

Version
1.2.00



NEC PD Comms Tool

User's Guide

Software Updates

Occasionally updates and enhancements to the *NEC PD Comms Tool* software will be made available. Use the *Check for updates* feature in the software to automatically see if a newer version is available.

Technical Support and Feedback

For technical support with the *NEC PD Comms Tool* product, please check for any Frequently Asked Questions that may help to solve the issue.

Trademarks and Copyright

Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Apple, Macintosh, Mac and the Mac logo are trademarks of Apple Computer, Inc., registered in the U.S. and other countries.

Copyright © 2010-12 NEC Display Solutions, Ltd.

The content of this manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by NEC Display Solutions. NEC Display Solutions assumes no responsibility or liability for any errors or inaccuracies that may appear in this manual.

All rights reserved. Your rights of ownership are subject to the limitations and restrictions imposed by the copyright laws as outlined below.

It is against the law to copy, reproduce or transmit, including without limitation electronic transmission over any network, any part of the manual except as permitted by the Copyright Act of the United States, Title 17, United States Code. Under the law, copying includes translation into another language or format.

The above is not an inclusive statement of the restrictions imposed on you under the Copyright Act.

For a complete statement of the restrictions imposed on you under the copyright laws of the United States of America, see Title 17, United States Code.

USA and Canada: www.necdisplay.com

Europe: www.nec-display-solutions.com

Revision 120328

Contents

	Precautions:	4
	Note:	4
	Supported Display Monitors	5
	System Requirements	6
1	Introduction	7
	Overview	7
	Main Features and Benefits	7
	Example Usage Scenarios	7
2	Controls and Functions	8
	Main NEC PD Comms Tool window	8
	Communications Interface	9
	Communications Send/Receive Log	10
	Controls tab	11
	Power tab	12
	Schedule tab	13
	Video tab	14
	Analog tab	15
	Status tab	16
	Tile Matrix tab	17
	Size/Position tab	18
	IR Remote tab	19
	Simple Commands tab	20
	Scripting tab	21
	IP Scan tab	23
3	Frequently Asked Questions	24
4	Troubleshooting	25
5	Scripting Language	26
	SETPORT command	26
	FOREACHPORT command	26
	SETMONITORID command	27
	SETPower command	27
	SETDATETIME command	27
	SETOPCODE command	28
	WAIT command	28
	SENDIR command	29
	SCHEDULE command	29
	Further Script Examples	31
6	Example Display Connections	32
	Daisy-chained RS232 with one COM port	33
	Daisy-chained RS232 with multiple COM ports	34
	Single IP LAN with daisy-chained RS232	35
	Multi IP LAN	36
	Wireless multi IP LAN with daisy-chained RS232	37
7	Assigning an IP address	38
8	Op Code Names and Values	40

Precautions:

- This software application allows many advanced features of the display to be adjusted. Care should be taken when making any adjustments to avoid misadjustment.

Note:

This document covers both the Mac OS and Windows versions of the *NEC PD Comms Tool* software. The features and functions of both versions are identical unless noted otherwise.

This document is intended to be used together with the display's User Manual and optionally the display's External Control specification document. It is not intended as a replacement for either.

Supported Display Monitors

NEC PD Comms Tool supports the following NEC display monitor models:

- **NEC P Series (P401, P461, P521 etc.)**
- **NEC X Series (X461UN, X461HB, X431BT etc.)**
- **NEC S Series (S401, S461, S521 etc.)**
- **NEC M Series (M401, M461 etc.)**
- **NEC Exx2 series (E322, E422, E462, E552 etc.)**
- **NEC Multeos M40 and M46 [RS232 connection only]**
- **NEC MultiSync LCD20 Series (LCD4020, LCD4620 etc.) [RS232 connection only]**
- **Newer models not listed may also be supported.**

System Requirements

NEC PD Comms Tool has the following system requirements:

	 Mac OS	 Microsoft Windows
Operating System	Apple Mac OS X v10.5 or higher.	Microsoft Windows XP, XP x64, Server 2003, Vista and Vista x64, Windows 7 and Windows 7 x64.
LAN (for supported display models)	Included on all Macs	Standard TCP/IP LAN interface (optional if using RS232 or Wireless LAN)
RS232	A USB to RS232 adapter can be used if connecting the Mac to displays via RS232 instead of via LAN. Null modem cables to connect devices.	One or more RS232 COM Ports (optional if using LAN). Null modem cables to connect devices. A USB to RS232 adapter can be used if necessary.

1 Introduction

Overview

NEC PD Comms Tool (NEC Public Display Communications Tool) is a software application that can be used to configure, control, and test supported NEC large screen LCD display models via either RS232 or LAN connections. It can also be used to assist with developing and debugging external control systems by showing the communications protocol for commands exchanged between the software and displays.

Main Features and Benefits

NEC PD Comms Tool provides a simple, intuitive interface to perform the following functions:

- Provides easy remote access to many common controls.
- Access to advanced controls.
- Assists with diagnosing connection and configuration related problems.
- Displays and logs all commands exchanged via RS232 or LAN.
- Shows a breakdown of how commands are constructed from the input parameters and monitor protocol.
- Powerful scripting command language allows complex control sequences to be performed on multiple displays.

Example Usage Scenarios

- Finding command codes for programming into an external controller.
- Configuring the settings on multiple displays to custom values with one click via a script. This would be useful when deploying many displays.
- Using a script to quickly switch the TileMatrix settings on a video wall between multiple layouts.
- Making adjustments to displays when it is not physically possible or convenient to use the IR Remote control.

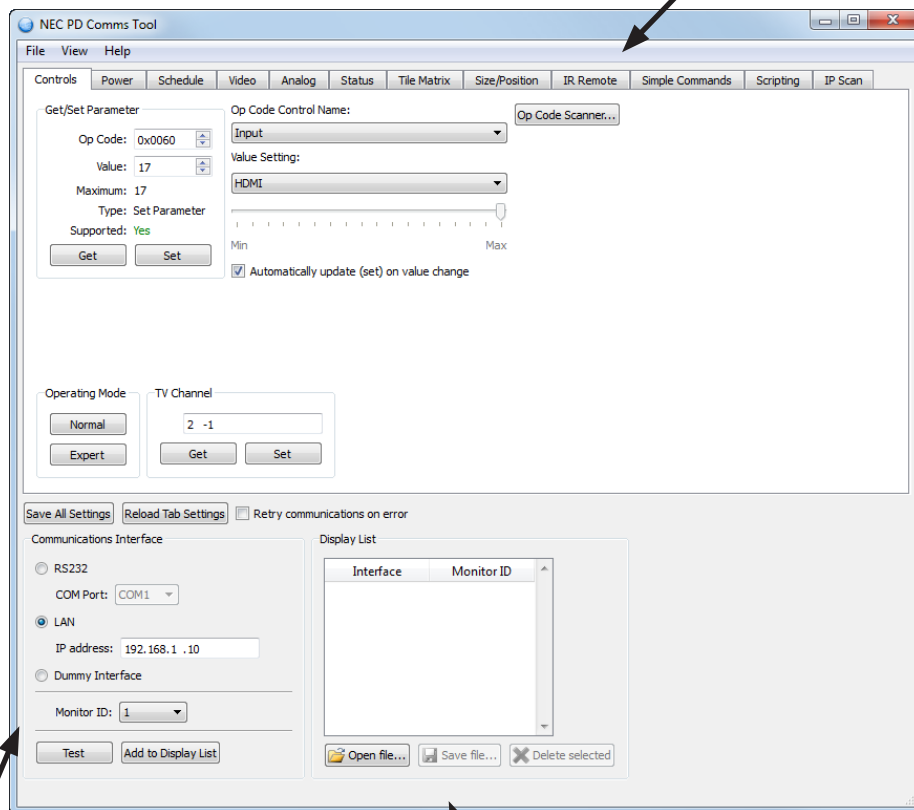
2 Controls and Functions

Main NEC PD Comms Tool window

The **NEC PD Comms Tool** window has multiple tabs at the top for the various monitor controls and functions. At the bottom of the window are the Communications Interface settings which specify how to connect to a display, such as via LAN or RS232.

Function tabs

Access the various monitor controls and functions



Communications Interface

Configures the connection to the display(s) and Monitor ID

Display List

Easy access to Communications Interface settings for multiple displays

Communications Interface

The Communications Interface section on the main window is used to specify the connection interface to a display. Displays can be connected either by RS232 or LAN (if supported).

When connecting to a display via LAN, select **LAN** and enter the IP address of the display.

When connecting via RS232, select **RS232** and select the COM port on the host PC.

When connecting to displays that are daisy chained via RS232, but the first display is connected via LAN, select **LAN** and enter the IP address of the first display.

See the example display connections section for examples of various configurations when multiple displays are used.

An additional option, **Dummy Interface**, is provided to allow some limited functionality of the application without the need to have a display connected. This can be useful for example to determine the data to send to perform a particular command, using the *View - Communications Log* feature, even when a display is not physically connected. Only the data to send to perform a command will be shown, and it does not mimic the expected reply from a display.

Select the **Monitor ID** of the display or group of displays to control.

Click the **Test** button to try communicating with the display. If this is successful, a message will be shown at the bottom of the window. An error message will be shown if an error occurred. See the troubleshooting guide for suggestions.

The **Retry communications on error** setting will force the application to re-send a command up to 3 times if it fails. This can be useful in some environments if the connection is unreliable due to noise etc.

The **Display List** allows Communications Interface settings for multiple displays to be stored for easy access by selecting from a list.

This is useful for example when there are multiple displays in use, as it allows the communications configuration for each to be stored, and accessed quickly by selecting from the list.

When selecting a display from the list, the Communications Interface settings will automatically change to the selected display's settings.

To add the current Communications Interface settings to the Display List, click the **Add to Display List** button.

To save the current Display List to a file for later use, click the **Save file...** button.

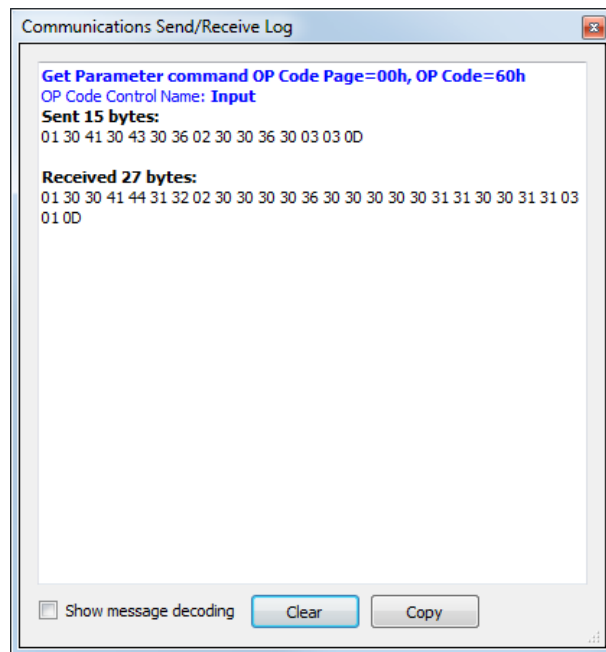
To load a previously saved Display List, click on the **Open file...** button.

To delete the currently selected item in the Display List, click the **Delete Selected** button.

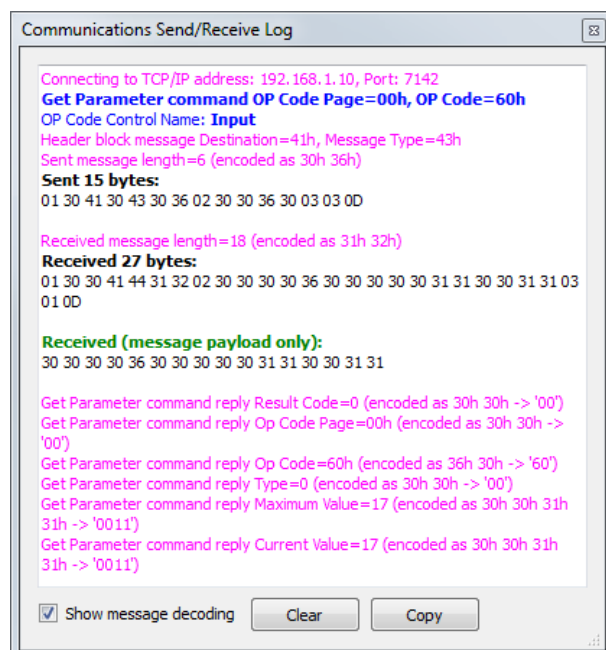
Communications Send/Receive Log

The *Communications Send/Receive Log* window is accessed from the **View** menu. When opened, the window shows the actual data that is transmitted to and received from a display for each command.

