

Cardinal Components

PG – 3000 Programmer

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PG3000 Field Instantly Programmable Oscillator (FIPO) Programmer

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Table of Contents

Introduction

Hardware Components

System Requirements

Installation

- Installing the PG3000 software
- Programmer connection
- Uninstalling the PG3000 software

Operation

- Parameter selection
- Programming a part
- Reading a part

Troubleshooting

- Error messages

Introduction

The PG3000 consists of a USB connected programmer and software which allows Cardinal's FIPO components to be programmed to the user's specifications. The FIPO device (Field Instantly Programmable Oscillator) can be configured by you for frequency, supply voltage, drive type and output control function using the PG3000 programmer.

Hardware Components

The package includes the following components:

- Cardinal Components, Inc. Field Instantly Programmable Oscillator Programmer
- USB Cable
- PG-3000 Programmer Installation CD

Optional Components:

- 5x7 Programming Socket Adapter
- Plastic Programming Socket Adapter
- 5x7, Plastic, Half Size Programmable Blanks

System Requirements

The minimum system requirements are:

Operating system: Microsoft Windows 98(SP2)/ME/XP/2000

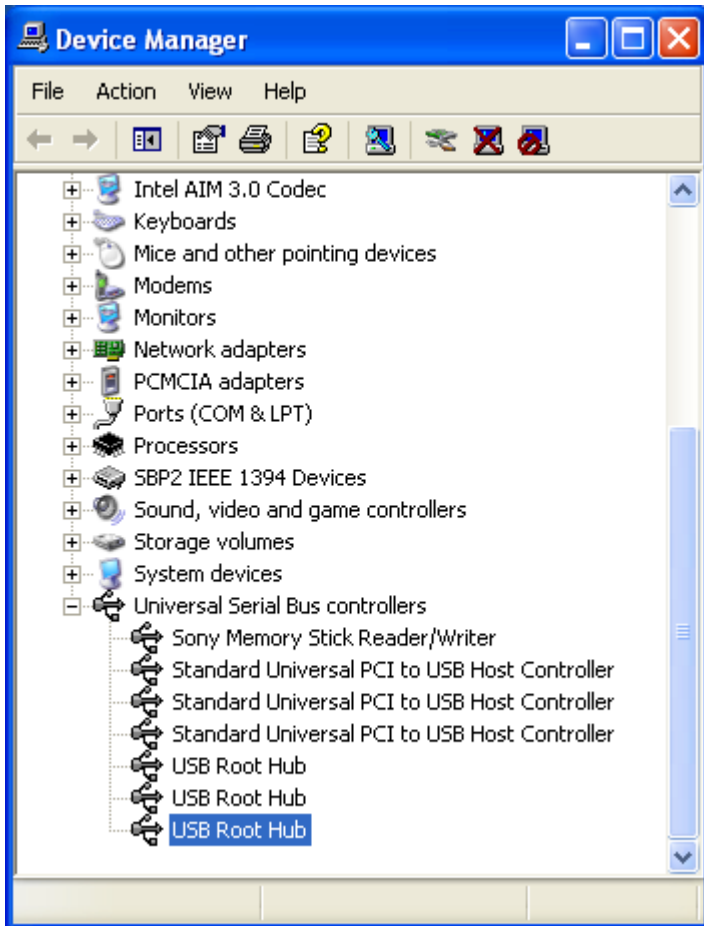
Processor: Pentium III 600MHz or higher

USB Port: 1.0 or higher with 500mA power per port. We recommend the use of a self powered hub when connecting to the PG3000 programmer.

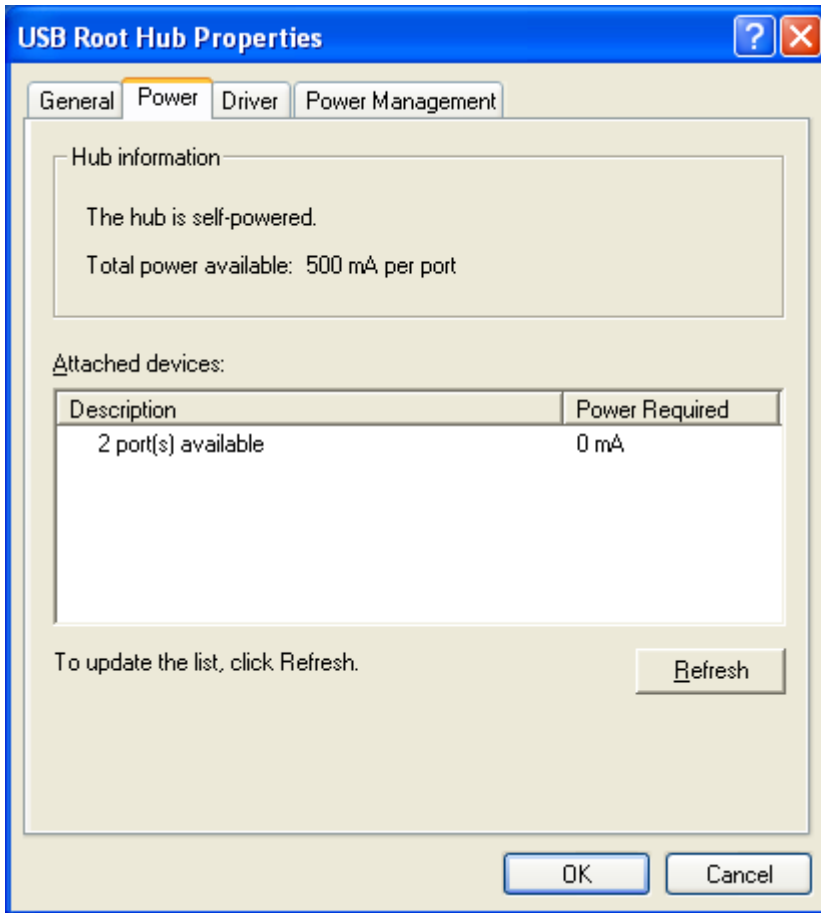
Installation

These instructions are given for the Windows XP operating system, equivalent operations should be performed appropriate to your operating system.

Ensure that your PC can deliver 500mA to the USB port, which is the case with most desktop units and powered hubs. Navigate to the hardware settings by selecting START, Control Panel, System and click the hardware tab. Click the device manager button and select USB Root Hub.



Right click and select properties.

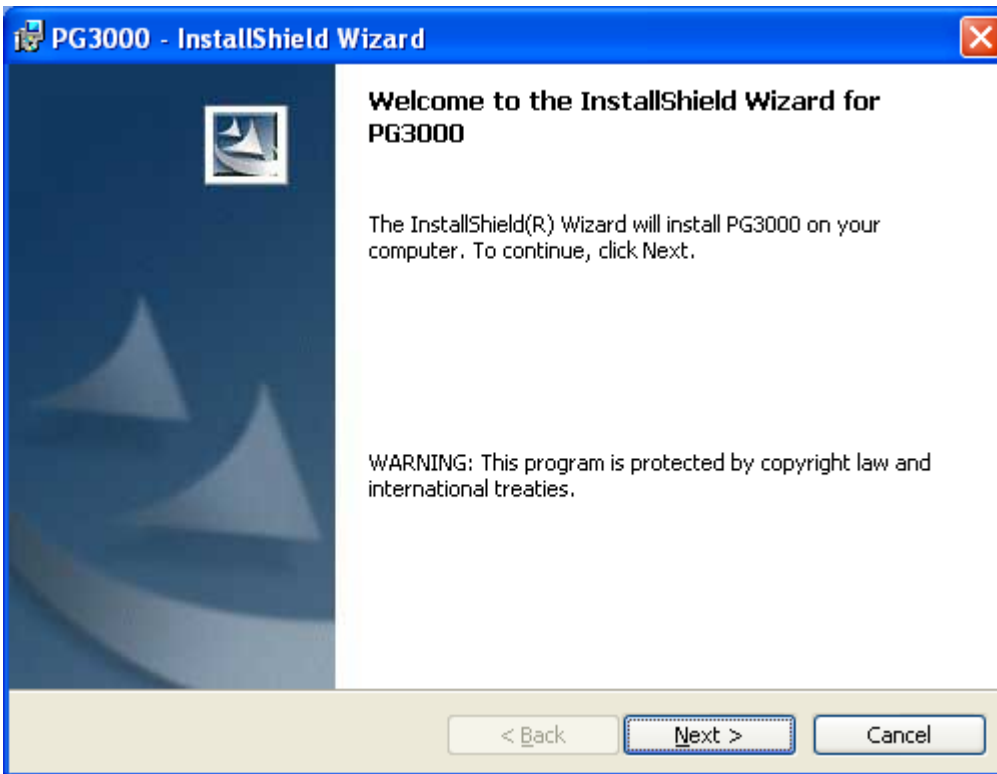


Select the tab labeled “power”. The total power available should be 500 mA. Some external hubs have a switch selection for bus-power or self-power, this must be set to self-power. Failure to do so may cause the driver installation to fail or your computer to reset.

