



PE9702 EVALUATION KIT USER'S MANUAL

6175 Nancy Ridge Drive, San Diego, CA 92121
(858) 455-0660, Fax (858) 455-0770
<http://www.peregrine-semi.com>

Table of Contents

- Introduction.....4**
- Introduction.....5
- Applications Support.....5
- FCC Labeling Requirement5
- Hardware Section6**
- Evaluation Kit Contents & Requirements7
- Evaluation Kit Configuration8
- Evaluation Kit Setup9
- Software Section13**
- Software Installation Instructions.....14
- Printer Port Programming.....14
- Software Operation Instructions14
- Programming Tip15

© Copyright 2001 Peregrine Semiconductor Corp. All rights reserved. Printed in the United States of America. No part of this publication may be reproduced, photocopied, stored in a retrieval system, or transmitted by electronic, mechanical or any other means without prior written permission of Peregrine Semiconductor Corp.

Peregrine Semiconductor Corp., the Peregrine logotype, and UTSi are registered trademarks of Peregrine Semiconductor Corp. PE9702 is a trademark of Peregrine Semiconductor Corp.

Peregrine Semiconductor Corp. reserves the right to make improvements to the hardware, firmware or software described in this manual at any time and without notice. While the accompanying material has been carefully reviewed to insure the most accurate information possible, the data are not warranted for absolute accuracy or completeness and are subject to change without notification.

Peregrine Semiconductor Corp. Life Support Policy

Peregrine Semiconductor Corp. products are not intended for use in life-critical situations, or as critical components in life-support devices or systems.

Life-support devices or systems are defined as devices or systems that are intended for surgical implant into the body, or that support or sustain life, and whose failure to perform when used in accordance with the instructions provided by the manufacturer, might result in injury to the user.

FCC Compliance Statement

This device is intended for use only in a research and development environment. It has not been tested for compliance with FCC regulations regarding interference with radio frequency energy. It might cause harmful interference with radio communications. The user assumes responsibility for any interference caused by this device.



Introduction

Introduction

This Evaluation Kit is specifically designed for evaluating the PE9702 3 GHz Integer-N PLL. The Evaluation Kit allows maximum flexibility for optimizing phase noise, spur, lock time and power performance for specific applications. Using the hardware and software provided in the Evaluation Kit both serial and direct modes of programming can be demonstrated.

Applications Support

If you have a problem with your evaluation kit, software, or if you have applications questions call **(858) 455-0660** and ask for applications support.

You may also contact us by fax or e-mail:

Fax: **(858) 455-0770**

E-Mail: **help@peregrine-semi.com**

FCC Labeling Requirement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.



Hardware Section

Evaluation Kit Contents & Requirements

The Evaluation Kit includes all of the specific software and hardware required to evaluate the PE9702. Included in the Evaluation Kit are:

- 1 PE9702 Evaluation Board
- 1 PE9702 3 GHz Integer-N PLL
- 1 Peregrine CD-ROM with application software included
- 2 Jumpers
- 1 4-Wire Interface Cable with GND
- 3 Power Supply Cables
- 1 Set of Evaluation Kit Data Plots

In order to program the part using serial programming mode the Evaluation Kit software will need to be installed on a computer with the following minimum requirements:

PC Compatible with Windows™ '95/98/2000

Mouse

Parallel Port

HTML Browser to access CD contents

CAUTION: The PE9702-EK circuit contains components that might be damaged by exposure to voltages in excess of the specified voltage, including voltages produced by electrostatic discharges. Handle the board in accordance with procedures for handling static-sensitive components. Avoid applying excessive voltages to the power supply terminals or signal inputs or outputs.

Evaluation Kit Configuration

The PE9702 Evaluation Board is configured with an on-board VCO, TCXO reference and a second order active loop filter. The loop filter is followed by a low pass filter after the Op Amp. The VCO tuning range is 3000 MHz to 3500 MHz and the reference oscillator runs at 10 MHz. The active loop filter is designed for a 1 MHz comparison frequency and a 3000 MHz output frequency with unity gain crossover at 75 kHz, phase margin of 65 degrees and 1.2 dB of peaking. The data provided was measured in this configuration with the default jumper settings shown in Figure 2.