This feature is particularly useful to help understand the format of the command protocol when making custom applications. It can also be used to quickly determine the command sequence for a particular operation which can then be programmed into another control device – thus avoiding having to understand the details of the communications protocol. It is expected to be used in conjunction with the communications protocol specification document available for each model from NEC.



In addition to showing the actual data send and received, a breakdown of most commands can also be shown by selecting **Show message decoding**. This feature helps in understanding how each message is encoded from the input parameters by providing much more detail.



The log text in the window can be copied to the system clipboard by clicking **Copy**.

Clicking **Clear** will clear the log contents.

Controls tab

The **Controls** tab provides access for Get (reading) and Set (writing) control settings. Each control has an Op Code number assigned. See the protocol specification document for your model of display for a list of supported controls and Op Codes.

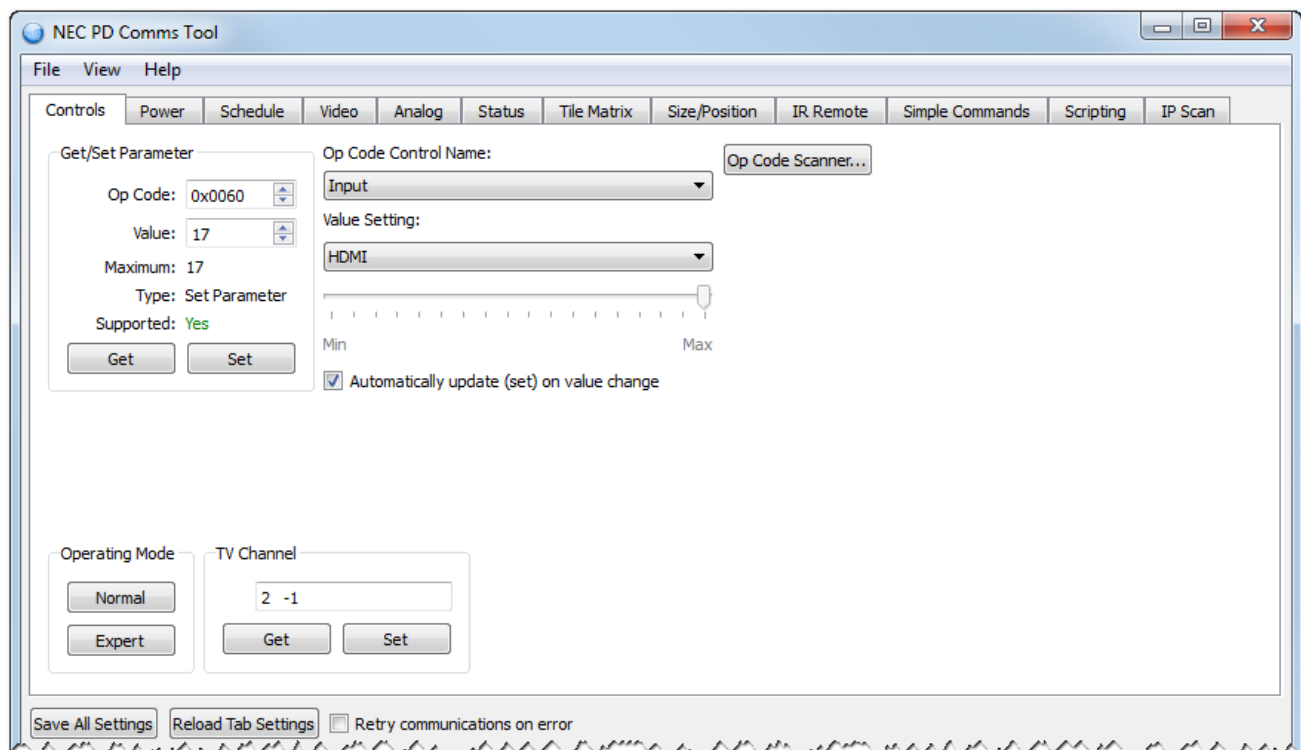
Controls can be accessed either by selecting the Op Code by name from the **Op Code Control Name** list, or by entering the Op Code value directly into the **Op Code** setting.

Clicking **Get** will attempt to read the current value of the selected **Op Code** control. The monitor will reply with the status of if the Op Code is supported, the current value, and the maximum possible value.

The value of the Op Code returned from the display will be shown. For some controls, such as *Input*, where each value has discrete setting, the value will be shown in the **Value Setting** list. For other controls such as *Brightness* which have a continuous range, the value will be shown on the **Value Setting** slider control.

The setting value for the Op Code control can be updated in the monitor by either:

- Editing the **Value** setting, and clicking **Set**.
- Selecting an item from the **Value Setting** list.
- Adjusting the **Value Setting** slider control.



Note: When completed making adjustments, it is good practice to click the **Save All Settings** button which will force the monitor to save the changes.

The **Operating Mode** controls can be used to change the current adjustment mode of the monitor's OSD (On Screen Display), and allow access to several advanced controls. Only use this control if instructed to do so by NEC personnel.

Power tab

The **Power** tab controls the power settings of the displays.

Clicking the **On** button will turn the display or displays on.

Clicking the **Off** button will turn the display or displays off.

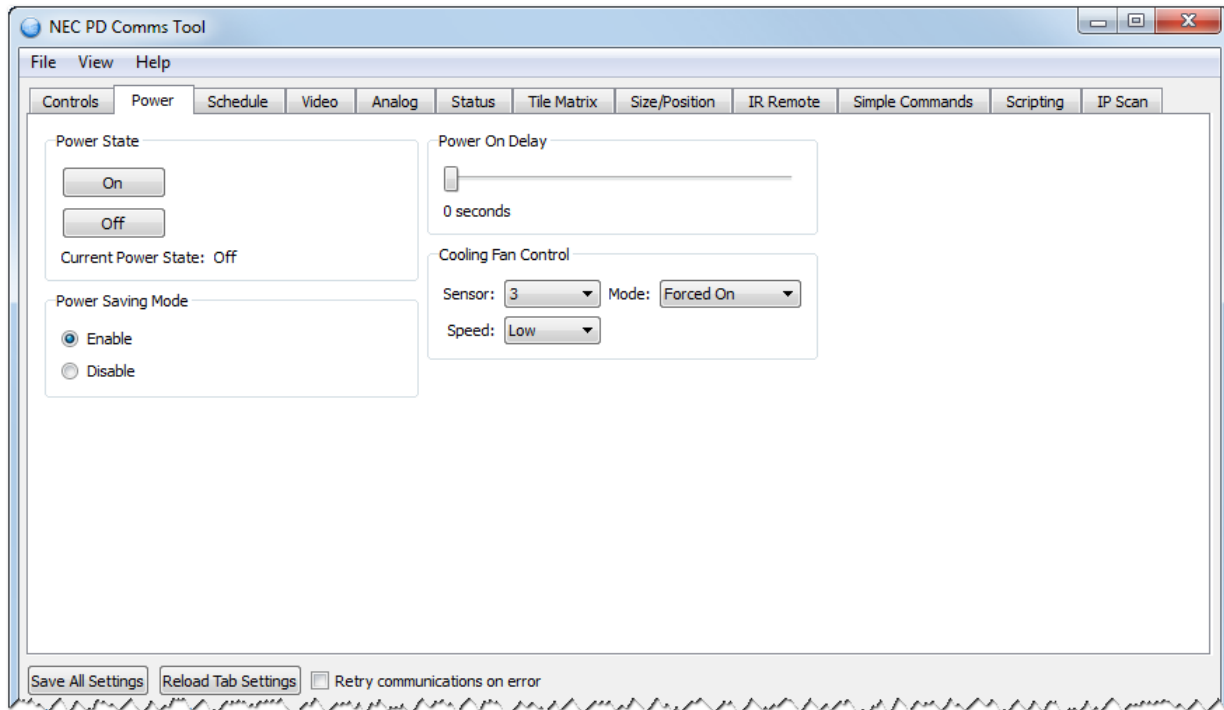
The **Current Power State** of the display is shown.

Power Saving Mode can be enabled and disabled for the currently selected video input using **Enable** and **Disable**.

The **Power On Delay** time control sets the time delay in seconds for the display to when the main display circuits are switched on after power on.

By staggering the delay time between displays, a sudden large power rush can be avoided when many displays are turned on.

Cooling Fan Control adjusts the cooling fan settings such as fan speed, temperature trigger point, and forced on or automatic operation.



Schedule tab

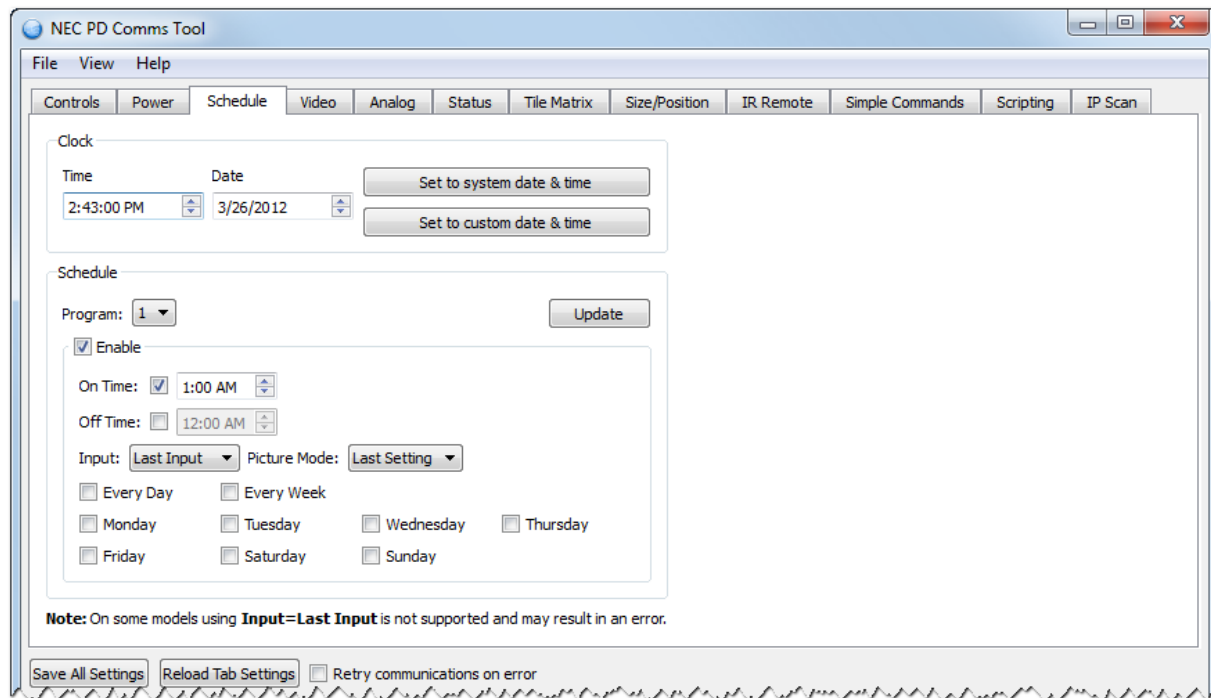
The **Schedule** tab is used to set the internal real time clock and schedule functions in the display. Various scheduled operations such as power on, power off, and changing inputs can be configured. Once a schedule has been created in a display, it will perform the operations on its own, and it is not necessary to keep this software running.

The internal clock can be set to the host PC's system date and time by clicking the **Set to system date & time** button.

A custom time and date can be set in the display by modifying the **Time** and **Date** fields and clicking the **Set to custom date & time** button.

The current time and date of the clock in the display is shown.

