

# Providing Secure Access to Required Root Commands Under KTHMGR Login

## Introduction

Beginning with Version 5.1.0, the Keithley Test Environment (KTE) software has a new architecture. New commands that test engineers must use to maintain, debug, and update their testers have come with this new architecture. (See the section titled “How to Use Sudo” for a list of these new commands.) These commands are process daemons, which require root access on the SUN workstation. Granting full root access is often considered dangerous, and the arguments for and against doing so are beyond the scope of this note. While most sysadmins are unwilling to grant root access on workstations they maintain; test engineers often require this level of access to perform their jobs. These conflicting needs can lead to delays and system downtime.

Sudo, a shareware program distributed under a BSD-style license, is designed to allow a sysadmin to give limited root privileges to certain users and then log that activity. The program’s underlying philosophy is to provide as few privileges as possible, while still allowing test engineers to get their work done.

Any sysadmin or test engineer with root access can install Sudo and its associated files in about 30 minutes per workstation. Once Sudo is properly installed and set up within the Keithley environment, no maintenance is required.

Using Sudo reduces the sysadmin’s workload and allows test engineers to perform system updates, maintenance, and troubleshooting with minimal delays and test cell downtime.

## Applicability

The information in this note is applicable to all Keithley Series 400 and 600 parametric testers that use KTE V5.1 or later. The version of Sudo that accompanies this note (V1.6.8) should be compatible with any SUN® workstation running the Solaris™ operating system, V7 or V8.

Typical scenarios when it’s necessary to provide root access:

1. For debugging, if it’s necessary to take down the datahub, proberio, and kisa; **kte\_system** would be used to start or stop all three of these daemons.
2. Any change to the prober driver requires re-starting the proberio.
3. Many kte upgrades and updates require the workstation to reboot; **shutdown -i6** would be used.

The installation instructions provided in this note assume a standard Keithley installation. Any changes to login accounts or directory locations will require modifying these instructions appropriately.

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An excellent public domain article titled “Eliminating Root with Sudo” accompanies this note as background information. For more on SUDO and how it works, visit <http://www.sudo.ws/sudo/>.

### The implementation procedure

This note is distributed with two additional files:

- `sudo-1.6.8p4-sol8-sparc-local.gz` — The Sudo package
- `Oreilly_sudo1.doc` — Word document titled “Eliminating Root with Sudo”

Before proceeding with implementation, we strongly suggest reading “Eliminating Root with Sudo.”

1. On the SUN workstation create a directory under `kthmgr` called `/tmp`  
**`mkdir /export/home/kthmgr/tmp`**  
**`cd /export/home/kthmgr/tmp`**
2. Copy the file `sudo-1.6.8p4-sol8-sparc-local.gz` into the `/export/home/kthmgr/tmp` directory.
3. **`gunzip sudo-1.6.8p4-sol8-sparc-local.gz`**
4. `su` into root and run the following command as typed  
**`pkgadd -d sudo-1.6.8p4-sol8-sparc-local`**
5. The following exchange or something very similar will be displayed. Take the action indicated.

**The following packages are available:**

```
1 SMCsudo  sudo
      (sparc) 1.6.8p4
```

**Select package(s) you wish to process (or 'all' to process all packages). (default: all) [?,??,q]: 1**

select 1

**Processing package instance <SMCsudo> from </export/home/kthmgr/tmp/sudo-1.6.8p4-sol8-sparc-local>**

```
sudo
(sparc) 1.6.8p4
Todd Miller et al
```

**Using </usr/local> as the package base directory.**

**## Processing package information.**

**## Processing system information.**

**## Verifying disk space requirements.**

**## Checking for conflicts with packages already installed.**

**The following files are already installed on the system and are being used by another package:**

```
* /usr/local/bin <attribute change only>
* /usr/local/man <attribute change only>
```

\* - conflict with a file which does not belong to any package.

Do you want to install these conflicting files [y,n,?,q] y

Select y (yes); these are attribute changes only.

## Checking for setuid/setgid programs.

The following files are being installed with setuid and/or setgid permissions:

/usr/local/bin/sudoedit <setuid root>

Do you want to install these as setuid/setgid files [y,n,?,q] y

Select y (yes)

Installing sudo as <SMCsudo>

## Installing part 1 of 1.

/usr/local/bin/sudoedit

/usr/local/doc/sudo/BUGS

/usr/local/doc/sudo/CHANGES

/usr/local/doc/sudo/HISTORY

/usr/local/doc/sudo/INSTALL

/usr/local/doc/sudo/INSTALL.configure

/usr/local/doc/sudo/LICENSE

/usr/local/doc/sudo/PORTING

/usr/local/doc/sudo/README

/usr/local/doc/sudo/README.LDAP

/usr/local/doc/sudo/RUNSON

/usr/local/doc/sudo/TODO

/usr/local/doc/sudo/TROUBLESHOOTING

/usr/local/doc/sudo/UPGRADE

/usr/local/etc/sudoers

/usr/local/libexec/sudo\_noexec.la

/usr/local/libexec/sudo\_noexec.so

/usr/local/man/man1m/sudoedit.1m

/usr/local/man/man1m/visudo.1m

/usr/local/man/man4/sudoers.4

/usr/local/sbin/visudo

[ verifying class <none> ]

/usr/local/bin/sudo <linked pathname>

/usr/local/man/man1m/sudo.1m <linked pathname>

Installation of <SMCsudo> was successful.

