

# Audio & Design



## NetClock User Guide Rev 1.1.d

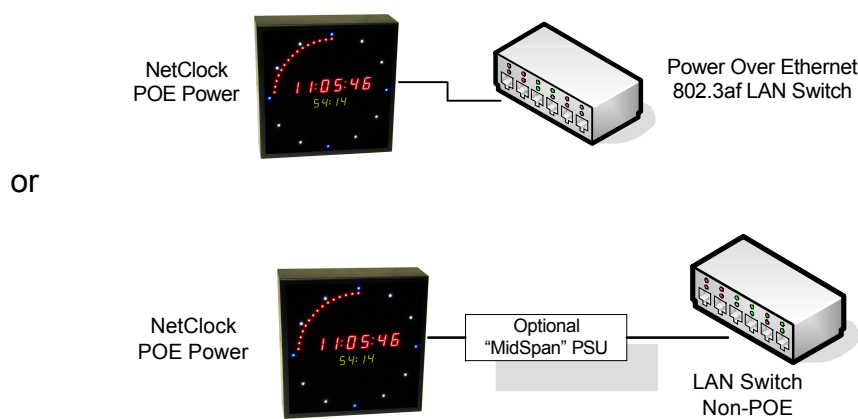
The Audio & Design NetClock is an accurate reference display clock for studios and broadcasters, it obtains its reference time over your Ethernet LAN from either a local network time server or an international time standard such as the National Physical Laboratory in the UK (ntp1.npl.co.uk) or the National Institute of Standards and Technology in the USA (time.nist.gov).

Please read the installation & configuration instructions below, before installing your NetClock.

## Power Supply (REV 1.0d and later)

The NetClock requires a DC power source of approximately 48v DC @ 12watts this can be supplied to the clock by two methods.

1. Power Over Ethernet – either powered directly from an Ethernet switch (10/100) that has internal 802.3af POE powering or by external “midspan” power injector such as Phihong POE20U-560G or any 802.3af compliant “midspan” PSU that can supply up to 12Watts on pairs 1&2, 3&6, (spare pair powering is not supported on hardware version 1.0d and later).



2. External 48v 0.25A DC PSU, this uses the PCB mounted DC connector that is accessible from the rear of the clock. DC connector required is 2.1/5.5mm type with center pin wired as +ve (typically +48v).



Audio & Design can supply either of these types of external power supplies as an extra cost option.

## Network

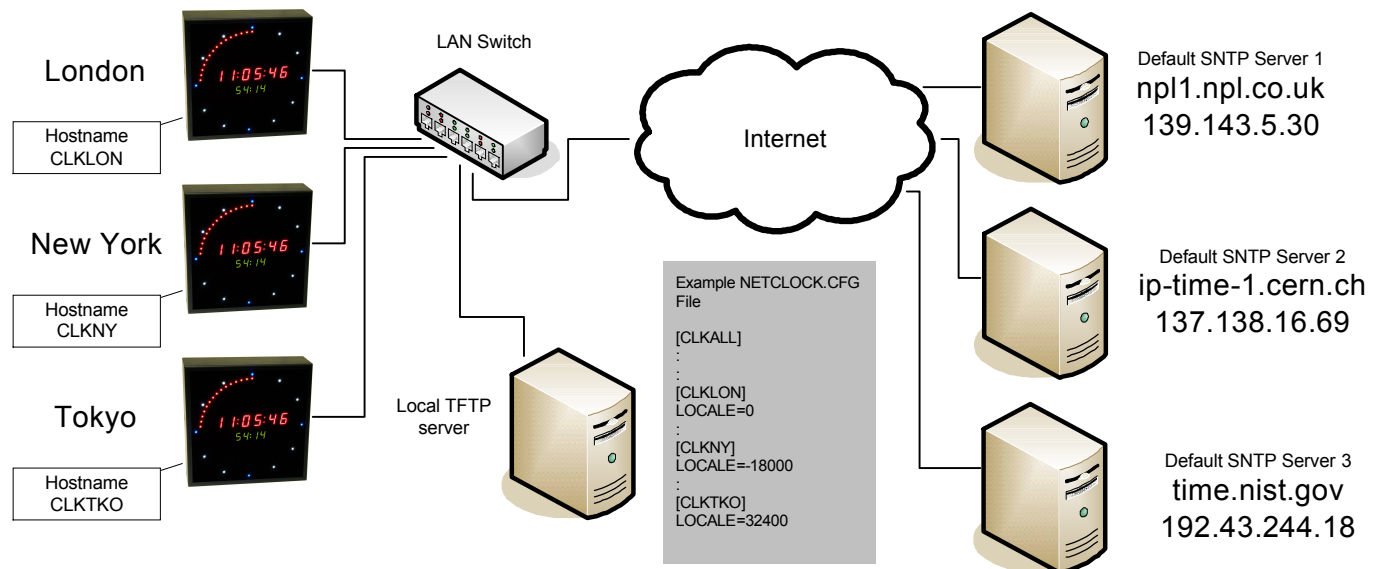
The NetClock uses standard Ethernet technology and components and can be connected directly to your network using a “straight through” RJ45 to RJ45 CAT5 UTP lead. The NetClock uses a 10Base-T connection; if you use managed switches then ensure that the port the NetClock connects to is set auto-negotiate duplex and speed. By default the NetClock will attempt to get its IP address using a DHCP server when first connected to your network. You can use the NetClock.exe utility program the most current version of which is available from [www.adrl.co.uk/support/NetClock/](http://www.adrl.co.uk/support/NetClock/) to alter various parameters once the NetClock has obtained it's IP address via DHCP

