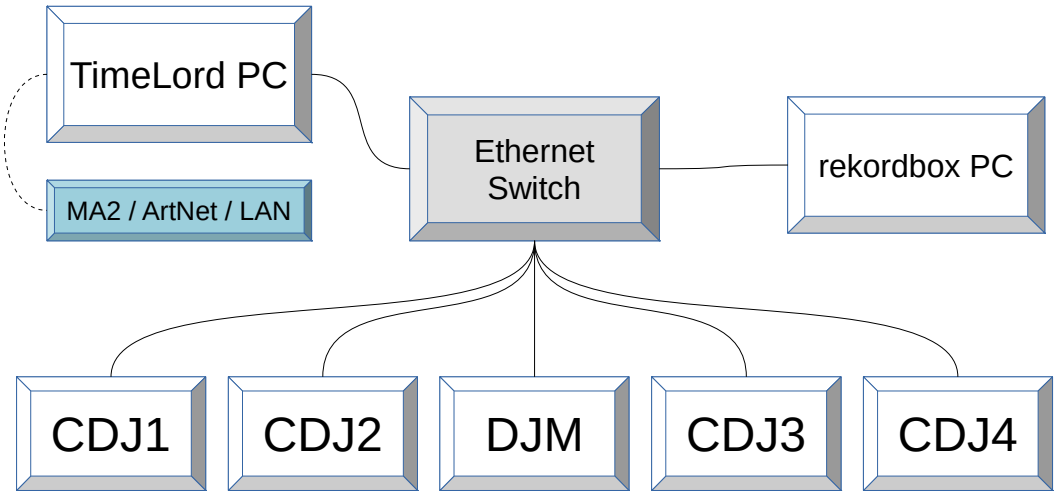
TimeLord - ProDJ Link Connectivity

1.1 Overview

TimeLord can communicate via ProDJ Link protocols with supported players in the popular Pioneer CDJ, XDJ and rekordbox range of products. By joining this conversation, we are able to generate events, time code and beat information in realtime for live lighting and vision applications, based on the currently playing tracks, as well as retaining extensive information relating to the actual individual tracks in a DJ Set (we will refer to as a *Session* in TimeLord) such as length, speed, time code offset, MA2 Time Code Object reference and Metadata for use in further automation.

2.1 Connection

ProDJ Link allows up to 4 supported Pioneer players and a Pioneer DJM mixer to be connect together via Ethernet cabling through an Ethernet network switch, along with a PC running the "rekordbox" software, which is the Pioneer supplied music management and network music server software. These players once connected can then access each others music (LINK) or music from the rekordbox server, and also synchronise their playback speeds (BPM) to assist the DJ in mixing tracks together. Currently, TimeLord expects your ProDJ Network eqipment to be in the 169.254.x.x range, which is auto-addressed when no DHCP exists on the network. If in doubt, set your ProDJ network adapter on your PC to 169.254.0.1



An example ProDJ Link Network. Notice there is no LAN / MA2 / ArtNet direct connection to the Ethernet Switch. It is recommended that only the TimeLord PC has this via a separate network adapter.

Note: Due to technical limitations, TimeLord and rekordbox can not be run simultaneously on the same computer, unless one is run in a virtual machine.

2.2 Passive / Active Modes

TimeLord can participate with ProDJ Link networks in either of two modes:

- *Passive Mode*, (default at startup) where TimeLord appears virtually non-existent to the ProDJ Link network, really only listening to the players talk amongst and posing no threat to the performance, or in

- *Active Mode* where TimeLord will also talk to and retrieve extended information from players where the music files have been analysed by rekordbox management software (usually done by the DJ and stored in their USB Sticks / SD Cards / rekordbox). This includes Metadata – Title, Artist, Album, Length, BPM, Comments and Artwork etc. of the tracks being loaded by the players.

2.3 Limitations

There is, however, a limitation when working with *Active Mode.* It will only allow for 3 physical CDJ/XDJ players to be connected to the network at any one time, along with a PC running TimeLord who must pose as a 4th virtual player in order to be able to collect this extended information.

Using a combination of *Active Mode* for pre-production and *Passive Mode* during performance, a *Session* can easily be built up by connecting players to the network alternately to retrieve their Metadata in Active Mode, which is then stored in the TimeLord *Session File.* Once the Metadata has been collected, we can switch to *Passive Mode,* with all 4 players connected, where the appropriate Metadata will be recalled from the *Session File.*

Note: If 4 physical players exist on the network with TimeLord in *Active Mode*, the physical player that shares the same player number as the TimeLord virtual player may behave erratically or even lockup when trying to access the network.

