If you are sitting next to a building there is a fairly good chance the antenna will "see" only partial sky only, which may delay time to fix. Once the PVT module gets satellite data you can start to exploit the different windows in the monitor.



GPS Monitor windows

8 DEMONSTRATION WITH MAPPING SOFTWARE

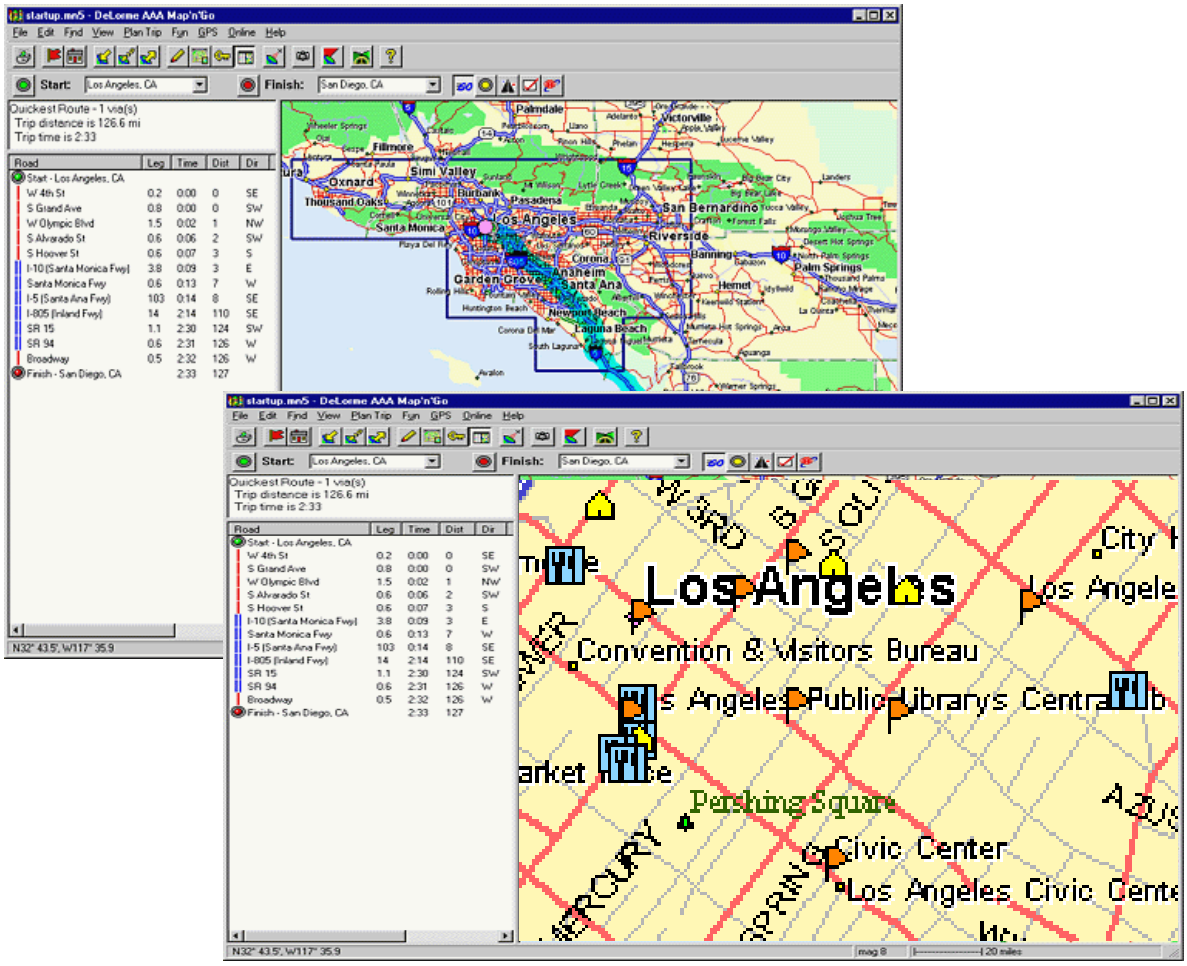
This demo directs the NMEA output string from the PVT module to a commercial mapping software package, which in turn will display the current location of the receiver on a street map. Follow these steps for setting up the demo with the Mapping software:

a) Use exactly the same set-up described above in the “getting started” section.

b) Install the mapping software package (such as Delorme Map ‘n Go, Microsoft AutoRoute Express, or Microsoft Streets&Trips) that accepts GPS NMEA input character string.

Note: some older mapping software packages support only 4800 Bd. In this case, make sure the (Virtual) COM port you use it set to the correct baudrate.

c) Launch the mapping application and follow instructions that are specific to that package to display your current position. Make sure the COM port where it will receive the NMEA string is set to COMc (replace c by the port number you have the GPS interface board connected). You will now see your exact position on the map.


startup.mn5 - DeLorme AAA Map'n'Go
File Edit Find View Plan Trip Fun GPS Online Help
Start: Los Angeles, CA
Finish: San Diego, CA
Quickest Route - 1 via(s)
Trip distance is 126.6 mi
Trip time is 2:33
Road Leg Time Dist Dir
Start - Los Angeles, CA
W 4th St 0.2 0:00 0 SE
S Grand Ave 0.8 0:00 0 SW
W Olympic Blvd 1.5 0:02 1 NW
S Alvarado St 0.6 0:06 2 SW
S Hoover St 0.6 0:07 3 S
I-10 (Santa Monica Fwy) 3.8 0:09 3 E
Santa Monica Fwy 0.6 0:13 7 W
I-5 (Santa Ana Fwy) 103 0:14 8 SE
I-805 (Inland Fwy) 14 2:14 110 SE
SR 15 1.1 2:30 124 SW
SR 94 0.6 2:31 126 W
Broadway 0.5 2:32 126 W
Finish - San Diego, CA 2:33 127
N32° 43.5', W117° 35.9
Palmdale
Victorville
Fillmore
Oxnard
Simi Valley
Burbank
Pasadena
Thousand Oaks
Santa Monica
Los Angeles
San Bernardino
Riverside
Corona
Anaheim
Garden Grove
Santa Ana
Huntington Beach
Newport Beach
Laguna Beach
Hemet
Palm Springs
Banning
Los Angeles
Convention & Visitors Bureau
Pershing Square
Civic Center
Los Angeles Civic Cente

Contact Information

Semtech Corporation
Wireless and Sensing Products Division
200 Flynn Road, Camarillo, CA 93012
Phone (805) 498-2111 Fax : (805) 498-3804