

Keithley Instruments  
622X-855B01.1  
Release Note for Version B01.1  
IVI Instrument Driver for the Model 6220/6221  
11/23/2008

**IMPORTANT:** To work properly with the driver, your instrument must have a compatible version of firmware. Refer to section 2 (System Requirements) below for specific details regarding the required firmware version for your instrument. Visit [Keithley.com](http://Keithley.com) for upgrade instructions if your instrument's firmware is not a compatible version. The instrument's firmware version is shown on the display when the instrument is first powered up, immediately to the right of the model number.

This document provides additional information for the installation and use of the 622X-855B01 6220/6221 driver for LabView and LabWindows CVI, Visual Basic, and C/C++.

## Table of Contents

---

1	Introduction
1.1	Included in this release
1.1.1	KE622X IVI Driver
1.1.2	Installation Locations
2	System Requirements
2.1	Supported Operating Systems and System Software
3	Installation
3.1	Keithley I/O Layer Installation
3.2	Instrument Driver Installation
3.2.1	Installing the driver from the web
4	Using the 622X IVI Instrument Driver
4.1	Virtual Instruments
4.2	Create your own Virtual Instruments
4.3	Logical Names
4.4	VISA resources
4.4.1	GPIB
4.4.2	RS232
4.4.3	Ethernet (Socket connection)
4.4.4	Example of using VISA resources:
4.5	Driver Speed up solutions
4.5.1	QueryInstrStatus
4.5.2	RangeCheck
4.5.3	Caching
4.6	Using the Example Programs
4.7	Using the driver with LabView
5	Known problems and issues
5.1	Fixed in this release
5.2	LabWindows/CVI examples
5.3	KE622X_WriteInstrData
6	Copyright Notice

---

## 1 Introduction

### 1.1 Included in this release

The components described below are provided as part of the KE622X IVI Instrument Driver for the 6220 Precision Current Source and the 6221 DC and AC Current Source. Some shortcuts for them are added to the Keithley Instruments folder on your Start Menu.

#### 1.1.1 KE622X IVI Driver

Version B01.1 of the KE622X driver supports the 6220 Precision Current Source and

the 6221 DC and AC Current Source.

The driver uses the Keithley I/O layer (VISA) to communicate with your instrument. IVI (Interchangeable Virtual Instruments) and VISA (Virtual Instrument Software Architecture) provide a common foundation for application development across multiple communication buses and multiple instrument vendors. This software driver supports many Application Development Environments under windows, such as Visual Basic, C/C++, LabView, LabWindows/CVI, and TestPoint. Numerous examples and an on-line help utility are provided to help programmers build their custom applications.

Important note: The Keithley Configuration Utility and Keithley I/O Layer software are no longer bundled with the driver as a single installation package. The Keithley I/O layer may be downloaded from the Keithley web site along with the driver. The Keithley I/O software should be installed before the driver itself is installed, if possible.

### 1.1.2 Installation Locations

Version B01.1 will try to detect the presence of the IVI Shared Components and the National Instruments IVI Engine. Depending upon the versions it finds the installer could put the driver files in either of two locations, listed below. If the installer finds the IVI shared components but no NI IVI engine then it will abort the installation and ask the user to install the NI IVI Compliance package first.

If the installer finds there is no IVI shared components on the system then the following files will be installed to the following locations:

Ke622x_32.dll	C:\VXIPnP\winNT\bin
Ke622x.fp	C:\VXIPnP\winNT\Ke622x
Ke622x.sub	C:\VXIPnP\winNT\Ke622x
Ke622x.txt	C:\VXIPnP\winNT\Ke622x
Ke622x.h	C:\VXIPnP\winNT\include
Ke622x.lib	C:\VXIPnP\winNT\lib\bc
Ke622x.lib	C:\VXIPnP\winNT\lib\msc

\* win95 would replace winNT on windows 9X systems.

If the IVI shared components are found on the system then the following files get installed to the following locations:

Ke622x_32.dll	C:\Program Files\IVI\bin
Ke622x.fp	C:\Program Files\IVI\Drivers\Ke622x
Ke622x.sub	C:\Program Files\IVI\Drivers\Ke622x
Ke622x.txt	C:\Program Files\IVI\Drivers\Ke622x
Ke622x.h	C:\Program Files\IVI\include
Ke622x.lib	C:\Program Files\IVI\lib\bc
Ke622x.lib	C:\Program Files\IVI\lib\msc

## 2 System Requirements

Pentium-class PC.