It is okay to use *Active Mode* in live, not pre-produced, scenarios where less than 4 ProDJ Link players are connected to the network. **It is not recommended to use *Active Mode* in a live show where 4 players are connected to the network.**

If a track playing on a player has not been analysed by rekordbox, or is CD-Audio track, then the BPM information will be the only useful information you can retrieve. You can enter details of the track into the TimeLord Database Editor for your reference that will be used next time the track is played. In this case, time code will be "jamming" along with the player though it won't be accurate if the track changes speed or scratches. Also, because the length of the track is unknown, it will be remembered as the furtherest point in the track that has ever been played.

Note: Music tracks on SD / USB / CD storage devices used in the players must have been analysed with the Pioneer rekordbox software prior to the performance for Metadata and accurate time code to be accessible. It is very common for DJs to have done this already in the process of loading their music on to storage devices. For professional and best performance, it is highly recommended having the music analysed with rekordbox.

2.4 Terminology

In this document and within TimeLord, the follow terminology is used and explained hereafter.

"DJ Set" - The series of tracks played by the DJ as part of a performance.
"Track" - A piece of audio, usually music, that is part of the DJ Set.
"Session" - A collection of information about a DJ Set that TimeLord keeps and manipulates.
"rekordbox" - Software supplied by Pioneer, used to import and analyse tracks onto USB/SD
"Metadata" - Data about a particular track including Title, Artist, Album, Year, Artwork, etc.
"Time Code" - SMPTE timecode, as transmitted from TimeLord via MIDI, Art-Net, or from an windows audio device as LTC.
"Time Code Offset" - The difference in time between 00:00:00.00 and the starting time code you assign to a track, as part of a time code synchronised performance.

3.1 Sessions

A TimeLord ProDJ Session contains all the data exchanged while interacting with a ProDJ Network. Metadata information retrieved from the Players as tracks are loaded is cached locally in the Session File, along with a historical log of time & dates, events, actions, and other information to build up a detailed profile of a tracks used in the scenario.

After the Metadata for all the tracks required in a performance is collected (while the DJ is performing a rehearsal in Active Mode), the operator of TimeLord can assign time code offsets and references to any individual track that are recalled whenever used by the DJ.

3.2 Pre-Production Scenario

The Session File stores all Metadata about a particular performance, with a particular set of USB/SD/rekordbox collections used on particular player numbers. Therefore it is highly recommended that in the case you are working exclusively with an act or DJ (ie. you are part of the production team) on a scripted or cue-listed performance, that you keep a separate session file just for this production and load it only when running for those performances, as the metadata between different DJ's USB/SD/rekordbox collections is not unique and can overlap.

i.e. if you have the DJ ABC shows session file loaded in TimeLord while DJ XYZ is performing with his/her own USB/SD/rekordbox collection loaded in the players, you stand a chance of corrupting DJ ABC's TimeLord session file metadata with that of XYZ' (when running in *Active Mode*)… with the only exception being that both DJ's ABC and XYZ share the exact same USB/SD/rekordbox collections.

Each Player has a USB/SD connector for loading collections of tracks, and TimeLord by default will treat these colllections independently, so that when a USB/SD collection is in Player 1, the tracks on that USB/SD collection are considered unique to Player 1 in the session. If you play the same track from the same USB/SD collection on Player 2-4, it will be considered a different track in the Session and have an individual entry with it's own Metadata and Offsets that only apply to the player that track was played on.

Also if the DJ uses the LINK function of the players, and for example, Player 2 is playing a LINK track from Player 1's USB Device, TimeLord will recognise that and fetch the metadata from Player 1 USB device, but still consider this a separate track for Player 2 in the session.

Similarly, if the DJ is using "rekordbox" as a source on any player, TimeLord will recognise this and obtain the data from rekordbox, regardless of the player it is loaded from. This is ideal, as all players can access all tracks in a collection and not have to be concerned about which USB/SD is in which player.

In some cases where DJ's have four identical USB/SD collections (four copies of the same USB/SD), so that they can play any track they have from any player, TimeLord can ignore the Player Number when looking for the track metadata in the Session by enabling the "Ignore Player Number" feature in TimeLord. This means when we have collected information on a track from Player 1, if this track is played from another player we will use the information we previously collected from Player 1.