Do not connect the programmer until the software has been installed.

Installing the PG3000 software

- 1 Insert the Installation CD into CD-Rom drive of your PC.
- 2 If you have auto run configured the installation wizard should start automatically. If not, select “RUN” from the “START MENU”. Click on browse, locate and highlight the file “SETUP.EXE” on the installation CD. Click the OPEN button.



Click Next and follow the instructions on the screen.

Programmer Connection

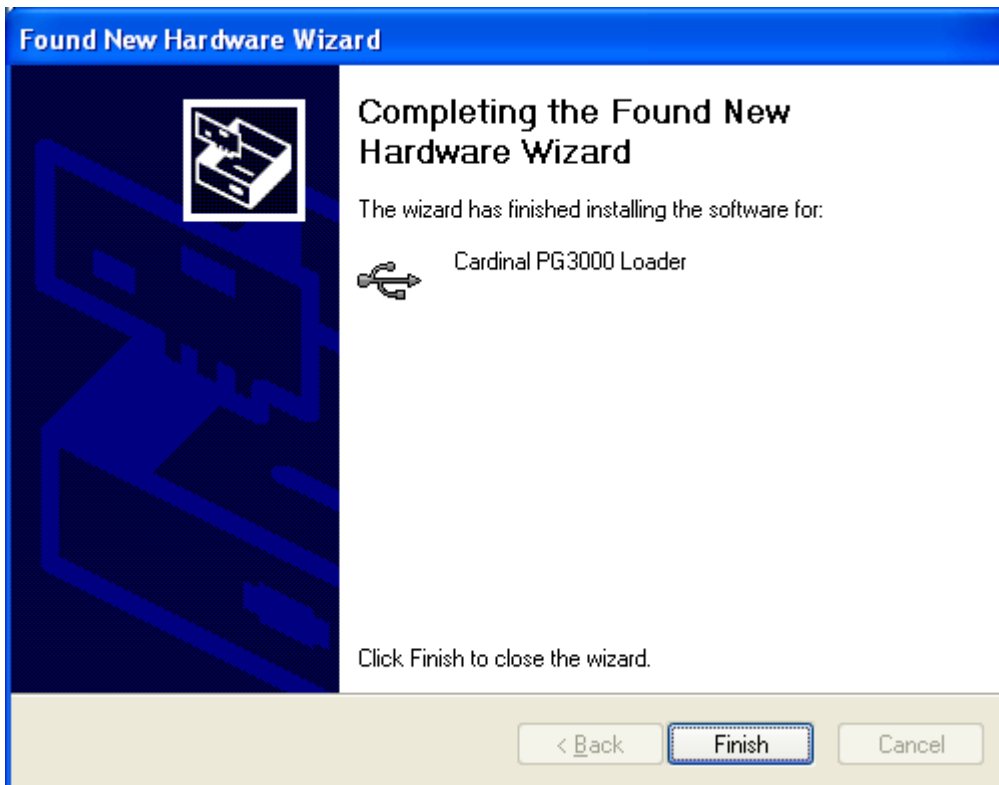
- 1 After installing the software, leave the installation CD in your PC cd-drive.
- 2 Connect the programmer to the PC or powered hub using the USB cable.
- 3 For an XP installation two drivers will be loaded. The following new hardware wizard screen will appear to start the installation.



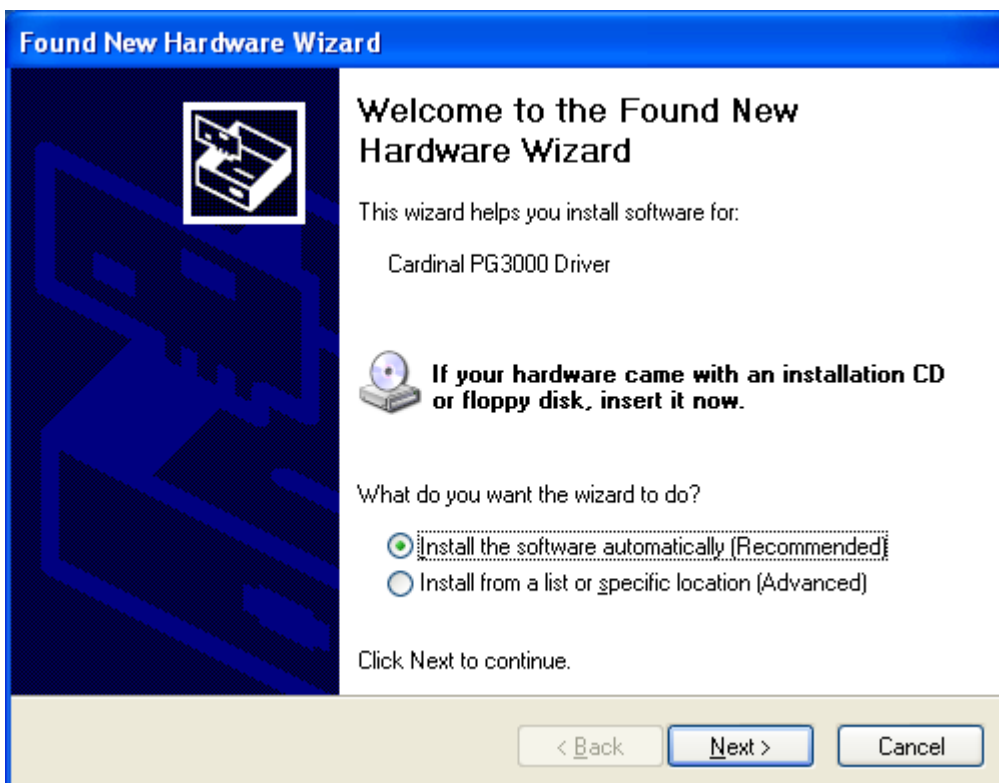
Click Next



At the time of going to press the drivers had not been verified for compatibility with Windows XP. Click Continue Anyway to proceed.