Two jumpers (JP1 & J3) configure the Evaluation Board to operate with either the on-board reference oscillator (TCXO) or an external reference applied to J10. Figure 2 shows the proper configuration for utilizing the TCXO reference. JP1 in the middle-to-right connection as shown connects the output of the TCXO to the PLL F_R input, while J3 installed provides power to the TCXO. Do not connect any external reference to J10 if the on-board reference is selected. Figure 3 displays the proper configuration for utilizing an external reference source. JP1 is in the middle-to-left connection, which connects the PLL F_R input to the J10 SMA connector and the jumper on J3 is removed to power-down the TCXO.

The PE9702 Evaluation Kit also allows for manual programming using the fifteen on-board switches. Setting the BMODE Control switch ON (BMODE switch S3-1) enables direct mode programming. Setting the BMODE Control switch to the OFF position (S3-1) and the A3-S_mode switch to the ON position (S3-8) the serial programming mode is enabled allowing for software control.

The default jumper and switch settings are shown in Figure 2, which will place the part into serial programming mode utilizing the on-board reference. Peregrine Semiconductor recommends that the default settings be used initially to bring up the evaluation board and duplicate the enclosed measured data.

Evaluation Kit Setup

1. Verify a jumper is placed on the connector J3 and REF Selector (JP1) is positioned to select the on-board reference as shown in Figure 2.
2. Connect power supply cables to the Evaluation Kit board as shown in Figure 1. Verify all supplies are turned off prior to connecting to evaluation board.
 - ➔ Connect the +3 V supply to VccPLL (J7 Pins 1 & 3)
 - ➔ Connect the +5 V supply to VccVCO (J7 Pins 31 & 33)
 - ➔ Connect the ± 6 V supply to VccOpAmp
 - J7-13: +6 V Red Connector
 - J7-15 & J7-17: GND Green Connector
 - J7-19: -6 V Black Connector
3. Using the application software provided and described in detail in the next section, serial and direct programming can be evaluated. To enable software control of the evaluation board, ensure all DIP switches are turned OFF except for ENH (S1-1) and A3-S_Mode (S3-8) as shown in Figure 2. The 4-wire interface cable (3-wire serial interface and GND) should be connected from your computer's printer port to J1 on the evaluation board to enable software control.
4. Direct mode programming can be evaluated manually without the Application Software enabled. To enable direct mode programming, both the ENH (S1-1) and the Bmode (S3-1) DIP switches should be turned on. The on-board DIPswitches can then be used to manually program the PLL. Note that M7 register is not available in the direct mode programming. Instructions for programming PLL registers are available in the datasheet.
5. The output of the on-board VCO can be measured by connecting a spectrum analyzer to port J5. Additional GND posts and test points are available on the Evaluation Board for measurement flexibility.
6. Refer to the next section for further information on configuring and running the application software.