#

6. Add Sudo path to kthmgr

Exit from root

**cd /export/home/kthmgr**

edit .cshrc to add **/usr/local/bin** to the path

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7. Update MANPATH to reflect location of sudo manpages.

```
cd $KIHOME
edit .ki_setup
  look for:
    # Set up the MANPATH
    if some stuff
    else
      some stuff
    endif
```

after the endif line: add the following two lines

```
# Add the manpages for sudo
setenv MANPATH ${MANPATH}:/usr/local/man
```

8. Create a sudoers file. This is the file that creates permissions for kthmgr to use root commands. The sudoers should only be edited with the visudo tool.

```
su into root
/usr/local/sbin/visudo you must specify the full path to visudo!!
```

This will open a sudoers template. Visudo uses VI as its default editor, but will respect the \$EDITOR environment variable. See the example sudoers file that follows. Make only those changes shown in **bold type**.

When exiting, visudo will do limited syntax checking. If a syntax error is found, it will print out the line number and ask what to do. Three options are available:

- **e** – back to the editor to fix the problem,
- **x** – quit and revert back to the previous sudoers file,
- The third option is for advanced users and will not be discussed here.

Unless you are confident of the location and cause of your error and know how to fix it, don't use the **e** option; it is usually best to quit (**x**) and start over.

### Example

The following is an example sudoers file. Remember—make only those changes or additions that are in **bold type**. Replace **hostname** with the workstation hostname. This will limit the user's permissions to that workstation only.

```
# sudoers file.
#
# This file MUST be edited with the 'visudo' command as root.
#
# See the sudoers man page for the details on how to write a sudoers file.
#
# Host alias specification
# User alias specification
# Cmnd alias specification
```

```
# Defaults specification
```

```
Defaults logfile=/var/log/sudolog
```

```
# Runas alias specification
```

```
# User privilege specification
```

```
root ALL=(ALL) ALL
```

```
# Lines below are valid for both S400/S600 systems
```

```
kthmgr hostname =/usr/sbin/shutdown -i6
```

```
kthmgr hostname =/opt/kiS600/bin/kte_system
```

```
kthmgr hostname =/etc/rc2.d/S80datahub
```

```
kthmgr hostname =/etc/rc2.d/S81proberio
```

```
kthmgr hostname =/etc/rc2.d/S82kisa
```

```
# Line below is valid for S400 systems only
```

```
kthmgr hostname =/etc/rc2.d/S80keithley
```

```
# Lines below are valid for S600 systems only
```

```
kthmgr hostname =/etc/rc2.d/S83kthd
```

```
# Uncomment to allow people in group wheel to run all commands
```

```
# %wheel ALL=(ALL) ALL
```

```
# Same thing without a password
```

```
# %wheel ALL=(ALL) NOPASSWD: ALL
```

```
# Samples
```

```
# %users ALL=/sbin/mount /cdrom,/sbin/umount /cdrom
```

```
# %users localhost=/sbin/shutdown -h now
```

This sudoers file will work as-is for any workstation (as defined previously) connected to either a S400 system or a S600 system.

## How to Use Sudo

Using the previous sudoers file, you have access to the following commands as kthmgr. The path must be specified as shown in these commands:

### S400 only

```
/etc/rc2.d/S80keithley { start | stop }
```

### S600/S400

```
/etc/rc2.d/S80datahub { start | stop }
```

```
/etc/rc2.d/S81proberio { start | stop }
```

```
/etc/rc2.d/S82kisa { start | stop }
```

```
kte_system { start | stop }
```

```
shutdown -i6
```

### S600 only (only valid for RF systems beginning with kte v510p09 and beyond)

```
/etc/rc2.d/S83kthd { start | stop }
```

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These commands normally require root access. To use one of these commands with Sudo, precede the command with the word **sudo**.

### **sudo /etc/rc2.d/S81proberio stop**

You will be asked for your password. This is the password for the kthmgr login. The command will now run in the kthmgr environment with root permissions.

If the file does not exist or you do not have Sudo permission to use that file, Sudo will let you know.

The Sudo password for kthmgr will stay active for five minutes. Giving any additional Sudo commands within five minutes won't require re-entering the password.

### **Sources for further information**

- UNIX "man pages" available for: sudo, sudoers, visudo.
- The excellent article titled "Eliminating Root with Sudo" that accompanies this tech note.
- "Sudo Main Page." 2005. <<http://www.sudo.ws/sudo/>> (21 March 2005).

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