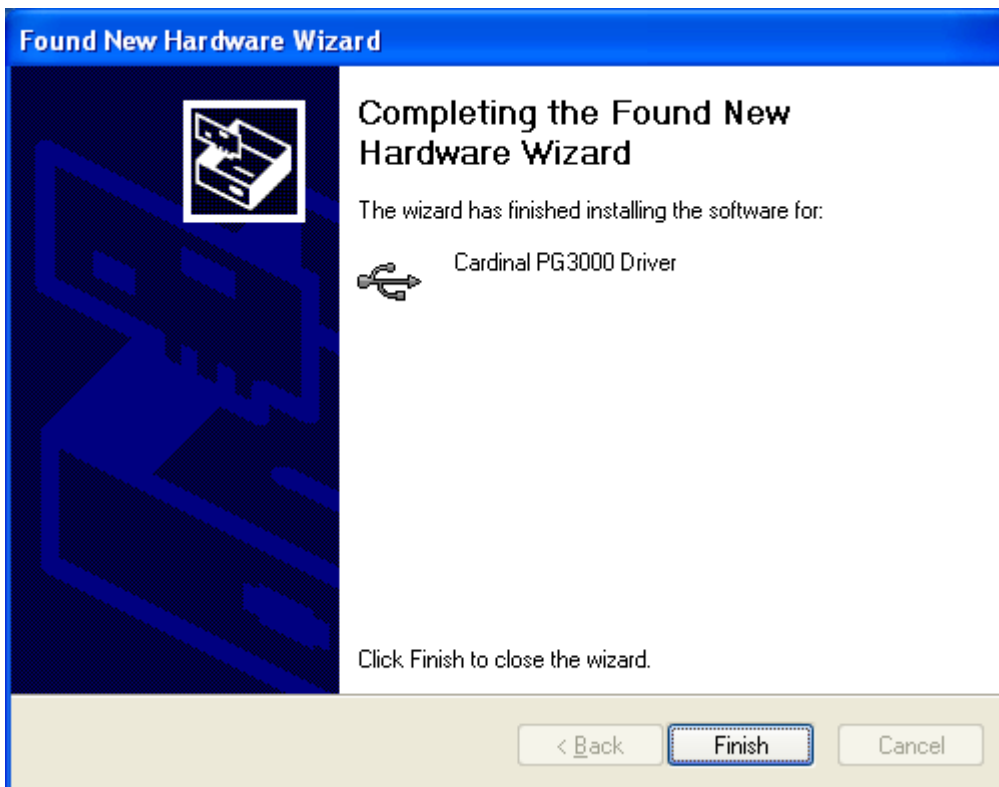
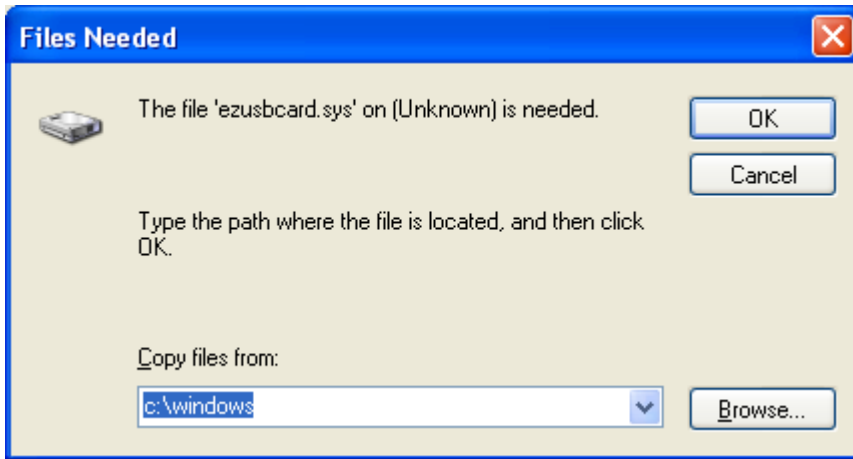


Click Finish



Click Next

Should a driver file not be found automatically as shown below, click browse and select the Drivers subdirectory on the installation CD, then click OK.



Click Finish

After the USB driver has been installed the Green indicator light should display on programmer. See Troubleshooting Section if green light does not display.

Different Windows operating systems have slightly different methods to load the drivers.

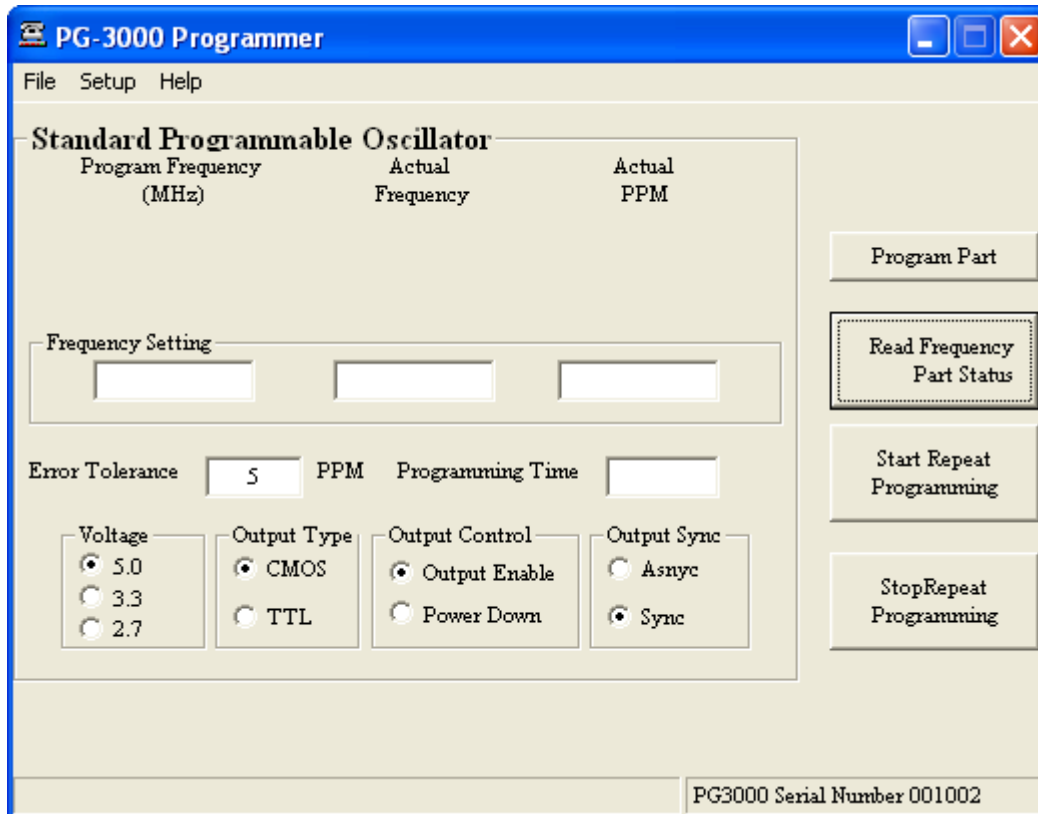
Uninstalling the PG3000 software

From the control panel select add/remove programs
Select Cardinal PG3000
Select remove and follow instructions

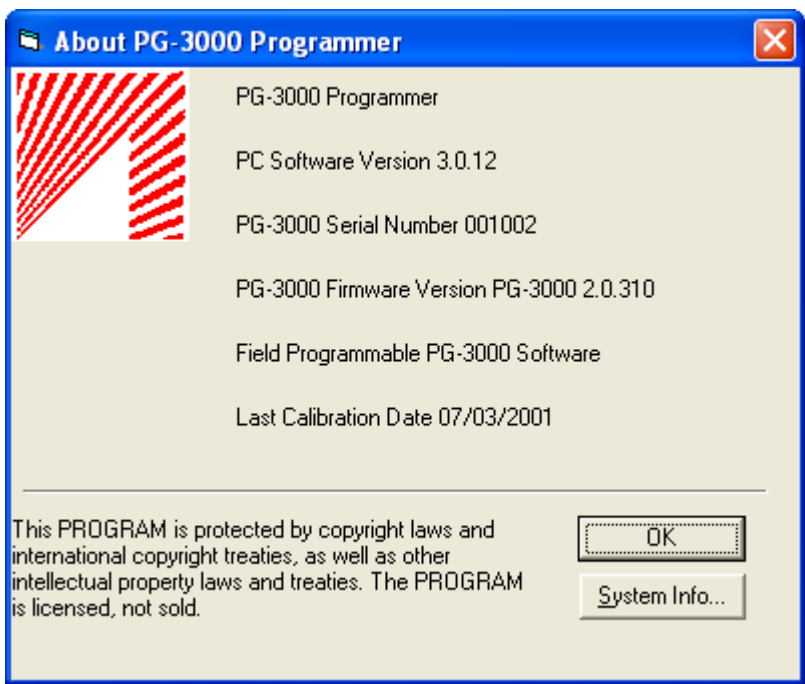
Operation

Before reading or programming any parts a warm up period of ½ hour should be allowed for the PG3000 programmer. This is necessary to ensure accurate reading and programming since the internal TCXO frequency reference of the PG3000 programmer is calibrated when the unit has reached its stable operating temperature.