3.3 Club / Festival / Busking Scenario

If you are not working exclusively on a production, and have random acts in a club environment for example, you don't need a separate session file for each act – all can be stored in the default Session which loads when TimeLord starts. The "Force Meta Grab" option in *Active Mode* is useful in this scenario, as it will grab the latest available data from whatever USB/SD is in the player. However, the 3 connected players limitations of Active Mode still applies.

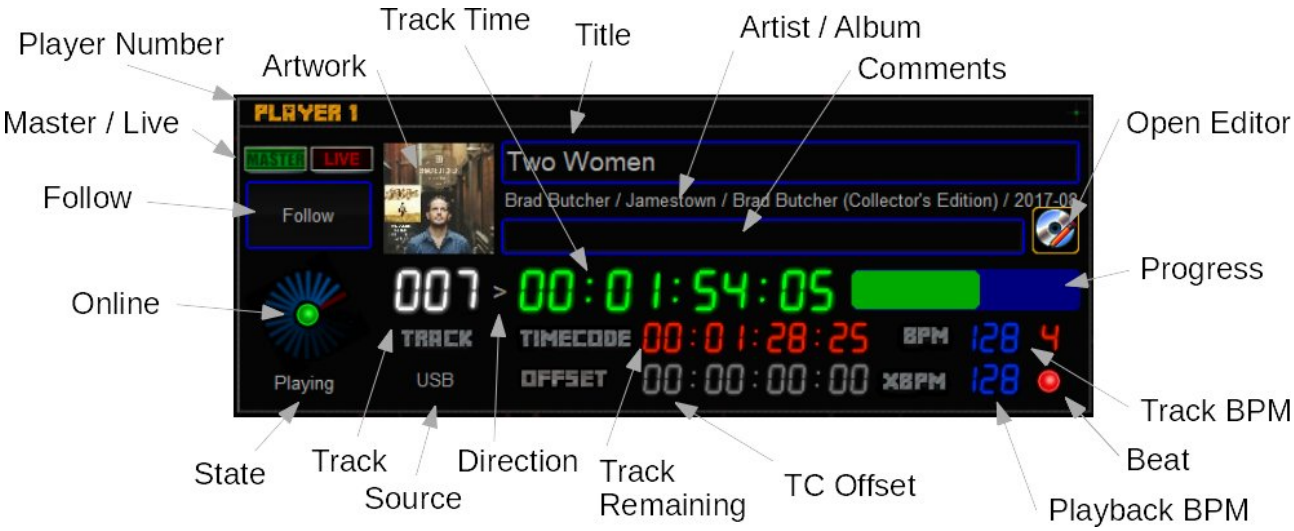
In this scenario, the time code will likely not be useful to you, as you will not have prepared a time code show on a receiver for this time code. However, the Metadata (in *Active Mode*) and live BPM information (any mode) can still be very useful in coordinating automation on the fly.

The operator can directly synchronise MA2 speed groups with BPM from any of the four players playback or follow the master layer, and also display what track is playing by name, see what track is cued for playback in which player and more.

If your club/venue has a resident DJ, pre-determined playlists, or an always-available rekordbox collection that is made available to any/all DJ's who visit the venue and use the system, you can certainly prepare time code for these tracks.

4.1 TimeLord User Interface

The above display shows the output time code and BPM information from the selected source, in this case “Player 1”. The “Follow Master” check box instructs TimeLord to follow the Master player in the PDJ network, as controlled by the DJ. Disable this to manually follow a specific player using the “Follow” button shown on the player windows.



There is up to 4 player windows, which all share the same layout, some of which will be explained as follows.

The Online indicator shows on if the player has been found, and holding the mouse over this will show the player type and IP address of the player.

The State below that will describe how the player is being used, and the Source to the right of it will show where the Track media is (USB, CD, SD Card, rekordbox). BPM shows the BPM of the original track and XBPM shows the BPM the track is being played at, and the beat LED will light on the beat.

The Follow button allows the operator of TimeLord to manually choose which player to use for time code and BPM information, if “Follow Master” option is not engaged.

The track displays the track number shown on the player, this is however relative to the folder the track was selected from and not used by TimeLord to identify individual tracks and is for display only.

The Master indicator lights when this player is the master, and the Live indicator lights when a DJM mixer is connected to the network and the track playing becomes part of the mix.