Figure 1. Typical Setup for Evaluation Kit Measurements

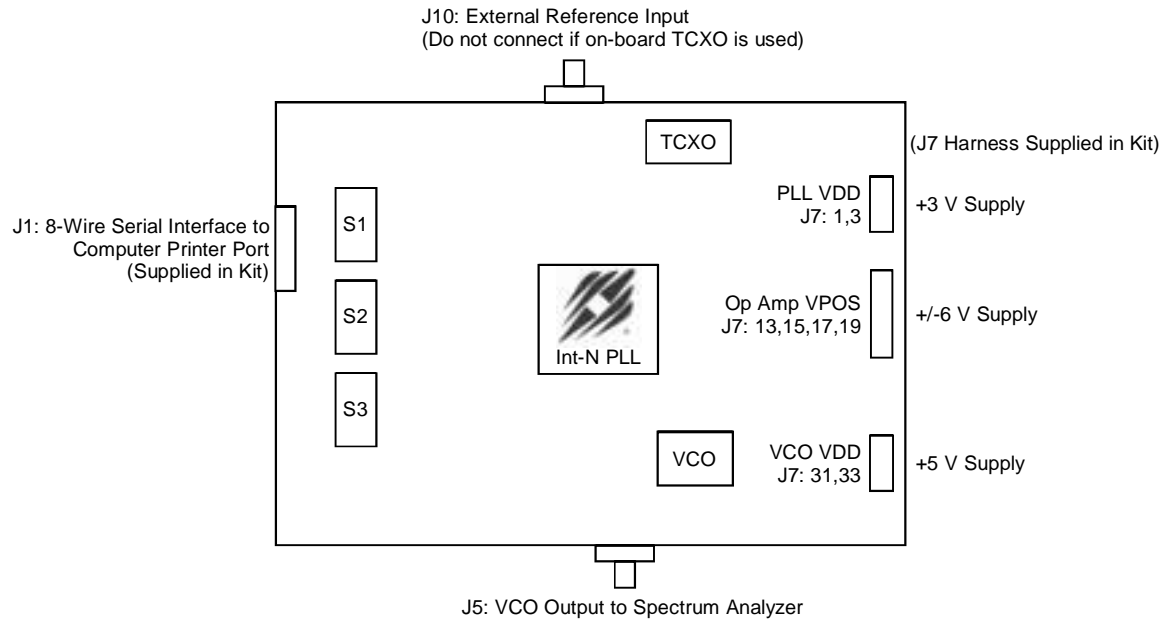


Figure 2. Evaluation