6220 firmware release A02 or later. DDC Mode is not supported by the driver.

6221 firmware release A02 or later. DDC Mode is not supported by the driver.

Keithley I/O Layer software KIOL-850 version B02.3 or later.

NOTE: Keithley strongly recommends that you power your computer and instrument from an Uninterruptible Power Supply (UPS) when running a critical application.

## 2.1 Supported Operating Systems and System Software

Windows XP Professional service pack 1 or later

Windows 2000 Service pack 3 or later

Windows NT Service pack 6a or later

Windows 98 Second edition only

Note: Windows 95 and Vista are not supported.

Chinese Windows 98 (Second Edition), 2000, and XP Pro are supported.

Japanese Windows 98 (Second Edition), 2000, and XP Pro are supported.

LabVIEW versions 5.1 through 7.1 are supported.

## 3 Installation

### 3.1 Keithley I/O Layer Installation

Before installing the KE622X instrument driver, download and install the Keithley I/O Layer, KIOL-850, following the instructions in the I/O layer readme file to install and configure the software, and to connect your instrument to your computer.

### 3.2 Instrument Driver Installation

#### 3.2.1 Installing the driver from the web

If you have an earlier version of the driver software installed on your computer, uninstall it by following the steps below before installing this version.

Using the Add/Remove Programs Wizard in Control Panel, uninstall the following components:

Keithley 622X IVI Driver.

Keithley I/O Layer.

NI-VISA x.x.x Runtime (If present) (x.x.x will be the VISA version)

Reboot your computer.

Download the driver software from the Keithley web site, [www.keithley.com](http://www.keithley.com). The software is a single compressed file and should be downloaded to a temporary directory.

Run the downloaded file from the temporary directory.

Follow the instructions on the screen to install the software.

When the installation is complete, reboot your computer.

## 4 Using the 622X IVI Instrument Driver

To connect to the instrument via the driver you need to first call `KE622X_init` or `KE622X_InitWithOptions`. The first parameter for either function is a VISA resource string, which indicates to the I/O layer which communication device you want to use to connect to the instrument and in most cases the address of the instrument. This can be specified using a Virtual Instrument name, a Logical Name, or a VISA Resource string. We recommend that you do not use the VISA resource string form, since it builds hardware and bus dependencies into your code. If you use the Virtual Instrument Name or the Logical Name form, the Keithley Configuration Panel can be used to select a different bus or address with no code changes required.

### 4.1 Virtual Instruments

The Keithley I/O Layer installer creates several virtual instruments that you can

use to automatically connect to an instrument.

If you are using a National Instruments GPIB card, select KE622X\_GPIB12 as your device. By default, the logical name KE622XExampleInstr is also assigned to this device. This logical name is used by the example programs but can also be used by user programs.

If you are using a Keithley Instruments or CEC ISA or PCI GPIB card, select KE622X\_GPIB1\_12 as your device.

If you are using a Keithley Instruments or INES PCMCIA GPIB card, select KE622X\_GPIB2\_12 as your device.

If you are using COM Port 1, select KE622X\_COM1 as your device.

If you are using COM Port 2, select KE622X\_COM2 as your device.

If you are using Ethernet to connect to a 6221, you will need to use the Keithley Configuration Utility to add a device with the proper IP address.

An example of using a Virtual Instrument Name to connect to an instrument connected to COM Port 1 is:

```
KE622X_init("KE622X_COM1", VI_TRUE, VI_TRUE, handle)
```

## 4.2 Create your own Virtual Instruments

If you want to create your own virtual instruments then use the Configuration Panel or Wizard. Open the Configuration Panel by selecting Start> Programs> Keithley Instruments> Keithley Configuration Panel, and wait for the wizard to start. Follow the wizard instructions to create a new configuration or modify an existing one.

## 4.3 Logical Names

You can also define logical Names for your devices using the configuration panel. One logical name is created by default: KE622XExampleInstr. This default logical name is used by the example programs supplied with the driver, and is associated with the KE622X\_GPIB12 device by default.

## 4.4 VISA resources

### 4.4.1 GPIB

For GPIB instruments, you would use a resource string of the following format:

```
"GPIBx::yy::INSTR".  
x is the GPIB card number.  
yy is the GPIB address of the instrument.
```

### 4.4.2 RS232

For RS232 instruments, the VISA resource string has the following format:  
"ASRLx::INSTR" where x is the COM Port number.