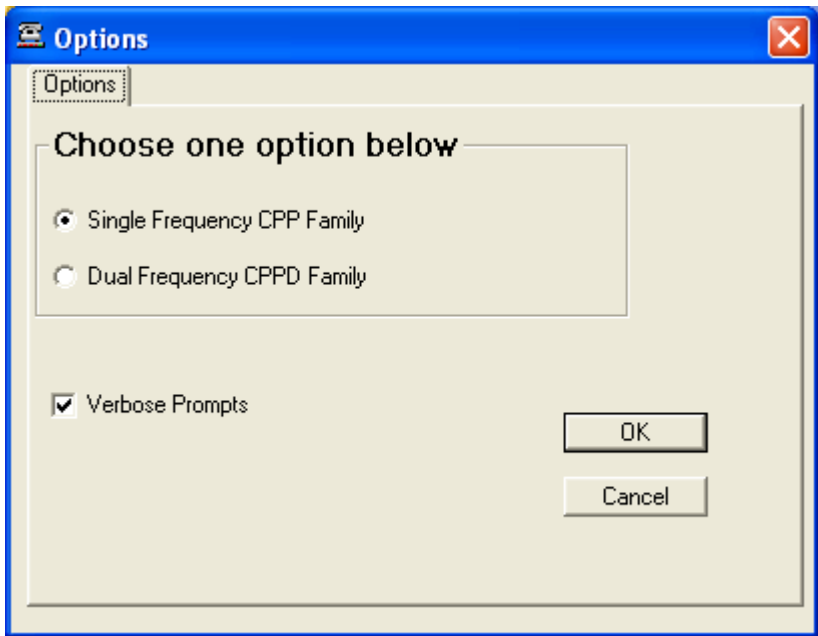
To run the PG3000 software, go to the installation location on your computer click the desktop icon or Navigate through Start, Program Files, Cardinal Components, PG3000 Programmer



The Help/About menu selection will give all the information concerning version numbers of your PG3000 installation.

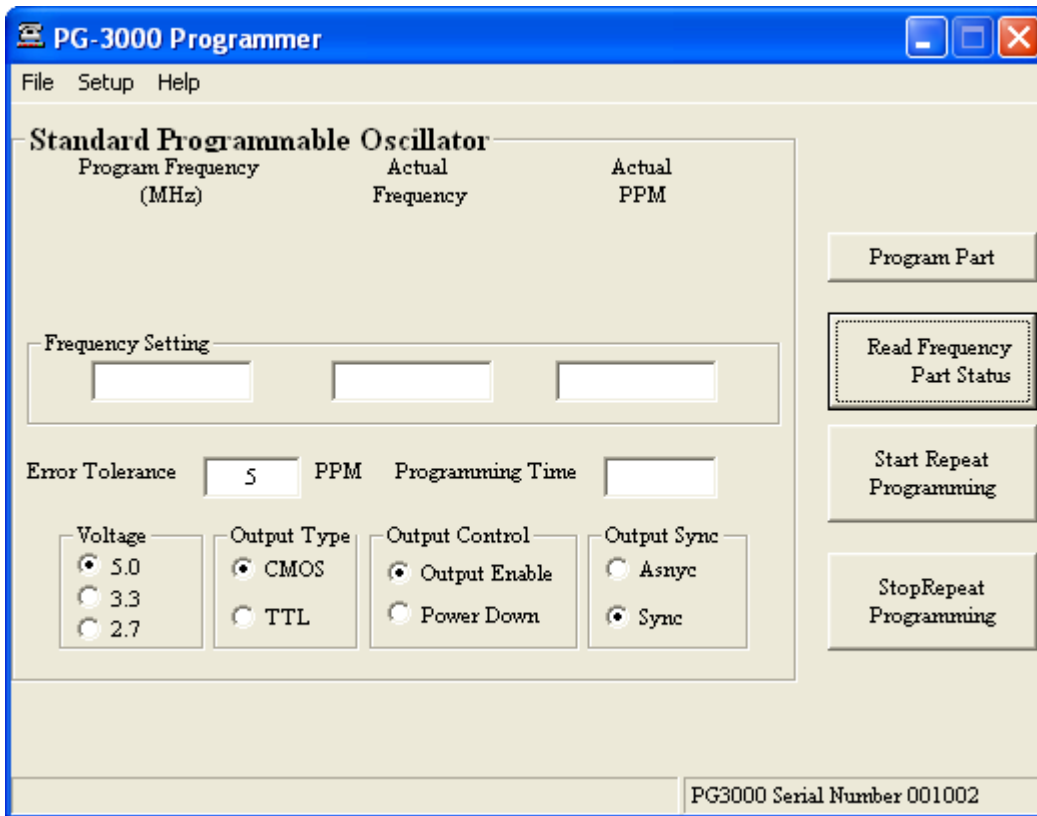


Choose the Setup/Configure menu option
Select here the device family type you wish to program, choose CPP.