Kit Default Jumper & Switch Settings.

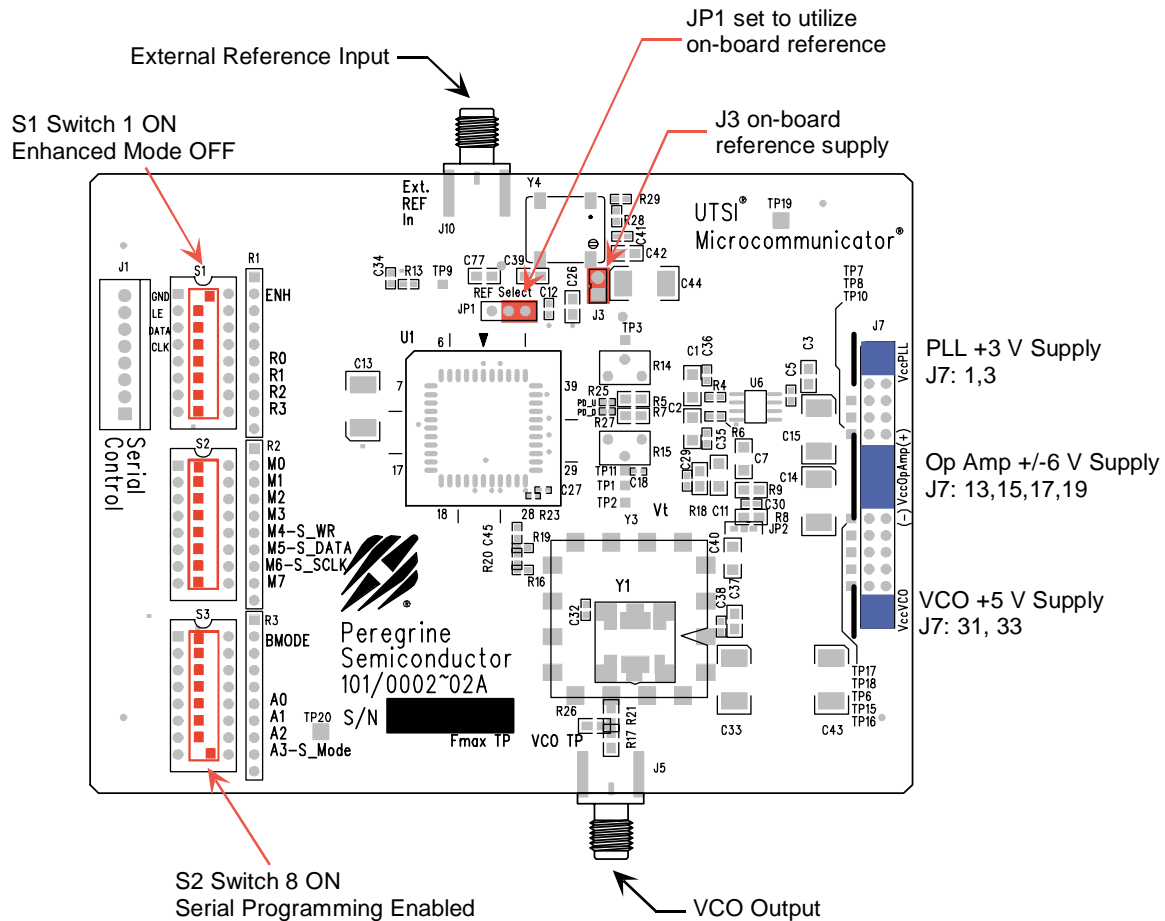
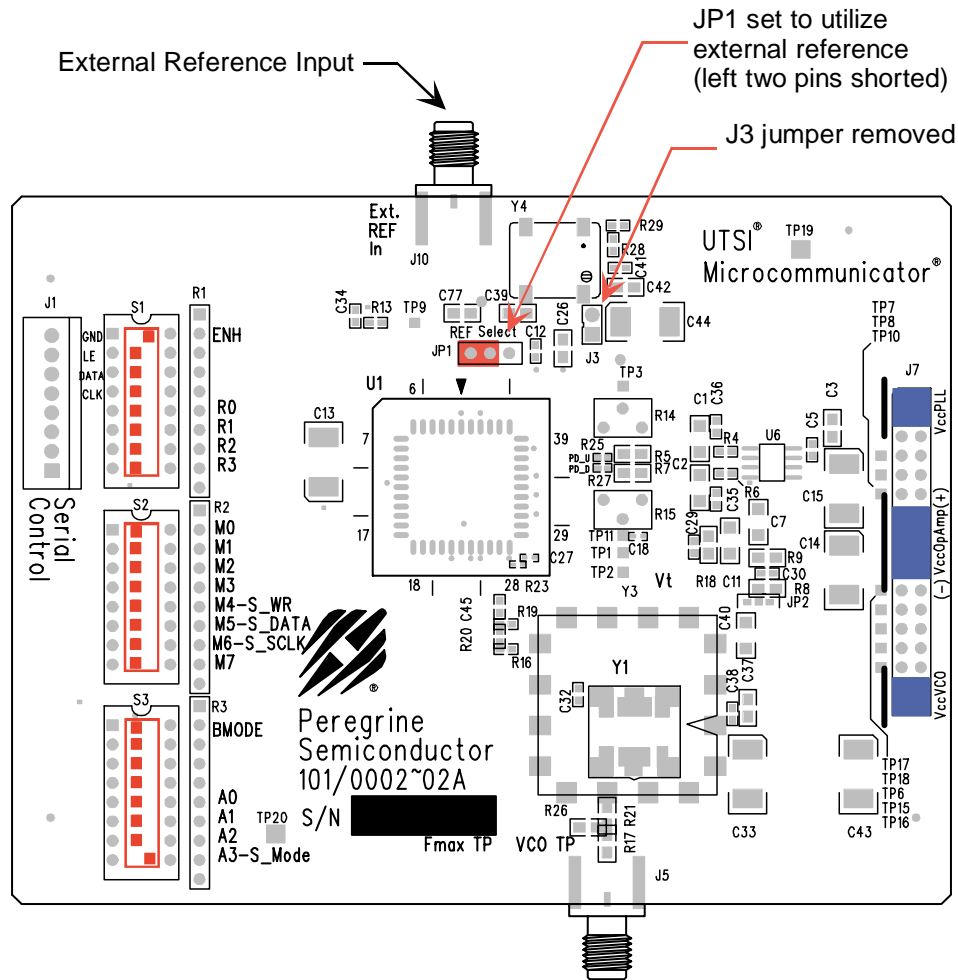