## Advanced Network

In situations where you have many clocks that need special configurations such as time offset, daylight saving or special display options. The NetClock can obtain its configuration via a file placed on a TFTP server. If the NetClock has been given the address of your TFTP server either by DHCP or by the NetClock.exe utility, on power up it will request file NETCLOCK.CFG from the TFTP server. This file contains 1 or more sections.

[CLKALL] Setting in this section affects all clocks.

[MyClockName] This is the host name of an individual clock and setting in this section only affect this clock. This will allow you set any particular clock differently from the rest of your clocks, if say you want one clock displaying London time, one New York time etc.



### Note:

Commands that exist in NETCLOCK.CFG override settings stored in Flash Memory on the NetClock and commands in [MyClockName] section override commands stored in Flash Memory and also commands in [CLKALL] section.

NETCLOCK.CFG is a plain ASCII text files that contain simple single line commands as below.

<b>[CLKALL]</b>	Commands following this section header affect all clocks
<b>[MyClockName]</b>	Commands following this section header affect clocks with hostname MyClockName
<b>LOCALE=</b>	Local difference from GMT in seconds
<b>SNTPENABLE=</b>	1=Enable, 0=Disable (free running)
<b>SNTPINTERVAL=</b>	Time between SNTP requests in seconds
<b>SNTPSERVER1=</b>	Overrides default server 1 address of <b>139.143.5.30</b> (npl1.npl.co.uk)
<b>SNTPSERVER2=</b>	Overrides default server 2 address of <b>137.138.16.69</b> (ip-time-1.cern.ch)
<b>SNTPSERVER3=</b>	Overrides default server 3 address of <b>192.43.244.18</b> (time.nist.gov)
<b>MYIPADDRESS=</b>	Overrides default address of 192.168.0.27 or address obtained by DHCP
<b>SUBNETMASK=</b>	Overrides default subnet mask of 255.255.255.0 or subnet mask obtained by DHCP