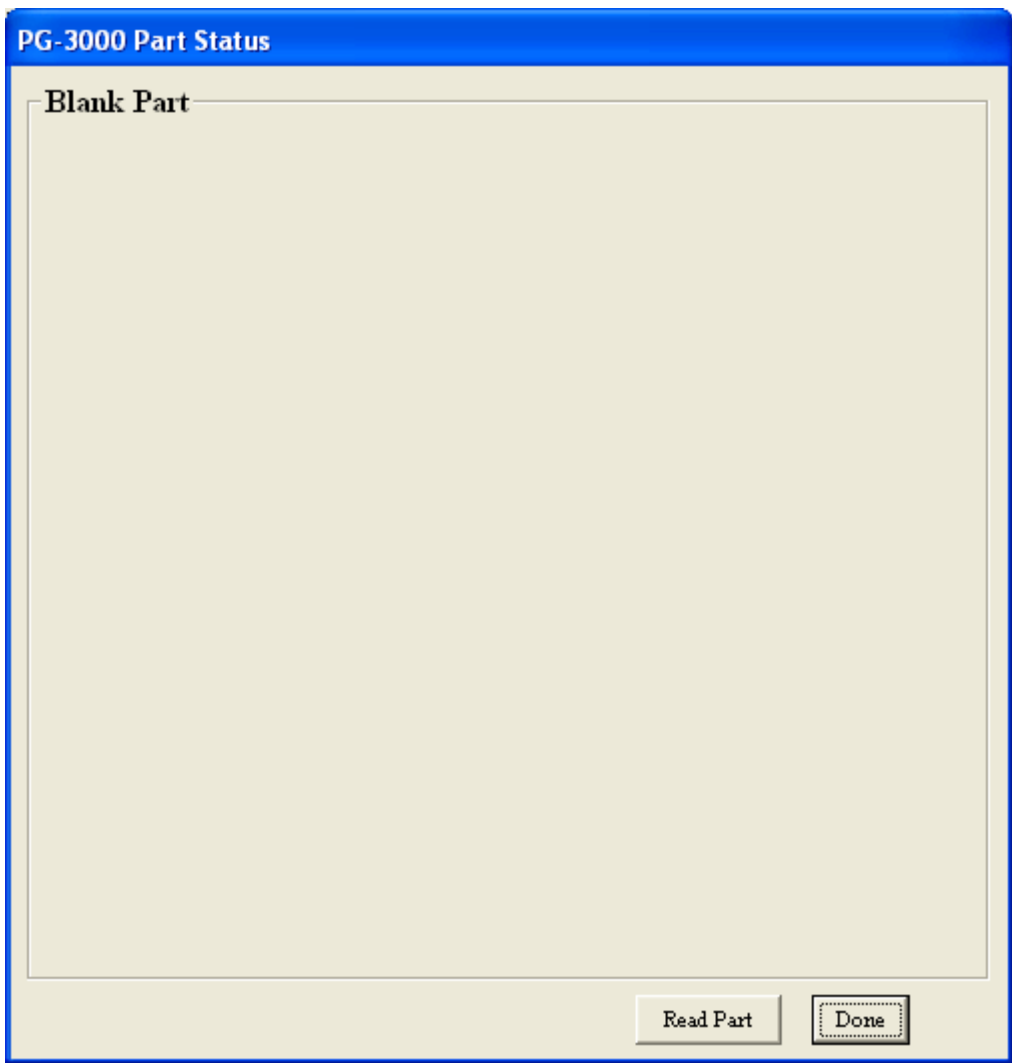


Click OK

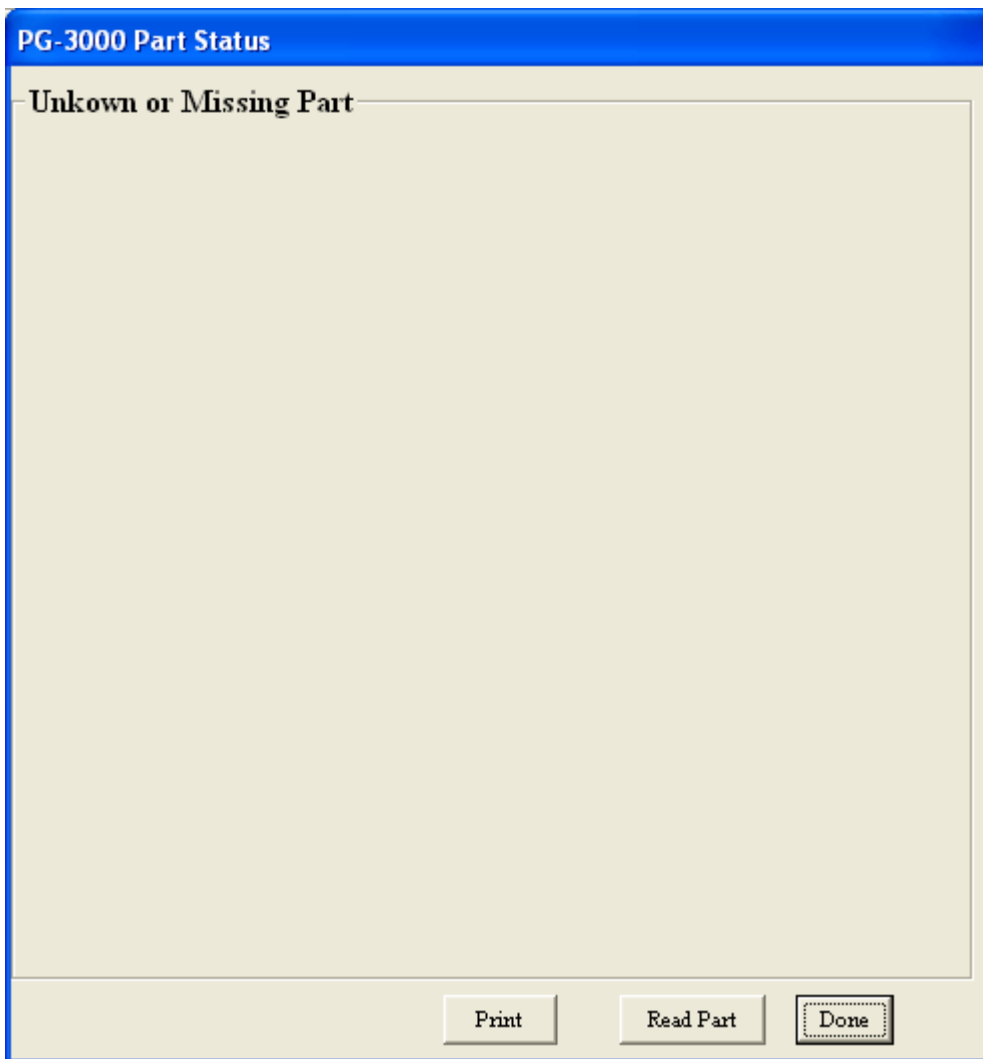
The main data entry form is displayed.



Place a blank device in the programmer.
Click the Read Frequency Parts Status button.



If the device in the PG3000 socket was unreadable then the following screen will be shown.



Parameter Selection for CPP (Two time programmable part)

Please refer to the data sheet of your device for specific parameter limits. Values used here are for illustration only.

Enter the desired programming frequency in MHz. This value should be between 1 and 133MHz for 5 volt devices and between 1 and 100MHz for 3.3 volt devices and between 1 and 66MHz for 2.7 volt devices.

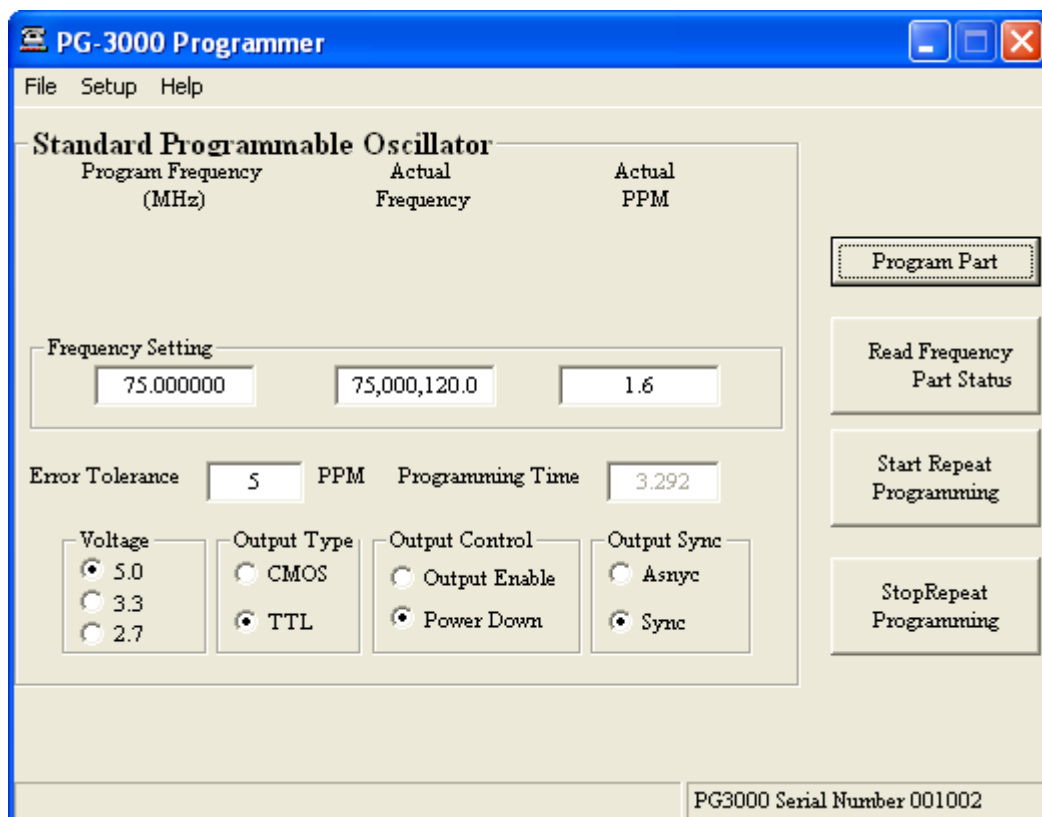
Enter the acceptable PPM error from this frequency in the Error Tolerance box. This value is used in determining values for the PLL dividers. Reducing the error tolerance also reduces the possible solutions available and may result in no solution being found.