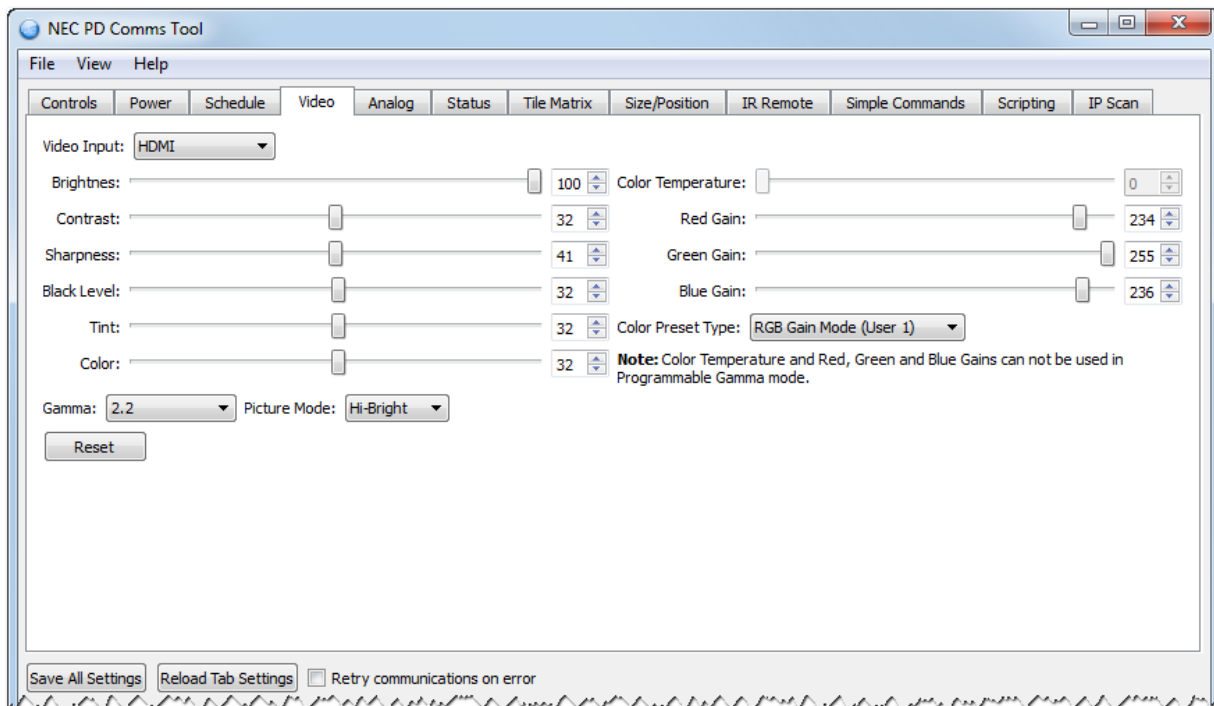
Different schedules are selected in the **Program** listbox. Each schedule can be enabled or disabled by selecting **Enable**. **On** and **Off** times can be specified and enabled or disabled, as well the video **Input** and **Picture Mode** (if supported by the display). Settings are updated in the display by clicking the **Update** button.



Video tab

The **Video** tab is used to perform video signal and color adjustments.

The **Brightness**, **Contrast**, **Sharpness**, **Black Level**, **Tint**, **Color**, **Gamma**, **Picture Mode** and **Red Green and Blue Gains** controls adjust the settings for the respective video controls in the display.



Analog tab

The **Analog** tab is used to make advanced adjustments to the internal analog-to-digital converters of the display.

These controls are only available when analog video inputs such as VGA, RGB/HV, and Option-Analog.

Analog Auto-Setup will measure the incoming analog video signal and automatically set the video level controls in the display as well as the size and position of the video.

This operation should only be necessary whenever a new analog video signal is connected, when a major change is made to the video wiring to the display, or when a video amplifier or splitter is added to the video link.

Note: It is essential that when this operation is performed a video signal that contains both pure black and pure white is being input. White video should extend to each edge of the active video area, otherwise the controls may not be adjusted correctly by the display. A sample test pattern is installed with the software and should be displayed full-screen on the video source input.

Analog Auto Bias/Gain Setup will measure the incoming analog video signal and automatically set the video level bias and gain controls in the display.

This operation should be performed if there is a color tint on black video.

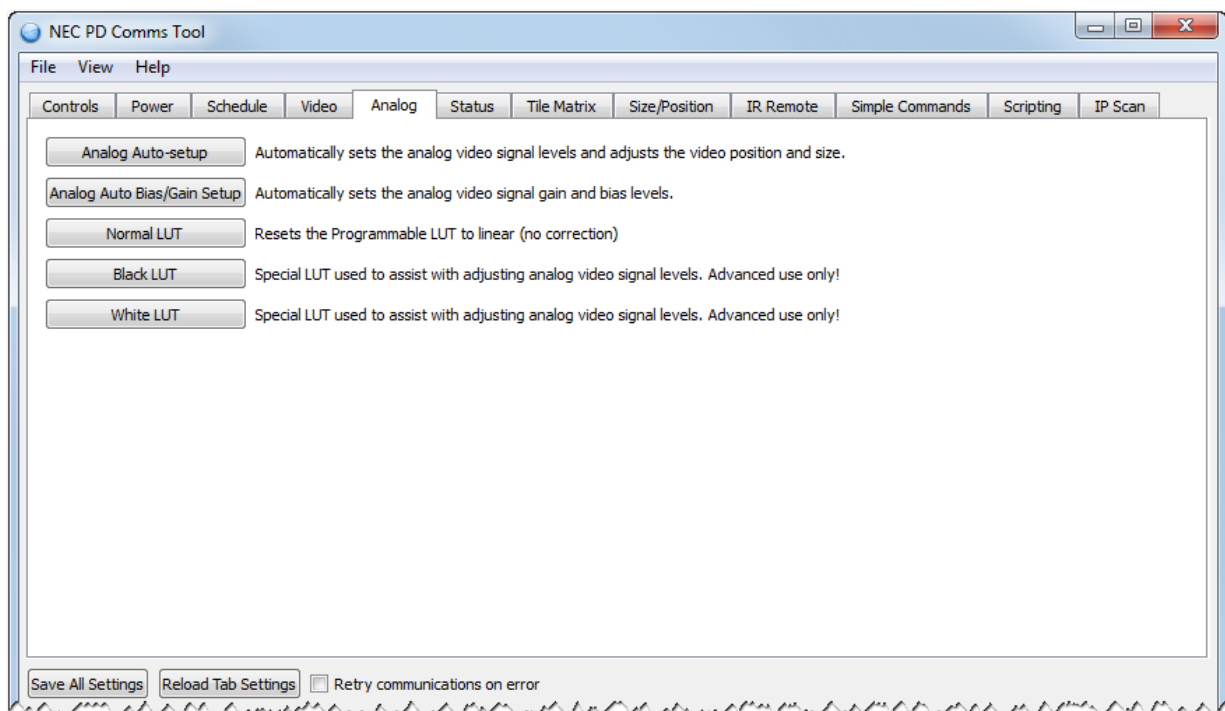
Note: It is essential that when this operation is performed a color bar test pattern video signal is input, otherwise the controls may not be adjusted correctly by the display. A sample test pattern is installed with the software and should be displayed full-screen on the video source input.

The following functions are considered advanced and should only be used if instructed by NEC personnel.

Normal LUT - Resets the Programmable LUT (if supported) to linear.

Black LUT - Creates a special LUT used to assist with adjusting analog bias.

White LUT - Creates a special LUT used to assist with adjusting analog gain.



Status tab

The **Status** tab reports various aspects about the display.

Model Name - Shows the model name read from the display.

Serial Number - Shows the serial number read from the display.

Operating Hours On - Shows the number of hours that the display has been power on (LCD panel active).

Total Operating Hours - Shows the total number of hours that the display has had AC power applied.

Firmware version - Shows the version number of the firmware in the display.

Fan 1, 2, and 3 - Shows the current operating status of the internal cooling fans of the display. On, Off and Error conditions are reported. The fan settings can be adjusted on the **Power** tab.

Temperature Sensor 1, 2, and 3 - Shows the current internal temperature sensor readings of the display.

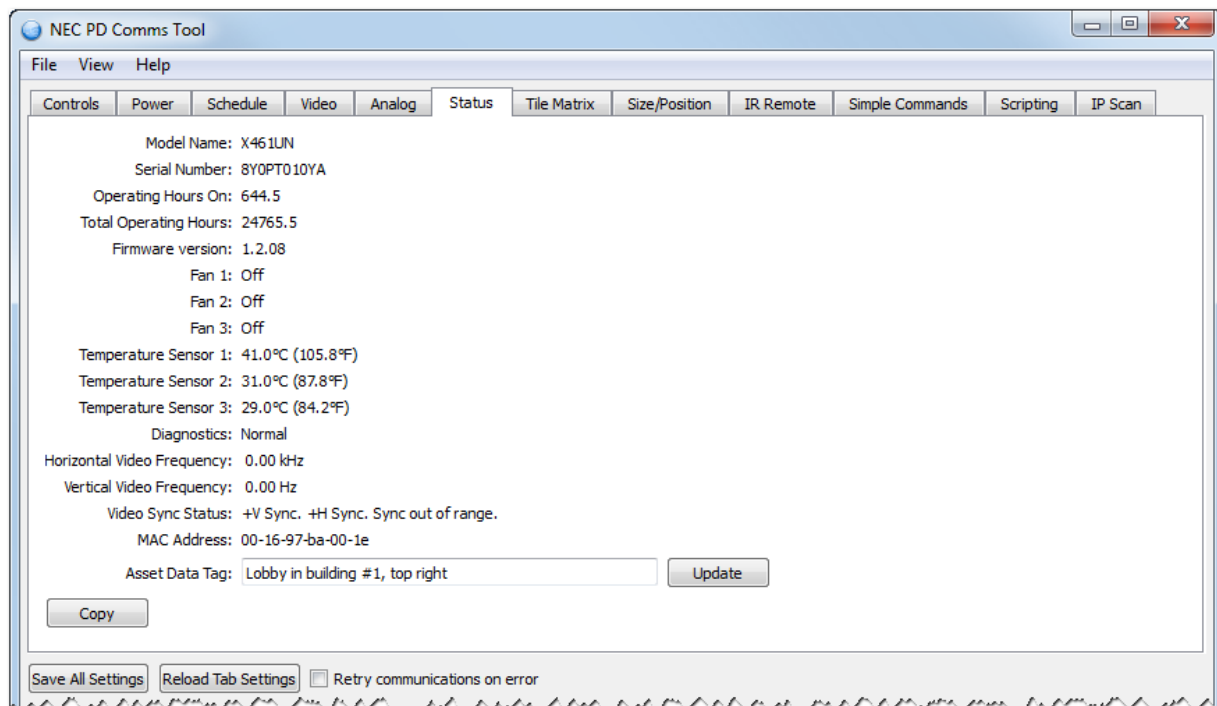
Diagnostics - Shows the diagnostic condition reported by the display, as well as various failure conditions such as power supply, fan, and temperature abnormalities.

Horizontal, Vertical Video Frequency, Video Sync - Shows the video frequency and sync polarity of the current video input signal.

MAC Address - Shows the LAN IP address if available (Note: Not available on Mac OS version).

Asset Data Tag - Shows the customizable text that can be stored in the display for asset tracking purposes (up to 64 characters). Click **Update** to store text in the display.

Clicking the **Copy** button will copy the current information to the system clipboard.