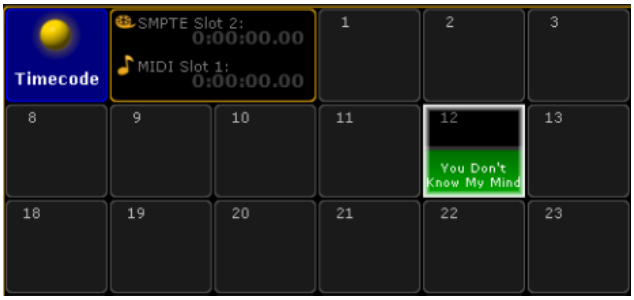
Open Editor will open the Track Database Editor to the database entry for the track currently on this player.

The Track Database Editor allows you to change details about an individual track within the session. These changes are stored locally as part of the session, and do not affect the players or DJ in any way. If you make any changes, don't forget to press "Save Changes". "Suck Off Player" will where possible retrieve the Metadata from the player again and overwrite and local changes – excluding Time Code Offset, MA2 TC Object ID, and EventScript (which are configured locally anyway).

"Session Auto Offset" will attempt to assign time code offsets to all the tracks in the session, based on the tracks place in the session. Tracks are added to the session in order of discovery, so the first ever track played in a new session will be Our ID 1, the second track played will be 2 etc. The "Auto" time code offset button will attempt a similar thing though for this track only.

Hint: You can use the mouse scroll wheel to manipulate number fields.

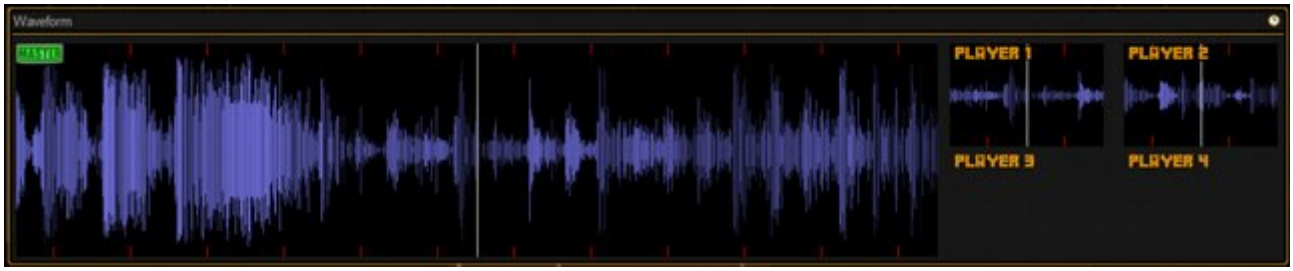
The MA2 TC Object ID is used to link this track to a specific MA2 Timecode object. In this instance shown on the right, we would set the ID to 12 to match a Timecode object we have previously recorded in MA2 for this track. Then whenever this track is started on a player, TimeLord will tell MA2 to start this Timecode object.



Setting this to 0 will ignore any MA2 Timecode object operations.

On the bottom left is a preview wave form and some further data about this track, including track BPM and date, the source media, and player number. Please refer to section 3 for a description of how this information should be used.

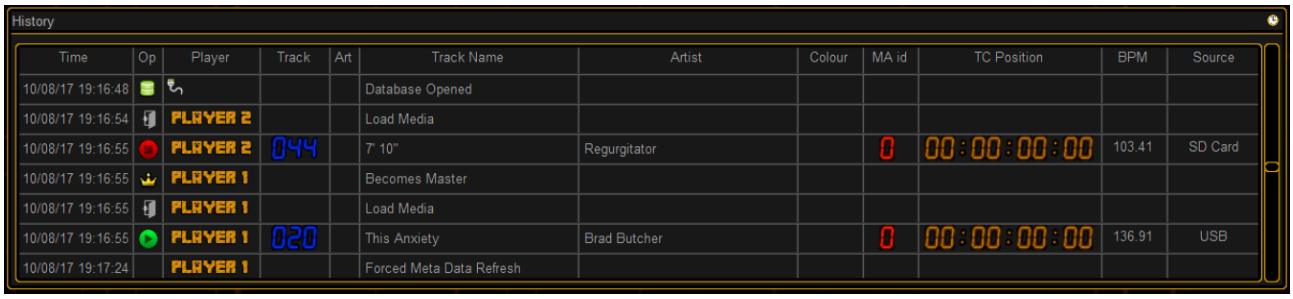
EventScript is a small scripting language to execute different functions on the occurrence of events for this track such as OnPlay, OnPause, OnBeat etc. It is for advanced users, and documentation will be available separately from this manual.