Choose the supply voltage at which the device will be operated by clicking the appropriate selection either 5, 3.3 or 2.7 volts.

Choose the device output type by clicking the appropriate selection either CMOS or TTL.

Choose how the control pin (pin1) will affect the device as either Output Enable or Power Down.

Choose whether the control pin will operate in an asynchronous mode (immediately) or synchronous mode (waits for clock low).



When all these fields have been entered the device can be programmed by clicking the Program Part button. This operation takes a few seconds, and the time is displayed in the Programming Time box. After successful programming the actual part's frequency and PPM difference from the desired programming frequency are displayed.

Click the Read Frequency Parts Status button to read back the programmed information.

The screenshot shows a software window titled "PG-3000 Part Status". Inside, there is a section titled "Programmed First Row" which contains a "First Row Measurements" area. Under "Frequency", there are four rows of input fields: "Nominal Frequency", "5.0 Vdd", "3.3 Vdd", and "2.7 Vdd". Each row has a text box for the value, followed by "Hz" and "PPM" labels. The "5.0 Vdd" row shows "75,000,225.0" in the text box. To the right of these fields is a "Programmed Data" box containing "Programmed TTL" and "Programmed PowerDown". At the bottom of the window are two buttons: "Read Part" and "Done".

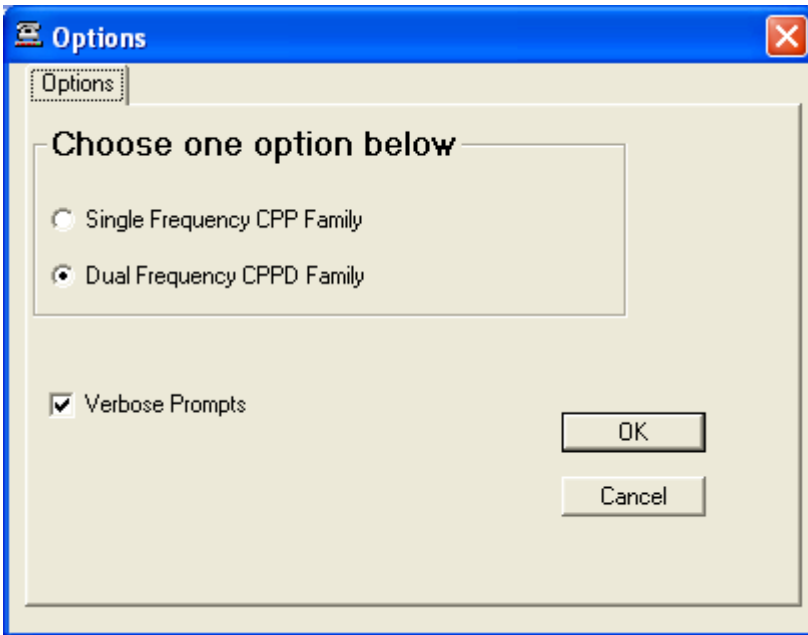
The device is read and the data displayed as to output type and frequency. The supply voltage selected during programming cannot be read from the device so the frequency at all 3 possible supply voltages is reported. If you enter a nominal frequency the PPM will be calculated. At the top of the display the status as to whether the device is blank, programmed once, or programmed twice is shown.

The actual frequency and PPM deviation from the entered programming frequency is displayed.

Parameter Selection for CPPD (One time, two frequency pin 1 selectable part)

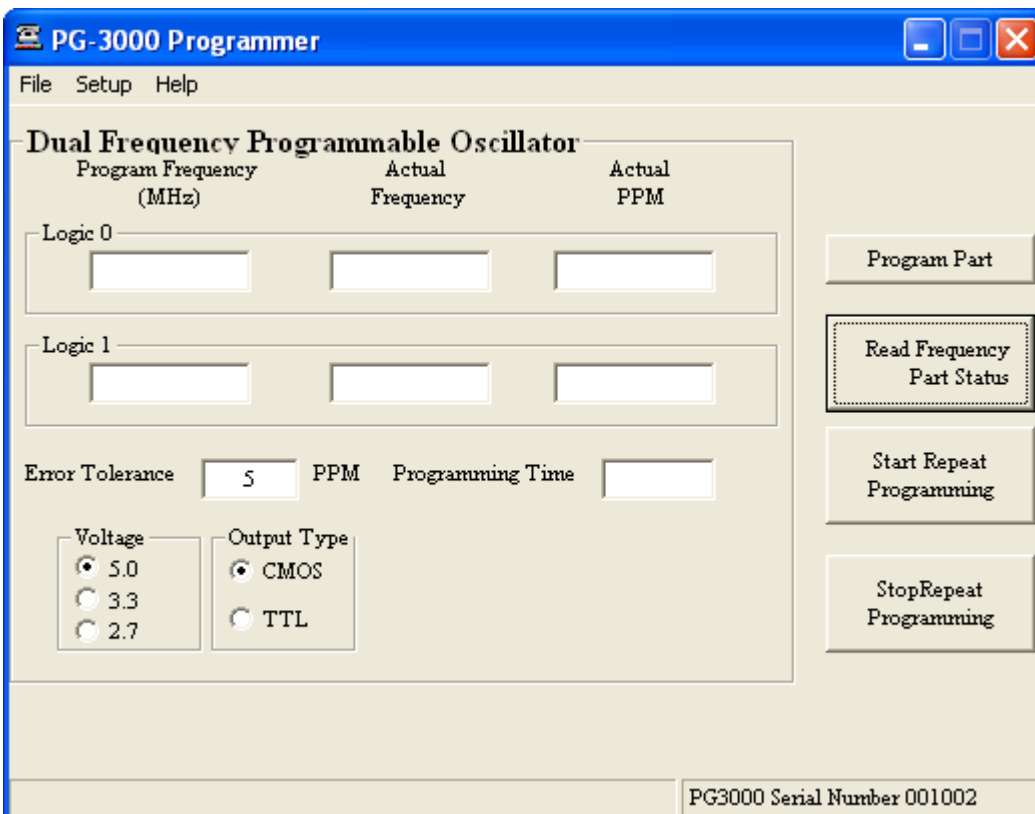
Please refer to the data sheet of your device for specific parameter limits. Values used here are for illustration only.

Choose the Setup/Configure menu option
Select here the device family type as CPPD.



The data entry screen will now allow the entry of two frequencies.

Enter the desired programming frequencies in MHz. This value should be between 1 and 150MHz for 5.0 volt devices and between 1 and 133MHz for 3.3 volt devices. When programmed the frequency in the first row will be output when the control pin is at logic 0, the frequency in the second row when the control pin is at logic 1.



Enter the acceptable PPM error from this frequency in the Error Tolerance box. This value is used in determining values for the PLL dividers and final tuning. Reducing the error tolerance also reduces the possible solutions available and may result in no solution being found.

Choose the supply voltage the device will be operated at by clicking the appropriate selection either 5, 3.3 or 2.7 volts.

Choose the device output type by clicking the appropriate selection, either CMOS or TTL.