Figure 3. Jumper Setting to Disable On-board Reference.





Software Section

Software Installation Instructions

In order to setup the Evaluation Software on your computer:

1. Start Microsoft Windows™ '95/98/2000.
2. Insert the Peregrine CD into CDROM drive. If your computer has AutoPlay enabled and the splash screen automatically appears, select the Products link at the bottom of the splash screen. If the Peregrine splash screen does not automatically appear, utilize Windows Explorer to browse the CD directory and open the file \cd\startup.htm.
3. Select the PE9702 link on the Products page to obtain product information and evaluation kit documentation.
4. Select the Evaluation Board Software link and choose the option of "Run this program from its current location." Identify the desired directory for installation and select the Unzip option when the WinZip Self-Extractor window appears.
5. Utilize Explorer to run Setup.exe from your hard disk directory and follow the instructions on the screen. This will install the Evaluation Kit Application Software in the selected directory and add a shortcut to the Windows Start menu.

Printer Port Programming

When programming the PE9702 in serial mode using the computer printer port option, the following software programming features are not available:

- ➔ Enhancement modes
- ➔ Parallel and Direct interface modes
- ➔ Ping-pong mode

Ping-pong mode may be implemented on the evaluation setup by attaching a square-wave generator to J1-5 pin of the Serial Control connector and programming both primary and secondary registers.

Software Operation Instructions

To run the PE9702 using your computer's parallel port follow steps 1 through 7 below and reference Figure 4.

- Step 1: Start the Peregrine Integer-N PLL EK Control program. This is a generic program for all Integer-N PLL's at Peregrine Semiconductor.

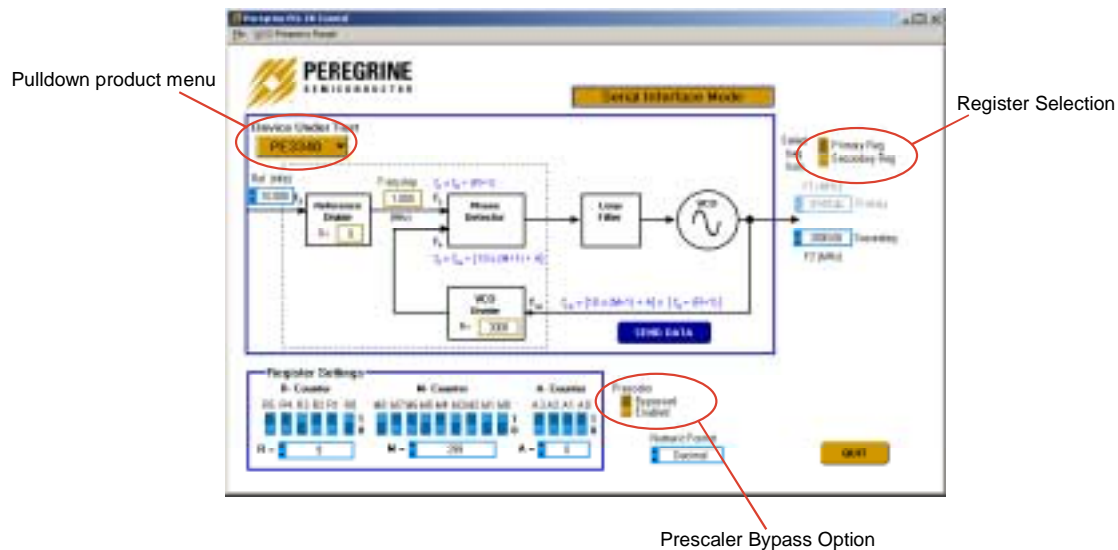
- Step 2: Select the PE9702 from the pull-down menu button in the upper left corner of the program screen. This selection will enable certain product specific modes of operation.
- Step 3: If the on-board reference is being used, set the reference frequency to 10 MHz by typing 10 into the reference frequency box. If an external reference is applied, type in the appropriate reference value in MHz.
- Step 4: Set reference counter (R counter) to 9 by entering it into the R counter box in the "R M A Select" box in the bottom left corner. Note that the numbers in the orange boxes are computed values and cannot be directly typed in.
- Step 5: Verify frequency step = 1.000 MHz.
- Step 6: Set Frequency to 3000 MHz by typing it into the secondary register frequency box. Once the frequency values are entered by "Enter" key in the keyboard, the software will automatically send out data to program PLL. You can also click the "Send Data" button to program PLL.
- Step 7: Verify on the spectrum analyzer that the part locks at 3000 MHz.

Programming Tip

When the PLL is first powered on and before programming, the Op Amp output could be resting at a negative voltage preventing proper VCO operation. The PLL will not lock in this condition. If this mode occurs, the power supply for Op Amp ($\pm 6V$) should be cycled. To prevent this from happening, the following power on sequence is recommended:

1. Turn on power supplies for PLL VDD and VCO VCC.
2. Program PLL.
3. Turn on the power supply for the Op Amp.

Figure 4. PE9702 Software Control Panel



- ➔ Light blue number boxes identify user defined program states and can be modified by utilizing the arrows next to the boxes or clicking into the box and typing the appropriate value. Either clicking on the light blue switches or typing the counter variable into the text box can program the registers.
- ➔ The primary or secondary register can be selected utilizing the switch identified in the upper right side of the panel.
- ➔ The prescaler can be either enabled or bypassed depending on switch position.
- ➔ Data is sent to the evaluation board with every change in register value. To force data across the bus, click on the dark blue “Send Data” button below the loop diagram.