Tile Matrix tab

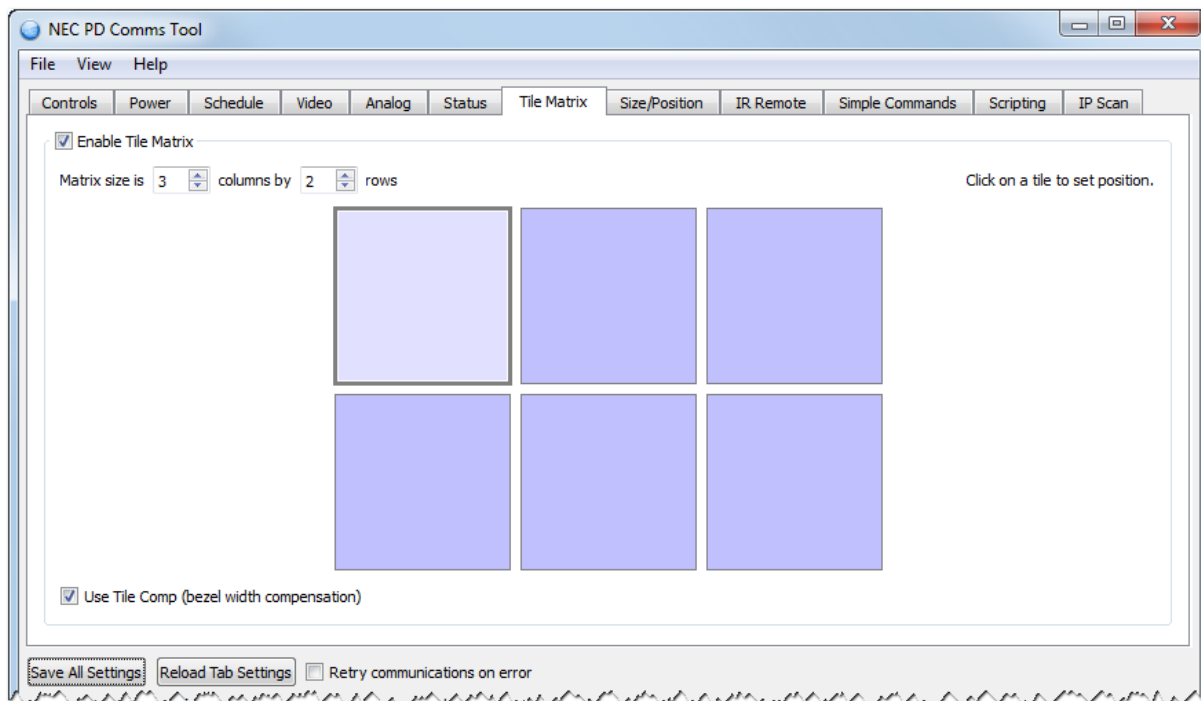
The **Tile Matrix** tab can be used to configure the Tile Matrix settings for dividing and expanding a video source over multiple displays.

Enable Tile Matrix - Is used to enable the Tile Matrix feature in the display.

Matrix size - Is used to set the matrix size in rows and columns.

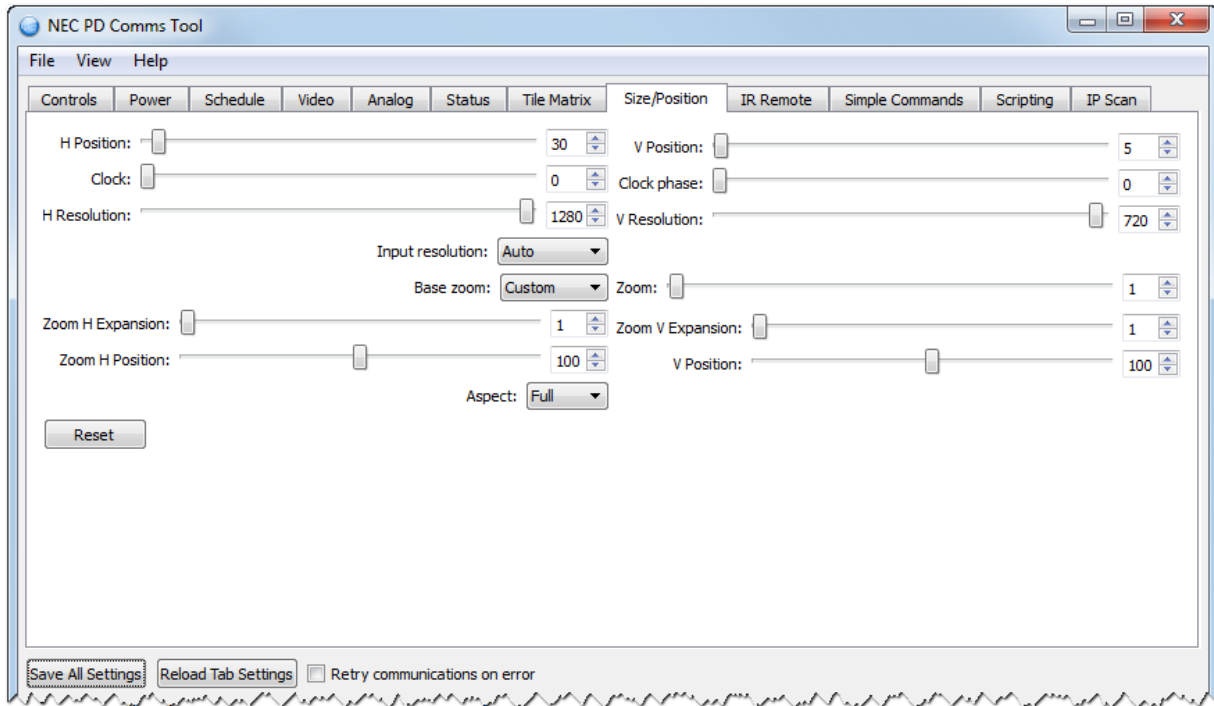
Use Tile Comp - Enables the Tile Comp feature to compensate for the display bezel width when the video is divided.

The position in the TileMatrix can be selected by clicking the relevant display on the matrix diagram.



Size/Position tab

The **Size/Position** tab can be used to configure the various video size and position settings in the display.



IR Remote tab

The **IR Remote** tab can be used to perform the equivalent operations as the physical IR Remote control using the software and communicating using the LAN or RS232 connection to the display.

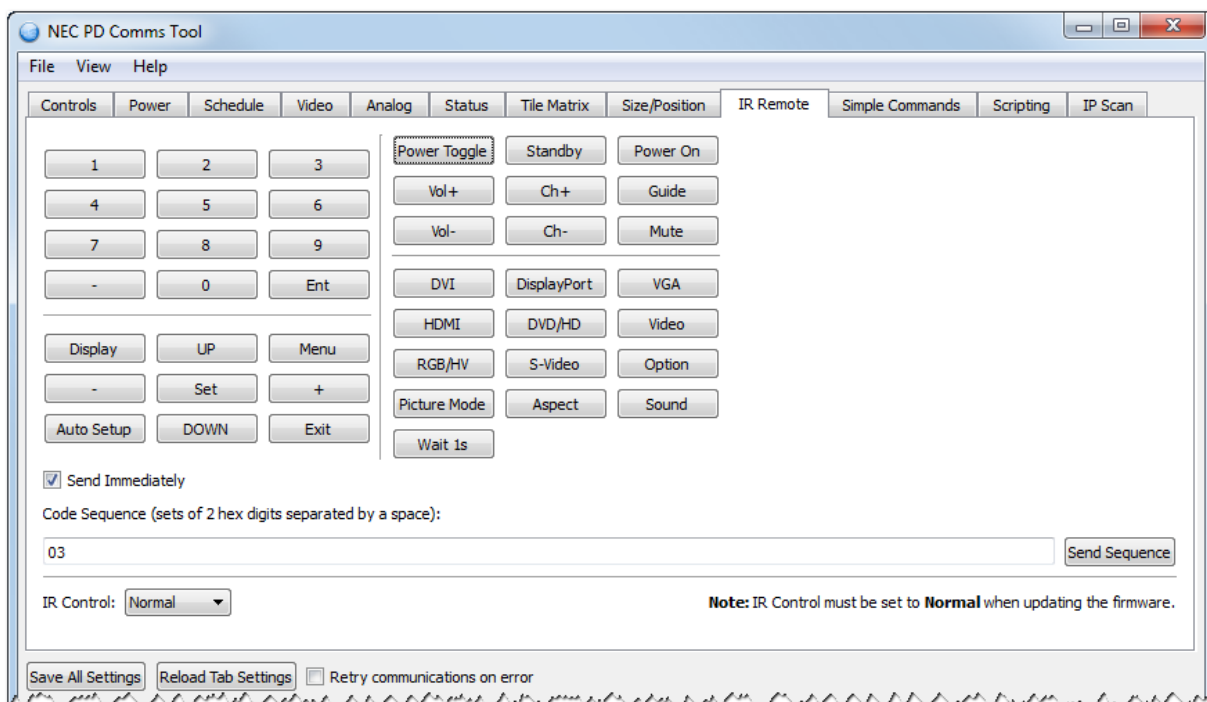
This is useful when it is not practical to use the actual IR Remote control with the display, or when it is necessary to access controls by remote that are not available from within the software.

Click the buttons to send the IR Remote command to the display. The display will respond as if it received a signal from the IR Remote control.

Sequences of commands can be created and sent to the display at once by clicking the **Send Sequence** button.

The IR Remote command code will appear in the Code Sequence list and can be manually edited. Each IR Remote button is a single 2 hex digit code.

To prevent each IR Remote command codes from being sent to the display as each button is pressed, deselect the **Send Immediately** checkbox.



Simple Commands tab

The **Simple Commands** tab can be used to send simplified commands to the display. These commands (if supported by the display) can be used to control the power state, video input and picture mode. They are intended as a simple alternative to the more complex commands used elsewhere which require calculating a checksum etc.

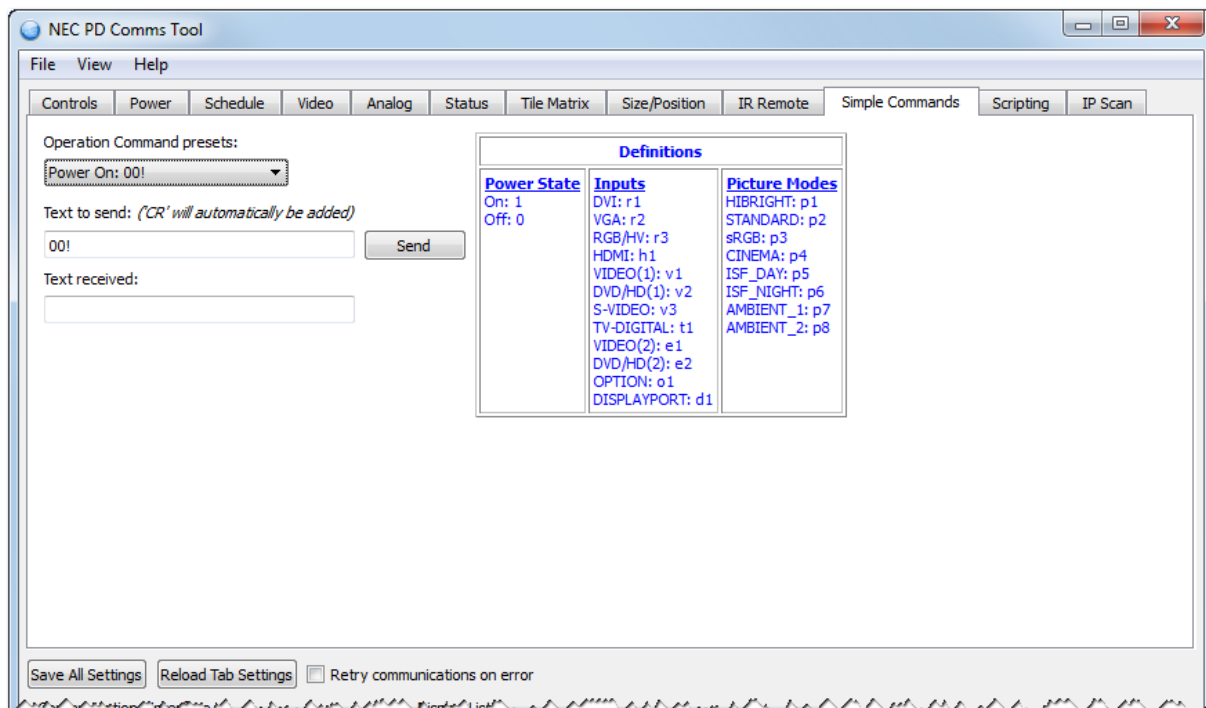
These simple commands do not support the concept of a Monitor ID.

Select a command from the **Operation Command presets** list.

The text that will be sent to the display is shown in the **Text to send** area.

Click **Send** to send the command.

The reply from the display will be shown in the **Text received** area.



Scripting tab

The **Scripting** tab is used to load, select and run script files.

The scripting function allows complex command sequences to be performed on multiple displays via a powerful but simple scripting language. Script files are simple text files that can be edited with any text editing application.

A script file contains a list of commands to perform, as well as optional Communications Interface settings. If a Communications Interface setting is not specified, the commands in the script file will be performed using the current Communications Interface settings.

One or more scripts can be loaded in the application by clicking the **Open script...** button.

When a script is loaded, it is expanded into individual commands which are shown in the "Selected script commands" list.

A script can be run either by double clicking the script in the list, or selecting the script and clicking the **Run selected script** button.

As the script runs, each command will be shown in either green or red, indicating the success or failure of the command operation.