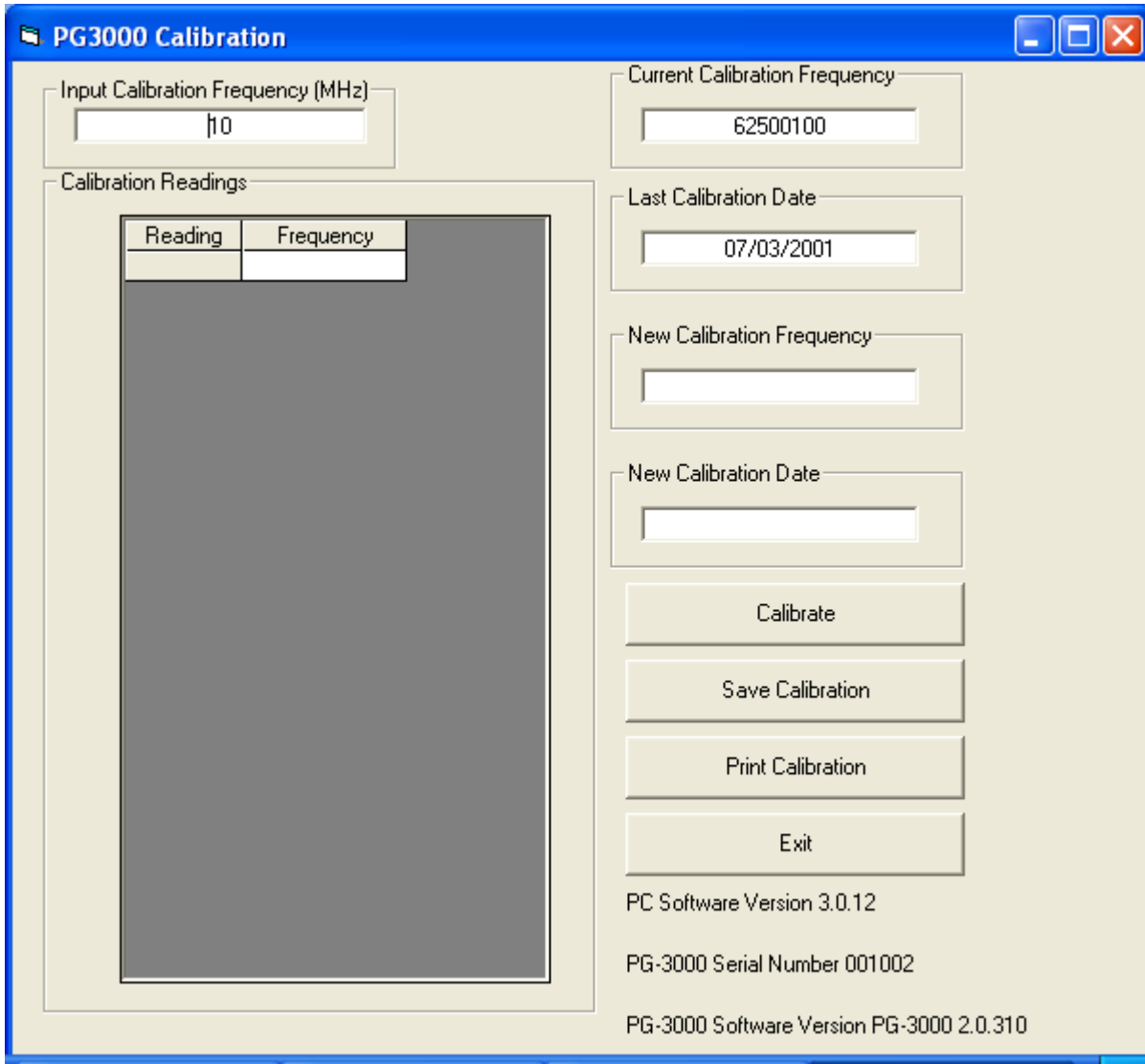
When all these fields have been entered the device can be programmed by clicking the Program Part button. This operation takes a few seconds, and the time is displayed in the Programming Time box. After successful programming the actual part's frequencies and PPM differences from the desired programming frequency are displayed.

Repeat Programming

Should a number of the same specification device need programming then the repeat programming feature can be used. When the parameters are setup for the device, as described above then click the "start repeat programming" button. This disables the input fields to prevent accidental changes and activate the programming button on the PG3000 programmer. By place a device in the programmer and pressing the button, the device is programmed and the actual measured frequency results are displayed in the window. The device can be removed and the next inserted and by simply pressing the button the next device is programmed. To exit the repeat programming mode click the Stop Repeat Programming button.

Calibration

Calibration of the programmer is performed at the factory. Should you decide to calibrate the programmer select the Setup/Calibrate menu option and the following screen will be displayed. **Remember to allow at least 30 minutes for the programmer to reach normal operating temperature before performing a calibration.** The calibration requires a very accurate (0.1PPM) reference oscillator. This reference source is typically obtained from a GPS frequency standard or similar standard operating at 10MHz and is connected between GND (pin 7) and CLK (pin 8) on the programmer socket.



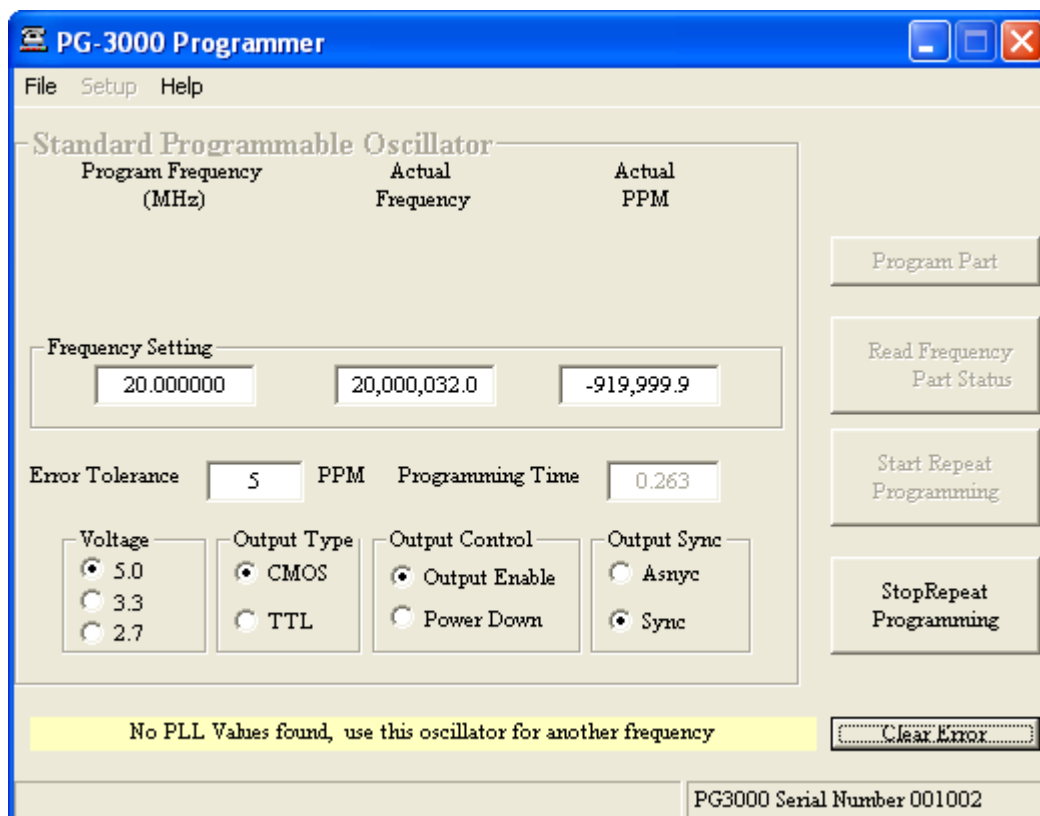
Click the calibrate button and twenty measurements of the reference are made. If the measurements are stable to better than 1PPM then the data is deemed valid and can be used for calibration. If the calibration data is invalid check your reference clock and connections very carefully before attempting to calibrate again. On reading a valid set of calibration values a new calibration frequency and date will be displayed which can be saved into the PG3000 programmer by clicking the Save Calibration button. The calibration screen can also be printed to the default printer using the Print Calibration button useful for ISO9000.

Troubleshooting

This section illustrates and explains the error conditions that can occur using the PG3000.