<b>GATEWAY=</b>	Overrides default gateway of 192.168.0.254 or gateway obtained by DHCP
<b>DHCPENABLE=</b>	1=DHCP Enabled, 0=DHCP Disabled
<b>DISPLAYFORMAT=</b>	<p>This is created by adding together a combination of the following:</p> <ul style="list-style-type: none"> <li>2        Single moving dot denoting minute, single moving dot denoting hour</li> <li>4        Start all LEDs on, then turn off over minute</li> <li>8        Start all LEDs off, then turn on over minute</li> <li>16       Last 15 seconds of minute count down, all LEDs flash at "top of minute" (Red LEDs)</li> <li>32       Red 7 segment dim</li> <li>64       Red 7 segment bright **</li> <li>96       Red 7 segment off</li> <li>128      Green 7 segment bright ** (firmware 1.1a)</li> <li>256      Green 7 segment dim (firmware 1.1a)</li> <li>384      Green 7 segment off</li> <li>512      Disable Green 7 segment error messages</li> <li>1024     White + Blue ring dim</li> <li>2048     White + Blue ring bright **</li> <li>3072     White + Blue ring off</li> <li>4096     Show temperature at 30 seconds past minute</li> <li>16384   Single dot seconds LED, all LEDs flash at "top of minute"</li> <li>32768   Disable Red ring</li> </ul> <p>** Not available on HW Rev 1.0C</p>
<b>DAYLOFFSET=</b>	Time to be added during daylight saving in seconds
<b>DAYLSTART=wxyz</b>	<p>Nibbles wx</p> <ul style="list-style-type: none"> <li>&lt;01..31&gt;    Normal date where day of month = dcode</li> <li>&lt;20h..26h&gt;   First Sat/Sun of month</li> <li>&lt;30h..36h&gt;   Second Sat/Sun of month</li> <li>&lt;40h..46h&gt;   Third Sat/Sun of month</li> <li>&lt;50h..56h&gt;   Fourth Sat/Sun of month</li> <li>&lt;60h..66h&gt;   Last Sat/Sun of month</li> </ul> <p>Nibble y</p> <ul style="list-style-type: none"> <li>&lt;hour&gt;    0..Fh Changeover hour (24 hour format) where 0=midnight</li> </ul> <p>Nibble z</p> <ul style="list-style-type: none"> <li>&lt;month&gt;   1..Ch month where 1=January</li> </ul> <p>Example – For UK  DAYLSTART=6013h    Last Sunday in March 1am  Or 24595 decimal  DAYLEND=601Ah     Last Sunday in Oct 1am  Or 24602 decimal</p>
<b>DAYLEND=wxyz</b>	As above:

## Status Codes

When first powered up, the NetClock will flash all LEDs, then show on the red 7-segments the version number.

If there are any problems during reset, the LED will show one of the following codes (x is any number)

**01xx** Problems with flash EEPROM, eg  
0123 EEPROM flash not working  
0100 No flash EEPROM installed

**02xx** Ethernet chip fault

**03xx** RTC chip fault

After this, the NetClock will start its internal program and display progress codes. These are displayed on the green 7-segment LEDs as "**-AB-**"

Where:

**A** is a number of single digit transaction progress codes (not added together)

6	DHCP offer rcvd
7	DHCP request sent
8	DHCP ack rcvd
9	arp handled OK
A	ping handled OK
B	UDP rx
C	SNTP request sent
F	unspecified error
Blank	finished

**B** is an addition of codes (add numbers together)

+1 If my IP is invalid (eg not yet DHCP allocated)  
+2 If DHCP is in progress  
+4 SNTP reply hasn't arrived yet

### A typical start-up sequence when using DHCP is:

**-07-** No IP Address, DHCP in progress, No SNTP reply  
**-84-** DHCP ACK rcvd, No SNTP reply  
**-64-** DHCP OFFER rcvd, No SNTP reply  
**-Correct operation,** Countdown timer displayed.

## NetClock Utility

Where the NetClock is on the same physical subnet as your workstation, you can use NETCLOCK.EXE Windows utility program to set all configurable parameters.