The following scripting commands are supported:

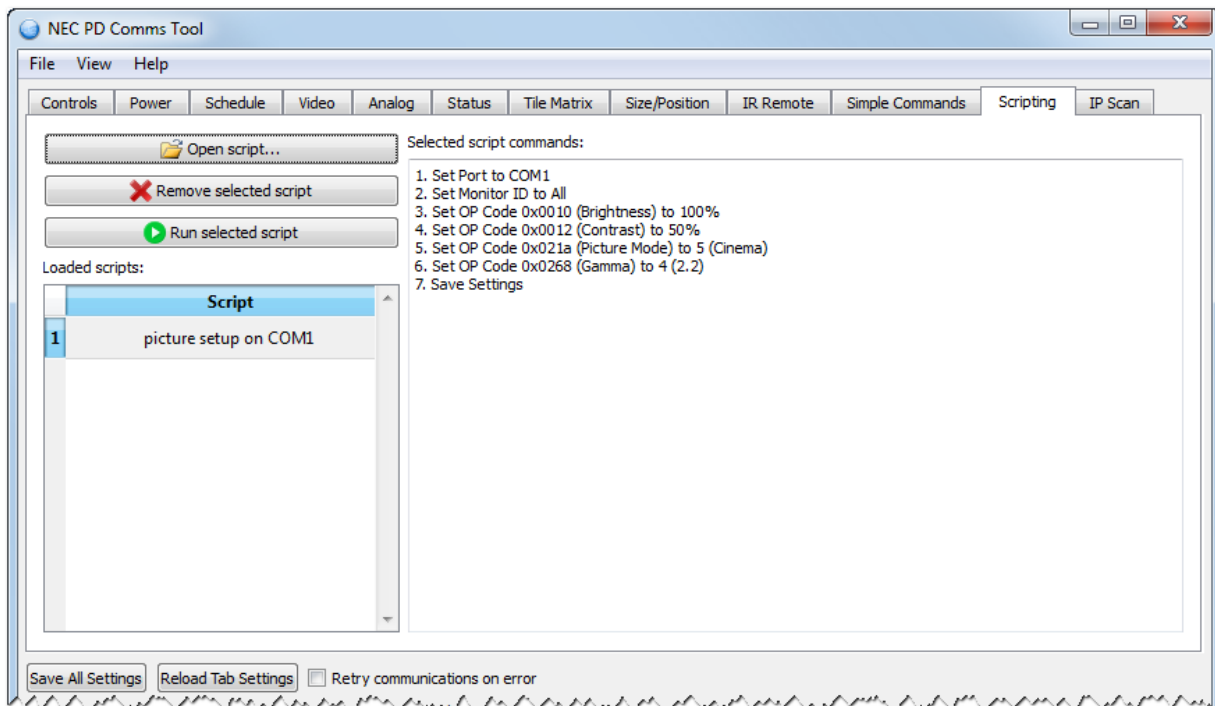
- **SETPORT** - Sets the Communications Interface settings. Either LAN or RS232 can be used. All subsequent operations will be performed using these settings.
- **FOREACHPORT** - Allows operations to be performed on multiple IP addresses
- **SETMONITORID** - Sets the Monitor ID of the display(s) to perform commands on.
- **SETPOWER** - Sets the power status of the display(s).
- **SETDATETIME** - Sets the internal clock on the display(s) to the current system date and time.
- **SETOPCODE** - Sets the value of an Op Code control.
- **WAIT** - Pauses between commands.
- **SENDIR** - Sends a sequence of IR Remote commands equivalent to pressing the buttons on the IR Remote.
- **SCHEDULE** - Sets the various settings for each of the schedules in the display(s).

Note: A single script can also be automatically run by specifying the script file name as a parameter on the command line used to launch the application. Once the script has completed, the application will automatically close.

For example from a command line:

```
NECPDCommsTool.exe "c:\my scripts\script 1.txt"
```

See the scripting language section for a detailed explanation of the script file syntax and examples.



IP Scan tab

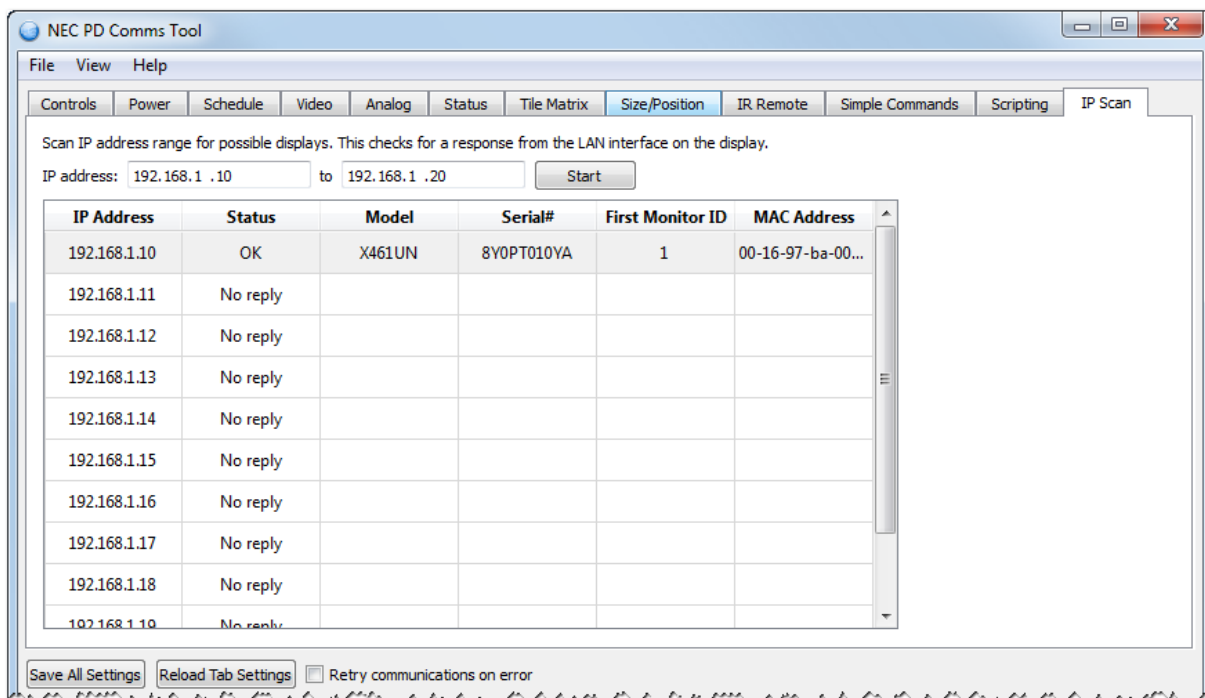
The **IP Scan** tab is used to scan a range of IP addresses and check to see if there is a display with a LAN interface on each IP address, and if it is responding correctly. This is similar to a “ping” function.

If a display LAN interface is detected, it will attempt to query the first display for a model name, serial number and Monitor ID. The the display is being used on an RS232 daisy chain, the **First Monitor ID** will show the Monitor ID of the first display on the daisy chain.

Enter the starting and ending IP addresses to sequentially scan and click the **Start** button to begin the scan. The results of each IP scanned will be shown on the list.

See the troubleshooting section if communications with the display is unable to be established.

The **MAC Address** shows the Ethernet LAN MAC address of the device at each IP address (Note: Not available on Mac OS version).



3 Frequently Asked Questions

This page intentionally left blank.

4 Troubleshooting

Problem: *Test Communications Interface* operation fails.

Solution: Check that:

- Each display is correctly configured to use either then LAN or RS232 interface by confirming the EXTERNAL CONTROL setting on the OSD menu.
- The MONITOR ID is set correctly on the OSD and matches the value assigned in the software.

If using RS232:

- If using daisy-chaining, confirm that no other displays on the same chain have the same MONITOR ID.
- Make sure that each display is connected via a NULL modem cable and that the correct IN our OUT socket on the display is used.
- Make sure that no other application or process is using the specified COM port.

If using LAN:

- Make sure that the IP address of each display is set correctly and that each display has a unique IP address.
- Make sure that the IP address assigned to each display matches those assigned in the software.
- Make sure that no other device on the LAN is assigned the same IP address.
- The IP address of each display must be configured using a web browser. The default IP address is 192.168.0.10.
- Make sure that the displays are on the same subnet as the host PC being used.
- Make sure that there are no firewall settings or antivirus applications that may be preventing the application from accessing the LAN.
- Try resetting the LAN settings from the OSD.
- Try resetting the monitor power.

5 Scripting Language

This chapter describes the format and syntax of the scripting language.

A script file is a simple text file that can be created and edited with any text editing application. Save the file with a .txt extension. When a script file is loaded into the application, it will be parsed and any errors in the script will be reported.

Within the script file:

- Each command in the script must appear on a new line.
- Blank lines are allowed.
- Comment lines can be used by adding *#* as the first character on each line.
- Multiple displays and operations can be specified in a script file.

Various commands are supported as follows:

SETPORT command

This command sets the RS232 COM port, or IP address of the display to communicate with.

Note: *If no port or IP address is specified, then the port currently selected in Communications Interface will be used.*

To specify an RS232 COM port use the following syntax where xx is the COM port number (e.g. COM1)

```
SETPORT COMxx
```

To use a TCP/IP address use the following syntax, where xxx.xxx.xxx.xxx is a numerical IP address in decimal format:

```
SETPORT xxx.xxx.xxx.xxx
```

Examples:

```
SETPORT 192.168.0.10
```

```
SETPORT COM3
```

FOREACHPORT command

This command allows operations to be performed on a range of IP addresses. If multiple displays are used, and they have sequential IP addresses assigned, this command can be used to perform operations on each, rather than specifying each IP address individually using the SETPORT command.

This command consists of a FOREACHPORT, and a matching ENDFOREACHPORT command. Any commands specified between these lines will be performed on each of the IP addresses in the specified range.

Use the following syntax to specify an IP address range where xxx.xxx.xxx.xxx and yyy.yyy.yyy.yyy are numerical IP addresses in decimal format:

```
FOREACHPORT xxx.xxx.xxx.xxx TO yyy.yyy.yyy.yyy
```

commands to perform on each IP address.

```
ENDFOREACHPORT
```

Example:

```
FOREACHPORT 192.168.0.10 TO 192.168.0.20
```

```
SETMONITORID "All"
```

```
SETPOWER ON
```

```
ENDFOREACHPORT
```

Sets the Power to On for all displays between the specified IP addresses.

SETMONITORID command

This command sets the Monitor ID of the display(s) to perform commands on. Use the following syntax to specify the Monitor ID where xx is a specific ID number, or "All", or groups such as "Group A".

```
SETMONITORID xx
```

When using "All" or "Group x", the text must be enclosed by ". For example: SETMONITORID "All"

Examples:

```
SETMONITORID 1
```

```
SETMONITORID "All"
```

```
SETMONITORID "Group A"
```

SETPOWER command

This command sets the power status of the display(s). Use the following syntax where xx is either ON, OFF, or STANDBY.

```
SETPOWER xx
```

Examples:

```
SETPOWER ON
```

```
SETPOWER OFF
```

```
SETPOWER STANDBY
```

SETDATETIME command

This command sets the internal clock on the display(s) to the current system date and time. The syntax is as follows:

```
SETDATETIME
```

SETOPCODE command

This command sets the value of an Op Code control. Use this to change a control setting in the display. Most controls are accessed using this command. Several different syntax formats are available for convenience and readability. The syntax of the command is:

`SETOPCODE opcode TO value`

`opcode` is the Op Code control to be changed, and can be specified either as:

- A 4 digit HEX value either in the format "0xZZZZ" or "ZZZZ" (where ZZZZ is the 4 digit HEX Op Code)
- A control name enclosed by "" (for example "Brightness")

Hint: The names of each Op Code can be found in the **Op Code Control Name** list on the **Controls** tab.

`value` is the value to set the Op Code to, can be specified either as:

- An absolute value such as 50.
- A percentage value by adding "%" after the value (for example: 100%)
- A named value for certain discrete controls. For example "On" and "Off". The named value must be enclosed by "".

The named values for an Op Code control can be found in the **Value Setting** list when the desired Op Code control is selected on the **Controls** tab. Also see the Op Code Names and Values chapter for a list of supported code names.

Examples:

`SETOPCODE 0x0012 to 0`

Sets the Contrast (Op Code 0x0012) to absolute value 0.

`SETOPCODE "Contrast" to 100%`

Sets the Contrast to 100%.

`SETOPCODE "Contrast" to 10`

Sets the Contrast to absolute value 10.