### 4.4.3 Ethernet (Socket connection)

For Ethernet instruments, such as the 6221, use the following VISA resource string format:

```
"TCPIPx::IP::Port::SOCKET".  
x is the Ethernet card number.  
IP is the IP address of the instrument.  
Port is the port number of the instrument (1394 for the 6221).
```

#### 4.4.4 Example of using VISA resources:

To connect to a 622X at GPIB address 12 via GPIB1:

```
KE622X_init("GPIB1::12::INSTR", VI_TRUE, VI_TRUE, handle)
```

#### 4.5 Driver Speed up solutions

Using the KE622X\_InitwithOptions function there is a parameter, called OptionString, where you can enable/disable certain features of an IVI driver.

##### 4.5.1 QueryInstrStatus

If this feature is enabled the driver will query the instrument after every function call to see if there were any errors. This is useful while you are writing your application but once it is finalized then you can disable this feature to gain extra performance.

##### 4.5.2 RangeCheck

If enabled the IVI engine will check to see if the parameters you are passing in are within range. Disabling this feature in the final application will also gain some performance increase.

##### 4.5.3 Caching

The driver has the option of caching all the settings it sends to the instrument so that it doesn't send a setting to the instrument a second time if it hasn't changed. By default this is enabled.

#### 4.6 Using the Example Programs

The KE622X Driver includes a number of example programs written in Visual Basic, LabView, and C. The examples demonstrate how to perform common functions using the driver. The example programs are hard coded to use the logical name: KE622XExampleInstr for the device identifier. By default, this logical name is associated with the KE622X\_GPIB12 device, which is a 622X at GPIB address 12 using a National Instruments GPIB interface card for communications. If you are using a different bus, address, or interface card, you must reassign the logical name to the correct device using the Keithley Configuration Panel. For example, if you are using a CEC GPIB card instead of a National Instrument GPIB card, you would use the Keithley Configuration Panel to reassign the logical name from the KE622X\_GPIB12 device to the KE622X\_GPIB1\_12 device.

#### 4.7 Using the driver with LabView

LabVIEW versions 5.1 through 7.1 are supported.

If LabView is already installed on your computer when the driver is installed, the LabView VIs will be installed in the proper subdirectory of the LabView directory so that they are directly accessible from within LabView.

If LabView is not installed on your computer when the driver is installed, the LabView VIs will be placed in a subdirectory of the Keithley Instruments directory. Once LabView has been installed, the VIs must be copied to the proper subdirectory under LabView before they can be used. This directory is typically:

```
C:\Program Files\National Instruments\LabView X\instr.lib\KE622X
```

Depending on the particular driver, there may be separate versions of the VIs for LabView 5.x and 6.x, in which case they will be installed into separate directories. Copy the appropriate version of the VIs into the National Instrument directory tree. The 6.x VIs are compatible with versions 7 and 7.1.

## 5 Known problems and issues

### 5.1 Fixed in this release

This version now supports Ethernet correctly on NI-VISA 3.3 or higher.

### 5.2 Labwindows/CVI examples

The examples were built on a system where the VXIPnP directory was installed on the d: drive. If VXIPnP is on the C: drive then you may see a warning dialog when you open up the example project in Labwindows/CVI. It has detected this mismatch and is asking if you want to switch to the correct location. Select yes and the project should compile and link. If not see the following issue.

The Labwindows/CVI examples have the ke622x.fp and ke622x.lib files referenced in the project files. These files could be installed under the VXIPnP folder or the Program Files/IVI folder. See issue 1.1.2 about this. When you compile these examples if there is an error that these files can't be found then replace them in the project. Right-mouse-click on the ke622x.lib or ke622x.fp file in CVI and then select "Replace File in Project" and browse for the file. Refer to 1.1.2 for the correct location.

### 5.3 KE622X\_WriteInstrData

When using this function you must append a linefeed character to the end of the command that you send to the instrument. In LabVIEW and C add a "\n" whilst in Visual BASIC add the "Chr(10)" or "vbLf" command to the end of the string.

## 6 Copyright Notice

The VISA software supplied with the Instrument Driver is Copyright (c) 2001-2004 National Instruments Corporation. All Rights Reserved.

The KE622X Series instrument driver is Copyright (c) 2003-2004 Keithley Instruments. All Rights Reserved.

End of Release notes.