The screenshot shows the NETCLOCK MANAGER V1.2 utility window. The window title is "NETCLOCK MANAGER V1.2". The interface includes several input fields and checkboxes for configuration. At the top, there are fields for "UDP port PC" (1067), "UDP port clocks" (1068), "MAC address" (00.A0.26.22.26.DF), and "Name" (CLK262226DF). Below these are fields for "IP address" (192.168.52.57) and a "Find clocks" button. A list on the left shows the IP address 192.168.52.57. The main configuration area includes fields for "New IP address" (192.168.52.57), "Subnet mask" (255.255.255.255), "Gateway" (0.0.0.0), "DHCP mode" (1), "DHCP status" (5), "DHCP server" (192.168.52.254), "DHCP lease left (secs)" (3580), "SNTP mode" (1), "Time between calls (s)" (60), "Time since last update (s)" (8), "SNTP server 1" (139.143.5.30), "SNTP server 2" (137.138.16.69), "SNTP server 3" (192.43.244.18), and "TFTP server" (0.0.0.0). On the right side, there are fields for "UTC time" (CA361933), "UTC local time" (CA362743), "Locale (secs)" (0), "ST Offset (s)" (3600), "ST Beg code" (24595), "ST End Code" (24602), "ST Enabled" (1), "Display Format" (1200), "Test" (0), and "Temp" (20.0). There are also checkboxes for "New IP address", "Subnet mask", "Gateway", "DHCP mode", "DHCP status", "SNTP mode", "SNTP server 1", "SNTP server 2", "SNTP server 3", "TFTP server", "UTC time", "UTC local time", "Locale (secs)", "ST Offset (s)", "ST Beg code", "ST End Code", "ST Enabled", and "Display Format". Buttons for "Double click to enquire one remote", "Clear list", and "Update" are also present.

The latest version of this utility and any documentation updates can be downloaded free of charge from [www.adrl.co.uk/support/NetClock](http://www.adrl.co.uk/support/NetClock)

### Notes:

The MAC address is an officially assigned unique address; we recommend that you do not change this unless you have very specific reasons to do so.

When changing the IP or MAC address then this needs to be done as a separate update task and NetClock needs to be rebooted. If you have options that need changing e.g. Display format or SNTP servers, set these first, then change IP or MAC as a second operation – then reboot NetClock.

The NetClock does not require a TFTP server to operate.

You can download a freeware package DHCP/TFTP/SNTP/SYSLOG server from [www.adrl.co.uk/support/NetClock/tftpd32.zip](http://www.adrl.co.uk/support/NetClock/tftpd32.zip) please read the license in the help section of this program. This program is supplied on an "as is" basis and Audio & Design cannot accept any responsibility for it's use.

You can obtain support for your NetClock, either by email to [sales@adrl.co.uk](mailto:sales@adrl.co.uk) or by telephone 9:00 to 18:00 UK time on +44 118 324 0046

## Technical Specification

<b>TIME SOURCE:</b>	Up to 3 RFC 1305 compliant NTP servers
<b>POWER:</b>	Power over Ethernet 802.3af (12Watts 48v)
<b>SIZE:</b>	217mmx217mmx75mm (HxWxD)
<b>MOUNTING:</b>	Supplied wall mount bracket
<b>WEIGHT:</b>	1.1Kg (net)
<b>ENVIRONMENTAL:</b>	Temperature:0– 50°C. Humidity: 10 to 90% non-condensing.



## EMC Compliance.

**Audio & Design Reading Ltd. Hereby confirm that the NetClock conforms to the requirements of EN50081-1 & EN60950 Provided it is used as described in this manual and in the sections below:**

### **Low Voltage Directive EN60950:**

There are no serviceable parts within the unit. All repair work must be referred to a qualified electronic engineer or returned to the factory. In the case where the unit contains plug in modules, always switch off the unit before removing or replacing any module.

Audio & Design Reading Ltd does not accept responsibility for non-compliance if the above criteria are not met in full.

### **WARRANTY:**

All Audio & Design products are of the highest quality and designed to give long, trouble free service. Nevertheless they are fully guaranteed for one year from the date of purchase. Provided any faulty equipment is returned, post paid, to Audio & Design or its established Agent by the original purchaser during the relevant period we will repair, or at our opinion replace, entirely free of charge all breakdowns due to faulty workmanship or materials. In keeping with normal practice, breakdowns due to fair wear and tear, misuse, neglect or faulty adjustment by the user, are outside the scope of this warranty.

**Warning:** Warranty repairs are subject to serial number checking. We reserve the right not to service any equipment whose serial number has in any way, been defaced or altered.

### **WEEE Directive:**



The end user must exercise due care when disposing of this product at the time it is deemed as waste material. For retail sales please email [sales@adrl.co.uk](mailto:sales@adrl.co.uk)

### **RoHS:**



The current status of Audio & Design products can be obtained from [www.adrl.co.uk/ReCycle](http://www.adrl.co.uk/ReCycle)



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