NEC Display Solutions
MultiProfiler for Linux x64
Versions 1.3.60

Installation Guide

1 About MultiProfiler

MultiProfiler is designed as a companion to NEC MultiSync monitors that feature the powerful and sophisticated SpectraView Engine; such as the P and PA Series desktop displays as well as several large-screen displays (please see “Supported NEC Display Models and Description”). This software provides complete control of the SpectraView Engine in an easy-to-use application.

SpectraView Engine equipped MultiSync monitors utilize this sophisticated processor, combined with internal luminance, temperature, and time monitoring, and individual characterization and calibration of each unit during production, to provide an unparalleled level of color control, accuracy and stability.

The high-contrast LCD panel used on the monitor, coupled with the SpectraView Engine, provide the utmost in versatility such as the ability to accurately emulate colorspaces like AdobeRGB and sRGB.

MultiProfiler uses a two-way communications link with the display monitor to perform adjustments. Two different methods of communications are possible:

- USB (Universal Serial Bus) - Communicates with the display via a USB connection from the host PC. A USB cable must be connected between the host PC and one of the upstream USB ports on the display. The display will also function as a USB hub. USB is the recommended communications method.
- DDC/CI (Display Data Channel - Command Interface) - Communicates via the video graphics adapter and normal video cable. No extra cables are necessary. Support is required in the video graphics display driver in order to provide this functionality. This communications link is an industry standard developed by VESA (Video Electronics Standards Association).

2 System Requirements

Operating System	64-bit Linux v. 10.04 or higher[1] (Other variants such as RedHat, CentOS, Linux Mint, and SUSE Linux should also work but may need to have specific system libraries installed. The configuration steps may differ from those described in this document.)	
Communications to the Display	USB Communications • One available USB port on the PC to connect to the USB upstream input on the display. • This is the preferred method of communication.	DDC/CI communications: • NVIDIA card with NVIDIA proprietary video drivers installed. • Other video cards/chipsets may also work. ATI cards are not currently supported.

2.1 Supported NEC Display Models and Description

- **MD301C4** – wide color gamut, medical
- **P212** – standard color gamut
- **P232W** – standard color gamut
- **P241W** – standard color gamut
- **P242W** – standard color gamut
- **P404** – standard color gamut
- **P484** – standard color gamut
- **P554** – standard color gamut
- **PA231W** – standard color gamut
- **PA241W** – wide color gamut
- **PA242W** – wide color gamut
- **PA271W** – wide color gamut
- **PA272W** – wide color gamut
- **PA301W** – wide color gamut
- **PA302W** – wide color gamut
- **PA322UHD** – wide color gamut, ultra-high-definition
- **PA322UHD-2** – wide color gamut, ultra-high-definition
- **V404** – standard color gamut
- **V404-T** – standard color gamut, touch screen
- **V484** – standard color gamut
- **V484-T** – standard color gamut, touch screen
- **V554** – standard color gamut
- **V554-T** – standard color gamut, touch screen
- **X551UHD** – standard color gamut, ultra-high definition
- **X651UHD** – standard color gamut, ultra-high definition
- **X651UHD-2** – standard color gamut, ultra-high definition
- **X841UHD** – standard color gamut, ultra-high definition
- **X841UHD-2** – standard color gamut, ultra-high definition
- **X981UHD** – standard color gamut, ultra-high definition
- **X981UHD-2** – standard color gamut, ultra-high definition

[1] 32-bit versions of Linux are *not* supported.

2.1.1 Minimum Firmware Version

If the display being used is not listed below, please disregard this section and continue to the next section “Support and Troubleshooting” on page 7 in this document.

Firmware version “R1.404” or newer on the following models to fully support the Print Emulation function:

- **P404** – standard color gamut
- **P484** – standard color gamut
- **P554** – standard color gamut
- **V404** – standard color gamut
- **V404-T** – standard color gamut, touch screen
- **V484** – standard color gamut
- **V484-T** – standard color gamut, touch screen
- **V554** – standard color gamut
- **V554-T** – standard color gamut, touch screen

The latest firmware versions can be downloaded from the NEC website at: http://www.nec-display.com/dl/en/dp_soft/pd_fm_update/index.html

3 Support and Troubleshooting

Please read through this guide for installation instructions as well as the included User's Guide.

For assistance with this Linux software, the most efficient method is to use the feedback form on the MultiProfiler web page (see below). Be sure to include a valid email address when submitting the form.