`SETOPCODE "Input" to "HDMI"`

Sets the video input to HDMI.

WAIT command

This command pauses between commands, and is used when it is necessary to allow the display time to perform some action before proceeding with the next command. Use the following syntax to specify the wait time where xx is a delay time specified in milliseconds.

`WAIT xx`

Examples of when it is usually necessary to have a pause are:

- When turning the display on or off
- When changing video inputs
- When performing a setting reset

The length of time to wait will vary by model, but typically powering on or off the display can take up to 10 seconds. Changing inputs can take 5 seconds, and performing a reset can take 3 seconds.

If a command in the script fails it may be because the monitor is still processing the previous command. In this case try adding a WAIT delay before the failing command.

Example:

```
WAIT 1000
```

Waits for 1s (1000 ms)

SENDIR command

This command sends a sequence of IR Remote commands equivalent to pressing the buttons on the IR Remote. Each button press is encoded as a 2 digit HEX value. Multiple IR Remote commands can be sent by adding a space between each HEX value.

Use the following syntax to specify the IR command(s) to send, where xx is one or more hex codes separated by spaces:

```
SENDIR xx yy
```

Hint: Use the *IR Remote* tab to find out the HEX codes for each IR Remote button.

Example:

```
SENDIR 08 0A 44 08 45
```

Sends the IR Remote commands corresponding to the buttons “1”, “3”, “-”, “1” and “Ent”.

SCHEDULE command

This command sets the various settings for each of the schedules in the display(s). Display models that support the Schedule function have an internal clock and timer which can be used to perform certain operations on specific days and times, such as changing inputs, or powering on or off.

This command will modify the existing settings in the specified schedule and only the specified settings will be changed.

For example if you only want to modify the power ON time, it is only necessary to specify this, and not all of the other settings.

Existing settings can be “cleared” or “set” if necessary.

The first parameter is the schedule number. This is a number in the range 1-7 and corresponds to the schedule on the display to modify.

The parameters following this allow the Power On Time (“ONTIME”), Power Off Time (“OFFTIME”), Video Input (“INPUT”) and Picture Mode (“PICTUREMODE”) to be specified, as well as Enabling (“ENABLE”) or Disabling (“DISABLE”) the entire schedule. Also the Every Day (“EVERYDAY”), Every Week (“EVERYWEEK”), and days of the week (e.g. “MONDAY”, “TUESDAY” etc.) can be SET or CLEARED.

IMPORTANT NOTE: This command only modifies the specified settings, and keeps other existing schedule settings. So for example if the “Monday” setting was already set in the display, and the “Tuesday” setting was set in the script, then both Monday and Tuesday would be set after running the script. Use the CLEAR parameter to unset other settings if necessary.

Use the following syntax to specify the schedule parameters, where x is the schedule number to set, and pppp is a list of the parameters to change.

```
SCHEDULE x pppp
```

All of the parameters for a particular schedule number are entered on a single line, with settings separated by a space.

Valid parameters are as follows and can be combined together on one line:

ENABLE - enables the specified schedule

DISABLE - disables the specified schedule

EVERYDAY SET - sets the Every Day setting for the schedule

EVERYDAY CLEAR - clears (unsets) the Every Day setting for the schedule

EVERYWEEK SET - sets the Every Week setting for the schedule

EVERYWEEK CLEAR - clears (unsets) the Every Week setting for the schedule

MONDAY SET - sets the Monday setting for the schedule

MONDAY CLEAR - clears (unsets) the Monday setting for the schedule

TUESDAY SET - sets the Tuesday setting for the schedule

TUESDAY CLEAR - clears (unsets) the Tuesday setting for the schedule

WEDNESDAY SET - sets the Wednesday setting for the schedule

WEDNESDAY CLEAR - clears (unsets) the Wednesday setting for the schedule

THURSDAY SET - sets the Thursday setting for the schedule

THURSDAY CLEAR - clears (unsets) the Thursday setting for the schedule

FRIDAY SET - sets the Friday setting for the schedule

FRIDAY CLEAR - clears (unsets) the Friday setting for the schedule

SATURDAY SET - sets the Saturday setting for the schedule

SATURDAY CLEAR - clears (unsets) the Saturday setting for the schedule

SUNDAY SET - sets the Sunday setting for the schedule

SUNDAY CLEAR - clears (unsets) the Sunday setting for the schedule

INPUT xxxxx - sets the Video Input to xxxx. Either a numerical value or a name can be specified.

Valid Input names are as follows:

VGA

RGB/HV

DVI

VIDEO1

VIDEO2

S-VIDEO

TV

DVD/HD1

OPTION

DVD/HD2

DISPLAYPORT

HDMI

PICTUREMODE xxx - sets the Picture Mode to xxxx. Either a numerical value or a name can be specified.

Valid Picture Mode names are as follows:

LASTSETTING
SRGB
HIBRIGHT
STANDARD
CINEMA
ISF-DAY
ISF-NIGHT
AMBIENT-1
AMBIENT-2

ONTIME CLEAR - clears (unsets) the Power On Time for the schedule

ONTIME hh:mm - sets the Power On Time to hh hours and mm minutes. Hours should be specified in 24 hour format.

OFFTIME CLEAR - clears (unsets) the Power Off Time for the schedule

OFFTIME hh:mm - sets the Power Off Time to hh hours and mm minutes. Hours should be specified in 24 hour format.

Example 1

SCHEDULE 1 DISABLE

This disables the schedule #1

Example 2

SCHEDULE 2 ENABLE EVERYDAY SET INPUT HDMI ONTIME 8:30 OFFTIME 17:00

This enables the schedule #2, sets the Every Day setting, Selects the HDMI input, sets the Power On Time to 8:30AM, and sets the Power Off Time to 5:00PM.

Example 3

SCHEDULE 3 ENABLE EVERYDAY CLEAR EVERYWEEK SET MONDAY CLEAR TUESDAY CLEAR WEDNESDAY CLEAR THURSDAY CLEAR FRIDAY CLEAR SATURDAY SET SUNDAY SET

This enables the schedule #3, clears the Every Day setting, as well as Monday-Friday, but sets Saturday and Sunday, as well as Every Week.

Note: To reset all schedules, the "Menu Tree Reset" OPCODE with the value "Reset Schedule" can be used, followed by a delay to allow the display time to process the reset command. e.g. add the following lines to the script:

SETOPCODE "Menu Tree Reset" TO "Reset Schedule"

WAIT 3000

Further Script Examples

Further examples of various scripts are installed with the application. See the **SampleScripts** sub-folder in the **NEC PD Comms Tool** folder on the Windows start menu.

6

Example Display Connections

Displays can be connected to the host PC via either RS232 or LAN (if supported by the display model), in several different configurations. A wireless LAN connection can also be used from the host PC if using a wireless access point or router.

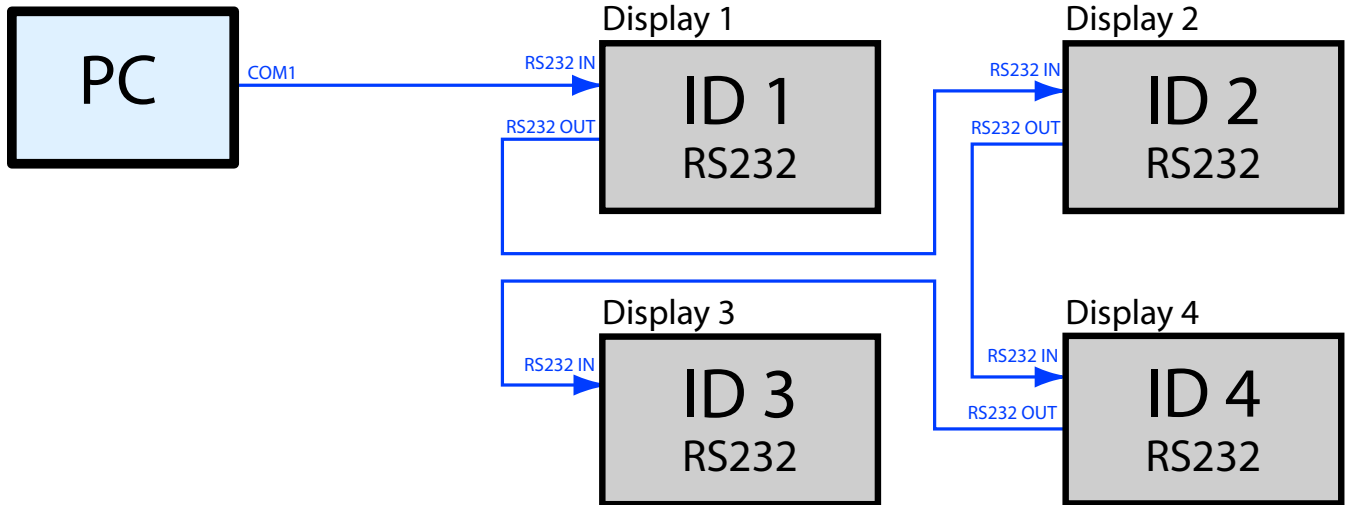
Keep in mind the following points when configuring and connecting displays:

- If using RS232 to connect displays using a daisy-chain, each display on the chain must have a unique Monitor ID (set on the display's OSD).
- If using RS232, displays should be connected using an RS232 serial NULL modem cable.
- The RS232 connection from the host PC should connect to the RS232 IN on the first display.
- The RS232 OUT of a display should connect to the RS232 IN on the next display in the daisy-chain.
- If using LAN to connect to one or more displays, make sure that the IP address of each display is set correctly and that each display has a unique IP address (set using a web browser). Also make sure that the displays are on the same subnet as the host PC being used.

Examples of various connection configurations are shown on the following pages.

Daisy-chained RS232 with one COM port

In this example, the host PC has one RS232 COM port, and all displays are daisy-chained together. Each display must have a unique MONITOR ID since they are all on the same daisy-chain. The RS232 OUT on the first display is connected to the RS232 IN on the next, etc.

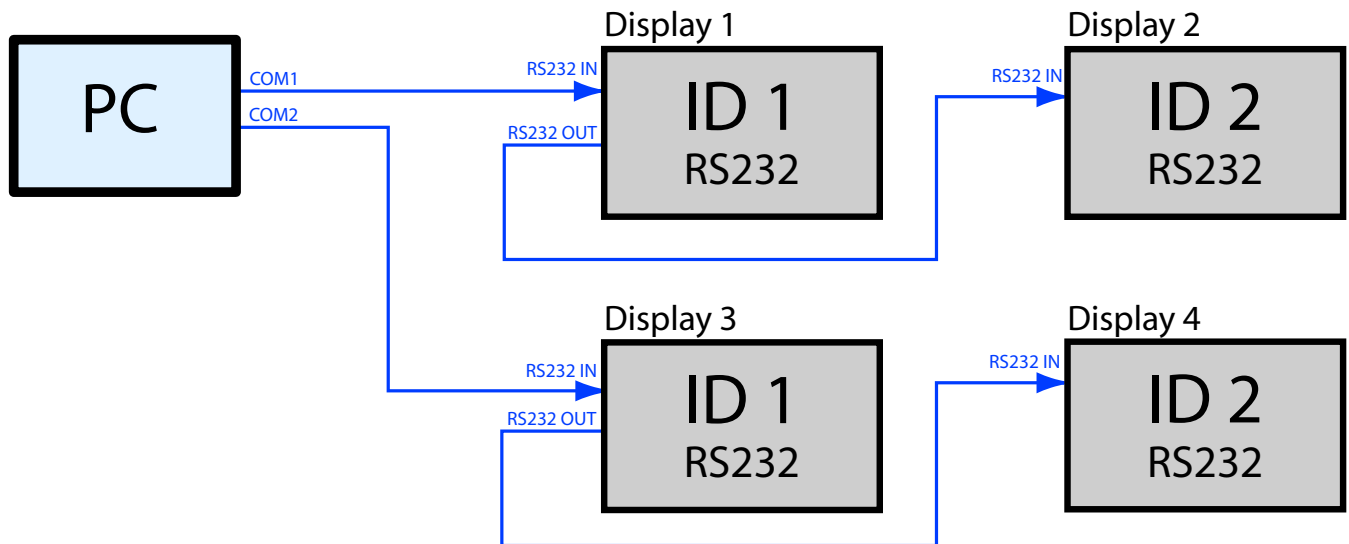


Note: The cable connections between displays does not need to follow the same ordering as the ID assignments. In this example the daisy-chain is connected in order 1 - 2 - 4 - 3.