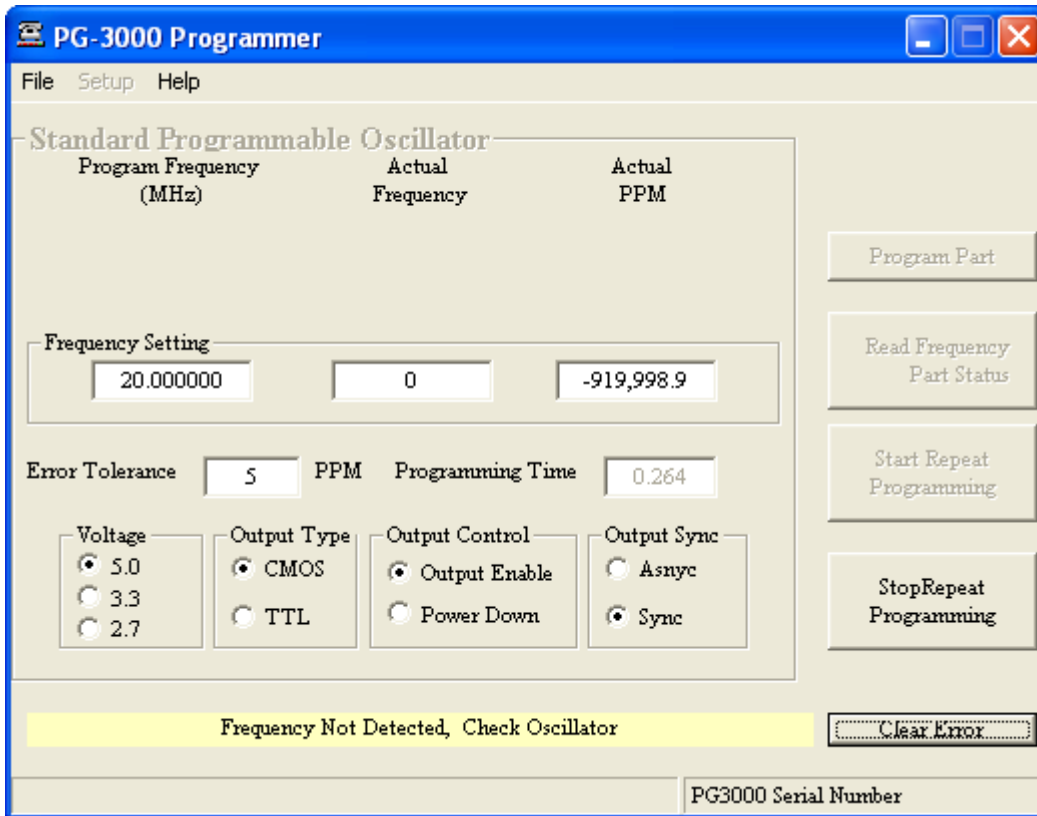
No PLL Values found, use this oscillator for another frequency

The error message “No PLL Values found, use this oscillator for another frequency”, occurs when no solution for the PLL dividers exists for this particular device. Remove the device and keep for use at a different frequency. Place another device in the programmer and a solution will most likely be found.



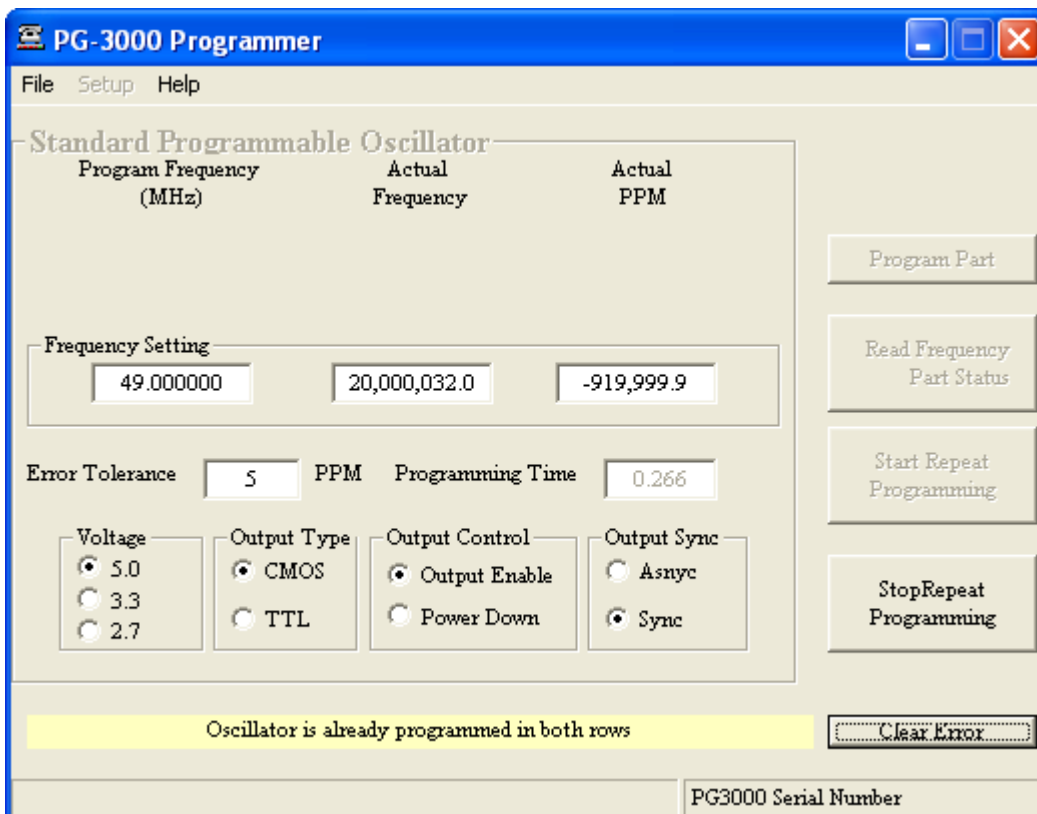
Frequency Not Detected, Check Oscillator

When reading or programming, the PG3000 first measures the frequency of the device. If no frequency can be read then the error message Frequency Not Detected, Check Oscillator is displayed. Check that the device is correctly placed in the socket with pin 1 adjacent to the ZIF handle and the handle is lowered.



Oscillator is already programmed in both rows

The FIPO contains OTP memory sufficient that it can be programmed a total of two times. Further attempts at programming will return the following screen.



This indicates the part cannot be further changed. Click the clear error button and insert a new FIPO device to continue programming.

Dual Frequency Oscillator Already Programmed

The CPPD device can be programmed only once. The message “Dual Frequency Oscillator Already Programmed” occurs when an attempt to re-program a CCPD device is made. A blank device must be inserted into the socket.

No PLL Values found for Dual frequency Oscillator Logic 0 or No PLL Values found for Dual frequency Oscillator Logic 1

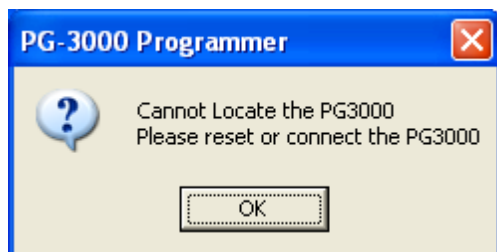
This message occurs when no solution for the PLL dividers exists for this particular device. Remove the device and keep for use at a different frequency. Place another device in the programmer and a solution will most likely be found.

Failed to Verify Programming, Defective Oscillator

This message rarely occurs and indicates that the device could not be successfully programmed. Check that the device is correctly seated in the socket and try again. Trying another device will also help determine if a connection problem exists or a defective part has been found.

Cannot Locate PG3000

Should the software be unable to connect to the PG3000 programmer the following message will be displayed on the screen of the PC.



Check the connection of the PG3000, unplug and re-plug the unit and try again. Should this not work then the driver from a prior session may not have been successfully unloaded. To remove the driver, perform the following operations. Disconnect the PG3000, open the device manager expand the entry USB Serial Bus Controllers, right click the entry Cardinal PG3000 Drive and select uninstall. This will remove the active driver. Reconnect the PG3000 and the driver will automatically be reinstalled. The PG3000 software can then be restarted.