3.1 Known Issues

The test pattern generated by MultiProfiler may not completely fill up the screen due to the desktop window management in the OS.

For the displays listed below, the ICC/ColorSync profiles generated by SpectraView II are not automatically selected, in the Color Management System, when a Picture Mode created by SpectraView is selected in MultiProfiler.

- P404
- P484
- P554
- V404
- V404-T
- V484
- V484-T
- V554
- V554-T

3.2 Feedback

NEC Display Solutions welcomes your feedback on MultiProfiler. Please visit the MultiProfiler support page and give us your comments and feedback via the feedback form.

3.3 Differences from Mac and Windows Versions

The Linux version has the following difference from the Mac and Windows versions:

- It is not possible to generate a 3D LUT based on a printer ICC profile.

4 Installation and Configuration

Installation and configuration consists of these main steps:

- Set USB device permissions
- Verify system libraries
- Configure display communications

Two differently compiled versions of MultiProfiler are provided for use with different Linux versions, “BUILD_A” and “BUILD_B”. Select the most appropriate version for the system being used.

Linux compatibility

Linux version	BUILD_A version	BUILD_B version
Ubuntu 10.x	Yes	No
Ubuntu 12.x	Yes	Yes
Ubuntu 13.x	No	Yes
Ubuntu 14.x	No	Yes
Other versions and variants	Use `ldd` to determine most appropriate version	

System library requirements

Library	BUILD_A version	BUILD_B version
libQt*	Uses static linked	Requires Qt4 v4.8.1 or higher
libudev.so.0	Required	Not required
libc.so.6		Requires GLIBC_2.14 or higher

4.1 Installation

The following steps describe the installation and configuration steps for standard installations of Ubuntu 10.04 through 13.10. Different Linux versions may require these steps to be modified.

Note:

Command sequences entered into a terminal window are shown highlighted.

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1. Extract the files from the archive.
2. Open a terminal window (`CRTL+ALT+T`), and `cd` to the `NEC_MultiProfiler_x64` folder.
3. Set the device permissions to allow communications access to the display via USB and DDC/CI from a user account.
    a. As su root or sudo, copy the `55-NEC.rules` file to `/etc/udev/rules.d/`

```
sudo cp "55-NEC.rules" "/etc/udev/rules.d"
```

Important: On Ubuntu 13.04 and higher, the rules directory has been changed to `/lib/udev/rules.d/` so use:

```
sudo cp "55-NEC.rules" "/lib/udev/rules.d"
```

b. The device permissions need to be reloaded by either:

   i. Disconnecting and reconnecting the USB cable to the display.

or

   ii. As su root or sudo, run `/sbin/udevadm trigger` to load the changes

```
sudo /sbin/udevadm trigger
```

On some systems this command may be used

```
sudo /sbin/udevtrigger trigger
```

Or

```
sudo udevadm control –reload-rules
```

4. Select the appropriate version “BUILD_A” or “BUILD_B” as detailed earlier in this document.
5. From a terminal widow, change to either the “BUILD_A” or “BUILD_B” directory where the application files are located.
6. Verify that the required system libraries exist for MultiProfiler by using the “ldd” command.
   a. Enter `ldd MultiProfiler` and look for any “not found” errors.
   b. Enter `ldd cmdlineddclite` and look for any “not found” errors.
   c. Download and install any missing system libraries.

4.2 Configure Communications

MultiProfiler can communicate with the display via either USB or DDC/CI. Using DDC/CI will require a compatible graphics adapter and video drivers. It is recommended to use USB since it is easier to configure.

A communications verification tool is included called cmdlineddclite, which can be used to confirm communications with the display via both USB and DDC/CI.

Follow these steps to use this tool and verify communications with the display:

1. Run `cmdlineddclite` from the terminal window using:

```
./cmdlineddclite
```

2. The application should detect the display and show the model name and serial number.

If the display is not detected:

- Verify that the model being used is supported by this version. See the list of supported models under “Supported NEC Display Models and Description”.
- As su root or sudo run `cmdlineddclite` again using:

```
sudo ./cmdlineddclite
```

- If it detects a display then the device access permissions are not set correctly. Verify the installation of the `55-NEC.rules` file in the previous steps.

If the display is still not detected:

- Verify that the USB upstream port from the display is connected to the PC.
- Disconnect and reconnect the USB upstream port on the display.
- Try connecting to the other USB upstream port on the display.