Notice that all displays will use the same COM port, even though only the first display is actually connected to the host PC.

Daisy-chained RS232 with multiple COM ports

In this example, the host PC has two RS232 COM ports, and there are two separate daisy-chains. Each display on a daisy-chain must have a unique MONITOR ID.



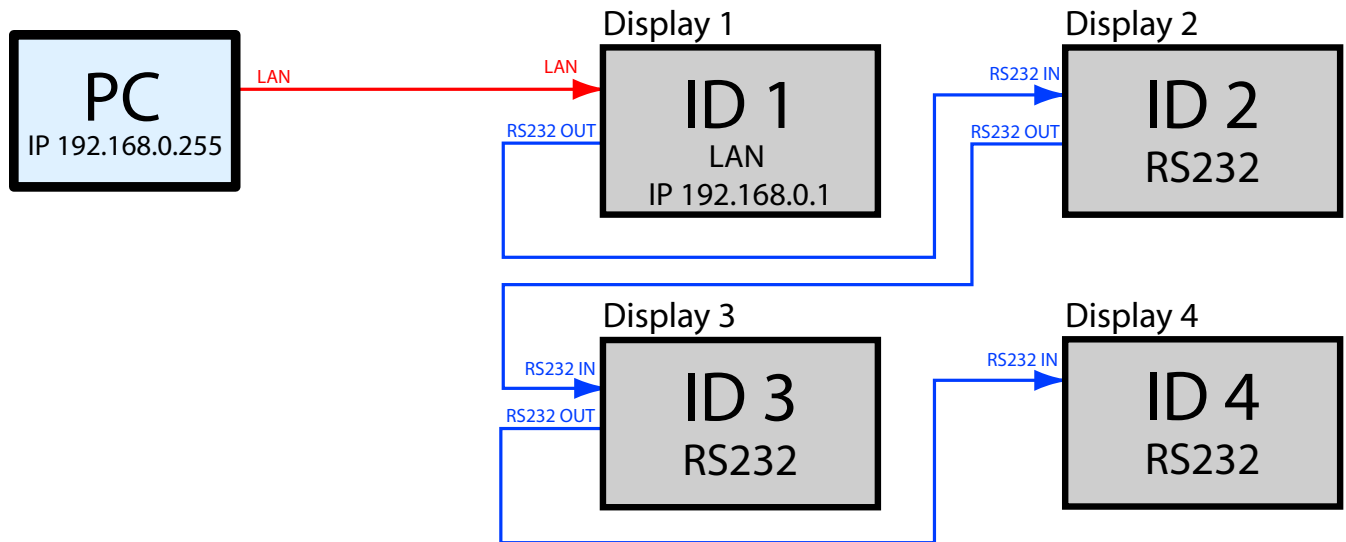
Notice that displays connected on COM1 can have the same IDs as those on COM2 because they are on separate daisy-chains.

Single IP LAN with daisy-chained RS232

In this example, the host PC is connected to the first display via LAN. Subsequent displays are connected together using RS232 daisy-chaining. Each display on a daisy-chain must have a unique MONITOR ID.

The first display is configured to use LAN as the EXTERNAL CONTROL on the OSD. The other displays are configured to use RS232 as the EXTERNAL CONTROL on the OSD. The RS232 OUT on the first display is connected to the RS232 IN on the next display.

Since communications to all of the displays is routed through the first display, the software should be configured to use the IP address of the first display. The first display will translate commands via LAN to the RS232 OUT to be received by the other displays.



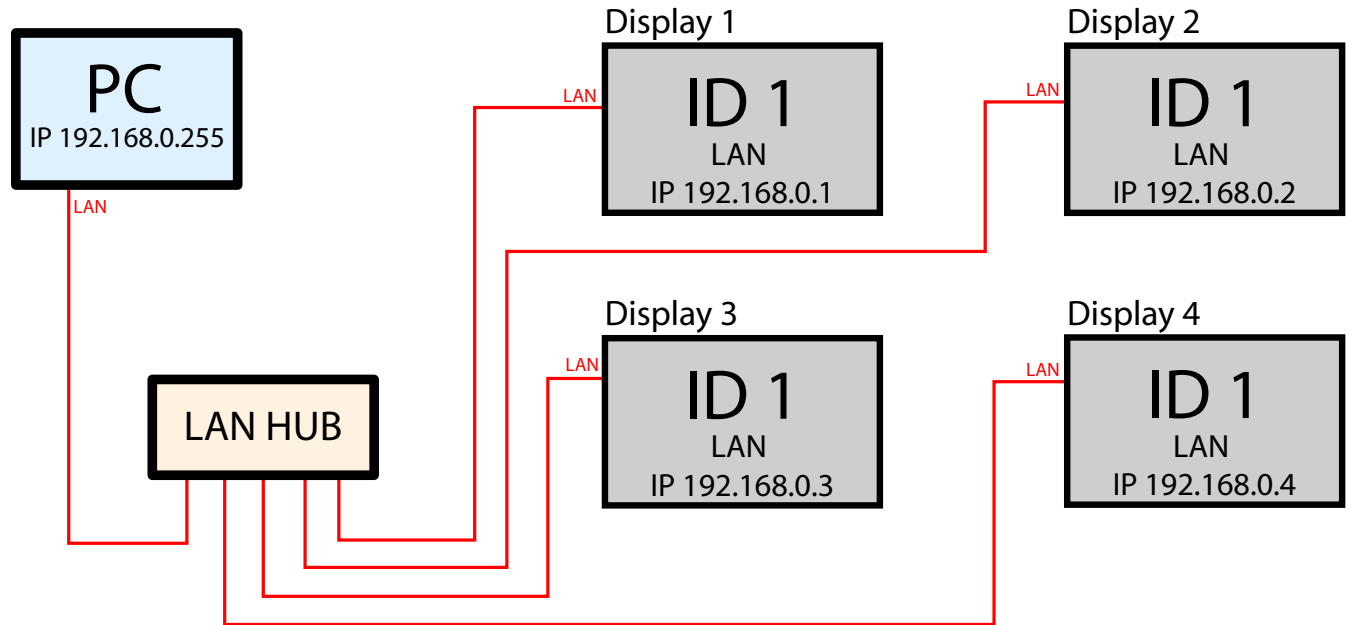
Note: The first display must be a model that has a LAN interface. Display models that do not have a LAN interface can only be used when connected to the first display by RS232.

Multi IP LAN

In this example, the host PC and each display is connected via a LAN HUB. Each display has a unique IP address and is configured to use LAN as the EXTERNAL CONTROL on the OSD.

The software is configured with the IP address and MONITOR ID of each display.

The ID of each display does not need to be unique since the displays are not daisy-chained, however the ID set on the OSD must match that set in the software.



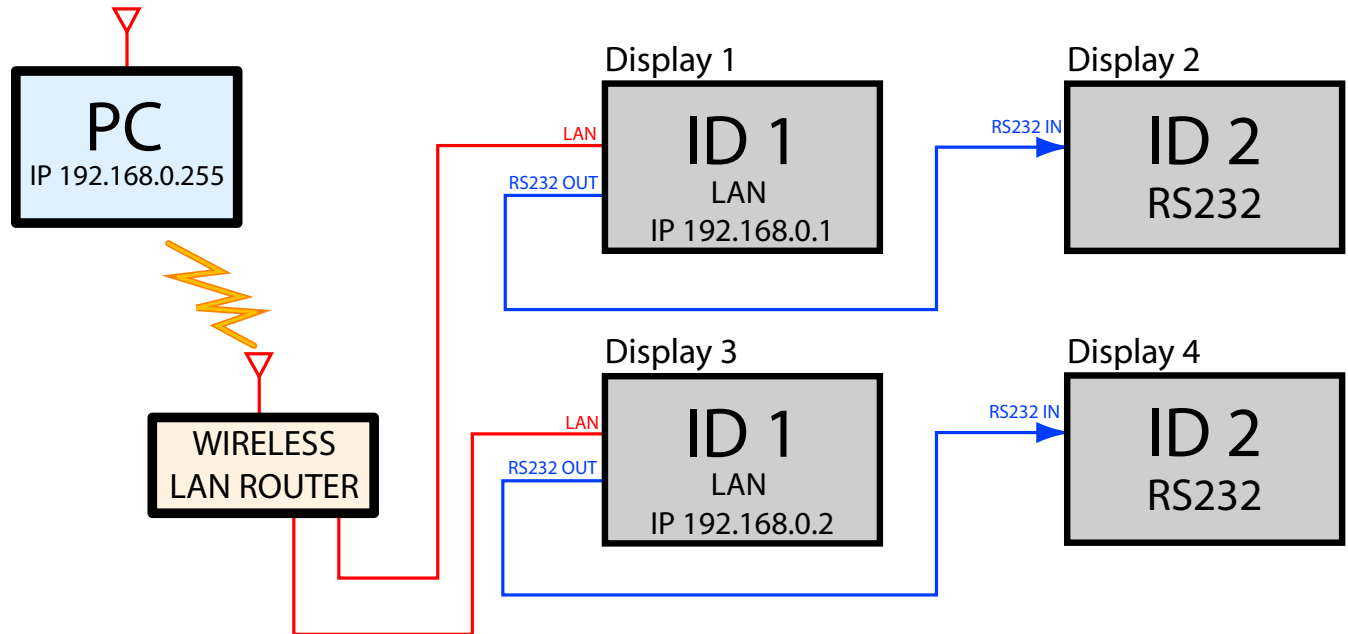
Note: This configuration is not available with display models that do not have a LAN interface.

Wireless multi IP LAN with daisy-chained RS232

In this example, the host PC is connected to a LAN via a wireless connection. Display 1 and Display 3 are connected to the LAN, have unique IP addresses, and are configured to use the LAN on the EXTERNAL CONTROL setting on the OSD.

Other displays are daisy-chained from the two displays connected to the LAN. Each display on a daisy-chain has a unique ID assigned, and is configured to use RS232 on the EXTERNAL CONTROL setting on the OSD.

Since communications to Display 2 is routed through Display 1, the software is configured to so that Display 2 uses the IP address of Display 1, even though Display 2 is configured to use RS232 on the OSD. Likewise the software is configured so that Display 4 uses the IP address of Display 3.



Note: Display models that do not have a LAN interface can only be used in this configuration if connected to the first displays by RS232 (displays with ID2 in the example above). The first displays must be models that have LAN interfaces.

Notice that Display 2 is configured in the software to use the LAN IP address 192.168.0.1 of Display 1, even though it is connected to Display 1 via RS232. Likewise Display 4 is configured in the software to use the LAN IP address 192.168.0.2 of Display 3, even though it is connected to Display 3 via RS232.

7 Assigning an IP address

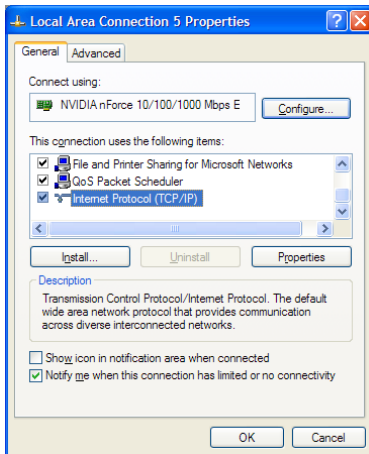
Displays connected via LAN need to be assigned an IP address so that they can be remotely accessed. Each display with a LAN interface has a default IP address of 192.168.0.10. This address must be changed in order to avoid conflicts when other displays are connected to the LAN.

When the LAN RESET operation is performed on a display's OSD, the IP address will be reset to the default value.

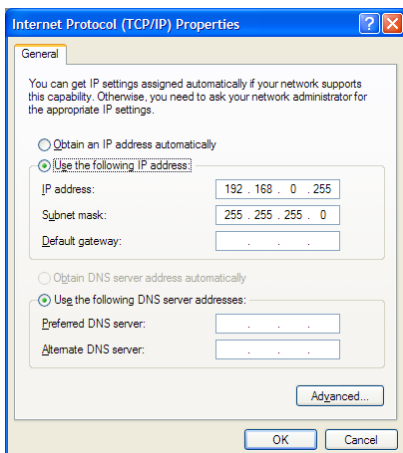
For display models that do not support setting the IP address via the OSD, the following procedure should be used:

It is recommended to assign the IP address of a display by connecting a PC directly to the LAN port on the display, or via a LAN HUB while no other devices are connected.