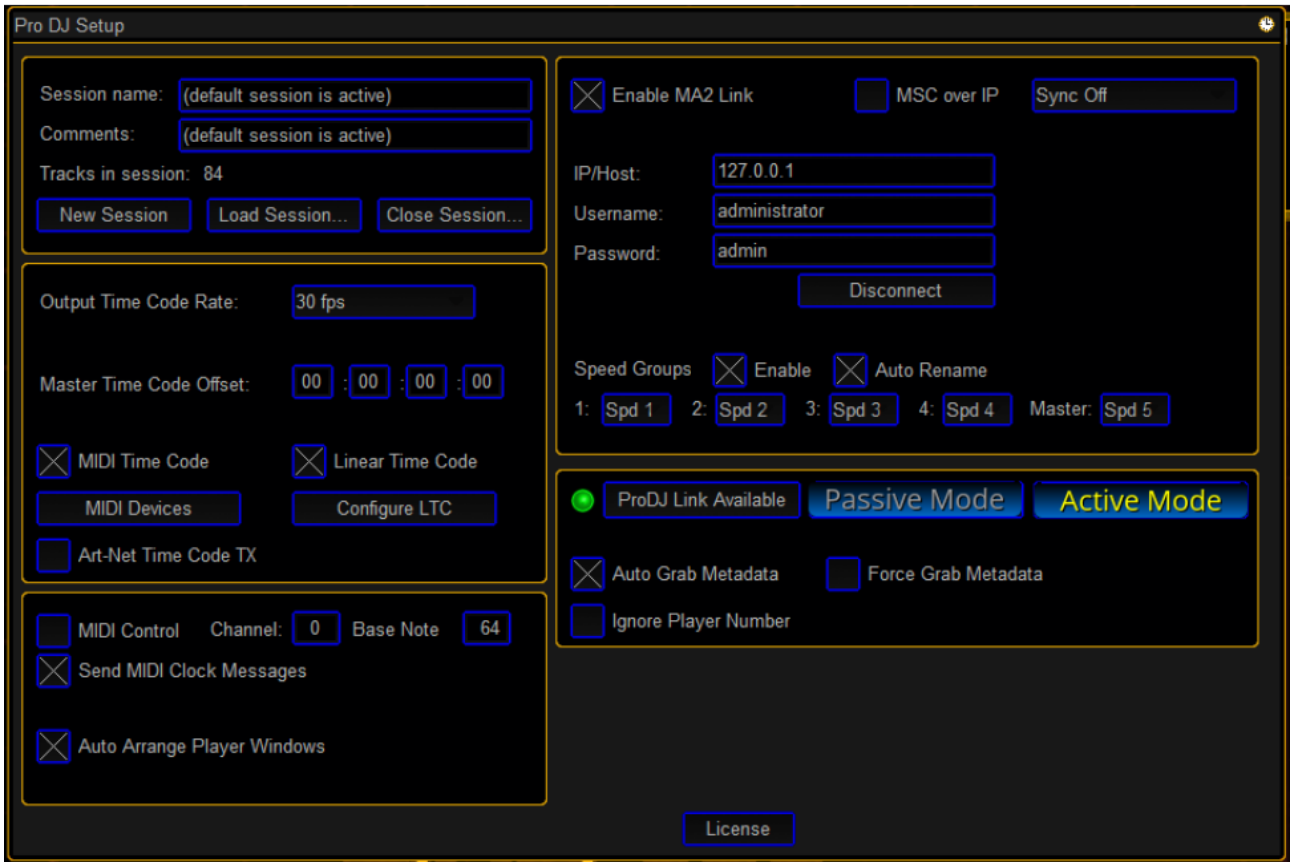
The Waveform window above shows the wave form of the current track (if available) for each available player as shown above on the right, with the large wave form on the left being the current followed player. This can be useful to see if breaks or hits are coming up. The red marks shown along the top and bottom of the wave form indicate beat boundaries, while the white vertical line shows the current position within the wave form.

It's possible to get the waveform to display under the players time code display, such as shown above. To do this, you will need to edit the C:\Users\Public\TimeLord\TimeLord.ini file and change the line "PRODJ_WAVEFORMUNDERPLAYER = 0" to read "PRODJ_WAVEFORMUNDERPLAYER = 1"

Whilst this looks cool, it's not useful for inspecting the wave form in busking scenarios.