If a display is still not detected, try using DDC/CI instead of USB. Load the i2c module as su or sudo using:

```
sudo modprobe i2c-dev
```

If no displays are detected, then the video drivers being used may not support DDC/CI.

Note:

If using DDC/CI, `modprobe i2c-dev` should be added to the system's startup script so that it will be loaded automatically whenever the system is restarted. This could be done for example by entering `i2c-dev` into the `/etc/modules` file.

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5 Running MultiProfiler

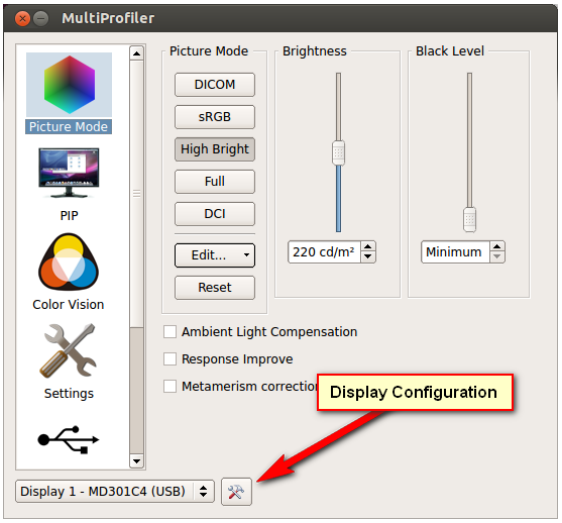
After communications with the display has been verified, and any necessary libraries have been installed, run the `MultiProfiler` application from the terminal window using:

```
./MultiProfiler
```

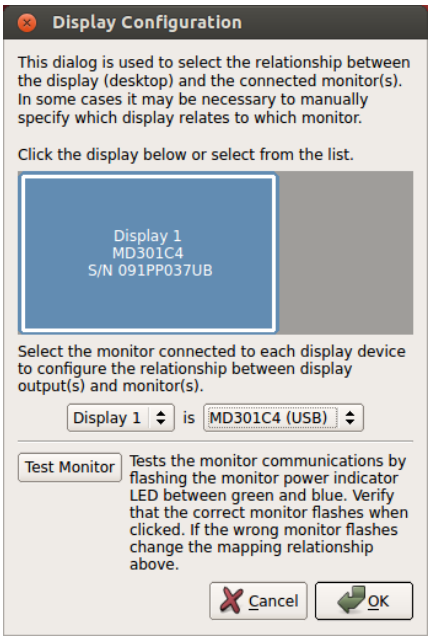
Do *not* run MultiProfiler as a “sudo” as it will create preference files with su only permissions.

The splash screen will show any detected displays.

Important: A message box may appear indicating no displays were detected, even though the splash screen showed that one was detected. In this case, the relationship between the desktop and the detected displays may need to be configured in MultiProfiler. Open the "Display Configuration" dialog by clicking the display configuration button to the right of the display list, located at the bottom of the main window.



Select the display from the list on the right for the selected display. Click "Test Monitor" to verify communications with the display. Both USB and DDC/CI connections may be listed. Choose the USB connection if available.



5.1 Using MultiProfiler

The functionality of MultiProfiler for Linux is identical to the Mac and Windows versions, except where noted earlier in this document. Please refer to the included MultiProfiler User's Guide PDF document.

Default UI theme

The MultiProfiler application uses the Qt "cleanlooks" UI style by default. This can be overridden by using the command line to either specify another supported Qt style using the "-style" switch, or adding any "default" to the command line will use the system default UI theme.

Examples:

`./MultiProfiler –style "plastique"`

`./MultiProfiler –style "motif"`

`./MultiProfiler default` (**Note**: This may cause a crash on some systems due to an issue with Qt and some desktop environments)

6 Revision History

V1.2.00: January 6 2014

- Initial public release of Linux version.

V1.3.00: October 24 2014

- Added support for the PA322UHD and X841UHD.
- Improved keyboard shortcut functions.
- Added the ability to import a custom gamma curve.

V1.3.40: November 13 2015

- Added support for the MultiSync X651UHD, X841UHD, X981UHD, P212, and PA322UHD-2.
- Improved keyboard shortcut functions.

V1.3.60: April 24, 2017

- Added support for the MultiSync X551UHD, X651UHD-2, X841UHD-2, and X981UHD-2.
- Added support for the MultiSync P404, P484, P554, V404, V404-T, V484, V484-T, V554, and V554-T.