If the PC being used to set the IP address of the display is not currently set to access the subnet that includes the display's default IP address, it will be necessary to temporarily modify the network settings in order to assign the PC a temporary IP address and subnet so that the display can be accessed. Once the display has been configured the PC network settings should be restored.



Open the *Network Settings properties* of the PC, and select *Internet Protocol TCP/IP* in the list, then click the *Properties* button.



Next enter a temporary IP address for the PC, such as 192.168.0.255, and a subnet mask of 255.255.255.0. Click *OK* and close the Network Settings.

Next open a web browser and go to the URL of the display's web server by entering:

`http://192.168.0.10`

This should display the display's MONITOR NETWORK SETTINGS page.

If this page can not be reached, :

- Confirm that the display is powered on and connected to the PC either directly or via a HUB.
- Confirm that the IP address assigned to the display is at the default value, by performing a LAN RESET from the OSD on the display.
- Confirm that the EXTERNAL CONTROL setting on the OSD is set to LAN.
- Try refreshing the web page in the browser. It may take several refreshes before the display can be found.
- Check if any firewall software or settings on the PC could be preventing access to the display's IP address.

Once the web page has appeared, the display's IP address and subnet mask can be entered and updated in the display. It is highly recommended to assign each display a static IP address so that the IP address will not be reassigned to another device if the network is reset.

Note: *Once the IP address is updated, the display will no longer be accessible from the current IP address.*

Next restore the original network settings on the PC.

8

Op Code Names and Values

The following table shows the names of the Op Codes that the software understands and that can be used in scripting.

Important note:

- Not all display models support all Op Codes.
- Some Op Codes are only supported in certain operating modes.
- Displays may support additional Op Code names not listed in this table. In this case use the Op Code HEX value.
- For controls that have discrete values such as “on” and “off”, the supported names are listed. These names can be used in scripts to set the value of an Op Code control instead of using a numerical value.
- For other types of controls that don’t have discrete values, such as Brightness, either a value or percentage can be used.
- This list is not intended to be used as a replacement for the codes listed in a display’s External Control specification document.

As an example, to set the Picture Mode to sRGB, first look for the Op Code name. Next look along that row for the supported discrete value names. Then use them in the script as follows:

SETOPCODE “Input” to “HDMI”

Be sure to include the quotation marks around both the Op Code Name and Discrete Value Name.

Op Code name	Op Code HEX value	Discrete Value Names
Brightness	0010	
Contrast	0012	
Sharpness	008c	
Black Level	0092	
Tint	0090	
Color	021f	
Color Temp	0054	
6 Axis Color Red	009b	
6 Axis Color Yellow	009c	
6 Axis Color Green	009d	
6 Axis Color Cyan	009e	
6 Axis Color Blue	009f	
6 Axis Color Magenta	00a0	
Saturation	008a	
Select Color Preset	0014	“10000K”, “User 1”
Red Gain	0016	
Green Gain	0018	
Blue Gain	001A	
Auto Setup	001E	“Execute”

Op Code name	Op Code HEX value	Discrete Value Names
Sound Reset	0231	"Execute"
Gamma	0268	"Native", "2.2", "2.4", "S Curve", "DICOM Sim", "Programmable"
Adaptive Contrast	028d	"Off", "Low", "Middle", "High"
Noise Reduction	0220	
Film Mode	0223	"Off", "Auto"
Picture Mode	021A	"sRGB", "Hi-Bright", "Standard", "Cinema", "ISF-Day", "ISF-Night", "Ambient-1", "Ambient-2"
Ambient Brightness Low	1033	
Ambient Brightness High	1034	
Current Luminance (Read Only)	02B4	
Bright Sensor Read (Read Only)	02B5	
Menu Tree Reset	02CB	"Factory Reset WARNING!!!", "Reset Picture", "Reset Adjust", "Reset Audio", "Reset Schedule", "Reset PIP", "Reset OSD", "Reset Multi Display", "Reset Display Protection", "Reset Advanced Option"
H Position	0020	
V Position	0030	
Clock	000E	
Clock Phase	003E	
H Resolution	0250	
V Resolution	0251	
Input Resolution	02DA	"Auto", "1024x768", "1280x768", "1360x768", "1366x768", "1400x1050", "1680x1050"
Base Zoom	02CE	"Off", "Custom", "16:9-Zoom", "14:9-Zoom", "Dynamic"
Zoom	026F	
Zoom H Expansion	026C	
Zoom V Expansion	026D	
Zoom H Position	02CC	
Zoom V Position	02CC	
Aspect	0270	"Normal", "Full", "Wide", "Zoom", "Trim"
Audio Volume	0062	
Audio Balance	0093	
Audio Treble	008F	
Audio Bass	0091	
Surround Sound	0234	"Off", "Low", "High"
Audio Input	022E	"Audio 1", "Audio 2", "Audio 3", "HDMI", "TV/Option", "DisplayPort"
PIP Audio	1080	"Main", "Sub"
Audio Line Out	1081	"Fixed", "Variable"
Mute	008D	"Mute", "Unmute"
MTS Audio	022C	"Main", "Sub", "Main + Sub"
Off Timer	02BH	

Op Code name	Op Code HEX value	Discrete Value Names
Enable Schedule	02E5	"Schedule #1", "Schedule #2", "Schedule #3", "Schedule #4", "Schedule #5", "Schedule #6", "Schedule #7"
Disable Schedule	02E6	"Schedule #1", "Schedule #2", "Schedule #3", "Schedule #4", "Schedule #5", "Schedule #6", "Schedule #7"
PIP Mode	0272	"Off", "PIP", "POP", "Still", "Side by Side (Aspect)", "Side by Side (Full)"
PIP Size	0271	"Small", "Middle", "Large"
PIP H Position	0274	
PIP V Position	0275	
Keep PIP Mode	1082	"Off", "On"
PIP Aspect	1083	"Normal", "Full", "Wide", "Zoom", "Trim"
Closed Caption	1084	"Off", "CC1", "CC2", "CC3", "CC4", "TT1", "TT2", "TT3", "TT4"
Text Ticker Mode	1008	"Off", "Horizontal", "Vertical"
Text Ticker Position	1009	
Text Ticker Size	100A	
Text Ticker Blend	100B	
Text Ticker Detect	100C	"Auto", "Off"
Text Ticker Fade In	100D	"Off", "On"
PIP Input (Sub Input)	0273	"VGA", "RGB/HV", "DVI", "HDMI (Set only)", "Video1", "Video2", "S-Video", "TV", "DVD/HD1", "Option", "DVD/HD2", "Display Port", "HDMI"
Still Capture	0276	"Off", "Capture"
OSD Language	0068	"English", "German", "French", "Spanish", "Japanese", "Italian", "Swedish", "Russian"
OSD Turn Off Delay	00FC	
OSD H Position	0238	
OSD V Position	0239	
OSD Rotation	0241	
Information OSD	023D	
Signal Information	02EA	"Off", "On"
OSD Transparency	02B8	"Off (Opaque)", "Type 1", "Type 2"
Monitor ID	023E	
ID All Reply	1085	"Off", "On"
IR Control	023F	"Normal", "Primary", "Secondary", "Lock"
Tile Matrix # H Monitors	02D0	
Tile Matrix # V Monitors	02D1	
Tile Matrix Position	02D2	
Tile Matrix Tile Comp	02D5	"Disable (Off)", "Enable (On)"
Tile Matrix Mode	02D3	"Disable (Off) and display frame", "Enable (On)", "Disable (Off) and hide frame"
Power On Delay	02D8	
Power LED Indicator	02BE	
External Control	103E	"RS232C", "LAN"

Op Code name	Op Code HEX value	Discrete Value Names
Power Save	00E1	"Off", "On"
Standby Mode	029A	"Standby", "ECO Standby"
Fan Select	027A	
Fan Status	027B	
Fan Control	027D	"Auto (No offset)", "Forced On", "Auto (offset -2)", "Auto (offset -4)", "Auto (offset -6)", "Auto (offset -8)", "Auto (offset -10)"
Screen Saver Gamma	02DB	"Normal", "On"
Screen Saver Brightness	02DC	"Normal", "Decrease Brightness"
Screen Saver Motion	02DD	
Screen Saver Zoom	1035	
Side Border Color	02DF	
Operating Time On (30 min)	00FF	
Total Operating Time (30 min)	00FA	
Auto Brightness	022D	"Off", "On"
Input Detect	0240	"First Detect", "Last Detect", "None", "Video Detect", "Custom Detect"
Custom Detect Priority 1	102E	"VGA", "RGB/HV", "DVI", "HDMI (Set only)", "Video1", "Video2", "S-Video", "TV", "DVD/HD1", "Option", "DVD/HD2", "Display Port", "HDMI"
Custom Detect Priority 2	102F	"VGA", "RGB/HV", "DVI", "HDMI (Set only)", "Video1", "Video2", "S-Video", "TV", "DVD/HD1", "Option", "DVD/HD2", "Display Port", "HDMI"
Custom Detect Priority 3	1030	"VGA", "RGB/HV", "DVI", "HDMI (Set only)", "Video1", "Video2", "S-Video", "TV", "DVD/HD1", "Option", "DVD/HD2", "Display Port", "HDMI"
Custom Detect Priority 4	1031	"VGA", "RGB/HV", "DVI", "HDMI (Set only)", "Video1", "Video2", "S-Video", "TV", "DVD/HD1", "Option", "DVD/HD2", "Display Port", "HDMI"
Custom Detect Priority 5	1032	"VGA", "RGB/HV", "DVI", "HDMI (Set only)", "Video1", "Video2", "S-Video", "TV", "DVD/HD1", "Option", "DVD/HD2", "Display Port", "HDMI"
Long Cable Manual Equalize	103D	"Off", "On"
Long Cable Manual Pole	1036	
Long Cable Manual Peak	1037	
Long Cable Manual Gain	1038	
Long Cable Manual Offset	1039	
Long Cable Manual Sync Terminate	02E1	"Hi (2.2 kOhm)", "Lo (75 Ohm)"
DVI Mode	02CF	"DVI-PC", "DVI-HD"
Scan Conversion	0225	"Off (Interlace)", "Enable (IP On/Progressive)"
Noise Reduction	0226	
SCART Mode	029E	"Off", "On"
HDMI Signal	1040	"Expand", "Raw"
Color System	0221	"NTSC", "PAL", "SECAM", "Auto", "4.43NTSC", "PAL-60"
Scan Mode	02E3	"Under-scan", "Over-scan"

Op Code name	Op Code HEX value	Discrete Value Names
Input	0060	"VGA", "RGB/HV", "DVI", "HDMI (Set only)", "Video1", "Video2", "S-Video", "TV", "DVD/HD1", "Option", "DVD/HD2", "Display Port", "HDMI", "HDMI2", "HDMI3", "USB"
TV Channel	008B	"Up", "Down"
Select Temperature Sensor	0278	"Sensor #1", "Sensor #2", "Sensor #3"
Read Temperature Sensor (Read Only)	0279	
Carbon Footprint (g) (Read only)	1010	
Carbon Footprint (kg) (Read only)	1011	
Key Lock	00FB	"Unlock", "Lock"
VT Mode	02C3	"Normal", "VT Mode"
Video (AV Input) Power Save	02D6	"Disable", "Enable"
Gamma Programmable Reset	02F8	"Execute"
EDID Switch	1049	"Timing 1 (1280x768@60Hz)", "Timing 2 (1360x768@60Hz)", "Timing 3 (1366x768@60Hz)", "Timing 4 (1920x1080@60Hz)"
Tile Matrix Memory	104A	"Common for all inputs", "Per Input"
BNC Mode	107E	"RGB Mode (Default)", "PComponent", "Video"
Group ID	107F	"RGB Mode (Default)", "PComponent", "Video"
Input Change	1086	"Normal", "Quick"
Motion Compensation (120Hz)	1087	"On", "Off"
Edge Compensation (Mura)	1088	"On", "Off"
OSD Off	1089	"On", "Off"
Shutdown	108A	"On", "Off"
Option LAN Alert	108B	"On", "Off"
Edge Comp Type	108C	"Type 1", "Type 2", "Type 3"
Edge Comp Brightness	108D	"10%", "20%", "30%", "40%"



Copyright © 2010-12 NEC Display Solutions, Ltd. All rights reserved.

USA and Canada: www.necdisplay.com

Europe: www.nec-display-solutions.com