SUNSTAR 商斯达实业集团是集研发、生产、工程、销售、代理经销、技术咨询、信息服务等为一体的高科技企业，是专业高科技电子产品生产厂家，是具有 10 多年历史的专业电子元器件供应商，是中国最早和最大的仓储式连锁规模经营大型综合电子零部件代理分销商之一，是一家专业代理和分销世界各大品牌 IC 芯片和电子元器件的连锁经营综合性国际公司，专业经营进口、国产名厂名牌电子元件，型号、种类齐全。在香港、北京、深圳、上海、西安、成都等全国主要电子市场设有直属分公司和产品展示展销窗口门市部专卖店及代理分销商，已在全国范围内建成强大统一的供货和代理分销网络。我们专业代理经销、开发生产电子元器件、集成电路、传感器、微波光电元器件、工控机/DOC/DOM 电子盘、专用电路、单片机开发、MCU/DSP/ARM/FPGA 软件硬件、二极管、三极管、模块等，是您可靠的一站式现货配套供应商、方案提供商、部件功能模块开发配套商。商斯达实业公司拥有庞大的资料库，有数位毕业于著名高校——有中国电子工业摇篮之称的西安电子科技大学（西军电）并长期从事国防尖端科技研究的高级工程师为您精挑细选、量身订做各种高科技电子元器件，并解决各种技术问题。

微波光电部专业代理经销高频、微波、光纤、光电元器件、组件、部件、模块、整机；电磁兼容元器件、材料、设备；微波 CAD、EDA 软件、开发测试仿真工具；微波、光纤仪器仪表。欢迎国外高科技微波、光纤厂商将优秀产品介绍到中国、共同开拓市场。长期大量现货专业批发高频、微波、卫星、光纤、电视、CATV 器件：晶振、VCO、连接器、PIN 开关、变容二极管、开关二极管、低噪晶体管、功率电阻及电容、放大器、功率管、MMIC、混频器、耦合器、功分器、振荡器、合成器、衰减器、滤波器、隔离器、环行器、移相器、调制解调器；光电子器件和组件：红外发射管、红外接收管、光电开关、光敏管、发光二极管和发光二极管组件、半导体激光二极管和激光器组件、光电探测器和光接收组件、光发射接收模块、光纤激光器和光放大器、光调制器、光开关、DWDM 用光发射和接收器件、用户接入系统光收发器件与模块、光纤连接器、光纤跳线/尾纤、光衰减器、光纤适配器、光隔离器、光耦合器、光环行器、光复用器/转换器；无线收发芯片和模组、蓝牙芯片和模组。

更多产品请看本公司产品专用销售网站：

商斯达微波光电产品网：[HTTP://www.rfoe.net/](http://www.rfoe.net/)

商斯达中国传感器科技信息网：<http://www.sensor-ic.com/>

商斯达工控安防网：<http://www.pc-ps.net/>

商斯达电子元器件网：<http://www.sunstare.com/>

商斯达消费电子产品网：<http://www.icasic.com/>

商斯达实业科技产品网：<http://www.sunstars.cn/> 射频微波光电元器件销售热线：

地址：深圳市福田区福华路福庆街鸿图大厦 1602 室

电话：0755-83396822 83397033 83398585 82884100

传真：0755-83376182 (0) 13823648918 MSN: SUNS8888@hotmail.com

邮编：518033 E-mail:szss20@163.com QQ: 195847376

深圳赛格展销部：深圳华强北路赛格电子市场 2583 号 电话：0755-83665529 25059422

技术支持：0755-83394033 13501568376

欢迎索取免费详细资料、设计指南和光盘；产品凡多，未能尽录，欢迎来电查询。

北京分公司：北京海淀区知春路 132 号中发电子大厦 3097 号

TEL: 010-81159046 82615020 13501189838 FAX: 010-62543996

上海分公司：上海市北京东路 668 号上海赛格电子市场 D125 号

TEL: 021-28311762 56703037 13701955389 FAX: 021-56703037

西安分公司：西安高新开发区 20 所(中国电子科技集团导航技术研究所)

西安劳动南路 88 号电子商城二楼 D23 号

TEL: 029-81022619 13072977981 FAX:029-88789382