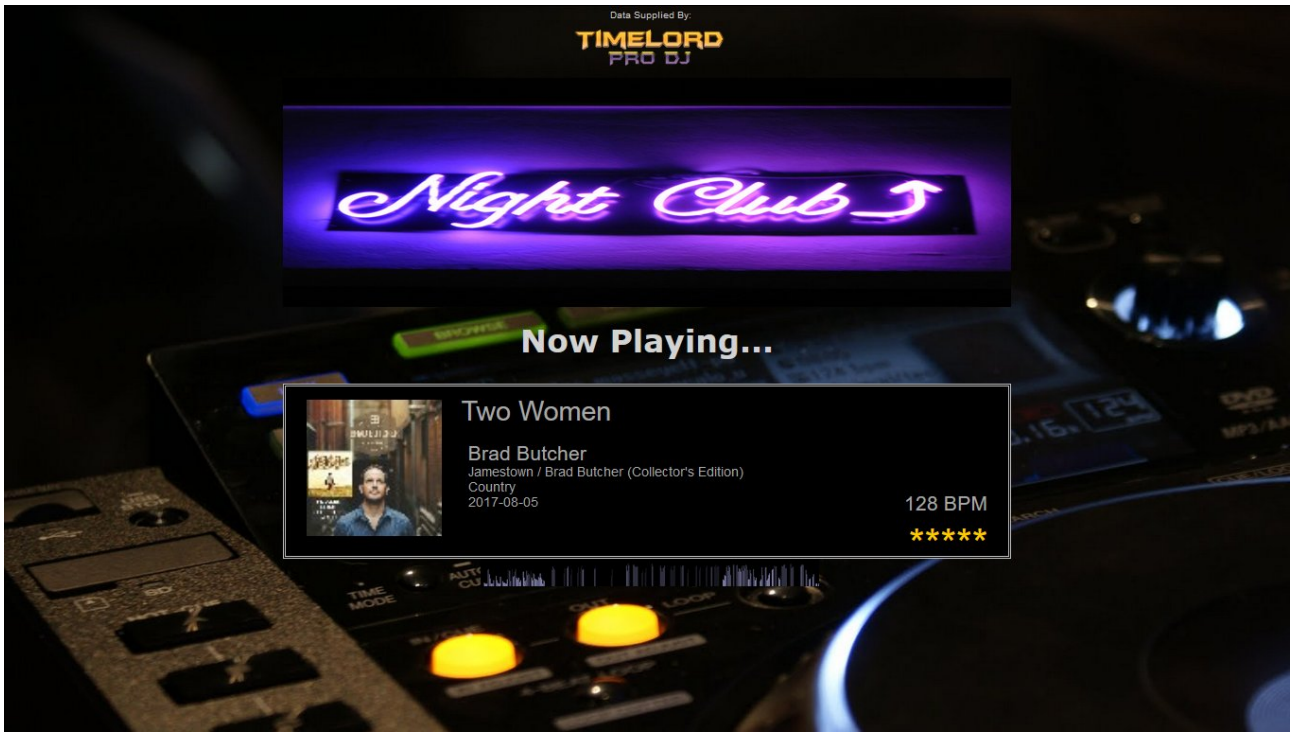
The History window above displays events that have occurred throughout the history of a session, from the session creation. Events such as loading media, playing, stopping etc. is retained.



The ProDJ Setup window is perhaps the most important. From this widow, you can control the session and change between Passive and Active modes. You can also connect with MA2 and configure which MA2 speed groups to control from the players BPM information.

The time code options presented on the left are fairly self explanatory. MIDI Devices will configure your MIDI output for Time Code, Configure LTC will present options for Linear Time Code, and “Art-Net Time Code TX” will start broadcasting Art-Net Time Code on the first available network adapter.

5.1 Web Server



By browsing to an IP address of your TimeLord PC on port 81, you can get access to various information about the Master track playing, or information about a track using JSON.

There is a default page available for you to use and modify. Try opening a browser to the following link, and you should see the page above. http://127.0.0.1:81/nowplaying.html

This page might be useful for digital signage in your venue, or for patrons to access via wifi to see what's playing.

Explaining how to modify this page is beyond the scope of this manual, though a simple thing to do would be replace the file "nightclub_logo.jpg" (search your computer) to use your logo. The default size is 860 x 270 pixels and recommended if you are not experienced with editing HTML.

More advanced users or web developers can read the JavaScript in this page to understand how to use it on another page.